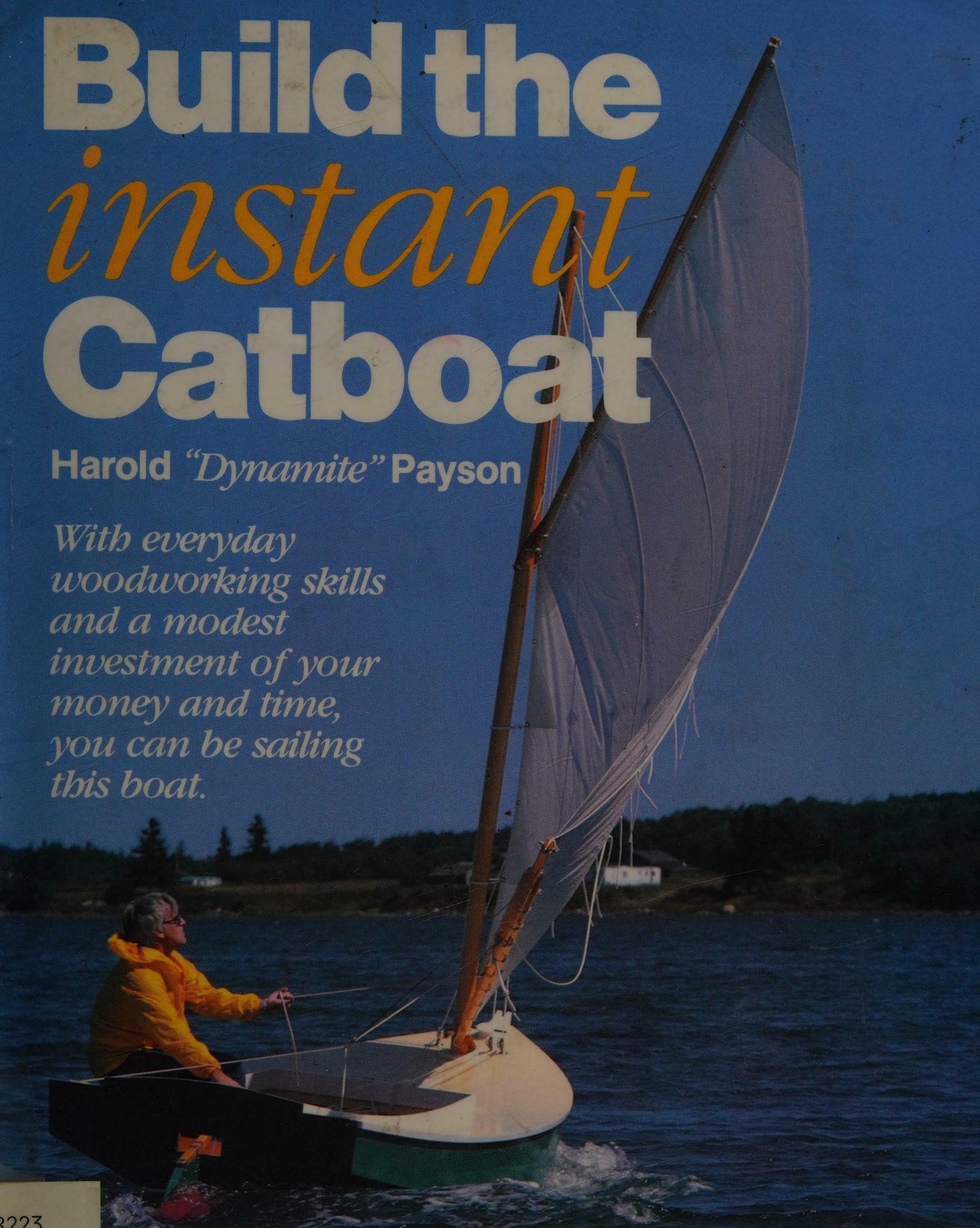
Build the *instant* Catboat

Harold *"Dynamite"* Payson

With everyday woodworking skills and a modest investment of your money and time, you can be sailing this boat.



3223

YOU • DON'T • HAVE • TO • BE • AN • EXPERT BOOK

Build the *instant* Catboat

Harold *"Dynamite"* Payson

Some years ago, downeast boatbuilder Harold H. Payson — known to associates, friends, and his wife as Dynamite — and Philip Bolger of Gloucester, Massachusetts — arguably the most innovative small-craft designer around — got their heads together and came up with a new and startling idea: Instant Boats. Bolger began designing a series of boats that would require no lofting, no jigs, and no exotic tools, skills, or materials. Boats that would not require a great investment of time to cut out and button up. In short, boats for the inexperienced builder whose fundamental desire is to get out on the water. Payson, for his part, builds and thoroughly tests a prototype of each design to wring out every bug before offering the plans for sale.

The original fleet of six boats was described in Dynamite's book *Instant Boats*. There followed *Build the New Instant Boats*, presenting eleven more designs, including three shapely and spritely "tack-and-tape" boats. The verdict is in: thousands of amateur builders have found that the Instant Boats make enjoyable and manageable backyard or basement projects and offer just about the least expensive boating available anywhere. You need not be driven by lack of tools, materials, skills, or time to abandon in frustration a project you conceived in a spirit of pleasurable anticipation.

Here is the Instant Catboat. Her easy grace and spirited performance belie her humble components. She is at home in fresh water or salt. Dynamite prefers she be built of marine plywood (sources for which are given), though exterior-grade is acceptable. With marine ply and a loft-made sail, her materials will cost about $1,000. Given her looks and performance, a better bargain is hard to imagine.

She is more complex than the other Instant Boats, but nevertheless far simpler to build than most other boats her size. The set of large-scale plans that Dynamite sells mail-order for $35.00 can save eyestrain and time, but she can be built right from this book. Either way, your efforts will be amply rewarded.

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KEEPING THE CUTTING EDGE
BUILDING THE GLOUCESTER LIGHT DORY

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If a builder wishes to have the plans for Bobcat in a larger scale than that shown in this book, they are available at a scale of 1½ inches equals 1 foot, with some details shown half or full size, from Harold H. Payson, Pleasant Beach Road, South Thomaston, Maine 04858. The price is $35.00 for the set, subject to change. Telephone inquiries are invited at (207) 594-7587.

Plans of like quality for nineteen other craft are presented for study in a descriptive catalog priced at $3.00. It includes sail, power, and oar-driven hulls ranging from 6 feet 5 inches to 31 feet long.

This book is dedicated to Phil Bolger,
for designing them simple
and designing them
right.

Preface

Not too many months ago, had anybody asked me if I would like to build and sail a traditional gaff-rigged catboat, he would have gotten a very short answer. *Me* fool around with all those sticks and strings—a gaff and a boom, two halyards, a topping lift, and a skein of lazyjacks, not to mention a centerboard and its trunk? No way. Life is too short.

And as for sailing her, almost every word I had read on the subject would indicate that every catboat should carry a hazardous-to-your-health disclaimer in letters three inches high. A catboat, I had gathered, is little more than a seagoing booby trap for the unwary, lying in wait for the chance to trip that boom in the sea and pitchpole you into the drink. Or, better still, execute a goosewing jibe with the gaff whipping off in one direction and the boom soaring skyward in another before slashing down to split your skull.

No, I never intended to have anything to do with catboats—never, that is, until Phil Bolger designed this little plywood gem. In my long association with Phil, I had learned to approach any design of his with respectful consideration and great expectations. And I had to admit that, with her bold sail plan over a cocky little hull, this catboat was very pretty. . . .

As for the danger of sailing a catboat, I tended to discount the doomsayers just a bit. The original working cat was developed for catching fish in the tricky waters south of Cape Cod and in Buzzard's Bay, and no fisherman in his right mind ever deliberately added to his troubles by going to sea in a craft dedicated to his destruction. Nor would Phil Bolger design such a boat.

From my shop window, I can see Bobcat out there in my yard: 12 feet 3 inches long, all wood and two yards wide. I have built well over two hundred rowing, sailing, and power boats in my one-man shop. A professional builder has to sell his product if he is going to eat. Consequently, a very careless carpenter could count the few I have kept for my own use for any length of time on the remaining fingers of one hand. I have been very slow to put Bobcat up for sail.

Why Bobcat?

With my hand on her tiller, I have the sensation of sailing a sizable boat, what with all that wide deck up forward, the hefty mast, and the boom stretching on out astern of me. I have to look back over my shoulder to realize there's nothing there. Someone has clipped off her tail.

Like any feline, she's quick and agile, and she sails like a witch.

Dynamite Payson
October 1985

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1. Introduction

Since 1920, when John Beetle drew the original plans, Concordia Company has turned out hundreds of Beetle Cats, and each winter it builds up an inventory to meet a predictable demand—all identical as specified by the Beetle Cat Association. As Phil Bolger has noted, this is an example of turn-of-the-century mass production, which depended on "a pool of craftsmen who would work steadily at *demanding* repetitive work." Such a team seems a phenomenon today, he says, and "a respectful bow is in order for the do-it-right-over-and-over, fast craftsmanship that was once the norm."

Demand is high but regional. The typical New England yacht club Beetle fleet usually starts as a junior class, but it is one whose young skippers and crews find themselves competing with parents and sometimes grandparents for time on the water in their graceful little hulls.

Bolger's adaptation was presented in his cartoon series in *Small Boat Journal* in January 1985, in response to an Upper New York State trailer-sailor who yearned to own a Beetle but found its cost (about $4,500 with sail in 1985) prohibitive. Moreover, he wanted to spend considerable time on fresh water, and he recognized that the plank-on-frame originals should be kept wet throughout a season in salt water. Hence his plea for a plywood equivalent.

Nauset Marine now offers a fiberglass version, but the major demand is for the Concordia product and low sales volume keeps the plastic hull cost high.

The materials for Bobcat cost about $1,000, and that figure includes marine (as opposed to exterior-grade) plywood and a sail ordered from a loft.

THE BUILDING METHOD: "TACK-AND-TAPE"

I have built any number of boats by the time-honored plank-on-frame technique. I have built hulls and used them as molds from which to clone fiberglass duplicates. (No, not again, thank you.) Working in close cooperation with Phil Bolger, I have built the prototypes of what he and I have come to call "Instant Boats"—flat bottoms and vee-bottoms—which taught me that, working from the plans, the rawest amateur could transform sheets of plywood, which will bend in only one plane, into strong and seakindly craft that you would swear embody curves as sweet and graceful as anyone could wish.

Most recently, and again in collaboration with Phil Bolger, I have used the tack-and-tape technique to build multichine hulls in close approximation of round-bottomed three-dimensional complexity, and matching it in performance.

This is how you build Bobcat.

What is Tack-and-Tape?

The first step is to cut out the plywood components of the basic hull. These are long panels that are sprung around frames, which are also cut from plywood sheets. These parts are all temporarily tacked together with small, fine-wire nails. The permanent fastenings are fiberglass tapes set in a polyester or epoxy putty mixture, running along the chines and across the jointures of frame panels with longitudinal panels.

Once these are set, the nails are removed or driven flush with the wood surface. Instead of tacking, some builders lace the components together with fine wire through drilled holes, but not me. I prefer to keep my fingers unpunctured and pain-free.

Your first question is probably the same as mine: How strong are these taped joints? To find out, I made up a test unit resembling a cross section of the first boat I ever built this way. It consisted of two pieces of plywood cut square-edged and butted together at an angle. I put one layer of fiberglass tape inside and a layer of tape and fiberglass cloth outside, applying both inside and out the same mixture of glass putty and polyester resin I was planning to use on the boat. Placing this on my hardtop driveway, I gave it the ultimate destruction test by driving my pickup truck over it.

I was delighted to find that the glass joint came through intact—it was still clinging to a strip of plywood veneer that had ripped off neatly across the joint itself. Obviously, too, the polyester resin was plenty strong enough, so I promptly forgot the epoxy resin at more than twice the price.

My second question was, how accurately fitted do the joints have to be? My test proved that gaps up to a quarter inch are perfectly acceptable, and even desirable. In fact, it's best to avoid wood-to-wood joints except at the inside edges. It's the glass putty filler that provides the strength and locks the joint together.

The Advantages of Tack-And-Tape

Take a good look at the shape of this little catboat. Years ago, any planked-up hull with this much complexity demanded many hours of lofting her lines, plus the time-consuming construction of a jig to build her on,

before you could even think of starting on the hull itself. But today, thanks to the creative ingenuity of designers applied to modern materials, you are off and running toward completing such a boat if all you have is a few carpentry skills and the will to follow through to launching date.

Equally important is the fact that the tack-and-tape technique doesn't handcuff the builder to a rigid schedule. You can work an hour or two here and an hour or two there as your activities permit. That's important to home builders because they have other demands on their time. Even though boatbuilding is my profession, it's important to me, too, because I'm also in the business of selling plans and consulting with hundreds of customers.

Besides, I like a change of pace. There are times when I can happily cut and fit the pieces that make up a skeg, but then I might want to work on the spars, shape a stem, or tinker with the demands of a centerboard trunk . . . or, as sometimes happens, I might just ache to get out of the shop and away from the telephone, giving myself a present of a couple of hours out on the water in a boat that needs exercise.

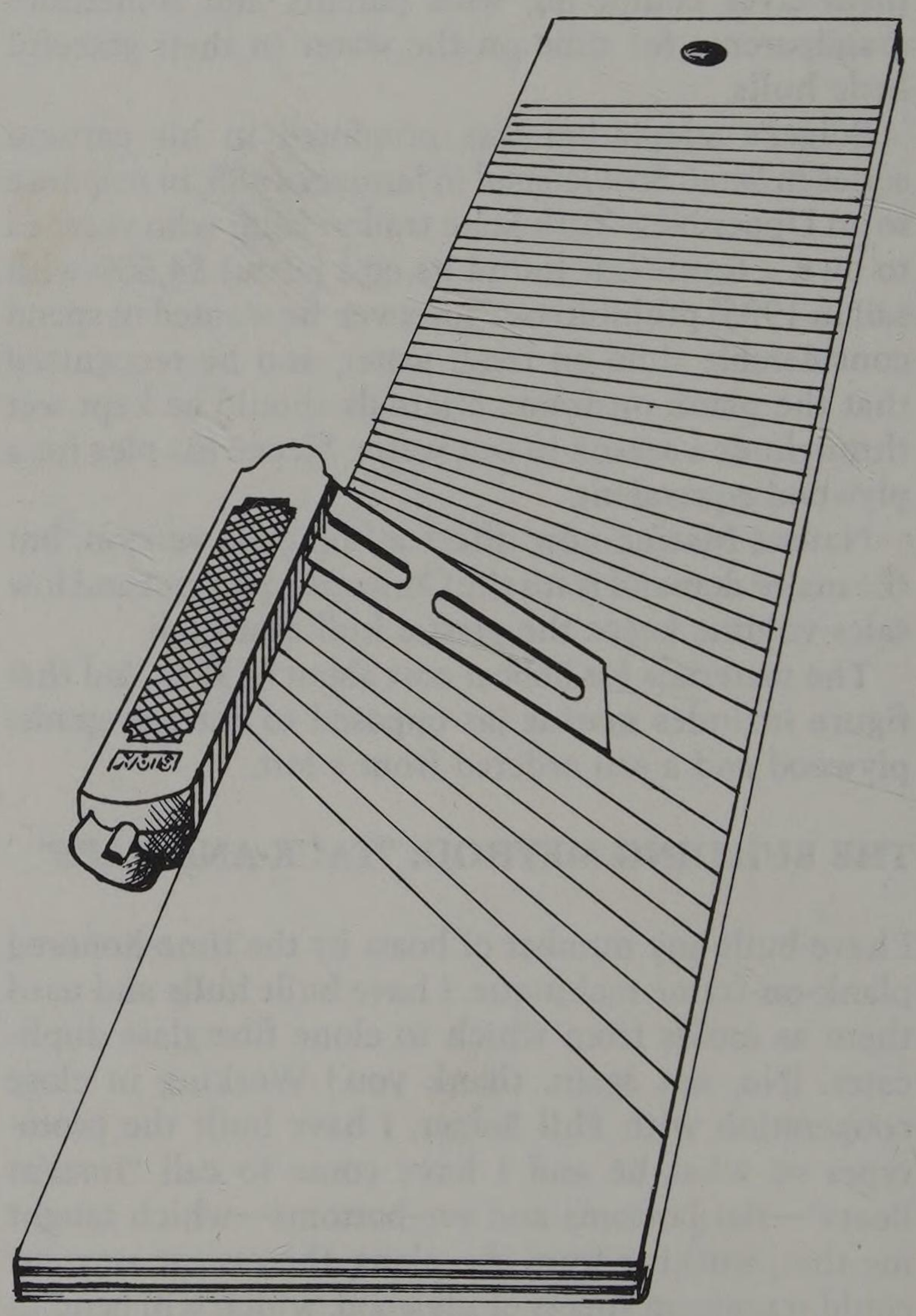
Therefore I can't really tell you how many hours Bobcat took to build. What with compiling a thick sheaf of handwritten pages on how-to-go-about-it and a couple of hundred photographs of various stages of her construction, and a couple of big fields that had to be mowed, I just plain lost track of the hours. I can say only that I started on May 10 and launched her August 17. I'd recommend that you allow a couple of months for the whole job. An Instant Boat she may be, but some Instant Boats are more instant than others. Bobcat demands time and care.

For certain, I can say that whatever time you spend on her, given the way she looks and the way she sails, she will be worth it.

TOOLS TO LAY YOUR HANDS ON

If you have built any of Bobcat's tack-and-tape relatives—Nymph, Diablo, or Gypsy, all of which are detailed in my *Build the New Instant Boats* (International Marine Publishing Co., 1984)—skip this and go on to the Bill of Materials. For the first-time tack-and-taper, I'll list both what you need and what is nice to have. Some items are arguable; for example, you could probably do all the cutting necessary for the whole boat with a saber saw (which, by the way, you *will* need), but you will find a Skilsaw with a planer blade much faster and more accurate in cutting the longer panels. So they both go down on my needed list:

saber saw
Skilsaw with planer blade and combination rip blade
putty knife
low-angled block plane *(A block plane is a small plane for general work.)*
3M automotive rubber putty spreaders, 2¾-inch by 4¼-inch
scissors
electric drill with 5⁄64-inch and smaller bits
C-clamps, minimum 1 dozen
tack puller
light hammer, 6 or 8 ounces
a pair of dividers
adjustable bevel square
bevel board *(see drawing)*
6-foot jointed extension rule
steel rule
chisel
assorted files, including a wood rasp and a half-round file
tongue depressors for stir sticks
mixing containers, all same size *(I use cut-down small milk cartons.)*



Reading an angle off a homemade bevel board. The adjustable bevel square is set to the needed angle on the plans or in the boat, then placed against the edge of the bevel board as shown. It is a simple matter to pick the angle off the board that matches the one locked into the bevel square. Though this drawing doesn't show it, the angles on the board are labeled, so that the value of the unknown angle can be read. (Tim Payson drawing)

I do not suggest buying additional power tools for just one boat. Perhaps you can borrow them from friends when a particular operation calls for one. You can make substitutions for some and do without others if need be. The point is not to let your boat's quality suffer for lack of adequate tools:

belt sander
disc sander
orbital sander
router
electric block plane
table saw with planer blade and combination rip blade
bandsaw, 12-inch width (blade to frame) minimum

Common sense, resourcefulness, and patience go a long way toward production of a first-rate job even when the most appropriate tool is not available.

BILL OF MATERIALS

Where necessary to meet specifications, I have included manufacturers' names and item designations.

- 10 sheets 4-foot by 8-foot by ¼-inch plywood, marine-grade or AC exterior-grade. *(Marine-grade is my first choice because it will look better on this handsome boat and because one can be sure that no interior voids will result in blistering down the road. If marine-grade plywood is unavailable to you, AC exterior-grade is acceptable, but keep the good side out unless the grain is good on the rough side. Steer clear of the ⅜-inch three-ply AC, which can suffer delamination.)*
- Additional plywood (shop scraps or partial sheets) in ¼- and ½-inch thicknesses for laminating the stem, centerboard, and rudder where suited
- 20 board feet of clear ¾-inch pine, spruce, mahogany, or fir for gunwales, deck beams, transom, and miscellaneous framing
- 1½-inch plank stock—the clearest available pine, spruce, or fir—for mast, boom, and gaff, as required by sail plan drawings and specified in text
- One box of 1- or 1¼-inch number 18–wire nails, plus a few bronze anchor or ring nails in ⅞-, 1¼-, and 1½-inch sizes
- One pound of ¾-inch small-wire copper nails for butt straps *(Substitute ¾-inch bronze flat-headed screws if the nails are unavailable.)*
- A few 1-inch number 9 silicone bronze screws
- ½ gallon epoxy resin (thickened a bit with wood powder if desired) for laminating rudder, centerboard, stem, mast, and skeg, for gluing frames and panels, and for all other gluing operations (or use glue of your choice)
- 2 feet of ½-inch round bronze or stainless steel stock for sheet, centerboard, and mooring cleat pins
- Two ¼-inch by 3½-inch bronze carriage bolts for mast step

For rudder assembly and deck hardware:

- Gudgeons and pintles: two Merriman-Holbrook RO 703, one Merriman-Holbrook RO 723, one Merriman-Holbrook RO 730
- Fourteen #10-24 stainless steel round-headed 2-inch machine screws
- Fourteen #10-24 nylon insert locknuts
- 3/32-inch brass or stainless steel flat stock for rudder straps
- Three Schaefer 02-62 swivel blocks on deck plates
- Three Schaefer 02-07 swivel eye blocks
- Three Wilcox, Crittenden 5520 6-inch bronze cleats
- A few ¾-inch number 10 brass or bronze screws

Fiberglassing supplies:

- 2½ pounds of 3-inch glass tape (4-inch is OK)
- 2 gallons of polyester resin (epoxy resin if preferred)
- 25 yards of 38-inch glass cloth
- 5 pounds of Fillite powder, or brand of your choice
- 1 gallon acetone
- Two rolls masking tape (¾-inch and 1-inch)
- Two 3-inch paint rollers
- Number 20–grit sandpaper

Miscellaneous:

- Oil-based or epoxy paint of your choice

- Spar varnish of your choice
- 3-inch, 2-inch, and 1½-inch brushes
- Filler putty such as Bondo for filling nail holes and smoothing dings

Most of the items on the Bill of Materials are readily available almost anywhere. For those that are a bit less common, I've included a list of mail-order suppliers at the back of the book. You should have no trouble obtaining everything you need to build Bobcat.

2. A Simple Model

The very best help I could give any builder of this tack-and-tape catboat would be to persuade him or her to build it first in miniature.

Doing this is no big deal. The cash investment ranges from the neighborhood of zero to a few dollars at the most. The investment in time is likewise minimal.

Yet, there is no better insurance against the costly onset of Murphy's Law, which is the most serious threat to the sanity (and the pocketbook) of every boatbuilder, including professionals like me. I have made preliminary models of every tack-and-tape hull I've built—all four of them. And the very first one I made paid off handsomely by suggesting a simple solution to a most bothersome waste of time, one I had come to accept while building two hundred-plus boats. Read on, and you will see what that bug-a-boo was.

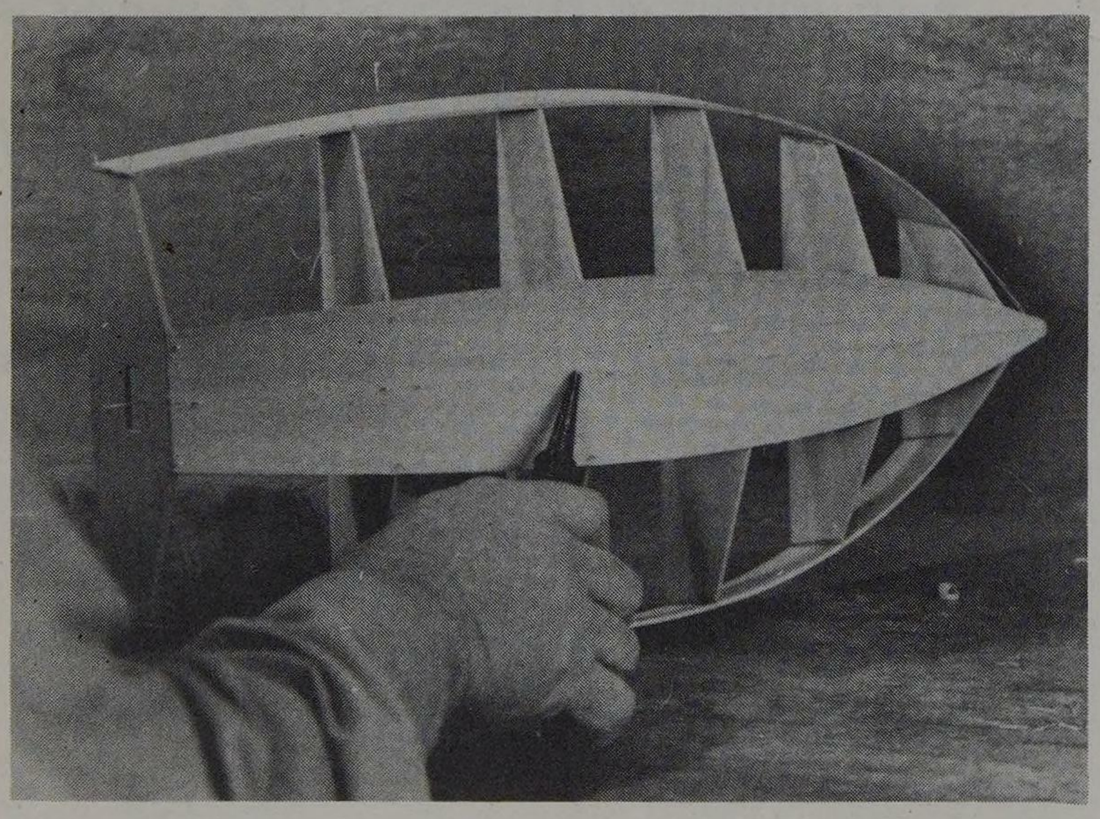
The sheets of tack-and-tape plans that I supply, courtesy of Phil Bolger, reduce making these miniatures to a lead-pipe cinch. Not that the full-sized plans are necessary. You can make your model from the reduced plans in this book, reading the measurements and adapting them to a convenient scale. Working directly from the drawings without applying any scale is easier, however. You can lay your see-through drafting paper right over the plans and then transfer the outlines to your material or paste them directly on it before you cut out the hull components. You can use very stiff thin cardboard for the model, but 1/16-inch slices of clear pine, cedar, or most any wood you have lying around your shop are better by far.

I use a planer blade mounted on my table saw to turn these out. If the table saw available to you won't slice thin enough, when it has done its best take what you get and sand it down to 1/16 inch. Or go to a model shop and pick up a sheet of their 1/16-inch basswood. Do not even think about using balsa—it can't hack it.

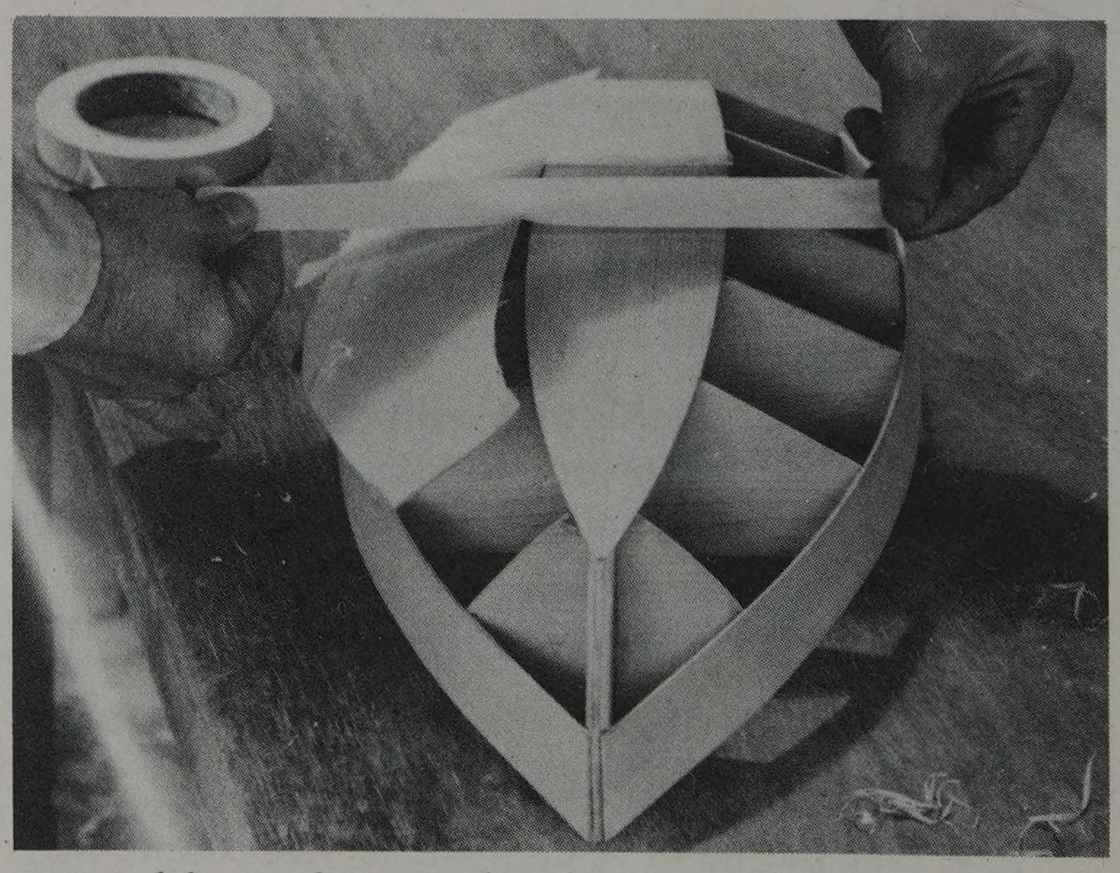
You begin by making one longitudinal member that doesn't exist in the full-sized boat. This is a profile of the entire hull, traced or otherwise reproduced from the construction view (see page 10) including stem, transom, bottom profile, and sheer. This is your strongback, or the spine of your model.

FILLING OUT THE SKELETON

Now, using the end-on view of the hull at each of the frame locations (including the transom), reproduce and make cutouts of these transverse components. Leave them solid, ignoring all the internal cutouts shown on the plans, including the limber holes.



Putting on the bottom panel. Small pins like the ones found in a new shirt hold the panel in place until the glue sets. They can be taken out with needlenose pliers, as shown.

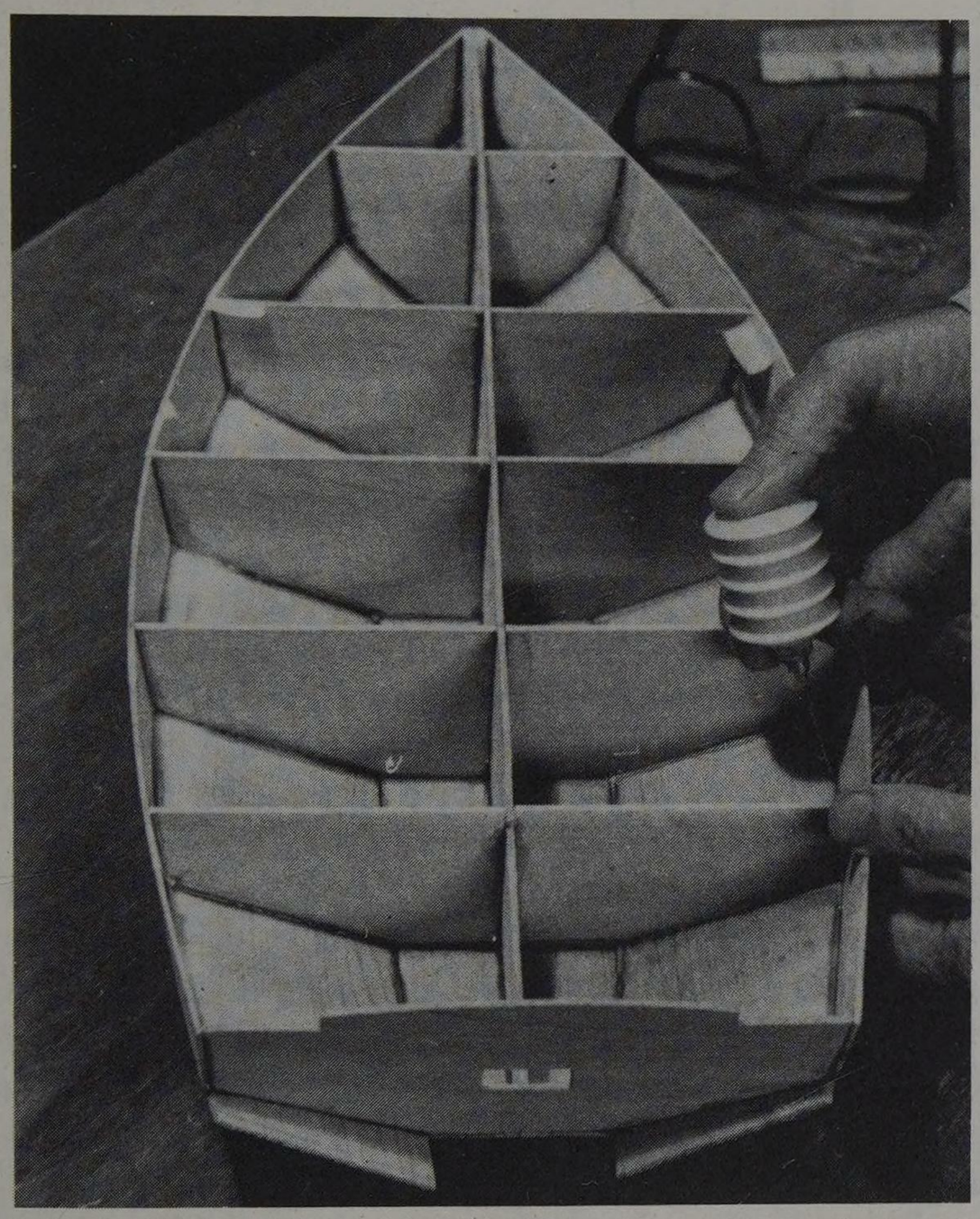


Fitting a bilge panel. A strip of masking tape will hold the middle of the panel in position while the ends are sanded and fitted.

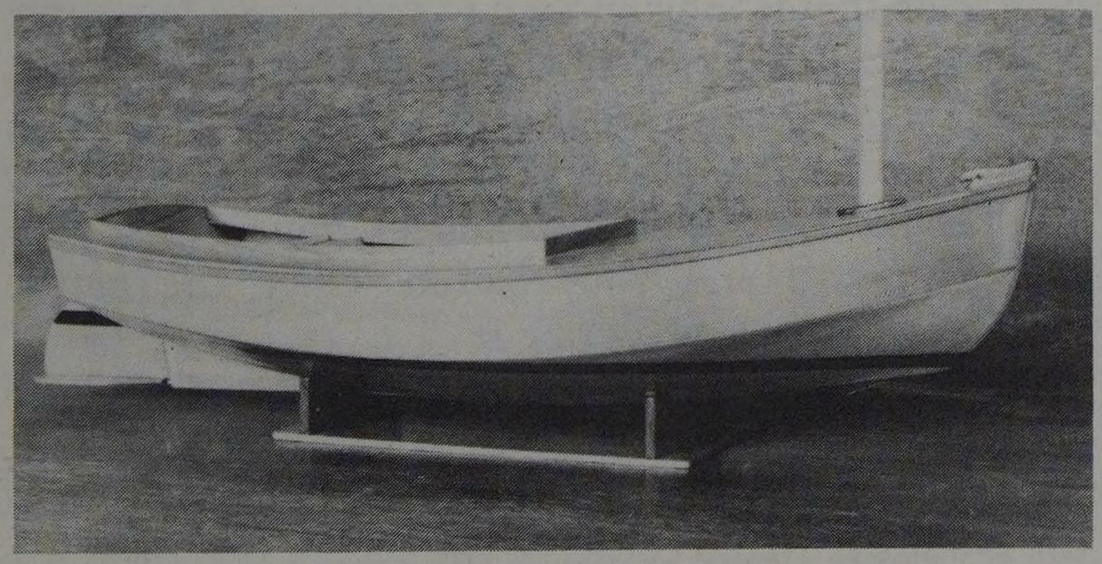
Cut vertical slots halfway down to the bottom edge of the strongback at each frame location, and cut a slot in the centerline of each transverse frame panel, extending halfway up from the bottom edge. Fit these parts together so that the top edges of the transverse panels lie right on the sheerline of the strongback. For the closest possible accuracy in terms of model length, take a sliver equal to the thickness of the transom off the aft end of the strongback. (When you get to the bottom panel, leave that full length so the transom can rest on it.)

At this stage, you can cut and sand bevels along the sides of the stem and transom to receive the side and bilge panels, which you will also cut from your cardboard or thin wood stock. In the model, the stem is merely the forward end of the strongback.

Now, with the frame panels in place, turn the skeleton upside down and glue the transom to the aft end of the strongback. Cut out the bottom and draw in its centerline and the frame panel locations. When you cut out the two side panels, indicate the frame locations on them too, but these markings are not needed for the two bilge panels.



With the model all planked up, the glue joints are reinforced from the inside. The ends of the bilge panel may now be trimmed flushed with transom and stem.



The completed model. I traced the deck and coaming shapes right off the plans.

CLOSING HER IN

When your glued-on transom is firmly set, pin the two side panels to it and to each of the bulkheads. Make sure that the tops of the bulkheads (the frame panels) are flush with the upper edges of the sides along the sheer. Work the side panels along to where they land on the beveled faces of the stem, and if all's well glue them there. Now glue the sides to the transom, check that the frame panels are lying perpendicular to the backbone, and glue the sides to them.

Spread glue across the bottom edge of the transom and along the backbone and apply the bottom panel, with its centerline resting squarely on the backbone.

Now the side panels, or sheer strakes, are in place, as are the bottom panel and the transom; all that remains is the pair of bilge panels and she'll be shut in. This is the tricky fit.

Start one of the panels at the transom and fit it as you move forward, sanding a bit here and there as necessary to get a seam you're proud of on its lower and upper edges. The forward end will take quite a twist to lie snug on the stem, and the bilge panel will do its damndest to put a bulge in the seam, but with an application of patience to the process of trial and fit you will make it. If anything, the full-size installation will come a little easier.

Draw a light pencil line across the junction of the bilge panel and the bottom amidships to help verify the fore-and-aft alignment when you put it in for good. Apply glue to the edges of the frame panels, the transom, and the beveled stem faces, and fix the bilge panel in place with pins and masking tape until the glue has dried. Repeat on the other side, and you have your catboat hull. (In the old days, as soon as the shutter strake had closed in a hull, all hands in the planking crew got a tot of rum.)

Of necessity, we have ignored the centerboard trunk. You may, however, decide to add the rudder, the tiller, and the mast, especially if you've made your model in wood, as I did.

After you've completed your real Bobcat you might feel inspired to add the boom and the gaff. I don't recommend rigging a sail on your model, though. They never hang quite right.

DEFUSING THE WATERLINE PROBLEM

The earthshaking discovery I made the day I completed my first tack-and-tape model did exactly that.

Without giving it much thought, I set the hull level, on its bottom. Having determined the height of the waterline where it touched the hull at bow and stern, I cut a block of wood whose thickness was equal to the distance from the waterline to the surface of the table on which the bottom rested. Using this as a rule to mark by while I slid it around both sides of the hull, I scribed what looked to me like a perfect waterline.

If I had been that old Greek engineer Archimedes, I would have jumped up and yelled "Eureka!" For at that moment a light bulb flashed on in my brain, and I saw that there was no reason on God's green earth why I couldn't use this system to strike waterlines on all my full-sized hulls. All it takes is a level floor or plywood platform that is big enough to allow you to crawl all around the boat, and the use of a block or T-square of the right height. And there you are—no chalk lines, no spirit levels, very nearly no nothing.

When I put on a waterline now, Mr. Murphy doesn't even bother to come watch.

3. Building the Full-Sized Hull

In my book, building a boat is fun, or should be. This does not mean it's all plain sailing. If you didn't run up against problems from time to time, it would be some kind of miracle.

Problems pose challenges, and meeting them is part of the fun. Tennis would be a dull game if you took away the net. Looked at in that light, every problem is a blessing in disguise. I must admit that all too often the disguise is perfect. There are times when every boatbuilder is tempted to chop his handiwork into bits and build a little fire. Much better to plunk yourself down in the Moaning Chair that Howard Chapelle says is indispensable in every boatbuilding shop, give voice to your frustration, and regroup.

LAYING OUT THE SIDE PANELS

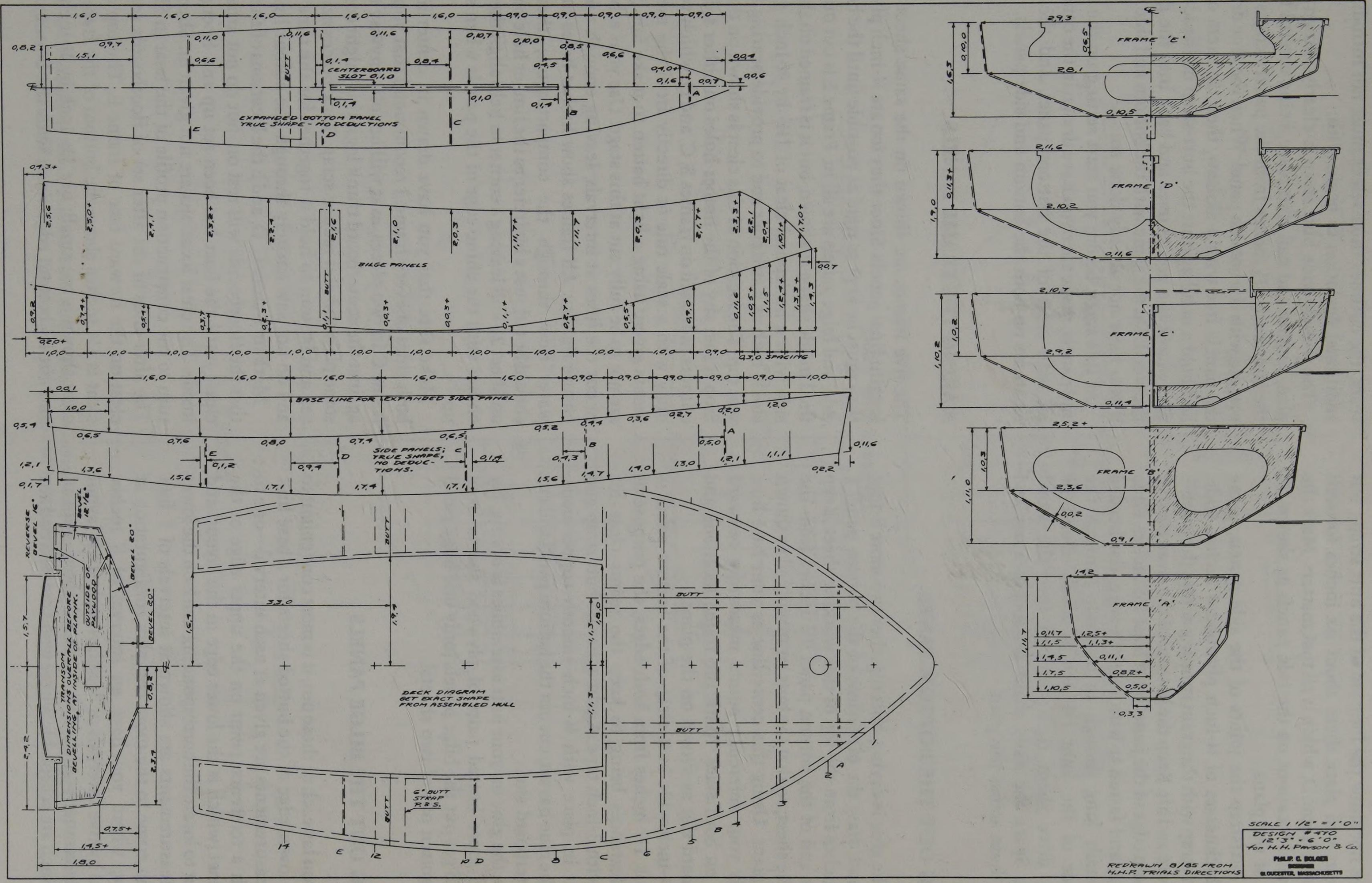
Any attempt to find the absolutely most frugal method of laying out Bobcat's parts is a waste of time. Inevitably you are going to make some scrap. Try to make it usable scrap. So let's jump in and proceed to step one, which is to butt two of your 4-foot by 8-foot by ¼-inch plywood sheets together end-to-end to make up the working sheet from which you will cut out the two side panels of your hull. At this point, if you are using AC exterior-grade plywood, you must choose which surface is going to appear outside, as mentioned in Chapter One. Butt straps will be inside.

For the same reason, you must determine the locations of the side panels on the plywood sheets and draw in their outlines before you apply any glue and nail down the butt straps, for these must be kept clear of the seams between the side panels and the bilge panels. You can figure out your own method for keeping the two sheets firmly aligned at their butt joint while you draw the lines along which to cut. I vote for temporarily tacking them down to the shop floor. If your floor is cement, lay sticks down and tack the plywood to them.

Only one side panel is shown on Sheet 1 of the plans. Note the "Base Line For Expanded Side Panel" from which you take measurements to establish its top and bottom curves. Let this base line be the upper edge of your butted sheets, and let the upper forward corner of the side panel (the forward end of its sheerline) fall on the junction of the base line with the righthand edge of the butted sheets. Then make the measurements given on the plans at the corresponding horizontal intervals (also given on the plans). From the forward end of the side panel, for example, measure to the left 1 foot, then measure perpendicularly downward 1¼ inches, then 1 foot 1⅛ inches, to locate the top and bottom edges of the panel. Note that measurements on the plans are given in three numbers separated by commas. The first is feet, the second is inches, and the third is eighths of an inch. A plus sign after the group indicates that a sixteenth of an inch should be added to the measurement.

When all the measurements for the panel have been marked, drive a 1¼-inch number 18–wire nail about halfway in at each mark. When you've driven a full set, take a flexible wooden batten about ⅜ inch thick by 1 inch wide that is long enough to continue a fair curve beyond the actual ends of the panel, set it on the flat, and bend it edgewise around the curve, securing with small nails as necessary. Sight the curve for fairness. If you see flat spots or humps, check your plans, your measurements, and your batten. Once the batten describes a fair curve, scribe it.

On the opposite longitudinal edge of the butted sheets construct a mirror image of your first side panel, with the forward end of its sheerline located right on the lower righthand corner of the sheets; this time, use the bottom edge as the baseline. Take note that the placement of these two side panels is important: the



Sheet #1 of Bobcat's plans. Bolger drew this at a scale of 1½ inches equals 1 foot, but, like sheets #2–4, it was reduced for inclusion in the book.

plan does not show the location of the butt straps, but this layout will place them about six inches forward and clear of frame D, which is all that matters. Mark the frame panel locations on the side panels as shown on Sheet 1 of the plans.

Now buttstrap the joints of the side panels, using single thicknesses of ¼-inch plywood 4 inches wide. Lay each strap with the grain running across the joint—that is, fore and aft. Keep the bottom of the strap clear of the bottom edge of the panel by at least 1½ inches. Glue the strap, and fasten it with smooth-wire, flat-headed copper nails long enough to protrude through the underside of the joint (¾-inch is ideal). Don't be bashful, drive them right through into the wood beneath. Space the nails about 2½ inches apart and stagger them across the joint.

LAYING OUT THE BOTTOM PANEL

While the glue is drying, butt together two more 8-foot sheets and draw the centerline of the bottom panel 1 foot 2 inches from the top of this working sheet. Keep the bow end of the bottom panel 9½ inches from the end of the sheet, so that the butt strap will fall as shown on the plans. Using this centerline as your base line, establish your reference points measuring outward from it on both sides. Mark the frame locations and centerboard slot as shown on the plans.

The 4-inch-wide butt strap of the bottom panel is kept back 1½ inches from both edges, the purpose of these clearances being to keep the seams clear for taping with 3-inch tape. Again, glue the butt strap and fasten it in place with ¾-inch smooth copper nails. When the glue has set, cut out the bottom panel and cut the centerboard slot.

While the glue on your butt assemblies is drying, lay out two more butted pairs of plywood sheets from which to get out the bilge panels (only one bilge panel can be gotten out of two sheets).

LAYING OUT THE BILGE PANELS

When you lay each of these out, it is most convenient to use the lower edge of the butted sheets for a base line. Two measurements are given at each interval—one to establish a reference point on the upper edge of the bilge panel (which is the *lower* edge in the layout) and the other to locate the corresponding mark on the lower edge. Measurements are shown at intervals of 1 foot until you come to the more complex configuration at the bow, where you have an interval of 8 inches followed by five intervals of 3 inches each. This layout demands accuracy. Although, as noted above, gaps of up to ¼ inch are acceptable where wood meets wood at a seam, the cutlines themselves must not introduce any additional deviation to begin with.

The 4-inch-wide butt strap is clearly shown on the plan, so glue and nail it in place, being careful to keep the ends back 1½ inches from the panel's edges just as you did with the bottom panel. When the glue dries, cut the panels free with a Skilsaw, then tip them on edge and hold a maul against the butt-strap nailheads while you whack the points over and back into the grain of the wood. Do the same with the bottom and side panels, if you have not already done so.

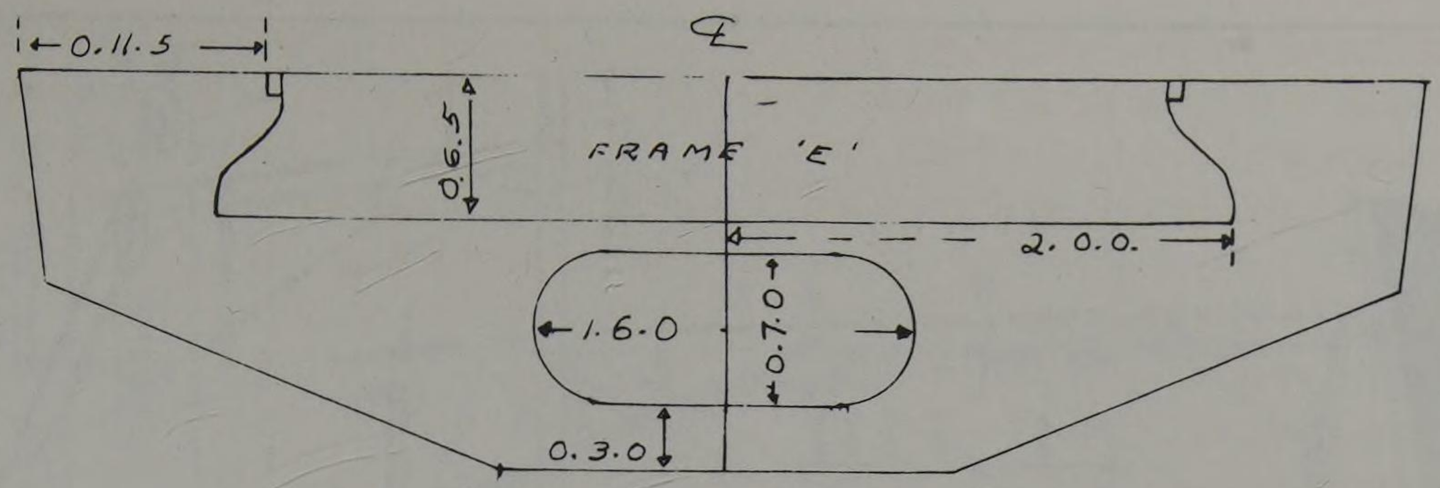
At this stage, before you start setting up the frames and panels, make sure you have drawn in the centerline on both sides of the bottom panel, and the frame locations on both the bottom and side panels.

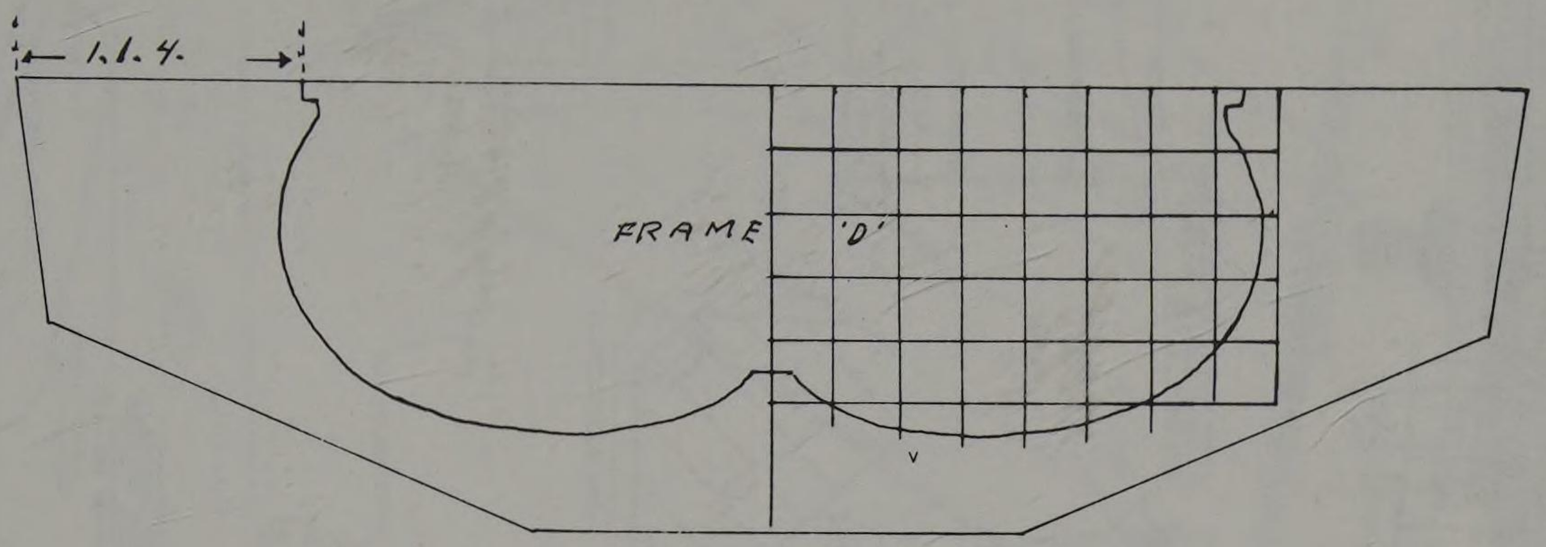
MAKING THE FRAME PANELS

The five frames are shown on the same sheet as the longitudinal panels. Since they too are ¼-inch plywood, they must be kept as rigid as possible until the bottom, side, and bilge panels are all in. Frame E is cut out to its final inside shape as shown, but it is framed on the after side with a horizontal cleat of 1½- by ¾-inch grained stock, both as a stiffener and to provide bearing for the seat top. The location of this cleat is shown on the plan. Stop it just shy of the limber holes on either side. The cutouts indicated on frames B, C, and D, which you can draw with a scale rule or directly from the measurements given, using a light batten to make fair curves, are not to be fully cut at this stage. Use your saber saw to cut the lines at intervals, leaving enough uncut to ensure rigidity. All frames show limber holes to allow water flow through the compartments; these too should be cut just a bit (refer to the limber hole patterns on Sheet 2), still leaving a corner to help align the frame chines with the chine edge of the panels when setting up.

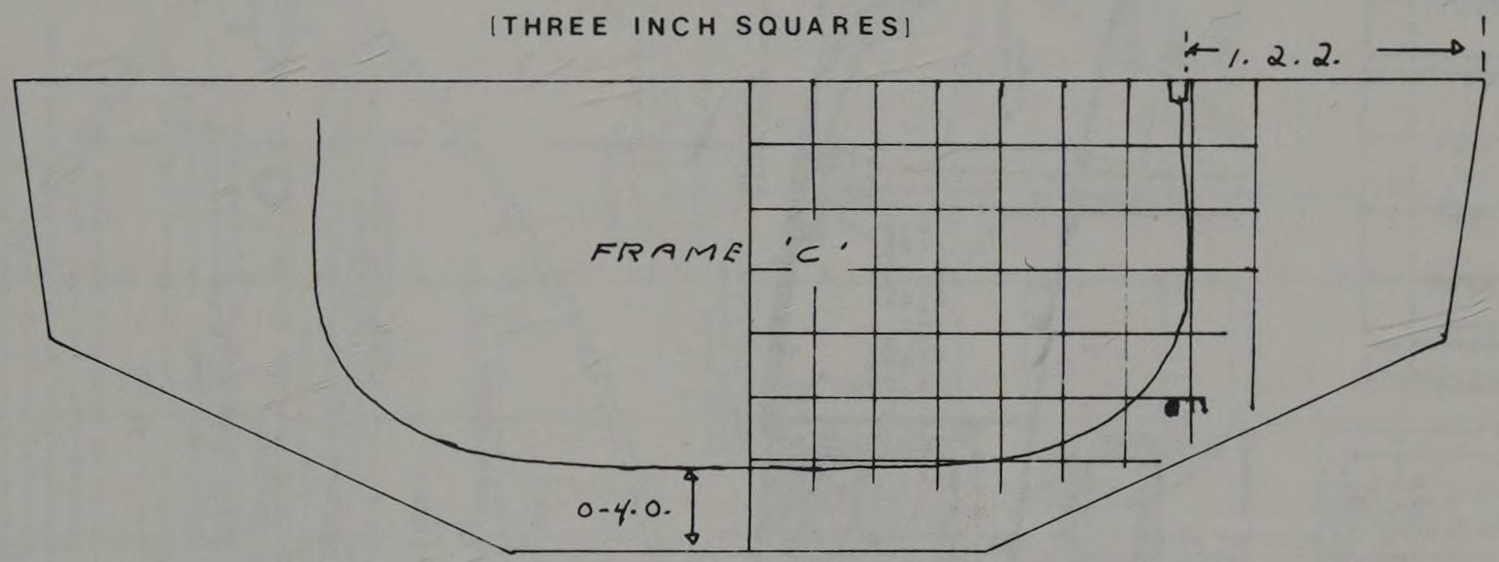
Make sure that you have drawn in centerlines on both sides of every frame. I recommend that you make frame C in two pieces, as it will be split anyway to butt against the centerboard trunk logs; this might conserve some plywood and reduce scrap. Tack braces across its top and bottom to hold it together for the time being, and do not saw entirely through the cutout lines.

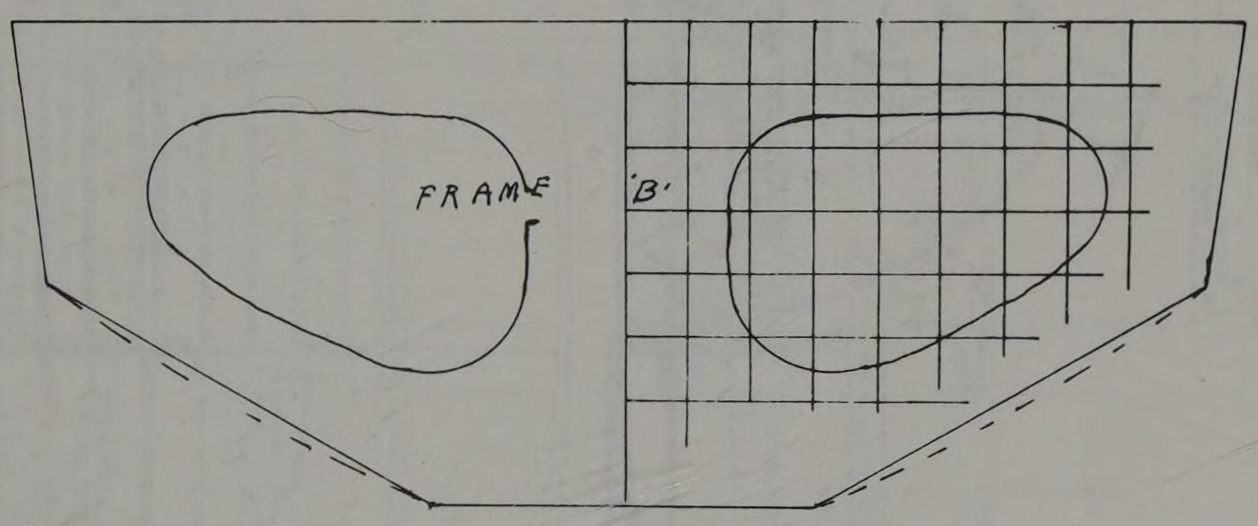
Mark on frames C, D, and E the locations of the cleats that the floorboards will rest on, but do not attach the cleats until the boat has been set up and fiberglassed inside. The cleat locations are not given on Sheet 1, so turn to the construction profile of the boat in Sheet 2. The after ends of the after set of floorboards rest on a cleat on the forward face of frame E. The top of this cleat is 1¼ inches above the bottom of the frame. The cleat shown is too small; use 1½-inch by ¾-inch stock and cut its bottom edge flush with the bottom of the



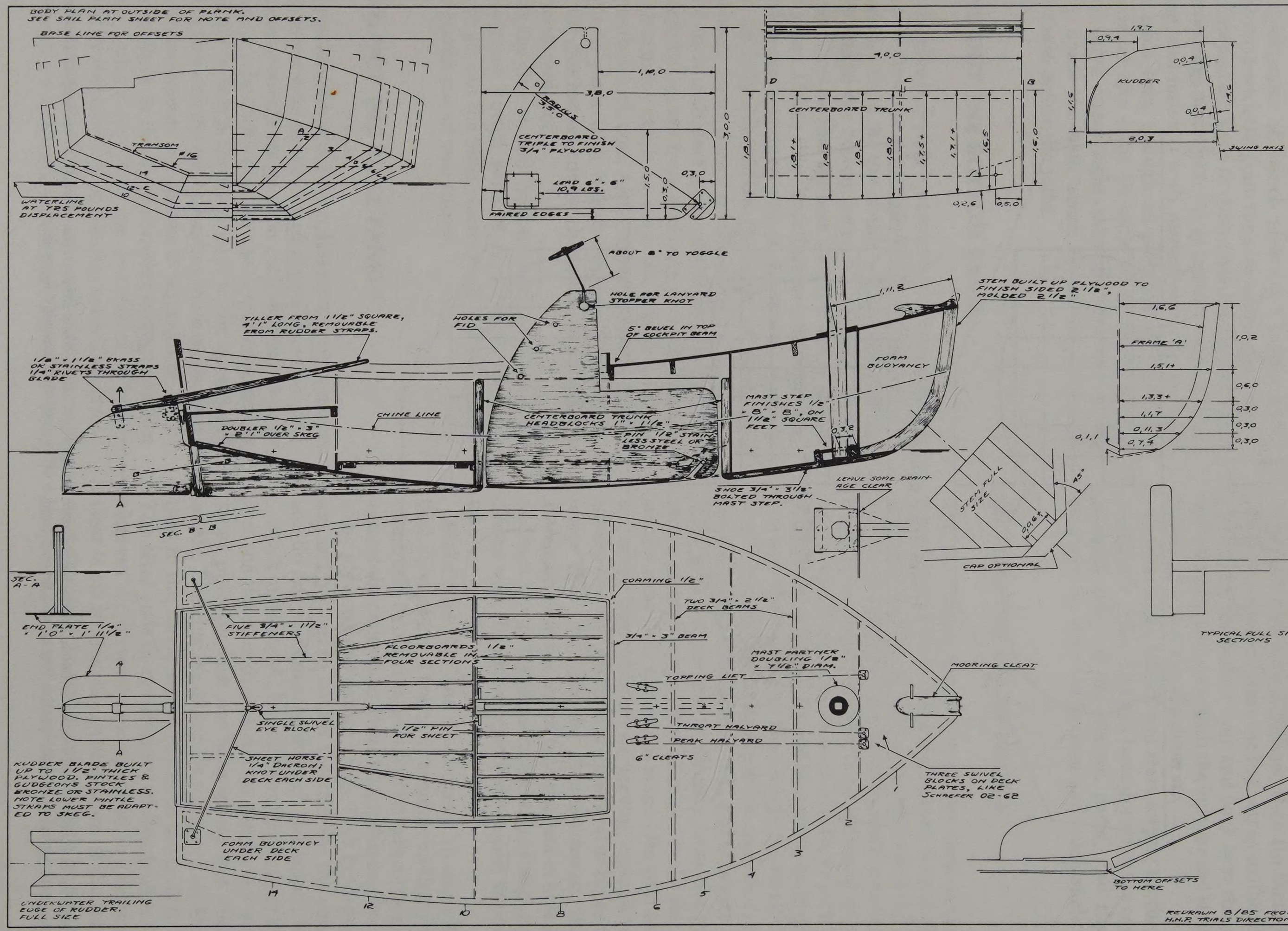


[THREE INCH SQUARES]





As an aid to those building Bobcat from this book, I drew these frame sections and added some dimensions. The grids superimposed on frames B, C, and D are composed of 3-inch squares. You should be able to pick off measurements readily from these.



Sheet #2 of Bobcat's plans.

HEIGHTS FROM BASE LINE

	16	14	12	10	8	6	5	4	3	2	1
CORMING	0,7,4	0,9,5	0,10,5	0,10,4	0,9,4						
DECK	0,9,3	0,11,3	1,0,4	1,0,5	1,0,0	0,10,3	0,9,3	0,8,1	0,6,5	0,4,7	0,3,0
CHINE	1,5,6	1,8,5	1,10,7	2,0,0	2,0,0	1,10,6	1,7,6	1,6,3	1,6,6	1,4,7	1,2,6
BOTTOM	2,1,2	2,4,7	2,7,6	2,9,5	2,10,0	2,9,1	2,8,2	2,7,2	2,6,0	2,4,6	2,3,4
PROJECTED KEEL	2,4,0	2,8,4	3,0,1	3,2,2	3,2,6	3,2,2	3,1,3	3,0,0	2,10,2	2,7,4	2,3,4

HALF-BREADTHS

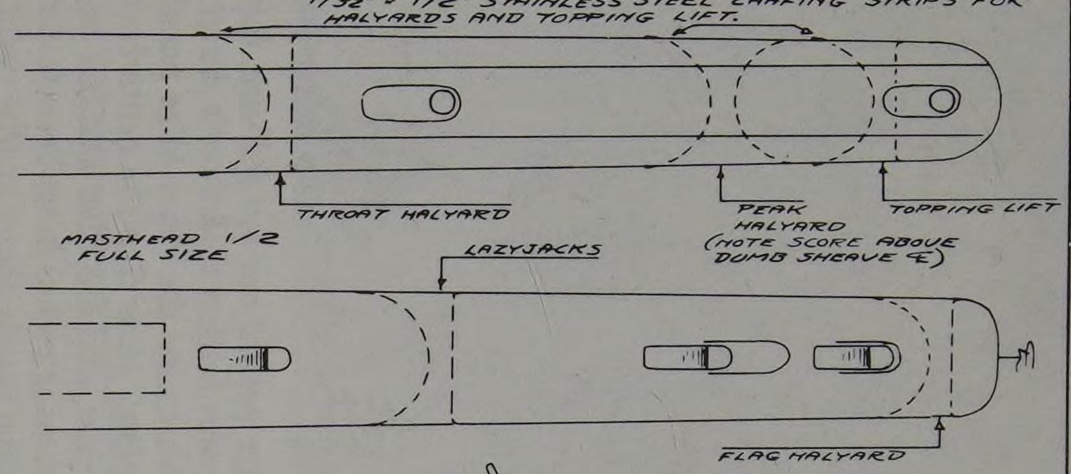
	16	14	12	10	8	6	5	4	3	2	1
CORMING	1,6,3	1,8,1	1,9,3	1,9,6	1,9,0	(1,6,6)					
DECK	2,4,2	2,7,6	2,10,4	3,0,0	3,0,0	2,9,5	2,7,2	2,3,7	1,11,4	1,6,0	0,11,2
CHINE	2,3,2	2,6,4	2,9,1	2,10,4	2,10,2	2,8,0	2,5,6	2,2,3	1,9,7	1,4,3	0,9,5
BOTTOM W.L. 18"	0,8,1	0,9,6	0,11,0	0,11,6	0,11,6	0,11,0	0,10,0	0,8,5	0,6,6	0,4,1	0,0,6
21"										1,3,4	0,8,1
24"								2,1,4	1,7,1	1,0,5	0,6,1
27"							2,1,4	1,8,5	1,3,1	0,9,5	0,3,6
							1,8,0	1,3,6	0,11,1	0,6,2	0,1,2

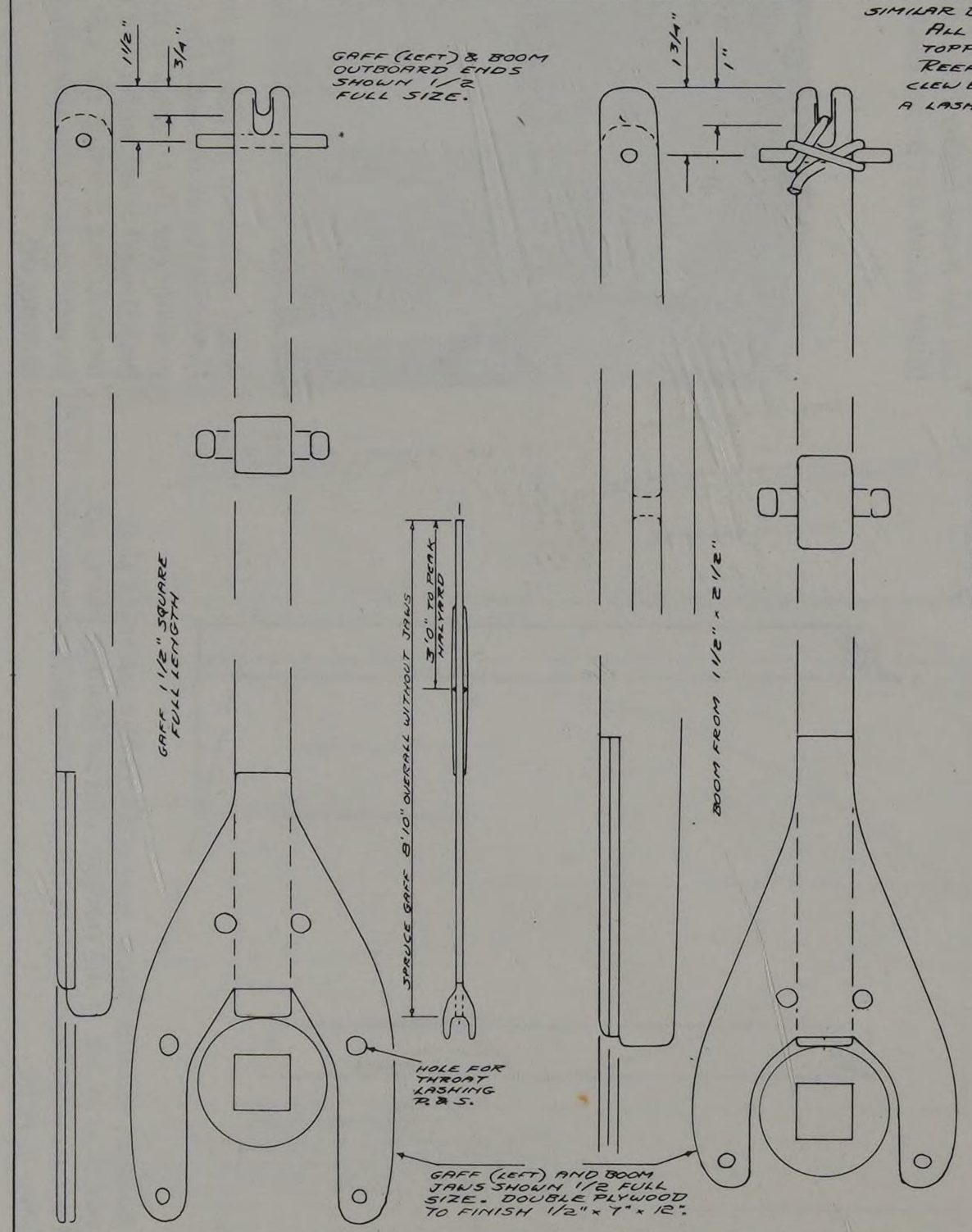
OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLANK. USE IF MULTIPLE BOATS ARE TO BE BUILT ON ONE JIG, OR SUBSTANTIAL ALTERATIONS FROM DETAILED DESIGN ARE INTENDED.

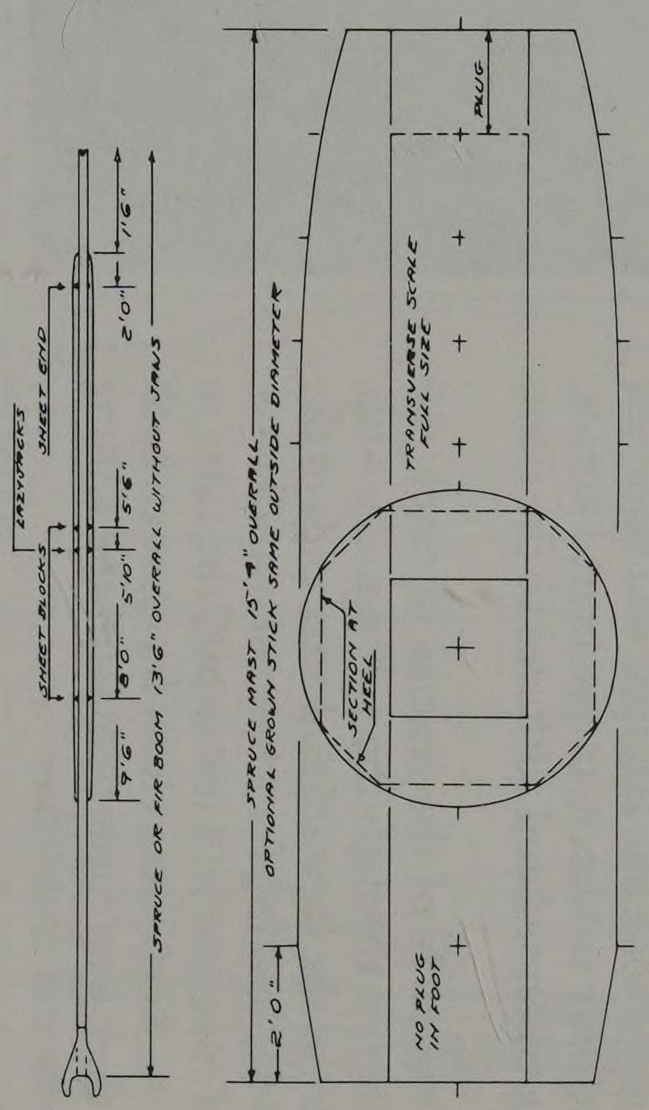
① SHEET ABOUT 45'; STANDING END SPLICED AROUND BOOM; THREE BLOCKS LIKE SCHAEFER 02-07 (1 1/16" SWIVEL EYE), ONE ON HORSE #10, TWO LASHED TO BOOM; FALL TO PIN ON C.B. TRUNK.
② THROAT HALYARD ABOUT 28'; STANDING END ON GAFF JAWS; THROUGH DUMB SHEAVE IN MAST & SWIVEL BLOCK ON DECK TO CLEAT.
③ PEAK HALYARD ABOUT 31'; LEAD SIMILAR TO THROAT.
④ TOPPING LIFT ABOUT 35'; STANDING END BELAYED ON PIN AT BOOM END AND THROUGH SLOT THERE. LEAD THROUGH DUMB SHEAVE AT MASTHEAD. GAFF AND SAIL HOIST ON EITHER SIDE OF LIFT AS CONVENIENT.
⑤ LAZYJACKS ABOUT 29' KNOTTED INTO ONE ENDLESS LOOP.
⑥ GAFF JAW PARREL; ADJUST LENGTH TO COME TAUT WHEN GAFF IS PEAKED.
⑦ CRINGLES ABOUT 5" INSIDE DIAMETER REPLACE MAST HOOPS.
⑧ THROAT LASHING; LENGTH BY TRIAL TO HOLD SAIL PROPERLY WITH GAFF FULLY PEAKED.
⑨ GAFF & BOOM TIES SEPARATE; NOT A LACING.
⑩ SHEET TRAVELLER HORSE ABOUT 4'8", LED THROUGH PADDED DECK WITH STOPPER KNOTS UNDER DECK.
⑪ BOOM OUTHAUL FAST TO CLEW OF SAIL; TAKE THROUGH BOOM-END SLOT & BELAY ON PIN ON TOP OF TOPPING LIFT. PEAK OUTHAUL SIMILAR BUT WITHOUT TOPPING LIFT.

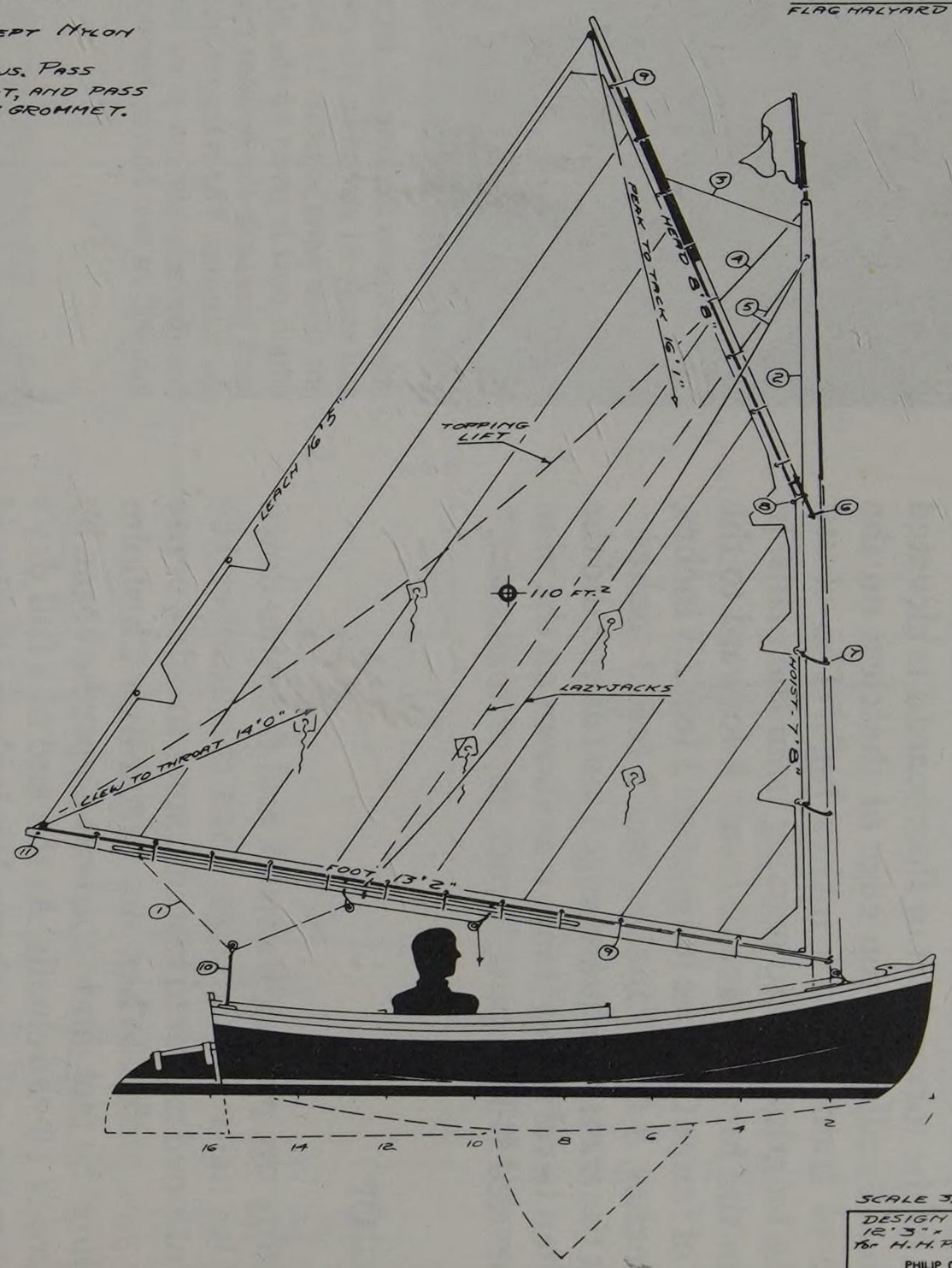
ALL RUNNING RIGGING 1/4" BRAIDED DACRON EXCEPT NYLON TOPPING LIFT AND 1/8" GAFF & BOOM TIES.

REEFING; LASH LUFF GROMMET TO BOOM UNDER JAWS. PASS CLEW EARING THROUGH BOOM-END SLOT; HAUL OUT TIGHT, AND PASS A LASHING AROUND BOOM & SAIL NEXT TO REEF CLEW GROMMET.









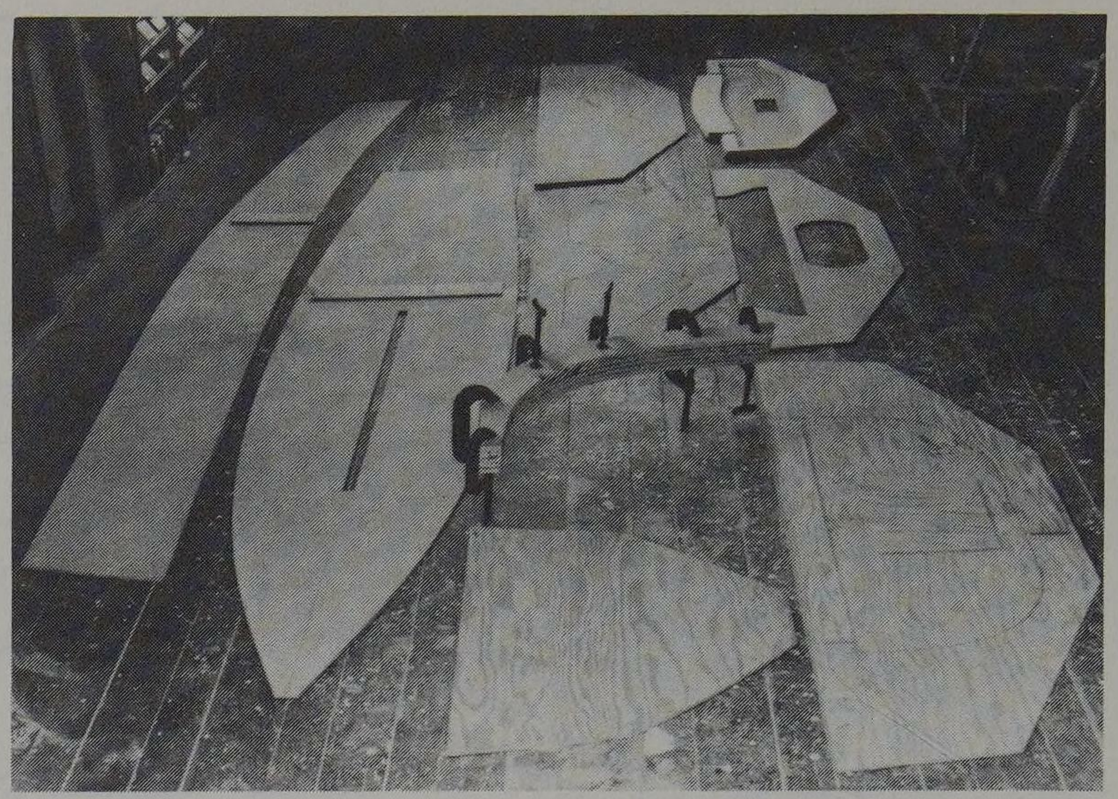
SCALE 3/4" = 1'0"

DESIGN #470
12'3" x 6'0"
for H. H. Payson & Co.
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASS.

Sheet #3.

frame. The top edge of the cleat on the after face of frame D is 3⅞ inches above the bottom of the panel, while the cleat on the forward face of frame D (for the after ends of the forward set of floorboards) is elevated 3 15⁄16 inches. Finally, the top edge of the cleat on the after face of frame C is 4 inches high. The cleats' thwartship lengths are also missing from the plans. In order from the forward face of frame E forward to the after face of frame C, those lengths are 2 feet 2½ inches, 3 feet 5 inches, 3 feet 5 inches, and 3 feet 3 inches.

Cut out the transom square-edged, just as you did the frames; then bevel it and frame it as shown on the plan with prebeveled ¾-inch pine, spruce, fir, or mahogany.

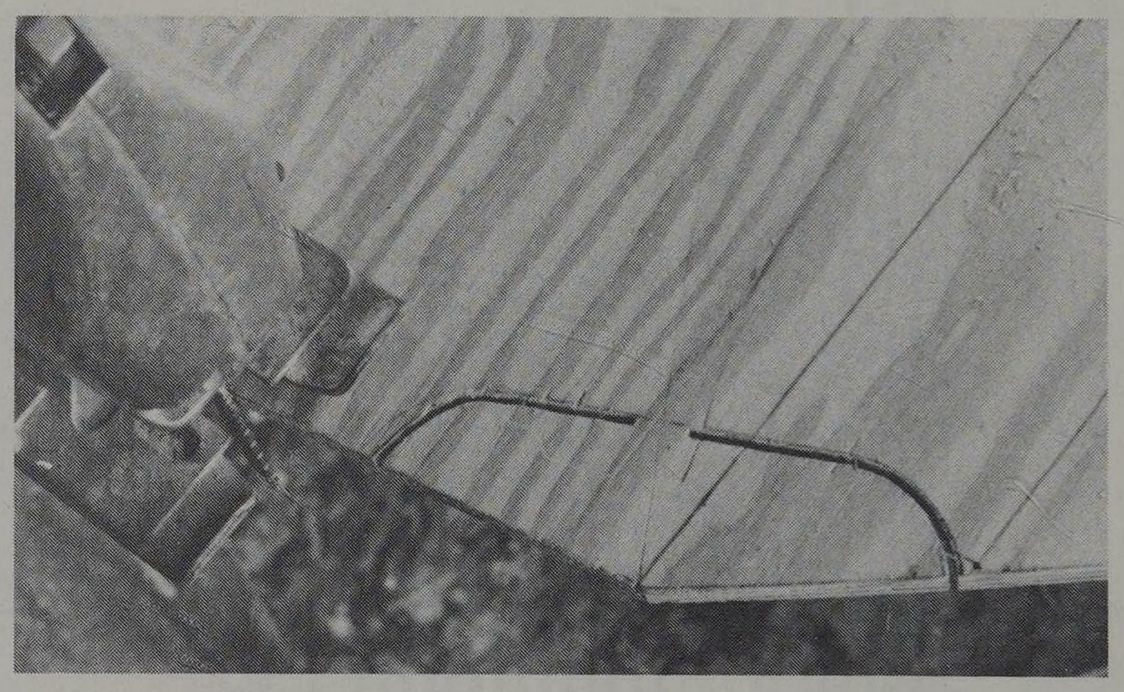


Bobcat's parts (lacking the bilge panels) cut out full-size, buttstrapped, and ready to assemble. My contribution to Bobcat's design was to put these parts together to determine the exact bilge panel shape, which now is given on the plans. Note that the centerboard slot has been precut in the bottom panel, and the tiller slot has been cut in the transom. The transom framing pieces have been fastened. Frame E is the only one cut to its final inside shape at this point. I made frame C in two halves, temporarily buttstrapped together.

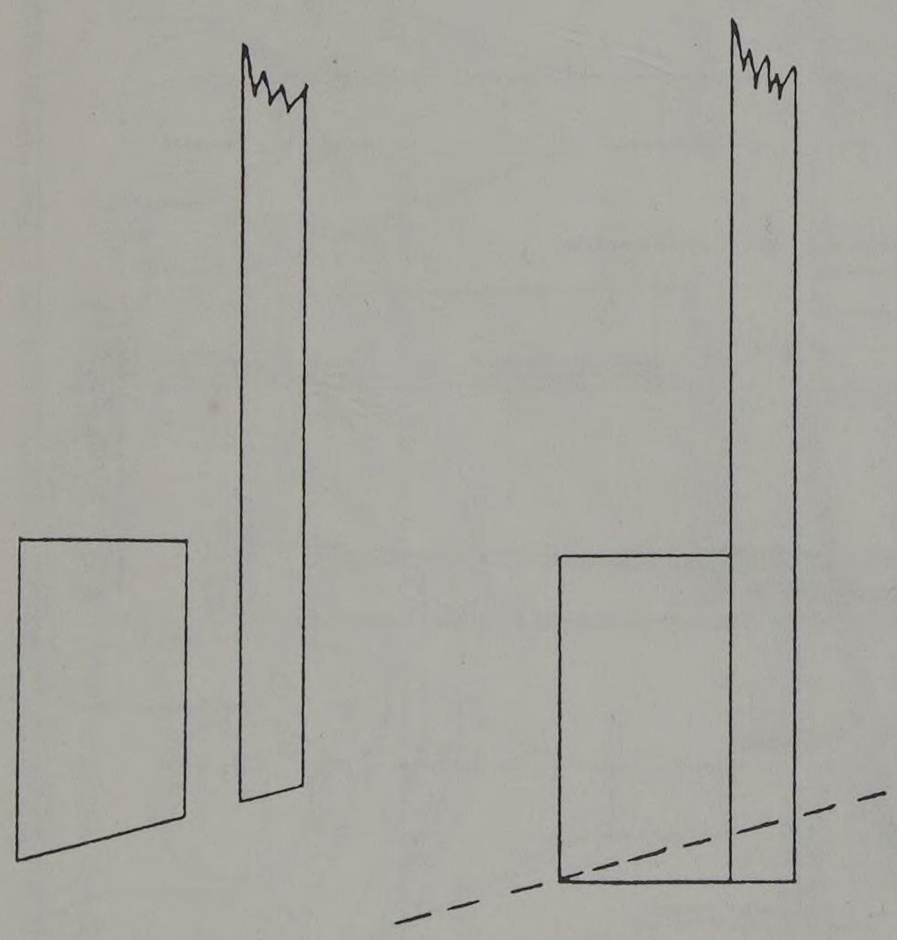
SETTING UP

Begin setting up, placing frames E and B upside down on legs. Use nails a little larger than the number 18-wire I mentioned earlier to fasten frames to sides, or use screws if you prefer. When my friend Bud Chisholm was building the tack-and-tape boat Gypsy he began by using number 18-wire nails. At the end of a full day's work setting her up, he took one last look and slammed his shop door shut, only to watch, in fascinated horror, as the whole thing collapsed and slithered to the floor, piece by piece.

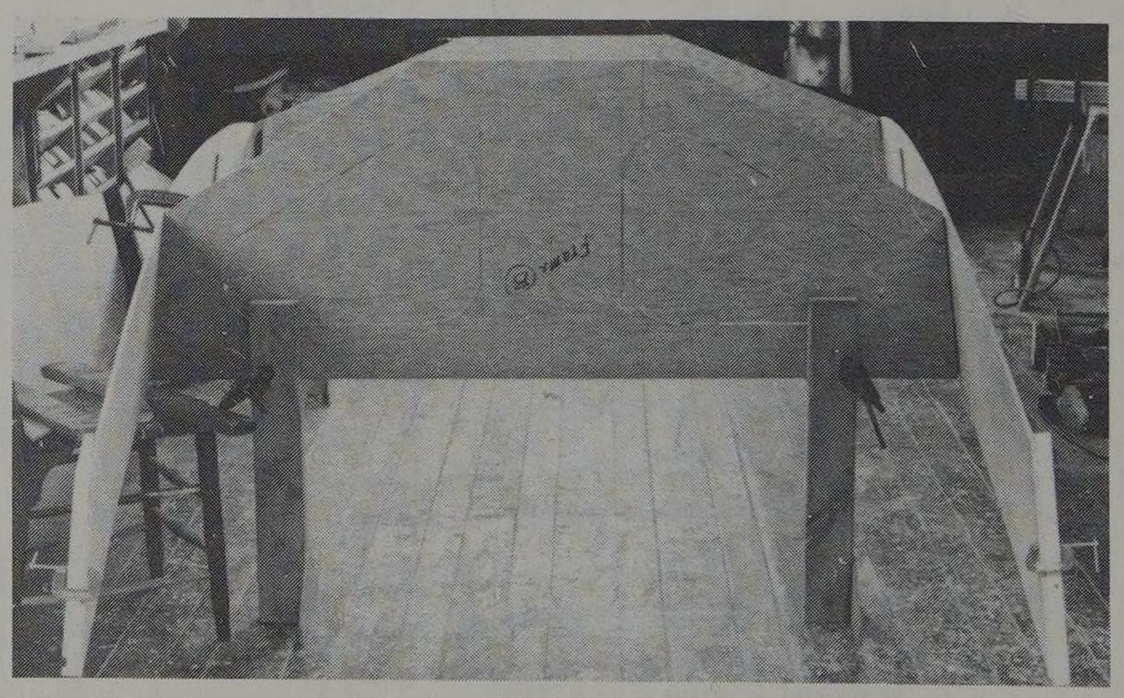
Tack cleats to the ends of the frames to catch the nails as they are driven through the side panels. Also, tack or clamp cleats to the forward and after ends of the side panels to provide bearing for a Spanish windlass—the twisted loop of rope you will use to pull the sides in at stem and transom. Keep these cleats far enough back from the ends so they won't interfere with the nailing of the sides to stem and transom.



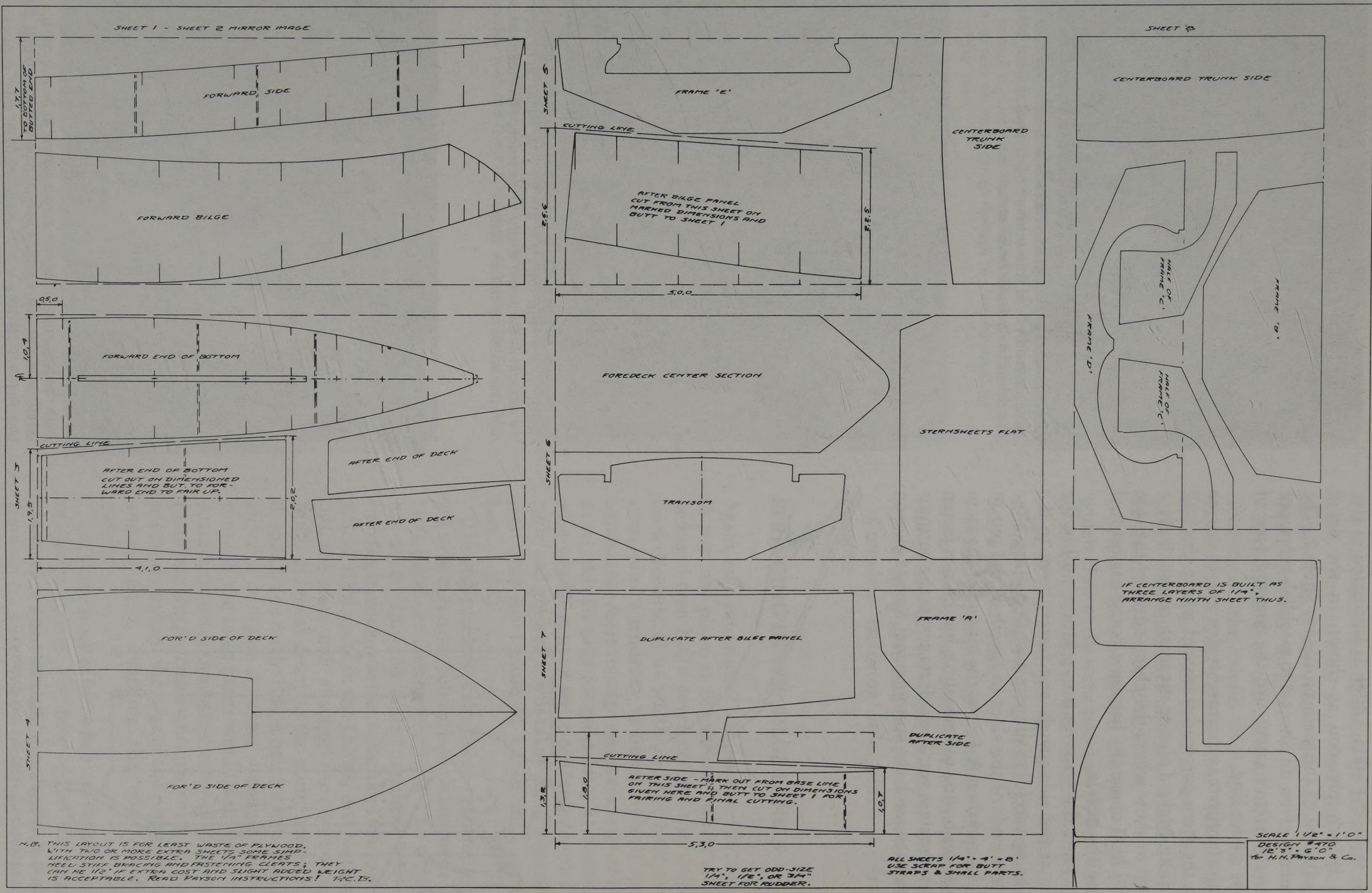
Cut the frame limber holes almost out, leaving a bit uncut so the frame chines can be set flush with the chine edge of the side panels.



Bevel the transom framing pieces separately, before fastening them to the plywood, as at left. If the transom and its framing pieces are assembled square-edged and then beveled, the dimensions come out shy, as shown at right.



Begin setting up by placing frames E and B upside down on legs. Daylight shows through the cutouts in frame B, which have been partially cut. Just visible at the righthand edge of frame E in the background is the upper end of a cleat, put there to anchor the tacks driven through the side panel. The cleats clamped to the forward ends of the side panels will keep a Spanish windlass from slipping off.

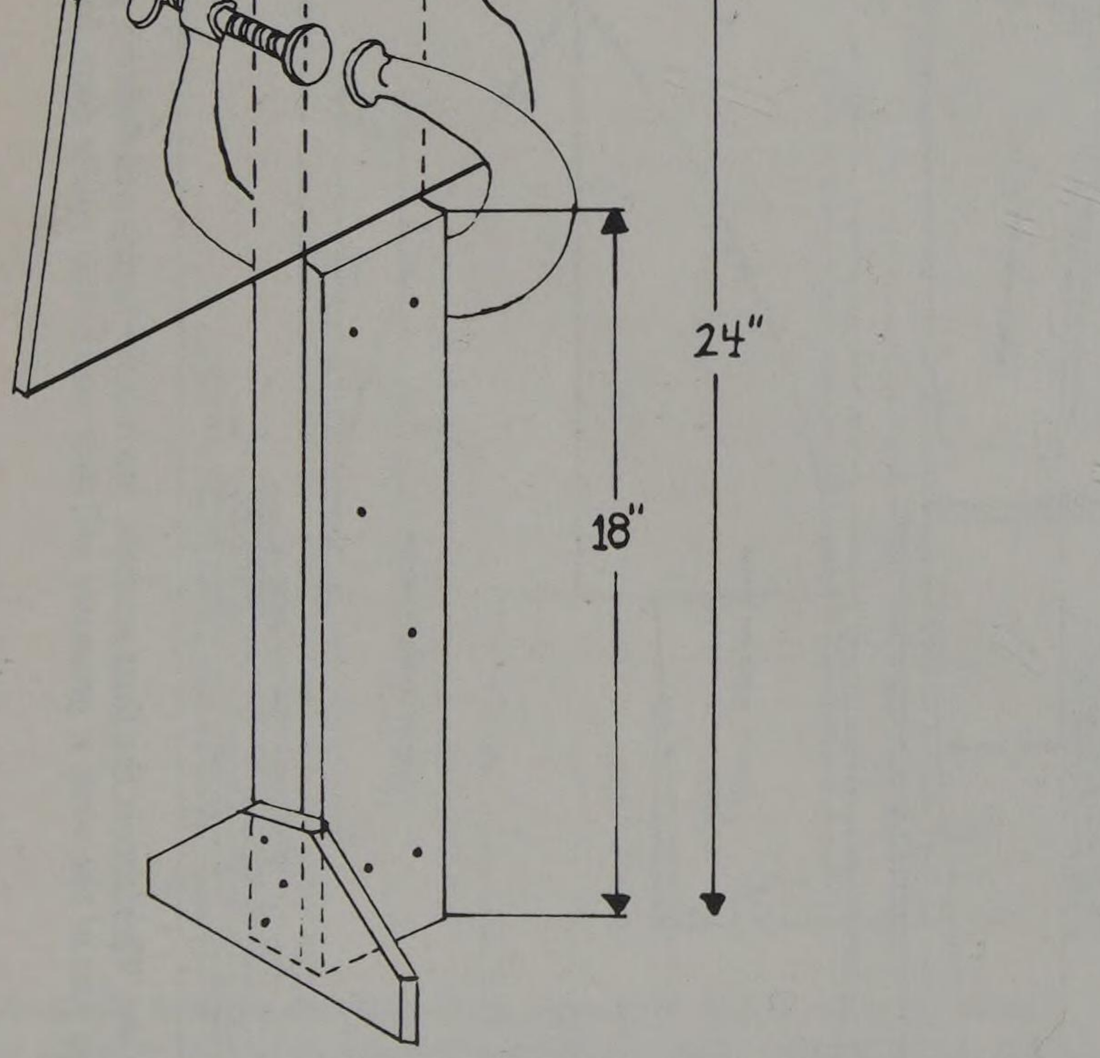


Sheet #4. This shows the least wasteful method for laying out Bobcat's parts on the plywood. This layout method is not *the one I describe in the text. The one I describe is easier, I think, and a good part of the scrap it generates will find uses before you're done. In any case, I offer Sheet #4 for the frugal builder, to use if he wishes.*

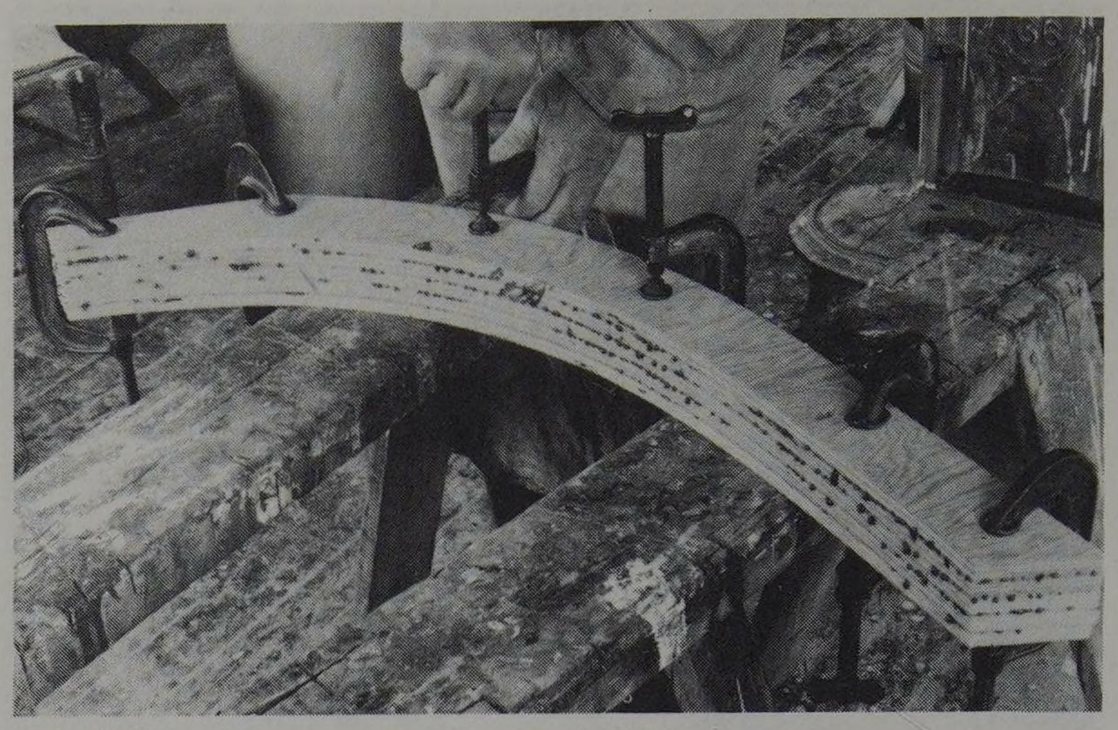
Time to make the stem, which is laminated of five layers of ½-inch plywood as shown in the detail drawing adjacent to the stem profile on Sheet 2. The measurements given on Sheet 2 to establish reference points for the stem's curve use the forward face of frame A as a base line.

When the laminate is thoroughly dry, cut 45-degree bevels on the stem port and starboard where the hull panels will lie. Make a placement mark across the face of the stem to show where the chine edges of the side panels will lie. I chose the bandsaw as the easiest tool for making the bevels.

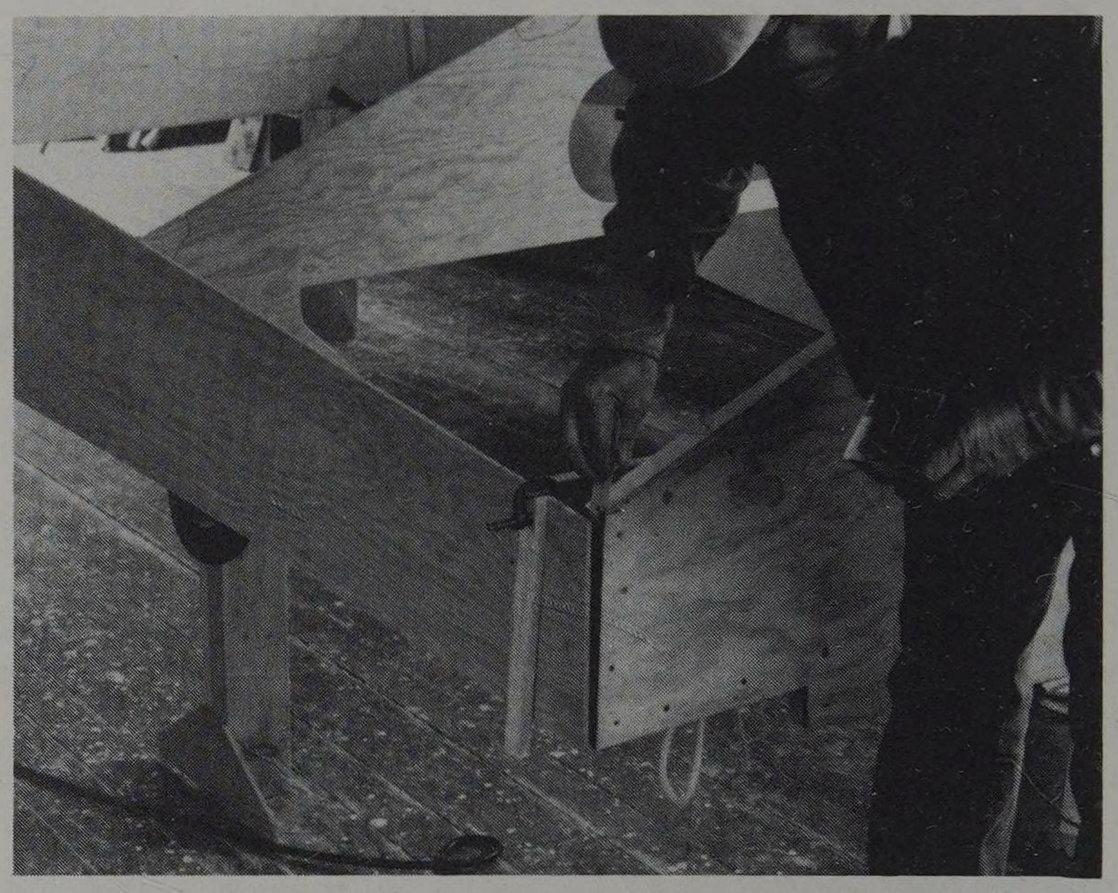
After moving the transom into position, pull in the after ends of the side panels and fasten them to the transom, being careful to support it while nailing. Now pull the bow ends of the sides in together, and put in frames C, D, and then A. Fasten the aft end of the stem to frame A, centerline to centerline, but do not fasten the sides to the stem yet. Tack cleats across the bottoms of the frames to catch the bottom panel. Spread glue on



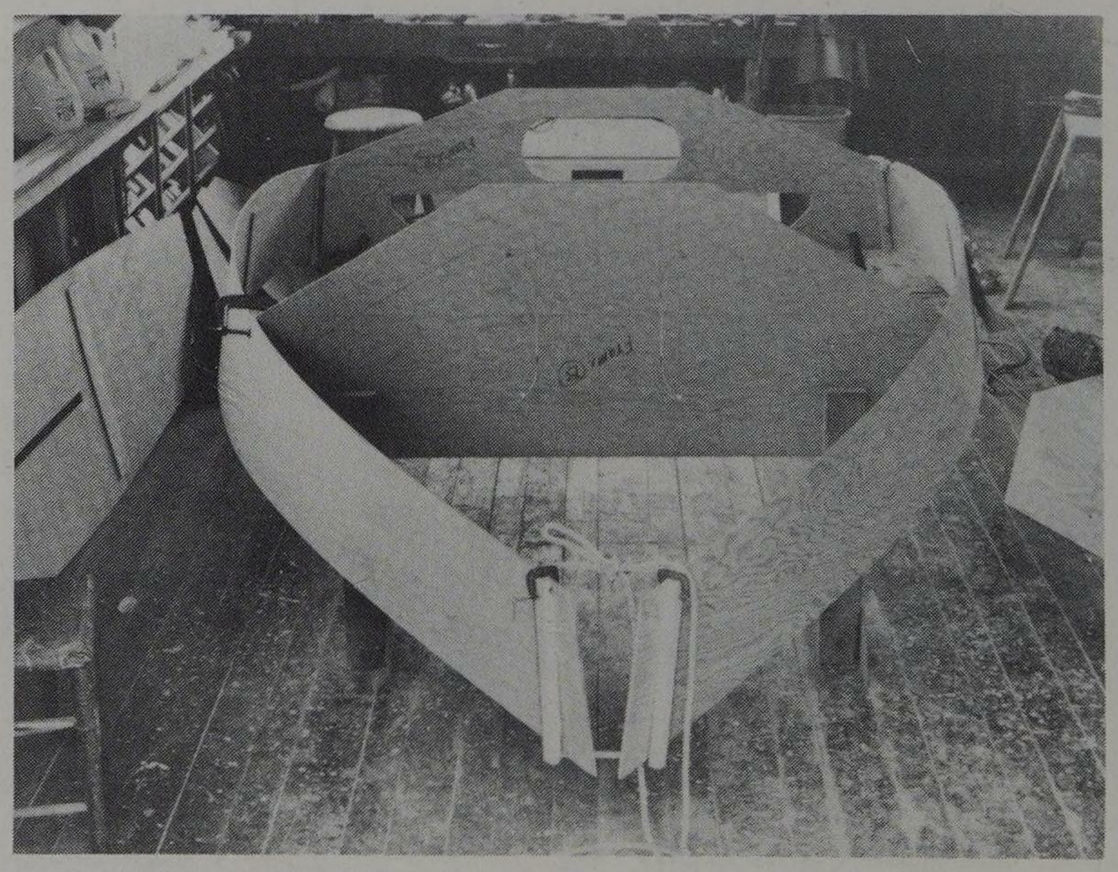
Schematic view of the legs used to secure the frames upside down when setting up the hull. (Tim Payson drawing)



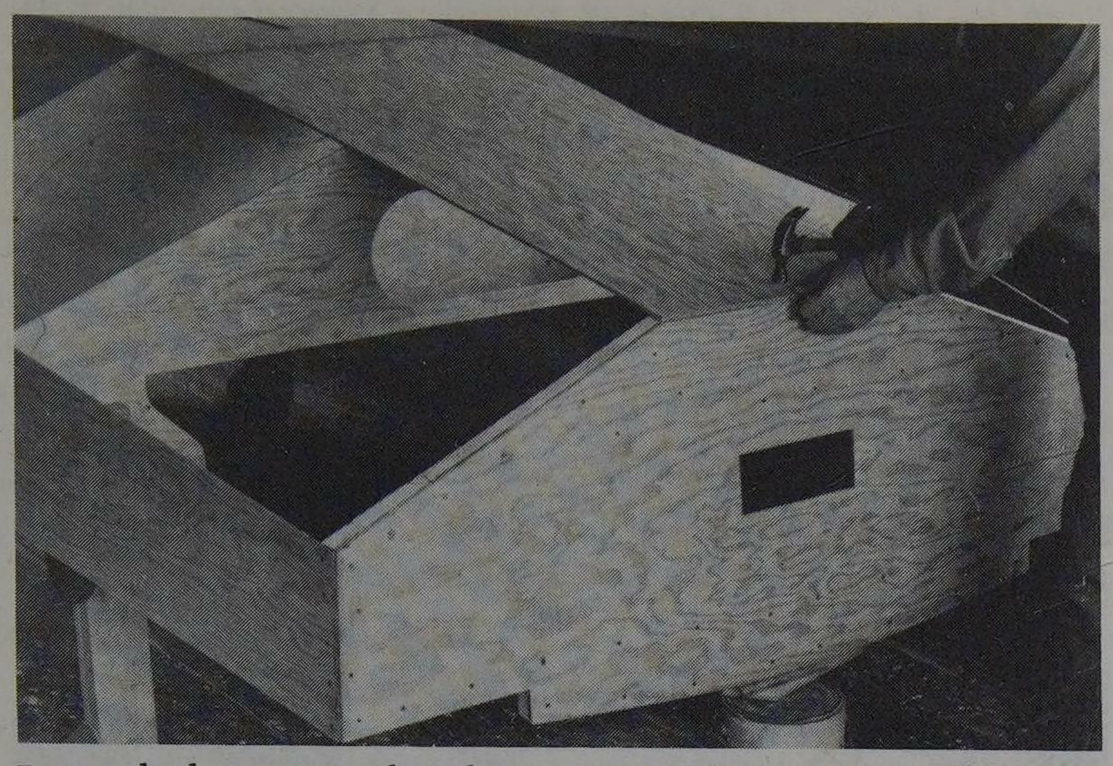
The stem is made from five layers of ½-inch marine or exterior-grade plywood, sawed with a saber saw or small Skilsaw. When the glue dries, the 45-degree bevels are cut.



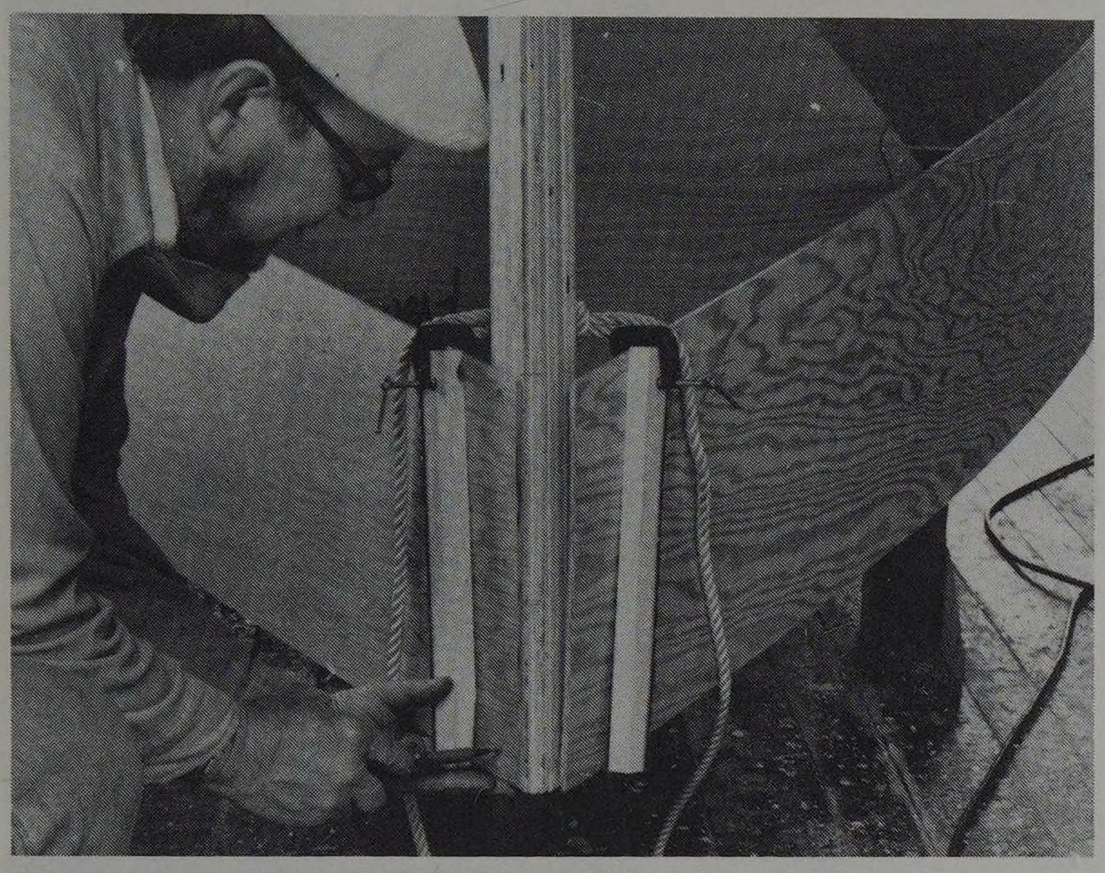
The side panels are glued and nailed to the transom. Use a bucket, wedges, or any other thing you can lay your hands on to support the transom at the proper height for fastening. Note the retaining rope, just visible behind my hand.



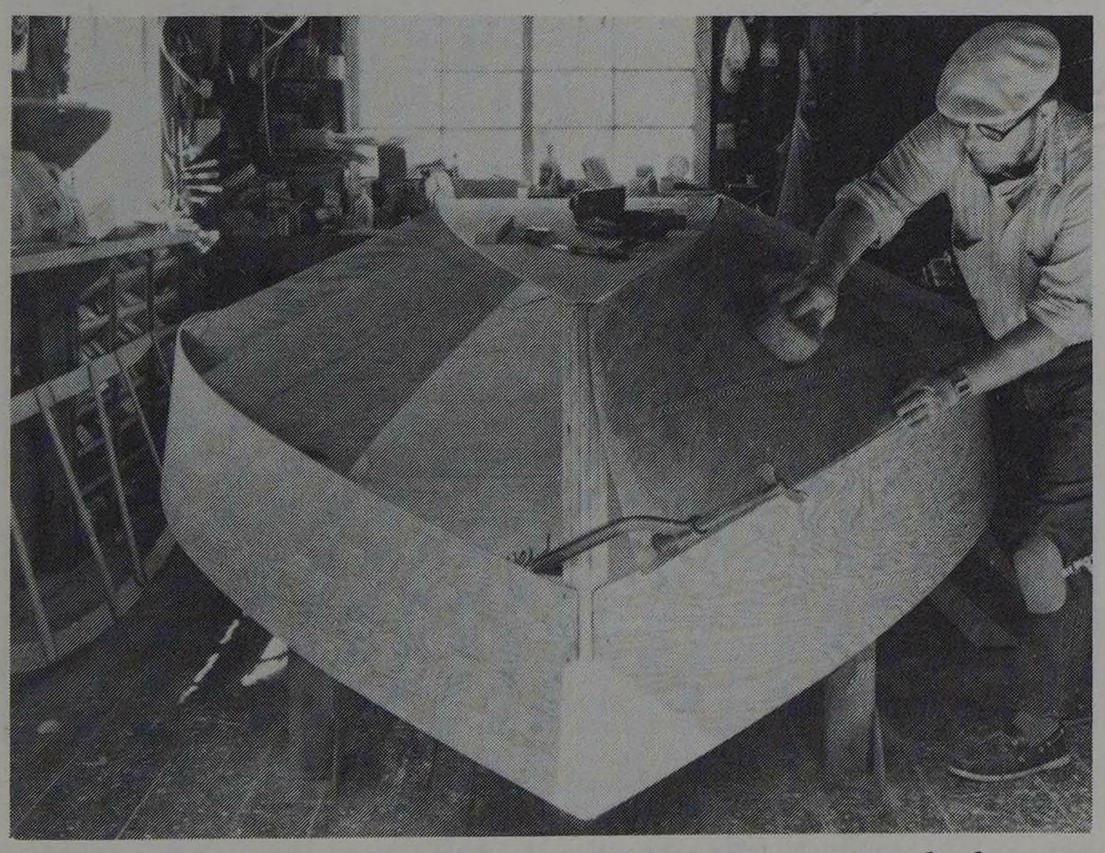
With the bow ends of the side panels sprung in by a Spanish windlass (in this case simply a loop of rope with a slipknot), it is time to put in frames C and D, and then frame A.



Fasten the bottom panel to the transom with glue and tacks, then tack it to each frame bottom with no glue. Cleats at the frame bottoms to take the tacks driven through the bottom panel are hidden in this view.



With the stem in position on frame A, fasten each side panel to it temporarily with one screw at the sheer edge and one at the chine edge.



Coaxing the bilge panel into position. A hot water sponge bath eases the forward bend. Note the hump amidships between the bilge and bottom panels. This must be taken out before the ends are fastened.

the transom frame and fasten the bottom panel to it for good, after making sure that the centerlines are matched up. Then fasten the bottom panel to each frame, but with no glue.

Remember that the accuracy of the entire setup depends on the careful alignment of its component parts, so DO TAKE YOUR TIME. Take special care in the bow area to ensure that the chine edges of the side panels are horizontal across the stem and that the ends lie flush to the rake of the stem.

When you have drawn the bow ends of the side panels close to the stem, temporarily fasten both panels to it with one screw each about one inch above the sheer. Check alignment and adjust as necessary, then add one more screw on each side panel about one inch below the chine edge.

When you are satisfied with the alignment, remove the last two screws, apply glue to the contact area and replace the screws. Next take out the bottom two screws, apply glue, and put those screws back.

Complete fastening side panels to frames and transom.

SPRINGING IN THE BILGE PANELS

Again, take your time. The bilge panel isn't going to fall or pop into place, as the shutter panels did in earlier tack-and-tape hulls developed by the Bolger-Payson team. Because of its width and the hard twist at the stem, plus a tendency to hump up and spring away amidships where its edge meets the edge of the bottom panel, this fit calls for great care. Remember, it's not edge-to-edge contact we're concerned with here. Filler paste and glass tape will take care of gaps of a quarter inch, and even close to a half inch, with relative ease.

The real problem is the hump I mentioned. This has got to be taken out before the bow and stern ends of the bilge panel are fastened in place. The whole shebang has to be snugged down together. While you are nursing it along, you can use a hand saw and a plane to relieve tight spots in the chines, just slipping the saw into the seam and "shaving" the plywood eges. Cut a little, and press down on the hump between frames A, B, and C. You might find it helpful to nail a cleat to the aft edge of frame B, where a couple of nails driven through the bilge panel would help hold it in place. Attaching two or three pieces of wire at strategic points for maximum purchase will give you more pull power if necessary to haul the edge of the panel into a fair fore-and-aft curve matching the edge of the bottom panel.

Let's take stock of just where we stand after this stage of the procedure. The bow end of the bilge panel is clamped to the stem, and its aft end is tacked to the transom framing. Take a long hard look all along the

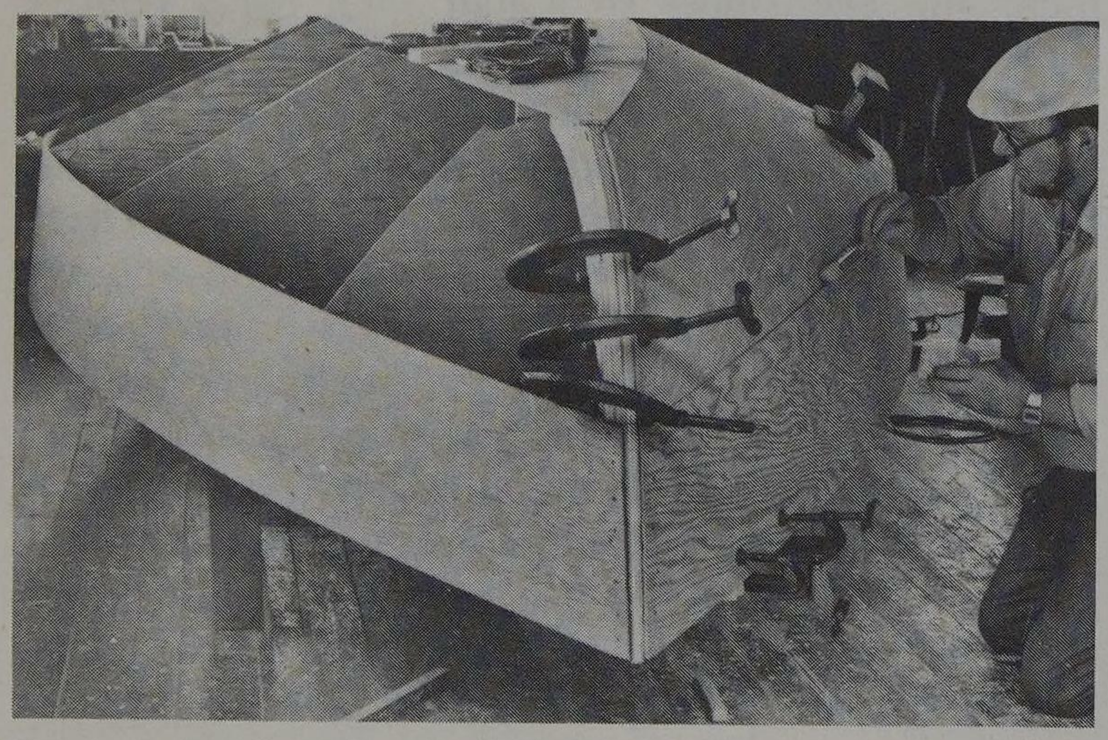
joints to see if they lie fair. If any sunken edges of the bilge panel have fallen slightly flat between frames, you can push them gently up with a stick clamped to the sides.

I found, too, that the edge of the bilge panel between the stem and frame A wanted to curl away a bit from the edge of the side panel where they should form the chine. So here I put a temporary stick with a beveled end inside the hull and used a couple of screws to pull the panels together. Pan-head or machine screws will do for this.

Satisfied that everything is okay? Release the clamps at the bow, slowly and carefully; apply glue to the stem and fasten the panel down with 1½-inch bronze anchor nails or screws. Moving to the stern, pull the nail from the aft end of the panel and let it spring clear of the transom. Glue and nail it for good.

Now the simplest of all building instructions: repeat the procedure on the other side. But first, one handy hint.

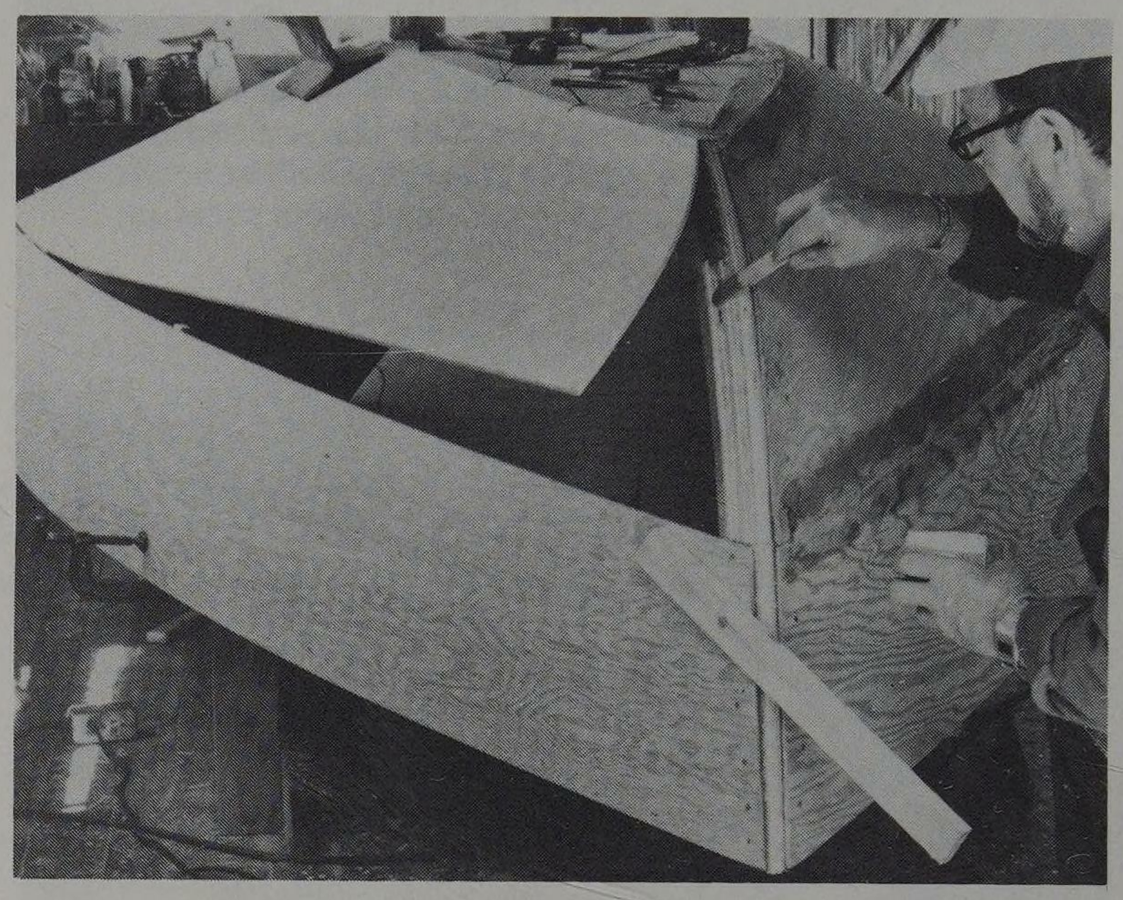
Clamping the first bilge panel at the bow end was no problem: C-clamps deep enough to reach the opposite side of the rugged stem made easy work of pulling in the panel, tough twist and all. But with one panel closed in, C-clamps are out. The solution is simple—you latch it in place. Just screw a stick to the side of the stem—a piece ¾-inch by 1½ inches and about 1½ feet long will serve; fasten it in place with a number 10 screw 1½ inches long for it to swivel on. Pull the bow end of the bilge panel in to the stem by hand, and swing the stick around to hold the edge of the panel just as you use a wooden button to hold a door shut. You don't have to worry about the inboard edge of the panel—the force of the twist holds it in place.



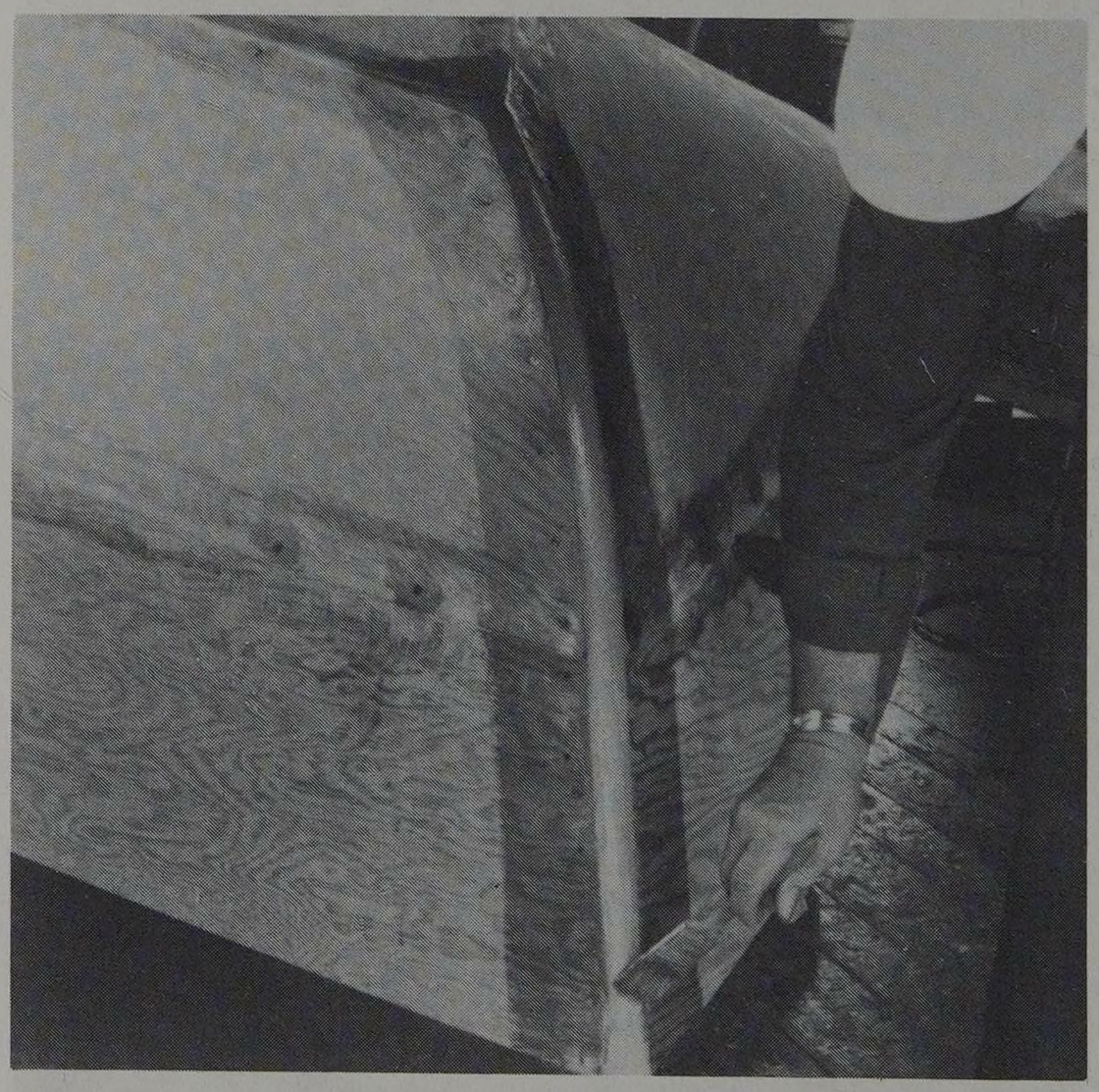
The first bilge panel in place, glued and fastened at the stem and transom and tacked to the edges of the bottom and side panels. The tacks that I toenailed into the edge of the bottom panel were not quite sufficient to keep the bilge panel in position at its forward end, so I supplemented them with a couple of wire stitches. The two clamps at the sheer edge of the side panel anchor a stick, the upper end of which holds the edge of the bilge panel out flush with the side panel. Here I'm coating a seam with resin in preparation for applying the putty.

If you have moments of doubt and near-panic while you're springing the bilge panels in place, remember you are not alone. So did I. I doubted that that panel would ever go into place, and meeting up with that hump did nothing to reassure me. I did it, though, and so can you, and you will be rewarded for all your anxiety when you squint along your hull and see a sweet, fair curve.

You know now she's going to float, so let's fill the seams and get ready to tape.



The forward end of the second bilge panel is latched in place with a swinging stick for gluing and fastening. Once the bilge panels are fastened, their aft ends are trimmed flush with the transom.



When the seams are filled and rounded with glass putty, the fiberglass taping begins. I taped the stem first, using a 6-inch-wide piece of scrap cloth. The photograph shows how the stem looked after I rounded it with glass putty.

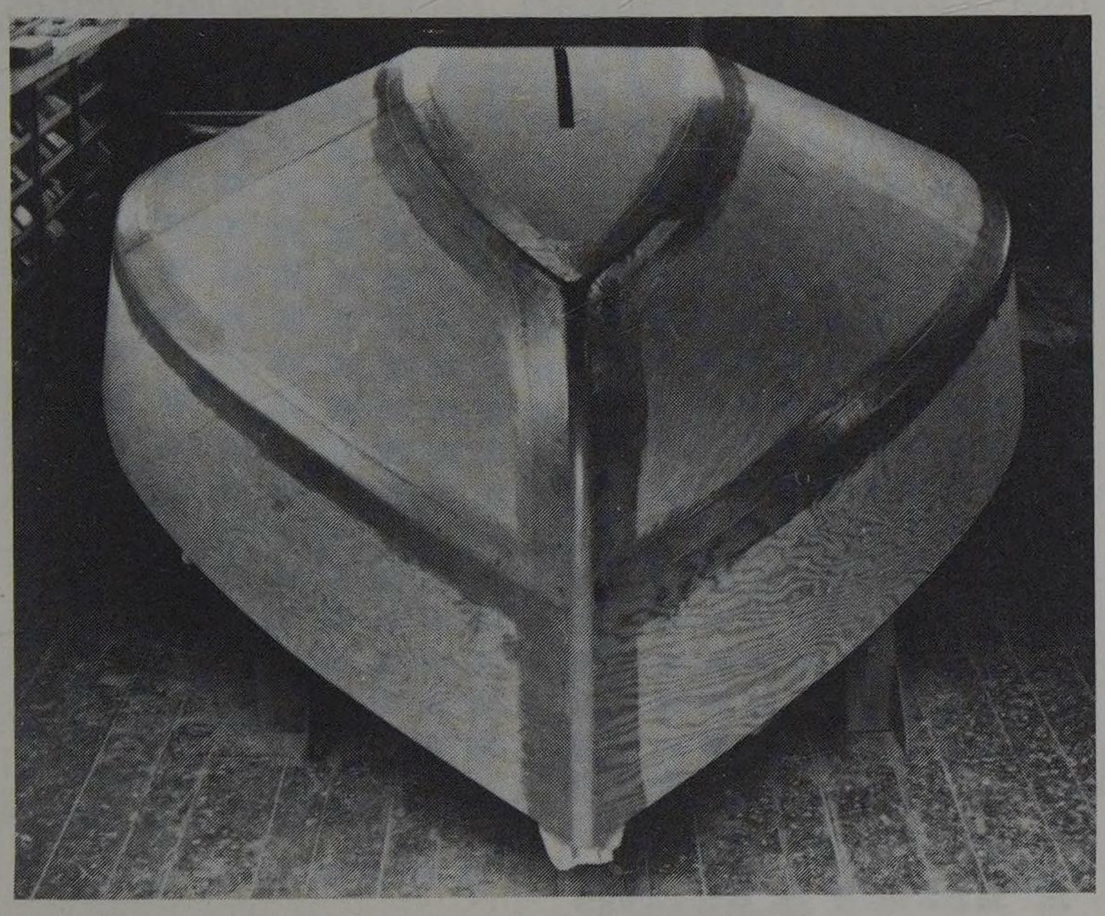
START ON HER UPSIDE DOWN

Begin by covering the inside seams from underneath with 1-inch masking tape to keep your resin mixture from seeping through to the inside when you're filling your seams from outside. Mark a line along each seam, parallel to it and offset 1½ inches, for the edge of your 3-inch glass tape to follow. Cover the area that is going to be taped with a one-coat application of resin. Let that set up, and fill your seams with the resin-putty mixture (see below). Seams are filled first, then rounded as shown in the detail on Sheet 2 of the plans. (At this stage the tacking nails have either been drawn or driven in flush with the wood.) I did my rounding by hand, using 20-grit sandpaper stapled to a block having one concave and one convex surface. The concave face rounds outside corners nicely, and the 20-grit paper mows them down fast. You don't want to use a power sander for this because it would hollow out areas between soft and hard veneers—a combination you always meet up with in plywood.

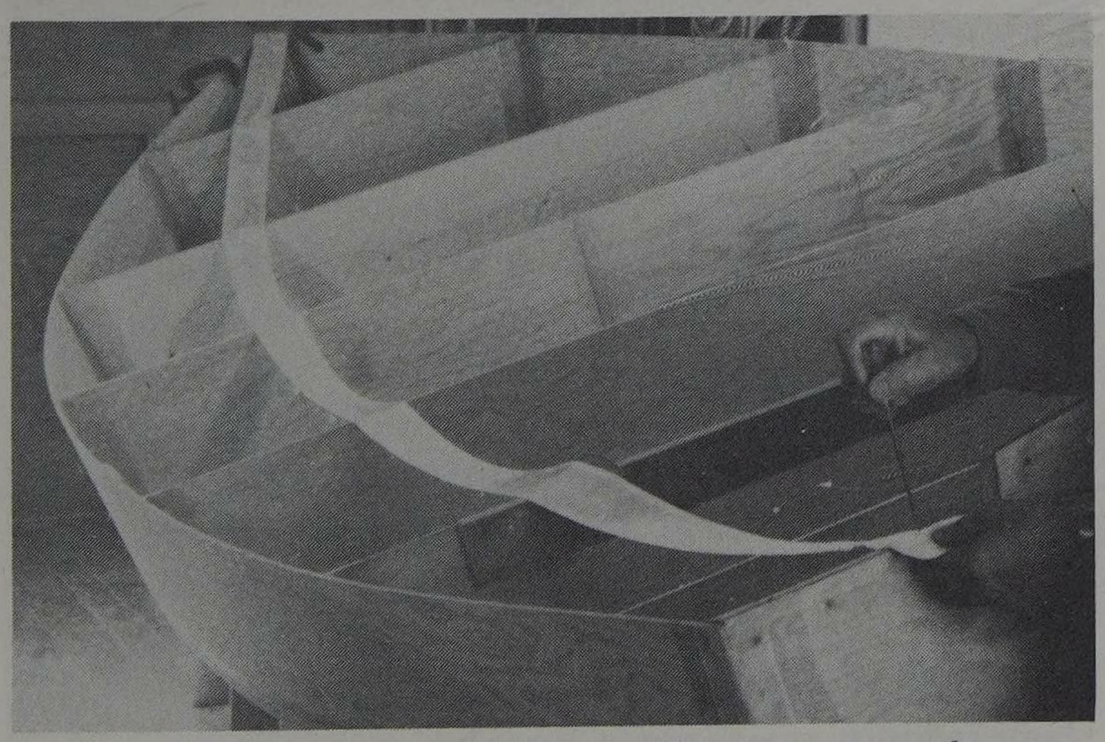
If your local hardware store can't supply 20-grit, move along to a tool-rental store; they will have it in stock to sell to the renters of floor sanders.

When your seams are all rounded and ready (I filled the stem face too, as shown in the "optional cap" in the stem detail drawing), start taping. I began at the stem, still working outside the capsized hull, and taped it with a piece of 6-inch cloth cut from scrap. Then I applied 3-inch tape along the transom edges, following up with 3-inch tape from stem to stern on each seam. To do this, lay a coat of resin over the hardened putty and then lay the tape. Immediately brush a second coat of resin into the weave, and let this set. Sand the seams lightly, just enough to get rough edges and any blobs of hardened resin down flat.

Now turn her right side up and see how she looks. (Speaking of looks, we won't glass the entire outside of the hull until the centerboard trunk is in place.) Strip the masking tape from the seams; it comes off easily, and resin doesn't stick to it.



With the seams taped, she's ready to turn right side up.



For the full-length seams inside, cut the fiberglass tape in advance and have it ready to place immediately into the fresh putty mixture.

THE PAYSON RESIN-PUTTY RECIPE

As I indicated in the Bill of Materials, I use the same size container for mixing all concoctions where use-up time is a factor. My choice is a cut-down half-pint milk carton, and for my resin-putty mix, I begin by putting in the resin with hardener and then stir in Fillite powder



For taping the fore-and-aft seams, a 1½-inch brush is just right. Note that as the tape is dry-brushed, the fresh putty mixture is seeping through.

to the desired consistency, which is just thick enough to hold its shape. I start with a half-inch or a little more of resin with hardener in my cardboard container, and with the Fillite I'm working toward a total mixture of about three times that amount—enough to do one long fore-and-aft seam, but not so much that it reaches the throwaway stage before I've used it up. At the same time, you want a little more than you'll need so you won't have to stop and mix up a fresh batch in midstroke.

Let's assume you're settling down to tape all Bobcat's inside seams and do supportive taping around the frames where they meet the side and bilge panels and the bottom. You'll mark in guidelines as before, for the edge of the tape along the seams and for the areas around the frames as well. You will saturate the seams and other areas to be taped with resin, let it set, and apply your glass putty, to be followed immediately with a strip of tape and another brushing of resin. (Note that the glass putty was allowed to harden before tape was applied to outside seams. This made the seams easier to round.) When that has set up a bit, on goes another brushing of resin, which will be followed a little later by a final coat.

Temperature can be critical, so check your thermometer. If it runs much over 60 or 70 degrees Fahrenheit, I'd do the frames first, laying down a strip of tape along their joints with the bilge and side panels, and save the long fore-and-aft seams for a lower temperature—say, by dawn's early light. If you must do them later, when it is warmer, you should con somebody into lending a helping hand so your putty won't start setting up before you get the tape into it.

When you have your frames taped to the side and bilge panels, list your boat over so you can work on the long chine seams more comfortably. Cut your tape the full length of each seam in advance, so you will have it ready to plunk into the fresh putty with no delay. Don't even pause to wipe your tools off. Just plop them into a bath of acetone or lacquer thinner and clean them off later.

Before you tape the bilge panel to the bottom panel seam, cut down frame C and saw out the holes in frame B. Leave frame D intact so you can use its centerline to plumb the centerboard trunk, after which you can cut it as indicated. Tape the frames across the bottom panel, with the exception of the forward face of frame D and the aft face of frame B, where tape would interfere with placement of the centerboard trunk headblocks. Do not tape the midsection of frame C (1½ inches either side of the centerline), where it must be cut away to make room for the centerboard trunk and trunk logs.

I'm on the short side, and correspondingly short of reach, so I found it impossible to work from outside the boat across the bottom panel. Taping along the frames from the inside would have brought my weight to bear on the bottom panel, which is only quarter-inch plywood and not even solidly fastened yet.

I rockered the hull until a section of it lay flat on the floor between frames D and E, and put a block under the bow to hold it in this position. That way I could get in her and put my weight on that section. There was no way I could step from the floor, clear the bilge panel, and step onto the centerline, so I put horses on either side of her and walked across a couple of 2 x 4s to get to the center.

4. Centerboard, Rudder, Mast Step, and Exterior Fiberglass

MAKING THE CENTERBOARD

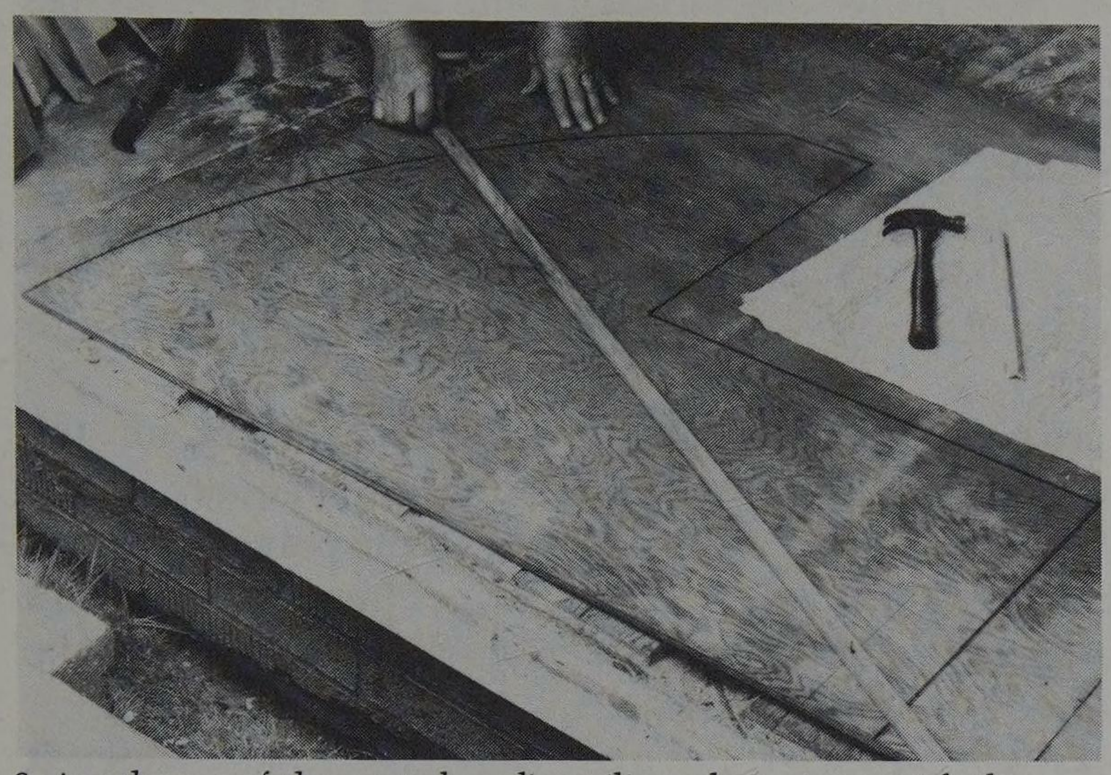
In preparation for the installation of the centerboard trunk, shift the hull's position so that the aft section of the trunk area bears on the floor, then get into her and cut out frame C in the path of the trunk logs. Two 4-inch vertical cuts are needed, offset 1½ inches either side of the centerline. This step is much easier if the cuts from the frame bottom were started before the frame was installed.

Make the centerboard first; having it right on hand helps clarify the demands that affect the conformation of the trunk, and lets you try it for fit from time to time.

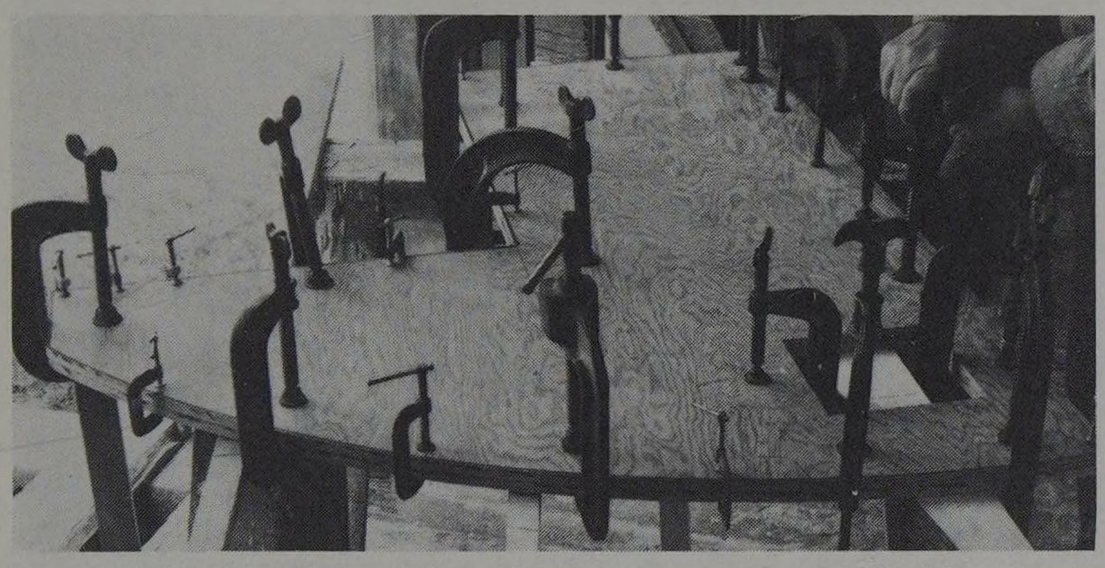
Laminate the board from three pieces of quarter-inch or two pieces of ⅜-inch plywood. Stick to marine grade in either case. Note the drawing on Sheet 2 of the plans for its shape. When you make your full-sized layout, mark it for the pin pivot point and the 6-inch by 6-inch square cutout for lead ballast; also mark the hole for the lanyard stopper knot and the holes for the fid.

To lay down the curve of the trailing edge, drive two nails in a stick 3 feet 5 inches apart, and use that to swing the radius. Two pieces of ⅛-inch brass plate cut 5⅜ inches by 3 inches are OK for making the pivot for the centerboard pin to ride on. Monel or stainless steel would probably be better, but are much harder to work. Tape the two together and saw out a ⅝-inch-wide slot using the bandsaw. Mark your brass plate for locations of ¾-inch number 10 brass or bronze screws, staggering the holes so the screws don't collide when you drive them from opposite sides. Bore holes for fid and toggle, and mark along the edges of the board for tapering where required.

Next, lay out the trunk sides by the dimensions given and place the two together, boring a ½-inch hole for the pin through both of them. With the centerboard between them, shove the pin in place and check to make sure the board pivots just as it's supposed to. It's much better to find out now, instead of taking for granted that it's going to work after you've launched her. Besides, you can see just what is happening while you've still got the trunk all open this way.



Swing the arc of the centerboard's trailing edge using a stick that pivots from a nail driven at the centerboard pin location. The radius of the curve is 3 feet 5 inches.



Use a blizzard of clamps when laminating your centerboard, and pick a level spot.

BUILDING THE CENTERBOARD TRUNK

When you're satisfied that the board will function in the trunk, fasten the headblocks to one of the trunk sides using thickened epoxy glue and 1-inch bronze anchor nails. The two 5-inch by ¾-inch by 4-foot trunk logs and the 1½-inch by ¾-inch top framing are fastened to the sides *before* you fasten the remaining side to the headblocks. Use thickened epoxy glue and ⅞-inch anchor nails driven from the inside out for this.

At this point, imagine that a little red flag is popping up, warning of the need for a little foresight. *Now* is the time to give the inside surfaces of the trunk a coat of wood preservative. (After this, it will be never.)

Take note of the dashed angled line right over the forward end of the trunk logs. This represents a block of wood ¾-inch thick on either side of the trunk, made to this approximate shape in order to catch the pivot pin; these blocks go on the outsides of the trunk's sides and sit right on top of the trunk logs, and are glued and then nailed from the inside. Before you fasten the trunk together, bore for the pin from the inside, through the pieces you have just put on, and cut the pin to a length that will fit the trunk's total width, outside to outside. Yes, this would guarantee a leak. To prevent it, make a couple of wooden pads to put over the ends. Alternatively, you can bore only partway through and bury the ends, but the recommended method provides more bearing for the longer pin. Another plus for the protruding pin is that you will know its location when you are mounting the centerboard from underneath



Two pieces of ⅛-inch brass plate are taped together and sawed on a bandsaw with a hardened skip-toothed blade.



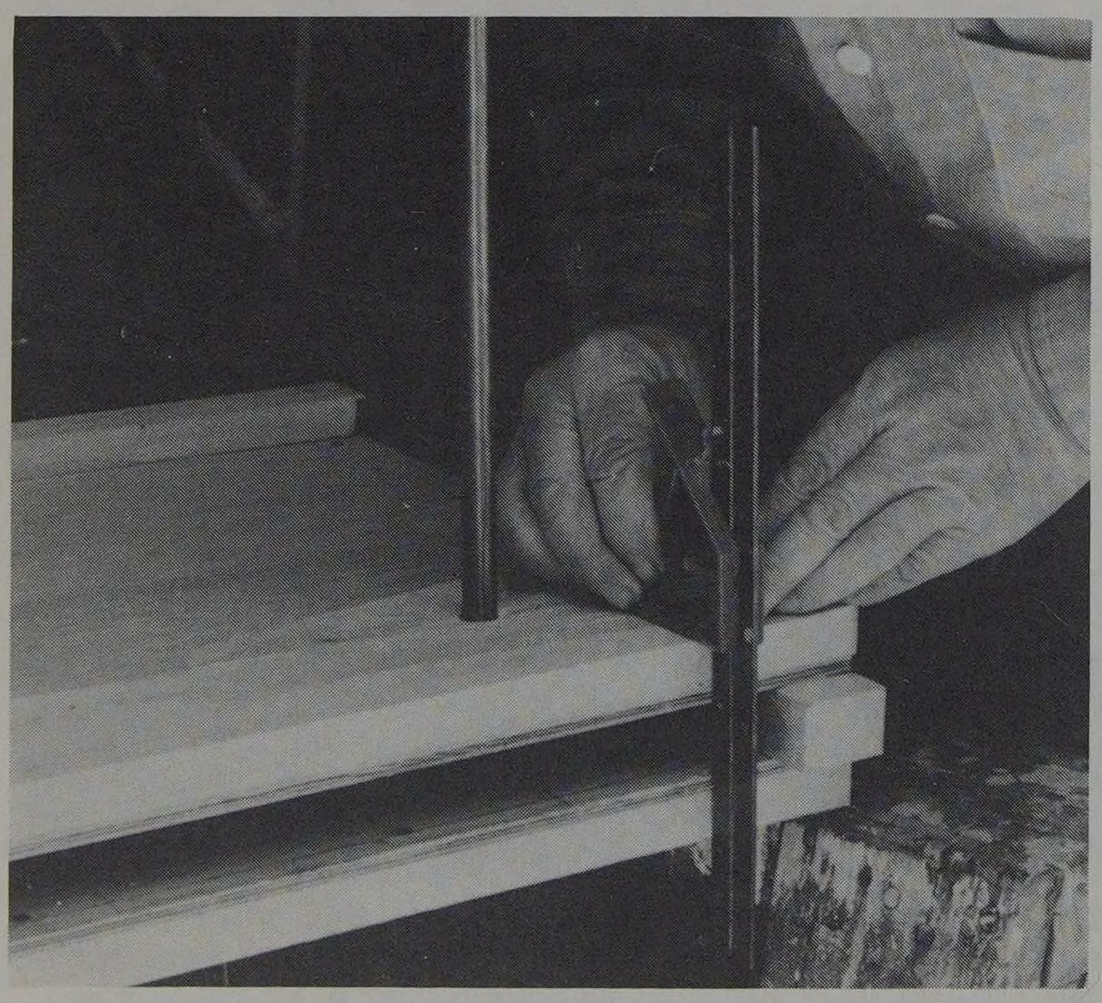
Try the centerboard pivot action right in your shop where you can see what is happening, instead of trusting your luck on launching day. Note the taper in the aft and bottom edges of the board: you can make this using an electric block plane and smooth it with a belt sander and 60-grit paper. The plywood veneer glue lines aid your eye during the tapering process.

and attempting to catch the pin in the centerboard slot.

Glue the remaining sides of the headblocks and fasten the other trunk side to them, gluing and then nailing from the outside, after checking across the tops to make sure they are square. Insert the pivot pin and cap the ends with a piece of ¾-inch wood of any type, glued and then nailed from the outside with two small nails. Finally, cut the headblocks off fair with the bottoms of the logs. Clean off any excess glue, locate the trunk in the hull, and trace a light pencil line on the bottom panel around the outsides of the trunk logs. Bore out through the hull from inside. Apply thickened epoxy glue to the ends of the trunk and the ends and bottoms of the logs, put back inside the hull, and fasten with nails from outside, first making sure that the centerlines of the headblocks match the centerlines of frames D and B.

Tack the frames to the ends of the trunk first, then fasten to the trunk logs from underneath, and finally finish nailing the ends. Now that the trunk is installed, you can tape the bottoms of the two frames to it. Put in the notched ¾-inch by 3-inch deck beam over the trunk at frame C as shown in the construction profile on Sheet 2, and remove the perforated segments of frame D.

If you have not already done so, install the 1½-inch by ¾-inch cleat on the aft side of frame E to support the forward end of the stern seat. Use glue and ⅞-inch bronze anchor nails for this. Don't put the fore-and-aft seat stiffeners in yet, as they would be in the way when fastening the skeg and painting. Install the transverse frames to catch the ends of the floorboards, using the heights previously marked on the frame panels.



Make sure the bottoms of the trunk logs are square before fastening the two halves of the trunk together. Note the reinforcing block for the pivot pin.

THE MAST STEP

Fabricate the step from ½-inch plywood as shown in the profile view of the inside of the hull. Mark its centerline and cut the mast heel hole angled 9 degrees fore-and-aft to match the angle between mast and step shown in the plan. Note that the hole is eight-sided in cross section, with four long and four short sides. The diameter is 3 inches between opposite long sides, 3¼ inches between opposite short sides, and 3½ inches between opposite corners. Start with a 3½-inch-diameter circle, its center 3¼ inches aft of the forward edge of the step, and mark and cut the hole accordingly.

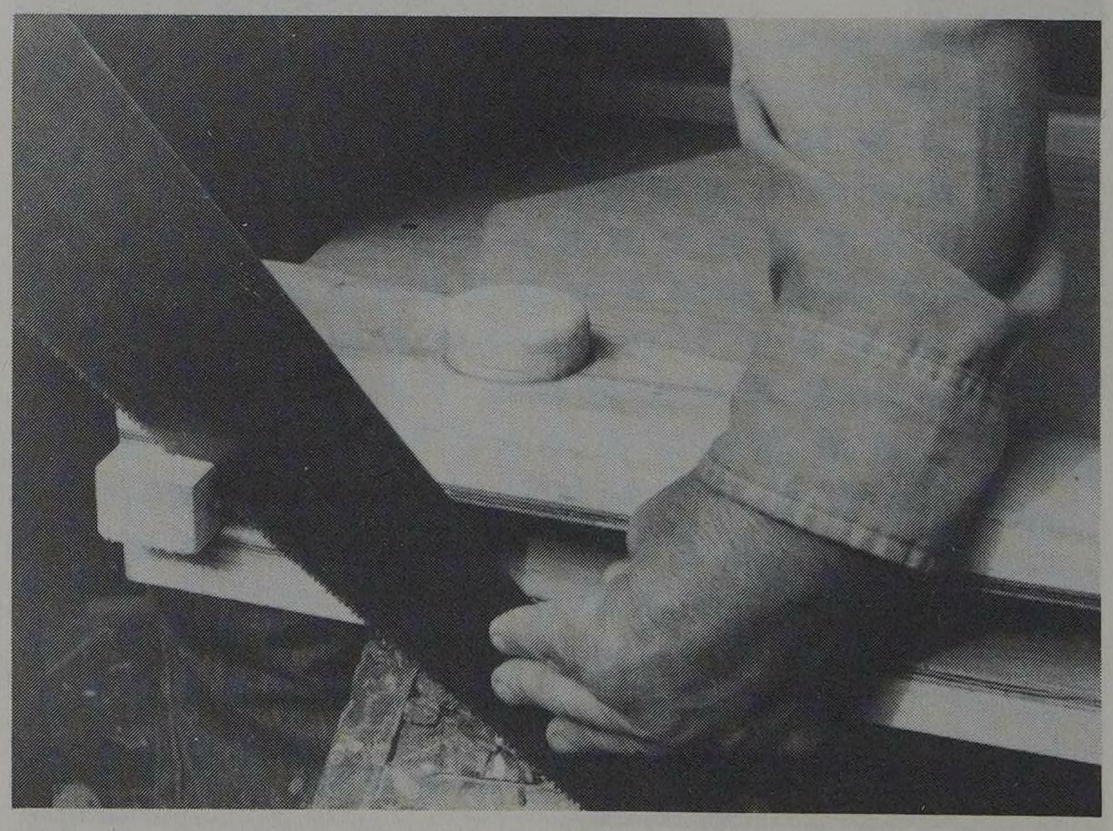
The plan also calls for a 9-degree bevel for the forward side of the forward 1½-inch-square frame beneath the step. When you get to the point of cutting the hole for the mast at the partner (on deck), you will need a 12-degree angle to accommodate the rake of the mast; otherwise the hole will not accept the mast.

Right now, glue the mast step in place and fasten it with 1¼-inch bronze anchor nails driven from outside the bottom panel. When the entire hull has been fiberglassed, it will be time to cut a shoe which will be through-bolted to the hull and the mast step. Both the step and the shoe assembly could be put in at the same time, after glassing, but it is much easier to put the step in now with the boat right side up and the shoe later when it will be upside down.

HOT LEAD: THE CENTERBOARD BALLAST

With the centerboard trunk solidly in place and the mast step fabricated and installed, this is a good time to pour the 10.9 pounds of lead needed to give the centerboard negative buoyancy.

Drive nails partway into the edges of the cavity all



Insert the pivot pin and cap the ends from leakage. Cut the headblock ends flush with the bottoms of the logs.



My brother-in-law Al Joy, with his plumber's torch and kettle for melting lead. Here he uses a ladle to skim off the impurities.

around, as shown, to anchor the lead insert. Then rustle up a friend with a plumber's torch, kettle, and ladle.

This is the fastest and most efficient way to do this job. Cut your lead up into convenient small pieces. I started with a printer's lead pig that I got from a friend; it was about two feet long and a couple of inches wide and weighed in at 23 pounds. I sawed it into 2-inch segments on my bandsaw, which was like sawing through cheese, and passed each chunk to my brother-in-law, Al Joy, who dumped it into the melting kettle. We had the centerboard laid out absolutely level over a sheet of asbestos, and we poured the molten lead into the cavity a few pounds at a time. Pouring it in batches like this was perfectly acceptable, according to Al, and safer, too.

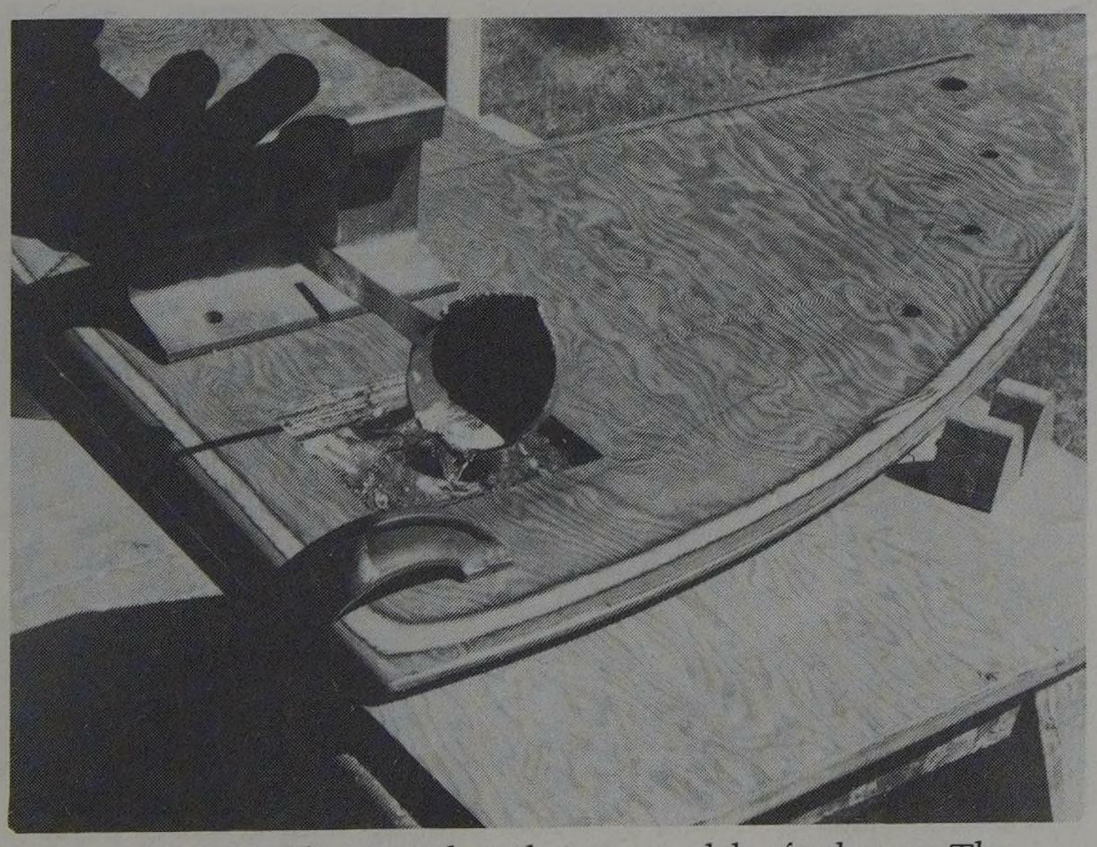
The big no-no is water. If there is any water in the cavity the liquid lead will spatter. (I have heard of large keels exploding in the mold with disastrous results, when the molder got careless about this.) So take it slow and easy, and see to it that any impurities—dirt, scum, or whatever—are ladled off before you do any pouring.

Fill the cavity a little more than level and trim off any excess later with an electric plane or spokeshave, finishing off by sanding it down flush to the board.

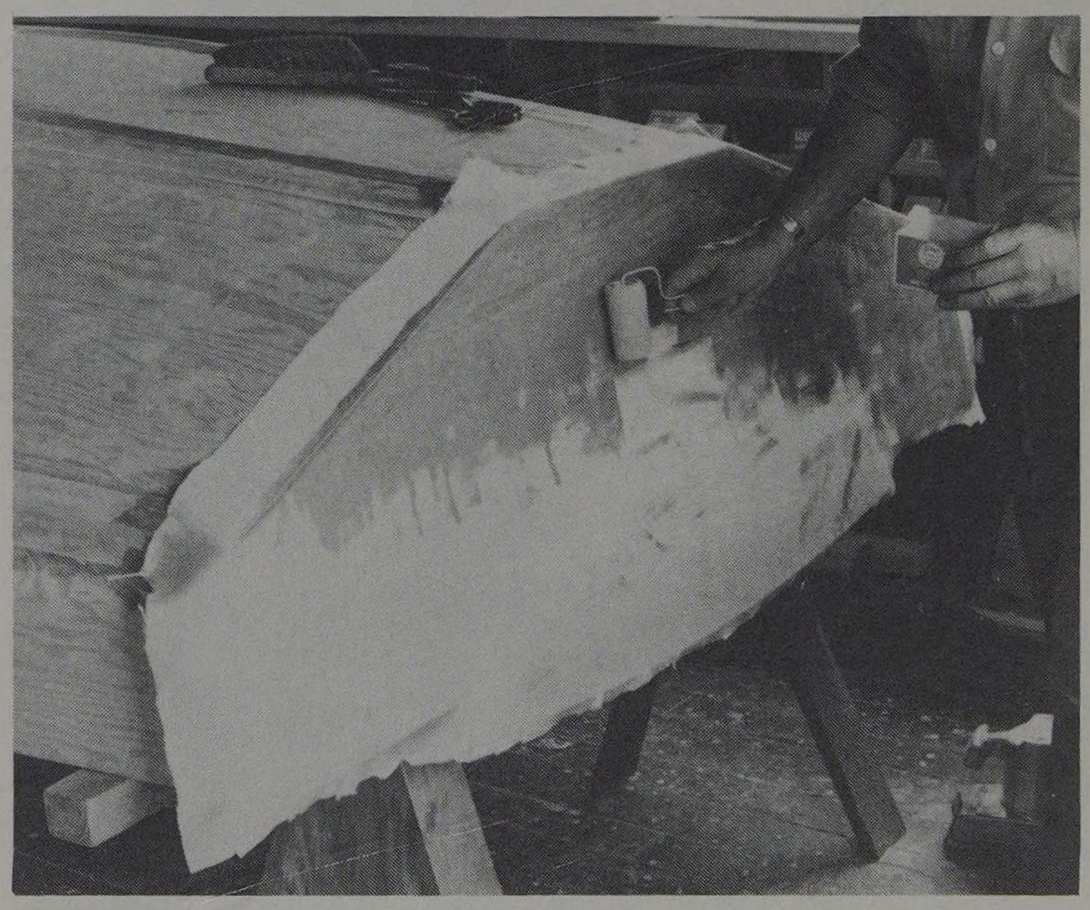
Lacking the plumber's equipment and the helpful brother-in-law, you can manage on your own with a portable Coleman stove.

GLASSING THE HULL

With the hull upside down, check it over thoroughly for any glass bubbles, nailheads, and any other protuberances that would interfere with the smooth application of glass cloth, and round off the corners of the centerboard slot.



Pouring the lead. The centerboard sits on a slab of asbestos. The nails in the edges of the cutout are not visible in this photograph.



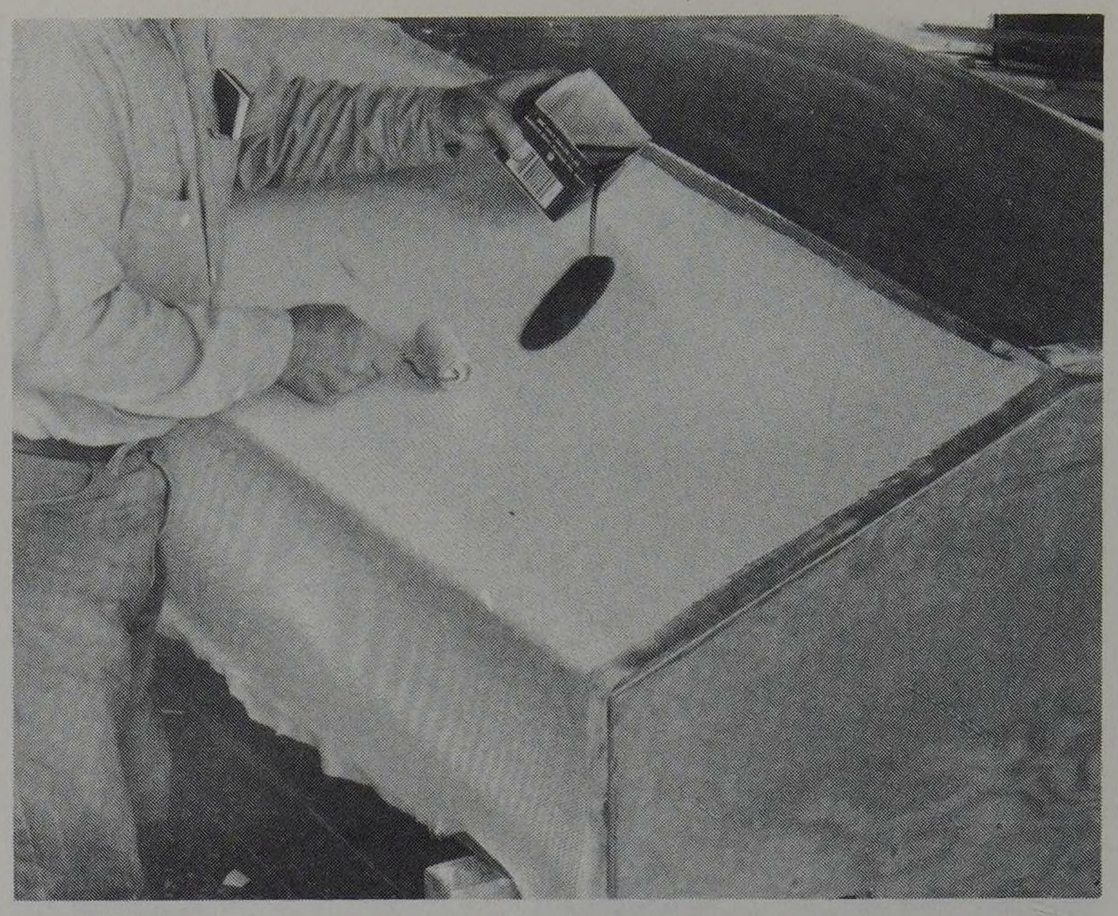
Glassing Bobcat's entire exterior. Start with the transom and stem. Lay the cloth into fresh resin, then immediately apply another coat over the weave.

Glass the transom first, starting with a coat of resin followed by fiberglass cloth overlaid into the fresh coat. In the same way, cover the stem with resin and a strip of cloth. Now move on to the bottom panel with a layer of cloth bedded in resin all along its length, or two layers if you prefer. At this point there is no need to cut out either the centerboard slot or the tiller hole in the transom. Glass right over both, and cut them out later, as long as you do it before the resin turns rock-hard.

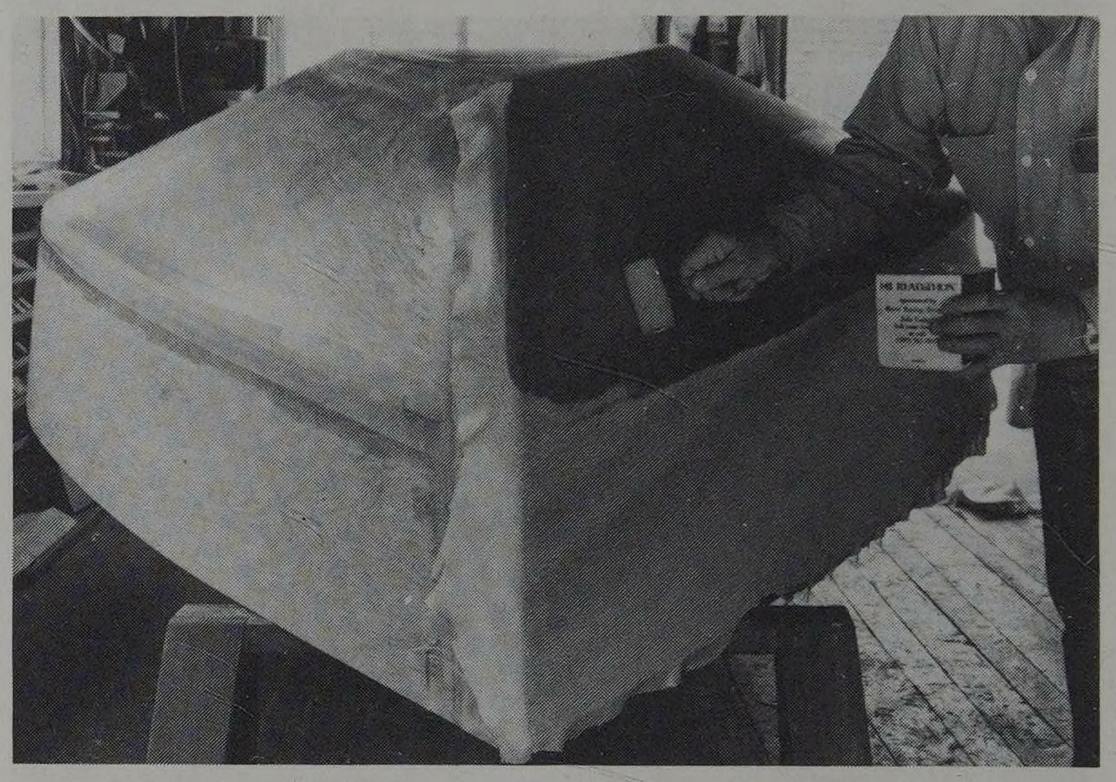
Two strips of 38-inch cloth, one on each side, will reach from the sheer down to the edge of the bottom panel. Don't lay these down in fresh resin. Put the resin coat onto the bare plywood and let it set up before you lay down the cloth. (Use lay-up resin for this, because this type of resin contains no wax and will give a better bond to the next coat.) You don't want to be interrupted and find yourself caught with the cloth full of wrinkles and stuck in a half-setup batch of resin. If the temperature is low enough, say 60 degrees or so, and you are a fast worker, you could probably do this, but to be on the safe side it's best to do only what you figure you will have full control over.

Don't feel that you have to glass the whole boat in just one day. I recommend that you do a reasonable amount, say the transom and the stem, let them set up, and grind down their cloth edges before you glass the bottom panel. Next time you can do the sides and the bilge panels all at one crack, and you'll be done with that part.

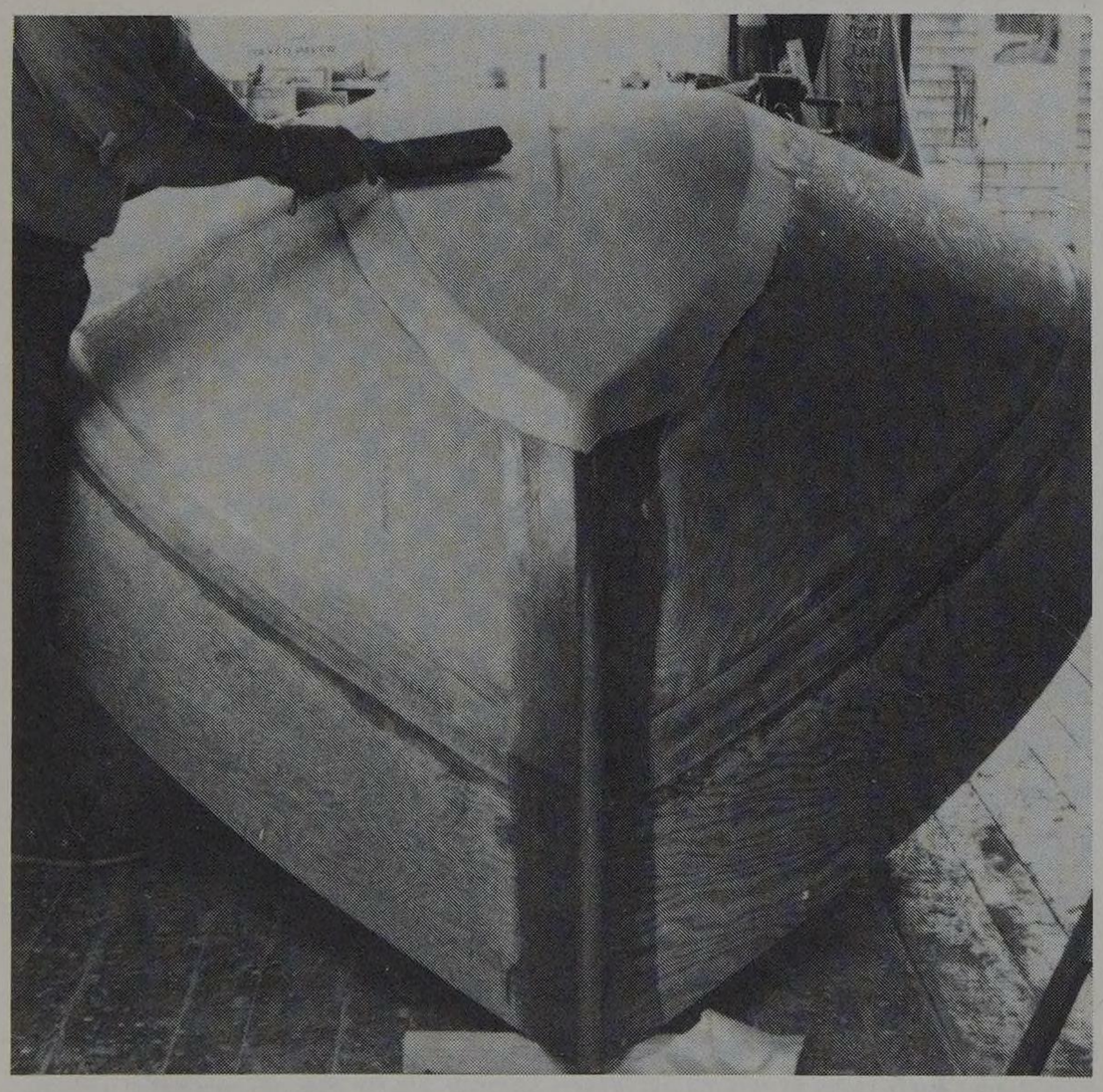
Next comes the sanding. For that you will want a good orbital sander, one that has some gimp, for best results. Mine is a Rockwell 505 that takes a half-sheet of 60-grit paper. Disc and belt sanders come in handy for taking down a surface fast. I work with all three



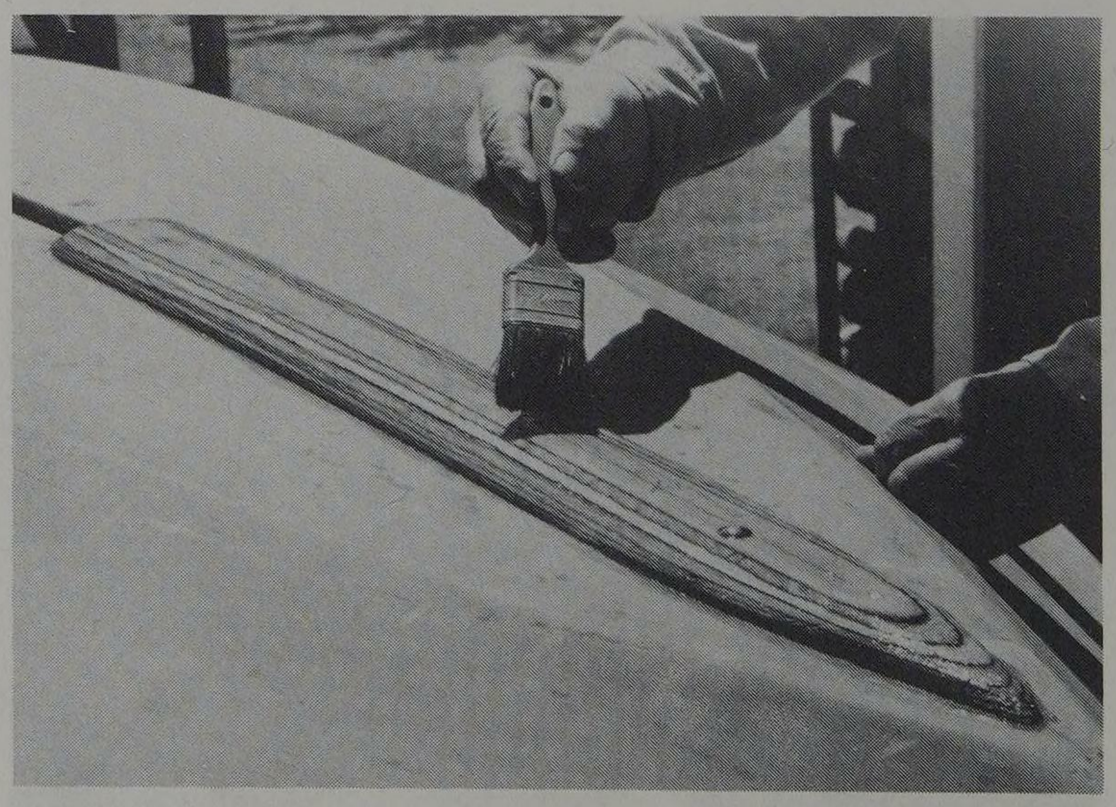
The bilge and side panels on one side can be covered with one piece of 38-inch cloth. Give the whole area to be covered a sealing coat of resin, let that set up, then go to it, making sure to brush the wrinkles out of the cloth before you apply the resin.



Wetting out the cloth. You can let the cloth bend over the stem a bit as shown for extra protection. Allow an inch or so of overhang at the sheer, which can be trimmed after the resin has set up.



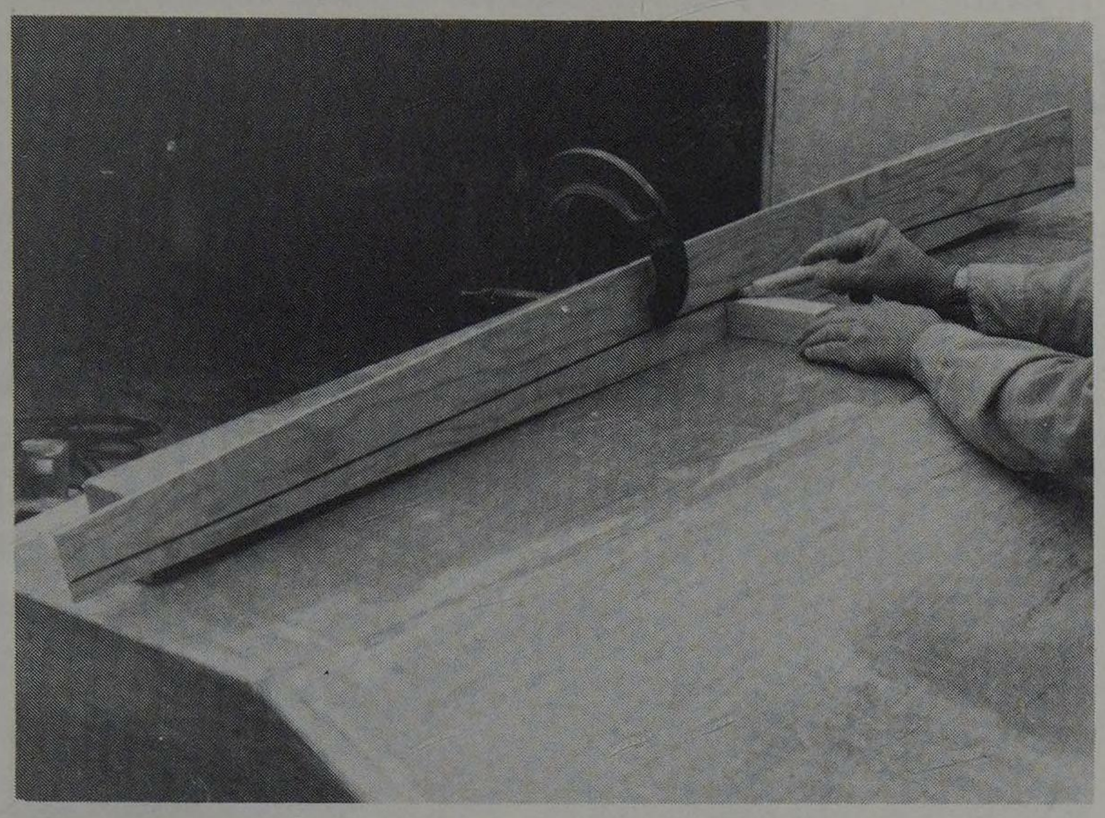
Glass the bottom next. Use one or two layers of cloth.



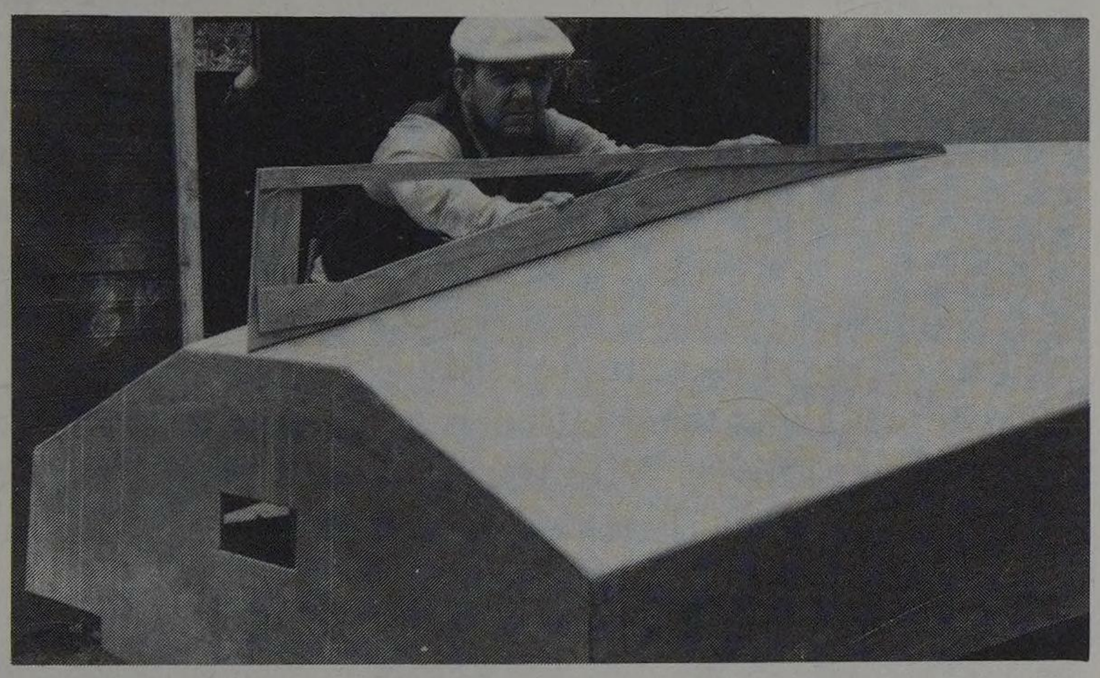
The shoe is made of ½-inch plywood, built up with layers of putty and fiberglass cloth and matting to the thickness called for on the plans.

types. But here a word of warning: don't hit your outside chine edges with either a disc or a belt sander. Either one will take you right through the cloth in just one pass.

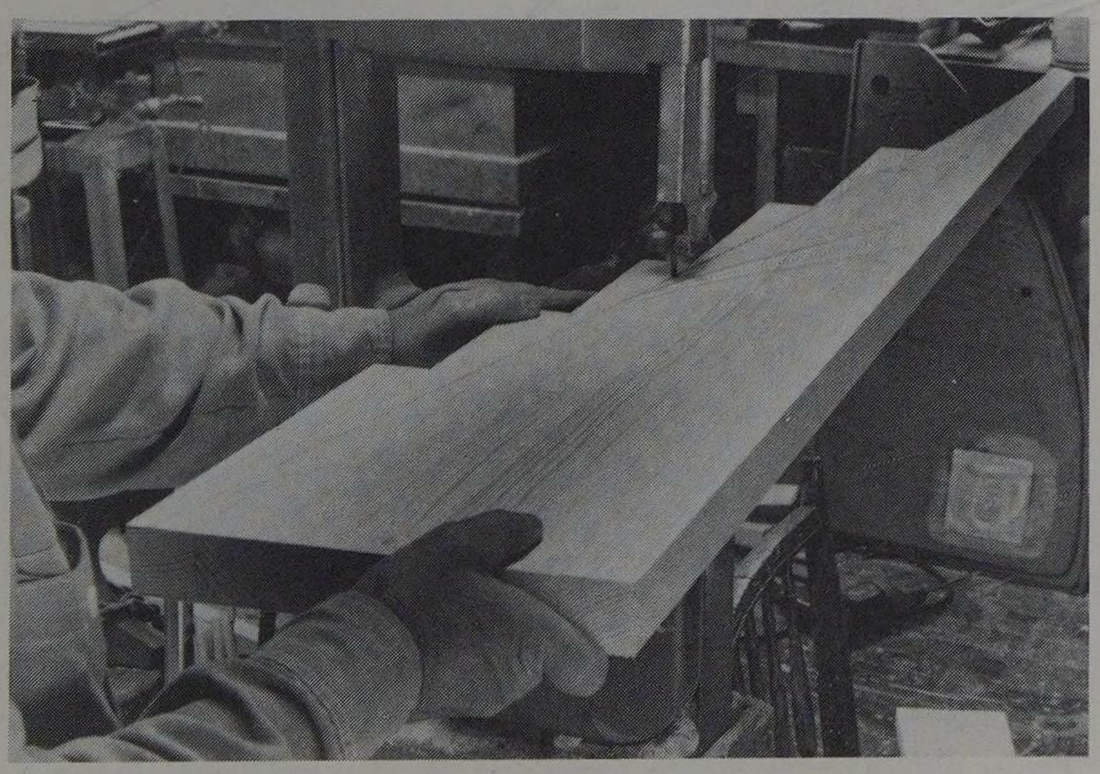
With the outside hull all glassed, it seems natural to pick up on Bobcat's essential underwater items.



Transferring the bottom rocker to a board, the first step in making a pattern for the skeg.



The completed skeg pattern.



Cutting the skeg on a bandsaw. Note how the grain varies from one strip to the next.



Checking the squareness of the skeg's cut, so the skeg won't rock when fastened to the hull.

THE SHOE, THE SKEG, AND THE RUDDER

Because the shoe is going to get a lot of wear whenever you pull your catboat up on some inviting shore (for which its shallow draft makes it a natural and multiplies such opportunities), I decided to make it from half-inch marine-grade plywood, first to the width shown on Sheet 2 of the plans and flat across, then filled out with fiberglass and faired to a well-rounded, pleasing shape. When the shoe gets worn, it is far easier to repair the fiberglass than to replace a wooden shoe that is through-bolted to the mast step.

The skeg comes next. It should be made of 1½-inch-square strips laid out as drawn. Granted, this means work, but it also means it's far less likely to cup or to bow across its depth, thanks to the differing grains. To its trailing edge I added another piece of 1½-inch stock with its grain running vertically, and I hollowed this slightly to accommodate the rounded leading edge of the rudder. I fastened it with glue and a couple of long bronze anchor nails. Countersunk screws would be OK here, too.

Begin by making a pattern for the skeg and cut your laminates to match it. Plane the skeg bottom square across so it will sit plumb to the bottom of the boat. From underneath the overturned hull, bore pilot holes out through the bottom panel, about six inches apart along its centerline. Mark the centerline on the outside of the bottom panel if you forgot to do it during the layout process, as I did. For a bedding compound I used thickened epoxy.

Just when I was planning to attach the shoe and the skeg and all set up for it, outdoors of course, it settled in to rain. I was also waiting for the rudder's gudgeons and pintles, which I should have ordered much earlier instead of taking for granted they would be in shelf stock. So I turned my attention to the rudder itself.

The rudder blade is laminated of plywood to a total thickness of 1½ inches. I rounded the leading edge with

a block plane and sanded it to fit the shape of the skeg's trailing edge. Take note that the rudder's trailing edge, instead of being rounded as is common practice, is hollowed, providing two sharp corners to give the blade more bite and improve the turning action. Use a gouge chisel with an inside bevel to its cutting edge to do the hollowing. A wood rasp will also work. We'll put the rudder hardware and end plate on later.

5. Shaping Bobcat's Spars

No one is going to settle down to making the gaff, the boom, and the mast for this catboat and complete them all in one consecutive sequence. For one thing, the weather is going to have something to say about what kind of work you are going to do on any given day. For another, you may want to shift gears, or other demands on your time may shift them for you.

We can pretty quickly take care of the gaff and the boom proper, temporarily ignoring the jaws, the hardware, and the stiffeners, all of which we will take care of a little later. For the most part they are straight pieces of clear, solid spruce or fir stock. The gaff is 8 feet 10 inches long by 1½ inches square, with no taper; the 13-foot 6-inch boom is 1½ inches by 2½ inches in cross section, and has only a slight taper in profile.

The mast, though, is something else again. It is 15 feet 4 inches in length, and except for the butt below decks it is round in cross section. Part of it is tapered, and most of it is hollow.

HOLLOW VS. SOLID MAST

It is possible to make the mast from a solid natural-growth stick, but hollow is lighter and nearly as strong, and hollow doesn't check. The weight in itself is worth considering, because Bobcat's displacement and consequently her waterline have been computed to allow for this rather hefty item right up in the eyes of her.

You could work with the 1-inch boards that porch flooring comes in, ripping them to 3½-inch widths to match the greatest mast diameter and hollowing them as required. These boards can often be found quite clear in Canadian spruce.

I recommend my approach: use a standard 1½-inch plank, ripped to 3½ inches wide and hollowed. We'll have to add a ½-inch slice between the two 1½-inch thicknesses to make up the 3½-inch diameter the mast calls for.

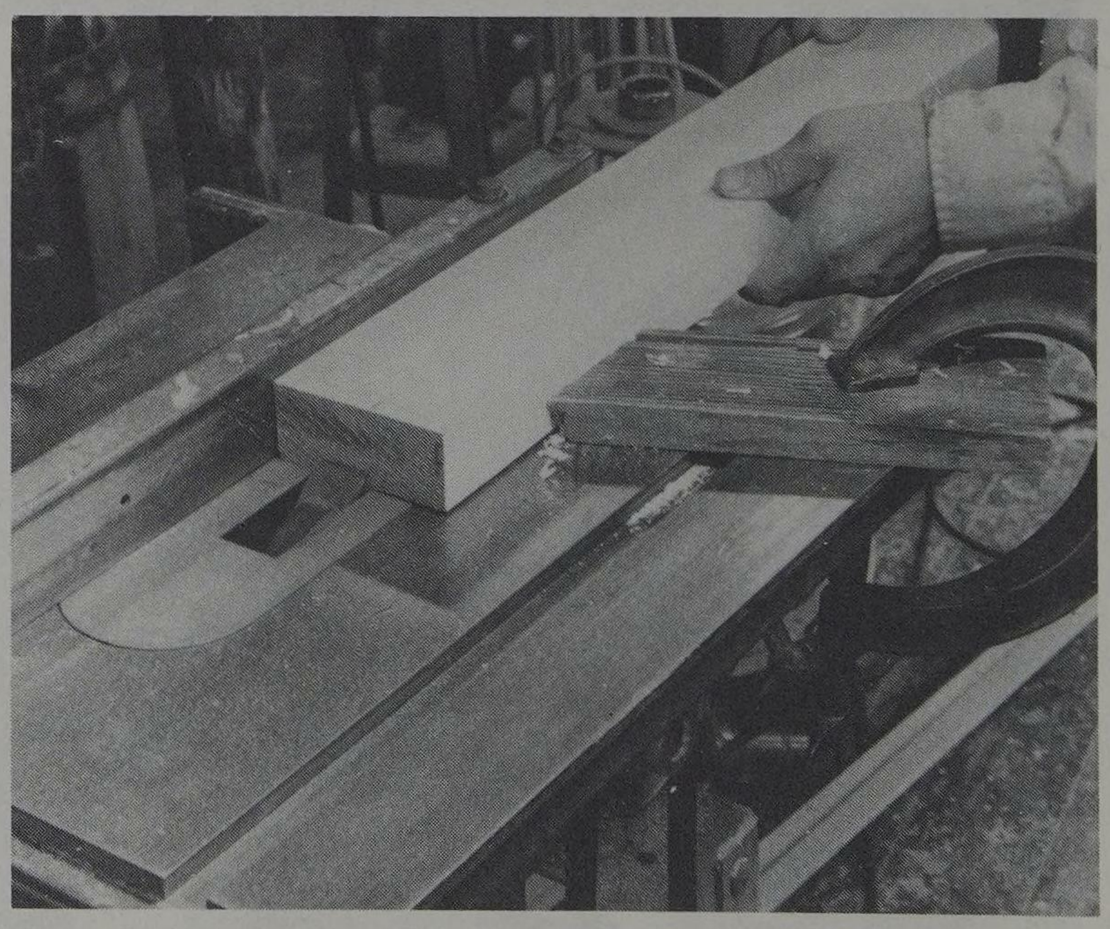
If you are tempted to laminate your mast from 2 x 4s—for they do hand you the 1½-inch and 3½-inch dimensions on a platter, ready-made—give that idea the deep six. Why? Because they come with rounded edges, and if you glue them together you end up with vertical seams running along your mast. It would be a first, of a sort, but an unsightly one,and you could get awfully tired of answering the same old question again and again.

Look for the clearest and straightest grain you can find, in stock that is relatively free of knots. Small black pin knots are not all that objectionable, and neither are sound tight knots. If you don't trust your ability to tell good knots from bad, just stay with the very clearest lumber you can find. Take it home and rip it into your 3½-inch-wide strips, using a Skilsaw with a rip guide, which is easier than going it alone on a table saw.

Three Ways to Hollow

Now hollow out your mast stock ½-inch deep, being careful to stay 1 inch in from the edges (see drawing on the sail plan sheet). You can do this with an ordinary rip blade in your table saw, by taking kerf-wide (that's the width of each separate saw cut) bites, a little each time. That's the slowest way. You'd go much faster with a dado set, which can take out from ½-inch to ¾-inch widths of wood at a single bite.

Faster still, and what I used, is a molding head with a set of planer knives. With that I took out an inch-wide swath at one pass, then switched the spar end-for-end

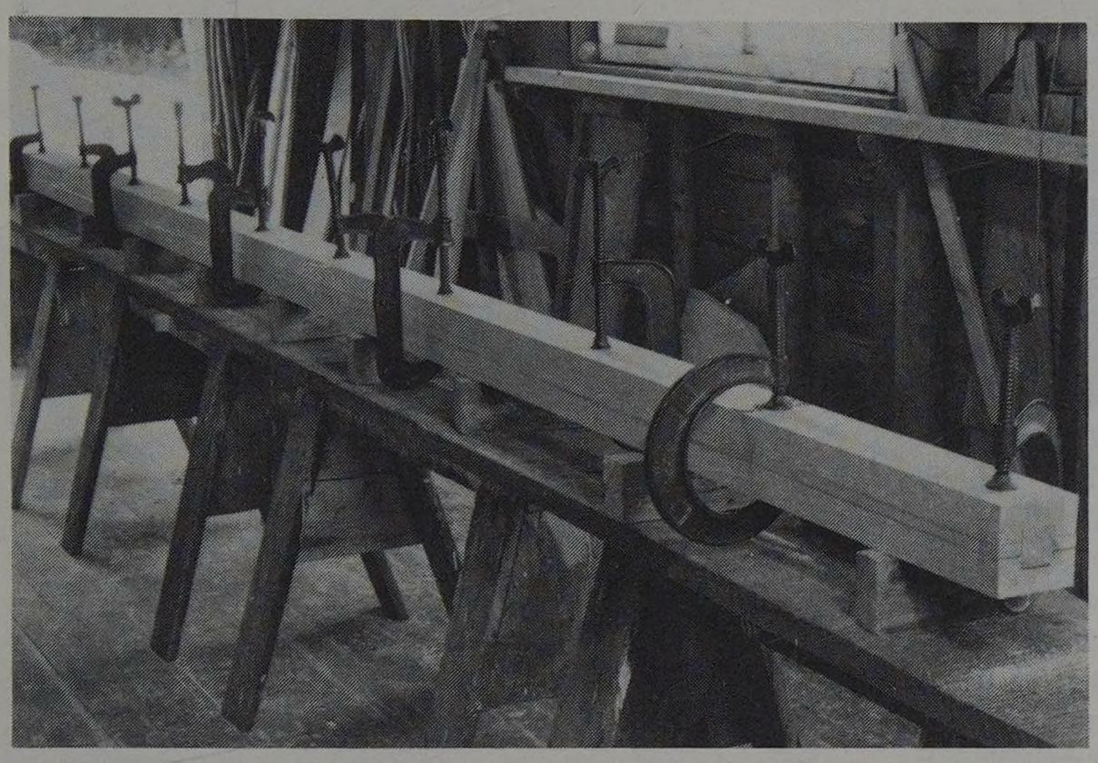


Planer knives in my molding head did the mast hollowing in two passes. Note the wooden fingers holding the mast against the rip fence.

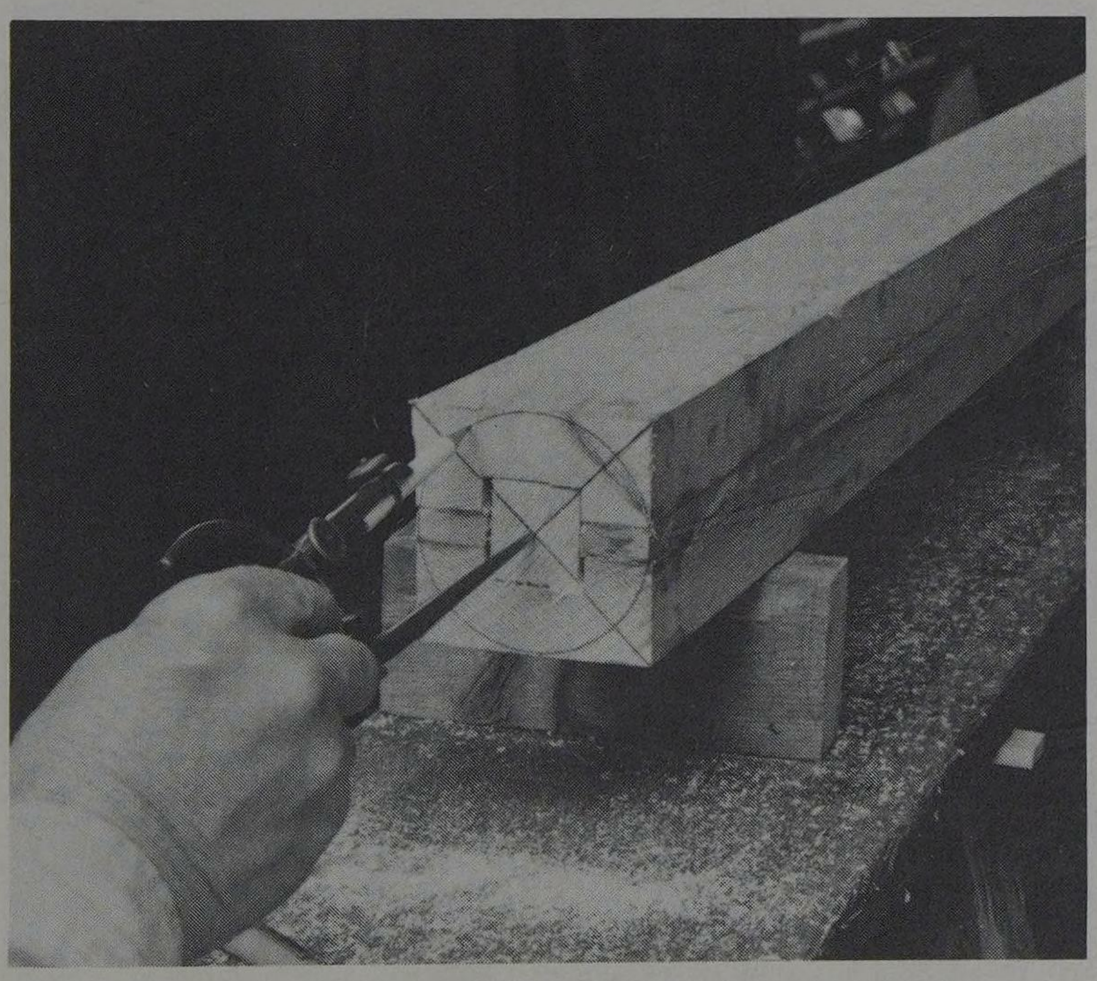
and took out the remaining half-inch at the second pass.

During this routing operation a set of "wooden fingers" firmly pressing down against the stock will hold it there for a perfect cut with no chattering, aided and abetted by a second set clamped to the saw table and pushing against the work with a little side pressure. This is one of those tools money can't buy: you make it yourself. Almost any short piece of board about a foot long and five inches wide will do. Cut off one end at roughly a 35-degree slant and make a series of close parallel end cuts, with the flexible fingers between them. This works much as a jam cleat does on running rigging. You can shove the work through, but you can't pull it back until you release the pressure.

Use the fingers when you're slicing off the two ½- by 1-inch strips you need for the mast sandwich, too.



Find or make a good level place to support the clamped mast laminates while curing. Note that the clamps are staggered to distribute their weight evenly.



To find the center of the mast, first plug the hole, then draw diagonals between the corners. Note the half-inch slice between the two 1½-inch pieces in the laminate.

KEEPING IT STRAIGHT

You wouldn't think a 16-foot by 3½-inch stick would be heavy enough and long enough to present a sagging problem when you're gluing it up, but it is. Want proof? Clamp up your mast assembly, leave it resting on a couple of sawhorses, and come back for a look in half an hour. QED. . . .

In just that brief time, even though your mast assembly is tightly clamped, the glued joints would creep and give you that same nice graceful curve, permanently. Howard Chapelle, who was familiar with the workings of Murphy's Law long before it was officially passed, wrote that if ever you should end up with a curved mast, the best thing to do would be to step it with the concave bend facing forward. He has also noted that masts which are supposed to be round don't always come out that way.

I was resolved that Bobcat's mast would be both as straight and as round as I could possibly make it.

A chalk line struck on your shop wall, with cleats tacked along it at every stud, makes a fine supporting rig during the gluing operation. Lacking the space for that, I set up four sawhorses end-to-end and laid a carefully leveled 1-inch-thick plank on them. I cut up scrap 2 x 4 spacers to lay the mast itself on, which provided clamping room between the mast and the plank. I used ten, spaced about 18 inches so the mast could not sag between any two of them.

For three reasons, thickened epoxy is my choice for any big glue-up operation: longer working time while it's setting, best-looking seams, and less clamping pressure needed. I applied glue to the two ½-inch by 1-inch strips first, and tacked them to one of the 3-inch by 1½-inch half-sections with number 18–wire escutcheon pins. I glued up the 1½-inch by 1½-inch by 18-inch upper plug and put it in at the masthead. Then I glued the other half-section and put it in place, applied clamps about 18 inches apart, and let it set overnight.

MAKING IT ROUND

This would be easy enough if you didn't have to taper it, too. Bobcat's mast calls for the top 6 feet to be tapered (see sail plan). The heel below decks is tapered to fit the step, but is not rounded. Years ago I discovered that making a round, tapered spar is an art. At the time, I was going through the procedure of eight-siding and sixteen-siding a square stick. No big deal, but I went happily along taking the same amount off each corner right through the taper. So I ended up with a gigantic pencil. An article by Bud McIntosh in *WoodenBoat* #60, page 125, opened my eyes to the virtues of the practical spar gauge he described.

Since then I have run up against some pretty weird variations on this approach. One gauge I tried had eight

pencils sticking out through holes in its chassis. It might work in Heaven, but it sure made a mess when I applied it to grainy earthbound timber.

I submit the Payson Process. First, plug the heel of the mast lightly with a 1½-inch-square insert, which you can take out once you've used it as a base to swing your compass. Find its center by drawing diagonals across the stick's corners, and swing a 3½-inch circle. Repeat the process at the masthead for a diameter of 2½ inches. At this stage, if your stick is not perfectly straight, pick the plumbest verticals for its port and starboard sides and let the concave side, if any, face the bow.

You'll need a centerline from which to establish your taper, and you can get this just by marking the mast's centerline along its length with a try square.

Note that the drawing shows the last full diameter 6 feet from the masthead, with taper diameters following at 18-inch intervals. Bolger drew these transverse measurements full-scale. The diameter is 3 7/16 inches at 4½ feet below the masthead, 3¼ inches at 3 feet below the masthead, and 3 inches at 1½ feet below the masthead.

Bend a thin batten, ½ inch by ⅜ inch by at least 6 feet, edgewise to those marks on your mast. Despite the purists, I nail right through the batten with 1-inch number 18–wire brads. It's not sacred, it's nothing but an easily replaceable piece of wood and it's mine, so for the sake of convenience I'll nail right through the middle of it.

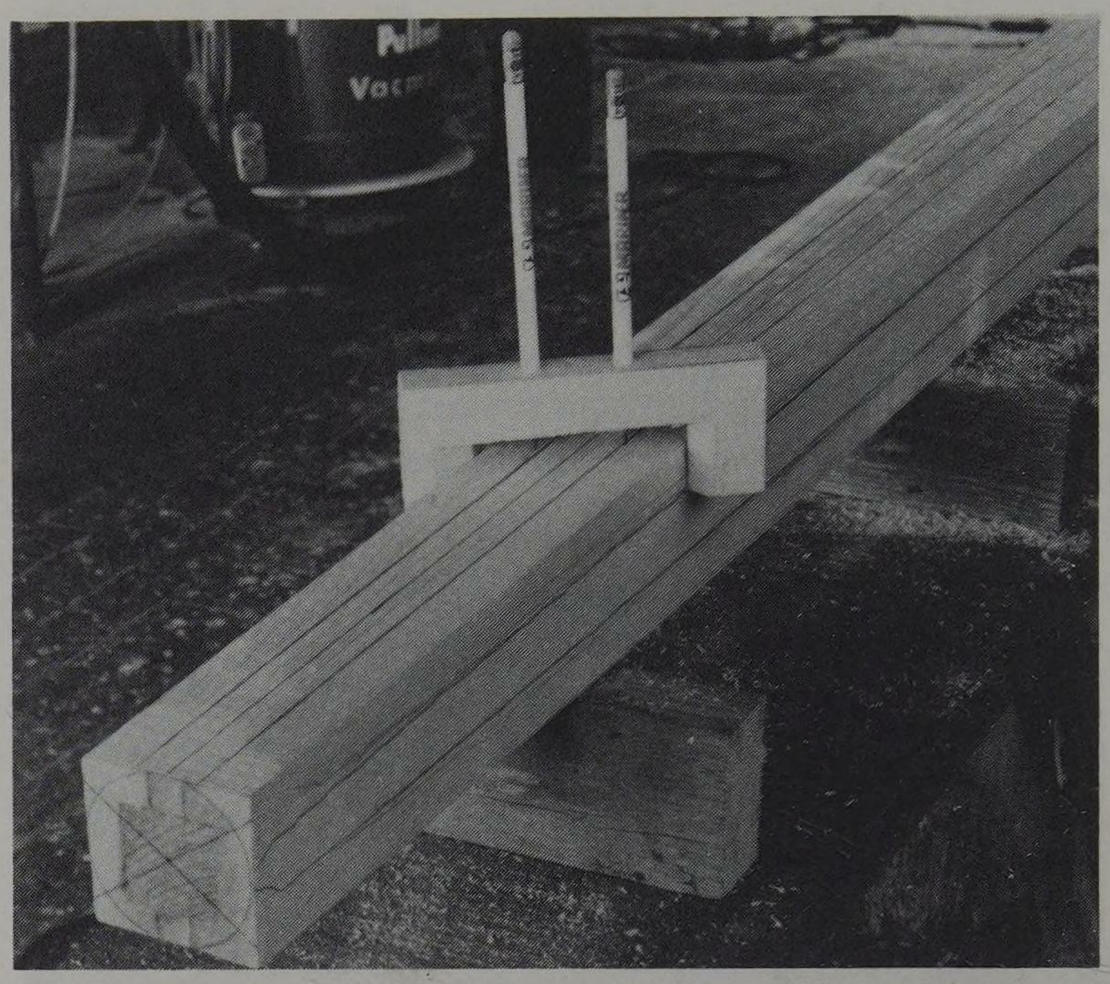
Sawing the Taper

With the taper marked, saw the cuts with a bandsaw and a helper. Lacking either or both of those, do it with your Skilsaw. You can rip the cuts by hand if no Skilsaw is available. Lay out the masthead taper again on the face of the cut you just made, make these cuts, then dress (plane) all the cuts and see that they are square. Accuracy here is the foundation of the whole process, so don't slight it.

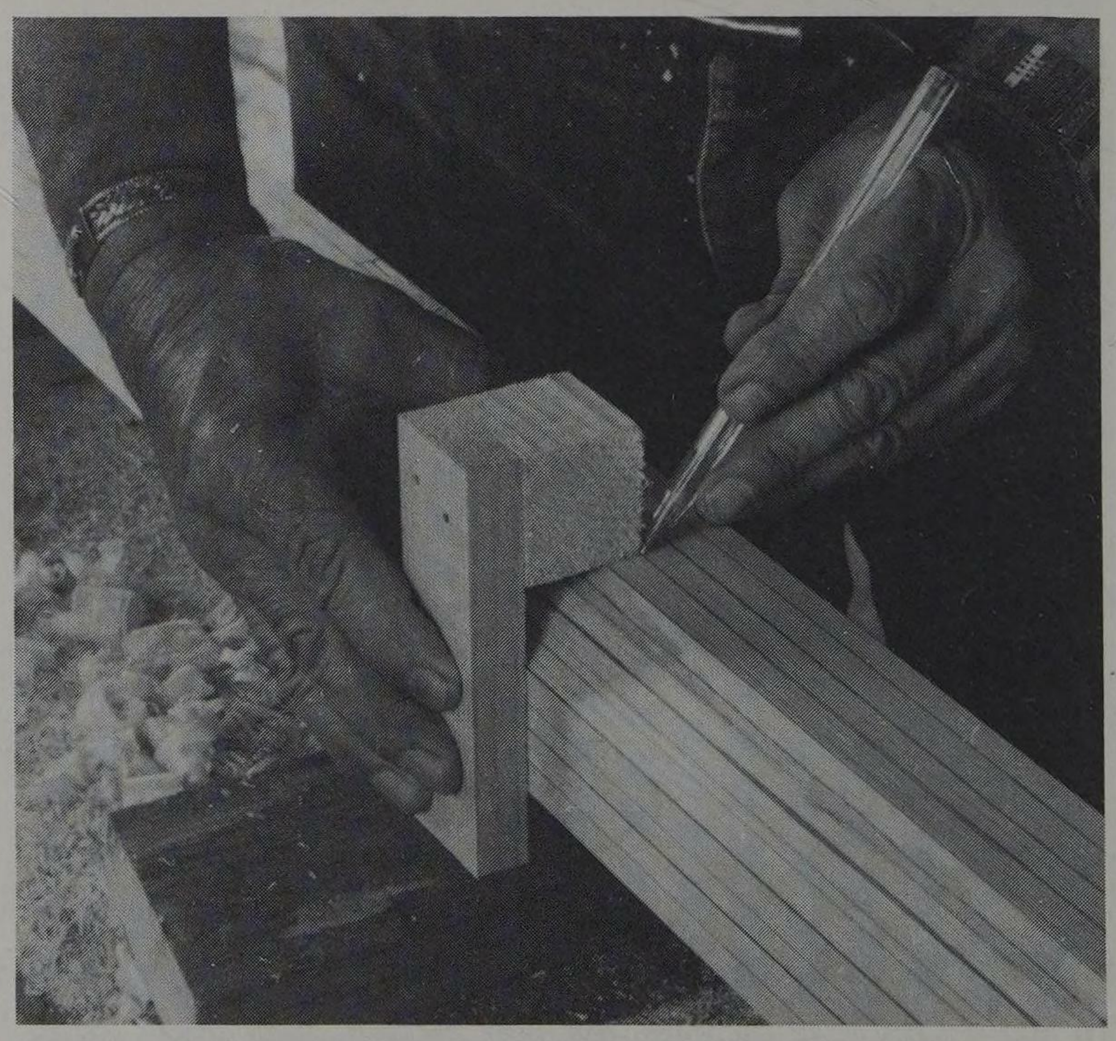
Now mark the straight section of the mast for eight-siding, using the try square. Here's how. Set a bevel square at 45 degrees and lay it on the bottom of the mast so that the blade is perpendicular to one of the diagonals drawn on the heel and tangent to the circle. Scribe the resultant line. Repeat this process across the other three corners, and you have your starting points for eight-siding along the mast length. Run through the same steps for the 2½-inch-diameter circle at the masthead.

Now place the try square at the heel, and start up the mast scribing a line from one of the established marks, stopping when you reach the point 6 feet below the masthead where the taper starts. Repeat eight times. For the tapered section you must use a spar gauge like the one shown in the photograph, for this is the only way to ensure that your eight-siding removes a diminishing amount of wood as the mast diameter diminishes.

Once the eight-siding lines are established, cut the corners off with your Skilsaw set at the proper width. You can start in the middle of the stick by making a saw



Using a taper gauge to mark the masthead section for eight-siding. The masthead has already been square-tapered, and the straight lower section of the mast has been marked for eight-siding with a try square. The taper gauge automatically reduces the amount of wood marked for removal in the eight-siding process as the mast diameter decreases over the tapered section. The gauge didn't work too well for me, however, as you can see by the wavy lines on the side of the mast. I wound up using the gauge simply to establish a series of reference marks, then I swept the marks with a batten to get the nice lines you see beneath the gauge on the upper face of the mast.



My homemade gauge for marking the straight section of the mast for sixteen-siding.

cut and then chiseling the corner flat to accept your saw blade. Be sure to stop cutting before you reach the tapered part or you will end up taking too much off the masthead and spoiling the job.

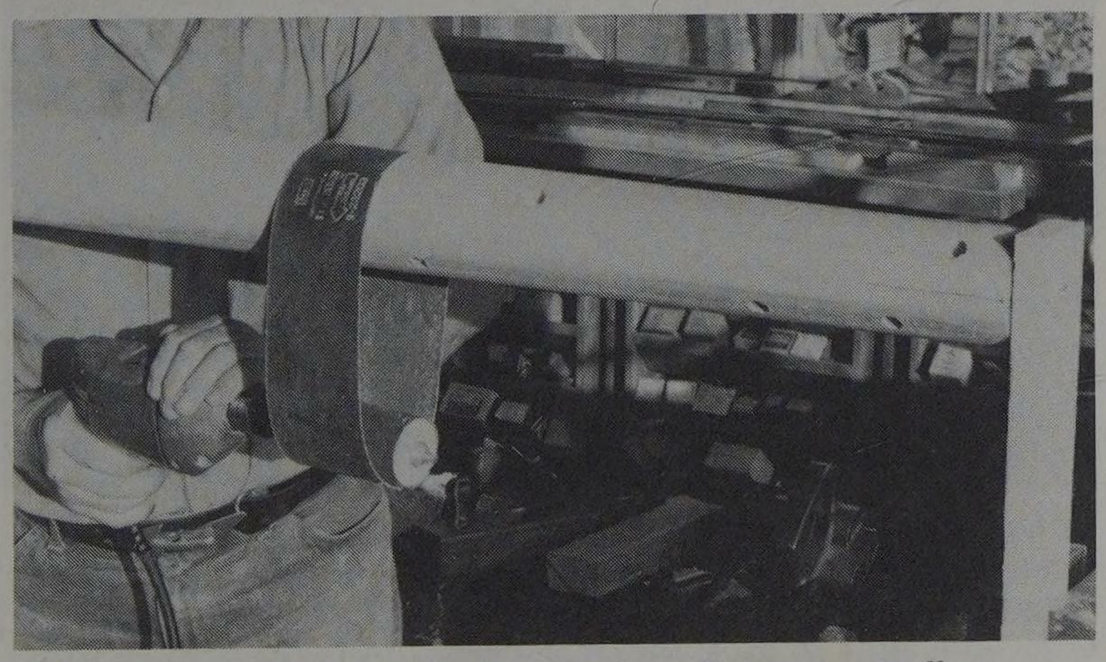
For the taper, start at the end and work toward the cuts you just made. You will have to do it freehand, so stay well outside the lines.

If you are real cautious you can take all the corners down by hand—but what a job of work, when the Skilsaw will mow them down in nothing flat. Try the Skilsaw, but think before you start. It's real easy to take too much off, but *real* hard to put it back.

With the mast eight-sided, now is the time to cut the heel taper. On the heel, draw a square measuring 3 inches by 3 inches and centered on the center of the circle. Each side of the square will lie about ¼ inch inside and parallel to one of the previously scribed octagon sides. The corners of the square can't be drawn, but don't let that worry you. From the points where the sides of the square intersect the edges of the heel, draw straight lines up the spar, intersecting the edge of the spar 2 feet above the heel. Make the cuts to establish the four broad faces of the heel taper. Then plane a bit of wood off the four narrow faces to achieve the sectional shape at the heel shown on the sail plan.



I did the sixteen-siding with an electric block plane, and finished with a bench plane. If you don't have an electric plane, you can do the whole job with a hand plane.



At last, sanding time. For the first time, sanding was actually a pleasure. Don't forget to wear a dust mask.

With eight flat sides to your mast, it's a good time to bore holes for the throat and peak halyards and the topping lift to be rove through. They are all ½-inch holes, and are all bored fore-and-aft. These holes are centered 2½ inches, 6 inches, and 15½ inches below the masthead. Two more holes are bored athwartships 1¼ inches and 12 inches below the masthead for the flag halyard and lazyjacks, respectively.

Technically these holes are called "dumb sheaves," meaning that there is no pulley wheel or block involved. (To me, by the way, there is nothing dumb about simplicity; maybe they're called dumb because they don't squeak or rattle.) For easy hoisting, the lower surfaces where the running lines bear are to be lined with 1/32-inch by ½-inch stainless steel, as called for by the plan. Actually, strips of copper flashing will do nicely and are easier to shape to the holes, but you can expect some discoloration when the copper turns green between sailing seasons.

To avoid splitting the undersides of these holes, bore them until the point of the bit just comes through, then turn around and bore back through.

Now mark the mast for sixteen-siding, which is pretty close to round.

A Word in Defense of the Eyeball

. . . and a frank opinion about applying overly complex spar gauges to tapered masts. A try square worked perfectly well for the eight-siding process along the straight section. When it came to sixteen-siding, I made up my own simple gauge (you can see it in action in one of the photographs), and that worked fine on the untapered part of the mast. All you're doing here is establishing a centerline along each of the eight faces left by eight-siding. (Remember, the 2-foot heel section is not touched during the sixteen-siding.)

For the masthead tapered section, though, it was pretty much back to the old eyeball method for me, but starting from an improved fundamental understanding gained from reading the above-mentioned article by Bud McIntosh on the use of a gauge. For the first time, I had a mast with good clean sharp corners to round down, which shows I had learned *something*.

But what I am truly most grateful to Bud for is his solution to the mast-sanding problem, which uses a sanding belt turned inside out and brought to bear by running it over a drum turned by an electric drill. Despite a bright and beautiful sunny day, I couldn't wait to get back into my shop to try this out. I was overjoyed to find that it worked just as well as Bud's article said it would.

In my rig, I used a 3-inch by 21-inch 60-grit belt and a turning drum made from a 4-inch by 1½-inch piece of closet pole I had lying around. I covered this by stapling a piece of inner tube around it, which gave a non-slip drive to the sanding belt.

Before using this device, I sanded the mast lengthwise by hand to take out any dips that might have been left from planing—there's no point in perfecting flaws. Then I went to work with the inside-out belt.

I'm no expert sparmaker, nor do I aspire to be one, but without question this mast is easily the smoothest, best-looking, straightest, and most accurately fabricated mast I have ever turned out. After the sanding there was little left to do on it, other than to round out the holes for the running rigging and install the inner metal strips after the upper part of the mast had been coated with wood sealer. I used Interlux 1026 clear wood sealer.

We have yet to perfect the heel taper. For that the boat goes right side up again, and with the mast step already in place and no deck in the way it is easy to check the fit. Let's not worry about the fit where it goes through the deck until a little later. Meanwhile, till this cussed fog clears—yes, the boat is outdoors but the beautiful bright day is gone with the east wind—I can make the mast collar (or partner) and finish off the gaff and the boom.

Make the collar from ½-inch plywood, with an outside diameter of 7½ inches and a hole diameter of a generous 3½ inches. The sides of the hole are plumb port and starboard but have a 12-degree bevel forward and aft. Make this cut with a saber saw.

The boom and gaff jaws are made from ½-inch plywood let into the top of the spar as shown in the sail plan. Both jaws measure 4 inches across the throat; the depth of throat (from end of spar to outer ends of jaws) is 5½ inches for the gaff jaws and 4½ inches for the boom jaws. Outside dimensions are not critical. Fasten jaws to spars with glue and 1¼-inch bronze anchor nails (six or so apiece for the boom and gaff). The reinforcing pieces along both the boom and gaff are made from ¾-inch stock. Again, shape is not critical.

6. Rudder, Waterline, and Boottopping

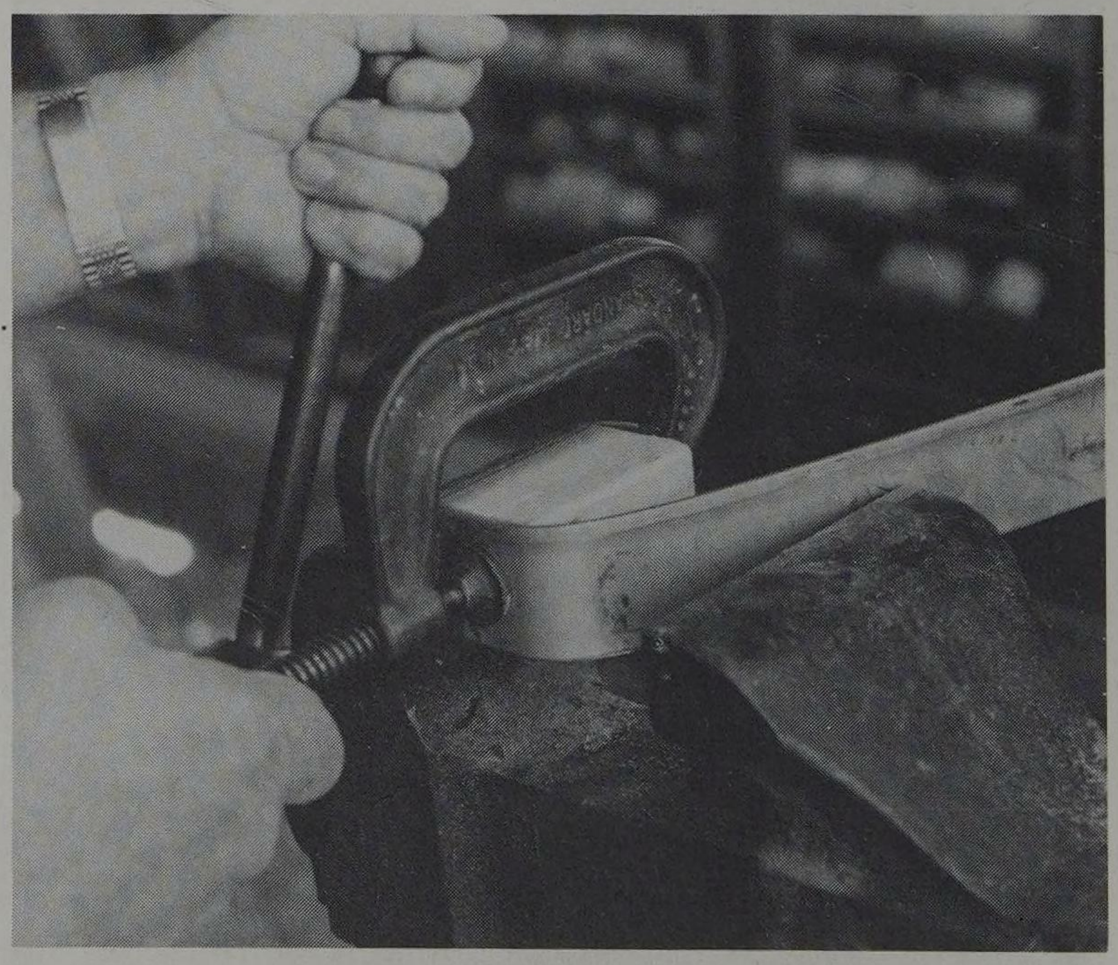
Time to deal with the rudder. Then, with the rudder hung, you can run the waterline on it while it's mounted on the hull—much easier than trying to scribe its location from the plan in the hope that its waterline and that of the hull will flow together in one straight line.

The plans say the straps that anchor the tiller to the rudder head should be ⅛-inch by 1½-inch stainless steel or brass. I used 3⁄32-inch by 1½-inch stainless instead, which is quite hard enough to bend, working as I was with just a vise, two hands, a hammer, and a few choice words. A thickness of ⅛ inch would have been very difficult in either stainless or brass.

The straps are 9½ inches long. Mark them where they will actually be bending over the top of the tiller and flatten that segment straight across; otherwise they will bend asymmetrically (cockeyed). I found that I could mold this stuff into a reasonable facsimile of what Phil had in mind, but I decided for about the thousandth time not to join the metalsmiths' union.

I had some room between the top of the pintle and the bottom of the strap (which the drawing does not show), so I made the forward strap almost as long as the aft one, which allowed me to use two fastenings rather than just one. Instead of the rivets indicated, I used 2-inch roundheaded stainless machine screws topped with nylon-insert locknuts. I also used this combination for fastening pintles and gudgeons when I got to them.

A close look at the hull profile drawing reveals that one of the pintle-gudgeon sets is topsy-turvy in terms of standard practice. Normally (if there is such a thing) all gudgeons are mounted on the hull, either on the transom or the skeg, and all pintles are fastened to the



Making the rudder straps from 3⁄32-inch by 1½-inch stainless steel. Bending this stuff was a challenge. I made the first 90-degree bend (here hidden behind the C-clamp) in the vise, then I used this piece of 1½-inch stock to make the second bend. I bent the strap by hand far enough to get it into the vise as shown. From this point, closing the vise completed the bend.

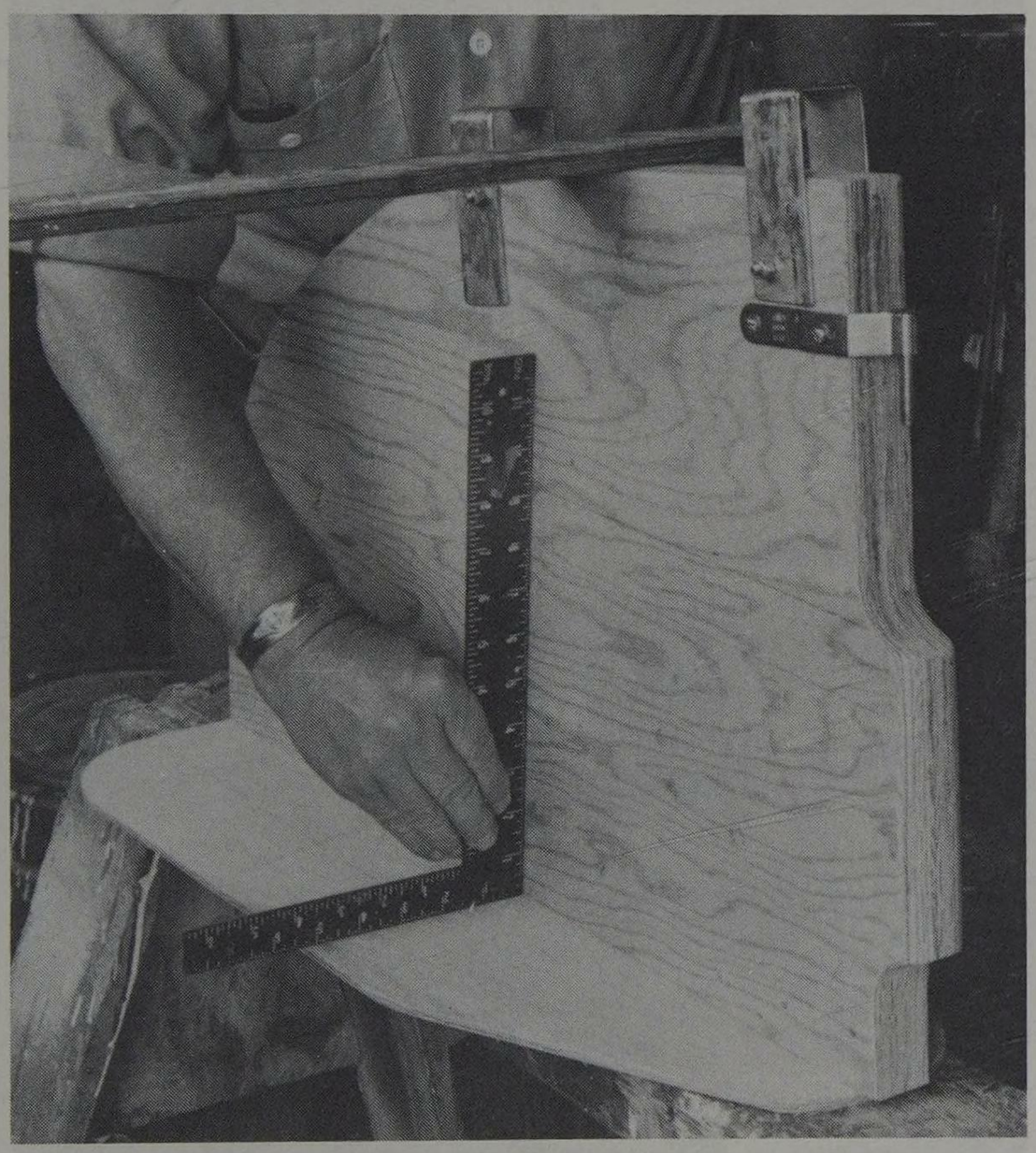
rudder, with points down to slip into the gudgeons. But on Bobcat's lower set, the gudgeon is set into the rudder and slips down onto the pintle, which is fastened, point up, to the skeg. This tends to minimize any tendency to jiggle up and down, and it presents the smoothest possible lower profile with no projecting pintle point to drag or scrape on anything.

Lofting's Not All Bad

I began an overly hopeful day by trying the mast in its step, and it went right in first try, but no such luck with the rudder. It didn't sit right when I put it in place—it cocked up on the aft end, which would have given it a less effective bite in the water. The fault lay with the skeg, whose trailing edge was too close to vertical.

I knew what the source of that was. I had determined the rake of the skeg by making a pattern based on the rake of the transom. Unfortunately the transom had a bit of a convex curve in its aft surface because the grain of its framing had pulled it a little out of whack. I had noticed this way back when I was building the hull, but I never thought it would throw off the skeg that much.

It showed up quickly, though, when I measured the rake of the skeg with my bevel square and then matched it to the shape on the plan.



Attaching the end plate and checking its squareness to the rudder before glassing. The brace across the top of the rudder holds the assembly in alignment while fiberglassing. The two straps and the upper pintle have been fitted. Note that the forward strap is nearly as long as the after one, yet does not overlap the pintle (as it does in the plans).

All I had to do was modify the rake of the skeg to agree with the plan, and presto, the problem was solved. If I had lofted this boat full-size, very likely I would have spotted this glitch early in the game, or more likely wouldn't have made the mistake in the first place. I still don't recommend going through all that procedure in preparing to build this boat; it isn't really necessary.

But chalk up one little star for lofting as the foundation of extreme accuracy. For those who hanker to use it as insurance against making the slightest mistake, Phil has provided a table of offsets in the upper lefthand corner of the sail plan sheet. It would certainly be used by anyone who wants to construct an elaborate jig setup for building a whole litter of Bobcats.

This was by no means the easiest rudder I have ever hung. I wanted the tiller in place before I mounted any gudgeons and pintles. I insist on a certain amount of aligning and checking for freeness of swing before I install any such hardware. The shop is the place to find problems and solve them, not out on the water cursing a stuck rudder or one that floats off the transom and goes adrift.

Floating away will never be a nuisance with this rudder, though. With the tiller dogged down in its straps, you simply cannot lift the rudder high enough for its pintles to come clear, because it fetches up on the top of the tiller slot.

At 9:00 P.M. of a long day, I was satisfied that the rudder hung right.

Or did it? Next morning when I checked the assembly again, I found that the lower gudgeon on the rudder didn't want to slip over its pintle mounted on the skeg, because the top pintle was exactly the same length. It was fine if I tilted the rudder just right, but on the water it's got to be easier than that.

Just taking a scant ¼ inch off the top pintle took care of the problem, and still the linkage holds so the rudder can't jump out of its bearings as long as the tiller is in place.

The Rudder End Plate

I had never seen a boat with this horizontal foot on the bottom edge of the rudder, nor had I seen any plans calling for one. The idea is that when a boat is heeled over and the rudder's bite is reduced as it leaves the vertical plane and leans toward the horizontal, this little lateral extension does just the opposite. It becomes more nearly vertical and thus gives the rudder back its bite on the water. Phil has told me he is including it in many of his current designs. I can vouch for its effectiveness on Bobcat, for her rudder holds right on when she heels over.

The Rockport, Maine designer Henry Scheel has adopted the same principal in the "Scheel Keel," which

employs a similar end plate on the lower edge of his racing and cruising boat keels. It is also echoed by the Australians' winged-keel feature on the Twelve Meter that plucked the America's Cup out of its glass case in the New York Yacht Club.

Back to Bobcat. Her rudder end plate is made of ¼-inch plywood, and it is 1 foot wide and 1 foot 11½ inches long. As Phil remarked, it is somewhat vulnerable, and I did all I could to make it less so.

First I glassed both its sides, and then I made it integral with the rudder by marrying them together with two thicknesses of glass cloth impregnated with resin. Finally I added what I would call a fillet: a strip of glass tape along each jointure with a good dollop of resin-putty mixture, smoothed snug into the joint with a tongue depressor. I took the precaution of removing the lower gudgeon to avoid glassing over it, so that all I would have to do before reassembly was cut away a little of the glass that would be in the way.

On Waterline Day Eve, I put a coat of polyester resin thinned about 20 percent with acetone on the rudder and let it set overnight.

STRIKING THE WATERLINE AND BOOTTOP

Luck was with me. The lower gudgeon went back on the rudder with only a little bit of sanding of the glass cloth, and the tongue depressor had made the fillet the right size exactly so I didn't have to cut into it. That, along with the two layers of cloth, had made up a really tough end plate, I decided. So on with the waterline.

I have touched on the New Payson Method, otherwise known as The Easy Way, back when we were making the model. Now we'll do it full-size.

First, choose a good level area. Your hot-top driveway is OK provided it was a well-engineered, level job. On top of that, you will place a couple of 8-foot plywood sheets put together end-to-end, or better still a nice smooth 12-foot or 14-foot sheet.

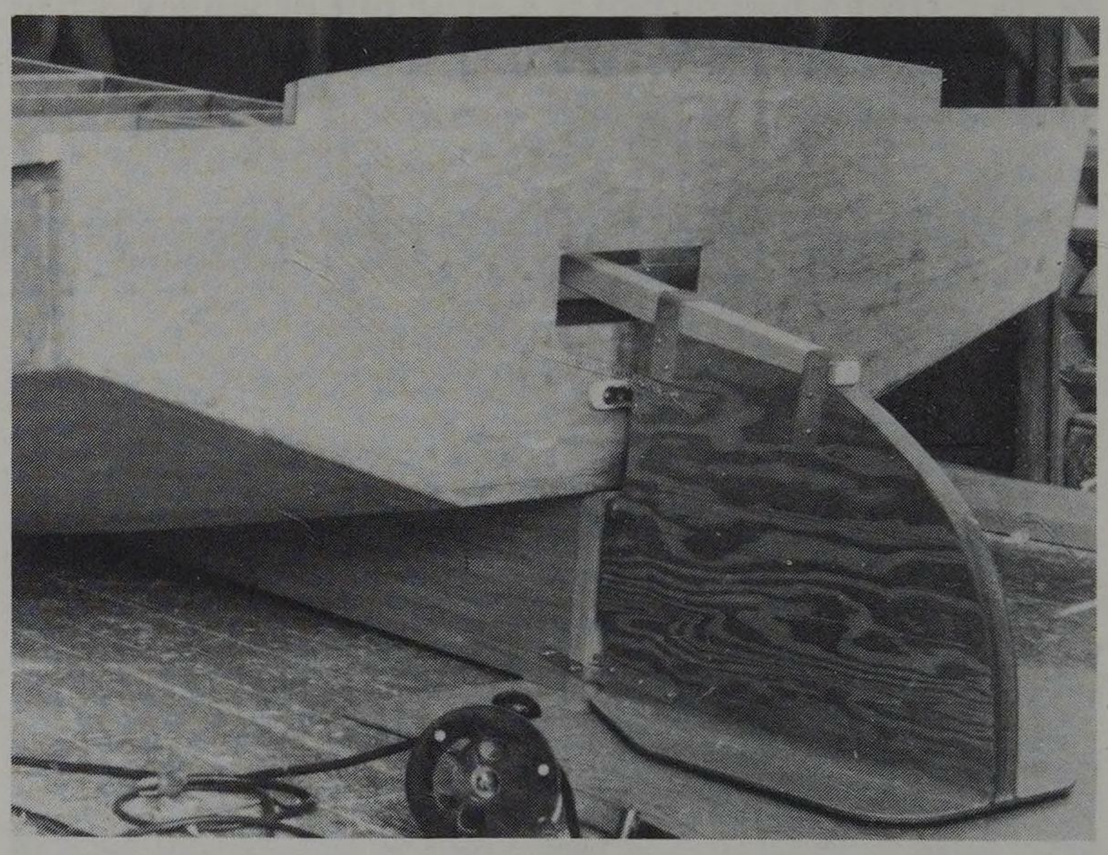
Place your plywood on the driveway and check its top edge for straightness, using a stiff straightedge standing on edge or a rigid board 3 or 4 inches wide. Do you see any uneven spots? If so, cut some small wedges you can slip under the plywood to bring it up to level.

If the floor of your shop offers a better foundation, you can do the same thing there. Remember, though, that you do need room to move your hull sideways on a 4-foot-wide sheet to allow for the boat's considerable beam. You can't set it on the sheet centerline to centerline and have sufficient width of plywood to provide bearing on which you can slide your T-square around.

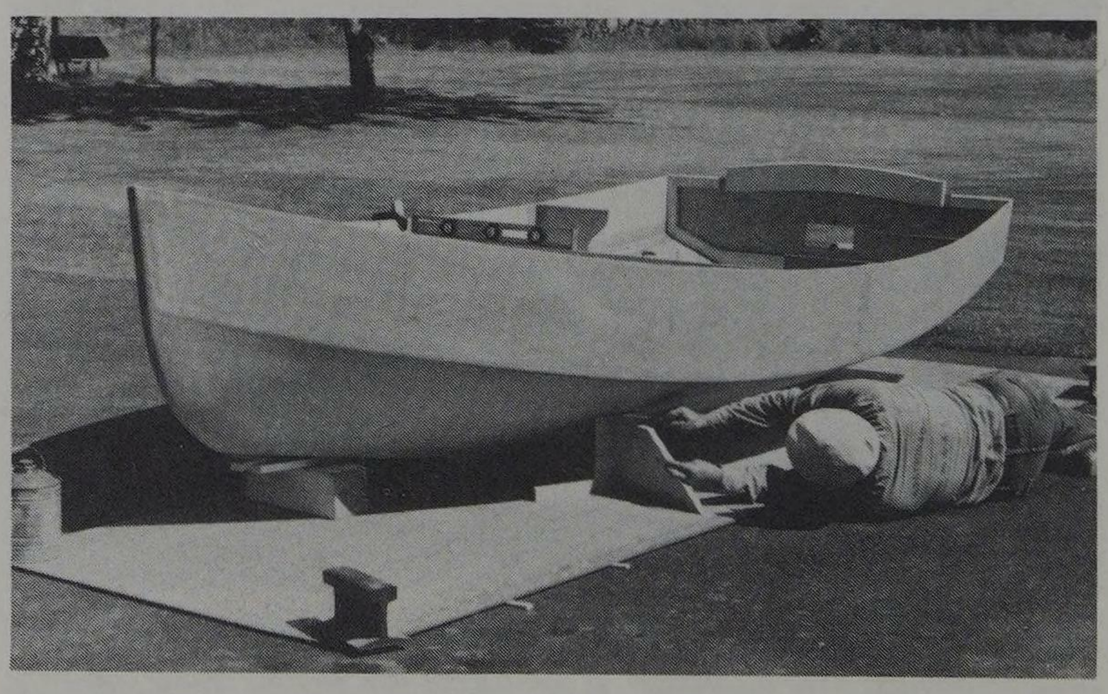
With the plywood laid out and ready, let's check out just what we are going to use to do the job and just how we are going to use it. This method is not the conventional approach, in which you affix level boards across both ends of your hull and work from a line stretched between them.

The conventional method is OK for a slab-sided boat, but not for this one. For one thing, we're going to give Bobcat a boottop as well as a load waterline. When you add in the slipperiness of the fiberglass surface you'll be dealing with, and all the deadrise or upward slant between her centerboard slot and her load waterline, you are looking at a very ticklish job of work. At my age I have a marked preference for doing in minutes what would ordinarily take hours. (As it is, all too often I find myself spending hours working at what I used to do in minutes.)

We'll simply plop the boat down, making sure that she is level athwartships, and mark around her with a T-square slid along the level surface. To begin, we must first establish two points of waterline height, at the bow and at the stern. We take those right off the profile view on the construction drawing, which shows the water-



Mounted and ready for work. I wound up fastening a wooden pad on the transom for the upper gudgeon, to improve the rudder alignment.



Striking the waterline. Find a straight section of your driveway or shop floor. The boat needn't be leveled fore and aft as long as the waterline parallels the platform. This photograph shows my home-made T-square in action.

line for the boat loaded to a total displacement of 725 pounds. Note those two heights and draw a line through them the full length of the hull right on the plan.

Now look at the waterline on the sail plan and note the boottop, which is 1 inch wide, with its upper limit 3 inches above the 725-pound load waterline. Going back to the construction profile, draw a line parallel to the load waterline at the appropriate height. You have now marked the top of the boottop and have a sense for how it should look on the full-size hull. You need only spot its height at both ends of the hull so you can adjust your T-square to the correct height.

Draw a vertical line from the bottom and aftermost part of the skeg on your hull to the top of the boottopping—11½ inches. (Why a measurement here? Because this is where the boat rests at its greatest depth in the water, and where it will sit on the plywood.)

The height of the boottop measured from the stemhead downward along the face of the stem is 25½ inches; mark it so. (I took this measurement off the construction drawing with a very small wood batten moistened with my tongue and bent along the stem's curve; then I marked the top of the boot and the top of the stem. I straightened the batten and measured between those points.)

With the hull placed on the plywood, the upper boottop mark at the stern should be 11½ inches above its surface. Now lift the bow off the plywood until its upper boottop mark is also 11½ inches above the surface.

Make a rough T-square with its tongue 11½ inches long, level the hull athwartships, and mark around it to scribe the top of the boottop. Cut 1 inch from the tongue and go around again to mark the bottom of the boottop. Now take off 2 inches more from the tongue and slide the T-square around once more to scribe the 725-pound load waterline. This will also mark the upper limit of your bottom paint.

This is the easiest, fastest, and most accurate way of striking waterlines I know of. It works especially well with a hull like Bobcat's, whose deadrise changes from almost flat aft through an ever-changing amount of flare forward. I am thoroughly sold on it after struggling through the batten-and-string fire drill for so many years. Admittedly, it takes a little figuring and preparation to set up, but so does the older method, and the actual scribing using just the T-square is much faster and then some. As for the boat itself, it needs only to be level athwartships, and the builder need know only the heights of the waterline at her ends. Actually, finding a level spot or making one is the most time-consuming step. Now, if only I could find some way of getting that boat through the kitchen door. . . .

7. Decking Her Over

There are three kinds of operations that must be completed before you deck over any hull. The first and obvious one is to install structural support for the deck itself. The second is to do all the work you won't be able to do at all once the deck is in place. The third is to finish off the tasks that would be so difficult to accomplish after the deck is buttoned down that it would mean a great waste of time and effort if you were to postpone doing them until then.

DECK BEAMS, GUNWALES, AND CARLINS

The beams that directly support the deck are transverse members, running from gunwale to gunwale, and the carlins are longitudinal stringers that will serve as underpinning for the coamings where they run fore-and-aft.

First, let's give the inboard top edges of the hull side panels a 7½-degree bevel so the tops of the beams will fair into them. The two deck beams, which fit between frames A and B and between frames B and C, measure 2½ inches by ¾ inch in cross section. Remember that the tops of the frames must be flush with the tops of the sides.

The gunwales go on next; they are 1 inch by ¾ inch and are given a 7½-degree bevel on the upper face. I bedded them in epoxy thickened with a bit of wood powder and fastened them with ⅞-inch ring (anchor) nails driven from inside. I did not go uninterrupted while I was working on these items. I had put myself on a 5:30 A.M. rise-and-shine schedule, but these were mid-July days and I could always count on company a few hours down the line, along with business calls, etc. So the day after I started, I was still working on the carlins. When beams, gunwales, and carlins were all installed, I gave all three items a coat of thinned resin sealer.

The carlins were the hardest part of the job—they didn't take kindly to the fact they had to take bends on the flat and edgewise at the same time. Like the gunwales, they are 1 inch by ¾ inch in cross section, so I used a small, thin batten to measure their length because I could bend it right where it had to fit between frame C and the transom, and it could easily manage the double curve.

But when I tried one carlin for a dry fit—no glue—I found that the forward end, which I wanted to fasten to frame C, pushed against the frame's deck beam and put a curve in it that, if not corrected, would have compounded the error right through to the deck and the coaming. If I had taken for granted that I could put it in without any trouble, I would also have nailed it to frames D and E, and removing it would have been just that much harder.

My solution was to nail its forward end to the deck beam at frame C, and then clamp a 2 x 4 alongside the deck beam, reinforcing it and taking out the bump. I then fastened the carlin to the other two frames and to the transom framing, and removed the 2 x 4.

PAINT BRUSH TIME

It's nice if you enjoy painting—you get much better results.

Do the whole interior now while you still can. It's the best time to put in the bow eye for Bobcat's painter, too, and fill the forward compartment with flotation. I left some ventilation at the top of frame A, since once she's decked over this is totally dead air space.

Let's check out a few don'ts. Don't paint over your centerline on frame A because you will need it to spot the location of your mast collar. It's also a good idea to mark and keep unpainted the centerline of the deck beams you just installed, as they will help with the alignment of the foredeck.

Don't paint the aft side of frame E, either, because we don't have the seat stiffeners in as yet, and they don't go in until the interior has all been painted. And don't paint the sides of the carlins, because the coamings are glued and fastened to them after the deck goes on.

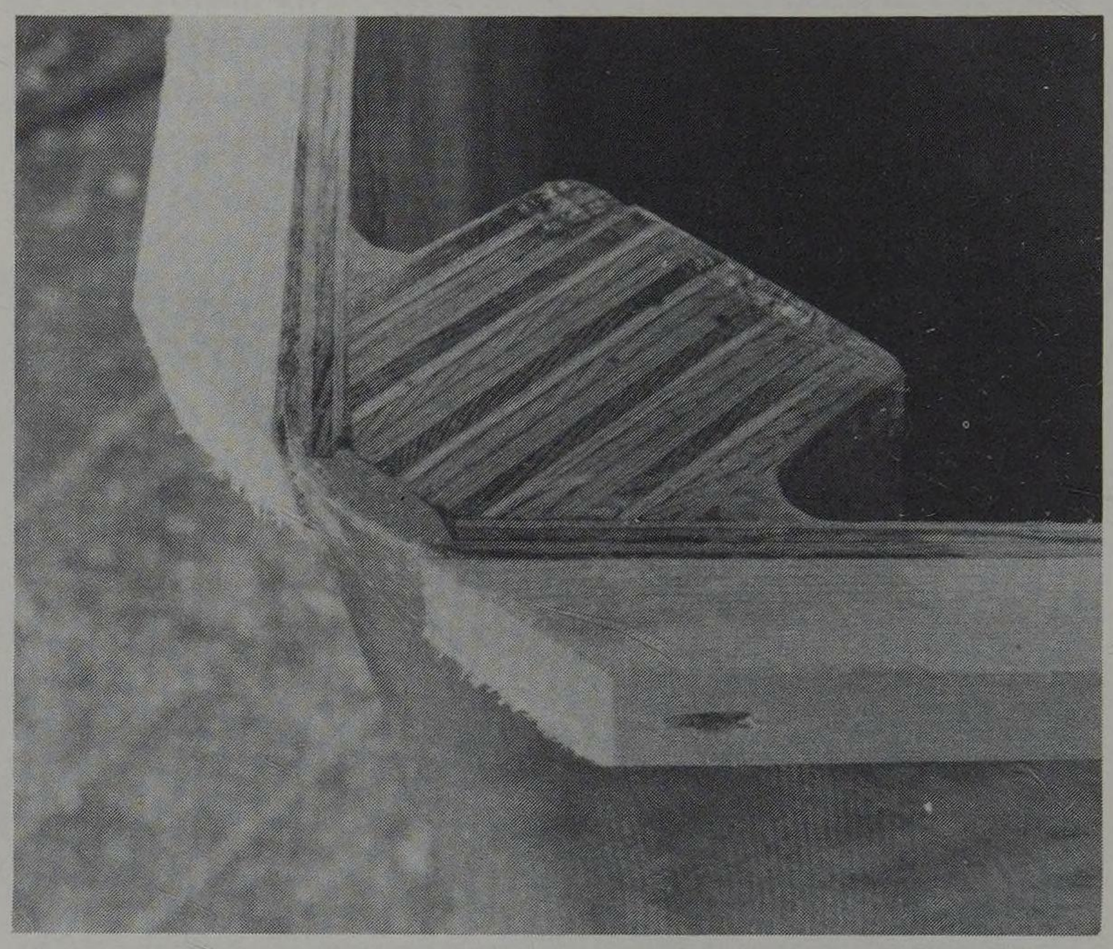
Before painting, I sealed the entire interior plywood with polyester resin thinned about 30 percent with acetone. This works fine in Maine, but I understand that in southern climates the resin sealer can cause rot in the long run. I don't know whether this is true, but to be safe, if you're building in Florida, either skip the sealer or use Interlux 1026 clear wood sealer instead of resin.

Usually, painting instructions begin with the discouraging words: "First prepare the surface." These won't, for I put on a coat of white undercoat (quite thick), and didn't do any sanding first because I wanted to have the paint stick to the resin sealer without any dust that would hamper the bonding.

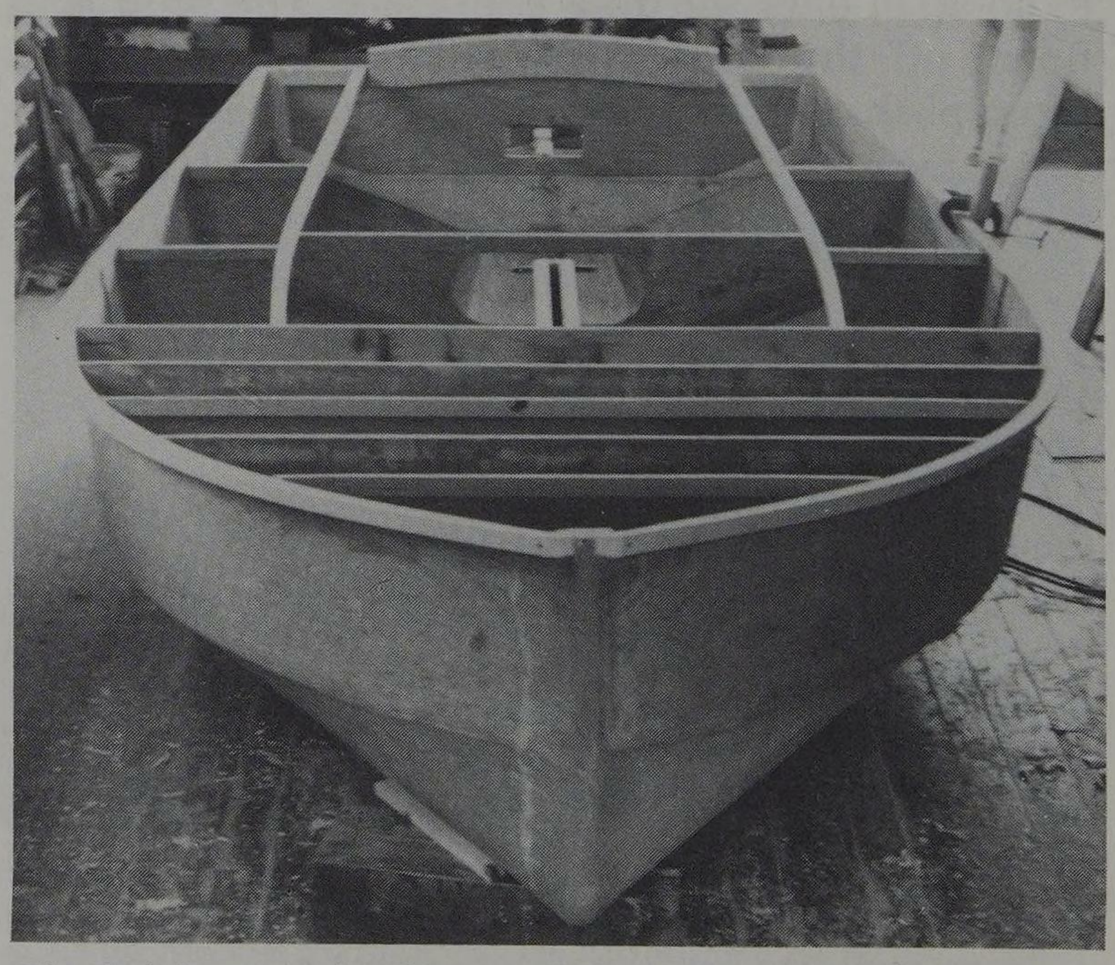
I could hardly believe that the single finish coat I had in mind for this finish would cover the interior adequately, but it did, and for that it deserves honorable mention: it is Gloucester Marine Cream 3104.

In every stage of boat work, one thing leads to another, which may or may not seem entirely relevant to the subject at hand. During the interior painting operation, I had a 2 x 4 laid across the gunwales to help me get into and out of the boat, and in passing I noticed that the straight edge of the 2 x 4 revealed that the top edges of the carlins were canted just a dight—enough, if ignored, to offset the coamings when they were installed.

It was hardly surprising, for whenever you bend any timber, and especially one that is very nearly freely suspended, you can be sure that it isn't going to end up bent exactly as you intended it to be. Whether the design is simple or complex, each hull you build is going to go its own sweet way in some little detail or other. This is why boatbuilding calls for full and continuing attention, and demands all the skills the builder can bring to it.



The forward ends of the gunwales, which are nailed from the inside. Note the filler putty on each side of the stem and capping the stem's forward surface.



The deck beams and carlins installed. The flotation is fitted next.

There is no foolproof system that I know of to take all the kinks out of building a boat, and there is no substitute for experience—which you can gain only by jumping in and going at it. However, here are three basic guidelines that will protect you against some of the traps set by inexperience:

1. Leave it long, if you can, and cut it off later.
2. Assume nothing. Doublecheck everything before it goes in—and again after it *is* in.
3. Don't hurry. Take the time to think it out before you do anything, no matter what or who tries to persuade you otherwise.

For some reason or other, problems that seem unsolvable during the day resolve themselves by morning if I give them some heavy thought just before going to sleep. And I'll put something off and agonize over it for a long time, awaiting a solution, instead of dashing out to my shop and whamming into it and risk not being happy with it.

Back to those coamings again. They will go in with their sides plumb for sure, because no matter if the carlins are cocked a bit, the board spacers I'll use to crowd the coamings laterally against the carlins will have squared ends, and that will hold the sides of the coamings vertical.

They can't go in anyway until the deck is down, but thinking about them in advance is the name of the game.

Earlier I mentioned two things that should be done at this stage: put in the bow eye, and fill the forward compartment with flotation. Yet another is to fill in the aft sections of the side decks with flotation. Let's do all three now, before we hear a gloating voice tell us, "It's too late now—the deck is glued and nailed for good."

The bronze eyebolt is ⅜ inch by 3½ inches. Just one little gimmick here: after I got the nut tight, I took a prick punch and gave it a whack right where the threads and the nut join, so that it will never back off.

For flotation, I use blue, dense Styrofoam. Any fair-sized lumberyard carries it, and it's far cheaper than sprayed-in urethane. What a boring job. It took almost three sheets of 2-foot by 8-foot by 1-inch foam to fill up the bow, and the whole afternoon fitting the pieces in. I didn't count the pieces; I didn't want to know how many there were. But there must have been more than twenty, all individually fitted.

LAYING THE DECK

It always helps to begin a day with a small success or two, especially if you have a problem looming on the horizon. On this particular day the five stern seat stiffeners cooperated by going in with very little trouble. All I had to do was put a couple of 45-degree corner gussets on the center stiffener because I had to cut out the bottom part of it to avoid the screws that hold the upper gudgeon to the transom. I toenailed and glued the stiffeners into the transom frame. They can be stiffened further with corner gussets if desired.

What was bugging me was the prospect of laying the deck. Actually, when I analyzed it, what was troubling me was only a mental hazard, and I even knew the cause. Just a little while before, I had had to put in and take off and then again put in and again take off the deck of a little kayak I was building. I had it thoroughly glued and nailed both times, too, before my eye caught an unwelcome bump in a line that was supposed to flow. This was a crowned deck, as well, which further complicated things because the plywood was raising its usual objection to being asked to bend in two directions. So I reassured myself by giving three cheers for flat decks. And Bobcat's deck is as flat as a pancake.

For reasons which will become apparent as we go along, the best way to begin is with a piece of ¼-inch plywood 5 feet 8 inches long by 2 feet 2¾ inches wide. We're not going to fasten this down; in the end we're going to lay down the whole deck all in one piece, or rather in one complete assembly made up of several pieces. Let's call this first piece the king plank; although it's wider than any king plank I ever saw, it does run right down the center of the forward deck. Put a centerline on it.

As the plan shows, all the forward deck fittings are mounted on this panel: the mast partner, the deck blocks for the halyards and the topping lift, the 6-inch cleats, and the Jonesport-type mooring cleat. Obviously you can't fasten all these fittings to ¼-inch plywood, so we'll take careful note of the locations of these items so that we'll be able to install backing under the deck of at least a board thickness. A full inch would be better, and a little heavier still wouldn't hurt.

Plotting Out Locations

To get a convenient look-see from down below, we'll clamp this king plank down to the deck beams—not centered, as it will finally lie, but with one of its edges lying along the deck beam centerlines. (Deck beams and gunwales will have to be taken down to provide bearing right across.) Clamp a stick across the aft side of the deck beam at frame C for the aft end of the king plank panel to butt against. This will prevent it from slipping aft while we're measuring and when we lay down the deck for good.

Starting with this size panel makes it easier to make sure the edges are laid down on the deck beams, and it is easier to mark and to work with. Now is the time to do the marking for deck fittings and for the mast partner.

From the plans you can see that the partner is centered on the centerline 3¾ inches aft of frame A. Cleat and deck block locations can be eyeballed from the plans, following which ample-sized backing blocks can be installed. Don't install the backing block for the mooring bitt yet.

There are two butt straps that you must provide clearance for—one on each side of the king plank, where it will be butted to the port and starboard deck panels that will extend the forward deck full width, gunwale to gunwale. We'll have to notch out a ¼-inch-deep by 4-inches-wide cut in the deck beams where the butts will cross them, port and starboard. You can do this in jig time with the Skilsaw, or you can make a series of cuts across the beams with a handsaw and finish notching them with a chisel.

I ran these butts fore-and-aft in one piece, as the plan shows. If you prefer, you can just butt between the beams so that you won't have to notch them. The deck is going to get glassed anyway, so watertight security should be no problem.

Butting the Forward Panels

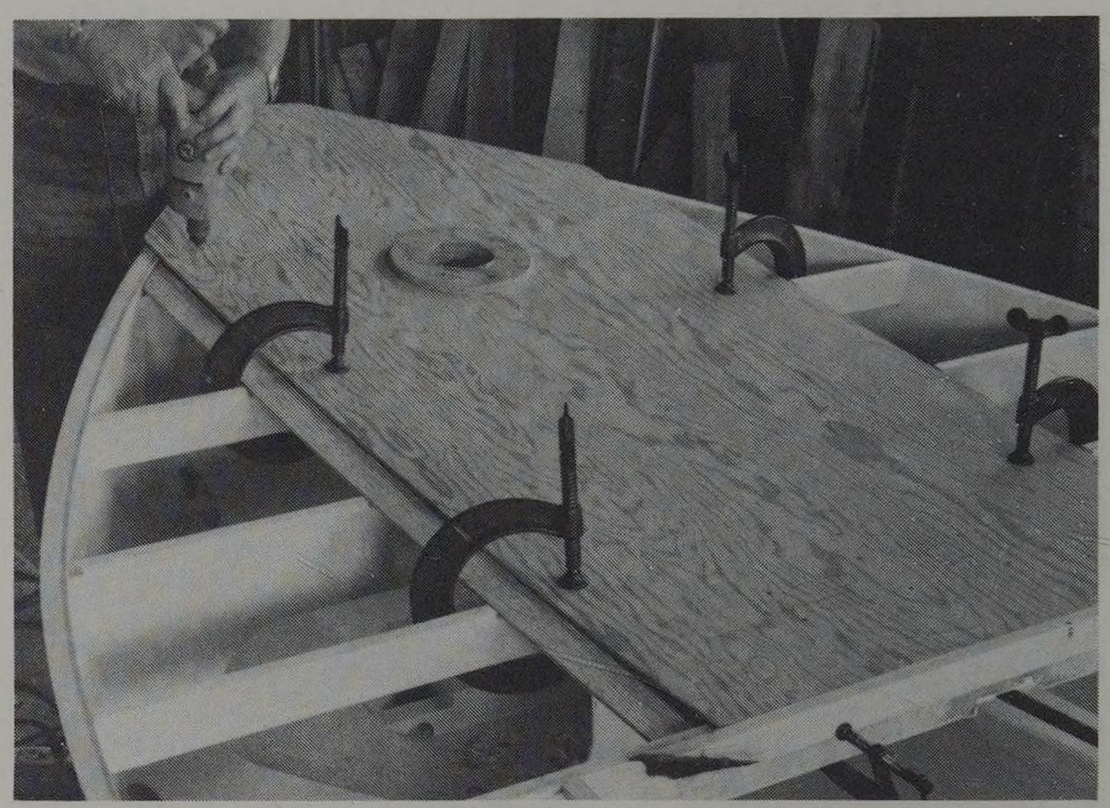
First a little recap: you have marked the king plank for the cleats, deck blocks, and mast partner, and you have installed backing blocks underneath to receive the fastenings for the hardware. You have also cut butt straps for the foredeck panel butt joints.

Now you can cut the mast partner hole in the king plank, angling the hole 12 degrees fore and aft. Glue the mast partner in place and fasten it from below the deck.

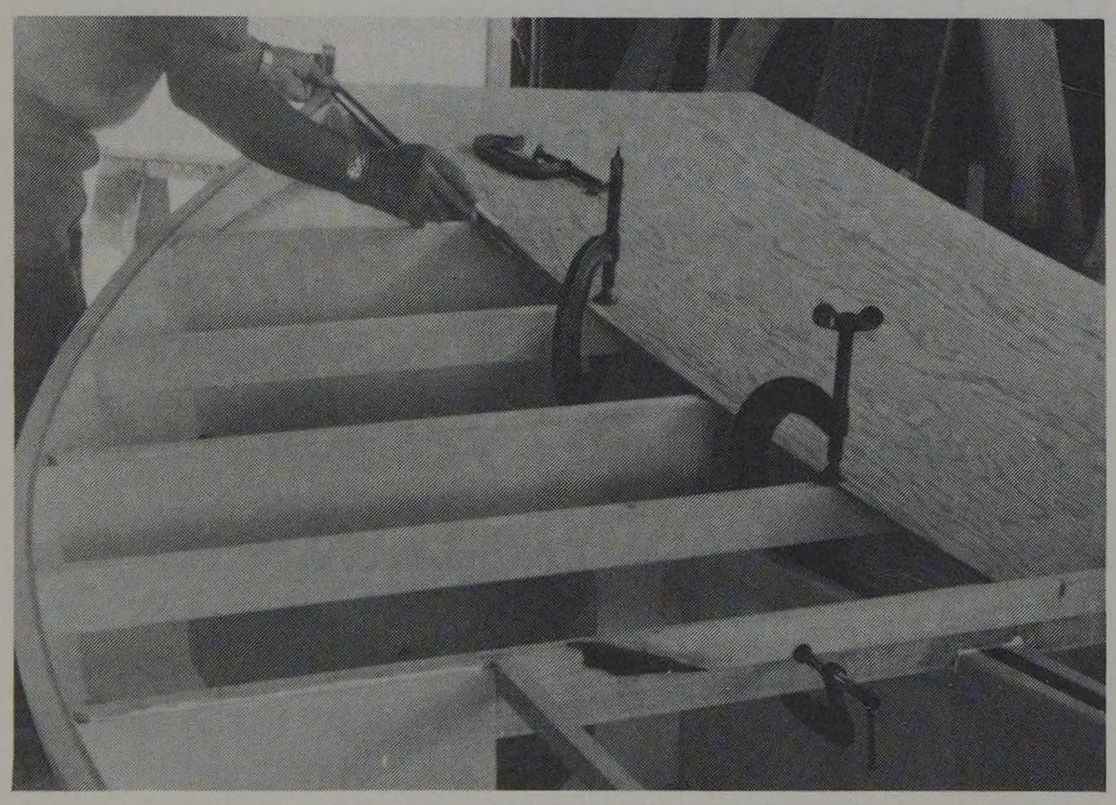
Now temporarily fit the king plank in its proper location with your two continuous butt straps lying in their beam slots under it (or, if you are using interrupted butt straps, place them just as they will fall between the beams). Clamp this free-floating assembly of king plank and butts to the deck beams. Are all the elements lying in a fair curve?

If so, take the butt straps out and apply glue to the inboard halves that will fit under the outboard edges of the king plank. Slip them back, clamp them in place, and fasten with ¾-inch number 18–wire smooth copper nails, driving them down through the king plank. Then remove the king plank from the hull and clench the nail points, whacking them flush into the plywood.

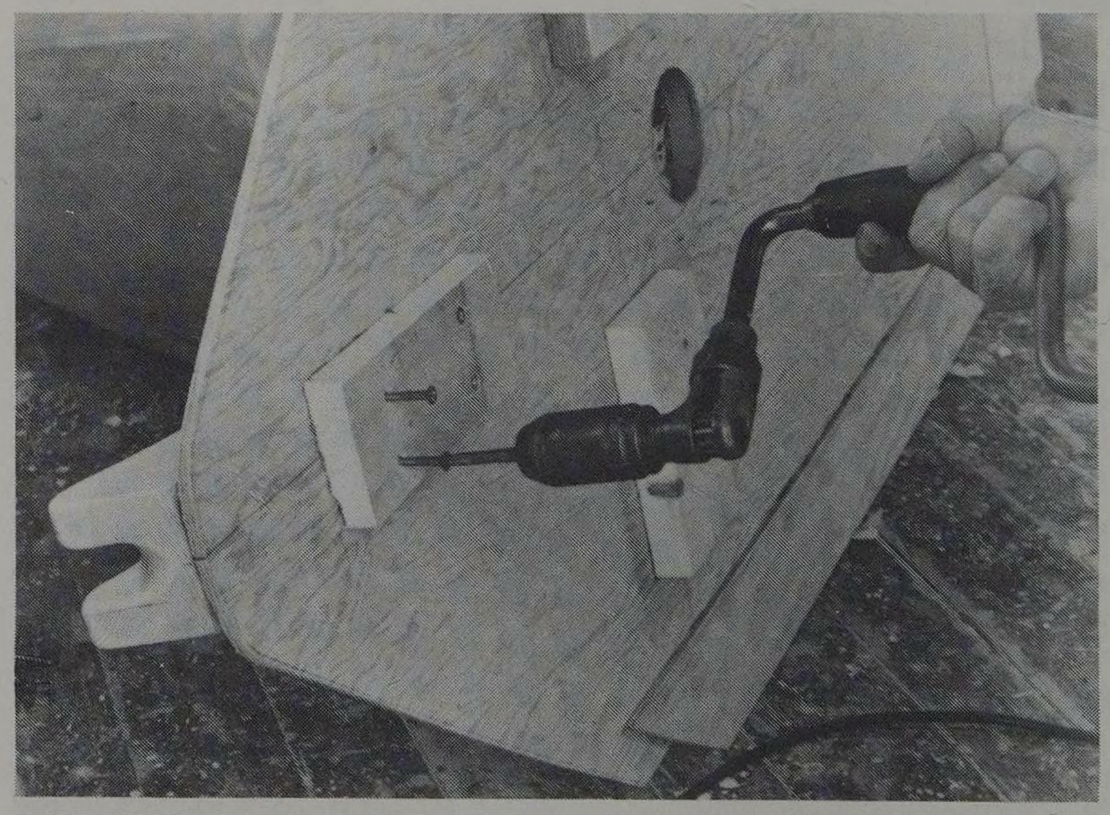
Next, fasten the mooring cleat in place, working



King plank fitted, port-side butt strap in place, and mast partner installed. The deck beams have been notched to accept the butt straps, and here I am boring the king plank and butt strap for the clenched-nail fastenings. Pilot holes are useful here because of the bounciness of the setup.



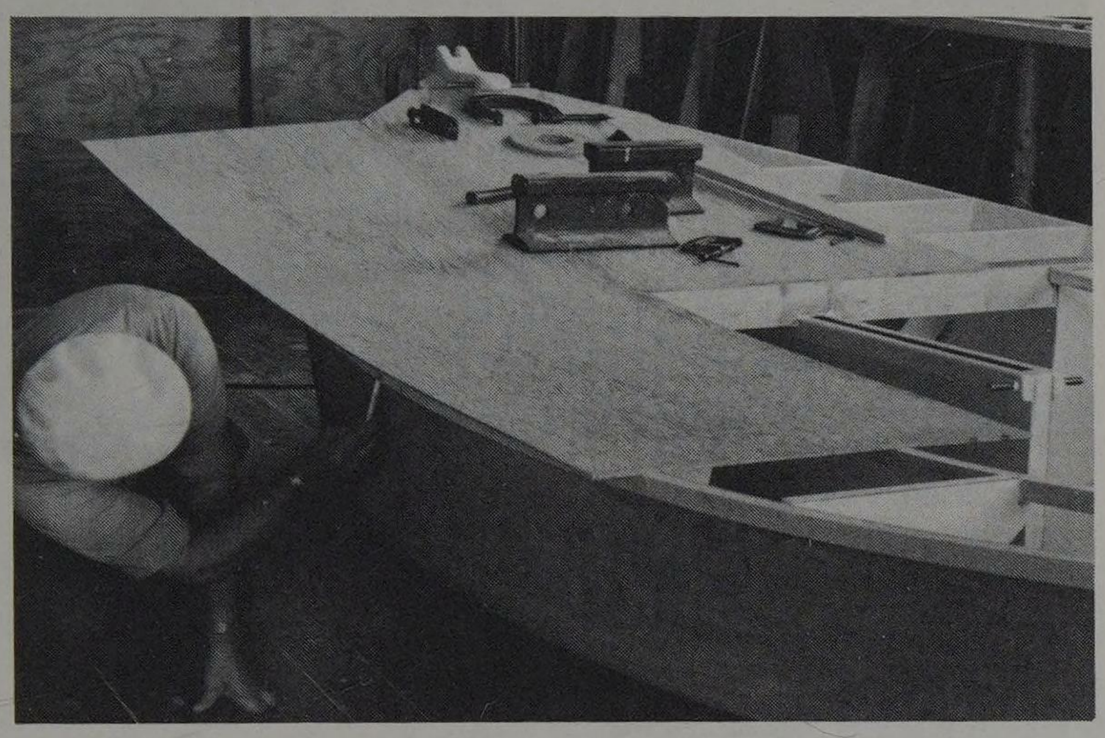
I laid the king plank's edge on the deck beam centerlines, clamped the plank to the deck beams, then measured aft from the stem and forward from the aft edge of the aft deck beam to locate the fore-and-aft center of the mast partner. Once I had the partner located, I measured and marked the deck hardware positions.



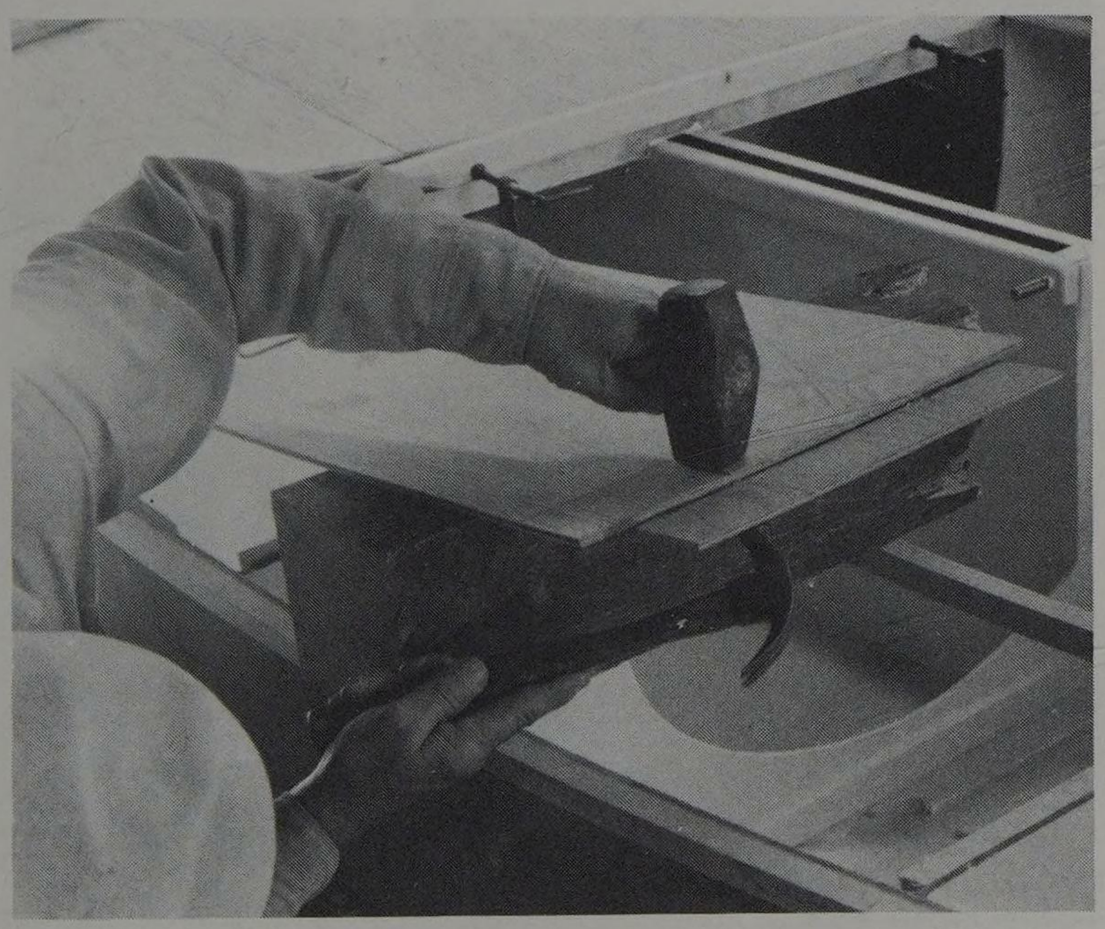
Backing blocks to catch the deck hardware fastenings are glued and fastened with anchor nails driven down through the deck. When I came to the mooring cleat, I glued and nailed it to the deck, then I glued and nailed the backing block. Finally, I fastened the cleat permanently with long bronze screws driven up through the backing block as shown here. The block is kept back out of the way of the stem.

from the underside through its 3-inch by 7-inch backup block, which must be secured to the deck clear of the stem so it won't interfere with final deck placement. Tack the deck panel, or king plank, down to the deck beams (no glue—you are going to take it off again), making sure that its centerline matches up with those of the deck beams and the stem. Remove the stick you installed earlier to keep the panel from slipping aft.

Now we'll make the port and starboard sections and butt them to the king plank. Split a 4-foot by 8-foot plywood sheet right down the middle. Snug one half of it right up against the center deck panel, and mark its shape to fit along the gunwale and the coaming carlin from underneath; repeat with the other half on the opposite side. If you're feeling timid, allow an extra eighth inch or more when you cut the outboard shape; if not, cut right to the line.



With the king plank in place, split a 4-foot by 8-foot sheet of plywood down the middle and snug one-half of it to the king plank. Then mark its outline from underneath.



The aft ends of the port and starboard deck sections are buttstrapped to receive the after segments of the deck.

When you're satisfied with the fit on both sides, put your thwartship anti-slide stick back in place, and glue and nail both side panels to the butt straps. We still have the aft sections of the side decks to add to this assembly; right now the object is to keep everything in exact alignment. In the end we will lay the entire deck, sides and all, in one piece. For the time being, just make sure that the two outboard panels fit smoothly along the curve of the sheer and are OK for fit both forward and aft.

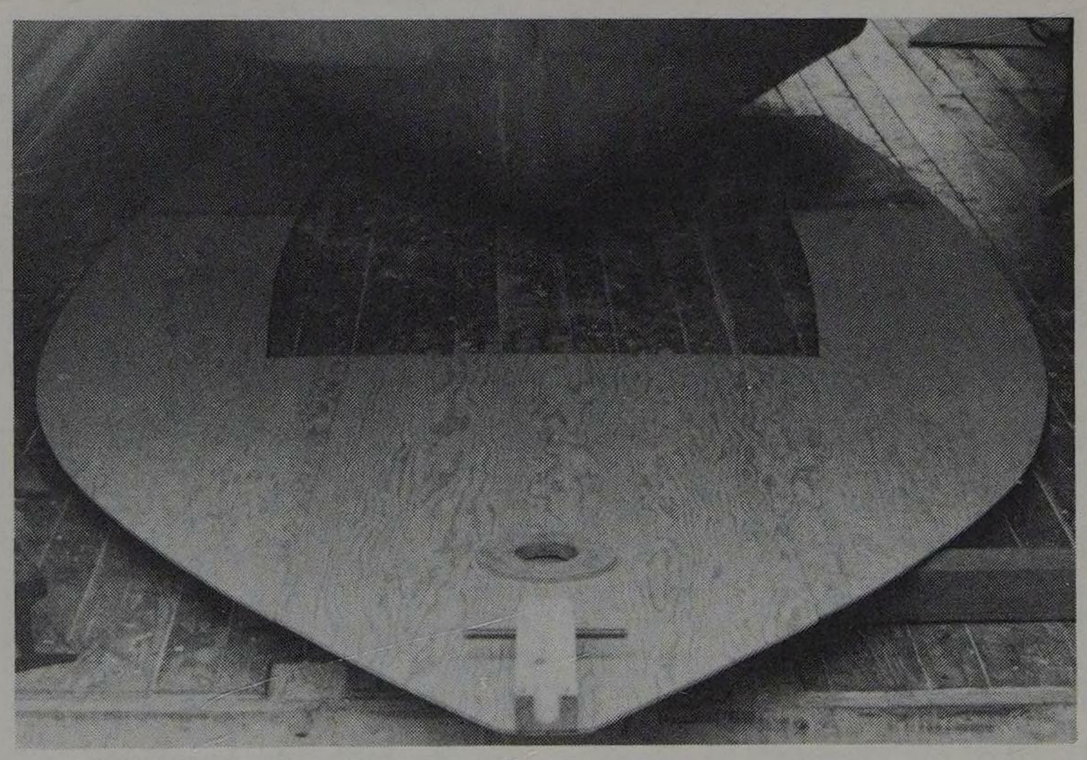
Getting the Whole Deck Down

Cut the two after segments of the decking and buttstrap them onto the forward assembly following the same procedure you used for the foredeck side panels. Yes, I did have the after flotation cut out in my boat so that it was not in the way of these butt straps, and the stick was again clamped to the aft edge of frame C to keep the whole deck from sliding aft on me. Now we're ready to glue. I talked my wife, Amy, into helping me glue the whole area, to save time.

We began applying the glue at the stern and worked toward the bow, so that the bow end of the deck would go into the freshest glue and we'd be able to make any adjustments in positioning if necessary. Rather than letting the entire aft section settle immediately into the glue, I put a 2 x 4 across Bobcat's sheer about two feet forward of the transom and let the after deck panels rest on that. This gave us more steerage, or should it be called wiggle control, enabling us to align the foredeck before seating the afterdeck in the glue.

PREPARING THE COAMINGS

I made my coamings of plywood, using two pieces ½ inch by 7 inches by 7 feet. Use any wood you like; some people prefer mahogany.



The deck in one piece and ready to go on.

I scribed each one to the deck to get the correct bottom rocker, and drew its top shape by scaling it off the plans. For those of you building the boat from this book, the coaming is 3 inches high (measured upward from its bottom edge) at the transom, and 2¾ inches high at a point 9 inches forward. At subsequent 1-foot intervals moving forward, the heights are 2¾, 2⅞, 2⅞, 3⅛, 3¼, and 3⅝ inches. Fair in the curve with a batten, correcting any bumps or hollows before you cut.

After I cut the coamings to shape, I scribed a line on the outboard side of each one, parallel to and 1¼ inches above its lower edge. This distance represents the combined depth of the deck and the carlin. When you reach the stage of installing them, glue them to that mark and the parallel line will show just flush with the deck. To make them plumb, I used a try square and some scrap 2 x 4 with squared ends. These 2 x 4 spacers spanned the cockpit and held both coamings square against the carlins. The coamings are nailed (as well as glued) to the carlins with 1-inch or 1⅛-inch anchor nails.

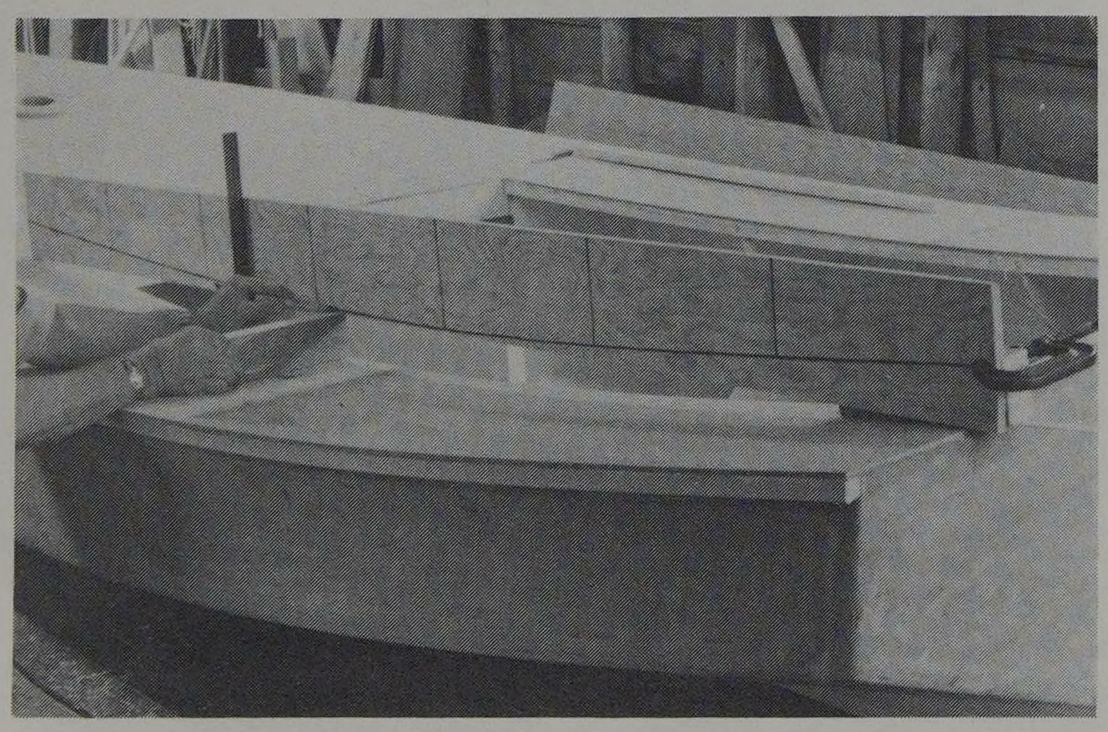
The coaming across the forward end of the cockpit goes in last, and easily. Reinforce the inside corners with a bit of putty and glass cloth.

The last thing I did before shutting up shop that night was to seal the edges of the coamings with a couple of coats of resin so they would be ready to install the next day after I got the deck glassed.

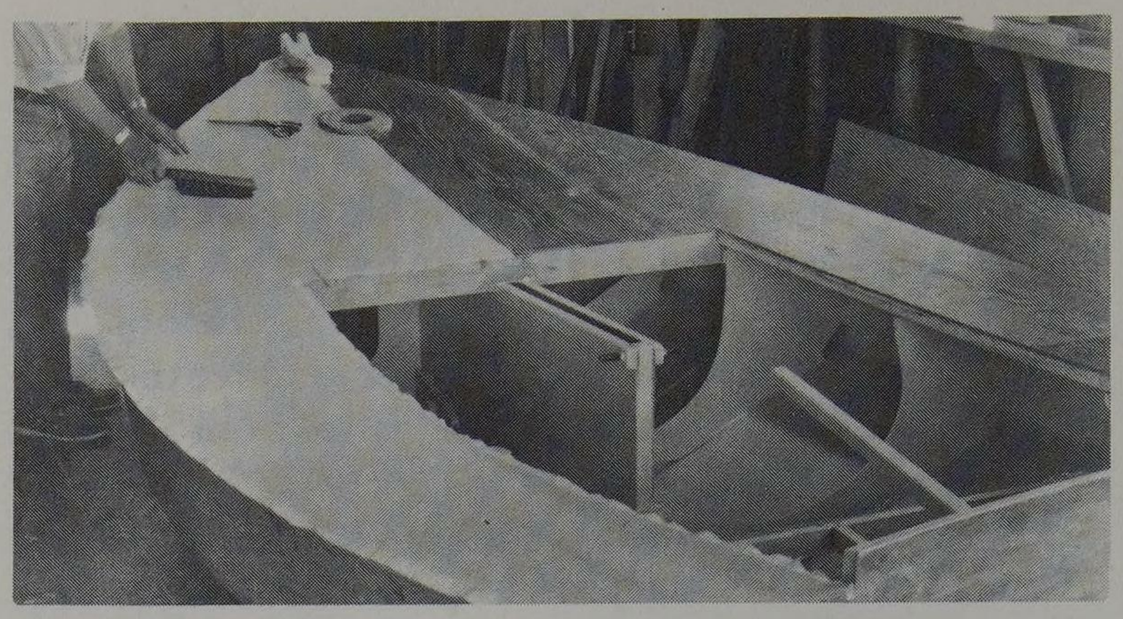
And now here it is next day, and it's fairly cool in the shop at 7:30 A.M., 70 degrees, and dry, too—a good day for it.

GLASSING BOBCAT'S DECK

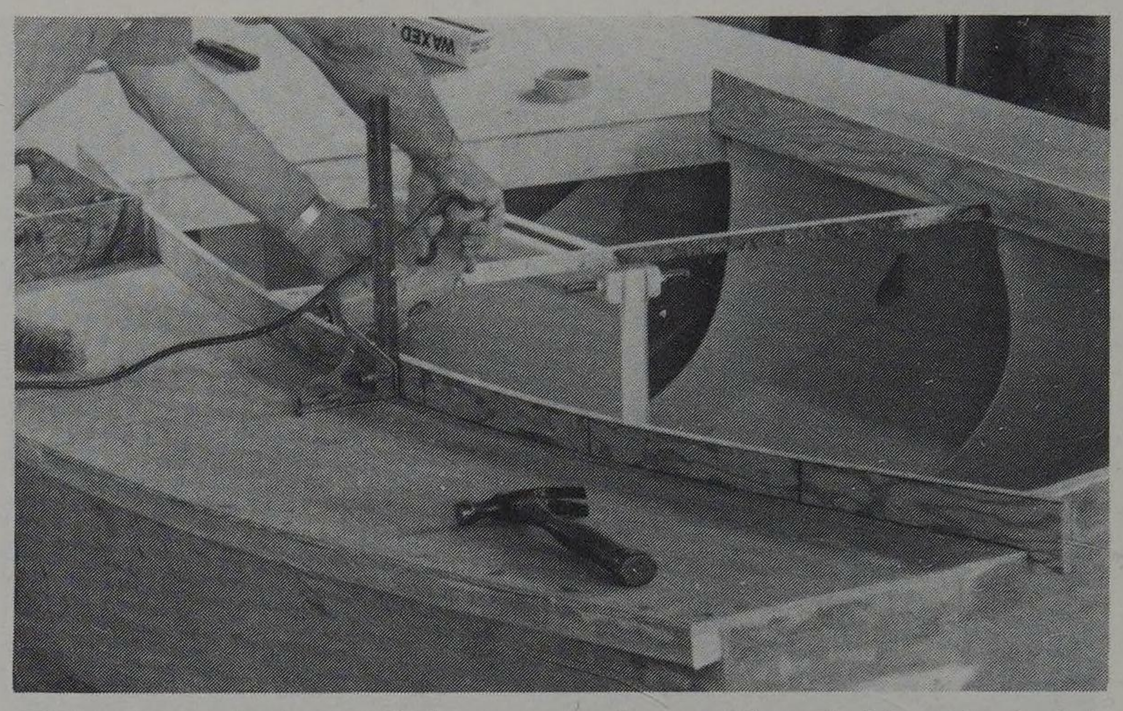
My first step is to fill the deck seams with Bondo, then give the deck a coat of resin and let that sink in while I cut two 38-inch by 13-foot strips of glass cloth, which I am going to butt on the forward deck's centerline. A pint of laminating resin put on with a 3-inch roller lays



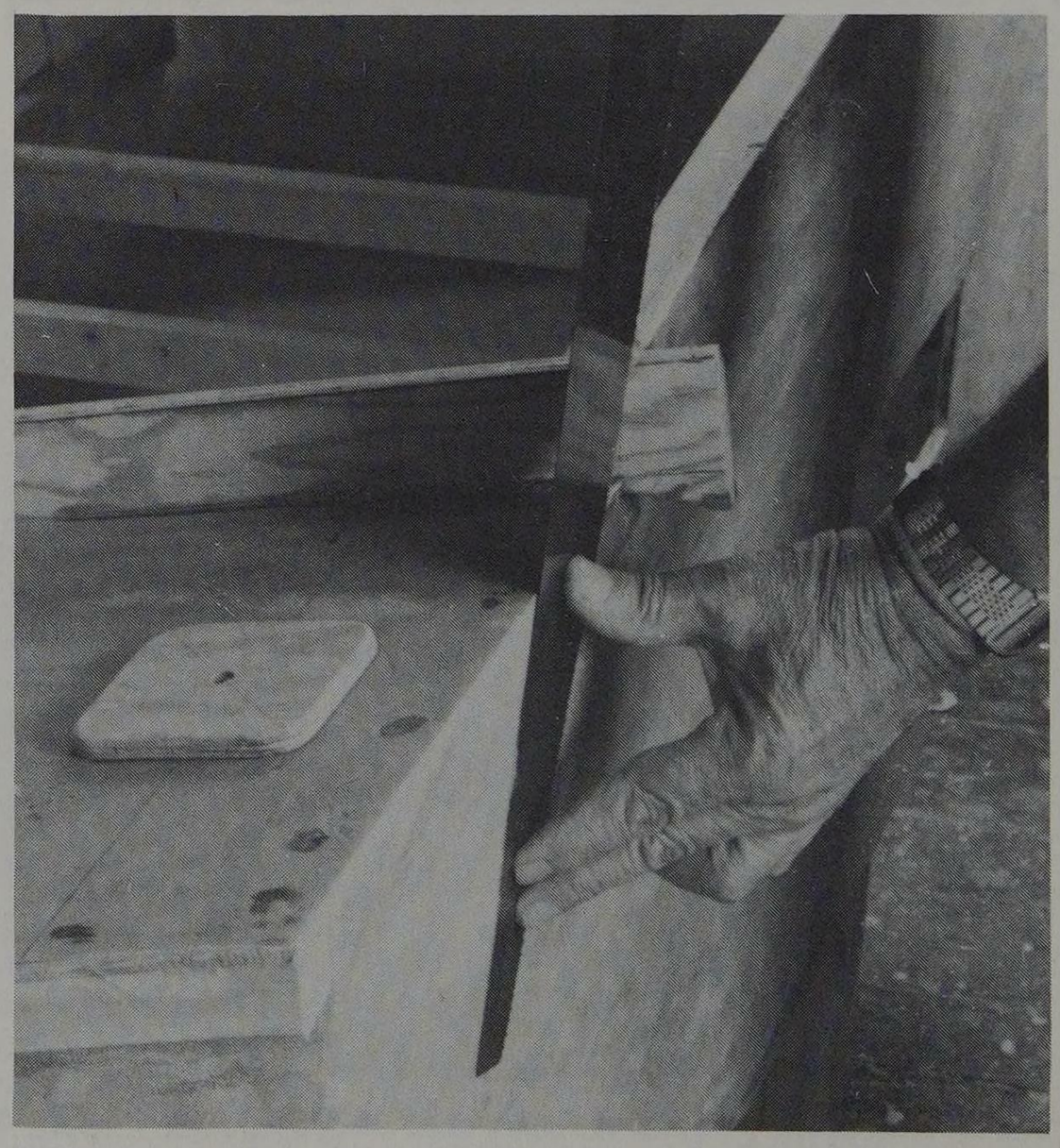
I scribed the coamings to the deck. You can make the coamings now, but don't install them until after the deck is glassed.



Holes and seams in the deck are puttied, and the entire deck is sealed with a coat of resin before glassing. One piece of cloth 38 inches wide by 13 feet long covers half the deck.



The coamings are installed square to the washboards (the side decks) and are glued and fastened to the carlins. I used square-ended spacers as shown to press the coamings against the carlins.



Following my own advice: "Leave it long, and cut it off later."

a complete base coat with none left over. That first coat has to set up good; I'd be in a mess if I were to put a chunk of cloth that size in half-cured resin. So I'll have another cup of coffee and think about the floorboards and the stern seat, neither of which I've made yet. Those two items plus the coamings will spell the end of all hull construction.

In about one hour the sealed deck is sufficiently set so I can give it a light sanding to get rid of any built-up globs of resin or any lifted splinters I might have missed. For this I use 60-grit paper made up into a pad so I can sand by hand. I'm especially careful to get rid of all projections the cloth might catch on, which would allow a bubble to form. It takes time to work off an air bubble, and you don't want to be bothered dealing with them when you're watching both the clock and the thermometer.

It's easier to glass the deck than it is to glass the hull. Once you get the cloth in place you can keep going until the job is done.

By 11:00 in the morning, when I fix my second batch of resin, my shop temperature is up to 80 degrees. I find that by mixing only a pint of resin at a time, I can usually get it on with either brush or roller before it sets up. I always put the third and final coat on with a 2½-inch bristle brush I've used on over a hundred boats and by some miracle haven't lost yet. I've come close a number of times when the resin was going over the edge into the gel stage, but quick immersion in a pot of acetone has saved the brush each time. The final coat should be a finishing resin, which has wax in it.

By 2:30 in the afternoon the deck is sanded down. I can still see the hardware locations through the glass, so I put the deck blocks and cleats on and that reminds me to install the two small square plywood deck pads through which the sheet horse runs, anchored in place by a knot under the deck on each side.

As it happened, the coamings and the sheet horse pads went on next day. I used thickened epoxy for glue on both, and had no problem with either. On the following day I fitted the stern seat of ¼-inch plywood, measuring its dimensions from the boat. I was all set to scale the floorboards next, and I was about to make a full-size pattern for each of the four pieces, which looked like a big improvement over climbing in and out of the boat and fitting them by trial and error.

But I didn't have to do even that. Dan and Linda Wood showed up, and Dan, who had built a Gloucester Light Dory plus a number of the Bolger-Payson Instant Boats, immediately went to work laying out the forward floorboards and freeing me up for painting the hull. Good chance to turn Bobcat over, too; with the two of them and Amy and myself we had two to a side to lug her out of the shop, capsize her and bring her back in, upside down, as easy as pie. Incidentally, the combined width of the floorboards is 2 feet 2½ inches just forward of frame E, 3 feet 5 inches on both sides of frame D, and 3 feet 3 inches at frame C.

8. Finishing Touches

You're so close to launching day you can smell it. Time to reinforce that feeling by putting some paint on your boat. At this point, a close look at the waterline of my boat told me it was clean enough to mask off without fairing it first with a batten. The ¾-inch masking tape works well to mask the boottop off. I can bend that edgeways a little to follow the curve. With narrower tape, I'm apt to snake it; any wider and I'm apt to get jerky places.

This takes about a half hour. Make sure the tape is tight against the hull.

PAINTING BOBCAT'S BOTTOM

I should say simply that you paint Bobcat's bottom with an antifouling bottom paint of your choice. That's what I *should* say, but I can't help adding that in your shopping for paint, you'll find some pretty fancy formulas with fancy prices. I know I did. And a lot of these fancy paints need their own special additives and thinners, and can be difficult to apply. Rest assured that most paint salesmen won't ask you whether you *have* all those special additives and thinners, so if you buy exotic paints, make *sure* you have all the trimmings. All of which gives me the opportunity to preach a bit.

I am running a boatshop, not a chemistry lab. I do not need a whole shelfful of additives and thinners. I especially don't need them when they come labeled with mysterious numbers that leave me without a clue even as to what family of ingredients they are akin to.

Experience has taught me that I can harden polyester resin with a bit more or a bit less catalyst, and the end results will not suffer. I know, too, that I can thin my Chem Tech T-88 epoxy resin with lacquer thinner, so I don't have to lay in a supply of a special variety for just an occasional job. I have recently learned that I can thin polyester resin with 10 to 30 percent acetone, and use it as a sealer with every confidence that it will set up. This is a far cry from the fears of my first instructor in the mysteries of fiberglass. He had to make sure that there

wasn't so much as a hint of acetone left in the brush he was about to use to put on his last coat of resin.

You can make helpful discoveries by accident and a pinch of instinct. Didn't Columbus? Didn't Marconi? One day when I thought I was using a heavy finishing resin with quite a bit of wax in it, very good for sanding, my brush whispered to me that the stuff was going on much too easily. I had picked up the wrong jug and was using thin layup resin. I made a grab for a surfacing agent, a liquid wax from Advance Coatings Company, and dumped in a capful. It worked.

When this particular surfacing agent is cold it is a solid clump of wax. Today I regularly blend ten milk-capfuls of it to a gallon of layup resin, after warming both of them, and I mark that jug for the last coat only. I don't have to pay top price for a heavily waxed resin (and sand laboriously between coats). I just use layup resin and top it off with my final coat mix. And it's something I can control.

So, my advice to you is to stay loose—as long as you have control.

MORE FINISHING TOUCHES

Build a classy little boat, and she has a claim on you. Bobcat looks great, and so she deserves to look a little better. There she sits, with her scarlet bottom, white boottop, and green topsides, her white gunwales, mast partner, mooring cleat, and coamings. Her deck is Gloucester Marine Cream—a very light buff to match her interior. I gave her last coat of deck paint a teaspoon and a half of Interlux 198 nonskid compound, which doesn't seem like much but proved to be plenty in the less than one cupful of paint it took to cover her deck.

Some say she looks a little bit like Christmas, and one friend says she is "distinctly Italian."

And so I decide to varnish her spars. The mast, the boom, and the gaff are smooth and absolutely clear of knots, not even so much as a pin knot. The mast, if I do say so myself, looks perfectly round, perfectly straight, and perfectly (I think) tapered. So they will get their varnish, and while we're at it, it would look good on the tiller, too. First I put on Interlux Number 1026 clear wood sealer, which also acts to some extent as a stain, turning the wood a sort of honey color.

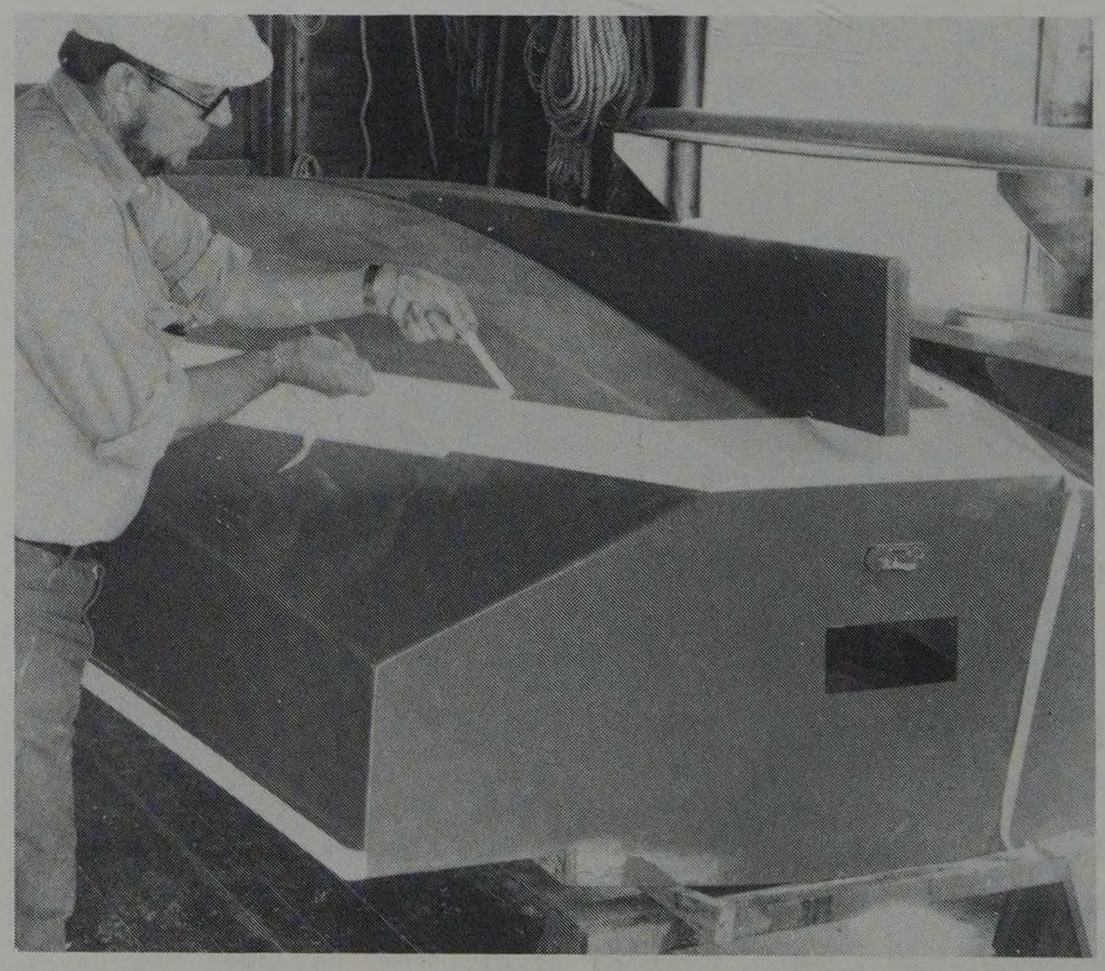
While we're talking spars, I made one mistake that serves as a typical example of what can go wrong if you're not 100 percent careful about scaling dimensions from your plans. I was making up the ¾-inch by 1-inch strengtheners that are fastened to the sides of the boom and the gaff. The drawing shows them in end view at half full size, or ⅜ inch thick by ½ inch wide. Double that and you get your ¾ inch by 1 inch. When I measured the length of the gaff strengthener, though, I stayed with the same scale and made it only 18 inches long. I should have used the ¾ inch equals 1 foot scale, which would have made its length 3 feet. So off it came, luckily before the glue had dried.

I was beginning to see it all coming together, so I was ripe for it when Gloucester Light Dory owners Lance Gunderson and Larry Pritchett suggested I lay my hammer down and go for a sail. So we pulled my 20-foot Zephyr out from the weeds behind my shop where she'd been stored since last season and aimed her for the water. No paint, nothing beyond a two-minute power sanding to knock off the paint blisters she had accumulated, because blisters would drag in the water. That's my kind of boating; launch on a moment's notice, and hang the painting. I would be pulling her out in another few weeks anyway.

Next my tall and talented friend Bill Robelen IV showed up on vacation. His idea of a vacation is work, so, not to disappoint him, I told him I had saved the after set of floorboards for him to make. With his reach, he can work on them from the outside. Which frees me to work on the rigging.

TIME TO STEP THE MAST

This is always an anxious moment. Will the mast have the right rake? All based on measurements in the short distance between the step and the mast partner as it is, it's painfully easy to slip up by an eighth of an inch or even a quarter, and think how greatly magnified that fraction can become by the time it reaches the masthead. Up she goes, with her five coats of varnish—three quite thin coats and two thinned just a dight—ready for the moment of truth, not just the optimistic



When the masking tape comes off, the waterline is clean as a hound's tooth. This is the waterline Bolger drew on his preliminary plans; it is different from the one shown on the plans in this book, but the procedure is the same.

eyeball appraisal. I had measured the distance, using the plan, from the aft side of the masthead to the top of the transom centerline, which came to 16 feet 9 inches. I marked this off on a light batten, and with this in hand I approached Bobcat with a degree of apprehension.

But not to worry: she was off by only a half inch in that long diagonal, and I was not about to hang myself in a closet for that. For a moment I had visions of rigging Bobcat the next day, which would only call for a little eyesplicing and fancywork, and getting her overboard the day after that. None of which happened, of course.

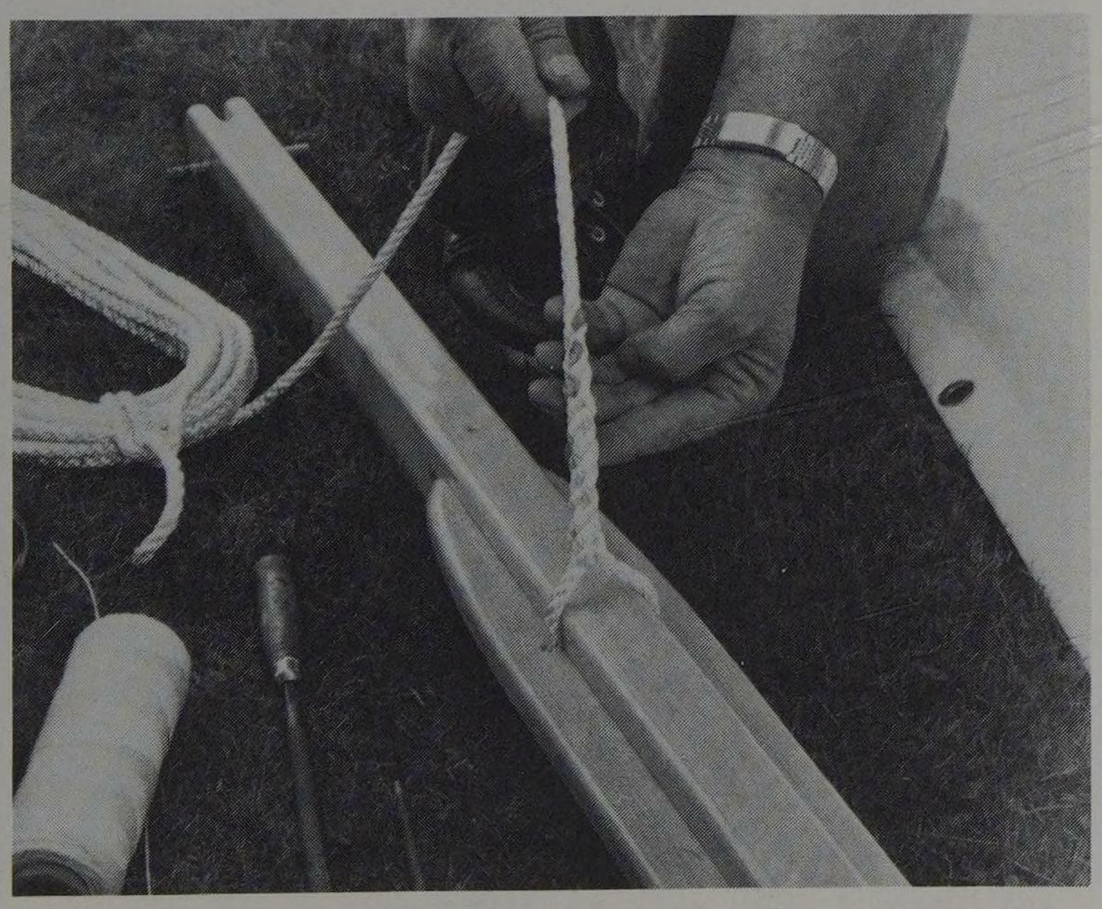
For one thing, despite Bill's valiant efforts it was taking two days instead of one to finish up the floorboards. As you might suspect, I had decided to varnish them, too, and so far they had only the first coat on. So the two of us turned to on the rigging.

I had already had the sail on hand for a couple of months, thanks to prompt delivery by Rockport, Maine sailmakers E.S. Bohndell & Company. A few nights out on the lawn, followed by resting in a loose roll from foot to peak, had done a fine job of getting the wrinkles out. It looked very promising, laid out in position with the spars in place around it, and the 110 square feet seemed plenty big enough compared to the 12 feet 3 inches of hull.

PUTTING ON THE STRINGS

I had settled on ¼-inch braided Dacron for Bobcat's peak and throat halyards, where I did not want any stretching, and ¼-inch three-strand nylon for the topping lift, lazyjacks, and mainsheet, where a certain amount of give is acceptable.

Bill Robelen and I rigged her in about the order the sail plan calls for:



The mainsheet is eyespliced to the boom. Note the easy taper of the tucks, which are then burned to prevent unraveling.

1. **The Sheet.** 45 feet of the ¼-inch nylon, with the standing end spliced around the boom, running through three Schaefer 02-07 swivel eye blocks (one on the sheet horse, two lashed to the boom) with its fall pinned on the centerboard trunk. The boom lashings consisted of three turns of number 190 braided nylon with ends tied in a square knot and backed with stopper knots, cut and burned with a rope-cutting gun to prevent untying.

2. **Throat Halyard.** 29 feet of ¼-inch braided Dacron, standing end made fast to gaff jaws, running through dumb sheave in mast and through deck swivel block to cleat.

3. **Peak Halyard.** About 34 feet of ¼-inch braided Dacron (the 31 feet indicated is a mite short) with similar lead.

4. **Topping Lift.** 35 feet of ¼-inch nylon, with standing end led to slot at outboard end of boom and belayed on adjacent pin, running through dumb sheave at masthead down through deck block to cleat.

5. **Lazyjacks.** About 29 feet of ¼-inch nylon, knotted into one endless loop. (I didn't know what lazyjacks were for, and was about to ask Phil when I found the answer in his book *100 Small Boat Rigs*, published by International Marine Publishing Company.) They are knotted for easy adjustment, which is helpful when the topping lift has been slacked while you're stowing the rig—you can slack them off to let the boom lie flat on the transom instead of sweeping back and forth.

6. **Gaff Jaw Parrel.** I used ¼-inch braided Dacron for this and adjusted it to come taut when the gaff was peaked.

7. **Luff Cringles.** I spliced these from ⅜-inch Dacron to an inside diameter of about 5 inches to replace wooden mast hoops (hard to find, and not much good when you do). I made some experimental fiberglass hoops, building up glass cloth resin-soaked wrappings around a section of 4½-inch PVC tubing and slicing them to size. These looked pretty good, but on rechecking Phil's instructions, I saw that he insisted: "Cringles to replace mast hoops."

8. **Throat Lashing.** I used a piece of braided fisherman's nylon long enough to hold the sail properly taut with the gaff fully peaked.

9. **Gaff and Boom Ties.** Make these a series of separate ties to lash sail to spars. Do not lace—that way, one failure and you lose it all. I used braided fisherman's nylon for this, too.

10. **Sheet Traveler Horse.** Slip the block onto a 4-foot 8-inch length of ¼-inch Dacron, lead the ends down through the padded holes, and knot below the deck.

11. **Boom and Gaff Outhauls.** Lead through slots on spar ends and belay on pins. In the case of the boom, belay the end on top of the topping lift. A couple of feet of the braided fisherman's nylon took care of both outhauls.

The flag halyard? I have yet to rig it; I thought I had enough strings to play with for my sailing trials. But Bobcat's got it coming, and it will do good service as a telltale wind indicator.

One last, and possibly unnecessary, word of warning: put stopper knots on your sheet, halyards, and topping lift. It can be very discouraging to watch any of these lines run out free and float away on the tide.

RED LETTER DAY

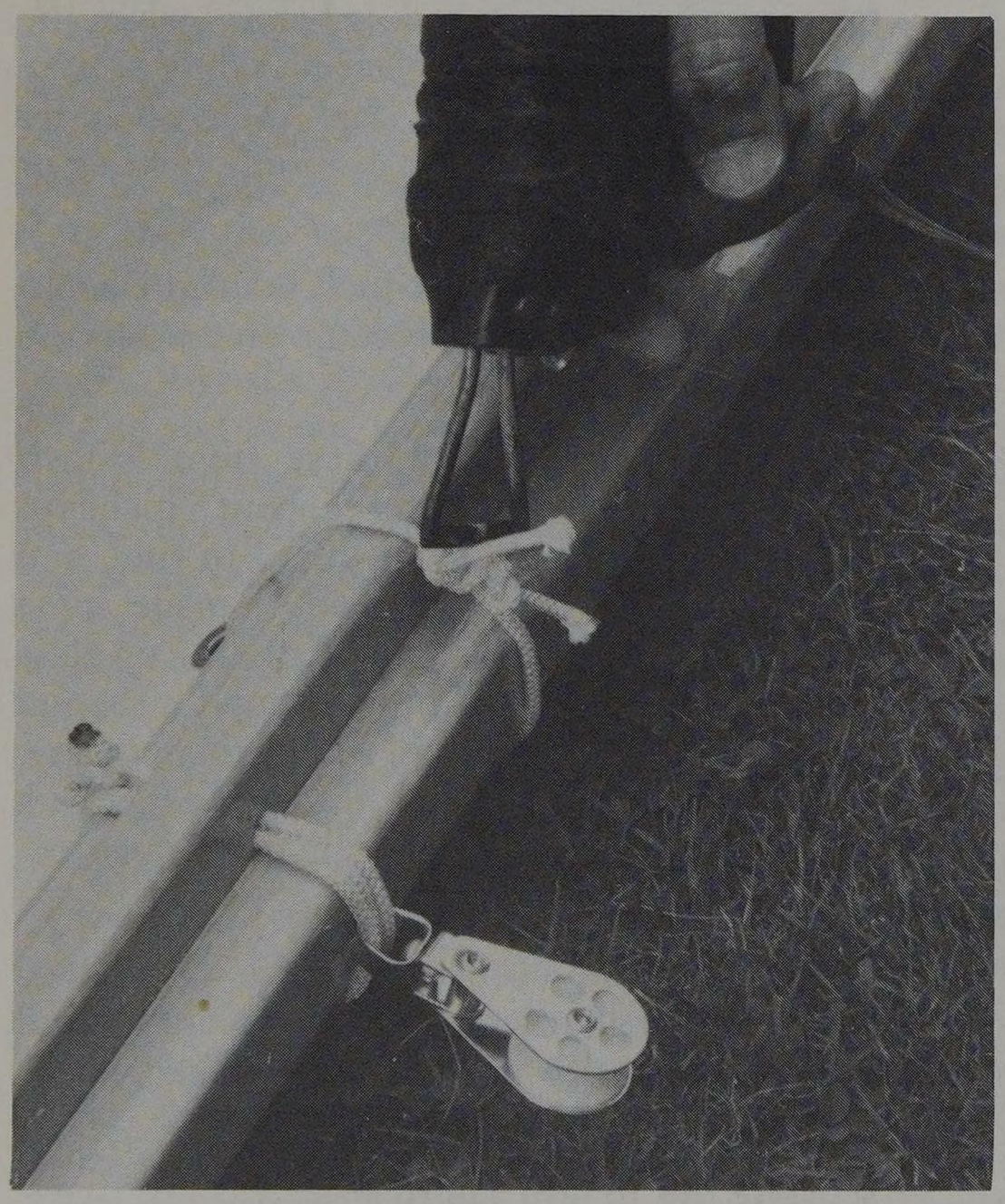
There's very little left to do now: a bit more varnish on the floorboards, a dab or two of paint to cover any thin spots, and rigging the centerboard.

Don't try to raise the hull high enough to slip the centerboard into its case all standing; she would have to go too high for peace of mind. Do it the easy way by heaving her over on her side, on the ground. When you've attached the ¼-inch lanyard to the board, take it through the lanyard hole, leaving about 8 inches of scope to the toggle, as the plan calls for. Be sure the toggle is at least 1¼ inches wide at its middle, so that if it works around in line with the centerboard slot it can't drop through.

Launching day dawned bright and beautiful, wind out of the northwest and unusually gentle for that direction, with only moderate puffs. We hoisted Bobcat onto Larry Pritchett's trailer and headed for Pleasant Beach. On the way the mast fetched up on a low-slung telephone cable, so we unhooked the trailer, tilted it, and hand-guided it to keep the mast clear.

It was noon, and the moment of magic was *now*.

Finally she was in the water, and I will admit that as I went through the routine of getting her underway, all the feline temperaments I had heard or read about ran through my mind.



The sail is lashed to the boom and gaff with separate ties. I used a square knot backed with overhand knots, and burned the ends.



Rigged and waiting.

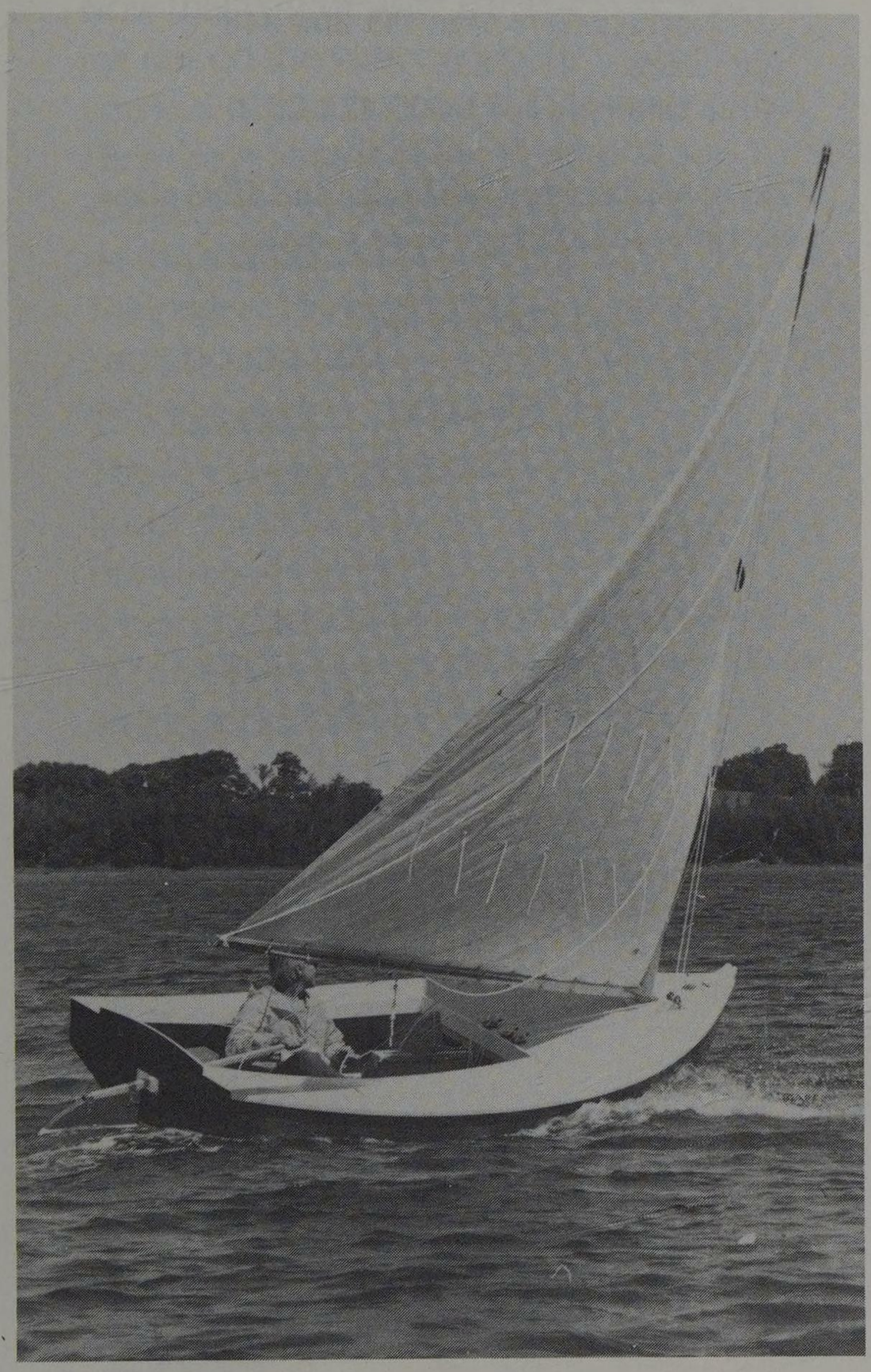
So, down with the centerboard, up with the halyards, throat and peak together and keeping the gaff horizontal until the boom jaws were four or five inches above the deck, as the drawings show; then secure the throat halyard and haul away on the peak. (The sail looks good, it's setting beautifully.) Tiller to windward to let her bow fall off a little so the sail can catch more wind; in with the sheet, tiller amidships, and off she goes.

I do not see that she sails much differently from any other boat. She carries a bit of weather helm. She feels steady and able, so as soon as I have the feel of her I head in to pick up photographer Ralph Johnson. He wedges himself in the lee bilge between trunk and coaming, and Bobcat seems to take no notice of his weight at all.

She outperformed my old standby, the 20-foot Zephyr, on all points of sail and was notably faster. That day and several days following I gave her the works, doing all the catboat don'ts laid down by the doomsayers who insisted that any boat of her type was mean and tricky. I ran dead before the wind, and she never threatened to trip on her boom. I jibed her and jibed her, and her gaff followed her boom along docilely. Were all the dire predictions baloney, or wasn't the wind strong enough to bring out the viciousness in her?

At last I got a 15- to 20-knot northwest breeze, and still with never a reef she easily carried that proportionately big sail with calm confidence. In gusts she tended to round up instead of heeling over. In fact, it didn't matter whether I was hiking out to windward or luxuriating in the cockpit, she lay down just so far and no farther. Of all the boats I've built and sailed, she has more of a big boat feeling than any other.

Yes, Bobcat was quite a bit of work, but the results were worth every hour of it, and several times over.





Look at her go! This could be you.

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Build the New Instant Boats by Harold "Dynamite" Payson
Why stop with one boat? Here are 11 more designs for boats that can be built without lofting, setting up molds, or building a jig. 160 pages, 125 illustrations, 8½ x 11″, paperbound. 1985.

Sailing: The Basics by Dave Franzel
Now that you've built *Bobcat,* you've got to get out on the water. Franzel's aim is to get you out of the classroom and into the boat. He's the operator of the Boston Sailing Center and former head instructor at one of the nation's largest sailing schools.
144 pages, 150 illustrations, 7″ x 10″, paperbound. 1985.

The Essential Knot Book by Colin Jarman
The knots and splices you really need to know aboard a boat — with great photos and drawings showing you both how to tie and when and where you should use each one. It is part of the Seamanship Series, a library of small, inexpensive books, each devoted exclusively and in great detail to one aspect of good seamanship.
96 pages, 212 illustrations, 5½″ x 8½″, paperbound. 1985.

Other books in the Seamanship Series include:

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Build the *instant* Catbo
Harold *"Dynamite"* Pays

Dear Dynamite,

My wife is glad that I have stopped sitting around the house after work reading spy novels. Now I am dreaming about building sailboats and spending time by the local lakes and rivers watching them sail by. But that is not a problem — she is as excited about building a sailboat as I am!!!

Doug Rice
Portland, Oregon

Build the New Instant Boats is a gem of clarity and friendly wit. May you build boats forever!

George Ugolini
Fishkill, New York

I like your style of writing and I like your way of making things so clear to us five-thumbed types. Keep up the good work and thank you.

E.G. Ragsdale
Florence, Oregon

Your book makes a lot of dreams come true for people like myself that didn't get born with a ton of money under the bed.

Daniel Lovell
Ashford, Connecticut

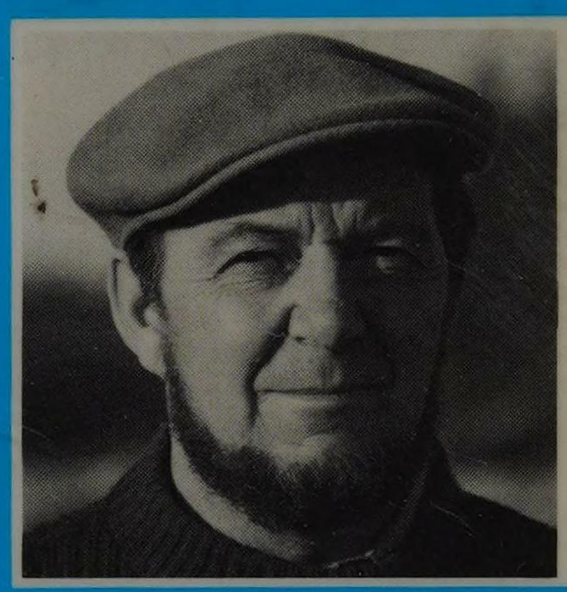
This is the first boat I have ever built, and I have found the experience to be highly enjoyable. Although I am an engineer by profession, I have never been much of a craftsman; this project has given me valuable practice in a craft. As work progresses, I find myself more and more excited about the idea of sailing her. Your book provided enough insight into the practical aspects of boatbuilding to overcome my timidity about tackling the project.

Norm Bernstein
Sharon, Massachusetts

Dear Genie,

You must be a genie! You gave me my three wishes. My first wish was that someone like you would see Bolger's catboat design and collaborate with him to bring this little craft into being. My second wish was that the completed design would be simple enough for an amateur like me to handle. When I realized that my third wish was being granted by your approximation of cost of materials (including sail) I almost wept tears of joy!

Randall K. Lewis
Atlanta, Georgia



Author photo by Ralph Johnson
Cover photo by Jeff Julian

About the Author:
Harold "Dynamite" Payson was a lobsterman off his native Maine coast for many years before becoming a full-time boatbuilder; the sea and his shop have kindled in him a fond respect for the simplest, most direct course to one's desired destination. This philosophy he has imparted in his previous books, including *Instant Boats, Go Build Your Own Boat!* and *Build the New Instant Boats*, and in many articles for *National Fisherman*, *WoodenBoat*, and *Small Boat Journal*. You can reach him in the shop behind his house at Pleasant Beach Road, South Thomaston, Maine 04858 ■
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