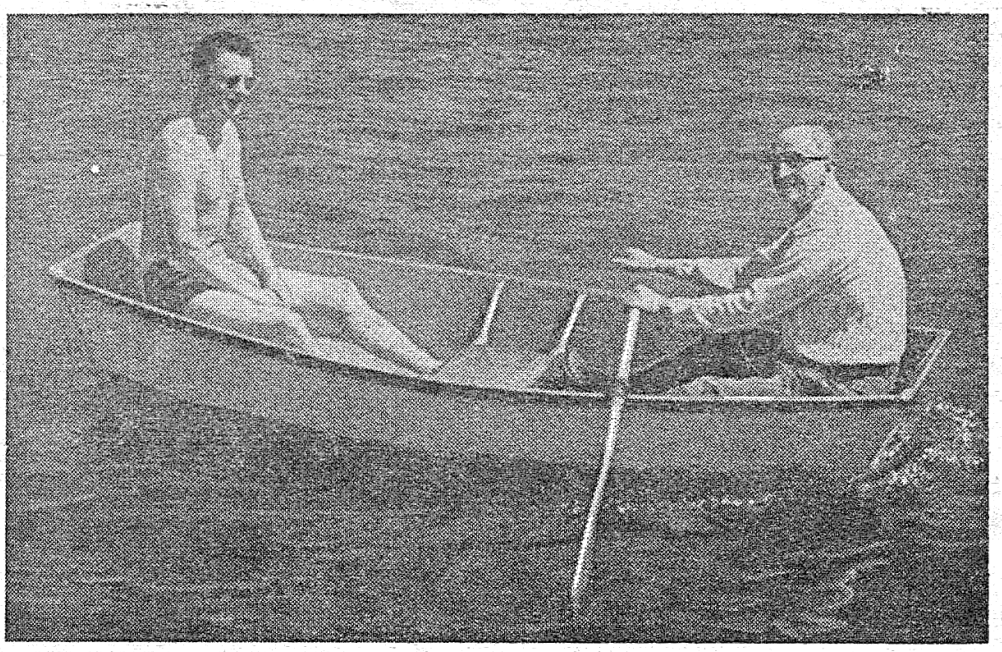
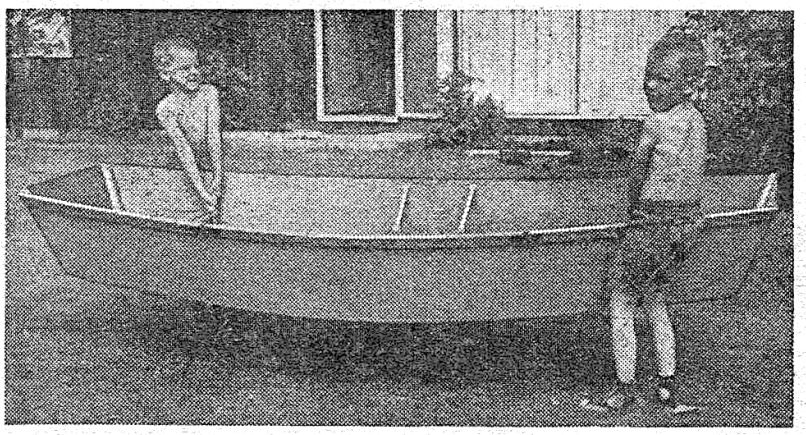
CORK Fishing Auto-topper

Craft Print Project No. 296





Cork scoots along on the water's surface in either direction since both ends are alike. She's perfectly balanced afloat with one, two or three men aboard, and two small boys can lift her.

By CHARLES JELLIFF

OUT here in Puget Sound country, some of the best fishing is on out-of-the-way lakes —can't get to 'em by car. So, I need a boat to pack in that is light. But I also need a boat that can ride out man-size salt water waves when it has to. *Cork* is the answer to both needs.

A real fisherman's boat, Cork has end seats just the right distance apart for two anglers to face each other (so one can see what the other is doing) and for one to help the other net a fish, untangle a plug that may have snagged a line, or quickly shift oars if a fish requires it.

Cork handles so nicely because of her V-bottom (scow ends are identical). In fact, she's a dream to row in either direction, from either seat. There's plenty of buoyancy for three adults, and for one occupant the center seat is just right to row from, using either pair of oar locks.

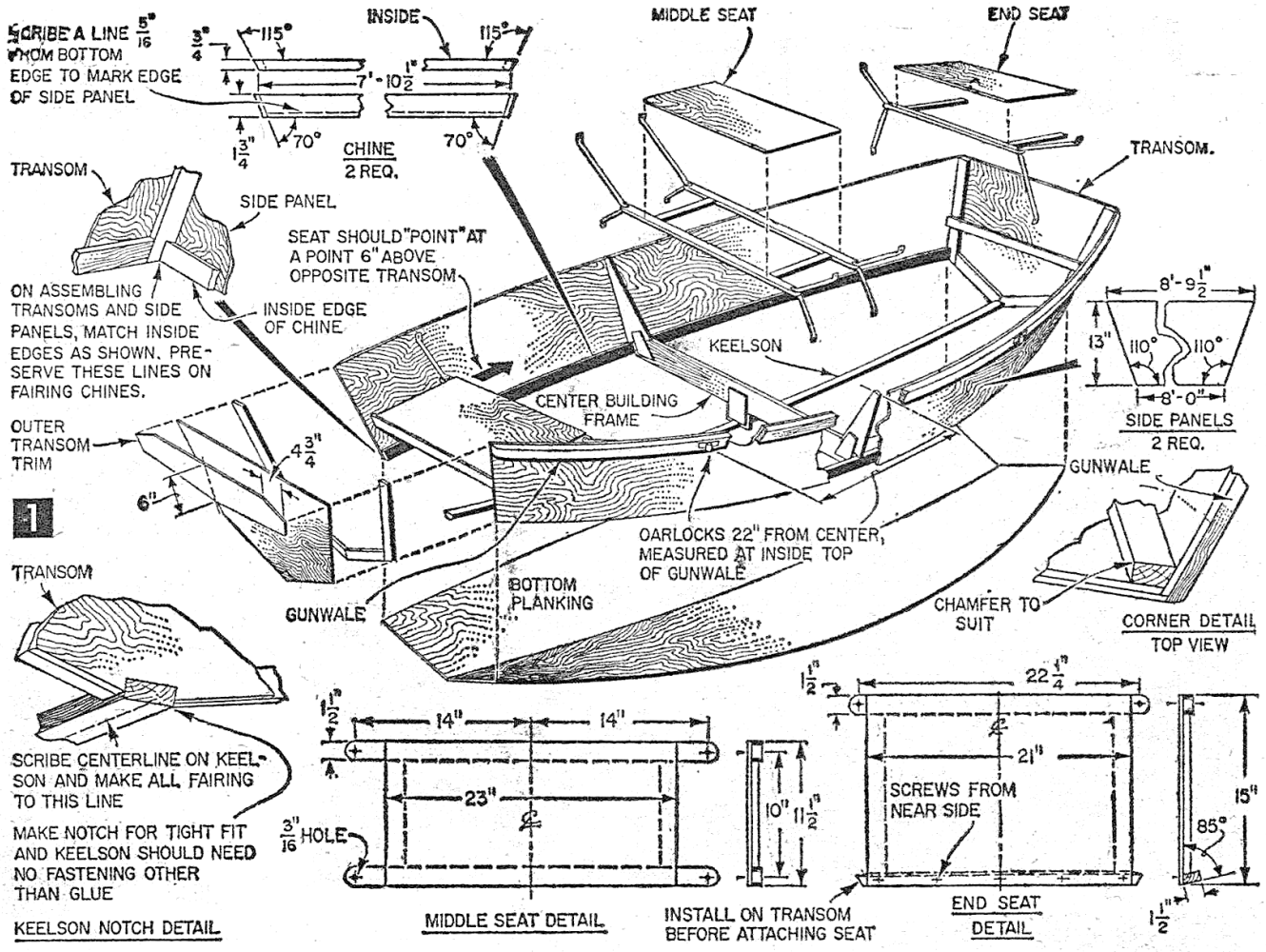
Materials cost only about $30 and construction is simple. The shape and size are set by the side panels, transoms and one building frame that comes out when seats are installed. The lightweight aluminum tubing struts that support seats add rigidity with little weight.

Because Cork is primarily a car-top boat, I finished the bottom, sides and ends with a muslin outer covering under paint. This muslin coating is easier to apply and costs less than a fiberglass outer coating and it keeps the bottom plywood from checking and cracking when exposed to the sun.

Cork's light weight comes from its semi-monocoque construction. That is, the skin or plywood covering does almost all of the work of keeping the boat in shape. The craft's center seat spreads the top gunwales apart and

STATEMENT OF USES

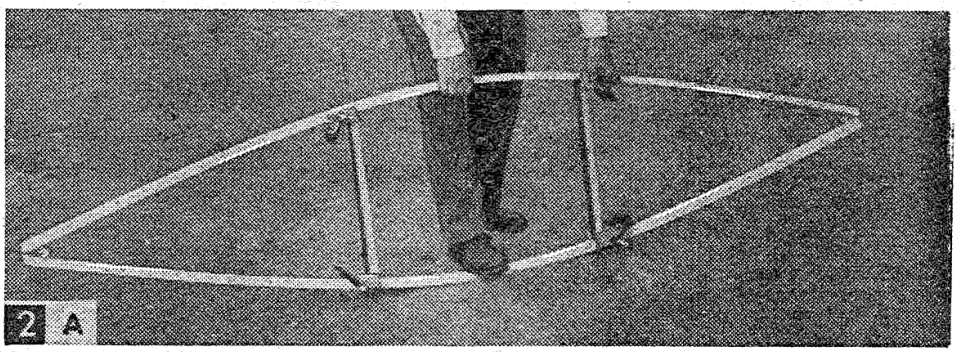
USES:	Cartop rowboat for lake, stream and protected saltwater fishing; ideal for portaging into off-road lakes due to light overall weight
TYPE:	V-bottom, frameless, double-ended
LENGTH:	9 ft. (8'-9½")
BEAM:	47 in. over all
DEPTH:	15½ in. (at center)
WEIGHT:	52 lbs.
SEATING CAPACITY:	Three adults
POWER:	Not adapted to outboard motors
CONSTRUCTION:	Skin-stressed ¼-in. fir plywood attached to gunwales, chines and keelson between identical scow-type transoms also of ¼-in. plywood reinforced around edges.

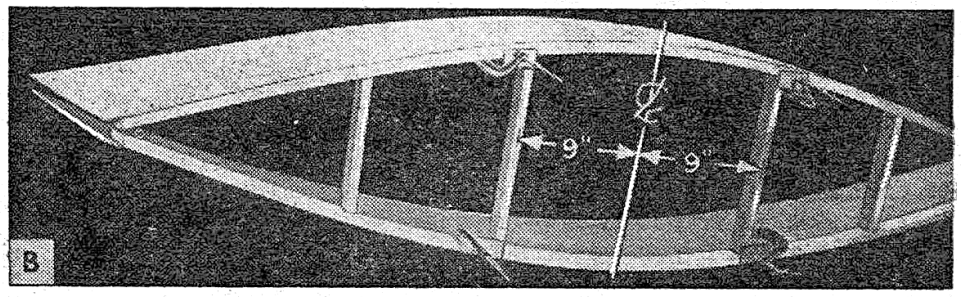


thereby, puts a spring in the bottom panels to keep them from oil-canning.

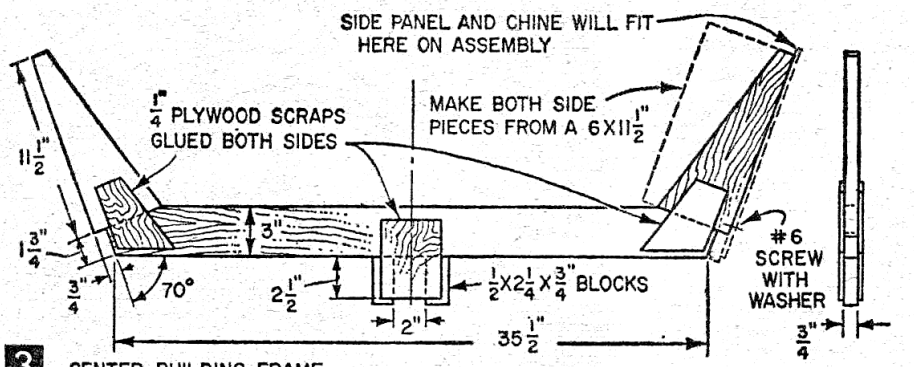
Construction. Fir plywood should be marine grade, if available. Otherwise, use a top-grade exterior plywood. The only major difference between the two grades is that marine grade is built with a solid core—no voids. But, sometimes, leaks can develop in the small voids that now and then show up in exterior grade. For the keelson, chines and transom frames, I prefer straight-grain, clear spruce—the same kind used years ago to build airplanes—and for the same reasons: light weight and straight grain for even bending, and strength. But, if spruce isn't available, choose a straight-grain Ponderosa pine; don't use fir.

Since Cork's final shape is largely determined by the side panels, lay them out first and carefully cut to shape (Fig. 1). Next, cut the two chines to length, cutting both from one stick of lumber if possible, so they will bend evenly. Mark all around the ends of the chines to locate





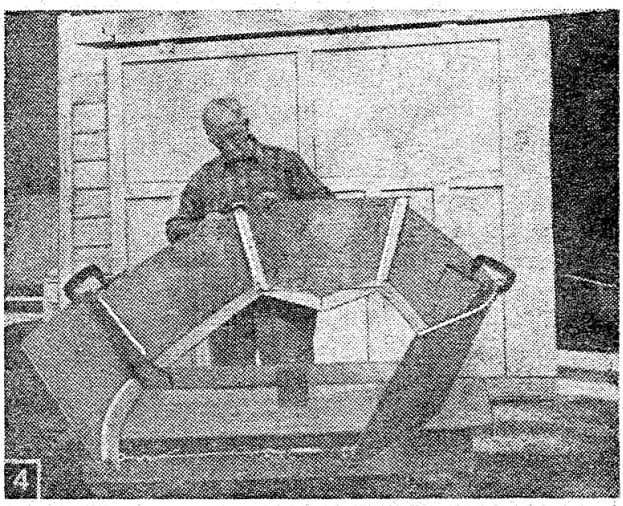
While holding chines apart at the center, clamp spreader sticks are clamped to chines. Screw-eyes hold chines together at ends (2A). Short spreader sticks are inserted between main sticks to bend chines evenly in a fair curve from end to end and plywood side panels are then screwed and glued to the outer face of the chines (2B). Fastening on side panels while chines are bent helps form curved shape when transoms are assembled.



3 CENTER BUILDING FRAME

the compound angle cut, then simply saw off the end, leaving half of the lines still on the wood. A metal marking protractor is ideal for this job.

Mark a line along the outside face of each chine 5/16 in. up from the bottom, making sure chines are marked as left and right to make one pair. Locate the amidships centerline of the side panels and chines and mark it with a heavy pencil line.



4

Side panel-chine assemblies are clamped and screwed to center building form, turnbuckles and wire through screw-eyes at ends of chines pull both sides into shape. Assembled transom is fitted and clamped in position, aligning inside lower edge of chine with similar edge of transom frame.

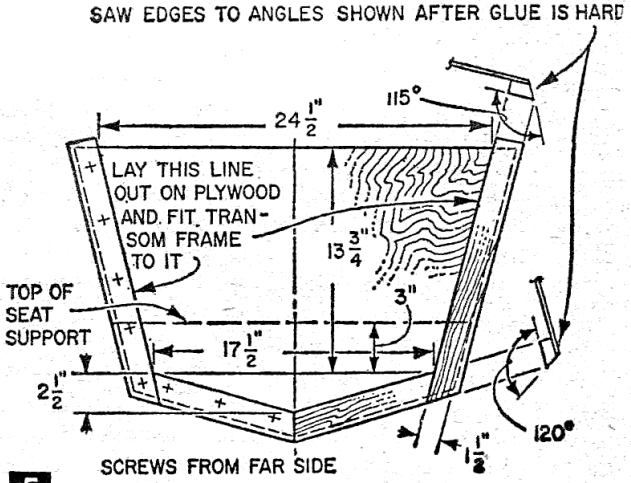
Now, lay out and make up the center building frame from scrap lumber (Fig. 3). This frame is used only to give Cork stability and shape during construction, but once you build the frame, copies of Cork are easy to build from it, so make it strong by gluing and nailing plywood gussets over the joints.

About 1½ in. from each end of the chines, screw in a screw-eye, centering it on the inside face of the chine. Spread one of the eyes apart at each end so the two chines can be hooked together, and, with a foot on one chine, pull up on the other and insert the two 18-in. spreader sticks evenly on each side of the centerline (Fig. 2A). Small pieces of plywood nailed to the ends of the spreader sticks aid in clamping them in place. Make sure that no part of the clamp or the plywood tabs stick out over the outer face of the chine, however. This face must be left clear to glue on the plywood sides. Insert two other spreader sticks between ends of chines and the 18-in. spreaders (Fig. 2B). Exact length and position must be determined to provide a smoothly faired curve from end to end of the chines.

Clamp side panels on center lines, leaving ends of panel protruding 1¼ in. past chine ends. Align the bottom edge of the sides with the mark scribed 5/16 in. up from the bottom edge of the chines. Because handling the plywood sides and chines at this stage is difficult, drill and countersink screw holes without using glue, using #8 x ¾-in. *fh* screws spaced 5 in. apart. If flathead, sharp-pointed, sheet-metal screws can be obtained in galv. or brass material, they will hold much better than ordinary wood screws. One of the combination pilot-hole and countersink drills in a #8 size makes short work of pilot drilling and countersinking.

When both sides are laid up dry with screws set, remove screws, apply Weldwood or other waterproof glue and replace all screws. Draw screw up tightly and wipe up any extra glue that may squeeze out. Let glue set thoroughly before removing spreaders.

While side panels are drying, build up transom frames. Start by laying out the inside frame line on plywood. Leave the vertical centerline in place for use in aligning during later construction. Fit the ¾ x 1¾-in. lumber with square edges around the inside of transom (see Fig. 5) Outer edge of plywood is 1½ in. wider than scribed line; cut edges square. This layout leaves the ¾ in. lumber ¼ in. outside of plywood. Cut and screw on the lumber pieces along the bottom edges first, then screw on side pieces. Use #8 x ¾-in. *fh* screws spaced as shown. When pieces are fitted exactly, remove them, apply glue and reset screws. When glue is dry, saw sides at 115°



5 TRANSOM DETAIL - 2 REQ.

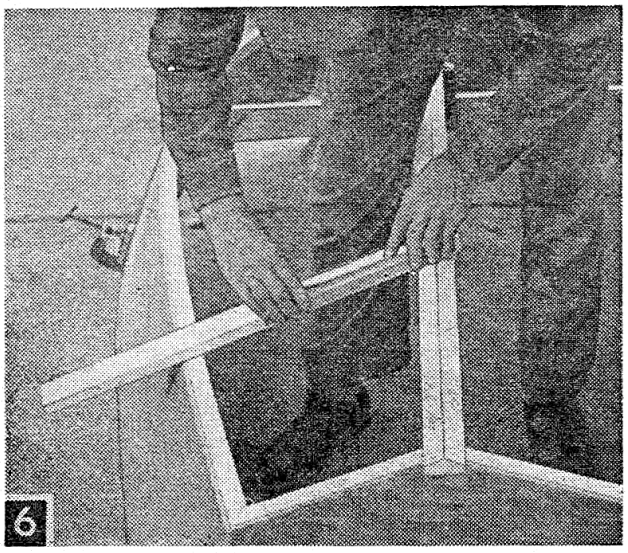
angle and bottom at 120° angle, both angles measured perpendicular to edges. Maintain the inside corner of the ¾-in. frame pieces, and after sawing, sand lightly and true up angle cuts if necessary.

Remove the spreader sticks from between the side panels and unhook the screw-eyes, but do not remove them yet. Fasten the side-panel assemblies onto the center building frame with one #6 screw with a washer under the head at gunwale and chine edge on each side. (Holes will be plugged later.) Centerlines on the side panels must be exactly in line with the center of the building frame.

Using a wire and turnbuckle in the screw-eyes at one end, pull ends of the side panels together around transom (Fig. 4). Adjust the transom until the inside edge of the transom matches the inside edge of the chine. The plywood of the side panel may overhang the outer face of the transom by about ⅛ in. at the bottom, but this overhang must be kept even and uniform from top to bottom. Drill holes for #8 x ¾-in. *fh* screws, spacing seven screws evenly down each side, about 4 in. apart. When both transoms are fitted and pulled up tight, check alignment to make sure that corners match and side curvature is even (accuracy of alignment depends on how accurately sides of transom are cut). When transoms are fitted dry to your satisfaction, take out all screws, apply glue and reset screws. Let the glue dry thoroughly before continuing, then turn the partial boat bottomside up and lay the keelson in its notch on center building frame. Center it with an even overlap over each transom. Cut and fit the keelson in notches cut all the way through each transom frame and plywood. To get a tight fit, cut the keelson notches slightly undersize through the transom, then trim the keelson slightly. Use only glue to hold keelson in notches, clamping until the joint is thoroughly dry.

When all joints are dry, fair the keelson and chines for bottom planking. First, draw a heavy black line down the exact center of the keelson, then plane the keelson, checking frequently to make sure no low spots are cut and leaving the dark centerline uncut. To check for proper angle, lay a small board over the keelson and chine. Work on both sides of the keelson together; if you try to fair first one side completely and then the other, the keelson is likely to distort. Checking keelson before cutting the chine leaves the outer edge of the keelson a bit high, so it can be smoothed into a fair plane after chine is planed.

Now, plane chines down, continuing to check with the small board laid across chine and keelson. Preserve the inside edge of the chine that was matched with the bottom of the transom at each end. To finish the fairing, take a 3-ft. length of ¾ x 1¾-in. material and hold a sheet of coarse garnet paper around one end. Using one end of the board as a guide on the chine, sand the keelson into fair, then reverse the garnet paper end and sand the chine into final fair. Carry the fairing across the transoms at each end.



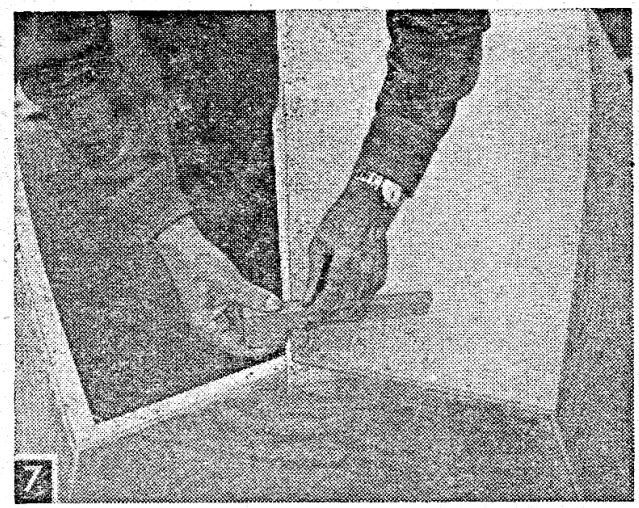
After rough planing of angles on keelson, board wrapped with coarse garnet paper quickly smooths keelson for application of bottom panels. Note how keelson is cut through transom and transom frame.

Bottom Planking. Lay the edge of the bottom plywood on the keelson so that the edge extends over the keelson centerline about ⅛ in. over the center building frame. This will leave the plywood ends about ¾ to 1 in. beyond the center of the keelson at each transom. Pull the plywood down flat and drive a shingle nail through it at transom corners. Mark around the outside of the side panels and across the ends. Remove the plywood and saw out the rough shape around ends and outside curve only. Drive screws around the side and ends, working from the center toward both ends equally, spacing screws 4 in. apart along chine and keelson and 2½ in. apart along transoms.

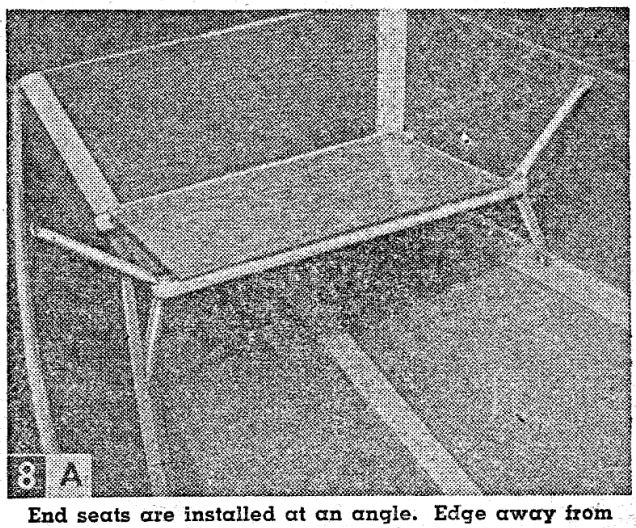
To mark the centerline on the bottom panel, use an L-shaped wood gage that indexes from the side of the keelson (Fig. 7). Remove the screws, take off bottom panel and trim along the centerline. Plane the center mating edge of the bottom panel to make a vertical joint along the centerline of the keelson. When one bottom panel is fitted, lay it aside and make up the other panel the same way.

When both bottom panels are fitted, apply glue liberally along all contact surfaces and set screws on one side, working again from the center toward both bends. Before gluing the second bottom panel in position, check to see that there is no binding along the centerline of the keelson. If panels bind against each other, you will be unable to pull them down tightly. Plane or sand edges to relieve any binding. After both sides are glued and screwed down tightly, fill any space that remains down centerline joint with Plastic Wood.

When glue is dry, plane sides and ends of bottom panels to match the angles of sides and



An L-shaped block that indexes from the side of the keelson is used to mark centerline on bottom panel. Bottom panel should overlap centerline on keelson by about ⅛ in. at center. About ¾ in. will be trimmed off at transom ends.



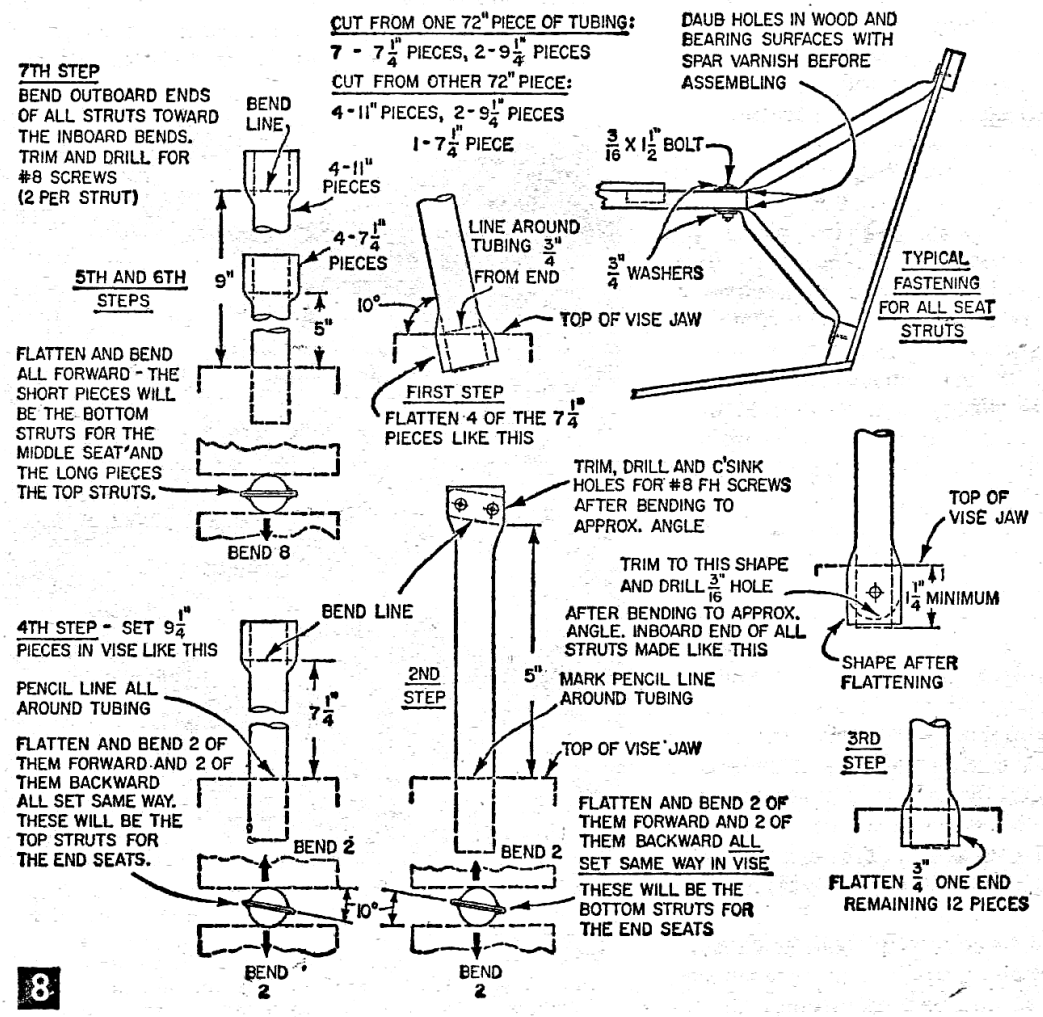
End seats are installed at an angle. Edge away from transom is supported with struts.

transoms. Round off the edges of the corners at the chines and transoms to about 1/16-in. radius. Along the centerline of the bottom, plane a flat surface ¾-in. wide the full length of the center joint. A metal cover strip will be attached later after covering the bottom.

An outer transom trim piece is cut from left-over plywood and fitted to the outside of the top of the transom (Fig. 1). Clamp and glue this trim-reinforcing piece in place. When glue is dry, trim ends to match contour of the side panel, and round corners.

Gunwale trim is next. Use ½ x 1½-in. fir blind-stop material, attaching with square edge up, rounded edge down, along the outside and top of side panels. Apply glue, and screw into the gunwale from inside the side panels, spacing #8 x ¾-in. *fh* screws about 6 in. apart. When glue is dry, trim ends to match contour of side panel, and round corners. Fill over all screw heads and any holes still open with Plastic Wood. If other cracks or open joints are not filled, fill them also. When the filler is hard, sand off smooth with the surface.

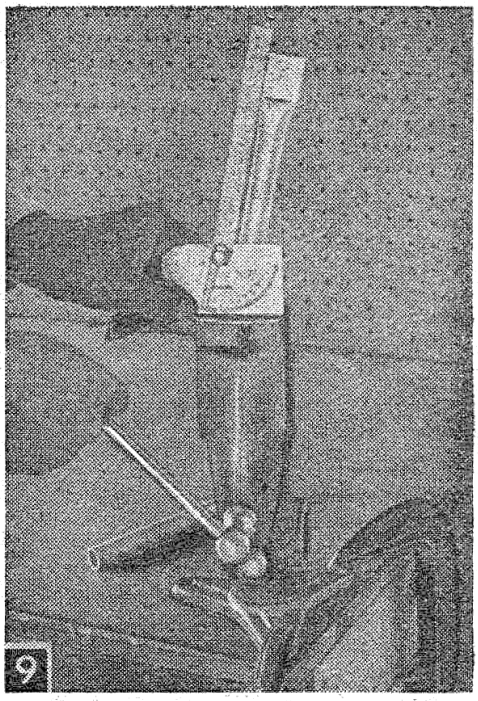
Make up the three seat assemblies as shown in Fig. 8. While the glue for the seat assemblies is drying, you can tackle the task of bending ends on the aluminum struts—all 16 of them. Aluminum struts are cut and bent from ¾-in. Reynolds "Do-It-Yourself" aluminum tubing. They may be flattened and bent in any metal vise, providing it does not have sharp-edged jaws. (If it



8

does, equip it with phenolic plastic or hardboard jaw liners to prevent cutting the aluminum.) To get all of the struts from two 6-ft. lengths of aluminum tubing, cut seven 7¼-in. pieces and two 9¼-in. pieces from one 6-ft. length. Cut four 11-in., two 9¼-in. and one 7¼-in. pieces from the second length.

Follow the steps shown in Fig. 8 to bend the struts accurately. Ends of the tubes are simply squeezed together at the proper angles. A metal protractor can be used to measure the angles as shown in Fig. 9. After flattening the ends, trim them and drill two holes for #8 screws through the end of the struts that attach to chine or gunwale. Countersink the holes to allow *fh* screws to fit flush with the surface when installed. Drill one 3/16-in. dia. hole through the inboard end of the struts where they attach to the seats.



Metal layout protractor helps to bend aluminum struts at correct angle. To make compound bend for end-seat struts, first locate tubing at angle to top of vise, squeeze end together and bend over edge to proper angle.

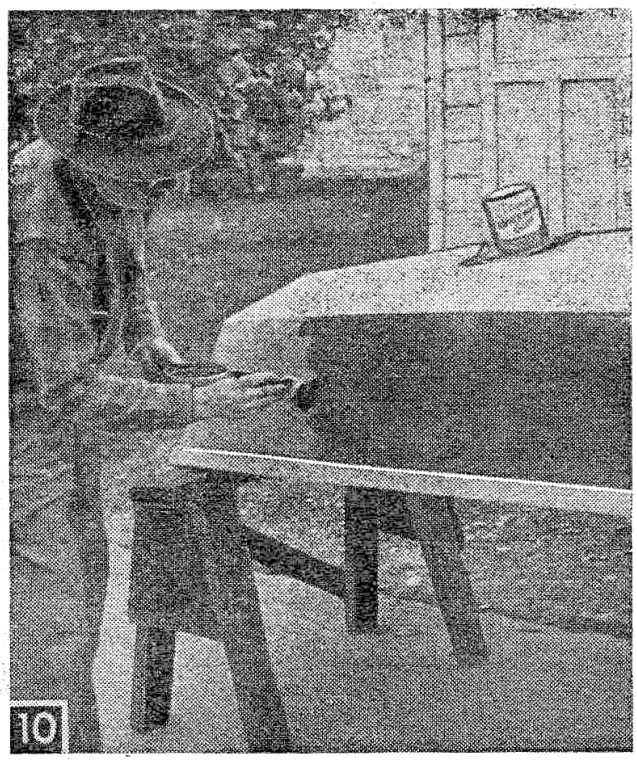
To install the seats, first coat the area under the strut attachment points with spar varnish. Attach the struts to the seats loosely with 3/16 x 1½-in. *rh* bolts with washers under head and nut, and now remove the center building frame.

Spread the sides apart with a spreader stick until the inner edges of the gunwales measure 45½ in. apart across the center. From the centerline, measure each way 5¼ in. along the chines and measure each way 5½ in. along gunwales. These points will be the centerline of the struts for the middle seat when attached. Screw the middle seat in place with *fh* screws countersunk flush with the aluminum. When all struts are screwed in place, adjust the seat until it sits firmly and squarely in place. Then tighten the bolts. The struts will determine the height of the center seat above the keelson.

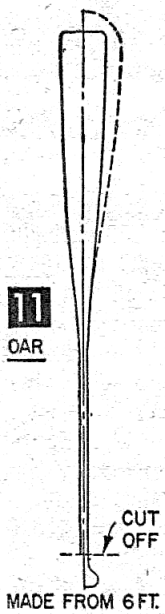
Fasten the seat riser at each transom for end seats with glue and screws. Glue and screw the end seat assemblies to the top of the seat risers, centering the seat on the transom, but leave the end toward the center of the boat loose. Before attaching the center-end struts, align the boat by sighting across the tops of the two transoms. If tops do not appear perfectly square with each other, block up a low corner to force it back into alignment. When the top of both transoms are in line with each other, fasten the end seat struts to chines and gunwales. These struts will hold the boat in alignment when blocking is released.

Now, you're ready to cover the boat with muslin and Elmer's Waterproof Glue (resorcinol resin glue). Muslin should be a medium grade unbleached sheeting with about 70 threads per inch. Glue muslin on transom ends first. Mix the glue according to label directions and then add enough water to thin it out for easier working (about 10% as much water as glue). Spread glue generously on transom and press the muslin into it. Use the rounded edge of a small board or stick to squeegee out the muslin to make a firm contact. When smoothly in place, the glue should be oozing through the muslin. Spread more glue over the outside of the muslin and continue squeegee action, making sure the muslin doesn't crawl away from edges or develop wrinkles.

Press the muslin tightly into the corner along the bottom edge of the transom trim, and from time to time, until the glue sets hard, examine this corner and press muslin back into it in case it tends to creep out. When glue is set (not dried hard), trim edges with a razor blade. Along the bottom edge of the outer transom trim, cut the muslin about half way out from the transom in a



Apply generous coating of Elmer's Waterproof Glue to bare plywood in preparation for muslin covering. Stretch muslin tightly over glue, then squeegee flat. When glue is set, but not rock-hard, trim edges with razor blade. Around corners, cut out muslin to prevent overlap as ends are wrapped over edge.



straight line. Around sides and bottom edges, trim it at the center of the radius.

Side panels are next. At the gunwale, push the muslin tightly into the corner so it will stick to bottom edge. When glue is set, trim the muslin at the center of the radius along chine joint, but allow it to lap around transoms at both ends by ½ in. Along gunwale, trim it to a neat edge half the thickness of the gunwale.

Even though the bottom is a double-curved surface because of the centerline joint, it can be covered with one piece of muslin. After applying glue, apply muslin and squeegee it toward the corners until it lies flat. There is enough "give" in the material to allow it to work over the surface. When glue is set, trim edges to lap ½ in. over chine edges. At corners, cut out a corner gusset to allow lapping ½ in. over transom edges.

Allow the glue to harden for at least 24 hours before sanding. Then, using a fine sandpaper on a block, smooth the rough spots off the outer muslin covering. Sand down lapped edges lightly. Very little sanding is required before painting.

Painting is primarily a matter of personal preference. I used a good quality marine enamel on the outside, except on the gunwales. Make sure, however, that any paint you use does not contain an alkyd resin base. An alkyd resin reacts with the glue resin and the paint will either not dry or will blister later when exposed to the hot sun. No priming is necessary because of the muslin covering. Simply apply two coats of paint.

Inside, including seats and the outside of the gunwales, I used spar varnish. Not only does varnish make a good-looking boat, but it can be repaired easily if scratches or nicks occur. Use three coats of a marine-type spar varnish, sanding the first two coats lightly.

Locate two sets of oar locks as shown in Fig. 1. Use exterior-mount type and screw them to the outside of the gunwale. They will also serve as anchors when carrying the boat on a car carrier. Along the centerline of the bottom, attach the ⅝-in. half-oval keel strip using No. 6 x ¾-in. oval-head screws spaced 6 in. apart.

After experimenting with oars on earlier editions of Cork, I found that reshaped canoe paddles work best. Cut down the ends and reshape them as shown in Fig. 11.

MATERIALS LIST—CORK

No. Req.	Size and Description	Use
1	¾" x 2" x 8'0" spruce or Ponderosa pine*	keelson
2	¾" x 1¾" x 8'0" spruce or Ponderosa pine**	chines
2	¾" x 1½" x 2'6" spruce or Ponderosa pine	center seat rails
2	¾" x 1½" x 2'0" spruce or Ponderosa pine	end seat rails
2	¾" x 1½" x 2'0" spruce or Ponderosa pine	seat risers
4	¾" x 1¾" x 1'6" spruce or Ponderosa pine	transom frames
4	¾" x 1¾" x 1'0" spruce or Ponderosa pine	transom frames
2	½" x 1½" x 10'0" fir blind stop	gunwales
4	½" x 1½ x 13" fir blind stop	seat stiffeners
2	½" x 1½" x 9" fir blind stop	seat stiffeners
	¾" lumber and plywood scraps for building form and spreaders	

PLYWOOD

1	¼" x 4' x 10' marine or exterior fir plywood AA or AB sides and seat plus transoms
1	¼" x 4' x 8' marine or exterior fir plywood AA or AB bottom

MISCELLANEOUS MATERIALS

27 doz	#8 x ¾" galv. fh screws (preferably sheet-metal screws)
1½ doz	#6 x ¾" galv. oval-head screws
8	3/16" x 1½" galv. rh bolts and nuts
4	¾" I.D. screw eyes
2	6" turnbuckles
16	3/16" x ¾" O.D. galv. washers
½ lb	Weldwood glue
1 pint	Elmer's Waterproof glue (resorcinol resin)
4 yds	84", 70-thread unbleached muslin sheeting
	⅝" half-oval keel strip, galv. steel or aluminum (Nautalloy), 8'0" long

* Do not attempt to use fir for keelson or chines

** If possible, cut both chines from a single piece of material to insure uniform springing.

• Craft Print No. 296 in enlarged size for building Cork is available at $3. Order by print number. To avoid possible loss of coin or currency in the mail, we suggest you remit by check or money order (no C.O.D.'s or stamps) to Craft Print Department, Science and Mechanics, 229 Park Ave. South, New York, N.Y. 10003. Please allow three to four weeks for delivery. For your convenience, there is a handy order form on the last page of this issue.