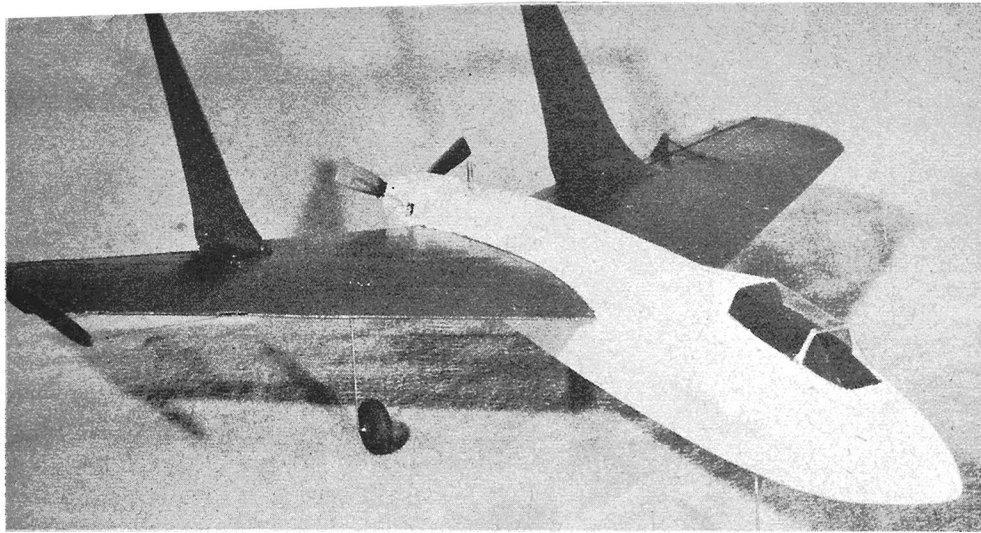


"CUTLASS"



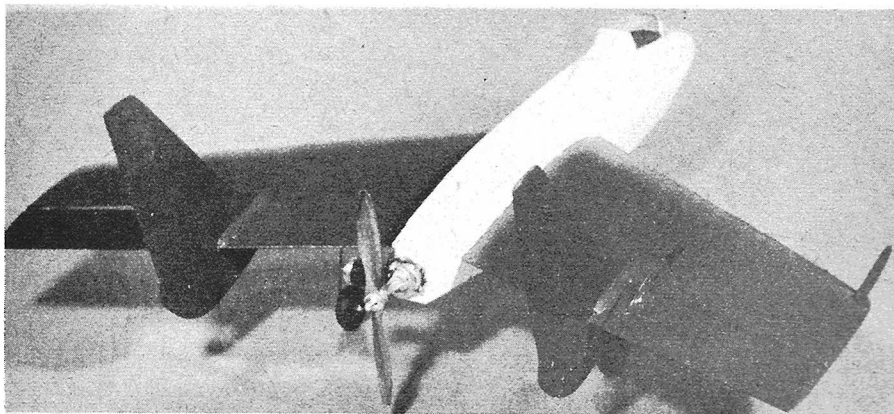
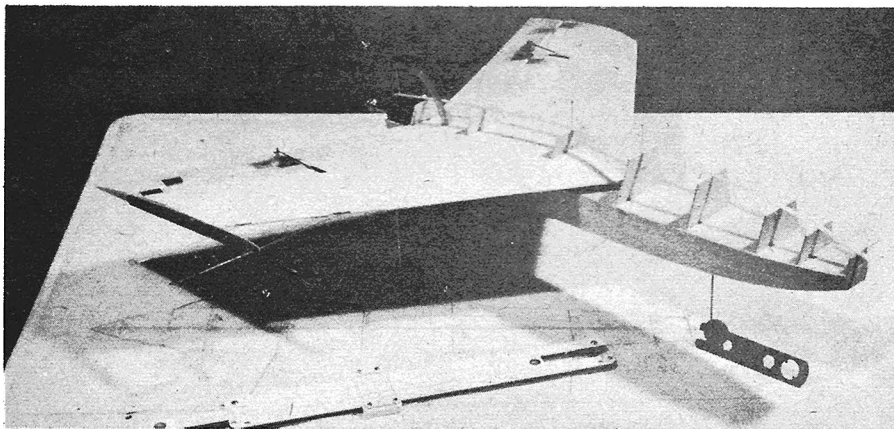
by JOHN BERRYMAN

For sport flying on Half A engines, Cutlass-type model is a refreshing experience in table-top construction.



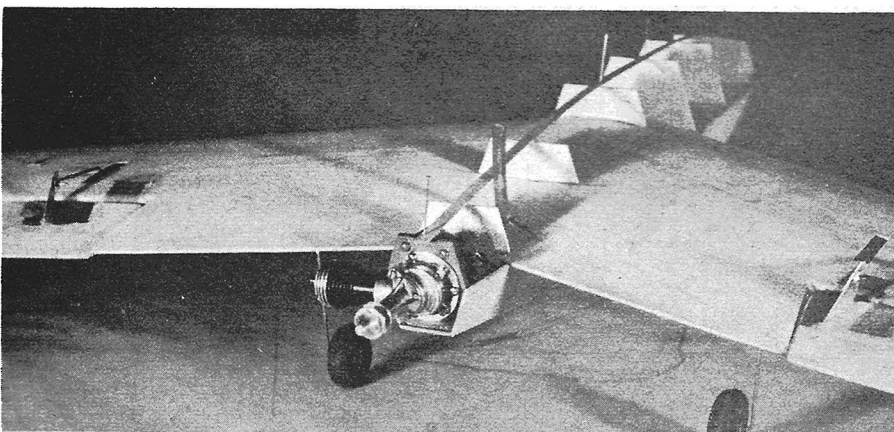
Despite an off-the-beaten-track appearance the half-pint "Cutlass" is stable, and will loop.

Below—For quickie sport flying, streamlined fuselage modified to use six sheet-balsa sides.



Weighing nine ounces for its 150 square inches of wing, author's Cox job zips on 40-foot lines.

Below—After bottom half of fuselage and wing are finished and joined, top of fuselage built.



► The radical planforms of many recent fighters make them hard subjects for flying scale. Here's a Half-A propeller version of the unorthodox Chance-Vought Cutlass Navy fighter that's as sharp as its name. This near-scale beauty is outstandingly stable and delightfully easy to fly.

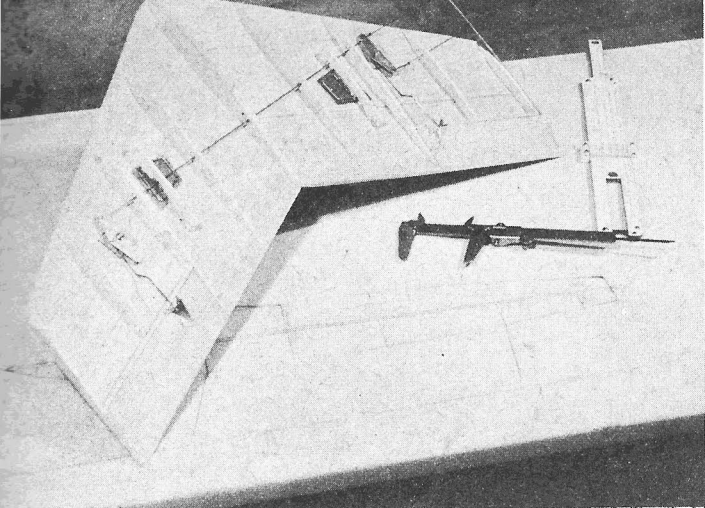
Changes from scale have been made to keep weight down: Wing location has been moved aft a trifle; the round fuselage has been rendered as a smooth six-sider; the jet intakes have been omitted for weight reasons (but you may easily add them if you wish); and the after-burner is made optional.

The full-scale Cutlass, powered by twin jets, has engine weight concentrated toward the rear. To get proper balance for our near-scale prop version, we located the engine aft, in pusher position. This makes the Cox Thermal Hopper .049 convenient to use. The reed-valve Cox engines run equally well in either clockwise or counterclockwise rotation without special parts. This lets you use your Cox as a pusher without carving special props.

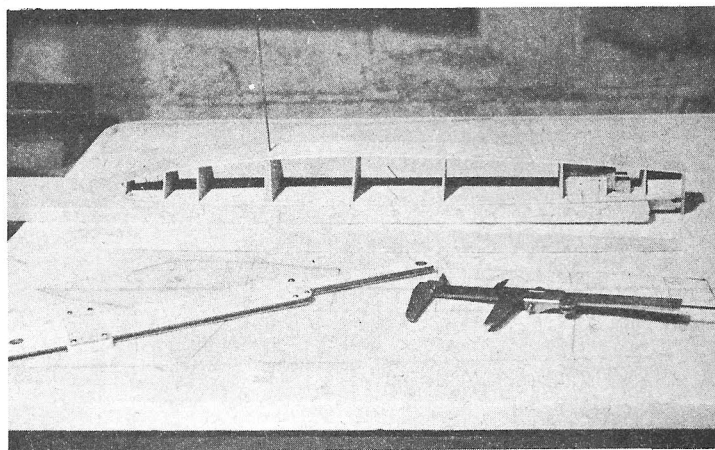
A number of other manufacturers will sell you special crankshafts for "left-hand" operation of their Half-A shaft-valve engines, notably Allyn, Atwood, Holland and K & B. Left-hand shafts cannot be secured for OK engines, the manufacturer informs us.

The Cutlass is a flying wing and as such is extremely clean and efficient. The plans here are for an all-balsa job of 150 square inches, which may seem like a lot of sail for Half-A. Your sharp Cutlass will check in at a husky nine ounces. The surprising power of your Cox .049, however, will give you all the speed you want on 40-foot Orlon lines, and your sharp Cutlass has enough sail for loops and wingovers.

To keep within the nine-ounce weight allowance, though, you'll have to use care in selecting your balsa stock. Working with laboratory scales, we've found that 50% differences in



Control surfaces are built integrally with wing and controls are installed; after wing is finished, control surfaces are cut free.



Bottom half of fuselage is assembled on its $\frac{1}{8}$ thick crutch, pinning crutch to $\frac{1}{2}$ thick wood. Jig (see plan) makes for good bulkhead fits.

weight are not at all uncommon in given sizes of the same grade of sheet balsa. Throughout in building your sharp Cutlass, pick the softest and lightest balsa in each size that you can find.

We use two construction ideas that you may not have run into before, and you should understand both before starting. Compound curves are strictly for the birds when it comes to handling sheet balsa. We've rigged up a simple way to avoid them, while giving plenty

of realism to fuselage construction. All fuselage bulkheads are cut on a jig that provides identical angles to all bulkheads. Don't try this job without jig-cut bulkheads—you can't hand-cut them accurately enough. If you try to hand-cut the bulkheads, you'll get a weak and sloppy fuselage.

Secondly, it is essential that the two separately operated control surfaces track exactly together and that the whole control system be "square." The only easy way to get the desired degree

of symmetry is to build the control surfaces integrally with the wing, install all controls, and late in the construction cut the control surfaces apart from the wing proper. The construction notes follow that scheme.

Start by building the bulkhead jig. Cut a piece of tin-can stock to the dimensions shown and mount atop strips of $\frac{1}{8}$ " balsa to a piece of plank with small nails. From $\frac{1}{16}$ " sheet, cut the balsa rectangles in sizes as shown on plans (continued on page 41)

"Cutlass"

(Continued from page 23)

from which bulkheads will be cut. Slide them in turn under the jig, tight against the stop, and cut away triangular sections with your X-Acto knife to form bulkheads. Number each bulkhead with soft lead pencil. Top and bottom bulkheads are identical. Note that two extra No. 4 bulkheads, of $\frac{3}{8}$ " sheet, are required for the forward landing gear mount. Cut rear bulkhead from $\frac{3}{8}$ " birch plywood and drill for rear intake of Cox engine. (If you are using a shaft-valve engine with special crankshaft, your mounting will be simplified.)

Build tank of .005" brass shim stock or tin can stock. Note length of filler tube.

Cut crutch from soft $\frac{3}{8}$ " sheet. Drill for location of tank filler tube. Pin crutch to a sheet of $\frac{3}{8}$ " balsa stock, taking care to sandwich a sheet of wax paper between crutch and the $\frac{1}{2}$ " balsa to prevent cementing troubles later. Drill through the $\frac{1}{2}$ " balsa so that the long filler tube may pass through the balsa when the tank is installed. Lay the $\frac{3}{8}$ " balsa on your work bench so that the rear portion hangs over the edge, and so that the long filler tube may pass through sheet during the course of construction.

Form front landing gear. Sandwich between two No. 4 bulkheads of $\frac{3}{8}$ " sheet which should be cemented together with Elmer's Glue-All. Compress the sandwich with gear in place in a vise and allow to dry.

When dry, erect all bottom bulkheads, including landing gear mount sandwich, on bottom of crutch. Pin erect, using a square to assure that they have no rake fore or aft.

While bulkheads are drying, make engine mounting plate of tin can stock and screw to forward (i.e., inside ship) face of rear bulkhead ($\frac{3}{8}$ " birch plywood) with 2-56 machine screws. Mark location of radial engine mounting screws for side-mount engine position, drill through rear bulkhead and tin engine mount. Mount engine to bulkhead with 2-56 machine screws. Solder all 2-56 nuts to the engine mount. Take care that the solder does not bind the three engine mount screws, but let it bind the screws holding the engine mount to the bulkhead. Cut off extra length on all machine screws. Dismount engine from bulkhead.

Cement rear bulkhead to crutch, squaring it by use of $\frac{3}{8}$ " balsa supports as shown in plans. We used Elmer's Glue-All in this location. The balance of the ship, unless otherwise specified, was assembled with Aero-Gloss C-77 Hot Fuel Proof Cement, although Elmer's works fine, too. (Use your favorite cement—Editor).

While rear bulkhead is drying, enlarge

Cement fuselage bottom in place, with tank installed. If your crutch is firmly pinned to the $\frac{3}{8}$ " stock, the springing of the bottom will not flex the crutch. Cut a fuselage side to shape. Removing the pins holding down one side of the crutch, cement to ship, replacing pins so that they go through fuselage side into crutch and hold crutch flat against the $\frac{3}{8}$ " stock. Repeat for opposite side.

When dry, remove from $\frac{1}{2}$ " sheet and install engine. This will require some cutting away of the crutch to permit fitting in the rear intake of the Cox .049. Shaft-valve engines, of course, will mount more readily.

Cement wing to crutch, cutting same out to permit clearance for filler tube. When dry, mount top bulkheads as shown. Because it is a little tricky to get the correct height for these bulkheads, it pays to spring a strip of $1/16$ " x $\frac{3}{4}$ " balsa across top of bulkheads. If you find any bulkheads too high, trim off the bottom and reinstall. Don't try trimming off the top—you'll wind up with compound curves, which are strictly no good.

Cut fuselage top to shape. Pierce for filler tube, cement and pin to bulkheads. When dry, add sides. Sand front bulkhead smooth and add nose block, sanding to shape when dry.

Cut small bulkheads for rear portion of canopy, mount, and later add top and sides. Pin curving strips of $\frac{3}{8}$ " square balsa to provide inner outline of transparent forward canopy. Add canopy brace of $1/32$ " steel rod, shaped as shown. Paint portion of top of fuselage which will lie inside plastic canopy with two or three coats of fuel-proof black dope. Cut clear plastic to shape for canopy. Cement and pin canopy in place. It is not necessary to cement canopy to the $1/32$ " steel brace—the portion of canopy aft of the brace should be

installed first, and the windshield portion so cut that it extends slightly beyond the aft portion, thus securing it to brace.

You may, if you care, at this point add the after-burner to fuselage. We chose to omit it, as the illustrations show, for easier cranking and simpler engine changing possibilities.

Cut out balsa fuselage sheeting for access to intake between last two bulkheads on outboard side, above crutch only. With engine dismounted, flow two or three coats of butyrate dope into entire final compartment.

The rudders on this ship must be kept light, but they are too sizable to be left weak. We laminated two sheets of $1/32$ " balsa with grain at right angles, using Elmer's Glue-All. This fix gives you a strong and very flexible rudder. Mount rudders to wing, using $\frac{3}{8}$ " square filler strips to top and bottom as shown. Wrap fine sandpaper around a pencil or thin dowel and sand filler strips to streamline fillets.

You can't afford too much weight in the finish of your Sharp Cutlass. We fine-sanded the whole ship, being especially careful of butt joints on the wing. Occasional use was made of Aero-Gloss Plastic Balsa. When dry, brush ship free of sanding dust and give two coats of fuel-proof colored dope. The original was Curtiss Blue with white fuselage.

Now comes a most important part of the job:

Balance your sharp Cutlass exactly—and we do mean exactly—at the balance point shown on the plans.

Because we used a pretty large tank, we found it necessary to add a small amount of ballast to the nose. Cut a small square hole in the top of the fuselage forward of the canopy, between bulkheads 1 and 2 and add BB shot until the ship balances at the indicated point. Cover hole temporarily with masking tape. When you have test-flown your sharp Cutlass and are satisfied with her balance, replace the small piece of wood cut out, sand and touch up with colored dope.

Before firing up your little mill, we recommend you testwhip your sharp Cutlass on eight or 10-foot lines. U-Reely Control is handy for this job, and for all flying, for that matter. If your Cutlass needs any down control to whip on short lines, or if she hunts vertically, add ballast until she smooths out. Properly balanced, she is sensationally stable.

When you've gotten the setting right, hook up 40-foot Orlon lines, crank up and fly. Control response is more leisurely than in conventional lay-outs, and at low speeds this configuration is slightly nose heavy. Best to land her fairly fast. Best of all is to hand launch and pay out from your U-Reely control.