
Cloud
'Cloudhopper'
EXPERIMENTAL
Gulf

hopper

In speed range and style of aerobatics, Cloudhopper echoes its 1930s home-built roots. The Hayfield Barnstormers logo was made from Coverite white trim sheet and ¼-in. Presto letters.

I SURPRISED myself with this design. Since I work in a rather small shop with only a 3 x 4 drafting table and have limited retirement finances, I had never contemplated building anything larger than a .60-powered model—until the 1989 flying season.

I flew my quarter-scale Keleher Lark (published in the July 1989 *Model Aviation*) at big bird fly-ins that year, and took along my semiscale Pea Patch, a .40 FS-powered Heath midwing featured in the September 1990 *MA*, to fly before and after the scheduled big bird activity.

When there's a flurry of remarks about our own flying model, somehow even those of us whose hearing isn't what it used to be manage to

At 30% larger than the author's semiscale Pea Patch, this big RC bird flies with impressive scale realism on a SuperTigre .90 and a 16 x 4½ propeller. ■Brad Shepherd

This easy-flying design handles well both on the ground and in the air.

The Williams Bros. 3-in. sportsman pilot wears a Sig Koverall scarf. His 1930s cap is built up from baking soda and thin CyA. The aluminum flange on the windshield was made from Coverite graphic ⅛-in. stripes painted with Sig aluminum dope.

Left: The equipment bay under the wing with the battery and transmitter neatly packed in foam. The radio gear is placed far to the rear to achieve the correct CG. Note the method of tying together the twin Lazer rods for the elevators. Right: The fuselage arrow and stripes were made from Coverite; the Gulf decal is from a set of *old* Formula One decals sold by Orbit. Dry transfer lettering was used for the model's name.

catch every word. Most of the comments about Pea Patch went something like this: "It's a nice airplane and flies great. Now if it were only twice as big . . .."

Maybe they had something there. After talking it over with fellow modelers, I decided that a 30% enlargement would meet IMAA requirements and adapt the model for big bird fly-ins.

The larger version, called Cloudhopper, is all I could have hoped for. Equipped with a SuperTigre .90 swinging a Rev-Up 16 x 4½ propeller, this model moves through the air at a scalelike speed reminiscent of the Golden Age home-builts that inspired it.

Once a few weeks of bad weather and turbulence had cleared, I test flew the airplane on a March afternoon at the Georgetown Modelers' new field in Georgetown, Texas. I bolted on the wing, filled the tank, and fired up the SuperTigre .90. I taxied Cloudhopper down the runway, turned her into the wind, and pushed open the throttle. After about 30 feet the plane rotated off the strip.

I fed in some slight trim changes, then made a few passes and turns. Everything looked good, but I needed more control throw on all surfaces. I gave the model some *down* trim at full throttle, throttled the engine back for landing approach, and

The aileron drive bellcrank and mounting plate. Refer to the plan for this arrangement and the alternative use of servos in the wing to drive the ailerons.

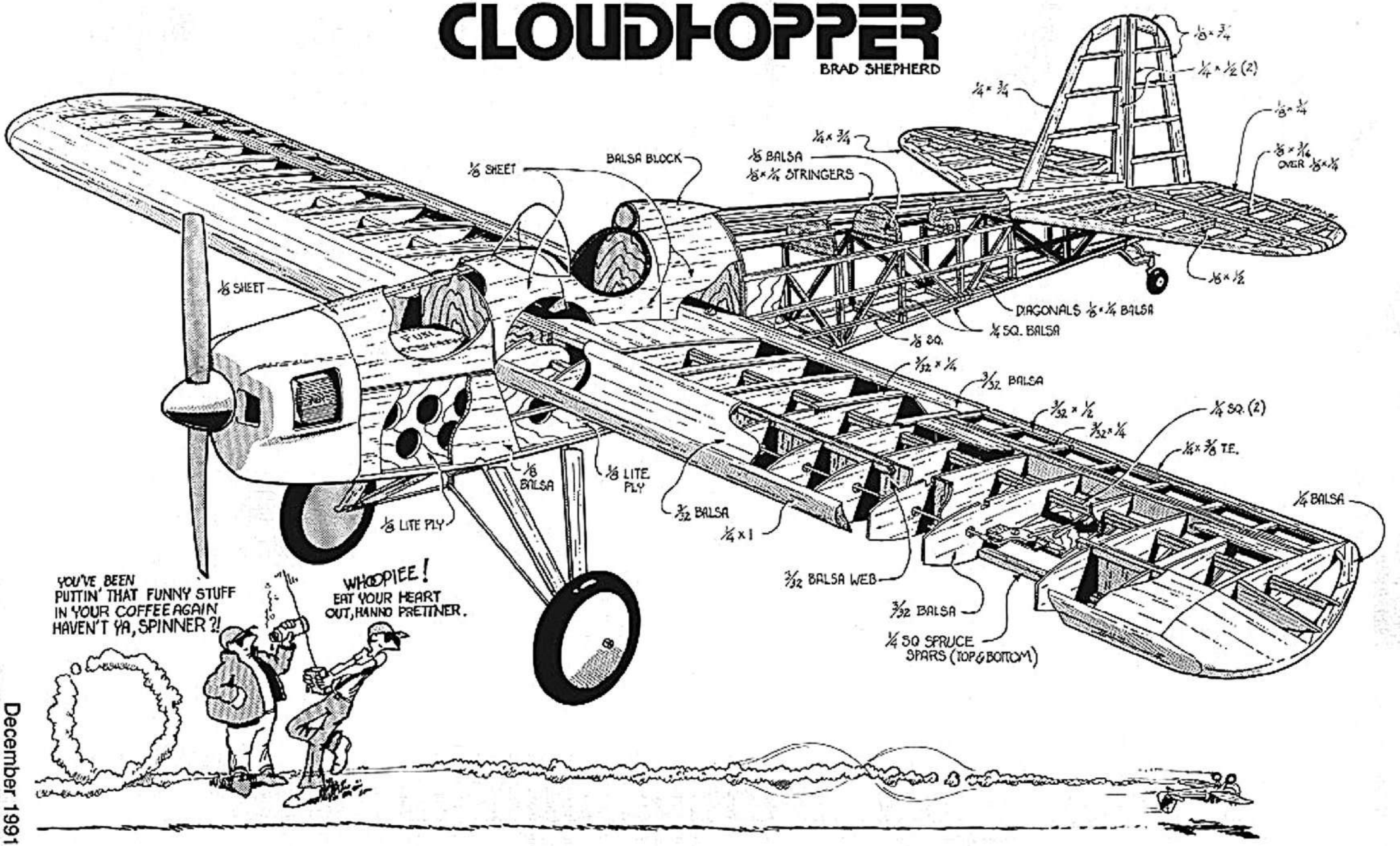
The 1½-in. tail wheel is from Sullivan. The rudder-to-arm drive yoke is K&S ¼-in. brass strip bent on a radius. The rudder and elevator horns use a Du-Bro Lazer pushrod. Dual Lazer rods drive the elevators.

The Golden Age Replicas Inc. ¼-in. lettering is stick-on vinyl by Presto. Coverite 1-in. letters and numbers make up the NC license number (the author's AMA number). Basswood blocks glued to the stab and fin accept the bolted-on wire braces.

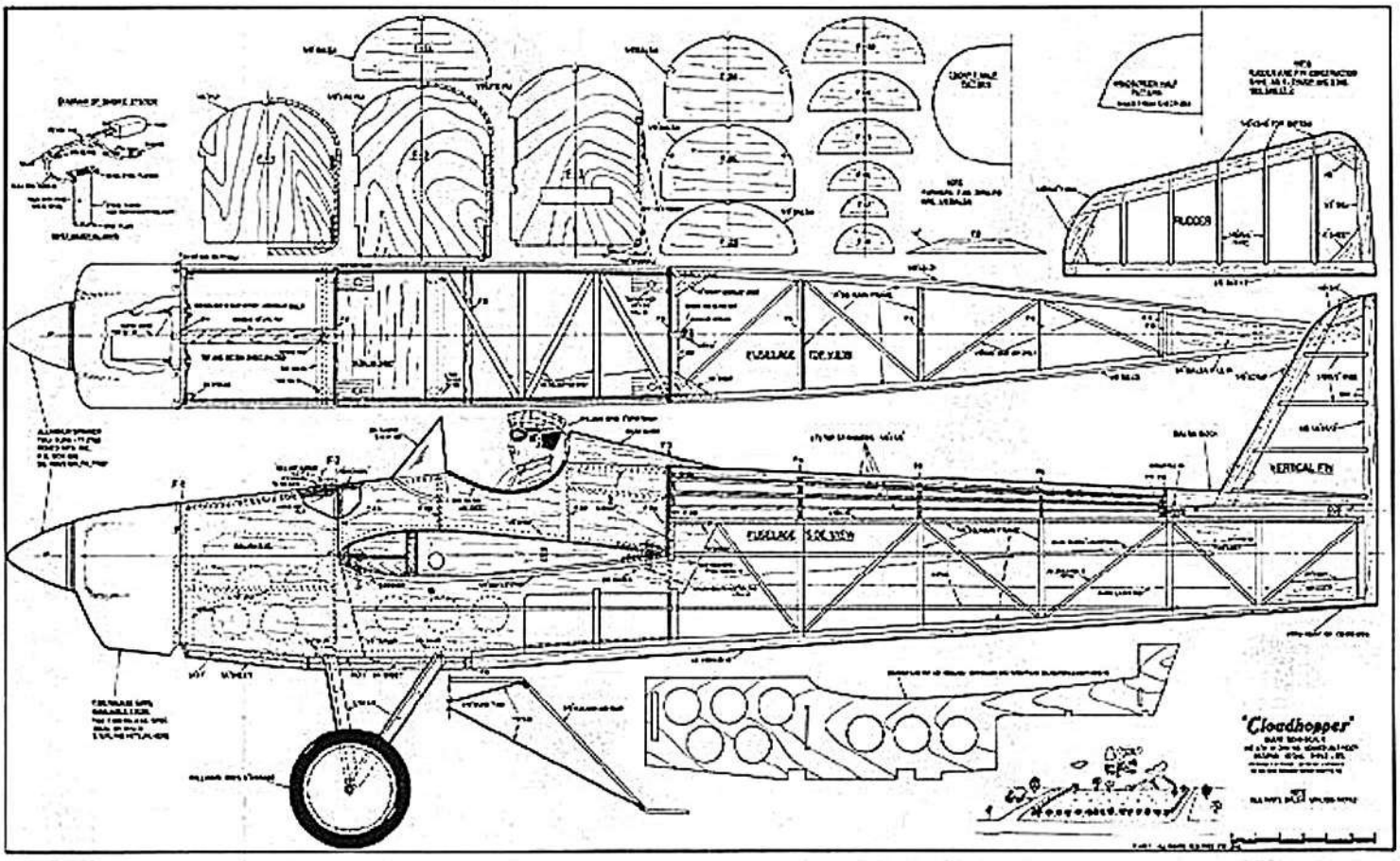
View of the left side of the engine shows the fuel tank fill and vent lines at top, the smoke tank lines at bottom. Note the Perry pump and pressure line to the engine crankcase.

CLOUDHOPPER

BRAD SHEPHERD



Full-Size Plans Available . . . See Page 192



put in *up* trim to elevate the nose a bit. The 18-oz. wing loading keeps the sink rate and speed slow and easy, making the airplane a pleasure to land.

When the winds began gusting across the strip, it was time to call it a day.

Back in my Victoria, Texas home workshop, I replaced the elevator and rudder servo arms with longer ones for additional throw, and moved the aileron links one hole up on the ailerons. These modifications proved effective. On its next flight, off Steen Strip, the airplane cut through strong gusts efficiently.

Fitted with the indicated power/prop combination, Cloudhopper does aerobatics appropriate to its heritage—and does them with scale realism. Don't expect the sort of Unlimited Aerobatics you'd wring out of an Extra 230 on, say, an Al Willaert A&M Sachs-Dolmar engine.

Construction. Building this model is simple and straightforward. Typical stick-and-rag techniques produce a structure that combines lightness with strength.

I used a high-quality cowl from Steve and Kim Durecki at T&D Fiberglass. The aluminum flange on the windshield is Coverite ⅛-in. graphic stripes painted with Sig aluminum dope.

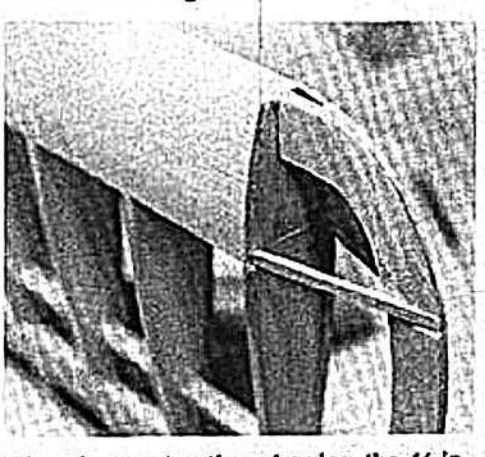
The old-timer in the cockpit is a Williams Bros. three-inch sportsman pilot. His goggles were pilfered from a Williams Bros. three-inch standard pilot; his scarf is a strip of Sig Koverall. To simulate the 1930s cap, I daubed on baking soda and built it up with thin CyA. The visor is a piece of 1/32 ply.

The Williams Bros. vintage wheels fit in nicely with the C.B. Associates tail wheel assembly. Top it all off with one of the superior-quality spinners from Tru-Turn, and you have a model that's appealing both on the ground and in the air.

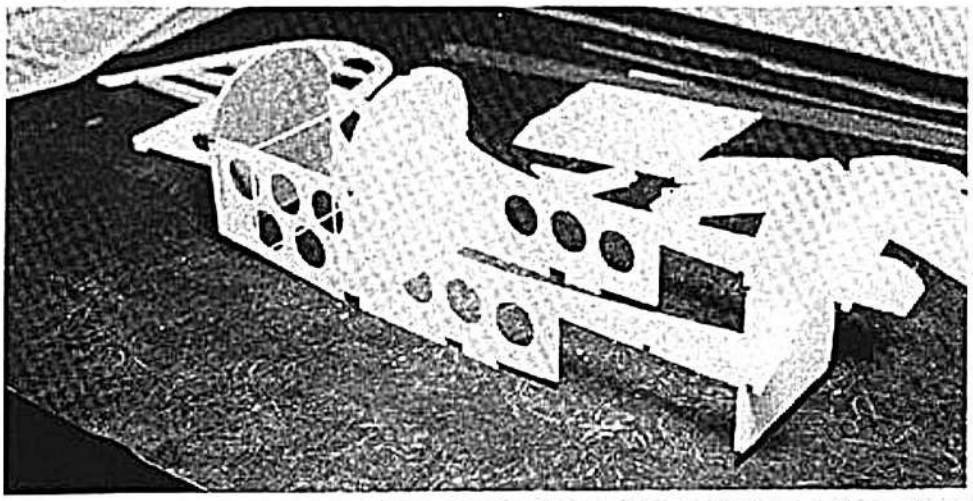
Wing. Cut out a master rib from a piece of aluminum or thin plywood. Make short saw cuts at the No. 2 rib position and for the aileron cutoff position.

Cut 26 full ribs from 3/32 balsa using the master rib. Mark the terminus of the No. 2 ribs and the leading edge of the aileron ribs on 12 of these full-size ribs. Cut along the marks, and then make four extra aileron ribs.

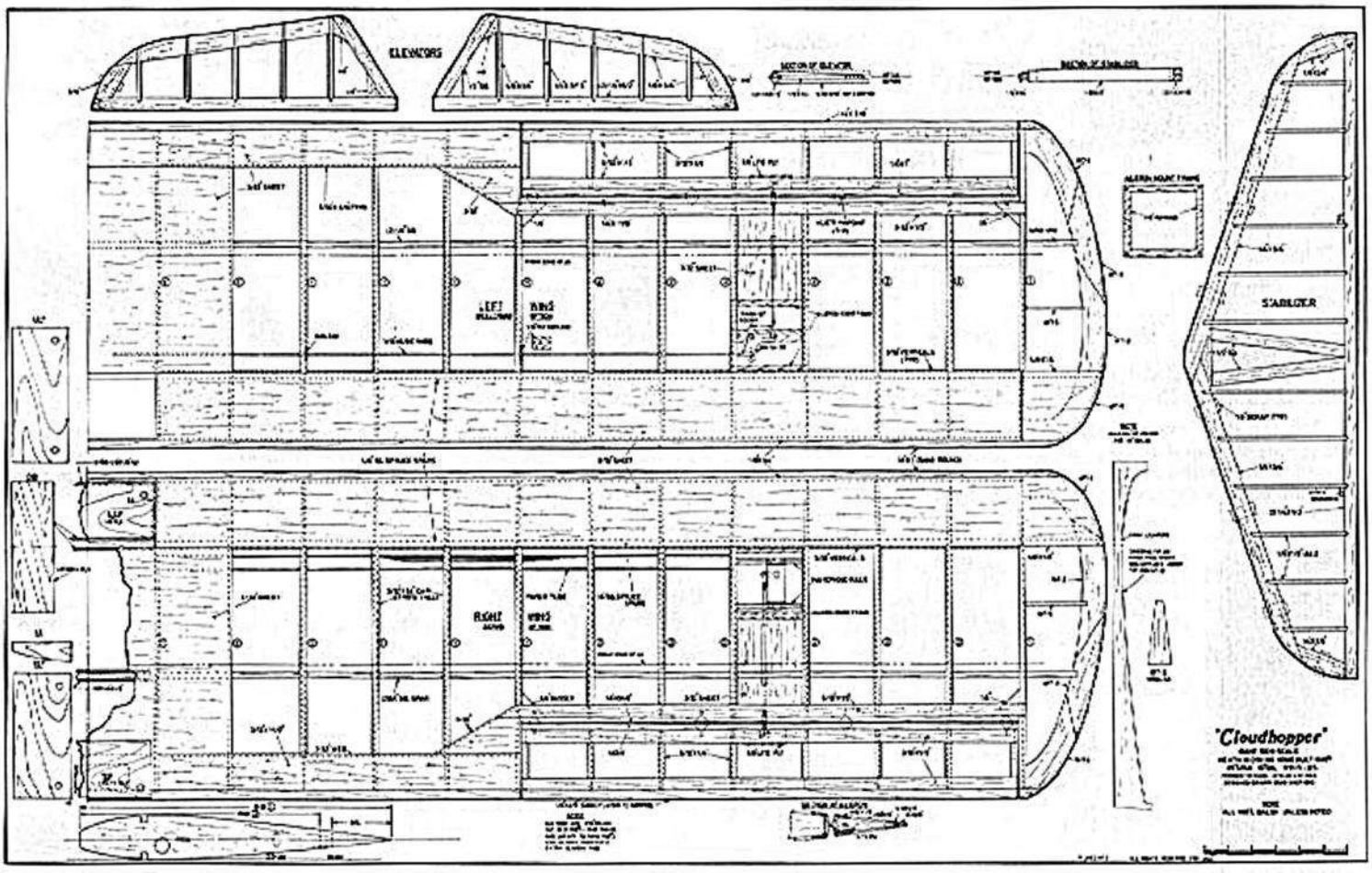
Select two ¼-in.-sq. x 48-in. strips for each rear spar panel. Choose strips that are as straight as possible. Clamp a straightedge to the bench over a section of waxed paper (a Sig 48-in. aluminum straightedge has a prominent place in my shop), and adjoin the strips, taking care to



Wing tip construction showing the ⅛-in. spar extensions, with the sheet tip sanded to a bevel to accept the 3/32 wing tip sheeting. The leading edge ¼-in. strip is glued on after the tip has been sheeted.



The main stress box of the fuselage. Made of ⅛-in. Lite Ply, its lock tab construction achieves lightness and strength at the major stress points of the landing gear, wing mount, and engine.



match up any bows in the wood. Pull the strips together along the straightedge, and glue them with CyA (cyanoacrylate glue). This produces a strong, straight spar.

Position a strip of 1/16 wood over the plan at the main spar location, then pin down one of the ¼-in.-sq. spruce spars. Pin a ¼-in.-sq. balsa jig in place along the designated line. Install the ribs, top spar, trailing edge (TE) sheet, and leading edge (LE) ⅛-in. strip.

Build the ailerons as a separate task. Do this later.

Turn the panel over, and pin it down. Install the bottom LE and TE sheeting. Join the panels with the dihedral jig under the last rib.

Glue on the top LE sheet and cap strips, shimming here and there along the TE and bottom spar to keep the wing true. Glue the 3/32 spar webs in place, and sheet the center section. Use epoxy at all center section joints that have plywood.

Remove the wing from the bench. Install the bottom center section sheeting and cap strips. Add the aileron drive option you have selected from the two that are detailed on the plan. Install the wing tips, ⅛ x ¼-in. spar extensions, and LE sheeting. Glue the ¼-in. LE in place.

Build the ailerons directly over the plan by emplacing the bottom 3/32 x ½-in. TE, cap strips, LE, and spar, pinning them firmly to the work surface. Glue on the ribs with thick CyA. Add the top TE sheet, LE sheet, and cap strips. Attach the plywood control horn mount.

Tail surfaces. These are built directly over the plan. The spars are made by gluing together two pieces of ¼ x ½-in. balsa. These spars are stronger and lighter than ones made from a single piece of ½-in.-sq. wood. Also, the built-in tension keeps them straight.

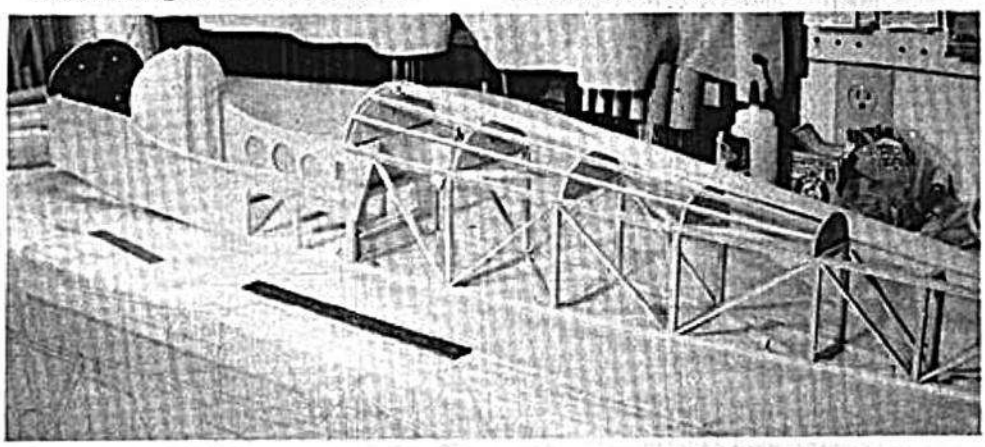
Fuselage. Make tracings of the formers and Lite Ply doublers. Tack glue them lightly to the respective wood pieces with spray contact cement.

Make the ⅛-in. balsa sheet sides using the Lite Ply doublers as a pattern; glue the doublers to the balsa sheet using contact cement, but seal around the edges with CyA for insurance. Build the right side over the wax paper-covered plan side view, then build the left side directly atop it for accuracy.

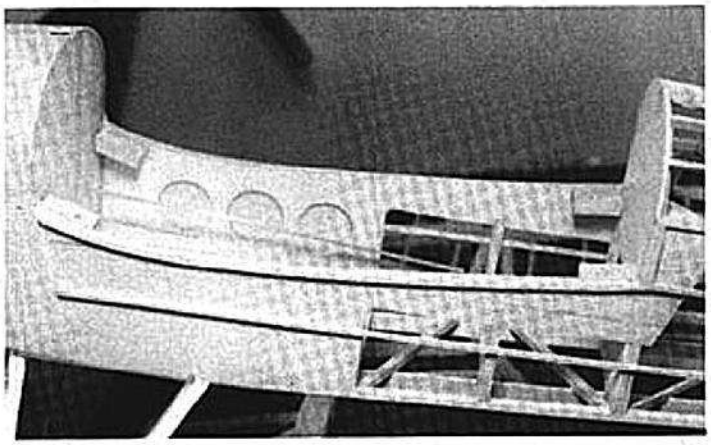
Before doing so, cover the top and bottom longerons with strips of waxed paper to prevent gluing the sides together. Since Lite Ply is less than a full inch in thickness, you'll need to shim between the doublers to raise the left side flush with the longerons.

Separate the sides, and pin them down over the plan top view from F-3 to the tail post. Epoxy F-3 into the appropriate slots in the doubler; Sig Kwik Set gives good results.

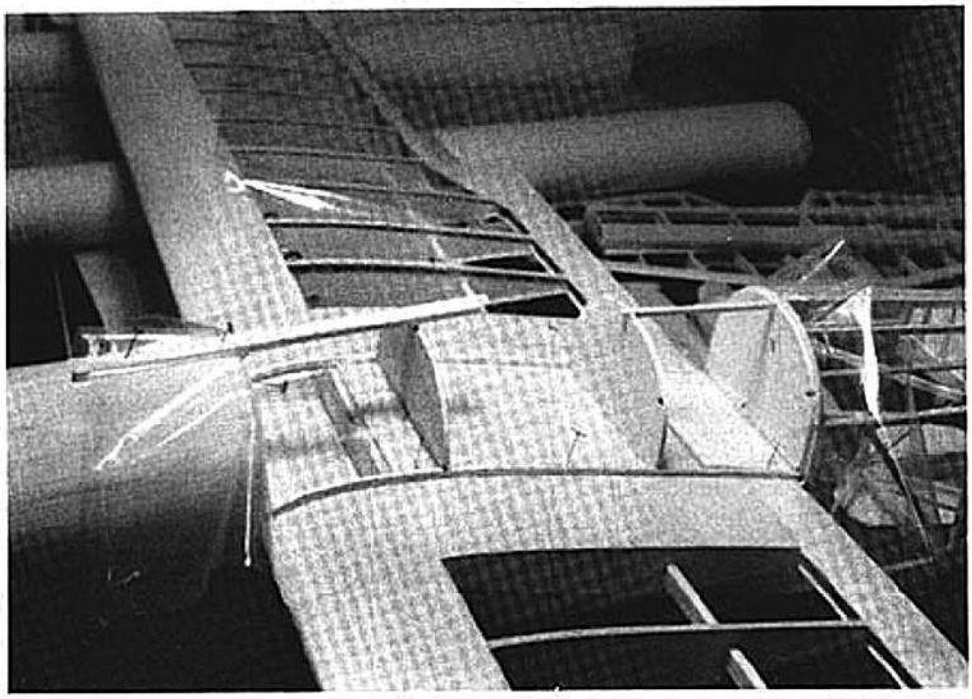
Cut all crosspieces and diagonals from F-3 aft; glue them in place. Position the engine mount on the firewall, and drill holes for the bolts. The method detailed on the top view has worked well on a variety of models. Pull the sides together, and install F-2 and the firewall with Sig Kwik Set, using 90° triangles to keep the forward section square.



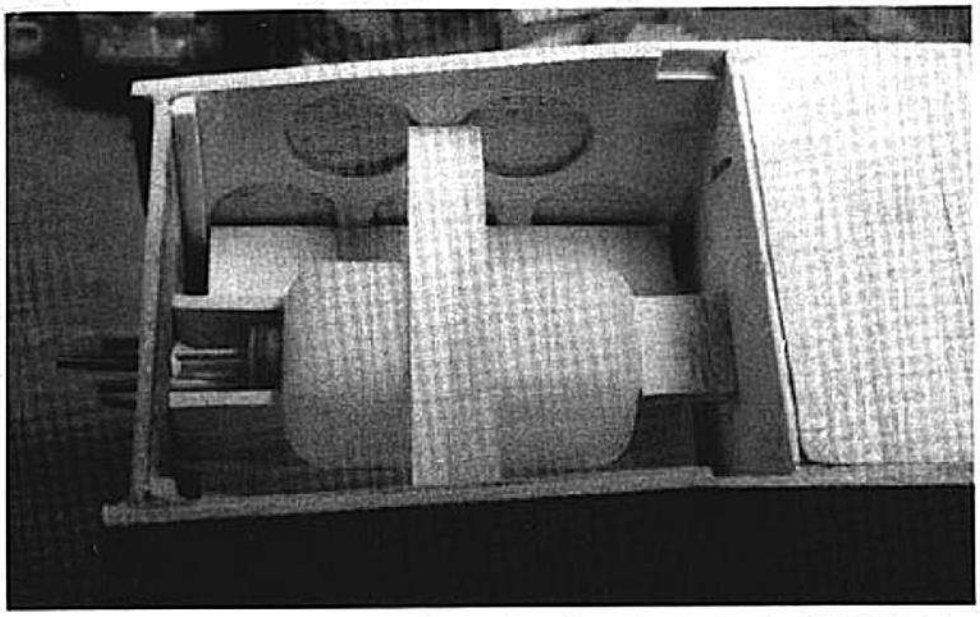
Fuselage construction under way. The crossmembers, diagonal members, top balsa formers, and ⅛ x ¼-in. stringers are in place. The two halves have been pulled together at the front, and F-1 and F-2 have been epoxied in place. Though the photo shows only five stringers, builders should use the seven stringers shown on the plan.



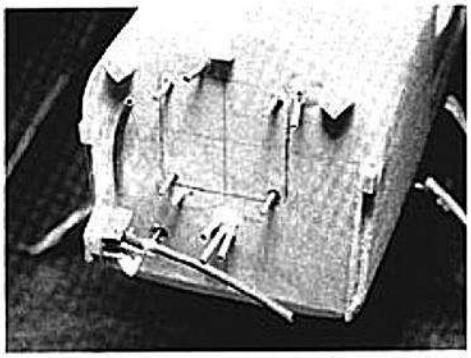
Left: The top ⅛-in. sheet has been installed between F-1 and F-2, the ⅛-in. sheet tripler has been glued on and sanded to taper, and the ⅛-in. wing saddle strip and side ⅛-in.-sq. stringers are in place. Note the maple wing mounting blocks inside the fuselage and the landing gear wire epoxied to the fairing strips. Right: The top fuselage sheeting being shaped on 1-lb. coffee cans prior to installation. Oversize random lengths of A-grain balsa were soaked in water, wrapped around the cans, and rubberbanded in place until dry. The precurved sheeting goes on easily.



Assembly of the removable fuselage top over the wing. The ⅛-in. strip is pinned to the wing sheeting, with the alignment stick pinned in place over the front sheet. The formers are installed after the alignment has been checked. A polyethylene sheet has been positioned between the formers and over the wing to prevent accidental gluing of parts.



Looking down on the smoker tank installation. Note the ¼-in. sheet balsa bottom between the landing gear blocks. The ¼-in. spruce firewall reinforcements can also be seen.



Close-up of the firewall showing the fiberglass cowl mounting blocks, smoker pinch valve and servo rod, and No. 6 engine mount bolts. The fuel tank tubing outlets are on top, the smoker tank tubing on the bottom.

Glue the bottom crosspieces to the frame. Attach the ¼-in. sheeting between F-2 and the rear landing gear mount block location.

Pin the top fuselage formers F-3B to F-8 in position. Make sure the top stringers will meet the formers, and adjust as necessary before gluing them in place. Glue in the seven top stringers.

Remove the fuselage from the plan, and epoxy the Sig landing gear mounts in place. Glue on the Lite Ply tank mount, and install the tank. Glue the top ⅛ x ½-in. Lite Ply double brace between the firewall and F-2, and install the throttle pushrod hardware.

Using Sig maple engine mount stock, cut four blocks and epoxy them to the fuselage as shown on the plan top and side views. Mount the wing in the saddle, squaring it with a straight line from the tail post to the wing tips.

Drill a 3/16 hole through one corner of the block, and insert a short piece of 3/16 dowel. Repeat the process with the next block, continuing until all four holes have been drilled.

Remove the 3/16 dowels, and drill the wing holes to ¼ in. Tap the maple blocks with a ¼-20 tap, and test one of the nylon bolts to see that it screws freely in the hole.

To precurve the ⅛-in. balsa sheeting for easy installation on the fuselage top, including the cockpit section, begin by

cutting random lengths of A-grain balsa to fit between the top fuselage formers from F-1 to F-3. Soak the strips in water, wrap them around coffee cans, and secure them with rubberbands.

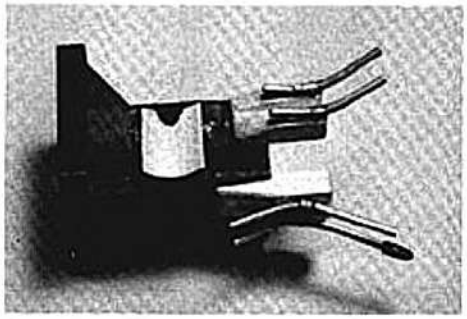
Once the sheeting is dry, it can be slipped easily over the formers without having to be secured with pins.

Bolt the wing in place, laying polyethylene sheet over the center section to prevent gluing the removable cockpit portion to the wing. Pin in place the ⅛-in. strips that go across the top of the wing between F-2 and F-3, making sure they're aligned with the formers. Pin formers F-2A, F-2B, F-2C, and F-3A in place. Align the formers by bridging across them with straight balsa pieces as shown in one of the photos, then adjusting as necessary.

Glue ⅛ x ¼-in. strips between the formers, then fit in the ⅛-in. curved top sheeting pieces, trimming as necessary to ensure that the joint falls over the formers. The almost exact radius provided by the coffee cans simplifies this task. Glue the sheeting in place.

Cut out the cockpit following the outline on the plan, and attach it with 4-40 screws.

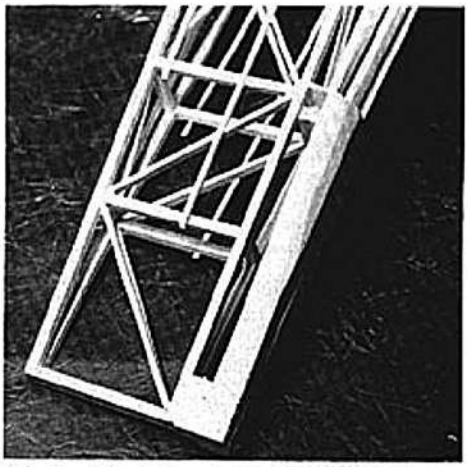
Remove the wing, finish sheeting the fuselage, and glue on the side and bottom stringers. Glue a lightweight balsa block to the fuselage over the stabilizer location, providing a ½-in. space for mounting the stabilizer. Sand the block to conform to the shape of the fuselage.



The Hayes engine mount. Note the basswood mount for the Perry P-40 smoke pump, and the smoke and fuel tank tubing extensions. The fuel tank is filled through the cylinder head opening, the smoke tank through the carburetor air intake hole.

The smoke system was used more or less as a test bed for a setup that would work with the SuperTigre .90—and for ol' dad to get a few jollies. I seriously doubt that any of the 1930s-era home-builders put smoke systems in their craft.

Bend the landing gear to shape, mount it in the gear-block slots, join the gear wires, and solder the units together as shown. Epoxy the hard balsa fairing strips to the wire. Sand the strips until streamlined, wrap them with Sig Koverall, and finish with nitrate dope.



A balsa block has been installed over the stabilizer, then partially shaped. The ½-in. scrap shim on the front edge creates just the right amount of space for the stabilizer to be slipped into place.

Glue and shape the bottom sheeting from F-1 to F-B, noting in the section drawing how the double ¼-in. sheet is assembled. The removable portion that covers the landing gear is held with two screws as indicated on the plans.

Covering and finishing. The fuselage, fin, and rudder were covered with Sig Koverall using Sig nitrate dope. Heat shrink the fuselage covering with an iron, and install the covered fin. Give the entire assembly five coats of 50:50 nitrate dope.

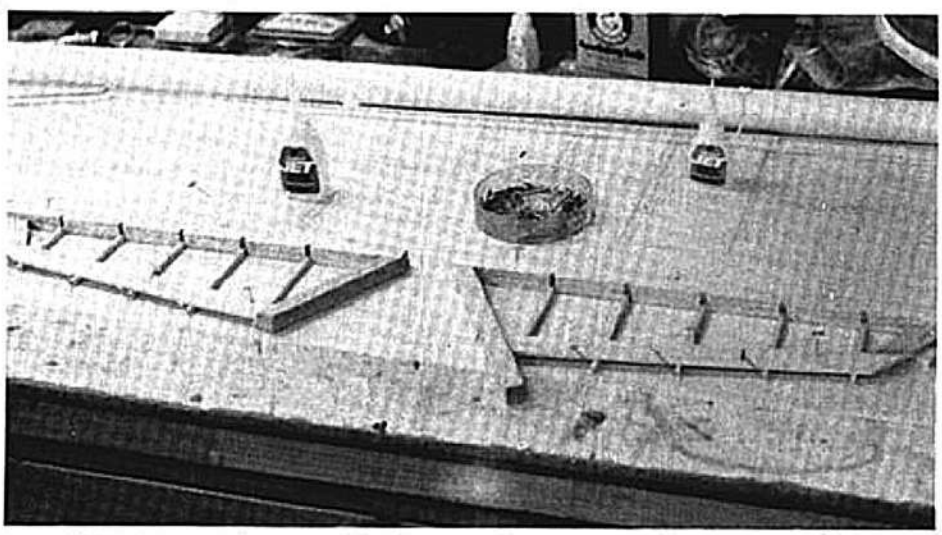
MonoKote was used for the wing and stabilizer. The cream-colored wing leading edge is MonoKote; the stabilizer leading edge is the same cream-colored Perfect paint used on the fuselage. This paint has good adherence.

The fuselage arrow and stripes were made from Coverite. The arrow was cut from black sheet; the stripes are ¼ in. and 1/16 in. A set of *old* Formula One decals sold by Orbit was used for the Gulf decal. The Cloudhopper lettering is dry transfer Chartpak Bookman 48-point bold italic.

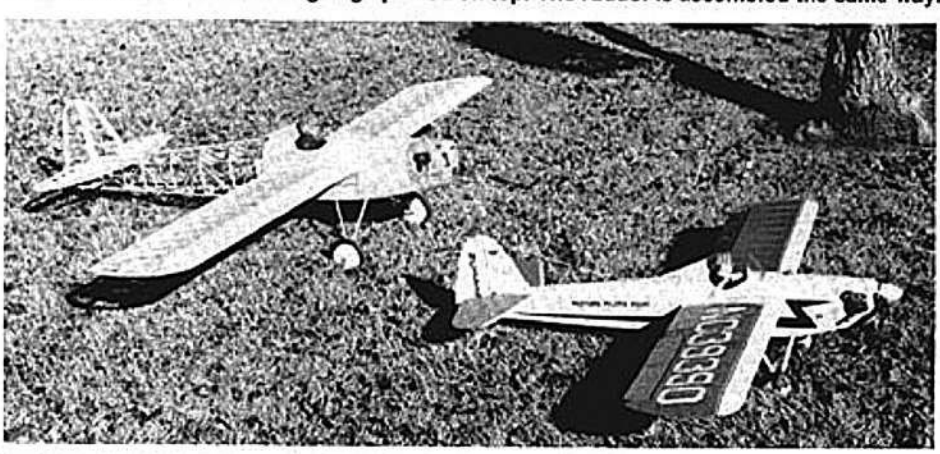
I made a fake left engine cylinder to simulate the Supertigre .90 head by gluing 1/16 balsa sheet strips (representing the cooling fins) to a ¼-in. sheet base. After epoxying the cylinder inside the cowl cutout, I epoxied on an old glow plug. The simulated cooling fins were painted with Sig aluminum dope. The gas tank cap is detailed on the plan.

Flying. An easy-flying airplane, Cloudhopper is guilty of no bad habits or wild quirks. The spring-loaded tail wheel and large rudder provide good ground handling. This model makes a nice change of pace from foam-and-fiberglass structures. I think it would be dandy with a two-cylinder, four-stroke Saito 1.30 or an O.S. 1.20.

Should you have any comments, criticisms, or suggestions, please write to me at 1308 E. Polk, Victoria, TX 77901. Because of a hearing loss I'm unable to use the telephone satisfactorily. □



Elevator construction under way. The bottom ⅛ x 3/16 strips have been installed in the spar slots, with the ¼ x ¾-in. trailing edge pinned on top. The rudder is assembled the same way.



A still half built Cloudhopper behind its older but smaller sibling, the semiscale Pea Patch.