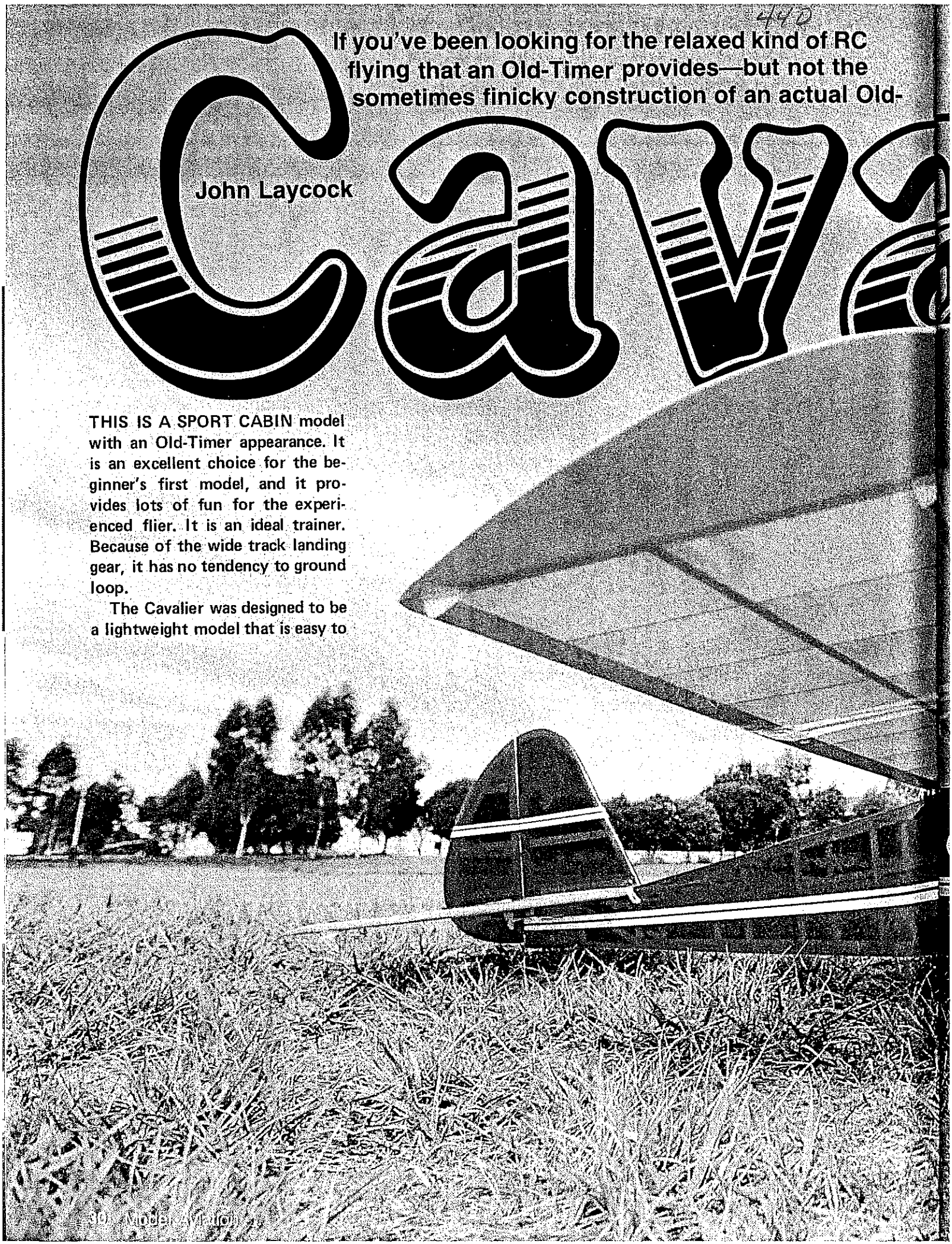
Cava

If you've been looking for the relaxed kind of RC flying that an Old-Timer provides—but not the sometimes finicky construction of an actual Old-

John Laycock

THIS IS A SPORT CABIN model with an Old-Timer appearance. It is an excellent choice for the beginner's first model, and it provides lots of fun for the experienced flier. It is an ideal trainer. Because of the wide track landing gear, it has no tendency to ground loop.

The Cavalier was designed to be a lightweight model that is easy to



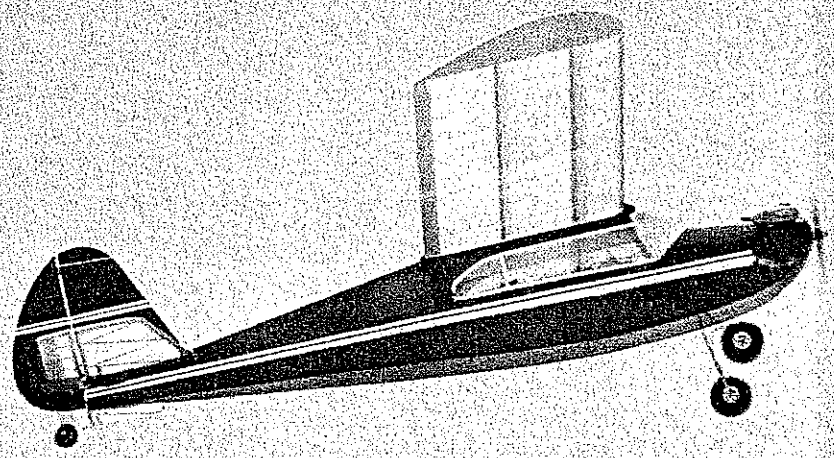
Cavalier

Timer—then look no more. This OT-reminder model builds fast, and it is a great flier. Uses a .35 engine and three-channel controls.

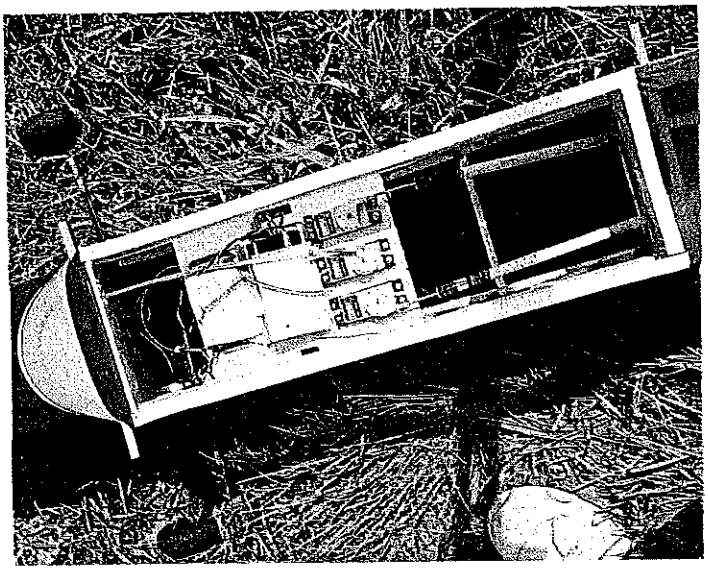
Translucent MonoKote covering lets enough of the structure show through to reveal the plane's character. The downward-pointing exhaust extension from the muffler was made from ½-in. soft aluminum tubing purchased at a hardware store. (Photo by Phil Vessa.)

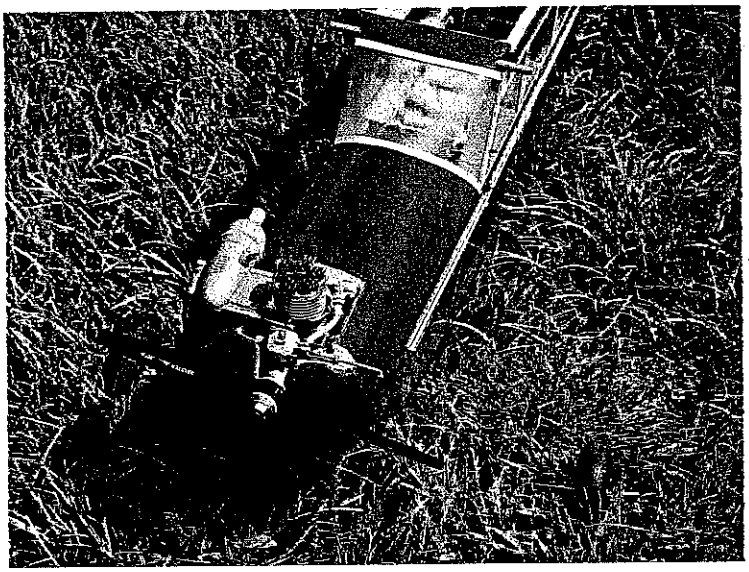
build. Engine size is .35 or .40 cu. in. displacement. One of the new .40 cu. in. four-cycle engines would be right at home powering the Cavalier, though my conventional .35 cu. in. Enya has proven to be more than adequate. It is a slow-flying model with 1,200 sq. in. of wing area and a total weight of about four pounds. Wing loading is 8 oz. per sq. ft. For its size, the Cavalier is very light, yet it is strong enough to take a beginner's rough landing.

The Cavalier was developed from a smaller model—a single channel, pulse proportional ship that was an excellent flier. I have retained the basic proportions, some of the construction ideas, and the Clark Y airfoil. I've had

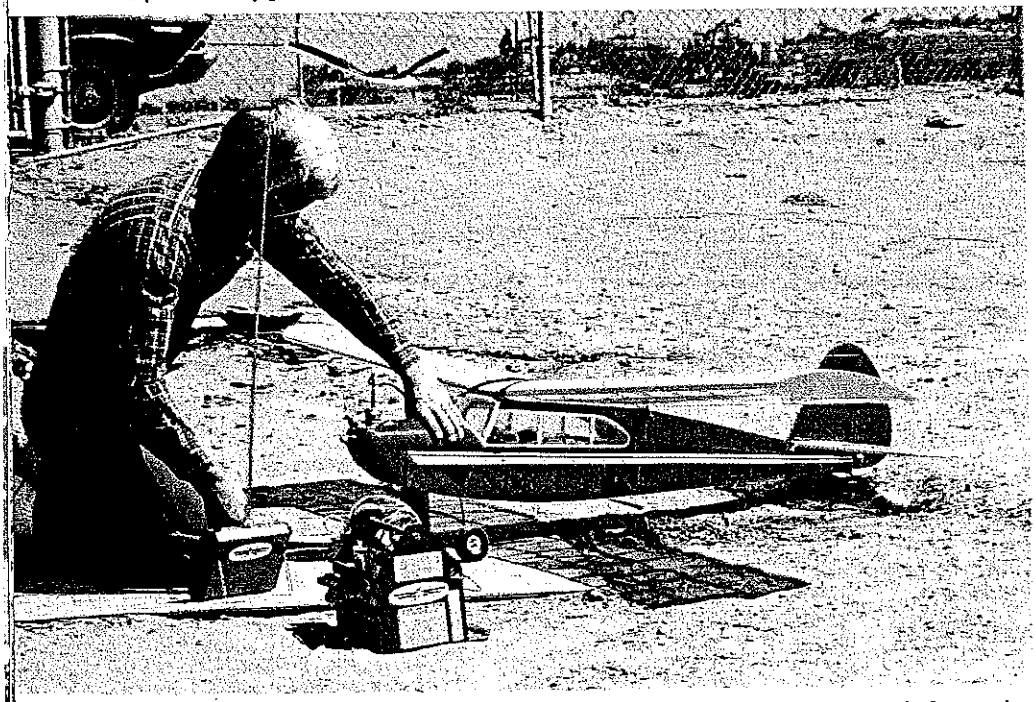


The lines give the impression of a late-30s FF that has been converted to RC, but it's an all-new RC designed for relaxed sport flying. The big wing has 1,200 sq. in. of area; at 4 lb. all-up weight, it can really soar. The author thinks it is a perfect basic RC trainer. (Ron Falk pic.)





Left: There's plenty of room for the three servos and the foam-wrapped battery and receiver. Instead of rubberbands, the author uses tension springs made of .015 music wire to hold the battery and receiver. To wind the spring, he clamps a hand drill in a bench vise, chucks a piece of 1/8-in. drill rod, sticks one end of the music wire between the chuck jaws, and turns the hand drill. Voila! Right: The cowl, upper and lower, is permanently glued in place, avoiding the sometimes-problem with loose pieces. A handy needle valve extension of brass tubing was soldered on.



A few hand flips by the author brings the engine to life, and the Cavalier is ready for another flight. We'd recommend having the model restrained by a helper for starting, if possible, to avoid the danger of getting the hand or wrist caught in the spinning prop. (Falk picture.)

good luck with this airfoil. In fact, I didn't build any washout into the wing, as the high-wing layout and the slow flying characteristics didn't justify it.

In keeping with the design criterion to "keep it light," was a companion desire to keep it simple. In this case, keeping it simple means fast building. I found out the hard way that a lot of time can be eaten up by complicated construction. I tried to benefit from my building and design experience by including some innovative ideas in the Cavalier. Maybe some of them will be obvious; all of them have been used many times before. What I've done is pick out the ones that have worked for me and put them all together in this design. Some of the areas that I kept simple and light are as follow.

For fuselage construction I decided to use the longeron and crosspiece method instead of the more common sheet construction. It can be argued that sheet is simpler, but building this way is a lot lighter; when covered, the fuselage is very strong.

I wanted to avoid a loose cowl. So many times the fasteners get lost or don't work, and the cowl ends up being held on with rubberbands (or worse, left off). So, the

3/8" SQ. ALL FIN RUDDER FRAMING

3/8" SHEET FORMS ALL CONTOURS

3/8"X 1 1/2"

3/8"X 3/4"

3/32" M WIRE ELEVATOR TIE

1/16" PLYWOOD REINF

3/8"X 1 1/4" T. EDGE

1/16" PLYWOOD BRACES FRONT BACK OF SPAR AT C/S ONLY

BANDS HOLD TAIL TO 1/8" DOWELS

1/4" SHEET WING CRADLE

3/8" SQ. FRAMES

1/8" PLY PLATFORM WITH ALIGN DOWELS (FOR TAIL REMOVAL)

1 3/4" WHEEL ON STEERABLE WIRE THRU NYLON ON 1/8" PLYWOOD TO BOTTOM

1/4" CRADLE SUPPORTS FOR ONE PIECE WING

1/4" SQ. FUSELAGE FRAMING AND LONGERONS

BALSA FORM FOR WINDSHIELD

1/4" DOWEL

1/4" DOWEL WING HOLD DOWNS

F 1 1/8" PLYWOOD SHEET

3/8"X 1 1/4" T. EDGE

1/8" SHEET PLANKING COWL

ENYA 35 ON HAYES MOUNT

F 2 1/8" SHEET FRAMING

1/16" PLYWOOD SERVO TRAYS

BALSA BLOCKS FORM FIXED COWL

1/8" SHEET BALSA BOXES FOR RADIO BATTERIES

1/16" PLYWOOD WING REAR SPAR C/S ONLY

3/8" SQ. HARD BALSA UPPER LOWER SPARS FRONT AND BACK

1/16" SHEET WEBS FRONT SPAR ONLY

1/8" SHEET TIPS FORM

1/4" PLYWOOD FIREWALL

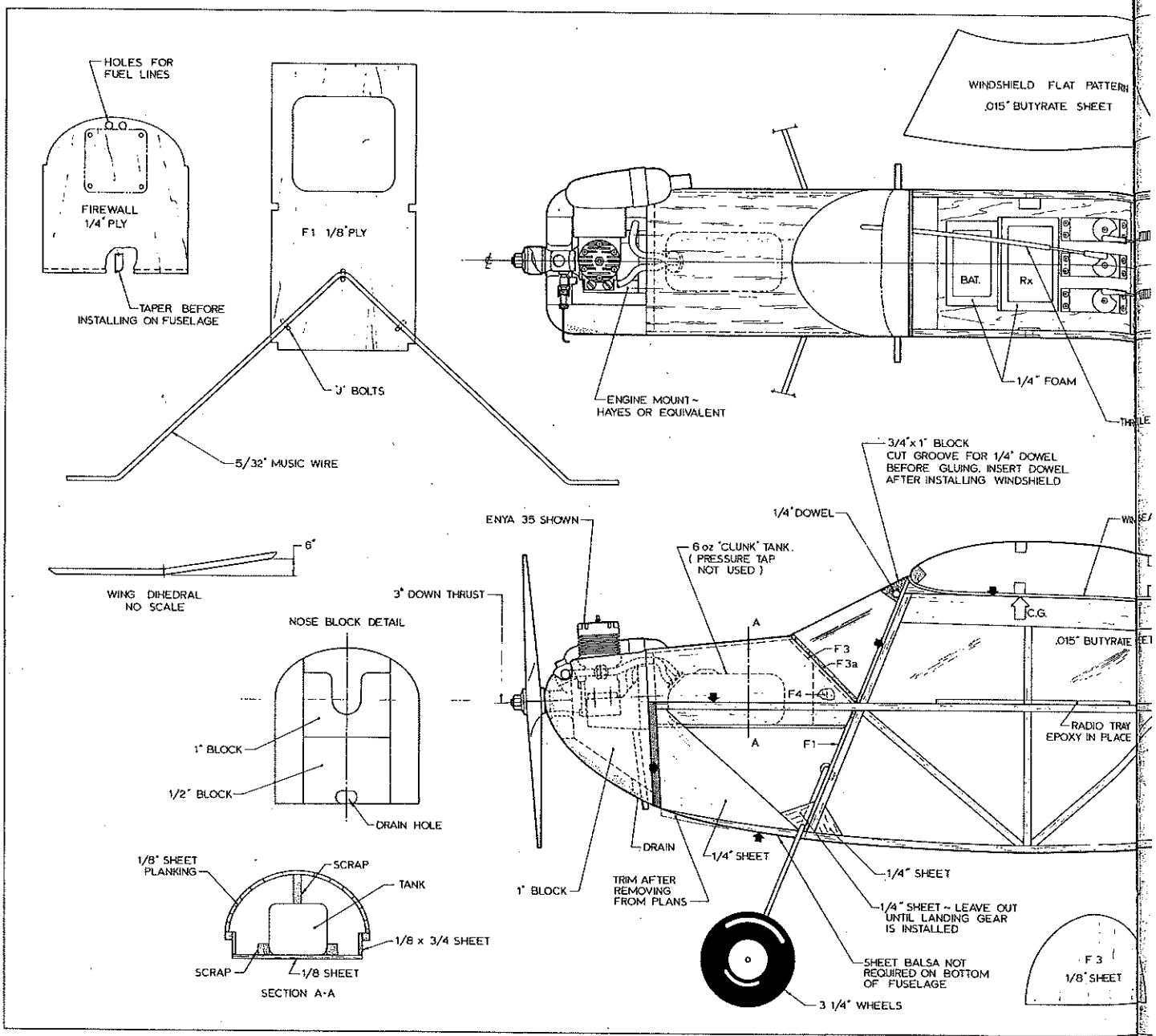
1/4" SHEET BALSA BRACING

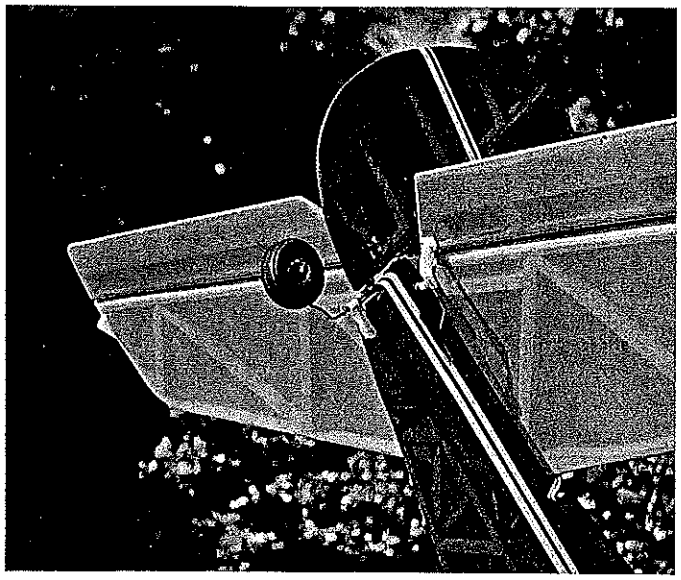
3/32" SHEET RIBS

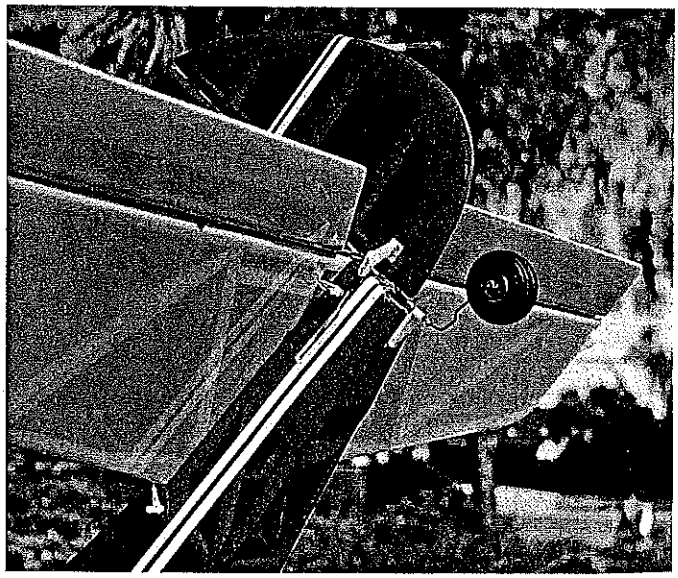
3 1/4" WHEELS ON 5/32" M. WIRE U-BOLT TO F 1 BULKHEAD

1/2" SQ. L. EDGE INTO RIB NOTCHES

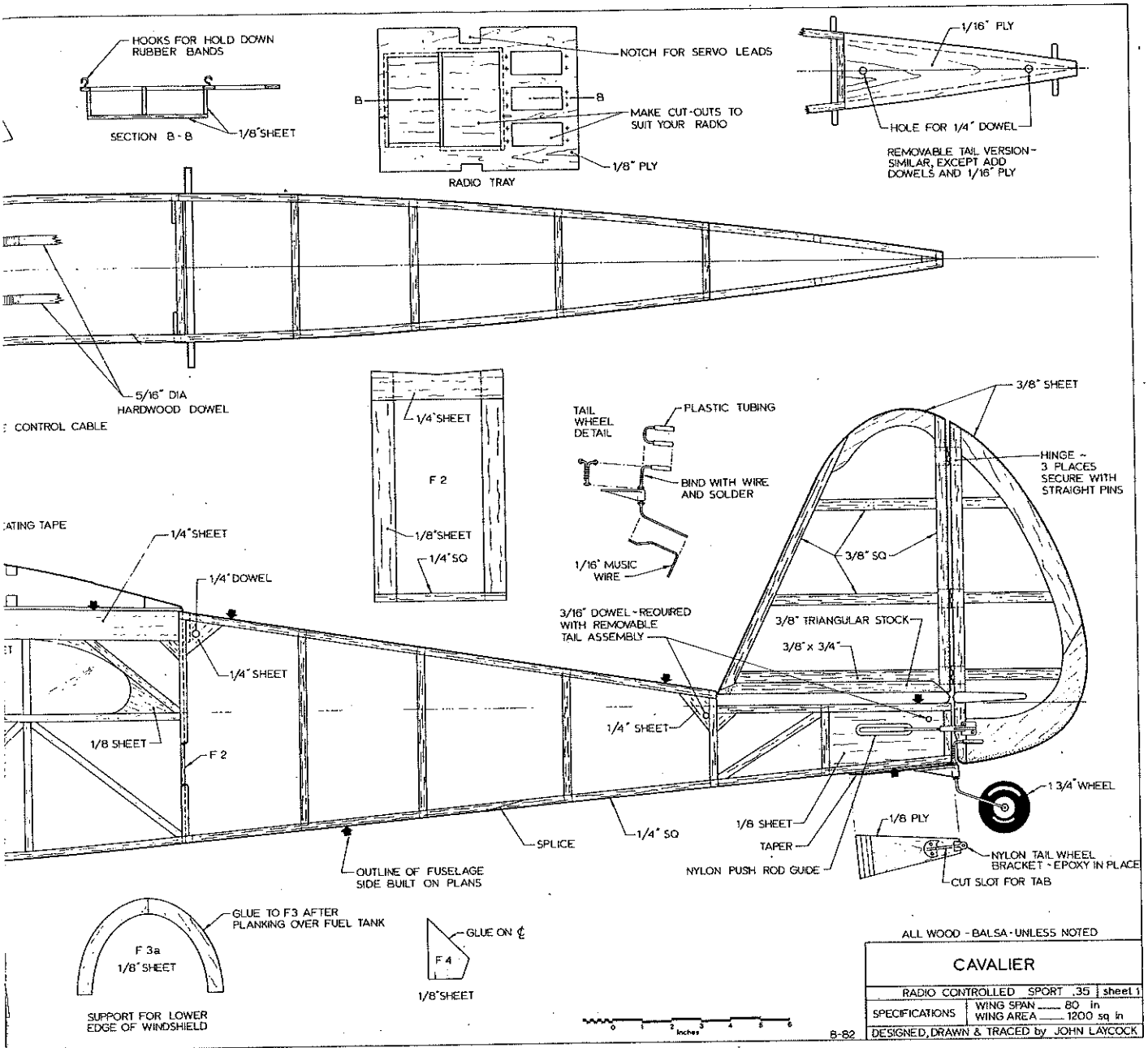
1/8" SHEET FOR TRAY SIDES AND FLOOR INSIDE LONGERONS







The tail section of the author's model was made removable, held on with rubberbands, so that the big model could easily fit in his particular car. If yours has plenty of room, you could permanently mount the tail surfaces and save a bit of assembly/disassembly time at each flying session.



front end of the fuselage has a fixed cowl. The engine was installed upright—again, for simplicity, easy starting, and good cooling.

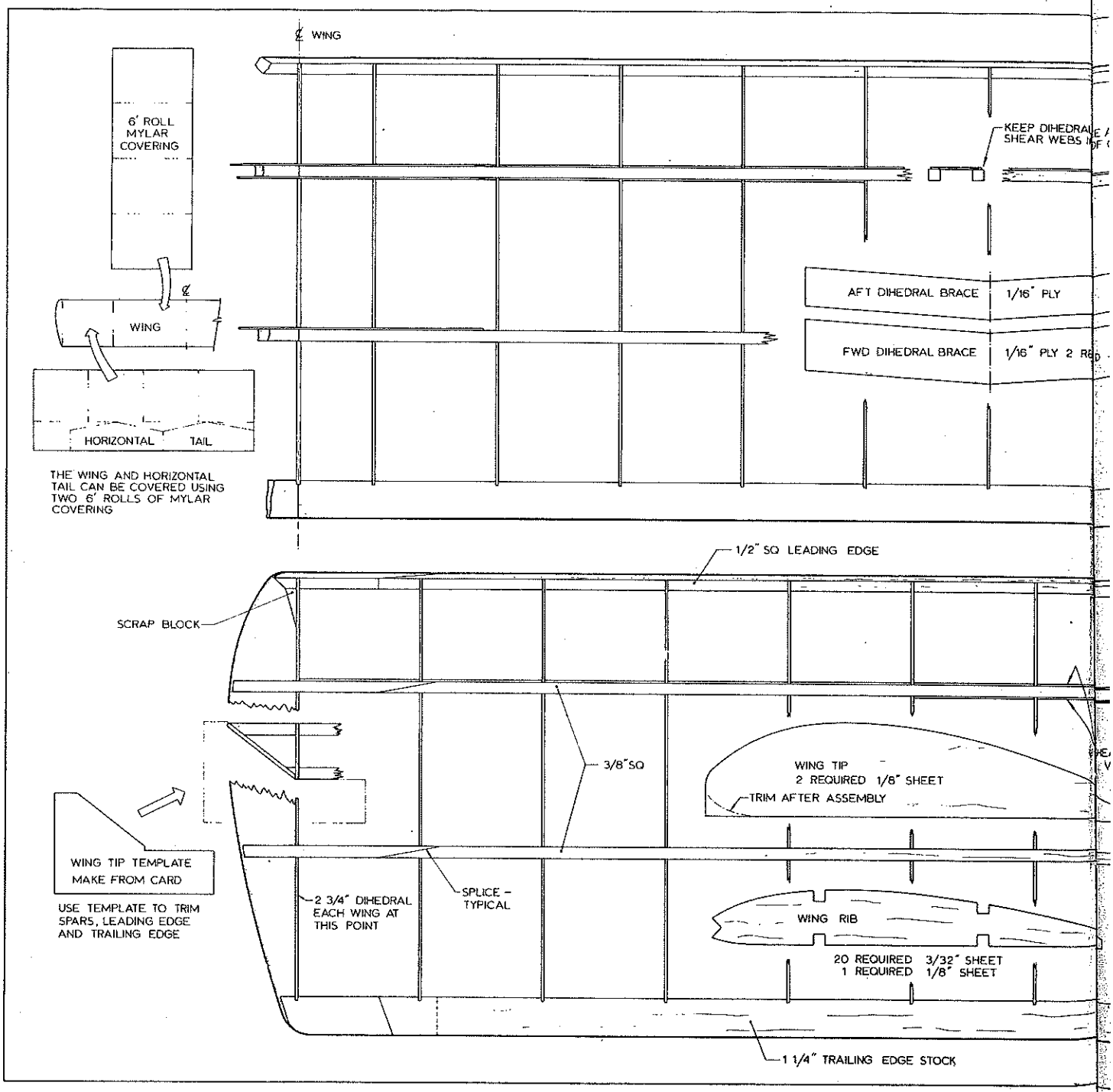
The main landing gear is easy to make, having just three beds in the wire. It is installed after the fuselage is complete, simplifying that phase of construction.

I strayed from my original goals when I used clear acetate for the cabin windows, but I feel that the improvement in appearance justifies the extra work.

The wing is absolute simplicity. It is basically a scaled-up version of the type that is usually found on small rubber-powered models. The one-piece wing, V-dihedral, and use of ⅛-in. sheet wing tips are more things for easy building.

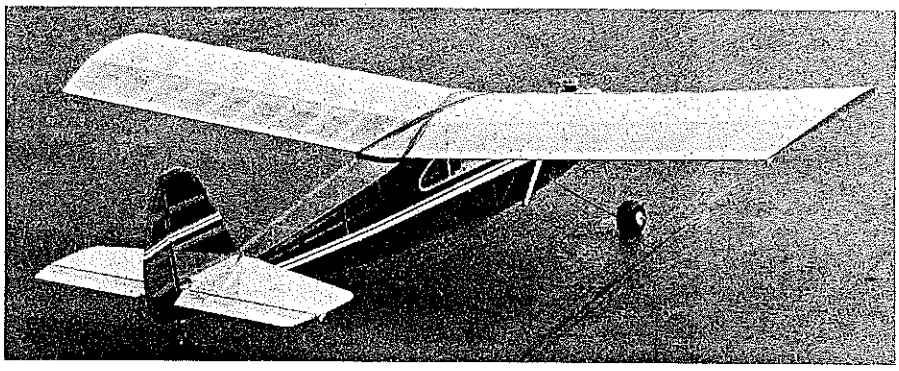
It would have been difficult to use wing hold-down bolts without sheet covering to distribute the load, but I feel that the hold-down rubberbands are in keeping with the design and allow for a lighter model than would be possible with a bolt-on system.

John Laycock hooks up the rubberbands to hold the tail section. This is an early picture when the landing gear of 1/8-in. music wire and Trexler wheels was in use. Being too springy, the author changed to 5/32-in. wire and low-bounce wheels. That did the trick very nicely.

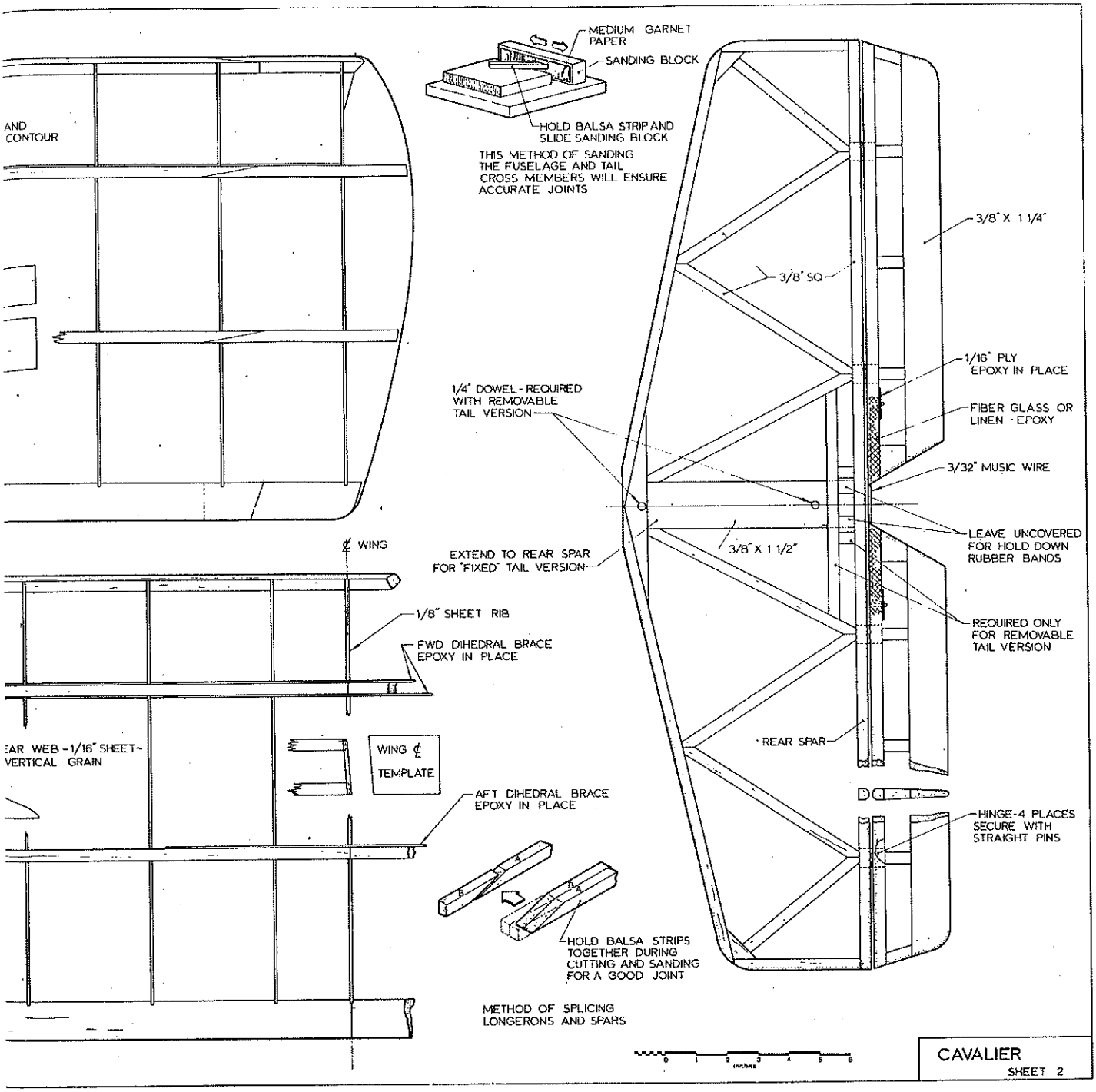


Fuselage construction. Start by building the sides over the plan. Use a flat building board, and protect the plan with kitchen Mylar film, such as Saran Wrap. Use ¼-in. sq. medium grade balsa, and select the straightest pieces for the longerons. For longeron splicing, try the method shown on sheet two of the plans—it works! Also, for sanding the fuselage crosspieces, use the sanding block method shown on sheet two. Use a razor saw (such as a Zona Saw) to cut the crosspieces a little longer than required; finish them to length with the sanding block. I used cyanoacrylate (CyA) glue throughout, except where I needed extra strength (then I used 5-min. epoxy). I didn't build the second side on top of the first. That method works fine for 1/16 and ⅛ sq. longerons, but it is cumbersome for this size fuselage.

When the first side is complete, remove it from the plans, and flip it over to check all joints. Add extra glue as required. Build the second side. Cut out the firewall and formers F1 and F2. It is important that these be made accurately, as the squareness of the fuselage



See those tiny bumps on the underside of the wing and stabilizer tips? Skids are recommended, as the big wing and light loading tend to tip the model when it is on the ground in a crosswind.



depends on them.

Now is a good time to form the main landing gear. Use a cutoff wheel in a drill motor to cut the 5⁄32-in.-dia. music wire. (You should be wearing safety glasses when doing this kind of work.) Locate and drill the holes for the three J-bolts, but don't final-assemble the main gear to the former at this time. It's a lot easier to work on the fuselage when you're not apt to be stabbed by the landing gear.

Epoxy the firewall and formers to one side of the fuselage; use a square to keep the formers true. When hardened, epoxy the second side. Again, be careful to maintain squareness. When the epoxy of the second side has hardened, pull the back end of the fuselage together, and add the crosspieces. Complete the fuselage as shown on the plans.

Add the engine mount and the platform for the fuel tank. I didn't fuel-proof the fuel tank compartment, but I did make sure that the fuel tank cap was properly tightened. Install the fuel tubing through the firewall before closing off the compartment. Seal the ends of the tubes to keep out sanding dust. Also identify the tubes for a correct hookup later.

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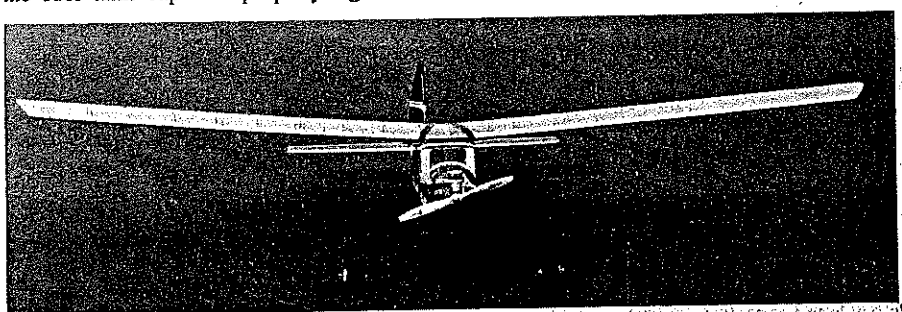

The Enya .35 in the nose looks almost lost in the total size of the Cavalier. It's the large size that gives the plane docile flight characteristics. It has controls of elevator, rudder, and engine.

For Fun/Winter

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modest figure, but still a lot of choppers in our modeling world. They do have others, of course, including one with a rotor span of 10 ft. for the Army. Another requirement of the magazine's selection was that sales be above $100,000 but less than $15,000,000.

The drone connection. Although the first patented remotely-piloted vehicle or "drone" dated to WW I days, it was not until WW II that RPVs became a practical part of our military hardware, mainly as lifelike targets. Things like the OQ2A, remembered by modelers, and later the full-scale, all-wood Culver Cadet. About 12 ft. in span with generous dihedral, the OQ2A, powered by a McCulloch engine (I've been told everything from 5 to 10 hp, up to 18), looked like an overblown Outdoor Rubber job, with a flat-topped, triangular cross-sectioned fuselage. The thing was catapulted by shock cord off a long launcher of open-frame, tubular construction. It could hit 175! For retrieval when hit, it shut down the engine and popped a chute from a top hatch.

At the first Mirror Meet in 1947, at Grumman's in Bethpage, Long Island, the Army demonstrated three. Wild, man. One shot vertically over my head. I heard, but did not see, the thunderous impact on the concrete runway. I was under a Good Humor truck. As a Free Flighter, I knew what to expect! Another tore up the sky until the pilot goofed (or the radio glitched), demolishing a chicken coop and its feathered inhabitants. So here's Warren Anderson, who started with Ohlsson .23 FF Gas jobs before WW II.

"One of my military assignments," he writes, "was as crew chief on the Radio Airplane Target Detachment flying OQ-2A drones. This was the first crew trained by Army personnel at Fort Bliss, TX in 1943. They had related to us that the Good brothers had taken their RC idea to several military units but were unable to stir up much interest. Finally, the U.S. Cavalry accepted the idea, according to them, and it was developed into the OQ2A. (I wonder what Walt Good has to say about this.)

"Reginald Denny was involved in the early manufacturing of the plane, as was a 'Mr. Smith,' pointed out in an article in *American Aircraft Modeler* in March 1971. The picture I took at the Radioplane plant in 1943 shows both Smith and Denny."

Reginald Denny, a handsome movie actor of considerable fame, was a truly good guy for aviation. I'm not going to check this out, but I believe Reginald was a pilot, interested in air schools, and most certainly a major model airplane manufacturer who advertised heavily in all our mags one grand FF Gas model kit (the Dennyplane) and the fondly-remembered engine, the Dennymite. The Dennyplane is famous to this day. It is a round-nosed (aluminum cowl), high-winged cabin model which flew superbly and, by gosh, looked like a full-size plane.

A lot of people in recent years have built it, thanks to Doc Mathews' revival in the January 1977 *Model Aviation* (Plan No. 169 for $4). Power is a .19 to .25. Denny was far more than a celluloid hero. He was one of us. You'll love that Dennyplane. Incidentally, Radioplane produced 13,935 drones under three designations.

Bill Winter, 4426 Altura Ct., Fairfax, VA 22030.

Cavalier/Laycock

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Epoxy the balsa blocks in place for the engine cowl. Shape and sand them to final contour. I keep a very sharp chisel handy for shaping and carving balsa. I find it is faster than using razor blades or a knife. Use the chisel to carve close to final size, and finish by sanding. Add the gussets. The windshield and side windows are affixed with contact cement. The engine compartment is given two coats of epoxy paint. It is a little tricky to paint around the engine mount. I used a long cotton swab inserted through the drain

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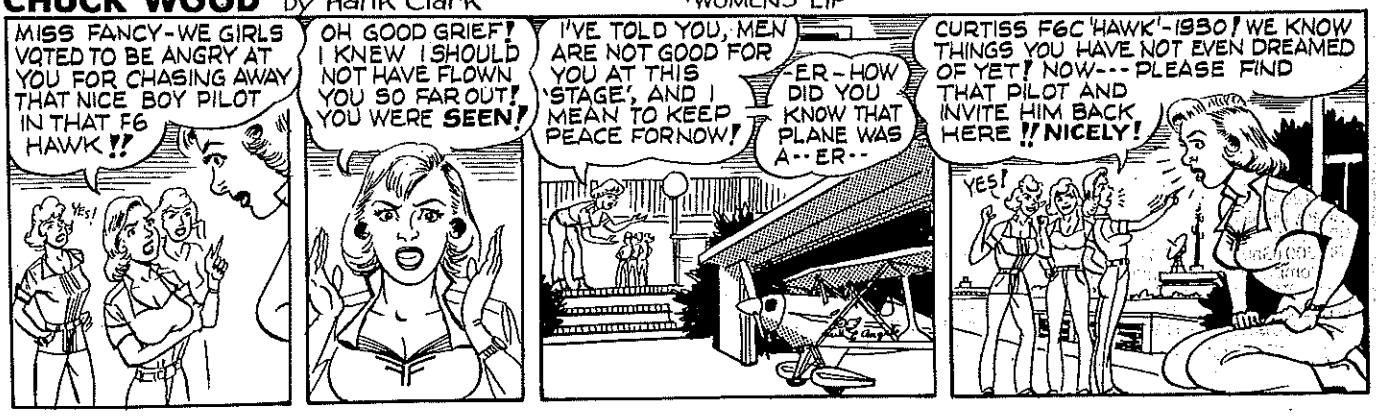
CHUCK WOOD by Hank Clark 'WOMENS LIP'



Cavalier/Laycock

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hole to get below the engine mount. It is better to have too much paint there than not enough.

If you are ready to cover the fuselage, now is the time to add the main landing gear. After covering, add the tail wheel assembly and the wing and tail hold-down dowels.

The tray method of radio installation has worked fine for me. Use epoxy to mount the tray. Incidentally, the tray strengthens the center of the fuselage. If you are not sure about getting the center of gravity (CG) located correctly, install the radio tray last, and move it fore and aft to get the proper balance position.

Wing. Once the ribs are cut, the wing panels assemble quite fast. Incidentally, four ribs can be cut from one 3 × 36-in. sheet. I made a rib template from 1/16 ply, splicing two pieces together to make a big enough piece.

Build each wing half flat on the plan. Before joining the two wing halves, complete the wing tips, as it is easier to work with just half a wing.

There are a number of ways to join the wing halves. If you have a favorite, by all means go ahead and use it. A method that works well for me is as follows. As I build each wing half, I trim the spars and leading and trailing edges to the correct length and dihedral angle. The dihedral angle template is very useful and worth the effort necessary to make it. Build both wing halves, and add the ⅛-in. center rib to one wing half. Block-up one half, bring the two halves together, and check the fit. When you are satisfied, glue with epoxy. Now you have a complete wing needing only the dihedral reinforcing. Carefully slot the center ribs for the dihedral braces. Glue them with epoxy, and clamp in place. Finally, add the shear webs. The wing is then ready for final sanding.

Tail. Construction is straightforward. Square the ends of the crosspieces with the sanding block. Be careful when cutting the slots for the hinges. Unless the hinge pins are exactly in line, it will take extra force to move the control surface, putting extra load on the radio servo and battery.

Whether to make the tail assembly removable or epoxy it permanently to the fuselage usually depends on the space in your vehicle. With my mid-sized, two-door American car, I can carry the wing inside the passenger area. The fuselage and removable tail are carried in the trunk. If your transportation permits a one-piece fuselage and tail, then build it that way—you'll save yourself some extra work.

Finishing. I used translucent Super MonoKote. It looks great on the built-up fuselage, and it also adds to the sense of being lightweight. The wing and tail can be covered with two rolls if the pieces are cut as shown on the plan. If you use this method, make the Super MonoKote lap joint over a wing rib, and don't shrink any part until the whole wing has been covered. Make sure the lap joint is well-sealed. I use a regular household iron for the final shrinking.

For trim around the windows, I used ¼-in. pressure-sensitive tape. After covering add the tip skids to the wing and horizontal tail—don't fly without them! For holding the wing down, make six 10-in. loops (use 20 in. of rubber) from ¼-in. rubber strip.

Flying. You will find the Cavalier to be an easy plane to fly. However, if you haven't flown multi-channel RC before, I suggest you have a qualified flier help you during the early flights. The Cavalier doesn't have any vices. It's not likely to ground-loop on takeoff or landing.

Basic commonsense rules apply. On takeoff, make sure that the model is heading directly into the wind. This is important on lightly-loaded models, such as the Cavalier.

Landings are fun. The final approach should be directly into the wind. Cut the engine throttle to idle. Add up-elevator trim to establish the glide, and start the flare-out when the model is about six feet above the ground. Keep giving more up-elevator until touch-down. The stick should be all the way back at this point. As with takeoff, there is very little roll.

In windy weather, don't attempt taxiing. Once the model is turned crosswind, the wind will tend to flip it over. This does very little damage to the model—the wing is strong—but it does spoil an otherwise good landing. I usually kill the engine and carry the model back to the pits.

Have fun building and flying the Cavalier. It's not a model that is pushing the state of the art, but it is an honest to goodness fun flier.

Radio Technique/Myers

Continued from page 39

ary 1982 *MA*, page 30) which can be used as a monitoring tool. When you aren't flying, you can go off the flight line by about 500 feet, plug the Bird-dog into your airplane, turn it ON, and try to find out what's happening on "your" channel. This unit draws quite a bit from your flight pack (about 300 mA), so use an Ace Fast Field Charger (34K40) or similar device to put back what you take out, before flying.

If you're not too thrilled with the idea of running down your flight pack, here's another approach. Figure 3 shows my Ace Silver Seven transmitter, modified by the addition of a small RC receiver and loudspeaker inside the set. You could do likewise. Since I have an SR900 battery pack in this transmitter and an expanded-scale voltmeter on the front panel, the small current drawn while monitoring is of no concern. A switch on the back of the transmitter selects either the Monitor or the Transmitter function.

The thought I was playing with, here, is that you might plug your receiver crystal into the monitor (to check the channel) before