

**Combining the best
of two worlds, the Fournier
uses electric power
to find its place in the sun,
followed by the silent
majesty of flight that can
only be experienced by
the soaring pilot.**



BY ROLAND BOUCHER

Photographs by Don Dewey

FOURNIER RF4

This Fournier RF 4 was especially designed for the Astro 10 electric motor, and with this propulsion system the plane flies very realistically. For example, take-off consists of a straight run followed by a few low hops culminating in a gradual climb-out. One pass around the field is usually enough to gain pattern altitude. The ship will loop from level flight and do near perfect wing-overs, especially to the left using engine torque. Rolls are not possible without ailerons, but snap rolls and spins are possible if large elevator deflections are used. The ship will thermal even at the high gross weight associated with electric propulsion (52 oz.) since, even at this weight, the wing loading is only 13 oz. per square foot. Flying speed is quite low and the ship is very stable in flight.

With the power plant removed, the ship has been flown as a slope and thermal sailplane. The radio battery was placed in the motor tube and the radio moved forward over the C.G. In this configuration the ship thermals well and is a striking change from the run-of-the-mill sailplane. The tow hook was placed to one side of the landing gear strut.

Although designed for electric propulsion, for those of you who wish to put a glow engine in this plane, I suggest a .10 or .15 be used. A throttle is not actually required, unless desired, as dead stick landings are a cinch with the excellent glide ratio of the RF 4. The new three channel radio systems are well suited to this design. It has been flown with ailerons which work well (use $1\frac{1}{2}$ " x 15" ailerons) but they do detract from the thermalling ability. The aircraft is a crowd pleaser and fun to fly. It can be hand launched if no smooth runway is available. I hope you enjoy building and flying the Fournier RF 4 as much as I have, and wish to thank both Dave Shadel and my brother, Bob Boucher, for their many helpful suggestions and assistance in designing, building, and flight testing this new aircraft. My special thanks to Bob for taking the prototype to the 1973 Nationals and entering it in R/C scale where he aptly demonstrated its realistic flight characteristics under electric power. Now let's get on with the construction.

Constructing The Wing And Tail

Begin the wing construction by taping the wing plan to a flat board which should measure at least $3\frac{3}{4}$ " x 12" x 36". Remember, your completed wing will only be as straight as your building board! If you use a 72" board you can build both wing panels simultaneously. Now, cover the plan with a piece of Saran Wrap or similar



product. Do not use waxed paper.

Carefully select your wing sheeting, making sure to match them as closely as possible, and pin directly over the plan in the correct position. Next, butt glue a $3\frac{3}{32}$ " x $3\frac{3}{8}$ " x 36" hardwood spar to the aft edge of the bottom sheeting.

Select a piece of $5\frac{1}{16}$ " square by 36" stock to use as a leading edge and glue to the top forward edge of the bottom wing sheeting.

Next, cut the wing center section planking from $3\frac{3}{32}$ " x 3" x 36" stock.

Then, glue and pin the $3\frac{3}{32}$ " x 1" x 36" trailing edge stock into place in the correct position over the plan and glue the bottom capstrips in place. Cut out all balsa ribs and glue in place.

When this is complete, add balsa shear webs between all ribs. Now, plane and sand the $5\frac{1}{16}$ " square leading edge to the shape shown on the plans. Pin the wing back on the board after shaping the leading edge and be sure to shim the trailing edge to obtain $1\frac{1}{4}$ " washout at the tips. Your wing is now ready for the top sheeting.

Glue the $3\frac{3}{32}$ " x $3\frac{3}{8}$ " x 36" hardwood top spar to the ribs and the

shear webbing. When dry, coat the ribs, spar edge, and leading edge, with a liberal amount of glue, then lay the planking on the wing and pin securely along the spar. Next, starting in the middle of the wing, bend the planking down to the leading edge and working toward the wing root, pin the planking every inch or so to insure good contact with the leading edge. Now work from the middle to the tip, pinning securely along the leading edge.

Next, add the $3\frac{3}{32}$ " top sheeting, capstrips, pine blocks, and trailing edge. When complete, leave the wing assembly pinned to the building board overnight to insure that all glue is completely dry.

When dry, remove the wing from the board and sand the leading edge to the approximate shape shown on the plan. Next, attach the wing tip and sand to shape. When this is complete, sand the wing with progressively finer sandpaper until all surfaces are very smooth. Join the wing at the center section using 1" wide glass cloth at the dihedral joint. The wing is now ready for covering.

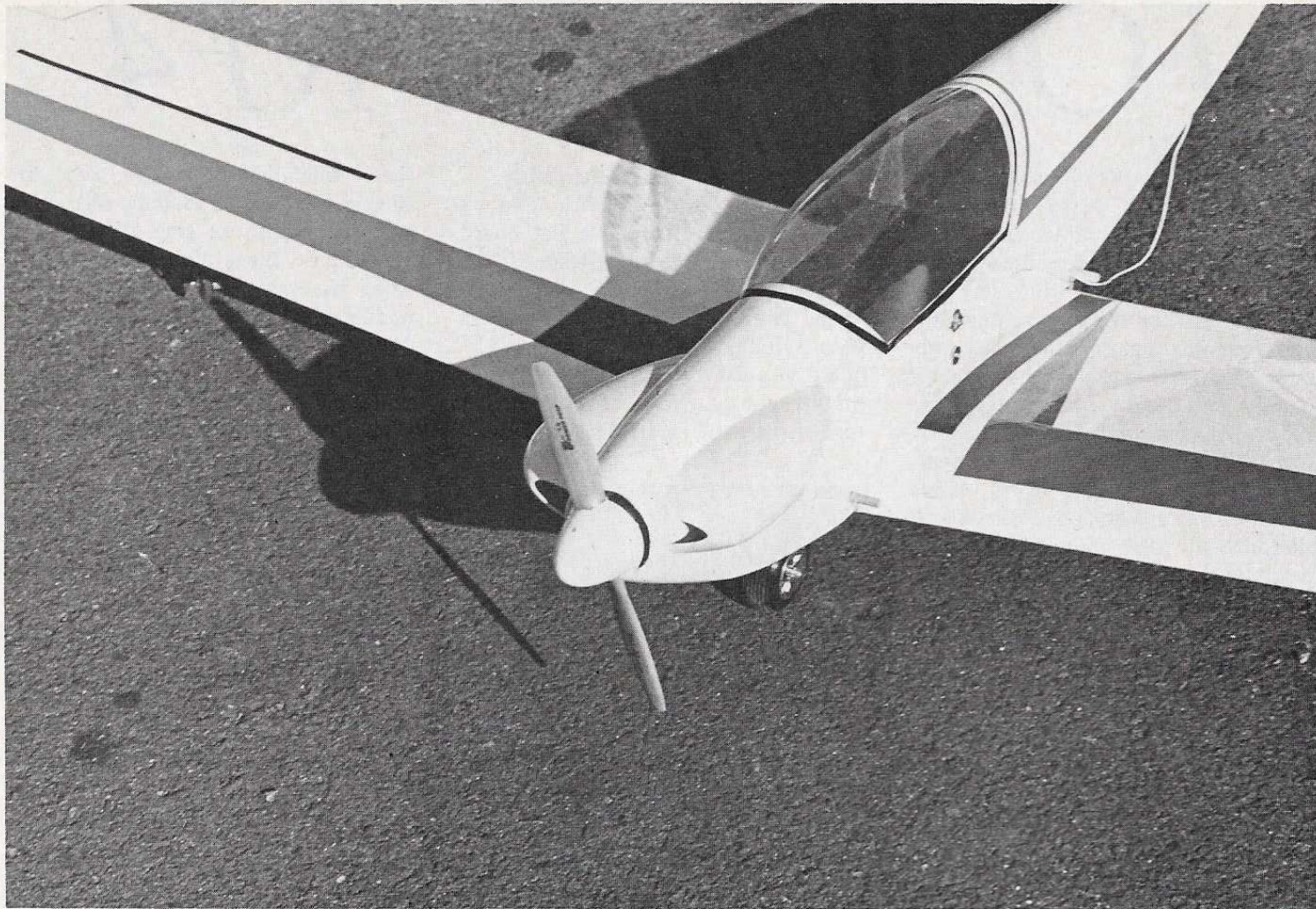
Constructing The Tail Section

The tail surfaces are of simple all sheet design and need only be sanded to approximate airfoil shape and the corners rounded after cutting from sheet stock. Be sure to leave the elevator in one piece, gluing the torsion bar in place and slitting both elevator and horizontal stabilizer for the nylon hinges. Assemble the stabilizer and elevator and make certain that the elevator moves freely without binding. When properly aligned, epoxy the hinges in place. Cut the elevators free and sand smooth. Repeat the above process for the rudder and vertical stabilizer assembly.

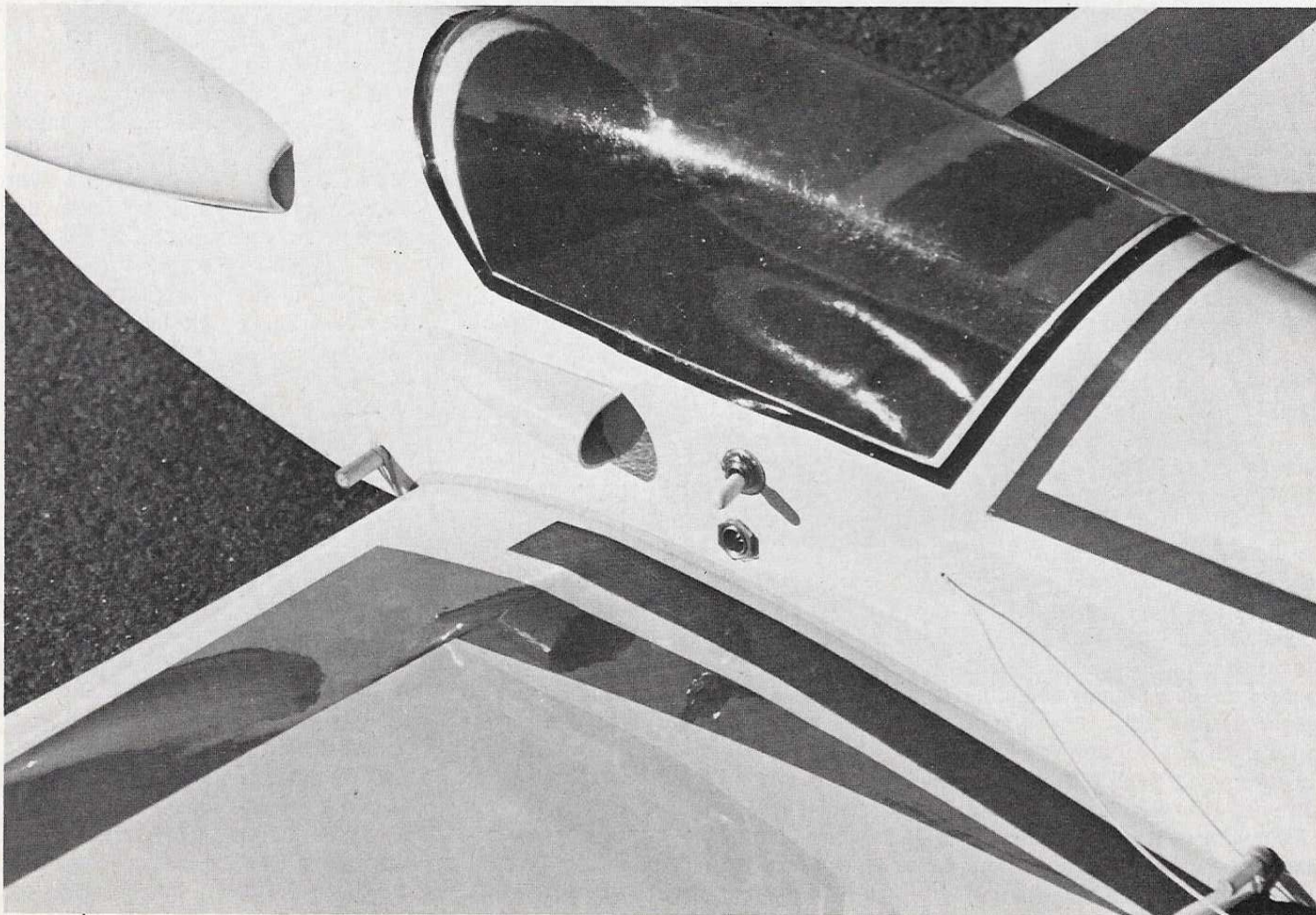
Fuselage Construction

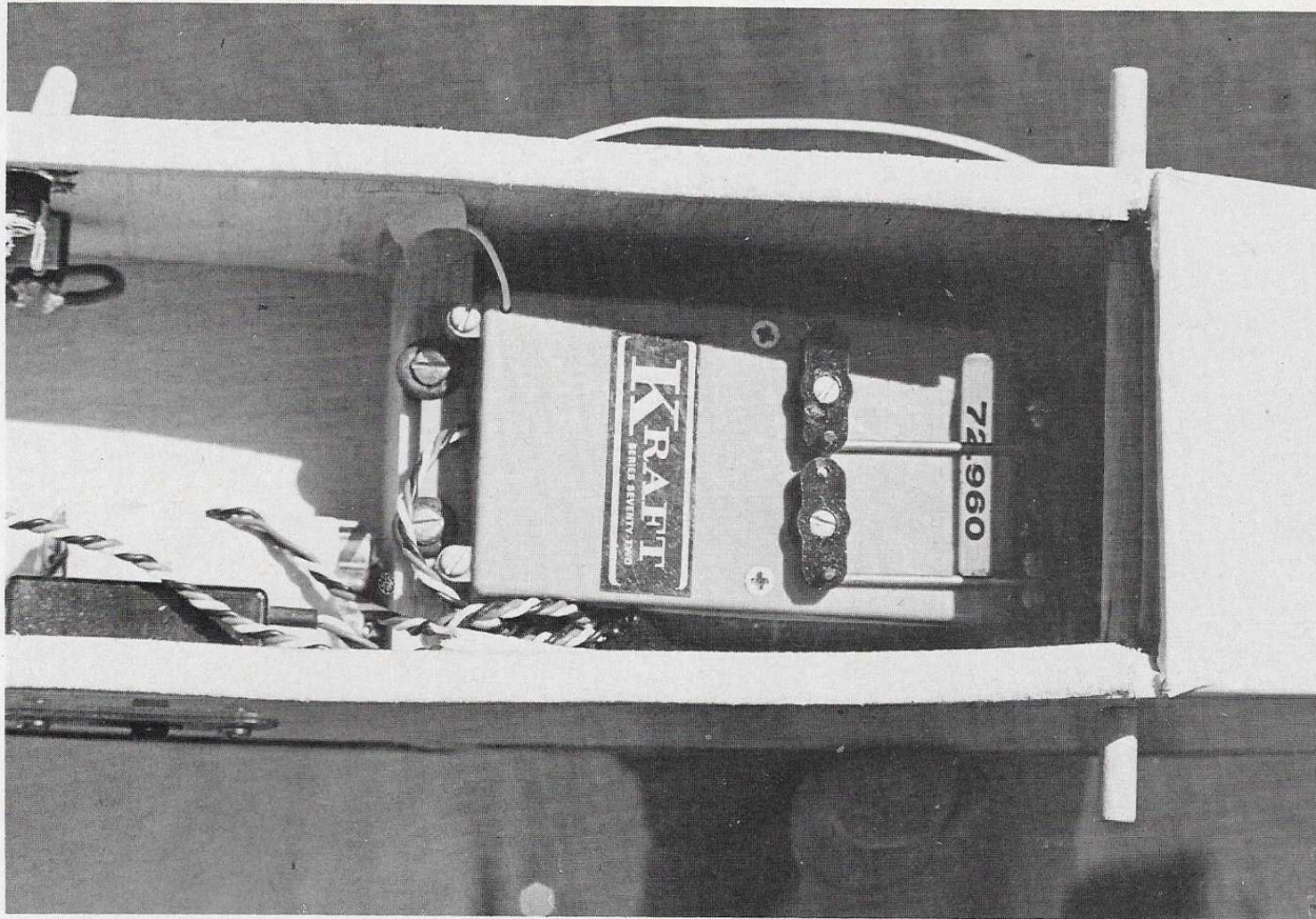
After cutting out the fuselage sides, mark the inside of each side with the bulkhead location. Trim the aft end of each side and glue formers F2 and F6 to the right fuselage side using 5 minute epoxy. When dry, glue the left side to this assembly making sure to keep the fuselage square and true. Use an RCM fuselage jig if you have one available.

When dry, pin the fuselage as-

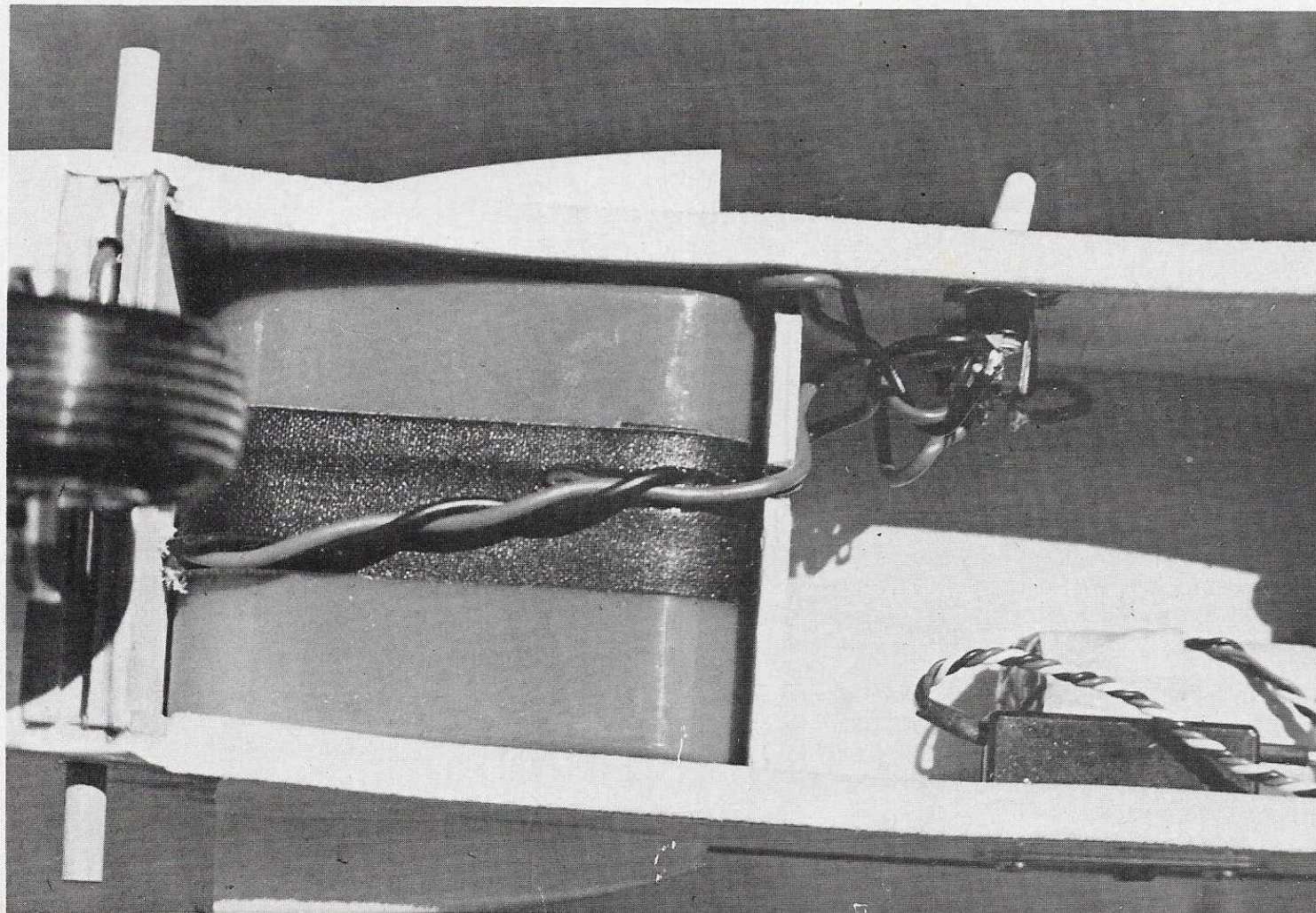


Note air intake and exhaust scoops for electric motor and battery.





Kraft 2-channel mounted aft, AF power supply forward in compartment.





"A powered sailplane with an electric motor has to be experienced - - - it really can't be described. An almost eerie feeling of quiet, responsive splendor."

- - - Don Dewey

sembly to the plan top view and pull the rear fuselage sides together and glue. Hold together with a clothespin and install formers F7, F8, and F1. Be sure to keep the fuselage straight and aligned to the top view on the plan.

Cut the canopy bottom from 1/8" sheet to fit between the fuselage sides and glue in place. Cut the servo mounting block to length and glue in place. Add the 1/4" square fuselage stringers and then bevel the lower edge of formers F3 and F5 and glue in place.

Cut 3/32" sheet for the top plank-

ing between F1 and F2 and from F5 aft. Soak the planking in hot water for 5 minutes and wrap on the fuselage using masking tape to hold it at the fuselage bulkhead location.

When dry, trim the formed planking and glue in place, first gluing at the butt joint with the 1/8" fuselage side with 5 minute epoxy and, when dry, gluing to the formers and stringers with slower drying glue, such as Wilhold Aliphatic Resin, again holding the sheeting in place with masking tape and pins or clothespins.

If the plane is to be electric powered or a slope soarer, install the motor tube next with 5 minute epoxy being sure to align it straight in the fuselage. Use a spirit level to align with the building board in order to set the thrust line at 0 degree incidence.

Remove the fuselage from the building board and install the rear bottom sheeting, landing gear block, and 1/4" square bottom stringers in the nose. Cut and sand the wing saddle to insure a good fit with the wing, then install the 3/32" vertical grain doublers on the inside of the fuselage.

Trim a 3/8" block and glue in place to make up the nose section and install the bottom sheeting between F1 and F2. When dry, plane and sand to a smooth contour as shown on the plans.

Cut and shape the cheek cowls to fit. Notch the fuselage sides for the cheek cowls and cut exit air holes in the fuselage sides. Also cut holes in the fuselage sides for battery cooling scoops and install former F4, making sure to provide a snug fit for the Astro 10 battery pack.

Make up the pushrods using the plan side and top view as a guide. Make a cut in the fuselage side for the pushrods and check that they work freely and without binding. Install the brass tube for the tail wheel with epoxy and a small piece of glass cloth.

Cut out the opening for the horizontal tail and fit the elevator in the slot, checking for any left or right tilt and zero incidence. When the elevator fits flat, remove from the fuselage. The latter is now ready for final sanding and covering. If one of the plastic film finishes such as Solarfilm or Monokote is to be used, apply it now.

Install a canopy liner of black paper or black sandpaper and fit the canopy in place. Hold down with black stripping tape over the canopy edge.

Install the tail surfaces, landing gear, cheek cowl, air scoops and install your power plant and radio.

Your Fournier RF 4 is ready to fly. We wish you luck with an outstanding model that combines the best of the power and sailplane worlds. □