FLY BABY

by Floyd Hipshire

When I first read that R/C MODELER was having a design contest, my immediate response was, I can't win so why try." But then I couldn't forget about it. The bug had already bitten and I wouldn't be able to live with myself if I didn't give it a try.

The hardest part of picking a subject was deciding what would impress the judges the most. Since judges are like any other modeler, they each have their own likes and dislikes. About the only category that would be common to all modelers would be scale. This was more to my liking since I prefer to build scale.

My next problem was time. I am a slow builder, and due to the closing date of the contest, I only had four months to complete the plans and build the model. This was quite a chore since I have a wife and three children who demand equal time! This didn't leave any time to eat or sleep. A few pieces of balsa and some glue keeps the two boys happy and the little girl isn't hard to please, but it would usually take an occasional night out for a movie and supper to please the wife.

Back to the airplane. I searched through several of the scale plans I had drawn over the past three years. All of them were beyond the maximum requirements of the contest since they were designed for larger equipment. Some were appealing due to the size of the model they would make, but would be less appealing if the scale was reduced. Finally it occured to me that the most appealing of the bunch, and the one which had the simplicity for the limited time available, was a 1½" = 1'0" model of Peter M. Bower's 'Fly Baby'.

Pete Bower stated that his Fly Baby started as a series of models dating back to 1936. He used many of the ideas from these models to create one of the neatest and most appealing homebuilts that I have ever seen. For his efforts, he won the design contest held by the Experimental Aircraft Association in 1962.

Since the Fly Baby started as a model, it is only fitting that it be brought back to model form. The construction of the real plane is so simple that it appears to be a 1'-0" = 1'-0" model. This makes it very easy for a person to produce a scale-like structure. The plans found in 1963 issues of *Air Progress* are a natural for drawing model plans. Any additonal dimensions can be scaled directly from the plans with the assurance of being correct.

CONSTRUCTION

The wing appeared so simple while I was drawing the plans that I started building it first. Cut the ribs for each panel by stacking ten pieces of 1/16" x 7/8" x 6½" together and jig sawing to outline of W3. Repeat this for the opposite panel. Stack five pieces of 1/8" x 7/8" x 6½" balsa and two pieces of 1/16" x 7/8" x 6½" plywood together and saw to the outline of W2. Modify the two plywood ribs to be W1's. Of the twenty W3 ribs, make eight of them into W4's and W4A's. Of these W4's, make two W4-1's and two W4-2's. Modify four more W3's for the tip ribs.

Boy, that is about as complicated as I can make it. You will probably end up with a pile of splinters, say "the heck with it," and start looking for a foam core replacement!

Pin the 3/16" square bottom spar on 1/16" scrap. Lay the 1/16" x 3/4" balsa trailing edge on the plan and cut for ailerons. Pin these in place. Slide the appropriate ribs on the 1/4" square spar and pin in place on the 3/16" spar and trailing edge. After this has been glued and has dried, glue the notched leading edge and 3/16" square top spar in place. Install the aileron hinge spars and ribs, leading edge planking, and 1/16" x 1/8" capstrips. Do not plank the inboard portion of these panels until they have been assembled to the center section. Turn the panel over and add the leading edge planking and capstrips. Install 1/16" plywood bellcrank mounts between W4-1 and W4-2.

By now you have probably noticed that the trailing edge sheeting does not touch W2 on these panels. This will be bent up after the center section is added. The reason for this is to match the wing to the body contour.

Build the center section directly over the plan with the spar doublers in place. Plank the top with 1/16" balsa, leaving the servo compartment open. When this is dry, join to the outer panels using plenty of glue. Block each wing tip up 1-3/8" at the location shown on the plan. Let dry overnight. The bottom trailing edge planking is now bent up to meet the center section ribs. Score the planking on the top side with a knife so it will bend easier and then coat with glue. Add the rest of the planking and wing tip blocks.

Laminate the landing gear struts as shown on the plan. Bend the 3/32" music wire to outline and use it as a guide for cutting the 3/32" plywood core. When this assembly is complete, shape and sand the struts to a semi-airfoil and glue to the bottom of the wing against the two plywood ribs and rest on the leading edge and front and rear spars.

With the wing upside down, lay a 36" piece of 1/8" music wire on the bottom of the struts and mark where to drill the holes. With this long wire you can eyeball the axle parallel with the leading edge of the wing. Cut a 7-3/4" piece of 1/8" music wire for the axle. Bevel two 1/8" wheel collars to fit on the axle and match the angle of the struts. Use either 2½" Trexler or standard Du-Bro wheels since this is the only place to absorb shock from hard landings.

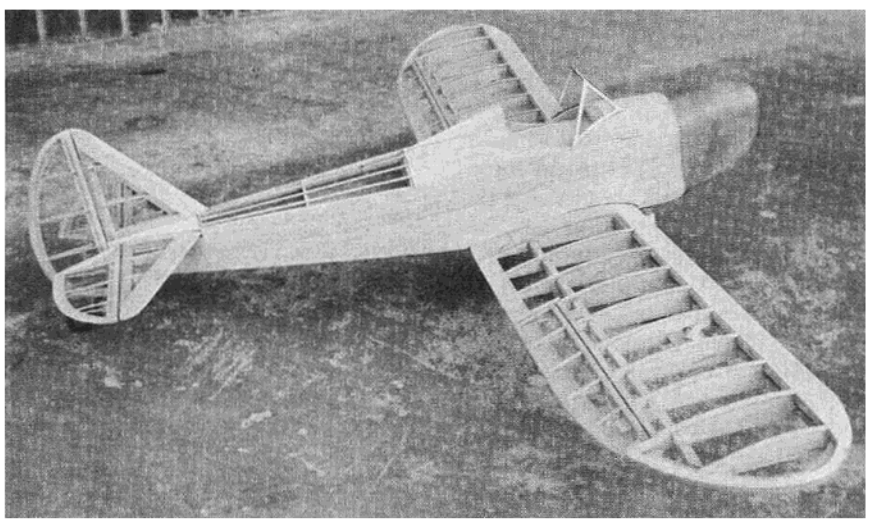
Begin the fuselage by laminating the two sides. Note that the 3/32" sides terminate at the back of the cowling. Glue the 1/32" plywood doubler to the side followed by parts D, C, and B in that order. Add the 3/16" square side stringers to the rear section and install the rudder post to one side. When this is complete, let dry overnight.

One note of caution; when laminating large areas of plywood and balsa, use either contact cement or slow setting epoxy. This will prevent the sides from cupping. Balsa to balsa or plywood to plywood can be glued together with Titebond or any other glue.

Install formers F1, F2, and F3 with epoxy and let dry. Add remaining formers and glue rudder post to other side. Let dry overnight. Glue the motor mounts in place with epoxy and add the servo rails. Be sure there is a 1-7/16" diameter hole cut in former F1. This is about the only way to get a 2 ounce Sullivan tank in this contraption. Glue the 3/32" cockpit floor in place on top of F4 and butting against back of F2. Add 3/32" x 3/16" stringers from F5 to F7.

Pushrods are usually the last thing I do. Maybe I wouldn't dislike them so much if I put them in while I had the room and the opening to work through. On the Fly Baby, I used the nylon-in-nylon pushrod. This is easy to install if it is accomplished early in the construction.

Now you can finish the fuselage. Plank the top of the fuselage with 1/16" sheet and cut out the cockpit opening. Carve and sand the headrest to shape and glue in place. Install the wing with dowels and nylon screws and finish planking the bottom of the fuselage. Build the tail wheel assembly and mount it in place.



The construction of the rudder and fin is simple but time-consuming. It proves out to be very rigid and warp resistant while retaining scale appearance. Begin the fin by pinning down the bottom 3/32" x 3/16" frame outline and 3/32" x 11/16" leading edge planking. The next step is to glue the 3/16" x 3/8" frame on top of the first frame. Slot for one half of a Du-Bro hinge. I cut the hinge pin out and replace with a headless straight pin which can be removed. Glue the hinge and drive two short pins through the frame and hinge. Now glue the top frame outline and leading edge planking. Glue the 1/16" x 3/8" ribs in place.

For the rudder, cut the 1/16" plywood outline to shape. Sandwich this between two pieces of 3/32" x 3/8" balsa with the other half of the Du-Bro hinges. Each piece will have to be grooved 1/32" to receive the 1/16" plywood. Glue one piece of 3/32" x 3/16" leading edge outline. Insert short pins through the hinge before gluing the other 3/32" x 3/16" leading edge. Cut 1/16" x 3/16" outlines from sheet to glue on each side of the 1/16" plywood. Glue ribs in place. Plane and sand to airfoil. Install a plywood plate for the control horn.

The stabilizer is built identically to the fin and the rudder with the exception of the control horn. The 1/16" plywood frame has a slotted area for the 1/16" wire control horn. It also has only one hinge per side and uses two nylon bushings on the control horn, trapped in the fuselage block, for the other hinge point. This works very well.

Cover the entire model with silk or one of the new synthetics I built this model so that all surfaces could be covered and painted before hinging. Install the stabilizer and fairing block before covering the fuselage stringers. Glue the fin in place, leaving the rudder off until later. Give the model one coat of clear dope and let dry for 24 hours. Apply a second coat and let dry about 6 hours. Now apply three coats of color and lightly sand between coats. Make a double stencil for the numbers on the fuselage sides, and a single stencil for the name "Fly Baby".

The colors of the original Fly Baby were predominantly yellow (slightly tinted with orange) and maroon. Maroon areas are the nose, top and bottom of fuselage, landing gear, and leading edge of wing, stabilizer, and rudder. The rest of the plane was yellow. Next to all maroon areas was a white strip followed by a narrow black strip. The aircraft numbers were white with a black border and the name "Fly Baby" was white.

To mix the yellow for the Fly Baby, I used a pint of Aero Gloss Cub Yellow and about 1/4 ounce of Stearman Red. The maroon was made from a pint of Stearman Red and about 1½ ounces of Curtiss Blue.

The windshield was made from a piece of .020 aluminum siding which was anodized maroon on one side and painted on the other. Cut the outline using the pattern on the plans. Clamp between two pieces of hardwood with sharp corners, leaving only the tab showing. Using a block of wood against the tab, bend down. Repeat for the other two tabs. Finish bending tabs flat, leaving a 1/32" gap. Fold the two side frames, using the top view as a guide. File the bottoms to match the fuselage contour. Drill and file out the window frames. Insert a piece of .020 plastic in the grooves and crimp the tabs shut to retain the plastic. Epoxy this assembly to the fuselage.

If the cowl has not been made by now, this should be completed so it can be fitted to the fuselage. Glue the blocks together with part 1A glued to the back. Cut blocks using side and top view as a guide and then start making the chips fly. You may need to use the pictures to get the proper shape on the nose. Sand and work to a smooth finish, using filler and elbow grease. Use the Hobbypoxy Easy Duz-It method and follow it closely. By all means, use a good mold release unless you want to chisel the wood out. Cut out the dummy cylinders and manifolds and epoxy to the cowling. This really adds character to the model. Finish the cowling in the same manner as the rest of the airplane. Glue hardwood blocks to the sides of the motor mounts and on the bottom sides of the motor mounts and on the bottom front of F1 for cowl fastening screws.

For a person who wants to super detail his Fly Baby, I would suggest he obtain copies of the June-July 1963 and August-September 1963 *Air Progress*. From the information in these articles there is no reason why a person couldn't produce a winner for any scale event. Due to time limitations, the model in this article does not have all these details.

An Enya 15 or O.S. 15 or 19 will fit under the cowl quite easily. The motor mounts have 2° right thrust built in. Mount the engine with about 2° down thrust. Install the radio as you desire. Most of the miniature radios will fit with three servos side by side. If not, mount the throttle servo beside the receiver. Since the model has 5° dihedral under each wing, the model should fly satisfactorily using the small Galloping Ghost outfits on rudder and elevator. Use a 2 oz. Sullivan tank and you should be ready to fly. Good luck!

MATERIALS LIST
FLYBABY

Fuselage
- (1) 3/32 x 4 x 36 Balsa (sides)
- (2) 3/16 sq. x 36 Strip (side stringers)
- (1) 3/16 x 3/8 x 36 Spruce (servo rails)
- (1) 3/16 x 3 x 36 Balsa
- (1) 1/8 x 6 x 12 Plywood (formers)
- (1) 3/32 x 6 x 12 Plywood (formers, D.H. braces)
- (1) 3/32 x 3 x 36 Balsa (formers & planking)
- (1) 1 x 2 x 6 Balsa Block (soft) (stab. mount)
- (1) 3 x 4 x 6 Balsa Block (soft) (cowling)
- (1) 3/32 x 3/16 x 36 strip
- (1) 3/8 x 3/8 x 12 Hardwood Motor Mount
- (1) 1/32 x 6 x 12 Plywood (side Doubler)

Wing
- (6) 1/16 x 1/8 x 36 Balsa Strip (cap strips)
- (2) 1/16 x 4 x 36 Balsa (ribs & planking)
- (2) 3/16 sq. x 36 Strip (spars)
- (2) 1/4 sq. x 36 Strip (spars)
- (1) 1/16 x 1 x 36 Strip (T.E.)
- (1) 3/16 x 3 x 36 Sheet
- (1) 3/16 Dia. Dowel x 36
- (1) 1/2 x 1 x 6 Block (tips)
- (2) 1/4 x 1/2 x 36 Balsa Strip (L.E.)
- (1) 3/32 x 6 x 12 Plywood (tip outline)

Stab., Elev., Rud. & Fin
- (1) 3/32 x 3 x 36 Balsa (sheeting & framing)
- (2) 1/16 x 3/8 x 36 Strip (ribs)

Landing Gear
- (1) 1/16 x 6 x 12 Plywood
- (1) 3/32 x 6 x 12 Plywood
- (1) 3/32 x 36 Music Wire

Miscellaneous
- (1) Pair of 2½ Du-Bro wheels or Trexler wheels
- (1) Piece of covering material or 1 yard of silk
- (1) Pkg. of Midwest Horn & Bell crank set
- (1) 1" Perfect wheel.