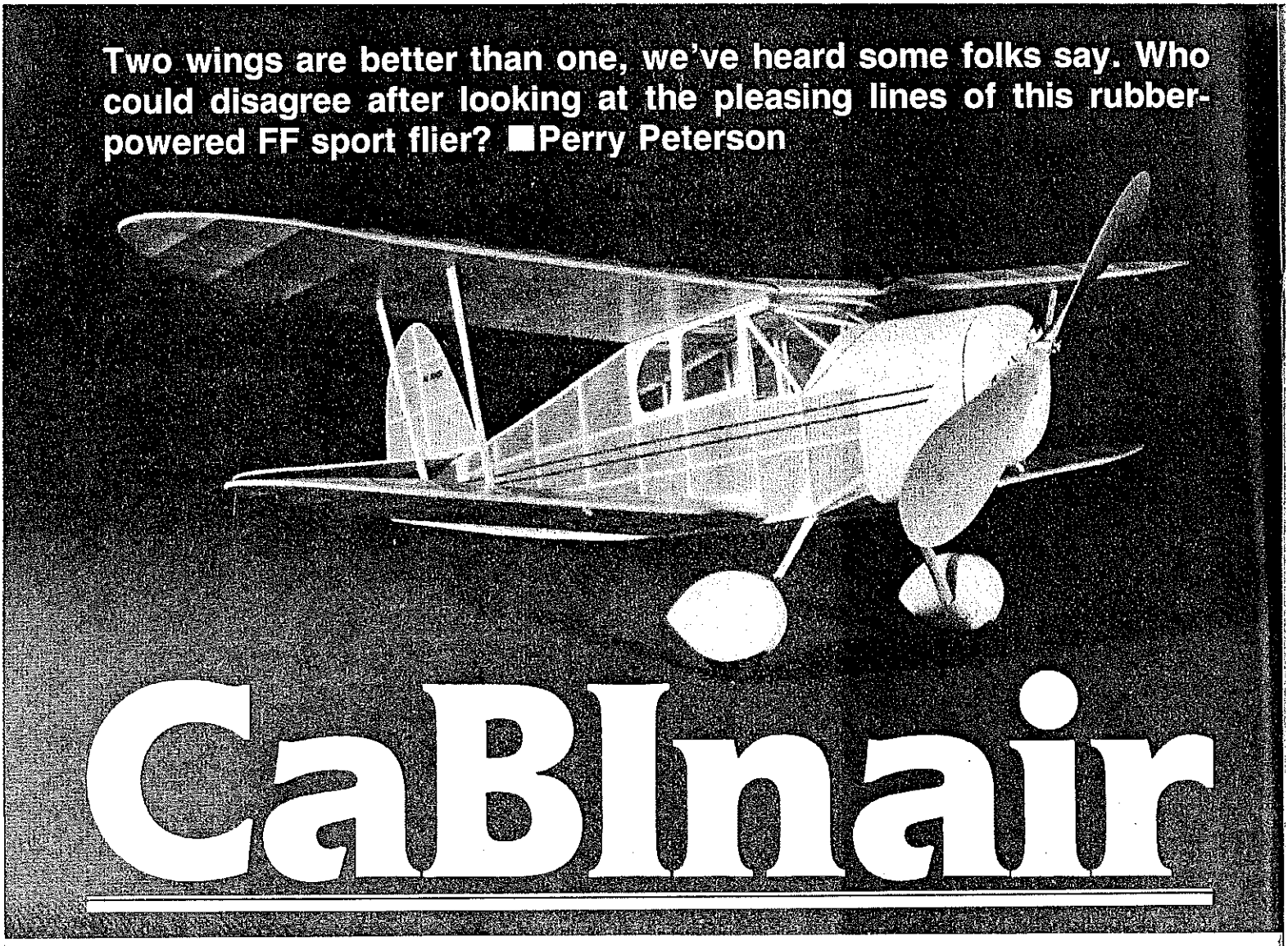
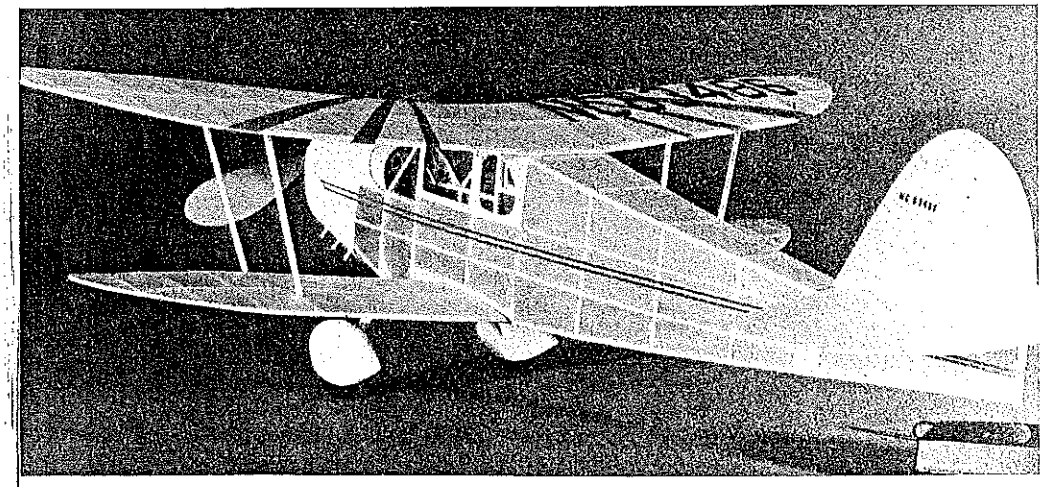
Two wings are better than one, we've heard some folks say. Who could disagree after looking at the pleasing lines of this rubber-powered FF sport flier? ■Perry Peterson



CaBInair

FREE FLIGHT SCALE or sport modelers who are not stirred by the sight of a rubber-powered biplane in the air are few indeed! From my own experience I can say that one of my biggest thrills in modeling is the successful launch and flight of a biplane built by my own hands, obeying the commands built into it.

After completing a construction article based on the Sig Cabinaire kit (see Bostonair, *Model Aviation*, June 1988), Larry Kruse suggested another project based on the Cabinaire. Larry said the great flying Cabinaire seemed to just beg for another set of wings. I hadn't thought of it myself, but I knew immediately he was right and that I just had to do it! In a weak moment Larry also agreed to help give the project a name. Since I have always had a problem thinking of names for my projects, I jumped at the chance. I think he came up with a great name, CaBInair. Now, with all due apologies to Paul McIlrath, designer of the fine Sig kit, here goes another Cabinaire variant.



Top: It sure looks like it could be a model of an airplane from aviation's Golden Age, but it really is a variation on Paul McIlrath's Cabinaire theme. The lower windshield line is colored self-stick tape. Above: Doll up your model! Detailing such as exhaust pipes, instrument panel, and fuselage stripes is easy to do, doesn't put on very much weight, and adds a lot of class.

Just as the Bostonair was not an exact reduction of the Cabinaire, this is not a true enlargement. It is larger and captures the Cabinaire flavor, but really it has a lot of differences.

This plane is designed as an outdoor model, so select balsa materials accordingly. Fuselage longerons, wing leading edge, etc. should be firm and strong enough to do the job properly. Fuselage uprights and crosspieces aft of the wing area (with the exception of the rear motor peg) should be of fairly light balsa. The landing gear and wing mount areas need firm balsa. The nose is also a good place for heavier balsa—most models need added weight in the nose to balance for flying anyway.

Even if you are fairly new to this type of modeling, you will soon develop a feel for balsa strength and grain type required for each part of the model. A very good study of the grain found in balsa and its uses is included in the Sig catalog.

Fuselage. Cover the plans with thin kitchen

#611

wrap. Build two fuselage sides, one over the top of the other. For the next step, prepare a single-edge razor blade. Cut it in half (I use dissecting scissors), creating two narrow blades. Apply a strip of masking tape to the cut end to protect your fingers during use.

When the fuselage side frames are dry, separate them carefully (with one of the blades you just made), starting at the front and working aft. Do not separate at the tail post. Leave the tail post glued to help keep things lined up properly during the next step.

Add the crosspieces, working forward. Make sure the sides are exactly vertical. Also keep the sides symmetrical by following the top plan view. Glue in F-1, then add F-2 through F-5. Add stringers between F-1 and F-3 and between F-1 and F-4. Also add the stingers between F-5 and the landing gear area cross member.

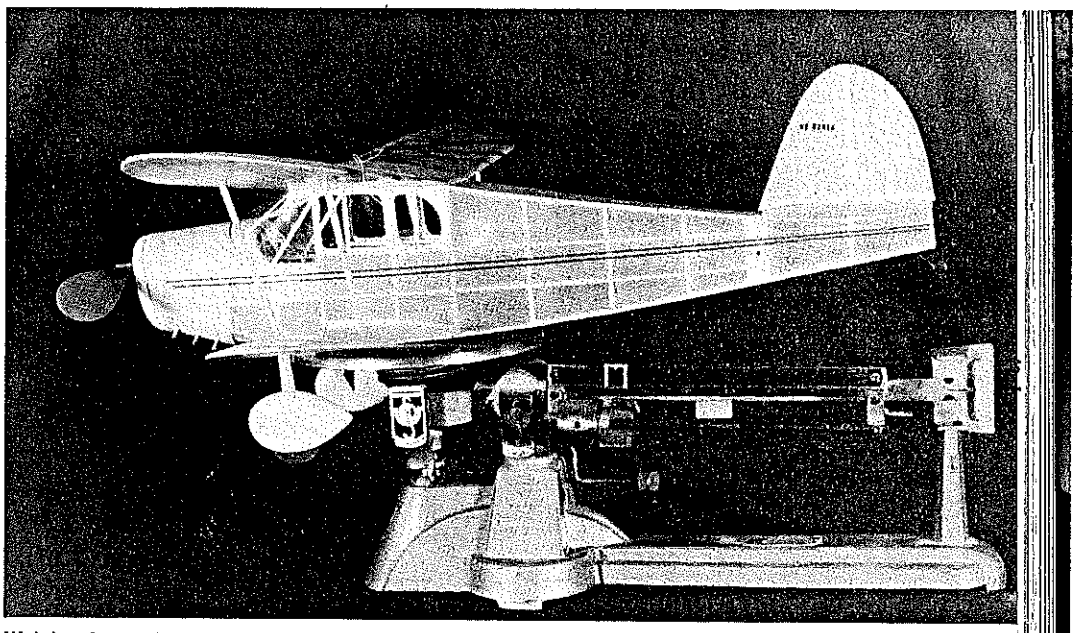
The cowl top and bottom are covered with 1/32 sheet balsa. Make a paper pattern. Check the pattern for exact fit before cutting the balsa. Soak the balsa in water laced with household ammonia until it will bend to the required curvature with ease. I use about 30% ammonia and 70% water.

When the top and bottom cowl wrappers are in place and the glue is dry, apply sanding sealer. At the same time, also brush sealer on the underside of the 1/32 balsa to keep it from warping or sagging between the formers after everything dries.

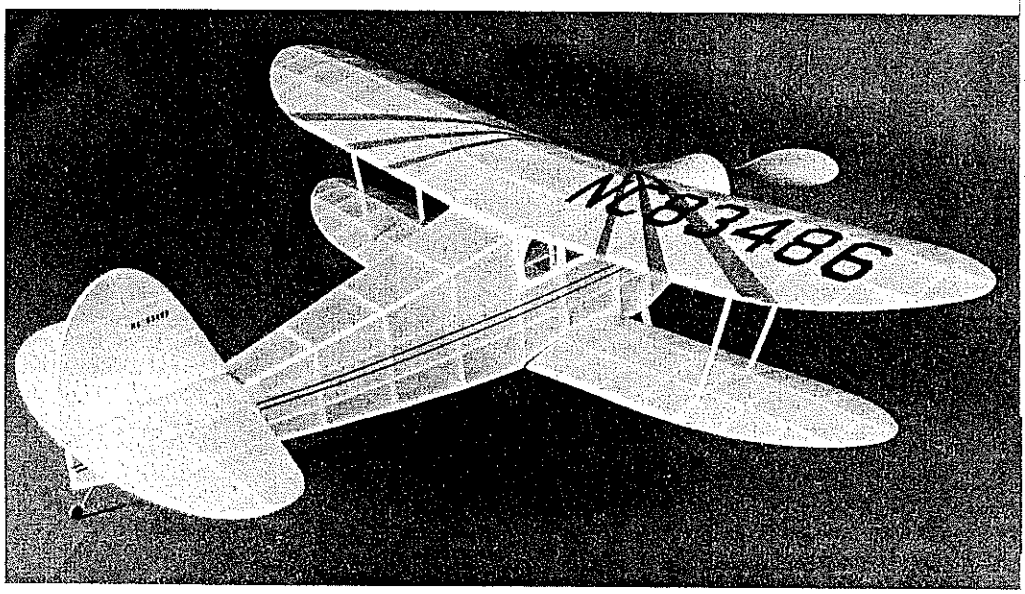
In the interest of simplicity, you could omit the fuselage stringers, but they will add some strength to the structure and a lot of character to the finished model.

Bend the .031 music wire landing gear using the pattern on the plan. Sandwich this wire between two L-1s and clamp tight until the glue dries. Cut the wheel pant pieces from soft balsa, then laminate and carve to a streamline shape. Make the wheels from balsa using a balsa circle cutter. Laminate each wheel with the wood at cross grain.

Model is sent off to a good flight from a hand launch by the author in a stiff breeze. It's a good windy weather flier, though adjusting is best done when there is little or no wind.

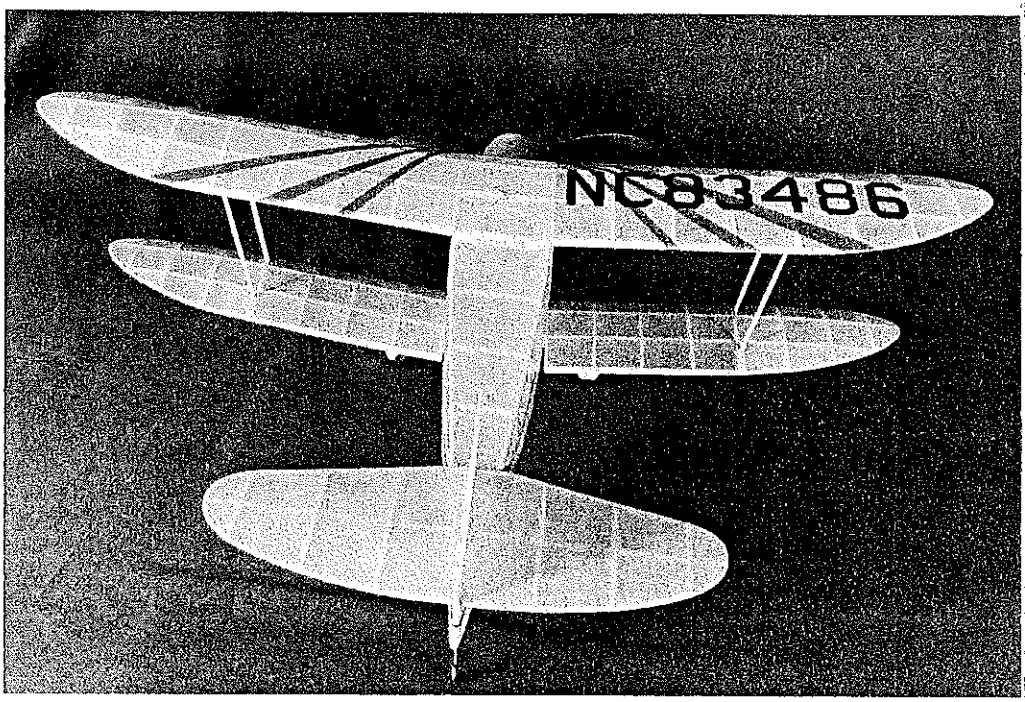


Weight of materials used to build the model is important. Keep it light for best flying qualities, especially aft of the wing. The author's model weighed just 1¾ oz. without the rubber motor.

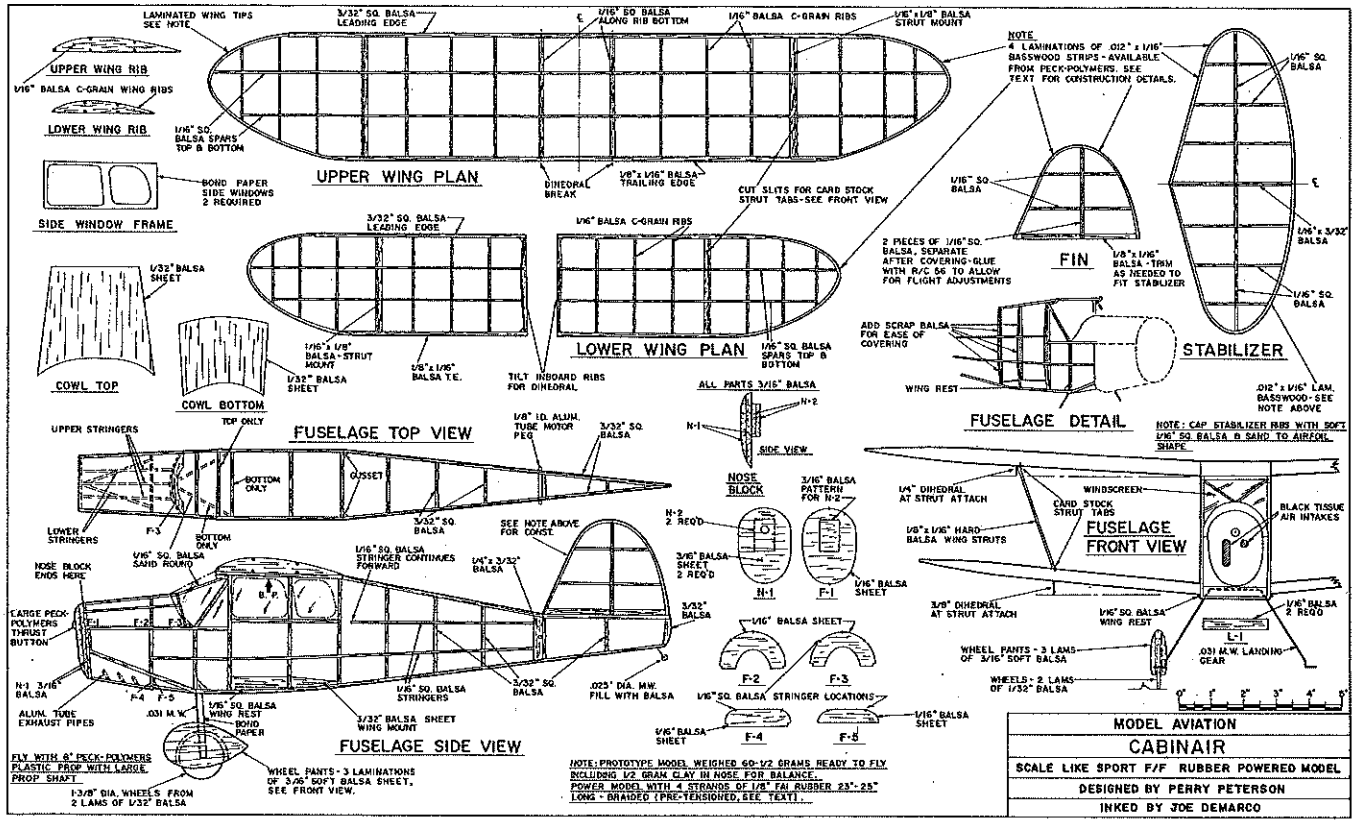


Scalelike qualities of the CaBinair are evident from this point of view, as are the good proportions for Free Flight flying. Registration numbers on the wing are the author's AMA numbers.

Graceful outlines please the eye. Sunburst pattern (and registration numbers) are cut from tissue and laid in place. Dope thinner is then applied for adhesion to the doped surface beneath.



Full-Size Plans Available . . . See Page 194



Cut a groove in the back of each wheel pant so the short vertical portion of the landing gear wire can be recessed. After the wheels are sanded, sealed, and painted black, trap them in the wheel pants with the landing gear wire, then apply quick-set epoxy sparingly to the place where the wire is recessed in the wheel pant groove. Attachment in this way will prevent your pants from 'falling down.' (Before I used this method, it was always a pain to constantly have to tilt the pants back to the right position. Either the front or the back would sag down after each flight.)

Brush on three or four coats of sanding sealer to the wheel pants and allow to dry; sand between coats before adding color. Cover the wheels with masking tape. I painted my wheel pants with Pactra yellow enamel spray can paint sold with plastic model supplies. Spray on with a couple of easy, light coats; use just enough to cover, as this paint can add weight in a hurry.

The landing gear assembly can now be glued to the fuselage at the location shown on the plans.

Flying surfaces. The curved outlines are made using four laminations of .012 x 1/16 basswood strips available from Peck-Polymers. Using the plan, trace the inside of the curved outline on a sheet of bond paper. Make a template by transferring this pattern to a piece of poster board. Coat the edges of this template with wax to help prevent sticking during the laminating process. If you use a crayon (as I do), select a light color, as a dark color transferred to the basswood won't look so good.

Dip the basswood strips in water so they will bend easier—no need to soak. Stack the strips and tape to one end of the template. Slowly pull the stack of strips around the form, applying steady pressure as you go, and tape to the other end. Apply thin cyanoacrylate glue (CyA) to both edges of the basswood, allowing the glue to penetrate between the strips by capillary action. Round the edges of the basswood with sandpaper before removing from the form. These strips are now ready to pin in place as you build the flying surfaces over the plans.

Cut the wing ribs from lightweight C-grain 1/16 balsa sheet. Pin the 1/16 x 1/8-in. trailing edge to the wing plan. Pin the ribs to the plan, gluing to the trailing edge. Line up the wing spar notches on the tip ribs, and trim the front and back of the ribs as needed. Add the hard balsa 3/32 leading edge and the 1/16 balsa spars. Cut the tip rib spar notches deeper, as needed, before adding the spars at the wing tips.

When dry remove the structure from the plan, and final-shape the tip ribs as well as the leading and trailing edges. Constructing tapering wing tips in this manner assures smooth wing tips. Build the top wings and center section in one piece, propping up the wing tips for the amount of dihedral marked on the plans.

The tail surfaces are built over the plan using medium-weight 1/16-sq. balsa stock and the curved outlines of laminated basswood.

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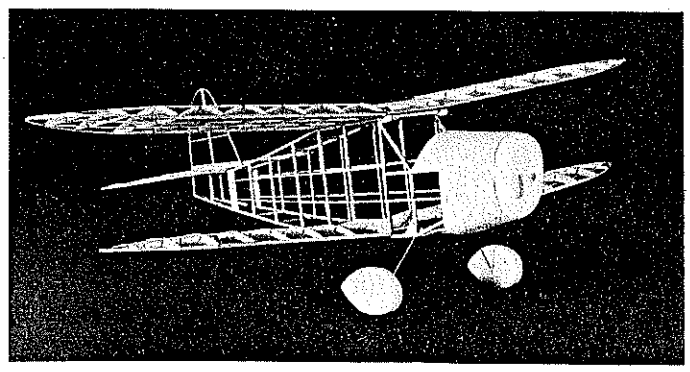

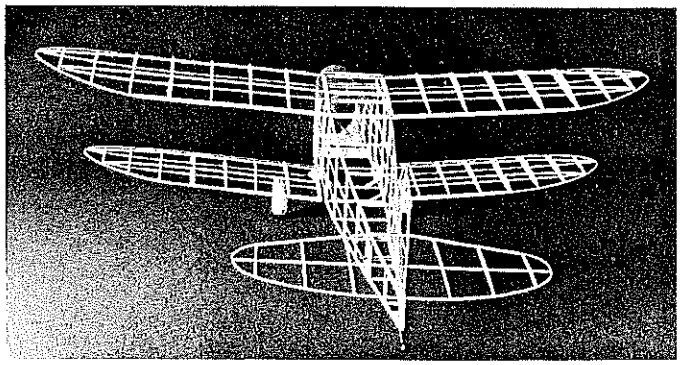

Fuselage stringers strengthen the structure and add to its pleasant shape. Wheel pants should be made from the lightest balsa you can find. Overall, the structure is both light and strong. Curved wing and tail outlines are easy to do with the lamination method described in the text.

and yet it was also very functional.

Just three months after his victory at Cleveland, Rudy Kling and Frank Haines were victims of a fatal crash at the Miami Air Races. All of us were stunned and felt a terrible sense of loss.

Kling and Haines, who had been one-two at the start of the Miami race, both stalled out at the first pylon turn. Although I have never seen it mentioned in other accounts, the *Chicago Tribune* reported that gusty winds were present. When racers are in a tight pylon turn they are likely near the stall speed, so that a wind shear of several miles per hour could produce the fatal stall. Also, in the excitement of a close race a pilot could easily exceed safe flight limits.

It's possible, too, that Jupiter was very marginal in stability: The SK-4, a later design which was very similar to Jupiter, also crashed killing the pilot.

Most articles mention that Rudy was relatively inexperienced, with rather low overall flight time. Yet, having flown Suzie in several races and Jupiter at least several times, he unquestionably had acquired considerable piloting skills. Anyone who could fly a high-speed plane with narrow-tread gear and tiny wheels off dirt fields clearly has what it takes. Moreover, experience is no guarantee against disaster. Veteran air racer Art Chester was killed in a pylon turn in a much more docile aircraft than Jupiter had shown itself to be.

When the Jupiter crashed, the red spinner popped off, hardly damaged. Fritz Kling kept it in the garage for years. After the war, several of us who rode Harleys were in the habit of stopping at the garage to gas up and talk with Fritz. That red spinner would remind us of the days that used to be.

Rudy was quite a bit older than I was, but although I didn't really know him well I had plenty of opportunity to form some impressions. He was rather short and of average build. He was quiet and neither stuffy nor arrogant. Rudy always had a friendly grin, and he willingly and cordially answered questions put to him by a scrawny farmboy in bib overalls.

CaBInair/Peterson

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Covering. Prepare for covering by brushing clear dope anywhere you plan to glue the tissue (the outside framework where you plan to apply each piece of tissue). Without this dope application, the glue and water solution used to attach tissue will seep into the wood too fast, causing warped flying surfaces and requiring a second application during the covering process.

Select a good quality tissue for covering. I used yellow Japanese tissue from Old-timer Models. Make sure the tissue grain is spanwise on the flying surfaces and lengthwise on the fuselage. If you can't tell the grain direction by holding up to the light, try a small tear in the tissue. It will not tear as easily or as straight against the grain. Try to avoid the heavier domestic tissues which have little or no grain characteristics. Such covering tissue may be available in more colors, but it is heavier and does not manipulate as well.

Use a soft water color brush to paint on a solution of 50% white glue and 50% water to the outside of the framework for each area to be covered. Lay the tissue over the framework and gently pat down and pull out wrinkles as you go. When dry, carefully trim away excess tissue with a sharp razor blade. Do not cover the lower wing mount area, because the glue used to attach the wing will not bond well enough to doped tissue.

When everything is covered, shrink the tissue by misting with water. Do not saturate; all you want is just a little sag in the tissue. I use a plastic spay bottle with adjustable spray nozzle sold at garden supply counters.

Finishing. Brush on a thinned coat of non-shrink dope. Sig Lite-Coat is a good butyrate dope, and Old-timer Models sells a good non-shrink nitrate dope. The wing sunburst stripes were cut from red tissue. They were laid in place and dope thinner brushed on to soften the dope underneath and create a bond. Numbers were then cut from black tissue and applied in the same way.

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Trace the windshield pattern on bond paper, and test fit it. When you have a good fit, transfer the pattern to acetate. Attach the windshield to the model by applying RC/56 glue sparingly to only the back and lower side portions. Do not apply glue to the bottom front of the window where it comes up around the cowl top. (Glue applied to the top of the cowl is not needed to hold the acetate and will only leave an unsightly mess.) After the glue on the lower sides and back of the windshield is dry, glue the top to the fuselage cross member at the wing front location. I used 1/32-wide red adhesive-backed RC decorating tape for the stripe on the windshield bottom.

The side window frames are cut from bond paper. Paint them the same color as the fuselage, and glue thin acetate sheet to the back side. Glue this window assembly in place on the fuselage.

The fuselage stripes are from 1/16-wide red adhesive-backed decorating tape sold in the RC model supplies department. Fix these strips with hot air from a blow dryer. Decorating tape sold with drafting supplies usually does not stick as well and generally will not withstand as much handling on the side of the fuselage.

Final assembly. Attach the top wings in place on the fuselage by applying glue to the four corners of the center section. Glue the horizontal tail in place, making sure everything is straight and true. Measure from the tips of the wings to the tips of the tail on each side to be sure of squareness. Also check by sighting from the back of the plane to the front.

When dry, turn the plane upside down, and attach the bottom wings. The card stock strut tabs fit into slots in the wing strut mounts. When the horizontal stab and wings are straight and true, glue the vertical tail in place. Do not apply glue to the rear rudder portion to allow for flight changes at the flying field.

Pretension (braid) the motor. Make up a motor using four strands (two loops) of 1/8-in. FAI Rubber about 25 in. long (if you use Sig rubber, you will need 3/16-wide, as it is not as thick). Lubricate the rubber before inserting in the fuselage. I use Roger Taylor's lube available from Peck-Polymers. It does not contain castor oil which can attack the rubber after a short period of time.

Install the motor in the plane, and hold the end of one of the loops on your little finger. Put the other loop on a winder and crank in about 75 to 80 turns backwards. Change loops, and wind in the same number of turns backwards in the second loop. Be sure you crank in the backwards winds in each loop separately.

Now put both loops on the winder and wind as if to fly. Hold the model carefully and let the prop unwind. Remove the nose block and inspect the motor. It should appear to be braided and not be bunched up in the tail or nose of the plane. If the motor is too tight to allow the prop to freewheel when unwound, remove the motor and start

over, using less backwards turns separately in each loop.

Flying. Wind in about 200 turns. Lock the prop with a pin in the rear of the nose block, and balance the model at the point shown on the plans, adding clay to the nose or tail as needed.

Select a calm day for test flying. If there is a wind, it should not be more than two or three miles per hour in order to properly trim the glide portion of the flight. Wind 200 turns in the motor and launch the model into the wind. Observe the glide. Trim the glide path by adjusting the tail surfaces.

Biplanes are not known for graceful, long, flat glides, but the descent should at least be flat. My CaBInair has the nicest glide of any biplane I have ever seen fly. When you are satisfied with the glide, launch with 300 turns to begin evaluating the powered portion of the flight. There is downthrust built into the model, but in case of a power stall, the amount of downthrust will need to be increased.

Trimming out a new model should be painless if you establish the glide first by moving the tail surfaces and then establish powered flight with thrust adjustments. If the powered flight requires changes in the stabilizer or rudder, you will need to go back and re-establish the glide.

Increase power in slow steps as you work on powered flights. These increases should not be more than 100 additional turns as compared to the last flight. If more than this, the plane may not be ready for the higher power and could spiral into the ground with enough speed to severely damage your plane. Patience is the key word here. Never try more than one adjustment at a time. You took a lot of time to build the model, so take a little more to make it fly well. After proper flight trimming, planes like this are seldom damaged while flying.

My CaBInair is a great flier. It is very stable, and the glide is a very satisfying flat, gentle descent that adds nicely to the length of a flight.

The prototype's original flight pattern was left under power and right in the glide. I changed to a right power pattern to match the glide for two reasons: A right power pattern will gain more altitude, and with the power and glide patterns in the same direction, I don't have to walk as far on most flights to retrieve the model!

Once your model is flying well with the ⅛ x 25-in. four-strand motor, you can work with a different rubber size and motor length depending on the final weight of your model and the size of your flying field. Experience the thrill of watching your CaBInair climb high with the sun shining through the tissue as it cruises over your head. It's a joy!

Dragonfly/Hunton

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parts and subassemblies smooth, breaking and rounding sharp edges. Parts can be preprimed at this time with sealer or clear dope.

Attach the ⅛-in.-sq. hardwood front and back wing reinforcement strips to the main wing panel over wax paper on a flat building board. Use a pencil to draw accurate lines to locate the tail booms. Glue the booms into place on the wing, noting that the inboard wing is longer than the outboard panel. Attach the horizontal stabilizer to the three booms. Add the bellcrank mount, rudders, and wing tips (the tip with the holes goes on the left side, the holes positioned on top).

Glue the firewall fairings in place, using the solid member for the top. The two remaining pieces mount either side of the center tail boom on the bottom.

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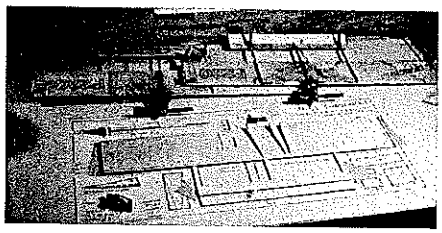

A new Dragonfly just off the board and two well used but serviceable prototypes in the background. With cyanoacrylate and accelerator, repairs of most any kind can be made at a contest or even during a match. The author was involved in a match where both models got clobbered and had their engines knocked off. Both contestants had the engines back on and their models back in the air doing battle again all before the clock ran out on the match's five-minute time limit.