"Pixie" Bipe's for Radio Control

■ If you thrill to the sight of a trim little scale Biplane in flight, this is your cup of tea Combining the appeal of design styling used in popular sport Biplanes of the past, the little "Pixie" bears marked resemblance to such greats as the "Stearman," "Fleet Trainer," "Great Lakes" and "Waco". This airplane is intended for the modeler that wants to enjoy the flying of a stable, compact, eye-catching Half-A powered, radio controlled model within the confines of a relatively limited area.

The model pictured, using a currently popular transistorized receiver weighs in complete at 19 ozs., giving a wing loading of approximately 9 ozs. per square foot. This light wing load coupled with any eager .049 engine results in a most gratifying flight performance. Using a Babcock Mark II Escapement modified to give 4 positions (a la Ken Willard in A.M. March 1958), "Pixie" has performed some well-mannered, hair-raising stunts.

By now your favorite T.V. program is over, so clear off the workbench and with grim determination hang a "Do Not Disturb" sign on the shop door and away-we-go building this little beauty!

As is the case with all small lightweight models, the proper selection of balsa in weight and hardness for the construction is very important. Let's, therefore, start our model correctly by carefully selecting the balsa as called for on the plan. Once we have our material selected we can get into the cut-and-glue part of the construction.

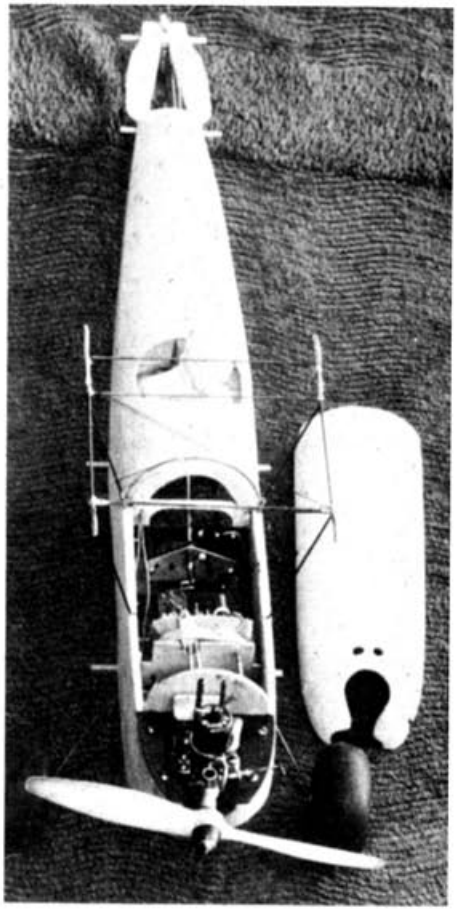
FUSELAGE: Building the fuselage is our first project. Sides are cut from 1/16 sheet balsa as shown. Cut the 1/8 sheet reinforcing doubler and carefully glue in place. The bulkhead stations are then cut with wood grain as per plan. Your plan should be protected prior to working on by covering with wax paper.

After glue has throughly hardened, place fuselage sides inside to inside and glue ends to tail post. Invert sides to be on edge and bottom up and before glue at tail post hardens and glue position bulkhead station #4. Carefully align this inverted assembly. After glue hardens additional bulkhead stations are then glued in place consecutively from station #4 forward to #1. When all are permanently in place, glue 1/16 sheet bottom on fuselage. Allow bottom to overlap sides so that when dry it can be neatly sanded flush to the sides. Your fuselage can now be handled and will remain in alignment.

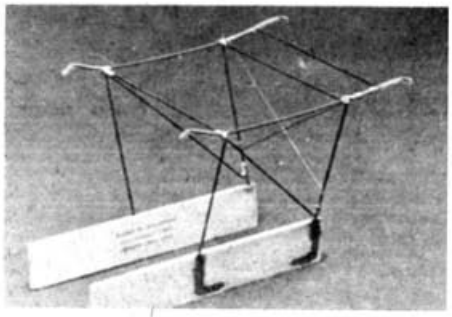
Escapement, torque rods (1/8 aluminum tubing with wire imbedded at ends) and tail skid with post are installed. Cowling and turtle deck bulkheads are glued in place, then carefully sheet covered as shown. Carve outside contour of nose block to blend with adjoining surfaces of fuselage, then hollow out inside to wall thickness of approximately 1/8". *DO NOT GLUE* in place at this time. Build removable hatch cowl with internal construction to suit your taste allowing space as needed for R/C equipment to be used. Drill holes located as shown for the 1/8" diameter anchor dowels; install small eyelets in fuselage bottom that landing gear hooks thru. Attach stab, mounting pads with glue to fuselage sides where shown and cut out passage shown for winding hook and cover. Reinforce around this passage by gluing 1/32 sheet of plywood inside the fuselage as indicated. This completes fuselage construction for this stage.

CABANE CENTER SECTION: Form .040 diameter wire sections as shown. Mark in pencil on doublers exact outline of where wire ends are to be anchored. By heating these ends and pressing firmly against doublers, a groove the exact shape of the ends is burned into the balsa the depth of the wire diameter. Tightly wrap wire ends with thread as shown, apply glue and allow to dry. It is advisable that a wood block 2-3/8" wide be used as a base upon which to assemble and solder the unit. In this manner clamps can firmly hold correctly positioned doublers against block with burned faces out. The wire ends are glued and tightly clamped into their respective grooves and allowed to dry. Remainder of the wire assembly is bound with wire and soldered in place.

(*Continued on page* 62)

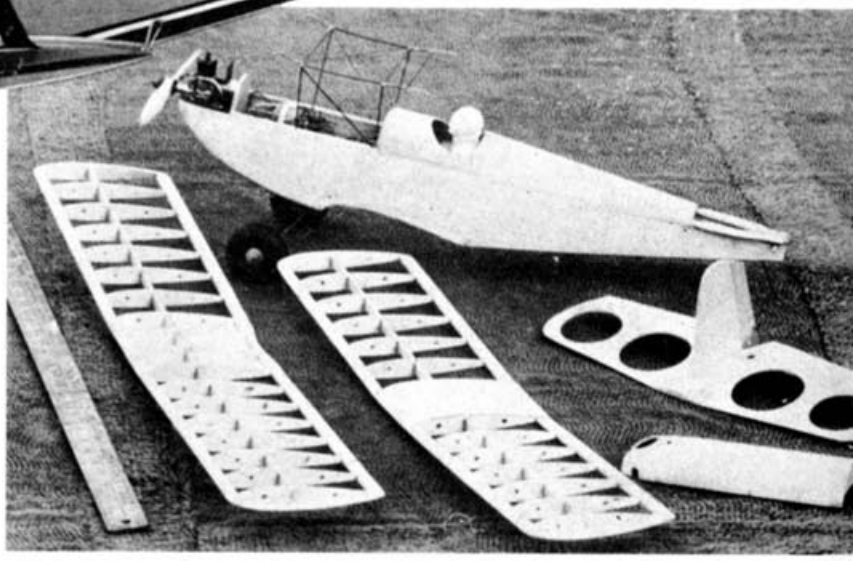


"Bird cage" cabane center section, extremely light and strong, is built separately. Power dept. above.

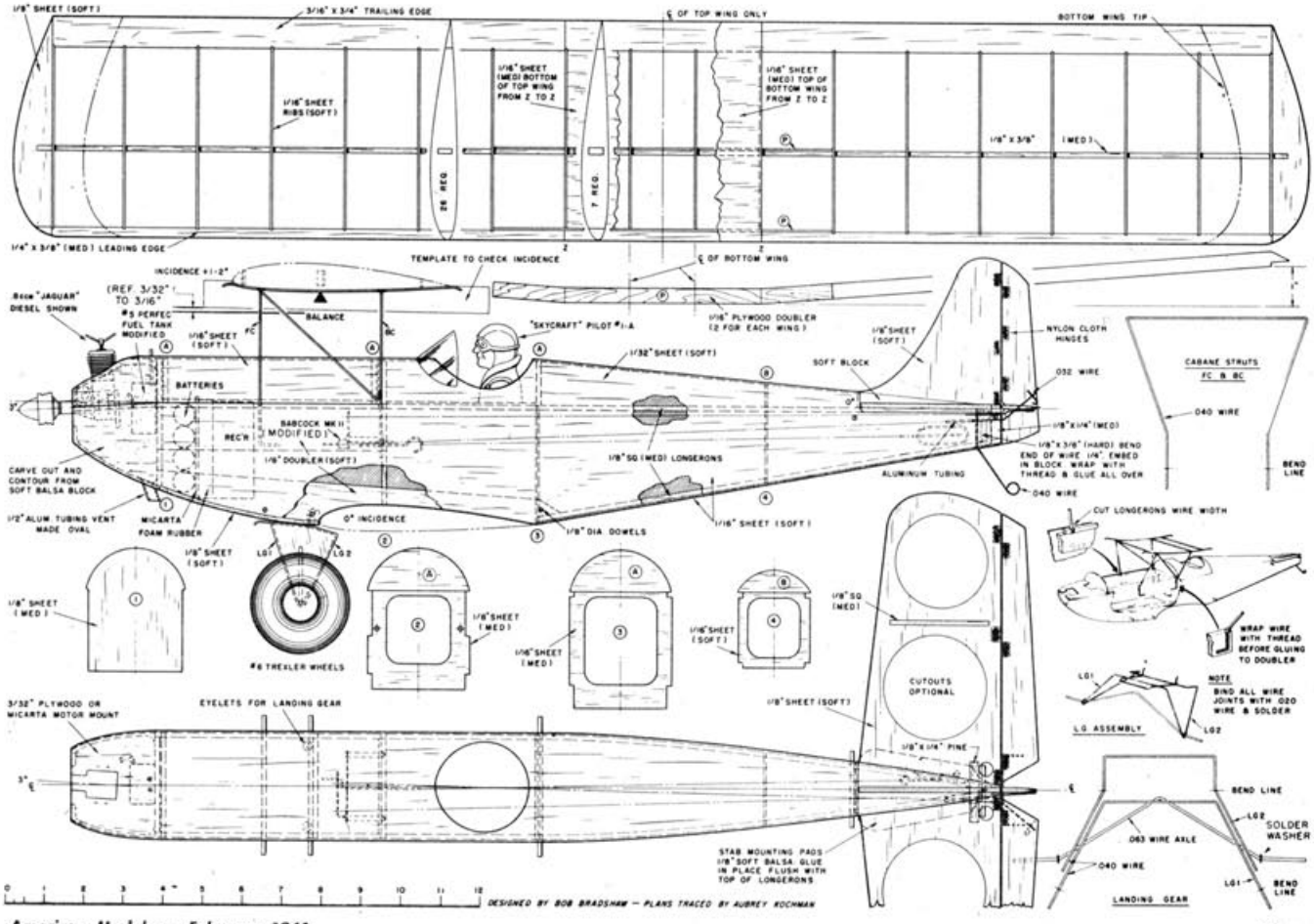


Rugged Bipe for .049 to .075 Power.

Designed and flown by Bob Bradshaw



Engine and fuel tank are part of removable assembly. Roomy radio compartment permits easy access for adjustments. Placement of landing gear assures prototype take-offs and 3-point landings. Full size plans from Hobby Helpers (Group Plan #261, 60c).



Pixie

(*Continued from page 22*)

Remove entire assembly from block and thoroughly glue outer (burned) faces of doublers, carefully position into their proper places within fuselage. Notch out longerons as required to accommodate wire struts. Doublers should be firmly clamped against the fuselage insides. Liberally apply glue to adjoining doubler and bulkhead joints. Nose block glues into place, its contour finished to blend with the fuselage by sanding. Sandpaper entire outer surface of fuselage and hatch cowl to a smooth finish. Receiver antenna is glued to bottom of fuselage.

LANDING GEAR: The plans are self-explanatory on the wire forming and assembly of the landing gear. Be careful to form the wire exactly to plan and no trouble should be encountered.

EMPENNAGE: The vertical fin and stabilizer are made from 1/8 sheet soft balsa. First key strips of 1/8 square balsa are imbedded with glue into cut slots in stabilizer sheet material as shown. If lightening holes are desired in stabilizer, they are cut out and sanded, also sand key strips smooth and flat with rest of surface. Lastly, exact outline stablizer is traced on balsa and cut out. Cut vertical fin and sand smooth; round all edges on both vertical fin and stablizer. Form empennage fairings to match top contour of turtle deck as it blends into fin and stabilizer surfaces. Allow for thickness of both vertical fin and stabilizer. Liberally glue fairings into place being careful to maintain fin in correct directional as well as vertical alignment until glue has dried. Rudder and elevators are cut from 1/8 sheet soft balsa and sanded to streamlined contour.

WINGS: Top and bottom wing are built in conventional manner. However, since "Pixie" uses a semi-symmetrical airfoil, extreme care must be exercised in obtaining alignment of wings prior to covering. The following procedure has shown excellent results in retaining alignment of the wings during their construction.

First the ribs are made by cutting via a template or preferably by sandwiching sheets of 1/16 soft balsa between two (2) metal templates and sanding to shape. This manner of producing ribs requires an initial investment of time and effort to first make the templates (use .040 aluminum); however, once these are made the ribs can be quickly produced and all identical. This twofold advantage more than compensates for the initial effort. Select straight grained spars and cut them to proper length and shape. Cut 1/16 plywood doublers and spars for center sections. Lay spars out on plan so angle of dihedral is duplicated. Glue plywood doubled to spars (left and right wing panel) so the spar is one complete unit. Duplicate this procedure for other wing. Also lay out leading edge on plan and glue respective plywood doubler in place. This permits the leading edge to duplicate the spar for dihedral. Again duplicate this procedure for the remaining wing.

Carefully mark the locations of the ribs on both leading and trailing edges and using either a file edge 1/16" wide, or two hacksaw blades taped together, cut notches exactly 1/16" deep into both trailing and leading edges to receive the ribs. Assemble correct number of ribs onto spar to form center section and using your plan for a guide, carefully glue these ribs into their respective leading and trailing edge so that the center section is true to a flat surface. Glue ribs to spar. When dry you may assemble remainder of wing. Working with one panel at a time glue only the leading and trailing edges of the ribs into place, again being certain that wing panel is shimmed at both L.E. and T.E. true to flat surface.

Only after all ribs are securely attached to both L.E. and T.E. and the glue joints are thoroughly dry are ribs then glued to spar. Glue wing tips into position and when dry trim both L.E. and T.E. to match tip contour. The 1/16" sheet balsa planking is formed and glued into position at center section of wings. This reinforcement protects botttom wing against damage by the fuselage in event of movement, and protects underside of top wing against damage from movement of wire cabane center section. Both wings are sanded smooth and set aside to be covered.

COVERING: Cover wings in conventional manner using colored silk. Fuselage and tail surfaces are covered with Japanese tissue of matching color. In this manner weight is held to the minimum. The model shown has six (6) coats of dope, sanding down after each coat from second coat on. As pictured color combination is red silk with black border trim and white pin stripe. For a mirror finish use rubbing compound after the last sanding, being cautious not to rub too hard on corners or where covering might be exceptionally thin. This is followed up with a coat of polishing wax.

Now, who ever saw an open cockpit airplane properly flying without a *pilot!* The "Pixie" shown has a "Skycraft" No. 1-A pilot authentically painted to resemble a goggled daredevil of the Biplane era! Attach pilot to cockpit platform with rubber-type adhesive. 1/8" diameter brown plastic wire insulation, known as spaghetti tubing, is slit thru on one side and cemented into position around cockpit edge to simulate leather padding. Cut out lucite windshield and glue in position with household cement.

If more authenticity is desired, jumbo size soda straws are flattened to a streamlined shape, painted with black india ink and temporarily attached outboard on the wing panels as interplane struts. These may be held in position by bending at the ends and taping to wing surfaces with black plastic tape.

AT THIS TIME — A WORD OF WARNING! Regardless of how carefully a model has been constructed, without precision in alignment, wing incidence and balance, all effort is doomed to disaster when flying takes place. Remember this and follow the next two instruction paragraphs on "Decalage" and "Flying Trim" exactly as given and your "Pixie" will practically fly off the workbench!

DECALAGE: Place model completely assembled on smooth flat surface. Raise tail until the surface the horizontal stabilizer sets on and the top of the longerons at the hatch opening are of equal distance from the flat surface. Place spacer under tail-skid so model will stay in this position. Cut out cardboard templates of bottom half of wing airfoil as given on plan. Temporarily attach these templates by Scotch Tape to underside of both bottom and top wings directly under a rib, preferably midway of each wing panel. Using a 12" ruler check angularity or incidence of both wings and horizontal stabilizer. Botttom wing and stabilizer should be at zero incidence, or in other words, both absolutely flat and parallel. Top wing should have from 1° to 2° positive incidence. This in measurement means that front corner of template is from 3/32" to 3/16" higher than the back as on plan. Shim leading or trailing edges as needed to obtain proper incidence given for all three surfaces.

FLYING TRIM: Although "Pixie" has been designed to balance with little or no weight shifting, it is necessary to make adjustment to compensate for possible weight variance of different equipment being used. Your "Pixie" should balance slightly nose down when supported by placing index finger of both hands under center section at spar location (refer to plan for exact location). Balance adjustment may be made by shifting placement of batteries and receiver forward or aft as required. *CAUTION*: Always install batteries forward of receiver so in event of a hard landing or a crash the heavy batteries will not damage receiver upon impact!

Only after a careful check of decalage and balance are we ready for flight testing.

In order to protect "Pixie" from the scratches and blemishes to its finish so easily acquired during early flights, it is suggested that vulnerable areas, such as underneath nose and wing tips be covered by masking tape. This is particularly advisable if model is to be flown over asphalt or concrete surfaces.

Once our model is thus protected we can perform glide tests. This is best accomplished in a field where the grass is tall enough to cushion a steep landing. Glide testing should be on a day with little or no wind. Hold model at landing gear just under bottom wing and headed into the breeze. Pick out some spot approximately 60 feet ahead of the point where you plan to release the model as a target at which to aim the model. Launch the model while running being careful to *push* the model forward and not to throw it. If you have followed instructions up to this point, you will be rewarded by a surprisingly graceful smooth and steady glide. If adjustment is in order, this should be accomplished by shifting R/C equipment. *DO NOT ADD BALLAST* to achieve balance as it will spoil the flying characteristics of your "Pixie." Once the little model is adjusted to produce consistently smooth glides, we are ready for powered flight.

Again we seek out a large field with high grass to cushion landings. Start the engine and run at an intermediate speed. If your engine is diesel this is easily done by backing off compression and richening the fuel-mixture. If a glow plug engine, put propeller on backwards and run with a rich mixture. Check controls with transmitter and receiver on and engine running. Allow your engine to run until there is only a small amount of fuel left. If the check-out to this point has been satisfactory, hand launch "Pixie" in the same manner as during the glide test. *DO NOT* attempt to control the model in its early stage of flight except in an emergency. Observe the flight characteristics—if model tends to stall, give engine more down thrust—*DO NOT* alter wing incidence—if model fails to maintain level flight even with sufficient speed, reduce engine down thrust. Directional adjustment is accomplished by altering side thrust angle of engine. It is suggested that you adjust your "Pixie" so it will perform a large sweeping left turn, both under power and in the glide. This will save a lot of walking to recover the model in the field and will also minimize the possibility of a lost model due to faulty radio contact.

Once "Pixie" is properly trimmed for flight, it is as stable and dependable as your old Aunt Matilda. You'll be the proud owner of the cutest crate at the flying strip and the center of attention wherever little "Pixie" is flown.