

By M. E. SALVAY . . . Nothing like having the top man do the whole thing. Our excellent free flight scale plane design worked up by one of the design team for the full scale plane.

Author's 12 year old son Bennet proudly displays Pop's creation for the whole world to see—classic lines of the Porterfield can be seen here.

PORTERFIELD

► In the summer of 1968, one of the model magazines had a feature article on the Porterfield “Collegiate” by Don Pratt. I read the article and reread it several times. What nostalgia! First, because I was born and raised in Kansas City; secondly, I worked for Ed Porterfield as a part time engineer in late

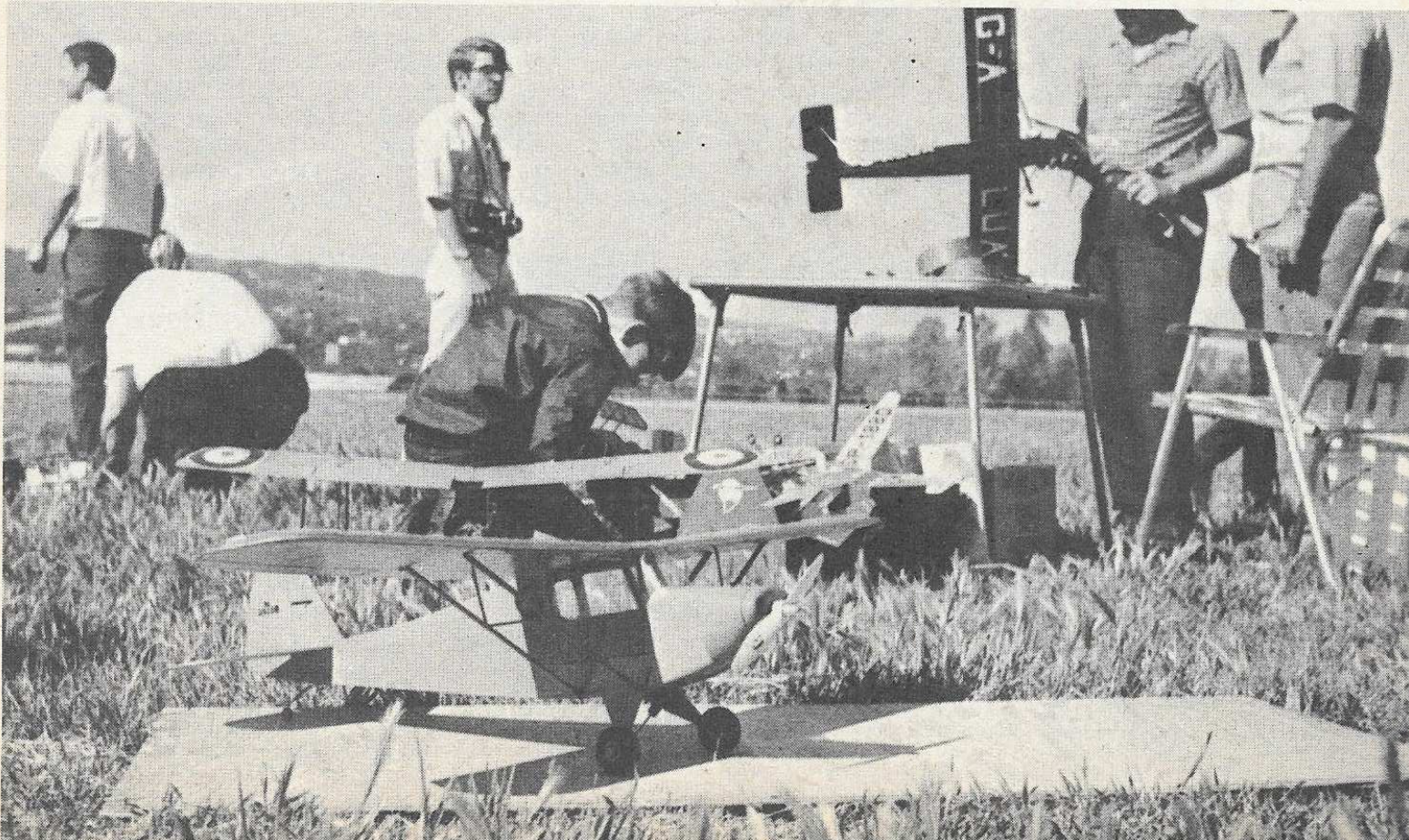
1941, just before the last “Collegiate” was manufactured; and thirdly, because I put many hours of flying in on the LP-65 model in 1946 and 1947, flying out of Culver City Airport in Los Angeles.

As a kid, I rode my bike down to the original American Eagle factory, later

drove a jalopy around to peek in the doors of Ed Porterfield's factory at the three different locations I recall he operated from in Kansas City, Missouri, and finally worked as an engineer with him when he operated from 14th and Chestnut in Kansas City, Missouri. At that

(Continued on next page)

Shades of the middle thirties when we had to ROG (Rise off ground) from plywood sheets as this was the only way we could off of the grass.





And here we have the full scale bird waiting for a driver. Amazing performance from only a 65 hp engine —clean well faired lines the answer.

PORTERFIELD ... CONTINUED

time two different planes were being built, the "Collegiate" and the "CP-75," a slightly redesigned, higher performing plane. Bill Skinner was chief engineer for Porterfield in its final year of activity. I was working for Rearwin Aircraft during the day and "moonlighting" for Porterfield in the evenings. There was a slight scarcity of aircraft engineers in the Kansas City area at the time as practically all the "older" (age 25 to 35) fellows had gone to the military factories in Wichita or St. Louis. So we "younger" type (age 22) had to do double duty. But in winter of 1941, the big military programs finally took their toll of the last private plane construction.

The next meeting with Ed Porterfield was in late 1945, just after I had flown my homebuilt "Skyhopper," which I managed to build in Kansas City during the war years. He wanted to design a

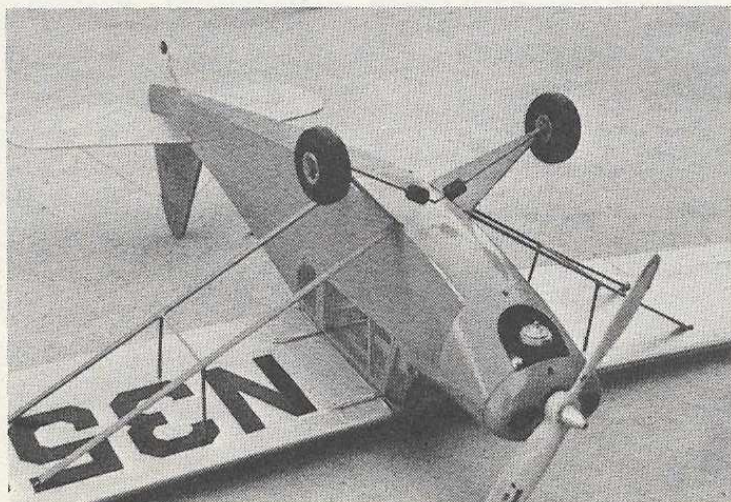
four-place plane and put it into production as a post war project. I guess I was too interested in "fighters" and "bombers" at that time to want to go back to the steel tube days, so decided against staying in Kansas City after the war. It was California for me and the beautiful flying weather.

I can honestly say that I exposed all my potential fiancées' at the time to the Porterfield. If they didn't take to flying, I figured I couldn't take to them! Let me tell you right now don't ever use that condition as a criteria for judging womanly characteristics.

I was very saddened when Ed Porterfield passed away several years later and when Rearwin folded up at about the same time, as it ended many years of private aviation activity in the Kansas City area. Today a number of Porterfields can still be seen at various airports

and are in the antique category. From a pure engineering standpoint, the Rearwins stood head and shoulders above the Porterfields, Cubs, Taylorcrafts, and Aeroncas. I'd say the Porterfields were next in line and then you could toss a coin for third. At least the Porterfield was laid out so you could solo from the front seat, and that was a novelty in pre World War II light planes. About six or seven years ago I built Walt Mooney's 27-inch free flight Porterfield featured in MAN at that time and had many hundreds of good flights. When a decent set of three views came out in publication recently, I was "off to the races." I debated as to an "R.C." or small "free flight." The scale free flight won out as I had the Hong Kong flu one week which was just enough time to build a free flight. How did I know I would have it

(Continued on page 52)



Hadn't ground looped, just placed on his back for a better view from beneath the machine. Note wing holddown rubber bands and engine cooling.



Standing on the tarmac, only difference is a garage instead of the usual hangar doors. Looks real with the oleo shocks and scale trim.

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PORTERFIELD

(Continued from page 18)

for one week? Simple. I had just taken a week's vacation and what else usually happens on vacations, you get sick. Well, that's what happened. Somehow model building is never affected by illness, or so my family claims in my case!

CONSTRUCTION DETAILS

The prototype model and text herein was constructed and written by Mr. Salvay and the model plan was created by Mr. Imrisek.

The model has been constructed reasonable to scale and is about 1/10 size. A "Clark Y" airfoil was used in place of the "M-6" and the horizontal tail was slightly enlarged.

Several interesting model building features are incorporated into the design of the Porterfield which should result in a stronger, simpler and more properly aligned framework. These will be found in the construction features of the wing and empennage. They relate mostly to the knock-off wing panels and the tips of the wing and empennage. This writer has always used silk to cover his models and trying to hold the surfaces flat after five or six coats of dope has always presented a problem. I believe the laminated tip has offered a solution to the problem, as shown on the plans. The plug-on wings are also an obvious necessity if sustained flying of the model is to be had over many months of activity.

In the interest of simplicity, the adjustable horizontal tail has not been included, although this was a feature of my previous Rearwin and Lockheed models featured in 1966 and 1967 MAN issues. Although warping tails to achieve proper power-on and power-off trim is done by most builders, it is not a sure fix as different temperatures and humidities can result in some pretty wild flights. However, as stated, in the interest of simplicity a fixed horizontal is used. Another feature that I have found which improves

flying qualities with minimum dihedral wings is to wash out the wing with 2°-3° twist. I have no real proof as to why it works, but it increases spiral stability quite a bit.

FUSELAGE: Begin with the fuselage side panels. I used hard 1/8 square and constructed both sides simultaneously. This is a conventional method to produce identical panels. Insure that the longeron materials are all of equal stiffness, so as to enable the fuselage to be easily aligned. This is a must.

After the panels have been glued and are dry and prior to further assembly, mark the location of the side stringers by laying over the plans. By the way, use a good grade of fuel proof model cement everywhere except if mentioned otherwise in the instructions. Cut seven pieces of 1/8 square 1 3/4" long to make the cross braces in the cabin area. The cross braces at the landing gear attach points are 1/8x1/4 hard balsa. Assemble the side panels together using pins through the side panel members into the cross members. The two 1/8x1/4 members should be located 1/16 inch up from flush with the lower longeron. This allows for future installation of the gear. Check to be sure the forward end of the framework make 90° planes to firewall, so that the nose blocks and the engine will be properly aligned. After drying, add the two diagonal members between the lower wing surface and the instrument panel cross member. Partially cut the four longerons at section F-F and bend the fuselage together toward the rear. Please note that the top view of the fuselage makes for straight side panels from F-F back to the leading edge of the stabilizer and then makes another break at this point to close at 1/8" width at the rudder post. Trim off—the inside surface of the aft 3/4 inch of the side panel ends so as to not exceed this 1/8 inch width. This will provide a smooth transition into the 1/8 inch thick rudder. Cut firewall "B" from 1/16 plywood and in pencil mark the location of the four 1/8 square longerons. This will help locate the firewall on the fuselage—glue in place. Add former "C" and "D." Glue on side panel "E" to each side of fuselage nose. Make from 1/8 sheet balsa.

Next, glue on the 1/8 x 1/4 vertical stiffeners at section E-E from the wing and attach surface to the lower longeron. Taper as shown in section E-E.

Cover the top of the fuselage between bulkheads "C" and "D" with 1/16 sheet balsa. Now cut ten blocks from 1/4 soft balsa to make up the nose cowl. Four are laminated together to form a side section and with a single top and bottom piece, a hollow nose cowl is formed. Cut one piece of 1/16 plywood to shape of bulkhead "A" and two pieces of 1/4 sheet balsa to bulkhead "A." The balsa parts will have the round prop shaft hole and the plywood will have the wedge cut. This permits the engine to be removed. Glue the plywood "A" to the front of nose cowl blocks. Glue the two 1/4 balsa sheet "A's" together. After drying, position the balsa nose in place and drill two 1/8 inch diameter holes through the entire assembly. Cut 1/8 diameter dowels about one inch in length and glue into balsa nose. The nose block is now removable with the dowel pins from the nose section of the fuselage. Do not shape nose section, as yet, until the landing gear is in its place.

LANDING GEAR: Build the landing gear now. Use 1/16 diameter steel wire and form front and rear legs over the full size templates shown on drawing. Form one brace of 1/32 wire for dummy shock absorber. Make this piece continuous from axle to axle in the Vee form shown for the tubing. It will be cut apart after all soldering is completed. All three pieces of wire are inserted into a section of 5/32 O.D. brass tube and soldered together. Notch lower longeron and tie landing gear into place securely wrapping to the lower longeron and the 1/8x1/4 cross braces; cut the excess portion of the 1/32 wire Vee away.

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DUMAS

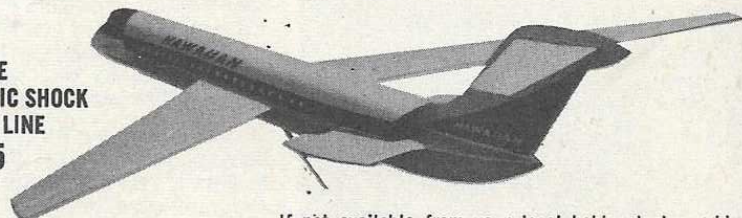


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Add the 1/8 sheet balsa gussets as shown on plan to help retain the 1/8x1/4 cross braces in position. Now the lower portion of the fuselage can be sheeted in as shown on the plan. Cut planks of soft 1/8 sheet balsa. Glue with grain running cross-ship. The entire nose of the plane can now be finished, trimmed and sanded. Add the two stringers down each side of the fuselage, the extra pieces of 1/8 square balsa to outline the door markings on the right side and install the sheet stock to outline the rear cabin window. A short stringer is added on the lower fuselage in the area of the rear landing gear cross brace. Fill in between the landing gear with 1/8 sheet plywood. Drill small holes in the plywood after it has been fitted and properly cross-section and then tie with thread as shown and over-glued. Note the small notch added in the plywood gear fairing at the upper corner of the forward gear wire brace. This is where the wing strut clips on to carry flight loads. Make the tail wheel

and spring assembly as shown and tie in place.

At this time, it would be advisable to mount the Cox .049 engine. Shim with tapered plywood or washers to get proper downthrust and sidethrust. Drill holes through top of cowl for throttle valve and filler tube. This builder slipped a section of vinyl tubing over the engine fuel tank filler and let it protrude about 1/8 inch above the cowl. After the engine has been completely fitted it should be removed before covering the model.

WING: The wing will be built in one piece and cut apart after final attachment to the fuselage. Cut 36 ribs from medium 1/16 sheet balsa and four ribs from 1/16 sheet plywood. Cut all notches for spars as shown on plan. A good technique is to cut 8 to 12 at a time on a fine tooth jig saw. This builder cuts one rib of plywood as a template and traces around with a sharp pencil for all other ribs. Take the four plywood ribs and stack together and drill the two 1/16 inch diameter holes used later to

hold the panels together. Drilling now assures good alignment for the removable outer panels from the wing center section which will eventually become a permanent part of the fuselage. By laminating the trailing edge as shown, you are assured of an absolute straight piece of wood. The oversized leading edge, as shown in Section "L-L", allows final trimming no matter how warped the piece may be. Since all that is needed is 3/8 net material, you have up to 3/8 curve to play with. Draw two lines 3/8 inch apart along the back side of the 1/4x3/4 medium balsa leading edge with a 3-foot straight edge. These are the reference lines for matching up with the upper and lower corners of the forward shape of the ribs. Assemble the ribs, spars, and trailing edge pieces over the plans using wax paper to prevent glue damage to the plans. Please note that the two lower spar 1/8 inch strips must be spliced near the tip to make the proper length. The plywood ribs at the wing root should have a slight gap at the top edge to allow for the eventual dihedral angle as shown in Section "X-X." Glue thoroughly and then reglue after removal from plans. Add the small 1/8 sheet gusset at root rib and trailing edge of wing. Add the 1/8x3/8 balsa rib stiffener at the root rib of the outer wing panel. This is on the lower surface only and is flush with the lower edge of the rib and lower spars. This prevents bending of the rib from cover tauntness. Next add the supports for the wing life struts. These are made by laminating two pieces 1/8x3/8 balsa and one piece of 1/16x3/8 plywood. Four assemblies are

needed and should be amply glued to the spars and ribs. Ensure they are flush with the rib lower surfaces. Add the four blocks of 1/8x3/8 balsa for the jury strut pins as shown. Note that the plywood is on the inner edge, and not next to the wing lower surface.

Next cut 20 pieces of 1/32x3/8x12 strip of soft balsa to laminate the wing tips. Soak the pieces of wood in hot water and then take 10 pieces and bend to shape of wing tip. Use plenty of pins to hold to contour. The inner and outer strip will be discarded so don't worry about the indents caused by the pins. When dry (about 6-8 hours), glue the best six or seven together to form the tip. The amount you use depends on how many are needed to make up the net 1/4 inch thickness required. This will provide the strongest wing tip possible and becomes fairly easy to build after once trying. Any poor bending while wet can be corrected at final gluing. The leading edge should be glued in place, using the reference lines to match up with the wing ribs. Glue the wing tips in place. The leading and trailing edges should be shaped as shown on the drawing. The final contouring of the tip should be completed. Add the upper spar strips to the tip. The wing structure is basically completed and is ready for assembly to the fuselage.

TAIL SURFACES: The horizontal and vertical tail surfaces are built up from medium 1/8 inch square stock except for the leading and trailing edges which are laminated up from four strips of 1/32x1/8 soft balsa similar to the wing tips. Note that the rudder will be adjustable after covering by cutting into the joint between the rudder and the vertical stabilizer. Note the location for the thread which will be added later to simulate the tail wire bracing. This is important to keep the tails in proper alignment.

ASSEMBLY AND COVERING: The model is now ready for final assembly and covering. Bend up two wing attach clips from 1/32 wire. Notch crosswise the fuselage upper longerons and cross-braces at the lower wing spar locations and glue the wire in place. Lay the entire wing in place on the upper longerons and glue solidly to the fuselage. Check alignment to be sure wing is 90 degrees to center of fuselage.

After all glue has properly hardened, cut the wing outer panels off the fuselage. Cut two lengths of 1/16 wire, round or point off the ends and glue into the wing center section ribs. Insert through the holes previously drilled in the plywood ribs. Add a 1/4x1/8 balsa strip at the trailing edge of the wing center section to fill in the gap. Make flush with wing airfoil.

Gently sand the longerons slightly round on the fuselage and, using a little filler, make a fillet at the center section trailing edge and the upper longerons. The outer wing panels can now be covered. This builder used lightweight silk for the entire model. I apply two coats of thin dope to all balsa surfaces that come in contact with the silk, and lightly sand the wood fuzz off. I also apply a spray coat of water to the silk after laying in place over the frames to assist in pulling all wrinkles out. A thin coat of dope over the edges soaks through into the wood and adequately cements the damp silk in place.

I find that trimming is best done after the dope has dried a bit. Proceed to cover the fuselage, tails, etc., and when all the silk is dry give a total of three thin coats of clear dope. Glue the horizontal tail in place and the vertical tail at this time. Apply one coat of silver dope over the entire model. Now apply two color coats. Most Porterfields left the factory with silver wings and horizontal tails and red or blue fuselages and verticals. A final coat of clear dope over the color will brighten the finish and protect it from the fuel.

At this point we come to the most painstaking portion of the construction—the main

wing struts. The front and rear struts are similar except for the end that attaches to the fuselage. The forward strut hooks onto the forward landing gear wire, and the aft wing strut hooks onto the wire cross-brace just aft of the rear gear wire.

Use 1/32 wire for the main strut support and form loops for the wood screws which hold the strut to the wing. Shape strips of 3/32x1/4 hardwood for the strut fairings and tie with thread to the wire. The final drilling for the wood screw holes into the wing should be done after the struts are completed. Attach the wings to the fuselage and lay upside down on a flat bench. Block up the fuselage to the dihedral amount shown on the plan. Align the wing and tail and drill for the wood screws as necessary. This technique allows for final adjustment of all misalignments, wing twist, etc. It is essential though that the landing gear and tails to be installed are true. Now add the 3/32 dowel jury struts as shown on the plan.

Cut windows and windshield from thin celluloid and glue in place. Cut 1/4 inch wide strips of celluloid and glue to fuselage wing ribs to cover joint between outer wing and center section. Use some 1/32 inch wide black striping tape and outline the door on the right side of the fuselage, the ailerons, and the elevators.

Add the registration numbers to the wing and tail as shown. Decals can be purchased at most model stores in the three-inch size for the wings, but for authentic tail numbers to size, you will have to paint on yourself. Solder in place the tail wheel and main wheels. These are purchased items at the model store. Add heavy thread to the tail surfaces to simulate the flying wires of the real plane. They add realism as well as extra strength. The engine can be attached with small wood screws. This builder uses an 8-4 propeller on all .049 powered scale models, and it is highly recommended for this model. The plane required 1/2 ounce of lead shot glued inside the aft end of the fuselage to balance at the point shown on the plan.

The total weight is 11 ounces. This is about half the weight of my usual .049 powered scale models of similar size and was done for no real purpose. It's the result of a simple approach to the design of the Porterfield.

FLYING

This builder uses clay for balance on initial flights. The rudder can be cut and bent along the hinge line to give a large turn. Be sure the tails have no warp. The model is slightly overpowered so, for all hand launch flights, run the engine very rich. A good flight is one where the climb is such that it reaches 100-foot altitude in one minute. Keep experimenting with needle valve setting to get the proper power to climb slowly. The glide transition will be very clean if it isn't climbing straight up, which it will do in full power. Takeoff from the ground requires more power and the climb is fairly steep. I adjust my models to fly in 200-foot circles under power. A circling glide is a must as well.

The model is a beautiful flyer and is virtually indestructible. The model flies well in moderate winds. It should offer you hundreds of good flights before its retirement. ■



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