PORTERFIELD COLLEGIATE

INTRODUCTION

The Porterfield project has been a lot of fun. I wanted to make a new model using the new mechanical speed reducer designed for the Astro 15 flight system and the new Astro electronic motor control. The speed reducer lets you swing a big prop for maximum thrust and aerodynamic efficiency. The recommended prop is a Y & O wood 13/8, but you can use a 12/8, 14/6 or 14/7 just about as well. A 6' span high wing monoplane from the golden era of aviation seemed just perfect since these planes had 32 to 36 foot wings and, therefore, at 2'' to 1' scale, the scale size prop would be 12.5'' and the wing area would be about 700 sq. inches, right in the middle of the recommended wing area for the electric system of 600 to 800 sq. inches.

Now which model to pick. A review of the best candidates in John Underwood's ''Lightplanes,'' and Joseph Juptner's ''U.S. Civil Aircraft'' gave us a nice shopping list. The J-3 Cub, Rearwin Speedster, Porterfield Collegiate, and Curtiss Robin all looked good at about 72'' wing span for the Astro 15 system.

The Porterfield was decided upon and the project was underway. The design is quite straightforward and fairly easy. It is reminescent of the old timer models.

The model was covered with dacron cloth and nitrate dope was used for the finish. Due to weather conditions, I ended up with about 10 coats. The cold and rain caused some blushing, however, the job was completed and still ended up at a total weight of 63 ounces ready to fly.

The first test flight was with a 12/6 prop and the flight was successful; however, it was a bit on the marginal side. The prop was changed to a Y & O 13/8 and this was the answer. The flying was superb and very smooth with rudder response quick and positive. The Porterfield was airborne in about three plane lengths and flight speed was a scale-like 35 mph. Loops were tried from level flight and were clean and precise. The 12 ounce wing loading makes it a perfect trainer. It's docile and flies hands off, yet responsive to commands.

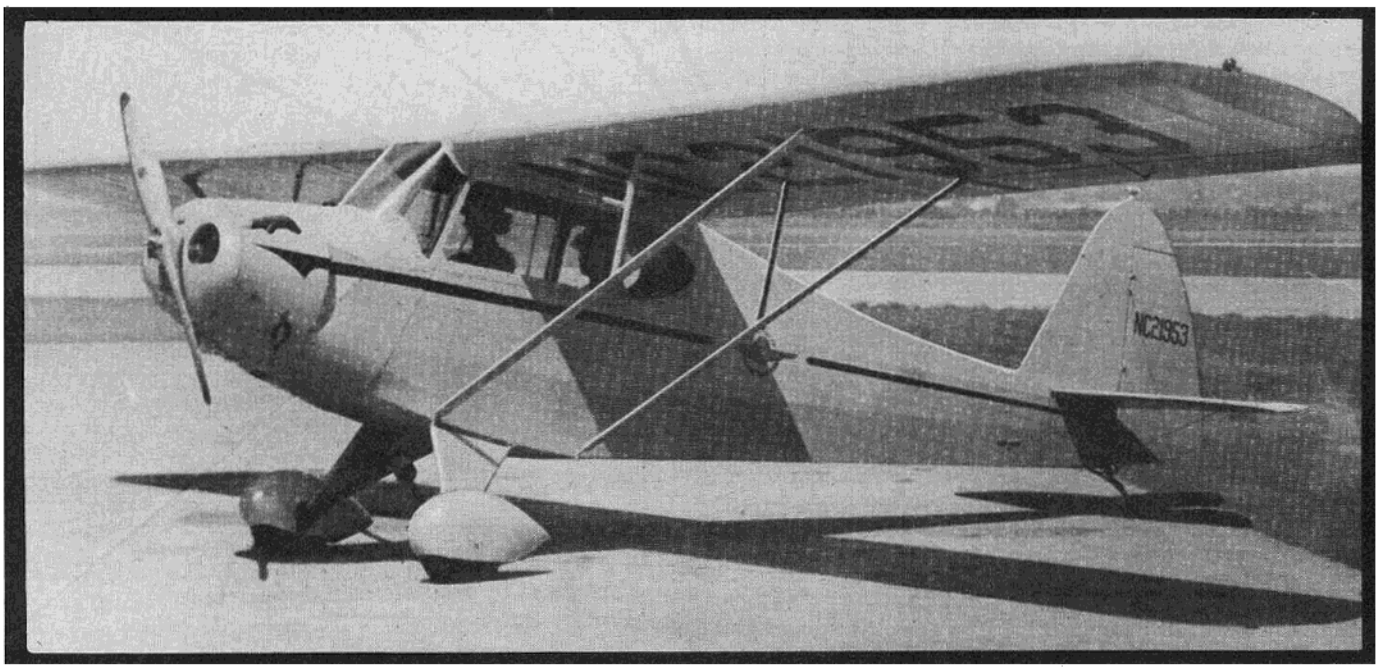
For even lighter weight, I would recommend using one of the plastic film covering materials and save about 6 to 8 ounces.

The model is designed to a scale of 2'' equal 1' (1/6 Scale), which gives us a nice size model that has scale-like power, speed and weight. See Table ''A''

SCALE REFERENCES:

U.S. Civil Aircraft Vol. 7, Joseph Juptner, Aero Publishers, 329 Aviation Rd., Fallbrook, Ca 92028, and Library of Congress Catalog No. 67-15967. Rankin Aircraft is working on a full size kit of the Porterfield for home builders. The 3-view was supplied courtesy of Rankin Aircraft, Rankin Airport, Route 3, Maryville, Missouri 64468.

A.T.C.#690 (10-7-39); Porterfield, CP-50; reprinted in part from U.S. Civil Aircraft, Vol. 7, Joseph Juptner.



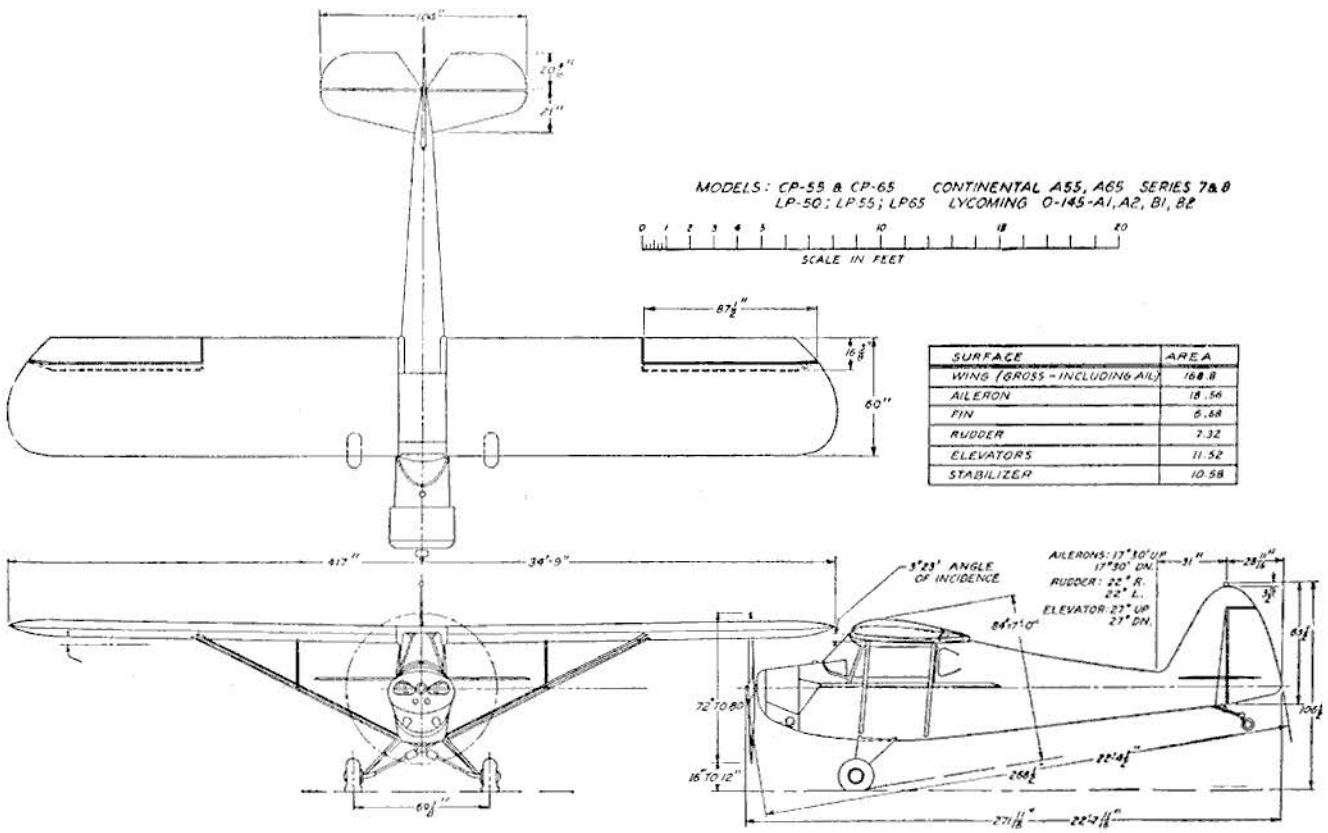
Porterfield CP-50 with 50 h.p. Continental engine. Photo courtesy Rare Birds, 791 Nisqually Dr., Sunnyvale, Ca. 94087.

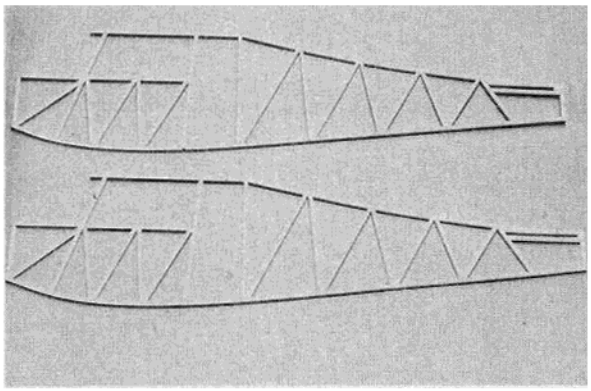
TABLE ''A''
SCALE FACTOR COMPARISON TABLE

	PROTOTYPE	SCALE	MODEL
Wing Span	34.75 ft.	69.5 in.	69.5 in.
Wing Area	168.8 sq. ft.	675.2 sq. in.	675.2 sq. in.
Length	22.75 ft.	45.5 in.	45.5 in.
Chord	60 in.	10 in.	10 in.
Prop	6.5 ft.	13 in.	13 in.
Weight	868 lbs.	4.01 lbs.	4 lbs.
Power	50 hp.	0.09 hp.	0.15 hp.
Max Speed	102 mph	42 mph	40 mph
Min. Speed	40 mph	16.6 mph	16.6 mph

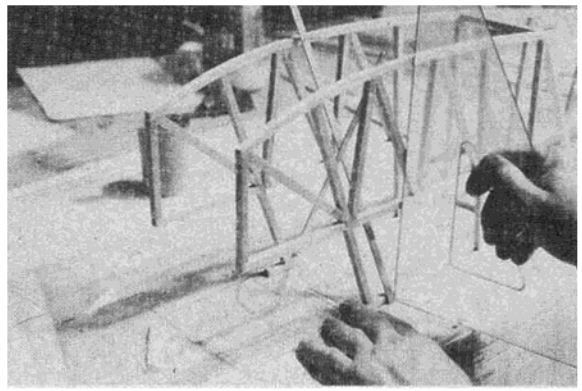
Note:
Weight scales as dimension cubed = 1/216
Speed scales as dimension sq. root = 1/2.4
Power scales as dimension to 7/2 power = 1/518

Designed to a 1/6 Scale, this high wing monoplane from the Golden Era of Aviation has proved to be an outstanding success for electric power. A .10 or .15 glow engine can also be used with slight modifications. By Bob Boucher

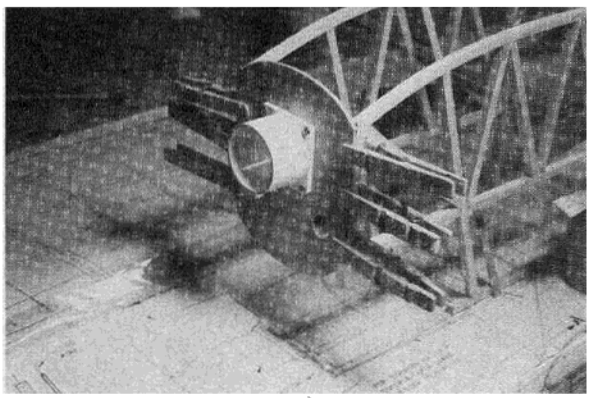




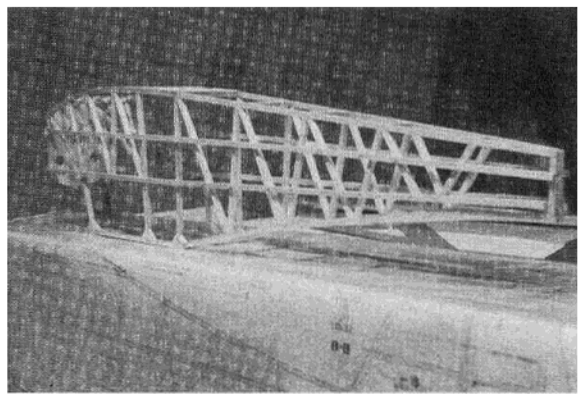
Two identical fuselage side frames.



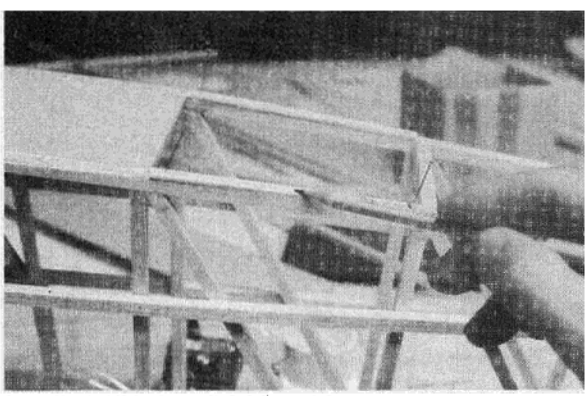
Square fuselage sides and brace.



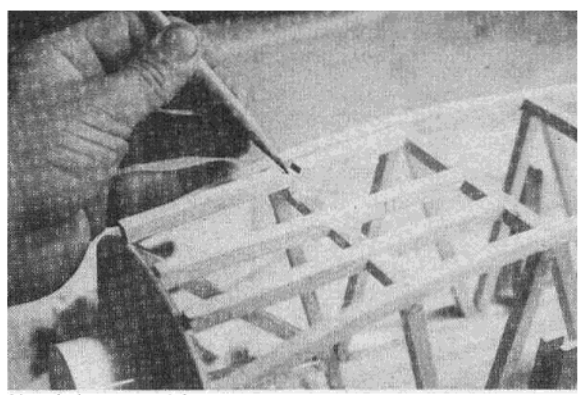
Epoxy plywood firewall to fuselage sides.



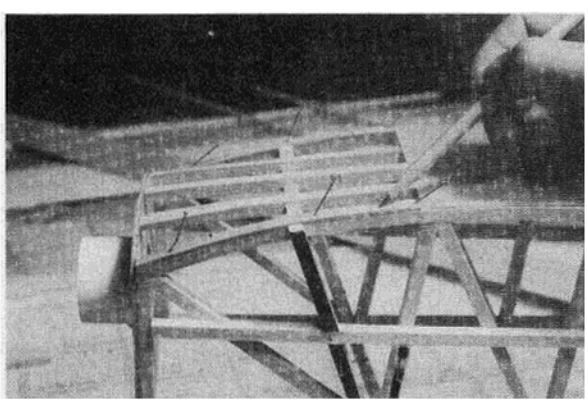
Stringers in place.



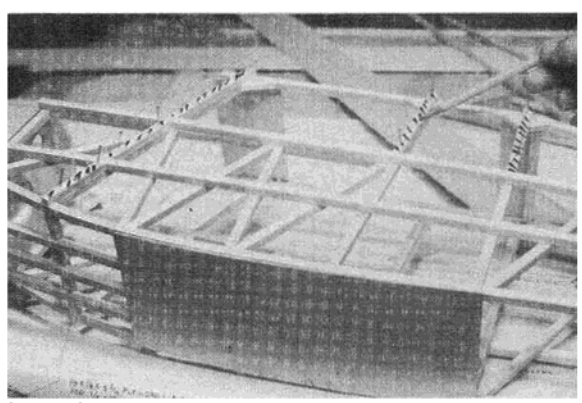
Install 1/16" balsa aft fairing strips.



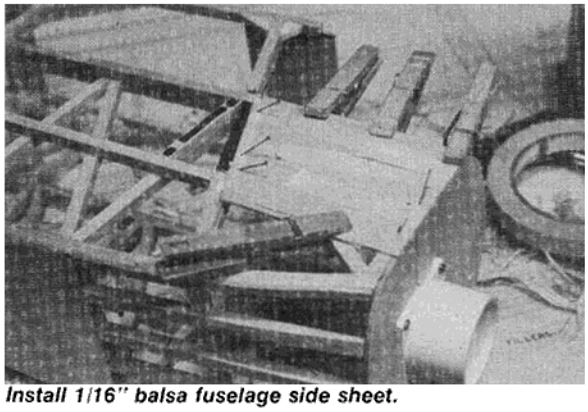
Notch bottom stringers.



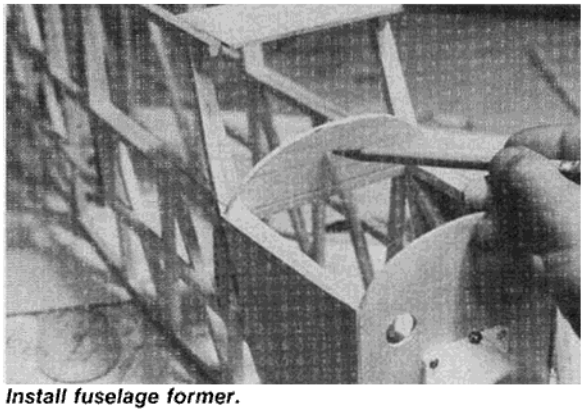
Trim bottom stringers, install 1/16" balsa forward fairing strips.



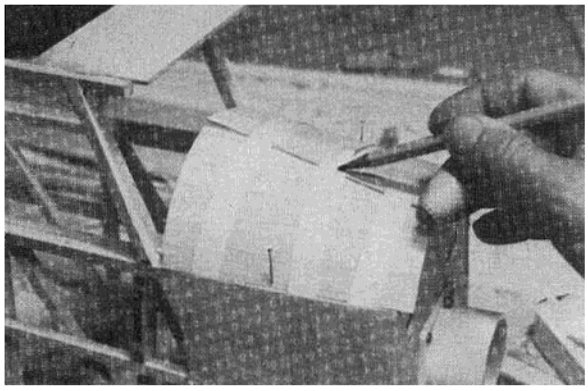
Install filler block in cabin area.



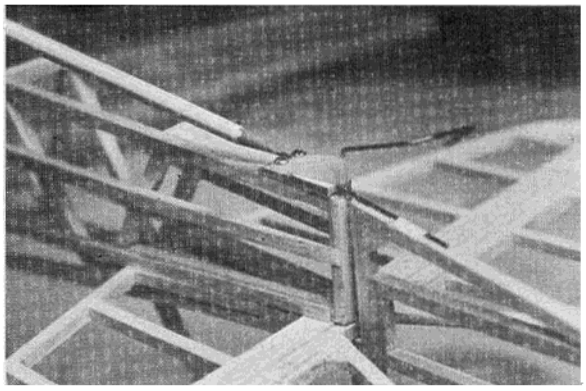
Install 1/16" balsa fuselage side sheet.



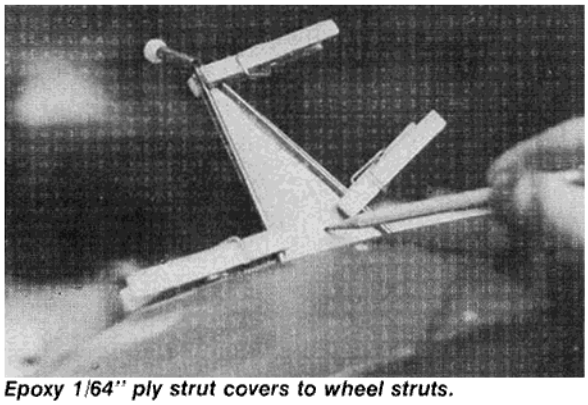
Install fuselage former.



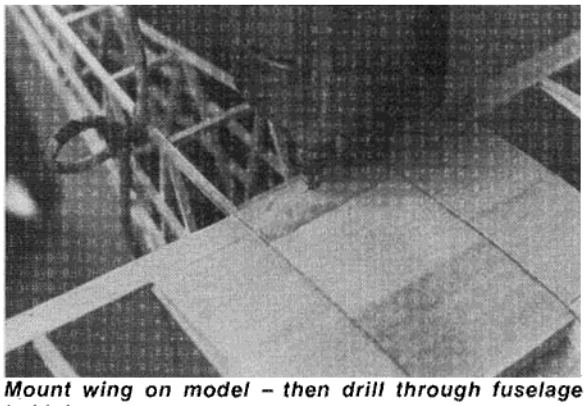
Wet sheet is held in place with masking tape. When dry, trim and glue.



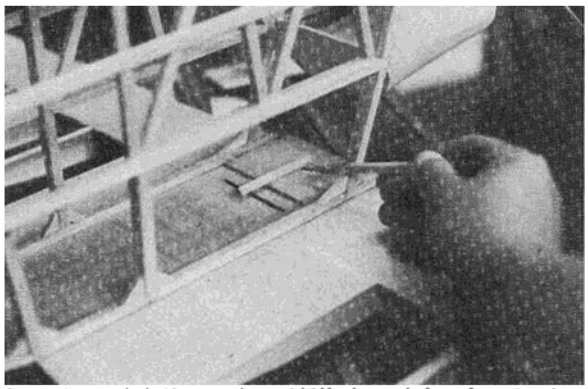
Tail wheel bracket is attached to plywood block with screws. Wire arm is glued to bottom of rudder.



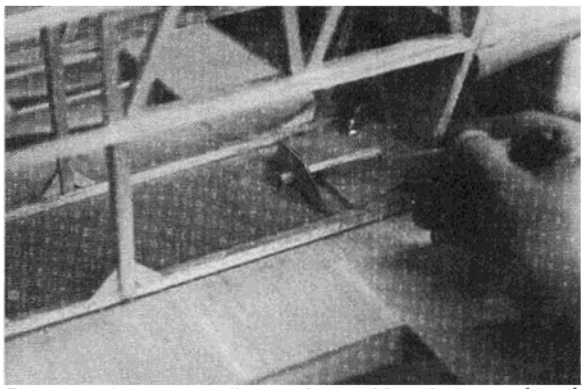
Epoxy 1/64" ply strut covers to wheel struts.



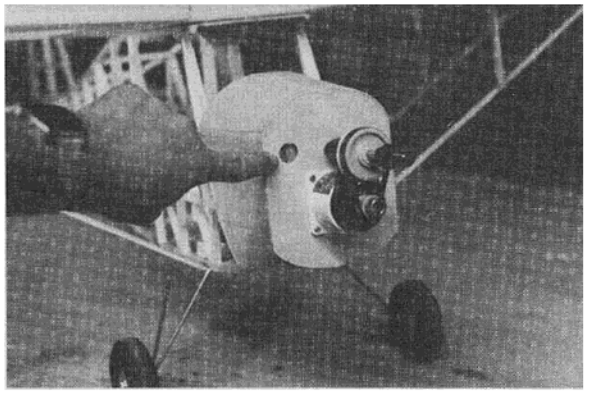
Mount wing on model – then drill through fuselage hold-down.



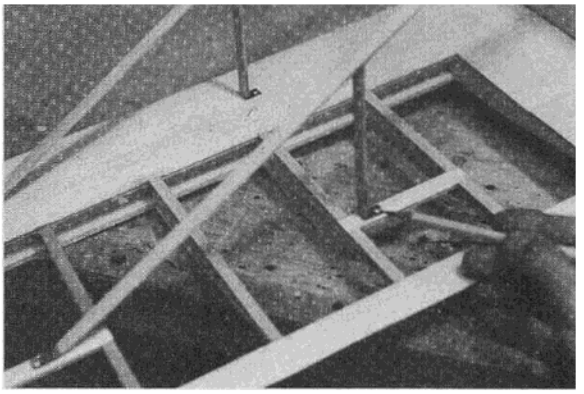
Invert model then glue 1/4" dowel for front wing attachment – let glue harden.



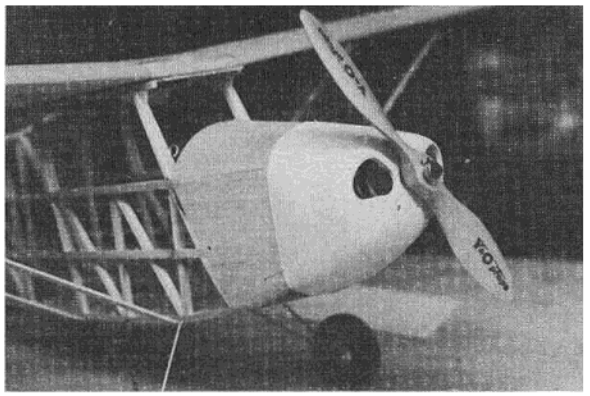
Remove wing – then slip on plywood bracket over dowel. When aligned, epoxy bracket to front of spar.



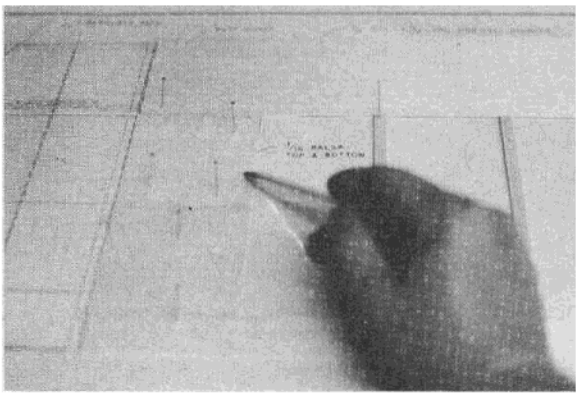
Cooling air inlet passage for battery cooling.



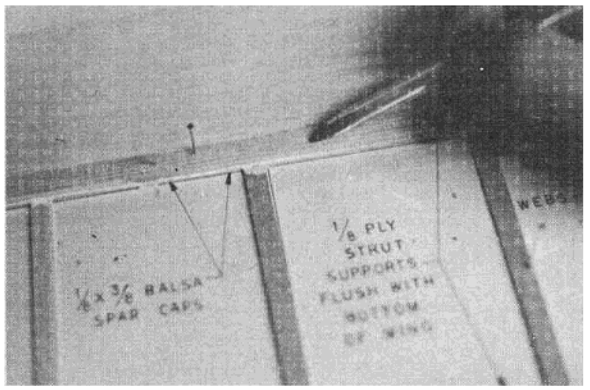
Steel strut brackets. Slit struts and epoxy steel brackets to strut ends. Screw struts to wing and fuselage.



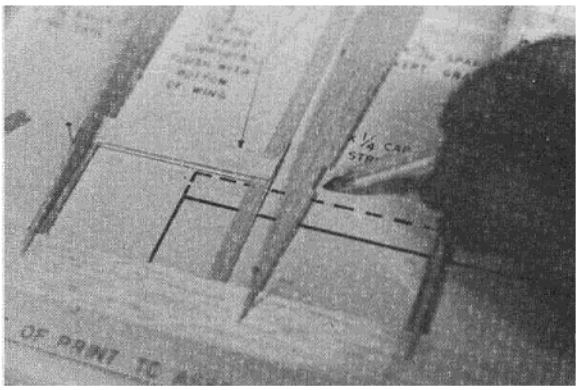
Plastic cowl fitted to fuselage.



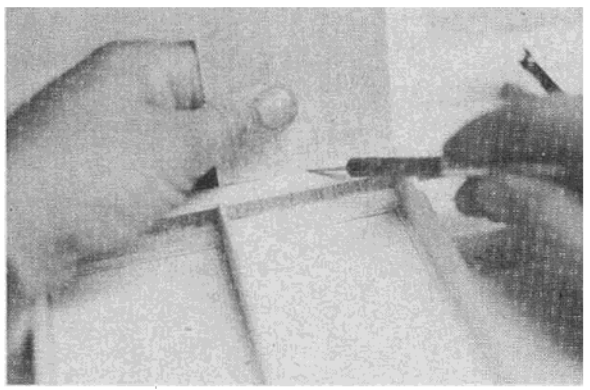
Pin 1/16" balsa sheet to plan. If necessary trim sheet to make it straight along spar line.



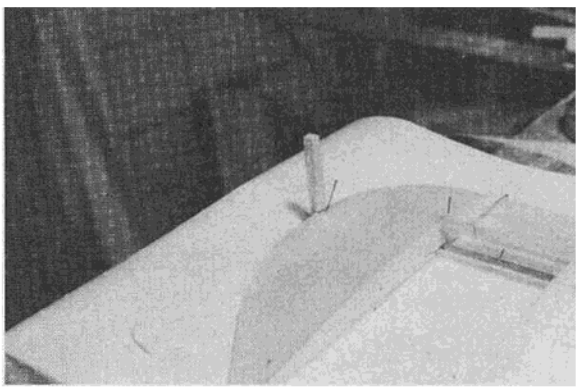
Glue 1/8" x 3/8" spruce spar in place. Apply Titebond to both balsa and spruce surfaces.



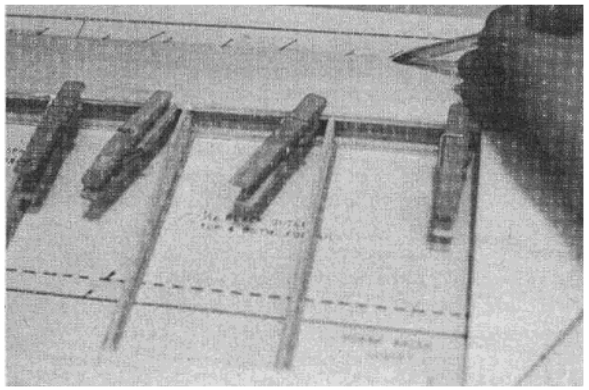
Notch ribs for plywood strut braces.



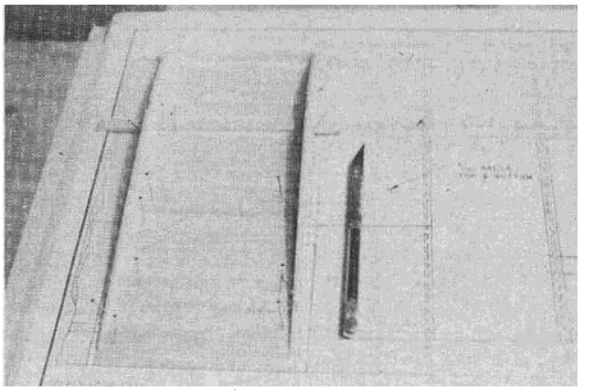
Install webs on front of spars, cut for 1/16" x 3" balsa sheet.



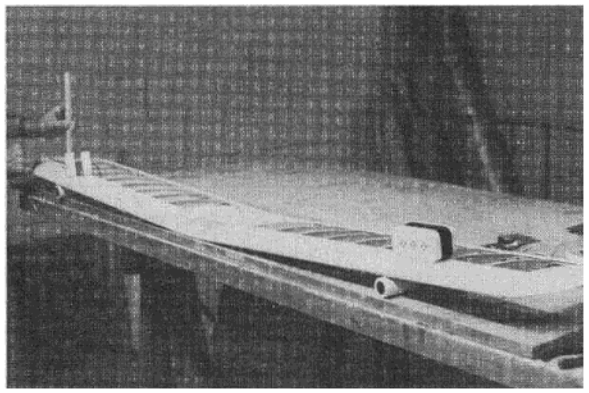
1/16" balsa wing tip bottom tilt-up as shown.



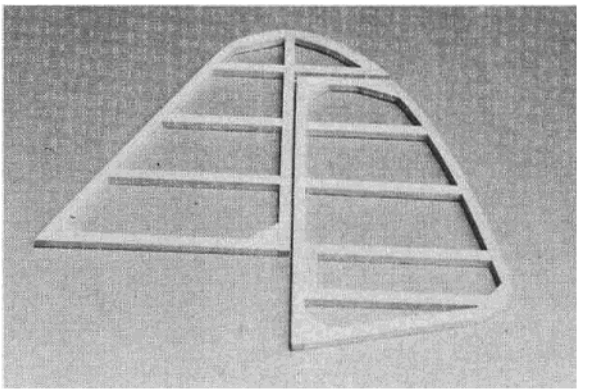
Hold sheet to spar with clothespins. Hold sheet to leading edge with lots of pins.



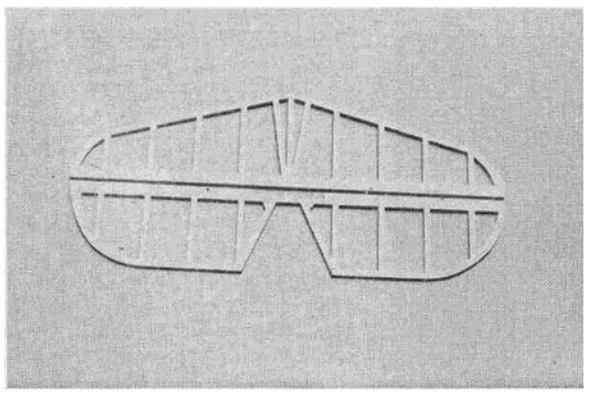
Build center section on plan.



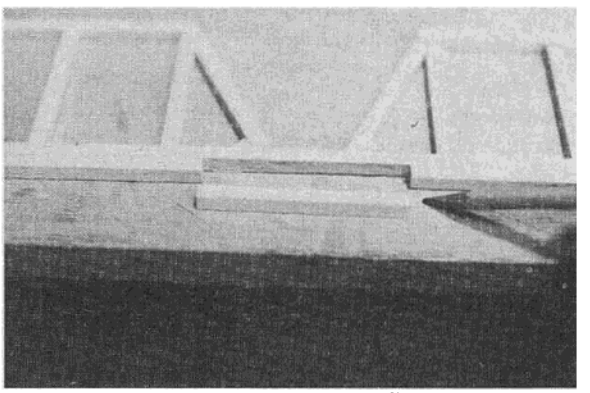
Join left, center, and right panels to form complete wing – support panels for proper dihedral.



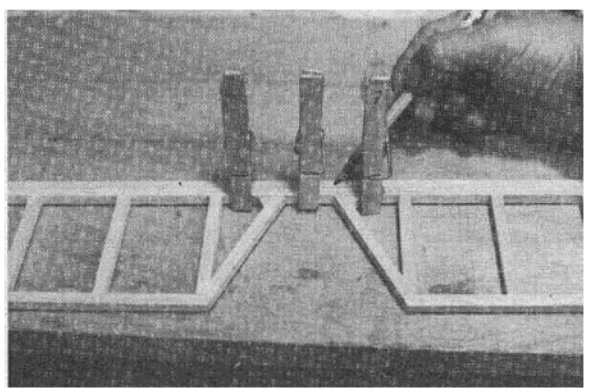
Vertical surfaces complete.



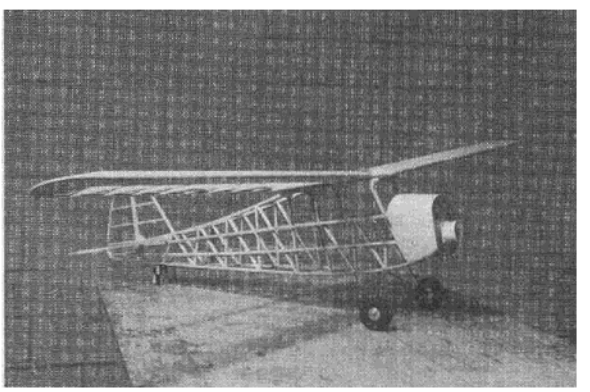
Horizontal surface framing.



Hardwood elevator torsion bar cut to fit.



Epoxy torsion bar in place.



Completed Porterfield ready for covering. Built-up frame is light but strong.

The perky-looking model CP-50 fairly radiated with "Porterfield" heritage, and it had much to draw from, so the new lines were tempered slightly with some of the past. Standing wide-eyed and taut, as if eager to get going, it had unmistakable character, and was perhaps the best looking of the current crop of low-powered lightplanes. With the country mobilizing, sometimes feverishly in preparation for threats of war, it was estimated that we would need many thousands of pilots, so the CP-50 "Collegiate" was offered primarily as a trainer; basically, as a trainer for the CPTP program to teach our young men the basic rudiments of piloting an airplane. Porterfield aircraft had long been known as good training airplanes and the new CP-50, they say, was designed to be one of their best. The basic design emerged first in 1936 as the 40 h.p. "Zephyr" and later remodeled into the CP-40. When the 50 h.p. engines of Continental, Franklin, and Lycoming were put on the market the design was modified again into the CP-50 and aptly called the "Collegiate"; of course, it was now slightly bigger and a little heavier, but it was better suited for teaching and training the so-called average student-pilot. All other lightplane manufacturers were also going into 50 h.p. engines, so it was a natural trend that all would follow. During development of the CP-40 and the CP-50, Ed Porterfield had taken on a famous partner, the illustrious Col. Roscoe Turner. Turner was surely known the country over, and was calculated to be an asset to the company as sales manager and director of national advertising. It was good publicity, but it had very little effect on sales because "Porterfield" airplanes stood on their own merits; they hardly needed endorsement from a racing pilot. In the "Standard" version the CP-50 was offered as a training airplane with durable interior and no frills, nor extras; as the "Deluxe" version the CP-50 was loaded with conveniences and all kinds of extras to entice and please the sportsman-pilot.

The Porterfield "Collegiate" model CP-50 was a light high-winged cabin monoplane with seating arranged for two in tandem. Although definitely in the lightplane category the frisky "Collegiate" seemed like a larger airplane than the better known Aeronca, Taylor, Piper types; more than likely it was the configuration that suggested more airplane than was actually there. The CP-50 provided ample room inside, but in width it still retained that obvious Porterfield characteristic of being "slim as an arrow."

The model CP-50 had adequate performance as a primary trainer with surprising economy for profitable operation; the sportsman on a low budget also found the performance quite satisfying, and the economy of operation allowed many more hours of enjoyable flying on his nominal budget. The "Collegiate" (CP-50) was rather easy to fly, had amiable characteristics that allowed relaxed enjoyment, and was tough enough to allow a little manhandling or unintentional abuse. Of course, the Porterfield CP-50 was not as numerous nor as popular as "the big three" in lightplane manufacture (Aeronca, Taylor, Piper), but CP-50 popularity came from many directions, so they were seen quite often, and were most often busy flying. The type certificate for the model CP-50 was issued finally on 10-7-39 and some 50 or more examples of this model were manufactured by the Porterfield Aircraft Corp. at Kansas City, Missouri. Ed E. Porterfield was president and general manager; Col. Roscoe Turner was V.P. in charge of sales; Louise Thaden, for a time, was Porterfield's traveling sales lady.

PORTERFIELD COLLEGIATE
Designed By : Bob Boucher

TYPE AIRCRAFT
Scale
WINGSPAN
69½ Inches
WING CHORD
10 Inches
TOTAL WING AREA
675.2 Square Inches
WING LOCATION
High Wing
AIRFOIL
Flat Bottom
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1½ Inches
O.A. FUSELAGE LENGTH
45½ Inches
RADIO COMPARTMENT AREA
(L) 10" x (W) 3¾" x (H) 4¼"
STABILIZER SPAN
19 Inches
STABILIZER CHORD (incl. elev.)
7" Average
STABILIZER AREA
119 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7½ Inches
VERTICAL FIN WIDTH (inc. rudder)
7½" Average
REC. ENGINE SIZE
Astro 15 Electric
FUEL TANK SIZE
NA
LANDING GEAR
Conv.
REC. NO. OF CHANNELS
2 (3 W/Speed Control)
CONTROL FUNCTIONS
Rud., Elev., (Opt. Spd. Control)
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Balsa and Ply
Empennage ..... Balsa
Weight Ready-To-Fly ..... 64 Ounces
Wing Loading ..... 13.46 Oz./Sq. Ft.

The price was $1495 at the factory. It was available as a "Standard" model for training, or as a "Deluxe" model for sport. The Deluxe version was $200 more.

The fuselage framework was built up of welded 4130 and 1025 steel tubing in a Warren truss, lightly faired to shape with wooden fairing strips, then fabric covered. A large rectangular entry door was on the right side. The seats were arranged in tandem, and dual stick-type controls were provided. Normally, the interior was upholstered in leatherette, or plain durable fabrics, but Spanish leather was optional. A baggage compartment with allowance for 30 lbs. was behind the rear seat; "solo" flying was from the front seat only. The windshield and cabin windows were of Pyralin; side windows could be slid open for ventilation. A skylight in cabin roof was optional; the trainer could also be equipped with drop-away door for emergency. The 4 cylinder engine was completely enclosed in a pressure-type cowling to provide positive cooling. The wing framework, in 2 halves, was built up of solid spruce spar beams with spruce and plywood truss-type wing ribs; the leading edges were covered with dural metal sheet and the completed framework was covered in fabric. Wing bracing struts, parallel to each other, were fastened to lower longerons. The split-axle landing gear of 69" tread used "Rusco" (rubber) shock absorbing rings; 6.00x6 wheels were fitted with low-pressure tires, and mechanical brakes were optional. Goodyear 16x7-3 airwheels with brakes were also optional. A leaf-spring tail skid was standard, but a tail wheel assembly, either full-swivel or steerable, was available. The 10 or 11 gal. fuel tank was mounted high in the fuselage just behind the firewall; the firewall was of terne-plate, but stainless steel was available. No airplane of this model was eligible with single ignition engines after 8-1-41. The fabric covered tail group was built up of welded steel tubing; a bungee device was fastened to stick controls for adjustment of trim. A Fahlin wooden prop, dual controls, carburetor heater, standard group of engine and flight instruments, fuel gauge, fire extinguisher bottle, safety belts, and first-aid kit were standard equipment. Dual ignition, ball bearing controls, battery, navigation lights, wheel brakes, compass, cabin heater, carpet, custom upholstery, overhead skylight, prop spinner, tail wheel assembly, wheel pants, and hand rubbed finish were as "Deluxe" equipment, or optional. Standard colors were Porterfield Red with Insignia Blue trim, or colors could be reversed; White or Cream with matching trim was available on order. The next Porterfield development was the model CP-55 and CP-65 as described in the chapter for ATC #720.

CONSTRUCTION

The construction of this model is quite straightforward with no tricky things to watch out for. It is like any old timer or free-flight job. First you make two framed-up fuselage sides from 1/4" sq. balsa, then assemble both sides to make a basic fuselage frame. Take the time to sand the balsa cross members to a good fit before

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Absentee Page

(6.) These coverings should be attached to themselves whenever possible for maximum strength and durability.

(7.) Compound curves can give you fits, but they can be done if you think ahead. Regardless of what some of the advertisers say, there are some covering jobs that are next to impossible to accomplish with any degree of neatness. Don't start out by trying to do an entire wing, tips and all. Do the major part of the wing first, then do the tips separately. Start out by cutting a piece of covering to fit just the tip and attach as shown in Figure 1.

Have someone hold down main part of the wing, grip the edge of the covering with either a gloved hand or a pair of pliers. Heat the plastic with a heat gun or iron and pull down in a downward motion until the plastic lies down on the edge with a minimum of wrinkles (Figure 2). Hold in this position until the plastic has cooled. Go over the edge and seal securely — trim and shrink.

(8.) Undercambered areas have to be done a little at a time, working from one edge to the other, sealing as you go along. See Figure 3, and Figure 4. If you attach like Figure 5 your covering will pull away as indicated.

(9.) Quite often it is better to plan ahead and paint these hard to do areas with a good epoxy finish. (colors tend to match quite well).

(10.) When placing covering over sheeted areas or over other areas of plastic covering air bubbles will develop. Use a sharp pin and prick the bubble and go over it with an iron and it will disappear.

(11.) Some areas are hard to get at with a heat gun or a sealing iron. I use a butter knife that I heat on the iron or the heat gun --- works fine.

(12.) The final finish is to go over the entire covering job and seal the edges. Feel the edges with your fingers and fingernails --- if you can get your nail under the surface, it is not secure --- apply more heat. Wipe off all marking pen lines with water or alcohol. I puposely did not mention heat settings on the iron, because the plastic is tolerant of a wide heat range. You will know when you apply too much heat, since it makes a neat hole. One mistake like this and you are educated for life!

(13.) If you want to trim your ship, buy the regular trim sheets that are provided, just follow the printed instructions. They are complete.

(14.) Sit back and admire your handiwork. It will never look as pretty again as it does now. You will find it easy to clean, and easy to repair, and it makes a neat "bag" to carry the wreakage back to the pits. □

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