

Multi-winged airplanes have always held a special fascination to those who prefer to model antiques. The realism and intricate construction of these seemingly delicate "aeroplanes" has an appeal all its own. The subject of this article, the 1910 Avro Triplane, may certainly be said to fall into this category. Moreover, while this model obviously offers the attention to detail and flight characteristics, in either the freeflight or R/C versions, to please the old pro, it is also a project that may be approached successfully by the novice.

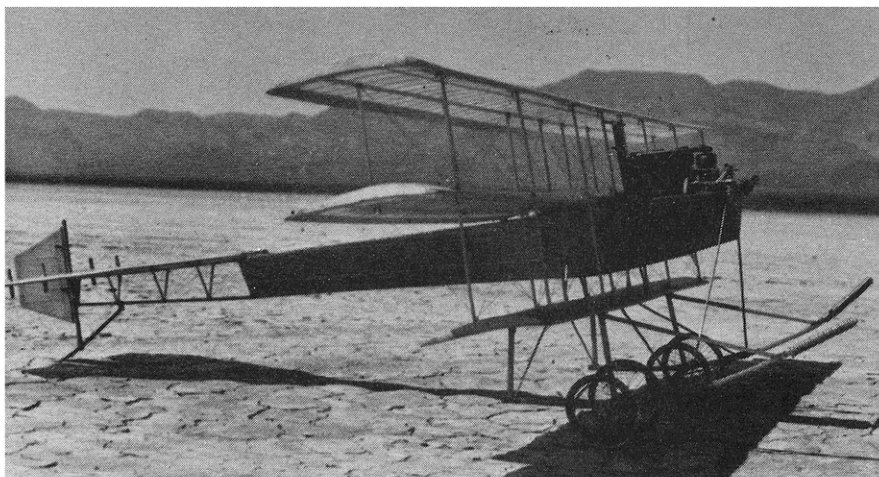
The original model of this aircraft was scratch built by Mr. Chuck West of Phoenix, Arizona, and since that time, has been a frequent and steady performer. To the Avro's credit is a first place at the Rockwell International Annual Scale Contest as well as a second place at the West Coast Free Flight Scale Nationals. This certainly speaks well of the airplane's aesthetic appeal as well as its flight characteristics. Although the above mentioned awards obviously involved the smaller free flight version of the Avro, we are assured by Mr. West that his larger R/C version displays the same form.

The original Avro Mark IV Triplane was built in September 1910. With its completion by the A. V. Roe Company of Manchester, England, the aircraft was delivered to the Brooklands Aerodrome where it served as a trainer. As built, the aircraft was 30 feet in length

THE 1910 AVRO MARK IV TRIPLANE

BY ART REINERS

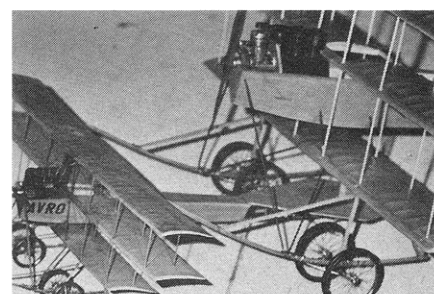
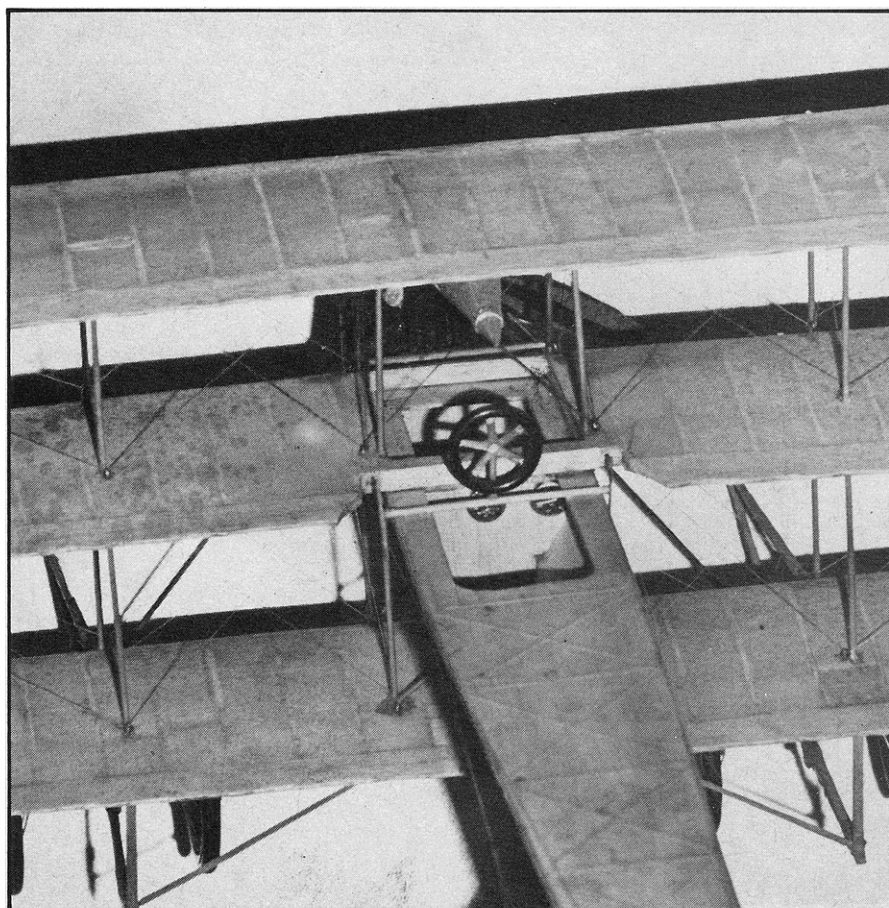
Although far from being a famed example of early flight, this classic looking funky flier possesses an undeniable appeal to all those who appreciate the art of building and flying scale model airplanes.



Side view of the R/C Avro Triplane as seen under a hot Arizona sky. Note how far the landing gear skids extend in front of the aircraft. The full size prototype was used to train pilots around 1910 in England and one can imagine that those skids saw a good deal of use in keeping the rather awkward and very underpowered airplane from going over on its nose.

Cockpit and rigging details are visible in this photo. Except for the time consuming rib cutting and rigging process, one has it rather easy with this scale airplane considering detail is so sparse. Note the very limited instrumentation in the cockpit. Directly above the O-ring wheel is the end of the teardrop gas tank.

The R/C version poses in back of its little brother. The small .020 powered freeflight version will be the basis for a new kit.



with an upper wingspan of 32 feet. Wingspan on the bottom wing was 20 feet. The diminutive Avro was powered by a 35 horsepower Green watercooled engine.

Although certainly not a weekend project, as we mentioned, the Avro Triplane model should present no particular problem to the average scale builder, so here we go.

FREEFLIGHT CONSTRUCTION

Construction begins with the wings—of which there is no shortage on this model. First, make a pattern of the wing rib (all ribs identical) either from aluminum or plywood. Using high grade 1/16" sheet contest balsa, trace and cut 102 wing ribs. To expedite this project, the builder may wish to pin a number of ribs together for the finish sanding and cutting of the spar notches. Again using the rib pattern, cut six tip ribs from 1/4" x 1/4" balsa. Next, pin the leading edges (1/4" x 1/4" balsa) and the trailing edges (1/8" x 1/2" balsa) into place over the plans and cement the ribs into position.

Because construction calls for an undercambered wing, it is best to wait to add the spars until the original construction is dry. In this manner the builder can turn the wing over to make sure the spars are perfectly flush with the level of the ribs. Be sure to add the small blocks made of 3/32" square spruce at all indicated rigging points.

Finish sand the wings and then pre-dope the under camber on all wings with thick dope. The scallops may be sanded into the trailing edges at this point if so desired, although not all photos of the prototype show this feature which leads one to believe that they may have only been added later in the airplane's career. Also, while constructing the wings, be sure to mark the exact strut location on each wing relative to the others. Do this by pinning the wings together on top of each other and marking each wing appropriately as indicated on the plans.

TAIL ASSEMBLY

Build the rudder and stabilizer in the usual manner. It is recommended that the rudder and stabilizer be made to provide ease in trimming the model for flight. Install the control cables after the trimming is complete. Allow the assembly to dry completely and sand to slightly over 3/32" thickness—make hinges of thin aluminum sheet. Tail post must be hardwood.

FUSELAGE

The fuselage is relatively simple in most respects. Start by cutting the top section from 1/16" sheet balsa and the two side pieces 1/8" oversize from the side view. Next, cut out formers C to G and glue in place as indicated on the top view of the plans. Once thoroughly dry, add the 1/16" x 1/8" spruce keel piece.

The next step is to bevel the fuselage sides to fit the top of the fuselage sheet. Place 3/32" spruce from former C to former G on top of the fuselage sheet. From here, cut 1/16" dowel spacers and glue in position forming the V configurations between formers C and G.

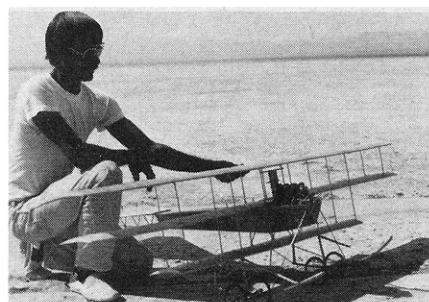
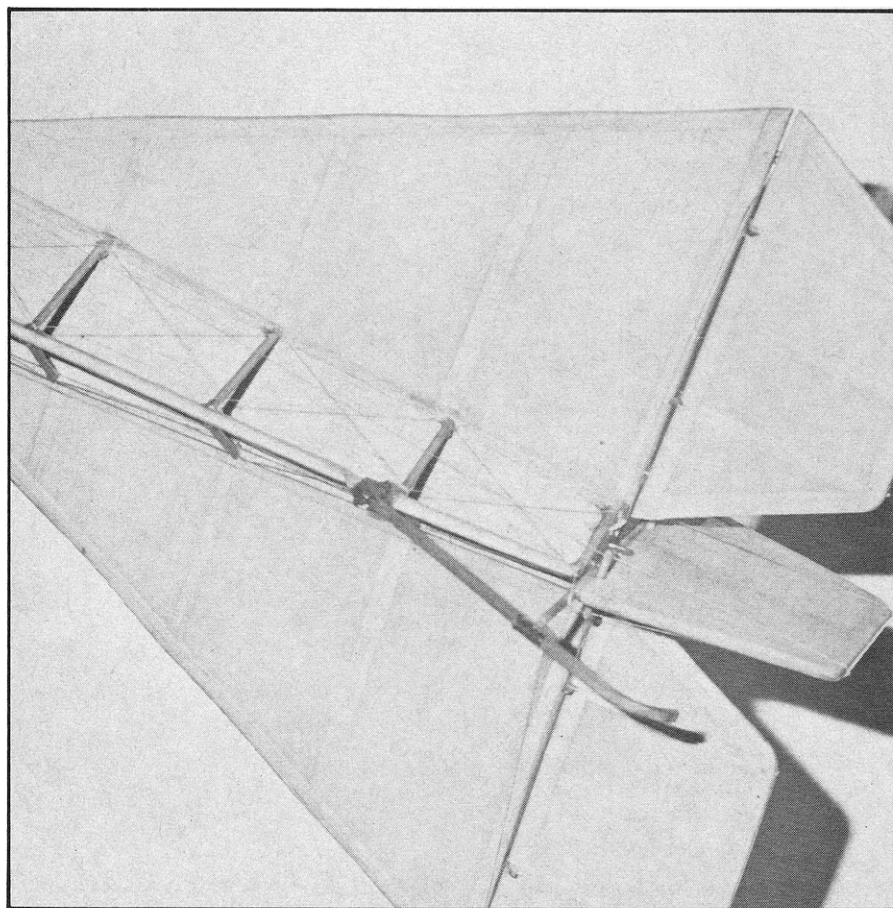
It is now time to glue both fuselage sides in place while the top is secured flat on your building surface.

Once the fuselage skeleton is completely dry, sand and apply simulated rigging with clear dope as indicated on the plans. Cut the pilot's seat from scrap 3/32" sheet and install as shown.

It is now time to start thinking about power. The freeflight version of the triplane works very well with the Cox TD .020. Simply construct a motor mount from 1/8" plywood as shown on the plans and tack the mount in place for the correct hole pattern. With the engine installed, build up the dummy 35 hp Green as shown. We will also mention at this juncture that the Avro Triplane is also a sterling performer using the new Hytork 48 electric motor. Although this motor may be in somewhat short supply at present due to the fact that it has only recently been introduced, it nevertheless is an innovative and very efficient, light weight propulsion system.

LANDING GEAR

To construct the landing gear, the



Chuck West, builder of both the prototype and R/C versions, is seen here with what appears to be a very delicate R/C model. Actually, the numerous struts and rigging serve a very functional purpose and indeed make the model a very strong unit as five years of continual operation will attest.

A close view of the tail assembly of the free flight version shows the careful attention to detail characteristic of Chuck West's modeling efforts. The intricate design is a thing of beauty when accomplished with skill and patience.

modeler will need on hand a supply of 1/16" and 1/32" diameter music wire as well as a few strips of 1/32" x 1/8" spruce or basswood. Laminate the strips into the pattern shown on the plans (make two) and install braces A, D and E as shown. Bend the V braces to the correct pattern and glue them temporarily into position on the fuselage. The next step is to make the yoke, axle and brass clamps as shown in the plans and epoxy these items permanently into position along with the V braces.

As far as wheels are concerned, the prototype model use a set of hand made wheels built by Bill Storm. Should the construction of such intricate items not be your forte, Fulton Hungerford spoked 2" wheels are perfect. Williams Brothers' #128 are also good.

COVERING

The prototype used lightweight silk on all surfaces. Cover all surfaces dry and use a spray bottle to lightly moisten the silk. Be careful to keep the fabric from getting too tight as the wings are only 1/4" thick and will warp easily. Don't worry about wrinkles because they are scale. The real airplane is a mess!

Dope the bottom of the wings twice before doing the top of the wings. This will help keep the wing from bowing. There is no dihedral in any of the wings, but don't worry because the Avro is a steady, stable flyer and over a period of many flights the only major repairs have been to the landing gear.

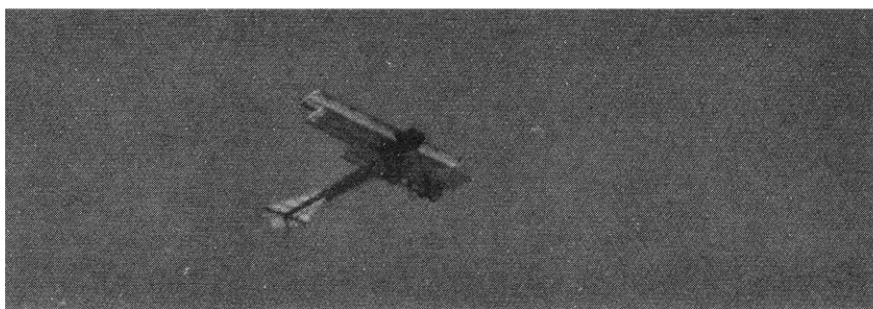
Dope the stabilizer and rudder on both sides as soon as possible. The fuselage is done in any old way as it will not warp. Dope the airplane completely before assembly.

ASSEMBLY

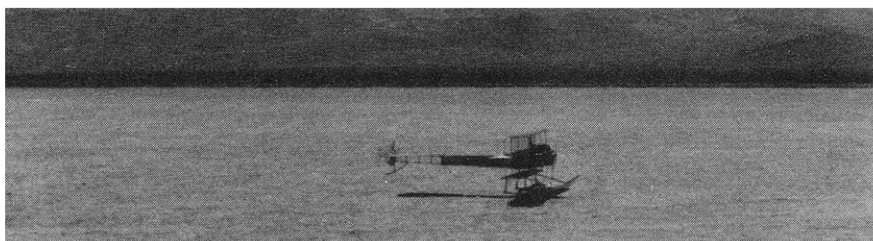
Chuck West used small brass cotter pins on his prototype model to simulate the rigging attachment points (try a hardware store or a hobby shop that carries a good line of model ship fittings). The model requires 70 of these little items and their installation is perhaps the most tedious aspect of the model's construction. Use an appropriately small drill and carefully drill a hole inboard of each strut attachment point on the outside struts and on each side of the inner strut attachment points. Glue the cotter pins in place and allow them to dry.

Mounting the wings is the next step and it is begun by gluing the middle wing into position on the fuselage. While the wing attachment is drying, cut 12 struts, each 6" long, from 1/16" doweling. With the midwing attachment dry, slide the struts through the midwing, each in their proper position, but do not glue them as yet.

scale r/c modeler



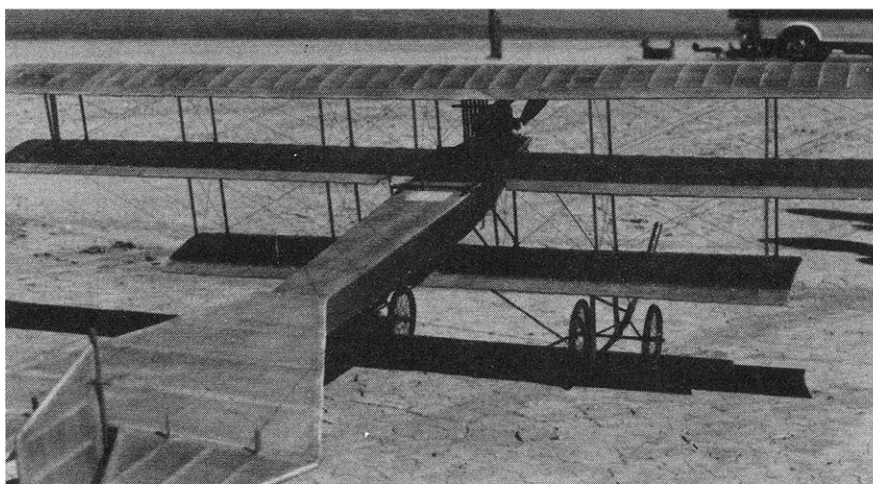
A classic antique drones through the warm skies of Arizona. The airplane has a very unique look while in flight, a charm all its own.



With its tail up, the R/C version of the Avro Triplane is just about to lift off in this photo. Obviously, an airplane such as this requires a rather gentle hand at the controls but builder Chuck West claims it is an excellent flier.



Relative size of the R/C Aero Mark IV is evident in this photo. Chuck West is justifiably proud of his unique modeling efforts.



Another look at the R/C Avro, this time from 3/4 rear. This photo gives one a fair idea of the number of wing ribs required. Luckily, they are all the same size.

Instead, glue the bottom wing to the bottoms of the struts. This is somewhat of a delicate alignment job, so go about it carefully and plan your moves to avoid the frustration of having to try to make the attachment several times.

With the bottom wing secured (glue thoroughly dry) to the struts, it is now time to glue the struts to the midwing. Before doing so, however, adjust the lower wing so that its leading edge is a constant 3" from the leading edge of the mid wing and its trailing edge is a constant 3 1/8" from the trailing edge of the mid wing. This allows for all the incidence needed on the model.

Once the glue has dried at the midwing-strut attachment points, cement the top wing into its proper position on the struts. Note that four additional struts are required here. Make them from the same 1/16" diameter doweling material and attach these pieces in the outermost strut position between the mid and upper wings only. The constant dimension between the centerlines of the mid and upper wings should be 2 3/4". Clear Duco glue was used at all joints for attaching the struts as it provides excellent strength with minimum visual blemishes. The stabilizer and rudder may also be glued into place at this time.

The landing gear may next be assembled to the lower wing panel. Loosen the fuselage V brace and cement it to the main landing gear brace. Install the remaining landing skid braces with epoxy.

DETAILING

It is now time to spend a few hours rigging the airplane. The best guide for rigging came from *Air Classics* magazine, Vol. 2, No. 2, 1965. This article also contained coloring references although the coloring of this aircraft appears to be quite straight forward. Additional information may also be found in *British Aircraft 1909-1914* as well as a volume entitled *Avro Aircraft*. If all else fails, follow the plans as they are quite specific on rigging detail.

The rigging may be of Dacron thread or light monofilament line (#4 or #6). The rigging will actually provide a lot of strength for the model so attend to it accordingly. Naturally, the degree of detail applied to the airplane will depend on the individual attitude of the modeler but bear one thing in mind. Most of the structure on this old flyer was put there to keep the thing together so don't fall victim to the tendency to shortcut on the ribs, rigging or bracing. It really will make a difference.

The dummy engine may be constructed of balsa block with aluminum

tubing for exhausts and dowel for engine brackets. Paint the engine flat black and hollow out to fit the .020 engine used. The "AVRO" letters are cut from Monocoate or black tissue.

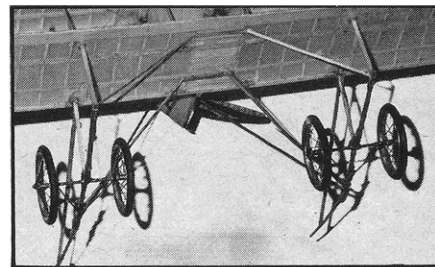
The steering wheel is made from a 1" diameter O ring and flat toothpicks, the gas tank from scrap balsa block, and the radiator from 1/16" dowel and flat toothpicks.

For realistic color, try the concoction Chuck used to get that "period look" on his models. Borrow 2 tablespoons of your wife's instant coffee and dissolve it in 2 or 3 tablespoons of water. Mix thoroughly. Add about an ounce of alcohol and mix in about a pint of clear dope. Pour off the excess water and stir the mixture. Apply by brush as usual or thinned out for a spray gun.

Now the model must be balanced to the correct CG as shown in the plans. Add weight as needed; there is ample room under the engine to do so. If the electric motor is used, shift the small battery to gain correct balance. If a Cox .020 is used, try a Cox 4 1/2-2 competition prop and let that .020 scream.

Chuck's prototype Avro now weighs about 15 oz. and it takes about 150 feet to R.O.G., but when it does it is the most realistic and enjoyable experiences to be found in scale modeling.

The landing gear has been the only area needing any repairs in over five years of flying time on the R/C model. Spoked wheels really seem to help "make" the model.



AVRO MATERIALS LIST

Sheet Balsa

- 2—1/16 x 3 x 36—Fuselage
- 1—1/20 x 3 x 36—Wing Ribs
- 1—1/8 x 3 x 18—Formers
- 1—1/4 x 3 x 12—Wing Ribs & Fill-in
- 1—1/4 x 3/4 x 4-1/2—Middle Wing, CS.

Strip Balsa

- 3—1/4 x 1/4 x 36—Leading Edges
- 3—1/8 x 1/2 x 36—Trailing Edges
- 3—1/8 x 1/4 x 36—Wing Spars
- 2—1/8 x 3/16 x 36—Rudder & Stabilizer
- 1—1/16 x 1/8 x 36—Rudder & Stabilizer & Radiator

Miscellaneous

- 1—1-1/4 x 1-1/4 x 3—Balsa—Fuel Tank
- 16—1/32 x 1/8 x 12—Pine—Landing Skid Struts & Skids
- 20—1/16 dia. x 6—Pine Dowel—Struts
- 2—1/16 dia. x 36—Music Wire—Axles
- 3—Sheets Silkspan, Lightweight or Silk
- 1—Piece Silk, Lightweight—Fuselage
- 60—ft., 4 or 6 lb. Monofilament Line—Rigging
- 1—Piece Brass or Aluminum Shimstock for Fitting & Hinges
- 2—Pair 2" Antique Wheels—Hungerford Spoke Type
- 1—Piece 1/8 x 3 x 5 Plywood—Nose & Firewall
- 1—Piece Aluminum Tube 1/16 dia.—Control Column
- 8—Washers 1/16 inside hole—Landing Wheel Retainer
- 1—1" O Ring—Steering Wheel
- 70—Cotter Pins—Rigging
- Use .020 COX TEE DEE Engine & Wood Prop or Hytork 48 Electric Motor.

The plans have been redrawn by the author for Peterson Products and are now available separately. Other flying models available in this series are the 1915 Lincoln Beachey Monoplane, Bleriot XI, Longster III, and 1911 Caudron.