Photos: George Meyer

Rubber Scale AVRO 511 "Arrowscout"

Once upon a time, the world was soft and wings were frail. A Rubber Scale oldie from the designer of "Little Toot."

by George Meyer

During the year before the start of the 1918 conflict, the idea of a specialized type for use as a fast scout in war had taken firm root in the minds of several designers; among them, A.V. Roe, who had by this time given up most of his active flying to concentrate upon design. His thoughts upon the subject appeared in the form of the "Arrowscout," the new machine being shown on the Avro stand at the 1914 Olympia Aero Show, where it was seen to embody a number of original and advanced ideas.

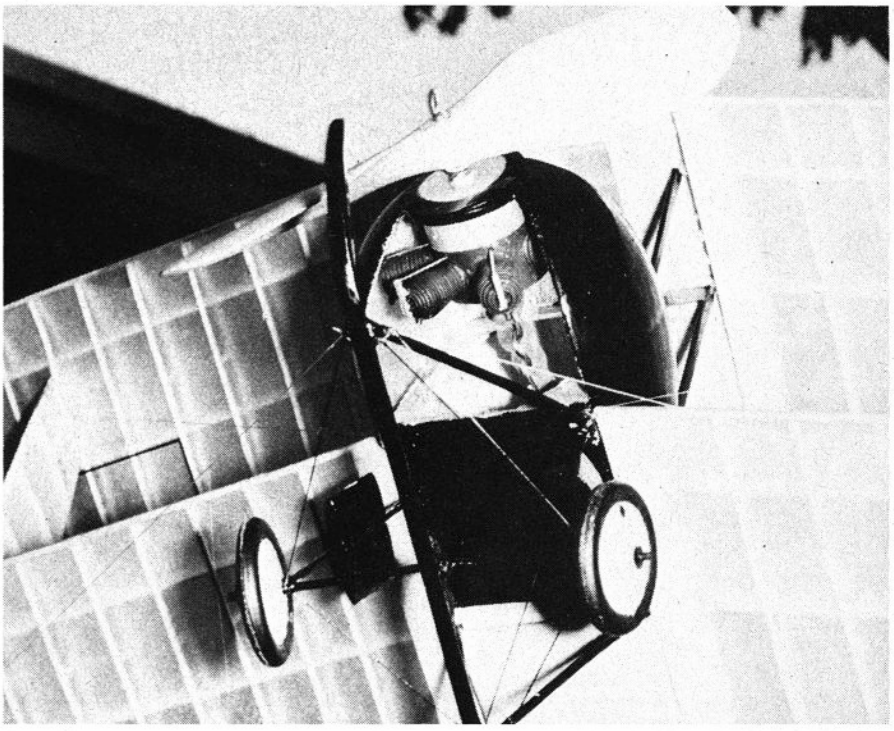
A single bay biplane layout was adopted, with considerable sweepback being used on the wings, the lower surfaces of which were flat. Slight dihedral was incorporated and the upper and lower wings were connected by single close-set pairs of lightweight interplane struts which were faired between with fabric to form "I" struts. "N" center-section struts formed the rest of the wing supporting structure.

Another unusual feature was the fitting of air brakes at the lower rear wing roots, consisting of rectangular trailing edge surfaces which were hinged at their centerlines to stand vertically across the airflow. The "Arrowscout" qualifies as one of the earliest airplanes to be fitted with them. Lateral control was provided by cable-connected ailerons on all four wing tips. The remainder of the airframe was strongly reminiscent of the "504" on a reduced scale. Power was provided by an 80 horse Gnome mounted within a cowling which proved to be too closely fitted for adequate cooling. Yet another feature of the "511" was the Avro system of unit construction which conferred quick dismantling and re-erection within a few minutes. The pilot also had the benefit of the Avro safety belt. The Avro 511 "Arrowscout" as a model design has close to ideal proportions for rubber powered Free-Flight Scale. With the large amount of sweepback, there is no problem in getting the airplane to balance properly.

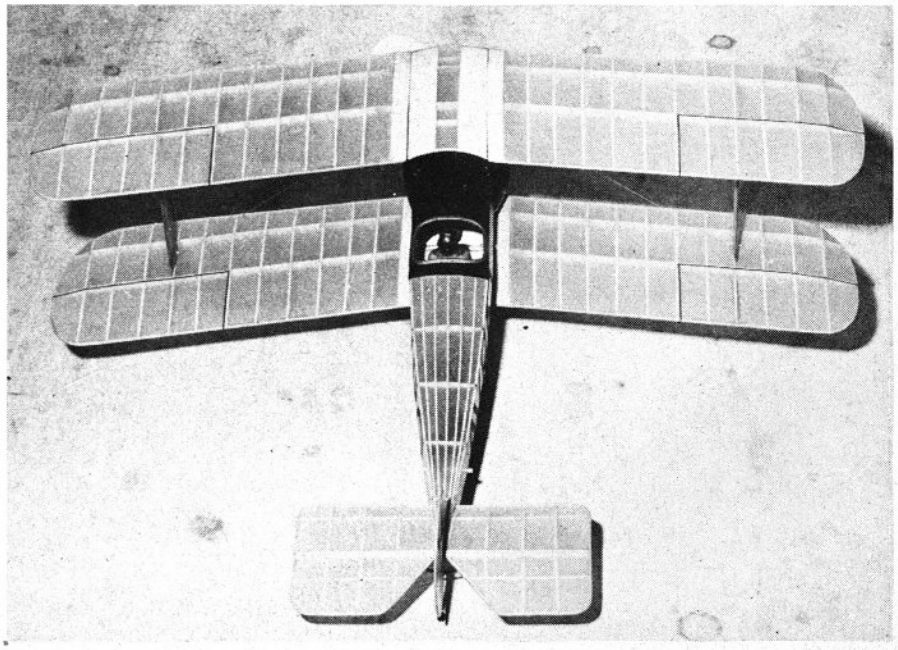
Construction Notes

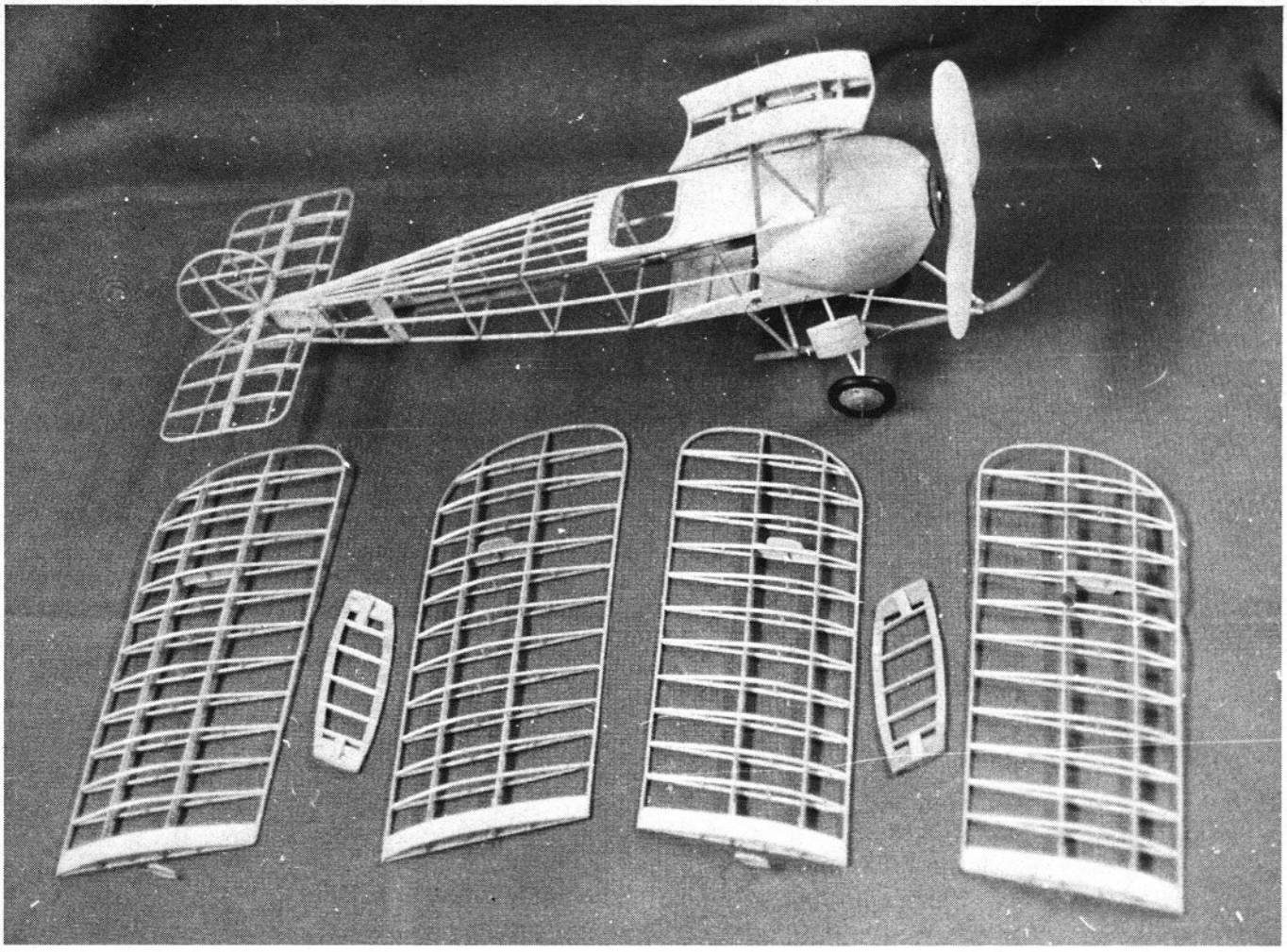
The fuselage is assembled using 1/16" x 1/16" railroad stock for longerons and 1/16" square balsa for the uprights. The landing gear is on 1/32" dia. wire with 1/16" plastic tubing slipped over the wires and mashed to a steamlined shape in a vise. The engine cowling is carved from a balsa block hollowed out to approximately 1/8" wall thickness. A ring cut from 1/8" plywood is glued into the front of the blocks to hold the dummy crankcase, which is made up of 1/64" ply rolled and cemented to the 1/8" ply ring. The Gnome engine cylinders are then glued to the 1/64" plywood tube. Make the dummy cylinders of 7/16" dia. dowel turned on a lathe or drill press and form the fins with a thread file. (A thread file is a tool used to clean up damaged threads on bolts etc.) You will find that with a little practice you can make perfect fins, evenly spaced, even on curved surfaces such as the Gnome engine cylinders have.

Carve the prop of bass wood or hard balsa. The wings and tail surfaces are built in the conventional manner with laminated wing and tail surface outlines of 1/16" x 1/32" railroad stock. Make templates of the wing and tail surface outlines 1/16" smaller than the surfaces to allow for the two pieces of



What will truly amaze you is the ease of turning down some fine fin detail on a balsa cylinder. **Above:** Skid to a stop. The theory was that with tail down, earth friction would save you. Maybe! **Beneath:** Tissue can't slump much with enough ribs. The scale-like structure is fun to frame out.

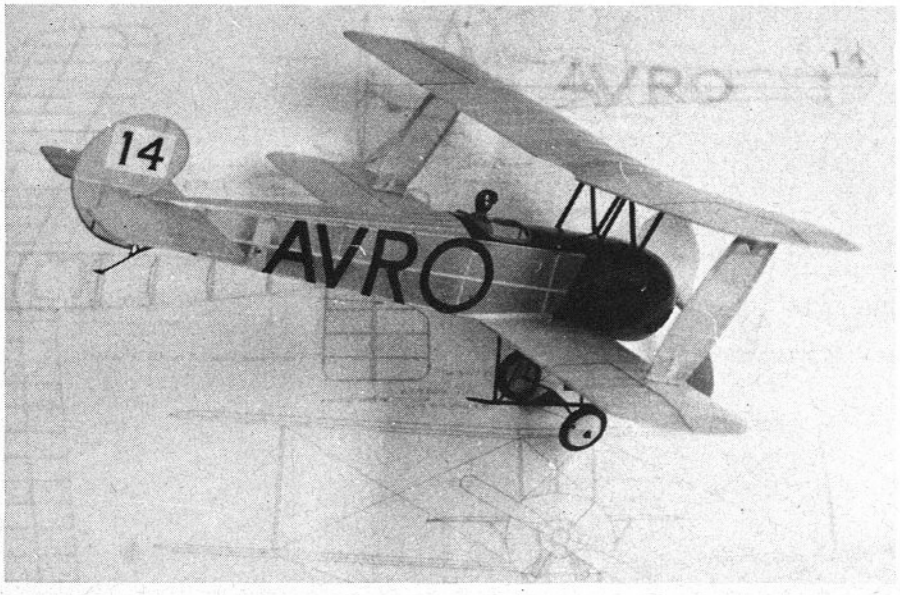




For you to glue. Something for a frosty winter's evening. Nothing tough in this structure, it's logical in frame, satisfying for the craftsman.

Below: From plan to finished product. Notice tissue covering wing struts. Antique designs all contributed something new toward a better aircraft.

1/16" x 1/32" wood. Wax the edges well with a colored crayon so you can tell that they are well covered with wax. Thin out some tight bond glue 50-50 with water and spread it on two pieces of the 1/16" x 1/32" railroad stock (available for model railroad construction material) and place the glued surface together, making a 1/16" square strip. Start at one end of the wing template, pulling the strips as you pin, especially around the curvatures. Let it dry overnight, then remove. Add 1/16" square balsa to the leading edge outline to form a 1/16" x 1/8" section.



The wing ribs are 1/32" x 1/16" balsa, bent over a light bulb. The bottom of the wing is flat, the same as the original airplane.

Wings of the "511" are of the knock-off type, using 1/16" dia. aluminum tubing in the wings and 1/32" dia. wires within the center-section and fuselage. The wing struts are attached to 1/32" ply tongues with toothpicks and the landing and flying wires are attached to the wing struts. The lower flying wire from the landing skid attaches to the lower wing with a small wire hook glued to the strut tongue on the bottom side of the lower wing. In this way the model can be broken down into a small box to transport to distant contests.

Cover the model with lightweight Jap tissue. Use two coats of 50-50 nitrate dope and thinner. My model is yellow and black and is very attractive with this scheme.

Test Flying

Power the model with four strands of 1/4" flat rubber. I would suggest short flights at first with about 300 turns over tall grass, until the model is properly adjusted.

I believe this model could be successfully flow with electric power or a small gas or diesel engine of not over .030 displacement. All reference information for this model was taken from Peter Lewis's book, British Aircraft 1809-1914.