

AVRO G of 1912

15½ inch wingspan
rubber powered
indoor biplane flier

HAS radio control depressed you? Control-line got you going around in circles? Getting too old to tow two gliders? Chasing free flight models a pain? Can't spend the time needed for free flight scale? But still like aircraft that *look* like aircraft? You need INDOOR FLYING SCALE!

That is the solution offered by Harold (Bill) Warner, organiser of the indoor flying scale meetings being held regularly at the Sepulveda California Junior High School in the U.S.A.

Historically, indoor scale has been with us for a long time, probably for about as long as aircraft of the man-carrying variety have been around. Very early issues of "Flight" show examples of Bleriot's, Antoinettes, and the like, which were flown indoors. Even the tiny paper gliders of that era sometimes approximated the general outlines of specific flying machines.

More recently, round-the-pole flying scale has held the interest of a fairly sizeable group of modellers, who appreciated the small flying site requirements coupled with protection from the elements.

In the Twenties and Thirties, a few indoor flying scale models were published in the various magazines, but evidently, the type was overshadowed by the "super-light" microfilm competition aeroplanes, and remained essentially a novelty, with few dedicated adherents.

**Designed for Golden Wings Club
by W. C. Hannan, who explains
indoor scale competitions.**



During 1963, a small group of Southern Californians began to take a fresh look at indoor scale, as a means of providing some fun, low-cost club events. Two organizations, the Wilmington Model Airplane Club, and the North American Flightmasters, formulated rules, which were deliberately kept simple, in order to attract the maximum number of entrants. One set of rules were designed to accommodate built-up (tissue covered) models and this category has proven to be very popular. The other set of rules were aimed at an easier to build, all-sheet balsa type of model. Briefly, these rules are:

1. Model subjects must be of a heavier-than-air man carrying aircraft.
2. Propeller length is limited to 35% of the wing span.
3. Model must be of all-balsa construction (no tissue).
4. Proof of scale in the form of 3-view drawings must be furnished to the judges by the contestant (when a rare aircraft is modelled and 3-views are not readily available, good photos are allowable).
5. 50 points are possible score for fidelity to scale and workmanship.
6. Flight points are awarded on the basis of one point per second, with an R.O.G. start.

Two classes are recognised; monoplane and multiplane.

And there you have it! At long last, a fun event for scale enthusiasts! Even the busy business man can scrape together enough time to build an all-sheet, and the poorest junior can easily afford the minimal amount of material required.

Make no mistake, however, the flying part of the game is where the practice is needed! Trimming a small model to fly within a limited area is not quite as easy as one might suppose. The paramount rule is: Build them light! the lighter the model, the slower it can be made to fly, and the less will be the power requirements. We try to achieve prop-run flights, which means that the model lands as the power runs out, rather than trying to obtain a glide from altitude. With a low ceiling, we have the best results by flying the aircraft in a left turn circle, which enables the model to use up its initial power burst at a low altitude.

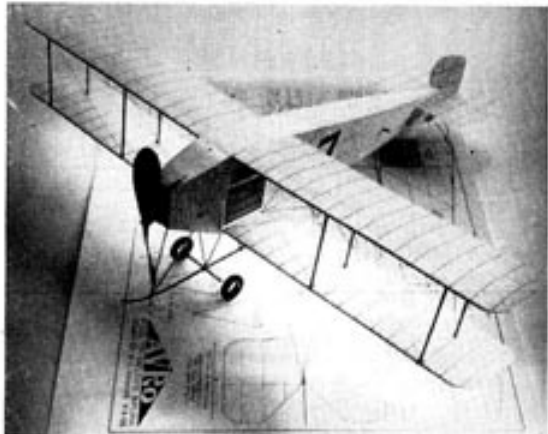
With high ceilings, a right turn is the more logical approach. This is not to be taken as an ironclad rule, however, as some models seem to exhibit a natural tendency to fly in a given direction, and will stubbornly resist efforts to change them!

Generally, turn adjustments are made by offsetting the thrustline slightly (trim and shim the thrust button), but slight bending of the rudder is sometimes indicated. Excess zooming or diving tendencies are also more effectively controlled by altering the thrust line up or down to suit, rather than resorting to elevator bending.

We find that there are two basic categories of competitors at our events. One is the endurance fiend, who sort of likes scale models; the other type is the research-for-authenticity bug, who hopes that his model may somehow manage to fly. The Avro is intended to fit somewhere between these extremes.

The real Avro "G" was entered in the Military Trials of 1912, and was the only entry with an enclosed cabin. Well, almost enclosed. According to the December 19, 1912 issue of *The Aeroplane*, "The 'windows' are not covered at all, but the only wind felt is the side draught when banking in a turn." The "G" also had the unique distinction of being the first aircraft in which a letter was typed, while airborne.

The "G" was fitted with a four-cylinder 60 h.p. Green engine which provided a maximum speed of approximately 62 m.p.h. In spite of being a winner in the minimum fuel consumption test, and the quick assembly test, the "G" was not favoured with any sizeable Army awards because of being underpowered.



The Avro G with its simple construction and low cost make this an ideal junior project. With a 4 in. diameter plastic propeller this prototype made an indoor flight of 27 seconds. With patient trimming, flights of 30-35 seconds should be possible. It could also be modified to Round-the-Pole flying by fitting a Cox TD .010 glow plug engine.

Construction of the model is quite straightforward, and the drawings should be nearly self-explanatory. Of particular importance is the selection of light balsa. The model's strength is based upon its configuration, not upon rugged materials. After the fuselage has been assembled, it should be given a careful overall sanding to further reduce weight, especially in the non-stressed area aft of the rear rubber peg. Note that the bamboo tail skid is fastened to the rear of the fuselage alongside the rudder, leaving the rather delicate rudder free from stresses. (On the real "G", the metal-shod lower rudder was actually used as a tail skid).

The various "rib lines" etc., are drawn on the balsa with a thin marking or ball-point pen, while the figure 7 is cut from black tissue and clear-doped to the fuselage sides. The dummy radiators are drawn in ink on tracing paper and glued to both sides of the fuselage.

The cowling is covered with aluminium-painted paper or thin aluminium foil, which lends a realistic effect, with very little weight. The louvres and other details are easily simulated by embossing them with a stylus prior to attaching the paper or foil to the fuselage.

Some of you may query the non-scale plastic propeller, but let me state that while it may be possible to improve the performance with the aid of a carefully created balsa prop, the time involved would see you at least half-way through another all-sheet model! And besides, we need weight up front anyhow, so why not in the form of a nearly crash-proof prop!

While the author's model sports a set of home-made pseudo-spoke wheels, the real aircraft featured a set of covers over the spokes, so why not relax and fit a solid balsa pair to your "G"?

Be sure that the finished model is free from warps. The original required additional nose ballast, a bit of left rudder, and slight wash-in of the lower left wing in order to fly in left circles under the 23 ft. ceiling at Sepulveda Junior High School. Power is provided by a single loop of $\frac{1}{4}$ in. flat rubber about 12 in. long. If more power is needed to make the model climb, shorten the loop. The model is built rather ruggedly for durability, and weighs slightly over $\frac{1}{4}$ oz., less rubber. Its performance could be improved with weight reduction, and conversely, a lot more rigging could be "hung on" by the purist. The choice is yours, but please remember, the name of the game is fun!