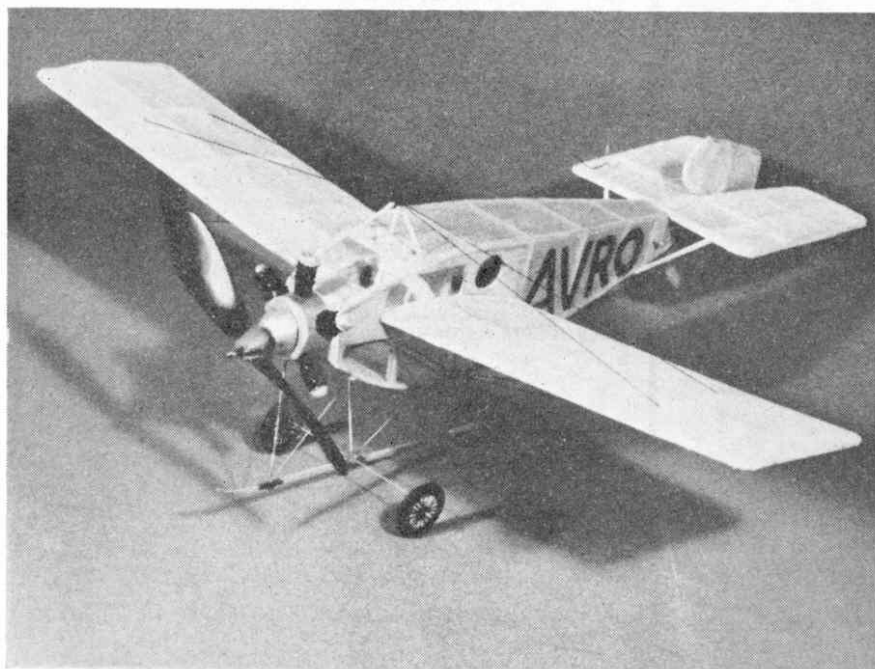
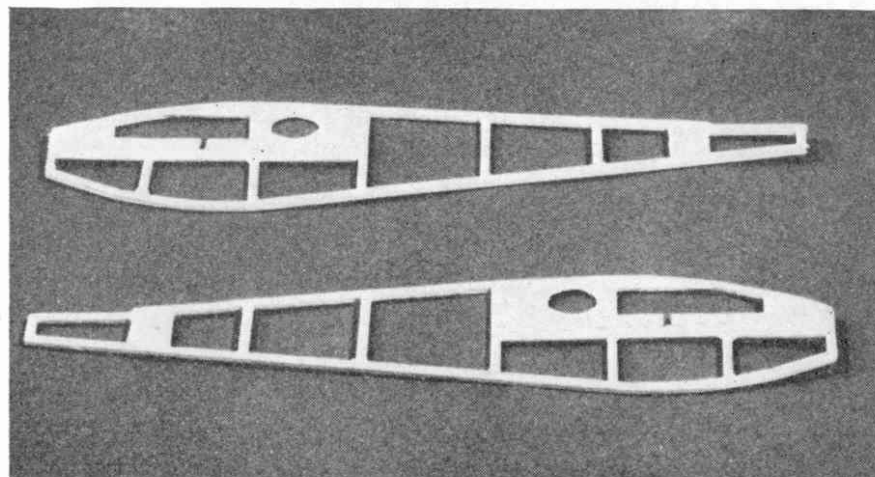


# THE AVRO-F

Build this first-ever cabin aeroplane exclusively modelled for Meccano Magazine by Ray Malmström



(Above) The completed model of the Avro 'F' ready to fly. (Below) The two fuselage sides are identical and therefore can be built at the same time for identical size and shape.



ALL of us owe a great deal to those gallant men who started out, over half a century ago, to conquer the air. The model we are presenting this month is a scale model of the Avro 'F', which first flew in 1912 and was designed by A. V. Roe. Its span was 29 feet, length 23 feet, loaded weight 800 pounds, and it was powered by a 40 h.p. five-cylinder 'Vale' engine. Also, it was the first cabin-type aeroplane in the world. Our model Avro 'F' does require a little skill and care to build, but it flies well and will capture for you some of the excitement and suspense of those early days of flying.

The stages for building the Avro 'F' are shown in the 'easi-build' sketches, so we are confining these instructions to advice on the trickier stages and to notes on test-flying your model.

When adding the sheet cabin sides to the fuselage side frames, make sure the outline of the wing rib is accurately drawn on the cabin sides. This outline will assist you when you assemble the wings to the fuselage and to line up the wings at the correct incidence angle.

Cover the fuselage and fill in the cabin windows with thin cellophane. Use lightweight tissue for covering, water shrink and give one coat of clear dope. Do this before cementing the tailplane, fin and wings in place.

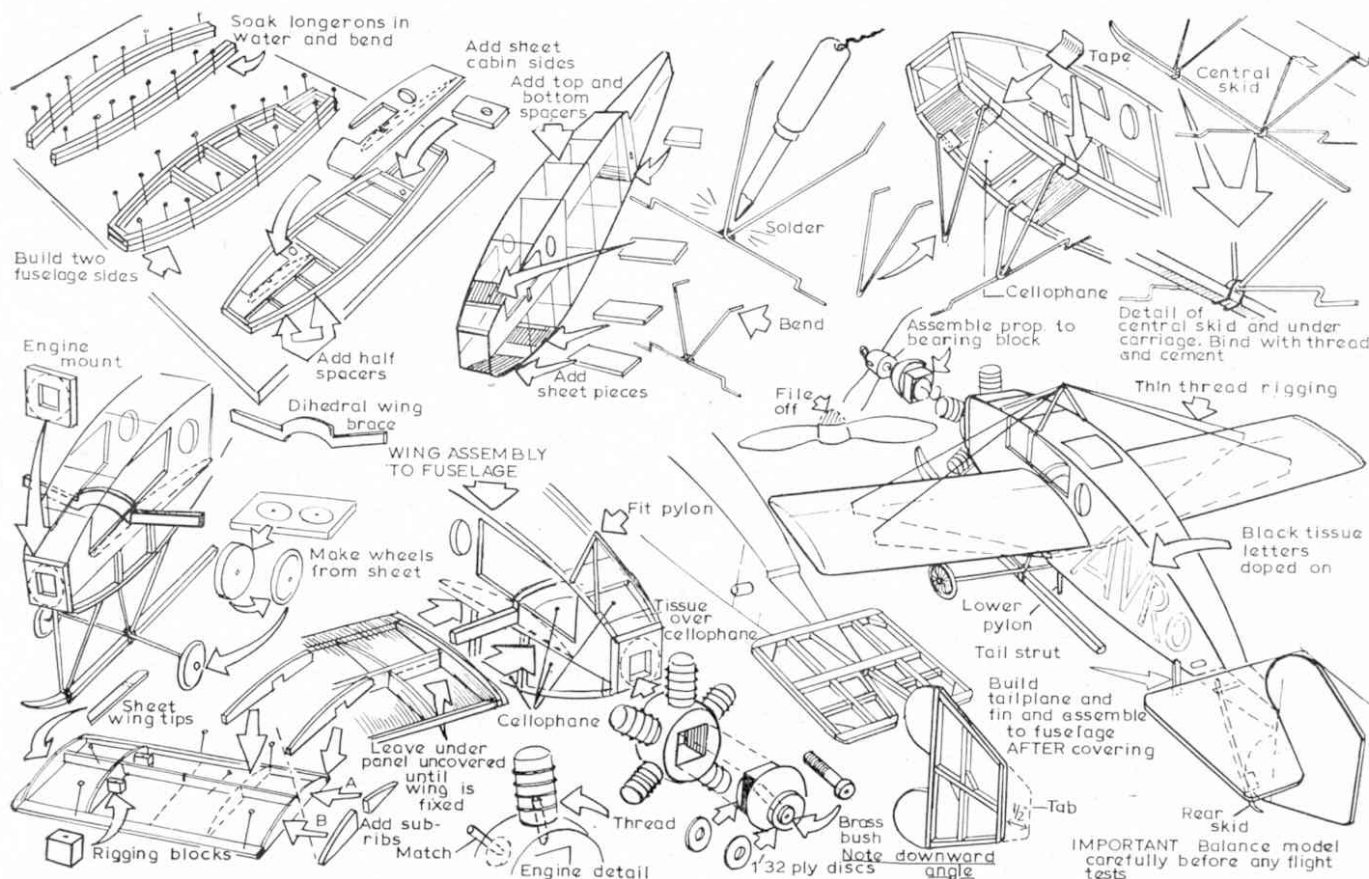
Before binding the bamboo central skid to the two undercarriage 'V's, moisten the front  $\frac{1}{4}$  inch and bend up gently. Around the thread binding rub a coating of balsa cement. Build the two wing panels as shown. You will need a tracing for the port wing panel. When covering, leave the inner underside panel open. This will help you to make an accurate union between the wing main-spar and the wing dihedral brace.

## The correct dihedral

After the wings have been assembled to the fuselage, check that there is an equal amount of dihedral under each wing tip. The inner underside wing panels may now be covered, shrunk and doped. The wing bracings, so characteristic of these early aircraft, may be omitted if desired, but the original model has made dozens of flights without damage to the thread bracing and there is no doubt that the bracings add much to the 'old timer' look of your Avro 'F'.

Note that the 5 inch diameter K.K. plastic propeller has the cone of the spinner filed off. Very few early aircraft had the refinement of a spinner over the hub of the propeller. By the way, a 5 inch diameter balsa propeller fitted with a free wheel clutch, would increase the duration of flight. One important point, check your construction frequently, using a set square. Also, use coloured tissue on your Avro 'F', not coloured dope, as this adds too much to the finished weight of the model. The engine should have the crankcase painted silver, the cylinders black and the cylinder heads silver.





Your Avro 'F' will need a little nose-weight and small pieces of sheet lead or folded cement tube, should be cemented into the noseweight recess shown on the plan. The rubber motor is a loop 15 inches long of  $\frac{3}{16}$  inch wide strip rubber. This should be well-lubricated with rubber lubricant before being installed in the fuselage. Balance your model carefully and choose a calm day and long grass for flight-testing your Avro 'F'.

Glide the model adding or removing noseweight until you get a straight glide. For the first powered flight, wind the motor about 150 turns and launch the model gently into the wind. Avoid throwing the model.

Our original model flew best turning gently to the left as it climbed. To achieve this, a small  $\frac{1}{16}$  inch square piece of balsa is cemented on the right-hand

side of the engine, model viewed from rear, between the front of the crankcase and the removable bearing block.

A small trim tab made of stiff paper, may be added to the fin for fine adjustments, without spoiling the model's scale appearance. Maximum turns on the lubricated motor are about 650. Finally, do wait for a calm day for flying your Avro 'F'. Remember, the full-size original, back in 1912, couldn't fly in a gale! On a calm day, the steady realistic flying of your model will amply reward your patience.

#### List of Materials

- 6 Strips  $\frac{3}{32}$  in. by  $\frac{3}{32}$  in. by 36 in. balsawood.
- 1 Sheet  $\frac{1}{16}$  in. by 3 in. by 36 in. balsawood.
- 1 Sheet  $\frac{1}{8}$  in. by 3 in. by 6 in. balsawood.

- 1 small piece of  $\frac{1}{8}$  in. sheet balsawood.
- 1 length  $\frac{1}{8}$  in. by  $\frac{1}{8}$  in. by 12 in. bamboo or cane.
- 1 small piece of  $\frac{3}{32}$  in. plywood.
- 1 short length  $\frac{1}{8}$  in. diameter dowel rod.
- 1 36 in. length 20 s.w.g. piano wire
- 1 20 s.w.g. brass bush.
- 2 20 s.w.g. cup washers.
- 1 K.K. 5 in. diameter plastic propeller.
- 2 yards thin thread.
- 12 in. linen tape  $\frac{1}{2}$  in. wide.
- 1 sheet lightweight tissue (white)
- 1 sheet lightweight tissue (yellow or brown).
- 1 small piece of black tissue.
- 1 sheet 6 in. by 6 in. thin cellophane.
- 1 length 30 in. by  $\frac{3}{16}$  in. strip rubber
- Strip of cored solder.
- 1 tube balsa cement.
- 1 small bottle of clear dope.
- 1 tube of rubber lubricant.

(Left) Wing Panels, tailplane and fin frames. (Right) Fuselage assembled and awaiting the fittings of wings, etc.

