

by D. M. COLLINS

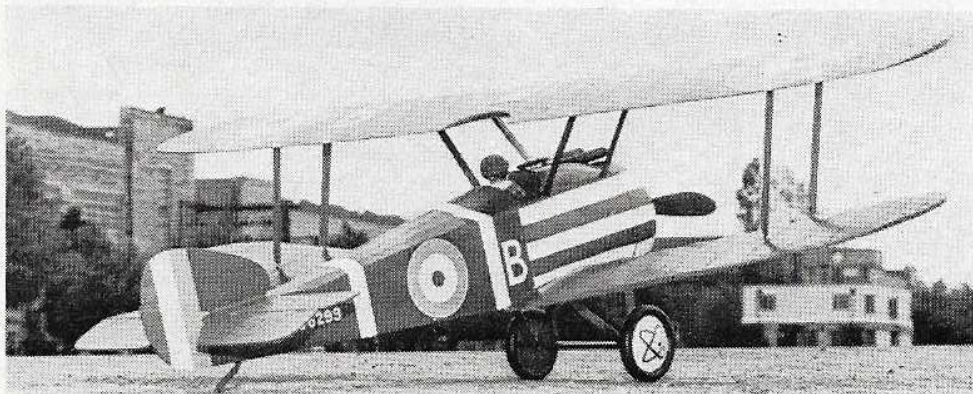
Your FREE plan! A 28" span free-flight scale model using 0.5 to 0.8 c.c. engines

THE CAMEL, in the eyes of the author, was quite the most fascinating aircraft flown in the First World War and by all accounts also the most effective in terms of enemy aircraft shot down. However it has some very obvious shortcomings as a flying scale subject which should be borne in mind by the builder. The full size aircraft was tail heavy and the model will be also unless care is taken to keep the fuselage aft of the cockpit, and the tail assembly, as light as possible. Use the lightest balsa available and limit the number of coats of dope applied at the tail end. Some relief from the C.G. problem can be obtained by making a really robust cowling of glass fibre with about $\frac{3}{8}$ in. wall thickness, or at least by covering a balsa cowling with a layer of glass fibre. The other problem is the small tail moment available with the scale tail area. One solution is to have a pendulum operated elevator. Pendulum controls are often justifiably criticised on the grounds that acceleration of the whole model will make the control operate, but remember that the only *significant* change in forward speed occurs at the launch and in that case the slipstream quickly damps out any such oscillations. Some folk limit the movement of the control surface, but the designer prefers to limit the weight on the pendulum relative to the control surface area, and rely on aerodynamic damping. Do not increase the weight 'for good measure'. The outline is to scale although the wing section is thickened to improve warp resistance and give more docile flight characteristics. Rigging wires are not needed for flight which speeds up assembly time after hard landings,



especially with cold fingers in the winter! Of course they may be added by the meticulous using shirring elastic thread, but on small models this often looks overscale. Engine installation is a bit of a problem due to the shallowness of the cowling. This does seem to rule out those trusty Mills .75s but the original flew well on a D.C. Dart .5 c.c. and the D.C. Merlin would also be suitable. Small glow motors are out unless they can swing a 7 in. x 4 in. prop at a reasonable speed. Incidentally the torque of a Dart on a 7 in. x 4 in. can be improved by making a conrod .02 to .05 in. longer between the centres of the big and little ends. This reduces the exhaust and transfer periods of the otherwise high speed timing. Fortunately Darts will start and run without any adjustment of the controls once they have been warmed up, so for this reason no external access to needle valve or compression screw is provided. If you must 'twiddle', you will have to make an extension handle for the compression screw, the gap between the prop and the top wing is too small unless you have unusually high aspect ratio fingers! Alternatively the motor can be inverted, with appropriate adjustment to the thrustline, and the compression screw extended backwards by soldering on a wire to come out of the cowling bottom vent area. Construction is quick and simple for a scale model but the following points will help guide you on your way.

Start the fuselage by cementing a piece of $\frac{1}{8}$ in. sheet on top of the engine bearers to give the correct spacing, then bind and cement on the pendulum assembly. The cabane and undercarriage wires are



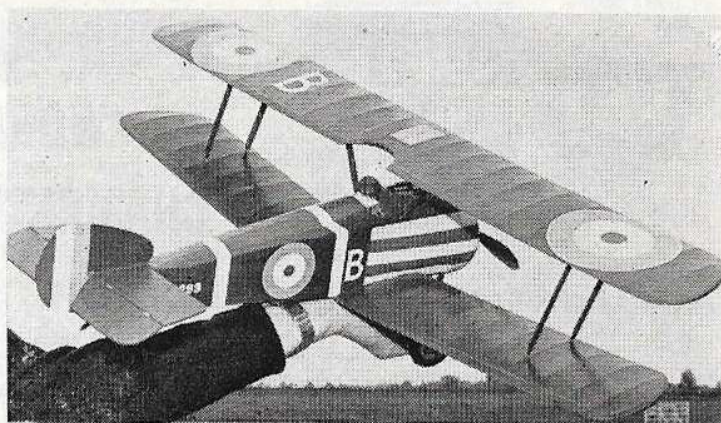
Heading pictures show the designer hurling his brightly decorated Camel off into the blue for yet another quick sortie around the airfield. At left, looking most realistic, the Camel poses on the tarmac in front of the building at R.A.F. Hullavington during the '71 Nationals.

bound and cemented to their formers F1 and F2 before cementing them to the bearers. If F1 is positioned at the edge of the building board so that the undercarriage legs dangle over the edge, then F1, F2 and F3 may be joined to the fuselage sides the right way up over the plan view. When this assembly is really set the fuselage sides may be pulled together at the sternpost and the other formers added. The cowling can be made by turning a wooden pattern to the required outside diameter, moulding a female glass fibre or plaster mould from this and finally the required cowling inside it. Rather roundabout perhaps but you should end up with a good external finish, but don't forget the parting agent! Children's crayons are good for this – most wax polishes contain silicone which stops the resin setting. Alternatively, make a conventional balsa cowling, a little undersize, cover with glass fibre and file smooth. The press studs for the cowling are quite simple to install, just press three pairs together with a scrap of thin polythene sheet between each. Wedge the fuselage up on end with F1 horizontal and put a dab of epoxy resin on each face of the studs and all round the plywood former in the cowling, put the studs on F1, then the ply former, finally place the cowling over the former. It will be necessary to make holes in the ply former to accept the pip on the sprung half of the press stud and allow it to seat down properly.

The wings are conventional until you come to the press studs which are sewn to the ply strips. When these are cemented in the wing use them to locate the mating parts on the cabane while soldering. Bind the 'pip' part to the cabane with a few turns of fuse wire. Press the studs together with the wing on a level surface and the model inverted. Check that the wing is straight by equalising the distance from each wing tip to the tail – a piece of cotton makes a useful check. Tack solder the studs to the cabane wires, separate the wing from the fuselage and finish the binding and soldering. If you prefer, extend the top rails fore and aft and use rubber bands to hold the wing on. You will then need to sheet over the wing top surface at these bays with 1/16 in. sheet.

All surfaces are covered with lightweight Modelspan tissue, white underneath and dark blue on top to give 'body' to the colour finish. Two coats of well thinned clear dope and two of well thinned 'Olive Green' on the top surface are sufficient. Olive green can be made by mixing two parts green with one part red, the result should be more brown than green. Roundels and markings were taken from the *Profile Publication* No. 31 and are applied with thinned Humbrol enamels using spring bow ink compasses to set out the roundels. Finally the fuselage was fuel proofed only as far back as the cockpit. The more elaborate silk-on-tissue covering method described by Eric Coates in his recent articles should almost eliminate maintenance between flying sessions.

With the model completed, it is most important to get the balance point right, do not attempt to fly with the balance point further aft than shown. The designer uses a range of spinner nuts turned from hexagon bar to add weight to the nose – as a guide the original model weighed 10½ oz. ready to fly. Do not assume that the pendulum eliminates the need for trimming, it doesn't! The elevator should be parallel with the tail surface (i.e. neutral) when the model is held with the nose approximately 20 degrees down. A few smoothly launched test guides should be made to check that the glide is straight or with a touch of right turn. It is difficult to glide the model without a few oscillations of the pendu-



Only a small model, but a great flyer with only a little power needed to stay aloft. Glow plug engines are not really suitable for this type of model due to their high revving characteristics – a diesel will turn a larger prop at moderate speed.

lum occurring so do not worry too much if the elevator trim seems a little out. A few flights with increasing power will establish the engine sidethrust – aim for a turn to the left under power and a gentle glide to the right. Adjustments can be made to the glide angle by gently bending the elevator horn. If the glide is right but it stalls under power, then you need more engine downthrust. The model will take off from a runway surface followed by a steep straight climb; as the speed falls the pendulum should get the upper hand and just prevent any stall developing. Happy Fokker hunting!

Press studs are used extensively on this model to retain both the upper wing and the glass fibre cowling. Interplane struts are quickly detachable and will fly-off in a 'prang' – thereby saving damage for the model. Note realism of the pilot – carved from balsa.

