



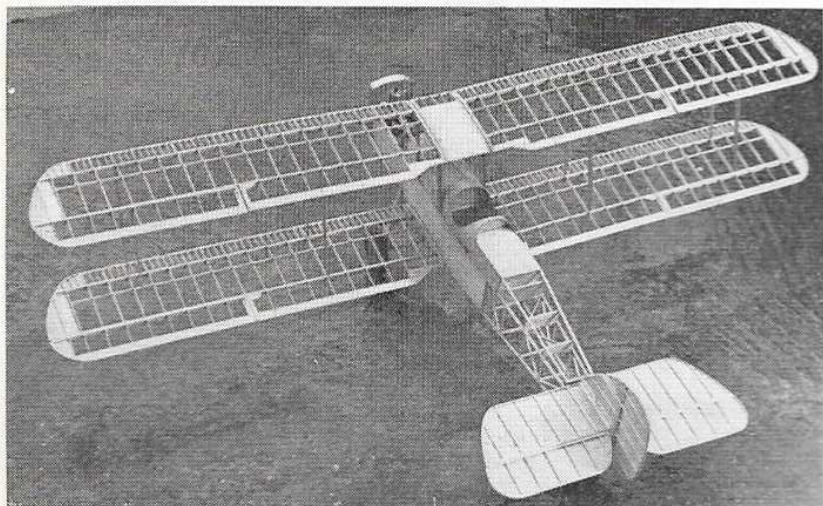
ERIC COATES'
 $\frac{1}{8}$ th scale, free flight
 replica of De Havilland's
 bomber is a real winner -
 ask any contest judge!

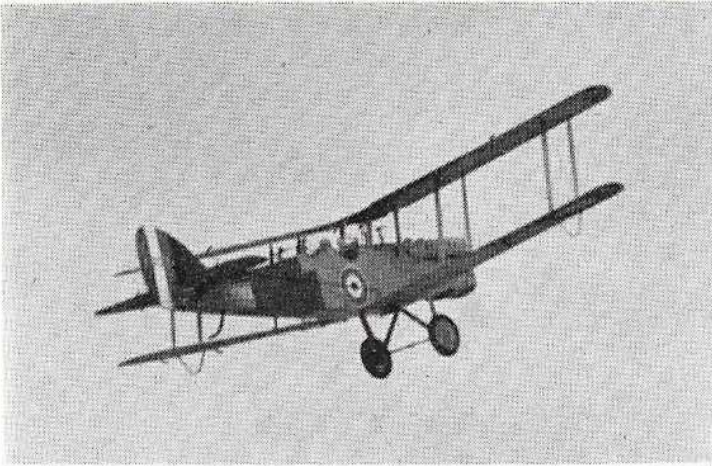
Use a 1-1.5cc diesel
 engine for a superb,
 stable flyer.

De Havilland D.H. 9A

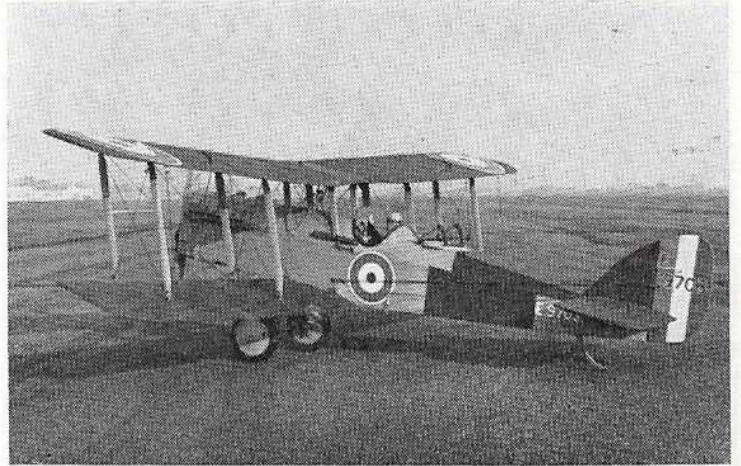
FIRST APPEARING in 1918, the D.H.9A was probably the best single-engined bomber of the First World War. With a top speed of 123 mph and a maximum bomb load of 750lb., it was the culmination of the remarkable development of British bomber design in the relatively short (four-year) period since the commencement of the war. Like the much better-known Lancaster bomber of the Second War, it evolved from previous designs which were far from satisfactory - in the case of the D.H.9A these predecessors were the D.H.4 and the D.H.9. The D.H.4 was a very fast machine, when powered by the Rolls-Royce Eagle engine, but communication between the crew (who were separated several feet by the petrol tank) was almost impossible. The D.H.9 was designed to rectify this problem; but, unfortunately, the B.H.P. engine fitted was woefully lacking in power and subsequently the D.H.9's performance was much inferior to the earlier '4'. This fault was rectified by fitting the 400-h.p. American Liberty motor - the vast engine giving the D.H.9A, as it then became, its unmistakable bluff front end, so useful for hiding a long-stroke model engine! The extra weight of the Liberty necessitated the wing span being increased from 42 to almost 46ft, and in this form it became one of the truly great aeroplanes of the Royal Air Force. Although only operational for the last few months of the war, it remained in service until the early 'thirties.

Now to the model. I built the prototype during the early months of 1972, completing it in time for the



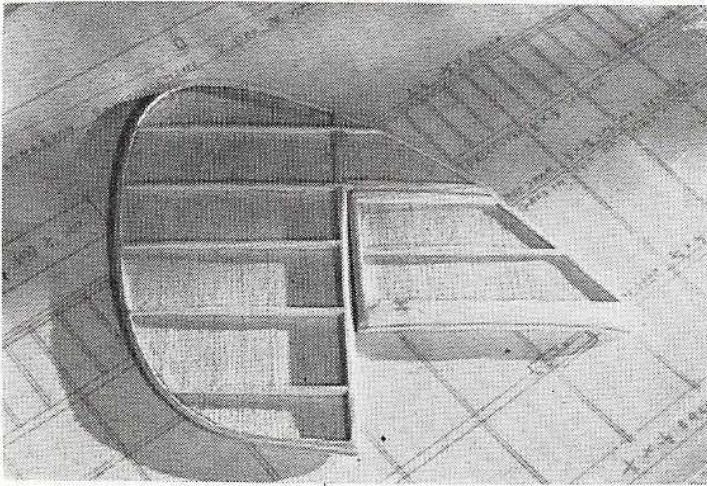


Nationals, but unfortunately it did not behave too well that year, apparently lacking longitudinal stability, and was easily induced into a stalling condition. In the winter of '72/'73, I critically examined the model and decided that the trouble probably lay in the relatively short tail movement, so I moved the C.G. half an inch further forward. The model was then re-trimmed: test glides allowed the elevators to be brought back to the horizontal – previously, they had to be depressed about 5° to prevent a stall. More downthrust was then found to be necessary in order to keep the nose down with full power on. When re-trimmed in this forward C.G.



configuration, the 'Ninack' has been one of the most consistent flyers I have ever had, and this is reflected in the results of the 1973 Scale contest season, when it was entered in five contests – and won all of them!

These competitions included the *Super* at the Nationals, the *Eddie Riding* at Woodford, and the *Selby* at the Northern Area Rally. The model is 'bang-on' scale: tail areas are exact, the dihedral is correct at 3° , providing ample lateral stability, while wing incidence and section are also exact scale. Although thin, the spruce spars, assisted by the working bracing wires, are adequate to carry the loads. The design is the culmination of over



All the tail surfaces consist of a central core of $\frac{1}{32}$ in. balsa sheet, to which are added the half ribs and balsa strip outlines either side – this results in a thin warp-free section.

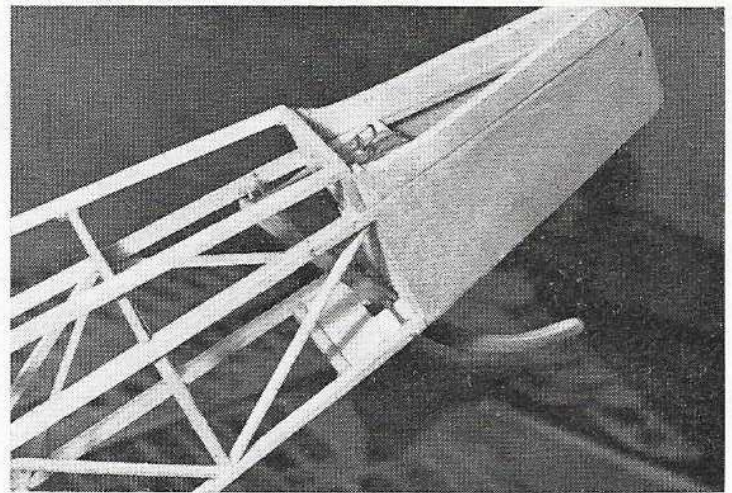
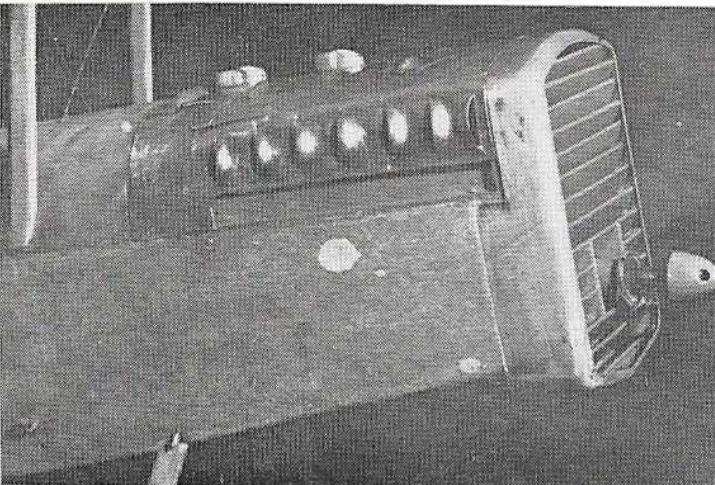
twenty years of development of practical working-scale structures which look delicate, yet are strong enough for years of hard flying. The structure is designed to bend and 'give', in an awkward landing, rather than knock off. The only part I have reservations about is the undercarriage – I normally fit a torsion-bar type on this class of model, but for the sake of authenticity I fitted a rigid job, allowing the scale bungees to do all the work. This has performed well since the model has been re-trimmed, but some of the early, stally flights caused the rear legs to bend and splinter the fairing. I issue this as a warning to prospective builders!

Over the past few years, I have covered in great detail the construction of scale models, such as the 9A, in *Flying Scale Column*, and therefore do not intend to do so again, but will highlight one or two of the less obvious points.

Fuselage

This is relatively simple, but incorporates several novelties. In full-size practice the fabric covering is not stuck to the structure, but is laced to the longerons and one or two uprights only, so in order to achieve this appearance on the model the longerons have $\frac{1}{32}$ in. \times $\frac{1}{16}$ in. overlays to keep the covering away from the uprights. In order to impart torsional rigidity to the rear fuselage, $\frac{1}{8}$ in. \times $\frac{1}{16}$ in. diagonals are fitted – formers 11, 12 and 13 are under-sized to lie beneath the stringer/longeron line. These formers, and all diagonals and uprights, are greased with a candle to prevent the covering adhering. Some

Nose cowlings and radiator shell are beaten from aluminium, both as described in previous 'Flying Scale Models' series. Techniques are simple once hardwood formers are made.



View of fuselage rear end reveals the sprung tailskid (note elastic band from top of skid to piano-wire hook) and $\frac{1}{32}$ in. sheet balsa stiffening below tailplane mount.

$\frac{1}{8}$ in. sheet is let-in solidly between formers 2 and 6 and local $\frac{1}{8}$ in. sheet reinforcement is used in the region of the curved portions of the longerons between formers 6 and 8. The upper deck between formers 6 and 10 is 1mm ply, while $\frac{1}{32}$ in. balsa sheet is laid over the flat portion of the fuselage between former 3 and the first upright aft of former 8. The ply, $\frac{1}{32}$ in. sheet and $\frac{1}{32}$ in. \times $\frac{1}{8}$ in. overlays, will therefore all 'flush up' to a smooth outline. All the nose cowlings are beaten from 22 swg soft aluminium – don't worry about how heavy the nose is, it will save ballast later.

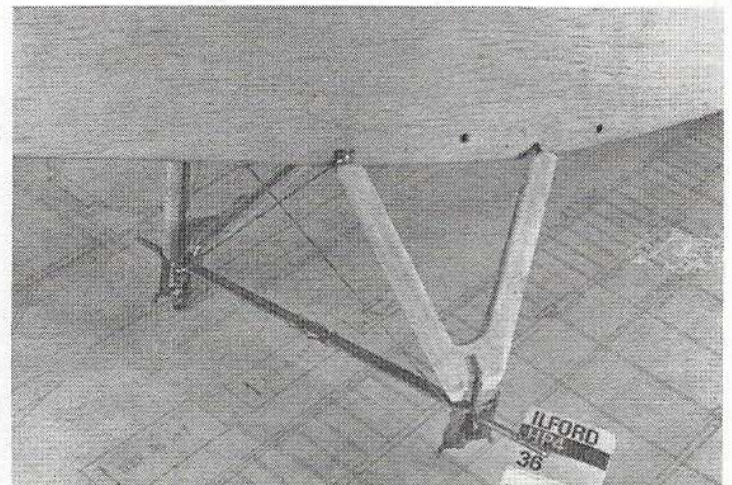
Centre Section and Cabane

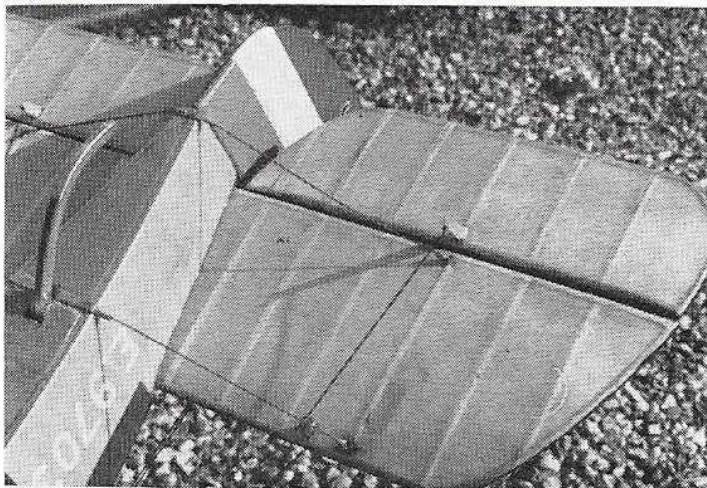
Sixteen swg tubes are epoxied to the forward face of former 6 and the respective cross members prior to covering the top decking with ply. The 16 swg cabane struts, enclosing the upper tubes, are entered into the fuselage tubes after the decking is fitted – the cabane struts are then braced with 22 swg tie wires soldered to their extremities. The centre section is then epoxied to the upper cabane tubes prior to covering with $\frac{1}{16}$ in. sheet. Make sure that the cabane struts work freely in their respective tubes; the idea is to allow the centre section to distort in a prang and not tear out of its mountings. Finally, epoxy $\frac{3}{32}$ in. \times $\frac{1}{8}$ in. fairings to the forward edges of the cabane struts.

Tail Surfaces

These are made by marking the position of all spars and ribs on either side of $\frac{1}{32}$ in. sheet, cut to outline shape.

Undercarriage detail reveals axle bound to spreader bars at centre and sprung with rubber band 'bungee'. Axle travel limited by slots in fairings.





Underside of tailplane - note 22 swg bracing wires soldered to tinplate tags epoxied to framework. Rib tapes are from heavy-weight tissue doped over the silk covering.

The structure is built up either side of the sheet and then sanded to the sections shown (the curved edges can best be produced by nicking the inside of the strip, at about $\frac{3}{32}$ in. intervals, with a thumbnail).

Wings

Apart from the rather large number of ribs and riblets, the wing construction is quite straightforward if a little tedious - centrally disposed spars are used, as on the original, so as not to foul the fabric surface. The ribs are pushed onto the two main spars *en bloc* and then slid out to the correct spacing. Spars are then pinned down over the plan with suitable packing interposed. The $\frac{1}{16}$ in. \times $\frac{1}{8}$ in. auxiliary spar is let in $\frac{1}{16}$ in. below the upper surface and the slots in the ribs filled with portions of $\frac{1}{16}$ in. square - this spar is fitted to prevent elliptical dihedral forming after covering. Tips are made in exactly the same manner as the tail surface. The interplane strut clips are epoxied to the spars, and the bracing wire guidance tubes are similarly attached to the forward face of the spars at the inner strut position. In order to facilitate covering, 'hard points' are glued to the ribs at the interplane strut positions.

Covering and Finishing

The whole model is covered with lightweight Modelspan tissue, clear doped, and is then covered again with lightweight silk to obtain a strong and realistic fabric finish. Wartime D.H.9A's were painted in the standard P.C.10 khaki on the upper surfaces, and clear doped underneath. Many had the forward fuselage painted pale grey - E.9903; the subject I based my model on was so finished. After the war, most D.H.9A's were silver doped overall. For a concise compendium of '9A' photographs and colour schemes, I would recommend the purchase of *Profile*, No. 248, D.H.9A (R.A.F. 1918-30), by Chaz Bowyer. This slim volume is packed with information about the venerable aircraft, and will give full details regarding the multitude of hardware which was hung from this maid of all work, but do not regard the drawings as the ultimate in accuracy.

Rigging

The wing bracing wires are made from lightweight control line wire. Sufficient friction is developed between this wire and the angled tubes at the inner interplane struts to hold the wings under normal flight loads, with the assistance of 12 swg dowels. During a prang, however, the wires freely run through the tubes, allowing the wing cell to distort.

The tail surfaces are braced with 24 swg piano wire soldered to tinplate tags which are epoxied to the structure. All incidence wires and control cables are made from black shirring elastic.

Flying

The original weighed 33oz. when ballasted to the correct forward position. The glide is fairly fast but flat, and due to the drag a fair rate of sink also exists.

Power flights are made slowly, increasing the power from an extended glide to the point where a slow left-hand climbing turn is achieved - if a tendency to stall is noted, then further downthrust is applied to the engine by placing washers under the rear lugs. The elevator and rudder are attached to the tailplane and fin respectively with stiff tinplate hinges - trim changes are achieved by small angular adjustments of these surfaces.

When trimmed, the take-off performance of the 'Ninack' is perfection, with no tendency to veer left or right, just a long straight run followed by a clean climb out. The axle, however, is only about $\frac{1}{2}$ in. forward of the C.G., therefore a smooth take-off surface is necessary; otherwise, a nose over can occur at the commencement of roll.

This is not the simplest of scale models to construct, but it is not difficult for anyone who has successfully built and flown a scale model previously. Providing the C.G. is kept well forward, trimming is relatively simple and the model possesses ample reserves of stability for flying in quite breezy conditions. It also looks *very* impressive in the air.

'Old Faithful' - Eric still prefers the 'slogging power' of the long-stroke Mills 1.3cc diesel, sadly no longer in production. Motor is mounted on 12 swg light alloy plate, which allows for easy adjustment of thrust line.

