

An 'old fashioned'  
interest rekindled  
by ...

**KEN  
McDONOUGH**

with his 40" span,  
one-twelfth scale,  
rubber powered

## DOUGLAS O-38

A RARE SIGHT INDEED in these 'instant, easy modelling' days, is that of a rubber powered scale model flitting across the skies, the only noise being that of a large propeller turning slowly, and the skein of rubber vibrating inside the hollow fuselage.

The challenge in building such models comes not only from building a reasonable replica of a full-size machine, but also in the model's flight performance. Too much weight kills the flying ability, so this unwanted factor must be pared to a minimum—while of course retaining sufficient strength to withstand the occasional 'bump'!

Allied to this fascination is of course one other great advantage—the models are cheap to build! No expensive engines with their attendant messy fuels, no fuel proofer, much less balsa, and even less paint is required—just a few feet of rubber and preferably an old hand drill and you have all the 'accessories' you need.

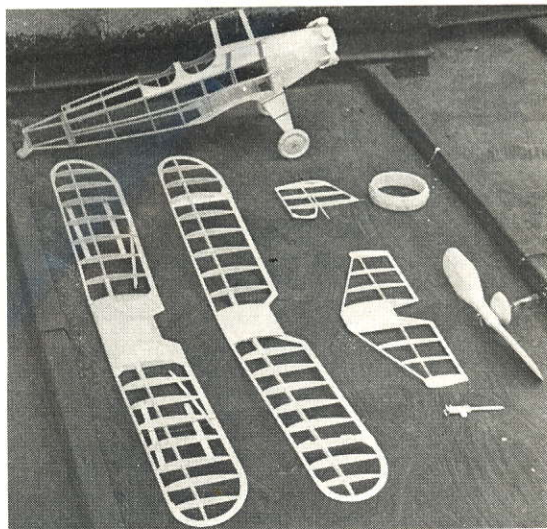
The designer's choice of model was the ever popular biplane, in this case the Douglas O-38, an aircraft which was widely used in the mid-thirties by the U.S. Army Air Corps as an observation machine. There were several versions of the basic design powered by the 450 h.p. Pratt and Whitney Wasp and 525 h.p. Hornet engines. The O2MC, externally similar to the O-38 was built for the Chinese Nationalist Government.

The near-scale model flew straight from the proverbial drawing board and has proved a reliable performer through three flying seasons. Apart from a motor breakage, necessitating a splice in one of the longerons, no damage has been sustained and the airframe *should* last indefinitely. Rubber-powered

scale models are fascinating to fly. With a slow, stable machine such as the O-38, the flight pattern is delightfully consistent and each landing is a gentle three-pointer.

Provided that the all-up weight is kept to 13 oz., flights of 60 seconds duration can be expected with 500 hand wound turns on 12 yards of  $\frac{1}{4}$  in. x  $\frac{1}{24}$  in. tensioned rubber, and about 90 seconds from 750 stretched turns applied with a winder. As the structure of the model is conventional and the plans practically self explanatory, the notes will be confined to those points which demand special attention.

First, a word about adhesives. Use balsa cement for the fuselage box frame and for any joints which will not be subject to warping. For the wings and



Heading picture shows the designer with his beautifully-built replica, which gives a good impression of the size of the model—larger than most people would imagine possible for this form of motive power. At right, the bare construction of the Douglas reveals its basically simple construction, although it is by no means a beginner's model.



tail surfaces, P.V.A. glue should be employed due to its non shrinking properties. If desired, each joint can be varnished with clear lacquer as a protection against moisture, though this is not really necessary.

After the basic fuselage frame has been completed, form and solder the centre section strut and undercarriage assemblies, and then bind and cement them to the appropriate cross-pieces. Formers, stringers, cowling and turtle deck are then added, using the lightest possible balsa for all sheeting.

When making the wings, splice the main-spars, add dihedral keepers and then assemble in the usual way. To avoid warps it is essential that spars, leading and trailing edges are quite straight and that the building board is perfectly flat. Keep warps out of the structure before covering! All notches should be an easy sliding fit on to the spars and each rib should be pushed right home. There should be no stress anywhere in the assembly as this is an open invitation to warps, etc.

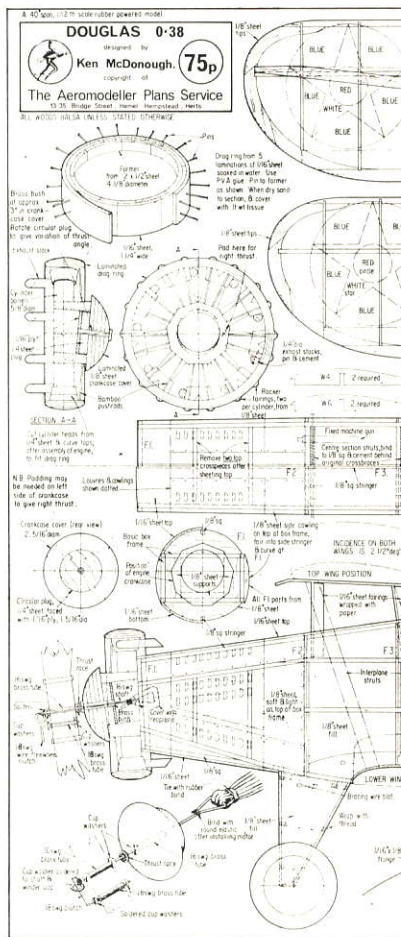
Tail surfaces demand special care, but provided that PVA glue is used and the diagonal members are incorporated in the tailplane, no distortion should result. However, it is important that the diagonals are fitted while the tailplane is still on the building board.

The airscrew is carved from a block of medium-light, balsa 14½ in. x 2 in. x 1½ in. The block should be tapered in side elevation as shown to allow for a decrease in blade angle towards the tips. Carve the

Top photograph shows the whole fascination of this type of model - its slow, stable flight pattern is very realistic, with no messy fuel to rot the airframe or spoil the finish! Below, two posed views of the Douglas displaying its colourful 'trainer' paint scheme, making it a most attractive subject. However, intending builders should take pains to achieve a light weight finish - for which a spray gun is a most worthwhile asset.

rear faces of blades first, applying undercamber by means of sandpaper wrapped around an empty dope jar - the blades should be kept as thin as possible towards the tips, consistent with strength. The finished airscrew should be balanced and covered with lightweight Modelspan tissue. For lazier modellers, 18 in. diameter balsa airscrews can be bought and no doubt would be suitable cut down to 14½ in. but the pitch would be coarser after trimming. The angled bush in the nose plug is essential - slight variation in the thrust angle can be obtained for trimming simply by rotating the plug.

The fuselage is covered with dark blue heavy-weight Modelspan tissue and all flying surfaces with lightweight yellow. Steam, or water shrink the tissue lightly with a fixative spray, then apply two coats of clear dope (diluted with 30 per cent thinners) preferably with a spray gun for lightness. The dope should be further thinned to 50 per cent for the tail surfaces. An extra coat of clear dope is applied to



FULL SIZE COPIES OF THE 1/6th SCALE REPRODUCTION ARE AVAILABLE AS PLAN No. FSR 1123, PRICE 75p (15/-) POST FREE F R O M AEROMODELLER PLANS SERVICE, 13-35 BRIDGE STREET, HEMEL HERTS, HEMPT.

the fuselage only, for added strength. Pin both wings and tail surfaces down after applying a second coat of dope to prevent warps from creeping in - then leave in this condition for several hours.

Titanine colour dope is recommended for finishing and was used on the original, again applied with a spray gun. The correct shades are readily mixed from orange, red, yellow, blue and black and are Olive Drab for the fuselage, undercarriage and all struts, with Chrome Yellow for wings and tail surfaces. The cowling ring and nose plug are Red. With the use of coloured tissue, very little dope mixed to the colour indicated on the plans need be applied. Aim to achieve an even, semi-transparent finish on wings and tail surfaces. National markings are cut from pieces of red and blue tissue doped on, and hand painted on top.

The 12 yard motor is made up into six strands 72 in. long. Approximately 100-120 turns are then applied, the two ends of the six strand skein being brought together to form a single plaited 12 strand skein the same length as the distance between the shaft hook and the anchor peg. Work up to maximum turns in stages starting with 20 per cent turns. Safe turns are 500 hand-wound, and 750 stretched-applied with a winder

Provided that the centre of gravity is correctly



Beautiful workmanship evident on the author's original, particularly in respect of the engine detail and wheels. Propeller may be carved from block as detailed on the plan, or alternatively a commercial balsa item may be modified to suit.

located, no difficulty should be encountered with trimming. The tailplane will take a small amount of positive incidence but no more than 1/16 in. packing should be added under the leading edge. The model should turn right and the correct trim can be achieved by offsetting the fin and by rotating the nose plug to obtain the best thrust angle. Should the model tend to stall under power then further down-thrust can be incorporated by packing behind the nose plug.