THE FRENCH Morane Saulnier type 'L' Parasol was designed in 1913 and subsequently saw much service in the first 18 months of World War I where it proved popular with the pilots being, for its time, fast and manoeuvrable. Perhaps it is best remembered for two of its renowned pilots - Roland Garros and Lt Warneford. It was Garros who fitted an 8mm Hotchkiss atop of the fuselage and then arranged to fire, with great accuracy, through the propeller arc, using steel wedges bolted to the rear face of the prop to prevent damage to that rather important piece of equipment. He thus preceded the use of interrupter gear and proved most successful until his capture following a forced landing. Lt Warneford is best remembered for his successful bombing and subsequent mid-air destruction of Zeppelin LZ37 for which he was awarded the Victoria Cross.

MINI-MORANE by W. D. BINNS

Delightful semi-scale free flitter for CO\textsubscript{2} power
Having previously built four variously sized models of the Morane—all of which proved exceptionally reliable flyers—this design seemed a 'natural' for CO₂ power. Construction is quite straightforward; the outline is to scale except for the tailplane and fin. A Telco engine provided more than adequate power and as the prototype proved rather none-heavy, it would appear that a lot more fine detail could be added—see AeroModeller Plan Pack 2865, price 35p plus 10p postage.

**Fuselage**

Build two basic fuselage sides from 2mm. sq balsa, dampening the longerons so that they take a permanent 'set'. When quite dry, join together with spacers and formers F1, F2 and two F3s. Now bend up the cabane struts and notch the fuselage to accept the lower part of the struts along the outside of the longerons. Laminate the thrust button from 1.5mm ply and medium balsa, taper off and cement to F1.

Bolt the engine in place, epoxy the nuts to the rear of F1, then remove again. Add the 1mm nose sheeting—it is easier to cut the holes for the cockpit and CO₂ tank first. Next build up the cowl using epoxy, reinforcing joints with ⅛ in. wide nylon strips.

Cross bracing consists of cotton retained with blobs of balsa cement. Covering (lightweight tissue) should now be added. The fabric of the original is easily duplicated by water shrinking the white tissue with dyed water—a little mustard mixed with coffee produced a realistic dirty brownish yellow! Apply three coats of 50/50 thinned dope.

Now cut a slot for the tailplane, then solder up the axle, wing runners, cross bracing wires and tailskid. Bolt the engine in place once again and install the tank. Excess copper pipe length can be 'lost' by coiling it. Strip the filler cap and solder it to the rear cabane strut as shown, and reassemble.

The front bay and cowl should be painted silver, cockpit edges and cowl interior black. Numerals and step are black. Cabane struts are faired in with thin paper and also coloured black. Roundels were hand-painted on the original, while the outline to the front bay panels was achieved with 1.5mm strips of tissue painted black. Likewise the 'Morane' motif on the cowl. My pilot started life as a plastic toy Viking...

**Tailplane and Fin**

Cut from 1.5mm medium-soft sheet and add the anti-warp strips. Sand to approximate airfoil, give one coat of banana oil and sand lightly. Cover with lightweight tissue and dye-continued overleaf
MINI-MORANE
continued from previous page

watershrink as before. Apply two coats of 50/50 dope and thinners, then paint and number the fin. Do not cement the tailplane in place when the fin is cemented in place, it holds the tailplane as well.

Wings
Cut out all the ribs. Pack up the bottom spars and the front portion of the trailing edge, and cement up the whole wing in one piece. Cut the top spars and nick the LE and TE, and bend-in 12mm dihedral under each tip. Cement in D1 and D2.

Cover and dye, giving three coats of 50/50 dope and thinners. Paint in the roundels. Glue in the top cabane, then glue loops of thread rigging to the spots indicated on top of the wing, and connect them through the cabane by very small loops of shirring elastic – this will tension them. I did not attempt the underside rigging!

Flying
The prototype weighed exactly 2oz and was a little nose-heavy. For initial test flights, pick the traditional long grass and calm day combination. I reduced the standard airscrew to 5in. diameter with rounded off tips, and established engine settings at home on a test bench – aiming for a 30 second motor run. It takes patience and several Sparklet bulbs... The Mini-Morane circles to the left and will fly quite happily in a medium breeze and recover from bad launches without trouble. After more than 50 flights the original has not even suffered split tissue, due to its delightful habit of bouncing, not crashing. She has very little glide due mainly to the high drag, but a warm day will result in flights of around the minute mark. The hotter the weather the better the engine performs – so beware and add a name/address label!