MISS FARNBORO

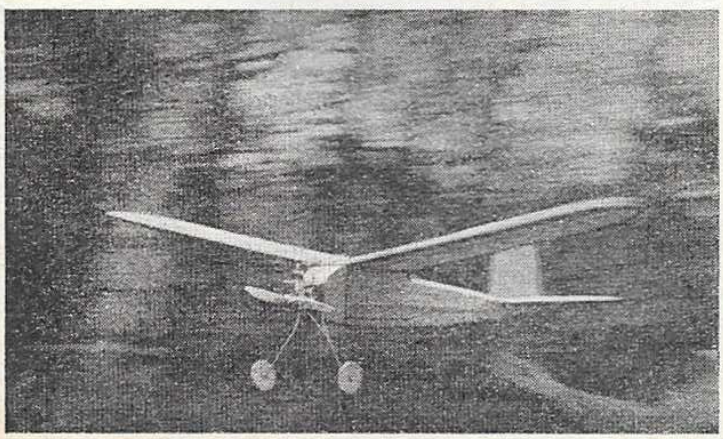
By G. W. W. HARRIS

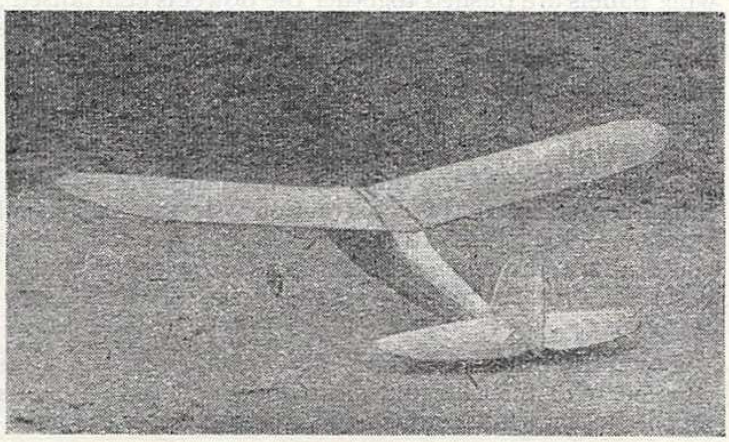
THE original model made its maiden flight the night before the 1945 "Hamley." At this time it was being flown with a 4·5 c.c. engine, which was changed later on in the season for a Super Tiger 7 c.c. engine. Fitted with a 4·5 c.c. engine, the take-off run on full power in still air is 15 feet, followed by a steady climbing circle to the left (150 feet diameter). The glide is what you make it: for contests such as the Bowden we must make sure of the take-off, which means the use of more power than is really wanted, causing the model, once airborne, to gain considerable altitude, and in order to bring it down again within the stipulated time it is best to fly the model under-elevated. With the larger engine the performance can be spectacular. I see no reason why a 9 c.c. engine should not be fitted: there is plenty of stability and strength. On one occasion "Miss Farnboro" glided into a high tension cable, then dropped to the ground some 40 feet below—the only damage sustained was a broken wing-joining dowel and a bent engine bearer plate. Unfortunately the latter was not noticed until the model was flown in the 1945 Bowden Competition . . . Yes, there's a moral in that!

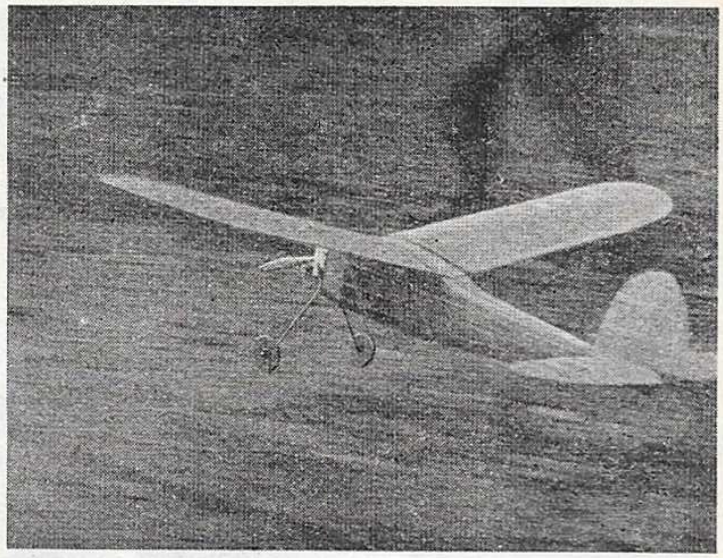
Spend an evening by the fire browsing over the plans: it won't be wasted. Although I hate doing it, I find for convenience it is best to cut out the various portions of a large drawing so that they may be pinned direct onto a reasonable size building board.

Fuselage. Pin down the fuselage drawing onto your board. Now select four lengths of $\frac{1}{4} \times \frac{1}{4}$ in. balsa of even quality and bendability; the design allows for the use of medium grade if you have no hard balsa. To prevent the structure sticking to the drawing obtain a cake of soap and rub over all joints with it. Now lay the top and bottom longerons on this drawing and set in position with joiner's pins. Cut the vertical struts off to dead size and cement in place, then fit in the diagonals. Fit in a temporary strut between the tail and extremities. When the cement has hardened, remove the job carefully from the board and proceed with the other side; while this is setting, cut out formers Nos. 1, 3 and 9, also the tail block. The fuselage sides are next mounted onto formers Nos. 1 and 3—use plenty of cement and stretch rubber bands over to pull the sides well in place while drying; pull the tail ends together and fit in former No. 9 and again use rubber bands to assist. Next, check formers for squareness on plan view and proceed to fit cross struts top and bottom, followed by the diagonals. Remove temporary struts and fit tail block. Shape up the engine bearers to the dimensions given and fit them into position; use bags of cement for this ob, applying successive thin coats, allowing each coat to harden off. The bearers should be checked for alignment with two straight edges laid across them. Now cement on the $\frac{1}{8}$ in. sheet balsa to the underside of the bearers at bay No. 2. Fill in sides and bottom of bay No. 1 with $\frac{1}{4}$ in. sheet balsa, then fit the two side $\frac{1}{4}$ in. sheets and slot them ready for the stringers. Cut out formers 2A, 3A and 5A and cement them in position, fit the side panels L, M and J. Bevel off the top edges of panels L and fit the 3/16 in. sheets Q. Now go ahead and fit the stringers, wing dowels and tail skid.

Undercarriage. This is very easy to make and fit. The method of mounting is unusual but successful. It can, if really necessary, be detached for transport purposes. The wheels detailed in the plans may offend the eyes of many from the appearance point of view, but nevertheless I recommend them for the following reasons:—(*a*) their tractive resistance is low, thus assisting the aircraft to get airborne quickly and reducing the tendency of the aircraft to pitch over when landing, (*b*) drag in the air is reasonably low, (*c*) cheap to produce. I make no apologies for the undercarriage; it was designed for a purpose and it does it. To mount the engine, cut out from 16 s.w.g. aluminium a plate similar to the one in Fig. 1M. By slotting the holes a little it will be







possible to vary the alignment of the engine. Having made sure your engine fits in and lines up O.K., remove and carry on with fitting the coil, timer, and wiring, soldering all joints. Booster connections can be fitted on panel J. Give the fuselage a good clean up with medium and fine sandpaper, removing all sharp edges on the longerons and stringers.

The Mainplanes. Begin by making a plywood or metal template of the main ribs. Lay the template on a sheet of 3/32 in. balsa and cut round it with a razor blade until you have 30 off. Lay the bottom spar on the drawing, supporting it on either side with long pins, and cement the ribs in position. It will be noticed that ribs 1 and 2 are two-ply—cement these together firmly. For the moment do not bother about ribs 14 and 15. With a sharp chisel or plane taper off the trailing edge, slot it and offer it up to the ribs, using plenty of cement. Carry on now and fit the leading edge, top spars and wing tip. Note the joints in the top spars. Make up the ribs 14 and 15 as shown on the plan. The holes for the wing panel joining dowels are best made undersize in the root ribs before the ribs are fitted, then when both wing panels have been constructed the final fitting can be made more easily and accurately with the aid of square and round files. The blocks W3 project through the top surface to facilitate joining up and putting the wing panels apart. Fit the leading edge sheeting and the centre section sheeting, the diagonal struts, and, lastly, the root rib reinforcing sheets of 1 mm. birch plywood. It will be noticed that the square joining dowel has a 1/16 in. diameter hole drilled through its centre; this serves two purposes, firstly by pushing a length of wire or a pin through the hole one can be sure that when the wing panels are pushed together the dowel is centralised; secondly, in the event of a nasty prang the 1/16 in. holes ensure the dowel will fracture at its centre, thus preventing damage to the wing roots. This practice works very well.

Tail Unit. Steam the leading edge to shape, likewise the cane outline of the fin. The fin is integral with the tailplane for speed of construction; if for reasons of transport you want to make the fin detachable you could adopt the same scheme as used on my "Dude," described in September, 1945, issue of the AEROMODELLER.

Covering and Finish. My own machine was covered with red silk and clear doped. I gave the silk on the fuselage five coats of full strength dope, the mainplane three coats and the tail unit two. I would impress the necessity of clamping down the wing panels and tail unit while each coat of dope is drying.

Preparing for Flight. Fit the engine, connect it up, check your timer and see you have a spark. Fit the wings and check for general alignment; correct obvious errors but try not to alter incidence angles. With a battery in the nose stowage, check the C.G. If the model is a reasonably faithful reproduction of the plans it should balance close to the position shown. If tail-heavy, fit the timer up forward near the battery stowage; if nose-heavy, fit the timer behind the mainplane centre section. The final weight adjustment can be embodied in the engine cowling, if required.

The model can now be hand-launched to check the glide; this should be straight and flat. Get the engine running, give it time to get warm, and adjust the contact breaker until you feel you are about half power (7 c.c. engine), face the model into wind, set timer for 10 seconds (not less), and let it go. It should raise its tail immediately and get airborne in about 15 to 20 feet and climb steadily. When the motor cuts, the nose should drop gently until the model has found its gliding speed. The model must not be allowed to glide in a wavy line. Now try another flight—this time setting the timer to 20 seconds and adjusting your motor for three-quarter power. The model should leap off the deck and climb steeply in a left-hand spiral until the motor cuts, when the glide should be fairly straight. If you have trimmed for the best gliding angle you will find yourself let in for quite a walk. For precision contests such as the Hamley and the Bowden this glide is too good and will have to be spoilt. I find this can be done by adding one or two ounces of ballast to the nose of the model (modelling clay in the battery stowage will do) and slipping a strip of 1/32 in. balsa under the *leading edge* of the tailplane. These adjustments bring the model down fairly quickly without, however, any fear of an upset. You will remember we slotted the engine mounting plate—this was done so that the engine could be turned a few degrees left or right. The engine should be offset to the right until the circle is not less than 150 feet. Additionally, the left wing can be pushed forward about $\frac{3}{8}$ in., which will increase the turning circle diameter and give a right-hand gliding circle. In a tight turn this model does not tend to push its nose down.