

1½ ins. to 1 ft. Flying Scale Model of THE BRISTOL 77 RACING MONOPLANE

BY E. J. RIDING



[Photo: E. J. Riding.]

IN September, 1920, the Bristol Aeroplane Company, Ltd., registered an M.1D wire-braced shoulder-wing monoplane. This machine in its original form was known as the type M.1C or type 20 and was designed by the late Capt. F. S. Barnwell during 1915-16.

The Bristol monoplane was of remarkably modern appearance and was considered by pilots who flew it during the last war to be the best single-seater fighting scout of its time. It was, however, not put into regular squadron use and saw service mainly on the Eastern Front during 1916-17. About 130 machines were built and they were fitted with the 110 h.p. Le Rhone rotary 9-cylinder engine.

The 77 racer was similar in most respects to the original design but had been modified to take the Cosmos "Lucifer" 3-cylinder radial engine of 100 h.p., in which form it was entered and flown in most of the important race meetings held in this country between 1921 and 1923.

The machine was registered G-EAVP and during its somewhat brief career it managed to win the Whitsun Handicap race at Croydon in June, 1922, piloted by C. F. Unwins, and the Aerial Derby Handicap of the same

year in the hands of the late L. L. Carter, at 109 m.p.h. It was also entered in the 1922 King's Cup race but was forced to retire after covering only a few miles. Its final appearance was in the Grosvenor Challenge Cup race held at Lympne on June 23rd, 1923, when it was flown by Maj. E. L. Foote.

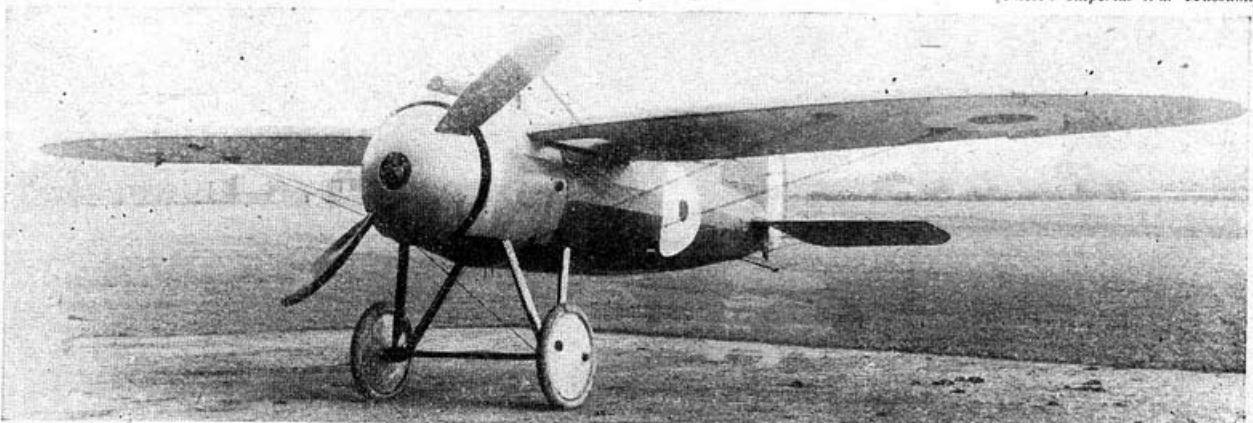
About half-way through the course, Maj. Foote complained that he was suffering from the effects of petrol fumes and subsequent inspection showed that the petrol tank was fractured. This was hurriedly repaired and the machine was able to continue its journey. Watchers along the course saw the machine flying low over the Fox Hills estate and a few moments later it crashed and burst into flames near Chertsey, Maj. Foote being instantly killed and the machine totally destroyed.

Fuselage.

The fuselage of the model was constructed in the usual

The "True to Life" appearance of the model is well demonstrated by comparing it with the full size aircraft below. The Bristol Monoplane shown was of the type used in 1918. It differed from the machine the model portrays only in regard to the motor installation.

[Photo: Imperial War Museum.]





manner, a sheet of tracing paper being laid over the plan and the $\frac{1}{8}$ in. by $\frac{1}{8}$ in. balsa longerons and cross members pinned and glued into position.

When dry, the two fuselage halves thus made were boxed together and trued up, using a set-square against the top and bottom longerons.

Formers cut to the patterns shown on the plan were glued to the four sides of the fuselage frame to provide bearers for the $\frac{1}{8}$ in. by $1/16$ in. balsa stringers over which the covering of superfine Jap tissue is stretched. A month or two ago, Mr. C. R. Moore patented a diaphragm for use in connection with single skein rubber motors and this model is being used as a test bed for his invention. Details showing the construction and assembly of this diaphragm are shown on the plan, but the model can be constructed less this feature if so desired.

The $\frac{1}{8}$ in. balsa supports for the rear motor dowel were glued on to the top and bottom cross members at frame 6.

The circular motor plate cut from .8 mm. three-ply, complete with the block balsa engine crankcase, cylinders and circular cowling, were built to the dimensions shown, the rear face of the motor plate being fitted with a flange the outside dimensions of which coincide with the inside dimensions of the square-shaped opening formed by the fuselage frame at No. 1 former. The engine cowling was made by pressing sheets of paste-soaked newspaper into a plaster of Paris mould and allowing to set, after which it was cut into three segments and glued to the motor plate. It is held rigid by the $3/13$ in. plywood exhaust collector ring. The exhaust pipes were made from lengths of $\frac{1}{8}$ in. aluminium wire fitted into holes drilled in the cylinder heads and the collector ring.

The engine crankcase has a hole cut through it, into which are glued two 1 mm. plywood diaphragms forming bearings for the rear half of the prop. shaft to which is attached the rubber motor. The other half of the prop. shaft runs through the nose block, which fits snugly into the hole in the crankcase and retained by three snap fasteners.



The two halves of the prop. shaft engage each other by means of a fork and "T" drive made from 18 s.w.g. piano wire. This arrangement ensures that the nose-block and airscrew come away completely from the engine in the event of a crash.

The yellow pine airscrew was made to the dimensions shown, runs freely on the prop. shaft and is fitted with a simple free-wheel device on the front face of the boss.

The pylon struts over the cockpit were cut from bamboo and glued into holes drilled in the longerons at the points shown. The apex is fitted with a piece of hardwood in the shape of a small pyramid drilled transversely to take the 24 s.w.g. piano wire bracings.

The undercarriage is made from similar material, the front members being floating and sprung to the bottom longerons by means of a thick elastic band threaded through the fuselage via a paper tube.

The rear undercarriage members swivel about the attachment points on the fuselage, cross bracings of 26 s.w.g. wire being soldered to the 18 s.w.g. axle and bent round the top fittings of each leg at the required tension. The wheels were moulded in the same manner as the nose cowlings, but balsa or celluloid ones would do just as well.

The fuselage was covered in four parts—from longeron to longeron circumferentially—the portions around the cockpit and between Nos. 1 and 2 formers being planked with $1/32$ in. balsa sheet.

It was treated to several coats of banana oil and sprayed red all over with the exception of the nose and tail portions which are black, and the white registration letters.

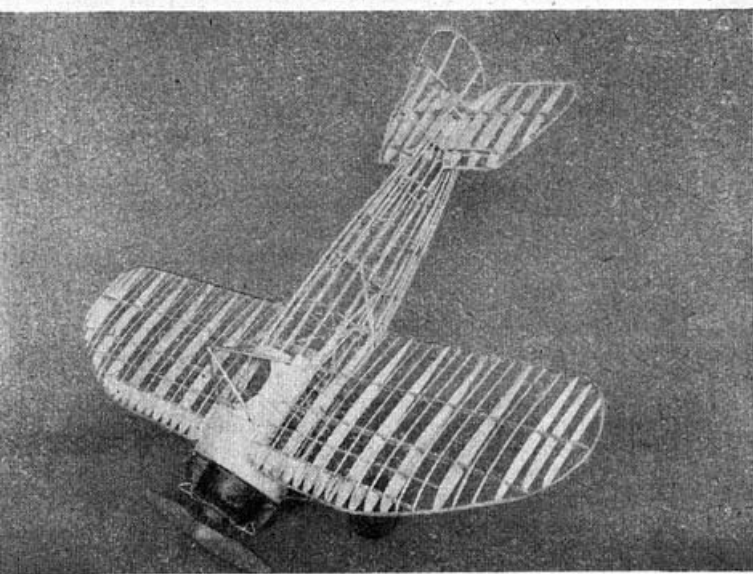
The Wings.

These are rather unorthodox, since apart from having a number of dissimilar ribs to make, there are seven spars arranged as shown on the G.A. drawing. In order to preserve scale effect I have incorporated the correct number of ribs, but only one in three are solid blanks, the others being $3/32$ in. by $1/32$ in. balsa strips laid over the spars and joined to the leading and trailing edges after the main portion of the wing had been assembled. The complete wing was then sanded to a continuous profile and built up where necessary. The fittings for the bracing wires take the form of 24 s.w.g. aluminium bands wound round the main spars at the positions shown; these were then drilled through ready to take the bracing wires on assembly.

The covering of superfine Jap tissue was applied and treated with two coats of banana oil and then sprayed bright red, the registration letters G-EAVP being painted on in white with the tops of the letters adjacent to the leading edges. When attaching the wings the machine was first placed in rigging position, i.e., with the top longerons level, afterwards, offering up the wings and packing with books until the dihedral angle of $2\frac{1}{2}$ degrees had been obtained. The top bracing wires, which are rigid, were then fitted, the lower ones being added later and tensioned by means of rubber bands looped through thread anchorages on the bottom longerons.

Tail Surfaces.

Are slightly over scale size and are fairly simple to make. The tailplane has a Clark "Y" lifting section and is fitted on to the fuselage in two halves. Together with the rudder, they were covered in the same manner as the wings and sprayed black all over with the exception of the white G's and Bristol trademark on the fin.



The various "Naked" views of the model shown on these pages emphasise the robust construction and the scale appearance of the wings. Note the former for the Moore diaphragm in the view below. The top photograph shows the diaphragm in position in the fuselage.

