

PULL-OUT PLAN

BUILD 3 BEFORE TEA

"SUPER — EBENEZER"

AN ALL-SHEET, 2 FUNCTION, SPORTS BIPLANE FOR 1½cc (.10cu.in.) MOTORS DESIGNED BY DAVID BODDINGTON

Readers of *Aeromodeller* may recognise the parentage of the 'Super Ebenezer' models of this article. They are descended from a S/C model called the 'Bi-Baby' which, in turn, was influenced by the all-sheet 'Ebenezer' series of free flight models. I had tremendous fun flying these designs — the 'Bi-Baby' was also an excellent free flight model — and thought that it was about time I produced something along the same lines, but taking advantage of modern lightweight multi R/C equipment. All sheet construction is retained to reduce building time and the longest job is likely to be the decoration; my son, Andrew, constructed the two prototypes and spent a few happy hours spraying the lozenge pattern on the German version. Most modellers will probably be satisfied with a simpler finish; covering with Solartex (or similar covering materials) would minimise the completion time, the underside of the wings are not covered.

Two function radio, on rudder and elevator, is used and most modern equipment will fit into the models — using standard servos — but a 225 or 250 mAH Ni-Cad is a must. You might be able to squeeze a throttle servo in by using miniature servos. 1.5cc diesels were fitted in the prototypes as these give a greater control flexibility and are capable of swinging large propellers slowly. If you decide to install a glo-motor don't use a '15' size or you will have problems in coping with the available power — unless you fit the prop on backwards.

Construction is so simple that building instructions are virtually unnecessary, select your balsawood carefully, choosing medium weight wood that is 'stringy' rather than 'carroty'. Ply fuselage doublers on the original were 0.4mm thickness but, if this is unavailable, 0.8mm plywood will be OK. Make sure that you can fit in the pushrods before you add the lower rear fuselage sheeting. Positions of all of the R/C gear should be determined before you commence con-

struction. A metal fuel tank (oblong C/L type), is the easiest to fit, between the bearers, extend the filler and vent to the top of the fuselage. Line the battery compartment with thin, but dense, expanded foam — it saves wrapping the Ni-Cads later and trying to push the combination through a small aperture.

Don't forget to angle the wing root ribs to give the correct dihedral when they are joined, the centre section should be well reinforced with glass cloth (or nylon) and resin. Thin plywood patches just outboard of the fuselage position will also prevent the leading and trailing edges from being 'dinged' if the wings are slewed on landing. Sand down the lower edges of the centre ribs until they align with the adjacent ribs. Reinforce the centre area with 0.4 or 0.8 mm plywood.

Tail surfaces can be hinged with strips of draughting mylar (thin but strong) or by using the covering material to form a hinge. Use small horns for the rudder and elevator and the innermost holes on the servo outputs — cranking the end of the pushrod to clear the centre boss. **Warning** — restrict the rudder movement to about 3/16 in. each way unless you want to do consecutive rolls shortly after take-off, the test flights were quite 'hairy'. I made up some spoked wheels to give the

models a bit of 'atmosphere' but any vintage wheels of around 2½ in. dia. will do. Interplane struts are optional although they do help to prevent the wings rocking about. House the tops of the struts into the top ribs (reinforced with thin ply on each side) and pin the lower ends to a 1.5mm ply bracket fixed to the lower wing. The 'Froggy' (French) version would have 'V' interplane struts.

Flying these all sheet bi-planes is quite exhilarating — not to be recommended for the rank beginner — so start off gently. Glide characteristics result in a high rate of descent due to the considerable drag and you should aim to gain a reasonable altitude before the engine cuts — diesels will usually give a few warning 'burps' before quitting completely. Tying a streamer on the tail may make the models more docile, and give a chance for a bit of WW1 combat!

