

build this most unusual scale biplane— by PHIL MOORE

57" SPAN for .60 POWER

BACK in February 1976 when my copy of *Aeroplane* monthly arrived, I (and a few others) was fired with enthusiasm for the home-built biplane that was pictured on the cover, so I did a few sums! My aim was to build something for competition and fun flying and, with that, test the feasibility of building it again for Class-1 judging.

The size was to be as big as an average 60 could be expected to pull, and, to cut a long story short, I decided on 2½ in. to 1 ft. (just over 57 in. wing span). Smaller, I thought, would be short on lift—a theory which, in the light of experience was unfounded—and larger, would have given a really vast fuselage.

The next thing to do was to 'dig up' some more gen. After referring to Janes 'All the World's Aircraft', I wrote to Sorrell Aviation in the U.S.A. who sent me a good set of detailed photographs and a plan.

The construction is fairly straightforward and should present no problems to anyone who has built a few models. The only unusual feature is the wing fixing, which is basically the sailplane system of tubes and rods. For retention, you 'leap inside' the fuselage with four bolts, one for

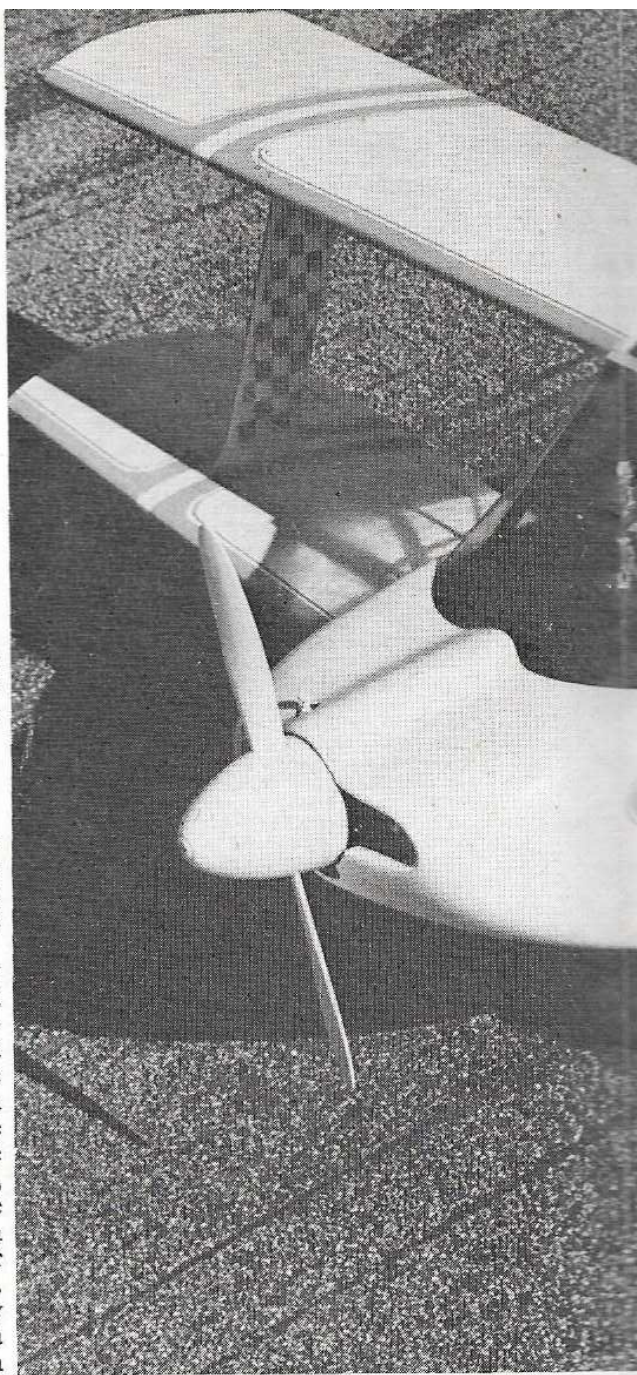
each wing. This overcomes the problem of that big window in the cabin roof and maintains a smooth, uninterrupted fuselage underside.

CONSTRUCTION

Fuselage

Careful study of the plan is needed to sort out the three layers of the forward area, and to note that rebates are formed for the doors and windows.

Start by cutting the ½ in. ply sides marked with an outlined ('hollow') arrow. Note that the starboard side has no luggage door and that reference lines for the wings should be marked. Cut out the cabin doors and put to one side. Lay the ½ in. ply over the plan. Now fit the ¼ in. × ¼ in. hard balsa main stringers, and ¼ in. × ¼ in. and ¼ in. × ¼ in. spruce door and window frames. Fill in on top of the ply and forward as far as the main bulkhead with ¼ in. balsa sheet. Cut out the ¼ in. ply inside doublers marked with a 'solid' arrow, and glue in place. Pin over the plan the three ¼ in. × ¼ in. stringers and the ¼ in. sheet tailplane base. Next, glue across the top of these, the ¼ in. × ¼ in. uprights, cutting the ends of these with a



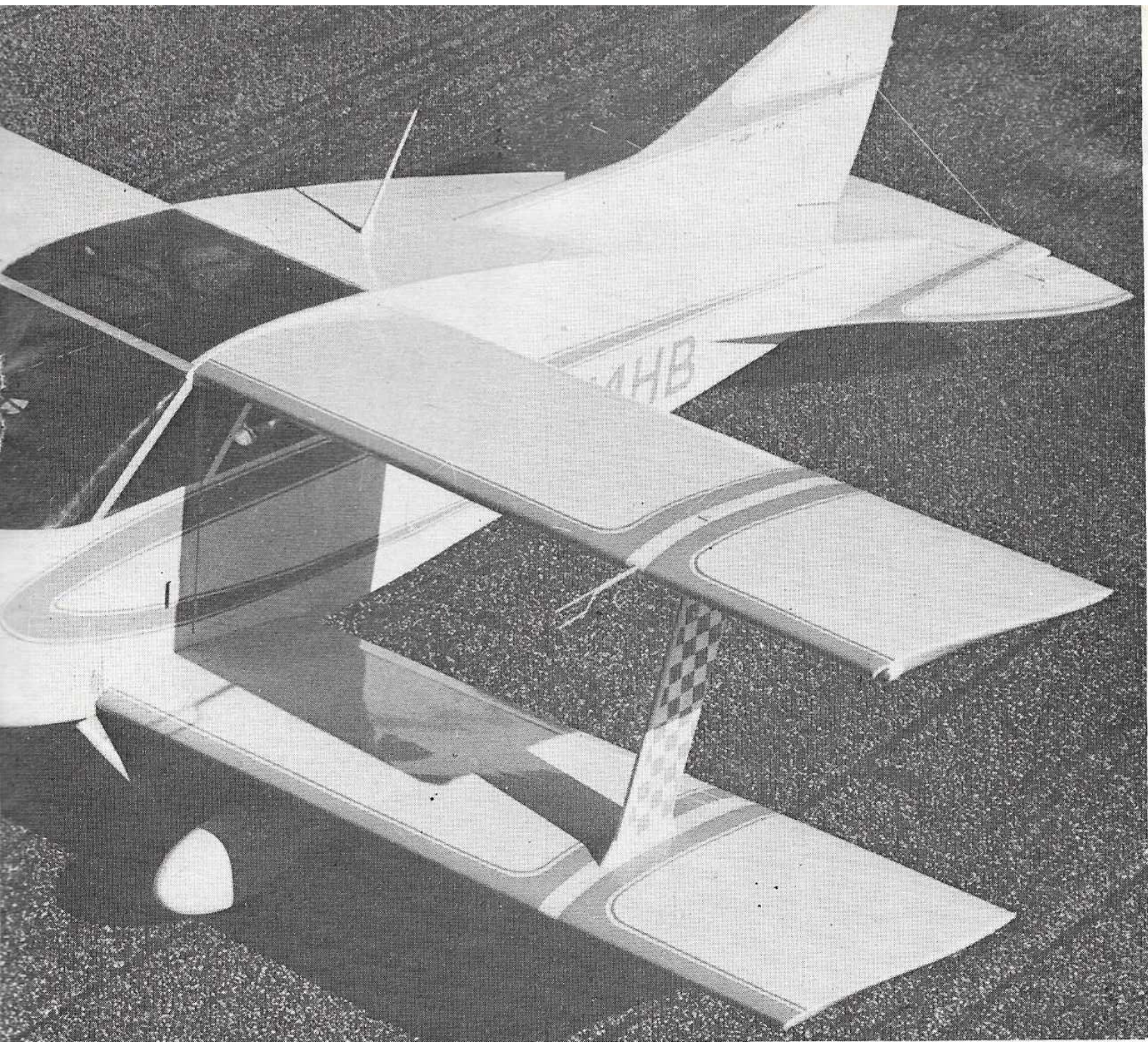
'HIT'

slope to prevent their showing through the top and bottom covering. That should complete side one. Now reverse the plan, trace through, and build the other side.

Make the template for the wing root/dowels from aluminium sheet. Carefully position over the reference lines on the fuselage side and drill for the three wing dowels only. The holes for the retention bolts and aileron torque tubes are best left until later. Now put both fuselage sides together, outside face to outside face, and drill the other side.

We can now attach the engine





PERBITE'

bearers, bulkheads, and undercarriage. Epoxy them together, making sure all is square and true. When set, take the sides and glue onto the bearer assembly. A bit of glass fibre here and there will help. Fix all cross members and the three top and two bottom stringers. The underside from the main bulkhead to the first cross-member is filled in with $\frac{1}{16}$ in. sheet. Fix the $\frac{1}{4}$ in. sheet bases for the fin and underfin. Now we are ready to epoxy in the 8g brass tube for the *top* wing. The leading edge tube is topped off with $\frac{1}{4}$ in. \times $\frac{1}{8}$ in. spruce to take the

joint between windscreen and roof windows. We can now build up the dashboard and fit remaining aluminium tubes to the cockpit area. Place the fuselage on one side and whiz off and make the wings!

Wings

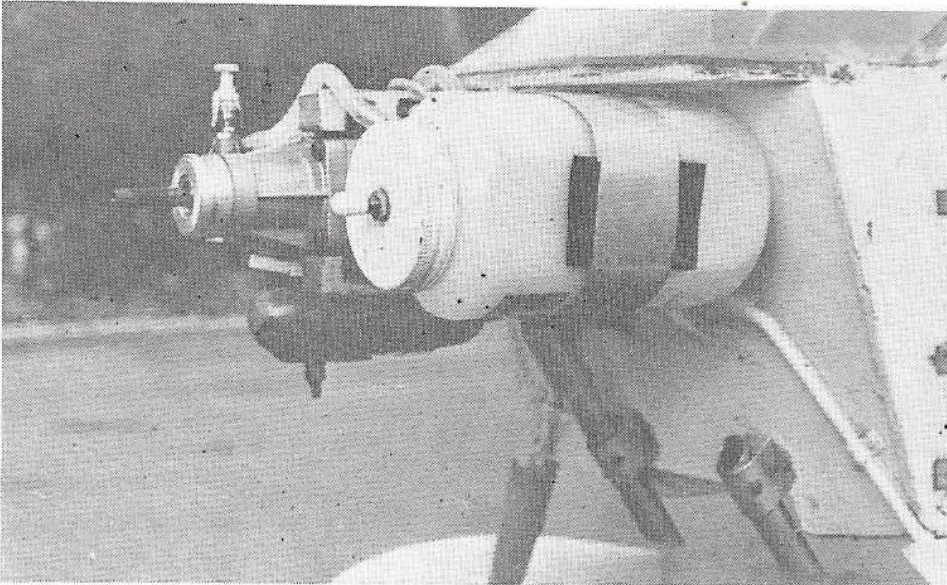
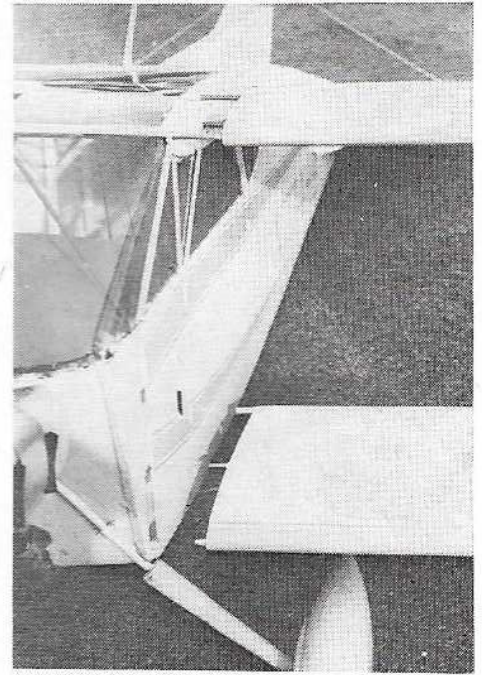
All is straightforward; just follow the plan except for the holes for the 8g rods which are drilled using the same template that we used to drill the fuselage sides. The rods are now installed into the fuselage and the wings slid onto them. Using a straight-edge across the top of the

cabin, align the wings (no dihedral). When satisfied, remove rods, roughen ends and epoxy into the wing. Before the job sets, re-install into the fuselage, leaving $\frac{1}{4}$ in. gap to prevent sticking to the fuselage! Re-check for straightness.

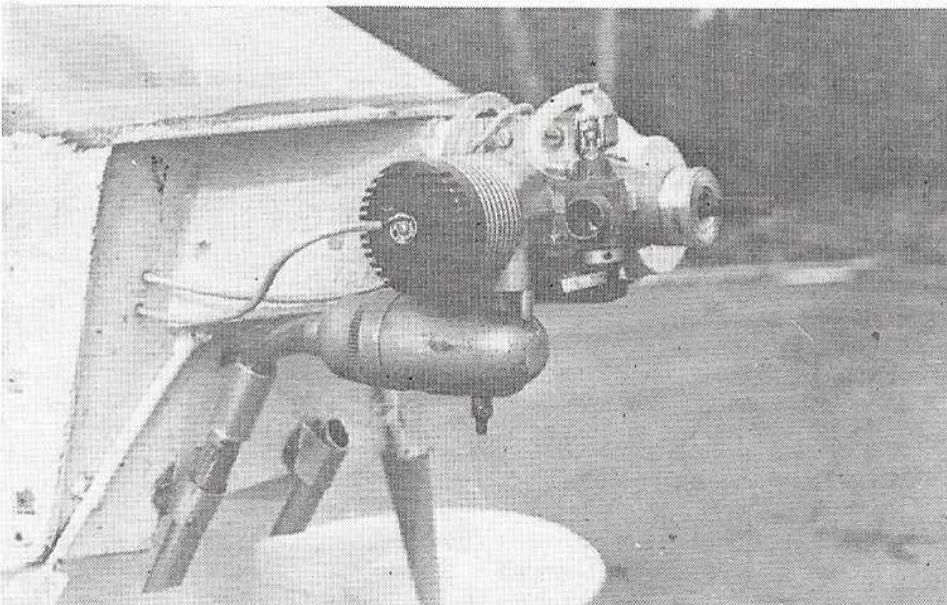
Now build the interplane struts as per the plan. The metal plate to the top and the wooden bearer and mooring loop to the underside, are as per full size. The alignment (sweep and dihedral) of the bottom wing is automatically taken care of by the root rib and interplane strut. When happy with it, epoxy and



One of the things that causes the most head-scratching by builders from plans is the engine installation, as very few designers seem to provide photographs of their models without the cowl! The three views here, then, should make the arrangements pretty explicit. The top one, plus that at right, also shows wing fixings.



Engine and tank in parallel. Note the exhaust extension(s) in scale position—one of which is "for real". That 'rough' paintwork, of course, is hidden by the cowl. Ready made glassfibre cowls for this model are available from Joe le Bot Models—see Classified advertisements (Plans & Parts)



glass in the short 8g i/d brass tubes.

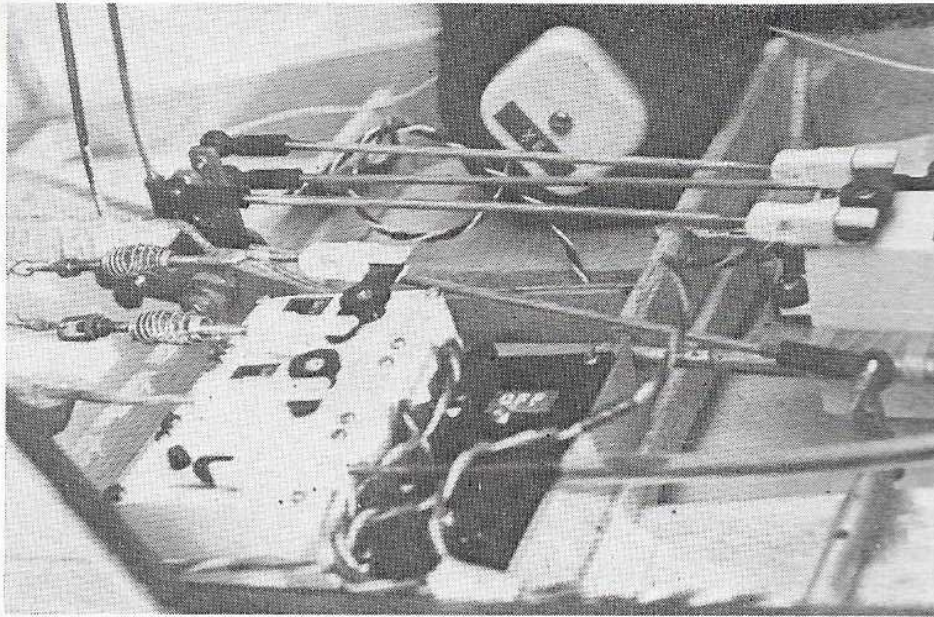
I find the best method of drilling the fuselage for the wing bolts, is to install into the wing a short piece of nylon bolt with a point on it. Slide the wings onto the fuselage and it should leave a dent dead centre of the bolt hole.

Make four flaperons and fit to wings, making sure there is plenty of 'down' for the flap movement. I used Robart 'Hinge-points' and set them well in, so that the centre point coincided with the centre of the $\frac{1}{4}$ in. aluminium torque tube. Offer up to the fuselage, mark and drill holes to clear torque tubes. Make up the torque rod assemblies as detailed on the plan. Fit each crank with a ball type coupler. With all four wings in place, 'climb' inside the fuselage and engage the torque rods into the aileron tubes, making sure that all slide together freely and operate well before epoxying. Cut out the $\frac{1}{8}$ in. ply crank support and mount two standard aileron cranks, one each side. Fit out with three ball couplers each and check for freedom of movement. Install centrally.

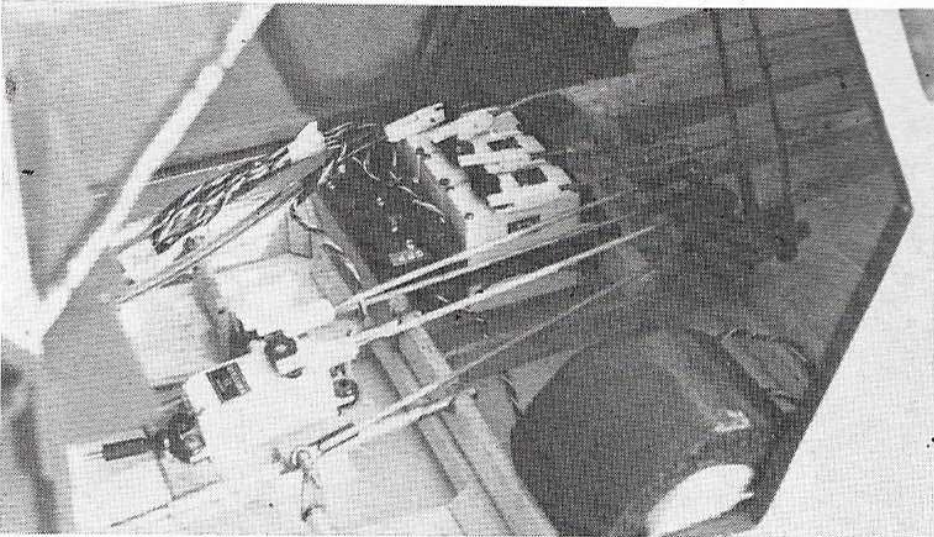
If you want to use flaperons, it is quite easy to mount the servo in a sliding carriage. Mine was $\frac{1}{8}$ in. ply and two sizes of brass tube. After that is done you can make up six—yes six—push-rods. Two—servo to crank; two—crank to bottom wing; and two—crank to top wing. You will be surprised how smoothly and well the whole thing works.

Tail group

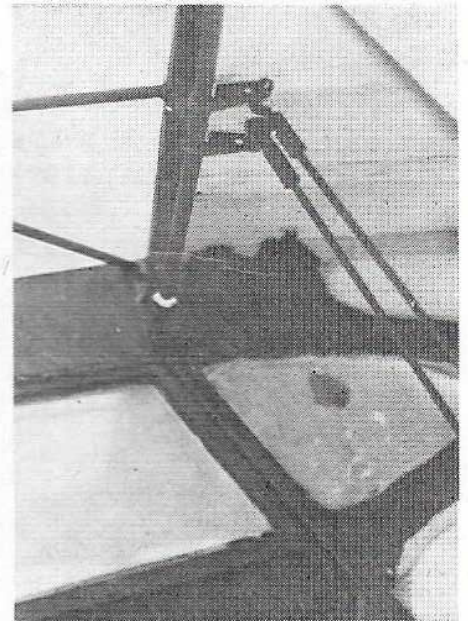
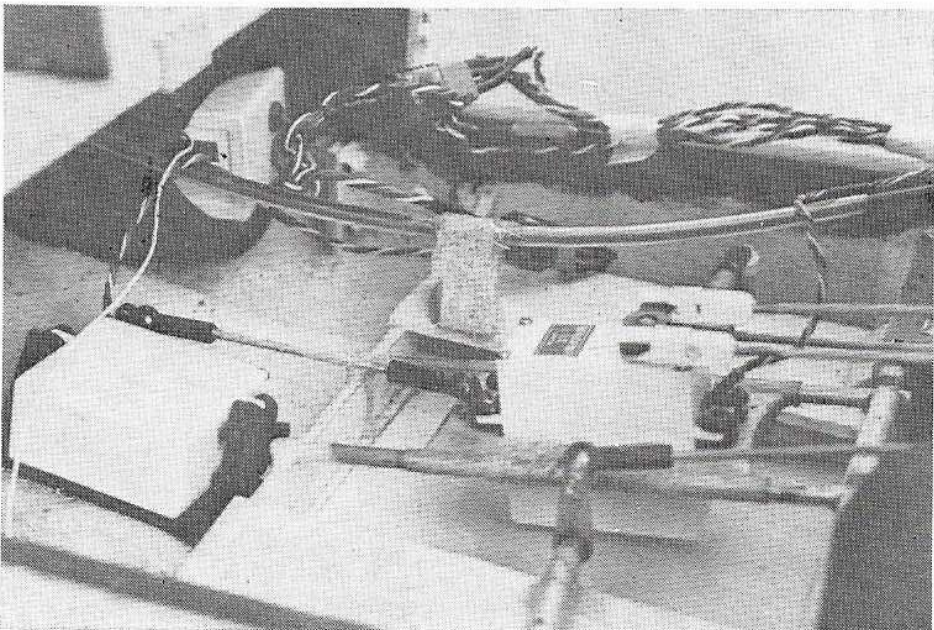
Building the tail surfaces is quite easy, the only unusual features being the balsa-ply laminate edges and the $\frac{3}{8}$ in. x $\frac{1}{8}$ in. roof stiffener. The latter



Not so formidable as it appears! The installation as detailed on the plan will be "brought to life" by these photos. Above shot is from starboard side, looking slightly aft, while below the installation is viewed through the port door, again looking slightly aft.



Below: the flaperon servo (on its side) is connected to the aileron servo by a short rod with ball-joint ends. Aileron servo is mounted in a tray which slides (via tubes) on rods—thus determining the amount of flap used, while maintaining independent aileron action. At right is close-up of tailwheel mounting.

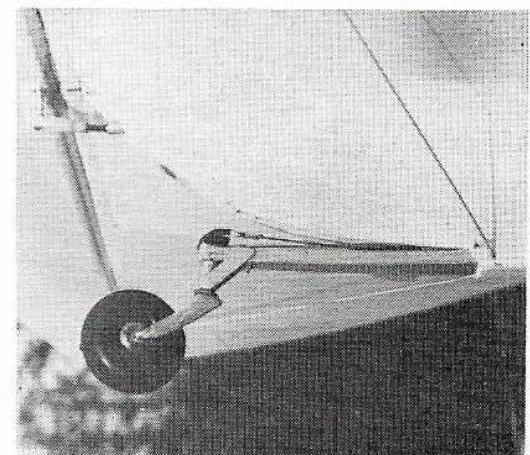


was necessary to maintain the shape as I like to cover all the tail surfaces prior to fixing to the fuselage. If you prefer to assemble the model first and then cover, you could well leave them out.

Cowl, spats and details

The prototype cowl was built by laying glass cloth over a suitably treated and shaped styrene block—but most people, I'm sure, will prefer to buy theirs ready-made, from *Joe le Bot Models* (see classified advertisement). A small hole will be needed in the cowl for the needle valve, and the glow connection is best made with a jack-plug mounted on the dash and connected to the plug with a press-stud. Mounting of the cowl is via 1/4 in. screws into hardwood blocks, as per plan.

The wheel spats were made from 1/2 in. and 3/4 in. sheet balsa with two collets; the inboard one is brass and has a 1 in. tinplate disc soldered to it that is punched with holes to aid epoxying. The outboard one is aluminium and just roughened up and stuck in. Now cut a piece of 6g brass tube to fit between the collets, take the tube and glue into your



wheel hub using a cyanoacrylate. The best tip I can give you on spatted wheels (a bug-bear to many) is to spend your money and time on getting a really good pair of wheels. (It is quite astonishing how many wheels you can try that are at least $\frac{1}{2}$ in. out of true).

Frame up the doors, hinge them and make the latches. Build the fin, under-fin and tail wheel assembly. I like to put a couple of small springs on the tail-wheel cables to protect my servo, and these may be visible in one of the photos.

Covering and finishing

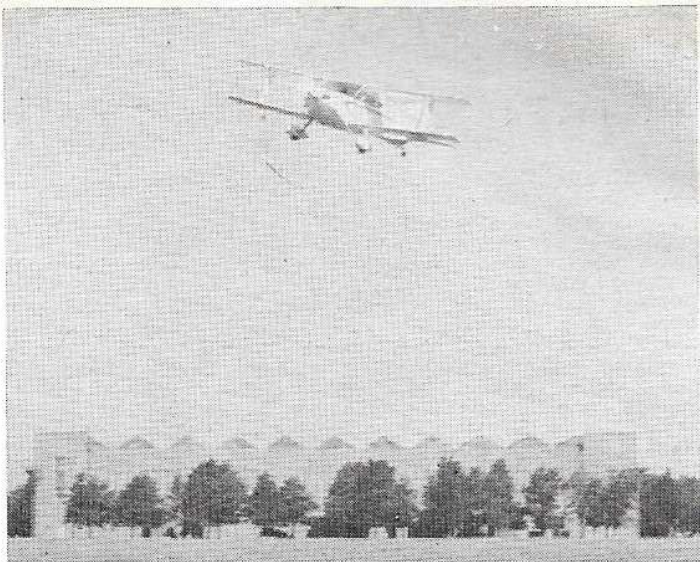
Covering and finish is largely a matter of taste. Mine was tissue wings and tail surfaces, nylon fuselage underneath, and silk sides and top. (It sounds as though I was emptying out the odds and ends from my covering drawer!) When the whole plane was covered and assembled, I gave it three coats of clear dope and then sprayed it with two coats of K & B. The trim was tape and film. Anyone wanting to put in some more detail could well invest \$10 with: Sorrell Aviation, Rt.1. Box 660, Tenino, W.A. 98589 U.S.A. They will get twelve 3in. x 5in. colour detail photographs and an 8in. x 10in.—plus a 3-view.

Flying

The test-flights of this model were done in the most adverse conditions—namely, the first round of the Class-2 event at Woodvale! I managed to complete my flight and was quite pleased with its performance, in spite of running out of right aileron trim due to the thrust-line being all wrong, having a fair amount of rudder trim, combined with not knowing at what speed it was going to fall out of the sky.

Once you have the c.g. and thrust-

Certainly one of the most striking looking models we have seen for a long time (below), it often appears more elegant in the air! If you want an unusual model for those demos, then this is the one for you—but will they believe there's a 'real' one like it?



line right, you will find *Hiperbipe's* handling very good indeed, and it is responsive at all speeds. With the flaps down, in any sort of wind, you should take care not to hover too long, as it does not look authentic! Take-off is easy, but should not be hurried. Feed on the throttle and hold her straight allowing the tail to rise. When the speed is good (subject to strip type and condition) lift her off with a small dab of elevator. Don't attempt to climb until the model's airspeed increases.

The landing approach is also good, with the model seeming to settle

into a definite groove and needing only minor assistance with elevator and throttle.

Aerobatics are straightforward, with a 'snappy' roll rate, but loops should be kept rather small or the top will get a bit floppy. This will depend, to a certain extent, on the motor and the weight of your model. Incidentally, the scale loops I have seen are usually quite small.

I would rate the *Hiperbipe* as a very versatile model, from Sunday-flier to competition entrant, and I wish all its builders 'Happy Landings'!

