


**A 36 in mini-size biplane
with a maxi-size performance**

BALDOCK B



By COLIN HARDWICH

HAVING become tired of flying high wing monoplanes I decided it was time I tried something different and after watching fellow members of my club flying bi-planes, I decided that a bi-plane it had to be for me.

Looking around, I could find nothing small enough available in kit form or on plans that I liked the look of, so I decided to roll my own.

Having only .20 size engines to hand it was apparent that the plane had to be about 36in. span, with a take-off weight of about 3½ lb.

The original was flown on an O.S.20 and the performance proved to be good, but at a later date I fitted an H.B.20 and the difference in performance was amazing

to say the least, she will now become airborne after ten to 15 yards and climb away hands off. (Maybe a case of the correct prop./motor combination, rather than just brute power—Ed.)

This being the first model I have ever designed, it was with some trepidation on a cold January morning that I started the engine to try out the ground handling and a few dummy take-off runs. (After taking plenty of photographs first, just in case.) I was very reluctant to try a flight as there was a 20-knot wind blowing across the patch which is somewhat short for a test flight, but as time was running short and I was anxious to try her out, I filled her up and started the engine, put in a touch of up elevator and full throttle and

away she went. The grass was long and wet which caused considerable drag and the end of the patch was getting too close for comfort so I decided this was it, now or never. I fed in full up elevator and she broke ground a couple of yards short of the ploughed field. She climbed away quite happily after a couple of slight trim adjustments and then flew hands off in spite of the strong wind. After a couple of circuits the engine decided to cut, and this was the moment I found out that she had to be brought in faster than the monoplanes I had been used to. Time for just one more flight I decided, once again she was rather reluctant to leave the ground but behaved beautifully in the air. On getting home, I sat and

IPE

pondered about this reluctance to take-off until I looked at her standing on the bench (the bipe, not the girl friend) of course the angle of attack of the wings was practically nil, so I fitted longer undercarriage legs.

The next weekend proved to be rather like the last . . . 20-knot wind and drizzle. Undeterred, I tanked up, started the engine and let her go. This time she was airborne after about 20 yards. During this flight I noticed that a touch of right rudder had to be fed in to keep her straight on full power but on half-throttle, neutral trim had to be put back. This I decided was due to having too coarse a prop, she was flying with a 9 x 6. The next flight was on a 9 x 4 and the trim

trouble was cured.

The 'bipe' has no nasty characteristics. If the engine cuts at a fair height you can face her into wind, feed in full up elevator and enjoy some very relaxing thermal sniffling without fear of her tip stalling or anything else equally nasty.

Construction

Start by cutting out the basic fuselage sides which are marked on the plan with black arrow heads, having done this, fit all the doublers including the 1/32 in. ply cabane and landing gear doubler. Be sure to make a handed pair (I forgot). Next, cut out and fit F2. Make sure this is fitted 90 degree to the fuselage sides on both sides, when set, fit F1 after drilling to suit engine mount. When fitting, make sure there is no down or side thrust. Then, pull in and glue the rear end of the fuselage, making sure that the fuselage is perfectly straight. I find the best way of doing this is to mark the centres of F1 and F2. Draw a straight line along your building board, put the fuselage on top of this and pull the sides together over the line. When dry, fit 1/2 in. square block at end of fuselage.

Next fit your landing gear crosspieces which is made from 1/4 in. ply, grooved to fit landing gear legs. Then drill and epoxy the uprights in place, not forgetting to drill the uprights slightly staggered. Next, sheet the top and bottom of fuselage with 1/8 in. and 1/16 in. balsa crossgrain. While this is drying you can bend and solder the cabane structure and epoxy it into the 1/8 in. grooves cut into 3/8 in. square hardwood, but do not epoxy in place yet.

Next, make up the two centre sections of the wings and draw a line through length of the chord where shown on plan.

Place lower section in position and check that it has zero incidence. If, its all right, epoxy the hardwood and ply crosspieces in as shown on the plan. Do the same with the top wing centre section. Put the cabane structure in place and check that you have one degree positive incidence; mark position of bearers then epoxy in place.

Cut to size the tank hatch, then cut out 4 in. x 3/8 in. where the cabane structure is fitted. The two pieces removed should be cut in half, lengthways at the same angle as the cabane wires. Place the inside pieces in position and press the outside pieces against the cabane wires to mark where to cut out the grooves. Cut these out and epoxy in place. When dry, carve and sand to shape, not forgetting to put the 3/32nd in. balsa on the radius of F1. Carve out space for tank as shown on plan.

Next carve and sand to shape the headrest and fairing and fix in place.

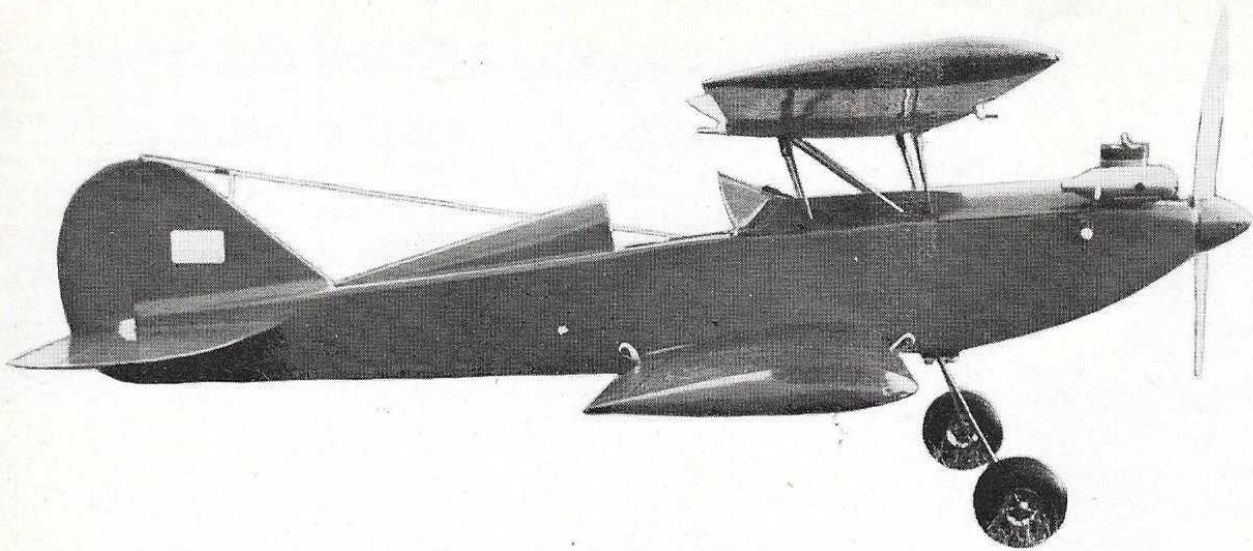
Sand the fuselage along the bottom at 45 degrees to side and bottom until the doublers appear, then round off to section. Do not sand the top yet.

Fit landing gear in place and hold down with 'ali' strips. Assemble tail wheel, fit into groove in 1/2 in. square block, fix in place with bandage and fibreglass resin.

Now fit the engine and carve and sand front to suit 1 3/8 in. spinner.

The rudder and elevator servos are mounted inverted on a plywood tray which is fixed to F2 and the other end to a 1/18 in. ply bearer across the fuselage. The throttle servo is mounted across the fuselage about halfway along the cabane bearers and the DEAC is placed as far forward as possible up against F1. The 4 oz. Kavan tank is laid on its edge on





top of the DEAC with the rear between the cabane bearers. Mount the receiver on a tray between the rudder and elevator servos and the throttle servo and also between the cabane bearers.

Horizon gear was used in the original and there was plenty of room for it.

Wings

The wings are extremely simple and do not require any constructional explanation. When completed, they are epoxied together and then strengthened with 1 in. fibreglass tape and 1 in. dihedral at each wing tip. When preparing the fibreglass resin, mix up a bit extra and use this in the engine bay.

Tailplane

The tailplane is simplicity itself and again requires no explanation. Fit into the fuselage complete with elevator not forgetting the one degree incidence.

Cut out fin and rudder, glue the 1/32nd in. ply doublers in place and epoxy in place on the fuselage. Fit the triangular pieces at the base of the fin and sand the whole at the top of the fuselage as per the bottom. This will give the fuselage a pleasing rounded appearance.

When installing the radio gear, use it to get the C of G in the right place rather than adding weight afterwards, as a high wing loading will probably make the plane fly like a wet log.

By not having to add extra weight to get the C of G right, you should end up with a model of approximately 3½ lb.

take-off weight and this will give her a lively performance in the air.

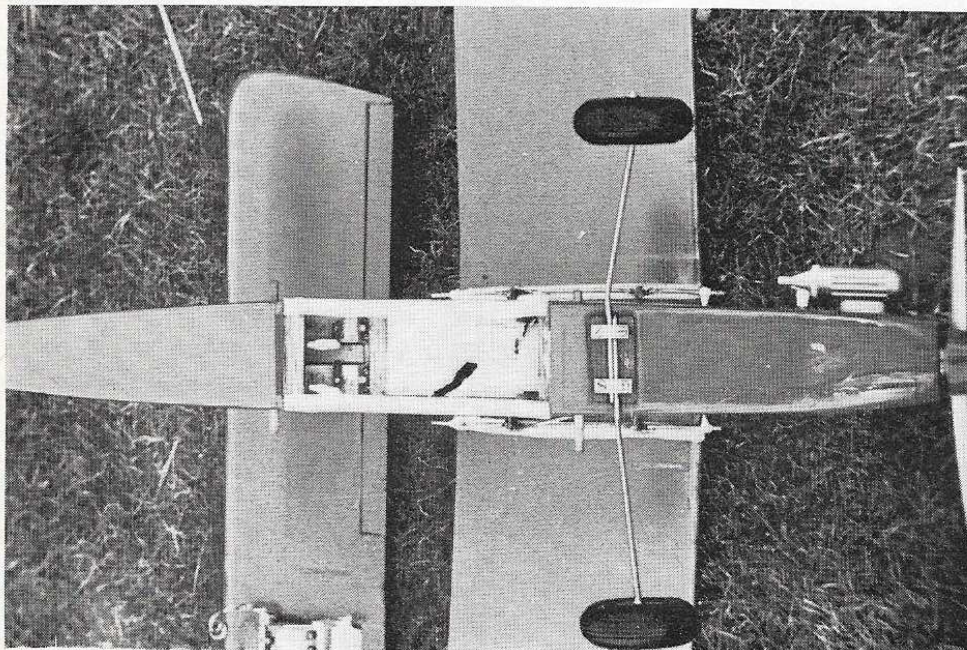
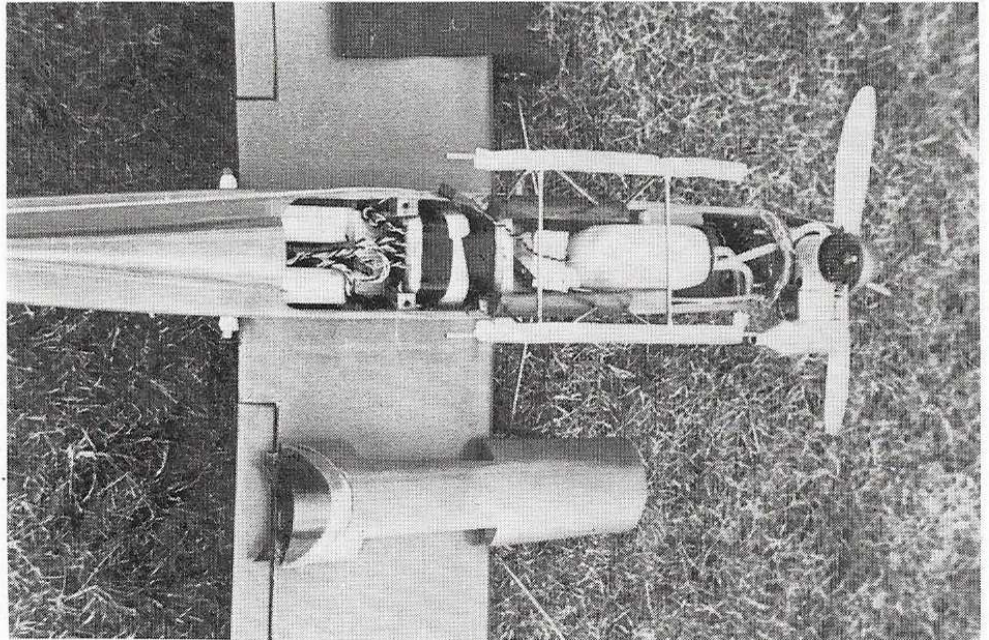
Finishing

The finish I chose was Solarfilm because of its ease of application and the fact that you colour, strengthen and fuelproof all in one go. Also pressing was the threat of eviction if I opened a tin of dope in the

house again and seeing it was January, I felt it would be a bit draughty to do it in the garden (. . . all those good principles - Ed!). But the way it is finished is purely a matter of one's own preference.

Flying

With the slight toe-in built into the landing gear, you will find that she tracks



dead straight. Hold in full up elevator, put on full power, and after a couple of yards ease off the elevator until the tail lifts up. Hold it there and you will find she will break ground after ten to 15 yards and climb away hands off. She will perform all the aerobatics in the book, but if you want to do them really fast, I would suggest that you put in interplane struts between the wings as I have had the wing tips meet during aerobatic testing. But for everyday flying, these are not necessary.

Above and left: two views of the Baldock Biplane radio installation. Large hatches to and bottom make for easy accessibility of radio equipment.