Build for our full-size plan — Vic Smeed's lively all-sheet bipe is just right for robust free-flight or radio control.

DOLLY BIRD

THIS WHAT MIGHT BE claimed 'nifty little biplane' is an all-sheet design, suitable for free flight or lightweight rudder-only radio control, of particularly perky appearance. It features Jedelsky-type wings but with slightly novel construction, no tricky wire bending and overall sturdiness coupled with modest weight. With something around 190 sq. ins wing area and a (free flight) flying weight of 10½ ozs (including iron-on heavyweight fabric covering) the wing loading is a bare 8oz/sq ft and the glide is consequently better than might be expected. A .5 to .8cc (.049) engine is plenty of power and by careful wood selection it would be possible to build down to 8oz or under and fly with an .020 glow motor.

A lot can be done with colour schemes, from WWI markings to Pitts chequers, and no doubt someone will fit a radial cowl (ex lemonade container) or dummy cylinders, or overhanging 'ailerons', or even squared-off flying surfaces to ring the changes on appearance without substantially altering the basic design. We quite expect some expert to fit three-function radio!

Before beginning construction decide on the engine to be fitted. The main drawing shows a side mounting for a Dart or similar, with a closely fitting cowling, and this layout can be used for similar front rotary intake engines with a separate tank. However, a popular choice is likely to be a modern Mills .75 and this would not so conveniently fit; much of the starboard side would need to be cut away to accommodate the tank and carburettor. It would thus be better to use an upright mounting, with bearers notched into B1 and supported by large gussets beneath; the space between bearers and fuselage sides should be filled with balsa strip and the cowling modified to fit around the engine.

For radial mounting engines a further bulkhead or firewall should be fitted at an appropriate distance behind the noseblock, a process which is quite simple since it will be of the same outline shape as B1 but with the bottom cut off to the required depth. For either of these latter alternatives the vertical ply plate of the side mount is omitted, of course, and the top shape can be carved from ½in. soft block between B1 and the noseblock, cutting away just enough to allow a snug fit round the motor. If block is used, parts B1A will not be needed. In any case, allow for a touch of right thrust.

Fuselage construction

Cut two fuselage sides from medium 3/32in. sheet. Note that the top edge is a straight line, as in fact are all the other lines except a tiny part of the lower wing seat. The bottom line at the nose is full depth, then comes the wing seat (which will need a final trimming to shape when the wing is finished) and the after fuselage line is 1/16in. in from the full outline. Mark on the former positions and, particularly, the exact position of the wire cabane strut on each side.

Bend two struts to the drawing - they can be laid one at a time on the plan to check that they are accurate, since the bends are all in one plane. Cement the lower 1/16in. strips to the insides of the sides, then cement the wires in place, propping the free ends with a scrap of 3/32in. When dry, fit and cement the upper 1/16in. filler strips, trimming to fit close to the wire, then add the 1/32in. ply cap pieces, which should measure 9/16 × 3.13/16in. These can be left to dry under weights or the sides picked up and bulldog clips used to clamp them while the cement dries.

Form the undercarriage next. This again is bent in one plane only and can thus be laid flat on the plan to check the shape (although there is nothing to prevent you from adding a touch of forward rake to complement the angle of the cabane struts). Trace and cut B1, lay the u/c on it and mark for holes and nicks to receive the binding. If an upright motor is used, mark and cut the bearer housings. B2 can be cut using B1 as a template, then cement and bind on the undercarriage to B1, using strong thread. Use a needle and start by tying at the bottom of one side, wrap twice round the wire, move diagonally behind the former to the next pair of holes, twice round, diagonally behind etc. till the other end is reached; then return with one wrap round the wire at each pair of holes, crossing the diagonals behind and tie off where you started. Rub cement into the thread and the former will have to disintegrate before the undercarriage will come loose!

Now cement B1 and B2 to one fuselage side, working at the edge of the board to allow the u/c to overhang, and cement the other side on top. Check that the top edges are absolutely parallel and the formers square to the sides and leave to dry. Trace and cut B3 and B4, draw the tail ends together and cement, then cement in B4 followed by B3. When dry, sheet the bottom with sheet cut with grain across the fuselage, starting by lodging the first piece half on B2. Fit a rectangle of softish ¼in. sheet between the bottom edges of the sides at the front if a side-mounted installation is planned, but leave this till after the bearers and right angled gussets are fitted if an upright engine is to be used.

The wing seat space is left open and in fact provides access if radio is fitted.

Installation should be prepared at this stage by fitting a sheet of ply or hard balsa between the inner ply panels of the cabane strut mountings. On this can be hung the rudder servo and possibly the receiver, using sticky pads; alternatively mount the receiver on the fuselage side and offset the hung servo to allow clearance. In either case the battery should be mounted against the back of B1 using hooks and rubber bands.

Fit a cockpit seat if required, fit the tailplane and plank the fuselage top with softish 3/32in. strips, or you could use soft ⅛in. if preferred to give a little more sanding scope. The fin is added after sanding. Fin and tailplane are simply medium grade 1/16in. sheet (they could be light 3/32in. sheet) traced, cut and sanded before cementing in place. Treatment of the nose is a matter of choice and alternatives are shown on the plan. Check by positioning the motor periodically and don't forget the tank if a separate one is to be fitted.

Sand the fuselage and tissue or film cover before adding the wing runners, which would otherwise restrict movement, but after completing the tail surfaces. The tailplane can be stiffened with fore-and-aft strips as drawn, cemented beneath. If a radio rudder is used tape, thread or film-on-one-side hingeing can be used; for F/F a smaller tab is shown and this can be attached by a couple of short lengths cut from a paper covered wire tie (as used on polythene food bags) cemented on the starboard side. The tail surfaces should also be tissue or film covered, both sides. Add the lower wing dowels to complete the fuselage.

The wing runners can be 3/16in. dowel or, better, bamboo of similar diameter, cut from solid garden canes or thinned down cheap chopsticks. Excavate small grooves at the wire positions and cement and bind in place. Check on length, as too great a forward projection could get in the way of engine handling.

The wings

A slightly different approach to Jedelsky-type wings is employed and this is an opportunity to use up any trailing edge section you may have which is much too soft for normal use. The original used lengths sold cheaply by the model shop because they were too soft for anyone to buy and were damaged from long shelf-life. Cut the medium 1/16in. wing panels slightly overlength and cement the TE stock to them, making sure that the longest face is in contact (see sketch) and that the front edge is almost flush but a whisker behind the front edge of the 1/16in. sheet. A light wipe with fine glasspaper will then bring the 1/16in. edge

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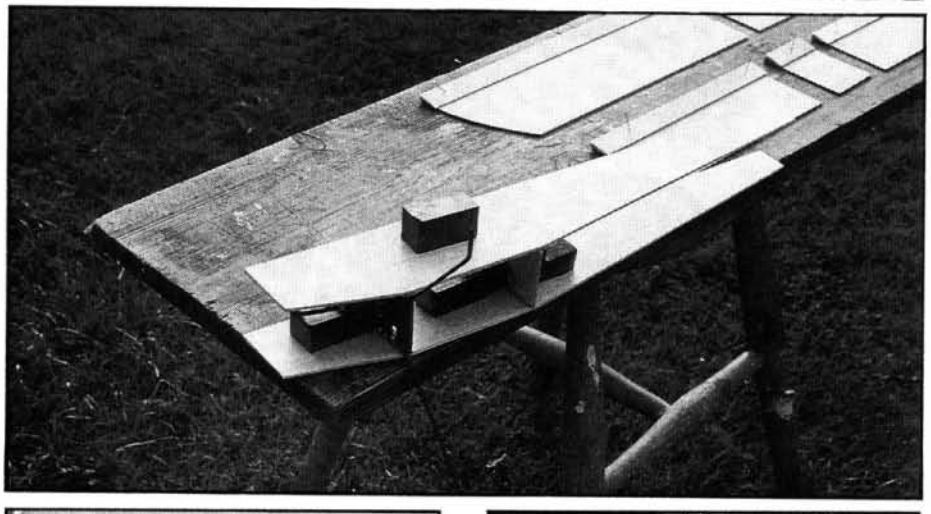

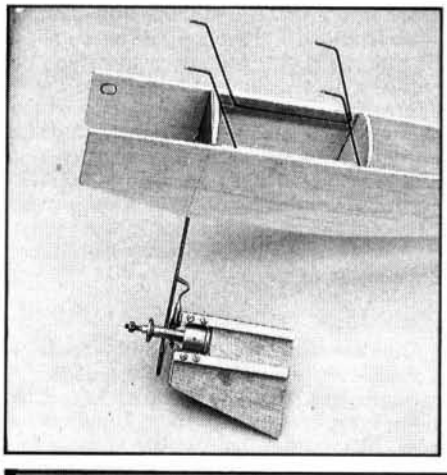

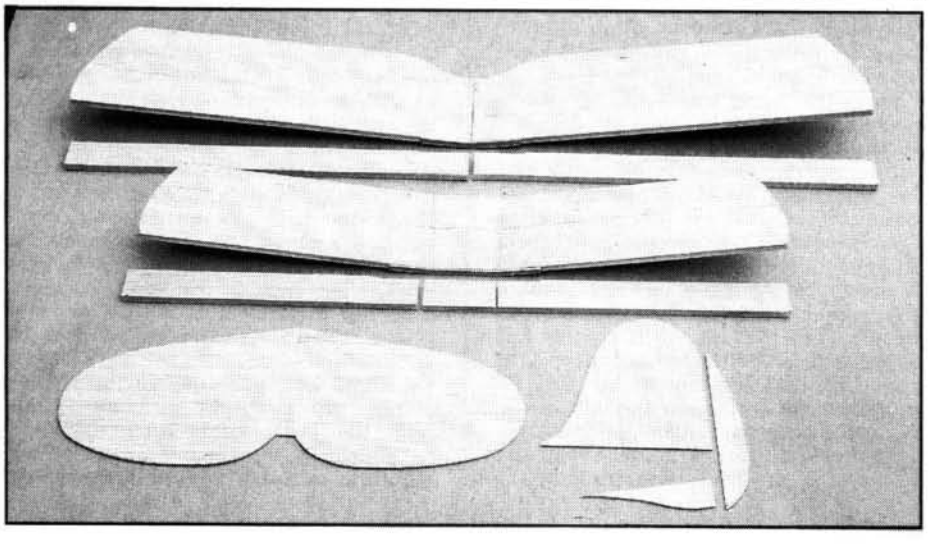

Top: Dolly Bird is one of those designs that looks right from any angle. Try one! Below that: Under construction - the fuselage is built on the edge of the board to allow clearance for the undercarriage. Note substantial blocks to provide accurate support. Above left: recessed cabane struts and the arrangement of side-mounted bearers are helpfully shown here. Above right: A Mills 75 goes in upright. Both mounting configurations shown on plan. Bottom: Wing and tail components partially assembled. Construction is quick!

flush with the TE stock to produce a flat and angled face.

Cut 1in. wide strips from soft ¼in. sheet, ensuring the edges are square, cut to wing panel lengths and chamfer meeting ends for dihedral. Recess the rear faces 1/16in. to receive the dihedral braces and double cement together, checking correct dihedral at the tips. When dry, cement on the 1/16in. panels, cutting the ¼in. sheet to the angled faces and trimming the panel ends to fit; because of the angles the 1/16in. panels (if left square) will diverge slightly, hence the need to trim them, which is why they need to be cut a shade overlength originally. Add the wing ribs and fill between the centre-ribs on the underside of the lower wing with a 1/16in. flat panel.

Sand to section, which involves only rounding the leading edge and sanding the top break to a smooth curve; rub cement into the dihedral joint lines, then tissue or film cover. These are probably the fastest wings you ever made, but they are very strong, quite light and more efficient than you might expect. All that now has to be done is to check the fit of the lower wing in its seating, trimming a fraction off the fuselage edges if necessary to ensure that the wing sits comfortably in place.

Finishing and flying!

Check over the whole model, paying particular attention to: fin (vertical), tailplane at 90 deg. to it and wings properly aligned when strapped in place with rubber bands. Check motor mounting details, too, temporarily installing the motor to ensure that it can be mounted and removed. It is much easier to correct anything at this stage than when the full finish has been applied.

Finish is a matter of personal choice but avoid adding a lot of weight. Colour tissue or film, with film, decal or tissues trim, is better than colour dope, though dope or Humbrol enamel on the fuselage is a reasonable approach. If used on the wings and tail surfaces, a light spray should be adequate. Fuel-proof the nose area, inside and out, solder on the wheels, instal the motor (and radio, if you're going that way) and the first flight will be imminent.

The model should balance at the mid-chord position of the upper wing and if you have some two-foot grass or weeds you can check it out with a couple of hand-glides. Judging the speed of launch and the glide of very small power models is not all that easy but the model is reasonably rugged!

Under power there will be a fairly pronounced turn to the left with a straight-ahead motor installation, so quite a bold amount of right rudder tab is needed. Short span models will always react noticeably more to torque, for obvious reasons, and a couple of degrees of right thrust when installing the motor, as mentioned in the introduction, will give more freedom in determining the size of glide circle. Side thrust also helps to eliminate power stalling, though if a fairly enthusiastic motor is fitted a touch of downthrust may also be desirable.

With increased height from short power runs the glide can be studied. It is possible to adjust upper wing incidence by bending out the front or rear legs of the cabane struts (though be careful not to damage their mounting) or by tack-cementing packing pieces, but the safest answer is probably a small amount of ballast in the nose or tail. It would be possible to cement on a wire to bend in a little up or down elevator but this would have a noticeable effect on the powered phase. As always, the golden rule is to adjust the glide with the C.G. and/or flying surfaces and then trim out any power problems with thrust-line adjustments only. And do put your name and address on the model - it invites rather longer motor runs and the higher it climbs the more chance there is of hitting that boomer which will take it away!

Giving new meaninng to the phase 'fly by wire', Dolly Bird (suspended in the sunshine) shows off its attractive lines. Send us a photo of yours!