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YELLOW BIRD

A 'How-to-do' feature by A. J. Webber on high performance chuck gliders

DO YOU WANT a contest model you can fly on the village green and not end up in jail? Then Yellow Bird's the answer!

The aim at all stages of development has been to obtain a safe launch in rough weather, have ability to recover from gusts and eddies and maintain sufficient altitude to catch thermals, rather than to rely upon fresh patches of low-level lift.

This might be expected to produce poor calm-air duration; but that is not the case. Flown after sunset on three occasions last summer the larger "Y.B." 20 recorded a tranquil 90 seconds *plus* on each outing.

Careful trimming on damp evenings gave maxima of 65, 58 and 74 seconds.

The long tail moment, 40 per cent tailplane and big fin keep the "Y.B.'s" on the right climbing track in rough weather. Less fin area is fine for the glide but allows swinging-off to one side on the launch.

The 4.7 per cent wing section is just right. Thinning it down produces no gain in height and sinking speed goes up sharply. Yet if it is thicker the rate of sink is the same; but on go the brakes early in the climb.

Both "Y.B.'s" will go over the 100 ft. altitude mark and the adjustments used produce (1) something between ½ loop and right-spiral climb under power, tending to nose up if the turn over-tightens and (2) a very flat, safe left glide circle.

Building the "Y.B.'s" to lower all-up weights than those shown does not improve performance. Increasing the weight may give one extra time, but calls for more force in the throw.

Bamboo leading edges are well worth the extra effort, placing tremendous strength where chuck-gliders take all the knocks. If necessary, "borrow" a piece off the neighbour's bean-poles.

The dangle dethermaliser causes a curious descent but landings have been effected safely on roofs, hawthorn trees and other unfriendly objects!

Colour-scheme on the originals was yellow wings, tailplane and black fin with black trim on fuselage. For elegance this takes some beating. Orange, used on two of the later versions, gives remarkable visibility.

Wood Selection: Cut wing, tailplane and fin from quarter grain sticks. This has a shining, mottled look and strong resistance to bending. If you have a choice, pick the lightest. Fuselage for the "Y.B." 20 needs hardest spruce, straight-grained, without natural bends. Softer spruce (usually lighter in colour) for "Y.B." 13, or, if you prefer balsa, use the hardest piece of straight-grained wood you can find.

Components: H.M.G. "Adhesive" was used on the prototypes for all joints involving spruce and all joints are pre-cemented.

Curve the bamboo leading edges over a candle flame and cut for dihedral breaks before cementing in place. Finish—sand the underside of wing and tailplane and add the linen thread edging to all parts. Reduce the wing to the tapered thickness shown and mark the high-point line of the section on the upper surface.

Study the section carefully and then carve and sand to shape, restricting sanding action to work from leading edge to trailing edge and at 45 deg. across the wing. Note the sharp-nosed leading edge. Don't try for a knife-edge sharp trailing-edge.

Cut the wing into four panels (build in throw-tab on "Y.B." 20 at this stage) and re-set for dihedral, using nylon or Jap silk stuck on top of centre joint.

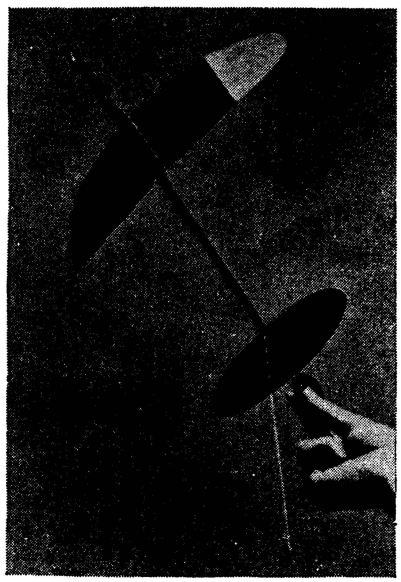
Throw-tab for "Y.B." 13 is now cemented in place, leaving it slightly off-centre to butt against the fuselage side. Steam in the wing warp as shown. Sand the tailplane and fin to section, but not too thin.

If using a balsa fuselage for "Y.B." 13, do not taper or reduce to a circular section between wing and tailplane, and do not cut grooves for wing rests.

The dethermaliser slot is deeper and longer than the dethermaliser block to allow additional ballast if needed. Note the lip at the aft end, which ensures the block cannot fly out during a launch. The size of the dethermaliser block is adjusted after completion of the model to give correct balance (positions shown are maximum rearward ones needed).

Finish: Use superfine Jap tissue, "Joyplane" Banana Oil No. 2, a 50/50 Banana Oil—Amyl Acetate mixture and clear dope (4 drops Castor Oil added to a 2 oz. tin).

Apply Banana Oil with cotton-wool pad, working along the grain. Rub down lightly with dry "Wet or Dry" paper (400 or finer grade). *(Continued on plan*



Designer with the larger, 20 inch version above. Plans available through AEROMODELLER Plans Service. At left, the "dangle d/t" shows how the Yellow Bird 13 descends when the fuse releases the brass nose weight, and brings the model down stalled.

FULL-SIZE PLANS FOR 13 in. VERSION OVERLEAF

Argus Specialist Publications Limited
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Yellow

by Alan

From here on, all rubbing down and polishing is done by working with the line of flight.

Tissue cover everything except spruce fuselages, using a minimum amount of dope, smoothing out thoroughly. Leave margins uncovered for wing and tailplane where fuselage joints occur.

Brushing with the grain, put four or five coats of Banana Oil (or clear cellulose lacquer) on wing, three on fuselage and fin and one on the tailplane. After the first coat use the thinned mixture. Rub down between each coat using wet and worn 400 paper with soapy water as a lubricant. Aim to keep the film of finish as thin as possible.

Spruce fuselages need two coats of Banana Oil over all and two extra on the nose. Rub down with finest grade paper.

Finally, polish everything except the tailplane with fresh *Dura Glit* using fast light action. Remember to leave the fuselage pylon area unpolished.

The dethermaliser slot should be well banana-oiled to prevent possibility of damp swelling the wood slightly and jamming the dethermaliser block.

Note that the tailplane has negative incidence relative to the wing. Use undersurface of wing, lower line of fuselage and a ruler to get this right. Sand the fuselage so the tailplane fits at the correct angle without distorting the section. Cement in place with model inverted, measuring tip heights from the building board for tilt.

Steam in port wing warp, avoiding distortion of wing section, and adjust for correct C.G. Check that tailplane is unwarped.

Trimming: Avoid a "half power" launch. Test at *normal* gliding speed and adjust by trim-tab for left turn of 30-40 ft. diameter circle. Cure a stall by use of extra nose-ballast; flatten out any steep glide by washing out the tailplane evenly. Avoid any tail wash-in.

Launch by gripping fuselage firmly between thumb and crooked second finger; index finger fits in the wing cut-out. If fuselage slips through one's fingers, cement squares of rough "wet or dry" paper on the fuselage.

Use a side arm movement with *no* wrist movement —keep the wrist bent well back.

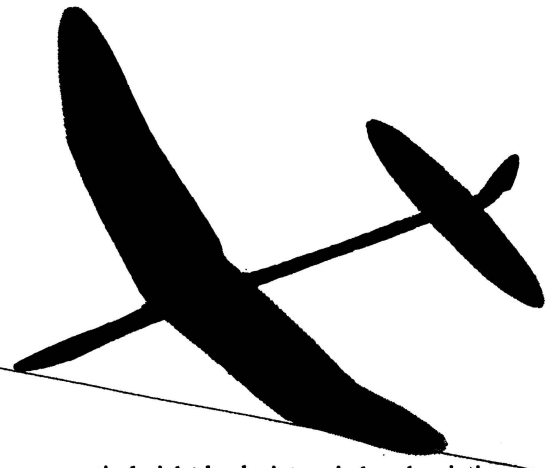
At point of release, the Yellow Bird should be in a near vertical right bank, into wind and pointing upwards 20 deg. or more from horizontal. Don't look at the model, aim at a point in sky. Practice without releasing, until you are thoroughly used to the "heave" procedure.

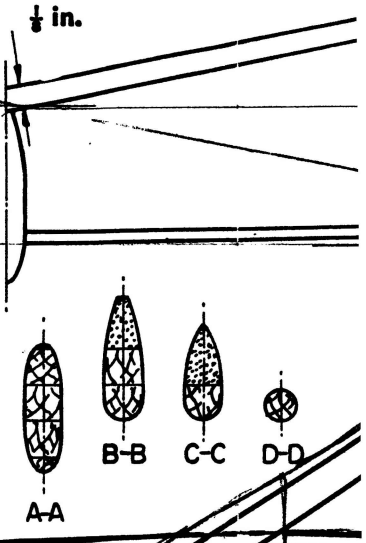
Launch flight-pattern is an elongated half loop with the model reaching gliding speed and rolling from inverted position just before the high-point of the half loop. Direction of roll is clockwise, viewed from the rear.

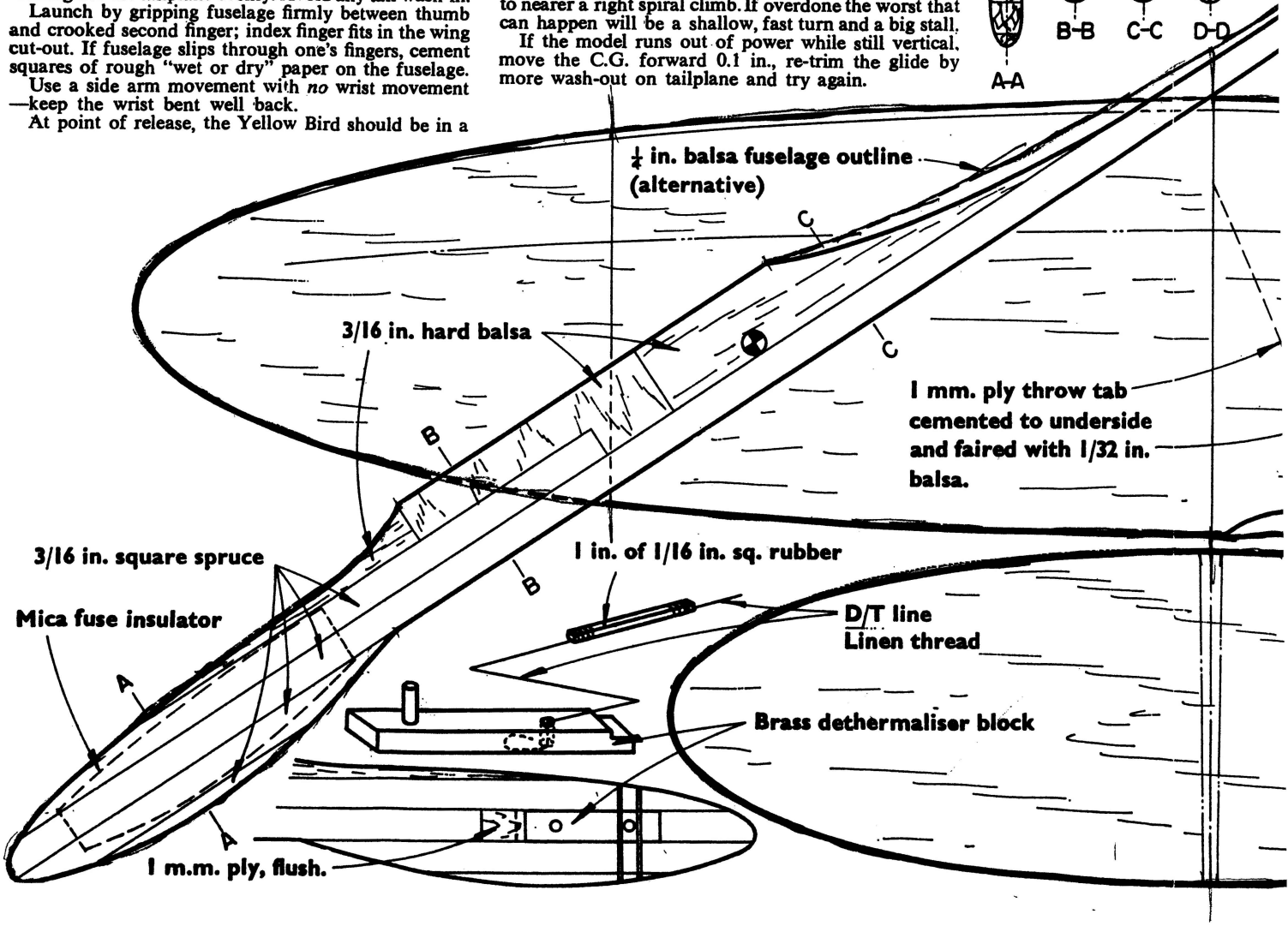
Throwing to the left of the wind and/or using insufficient right bank tightens and speeds up the loop and, if badly overdone may cause spinning to the left.

Going to the right of wind and/or using increased right bank opens out and delays the half loop. This is useful in windy weather and modifies the flight pattern to nearer a right spiral climb. If overdone the worst that can happen will be a shallow, fast turn and a big stall.

If the model runs out of power while still vertical, move the C.G. forward 0.1 in., re-trim the glide by more wash-out on tailplane and try again.

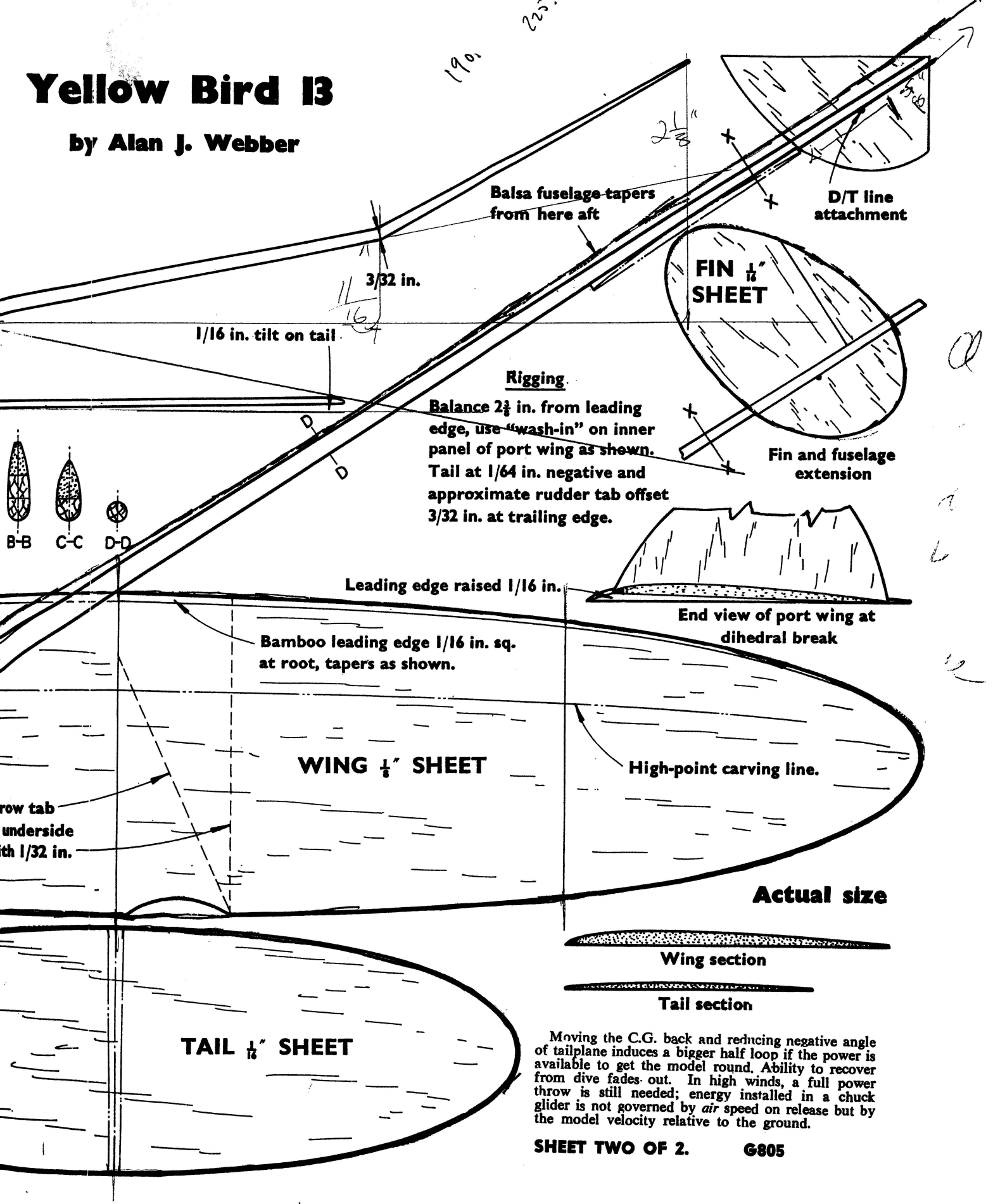






Yellow Bird 13

by Alan J. Webber



Moving the C.G. back and reducing negative angle of tailplane induces a bigger half loop if the power is available to get the model round. Ability to recover from dive fades out. In high winds, a full power throw is still needed; energy installed in a chuck glider is not governed by *air* speed on release but by the model velocity relative to the ground.

SHEET TWO OF 2. **G805**