

VELI *Nice* VOLE



**Clifford Kershaw's
enlarged Vintage
classic is ideal for**

48in canard is surprisingly elegant for a Vintage subject. Fit two or three-function radio and fly! Ideal for up to 1.5cc motors.

ONE of the more foolish things I did in my sadly distant youth was to sell my Keil Kraft Bandit, complete with Mills 1.3 Mk.I and Snip timer for thirty bob – er, £1.50. If that doesn't convince you I'm daft, I confess my Southerner Mite went, same price, same day, complete with Mills .75. That was in the early Sixties when I'd just bought my R/C licence and was trying to save. Radios cost twenty times more then than now in real terms. It was about that time I replaced the Webra Mach I in my Dixielander with one of the new-fangled Cox Babe Bees and sold it as a Sunday Flier's pussy cat for a similar price. I soon came to regret these impulses and spent the next twenty years trying to replace my lost engines. By 1970 I'd landed a rodless .75 for 3/9d and in July '71 added a 1.3 Mk.II, but my old 1947 Mk.I, the second engine I ever bought, remained irreplaceable...

Until two years ago when a friend passed on an old engine he'd been given – not just a 1.3 Mk.I but a Mk.I Series I, No.10, no less! There was a string attached; he wanted to see it fly, preferably in something of appropriate vintage. He suggested Velivole, a design he knew I'd admired since seeing one fly forty years previously. Now Velivole is a very strange bird indeed; it not only flies backwards but upside down as well. Furthermore, since it leapt out of the cover of my June 1946 Aeromodeller I had never met anyone who could pronounce it with certainty. In 1946 I'd seen photos of such exotica as the Kyushu Shinden or Curtiss Ascender but I'd certainly never met a canard, let alone seen one fly. Marvellous!



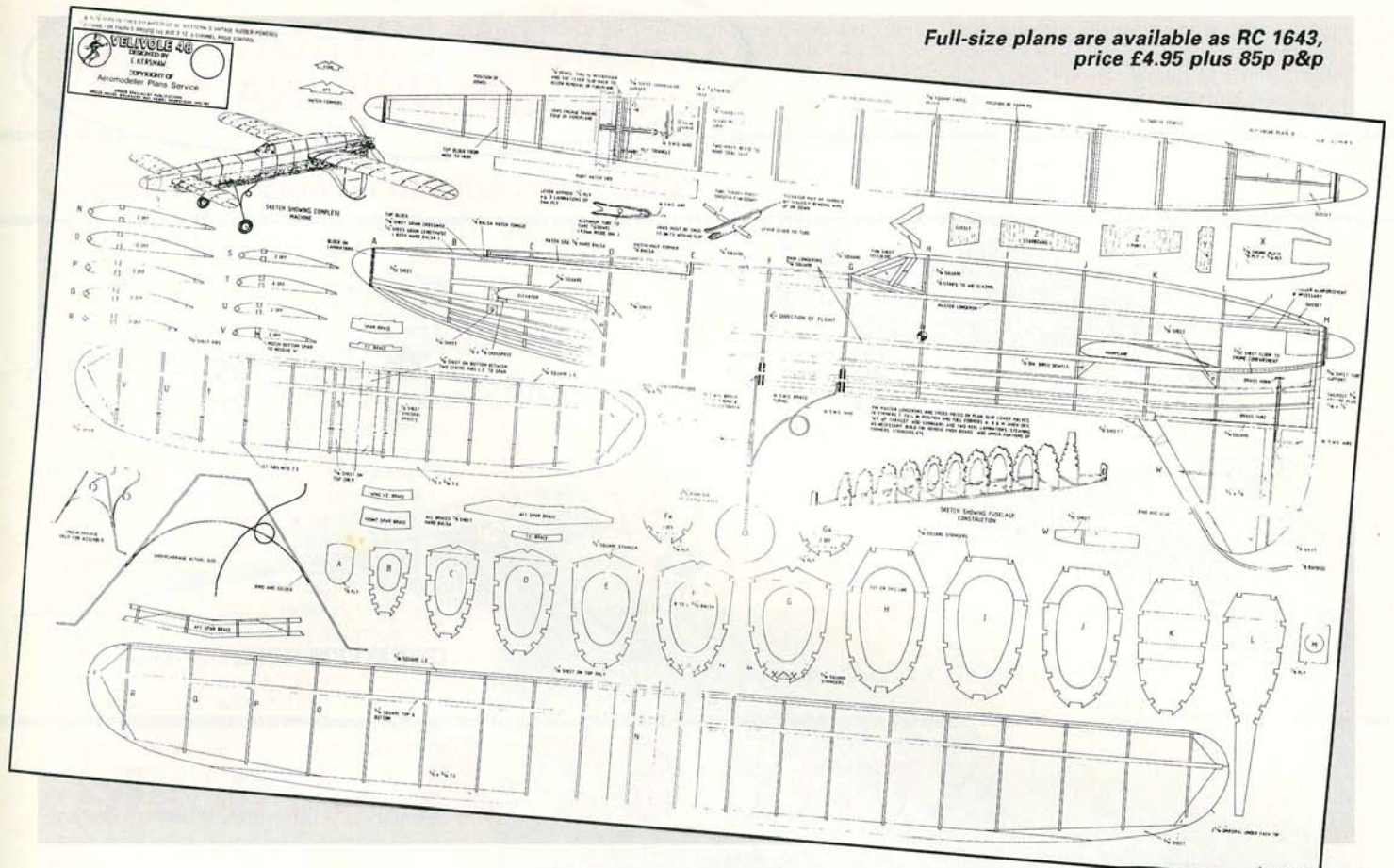
Which way? Velivole will arouse much debate on the flying field...

Not that Velivole's flights lasted very long, as rubber suitable for motors remained unobtainable for us lads, as it had been through the war; some kits included it but these we could rarely afford. We occasionally got our hands on 'synthetic rubber' which I think you were supposed to boil before use, whereupon it should swell like weird, black noodles. No doubt when expertly prepared and handled it worked well enough but we found it one of the least elastic things on earth. You got one flight, after which it remained stretched out in the fuselage bottom like a dead snake or, worse still, bunched up at one end or the other with predictable results. We preferred to buy or scrounge household electrical flex as in those days the insulation was not plastic but rubber. This we carefully slit and peeled away from the wire; four strands gave around thirty seconds run – who said electric free flight was new? In his article 'Talking of Canards' which accompanied the Velivole plan in 1946 Mr. Laidlaw-Dickson claimed that for a canard,

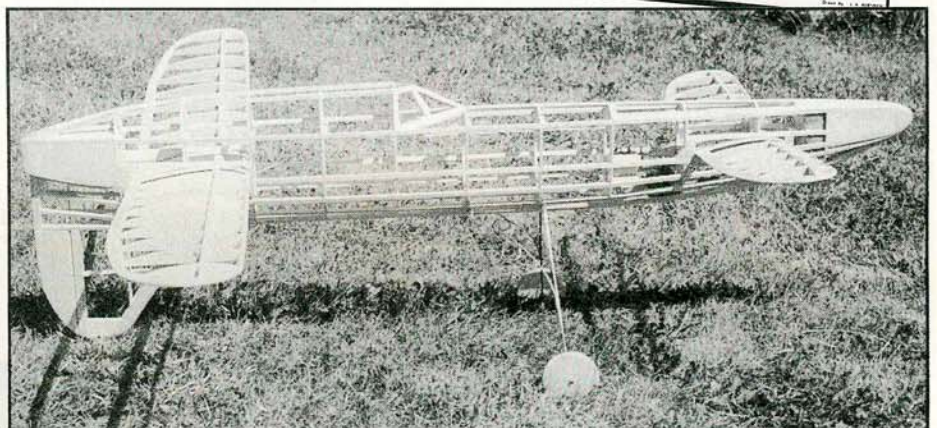
'stalling is impossible', bad trimming producing solely 'a curious pitching movement'. This comforted us yet didn't fully prepare us for Velivole's odd gait: when over-elevated or tail heavy she didn't pitch so much as porpoise smoothly along, a flying sine wave. Observing this in 1946 didn't prepare me for my 1989 versions antics either, but I'm jumping ahead.

So then...

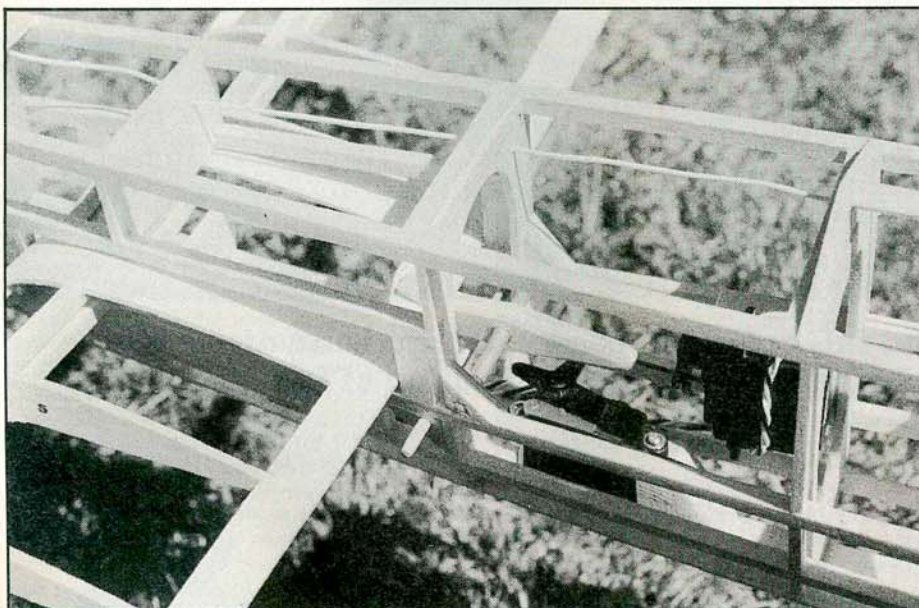
I scaled the original Aeromodeller plan up one-and-a-half times as this gave a span and area typical of contemporary Mills-powered models and I thought I could keep the wing loading reasonable at that. Even so the wings look unusually small compared with the huge fuselage. Keeping weight down had first priority from the outset because when I had added 'radio assist' to my Keil Kraft Outlaw it ended up over twice the design weight, which spoiled the glide and overstressed the balsa wing structure. The 1946 Velivole was mostly made from 1/8in balsa, square and



sheet, which at 1.1/2 times translates conveniently into 3/16in. Of course, this yields more than double the cross sectional area – over three times the volume of wood. Furthermore, the four 3/32in stringers turned into an unobtainable 9/64in which I rounded up to 3/16in. To avoid overkill and possible overweight I used only medium-soft, producing adequately strong fuselage fin and foreplane. For the wing, which lacks the now almost universal sheeted leading edge 'D' box I reserved my hardest, but still no more than medium. If you buy two or three hard sheets and cut all components from these, as I did, you will get (by magic!) medium spars, stringers, trailing edges and so on –



Structure is uncomplicated. Note nicad pack in nose.



Foreplane linkage is totally enclosed. Neat!

cheaply. My only deviations from the original structure of both flying surfaces was to allow the dihedralled panels to continue to the centre instead of having flat centre sections, adding a couple of braces, and fitting 1/16in sheet flush with the upper surface instead of on top. The wings bend without so far breaking but I have not performed any violent manoeuvres other than the vertical descent I'll describe later. If you are uneasy about wing strength I suggest substituting spruce for the upper mainplane spar, but no more. These surfaces also appear vulnerable because they pass through the fuselage and have no 'knockoffability' or indeed scope for movement at all; you might prefer to accept a slight weight (and authenticity?) penalty and build separate plug-in halves. Me, I try to *vola cum cura*. Building the flying surfaces is so straightforward instructions would be superfluous.

Now to the fuselage

The fuselage is built upside down upon the two master longerons and cross pieces. Formers were prepared in one piece, grain vertical, then cut across and the bottom section set up. For C to G this leaves flimsy top pieces with eminently break-offable corners. I preferred to make separate tops with grain horizontal, including the hatch formers. I steamed some stringers to avoid building stresses into the structure; the need depends how hard your wood is. Using two laminations for the main keel helps lock in the curve. When you've added keel, stringers and fin I think you'll suddenly appreciate what a beautiful shape you've made, as much like some exotic ship as an aircraft. You may find it convenient to fit servo blocks, rudder snake, perhaps an aerial tube, before adding upper formers and stringers. Only tricky bit is the cockpit glazing. I used four separate pieces of acetate or celluloid. I was stuck for bamboo to make a tailskid until my wife produced house plant supports. Scrape off the green dye and steam to shape. I admit I worried about the adequacy of the wire gauges I'd chosen for the undercarriage because changing to thicker after the model was completed would entail major surgery, but I've had no trouble. If you beefed it up by just one gauge you'd add weight... I fancied using lightweight celluloid wheels as in the old days but, finding none, made ply-cored balsa ones similar in shape to the Keil Kraft streamlined types supplied in Bill Dean designed kits of the 40s and 50s.

Controls

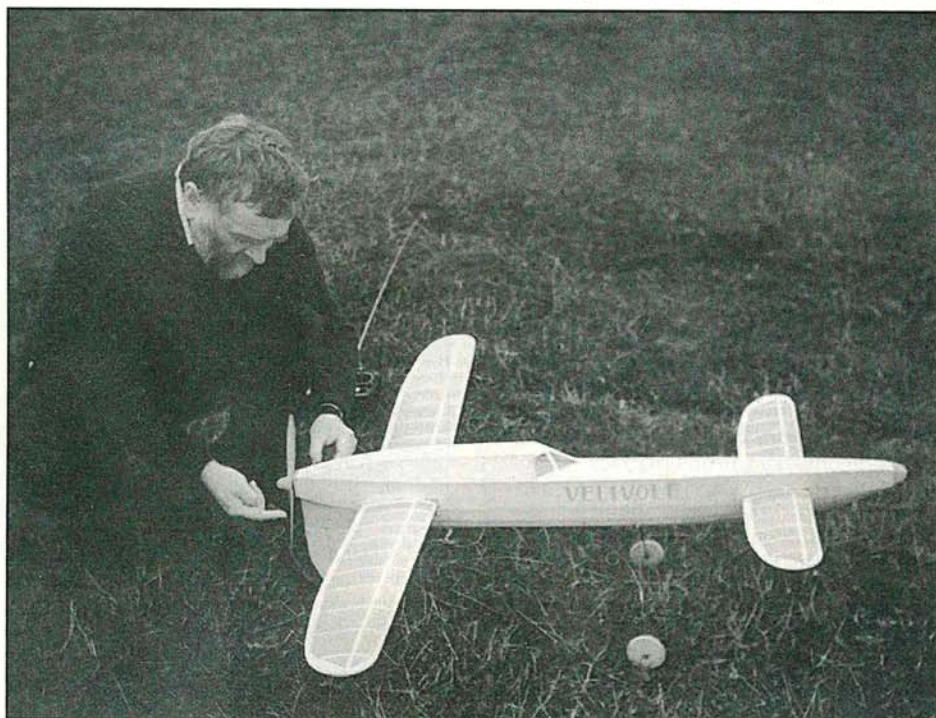
The original trim tab/rudder is fine for R/C. I used one hinge at the bottom and a 16g post passing up through a brass tube in the fuselage to a short brass horn. It's easier to fit post in tube, make two right angle bends, and solder on the horn before gluing the tube into the fuselage. A plastic swing keeper will fasten a nylon snake inner direct to the horn without adaptor or clevis; a fine pin through the tip of the inner for added security if desired, adjust at the servo end. If you can arrange for the horn to swing between two stringers there is just room to hide the lot inside the covering. The system of pitch control is unusual – as surely befits Velivole – but aerodynamically clean and inconspicuous. The leading edge of the all-moving elevator/noseplane rests upon a 'V' shaped cross piece and locates in small recesses at the back of 3/16in sheet uprights, its trailing edge held snugly in the jaws of the rocking lever. The whole foreplane thus pivots on its leading edge as the lever raises or lowers the trailing edge about 1/8in either way. Elastic bands are not necessary; purists will find a couple aid the illusion that the foreplane is fixed but I would remove them for flight to unload the servo. Pitch control is not sensitive, the amount of movement being adjusted by moving the servo fore and aft. Position your rudder servo, Rx and nicad so as to achieve the correct CG position. Choice of radio is obviously personal. There's room for anything, but the lighter the better. Miniature gear is

expensive so I married two Futaba micro servos to an Acoms 35 MHz mini Rx costing £13 and a 6 volt, 110mAh nicad. No switch; instead a plug and socket in the nicad lead is accessible behind a tiny hatch below the port foreplane. Pull the plug for 'off' and plug in charger as necessary.

Covering

Covering Velivole's flying surfaces was my first experience of using Litespan. Doubts about its shrinkage were soon dispelled, it is only slightly more difficult to apply than films or Solartex and looks exactly like doped tissue. I decided the multiple compound curves of the fuselage would not be impossible but would require about eight separate pieces as against three of Solartex if you're careful. Also, although Litespan is much stronger than tissue it is easily dented (admittedly almost as easily re-shrunk) by thumb or finger and there are no sheeted areas to grip when hand

immediately struck by how beautifully Velivole sits in the air, again reminded of a ship. When I eased in some rudder I was surprised how effective it was, given so short a moment arm. Second flight, engine problems, later traced to a non-Mills knob coming unsoldered from the needle. It quit in the classic position: just after launch, nose up, eight feet high, and side-slipped in. No damage. I took her home, very relieved. Next flight Velivole went up high, about six minutes duration from the 7.1/2cc tinplate tank, climbing well but with a slight, stalling undulation. The glide was similar. I think free flight models dislike pilots; command a turn, and the moment you release the stick they shrug you off or turn their nose up at you. I was feeding in an occasional notch of down to stop the nose rising when she suddenly stopped dead and descended vertically under perfect (self) control, everything horizontal. Hit with a rare thump and tried to push the fin up through the



Clifford prepares Velivole for another circuit or several. Now build yours!

launching. I settled for Solartex followed by Clearcoat, fuselage only. With a side mounted pusher engine you might suppose proofer unnecessary but those old diesels burn 30-40 per cent paraffin and there are black streaks down the fin after every flight. Plenty of alternatives to the Mills are available, by the way, E. D. Bee, Heron, AM or AE IO, PAW 80 or, probably a Cox Texaco .049 if you prefer glow, and with any of these you'd save a couple of ounces. If, like me, you're an enthusiast for both beachcombing and prop carving you'll surely have a lovely piece of mahogany put by somewhere for just such a safe place as the rear of Velivole...

Flying

More than usually nervous with so strange a machine I picked a calm evening and hand launched, tank one third full. She calmly flew herself round in slow shallow, right hand circles, Mills purring contentedly. We were

fuselage. I mused long and hard on this while ironing the wrinkles out of the back end (and afterwards). Theory: canards cannot stall because the foreplane, always at higher incidence than the main, loses lift first as a stall is approached, dropping the nose before the mainplane reaches stalling point, hence the porpoising flight. Practice: my canard raised her nose a bit then dethermalised 200 feet without parachute or pop-up tail. The only explanation occurring to me was that I had added 'down' until the difference in incidence between nose and mainplane became so small they stalled simultaneously. A little noseweight instead of down trim seemed to cure the problem so I removed both lead and the 110 mAh nicad, substituting a 225 Deac of equivalent weight. Velivole now flies at 1lb. 7.1/4oz. her CG 3/16in forward of Watteyne's position which is shown on my plan. By all means experiment; enjoy Velivole, and many Happy Landings!