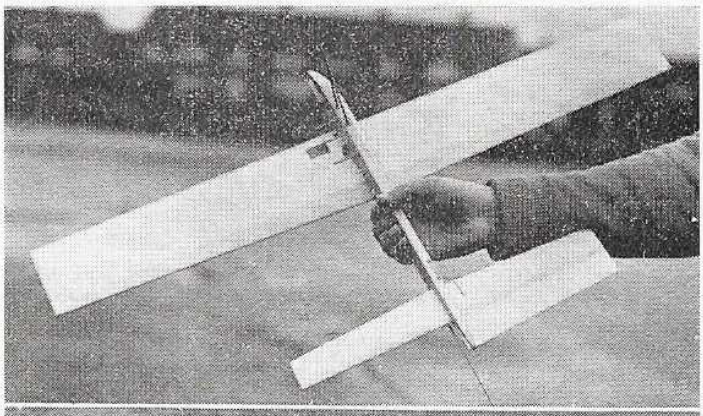
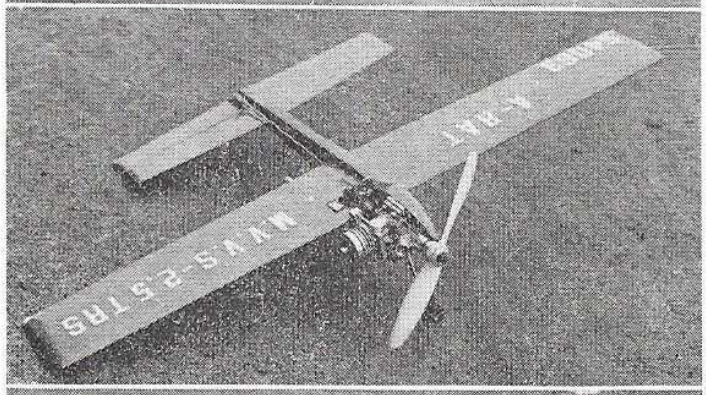
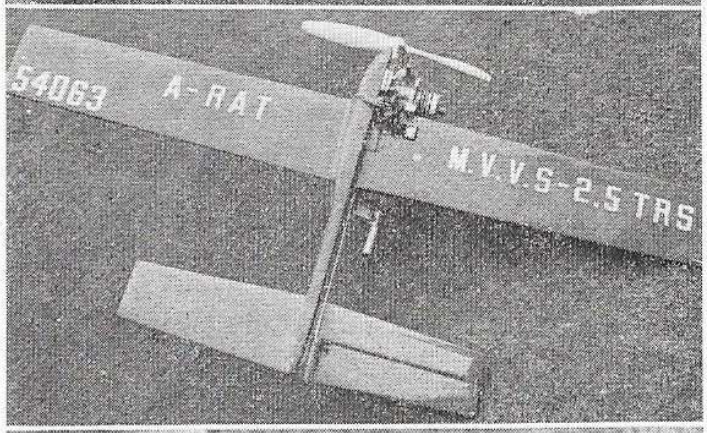
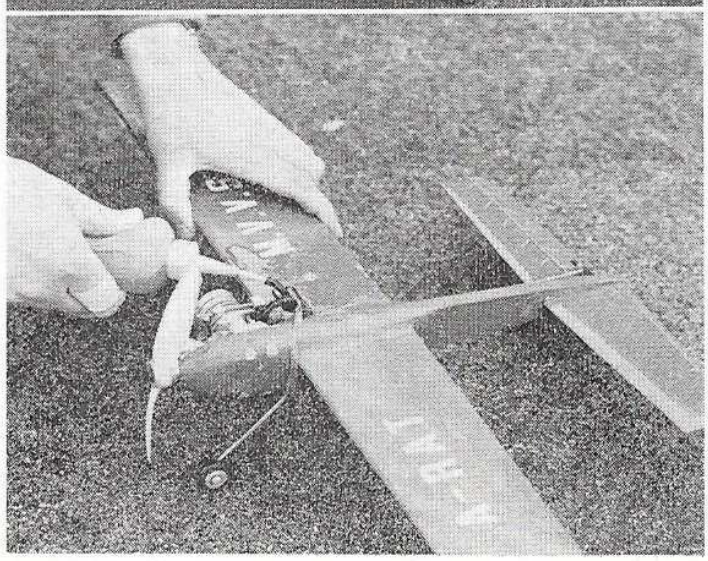
A-RAT

By D. C. CLARKSON









THE AUTHOR'S interest in A-class rat racing started with a contest run by Avro Lancaster MAC last summer at Woodford. The rules for this contest are compared below with normal A-class rules and are worth serious consideration for club contests because organisation required is minimal, and a large entry is not essential.

	Normal Rules	Avro Rules
Models	No limitation	No limitation
Engines	3.5 c.c. max.	3.5 c.c. max.
Lines	52 ft. 3 in.	50 ft. 0 in.
Heats	100 laps (10 km.), 1 stop	82 laps (5 miles), 1 stop
Finals	200 laps (20 km.), 2 stops	—
Starts	Le Mans type	Le Mans type
Circles	5 ft. 0 in. rad. piloting 10 ft. 0 in. rad. landing 62 ft. 3 ft. rad. pitting	No markings required
Pitmen	2 maximum	One helper only for pilot. Helper can hold model and do nothing else.

This contest was enormous fun and the designer returned the winning time of 4.10 for the five miles. A run later on the same day using one pit-man gave a time of 3.46 for the five miles. The fastest model in the air at the contest was G.15 powered, and was timed at 103 m.p.h. compared with a timed speed of 86 m.p.h. – obtained using the author's old 120 sq. in. flat-bottomed wing model which was 'crawling' with drag. These results set his brain working – if he could build a really clean model, 100 m.p.h. should be possible using a standard MVVS 2.5 TRS (now on its third con-rod) and a 3.10 five-mile time could be attainable. Borrowing constructional and design features from 'big' rat racers, and aiming for a 15 oz. all up weight with a 90 sq. in. wing resulted in *A-RAT*.

Since A-class rat racing is still in its infancy no great strings of contest successes can be claimed for this model. However, it has proved to be a reliable and sturdy machine – very important in the rough and tumble of competition flying. One word of warning concerning this model is that it was designed for flying over tarmac, and although landings on smooth grass are possible, anything other than this will produce cart-wheeling. Although *A-RAT* is tough enough

Functional design permits wide range of engines and developments. On this prototype one can see the Czechoslovakian M.V.V.S. 2.5 special used to such good effect by the designer, D. C. Clarkson.

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to withstand this treatment, it is a most undignified way to 'arrive'!

Construction is straightforward, but remember that accuracy is directly related to strength. Begin by cutting out the $\frac{3}{8}$ in. sheet wing core and glue on the hardwood leading and trailing edges. Using a sharp modelling knife, cut the $\frac{1}{4}$ in. x $\frac{1}{8}$ in. lead out grooves – a piece of bent tinplate can be used as a gouge to remove the excess material. Epoxy $\frac{1}{2}$ in. lengths of brass tubing in the relevant positions for lead-out guides, then insert lengths of 14 s.w.g. wire. Cover over the wire with soft balsa packing, then remove the wire, thus leaving two small diameter holes for the lead-outs.

Shape the wing to a symmetrical section, but leaving the centre section at the fuselage square. Insert the $\frac{1}{8}$ in. ply plate for the tank mount, add the tin-plate tip protectors and cut-out to suit bellcrank, tank, u/c and shut-off wire.

Cut and plane the engine bearers to shape, then epoxy the top one in position. Now make up the bellcrank as shown on the plan and pivot on a 6 B.A. bolt, epoxied in position. Complete the remainder of the fuselage by adding the remaining pieces of $\frac{3}{8}$ in. square balsa, plus the lower bearer. When dry, shape to the correct profile and add the $\frac{3}{8}$ in. soft balsa nose block. Sandwich the 14 s.w.g. tailskid as shown, and cut away the left-hand fuselage side to incorporate it. Drill holes for the engine mounting, tank and u/c clamp, then countersink and epoxy bolts in position. Taper the fuselage aft of the tailskid before cementing on the 1/32 in. ply sides. Cut the tailplane from very hard $\frac{1}{8}$ in. sheet, then epoxy to slot in the fuselage. Epoxy elevator horn in position, then sew elevator to the tailplane.

Attach the pushrod to the bellcrank and elevator horn, checking for freedom of movement. Assemble the tank, checking to see that it slots through the wing correctly and does not foul the pushrod. Bend the u/c to shape and clamp to the fuselage side. Cement the $\frac{3}{8}$ in. soft balsa nose fairing in position, followed by the 1/32 in. ply cover over the bellcrank. Finally, add plastic wood fillets to the inboard wing/fuselage joint before sanding down the whole model. Apply a coat of sanding sealer, then cover the wings and tail with heavyweight tissue doped on. Apply sufficient sealer to provide a smooth surface (rubbing down between each coat) before adding colour – but do remember the weight penalty. This model should not weigh more than 15 oz. – any more and the wing loading becomes excessive. The original model was finished in polyurethane yacht enamel – a finish which is very hard, abrasive resistant, and fuel proof.

When completed, add the cutout and mount the tank. Connect the cut-off wire to the pushrod with heavyweight Laystrate – adjusting for the operation to work on approximately 10° down elevator. Bolt the engine in position – checking G.G. location – then connect all the 'plumbing', making sure that thin-wall rubber tubing is used for the fuel and pressure lines, and that they pass beneath the trip wire.

This model is fast and similar to its 'big brothers' in flying characteristics. Air speeds of 95+ m.p.h. should be expected with a good motor and using pressure feed and a cut-out, pit-stops can be very fast. Don't regard this as a 'trainer', after all it is of $\frac{1}{2}$A team race size with more than twice as much power available. Take off low and fast, overtake as much as possible, and cut the engine as near to your pitman as he (or she) will allow ($\frac{3}{4}$-1 lap out seems best). Keep your model and gear in fine fettle and you could go places. Class A-rat racing is wide open, and could well be the first real glow v. diesel contest class.