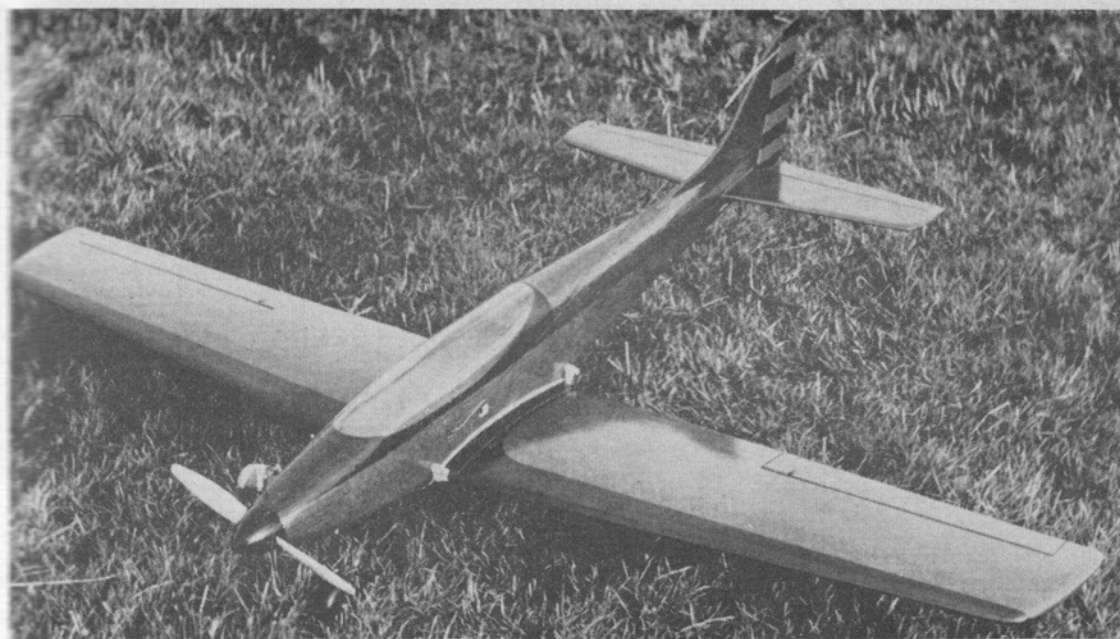




CLIPPER III

by CHICK HOLLAND

a really top-notch aerobatic job for the 1971 Season

THE CLIPPER III has been developed, in various stages, by trial and error (mostly error!) commencing with a tapered wing and tailplane on a standard *Swinger* fuselage. The *Swinger* wing section was retained, at this stage, with the same wing chord at the root, but tapering down from 11in. to 7in.—the idea being to build a tapered wing with roughly the same area as the standard *Swinger* constant-chord wing. This meant increasing the span to approximately 60in.

Several prototypes were built in this form, and flown by *Swinger* designer Keith Jones and also Terry Cooper, in addition to my own. Their comments and suggestions, together with my own observations, resulted in further modifications, including larger wing area (same span, but wider at root and tip), slightly deeper wing section—and one inch of dihedral at each tip. With the present aerobatic schedule in mind, I then added to this a deeper fuselage to give better knife-edge performance (particularly useful in four-point rolls). Longer tail and nose movements were then tried, and finally the removal of the *Swinger* sub-fin and increasing

the fin and rudder area! (You really shouldn't have started there, in the first place!—Eds.)

Prototype *Clippers* were flown using various engines, including Rossi 60, rear-induction H.P.61 and the Webra Blackhead. The original was well placed in the first two competitions entered—Odiham and the 1970 Nationals.

CONSTRUCTION

Fuselage

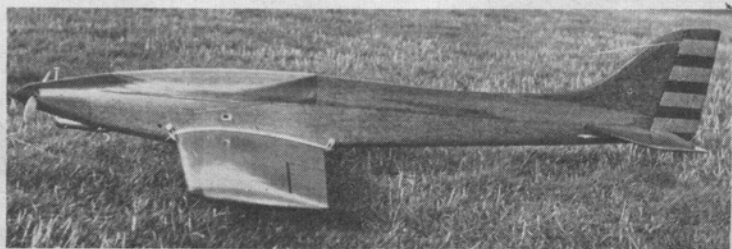
Cut out the sides from 48in. lengths of $\frac{3}{8}$ in. sheet balsa, and add the $\frac{1}{8}$ in. ply doublers, using

Sleek and attractive lines make Clipper a popular model. Several prototypes have already been built, some with "solid" painted canopies and others, like this, with moulded acetate ones.

Evo-stik or similar contact adhesive. Spread this thinly on both surfaces and allow it to dry for approximately 15 minutes. Whilst aligning and gluing the doublers to the balsa, form it into a slight curve, as per plan-view. It is much easier this way than afterwards, and the curve is then "set" into the structure.

Add the $\frac{1}{4}$ in., $\frac{1}{2}$ in. and 1in. triangular balsa stock and leave the assembly to dry. Now cut out the $\frac{1}{4}$ in. (cross-grain) canopy floor, using the top view of the plan. Cut out the $\frac{3}{8}$ in. ply former, F1, and fit the nylon nose-leg brackets on the back of this, after drilling holes for the tank vents. Align the engine mount and drill holes for fitting it.

Commence assembly by pinning



the canopy floor so that the rear end (nearest to F3) is on the edge of the building board. Now add the pre-bent fuselage sides, F1 and F3, making sure that these formers are set square to the sides. Add $\frac{1}{2}$ in. triangular balsa or hardwood behind F1, for strength, and add $\frac{1}{8}$ in. sheet fillet behind F3. Cut out the top and bottom sheets, again using the plan view. Cut slits, with a junior hacksaw, in the $\frac{1}{2}$ in. and 1in. triangular stock at approximately 2in. intervals for 9 or 10in., behind F3 to assist correct curvature of the fuselage.

Join the rear of the fuselage and

add the top and bottom sheet, remembering to insert scrap balsa stiffeners to support the $\frac{3}{8}$ in. bottom sheet. *Note:* F2 is not added until the wing is built and properly aligned. Fit the engine mount (Mid-West Specialties ones used on prototypes) and the nose floor, followed by the nose blocks and $\frac{1}{2}$ in. triangular fillets, and align the engine and $2\frac{1}{2}$ in. diameter spinner. Draw round the spinner and add $\frac{1}{8}$ in. ply nose ring. *Important: before carving and sanding, draw the centre-line on the top block to assist alignment of the fin.*

Finally add cockpit details to

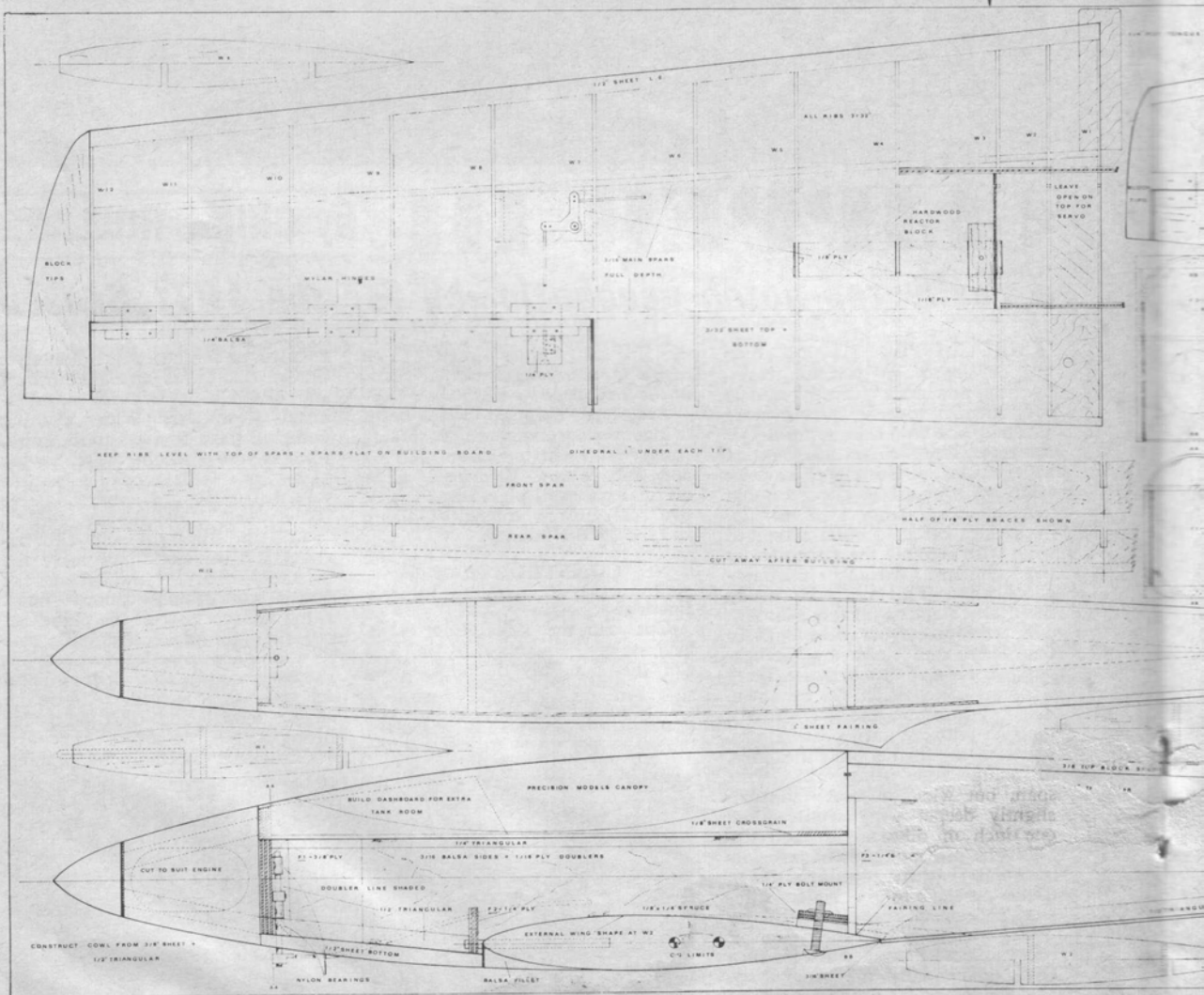
taste, paint the interior and secure the canopy in position with Araldite or other epoxy-resin adhesive, before carving and sanding the fuselage to the sections shown on the plan.

Wing

Cut out the ribs and spars, and notch them as shown on the plan. Use two flat boards, blocking them up to give 1in. under each wing-tip, jig-fashion, for correct dihedral to be built in. Lay down the $\frac{1}{2}$ in. spars and add ribs W4 to W12, making sure that the tops of the ribs are level with the tops of the

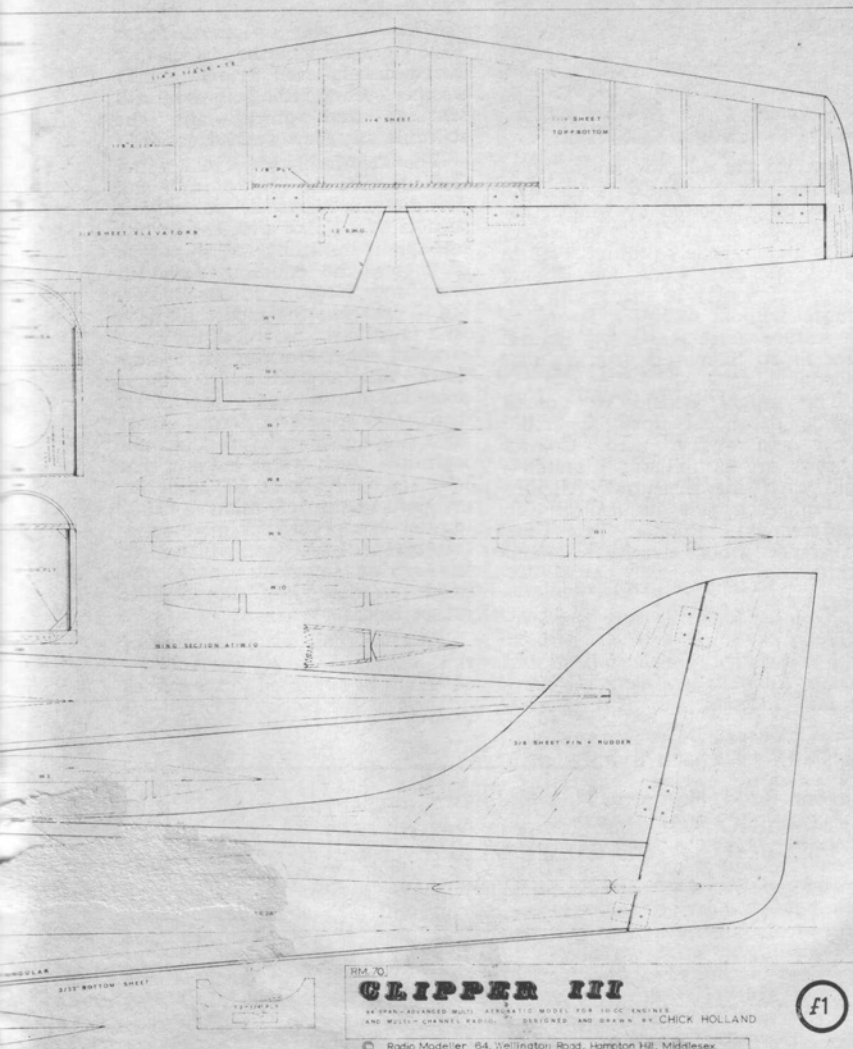
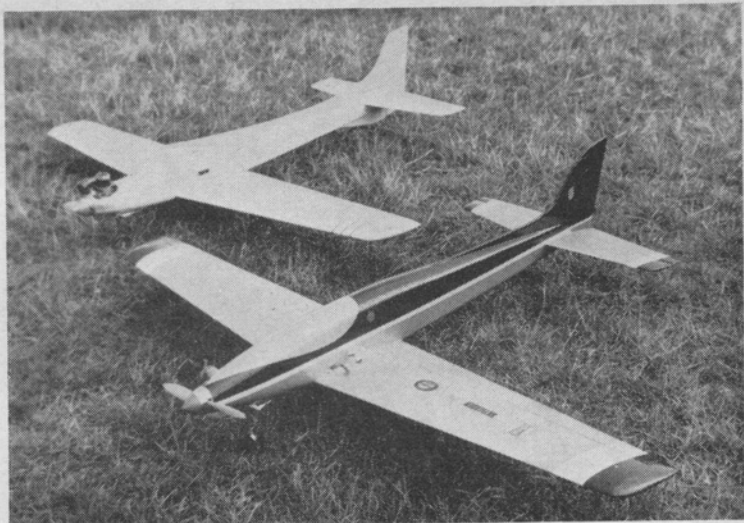
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spars. Fit the $\frac{1}{4}$ in. ply braces on ribs W1 to W3. Now add the leading edge, which is cut from $\frac{1}{2}$ in. sheet, and should be $\frac{3}{4}$ in. wide to allow for the $\frac{3}{8}$ in. sheet covering, which will butt against it.

Join three 3ft. sheets of 4in. wide $\frac{3}{8}$ in. sheet flat on the building board, using balsa cement. (It's a good idea to place a sheet of polythene underneath, to prevent adhesion to the board, and the backing from Solar-film, or Mono-Kote is ideal!). When dry, cut to shape and apply it to the top surface of the wing, using PVA adhesive, this time, and using plenty of pins. When this is dry, turn the wing over and add the $\frac{1}{4}$ in. balsa aileron leading-edge, cutting notches in ribs W8 to W12. Now add the



aileron sub-rib to W7, leaving a $\frac{1}{8}$ in. gap. Glue on scrap inserts of $\frac{1}{4}$ in. balsa to take the mylar hinges, and position the aileron horns and bellcranks to suit. The $\frac{3}{8}$ in. ply undercarriage mountings and their reactor blocks are added next, followed by the $\frac{1}{4}$ in. ply tongue and bolt mounts. Fill in around these with scrap block balsa.

Next sheet the bottom of the wing, in the same way as the top, finally adding the tip blocks and carving and sanding these to shape. Sand the entire structure before proceeding to cut out the ailerons, which should be arranged for centre-line hinging, as shown at section W10 (wing section) on the plan.

Tailplane

Build the tailplane flat on the plan, making sure to insert the $\frac{1}{4}$ in. ply brace at the centre section. The tailplane "ribs" are simply strips of $\frac{1}{4} \times \frac{1}{8}$ in. balsa, and the structure is sanded to the section shown (on the side-view of the model) after removal from the building board, when quite dried out.

Assembly

Fit the wing onto the fuselage and add former F2, which is the mounting piece for the wing tongue. That is to say, it has a slot in it, into which the wing tongue (which, as you will appreciate, is in the wing) fits when the model is assembled. Now fit in the $\frac{1}{4}$ in. ply wing-bolt mounting plate, align and drill. Line up the tailplane with the wing in position, glue and leave to set. After this, glue and line up the fin, making sure that it is at right angles to the tailplane, with the use a try-square. Add the

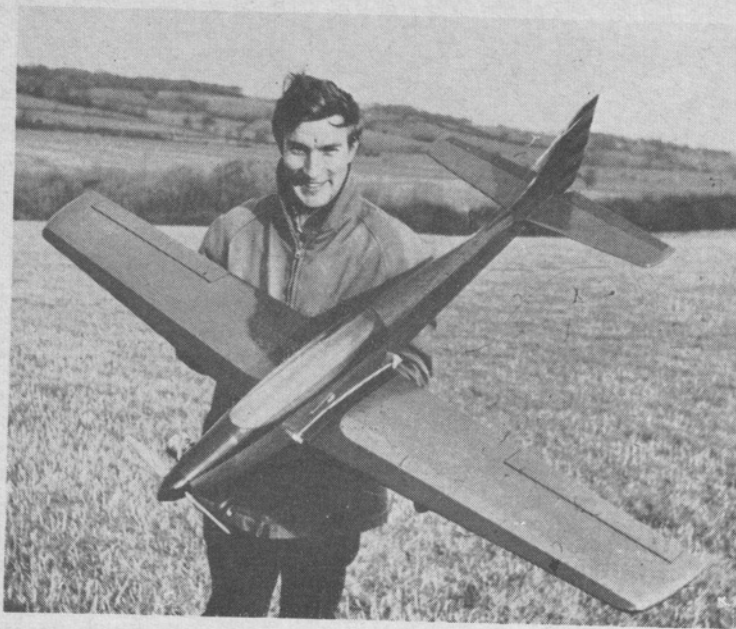
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RM 701

CLIPPER III

34 SPAN-ADVANCED MULTI-ACROBATIC MODEL FOR 10-CC ENGINES
AND MULTI-CHANNEL RADIO. DESIGNED AND DRAWN BY CHICK HOLLAND

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ailers, elevators and rudder *after* covering, using mylar hinge material, pinned through with toothpicks or $\frac{1}{16}$ in. dowel.

On flying the Clipper . . .

The *Clipper III* is an extremely advanced aerobatic design, and will perform the current aerobatic schedule with ease. However, with the c.g. at the *forward* position indicated, it has been proved stable enough for the average sports flier to handle, several having even been built and flown as a second model by comparative beginners. It is with this (forward) c.g. position that the model should first be test-flown, gradually moving it back as one becomes accustomed to the increasing elevator response and general sensitivity. (Do not take the c.g. any further back than shown, however, or you will wonder what has hit you!)

When flying sustained knife-

edge, do not add too much "top-rudder," or the speed is liable to drop off (followed by wings, tail-plane, etc. ! ! !). The spin is very easy and extremely positive, both in entry and exit. Long, low landing approaches may be made with this model without fear of a tip-stall—a feature which makes it a natural for limbo flying (if you like that sort of thing!).

The weight should be around 6½ lb., dependent upon the radio gear and engine used. Control throws are as follows: Elevator— $\frac{3}{8}$ in. each side of neutral. Ailerons— $\frac{3}{8}$ in. each side of neutral (no differential). Rudder: just $\frac{3}{8}$ in. clearance from elevator, at full throw.

Opinion seems to vary considerably as to the optimum c.g. position for this design, Chick Holland and Dave Runnalls preferring the rearward location, while others—

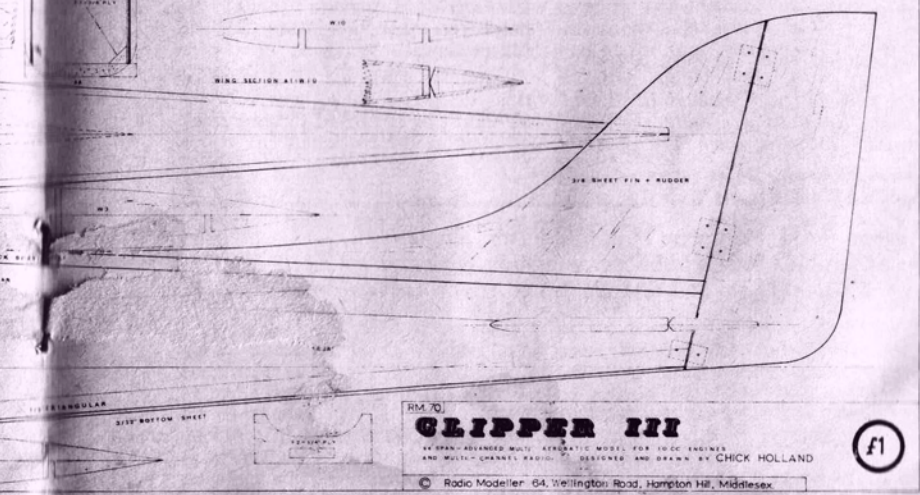
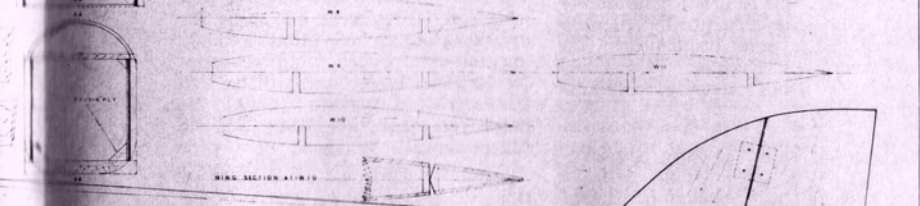
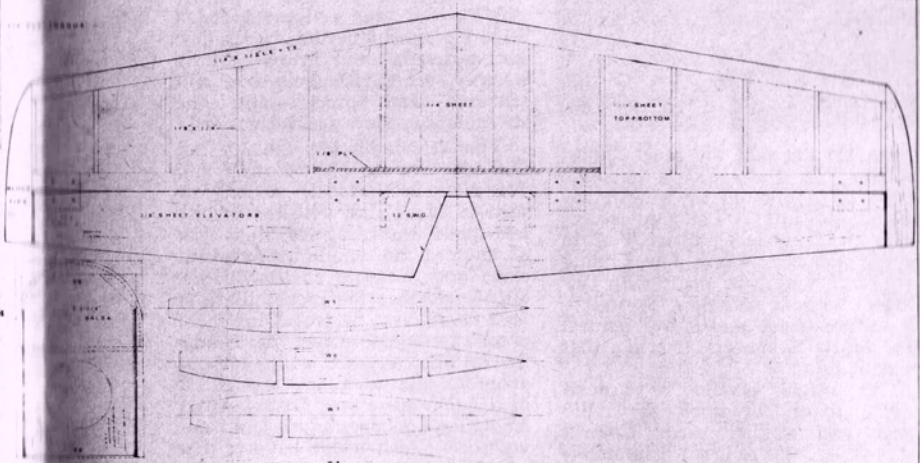
especially those perhaps not so proficient as exponents of the aerobatic art—play safe with a 45% or even 30% c.g., as will be seen from the following notes from Ron Radley, who built one from the designer's drawing last summer. . .

The drawings called for a c.g. at about 60% from the leading edge which seemed a long way back for a wing with no sweep-back, so into the nose went 5oz. of lead. Despite this, however, the *Clipper* still had a tendency to try to get its nose into the cloud-base. We were able to put her through the basic manoeuvres, which she handled beautifully, all patterns being executed cleanly and precisely—the model was obviously going to be a joy to fly—but I still felt that the c.g. was too far back, even at 45%.

With the gear re-located for a 30% c.g. position, the model flew like a dream, even in very windy weather, yet the controls were still sensitive and precise—and the schedule somehow seemed easier!

The rear-induction Gold Head O.S.60, with its 11 × 8 prop and 7% nitro in the fuel, gave a fair turn of speed and, with the precise low-speed throttling of this type of motor, the handling remained clean and accurate at low speeds, but I felt that the model liked to land fairly fast. Several of my more experienced club-mates have now flown this aircraft and, without exception, it is voted the nicest model they have ever flown! Apart from the c.g. position, I could not fault it—Chick won't have it that it is too far back at 60% but for my own peace of mind a 30% location has proved far more satisfactory and I feel sure will lead to less anxious moments should the hands on the "box" be a little inexperienced.

That we shall see a lot more of this design I have no doubt—shouldn't be surprised to see a flock of them at the Nationals!



RM 70

CLIPPER III

AN OPEN-ABRADED MULTI-AERATOR MODEL FOR 10CC ENGINE
AND MULTI-CANAL RADIO. DESIGNED AND DRAWN BY CHICK HOLLAND

Radio Modeller: 64, Wellington Road, Hampton Hill, Middlesex