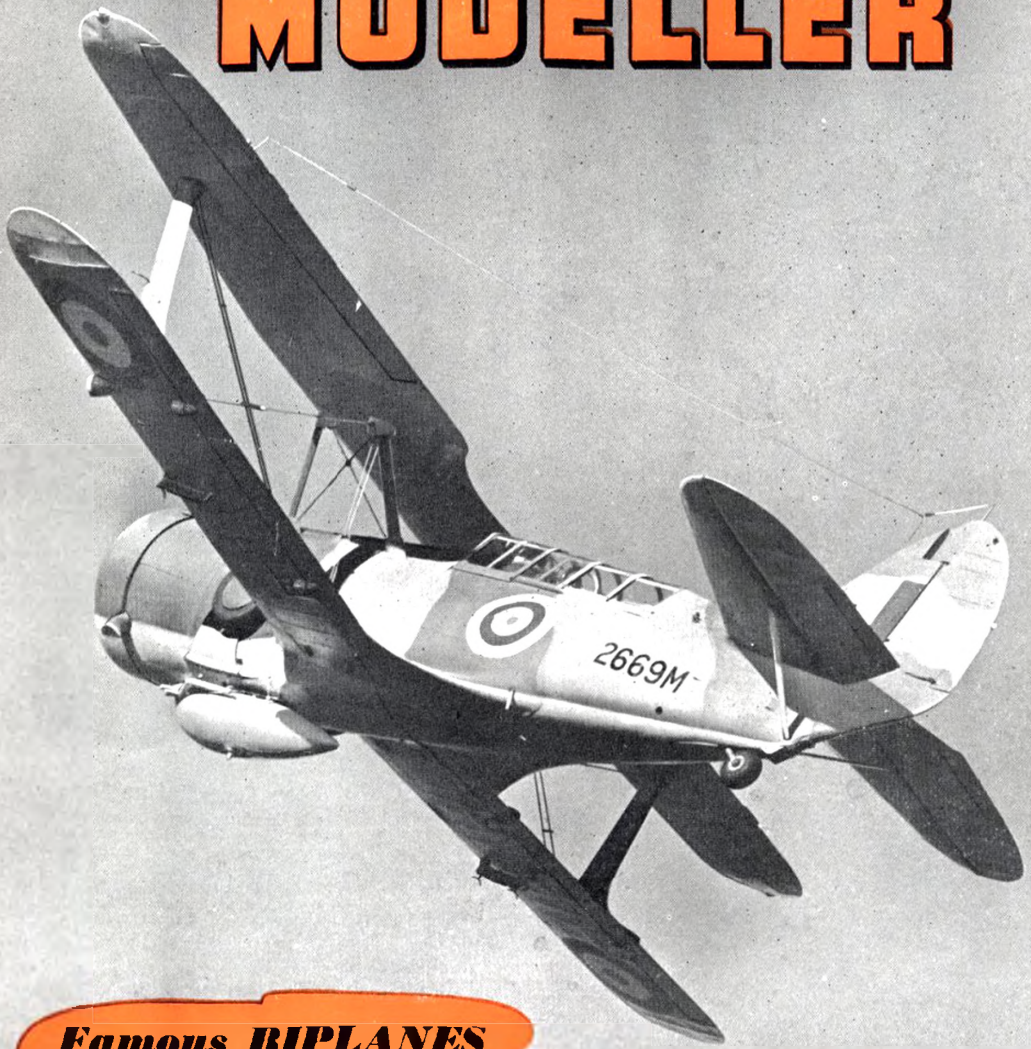
FEBRUARY 1956

AERO MODELLER



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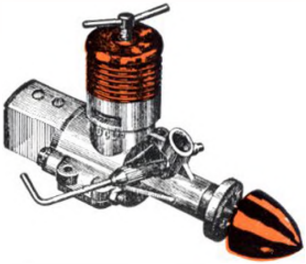

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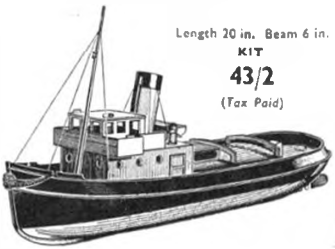

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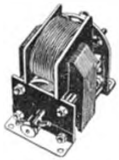

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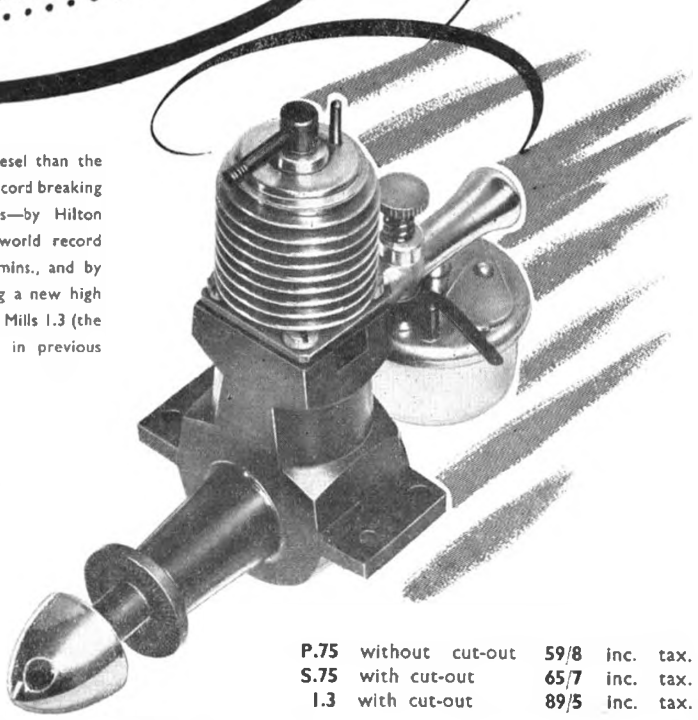

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Because their opportunities are great and their work important, standard of entry for aircrew is very high. Education to at least the level of the General Certificate of Education, Scottish Leaving Certificate or their equivalents, perfect physical health, aptitude as well as enthusiasm for flying — to these must be added the ability and personality to lead others. You must also be between 17½ *and* 26. *If you have these qualifications you have the chance of a career that is both rewarding and worthwhile.*

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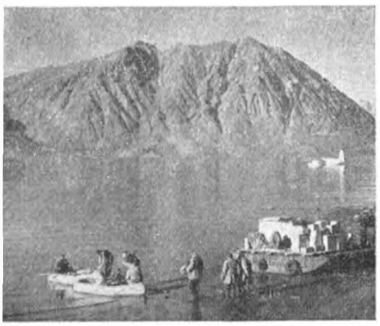
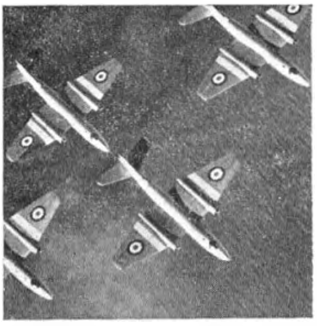
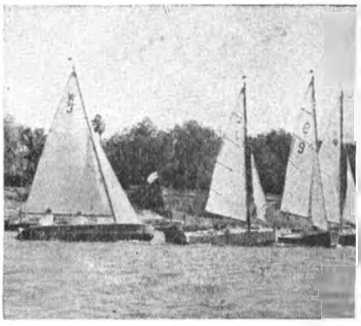


RESPONSIBILITY. Pontoons at Young Sound, Greenland, carrying stores to a Sunderland of R.A.F. Coastal Command, during the British North Greenland Expedition. A share in such missions is a likely part of every pilot's and navigator's future.



REWARD. Training to fly with the R.A.F. is exacting . . . and rewarding. It leaves you highly skilled and self-reliant, able to meet the challenge of the skies. Here, Canberra T.4 jet trainers fly in formation.



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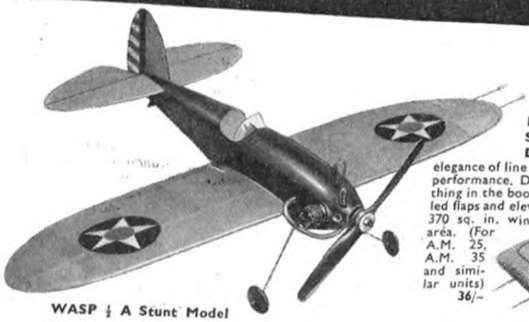

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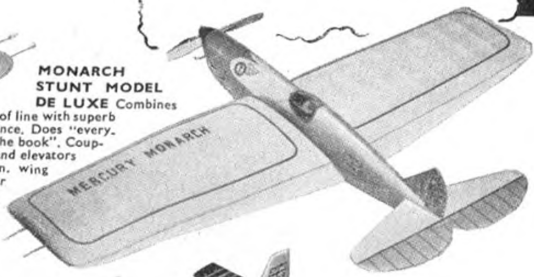

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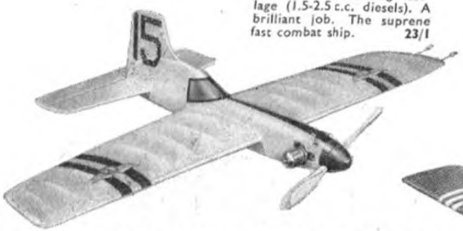

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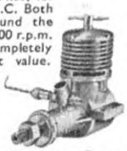

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AERO MODELLER

"Covers the world of Aeromodelling"

VOLUME XXI
NUMBER 241
FEBRUARY 1956

Managing Editor - C. S. RUSHBROOKE
Editor - H. G. HUNDLEBY
Assistant Editor - R. G. MOULTON

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F.A.I. Rule Changes

ON MANY OCCASIONS in the past modellers in this—and other—countries have been faced with sudden, and almost unannounced, changes in International rules pertaining to the top line events in the International calendar, and the resulting turmoil has inevitably evolved around the unconstitutional manner in which such changes are brought about.

Pressure from the S.M.A.E. produced better conditions, inasmuch as agendas were prepared (though rarely in time for mature consideration), and we were confident that at last the drill had been improved to the stage where the movement as a whole had a say in matters that vitally affect the aeromodelling world.

Unfortunately, it appears that the agenda for the last F.A.I. Models Commission conference, held at the beginning of December, 1955, was considerably delayed, and in any case was not brought to the attention of the Council of the S.M.A.E. As a result, the British delegate attended the Paris meeting completely uninstructed, only to be faced with a number of extremely important matters contained in the agenda—the passing of which have created a first class furore. Lest we be misconstrued (which is a common occurrence!) let us make it clear right here and now that in our opinion Mr. Gosling did the best he could under the circumstances, though we would have preferred that he requested the deferment of certain items to a later meeting, giving him time to discuss the details with those he represents.

Though the results of the 1955 World Championships held in Germany made it clear that certain modifications were overdue, if only to eliminate the unsatisfactory factor of a fly-off in such important contests, the doubling of power loading and reduction of Wakefield rubber weight to 50 grams (proposed by Belgium and passed by the Conference to take effect as from 1957) has created a storm of criticism from both official and general quarters. As far as Great Britain is concerned, these vital modifications were put through without reference to the modelling public, or even at committee stage, and we are not at all surprised at the critical feeling thus engendered.

At the first opportunity the Council of the S.M.A.E. discussed the new regulations, and we understand have forwarded a protest to the F.A.I. with the request that the subject be reconsidered at an early date. We know that this feeling is echoed in other countries, and we await with interest the outcome of further discussion.

The Rise-Off-Ground controversy, which has been debated over a long period and at many levels, has at last been laid, and the S.M.A.E. proposal that this requirement be discontinued in International events has now been adopted, the change taking effect as from 1957.

Readers' comments on the vexed subject of rule changes are welcomed, for we are of the opinion that it is by this means, where the pro's and con's of such matters are aired in public that the best and most acceptable results are obtained.

On the Cover

Heralding the first of a new series of bi-monthly features for the solid model fraternity, the R.A.F. Camouflaged Curtiss SBC-4, or Cleveland is unique in being the only American fighting biplane to see service with the British Forces. Unusual registration lettering denotes that this particular airframe has been relegated to ground instructional duties with Technical Training Command. (*Photo by courtesy of The Aeroplane*)

Heard at the HANGAR DOORS

"Gadget" Gibbs and Fred Carter at the pylon, inset is the "Nipper" powered record breaker

Record Round up

We recently had the pleasure of witnessing probably the most correctly conducted speed record attempt in this country, when Ray (Gadget) Gibbs of the East London Speed club set up a speed of 123·5 m.p.h. (198·8 k/hr.) in the 2·5 c.c. class at Heston Airport on the 4th December.

Unfortunately, hopes of submitting this as an International Record were dashed when an F.A.I. Circular received the day following gave the Class I record to J. Koci of Czechoslovakia for a flight of 203·5 k/hr., made on the 11th September, 1955. For international recognition, claims must exceed the existing record by at least 5 k/hr., so it is only possible to credit Gibbs with the British record. Discussion at the S.M.A.E. Council level elicited the fact that for *record* purposes only, there is no limitation on line thickness etc., so future attempts on International Records will have certain handicaps eliminated.

We have considerable doubts on the advisability of such freedom, for it has apparently been overlooked that under such "free" conditions the vital factor of safety is discounted, and for our part we deplore any International regulation that does not take this important factor into account. However, if overseas fliers may set up records in this manner, the British modeller must operate under the same freedom, so it appears that we are in for a spate of "anything goes".

On the 18th December, Gadget had a further go at the record, this time using thin lines, and pushed the speed up to 129·3 m.p.h., equivalant to 208 k/hr. It is anticipated that a claim will be lodged with the F.A.I. for recognition, for the F.A.I. rules state that a speed shall be recorded as the next whole kilometer *below* that achieved, and therefore (technically) Koci's record should have been ratified as 203 and not 203·5 k/hr.

Supersonic Modeller

When we visited the R.A.F. Model Flying Championships at Horsham St. Faith last summer, main topic of conversation in the mess was the absent Fighter Command power flier who was "in dock" following a high speed bale out. As it turned out this rather understated the case as F/O H. Molland of Wattisham flying a Hunter in a high speed dive over the East Anglian Coast, did in fact bale out at a speed of between 710 m.p.h. and 765 m.p.h. when the controls failed. In doing so he sustained a broken arm, two black eyes, and a fractured pelvis. His crash helmet, gloves, wrist watch, and one shoe were all blown off during ejection, and although in baling out he became the second man to do so above the speed of sound we imagine he would have preferred to have kept off this particular honours list.

We talked to F/O Molland who is still convalescing, and it seems he is an aeromodeller of some seven years standing, flying gliders, sport, power models, and scale models. The latter class of model is his particular interest and we bet that right now he finds them a nice quiet peaceful change after Hunters!

"No. 1" Reminisces

In a fascinating speech at the 1955 S.M.A.E. Annual Dinner and Dance where he was the guest of honour, Lord Brabazon of Tara suggested that aeromodellers could do much useful and practical work at the lower end of the air speed range. He pointed out that little research had been done in this direction and that knowledge of really low speed flight, particularly with full scale machines, was scant indeed, and that models were ideal for this type of investigation. Reminiscing, Britain's pioneer aviator acknowledged the invaluable work the S.M.A.E. had performed during the 46 years it had been in existence, and stated that it was now an accepted part of the aviation world. He emphasised that since the very beginnings of aviation the model had preceded the full size aircraft and quoted with surprising accuracy details of Langley's famous flying machine of 1896, which took the air seven years before the Wright brothers. Continuing the theme of low speed flight, he recounted how in 1909 he covered a distance of 18 miles in a Short-built Wright Biplane at an

average speed of 32 m.p.h. with a wing loading of less than 16 ounces per square foot, which is about the same as the average radio control model of the present day, and as Lord Brabazon remarked, contrasts greatly with current full size loadings of 100 pounds per square foot and upwards.

On the subject of his own aeromodelling career Lord Brabazon mentioned how he and "Charlie" Rolls inveigled themselves into the Albert Hall through "connections" on the maintenance staff, and how they tested model gliders in the spacious surroundings of this famous building. We wonder how many readers remember pre-war Indoor Meetings in the Albert Hall where Bob Copland set up his famous record of 18 minutes 52 seconds, which stood right up until August, 1954.

Henry Nicholls replied at length on behalf of the Society and emphasised how much the aeromodellers of this country appreciated the real interest Lord Brabazon showed, and went on to say what a pity it was that the full size aviation industry did not share the same enthusiasm. Drawing attention to the serious shortage of technicians within the industry at the present time Henry pointed out that they neglected a very lucrative field of labour recruitment by not supporting the aeromodelling movement.

After the speeches, Lord Brabazon presented some 42 trophies to national contest winners, and although this is a formidable task we do deprecate the bad mannered few who left in the direction of the bar whilst the prizegiving was in progress. Possibly some better solution to this somewhat lengthy process can be found for future S.M.A.E. Dinners, but on an occasion such as this there is no excuse for plain bad manners.

Dancing and general festivity continued until midnight and general opinion has it that this S.M.A.E. Annual Dinner and Dance was one of the most successful yet held.

Loading the power

The storm of comment on doubling the power loading factor in International contests, amounting to 14·12 ounces per c.c. engine capacity, has promoted considerable speculation as to the type of model likely to make the most of the heavyweight ruling to be applied in 1957. One point which comes to mind immediately is that by altering the power loading, without adjustment of the wing loading, modellers will be able to retain the same weight per square foot at the expense of adding more area. Thus the F.A.I. defeats its original purpose in calling for 2·5 c.c. as the maximum capacity for a *convenient* size of model. But will modellers jump to a 900 sq. ins. wing for this capacity? We doubt it. Few finalists work to marginal figures, and most of the successful models are loaded to 4½ oz./sq. ft. On that basis alone, we can visualise the current 400 sq. in. wing growing to 700 sq. in. for 2·5 c.c. How will it fly? We have previous examples which approach the proposed rule change, in the 2·5 c.c. International PAAload class, the winner of which (at the U.S. Nationals in 1955) had a wing area of only 530 sq. in. for a total weight of

35 ounces. His 5-flight total was 13:18, or 1 minute 42 secs. below the absolute maximum score showing that although the weather might have been favourable, the higher-than-average wing loading had only a moderate effect, when spread over five flights.

If 2·5 c.c. engines can take care of 35 ounces, how does the extra power loading affect other capacities? The 1·5 c.c. engines have, in the past, stood a fighting chance of a win and three of the four British power teams selected to date have included a 1·5 c.c. representative. But now that this capacity has to carry 21 ounces, opinion may change.

For the small engines, we can discount 1 c.c., for the weight of 14·12 ounces minimum is higher than that of the average sport model for this size. The ·8 c.c. and "point-fives" *could* offer a different story. These are the capacities least affected by the change, for the wing loading has always been against them for F.A.I. use in the past, and now that they are obliged to be heavier, it is possible to build a model down to both minimum loading factors, and still have a presentable size of design.

The popularity of the "Half-A" (·8 c.c.) free-flight contest in the U.S.A. indicates the possibilities of these almost "Wakefield" size power models, but we should not lose sight of the fact that the American approach is to employ a surface loading of only 2 ounces per sq. ft. On the other hand the ·8 c.c. glow engines seem to have but little difficulty in lifting a total of 50 ounces in Clipper Cargo, so a mere 11 oz. should be nothing for a fast Merlin or Piccolo to handle,—in theory!

For a time there will be diverse opinion as to which is the better avenue to explore; either a larger 2·5 c.c. model with the most powerful diesel obtainable, or a minimum wing loading ·5 or ·8 c.c. design. Both are relatively unknown factors, and until example designs have been built and fully tested, we would hesitate to commit ourselves, except to say how much better it would have been to let the modellers have their say before such drastic changes are made.

The following table indicates approximate weights and sizes to provide a minimum area loading and minimum power loading. Figures in brackets show the current vogue for 1·5 and 2·5 c.c.

Capacity	Weight	Wing Area	Tailplane Area
·5 c.c.	8 ounces	206 sq. in.	84 sq. in.
·8 c.c.	11 ounces	288 sq. in.	108 sq. in.
1·0 c.c.	14 ounces	350 sq. in.	150 sq. in.
1·5 c.c.	(10½) 21 ounces	(275) 550 sq. in.	(110) 220 sq. in.
2·5 c.c.	(17½) 35 ounces	(400) 900 sq. in.	(160) 360 sq. in.

NO. 1 in a new series of stage-by-stage solid model articles on FAMOUS BIPLANES

Curtiss SBC-4

by G. A. G. COX

THE CURTISS TYPE 77 two-seat dive bomber was probably the only American operational biplane to be used by the Royal Air Force. Early in the war the United States Navy permitted the diversion to France of ninety of these machines which they had on order. Half of them were aboard the carrier *Bearn* when news was received of the French armistice and the ship put into Martinique. The remainder were delivered to the R.A.F., where they received the name "Cleveland" I.

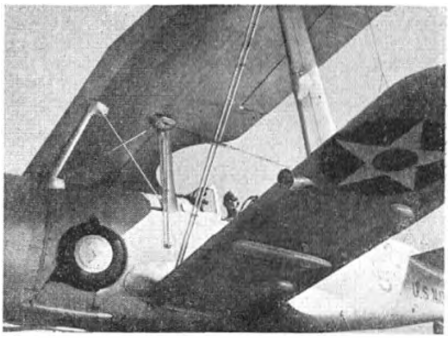
"Helldiver" was an unofficial name given to a succession of Curtiss dive bombers, starting with the XF8C-2 of 1928, and including the F12C-1, SBC-3 and the SBC-4. The name was later officially bestowed on the well-known SB2C-1 monoplane. The SBC-3 was externally similar to the SBC-4, but was equipped with the less powerful Pratt and Whitney "Twin Wasp" 14-cylinder engine. Both types served on the carriers *Lexington*, *Saratoga*, *Yorktown* and *Enterprise*.

The Type 77 was powered by a Wright "Cyclone" nine-cylinder radial engine of 1,000 h.p., and its armament consisted of one forward-firing machine gun in the fuselage and one movable gun in the rear cockpit. Either a 1,100 lb. bomb or a 41½ gallon long range tank could be carried beneath the fuselage. Construction was of metal with fabric covering on the lower wings and control surfaces. The machine had a maximum speed of 235 m.p.h. at 17,000 feet, and its range was 610 miles at 197 m.p.h. The service ceiling was 27,000 feet.

The model

General Notes.—1. The distinction between glue and cement must be emphasised. Cellulose cement is an ideal adhesive for most joins in balsa wood, but for certain operations, *e.g.*, stage 34, it is too rapid in action and might damage the dope finish. Lepage's glue has been found most satisfactory where retarded setting is essential. Similarly, there are occasions when cellulose dope is too quick-drying. Where intricate designs have to be painted, a good 2-4 hour lacquer is preferable. Never apply dope on to a lacquered surface.

2. If hardwood is used, it is best to choose an easily-carved timber such as Lime, Bass, or Rauli. Leave 2 in. spare wood on the fuselage which may be held in the vice while carving. Use a synthetic resin glue such as "Cascamite".



3. Tail bracing wires and aerial wires are omitted from these models because to this scale they would be too fine to be practicable.

Building the model.—1. Cut upper and lower wings from ¼ in. and ⅜ in. wood respectively, carve and sand to correct cross-section. Score along centre-line of lower wing to give dihedral, and cement.

2. Coat fine (No. 30) thread with cement to smooth-down loose fibres. Give wings three coats of sanding sealer, rubbing down between coats with "Flour" grade glass paper. Score outlines of ailerons and flaps with a knife, then mark rib spacing lightly with a 6B pencil. Wind thread round wing, following pencil lines, then give a final coat of sanding sealer brushed rapidly chordwise. Trim off surplus thread with a sharp blade.

3. Cut the tailplane and rudder from ⅛ in. sheet, and shape to the correct cross-section, and score hinge lines.

4. Carve the fuselage from two ⅜ in. thicknesses of balsa temporarily cemented together.

5. Separate the halves and hollow to 3/16 in. thickness, except where indicated.

6. Pin the halves together again and cut the wheel wells ⅜ in. too small in diameter. Widen the holes with glasspaper wrapped round dowel, checking for alignment with the centre line.

7. Make floor from ⅛ in. sheet to fit the cockpit and cement to one half of fuselage.

8. Smear cement over each undercarriage door to form a strengthening skin, then remove door, cutting right through thickness of fuselage. Carefully remove 1/32 in. from the outside to form the door, then cement the remaining portion back into place.

9. Fit ⅛ in. thick rear face to each wheel well.

10. Give all interior surfaces (including wheel wells) three coats of sanding sealer, sanding between coats, and when dry dope grey.

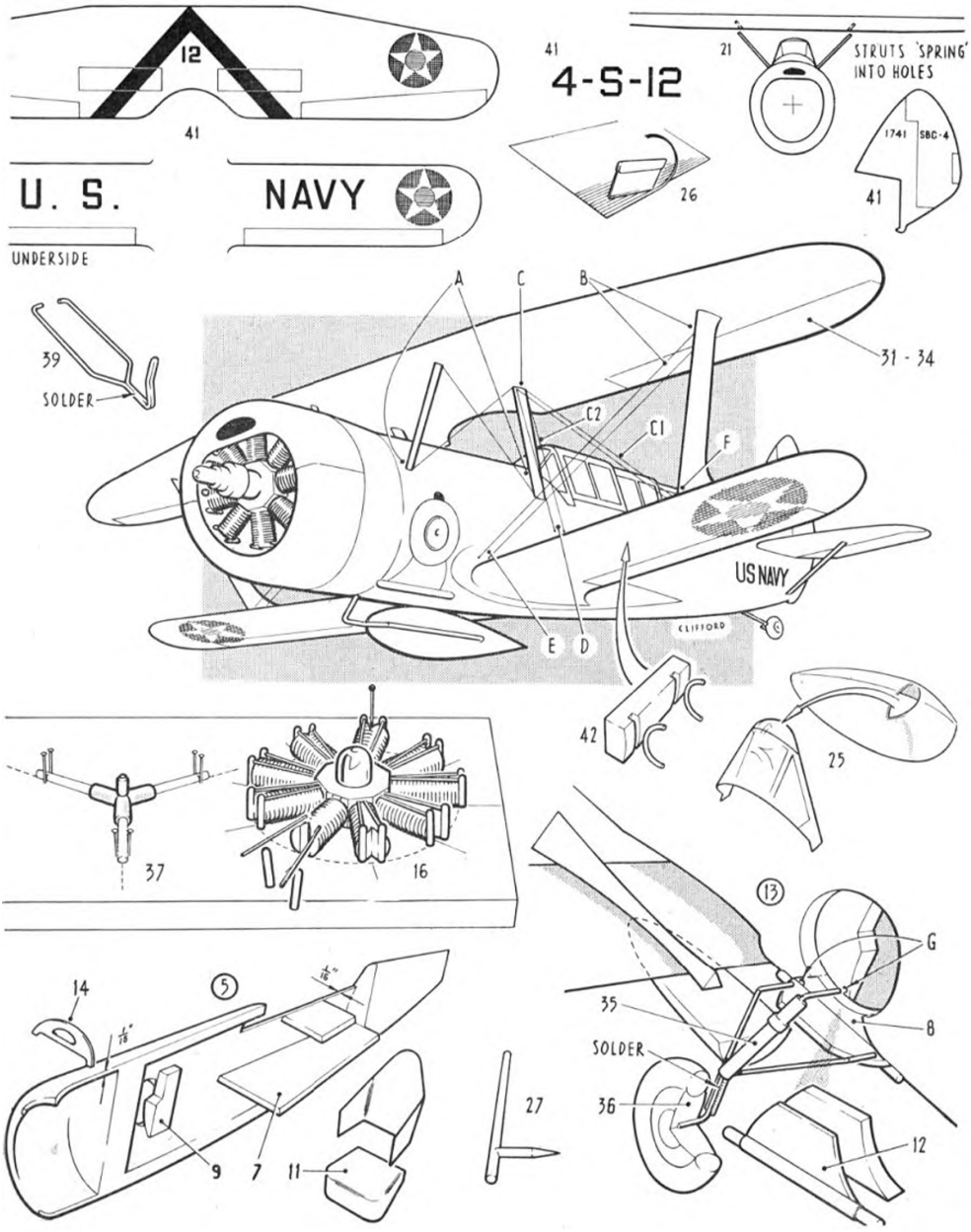
11. Fit seats, instrument panel, and pilot's headrest, and cement fuselage halves together.

12. Make paper tubes for u/c door hinges and cement to doors. Cut off the spare ⅛ in. from each side, thread all three parts on to wire and cement outer tubes to fuselage. Fillet well with cement.

13. Cut recess for lower wing, and cement wing in place. Make fillets from soft balsa and sand to the correct curve when attached.

14. Cut upper part of cowling lip away to a depth of 1/32 in. and insert celluloid, having first cut elliptical hole as shown on plan. Sand outer edges smooth.

Heading picture gives close-up detail for a pre-war U.S. Navy Helldiver, while that at left shows the camouflaged version in French insignia. Across the fin is U.S. A. Civil registration, NX-C5


12
41
U. S. NAVY
UNDERSIDE
41
4-S-12
21
STRUTS 'SPRING' INTO HOLES
26
1741 SBC-4
41
39
SOLDER
A
C
B
31 - 34
C2
C1
F
US NAVY
CLIFFORD
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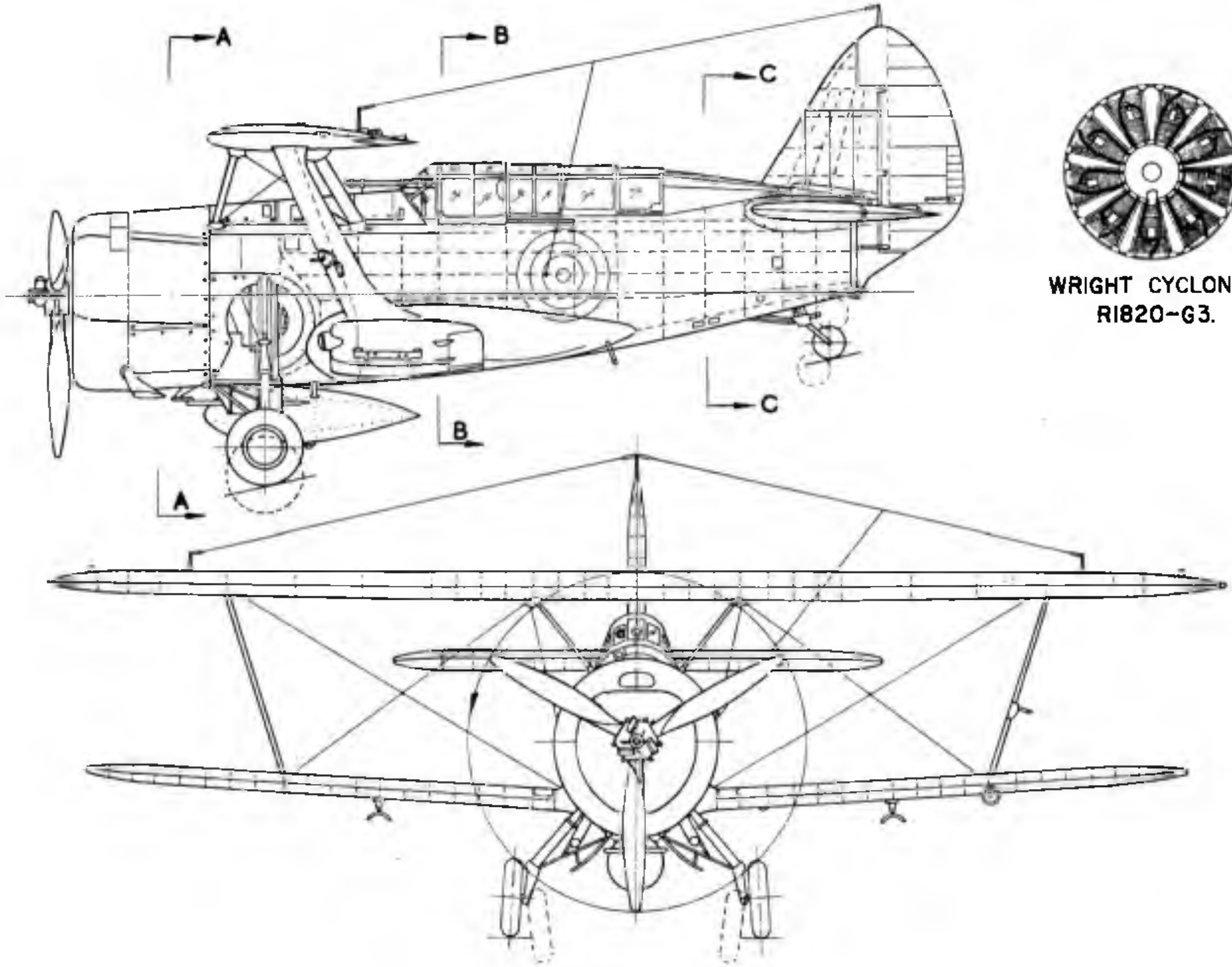
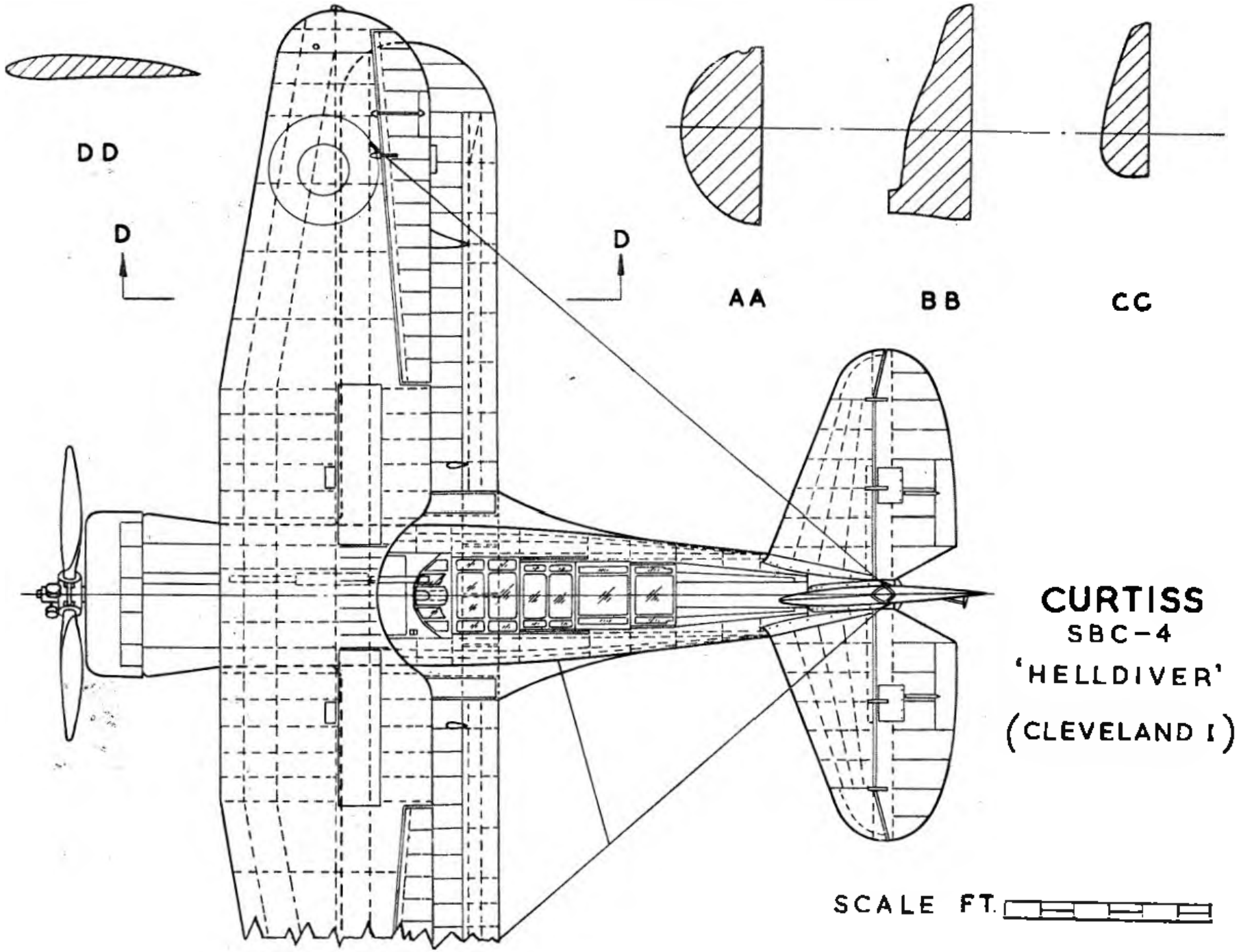


WRIGHT CYCLONE.
R1820-G3.


DD
D
D
AA
BB
CC
CURTISS
SBC-4
'HELLDIVER'
(CLEVELAND I)
SCALE FT.

15. With a 6B pencil draw the rear edge of engine cowling and cut along this line to remove cowl.

16. To make the cylinders for the engine wind cemented thread round $\frac{3}{16}$ in. balsa dowel and when coated with cement cut into $\frac{5}{16}$ in. lengths. The crankcase may be made from $\frac{1}{4}$ in. sheet, and the engine assembled as shown. Use pins to represent pushrods. Dope crankcase grey, remainder black. Cement in position and replace cowling.

17. Cut a notch in the fuselage to take tailplane, then cement tail assembly in place, checking alignment with the wing and centre-line.

18. Cut machine gun trough in fuselage and smooth with folded glasspaper.

19. Fill the grain of the fuselage as with the wings, allowing each coat of sealer to build up a small fillet round the tail assembly.

20. Make centre-section struts from bamboo, allowing $\frac{1}{4}$ in. spare on each length.

21. Pierce holes in fuselage and wings, then glue struts in *fuselage only*. Fit the upper wing and adjust until in alignment with lower, do not remove until glue is dry.

22. Fillet c/section struts with sanding sealer. Dope entire fuselage light grey, using 1/5 thinners, 4/5 dope for at least three coats, rubbing between coats. Similarly, colour the tail red. Score cowling lines with a knife.

23. Cut strips of celluloid to the widths required for the cockpit cover, heat and bend to balsa former.

24. Cut slots in the cockpit edges and cement rearmost window in place. Add the other three, making each one overlap the previous one by $\frac{1}{16}$ in.

25. Mould the windshield, or build-up from flat celluloid and a piece cut from a moulded cover as shown.

26. Cut notepaper into strips as shown, then dope grey. Glue the strips to the cockpit cover to represent framing.

27. Pierce hole in windscreen for gunsight and glue in place.

28. Dope the upper surface of the top wing yellow, all other wing surfaces silver. Rivet lines on the top wing may be represented by running a clock gear-wheel along a straight edge.

29. Cut the interplane struts from mm. plywood, allowing $\frac{1}{8}$ in. each end for insertion in wings. Shape to streamlined section with a fine file. Dope silver.

30. Make slots in both wings to take these struts. Attach upper wing with an elastic band and trim the struts to fit.

31. Coat plenty of light grey sewing cotton with cement. Pierce holes for bracing wires at points "A". Apply a spot of glue to each hole, and with a darning needle push in one end of a single thread. Cut a notch in the end of each strut, cross over the threads and glue into notches. When dry trim off the surplus. (These threads should be very slightly slack because they will tighten when top wing is in place.)

32. Cement generous lengths (doubled) into strut holes "B", and two doubled lengths into holes "C".

33. Pierce two holes on each side of fuselage at "D" and "E".

34. Work quickly on this stage. Glue top of C/S struts and attach wing with rubber band. Take the pair of threads "C1" and glue at "F". Glue both ends of interplane struts and pop into position. Pull threads "C1" tight and trim. Glue holes "D" and push into them threads "C2" and trim. Similarly threads "B" are glued at "E".

35. The undercarriage. This is designed so that the model may be displayed with wheels in retracted position. The leg units are quickly detachable, and the rubber-tyred wheels will fit into their wells with the doors closed. Bore holes and glue in brass tubing at points "G". The main legs are constructed from wire and brass tubing as shown in the diagram. It is advisable to support the model on blocks and pin the legs to the baseboard while soldering the struts.

36. Turn the wheels to fit "Dinky Toy" tyres, making sure that the wheels are a push fit in the wells.

37. The propeller. Push a pin vertically into a block of wood on which are marked lines radiating at 120 degrees. Locate accurately three lengths of brass tubing with matchsticks or aluminium wire, and solder them to the pin.

38. Carve the propeller blades and seal the grain. Make counterbalances from balsa dowel, assemble the prop. with glue and dope silver.

39. Carve the belly tank from balsa, dope grey, and attach to fuselage with the "crutch" made from wire.

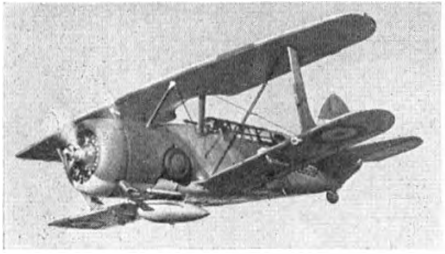
40. Build up a blob of solder on a pin, then file flat to make the tailwheel. Make balsa exhausts and glue in place.

41. Paint the lower half of cowling and wing chevron black; use Indian ink for all lettering. Readers without detailed knowledge of the U.S. Navy's pre-war colour coding system are advised not to alter these markings if they wish to achieve authenticity. Letters 4-S-12 appear on the fuselage sides beneath cabin.

42. Fit navigation lights, landing light, bomb racks, and other details.

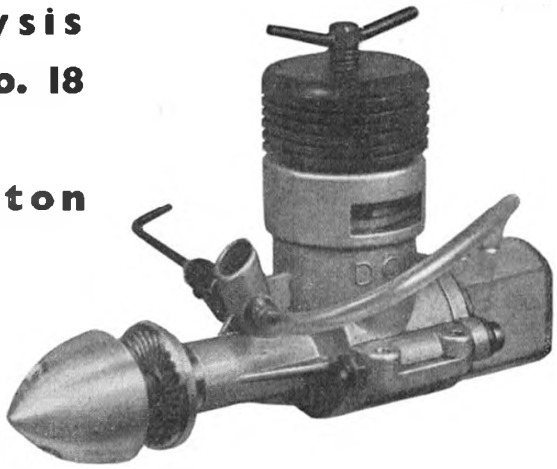
43. To mark the national insignia, use a paper pattern to pinprick the centre of the circle and points of the star, then lightly scratch the circle with dividers. Fill in the holes with a spot of glue, then paint the white star first, adding a red spot and blue field when dry. The easiest way to obtain an exact 5-point star is to divide the circle into 72-degree sectors using a protractor.

Below left is another view of the 'plane on the cover, showing British Dark Earth and Dar Green camouflage, with Sky undersurfaces on a Cleveland 1. Below right is Mr. Cox's model, with under a[illegible]e extended, and built exactly as detailed in the above instructions. (Left photo by courtesy of the Aeroplane).



Engine Analysis No. 18 — new 1·5 from Davies — Charlton

ALLBON SABRE



reviewed by R. H. WARRING

REPLACEMENT FOR THE "JAVELIN"— one of the world's "standard" 1.5 c.c. engines—the Sabre, together with the *Super Merlin*, must rate as about the prettiest engines so far produced in this country. The external appearance is very clean and tidy, with a tumble-finished crankshaft casting, bright red anodised cylinder jacket and spinner nut and a really sound transparent plastic tank. The design also looks modern, although it is a perfectly conventional crankshaft rotary valve layout.

In appearance, at least, the Sabre is a scaled-up Super Merlin. The crankshaft and connecting rod are identical with those of the Javelin, with the exception that the taper on the shaft is not ground to finish. And unlike the Merlin there is no sub-piston induction of air at the top of the stroke, which means that it does not require rich mixture for starting.

Production of the Sabre has obviously been influenced by the necessity of getting down to minimum cost. The number of mechanical operations appears to have been cut to a minimum—only two, plus threading on the crankcase, for example; the cylinder jacket a very generous loose fit around the liner (but a really excellent fit with the crankcase); transfer and exhaust ports appear to have been cut by the same tool; etc. Not that workmanship suffers as a result. This is generally excellent throughout and the compression in both cylinder and crankcase is outstanding for an engine of this size. There were one or two points resulting which did not meet with our full approval, however, although in all fairness it must be emphasised that these would not necessarily detract from performance; and a number of detail design features which, we felt, could be modified with advantage.

Exceptionally easy to start

The Sabre proved exceptionally easy to start with just finger choking and needle valve well open. It is very non-critical in response to both needle valve and compression setting although the more the speed is pushed up the more necessary it is to adjust for "optimum" running. At speeds above 12,000 r.p.m. this "optimum" setting is not all that easy to establish largely because of the lack of sensitivity to control. At very high speeds, too, starting characteristics tend to deteriorate. The Sabre has quite a vicious "bite" on small propellers and a tendency to backfire and start running in the opposite direction. Also vibration tends to show up badly at high speeds to such an extent that the fuel foams in the tank—although this does not stop the engine from continuing to run consistently.

Frankly, the Sabre is not a super high-speed engine and so probably these troubles will never arise in practice. Power output is up to normal expected standards for a 1.5 c.c. general purpose engine—but the peak is extremely flat and there is very little difference in power between 11,000 r.p.m. and 14,000 r.p.m. It is obviously a sports type engine when it would seem quite unnecessary to operate much above 11,000 r.p.m. such as produced by something like a 7 x 4 or 8 x 3 propeller load or even an 8 x 4 propeller to pull the static r.p.m. figure down to about 10,000. Any one of these propellers should give the average free flight user all the performance he could want and operate the Sabre over the speed range at which it is obviously happiest. The almost faultless starting characteristics will then be very evident and the engine will run with very little apparent difference in performance over a range of compression setting of at least three quarters of a turn and needle valve opened up two turns from the leanest setting. Throttled down running, ideal for the initial test flights, can readily be obtained by richening the mixture right up and reducing the compression. Altogether, in fact, a most flexible engine in this respect.

Good with high pitch

Control line users will be delighted with the Sabre's ability to swing quite high pitch propellers. The engine should reach about peak power performance in the air on a 6 x 6, although this is down to the diameter size which makes starting a little vicious. A 7 x 5 propeller would probably be a better bet for average work. The use of fine pitch propellers (below 4 inches) requires the addition of washers, otherwise the crankshaft protrudes into the spinner hole and the tommy bar cannot properly be engaged (or more likely the tommy bar will be locked into the spinner on tightening up). The

propeller hub hole should be drilled to 2 BA clearance for a proper fit (this being more or less a British "standard" for 1.5 c.c. engines).

Two engines were received for test and both had obviously received a fair amount of running time before being passed on. One engine showed up slightly better than the other and this was the subject for the final torque-r.p.m. figures.

Faults common on one engine were that at very high speeds (e.g. above 13,000 r.p.m.) the contra-piston had a definite tendency to work up and slacken off compression, at other speeds the contra piston was too stiff a fit to come back to a low compression setting, even when running unless deliberately over-compressed and the screw then turned back rapidly. The same fault was not evident on the second engine. The needle valve and spray bar is of standard Javelin size nut incorporates a spring lock bearing on the needle thimble. The spring is far too rigid (the spring material rather thick, short, and lacking a dimple) and the thimble itself not knurled deeply enough. As a result although the lock is effective, the spring merely wears away the matching knurled length of the thimble. We do agree, however, that a spring lock is infinitely to be preferred to the usual split thimble.

The crankcase casting is a first-class piece of work. The matching end cover has a stud cast into the centre, which would appear to indicate that first thoughts were for the usual screw-fitted tank. The tank as fitted, however, is a definite advance on usual standards, locked in place by the two screws which hold the back-plate in place. These screws are cut off to non-standard length and the ends ground. They can be replaced with longer screws for radially mounting the engine when it would appear desirable, if not strictly necessary, to dispense with the integrally mounted tank. The tank itself is moulded in clear plastic with a cemented-on end cover and looks quite an expensive job.

The fact that the two 6 BA crankcase holding screws pass through the inside of the beam mounting lugs rather crowds the width of these lugs so that only 8 BA size mounting holes are available for beam fitting. There is not enough metal left around the edges to enlarge these to 6 BA size, which is a warning to those who might be tempted to try.

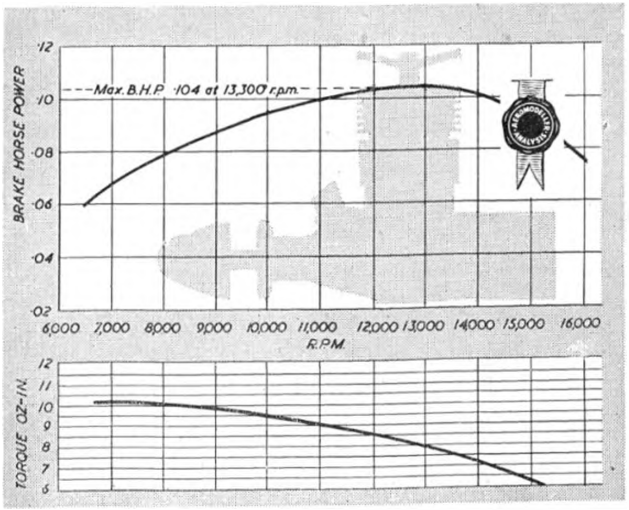
Robust components

The cylinder is a very stout member, presumably in mild steel, machined with a fairly wide flange into which is cut the three exhaust ports, the transfer ports being cut immediately under the flange and staggered with respect to the exhaust openings. Because there is an appreciable delay between opening of the transfer ports and exhaust, the timing could possibly account for the readiness to start running in the opposite direction with small propellers.

Unlike the Merlin the crankcase is not undercut to allow the exhaust to bleed around the outside of the cylinder, the threaded portion being continued right down to the cylinder seating. The cylinder itself seats on a substantial gasket and is held down by the screwed-on light alloy jacket.

Bore of the cylinder is not relieved, being parallel throughout its length. There was some evidence of scoring by the gudgeon pin but the piston fit remained truly excellent. The piston itself is a massive affair for this size of engine, with thick walls, presumably to support the gudgeon pin. Some play had developed on the big end bearing of one engine and the little end bearing of the other after an hour or so's running, but in neither case was this significant. In one engine the little end bearing appeared to be slightly out of line with the result that it was "grooving" the gudgeon pin and also tending to hit the inside of the piston.

The cylinder jacket is an extremely good screwed fit into the crankcase, but a very loose fit over the cylinder liner. As a result the only effective area of heat transfer between liner and jacket is at the flange, but the cylinder would appear more than substantial enough to resist distortion through over heating. The loss of power after warming up was less noticeable than with many screwed-in cylinder designs and the jacket itself does not get particularly warm.



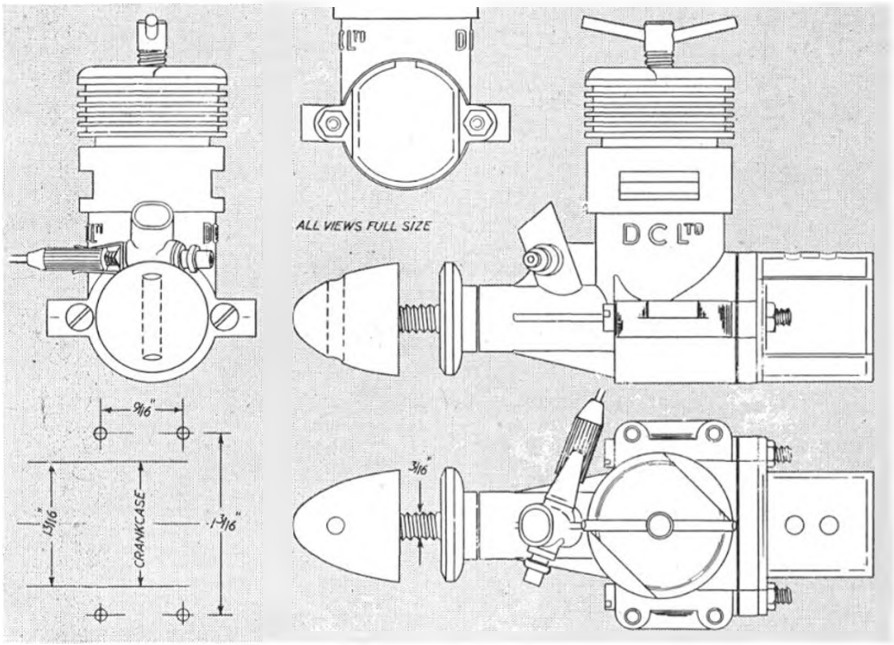
SPECIFICATION

Displacement: 1.457 c.c. (.089 cu. in.)
Bore: .519 in.
Stroke: .420 in.
Bore/Stroke ratio: 1.24:1
Bare weight (with tank): 3¼ oz.
Max. B.H.P.: .104 at 13,300 r.p.m.
Max. torque: 10.3 oz.-in.at 7,000 r.p.m.
Power/weight ratio: .032 B.H.P. per oz.
Power rating: .0715 B.H.P. per c.c.

MATERIAL SPECIFICATION

Cylinder: mild steel.
Contra-piston: steel.
Piston: cast iron.
Connecting rod: drop forged light alloy.
Crankcase casting: pressure die casting in light alloy.
Crankshaft: steel.
Bearing: plain.
Cylinder jacket: light alloy, anodised red.
Spraybar assembly: brass.
Tank: transparent plastic, integrally mounted.
Spinner nut: light alloy, anodised red.

Manufacturers:
Davies Charlton Ltd.,
Hitts Meadows, Douglas, Isle of Man.
Retail Price: 67/5 (inc. P.T.)



PROPELLER R.P.M. FIGURES		
Propeller dia. pitch	Albon diesel fuel r.p.m.	Mercury No. 8 r.p.m.
8 x 8 (Stant)	6,400	—
8 x 4 (Stant)	9,000	8,800
6 x 6 (Stant)	11,200	—
6 x 4 (Stant)	13,300	12,950
8 x 5 (Stant)	7,800	7,800
7 x 4 (Stant)	—	11,600
8 x 3 (constant g.m.p.)	10,200	—
7 x 3 (constant g.m.p.)	13,400	—
6 x 4 (Frog nylon)	15,000	—

Special Note: Although a higher B.H.P. figure was obtained for the original Javelin (Jan. '55 supplementary test), it is certain that this particular engine was exceptional and possibly also the test technique flattering in this instance. A recent check test with a standard production Javelin indicates similar prop-r.p.m. figures as the new Sabre at the lower speeds and slightly inferior figures at the top end. The performance curve given here for the Sabre was double-checked by both dynamometer and shielded reaction rig, with excellent agreement between the two.

Main bearing fit was quite loose on both engines. On one there was appreciable side play which meant that it blew fuel readily through the front of the main bearing. Fore and after play on both engines was nearly $\frac{1}{64}$ in., which we consider excessive, although not significant in theory since, with a propeller, the shaft is always pulled forwards. But fit a pusher propeller and it is a different story. The reason for this generous gap appears to be that the manufacturers have "played safe" with regard to tolerances on the die casting, the front end of the crankcase bearing being just the plain casting, not faced off. We fitted a thin washer behind the propeller backplate to take up this play, if only to improve the general "feel" of the engine when starting.

Summarising, a pleasant, clean-looking engine in the sports model class which should be easy to handle by anyone, provided they do not try to extract, or expect, "racing" engine performance. Davies Charlton have "Americanised" their design to the extent of giving it definite "eye appeal" and really got down to minimising production costs without sacrificing the typically "British" requirements of good compression, good starting characteristics and rugged construction. As such we anticipate a long life for it, both as a top selling line and in the hands of individual modellers.

Mono-line

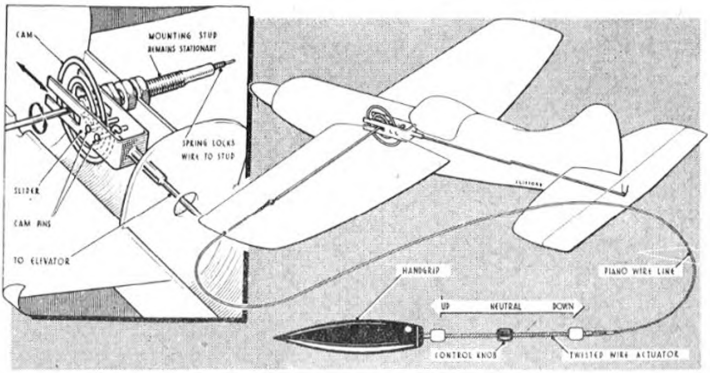
continued from page 77.

of the circuit and dive on the other side. To level off, one must over-correct, and the less natural action of pushing and pulling does take some getting used to. Therefore, the first few laps are strictly up and down affairs. Secondly, control must be anticipated—the action is not quite as immediate as with 2-line; but like the method of control, this is soon appreciated.

In its strong favour is the possibility of using very long lines—even as much as 300 ft. long, and the fact that for sport or stunt, the single line is a very manageable 22 s.w.g. For the FAI 2.5 c.c. speed class, we are permitted the use of 29 s.w.g. (.0136 in.) but there might be some difficulty in transmitting sufficient control torsion through this thickness over 52 ft. The advised thickness in the U.S.A. for this class is 27 s.w.g. (.0164 in.) and there is no reason to doubt that the first person to use the Mono-line for the class in Europe will be at a distinct advantage—providing he has the motor to match the model

Only ONE LINE

Monoline flying reviewed by **RON MOULTON**



WHY A MONO-LINE? The advantages can be listed firstly, that there is no need for a tight line, secondly, that control is absolutely positive and allows a model to be trimmed for "hands-off" flying, and thirdly, the use of one, instead of two lines permits a higher flying speed.

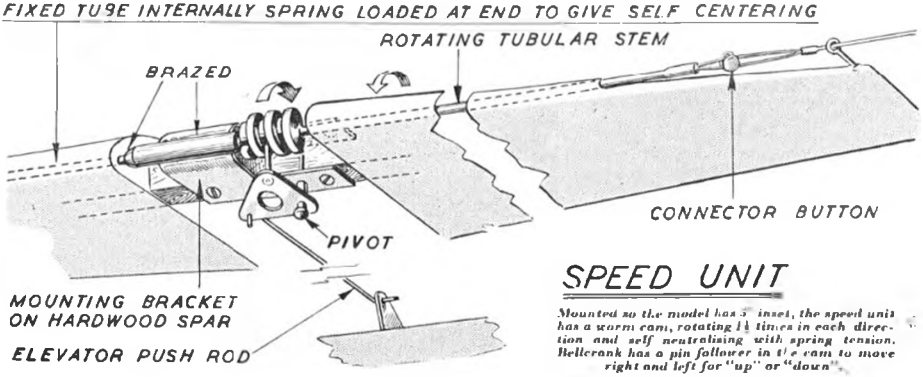
Line resistance for a speed model using the conventional two-line system is such that up to half of the engine power (depending upon capacity) is absorbed in dragging the control wires around, so it is no small wonder that Mono-line demonstrators at the 1955 U.S. Nationals walked off with fastest speeds in nearly every event, including a fabulous 100.89 m.p.h. with a .8 c.c. Cox Space Bug engine (nearest 2-line model did 79 m.p.h. with similar engine).

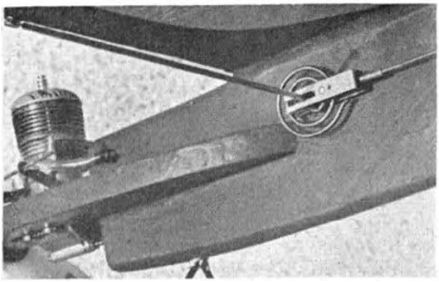
Thus it becomes obvious that for best use of the one-line principle, the speed model is its finest application. In practice, these fast American fliers take off using elevator control, neutralise the control knob, fly one handed in the pylon for the speed run and resume control again for the landing. There is no possibility of whipping as this would render control ineffective and damage the handle, so any performance improvement is truly an achievement to be attributed to Mono-line.

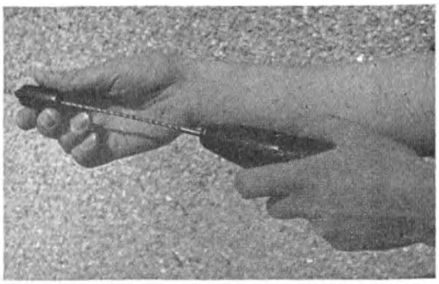
There are two separate methods of using the system for speed or stunt flying, and these are the spiral cam, as illustrated across the top of these pages, as used for training models, and the worm cam/bellcrank method as below, for speed or full aerobatics. The training method came first, and is perhaps the easier to understand.

One could liken the actual control handle to an Archimedian screw as supplied in fretwork outfits. The long spiral wound actuator is free to revolve in the plastic handgrip, and if the control knob is held firm and pushed from end to end, the twisted actuator is forced to spin. To this we attach the single control wire, and it will be seen that a twisting motion (or torsion) is applied along the line, diminishing in the number of actual twists as it reaches the model where it is hooked onto the button end of a rotating tubular stem. Fixed to this stem is the spiral cam to which is interlocked a sliding follower on the elevator pushrod. A pair of cam pins either side of the spiral are "wound" either to the centre or the outside of the cam as the control rotates, and so we get elevator control. Some idea of the loss of twists in the control wire can be gathered by the fact that 3 turns of the cam give the entire range of elevator motion; but this is due in the main to the neutralising device which makes Mono-line so attractive for speed flying.

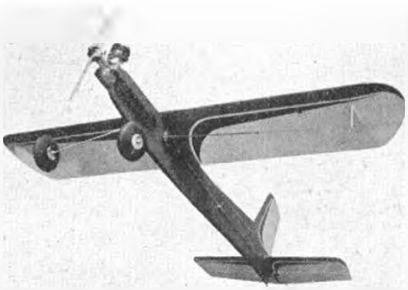
An extension of the tubular stem passes through a







Now more moderately powered, the 36 in. solid balsa trainer has Frog 500 on a hardwood block. Spiral cam is adjustable to find perfect neutral. Right, flying attitude shows knob at neutral. This can be adjusted for more up then down if desired. Below is the complete ABC trainer



bearing in the mounting stud and is connected to a fixed tube means of a torsion wire. This has just enough spring tension to return the cam to neutral whenever control is relaxed by the pilot, but allows a full range of elevator motion.

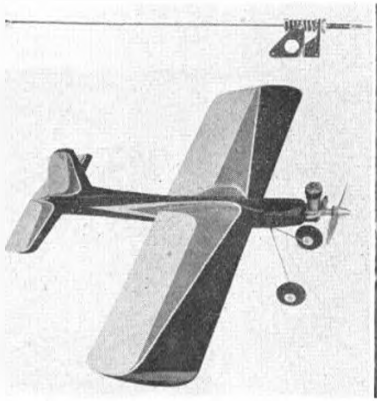
For a speed model the spiral cam is obviously bulky, and so an ingenious worm cam has been evolved. It works in exactly the same manner except that instead of the slider, there is a small bellcrank to convert the motion to the elevator, and the mounting bracket permits a greater stress. It is worth noting that because line tension is not necessary, Victor Stanzel advises that the unit be mounted at 95° to the span line, so that the entire model has as much as 5° inset towards the centre of the circle.

What is it like to fly? For one accustomed to 2-line flying for more than eleven years, it was like learning all over again—and was all the more exciting for that. First attempt lasted no more than a half lap, and that happened to be in the inverted attitude! Reasons were threefold: (a) the K & B 36 is a mighty powerful engine, (b) the model was so much faster than expected and (c) complete lack of appreciation for the positive control.

When a 2-line model takes off, we use a little "up" elevator, and as the model comes in-line with the handle, it gradually neutralises itself to fly level. With the jack-rabbit acceleration of the Mono-line ABC trainer, the "up" elevator remained constant, and as fast as one can read this, the 2 lb. solid balsa model was howling round upside down! The situation did not last for long. Next time out, it was strictly "neutral" take-off and after two laps of acclimatiaztion, Mono-line was mastered and some very entertaining performances (including a glide landing under full control back to the pilot's feet) revealed the major differences between it and 2-line.

Firstly, neutral only serves to direct the model straight ahead—if it is pointing upwards it will pass over the top

Continued on page 75



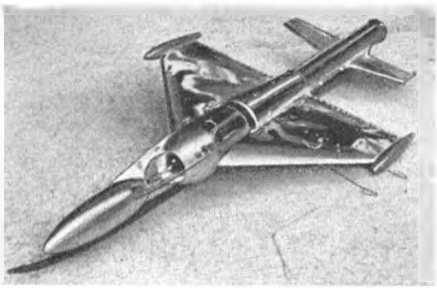
Mid-wing full stunt model "Sky Raider" is the latest Victor Stanzel kit and Stunt Master control unit above replaces the spiral cam method as on trainer, providing 8 turns for elevator motion. At extreme right is Dale Kirn, now a Monoline demonstrator in the U.S.A., with models he used to break .19 (134.6 m.p.h. and Jet (155 m.p.h.) records in 1954. At '55 Nationals, Dale flew a .8 c.c. model at 100.8 m.p.h., 5 c.c. at 143 m.p.h., Jet at 162.8 m.p.h. and 10 c.c. at 165 m.p.h. When in the U.S.A.F.F. Dale visited the All-Hearts rally where he impressed all with his fine speed models

World News

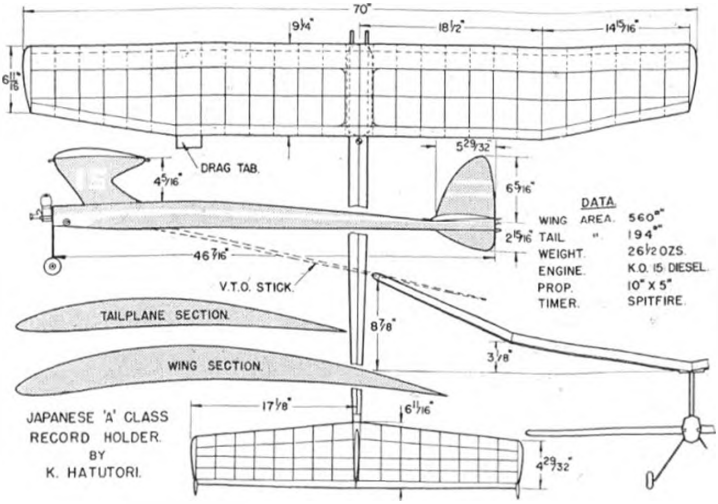
AS IN OTHER years the town lake in Budapest was drained for the National control-line contests in **Hungary** to provide a nice smooth concrete surface. It must be a clean lake! There was a very strong wind, and adoption of the new FAI 2.5 c.c. line length and diameter (.25 mm., 15.92 metres long) meant that speeds in this class were not as high as before. R. Beck won the 2.5 category with 104 m.p.h., almost all competitors using Italian Super Tigres. In 5 c.c., E. Horwath made 129 m.p.h. with a McCoy 29, using the regulation line thickness, and set a 138 m.p.h. record after the meeting using 0.2 mm. instead of 0.3 mm. wires. Similarly, Georges Benedek of airfoil fame, raised his contest winning speed of 146 m.p.h. in Jet to 162 m.p.h. for a record, simply by changing from 0.4 mm. to 0.3 mm. wires. This serves to illustrate the advantage of flying on thinnest possible wire for an FAI record, particularly now that Jaroslav Koci's 2.5 c.c. record has been accepted, using .0065 in. wires (December World News).

A unique record has been set by George Horwath with a McCutchen type Helicopter (July '54 issue) suitably enlarged to take an East German 1.5 c.c. Wilo diesel. During a 7 m. 18 secs. flight, it travelled 4,280 feet and ascended 928 feet high.

Writing in *Der Flugmodellbau*, Max Hacklinger deals with the elimination of the luck element in contest flying, with accent on the A/2 glider class. This very successful exponent of the towline art in **Germany,** states that model contests fall into three categories. Those with thermals and strong winds, those with thermals and little wind—and pure gliding contests flown on 75 to 100 feet of towline. He also advocates a form of directional control for flight with an auto-compass—could this be vane steering again? Gustav Saemann, the



Top: Forward fin is evident on O. Frischknecht's Swiss slope soarer with transparent wing covering. Metal delta jet by Hungarian Stephen Tihanyi has streamlined nose tank in front of jet head. Before and after pictures of the IL-2 (Russian Dakota) with two French RE.1 10 c.c. engines by J. Papp is a sad story indeed! Below, at left, Georges Benedek and 162 m.p.h. Jet record holder, fabric covered wings. Right is Jorge Handa, one of Argentina's leading power fliers



Right: from Japan, this large and rather heavy for its class, 2·5 power design was champion for '55 and is of a size to be anticipated when new rules come in force for the F.A.I. in 1957

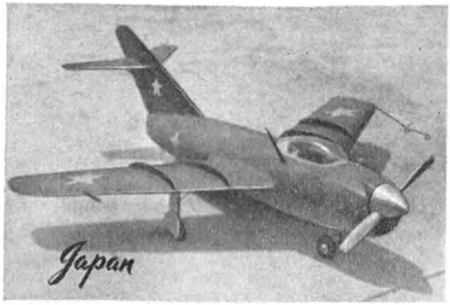
Below, right: 32 in. Mk; 15 has an Enya 29 engine, the spinner representing nose mounted radar when in flight. Built by T. Kitazawa, it weighs 3 lbs. and needs a long control lead extension at the tip. Bottom is the NACA aerofoil used by Hungarian Nandor Radacsi in his A/2 to win the Soviet International contests reported in December issue. It has useful depth for spars and anti-warp construction and is not unlike the Hansen aerofoils at its trailing edge

Wakefield winner, has been playing with 60 instead of 80 grammes of motor, in anticipation of a cut in the rules by the FAI, but he'll have to go even lower than that in '57, when the 50 gramme rule takes effect. Rocket climb is the approach, he states, and he is against an increase in the maximum flight time limit, as beyond the 3 : 30 mark, it is eyesight that governs performance. Gustav advocates a junior class in rubber, rather on the lines of the Scandinavian C-1 group, parallel to the A-1 glider class and coupled with an age limit.

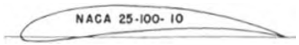
Fine though the idea may be, Gustav—we see little hope of it becoming International, if treatment of the beginners glider class (now in its third year of being on the FAI Model Commission agenda) is any measure of progress.

We are pleased to see that the Hydromodel contest at Milan in **Italy**, is featured in the FAI calendar for 1956. This meeting was all too briefly reported in our October issue of last year, and is deserving of International support. It takes place over July 7/8th.

A/2 fliers who are pestered with an occasional stalled launch through a sticky auto-rudder pin release, will be interested in Pierre Serres' "La Libellule" design published in *Modele Reduit*



D'Avion. Pierre places the auto-rudder trip in front of the towhook instead of at the usual place about 4 in. behind, and if the pin does happen to "hang-up", the nose down tug is far more beneficial for the launch than the height wasting stall we see so often.



NACA 25-100-10

% Chord	0	.5	1	2.5	5	7.5	10	15	20	30	35	40	50	60	70	80	90	100
UPPER	1.6	2.35	2.9	4.1	5.55	6.70	7.55	8.85	9.75	10.75	10.95	11.00	10.85	10.05	8.70	6.55	3.50	0
LOWER	0	-0.70	-1.0	-1.35	-1.55	-1.5	-1.35	-0.80	-0.20	0.80	1.30	1.75	2.55	3.05	3.20	2.80	1.50	0

Conspirators in the film production were Ron Perkins with "Audacious" fighter, R. F. Bourne, Cyril West and Don Holt, examining a "Flying Eye"

How the Godalming Club co-operated with a film company — providing special model designs for

The

Flying Eye

IT WAS DURING the summer of 1954 that the Godalming and District Model Flying Club, through an acquaintance of Hon. Sec. Cyril West, was approached for assistance in the making of a Film entitled "*The Flying Eye*".

The company concerned were British Films Ltd., and the whole thing was commissioned by The Children's Film Foundation.

Some considerable difficulty was expected in the actual presentation of model aircraft in flight, but the club suggestions as to how the flying scenes might be tackled lifted the cloud a little and so preparations were made in the autumn.

A brief résumé of the plot will assist in showing why the models are so designed.

The story begins at the home of a retired Colonel who is a keen and very advanced R/C model exponent. He has perfected a flying wing type which is not only remotely controlled but also has a television camera installed. With this he can see, on a large T.V. screen in his workshop, a complete picture of whatever lies below the model as it flies.

The name of this model forms the title of the story, hence the *Flying Eye*.

"Coming to the flicks tonight? They've got the 'Flying Eye' at the Odeon."

In the opening scene we have the Colonel and a small boy in the workshop (a disused barn). The model is on a stand and the T.V. lens is pointing at the boy whose picture appears on the receiver screen.

Incidentally, the Colonel appears to be the local "King of the Kids" in that he builds R/C models for all and sundry. These take the form of small fast fighter aircraft somewhat reminiscent of a Class B Team Racer.

On the other side of the valley in a large rambling country mansion there lives an eccentric old professor who has perfected in his comprehensive laboratory, a new and secret engine fuel. This fuel is supposed to be so powerful that only a small amount need be used. It is natural therefore that the Colonel takes advantage of this, being just what he needs to bring the range of his heavily loaded model up to his requirements.

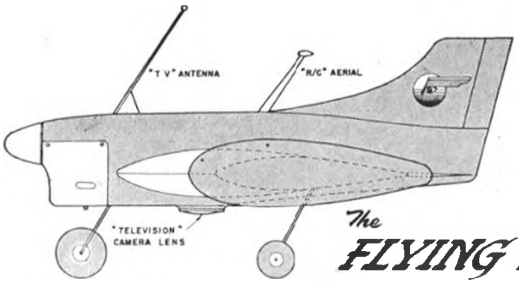
There is another body of people interested in this fuel with a view to selling the formula to a foreign agency and so the three tame crooks come into the story.

The most amusing things begin to happen when the crooks steal the formula and are chased by the police in squad cars.

The fun now begins in earnest with the Colonel watching the progress of the chase by means of the *Flying Eye* and relaying the information to the police who finally head them off into a field where the kids are flying their fighters.

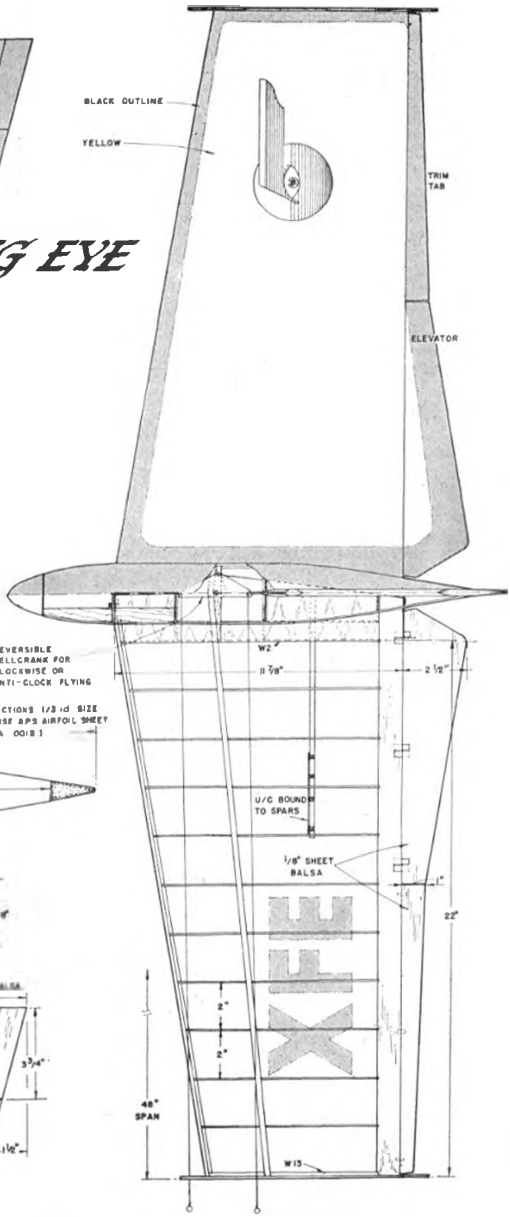
A terrific battle scene commences with the crooks being chased hither and thither by the diving fighters; the Colonel arrives to direct operations from his prehistoric car, an old 1919 Renault.

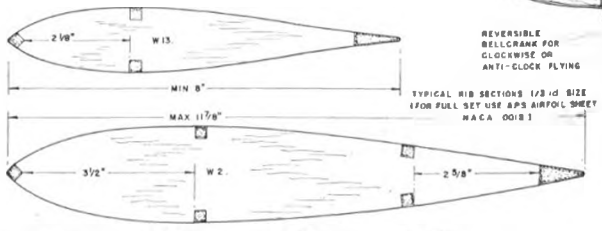
Finally the crooks are herded into a football goal net and kept there by the models while the *Flying Eye* circles triumphantly overhead until the police close in for the capture.

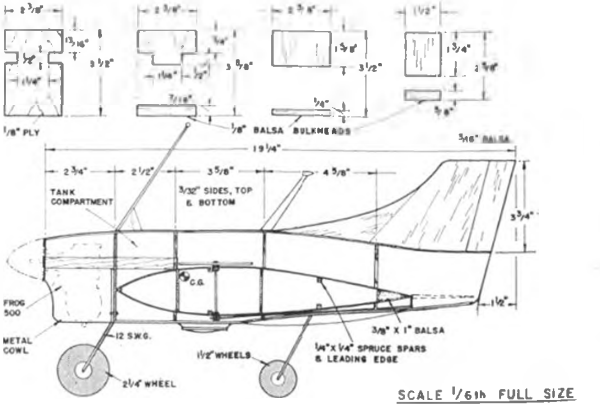


The FLYING EYE

The Flying Eye is a 48 in. span all-wing stunt model, designed for 5 c.c. glowplug engines but equally suitable for a powerful 3.5 c.c. diesel. As designed, it can be flown in either clockwise or anti-clockwise direction by virtue of the reversible bellcrank mounted on the opposite end of a central rod to the actuating horn, and push rod. A third version of the "Eye" was made for the film to be towed Kite fashion for straight flying behind a car. This was engine-less and had the same elevator control but with the bellcrank mounted vertically so that the towing (and control) lines came out of the fuselage bottom. The model can be scaled up to full-size using the dimensions quoted and the scale factor of 6 for other parts. Roof and tip rib sections are drawn one third size and for those who prefer to work from actual airfoil sheets, we recommend Aeromodeller Plans Service sheet for NACA 0018 (8½d., inc. post) which has a more rounded leading edge but which is an admirable substitute.







SCALE 1/6th FULL SIZE

The film company were at first under the impression that the whole thing could be done by remote radio controlled models, but fortunately the Godalming lads were able to advise them that the only way of achieving the precision flying required was by control line. After a long moment during which they all wore puzzled expressions we explained that they were the models which "flew on strings". The next worry was—"would they be able to see the string?" So a C/L demonstration was arranged at the club flying field, and the frowns disappeared one by one.

A meeting followed at which the model requirements were discussed after which the designs were commenced.

The *Flying Eye* was designed by Cyril West and the general arrangement overleaf shows how it looked. Power is a Frog 500 mounted inverted and using a 10 x 6 in. prop., the performance is lively. With a slightly modified tank position the model could perform the proverbial book with ease

An unusual feature on all the models used is their ability to fly in either left or right hand circuits according to the side on which the lines are attached. This was done for the purpose of faking "S" turns etc.

The fighter models were designed by Roy Purkiss and were powered by the Allen-Mercury 25. These engines ran extremely well under adverse conditions and in one day the running time ran into some 3½ hours.

Constructionally the fighters were made entirely of sheet. Manoeuvrability was provided by a full span flap system, thus they obtained fast, if moderately open stuntability, this being not too tight for the free-flight impression to be conveyed.

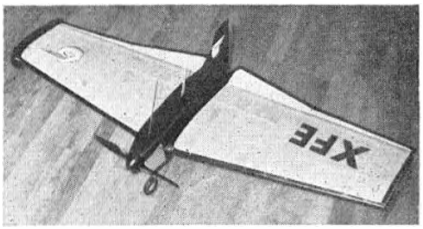
Six fighters were built by junior members of the club and two *Flying Eyes* by the seniors. The flying equipment was from a loan pool.

Flying difficulties

Flying sites were really rough being mostly cowpasture and common land. After a time, they thought little of flying while standing within three feet of a wire fence with a railway line on one side, then whipping the model round on to a patch of grass by a footpath, the only possible landing spot.

FLEMING

"Jones will use that 'Blast' fuel"



"The Flying Eye" could be a full-stunt model

In the "battle" scenes there were overlapping circuits having all taken off from a small footpath out of camera range and then run in to the fray to dive and swoop on the crooks who were hectically trying to avoid each other.

There was no room for a clear circuit anywhere, the whole place being cluttered up with gorse bushes, cameras, crews and the Colonel's car to say nothing of the Director and others.

The other hazard was mud, yards and yards of it. While flying for the *Flying Eye* model shots, Cyril West was asked to take off from a twelve feet long ramp in a field which was on a steep hillside. This would have been difficult enough but the mud made it almost too much. Wellington boots have a habit of being left behind when one's foot is lifted from squelchy mud and the queer feeling of trying to get the boots to keep up with a model which was determined not to wait and on a steepish slope with a tricky wind as well, can only be imagined as a nightmare.

At one time a hand launch was being made by Chairman R. F. Bourne, who is to say the least, on the portly side. Half a circuit of laboured mudstuck stumbling was followed by an almighty heave during which he slipped and fell flat in the mud! The model just crawled away derisively and stood on its tail while Cyril executed a wild Irish jig in the centre until at last the lines were tight enough to get things under reasonable control.

It is certain that had some of the antics been recorded by the camera they would have made the film into a super edition of the radio Goon Show.

Incidentally there were cows too; they did not appear to mind the fliers entering the field but seemed to strongly object the lads leaving it. Keeping them occupied while models, equipment and cameras etc., were passed over the fence lower down was quite a business.

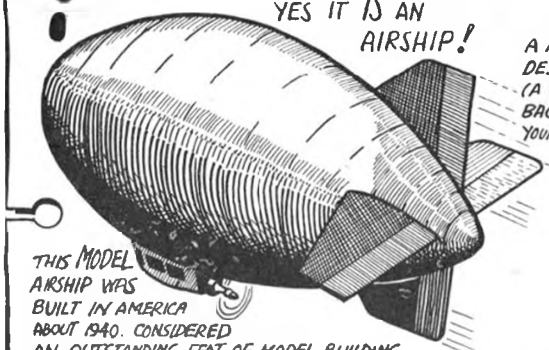
If the flying conditions are overlooked however, there was a good deal of fun in it, but it is now realised only too well why there are not more films featuring aeromodelling.

Tribute should be paid to the Director of the film, Bill Hammond. His patience seemed at times to be inexhaustible. He appeared to be the *only* person who could see that somewhere, there *must* be a limit to what can be achieved under adverse conditions.

QUIZPAGE

AN AEROMODELLING MIXTURE STIRRED BY ... RAY MALMSTROM

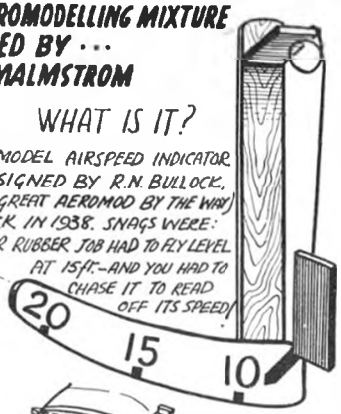
YES IT IS AN AIRSHIP!



THIS MODEL AIRSHIP WAS BUILT IN AMERICA ABOUT 1940. CONSIDERED AN OUTSTANDING FEAT OF MODEL BUILDING. (THERE WERE OVER 10,000 NOTCHES IN THE FORMERS ALONE) POWER: .097" PETROL ENGINE. LENGTH 10'. MAX. DIA. 4'. WEIGHT: 36ozs.

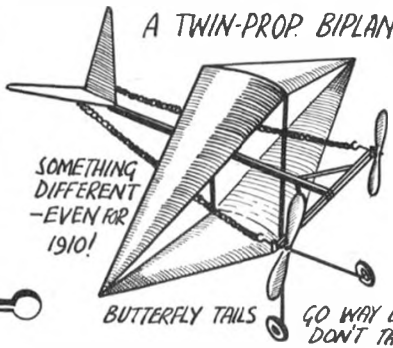
WHAT IS IT?

A MODEL AIRSPEED INDICATOR DESIGNED BY R.N. BULLOCK, (A GREAT AEROMOD BY THE WAY) BACK IN 1938. SNAGS WERE: YOUR RUBBER JOB HAD TO FLY LEVEL AT 15ft.—AND YOU HAD TO CHASE IT TO READ OFF ITS SPEED!



METHOD OF FIXING TO WING.

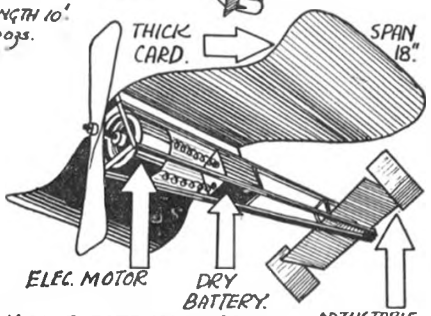
A TWIN-PROP BIPLANE



SOMETHING DIFFERENT —EVEN FOR 1910!

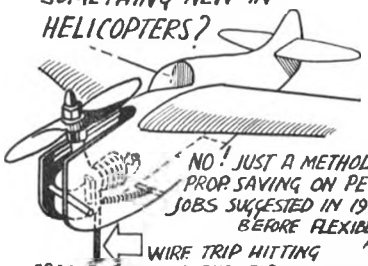
BUTTERFLY TAILS

GO WAY BACK DON'T THEY?



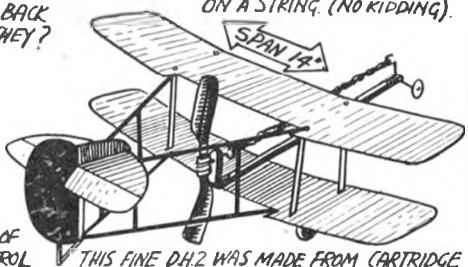
A 1909 ELECTRICALLY DRIVEN MODEL. WEIGHT: 2lbs. FLEW ON A STRING. (NO KIDDING).

SOMETHING NEW IN HELICOPTERS?



NO! JUST A METHOD OF PROP SAVING ON PETROL JOBS SUGGESTED IN 1942.— BEFORE FLEXIBLE AIRSCREWS.

WIRE TRIP HITTING GROUND RELEASED ENGINE BACKWARDS.



THIS FINE D.H.2 WAS MADE FROM CARTRIDGE PAPER, VENEER, IRON WIRE. MOTOR WAS UNRAVELLED SHOCK-CORD FROM A REAL MAURICE FARMAN 'SHORTHORN.' WHO BUILT IT? SEE BELOW!

ARTIST-AERONOD. C.RUFFET MOORE. DATE:1917. A N's OWN

A BRACE OF DART PUPS

Two sizes of this popular subject for free-flight scale

1/8th SCALE for .5—.75cc
By W. PETER HOLLAND

1/6th SCALE for 1.5cc
By F/Lt. D. BARTON

Pete Holland's Pup takes-off with appropriate Allbon Dart power, it has a larger, balanced rudder shape unlike F/Lt. Barton's Mills 1.3 version

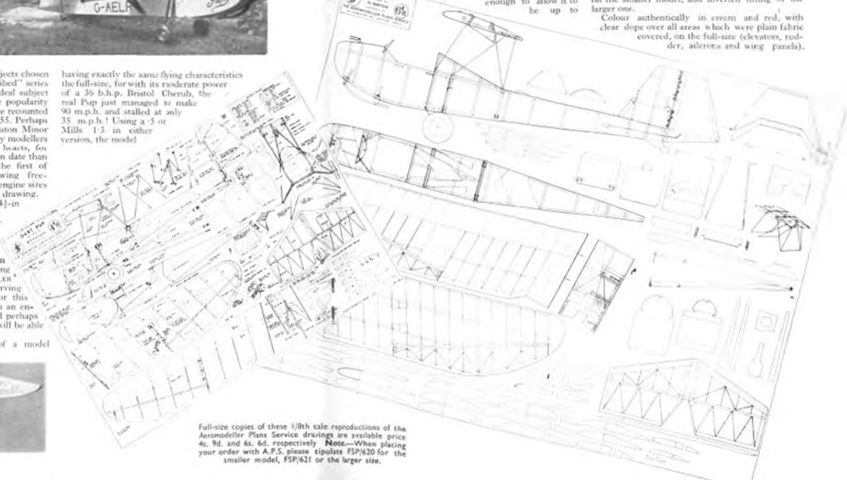
PRACTICALLY EVERY ONE of the subjects chosen by George Cull for his "Aircraft Described" series has been received with alacrity as an ideal subject for flying scale, but none can rival the popularity of the Dart Pup, history of which George recounted so delightfully in our issue for April, 1955. Perhaps it was because of the success of the Luton Minor (another Cull introduction) that so many modellers took the parasol-winged Pup to their hearts, for scarcely a month passed after publication date than the editorial office began to receive the first of literally dozens of photographs showing free-lance models built for a wide variety of engine sizes from enlargements of our 1/72nd scale drawing.

Among them were Pete Holland's 44½-in version with structure blended to suit modelling purposes, very appropriately "Dart"-powered, and Flight-Lieutenant D. Barton's larger model of nearly 60" span with exactly the same construction as the full-size and flying very neatly on the power of a Mills 1·3 c.c. By publishing both drawings through "AEROMODELLER" Plans Service we hope that we shall be serving the wide demand that obviously exists for this attractive ultra-light, so that anyone with an engine of between ·46 c.c. and 1·5 c.c. (and perhaps some of the earlier 2 c.c. engines also) will be able to build a Pup of his own.

This is another classic example of a model having exactly the same flying characteristics the full-size, for with its moderate power of a 36 b.h.p. Bristol Cherub, the real Pup just managed to make 90 m.p.h. and stalled at only 35 m.p.h.! Using a ·5 or Mills 1·3 in either version, the model is likewise a slow flier, with a gentle level sink rather than a stall, and is perfectly viceless to trim. An indication of this is the arrangement of fixed angles of incidence on wing and tail of both models—just build according to the plan, and if the balance is not quite right, add a little ballast to bring the centre of gravity near to that indicated. The C.G. range is wide and tolerant enough to allow it to be up to 1 inch out of position without affecting the flight pattern seriously enough to cause a crash.

In both models particular care has been taken in producing the A.P.S. drawing to show the construction of the parasol centre-section strutting (cabane) to make it easy to construct for anyone with limited model making experience. Ply engine mounts are used in each case, for side-mounting on the smaller model, and inverted fitting of the larger one.

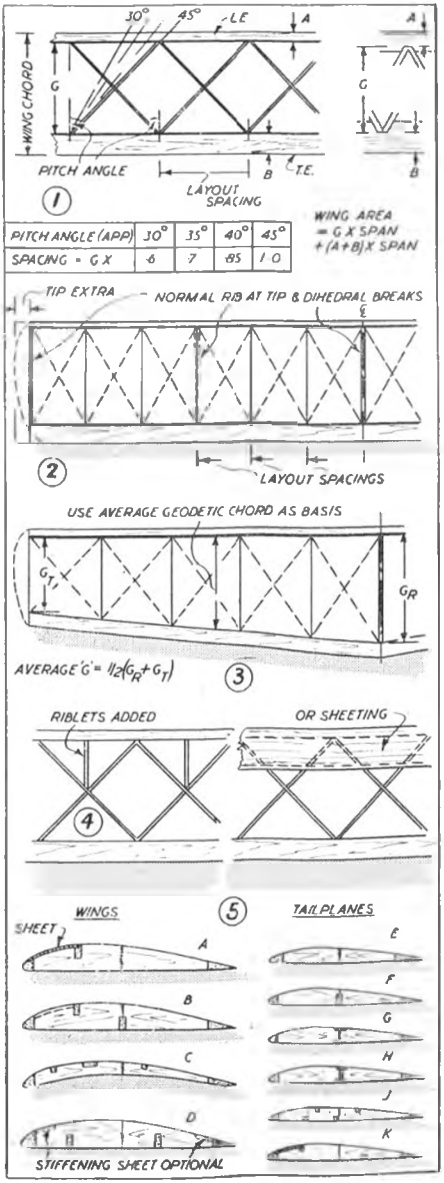
Colour authentically in cream and red, with clear dope over all areas which were plain fabric covered, on the full-size (elevators, rudder, ailerons and wing panels).



Full-size copies of these 1/8th sale reproductions of the *Aeromodeller* Plans Service drawings are available price 4s. 9d. and 6s. 6d. respectively **Note.**—When placing your order with A.P.S. please tipulate FSP/620 for the smaller model, FSP/621 or the larger size.

Aeromodelling Step-by-Step

GEODETIC & WARREN RIBS



GEODETIC AND WARREN girder are both anti-warp types of structures particularly suited to wings and tailplanes.

Resulting stiffness or resistance to warping depends largely on the pitch angle of the ribs. If less than 30 degrees, then much of the advantage of the system is lost. The "ideal" pitch angle is 45 degrees, but the usual practical range is from 35 to 45 degrees.

Layout must be arranged relative to the actual geodetic chord (G) and not the true wing chord—**1**. This is the inside dimension between leading and trailing edge members, if the ribs are not inset. It is necessary to establish the value of "G" right at the beginning, when the layout spacing can be calculated from the table. For instance, if a 35 degree pitch angle is chosen, spacing is 0.7 or 7/10th of G.

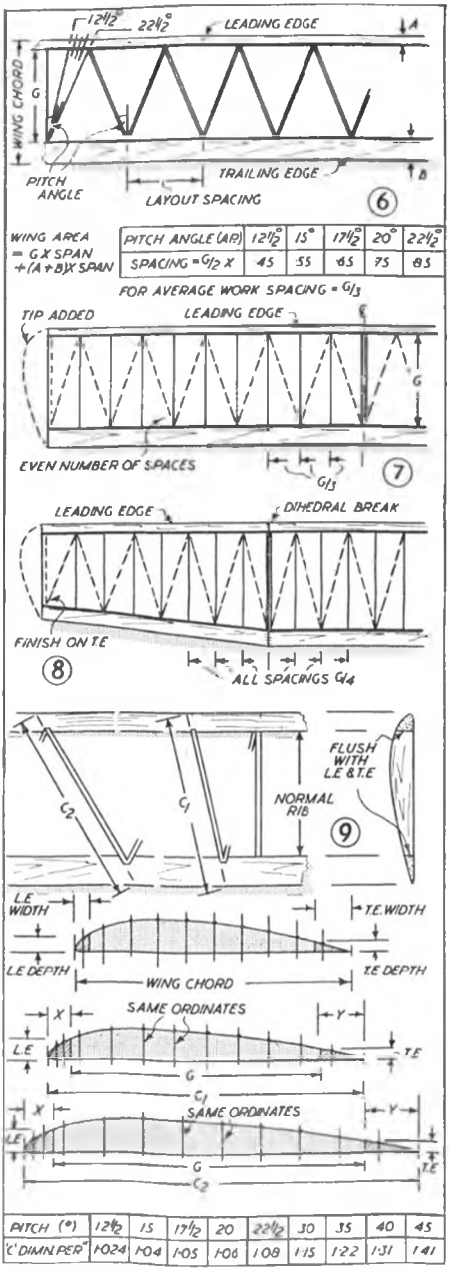
The span of the wing must then be adjusted to give an equal number of stations or layout spacings, as in **2**. Mark out in the normal way, drawing in station positions and then adding the actual geodetic rib positions (shown dotted).

In the case of a straight tapered wing **3**, the value of "G" used to establish the layout spacing is the average geodetic chord. The procedure is then exactly the same, bearing in mind that with a tapered wing the actual pitch angle will increase from root to tip. Thus it may be advisable to adopt a 30 degree pitch angle as a basis, i.e., multiply the average "G" by .6 to obtain the layout spacings.

Once drawn up, a decision must then be taken with regard to the likely distortion of the aerofoil section. On wings it is usual to preserve the nose section either by adding riblets or nose sheeting—**4**. The rear edge of the latter is supported by one of the spars, or the mainspar.

Finally, the spar arrangement is decided and the spar positions added in to complete the wing plan—**5**. The monospar type with sheeted leading edge (A) has already been mentioned. Type B can be used to give greater strength, with or without nose sheeting, or riblets as an alternative. Type C, using top spars, can be adapted for very thin aerofoils, although thin, heavily cambered ribs are tricky to handle in geodetic structures. Type D is a general purpose wing, particularly suitable for thicker aerofoil sections. For duration model designs, type A is generally preferred.

Tailplane spar arrangements can be somewhat simpler. A monospar design may be satisfactory (E), although it can be expected to warp into a bend, even if it does not twist. Type F is better, and G better still. G can be still further improved by inserting webs between the top and bottom spars —H. This gives strong resistance to bending and need not add much weight. The multi-spar arrangement is also excellent, being another "stiff" system —J. Some of the spars may be eliminated and stiffness restored with nose sheeting, as in K.



It must be remembered that the success of an anti-warp structure depends as much on the spar arrangement as the rib arrangement.

In a Warren girder wing, a much lower pitch angle is used, normally between 12½ and 22½ degrees—**6**. Also the ribs do not cross, but zig-zag between the outlines. However, method of laying out is similar and layout spacing decided in a similar way.

With a parallel chord wing—**7** layout spacing can be taken as one-third of the inside chord (G). An even number of spaces is required for the ribs should start and finish on the trailing edge at centre and tip. Normal ribs are used at the centre, tips and dihedral breaks. On a tapered wing, the pitch angle increases from root to tip and so a closer spacing is advisable, i.e., a smaller basic pitch angle. A good figure for general work is one-quarter of the inside chord, when the wing is laid out as in **8**.

The plotting of geodetic and Warren girder ribs is a puzzle to many people. Either type of wing will have at least three normal ribs, which are plotted in the usual way from ordinates. **9**. No further calculation of ordinates are required for the same vertical heights apply to angled ribs. It is merely the chord stations which are adjusted.

For instance, the top aerofoil represents a normal section plotted out to the full chord of the wing. Leading and trailing edge sections are established. The usual method is to decide on the width of each of these sections, mark on the aerofoil and measure off the depth required to conform to the aerofoil section. The angled ribs are essentially similar, except that they have an increased chord (C_1 or C_2). This chord length is drawn out and 5, 10, 20, 30%, etc., stations marked and verticals erected. The ordinates previously calculated for the normal rib are marked on these respective stations and the section drawn in the same *depth* of section, but elongated. In the case of tapered wings, "root" and "tip" angled ribs can be plotted separately and used as templates for making a complete set of wing ribs by the "sandwich" method.

With angled ribs, nose and rear portions to be cut off are now longer than the actual leading edge and trailing edge width. It is readily possible to decide this simply by making complete ribs, laying over the plan and trimming off to required length. Alternatively, both the leading edge and trailing edge "X" and "Y" dimensions, respectively, can be calculated and marked on the full section. In practice, only the "X" dimension need be marked. The trailing edge portion "Y" is cut off by offering the rib up over the plan and marking off.

The bottom table gives the factor involved for the increase in length of the full chord dimension. Multiply the measured or known right-angle dimension by the appropriate factor. It will be seen that the increase is not really significant with Warren girder ribs, but quite appreciable with geodetic ribs of high pitch angle.

A 36" SPAN POWERED SPORT MODEL.

VAMPIE

DESIGNED BY

T. E. Naughten

THE AEROMODELLER PLANS SERVICE

38, CLARENDON RD, WATFORD, HERTS.

3½"

ALL WOODS ARE BALSA UNLESS OTHERWISE STATED

MATERIALS REQUIRED

1 SHEET OF	1/2" x 2" x 36"	BALSA.	2 HARDWOOD BEARERS 5/16" SQ. X 4"
1 " "	3/16" x 4" x 36"	"	12" OF 16 S.W.G. WIRE.
1 " "	1/8" x 3" x 36"	"	3" = 1/4" SQ. SPRUCE.
1 " "	3/32" x 3" x 12"	"	SMALL PIECE OF ALUMM STRIP.
1 STRIP "	1/8" x 1/8" x 36"	"	1 COCKPIT CANOPY.
1 " "	1/4" x 1/4" x 18"	"	SCRAP PIECE OF 1/4" SHEET.

ROUND OFF BEARERS & FAIRINGS.

1/2" SHEET STARB SIDE.

1/8" SHEET KEYING PIECE. LAMINATE BETWEEN SIDES

1/8" SHEET STIFFENER.

NOTE: BOOM SHOWN DRAWN IN ASSEMBLED POSITION.

BOOM DRAWN WITH PORT SIDE REMOVED.

SPACE FOR LEAD BALLAST.

FUSELAGE DRAWN WITH PORT SIDE REMOVED.

CUT SIDES TO THIS LINE. CHAMFER TO DOTTED LINE.

1/8" SQ. STRIPS.

3/32" SHEET FIN. LAMINATE BETWEEN BOOM SIDES.

3/16" SQ. ON INSIDE OF FIN FOR TAILPLANE SEATING. NOTE - 3° INCIDENCE.

RUDDER ON PORT FIN ONLY. HINGE WITH THIN ALUMM STRIPS.

1/4" SHEET.

1/4" SQ. SPRUCE.

1/4" SQ.

16 S.W.G. SKID BIND & CEMENT TO 1/4 SQ. SPRUCE.

1/4" SQ. SPRUCE.

1/4" SHEET.

1/4" SQ.

TAILPLANE 3/32" X 3" X 12"

POSITION OF STANDARD COMMERCIAL CANOPY.

1/2" SHEET SIDES.

TRIM TAB. HINGE WITH THIN ALUMM STRIPS.

PLUG HOLE AFTER BALANCING MODEL WITH LEAD BALLAST.

1/4" SHEET CENTRE.

ROUND OFF TAILPLANE SEATING.

SOLDER BOLT HEADS TO TIN STRIP.

PUSH PINS INTO BEARERS.

ED. BABY TYPE.

STANDARD TYPE.

METHOD OF SECURING BOLTS.

BALSA FAIRINGS EACH SIDE & BETWEEN BEARERS.

NOTE: COVER COMPLETE MODEL WITH LIGHTWEIGHT TISSUE.

CEMENT FILLET.

CEMENT FILLET.

5/16" SQ. HARDWOOD BEARERS. CEMENT TO WING BEFORE SANDING TO SECTION.

NOTE: IF USING .5 C.C. ENGINE INCREASE LENGTH OF BEARERS TO PROJECT 3/4" BEHIND WING.

FLIGHT TRIM.

WITH MILLS .75 OR AMCO .87 C.C. REVERSE PROP & RUN ENGINE CLOCKWISE. MODEL MUST TURN LEFT UNDER POWER. WITH ROTARY INDUCTION ENGINES TWIST PROP BLADES OF PLASTIC PROP REVERSE WAY IN HOT WATER & WITH ENGINE RUNNING COUNTER CLOCKWISE, MODEL MUST TURN RIGHT UNDER POWER.

1/2" SHEET SIDES.

1/4" SQ.

SECTION B.B.

1/8" SQ.

C.C.

1/8" SHEET SIDES.

SECTION D.D.

SECTION E.E.

SECTION A.A.

SLOT UNDERSIDE OF WING TO TAKE BOOM KEY.

WING FROM 3/16" HARD SHEET.

BALSA FAIRINGS.

CARVE WELL FOR ENGINE CRANKCASE FOR ALL ENGINES ABOVE .5 C.C.

BOOM POSITION.

EXPLODED VIEW OF ASSEMBLY.

PLY 69

FULL SIZE COPIES OF THIS 1/3RD SCALE REPRODUCTION ARE AVAILABLE PRICE 3/- POST FREE FROM AEROMODELLER PLANS SERVICE

AERO MODELLER

An all-sheet balsa sport model for .75cc

——— FREE FLIGHT

VAMPIE

By Lt. Cmdr. T. E. Naughten

IT WAS AT THE Northern Heights Gala that we first noticed one of these all-sheet sport models, when we came across the Abingdon and District M.F.C. encampment, and found a whole squadron of Vampie's. This design was created by Lt. Comdr. T. E. Naughten, M.B.E., R.N., Retd., to be an *unbreakable* flyer calling for a minimum of constructional time, and such a specification also obviously called for a model made from solid sheet, but the problem was would it be too heavy to fly?

Although the wing loading was obviously high, the first version used a Frog 50 and flew magnificently. Subsequent models have been flown with undercarriages, using an Allbon Dart, there is a 6 ft. version having a Mills 1.3 and another was made for control line with an Elfin 2.49. The pusher arrangement is a perfect propeller-saver, and the robust construction has survived all crashes. No wonder the idea has caught on like wildfire among the Abingdon clubsters.

If you have a .5 c.c.-1 c.c. engine lying spare, and would like to get some enjoyable hours in, regardless of the weather conditions, "Vampie" is the ideal project for you.

Be certain to choose balsa with straight close grain and if in doubt over the quality, choose a hard grade for preference. Start with the wing, cut from a $\frac{3}{8}$ in. sheet and divided in the centre for the dihedral angle. Carve to airfoil section from the booms outboard and with one half lying flat on the building board, lift the opposite tip 6 in. and glue the centre joint secure.

Cut two fuselage sides from $\frac{1}{2}$ in. sheet, making up the 16 s.w.g. skid bound to $\frac{1}{4}$ in. square spruce mountings, and sandwich the centre $\frac{1}{4}$ in. balsa fuselage core with the sides. Chamfer the fuselage to take the wing which is now fitted and securely glued (slow drying cement can be used if joint is "pre-cemented").

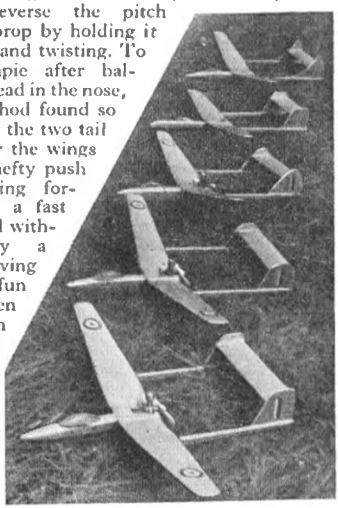
Drill the engine bearers to take your engine, bolt them to the engine and then attach them to the wing centre section having been chamfered on the underside to fit. Note that the .5 c.c. or lighter engines should be mounted just behind the trailing edge, heavier engines go farther forward. Whilst drying, make up the tail booms on either side of $\frac{1}{4}$ in. strip and sheet core, and chamber to fit the under surface of the wing.

The engine bearers should now be firm and we can fill in the scrap fairings between and on either side, rounding off the front edge. Finish off the wing centre section shaping to section DD and cut out fins and tailplane from sheet. Note that the $\frac{3}{16}$ in. square tailplane seating rail is at negative angle.

Insert the fins in the tail booms, and fit the booms to the wing. To ensure that they are square, pin the tail in position temporarily and view from above before finally setting aside to dry. Tailplane can be permanently fixed after being sandpapered smooth and the whole Vampie should be covered with lightweight tissue and given at least two coats of clear dope.

An attractive final finish is all silver with R.A.F. roundels, and the optional commercial canopy fitted to the fuselage can be occupied by one of the moulded Team Racer pilots.

For the side port Mills or Amco engines fit a normal airscrew in the reverse manner (front facing the engine) and run the engine clockwise. The model must turn to the left under this arrangement whilst with a rotary induction engines like the Allbon, Frog or E.D. series, we use a pusher prop, or reverse the pitch of a plastic prop by holding it in hot water and twisting. To launch Vampie after balancing with lead in the nose, the best method found so far is to hold the two tail booms under the wings and give a hefty push whilst running forwards. It is a fast flyer and will withstand many a tumble, giving you hours of fun without even one broken prop.



Heading shows A. J. Hare of the Abingdon Club who has built and flown many Vampies – a variety of them are seen at right

MODEL NEWS

NEWS AND VIEWS from far and wide

LAST MONTH WE passed on a few tips regarding the type of photograph we like best for this feature, and out of the postbag this month comes a fine example of captured realism which earns the title of Model of the Month. Built from the AEROMODELLER Plans Service drawing, this De Havilland Beaver about to be boarded by a card cut-out pilot, complete with luggage, likewise from card and poster painted, was built and photographed in early morning light by A. Warren of Falmouth.

G. H. Berry over in Vancouver, British Columbia is a discriminating flying scale modeller with a preference for small diesel powered lightplanes. Picture **1** shows his Beardmore Wee-Bee which flies well on an E.D. Baby .46 diesel and differs from the A.P.S. scale drawing only in a slight increase of tailplane area. Note the scalloped trailing edge and scale rib spacing. Next to it is about as great a contrast as one might get in **2** with D. J. Tanner's 51 in. Grumman Guardian, built from an American kit and fitted with a Fox 35 engine. It was Mr. Tanner's intention to fly this model in the '55 Gold Trophy at the Nats., but he was unable to arrange transport for its one-piece construction up from Lee-on-Solent.

With the new year's contest season not so very far off, a number of winter productions are beginning to see the light of day, and it is always interesting to see what emanates from the prolific O'Donnell household. Number **3** is John O'D's latest Jetex design, a Scorpion powered project with identical fins fore and aft. Brother Hugh says it will be loop happy; but the proof of the pudding will come when test flights are complete. No. **4** is John's serious contender for the F.A.I. power class. An E.D. Racer is mounted sidewinder (to the left—note) on this high pylon design, called "Treble Chance". Could this mean that John intends to try and be the first to get a place in all three British free-flight teams?

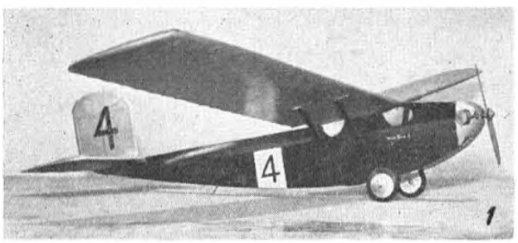
The very smart white and royal blue Luscombe Sky Pal in picture **5** comes from W. Scott of Tunbridge Wells. Built from the A.P.S. drawing, it uses a Mills 1.3 and was awarded a very highly commended diploma at the 1955 Model Engineer Exhibition, and deservedly so we would say.

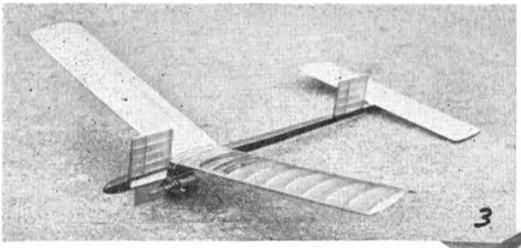
Now for a solid, and one all the way from Johannesburg, South Africa.

Made by Robin Millar from the full-size drawings we published in the December '54 issue, this Viscount (**6**) carries the colours of Central African Airways with a reflective white top to the fuselage and highly polished silver over the rest.

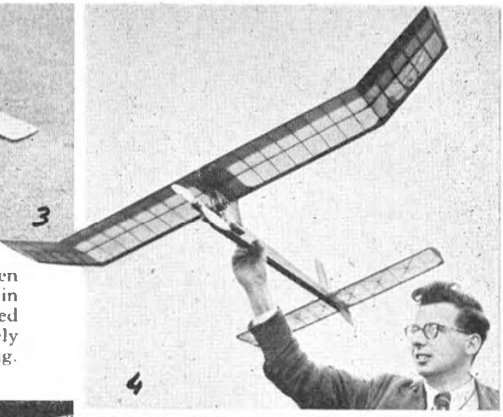
Big stuff in picture **7** is an A.P.S. Goliath which F. Luite of Ladbrooke Grove, London has built for his Ohlsson 60 spark ignition motor. When it came to covering this nine-foot monster, Mr. Luite spent quite a time searching out supplies of surplus parachute material in the London Area. This was to no avail, so he tried washed-out tracing linen: but being pre-shrunk, this was of no use if a taut surface is needed. So he had another scour of the drapery shops, and uncovered a source for 36 in. wide heavy grade white silk at only 2/11 per yard. This was "just the job" and if other big-model builders are interested, we will happily pass on the address if they supply a stamped and addressed envelope.

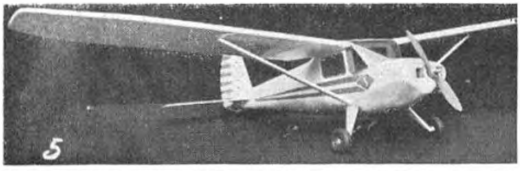
One of the most compact flying units we have ever seen is Cpl. Godfrey's twin Frog 500 control-liner in **8**. Model itself is a 440 sq. in. freelance design weighing 4¼ lbs., finished in light and dark blue. As we can see in the photo., Cpl. Godfrey

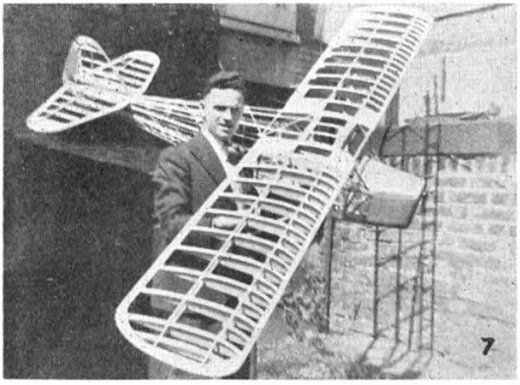


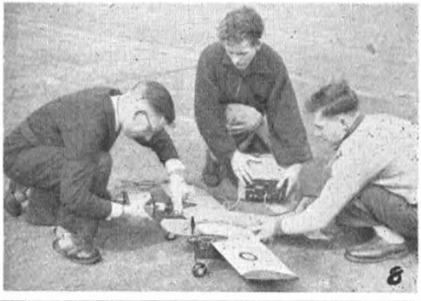


has devised a self starter box which is power driven from a pack of four 2 volt accumulators in the main control box. Glowplug connections can be switched on by the second assistant, and immediately switched off as the starter gets the motor going. Nice work Cpl. Godfrey!









We have so many pictures in our files of De Havilland Mosquitos built from the A.P.S. plans that it is refreshing to see one with a difference, like that built by T. Shortt, Secretary of the Shankill M.F.C. at Vevay, Bray in Eire. Seen in **9**, this "Mossie" was made in '52 for a pair of Amco 3.5's and was later modified to have the E.D.'s as shown. All-up weight is rather heavy at 4¼ lbs. but the side-mounted engines take it up to 55 m.p.h.—very good considering the Christmas Tree effect of rocket rails and undercarriage in the down position.

AEROPLANE IN OUTLINE NUMBER 42

Lockheed F94 Starfire

Described by J. ENOCH

SINCE JANUARY 8TH, 1944, when the Lockheed F.80 single-seat jet fighter made its first flight, the Lockheed Company have progressively developed the basic design to produce the highly efficient F.94 Starfire series of all-weather day and night fighter aircraft.

Basically a direct development of the T.33 two-seat Trainer version of the F.80C Shooting Star, the first F.94 was in fact a converted T.33A. The nose section of the fuselage, lengthened to 40 ft. 1¼ in., was modified to accommodate the Hughes A.1 Radar within a small dome-shaped, di-electric fairing. This equipment, weighing 940 lb., had an effective range of approximately five miles, and was almost completely automatic in operation, requiring only to be monitored by the Radar Operator. Beneath this installation, mounted in pairs each side of the forward fuselage, were 4 x 5 in. M.3 guns. The rear fuselage diameter was sufficiently increased to permit the installation of a "Solar" afterburner which, in addition to water methanol injection, boosted the power of the Allison J.33-A-33 turbojet from 4,600 lb. to 6,000 lb.

Orders for 110 F.94A aircraft were placed in December, 1948, and production commenced the following month, the first aircraft off the line making its maiden flight on July 1, 1949. In June, 1950, No. 319 A.W. Squadron became the first unit to be equipped with the type. Performance of the F.94A was far from satisfactory, due principally to low fuel capacity (total 340 gallons), range, endurance, and high altitude performance being severely limited. In order to offset these critical disadvantages it was decided to install a more powerful engine, and adopt a wing of thinner section with tip mounted tanks of greater capacity. Initially designated F.94B, the magnitude of the modifications was such that the type was re-designated F.97A. During this stage of development 150 improved F.94A Starfires were ordered, with Fletcher 230 U.S. gallon tanks of improved shape, centrally mounted on the "squared-off" wing tips, bringing total capacity to approximately 1,000 gallons. Additionally, improved electronic and operational equipment was installed. These modifications resulted in the Type being designated F.94B, the F.97A being re-designated F.94C.

Production of the F-94A and B ceased in January, 1952, after over 400 of these had been built, but they remained in service at such widely separated places as Alaska, Greenland and Japan, in addition to providing 24-hour standing patrols around major U.S. cities and "Key" towns. In Korea, operating on Night Patrol and Bomber Escort duties, it was an F.94B which scored the first "after dark" victory over a Mig. 15.

Development of the F.94D, envisaged in August, 1941, as a single-seat long range ground attack version, was dropped in early 1952, as a result of Korean experience.

In its original form the first F.94C retained a nose section similar to that of early variants with 5-in. machine guns, but the same airframe was later modified, assuming the shape illustrated. Though early production aircraft had a rounded radome, the pointed di-electric nose cone was introduced (after eighteen months' experiment with the shape), and resulted in a 5 m.p.h. increase in speed. The most significant feature of the F.94C Starfire is the armament. Dispensing entirely with conventional machine guns, it was the first American fighter to be armed exclusively with Rocket Projectiles. Twenty-four 2.75-in. Mighty Mouse rockets are carried in four group of six individual discharge tubes, ranged around the radome. Fairings, hinged at their forward edge retract momentarily to permit firing. A further 12 x 2.75-in. missiles can be carried in each of the two wing-mounted "pods".

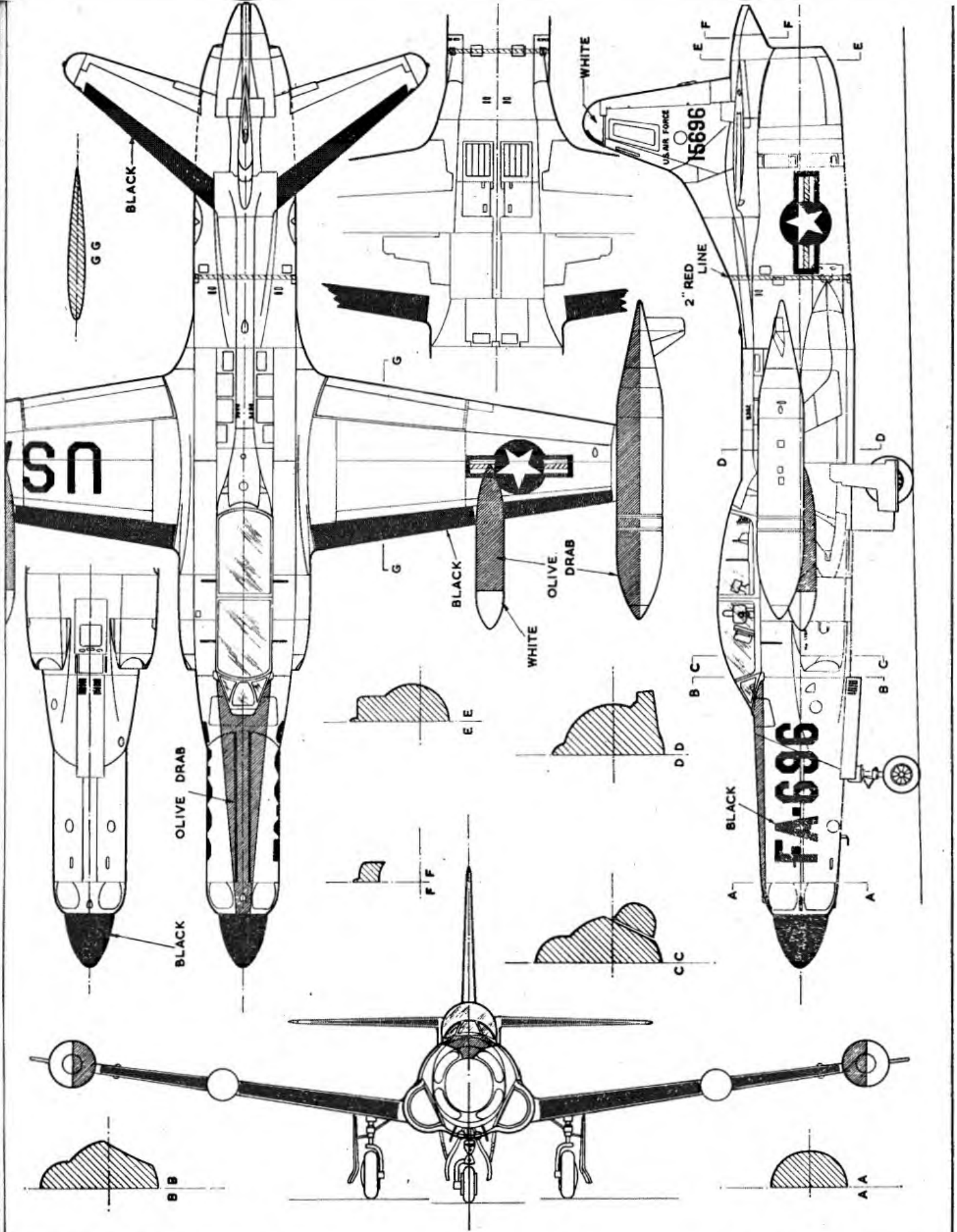
Powered by a Pratt & Whitney J.48-P5 centrifugal turbo-jet of 6,250 lb. st. (8,300 lb. with afterburning), the aircraft has benefited greatly from detail re-design. The revised nose shape and the introduction of high efficiency air intakes being two of the principle features. To supplement the existing dive brakes forward of the fuselage wheel wells, air brakes, located either side of the rear fuselage, have been provided. When jointly extended they confer a high degree of directional stability, essential for the successful firing of rockets. The large fibreglass fairing above the jet pipe orifice contains the 16-ft. diameter ribbon braking parachute, which, it is claimed, reduces the landing run by 40%. The Starfire is the first production aircraft so equipped.

Wing thickness, reduced from 13% to 10% resulted in raising the critical Mach No. to .85 and consequently necessitated the introduction of sweepback to the fairly thick horizontal tail surfaces. Many novel structural features and production methods have been incorporated. The single piece wing leading edge, for example, is machined chordwise from solid, to have thin section and integral semi ribs.

The F.94C has a maximum speed of approximately 650 m.p.h. at sea level with the afterburner in operation, and a rate of climb in the region of 9,500 ft. per minute to its ceiling of almost 50,000 ft. A maximum range of 1,600 miles is possible. Weight of the F.94 has progressively increased from 15,700 lb. of early versions to the 27,000 lb. a.u.w. of the F.94C which has a wing loading of 115 lb./sq. ft. at take-off. Principle dimensions are: Span 38 ft. 10½ in.; Length 41 ft. 5 in.; Height 12 ft. 7 in.

Production of the F.94C ceased when in February, 1954, 279 machines had been completed.

Above, latest markings on an F.94C, recently introduced, most aircraft having insignia as below and on drawing opposite



LOCKHEED F94C STARFIRE

FT.

"J" TYPE 1/72ND SCALE REPRINTS OF THIS DRAWING AND "A" TYPE 1/4dch SCALE DYE-LINE PRINTS ARE AVAILABLE FROM A.P.S. PRICE 6d. AND 1/- RESPECTIVELY FROM A.P.S.

Trade Notes

A recent visit to Messrs. **Ripmax** accentuated the service they provide for Radio Control modellers. The smartly presented Test Meter we illustrate retails at 52s. 6d., covers a range from 0 to 150 volts, 0 to 10,000 ohms, and 0 to 30 milliamps, in other words, all that the average R C flier needs. Other items noted were plugs, slide switches, and sockets from two-pin up to six-pin, wire wound potentiometers value 5k, battery press studs, and coloured wiring flex at 4d. per yard in Red, Blue, Green, Orange, Yellow, White, Black and Brown, and a new version of the **Flight Control** Absorbtion Wavemeter set to a spot frequency of 27·1 M/Cs which retails at 21s. 6d. Ripmax also distribute the **Taplin** Electric Motor which is ideal for servo use. Specifications are as follows:— Overall length excluding shafts, 1⅞ in.; diameter, 1 in.; flange mounted; sealed plastic case; ⅛ in. diameter shafts; weight,

Ripmax Test Meter and Exide acc.

1¼ oz. (50 grams); 4½-6 volts; 18 amps free running consumption. Motor is unique in that it contains a reduction gear box at one end of 11·75 to 1 with the armature shaft projecting at the other end, thus giving a low speed and high speed range from the same motor. At an armature shaft speed of 6,000 r.p.m.

Flight Control wavemeter

gear shaft speed is 500 r.p.m. giving approximately 2 ozs.-in. of torque which is more than enough power for the largest of control surfaces. Another useful line both for radio control purposes and for use as a booster starter battery for gloplug and petrol motors is the **Exide** Accumulator range. Basic unit as illustrated at left is the 1 amp., 2 volt model which retails at 15s 6d., a heavier version of 5 amp. 2 volt costing 18s. 3d. These cells can be made up into units by means of connecting bars should higher voltages be required, and prices work out pro-rata including connecting bars. Correct charging of miniature accumulators such as these is most important, and many modellers are a little baffled as to how to go about it. We would therefore recommend a very instructive article in the January 1956 issue of our associate journal "*Model Maker*" describing suitable charging unit which can be constructed quite cheaply by the average modeller.

Messrs. Ripmax also inform us that they have been appointed official Sales organisation for the popular range of **Mills** diesel engines which include the Mills 1·3, the Mills 75 and the useful Mills throttle and cut-off valve accessories.

Messrs. Jones and Stevens have sent an example of their miniature squirrel cage electric motor which retails at £2 4s. 6d. Approximately 1/70th horsepower, this A.C. motor has a driving speed of 2,700 r.p.m., measures 2 x 3 in. with an ⅛ in. shaft, ½ in. long. It has sintered bearings, requires no maintenance, and is very well engineered indeed. Available in any voltage from 6 volts to 250 mains voltage, it is a little heavy for servo use in aircraft, weighing 8 ozs., but would be ideal as a power unit for boats. With the power available has great possibilities for electric r.t.p. flying, particularly for club exhibitions. The main voltage type would obviate the use of accumulators although great care would have to be taken with the electrical rig for very obvious reasons of safety.

We receive numerous enquiries from radio control builders concerning the **Seimens** High Speed Relays which are available on the surplus market usually with coils of the wrong resistance. Re-winding the twin coils with 48 gauge enamelled wire is a very tricky job without the correct equipment and one which the inexperienced should leave well alone. We understand from **Messrs. E.C.C. (Telecommander) Ltd.**, manufacturers of the well-known E.C.C. Radio Equipment, that they are prepared to rewind coils to whatever resistance required for a nominal charge. It is, however, essential that the coils are stripped of the original windings before sending.

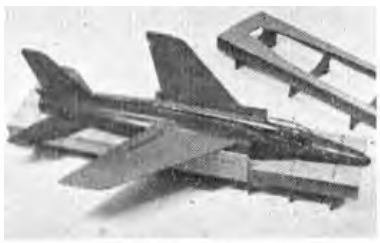
An entirely new type of solid model put out by **Wimco** from the

Squirrel cage motor is 1/70th h.p.

Wilmot Mansour establishment at Salisbury Road, Totton, Hants, is now marketed under the name of "Hollows". All aircraft included in this plastic range will be to 1/144th scale, and kits are complete with transfers, drawings and instructions. We made up the Gloster F (A.W.) 1, Javelin Delta (3s.) including tax,

and the result can be seen in the photo. Each component is supplied in a pre-moulded half, bisected along its centre-line, and a small flange left for joining together with polystyrene cement. An unfortunate feature of these kits is that the better side of each moulding is on the *inside*. This is due to the vacuum moulding process, whereby the plastic sheet is heated, then drawn tightly on to a metal mould. Every effort has been made to ensure accuracy in the detailed drawings, and an authentic camouflage pattern permits a realistic, if simple, model for the mantlepiece.

We have already thrown all superlatives at the **Jetex** Tailored range, and the latest additions, the



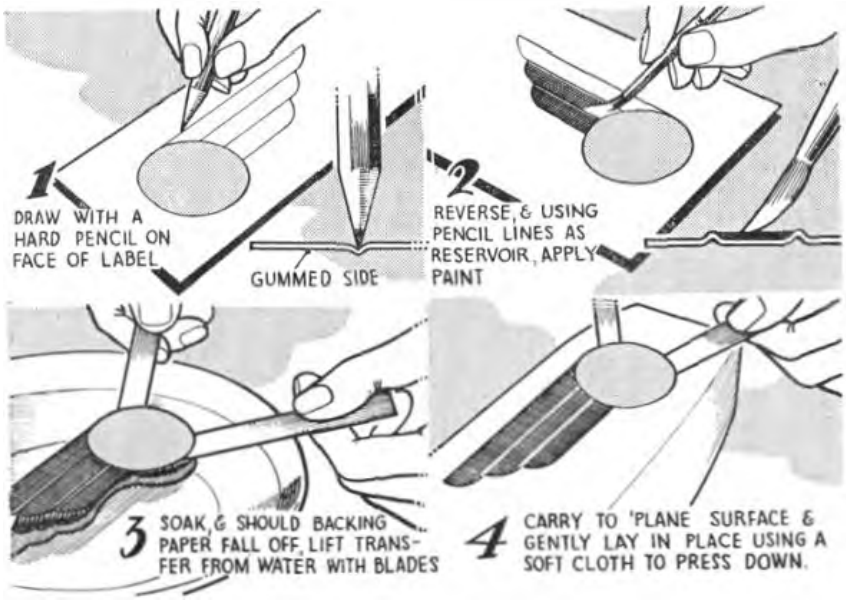
Jetex Gnat in card jig

Gnat and **English Electric P.1.**, ably uphold the very high standard. We made up the Gnat, and the Tailored kit went together in its cardboard jig as easily as it is to build up a wall of child's bricks. The retails at 10s. 6d., including tax, and as this gives one everthing except the Delft Blue Dope, it represents magnificent value. If Jetex take the moulded balsa process a stage further, they might even be able to make a piece of ½ in. sheet into a table tennis ball ! ! The Gnat fuselage is, of course, a moulded shape, and one with a most complicated two-way stretch which has been executed to perfection.

For a super gloss finish, a number of modellers are turning to the slower drying "four-hour" enamels, and the latest range of **Humbrol** Art Oil enamels is to be recommended. Look for the black and orange label on your dealer's shelf—and try the glass hard finish on a solid surface such as wing sheeting or a planked fuselage.

more on Making your own Transfers

By P. O'KEEFE



THE METHOD OF forming home-made transfers as shown in the October, 1955 AEROMODELLER evoked great interest and P. O' Keefe a regular among our "gadgeteer" contributors, has a few additional points of advice.

If, instead of marking the design in soft pencil on the "face side", i.e. the gummed side, it is set out in hard pencil on the reverse it will be found that the design shows through on the surface as a slightly raised line. This is not only more easily visible on the "face side", but also forms a definite line which guides the brush, and also forms a small "dam" to prevent the flow of paint over an adjacent colour. Incidentally, ordinary enamel or household paint can be used instead of dopes, provided they are not used together with dopes as the dope will act like a paint stripper on enamel or oil bound paints. When using paint, a layer of thick clear dope is still put on the gummed side first, the paint being applied when the dope is well dried.

If, as sometimes happens, the paper backing drops off while the transfer is soaking, get two metal strips as shown, a knife blade, balsa cutter, nail file or similar objects will do and lift the transfer off the water as in the drawing, carry to the model and place in position. This is more easily done if the surface to receive the transfer is at about 45° or more to the horizontal, as the transfers tend to fold up when attempting to lay them in a horizontal position. To prevent inconvenience, should a transfer be spoiled, always paint an extra one or two when doing that part of the job. It is much easier than having to get all the dopes, brushes, pencils and paper out again, apart from the extra time wasted while the colours dry.

Not only can your own "special" designs be done in this way, but also chequer-board designs, trim strip, roundels for "solids", lettering, and all in colours of your own choosing

RADIO CONTROL NOTES

Conducted by Howard Boys

THE MOST OUTSTANDING equipment the writer has come across during the last season is no doubt that of Mr. David McQue of the Bletchley and District Model and Experimental Society. This is a crystal controlled superhet receiver with a crystal controlled transmitter to match. One of the advantages of such equipment is that when it has once been set up, there is no need for retuning, so that there is never any tuning on the flying field. Another advantage is that it suffers much less from interference. Mr. McQue's receiver is tuned to 26.97 mc/s and it was not affected by Mr. Sill's transmitter only ten feet away, and tuned to 27.00 mc/s. On another occasion this receiver was tried close up to a transmitter tuned to 27.12 mc/s and it gave no response. From these tests Mr. McQue believes it is quite possible to get six outfits operating simultaneously in the band we are allowed.

The reader may think that a large model would be needed to carry a superhet receiver using four valves as it does, but this one is used in an R6-B with an E.D. 246 Racer. The model is also fitted with the mark/space system of proportional control. The frequency of mark/space is limited to about 4 cycles/second due to the time taken for a crystal controlled oscillator to start oscillating. The transmitter has an output of about one watt and the range at ground level is half a mile. We had better have a description of the receiver, but the non-technical reader can ignore what he does not understand. The circuit is shown in *Fig.* 1.

A 1R5 valve is used as the frequency converter, the local oscillator working at the signal frequency less the I.F. divided by three, to which coil L2 is tuned. The crystal is necessary to stabilise the local oscillator frequency. The coil L1 is tuned to the signal frequency without any capacity other than that of the valve and the aerial. The Intermediate Frequency is the standard 465 Kc/s and midget transformers weighing only half an ounce each are available at 11/9 per pair from Messrs. Clyne Radio. The I.F. amplifier is a 1T4 valve, and the detector

THE McQUE 27 M/c

is the diode section of a 1S5 valve, which is D.C. coupled to the pentode section. This is in turn D.C. coupled to the relay valve which is a 1S4. Positive feedback is applied from the 1S4 screen to the 1S5 screen. This is disconnected at pin 4 on the 1S4 for initial adjustment and alignment.

The receiver, except for relay and batteries, is built on an aluminium chassis, drilled and bent as shown in *Fig.* 2. The valve holders can be amphenol or ceramic type. The crystal mounting consists of two sockets, each mounted in a rubber grommet. The coils are wound on standard ¼ in. diameter formers with dust iron cores. L1 consists of 16 turns of 26 guage double silk covered wire, the turns being spaced equal to the wire diameter. L2 has 20 turns of 28 guage D.S.C. wire close wound. The 1 megohm variable resistor is the pre-set type. The battery leads are taken to a five pin plug to match with a socket in the model. The relay is mounted

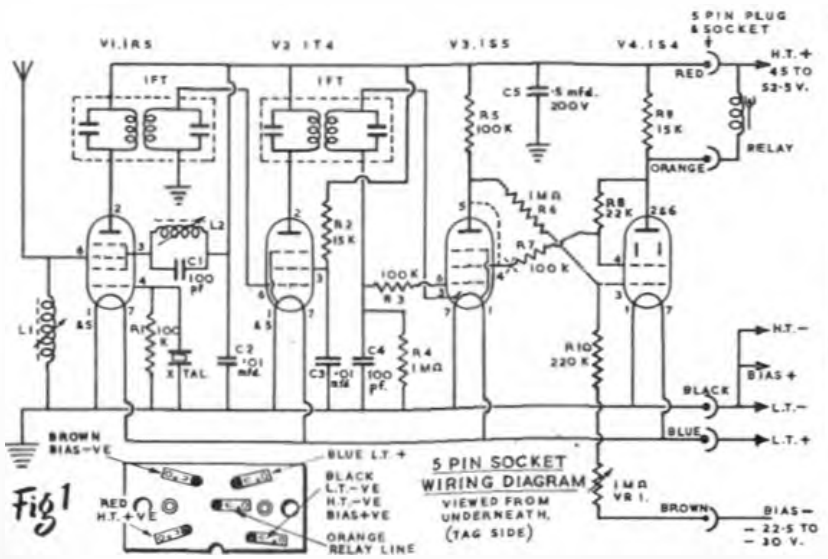


Fig 1

Range of Bletchley Society's frequencies is given below. Odd numbers are allocated for aircraft and even numbers for boats.

Radio frequency Kc/s	Tx crystal Kc/s	Rx crystal Kc/s
26,970	8,990	8,835
27,000	9,000	8,845
27,030	9,010	8,855
27,060	9,020	8,865
27,090	9,030	8,875
27,120	9,040	8,885
27,150	9,050	8,895
27,180	9,060	8,905
27,210	9,070	8,915
27,240	9,080	8,925
27,270	9,090	8,935

separately. Two spacer bars are fitted across the chassis underneath, visible in the photograph, but not in the drawing, and these fit into rubber mounted clips on the model.

Now for the tuning of the completed receiver. On valve No. 3 disconnect the 100k resistor from pin 4 and connect this pin to pin 5. Put a meter in the main H.T. line and with only V1 in its socket, switch on. Screw the core of L2 until the current falls. Screw in further until the current suddenly rises, then unscrew until the current falls sharply again, and unscrew a further 1/6 of a turn. This completes the oscillator tuning, and it will not require readjustment unless the crystal or V1 are changed. Plug in the remaining valves and put a meter in the relay lead, and set the current to 1 ma by the 1 megohm variable resistance. Switch on the transmitter and couple to the receiver aerial. Adjust the I.F. transformer cores for maximum relay current, reducing transmitter power or coupling whenever the meter reading exceeds 2.5 ma. This tuning will not require further adjustment unless

CRYSTAL RECEIVER

the crystal or one of the first three valves are changed. L1 is finally tuned when the receiver is fitted in the model, and will then only need readjusting for a different aerial or model. The 100k feedback resistor should be reconnected to pin 4 on V3 and the connection to pin 5 removed. The 1 megohm resistor is then adjusted so that V4 passes its full current and slowly reduced until the current falls suddenly to its low value. A signal will then cause the current to rise suddenly to its maximum value. The various current values are V1, V2, and V3, together, 3.3ma. V4 current without signal 0.3 ma, and with signal 3.8 ma. H.T. volts are 45. L.T. is 1.5 volts, 250 ma. The grid bias is -22.5, and this, of course, can be the smallest type battery.

Due to the comparatively heavy L.T. current, Mr. McQue uses a Venner 1.5 volt accumulator. The receiver aerial is made from 18 gauge steel wire, and is fixed vertically on the model, as it was found to give a greater range that way.

The model has been modified slightly from the original R6-B design. The fuselage is slightly wider, and the wing has constant chord. The E.D. Racer has the crank case back plate turned through a right angle which reverses the rotation, this enables the engine to be used as a pusher with the standard 9¼ x 6 plastic prop. The total weight of radio and actuator equipment is about 25 ounces. The model flies very well, the speed being quite high, though not unduly so. The writer has had the pleasure of trying the model, hand launching and controlling. Launching is a little easier than with a Sparky. Control is quite pleasant, though response is a little slower than the writer is accustomed to, and the model floats on the glide more than expected. Even so, the model was landed no more than twenty or thirty yards upwind of the transmitter in conditions of no wind at the first attempt, and this the first non-family model for about four years.

To operate this receiver, a crystal controlled transmitter giving plain carrier wave is necessary, and will be described later.

The crystals used by Mr. McQue in both transmitter and receiver were obtained for £1 each from Mr. H. Whitaker, a radio amateur G3SJ, of Court Road, Newton Ferrers, South Devon, who is well-known to members of the I.R.C.M.S. for the supply of useful items for radio controlled models. Unfortunately he cannot supply any more of these cheap crystals, but he has put in a plant to manufacture gold-plated electrode type crystals. These are much more active, accurate, and stable, and are mounted to standard ½ in. pin spaced holders. Mr. Whitaker normally keeps a stock of all frequencies in the model control bands, so they are more or less available by return post.

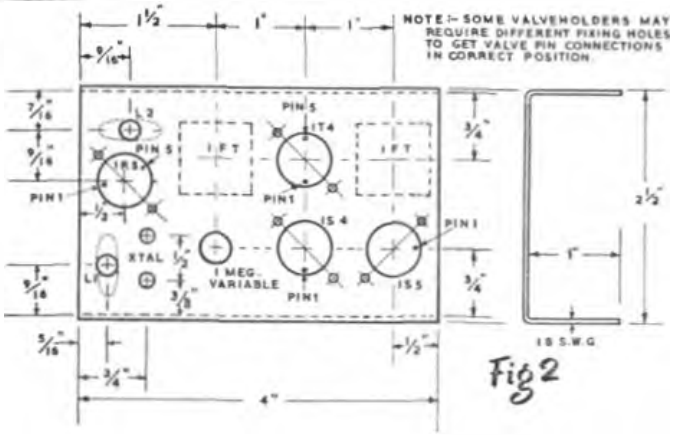
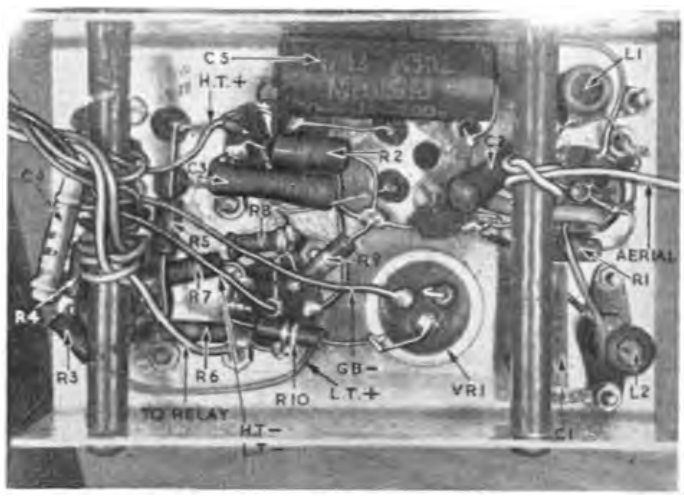


Fig 2

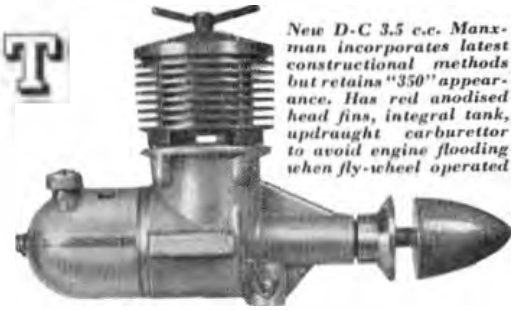


MOTOR MART

WE HAVE HAD correspondence and comment of late, on the subject of modelling in Soviet States, and note that a few people appear anxious to misconstrue the facts to make a political issue out of so-called "State" motors. That such motors exist is no secret—we have kept readers well abreast of the facts through this feature and our annual Soviet International contest report, but to correct the false impression some would like Western modellers to accept, perhaps the following will explain the situation.

These Soviet countries have Aeromodelling Institutes, where expert modellers are permanently employed to explore latest developments, and issue instructive information for the guidance of those who like to take up the hobby. It is an admirable situation, having a parallel in other countries, notably Switzerland. When engines have been produced by these experts—solely because there has been no other local source of supply, they have represented just as much of an individual effort as, say, Fred Carter puts into his record-breakers. For example, the Yugoslav **Aero** series have been best employed in the hands of their makers, Dragan Prohaska and Emil Fresl of Yugoslavia. The Russian **"K"** series, made by Jeorgenij Kucerov have been put to best use in the designer's own free flight models, and the Czech pair Sladky and Koci have worked together on their control-line speed engine under the guidance of Husicka to produce an astounding jump on the 2·5 speed class.

Granted, this **S-K 25** engine has had to change its name and adopt the title of the MVVS department and be called the **MVVS 2·5/1955-D** because it proved to be better than the engine originally designed for the same purpose (and drawn below): but it still represents *individual* rather than State effort, and should not be snubbed as a product of mythically superior research departments.



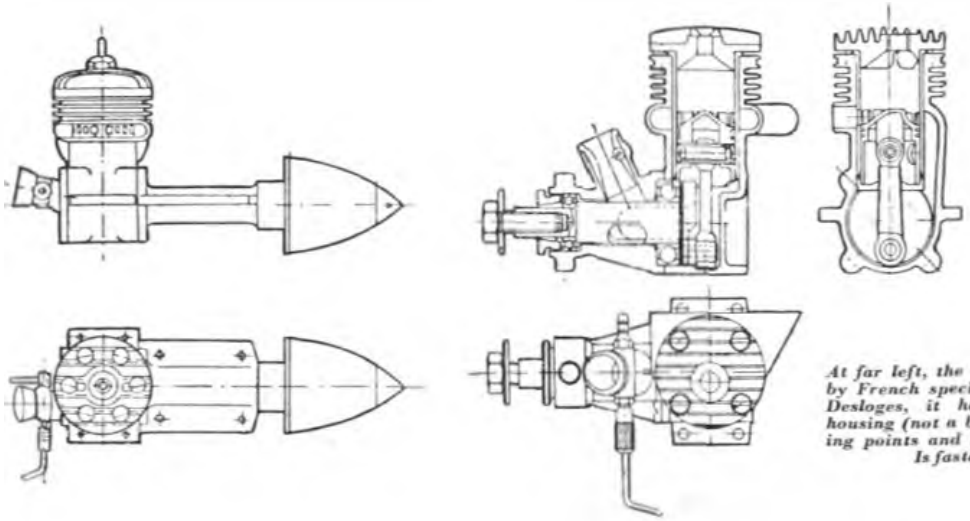
New D-C 3.5 c.c. Manxman incorporates latest constructional methods but retains "350" appearance. Has red anodised head fins, integral tank, updraught carburettor to avoid engine flooding when fly-wheel operated

Incidentally, when in Paris, the Czechs were co-operative to the extent of dismantling their engines for us to see the constructional details—a facility not offered by other teams.

Following our analysis report last month, **Frog's** have announced a slight constructional change in the 249 BB which alters the porting to simplify a machining operation. This has actually given the engine a few extra r.p.m., over and above the propeller figures quoted.

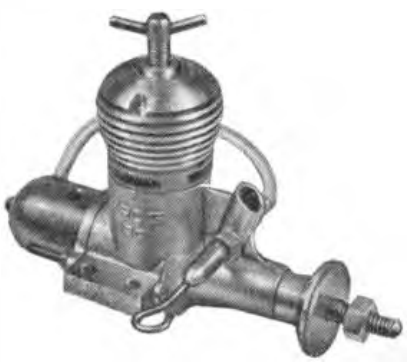
The 249 runs well as a glowplug conversion, particularly in the higher speed range with small props., though for the time being this is not considered as a production job. It should, however, be of interest to the speed enthusiasts, and with a little weight paring off the reciprocating parts, the "glow" version could be a useful modification.

A welcome return to the British market is the **Davies-Charlton Manxman**, the popular "350" diesel which has been out of production for more than two years. This is virtually a new engine design, using the latest production techniques yet not changing the basic appearance of the original product. With an updraught carburettor, it is particularly suitable for the pulley and string boys—the boat and ducted fan builders who complain that with a downdraught they get a hydraulic lock by sucking in too much fuel when starting. We see a fine application for this robust red-head in radio control and have already suggested to designer Hefin Davies that a twin-needle valve unit be made to plug in the existing carb: for two speed control.



At left, the original Czech State MVVS 2.5/1955-D engine as patterned much after the Italian Super Tigre. A rear disc version now replaces this type. Note mounting steadies on front ballrace, domed piston, wide angle exhaust and remote needle valve in venturi sectioned intake

At far left, the Vega-Jarry. Designed by French specialist, youthful Jarry-Desloges, it has extra long shaft housing (not a bearing), eight mounting points and Dooling type porting. Is fastest in France.



SUPPLEMENTARY ENGINE TEST

FROG 150

REVIEWED BY RON WARRING

EXTERNALLY UNCHANGED the current production Frog "150" incorporates a number of new constructional and internal design features. Result is greater flexibility of control, easier starting and better handling characteristics generally. Torque is sustained well past the peak B.H.P. speed and is 5 ounce-inches at 16,000 r.p.m., which figure the "150" achieves with a 6 x 4 nylon propeller.

In appearance, the only noticeable changes are the slightly longer compression screw, taking this control farther away from the head (the tommy bar length is unaltered) and the better finish on the castings, which are now tumbled.

Internally, cylinder design is completely modified. Transfer passages are now cut externally through the bottom threaded length of the cylinder, which is of substantial wall thickness. The thread itself has been modified to 32 t.p.i. instead of the original 40 t.p.i. to give a stronger thread. Above the flange the cylinder wall thickness has been appreciably reduced. The piston is now flat topped. Modified timing incorporated now opens the transfer for a longer period than on the original "150", with exhaust opening slightly shortened. Result is a definite improvement in high speed performance.

A Vandervell sintered bronze, steel backed main bearing is now fitted as standard, assembled with a quite generous intial clearance. This gives complete interchangeability of crankshafts on the production line and results in a cooler bearing, with minimum friction at high speeds. It is imperative, however, with this type of bearing that the engine should be run in carefully, not exceeding a maximum of, say, 10,000 r.p.m. for the first half hour. One hours' running in time should be more than ample to ensure consistent performance. By this time, too, any stiffness at top dead centre due to the tapered bore will have disappeared.

Another noticeable change is that the spray bar now has two holes, making it non-sensitive to positioning. And a "hidden" feature, the crankshaft is stress relieved after finishing by annealing the threads and the region of the inlet hole.

The particular example tested had a remarkable low speed performance, being quite happy running at 6,000 r.p.m. with a 10 x 6 nylon propeller and, indeed, being difficult to stop when slow running. It was impossible to stop by slackening off the compression, as this would not come off far enough, and so choking or turning down the needle valve had to be resorted to to bring the "150" to a halt. It becomes increasingly more sensitive to compression adjustment as the speed is pushed up.

Despite the fact that a new model of the same size is known to be going into production shortly, the "150" will continue as a parallel production item and with its low selling price should be a most attractive buy for sports model fans.

PROPELLER-R.P.M. TEST DATA

Propeller dia x pitch	r.p.m.
10 x 6 (Frog nylon)	6,000
9 x 6 (Frog nylon)	7,200
8 x 5 (Frog nylon)	8,600
8 x 6 (Frog nylon)	7,400
6 x 4 (Frog nylon)	15,900
7 x 4 (Stant)	11,600
8 x 4 (Stant)	8,900
6 x 5 (Stant)	12,500
6 x 3 (Trucut)	13,400

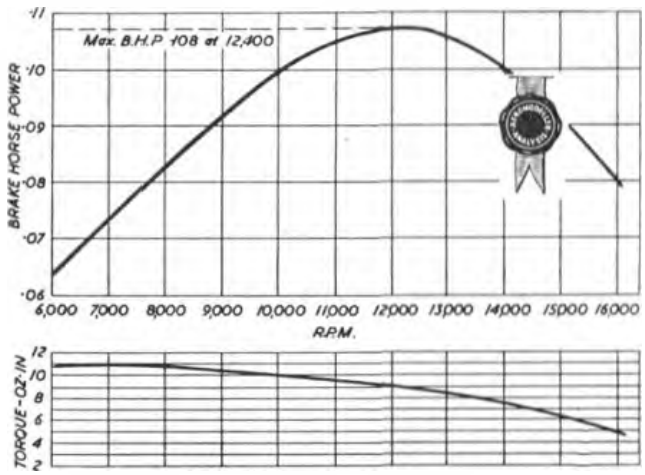
Fuel used: Frog "Powamix" (2 per cent amyl nitrite)

Specification:

Bore: .50 in. Stroke: .460 in.
Displacement: 1.49 c.c.
Price: 40/9 + 8/1 P.T.

Manufacturers:

International Model Aircraft Ltd.,
Morden Road, Merton, Surrey.



Members of Cambridge M.A.C. register appropriate expressions as Peter Firman, club Chairman concentrates on a Vertical Take Off launch.

FIRST REACTION to the proposed F.A.I. power class for some clubs will no doubt be to institute a search for bigger and better shovels. Twice the weight means twice the impression and the holes bored by many current models are already something to marvel at! Seriously, our first thought was to try and recall any models of anything approaching the loading which looks like being called for in 1957, and apart from a good many hack sports jobs the only thing we could think of was the 1952/53 Queens Cup rules, which called for a 30 oz. model with up to 5 c.c. power and 1,000 sq. in. total area. Quite a few entries used 2.5 c.c. motors in those airframes and achieved reasonable performances; with slightly smaller airframes and a spot of development work, no doubt we shall end up seeing regular maximums even with such heavy-weight designs. Pity, though, for those experts who have spent some years in developing their present models—but then the same thing happened in the Wakefield and despite the cries of horror performances showed no great drop.

South Midland

The year old OXFORD METEOR M.C. now numbers approximately fifty, and ran a very successful exhibition recently in the local town hall. Something over 2,000 tickets were sold, and the impetus gained by club members furiously readying models for this show has not yet spent itself, since now flocks of multi-engine scale designs are coming into being. Radio is still attracting considerable interest—one member is a sadder and wiser man since losing his A.M. 25 powered *Matador* as a result of forgetting to switch on the radio! Nocturnal activities have included night flying with a *Falcon* carrying an ordinary cycle lamp underneath.

News comes in from the Aircraft Section of the **BLETCHLEY D.M.E.S.,** whose interests are at present focussed on free-flight and indoor R.T.P. Among the R.T.P. models is a Bambi powered *Dandy* which sparked off a lot of thought about .5 c.c. speedsters, but with no tangible result as yet.

Sixty clubmen and friends of **LUTON D.M.A.S.** attended the best annual dinner and prize-giving yet, and eight members repeated the "punishment" by attending the Area dinner, taking along the club film (now 400 ft.) for post-prandial entertainment.

Northern

Growth from six to thirty in twelve months is reported by **NORTH SHEFFIELD M.A.C.,** who mean to make 1956 a bumper year which will not only include visits to all important contest, but also interclub contests and visits to steel works etc. A close link is maintained with a German club for postal contests and exchanges of views etc. A new idea in the club is patron membership for members' parents; it is felt that is papa's see the club in action at various meetings they will be more kindly disposed towards their offsprings' activities!

East Anglian

Some serious building is going on in **NORWICH M.A.C.** and with the first decent weather a whole scad of new jobs will be out for their maiden airings. In the final monthly competitions of the year G. Davie senior won the team race with an Oliver Tiger Cub model, and ended up winner of the series by a handsome margin. Junior Woodcock collected the standard monthly cup with an A.P.S. *Frankenstein.*

A new club has been formed by the 1451 Squadron A.T.C. at **HAVERHILL** and new members would be welcomed. There is no need for us to emphasise the fun to be had out of membership of the air cadets, so modellers in the locality are thoroughly advised to see the secretary at 6 The Pightle.

1956 INTERNATIONAL CALENDAR

April 29-May 2nd.
Criterium of Europe—Brussels.

June 9-10th.
Flying Wing, Glider, Rubber and Power—Terlet (nr. Arnhem).

June 15-18th.
King of Belgians Cup—Antwerp.

July 7-8th.
Seaplane contest—Milan.

July 21-22nd.
Europa Cup (all classes)—Saar.

August 3-6th.
POWER CHAMPS.—Cranfield.

August 5th.
I.R.C.M.S.—

August 17-19th.
WAKEFIELD—Sweden (Hoganas).

September 15-16th.
C/LINE CHAMPS.—Italy (Genoa).

October 6-7th.
GLIDER CHAMPS.—Italy (Florence or Rome).

South Wales

Perfect weather favoured **CARDIFF M.A.C.** when they held open rubber, power, glider and Wakefield events for four cups at the beginning of December. Outstanding performance of the day was by K. Horlock, who smashed both his power and glider models, but repaired each on the field and took first place in each comp.

Southern

A new club has been formed in this area under the chairmanship of veteran C. A. Rippon, to be known as the **CHRISTCHURCH and NEW FOREST M.A.C.** The object is to foster the building and flying of models throughout the New Forest and the initial start of thirty members (including 26 seniors) will, it is hoped, eventually expand to cover modellers in Christchurch, Highcliffe, New Milton, Lyndhurst, Brockenhurst, Milford, Lymington, Ringwood and Fordingbridge. Flying takes place at Wilverley Post.

FARNBOROUGH M.A.C. look back on a very good 1955 season, in which entries were made in twelve national contests, the best performance being J. Webster's third in the Keil Trophy, though junior member D. Sibbick's 1.49 powered *Y-bar* has been making the seniors sit up. A desire to change to the London area has been evidenced, since Chobham Common is considerably closer than the usual venue for Souther Centralised Comps.

North Eastern

Satisfaction was expressed at the area A.G.M. with the general progress of the area during the past year, a great improvement in all aspects of the year was of course the Northern Area Rally at Croft (organized by N.E. Area), which was remarkable in that every contest finished on time and every winner received his prize—possibly the only meeting since the war in which this has been done!

For the first time in many years the junior membership of **SEAHAM D.M.C.,** exceeds the seniors in number, and *Phantoms* by the dozen stagger round the circle. More advanced C/L enthusiasts are getting in plenty of team race practice with **THORNABY PATHFINDERS M.F.C.** Indoor contests scheduled during the colder weather include Jetex 50 R.T.P. scale speed, helicopter duration, and unorthodox R.T.P., as well as more standard contests.

Western

Although rubber and glider flying only is permitted on Durdham Downs, a regular Sunday morning crowd assembles and **BRISTOL and WEST M.A.C.,** is reaping the benifit by a healthy increase in membership Considerable numbers of new models are showing up at indoor meetings, including electric R.T.P., and rubber pusher types. A film show is being given on Feburary 23rd, and it is hoped that a postal contest may be arranged against the Guernsey club at a later date.

London

One of the younger members of the **GODALMING and DISTRICT M.F.C.,** took his first contest power model to the local common for testing, and, as beginners will, sent the model off for its first flight with the engine screaming. Whilst "experts" winced and waited for the crash, said model performed a perfect right spiral climb with a pull out at the top just to show how simple it is to trim a "hot" design. Bet he doesn't have the same luck next time! Climax of the

season for this club was the annual dinner on November 22nd, when the "Flying Eve" film was shown to the members for the first time. As related on the pages 80/82, this 1½ hour film was produced with the co-operation of the Goldaming boys and the model antics kept the dinner party amused, particularly in the scene where Cyril West successfully pushes a crook into the bushes with the spinner of his 75 m.p.h. C/liner. Unfortunately, although the credit titles of the film go right down to the continuity girl, the Godalming club gets no mention whatsoever, yet the film could not possibly have been made without their co-operation and technical advice.

Ken Brookes used his transparency parade to open the **ST. ALBANS M.A.C.**, winter programme with an illuminated report on the World Model Olympics and the All Britain Rally together with tape recordings including excerpts from "Children's Hour" and the radio "Goon Show". In the "Thermal", the club's newsletter, we learned that Scotsman Urban Wannup visited Oskar Czepa and gleaned the comment that "British A/2's are too conservative, turbulators and flapped T.E.'s are no good, and the next step to progress is mechanical techniques to improve performance by varying rigging angles in flight". Hmmm! Chris Marsh's useful series on power trimming appear in the newsletter and wise club secs. should get in touch with the St. Albans magazine for edification of their own members.

Annual Power Championships of the **REGENTS PARK M.F.C.**, were held on November 27th, with R. Dee winning the event flying a D.C. *Ballerina* followed by R. Denny with a Contest Kits *Cresta*. On December 4th, the club had a freindly event against Mill Hill, and were well and truly trounced. The contest was open to any type of model except power, simple rules being the nearest to three minutes in three consecutive flights to be the winner, a simple, wide open event which is apparently much more difficult than it sounds.

An interesting system of scoring in club contests used by the **HAYES M.A.C.**, is that the winner receives 100 points and other competitors percentages according to the ratio of their times to that of the winner. This gives a truer representation of individual performance than in a points-for-place system. Times are restricted by the smallness of the local flying field to a 2½ minute maximum under the very least wind conditions, and four contests are held in each of the three F/F classes each year. Competitors can enter any three of the four comps. in each class, so that if they are unlucky enough to miss one they do not lose ground in the annual championship.

North Western

Area champion for 1955 is, guess who — John O'Donnell of Whitefield, with G. Evans of Cheadle as runner-up. The Whitefield club also takes the Rootes Trophy, which was one of the earliest of the area possessions, and which has been awarded on this occasion as a result of the performance in the Whitefield Rally.

The somewhat unique result in the Whitefield club combat and speed events was J. Allen winning both events using the *same* model (has he got a fast stunter, or an aerobatic speed model?). Great fun was had in the speed event when a roll of wallpaper was used most unsuccessfully to provide a runway over the grass. John O'D completed his trio of certificate flights by qualifying in the power section with *Triple Chance*, (see "Model News").

John Done is the individual club champion for **WALLASEY M.A.C.**, entering in a series of club competitions which were fortunate enough to coincide with four consecutive fine Sundays. For all comps., a maximum of 1½ minutes was chosen as suitable for the flying conditions of the ground with five flights per contest; sounds like a test for dethermalizer setting to us! Interesting line length used for glider was 25 metres (82 ft.) which gave G. M. Hutton 5 : 40 for 'e flights, and Stan Hinds, 5 : 33.

We are pleased to see that the **LEICESTER M.A.C.** have adopted the A.P.S. *Mam'selle* as the model for their winter building competitions, the first portion of which will be judged during January.

HEANOR and DISTRICT M.A.C., are hoping that their first and third places in the Class A team racing at the Loughborough Rally on November 13th will be a good omen for their performances in '56. The club ground has already seen a few new prototypes going through their places, and the club Class B prototype was recently flown off despite miserable damp conditions. M. Ward became the Class B champion, L. Clifford Jetex, D. Froggatt F/F power, D. Perritt (Derby) Combat.

South Eastern

We wonder what 1955 British power team member Ron Mussell of **BRIGHTON and DISTRICT M.A.C.**, will think of the rule changes proposed by the F.A.I. for 1957, especially now that as the most prolific builder in the club he has completed a Mark 3 version of his *Kismet*! Flight trials show it to have an even better performance than the Mark 1, which got him into the team; there is also a new Pauload version on the way. (Perhaps this will do for F.A.I. in '57!) Joe Kay is building a *Swiss Miss*, and Peter Brown two new *Fifteen's*, showing a wealth of appreciation for Aeromodeller Plans Service. Those keen types the Boxall brothers have been doing a spot of slope soaring up at Devils Dyke and acted as timekeepers to Grahame Gates of the neighbouring **SOUTHERN CROSS A.C.**, in his attempts on the British hand launch lightweight glider record. We hear that Grahame is planning a Nordic A/2 of an "experimental nature"—as if that finless sheet tail model we saw at the All Britain was a normal type! Looking ahead, the club is already planning its coach and camping party to the Nationals at Waterbeach, and is already inviting bookings for the seats to save later disappointments! The club *Downman* A/2 design appears to be in steady demand; Keith Donald issues this to club members on the proviso that the applicant is capable of constructing it and intends to get weaving as soon as he receives the plan.

Scotland

Report from Prestwick reads: "Whilst the West of Scotland Area as a whole seems to have retired to winter quarters (or is it to hide its face in shame after the P.A.A. Rally?) **PRESTWICK M.A.C.**, has been unusually active in the last few months. After braving extremes of climate to top Area results on M.E. and K.M.A.A. days, a climate which incidentally seems to have deterred the rest of the area from even attending, the club went to town at the recent Ayrshire Gala, adding to their formidable array of silverware by collecting every prize going. This retains their position as Ayrshire, West of Scotland and Scottish champions."

Ireland

A new club has been formed with twelve members of all types from control line to radio control at Larne in County Antrim. Local unattached fliers are recommended to get in touch with the secretary at 1, Fagan Row, Millbrook.

Looking for a pen-pal in the U.S.A.? Young Roland Haigh at 1 Buena Vista Ct., Windsor, Vermont, U.S.A., is looking for a 16-year-old British enthusiast willing to exchange correspondence on all matters relating to aeromodelling.

To wind up this month's report here is a nice little tale which we reproduce from the

Southern Cross Area Club Christmas news sheet, without comment.

"This is a reputedly true story, of what happened to a friend of afriend a short time ago. Said friend of friend was flying home from Cyprus and one of the other passengers in the aircraft was a seven year old boy. This small lad was a real terror and completely irrepressible, and one of his favourite pastimes was to race along the gangway of the aircraft. The time passed and as usual the stewardess went into the galley to prepare coffee. She was just coming out when she had the misfortune to meet the small boy in full flight down the gangway. The inevitable happened. A silence followed, or as near to a silence as you can get in an aeroplane, and then the stewardess picked herself up slowly and painfully from the midst of the pile of broken crockery and, turning towards the small boy, said "Sonny, why don't you go and play outside?"

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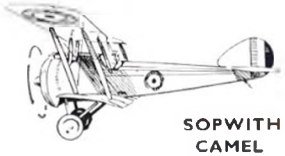

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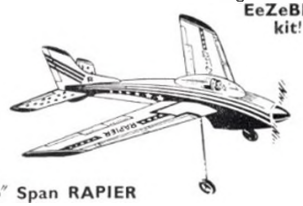

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