MODEL AIRCRAFT

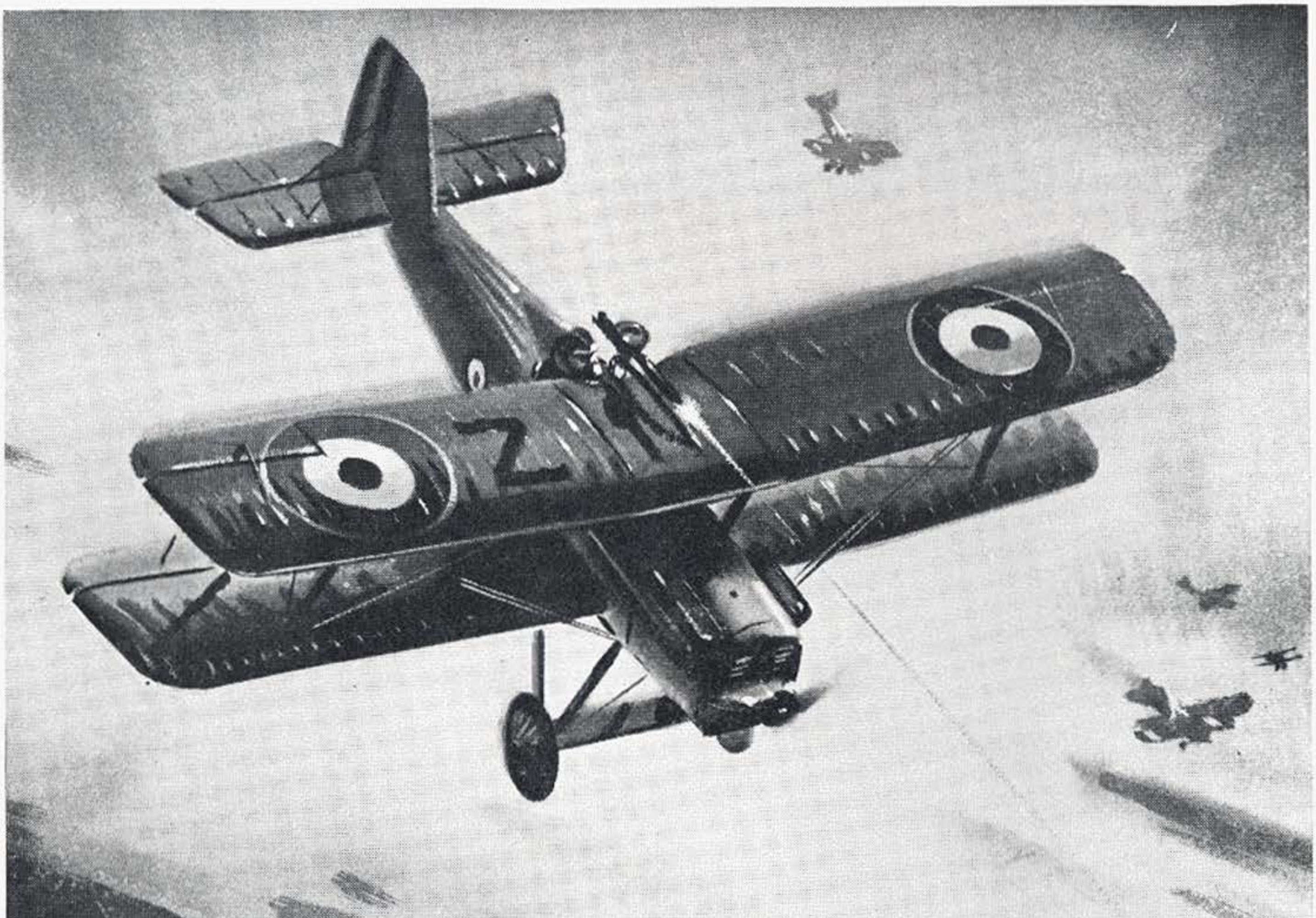
1'6

FEBRUARY
1958

In this issue

NIEUPORT SCOUT
Plans for Free-flight
and Solid-scale models

THE S.E.5. ANOTHER SUPERB HISTORICAL MODEL



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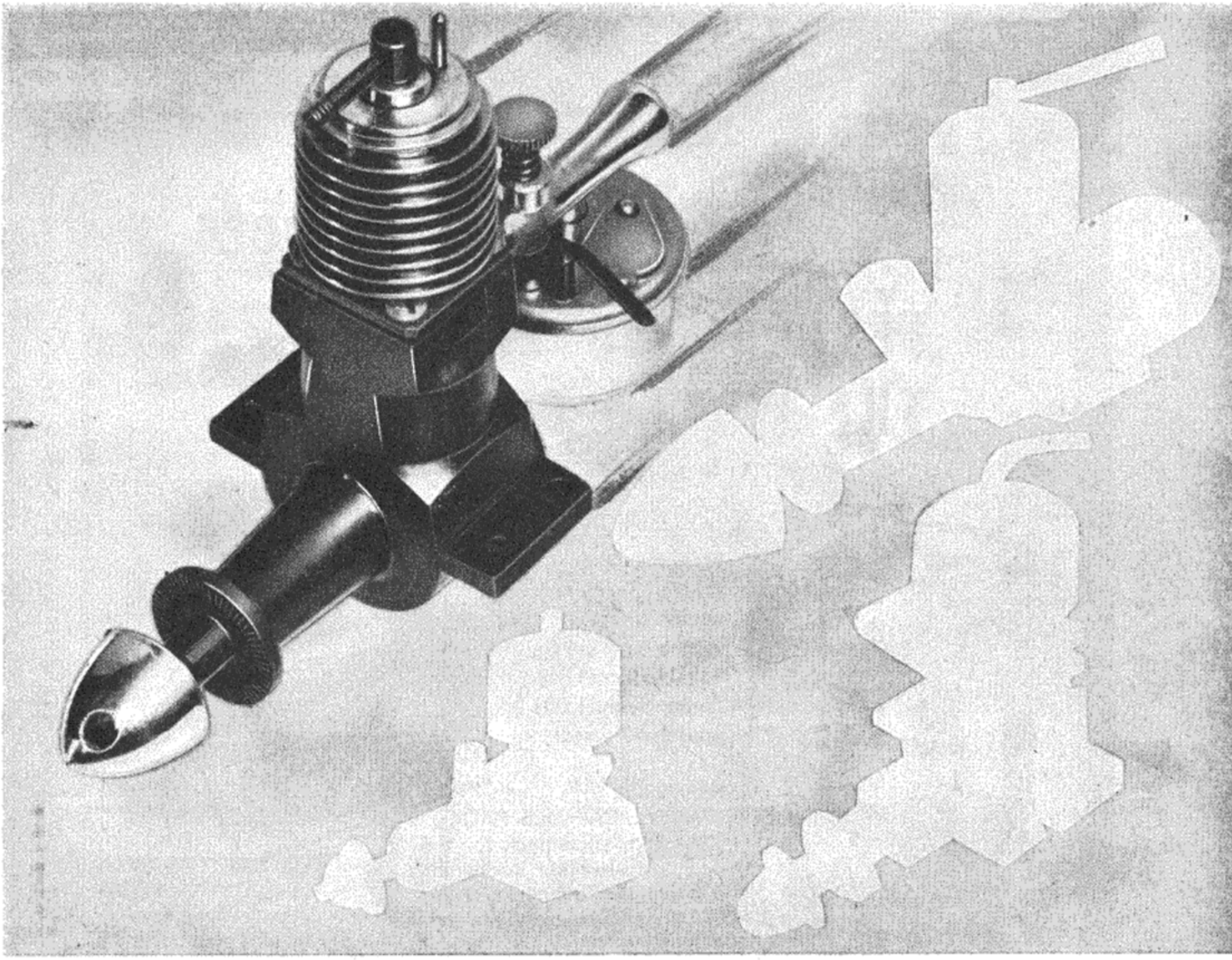

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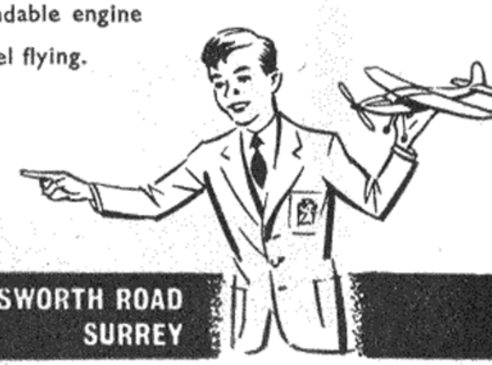

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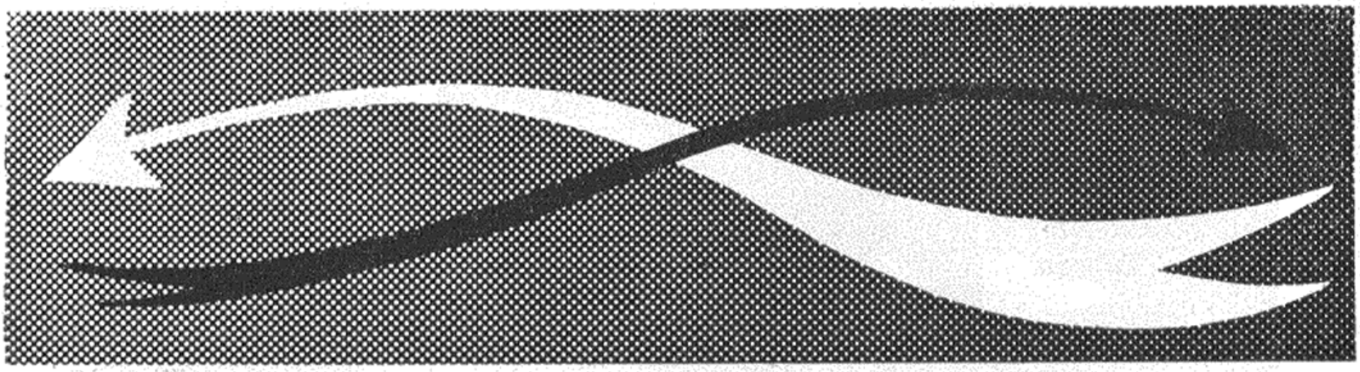

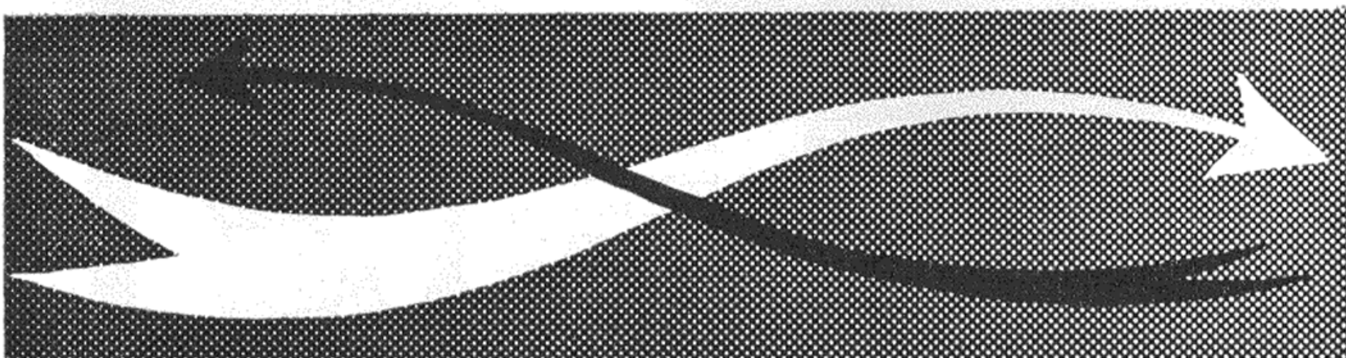

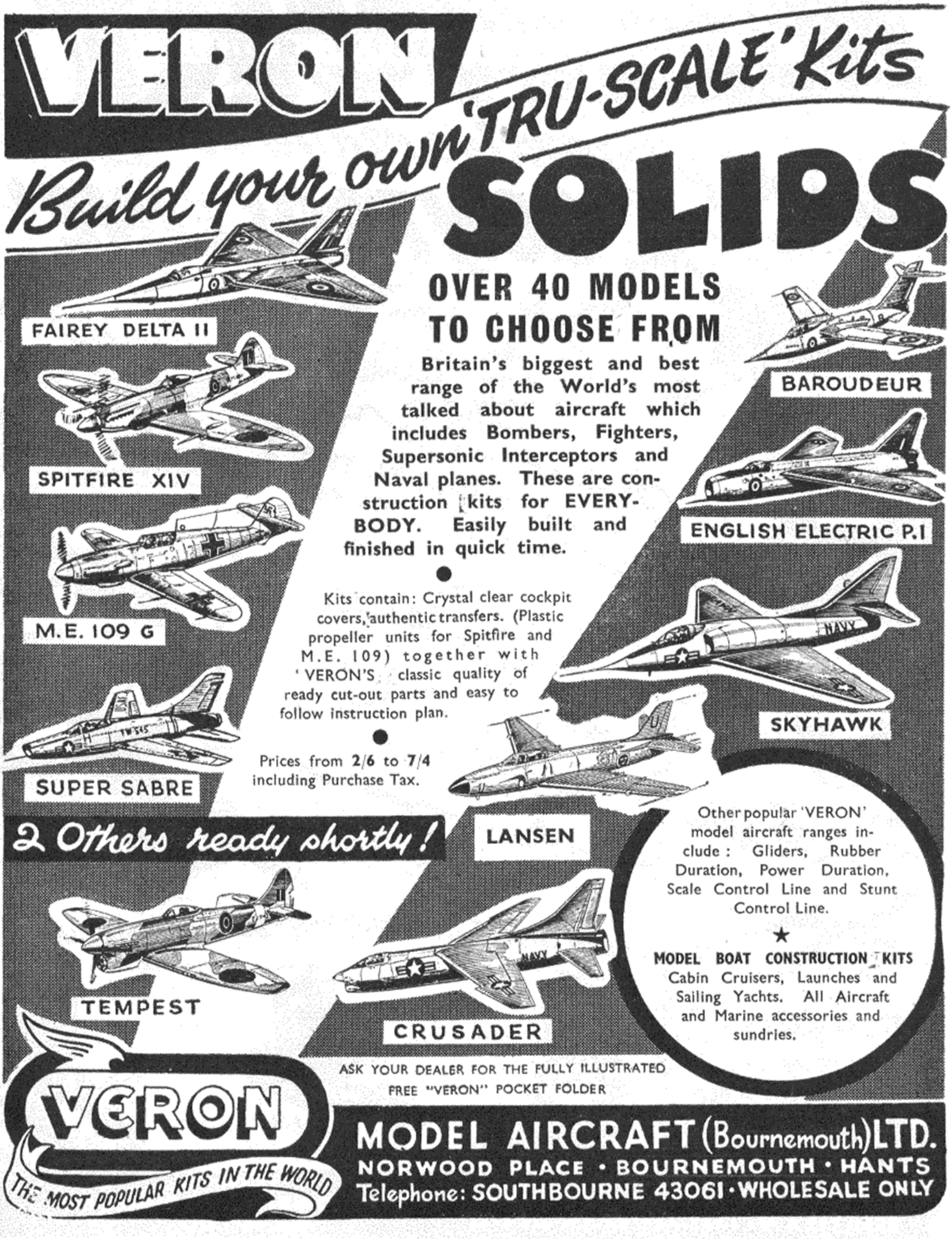
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★

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Here and There

Bob Copland Awarded S.M.A.E. Fellowship

EVERYONE will join with us in congratulating Bob Copland on being unanimously elected a Fellow of the S.M.A.E. Fellowships are awarded for long and outstanding service to the Society and on this score Bob has qualified many times over.

He started modelling in 1935 and was in the Wakefield team that went to America in 1936, following this with a trip to Yugoslavia for the 1938 event, and to America again in 1939, for the contest which Dick Korda won with his memorable flight of 44 min.

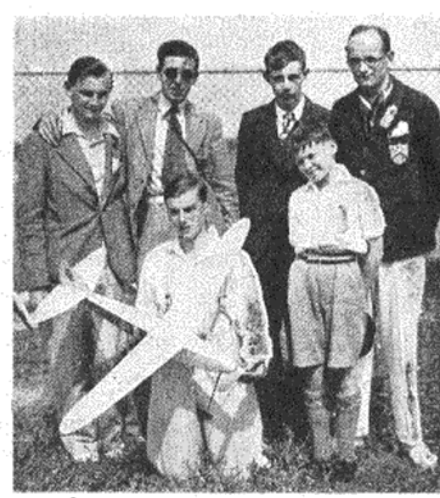
Came the War, and although flying was restricted, Bob played an active part, with others, in keeping the S.M.A.E. going during that difficult period, serving at various times on the Council and frequently in an advisory capacity on sub-committees.

1948 saw the first international event after the War, which was naturally the Wakefield Cup, held in America by virtue of their 1939 win, and Bob gained a place in the winning team that brought the trophy back to this country, finishing 6th in the individual results.

In 1950 a visit to Italy with a "private enterprise" team for the F.N.A. cup brought a second place in the individual class, and with a win in the team event, the seal was set on combining the Wakefield as the individual, and the F.N.A. Cup as the team, World Championship events.

Cranfield in 1953 for the first double World Championships will long be remembered by all who were there, and needless to say Bob was again in the team flying in his usual impeccable manner, although luck was not with him and he was placed 26th. In addition to the "big" international events, Bob has, of course, flown in British teams at the Irish Nationals and similar events, while at home his successes are just too numerous to mention.

Although Wakefields are his first love, we have seen him with different types of models ranging from micro-filmies to F/F power. Latterly, however, his interest has turned towards radio, and with good effect,



Flashback to 1936, Bob (standing left) with Denis Fairlie, Harry Jones, J. B. Allman, Albert Judge, and Alwyn Greenhalf who formed that year's Wakefield team.

as the recent record of 3 hr. 39 min. put up in co-operation with other Northern Heights members, shows.

Asked what his ambition for the future was, he said to obtain a world R/C record, but remembering the number of times he's flown in a Wakefield team without securing premier honours, we have an idea his greatest wish is for that bit of luck at the trials, and at Cranfield this year, that would enable him to become the official World Champion for rubber driven models.

Yes, Sir!

TO meet the constantly increasing demand for Model Aircraft plans we have now installed the latest printing machinery, and our Plans Department can offer a "by-return" service on receipt of an order. And what a range there is from which to choose! Whether your interest is in F/F or C/L models, you'll find all types listed and illustrated in the M.A. Plans Catalogue, which also contains all the 1/72nd scale plans available. You can buy a copy from your local model shop for 6d., or from the Sales Dept., 19-20, Noel Street, London, W.1, price 8d. post paid.

New additions to the range are made every month, as they appear in each issue of MODEL AIRCRAFT—which reminds us: if you want to make 22s. last a whole year, why not take out an annual subscription for MODEL AIRCRAFT? You can start with any issue in the year and your copies arrive through the letter-box bang on the 20th of each month.

Whose Pidgeon?

THE organisation of the Nationals is one of the "thorniest" problems the S.M.A.E. has to surmount.

From the average modellers' point of view it is the biggest meeting of the year, and as, of course, everyone wants to fly, it is also one of the most difficult to organise.

This year, however, the Area Committees have been brought into the picture early, and each will be expected to perform its quota of work, either in contest organising or ground layout, under the control of an Area delegate or S.M.A.E. official.

We hope this will be successful, as but for the intervention of the weather last year in restricting flights, that meeting would have ended in chaos.

No Eliminators

IN the informal discussion held after the S.M.A.E. annual general meeting, the contest fliers present voted by a large majority that they were in favour of selecting the teams for this year's international contest at two centralised trials, dispensing with eliminators completely.

That such an idea is practical reflects sorely upon the lack of support now given to F.A.I. formula events by the average modeller. Only ten years ago the London Area alone could produce 300 entries for a Wakefield eliminator, now it is doubtful if this number would be forthcoming from the whole country for two contests.

Assuming that this recommendation is adopted, the average or aggregate of the results from both trials would be used in selecting the team, and only those who flew in the first trial would be eligible to compete in the second.

SILENCE!

THERE is one rule that all modellers should remember concerning the Third Party cover given by the S.M.A.E. insurance, and it is this: should they be unfortunate enough to have their model involved in an incident that is likely to result in a claim, they should *never* say that they are insured, nor should they admit liability. All that is necessary is to give the person concerned their name and address, and at once inform the S.M.A.E., 19, Park Lane, London, W.1, giving full particulars.

By numbers . . .

REVERTING to an old idea, it has been decided that all models flown in S.M.A.E. contests must carry the entrant's membership number.

This will enable immediate checks to be made on membership grades (which affects entry fees), insurance cover, and will assist in the return of lost models, (wot, no address label?); it will also effectively prevent the occasional sharp practice which has latterly crept into combat and team-race events.

Although this decision is effective immediately, no minimum size has yet been announced—we hope the council will do so before the start of the season.

P.S.—Not wishing to make indoor models into a P.A.A. load class, these will be exempt.

On the right lines?

A RECENT article published in MODEL AIRCRAFT criticised aircraft modellers for their lack of originality, but can the same criticism be applied to other hobbies? The model railway movement, at least, would appear to be graced by men of foresight. We base our assumption on a letter appearing in our companion journal *Model Railway News*, and reproduced here by courtesy of the Editor:—

DEAR SIR,—I have just made a rather unsuccessful attempt at making a jet powered railcar. The railcar was a modified Tri-ang S.R. electric dummy end. The power unit was a Jetex "200," although a "100" would have done equally well.

The main reason for writing this is: (1) I thought other modellers may be interested, and (2) maybe someone could give me some ideas on controlling this smoke trailing monstrosity of mine, as it throws itself off the track every time it comes to a reasonably sharp curve.

It could be a practical proposition from the experimental point of view, if only it could be controlled. Besides being uncontrollable it is rather costly to run, something like 10d. for 40 sec., most of which is wasted by derailment at the first curve.

Yours faithfully,
"Jet Pioneer,"
Edinburgh. B. S. BROWN

U.S. Teams Chosen

IT is interesting to note that while we, as host country for the World Championships this year have not, as yet, even held one eliminator or trial, some countries already have their teams selected.

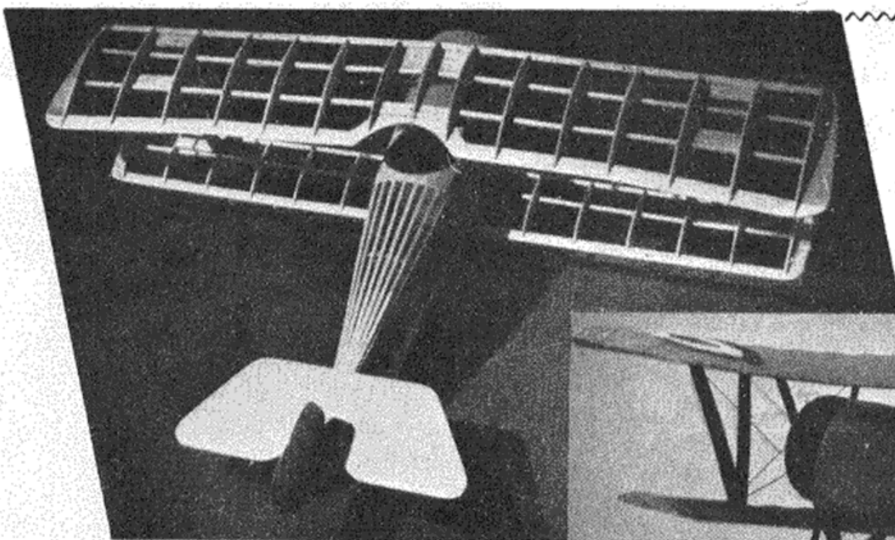
From America comes the following list of fliers who will represent them at Cranfield.

Wakefield. Sal Cannizzo, 900 sec.; George Reich, 852 sec.; Herb Kothe 837 sec.; and Frank Newquist, 818 sec.

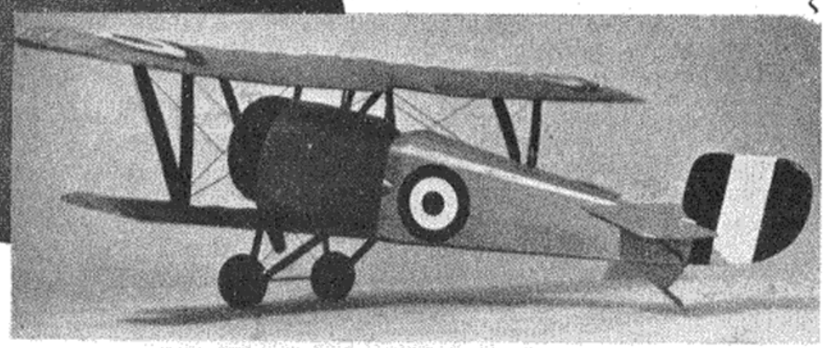
Power. James Patterson, 900 sec.; Larry Conover, 882 sec.; Bill Dean 878 sec.; Carl Perkins, Jnr., 807 sec.

The S.M.A.E. DINNER and DANCE

1. *Mr. and Mrs. T. L. Palmer were the guests of honour, and Mr. Palmer, who is Warden of the College of Aeronautics, Cranfield, proposed the toast to the Society. In his speech he confirmed that Cranfield would be available for the 1958 World Championships, and stressed that although the facilities at the College were ideal for the social side of such a meeting, he felt that in the past they had not been utilised to the full. We hope matters will be rectified this year.*
2. *Mrs. Palmer presented the prizes, in this instance receiving assistance from Bob Gosling in handing over the Sid Allen Memorial Trophy to John Nixon.*
3. *Josh Marshall of Hayes looks pleased with the Lady Shelley Cup.*
4. *Popular London Area Comp. Sec.. Sid Smeed, receives the Plugge Cup on behalf of the Surbiton Club of which he is Chairman.*
5. *Who's fraternising ? M.A.'s Managing Editor, Eddie Cosh, is " caught " dancing with Mrs. McHard, Aeromodeller photographer Dougie McHard's wife.*
6. *How many familiar faces in unfamiliar garb can you recognise in this general scene ?*



A MOUNT of THE ACES!



P. M. H. Lewis's

Nieuport SCOUT

A free-flight model for .5–.8 c.c. engines

A FIRM favourite as a fighting mount with many World War I ace pilots, the Nieuport 17C-1 is just as popular 40 years later with modellers.

The plans are for .5–.8 c.c. engines and the form of construction ensures a speedily-built and strong model which will last a long time.

Fuselage

Take a sheet of medium-grade $\frac{1}{16}$ in. balsa and trace the sides on to it, either pricking through the outline or using carbon paper below the plan. Score vertically, level with the cockpit, and cement over the angle after bending the sides to the plan view: 3/32 in. sheet is used for the formers F1 to F6 which are cemented in place from F1 to the rear when the sides have set firmly at the sternpost.

One piece of 18G. wire is used to form the undercarriage vees which are mounted in place by binding and gluing to $\frac{3}{16} \times \frac{3}{16}$ in. cross braces. At the same time, the 18G. wire centre-section struts are fitted. The 20G. wire tailskid is fixed in place on a $\frac{3}{8} \times \frac{1}{8}$ in. strip between F6 and the sternpost, the $\frac{1}{4} \times \frac{1}{4}$ in. motor bearers follow, then the underside of the fuselage receives its $\frac{1}{16}$ in. sheet covering, as does the top decking also from F1 to F3.

Aft of F3, 3/32 × 3/32 in. stringers run to the leading edge of the tailplane. The cockpit is cut out of the sheet and the forward side panels are added after curving to shape over a fire or in steam. To secure the engine, 8 B.A. bolts are passed through the bearers and soldered to strips of tin or brass, which are then pinned to the wood.

The front ring is of $\frac{1}{16}$ in. plywood and this is faced with laminations of $\frac{1}{8}$ in. sheet. When the front is firm, soft block is used, hollowed out, to fill in the cowling, the lower half being retained by press studs. The tailskid is faired with 3/32 in. sheet and the cockpit headrest is added.

Cut 3/32 in. sheet to the outline of the tail unit and both the tailplane/elevators and the rudder are sanded to section. Note that there is no fixed fin—just a rudder which is hinged to the sternpost with a piece of thin aluminium. The tailplane is cemented in position and the fuselage cleaned up with sandpaper. The 18G. wire axle is soldered to the undercarriage legs, the wheels being fitted later.

Wings

The upper wings are made in one piece and are started by pinning down the $\frac{3}{16} \times \frac{3}{16}$ in. leading edge and $\frac{1}{2} \times \frac{1}{16}$ in. trailing edge: $\frac{1}{8} \times \frac{1}{8}$ in. strips form the spars, and the ribs are cut from $\frac{1}{16}$ in. sheet. $\frac{1}{2}$ × 3/32 in. is used where shown to anchor the centre-section and interplane struts. The tips are of $\frac{1}{16}$ in. sheet and this is also used for the corner gussets. Port and starboard lower wings are made next, with $\frac{1}{8} \times \frac{1}{8}$ in. leading and $\frac{3}{8} \times \frac{1}{16}$ in. trailing edges.

Covering and Assembly

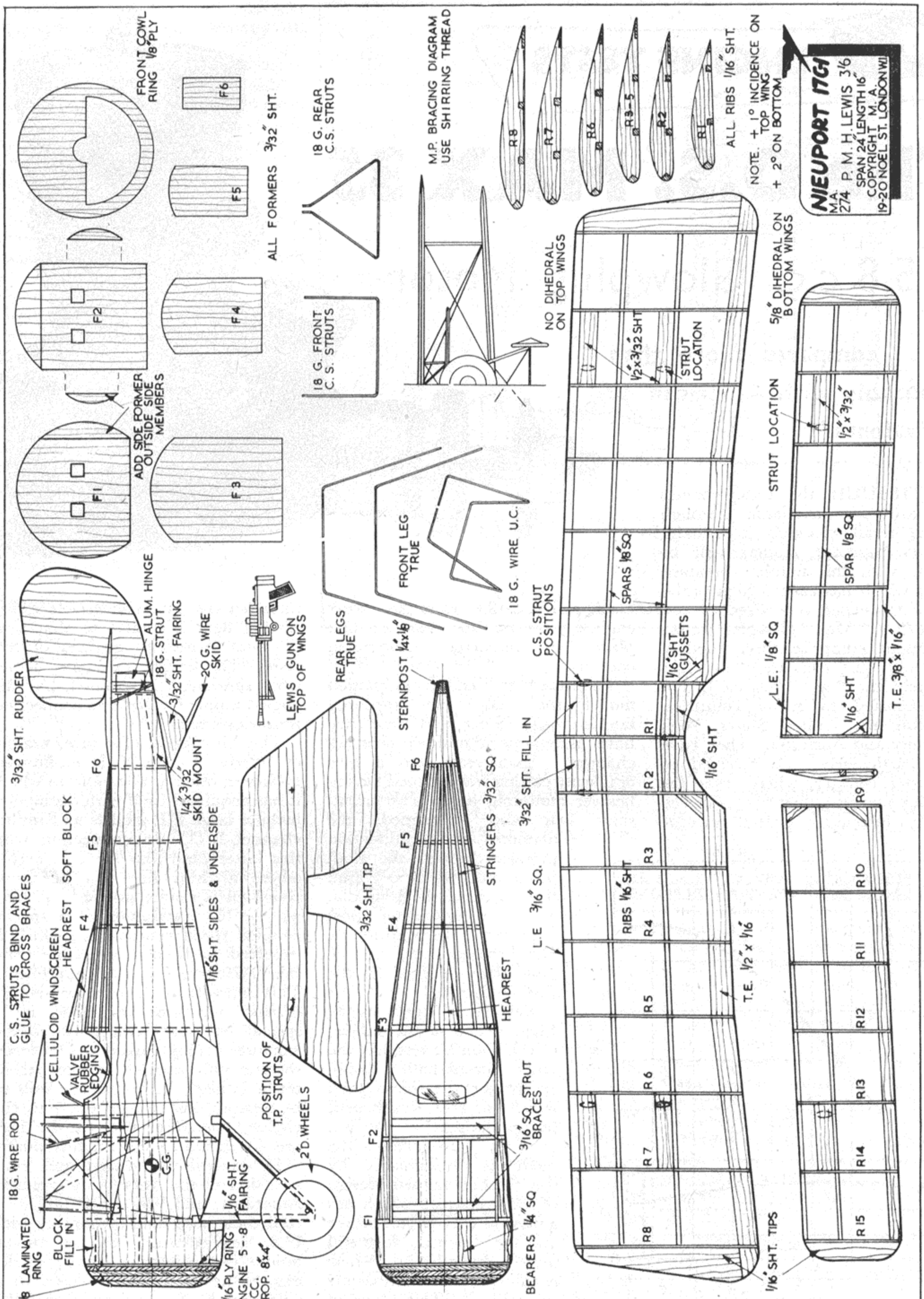
The structure is now complete and, after the rough edges have been sanded away, is ready for its covering of tissue. Cover the entire model with dry paper, and water spray the wings. As soon as they are dry and the tissue is taut, give two or three coats of clear dope.

The lower wings are cemented firmly to the fuselage and the centre-section struts faired with $\frac{1}{16}$ in. sheet before the upper wings are mounted on them. At the same time, the undercarriage legs receive their fairings. The ends of the hard $\frac{1}{8}$ in. sheet interplane struts are pointed and cemented into the wing blocks.

Before adding the details, colour dope the complete model. Silver dope was used on many Nieuports as an alternative to the khaki-green upper and natural lower surfaces. Roundels were painted on both upper and lower surfaces of the top wings and below the bottom planes, and on each side of the fuselage. Blue, white and red stripes covered the rudder, with the blue foremost. The serial number was on the rudder and the squadron markings on the fuselage.

When the colouring is finished, the bracing wires are installed with grey shirring thread. The gun and sights are made from scrap materials, painted black and then mounted in position. A piece of clear celluloid forms the windshield, the cockpit edging utilising a length of rubber valve tubing as padding. The 2 in. dia. celluloid wheels are retained on the axle by soldered washers.

Test glides will determine how much weight has to be added to the nose or tail and adjustments are made to the rudder and sidethrust until the flight pattern is satisfactory.

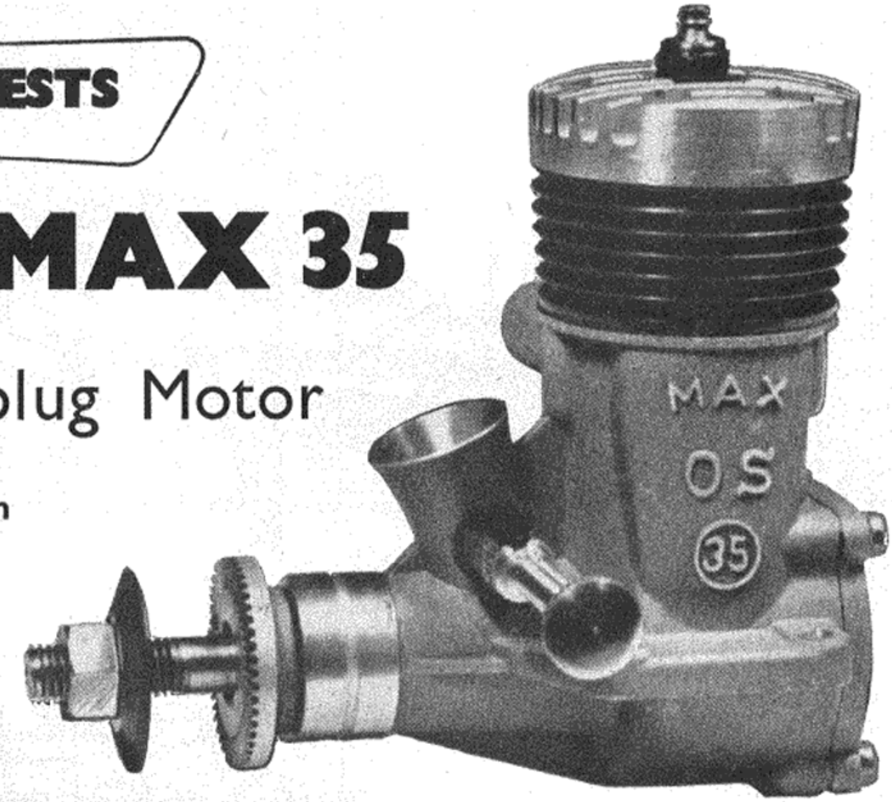


FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 19-20 NOEL STREET LONDON W.1 3s. 6d., POST FREE

MA ENGINE TESTS

The O.S. MAX 35

5.8 c.c. Glowplug Motor

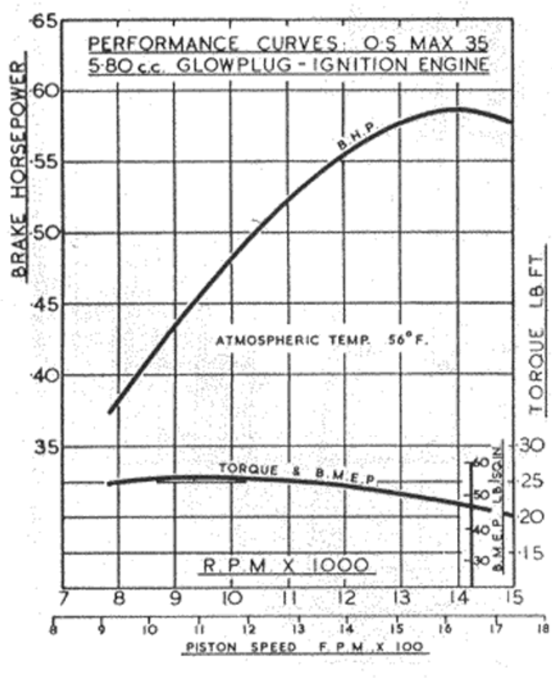


" . . . compares more than favourably with American equivalents."

ALTHOUGH the O.S. engines are not available through normal retail channels in Britain, MODEL AIRCRAFT readers will be familar with this notable Japanese range, which has earned high praise from many expert modellers.

The O.S. " Max " glowplug motors at present comprise three models, the " 15 " (2.5 c.c.) the " 29 " (4.8 c.c.) and the " 35 " (5.8 c.c.), and are exported to many countries, including the United States, West Germany and Australia. They have been particularly well received in the latter country, where, over the past three seasons, they have achieved steadily increasing contest success. During 1957, for example, Max engines won no less than 46 first places in important Australian contests.

The Max " 35 " and its companion model, the " 29," first appeared late in 1954. Since that time they have undergone a number of small changes. Two years ago a new crankcase casting was adopted having heavier mounting lugs. The crankshaft was also redesigned, the diameter of the induction passage through the shaft being reduced by 0.5 mm. to approximately 5/16 in. dia. and the admission port improved. In addition, a U.S. thread was, at the same time, adopted for the shaft end.

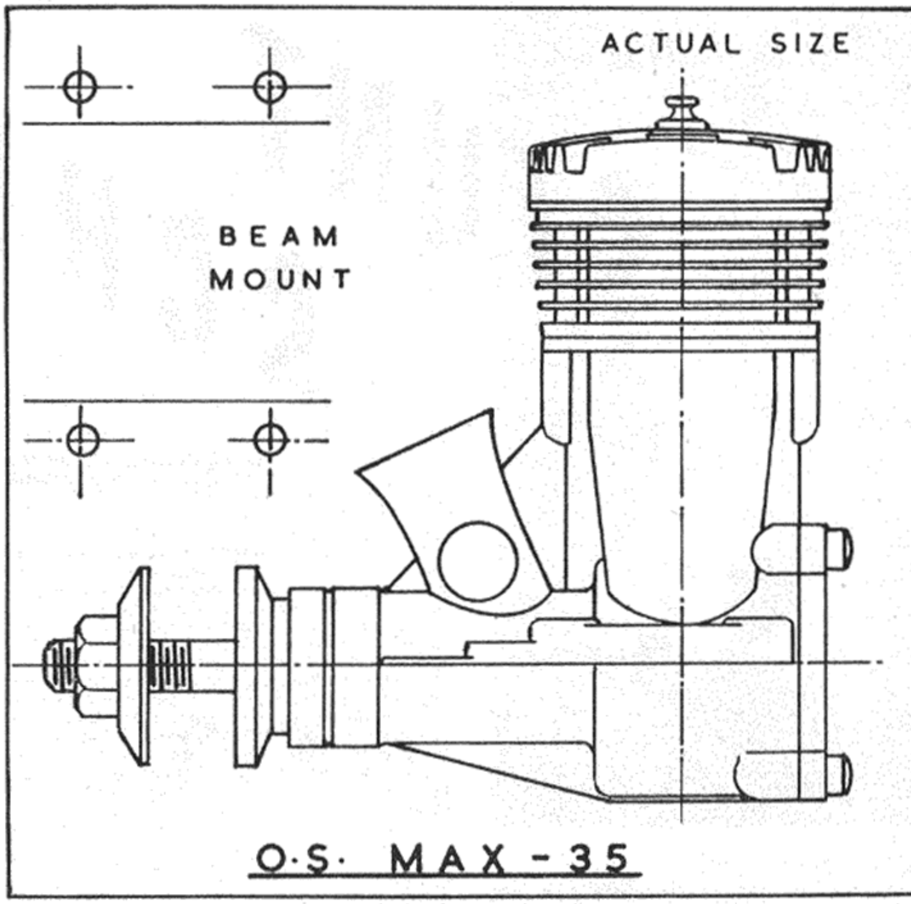


The latest 1958 model Max, which is the subject of this month's test, has the same crankshaft design except for the valve port, which has been lengthened, by approximately 3/32 in., to ½ in. Externally, the model is distinguished by the further revised design of the crankcase which has a massive carburettor intake and the mounting lugs still further strengthened. A new needle-valve assembly is now featured. This has a threaded thimble, with double spring ratchet device, similar to that seen on most American engines of this class. The flexible extension, somewhat shortened, is retained, but the angled nipple for fuel line connection is now omitted.

The Max 35 is, of course, mainly of interest to the C/L enthusiast. However, other applications in which it has acquitted itself with distinction include large F/F models and multi-channel R/C. In connection with this latter (and also for C/L events where a third line can be used) provision is made, in the new Max 35, for the installation of a special coupled speed control unit which is expected to become available from the O.S. factory in the near future. This unit will consist of a semi-rotary exhaust restrictor contained in a special housing clamped on to the exhaust duct and linked to a butterfiy throttle unit inserted in the carburettor intake. To enable the unit to be securely and neatly fitted to the engine, therefore, two cast-in lugs are concealed in the exhaust duct.

In general the design and construction of the Max 35 is typically American and, by and large, it compares more than favourably with U.S. equivalents. It has to be admitted that, today, many model engines are being built down to a price and, in consequence, the greater attention to detail which is apparent in the O.S. becomes an added attraction.

Basically, the Max 35 is a short-stroke, loop-scavenged, shaft-induction glowplug motor of modern design. The crankcase is cleanly diecast in light alloy and incorporates the front bearing housing which is bronze bushed. It is adequately webbed for strength and has long mounting lugs with widely spaced bolt-holes for rigid mounting. The shaft has an 11 mm. dia. journal and a crescent counterweight which balances all rotary mass. From the circular section carburettor venturi (which is equipped with a removable insert) the intake is now squared to register with the large crankshaft port, giving a more rapid opening and closing of the valve than on the earlier models. A very generous induction period (approximately 210 deg. of shaft rotation) is retained but there is no significant sub piston period. The new Max also retains the ported skirt piston that has been a feature of the engine since the introduction of the original model.



Specification

Type: Single-cylinder, aircooled, loop-scavanged, two-stroke cycle. Glowplug ignition. Crankshaft rotary-valve induction. Baffle piston. Central ignition plug.

Swept volume: 0.3536 cu. in. (5.795 c.c.).

Bore: 0.809 in. Stroke: 0.688 in.

Stroke/bore Ratio: 0.85 : 1.

Compression Ratio: 8 : 1.

Weight: 7.1 oz.

General Structural Data

Pressure diecast aluminium alloy crankcase unit with bronze bushed main bearing and sandblasted finish. Hardened steel counter-balanced crankshaft with 17/64 in. dia. tubular crankpin. Alloy drive washer keyed to flat on shaft. One-piece cylinder with blued non-corrosive external finish. Diecast, sandblasted and machined alloy cylinder head with bronze insert for glowplug. Six cylinder-head screws, two extra long and securing complete cylinder assembly to crankcase. Lightweight cast-iron piston with tubular .197 in. (5 mm.) dia. full-floating gudgeon pin with brass end-pads. Alloy connecting rod with bronze big-end bush. Plated brass spraybar type needle-valve assembly with removable venturi insert reducing choke diameter from .433 in. (11 mm.) to approximately .30 in. Beam mounting.

Test Engine Data

Running time prior to test: $1\frac{1}{2}$ hr.

Fuel used: 10 per cent. B.D.H. Nitromethane, 65 per cent. Methanol, 25 per cent. Castrol "M" castor base oil.

Ignition plug used: K.L.G. Miniglow short reach. 1.7 volts used to start.

Venturi choke retained for all tests.

Performance

Some people are apt to regard with trepidation any engine capable of delivering over $\frac{1}{2}$ h.p., but there is no need for anyone to worry about the behaviour of the Max. Provided that it is treated properly, it is quite docile and easy to start.

With a new engine it is advisable to start off by using a mild fuel consisting of 70 per cent. methanol and 30 per cent. castor oil, setting the mixture control rich to slow the engine and produce "four-stroke" firing for the first 15 or 20 min. running time. After this, the needle can be gradually closed down until the engine begins two-stroking in the normal way. Normally, an O.S. engine will hold an almost even run at this point, but, of course, any tendency to overheat and slow up or even stop would require the rich mixture time to be further extended. Only when the engine will hold an even speed on the 70/30 mixture, should nitromethane be added to the fuel.

One of the advantages of the Max 35 is its excellent performance on the less expensive low nitro content fuels. Our tests were carried out with 10 per cent. nitromethane under cool, dry conditions and, as the curves indicate, this provides all the power likely to be needed for the hottest stunt model.

Starting the Max from cold was accomplished in the usual way with a moderate exhaust prime and the needle setting opened up. Hot restarts were obtained quickly after a single choked preliminary flick and without readjusting the needle from running position. The engine was responsive, but not critical, to the needle control and ran evenly at all speeds tested.

Following torque reaction dynamometer tests, a maximum power of just under .59 b.h.p. at 14,000 r.p.m. was determined, which, needless to say, is excellent.

Power/Weight Ratio (as tested): 1.32 b.h.p./lb.

Specific output (as tested): 101 b.h.p./litre.

The new STUNT SCHEDULE in detail

SAFETY PROVISIONS
The control handle/device, connections, lines and internal control system of the model, up to the point of attachment to the model (e.g. bellcrank or other device) will be in good condition, free of kinks, rust, etc., regardless of whether the equipment has already withstood the pull-test. Judges' opinion will be final in respect of the safety of a model or equipment. Judges should exert their authority to disqualify a model deemed unsafe for flight.

CONTROL LINES
Control line(s) shall be steel wire, plain or stranded high tensile. Line length must be at least 25 ft. but no more than 70 ft. measured from the centre point of the grip part of the control handle (device) to the fore and aft centre line of the model. The following wire diameters will be used according to displacement of engine, regardless of model's weight:—

Motors having a maximum displacement of	Minimum dia. if one line is used	Minimum dia. of each line if two or more are used
2.5 c.c.	27 s.w.g.	33 s.w.g.
5.0 c.c.	26 s.w.g.	30 s.w.g.
10.0 c.c.	23 s.w.g.	26 s.w.g.

LANDING GEAR
The landing gear may consist of any combination of permanently affixed wheel(s) and/or skid(s) which allow the model to take-off and land under its own power in a normal manner. Drop-off gears or similar take-off devices are not permitted. If a retractable gear is used for take-off, it must extend to its original position for landing.

NUMBER OF FLIGHTS
Contestants shall be allowed three attempts to make two official flights. Each attempt period shall be of three minutes duration. A contestant may make as many starts as necessary, or may take-off, land and restart if necessary, as long as the three-minute time period has not been exceeded. If a second take-off is made during the three-minute period, the first take-off score will be cancelled and a new score made.

DURATION OF FLIGHTS
Eight minutes total elapsed time are allowed from the time the contestant starts flicking the propeller (this should be done upon signal to or from judges) to start, take-off, complete the flight pattern and land. No manoeuvre, including the landing, will be scored after the eight minutes allowed have elapsed.

APPEARANCE
Models shall be judged for appearance complete and ready to fly. After model has been judged, nothing will be removed from or added to the model which, in the judges' opinion, changes in any manner the appearance of the model from the way it was when presented for appearance judging. However, during an attempt for official flight after the contestant has begun to start the engine, if it becomes necessary to remove the propeller spinner for change of propeller, it is permissible to leave off the spinner for that particular flight. Any damage to the model after judging, or changes that may be made as a result of such damage, will not be cause for loss of appearance points. Appearance judging will take place just before contestant's first flight.

	Poor	*Fair*	*Good*	*Excellent*
Design ..	4	6	8	10
Realism ..	4	6	8	10
Finish ..	4	6	8	10
Detail ..	4	6	8	10

Minimum 16 Maximum 40

Appearance points are added to the contestant's flight points for scoring purposes.

FLIGHT PATTERN
Manoeuvres shall be accomplished in the order listed under "Manoeuvres." The contestant shall notify the judges prior to the flight as to the specific manoeuvres he wishes to omit in order that the judges shall know the exact sequence in which manoeuvres are to be performed. Twenty-five flight pattern points shall be awarded a contestant who successfully completes the entire pattern as listed. Omitting any manoeuvre, either intentionally or otherwise, or completing a manoeuvre out of its proper order shall result in loss of flight pattern points. A crash or failure to complete the pattern due to engine failure shall also result in loss of pattern points. Exceeding the eight minute total elapsed time limit will cause loss of points on any manoeuvres performed after the time limit, as well as loss of flight pattern points.

Flight will become official upon attempt to perform any prescribed manoeuvre after take-off. At least one lap of level flight shall precede each manoeuvre. Judges should not require more than one level lap between manoeuvres. Level flight at an altitude of from 4 to 6 ft. will be considered normal level flight, regardless of height of flyer. The portions of certain manoeuvres which require normal level flight elevation must be accomplished between 4 and 6 ft. for maximum points. Flyers and judges alike should note that manoeuvres should be flown and judged in relation to two or three reference points, depending upon the particular manoeuvre. For example, loops should be performed with bottom track at approximately 5 ft. elevation, and the top track at 45 deg. elevation of the lines; the vertical eight should also have the approx. 5 ft. lower track elevation, while the top track should be approx. 5 ft. less than a 90 deg. angle formed by the lines. All flyers should be attempting to perform manoeuvres of approximately the same angular dimensions.

HAND SIGNAL
The hand signal will be considered a part of the manoeuvres, and improper use of, or failure to use, this signal may result in the loss of points for the manoeuvre concerned, though not the flight pattern points. The contestant must hold his free hand high overhead for at least one-half lap prior to the execution of each manoeuvre. A second or two before manoeuvre is commenced, the hand is dropped. Contestants should re-signal if attempt to perform a manoeuvre is delayed.

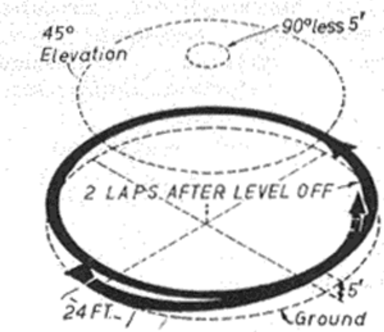
MANOEUVRES

STARTING
Take-off within one minute from the time the contestant begins to flick the propeller. Starting within one minute receives full points; starting after one minute receives no points.

Maximum 5 points. Minimum 0 points.

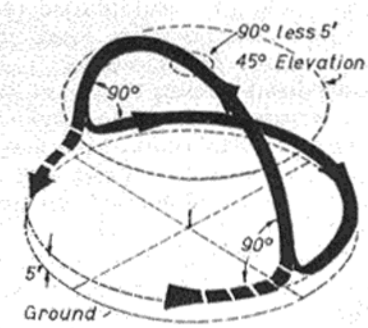
TAKE-OFF
A correct take-off consists of the model rolling smoothly along the ground for a distance of not less than 15 ft., then rising smoothly into the air with a gradual climb to, and a smooth level-off, at normal level flight altitude. Model continues on for two smooth laps of normal level flight to point of original level-off.

Maximum 40 points. Minimum 10 points.



Errors. Model bounces or becomes airborne too soon. Take-off, climb or level-off, are not gradual and smooth. Level-off and normal level flights are not within 4-6 ft. altitude.

REVERSE WING OVERS (One required)
Correct reverse wing overs are judged when model starts from normal level flight, makes a vertical climb and dive, passing directly over the flyer's head, cutting the ground circle in half, and recovers in an inverted position at normal flight



level. The model continues for half a lap inverted, to the starting point, then makes a vertical climb and dive over the centre of the circle from inverted flight and recovers in normal level flight.

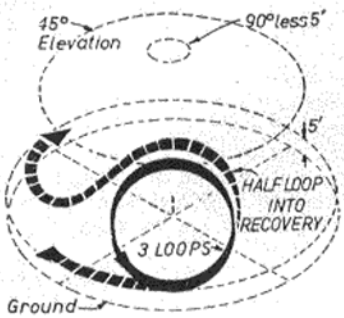
Maximum 40 points. Minimum 10 points.

Errors. First half: Model starts at other than normal level flight, wobbles or mushes going into climb. Model does not cross directly over flyer's head. Model does not cross circle in a straight line. Model wobbles, mushes or recovers at other than normal flight level in an inverted position. Model does not cut circle in same position and direction in second part of manoeuvre. Second half: Scored same as first half, reversing the entry and recovery positions.

CONSECUTIVE INSIDE LOOPS (Three required)

Correct loops are judged when the model starts from normal level flight and makes a series of three smooth, round loops, all done in the same place with the bottoms of the loops being at normal level flight altitude and the tops of the loops with the line(s) at 45 deg. elevation. The model then continues for another half loop, recovering inverted and descending to normal flight level, flying one lap before being judged for inverted flight.

Maximum 40 points. Minimum 10 points.

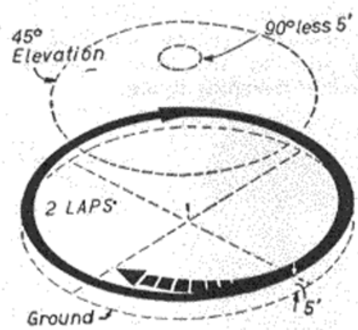


Errors. Loops are rough and irregular (i.e. egg-shaped, hexagonal, etc.). Bottoms of loops are not at 4-6 ft. height. Tops of loops vary more than 2 ft., plus or minus, of the 45 deg. elevation point. Second and third loops vary more than 2 ft. from the path of the first loop.

INVERTED FLIGHT (Two laps)

Correct inverted flight is judged when the plane makes two smooth, stable laps at normal level flight altitude.

Maximum 40 points. Minimum 10 points.



Errors. Altitude is not 4-6 ft. Altitude varies more than 2 ft.

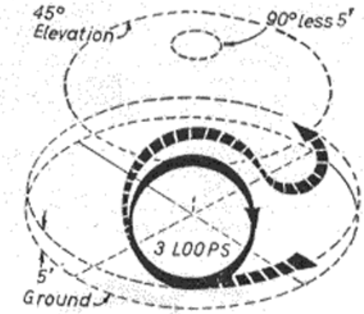
CONSECUTIVE OUTSIDE LOOPS (Three required)

Correct loops are judged when model starts from inverted position at normal flight level and makes a series of three smooth, round loops, all done in the same place, with the bottoms of the loops beinging at normal level flight altitude and the tops of the loops with the line(s) at 45 deg. elevation. The model then continues for another half loop, recovering in normal flight.

Maximum 40 points. Minimum 10 points.

Errors. Loops are rough and irregular (i.e. egg-shaped, hexagonal, etc.). Bottoms of loops are not at 4-6 ft. height. Tops of loops vary more than 2 ft., plus or minus, of the 45 deg. elevation point. Second and third loops vary more than 2 ft. from the path of the first loop.

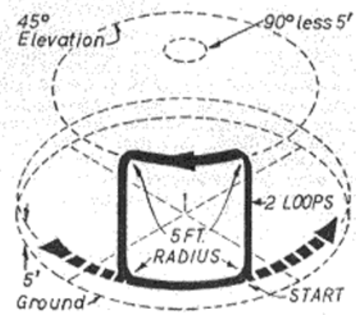
Illustration top of next column



CONSECUTIVE INSIDE SQUARE LOOPS (Two required)

Consecutive square loops are judged correct when the model starts from normal level flight and flies a square course consisting of two loops, each with four turns of approx. 5 ft. radius and straight, equal length segments, with bottom segments at normal level flight altitude and top segments at 45 deg. elevation. Manoeuvre begins and ends with model in level flight at point of start of first turn.

Maximum 40 points. Minimum 10 points.

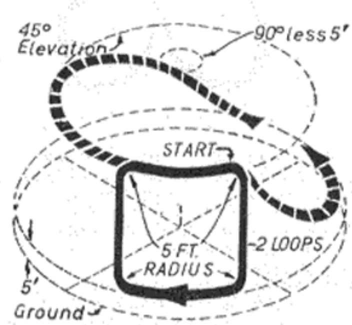


Errors. Model wobbles or mushes on turns. Lower altitude is not 4-6 ft. Upper altitude is not within 2 ft. of the 45 deg. elevation point. Turns are not precise and exceed 7 ft. radius. Sides of loops are not equal. Second loop is not in the same flight path as the first loop.

CONSECUTIVE OUTSIDE SQUARE LOOPS (Two required)

Consecutive outside square loops are judged correct when the model starts from level flight at 45 deg. elevation and flies a square course (starting with a vertical dive) consisting of two loops, each with four outside turns of approx. 5 ft. radius and straight, equal length segments, with bottom segments at normal level flight altitude and top segments at 45 deg. elevation. Manoeuvre begins and ends with model in level flight at point of start of first turn. Model recovers into normal level flight within a quarter lap.

Maximum 40 points. Minimum 10 points.

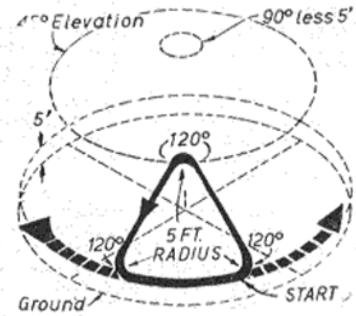


Errors. Model wobbles or mushes on turns. Lower altitude is not 4-6 ft. Upper altitude is not within 2 ft. of the 45 deg. elevation point. Turns are not precise and exceed 7 ft. radius. Sides of loops are not equal. Second loop is not in the same flight path as the first loop.

CONSECUTIVE INSIDE TRIANGULAR LOOPS (Two required)

Correct triangular loops are judged when the model starts from normal level flight, turns 120 deg., proceeds in an upward and backward direction to an altitude of 45 deg. elevation, turns 120 deg. and flies downward to make another 120 deg. turn into normal flight altitude, returning to the starting point of the first turn, and flies an identical second loop in the same flight path. All corners must be smooth, precise and of approx. 5 ft. radius.

Maximum 40 points. Minimum 10 points.

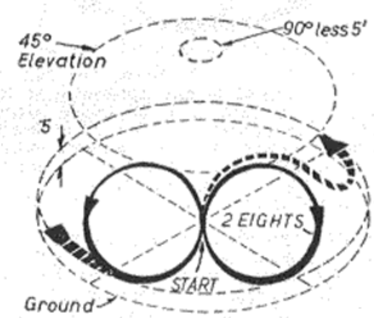


Errors. Model starts at other than 4-6 ft. height. Turns are rough and wobbly or exceed 7 ft. radius. Peak of second turn is not within 2 ft. of the 45 deg. elevation point. Sides are wobbly and not equal in length. Second loop is not in the same flight path of first loop.

HORIZONTAL EIGHTS (Two required)

Horizontal eights are to be entered at the intersection point of the circles and exit at the same point. Either the inside or outside loop may be flown first, at the pilot's discretion. Correct eights are judged when the model makes two eights, each consisting of two round circles or loops of the same size, tangent to each other, and in a horizontal line. The model must enter the eight from normal flight and be vertical at the intersection point of tangency of the circles. The eights must be symmetrical. At the top of each circle the model must be at the 45 deg. elevation point; bottoms of circles must be at normal flight altitude.

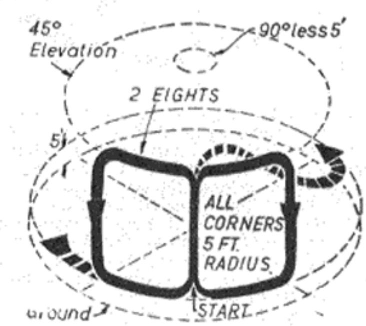
Maximum 40 points. Minimum 10 points.



Errors. Model is not vertical at entry. Model at top of circles is not within 2 ft. of 45 deg. elevation point. Bottoms of circles are not within 4-6 ft. height. Loops are not round and equal in size. Point of intersection varies. Second eight is not in same position as the first.

SQUARE HORIZONTAL EIGHTS (Two required)

The eight is to be entered at the intersection point of the squares, and exit after completion of two eights is made from the same point.



Either the inside or outside loop may be flown first, at the pilot's discretion. Correct eights are judged when the model starts a vertical climb and makes a correct square cornered loop followed by a reverse square cornered loop ending with a vertical climb at the same point. The manoeuvre is repeated to form two eights. Tops of loops must be at 45 deg. elevations, bottoms of loops must be at normal flight height, and all corners must be smooth, precise and of approx. 5 ft. radius.

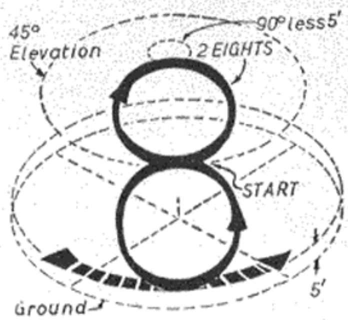
Maximum 40 points. Minimum 10 points.

Errors. Corners exceed 7 ft. radius, sides are not square and equal in length. Loops are not equal in size. Sides are not square horizontally and vertically. Tops of loops vary from the 45 deg. elevation point more than 2 ft. Bottoms of loops are not within 4-6 ft. height. Point of intersection varies. Second eight is not in same position as the first.

VERTICAL EIGHTS (Two required)

Vertical eights are to be entered at the point of 45 deg. elevation and exit from the same point. Either the inside or outside loop may be flown first, at the pilot's discretion. Correct eights are judged when the model makes two eights, each consisting of two round circles or loops of the same size, tangent to each other, and in a vertical line. The model must enter the eight in inverted flight and be horizontal at the intersection point or tangency of the circles. The eights must be symmetrical, the top of the eights at a point 5 ft. less than 90 deg. directly above the flyer's head, and the bottom of the eights at normal level flight altitude.

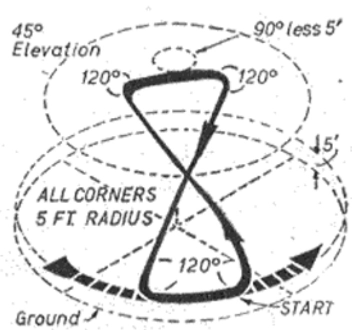
Maximum 40 points. Minimum 10 points.



Errors. Model is not horizontal at entry. Entry is not within 2 ft. of 45 deg. elevation point. Tops of eights are not 3-7 ft. less than the 90 deg. point. Bottoms of eights are not at 4-6 ft. height. Loops are not round and equal in size. Point of intersection varies. Second eight is not in same position as the first.

HOURGLASS FIGURE (One required)

An hourglass figure will be judged correct when the model starts from normal level flight, makes an abrupt, smooth turn of 120 deg. into inverted climb, turns 120 deg. into level flight



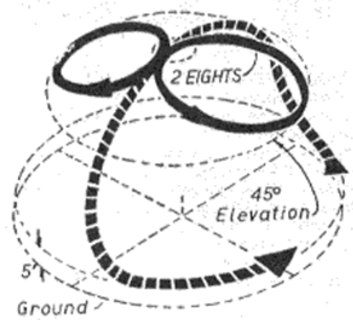
at an altitude 5 ft. less than the 90 deg. point above the flyer's head, flies level a distance of half the total climb, turns 120 deg., dives at an inverted angle to complete the hourglass shape, and recovers with a 120 deg. turn at a point directly below the upper left-hand corner of the figure, into normal level flight. Flight paths of the climb and dive cross at the 45 deg. elevation point. The manoeuvre consists of two triangles, one directly above the other, with segments of each triangle of equal length.

Maximum 40 points. Minimum 10 points.

Errors. Model starts at other than normal level flight at 4-6 ft. height. Turns are rough and wobbly or exceed seven foot radius. Top of figure is at an elevation 3-7 ft. less than 90 deg. Triangle segments are not equal in length. Termination of dive is not directly beneath point where climb terminated. Recovery is not at normal level flight altitude.

OVERHEAD FIGURE EIGHTS (Two required)

Overhead eights are to be entered at the intersection point of the circles, directly over the flyer's head, and exit from the same point. Either the inside or outside loop may be flown first, at



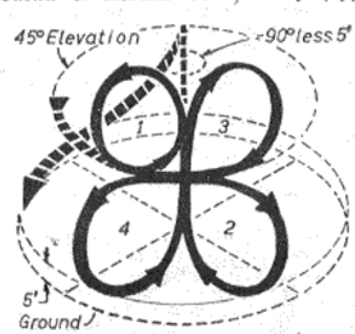
the pilot's discretion. Correct overhead eights are judged when the model makes two eights, each consisting of two round circles of the same size, with the intersection or point of tangency directly over the flyer's head. The model must enter the eights with a vertical climb through the centre of the circle, and must always point in this direction at the centre of the eights. The eights must be symmetrical, and the model at the lowest point of each circle must be at a point of 45 deg. elevation.

Maximum 40 points. Minimum 10 points.

Errors. Model is not vertically overhead at entry. Low point of circles is not within 2 ft. of the 45 deg. elevation point. Loops are not round and equal in size. Point of intersection varies. Second eight is not in same position as the first.

FOUR LEAF CLOVER (One required)

A correct four leaf clover is judged when the model starts from a 45 deg. elevation point, performs an inside loop (upper left), flies level a distance equal to the diameter of the loop, completes three-fourths of an outside loop (lower right), climbs vertically a distance equal to the diameter of the first loop, completes three-fourths of another outside loop (upper



right), flies inverted a distance equal to the diameter of the first loop, and completes three-fourths of an inside loop (lower left). As the tangency point between lower left and lower right loops is reached, the model climbs vertically through the four-leaf clover and recovers into normal level flight.

Maximum 40 points. Minimum 10 points.

Errors. Entry is not within 2 ft. of 45 deg. elevation point. Loops are rough or not of equal size. Paths connecting loops are not properly horizontal or vertical according to the manoeuvre sketch. Bottoms of lower loops are not at 4-6 ft. height. Tops of upper loops are not 3-7 ft. below the 90 deg. point over the flyer's head. Loops are not properly tangent to form a square pattern. Model recovers before it has flown vertically through the clover pattern.

LANDING

A correct landing is judged when the model lands smoothly with no bounce or unusual roughness, and comes to a stop without having touched any part of the model to the ground other than the landing gear. Wheel or 3-point landings are permissible.

Maximum 40 points. Minimum 0 points.

Errors. An error is scored any time the model bounces or touches any part of the model to the ground other than the landing gear. Crash, flip-over, belly or upside down landing receives no score. Any unusual circumstances surrounding the above errors which may cause an error not within the pilot's control will be judged accordingly.

NOTE.—Illustrations are for anti-clockwise flight and are reversed for clockwise flying.

When it was announced that the S.M.A.E., were to adopt the A.M.A. schedule and rules, we asked several leading stunt fliers for their views. First reply came from **Mac Grimmett** . . . " I think the adoption of the A.M.A. schedule is a move which has been long overdue, as it shows that at last the S.M.A.E. have woken up, but whether they are too late to effect a complete revival of stunt flying remains to be seen. I can remember those wonderful days when stunt events and entries were large, flying was keen, yet everyone derived great enjoyment out of it. The main reasons for those happy state of affairs were :

(a) the old S.M.A.E. stunt rules were a real challenge to man, model and motors ;
(b) the final results could never be forecast as no-one could manage even to get near a perfect schedule.

That was 10 years ago, and until recently we were still with the same old schedule—no small wonder interest has dropped off, and a few near perfectionists have emerged with the help of better model materials and power units. Now, at last, we have a new and more tricky schedule with which we can " do battle," with the latest in model development to help us."

Dave Platt *held similar views* . . . " I am pleased to hear that the S.M.A.E. has adopted the A.M.A. rules and schedule for stunt flying.

" It is obvious models will now have to be especially built for stunt, and the type of model which has won in recent years, i.e., the 2.5 c.c. diesel, unflapped " stunt " job—virtually a combat model—will no longer be a practical proposition. Therefore, I believe that the new rules will improve the breed and I hope that the reduced entry, due to less people being able to do the much more difficult manoeuvres, will be offset by increased interest (and entry) from the keen fliers who have not bothered to enter lately, on the count of lack of interest in the

Continued on page 63

Topical Twists

by PYLONIUS

SKETCHES BY—ALI

A Clever Stunt

One thing the Russians do not claim to have invented is the C/L model. They have their national pride, I suppose. When the wing on a wire idea first hit this country it caused almost as great a stir as Espresso coffee. We, in our quiet little island, were not used to such fierce gadgetry, and a whole year of gentle circulating had elapsed before an intrepid flyer earned immortal fame by executing the first wing over. The second year was more exciting. From various parts of the country came strong rumours of secret loops and surreptitious bunts. These stories were dismissed as far fetched nonsense by the cautious model writers, but others were thrown into mild hysteria, prophesying figure eights for all within a decade.

Progress was slow but sure, and with the first 90 deg. wing-over yet to be achieved, it was felt that, with careful nursing, the C/L novelty would keep us all in a happy state of suspense for years to come.

At this point someone threw a spanner in the works by smuggling in plans of a five-year-old American stunt job. Experts, who were still wrangling over the secret loops, were amazed to see several characters doing the book on Fairlop. Unable to recover from the shock many of the experts retired from active flying, but remained authorities on C/L flying. They still remember the glamour of the old days, however, and at least one of our eminent designers can boast of having once attempted a loop.

With all this in mind I'm surprised to see that C/L contests are still a going concern. In these days of Combat for the masses there's hardly a kid with two wires who can't do the book with a few supplementary chapters thrown in. This sort of standard must make it pretty rugged going for the judges, particularly as the aerial fluttering is carried out in the 100 m.p.h. region. How they manage to check up the statistics on the hourglass figure must be a question of the quickness of the eye deceiving the hand.

I must say I'm all in favour of a revival of stunt contests. They could be held on all major rally days at a distance of not less than a hundred miles from the rally venue. This would enable model flyers to have a clear run across the airfield, particularly that wire infested stretch across the Radlett field.

Wasters All

I suppose there are hobbies where the happy enthusiast is left in peace to carry on in his own sweet way. For example, it's hardly likely that the Moth Collector comes in for much interference in the way of angry letters condemning moths as functional monstrosities, and exalting him to the nobler pursuit of the butterfly. Or again, I cannot imagine the model train fan being publicly pilloried for spending his leisure hours tracking the *Flying Scotsman* on its gruelling run from Fireside Station to Bookcase Terminus. No one would expect him to give up his fun in order to design some new points system (non-pool) for the benefit of train-stricken humanity.

The poor old modeller is not so lucky. Perhaps because his hobby is too much in the public eye (not literally, we hope!) he is under attack on every side by legions of apoplectic critics. If he builds ingenious flying machines they are ridiculed for not being like the real thing, and if he turns out realistic scale models he is accused of playing with toys. Either way he's had it, which makes it such jolly fun to be a model critic.

These thoughts occurred to me upon reading yet another grand indictment on the way we simple folk stick our bits of balsa together. This time we are getting it in the neck for frittering away our genius on pretty scale models instead of buckling down to the task of producing experimental masterpieces with which to advance the cause of aviation.

This stern call to duty comes from a gentleman who, at one time, specialised in early flying machines reminiscent of the flying bedstead. Belonging, as he did, to a less austere generation, his bedsteads were complete with sheets and pillowcases.

If, today, you built a model that did something out of the ordinary—like flying, the world of aviation would be quite unshaken. Even a model that could fly into free orbit, powered on nothing but dog food—would be lightly regarded in an age when a new wing tip design involves the use of an army of technicians and draughtsmen for up to 10 years, with possibly an appeal to the nation from the Chancellor of the Exchequer.

Non-Starter

One thing I admire about the Russian system of building model builders is that the youthful initiate has to start with something really basic. Before the air-minded young comrade can come to grips with that radio-controlled scale model which is the popular beginner's choice in our easy-going western world he has to start model life with a primitive hot air balloon—a gadget which has the virtue of its own built-in thermal. After his balloon contraption has performed to the satisfaction of the Central Committee of something or other he goes on to battle his way through the history of aviation via box kites and chuck glider until, in venerable old age, he comes to grips with a model Sputnik.

If you happen to be the type of young comrade with two left hands and an I.Q. rating of minus ten you'll never set foot on a flying field, except, perhaps, to cut the grass. This makes me wonder what would have happened to my own glorious flying career had I done you all a favour by being born on the other side of the curtain. How my two left hands would have botched up the hot air balloon, and what would have been the consequences, only a two left-handed salt mine worker would know. Kind friends assure me, however, that I would have had little trouble in filling the thing.

The hard fact is that I would never have been allowed to become a modeller, and I doubt if I should have wanted to after the hot air balloon ordeal. I should have been further frightened off by all those frightful Russian building materials, not to mention the armed guards. Give me a piece of balsa and I'm happy. Trying to build a Wakefield out of bits of reed might eventually earn you the Order of Lenin but is too great a price to ask in terms of human suffering. And talking of human suffering, I should never have been allowed to write this column, which might make you think that there is something in the Russian modelling system after all.

AVIATION NEWSPAGE

by J. W. R. Taylor

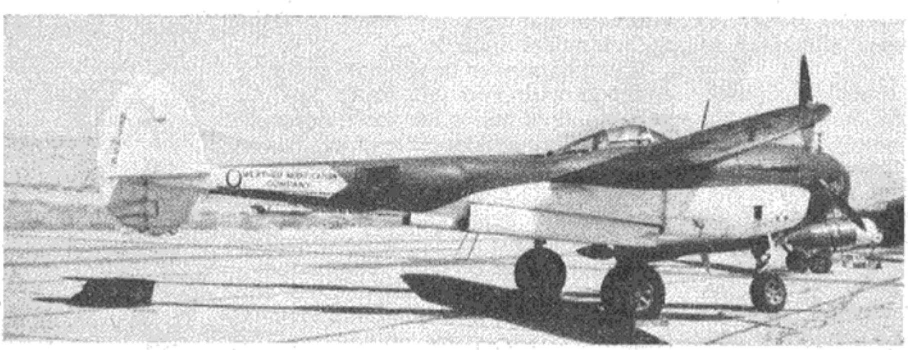
The Cessna T-37A.

ALL-THROUGH JET TRAINING in the States has been brought one stage nearer by the success of Cessna's neat little twin-jet T-37A in its final evaluation tests at Bainbridge Air Base, Georgia. After 30 hours' *ab initio* flying on piston-engined T-34 *Mentors*, a batch of 20 pupils was put straight on to the T-37A which, with two 920 lb. thrust Continental J-69-T-9 turbojets, has a top speed of over 400 m.p.h. Like the R.A.F. pupils at Hullavington who were put onto the *Jet Provost* with no previous piston-engine experience, they had no difficulty in coping with the more sophisticated jet trainer, and Cessna have been awarded a new production contract for additional T-37's. They will replace piston-engined North American T-28's.

Primary training of U.S.A.F. pilots is done at civilian flying schools, under the supervision of a U.S.A.F. Commander, and Bainbridge is operated by Southern Airways Company. T-37's are being delivered now to Graham Air Base in Florida, with others due to be re-equipped soon.

* * *

Brilliant **RED AND WHITE LIGHTING** (below) is a P-38M, registered N57496 and owned by the Weather Modification Company. It is used for cloud seeding with dry ice and is fitted with a variety of special equipment, including a radar canister under the nose to help track down the right kind of clouds. On the outer side of each engine nacelle appears a small symbol of a man with zig-zag lightning arms and legs and the words "I'm ready."



* * *

D.H. of Australia's **"THREE-ENGINED DOVE"** the *Drover*, is still giving good service, although seldom in the news. Three of them, operated by Fiji Airways, are flying a total of nearly half a million miles each year, carrying over 20,000

Old warhorse in a new guise is the Lockheed Lightning (left) Below left: Odd man out of the D.H. family is the Drover. Below, right: The Lockheed Electra turbo-prop airliner.

passengers, plus about 400,000 lb. of freight and mail. Others are owned by Quantas and Trans-Australia Airlines, who operate them on the Royal Flying Doctor Service.

Intended as a simple, rugged *Rapide* replacement for service in the inland, the *Drover* was given three well-proven 145 h.p. Gipsy Major 10 engines and a fixed tailwheel undercarriage; but is otherwise basically a *Dove* airframe. Carrying up to eight passengers, it cruises at 140 m.p.h. and will take off and land in under 500 yd.

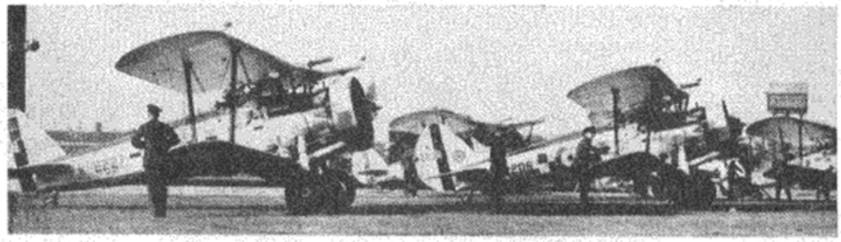
* * *

America's **FIRST TURBOPROP AIRLINER**, the Lockheed *Electra*, flew for the first time on December 6th, staying up 87 min. on its maiden hop. Together with two more demonstration *Electras*, it will be flown fairly intensively, with the idea of completing 400 hr. and qualifying for a C. of A. by the end of September. Production aircraft are already well down the assembly line.

Powered initially by four 3,750 h.p. Allison 501-D13 turboprops, the *Electra* will carry up to 91 passengers on medium-length routes. At the time of writing, a total of 142 had been ordered by twelve airlines. Wing span is 99 ft., length 104 ft. $6\frac{1}{2}$ in., and loaded weight 113,000 lb. It is, therefore, in a smaller class than the 76-117 seat, 135,000 lb. Vickers *Vanguard*, the prototype of which is due to fly this year.

FROM THE PAST . . . . No. 21

The Bristol Bulldog

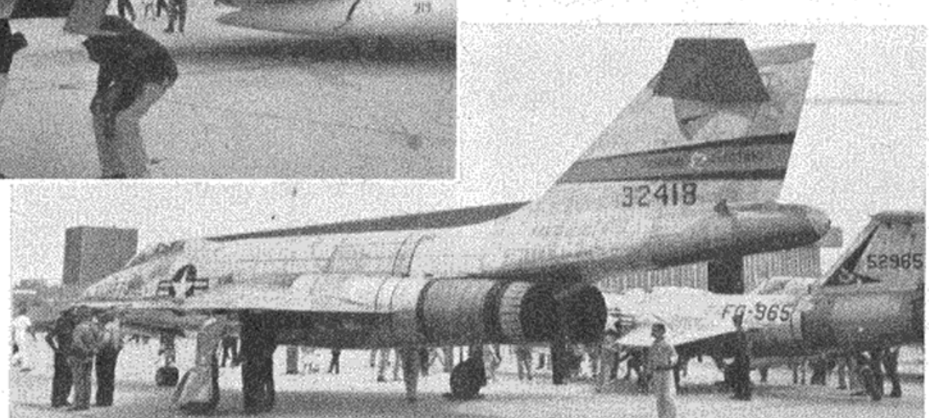


THE BRISTOL *BULLDOGS* on No. 56 Squadron pioneered the Townend ring idea when fitted with experimental cowlings in the early 'thirties. Their tailwheels and convex fin leading-edges identify them as late series Mk. IIA aircraft.

A total of 348 *Bulldogs* were supplied to the R.A.F., of which 293 were single-seat fighters and the remainder dual-control two-seat trainers to specification T.12/32. The prototype fighter (J9480) was built to specification F9/26 and flew on May 17th, 1927. *Bulldogs* entered service with No. 3 Squadron in May, 1929, the first 46 machines (Serials J9567 onward) being designated Mk. II. Later batches (K1603 onward) with strengthened structure, wider undercarriage track and other changes, became Mk. IIA. They equipped nine R.A.F. squadrons—nearly three-quarters of our total fighter defence force—in 1932 and were not finally replaced by *Gladiators* until 1937. All had a 490 h.p. Bristol Jupiter VIIF or VIIF.P engine and were armed with two Vickers guns and four 20 lb. bombs.

The following data apply to the standard *Bulldog* IIA.

Span: 33 ft. 11 in. Length: 25 ft. Height: 9 ft. 10 in. Wing area: 306.5 sq. ft. Weight loaded 3,503 lb. Max. speed 174 m.p.h. Time to 20,000 ft.: $14\frac{1}{2}$ min. Service ceiling 27,000 ft.



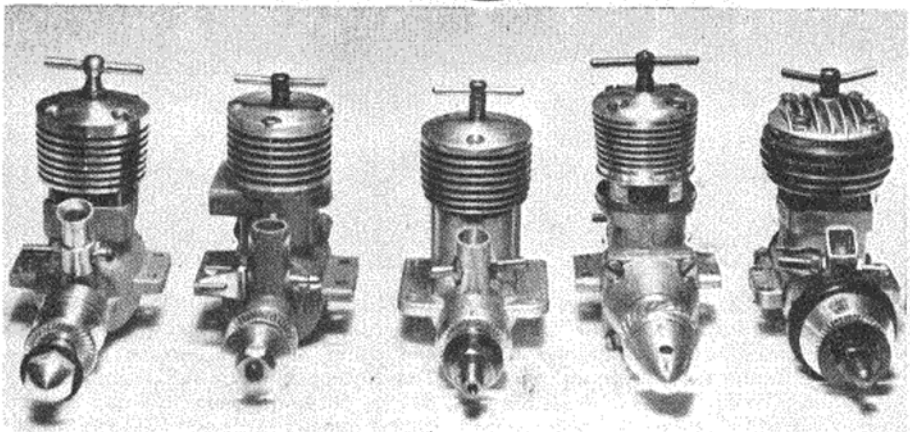
Although McDonnel *Voodoos* have been **IN THE NEWS** in recent months because of their record attempts, no photo has ever been published in the U.K. of the most powerful version of all—the F-101A fitted experimentally with two General Electric J79 turbojets. This is now remedied by MODEL AIRCRAFT with exclusive pictures taken at an "open house" at Edwards Air Force Base. They show clearly the immense size of the tailpipes and the wide spacing of the two red bands on the fuselage in line with the turbine discs. (Photo below.)

This particular *Voodoo* (serial 32418) is the original prototype, now on loan to General Electric for engine development. Visible in the photo are the almost completely-perforated air-brakes above the end of the jet pipes, and guides which show the very large range of movement of the variable-incidence one-piece tailplane, which McDonnell call a stabilator.

* * *

FISHY STORY from Idlewild is that a special room has been built at New York's International Airport solely to keep tropical fish warm. It follows a twenty-fold increase in Florida's tropical fish business in ten years, to an annual 4 million.

Looking Back



PETER CHINN recalls some of the highlights of 1957

ONCE again, much of our year's model activity was taken up with engine testing and no less than 36 different engines were tried out during the year. Twenty-six of these were given the "full-treatment" of lengthy dynamometer tests, from which 13 were selected for inclusion in the M.A. Engine Test series. Nearly all of these latter were "first published test reports" on the engine types concerned, five of which, so far, have reappeared in reports published elsewhere two to eight months later.

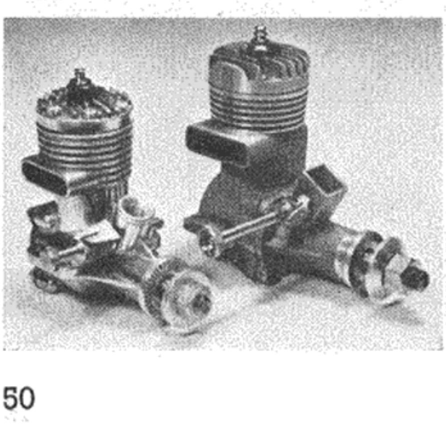
Understandably, the 2.5 c.c. "International" class still claims the attention of most contest enthusiasts and the year 1957 was a happy one as regards promising new diesels in this capacity group. Last year we wrote: ". . . it is becoming obvious that a peak output of 0.30 b.h.p. must be the target for all designers of 2.5 c.c. engines who aspire to International contest success. We would further suggest that a figure of at least 90 per cent. of this (i.e., 0.27 b.h.p.) should also be the goal of the manufacturers of mass-production 2.5's if they wish to retain a footing in the competition classes."

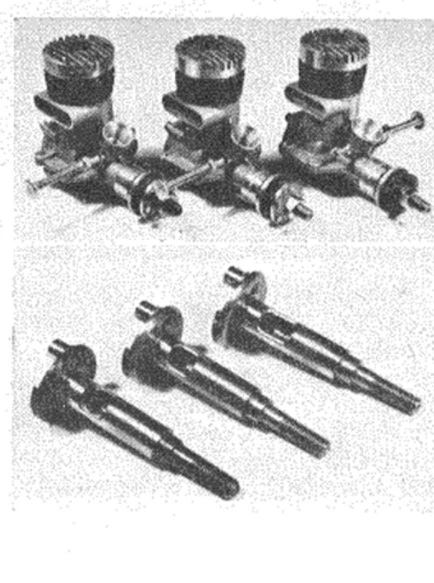
Eighteen months ago there were only two 2.5 diesels that could claim such performance: the Oliver Tiger Mk. III and the West German Webra Mach-1. Today we have six 2.5 diesels all developing not less than .28 b.h.p.; three of them, the Oliver, the Japanese Enya 15-D and the new British P.A.W. Special 2.49-D, giving around 0.30 b.h.p. The Mach-1 is now relegated, by our reckoning, to fourth place, closely followed by the Italian Super-Tigre G.30D and British Frog 249-BB Modified.

Two of these engines, the Modified Frog and Enya, actually first appeared during 1956, but the Frog was, until recently, a "secret list" item for the American market only and the Enya was a limited-production unit restricted mainly to the Japanese market. The other two, the P.A.W. Special and Super-Tigre G.30, were, however, first introduced in 1957.

When evaluating the performance of any new product one should, preferably, have experience of more than a single example and our rating made accordingly. Even Oliver Tigers vary a bit, but we have no hesitation in still placing this beautifully-made British engine first. How the Olivers can make it for £6 10s. 0d. is a mystery. Close behind the Tiger, however, is the Enya which, as we have remarked more than once during the past year, is an astonishing design. Immensely powerful over a wide speed range, very smooth and consistent, very easy to operate, yet a complete breakaway from previous concepts of diesel design, it is likely to be seen in increasing numbers now that it is distributed in the U.S.A. The Eifflaender-designed P.A.W. Special 249-D is another highly significant contribution to the 2.5 class and, in its latest form with enlarged rotary-valve and transfer ports (as tested in the July, 1957, issue) its performance is such as to put it very close, if not equal, to the Enya. Like the Enya, it remains easy to start despite its lively performance.

The Super-Tigre G.30-D is the most complicated design of the six, featuring, as it does, a separate rear shaft type rotary valve and, accordingly, it pays the penalty of slightly greater overall dimensions and increased weight, but, like all Super-Tigres, it is a finely made engine and is certainly one of the most pleasant handling of current 2.5 c.c. diesels. This motor is to be dealt with very shortly in the Test series. The Frog 249-BB Modified model, now available on the home market and offering at least 10 per cent. more b.h.p. than the standard 249-BB for a mere 15s. 6d. extra, will obviously gain many adherents during the coming season. There may be a





Two of the most impressive glowplug motors tested during the year were the American Veco 19 and the Japanese Enya 29.3. (Left.)

Three years' development of the O.S. Max 29/35 engine. Note gradual increase of intake port area and strengthened mounting lugs of latest 1957-8 model. (Right.)

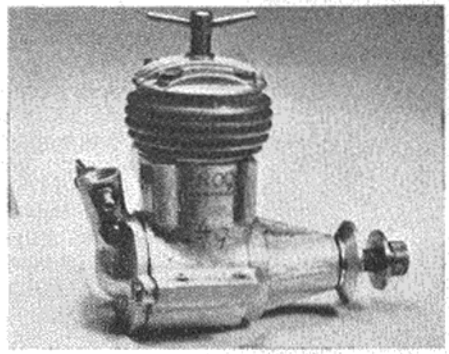
certain prestige value attaching to the ownership of a "specialist-built" or foreign engine, but we have heard of some outstanding performances with Modified Frogs and their relatively low price must obviously be a consideration to F/F enthusiasts who need at least two engines and continually face the risk of flyaways and losses.

Turning now to glowplug engines, we have to confess that the engine that impressed us most of all during the year was another Enya, the entirely revised Mk.3 "29" of 4.9 c.c. capacity. Outwardly a normal looking shaft-valve design, its torque exceeded that of any of the pukka disc-valve ball-bearing racing 29's, was even better than we have yet obtained for a .35, and resulted in a power output well in excess of any equivalent American design. The secret of the 29.3's performance appears to be in its highly developed intake and transfer system. The Enya brothers spend their spare time with Guzzi and B.M.W. motor-cycles and perhaps this has some bearing on their enthusiasm for really high performance.

Despite its performance the 29.3 remains a docile and easy handling engine, a quality which could certainly not be attributed to the American Fox 29R racing engine, the most powerful engine featured in the Engine Test series during 1957. To paraphrase "Barnacle Bill" the Fox was "big and tough and hairy and rough" and the manufacturer's admission that it is "Not suitable for Beginners" is something of an understatement.

The only other American motor featured in the Engine Test series during the year was the Veco 19 Series 100. The all-round excellent bench performance of this motor and, especially, its delightful handling characteristics, were remarked upon a year ago and have since been confirmed by other writers, but during the year an opportunity was taken to test the aerobatic qualities of the engine in a stunt model and in this respect it proved outstandingly good; fast, smooth, and quite unaffected by the most abrupt manoeuvres.

With these pleasant recollections of the Veco 19, we approached our test of the new Series 100 type Veco 35 anticipating similar results and, in consequence, suffered some disappointment at finding our test sample a trifle touchy. Needing a very lengthy running-in period before



One of the manufacturers' experimental models tested during the year was this prototype Frog 349, but it is not likely to go into production.

it would tolerate even the mildest fuel, the 35 lacked the foolproof starting of the 19, but it must be remembered that this engine has been designed to cope with the latest stunt schedule requirements, including the tricky triangular loop and hourglass figure. For this, there seems to be a demand among some U.S. enthusiasts for an engine which will automatically go into "four-cycle" operation and slow up in these manoeuvres, yet switch again immediately to full power when required, and only when we have made some actual field tests on the Veco will we feel justified in judging its true worth. Meanwhile, we have obtained two more examples so that no question of the test engine being sub-standard should arise.

Mention of the glow 35 class brings to mind two other stunt 35s: the American K & B Torpedo-35 and Japanese O.S. Max 35. As a test on the former was published last month and the latter is dealt with elsewhere in this issue, there is no need to elaborate on our experiences here. However, we include a couple of photographs which trace the gradual development of the Max since its introduction three years ago. Redesigned parts include the crankcase, crankshaft and needle-valve assembly.

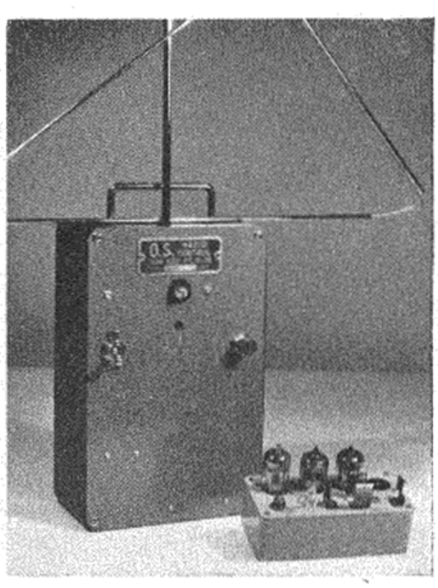
Needless to say, the reappearance of the Eta 29 in a newly revised Mk. V model, was most pleasing. The Eta is one of the very few surviving genuine racing type motors and it is good to see the classic layout perpetuated by this finely made British engine. Incidentally, since our description of this engine in last month's issue, a new piston material has been adopted for the Mk. V.

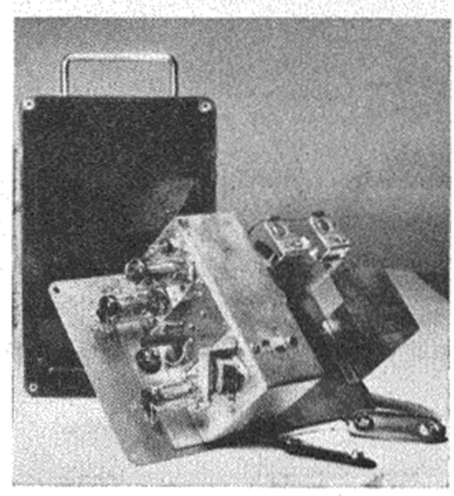
More surprising was the reappearance of the famed Dooling 29 in America. After the demise of the Hornet, Dooling and McCoy racing engines, and the universal switch-over by American manufacturers to simpler designs, we had not expected such a welcome development as this. A sign of the times is, however, indicated by the new price of the

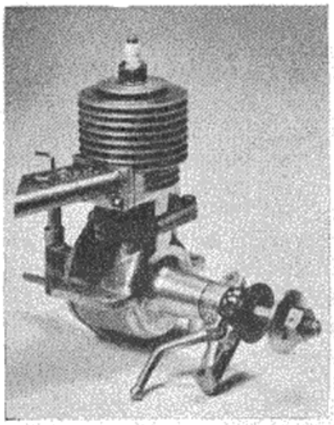
E.D.'s 1957 receiver, the Transitrol, proved trouble-free and easy to tune (right).

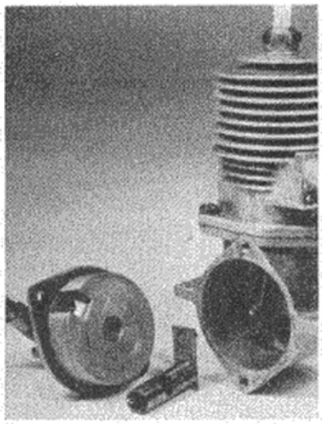
The interior of the O.S. 3AP 3-valve crystal-controlled transmitter (lower right). Wire saddles prevent valves from being jarred loose.

The most popular outfit in the 1957 range O.S. R/C units was the 3AP transmitter and 3A receiver shown below.









An interesting addition to the author's collection of vintage engines was this 1939 May Silver-King petrol engine. The unusual design of the rotary-valve induction system will be noted.

Dooling which has gone up from \$14.95 (£5 7s. od.) to \$23.95 (£8 11s. od.).

During the course of the year, a few tests were carried out on experimental engines including one on a Frog prototype, the "349" diesel. Having obtained the manufacturer's permission to mention this engine, we must also point out that it is *only* an experimental motor and a production version is not likely in the forseeable future, so readers are requested not to shower the factory with enquiries, but to await a further announcement. In the meantime we shall, next month, give a little more information about this interesting and, in many ways, unique design. Before a production model Frog 349 appears, there will, however, be another new small engine from International Model Aircraft. To be known as the Frog "100," this may actually be ready shortly after these words are printed. The new model in no way resembles its namesake, the very first Frog Diesel, of some 11 tears ago. Externally, it is similar to the "150," but internally it features a new idea in transfer porting in which the transfer passages are actually within the very thick wall of the cylinder liner itself.

As well as adding a number of interesting new engines to our collection during 1957, we also acquired several interesting old ones, including three pre-war examples, which, of course, are spark-ignition petrol engines.

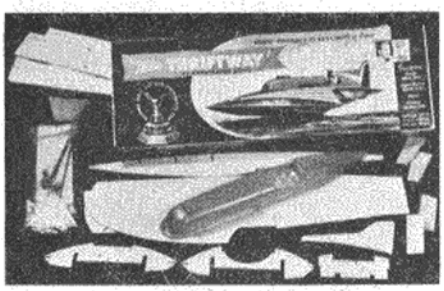
One of these is a May "Silver-King," an American 7.4 c.c. motor which first appeared late in 1939 but which, due to the outbreak of war, was virtually unknown in Britain. If anyone should think he detects a resemblance, in the Silver-King, to the "Rocket" engine of 1946-47, however, he is quite right, for the Silver-King, designed by Ashton L. May and made in Detroit, was the forerunner of the Rocket 45 engine that was made for a couple of years after the war. The two engines were, in all essentials, identical, the design simply being renamed as a result of its manufacture being taken over by another company.

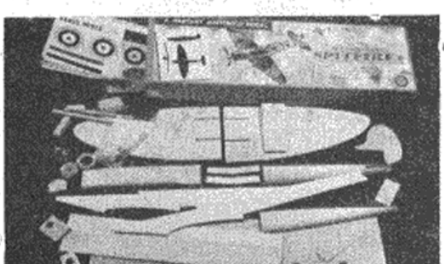
An interesting sidelight on the fate of the Rocket comes from Bruce Underwood in the U.S. It appears that the Rocket—gone from the model market these past 10 years—still lives on, in name at least, under a car bonnet. Motor enthusiasts will know of the Oldsmobile "Rocket" engine used by the Oldsmobile car, and the story goes that when this new V-8 o.h.v. engine was designed and the General Motors Corporation wanted a name for it, they cheerfully bought the name of the Rocket-45 model engine—rather in the manner of film companies who buy stories merely to use only the title.

Apart from engines, a variety of modelling merchandise, from plastic scale kits to R/C sets, was sampled during the year. Plastics have undoubtedly obtained a very strong position on the market. Having no trade connections, we cannot say whether this has been at the expense of other types of kits, but, personally, we would be very surprised indeed if it were proved that "serious" modelling had suffered in any way from the plastics invasion. The average model-flying enthusiast is not likely to give up his hobby in favour of assembling plastics. As for plastic models themselves, one must admit that, even if the hardened solid-modeller does not find much satisfaction in merely sticking ready-finished parts together, some of these kits make up into very attractive desk ornaments.

The plastic craze, incidentally, is not now merely confined to Britain and the U.S. From West Germany, for example, we received three kits in the Faller 1/100 scale series. Despite their small size, these are well detailed and are especially complete in regard to transfer decoration—except, for one very significant omission: the Ju. 87's swastika. . . .

(Continued on page 63)





As a relaxation from aircraft, a new scale hydroplane kit, made by Jim Walker, was tried (top).
Some kits have now reached unprecedented levels of prefabrication, as evidenced by the British Mercury Spitfire (centre) and American Jim Walker Firecat stunt model (lower).

Enthusiasm for plastics has spread to Germany and from that country came this very complete 1/100 scale "Stuka" kit.

The NIEUPORT 17C.1

by Peter G. Cooksley

THE Nieuport Scout was representative of a type first obtained from the French to meet a temporary shortage of British single seaters, and it rapidly became popular with its pilots. Eventually it was manufactured in this country also, by the former Nieuport and General Aircraft Company at Cricklewood.

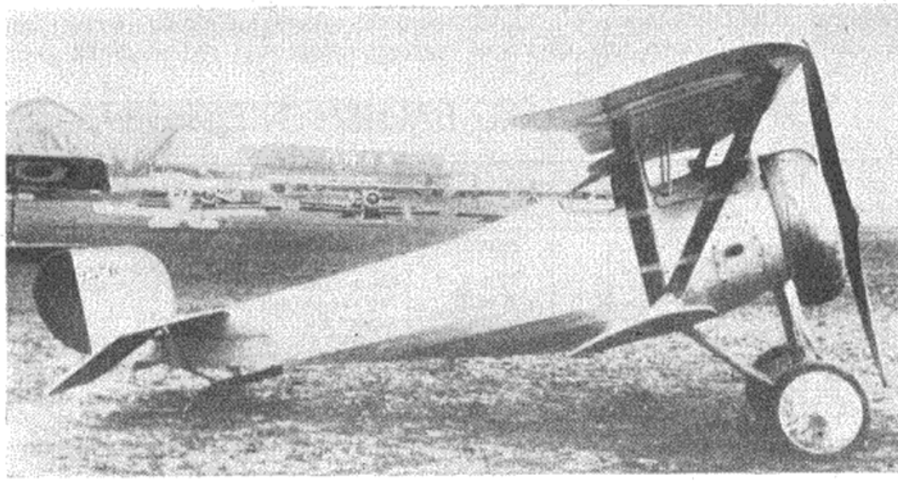
Capt. Albert Ball thought highly of this machine as a fighter, deeming it superior to the S.E.5, which he regarded as a failure.

When first issued, these machines carried a single Lewis gun on the centre section firing outside the airscrew arc, but the personnel of No. 11 Sqdn. amended this to a curved rail-mounting to facilitate reloading (similar to that of the S.E.)—a feature that was rapidly copied by other squadrons.

Later, with the advent of interrupter-gear, Vickers guns were fitted to the forward cowling. (Lufbery was one of the first to have this modification in the Escadrille Lafayette.)

Experiments were also carried out with Le Prieur rockets, and with these weapons Nieuport 17C's gave a good account of themselves in the destruction of observation balloons before the Somme offensive of 1916. Ball also experimented with this form of armament.

Several scout squadrons on the Western front flew the type and at least two in the Middle East. Nos. 8, 9 and 10 Sqdns. R.N.A.S. also flew these, together with Italian and, of course, French pursuit units.



This Nieuport would appear to be of French origin. Note the absence of fuselage roundels. The faintly discernible serial number is 2376.

Construction followed the general practice of the day—wooden framework, wire braced, with fabric covering. All flying wires were double and the forward section of the fuselage, ply-covered.

Dimensions: Span: 27 ft. 3 in. Length: 19 ft. 0 in.

Weight: (tare) approx. 830 lb.; (loaded) approx. 1,200 lb.

Performance: Max speed, 107 m.p.h. at 6,500 ft. Climb: 1,080 ft./min. Duration: 2 hours.

Motor: 110 h.p. Le Rhone rotary.

Markings and Colour Details

British. With few exceptions R.F.C. machines were doped silver overall including the wheel discs. Inter-plane and undercarriage struts were natural varnished wood, the former with tape bindings which rapidly became a dirty grey. All metal fittings remained self-colour. Airscrews were French polished.

Rudder stripes displayed blue in the forward position, while, in common with French flown machines, roundels appeared *under* the upper wing as well as the lower; the exact shades were vermilion and ultramarine.

No. 29 Sqdn. changed to two vertical bars in black, one each side of the cockade just before the Nieuport gave place to the S.E.5a. While the earlier markings were still in use, the outer sides of the wheels

Unfortunately a much-used photograph but nevertheless one which shows a genuine Nieuport 17. Serial No. is A6684 and the red band of No. 29 Squadron can be clearly seen behind the roundel.

were red, all except a small central disc (about 12 in. dia.) remaining silver. No. 32 Sqdn. carried individual letters as shown in Fig. 4.

No. 40 Sqdn. carried three vertical bars, one over the headrest and down the sides and two further, immediately ahead of the tail-plane in black. Individual numbers were frequently borne aft of the cockade.

(Then) Capt. W. A. Bishop, V.C., D.S.O., M.C., D.F.C., flew three different Nieuports with 60 Sqdn. of which B1566 forms the subject of the main drawing. The cowling ring and interplane struts were roundel blue.

French. General finish, silver. Serials were black across rudder, fraction style. Examples N1424 and N1559. No fuselage roundels; rudder stripes in the same order as the British. Shades were azure centre and scarlet outer ring.

Italian. As French, but with fuselage roundel; none beneath the upper wing. Colours were light green, white and red with the green aft on the rudder and outermost on the cockade. Serials were carried on fuselage immediately forward of roundel, about 5 in. below upper longeron. Examples: N3035, N3030.

American. This country is represented here by their second highest scoring pilot, Raoul Lufbery. He flew this particular machine (Fig. 1) after the famous Escadrille Lafayette had been absorbed into the 103rd Aero, with which he was killed in combat in the spring of 1918.

Main planes and tail surfaces

SOME INDIVIDUAL BRITISH NIEUPORTS

SERIAL NO.	STYLE	SQUADRON	SQUADRON MARKING	NOTES	
B 832	A	No. 1	RED		Serial numbers were black and positioned across rudder stripes
A 6684	B	No. 29	RED	With band as Fig. 3	
A 308	A	No. 32	BLACK	No bar on this particular a/c	
A 678	A	No. 40	—	Aircraft VI	The majority of the a/c listed here carried unstripped Lewis guns on the top wing
B 1566	B	No. 60	NONE	This a/c had blue cowling and was flown by Bishop	

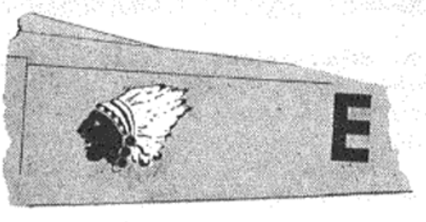


Fig. 1. American Raoul Lufbery's aircraft. Individual letter was black. See text for head-dress colour details.

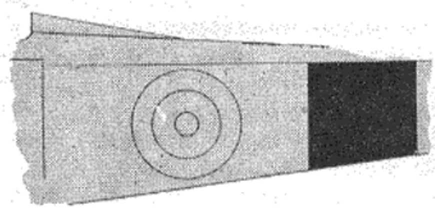


Fig. 3. No. 29 Squadron aircraft. Red band.

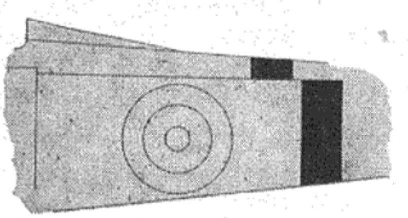


Fig. 2. No. 1 Squadron aircraft. Red bands.

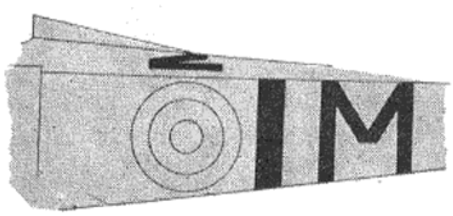


Fig. 4. No. 32 Squadron aircraft. Markings black.

B'1554

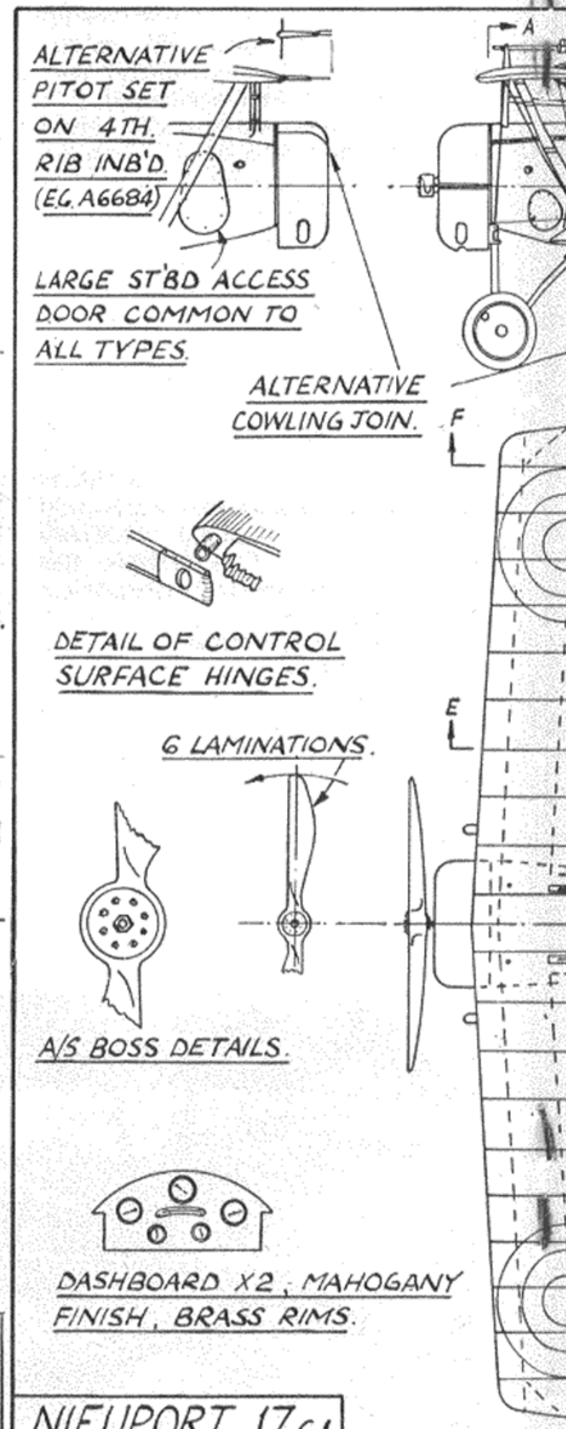
B1566

Fig. 5. British serial styles. Above: Style A, often outlined. Right: Style B.

N1423

Fig. 6. French and Italian serial styles.

Copies of plans published for solid models can be obtained in 1/72 scale, from "Model Aircraft," Plans Department, 19-20, Noel Street, London, W.1, price 9d. each, post free.



were chrome yellow while the fuselage was completely orange except for the metal finish of the cowling ring and clear doped under surface. The individual letter was black.

The Indian head insignia had a red/brown face with the triangular pattern on the head-piece, scarlet and yellow. The dark band immediately above this, the circular hangings and "S" shaped ribbon: red. Feathers were white, a few having azure blue tips.

Tricolour rudder bands had the blue aft, while roundels were white, blue and red, working outwards from the centre; these above and below the top wing and beneath the lower.

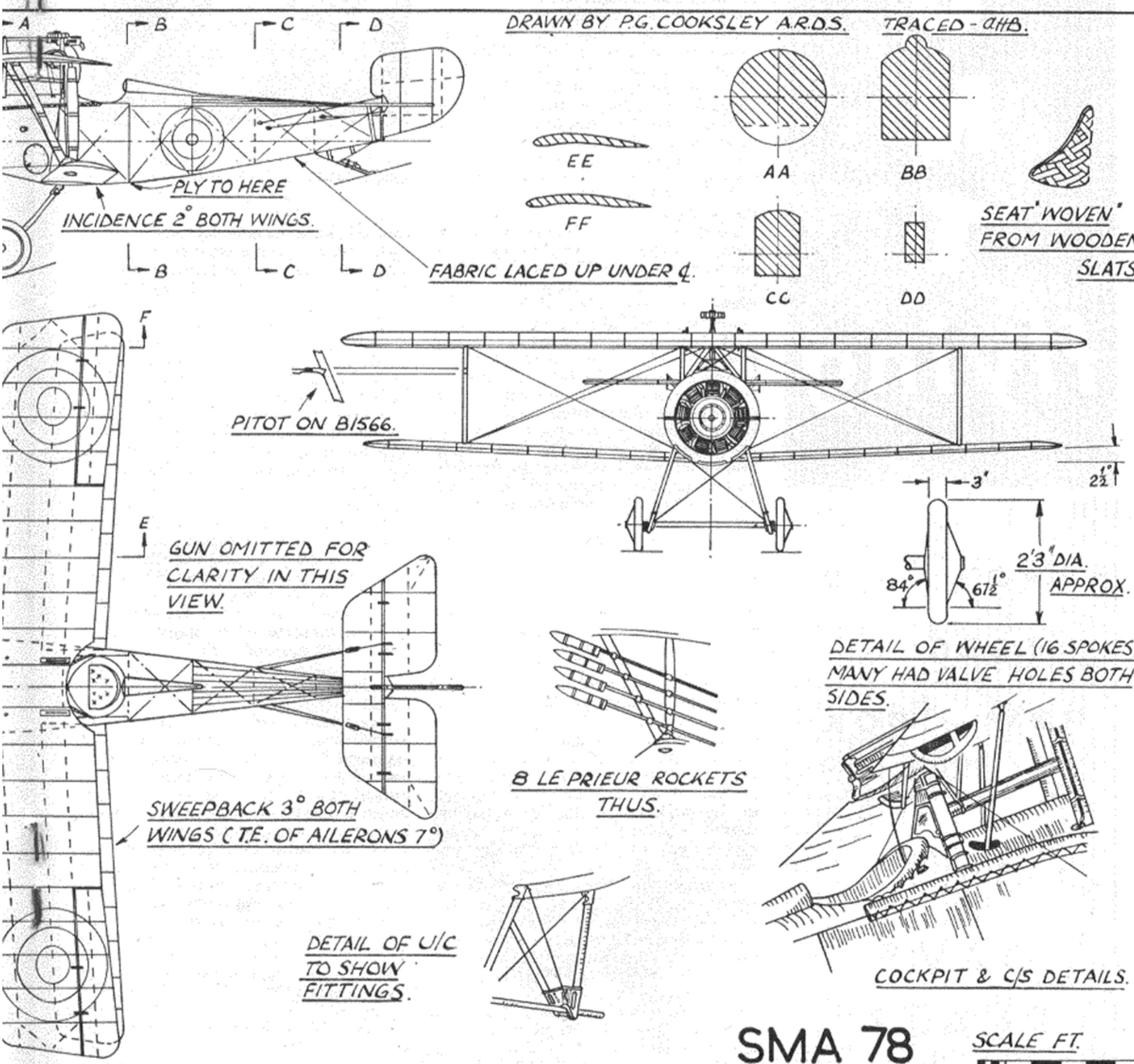
This particular aircraft, of which the wheel discs appear to have been orange, carried a synchronised Vickers gun on the forward fuselage.

In all these examples, general fittings, etc., were similar to the British.

Roundel proportions. Those on the wings of both British and French Nieuports had large centre discs similar to present day practice in this country. Except for a few examples (e.g., Fig. 4) fuselage cockades had small red spots, the radius of which formed one fifth of the total.

Italian machines had those with large centre spots in *all* locations and American aircraft the small radius type.

I should like to extend my thanks to my good friend the Head Curator of the Air Museum, Claremont, California, for assistance with some of the American information.



STUNT flying

"Now we need a new look in models" says DAVE PLATT

NOW that the S.M.A.E. has adopted a new and more interesting schedule for stunt contests in this country, some of the patterns included demand more from a model in the way of manoeuvrability, and a change from the designs we have hitherto used is indicated.

Turning radius is the criterion of stunt performance and some of the recently introduced patterns require a very small radius. In the triangular loops, for example, the model has, from level flight, to turn through 120 deg. and fly back on itself in almost the reverse direction. These 120 deg. turns are incredible manoeuvres in themselves—certainly no full-size aircraft could perform them, or has ever needed to, so we are not able to see how full-size designers would meet the problem. However, the new S.M.A.E. schedule is virtually the same as that which has been used by the American A.M.A. for their contests for some years now, so we are fortunate in having our experimental work cut short simply by looking at how the U.S. designers have solved the problems.

Firstly, and most important, power plant considerations, embracing both engines and tanks. To avoid interruptions in the pilot's train of thought caused by uneven airspeed, we need a motor which will give the same speed in level flight as in manoeuvres. More power is, of course, needed for the abrupt turns and climbs than for level flight. Ignoring, in the present state of development, the possibility of engine-speed control, we find that glo engines, which can four-stroke in level flight, leaning out to two-stroking (giving more power) for the manoeuvres, are best, having a virtually automatic two-speed action built-in.

Diesels give fairly constant power throughout the flight when at their best settings, which is exactly what is not wanted. Also, in practice, diesels invariably run too lean, and thus power sags in the higher parts of the circle.

Engines under 0.15 cu. in. (2.5 c.c.) are not at all satisfactory for advanced stunt work, so there are four possible groups from which to choose, namely, 0.15 cu. in. (2.5 c.c.) 0.19 cu. in. (3.5 c.c.), 0.29 cu. in. (5 c.c.) and 0.35 cu. in. (6 c.c.). It will immediately be apparent that we have no British made glo engines suitable for stunt use, and so the modeller has to buy a foreign engine, but these are not in very short supply, neither are they usually too expensive.

Summing up the size question, we would say "The bigger the better," although it cannot be denied that the 0.19 cu. in. class produces a very handy size model for transporting and is capable of excellent performance.

The subject of tanks is wide open. As Bill Netzeband once said: "Ask 10 guys what type of tank they use and they will show you 10 different ones, all of which work best!" The writer's choice is for a rectangular tank with a slight wedge on the outside, and one filler pipe vent facing forward, giving pressure to force fuel to the engine in abrupt turns.

The writer with the model he flew in the Gold Trophy and at the Criterium d'Europe last year.

Make a tank that gives about 5 minutes' run. In spite of what other authorities quote, this is quite enough for the schedule, and more. Remember that a tank which is too big takes a lot of weight of fuel, causing changes in C.G. position throughout the flight. Since we trim the aeroplane to a rather rearward C.G. placing to get small radius turns, a rearward shift of C.G. could be embarrassing.

A neoprene collar is fitted to the spout of the squeeze bottle (Fig. 1), this spout must be a gauge or two less than that used for the tank filler pipe. When the tank is full, fuel will spurt back out around the spout, then a further push until the neoprene collar seals the gap—plus a quick squeeze—will force the fuel to the engine. This prevents fuel dribbling all over the model and is very quick.

The next consideration is that of the general size of the model. This is expressed in terms of wing area, all the rest of the model being proportioned around this. The wing area for our design is arrived at by considering wing-loading and flying speed.

The airspeed is required to be as low as possible, consistent with reasonable line-pull and ability to bore through the hefty wind we can expect for our contest day. Herein lies one difference between the American approach and our own. Their idea of a windy day and ours differ rather; therefore slightly higher speed is needed for flying in Britain. A figure of 65-70 m.p.h. is best, but beware!—a higher speed than this will give less time for thought, while you are trying to get your most intricate patterns placed just as you want them.

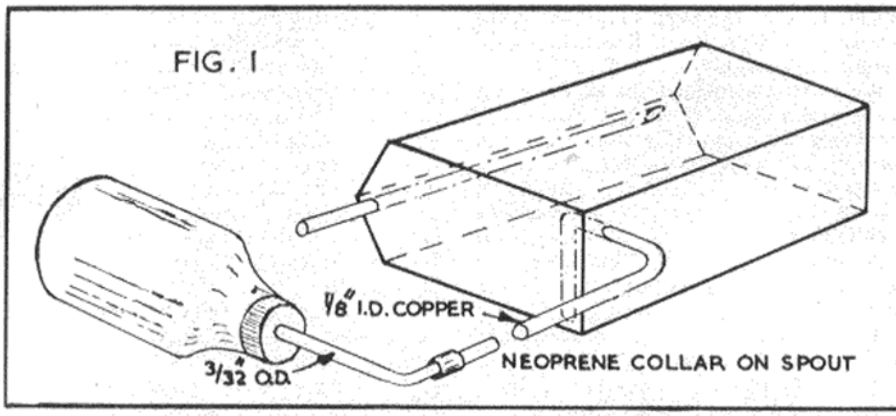
The other thing affecting wing area is wing loading. Naturally, for the extreme manoeuvrability we seek, a low loading is called for; 10 oz. per sq. ft. is about the practical minimum. The area is fixed from this by estimating the weight that we can build a model to, which will give the flying-speed and penetration we want.

As an example of this reasoning, let us assume that we wish to build a model around a modern 0.19 cu. in. glo-motor. If we start by estimating wing area at 350 sq. in., we work out that at the 10 oz. wing-loading specified, the model will weigh 24 oz. If our engine is of normal power for this volume, it is obvious that the model will be too light and small to give the low airspeed required. So we make a further guess at 400 sq. in. Weight will be 28 oz. This is better! Areas for 0.15, 0.29, and 0.35 cu. in. come out at 350, 500 and 560 sq. in. respectively. These areas are only approximate and may be regarded as "middle of the road" figures which can be increased or reduced a little to satisfy a particular wing span or planform.

The other considerations of the wing concern aspect ratio, section, flap area and planform. An aspect ratio of between $5\frac{1}{4}$ and 6 is a good compromise between strength and appearance. The section should be between 15 and 18 per cent. thick with maximum thickness at 30 per cent. chord location, these figures being calculated without the flap chord.

Now, the controversial point of "to flap or not to flap." The writer believes that flaps are a definite necessity, especially on 0.19 cu. in. size models and up. They increase the lift co-efficient of the wing exactly when required; they are proportional in action; and anybody who has flown the same model with, and then without the flaps, will concede that they improved the manoeuvrability and reduced the looping radius, which is just what we want. Also they improve the glide, especially at low speeds, thus helping us to get a good landing.

Flap area is not critical; many excellent designs have flap areas between 8 per cent. and twice this amount. The *Smoothie* has 9 per cent., the *Thunderbird* likewise about 10 per cent., while the *Mars*, *Thunderbolt* and *Skiffler* have around 15 per cent. The important thing is that they should line up perfectly with the elevators in the neutral position, and it is also necessary to keep the area of the flaps concentrated away from the tips of the wing as far as possible. Tapered or elliptical wing planforms are best or, if you must have broad tips,



stop the flaps about three-quarters of the way along the wing. We thus ensure that the tips of the wings are operating at a lower angle of attack than the centre of the wing when the flaps are depressed. This results in an unwillingness to tip-stall, which is a most frightening experience at the top of the circle while progressing with an overhead figure.

Having got the aerodynamic design of the wing settled, the fuselage can follow any design you prefer. Nose moment is made to a length to suit the weight of the motor and full tank, to give the desired balance point; this length will usually be found to be at approximately two-thirds of the centre wing chord.

The engine should be completely cowled for the sake of appearance; inverted is a good installation on this count and also gives the easiest starting. If you use a spinner, make sure that it cannot fly to bits in mid-air, and that it balances true; all-metal, crankshaft-fixing spinners are best of all. We will commit ourselves here and state categorically that all of the plastic and half-plastic spinners made are useless with high output engines, although the makers do realise this, and are endeavouring to find a better plastic from which to mould them. Faulty spinners are a cause of endless trouble; vibrating badly, fronts fly off and end up stuck in a wing panel, or, as has happened, breaking one prop-blade causing shaft-runs or even disintegration of the model. Naturally, this sort of thing is not very funny. The moral is: either get a good spinner or don't use one.

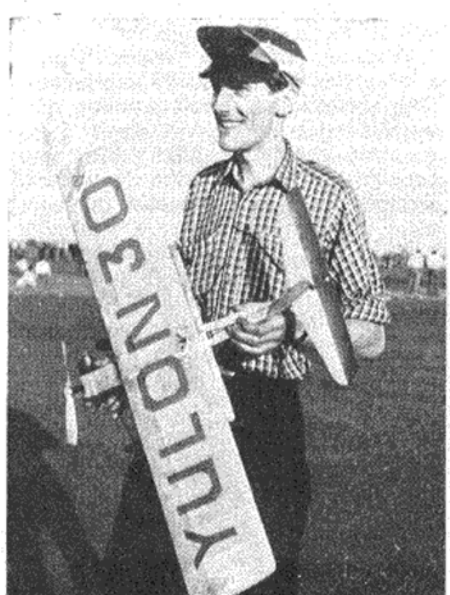
Undercarraiges come in all sorts and sizes. It really doesn't make much difference whether you use normal two-wheel, tricycle, or wing-mounted. Use the biggest wheels you can, consistent with weight and appearance. For appearance, spats are excellent and unusual but best if your normal flying field is tarmac or very short grass. Tricycle types give impeccable take-off and landing characteristics, helping an inexperienced pilot to get top notch results, but are heavy and seldom "fit" a design really well. Wing mounted U/C's are best made on the torsion-bar principle.

Take-off and landing between them carry 80 points, so make sure of free-running, true tracking wheels. If using a two-wheel type, a tailwheel is helpful in several ways. It avoids unpleasant scraping noises given by skids, runs more smoothly, which looks better as the model lands, and is a useful "trimmer" for tracking. If anything, in our opinion, the tailwheel type U/C is the best bet for an experienced pilot, and the nosewheel type is best for those not so sure of themselves.

Tail moment arm is our next design problem. The length of this is governed by the areas of tailplane and elevators in relation to each other, and the total tail area in relation to the wing area. It is safe to use a tail area of 18-20 per cent. of the wing, with half of this as movable elevator. In this case, tail moment will work out at about half the mean chord of the wing. (This assumes tail moment arm to be the distance between the flap trailing edge and the tailplane leading edge.)

It is considered good practice to keep fuselage side area greater behind the neutral point than in front, and this dictates as large a fin as possible.

The lines we fly on have a marked effect on the design of the model and having got the rough outline of our model set down, the next important



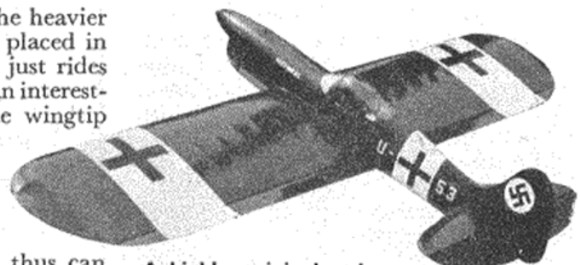
Progress in design! Allan Hewitt won the 1949 Gold Trophy with this 5 c.c. powered model. Compare with Platt's machine opposite which has only a 3.5 c.c. motor.

aspect is the rigging; i.e., the pivot location, C.G. position, line rake, wing weight and so on.

We offset the centre-line of the wing towards the inside of the circle, making the inner wing larger in area than the outer. There is much misconception of exactly why this is done—many feel it is "to carry the weight of the lines"—a ridiculous notion that could well do with some clarification. The lines are carried by the entire wing, not only the inner one. Since our model is flying in a circle, the outer wing is travelling faster than the inner, and lift being a product of area × velocity, if both wings are equal in size the faster (outer wing generates more lift, tending to make the model fly outside-wing-high. To eliminate this, we donate more area to the inner wing. For normal models a figure of 1 in. more inner-wing span per 40 in. total span is acceptable. This for a 40 in. model, the inner wing spans $20\frac{1}{2}$ in. and the outer $19\frac{1}{2}$ in. For 48-50 in. models $1\frac{1}{2}$ in. is O.K.

To give lateral balance to the heavier inside wing a weight must be placed in the outer tip until the model just rides outside-wing heavy. (There is an interesting theory [not ours] that the wingtip weight can be eliminated by moving the pivot-point in towards the inner tip from the centre-line. Theory indicates this idea would work, but we have not tried it and thus can give no firm decision.)

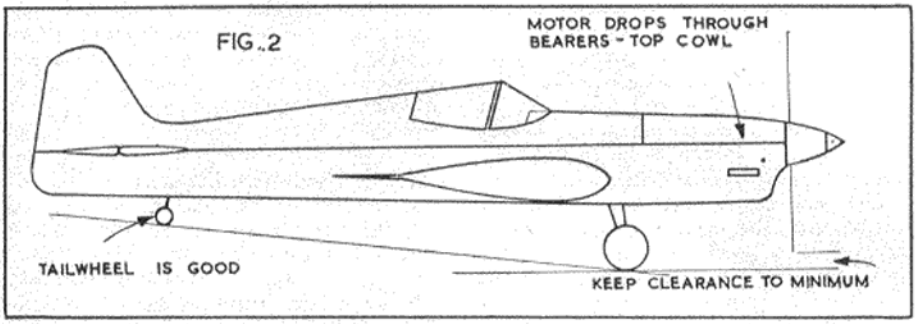
The pivot-point of the two lines should be at about 30 per cent. of the total wing-and-flap chord from the leading-edge. Since we want extreme manoeuvrability the C.G. of the model must be as near as possible to the pivot point. However, it is the nature of the beast that in gaining manoeuvrability in this way, something must be lost to compensate, and the characteristic which is lost is stability. The nearer the C.G. approaches the pivot, the less stability we get, shown in practice by excessive sensitivity to control or an undue lack of line-tug. Naturally, it is better to err on the side of too forward a C.G. location for a start, as, at least, we will have the model in one piece at the end of the flight, even if it wouldn't square properly. The C.G. can then be brought rearwards until the best compromise is found. As a guide, a 25 per cent. C.G. placing is usually found best. Elevators should move 50 deg. and flaps half this amount.



A highly original colour scheme is employed on the writer's "Skiffler."

We have several ways of guaranteeing that the model will produce a healthy pull on the lines but the best one has been found to be a 2 deg. line-rake on the leadouts, together with small engine out-thrust (1 to 2 deg.) and slight rudder offset. These measures should make sure of enough tug in overhead figure eights and this is the only time we need worry about, for if the pull is sufficient in this manoeuvre, the others will be all right.

Next month we will get down to the ways of constructing the aeroplane for light weight with adequate strength, and also give some trimming and flying notes. You'll join us?



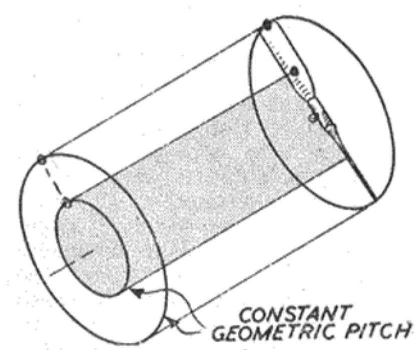
WASHOUT and WASH-IN

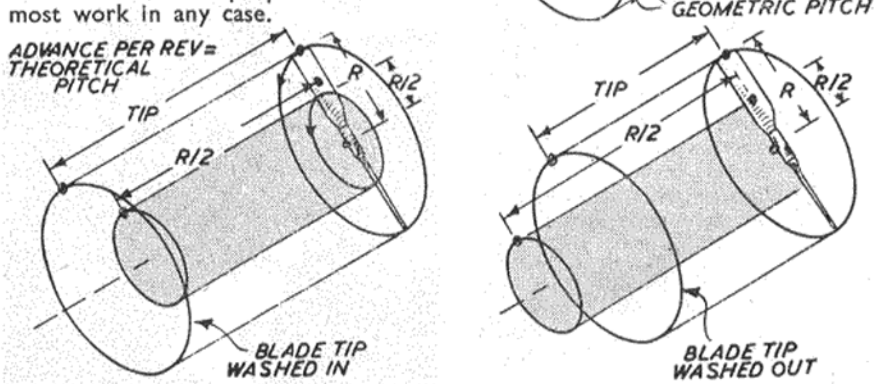
DIFFERENT sections of any airscrew have different actual speeds through the air. The tip section is always travelling the fastest and the section adjacent to the hub the slowest. Hence the characteristic "twist" in a propeller blade to ensure that all sections meet the air at approximately the same angle.

When a blade tip is washed-in, it means that the propeller is carved so that the geometric pitch at the tip is greater than that over the rest of the blade. Thus the tip section is trying to advance a greater distance per rev. than, say, the middle section of the blade (left-hand diagram). Since the propeller can only advance as a whole, this means that the tip section is operating at a coarser angle. Like a wing, a propeller blade section can also stall, and so if this angular difference is too great, part of the blade can be operating stalled and part unstalled.

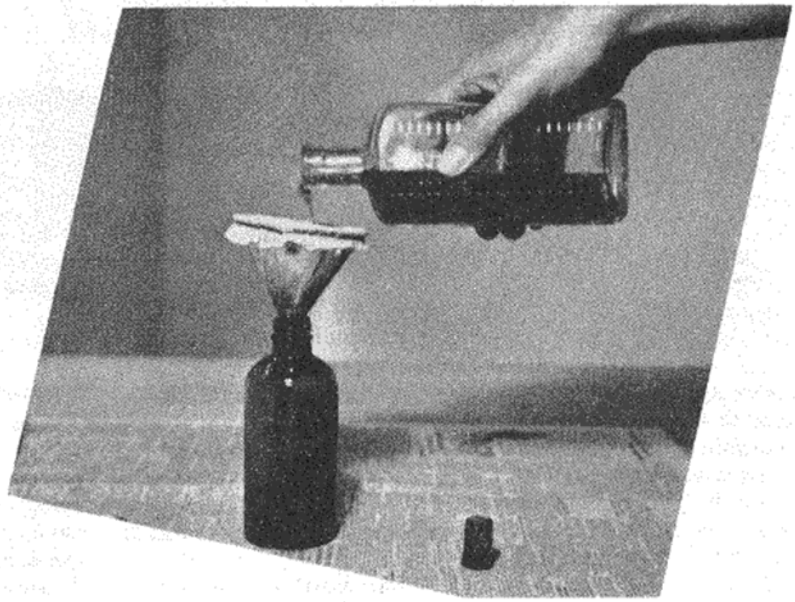
Washout on a propeller blade is opposite in geometry, but the effect is similar in that the tip section is trying to advance a different distance to the mid-section (lower right.) This time, however, the centre section of the blade is operating at the higher angle, so this will tend to stall first. In the case of blades with wash-in, the tips of the blade will stall first. Only if the blades have the same geometric pitch throughout will all sections stall together.

Washout (excessive "twist") on a propeller blade usually produces poor results. A small amount of wash-in (less "twist" than for constant geometric pitch) can be beneficial. This is because the outer sections of a model propeller do the most work in any case.





Fuels—and how to make them



The NEW M.A. BEGINNERS' COURSE PART XXIV

THERE are three basic types of model engine fuel: petroil, diesel and glowplug fuel. The first, consisting of a mixture of petrol (gasoline) and heavy motor-oil and intended for spark-ignition engines, is only very occasionally required nowadays. The second, comprising various mixtures but all containing oil and ether, are the most commonly employed model fuels in Britain and on the Continent, where diesel motors are the most popular type of model engine in current use. The third group embraces a wide variety of formulae based on methyl-alcohol and castor-oil (or synthetic oil) for the many types of glowplug motors in use in America and elsewhere.

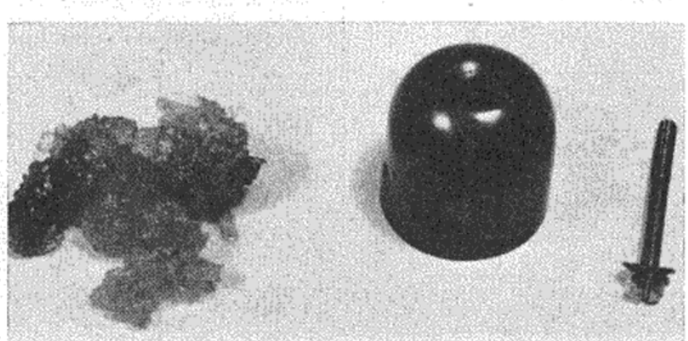
Atmospheric conditions can have a serious effect on model engine performance, but, fortunately for British modellers, in the temperate climate of the British Isles, this does not normally present any serious difficulties. For this reason, most of the commercially available model engine fuel mixtures will be found adequate for use throughout the year. However, where optimum contest performance is required under a given set of conditions, blending the fuel to suit the engine can be expected to yield best results.

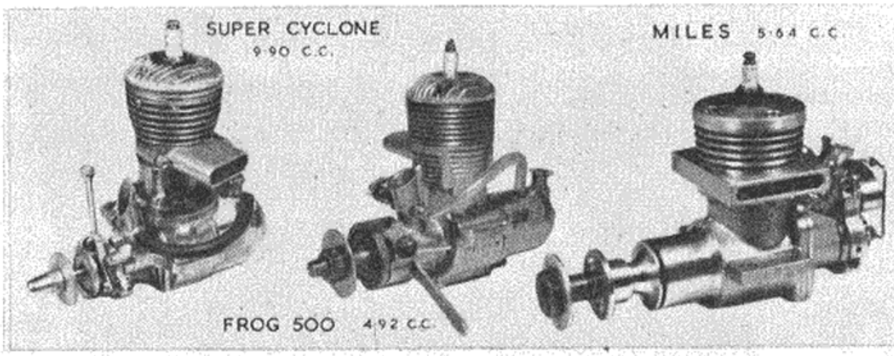
Another thing in favour of mixing your own fuel is the question of cost. Generally speaking, you can make up a fuel for less than half the cost of a ready bottled equivalent from a model shop. Your own mixture can be every bit as good as the branded fuel which, inevitably, must have its retail price somewhat inflated by labour and distribution costs.

When mixing your own fuel, you can ensure, at the same time, that it is pure and free from any foreign matter, by filtering it as it is bottled. Only very simple equipment is necessary for filtering and blending. As quite small quantities are involved, a 12-oz. medicine bottle will generally be found adequate. These are obtainable graduated in ½-fl. oz. divisions and if ½-pint (10 fl. oz.) of fuel is made up each time, these ½-oz. graduations each conveniently become equal to 5 per cent., enabling the correct proportions of the constituents to be quite easily measured.

No matter how careful you may be, or how clean your materials and containers appear to be, there is an ever-present danger of picking up dirt or fluff which, if left in the final mixture, may cause annoying trouble when the fuel is used by clogging the carburettor jet. For filtering, a piece of parachute nylon is very effective. However, where commercial paraffin is used, this sometimes contains a sediment—usually minute particles from

Left: For measuring and mixing fuels, ordinary 12 oz. medicine bottles, graduated in ½ oz. are excellent. For measuring small quantities of additive, a graduated syringe is useful. Right: The unfortunate results of poor formulation in a commercial fuel, and failing to empty the tank after use. Coagulated deposits removed from a small diesel.





Cheapest fuel is petroil used in spark-ignition engines. Where higher performance is required, a methanol base fuel can be employed.

inside a rusty or dirty drum—and in such cases it is advisable to first filter the paraffin only through a filter paper. Suitable papers can be obtained from a retail chemist.

To avoid spillage and for use with the filter materials, a small funnel will be required. One with a rim is preferable, as a rubber band can then be used around it to hold the filter material in place.

Finally, you will want one or two bottles in which to decant your mixture for use on the flying field. These should preferably be of the screwcap pattern.

Fuel constituents and their uses

Technical Ether BSS.579 Anaesthetic Ether	Diesel. Also sometimes used in small quantities in other fuels to help winter starting.
Power Blending Methanol Methyl-alcohol	Base material of nearly all glowplug fuels and racing fuels. Cannot be mixed with mineral base lubricants.
S.B.P.4 Industrial Spirit Commercial Grade Petrol (white gasoline) Lighter fuel	All spark-ignition engines except where very high compression ratios make alcohol base fuels preferable.
Paraffin or Kerosene, including standard grades such as: Shell Royal Standard or 1st quality burning oil such as Aladdin Pink, Esso Blue, etc.	Diesel fuel base.
Light distillate fuel oil such as Iranian gas-oil or DERV	As above. No advantage over paraffin except that a smaller lubricant percentage can be used.
Nitromethane	Additive for methanol base fuels for giving substantial power increase and/or improved combustion under "cold" conditions.
Nitrobenzene (Oil of Mirbane)	Stabiliser and coolant for racing fuels where large percentages of nitromethane are used. Also used as an inexpensive substitute for nitromethane.
Amyl-Nitrate	Ignition control additive for diesel fuel.
Amyl-Nitrite	Ignition control additive for diesel fuel. Cheaper and less effective than Amyl-Nitrate.
Acetone Amyl-Acetate	Additives for methanol/castor-oil fuels to ensure homogeneous mixture. Not necessary if pure lubricant and water-free methanol are used.
Heavy mineral motor-oils such as: Castrol Grand Prix or Essolube Racer and others of SAE.50 to SAE.70 viscosity rating.	Lubricant for petroil and standard diesel fuels. Not suitable for alcohol fuels.
Compound motor oils, containing castor-oil and including: Castrol R and Shell Super Heavy	Lubricant for all types of diesel fuels. Not suitable for alcohol fuels.
Castor oils, including: Castrol M, Duckham's Racing Castor, Pratt's Racing Castor, Baker's AA, Castor-Oil B.P.	Lubricant for all methanol base fuels.

Petroil Fuels

Nearly all model aircraft engines produced during the past few years have been of the diesel or glowplug type. However, there are a few exceptions, two British examples being the spark-ignition version of the Frog 500 and the 5.6 c.c. Miles engine. There are also some older American spark-ignition types still in use, including the famous Super-Cyclone, Anderson Spitfire, Forster 99 and Ohlsson models. Spark-ignition petrol engines are preferred by some modellers, for R/C in particular, because they offer accurate and positive speed control by means of the ignition contact-breaker advance and retard control.

The standard fuel for use in engines of this type consists of a simple "two-stroke" mixture of petrol (gasoline) and motor-oil, commonly referred to as "petroil." Ordinary petroil mixtures as used in two-stroke motorcycles, mopeds and scooters, however, are not suitable, due, mainly, to their low oil content. A mixture of 1 part motor oil to 4 parts petroleum spirit is best for most types, a proportion of 1 part oil to 3 parts spirit being preferred for a new engine.

The motor oil should be the heaviest engine-oil obtainable from your local garage and not less than XXL quality or SAE 50 viscosity rating. Better still is Castrol "Grand Prix" or Essolube "Racer," such as is sold by the motorcycle specialists. As regards the petroleum spirit content, there is no advantage in using high-octane ratings and a cheap commercial grade petrol, or, alternatively, S.B.P.4 industrial spirit will give excellent results.

Diesel Fuel

Model compression-ignition, or diesel, engines depend on a fuel having a low self-ignition temperature. They require a fuel which, merely through the heat obtained from the compression stroke, will ignite spontaneously, instead of being ignited by means of a spark or glowplug.

This requirement is fulfilled by using ether, which has a very low self-ignition temperature, as one of the main constituents in our diesel mixture. The other essentials consist of a burning oil and a lubricating oil. The first can be either paraffin (kerosene) or diesel fuel oil. The paraffin may be the popular "Aladdin Pink" or "Esso Blue" or any similar oil sold especially for use in domestic heaters, but the ordinary white grade, such as "Shell Royal Standard" is equally effective.

Some engine manufacturers specify the use of diesel fuel-oil. Numerous tests have shown that no real advantage is to be gained by the use of fuel-oil as opposed to kerosene; in fact, fuel-oil tends to produce a dirtier exhaust, but, where used, fuel-oil should be a gas-oil of the type sold for use in modern high-speed true diesels and known commercially as "DERV" or diesel-engined-road-vehicle fuel. Where obtainable, Iranian gas-oil would appear to be the best grade to use. When using this, incidentally, it is permissible, due to the lubricating properties of the gas-oil itself, to reduce, by up to 5 per cent., the lubricating-oil content in the mix.

The lubricating oil can be a heavy grade motor oil such as has been recommended already for spark-ignition engines. Alternatively, castor-oil, or a castor-base racing oil, or a castor type compound oil may be used. Castrol "R" is an oil of this latter type that is widely favoured by contest enthusiasts. Castor-oil is, of course, well-known for its excellent lubricating properties and, in view of the small quantities involved, the very slight extra expense of using castor base oils can be well justified.

Castor oils (which, of course, are of vegetable derivation) and petroleum products, such as paraffin and fuel-oil, will not mix, but, fortunately, the ether content of our basic diesel mixture, here plays a secondary part by acting as a "stabiliser," dissolving both vegetable and mineral products and ensuring a clear, homogeneous mixture. Ether is available from any pharmacist and it is not necessary to insist on the anaesthetic grade, technical ether (preferably to British Standard specification 579) being cheaper and just as good for our purpose.

The most widely favoured additive for diesel mixtures is amyl-nitrate. This has the effect of making the fuel "hotter" and lowering the compression ratio required to achieve auto-ignition. As we learned in an earlier article, light propeller loads and higher speeds require ignition timing to be advanced accordingly and, in a model diesel, we normally do this by increasing the compression by means of the compression adjusting screw so that the temperature within the combustion chamber is brought to the self-ignition point earlier in the cycle. However, the extremely high compression ratio now tends to be excessive for smooth combustion. This is particularly evident in the larger capacity engines because the best compression ratio for any internal combustion engine is also a function of the cylinder bore.

We find, therefore, that most small diesels of around 1 c.c. capacity, as recommended to beginners and usually operated at speeds of 7,000 to 9,000 r.p.m., will operate perfectly satisfactorily on a plain mixture of ether, paraffin and oil.

Contrasting with this is the typical 2.5 c.c. competition diesel, operated at, perhaps, 12,000 r.p.m. or more, and, also, still larger, though slower-revving engines, such as the 3.5 c.c. E.D. Hunter. Here, about 2 per cent. amyl-nitrate will be required to ensure even running.

A few high-speed contest diesels may require even more nitrate and the two most prominent examples of this are the Oliver Tiger and Frog 249-BB, which require 3 to 5 per cent. amyl-nitrate, especially if required to reach their peak horsepower, which is delivered somewhere in the region of 14,000 to 15,000 r.p.m.

Thus, a simple mixture of equal parts of oil, ether and paraffin can be used in any small diesel and also as a running-in mixture for the first hour or so with new engines of larger type and when speeds are held to less than 10,000 r.p.m. In most cases the paraffin content can, for the sake of economy, be safely increased after running-in, to $1\frac{1}{2}$ to 2 parts (i.e., 40 to 50 per cent.).

In general, however, 25 per cent. ether should be regarded as the minimum. Some engines require a higher ether content of 30, 35 or even 40 per cent., especially when new and when the heat generated by the friction of new parts is higher. The same applies when the fuel contains amyl-nitrate. The extra ether here acts as a coolant by absorbing heat as it evaporates.

The only purpose of the oil content in the fuel should be lubrication; anything over the quantity required for this is only being wasted. This does not usually matter as only relatively small amounts are involved and an excessively oily exhaust at least indicates that the cylinder is being adequately lubricated. When actual fuel consumption is a major consideration, however, as in team racing, it is to the modeller's advantage to experiment and reduce the oil content to the safe minimum. With a well-run-in, ball bearing diesel and employing a good castor oil, 20 per cent. is usually adequate.

Amyl-nitrate, normally available through a retail chemist, is difficult to obtain in some countries and an alternative is iso-amyl-nitrite. Nitrite is cheaper and slightly less effective than nitrate. It requires a higher compression setting (but one which is still less than when using plain fuels) and, compared with nitrate, about 50 per cent. more nitrite as an additive.

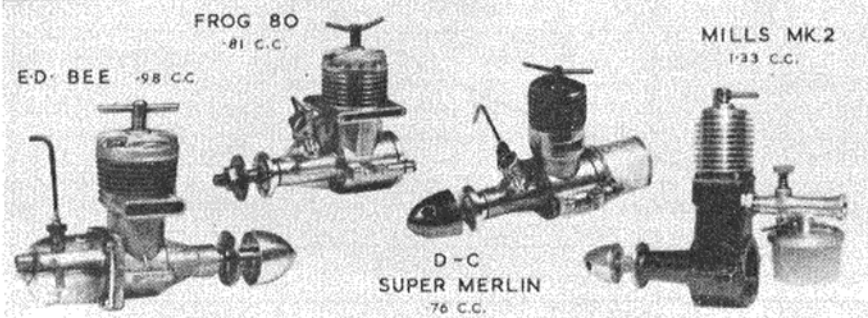
Glowplug Fuels

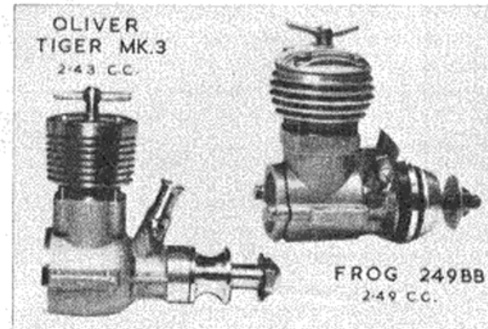
A basic fuel for use in glowplug engines consists of 75 per cent. methyl-alcohol, or methanol, and 25 per cent. castor oil. For running-in, the castor oil content can be increased to 30 per cent.

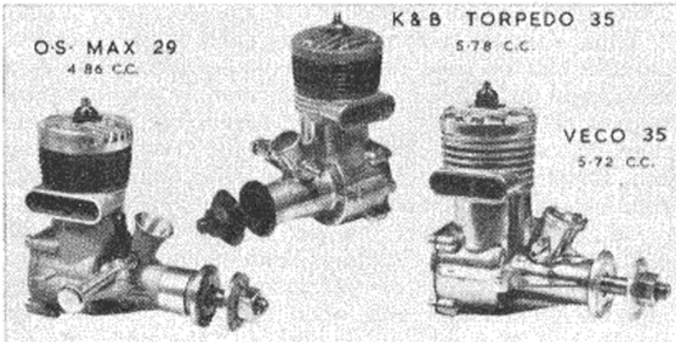
The most suitable fuel for any glowplug engine, however, depends on many factors. Apart from questions of engine design, these include atmospheric temperature, pressure and humidity, the amount of running that the engine has received, the type of model in which it is to be installed, the speed at which it is to be run and the type of glowplug used. The whole question of glowplug engine fuels is, in fact, too complex to be dealt with in detail here, but the following will serve as a guide.

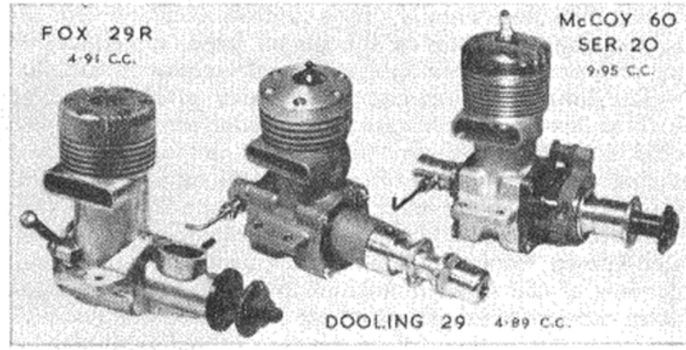
Most modern American engines, for example, are designed to make use of fuels containing an oxygen liberating compound (nitromethane). Some of these engines (especially the small "Half-A" class motors)

Simple three-part ether/oil mixtures can be used in most small diesels. Three to five per cent. amyl-nitrate additive is essential for high r.p.m. with the Oliver Tiger and Frog 249-BB.









"Hot" fuels, containing 30 to 60 per cent. nitromethane, are used in racing engines where conditions permit. "Mild" glowplug fuels containing not more than 10 per cent. nitromethane are adequate for most stunt type engines.

tend to run too "cold" on a plain methanol/castor fuel and will slow down or stop when the starting battery is disconnected. In this event, the use of not less than 10 per cent. nitromethane will usually effect a cure.

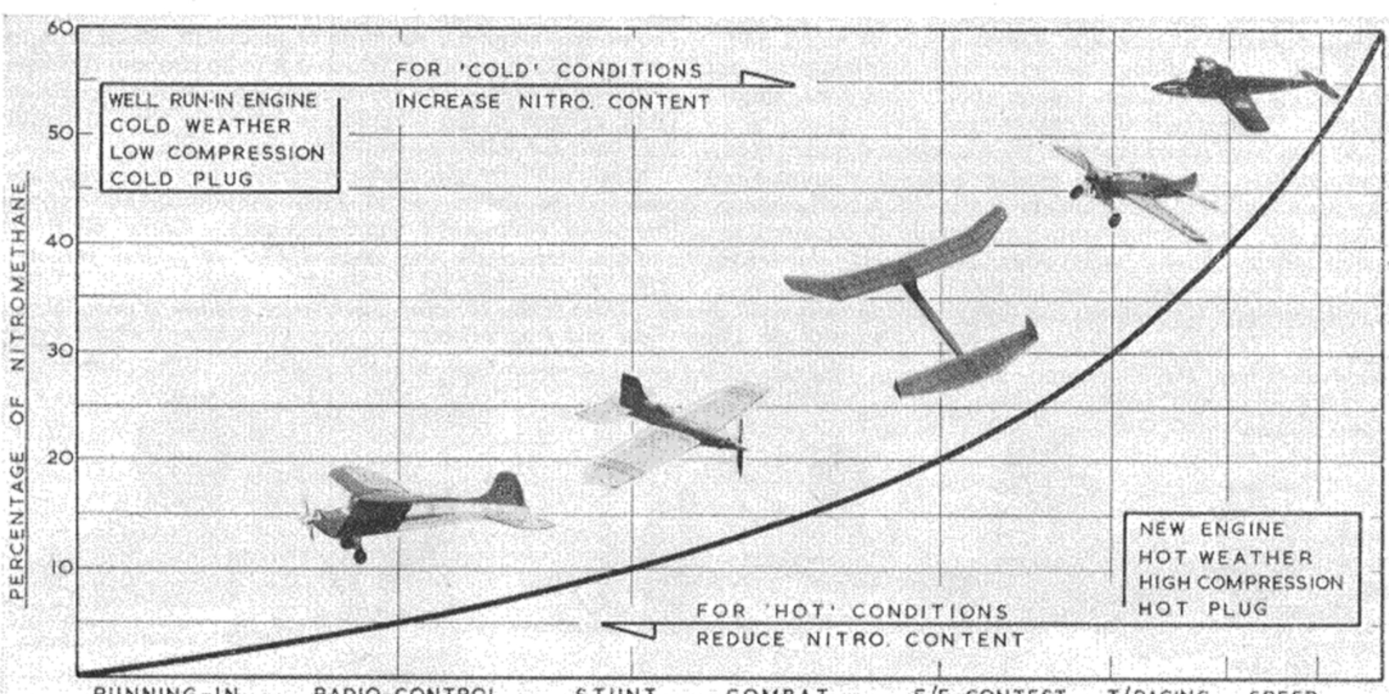
After running-in, most glowplug engines give their best all-round performance with a nitromethane content of between 10 and 30 per cent. The addition of nitromethane to a plain methanol and castor fuel gives a substantial increase in power, but, beyond a certain percentage, will cause over-heating and care should therefore be taken to increase the nitro content only as far as the point beyond which no further gain in performance is obtained.

Unless absolute maximum power is essential, however, it will generally be found that about half the optimum nitro-methane percentage will give excellent performance. This reduction may be desirable for two reasons. Firstly, nitro-methane is (except in the U.S.A.) very expensive, costing in the region of £1 per lb. Secondly, during very hot and sultry weather, it may, in any case, be necessary to reduce the nitromethane to avoid overheating.

Some engines will not tolerate high nitro fuels. Loss of power, or overheating to the point of seizure, or pre-ignition (sometimes to the extent of kicking the propeller loose) may all indicate an excessively "hot" fuel. Such tendencies are especially noticeable in certain of the larger lightweight stunt engines of the "29" and "35" class, such as the K. & B. Torpedo, Veco and O.S. models illustrated. These engines are designed to provide all the power required for a large aerobatic C/L model without recourse to expensive fuel mixtures and 5 to 10 per cent. nitromethane is adequate, although higher quantities can be used after several hours' running.

Very high nitrated fuels, however, are the rule with racing engines used in pure speed models where it is essential to extract the utmost power from the engine. In contest work and record breaking, the blending of fuel to match a specific combination of conditions then becomes a highly complicated process. Generally, a nitro content of at least 30 per cent., and often 40 to 50 per cent., is used in engines of the Dooling and McCoy type, while, with the Fox 29R, 60 to 70 per cent has been used. In order to prevent overheating and pre-ignition, and also to maintain a homogeneous mixture, the nitromethane is combined with 5 to 10 per cent. nitrobenzene.

In conclusion, we must point out that most of the fuel constituents we have mentioned are poisonous, as well as highly inflammable, and great care should, therefore, be exercised when handling them.



STUNT SCHEDULE COMMENTS . . . .

Continued from page 46

very basic schedule that was in operation.

"I believe that the 1957 contest will be won with less than 450 points, so nobody need worry that expert fliers are taking part, for these manoeuvres are new to everyone, although those who could fly the previous schedule will have a head start."

As did **Bill Morly** . . . "I welcome the adoption of the A.M.A. Stunt Schedule as a move which has been necessary for the past four years. Stunt flying has been relatively in the doldrums for this period because of the lack of enthusiasm engendered by the ridiculously easy S.M.A.E. schedule.

"Stunt flyers now have something to get their teeth into, and the Gold Trophy will no longer be the boring procession of flights of near-equal merit that has prevailed since 1952.

"This is the shot in the arm that British Stunt flying sorely needed."

Pete Russell *had strong reasons for disagreeing* . . . "I am against the adoption of the A.M.A. schedule in this country. It is far too complicated and cumbersome, and its introduction would serve no useful purpose. What is the point, when certainly no one currently flying can do the present schedule to anything approaching perfection?

"The present schedule is straightforward and composed of entirely recognisable manoeuvres. The introduction of 'Cloverleaf,' 'Hourglass' figures, etc., raises new problems for the poor old judge, that most important person, whose job is already difficult enough.

"Perhaps two square inside and outside loops, plus the ordinary wingover (so rarely performed well), could be added to the present schedule, to make it a bit more elaborate, and without introducing complications.

"I should not like to see a premium placed on 'square corners' though, as nothing offends the eye of the genuine aviation enthusiast more than the grotesque overwinged and flapped American type model changing direction in its own length.

"If anybody ever does a perfect schedule that will be the time to think about further really difficult manoeuvres."

And **Dave Chizlett** *also dissented* . . . "As a very keen stunt pilot, I was interested to hear of the decision to adopt the A.M.A. schedule. Unfortunately, this decision came at just about the same time as my own decision to give up aeromodelling on the grounds of expense. This adoption of the A.M.A. Schedule would only have urged me to give up sooner.

"Up to now, my achievements, such as they were, were made using comparatively cheap, both to buy and to run, English motors (i.e., A.M. 25, Frog 500, etc.) and this latter is quite the best stunt motor I ever handled. However, the British market does not, and here I stick my neck out, repeat does not, manufacture a motor capable of running consistently through the complete A.M.A. schedule. This means that any would-be stunt champion must pay approx. £7 10s. od. for an American motor, and then spend about £2 10s. od. or more to build a suitable model, i.e., a large area, flapped machine typified by Palmer's designs. Thus for the model alone we have a bill of about £10 os. od.

"Now I defy anyone to perform the new schedule with such a combination without the use of expensive additives, such as nitro-methane, retailing, when obtainable, at about £1 per pint. This means that, like myself, a great many stunt pilots will give up until such times as the English manufacturers produce a stunt motor comparable to the Veco 19 or 35, at a sensible retail price (about £4)."

But with **Gig Eifflaender** *joining with the majority, the result is 2-1 in favour* . . . "I like the introduction of a new schedule, this has been long overdue and will definitely stimulate stunt model design, albeit that all the sharp corners suggested will very likely bring forth a crop of, ton-and-a half wing-tip weighted, '35' powered box-cars by way of acclimatisation.

"I would like to see more points awarded for realism, finish and less points for landing, and the removal from the proposed schedule of the design-detail-and-flight pattern points.

"I feel that those particulars could only be judged by a very competent designer cum builder cum stunt-flier with any hope of achieving a fair decision. As it stands, the schedule proposed is, in itself, difficult, indeed, to judge, from the flying aspect alone, especially when it is remembered that the old S.M.A.E. schedule was pruned because of difficulty in the judging of square loops, etc."

Mac Grimmett also commented upon the points awarded, and difficulties in judging, but as at the moment such comments can only be theoretical, the general feeling is that as the Americans have found their system satisfactory it should be given a full trial.

Looking Back

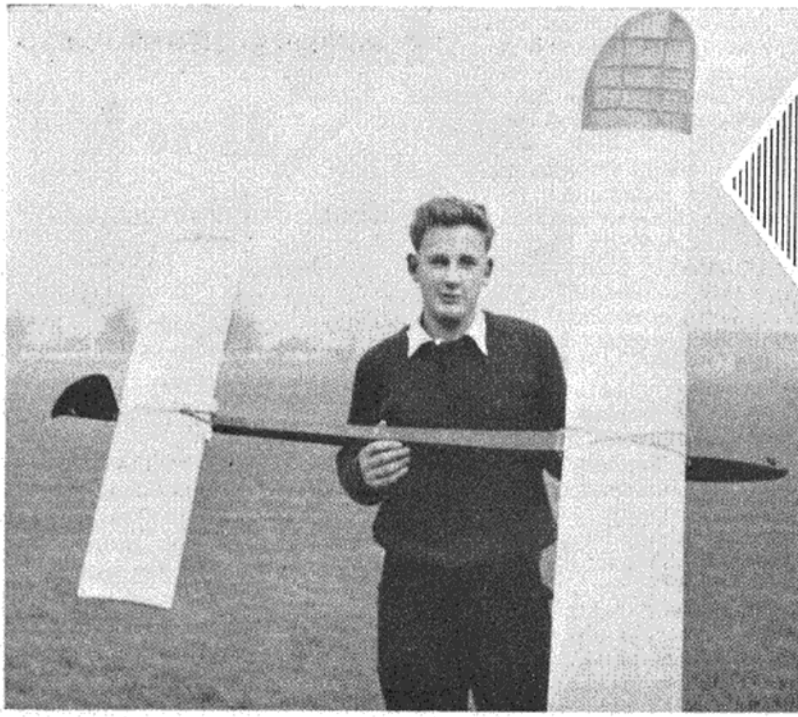
Continued from page 52

Prefabrication in kits seems to have almost reached the ultimate with some manufacturers. Block balsa parts ready cut to quite complicated curved shapes are not unknown and Mercury's *Spitfire* and *Mustang*, British examples of modern prefabrication, are assembled without the aid of the usual building plan.

From the U.S. came one of Jim Walker's *Firecat* stunt model kits. This is a 43 in. profile model for .19-.35 cu. in. engines and is another example of extensive prefabrication. It has a built-up wing, of course, but one that could scarcely be quicker to make : leading and trailing edges are ready shaped and slotted, wing ribs diecut and even the tips are ready shaped. There is also a ready made elevator hinge. Another Jim Walker kit (albeit somewhat removed from aircraft) which took our fancy was his new 18-in. scale model of the American Unlimited class Gold Cup winning hydroplane *Miss Thriftway*.

We cannot conclude without a word about two R/C sets obtained during the year. First, the E.D. Transitrol receiver. From our experience with it so far, this seems to be a trouble-free set of good performance and certainly marks an advance on the single-valve commercial receivers of seven or eight years ago. We feel that it can be especially recommended to the newcomer to radio-control as it is easily tuned and reliable.

The other set is a somewhat more complicated outfit which has been manufactured for the past year or two by the Japanese O.S. company and is now being offered for export. It consists of a three-valve hand-held transmitter, using two 3S4 and a 3A4 valve in a modulated carrier circuit. The transmitter is crystal controlled on 27.12 Mc/s and modulates at 500 cycles. The O.S. Type 3A receiver, intended for use with this transmitter, uses three valves (3A5, 1U5 and 3S4) and a polarised relay. Both units are beautifully put together. They are expected to form the basis of a range of multichannel O.S. units now under development.



Walkin' Shoes

A 7 ft. 6 in. glider for those who like 'em big

Designed by J. MOSELEY

WALKIN' SHOES is developed from a design laid down early in 1956, the basic requirements being a lightweight sailplane of simple construction, with a one-piece wing of the largest size practical for relatively easy transportation. The aspect ratio was kept fairly low so as to arrive at a wing area of approximately 850 sq. in., and a powerful tailplane was used in conjunction with a rearward c.g. position.

This prototype model was relatively successful, though of strictly functional appearance, and rather unsteady on the towline, but it was lost at Mill Hill soon after completion.

Walkin' Shoes was then laid down with structural alterations and considerably more eye-appeal than its predecessor, while flying tests showed that performance and tow-line stability were much improved.

Fuselage

Commence construction by binding the towhook to a piece of hardwood, and cementing it securely to the fuselage base. Next, cement all formers to the base and put aside to dry thoroughly, cutting the fuselage sides to shape in the meanwhile. Cement one side to the fuselage base assembly, and when dry add the auto-rudder mechanism. Cut a small slot in the rear of the port fuselage side, and cement in a short length of neoprene fuel tubing for the rudder line to run through.

Add the second side, dowels, gussets, etc., and complete the fuselage by sheeting in the top. The fin is cemented securely between the rear fuselage sides, ensuring that it is vertical and true, then the noseblock is added and the entire structure well sandpapered. Finally, add a strip of $\frac{1}{16}$ in. sq. to each side of the top of the body to form a firm mounting for the wing.

Wings

Lay down the leading and trailing edges of the centre panels on the plan, packing up the trailing edge to allow for the undercamber, and cement the ribs into place. Slot the top spars into the ribs, and on removing each panel from the plan add the lower spar.

The wing tips are built in a similar manner, the curved tip members being cut from medium-soft $\frac{1}{4}$ in. sheet. At this stage build slight washout into each tip.

The next stage is to join the panels, which must be done most carefully. Thoroughly pre-cement all spars at the spots where they overlap and fit the panels together, ensuring that a perfect joint is made at the spar laps. If properly built, this joint is extremely strong and is quite capable of taking the strain of a fast tow without failure. Add all gussets, reinforce the leading and trailing edges with silk or gauze at each dihedral joint, and finally slice the riblets from $\frac{1}{16}$ in. sheet and cement into place. Sandpaper the wing thoroughly and check all joints.

Tailplane

The construction of this is so simple that detailed instructions are hardly necessary. It should be remembered, however, that the riblets are cut from the template of the true section (end and centre ribs). The finished structure is very light, strong and warp resistant.

Covering

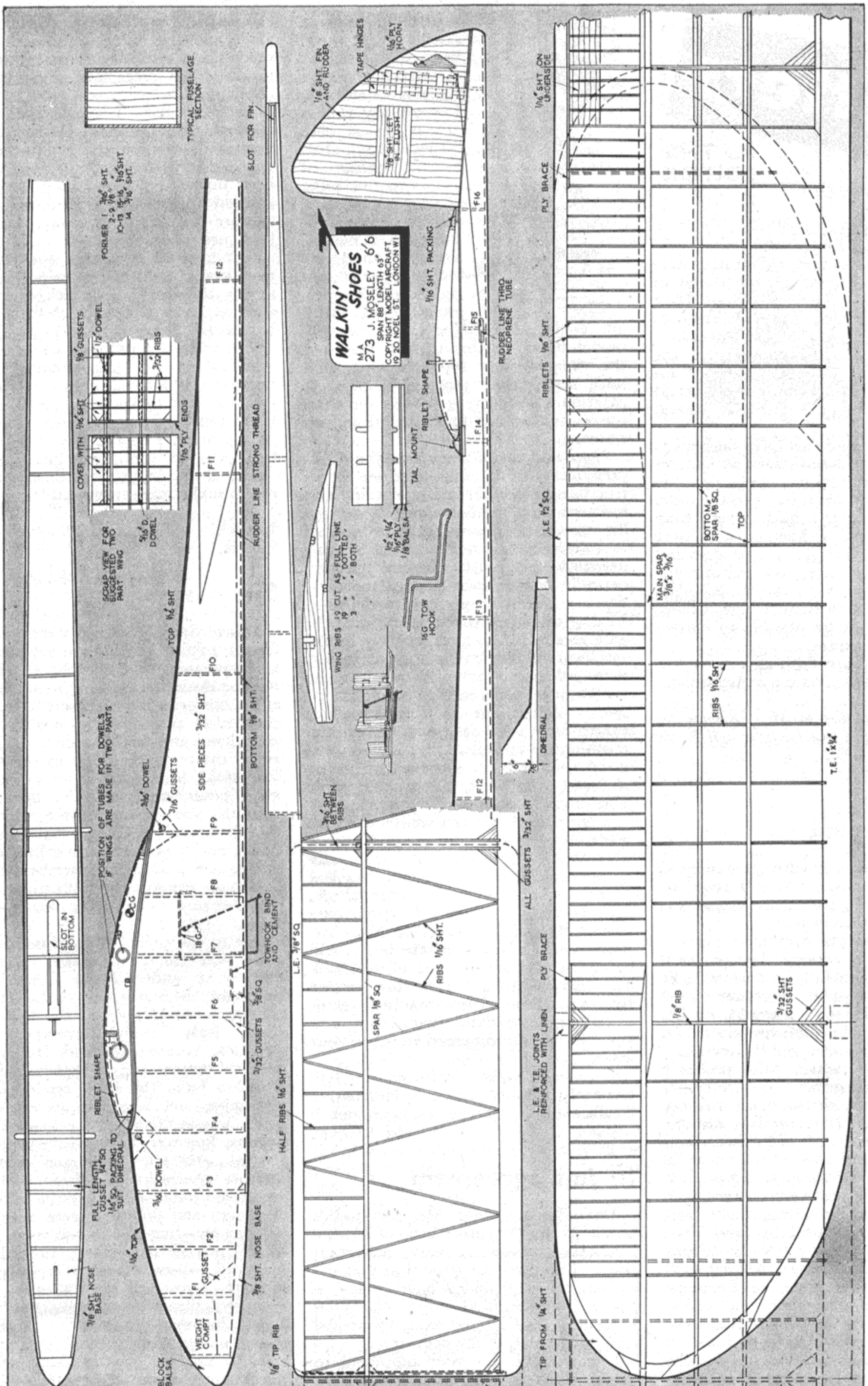
Use heavyweight tissue on the centre panels of the wings, lightweight on the rest of the model.

Trimming

Correct any tendency to turn on the towline by adjusting the position of the rudder. When correctly trimmed the model should tow fast to full altitude with no weaving whatsoever, the actual glide pattern being a slow, fairly wide circle to the right, flying close to the stall but not undulating. When correctly adjusted, times of 2 : 40 - 2 : 45 should be achieved from a 50 metre line in calm evening air, this trim being equally effective in most other conditions.

It is important that the rubber band holding down the trailing edge of the tail passes between the fuselage side and the rudder line. If placed *over* the line, the rudder will pull straight for the turn but cannot spring back to its normal glide position, in which case the stalls are truly magnificent!

Walkin' Shoes is light and rides the weakest lift so the d/t should be used at all times.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 19-20, NOEL STREET, LONDON, W.1, 6s. 6d., POST FREE

Letters TO THE EDITOR

Correction !

DEAR SIR,—A most unfortunate misprint has been pointed out to me in my article "Modellers, You Lack Originality," which was published in the December issue of MODEL AIRCRAFT.

On page 410, the caption for the second picture at the top, reads "An experimental model built by Donald Stevenson in 1913."—but this should read 1903.

This is rather serious as it contradicts what I have said in illustrated lectures and in other articles, and also the beauty of the whole thing is in the date, showing that swept back wings were thought of, and experimented with, over 54 years ago. In addition, it does not agree with the date printed on the notices displayed with the model when it has been lent to R.Ae.S. Exhibitions, etc., so would it be possible to correct it in a future issue?

Yours faithfully,
Portsmouth, Hants. DONALD STEVENSON.

We must apologise to Mr. Stevenson for this error, and trust that his letter will set the matter straight.—Ed.

Disagreement

DEAR SIR,—It was with some interest, not to say amusement that I read the article by Donald Stevenson on page 409 of your December issue.

I assume that Mr. Stevenson is out of touch with the present day practical aeromodeller, although he assures us he has acted as a judge at recent model exhibitions. Therein, I would say lies the whole weakness of his assertions. He has obviously seen the "Concours" type of model which will probably never leave the ground and competes for a place in the sitting room with the aspidistra! Without entering into the well-flogged arguments of "Scale versus Functional" and "what is a model aircraft" I would strongly advise Mr. Stevenson to attend any large scale rally or competition where, I am sure, he will be overwhelmed by originality.

He informs us that "fewer experimental models are being made today." Of course there are fewer, as I assume by "experimental models" he means scaled down prototypes of full size aircraft. This type of work is done by aircraft companies and owing to the complexity of modern aircraft no aero-

modeller could attempt this work. With all due respect to Mr. Stevenson's age and experience, I would say that a modeller of the "1900 era" had more chance of stumbling on some device or invention of practical application in a Bleriot, than a modeller today, in the present generation of supersonic aircraft. After all, model aircraft (or more correctly model flying machines) flew first and the man-carrying type followed, and have served their purpose in full size aviation. (Non-flying models for wind tunnel testing are precluded from this statement.)

Once and for all, aeromodelling, in its presentday form, must be seen in its true perspective. It is a hobby first and foremost and whether a person devotes his energies to copying full size aircraft in miniature, or flying model aircraft designed for some specific purpose, depends on his own particular fancy. To say that the present modeller is lacking in inventiveness is absurd. As long as the F.A.I. have any say in the specification of contest type models there will be no lack of demand on the aeromodeller's source of ideas and initiative! It is due to the modeller's versatility in designing successful machines to formulae, that has resulted in the Wakefield specification being changed four times in post-war years. This is surely no sign of stagnation.

I have no doubt the article will give rise to a great deal of correspondence if only for the assertion that the greater number of models are merely glorified toys. Is Gibb's record holder a toy, are Posner's "Weavers" toys, are Evan's Wakefields toys? No, Mr. Stevenson! You are off the beam, still living in the atmosphere of oiled-silk and bamboo and I can only suggest that you bring your practical aeromodelling up-to-date when I am sure you will be fully prepared to revise your ideas.

Yours faithfully,
Gourock, Renfrewshire. (Sgd.) G. A. HUNTER, (Secretary, Grennock M.A.C.).

In full agreement

DEAR SIR,—I think Mr. Stevenson's article in the December issue of MODEL AIRCRAFT makes a very important point. I have felt for some time that the various types of models have tended to become standardised, with the consequent shift of interest from the model itself to the skill of the operator.

I, personally, am more interested in models than in the people who win competitions with them, and I would gladly exchange some of the competition reports and reviews of new commercial products for more instructive articles about models.

In particular, I recall the, often, mathematical articles which used to appear in the modelling press around 1945, when serious attempts seem to have been made to design models on sound theoretical grounds. Perhaps models still are designed in this way, but, if so, they are never reported. No doubt design by trial and error and previous experience produces just as good results as the theoretical approach, but these are two points of view which should both be catered for.

Therefore, let us have an occasional technical article, mathematical where necessary, which will appeal to those of us who want to know not only how to make a model fly, but also why it does so.

As a start, I should like to see a full treatment of the forces on a glider during a tow launch, which might help me to make mine more stable.

Yours faithfully,
Ipswich, Suffolk. L. BURKINSHAW.

Silvio says . . .

DEAR SIR,—Looking back to the fateful 1956 S.M.A.E. annual meeting, when we were told that the F.A.I. had made a decision to alter the existing F/F rules, one wonders if the criticism then thrown at our delegate was, in fact, considered and well founded. I do not regret the accusations, if such they were, first of all because they were taken in good heart, and secondly, because it certainly showed our officials that we, the fliers, should always be consulted before any major action is taken. After all we feel that as the members of the S.M.A.E. we have a right to instruct our delegate as to what we have in mind.

But to the point, most of us thought then that the new rules would kill enthusiasm and kill the F.A.I. competitions. Many expressed the opinion that they would give up the F/F class. From Italy, from Germany, from America, Guatemala, and Holland, I received letters asking that we should work to have the rules rescinded. I remember not one flier, except Alan King, was in favour of the new rules.

Now, however, having reflected, considered, and tried we have come to another conclusion. From Milan I received a letter telling me that after all they said and did they were now considering building to the new rules, from Ohio I get the same story. From Larry Conover, whose model I flew proxy in 1956, I received the following:

"It will please you to know that 'The Lyndi' has made it again and is in the American team for the World Championships in England, so the Lyndi will fly the Atlantic again. In the last elim. I made 882 sec. out of 900 and beat the next best by 60 sec. All this with a ship loaded up to 28.5 oz."

My own experience shows that the above is no exception. I loaded my *Golden Hawk* to the required weight of 33 oz. and except for slightly decreasing the turn, I left trim as it was, results? two flights in still damp air, off a 15 sec. run of 3.10 and 4.00.

In view of the above, my advice to you is to get moving with your old model loaded up to the required weight, or, better still, build a strong model putting the weight well under the C.G., add a substantial undercarriage and, I believe, you will find that the new rules are not as bad as most of us made them out to be.

One final remark? I have not, and would not like to fly my plane in a strong wind, less still would I like to be at the receiving end of the plane while landing. That, I believe, will be the biggest snag—casualties much greater when hitting an obstruction.

Yours faithfully,
Bradford. S. LANFRANCHI.

Full size defence

DEAR SIR,—May I claim a little of your space to note my vigorous disagreement with Mrs. Fisher (Jan. issue).

Few modellers are so narrow-minded that their interest in full-size aviation is nil; after all most readers according to their age, I imagine, have either had, have, or hope to have, some full-size connections.

As for the "very large number of periodicals concerning this subject" there are exactly five, of these the two weeklies and one monthly owe a first allegiance to the industry, one monthly is restricted in its scope by a service slant, while the third is largely concerned with defence policy.

No sir, we are not so many single-minded ostriches! Keep up the good work, the balance is just right.

Yours faithfully,
Wallington, Surrey. PETER G. COOKSLEY.

Measuring airspeed

DEAR SIR,—Reading through the correspondence in the December issue of MODEL AIRCRAFT on the vintage number (July, 1957), I see that Mr. B. Waugh of Australia would like to know how the Germans measured their airspeed during World War 1. If he looks very carefully at his photographs of the machines of the period, he will probably see, either mounted on the interplane struts or on a small strut on the leading edge of one of the wings, an instrument which, at a distance, resembles an egg-timer. This is nothing of the sort, but is actually an anemometer of the revolving cup type.

The complete instrument consisted of a circular, white-faced dial upon which were marked the airspeed figures, above it the gearing mechanism, and on top of this the horizontally revolving cups, which were protected by a wire guard. The speed was indicated by a single balanced hand, turning on the face of the dial. The anemometer was fitted on the machine so that it was easily visible to both pilot and observer.

The more usual type of pressure-head system, registering on a dial on the cockpit instrument-board, was also in use on various types.

Yours faithfully,
South Benfleet, Essex. P. M. H. LEWIS.

Candid comments

DEAR SIR,—During a recent visit to England I was able to visit the "All Britain Rally" at Radlett and enjoyed it thoroughly. To tell the truth, it did not look very much like a competition to me, but more like a model aircraft picnic with everybody having a jolly good time. I was very much impressed by the high standard of team racing and combat flying, but the R/C was a very, very big disappointment.

After witnessing a series of crashes I asked a competitor, whether this was the usual standard of R/C flying in Britain and he replied: "I would say there is a slight improvement this year" and blamed the English weather in not giving the flyers enough opportunities for getting the necessary experience. This looks a poor excuse to me. There were two or three fine demonstrations (all of them hand launched, I think) and even if their horizontal eights were rather lop-sided and their spot landings many yards off the mark—I give them full credit because here the wind really did interfere most disturbingly. But the majority of the crashes I saw were a result of sheer stupidity and lack of intelligence and had nothing to do with English weather. I am sorry if I am a bit too emphatic about this point, but I looked forward to this particular competition with much anticipation and was so bitterly disappointed.

By the way, the organisation of the R/C event was most efficient and impressed me very much. But later on I saw how a poor competitor tried to launch his A/2 model, one hand holding the line while the other was occupied in pushing people out of his way. Believe me, launching a glider in a strong and gusty wind is difficult enough, even without having to fight one's way through a milling and pushing crowd.

Now I have been told that last year the spectators nearly stampeded the R/C event, so this year they put a rope round the take off area to keep the crowd away from the models. How about adding another rope next year, to clear some space for the poor A/2 boys? Otherwise I would advise the competitors to provide themselves with machetes and tomahawks, to "cut their way through" more easily. I also saw a female timekeeper trying to deal with many flyers of different events and having one stopwatch only, how she checked the 10 sec. engine run is beyond me. If you have not enough officially approved timekeepers, this is the only method, but why couldn't they find somebody to assist her with the paper-work, so that she could concentrate on the actual timekeeping?

There are many ways of running a competition. One is to put in a lot of ropes, stakes and notices, or there is the Radlett way. I prefer the latter, but I think they are exaggerating a bit on the "easy going" side. After all, there were some people who did not only want to have a good time, but were trying to compete for this or that cup. These few unfortunates should be provided with minimum facilities and this was not always done. Another point is, that the London Transport Corporation was solving the problem of transporting the 10,000 or so spectators by simply ignoring it—running no special bus service between the railway station and the flying field, to say nothing of special buses to London. This, to put it mildly, was scandalous. I hope you don't mind my criticism, but I thought you might be interested in a foreigner's reaction to the "All Britain Rally."

Yours faithfully,
Tel Aviv, Israel. Y. MARGONINSKI.

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

S. LANFRANCHI wins this month's X-acto Knife Chest with his letter on F.A.I. Models. Have you anything to say?—Choose your own subject, but keep it short, snappy and of general interest.

Club News

WOLVES M.A.C.

The club has now been revived from almost non-existence. C/L is the main interest, although F/F still survives. A combat comp. was held recently and an A/1 comp. is planned for the winter. We appeal for new members, and will those interested please contact J. Wilkes, 19, Springhill Grove, Penn, Wolverhampton.

ANGUS & DISTRICT AE. L.

The league held its annual general meeting in the Montrose clubroom. A strong element was in favour of having six A/2 events again in '58 as it had brought record entries in 1957. However, half the meeting was against so many in the same class; so a compromise was reached which plans 15 events, namely five classes: A/1,

S.M.A.E. NATIONALS FILM

Jan.	26th.	Brighton District Model A.C.
,,	31st.	London Area.
Feb.	7th.	North London M.E.S.
,,	17th.	High Wycombe M.A.C.
,,	21st.	Plymouth M.F.C.
March	3rd.	Stratford-on-Avon & District M.A.C.
,,	14th.	Wakefield M.F.C.
,,	20th.	Lincoln & District M.A.S.
April	2nd.	De Havilland (Hatfield) M.A.C.

A/2, open rubber, open power, and F.A.I. power, there being three competitions on different days for each of the above. There will be six contest days altogether, one every month April-September inclusive.

The scale contest has been held over till 1959 and there appeared to be no demand for an unrestricted glider competition. A new trophy, "The Grampian Cup," will now go annually to the league's best F/F junior member.

K. B. Whyte, A. McCallum, D. D. Edward and Roy Yule, all from different clubs were elected once again to president, vice-president, secretary/treasurer and comp. secretary, respectively. It is noted that the league is now over 10 years old and has risen to be the only effective independent competitive model-flying organisation in Scotland today.

Owing to the increased number of events and competitors we had to wait longer than usual to have the total championship pointage gathered in, but here are the final placings:—

Clubs' Championship, "*Strathmore Trophy*."—1st Montrose, 11,296 pts.; 2nd Bucksburn, 7,108 pts.; 3rd Arbroath, 4,917 pts.; 4th Kirriemuir, 3,957 pts.; 5th Dundee, 1,505 pts.

Individual Championship, "*Angus Cup*."—1. D. L. Petrie, 3,916 pts.; 2. K. B. Whyte, 3,205 pts.; 3. A. McCallum, 2,242 pts.

MONTROSE M.A.C.

Out of debt at last, after being in the new place more than a year and a half, Montrose M.A.C. has been able to revive some of its cosy social activities. We held a Halloween night especially for Martin Dilly of Croydon. We had the traditional dooking and scone-licking contests and other activities in which even some of the courageous young ladies who attended took part. It was the first party we ever had that required a microphone to control it. The local rock/skiffle band played to beyond the point of exhaustion and is the first (and possibly the last) to include a Wakefield fuselageist in some of the numbers.

At our annual general meeting, D. L. Petrie entered his fifth year as president, and K. B. Whyte—who has fortunately had second thoughts about emigrating—has taken on the work of comp. secretary. This bodes well, as he is popular on both sides of our stormy east and west coasts. It was decided that we should re-join the S.A.A. as a club.

Our next big effort is to refurnish the club room with several carpenter-made building benches and improve our present workshop facilities.

SOUTHPORT M.F.C.

We attended an inter-club competition at Blackburn recently. The club made a good turn out and taking all into consideration did fairly well. Several models were damaged due to windy conditions. Geoff McCabe gained first in glider and Doug Barber second and fourth in rubber and glider respectively. Back at home in Sunny Southport, flying weather has been fairly good just recently and Miss Maureen Jones has been attempting to break the club's ½A record which at present stands at 3 min. Several new members have been admitted to the club, bringing the total membership up to 25.

NORTH WESTERN AREA

At the annual general meeting of the N.W.A. S.M.A.E. the committee was returned unopposed, with Frank Nixon as chairman, Ray Musgrove as secretary, John O'Donnell, treasurer, Joe Chadwick competition secretary, and John Hanney as P.R.O.

In his address the chairman reviewed the 1957 season and noted that the area was maintaining its position as one of the leading areas in the country, and he confidently looked forward to progress in the future. The competition secretary's report noted a decrease in entries and this was due to the distance which we have to travel to the comps. at Tern Hill, e.g. Blackpool M.A.S. travel 100 miles each way. A vote of thanks was proposed to the committtee for the hard work that they have put in, and a special vote of thanks to Mr. Salloway, who was not able to attend due to the council meeting in London. A telegram from Don was read at the dinner wishing the area "all the best for 1958."

A trophy for R/C models was presented by Mr. Neild for annual competition in the area, the trophy, which consists of a silver monoplane, is mounted on a black ebony base.

CONTEST CALENDAR

Feb.	2nd.	N.W. Area Winter Rally, R.N.A.S. Stretton, Nr. Warrington. Rubber, Glider and Power. C/L "Rat Race," "A" and "B," Radio.
,,	22/23rd.	Indoor Nats., Corn Exchange, Manchester. Microfilm, Tissue, Check glider.
,,	23rd.	Southern Area Rally, Beaulieu Aerodrome. Rubber, Power, Glider, Radio, T/R ½A, "A" and "B."

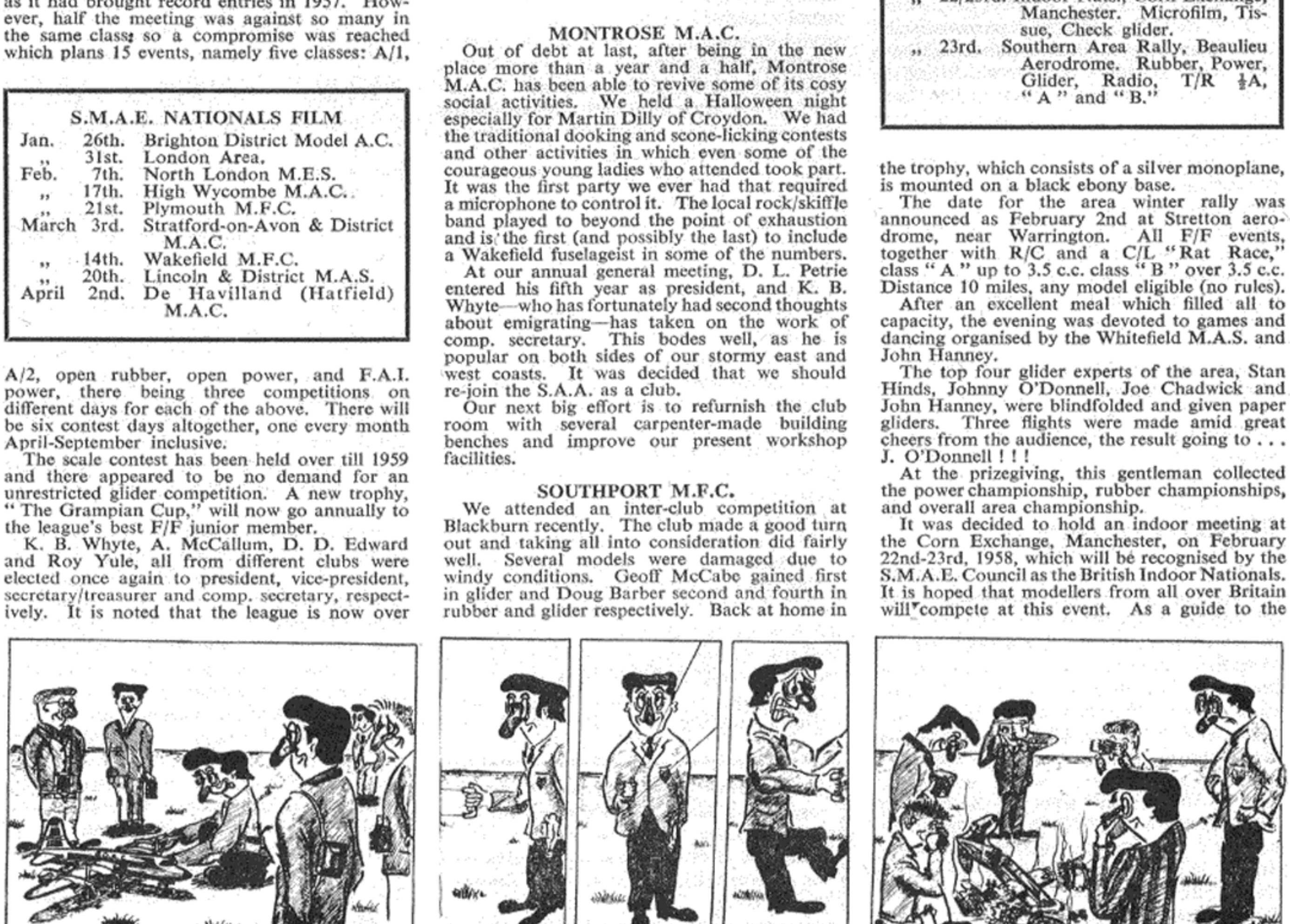
The date for the area winter rally was announced as February 2nd at Stretton aerodrome, near Warrington. All F/F events, together with R/C and a C/L "Rat Race," class "A" up to 3.5 c.c. class "B" over 3.5 c.c. Distance 10 miles, any model eligible (no rules).

After an excellent meal which filled all to capacity, the evening was devoted to games and dancing organised by the Whitefield M.A.S. and John Hanney.

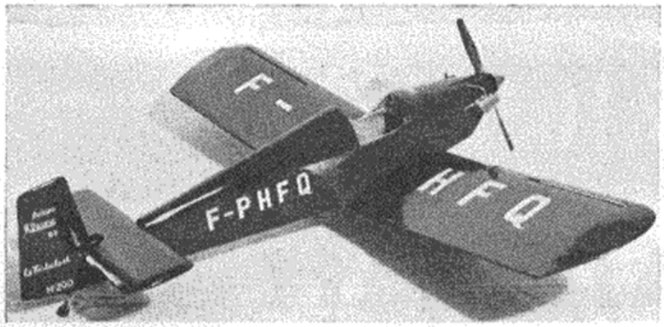
The top four glider experts of the area, Stan Hinds, Johnny O'Donnell, Joe Chadwick and John Hanney, were blindfolded and given paper gliders. Three flights were made amid great cheers from the audience, the result going to . . . J. O'Donnell ! ! !

At the prizegiving, this gentleman collected the power championship, rubber championships, and overall area championship.

It was decided to hold an indoor meeting at the Corn Exchange, Manchester, on February 22nd-23rd, 1958, which will be recognised by the S.M.A.E. Council as the British Indoor Nationals. It is hoped that modellers from all over Britain will compete at this event. As a guide to the



Clifford Kendall sent us this photo of a beautifully made Druine Turbulent, built by Charles Hollowood, of the Crewe M.F.C. It has been shown at the Northern Models and Model Engineer exhibitions.



type of model to build, the following events will be held:

Chuck Glider, max. weight ¾ oz.; Microfilm, one class only, unrestricted; Tissue-covered F/F, max. weight 2 oz.

Further details may be obtained by writing to the area secretary, R. Musgrove, 81, Moorhey Street, Oldham, Lancs.

It is hoped to offer accommodation to visiting modellers and an appeal is made for Manchester modellers to offer a bed or couch to visiting competitors for one night.

LOUGHBOROUGH COLLEGE

The weather was kind for our winter rally, with light rain about lunch time, mist reduced visibility, but luckily the wind was light. There were very good entries in all events and the high standard of flying showed up when, by 3 o'clock, there were five in the power fly-off and three in the rubber. All contests were for open models with four flights of 3 min. maximum each flight. For the fly-off it was decided that the models should go off nearly together and that the time keepers should walk under them to get results in the mist and light wind.

In the glider event nobody obtained four maximums but the first three places were very close. The combat proved very interesting and the final was fought out in failing light conditions.

The club thanks the members of Foresters M.F.C. for handling the combat and team race.

Results

Open Power (Fly-off times)		
1. J. O'Donnell	.. Whitefield	.. 6 : 29 min.
2. R. Gray	.. Wakefield	.. 4 : 36 ,,
3. M. Gaster	.. Surbiton	.. 4 : 14 ,,
4. A. Young	.. Surbiton	.. 4 : 05 ,,
5. P. Muller	.. Surbiton	.. 3 : 06 ,,
Open Rubber (Fly-off times)		
1. J. O'Donnell	.. Whitefield	.. 6 : 21 min.
2. P. Read	.. Birmingham	5 : 27 ,,
3. Lennox	.. Birmingham	4 : 23 ,,
Open Glider (Total times for four flights)		
1. Watson	.. Whitefield	.. 11 : 17 min.
2. Farrar	.. Wakefield	.. 11 : 11 ,,
3. Wisher	.. Surbiton	.. 11 : 03 ,,
Combat		
1. Keeling	.. Rangdipoids	
2. Lomas	.. Rugby	
Team Race		
1. Firth	.. Heath	
2. Geeson	.. Long Eaton	

CHANGE OF SECRETARY

WOLVES M.A.C. J. Wilkes, 19, Springhill Grove, Penn, Wolverhampton.

GLEVUM (GLOUCESTER) M.A.C. R. P. Roles, 53, Park Avenue, Longlevens, Glos.

URMSTON & DISTRICT M.A.C. K. W. Hulme, 3, Wycliffe Road, Urmston, Manchester, Lancs.

WANSTEAD M.A.C. D. Howell, 49, Monmouth Road, East Ham, London, E.6.

THE CHEADLE & DISTRICT M.A.C. L. Whalley, 43, Cranleigh Drive, Cheadle, Cheshire.

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Each wing panel is built separately. The true plan shape of one wing is cut out from light $\frac{1}{16}$ in. sheet. Using this as a pattern, mark out a similar piece of $\frac{1}{16}$ in. sheet but about $\frac{1}{8}$ in. bigger all round (1).

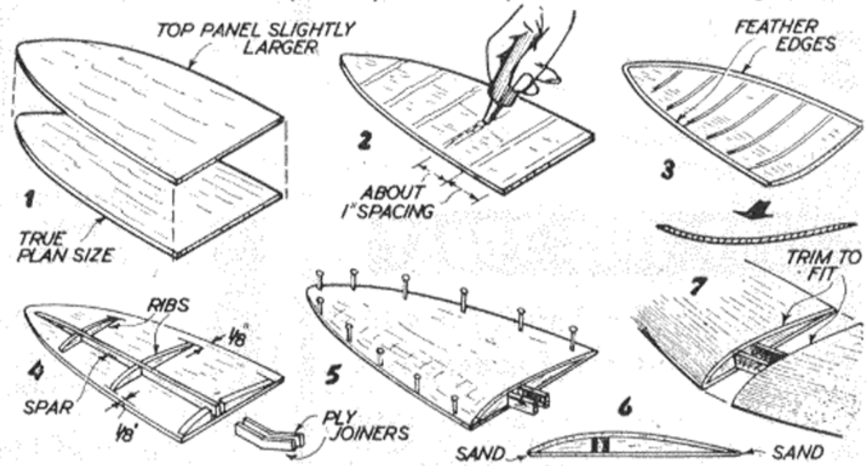
Lines of cement are then put across one side of the larger wing panel (2), spacing these at about 1 inch intervals. Allow the cement to dry when it will curl the sheet up into a top surface aerofoil shape. Then feather the bottom edges of this piece with sandpaper, continuing right around the tip but not the centre (3).

On the smaller wing panel, so far untouched, a skeleton spar and rib frame is assembled. The spar can be cut from hard $\frac{1}{8}$ in. sheet, tapered off to nothing at the tip. Cement this in place first, then cut and trim the ribs to the required section, making sure that they fit neatly, and cement in place. Each end of the rib should finish $\frac{1}{8}$ in. from the edge of the wing panel (4).

Two $\frac{1}{16}$ in. ply wing joiners or dihedral braces are required, cut to the necessary dihedral angle and trimmed to match exactly the spar depth at the centre. Cement these in place before fitting the root rib.

The former upper panel is then cemented in place, pinning the assembly down over a flat surface so that the wing will dry without warps (5). While this is setting you can build up a second wing in an identical manner, remembering to make this of opposite hand.

The wing edges are then finished off neatly to section with sandpaper. Check that the second wing slides in place over the wing joiners protruding from the first and trim away both wings at the centre until they fit neatly together. Smear the wing joiners and root ribs generously with cement and simply slide together. A skin of cement over the top and bottom of the joint will provide extra strength.



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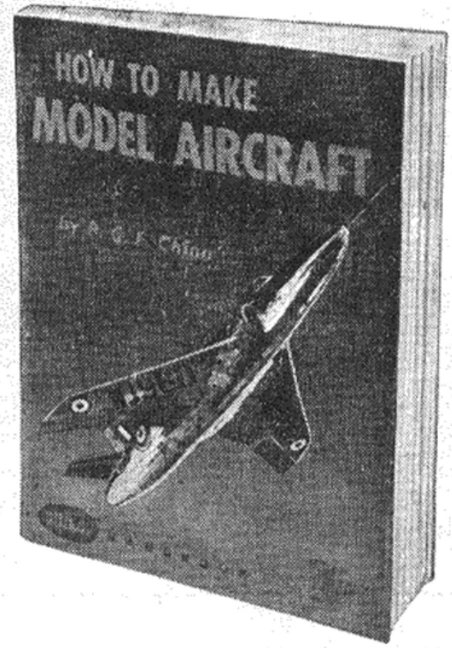

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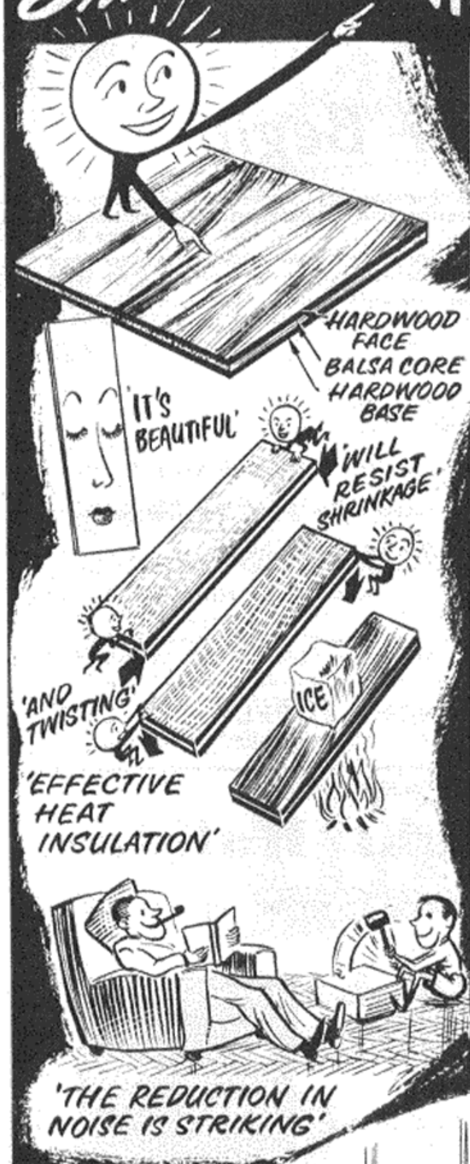

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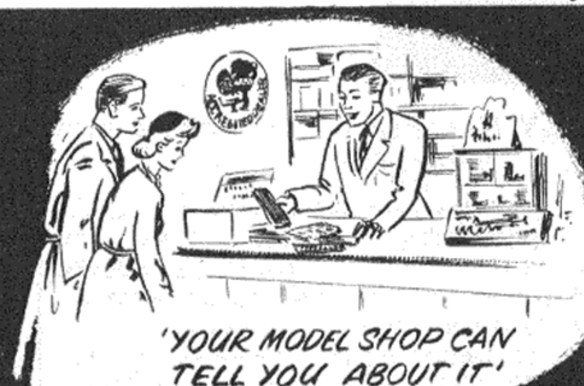

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ED
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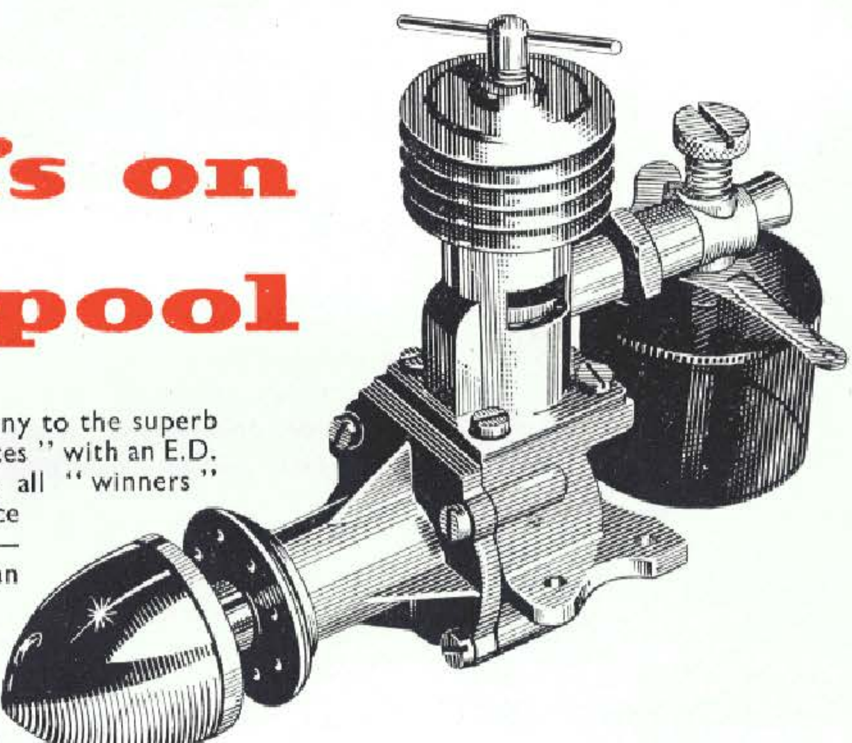
win's on the pool



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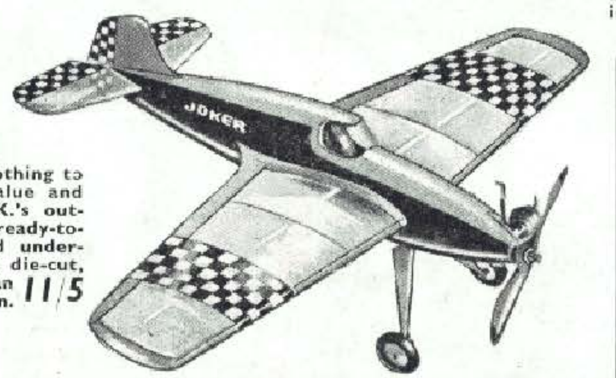

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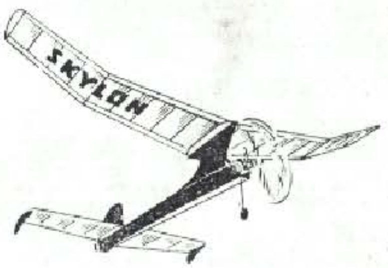

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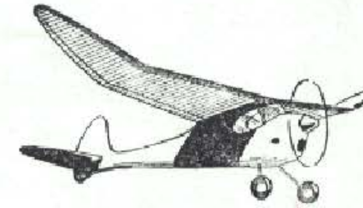

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