

JANUARY 1971

Aero Modeller

INCORPORATING
MODEL AIRCRAFT

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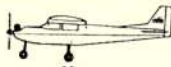
SCALE: Piper Cub 162/4; Skylane 54 164/4;
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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

January 1971

Volume XXXVI No. 420

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Advertisement and Subscription Offices: Model & Allied Publications Ltd, 13/35 Bridge Street, Hemel Hempstead, Hertfordshire. Tel Hemel Hempstead 2501-2-3.

Direct subscription rate 41/- per annum including December edition and Index.

CORRESPONDENCE anticipating a reply to addresses within the United Kingdom must be accompanied by a stamped and self addressed envelope. News reports should be submitted to arrive not later than the 15th of each month for publication in the next immediate issue. Photographs should be accompanied by negatives where possible and can only be accepted for use on an exclusive basis for British Copyright.

AERO MODELLER incorporates the MODEL AEROPLANE CONSTRUCTOR and MODEL AIRCRAFT and is published on the third Friday of each month prior to date of publication by:

MODEL & ALLIED PUBLICATIONS LTD.

13-35 Bridge Street, Hemel Hempstead, Herts

Tel.: Hemel Hempstead 2501-2-3 (Mon.-Fri.)

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COMMENT

In all Associations and Societies, the dominant topic of every Annual General Meeting concerns finance without exception. Society Officers are torn between establishment of a fee at the lowest possible level for their fellow enthusiasts, and their consideration for the future wellbeing of their organisation. Such was most certainly the case at the A.G.M. of the Society of Model Aeronautical Engineers on 28th November. For over ten years, the S.M.A.E. membership fee income has remained static while costs have risen. For 1970/71 the Society faces an insurance premium equal to half the normal annual income! Heavy claims have obliged the insurers to make a substantial increase. In consequence, the scale of fees from membership must also rise and from 1st January the charges will be for Full Members: Juniors and Ladies £1; 16-21 Intermediates £2; and over 21 Seniors £3. The Associate Membership fee will be £2. There is no such thing as cheap insurance (our own M.A.P. scheme is tied to continuous purchase of a M.A.P. magazine) and these realistic fees for membership of Aeromodelling's most respected Society should be accepted without question.

on the cover

Woodford's 'Miss Aeromodelling 1970' Linda Stafford poses with John O'Donnell's 'Slow-coach' Wakefield.

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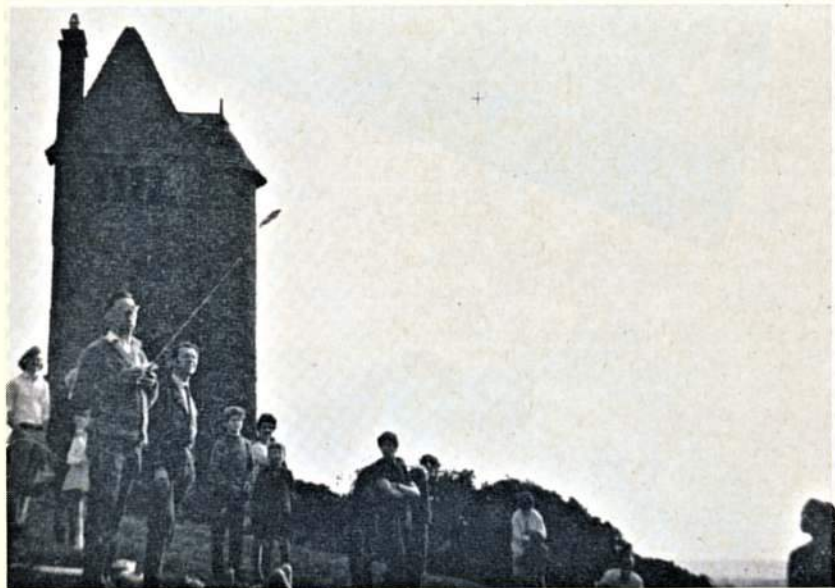
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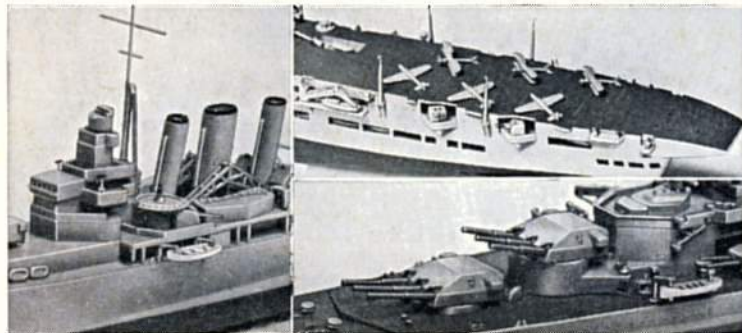
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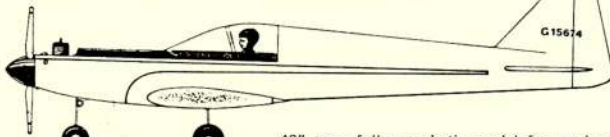
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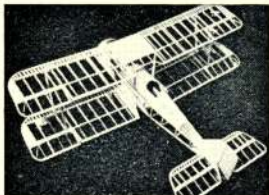
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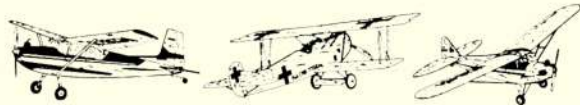


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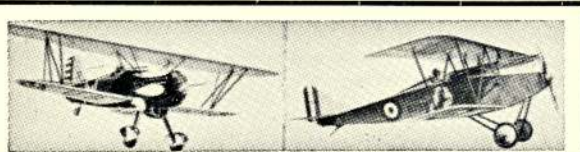
STERLING R/C or C/L SCALE

Piper Tri-Pacer 58¾" span £9.7.6
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 New SE5 (1½" scale) £14.5.0

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STERLING RUBBER-POWERED SCALE KITS

REAL flying scale models with IN-FLIGHT ACTION FEATURES design for rubber power BUT EASILY CONVERTED TO CONTROL LINE OR RADIO CONTROL! Look at the choice you get, too - 27 different models, all in fully prefabricated kit form with hardware, plastic parts, etc. . . . and EXCLUSIVE design features. Real value for money!

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 Stearman PT-17 22" span 49/11
 Beechcraft Bonanza 22" span 37/6
 Nieuport 17 biplane 24" span 49/11
 AT-6 Texan 18" span 24/11
 Piper Super Cub 18" span 18/11
 Cessna 180 17" span 18/11
 P-51D Mustang 24" span 49/11
 SE5A biplane 22" span 49/11
 Jap Zero 24" span 49/11
 Spitfire Mk. I 24" span 49/11
 Spad 13C 24" span 49/11
 Aeronca C-3 36" span 49/11
 Eindecker E-3 25" span 37/6
 NEW SCHWEIZER 2-32 scale sailplane 42¾" wingspan ... 37/6

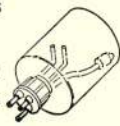
'RIPMAX' iron beech CONTEST PROPS

9 x 6 5/6	11 x 7 3/2	6/-
x 7 5/6	x 8	6/-
x 8 5/6	12 x 4	6/6
10 x 5 5/8	x 5	6/6
x 6 5/8	x 6	6/6
x 7 5/8	13 x 4	7/2
x 8 5/8	x 5	7/2
11 x 4 6/-	x 6	7/2
x 5 6/-	14 x 4	7/11
x 6 6/-	x 5	7/11
x 6 3/2 6/-	15 x 4	8/9
x 7 6/-		

An outstanding NEW RANGE of precision machine-carved propellers giving TOP performance with any engine. Used by WORLD CHAMPION flyers Mick Charles (R/C scale) and Mick Reeves (C/L scale).

'RMA' TUF-TANKS ROUND CLUNK

½ oz. ... 6/6
 1 oz. ... 6/6
 4 oz. ... 6/11
 6 oz. ... 7/6
 8 oz. ... 7/11
 10 oz. ... 8/9
 12 oz. ... 9/6



NEW LOW-BOUNCE WHEELS

1¾" ... pr. 13/6
 2" ... pr. 14/6
 2½" ... pr. 15/6
 3" ... pr. 17/6
 3½" ... pr. 19/6
 4" ... pr. 21/6
 Also 4" dia. ... pr. 36/-

RIPMAX MK CONTEST AIR-WHEELS

20mm (¾") pr 3/3 35mm (1½") 6/6
 25mm (1") pr 4/6 40mm (1½") 7/6
 30mm (1¼") pr 5/6 45mm (1¾") 8/9
 also 50mm (2") ... 9/11

KBK TRU-SPIN AIRWHEELS

20mm 3/3 25mm 4/6 30mm 5/6
 35mm 6/6 40mm 7/6 45mm 8/9
 50mm 9/11

NYLON HUB TRU-SPIN AIR-WHEELS

40mm (1½") pr 9/6 45mm (1¾") 10/9
 50mm (2") pr 12/6 60mm (2½") 15/11

RIPMAX PB AEROSCALE WHEELS

2½" pr 19/6 2" pr 15/3 3" pr 17/-
 3¼" pr 28/- 3¼" pr 30/- 4" pr 36/-
 4½" pr 46/- 5" pr 58/-

KAVAN AIRSPIN WHEELS

1¾" pr 13/6 2" pr 15/3 2½" pr 17/-
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WHITEWALL AIRSPIN WHEELS

1¾" pr 15/6 2" pr 17/3 2½" pr 19/-
 2½" pr 20/9 2¾" pr 23/- 3" pr 25/6

UNDERCARRIAGES

12swg single nose leg 3/6
 10swg single nose leg 3/11
 12g leg with 2" wheel 10/6
 10g leg with 2½" wheel 11/6
 5/32" single nose leg 5/6
 10g twin leg 2½" wheel 19/11
 L/W undercut pack 12/6
 2¾" Maximu Brake Whis 50/-
 RipMax Scale steerable nosegear £12.19.6

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Master U/C Servo £11.12.6
 Aux. U/C Servo £11.12.6
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 L'ghtwt steerable nosegear 15.6
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4 each nuts, bolts, plain and spring washers. 4BA 2/6; 6BA 2/6; BBA 2/6.

ADJUSTAHORN

Adjustable rudder horn in nylon with steel screws. Packet (2) for ... 3/11

BALL JOINT LINK

Pkt. (2 links) 7/11
 Pushrod exit guides (packet of 2) 3/-
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PUSHROD KEEPERS

Particularly suitable for rotary output servos. Pkt. (6) 3/11
 RAND SWING-IN KEEPERS(4) 5/11
 RIPMAX-FUTABA NYLINK (2) 4/6

RAND CONTROL HINGES

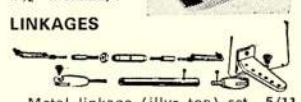
3/16" Neutral Axis (4) ... 5/11
 ¼" Neutral Axis (4) ... 5/11
 ¼" Top Edge (set 4) ... 5/11
 ¼" Slip Over (set 4) ... 5/11

GRAUPNER ACCESSORIES

NOSELEGS
 L/W S, Short 21/6
 L/W S, Long 21/6
 Bulkhead fit 36/6
 Belly fit 43/6
 (All the above are single leg, steerable)
 Noseleg bracket (packet of 2) 5/11
 Steering arm (2) 5/6

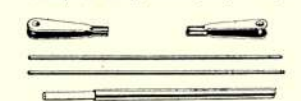
SPINNERS

1¼" 3-bl. 4/8
 1½" 3-bl. 5/4
 1¼" 2-bl. 2/11
 1½" 2-bl. 3/7
 3¼" 2-bl. 3/5
 2½" 2-bl. 22/6
 1½" metall1/9



LINKAGES

Metal linkage (illus top) set 5/11
 Moulded linkage, set 4/11
 Extension tubes 20" x 5mm 3/-
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 Horn and snap-on link 8/11
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 Graupner Wing Bolts (set) 5/6



Bowden Cable with Links 8/11
 Full length Pilot Doll 18/3

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1½" (30mm) 6/9pr 2¾" (60mm) 11/6
 1½" (40mm) 7/6 2¾" (70mm) 15/9
 2" (50mm) 8/11 3½" (90mm) 16/6
 2" (50mm) Scale Sponge 11/9

Graupner Round Clunk Tanks

Suitable for R/C or C/L models.
 100cc 3½oz 15/6
 200cc 7oz 16/9
 300cc 10½oz 18/11

100 cc Square Clunk tank 13/9
 250 cc Square Clunk tank 15/-
 500 cc Square Clunk tank 18/6
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 60 cc Metal (for Amateur) 16/11
 Graupner in-line Fuel Filter 5/3
 200 cc Squeeze Bottle 5/4
 500 cc Squeeze Bottle 8/4



Flat Nylon Hinges each 1/-
 Capped Nylon Hinges each 1/-
 One-piece Polypropylene Hinge 6d.

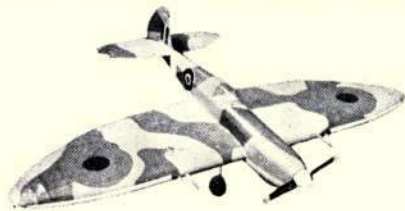


FLOAT KIT ... £4.17.6
 Enjoy the thrills of seaplane flying!
 Suits models up to 7¼ lb. all-put.

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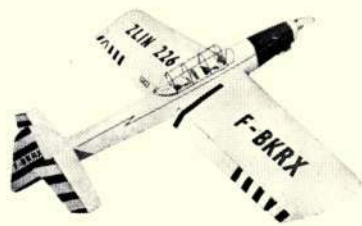
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The Mk. VIII Spitfire as used by R.A.A.F. in S.E.A.C. is made semi-scale for full stunt flying on a 29 or 35 engine. Span of 53½ in. offers ample wing area for all aerobatics, is flapped, has all latest design features incorporated by Australian design.
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D. H. MOSQUITO By A/M Staff
A beautifully accurate scale control-liner of 40 in. span, suitable for any pair of engines totalling more than 4 c.c. All sheet covered and extremely robust.
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Another large semi-scale C/L stunt model designed by an acknowledged expert in the class. Featuring adjustable lead out position for final trimming. Span 50½ in. for .35 cu. in. motors.
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Semi-scale, all-sheet construction, 12 in. span free flight sportster-powered by a Cox Pee Wee or similar small capacity engine. Great flier, provides hours of fun.
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TIGER MOTH By A/M Staff
A magnificent 44 in. span model of one of the best known aircraft ever. Flies extremely well with magnificent air of realism. ½th scale for 1.5 to 3.5 c.c.
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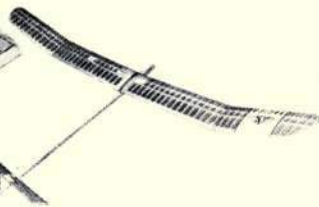
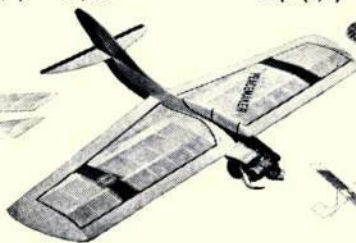
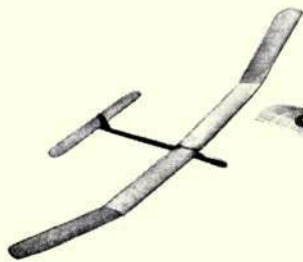
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96 in. span, large lightweight, can meet F.A.I. rules, has fine contest record, very simple construction two-piece wing. Averages 2:50 from 164 ft. line.
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HP 61
front rotary

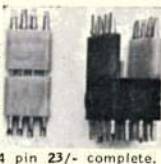
We also carry comprehensive stocks of all the following motors: K&B, Veco, Fox, Cox, E.D. Super Tigre, D.C., E.T.A., A.M., McCoy, Fuji, P.A.W., as well as silencers to fit most of them.

NEW! NEW! NEW!

The S.L.M. servo FB3. Kit of mechanics £5 5. 0. Assembled complete with amplifier £14. 10. 0. We are now offering stock of components for the R.C.M.&E. digital and the R/C Modeller Classic. Please send S.A.E. with your request and we will quote by return.

S.L.M.

Plugs and sockets. Smallest and best and very good value indeed. Gold plated contacts throughout. 2-pin 3/4", 3-pin 4/6", 4-pin 5/9". Multiblock 4 x 4 pin 23/- complete.



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BARTELS PROPS. The original and the best fibre glass props. Outstanding for performance and durability. In stock at the moment: 5 1/4 x 8 1/2; 6 x 7; 7 x 7 1/2 (Drazek); 7 x 8 (Tornado); 7 1/2 x 3 3/4 (F.A.I. F/F); 7 x 4. All these 18/11.

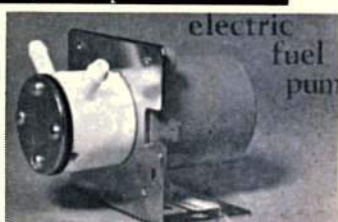
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MICROMOLD accessories ALL in stock. Send S.A.E. for illustrated list. Proportional STICK ASSEMBLIES. Horizon £4. 10. 0. complete. H.B. £4 12. 6. complete.



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ELECTRIC FUEL PUMPS. 49/6. A must for the complete field box. 6V operation. QUICK-FILL PRESSURE PUMPS. 65/-.

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MERCURY 2oz. 6/5; 4oz. 7/-; 6oz. 7/11; 8oz. 8/6; 10oz. 9/5; 12 oz. 10/1.

KAVAN square tanks. 4 oz. 13/6; 6 oz. 14/3; 8 oz. 14/11; 10 oz. 15/9; 14 oz. 16/9.

Very flexible black rubber fuel tubing for clunk connection 3/- yd.

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KAVAN throttles £4
PERRY Carbs £6
(please state engine)



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This finely engineered starter runs off a 12V accumulator and starts all engines up to 10 c.c. capacity. Comes complete with 10 ft. of heavy duty cable and connectors. Other features include: small 2" diameter body vinyl-covered for safety. Replaceable rubber propeller drive for either spinner or prop nut arrangement. Will work off your car battery or from the Lucas battery which we can supply as illustrated. Nifty starter £13.10.0. Lucas 12V Bty £7. Complete outfit of starter and battery together £20.

Please note that we cannot send the battery through the post.

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P.B. semi scale type wheels with plated nylon hubs and pneumatic tyres. Recommended: 2 1/2", 19/6; 2 3/4" 25/-; 3 1/4" 28/-; 3 1/2" 30/-; 4" 36/-; 4 1/2" 46/- per pair.

PROTECT that receiver. Super-soft lightweight sponge 6/6 sq. ft.

SERVO MOUNTING TAPE. 36" long, 7/16" wide 5/6.

HOOK-UP WIRE. Imported American 19 strand. 7 colours in pkt. 4/6.

SPECIAL OFFER

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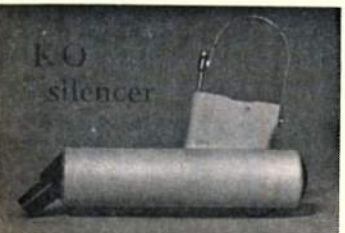
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TATONE TIMERS. D/T 59/6. Standard tick-off, 1/2A tick-off and flood-off all in stock at 52/6.

PIRELLI RUBBER, 1/24 x 6 mm. 35/- for 500 gms.



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NEW! NEW! NEW!

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FIREBALL glowplugs



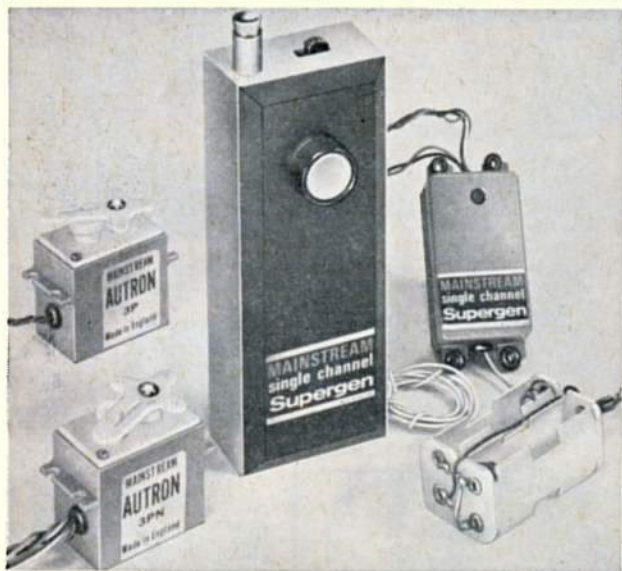
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single channel R.C. has
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And now Single Channel offers the same protection as Digital Radio with the "Frequency Channel Lock System" applied to all Mainstream Single Channel units.

- 1) space era design
- 2) F.C.L.S. locks interference onto the Side Bands, giving maximum protection
- 3) full choice of servo configurations

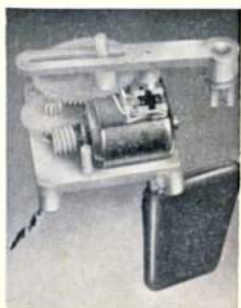
- 4) new 3PN, 3P and 2PN high powered, high response servos
- 5) no wiring — just plug together
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- 8) positive micro button control for the beginner and expert alike.

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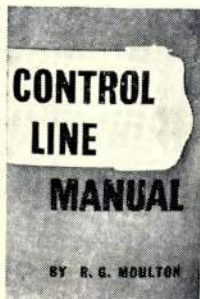
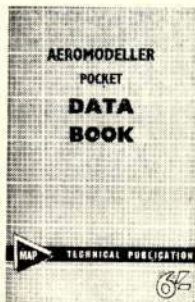


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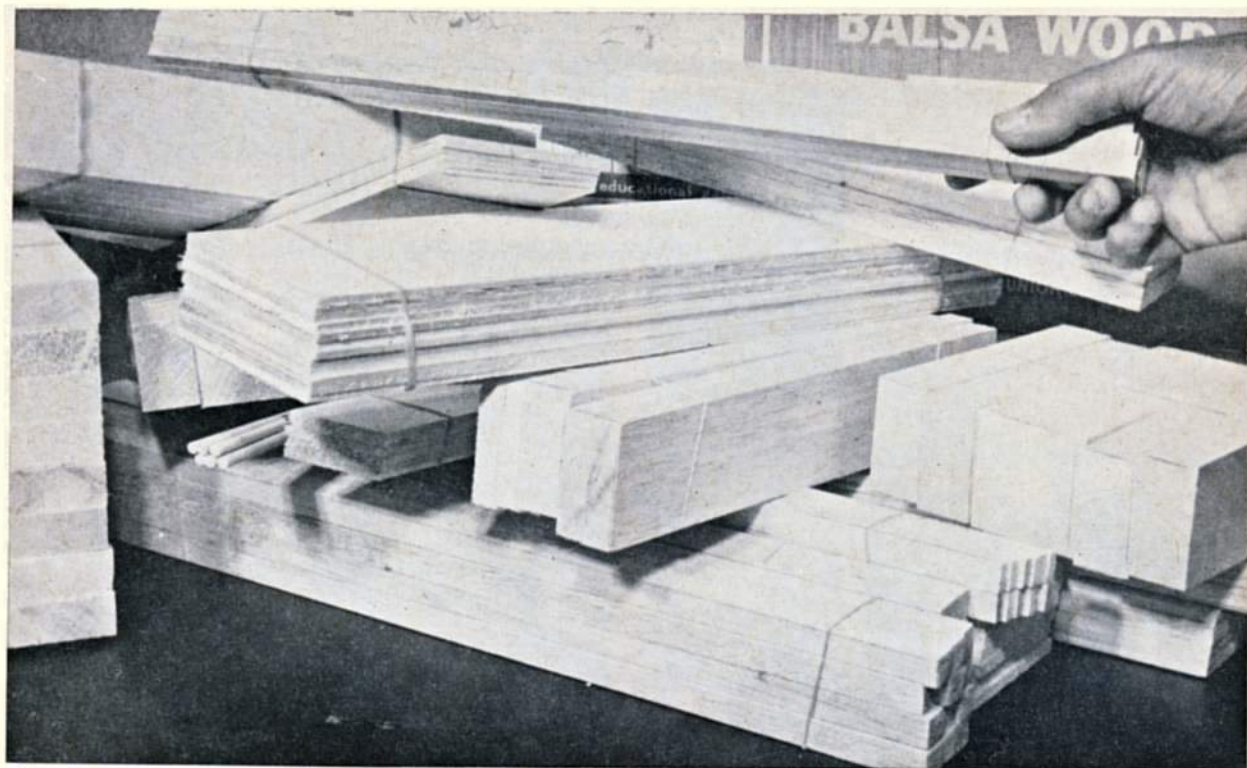
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HEARD AT THE HANGAR DOORS

We could list dozens of aeromodellers who have built their own full-size aircraft, many of them self-designed, but few have achieved the notoriety of FRED by Eric Clutton and Eric Sherry. Slow-flying and practical, FRED is currently operating with a standard Volkswagen engine and is seen here at the P.F.A. Rally, Sywell, with Eric Clutton standing by the cockpit.

DATES for the 1971 World Championships are now known. The free flight classes are scheduled to be flown at Gothenburg, Sweden in the period 30th June to 7th July. This will be the second World Championships using the seven-round system and the marathon is reflected in the long allowance between the dates for arrival and departure. Most nations have already arranged extensive trials. We have already announced the U.S.A. and British teams and now the Swedes reveal their team as follows:

A/2 Glider

1. Lars Larsson	Goteburg	2755
2. Knut Andersson	Hassleholm	2668
3. Claus Martensson	Malmö	2663

Wakefield

1. Anders Hakensson	Malmö	2839
2. Olof Nerud	Malmö	2748
3. Rune Johansson	Norrköping	2741

Power

1. Urban Nygren	Solna	3160
2. Rolf Hagel	Malmö	2897
3. Hans Friis	Norrköping	2855

There is a change in the British A/2 Glider Team. Bryan Spooner has decided to concentrate on his Wakefield and relinquishes his place in the A/2 team to Tony Young who was first reserve. Tony has extensive experience of International and World Championship flying, and his position on the team along with current Champion Elton Drew and Mike Woodhouse, makes the U.K. contingent extremely strong.

The Radio Control World Championships, relinquished by the S.M.A.E. and taken up by the U.S.A., are now announced to be held from 14th to 22nd September at Bucks County Airport, Philadelphia. The site has been chosen after long deliberation and is a

private airport which will be entirely given over to the Championships and associated events plus a Radio Control Expo in hangars. Located at Doylestown, 8 miles north of Willow Grove, 15 miles from Philadelphia, 45 from New York City, the Airport will be a tremendous centre of attraction. Hitherto, World Championships outside the European Continent has been unacceptable to the majority of competing Nations purely on the basis of travel expenses. It is over 16 years since a Championship was held in the U.S.A. and on that occasion many models had to be proxy flown. Now the Academy of Model Aeronautics has put forward an A.M.A./F.A.I. flight charter for teams and supporters to provide low cost travel. The flight will start at Paris, landing at London, thence to the U.S.A. Supporters must be full members of an F.A.I. member club to qualify for the charter, S.M.A.E. membership prior to March would be essential for British travellers.

BRAIN DRAIN across the Atlantic took away many prominent British aeromodellers; but it's always nice to learn how well they've been doing and that they have not forsaken the hobby. Lockheed sent a purchasing mission to Europe last month. There were four people invited. Two of them were none other than John Gorham ex-Ipswich and Ted Buxton ex-St. Albans. Ted reflected on the fact that both his and John's design which are still popular in the Aeromodeller Plans Service now qualify for vintage events! Time flies, but enthusiasm never seems to wane.

AREA organisation with S.M.A.E. has its pros and cons. A restructuring committee which has spent many exhaustive hours deliberating how to streamline Society ac-

tivities came up with the proposition that the Areas at present should be condensed to four regions. The proposition suffered a 3:1 defeat on vote at the A.G.M. Though it is recognised that the present democratic system of representation at the S.M.A.E. Council is both expensive and time-consuming, there does not seem to be an adequate alternative to the existing lines of communication.

Increase of membership fees was adopted to meet the 400 per cent increase of insurance premium and this may well be the first step to establishment of the Society on a better income policy to justify appointment of an Executive Director.

FAI REGULATIONS undergo a four-year 'freeze' from 1st January, 1971. This important decision, which affects all sporting categories was made by the General Conference in Delhi, late November. The new Sporting Code will be issued to National Aero Clubs in 1971. It will incorporate all Sporting Code amendments to December, 1970. These include staggered fly-off launching in FAI power to prevent simultaneous engine runs and reduction of the engine run by increments of two seconds in rounds 8, 9 and 10, after which the engine run remains at four seconds. The three-minute maximum applies to all power model flights. The starting area is now to be replaced with a starting line for free flight events. Indoor models must weigh at least one gramme without rubber. Fuel is to be included in the weight check of all models. A complexity score is incorporated in scale judging. R/C Pylon rules adopt many British propositions and become official, while Combat reverts to provisional status. Team Race rules are re-written but specs. remain unchanged.



A $1\frac{1}{4}$ in. equals 1 ft.
free flight scale
model for .5 to .8 c.c.
engines, designed by
D. M. COLLIN

MILES M.5 SPARROWHAWK

THE GENERAL PROPORTIONS of the *Sparrowhawk* immediately struck the designer as nearly perfect for a free-flight scale model, when he discovered a three-view drawing in *The Book of Miles Aircraft*, a Harborough publication, no longer available and much treasured by collectors.

The first model built utilised a D.C. Dart .5 cc. diesel, and weighed $14\frac{1}{2}$ oz. In this form it was underpowered and would only just maintain height—although no doubt a lightweight version with a powerful .5 cc. engine would be quite satisfactory. However, the resulting flight would be unrealistically slow, and thus a .75 to 1 cc. engine is advised.

Originally, the model featured pendulum-operated rudder, but later experiments proved that stability was increased by using a fixed fin and trim tab. To check this, an A.M.10 diesel was substituted for the Mills .75 cc., and it was found that providing the model was trimmed to glide straight (or with just a gentle turn), it would fly successfully in quite a strong wind. Even with the model trimmed to stall heavily on the glide there was no tendency to spin-in. It would appear that pendulum control is fine on a relatively slow flyer, such as the B.A. *Swallow*, but on faster models any sudden change in direction due to air turbulence etc., causes the pendulum to swing outwards under centrifugal force and tighten up the turn into a spiral dive. This caused quite a few inexplicable random crashes while the pendulum was in use.

The only known deviation from true scale is that the dihedral does not start immediately outboard of the wing fillets.

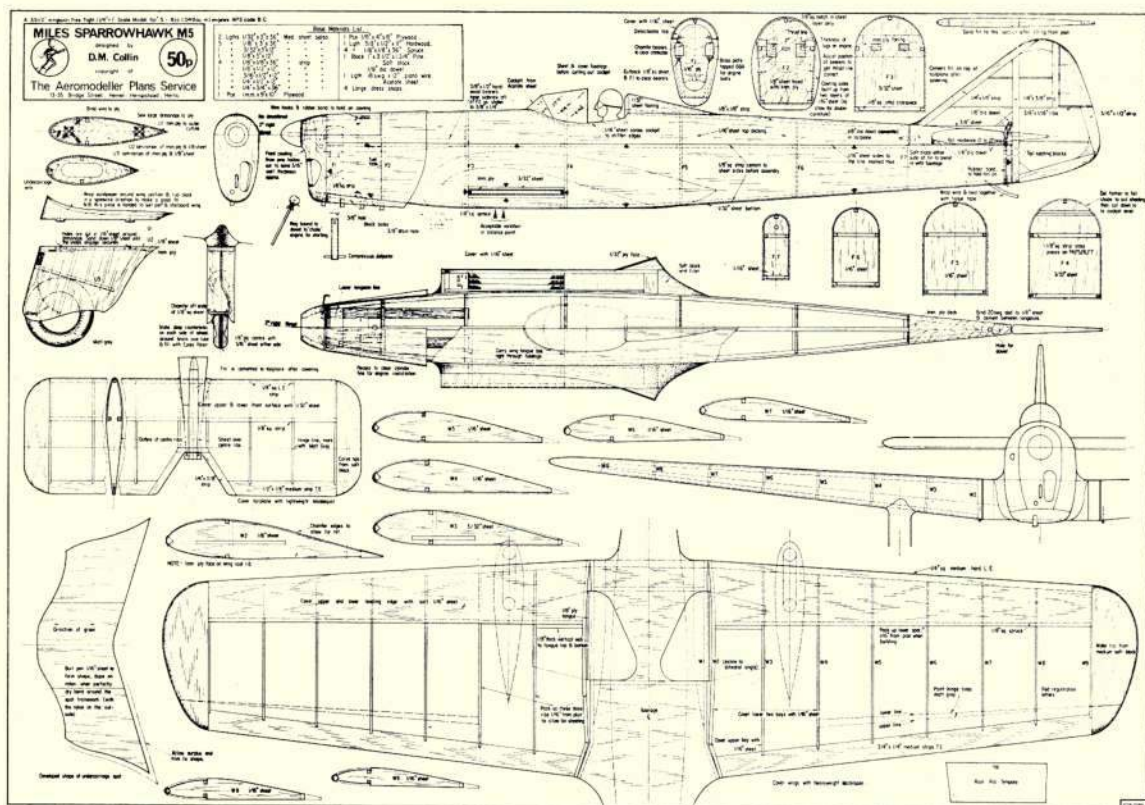
The *Sparrowhawk* has extensive sheet areas, so choose soft or medium balsa to keep the weight down. Use P.V.A. adhesive for joints involving hardwood or ply.

Cut out the fuselage sides and cement on the $\frac{1}{4}$ in.

square edging strips. Build up the wing tongue box and glue between F3 and F4. Stand the assembly upright on a flat surface and carefully check for squareness. When this is quite dry, cement the sides to F3 and F4 but do **not** put any cement on the joint where the wing tongue box goes through the fuselage sides until after the tail end of the fuselage has been pulled together. This is essential as otherwise the fuselage will not be able to assume the correct curvature between F3 and F4. When cementing the tail end together, and when inserting the other formers, carefully check that the fuselage remains symmetrical and untwisted. The rest of the fuselage is straightforward. The curved top decking is easy if you use soft, straight grained sheet wetted on the outside and doped on the inside. Engine bearers are glued into F2 and F3 and before pulling-in the front part of the fuselage sides around F1. Check that the engine can be installed at this stage of the construction and leave off the bottom part of the engine cowling until the engine is finally fitted. As the model is likely to be tail heavy, a piece of pine can be used for the front cowling, which can better absorb impact damage than the hardest balsa. Wing fillets are built up from soft $\frac{1}{4}$ in. sheet cut to the side view shape. Profile them to match the fuselage sides, carve and sand out the concave surface before cementing in place.

The wings are conventional although care should be taken that the root ribs for the port and starboard wings have the slots for the wing tongues cut identically. If soft block is not used for the wing tips they should be hollowed out as much as possible. The fillets for the undercarriage legs are fitted after covering the wings. Remember that the undercarriage spats are vertical and are not perpendicular to the undersurface of the wings. The joint onto the wing surface can be neatly made by rubbing the fillet spanwise on glasspaper wrapped around the wing.

Cover the wings with heavyweight Modelspan and



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all the rest, including all sheet areas, with the lightweight grade. A couple of coats of clear dope followed by two coats of cream colour dope thinned with their own volume of thinners gives a reasonable lightweight finish. Registration letters are painted on with Humbrol enamel (so that mistakes can be corrected). The fuselage was also fuel proofed with particular attention given to the engine bay.

Before flying make sure that the plane balances as indicated on the plan, preferably on the forward limit. The original model required nearly one ounce of nose ballast. Probably due to the thick wing section and the in-built wash-in towards the tips the stall is very gradual, more of a 'mush'. This is just the job for the full size version, but rather tricky for the first test glides as there may not be sufficient height for the stall to develop. If possible, launch

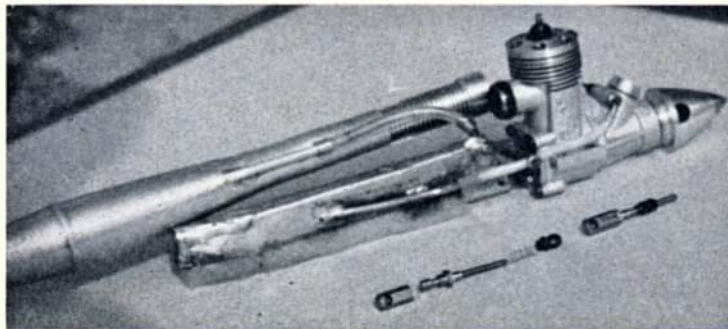
down a gentle hill slope and trim out any tendency for the glide to level out, which is really the start of a stall. The glide is quite fast and should also be quite straight.

With power on, adjust the sidethrust to give a slight turn to the left—a gentle glide turn either way seems quite safe. If the glide is satisfactory but the model flies fast under power without gaining height, try a spot of UP thrust for the engine. A high thrust line in a low wing model produces a nose down couple under power, which may prevent the model from climbing.

The designer has no experience of radio control in this model although there is plenty of room. The model is very robust and is reasonably stable, but it is expected that at least a 1 c.c. engine would be needed.

The clean, attractive, lines of the Sparrowhawk, combined with the very smart cream and red colour scheme, make this racer a 'winner' in all respects. Incredibly, Mrs. Miles devised and directed the construction of this aircraft in just eight weeks—using mainly modified Hawk components and a 140 h.p. Gipsy Major engine—so that her husband could compete in the 1935 King's Cup air race.

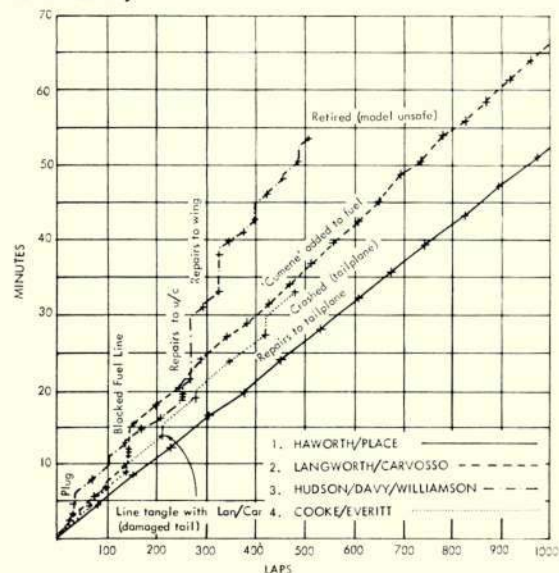




CONTROL LINE NEWS

IF 1970 ACHIEVED nothing else, at least it saw the Goodyear racing class become well established, to the point where entries for this event often exceeded those of F.A.I. team-race, normally the most popular. Despite the expertise of several well-established team racing fliers, several new names have appeared high in the results, even occasionally winning! This is all to the good, and no doubt due to the fact that no particular 'best' compromise of engine/tank model layout has yet been found.

Suitable three-view drawings of Goodyear racers are not easily found, but a journey to the library, or better still *Beaumont Aviation Literature* (11 Bath Street, London, E.C.1) may reveal American publications containing them, in particular the series of 'Racing Planes and Air Races', published by Aero Publishers Inc. are a useful source. Alternatively, of course, our own range of scale drawings cover the *Cosmic Wind* and *Long Midget* (Order No. 2762 price 2/6) and the *Airmark Cassutt* (Order No. 2905, price 10/-). Unfortunately, even when a drawing has been found, it may not be as desirable as was at first thought—for instance, is the nose moment arm too long (forward C.G.), the aspect ratio too low (less wing to catch!) or the wing in an 'awkward' position? Even with this resolved, how about the model construction? Opinions vary from the ultra light to the overweight. A light model, of course, accelerates quicker and will not overload the engine when overtaking, but assumes the gliding angle of a well-trimmed brick when the engine cuts. A heavier model makes it possible for the pilot to whip the model round to the pitman with a dead engine—although, in theory, when using a fuel cut-off this should not be necessary.



Whether it is worth installing the controls within the model structure is also debatable. The bellcrank 'hanging in the breeze' is simpler to install, and although less aesthetic, it is unlikely to slow the already 'draggy' aircraft.

Engines in current use vary widely, including both glows and diesels. At present, few are making use of the 3.5 c.c. capacity allowed, preferring racing diesels or high performance 2.5 c.c. glows. However, a few Oliver Majors are now being seen, and we believe that a certain Mr. Place and Mr. Haworth have been doing rather well with an elderly Rivers Silver Arrow of the same capacity. Super Tigres, in their various forms, are currently most popular—the Smith/Harknett team having just recorded the first ever sub-four minute time with a G.15 R.V.—one of their team-race reject motors, and without the aid of a fuel cutout.

One final point regarding Goodyear racers is the 'processing' situation which does not exist at present, but should! Is the onus on the builder or the contest director to prove/disprove scale accuracy to within 5 per cent? Also, the original (American) rules called for a 'scale-like' paint scheme, not necessarily the same colour, but representative of full-size racers'. Presumably, therefore, colours should at least be bright and attractive—with large-sized numbers, etc. Looking around at many models recently, with their 'scrawled on' numbers, drab (even clear balsa finished) surfaces, something seems to be wrong!

'Rufforth 1000'

The eleventh annual one-thousand-lap race for Class B team racers was postponed from the 7th to the 15th November, due to high winds. John Horton, who once again organised this event, sent the adjoining 'traditional' chart showing the progress of the four finalists—note the practically dead straight line of winners Place/Haworth—how about that for consistency!

Of the original 15 entries, 7 were missing or scratched, while a further four pranged in practice, so obviating the need for a qualifying heat! It is surprising, but the smallest engine in the race, was also the fastest. Don Haworth's over-bored Eta 15 achieved 96 m.p.h. for 75 laps, using a 7 in. x 8 in. propeller in his 1969 F.A.I. model. Second fastest was the Hudson/Davy/Williamson Eta 29 VI D at 90

In last month's issue, we reproduced a drawing of Dusi's dolly-operated fuel switch, then promptly illustrated it with a picture of Curt Burrus's 'power pack' comprising Miebach-tuned Rossi and MZ centrifugal force-operated switch! The heading picture is, of course, the one we should have used—apologies all round! Note the pressure tapping point on the Rossi's pipe, the long, narrow tank and parts of the dolly-switch in the foreground. At left is the interesting performance graph for the 'Rufforth 1000'.

m.p.h. for 22 laps with a modified KeilKraft *Pacer*. Langworth's modified Merco 29 matched Cooke's Oliver Major with 85 m.p.h. but at the cost of a 33-lap range compared with the latter's 70.

Incidentally, hawk-eyed readers, thirsting after knowledge and who noticed that the graph refers to 'Cummene' being added to fuel, may be interested to know that according to our dictionary, 'cummene' is an aromatic hydrocarbon obtained from cummin oil – which in turn is a volatile extract from the seeds of cummin – which in turn is a plant of the parsley family – which in turn is killed by spilt glow fuel. Full circle!

Record those Revs!

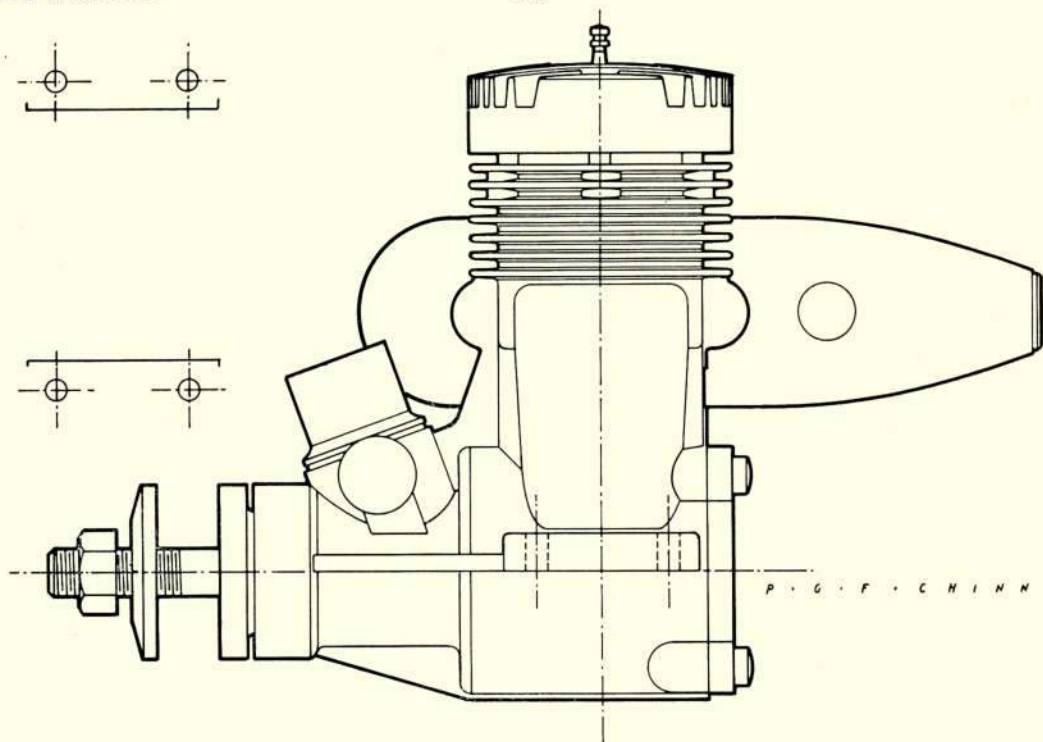
A recent visit from Ron Irvine introduced us to two very interesting items – a mechanical and an audio tachometer which he is now importing. The mechanical unit is made by the West German firm, Deumas, and is a very well-made device, being packaged in a plastic container which holds a variety of adaptors so that the r.p.m. of various objects, from wheels, discs, tubes, etc. may be read. The range of the readings are varied simply by twisting the knurled knob at the top of the case to one of three positions. When a reading is taken from an engine, the needle may be locked in position by a simple button. Ron reports that this unit causes very little drag on the engine, so readings are very precise.

The second unit reads from just 11,500 to 26,000 r.p.m., thus is rather more limited in its range. It, too, is packaged in a plastic case, and is a lightweight unit. To use, the ear-plug is connected up and the dial turned until the engine is heard to 'beat' – the r.p.m. is then read off the scale. This type of unit, while less accurate, does give the advantage of being able to record airborne r.p.m.

Both units are now available, marketed by Kavan, and cost around £30 each.

Right, a selection of Goodyear racers. At top, Neil Webb believes in lightweight models – his 'Little Gem' weighs 12 oz., thanks to use of polystyrene in wing and fuselage. Glassfibre tape indicates repaired weak spot! K&B 15 used with pressure and fuel cut off. Beneath is the Harknett/Smith 'Ginny'. Basic, built in just four days, but winning most events! No fuel shut-off used. Below is Gerry Johnson's 'Wing Wax'. Features built-up wing and fuselage weighing 19 oz. with Copeman-tuned Oliver 2.5 c.c. Below is an 'Ole Tiger' by Peter Williams (Stansted) powered by pressure-fed Super Tigre G.15 F.I. Weighs 16 oz. and uses a cut-out. Bottom photo shows Peter Rabjohn's (Luton) 'Cosmic Wind', powered by a P.A.W. 19 – built as a 'hack' model only. Below are two Kavan rev counters imported by Irvine Engines, the mechanical version on the left, audio to the right.



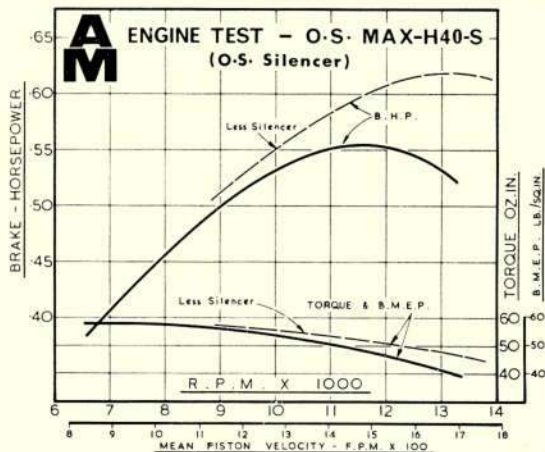
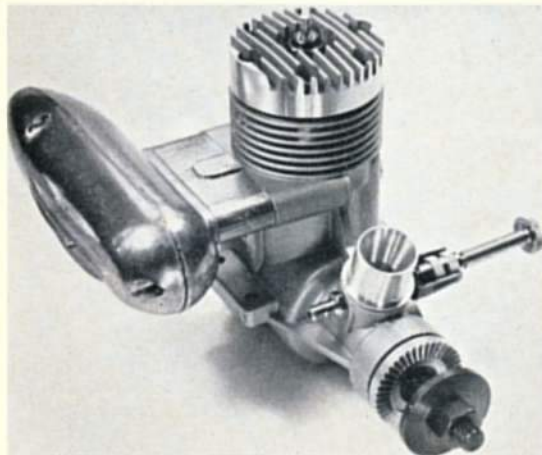


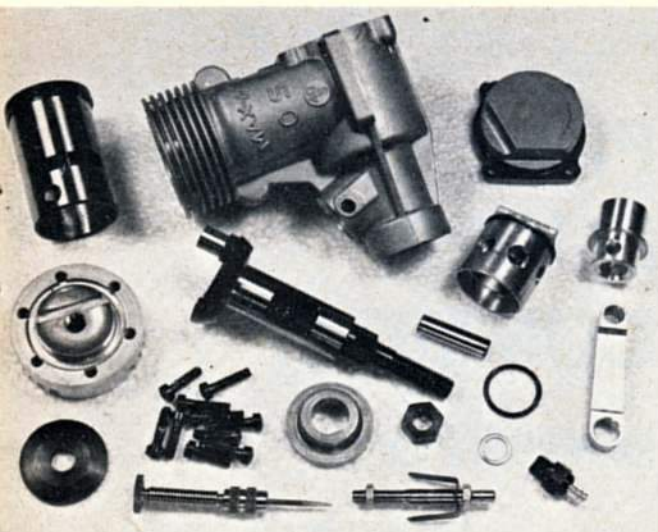
ENGINE TEST by Peter Chinn O.S.-H40-S

THERE ARE at the present time, four separate models in the 6.5 c.c. O.S. Max-H40 range, each of which has been developed for a specific section of the market. All are ball-bearing equipped shaft rotary-valve engines with ringed aluminium pistons and outwardly they all look very similar but, in fact, there is only a limited interchangeability of parts between them. At the top, performance-wise, are the very powerful twin ball-bearing H.40-P and H.40-R designed, respectively, for high-performance radio-control (including racing) models and control-line rat-racing. Then there are the H.40-SP, intended for more

general R/C use, and the H.40-S. The last-named, subject of our present report, is the most recent addition to the range and has been specially de-tuned for control-line aerobatics.

O.S. already have a very good C/L stunt engine in the Max-S.35, a lightweight, bronze bearing, lapped piston motor that is well suited to the type of aerobatic control-line model that has been popular for many years. The H.40-S is not intended to replace the S.35. Rather, it has been introduced for the benefit of those users who, for various reasons, find that an engine capable of delivering a little more power than





the popular .35's is desirable (e.g., for some of the more elaborate stunt models now being flown, and/or to make up for the loss of power through the obligatory use of silencers).

The Max-H.40-S has quite a bit more power than any of the current stunt 35's and, even with a standard silencer, still has an edge over them. It is between one and two ounces heavier than some of the more popular 35's and requires a slightly wider bearer spacing, but remains a fairly compact motor and, for a stunt motor, offers a good power/weight ratio.

A control-line stunt engine calls for operating qualities quite different from those of other types of engine. It must keep running, irrespective of the model's attitude and the gravitational, centrifugal and aerodynamic forces acting upon it. However, in accordance with modern aerobatic techniques, it must not simply keep going flat out: full power is reserved for manoeuvres in order to maintain taut lines and precise control, whereas, at other times, the engine should automatically slow the model by breaking into 'four-cycle' operation. In other words, a stunt motor must not be totally oblivious to changes in fuel delivery pressure, but should make proper use of them.

When the Max-H.40 design was first laid out some six years ago, it was certainly not envisaged that it would, at any time, be required to form the basis of a C/L stunt engine: this role had already been allocated to the Max-S design. However, the design staff at O.S. includes former C/L stunt flyers and they were, of course, well aware of what was wanted when the H.40-S was being developed.

Compared with the other Max-H.40 models, the H.40-S has considerably shorter induction, transfer and exhaust periods. The rotary-valve opens at 45 degrees ABCD and closes at 40 degrees ATDC for an induction period of 175 degrees of crank angle compared, for example, with 180 degrees for the 40-SP and 195 degrees for the 40-R. The transfer and exhaust periods are a modest 105 degrees and 125 degrees as against 120 and 142 degrees for the 40-R. The combustion chamber shape, unlike the high-compression wedge pattern of the 40-P and 40-R, is a shallow hemispherical type as on the 40-SP, but

compression ratio has been further reduced.

The effective venturi choke area - necessarily small in a C/L stunt engine in order to ensure plenty of fuel suction - is 15.8 sq. mm. (The 40-R has an effective area almost four times as large). The skirt transfer ports in the piston and cylinder are retained - primarily, one would guess, for their usefulness in scavenging stagnant gas from inside the piston, thereby aiding its cooling.

Performance

On test, the H.40-S created a most favourable impression from the beginning. It started on the second flick of the prop and without a port-prime: we had simply guessed at the required needle setting and choked the intake for a few turns before connecting the plug. Hot re-starting, moreover, was equally good, thanks to the engine's very good piston seal, even when brand new.

The docile handling characteristics and apparent readiness to run at a fast two-stroke, straight out of the box, is fairly typical of the ringed piston Max-H engines and has encouraged some users to believe that the recommended rich mixture running-in period is unnecessary. The results of ignoring this advice, in some instances, have been overheated cylinder liners and pistons, causing excessive small end wear. Purchasers are therefore urged to give their Max 40's

Continued on page 25

SPECIFICATION

Type: Single cylinder air-cooled glowplug ignition two-stroke. Shaft type rotary-valve induction. Single ball-journal main bearing plus bronze outer bush.

Bore: 20.6 mm. (0.8110 in.).

Stroke: 19.5 mm. (0.7677 in.).

Swept Volume: 6.499 c.c. (0.3966 cu. in.).

Stroke/Bore Ratio: 0.947:1.

Weight: 237 grammes - 8.38 oz. (less silencer).

267 grammes - 9.42 oz. (with silencer).

274 grammes - 9.66 oz. (with silencer plus extension duct).

General Structural Data

Pressure diecast aluminium alloy (*crankcase/cylinder/main bearing housing* with detachable rear cover secured with four Phillips screws. Case hardened steel counterbalanced *crankshaft* with 13 mm. dia. main journal, 9.7 mm. bore gas passage and 6.35 mm. dia. hollow crankpin. Shaft runs in one 13 x 28 mm. 8-ball steel-caged *ball journal bearing* at rear and 13 mm. i.d. phosphor bronze bush bearing at front. Gravity-cast and machined aluminium alloy *piston* with baffle, single compression ring and two 6 mm. dia. skirt transfer ports. Fully floating case-hardened 5.5 mm. dia. tubular steel *gudgeon-pin* with brass pads. Machined duralumin *connecting-rod* with two oil holes at big end. Hardened steel *cylinder liner* located in cylinder casing by flange at top and secured by cylinder-head. Pressure diecast and machined aluminium alloy *cylinder head* with cast-in brass thread insert for glowplug, recessed 0.8 mm. soft aluminium gasket and secured to cylinder casing with six Phillips screws. Machined aluminium alloy carburettor *venturi insert* retained by plated brass spraybar assembly with flexible needle-valve extension. Beam mounting lugs.

OPTIONAL EXTRAS

(a) O.S. Jetstream Type 'L' expansion chamber silencer.

(b) AMA safety pattern spinner nut.

TEST CONDITIONS

Running time prior to test: 1 hour.

Fuel used: 5 per cent pure nitromethane, 25 per cent Duckhams Racing Castor-oil, 70 per cent I.C.I. Methanol.

Glowplug used: O.S. No. 7 bar type, platinum filament, medium reach.

Air temperature: 72 deg.F (22 deg.C).

Barometric pressure: 30.30 in. Hg.

Silencer: O.S. Jetstream Type L with extension duct, less restrictor rings.



Top three contenders for the British Free-Flight Champion title were your columnist John O'Donnell (left) who placed second, John Cooper the eventual winner, and Trevor 'Prof' Payne of Northampton, the runner-up.

FREE FLIGHT COMMENT

by John O'Donnell

ONE RECURRENT FEATURE of the English contest scene is the way that meetings are crowded together at the end of the year. Early autumn is popular with contest organisers for a number of reasons. These include the easing of retrieving difficulties after the harvest, belief that the weather is more settled, and increased time for publicity and other arrangements (bearing in mind that a date can only be selected after the S.M.A.E. Programme is known). 1970 exhibited this phenomenon to the extent of there being a choice of contests on some weekends. However, English weather is notoriously fickle, and several meetings were plagued by wind with fairly predictable repercussions.

It is convenient to take events in chronological order. On Sunday, 11th October, there were two club organised galas at quite widely separate locations. I attended the relatively local **Congleton Gala**, held at the N.W. Area's regular field at R.A.F. Chetwynd. The meeting had been quite well publicised with some emphasis laid on the guaranteeing of prizes. Such an idea does not appeal to all as it obviously involves a financial risk. In Congleton's case the underwriting was done by certain individuals rather than the club itself. Such commitment was an excellent beginning, but surprisingly was not followed up by equal involvement on the day.

Flying got off to a slow start due to very poor visibility. There was also quite a noticeable breeze, and models disappeared into the mist (or was it low cloud?) at well under a minute. Conditions improved somewhat as the day wore on, and occasional maxs were recorded in the early afternoon. The best period was short-lived, however, and the mist came down again to catch out some participants who waited too long.

Glider had largest number of entries and was topped by Mike Reeves flying a brand new *Humphhound* finished before but trimmed after his disastrous time at the Second Trials. A minute behind was runner-up Norman Duncan, but subsequent scores were comparatively close.

Rubber models were the most prone to disappear with scores unrelated to airborne durations. Nevertheless, rubber winner Joe Barnes recorded the day's highest aggregate (8:19) with a straightforward diamond pylon design—conventional but for the use of a single blade feathering propeller. Second place went to Russell Peers by virtue of re-entering after an early flight of about 1½ minutes. This was despite his use of a large model designed for visibility rather than performance. Third was John Carter, who I could have beaten if the contest had not been closed whilst I was winding for a third flight.

The Open Power event was a tussle between Russell and I—being the only contestants with large and reasonably trimmed models. Top place went to Russell's reliable ETA 29 powered *Woodpecker*, whilst I was flying an OS 35 powered design. Alan Wood was third with a G15 F.A.I. model.

Chuck Glider is usually well supported in the N.W., and this was no exception. Tony Slater, still flying for Leatherhead despite his recent move to Shropshire, proved a decisive winner with over two minutes' lead over Barry Kershaw. Third place went to a local modeller—T. Rigden.

Wigan's Barry Kershaw used this glassfibre fuselaged chuck glider, or similar models, to win or place at Lindholm, Cranfield, Rootes and Congleton Galas.

It might be worth noting that chuck glider is becoming almost as tactical a contest as the normal towline event.

Unusual for a club gala was the inclusion of a C/L Stunt run—perforce flown over grass as Chetwynd has no runways—and quite well supported. Protagonist and winner was Neil Billington with the *Novi* depicted in November's Woodford Report. Even more unusual (and perhaps more within the scope of my column) was a F/F flying scale event. This was for the *E. J. Riding Trophy*, held over from Woodford following the curtailing of F/F power events there. It was hence really a N.W. Area event. Dennis Allman volunteered as judge when the intended officials (non-Congleton, I should add) failed to appear. Three scale models arrived, but only two entered, and neither managed to make a qualifying flight! Winner was Jeff Kilburn, whose Fokker D7 had a few more static points than Yates' *Gamecock*. The winning model, at least, had been flown previously but was disinclined to perform on the day.

A minor but irritating matter was the lengthy delay between the close of the contests and the informal distribution of prizes. This situation could have been avoided simply by the acting competition secretary delegating a 'stand-in' before going downwind retrieving.

Meanwhile, at the other end of the country, the **Torbay** club were running their rally on Woodbury Common, near Exmouth. A report and results were sent to me by Barry Hyde.

Weather conditions were the worst yet encountered for one of their rallies—with wind, rain and sub-two-minute visibility. Maxs were cut to two minutes and *none* were recorded. 'Doubling-up' of the All-in F.A.I. event with the open events was permitted and universally used. Even with this 'boost' the entry list must have disappointed the host club.

D. T. Newth, of Swindon, won the *Torbay Trophy* for the five flight F.A.I. event, and also came third in glider with his first three flights. He flew an own design taper-tip, glass fibre rod A/2. Colin Morris only made three flights—but



secured first place in glider and second in F.A.I. Martin Dilly flew a Jedelsky section (and structure) A/2 to third in F.A.I. Runner-up in glider (but without an entry in F.A.I.) was Gerry Pink flying Elton Drew's *Lively Lady* design.

Rubber was a 'flyover' for Brian Bow, who made all three flights to total only 2:25. In power neither the winner, Les Long, nor R. Woodruffe, completed their flights. Even chuck glider was badly supported with only four entrants, all from South Bristol. Winner was B. Silcocks.

Sunday, 25th October, 1970, saw the simultaneous staging of two meetings, both becoming well established and usually catering for many of the same regular competitors. The **South Bristol Gala** at Hullavington is usually held in mid-season, but the full-size aerobic World Championships presumably accounted for the postponement. I have heard little of what happened at the Gala, but would expect it to be reported separately.

The other meeting was the **York Rally**, this year reverting to its original venue of Elvington. There is no doubt that the organising club is intending to make this a prestige meeting. It was well publicised, both by magazine and newsletter announcements, and by duplicated handouts at earlier contests. Not only were the first prizes in each category guaranteed, but included the unrivalled award of £10 for the A/2 winners. This concept obviously involves risk, but the implications had been well thought out by the York club. There was a single combined entry fee, entitling participation in all events, payable at the airfield gate. This effectively meant that all prospective entrants paid on arrival, and gave many of the financial advantages of pre-entry without the organisational difficulties with paperwork.

The meeting was affected by strong wind - but the above approach ensured its financial success as just over 100 people 'entered' the meeting. Field organisation had a control tent, scoreboards, tear-off slips as flight cards, and a number of York members (none of whom flew) to timekeep. Particularly noteworthy was the exhortations for newcomers to contest flying to make themselves known to the contest organisers. It is not often realised just how difficult such people find in the obtaining of helpers and timers.

All-in-all this made for a successful and viable contest, despite the weather and attendant casualty rate. The wind was not only strong - it was also gusty. This proved particularly hard on the glider fliers and several pairs of wings were seen to fold on tow. This had a salutary effect on the rest of the entry. Consequently a drop in wind strength in mid-afternoon failed to produce the activity that might have been expected. Most competitors seemed to become discouraged, despite the lucrative bait offered, and only half a dozen actually completed their full five flights. Another four made three flights, whilst the remainder of the 29 with scores stopped after one or two.

Eventual winner of the 'big money' was Tony Cordes, flying remarkably well in the conditions, and despite the loss of a model on his first flight due to timer failure. This was his fourth such incident this season and the model landed 26 miles away! His spare model survived the contest and only 'dropped time' on the fourth flight. I managed second place with only one max, even though all flights looked promising on release. Third was Brian Picken who started well with two good flights before the wind eased.

Somewhat naturally the other events were rather overshadowed by the A/2 contest. However, they were far from neglected. The open rubber event had all five actual fliers complete three flights apiece. Winner with a treble max was Ron Pollard. He flew two models, one after the other, at the beginning of the best period of the afternoon; recovered the first model from his downwind helper and flew it again without hesitation.

I had a hectic day as my first rubber flight produced a max, but also a two piece fuselage because of a rough landing on D/T. This was a simpler repair proposition than that performed on the same fuselage at this year's Nationals - and again repaired without upsetting the trim. The second flight went behind a wood just short of a max, but saved the need to fly-off. Third place went to Joe Barnes, again with a model showing evidence of field repairs.

Russell Peers had a relatively easy win in Power, but was obviously pleased max with his treble max in the conditions. Model was his usual 'old' *Woodpecker*. Second place was taken by Dave Miller whose O.S. 15 *Climax* had its fast but rolly climb prove rather sensitive to the wind. Mike Harreaves secured third place by dint of a max on his last flight.

Coupe d'Hiver demanded five flights with a 2:00 max, hand launch. This, of course, is the F.A.I. version of the rules for this event. Winner was Graham Jubb, half a minute in front

Nigel Clark from Bracknell, but flying with the Richmond club, uses Solarfilm-covered wing (white on top, red underneath) on his own-designed A/2. Tail is covered with clear I.C.I. Polypropylene. Model spent several weeks in a tree after the Trials without ill effect.

of Frank Elton. Both had very good last flights to raise their scores well above the opposition.

The Chuck Glider event was well supported with some very good flying. Top score of over six minutes (for best five out of nine launches) by E. B. Jones was quite remarkable in the conditions. Max used was 1½ minutes, and the only one recorded was by third place man Brian Picken. In between came W. Newton from Lee.

To sum up this was a meeting saved from the weather by the promotional and organisation attitude of the host club. The principal contest official was not quite the last person off the drome in the pitch dark however - Tony Young was still not back from searching for his A/2.

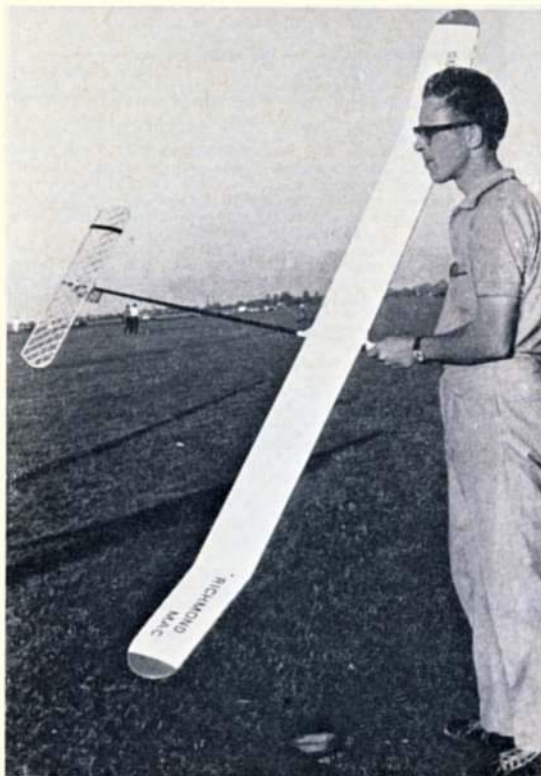
The next Sunday was still as windy - at both ends of the country. I attended the **Northern Area F.A.I.** meeting at Topcliffe to find that their long run of good weather for this event had run out with a vengeance. It was overcast, windy, murky and trying to rain!

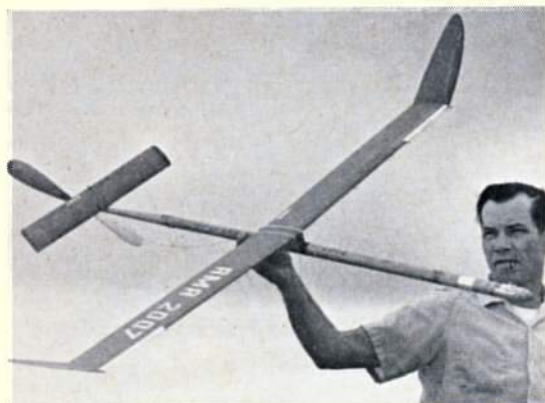
As the events were scheduled to be held in rounds (one of two hours from ten o'clock till noon, then four of one hour each) there was little time for a choice between discretion and valour. No first round score effectively ruled out any point in participation.

Flying was not of a high standard despite the presence of many good fliers. Not all were willing to risk the conditions, even though it was the last Northern event of the year. I decided that power was the event for the conditions, got my HP15D model away well into lift - only to be given an over-run of 10.3 seconds. Not seeing the model D/T, recovery was clearly impossible before the round ended, and I returned to fly glider. The first launch 'fell off' the line whilst paying out line and finished my hopes in that event. Consequently I entered Wakefield and managed to get away just half a minute before the round end was signalled!

Scrutiny of scores was rather eye-opening. The best glider flight in the first round was only 2:14 and that cost Graham Jubb the loss of his *Shorty*. My Wakefield score was certainly competitive, and glider well worth continuing. The remaining rounds were very hectic and involved launching the A/2 and Wakefield one after the other, then retrieving the pair. This was clearly risky but was fully justified by the outcome.

I managed to win the *Muxlow Memorial Trophy* for the Wakefield event (after very many attempts in previous years) with the model that gave me so much trouble at the Second





Always original in his design conceptions, Henry 'Hank' Cole produced a pusher for the U.S. Trials but did not have it fully trimmed out.

Trials. Only alteration was to steam out a wing warp induced by repairs at Syerston. The model is now several years old, has been to Finland, California and Austria, and is hardly in keeping with current trends.

Deri Morley flew his 'third best' Wakefield to second place, after refitting a broken wing tip panel with 'Devcon 5-minute Epoxy'. Alan Jack used one of his all-sheet surface models to place third, but is now wondering about the validity of the short-fast climb theory in wind. No one else made more than two flights.

The A/2 contest was won by Pete Oliver mainly by virtue of two maxs in his five flight score of 9.48. His model was the same as used to win at York last year and features *Sans Egal* surfaces on a glassfibre fuselage. Just five seconds behind Peter was Brian Spencer with a remarkably consistent set of flights – and with his best one timed O.O.S. well under three minutes. I came third with two good scores and three dreadful ones!

Power was mainly a question of perseverance, as only three people made more than a single flight. Some of the others were unfortunate to say the least! Winner proved to be Jim McCann who started off with a high thrust line, sheet surfaced model and later concluded that it was not really suited to the conditions. Remaining flights were with one of the models prepared for this year's Trials. These have *Night-Train* wings and tail on a modified fuselage built round a glassfibre rod. Power unit was a Miebach G15. Final flight proved expensive as the model could not be found despite a protracted (and resumed the next day) search. Runner-up was Brian Hoolley, who renounced his final flight on realising he was already second and could not win. Henry Tubbs was third with an old model powered by a Webra Mach 1.

The team award based on the total of a club's best individual score in each of A/2, Wakefield and Power was won, without trying, by Whitefield. To make such an award meaningful requires adequate promotion to generate interest.

The meeting closed on a rather unique note for these days – a prizegiving with *speeches!* Northern Area Chairman Ron Firth did 'the honours', pointing out this was the tenth annual meeting since the N/A F.A.I. meeting started with the 'Muxlow'. This meeting had been supported by several members of the Modelling Trade who had donated prizes. The presentation of awards included most appropriate cries of 'Coals to Newcastle' when Tony Cordes stepped forward to collect Jim McCann's prize on his behalf, and was given a glassfibre blank!

The East Grinstead Gala was held at Chobham Common on the same day and results and a report have been forwarded to me by Mike Coomes and Tony Grantham. Perhaps I can quote them almost verbatim:-

The day dawned dry, but extremely windy, with the direction taking models straight towards the tank factory. Because of this maxs were cut to 2½ minutes. Even so, about ten models landed inside the fence, among them Russell Peers', John West's and Colin Morris'. Most models were recovered however.

Scores were mostly low although lift was plentiful. Plaques and engraved key-fobs were given as prizes, with an engraved tankard as an annual award to the Gala Champion. The Champion was worked out on a points system. The winner of each class was awarded points equal to the number of entries in that class, with points awarded to the other competitors on a descending scale until the last man had one point. Therefore, the more classes you flew in the more chance you had.

As in previous years, East Grinstead members did not fly and organisation was, therefore, of our usual high standard – (where were you?)

With such a championship scheme a low position in a well supported category can gain as many points as the premier position in another class with a smaller number of entries. One easy route to Gala Champion is to make mediocre flights in the well-supported events. Whether this is really a criticism depends on one's viewpoints. Certainly no championship system yet seen is completely satisfactory.

British Senior (F/F) Championship

For many years the S.M.A.E. have awarded the British Senior and Junior (F/F) Championships on the basis of performance throughout the (S.M.A.E.) contest season. The number of contests involved and the computational system specified have of course varied over the years, but the concept has remained unaltered.

Considering the amount of effort and perseverance required, the titles carry little attention or prestige. This year (1970) the eligible events comprised one at each of the six area centralised meetings plus all three open events at the Nationals. Participation with any real hopes meant having a comprehensive fleet of both Open and F.A.I. models.

The Senior Championship was a very hard fought affair between two Northampton members, John Cooper and Trevor Payne, and myself. Fortunes fluctuated through the year – but the overall winner proved to be John Cooper, principally through winning both the *Gutteridge Trophy* and the *S.M.A.E. Cup* in rough conditions at the last two area meetings. He and Trevor flew all the area events at Henlow despite the hazards of full-size gliders and downwind crops. Both lost and broke several models. I missed the power event at the 'Nats' through repairing the rubber flyoff – and in trying for the Championship hardly helped my Team aspirations by losing my modrn Wakefield in the *Gutteridge* gale just two weeks before the Trials.

John Cooper is 19, and by now has embarked on an engineering degree course at Edinburgh University. Trevor Payne is 27, a cabinet maker by profession, and currently the South Midland Area competition secretary. When asked about contesting future Championships, both said, 'Never again'.

Junior National Champion is Martin Shepherd from St.

Roger Baggott launches at the British team trials. 1970 wasn't quite Roger's lucky year.



Albans despite only flying in four of the nine possible events. That he is really an all-rounder is demonstrated by his appearance in the indoor scene, flying both chuck glider and microfilm.

These remarks would surely be inappropriate without including my personal congratulations to John Cooper - for quite obvious reasons.

CONGLETON GALA

Open Rubber (19 entries): 1. J. Barnes (Liverpool) 8:19; 2. R. Peers (Congleton) 7:28; 3. J. Carter (Spitfires) 6:59.
Open Glider (28 entries): 1. M. Reeves (Whitefield) 8:04; 2. N. Duncan (West Lancs.) 7:06; 3. B. Picken (West Lancs.) 7:00.
Open Power (11 entries): 1. R. Peers (Congleton) 7:40; 2. J. O'Donnell (Whitefield) 7:04; 3. A. Wood (Whitefield) 5:42.
Chuck Glider (16 entries): 1. A. Slater (Leatherhead) 6:08; 2. B. Kershaw (Wigan) 4:07; 3. T. Ridgen (Shropshire) 3:59.
Free Flight Scale (E. J. Riding Trophy - 2 entries): 1. J. Kilburn (Whitefield), Fokker D.7, 427 points; 2. R. Yates (Wharfedale), Gamecock, 423 points.
C/L Stunt: 1. N. Billington (Congleton) 1,031 points; 2. S. Blake (Bucks.) 1,024 points; 3. J. Mannall (Lincs.) 1,014 points.

TORBAY RALLY

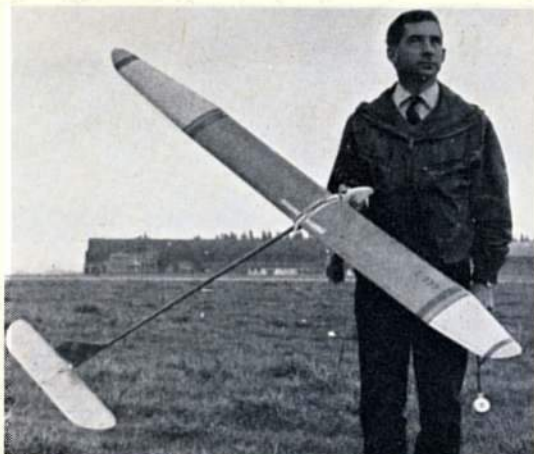
Open Rubber (2 entries): 1. B. Bow (Bristol and West) 2:25.
Open Glider (7 entries): 1. C. H. Morris (St. Albans) 4:25; 2. G. Pink (South Bristol) 3:43; 3. D. T. Newth (Swindon) 3:06.
Open Power (3 entries): 1. L. F. Long (Torbay) 1:59; 2. R. Woodruffe (Swindon) 0:46.
All-in F.A.I. (5 flights - 7 entries): 1. D. T. Newth (Swindon) 5:43; 2. C. H. Morris (St. Albans) 4:25; 3. M. Dilly (Croydon) 4:11.
Chuck Glider (5 flights - 4 entries): 1. B. Silcocks (South Bristol) 2:28; 2. J. W. Down (South Bristol) 2:05; 3. G. Pink (South Bristol) 1:53.

YORK RALLY

A/2 Glider (5 flights - 43 entries): 1. A. Cordes (Tynemouth) 13:07; 2. J. O'Donnell (Whitefield) 12:45; 3. B. Picken (West Lancs.) 11:31.
Open Rubber (12 entries): 1. R. Pollard (Tynemouth) 9:00; 2. J. O'Donnell (Whitefield) 8:55; 3. J. Barnes (Liverpool) 8:09.
Open Power (11 entries): 1. R. Peers (Congleton) 9:00; 2. D. Miller (Cambridge) 6:25; 3. M. Hargreaves (Baildon) 4:44.
Chuck Glider (20 entries): 1. E. B. Jones (Sunderland) 6:08; 2. W. Newton (Lee) 5:03; 3. B. Picken (West Lancs.) 4:37.
Coupe d'Hiver (5 flights - 11 entries): 1. G. Jubb (Liverpool) 6:18; 2. F. Elton (Baildon) 5:50; 3. H. Tubbs (Baildon) 4:11.

EAST GRINSTEAD CLUB GALA

Open Glider (13 entries): 1. C. Morris (St. Albans) 6:19; 2. J. Boon (Congleton) 6:18 + 1:17; 3. N. Clarke (Richmond) 6:18 + 1:12.
Open Rubber (7 entries): 1. D. Wain (South Bristol) 7:22; 2. Digby (North Surrey) 6:00; 3. R. Peers (Congleton) 2:52.
Open Power (8 entries): 1. J. Allen (Brighton) 6:55; 2. J. West (Brighton) 6:33; 3. R. Peers (Congleton)



Dick Twoomey, who has given so many people so much pleasure over the years through his gigantic Leprechaun (Plan No. G/730, price 11/-) still takes a keen interest in competition affairs, though a busy B.E.A. Trident Captain. Seen here at F/F Trials.

6:10.
A/1 Glider (6 entries): 1. P. Mitchel (C/M) 4:52; 2. C. Morris (St. Albans) 2:30; 3. D. Wylds (Crawley) 2:14.
1/2 A Power (7 entries): 1. G. Head (Brighton) 7:02; 2. B. Hadiand (R.A.F.M.A.A.) 5:03; 3. J. Hook (Southampton) 4:40.
Coupe d'Hiver (13 entries): 1. J. Oulds (Crawley) 4:02; 2. D. Wylds (Crawley) 3:36; 3. D. Wain (South Bristol) 3:33.
Chuck Glider (10 entries): 1. M. Keevil (Leatherhead) 1:47; 2. A. Fathers (C/M) 1:46; 3. G. Smith (Crookham) 1:42.
Gala Champion: 1. D. Wylds, 24 points; 2. D. Wain, 18 points; 2. C. Morris, 18 points.

NORTHERN AREA F.A.I. MEETINGS

A/2 Glider (22 entries): 1. P. Oliver (Whitefield) 9:48; 2. B. Spencer (Ashton) 9:43; 3. J. O'Donnell (Whitefield) 8:21.
Wakefield (15 entries): 1. J. O'Donnell (Whitefield) 8:35; 2. D. Morley (Norwich) 7:19; 3. A. G. Jack (Tynemouth) 5:54.
F.A.I. Power (7 entries): 1. J. McCann (Tynemouth) 8:56; 2. B. Hooley (Whitefield) 5:55; 3. H. Tubbs (Baildon) 5:19.
Team Award: Whitefield (Oliver, O'Donnell, Hooley).

ENGINE TEST (continued from page 21)

the courtesy of a proper running-in procedure.

After running-in (on a straight 75/25 mixture of methanol and castor oil) we checked the H.40-S on a number of props, using a standard 5 per cent nitromethane test fuel and with the O.S. Type L silencer. Figures obtained on suitable sized props for C/L stunt work included 10,300 r.p.m. on an 11x6 Power-Prop maple, 11,000 on an 11x5 Power Prop standard and 11,300 r.p.m. on a 10x6 Top-Flite maple. The silencer had both of the optional restrictor rings removed. (This was, to some extent, done to lessen the risk of overheating while the engine was still quite new.) In this condition, the silencer deducted about 400 r.p.m. from the static revolutions on 10x6 props. Replacing the restrictor rings cost another 400 r.p.m., but made for considerably quieter operation.

In the true stunt engine manner, the 40-S refused to be upset by wide variations in fuel mixture strength. Increasing fuel head or the needle setting (to stimulate the pressurising effect of centrifugal force in level circular flight) slowed the engine to a four-stroke cycle at which it continued to run steadily even after considerably greater enrichment. On the other hand, weakening the mixture to well below the maximum power setting - even to the point of temporarily interrupting fuel flow - did not cause the 40-S to abruptly cut out; it merely slowed down, picking up again immediately that proper fuel flow was restored.

In all, this seems to be a nice engine. It has a good

power/weight ratio with plenty of pulling power at the more moderate speeds used for C/L stunt; it is flexible, very easy to handle and is well finished.

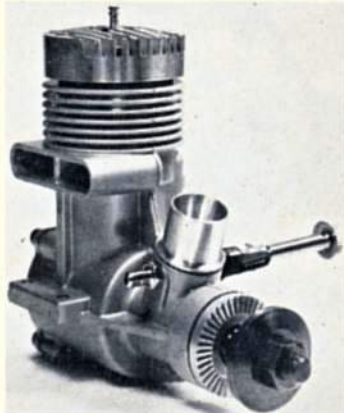
Power/Weight Ratio (as tested):

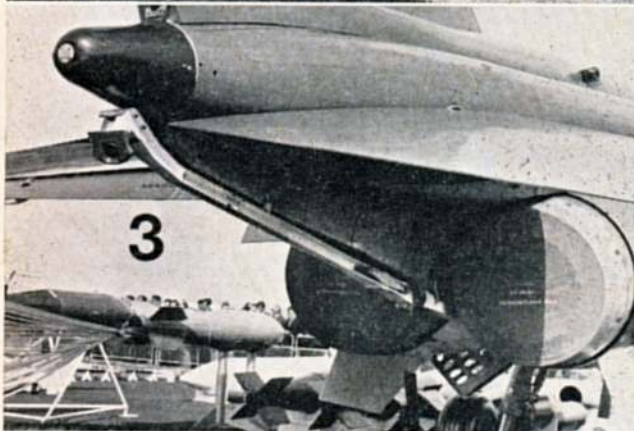
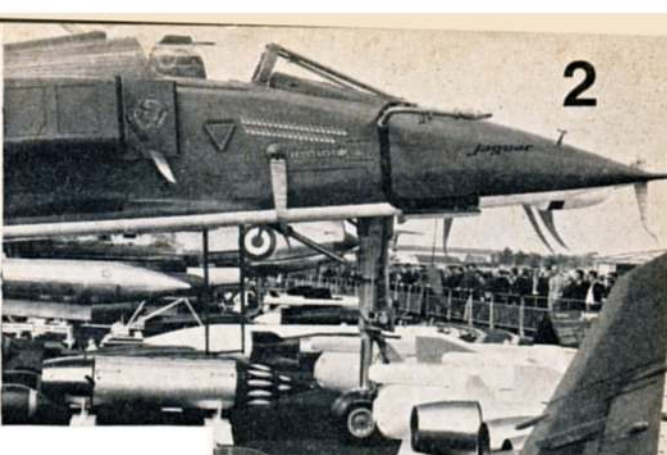
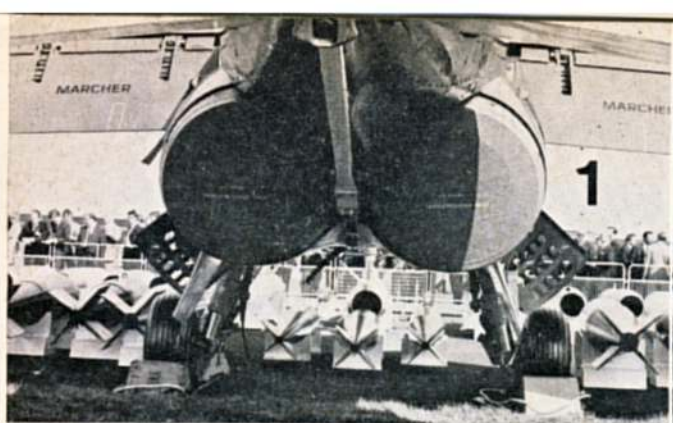
0.92 bhp/lb with silencer.
 1.18 bhp/lb less silencer.

Specific Output (as tested):

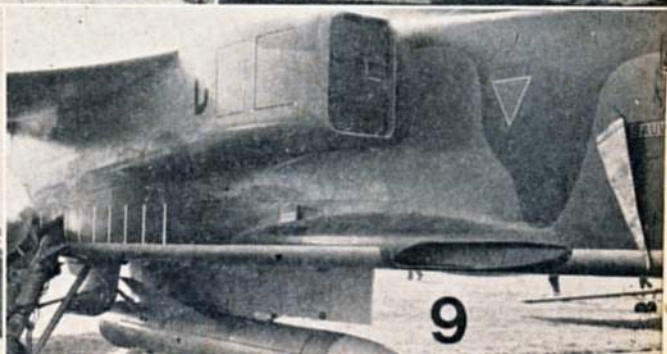
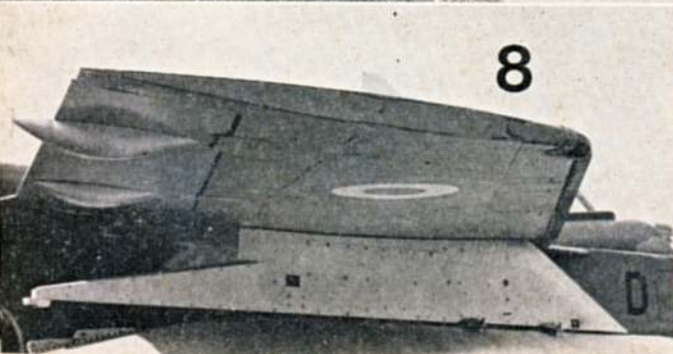
86 bhp/litre with silencer.
 96 bhp/litre less silencer.

Latest in the line of O.S. 40 engines, the stunt version is an extremely well-made unit, and is one of the few engines made specifically for control line aerobatic use. Compact size and modest weight enables it to fit even the most modern shaped aircraft, and would form an ideal unit for the larger, Continental, trend of design.





1. Four rows of airbrake holes, two mainwheels and deck hook distinguish M-05. 2. First flown 14th November 1969, M-05 has 'Clemenceau' carrier emblem on splitter plate and 37 deck landing marks aft of retractable refuelling probe. Note extended nose leg with twin wheels. 3. Deck landing hook and plain tail of M-05 contrast with S-06 in picture 4 where the tail kink is obvious, also surface extensions and antennae. 5. The S-06 nose leg with single wheel; and 6, the main gear with twin wheels. Note two rows of air brake holes. 7. Cleanest tail surfaces are on M-05. 8. The wing stores pylon of A-03, carrying long range fuel tank. 9. Centre pylon of A-03 with Matra missile, also showing pitot style intake.





AIRCRAFT DESCRIBED No. 199

Drawn by C. J. Nichols

SEPECAT 'JAGUAR'

The collaborative B.A.C./Breguet: Rolls-Royce/Turbomeca Tactical Strike design

IF ANY SINGLE airframe company was to bring a sophisticated supersonic fighter/trainer from the sketch stage to a first flight in a matter of three years, and was to have four versions flying, with a fifth soon to follow, within five years, it would be no mean achievement.

And when consideration is given to the fact that this has indeed been done, not by a single company, but by an international Anglo-French team separated both geographically and by language, then the achievement is seen to be all the more remarkable.

The resulting aeroplane is the Jaguar strike/trainer, 400 of which are on order for the British and French armed services.

Its history can be traced back to 1964 when the British and French individually formulated similar operational requirements. Both called for tactical strike and training aircraft, but differed in that Britain required supersonic performance and at the time put more emphasis on the trainer, whilst the French were more interested in a subsonic close support machine with a secondary training role.

At the time, the wisdom of the policy of international aerospace collaboration was rapidly coming to the fore and the two governments, seeing the opportunity for a unified military project, got together and hammered out a joint requirement. Basically, this called for a supersonic tactical strike and training aircraft which was to be capable of operating from rough dirt strips in a battle area.

In 1965 an undertaking to develop and procure

such an aircraft was signed by the Defence Ministers of both countries. This 'Memorandum of Understanding' as it was called, nominated British Aircraft Corporation in the U.K. and Breguet Aviation in France as the primary airframe contractors, with Rolls-Royce and the French Turbomeca company controlling development of the associated Adour engine.

To get the best advantage from these collaborative agreements, overall management authority has been centralised in international airframe and engine companies. These are controlled on an equal basis by the participants, B.A.C. and Breguet forming SEPECAT, a French acronym which roughly means 'Organisation for the Production of Tactical Strike and Training Aircraft', and the engine companies forming Rolls-Royce-Turbomeca.

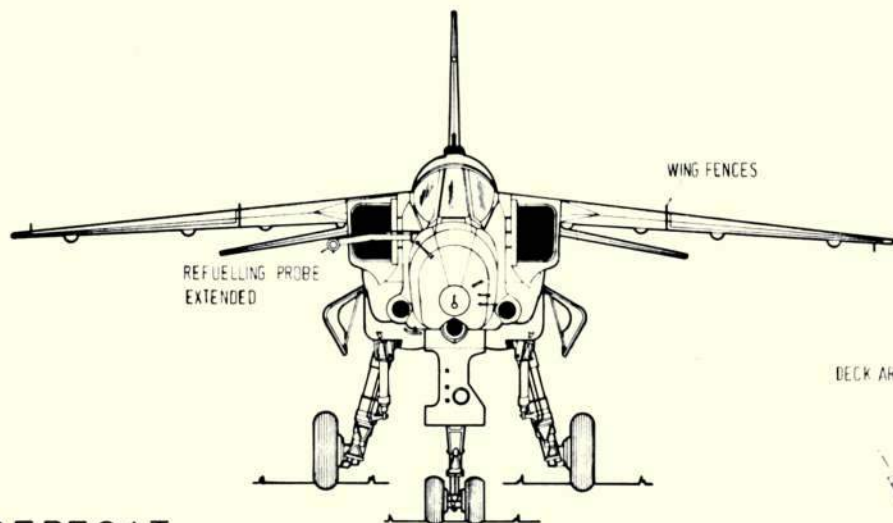
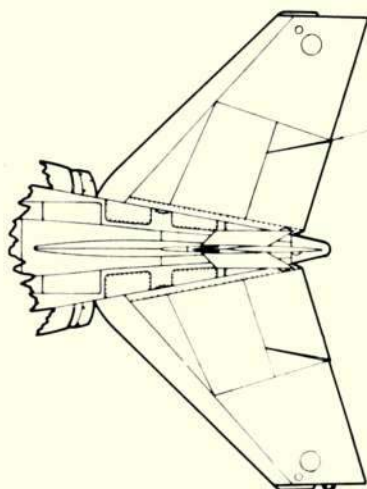
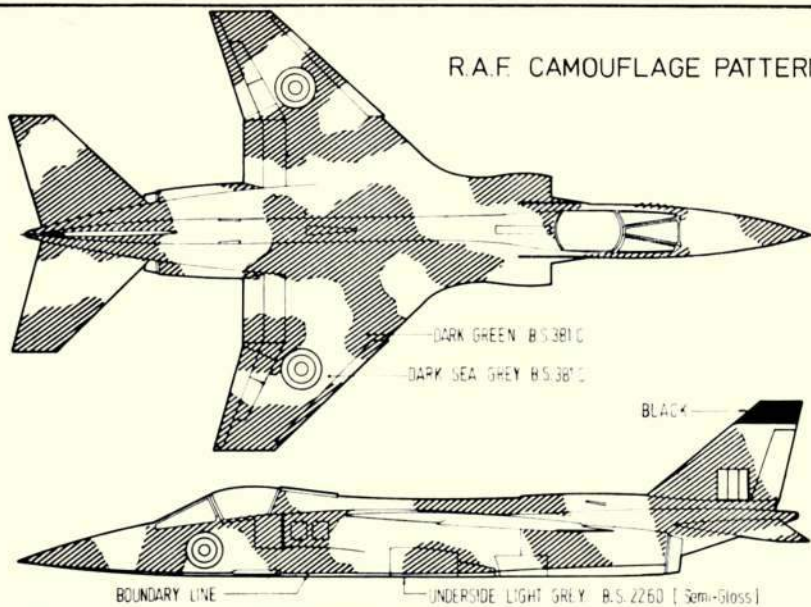
The Jaguar's development programme is being run on what might be termed a dual basis with basic airframe and engine testing running concurrently with the separate development of all five versions now on order. This is being done through a batch of prototype aeroplanes which, together, represent the needs of the French and British user services.

The first to be completed was a two-seat Jaguar built to French Air Force training requirements. This aircraft made its maiden flight from the French Government Flight Test Centre at Istres on 8th September, 1968 and marked the first occasion on which a truly internationally-designed aircraft had taken to the air.

Three views on this page of the first Jaguar to fly, on 8th September 1968, the two seater EO-1 which was lost at Istres in March 1970. It carried rudder stripes, had 'solid' airbrakes without perforations and as first displayed, did not have the ventral fins. Device below fuselage was for instrumentation and was not a permanent feature.



R.A.F. CAMOUFLAGE PATTERN



S.E.P.E.C.A.T.

BREGUET ~ B.A.C. JAGUAR A, S, M,

NB. 3 Variations in vertical and horizontal tail surfaces.

drawn and traced by C. J. Nichols

FRENCH TACTICAL SUPPORT VERSION 'A' ~ 03

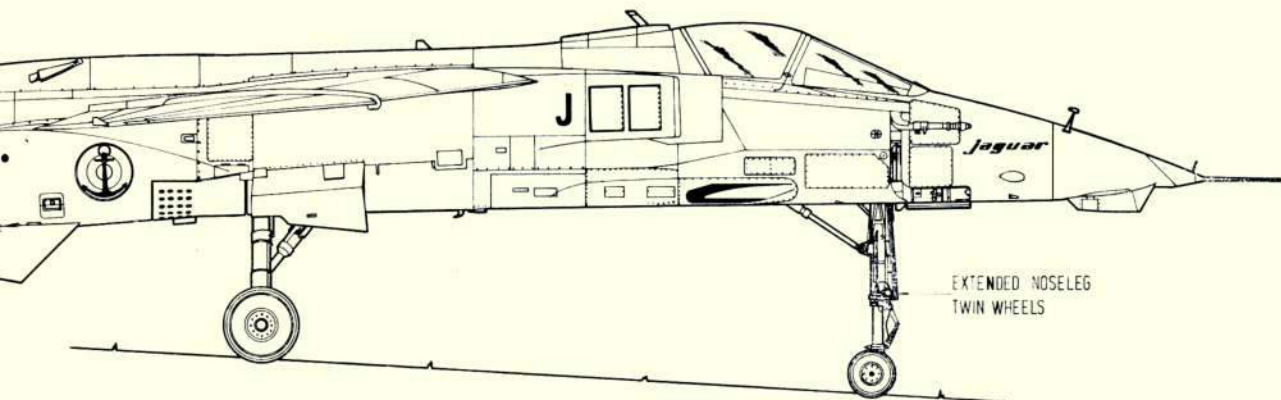


LANDING GEAR AS 'E' & 'B' VERSIONS

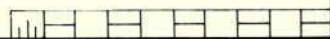
BRITISH TACTICAL SUPPORT VERSION 'S' ~ 06

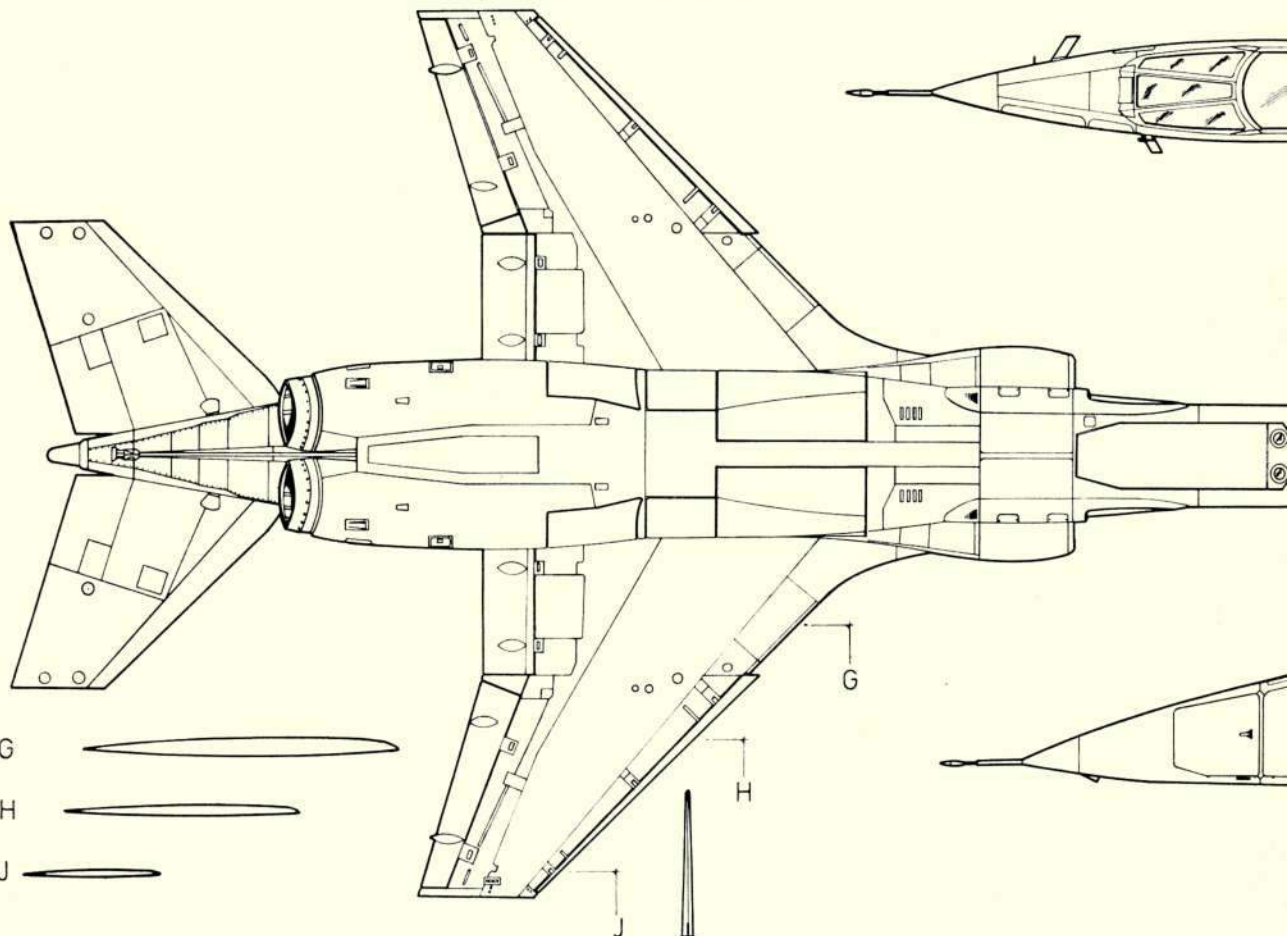
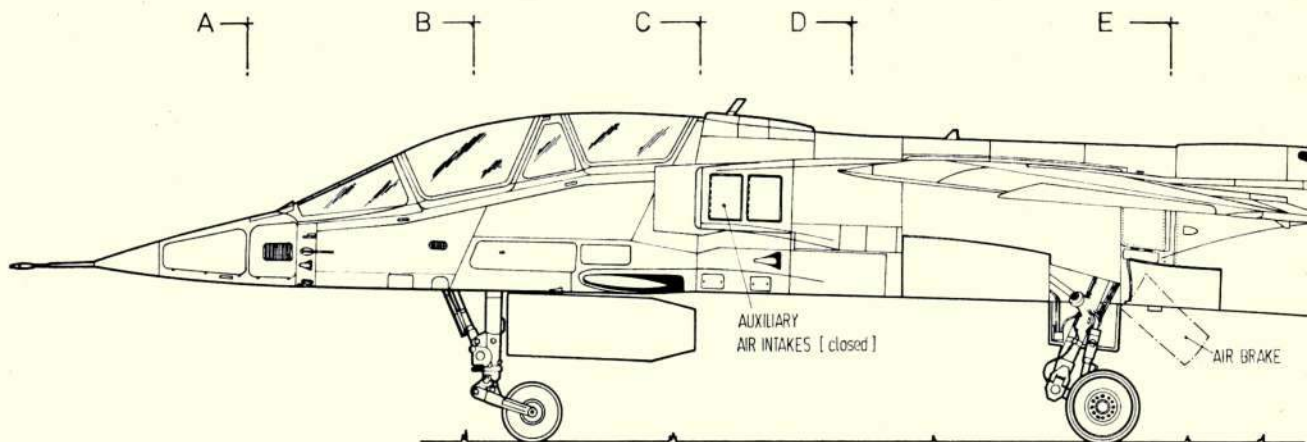


FRENCH NAVAL VERSION 'M' ~ 05

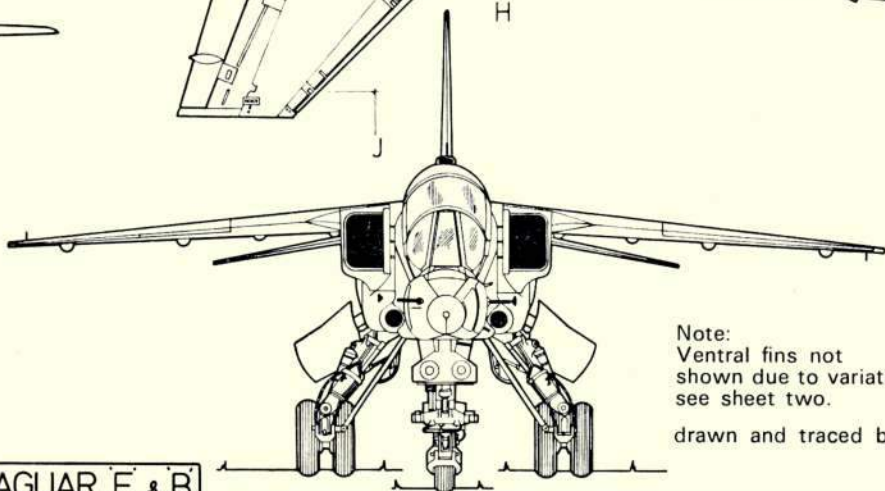


Scale Ft.





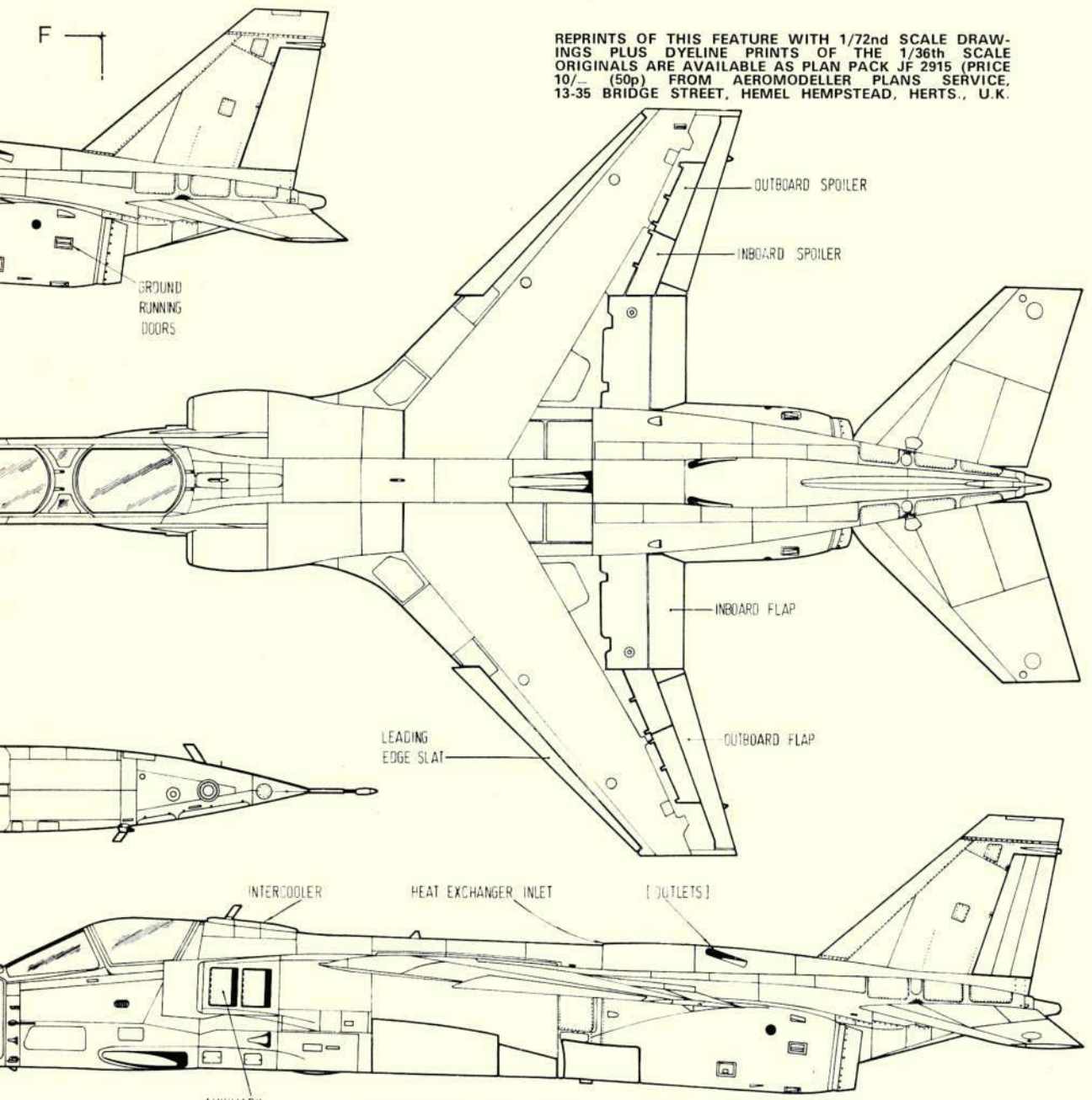
Span: 27.86 ft.
 Length (two-seat)
 53.87 ft.
 Length (single-seat)
 50.91 ft.



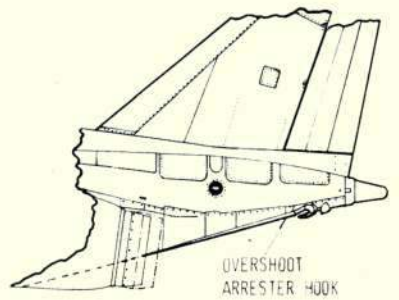
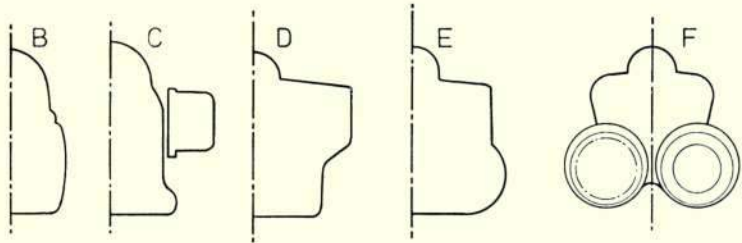
Note:
 Ventral fins not
 shown due to variations,
 see sheet two.
 drawn and traced by C. J. Nichols

S.E.P.E.C.A.T.
 BREGUET-BAC JAGUAR E & B

REPRINTS OF THIS FEATURE WITH 1/72nd SCALE DRAWINGS PLUS DYELINE PRINTS OF THE 1/36th SCALE ORIGINALS ARE AVAILABLE AS PLAN PACK JF 2915 (PRICE 10/- (50p) FROM AEROMODELLER PLANS SERVICE, 13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS., U.K.

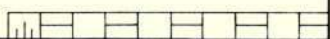


Single-seat type A and S



--- RE-HEAT ON.

Scale Ft.



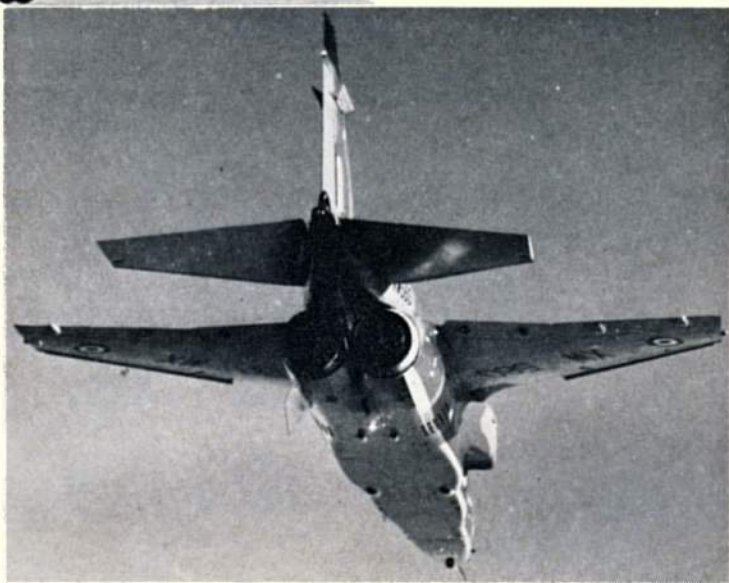


XW560, the B.A.C. built prototype, breaks ground at Walton with partial flap, and depressed leading edge. Compare with close-up photographs on previous pages for undercarriage extension, and the change of airbrake perforations, in this case four rows of six holes, later reduced to 20 holes, currently 10! Twin VHF Homer aerials behind cockpit are also an S-06 distinction. Flat base of fuselage is evident in flight shot below, where leading edge slats are drooped. Bottom left is the first Jaguar, the French E.01 two-seater.

A further six prototypes have since followed at successive intervals, comprising of a second French two-seater, two strike aircraft for the French Air Force, a navalised strike version for the French Navy, and two strike aircraft built to R.A.F. requirements. An eighth and last prototype, which is, in fact, being produced with production jigs and tools, is due to fly early in the new year and will be representative of the R.A.F.'s two-seat trainer.

Design and production-wise, responsibility for the overall aircraft including the engine, is divided equally between the two countries. On the airframe side Breguet is responsible for the front and centre fuselage, whilst B.A.C. is charged with the wing, rear fuselage, tail and tailplane.

There are two final assembly lines, one being centred at B.A.C.'s Warton factory in Lancashire and



the other at the Breguet facility at Toulouse. Although each line will cater for its own country's needs, every Jaguar produced will be a joint product in every sense of the word.

Operationally, the Jaguar lies between the transonic Harrier V/STOL fighter and the Mach 2 plus Phantom. It can carry up to 10,000 lb. of weapons in addition to two internally mounted 30 mm. cannons, has a tactical radius which ranges out to the order of 500 miles, and has a maximum speed performance which varies from a sea level value of Mach 1.1 to Mach 1.6 at stratospheric levels. The avionic fit gives a completely self-contained navigation capability in all versions, which is supplemented by a weapon-aiming system in the two British variants.

In Royal Air Force service the Jaguar will now only be used in the tactical strike role as military requirements have changed to the extent that a new advanced trainer is no longer considered to be an immediate necessity. About 35 or so two-seaters will, however, be acquired and used as operational conversion trainers.

The Jaguar fulfils a role which air forces all over the world are increasingly finding that they are lacking. Interest in this international all-rounder is intense, and with many hundreds of obsolete subsonic types just begging for replacement, it bids fair to capture a sizeable slice of the available market.

Topical Twists

by Pylonius, illustrated by 'Sherry'

Tail End Charlie

For the benefit of contest flyers who may be a bit oily behind the lugholes there should be a boldly displayed notice on the airfield, 'Beware of the Undertow'. The undertow not being the dangerous currents the term may suggest, but the warm currents the tactical flyer angles for under the glider towlines. Bit of a cheek when you come to think of it, letting the glider flyer do all the thermal picking donkey work while you just put your Wake up in his wake.

When you see all the oneupmanship going on – and even twoupmanship if the officials start getting officious – it makes you sigh for the days when the regimented queues of competitors patiently awaited their turn at the take off board. All very compact and democratic, even if some thermals were more equal than others. Nostalgic, too, the thought that the term out of sight referred to the distant disappearing model and not to the distant disappearing tactical flyer in search of a thermal, for it would take a brave timekeeper today to clock a model out of sight. In fact, if some of the optical power displayed is to be believed they wouldn't need that 200-inch telescope on Mount Palomar.

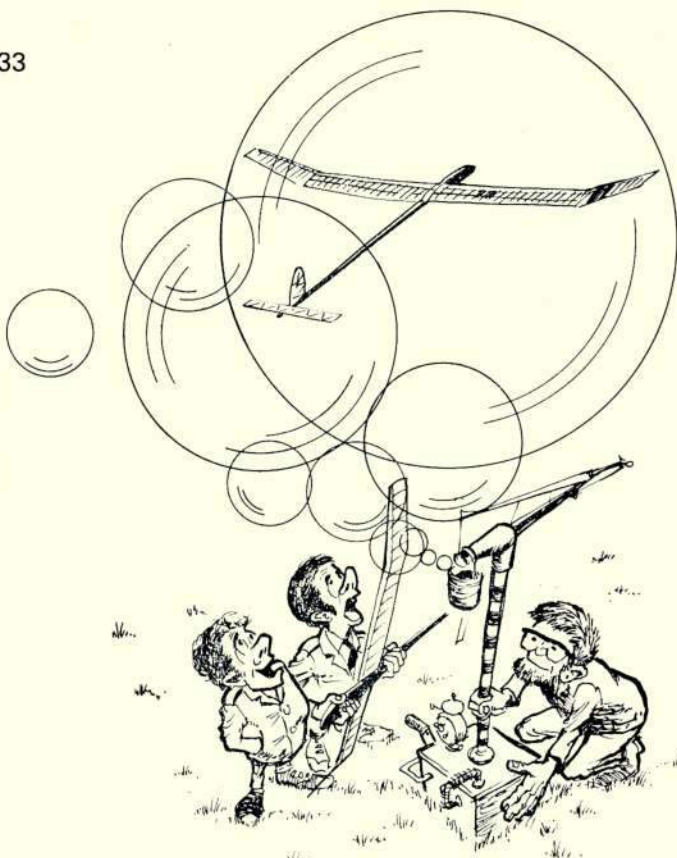
Blind Flying

Still on the subject of timekeeping, here is a friendly word of warning: do not choose a long-haired watchholder for your power flight. It is not so much that the flying tresses obstruct the vision as the muffling effect they have on the lugholes. And this can be very bad when it comes to detecting the sonic termination of the motor run: 'Alright, so it wasn't an over run. How was I to know that the Concorde was overhead at the time?'

To my mind all this visual timing by ear seems so very archaic, particularly in these days of advanced electronic aids. Already free flight models are being equipped with radio, and this might suggest that the day of the blind flying timekeeper is not all that distant. Electronically equipped, he could cut the engine-run spot on the ten-second mark, record the flight time by means of an airborne-state signal, and computerise a points deduction value for tactical flying. Such a system would, in effect, eradicate the Perpetual Vision clause in the Old Pals Act, which many would perhaps regret, and any grievances would have to be sorted out, not with the officials, but the little black box.

Kitted Up

At times you wonder if all the marvellous progress we are making is really worth the while. There they were, the modern, up-to-the-minute glider flyers, with turbulated, wafer thin wings, glass fibre rod fuzzes, postage stamp-sized tailplanes and every gadget known to aerodynamic science. Tactical flyers to a man, seeking the bubble reputation in the North polar air, they failed to notice the boy with the blown-up kit model.



'Don't you think they're carrying this tactical flying too far?'

Crafty Art

In these days of automated living and the mass cult, artistic expression is so stifled that to change the colour of your front door could bring a stern reprimand from the Ministry of Town and Country Planning, or even cause a demonstration by people outraged by such flagrant despoilation of the historic environment. We should be thankful, therefore, that the model plane does give some little scope for the creative impulse. Not so much in beauty of line and contour, for no one dare commit the heresy of deviating one rounded wing tip from the accepted format, but in the sort of imaginative decor with which you can dress up the flying surfaces.

Dressing up, however, is perhaps an over-statement, particularly where it is a question of accommodating *Playmate of the Month* along the wingspan. And even this pose poses a critical aerodynamic problem, since the ample statistics of the young lady are at variance with the undernourished character of the elongated wing. You get a condition known as spill-over, which can only be corrected by replottting the curves.

Possibly, the best artistic approach is that of blot and splotch modernism, whereby you can give full range to your artistic gifts with any ragged pieces of tissue or congealed spot of dope you may have lying around. The only trouble is that you can easily overdo the drip and daub effects and come out roughly even with people who get similar results without even trying. You can all too easily be misled, particularly at this time of the year. That piece of discarded wrapping paper you see on the airfield may well turn out to be a radio model.



Above, these three views of the new Model Hobby Consortium shop at Lewisham High Street, London, gives an idea of the size and scope of this model-makers haven. Quite a contrast from the traditional model shop, there are coffee machines and refreshments available as well as a customers workshop! Below is the RipMax nickel cadmium accumulator, which if connected in series with similar cells (straps provided free), may also be used to power boats. Beneath that is the Sonic Tronic engine starter, a useful luxury and at bottom is the Hobby Poxxy glue, packaged in a neat plastic case.

TRADE NOTES



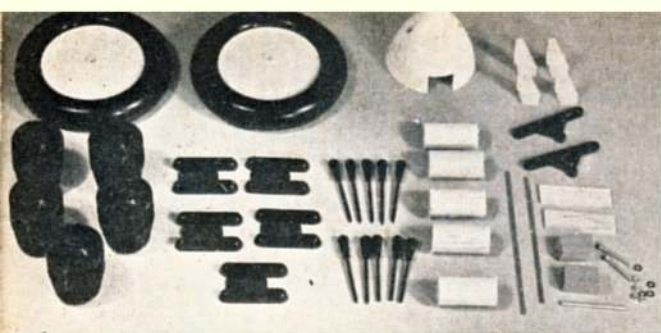
ONE OF THE MAJOR drawbacks to using epoxy adhesives has always been the lengthy 'setting time' with the consequent hold-up of production that it necessitates. The tremendous strength that this form of adhesive produces has to some extent over-ridden its disadvantages, but the recent strides made in this field of technology have now created various rapid-setting epoxies which are readily commercially available.

Ed. Johnson (of 215 Devizes Road, Salisbury, Wilts.) sent us a sample of the *Devon '5 Minute Epoxy'*—a product which readers of *Free Flight Comment* will have seen frequently mentioned. It seems that free-fighters are rather in the habit of breaking fuselages/engine mounts/pylons, etc., and have found this product extremely useful for 'on the field' repairs. Just as handy when building as a great time-saver, but do make sure that all the pieces are cut to the correct shape and size before mixing this two-pack adhesive—five minutes after the hardener meets adhesive and the joint is firm! Not much time is available for 'fiddling' parts into position. Price of the two tube pack is 9/-.

Another rapid-setting epoxy is the *Henkel Stabillit Express*. This is unusual in that the hardener is in powdered form, while the adhesive is a 'normal' resin contained within a tube. This product claims a firm bond after 20 minutes, full strength being achieved in an hour. The 'working life' is a useful eight minutes. Mixing this adhesive is very easy, using the measure and mixing tray supplied. Distributed in this country by **RipMax**, our sample was obtained from Taylor and McKenna (Aylesbury) at a price of 8/9d.

Hobby Poxxy two part epoxy is also available in this country from **Horizon Model Aircraft Supplies** (35a Pickford Lane, Bexleyheath, Kent) at 9/6d. per pack. This product claims to set within 30-45 minutes, full strength being achieved in two hours, and with a useful pot life of 15 minutes.

We gave these three products a simple test to check their claims. This consisted simply of two pieces of 1/16 in. plywood, unprepared in any way and cemented at right angles. Pressure in the form of a 'standard' typewriter was applied to each of the samples in a room where the temperature was 59 degrees F.—yes, slightly less than the *Shops, Offices and Factories Act* requires! Each sample was tested for strength after the period of time at which full hardness was claimed, with the result that the *Devcon* sample broke (five minutes), but the joints failed on the other two products after one hour (*Stabillit*) and two hours (*Hobby Poxxy*).



It should be emphasised that these tests were in no way intended to prove conclusively the merits of the various adhesives, but merely to form a rough indication of their usefulness.

RipMax have a limited supply of soft nickel-cadmium 15 A/h accumulators of 1.25 volts available, being recently made for the R.A.F., but have never in fact been used, and are thus 'good as new', carrying the full Ripmax guarantee. These sintered-plate constructed batteries will take very high currents, and are ideal for glow plug motors, although better suited to 1.5v plugs than 2.0v. Their slim size (6 in. x 2½ in. x 1½ in.) make them suitable for control line racing mechanics to carry in their back pockets providing, of course, that the stitching will take the 27 oz. weight! Advantages of this type of battery are that they are completely unspillable, will last approximately ten times as long as an equivalent lead/acid cell, and can be re-charged at a high rate of amps. Price is £25.0 each.

Electric engine starters are becoming increasingly popular, and one of the neatest units we have seen is the *Sonic Tronic*, supplied by **H. J. Nicholls**, of 308, Holloway Road, London, N.7. With an overall length of 6in. and a diameter of 2 in., the unit fits the hand well, the starting button being conveniently positioned so that grasping the casing

'automatically' spins the motor. Not a cheap luxury, the *Sonic Tronic* costs £13.10.0 plus, of course, the cost of a 6 volt battery. Weight is 2 lbs. 2 ozs.

Books on the subject of aeromodelling are all too rare, so it was a pleasure to see the *Book of Balsa Models* by Bill Dean. This, in fact, is an American edition, revised and updated, of 'The Eagle Book of Balsa Models', originally published in this country in 1959. The 64-page book contains full instructions and plans for building some 18 different designs, all of a very simple nature, and quick to make. Types include catapult gliders, towline gliders, rubber and Jetex powered aircraft, in addition to cars and sailing vessels. An ideal introduction to the hobby for the young enthusiast, published by **Arco** and should be available in this country shortly.

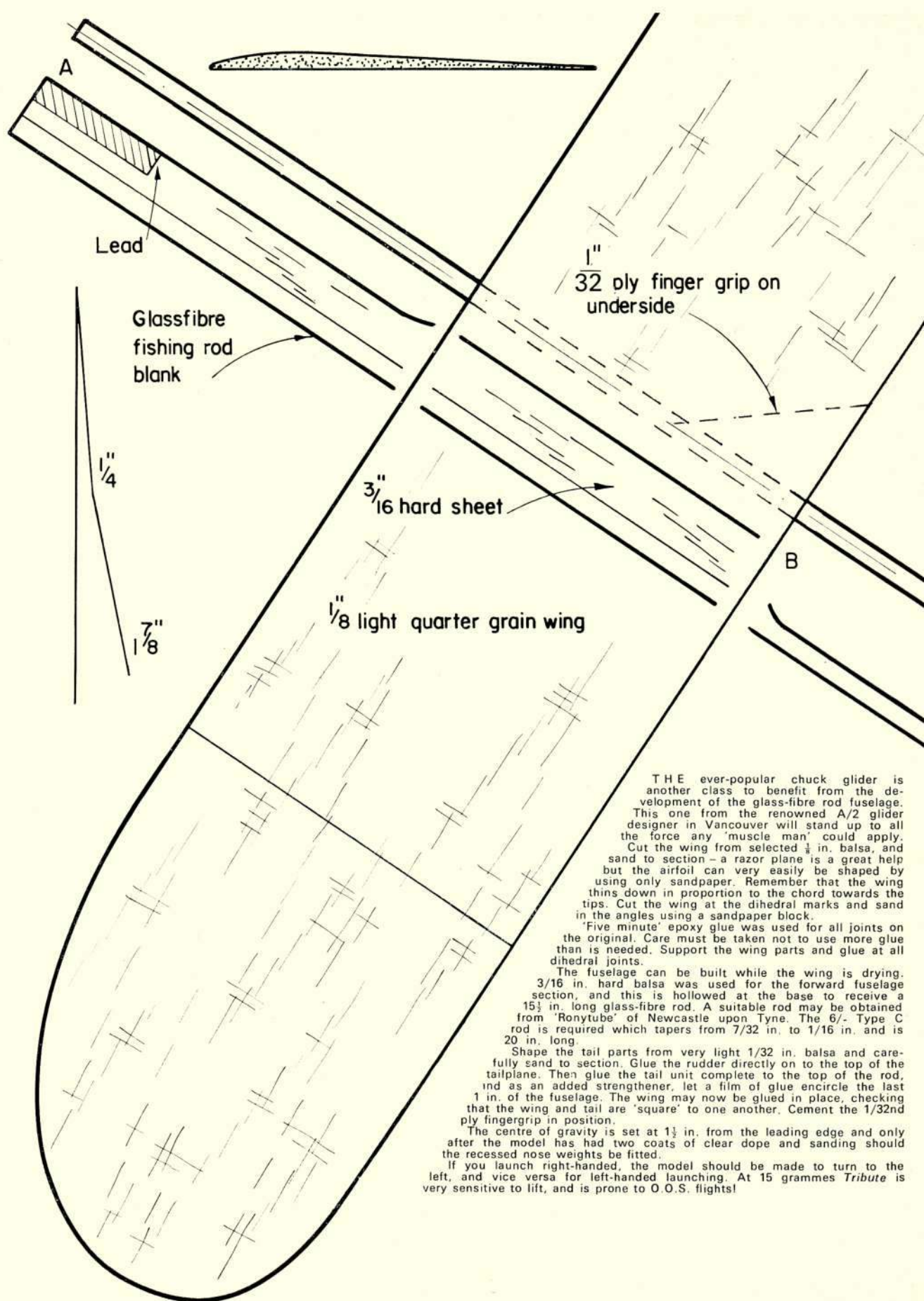
The latest model from the **Veron** stable is the *Hawker Tomtit*, a rather unusual choice as this aircraft was something of a rarity. Perhaps the fact that the top and bottom wings are identical, and that the lower wings carry the ailerons made it an attractive proposition to the designer, Phil Smith. Nonetheless, it is good looking, has two wings and is 'British', thus it can hardly fail as a popular 'full house' scale model! The span is 52 in. and it is intended for .23-40 cu. in. engines - prototype flying very nicely on a .29. Die-cutting is to the usual Veron high standard, and as can be seen in the picture, the kit is most comprehensive, even down to containing five plastic 'cylinders', 3½ in. diameter 'vintage' wheels and vinyl decals. These latter items will also be marketed separately. Price for this beauty is a full £22 - and don't expect to fly it on a single channel equipment!

Picture at the head of the page illustrates just some of the hardware supplied with the **Veron Hawker Tomtit** kit. Objects in the foreground are the dummy cylinders with rocker-covers and push rods. These and the 'vintage' wheels will be sold separately as well. At left, the contents of this luxury kit display the multitude of die cut parts. Decals are vinyl, and simply peel off the backing strip.



Above right is the very rapid setting 'Devcon Five Minute' epoxy - means what it says too! At right is the **RipMax** distributed 'Stabilit Express' epoxy. Adhesive is mixed in the plastic tray provided, using the 'spoon' measure for the powder and the plastic mixing rod.





THE ever-popular chuck glider is another class to benefit from the development of the glass-fibre rod fuselage. This one from the renowned A/2 glider designer in Vancouver will stand up to all the force any 'muscle man' could apply. Cut the wing from selected $\frac{1}{8}$ in. balsa, and sand to section - a razor plane is a great help but the airfoil can very easily be shaped by using only sandpaper. Remember that the wing thins down in proportion to the chord towards the tips. Cut the wing at the dihedral marks and sand in the angles using a sandpaper block.

'Five minute' epoxy glue was used for all joints on the original. Care must be taken not to use more glue than is needed. Support the wing parts and glue at all dihedral joints.

The fuselage can be built while the wing is drying. $\frac{3}{16}$ in. hard balsa was used for the forward fuselage section, and this is hollowed at the base to receive a $15\frac{1}{2}$ in. long glass-fibre rod. A suitable rod may be obtained from 'Ronytube' of Newcastle upon Tyne. The 6/- Type C rod is required which tapers from $\frac{7}{32}$ in. to $\frac{1}{16}$ in. and is 20 in. long.

Shape the tail parts from very light $\frac{1}{32}$ in. balsa and carefully sand to section. Glue the rudder directly on to the top of the tailplane. Then glue the tail unit complete to the top of the rod, and as an added strengthener, let a film of glue encircle the last 1 in. of the fuselage. The wing may now be glued in place, checking that the wing and tail are 'square' to one another. Cement the $\frac{1}{32}$ nd ply finger grip in position.

The centre of gravity is set at $1\frac{1}{2}$ in. from the leading edge and only after the model has had two coats of clear dope and sanding should the recessed nose weights be fitted.

If you launch right-handed, the model should be made to turn to the left, and vice versa for left-handed launching. At 15 grammes *Tribute* is very sensitive to lift, and is prone to O.O.S. flights!

TRIBUTE

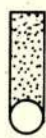
by E. Avory

A 15" span chuck
glider from
Canada

Total finished weight
15 grammes



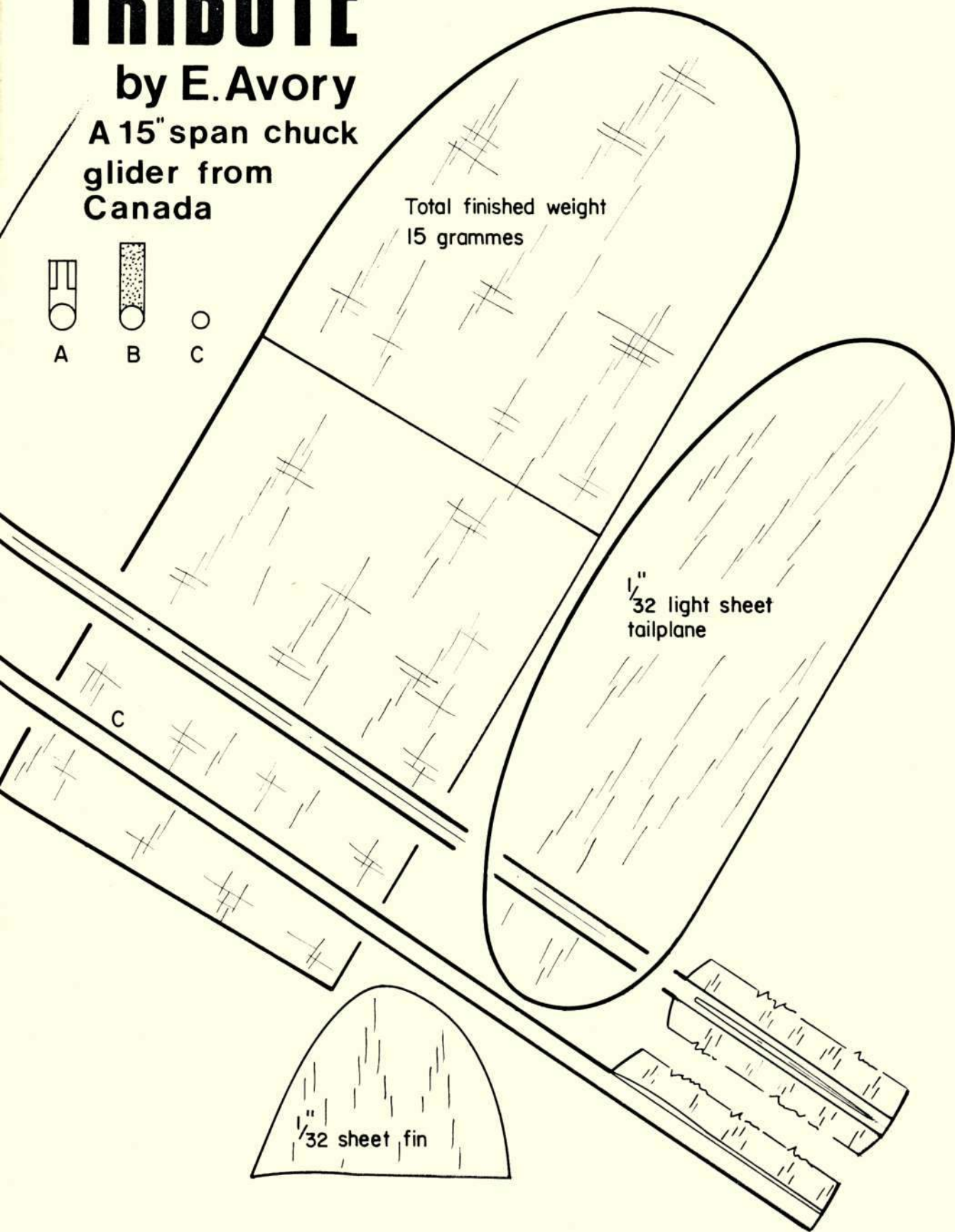
A



B



C



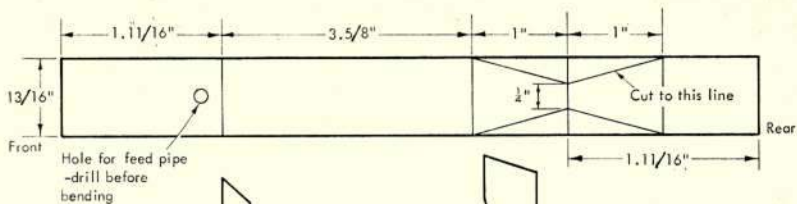
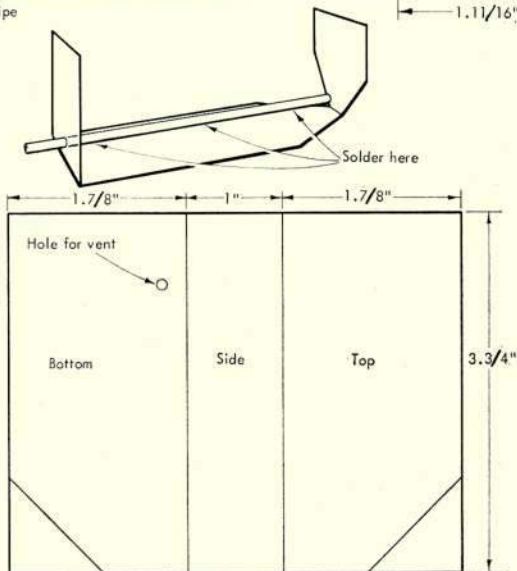
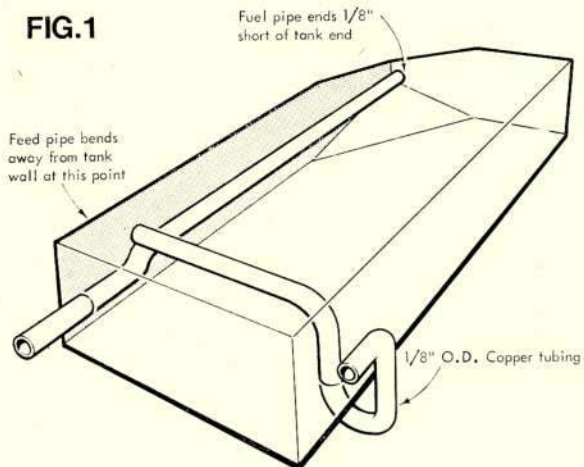


FIG. 1

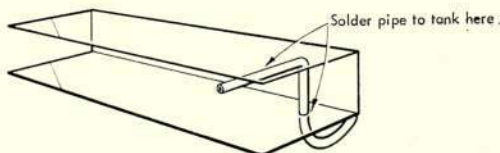


Poor engine runs? Try a

UNIFLOW TANK

by M. Harvey

FIG. 2



THE 'UNIFLOW' TANK, which has been used for several years now in team-race circles, also has its applications in other fields, and Mick Harvey has been using the version depicted above in his stunt models for quite some time. It combines the virtues of both performing reliably—providing the engine with a constant supply of fuel—and being easy to make. No baffle is required in this tank, which works on the principle that fuel is only released to the engine when a bead of air is pulled into the tank by the partial vacuum. The air entering the tank to enable it to be emptied has to pass through the fuel, providing a regulated flow to the engine.

Ordinary tin-plate, such as may be 'salvaged' from canned foods, etc., can be used in the construction, or alternatively, thin brass sheet, which is perhaps a little easier to bend accurately. Note that copper tubing ($\frac{1}{8}$ in. O.D.) is specified, as brass tube can break up under prolonged vibration. The basic shape, as seen in Figure 1, is simply a rectangular box with the offside rear corner 'compressed' to enable the last drop of fuel to be used up. The tank parts are marked out on the tinplate/brass as shown in Figure 2—the dimensions shown are for a .35 cu. in. glow motor, and may be varied to suit other applications. Allowances are made for sufficient overlap to provide a strong soldered joint.

Cut out the narrow (side) strip, drill the feed pipe hole and bend to shape. Bend the feed pipe to shape, so that the fuel tubing will clear the fuselage sides, and solder where indicated, ensuring that there is an $\frac{1}{8}$ in. gap between the end of the pipe and the end plate. Now, cut out the main body, drill the hole for the vent pipe, then bend to shape. Bend the vent pipe to shape, and again solder where indicated. The two

halves may now be brought together and soldered securely. Check for leaks by sealing off the vent pipe, and blowing down the feed pipe via a length of fuel-tubing, whilst the whole is immersed in water—any leak will be disclosed by a series of bubbles—size depending on the quality of your workmanship! Repeat testing until completely airtight.

The tank is filled via a large 'squeeze bottle' while the nose is pointed downwards, the trapped air escaping via the spray bar. Mick finds that once accustomed to the tank, the flyer can gauge the duration of a flight, and alter it (as shown in Figure 3) by tilting one of the wing panels whilst filling. This can be very useful, especially when flying in a stunt contest, as the fuel consumption can vary under differing conditions, and a premature cutting, or over-long engine run both result in loss of points.

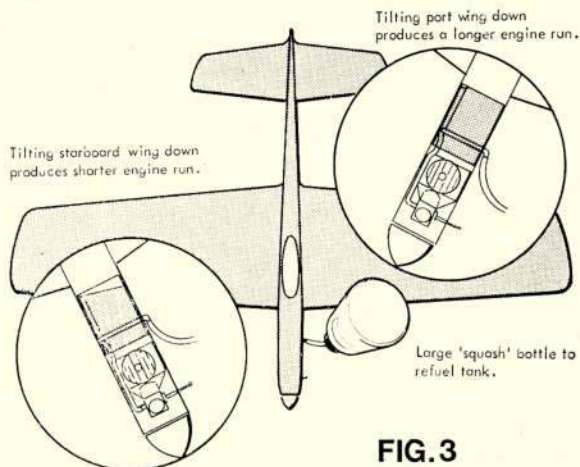


FIG. 3

Dr. Brenig James has been a keen glider pilot for 24 years, during which he has obtained Britain's 11th Diamond C, with a flight to 27,000 in a thunderstorm (wearing a pair of swimming trunks) and has made the first 500 kilometre triangular goal flight in this country. He first became interested in boomerangs when he read an article by Felix Hess in the November 1968 issue of 'Scientific America'. He feels that a great deal can be done to improve the boomerang as a missile and to develop boomerang throwing as a serious sport; with this in mind, he has founded the Society for the Promotion and Avoidance of Boomerangs. The annual subscription is one pound and the Secretary is Major Christopher Robinson of 12 Stoneham Close, Reading, Berks., to whom applications for membership should be addressed.



Why not try a

BOOMERANG

glassfibre techniques

applied to an age-old

'flying machine' by Dr. Brenig James

BOOMERANGS are rotating chuck gliders which usually land fairly heavily, so the first consideration is to make them of a really strong material. In this respect glass fibre appears to be a considerable advance over wood, and is a material which can be easily worked by the modeller. A mould is constructed out of plywood having the same plan form as the required boomerang, but with a rectangular cross section (Fig. 1). This is then waxed or lined with clear adhesive tape to give a surface to which the glass fibre resin will not adhere. The glass fibre cloth used should be a unidirectional rovings mat of about 18 ozs. weight. A length should be cut slightly longer than the full span of the boomerang and about one-third of the width of the roll. This is then laid out on a large sheet of polythene and the resin poured over it and distributed evenly over the cloth with a roller and spatula. The type of resin used is not important, but a low viscosity is helpful and a coloured pigment adds to the appearance of the finished article—sufficient catalyst should be added to give a pot life of about an hour. When thoroughly impregnated, the cloth should be coiled up like a Swiss roll and placed in the mould. A sheet of polythene is now laid on top and a roller used to force out excess resin and air bubbles towards the tips, after which the mould is left on a flat surface to harden thoroughly—usually for about 24 hours in a warm place. It should be emphasized that polyester resin is a messy substance and adequate newspaper and cleaning materials are required.

When removed from the mould the blank is found to be very strong and resilient, and is now ready for grinding into shape. The section required is L.D.C.2 at + 4 degrees incidence, using a right-hand pitch for right-handed throwers and the opposite for left-handed throwers. Working from the lower surface, which should be quite flat, faces are chamfered off according to the plan in Fig. 2. This is best done using an abrasive disc on a power drill, preferably out of doors, as the dust produced is abrasive and irritating to the skin.

The next step is to round off the corners using a foam-backed drum sander on a power tool followed by finally finishing by hand. The central part

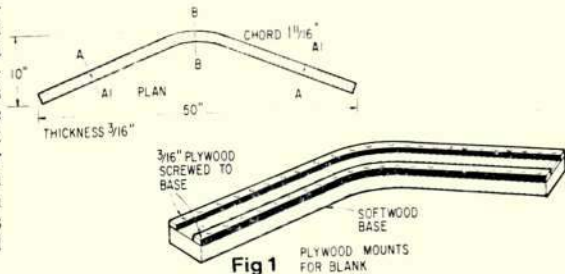
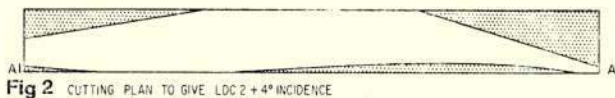
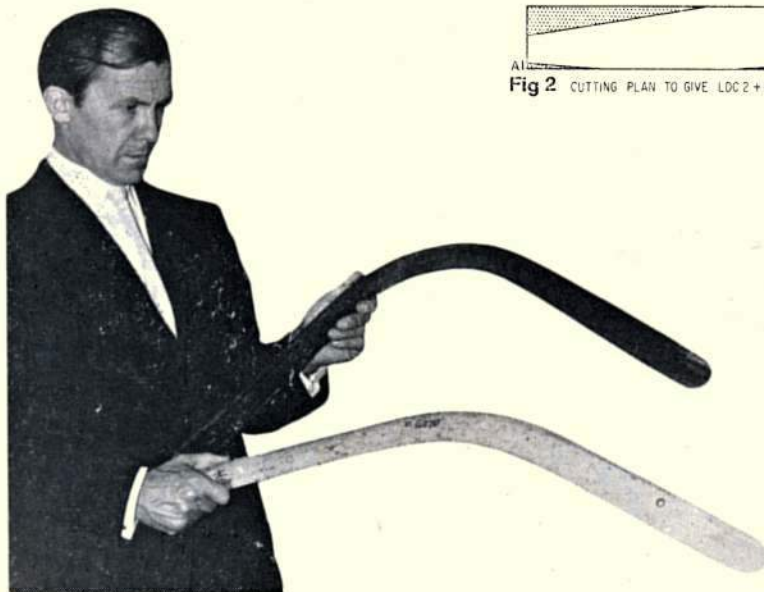


Fig 1



Dr. Brenning James with two of his glassfibre boomerangs made on the principles described in his article and using the airfoil section illustrated on this page.

of the boomerang has a fore and aft symmetrical section as shown in Fig. 3, and the wing tips are rounded off in the usual manner. The weapon should be placed on a flat surface and the incidence checked as this is important if the performance is to be satisfactory. Since the trailing edge is sharp it is advised that a glove should be worn for throwing.

The boomerang should be thrown with an overhand action rather like a tennis serve and with plenty of top spin, getting a good trajectory is from then on a matter of trial and error.

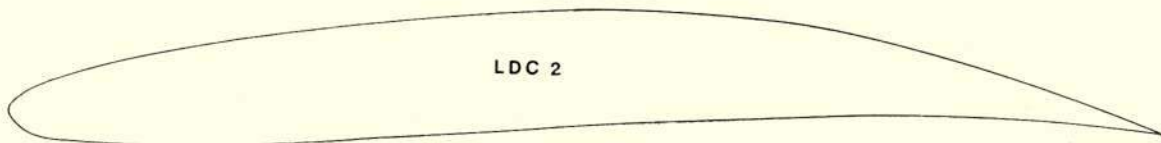
The boomerang blades generate lift like the wing of any model aeroplane, however, since the forward going blade has a higher air speed the lift has a rolling movement, and since the centre of pressure is ahead of the wing midline there is also a pitching movement. As the boomerang is a gyroscope, these

forces produce precessions so that the rolling force causes a pitching movement which, since the boomerang is on its side, causes it to turn and fly back around a curved track to the thrower. The pitching movement causes a rolling movement so that the boomerang takes off bank. If the boomerang takes off bank slowly the result is a perfectly banked turn as the missile returns, but if the rolling is accentuated by increasing the incidence at the central region the boomerang will continue to roll so that it changes direction, giving an S-shaped track. Greater incidence at the tip reduces the diameter of the turn, however, approximately + 2 degrees to + 4 degrees incidence gives a nice, wide turn so that with a strong throw a flight of about 300 yards around the circumference can be obtained.

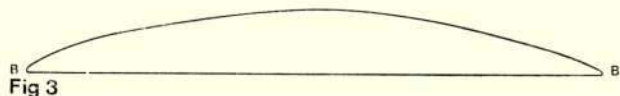
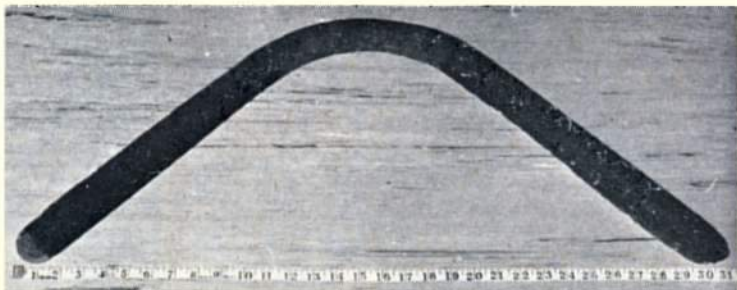
With use the tips tend to get pranged and chipped, but fortunately, since the wing has a parallel chord and no twist, grinding the tips back to the proper shape does not affect the performance appreciably. The strength of unidirectional glass fibre cloth gives great freedom to the designer, multi-bladed types which have greater stability can be easily made and the span section, etc., can be experimented with to get the best performance. Since the boomerang is a variety of aeroplane the performance can be improved by increasing the power and reducing the drag.



A selection of five quite different boomerangs made by the author, showing the variations in included angles and aspect ratios which have been used for experiment.



One of the smaller boomerangs with tape measure to give size comparison. This one has been very successful. Return flights over a course of 200 ft. are possible and the thrower should take care not to try to catch the boomerang when it returns!



In the first aspect the main consideration is that the human hand can hardly be made to travel faster than about 80 knots, however, one can strike a golf ball much faster than one can throw it, and by much the same kind of reasoning it follows that increasing the span of the boomerang increases the launch velocity. There is great scope for drag reduction by the choice of the best wing section, since the advancing tip is travelling fastest and since drag is proportional to V^2 this is where greater attention is required—although the use of the L.D.C.2 airfoil must be regarded as an initial step which will be soon improved upon.

Since the boomerang is a glider it may be soared; most obviously on a hill soaring site, however

dynamic soaring is possible and gives a more interesting flight. In a fresh-to-strong wind it blows much faster at 30 feet than 10 feet, so that if the boomerang is thrown slightly upwards and against the wind it gains energy as it climbs. It then turns and dives down through the wind gradient now gaining energy as it falls; the net result is a spectacular flight and a walk of two hundred yards to retrieve it. Boomerang throwing can be dangerous to the thrower and spectator alike as the missile is fast and sharp and the flight is difficult to predict. Throwers should pick an open space free of spectators for about 200 yards around themselves, taking care not to throw so that the boomerang returns down-sun.

It seems likely that considerable progress can be made in boomerang design construction and that new records can be set for range, duration and accuracy. Since the aerodynamics of boomerangs is in the same range as that for model aircraft it is hoped that aeromodellers will be in the forefront of boomerang development.

Round the Rallies...

South Bristol Gala 1970

Held on October 18th, this year's attendance was very good, considering the rival attraction in the North, the lateness of the event and the blustery wind. The latter made life very difficult for the free-flyers, with turbulence from the woods and buildings downwind.

George Fuller broke two models winning *Open Power* and son Chris lost one (fortunately recovered later in the week). *Rubber* had an unorthodox winner in the shape of K. Horry's canard (used in the Yeovilton Nats fly-off a few years ago).

Glider had an excellent entry of 33 and proved a resounding victory for M. Fantham. *Vintage Precision* (our forte) drew a good entry and Jack Law, with a *Berkley Musketeer* powered with spark ignition Ohlson 23 S.P. eclipsed everyone with a perfect score of zero. Jack aimed near the minimum score of 45 secs., actually using 50 secs., and did not get high enough to be really affected by turbulence.

At the other end of the 'drome, away from the welcome tea stall, the control line events ground on through their heats (hardly the right word, hearing all the teeth chattering!). *Combat* quibbling was cut somewhat by allowing our ladies to officiate—could have done with some over at the *Goodyear* circle judging by some epithets from one team member. Final was between Evans and Wright of the home club and was a lightning affair, Evans taking all of Wright's streamer and Wright taking two clips at Evans's to win in less than a minute.

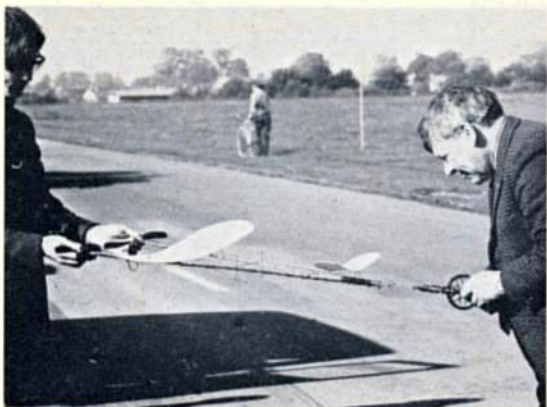
The *F.A.I. Team Race* final went at a fast clip with excellent flying and pitting. Rudd/King, however, had the edge on Nixon/Ellis, beating them by half a minute. The *Goodyear*

The South Bristol Rally is one of the few contests catering for vintage aircraft—and this year attracted a good entry. At right, Alwyn Greenhalgh is seen winding up his original A-frame pusher, which subsequently made an excellent flight.

final produced one almost rat-racer type with mono wheel against two conventional jobs and proved an easy win for the former.

Results:

Glider (33 entries) 1. M. Fantham (Richmond) 7:55; 2. Hart (R.A.F.) 6:47; 3. E. Drew (Bristol & West) 5:53. **Power** (10 entries) 1. G. Fuller (St. Albans) 8:05; 2. F. Chilton (Crookham) 7:41; 3. A. Fathers 6:32. **Rubber** (7 entries) 1. K. Horry (Bristol & West) 8:48; 2. B. Bow (S. Bristol) 8:42; 3. K. Lloyd (Glevum) 7:22. **Vintage** (18 entries) 1. J.



Law (Newhark) 0 per cent; 2. W. Manning (S. Bristol) 14.5 per cent; 3. K. Haggart (A.M.A.) 18.4 per cent. **F.A.I. Team Race** 1. Rudd/King (Feltham) 9:46.2; 2. Nixon/Ellis (Hinckley) 10:15; 3. Campbell/Perkins (Hinckley) 11:10. **Goodyear** 1. Hamilton (Hayes) 8:55.5; 2. Coote (S. Bristol) 10:06.8; 3. Evans (S. Bristol) 11:02. **Combat** 1. Wright (S. Bristol); 2. Evans (S. Bristol).

London Area Rally

November 1st was plagued by high winds (over 20 knots) which, combined with a local Western Area event, greatly reduced the number of competitors at this first rally to be held at the army-owned airfield of Bassingbourn.

This was most unfortunate, both because of the first-class prize list available to winners, and also the excellent venue. The Army are reluctant to allow frequent use of the airfield and the London Area S.M.A.E. were obliged to prohibit spectators.

The free-flight contest was for F.A.I. models only, run in seven separate 45-minute rounds, with 15-minute gaps between, and a scoreboard on which running end-of-round totals were displayed was used; maximums were limited to 150 seconds, and apart from the Hayes pair who eventually won and placed second, there was a marked lack of tactical flying, due to the difficulty of controlling models on the line. As many people flew Wakefield as A/2, but Power was a walkover for Fred Chilton from Cookham.

On the Control Line (centrifugal lunacy) side, the *Rat Race* event fell to Frank Bradley who established a 2:47.5 time in his first heat – the only person to beat 3 minutes in the very gusty conditions. **F.A.I. Team Race** had just six entries (as did *Rat*), with none of the top-line fliers present. Fastest time of the day (5:11) went to Campbell/Perkins of Hinckley, but it was Nixon/Ellis who triumphed in the final. As is becoming 'normal' these days, the *Goodyear* event had the greatest support with eleven entries. Winner yet again was the Harknett/Smith team who set up an incredible heat time of 3:55.8 (the first sub-4 minute time recorded) followed by a final time of 8:17.8. These times will be put forward as new records and under the appalling conditions encountered, they were almost unbelievable!

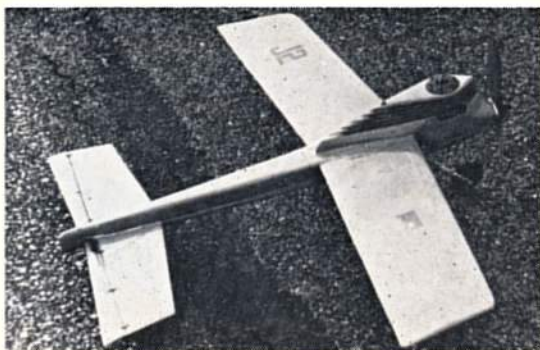
The *Stunt* event was naturally affected badly by the wind – Brian Turner in particular having line tension problems, 'losing' his model on several of the high-pointed manoeuvres. J. Lambert was less fortunate and hit the ground with the usual result. First place was a tussle between Steve Blake and Mick Harvey, the latter leading the first round but losing on aggregate.

The *Speed* area showed little activity, especially after Alan Woodrow and Bill Firbank experienced some expensive engine damage – the latter's K&B 29's con-rod breaking at the big end in a spectacular fashion. However, John Dixon's Super Tigre 29 was fully sorted and he achieved over 150 m.p.h. to take final place, followed by Gordon Farnsworth with his Super Tigre G.15 Open model.

Results:

Wakefield (9 entries) 1. A. Wells (Norwich) 12:27; 2. C. Hadland (R.A.F. M.A.A.) 8:54; 3. A. Crisp (F.A.C.C.T.) 8:53. **A/2 (10 entries)** 1. J. Baguley (Hayes) 13:17; 2. J. Punter (Hayes) 12:54; 3. M. Fantham (Richmond). **Power** 1. F. Chilton (Cookham) 8:00. **Rat Race (6 entries)** 1. Bradley (Feltham) 6:38.8; 2. Clarke/Jackson (Feltham) 6:44.8; 3. Heindrick (S'end) 10:09. **F.A.I. Team Race (6 entries)** 1. Bedford/Allen (Feltham) 10:29; 2. Campbell/Perkins (Hinckley) 11:48; 3. Bedford/French (Feltham) 12:40. **Goodyear (11 entries)** 1. Harknett/Smith (Feltham) 8:17.8; 2. Hamilton/Carson (Hayes); 3. Morgan (Finchley) ret'd. **Stunt (5 entries)** 1. S. Blake (Buckaneers) 920; 2. M. Harvey (Three Kings) 903; 3. F. Pateman 764. **Speed**, 1. J. Dixon (Feltham); 2. G. Farnsworth (N. Sheffield); 3. W. Firbank (N. Sheffield).

Noel Barker was in slight trouble with the strong breeze when he flew his Foster-powered Vulcan at the Bristol meeting.



John Clark of Feltham produced this magnesium pan, swept wing rat-racer at the London Area meeting. Inspiration for the slatted cowl to the K&B came from the rear-end of a Ferrari!

FAR EAST AIR FORCE CHAMPIONSHIPS

The F.E.A.F. championships for 1970 were held at R.A.F. Changi, Singapore on Sunday, 20th September, Sunday, a day which usually permits model flying on the Changi airfield with little restriction, was on this occasion attended by so many full-size aircraft movements that by midday the contest director (Sqn. Ldr. Bill Jacobs) was quite anxious about the possibility of having to declare a postponement. However, with first-class co-operation from airfield control, judges and competitors the contest programme was curtailed in minor respects only and without effect on the results.

For operational reasons, coupled with the close proximity of the model landing/take-off area to a busy main road, model flying at Changi is restricted to radio control and control-line types. Forty-six competitors got off the mark in the various events and it was good to see the Changi juniors well represented. Apart from Changi, the largest R.A.F. club in Singapore, competitors came from R.A.F. Seletar, R.A.F. Tengah and R.A.A.F. Butterworth. David Bowring (17) of the Changi club was the most prominent R/C contestant. Scale entries were few, but of special merit was the successful radio controlled scale model of the Lee-Richards Annular Wing aeroplane by Chief Technician Cyril Edwards expertly flown by Chief Technician Derek Hughes. Contest winners were:

Radio Control

Spot Landing	David Bowring	Changi
Team Race	Cpl. Alan Richardson	Tengah
Limbo	David Bowring	Changi
Scale	C/T. Edwards	Changi

Control Line

'A' Rat Race	J/T. Fred Broadbent	Changi
Combat	David Bowring	Changi
Juniors' Mouse Race	Julian Bensaïd	Changi

Chief Technician Cyril Edwards once again produced a scale model of the Lee-Richards Annular Aeroplane of 1914 for the F.E.A.F. champs – this one to 1/9th scale and for multi R/C. These championships would not seem the same without one of Cyril's Lee-Richards, in either free-flight, control-line or R/C form!





Are you between 10 and 16 years of age? Then don't delay, join today

Dear John,

Can you please advise me if there is a kit available of a control line 'Spitfire' approximately 40 in. to 50 in. wing span.

Liskeard, Cornwall

P. J. Hart

The only kit available for a control line version of the Spitfire, of which we are aware, falls rather short of your specification, as it is only 23 in. span. This is the kit produced by Mercury, retailing at around £3 and using engines of 1.5-3.5 c.c. Nearer to your size requirement is the Aero Modeller Plans Service order No. CL/776 price 10/- post free. This is a semi-scale version of the Mk. VIII, and is 53½ in. span. It is also fully aerobatic, having been designed primarily as a stunt model for use with .29 or .35 cu. in. motors.

When you refer to your problems when covering with nylon, I presume you are referring to covering sheet surfaces. This is best done by applying the nylon wet, and using P.V.A. glue as the adhesive. Pull the covering taut, and pin if necessary. When the nylon has dried out, sanding sealer may be applied in the normal manner and no wrinkles will result.

Dural and similar materials may be purchased from J. Smith and Sons of St. John's Square, Clerkenwell, London, E.C.1 - who will supply small quantities if required.

Dear John,

I have recently obtained a Cheshire Kitten from M.A.P. Plans Service and have some questions I would like to ask you about it.

Is a D.C. Spitfire, with a Sabre cylinder head, light enough for it and, if so, what type and length of lines would I use? If it is too heavy, can you please give me the same information about the D.C. Merlin.

How is the celluloid tank made and cut and what is the wing tip solder for? Also how is the push rod made at each end?

Dunstable, Beds.

W. Carley

The D.C. Spitfire, modified as you describe, is not too heavy for the 'Cheshire Kitten', although the model may turn out nose heavy, which will cut the manoeuvrability. If this proves to be the case, a little Plasticine or lead, slotted into the tail unit, should cure this. The 'Cheshire Kitten' can be flown on 35-foot lines, preferably light Laystrate. The celluloid tank is cut out of acetate sheet and stuck together with balsa cement. The solder in the wingtip is for weighting the starboard wing tip, so that the weight of the lines is offset, and the lines remain tight. The push rod ends are bent at 90 degrees, pushed through the control, and washers soldered on.

Dear John,

I was recently looking through my pile of AEROMODELLERS and in the April, 1969 issue, I read about an article on modelling with plastic-card



Nigel Bromley, son of a Squadron Leader serving in R.A.F. Changi is seen launching a combat model during the Far East Air Force Champs - better weather in those parts!

and was very interested because as winter is setting in, I was looking for a new sort of building for the long evenings and was wondering if you could please tell me the names of any books on this hobby.

Motherwell, Lanarkshire. A. Milligan

The only book which to our knowledge includes details of modelling with plastic card is Chris Ellis's 'How to go Advanced Plastic Modelling'. This is published by Patrick Stephens, and costs £2.

* * *

Owing to increased administrative costs, it is regretted that membership of the 'Golden Wings Club' must be increased to 25p. (5/-) as from 1st January, 1971.

Dear John,

I am making a Double Scotch. Is it possible to convert it to rudder and elevator R/C? If so, could you recommend a suitable R/C?

Oakham, Rutland

Brett D. Morgan

'Double Scotch' was designed purely as a twin-engined control-line sports model, and would be most unsuitable for R/C conversion, especially with single channel equipment. The wing loading would be much too high, the airfoil section all wrong, and the whole project not really feasible quite apart from the two engines!

Your best solution would be to build a simple, rugged trainer-type model, capable of taking knocks while you learn the technique of flying. Many such plans are available, and I suggest that you select one to suit your engine from the Plans Handbook No. 4 which deals exclusively with R/C models. This publication will be available in the New Year at a price of 3/- (15p).

Dear John,

I am now making David Boddington's 'Barnstormer'. I have installed in this model the Elmic Commander, but the rattler (I think it is called that) tends to stick to the teeth of the nylon wheel. Should I send it back to Elmic or to the model shop or would I be able to mend it myself?

When covering the 'Barnstormer' with nylon and sanding sealer, the nylon comes up in prominent bulges and wrinkles. I have tried sanding and cutting these bulges, but it only comes out worse.

I would be pleased if you could tell me anywhere where I would be able to obtain dural, as when I was trying to obtain dural struts for the 'Barnstormer' I went to great trouble to obtain dural and the manufacturers would not be pleased if I again went to them for a bob's-worth of dural, and the minimum order is 30/-.

Swinton, Manchester

S. Riley

The Elmic Commander is a very well-made unit, and it is most unusual for it to give trouble. It is possible that a little silicon grease will cure your trouble, but if this does not succeed, suggest you return it to the makers.

Dear John Bridge,

I am between 10 & 16 years of age and would like to become a member of the "Golden Wings Club". With this application I enclose postal order (International Money Order) for 25p (5/-) to cover cost of the enamel club badge, two coloured transfers and membership card.

NAME IN FULL

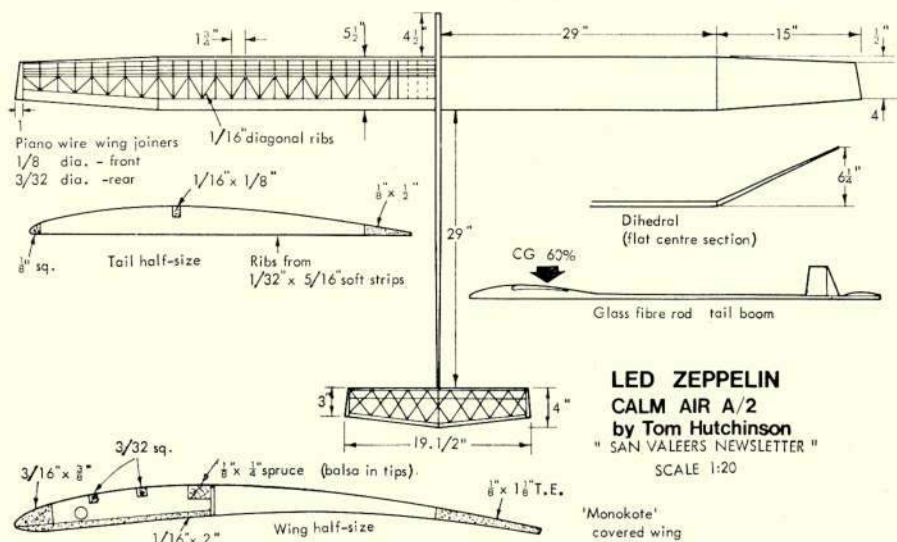
ADDRESS

YEAR OF BIRTH SCHOOL

NAME OF ANY OTHER CLUB OR CLUBS TO WHICH I BELONG (if any)

SEND TO: GOLDEN WINGS CLUB, AEROMODELLER, 13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.

1/71 2d. in the 1/- Rebate
to plan purchase coupon
G.W. No. Golden Wing Members



LED ZEPPELIN
CALM AIR A/2
 by Tom Hutchinson
 "SAN VALEERS NEWSLETTER"
 SCALE 1:20

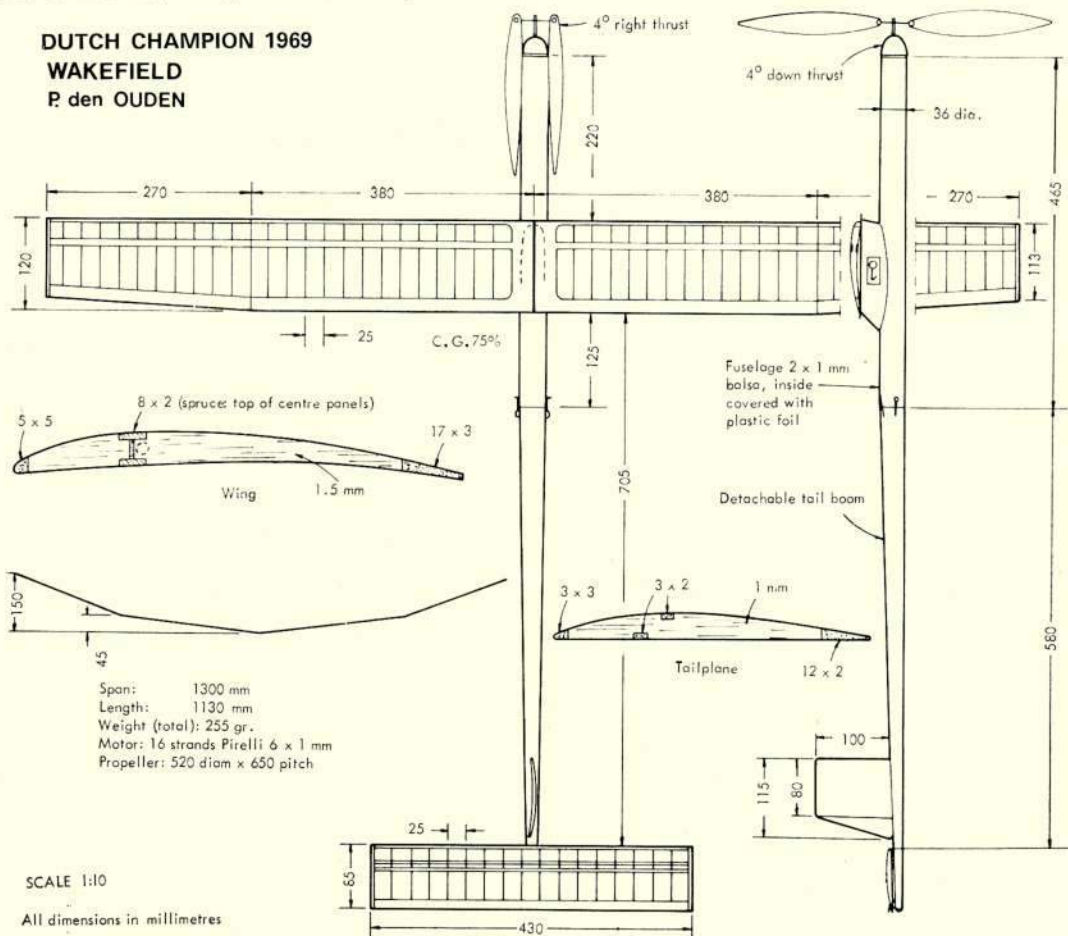
LED ZEPPELIN

Tom Hutchinson's model displays straight forward design with fairly intricate lightweight construction, and utilises the almost universally adopted glassfibre rod for the fuselage. Use of a mylar covering, such as Monokote or Solarfilm permits warps to be removed or induced as required, as well as providing a visible, weatherproof finish.

DUTCH CHAMP WAKEFIELD 1969

Peter den Ouden used this simple design, featuring a pylon mounted wing and rolled balsa fuselage, to win the Dutch Champion title and also to place 21st in the World Championships during 1969. In the latter contest he dropped just 95 seconds over seven rounds. Note the use of an 'airfoil sectioned' fin.

DUTCH CHAMPION 1969
WAKEFIELD
 P. den OUDEN

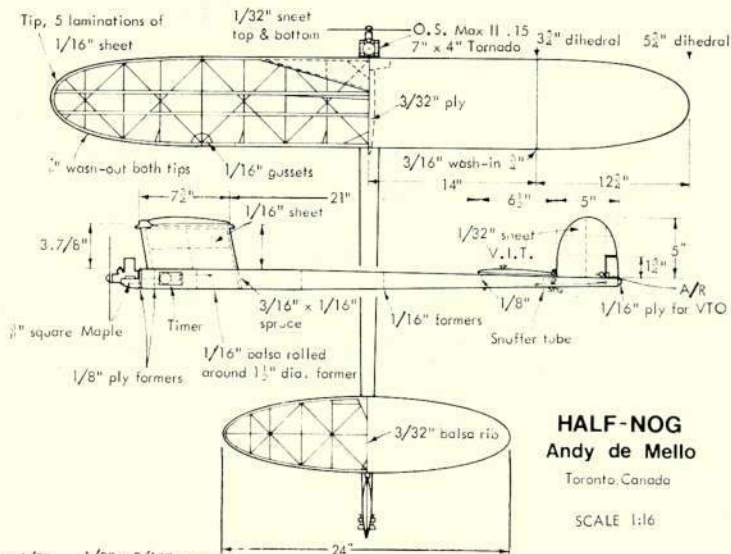


SCALE 1:10

All dimensions in millimetres

BBER - POWER - JETEX

ADING ntest signs



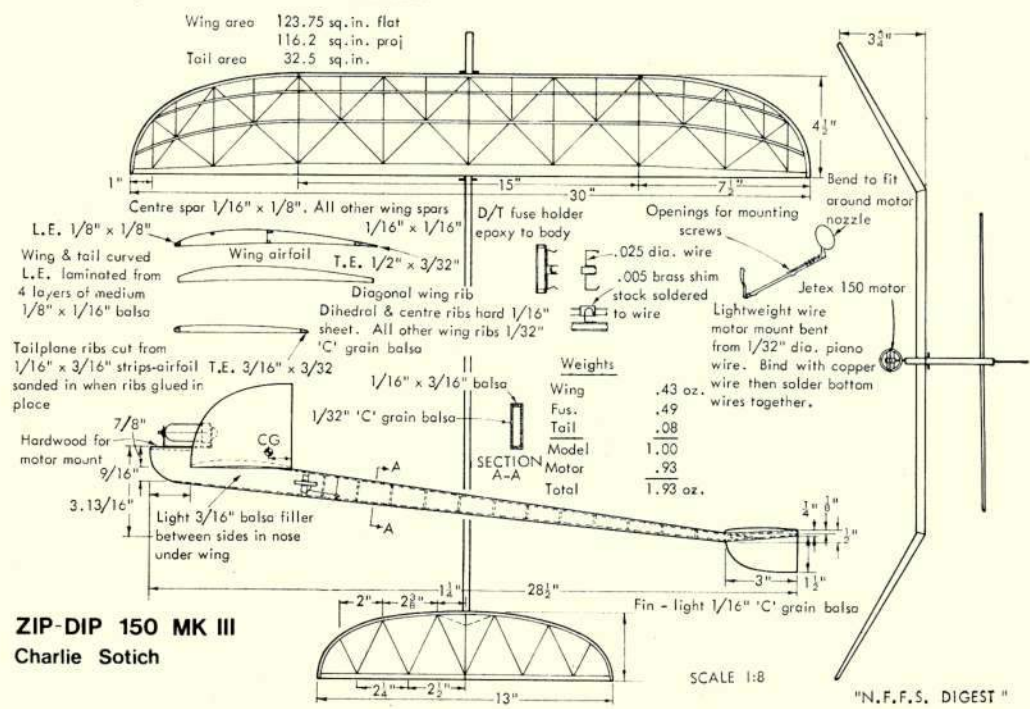
HALF-NOG
Andy de Mello
Toronto, Canada
SCALE 1:16

ZIP-DIP 150 MK III

The unconventional fuselage layout on the Jetex 150 powered model drawn below is designed to improve spiral stability. The high motor and low tail help give a more desirable distribution of mass and the resulting thrust line provides a more stable power pattern. 'Unaided' duration of two minutes is possible with this ultra light ship - essential for maximum performances from these motors.

HALF-NOG

As its name implies, this is a scaled down version of Tom Smith's very successful 'Nig-Nog' open model of several years ago. Airfoil is modified to NACA 6408 to improve the glide and slow the climb, which combined with the addition of a variable incidence tailplane, makes it easier to handle.



ZIP-DIP 150 MK III
Charlie Sotich



THAT LONG, DRY SPELL we have all enjoyed has been very well in its way, but it has made of the usually squelchy flying field an iron hard model mangle. This was brought home to me quite forcibly when, thinking I had the radio air all to myself, I bungied my old radio glider for a few quiet circuits. Alack and alas, I failed to notice one of the radio anarchists doing a test out behind a screen of parked cars. Result was a very much exploded model. Had the ground been just a wee bit softer...

Exactly what a 'Hi-Day' is I am not sure, but the **Three Kings Aeromodellers'** bulletin reports of a flying display being given at such an event held at Raynes Park in September. Proved to be a good crowd drawer, thanks to a well-rehearsed repertoire of Stunt, Scale, Goodyear and balloon bursting. Overall winner at the South East Area Stunt Comp was member M. Harvey, who got a white set of same plus an engraved silver cup for his very impressive performance. Third man, D. Morbin, got fifteen bob. Being a kitchen table modeller myself - when it's available - I envy the bloke with the fully equipped workshop; so a special shade of green for the super modelling den of Tony Goodger. It has a lathe, a drill, and all the mechanical aids of the modern production line. Good thing, too, since young people nowadays no longer use razor blades. However, club benches, kitchen table and otherwise are sprouting a goodly crop of new models. Dave Woods has a *North American SNJ Harvard* on the go, and R. Tidder preparing a veritable *Thunderbolt* - large size P47D. Deviationist P. Mason is at work on an *R/C Citizen Krote* and an *Apex F/F*. Loud wailing and wringing of bell cranks from the C/L purists.

If you see a skull and crossbones device down Cheshire way, it could well be a sign that the **Pirates M.A.C.** are operating in the skyways. A letter from Mr. P. Davison recounts an incident at the South Bristol Gala when his combat model got into a line tangle and came adrift from its moorings. Off it went in brave free flight fashion, with the streamer holding down the tail to give the model a rocketing climb into cloudland above. All very weird, wonderful and exciting at the time, but it has meant the loss of a valuable *Vernon Hunt Warlord* model, fitted with a *Copeman* tuned *Oliver Tiger*. Further indentifying features are an Eagle transfer underlined with the legend *Night Hawk* on the inboard wing and the S.M.A.E., number 56706 on the outboard wing. Anyone finding the model, or even meeting up with the engine, serial No. T 6843, are kindly requested to drop a line (no pun intended) to Mr. Davison, at 26 Woodlands Drive, Sale, Cheshire.

We have been sent a newspaper clipping, or rather a full page spread, from the *Hampshire Telegraph*, by Chris Davenport, of Lee-on-Solent, Hants. Chris is a member of the **Lee Bees Club**, and the club should be proud of the splendid piece of publicity they have been given. The pictures, two of which are in colour, are really excellent. I liked, particularly, the shot of Dave Bishop's twin engined *Islander*. There is also a cautionary shot of a wrecked radio model, just to prove that model flying is a tough if highly rewarding business. The photos are accompanied by a well-balanced survey of the model flying scene as presented by the wide ranging **Lee Bees Club**.

A feature in the **South Essex M.A.S.'s Marsh Gas** is typically entitled 'Monty Python's Flying Circus', but is not quite as zany as its title suggests. Part of the flying circus was a model chuck around last September. Just a get-together of friendly free fliers out for no greater glory than a few gentle circuits of the flying field. Pleasant, too, and equally unpressurised, was a spot landing event held on the 11th October. Man on the spot was John Thirkettle, of the **Southend Radio M.F.C.**, with his well-trained power-assisted glider. As mentioned last month, the club is trying to boost indoor flying interest in the Southend Area, with flying to music as a particular attraction (Hi-fi equipment?). Published in the bulletin is something we have not seen for

CLUB NEWS

No mistaking these outlines! Steep dihedral and elliptical wings on the pacemaker which is a regular sight at all Vintage meetings, flown by John Haggart, of **A.M.A.** and authentic right down to the wheels and airdraulic timer.

a long time; a plan of a tissue r.t.p. model. These can be good fun, particularly recommended for those winter club evenings as a substitute for argument.

Ron Hughes has little to report on behalf of the **Watford Wayfarers M.A.C.**, but hopes to run a spot landing comp in the near future.

One advantage of having your own club building is that you can make your own provision for refreshments to bridge the gap between talking shop and talking shop. But they do more than talk shop at the **Heswall M.A.C.** Meetings; discussions, demonstrations and film shows all help to give purpose to the get-togethers. On the flying side, Goodyear enthusiasts are advised that there is no profile rubbish in this club. To give point to the boast, Malcolm Brewer is building a scale, repeat scale, one-ninth Cassutt Racer.

The widely dispersed nature of the large, modern rally can cause problems to users of club transport, particularly, as in the **Bridlington & D.M.A.C.**, if the van occupants have differing interests. You have to decide where best to park the vehicle for ease to all, and how to spread the 'tea up' message over the distant acres.

Problem raised in *Seadog*, the newsletter of the South East Area, by Mr. Charles Atkins, of the **Elliott M.E.C.**, is the hoary one of the insurance content of the S.M.A.E. membership fee. There is, he feels, a considerable demand for some re-adjustment of fees between various classes of flyers whose insurance requirements are so disparate. This, on the face of it, is fair enough, particularly since claims against free flight over a four-year period amount to less than £50, whilst for Radio it was over £4,000. But there are difficulties. It must be remembered that insurance is not compulsory, and to raise the Society's fees for Radio flyers may well have the effect of frightening them off, so that they fly uninsured. Then, again, many radio flyers operate on private fields, and may be as reluctant to pay for the depredations of the negligent flyer as any free flier. Personally, I like to feel that the person flying his radio model on my patch does carry insurance. Claiming damages against an uninsured person can be costly and not necessarily successful. As Mr. Atkins points out, club committees could do more to resolve the present unsatisfactory insurance situation. Whether the club is affiliated or not they can at least ensure that insurance cover is a condition of membership. Cover of a waterproofing kind required though, if you attended the **Brighton D.M.A.C.'s** Hydro contest. Entries none too numerous, as you might well expect, but the ten models that did turn up were varied and interesting. They included a number of conventional F/F models, rubber and power, fitted with boots, a pre-war twin pod flying boat and one small stick fuselage model. The aquatic antics proved most amusing, some models getting unstuck and others just coming unstuck. A. Grantham, of East Grinstead, won Rubber, and J. West, of Brighton, was first in Power.

You can learn the craft of model building the hard way, that is by your mistakes, or you can do it more constructively by acquiring the know-how from an expert teacher. The **Harlow M.F.C.** has had quite an influx of juniors of late, most of them keen but yet unpledged. In order to give them wing power the club is running a 13-week course on the building and flying of a small glider. A prize to be given for the best built model, and another for the winner of a flying competition. Coming to the senior side of things, radio flying is all the rage, with as many as 15 machines taking the air on a Sunday. You sometimes have to queue up for a turn on your frequency colour. Quite a number of the radio machines are propo, and there are many very able operators of same, with George Kelk really outstanding. Pressure is now upon him to get his light out of the bushel and get it shining at some of the big radio comps. Look out, too, for Ken Faux at the F/F Power contests. He has three good F.A.I. jobs lined up, and is deserving of

some success. Two wire control also features in club life. Expert Ivor Cave has built a couple of small models for juniors to practice on. Report from P.R.O., John A. Cheney.

In spite of the loss of several expert combaters, the **Maidenhead Combat Team** collected four places in contests during the past season. Highlight of the year for the club was the Nationals, where one of the juniors, flying a 21 ounce 'brick', got through to the fourth round, only to be narrowly beaten by the chap who ultimately got third place. In Mouse race they are man enough to admit that they came fifth in an event with almost a half dozen entries. Black spot of the year was a frustrating journey to a comp that never was, with all the sweat of preparation wasted. The club, therefore, had a few nasty words to say about the club that did not turn up for its own contest. Whatever the pretext they may have had they should know that one hopeful travelled all the way from Scunthorpe, and Maidenhead itself is not exactly on the doorstep. It was such a lovely Sunday, too. And beautiful also the Scale jobs of Tony Clements which arouse so much interest in the local model shop where they are displayed.

Not being too expert in such matters, I have no idea what tools are required to build a Goodyear Racer, but I should think £35 worth of Stanley tools would make a useful contribution. This was the prize, the Champions prize, to be awarded to the club gaining the highest points at the Northern Area Meeting at Lindholme. Very cunningly the **Wharfedale** boys saw that the Champions prize hinged on a single contest and entered Messrs. Horton/Kirton in the Speed event, where they placed a not ignoble sixth, to collect all that glorious tool booty. Warning: if you see any Goodyear Racers resembling sideboards you will know why. The tools, incidentally, were kindly donated by Messrs. Stanley. A somewhat undersubscribed event at the Northern Gala was Radio Scale with six entries only, with only one model being a true scale replica, and this, fairly enough, taking first prize. However, it is hoped that Radio Scale enthusiasts will make a note of this event for next year's Gala. Very much in the public eye were the members of the demo team who put on a display at the R.A.F. Topcliffe Open Day. The full size display lasted one hour and the model display three hours! Since there seemed to be more people watching the model flying than the full-size stuff, the lads are not complaining.

A letter from Mr. C. G. Baker, of the **Coventry & District R/C Society**, gives us some information about a Models Exhibition to be held at the Herbert Art Gallery in Coventry on the last two weeks of December and the first two weeks in January. All types of model, boats, cars, aircraft, etc., represented - it is hoped in abundance. Mr. Baker points out that the aeromodellers in the Coventry area have for some 25 years been trying to get recognition from the local authorities by way of a decent flying ground, and it is hoped the Exhibition will help in this direction.

Another letter, this time from Mr. Sydney M. Thompson, asks us to announce that the **Canvey Model Association** is canvassing for new members. The club has much to offer: two flying fields, one a nine-acre patch and the other a 17-acre one. All sections of model flying catered for, an active programme for 1971 and a good social side.

The **Model Aeronautics Council of Ireland** Newsletter discusses the differing attitudes to the hobby of contest flyers and the not so zealous fly for fun people. The latter seem content to play around on the fringe of the hobby, as it were, whilst the contest-minded people take care of the organising side of things. Now, since much of the organising demand is for contest work this would seem fair enough, but the contest flyers themselves seem to think that unless people try their hand at contest flying they will not get the right sort of fulfilment from the hobby.

W.M.C., Patter, the bulletin that circulates in distant Oregon, gives the results of a recent F/F Meeting. From the number of contests flown and the support each one got, it would seem that the trend of events outnumbering entries is a world-wide phenomenon. At this particular meeting entries ranged over the ten events from nil in Scale to a high point of six in Chuck Glider. True, the weather was pretty frightful, but organising nil and two entry contests does seem a waste of time.

Interference from T.V. is a topic discussed in the **Leicester M.A.C.**'s newsletter. Not the usual T.V., smothering of those Winter building plans, but broadcast blanking on the Wymeswold field. May not be anything in it beyond the suspicion - all models pranged have done so for the usual divers reasons. Unhappily, prangs or no prangs, it looks like it's curtains for this cherished flying field. The ploughs are already at work tearing up the grass, and no reply has been received to the club's application for the renewal of its licence.

What about a 'Weirdie Night' to liven up those long **Arthur Fox of Nottingham** is almost dwarfed by his **A.P.S. Goliath**, seen at the **South Midland Rally**. It is powered by a **Nordec 10 c.c. glow plug engine**.

club evenings. The **Wolves M.A.C.** have one on their Winter agenda, when it is hoped that the clubroom will be alive with helicopters, autogiros and similar creatures of the air. Other Winter distractions include round-the-pole Jetex and various others (bring your own gas mask), a slide show and a nosh and natter.

The **East Anglia Area** newsletter speaks with some misgivings about the glorious summer of 1970. For some unprintable reason the area events would coincide with the windier days, particularly the **S.M.A.E.** contests held at **R.A.F. Watton**; thus, to disorganise the valiant efforts towards keeping the Plugge cup in the area precincts. The present custodians, the **Norwich club**, though very much in evidence on the contest scene, could not find the necessary form to retain the trophy. Better luck next year, we hope. We are also reminded here that the building and flying of model aircraft forms part of the syllabus for the **Duke of Edinburgh's Award**. The standard required would seem quite within the capabilities of the average 14 to 21 age group, flyers. But if they wish to fly Radio they should pay heed to the cautionary words in the newsletter. Strong transmitters are now operating on the model aircraft allocated frequencies and the future portents are not too hopeful. If we do not fly with the utmost care, with proper and adequate insurance cover, all that shiny radio equipment may become just a pile of junk.

The **November Free Flight News** is well up to its usual high standard: articles, plans and drawing all of excellent quality. The magazine, quite rightly, focuses on those detail points of free flight of particular interest to the expert in this field. I'm afraid a lot of it is much above my head.

Comment in **Wipmac**, the journal of the **South African Cape Flyers**, on the respective merits of flying in the cold, wet and windy U.K., or in dry, fly-infested S.A.: it all depends on your fly repellent. The weather, however, is not always at its unniest for model comp flying. In fact, the description of overcast skies, a cold breeze and a flooded field, for a September R/C Soaring event, could fit any average U.K. event.

Since we made known the declining fortunes of the **Blackheath M.F.C.** in these columns, there has been a stiffening influx of new members, due, we hope, to our publicity. Even so, the situation is still far from satisfactory, and a further expansion of members is looked for. Meetings are held on alternate Fridays at **St. George's Church Hall**, **Carholme Road, Catford, S.E.6**. The hall is large enough for indoor flying. The existing record is four minutes with a microfilm model, and it is hoped that chuck glider and r.t.p. comps will be staged during the winter. Much depends on extra support, though; so why not give **Martin Stagg** a ring, Telephone No. 778 0939, any evening.

Know anyone who lost an elderly Junior 60 model at **R.A.F. Hullavington**, during October? The old lady is powered with 3.46 diesel, and the only identification is a partly obscured number on the wing: **G 564**. The model is in the possession of **Mr. A. Pulman**, 5 Box Corner, **Hampton Road, Twickenham, Middlesex**.

Back to **Loughton Hall** after a brief honeymoon with a youth club come the somewhat disillusioned **Debdens M.F.C.** Certainly the generation gap had nothing to do with it, as the club is now comprised of lads in the 15-16 bracket. Such elder statesmen as were left retired from office at the last **A.G.M.**, leaving the club to the tender mercy of those tender in years. Looking forward, however, to the **M.E. Exhibition**, the lads hope once again to enjoy the hospitality of the **M.A.P.** on the r.t.p. circuit. And a backward look at the past season, where the weather smiled on the club comp programme - only one event having to be postponed. New members still required. Call in at **Loughton Hall** any Friday evening, 8 to 10 p.m.

Sorry for any omissions. Happy New Year.

The Clubman.



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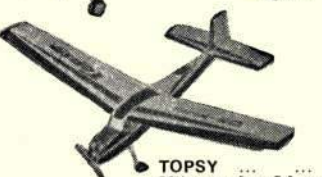
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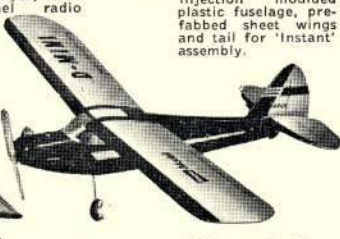


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Radio Models



January R.C.M.&E. features a new single channel design, for R/C sports enthusiasts designed by David Boddington. Called **Barnstormer Baby**, this span model is a reduced size version of David's earlier Barnstormer design, which is already very popular.

January also marks the first part of a new series on R/C model yachts, aimed specifically at the would-be enthusiast who has no previous knowledge of the subject at all. One of the real problems of the R/C yachting hobby has been the lack of purpose made R/C equipment, and this new instructional series will set out to show how both single and multi channel commercial R/C equipment can be adapted to this use and will also detail how to make a powerful sail winch from a readily available geared electric motor.

Regular features this issue include **Scale News** by Dennis Thumpston, and **Throttle Benders Union** for R/C pylon racer fans, plus all the usual favourites including **Straight & Level**, **Sport & Single**, plus **Technical Forum**.

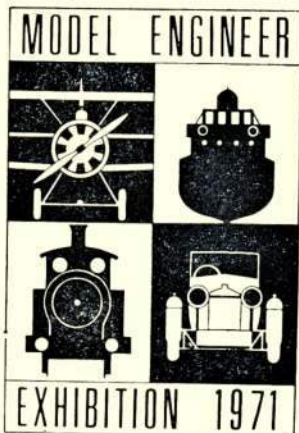
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SOUVENIR GUIDE

Another CHRISTMAS EXTRA issue of *Model Engineer* will be coming out 2nd Friday in December with entries, trade stands, articles galore to assist the visitor and solace the stay-at-home.

FEATURES

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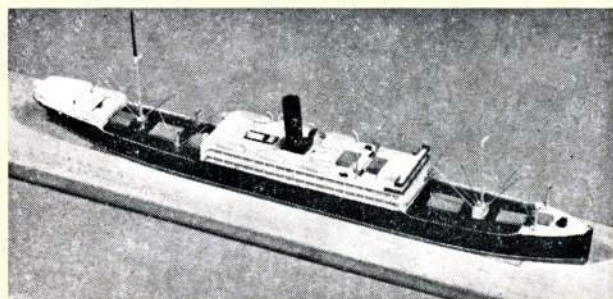
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Waterline model construction techniques are unravelled by expert R. Carpenter in January issue in a specially-requested feature. John Surtees' TS7 Formula 1 racing car is the subject of a detailed drawing and part two of Fairey Battle deals with trainers, target tugs and colours. Big book survey and kit review covers Christmas gift suggestions, while other reference features on markings and modelling make this another edition to treasure.

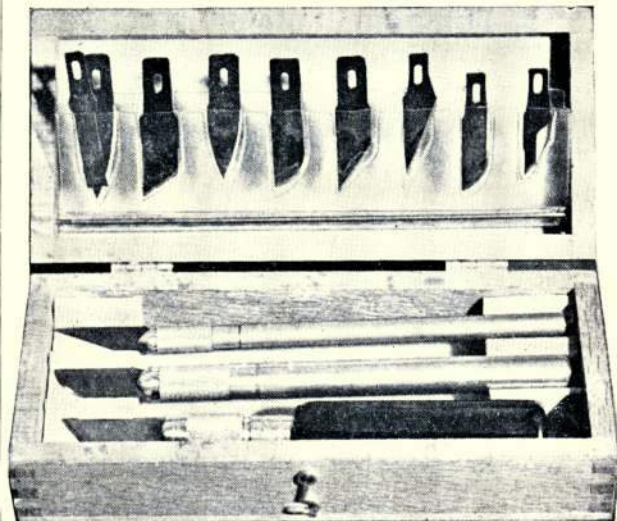
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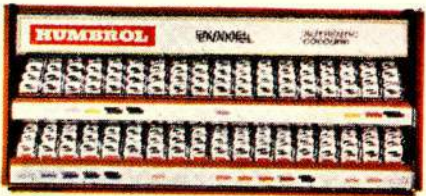
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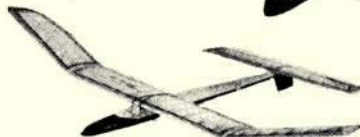
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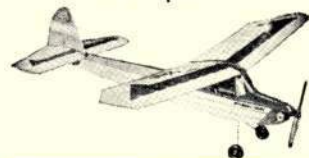
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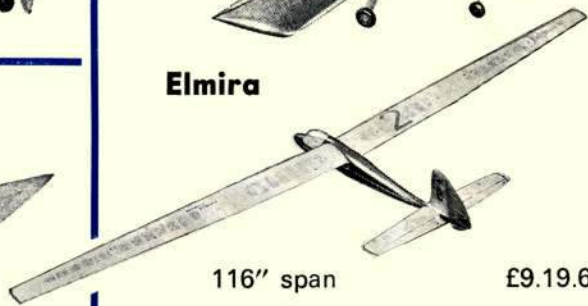
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Snipe 30/1 **POWER**
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116" span

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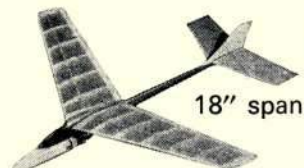


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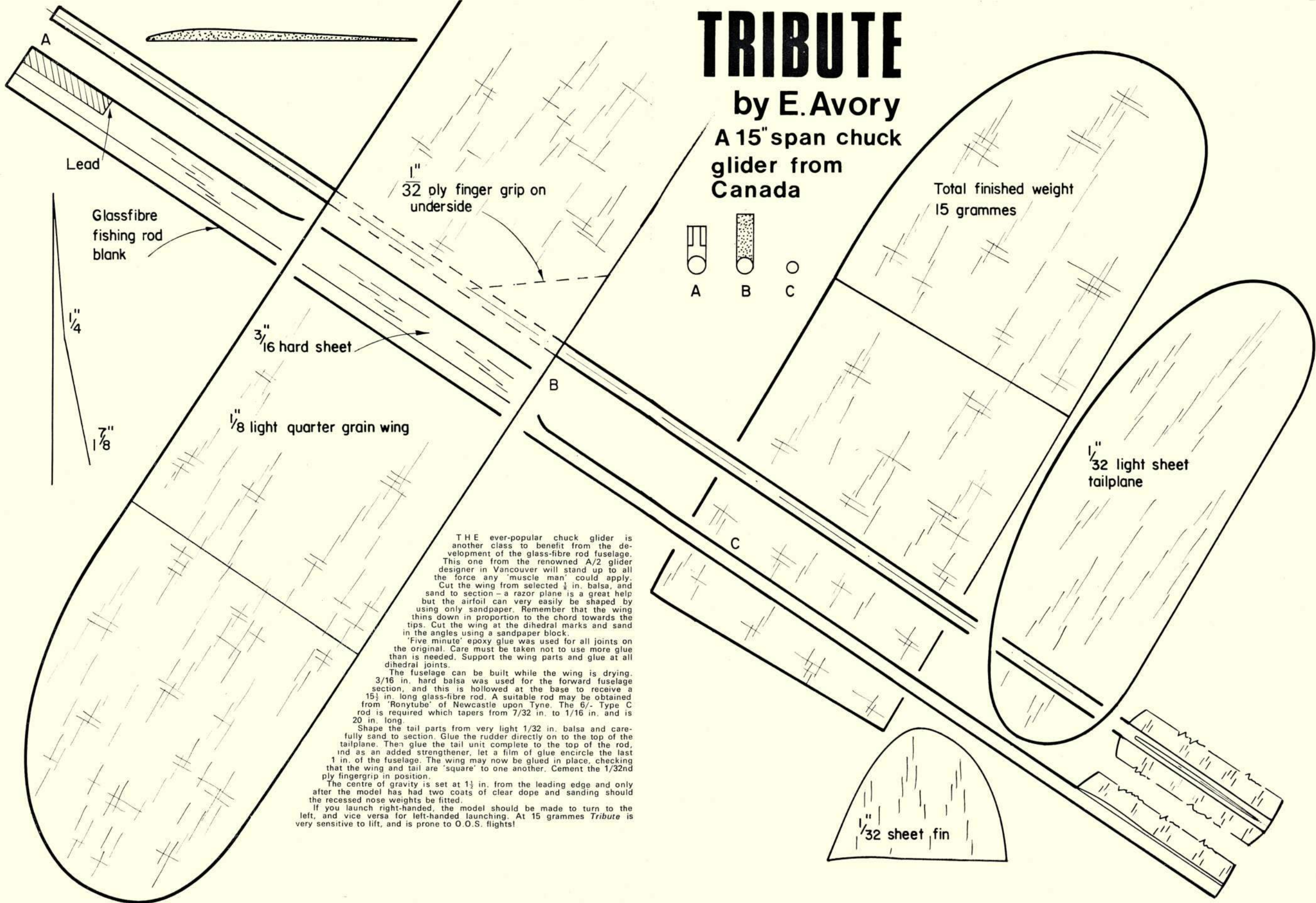


Obtainable at **KETLKRAFT** agents

TRIBUTE

by E. Avory
A 15" span chuck
glider from
Canada

Total finished weight
15 grammes



THE ever-popular chuck glider is another class to benefit from the development of the glass-fibre rod fuselage. This one from the renowned A/2 glider designer in Vancouver will stand up to all the force any 'muscle man' could apply. Cut the wing from selected 1/8 in. balsa, and sand to section - a razor plane is a great help but the airfoil can very easily be shaped by using only sandpaper. Remember that the wing thins down in proportion to the chord towards the tips. Cut the wing at the dihedral marks and sand in the angles using a sandpaper block.

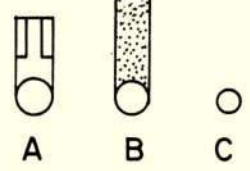
'Five minute' epoxy glue was used for all joints on the original. Care must be taken not to use more glue than is needed. Support the wing parts and glue at all dihedral joints.

The fuselage can be built while the wing is drying. 3/16 in. hard balsa was used for the forward fuselage section, and this is hollowed at the base to receive a 15 1/2 in. long glass-fibre rod. A suitable rod may be obtained from 'Ronytube' of Newcastle upon Tyne. The 6/- Type C rod is required which tapers from 7/32 in. to 1/16 in. and is 20 in. long.

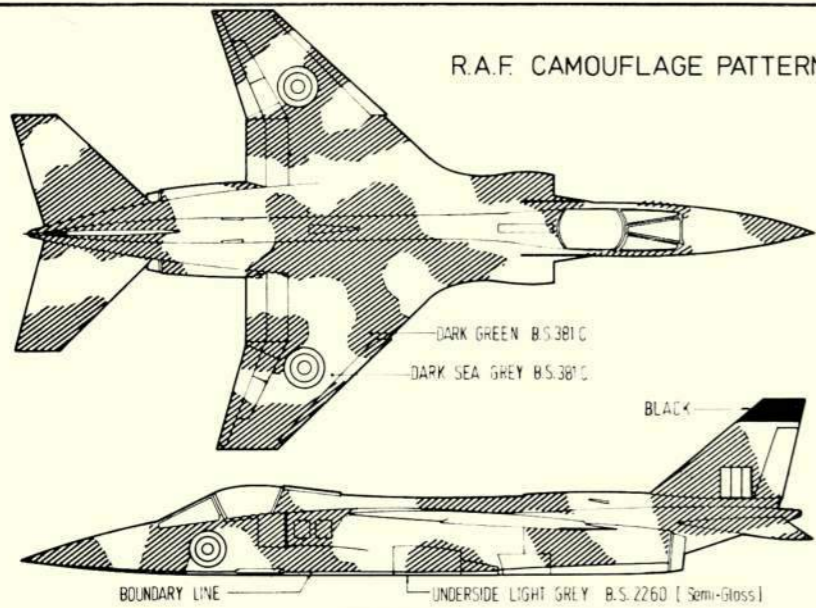
Shape the tail parts from very light 1/32 in. balsa and carefully sand to section. Glue the rudder directly on to the top of the tailplane. Then glue the tail unit complete to the top of the rod, and as an added strengthener, let a film of glue encircle the last 1 in. of the fuselage. The wing may now be glued in place, checking that the wing and tail are 'square' to one another. Cement the 1/32nd ply finger grip in position.

The centre of gravity is set at 1 1/2 in. from the leading edge and only after the model has had two coats of clear dope and sanding should the recessed nose weights be fitted.

If you launch right-handed, the model should be made to turn to the left, and vice versa for left-handed launching. At 15 grammes *Tribute* is very sensitive to lift, and is prone to O.O.S. flights!

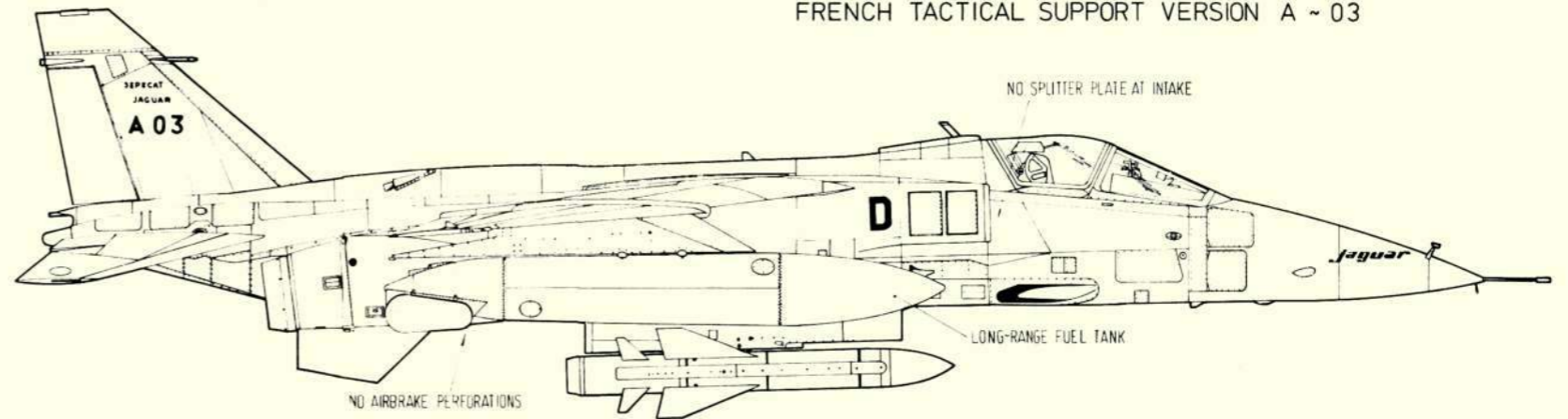


R.A.F. CAMOUFLAGE PATTERN



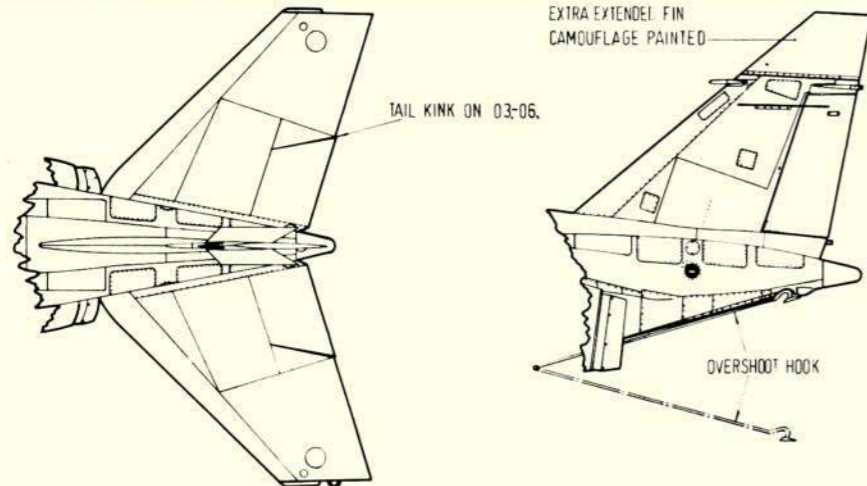
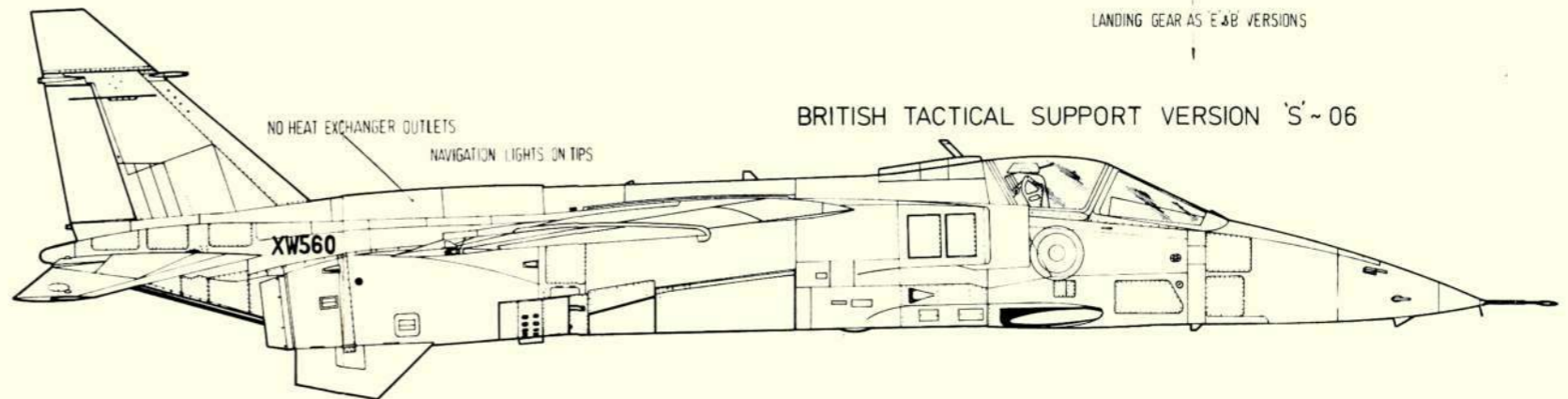
drawn and traced by C. J. Nichols

FRENCH TACTICAL SUPPORT VERSION A ~ 03

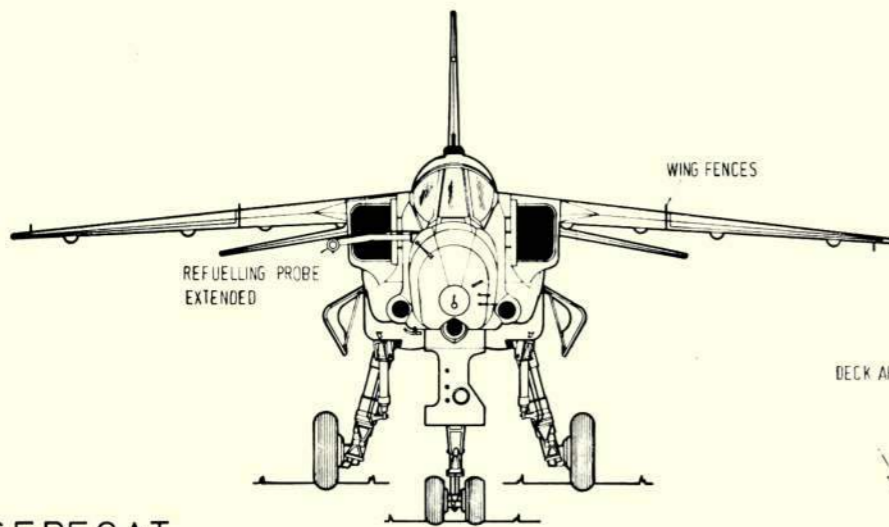
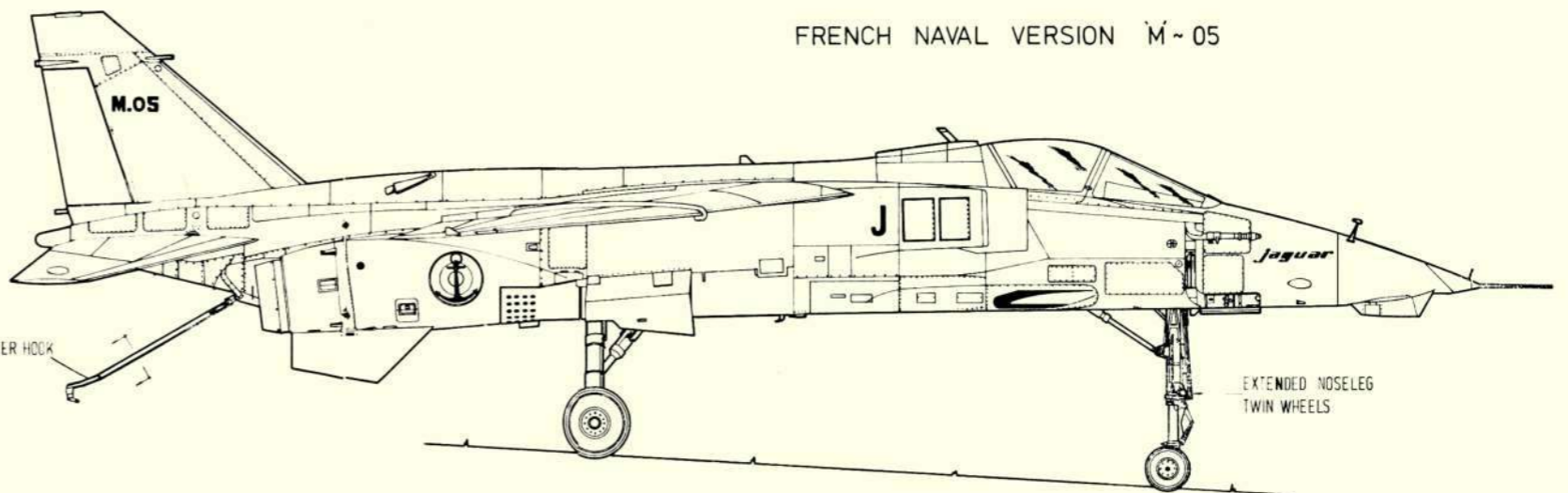


LANDING GEAR AS E&B VERSIONS

BRITISH TACTICAL SUPPORT VERSION 'S' ~ 06



FRENCH NAVAL VERSION M ~ 05

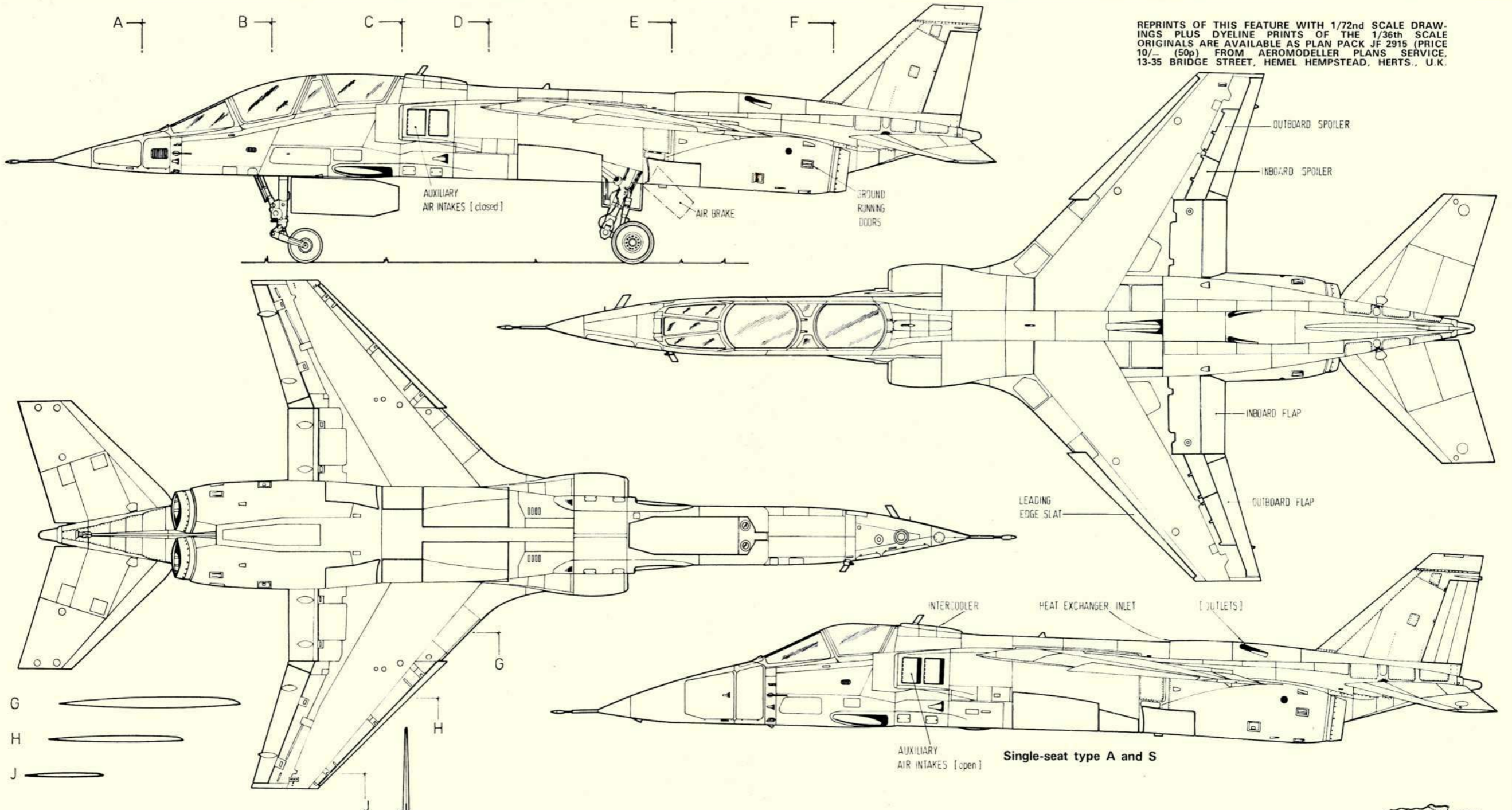


S.E.P.E.C.A.T.

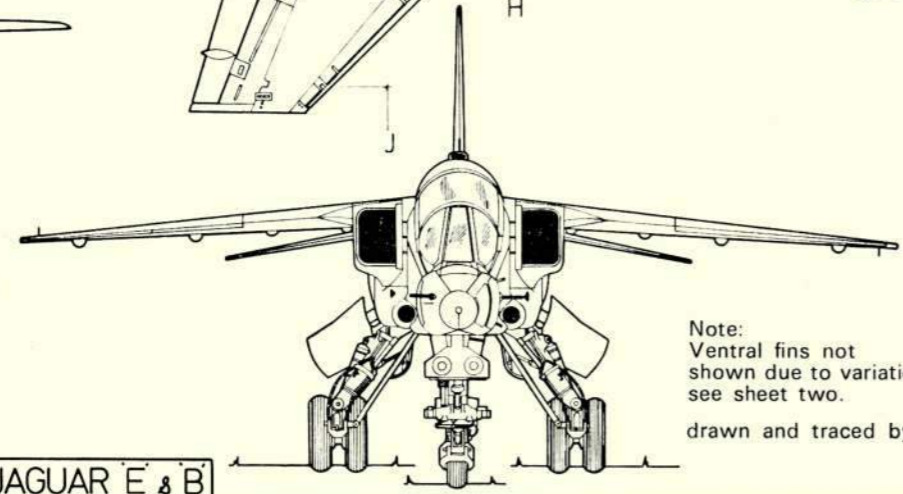
BREGUET ~ B.A.C. JAGUAR A, S, M, N.B. 3 Variations in vertical and horizontal tail surfaces.

Scale Ft.

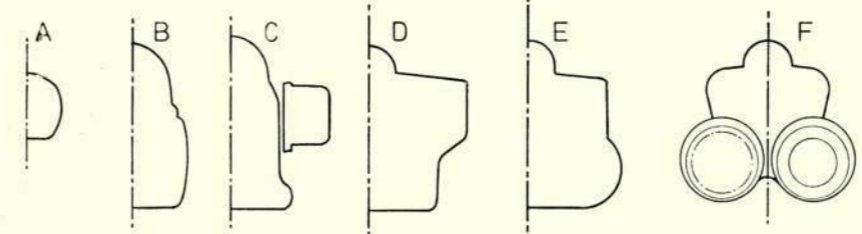
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Span: 27.86 ft.
 Length (two-seat) 53.87 ft.
 Length (single-seat) 50.91 ft.



Note:
 Ventral fins not shown due to variations, see sheet two.
 drawn and traced by C. J. Nichols



--- RE-HEAT ON.

Scale Ft.

S.E.P.E.C.A.T.
 BREGUET-BAC JAGUAR E & B