

OCTOBER 1982 70p  
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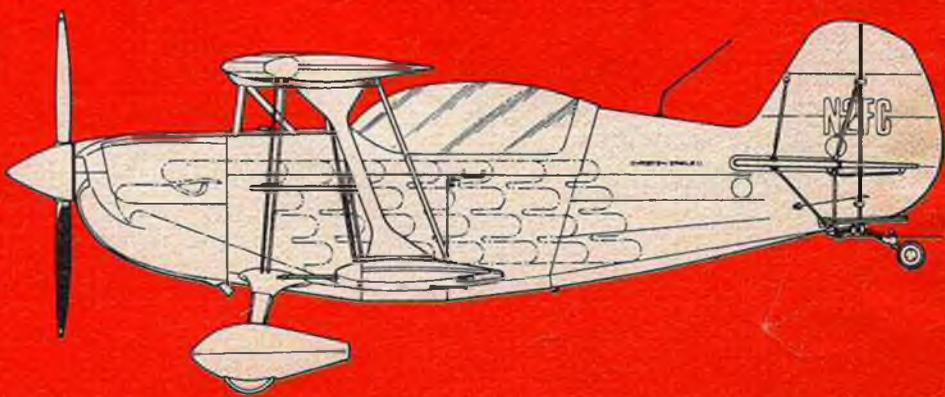
# Aero modeller



MODEL  
MAGAZINE

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After all, why spoil the ship for a ha'p'orth of tar?



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# Aero modeller

OCTOBER 1982

Editorial Director  
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MAP

MODEL DIVISION MAGAZINE

Advertisement Director  
Managing Director

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RON MOULTON

quires a considerable amount of involvement which obviously does not appeal to everyone, but without this hard core of enthusiasts the aeromodelling movement would be hard put to survive. This brings me to another point, the editorial balance of our magazine would soon become very lopsided if left to any one of the specialist groups of modellers, but there is space available for all areas of our hobby, even though it may be somewhat limited at times, so make use of it. If you don't like what is being published in your area let us know and we will endeavour to do something about it, bearing in mind that a balance has to be maintained.

Editor

## Comment

MY recent visit to the World Control Line Championships was an enlightening experience, which has prompted me to try and put across the dedicated competition modellers' point of view. It soon became very clear to me that although the model flying is of course enjoyed, there is also a range of other parameters that make up the sport. The anticipation of perhaps winning or coming close to the top, starts the adrenalin flowing from the very start of the

meeting, and in this instance, a World Championship there were many old friends as well as new faces to meet.

Free from any political barriers, peoples of all nations freely mix and compare their latest innovations and developments and live together for the period of the competition, at least, in harmony. The organisation and decisions of the judges always supplied plenty of material for evening discussions, in fact the whole atmosphere soon becomes electric, spurring people to achieve their utmost best. Naturally enough this level of competitiveness re-

## Contents

© Model & Allied Publications Ltd., 1982. ISSN 0001-9232

Volume 47 Issue No. 561

- 476 HANGAR DOORS
- 478 AIRCRAFT DESCRIBED — Christen Eagle
- 483 ENGINE TEST — OS FS-40 Four-Stroke
- 486 WORLD CONTROL LINE CHAMPS — Full report from Sweden.
- 496 VINTAGE CORNER
- 500 FREE FLIGHT SCENE

- 504 SCALE MATTERS — Ron Truelove's Hawker Typhoon described.
- 507 KIT REVIEW — DPR Rare Bird
- 508 RUPERT MOORE — An appreciation
- 509 SHOP TALK
- 511 SHOP GUIDE
- 513 CLASSIFIED ADVERTISEMENTS
- 514 25 YEARS AGO



World C/L Champs Report p.486



### Cover

Little and large, they are both built from kits! We will remember Spencer Flack's semi-complete full size Christen Eagle in his hangar at Elstree airport with all the freshly painted control surfaces strung out on a line to dry — just like model practice. The smaller Christen Eagle is an R/C model from the Japanese *Pilot* kit, built by Peter Halman, and Irvine rear exhaust .60 powered. Fine performer according to Peter.

### Next Month

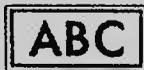
Our APS Plan will be the Nieuport Night Hawk, designed by the late Alan Pallfrey for free flight electric power. There will also be a full report of the British Control Line Nationals and an interesting technical article about R/C glider design and performance. News from the free flight scene, vintage and the trade. On sale October 19.

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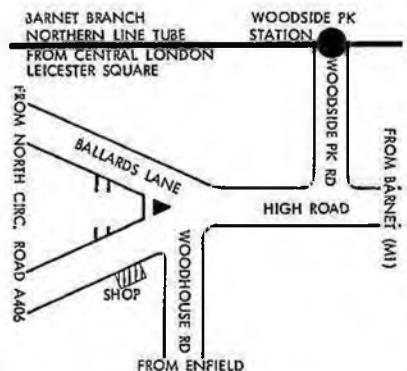
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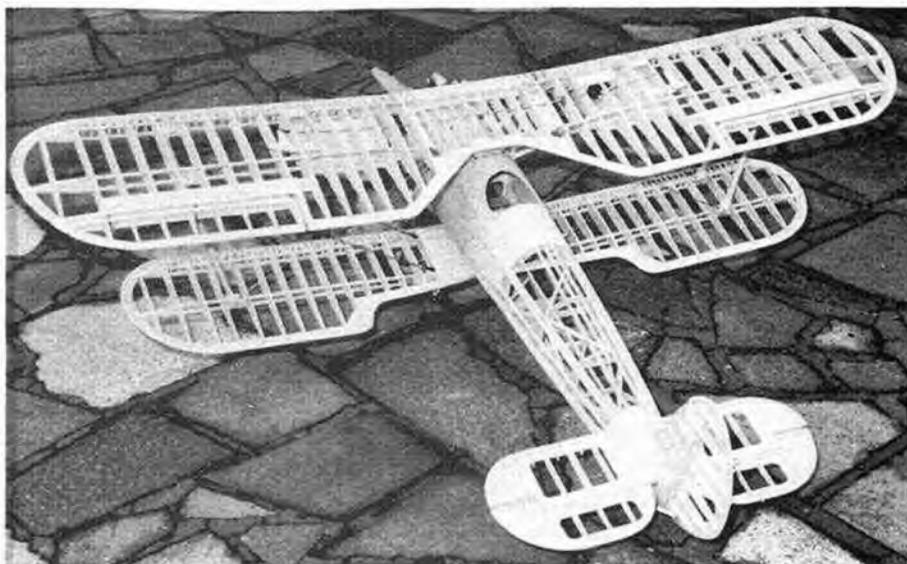
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*63-inch span Bristol Bulldog built by John W. Ede from a Dennis Bryant plan. Fully detailed airframe built throughout in Solarbo Balsa. Weight of model complete with engine and radio is 9 pounds.*

Last month we featured the Bristol Bulldog in our ad. Coincidentally, before it actually appeared in print we received these photographs from a modeller who obviously had the same idea. The Bristol Bulldog is an ideal scale subject for aeromodelling.

*Absolutely dwarfing a 1/72nd scale Bristol Bulldog, this superb model is an outstanding example of true aeromodelling skill. Now covered and finished, it also flies extremely well. Both photos by the builder, John Ede.*



Note the scale ribs and riblet spacing. The ribs are also cap stripped like the full-size aircraft. Just discernible, too, is the aileron linkage in the upper wing. The servo is housed in the swelling produced by the scale starboard wing tank. Count the stringers in the rear fuselage. They are scale again. With the metal covered parts of the forward fuselage reproduced by sheet balsa. Note also the gun trough and the engine cylinder fairings. Scale rib positions, too, in the fin and rudder, and tail-plane. Scale realism throughout!

There is immense satisfaction in building a 'real' airframe like this — and it can only be done in balsa if you want a good flying model. But it needs experience and skill to tackle such a job properly. John Ede himself says: "Building a model of this size needs the correct grade of (balsa) wood in strength and lightness and Solarbo Balsa without question is the best . . . It flies very well, and looks great in the air." It looks great in uncovered form, too John!

Even if your next model is not as ambitious as this, the lesson is clear. The best models are built from the best Balsa — which is?? (No prize for the answer!)

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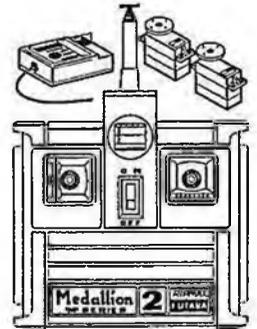
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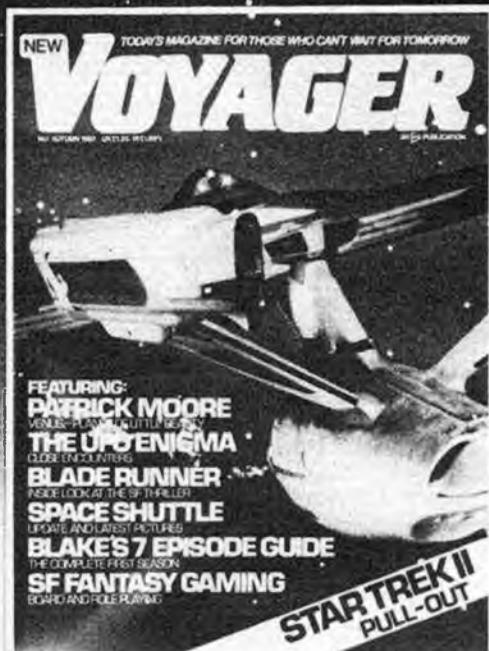
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## OCTOBER 10th SUNDAY 10a.m.

MODEL SHOW ★ 350 mph DUTCH PULSE JETS ★ R/C BUGGIES ★ FUN COMPS ★ DURATION COMPETITION FOR JUNIORS RUN BY D.P.R. MODELS ★ SCALE FLYING ★ JUNKERS 52 ★ B17 ★ JUNKERS 88 ★ GEE BEE RACER ★ AVICRAFT PANIC BIPES ★ LITTLE NELLIE ★ CROYDON AIRPORT FLYPAST ★ CHRIS FOSS ★ PHIL RAMSEY ★ MARCUS NORMAN ★ DAVE NIEMAN ★ DON STOTHERS ★ REFRESHMENTS AND PROPER TOILETS ★ GIANT PLAY CASTLE ★ THERMAL SOARING ★ DEMO ★ TRADE STANDS ★ PRE-ENTRY TO TATSFIELD 550 OR TONBRIDGE 351738 ★ WE PROMISE A GOOD FAMILY DAY OUT ★ DAVE BISHOP ★ DB SOUND AND JOHN BLACKMAN.

PLUMPTON RACE COURSE  
Near BRIGHTON SUSSEX





## NEW PLANS HANDBOOKS

Our range of plans increase month by month and the demand for older types is also increasing. The latest Plans Handbook No. 1 includes 13 pages of illustrations which show just a few of the vintage models still available from our X list. R/C aircraft of all descriptions are catered for in No. 4 Plans Handbook while Scale enthusiasts have a range of super scale aircraft drawings available in Plans Handbook No. 5. Available now from MAP Plans Department, PO Box 35, Hemel Hempstead, Herts. Price 85p plus 30p post and packing each.

## SAM 35 NATIONAL EXHIBITION AND MECA MEETING OCTOBER 17

Sam 35 in conjunction with the MECA engine collectors have taken up the challenge issued in our May issue editorial, where it was suggested that events "like they used to be" were organised. The exhibition and flying day will be held at the Samuel Whitbread School, Shefford, Bedfordshire, which is located five miles south of Old Warden.

The school has a large sports hall (100ft. x 55ft.) which will be available for indoor flying and a large sports field which will be used for control line and R/C assist. (35 MHz only). Unfortunately it will not be possible to fly free flight.

Entry is not restricted to SAM members so all are welcome at an entrance cost of 60p and 30p for children. The model exhibition is open to all classes of vintage models, so if you want to enter write to: Dick Hardwick, 117 Clifton Road, Shefford, Bedfordshire enclosing a stamped addressed envelope for further details.

This should be a good day out and our congratulations go to SAM and MECA for their initiative. The gates open at 10am so why not go along and see it all for yourself.

## SHUTTLEWORTH PAGEANT

For the first time in two years, on the 26th September, ALL the hangars of the Shuttleworth Collection will be open for a full scale performance by nearly all the flyable aircraft in the Museum. Also most of the veteran cars will take part in a drive-past.

Some of the notable aircraft that will be flying are: Bristol Boxkite, Avro Triplane, 1912 Balckburn monoplane, Avro 504K, SE5a Bristol Fighter of World War I, Avro



Tutor, Hawker Hind and a Gloster Gladiator.

Apart from the above, wind and weather permitting, there will be many light aircraft of the 30s flying, a day not to be missed.

The usual charge of £8 per car or £2 per coach passenger or individual (child half price) will be made. Old Warden is situated two miles west of the A1 near Biggleswade, in Bedfordshire.

## NEW KREMER PRIZES

Successful claims for the first man-powered aircraft to fly a figure of eight course for a £50,000 prize and to cross the channel from England to France for a £100,000 prize have now led to a new challenge for speed over a triangular course. Rules are currently under study by the Royal Aeronautical Society manpowered air group. A substantial prize structure is being planned to encourage successive world speed records but real distinction between this and previous Kremer competitions is that the regulations are to permit devices for storing energy prior to take-off. It is expected that a course speed in the region of 20mph will establish the first record.

Anyone for a 20x, man carrying, Wakefield with 500 skeins of rubber?

## MODEL R/C SHOW AT PLUMPTON RACE COURSE

Dave Bishop, well known for his many commentaries at model meetings, has, in conjunction with John Blackman of the GBRCAA, organised their own show.

This will be held on Sunday October 10 at the Plumpton Race Course, situated near Brighton, Sussex. There will be super scale models, built and flown by some of the top R/C modellers in the country, which will include the world famous Dutch pulse jets, which are highly spectacular. Trade stands, refreshments, a duration competition for juniors run by DPR Models and a full size DH flypast, in fact something to interest everyone.

Pre-entry forms are available for the competitions to be held from 17 The Square, Tatsfield, Near Westerham, Kent. TN16 2AS or phone Tatsfield 550/Tonbridge 351738.

The show starts at 10am and costs £1.50 adults and 50p per child.

## 1982 WITCHFORD F/F MEET

Following the success of last year's Witchford Meeting, the event will again take place at the same site, a couple of miles south-west of Ely, but this time on a Saturday, October 16. With an indoor meeting the following day at Cardington, this will make a worthwhile two-day weekend of flying in the same part of the country. Access is from the A142 road and will be signposted.

One aim is to raise money for local disabled charities, and all are welcome, SMAE or otherwise, providing they have proof of insurance. Cost of pre-entry (to arrive before October 1) is £1.00 per class (50p for juniors); field entry will be £1.50 (£1.00 for juniors).

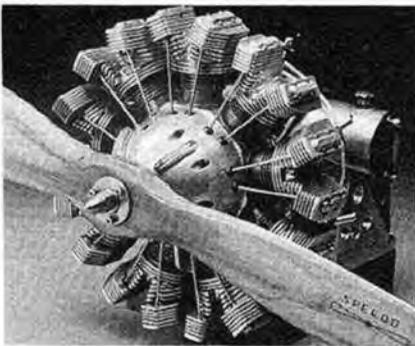
Classes will be F1A, F1B and F1C plus A/1 Glider, Coupe d'Hiver and 1/2A Power. FAI classes will be flown in rounds, starting at 9.30, with two flights to be completed before midday.

Contact: M. Dilly, 20 Links Road, West Wickham, Kent, BR4 0QW.

## MODEL ENGINEER SEPTEMBER 1982

There's some real aeromodelling interest in the September issue of Model Engineer magazine in the form of a fully working nine cylinder radial aero engine seen top of the page opposite. It was built by Joseph 'Speedy' Sciarnatta, and was constructed in just two years of spare time! It has a displacement of 29.82cu.in., oil pump lubrication, turns a 20in. diameter propeller and will run on a spark or glow ignition.

Just imagine if it was fitted to a suitable scale model or similar aircraft, what a pretty sight it would make.



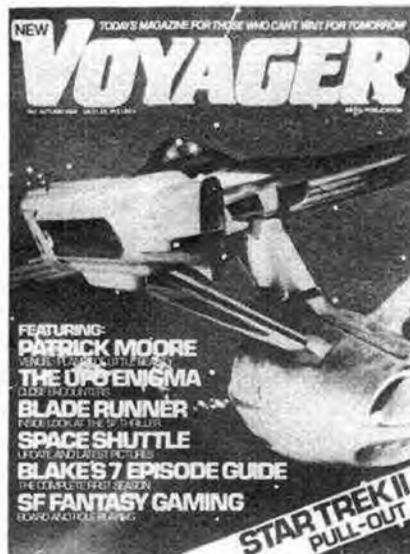
## NEW VOYAGER

Yes, it's back! Due to popular demand and consolidating the success of the Space VOYAGER pilot issue, NEW VOYAGER, "today's magazine for those who can't wait until tomorrow" is launched on September 30. Eighty four pages packed with exciting up-to-the-minute news and features with 16 pages of colour providing the latest Shuttle pictures; stills from movies such as *Firefox*, *Star Trek II*, *Blade Runner* and *Tron*; astronomical wonders of the Sun and Venus; plus a model feature on the AT-AT Walker from *The Empire Strikes Back*.

Other highlights include news on the latest videos, books, films and model products whilst subjects as diverse as hand-held games, model rockets and the human brain are also featured. The Autumn issue of NEW VOYAGER, priced at £1.25.

## AIRCRAFT FROM THE BATTLE OF BRITAIN

This second Scale Models Special for 1982 brings together the most widely-acclaimed series ever run in the popular MAP monthly. In response to heavy reader demand from all over the world, the 12 part



Battle of Britain series of model features is now available in one 80-page, colour-packed issue! All of the original first class reference material will be found in the new Special including colour profiles, scale drawings, accurate cutaways and modelling hints and tips by the score.

Not content with a mere repackaging of SM material, the editors of this new Special have corrected earlier errors and altered copy, scale drawings and photographs in their efforts to present the best possible reference source. Not only that but there are extra scale drawings and an exclusive new cutaway of the famous Junkers Ju 87 Stuka dive bomber.

Aircraft featured include the Spitfire, Hurricane, Beaufighter, Blenheim, Gladiator and Defiant of the Royal Air Force and from the Luftwaffe; the Me 109, Me

110, Stuka, Ju 88, He III and Do 17Z. Each type is shown modelled to 1/72nd scale using existing kits and supported by colour profiles and pages of drawings. If you ever wanted to build a Battle of Britain aircraft but were stuck for proper references then publication of this new Special will be the answer to all your problems. Published on September 3, Aircraft from the Battle of Britain — endorsed by the RAF Museum, Hendon — is available at a model shop or newsagent near you for £1.75. In case of difficulty, copies can be obtained direct from MAP Ltd. but please include an extra 30p for postage and packing.

## † F. BRIAN THOMAS

We have just learned of Brian Thomas's death in April, aged 71, at his home in Hereford. Brian was flying control line models in 1925 and could thus be said to have been the very first in this country, even in the world, to discover the pleasure of control-line flight. Only at this year's MODEL ENGINEER EXHIBITION where we met him as a regular entrant in the Hot Air Engine Competition, did we have the pleasure of borrowing his 16mm film showing a young Brian flying his model while seated on a biscuit tin 'cockpit' seat outside a circle arranged in his parents' garden. He was the first columnist on control-line in AEROMODELLER, during early post-war years. He even converted a free-flight 'Buccaneer' with Brown Junior engine to control-line. As a model engineer Brian was a highly regarded founder member of the 'Stirling Circle' an international group who exchange information and experiences on Hot Air Engines.

As an orthopaedic surgeon he was renowned for his contributions in methods and appliances which stemmed from these extremely active skills now to be missed greatly by the model engineering fraternity.

# What's Happening?

September 18/19  
1ST FREE FLIGHT TRIALS F1A, F1B, F1C — 10.00am start. Venue: Barkston Heath.

September 19  
SHEFFIELD ARCS. VINTAGE RADIO ASSISTED COMP INCLUDING TEXACO. Venue two miles from Junction 31 off the M1. Contact: SAE to D. Hanson, 23 Meadowhead, Sheffield, S8 7UA.

September 19  
DOUG BLAKE MEMORIAL TROPHY C/L AEROBATICS OPEN & NOVICE at Radlett, Hertfordshire. Contact: Glen Alison, Rickmansworth 726765

September 19  
2ND ELLIOTT RALLY FAI TEAMRACE, 'B' TEAMRACE, GOODYEAR TEAMRACE, CARRIER, AEROBATICS, SPEED. Venue: Marconi Avionics, Rochester, Kent. Contact: Peter O'Neill, Tel: Sevenoaks 57899.

September 25  
SMAE SOUTHERN AREA INDOOR FLYING AT COLLEGE OF FURTHER EDUCATION, SOUTHAMPTON. Gym shoes must be worn. Contact: Howard Metcalf, Brook Cottage, Winters Hill, Durlley, Hants. Tel: Durlley 447.

September 26  
SMAE 6TH AREA CENTRALISED TEAM RUBBER - FARRON SHIELD + PLUGGE POINTS. F1A - SMAE CUP + 1/2A POWER. Area venues.

September 26  
SMAE SOUTHERN AREA CLUB 20 FLY-IN AT BOURNE-MOUTH (PHOENIX). Contact: Roger Webber, 88 Farnham Road, Poole, Dorset.

September 26  
SMAE SOUTHERN AREA. CENTRALISED F/F & TEAM R, 1/2A, F1A, P.30. Contact: Barbara Tyson, 19 Wilverly Avenue, Stroodon Park, Bournemouth, BH8 0HT.

October 3  
SMAE SOUTH MIDLAND AREA VINTAGE RALLY R/C ASSIST, C/L, F/F. SMAE members only. Venue: Hanlow, 50pperhead, 10p entry. Contact: R. Truelove, Tel: 049481 5300.

October 3  
SMAE SOUTHERN GALA O/P - SHORT CUP, O/R - FLIGHT CUP, O/G - PILCHER CUP, 1/2A POWER - QUICK-START TROPHY, CD/H, HLG + C/L. SMAE members only. Venue: Odihm. Contact: Norman Couling, 7 The Green Walk, Willingdon, Eastbourne, E. Sussex BN22 0RB.

October 10  
Dave Bishop of DB Sound and John Blackman of GB R/C AA MODEL RADIO CONTROLLED SHOW - Many well-known display teams plus Pete Neato's Junkers 52, Roy Scott's B-17 Junkers 88, BeeGee Racer, World Famous Dutch Pulse Jets. Venue: Plumpton Racecourse, Nr. Brighton, Sussex.

October 10  
14TH TOWNER TROPHY FOR THERMAL SOARING (BARCS RULES). Organised by SE Area, SMAE. Venue: Golden Cross, East Sussex. Contact: N. F. Couling, 7 The Green Walk.

October 10  
SMAE SOUTHERN AREA BEAULIEU FLY FOR FUN. Contact: Dick Hall, 21 Peak Road, Clonfield, Hants. Tel: Hornean 593048.

October 10  
THREE KINGS AEROMODELLERS ALL SCALE DAY. Venue: Old Croydon Aerodrome. Contact: Wal Cordwell 01 764 1661.

October 10  
NORTHERN AREA MODEL FLYING RALLY ALL CLASSES F/F, C/L, R/C. Venue: Church Fenton. SMAE members only. Contact: 0653 2580.

October 16 (Saturday)  
WITCHFORD MEETING. F1A, F1B, F1C + A1 GLIDER, CD/H, 1/2A Power, FAI classes In rounds, starting 9.30, with

two flights completed before midday. See Hangar Doors for further details. Contact: M. Dilly, 20 Links Road, West Wickham, Kent BR4 0QW.

October 17  
COTSWOLD RCS END OF SEASON SCALE RALLY TO SMAE 'STAND-OFF SCALE' RULES. INCLUDES REDIFUSION CLUB 20 SCALE TROPHY. Venue: Aston Down Airfield on A419 Stroud Cirencester Road. Start 10.30am. £1.50 pre-entry, £2 on the day. SAE to Contact Mike Whittard, 2 Cotswold Terrace, Nympsfield, Stonehouse, Glos. Tel: Dursley 860793.

October 17  
NORTHERN AREA FAI MEETING F/F F1A, B&C, C/L F2 B&C R/C F3A&B, SCALE CLASS 1, F/F 2 flights before 1pm. Venue: Church Fenton. SMAE members only. Contact: D. Kerswell, Tel: 0653 2580.

October 17  
INDOOR VENUE: Cardington. Contact: L. Barr, Tel 0628 25595. Programme to be announced.

October 17  
SAM 35 NATIONAL EXHIBITION AND MECA MEETING. Vintage model and engine exhibition plus indoor, control line, and R/C assist flying. Venue: Samuel Whitbread School, Shefford Rd., Clifton, Beds. Contact: Dick Hardwick, 117 Clifton Road, Shefford, Beds.

October 24  
INDOOR MODEL FLYING SPECTACULAR SWEEPETTE TROPHY FOR HAND LAUNCH GLIDER, PEANUT SCALE, OPEN & CO, SCALE, MAHATTAN CABIN, EZ8 TO STANDARD 1.2g RULES. Venue: Middleton Hall, Milton Keynes. Start 10.00am (practice session). Contact either: L. Barr Tel: 0628 25595 or Bob Bailey Tel: 0438 723642.

October 8/10  
ROTHERHAM SCALEDOWN ASSOCIATION. Many working exhibits covering all types of modelling from railways to aircraft, military to marine, and engineering to sci-fi. Open Fr. 13.00-20.00, Sat, 10.00-18.00, Sun 10.00-18.00. Venue: Clifton Hall, Wharnccliffe St. Rotherham. Further details from John Turner — 0709 2121 Ext. 3623



# CHRISTEN EAGLE

By  
Pat Lloyd

**AIRCRAFT  
DESCRIBED**  
No. 254

'The Christen Eagle?' - *that's the one like a Pitt's isn't it?* - such astute observations are understandably commonplace as the Eagle more than superficially resembles that aerobatic criterion of so many years standing. But closer study reveals many differences, and confirms the Eagle as a very smooth aeroplane. It comes from an organisation founded by Frank L. Christensen, who believes in absolute perfection. Having made a successful business, selling out profitably to 'retire' at 32, Frank's interest in aerobatics led him to set up his Ranch home at Hollister, California where he had enough room to eventually build his own airstrip.

It didn't take long for the airstrip to 'grow' a small manufacturing business which made accessories for aerobatics, including inverted oil systems supplied for Curtis Pitts' machines.

At one time Christensen almost bought the Pitts company — but that didn't work out and being devoted to aerobatic flying, and no mean pilot himself, Frank started manufacturing his own machine, the *Eagle*, and designing it for ultimate sale in kit form.

When unveiled, this machine caused a visual impact through its extravagant colour scheme. Beauty in this case was far from skin deep, there were many other points which were very refined and streamlined.

First of the Eagles was actually an Eagle II (meaning two-seater) for the more sociable market of sport flying, being kitted in such sub-assemblies which are so completely finished that it has been likened to an assembly rather than a kit. On the FAA's insistence the kit has in fact been made less complete, in that one now has to make up the wing ribs oneself! A typical touch by Christen is that the shrink wrapped sub-assemblies come with a single edge razor blade — to slit the shrink wrap!

Time for completion is estimated at some 1800 hours and the cost at present is \$41,765. For this one also gets the back-up of splendid instructions and product support literature.

Factory fresh Lycoming AE10-360's are stripped, checked and re-assembled by Christen, then finished in Red, White, Black  
**Span 19ft. 11in.**  
**Length OA 18ft. 6in.**  
**Height OA 6ft. 6in.**

*The detailed photographs shown here illustrate the superb finish and the tremendous attention that has been given to detailed components of the Christen Eagle.*

and Chrome — which when mounted on a mirror finished firewall really cause a gasp when the cowl is opened. Sensibly enough such a clean machine makes easier maintenance to check for cracks and leaks.

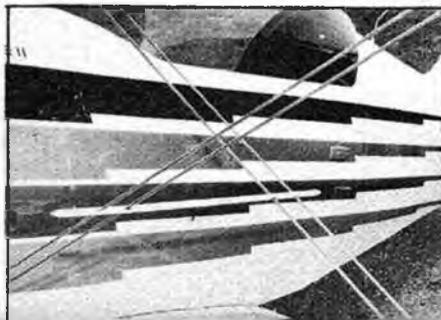
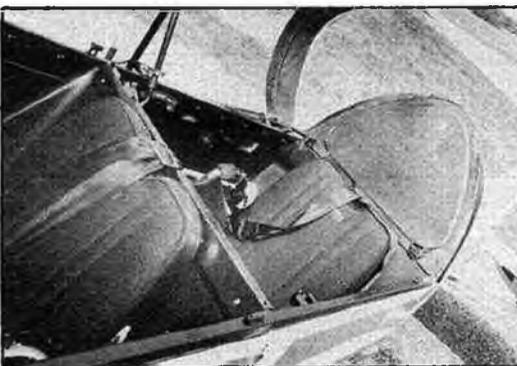
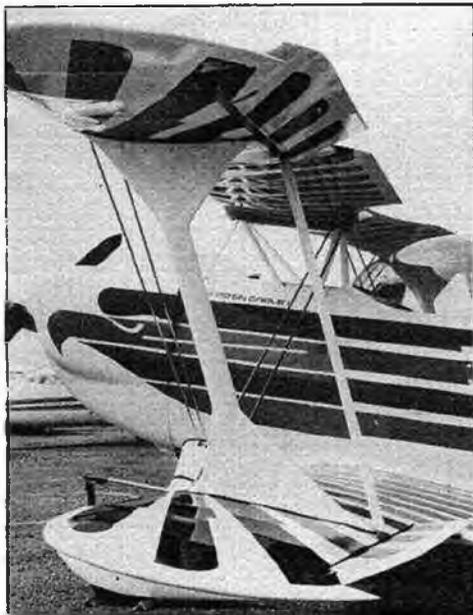
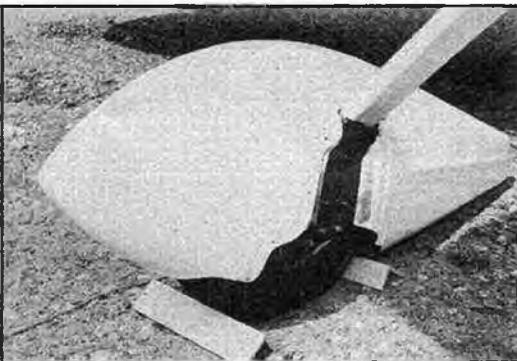
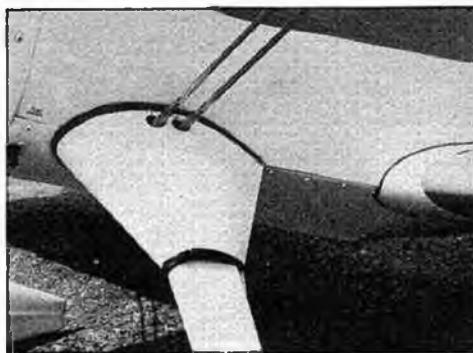
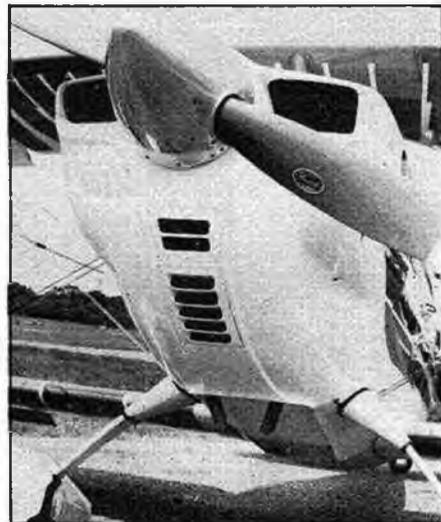
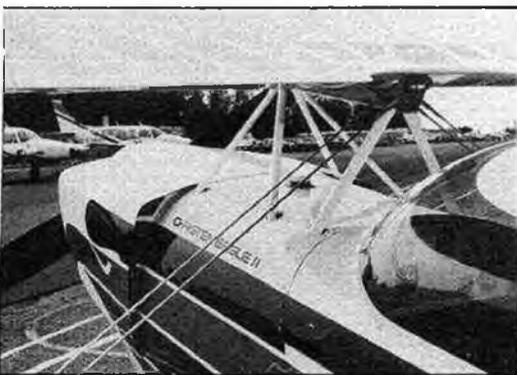
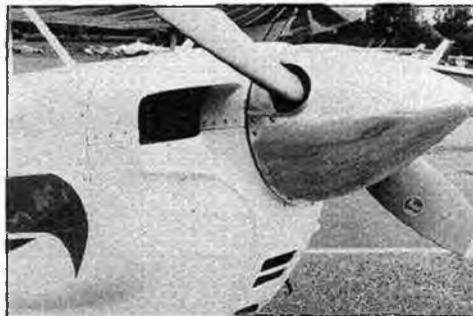
The Eagle I single seater evolved as a purely aerobatic high performance machine, with the more powerful 260hp engine and constant speed Hartzell propeller. Note from the drawings that the Eagle I has unusual internal aileron linkages to the upper wings. Link rods extend up inside the wing struts — saving drag for an extra weight penalty.

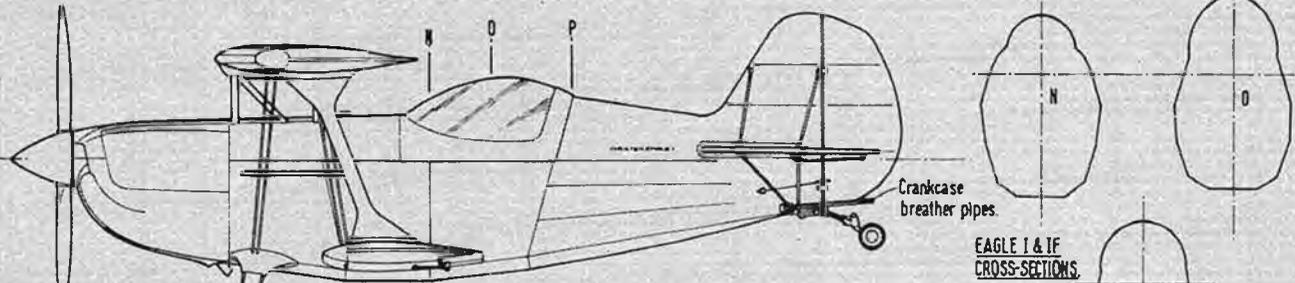
A team of three accomplished world class aerobatic pilots, Charlie Hillard, Gene Soucy and Tom Poberezny fly as the Eagles Aerobatic Team throughout the USA and have ably demonstrated the exceptional performance.

As for the future plans, a Christen Eagle IF has been proposed — with a fixed pitch propeller. The obvious next step will be to offer factory assembled machines, as a 'Special Edition' offering Eagle II's at \$82,000, for those who don't have 1800 hours to spare. They'll lose a lot of fun buying a ready-made, for the Christen Eagle has established a standard in kit-building that brings home-built aviation genuinely right into the backyard.

Readers are reminded that the names Christen Eagle I or II, the logotypes, marks and designs are copyrighted and registered trademarks of Christen Industries and that permission should be requested from Christen Industries for use of these designs on the construction of models. They freely grant permission to use the designs on one-of-a-kind models constructed for non-commercial purposes. Any manufacture of models for sale requires execution of a licensing agreement.







EAGLE I & II CROSS-SECTIONS

PORT SIDE ELEVATION: EAGLE I & II. (Single seater only.)

EAGLE I has a constant speed Hartzell propeller, EAGLE II is equipped with a McCauley fixed pitch prop.

FUSELAGE COLOUR SCHEME.

N2FC Demonstrator has this 7 colour non-standard pattern.

Black.

Deep Purple.

Mauve.

Cerise.

Red.

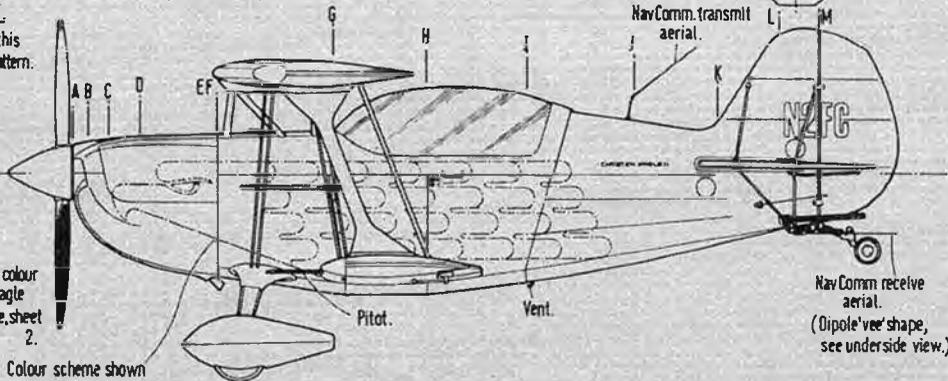
Orange.

Yellow.

4" }  
5" }  
6" }

\*4, 5 & 6 Give colour groups for Eagle team badge, sheet 2.

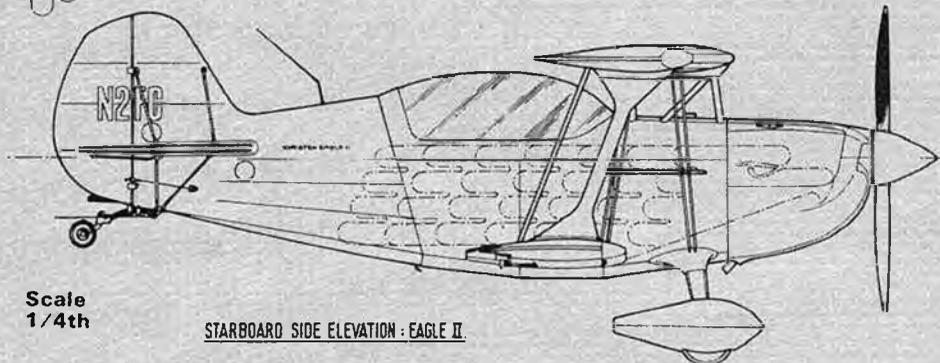
Colour scheme shown in chain lines. —



PORT SIDE ELEVATION: EAGLE II. (Single or Two seater.)

N2FC is the Christen company demonstrator.

(TM) See IMPORTANT NOTE on Sheet 2.



STARBOARD SIDE ELEVATION: EAGLE II.

EAGLE is available in a wide range of assembly kits or as the complete a/c. Great pains have been taken to refine many of the drag producing areas on this type of machine. Engine cowling, Centre-section strut-to-wing fixings, Fuselage to Undercarriage junction & Wheel spats are all moulded from Glass re-inforced plastics to give a smooth high-gloss finish.

CHRISTEN EAGLE II

EAGLE I

FUSELAGE LOGOS: EAGLE I or II.



CHRISTEN INDUSTRIES INC. LOGO.

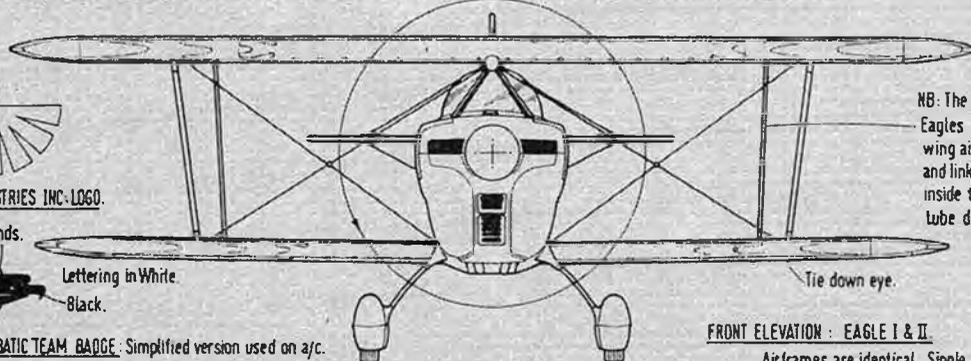
3 Grey bands.



Lettering in White.

Black.

EAGLES AEROBATIC TEAM BADGE. Simplified version used on a/c.



FRONT ELEVATION: EAGLE I & II.

Airframes are identical. Single seater uses the 260 hp Lycoming & the two seater has a 200hp engine.

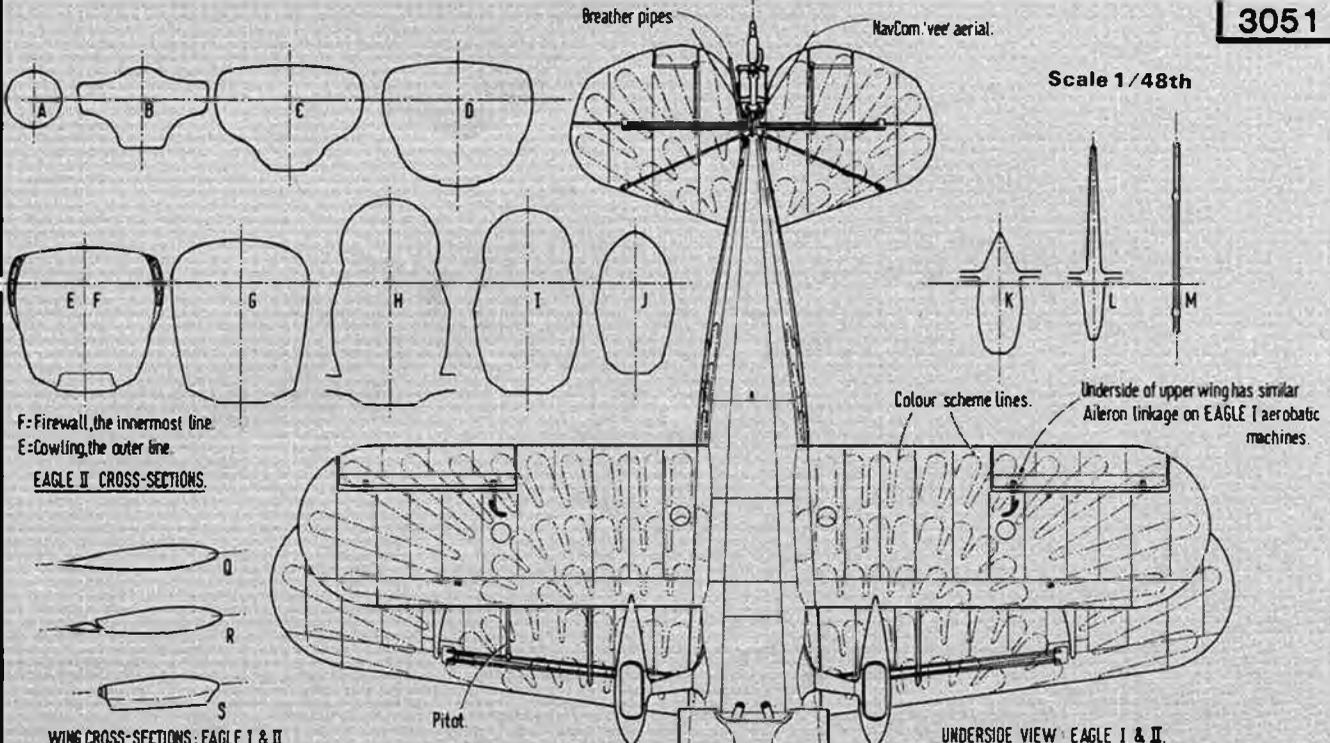


CHRISTEN EAGLE I & II

Drawn & Traced A. A. P. LLOYD.

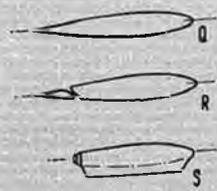
-1-

Scale 1/48th



F: Firewall, the innermost line.  
E: Cowling, the outer line.

**EAGLE II CROSS-SECTIONS.**



**WING CROSS-SECTIONS: EAGLE I & II**

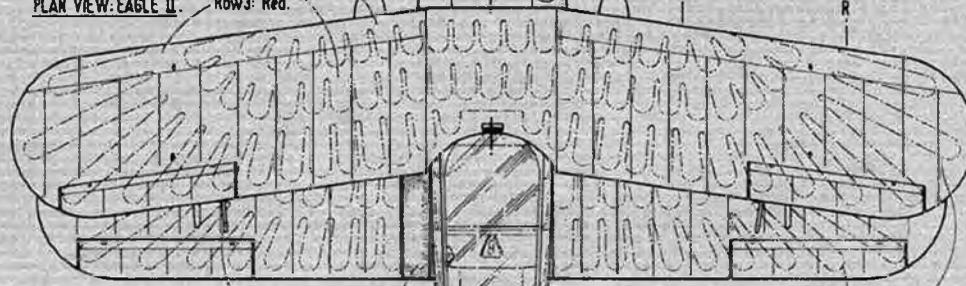
**IMPORTANT NOTE:** All Colour schemes Patterns & Logotypes are the registered property of CHRISTEN INDUSTRIES INC. All rights to their use is reserved, and may only be waived upon written request for permission to incorporate in a model, from CHRISTEN INDUSTRIES INC. See also descriptive text.

**UPPER & LOWER WING SURFACE**

**COLOUR SCHEME:**

Colours are three shades from the fuselage scheme, in three distinct rows.  
Row 1: Deep Purple.  
Row 2: Mauve.  
Row 3: Red.

**PLAN VIEW: EAGLE II.**

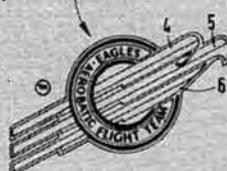


**COLOUR SCHEME, N2FC:**

Aircraft is overall GLOSS WHITE.  
Main colour decoration is called the 'Full Feathers' scheme and is the copyright of Christen Industries Inc. The pattern can be supplied in either 4 or 8 standard colours applied over the base colour white.  
The demonstrator N2FC differs in that the fuselage design is in 7 colours, but as with production a/c only 3 of the fuselage colours are used on wing and tailplane scheme.  
Matt Black rear faces to propeller blades,  
Silver grey front faces with Yellow tips.  
'N2FC': Gloss Black.  
Interplane struts & Aileron pushrods are Red.

N.B.: Narrow Black pinstripe outline to outermost colour pattern on wing & tailplane.

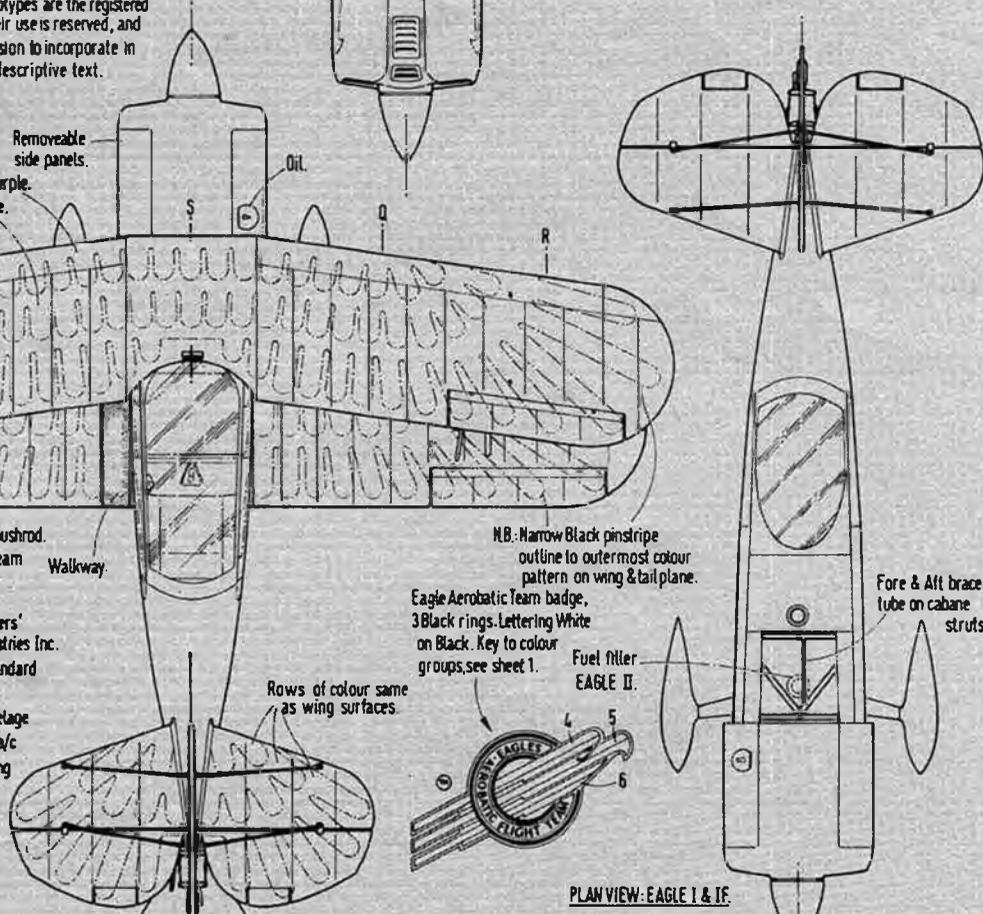
Eagle Aerobatic Team badge, 3 Black rings. Lettering White on Black. Key to colour groups, see sheet 1.



Fuel filler EAGLE II.

Fore & Aft brace tube on cabane struts.

**PLAN VIEW: EAGLE I & II.**



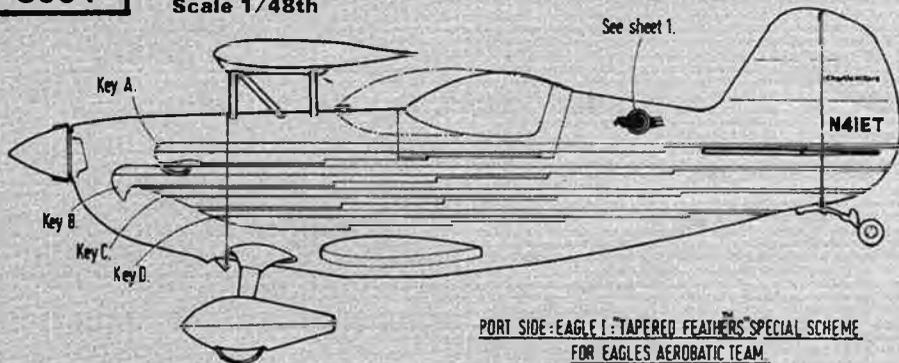
**CHRISTEN EAGLE I & II**

Drawn & Traced A. A. P. LLOYD.

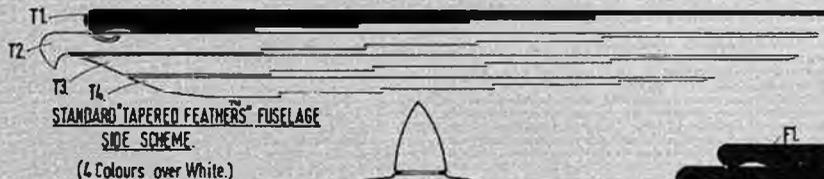
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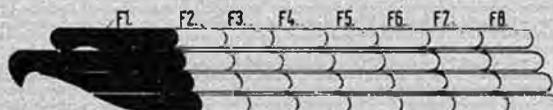
See sheet 1.



PORT SIDE: EAGLE I: TAPERED FEATHERS SPECIAL SCHEME FOR EAGLES AEROBATIC TEAM (8 Colours over White)

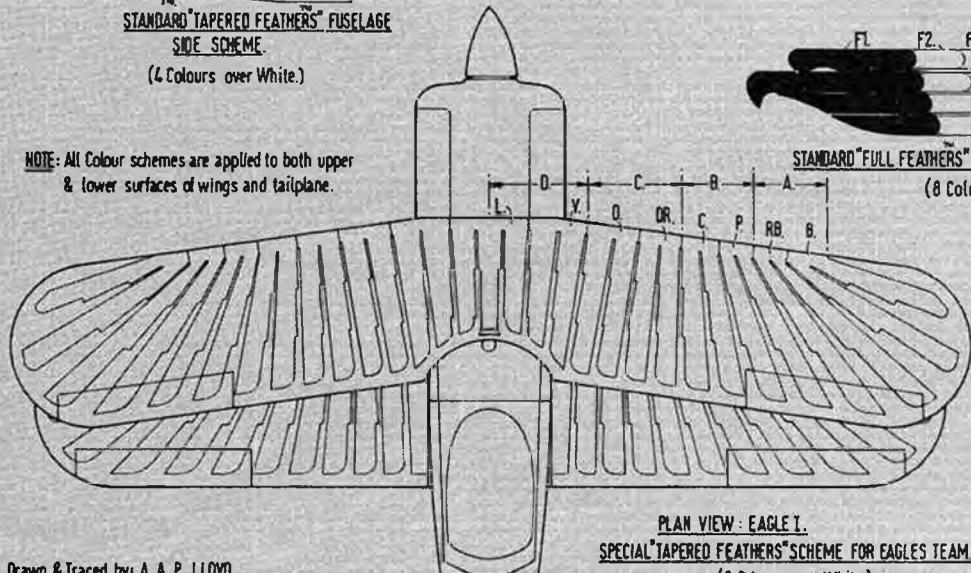


STANDARD TAPERED FEATHERS FUSELAGE SIDE SCHEME (4 Colours over White.)



STANDARD FULL FEATHERS FUSELAGE SIDE SCHEME (8 Colours over White.)

NOTE: All Colour schemes are applied to both upper & lower surfaces of wings and tailplane.



PLAN VIEW: EAGLE I. SPECIAL TAPERED FEATHERS SCHEME FOR EAGLES TEAM (8 Colours over White.)

Drawn & Traced by: A. A. P. LLOYD.

EAGLES AEROBATIC TEAM: Use Eagle I aircraft basically overall gloss White, with the Tapered Feathers™ pattern scheme applied in eight instead of the standard four colours.

- N 41ET Charlie Hillard.
  - N 42ET Tom Poberezny.
  - N 43ET Gene Soucy.
- Fin details in Black.

EAGLES AEROBATIC TEAM Machines using the non-standard 8 colour scheme have the Tapered Feathers™ fuselage side flashes divided longitudinally into two. This in turn gives four groups of blending colours which are repeated on the flying surfaces. To simplify identification each of the four groups is lettered A, B, C & D. The key then gives the two colours.

- KEY:
- A. Black (upper) Royal Blue (lower)
  - B. Purple - - Cerise - -
  - C. Deep Red - - Orange - -
  - D. Yellow - - Lemon - -

STANDARD SCHEMES: TAPERED & FULL FEATHERS™

The Tapered Feathers™ scheme is four colours over the basic white airframe. In the main drawing the colours for this scheme are designated, T1, T2, T3 & T4. The key gives these colours, & three alternatives offered by the factory. Additionally, CHRISTEN offer: All four fuselage stripes & flying surface pattern in one of the four alternate colours over white, or the whole aircraft in one of the colours in the key, with the fuselage & flying surface designs remaining white.

- KEY:
- |             |           |         |
|-------------|-----------|---------|
| T1. Black.  | Black.    | Black.  |
| T2. Red.    | Blue.     | Brown.  |
| T3. Orange. | Green.    | Fawn.   |
| T4. Yellow. | lt Green. | Yellow. |

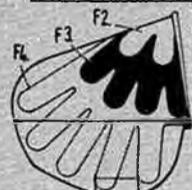
STANDARD SCHEME FULL FEATHERS™

The Full Feathers™ scheme is eight colours over white, but the full eight shades are only used on the fuselage, and three of these appear on the flying surface pattern, the colours are identified in the key below.

- KEY:
- F1. Black.
  - F2. Deep Purple. \*
  - F3. Mauve. \*
  - F4. Cerise. \*
  - F5. Red.
  - F6. Orange.
  - F7. Yellow.
  - F8. Lemon

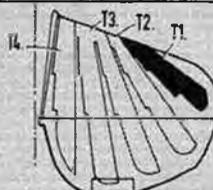
\* Flying surfaces only.

SCRAP PLAN VIEWS: FULL FEATHERS™

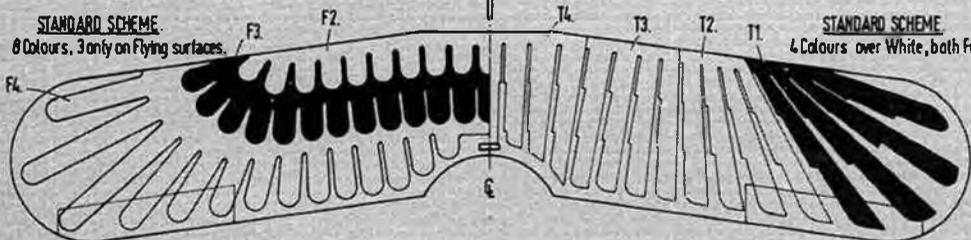


STANDARD SCHEME. 8 Colours, 3 only on Flying surfaces.

SCRAP PLAN VIEWS: TAPERED FEATHERS™



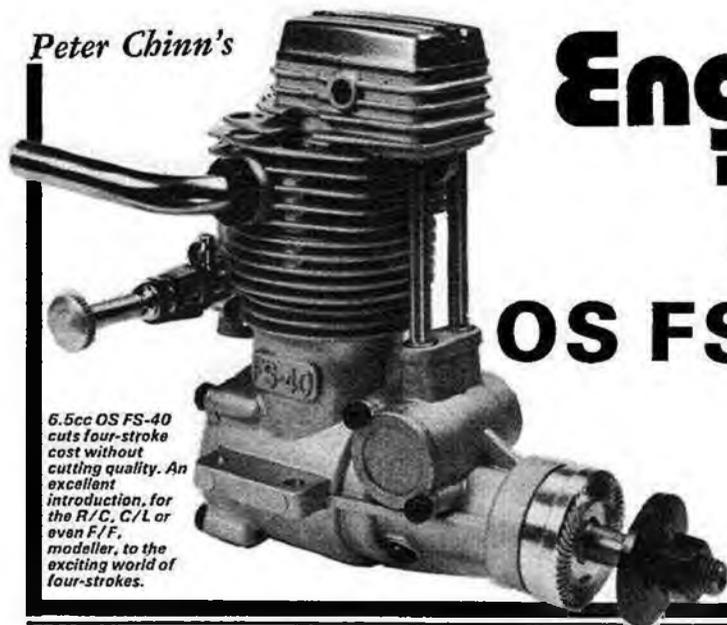
STANDARD SCHEME. 4 Colours over White, both Fuselage and Flying surfaces.



IMPORTANT

Read and observe instructions regarding Copyright on Sheets 1 & 2 and in accompanying text. All rights reserved unless written permission obtained.

Peter Chinn's



6.5cc OS FS-40 cuts four-stroke cost without cutting quality. An excellent introduction for the R/C, C/L or even F/F. modeller, to the exciting world of four-strokes.

# Engine Test

## OS FS-40

### Specification

**Type:** Single-cylinder, glowplug-ignition four-stroke with enclosed pushrod-operated overhead valves. Twin ball-bearing crankshaft. Twin ball-bearing camshaft.

**Bore:** 21.2mm (0.8346in.).

**Stroke:** 18.4mm (0.7244in.).

**Swept Volume:** 6.495cc (0.3964cu. in.).

**Stroke/Bore ratio:** 0.868:1.

**Measured Compression Ratio:** 8.5:1.

**Measured valve timing:**

Inlet opens: 45° BTDC

Inlet closes: 60° ABDC

Exhaust opens: 45° BBDC

Exhaust closes: 45° ATDC

**Measured maximum valve lift:** 2.0mm.

**Recommended tappet clearance:** 0.04mm (0.0015in.) cold.

**Checked weight:** 341 grammes. (12.0oz).

### General structural data

**Crankcase:** Pressure diecast aluminium alloy main casting comprising crankcase, full-length finned cylinder casing, main bearing housing and camshaft housing. **Crankshaft:** One piece hardened and ground crankshaft with 12mm o.d. main journal, bored 6mm to reduce weight, 8mm o.d. front journal, integral 5.5mm o.d. crankpin on T-type crankweb with crescent counterweight and integral 12mm dia. spiral toothed gear for camshaft skew-gear drive. Shaft end threaded for standard 1/4-28 UNF prop-nut. **Main bearings:** Crankshaft supported in one 12 x 24 mm 8-ball steel-caged ball journal bearing at rear and one 8 x 19mm 7-ball steel caged shielded ball journal bearing at front. **Camshaft and camshaft bearings:** Round-flank inlet and exhaust cams disposed either side of central 13.6mm dia. x 8mm wide 22-tooth helical gear. Camshaft supported at each end by 5 x 13mm 7-ball steel caged ball journal bearings. Left hand bearing fitted in fixed end of camshaft housing, right-hand bearing fitted into camshaft housing end cover. **Piston and conrod assembly:** Flat-crowned, gravity-diecast piston with single compression-ring and cutaway skirt to clear crankweb at BDC. Fully-floating 5mm o.d. tubular gudgeon-pin equipped with brass pads. Machined high-duty alloy connecting-rod, 31mm between centres, with bronze bushed bearings and oil holes at both ends. Reciprocating weights: piston and ring 6.7g; gudgeon-pin 2.3g; conrod 3.8g. **Cylinder-liner:** Drop-in steel cylinder-liner located in main casting by flange at top and having OS special ultra hard-wearing low-friction corrosion-resistant non-electrodeposited composite plating. Cylinder wall thickness: 1.2mm.

**Cylinder-head:** Pressure diecast aluminium alloy cylinder-head with integral rocker-box and bronze valve guides and seats. Head secured to cylinder casting with five 3mm chrome-molybdenum steel hexagon socket-head cap screws. Soft aluminium head gasket. Polished pressure-diecast aluminium alloy rocker-box cover secured with two screws. **Valves:** Valves placed vertically, side-by-side, in discoidal combustion chamber. Valve length 22.3mm; head diameter 8.6mm; stem diameter 3mm except immediately below valve head where stem diameter is reduced to 2.2mm. Steel valve spring caps anchored to the valve stem with horseshoe shaped retainers. **Rocker-arms:** Rockers of case-hardened, investment cast chrome-molybdenum steel, pivoted on 4mm dia. hardened steel shaft, supported at each end and in post in centre of rocker-box. Screw and lock-nut adjustment for setting tappet clearances. **Tappets and pushrods:** Hardened and ground steel cam-followers (tappets) 5mm dia. x 10mm long. Hardened steel pushrods, 2mm dia. x 48mm long, enclosed in 3.8mm o.d. stainless steel tube covers, flanged at each end and located in camshaft housing and underside of rocker box with O-rings. **Carburettor and inlet pipe:** Pressure diecast aluminium alloy carburettor body with integral inlet pipe flange fitted to cylinder head with two 2.5mm cap screws. Steel throttle barrel with 4.4mm dia. choke. Effective choke area 10sq mm. Adjustable throttle stop. Adjustable air-bleed control for setting idling mixture strength. Adjustable nylon throttle arm. **Exhaust pipe and pressure adaptor:** Stainless steel 6mm i.d. exhaust pipe, flanged and fitted to cylinder head with blued steel nut and copper gasket. Optional machined aluminium pressure chamber for fitting over exhaust pipe outlet for pressurising fuel tank.

### Test conditions

**Running time prior to test:** Approximately two hours

**Fuel used:** 72 per cent methanol, 18 per cent castor-oil, 10 per cent nitromethane.

**Glowplug used:** OS Type F (four-stroke type).

**Silencer used:** None.

**Air temperature:** 11°C (52°F).

**Barometric pressure:** 757mm (29.80in.) Hg.

**Relative humidity:** 75%.

### Test results

**Power output, gross:** 0.455bhp at 11,200rpm.

**Torque, gross:** 50oz in. at 7,000rpm.

**Equivalent bmep:** 99lb/sq. in.

**Specific output, gross:** 70bhp/litre.

**Power/weight ratio gross:** 0.61bhp/lb.

This is the first four-stroke engine to be featured in the AEROMODELLER Engine Test series. Although four-stroke motors appeared on the market, from time to time, over a period of nearly 40 years between the late 1930's and mid 1970's, few of them survived for more than a year or two, largely due to the fact that they could not compete with existing two-strokes on price, performance, compactness, lightness, or general suitability for model aircraft use. In recent years, however, two factors have combined to change the climate so far as four-strokes are concerned.

First, the enormous increases in power that model two-stroke motors have achieved, have, to some extent, also been their undoing, since extremely high noise levels (only partly ameliorated by the use of silencers) of modern high speed two-strokes, constitutes something of a public nuisance in many areas and has resulted in the loss of numerous flying sites.

Second, the immense increase in the popularity of radio-control and the more advanced models that modern R/C systems have made possible, have combined to open up a market to a wider public willing to buy ever more complex engines, so that the extra cost of a four-stroke engine is no longer a barrier to its acceptance by a larger and, generally, more affluent modelling fraternity.

In 1975, the OS company of Japan, the world's largest and longest established (45 years) manufacturer of model i.c. engines, decided that the market was ripe for the quantity production of a new breed of model four-stroke engine. In order to attract the widest possible acceptance, the engine had to be little or no larger, or heavier, than existing two-strokes of the same capacity and had to operate on glowplug ignition and the readily available two-stroke glow engine fuels familiar to all model i.c. engine users.

The result, introduced just six years ago, was the OS FS-60, a high-quality 10cc pushrod-OHV motor that was easy to operate, compact and weighed no more than a good 10cc two-stroke with silencer. This was the signal for several other manufacturers, large and small, to follow suit and, to date, a round dozen different makes of four-strokes have appeared on the market. In 1979, OS introduced their superb 20cc horizontally-opposed twin-cylinder FT-120 Gemini, costing some £350 but, by now, four-strokes were beginning to attract the attention of the 'ordinary' modeller and it was clear that there was a good market for a smaller engine at a reasonable price. The result was the 6.5cc FS-40 model, introduced last year, which is the subject of our present report.

Having a power stroke once every two revolutions instead of every revolution, model four-strokes do not develop such high specific power or torque figures as modern high performance two-strokes, but, although development over the next few years could bring about more powerful four-strokes, the gap is not, in any case, quite so wide, in terms of actual usable performance, as mere figures would suggest. This is because the four-stroke develops higher brake mean effective pressure and delivers its peak brake horsepower at lower revolutions; as a consequence of which it is happier turning larger (and, generally, more efficient) props than is a two-stroke of

the same peak power output.

Where the four-stroke really scores, of course, is in its much quieter operation. Not only does it have a far less piercing exhaust note — at 10,000rpm this has a frequency of only one-third that of a two-stroke running at 15,000rpm — but actual sound levels are markedly reduced so that a four-stroke without a silencer is still quieter than a two-stroke with one. The sound produced by the four-stroke is also more pleasing and, particularly for a scale model, more realistic.

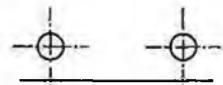
In the short time since it was introduced to the UK market, the OS FS-40 has become by far the best-selling four-stroke engine and it was for this reason, plus the fact that, at a £78 list price, it is one of the least expensive, and certainly the best value, four-stroke engines currently available, that we chose it for this first AM report on a four-stroke.

As the drawing and photos show, the FS-40 is a pleasantly clean design, with totally enclosed valve gear and a cross-camshaft at the front of the engine that reduces overhang and places the glowplug, as well as the carburettor controls, safely to the rear. Despite its modest price, the engine is of quality construction throughout, has OS's special extra hard-wearing, low-friction cylinder plating and, unlike some of its rivals, has its camshaft, as well as its crankshaft, supported in ball-bearings at each end. The valve gear is very robust, is hardened on all wearing surfaces and the engine has proved to be extremely reliable and hard-wearing.

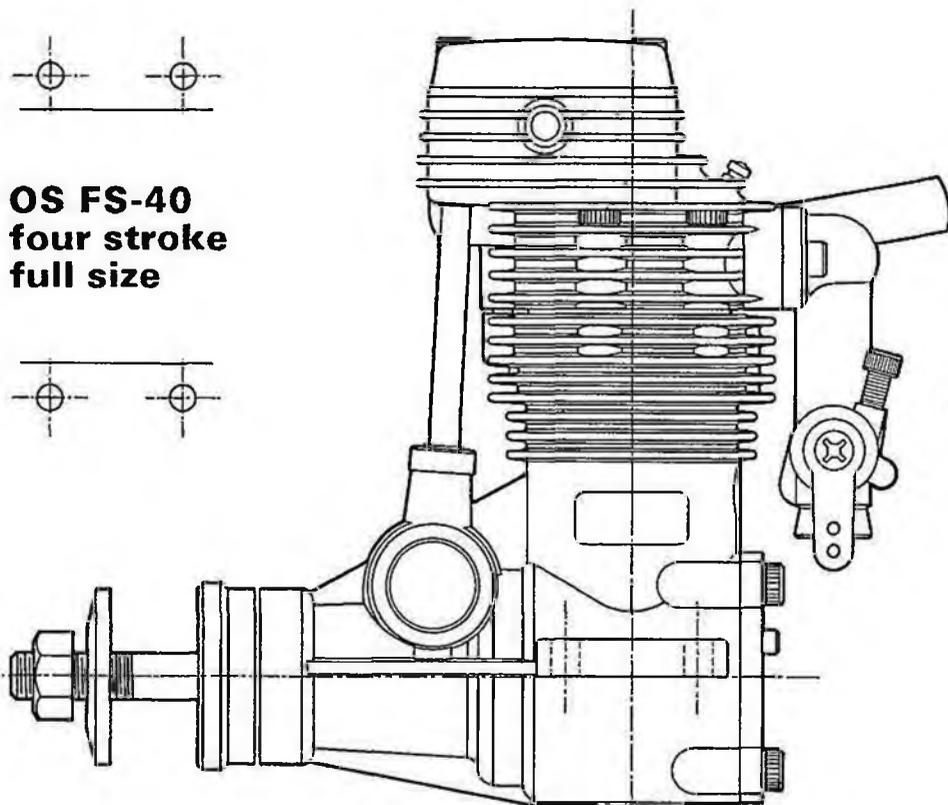
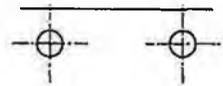
### Performance

The FS-40 is supplied with an OS Type 'F' glowplug, a special plug intended solely for four-stroke engines. As with most of the current glowplug-ignition four-strokes, the makers state that the engine can be operated on standard model two-stroke fuels. Certainly it is a good idea to start off with such a fuel since the relatively high oil content (20-25 per cent) of the average two-stroke fuel is beneficial during running-in. When the engine is adequately run-in, however, there is no doubt that the average four-stroke requires far less lubricant. Eighteen per cent castor-oil was used for the FS-40 during the tests which,

*FS-40 has skew-gear driven cross camshaft. Special reverse rotation camshaft is available for pusher or 'handed-pair' use.*



## OS FS-40 four stroke full size

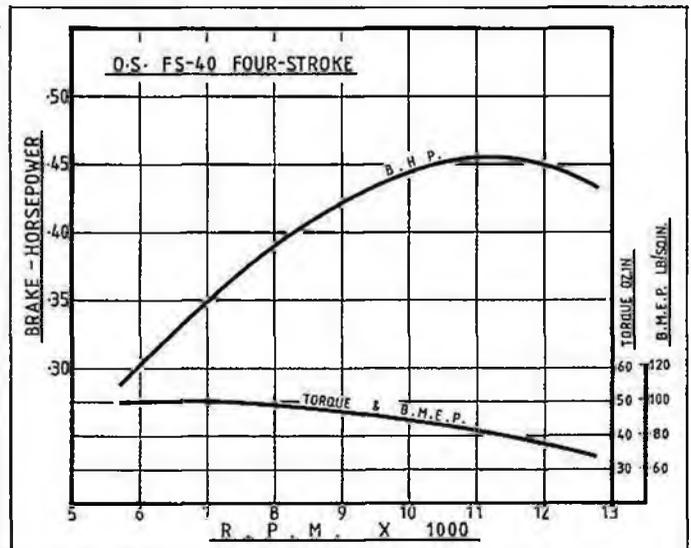


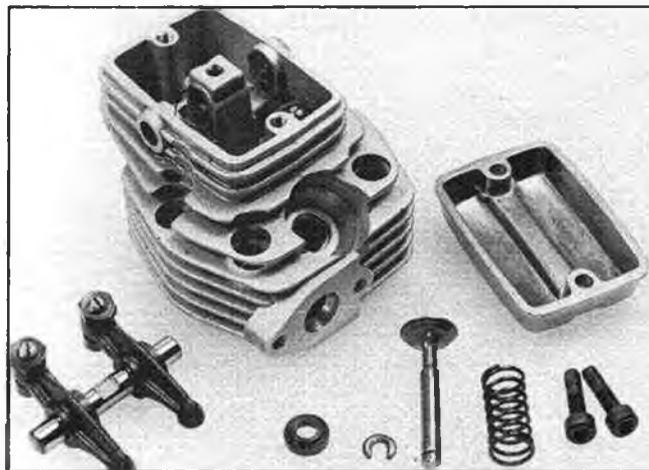
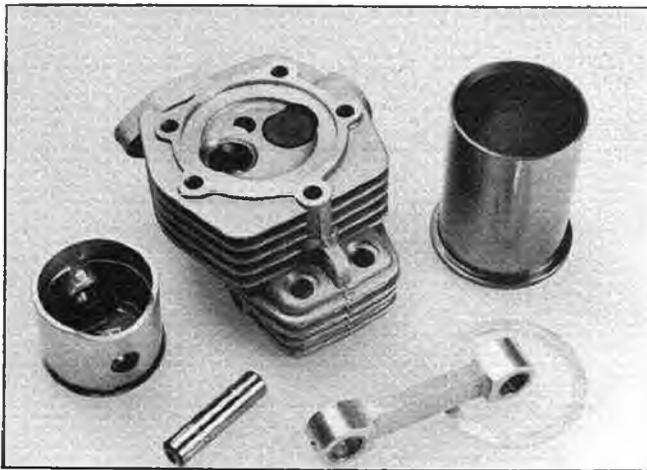
one feels, is more than sufficient at this stage. It seems, from experience gained so far with four-strokes, that, in the future, recommended lubricant percentages for four-strokes are likely to drop to 15 per cent or less. There are certain benefits to be gained from these lower percentages, including better inverted operation, improved throttle response and, of course, cleaner running, although, with four-strokes, this latter is not generally a problem since most of the excess oil, in a well designed four-stroke, is discharged through the crankcase breather and can be drained away through a length of fuel tubing.

Starting the FS-40 presented no problems. For an initial start from cold, the

manufacturer's instruction leaflet suggests the backwards-flick or bounced-start method where hand starting is used but, especially for a warm re-start, we found that, after a single choked preliminary turn of the prop to suck-in, the engine responded instantly to flicking the prop in the normal direction of rotation. Using an electric starter produced an immediate start, hot or cold. All starting was carried out with the throttle set approximately one-third open.

One thing that has to be remembered, whenever one is starting a four-stroke, is that, because induction is directly into the cylinder and not (as in a two-stroke) via the crankcase, it is all too easy to over-prime





Above: head, showing combustion chamber and with inlet valve removed; cylinder liner, piston, gudgeon-pin, conrod. Note excellent condition of all parts, photographed after five hours' test running. Right: neat cylinder-head incorporates valve rocker box with detachable cover. Note substantial rocker assembly.

the cylinder when choking the carburettor air intake. In fact, if one is careless, it is possible for so much raw fuel to be sucked into the cylinder that an hydraulic lock may be caused. Damage may then result if an attempt is made to start the engine in this condition.

As part of the starting drill, therefore, we would recommend checking that the prop can be pulled through compression before any attempt is made to start the engine, either by hand or with an electric starter. If undue resistance is felt, remove the glow-plug and flick the prop to eject as much surplus fuel as possible. Make sure that you have the proper size tubular plug spanner to reach the recessed glowplug. Such a tool should always be part of any power modeller's kit, since it is important that you should be able to quickly and safely remove and re-install the glowplug in any engine at any time. Only in this way is it possible, for example, to check, before starting, whether the plug is receiving enough current to provide the required red-to-orange glow at the plug element. Incidentally, OS offer an excellent double-ended box spanner, with tommy-bar, which fits all standard glow-plugs and also the standard size  $\frac{1}{4}$ -28 UNF

propnut.

The manufacturer's suggested prop sizes for use with the FS-40 range from 12x5 for scale type R/C models having large wing areas and low wing loadings, through 12x5 and 11x6 sizes for lighter type scale, sport and trainer models, to 11x6 or 10 $\frac{1}{2}$ x6 for sport and stunt models.

Typical rpm figures obtained with similar props, on test, included 8,000rpm on a 12x5 Top-Flite maple, 8,950 on an 11x6 Top-Flite maple, 9,500 on an 11x6 Power Prop maple and 10,200 on a 10x6 Top-Flite maple. The latter is about the smallest practical size for this engine: allowing for a 10 per cent rpm build-up in flight, the engine will then be just about on the peak of its power curve. Revolutions obtained on other sizes included 7,000 on a 13x4 Punctilio beech prop, 8,900 on a 12x4 Zinger maple, 9,800 on an 11x4 Power Prop maple, 10,800 on a 10x5 Top-Flite maple and 11,400 on a 9x6 Zinger maple.

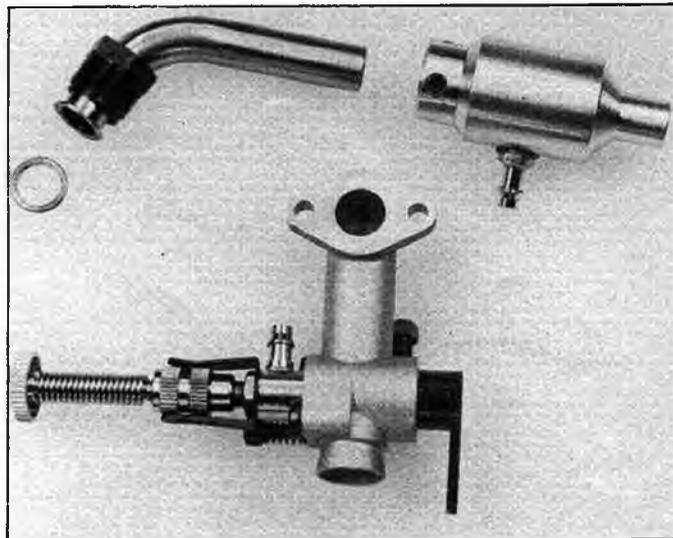
Here we should mention that, generally speaking, it is inadvisable to run a four-stroke at speeds much in excess of its peak bhp revolutions. Of course, there is no practical advantage in doing so, but some users, familiar only with two strokes, might

be tempted to fit a very small prop with the idea of seeing how fast their new four-stroke will turn. Unlike a two-stroke, which under minimal load, will often turn at phenomenal revolutions, limited, ultimately, only by reduced breathing ability and escalating frictional losses, the four-stroke has more mechanical limitations to contend with: i.e. the risk of valve float occurring and the danger of a valve hitting the piston. However, it does appear that most of the present generation of model four-strokes are capable of withstanding the sort of over-revving that can occur in a dive with the throttle wide open and, by way of checking this with the FS-40, we allowed out test motor to run up to just on 13,500rpm, with no harmful effects. Nevertheless, this is not something that we would recommend. We would suggest that the FS-40 is propped for a speed of not more than 10,000rpm static.

With the average model, it may well be found that equally good performance can be obtained by using a slightly larger, more efficient prop, even though this will be turning more slowly and absorbing less of the engine's potential output. The power curve is fairly flat and, with a 12x5 prop, the engine is still likely to be developing over 90 per cent of its peak output in the air, a figure that may rise to 96-99 per cent full power on an 11x6.

As our performance curves show, the FS-40 delivered its highest torque at around 7,000rpm where a figure of 50oz. in. was recorded. Note that since the FS-40 is a four-stroke, having a power stroke every two crankshaft revolutions, this is equivalent to a brake mean effective pressure of nearly 100lb/sq. in., the highest ever pressure recorded in an AEROMODELLER test report. The torque curve declined steadily and plotting torque figures against rpm revealed a peak bhp of just under .046bhp at approximately 11,200rpm a figure which, representing a specific output of 70bhp/litre, is well up to expected levels for current model four-stroke models.

The FS-40's throttle response was outstandingly good: linear, with a low idling speed. We actually had the engine ticking over as low as 1,800rpm on a 12x5 prop (this, with a four-stroke, sounds like only 900rpm). Allowing a safety margin, a 2,200-2,400rpm idling speed would seem to be realistic with 11-12in. dia. props.



Carburettor and induction pipe, exhaust pipe and optional exhaust pressure chamber which can be added for pressurising fuel tank if required.



# WORLD CONTROL LINE CHAMPS

**Oxelosund Sweden  
July 20-26, 1982**

**Report by Colin Rattray**

THIS was for me my first experience of an aeromodelling World Championship and I must admit before going the finer points of Combat, Stunt and Team Race were a bit of a mystery to me. However, by the end of the ten day experience I had heard enough information to fill a book and certainly improve my previous ignorance.

I met up with most of the British team at Felixstowe where we started the 24 hour boat trip to Goteburg. The feeling of excitement at the forthcoming event began to grip us all even at this stage, but was dampened somewhat a few hours later when the rise and fall of the ship took its effect. Nevertheless, it was a good crossing and then a stop overnight at Goteborg before starting off for the 3½ hour drive to the flying site at Oxelosund.



The facilities on the flying site were excellent, comprising of two enclosed circles for F2C and F2A, a grass area which was in fact a football pitch, for Combat, a tarmac circle for Stunt, and also practice circles for F2B and F2D. There were also practice areas nearby for the team racers.

While the location, accommodation, weather conditions, refreshments and information were excellent, there was some criticism from all flyers with the Stunt circle, the problem being that the circle was not flat by some way and the nearby trees gave extreme turbulence in certain wind directions. Early flyers had a considerable advantage as there usually was very little wind and if any, it was blowing from the non-turbulent side.

## Wednesday 21

This day was for practising, processing and the opening ceremony and meeting fellow competitors. The friendship between all nations was tremendous, even if you couldn't find the right words to communicate, signs, drawings, and a few friendly smiles soon sufficed and before long all were one in trying to help each other and show details of their models.

Processing took place throughout the day and was very efficient with all engines being marked, aircraft weighed and tank capacities measured; a mammoth job for the organisers. A computer was used to monitor all results which were given out at the end of each day. The opening ceremony took place around 4pm complete with brass band, many flags and the usual speeches.

*Left to right: Bernie Langworth fighting it out with the Canadian and Belgian pilots. Colin Brown warming up the engine prior to their semi-finals bout, and John Broadhead in action; with contra tweeker in mouth.*

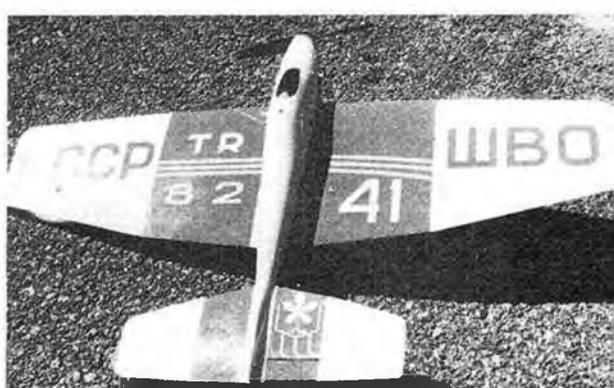
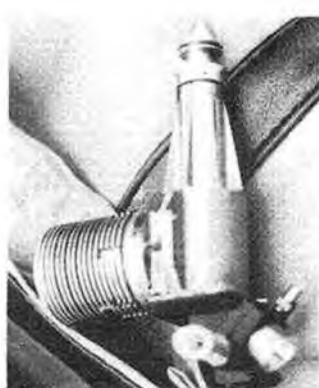
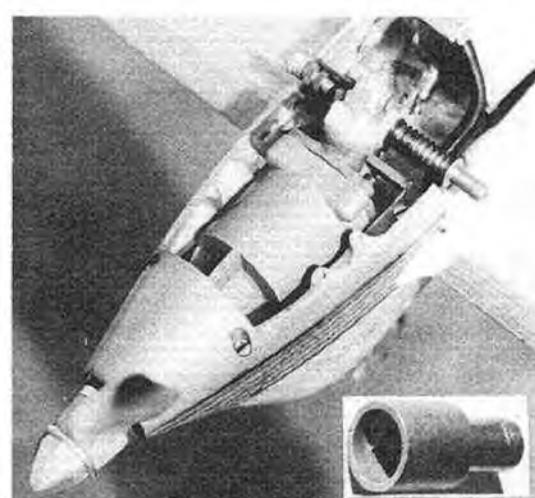
Most nations were dressed in smart track-suits of the appropriate colour, except for the British and Dutch who compete for the most outlandish dress, or should I say undress award! So the scene was set with the weather up in the 70s, good accommodation, food, and the will to win by all competitors.

## Thursday 22

### Team race

It soon became apparent that everyone had been working flat out on improving their engines or making their own. Our team member, Bernie Langworth, had produced a high silicone content piston in conjunction with the Dutch for the Nelson engine. The engine was still rather tight although it was giving 19.5 for 10 laps but the model was very twitchy and difficult to fly straight, so it was decided to keep it as a reserve. Discussions with Rob Metkemeyer (Netherlands) showed he had been following similar lines using the same high silicone content alloy for his pistons, the advantage being negligible distortion which allowed for a parallel sided piston without the usual tapered crown. Everything was being tried from titanium crankshafts to magnesium crankcases, roller bearing big ends, large size timing drums, choke sizes up to 4mm, one, two and even three bladed carbon/epoxy propellers, the combinations were endless. Model weight was also high on the list of gaining those extra fractions of a second and at the same time, retaining a rigid flying machine. I was by now beginning to understand what these fellows were all about; I must say as a casual onlooker, the technicalities are not at all obvious.





Left: Broadhead/Langworth's magnesium crankcase Nelson with silicone piston (inset piston blank). Centre: Theo Georgiadis, Australian engine maker's new magnesium crankcase, titanium crankshaft, TR motor. Right: Barkov/Surev's super model with interesting graphics, similar to the finish on Shapovalov/Onufrienko's model.

The USSR all had own design motors which had different timing and priming systems than all the other engines being used. For starting they fed fuel into the carburettor, exhaust port and transfer passage. It soon became apparent that these engines were going quite a bit faster than most with 10 laps completed in under 19 seconds. However speed alone does not win a race as was seen later in the semi-finals; pilot skill and fast pit work can make up for a slower model.

Albritton/Perkins (USA) had an incredibly light and complex retracting undercarriage of their own design fitted to their model. Made from titanium and alloy castings and operated to go up by centrifugal force moving a bellcrank, and down when the fuel shut off valve was operated by down elevator. Although we were able to inspect the mechanism, which was superbly made, without detailed drawings it would be hard to describe its exact function. When you consider these models land at some 75mph, the loads imposed on the undercarriage and model are tremendous, and yet it still has to be very reliable. This just goes to show how far people are pushing to gain those extra fractions of a second.

Outstanding in all categories were the Chinese. They had made engines for TR and Speed from information they had gleaned out of Aeromodeller! It was also intriguing to note two of the Chinese team were professional aeromodellers — Mr. Huang Yongliang of the China Sport Association, Peking, and Mr. Kao Kao Chin of the Shanghai Aeromodelling Research Dept.,

both gentlemen being most friendly and helpful.

At practice the British teams' models had all performed according to plan apart from the usual last minute problems, but after the first round problems arose for Langworth/Broadhead's model which developed cooling/heating problems and they had to spend a whole day trying various combinations of air inlet size etc. Smith/Brown were in good shape with incredibly fast pit stops and Gray/Haycock had produced good times which gave them a chance.

### Round 1

From the start it was clear the administration was going to be very firm; in fact 25 of the 51 competitors were disqualified. The border line between keeping things under control and actually restricting the flow of racing is very difficult and it was felt at times, faults were dished out a bit too liberally and in some cases, unwarranted, but after the first round things settled down to a reasonable balance.

The first big event of the day was at 2.00pm when Shapovalov/Onufrienko (USSR) flying against Voghera/Menozi (ITA) and Oodov/Sckelov (BUL) broke the world record with 3:26.8. This was to be beaten two hours later by Barkov/Suraev (USR) with an incredible 3:23.9 flying against our own Gray/Haycock. The fast practice times made by some competitors started to look a bit sick against this USSR onslaught. Without doubt everyone started practising to try and tweek a fraction more out of their models.

### Round 2

Speeds were not so fast, flyers tending to play safe and hold onto their lead gained in round 1, although Rossi/Rossi made a strong bid and came second after being disqualified in the first round. The British team were looking good for team prize being placed 7th, 8th and 10th. These points held good to beat the Russians for Team Prize by  $\frac{1}{10}$ th of a second. So at the end of the day the nine semi-finalists included two teams from the UK, Smith/Brown and Gray/Haycock, so we were still in with a fighting chance.

### First Semi

The draw was: Smith/Brown, Albritton/Perkins, Shapovalov/Onufrienko first flight; Metkemeyer/Mekemeyer, Gray/Haycock, Voghera/Menozi second flight and Rossi/Rossi, Geschwendtner/Mau, Barkov/Suraev third flight. Shapovalov/Onufrienko once again came out on top, Rossi/Rossi getting disqualified for not putting their handle on the ground. Smith/Brown were going well but unfortunately missed a catch which put them out of the running.

### Second Semi

Rossi/Rossi made a great comeback with a time of 3:32.9 giving them a place in the final. Smith and Metkemeyer put up a solid fence causing Shapovalov to run after his faster model which finally over-cooked and fell out of the sky. Barkov also failed to get a time in but both the Russians' previous world record flights were more than enough to put them into the final.

Left to right: Walt Perkins holding his 'Shadow' design with highly modified Nelson engine and retracting undercarriage. A. Rossi making a very fast getaway in the final. Onufrienko at practice almost falling over with the action. The winners Shapovalov/Onufrienko (USSR).





Ken Parent left, and Eric Harding from Canada. Model designed by Ken Parent has solid wing with three carbon fibre spars, powered by a RAM engine and weighs 380gm.

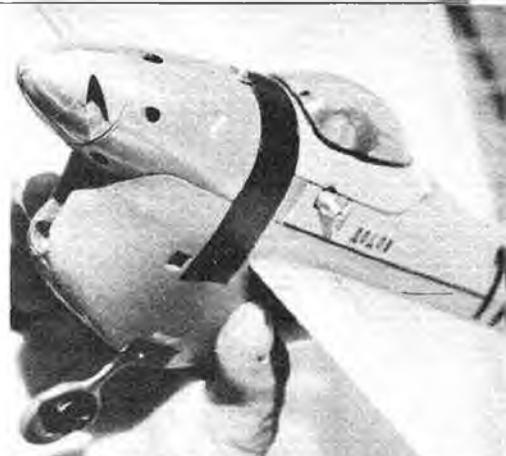


### Final

This was tremendous stuff, by far the most exciting round of the whole competitor. For those who don't know, the final is flown over 200 laps and flyers are allowed a practice just before, although only the Russians made use of this; we were to see why later!

The crowd was immense; I fortunately managed to get into the pit area which was lucky as I would not have been able to take my pictures with the crush outside. The whistle blew and the countdown began — they were off, all starting first flick. The electronic lap recorder showed that it was neck-and-neck 33 laps up and still Shapavalov/Onufrienko went on; suddenly it dawned on everyone they were going for a 40 lap pit stop. Rossi/Rossi were fighting strongly but could not match the speed or duration of the Russians. Suddenly disaster for Barkov/Suraev struck and broke the single blade propeller as he caught the model. So here it is — Rossi/Rossi v. Shapavalov. The Russians seem to never stop and then it is all over as they just scrape in on the glide for yet another new world record time of 6:56.3 and only four stops, an amazing 66 seconds faster than second place Rossi/Rossi.

There was no doubt after this everyone is going to have pull out a lot of stops to compete competitively at the next World Championships.



R. Dodov from Bulgaria used Nelson power. Note in the close-up above, the three cooling holes situated around the cowl behind the spinner.



Above: Steve Smith at the back in his bout with Gustavsson (Sweden) and Badurkov (Bulgaria). Below: Voghera/Menozzi's (Italy) model. They reached the semi-finals and were placed ninth.



Zhang Qiguang/Zhang Qinghua from China. Their model was powered by the Chinese CS engine.



Above: single and three bladed carbon fibre propellers made by Jensen Racing Props. A price list is available from Flemming Jensen, Lindebugten 23, 2500 Valby, Denmark. Left: Danish flyer John Geschwendtner and below Jed Kusik from the USA.



*Bill Draper, top placed British flyer, halfway through a figure of eight manoeuvre. Note the shadow of the aircraft bottom right-hand corner.*



### Stunt

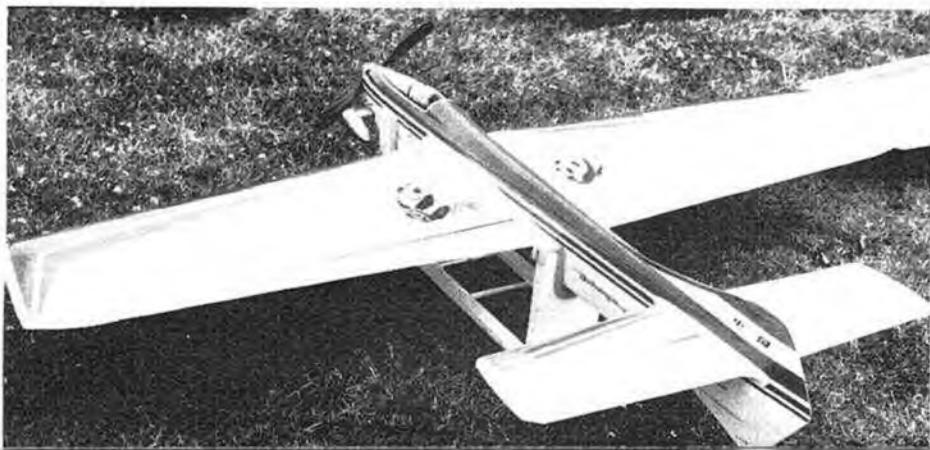
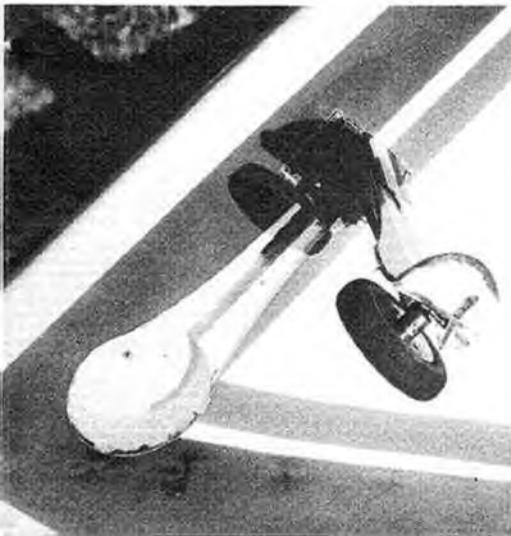
Apart from the turbulent air conditions previously mentioned, the site was conveniently placed near the main entrance which attracted many spectators.

The British team, and probably quite a few others, increased their normal flying speed to try and cope with the turbulent conditions but still had difficulties in keeping a constant and accurate flying pattern. Nevertheless at the end of round one Bill Draper flying his Super Hawk was in a very respectable position of 10th place with Barry Robinson not so far behind. Les MacDonald (Champ) gained a strong lead with 2896 points, closely followed by fellow Americans Baron, Fancher and Werwage. Compostella of Italy and Anderson of Sweden were fighting hard in fifth and sixth places with Wu Dazhong of China close behind in seventh position.

By the end of round two Wu Dazhong (China) had secured third place with fellow countrymen Niu Alin and Zhang Xiandong lying eighth and fourteenth; they improved upon these positions by the end of the competition to give them team prize and second place in the overall championship. This was no mean feat considering the short time they have been involved in world class competition.

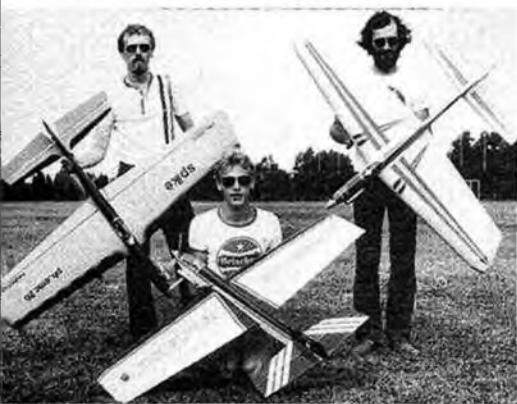


*Above: Neville Dickinson with his 'Windy' which is a modified 'Smoothy,' powered by an OS40 FSRS motor. Right: Barry Robinson with his latest 'Nothwind 5' which he has been developing for seven years. Below, left and right: Zhang Xiandong's (China) model which had retracts. Note the wheel cover is hinged so that it gives landing clearance and complete enclosure of the wheel when up.*





Left: Les MacDonald retains the World Championship flying his superbly finished 'Stiletto' design. The detail of the wing above gives some idea of the fine finish and detail on the model.



The final result was Les McDonald first, retaining his lead throughout, with his beautifully finished 'Stiletto' model, flying a fast very smooth pattern and apparently not too disturbed by the turbulence, followed by Dazhong (China) and the host country gaining third place with Oye Anderson's score of 5609 points.

The Chinese flyer Zhiang Xiandong had the only model with retracts. This worked perfectly, both wheels retracting cleanly into the wing. It was operated by a mechanical timer activated by the mechanic on take-off, which then triggered a switch six seconds later to work the retract servo. Down position was worked from a pressure switch fitted to the engine working the servo as soon as the motor stopped. Most impressive and realistic to watch.

The Chinese were using OS46 engines but told me they were developing their own design motors which were now in production and should prove to be very good in the future.

Three bladed propellers were in evidence; two of the Dutch team Eric Janssen and Hector DeJong, used 11 x 6 Zinger wooden propellers cut down to 10in. which were epoxied together with a metal ring embedded in the front and rear of the hub.

Eric Janssen also had very close fitting elevator and flap hinges fitted to his new 'Flying Dutchman' model which was powered by a Super Tigre 46 and weighs 43oz.

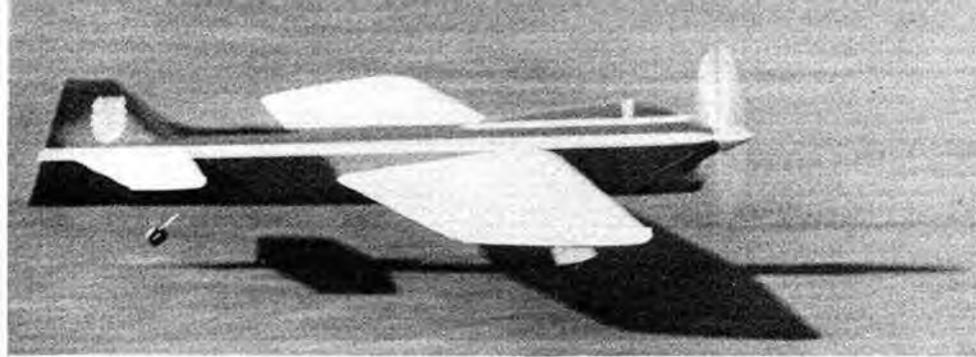
British team member Barry Robinson, had a new 'Northwind' model of his own design which looked superb. Powered by the good old Merco 49 with pressure fuel feed and driving a 12 x 6 cut to 11½in.

It is interesting to note that the results show close grouping of individual members of each country which might suggest improvements in this precise area of control line only take place with international contact.



Above: the Dutch team and a close-up of Eric Janssen's close-fitting elevator hinge. Right: the Chinese team with Mr. Kao Kao, CS engine designer, far right. Below: M. Lavalette (France) - more details of this model in a future issue. Centre: Canadian Fred Teller with his 'Snowbird' which had nice lace airbrush effect on the leading edge. Last but not least Salvatore Rossi who has been flying control line since 1964.





*S. Cech of Czechoslovakia makes a super take off. Below left: Bill Draper and his models at processing. Centre: Luchano Campostella (Italy) with his Super Tigre powered 'Tango.' Right: P. Zawadd of Poland about to have his line test.*



*Above: Bill Werwage of USA straining on the lines.*



## Speed

Hungary swept the board gaining first, second and third places with their long mono wing models. Szegedi, the winner, was just .591km/h faster than the winner of the 1980 Championships P. Constant, with a speed of 275.4 km/h. Parramon of Spain, one of the favourites to win, managed fourth place with a best speed of 268.8km/h. Once again China were well up front with He Shuncaï seventh, Ding Yibo twelfth and Zhu Yongnian fifteenth. They were all using CS (China Shanghai) engines built by Mr. Kao Kao (China). Apparently there were versions of ABC (aluminium brass chrome) S.ABC (silicone, aluminium brass chrome) with 20 per cent silicone content in the piston alloy and AAC/aluminium, alloy chrome). I was not able to ascertain which type was being used but obviously the engines have potential. Mr. Kao Kao was certainly sure that he would be getting much better results by the time of the next World Champs.

The British team had put a lot of hard work into preparing for the Championships. Peter Halman had made a new model with a much cleaned up rear end which incorporated a centrifugal switch operated mixture control to the Rossi engine. Unfortunately he was to suffer a few problems. After a promising start with a speed of 244.5m/h, his second attempt failed to get on tune long enough to complete a recorded speed and on his third attempt he broke the propeller, which put him out of the running.

Dick McGladdery also had a new and most unusual design model. The fuselage consisted of a rectangular aluminium tube housing the pipe, with an all-moving tail-plane hinged at the rear end. The Rossi engine bearers had been removed and a new backplate fitted with radial mounting.

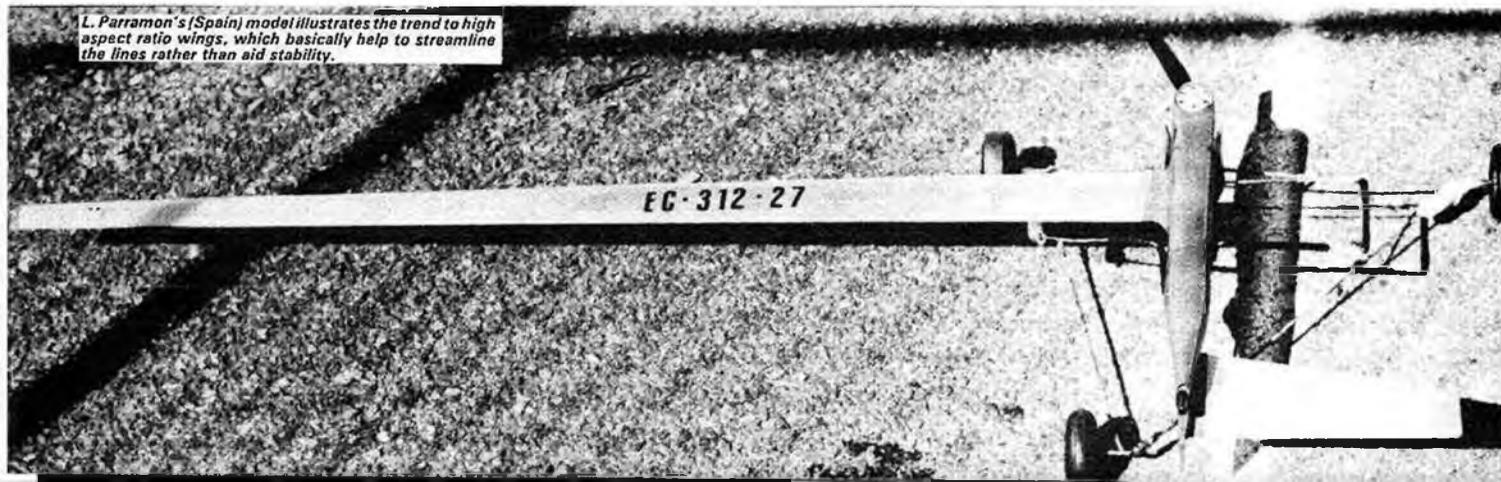
Paul Eisner had considerable success with his Rossi powered model making two flights of 242km/h and then a third flight of 249.4kph which secured him 25th place.

Paul's Rossi used timed crankcase pressure fuel feed fitted with a leaker device. This allows the engine to run lean until it comes on the pipe. The leaker allows pressurised fuel to bleed and has a needle valve to control the amount. It is operated by up elevator and shut off by neutral flying position, thus giving a full charge of pressurised fuel to the engine once it is running on the tuned pipe.

Another interesting feature shown to me by Ingle Schmidt of West Germany was his modification to the cylinder of his Rossi. This was made from aluminium with a chrome bore and had integral cooling fins. The wall thickness above the exhaust is 2.5mm instead of the original 1.5mm and this, combined with the better cooling, has given a stable condition to the bore even after 70 flights.

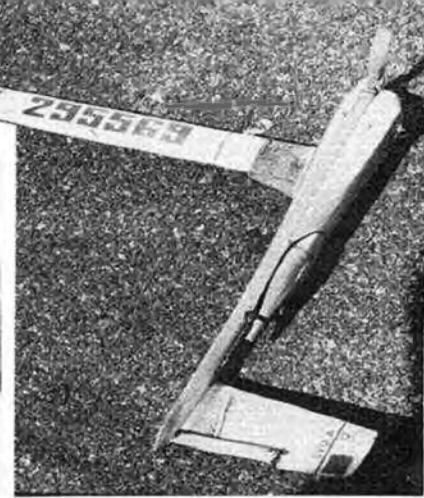
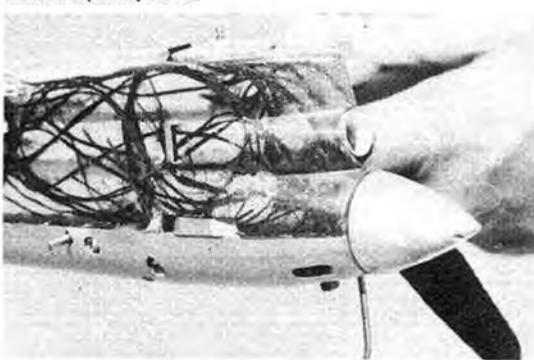
One begins to realise here again, that obtaining those few extra km/h is no mean feat and requires a lot of technical know-how as well as dedication.

*L. Parramon's (Spain) model illustrates the trend to high aspect ratio wings, which basically help to streamline the lines rather than aid stability.*





*Above: J. Mult's (Hungary) high aspect ratio second placod model. Left: front end of Dick McGladdery's (UK) new design. Below: unusual decor on H. E. Shuncal's (China) model.*



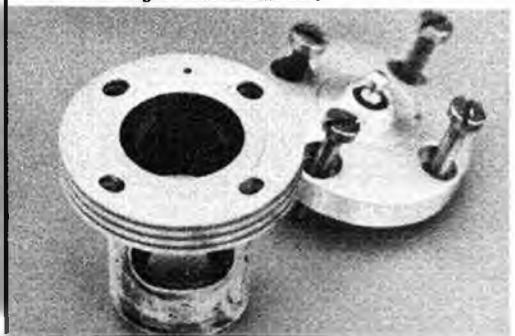
*Chinese CS engine with aluminium/brass/chrome construction made by the Shanghai Aeromodelling Research Department.*



*Left: Peter Eisner thrilled after his round three run of 249.4kph. Right: Peter Halman's latest design which incorporates a very much cleaned up rear end as can be seen from this photograph.*



*Above: Speed winner S. Szegedi of Hungary. Below: Ingle Schmidt's (West Germany) modified cylinder of his Rossi, which is made of aluminium with integral cooling fins and chrome bore.*



## Combat

After the Russian victory of the 1980 World Champs when it was won with far superior equipment, much hard work had been put in by the British team into producing light, large area models. These models powered by Rossis and Nelsons, combined with carbon fibre propellers made by Pete Grange, had increased model performance dramatically and as the competition approached spirits were high. (Incidentally Pete was sponsored by Kelloggs to the sum of £200 for his travel costs to the Champs!)

Official practice day saw the British looking confident and also going well were Fred Meyer (Holland), the Danish team and of course, the Russians with Doroshenko especially looking phenomenal in practice. However modern Combat now tests not only the superhuman effort for perfect preparation, it also requires a lot of luck and skill and this proved to be the downfall of many able pilots.

## Round 1

First on for the British was Neil Gill v Christian (Swiss); the opening minute saw the Swiss take a cut, followed quickly by a mid-air collision. Neil took off with his spare but then immediately crashed and was in



danger of losing but once back in the air, comfortably managed 3 cuts to win.

Next was Vernon Hunt v Beckers (Belgium) and saw Vernon taking all the streamer in the first few seconds and after some superb defensive flying was very unlucky to be cut in the last second of the bout to lose 2 — 1. Third flyer Dave Wiseman comfortably won, beating Canadian Sigouin 2 — 1.

Other notable bouts in this round were Mu Gang (China) beating Kiseliiov (Russia) 3 — 2 in an excellent bout, Uffe Edslev (Denmark) winning 4 — 2, and Titov (Russia) losing to J. Karger (France).

Losers Round saw elimination of one of the Russian team (Kiseliiov) when he was outflown by R. Forstner (Germany), and Titov was very lucky to win when his opponent, Van Mourik, was disqualified for letting go of his handle after being down 3 — 1.

Vernon Hunt won when his opponent was disqualified for cutting Vernon's lines in a line tangle.

## 2nd Round

Flying started at 8 o'clock and proved to be a disaster for the British team. First on was Vernon Hunt and saw him taking all the streamer in the first minute and then flying some excellent defending tactics but was very unlucky desperately unlucky to be cut in the last seconds and lose 2 — 1.

Dave Wiseman flew B. Furbo (Denmark) and after following closely for a minute, he took all the steamer and then reverted to the defensive and put his opponent in the ground. Once back in the air Furbo managed a cut as Dave crashed when his motor cut on a bunt and then for no apparent reason, he crashed on take-off with his spare and this was enough to cost him the bout.

Neil Gill's opponent was Benincasa (Italy) and after some good flying, saw both 3 cuts each and thus requiring a re-fly. Unfortunately Neil's first cut took off all the streamer and the final result was 2 — 1, thus putting the British team out of the running for a victory.

The best bout of the competition was seen in this round when Mu Gang was again drawn against Titov and lost 3 — 2 after some excellent flying.

Fred Meyer was also unlucky to lose when after being 3 — 2 ahead, he had a mid-air and was left with no spare after his model set on fire when the dummy burst. (Pacifier tank).

The competition then proceeded to pass uneventfully with some very messy bouts being flown. One of these included Doroshenko in the 4th round when he took most of the streamer early on and was left with no model after two mid-air.

The semi finals saw Edslev beat Salerma when he was left with no models after a mid-air and a fly away, and American T. Fluker beating Benincasa on ground time with both having 2 cuts each.

The final, Edslev v Fluker, saw Edslev who up until the semi-final had taken 4 cuts each bout, removing all of the American's streamer and then Fluker managed to obtain the necessary 2 cuts to win.

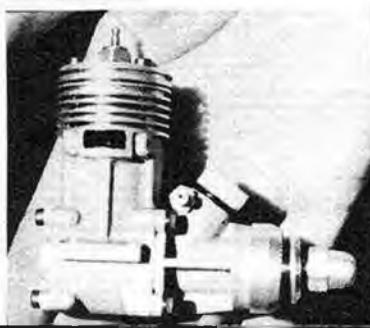
Congratulations to Tom Fluker as he had flown consistently throughout the competition, not making any mistakes, but it must be said that the standard of flying was generally poor with 90% of bouts being won through pilots taking all of the streamer or following mid-air with the flyable model winning.

As for the British? Well patience is required but the feeling was 'Just wait until 1984'.

Left: a general view of the combat flying site. Above: the British team prior to the competition.



Above: first and second; left: New World Combat Champion T. Fluker Jr. of the USA. Right: U. Edslev of Denmark. Below left: new Dutch combat engine produced by USE of Floridraael 17, 3565 AM, Utrecht, Holland. Centre: Fred Meyer and A. Koch (Nat) on their way to processing. Below: In contrast to the mainly foam construction of most models the winner's model seen here was made from balsa with boom tail and rather dated Pacifier tank construction.



# World Championship Results

## F2A Speed

Name	Nat.	Rd.1	Rd.2	Rd.3	Best																	
1. Szegedi, S.	HUN	274.1	275.4	0.0	275.4																	
2. Mult, J.	HUN	267.4	270.8	272.3	272.3																	
3. Molnar, J.	HUN	271.0	268.6	271.9	271.9																	
4. Parramon, L.	SPA	268.8	256.5	267.0	268.8																	
5. Schuette, C.	USA	266.2	261.4	0.0	266.2																	
6. Rusek, T.	POL	266.0	259.3	262.1	266.0																	
7. He Shunca	CHI	0.0	0.0	263.9	263.9																	
8. Fontana, P.	ITA	248.2	263.3	0.0	263.3																	
9. Velunsek, O.	YUG	255.6	262.9	0.0	262.9																	
10. Rosenhan, G.	FRG	0.0	236.5	262.3	262.3																	
11. Rachwal, A.	POL	0.0	248.2	261.2	261.2																	
12. Ding Yibo	CHI	260.4	258.2	249.6	260.4																	
13. Gaya, L.	SPA	258.4	256.5	258.2	258.4																	
14. Bilat, L.	SWI	251.5	258.4	251.3	258.4																	
15. Zhu Yongnian	CHI	258.2	255.3	0.0	258.2																	
16. Lyhne-Hansen, N.	DEN	0.0	248.2	258.0	258.0																	
17. Lehman, W.	SWI	256.2	0.0	257.3	257.3																	
18. Magne, J.	FRA	0.0	256.5	0.0	256.5																	
19. Kabakov, G.	BUL	254.4	0.0	253.6	254.4																	
20. Bellelle, J-F.	FRA	0.0	253.5	240.4	253.5																	
21. Lenzen, J.	FRG	245.9	245.3	251.5	251.5																	
22. Urban, O.	SWI	243.7	251.3	245.5	251.3																	
23. Schmidt, I.	FRG	0.0	250.6	245.2	250.6																	
24. Björk, N.	SWE	0.0	249.6	0.0	249.6																	
25. Eisner, P.	UK	242.7	242.0	249.4	249.4																	
26. Billon, G.	FRA	248.7	245.0	248.6	248.7																	
27. Ivancek, M.	YUG	247.5	0.0	244.3	247.5																	
28. Dodge, C.	USA	243.7	243.9	247.2	247.2																	
29. Halman, P.	UK	244.5	0.0	0.0	244.5																	
30. D'Orsi, M.	ITA	244.2;	31. Tanev, A.	BUL	244.0;	32. Eskildsen, L., DEN, 243.2;	33. Kitipov, H., BUL, 242.0;	34. Poulsen, O., DEN, 240.3;	35. Chojnacki, T., POL, 240.1;	36. Brands, R., NET, 238.8;	37. Sackett, C. H., CAN, 238.2;	38. Horvath, J., ITA, 233.0;	39. Fällgren, G., SWE, 228.8;	40. Kajic, I., YUG, 226.7;	41. Marksteiner, F., AUT, 226.2;	42. Gifford, E., USA, 223.8;	43. Kjellberg, O., SWE, 214.9;	44. McGladdery, D., UK, 213.2;	45. Gibealt, P., CAN, 205.2;	46. Gibson, C. Sr., CAN, 0.0;	47. Constant, P., CHAMP, 0.0;	48. Miltenburg, R., NET, 0.0.

## F2B Aerobatics

Name	Nation	Rd. 1	Rd. 2	Rd. 3	Rd. 4	Total
1. McDonald, L.	CHAMP	2896	2923	2868	2890	5813
2. Wu Dazhong	CHI	2695	2835	2787	2763	5622
3. Andersson, O.	SWE	2699	2842	2767	0	5609
4. Fancher, T.	USA	2750	2817	2775	2576	5592
5. Baron, R.	USA	2789	2747	2778	2694	5567
6. Werwage, B.	USA	2727	2803	2757	2721	5560
7. Zhang Xiandong	CHI	2583	2679	2812	2596	5491
8. Niu Anlin	CHI	1749	2724	2757	2631	5481
9. Lavalette, M.	FRA	2473	2718	2758	2561	5476
10. Billon, G.	FRA	2656	2702	2696	2669	5398
11. Filho, B. R.	BRA	2591	2697	2638	2680	5377
12. Rampnoux, P.	FRA	2536	2699	2656	2554	5355
13. Compostella, L.	ITA	2706	2731	2614	2539	5345
14. Mayer, E.	FIN	2455	2691	2578	2394	5269
15. Skrabalek, J.	CZE	2661	2501	2537	2355	5198
16. Zawada, P.	POL	2596	2655	0	0	2655
17. Trudler, B.	ISR	2586	2632	0	0	2632
18. Rasmussen, J.	SWE	2215	2606	0	0	2606
19. Draper, C. W.	UK	2601	2479	0	0	2601
20. Rossi, S.	ITA	2588	2582	0	0	2588
21. Sedlatchek, Y.	SWI	2269	2568	0	0	2568
22. Nyström, Å.	SWE	2401	2554	0	0	2554
23. Robinson, B. P.	UK	2409	2515	0	0	2515
24. Janssen, E.	NET	2465	2509	0	0	2509
25. Maor, O.	ISR	2205	2496	0	0	2496
26. Tellier, F.	CAN	2494	2486	0	0	2489
27. Cani, I.	CZE	2291	2489	0	0	2489
28. Cech, S.	CZE	2417	2470	0	0	2470
29. Eskildsen, L.	DEN	2464	2396	0	0	2464
30. Salathe, T.	SWI	2437	2347	0	0	2437
31. Ballesio, F.	ITA	2433	2411	0	0	2433
32. De Jong, H.	NET	2410	2426	0	0	2426
33. Järvinen, K.	FIN	2375	2330	0	0	2375
34. Dickinson, N.	UK	2311	2373	0	0	2373

35. Forbech, H., DEN, 2372; 36. Liber, G., BEL, 2372; 37. Rozenberg, E., ISR, 2366; 38. Karma, K., FIN, 2363; 39. Kehnen, U., FRG, 2353; 40. Olijve, R., NET, 2352; 41. Barile, S., BEL, 2340; 42. Wenczel, F., AUT, 2320; 43. Hamilton, J., IRL, 2300; 44. Doyle, M., IRL, 2284; 45. Liber, R., BEL, 2280; 46. Alfonso Rodiles, MEX, 2253; 47. Mortensen, L. O., DEN, 2245; 48. Walters, M., NZ, 2217; 49. Reichle, A., FRG, 2188; 50. Rodriguez, A., SPA, 2160; 51. Gromann, W., FRG, 2159; 52. Peters, R., CAN, 2076; 53. Shaw, M., IRL, 2017; 54. Duran, G., SPA, 1953; 55. Harsem, P., NOR, 1779; 56. Settem, S., NOR, 1345.

## F2C Teamrace

Name	Engine	Nat.	Rd. 1	Rd. 2S'mi	1S'mi 2	Final
1. Shapovalov, V.	O/D	USSR	3:26,8	3:32,4	3:26,5	0:00,0 6:56,3
Onufrienko, V.						
2. Rossi, F.	Cipolla	ITA	0:00,0	3:37,0	0:00,0	3:32,9 7:22,3
Rossi, A.						
3. Barkov, V.	O/D	USSR	3:23,9	4:01,4	3:34,7	0:00,0 0:00,0
Suraev, V.						
4. Metkemeyer, A.	FMV	NET	3:34,4	0:00,0	3:36,2	3:40,3
Metkemeyer, R.						
5. Geschwendtner, B.G.		CHAMP	0:00,0	3:36,5	3:47,3	3:40,5
H., Mau, J.						
6. Albritton, J. E.	Nelson	USA	3:36,9	0:00,0	3:35,2	3:39,3
Perkins, W.						
7. Smith, S.	Nelson	UK	3:36,9	0:00,0	3:48,2	0:00,0
Brown, C.						
8. Gray, J.	Nelson	UK	3:38,8	3:54,9	3:47,4	3:40,2
Haycock, S.						
9. Voghera, G.	Cipolla	ITA	0:00,0	3:39,9	0:00,0	3:43,9
Menozi, M.						
10. Langworth, B.	Nelson	UK	0:00,0	3:46,0	0:00,0	0:00,0
Broadhead, J.						
11. Samuelsson, B.	Nelson	SWE	5:00,6	3:46,3		
O., Axtillus, K.						
12. V. Uden R	Nelson	NET	3:53,7	3:46,6		
V. Uden J						
13. Marschall, H.	Nelson	FRG	4:02,2	3:46,6		
Kuckelkorn F.						
14. Meder, H.	Nelson	FIN	3:50,6	4:15,5		
Nore, P.						
15. Tinev, S.	Nelson	BUL	3:51,6	3:57,3		
Rashkov, K.						
16. Pulido, F.	Nelson	SPA	3:51,8	3:52,3		
Pastor, A.						
16. Defor, B.	Nelson	FRA	0:00,0	3:52,4		
Surugue, R.						
18. Fitzgerald, R.	Cipolla	AUS	0:00,0	3:52,8		
Dislers, M.						
19. Kelly, D.	RAM	CAN	0:00,0	3:52,9		
Parent, K.						
20. Favre, M.	Cipolla	FRA	0:00,0	3:54,2		
Gauzelin, A.						
21. Bezgovsek, P.	Nelson	YUG	3:54,2	0:00,0		
Lesosek, B.						
22. Visser, J.	FMV	NET	0:00,0	3:55,8		
Buys, E.						
23. Borer Hugo	Nelson	SWI	0:00,0	3:56,7		
Studer, R.						
24. Nitsche, H.	Cipolla	AUT	3:58,5	3:57,6		
Kuhnegger, F.						
25. Fagerström, V.	Nelson	FIN	4:33,8	3:58,6		
Ekhholm, R.						
26. Sedlatchek, Y., Saccavino, V., Nelson, SWI, 4:00,1;						
27. Pedersen, K., Lynne-Hansen, N., GB, DEN, 4:01,0;						
28. Borer Heiner, Muller, R., Nelson, SWI, 4:02,0;						
29. Petersen, L., Geschwendtner, J. BG, DEN, 4:03,8;						
30. Martin, K., Vogel, E., Nelson, FRG, 4:04,3;						
31. Rasmussen, I., Poulsen, O., DG, DEN, 4:05,2;						
32. Zhang, Qiguang, Zhang, Qinghua, Nelson, CHI, 4:07,6;						
33. Uzan, C., Uzan, M., Cipolla, FRA, 4:08,3;						
34. Kramarenko, V., Kusnetsov, S., O/D, USSR, 4:11,1;						
35. Brendel, P., Figus, N., Nelson, FRG, 4:16,9;						
36. Dodov, R., Sokolov, S., Nelson, BUL, 4:18,3;						
37. Gustavsson, J., Härne, G., Nelson, SWE, 4:24,0;						
38. Bodurkov, G., Papov, R., Nelson, BUL, 4:24,6;						
39. Gaya, L., Grau, L., Nelson, SPA, 4:25,6;						
40. Desmedt, J., Delrue, M., Nelson, BEL, 4:32,1;						
41. Dewez, M., Dessauy, J., Nelson, BEL, 5:00,5;						
42. Harding, A., Harding, E., Nelson, CAN, 5:14,6;						
43. McCollum, J., Knoppi, T., Nelson, USA, 7:17,1;						
44. Jolly, L., Kusik, J., Nelson, USA, 0:00;						
45. Borovak, N., Pazin, S., Nelson, YUG, 0:00;						
46. Böhlh, M., Bengtsar, G., BFF, SWE, 0:00;						
47. Vazquez, B., Martinez, M., Nelson, SPA, 0:00;						
48. Fischer, J., Straniak, H., Cipolla, AUT, 0:00;						
49. Fairey, R., Fairey, B., RAM, CAN, 0:00;						
50. Velunsek O., Ivancek, M., Nelson, YUG, 0:00;						
51. Cipolla, A., Cipolla, C. Cipolla, ITA, 0:00.						

## F2D Combat

Name	Nat.
1. Fluker, T. JR	USA
2. Edslev, U.	DEN
3. Salerma, P.	FIN
4. Benincasa, G.	ITA
5. Vegetti, D.	ITA
6. Titov, O.	USSR
7. Beckers, A.	BEL
8. Gibson, C. Jr.	CAN
9. Roura J.	SPA
10. Qezada, F.	MEX
11. Arnold, G.	USA
12. Silva, L.	MEX
13. Furbo, B.	DEN
14. Maestrelli, R.	ITA
15. Doroshenko, O.	USSR
16. Borer, S.	SWI
17. Mu Gang	CHI
18. Gill, N.	UK
19. Stubblefield, D.	USA
20. Mallorqui, J.	SPA
21. Koch, A.	NET
22. Hunt, V.	UK
23. Meyer, F.	NET
24. Christen, W. (1)	SWI
25. Wiseman, D.	UK
26. Christen, W. (2)	SWI
27. Forstner, R.	FRG
28. Fällgren, B. Å.	SWE
29. Henry, P.	FRA
30. Mata, F.	SPA
31. Janssens, J.-C.	BEL
32. Niskanen, J.	FIN
33. Schou, B.	DEN
34. Ougen, T.	FRA
35. Karger, J.	FRG
36. Saadi, E.	FRA
37. Wu Zhaoqian	CHI
38. Kiseliov, B.	USSR
39. Melhuish, R.	CAN
40. Stjärnesund, P.	SWE
41. Dubell, J.	FRG
42. Usala, N.	BEL
43. Yang Weimin	CHI
44. Sigouin, P.	CAN
45. Monge, R.	MEX
46. Östman, H.	SWE
47. V. Mourik, T.	NET



Top left: victorious combat winners, left to right: Edslev of Denmark, Fluker of the USA, and Salerma from Finland. Top right: TR winners Rossi/Rossi left, Shapovalov/Onufrienko and Barkov/Suraev. Below: the British team race team retain the team prize cup for the third successive championship.



## National Team Results

### Class F2A Speed

Nation	Score
HUN	819.6
CHI	782.5
POL	767.3
SWI	767.0
FRG	764.4
FRA	758.7
DEN	741.5
ITA	740.5
BUL	740.4
USA	737.2
YUG	737.1
<b>UK</b>	<b>707.1</b>
SWE	693.3
SPA (2)	527.2
CAN	443.4
NET (2)	238.8
AUT (1)	226.2

### Class F2B Aerobatics

Nation	Point
USA	16719
CHI	16594
FRA	16229
ITA	15451

SWE	15385
CZE	14865
<b>UK</b>	<b>14688</b>
FIN	14574
ISR	14562
NET	14473
BEL	13792
IRL	13086
FRG	13040
DEN	11557
SWI	9621
CAN	8710
SPA	7642
BRA	5377
POL	5251
NOR	4788
AUT	4510
MEX	4433
NZ	4326

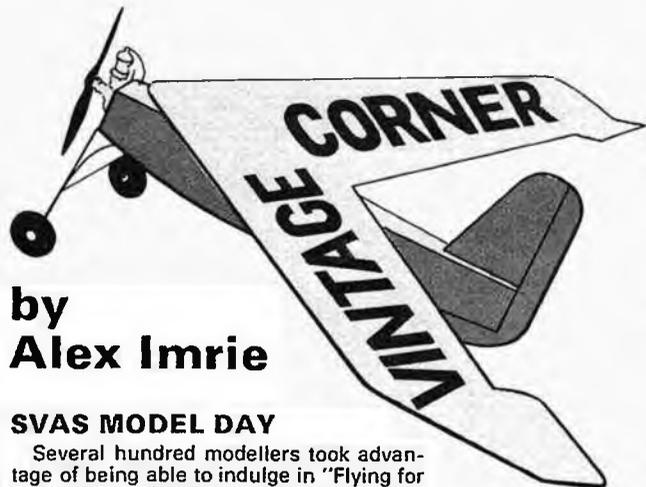
### Class F2C Team Race

Nation	Time
<b>UK</b>	<b>11.01,7</b>
USSR	11.01,8
NET	11.16,8
FRA	11.54,9
SWI	11.58,8
FRG	12.07,8
DEN	12.10,0
BUL	12.34,5

ITA (2)	7.16,9
FIN (2)	7.49,2
SWE (2)	8.10,3
SPA (2)	8.17,4
CAN (2)	9.07,5
BEL (2)	9.32,6
USA (2)	10.54,0
AUS (1)	3.52,8
YUG (1)	3.54,2
AUT (1)	3.57,6
CHI (1)	4.07,6

### Class F2D Combat

Nation	Point
USA	11
ITA	12
DEN	13
SPA	17
SWI	17
USSR	17
BEL	18
MEX	18
<b>UK</b>	<b>18</b>
CAN	20
FRA	20
NET	20
FRG	21
CHI	22
SWE	22
FIN (2)	8



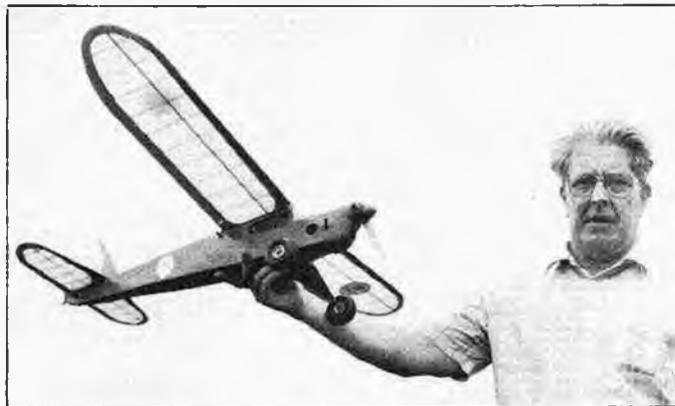
by  
**Alex Imrie**

### SVAS MODEL DAY

Several hundred modellers took advantage of being able to indulge in "Flying for Fun" at Old Warden on July 18 when the aerodrome was available for model flying during the Shuttleworth Model Group Open Day. Although control line and radio flying was taking place, it was the free flight area that was the main attraction, and the bulk of this activity was of the vintage variety with a high percentage turnout of SAM 35 members, so much so, in fact, that this part of the aerodrome greatly resembled a 'SAM Meeting'!

Many outstanding models were in evidence, and it was a pleasure to see that an ever increasing number were painstakingly finished in the manner of the originals that they represented. Models were generally better finished in detail than has previously been the case, and some of this credit is due to the appearance of period transfers, especially the excellent black and gold old NGA and NGM insignia produced by Rojair. These have filled a long standing gap, and it was nice to see some modellers using them to give their models a true vintage look.

Perhaps the most correctly finished rubber driven model in this respect was Bob Hodgins' 'Percy' designed by R. H. Warring, which was described in the August 1942 *Aeromodeller*. Simply decorated with black and white tissue, Bob's model had its wing emblazoned with the name 'Littlehampton' on one side and 'WSMAS' (West Sussex Model Aircraft Society) on the other. This was a most effective scheme, similar to that used on the original 'Percies' flown by the West Sussex Club's National Cup Team at Fairey's aerodrome in 1938. As regards the



*Top right: The Frog 45 was one of the first post-war power models to be given comprehensive pre-fabrication when kitted by International Model Aircraft. This is Derek Hughes with his Mills 1.3 powered version. Above left: Ken Tansley holds aloft his 'T9' showing the battery bulge on the forward fuselage. This is an exact replica of the model with which he had so much competition success in 1946. Above right: distinctive black and white 'Percy,' beautifully built by Bob Hodgins, a high performing pre-war design by Ron Warring.*

power driven machines, I am sure that all would agree that Ken Tansley's 'T9' should take pride of place. Ken designed this model just after the end of the war, and described it in February 1946 *Model Aircraft*: he is shown starting the engine of this model on the front cover of the June 1946 issue of the same magazine. It took twice as long to build the current model as it did to make the first one, due, says Ken, to his advancing years!

One thing that he did take time over was the matching of the colour shade exactly to the original's Caribbean Grey, and to apply-

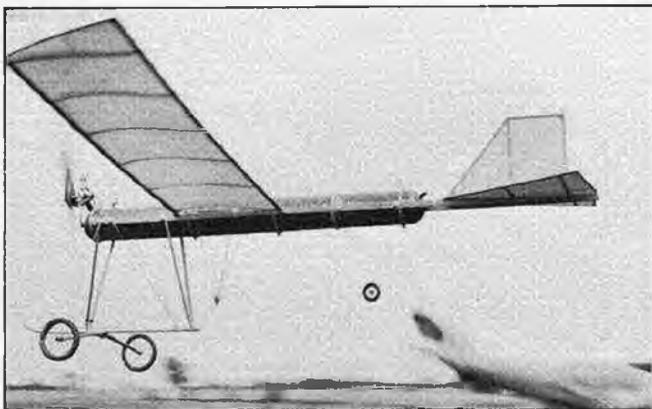
ing the decorative insignia in the correct proportions, including the attractive badge transfer of his famous old club 'Northern Heights.' Ken has installed a rudder linkage that will eventually operate the original sized trim tab to give rudder only, and this is the only radio control envisaged. On the original model, to provide ignition for the Baby Cyclone copy with which it was powered, it was necessary to fit the flat pocket lamp 4.5 volt battery well forward for balance purposes. Since the fuselage cross section would not accommodate the battery in this location it was necessary to



*Brian Yearly does not always field a 'Flying Minutes'! Seen here with his 'Smoothie' a Hank Cole design that was described in *Air Trails* September 1942.*



*CO<sub>2</sub> powered Brooks' Comet II held by its builder Noel Crane from Poole, the birthplace of the original design in 1935.*



Top left: Tony Turner and 70psi of compressed air combine to win the battle against gravity. Top right: resplendent in its orange and white colour scheme, appropriate registration letters and tail transfer, Peter Michel's Jackdaw in the winding rig. Above left: son Chris holds while turns are applied to Don Knight's Heston Phoenix, all those stringers protected by the winding tube. Above right: Peter's model away on one of its long stable excursions.

bulge the forward bottom fuselage. Even these bulges are present on Ken's current model, although no battery is, of course, carried on this PAW 19 powered version.

Apart from the usual models powered by a variety of engines, the following types were noted: nice blue and white Glenelg powered by a Merco 29 built by Charlie Havis, Frog Powavan built by Peter Harvey powered by an original Allbon Javelin 1.49cc diesel, Super Buccaneer powered by an ignition Ohlsson 60 built by Jack Humphries, a very nice flying blue and white Frog 45 powered by a replica Mills

1.3 diesel built by Derek Hughes, Don Knight's fine Henri Varache designed HV 450 powered by a 'K' Vulture 5cc diesel, (using this engine has forced Don to adopt 'chicken stick' tactics!) and an absolutely delightful Telco CO<sub>2</sub> powered 24in. wing-span version of A. E. Brooks' Comet II built by Noel Crane from Poole. It was good to see Howard Boys there with his tailless designs, one of them powered by a pusher Kalper .32cc diesel. Amidst all the activity a Flight of three Pinochios fielded by Geoff Clark and friends cavorted around together, in rather loose formation with crepe paper

streamers fluttering from top wingtips to give the place a carnival touch!

Although some petrol engines were being used, the bulk of the models were powered by diesel engines, but from conversation with the "oily fingered brethren" interest is high in the recently made glow/ignition conversions which makes much practical sense since spare parts availability will ensure normal operating lives of these petrol engines. Phil Cox, who is a regular visitor at all vintage flying meetings, and has previously built complete engines of different types, (he even makes his own spark plugs!) is one of the increasing number of model engineers engaged in such work. Although Phil is not commercially involved in this direction at present, he brought along a very neat ignition converted Merco 61 that cannot help but appeal to petrol engine enthusiasts.

#### THEN THERE WAS RUBBER

Down in the free flight area one kept tripping over small masts, rigged with guy ropes, lengths of tubing, and winding devices some of them real engineering jobs, others fashioned from kitchen utensils. The models that were sent about their business with this equipment varied from Cruiser Pup, Achilles, Ajax, Condor Clipper, and Air Cadet to Smoothie, Zombie, Judge and Korda. Flying scale rubber was also well represented and a number of examples of Earl Stahl's Rearwin Speedster as described in January 1940 Model Airplane News were seen flying



Gerry Ketchell does not know of any name for his pre-1914 model, but one thing is for sure, that's the right way to wind a twin pusher!



Veteran modeller Howard Boys with his original first all-balsa model which won the duration contest at the inaugural meeting in Northampton over 50 years ago!



Above left: Stenator powered Club Conquest about to be released by Tony Penhall. Note authentic Club Model golden eagle transfer on rudder. Right: Replica Mills .75 powered Wlgdor Wasp built by Paul Leith from plans reprinted in this column in July 1981.

strongly, as well as Don Knight's Heston Phoenix designed by Eric Fearnley made from plans in June 1938 *Aeromodeller*. Howard Boys had brought along his first all-balsa model, this was a high aspect ratio high wing design of 54in.wingspan, and featured a massive paddle-bladed balsa propeller. This model was built in the early 1930s and is a worthy contender for preservation, also it deserves to be measured-up and drawn into plan form, in order that copies can grace the Old Warden sky!

Two or three years ago it was rare to see a vintage rubber model, now it is a most popular branch of the hobby, and I think that this is partly because they present more of a challenge than power models, being quite demanding to trim well. We fortunately have a number of enthusiasts who have devoted themselves to this type of model and they seem to produce them like hot cakes! There was plenty of action and much good steady flying by the 'rubber-ears,' but I was astounded by the fine flying of the two Jackdaws, marked up with registrations that included the initials of the builder. Durations of around two minutes were laughed at when C. Rupert Moore's Jackdaw was re-introduced last year... "impossible," "hasn't got enough dihedral," and many more unsavoury things were said. Well, the rumourmongers can eat their words, just wait until you see the silver and red G-ARPB (Phil Brooks) and the orange and white G-APDM (Peter Michel) perform: and those ROG's off Old Warden grass are really something!

Below left: Arthur Rodway with his replica Mills 1.3 powered Slicker 42, well known Bill Dean design kitted by Keil Kraft Kits in 1947. Right: Don Knight lets the Phoenix go on one of its fine flights.



#### VINTAGE AND HOW!

Being a bit old-fashioned by nature the real oldies truly caught my eye. Gerry Mitchell had a most ancient two-motor canard biplane with flat aerofoil section wings covered only on the bottom surfaces. He wound this up in the approved style, (both motors at the same time) with a twin winder made from a Prestige egg-whisk, but alas, the flight was short and I did not see any further attempts since I hot-footed it to a less well populated part of the field where Tony Turner was setting about getting his compressed air model airborne.

Watching this performance made one realise how relatively trouble-free our flying of vintage power models is today, provided that we don't go too far back in time to select a prototype and engine!

Tony's three-cylinder motor built from F. J. Camm instructions goes back to about 1920 (or earlier!), and the hardwood (mostly spruce) structure of his model was of the D. A. Pavely pattern also from the 1920s. Rigidly braced with fine gauge pianowire, the least landing shock causes fittings to 'pull,' and undercarriage components to buckle or break. Tufts of long grass applied to the whirling propeller on landing, effectively wrenches the main bearing of the motor out of line or bends the crankpin: either way the friction that is then obtained cuts the power output of the engine drastically and Tony was continually employed trying to reduce this by frequent applications of '3 in 1' oil!

The compressed air container is a work of

art, made from copper foil five thousandths of an inch thick closely wound with fine gauge pianowire (none of your epoxied aluminium beer-can stuff here!) it will stand about 150psi, but unless one has a whole army of pumpers it is pretty tiring to get much more than 70psi on board, modern pump hose connections will hardly tolerate this sort of pressure anyway and usually give up the ghost before a good working pressure can be obtained.

I take my hat off to Tony, who pumped and adjusted, pumped and sweated, and just pumped! The short hesitant flights that resulted from this hard labour, into the proverbial long grass, slowly became longer, and the downward angle less acute, until after a number of launches, level flight was obtained, and final attempts actually resulted in altitude being gained. The sight of the model climbing away to the pulse-quickenning sound produced by the three-cylinder engine driving that 18in. diameter Chauviere laminated propeller, was, in present day parlance, "something else!"

#### VOLA CUM CURA

All over the field there was much activity throughout the day, the modellers made the most of the chance given them to fly. Possibly the few opportunities that the bulk of modellers have to fly their models, breeds the sort of enthusiasm that tends towards carelessness which can be dangerous. Some models became tree-bound, others flew away completely,



Garth Hooper was kept busy retrieving his Grandfather's Cruiser Pup, a famous C. A. Rippon design from the old Premier Aeromodel Supplies.

Three year old Airflo Mite designed by Ron Warring, built by Vince Chester and power by the replica Mills .75 diesel.

engine overruns for the light breeze conditions were responsible for many power models gliding into, and colliding with cars (and people) in the car park area. Most of these were large power models, weighing several pounds, and the reader might not be aware of the sort of damage that such a projectile can inflict.

Some of these machines glide at about 20 miles per hour, but it is not the speed that does the damage, rather the suddenness with which it stops! From personal experience I know that a Brown Junior crankshaft, being the first point of contact of a gliding 4lb 'Scram' will punch a very clean hole in sheet steel of quite hefty gauge. Imagine what it could do to someone's head! So when you decorate your model with the vintage NGA and NGM transfers mentioned earlier, just spare a thought for the meaning of VOLA CUM CURA, remember that when the transfers were originally issued they were to signify

membership of a third party group insurance scheme whose motto was FLY WITH CARE. Take heed of that every time that you fly, and you will be helping to keep the hobby popular.

### TURNING THE CLOCK BACK

During the late 1940s I built the Slicker and the Bandit, and since at that time I was employed in a model aeroplane supply house I became very familiar with the yellow boxes adorned with the black, white and orange labels of Keil Kraft Kits. The high standard of the goods inside, plus the fine plans drawn by that company's designer, Bill Dean, were always a real source of pleasure.

Well, here it is all over again some 35 years later! One can only congratulate Rojar on the excellent reproduction of the Keil Kraft Slicker 50 kit that has been on the market for the last few months. The quality



printed balsa and plywood, instruction leaflet, CORRECT wheels, tissue, wire, strip wood, cement and tissue paste ... how the contents and the presentation of this kit brings it all back! A real treat in this day and age and reasonably priced at £18.75. I will be able to tell you more of this model when I get it built, and although ideally suited for the ED Competition Special 2cc diesel, I am intending to power mine with an ignition .19 or .23 cubic inch displacement engine.

To those modellers building the Slicker 50 I would say, stick to the plans, refuse to even consider any modifications, and cast from your mind any notion of fitting radio, instead, make sure that you use a good reliable timer that will put your model up on 20 seconds power flights. You will love it, and what's more you will be actually turning the clock back ... this is how it really was!

### CHRISTMAS SHOPPING

A treat to be looked forward to for all vintage enthusiasts, and one that is planned to be available in time for Christmas, is the SAM 35 YEARBOOK No. 1. This will contain some 250 pages of nostalgia, and amongst other articles will contain sizeable contributions from Col. C. E. Bowden and Reg. Parham on the history of power and indoor flying respectively. Price expected to be approximately £2.50.



Brian Fennett with his blue and white 'Sadler Pacemaker' as described in January 1940 Air Trails.

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# Free Flight Scene

## Cardington Meetings Report by Bob Bailey

Although the attendance at Cardington hasn't been quite as good as we hoped, the flying conditions in No. 2 shed have been markedly superior to those we have experienced in No. 1 shed. No. 2 shed is more airtight and consequently there has been much less drift and turbulence than might have been expected.

EZB flying has advanced considerably with a small nucleus of 'new' fliers who have not missed a meeting — very nice to see Geoff Jones, who previously considered himself lucky to clear 12 minutes, has really put some effort in — at the last meeting which had warm and humid conditions, he cleared 16 mins. and was going hard for 17. With a 1.3g tissue covered model, this represents tremendous progress — congratulations, Geoff.

Among the more established fliers, the Davitts have been sweeping all before them. Graham now uses model with very long and heavy motor sticks, 12in. dia. props which rev fast (125rpm) and very thick microfilm covering. Incidentally although it sounds paradoxical, EZB now represents an easy way of learning how to handle microfilm!

In the last event run, Graham showed how good the current layout which has a very long (and very stiff) tailboom can be by winning it with 18:23 + 19:43. Considering that Dave Pymm holds the unrestricted weight EZB record with 20:07 set in 1977 with a 0.85g model and that the current models weigh 1.2g this really represents some progress! Dennis Davitt who was the first (last year) to clear 19 minutes with a 1.2g model was left a bit behind with 16:57 and 18:03. The pairs event went to Graham and Barry Wade who flew consistently well with 9:40 + 10:13.

My own experience with EZB (most discouraging so far) has indicated that the tailbooms have to be very strong (twice as stiff at least compared with an unrestricted model) and also that the optimistic 30in. pitch to keep the rpm down made the models virtually untrimmable. It is sometimes useful to know what not to do!

On the microfilm side, preparations for the World Champs at Slanic in terms of evolving suitable layouts, have gone apace. Because of the high climb rate required, it is not possible to test using full length motors, otherwise a model would be through the roof in 2½ minutes at Cardington. Therefore, half length motors are used with a ballasted spacer to make up the length and weight. It has proved quite possible to reach the roof with a half motor on a good day; this seems to be a reasonable goal to aim at; it has often proved necessary to use a very thin motor to be able to get the torque level required for launch in Slanic otherwise the model will climb too high. In general, the thicker the motor, the higher the model will climb for the same launch torque.

These sessions have been of immense value for the team who should be in good shape by the time the Champs take place on September 22-26.

On the F1D front, some remarkable flying has taken place — Bernard Aslett started things off with a flight launched with an incredible 1900 turns (more usually 1700); although he had to scrub off some altitude to prevent it from hanging, it required no further steering and made 43:25. Without that bunch, it might well have done 45 minutes!

Laurie Barr has continued with his amazingly successful combination of the last two years with a very light motor (1.1g); at the last meeting on

July 25, a rainstorm at about 3pm produced some lift at the right time and his model went up again after about 28 minutes almost to the top. Flight time was 47:28! A light model with a light motor means that the let down after the climb has finished, just goes on and on — this gives the increase in flight time of the order of two minutes from using a 1.3g motor.

I myself have built a large open microfilm model (40in. span) and have tested it over the last two sessions. The wing was built with wash-in/wash-out to 'spread the warps' over a longer length, but the wing distorted badly on launch, which was found to restrict the climb severely. I reset the wing with about ¾in. wash-in on the inner panel with a dramatic improvement in climb. So much so that on the only flight so far with a full motor, the model shot up at an alarming rate and had to be steered to scrub off at least 40ft. of altitude. It finally made about ¼ shed height and deadsticked at 42:28. A very satisfactory start.

The model features carbon fibre reinforcement on leading and trailing edges of both wing and tailplane and carbon bracing on the tailboom, making them very stiff. Trim problems have been minimal. The tailplane and tailboom are notorious weak spots on large models. Carbon fibre reinforcement on both sides of a piece of wood can increase its stiffness by up to ten times with less than 50 per cent increase in weight so there is considerable scope for structural development.

Overall, we have been favoured this year with better weather than of late, with good shed conditions to match. This makes a great deal of difference to the quality of flying and development and contrasts vividly with two years ago when the shed was so full of holes that it was almost impossible to deduce anything of value. A great time has been had by one and all!

## Walt van Gorder's EZB

As a contrast to EZB in Britain at the moment, I have to hand a drawing of Walt's EZB which demonstrated its (and his) potential to great effect at West Baden after the 1980 World Champs. The principal problem on EZB day there at the time was the CG shift due to hornets taking unauthorised rides on the tailplane of more than one model!

The model is tissue covered, unrestricted weight (0.85g) and features a relatively small low pitch prop which really cuts down the required rubber size and in turn permits the weight to be

reduced further because of the lower power requirements.

Results in 1980: 1st AMA Open 65ft. site 16:44, 2nd. West Baden 96ft. site 19:10, 3rd Akron 180ft. site 19:58. An unbraced film covered version at 0.68g has done 21:12 at Akron.

## Swedish Rubber Stripper

At last another source of these invaluable instruments for indoor fliers but for Coupe or Wigan 70, 'fine turning' of number of strands or strand width can be done. The strippers come from Ulf Carlsson, Nova Gubberogatan 26, S-41633 Goteburg, Sweden. Cost 690 DKR = £46.

The stripper features a top slide for adjustable thickness of rubber and like the Polish version, cuts by rotary action of two circular cutters by turning the handle.

Ulf points out that the top slide will require some adjustment since the rubber is stretched to make the cutter work perfectly (presumably to produce the precise desired width). However, measuring the width accurately with an ordinary micrometer is extremely difficult and for me, not reliable enough. Length and weight are much easier to measure.

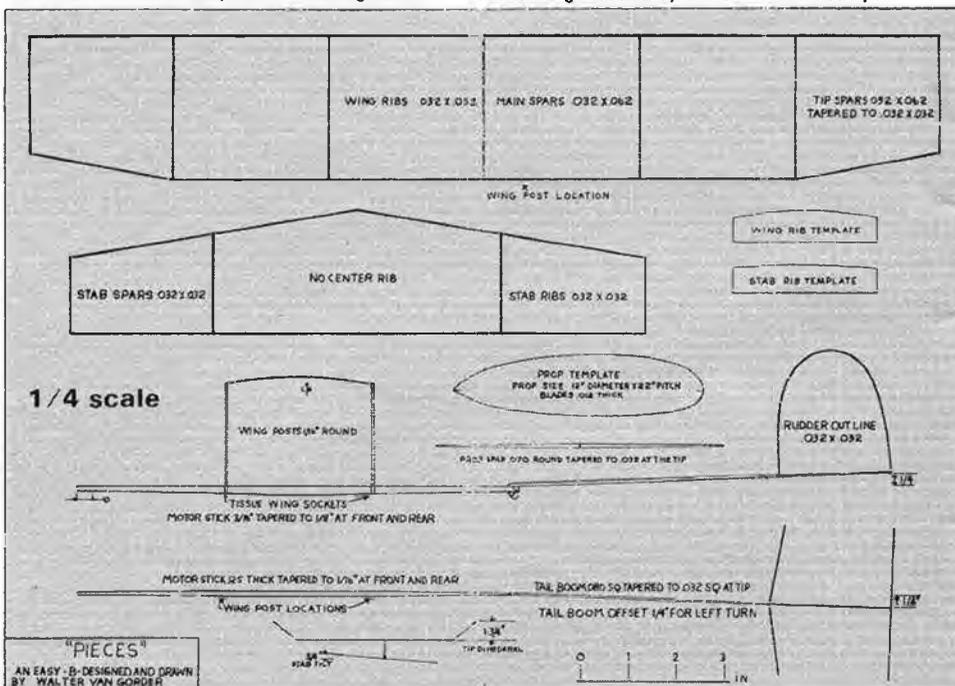
Ulf's other reminders are to avoid talcum powder, oil and dirt. Pack the cutter away carefully until next time.

## Erratum

I am grateful to Mick Page for pointing out an error in the drawing on Page 294 of June 82 Aeromodeller — Tip Dihedral on the 20in. version should be 1½in., not ¼in!

## SMAE Club Champs . . . Everleigh . . . 25.7.82. Report by Dave Hipperson

So many attended this meeting that Open Power had almost as many fliers as it did at the Nats! Proceedings were delayed by the arrival of the Army who asked all to vacate the area for an hour or so while they detonated some bombs. No-one was sure whether these were *in situ* or had been brought along specially for the occasion. The delay was utilised in taking entries and announcing that the finish was to be extended an hour. The possibility of such an interruption is a disadvantage of Everleigh but its shape and enormous size greatly outweighs this as we discovered when despite an almost 100 degree wind shift throughout the day it was never necessary to





move control. With the very warm summery weather a relaxed and friendly atmosphere pervaded over the launch area which also happily coincided with the only of cut grass for miles — a great boon for the glider flyers.

Although the 10mph plus breeze had given little flying problems the expectancy was for this to drop by the flyoffs particularly as they were now scheduled for 7.15pm. The surprise was that when they got underway it became slightly windier and quite chilly which at least killed the lift and made the chances of model loss less than during the day. Glider was first and those launching early found poor air. Towards the end Pudney's release looked promising and triggered a little rush in which Andrew Moorhouse's model with sharp dihedral did best just clearing the downwind copse to disappear behind it and into its far edge at 3:10. Alan Gibbs had followed and caught the tail end of the good air to record only a few seconds less, drifting appreciably less far landing in front of the trees. It was Pete Williams that topped it however with a flight made at the same moment but strategically taken off to the left of the bunch so that his model was seen down to the ground and did not lose time behind the trees.

It was now quite cool and the breeze had increased to give the Power fliers poor air. Some used FAI models and very short runs in a number of cases. Faux had a good pattern and picked stable air but used only a run of seven seconds or so. It was good enough for second — a full run might have won it for him because on this occasion Julian Hopper could only produce 5:19 from his 40 model but it was enough to win. Baggott also using a large model had a useful power pattern but also a short run to take third.

The Rubber flyoff was at 7.45 and the wind was now giving some cause for concern and many had rough weather models assembled for back up in case it got worse. Most of the extraordinary low times were attributed to Wakefields although not all! To be fair most flights had a minute and in the case of the top three, probably more than a minute, lost from their totals due to the trees on the near horizon obscuring the view. Peers flew very early and in positive sink but still clocked enough for third whereas the top two flew in the final 90 seconds when most others were down. Despite the blustery conditions Ball managed to get his large tapered model airborne and it proved a good match for the conditions with a shorter more powerful prop run than when last used.

Immediately all this was over, CD Pete Farrimond set about calculating the teams' points. Peers' Open Rubber flyoff placing had been backed up with a useful if a little off pattern Power flyoff flight. John Carter also of Falcons had clinched a fourth in the Glider flyoff and therefore Falcons emerged top and overcame the might of larger but perhaps not so well organised clubs. They were quick to point out that this victory would have been impossible without the assistance of Dave Evans and Dave Refern particularly as Russell didn't start flying Rubber until very late in the day presumably after searching long for his favourite and now lost Power model. Freebirds had strength in depth with the



top two in the Power flyoff — pity only one could count. Hopper consolidated this win with a seventh Rubber flyoff and Ian Bracken's points earned at tenth in Glider put Freebirds in at a comfortable second ahead of last year's winners Birmingham. They managed a third in Power from Baggott and once again a double points scorer in the form of Alan Gibbs with his third in the Glider flyoff and 14th in Open Rubber when a 2.44 flight robbed him of a chance in the flyoff and his club almost certain second place.

The formula for this event worked well once again as it did last year. Club spirit seemed to have just as much to do with encouraging entries as the fine weather. It was also quietly but effectively run — a good day.

Open Glider ... 40 flew — 12 flew off			
1	C. P. Williams	Richmond	9:00 + 3:24
2	A. Moorhouse	B&W	9:00 + 3:10
3	A. Gibbs	Birmingham	9:00 + 3:01
4	J. Carter	Falcons	9:00 + 2:40
Open Rubber ... 28 flew — 12 flew off			
1	P. Ball	Grantham	9:00 + 6:17
2	D. Hopperson	Grantham	9:00 + 5:02
3	R. Peers	Falcons	9:00 + 4:09
4	G. Sharpe	Croydon	9:00 + 3:58
Open Power ... 22 flew — 8 flew off			
1	J. Hopper	Freebird	9:00 + 5:19
2	K. Faux	Freebird	9:00 + 4:23
3	R. Baggott	Birmingham	9:00 + 3:10
4	R. Peers	Falcons	9:00 + 3:04
Team Results			
1	Falcons: Peers, Peers, Carter	274pts.	
2	Freebirds: Hopper, Hopper, Bracken	255pts.	
3	Birmingham: Baggott, Gibbs, Gibbs	237pts.	

### SM&E Summer Mini ... Driffield ... 1.8.82 ... Report by Dave Hopperson

This was rather more successful in terms of attendance than its counterpart held in the South a month previous. Driffield did not live up to its 'dreadful' — name the wind was light all day with the warm overcast muggy conditions punctuated with very warm periods of sun. Thermal picking was not as easy as it looked and many came to grief. Hence 1/2A and Coupe did not require flyoffs although the top times were very close. Pete Harris having shaken off his early season gremlins completed the winning 1/2A total — the only full score — early enough to let him concentrate seriously on Coupe during the best part of the afternoon. His total in this included a couple of unlucky sub-max flights but was sufficient by a second for 2nd place. Another Birmingham power flyer seems to be taking this class seriously as well. Screen flying his French influenced design to good effect. He dropped a little too much time on the first flight but made amends thereafter. Extraordinary to watch Stafford winding 10



Left: impressive A1 glider flyoff from Mike Cook could have won but vanished in the murk too soon. Centre Julian Hooper winner of HLG at both SM&E Summer Mini events this year. Above: Gary Madelin showing off his sultan too early. A DT could have robbed him of a higher place in the A1 flyoff. Below: Stafford Screen flying rubber! Well too — a slight first flight boob robbed him of a place — even victory!



grams of rubber and looking terrified when one considers the frightening power models he usually handles without batting an eye.

In 1/2A Baggott could have made it a flyoff but dropped 23 seconds on the fourth flight letting in Freebird — Chapman who only went 20 seconds adrift. HLG was topped by Julian Hopper flying most calmly and making his best flights in the last five when he had got the model really sorted. John Brookes topped Coupe D'Hiver with the same unusual configuration that he used to good effect at the Nats. He insisted that it is not a Jean Claude Neglais design but only influenced by it. Had a ducking in a lake been avoided on the first

flight the next of 1.43 taken before it had dried out properly would probably have been a max. Ian Davitt was unlucky after picking five pieces of good air to have a doubtful trim glide his straight out of the lift and into sink on one flight. His model total was good enough for third and there were five others beneath him with scores of over nine minutes.

The two flyoffs were in A1 and CO<sub>2</sub> and four had qualified in each. The conditions had cooled and a murky overcast did nothing to suggest an exciting conclusion. We were however about to be treated to some excellent A1 flying. All four were towing quickly on the start signal and Gary Madelin who had already had to rebuild a model from the pieces of two broken ones for his last official was off in air that had the model twice towline height in 60 seconds. Way upwind Tony Cordes unlatched to hold height for over a minute then he too began to climb steadily. Downwind Philpott had launched into a reasonable patch but it faded and he was down in less than three. Mike Cook was still towing and when at last he released he too was in powerful lift. Presumably Madelin outed as he returned with his model from a flight that should certainly have bettered six. Cordes won with a massive flight of nearly eight minutes over Cook's excellent six plus. They were all very difficult to see in the murky evening air.

CO<sub>2</sub> had come of age at last and produced a real contest with a four way flyoff not including Nats winner Philpott who had a holed piston ruin two flights. O'Donnell had a power model like climb — his mylar covered model had looked most impressive all day but in the flyoff an undetected gas leak ruined his flight. Hipperson used a large light airframe with conventional rather than Turbo tank. His model seemed no match for the Morley duo of Brown and Fielding who had both sailed into the flyoff without needing all their attempts and now flew together in good air and produced excellent flights from relatively basic airframes. Fielding's little sports configuration actually did and went further than anyone but it was just too tiny to time or find at such a distance in the long grass. Brown's larger model was seen all the way down and topped the list with nearly four minutes.

Pete Farrimond had run the proceedings all day and deserved more thanks than he got. He distributed plaques at a well handled prize-giving to round off a good day.

## Results

### A1 (16 flew) — 4 in flyoff)

1. A. Cordes	Birmingham	10:00 - 7:56
2. M. Cook	NYFFG	10:00 - 6:06
3. G. Madelin	C/M	10:00 - 5:49

### Coupe D'Hiver (13 flew)

1. J. Brookes	C/M	9:43
2. P. Harris	Birmingham	9:32
3. I. Davitt	Leeds	9:31

### ½A Power (16 flew)

1. P. Harris	Birmingham	10:00
2. P. Chapman	Freebird	9:40
3. R. Baggott	Birmingham	9:37

### CO<sub>2</sub> (7 flew) — (4 in flyoff)

1. G. Brown	Morley	10:00 - 3:54
2. S. Fielding	Morley	10:00 - 3:46
3. D. Hipperson	Grantham	10:00 - 3:32

### HLG (6 flew)

1. J. Hopper	Freebird	4:53
2. N. Pope	Wigan	4:17
3. S. Philpott	Biggles	4:02

## Calendar and rule changes

The Free Flight Technician Committee of the SMAE are putting before the SMAE Council some very radical suggestions as to the form of next year's Free Flight contest programme. If passed they will mean considerable reductions in contests at Area level, with no events to replace them at centralised venues, as well as possible alterations to towline length, engine runs and maxes.

We have been asked not to publish details in case it prejudices opinion! If you care about the future of competitive Free Flight in this country



Above: Junior prizewinners show off their awards left to right: D. Arnott, A. Campbell, I. McNaught, J. Arnott, C. Borthwick, R. Bhatti, D. Donnelly. Right: Brian Martin, winner of F1B - design features very close rib spacing and sunken spar to preserve smooth upper surface. Below: rubber winner Jim Campbell, with reserve model. Below right: Julian Hopper and Jo run for shelter when "the rains come" in final A/2 round.



and wish to see improvements rather than reductions contact your local SMAE competition secretary — now, He will have full details of the proposals. Let him and your area delegate know how you feel. You can affect things if you act now — don't complain when it's too late.

## Scottish F/F Nationals Report by John O'Donnell

The 1982 Scottish Free Flight Nationals were held over the weekend of June 5 and 6 at the usual venue — a vast stretch of moorland just outside Newbigging in Lanarkshire. Despite this being very much Southern Scotland, only a comparative handful of English fliers were in attendance. Some indeed, had come 'straight' from the British Nationals (with a few days' touring in between).

Saturday was FAI day with the events flown in rounds and from a line. The weather was un-



believable (and almost unbearable) for most of the afternoon; being very sunny, very hot, and very calm. Thermals were big and strong, with down draughts to match.

Glider towing was a problem, and some fliers had 'attempts' though not being able to run quickly enough over the rough moorland surface. Nevertheless, there were several mass launches, with models climbing rapidly into the blue directly overhead! Perhaps surprisingly, few could cope consistently with the conditions — and by the end of the fourth round, there were only two perfect scores left in glider. Julian Hopper and Richard Sheen seemed to have found the right technique — perhaps it was their use of a lightly-clad lady assistant!

The weather changed in the late afternoon with a darkening sky, thunder, and lightning flashes. Although we escaped the worst of this, the final F1A round started with a certain amount of wind and a little rain. Julian Hopper made the mistake of rushing to fly right at the start of the round, and

having the flight ruined by turbulence. Mind you, he also changed his launcher! As it turned out, he still secured second place.

Richard Sheen waited patiently until conditions improved — and flew in the last minute or two of the round. His model 'worked its way' into weak lift, and eventually disappeared behind some downwind woods at just over a fifth max. He looked justifiably pleased when he returned with the model — which uses 'Classic' wings on a very neat home-made glassfibre pod faired into a Ronytube. The internally mounted timer looks a good idea — if only to keep the mechanism clean and more reliable. Practically everyone, including the winners, flew straight tow models — with Brian Baines providing the sole demonstration of extended circle towing — unfortunately at a time and place without obvious lift!

Wakefields and FAI Power were flown alternatively with A/2 — and had noticeably more trouble finding lift. In fact, there were only four maxes recorded between all the fliers! The eventual F1B winner proved to be Brian Martin, whose technique seemed to be that of waiting until the imminent end of the round forced him to fly! His model was based on the mid-1970 North Korean layout, and featured hardwood prop blades and a Ronytube glass-fibre motor tube. The only auto-surface was a prop-stop actuated rudder.

I flew my ancient single-blade featherer model to second place, whilst last year's winner, Ivan Taylor, could only manage third this time. His high a/r solid-wing design climbed well but it didn't seem to like the lift! Perhaps surprisingly these three differing approaches all produced very similar scores in the final calm cool round — after the rain.

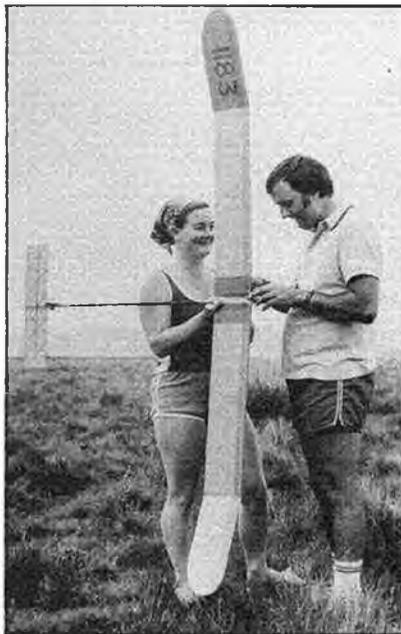
F1C was a virtual flyover for Ray Moore — a not unfamiliar experience at this contest — with little more than token opposition. Saturday evening was ideal for trimming, but was only so used by the long-distance visitors. The weather changed overnight — one of the campers said it was windy at 4.00am! — and Sunday was a complete contrast to the previous day. Although a cloudy sky and a fresh breeze made for more comfortable temperatures, the easterly drift was onto some awkwardly situated woods — with quite predictable consequences.

Sunday's programme opened with a three-hour Mini event. This got off to a slow start — and hence proved to be a race against time for most entrants. Fraser McKay and Russell Peers managed all five flights — albeit with rather mediocre totals — flying ½A and Cd'H respectively. The winner, however, proved to be the writer (J.O'D.) with almost three maxes (plus the best part of another from a non-scoring line-break) flying two A/1 gliders. It must be admitted that one or two promising scores stopped suddenly due to retrieving problems.

The afternoon was taken up with the open events, of which glider was by far the best supported. There were some good flights early and late, but very few in the middle. No-one managed to string three good scores together, which at least kept the event 'open' right to the end. Both Ron Sabey and Dave Hambley made very late two-minute flights to take first and second, just ahead of 'yours truly' and Tom Laurie.

Open Power was a fine example of overkill with Russell Peers making at least one superfluous max. The main threat to his premier position disappeared when young Fraser McKay failed to find his ½A model in the woods. Rubber in comparison was a Scottish monopoly, with Jim Campbell having a convincing (if expensive) victory. His first model disappeared in haze just short of a max — but a nominal back-up with his reserve was more than sufficient to win. The general layout and style of his models were more than a little familiar — to me at least.

The events closed with a prize-giving — and even a summing-up speech, in which the Contest Director, Ron Sabey, thanked the English visitors for attending and helping raise interest and standards. A nice touch! Also notable was the presentation of awards to the various junior fliers — a move clearly slanted to the future. One young man even received a prize for having the



F1A winner, Richard Sheen, prepares his model which uses 'classic' wings on home-made glassfibre pod faired into Ronytube. Wife Rosetta does the launching.

commonsense *not* to fly in view of the downwind woods! I could think of many meetings where such an award would have not one candidate but a lengthy queue!

## Results

### F1A (13 entries)

1. R. Sheen (Nantwich) .....	15.00
2. J. Hopper (Freobird) .....	12.47
3. D. Hearn (Edinburgh) .....	12.03
4. J. Eland (Paisley) .....	11.54
5. F. McKay (Edinburgh) .....	9.59

### F1B (six entries)

1. B. Martin (Tynemouth) .....	13.05
2. J. O'Donnell (Whitefield) .....	11.53
3. I. Taylor (Falcons) .....	11.04

### F1C (two entries)

1. R. Moore (Biggles) .....	5.38
2. T. Laurie (Paisley) .....	0.28

### Mini (12 entries)

1. J. O'Donnell (Whitefield) .....	5.56
2. F. McKay (Edinburgh) .....	5.48
3. R. Peers (Falcons) .....	4.45

### Open Glider (13 entries)

1. R. Sabey (Hamilton) .....	6.13
2. D. Hambley .....	5.57
3. J. O'Donnell (Whitefield) .....	5.43
4. T. Laurie (Paisley) .....	5.28

### Open Power (three entries)

1. R. Peers (Falcons) .....	8.23
2. R. Moore (Biggles) .....	2.44
3. F. McKay (Edinburgh) .....	2.25

### Open Rubber (six entries)

1. J. Campbell (Paisley) .....	4.36
2. J. Arnott (Hamilton) .....	4.06
3. D. Arnott (Hamilton) .....	2.52

### Top Juniors

F1A. I. Arnott (Hamilton) .....	3.33
Mini. D. Arnott (Hamilton) .....	2.00
Open Glider. I. Arnott (Hamilton) .....	3.50
Open Rubber. D. Arnott (Hamilton) .....	2.52

When ex Aeromodeller editor Martyn Cowley established a new American AMA record for A1 Gliders by first scoring 5 x 2 min. maximums, then a succession of 3, 4, 5 and 6 minute fly-offs, he ended up without a glider to gain even a just a few more seconds on a tenth flight to beat the existing record. So he took his Coupe d'Hiver, cut the tail in half to bring it down to area and Sallotaped a tow hook to the lower fuselage and added eight pen cell batteries for ballast. The resulting compromise made 55 seconds for the new record of 28:55. Martyn found his original A1 after the contest which was lucky for him as it had an electronic timer fitted which Martyn considers an essential for flying at dusty Taft, California. Photo shows Martyn Cowley with Ralph Prey on the left and Joe Bilgi on the right with winning time on stopwatches.



# SCALE MATTERS

## Ron Truelove describes the development and construction of his 1/6th scale control line Hawker Typhoon 1b

OVER THE PAST year or so, I have found myself in a strange situation that some scale modellers must recognise, having embarked on what was not just a new, but was also a rather ambitious and time consuming project. Everywhere I went people asked 'have you flown it yet?' and I got the impression that after a time they were beginning to doubt the various excuses, and even some nasty remarks began to appear from some quarters (particularly from the plastic kit R/C flyers) such as: "If I had built a model like that it would have flown by now . . ." etc.

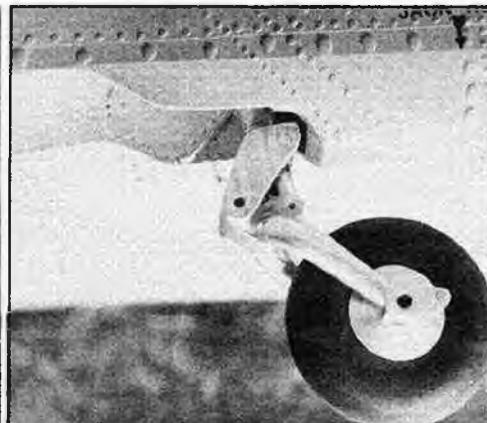
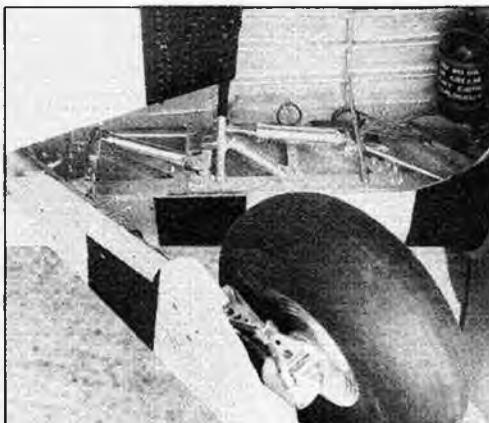
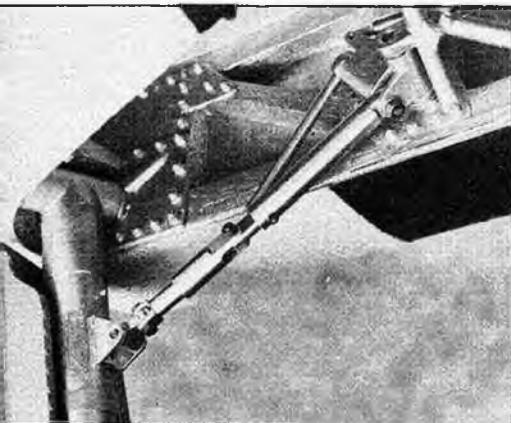
So why did it take so long. Well, if we discard the incidental 'agro' factors such as wives, young children, decorating, work . . . etc. and even the general modelling problems like keeping old models flying for displays and competitions, moving workshops, building trailers, running



The first 9 months were spent on building the bare-bones of a retracting U/C leg into a plywood mock up wing structure. This is where you find out all is not as simple as you thought. Those couple of joints in the locking arm are *not* enough. In fact the present locking arm is now an assembly of many different moving bits. Apart from the 3 normal pivots and over-centre lock (knee-joint) required to make any leg of this type retractable, there is now: a pivot at right angles to the arm forming the scale triangular assembly at the upper end, a small universal joint at the leg end, and a twisting pivot (I used an 8BA thread for adjusting purposes). The telescopic leg is sprung, of course, with working torque links, not only for shock absorption but for the correct 'sitting' length and extension to fit correctly into the wheel bay. All components are aluminium alloy with a few small stainless

with an excellent digital control system, roughly described in his language as a digital shift register, using C-MOS chips, ideal because of their low current drain and ability to work at a wide range of voltages. (Vital when heavy retracting U/C's are soaking a lot of power out of the battery). It uses 11 of these chips in the coder (handle) unit, to generate a stream of pulses which is received and stored by the decoder. This consists of only 3 chips plus 2 servo drive amplifiers and 4 transistor drives. This gives (1) 4 position throttle and flaps (servo drive), (2) U/C up and down (reverse polarity), and (3) 3 auxiliary (on/off) functions, although (in theory) the system could be extended, or be of any combination of these 3 (eg: all servo drives).

Incidentally the lines are both nylon coated, 7 strand stainless, 75lb breaking strain, fishing trace.



model clubs, etc., etc., and we only consider what's involved with the aeroplane itself then it's enough to fill a small book. However, here is an attempt to provide a somewhat abridged version.

To begin with, why a Typhoon? Well, for a start, after flying my *Hampden* in competitions with its appalling lack of available documentation I decided to embark on something with 'good proof of scale' for competitions. So being able to obtain Arthur Bentley's superb scale drawings, close-ups of the sole survivor at R.A.F. Hendon and a set of incredibly clear photo's of DN406 from the Imperial War Museum Library, (all taken on the same day from different angles) I considered this should be a suitable subject. Also, and probably more important, I actually wanted to build this particular aeroplane.

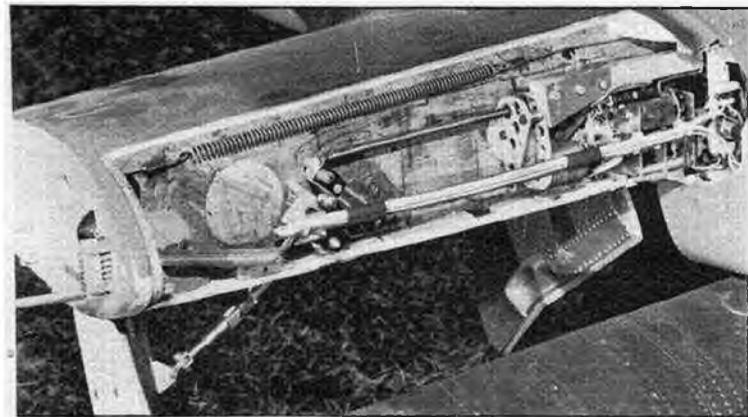
*From left to right: undercarriage locking arm (port) showing all the various joints as per full-size including the dummy jack arm at the top. The scale nuts were made from leftover epoxy cast in a plaster of paris mould; u/c half up showing movement of locking arm and dummy jack; Tailwheel locked down: LH Coder unit, left thumb switches for u/c, flaps and auxiliaries. Centre: on/off switch, engine stop and right throttle trigger. Coder, showing PCB and DEAC - (bottom) de-coder with two servo amps and transistor drives. Webra '61 R/C G shown inverted with home-made silencer, mounting brackets and throttle linkage. Cockpit viewed through starboard door - two of the working switches are shown centre left. Undercarriage indicator lights up and stick moves with elevator.*

steel bushes and pivot pins and all had to be capable of being made on my then new (now old) 'Unimat' and all parts had to be screwed together for ease of servicing. The tyres (6in. dia. balloon with no tread) were left until later, from subsequent experience perhaps they should have been dealt with first.

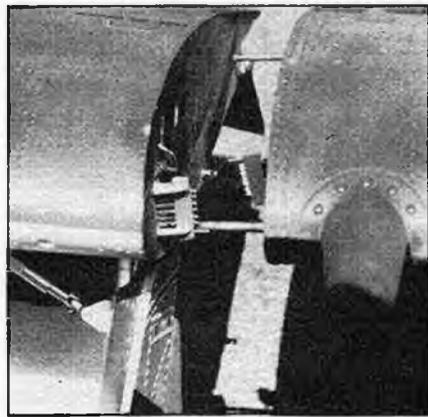
Roughly in parallel with the U/C development, an electronic design engineer named Bob Waterfall and I concocted a control system that would drive 2 Flight Link servos and other home made motors, etc. The result, we came up

The initial coder test rig lived in a tobacco tin screwed to a special handle which was wooden with separate alloy line connections, the de-coder unit was on 3 separate boards and the system was flight tested with a modified old model using only flaps and throttle. The electronics worked perfectly but the heavy handle with its box was awful, losing all 'feel' of the aircraft.

About 2 years ago it was decided to convert the *Hampden* to take this system and a new coder control layout was devised. The handle and box were now separate, consisting of a left hand (only)



*Left: leading edge panel removed revealing the complex retract mechanism. Note: low gearing of servo mechanism and also wiring harness. Right: wing joint (port) showing piano wire rods, electrical connector and Dzus quarter turn fastener.*



unit with a trigger throttle and thumb operated U/C etc. joined by approximately 3 foot of extended control line to the, now separate, handle which is now the lightest one I've got. The throttle control is split, being 3 positions on the trigger switch for flying and a push button 4th position stop situated around the side of the box. This normally has to be worked by the right hand and avoids any accidental cutting out in flight. The flap is similarly now 3 position and all the 'thumb' switches have different shaped toggles and buttons to avoid confusion, and actually having to take your eyes off the aeroplane. Power is provided by a 12 volt 125mAH button cell D.E.A.C. in the coder with a 12 volt 500mAH pack of pancell Ni-Cads, in the aircraft.

With all this power available it seemed a good idea at the time, particularly for static display, etc. to wire up the Nav. and landing

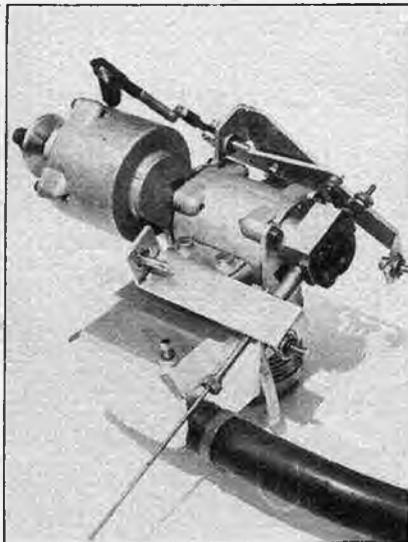
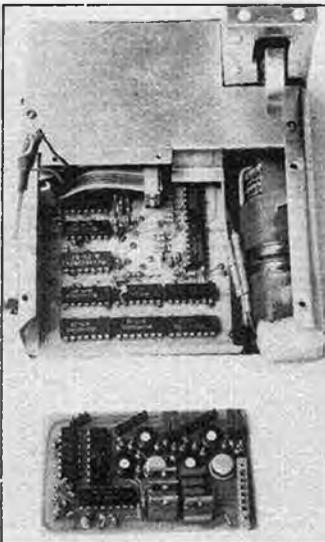
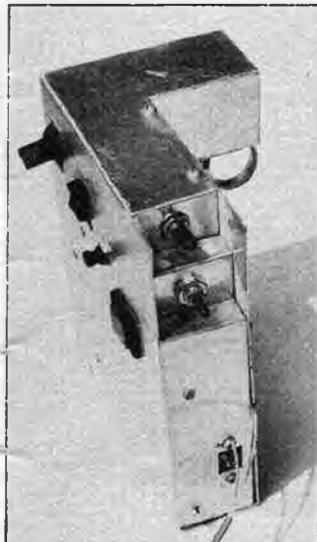
the throttle servo a close 2nd. The flap servo lives well forward under the tank and all the retract motors are forward of the mainspar. Down the other end the tailplane, elevator, and fin were made almost entirely of 1.5mm balsa sheet and the rudder was a tissue covered, 'scale' structure. Together they almost compensated for the retractable tailwheel, but never mind it all helps.

The cockpit goes down a long way into the fuselage, so the elevator and flap pushrods had to be routed down low and the elevator rod has to angle up from a crank arm just under the rear cockpit. The leadouts were taken over the wing as routing through what is effectively an inverted gull wing was not considered practical, not to mention going through the full depth undercarriage bay. The bell crank is a two plate construction separated by

include the electrical connections to the lines, (port rear 2), the battery charging points (port fwd. 2), and the accumulator connections to the glow-plug. (Stbd. 3rd).

The retract mechanism was crowded into the starboard inner section of the wing forward of the mainspar and a one piece cover, made from 0.5mm ply was wrapped around from the top of the mainspar to the bottom, and retained by a single screw inside the wing joint.

After two or three variations of motors and balance springs the retract mech. has arrived at being a single motor and gearbox for the main legs, screw driven to the stbd-leg and attached to the pushrod connected to the port leg. The single balance spring is connected to both legs and these together maintain a floating action moving the easier leg first. When the main legs are up a limit switch automatically turns their motor



lights and also connect some nutplate type hard points in the wing from one of the auxiliary outputs, for bomb racks or even rockets. This, needless to say turned the airframe into a prototype wireman's nightmare.

The airframe was now designed, quite literally, around the undercarriage, and a few problem areas came immediately to light. First the short nose/long tail arrangement had to be balanced. It was considered that the nose was large enough to accommodate some of the heavy lumps, the battery pack being a hot favourite and

insulating pillars, pivoting on a 2BA Screw.

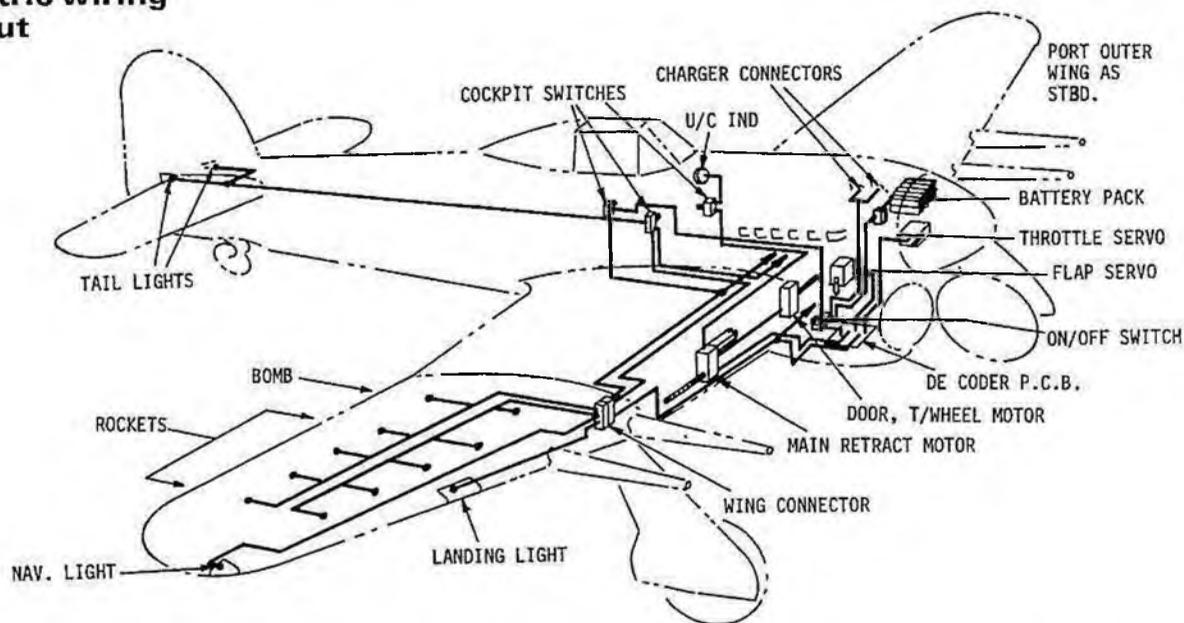
For transportation it was decided to 'break' the wings at the dihedral joint. Locating the outer sections on 8 SWG piano wire dowels and securing with one 'DZUS' type fastener each. The big advantage here was that all the U/C mechanics stayed together in one piece, and only the lights and hardpoint wiring need to be connected together with the flaps.

A bit of tidying up was achieved by making the Taic/Resin moulded exhaust stubs, cast in a plaster of paris mould,

off, and turns the motor that retracts the inner doors and tailwheel on. These then retract until another limit switch turns the lot off. Fortunately the whole system can be thrown into reverse at any time, if necessary. Also fitted are switches that light up bulbs in the U/C indicator although at the moment the effect is spoilt by the plastic card panel suffering from a bit of light leakage.

The canopy was vacuum formed by Actic Plastics over a one piece Jeltong mould hand carved by myself and sanded by many, many sheets of fine wet and dry. (used dry).

## Electric wiring layout



Despite the large chin radiator, cooling the engine looked to be a problem. Because of the large scale the original HP61 didn't come much lower than the spinner. So instead of having a straight flow of air through the rad. the incoming air was ducted up to the Stbd. side of the cowl and then diverted down the port side, with the silencer, and so out the back.

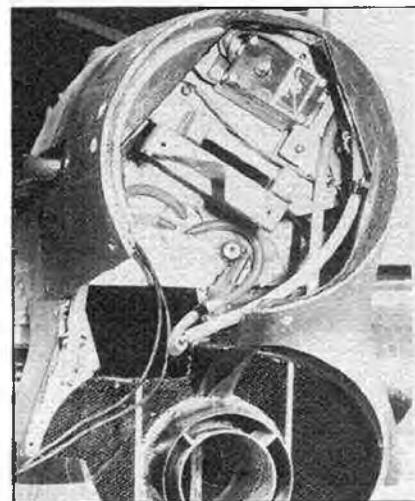
It was some way towards the end of the project, probably after weighing *all* the bits, that it was doubtful if the poor little H.P. could cope, particularly with so little of the Prop. protruding from the 6in. dia. spinner. After some time looking at add-on reduction gears and motor cycle engines, I began to show interest in the Webra '61 with its own integral reduction gear. After saving up many pennies, I found a second hand never-been-run Webra going in Wallingford Models, bought it and then my troubles really started. It now involved the long laborious job of modifying the whole of the inside of the nose, without disturbing the outside paint finish, to accommodate the new engine. For a start the reduction gear put the bearers in a new position and a set of 3 alloy brackets had to be made up to fit the new engine to the original wooden bearers. Both the battery box and the servo had to be moved and a silencer made up. Rods and levers were built to connect the throttle servo with the inaccessible, rear induction carb.

The spinner was a fibreglass moulding made in a papiermaché mould built around the wooden spinner used for the scale prop. But due to serious, out-of-balance vibration problems it has been re-made from ABS formed around the same wooden 'mould.'

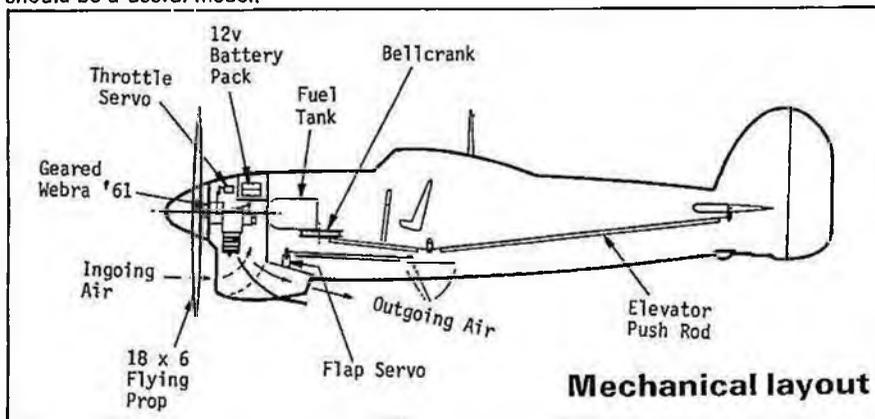
The tyre problem is a saga which I can see I have not heard the end of yet. The 1:6 tyre is basically a 6in. dia. low pressure balloon type with no tread. The only commercial one available, 6in. dia., is the 'Fox' and these weight almost as much as the full size. A pair of these was used with home

made scale hubs but in attempt to lighten the tyres, the centres were removed and the inner side walls whittled away with a scalpel. The result was much lighter, but their ability to stay on the hubs left much to be desired, as the maiden flight proved.

Determined to have a test flight *before* the Old Warden Scale Days I took the Monday before off work and crept down to our flying field to have a quick flight while no-one was watching. In the event the 20x6 prop and rich needle setting caused a lack of power which made the model difficult to handle and I considered it prudent to land after only 3 laps to make some adjustments. Unfortunately as soon as the wheels touched the ground a tyre came off and the model nosed over, coming to rest on its back, and looking rather sick. As an interim measure, a pair of 5in. lightweight 'scale' wheels was purchased and fitted plus an 18x6in. prop. The next flight was at Old Warden and with a far better engine run the model handled much nicer, so, with a few adjustments to stop spinner vibrating off and other 'first' flight minor ailments, it should be a useful model.



*Nose minus engine, showing top throttle servo with old wooden bearers, new metal bracket and tank plumbing. DEAC is behind servo, and plug leads are on left.*



**Mechanical layout**

DPR Models have concentrated for some years on encouraging the younger modeller with their fleet of almost-ready-to-fly and simple to construct models.

The Rare Bird glider is a logical progression to their range. David Rawlins had designed this rugged all built-up model with great care and leaves no doubt about any of the construction details. All ply and balsa shapes are die-cut and require only the slightest easing to release from the sheet; an essential point for the beginner.

The kit includes everything even balsa cement, a tow line, pennant and ring; in fact the only extra required is a bottle of clear dope.

The comprehensive plan gives adequate instructions to anyone who has built a model before, but to leave no doubt, DPR include a 12 page instruction book which illustrates each stage of the construction and gives covering and flying details.

## Construction

As previously stated there is very little we can add to aid construction other than stress the need for accuracy when building the initial stages of the fuselage. The 12.5mm x 2.25mm fuselage sides are made up from two pieces for each side. It is essential that the side-strips are joined accurately. This is best done by overlaying two pieces and using a metal ruler as a guide, cut through both strips at the same time. Before gluing together, lay a straight edge along the two strips to check they are in line while the glue sets. These two fuselage side strips are then glued to formers F3 and F5 over the plan view of the fuselage. When joining the rear ends together and all the other formers, make sure the shape



does not deviate from the plan view.

Before removing this basic fuselage crutch from the plan, add the top longerons and details. The next stage is to pin the fuselage upside down on the building board and fit the lower formers, ply skid, sheeting and nose block. A point not mentioned before and well worth doing, is to cover the plan with the polythene sheet provided. This saves excess glue from sticking to the plan and also keeps it in good shape for future use.

Wings, tailplane and fin are of conventional construction. The leading edge and spar strips should be selected so that they are of similar hardness and weight. The main consideration, as with any wing, is to make sure you build on a flat surface and when joining the two halves together, ensure the leading and trailing edges line up accurately.

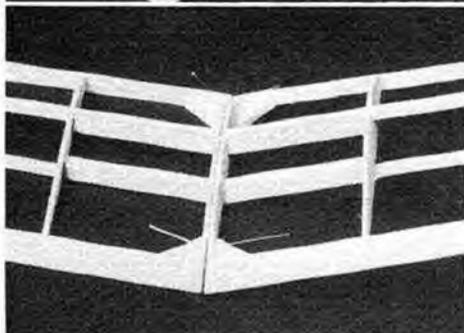
We feel it is best to cover the model with the tissue supplied, although iron on film can be used. If covering with tissue, dope the airframe with clear dope and as

suggested, wet the tissue either by soaking and squeezing out the excess water or as we prefer spray the tissue with an airbrush or scent spray until damp.

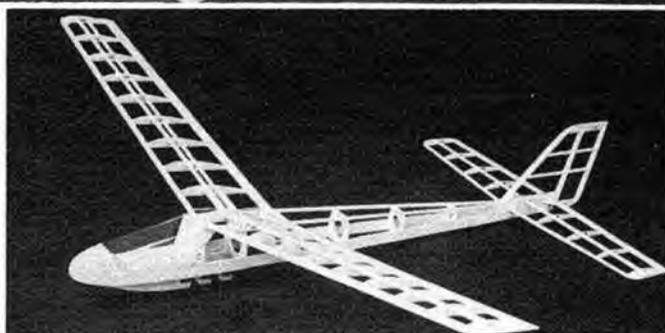
Then lay over the frame removing any wrinkles and using clear dope as a gluing agent. The underside of all surfaces should be covered first so that overlaps are less obvious.

The completed model is very elegant and capable of good flights from a tow or from a slope. You will get the best performance if the glider is trimmed just off the stall. We found it best to just add enough weight to get the suggested centre of balance position and trim out by packing the tailplane. In windy conditions it may be worth adding just a little more nose weight to avoid stalls.

Summing up, this is an ideal beginners' introduction to aeromodelling and at £5.99 represents very good value. Manufactured by DPR Models, 351 Fairfax Drive, Westcliffe-on-Sea, Essex SS0 9LZ, and available from most model shops.



*These photographs illustrate the well thought out construction of the Rarebird. Note the three stages of construction of the fuselage. The basic crutch is shown on the left, centre top longerons added, and the far view shows the crutch reversed and the keel formers and bottom and front sheeting in place. The final shaping of the nose block is made after gluing to the fuselage.*



# Rupert Moore

## An appreciation by Alex Imrie

Charles Rupert Moore trained as a professional artist at the Sheffield College of Art and was a graduate of the Royal College of Art, London. Although he was an accomplished artist and world famous in the field of stained glass, the subject in which he had taken his degree, it was as an aeronautical artist and aeromodeller that he is better known to readers of this journal.

Who amongst us remember the Aeromodeller between the years 1940 and 1950 without automatically recalling the name of Rupert Moore? He it was, who painted all those fine front covers, and he always seemed to be writing about a new model. His models all possessed "something" that made them different, and his 12 part serial on the rubber driven flying scale model, remains a standard work on the subject.

His interest in aviation stemmed from being a witness of the very first Flying Meeting to be held in the United Kingdom, when this event was staged on the race-course at Doncaster, his home town, in October 1909. The hero of this meeting was S. F. Cody, and it was a model of Cody's machine that the young enthusiast tried to make out of boot boxes and wooden sticks immediately on his return home. This was the first of a long line of models that would terminate some 35 years later with the incredible Hawker Typhoon which was fitted with an automatic retracting and detracting undercarriage, including tailwheel, all operated by gravity and the tension of the rubber motor.

During the First World War he made models of the famous machines of the day, but the period was, as he himself said, "... the dark ages of trial and error (mostly error)!" His first successful model was a German LVG two-seater made from a drawing that appeared in *Flight* in 1916. He enjoyed designing his own models and was a staunch supporter of the semi-scale type, with which he strived to obtain representative performance, and if he made an interceptor fighter, he wanted high speed, rapid climb and a good slow glide. So it was that by the end of the 1920s his dogged determination and persistence was beginning to get results, one of his models at this time being the Hawfinch, a 22in. span 3½oz machine.

Due to his very deep interest in aircraft it was hardly surprising that aviation became the principal subject of Rupert Moore's paintings, and his first picture to be submitted to the Royal Academy was hung in 1928, this being a study of the latest type of RAF fighter titled 'Gloster Gamecocks.'



*Above: only the snarl of the Napier Sabra engine is missing as the fantastic 1/12th scale rubber driven Hawker Typhoon approaches to land with the undercarriage down. Man and model. Castor was the test bed for the patented Moore Drive, it represented the twin-engined medium bomber of the day, and was initially finished overall in aluminium dope.*



Unfortunately, illness about this time confined him to a hospital at Ventnor in the Isle of Wight, and it was here, while a strict bed patient that he built his famous Viper I with "... nail scissors, Woolworth file, twist brace, two drills, pliers, soldering iron, razor blades and a pocket knife!" Over a period of time this machine incorporated necessary modifications and eventually became the prototype of Viper II. This was his idea of what an interceptor monoplane should look like, since he was "fed-up" with the outmoded biplanes still then being issued to the fighter squadrons of the Royal Air Force.

In 1937 he won the Northern Heights Coronation Cup with Viper II, which he described in *Aeromodeller*, and in the same year he produced a very interesting twin-engined version named 'Castor,' a 57in. wingspan medium bomber. This model used the same amount of rubber as Viper but incorporated the Moore Drive (Patent No. 514974) a system enabling two propellers to be driven by one rubber motor. 'Castor' was in fact a test-bed for the mechanism, which, when declared satisfactory, was built into 1/12th scale models of the Short Scion five-seat light airliner and the Bristol Blenheim IV medium bomber, and both of these twin-engined models flew successfully. The drive was, in addition, used on a twin pusher gull-winged Wakefield model, called appropriately enough, 'Twin Gull,' and this also flew well.

Even more revolutionary but simpler to make than the Moore Drive was the Moore Diaphragm (Patent No. 582542), this was a method of dividing a rubber motor into two unequal parts, that helped the centre of gravity problem, by concentrating most of the rubber in the front end of the fuselage. Originally this was fitted experimentally to

Eddie Riding's Bristol 77 Racer monoplane before it was used on the second 1/8th scale DH Tiger Moth that Rupert Moore built. Improved durations were immediate, since ballast could be removed even on models with short noses.

There is little doubt that his greatest model aircraft achievement was his 1/12th scale Hawker Typhoon, he himself regarded the fully automatic undercarriage, as the most difficult design problem that he had ever solved. At the time (1943) this model was as near perfection as it appeared likely to achieve with the rubber driven flying scale type, and photos of the model in flight, were almost indistinguishable from those of the full-size machine.

One became so used to the fine colour paintings on the front cover of *Aeromodeller* (they had been there since July 1940) that it was quite a shock to see them suddenly replaced from January 1951 by black and white photographs. It was fitting that the last (125th) consecutive front cover from his brush should have featured the Missel Thrush, which was the last model by his close friend Eddie Riding, who had been killed in an air accident the previous Easter. Although further contributions from Rupert Moore were to come, the December 1950 issue of *Aeromodeller* marked the end of an era, a period of aeromodelling history that we spend considerable effort in trying to recapture today. Rupert Moore's art and model designs were very much part of that scene and he will always be associated with it.

It was indeed a pleasure to visit with him, his studio was steeped in atmosphere, and on entering one was acutely aware that this was the place where it had all happened. Here the fondly remembered paintings had been created, and unbelievably, around the studio walls, still hung many of the original models that one read about over the years. He delighted in reminiscing, and proudly showed his encyclopaedic gathering of colour data covering the whole span of aviation, from schoolboy World War One descriptions, to detailed schemes with paint samples taken from German aircraft at Farnborough immediately after World War Two.

The story of Jackdaw has recently been told in these pages, and Rupert Moore was delighted that SAM 35 should select this design for revival. He was greatly looking forward to the competition for this model to be held at Old Warden on Vintage Day, and had only just finished the oil painting of this machine which he kindly donated for annual competition, this award will now be known as 'The Rupert Moore Memorial Trophy.'

DAVE  
DAY'S

# SHOP TALK

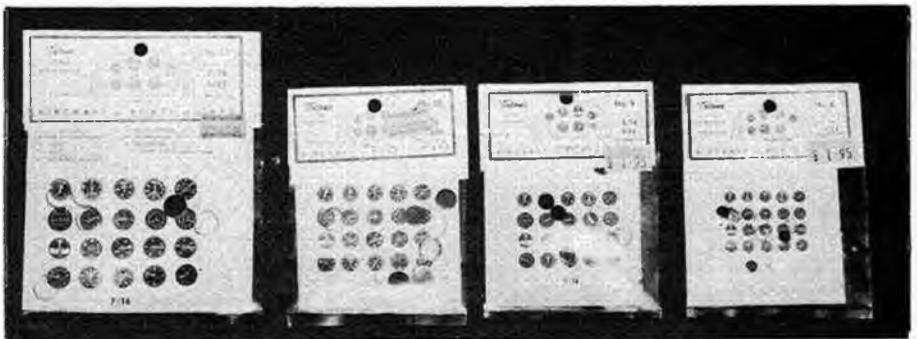
The latest in products for  
the modelling scene

## Gloy Glues

The entire range of Gloy glues is being revamped, repackaged, and added to and is now widely available under the Supergloy label.

One of the new items is a hot weld adhesive gun which utilises 240v main power to melt sticks of a special glue which, upon cooling, immediately sets to produce a secure joint in most materials. This type of adhesive gun has been available for some time in the USA and has been widely recommended for aircraft structures. Price Gun £13.99, extra glue sticks £1.75 per 24.

Other Supergloy products include: fast-set wood adhesive; non-stringing polystyrene cement; all purpose adhesive; liquid polystyrene cement; contact adhesive, all purpose super glue; fast set epoxy; and of course, balsa cement!



## Tatone Instruments

For scale modellers or for those who wish to improve the appearance of their semi-scale models a range of dummy instruments are produced by Tatone. These are available in the following diameters and prices:  $\frac{1}{4}$ in. (£1.95);  $\frac{3}{16}$ in. (£1.95);  $\frac{3}{8}$ in. (£2.45);  $\frac{7}{16}$ in. (£2.45);  $\frac{1}{2}$ in. (£2.70);  $\frac{5}{8}$ in. (£3.50);  $\frac{11}{16}$ in. (£3.99) and  $\frac{13}{16}$ in. (£4.20). Each pack contains 20 printed dials, 5 clear lenses and packing pieces and 5 plated bezels, plus full instructions.

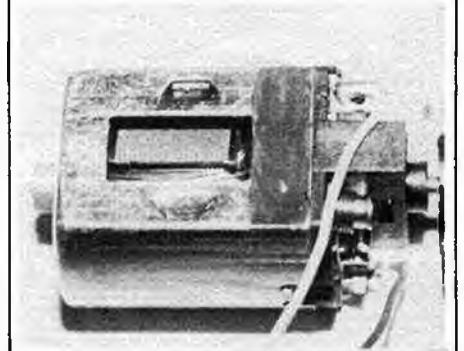
Available from H. J. Nicholls & Son.

## New electric RTP motor

The well-known Harry Butler range of electric RTP models has now been taken over by Ballards Models and Electronics, 54 Grosvenor Road, Tunbridge Wells, Kent, TN1 2AS. A new addition to the range is the 4549 Motor which is claimed to have the power of the type 4552 motor in a type 4551 case. Maximum current drain is three amps and the price £3.45. All motors now include English, German and Swedish instructions. Available from model shops.

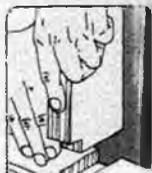
## 2 volt charger

The humble 2 volt wet cell accumulator is still used by many as a source of current for Glo-Plugs, and to many the charging of them can be a problem. One solution is supplied by Jester Products in the form of their mains powered 2 volt charger. This supplies a  $\frac{1}{2}$ amp output for charging single cell lead/acid batteries. Price £5.44 from model shops.



# SUPERGLOY FAST-SET WOOD ADHESIVE

- \*DRIES VERY FAST
- \*DRIES CLEAR
- \*NON-FLAMMABLE
- \*HIGH BOND STRENGTH
- \*FOR HARD AND SOFT WOOD
- \*IDEAL FOR AIR AND CRAFT WORK



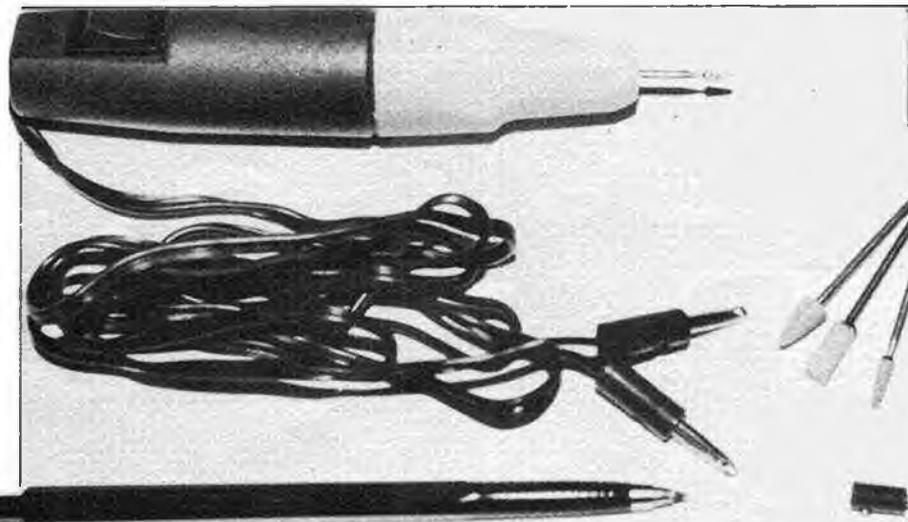
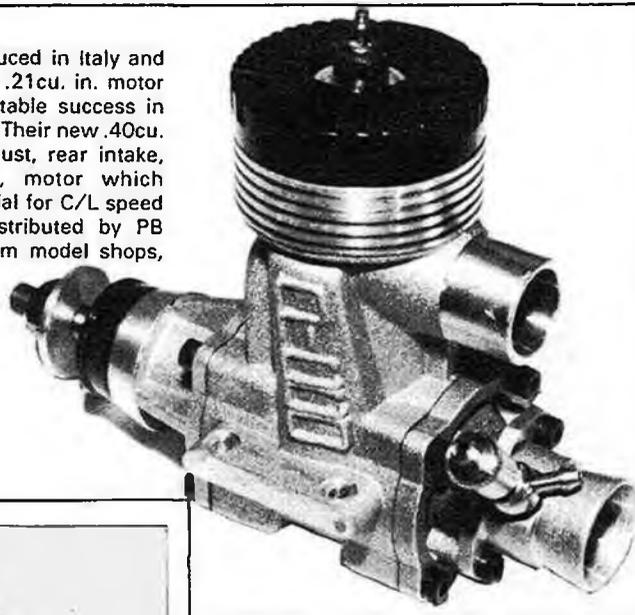
### Du-Bro Pumps

While the humble squeeze bottle will no doubt live for ever in F/F and C/L circles (no pun intended), our R/C brethren have tended to adopt the electric fuel pump. Those who feel the need for a pump but not for an attendant battery may be interested in a DU-BRO hand-cranked pump. Designed to be bolted to the top of a one gallon (or five litre) can, it is available in glowfuel or petrol/diesel types at £6.95. If you already possess a starter motor, it can be used to drive the pump via an adaptor which costs £1.77.

DU-BRO Products are available from several sources, the review example came from H. J. Nicholls & Son, prices may vary.

### Picco 40

Picco Motors are produced in Italy and their recently introduced .21cu. in. motor has already achieved notable success in the model R/C Car world. Their new .40cu. in. motor is a rear exhaust, rear intake, Schnuerle-ported, ABS, motor which should have great potential for C/L speed and Carrier classes. Distributed by PB Racing and available from model shops, price £64.47.

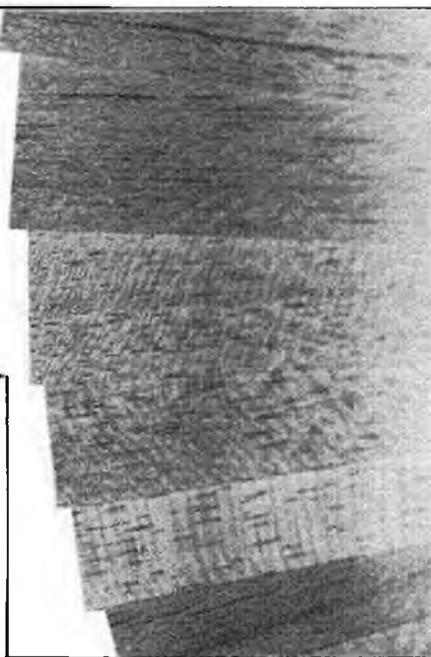


### Elektro Hobby Drill

Comprising of a high speed 12 volt electric drill with a variety of abrasive bits, this handy device, designed originally for glass engraving (for which it is very effective) has many modelling uses. Obviously if it will work on glass it will work on just about any material such as metal, glass-fibre, etc. The basic outfit costs £12.50 and includes drill and three bits. A deluxe outfit includes carrying case, manual chuck and extra bits and costs £20.00. Available from W. H. H. Seelig, 8 Felbridge Close, Sutton, Surrey SM2 5QH.

### Thin balsa

If you are looking for thin balsa sheet, Ballards can help you. Our sample is  $\frac{1}{60}$ th of an inch thick (.0125in.). Various thicknesses can be supplied in sheets measuring 15in. x 2 $\frac{1}{2}$ in. Cost is £1.15 per five sheets plus 50p p&p per order. While the quality is average and cannot compete with the specially selected 'Indoor' balsa, it costs *substantially* less and is of use for small outdoor scale models, etc. Available from Ballards, 54 Grosvenor Road, Tunbridge Wells, Kent TN1 1AS.



### ABS to balsa glue

ABS is a material which is finding increasing use in modelling. Gluing ABS to balsa prevents no problems, but sticking it to balsa is not so easy. An adhesive designed for just this purpose is now manufactured by Krick and being distributed by *Micro-Mold* to model shops. Price is 99p per bottle.

### X-Acto Tools

The name X-Acto has become a general term for balsa knife in the USA, although the X-Acto range does include much more than just balsa knives. Such things as saws, files, vices, balsa strippers, etc. all the way up to an airbrush. Most of the range is now being imported by Humbrol Ltd. and should be widely available in model shops. Some examples are:

No. 1 Knife: a 47/8in. long aluminium handle which can take a wide variety of blades. Supplied with one No. 11 blade. Price 99p. No. 5 Knife: a heavy plastic handle designed for heavier cutting. The metal blade holder accepts a large range of blades (different from No. 1 knife). Supplied with one No. 19 blade. Price £1.95.

Jewellers' Screwdrivers. These have hardened steel blades, and aluminium handles with swivel heads. A pack of three different sizes cost £2.85p.

Needle files. Many types are available. A pack of six assorted types with a quick change handle costs £7.95.

# SHOP GUIDE

## AUSTRALIA

**MELBOURNE 3000** Tel: (347)  
RIVERSIDE HOBBY CENTRE 8029  
16 LITTLE LATROBE STREET \*  
9 am-5.30 pm Mon.-Fri.  
9 am-12 noon Sat.

## AVON

**BRISTOL** Tel: (0272) 662544  
BEV'S MODELS \*  
35 WEST STREET  
BEDMINSTER  
Mon.-Thurs. 10 am-6 pm  
Wed 10 am-1 pm  
Friday 10 am-7 pm  
Sat. 10 am-5 pm

## BEDFORDSHIRE

**BIGGLESWADE** Tel: (0767)  
IVEL MODELS & HOBBIES 313840  
94-96 SHORTMEAD STREET  
Mon.-Sat. 9.00-6.00  
Wed. closed  
Friday 9.00-9.00

## BERKSHIRE

**WINDSOR** Tel: (07535) 56321  
WINDSOR MODEL SHOP \*  
45 ALBANY ROAD  
Open Mon.-Sat. 9 am-6 pm  
Late night Fri. 7 pm  
Half day Wed. 1 pm

## CAMBRIDGESHIRE

**CAMBRIDGE** Tel: (0223) 59620  
MODEL MANIA \*  
17 KING STREET  
Open: 9.30 am-5.30 pm  
Mon.-Sat. Inc. Lunchtime

## CHESHIRE

**MACCLESFIELD** Tel: (0625)  
HOBBY-CRAFTS 29467  
(MACCLESFIELD) LTD  
PARK MILL  
HOBSON STREET  
Open: 9.30-5.30 Mon.-Sat.

**SALE** Tel: (061 962) 4561  
HOBBYWORLD \*  
200A MARSLAND ROAD  
Mon.-Sat. 9.30-6.00  
Wed. early closing

## CLEVELAND

**MIDDLESBROUGH** Tel: (0642)  
HOBBYDROME 211212  
283 LINTHORPE ROAD  
Open: 9.30 am-5.45 pm  
Late night Friday 8 pm  
Closed Wed.

## DERBYSHIRE

**DERBY** Tel: (0332) 46579  
THE BALSA TREE \*  
16/18 HOWE STREET  
DE3 3ER  
Open: Mon.-Sat. 9 am-8 pm  
Tues. 4 pm-8 pm

## DEVON

**EXMOUTH** Tel: (039 52) 72540  
EXMOUTH MODELS \*  
78 EXETER ROAD  
Mon.-Sat. 9.00-6.00

**PLYMOUTH** Tel: (0752) 263133  
RUNWAY SOUTHWEST \*  
22 FRANKFORT GATE  
CITY CENTRE  
Mon.-Sat. 9 am-6 pm  
Late night Friday 8 pm

**TORBAY** Tel: (0803) 521767  
MANSEL'S MODELS \*  
PALACE AVENUE, PAIGNTON  
Open 9.15 am-5.30 pm  
Mon.-Sat. inclusive  
Half day Wed.  
Late night Fri. 7 pm

## DORSET

**BOURNEMOUTH** Tel: (0202)  
R. F. AUSTIN, MODEL SHOP 424038  
156 SEABOURNE ROAD \*  
SOUTHBOURNE BH5 2JA  
Open: 9 am-5.30 pm Mon.-Sat.  
Closed 6 pm Thurs.-Fri.  
Half day Wed.

## ESSEX

**CHELMSFORD** Tel: (0245)  
CHELMSFORD MODEL 352553  
CO LTD  
204 MOULSHAM STREET  
Open: Mon., Tues., Wed., Thurs &  
Sat. 9 am-5.30 pm, Fri. late night  
9 am-7.30 pm

**HORNCHURCH** Tel: (040 24)  
RADIO ACTIVE 40016  
94 ARDLEIGH GREEN ROAD \*  
Open: Mon., Tues., Thurs. & Sat.  
9 am-6 pm, Fri. 9 am-7 pm  
Half day Wednesday

## HAMPSHIRE

**FAREHAM** Tel: (0329) 234136  
G. M. H. BUNCE & CO LTD \*  
206 WEST STREET  
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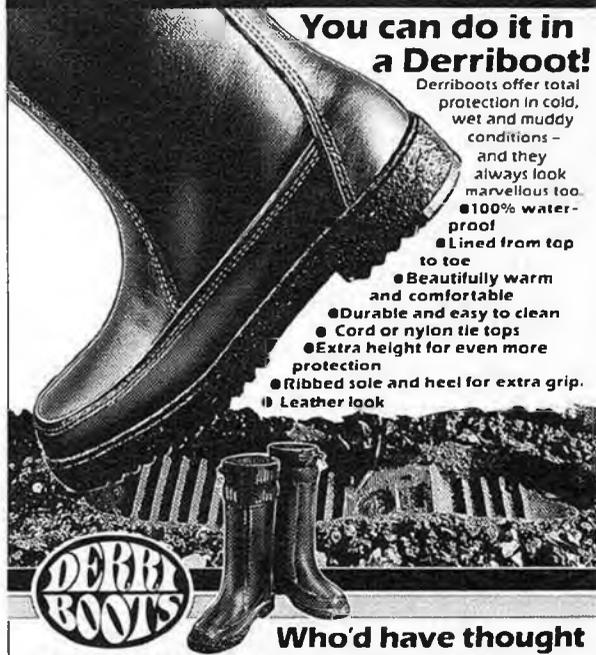
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## YEARS AGO IN AEROMODELLER

**By Dave Day**

This issue was a 'Brisfit' Special. Laurie Bagley produced a cover painting of a flight of Bristol fighters on patrol to compliment a scale feature by G. A. G. Cox (Famous Biplanes No. 11), which as usual contained hints on building a solid model, and Peter Gray's feature on noted F2B 'Ace' Major Edward Andrew McKeever, DSO, MC & Bar.

Main features of the month were coverage of the World A/2 Championships and the World C/L Speed Championships so it was no surprise that the editorial was entitled 'World Championship Reflections'! Main point made was the matter of UK competitiveness when measured against Eastern European training measures and state-sponsored engine manufacturers. It was hoped that the new SMAE proposals for two team trials, one to be held in the year prior to the Championships (*still* not implemented by *all* disciplines!) would help. However it was thought that little could be done in Speed flying without the help of some commercial sponsor, or the forming of a specialist engineering group — any takers yet?

The A/2 and Speed Championships were

held together (were there fewer barriers in those days?) at Mlada Boleslav in Czechoslovakia. In A/2 the British team placed 8th (John Hannay), 29th (Ed Wiggins), 46th (Bob Burgess) and 49th (Brian Tyrell), the winner being S. Babic of Yugoslavia who was the only flyer to achieve 5 x 3 minute maxs. Russia won the Team prize, with Yugoslavia second, Czechoslovakia third and Hungary fourth. Great Britain was 9th, just ahead of the USA.

In Speed, the Czechs were 1st (Sladky), 2nd (Zatocil), 3rd (Pastyrik), and 5th (Smejkal) (four man teams in those days) and not surprisingly, won the team prize. For the UK, Pete Wright was 22nd and 'Gadget' Gibbs was 29th, for a team placing of 9th. Winning speed was 134.3 mph (two lines, unrestricted fuel).

Meanwhile, back at the 'Hangar Doors' was news of several SMAE Council decisions which it was said "will have considerable influence on contest and other matters in the future". It is worth noting these which required a minimum of two centralised trials to select World Championship teams (see above); a proper elimination contest to select teams for international contests other than World Champs; the withdrawal of the Wakefield Trophy from the World Champs "unless the FAI are prepared to re-introduce annual competition for it"; to create a class of Empire membership to meet the requests of overseas membership; the *recommendation* that the owners' SMAE membership number be carried on all models.

There were two Plans Service introductions; 'Sword' a 33in. span C/L flying wing for Sport, Stunt or Combat flying with 2.5-3.5cc motors by J. Templeman and 'G.B. 1X', a 66in. span A/2 Glider by Geoff Brewin. Full size plans were shown for a 15in. span indoor chuck glider by John H. Dixon and rejoicing in the name 'Indora'! 'Engine Analysis' number 40 by Ron Warring described the then new, and now immortal, Veco 19. First of the 'Series 100' Vecos, this motor was to see continuous development over the years and was to virtually create R/C car racing and play a leading role in the introduction of Club 20 pylon racing. Power then was .316 bhp at 15000 rpm.

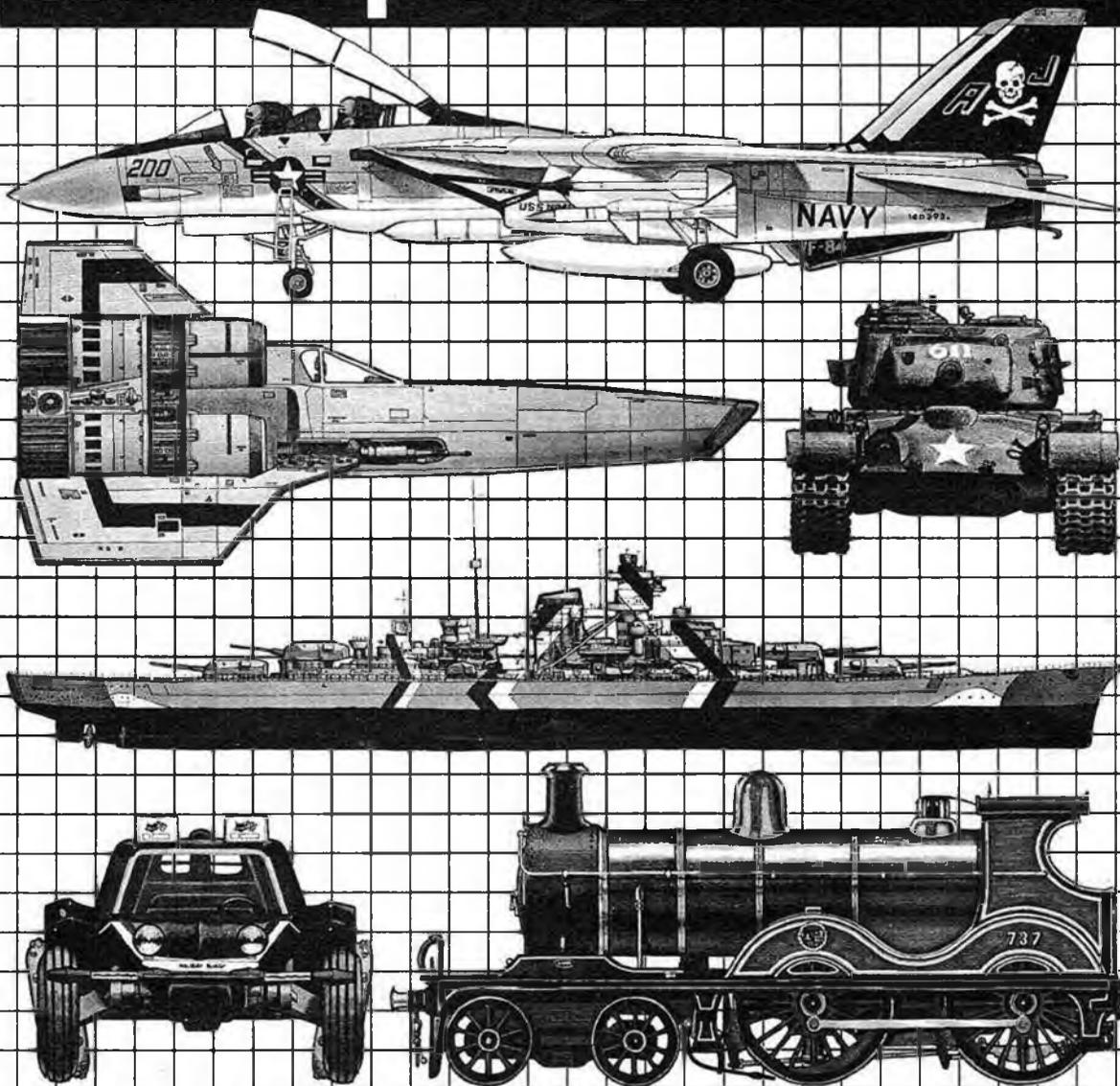
News of the first successful international postal team contest for A/1 and A/2 gliders and Open Rubber on May 19th showed similar weather in Montreal, Holland, Boston and the I.O.W. — yes, you guessed! — gales and intermittent rain! A/1 was won by Montreal MFC, A/2 by the New England Wakefield Group (?), while the Rubber event was abandoned.

'Radio Control Notes' contained more news of the latest sport of keeping an R/C Glider balanced on a permanent updraught for as long as possible with a new claim of 3 hrs. 39 mins. 27 secs. set at Ivinghoe Beacon on August 18th. The same column also had news of a revolutionary idea which was to set the R/C world alight in the ensuing years. Instead of turning on your receiver by means of a shorting plug inserted in the meter socket, why not use a *switch*? Sheer genius!

# Model Engineer Exhibition

1-9 Jan '83  
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Late night Thurs. 6th until 9pm

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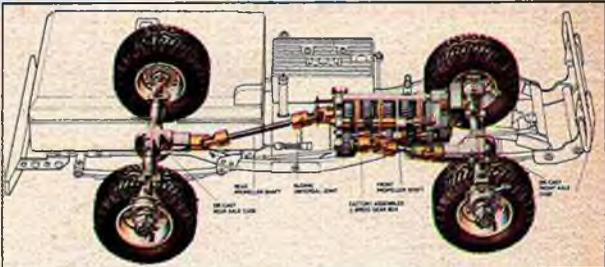
*It is regretted that for safety reasons no prams or pushchairs can be admitted. However limited pram parking space is available.*



# TOYOTA 4x4 PICK UP

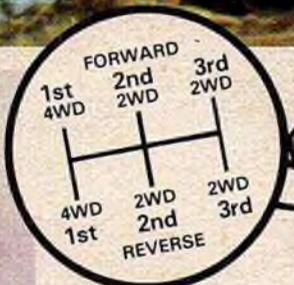
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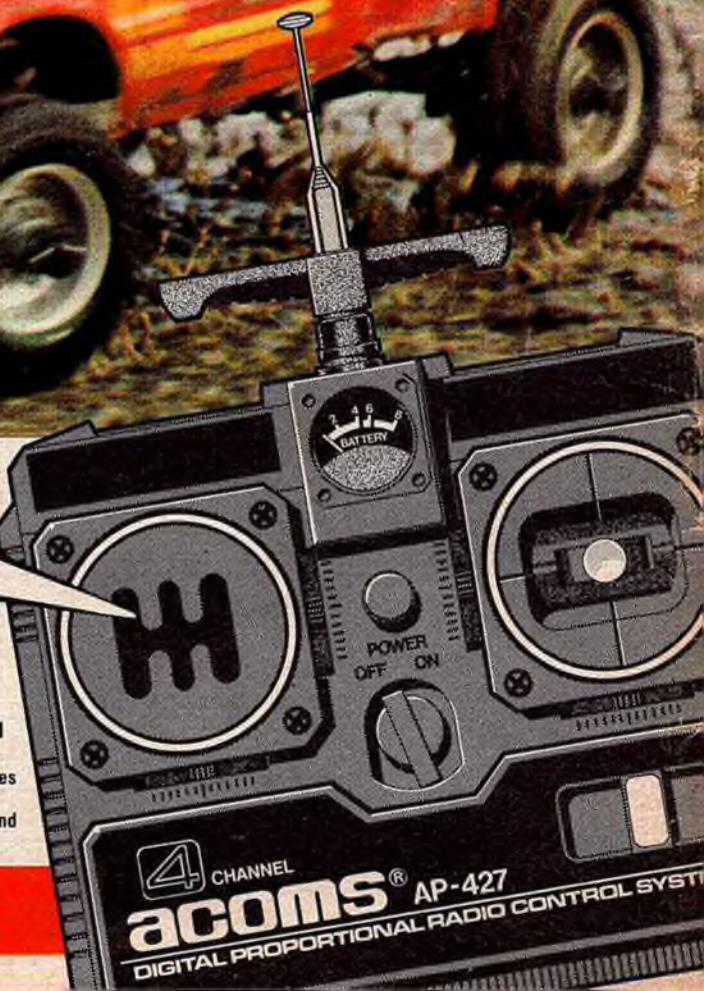
\*\*\*\*\* **IN 1:10th SCALE** \*\*\*\*\*

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