

705

AUGUST 1977 35p

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# Aero Modeller



HOBBY MAGAZINE

## THE CUP FINAL FLYING DISPLAY AT WEMBLEY



SONY... e 510

# QUICKSTART

**DART**  
.5 c.c.

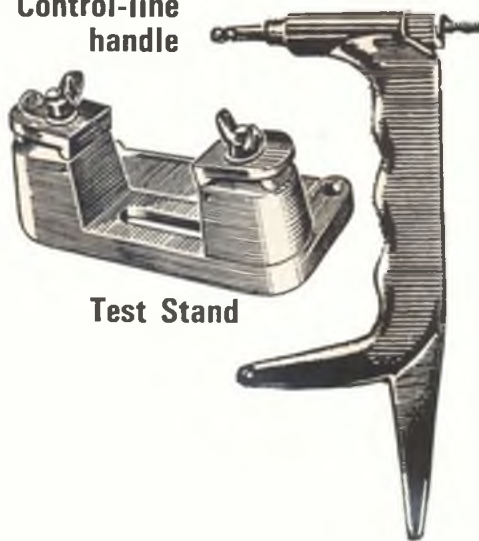


**WASP**  
.8 c.c.



Control-line  
handle

Test Stand



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THEM  
AT YOUR  
MODEL  
SHOP

**SPITFIRE**  
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**SABRE**  
1.5 c.c.



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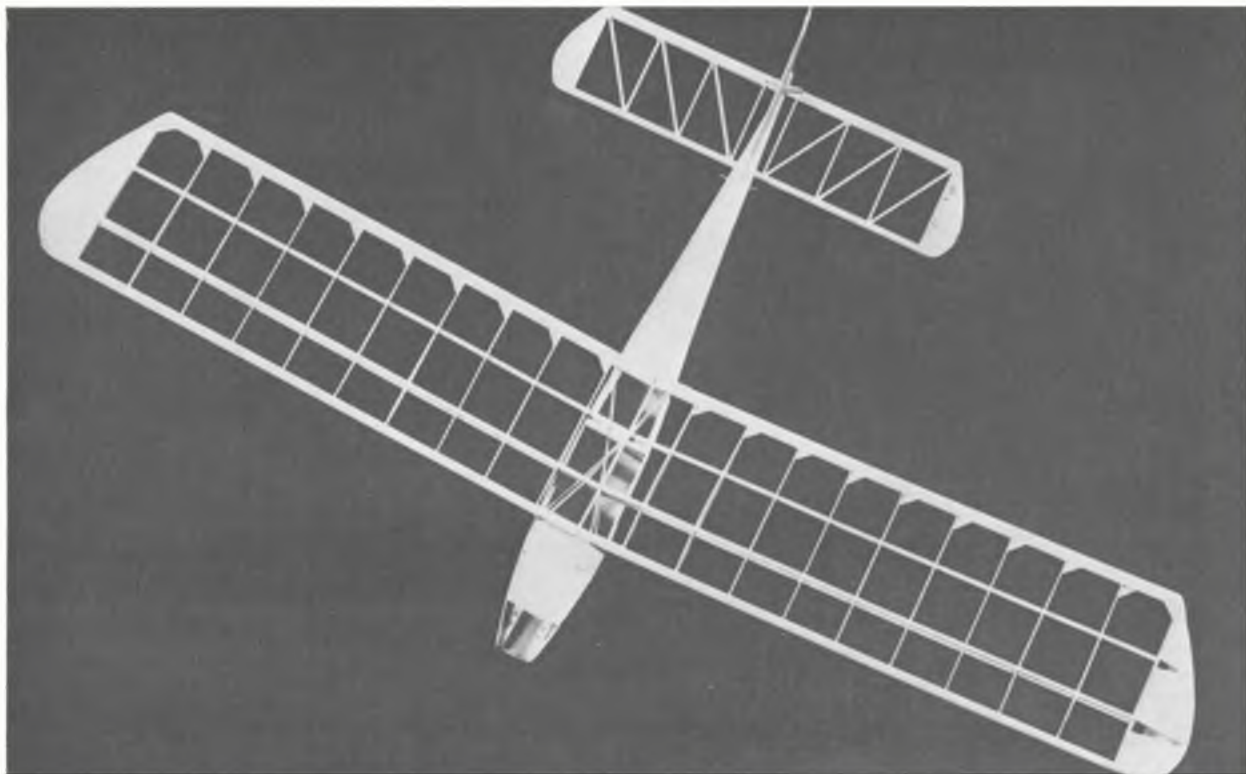
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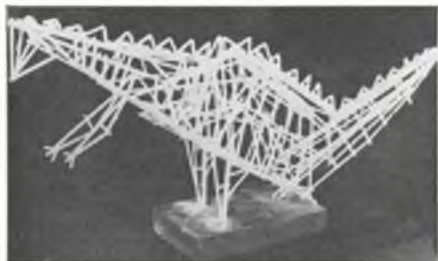
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# Aero Modeller

INCORPORATING  
MODEL AIRCRAFT

August 1977

Volume XLII No. 499

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HOBBY MAGAZINE



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Editorial Director

R. G. MOULTON

EDITOR

P. S. RICHARDSON

Managing Director

GOSPATRIC HOME

Advertisement Manager

M. GRAY

Production Manager

A. DOWDESWELL

## Comment

With the memory of yet two more very successful *AeroModeller* rallies at Old Warden still fresh in the mind (the Vintage Day being reported in this issue, whilst the Scale Day will be related next month) perhaps it is wise to examine just what appeal these meetings have.

Visit any scale competition and you will be lucky to see more than thirty models in total, and there will be few spectators. Old Warden attracts literally hundreds of models and more than two thousand visitors. The reason? Firstly, although prizes are awarded, there are no formalities: 'entries' do not have to be made, and 'official' flights do not have to be performed in front of critical judges.

Secondly, the meeting is primarily a rally, not a competition. Friends re-unite here once a year, and new acquaintances are struck up. In essence, Old Warden equates with *fun*. Where else do you see so much varied activity on one small airfield?

Perhaps the meeting re-kindles the spirit once prevalent amongst model fliers: the sort of atmosphere that Eaton Bray once knew. *People* made it happen - and the ideal place to re-create this atmosphere should be the Nationals, the perpetual 'mecca' for aeromodellers. Visit Little Rissington on either, or both, the week-ends in August, and play your part - making it a *real* event. It's well worth it.

## on the cover

*Just a piece of the action from the Wembley Cup Final display put on by Wonderwings on behalf of the Society of Model Aeronautical Engineers - full story appears on pages 483-5. Inset picture shows the team itself looking very professional in matching clothing and appropriately decorated models. Indeed, the whole show and attendant organisation was very professional - and highly successful. Photographs by Ian Dowsett.*

## next month

Plans for a superb free-flight scale LVG C6 which has delighted the crowds at Old Warden Scale Days in previous years. Full report from the World Free Flight Championships, plus features on control line, scale and engine topics. Don't miss the September issue - on sale 19th August.

## RADIO CONTROL HELICOPTER MODELS

The first book solely devoted to the design and construction of radio control helicopter models it caters for the growing interest in this aeromodelling aspect. Splendid work has been done by model trade and press in providing features, kits, parts and the like, now the enthusiast who has already built and flown a model is given data to help them design their own, or modify their existing model. The newcomer is also provided with useful information. Numerous drawings, diagrams, pictures support a skilled and informative text by an author with extensive modelling experience and professional occupation in the computer engineering field; he is also a glider pilot.

8½ x 5½ ins 144 pages.  
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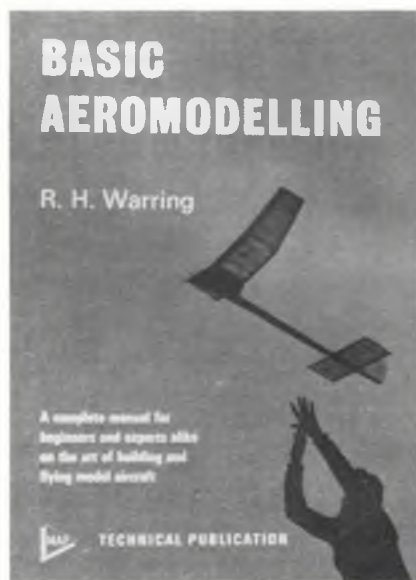
Published Autumn 1977



## MODEL AIRCRAFT AERODYNAMICS

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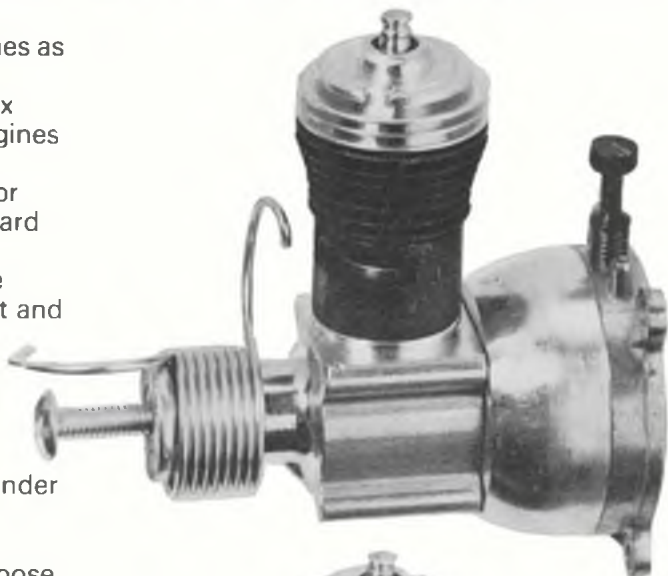
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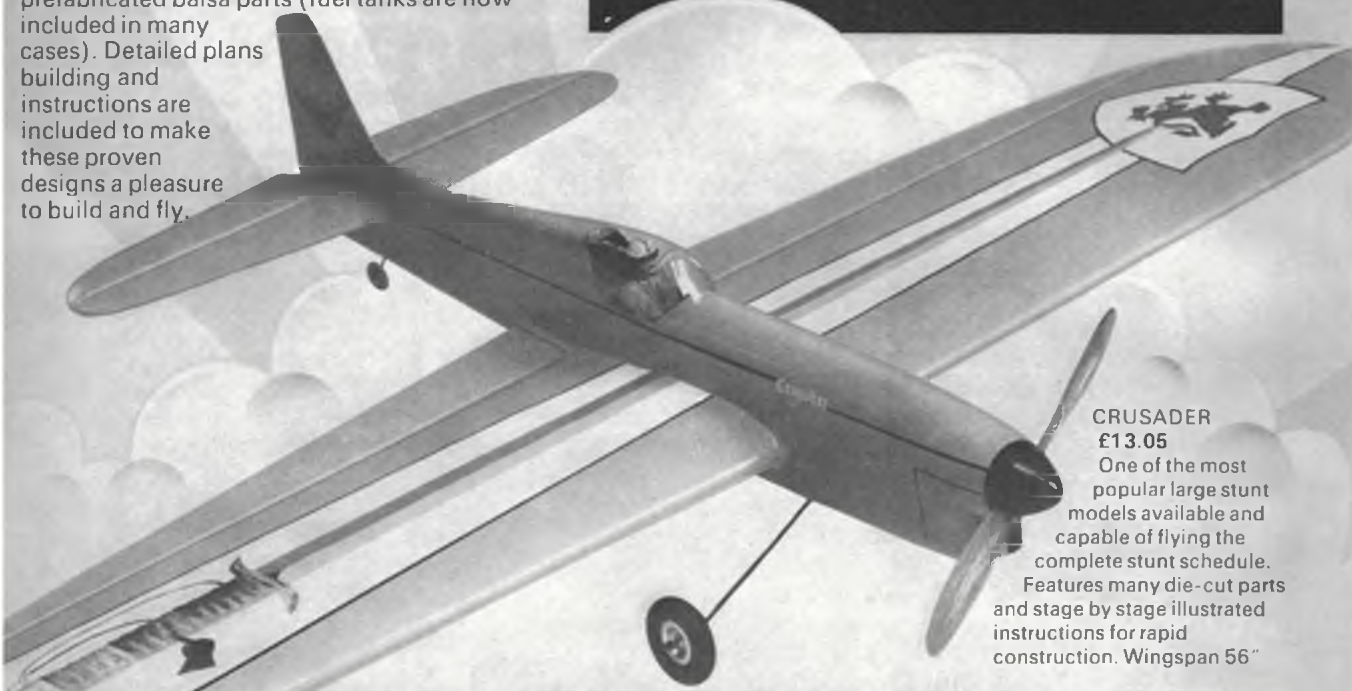
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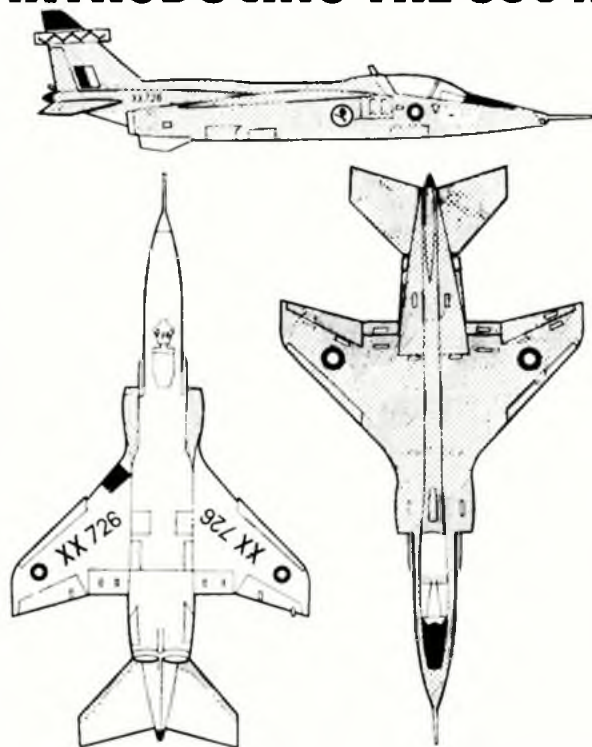
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**B.A.C. SEPECAT JAGUAR**  
1:72nd Scale



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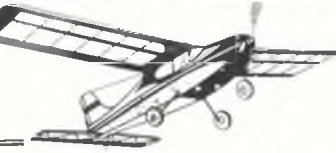
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### BULLET 30

develops the SAME POWER as a '29 glow engine! 10,000 rpm on a 10 x 4 prop! Flies models up to 72" span. 6-8 min. power run! Motor weight 14 ounces. Motor only, price £12.95



Super-powerful 12-pole motor takes standard '29' size power props. Uses two RIPMAX HI-AMP NICAD FLIGHT BATTERIES (rechargeable on the flying field direct from a 12 volt battery). Total weight of installed flight system 46 ounces.

and the smaller equivalent power to a .15 glow engine! 11,000 rpm on a 7x4 prop! Flies models up to 60" span. Installed weight 21 oz. (with batteries.) Motor only Price £4.95

### CYCLONE 15

#### RIPMAX ELECTRIC FLIGHT SYSTEMS . . .



Each system consists of the appropriate MOTOR fitted with INTERFERENCE SUPPRESSION, Shaft Adaptor and Allen key, motor fuse holder and flight fuse, heavy-duty toggle switch, all prewired to heavy-duty leads and connector; battery pack connector; charging lead with fuse holder, charging fuse connector and crocodile clips. Spares and other accessories are also available.

BULLET 30 SYSTEM . . . . . £48.50  
CYCLONE 15 SYSTEM . . . . . £24.50

#### ADVANTAGES

- No engine starting problems - just switch on and go! No starting skill, no starter or separate battery required.
- Smooth SILENT FLIGHT - well below the legal noise level which enables you to operate from sites where normal powered models are banned!
- CLEAN! No liquid fuels to mess about with, or clean off models after use! Models do not require fuelproofing, either.
- ECONOMIC OPERATION because once you have bought the system your Battery Pack can be recharged time and time again from your car battery. Operational time costs you nothing for fuel!
- LOW MAINTENANCE COSTS since there are no expensive glowplugs to burn out and the system is fully fuse protected. Only brushes need replacing when they eventually wear right down.
- VIBRATION is almost non-existent so servo mounting can be more rigid, simplifying installation and giving a more positive linkage for exact control response.

## MABUCHI A1

recommended electric power for lightweight models up to 36" wingspan approx.

Weight (complete with two RECHARGEABLE SUPER CELLS) is only 2½ ounces! Motor run up to 40 seconds on a single charge. Motor unit incorporates battery case and clips onto simple motor mount for simple, easy installation. Complete with 4½" dia. plastic prop. with spinner.

A1 Aeromotor Unit £3.30  
A1 Flight Batteries £2.05  
Battery Charger £4.80

This charger works off dry batteries (four HP II cells) and recharges the A1 Flight Batteries in seconds!



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**THE TOP BRITISH KITS** in the sports flying field. No wonder, either, for they are designed by expert modellers and superbly fabricated using modern techniques. Performance-proven and representing **OUTSTANDING VALUE FOR MONEY!** AT YOUR MODEL SHOP NOW!

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## PETREL 43" span

Designed to meet the A1 contest spec and an ideal choice for a 'junior' club model. Precut fuselage parts, die-cut ribs, etc. A really efficient thermal soarer, with superb stability on the towline.

Price £2.95

## PROFILE SCALE WITH A DIFFERENCE!

### HURRICANE

28in. wingspan for .09 glow or 1.5cc diesels. A VERY COMPLETE KIT (see photo below)

Price £4.95



### FW 190

28in. wingspan for .09 glow or 1.5cc diesels. A REALLY COMPLETE KIT (like the Hurricane)

Price £4.95



Just check the kit contents for value and study the photo below! Fuselage is fully shaped from balsa sheet, with additional moulded cowling blocks, and other plastic parts. Tail parts are pre-cut from balsa sheet. All wing ribs are die-cut. Shaped ply parts, formed wire parts, ballcrank, horn, wheels, moulded clear canopy, tissue for wing covering, and even scale-type transfer markings are all included. Plus a really detailed plan.



HURRICANE



Superbly engineered kits - every one of them! Really easy to build - and performance guaranteed! Prefabricated parts. Fully detailed plan and instructions. Britain's top-selling kits!!

## MISTRAL 55" span

Open-class high-performance towline glider with auto-rudder and tip-tail dethermaliser. Built-up tissue-covered wing and tail, sheet fuselage (all sheet parts die-cut). Kit includes all necessary items, except cement.

Price £3.95

## MERLIN 33" span

A simpler type of model with easy assembly

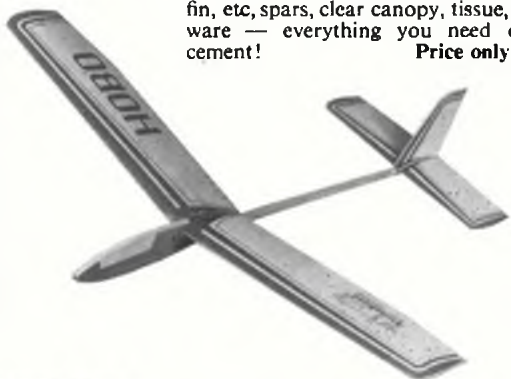
and performance guaranteed! All-sheet fuselage (with preshaped parts); built-up tissue-covered wings and tail. Kit includes die-cut ribs, fin, etc, spars, clear canopy, tissue, hardware - everything you need except cement!

Price only £1.95

## 28" HOBO

All-balsa construction with preshaped parts. Five die-cut sheets (four colour printed) - and the kit is complete even down to noseweight. Cambered wing for high performance as a beginner's glider. Only cement needed to complete your model; also readily adapts to Mabuchi A1 ELECTRIC POWER.

Price £1.85



## SCOUT 21" span

Sleek, speedy - control line model. Designed specially as a trainer or sports model for .75-1cc engines. Preshaped parts, hardware, and wheels included. No soldering required.

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# SUPER Tigre



**G60 F.I. R/C £54.71**

Super Tigre Engines	Retail (inc. VAT)
G20/15D	£19.80
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G20/15G	£19.80
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G15 R.V.D.	£30.40
G15/19 F.I. R/C	£31.05
G15/19 F.I.	£24.64
G20/23 Std.	£19.80
G20/23 R/C	£28.20
G21/29 F.I.	£28.53
G21/29 F.I. R/C	£34.51
G21/35 F.I.	£28.53
G21/35 F.I. R/C	£34.51
G21/40 F.I.	£28.87
G21/40 F.I. R/C	£35.45
G21/46 F.I. Std.	£29.81
G21/46 F.I. R/C	£36.37

THE NAME THAT STANDS FOR SPEED & POWER

*X21 F.I. Std.	£36.86
*X15 F.I. Std.	£36.86
*X29 Speed	£40.38
*X40 Speed	£40.38
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*ST. 35 S/R/C	£29.32
*ST. 60 R/C	£39.00
*G60 F.I. Bluehead ABC	£65.00
*G71 F.I. R/C	£54.71
*G60 RING Blue Head	£54.71

Silencers	
S15, fits G20, 15, 19, 23	£5.41
S29, fits G21, 35, 40, 46	£5.81
S35 fits ST35S, ST35C, ST35R/C	£5.81
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S56, fits STS1, 56, 60	£5.81
S71, fits G60 FI & RV & G71	£5.81
Glow plug standard	.74
Glow plug R/C	£1.44
Speed Glow Plug	.96
Needle valves, fit all sizes	.35
Needle valve and spray bar	£1.12
Pressure Nipple	.35
R/C car heat sink	£2.96
Exhaust extension (R/C car)	£1.84
Idle Needle Assy. MAG III	£1.19
Fuel Inlet Section	£1.19

\*Indicates from stock at May. 1st.

To Commonwealth Dealers, Importers and Wholesalers. We are the agreed suppliers for engines and parts. Just drop us a line for copies of our latest price schedule & delivery position.

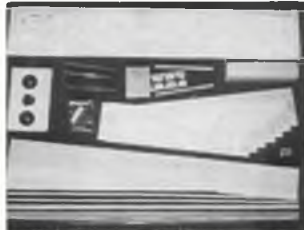


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### CONTROL LINE

STUKA-34"	£12.00
MOSQUITO-40"	£15.00

### FREE FLIGHT

SE5A - 27"	£13.75
STUKA - 34"	£11.50
ALBATROSS - 44"	£11.00
CESSNA - 46 1/2" - F.F./RC	£13.50

### RADIO CONTROL

CESSNA - 172H - 57"	£17.50
FIESELER STORCH - 46 1/2"	£12.00

# SCALE



The following AEROMODELLER PLANS are available in

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EXCELLENT VALUE FOR MONEY



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### CONTROL LINE

STUNT SPITFIRE - 53 1/2"	£21.00
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### FREE FLIGHT

FOKKER DRI TRIPLANE - 40 1/2"	£11.50
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Hot Wire 30p per m. Pacifiers £1.20 per 10. D.T. Fuse 2m 23p. 10m £1.08  
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A simple but high quality kit capable of excellent proportional control of one function of model car, aircraft or boat up to one mile range. Will drive almost any spare digital servo (can be supplied).

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**Kit of Parts and Drawings to assemble Transmitter and Receiver (Less xtals)**

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ROSSI NO. 2 Heads **88p** post 10p.; TELCO MOTORS **£8.45** post 30p.; Repair KIT **£1.00** p pd.; BADGER 250 BRUSH with 4 oz JAR & PROPEL **£8.99** post 60p.

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# RIPMAX

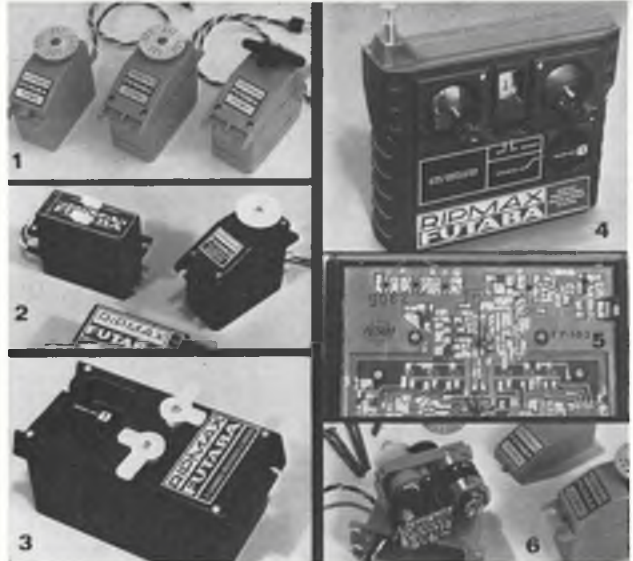
# FUTABA

Radio control is the ultimate in aeromodelling, and it need not be as expensive as you think (£63.50 will buy you a COMPLETE 2-function Ripmax-Futaba outfit). You can also swap radio from one model to another. So radio control can be a real and lasting investment.

Starting in radio you obviously want to go for the best value for money you can find, with proven technical performances—and above all, RELIABILITY. And that just about describes RIPMAX-FUTABA radio control in a nutshell!

Our three 'Standard' servos (1), for example, are the envy of other manufacturers. And there are four more in the range including the low-cost FD22M and the FD21M linear model (2) for direct push-pull movement. Also a 'brick' Module (3) incorporating Receiver and two servos in one ready-to-fit unit. That goes with the economically priced MEDALLION Transmitter(4).

Transmitter-Receiver 'Combos' start from as little as £37.50. All with the same superior state-of-the-art-solid state circuitry that has made RIPMAX-FUTABA Transmitters (5), Receivers and Servos (6) world famous.



Buying RIPMAX-FUTABA is an investment in **QUALITY, PERFORMANCE** and **RELIABILITY**. Real value for money! And you can start as low as £37.50 for a Medallion '2' Drycell Combo (£63.50 complete with two Servos). You can pay more for an R/C engine!

**TRANSMITTER-RECEIVER COMBOS WITH DRYCELL BATTERY BOXES 1 PAIR OF CRYSTALS\* etc.**

Medallion 2 Standard	... £37.50
Medallion 2 Brick	... £60.00
Medallion 2 Car	... £37.50
Twinstick 2-channel	... £46.00
Steerwheel 2-channel	... £46.00

**TRANSMITTER-RECEIVER COMBOS COMPLETE WITH NICADS, CHARGER, 1 PAIR OF CRYSTALS\*, etc.**

Twinstick 2-channel	... £74.00
Steerwheel 2-channel	... £74.00
3-channel M Series	... £93.00
4-channel M Series	... £98.00
6-channel M Series	... £111.00

**DRYCELL TX/NICAD RX WITH 1 pr. OF CRYSTALS\* etc.**

3-channel M Series with:	
three FD22M Servos	... £110.50
three FD16M, 17M or 21Ms	... £127.00
4-channel M Series with:	
four FD22M Servos	... £128.50
four FD16M, 17M or 21Ms	... £150.50
6-channel M Series with:	
four FD22M Servos	... £141.50
four FD16M, 17M or 21Ms	... £163.50

**ALL NICAD OUTFITS WITH 1 PAIR OF CRYSTALS\* etc.**

TWINSTICK 2-channel with:	
two FD22M Servos	... £100.00
two FD16M, 17M or 21Ms	... £111.00
STEERWHEEL 2-channel with:	
two FD22M Servos	... £100.00

two FD16M, 17M or 21Ms	... £111.00
3-channel M Series with:	
three FD22M Servos	... £132.00
three FD16M, 17M or 21Ms	... £148.50
4-channel M Series with:	
four FD22M Servos	... £150.00
four FD16M, 17M or 21Ms	... £172.00
6-channel M Series with:	
four FD22M Servos	... £163.00
four FD16M, 17M or 21Ms	... £185.00

\*All transmitter-receiver combos are also available with 6 pairs of crystals at an additional cost of £15.00.

**INDIVIDUAL SERVOS**

FD16M, 17M & 21M	... £18.50
FD22M	... £13.00
FD18M	... £21.50
Mammoth £45.00 Sail Winch	... £53.00
FD19M Speed Controller	... £39.00

**ADDITIONAL RECEIVERS**

Medallion 2 Std.	... £21.50
Medallion 2 Brick	... £44.00
2-channel M Series	... £21.50
3-channel M Series	... £24.00
6-channel M Series	... £30.00

**Examples of Accumulative Prices of Combos Plus Servos (All Drycell outfits, 1 pr. crystals)**

MEDALLION 2-channel with two FD22M Servos	... £63.50
with two FD16M, 17M or 21Ms	... £74.50
MEDALLION BRICK includes two Servos	... £60.00
TWINSTICK 2-channel with two FD22M Servos	... £72.00
with two FD16M, 17M or 21Ms	... £83.00
STEERWHEEL 2-channel with two FD22M Servos	... £72.00
with two FD16M, 17M or 21Ms	... £83.00

## NOW AT YOUR LOCAL MODEL SHOP

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# Heard at the HANGAR DOORS

**BRITISH NATIONAL CHAMPIONSHIPS.** Details of this annual treat, to be held at RAF Little Rissington, Gloucestershire, over the

weekends of 20/21st and 27/29th August, were provided in the August issue, and entry forms are currently being circulated to SMAE members. Camping facilities are available for all - but it is recommended to pre-book in order to ensure that you have a place to pitch your tent or park a caravan. Fee for the first weekend is £2 per tent or caravan, which permits you to camp for the Friday and Saturday nights only. For the second weekend the fee is £4 per tent or caravan, this entitling you to camp through from the Friday to Monday nights - but the airfield *must* be vacated by 9am on Tuesday 30th August. A booking form is being circulated to SMAE members, but this is not essential - just write to the Nationals Organisers at 9 Barbury Drive, Wantage, Oxon. General enquiries may be made to the Secretary, Jo Halman, at Luton (0582) 414678.

## BRITISH NATIONALS PROGRAMME

### Saturday 20th August

#### FREE FLIGHT

##### FAI Events:

F1A: 09.30-09.55 hr., 10.45-11.10 hr.,  
12.00-12.25 hr., 13.15-13.40 hr.  
F1B: 09.55-10.20 hr., 11.10-11.35 hr.,  
12.25-12.50 hr., 13.40-14.05 hr.  
F1C: 10.20-10.45 hr., 11.35-12.00 hr.,  
12.50-13.15 hr., 14.05-14.30 hr.

Coupe d'Hiver, A/1 glider, ¼A power, hand-launched glider.

Vintage and Tail-less 11.00-19.30 hr., Fly offs from 19.30 hr.

Open glider, Open rubber, Open power 14.30-19.30 hr.

#### R/C THERMAL SOARING

Open/FAI/100s.

### Sunday 21st August

#### FREE FLIGHT

##### FAI Events:

F1A: 09.30-09.50 hr. 10.30-10.50 hr.,  
11.30-11.50 hr.  
F1B: 09.50-10.10 hr., 10.50-11.10 hr.,  
11.50-12.10 hr.  
F1C: 10.10-10.30 hr., 11.10-11.30 hr.,  
12.10-12.30 hr.

Open glider, Open rubber, Open power 12.30-18.30 hr. Junior kit from 14.00 hr. Remaining fly-offs from 18.30 hrs.

#### R/C THERMAL SOARING

Open/FAI/100s.

### Saturday 27th August

#### CONTROL LINE

Aerobatics Round 1 09.30 - 17.00 hrs.  
Combat Round 1 09.30 - 17.00 hrs.  
Speed Round 1 09.30 - 17.00 hrs.  
Goodyear Round 1 09.30 - 13.00 hrs.  
Class B Round 1 13.00 - 15.00 hrs.  
FAI team race Round 1 15.00 - 18.30 hrs.

#### RADIO CONTROL

Helicopter 09.00 - 10.00 hrs.  
Aerobatics 10.00 - 13.00 hrs.  
14.00 - 17.00 hrs.  
Demonstrations 13.00 - 14.00 hrs.

#### SCALE

Free Flight from 18.00 or 07.00 Sunday

Control Line from 10.00

### Sunday 28th August

#### CONTROL LINE

Aerobatics Round 2 09.30 - 17.00 hrs.  
Combat to quarter finals 09.30 - 17.00 hrs.  
Speed Round 2 09.30 - 17.00 hrs.  
FAI team race Round 2 09.30 - 13.00 hrs.  
Class B Round 2 13.30 - 15.00 hrs.  
Goodyear Round 2 15.00 - 18.00 hrs.  
Mini Goodyear 11.00 - 15.00 hrs.

#### RADIO CONTROL

Aerobatics 09.00 - 12.00 hrs.  
Helicopter 12.00 - 13.00 hrs.  
Pylon 13.00 - 18.00 hrs.

#### SCALE

Free Flight Possibly from 07.00 hrs.  
Radio Control 09.00 - 18.00 hrs.

### Sunday 29th August

#### CONTROL LINE

Speed Round 3 09.30 - 16.30 hrs.  
Aerobatics Round 3 09.30 - 12.00 hrs.  
Round 4 14.00 - 16.30 hrs.  
Novice/Junior Stunt 11.00 - 15.00 hrs.  
¼A team race Rounds

1 & 2 09.30 - 12.30 hrs.  
Semi final 13.40 - 14.20 hrs.  
Final 16.20 hrs.

FAI team race Semi finals 1 12.30 - 13.10 hrs.

Semi finals 2 15.40 - 16.00 hrs.  
Final 18.00 hrs.

Goodyear Semi final 14.20 - 15.00 hrs.

Novice final 16.40 hrs.

Final 17.00 hrs.

Class B Semi final 15.00 - 15.40 hrs.

Final 17.20 hrs.

#### RADIO CONTROL

Pylon racing 09.00 - 12.00 hrs.  
Finals 17.00 - 18.00 hrs.

Aerobatics 12.00 - 15.00 hrs.  
Helicopter 15.00 - 16.00 hrs.  
Demonstration 16.00 - 17.00 hrs.

#### SCALE

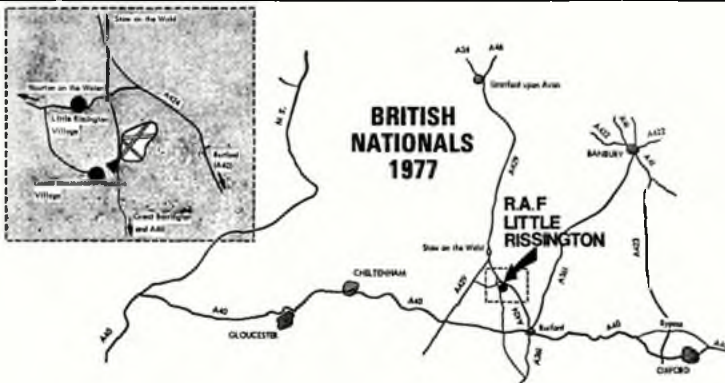
Radio Control 09.00 - 18.00 hrs.

**AUSTRALIAN WAKEFIELD** team member Peter Smith from Canberra arrived with his wife in April and bought a new Volkswagen Camper to house his models and luggage while doing a European tour before the World Championships at Roskilde. After getting caught up in a riot in Milan they parked the Camper outside the main railway station while they did a couple of hours pedestrian sightseeing. While they were away the Volkswagen and all its contents, including Peter's three Wakefields, was stolen leaving them the clothes they stood up in and the Pentax round Peter's neck.

With six weeks to go before the Championships, British team manager Bryan Spooner and New Zealand proxy flyer Martin Dilly fitted Peter up with building tools, free flight-grade balsa, spruce and jigs to produce Loffler Wakefields, and these were built in Ian Dowsett's workshop and on the bonnet of the hire car that Pete used till the Camper could be replaced.

**GOOD NEWS!** The Recreation and Culture Committee of the Stockport Metropolitan Borough Council has approved, in principle, the proposal that the site at Manchester Road, Cheadle, Cheshire, be developed as an International Control Line site. This approval is subject to confirmation by a superior committee.

If this flying site does get the 'green light' then it will be a tremendous fillip for all control line fliers, as well as a just reward for all those stalwarts who have put so much work into the planning and negotiation of such a site.



Choose between the Mark I or Mark II versions of Brian Kenny's basic yet very competitive Wakefield – the original placed fourth at the British Team Trials.



IN THE COMPANY of most modellers who have built rubber powered duration models, I have always considered the Wakefield class to be the ultimate challenge. Even in my 'short trousered' days the reports of the Wakefield competitions were read with avid interest. My very first Wakefield never reached the flying stage – still that wasn't at all surprising, since to attempt to build a 'Flying Minutes' kit model as an eleven year old is doomed to failure. . . It amazed me no end to see how much twist developed in the uncovered, elliptically sectioned, stringered fuselage when hand turns were applied to the motor!

I began to be seriously interested in the Wakefield class after I returned to modelling in 1970, and built the first Dave Greave's design published by *Free Flight News* in January 1972. This model was chosen since it was a straight forward design and I needed to learn the ground rules on a proven model. This flew well, if not successfully, for two or three years and is still used as a reserve model.

*Sniffer* owes much to many other designs and was conceived to be a simple model which was capable of performing well in typical British contest conditions. Consequently, no auto-surfaces were employed and the structure was chosen to be such that I would not be afraid to get it out of the box if the wind was above five miles an hour.

The wing is of moderate aspect ratio using a five inch chord and an early Pollard section. The section features a sharp leading edge and a turbulating spar since I see no point in designing a wing to be as smooth as possible only to have to employ an external turbulating cord to improve the glide. The wing employs no differential warps, but does use tip washout. It soon becomes clear when flying competition classes seriously that one requires a model which stays in trim (forever if possible!) and so visual checking for undesirable wing and tail warps is required. Washing-in the inner wing panel to prevent spiralling-in under power seems to be universally adopted, but how do you check *visually* that you have the same wash-in at each competition? I prefer to build the main panels flat since unwarped panels are easier to spot check, and to



use a piece of reversed trailing edge section stuck on the underside of the inner wing trailing edge near the polyhedral joint to give a lifting flap effect, should this prove necessary on testing. This has the advantage that the amount of 'flap' may be found by trial and error on the flying field quite simply, as opposed to the procedure required when re-warping a wing panel.

The tailplane employs an undercambered section which started off as a Lindner, but which has had some of the undercamber removed. The intention here was to try and control the powered portion of the flight and prevent power stalling. This appears to have been achieved with the addition of good stability when flying into, or on the edge of, lift. Whilst some other models appear to be upset by such conditions, producing a series of stalls and steeply banked turns, *Sniffer* seems to ride the lift in a stable attitude without an undue 'nose-up' attitude. In fact this feature suggested the model's name when Ian Dowsett remarked that the model was "*sniffing its way into lift*" on one flight at the World Championship trials.

The model uses a propeller of Schwartzbach pitch distribution and a blade of smaller width than usual. This was done to try to obtain a good rapid climb. I cannot claim a climb as high as Ron Pollard's yet, who can at the moment, but it is adequate and who knows, if I can summon up enough courage to wind up the sixteen strands to the absolute limit. . . Two commercially available hub assemblies have been used so far on *Sniffer*, those supplied by *Free Flight News* and the Ron Pollard designed Allan Cooper produced unit.

It seems inappropriate to give a full set of construction notes on a Wakefield since it is not a beginner's class, so I shall only mention factors which affected my method of construction.

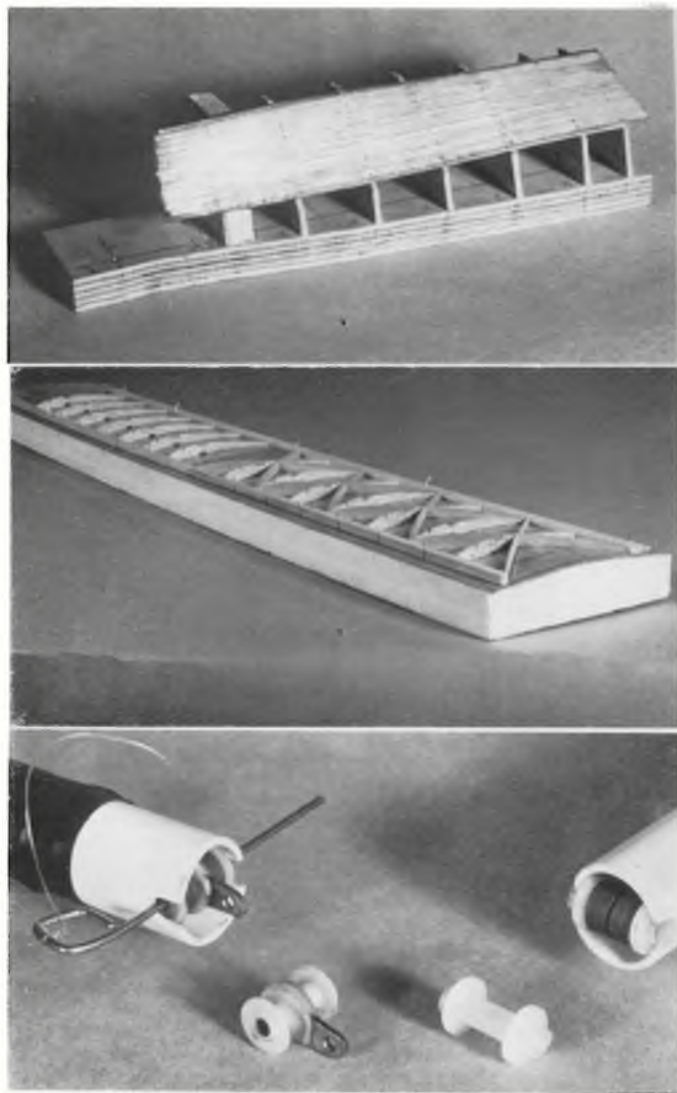
#### Fuselage

The main component here is the motor tube, and convenient solutions to this item are the Laurie Burrow's glass fibre product, or a light alloy tube as described in Ron Pollard's excellent series on his *Vitar* model in the April-June 1975 *AeroModellers*. When *Sniffer* was built, however, I did not have access to either of these items, and so I employed a plastic tube used by golfers to separate their club handles whilst in their golf bag. I first saw Arthur Wharry of the York Club using this idea and the tubes are cheap and durable although on the heavy side. The outside of the plastic tube was sanded to provide a keyed surface, and PVA glue used to attach an outer skin of 1mm balsa sheet.

The tail boom was moulded on a home planed tapered circular sectioned former in the usual manner. A piece of

**Method of rolling the tailboom around the tapered former and employing a sheet of newspaper to prevent splitting of the balsa blank.**

Picture top right shows the laminated propeller former as drawn on plan. Below is shown two wing centre panels under construction on an expanded polystyrene foam wing jig. At bottom are detail of cartridge loading system used. Left shows the front end of tube with double nylon bobbins retained in slotted tube by captive wire pin, and right shows rear view of loading/winding tube with nylon bobbin held in place in slotted tube by motor tension.

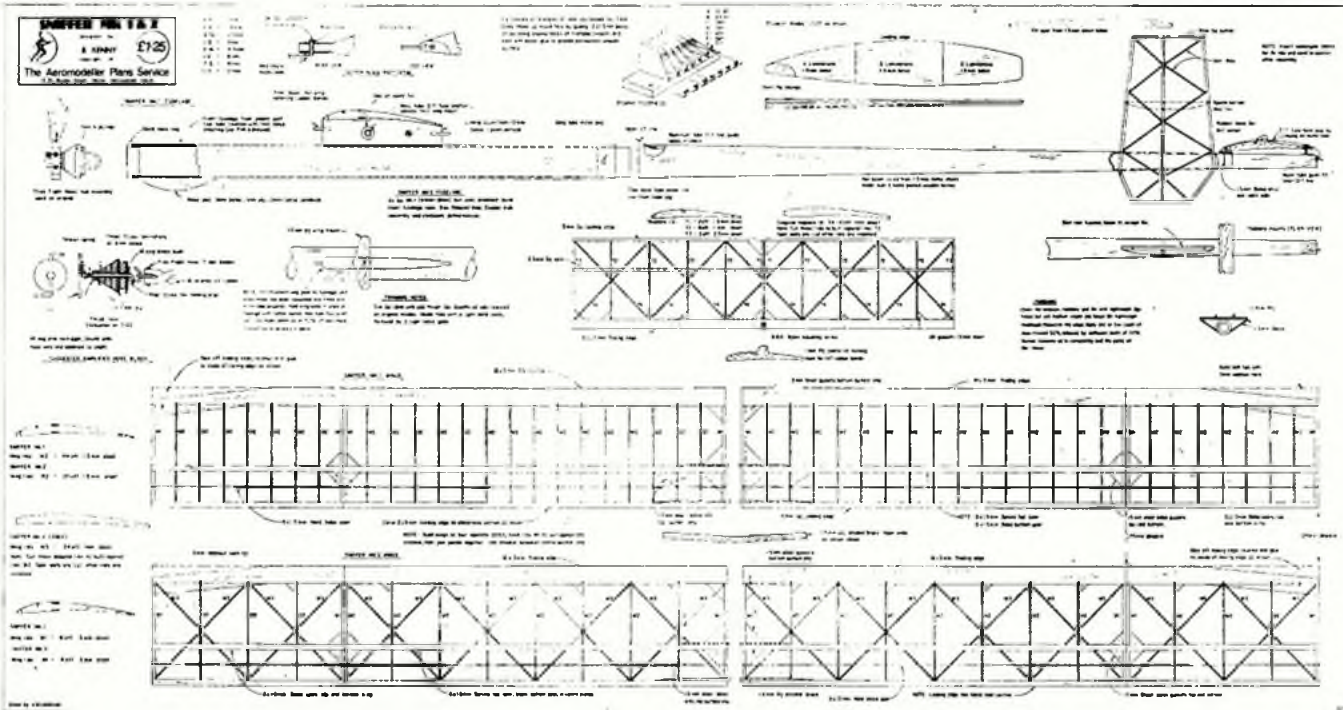


soft 1-5mm sheet balsa is cut to the developed shape of the tailboom and the inside surface given a coat of full strength dope. On soaking the sheet in water, the boom begins to develop a curved shape which helps to wrap the sheet on the tailboom form. If you have difficulty in stopping the wet balsa sheet from splitting as you are trying to roll it around the former, use the method adopted by the indoor flyers. Start by rolling a sheet of newspaper on the former for one turn, insert the balsa sheet so that it is trapped between the newspaper and former and continue to roll the newspaper and balsa sheet onto the former. Bind with a bandage or rubber bands and when dried overnight the newspaper can be removed and the balsa tail boom slipped back onto the former for final trimming and gluing.

On *Sniffer Mk 1* the tail boom was glued to the motor tube by means of an alloy joining tube which also served as a local reinforcement for the dural motor peg. The one piece fuselage, however, has two disadvantages, the first being one of inconvenience since the modern Wakefield fuselage is about four feet long and presents a sizeable storage or transport problem. The main objection however, is the possibility that the motor may decide to blow after the winding tube has been removed. The removal of the blown motor is made much easier if the tail boom is detachable.

Subsequent versions of *Sniffer* have this feature, both the motor tube and tailboom having mating concentric

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Two commercial propeller hub assemblies have been used. At left is that produced by Alan Cooper (68 Station Road, Wombwell, Nr. Barnsley, Yorks.) and on the right the Free Flight News product - details from 21 Ravensbourne Drive, Chelmsford, Essex CM1 2SJ.



dural connecting tubes which are retained and located by a good fitting motor peg which passes through both connecting tubes.

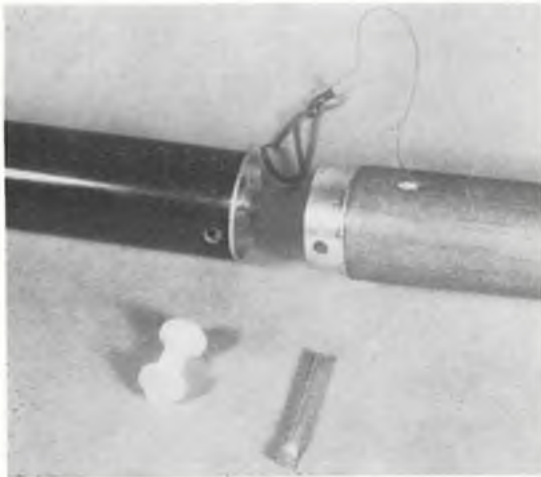
### Propeller

I prefer moulding propeller blades to carving them; its quicker, cheaper and ensures identical blades. The propeller mould was formed by laying balsa strips across a number of pitch triangles which are glued to a substantial base board. When positioning the triangles, care should be taken to see that the middle of the mould forms a straight line which is parallel to the base board. A straight edge laid edgewise across the triangles facilitates this. Spruce reinforcing strips form the outer two radial boundaries of the mould, and a coating of 5 minute epoxy on the face of the mould provides a hard smooth surface.

The appropriate blade blanks are cut from 1.5mm balsa sheet, soaked thoroughly in water and then bound to the mould with a bandage. The mould is then either left to dry out overnight or placed in an oven to accelerate the process. When dried out, the blades can be 5 minute epoxied together once more being bound onto the mould. After shaping the blade and reinforcing the root by two pieces of 1mm ply, the blade is once more positioned on the mould to enable the root hinge to be accurately fitted. The blade is then covered in Jap tissue and finished with two or three coats of thinned dope and a final coat of thinned banana oil.

### Wing

*Sniffer Mk1* had a wing incorporating parallel wing ribs at 1in spacing and relied on the covering to provide adequate torsional stiffness. With this in mind the centre wing



panels were covered in heavyweight Jap tissue and liberally doped to provide a damp proof surface which would not lose its rigidity under early morning flying conditions. This resulted in an overweight wing and on the second version, a fully geodetic structure was adopted.

This prompted me to consider constructing a wing jig since past experience has shown that the undercamber of such a wing can pose some difficulties when sanding. This sanding is made unnecessary if one uses an accurate diagonal rib template and a wing jig. The jig I used was made from expanded polystyrene foam using a hot wire cutter to produce the undercambered shape of the airfoil section. The top of the foam was made serviceable by covering with a 1.5mm balsa sheet surface using PVA adhesive. The wing plan form was then drawn onto the sheet and two coats of dope applied. Finally, the sheet was covered with plastic film to provide a non stick surface. Transparent self adhesive book backing film is ideal for this purpose.

After leading and trailing edges are pinned or attached to the form with clear adhesive tape the wing ribs are glued in position and diagonal ribs fitted. I prefer to set the dihedral angles at this stage using 5 minute epoxy at the leading and trailing edge joints since the wing spars are then easier to fit with good joints.

### Tailplane and Fin

The fin features a lifting section to give a right turn, and the section is sanded to shape after the originally rectangular geodetic ribs have been allowed to set. After covering and doping, the fin may be fitted through an appropriate slot cut into the tailboom. Two versions built by fellow clubmate Dave Goodwin have had the fin stuck to the left hand side of the tailboom, the fin being located vertically by a transverse dowel passing through the boom and being forced into the main spar of the fin. This feature acts also as a shear pin where failure occurs on a heavy landing to allow the fin to knock off saving the tailboom.

The tailplane is of conventional geodetic structure and features an 8BA nylon screw epoxied through the trailing edge to serve as an incidence adjuster. (Try your local electronic spares shop if your model shop does not stock these).

### Finishing

As with all free-flight models, the tail region of this model should be kept as light as possible and this should be borne in mind when selecting wood for these components

*continued on p468*

**Fuselage/tail boom joint.** The dural joining rings are a good fit and are aligned by dural tube motor peg which passes through new nylon bobbin. One end of motor peg is flattened so that it is retained on pushing into fuselage. Nylon D/T line exits from top of tailboom.

# FROM THE HANDLE + FROM THE HANDLE + FROM

## COMBAT

by Richard Wilkens



### STOCKPORT COMBAT RALLY

FREE BOOZE was available to entrants at the fifth annual event, on 29th May. The competition began at 11am with a total of 26 entries – a very low entry considering there was about £100 in prizes as well as the plonk. Free beer! Where was Mick Tiernan? The weather was warm with a slight breeze, which certainly helped the ale to be consumed quicker than was anticipated: in fact by 2pm 72 pints had been consumed . . .

Most of the models were *Superstar II*'s with Super Tigre G20/15's up front. There was nothing new in model design; speed appeared to be the main concern, with a few competitors experimenting with STX15 ABC's and Cox 15's – although the G20/15's appeared to be just as fast and were certainly more reliable and consistent.

The morning saw the first round and losers fly-off with no real surprises. However Junior A. Tyson beat Dave Wiseman in the second round when Dave had excessive ground time, due to engine

problems. Another big upset was British National Champion, Mick Lewis, losing to Frank Dowling by 2 cuts to 1. One of the most spectacular bouts of the day was between Dave Wood and Steve Malone. Dave got 2 cuts and had 14 seconds ground time, whilst Steve also made 2 cuts and lost 16 seconds ground time. The re-flight proved that Dave was on top form as he managed to win 4 cuts to 2.

In the semi finals, Woody put out Frank Dowling by a 2-0 victory and Bob Morgan beat Finchley club mate Tothill on ground time, who did very well considering this was only his second contest (must have been the booze!). Third and fourth place was decided between Frank Dowling and Tothill, Frank being the eventual winner. The final brought Bob Morgan and Dave Wood together, which was certainly the climax of the day's events. Both flew extremely well, the final score being 2-2, with Dave winning on ground time. In fact this is the third consecutive year Dave has won the *Mainstream Combat Trophy*, soon to be renamed the 'Woody Wonder Pot'!

### COX FOR COMBAT?

If you have just bought a Super Tigre X15 F1 ABC and have found difficulty in getting it to run consistently on pacifiers, then the following information received from our partlally-retired but still very active columnist, Dave Clarkson, may help you. The apparent cause of the trouble seems to be that the standard venturi is too short and too wide, but fitting either of the two types shown in *Figure 1* seems to solve most problems. The No. 1 type allows the venturi to be rotated to give the needle extra prop clearance.

Dave also sends his opinions on the Cox 15 and an extract from his letter reads as follows:

*'The Cox is probably the most powerful combat motor now available on the props we use – certainly faster than the Rossi, Taipan, Super Tigre etc. on the latest Tornado 7 x 4in. Nica handling too, except for a tendency to start backwards if over-primed. I have found mine is easy to set and is very consistent in the air – no manoeuvre or series of them makes it cough or slow up. All good so far (the regular head is a beaut too – takes up to 25% nitro no bother and I have not blown mine yet, even after about 30 flights). BUT it can be 'not quite tight' out of the box.*

*Firstly Cox's come 'squeak-tight' which is necessary, for the sintered iron piston does not grow like a machined cast iron one does during running-in. So to ensure a good and happy life, accept that your Cox is really tight and do the first 10-15 minutes of running in mighty slow and rich in short bursts (use an 8 x 4in prop and 10% nitro to keep it whirling all tight during this mighty slow session). Then move to 10-15 minutes of normal type running-in ie a bit slow and rich (4 stroke for parts of the runs) to get it right on. This is one motor where the 'Brasso trick' or loosening the piston/liner by lapping WILL RESULT IN DISASTER. Disaster here being a 200% clapped motor within 10 minutes.*

*Secondly, Cox adjust and seal the crankcase split with paper gaskets. Definitely a no-no as those who have suffered a Taipan 15 will know! Mine came with three (!) paper gaskets in it – about 0.010in of paper so as to give Cox's desired timings and squish*

Dave Woods retains his grasp on the Mainstream Combat Trophy for the third consecutive year, having beaten Bob Morgan (complete with patriotic model) in the final. No truth in the rumour that they removed the motors to save weight – or is the state of their models one-up for the anti-noise brigade?



# THE HANDLE + FROM THE HANDLE + FROM THE



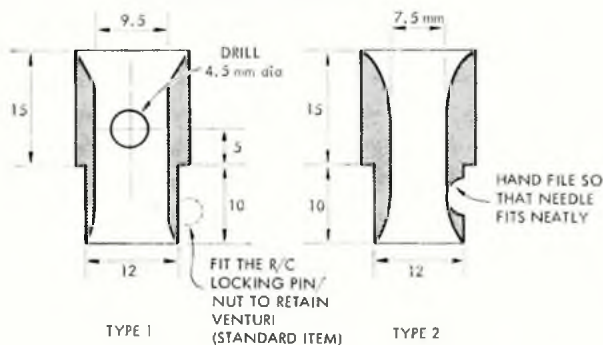
Bit of the combat action (!) from Wembley, where the sacred turf was treated to the sight of a first class flying display – pacifiers could not be used due to the risk of having glow fuel squirted over the grass thereby incurring the wrath of the groundman who reputedly knows every blade of grass by name.

clearance!!! Not surprisingly, tightening the head bolts produced a canted-over liner (symptom – tight when turned over forward and jolly rigid when turned over backwards, or vice versa, depending on which head bolts were tighter). Did not even bother to run it like that for another disaster was indicated. So I threw away the paper gaskets and lapped the two mating faces together with toothpaste, using the liner as a mandrel ie to keep things straight. (Toothpaste is great for gently removing aluminium and yet is not abrasive enough to hurt the liner). Then the use of a depth-micrometer and a calculator indicated a 0.012in liner shim necessary to get 150 exhaust timing with an exact 0.012in squish clearance without adding or removing head gaskets (I do not like more than one of them either). Being a pinned liner, a full shim washer under the liner flange is impossible on the Cox because the liner-locating pin gets in the way. However, a ring of 0.3mm dia C/L single-strand line, cut so as not quite meeting, giving space for the liner-locating pin, was used with a bit of reluctance. So far this crude liner shim has been 100% successful and the method therefore seems acceptable, although I do not recommend everybody should do the same thing!

The only other modification I have adopted is to use an MVVS prop driver and collet instead of the Cox spinner and backplate, so as to reduce weight, etc. Plainly, just like Supre Tigre G 20's, X 15 FI's, Rossi 15's, Taipan 15's and so on, the Cox needs attention to make an ace combat motor but, with attention like I have described above, it can be made, in my humble opinion, into the BEST of the lot. Without care and attention, both before running and during initial run-in, maybe real disappointment will result though. Not a cowboy's motor!

Figure 1 – Replacement venturis for Super Tigre X15

BOTH REPLACEMENT VENTURIS TURNED FROM 15 mm ALUMINIUM BAR



## DUTCH INTERNATIONAL

If you would like to meet a whole bunch of nice guys, see interesting combat models and matches, camp by a swimming pool, enjoy beer, good food and the best of Dutch hospitality and fly in one of the fairest and best organised contests possible, then don't miss the Dutch Combat International in Amerongen, Holland on 6th and 7th August. Entries must reach Rob Olijve, Oranjestraat S1, Elst (Utr), Holland by around 15th July. Write to this address also for more information.

Last year the temperature was a cool 95° and sleeping under the (super) stars in a recommended way of ensuring you wake up in time for dinner. You must have an FAI licence and proof of insurance, but you can get insured on the site for the duration of the contest. Entry fees are 20 guilders for competitors and 10 guilders for supporters, which includes the camping fee or for sleeping in the sports ground changing rooms. For an extra 20 guilders you get meals both days and for another 20 you can stay in the local youth hostel. You pay all fees on the Friday night or send them in advance. Can John Berry pull out all the stops again?

## HANDY HINT DEPARTMENT

If you have just arrived at a contest on a cold day and your pacifiers are all hard and unusable, or if they have not fully deflated, just dunk them in the car radiator for a minute to soften them up.

Any news or views on combat should be sent, with pictures if possible, to R. Wilkens, 'The Laurels', 3 Rack End, Standlake, Oxon, for inclusion in this Column.

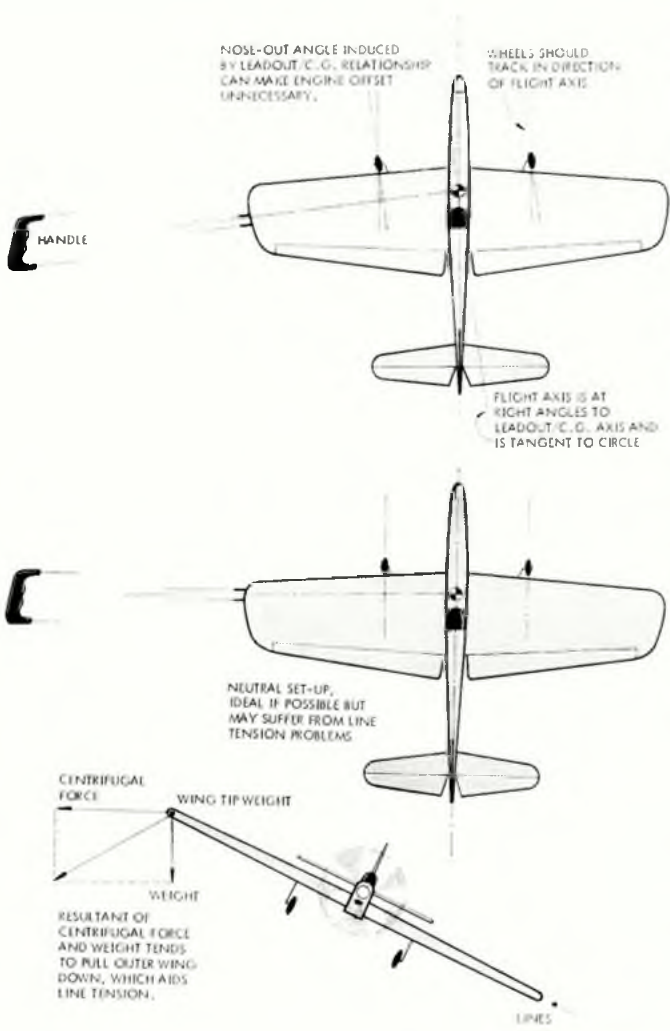


## AEROBATICS

by Glen Alison

HAVE YOU ever noticed how some models take off very badly, with the undercarriage legs shuddering sideways and the whole model adopting a crab-like sideways motion? The first and most obvious cause of this is incorrect wheel tracking, but just what is the proper set up? If the model is going to fly in a circular path, then it must take off in a similar fashion, so it must roll in a slight left hand turn when pushed free on the tarmac. Do not overdo this, of course, as it could lead to disaster if the model runs into the circle under power on the take off run. The second consideration which affects this is the attitude of the model to the circle tangent, and the factor which affects this is the relative position of the leadout guides at the wing

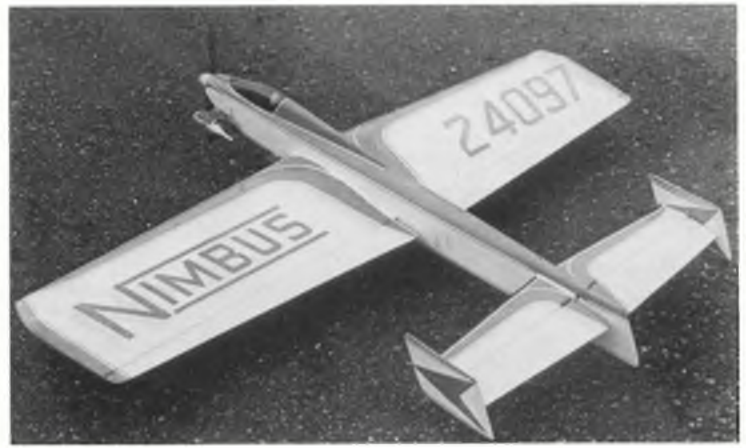
# HANDLE + FROM THE HANDLE + FROM THE HANDLE



Promising newcomer to the competition scene is Eric Fearn from Nottingham - seen here at Barkston Heath with his Nobler - the best stunt kit ever?

tip to the centre of gravity position. A fact which is not always appreciated by stunt fliers is that a model flies with the handle to wing tip connection to centre of gravity position tending to form a straight line. Never mind where the bellcrank is, that is unimportant, the fact is that the centrifugal force will always try to force the CG to the furthest radial distance from the point of connection or support (ie the leadouts). Thus it can be seen that the wing tip/CG relationship plays an important role in establishing the attitude of the model relative to the circle tangent, or in other words, the direction that it is *pointing* in can be very different to the direction that in which it is *flying*. This is important to bear in mind when trimming. The model will adopt a nose out tendency if *either* the leadouts are moved rearwards *or* the CG moved forwards, and either will improve line tension.

However, things should be done in the correct order, and I would suggest that the CG position ought to be adjusted first, using either nose or tail weight, to get the sensitivity of the model to suit the reactions of the flier. If the CG is too far rearward, then the model will be very difficult to stabilise after an abrupt manoeuvre, and if too forward then control will be sluggish. So, having reached a suitable CG position, the leadout connection can be adjusted from the rear most position, gradually moving forward until line tension is at the minimum which is acceptable to the pilot. Now you see the value of variable line rake! You will now have established the model's optimum attitude which will have a certain amount of nose-out angle. The rudder is now set in order to maintain that attitude, and should be the same as the nose-out angle in flight. Adjustment is made easy if the advice was followed in the June



Glen Sibley of the Wolves has been busy all winter building this very attractive Nimbus, powered with the almost inevitable Super Tigre 46, it is very neatly finished in white with blue and black trim.

# FROM THE HANDLE + FROM THE HANDLE + FROM



Above is the latest design from Ken Burton, named Falcon II, and featuring a high aspect ratio wing in the aim for greater efficiency. Slightly old fashioned in the use of a '35' for power – in this instance an Enya. Very attractive colour scheme makes it stand out from the crowd. At right is Norwich enthusiast John Bailey with Lochinvar V with ST 46 power and RAF style colour scheme. Picture below reveals typical section of hollowed out foam core for stunt wings used by Marco Beschizza of the High Wycombe club. Wing is skinned with 1/16in balsa – wealthy fellow!



issue! This is in order to stabilise the rear end of the model and prevent those 'wiggles' on sharp corners which some models perform, thus upsetting the flight path of the manoeuvre.

The wing tip weight is very important indeed, and it performs two functions. In level flight, it counter-balances the weight of the lines, thus allowing the model to fly in a 'flat' circle with the wings level. Secondly, when flying high, the centrifugal force of the tip weight still acts horizontally and thus tries to keep the outer wing down and this is a big help in maintaining line tension when flying high. It is far better to have too much tip weight than too little, as this will only cause wobbling due to the too high inertia of the tip. Too little will result in lost line tension when flying high.

## NOVICE STUNT COMPETITIONS

There have been good entries at the Junior/Novice events already held this year, a good sign that it was much needed as a new class in order to encourage people into the competition scene. A noticeable feature of the entrants has been the wide range of age of the participants, from youngsters of 13, dead keen, up to middle aged men who have perhaps been competent fliers for many years but have hesitated to jump into the 'deep end' of competition flying, but enjoy the less demanding schedule for a bit of fun.

The novice schedule omits the manoeuvres which many beginners find troublesome such as square bunts, square eights, the hourglass and cloverleaf, and concentrate on the round manoeuvres – although two square loops are included in order to give a taste of the more advanced stuff. The reverse wing over, which is at the beginning of the FAI schedule, is moved back until later in this revised schedule because even the experts find this one nerve racking with the inverted pull-out. It is, however, a confidence booster if one has already completed a few stunts and settled oneself down mentally.

One query which has arisen due to a slight misunderstanding, is how and when a novice flier 'graduates' out of that class into Open stunt events. The rule is this: a flier must score more than 350 points twice in an official SMAE Centralised competition, before being promoted up to Open events. These are *flying* points, not including

the appearance points, but they do include the 10% bonus for fliers under 14 years of age.

Many contest organisers are keen to encourage entries in Novice and good prizes have been offered, such as engines, so do not just think about it . . . Enter!

## NEWS . . .

THANKS TO Dan Harley we have brief details of the Australian State Championships meeting which attracted 116 competitors – not bad considering the prevalent petrol strike. A total of 16 events were held over the two day meet, with Robin Hiern (who flew for Australia in the '76 World Champs speed meeting) displaying his versatility by placing fourth in stunt, first in Goodyear and first in FAI speed. Most of the events flown have different rules to our own thus direct comparison of results is impossible (for instance Rat-Race is flown on a 'number of laps in a set time' basis) while the fact that tarmac was not available further makes performance levels hard to equate. Nonetheless, it is clear that FAI team race standards are high with Georgiadis/Prior recording a 4:26 heat and 8:50.8 final time to win – well ahead of the Wilson Brothers with 4:46.7 and 9:17.5 respectively.

Perhaps of greater interest was the venue – the Weapons Research Institute, Model & Experimental Engineers Society field, which features three grass circles, a lake for ROW and full provisions for night flying. In fact, we learn that several of the racing events and combat were flown under floodlights!

\* \* \* \*

Courtesy of Ingo Schmidt, we learn of happenings in West Germany. Firstly, at the **North Rhine Westfalen** contest, which despite good weather conditions attracted only 11 entries in *all three* FAI events, the only notable happening was that Ingo himself topped Speed, recording 241.6km/hr beating Emil Rumpel by a large (9km/hr) margin. Fastest heat in team race went to Brendel/Glodeck at 4:23, but only Marschall/Kuckelkorn completed the final – and that was in a very leisurely 10:29.

A week later (May 15th) was the much harder fought Team Trials for the European Champs. On this occasion Ingo Schmidt again topped the results, this time with 243.2km/hr, and he will be joined by Josef Frohlich (241.6km/hr) and Helmut Gorczicza (240.0 km/hr), plus of course the '75 European Champion, Emil Rumpel.

In team race, representation will be via Baader/Kaul (4:15), Brendel/Glodeck (4:10) and Marschall/Kuckelkorn (4:54), while aerobatics will have a full team at last consisting of Claus Maikis Stefan Ratsch and Uwe Kehnen.







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

# JUNIOR EVENTS AT THE NATIONALS

AT THE 1977 British National Championships (known to all as 'the Nats') due to be held at RAF Little Rissington in Gloucestershire, there are several contests arranged especially for Junior modellers. The full programme of events to be held are published on the *Hangar Doors* page – and note that the free flight and control line events are to be held on separate weekends. To enter any of the following contests, it is essential that modellers are adequately covered by third party insurance for flying model aircraft. The MAP scheme (details on page opposite inside back-cover) is fine – but your club may already organise insurance on your behalf. Check up first – and bring proof of cover with you!

### Junior Kit

Two classes (glider and rubber powered) are catered for in this free flight contest which will be held on Sunday, 21st August, from 2pm. Any model may be used, provided that it has been built by the competitor from a commercial kit. Whilst competitors are free to choose which ever rubber powered model they wish, gliders are restricted to those with a maximum wingspan as stated on the box or plan, of 50in. Models must be built from the kit without modification except that dethermalisers may be added, and gliders can be fitted with auto-rudders. Bring the plan of your model with you. The competitors must be under 16 years of age on the day of the contest.

The contest, for which there will be no entry fee, will take place at the upwind end of the airfield, near the other free flight events, and will be clearly marked. In the contest you will be asked to make three flights with a maximum duration of 2 minutes apiece. Glider competitors will need to bring their own towlines – which must not exceed 50 metres in length. Rubber fliers must wind the motor and launch the aircraft themselves.

First prizes in each category are superb trophies, consisting of a silver model of a seagull potted in clear resin. Both trophies were generously donated by Norman Foster, and designed by Ian Dowsett.

### Mini Goodyear

Due to be held between 11am and 3pm on Sunday, 28th August, this control line racing event will this year take place over grass so undercarriages are now optional. Models themselves must be 1/12th scale, profile fuselage version of 'Goodyear' specification racers, with the tail enlarged by a maximum of 25% extra area. See SMAE rule book for full specifications. (Suitable plans were provided in our December 1976 issue). Fuel tank capacity is a maximum of 10cc – and commercial tanks are preferred. Maximum engine capacity is 1.6cc and plain

bearing engines are preferred. Line length is 41ft 11ins. *Either* the mechanic or the pit man must be under 16 years of age on the day of the contest.

Entries may be made on the day and cost 50p. Competitors must be SMAE Members.

### Combat

Sponsored by *Wonderwings*, this event will take place on Sunday 28th August and is intended to encourage youngsters to combat flying. The rules are:

- (1) Any engine up to 1.5cc, retailing at less than £10 on 1st March 1977 must be used.
- (2) Motors to run on suction or crankcase pressure only. No pacifiers will be allowed.
- (3) Each contestant will be allowed only three models for the contest. One model only may be used per match.
- (4) All pull tests will be 15lbs.
- (5) Three pit crew maximum per model, including streamer holder. Crash hats must be worn.
- (6) 100 points per cut, including string cuts. One point per second air-time. Four-minute bouts. One-minute warm up, engines running at start, streamers 6ft string, 10ft streamer. One inch wide.
- (7) Lines 45ft plus or minus 3in.

People of any age can enter and the champion will receive the *Wonderwings Combat Trophy* but there will be a special prize for entrants up to 14 years of age and another for those up to 18 years. For further details, contact Martyn Cowley, *Wonderwings*, 'The Laurels', 3 Rack End, Standlake, Oxon.

Entry fees: Up to 14 years old=25p; 14-18 years=50p; 18 and over=£1.00.

### Novice/Junior Stunt

This will be 'two events in one' for Juniors (any person under 16 years of age on the day of the contest) and Novices. A 'Novice' is defined as any person who has not scored more than 650 points in an FAI schedule flight in an SMAE aerobatic contest. If a person obtains more than 350 points in the

new schedule in two separate Novice competitions, then they are promoted out of the class.

Although both contests will be flown before the same set of judges, two separate results lists (and prize lists) will be produced. A feature of the scoring system is that groups of manoeuvres (e.g. three loops or two eights) will be marked as a whole out of 10 and then multiplied by the 'K' (or difficulty) factor. Also any manoeuvre not attempted will score minus 5 times K factor unless the competitor has previously notified the judge that he intends to omit certain items. Pull test is to be 10 times model weight.

Now for the schedule itself:

1. *Starting within 1 minute* – 10 points; after 1 minute – 0 points
2. *Take off* – (K factor 2)
3. *Inside loops* – 3 off (K factor 3)
4. *Inverted flight* – 2 laps (K factor 2)
5. *Outside loops* – 3 off (K factor 3)
6. *Reverse wing over* – 1 off (K factor 8)
7. *Square loops* – 2 off (K factor 6)
8. *Horizontal eights* – 2 off (K factor 4)
9. *Vertical eights* – 2 off (K factor 6)
10. *Overhead eights* – 2 off (K factor 6)
11. *Landing* – without undercarriage 2 points, with undercarriage 5 points

Entrants under 14 years of age on 1st January 1977 will receive an extra 10% of their final score. The judges will award appearance points for construction and finish marked out of 10. These points will carry a K factor according to the type of model as follows:

- (a) Flying wing combat type model (K factor 1)
- (b) Profile model with definite wing/fuselage/tailplane (K factor 2)
- (c) As (b) but with undercarriage and minimum fuselage width of 35mm (K factor 3)
- (d) As for (c) but with cowled engine and semi-scale appearance (K factor 4)

For this event to be held on Sunday, August 28th between 11am and 3pm, competitors will need to be SMAE members. Entry for contest may be made on the day at a cost of 50p. The event will be located near to the other control line events.

Dear John Bridge,

I am between 10 and 16 years of age and would like to become a member of the 'Golden Wings Club'. With this application I enclose postal order (International Money Order) for 50p to cover cost of enamel club badge, two coloured transfers and membership card.

NAME IN FULL.....

ADDRESS.....

YEAR OF BIRTH..... SCHOOL.....

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

Send to: GOLDEN WINGS CLUB, AEROMODELLER, P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE.

8/77 15p in the £1 Rebate plan purchase coupon for Golden Wing Member G.W. No.....



EVEN THOUGH a blustery 20 knot breeze with attendant chilled temperature swept Old Warden to greet early arrivals with their vintage models, it took just five minutes for Mr Gandolfi to get his *Ethereal Lady* airborne for a succession of splendid flights. Fortunately, the weather turned kinder, and as the day progressed, we were treated to one of the most pleasant experiences of a decade. Howard Boys seemed to be the only one on the field with a *model* that was actually more than 25 years old. Moreover, it was radio controlled, and it flew just as it started all that time ago, on simple pulsed rudder.

A KeilKraft *Scorpion* by Jim Travers, of Newark, won the Concours d'Elegance, hastily arranged for the free flieders, and which attracted a fine spread of rare and exotic shapes; David Baker not only had the largest model – a 1937 Bowden Contest replica – but also the largest number, as 17 'oldies' were crammed into his caravan! Rarest of all the vintage types, but unhappily not in full flight for aviating, was Alex Imrie's reproduction of the pre-war German record-holding ornithopter by Alexander Lippisch. Beside the vintage types, the 'hush' models also arrived in numbers, notably the CO<sub>2</sub> brigade, which seems to increase its strength month by month.

Meanwhile at the top end of the field, the vintage control line enthusiasts were enjoying themselves. All too often, a 'new' event receives good support in its initial year – only to fade quickly into obscurity. Not so the *Fireball Trophy*, inspiration of Michael Beach, which in its second year again attracted around 40 models, many of them newly built for this event. Favourite subjects were the *Kandoo* and *Flicka*, plus other AeroModeller designs such as *Candy II*, *Crackerjack* and *Yoicks*, still available via the 'X' list.

Before Michael Beach made and donated his unique and splendid trophy, the C/L vintage model was a complete rarity. Now that the enthusiasm is there to 'build 'em like they used to', so it is worth considering his original aim, and channelling further efforts along the same simple theme. The main objective is: enjoyment. The low-key competition atmosphere is intentional – the meeting is arranged primarily as a rally, a get-together of like minded enthusiasts. Certainly there is a trophy to be presented, but there are no formalities to observe.

How does a model qualify? It merely has to be built to a plan or kit published pre 1950 – and be flown. However, the way to impress the

## AeroModeller

# VINTAGE DAY

held at Old Warden  
on Silver Jubilee Day

judges is to use a bit of imagination in your choice of model. Fine, build a *Flicka* if you wish – plans are still available from *AeroModeller Plans Service* – but go to the trouble of searching out a design from period magazines or books, and that will be rated higher. If you have the same engine as shown on the plan, or one of the equivalent era, then that will be well received. Not possible? Do not be put off: use a more modern powerplant, but the older the better to suit the character of the model.

Is the model neatly built? That is bound to impress the judges more than a really scruffy aircraft, while is the finishing in keeping with the era? Here, plastic film covering is unlikely to arouse much enthusiasm, nor

Heading picture shows Jim Travers launching his beautiful Keil Kraft *Scorpion* which won the Concours d'Elegance event for free flieders. Flew well despite the wind.

Doug Scott produced very nicely built *Boxcar* but to save time had to use Coverite (an American shrink-tight woven material) for the covering. Neat, but not authentic, unlike the Ohlson 60 *Sparky* which had been unused for 23 years! Ran well but fuel problems prevent much flying.





Charlie Crawley of the Finchley club with very nice Mills Bomb Mk 2. Uses a very early Efin 2.51 engine - still has original plan and kit box. Flew extremely well and the drop-off undercarriage did.



Gerry Johnson put aside his thermal soaring interests to build a couple of vintage models - this Flicka performing the best flights of the day with brand new Frog 500 powerplant. Really good squares!



This 'Stunster' was 'found' in the 1949 AeroModeller Annual by Jack Law. Looked really attractive in its all blue colour scheme but the 5cc Vulture diesel needed more power for stunts.



Prolific builder Geoff Burkett produced this neatly trimmed Defender fitted with a Miles Special prototype diesel. Must have iron nerves, or at least iron fingers, to start that beast!

SVAS member Mick Staples with the inevitable Kandoo plus ED Comp. Special. Several examples seen but only Geoff Burkett's flew like the original - shaky loops and all.



Winner of the superb Fireball Trophy - Alan Callaghan's beautiful De Bolt Super Bipe (7in less span than the famous 'Bipe'). Uses Frog 500 power and flies in clockwise direction.





Geoff Hardwick cheated wisely by replacing wire and bent reed outlines on his Kamlet with balsa (left). Lippisch 1938 ornithopter replica by Alex Imrie provided a flapping diversion (centre). Old timers reunion, Mercury IV designer, Mick Smith and Noel Baker reminisce among the great turnout.

would 'uncharacteristic gaudy transfers. Finally, the flying side. Here your model should emulate the original. Whilst a *Challenger* can only be expected to go round and round, there is little credit in a *Stunt King* that will not stunt. Equally, a *Kandoo* will not be expected to 'square'! Keep it in the right context, and your efforts are more likely to be rewarded.

Not, let us emphasise, is it necessarily desirable to produce a contest winner – just build to enjoy yourself, but if at the same time it is really 'authentic' . . .

Clear winner of the Fireball Trophy proved to be none other than our Scale Columnist, Alan Callaghan with just the right sort of model. His De Bolt *Superbiqe* was not perhaps

such an original choice of design, but it was very neatly made, finished in a 'proper' colour scheme and adequately powered by a Frog 500. Set-up to fly in the early American clockwise direction, he flew it superbly – including inverted a couple of feet off the ground. He had to hold the handle upside down though in order to equate the direction of travel with the attitude of the model!

Behind Alan was Charlie Crawley with two very fine models – a Veron *Stunter* (as featured on the cover of the April issue) plus an equally nice *Mills Bomb Mk 2*, which also performed well with good round loops and inverted flight. For sheer bravado, Geoff Burkett deserved a prize – his specially light *Kandoo* (8oz less

than its predecessor) performed some heart-stopping loops from its Comp Special powerplant – just like the original! He also brought along no less than nine vintage C/L models.

The atmosphere at Old Warden at this Silver Jubilee Day was quite remarkable as it seemed to transport the participants back to a time which is so fondly remembered. Among the visitors were two who did much to pioneer Free Flight power modelling, and who still retain their interest in those elegant large cabin designs, namely, Noel Barker and Mike Smith, designer of the famous *Mercury IV* (who just happened to be over here on holiday from South Africa).

## SNIFFER MK 1 & 2

continued from page 460

and particularly when covering and doping. Jap tissue is now freely available and is the ideal covering for tailboom, tailplane and fin.

If you are going to fly seriously in FAI competitions in this country you have to remember the early morning 'cold and damp' rounds and ensure a light, waterproof finish. One or two coats of 50-50 thinned dope followed by 50-50 thinned banana oil should be adequate for this. The number of coats should be a question of personal judgement rather than a rigid adherence to a stated number. Lightweight Modelspan or medium weight Jap tissue is used for the wing covering.

A 70% centre of gravity position was used on *Sniffers I and II* and this is achieved by finally attaching the wing pylon to the fuselage to obtain this position when balancing the finished model complete with its motor installed and propeller fitted.

### Flying

Since the model uses no auto surfaces it is essential to find the standard patch of 'tall grass' and test glide until you are satisfied that you have a reasonably flat glide with a tendency to an open right hand turn.

Half turns should then be used to check out the climb,

trimming this with side and downthrust. The original models required about 1.5mm right side thrust which was built into the nose block during construction, and no downthrust. If more than 1.5mm right side thrust is required for the climb turn, try a small amount of right rudder by adding a trim tab to the fin and correcting the glide turn by tail tilt if desired.

There is nothing worse than trying to handle a model with rubber lubricant on your hands, and for this reason alone it is well worth using the cartridge loading system. But add to this the possibilities of safeguarding the model against a burst motor and having a stock of pre-prepared motors for loading into the model and it becomes unbelievable that the method is not universally employed. A cheap cartridge tube is available from your electrical contractor supplier in the form of 25mm diameter rigid PVC conduit which may be purchased for about £1.00 for a 3 metre length, enough for about 5 cartridge tubes. *Free Flight News* can supply you with bobbins and T-bars for use with this system, or if you have access to a lathe or friendly machinist you may fashion your own versions. The system I use at the moment is shown in the accompanying photographs.

So far *Sniffer* has only been flown in one contest and this was entirely due to the fact that Dave Goodwin persuaded me to attend the recent World Championship trials to select Great Britain's teams to fly in Denmark. *Sniffer Mk 1* placed fourth after having been in the first three or four for the various weekends flown. Unfortunately I saved my worst flight of the competition for the final one when in the lead. That's competition flying!! Here's to the next Trials.



AIRCRAFT DESCRIBED—No. 232

## MORAVA L-200 D

**Attractive Polish light twin aircraft drawn by Z. Luranc**

THIS ATTRACTIVE light business aircraft is the third development of Ladislav Smrcek's original *Morava L-200* design, which first took to the air in April 1957. Then powered by a pair of 160hp Walter Minor 6 III, six cylinder in-line air cooled engines, it was put into production at Czechoslovakia's National Aircraft Works at Kunovice. However, this model was soon superseded by the L-200A version with modified fuselage and cabin, and now with more powerful engines — namely 210hp M337 six cylinder in-line aircooled units, supercharged and fuel injected driving two bladed propellers with electrically operated pitch control. In all, around 400 aircraft were produced in this configuration before the L-200D — the subject of our drawing — was produced in mid 1962.

This version showed several refinements over its predecessors, although there were no major alterations. The undercarriage unit was strengthened while the hydraulics to both this assembly and the flaps were improved with a pump being driven from each engine. In addition, the electronics and other equipment were updated, but the most obvious change was the switch to three-bladed, hydraulically operated constant speed propellers.

Construction proved quite conventional. The all metal fuselage was a semi-monocoque structure, while the 5° dihedralled wing used an all metal two spar assembly, high lift flaps and Frise type ailerons. Warm air deicing was employed for the leading edge. The all metal cantilever tailplane carried the twin fins, and both rudders plus elevator carried trim

tabs. A total fuel capacity of 92 gallons was achieved by use of both tip tanks and auxiliary tanks in the wings, outboard of the engines.

Inside the heated and soundproofed cabin, up to five persons could be carried on the two individual front seats (with dual controls) and the rear bench style seat. Access was gained via forward opening doors on each side. Standard equipment included VHF communication radio and radio compass, while there was also provision for night and blind flying instrumentation.

**Performance:**

Max. level speed .. 300 Km/hr  
Max. cruising speed .. 285 Km/hr

Max. level speed .. 300 Km/hr  
Max. cruising speed .. 285 Km/hr  
Econ. cruising speed .. 265 Km/hr



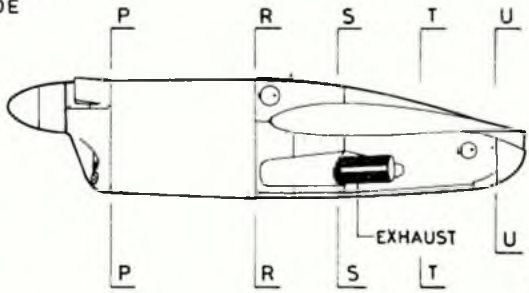


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THE PORT ENGINE VIEWED FROM THE PORT SIDE

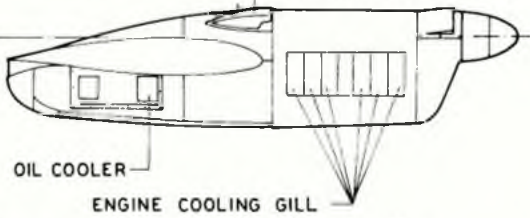
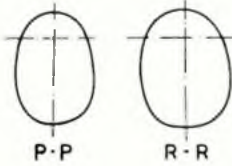
TAXI LIGHT



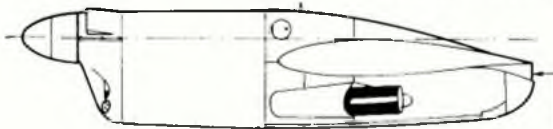
THE PORT ENGINE VIEWED FROM THE S'BOARD SIDE

SUPERCHARGER INTAKE

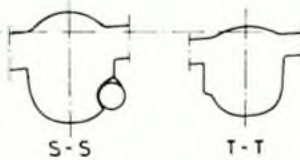
STEP



THIS PORTION SLIDES IN WHEN FLAPS ARE LOWERED



MAIN LANDING GEAR



METAL ELEVATOR TAB  
TAB CONTROL



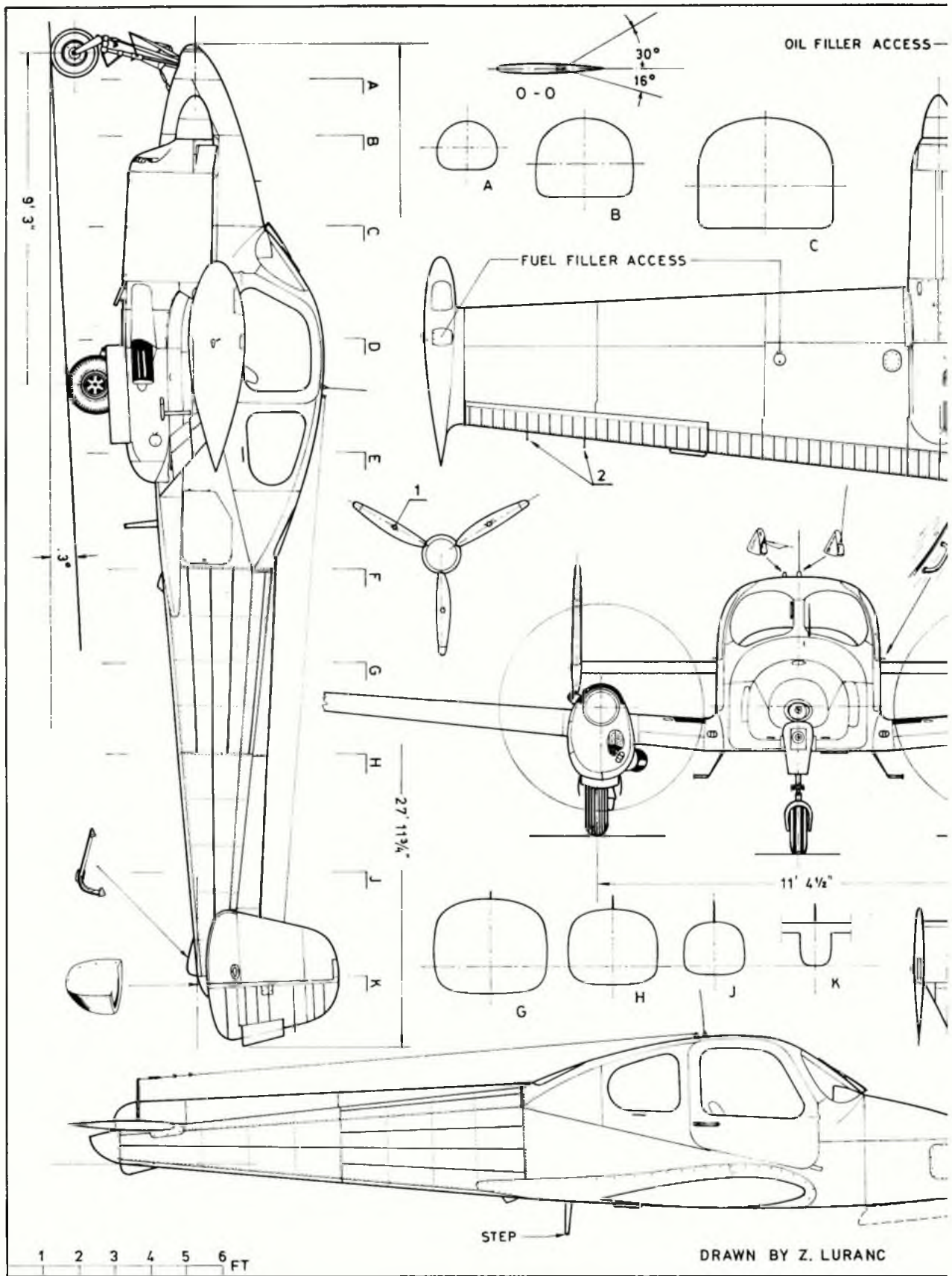
S'BOARD ENGINE VIEWED FROM THE S'BOARD SIDE

# L-200 D MORAVA LIGHT BUSINESS AIRCRAFT

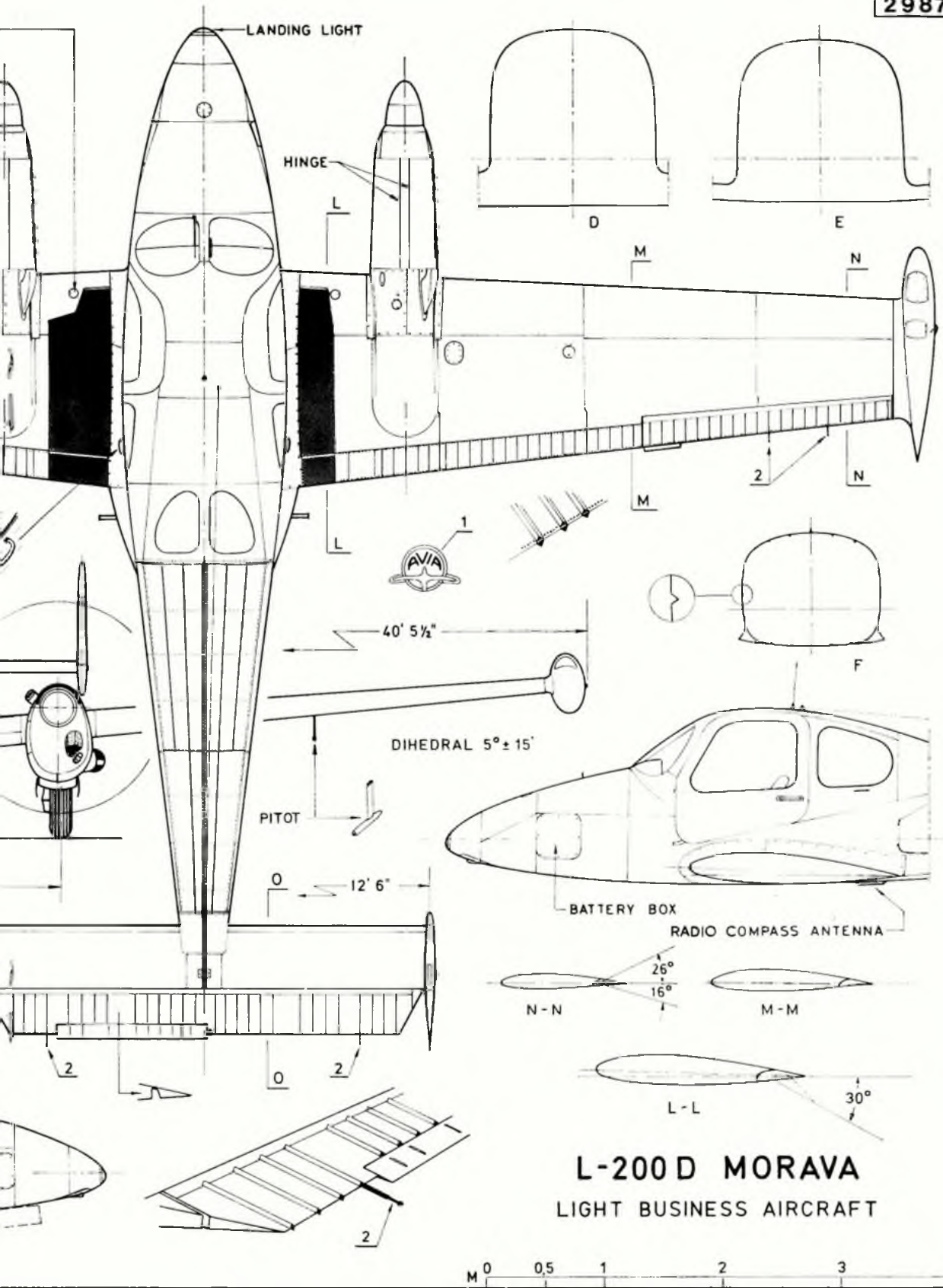
DRAWN BY Z. LURANC

1 2 3 4 5 FT

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L-200 D MORAVA  
LIGHT BUSINESS AIRCRAFT

# topical twists

by 'Pylonius'  
illustrated by Sherry



## Cover Story

That picture on the cover of our companion magazine just about summed up the modelling situation today. There it is, this gorgeous model, all power and potential, with the obligatory and equally gorgeous other type model in decorative attendance, posed against a typically modern background of crumbling concrete, towering pylons and an industrial fill in of yuck and yet more yuck. It all exemplifies the old saying: trendiness is next to grottness.

In effect the modeller is all dressed up and nowhere to go. Where, for instance, can he fly all that gleaming model? Certainly not in the local park, where you might get away with a quick daffy with a stunt kite if the park keeper is in a good mood, but they don't call them model by laws for nothing. Nor can he go to the old flying site where models had been traditionally flown since it became known that elastic could keep things up other than what they usually keep up, for that is now a petro-chemical plant – and spreading rapidly.

Nor, come to that, is there anywhere to take the young lady. The lovers lane is now a six track motorway, and the woodland tryst a gravel pit. Even the old *Palais de Dance* has been changed into an office block, and there is sodium lighting over the porch. What is more, she is most probably the wife of the Managing Director of the petro-chemical plant.

But if you were really hell bent on putting the glamour girls to one side and flying the model, it is but a mere hundred miles to the nearest hope of an airfield where, provided you have the right membership and correct insurance cover, you could put in for an additional audio test. Having not blown the noise meter apart you then have to check out that no-one else is using the field – no karts, charity walkers or paratroppers, all of whom take precedence on a maturity scale basis, toys coming last. Then again you could be upstaged by a march past of guard dogs, or the airfield could be cleared for an emergency landing – a private glider coming in within the next four hours. As a final blow to any possibility of getting airborne there is the chat chat of Citizen Radio right bang on your frequency.

Makes a nice photograph, though.

## One Man's Meet . . .

What's all this I read about "the *Sunday Flyer pottering around in his local park every weekend*." It sounds to me all very cosy and old fashioned, the idea of unambitious hobbyists doing a bit of genteel and limited model flying under the benevolent eye of the park keeper.

Anyway, the general idea is that the Sunday potterers could be usefully recruited into the active and exciting world of contest flying – in other words to put the emphasis on the pot rather than the pottering. Why fly the same old model boring year in and boring year out when you could sportingly lose it in one glorious contest flight on some remote airfield?

That's the philosophy, but I would have thought that the 'lone wolf', as he used to be called, has suffered the fate of most of our wildlife: either hunted to extinction or knocked out by encroachment and pollution. He is, in any case, one of an extinct species who used to look upon

"He would fly it before the photographer arrived."

the local park or common as a proving ground extension of his hobby bench, and he has been replaced by the modern dabbler who, if able to get into the local park, regards it as a spill over of the toy shop counter. And here, bolstered by modern technology and with morale uplifted by confidence boosting advertising, he has little doubt that his pre-fab model will fly like an angel. But this is where his model career is apt to be cut short. Give him a glider and he'll pull it up at such a whistling speed that the wings fold up like a pair of hands, as if praying for gentler treatment; give him a typical, all balsa C L model and he'll do things with gravity old Newton never dreamed of; and give him a radio model and its every man for himself, and an emergency Council meeting. No use trying to recruit him into the contest ranks for he is only too happy to get back to his Scalextric.

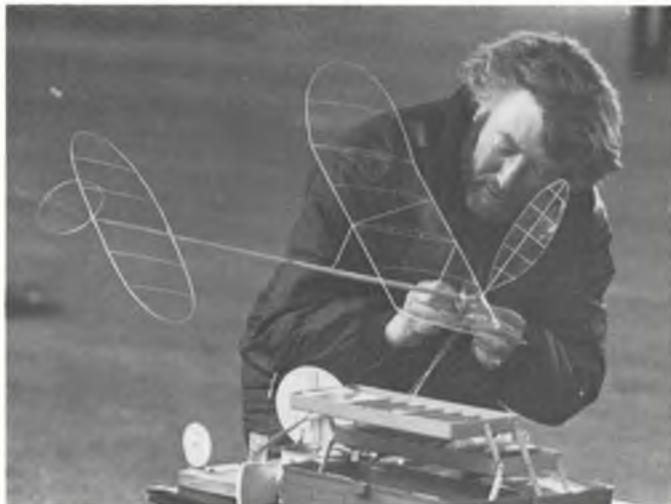
So, from where do they recruit the free flight contest flyers? Well, it seems to be by family descent: the spins of the fathers being visited on the children. They are brought up more or less on the bubble machine bottle and cut their teeth on balsa shavings. And when they get older its not much joy staying at home listening to Mother's endless moan on "your father and his silly model aeroplanes" – better to go along to join Dad in the open air dog house.

## Prize War

Most of us by now have been staggered to read of the model flying bonanza in the gaudy environs of Las Vegas, where the golden boys of Radio competed for a whopping first prize of 10,000 dollars, plus bounteous hand outs to all who took part in the glorious gamble in the air, with a gold jacket apiece as a useful memento of the occasion.

With this in mind we looked in upon a typical British competition to see how we are keeping our end up in the big pay out stakes. The organiser was enthusiastic: the fine weather had brought out the flyers in their hundreds, well tens. Another five more re-entries and it would be a top prize of three whole quid for the Open Glider winner. Yes, he said, contest flyers were going off cups, trophies, plaques and whatever and looking instead to the big cash handout. It had a lot to do with their wives and the trendy homes people live in these days. What's the good of coming home with a cup or a plaque when there's nowhere to display it? The wife would rather die than have it on the glass coffee table or the reproduction escritoire. Of course, he went on, they don't realise just how trendily antique some of our cups are. Take our Open Rubber Trophy. Well, that was first presented for the Kite of the Year in 1913, and the slightly battered Glider Cup is of unknown age but was known to have been awarded to the first heavier than air model to fly 50 yards in a straight line. And who's to know that the inscription underneath, Wright Brothers, is just the name of the makers.

Presentation jackets? Not exactly, but they had thought of a smart line in windcheaters, coming in two camouflage styles: cabbage and corn.



# THE FREE FLIGHT SCENE

this month: **Bob Bailey**

Photos by **Mike Fantham**

## FREE FLIGHT TECHNICAL COMMITTEE NEWS

Readers of *SMAE News* (*Model Flying* that was) will have noticed the heading: 'New DCI'. DCI stands for *Defence Code Instruction* – the significance thereof being that Station Commanders can, if they wish, enforce these instructions on anyone using their (MOD) property. The article implies that silencers could be mandatory for all power models at zero notice, at the Station Commander's discretion. Clearly, a situation that is highly unsatisfactory, particularly for FAI Power models where silencers are specifically *not* permitted. However, the DCI has not yet been passed, and even when it is, there is room for appeal.

*Free Flight News* readers will have read Dave Hipperson's very good letter in the March issue (*FFN* is practically back on schedule and the new format is not as bad as I thought it was, it just takes a bit of getting used to!). Dave put forward the SMAE Technical Committee's view that trophies should not be awarded to Area winners at the expense of winners at the Centralised events.

I firmly believe that Centralised events – and this includes all indoor events – should have trophies in preference to Area events. There is plenty of cash in the SMAE General Fund to provide such trophies. (*Is that true? Should not trophies come from the Competition Fund? Ed.*) When the Tech Committee last year proposed a re-allocation of trophies, there was an extraordinary amount of objection raised (we were not trying to scrub Area events – far from it in these days of expensive travel, but to remedy a somewhat anomalous situation that has developed with the appearance of

more Centralised events). The Committee has now reluctantly decided to abandon the re-allocation of trophies and to adopt a compromise in that extra trophies are to be sought for the Centralised events which do not have them as yet.

John Cooper, Chairman of this Committee, has sent me details of the proposed rule changes which are to be put to the Council Rules meeting in September. If you have any comments to make, please channel them via *your Area Delegate* to get to Council for this meeting.

It seems to me that this vital meeting is held at the wrong time of the year, September is still in the middle of the season: surely rule changes should be decided towards the end of the season in time to implement them at the start of the next season? In addition, all proposed rule changes have to be prepared (typed etc) and given to the SMAE Secretary *six weeks* before the meeting; this means in practice the middle of July. It often happens that some problem comes up *after* this time which causes difficulty with the present rules; it is then too late to deal with it *for the next season* – result, one year lost.

I would have thought that the beginning of November would be a more suitable time to allow the changes to be decided and published for the beginning of January, say, as the implementation date.

It is realised that the date of the meeting must be such as to allow proposed FAI rule changes to be submitted to CIAM who usually meet in December – does the Rules meeting have to be as early as September?



Heading picture shows Ray Monks with his Class F1D microfilm model - quite a change of pace from his usual contest machinery, namely Rossi-powered FAI ships. At right is Ron Green so very active in all indoor categories these days, with his open class indoor model, which is actually a stretched (extra 6in. span) FAI class design.



Indoor flying from the USA - Roman Syzmula winds up on the torque meter for his FID model at the Goodyear Blimp Hangar, near Miami. Photo: Dave Linstrum.



Old "Mr Peanut", Doc Martin of Miami with "Gotham Bomber" Manhattan Cabin design, also flown in the Goodyear Blimp Hangar. Photo: Dave Linstrum.

- Back to the rule changes which are here reproduced verbatim :
- 5.4.1. *(Insert after present rule)*  
Before the start of a Centralised contest, the contest director may vary the maximum, for the day, as below:  
For F1A, F1B and F1C, the maximum may be reduced below three minutes. For Open glider, rubber and power, the maximum may be varied above or below three minutes.
  - 5.5. *(Amend title)*  
Attempts for official flights (for both FAI and SMAE class contests).
  - 5.5.2.7. *(Delete rule)*
  - 5.8.3. *(Insert after present rule)*  
In the event of poor visibility conditions the contest director can waive the 10 metre requirement and allow the timekeepers to follow the model, on foot, whilst trimming.
  - 5.8.5. *(Rewrite first two paragraphs, explanatory notes as before)*  
Binoculars, telescope or other magnifying aids may be used by the timekeepers to observe all flights. The magnification of such devices shall be between four and eight.
  - 6.7. *(Insert after present rule)*  
This rule shall not apply in Area Centralised events when competitors shall only be entitled to 5 official flights.

**Reasons for above proposed changes:**

First change: to reduce retrieving problems particularly in the crop season, in windy weather. To give more meaningful contests in good weather conditions.

Second and third changes: the current rules are unenforceable in practice and are so complicated that very few competitors understand them. Line cross rules are only necessary when competitors are forced to fly in close proximity to one another i.e. when starting

poles are used. Since FAI class contests run in this country no longer use starting poles, competitors are not forced to risk line tangles by flying close together.

Fourth change: to reduce the need for contest stoppages in certain weather conditions.

Fifth change: this should reduce timekeeping mistakes which frequently happen when the model drops below the tree line.

Sixth change: to allow competitors a greater chance of being able to fly in more than one event per day at area centralised contests. Many areas use flying fields that are so bad for retrieving, that a seven flight FAI contest takes all day.

**DAVE PYMM'S 'WORLD RECORD' EZB**

Once again, Dave has been working very hard on EZB; the model featured here is so light that most of us thought it would not be strong enough. However, it is, in good conditions, and most impressive too – beautifully built as usual. Dave writes:

*"The model is a radical departure from the design I flew last year, plus some changes after reading the Siebermann article. The main modifications are:*

*(a) Use of a small highly cambered 'floppy' tailplane to save on paper weight, and combined with a long tail moment and rearward CG to make it 'work' a bit harder. Stall recovery seems remarkably good.*

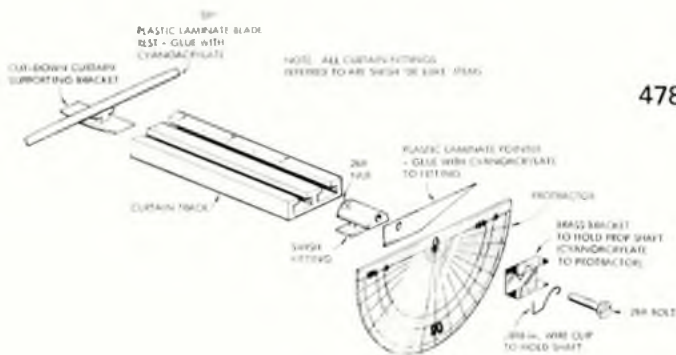
*(b) The change to Theodorsen propeller design with the prop spar located at 43% chord to minimise distortion under load.*

*(c) Low wing mount. Surprisingly this does not seem to make any difference to the flight pattern, but does save a little weight.*



It can't be that heavy! Derl Morley is clearly in need of a course of intensive physical training if he finds it that much of a strain lifting his FID model to shoulder height. Either that, or he desperately needs some decent balsa wood!





Ron Green's Indoor Prop Pitch Gauge.

which is very good – details to follow in a future article, so keep on reading! He used a piece of rubber given to him by Bud Romak; the principal feature being the incredible number of turns that can be put on – fantastic energy storage. Laurie cleared 20 minutes without much trouble and went on to notch up 24:00 with even more turns – 2,750! A new record, beating Butch Hadland's record of 21:32 established last year – and *not* in good conditions either!

Bernard flew with great consistency to take second place with a model based on Laurie's. There is no doubt as to their superiority over the smaller, shorter model which I was flying.

Other main points of interest during the day were Ron Green's very long model with high aspect ratio tail, based on Dieter Siebermann's ideas published in *Free Flight News* (Oct '76). With the C.G. at 100% chord, the model flies very well. Unexpected trouble struck after great promise had been shown – 18:46 with no Teflon bearing for the prop. Beat that!

Derl Morley's model gave the impression that tailplane ribs were going out of fashion – one only! He suffered from the usual stalling trouble which prevented him from being seriously in contention.

1. Laurie Barr	20:46 - 24:00	44:46
2. Bernard Aslett	18:47 - 18:15	37:02
3. Bob Bailey	16:47 - 17:25	34:12

#### SMAE INDOOR TECHNICAL COMMITTEE NOTES

A short meeting of this Committee was held at Cardington on 15th May to deal with some urgent business. In addition, it was unanimously decided that Dave Pymm's outstanding performance in EZB be submitted to Council for recognition as a 'Noteworthy Flying Achievement' (as detailed in *Hangar Doors*). Dave's flight of 20:07 on 24th April constitutes an unofficial World Record.

Decisions taken were as follows:

##### Steering

It should be emphasised that not only are the EZB rules as written in the SMAE Rule Book incorrect, the steering rules (Section 40.7) are also incorrect. The new steering rules are as follows:

- An unlimited number of steering attempts shall be allowed per flight.
- Steering of the model shall be *from the front only*.
- If the propeller stops during steering, the time for which it is stopped shall be deducted from the total flight time.
- No attempt shall be made to pay out line in order to increase the model's altitude.

These rules shall apply to all SMAE events unless otherwise specified by the Contest Director (many low ceiling events held now, I suspect, will ban steering altogether).

These rules were accepted by the FAI before the big CASI freeze in April '76. The Committee will ask the FAI Delegate to press for a re-acceptance of these rules at the next CIAM meeting.

##### EZB Rules

The committee resolved that for this season, all 'Y' and 'V' wing props/supports will be acceptable. The rules for this class will be reviewed at the end of this season for next season.

##### Indoor Team Selection Trials

As originally published, the Trials were to consist of the best two from nine flights, with three flights to be made on each day. The schedule has been revised slightly, as follows: 27th August: Practice; 28th: Flights 1, 2 and 3 in Rounds; 29th: Flights 4, 5 and 6 in Rounds. The sum of the best two flights to count in determining team selection.

##### Finances and Trophies

The Committee has been unhappy about the complete lack of trophies for any of the SMAE indoor events. Some trophies from 'dead' free flight events were offered but rejected as being totally unsuitable. The Chairman reported that no action had been possible in view of the poor state of finances available to the Indoor Technical Committee. He said that as from this year, Indoor activities

must be self supporting and as yet they are not.

The greatest single expense was gas and cylinder hire for balloons. It was resolved that Society balloons shall be available at 50p per balloon and 50p per fill. So if you borrow someone's balloon and bust it, it will cost you a quid to replace it!

#### INDOOR PROP PITCH GAUGE

Ron Green has produced a very neat prop pitch checker which costs practically nothing to make and although intended for indoor model use, I see no reason why it should not be adapted for power model props. Instead of rotating an arm to line up on the blade, the propeller itself is rotated in conjunction with a protractor to measure the pitch angle.

Ron writes: "Prior to the '76 Indoor World Champs I realised the need to carefully check the pitch of my indoor props. Most pitch checkers I had seen only checked the pitch at one station along the blade. I spent some time sketching ideas to enable a check to be made at any station, and also any diameter, of propeller. The breakthrough came when fixing some new curtain rails for the wife. (Yes, I do manage things like this sometimes!) It suddenly dawned on me that here was just the thing for my pitch checker: the curtain rail consists of a plastic channel section with sliding fixing brackets. A few modifications to the brackets plus a cheap 180° plastic protractor and a short time later I emerged from the workshop with a very versatile and quite accurate tool at a negligible cost. The angle of the blade can be read off at any station and converted to pitch by simple trigonometry; alternatively a chart can be made up to do the job."

#### SOUTH AFRICAN NATIONALS

I have to hand a report sent by Sandy Benny, their F/F Sub-Committee Chairman. Thanks to Sandy for the report – perhaps others could follow this example?

Sandy also tells us that for the World Champs, South Africa will be represented by Neil Murray in A/2 and Pete Rautenback in Wakefield. He writes:

"The 1977 South African Nationals were, for the first time, split between Free Flight and Control-Line. Free Flight took place at Easter at Pietermaritzburg, Natal, quite outstandingly organised by members of Maritzburg Model Aircraft Club. The field proved open, grassy, with a few isolated thorn trees which caused no-one any particular trouble, though the retrieving area downwind included waist-high grass, some 'ups and downs' and a reed filled stream, which did make the chase interesting. The weather was pretty much the same for all three days – starting calm, with the wind gradually increasing to moderate late in the afternoon – at all times perfectly flyable.

Friday produced the first shock for the 'experts', as 13 year old Michael Gundry, flying his first contest, took A/2 with a score of 1,240, to beat Kingsley Appleby by 29 seconds, with Neil Murray third. More of Michael later! Tony Dakin took A with 795 seconds from Brian Partridge who had a disastrous third flight of 51 seconds, and Horst Wagner. Hand launched glider, flown late in the day by most entrants, went to Sandy Bennie flying a Bo'weevil, with Horst Wagner and Roger Bridges 2nd and 3rd.

Saturday was Wakefield day and this event produced a ding-dong battle between Keith Lambert and Dave Pettifar, last year's winner. Eventually Keith won by 2 seconds! Both had their bad moments, as the lift on this second day was a little erratic and often turned out to be less impressive than anticipated! This was a day of close contests, as 14 seconds separated the first two in Open Power (Horst Wagner and Sandy Bennie) and Open Glider produced a fly-off. The latter featured Michael Gundry again, together with Neil Murray, and resulted in a win for Michael.

Saturday evening featured Indoor flown under a 30 feet ceiling in a basket-ball stadium. Horst Wagner took the honours in both Pennyplane and hand-launched glider.

Sunday saw A/1, Coupe d'Hiver (with almost no support – not a popular class in this country) and team events. A/1 went to Tony Dakin, with 560, from Keith Lambert, and Roger Bridges was in fact the solitary entrant in Coupe!

Senior High Point went to Horst Wagner and the Junior to Michael Gundry. The entry was good by the standard of present years and a heartening feature was the attendance of a few 'old' faces, as well as some new ones. U.K. readers may be interested to know that one of the latter (new to us, that is) was Brian Perks, still recovering from a nasty industrial accident.

The 1978 Nationals will be held in Cape Town and we do hope that in spite of the distance, we will have an even better turn-out."



## Scale Matters

by Alan Callaghan

THE MAJOR indoor scale meeting of the year took place at Cardington on 8th May, when the rather dismal and changeable weather made the great indoors the only civilised place to be if any model flying was to be performed. Whereas a fair amount of serious contest flying took place at this, the 'Nationals', the general atmosphere was much more that of a typically informal indoor fly-in. The title 'Nationals' conjures up all sorts of images of the great festive occasion, but this type of thing has yet to materialise on the indoor scale scene. Since the very nature of indoor modelling is rather genteel and subtle, the simple enjoyment of a good day's quiet flying is probably all that modelers attracted to this class ever wish.

To get straight to the main subject: as is usual there were not very many outstanding new models present. This is understandable when one contemplates the amount of time and skilful design that is required for a really top class model - an aspect not generally appreciated by those who have never been to an indoor meeting, nor seen the standards attainable. A thoroughly sorted out model, however, should last several years barring major accidents, and this was amply demonstrated by Mike Reeves who won the Open Rubber event with his *Bristol M1B*. As for consistency, Mike lost only one point on his flight score compared with the last time he flew it here - not bad at all from the point of view of the model, the flier, and the judges. All aspects of the *Bristol's* flights were equally good: take-off,

climb, cruise, approach and landing. The model flies in a realistically-banked left turn and although the duration is not particularly great, it is obviously quite sufficient. In second place Butch Hadland flew his familiar large *Lacey*. Whilst scoring top static

points the *Lacey* was some 18 points behind the *Bristol* in flying. The *Lacey's* take-offs are superb during which the cantilever sprung undercarriage can clearly be seen to be working, but the flat skidding right turn does not look quite right, and the landings are



Heading picture shows the majority of the competitors at the Scale Indoor Nationals held at Cardington Airship Shed - just see if you can spot all those models. At right is David Kew of Kingston with his Focke Wulf TA152, built from "Flying Scale Models of WWII" book - as distributed in UK by Argus Books Ltd. Excellent flier.



Above: Airabonita built by Chris Chapman from Walt Mooney plans. Very nicely made and neatly finished in silver/yellow/blue livery. At right, is a prototype twin cylinder Telco CO<sub>2</sub> motor - no immediate plans for production. All tanks are interconnected, and it swings a 7 x 4in. prop.



rather abrupt after a somewhat steep approach. The duration must be almost double that of the *Bristol* and bordering on the minute mark, during which time it climbs to about twice the altitude; but long durations do not count in the Open class and a slightly less powerful or longer motor of the same rubber would probably keep the altitude and duration down and smooth out the landings after a shallower-angled descent.

A new name in the top three was David Kew of Kingston who had a nicely finished *Focke-Wulf TA 152* in third place which was built straight from the *Book of WWII Flying Scale Models* published by the American *Model Builder* magazine and which is generally available in this country. Spanning almost two feet, this 1:24 scale model amazed many people with its slow and steady flights. In fact, since the model was only one point behind the *Lacey* in static, it could conceivably have finished in second place overall had a superb trimming flight been taken as a qualifying attempt! David was unable to

repeat this performance on his official flight but was not too disappointed after having shown that the model will fly very well indeed. Notice that the model features a three-bladed flying propeller. It also uses a fairly powerful motor which gains a good deal of altitude, but when the power dies away after having got up there, the nose tucks down and a bumpy 'arrival' results. I think David opened a few eyes with this subject, and perhaps we will see a few more like it in future.

Finishing third in the flight section, but fourth overall, was Mark Hinton flying a Peanut scale *Bristol Scout*. Although this model was a little the worse for wear, it nevertheless flew very well with its slow and steady progress being well suited to the Open rules. Taken altogether, these four models and the final results show that more ways are open for success in this class than in the Peanut event, where despite everything else a model *must* be able to return a high flight duration in order to get anywhere near winning. Very high durations

with these small models really are much more a task for the rubber and trimming expert rather than the ardent scale fan, who is always tempted to overdo the detailing when confronted with what I would call the 'dial-a-model' system of point scoring used in Peanut static judging these days. It is much better to build a slightly larger, simpler, and more forgiving model in order to get the hang of flying indoors and acquire a useful trimming technique. The slight lack of new competitive models in this category may also be due to the fact that under such absolutely perfect flying conditions, there is *no* scope for excuses such as "Well, er, the wind seemed to catch it . . ." as the prize possession lurches into the ground on a maiden flight!

The Peanut event drew a total of twelve entries although many more models were to be seen around during the day. The damp atmosphere and its effect upon rubber was more critical in regard to these rather than the larger Open models, and so no really high flight times were returned. Rex Oldridge was the winner with one of his *Isaacs Furies*, and he managed an ideal compromise by coming first in flying and second in static. Doing rather well with his second 2nd place of the day was R. Lorente with a *Lacey M10* - understandably one of several present. Third place went to the *Lacey's* designer, Butch Hadland, with his new *Monocoupe* which easily topped the static section but which wasn't quite doing its thing in the air by coming only fifth in flying. This subject seems to be posing a few



One-twentieth scale RWD 6 by Butch Hadland for CO<sub>2</sub> power. Immaculate model - good enough for any museum. Note the drooped flaps. Most attractive in its silver, red and white colour scheme.



problems for Butch in achieving high enough flight times. Being a special clipped-wing version of the standard *Monocoupe*, the fuselage and undercarriage are proportionally very large and these together with the big radial cowl must absorb a fair amount of useful thrust in overcoming drag.

A number of other Peanut models that caught my eye included a superbly-made *Airabonita* by Chris Chapman of the Grantham club as mentioned last month. Looking very attractive in its silver, yellow and blue colour scheme this model also features an impressively moulded canopy and was more outstanding for the neatness of workmanship rather than the wealth of detail incorporated. It seemed the ideal simple, attractive little craft that the original Peanut event instigators must have anticipated. In a similar vein were a *Loving-Wayne 'Love'*, and an *Art Chester 'Jeep'* whose builders' names I unfortunately missed. It would have been quite something to have seen these two flying in the air together.

If they ever ban *Lacey* and *Fike* monoplanes because of the so-called advantages of their enormous wing areas (the idea has been mooted in the States, but surely will never be taken up) then I think Chris Edwards' *Farman Sport* may possibly take over the role as 'the' subject! This biplane actually has the equivalent of two *Lacey* wings, and built extremely lightly would be well worth looking into as an alternative high-duration subject. On the other hand, one must not lose sight of the fact that it is the degree of aerodynamic efficiency achieved that allows a particularly small model to fly at all well, and not just simply the greatest wing area or longest fuselage that will carry the biggest motor that is always a guarantee of success. I have a Peanut Scale *Rearwin Speedster* that is built very simply as an ultralight and which weighs three grams. It flies on a 12in loop of .060in Pirelli, and will regularly fly for over a minute without any special effort or technique being required. It will never win a contest, that was never the intention behind it, but the amount of flying enjoyment it gives is enormous. And the chord of the 13in wing? Barely two inches.

The CO<sub>2</sub> event was also affected by the dank weather conditions. These little motors certainly seem to prefer the outdoor life on a warm day in order to give of their best. The con-

test attracted only four entries, although many more eligible models were present. If, as it seems they now are, people are going to continue to be put off entering because of the high standards of some of the leading models, there could be scope for the introduction of a Class 1 and Class 2 arrangement as used in R/C scale. I would think that for a Class 2 category that the normal flight scoring system could be retained - there is no reason why this should change, but the scale realism factor could either be far less critical, as in Class 2 R/C, or indeed carried out *during the flight* only. It certainly would be possible to do this when one considers that, for example, a *Tiger Moth* will fly differently to an *Antoinette*, which will fly differently to a *Spitfire*, and how well each simulates the performance of the real thing is capable of being judged quite clearly, regardless of the fact that they each need to fly at three or four times their various true scale speeds in order to remain airborne.

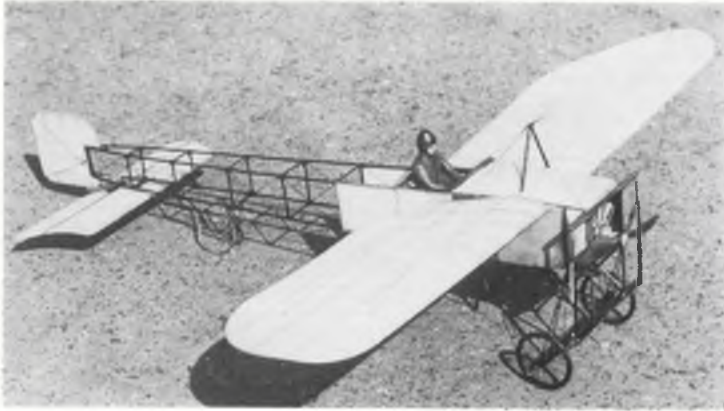
Only eleven points separated the first three places in a very closely fought contest. The top scale scoring *Bleriot* of Ron Green took quite a bit of sorting out under these conditions, but nevertheless just managed to pip at the post by two points the new *Supermarine Sparrow* of R. Lorente. In third place was Butch, again with his well-flown *Potez*. Butch also had with him an immaculate new *RWD6* which was one of the very first STOL aircraft to be made. This silver, red and white model features moveable flaps, a turned aluminium drag ring fitted around the scale *Genet* engine, and is complete with crew visible through some of the cleanest cockpit glazing I have ever seen. The thought occurred that anyone looking for an ideal large rubber-powered scale model for outdoors would be wise to examine aircraft in the STOL category, since the traditional leap-off the

ground due to the initial rubber burst would be well in keeping with the true character of the real thing. The superb finish on Butch's model has resulted in a craft a bit on the heavy side, and not being fully trimmed the *RWD6* was not to be flown on this occasion.

My own effort also remained on *terra firma* due to lack of time for adequate testing before the meeting. Some years ago I had a try at a rubber-powered twin in the form of an *Avro 642* airliner which I did actually get to fly once or twice. However, it was underpowered, and the addition of yet more rubber would have pushed up the weight much too high for safety. The model was unshelved when I acquired two Telco motors which I rigged up in underwing pods on a converted *KK Pioneer* glider as a flying test-bed. The system worked very well, the model flew a treat on this power outdoors, regularly doing one-minute flights. Transferring to the *Avro* I installed two tanks in the fuselage with a small inter-connecting header tank to balance out the gas pressure being fabricated from brass tube. With a model of this size and weight, contra-rotating props were found not to be necessary to cancel torque effects. In fact if the flying surfaces have been built dead true and the engine speeds matched (only by ear) it is more of a problem to make the model turn than to prevent it spinning in. Also because of the gradual power tail-off the model will have cruised down to a landing long before either motor cuts. The flying props on the *Avro* are very near-scale left-handed four bladers made from gelutong and stained to resemble mahogany. I thought it worth going to this trouble since they are almost invulnerable to damage except in the unlikely event of an inverted crash, and they do enhance the appearance of this rela-



Our columnist's Avro 642, which spans 26in. and weighs 90 grams is equipped with a pair of Telco CO<sub>2</sub> motors - the tanks being mounted in the fuselage. Converted from a rubber powered model, it features turned aluminium cowlings and working suspension.



Alan Jupp built this 44in. span Bleriot for a Mills 75. Features spoked wheels and rotating dummy engine fitted to shaft extension - these parts being made by a friend with a lathe. Total weight is 18oz.

tively simple subject.

Only on the day of the contest did I realise that I had located the tanks too far forward in the fuselage, thus making the model much too nose heavy as some rather gingerly-attempted taxiing runs proved. Acceleration from a standing start is impressive, there is ample power, but until the fore and aft trim is changed by moving the tanks about 2in nearer the tail it was too much of a risk to try it over anything but long grass. I hope to give some more explicit details of this model, and the twin motor arrangement, at a later date.

Still on the subject of CO<sub>2</sub>, Derek Jackson and David Lee of Telco were once again on hand with unflinching help and advice, not to mention their much appreciated supply of free gas which went down very well (literally!) as did a similar, generously-contributed tank from *The Modeller's Den*. As well as demonstrating Telco's new and cleverly designed polystyrene sports F/F model (reviewed in the July issue), Derek also showed me an experimental prototype of a horizontally-opposed twin motor that just may get into production if enough demand materialises. This one uses rotating cylinder barrel speed control rather than the eccentric crank shaft bearing (impossible on a twin), and swung a 7 x 4in prop very smartly indeed. A larger gas tank would be required, but this is well within the bounds of possibility. It is encouraging to see such active development of ideas for the smaller model, and would be something to look forward to, to have this motor generally available.

During one of our chats, Derek mentioned the subject of gas pressures in CO<sub>2</sub> bulbs and tanks. From tests carried out it seems that the pressure can vary from about 800 to an amazing 3,000 pounds per square inch, according to the conditions in

which it is kept. A moral is obvious. *Never* leave bulbs or charged tanks in a position where they can get hot, especially not in the boot or on the rear window shelf of a car on a sunny day. A carelessly twisted or fatigued feeder pipe could very well break when coping with the increased pressure, and whereas it is very unlikely to cause a bad accident, it could damage your model and spoil your day's flying. CO<sub>2</sub> motors will take much less abuse than will a small diesel or glow engine.

Another tip that Derek passed on is that it is much better *not* to mount the gas tank in polystyrene foam in a model as a number of people seem to be doing. As the gas expands during the motor run, the tank naturally becomes very cold as you can see from the ice that occasionally forms. In order to work properly and quickly again on each successive run the tank must be allowed to regain some of the ambient atmospheric temperature, and if it is completely insulated in foam it will take about twenty minutes to do so. That's a long time between flights. Do not forget that the foam is effectively keeping warmth *out*, and whereas it is not absolutely essential for the tank to be

exposed to the airstream, it really should be in a position where warm air can surround it naturally as, for example, through an open cockpit.

One final reflection on this meeting. I always find it surprising that so few *new* faces attend the Cardington sessions. Although it may perhaps seem so, Cardington is definitely not a 'closed shop' site, you are simply required to be an SMAE member and to have given your name and an indication that you would like to attend to Laurie Barr, who liaises with Cardington security for the benefit of the SMAE. The only limitations are that small children and dogs are not very welcome. Although the cathedral-like atmosphere is very amenable to busy model flyers, the Sheds are not the ideal place for a family outing. There definitely exists a good deal of interest in indoor scale as is proved by the attendances at other indoor sites, so why is it that the biggest and best one in the country always draws fewer people? You can always find a quiet corner here to try out that untested model away from other people. At the Crawley Indoor Meeting earlier this year I acquired a wrecked EZB model, a substantially damaged Peanut model, and lost two HLG's mainly as a result of overcrowding, and I was not the only one to suffer. Leisure Centre Sports Halls are finite spaces that are only capable of accommodating a limited number of people safely. Cardington, of course, is exactly the same, but on your first visit the difference in scale will amaze you. These Sheds used to house the R101 amongst other craft, and this airship itself could probably contain, volume for volume, the equivalent of an average sports hall in only one of its gas envelopes!

#### Open Rubber (6 entries)

		Scale	Flying	Total
1.	M. Reeves <i>Bristol M.1B</i>	62.5	90	152.5
2.	C. Hadland <i>Lacey M10</i>	74.5	72	146.5
3.	D. Kew <i>Focke-Wulf TA 152</i>	73.5	54	127.5
4.	M. Hinton <i>Bristol Scout</i>	35.5	71	106.5

#### Peanut Scale (12 entries)

		Scale/Place	Flying/Place	Final Place
1.	R. Oldridge <i>Isaacs Fury</i>	37.5 2	84.6 1	2+1=3
2.	R. Lorente <i>Lacey M10</i>	34.5 3	82 2	3+2=5
3.	C. Hadland <i>Monocoupe Special</i>	43 1	73 5	1+5=6

#### CO<sub>2</sub> Scale (4 entries)

		Scale	Flying	Total
1.	R. Green <i>Bleriot XI</i>	87	58	145
2.	R. Lorente <i>Supermarine Sparrow</i>	83	60	143
3.	C. Hadland <i>Potez</i>	77	57	134

# Wonder Wings at Wembley

Smoke canisters, as suggested by the Football Association, greatly aided the spectacle of model flying. Just look at that audience – roughly equivalent to all the aeromodellers in the country herded into one stadium. Think about it. A wonderful opportunity taken by the SMAE to show our sport to the uninitiated.



THE FIRST WE heard of the Cup Final Display was from Martin Dilly, who told us that the Football Association had approached the SMAE regarding a display at Wembley. Apparently one of the FA officials had just returned from a Yugoslavian football final where the proceedings were started with a model flying display – this was so well received by the crowds there that he was convinced it would be a better alternative than community singing for our own Cup Final.

Radio control demos were obviously out due to the consequences of being 'shot down' with interference, and free flight would have proved impossible. Control line was the obvious choice and aerobatics and combat fitted the bill, being both simple and spectacular. At the time, the Society did not have an organised team it could call upon to handle the show; the importance and public exposure involved meant that it could not rely on its members merely to give a display using their normal equipment. The flying and the models themselves would need to be specially matched to the event, being both an exhibition of the skills of model flying and an entertainment in the eyes of the general public. Thus, various top fliers were asked to offer their help in forming a suitable show team.

With the responsibility of entertaining the fans on the day, the FA were naturally apprehensive about booking an unknown and as yet an unformed act. Consequently, in January, an advance party of intrepid fliers presented themselves at Wembley Stadium to meet Ted Croker of the FA together with Alec Weeks of the BBC and other producers from ATV and ITV. The empty stadium appeared much smaller than anticipated, allowing only two circles to operate simultaneously. Great care had to be taken to protect the grass, and turbulence from the wind swirling around the stadium was obviously another special hazard.

Present at this initial meeting was Jim Mannall, assisted by Ted Fowler, who performed an impressive stunt schedule in difficult wind conditions. In the stadium models only rarely appear above the skyline during wingovers etc, producing a heightened impression of speed as the models flash past the background or dive towards the ground. This was followed by a half-hearted attempt at balloon bursting by Richard Wilkens (he missed them all!). Finally, John Hammersly joined in for five minutes of combat. The assembled officials then gave their verdict on the performance. As laymen new to model flying, they found the aerobatics hard to follow and suggested a commentary or even smoke trails. The balloon

bursting did not go down too well and the combat, using standard FAI *Superstars*, they found too fast and they could not see the little bits of streamer fall off. We were asked if we could provide a Spitfire chasing a Messerschmitt, but we explained that our models were sporting equipment and did not have to represent the real thing. However, in general they liked the spectacle, the noise and the excitement. The television producers were also very interested in screening model flying as part of their full day's build up to the match itself. Before we went home, Ted Croker was given his first C/L flying lesson, flying a *Superstar*, but he got a bit giddy!

In the meantime, we had to reflect on what was required for such an event. Aerobatics were obviously impressive in their own right, but the combat models had to be bigger and slower, look more like real aircraft and tow more obvious streamers. Class B combat models seemed to fit the bill, although no one in Britain was suitably equipped. The team event of the football was an obvious lead for two representative combat teams to do battle on behalf of the supporters. A well informed commentary would tidy the whole show up and help to involve the crowds. Very little time was left to organise the event as confirmation for the go ahead was only received five weeks prior to the actual event. This dictated a *full time* commitment to the design and construction of a fleet of special models. After much consultation between the volunteers, the SMAE eventually appointed *Wonderwings* to the job of administering the event and ensuring that model flying was presented in an organised, professional manner that would benefit the SMAE and model flying in general. This would also lead to the establishment of a display team that could be called upon for future events, as replacement aircraft could be manufactured at very short notice.

Having been duly elected, we then set about forming the team. With a chance of both flying and watching the Cup Final, we were obviously over subscribed. To avoid favouritism, the current British Team members were chosen as pilots, with pit crews that included a predominance of National and European as well as World reigning champions. Model flying for demonstrations, especially one of this scale, requires a different approach to normal contest flying. Safety more than ever is paramount, especially when considering the layout of the stadium. We chose to fly on Sullivan .018 dia. stainless steel wires, 60 feet long, for safety and to slow things down. The crimped ends of the Sullivan lines were epoxied to guard against slippage – important as the lines cannot be soldered. Bowden cable linked the motors to the bellcranks, and



The Wembley 'Aerostar' - the prototype for which was designed, built and flown in just two days. Note the free-flight timer below fin to deploy different colour streamers and Terry clips on fuselage to hold smoke canister. Sullivan R/C clunk tanks used - made checking fuel levels very easy.

wrist straps completed the precautions. Using experienced pilots flying with handles side by side meant all collisions would be the spectacular model to model type and not the potentially dangerous motor to lines variety.

With so much safety hardware to be pulled around the sky, we were going to need big models and motors that would produce hefty line tension. This would also allow us to manoeuvre up wind if necessary in a turbulent stadium. Models had to be quick to build and were designed to cope with crashes. No Class B combat model will survive mid-air collisions, so they were conceived with strong fuselages, tails and fins that could be re-used with replaceable spars and expendable foam wings. In the event, they turned out very rugged and only the action of an opponent's propeller required parts to be replaced. The choice of motive power required an inexpensive reliable unit, around the 35 size. We finally settled for Fox 36 plain bearing motors (there are more powerful motors and more expensive ones, but this Fox fitted our needs perfectly). Being a plain bearing motor, they needed a good running in and in view of the immediacy of the problem of dealing with a dozen brand new Foxes, Dave Clarkson stepped in and lapped each one by hand, and fitted pressure tappings.

For an event with such public exposure, it was also important to present an organised, professional image. The show was not just about model fly-ability, but also an entertainment that would be judged alongside other more professional teams. Neither the SMAE, nor the fee from the FA could afford to equip the teams to the desired standard. Fortunately, various clothing manufacturers came forward offering to provide a wardrobe to be worn at Wembley and other future SMAE displays. **Wonderwings** donated a special batch of T-shirts printed in Manchester United and Liverpool colours, **Levi's** provided the jeans, **Dunlop** provided training shoes and **Kangol** the full-face helmets. **Gola** provided smart track suits embellished with 'SMAE G.B.' team markings to be used later by the British F/F team in Denmark.

In the space of just five short weeks before the Cup Final, we had assembled a pool of equipment, clothing and models that enabled us to present model flying to the general public at fetes, symposia and other sporting events. There had only been time for two brief practice sessions with the chosen teams before the final itself. May 1st was the only free day at Wembley to enable everyone to get used to the stadium. The Elmbridge Club's Symposium at

Sandown Park on 14th May provided the only other opportunity to try things, this time before a crowd of 2,000.

The final line up of the Display Team was as follows:

<i>Aerobatic Pilots</i>	Pete Tindal & John Newnham
<i>Combat Pilots</i>	Mick Lewis & Richard Evans; Richard Wilkens & John Hammersley
<i>Engine Starters</i>	Dave Wood & Bill Gripton
<i>Launchers</i>	Dave Clarkson & Bob Morgan; Bill College & Jim Carolan
<i>Model Servicing</i>	Trevor Sayor & John Berry
<i>Retrievers</i>	Steve Marriott & Chris Wellington
<i>Centre Marshall &amp; Pilot</i>	Martyn Cowley
<i>Commentators</i>	Richard Walker & Alan Bowley
<i>PRO &amp; SMAE Rep.</i>	Shirley Tate & Ian Dowsett

Finally the big day dawned. With the pilots and crews in a mini-bus following the van containing all the equipment, the final approach to the stadium had an awe inspiring build up similar to Hitchcock's movie 'The Birds'. A mile from the stadium, the first fans were spotted. As we got nearer, the fans were massing in their hundreds. The final approach roads to Wembley were literally carpeted with tens of thousands of red and white bedecked fans, banner carrying, wrapped in scarves and flags, singing and chanting. We slowly drove our way through them as they peered in through the windows. It was still only 10 o'clock.

10.30am and we drove into the fortress-like stadium under the amnesty of our security passes, leaving behind the noisy fans outside, to enter a chaotic world of tranquility. We were to be one of a series of entertainments that would include a 370 piece band, an Alsatian dog display by the RAF and a demonstration of gymnastics. Each of them wished to cover the pitch with their own equipment, being unaware of the requirements of others. All were eventually speedily and efficiently dealt with, and their needs met.

Just some of the 'stars' to be seen on Cup Final day. Shirley 'Fittipaldi' Tate waits with an anxious Pete Tindal, an eager Dave Wood, a confident John Newnham and a relaxed Steve Marriott - plus the rest of the hard worked crew.



In the foreground are (Editor consults notes) a Mr Kevin Keegan and a Mr Emlyn Hughes, who apparently know a bit about football but not a lot about model aircraft, judging by the way the 'stars' had to be asked to 'mind the lines'. Behind is our own Dave Clarkson in track-suit supplied by guass-who.

For the display, the combat models had to have fins and cockpits so that the crowds could understand just what was happening, and which way up they were. They also needed excellent line tension to overcome the turbulent conditions within the stadium. Eighteen sets of hollowed out, tapered wing cores were produced - just sufficient to cover practice and the big day 'stuff'. A dozen complete models were made in a week.



We were to be the opening act and therefore got first say on the layout of equipment. At 11.00, Bill Gripton of the Outlaws Combat Team inspected the pitch and declared it fit to flick on, except for a few weeds. The team laid out the equipment and test-ran motors, refuelled and fitted new plugs. During this operation there was an air of calm within, broken only by our commentators Alan and Manfred cueing up *'Those Magnificent Men'* and various musical and audio effects ready for the show. Outside, rival chants filled the air - *Yuuuu . . . niiii . . . ted; LIVER . . . POOL; Yuuuu . . . niiii . . . ted.*

At one o'clock the flood gates were opened and the fans poured in. We retired to the sidelines to let the band get things under way. After weeks of rain, the weather finally did the trick - blue skies, sunshine, the green turf, fourteen models and 100,000 spectators. 13.43pm: Stunt team lined up in the Royal Tunnel. 13.45pm: We were ready and out onto the pitch. Had we started the programme with team race, the show might actually have taken off at this point. As it was, the stunt pilots were just starting their motors as an official ran onto the pitch to tell us to postpone the display! There was apparently going to be a footy match later in the day. The two teams were ready at last to come out and inspect the pitch. Those of you watching the BBC will have witnessed the next five minutes, as the teams sauntered around our equipment, waving to the fans. The live screening of Britain's largest flying display ever was reduced to shots of fliers telling Tom Docherty and the teams to *"Mind those lines"*! The only TV coverage on the day was in the form of an aerial backdrop to interviews of players at the sides of the pitch.

However, for the 100,000 in the stadium, all was not lost and the programme re-continued 10 minutes late. Stereo aerobatics were performed by Pete Tindal (semi-scale *Chipmunk*) and John Newnham (own-designed *Shadoogie*). Well silenced models performing to the '2001' sounds of a moog synthesiser put a spell on the crowds, broken occasionally by *'Ooohs'* and *'Aahs'* as the models dived earthwards, only to pull out at the last moment and continue their aerobatic schedule. Both members of the British stunt team for the European Championships, they put on a truly polished display. Flying in the stadium was tricky at times; one moment the sun was in your eyes as the models were above the stands roofline, then lower down they were seen against a darker multi-coloured backdrop of fans. The turbulence inside the stadium played tricks on the pilots who were experiencing the unusual sensation of feeling the wind blowing on their backs, while the models were blown towards them, reducing the line tension sometimes to zero. The delays earlier resulted in a slight hiccup in continuity. However, only the pilots themselves were aware of this as Martyn Cowley flew a special display model with a sky writing smoke canister to link the aerobatic start to the combat finale. The model should have deployed and flaunted rival team colour streamers before the fans, all courtesy of Steve Marriott and his

amazing F/F timers, however a short engine run foiled this added attraction, and the model landed at the end of the smoke.

The crowds were then presented with a Rollerball style spectacular. Onto the empty pitch ran two lines of fourteen fliers and pit crew wearing full facial crash helmets in two teams, flying for Manchester United and Liverpool. Everyone ran to his post, fired up the unsilenced Fox 36's and battle commenced. The crowds were still not sure what to expect, as up until then, models had appeared quiet and precious. Hammersley for Liverpool and Lewis for Manchester United made a deliberately ponderous start, flying cautiously into attacking positions, leading to a flurry of manoeuvres - a few quick cuts and a Liverpool model plummeting back into the turf. The stadium erupted and as quick as a flash, Liverpool's No. 2 pilot, 'Tricky Dicky' Evans was away, airborne for revenge, which he got, plus half a wing off his opponent's model. Wilkens took off to fight back for Manchester United in a real ding-dong battle. The pit crews worked like clockwork always having one or two models ground running ready for take off with retrievers and feeders collecting ditched models to present back to the starters. Pilots running in and out of the circle added a physical element of urgency to the proceedings and the take-offs, using mono wheels, added to the excitement. After 10 minutes of well received combat, the signal was given for the last pair of models to be launched: in order to finish on a high note, these were fitted with Fox 45 Schnuerles for a bit of extra zip, fitted out with smoke canisters plus streamers, and this brought proceedings to a suitable crescendo.

The teams then ran into the centre joined by the stunt pilots to line up, acknowledge the crowds and make their exit back into the tunnel, leaving behind a pitch strewn with models and streamers. A quick change into track suits and back onto the pitch for clearing up. A couple of minutes work saw a spotless pitch ready to receive the next act. All in all, a faultless show. Practice and preparation had made it possible, but immaculate flying and pitting ability and the luck that produced those well controlled spectacular mid-air kept the crowd really bussing.

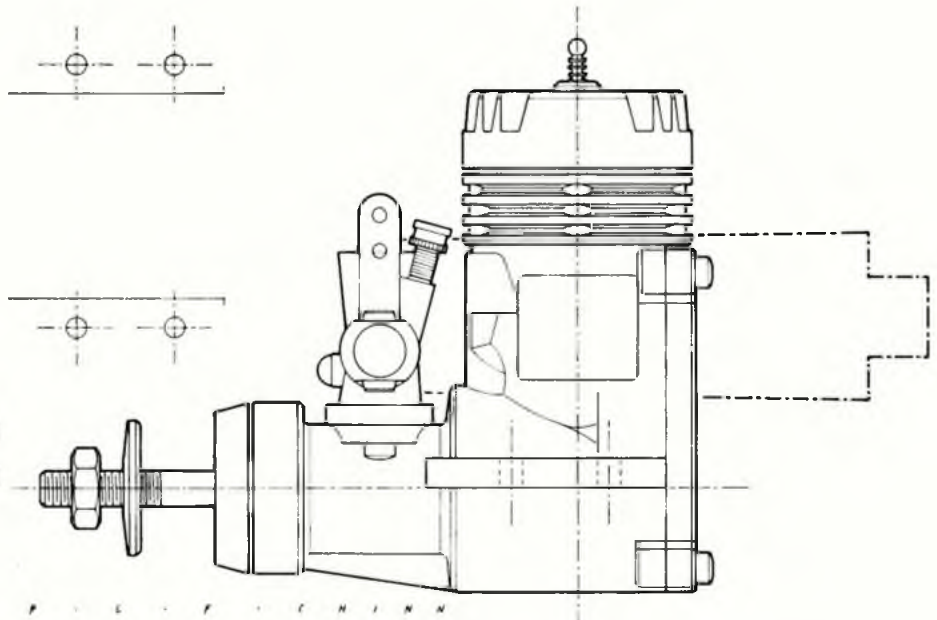
After all that excitement, the FA Cup Final could only be an anti-climax. But then I'm a model flier, not a footie fan. Perhaps next year they can get the football over first and then have the flying show . . .

*We must take this opportunity of thanking Duke Fox and John Haytree for part sponsoring the show, and for the excellent back up and servicing of motors at very short notice. Also Irvine Engines, who came up with lines, handles, tanks and spinners again at very short notice.*

*Thanks are also due to Alan Bowley and Richard (Manfred) Walker, who provided us with an excellent commentary full of amazing sound effects with the £2,000 worth of PA equipment that they brought to Wembley and plugged into the stadium's sound system. Thanks to the SMAE Councillors too, for entrusting us with the work.*

## ENGINE TEST by Peter Chinn

# FOX 15BBR/C



THE FOX MANUFACTURING COMPANY of Fort Smith, Arkansas, USA, introduced this 2.5cc motor last year. Offered in a choice of twin ball-bearing or bushed bearing models, it is the first completely new Fox 15 since 1962, features Schnuerle scavenging and differs considerably from previous Fox 15 models, all of which have been of the crossflow-scavenged type, with plain (bushed) bearings only.

In appearance and general layout, the new Fox 15 is not unlike the current Fox 40 and 45 series engines. Like

these larger models, it has a highly unusual 'back door' in the main casting which uncovers not only the crankcase but also the rear lower part of the cylinder liner. The rear transfer passage is, in fact, formed in the backplate and this was one of the reasons for adopting this particular form of construction since it eases the problem of coring the casting for the three transfer passages.

Cylinder porting is similar to that of the 10cc Fox Hawk 60. The fore and aft transfer ports are angled to direct fresh gas to the left side of the cylinder (i.e. opposite the exhaust), in the usual Schnuerle manner, and are met by an upward flow from the inclined 'boost' port but, instead of using a single port of moderate area here, the 15, like the Hawk, has two elongated ports of very large area. These are open, according to our measurements of the test motor, for 126 deg of crank angle, or about 6 deg less than the fore and aft transfers. The exhaust period is quite long (160 deg) and is reflected in a relatively high nominal compression ratio (12.5:1 measured) since the effective compression stroke is appreciably shortened by the height of the exhaust port.

The shaft type rotary valve is timed to open at 40 deg ABDC and to close at 50 deg ATDC. It is fed from a vertical carburettor which, as with several current Fox engines, is flange mounted to a saddle on the crankcase nose instead of the usual spigot fitting. The engine is available with either a standard suction type C/L intake or throttle type (R/C) carburettor. The motor submitted to us for test had the R/C carb. This has a reasonably generous choke area (approximately 13sq.mm) and we would assume that the suction C/L type intake would not be larger than this. We can therefore assume that the C/L version of the engine would have much the same power as our test motor, but more power should be available with one of the special large choke intakes that are obtainable to special factory order. (These are *not* included in the Fox 15 spare parts list.)

In addition to a choice of main bearings (bushed or BB) and different choke areas, the purchaser of a Fox 15 can also try different compression ratios. The 15 has an insert or 'button' type head and there is a choice of four inserts: low or medium compression, high compression for use with nitro fuels and high compression for use with straight fuels.

Our test motor was supplied with the optional Fox silencer offered for these engines. This has a die cast body with a machined full length slotted 8mm i.d. tubular insert into which the exhaust gases pass to escape at the rear end. Effective outlet area is 50sq.mm and the silencer, which

### SPECIFICATION

**Type:** Single-cylinder, air-cooled glowplug-ignition Schnuerle scavenged two-stroke with crankshaft rotary valve and twin ball bearings. Throttle type carburettor. Silencer extra.

**Bore:** 0.590in (14.99mm).

**Stroke:** 0.550in (13.97mm).

**Swept Volume:** 0.1504cu.in (2.464cc).

**Stroke/Bore Ratio:** 0.932:1.

**Measured Nominal Compression Ratio:** 12.5:1.

**Checked Weights:** 170grammes (6.0oz) (less silencer).  
205grammes (7.2oz) (with silencer).

### GENERAL STRUCTURAL DATA

Pressure die cast aluminium alloy *crankcase/cylinder-casing/main-bearing-housing* with large detachable *backplate* incorporating rear transfer passage as well as crankcase cover. Hardened and ground counterbalanced *crankshaft* with 10mm o.d. journal, 6.35mm ( $\frac{1}{4}$ in) i.d. gas passage, 4.7mm ( $\frac{3}{16}$ in) solid crankpin and running in two 10 x 19mm 9-ball steel caged *ball journal bearings*. Separate  $\frac{3}{8}$ in propshaft stud. Drop-in steel *cylinder-liner*. Lightweight lapped Meehanite *piston* with flat crown and wide skirt port. Lightweight tubular *gudgeon-pin*, 3.9mm ( $\frac{3}{16}$ in) o.d., retained by wire circlips. *Connecting-rod* machined from extruded aluminium alloy bar, unbushed. Two-piece *cylinder-head* consisting of finned pressure diecast outer component and machined central insert carrying conventional short-reach glowplug, the whole being secured to main casting with four Phillips screws. Machined steel *prop driver*, keyed to shaft with four short splines. Pressure die cast *carburettor body* flanged at base and secured to cast-in saddle on crankcase nose with 2 screws and gasket. Ground steel *throttle valve* with separate low-speed and high-speed jets, each with its own adjustment, and throttle arms on both sides.

### TEST CONDITIONS

**Running time prior to test:** Approx 1 hour.

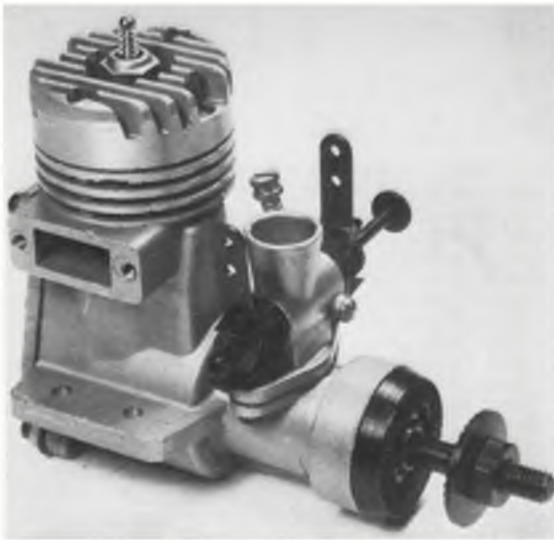
**Fuel used:** 5 per cent nitromethane, 20 per cent Duckhams Racing Castor-oil, 75 per cent methanol.

**Glowplugs used:** Fox 1.5 volt short-reach idle-bar type.

**Air temperature:** 10°C (50°F).

**Barometric Pressure:** 987mb (29.15in.Hg).

**Silencer:** Fox baffle-tube type. Outlet area: 50sq.mm.



fits over the engine's exhaust duct, is attached with two hexagon head screws.

### Performance

The Fox 15BB is basically a high speed engine and, like the Fox 19, needs to be given its head if its full potential is to be realised. In terms of prop sizes, this means that 8 x 4 and 7 x 5 are about the largest practical sizes because there is not much torque available when the engine is loaded for operation at low rpm. On test, our sample delivered its maximum torque (20oz.in) at around 12,000 rpm, there being a marked drop at lower speeds, yet only a slight decline under lighter loads, especially when running in the open exhaust condition. This allowed the torque curve to remain so flat that the peak of the power curve was not reached until the Fox had exceeded 19,000 rpm, where a figure of 0.33 bhp was indicated.

When the Fox silencer was fitted, this made very little difference to the *maximum* torque figure, but did, increasingly, affect torque at speeds above 14,000rpm. When the figures obtained were plotted, it was found that adding the silencer actually caused the power curve to level off at 0.28bhp at just over 16,000rpm.

These figures were obtained on our standard R/C test fuel containing 5% nitromethane. The Fox ran perfectly on this mixture: in fact, it also tolerated a straight methanol/castor-oil mix quite cheerfully. The maker's instruction leaflet, however, recommends two Fox fuels: "Duke's Fuel" (10% nitromethane) or *Missile Mist* (25% nitro) and although neither of these is available in the UK, we also ran a check on the 15 using *Missile Mist*. This increased the peak power output (less silencer) to 0.37bhp at over 21,000rpm.

All these figures are a substantial improvement on the performance obtained during our last *AeroModeller* test of a Fox 15, the 1970 model 15 R/C, which, in the open-exhaust condition (no Fox 15 silencer being available at that time) delivered 0.22bhp at 12,500rpm on 5% nitro



and 0.29bhp at 14,500rpm on 20% nitro, both figures less silencer.

Propeller rpm recorded by the new Fox with silencer included 9,900rpm on a 9 x 4 Tornado nylon, 10,100 on a 9 x 4 Top Flite nylon, 11,100 on a 9 x 4 Taipan glassfibre-nylon, 11,300 on a 8 x 6 Power-Prop wood, 12,500 on a 8 x 5 Power-Prop wood, 13,200 on a 7 x 6 Taipan glassfibre-nylon, 13,500 on an 8 x 4 Power-Prop wood, 13,600 on an 8 x 4 Taipan glassfibre-nylon, 16,600 on a 7 x 4 Power-Prop wood, 16,600 on a 7 x 4 Taipan glassfibre-nylon, 16,800 on a 7 1/2 x 3 3/4 Bartels glassfibre-epoxy and 17,700 on a 7 x 3 1/2 Bartels glassfibre-epoxy.

The general handling and running qualities of the Fox 15BB were very good indeed. It was very docile and started easily, hot or cold, and with the throttle open or closed. The needle-valve was thought to be a trifle insensitive, so that care was needed to find the best setting for maximum power, but the engine then ran very evenly and very smoothly.

The throttle also worked well. As delivered, without any readjustment, the carburettor provided a safe idle of 2,800rpm on an 8 x 4 Taipan prop and a steady transition between idle and full power and back again. Incidentally, with each of these engines, there is a copy of Duke Fox's very helpful notes on carburettors and carb adjustments and these are well worth studying, whether or not the reader is a Fox owner.

Examined at the end of the tests the 15BB was found to be in excellent condition. No plugs were burned out either during running-in or testing which, incidentally, included running the engine up to nearly 22,000rpm.

**Power/Weight Ratio** (as tested on 5% nitro fuel):

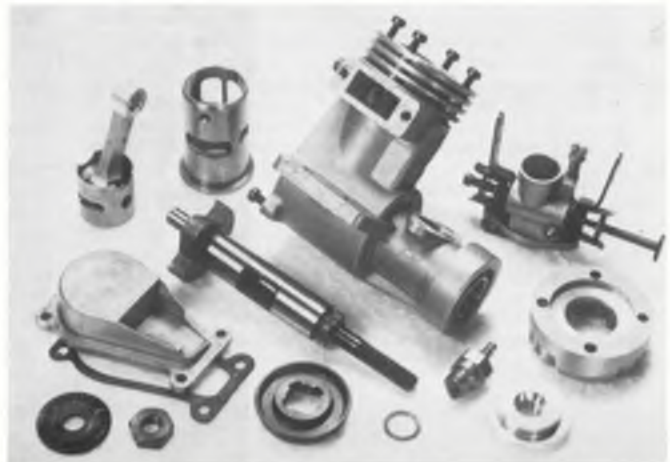
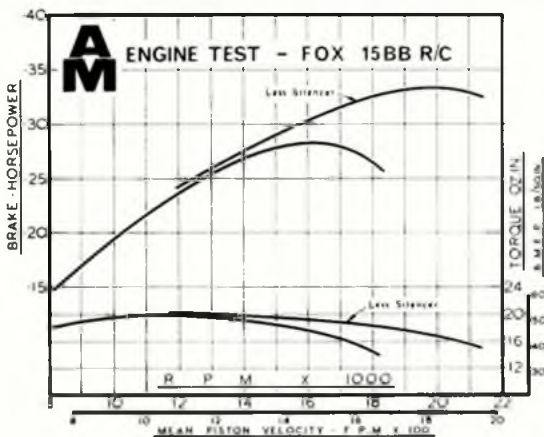
0.63bhp/lb (with silencer)

0.89bhp/lb (less silencer)

**Specific Output** (as tested on 5% nitro fuel):

114bhp/litre (with silencer)

134bhp/litre (less silencer).



# CLUB NEWS

THINKING OVER a comment in a report the other month on Juniors '*persevering in spite of the cost of modelling*', I could appreciate that pay restraint plus inflation has hit many a once adequately lined pocket but was still not convinced that, in general, aeromodelling had become more expensive over the years. Looking back over some old magazines I found that in April 1939, when the average wage was between £3 and £4 per week, a Baby Cyclone petrol engine retailed at £4 9s. 6d., and what would now be accepted as a beginners' rubber model kit was all of 9s. 6d. An equivalent kit today can be bought for around £2, but imagine paying £10 for a beginners' rubber kit!

Coming into the immediate post war period, March 1946, I found a sheet of  $\frac{1}{8} \times 3 \times 36$ in balsa advertised at one shilling, but available now at about 25 pence over a time when incomes have increased at least twelve times.

What becomes evident, though, is that with the increase in the available options over the years and a much wider range of marketed goods, tastes have become more sophisticated and relatively more expensive. Today the newcomer to the hobby looks for layout and equipment that not even the expert would aspire to years ago. It is very much more of a buyers' world than ever it was before.

Certainly there is no evidence of stinting on building materials in our first report which comes from Jim Dobson of the Nottingham MAC. During the winter months members put in some furious building, and though this has meant some thin club night attendances, the industry has paid off in the new squadrons available for decisive action on the competition front. On the home battleground it was the old aces, Ken Oliver, Mike Chapman, Bill Draper and Reg Lowe who have secured all the club honours in the early skirmishes. Open Free Flight went to Ken's *Wichita* glider, with Vic Hanby second and Bill Draper's own design third. But it was Mike who came out top in the 40in glider comp, with Ken second and Bill third. Just to show his versatility, Bill won the club C/L stunt event, held in May, with Frank Fearn and Reg Lowe in second and third places. And it was Reg's o/d stunt model that won the club Building Competition. Second was Rex Stevenson, also with a stunt model. Both these models feature quite prominently in comps up and down the country, and for necessary portability have detachable wings. No doubt these models are a popular feature of the many demonstrations given by the club. The very fact that model flying is in such demand at open air functions is proof that even if there are people who are opposed to model flying there are many more, perhaps less vociferous, who respond to its special fascination.

The Cosmo Aeromodelling Club is one that has been operating steadily and successfully over many years in the North Kent area, and from the newsletter sent along by Mr H. Jones, the Hon Sec, we see that another active year is under way. New models, secretly built during the winter, and old ones dusted off, have been appearing on the flying field, and the season got off to a hectic start with a Combat event. This proved to be a turn up for the book as veteran

combateers, Chris Snitter and Pete Tribe were shown the way home by Alan Pearson, a mere Goodyear flyer. Other C/L news is that the new club Rat Race rules give advantage of 30secs in 70 laps to chaps using effective silencers, and one minute in the 140 lap final. Harry Jones' *A-Rat* is already doing 85mph at 80dbA using a Weston piped Rossi 15D, so the idea seems to be catching on. No doubt our non-existent Spring this year has helped to sustain an interest in the cosy arts of indoor flying. Four members visited the SMAE Indoor Meet at Crawley, with Ray Sibbald getting a fourth place, but whether this was in Peanut we are not told. Plenty of interest then, ranging over the 30 strong membership, boosted by a recent increase in Juniors – taken as a good sign. Twelve of the members are SMAE members.

A club whose origins go back to the more leisurely days of flying, the Debdenairs (Loughton) MFC, is slowly but surely re-establishing itself in what the Hon Sec Rupert Harris terms this supersonic, highly transistorised age. Characteristically, the club ground, Grange Farm, is poised between the old and the new: the timeless River Roding on one side and the petrol age 'Roading River', that is the M11, on the other side, but they also have a farmland patch 'somewhere in Essex'. Interests, too, range between the long established and the relatively new; from free flight to thermal soaring. There are several full SMAE members in the club at present, and it is hoped to achieve full affiliation at the end of the year. Meantime, members have all the comforts of the Debden Community Association centre at Loughton Hall where the club meets every third Friday in the month.

According to Stuart A. C. Lodge, PRO of the Bath MAC, our remarks about the club operating at a 5in level during drought stricken 1976 seem to have had a galvanising effect on the membership, for this year has seen some real flying action. Already the club field is bestrewn with the destructured produce of winter's long labours, and it is double booking at all the fetes, with many an entreaty from a public agog for model action having to be turned down. The club field, incidentally, is a Corporation site at Lansdown Playing Fields. In addition, there is now a ten acre piece of land available through the good offices of a newly co-opted member. A bit overgrown and bleak looking at present it is hoped a few week ends work will see the area flyable. Good news, indeed, in these days of diminishing flying zones. Competition wise, the club got off to a modest start with a Chuck event, which Andy Cox had the nerve to win with a pair of Mr Lodge's old wings. In a general sense, much of the credit for the club resurgence goes to the new Chairman, Dave Jones, who has the happy knack of inspiring guilt in those who miss club sessions, and who gains respect when he takes from his locker his highly flyable C/L *Catalina*. Apart from the club newsletter which Mr Lodge has sent along, the PR front is kept healthy by the promise of a newshound from the local rag coming along to a club fly-in.

One of the more eyeworthy of control line activities is undoubtedly the stunt event, where the relatively large models execute their intricate manoeuvres with precision and aplomb. A highly watchable treat, then, for anyone who went to the Three Kings Aeromodellers 'May Day' stunt comp, a report of which appears in the May issue of *Court Circular*. A class field of eleven entrants put up some highly polished performances to which passing storm clouds added a dimension of drama by discharging static down the lines. Not wishing for a shock result the contest was held up at one stage after one competitor complained of a fireworks display around his handle. Perhaps they could have carried on had they heeded the rhyme: "*When lightning strikes and the sky all hell is, you'd be safer wearing your wellies.*" Jim Mannall came out top with J. Lynch of Dagenham not so far behind. Man, or should I say



Master, of the occasion was 13 year old Barry Ensten who made a very smooth and good looking flight with his *Nobbler* to take second place in the Novices event. But for real eye appeal the honours must always go to the scale event, and the one also held on May Day had a number of colourful models on view, but Scale models are always the trickiest to fly and the field was not a big one. Vic Willson came out top both in flying and static to take first place, with Wal Cordwell's *Waco Cabin Biplane* in second place. Yet more spectacle on the same day was provided by the Carrier event. Again a rather poor field of only four, but they put on a brave show. Second place man, Alan Fritz, flew quite a humdinger of a model. A copy of an American profile Carrier model, it used a system of flaps and out-board aileron which deflect on tripping the hook. Winner was D. Bird with a *Seamew*. The club flag flew very prominently at the Elmbridge Symposium where members 'drooled' over the mostly radio goodies on display, much of which, though, had C/L applications. Not featured in the volume of products available, alas, was something you could spray over gypsies to make them disappear (the club's Croydon patch is a favourite gypsy stopping point), but an aerosol containing good old soap and water might do the trick. An outstanding model at the symposium was the new Mick Reeves' *Hurricane* flown C/L style by Vic Willson. And 'outstanding' is just the word for this 80in wingspan model, for it has a retractable undercart which folds away quite realistically, and operates on only two lines as throttle and undercart are activated by closed circuit radio. The football special team of Combat fliers were also at Sandown, resplendent in their red and white jerseys and crash helmets. They 'kicked' off with a bright yellow model with two streamers and smoke canister released by an F/F timer. On the second day the CL circuit was almost entirely Three Kings, where a colourful variety of models gave a continuous performance, including Ken Gardner's *Cherokee* and *Tom Tit*, and Mick Staples' *Avro 504K*.

"*Air Mail 77*", the newsletter of the Sevenoaks MAC, is mainly concerned with the techniques and technicalities, but adhesives, discussed in one article, are of common concern to us all. Few people use balsa cement, nowadays, it seems, mainly going over to the PVA adhesives for general use, with the epoxies where extra strength is required. All these adhesives have sufficient body to fill in gaps, unlike the cyanoacrylate adhesives (finger stickers), which bond like nobody's business but require perfect joints. Personally, I still find balsa cement quite useful and think it still has a part to play. Possibly the most sophisticated model flying of all is the radio aerobatic model. Sleek, heavy and powerful, it can be thrown about the skies almost recklessly at speeds of around 100mph. It has no inherent stability and must be flown all the way on the box. The super model of twenty years ago would only now pass as a trainer.

News in the Watford Wayfarers MAC Bulletin is mostly of displays. A show was put on at a school in May. It was well received, but models can be damaged when flying on a strange site in perhaps a restricted space, and one or two got badly knocked about. Several more displays in the offing.

The newsletter of the Anglia MFC, *High Flyin*, is so full of humour that I had difficulty in separating the gen from the jokes, but I did learn that the Free Flight section, second in the 1976 Plugge Trophy, is still going great guns, and the lads are just as active on the home flying field as on the broader competition front. The *Raf V* contest was quite a success, occupying Sunday after flyable Sunday during the winter months. There were nine entries and, in all, no less than 96 flights were made. The object was to get three two minute maxes in succession, and finally four people lined up for the fly off, which Ray Paveley won

with a flight of 2:51. As far as general contest flying is concerned, and the particular farmer difficulties encountered at Bassingbourn I was impressed by Bob Wells' list of priorities: 1. Have an enjoyable day; 2. Safeguard the flying field; 3. Safeguard the model; 4. Win the contest. He admits this system has lost him many a contest, as it generally means D/T-ing inside the aerodrome, but on the other hand he has preserved a reasonable collection of models. Incidentally he, and others who contributed to their high Plugge placing, use only very moderate tactical methods.

I do not know what a sod farm is, but unpleasant as it may sound it makes an ideal flying field according to *FMA News*, the newsletter of the Florida Modellers Association. Judging by the photographs and result list the type of model they mostly fly around the sub-tropical everglades is the big C Class Gas Job. From the vast emptiness around (not a s-d in sight) the large area models are probably favoured for their secondary use as sunshades.

Your reports and newsletters welcome.

Clubman

## YOUR CLUB?

If your club is not listed – or if the secretary has changed recently – then please let us know and enable an accurate listing to be achieved. Amendments will be printed at the soonest opportunity.

### LONDON

#### Croydon & District Aeronautical Club

D. H. Thomson, 18 St Peter's Way, London W5.

#### Elmbridge Model Club

P. W. Maddocks, 2 Lexton Gardens, Clapham Park, London SW12.

#### Havering MC

J. Palmer, 14 Myddleton Square, London EC1R 1YE.

#### Imperial College Model Aircraft Club

Imperial College of Science and Technology, Prince Consort Road, London SW7 2BX.

#### North London R/C

R. Nicholls, 308 Holloway Road, London N7.

#### Three Kings Aeromodellers

Dave Woods, 133 Ravensbury Road, Southfields, London SW18 4RY.

### MIDDLESEX

#### Crookham Contest Modellers

G. Madelin, 10 Canterbury Close, Greenford, Middx.

#### Eastcote

Don Silver, 186 Field End Road, Eastcote, Middx.

#### Faltham DMAC

Richard King, 55 Longford Avenue, Faltham, Middx TW14 9TH.

#### Finchley & District Model Aero Club

S. R. Hart, 43 Preston Road, Wembley, Middx HA9 8J2.

### NORFOLK

#### Breckland MAC

M. Millett, 59 Gloucester Way, Thetford, Norfolk.

#### Broadlands Control Line Group

John Bailey, 4 Millers Breck, Teverham, Norwich, Norfolk NR8 6NH.

#### Downham RFC

M. H. Simms, "Riverside", East River Side, Ten Mile Bank, Downham Market, Norfolk.

#### Kings Lynn A/C

M. W. Griggs, 7 Burnham Avenue, Kings Lynn, Norfolk.

#### North Norfolk Aeromodellers

B. T. Dew, The Bungalow, Foulgers Opening, Ber Street, Norwich.

#### Norwich Model Aero Club

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# Contest Calendar . . .

- July 17th **SMAE INDOOR MEET.** FAI Microfilm at RAE Cardington, Beds. SMAE members only.
- July 17th **LEEDS RALLY.** F/F: Open R/G/P. Combined Mini. Vintage Duration, Eyeball F/F Scale. R/C: Thermal Soaring (simple 'fun' event). Details: Mike Proctor, 39 Fossway, Stamford Bridge, Nr York. Rally telephone contact: T. Hargreaves, Mirfield 494485. Venue: Elvington, Yorks. SMAE members only.
- July 17th **SVAS (MODEL SECTION) OPEN DAY.** C/L & F/F, sports models preferred! All types welcome - but none too noisy . . . Venue: Shuttleworth Collection, Old Warden, Nr Biggleswade, Beds.
- July 17th **SOUTHAMPTON & SOUTHERN AREA (SMAE) F/F GALA.** Open R/G/P. FAI Glider (5 rounds, 11am start), Combined Mini (A/1, A, Cd'H) Venue: Beaulieu Common, 10am start. Information: P. Stewart, Aldershot 29735.
- July 17th **LONDON AREA C/L MEET.** Combat at Charville Lane, Hayes. Confirmation: 01-304 0389.
- July 24th **SMAE CLUB CHAMPS.** Open R/G/P. Venue: RAF Bircham Newton, Norfolk - confirmed. Details: J. Cooper, Northampton 42449.
- July 24th **ASHFORD R.A. THERMAL SOARING.** % Slot scoring plus Ladies event (free). Send 50p pre-entry plus freq. to D. Hopkins, Broad Downs, The Street, Brook, Nr Ashford, Kent.
- July 31st **FACTT R/C THERMAL SOARING.** BARCS rules. Venue: RAF Weston-on-the-Green, near Bicester, Oxon. SMAE members only. £1.00 pre-entry to N. Webb, The Bungalow, 13 East Street, Fritwell, Oxon.
- July 31st **MORLEY SPORTS RALLY.** Vintage duration, Vintage precision, Open precision, 'Eyeball' F/F Scale. SMAE members only. Venue: Elvington, Yorks. Tel. Contact: Morley 521002.
- July 31st **WAKEFIELD 500 C/L MEET.** Marathon event for Goodyear. Details (SAE): G. Goddard, 191 Wrenthorpe Road, Nr Wakefield, W Yorks WF2 0HR. SMAE members only.
- August 14th **LONDON AREA (SMAE) GALA.** Open R/G/P (varying max. may be used) SMAE members only. Contact 01-736-7163. Venue: Basingstoun Old Airfield, Nr Royston, Herts. (On A14, north of Royston).
- August 20th 21st **BRITISH NATIONALS - FREE FLIGHT & R/C SOARING.** RAF Little Rissington, Glos.
- August 20th 21st **INT. COMBAT CONTEST.** Organised by Alfreton & District MAC. Venue: Donington Park, Castle Donington. Camping facilities. Competitions £6. Supporters £2.50. Details: D. Degg, 31 Stretta Lane, Higham Derby.
- August 27th **BRITISH NATIONAL CHAMPIONSHOPS - CONTROL LINE & RADIO CONTROL.** Venue: RAF Little Rissington, Glos.
- September 11th **SMAE INDOOR MEET.** Marathon and Open Tissue. Venue: RAE Cardington Beds. SMAE members only.

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- September 11th **SMAE SOUTHERN GALA.** R/C Scale & F/F events. Details circulated to SMAE clubs. Venue: RAF Odiham, Nr Basingstoke. SMAE members only. Confirmation: N. Couling, Eastbourne 53116.
- September 18th **SMAE INDOOR MEET.** F1D, Peanut, CO<sub>2</sub> duration. Venue: RAE Cardington, Beds. SMAE members only.
- September 18th **WREXHAM C/L AEROBATICS.** FAI stunt at Queensway Sports Centre, Queensway, Wrexham. 9am-5.30pm. Prizes: £30, £20, £10 plus £10 for best model in event. 50p entry fee to D. Roberts, 21 Newtown, Gresford, Wrexham, Clywd 2L12 8NG. Tel. Gresford 3895. Closing date for entries Sept 9th. Refreshments on site. Accommodation/camping facilities available.



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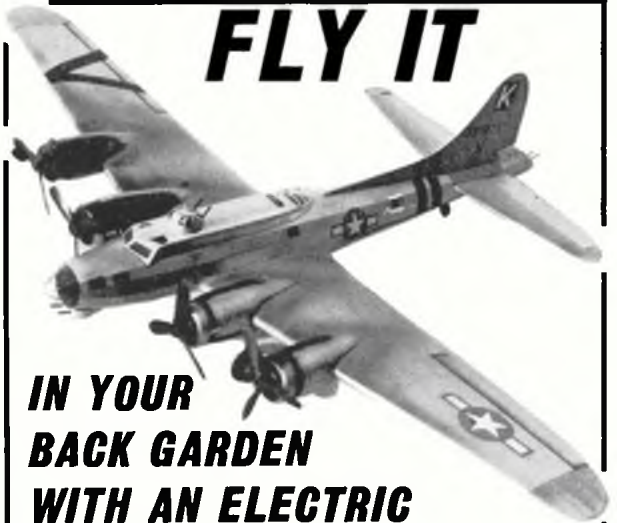
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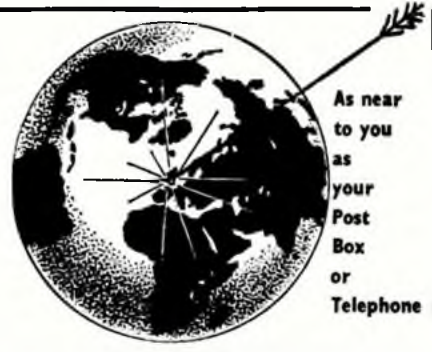
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SUBJECT TO ALTERATION DUE TO ECONOMIC CONDITIONS**

# SHOP GUIDE

## READERS PLEASE NOTE:

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Welcome

## DEALERS —

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## MODELLERS —

buy with confidence from these well-stocked shops

### AUSTRALIA

**MELBOURNE 3000** Tel. 347 8029  
RIVERSIDE HOBBY CENTRE ★  
16 LITTLE LATROBE STREET  
9am–5.30pm Mon–Fri. 9am–12 noon Sat

**LUTON** Tel. 28435  
MAPLE MODELS ★  
16 MAPLE ROAD  
9.00am–5.30pm. Lunch 1.30pm–2.30pm  
Closed Monday

### AVON

**BRISTOL 5** Tel. 557764  
AVONAIRE MODELS ★  
351 CHURCH ROAD, ST GEORGE  
9am–6pm Mon–Thurs. Late night Fri 7pm.  
Half day Wed

### BERKSHIRE

**NEWBURY** Tel: (0635) 46004  
TRENTS MODELS ★  
25-26 CHEAP STREET  
9am–5.30pm Mon–Sat

### CHESHIRE

**STOCKPORT** Tel. 061-488 5478  
THE MODEL SHOP  
280 WELLINGTON ROAD SOUTH  
Open Mon–Sat 9am–5.30pm. Closed Tuesdays

### CLEVELAND

**MIDDLESBROUGH** Tel. 211212  
MODELDROME ★  
265 LINTHORPE ROAD  
9.30am–6pm. Closed Wed

### CO DURHAM

**DARLINGTON** Tel. 69870  
BANK TOP CYCLE & MODEL SHOP  
BRIDGE TERRACE, YARM ROAD  
Open 9.00am–5.30pm. Closed Monday

### DEVON

**EXETER** Tel. 0392 58417  
EXETER MODEL CENTRE ★  
98 SOUTH STREET  
Open Monday–Saturday 9–5.30

### BEDFORDSHIRE

**LUTON** Tel. 23182  
AEROMODELS (LUTON) LTD.  
20 GORDON STREET  
Open 9am–5.30pm. Closed Wed

**SLOUGH** Tel. Slough 39419  
SLOUGH RADIO CONTROL MODELS ★  
273 HIGH STREET  
Mon, Tue, Thurs & Sat 9.30am–6pm  
Wed 9.30am–1pm  
Fri 9.30am–8pm

**PLYMOUTH** Tel. 0752 21851  
PLYMOUTH MODEL CENTRE  
11 OLD TOWN STREET  
9am–5.30pm Mon–Sat

### BUCKINGHAMSHIRE

**LUTON** Tel. 36218  
TAYLOR & McKENNA  
73 ARNDALE  
Open: 9am–5.30pm Mon to Thurs. 9am–6pm  
Fri and Sat

**AYLESBURY** Tel. 85752  
TAYLOR & McKENNA LTD  
46 FRIARS SQUARE  
Mon–Thurs 9am–5.30pm. Fri–Sat 9am–6pm

**PLYMOUTH** Tel. (0752) 53330  
RUNWAY SOUTHWEST  
16 DEVENPORT ROAD  
STOKE, PLYMOUTH  
Mon–Sat 9am–6pm. (Late night Friday 8pm)

**BLETCHLEY** Tel. MILTON KEYNES 70478  
TAYLOR & McKENNA LTD  
16 THE CONCOURSE, BRUNEL CENTRE  
Mon–Thurs 9am–5.30pm. Fri–Sat 9am–6pm

**MILTON KEYNES** Tel. M.K. 312553  
WOLVERTON MODELS & HOBBIES ★  
26 CHURCH STREET, WOLVERTON,  
MILTON KEYNES  
Open: Mon–Sat 9.00am–6.00pm. Half day Wed

### CAMBRIDGESHIRE

**CAMBRIDGE** Tel. 59620  
MODEL MANIA ★  
17 KING STREET  
9am–5.30pm Tues–Sat. Closed Mondays

### CHANNEL ISLANDS

**JERSEY** Tel. Central 21993  
THE HOBBY CENTRE ★  
8 COLOMBERIE PARADE, ST HELIER  
Open 9am–6pm  
Closed half-day Thursday

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS



**TORBAY** Tel. 0803 521767 ★  
MANSEL'S MODELS  
PALACE AVENUE, PAIGNTON  
Open 9.15am-5.30pm Mon-Sat inclusive  
Half day Wed

**SOUTHAMPTON** Tel. 25919 ★  
HOBBY LOBBY LTD  
52 COMMERCIAL ROAD  
Open 9.30am-5.30pm Mon-Fri  
Sat 9.30am-5pm

**KOWLOON** Tel. 3-800155 ★  
SCIENTIFIC HOBBIES LTD  
185-D PRINCE EDWARD ROAD  
Open 10am-8pm  
Sunday Closed

**TORQUAY** Tel. 27764 ★  
TORBAY MODEL SUPPLIES LTD  
59 VICTORIA ROAD, ELLACOMBE  
Open 9.15am-12.45pm and 2.15pm-5.45pm  
Half day Wed

**SOUTHAMPTON** Tel. 29223 ★  
SOLENT MODELS LTD  
60 OXFORD STREET SO1 1DL  
Open Mon-Sat 9.30am-6pm  
Fri 9.30am-7.30pm

**HONG KONG** Tel. 3-684184  
WINNING MODEL & HOBBY SUPPLIES  
2a AUSTIN AVENUE  
KOWLOON, HONG KONG  
Open 10am-7pm. Closed Sun

## DORSET

**BOURNEMOUTH** Tel. 763480  
WESTBOURNE MODEL CENTRE  
59 SEAMOR ROAD, WESTBOURNE  
9am-5.30pm Mon, Tues, Thurs, Sat.  
9am-7.30pm Fri. Closed Wed

## HEREFORDSHIRE

**HEREFORD** Tel. (0432) 4152 ★  
FRED PERKINS LTD  
48c COMMERCIAL ROAD  
Open 9am-5.30pm. Half day Thurs

## KENT

**BROMLEY** Tel. 01-460 0818 ★  
AVICRAFT LTD  
6 CHATTERTON ROAD  
10am-6pm (not closed for lunch) except  
Wed 10am-1pm

**BOURNEMOUTH** Tel. Northbourne 4170  
J. & H. MODELS ★  
1288 WIMBORNE ROAD, NORTHBOURNE  
Mon-Thurs 9am-5.30pm. Fri 9am-6.30pm  
Sat 9am-6pm. Half day Weds

## HERTFORDSHIRE

**HATFIELD** Tel. 63404 ★  
DESIGN AND HOBBIES  
5 MANOR PARADE  
Open 9.30am-6.30pm (Thurs 7.30pm)  
Half day Wed

**CANTERBURY** Tel. 69888 ★  
THE MODEL SHOP  
83 NORTHGATE CT1 1BA  
Open 9am-5.30pm inc. Sat  
Closed all day Thursday

## ESSEX

**WICKFORD** Tel. (037 44) 2621 ★  
WICKFORD MODEL EXCHANGE  
ST PETERS TERRACE, LONDON ROAD  
Open 9am-7pm Mon, Thurs, Fri, Sat.  
10am-1pm Sun

**HEMEL HEMPSTEAD** Tel. 53691  
TAYLOR & McKENNA LTD  
203 MARLOWES  
Mon-Thurs 9am-5.30pm, Fri-Sat 9am-6pm

**MAIDSTONE** Tel. 51719 ★  
THE MODEL SHOP  
19-23 UPPER STONE STREET  
Open 9.30am-1pm, 2.30pm-5.30pm  
Closed all day Wed

**WOODFORD BRIDGE** Tel. 01-504 3602 ★  
ARNOLD'S GIFT SHOP  
656 CHIGWELL ROAD  
Open 9am-6pm Mon-Sat. Closed Wed

**HERTFORD** Tel. 50101  
MODELLERS WORLD  
17 RAILWAY STREET  
Open 9.30am-6.00pm  
Closed Monday

**NEW ASH GREEN** Tel. 0474 872136  
THE HOBBY HOUSE  
10 UPPER STREET NORTH  
Open 9am-5.30pm. Closed Mon

## HAMPSHIRE

**ANDOVER** Tel. 61307 ★  
RADIO CONTROL SUPPLIES  
1a UNION STREET  
Open 9am-6pm. Fri 9am-8pm

**HITCHIN** Tel. 56132  
REDHILL MODEL SUPPLIES  
21a HERMITAGE ROAD  
10am-6pm. Thurs open till 7.30pm. Closed all  
day Wed

**SWANLEY** Tel. 67457 ★  
SWANLEY MODEL CENTRE  
(Formerly H & J Electronics)  
39 HIGH STREET  
Open 9.30am-6pm. Half day Wed

**FAREHAM** Tel. 4136 ★  
G. M. H. BUNCE & CO LTD  
206 WEST STREET  
Open 9am-5.30pm. Closed Wed

**POTTERS BAR** Tel. 59355  
HENRY J. NICHOLLS & SON LTD  
8 SOUTHGATE ROAD  
9.30am-6pm. Closed all day Thurs.  
Fri 9.30am-8pm

**TUNBRIDGE WELLS** Tel. 36689 ★  
E. M. MODELS  
42 CAMDEN ROAD  
Mon-Sat 9am-5.30pm. Closed Wed

**PORTSMOUTH** Tel. 25049 ★  
RAY BROWN MODELS  
10 KINGSTON ROAD  
Mon 9am-6pm, Tues 10am-5.30pm,  
Thurs 10am-6pm, Fri 9am-6pm  
Sat 9am-5.30pm. Lunch 1.30pm-2.30pm

**ST ALBANS** Tel. 53954  
S A M S  
12 HATFIELD ROAD  
Mon-Fri 9am-6pm Sat 9am-5.30pm

## LANCASHIRE

**BURNLEY** Tel. 23983 ★  
A.D. MODEL SUPPLIES  
22 PLUMBE STREET  
10am-6pm Mon-Fri. Sat 9am-5.30pm

**SOUTHAMPTON** Tel. Eastleigh 617849  
EASTLEIGH MODEL CENTRE  
2e HIGH STREET, EASTLEIGH  
Open 9am-6pm. Half day Wed

**HONG KONG** Tel. 3-680507 ★  
RADAR CO LTD  
3 OBSERVATORY ROAD, TSIMSHATSUI  
KOWLOON  
Open 10am-7pm. Closed Sundays

**BURY** Tel. 061-764 5787 ★  
M & T ELECTRONICS  
(NORMAN McFARLAND)  
52/54 BOND STREET  
10am-6pm. Thursdays till 8pm. Closed Tues

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**LONDON NORTH**

**FARNWORTH** Tel. 0204 74688  
**JOYCRRAFT**  
 3 BOLTON ROAD, MOSES GATE  
 Open Mon-Sat 9am-6.30pm  
 Closed all day Wednesday

**CAMDEN TOWN** Tel. 01-485 1818  
**AERONAUTICAL MODELS** ★  
 39 PARKWAY, NW1  
 9.15am-5.30pm Tues-Fri. 9.15am-5pm Sat.  
 Closed all day Mon

**MIDDLESEX**

**EASTCOTE** Tel. 01-866 7631  
**LANCASTER MODEL CRAFT** ★  
 217 FIELD END ROAD  
 Mon-Thurs 9am-6pm. Fri 9am-7pm  
 Early Closing Wed

**LEIGH** Tel. Leigh 677152  
**LEIGH MODEL CENTRE** ★  
 4 QUEEN STREET  
 Mon-Sat 9am-6pm. Wednesday 9am-1pm

**LONDON** Tel. 01-607 4272  
**HENRY J. NICHOLLS & SON LTD** ★  
 308 HOLLOWAY ROAD, N7  
 Monday to Friday 9am-6pm  
 Saturday 9am-5.30pm

**HARLINGTON** Tel. 01-897 2326  
**RADIO CONTROL MODEL CENTRE** ★  
 214 HIGH STREET  
 Mon. Tues. Thurs. Sat, 9am-6.30pm  
 Fri 9am-8.30pm. Wed closed all day

**LIVERPOOL** Tel. 051-709 8039  
**STAN CATCHPOLES MODEL WORLD** ★  
 85 BOLD STREET  
 9.30am-5.30pm. Six days

**NORTH FINCHLEY** Tel. 01-445 6531  
**MICHAEL'S MODELS** ★  
 646-648 HIGH ROAD, N12  
 Open Mon-Sat 9.00am-6.00pm

**HARROW** Tel. 01-863 9788  
**THE MODEL SHOP** ★  
 190-194 STATION ROAD  
 9.30am-6pm Mon-Sat. Half day Wed 1pm

**LONDON NORTH WEST**

**MANCHESTER** Tel. 061-834 3972  
**THE MODEL SHOP (MANCHESTER)**  
 209 DEANS GATE  
 Mon-Fri 9.30am-6pm. Sat 9.00am-5pm

**MILL HILL** Tel. 01-959 2877  
**H. A. BLUNT & SONS LTD.** ★  
 133 THE BROADWAY  
 NW7 4RN  
 Open: 9am-6.30pm Mon-Fri  
 9am-6pm Sat

**ISLEWORTH** Tel. 01-560 0473  
**RADIO CONTROL SUPPLIES** ★  
 581 LONDON ROAD  
 Open 9am-6pm. Fri 9am-8pm

**MANCHESTER** Tel. 061-794 4084  
**LISTER'S MODEL SUPPLIES**  
 285 EAST LANCASHIRE ROAD, SWINTON  
 Closed all day Wed. Open Sun 10.30am-1pm

**ELTHAM** Tel. 01-850 4324  
**ELTHAM MODELS** ★  
 54 WELL HALL ROAD SE9  
 Mon-Sat 10am-5.30pm. Closed Thurs

**KENTON** Tel. 01-204 9867  
**HOBBIES AND MODELS**  
 217/219 STREATFIELD ROAD  
 QUEENSBURY CIRCLE  
 Open 9am-6pm. Thurs 9am-8pm  
 Closed all day Wed

**WIGAN** Tel. 45683  
**G. FORSHAW & SON**  
 58 MARKET STREET  
 Open 9.15am-5.45pm. Early Closing Wed

**FULHAM** Tel. 01-385 9864  
**PATRICK MODELS** ★  
 107-111 LILLIE ROAD, SW6  
 Mon, Sat 9am-5.30pm. Thurs 9am-1pm

**AYLSHAM** Tel. 3145  
**THE MODEL SHOP**  
 PENFOLD STREET  
 9.00am-5.00pm Mon-Sat  
 Half day Wed 12.30pm

**LEICESTERSHIRE**

**HINCKLEY** Tel. 30952  
**PUNCTILIO MODEL SPOT** ★  
 6 WATERLOO ROAD  
 Open: Mon 9.15am-7pm. Tues 2pm-7pm.  
 Wed & Thurs 5.30pm-7pm. Fri 9.15am-7pm.  
 Sat 9.15am-5pm

**LEWISHAM** Tel. 01-852 2637  
**LEWISHAM MODEL CENTRE** ★  
 45 LEE HIGH ROAD, SE13  
 Mon-Sat Closed 6pm. Thurs Closed 1pm

**KINGS LYNN** Tel. 63164  
**BARNEY'S MODEL SHOP**  
 SOUTH EVERARD STREET  
 Open 9am-6pm

**LEICESTER** Tel. 544529  
**RADIO CONTROL SUPPLIES** ★  
 52a LONDON ROAD  
 Open 9am-6pm. Fri 9am-8pm

**LONDON** Tel. 01-228 6319  
**E. F. RUSS** ★  
 101 BATTERSEA RISE, SW11  
 Open Fri till 7pm. Other days 9am-6pm. Early  
 closing Wed 1pm

**NORWICH** Tel. 618023  
**GALAXY MODELS** ★  
 107 WADDINGTON STREET  
 Open 6 days a week

**LINCOLNSHIRE**

**LINCOLN** Tel. 25907  
**MODEL CENTRE** ★  
 24 NEWLAND  
 10am-5.30pm. Closed all day Wed

**LONDON EAST**

**LONDON** Tel. 01-520 7397  
**ARNOLD'S GIFT SHOP**  
 132-134 HOE STREET, E17  
 Open 9am-6pm Mon-Sat. Closed Wed

**NORTHANTS**

**NORTHAMPTON** Tel. 31223  
**THE MODEL SHOP** ★  
 230 WELLINGBOROUGH ROAD  
 Open 9am-6pm. Half day Thurs

**STAMFORD** Tel. 4524  
**SPORTS & HOBBIES** ★  
 4 ALL SAINTS STREET  
 Open 9am-5.30pm. Half day Thurs

**PLAISTOW** Tel. 01-472 2471  
**A. G. HERMITE** ★  
 633 BARKING ROAD, E13  
 Open 9am-6pm. Closed all day Thurs

**NORTHAMPTON** Tel. 27726  
**TAYLOR & MCKENNA LTD**  
 41-43 PRINCES WALK  
 GROSVENOR CENTRE  
 Mon-Thurs 9am-5.30pm. Fri-Sat 9am-6pm

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**WELLINGBOROUGH** Tel. Wellingborough 226263  
D. B. MODELS ★  
17 SILVER STREET  
Open 10am-6pm Mon-Sat

### NORTHUMBERLAND

**NEWCASTLE UPON TYNE** Tel. 22016  
THE MODEL SHOP ★  
18 BLENHEIM STREET  
Mon-Fri 9am-5.30pm. Sat 9am-6pm  
Closed Wed all day

### NOTTINGHAMSHIRE

**NOTTINGHAM** Tel. 50273  
GEE DEE MODELS LTD ★  
19-21 HEATHCOTE ST, OFF GOOSEGATE  
Open 9.30am-5.30pm. Early closing Thurs

**SUTTON-IN-ASHFIELD** Tel. Mansfield 58157  
MODELLERS CORNER ★  
146 OUTRAM STREET  
Open: Mon-Fri 9am-8pm  
Sat 9am-6pm  
Half day Wed (1pm)

**WORKSOP** Tel. 2855  
RUSSELL MODELS ★  
MODEL CENTRE, RYTON STREET  
Closed all day Thursday

### OXFORDSHIRE

**ABINGDON** Tel. 21927  
F. KNIGHT & SON ★  
44 BATH STREET  
Open 8.30am-1pm/2pm-5.30pm. Late night  
Fri 6pm. Closed all day Thurs

**OXFORD** Tel. 42407  
HOWES MODEL SHOP ★  
9-10 BROAD STREET  
Open 8.45am-5.30pm. 6 day week

### SCOTLAND

**GLASGOW** Tel. 041-632 8326  
RIDDELL BROS ★  
61 MOUNT ANNAN DRIVE  
Open 9am-6pm. Half day Tues

### SOMERSET

**BRIDGWATER** Tel. 3632  
R.M. TOYS AND MODELS ★  
36 ST. JOHN STREET  
Open 9am-5.30pm. Half day Thurs

**MINEHEAD** Tel. 2516  
OASIS MODELS ★  
44A THE AVENUE  
9am to 6pm, 10pm Fridays. Will open Sun by  
request

### STAFFORDSHIRE

**BURTON-ON-TRENT** Tel. 64240  
J. & N. MODELS  
22 DERBY STREET  
Open 9am-5.30pm. Closed Wed

**STAFFORD** Tel. 3420  
JOHN W. BAGNALL LTD. ★  
18 SALTER STREET  
9am-5.30pm. Closed all day Wed

**STOKE-ON-TRENT** Tel. 263574  
JOHN W. BAGNALL LTD.  
30 PICCADILLY, HANLEY  
9am-5.30pm. Closed all day Thurs

**WOLVERHAMPTON** Tel. 26709  
WOLVERHAMPTON MODELS & ★  
HOBBIES  
BELL ST, MANDERS CENTRE  
9am-5.30pm Mon-Sat. Early Closing Thursday

### SUFFOLK

**IPSWICH** Tel. 51195  
BOWMANS OF IPSWICH ★  
37/39 UPPER ORWELL STREET  
Open 9am-5.30pm Mon-Sat  
Early closing Wed

**IPSWICH** Tel. 79279  
GALAXY MODELS ★  
160 FELIXSTOWE ROAD  
Open 6 days a week

### SURREY

**ADDESTONE** Tel. Weybridge 45440  
ADDESTONE MODELS LTD ★  
63 STATION ROAD  
Open 9am-6pm. Closed all day Wednesday.  
Late night Friday 6.30pm

**FARNHAM** Tel. 26128  
FARNHAM MODELS  
57A DOWNING STREET  
Tues, Thurs, Fri, Sat 10am-5pm. Sun 9.30am-  
11.30am

**GRAYSHOTT** Tel. Hindhead 6135  
GRAYSHOTT MODELS  
5 HEADLEY ROAD, HINDHEAD  
Mon-Sat 9.00am-5.30pm  
Early Closing Wed

**HORLEY** Tel. 2412  
HORLEY MODELS  
91 VICTORIA ROAD  
9.15am-5.30pm  
Closed Wed

**KINGSTON on THAMES** Tel. 01-546 4488  
MICK CHARLES MODELS ★  
180 LONDON ROAD  
Mon, Tues, Thurs, 9.30am-6.30pm  
Wed 9.30am-1pm. Fri, Sat 9.30am-9pm

**WOKING** Tel. 66493  
WOKING MODELS ★  
9 GOLDSWORTH ROAD  
Open 9am-6pm Mon-Sat. Closed Wed after-  
noon

### SUSSEX

**BRIGHTON** Tel. 418225  
HARRY BROOKS ★  
15 VICTORIA ROAD, PORTSLADE  
Open every day except Sun 8.30am-5.45pm  
(no half day)

**CHICHESTER** Tel. 83592  
PLANET MODELS & HANDICRAFTS ★  
108 THE HORNET  
Open 9am-1pm and 2pm-6pm. Closed Thurs

**CRAWLEY** Tel. 21921  
HEATHER CRAFT  
60 HIGH STREET  
9am-5.30pm Mon-Sat. Half day Wednesday

**HORSHAM** Tel. 61533  
MODEL CORNER ★  
30 NORTH STREET  
Open 9am-5.30pm Mon-Sat. Closed Thursday  
afternoons

**WORTHING** Tel. 207525  
SUSSEX MODEL CENTRE ★  
10 TEVILLE GATE  
9am-5.30pm. Open six days a week. Monday to  
Saturday

### WALES

**CARDIFF** Tel. 29065  
BUD MORGAN ★  
22 CASTLE ARCADE  
SOUTH GLAMORGAN CFI 2BW  
9am-5.30pm. Early closing Wed 9am-1pm

**CARDIFF** Tel. 31367  
RYALL & WALTERS RADIO MODELS  
34 LLANDAFF ROAD  
Open 9am-12.30pm/1.30pm-5.30pm Monday  
8pm. Closed Wed

**CWMBRAN** Tel. 66727  
THE HOBBIES SHOP ★  
32 THE PARADE (on the balcony), GWENT  
9.30am-5.30pm. Half day Wed  
Open late Fri, 7pm

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**FLINT** Tel. 3123 ★  
FLINT MODELS  
5-9 CHURCH STREET  
Open five days 9am-5.30pm. Closed all day  
Wednesday

**SWINDON** Tel. 32829 ★  
THAMESDOWN HOBBIES  
21 HIGH STREET, OLD TOWN  
9.30am-5.30pm Mon-Sat  
Early Closing Wed 1pm

**HUDDERSFIELD** Tel. 45570 ★  
WEST YORKS MODELS  
61 WAKEFIELD ROAD  
Mon-Sat 9.30am-5.30pm  
Closed all day Wednesday

**NEWPORT** Tel. 65061  
MAKE A MODEL  
123 COMMERCIAL STREET  
Mon to Sat 9am-5.30pm  
Late Friday - 8pm

### WORCESTERSHIRE

**EVESHAM** Tel. 45828 ★  
P. & R. MODELS  
8 VINE MEWS  
Mon, Tues, Thurs, Fri, Sat, 9.15am-6pm  
Closed all day Wed

**LEEDS** Tel. 646117 ★  
FLYING MODELS  
88 CROSSGATES ROAD, CROSSGATES  
Mon-Sat 6am-6pm, Sun 8am-1pm

**SWANSEA** Tel. (0792) 52877 ★  
SWANSEA MODELS & HOBBIES  
11 SHOPPERS WALK, OXFORD STREET  
GLAMORGAN  
Mon, Tues, Wed, 9.30am-5.30pm. Thurs,  
9.30am-1pm. Fri and Sat 9.30am-6pm

**QUINTON** Tel. 021-422 1000 ★  
HOBBY SPOT  
280 HAGLEY ROAD WEST  
Weekdays 9.30am-6.30pm. Sat 9.30am-5.30pm  
Wed closed

**LEEDS** Tel. Leeds 787073 ★  
LEEDS MODEL RAILWAY CENTRE  
(AERO-R/C EQUIP DEPT.)  
10 ST. ANNE'S ROAD, HEADINGLEY  
Open six full days

### WARWICKSHIRE

**BIRMINGHAM 10** Tel. 021-772 4917 ★  
BOB'S MODELS  
520-522 COVENTRY ROAD, SMALL HEATH  
Open 9.45am-6.30pm. Early closing Wed  
1.30pm

### YORKSHIRE

**BARNSELY** Tel. 6222  
DON VALLEY SPORTS  
28 DONCASTER ROAD  
Open 9am-5.30pm Mon-Sat  
Closed Thursday

**LEEDS** Tel. 457891 ★  
THE MODEL SHOP (LEEDS) LTD  
38 MERRION STREET  
Open 9am-5.45pm Half day Wed

**BIRMINGHAM** Tel. 021-554 5569  
MODEL MECCA  
(G. I. & N. ROWAND)  
204 WHITTON ROAD  
Open 9am-6.30pm. Wed 9am-1.30pm  
Sat 9am-6pm

**BATLEY** Tel. 479300 ★  
BOBS MODELS (BATLEY)  
4 OXFORD STREET, MOUNT PLEASANT  
Open: Mon-Thurs 9am-6pm. Fri 9am-7pm.  
Sat 9am-5.30pm. Closed all day Tuesday

**OTLEY** Tel. 56334  
H. & S. CLIFF  
FLYING MODELS  
57 GAY LANE  
Mon-Sat 6am-6pm

**RUGBY** Tel. 3282 ★  
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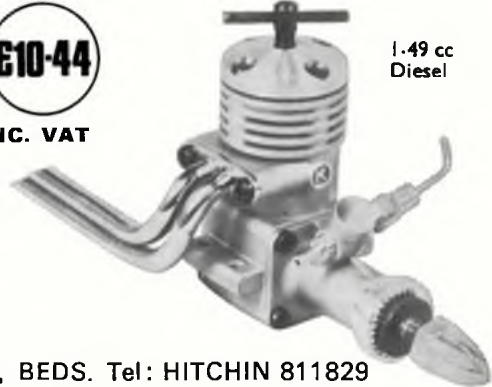
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9



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