

January 1974

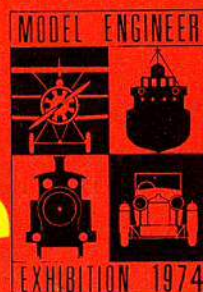
Aero Modeller

20p USA & Canada \$1

INCORPORATING
MODEL AIRCRAFT



HOBBY MAGAZINE

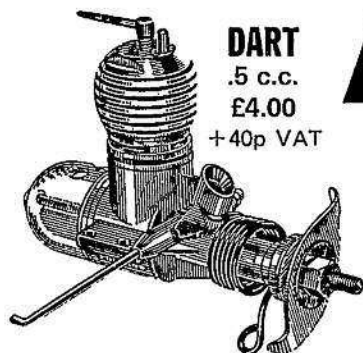


**BOLERO - 76in. SPAN
R/C GLIDER PLANS**

AEROMODELLER'S METALWORK

CLOCKWORK DETHERMALISERS





DART

.5 c.c.

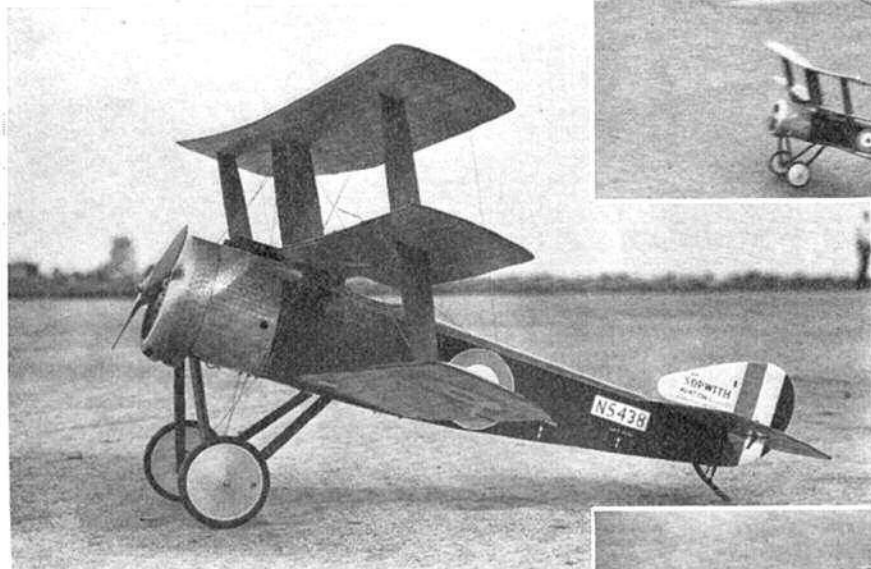
£4.00

+ 40p VAT

QUICKSTART

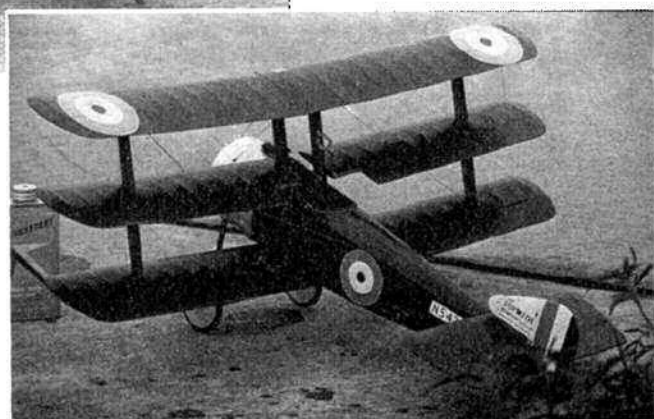
— Champion's
choice in U.S.A.

*The engine
always
performed
flawlessly —
Jack McCracken*



Jack's beautiful Sopwith Triplane is to 1/12th scale from *Aero Modeller* drawings by Peter Gray. It has a replica Clerget engine, true scale sprung axle, pendulum ailerons, full rigging and internal detail. All-up weight is 10 oz. and the DART is just the right size for perfect flight. No battery, no wires, no glowplug. All you need is a can of Quickstart fuel when operating a tried and trusted diesel.

When US National Champion in free-flight scale models, Jack McCracken, travelled thousands of miles from California to Oshkosh to compete, he needed absolute reliability, steady power and easy starting. He chose the DART and Quickstart fuel.



Photographs by Dick Stouffer and Bill Warner

Others in the range . . .

MERLIN .75 c.c. £3.17 + 32p VAT

SPITFIRE 1 c.c. £3.77 + 38p VAT

RAPIER 2.5 c.c. £8.25 + 83p VAT

SUPER MERLIN .75 c.c. £3.47 + 35p VAT

SABRE 1.5 c.c. £4.00 + 40p VAT

RAPIER R/C 2.5 c.c. £9.50 + 95p VAT

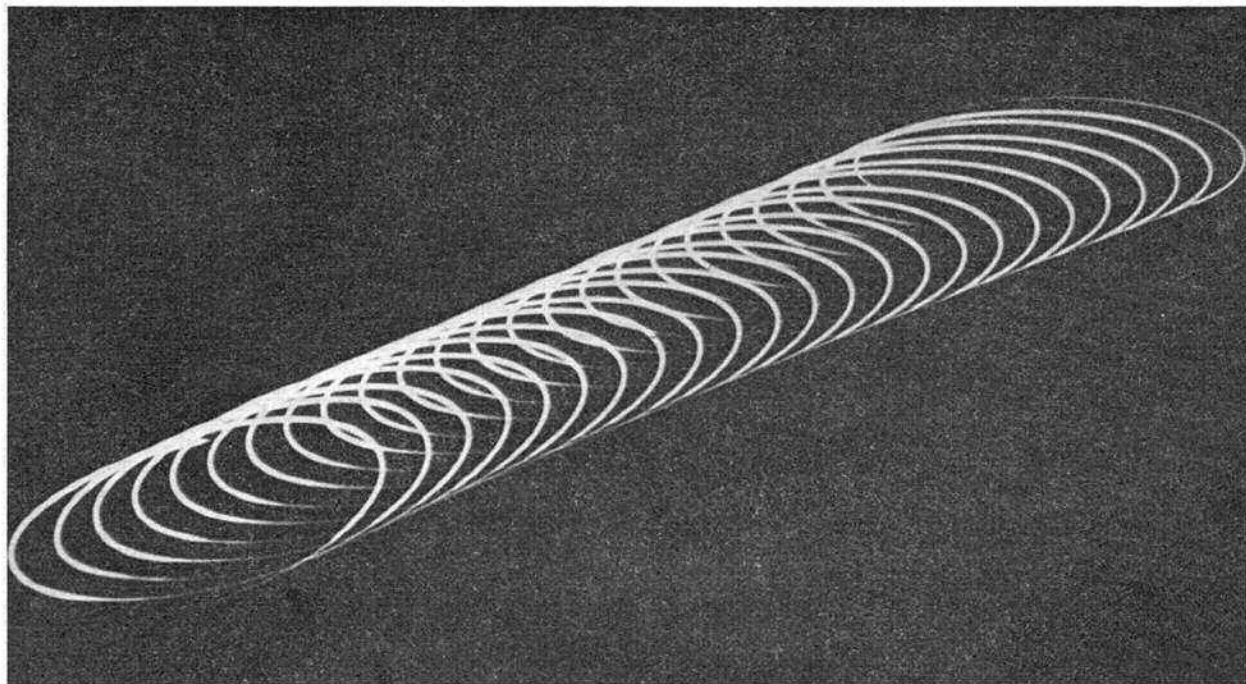
Tried and tested, backed by a full spares service

See them at your model shop!

DAVIES-CHARLTON LTD.

**HILLS MEADOW
DOUGLAS, Isle of Man**

SOLARBO



We'll tell you straight away it's an aircraft photo – a full-size helicopter in flight at night, in fact. The pattern is traced by lights on the rotor tips. Or it could have been an aerial shot of a control-line model flying at night with nav. lights!

Night flying used to be quite popular with models . . . and good fun. Pea bulbs for the navigation lights, coupled to a pencil. A power job could easily carry the extra payload of a proper landing light, switched on by a timer or a radio channel. Funnily enough, we have never tried – or seen – R/C night flying. *Somebody* must have done it. Car headlights are an obvious solution for lighting up the landing strip.

It just needs confidence in your model's performance. Confidence that starts right with the building of a completely reliable airframe. And there *everybody* knows the answer – Solarbo, the best balsa for every job. Models built from Solarbo Balsa perform better, live longer – day or night flying!

THE HOME OF
GOOD Balsa

SOLARBO
(LIMITED)

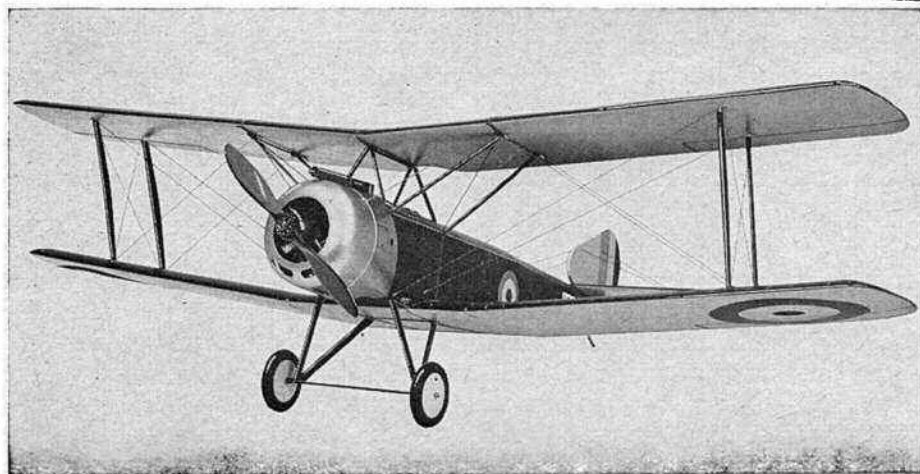
COMMERCE WAY
LANCING SUSSEX

ALWAYS ASK FOR
'SOLARBO' BY NAME

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

Buy and Fly the Best...

VERON



**BE A WORLD
WAR I PILOT!**

WITH THE

SOPWITH

1 1/2 STRUTTER

'VERY-NEAR-TO-SCALE'

Circa 1916-18

48" Span (1220mm)

Photo of our Prototype Model fitted with 2 Channel Proportional on Rudder & Elevator only (optional 3 on Motor), powered with a 3.44 c.c. 'GLOW-STAR' with Silencer. For 2.5 to 3.5 c.c. (.15 to .19 cu. in.) A.B.S. Vacuum Formed Cowl, Semi-pneumatic Vintage Wheels, Vinyl Decals, Superlative Die-cutting, Preformed Wire Strutting and Super Kitting.

KIT PRICE £15.35

**GO POWER
WHEN THE
WIND DROPS!
2 CHANNEL
PROPORTIONAL**



MADE IN
AUSTRALIA

Taipan

**2-in-1 HILLSIDE SOARER
& CLASS 2 SCALE POWER**



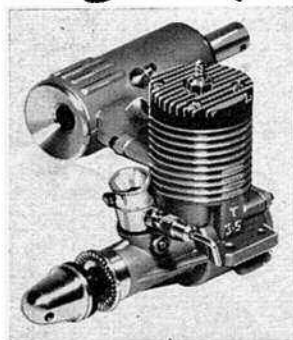
**KIT PRICE
£12.97**

FOURNIER RF5

72" Span (1830mm)

For 1.5 to 2.5 c.c. Motors
Very-near-to-scale Auxiliary Powered Soarer and Sport Plane for Intermediate 2-Channel Proportional Radio on Rudder and Elevator only. Canopy, A.B.S. Fairings, Wheel Spinner, etc.

**AT YOUR
MODEL SHOP
NOW!**



TAIPAN 3.5 GLOW

**TAIPAN
3.5 GLOW B.B.**
(Ball Bearing)
Hottest Schnuerle
Port '19' YET!
R.C. Version ... £18.47
Standard Motor ... £16.18
3.5 GLOW P.B.
(Plain Bearing-Illustrated)
R.C. Version ... £15.37
Standard Motor ... £13.10
Silencer (P.B. & B.B.) ... £4.06
2.5 GLOW
R.C. Version ... £15.37
Standard Motor ... £13.10
2.5 Ball Race Diesel
Standard Motor ... £12.31
Marine Version ... £15.71
1.8 TYRO Diesel
Standard Motor ... £8.15
Marine Version ... £11.55

FOKKER DVIII

46" Span (1168mm)



**KIT PRICE
£9.98**

For 1.5 c.c. (.09 cu. in.) with Rudder only (Single or 1 Prop) and up to 2.5 c.c. (.15 cu. in.) with 2-Ch. Prop on Elevator and Rudder. Also for Free-Flight with 1 c.c.

Very-near-to-scale (Class 2) Vintage W.W.I Circa 1917/18. With Wheels and A.B.S. Cowl. Transfer Decals.

FOX ENGINES

STANDARD and RADIO CONTROL

GOOD STARTERS—

PUNCHY & POWERFUL!

NEW!

11900 Fox 19	3.5 c.c.	...	...	£4.92
21900 Fox 19	R/C	...	...	£7.57

STANDARD

11500 Fox 15	2.5 c.c.	...	...	£4.16
12500 Fox 25	4.1 c.c.	...	...	£4.92
12900 Fox 29	5.0 c.c.	...	...	£5.67
13600 Fox 36	6.0 c.c.	...	...	£5.67
14000 Fox 40	6.6 c.c.	...	...	£7.19

RADIO CONTROL

21500 Fox 15RC	2.5 c.c.	...	...	£6.05
22500 Fox 25RC	4.1 c.c.	...	...	£7.57
22900 Fox 29RC	5.0 c.c.	...	...	£9.10
23600 Fox 36RC	6.0 c.c.	...	...	£9.10
26000 Fox 60RC	10.0 c.c.	Falcon	...	£13.24

SILENCERS (Open or Closed)

Type A	...	£1.88	B	...	£2.64	C	...	£3.39
--------	-----	-------	---	-----	-------	---	-----	-------

MODEL AIRCRAFT (B'MOUTH) LTD — NORWOOD PLACE — BOURNEMOUTH

Aero Modeller

INCORPORATING
MODEL AIRCRAFT

January 1974

Volume XXXIX No. 456

CONTENTS

HANGAR DOORS	21
'BOLERO'	22
BACK TO SQUARE ONE	24
TOPICAL TWISTS	27
LIGHTEN THE LOAD	28
TRADE NOTES	30
BASIC METALWORK	33
LATEST ENGINE NEWS	37
FLYING SCALE COLUMN	40
ROLLED PLY BOOMS	43
FREE-FLIGHT COMMENT	45
BETWEEN THE LINES	49
TEACHING AEROMODELLING	52
CLUB NEWS	54
CONTEST CALENDAR	55



HOBBY MAGAZINE



ALSO MODEL BOATS · RADIO CONTROL
MODELS & ELECTRONICS · MODEL ENGINEER
MODEL RAILWAYS · SCALE MODELS · WOOD-
WORKER and MILITARY MODELLING

This periodical is sold subject to the following conditions that it shall not, without the written consent of the publishers, be lent, re-sold, hired-out or otherwise disposed of by way of the Trade except at the full price of 20p or 1 dollar and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorized cover by way of Trade, or affixed to or as part of any publication of advertising, literary or pictorial matter whatsoever.
Second-class postage rates paid at New York, N.Y. Registered at the G.P.O. for transmission by Canadian Post. American inquiries regarding subscriptions, news stand sales and advertising should be sent to AERO MODELLER, Eastern News Distributors Inc., 155 West 15th Street, New York, N.Y. 10011 U.S.A.

Advertisement Offices: Model & Allied Publications Ltd., P.O. Box 35, Bridge Street, Hemel Hempstead, Hertfordshire HP1 1EE. Tel: Hemel Hempstead 56117.

Subscription Department: Remittances to Model & Allied Publications Ltd., P.O. Box 35, Bridge Street, Hemel Hempstead, Herts HP1 1EE (subscription queries Tel. Kings Langley 62692/3). Direct subscription rate £3.00 per annum, including December edition and Index, 50 (U.S.) for overseas subscribers.

CORRESPONDENCE anticipating a reply must be accompanied by a stamped and self-addressed envelope or international reply coupon. While every care is taken, no responsibility can be accepted for unsolicited manuscripts, photographs or artwork, etc. News reports should be submitted to arrive not later than the 15th of each month for publication in the next immediate issue. Photographs should be accompanied by negatives where possible and can only be accepted for use on an exclusive basis for British Copyright. AERO MODELLER incorporates the MODEL AEROPLANE CONSTRUCTOR and MODEL AIRCRAFT and is published on the third Friday of each month prior to date of publication by:

MODEL & ALLIED PUBLICATIONS LTD.

P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE

Tel.: Hemel Hempstead 2601-2-3 (Mon.-Fri.)

Editorial Director **D. J. LAIDLAW-DICKSON**

Managing Editor **R. G. MOULTON**

EDITOR **P. S. RICHARDSON**

Advertisement Manager **M. GRAY**

comment

Another well attended Annual General Meeting of the S.M.A.E. at Leicester on December 1st produced lively comment, and changes both in terms of new faces for the Official posts, and the fees charged for membership. The 1974 decision to apply a uniform fee for both Senior and Junior members has not been popular or practical. For 1974, the Junior fee is now reduced from £2.50 to only £1 and this applies to all members under the age of 16 at January 1st. Good news for Juniors! Small penalty is the application of Value Added Tax to all membership fees so that in fact the fees are to be £2.75 for Seniors, £1.10 for Juniors. The S.M.A.E. meeting followed immediately after the F.A.I. reunion in Paris where many radical rule changes were debated. Outcome of the 28th Nation assembly's decision was that free-flight championship class specifications (and Coupe d'Hiver) are to stand unchanged, except that the U.K. proposition for Wakefield airframes to be a minimum of 190g, and the U.S. proposition for power model fuel to be 80/20 formula were adopted. In control-line, Combat rules have become 'official' which is a first step to World Champs status. Radio Control sees greatest changes. A new aerobatic schedule for World Championships; a completely different multiple task glider schedule to be used provisionally; standard silencer sizes and obligatory crash helmets for officials at pylon races are some of the important improvements. 1974 World Championships for Scale, plus Indoor will be at Lakehurst, New Jersey, U.S.A., July 1st/7th.

on the cover

Trio of Junior Competitors at the 1973 Nats. R.A.F. Lindholme. Martyn Kinder (17-left) with a Reeves 'Humphreys', Anthony Fantham (15) with brother Mike's design and Clifford Waddilove (14) and his Pete Stewart-designed A/2 - all from the Richmond club, and keen as mustard.

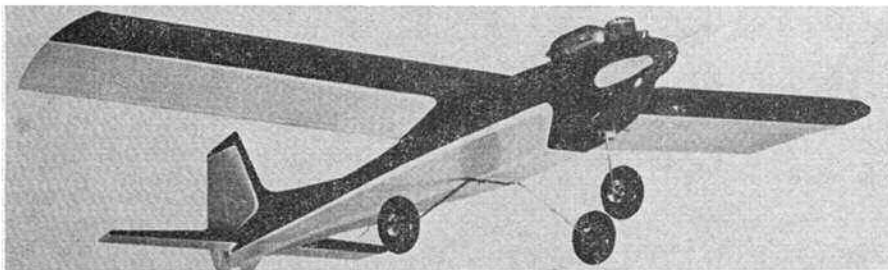
next month

A Bucker Jungmeister 'special' - plans for Eric Coates' superb free-flight scale model, plus three-view drawings and feature on the full-size machine for absolute scale authenticity. Free, full-size plans too for an attractive C/L stunter using 1.5 c.c. engines. More on basic metalwork plus how to make a winch for your towline glider. These and many more features are all in the February issue of AeroModeller - on sale January 18th.

RipMax

GIVES YOU A

POWER, GLIDER, SCALE . . . FREE-FLIGHT, CONTROL-LINE or R/C. Take your pick from this list of the **WORLD'S BEST KITS** . . . specially selected and distributed by **RIPMAX**.



FREE FLIGHT

Curtis Jenny JN4 32 1/2" span	£4.25
Fokker Triplane DR1 23 1/2" span	£4.25
Diamond Sailplane 74" span	£4.25
P-40 Warhawk 27" span	£4.25
Citabria 33 1/2" span	£4.25
Piper Cub Super Cruiser 35 1/2" span	£4.25
Cirrus 87 1/2" span	£6.35

FREE FLIGHT OR R/C SCALE

Piper Tri-Pacer 58 1/2" span	£14.30
Cessna 180 45" span	£8.50
Fairchild PT-19 48" span	£10.10
Piper Cub J-3 54" span	£9.50
Wizard Biplane Semi Scale 54" span	£15.90
Piper Cub Super Cruiser 72" span	£21.20
Mustang P51 Super Scale 66" span	£29.20
King Cobra Super Scale 70" span	£25.45
Spitfire Super Scale 64" span	£29.20
Stearman PT17 Biplane 64 1/2" span	£34.50
Fokker D-7 Super Scale 58 1/2" span	£33.45
S.E.5A Super Scale 40 1/2" span	£16.95
Lancer R/C Sports Stunt 53 1/2" span	£16.95
Schweizer 1-34 Sailplane 98 1/2" span	£17.50
Rimfire Super R/C Stunt 56" span	£15.90
Schweizer 1-260 Sailplane 70" span	£13.25
Fledgling de luxe kit 56" span	£15.90
Super Lancer SL-62 R/C 62" span	£22.30
Citabria Super Scale 54" span	£15.95

CONTROL LINE

S.E.5, Biplane 32" span	£7.95
Fokker D-7 32 1/2" span	£7.95
Chance-Vought Corsair F4U 135" span	£8.50
Rickenbackers Nieuport 28 33" span	£8.50
Stearman Crop Duster PT17 32 1/2" span	£7.95
Great Lakes Trainer 36" span	£9.00

FLEDGLING for .23 to .40 engines

Span 56 in. Length 42 in. Area 545 sq. in. A NEW sports model specially developed as an R/C trainer! Fuselage sides are one-piece, with ply doublers. Complete wing built on the board. Tapered strip ailerons. All parts die-cut or shaped. Pre-formed sprung landing gear. The model that goes together fast - and accurately.

SUPER SCALE CONTROL-LINE



Superbly - designed models, prefabricated and presented in the world-famous Sterling manner! Your choice of six different "character" models.

GREAT LAKES TRAINER 36" span
RICKENBACKER'S NIEUPORT 28 33" span
CORSAIR F4U 135" span
FOKKER D-7 32 1/2" span
SE5 32" span
STEARMAN CROP DUSTER (32 1/2")



CITABRIA (above)

All the latest ideas in Sterling kit prefabrication and design. Numbered parts for fast and accurate assembly with step-by-step plans. Plastic cowl and spats. There are two versions of this beautiful scale subject - 33 1/2" span for rubber power; 54" span for .23-.35 engines

CURTISS JN-4 JENNY

Step right back into the old-time with this 3 1/4" to the foot accurate scale classic. Built-up construction from die-cut parts, etc. For rubber power (as supplied in kit); or adapted to free-flight, R/C or control-line. (020-049 engines, or CO2.)

Sterling RUBBER POWERED

Detailed SCALE MODELS with IN-FLIGHT ACTION FEATURES. Fully prefabricated kits with die-cut and plastic parts, rubber motor, hardware, etc. EASILY CONVERTED to engine power for control-line or R/C!



Aeruca C-3 36" span	£3.20
Fokker D-7 24" span	£3.20
Nieuport 17 biplane 24" span	£3.20
AT-6 Texan 18" span	£1.60
Piper Super Cub 18" span	£1.30
Cessna 180 17" span	£1.30



Fokker Eindecker 25" span	£2.40
P-51D Mustang 24" span	£3.20
SE5A biplane 22" span	£3.20
Jap Zero 24" span	£3.20
Spitfire Mk. I 24" span	£2.65
Sopwith Camel 24" span	£3.20



Beechcraft Bonanza 22" span	£2.40
Ju 87 Stuka 20" span	£2.40
Messerschmitt 109 17" span	£1.60
Curtiss Hawk P6E 16" span	£1.85
L-19 Birdog 17" span	£1.30



Stearman PT-17 22" span	£2.65
F4U-5 Corsair 24" span	£3.70
Ansaldo SVA 5 19" span	£1.85
Focke-Wulf 190 24" span	£2.65
Thunderbolt P-47 20" span	£2.40



KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

FLYING START TO 1974!

RIPMAX KWIKFORM 'DINGBAT'

A NEW AND EXCITING design for R/C COMBAT! Fast to build. Fast to fly. Kit contains StyroTru veneered wing, glass-fibre tape, all balsa and ply parts, pre-formed nose-leg, all nuts, bolts, control horns. Fully detailed plan with building instructions.

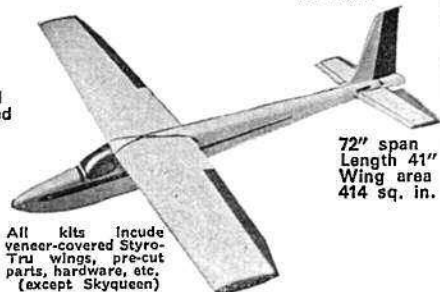
36" span
For .19-.40 engines. De-
signed to be flown with
3-function radio!
Kit £9.60

IVINGHOE £8.95

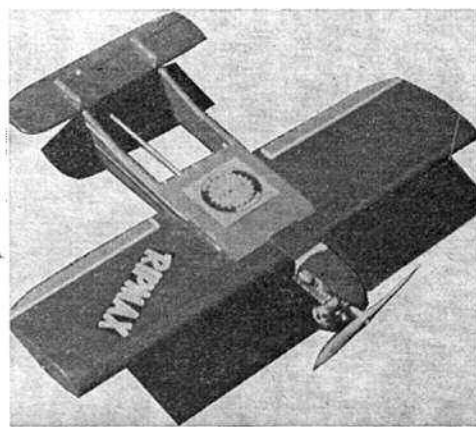
Fully aerobatic general-purpose sailplane or slope soarer. Ideal for R/C (rudder-only or multi-function). Prefabricated kit includes finished veneer-covered StyroTru wings, shaped parts, etc.

OTHER RIPMAX-AVIETTE KITS

include:
NIEUPORT 1751" (19-49 engines) £16.80
SOPWITH SWALLOW 53" (19-49 en-
gines) £15.70
FOKKER EINEDECKER 56" (15-49 en-
gines) £14.30
B25 MITCHELL 74" (twin .29's) £39.95
SENATOR 52" span R/C trainer £10.90
SKYQUEEN 58" span R/C trainer £9.95
DAZZLERS - 30, 36, 42, 48, 54 and 63!



72" span
Length 41"
Wing area
414 sq. in.



GOLDBERG

The QUALITY PLUS de luxe kits from the American maestro himself!

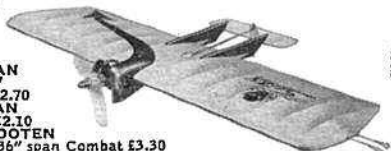


SKYLARK 56 £15.60
JR. SKYLARK £5.95



JNR SATAN
(right) 29"
span £2.70
L'IL SATAN
£2.10

RILEY WOOTEN
VOODOO 36" span Combat £3.30



SENIOR FALCON £25.75
FALCON 56 £13.75

GOLDBERG KIT FEATURES:

- ① All de luxe with top quality parts
- ② Coil-sprung nosegear, formed main undercarriage legs



JUNIOR
FALCON £5.40

- ③ Die-cut ribs, fuselage sides, formers and other sheet parts
- ④ Shaped and notched LE's and TE's
- ⑤ NEW 'Symmet-TRU' wing construction for easy, accurate assembly

L'IL WIZARD £2.70
21" span for .049s.
L'IL JUMPIN BEAN
21" span £2.35
SWORDSMAN 18
18" sp. stunt (.049s) £2.35
SHOESTRING
STUNTER 42" span £5.35



stand-off scale

KITS

Wing span 60". Engines .40- 61
Weight up to 7 lb. with radio gear

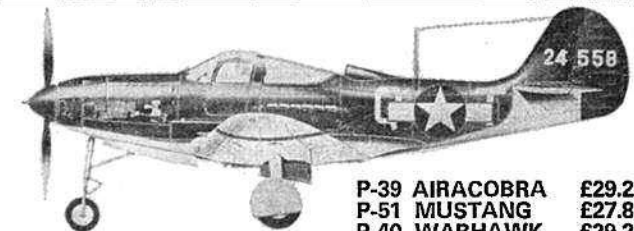
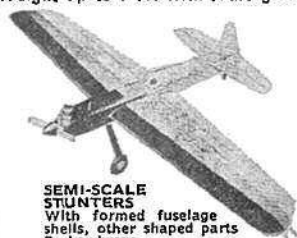
CONTROL LINE

NOBLER ... £10.00
Famous 50" stunt champ!
JNR NOBLER ... £6.10
40" span for .15-.19s.
PEACEMAKER ... £6.95
46" span fully aerobatic.
42" FLITE STREAK £4.95
JR FLITE STREAK £3.90



SEMI-SCALE

STUNTERS
With formed fuselage
shells, other shaped parts
& hardware.
42" span HURRICANE £5.55
42" P-40 TIGER SHARK
£5.55 also
28" WARHAWK scale £7.75
27" THUNDERBOLT £7.75
37" MUSTANG £11.10



P-39 AIRACOBRA £29.25
P-51 MUSTANG £27.80
P-40 WARHAWK £29.25



R/C

COMPACTS
(good for free-
flight tool)
ROARIN' 20 ... £2.80
48" HEADMASTER £11.10
SCHOOLGIRL BIPE £5.55
39 1/2" TOP DAWG £9.45

all sheet balsa con-
struction

IF IT'S
RipMax
IT'S
GOOD!

SEE THEM ALL AT YOUR MODEL SHOP

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

43rd GREAT SHOW!

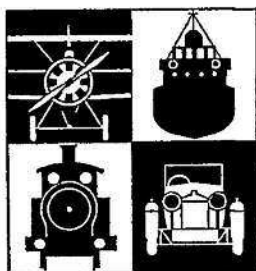
SEYMOUR HALL, LONDON, W.1

1st January - 12th January 1974

(Not Sunday)

Daily 10 a.m. - 9 p.m.

**Model Aircraft, Locomotives
Boats, Traction Engines
Military Models, Crafts**



COMPETITORS

£300 in prizes . . . some 30 cups, trophies and other awards. Championship Cups for permanent retention. A win confers 'Expert Status'! Edgar Westbury Memorial Challenge Trophy.

ENTRY CLASSES

Examples of every form of modelmaking activity on show. Model Engineering masterpieces, locomotives, traction engines, aircraft, boats, yachts, cars . . . simple plastic creations. . . . Classes include Military Models (six classes) and Craft entries (furniture, glass-fibre, etc.).

WHAT WILL BE ON DISPLAY

OPEN PLAN arrangement of the MAIN HALL provides excellent access and viewing, whilst retaining the concourse round the WINNER'S PODIUM - (This year, we hope winners will fit this stand!) A slight change in S.M.E.E. WORKSHOP will allow spectators better viewing without blocking a door. 'Bill' Carter will again be in charge of the S.M.E.E. PASSENGER RAILWAY with non-stop service during opening hours for young and old. The team of experts from the Society will be providing practical work and advice to visitors.

LARGE FLYING CIRCLE - balcony to balcony - again in operation with even more exciting and expert models, and operators. All-electric models that do most of the things that i.c.-powered control-line models do. It gets better every year.

TRADE STANDS - We have increased numbers this year in view of increasing demand from exhibitors. These are in MAIN HALL; further trade and DEMONSTRATION STANDS in BRYANSTON ROOM will show construction techniques and use of tools.

Introduction of a MODEL ENGINEER WORKSHOP manned by the S.M.E.E. proved immensely popular and will be increased in size and scope, again with experts from S.M.E.E. in charge and assisted by M.E. consultants. Working models under compressed air will also be on show. I.C. engine testing with swinging field type Dynamometer.

BRYANSTON ROOM will again be a CLUBMEN'S CORNER with stands manned by the principal governing bodies plus club unit demonstrations, and trade demonstrations.

LECTURE HALL will house the clubs connected with MILITARIA - British Model Soldiers Society, International Plastic Modellers' Society, etc. - and also display the entries in the MODEL SOLDIER classes.

BATTLE GAMES on announced themes with expert commentary.

BOATING MARINA: Timed sessions will be held. TRADE DEMONSTRATIONS of RADIO-CONTROLLED BOATS will be welcomed (please let us hear early), which will be varied with CLUB EVENTS (mainly in evenings) and STAFF EXHIBITS. There will be no selling at the poolside, but demonstrations can be announced and suitable display cards shown advising visitors where products obtainable and information given. Club features or displays specially invited - drop us a line!

GALLERIES provide sitting-out space for several hundred persons, and offer best view of model aircraft flying. There will also be club exhibits displayed and entries in our BOYS' EXHIBITION and other displays.

SOUVENIR GUIDE

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

PRIZE POOL ALLOCATION

Classes attracting six or more entries will enjoy prizes to value of: 1st £5; 2nd £3; 3rd £1. With over 12 entries: 1st £7; 2nd £4; 3rd £2; 4th £1. Classes under six will have 1st and 2nd only, or at discretion of the judges, may be combined with other classes.

REFRESHMENTS

Snack Bar in the Balcony Cafe, with teas, soft drinks, sandwiches, cakes, Restaurant Service (licensed) available on ground floor. Parties may book in advance.

ADMISSION

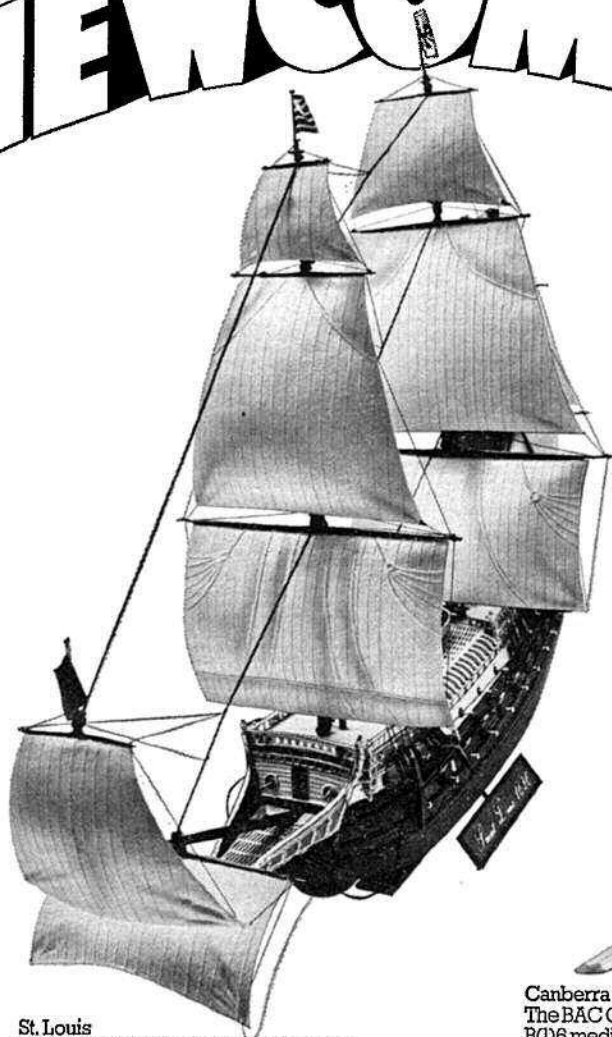
Price of admission at the door will be: 35p adult, 20p child, including V.A.T. A child is regarded as anyone still at school. Children under five who have not started school and are accompanied will not be charged.

Reduced admission charges for pre-booking as under: Single and small number pre-booking tickets available from these offices. Adult 27p, Child 15p. Parties of more than 10: Adult 22p, Child 12p, Teachers 1/c parties free - one per 10 in party.

A combined family ticket can also be bought in advance.

**Advance Bookings and details from:
EXHIBITION MANAGER,
M.A.P. LTD., P.O. BOX 35,
HEMEL HEMPSTEAD, HERTS HP1 1EE**

AIRFIX NEWCOMERS



St. Louis

The Dutch-built 60 gun St. Louis warship displaced some 1,200 tons and was introduced into the French Navy by Cardinal Richelieu, to give strength to the existing French fleet. This big scale kit has 189 parts plus sails, rigging and flags.



Two New

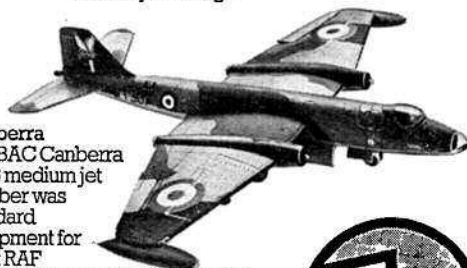
Waterline Models

67 parts make up the highly detailed waterline model of HMS Hood, the largest British battlecruiser of the Second World War until she was sunk by the Bismarck. The Bismarck, one of the German fleet's most powerful and heavily armed battleships was sunk in perhaps the most famous naval encounter of the War. The kit has 49 high definition parts. These two clip-together kits are in 1/1200th scale.



SA 341 Gazelle

The SA 341 Gazelle is a streamlined 2-seater military helicopter with the unusual feature of a tail rotor built into the tail fin. The 1/72nd scale kit has more than 40 parts and includes transfers for Army markings.



Canberra

The BAC Canberra B(1)6 medium jet bomber was standard equipment for most RAF squadrons during the 50's and 60's. Either the RAF B(1)6 or Australian B20 versions can be modelled and parts include armament and drop tanks. 1/72nd scale.



The world's biggest range of construction kits

TSIX

**All prices include Value Added Tax,
post & packing, effective 1st Nov 1973**

[illegible]

SUPER Tigre

Choice of Champions!

THE NAME THAT STANDS FOR SPEED & POWER

We are writing this advert copy whilst being driven down the Autostrada from Milan to Bologna by Mr. J. Garofali of Super Tigre. The writer has spent a day in the new factory at Pianoro and has been brought up to date with the current activity.

The new X15 is definitely scheduled for completion at the latter end of November. Some of the parts are already assembled and only await the final pieces before completion. All of this first batch of fifty destined for England are of the tuned pipe type and the price of approximately £23 including tuned pipe is expected.

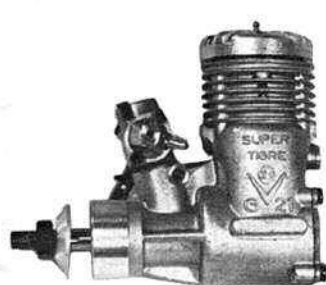
At the recent Italian championships the X15 did 238 k.p.h. on F.A.I. fuel on two lines .04mm diameter. The X29 did 258 k.p.h. and both are new Italian records. The factory at Pianoro is now working flat out to achieve 7,000 engines per month after the delays earlier this year.

The shipment of G21/29, 35, 40 and 46 engines, together with X15 R.V. Diesels are at present clearing Customs at London Airport.

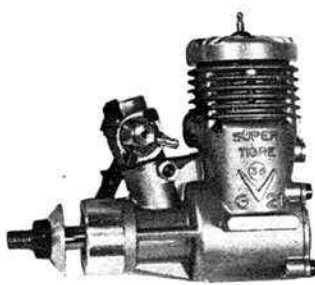
The picture below shows the four G21 series motors, one of the nice points about these is the interchangeability since all use exactly the same crankcase casting and hence fit the same engine bearers or radial mount. It is very versatile to have a 5 c.c. motor giving out .5 b.h.p. to a .46 cu. in.-7.6 c.c. motor giving out .88 b.h.p. and weighing approximately the same.

The G21/29 and 35 motors are a lap piston type and the G21/40 and 46 are ring motors. Both types feature a chrome liner for long life. All four motors have the Mag. III carburettor with the thimble control idle needle for lowest possible tick-over.

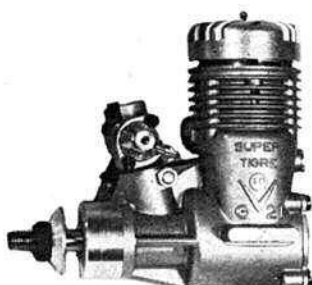
FOUR OF A KIND



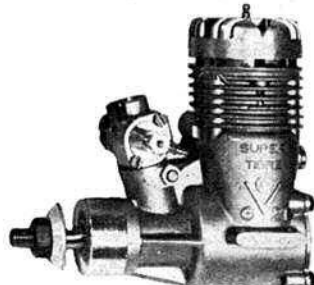
G21/29 F.1 R/C £17.55



G21/35 F.1 R/C £18.62



G21/40 F.1 R/C £18.62



G21/46 F.1 R/C £19.60

THE SUPER TIGRE RANGE

G20/15 D	...	...	...	£11.40
G20/15 D R/C	...	...	...	£14.02
G20/15 G	...	...	...	£11.40
G20/15 G R/C	...	...	...	£14.02
G15 F.1 w/spinner	...	...	...	£14.50
G15 F.1 R/C	...	...	...	£18.13
G15 R.V. D	...	...	...	£18.02
G15/19 F.1 R/C	...	...	...	£18.13
G15 R.V. G	...	...	...	£18.02
G15/19 F.1	...	...	...	£14.50
G20/23	...	...	...	£11.40
G20/23 R/C	...	...	...	£15.09

G15/19 CAR	...	...	...	£21.28
G21/29 R.V. ABC	...	...	...	£19.82
G21/29 F.1	...	...	...	£14.02
G21/29 F.1 R/C	...	...	...	£17.55
G21/35 F.1	...	...	...	£14.28
G21/35 F.1 R/C	...	...	...	£18.62
G21/40 F.1	...	...	...	£15.30
G21/40 F.1 R/C	...	...	...	£18.62
G40 ABC R/C	...	...	...	£21.97
G21/46 F.1 Std.	...	...	...	£15.92
G21/46 F.1 R/C	...	...	...	£19.60

ST.35 Std.	...	...	...	£12.16
ST.35 S R/C	...	...	...	£15.80
ST.51 R/C	...	...	...	£19.66
ST.56 R/C	...	...	...	£21.08
ST.60 R/C	...	...	...	£22.25
G60 F.1 R/C	...	...	...	£28.10
G71 F.1 R/C	...	...	...	£28.68
G60 R.V. Racing	...	...	...	£35.12
G60 Marine	...	...	...	£38.63
G60 Marine R/C	...	...	...	£40.97
G21/29 M	...	...	...	£21.61
G21/29 R/C M	...	...	...	£24.48

* Available from stock as at 1st October.

ADDITIONAL SPARE PARTS AND ACCESSORIES PRICES

SUPER TIGRE ACCESSORIES

Silencers	Retail
S15 fits G20, 15, 19, 23	£3.10
S29 fits G21, 35, 40, 46	£3.79
S35 fits ST.35 S, ST.35 C, ST.35 R/C	£3.79
S40 fits G40	£3.79
S56 fits ST.51, 56, 60	£3.79
S71 fits G60 F.1 & R.V. & G71	£4.31
G15 tuned pipe	£3.10
G21/20 tuned pipe	£3.79
G60 tuned pipe	£4.31

Glow plug standard	41p
Glow plug R/C	78p
Speed Glow Plug	53p
Spinners, G15, G60, G29	£1.43
Screw on 21" dia.	£2.00
Tank mount fits ST.51, 56, 60	

Radial mount for:	
G20/15 & 23, G15	£2.15
G21/29, 35, 40 & 46	£2.15
ST.51, 56 & 60	£2.15

Needle valves fit all sizes	18p
Needle valve and spray bar	57p
G60 Throttle Mag II	£4.88
ST.51, 56, 60 Throttle Mag II	£4.88
G40 Throttle Mag II	£4.88
G20/15 & 23 Throttle Mag II	£4.30
Pressure nipple	15p
Sealig Free Flight mount	£3.45
R/C car heat sink	£2.00
Exhaust extension (R/C car)	£1.25
Idle Needle Assy. Mag III	72p
Fuel Inlet Section	72p

SUPER TIGRE MOTORS ARE AVAILABLE FROM THE VERY BEST MODEL SHOPS



WORLD ENGINES

LIMITED

97 TUDOR AVENUE, WATFORD, HERTS

PHONE WATFORD 42859

VISITORS BY APPOINTMENT

S.A.E. WITH INQUIRIES PLEASE

DREMEL

MOTO-TOOL MULTI-PURPOSE 'HAND WORKSHOP'



DRILLING HOLES



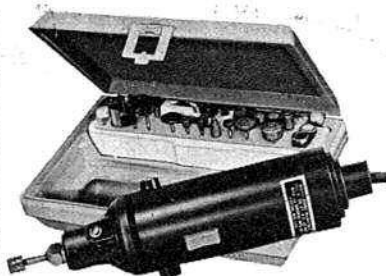
SANDING SMALL AREAS



SHARPENING



DEBURRING & REFINISHING



Powerful HI-SPEED mains-powered motor in sturdy phenolic housing with 1/8", 3/32", 1/16" and 1/32" collets. PLUS 34 accessories including high-speed cutters, emery and silicon grinding wheels and points, wire and bristle brushes, polishing tips, sanding discs, etc. Weight 12 ounces.

Moto-Tool (240v) £32.50
INDUSTRIAL MOTO-TOOL KIT (110v) £39.95

EXTRA ATTACHMENTS: ROUTER £8.25

BIT SET (6 pcs.) £15.40

EMERY WHEELS (36) £1.35

SAWS (Light Duty or Heavy Duty) £2.75

packet 3

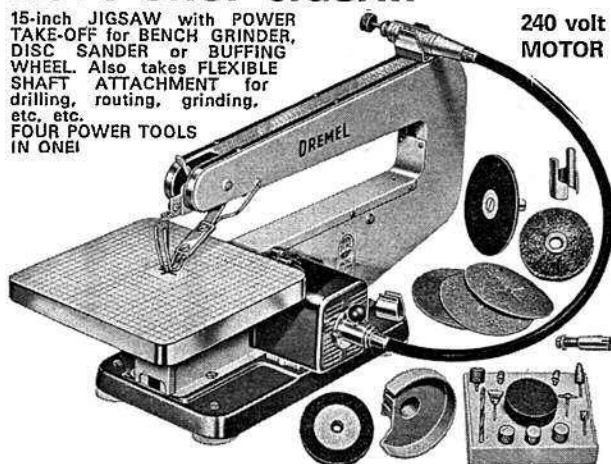
SANDER BANDS — Fine (12) 50p

Coarse (12) 50p

MOTO-SHOP JIGSAW

15-inch JIGSAW with POWER TAKE-OFF for BENCH GRINDER, DISC SANDER or BUFFING WHEEL. Also takes FLEXIBLE SHAFT ATTACHMENT for drilling, routing, grinding, etc. etc. FOUR POWER TOOLS IN ONE!

240 volt
MOTOR



Jigsaw complete with Disc Sander £33.50

GRINDSTONE and FLEXISHAFT . . . £16.45 ADDITIONAL SAW BLADES:
Grindstone Adaptor and Guard £2.75 Fine or Coarse (pkt 5) 59p

DREMEL

CREATIVE POWER TOOLS
DISTRIBUTED BY RIPMAX — AT YOUR MODEL SHOP



We have a good case to help you create super models

No. 82
X-acto Burlington
Hobby Chest
Just one of the many
hobby kits available.

You have only to glance at our case to see that in your hands these precision X-acto tools will give a new dimension in the creation of even finer modelling.

X-acto—everything from a single knife to a complete Hobby Chest.



KNIVES • PLIERS • FILES • RAZOR
SAWS • CLAMPS • DRILLS •
SCREWDRIVERS • SOLDERING
IRON/HOT KNIFE.

**AVAILABLE FROM ALL
GOOD MODEL SHOPS**

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

MacGregor puts you in the Pilot's Seat.

"If only I could give it a bit of up elevator!"

Haven't you ever thought that to yourself when that beautiful free flight model you've spent all winter building does a sudden flip or catches a gust of wind. Just imagine how much extra fun it would be if you could have control over your craft.

Well, you can. With a MacGregor Radio Control outfit, you can put yourself right there in the cockpit and fly your 'plane just like the real thing!

And it needn't be expensive. With more than ten years' experience of designing and manufacturing best selling, top quality model control gear we can today offer you

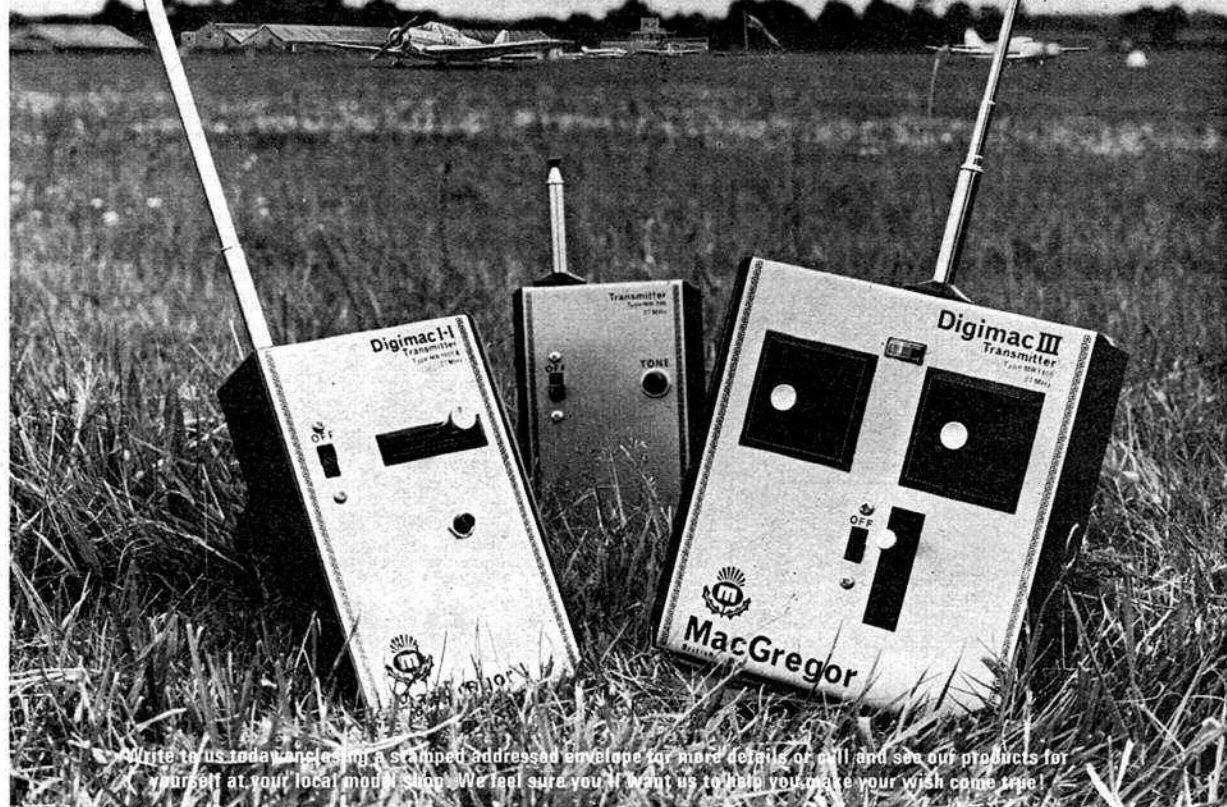
the finest, most comprehensive range of precision equipment in the world with something to suit every requirement and pocket.

A single channel outfit for instance with simple rubber driven escapements for both rudder and engine control can cost as little as £19! Or if you are more ambitious and desire more sophistication there are complete digital proportional outfits ranging from £42 right up to £150 or more, with a complete range of accessories and spares to suit any application. And of course all this is backed up by one of the finest and swiftest after sales organisations in the business.



Available from all Ripmax stockists throughout the UK

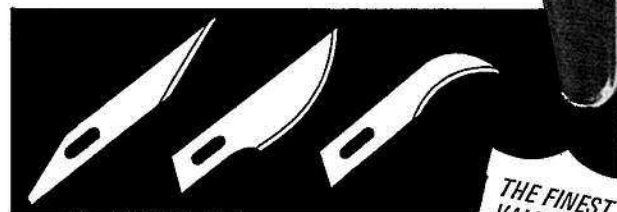
MacGregor Radio Control,
Canal Estate, Langley, Bucks. SL3 6EQ



Write to us today enclosing a stamped addressed envelope for more details or call and see our products for yourself at your local model shop. We feel sure you'll want us to help you make your wish come true!

THIS ECONOMY CRAFT TOOL CUTS RIGHT ACROSS ALL OTHERS FOR VALUE!

We designed this knife for all light cutting purposes – the quality is high – the price is low. Three spare blades in different shapes are available, making a cutting tool of unbeatable value for money.



Swann-Morton

SWANN-MORTON LIMITED
PENN WORKS, OWLERTON GREEN,
SHEFFIELD S6 2BJ, ENGLAND.

THE FINEST
VALUE FOR
THE HOBBYIST
HANDYMAN,
MODELLER,
AND D-I-Y
ENTHUSIAST

£100,000 INSURANCE

Holder must bear the first £25 of each claim otherwise payable

MODEL & ALLIED PUBLICATIONS LTD.

P.O. Box 35, Bridge Street, Hemel Hempstead, Herts. HP1 1EE

This magnificent insurance scheme which covers modelling activities within Great Britain, Northern Ireland, Channel Islands and the Isle of Man, has been negotiated with a leading insurance company.

In addition a separate Special Insurance is also available for drivers of model locomotives and traction engines.

Normal third party cover costs 75p per year plus regular order for the magazine of your choice; special model locomotive insurance costs £1.25 per year plus a regular magazine order.

All that is necessary for you to do to obtain the benefits of this magnificent cover is to complete the forms sending the second part to us together with your remittance which covers you for one year, and handing the first part to your usual magazine supplier.

We will send you back your membership card, lapel badge and waterlido transfers immediately.

M.A.P. INSURANCE MEMBERSHIP FORM

PART I to be handed to Newsagent

To _____

Please "reserve/deliver one copy of" AEROMODELLER, MODEL BOATS, MODEL ENGINEER, RADIO CONTROL MODELS & ELECTRONICS, WOODWORKER, MILITARY MODELLING, SCALE MODELS, MODEL RAILWAYS commencing with the _____ issue. (*Delete as applicable)

Name _____

Address _____

PART II of the form should be completed and sent to us at the address above together with your remittance of 75p, £1.25 for locomotive and traction engine, passenger carrying. PART I should be handed to your usual supplier, either newsagent, model shop, bookseller or wherever you normally expect to get your magazine.

Name (in full) _____

Address _____

Date _____

PART II to be sent to M.A.P. Ltd., £100,000 Insurance scheme. This sum, I understand, includes two transfers and a lapel badge, and is conditional upon my ordering: RADIO CONTROL MODELS & ELECTRONICS, MODEL RAILWAYS, MILITARY MODELLING, SCALE MODELS, MODEL ENGINEER, AEROMODELLER, MODEL BOATS, WOODWORKER (*Delete those not applicable) I have today instructed my newsagent _____

Address _____

to deliver me the magazine _____ until further notice

Registered in England number 328328

Registered Office 12-18 Paul Street, London EC2A 4JS

TAKE OUT A SUB

MAP HOBBY MAGAZINES

Let the Postman bring your Hobby Magazine direct to the door each month. All rates include postage, indices and special enlarged issues for 12 months.

Subs. queries telephone
Kings Langley 62692/3

Make cheques, I.M.O.s, P.O.s payable to Model and Allied Publications Ltd., and send name and full postal address clearly printed in BLOCK LETTERS to:

**SUBSCRIPTION DEPT.
MODEL & ALLIED PUBLICATIONS LTD.**
P.O. Box 35, Bridge St., Hemel Hempstead, Herts HP1 1EE

AEROMODELLER
Home £3.00
Overseas* \$8.00

**MODEL BOATS
WOODWORKER**
Home £2.50
Overseas* \$7.00

**RADIO CONTROL MODELS &
ELECTRONICS
MILITARY MODELLING
SCALE MODELS
MODEL RAILWAYS**
Home £3.25
Overseas* \$8.50

**PHOTOGRAPHY
MOVIE MAKER**
Home £3.85
Overseas* \$12.00

MODEL ENGINEER
(25 issues)
Home £6.00
Overseas* \$15.00

*U.S. dollars, other overseas
Nations send equivalent.

The Worlds Finest Contest Engines!

*The Supremacy of COX Engines
is well known by
all model flying
enthusiasts
throughout
the world*



REED VALVE

.049

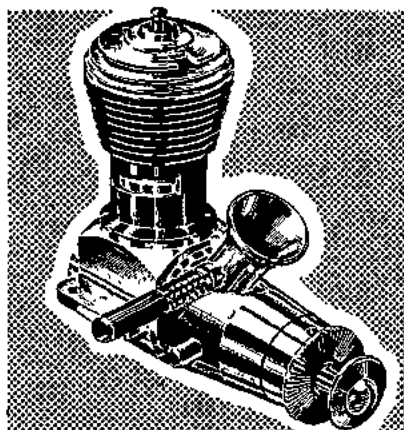
The world's most popular engine for 1/2-A free flight and control line flying. Powerful, instant starting, smooth and dependable.

2/3500 Babe Bee 049 (-819cc) 3-43
1/1200 Golden Bee 049 (-819cc) 3-89

.020

Less than half the size of .049 engines, yet with so much power it will fly most 1/2-A planes. It's ideal for free flight — only 21 grams light.

1/1000 Pee Wee 020 (-327cc) 3-66



MEDALLION

FRONT ROTARY VALVE

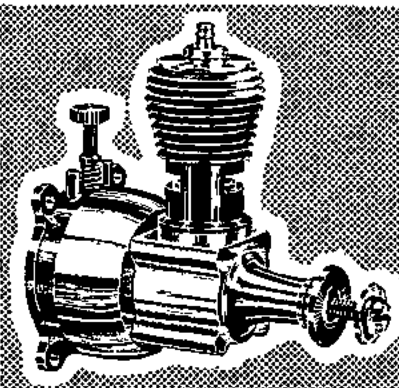
Ideal for general sport and R/C flying. The Medallion always turns in a perfect flight. Fast starting. Suited to both beginners and experts.

1/2200 Medallion 15 (2-499cc) 8-75
1/2300 Medallion 09 (1-497cc) 6-80
1/2400 Medallion 049 (-819cc) 5-84

THROTTLED ENGINES

The ideal combination for R/C flying — the popular Medallion sport engine with the new Cox throttle. Throttle designed with minimum number of working parts — offers instantaneous response.

2/2201 Medallion 15 W/T (2-499cc) 10-70
2/2301 Medallion 09 W/T (1-497cc) 8-75
2/2401 Medallion 049 W/T (-819cc) 7-78



MUFFLER EQUIPPED .049

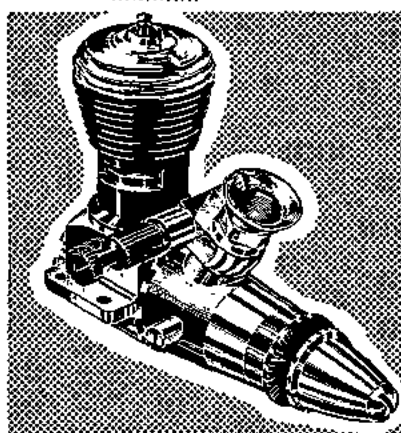
Makes every neighborhood a QUIET ZONE. Muffler eliminates engine noise to a mere whisper with little or no loss of power. Easy to operate.

2/4500 QZ-049 Muffler equipped (-819cc) 3-89

THROTTLED ENGINES

New Cox throttle-controlled reed valve engines for radio control; carrier event and fun flying. Throttle is operated by a third line for U-Control flying.

2/1001 Pee Wee 020 W/T (-327cc) 5-37
2/1201 Golden Bee 049 W/T (-819cc) 6-37



TEE DEE

FRONT ROTARY VALVE

An impressive list of design changes in the Cox Tee Dee's .049 and .051 for 1973. Enlarged cylinder porting for more efficient breathing — Improved crankshaft port timing — Modified venturi Incorporates a screen for protection against dirt. These and other design changes made to keep the Cox T.D.'s the best performing engines in their class.

1/2100 Tee Dee 09 (1-497cc) 7-78
1/2000 Tee Dee 051 (-835cc) 6-80
1/1700 Tee Dee 049 (-819cc) 6-80

.010 & .020

The smallest production engine made, yet it's perfect for lightweight free flight and radio control planes. Turns 27,000 RPM.

1/1300 Tee Dee 010 (-183cc) 6-80
Small, light, powerful. May be used for lightweight free flight, control line and radio control.

1/1600 Tee Dee 020 (-327cc) 6-80

*Any of these superb Cox engines may be obtained
from your local model shop*

A. A. HALES LTD

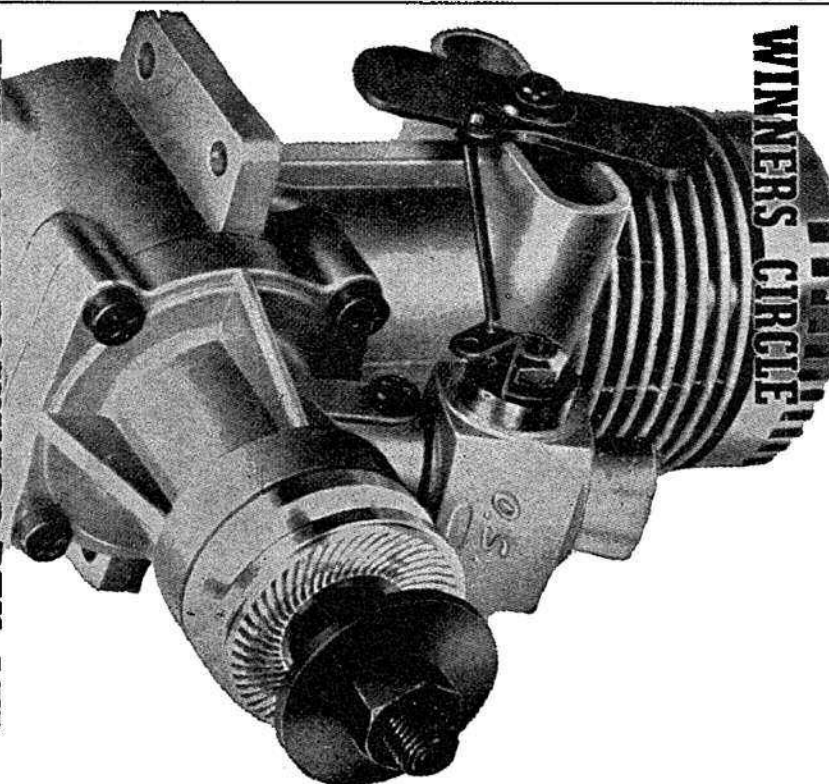
P.O. Box 33 — Hinckley — Leics.



HALES
LEADER IN THE WORLD OF MODELS

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

NOVICE OR EXPERT LET
POWER YOU TO THE
WINNERS CIRCLE



NO MATTER WHICH WAY YOU LOOK AT IT

THE MODEL DOCKYARD PTY. LTD.
216-218 SWANSTON STREET
MELBOURNE, Ph. 663-3505
AUSTRALIA

The range of model engines & accessories

... for more than 25 YEARS a comprehensive selection of quality model power plants



FOX .35 STUNT

WT. 6½ oz.
DISP. 352 cu. in.
RPM 9,600
WITH A 10-6
PROP
Order No. 13500
£6.42

The size, weight and performance of the .35 Stunt has made it the world's leading contest stunt motor for 24 years. We are even more proud of the fact that it has introduced hundreds of thousands of young men to model building. An ideal beginner's motor, its low compression is easy to crank and forgiving of poor tank installations. The B size FOX SILENCER is easily bolted onto the exhaust stack studs.

40203	Standard	Long	31p
40503	R/C	Short	44p
40603	R/C	Long	44p

FOX MACHINED SPINNERS

	Conventional Contour		
60106	11"	£1.91	
60107	13"	£2.09	
60108	2"	£2.29	
60109	23"	£2.46	
60110	23"	£2.66	
60206	13"	£2.09	
60207	13"	£2.28	
60208	2"	£2.46	
60209	23"	£2.66	
60210	23"	£2.85	

FOX ENGINES

Ref:		Recommended	Retail
11500	Fox 15	2.5 cc	£4.16
11900	Fox 19	3.2 cc	£4.92
12500	Fox 25	4.1 cc	£4.92
12900	Fox 29	5.0 cc	£5.67
13500	Fox 35	5.9 cc	£6.42
13600	Fox 36	6.0 cc	£5.67
14000	Fox 40	6.6 cc	£7.19

†90222	Size B (closed)	£2.64
*Fits:	Fox 15 and 15 R/C	
†Fits:	Fox 19 & 19 R/C, 25 & 25 R/C, 29 & 29 R/C, 35 Stunt and 36 & 36 R/C	

FOX GLOW PLUGS

Standard Series for use with Ni-Cad or Dry Cell			
40101	Standard	Short	26p
40201	Standard	Long	26p
40102	Heavy Duty	Short	35p
40202	Heavy Duty	Long	35p
40502	R/C	Short	44p
40602	R/C	Long	44p
2-volt	Series for use with Lead-Acid Battery		
40103	Standard	Short	31p

FOX MOTOR MOUNTS

	Width Dimension		
50201	1.000"	96p	
50202	1.062"	96p	
50203	1.135"	96p	
50401	1.217"	£1.13	
50402	1.281"	£1.13	
50403	1.320"	£1.13	
50404	1.385"	£1.13	
50601	1.475"	£1.32	
50602	1.525"	£1.32	
50603	1.640"	£1.32	

FOX SILENCERS

*90211	Size A (open)	£1.88
*90212	Size A (closed)	£1.88
†90221	Size B (open)	£2.64

Fox Engines & Accessories are distributed in Great Britain by 'VERON' and IRVINE ENGINES

Call in now at your local hobby dealer - or, if you prefer, write direct for 8-page colour catalogue and price list, to:

JOHN D. HAYTREE, Fox Manufacturing Co. (U.K.)
40 BUCKERIDGE AVENUE, TEIGNMOUTH, DEVON

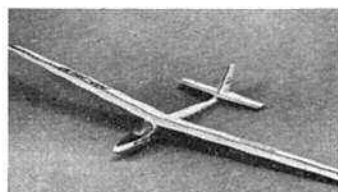
Graupner

for top quality!



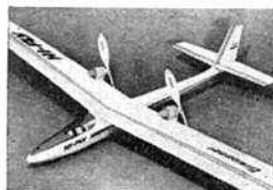
90½" span AS-K14

Fully aerobatic **MOTORISED** R/C sailplane for .15 engines. Quickie kit with ready-formed components including seamless fibreglass fuselage moulding, foam plastic wing and tail surfaces balsa-planked, canopy, and super R/C installation plan. Designed for aileron, rudder and elevator control.



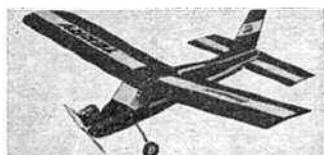
ELECTRIC POWER!

The multi-purpose **HI-FLY** lightweight R/C thermal glider which converts to powered glider with a pylon-mounted .049 engine, or **TWIN-MOTOR ELECTRIC POWER!** This version opens up a new era of model flying! Designed for rudder and elevator control.



CIRRUS

118" span



TERRY - preformed wings and tail parts.



BO 209 MONSUN - prefab for rubber power.



CARDINAL - preformed fuselage, wings, and other parts in precision-moulded high-impact plastic. Quite the most advanced power model kit yet!

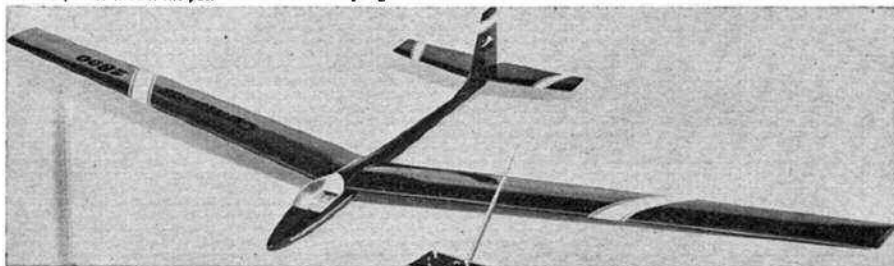


NEW! JUNIOR!

So new, in fact, that it hasn't made the kit list opposite! Span 53½". Model sheet wing construction with high-performance aerofoil section - plus turbulator (all parts fully shaped). Stick-type fuselage (again shaped). Auto-rudder and dethermaliser! The beginner's model that puts you in the expert performance class. Kit £6.80 (and very complete!).

CUMULUS 2800

Ready-formed, nylon fuselage, balsa-sheet covered foam plastic wings, stabilisers, fin, cabin, canopy, frame, etc. **THE OUTSTANDING** addition to the world-famous Graupner range of radio-controlled sailplanes. King-size 110" span for superb performance from tow launch, slope soaring - or powered glider flying.



Graupner

GLIDERS

BEGINNER 39" span	£4.00
FILOU 50" span	£7.15
Pylon engine mount	£1.30
JOLLY 45" span	£5.30
Pylon engine mount	£1.30
AMIGO 2 78½" span	£12.25
Pylon engine mount	£1.70
Ditto in ABS	£3.40
FOKA 102½" span	£19.75
Canopy 90p Fuselage	£7.50
Wing grommets (10)	£1.40
UHU mark III 43½" span	£3.75
DANDY 63" span	£10.20
Pylon engine mount	£1.30
CIRRUS 118" span	£27.50
Pylon engine mount	£2.10
R/C pack	£4.40
NANCY 48½" span	£6.00
KATY 67½" span	£11.45
CUMULUS 2800 110" span	£62.00
Pylon engine mount	£2.10
R/C pack	£3.60
AS-K14 90½" span	£54.90
Canopy 65p Fuselage	£24.10
R/C pack	£6.00
HI-FLY 90½" span	£19.80
R/C pack	£3.00
Pylon engine mount	£3.40
Electric motor flight pack	
Installation pack	£4.00

Graupner

TOPSY 32" span	£5.05
AMATEUR 43½" span	£11.30
TAXI 59" span	£17.95
MINI PIPER 28½" span	£9.70
KWIK FLY MK3 59½" span	£28.85
MIDDLE STICK 55" span	£21.80
CESSNA 177 CARDINAL 61" span	£43.35
Wheel Spats	£4.15
R/C Installation pack	£7.10
TERRY 41½" span	£13.10
BELL 212 HELICOPTER	
Fuselage Kit	£56.00
Engine & Mech. Kit	£153.50
Engine only (HB61 Stamo)	
	£56.75
Engine Silencer only	£7.60
Rotorhead only	£46.35
Main Rotor Blades	£3.20
Tail Rotor Blades	£1.15
Steering Rotor Blades (pr)	
	£3.30
Main Rotor Shaft only	£2.90
CONTROL LINE	
MUSTANG 29½" span	£7.80
DORNIER Do 27 31½" span	£9.70
F-W 190 38½" span	£11.70
KLEMM KL-107B 28½" span	£8.00

distributed by **RipMax**

see them all **AT YOUR MODEL SHOP!**

Some descriptions and prices may be subject to change, due to our policy of continual improvement, fluctuating exchange rates, etc.

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

196 AEROMODELLER ANNUAL 1973/74

A full mixture to suit all tastes. The Annual was the first to foresee the model helicopter, electric power, use of carbon fibres and foam plastics, and this year's volume maintains the proud reputation now upheld for 26 years of continuous publishing.

8½ x 5½ in. 144 pages, printed boards.

£1

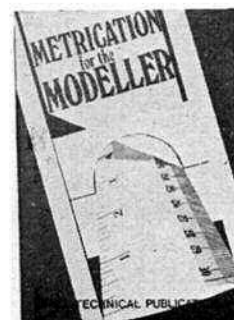


155 MAN-POWERED FLIGHT

In this, the first book primarily aimed at the student of man-powered flight, Dr. K. Sherwin of the University of Liverpool analyses the problems of design structure and operation adding his own theories for production of a practical 'pedal scooter'. Over 128 specially selected illustrations collected by Aeromodeller staff convey a pictorial history of progress and combined with more than 90 text diagrams, form a scientific reference work of great value to all students of aviation.

176 pages, 8½ x 5½ in. Casebound.

£1.75



170 METRICATION FOR THE MODELLER

The main object of this book is to provide the modeller with figures and information for making conversions from English units to metric and vice-versa when necessary to match the availability of materials, etc. All that is needed is to look up the appropriate section - Linear Measure, Areas and Square Measures, or whatever you're involved with.

and find all the information you need in condensed form.

8½ x 5½ in. 40 pages.

45p

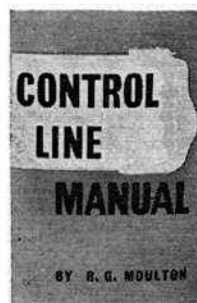
7 CONTROL LINE MANUAL

R. G. Moulton

Main chapter headings: Why Control Line?; Basic U-Control; Basic Monoline; Basic Flight Control; Learning to Fly; Aerobatics; Speed; Team Racing; Combat; Carrier; Cargo and Endurance; Scale Models; Jet. The Engine in Control Line; Towards the Indestructible; Looking after the Lines; Variations on the Theme. Plus appendix.

8½ x 5½ in. Hard Bound. Chapter Headings by cartoonist Roland, over 300 diagrams, sketches, photo-illustrations.

£1.50



8 FLYING SCALE MODELS

All types of scale flying models are described in turn - glider, free-flight and control-line, Jetex, diesel, rubber or ducted-fan types. Much useful information is given on achieving highly realistic finished and detailed parts and there is a useful set of tables listing camouflage and insignia from 1914 up to date. Very large number of illustrations, including photographs, diagrams and scale plans.

8½ x 5½ in. Paperback. Over 300 diagrams, sketches, photographs, illustrations, 74,000 words.

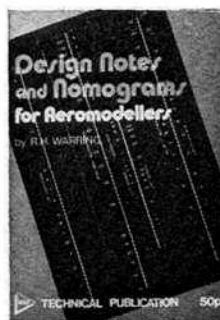
£1

171 DESIGN NOTES and NOMOGRAMS FOR AEROMODELLERS

Vital data for the designer, conversion scale, tabular facts and criteria, plus the famous Nomograms which have been long in demand for the serious contest modellers. These charts enable involved design factors to be determined quickly. Drag, Aspect Ratio, Power loading, Reynolds Number, Rate of Climb, Rubber Power, Downwash plus many other vital charts.

Size 8½ x 5½ in., 56 pages International A5, stiff card cover, saddle stitched.

50p



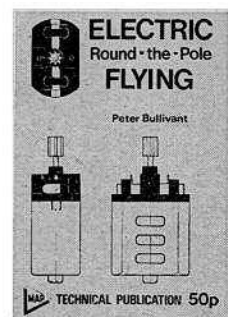
HOW TO ORDER. Ring round the reference number of the titles you have chosen. Carry out totals to cash column and then total up at the bottom. Please add 10p packing and postage for orders of £1 and below, 15p up to £1.50, 20p up to £2. Above this post free.

Registered England 328308
Registered Office
12/18 Paul Street, London EC2A 4JS

Name.....
Address.....

7 8
155.170
171.126
A/Annual
73/74

£



126 ELECTRIC R.T.P. FLYING

A compact and full appraisal of all aspects of electric-powered round-the-pole flight from which the experimenter can produce all he needs for operation either at home or for the clubroom. Liberally illustrated, and written from long experience by Peter Bullivant, the text includes data on choosing the motor, fitting propellers, gearing and direct drive, scale and novelty, model subjects and rules for club contests.

56 pages, 8½ x 5½ in.

50p

ENYA

Engines with that little EXTRA
in power ... performance ... and
value for money!!
Each model precision made by
master craftsmen. There's a
size in the range to suit YOUR
next model!!

AT YOUR MODEL SHOP

ENYA 09

(not shown)
AIRCOOLED:

Standard £4.95
R/C version £6.45

ENYA 15

AIRCOOLED:

Standard £5.95
R/C version £7.75

ENYA 19

AIRCOOLED:

Standard £6.95
R/C version £8.80

ENYA 35

AIRCOOLED:

Standard £8.95
R/C version £10.95

ENYA 35BB

AIRCOOLED:

R/C version £15.70

ENYA 45BB

AIRCOOLED:

R/C version £19.60

ENYA 60BB

AIRCOOLED:

R/C version £22.95

SILENCERS:

ENYA 09 ... £1.10

ENYA 15 ... £1.35

ENYA 19 ... £1.35

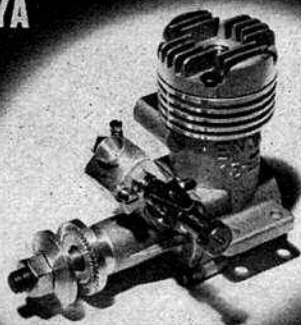
ENYA 35 & 35BB

£2.00

ENYA 45BB £2.00

ENYA 60BB £2.70

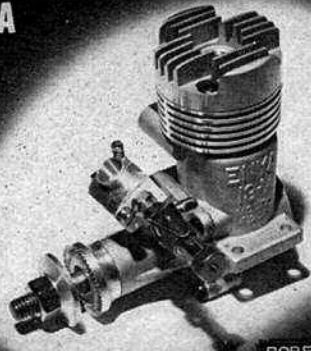
ENYA 15



BORE .590"
STROKE .551"

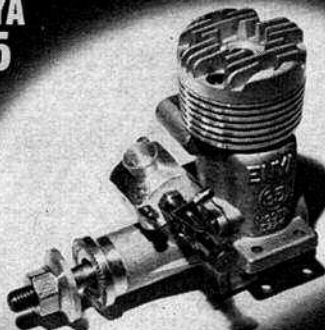
• YOUR TOP CHOICE FOR FREE FLIGHT, CONTROL LINE OR SMALL R/C MODELS

ENYA 19



BORE .654"
STROKE .590"

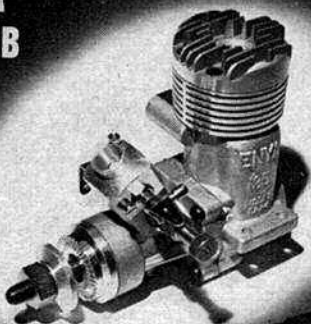
ENYA 35



BORE .803"
STROKE .704"

• CHOICE OF 7.5:1 or 9:1 COMPRESSION RATIO

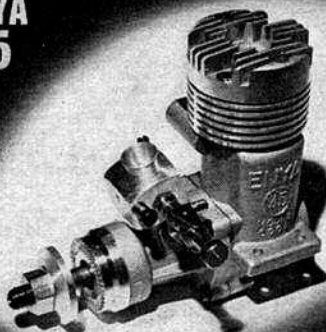
ENYA 35BB



BORE .803"
STROKE .704"

• SMOOTH RUNNING BALL RACE ENGINE

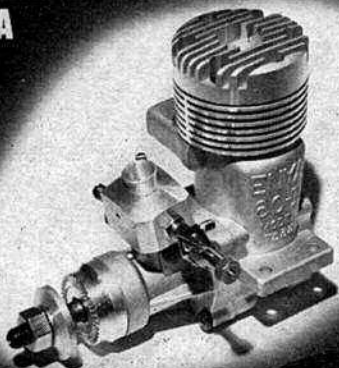
ENYA 45



BORE .878"
STROKE .756"

• TOP CHOICE FOR PERFORMANCE !

ENYA 60



BORE .944"
STROKE .865"

IF IT'S
RipMax
IT'S
GOOD!

distributed by

RipMax

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

Pegasus Models



171 BRAMCOTE LANE, WOLLATON, NOTTINGHAM NG8 2QJ

Tel: 281903



GINNY

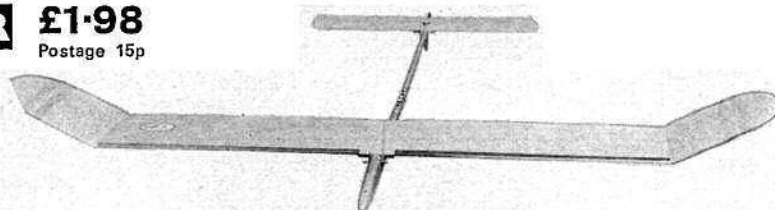
£3.46

Postage 15p

A control-line Goodyear racer kit with a wingspan of 32 in. for .15-.19 cu. in. engines. Kit includes all balsa and plywood parts, tank kit, preformed wire undercarriage, nylon wheel and elevator horn.

PLOVER **£1.98**

Postage 15p



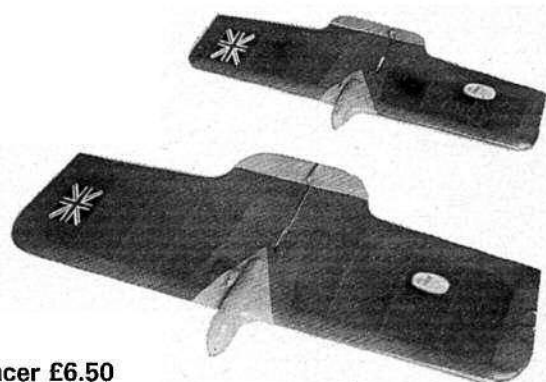
An all-balsa 45½ in. wingspan towline glider to A1 specification. Kit includes balsa, ply and Spruce, die-cut parts, wire and self-adhesive vinyl trim tapes. Quick and easy to build.

MINILORD **£1.65** Postage 10p

For 1.5 c.c. engines

WARLORD **£2.64** Postage 15p

For 2.5 c.c. engines



SILVER SWALLOW

2.47 c.c. diesel engines – complete with silencer £6.50

PAW ENGINES – as available

PAW 1.49 OS	...	...	...	...	...	£5.50
PAW 2.49 OS	...	...	...	...	...	£6.05
PAW 19 OS	...	...	...	...	...	£6.60

CONTROL LINE ACCESSORIES

'Mustard Tin' Tank Kit	...	...	13p Post 3p
100 c.c. Stunt Tank	...	...	66p Post 5p
1½" Nylon Wheel	...	...	20p Post 3p
1½" Steel Rotary Bellcrank	...	...	30p Post 3p

TRADE & EXPORT INQUIRIES INVITED

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

Heard at the HANGAR DOORS

PROVISIONAL DATES reserved for the 1974 World Control Line Championships are 24th-29th July, the venue being Hradec Kralove, Czechoslovakia. It seems likely that a very reasonably-priced air trip can be organised for this meeting, and in view of the current threat of petrol rationing this could, in fact, be the *only* way to travel! All persons interested in making up a party to fly to Prague (with coach transport to the contest site) should contact the Editor as soon as possible — final details can be established only when exact numbers are known.

ALSO PROVISIONALLY scheduled for the month of July is the *Criterium des As* European Championships, a meeting which in the past has been held on alternate years, between World C/L Championships, although sadly, 1973 proved the exception and no such event was organised. Now, however, the Belgian Aero Club have submitted the date of July 15th (the venue being Verviers, Belgium) to the C.I.A.M. for their approval. To choose a date just two weeks before a World Championships would seem most unfortunate to say the least . . . for all concerned.

THE ACADEMY of Model Aeronautics, governing body of aeromodelling in the U.S.A., have run into problems with finding a suitable site for their Nationals once again. Last year, for the first time, they were without the benefit of Navy help with regards to venue or personnel, and eventually had to settle on Oshkosh, home of the *Experimental Aircraft Association*. This site unfortunately proved most unsuitable to most factions, particularly the free-flight enthusiasts who had difficulty in even keeping a chuck glider within the confines of the airfield. However, this year all seems to have changed for the better, as the former Chennault Air Force Base has been offered to them by the Mayor of the Lake Charles community. The

site, which lies between New Orleans and Houston in the State of Louisiana, is huge: the main runway being 12,000 ft. by 200 ft. wide, and it has a full-length taxiway alongside. Also, there are two concrete areas, each at least 1,000 ft. wide, one nearly 4,000 ft. long, the other over 5,000 ft.! Free-Flighters will have at least one mile downwind within the confines of the airfield, with two miles in the direction of the prevailing wind. Most important, perhaps, is the fact that F/F, C/L and R/C events could operate with complete freedom of interference from one another.

The same good news for ourselves? Unfortunately, no . . . the S.M.A.E. has been negotiating for the use of several sites, but to find one suitable for all interests and practicalities, and one that is available over the period of 25th-27th May is far from easy. In fact, the site has not yet been established and time once more is running short.

REPORT ON THE Sixth Annual Symposium of the *National Free-Flight Society* must represent the most detailed technical analysis of free-flight competition aircraft available. Contents of this excellently presented publication include model glider performance from aerofoil data, a quasi-static analysis of model glider longitudi-

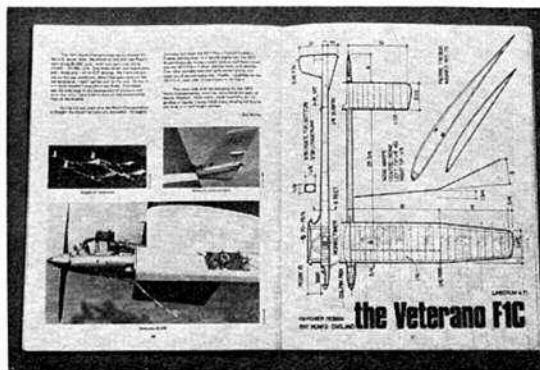
dinal towing characteristics, rubber thermodynamics, optimum propeller design, methods of producing propellers for rubber models, evolution and improvements made to the Rossi R15N and the experimental verification of indoor model flight by computer. Add to this drawings of the 'ten best' models of the year, then clearly this 88-page book is essential reading matter for dedicated contest flier and theorist alike. Copies are available at a cost of \$4.50 (add an extra dollar for airmail postage) from Jack Shafer at 9100 Rayford Dr., Los Angeles, CA 90045, U.S.A.

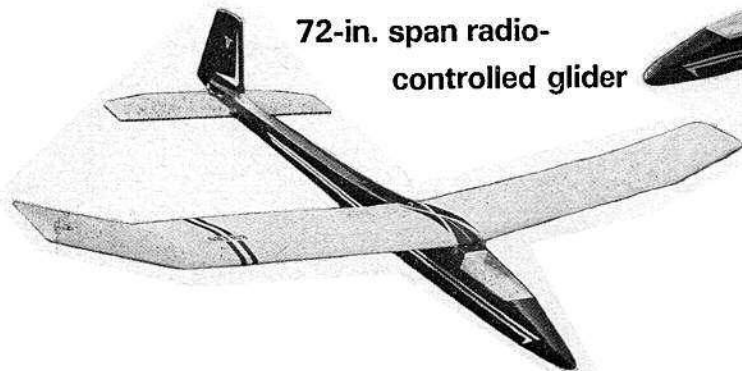
IMPORTANT rule changes affecting Goodyear team racing which will at least end the 'will they, won't they' speculation, were instituted at the last S.M.A.E. Council Meeting, held in November. The new rules state that models shall have profile fuselages with *maximum width of one inch* excluding cheek cowl and motors shall be uncowed. Fuselage side cheeks shall be permitted in so much as they do not cowl the motor. *All motors to be side-mounted.*

The other rule introduction which will probably be the most hotly debated, reads: *No skids are to be affixed to the undercarriage or nose of the aircraft.*

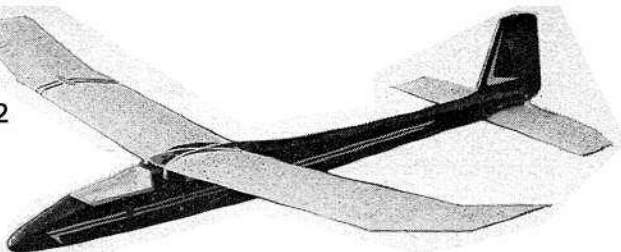
NEXT MEETING of the London Society of Air-Britain will be held at the Holborn Central Library, 32-38 Theobalds Road, London, W.C.1 on Wednesday, 9th January from 7 p.m.-10 p.m. The meeting will start with a slide show on *Four Years of General Aviation around the Black Forest* by Peter J. Marson followed by an illustrated talk on *The Avro Shackleton* by Peter J. Howard. Visitors are welcome, admission 20p.

The N.F.F.S. report on the Sixth Annual Symposium is an excellently produced, large format (11 x 8½ in.) publication with good photographic reproduction too — a typical page is shown at right, which just happens to illustrate Ray Monk's F.A.I. power model, *Veterano!*





72-in. span radio-
controlled glider



— an ideal introduction to
slope, thermal or even
power-assisted soaring

BOLERO

by W. I. BARRETT

BOLERO was designed to fulfil a variety of roles; it simply takes too much time, money and storage to build special-purpose gliders, even though they may be desirable! It had to be able to function as a slope soarer for windy occasions, a flat site 'thermal' soarer for those calmer days, and be able to fly as a power-assisted glider on those liftless or more rare, windless, days. In addition, something rather more elegant than a simple box glider was required without going to all the trouble of a planked fuselage, as the design presented here features straightforward, robust construction with a special emphasis on minimising material costs. Even in these days of escalating prices, the model should not cost more than £5 to build (excluding R/C), assuming, of course, that your 'scrap box' will come to the rescue with regard to many of the smaller components.

The ideal form of control is provided by one of the many two-function proportional radio control outfits, currently available at very competitive prices, and the model was in fact designed around such a system. Two servos are mounted side by side in the fuselage centre-section to operate the rudder and elevator controls. However, flight tests have shown that quite satisfactory control can be achieved using rudder alone, thus simple single-channel equipment may be used if preferred.

Construction should present no difficulties to anyone with a little previous free-flight and building experience, and the model is a suitable choice for the many new converts to radio control. Whatever your feelings about the 'purity' of free-flight, you must admit that having a model land at your feet certainly beats the usual cross-country run!

Two basic fuselage sides are made up from $\frac{1}{8}$ in. sheet balsa; the joint lines on the side elevation enable these to be made from three sheets of 3 in. x 36 in. medium stock balsa. Glue the $\frac{3}{16}$ in. sq. longerons to the sides (remember to make them opposite hand) and then mark upon them the position of the formers. Make up the servo mounting frame from hardwood, then position this, with the formers, between the fuselage sides. The nose and tail can be held together by rubber bands while the glue is drying. Before fitting the keels, install the operating rods from the servo units to quick-release clips at the tail; the position of the control horns can be determined from the plan. Add the lower keel strip and bind on the tow hook.

Build the fin and rudder assembly as a complete unit, and sand to section before mounting it in the fuselage. With this in position, the upper keel strip can be added, and the $\frac{3}{32}$ in. sheet added to the

top and bottom of the fuselage, the grain running across the fuselage width. Plank the upper nose section and glue on the nose block. When dry, sand the whole fuselage, rounding off the edges.

Build the frame for the canopy as sketched. Before fitting the glazing (this is a simple moulding job, as very little 'stretching' of the sheet is required), paint the inside of the canopy and add your name and address — even with modern equipment things can still go wrong! A simple wire clip retains the canopy.

The tailplane and elevator can now be built, and checked for fit against the fuselage. Small keys on the upper sheeting will help to locate it. Fit the control horns and check that nothing fouls when the servo motors operate. The rear peg for holding the tailplane retaining bands must clear the cut-out in the elevator.

Wing structure is semi-geodetic, which is virtually warp-proof, so build them as you want them to remain! Build the main spars first, and then clamp the plywood tongue boxes to them while the P.V.A. glue is drying. When this assembly is dry, pin the spars to the plan and add the leading and trailing edges, followed by the ribs. Build the inner panels first, and when set, lift up these panels onto supports and build the tips flat on the plan, remembering to pack-up the trailing edge tips by $\frac{1}{4}$ in. to give built-in washout. After sanding, the wings are ready for covering.

The original model had the fuselage covered with lightweight nylon, and the flying surfaces covered



with Solarfilm. However, depending on the use to which the model will be put, either nylon or tissue covering could be substituted on the wings and tail. Tissue would be satisfactory for flat sites only, while nylon would stand up to a rough hill site better. When the model is painted, ballast the nose to give the correct balance.

The finished weight of the original model was 2 lb. 12 oz., but this will vary according to the type of radio gear being employed as well as wood selection, covering material used, etc.

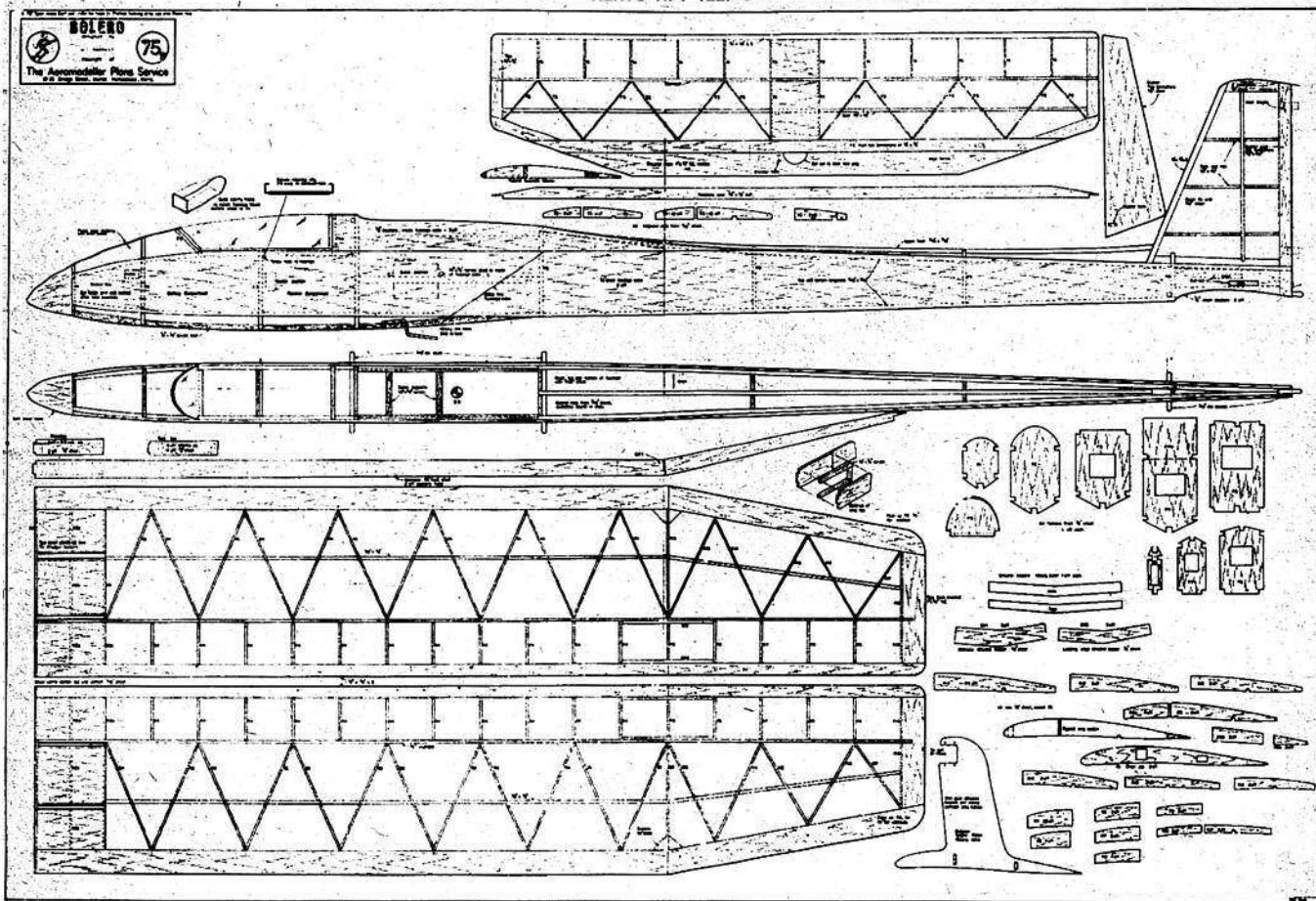
Test glide over long grass, and if you can find a gentle downhill slope, longer glides can be obtained which will enable the effectiveness of the controls to be assessed. This method revealed the lack of sensitivity using the original rudder, and a new, larger one was quickly fitted. The elevator control is very responsive, and if proportional gear is being used, it is recommended that the trims alone be used on the early flights until the urge to 'stir the pudding' with the control stick can be contained.

First attempts at slope soaring on Rivington Pike in gentle conditions showed that the model would maintain height in weak lift, although the occasional blundering by the pilot on the turns gave it the nickname *Rivington Riveter*! The model has stood up to this punishment remarkably well, and has now learned how to fly properly (naturally, the pilot knew how to do it all the time!).



For those who want a flat-field flyer, the model can be towed aloft, or fitted with a power pod as detailed on the plan. Very little motive power is needed to pull the model up – a veteran Amco .87 will produce a lazy (yet positive) climb, while any modern 1 to 1.5 c.c. motor will soon get the model 'up there'. However, if you use a glow engine, do not forget the fuel-proofer. . . .

FULL-SIZE COPIES OF THIS 1/8th SCALE REPRODUCTION ARE AVAILABLE AS PLAN No. RC.1215, PRICE 75p (INCLUSIVE OF POSTAGE AND V.A.T.) FROM AEROMODELLER PLANS SERVICE, P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE.



Back to SQUARE ONE!

in which we help the beginner to 'bring 'em back alive' by detailing the fitting of an auto rudder and clockwork dethermaliser system to the Asteroid A/1 glider.

NOW THAT the 'donkey work' has been completed, all that remains is to cover the flying surfaces, and install the dethermaliser plus auto rudder mechanism. Tissue covering was dealt with in the April 1973 issue, but a precis (and reminder!) of the various operations are as follows:

a) Sand the whole model smooth with fine grade glasspaper. Take care not to alter shape of ribs, etc.
b) Cover the undersides first. The wing centre section is covered with heavyweight tissue, the remainder with lightweight, but both are applied in exactly the same way.

c) On undercambered surfaces, apply tissue paste to each rib as well as at the leading and trailing edges. Apply tissue dry, making sure it is smooth and wrinkle-free. Rub the tissue into contact with each rib until the moisture of the paste shows through. When using heavyweight tissue, use plenty of paste. Water-shrink after tissue paste is quite dry - preferably leave overnight.

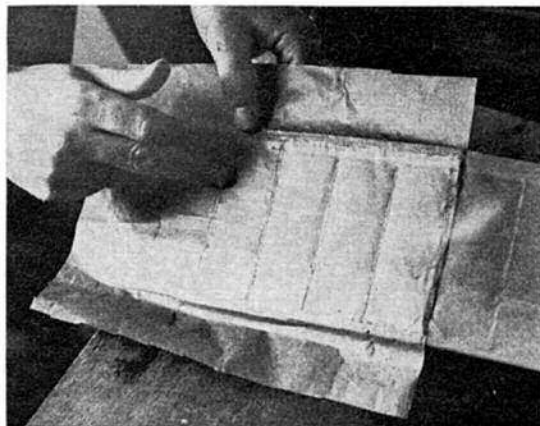
d) When covering top surfaces, apply paste around the perimeter of the framework, soak tissue in cold water, then apply to wing, pulling taut and removing all wrinkles, etc. When dry, trim off, leaving small overlap - wrap around L.E. and T.E. and paste down.

e) Apply 3-4 coats of dope, thinned 50 per cent, to wings, and just a couple to the tailplane. Pin down to a flat surface when dope is touch-dry to prevent warps creeping in.

f) If warps do occur, remove by holding in front of electric fire or over steam from a kettle while twisting straight.

A dethermaliser is well worth fitting as an insurance against losing your model, and we shall describe the fitting of a typical clockwork item - in this case

When covering undercambered ribs, apply the tissue dry, and make sure that each of the ribs has a generous amount of tissue paste, as well as the leading and trailing edge. Rub the tissue over each rib individually as shown to ensure paste adheres well. Keep tissue as wrinkle-free as possible. Water-shrink when quite dry.



a Tatone D/T timer, which costs around £2.60. The cheapest solution is, of course, the fuse type, described in the June 1973 issue, and this can easily be adapted to this model if preferred.

The *Asteroid* features a neat D/T arrangement which is often found on competition gliders, but is quite easy to install. The method of operation is clearly shown in Figures 1-3, but basically the sequence is this:

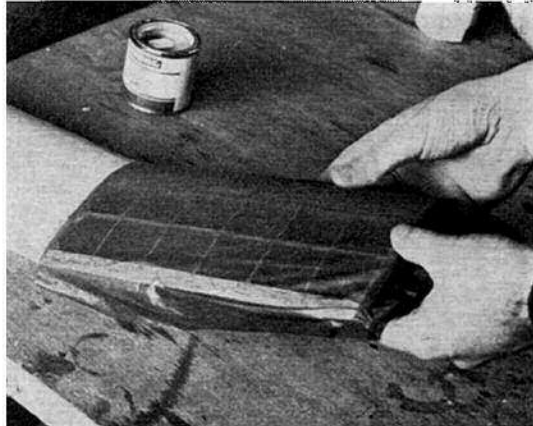
The glider is towed up with the rudder straight. As the towline falls off the towhook, a pin which is attached to the towline by an extra piece of nylon, is pulled from a brass tube glued to the fuselage side. As it does this, it releases the nylon line from the rudder - which is spring-loaded to the right with a rubber band. This causes the model to turn in right-hand circles when gliding.

At the same time as the pin operates this 'auto-rudder' it also switches on the dethermaliser timer. (A switch on the D/T timer is held in the ON position by a rubber band, but a second - stronger - rubber band from the switch to this pin holds it in the OFF position. Thus as the pin falls away, the band loses tension and the second band pulls the switch on.)

When the timer has unwound (it can be adjusted for several minutes' duration) a slot in the disc releases the operating arm which releases the nylon line running from the tailplane hook. The tailplane, being tensioned by rubber bands passed under the fuselage, pops up to an angle of approx. 60 deg. allowed by the wire loop shown, and brings the model safely down.

To install the timer, we first made a cardboard template by drawing round the shape of the 'works', then measuring off the size of the faceplate. In this way we could position the faceplate as it would fit

Covering to the upper surfaces is applied wet and the wrinkles in the tissue are gently eased out with the thumbs. Take care not to tear the tissue - the lightweight tissue is quite vulnerable. Only apply tissue paste around the perimeter of the framework, not to ribs. Use separate pieces of tissue for each wing panel, i.e. tips and centre section.



the model, then pin-prick through the shape which would have to be cut away to fit the timer flush. Unfortunately, our timer was slightly bigger than the one on the plan, so we had to file away the top edge in order to allow it to fit under the wing mount. This we copied on to the template, and then cut out the opening with a sharp balsa knife.

The timer is screwed in place with very thin wood screws – we found it necessary to glue in two bits of scrap $\frac{1}{8}$ in. sheet to the lower fuselage longeron in order to have some 'meat' for the lower screws to bite into. Apply a drop of oil to the timer on/off switch and 'wiggle' for a while to free-off the action.

Now bend the tailplane hook to shape and glue in position. We highly recommend a fast-setting (or 'Five Minute') epoxy resin for all wire or metal to wood joints – take care to clean all metal parts with glass-paper first. Nothing else sticks metal as well, or as quickly as these epoxy resins. Likewise glue the D/T line guide and hook for the band to the D/T timer in position – bend all these from the 22 s.w.g. wire provided.

Visit your usual model shop and buy a length of 18 s.w.g. brass tubing – you need just $\frac{1}{2}$ in. or so for this model! Cut off this length using an old knife blade in your balsa knife, and roll the tube back and forth. When scored all round, it will snap off easily and cleanly. Epoxy this in position shown.

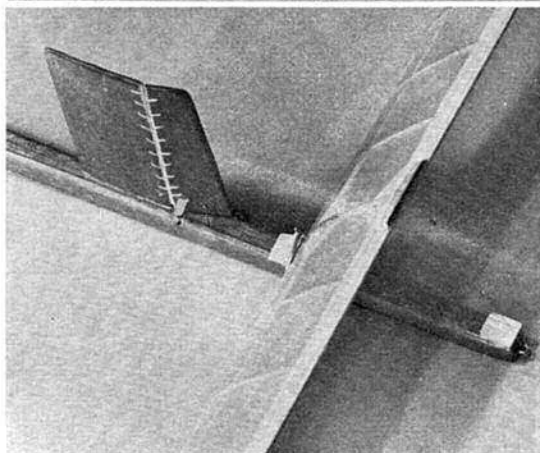
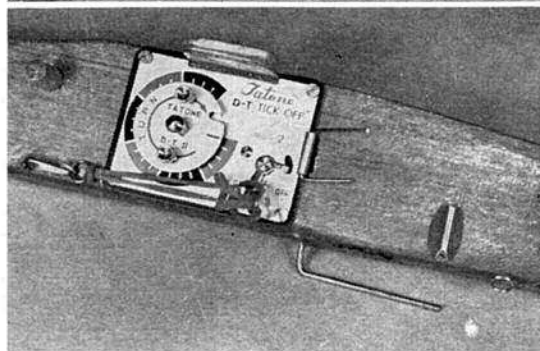
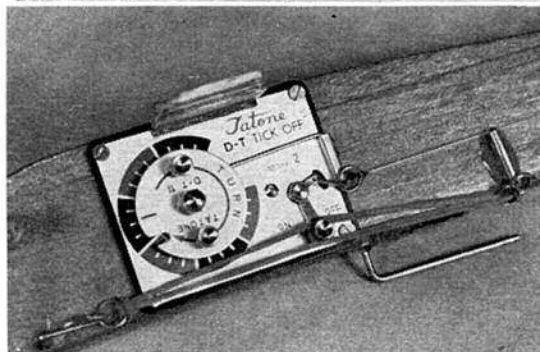
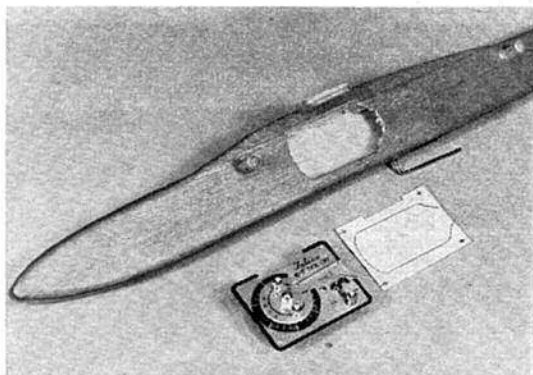
Now is the time to explore your local fishing tackle shop, and buy a length of 5 lb. fishing line – at the same time you can purchase some lead split-shot weights and miniature split rings (approx. $\frac{3}{16}$ in. diameter). We use these split rings at the ends of all nylon lines for neatness – they are not necessary as simple loops may be tied, but at 4½p for 10 they are hardly expensive!

Firstly, the auto-rudder. The rudder must be tensioned to spring to the right – an elastic band anchored by a pin and looped over the plywood horn is fine. Two more pins act as 'stops' – one to keep the rudder straight, and the other to regulate the amount of offset – the exact amount will be found by experiment later. Tie nylon line to the opposite horn and attach a split ring to the other end of the nylon, adjusting it so that when the pin is in the tubing, the rudder is held tightly against the pin stop.

Now for the dethermaliser. Tie a split ring to a length of nylon, place over tailplane hook, then attach tailplane to fuselage by placing rubber bands over the hook and around the fuselage. Use several bands so that the tail is 'spring-loaded' and pops up readily when released. Now, taking the line through a guide at the tail, attach it via a split ring to the operating arm of the timer. Pull the line very tight during this operation – with the split ring over the operating arm, the tail must be pulled down hard onto its platform – the elasticity of the nylon line helps this.

Operate the timer to release the operating arm, but hold the tailplane at its D/T angle of 60 deg. to form the normal position. Mark the position of the split ring when the tail is in position, then epoxy in place a U-shaped wire guide for the nylon, this will restrict the tail to the correct angle. All that now remains is

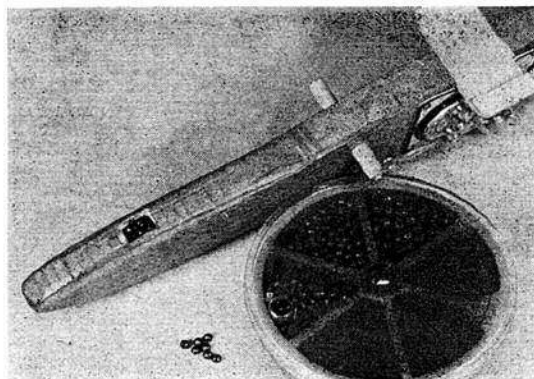
Top picture shows the card template and the hole cut in the fuselage side to clear the timer's mechanism. Note too how timer faceplate had to be filed down to fit the model. Below that is the timer mounted in the fuselage and 'primed' prior to release of the towline's operating pin (in brass tube at right). Below that is the timer in the final position after D/T operation – note how the removal of the towline's pin has allowed the timer to be started, and how the timer's slotted disc has released the operating arm – see sketches overleaf. At right, the 'tail end' reveals auto-rudder moved to the right and the tailplane tilted to the appropriate D/T position.



A small slot is cut in the top longeron over the 'weight box' area, and fishermen's lead split shot added until the balance is correct. Seal the hole with Plasticine. We needed to epoxy a thin piece of lead sheet either side of the nose in addition to make the model balance correctly.

to find a small rubber band which goes around the hook and to the on/off switch, holding it in the 'on' position, and a stronger one which holds it in the 'off' position when stretched between the switch and the operating pin. Thus the switch is held off until the pin is released and relaxes its tension when the second band takes over and switches the timer on. Check that all works smoothly, every time.

Now we just need to balance the model. Cut a small hole in the top longeron above the 'weight box' - refer to the plan. With the wings and tail in place, support the model either side of the fuselage in the position marked 'C.G.', and add the lead shot until the model balances exactly as shown. Near enough is not good enough! If all is well, stuff tissue paper into the hole to prevent the lead from rattling around, and seal the hole with a little piece of Plasticine. However, in our case, all was not well! Even with the whole of the 'weight box' crammed with split shot, the C.G. was still $\frac{1}{4}$ in. too far back, so we were forced to epoxy thin lead sheet either side of the nose; check



the amount needed beforehand. Lead sheet may be obtained from the ironmongers as 'flashing' material. It is best to add a little too much weight in this way, as it is then simply a matter of filing away excess weight, or removing shot from the 'box', which is why we only use Plasticine to seal the hole. . .

Next month: making a bowline winch

Figure 1 - showing model before release from towline.

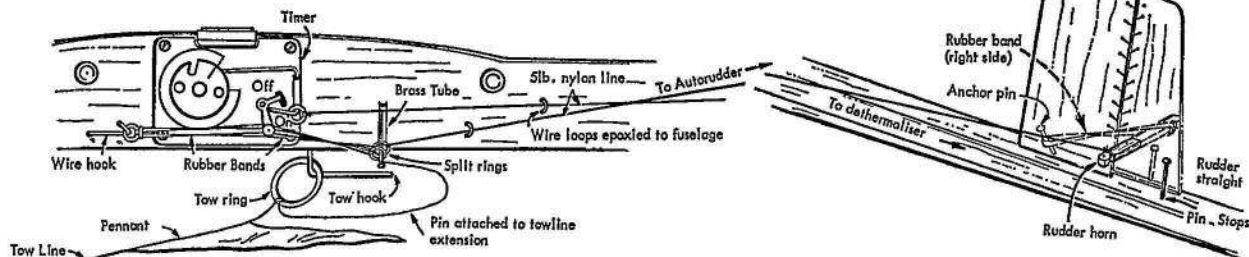


Figure II - showing auto-rudder operation and timer switched on as model leaves towline

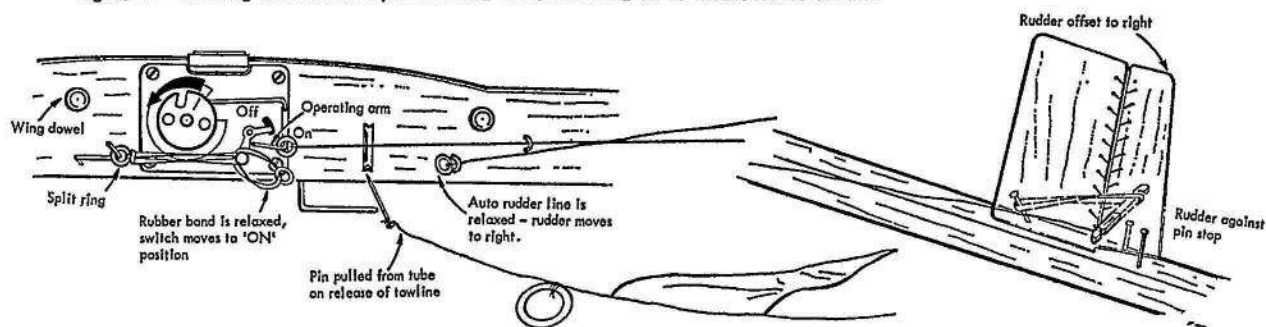
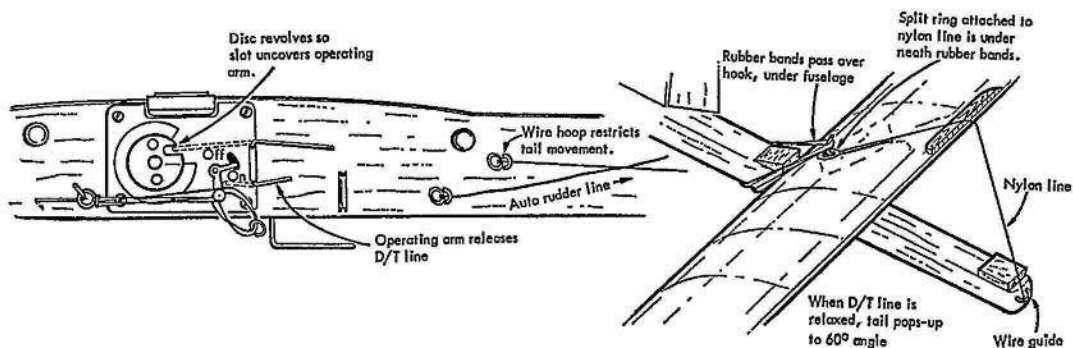


Figure III - showing operation of dethermaliser 2-3 minutes after model leaves towline.

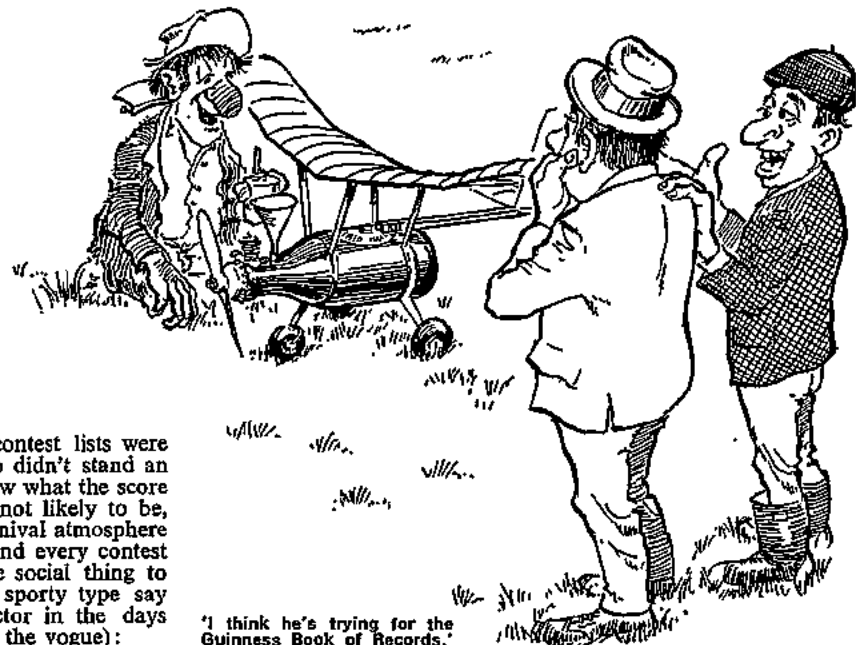


topical twists

by 'Pylonius'

illustrated by Sherry

★ ★ ★



'I think he's trying for the Guinness Book of Records.'

Rallying Round

BACK in the old days those huge contest lists were made up mainly of contestants who didn't stand an earthly chance of winning. They knew what the score was, or rather what the score was not likely to be, but in the general have-a-go-Joe, carnival atmosphere of the old time Gala, to enter all and every contest for which you had a model was the social thing to do. It was customary to hear some sporty type say to the timekeeper (a pluralistic factor in the days before the do-it-yourself rally became the vogue):

'I think you'd better stand back a bit. Haven't flown this thing before.'

Prestige contests, like the Wakefield, were no exception to the have-a-go enthusiasts of yesteryear. They would travel half way round the world merely to demonstrate their steadfast intent of one day getting the model unstuck from the take-off board. To the timekeepers they were welcome - a sight for sore eyes.

What surprises me about the modern-day meeting is that it is often referred to as a Gala, for, according to my dictionary, a Gala is a festive occasion.

'Are you aware that this is a festive occasion?'

'No. But if you'll excuse me I want to pop over to control to put in a complaint against that group of merry-makers over there.'

'Why?'

'Their bubble machine has a thirty-foot pole.'

Or you may approach another festive type:

'Are you letting your hair down on this festive occasion?'

'No. As a matter of fact the air has let me down. I never fly if the wind speed is above 5 m.p.h. I'll give it another hour to calm down, otherwise I'm off.'

'Don't forget your paper hat.'

One recent Gala styled meeting was so festive in spirit that entry to the field was limited to competitors only - no wives, girl friends or other frolickers allowed. Thus, when it comes to making modelling whoopee you can whoop it up with the 'he's' but not with the 'she's'. To heighten the Gala atmosphere the festive flyers were on a moment's notice to evacuate the field - possibly if the jollity were to get out of hand. The great romp off was to be preceded by a spectacular firework display of Very lights. No doubt it would all have been done in Conga style, with the merry makers pelting each other with streamers the while.

Perhaps it's high time we began to examine some of the terms we use. We live in a dour and doleful age in which people no longer go to Galas, Rallies or even meetings - they just go to fly in contests.

Delayed Charge

Electric model power, like battery-powered cars, seems to be forever in the pipeline without ever actually materialising: a tantalising promise of sweet, silent modelling, with none of the finger chewing, non-starting, noisy anguish of power flying, or the exhausting, line tangling misery of glider flying.

But, like many a Utopian dream, does anyone really want it? Taking first the electric car, who would want to be bothered with plugging in the car overnight, and then only to find a smoking mass of buckled plates because you had overlooked the topping-up maintenance? And what happens when you run out of juice? Just fancy staggering back from the nearest garage, perhaps a couple of miles away, with two dirty big replacement batteries. Surely you are not too readily going to pass up the convenience of just sloshing a few gallons of juice into a tank every few days, with no fear of being overcome by acid fumes in the special, very slow lane of the M.1.

Much the same arguments go for electric model flying. Most people who muck around with engines do so for the sheer mechanical hell of it. An engine is a piece of drama; an electric power unit just a system. And all that charging up too; not to mention the expense. If electric model power was the thing, and someone brought out a brash, noisy power unit which required no other attention or processing than a few squirts of juice into a tank, he would be hailed as a genius. And just think of the publicity blurb '... sounds just like the real thing. Flick prop start. All the power you need. . . '.

Lighten the Load



I STARTED entering control line stunt competitions four years ago and although a keen modeller when young, I had only just returned to modelling after a seven year break. The first thing I noticed was that the stunt 'crowd' were very free with their advice, which surprised me as I thought that the top flyers would want to keep their knowledge and skills to themselves! After only a short while I got to know most of the flyers and through information gained from talking to them, soon found my flying and building standards improving.

The next step was to find a model that both suited me and which would perform better than my own flying standard, thus if I failed to improve it was my fault, not that of the model. I designed a machine based on the F86 Sabre using the dimensions of a *Nobler* and this flew very well – but finally fell apart last season.

In the meantime I tried three Zlin 226's from the *AeroModeller* plans range which I flew in many competitions and in fact reached fifth in the *Gold Trophy* event, but I still had not found a plane that really suited me until Mick Harvey suggested the Jim Van Loo designed *Chipmonk*. This I built and within a short space of time was having a fair amount of success. I decided that this was the model for me, so I built another one and found that being lighter, it flew much better than the first, giving me a fourth in the 'Gold' on only one flight, as a mishap in the second flight gave me a low second round score.

At this time I changed my car to a smaller one and so I asked Jim Mannall about removable wings. He helped me no end, but also convinced me that a model should have as light a wing loading as possible. I started constructing another *Chipmonk*, this time with removable wings and tried to build it light, but found that most of the excess weight came from the finishing. I use mostly silver for a scale appearance and found that I was adding up to 16 oz. of finish from a bare wood structure! By the time I reached *Chipmonk 4*, I had made quite a few alterations to the original and it was flying far smoother but I realised that to improve my flying any more I would have to finish my models still lighter, so I set to reading articles on finishing and eventually came across an article by Don Bambrick in an old *American* magazine. My version of this finish is recorded below and if it helps a few people I shall be pleased as it took me four years to achieve the lightness I require in a stunt model.

The balsa I buy is graded 6/8 lb. cu. ft. so the framework is not all that heavy to start with, considering I use a double 'D' box construction, leading edge and trailing edge and solid tail surfaces. From the chart showing weights it will be seen that the last two coats, e.g. finishing colour and fuel proofer add

Says PETER TINDAL

the most weight so the preparation beforehand will be well worth the effort as then the finishing coat can be kept to a minimum.

The fuselage and tail can be constructed as normal but the sheeting on the wings should be sanded with dry 320 grade wet and dry paper to remove all saw marks etc. before the wing is constructed. If left until the model is built you will find that when sanding, the wood over the ribs will become very thin.

Once the model construction is finished, weigh both pieces e.g. wings and fuselage, then rub entire model with 320 paper used dry until absolutely smooth all over. If there are any dents, 'dings' etc. then fill them now with a mixture of balsa dust (rubbed off the rest of model) and dope. Weigh again and see the difference; it may only be an ounce but it is worth removing. Once the model has the required finish, add two coats of clear unthinned dope to the entire model, *except* for capping strips – if added to capping strips they will tend to curl up and cause a distortion in the tissue (I've done it!). Weigh the parts again and you will be surprised how little weight has been added. Sand entire model with 320 wet and dry – still dry – and when all roughness has been removed (and any new dents filled) check the weight again. There should be little difference from that before doping.

Mix 30 per cent dope, 70 per cent thinners and brush on clear lightweight tissue over entire fuselage and tail with this mixture (when covering make sure that where the tissue goes over a fillet or round an inside corner, e.g. tail to fuselage, join the tissue in the middle of the fillet in the form of a butt joint. Do not overlap because the shrinking effect of the dope will lift the tissue away from the fillet). The thinners will attack the dope in the wood and will produce very good adhesion; when dry add another coat of 30/70 and allow to dry completely. The tissue will take on a slightly 'furry' appearance and this must then be rubbed down with dry 320 (use the same piece because it will by now be slightly finer) until completely dull all over, but do not rub right through the tissue at this or any other stage. Mix up a 40 per cent dope, 60 per cent thinners mixture and brush on another two coats and leave to dry for 24 hours.

Having doped the wings with two coats of unthinned clear dope (not capping strips) and rubbed down to original weight again, use a mixture of 30/70 to apply the heavyweight clear tissue over entire wing (except bottom of fuselage – use lightweight). Once dry give another coat 30/70 to tissue over wood but still not capping strips. This method is far more satisfactory than tissue paste – it is quicker, cheaper, cleaner and LIGHTER! This will dry very quickly

and the tissue can be water shrunk almost immediately. When dry add two coats of 40/60 to openwork of wing but not to the wooden parts. When dry add two further coats of 40/60 to entire wing and leave to dry.

Back to the fuselage; this is now ready to rub down with 400 (dry) and when completely matt all over and you are sure there are no dents etc. (the point of no return has been reached!) spray with a mixture of 30 per cent silver ??? and 70 per cent thinners. I questioned silver from Don Bambrick's article but it covers all and is an excellent base for any colour. Only a very thin coat will be necessary as it has very good covering qualities, so obliterates all balsa wood company's trade marks and wood grain colouring. When this has completely dried, rub down with 400 grade paper (dry) but make sure not to cut right through the colour at all, and the fuselage is ready for its finishing colour. I use silver for this as well so I apply two more coats of 30 per cent silver, 70 per cent thinners to the fuselage and this is then ready for decoration.

The wings should now be completely dry and should be rubbed down with a piece of 600 grade (dry) stuck to a piece of foam rubber with impact adhesive; this follows the contours of the wing and will not cut into the tissue if used carefully. The wings are ready for the 30 per cent silver, 70 per cent thinners treatment and when dry can be rubbed down again with the 600 dry, making sure not to cut out the tissue on the ribs or sheeting edges. This is now ready for the finishing coat and again I apply two more coats of 30 per cent silver dope and then leave entire model for at least three days before adding any decoration. It had been suggested that a coat of 30/70 clear over the entire model would help stop the finishing colour being damaged so on *Chipmonks* 6 and 7 I tried it and the gloss added was well worth the effort. It certainly helps when adding decoration as any slight drips of dope or enamel can be wiped away without the base colour being marked.

If silver is used as a finishing colour then to achieve a good finish it must be sprayed on and so must the fuel proofer as the dope consists of particles in suspension and a brush will leave ugly lines. The previous coat of 30 per cent silver, 70 per cent thinners need not be sprayed as it has to be well rubbed down, thus the brush marks will go anyway.

When adding trim and using masking tape to achieve a clear line, it is advisable to run a thin seal of clear dope along the edge of the tape to prevent the

CHIPMONK NUMBERS

FUSELAGE

	5A ozs.	6 ozs.	7 ozs.
with cockpit uncovered	15	11	12
with 2 coats full strength	15½	11½	12½
after rubbing down—320 dry	15	11	12
with lightweight tissue + 2 coats			
30/70 dope	15½	11½	12½
after rubbing down—320 dry	15½	11½	12½
+ 2 coats 40/60 dope	15½	11½	12½
after rubbing down—400 dry	15½	11½	12½
+ 1 coat 30% silver, 70% thinners	16½	12	13
after rubbing down—400 dry	16½	11½	12½
+ 2 coats 30% silver, 70% thinners—			
finishing trim	17½	13	14
+ Tufkote	18½	14	15
+ Fox 40, ally spinner, tank, shaft			
extension, prop. and silencer	31	27½	28

WINGS

Uncovered including flaps	12½	12½
+ 2 coats full strength dope	13½	13½
after rubbing down	13½	13
covered with heavyweight tissue	14	13½
+ 2 coats 40/60 dope	14½	14½
after rubbing down	14½	14½
+ silver 30/70, 1 coat	14½	14½
after rubbing down	14½	14½
+ 2 coats silver 30/70 and		
finishing trim	14½	14½
+ Tufkote	15½	15½
+ wheels	17	17½

Total Weight No. 6 before covering, 38½ oz. — after covering 44½ oz.

Total Weight No. 7, before covering 39½ oz. — after covering 45½ oz.

A gain of 6½ oz. No. 6—and 6 oz. No. 7.

colour from running underneath. Apply the trim colour well thinned — whether sprayed or brushed it should flow out smoothly.

As I said before, the last two items, finishing colour and fuel proofer are the heaviest; be sparing as you should have had a very good base to apply them to, so they only need to be thin.

This method of finishing should only add about 6 ozs. maximum to a 56 in. span stunt model so with a heavy motor like a Fox 40, weights of 44-46 ounces are within easy striking distance. Once the model is completely finished it is well worth making cardboard covers for all flying surfaces as although they may be damaged once on the flying field, transportation is usually the most injurious to good paintwork.

Proof of the pudding . . . the author with his collection of control-line stunters: three *Chipmonks* and a Sabre based model. By using the methods described, he has been able to cut down the weight of finishing his models by up to 10 oz. — try doing that by balsa selection alone!





The Aviomodelli Macchi MB 308 is claimed to be aerobatic, and uses 2.5-5 c.c. engines. Moulded ABS cowl and good accessory pack are included in the kit.

WE HAVE often bemoaned the lack of commercially available kits for any type of model aircraft other than those designed for radio control, but are happy to report that this situation is now changing somewhat with both small-production British kits appear-



Always a favourite subject, the Ju 87B as kitted by Aviomodelli should be a success. Note the moulded plastic fuselage, spats and bomb halves - all make for quick assembly.

said to be designed for stunt manoeuvres, which certainly provides for a more interesting model to fly. All ribs etc. are die cut while larger balsa sections such as the tailplane and fin are pre-sawn to shape. Thin ply parts are only partly die cut,

TRADE NOTES

A review of the latest products

ing on the market together with various new imported items.

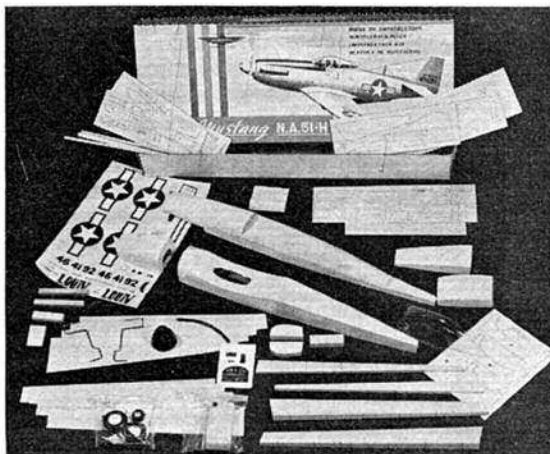
Control line fliers will certainly find their horizons widened by the attractive range of Aviomodelli kits now being imported from Italy by World Engines Ltd. (97 Tudor Avenue, Watford, Herts).

Scale enthusiasts have a choice of three different models. Firstly, there is the 40 in. span Aermacchi MB 308 for 2.5 to 5 c.c. engines and is

The Mustang from the Aviomodelli stable features 'hollow log' construction - the exterior is partially shaped, and templates are provided for final carving. Note the pre-slotted trailing edges and large transfers.

while the remainder are merely printed and need the use of a fret saw to cut them to size. A nice ABS moulded cowl overcomes the tricky problem of housing the engine neatly, while a hardware package included three rubber wheels, spinner, preformed undercarriage legs, and a huge transfer sheet for the registration letters - no tricky hand painting here! Plans are printed on three large sheets and clearly show the straightforward construction. Price of this attractive lightplane is £8.85.

Semi-scale stunt model from the Italian manufacturer uses 2.5-3.5 c.c. engines - nice convenient size for performance and economy. Lots of good quality wood in this kit, plus all the necessary hardware items.





Another C/L stunter from Aviomodelli to suit .19 cu. in. motors — the 47 in. span Assault which, like the Mustang, features a solid balsa fuselage. Good looker with its modern lines and tricycle undercarriage.

The *Junkers Ju87D Stuka* is a firm favourite with most modellers no doubt due to its glamourisation in most W.W.II film epics. Most interesting features of this 36 in. wingspan model is the extensive use of ABS plastic mouldings — indeed the complete fuselage, spats, bomb and bomb release are provided in this material, so it should appeal to those who like a quick result! However, both balsa and ply parts are simply die-printed, so the balsa knife and fretsaw will not be completely redundant. Other accessories include spinner, preformed undercarriage legs (rather spindly perhaps for a model which weighs some 28 ounces), wheels, bellcrank, etc., together with two very clear plans and excellent transfers. Price for this model, which is for 3.5 to 6 c.c. engines (should really tear round with that sort of power!) is £11.06.

The last of the true-scale kits is for the *North American Mustang P51H* and which retails at £11.99. Fuselage construction is based around the 'log' principle — it being carved from two full-length pieces of balsa block which are joined horizontally. The parts are hollowed out and partly shaped, but much more carving is necessary to bring the weight down to reasonable limits as the balsa was rather on the hard side. Cardboard templates are provided to aid the final shaping. Again balsa parts are merely die-printed — a pity as the leading and trailing edges are superbly presented and are pre-grooved to accept the ribs. Hardware provided is similar to the previously described models and this 31 in. span model employs 2.5 to 5 c.c. engines.

Appealing to the aerobatic flyer who likes a semi-scale appearance, the *Hurricane Stunt* should prove most popular. The balsa in our sample was of excellent quality while both ribs and fuselage sides were die-cut although many other parts are simply printed. In all, there was plenty of wood in this 47 in. span model which features coupled flaps/elevators in traditional 'stunt' fashion and should prove a good performer when fitted with a 2.5 — 3.5 c.c. engine; a 0.19 cu. in. glow engine would prove ideal.

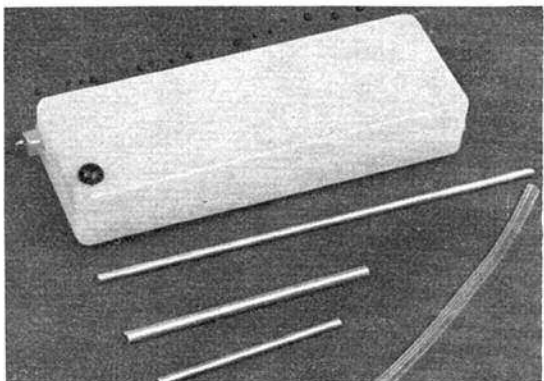
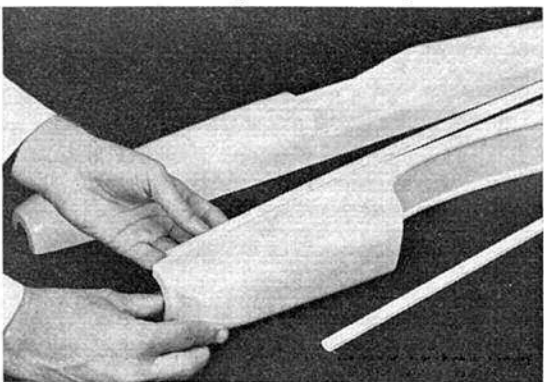
Above right, neat method of joining Baga's ABS fuselage halves, the channel strip covers the joint line decoratively, and adds strength. Below is the huge moulded fuel tank from the same kit — all tubes are simply push fits through hard rubber grommets. Similar tank designs provided in other Aviomodelli kits.

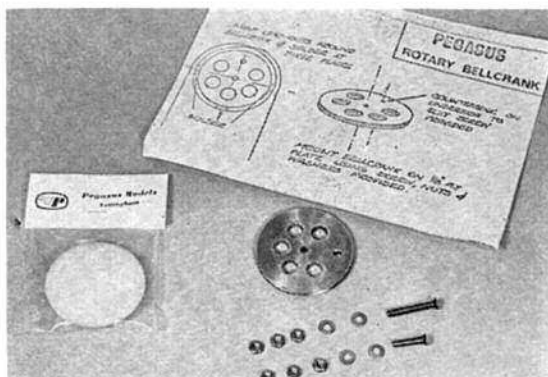


Probably the most 'de-luxe' control-line kit available the Baga 32, top of the Aviomodelli range. Fuselage is moulded in ABS plastic while there is a high degree of pre-fabrication and completeness.

Accessories include tank, spinner, cockpit moulding, wheels, transfers etc. — in all a lot of model for £9.21, and one which is very straightforward to build from the two sheet plans.

Another stunter for similar sized engines, the 47 in. span *Assault* retails at £11.99 and has modern, rakish lines accentuated by its tricycle undercarriage. The fuselage is based on the hollow leg principle just like the *Mustang*, and the same comments apply. Leading and trailing edges are pre-formed and pre-slotted for





Two useful accessories from Pegasus Models for control-line racing fans. The 1½ in. diameter nylon wheels are sold individually, and the circular steel bellcranks are nice and slim for burying in sheet wings.

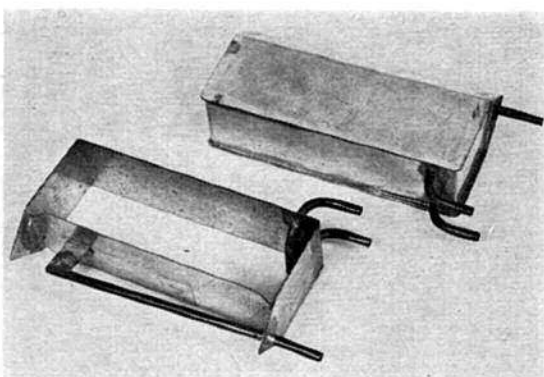
the ribs, while many other balsa parts are pre-cut. The accessories are similar to those previously described, and once more a nice transfer sheet is provided for this aerobatic machine.

Top of the range in completeness, manufacturing techniques (and price - £17.52) is the *Baga 32 bis* - a semi-scale type of stunter for 0.35 cu. in motors named after its designer Bagalini, a top Italian aerobatic flyer.

Most novel construction feature (although seen before in Aviomodelli R/C kits) is the two part vacuum formed ABS plastic fuselage, the top and bottom halves being joined by a plastic channel which is decorative and hides the potentially ugly seam line. The nose former is also a plastic moulding, and fits the fuselage contours snugly. The balsa supplied was of superb quality and all parts other than plywood ones are die-cut. All spars, leading and trailing edges are pre-slotted and nicely machined, and in all the quality is 'A1'. A torsion bar undercarriage is used, although main wheels are not supplied. Accessories include nylon hinges, control system, crystal-clear canopy, tail-wheel etc., plus a huge (baffle-less) polythene tank. A very attractive, fully aerobatic stunter with a 56 in. wingspan. Would also make a nice R/C model with very little adaption...

Pegasus Models (171 Bramcote Lane, Wollaton, Nottingham) also cater for control-line enthusiasts, the latest additions to their accessory range including a large (100 c.c.) metal fuel tank which is very well made and incorporates a longitudinal baffle. One neat touch which we particularly liked was the way in which the filler/vent pipes are soldered together inside the tank, while the feed pipe is supported on a bracket from the baffle. Good detail points which should prevent any chance of these pipes loosening when in service - and all for a very reasonable price of 66p.

The same company also has a couple of new items for racing men. Their 1½ in. diameter nylon wheels are ideal for Goodyear racers and sensibly are sold individually - priced at 20p each. Being solid nylon, there is no tyre to fall off! The other new product is a rotary bellcrank which is machined from steel and has a diameter of 1½ in. It is only some 3/32 in. thick so may easily be buried in sheet wings and although being made of steel does make it a little on the heavy side, it also simplifies line attachment as the leadout are just wrapped around 1½ times and spot soldered in place. Mounting bolts are pro-



Thirsty engine? Try a 100 c.c. baffled fuel tank from Pegasus Models - very nicely made with 'practical modeller' touches about them like the supported end of the feed pipe and filler/vent pipes soldered together internally.

vided, the whole retailing at 30p - excellent value and a convenient answer to what can be a tricky problem for the modeller with no machining facilities.

If you have ever lost a free-flight model, then you may appreciate the value of *Aerobleeper*, as marketed by Euronics Ltd. (Easthouses Industrial Estate, Dalkeith EH22 4DJ, Midlothian, Scotland). This consists of a small transmitter (2 in. x ¾ in. x 1½ in., weight 2½ oz.) which is carried within the model and emits a continuous 'bleep' signal which can be picked up on a hand-held directional receiver. Range of the transmitter is limited to 25 feet which may not seem much, but any free-flyer can tell tales of models lying invisible from the searchers at even closer ranges when lost in grass, cornfields, even dense bushes or trees. By turning the volume switch to 'high' and 'sweeping' an area, the transmitter signals can be picked up. As soon as the approximate area is located, the volume is turned down and then the receiver is used to pin-point the direction from which the signal strength is loudest thus locating the wayward model. There is no switch provided for the model-borne transmitter, so access to it must be provided in order to connect/disconnect the battery, which incidentally will operate for some 20 hours. Cost of the transmitter/receiver is £10.00, the batteries costing an extra £1.00 and 16p respectively. Additional receivers cost £3.50 each. Full instructions are provided.

The Euronics Aerobleeper consists of transmitter (left) and hand-held receiver, and is useful aid in recovering wayward free-flight models. The transmitter has encapsulated components, so should be shock-proof.





Tools shown at left are those which most aeromodellers will have to hand anyway, so there should be little extra expense involved. At far left is seen a pair of 'school-type' compasses which can be used as dividers with a suitably sharpened nail.

Bill Burkinshaw
describes how to avoid
being a 'bodger' and
to produce a good
workmanlike result
using just basic tools

an aeromodeller's guide to

BASIC METALWORK

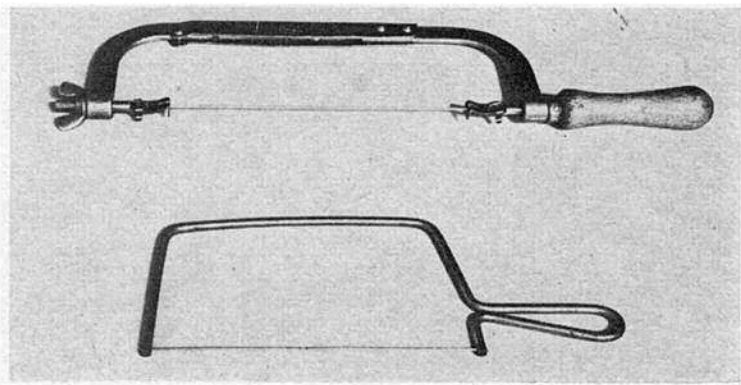
IT HAS BECOME increasingly common over the past decade to find included on plans, drawings, etc., details of more and more sophisticated metal gadgetry, often referred to by other columnists as 'ironmongery', without which the model just will not function as the designer intended. The intention of these articles is to give the average modeller a basic working knowledge of simple metal-working techniques that can be used to help manufacture such 'ironmongery' - they are not intended for the expert, but for the novice who has not had the benefit of a technical education, but feels the need to 'have a go'.

The first essential is a kit of tools, some of these most modellers will already have, and others can be improvised, e.g. dividers, punch, scriber and soft jaws for the vice.

Tool List

1. Vice - this can be one of the 'clamp-on' type; there are many different types of metal-working vices available.
2. Soft jaws - to protect soft material such as copper or aluminium from bruising in the vice.
3. Hacksaw - the 'Junior' type will do.
4. Hammer - preferably $\frac{1}{2}$ lb. ball pein.
5. Hand wheel brace or a power drill. A hand drill can, however, be useful for making springs and also doubles as a winder for rubber models.
6. Pliers - Engineers' 6 in. combination and 6 in. round-nose.
7. Steel rule 6 in. long with $\frac{1}{32}$ in., $\frac{1}{16}$ in., $\frac{1}{8}$ in. and millimetre graduation.
8. 4 in. Engineers' square.
9. Files: 8 in. second cut, flat; 6 in. second cut half round; 6 in. second cut half round; 6 in. second cut round. A handle for each file is absolutely essential - the result of not using one could be a visit to the 'out-patients' department of the local hospital for stitches in the palm of your hand. . . .

Above, a conventional hacksaw frame fitted with adaptor clips to accept an Abrafile, while below is an Abrafile fitted in a specially designed frame - a cheaper alternative if you do not possess a proper hacksaw. These Abrafiles are very useful for cutting slots in metal, as they consist simply of very small-diameter round files with a coarse cutting action, which can be used like a hacksaw in any direction. Very reasonably priced too, available from most ironmongers, etc.



10. Pair of dividers - school-type pencil compass can be used instead, with a nail for the second point.
11. Pair of tin snips.
12. Abrafile frame, or if you have a large-type hacksaw, clips can be obtained.
13. Scriber.
14. Centre Punch.
15. Drills - the sizes given in the table on page 36 are those that will allow a running clearance for the various model size wires and bolts commonly used. The actual size is given and the clearance size drills both imperial (plus No. drills) and metric, as many suppliers now only stock metric.

Materials

Most of the plans in the *AeroModeller* plans range use materials that are within your reach in respect of availability and feasibility of handling with the sort of tools described. Many aeromodellers use very little other than tin plate, aluminium sheet, brass sheet, piano wire and thin-walled tubes of aluminium and brass. The great majority of these materials can be obtained quite easily at many model shops nowadays in reasonably small packages, while some materials you can find for yourself.

A source of supply for tinplate is, of course, the old faithful tin can. 'Maxwell House' coffee tins are very good and, of course, the larger biscuit tins are ideal, as they provide largish pieces of flat, clean material. A visit to a local breaker's yard or scrap metal merchant can often provide sheet aluminium or aluminium alloy and mild steel. Beware of paying too much however; anything more than 10p a square foot for $\frac{1}{16}$ in. aluminium alloy second-hand is robbery without violence! Rods of $\frac{1}{16}$ in., $\frac{3}{32}$ in., $\frac{1}{8}$ in. or $\frac{3}{16}$ in. mild steel are used for welding and can probably be obtained at a local garage which does welding, for only

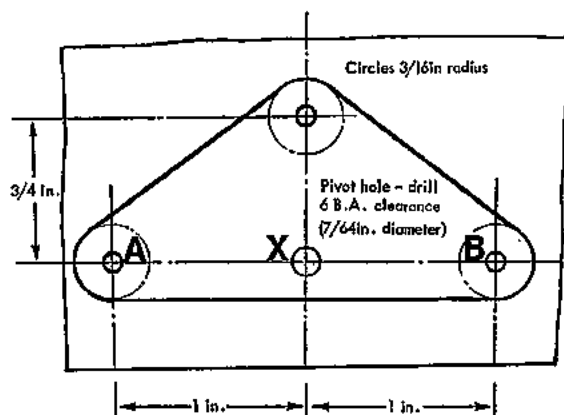


Figure 1 - Marking out a bellcrank on the sheet metal.

a few pence each. These rods often have the added advantage of a copper coating which prevents them from rusting.

It is necessary, however, to be reasonably certain of what material you are handling before subjecting it to heat and vigorous bending. Tinplate, for example, could be spoiled by overheating which would destroy the coating of tin, while light alloy could, in extreme cases, be melted if mistaken for steel and can also crack along bend lines. If you are not certain what metal you have got hold of, try to find someone reasonably expert to identify it for you, as trying to describe detailed methods of identification of metals is rather beyond the scope of this article! Broadly speaking, aluminium alloy and aluminium are very much lighter than steel of same thickness; tin plate is much more silvery than aluminium, brass is a yellow colour, and copper reddish. Steel can easily be distinguished from all if a magnet is available, as steel is attracted to the magnet, but as tinplate is also steel coated with tin, a magnet will attract this too. Tinplate can usually be distinguished from steel as the steel will almost inevitably be oxidised (rusty) on its surface, whilst the tinplate will be bright and shiny. Aluminium alloy is usually much harder than aluminium and bending between finger and thumb can often identify them.

Making flat shapes

Before attempting to shape any of the materials mentioned, it is essential if accurate and satisfying results are to be obtained, to mark the shapes on to the metal really precisely. Metal worker's marking-out is usually done by accurately drawing, with proper instruments, directly on to the metal, unlike the technique of the balsa modeller who uses carbon paper, pricking through the plan or sticking the plan onto the material and cutting round it. The tools from the list needed are rule, square, hammer and dividers. In addition, with the aid of an 8 in. flat file, a punch and scriber can be produced. Try to obtain a couple of nails (the 4 in. wire type will do) and file both to a conical point, one of about 60 degrees included angle, and one 30 degrees - the former to be used as a centre punch, the latter as a scriber. Alternatively, a punch and scriber could be purchased which will last much longer in between sharpening, as they will be hardened, which is impossible with a nail.

The scriber is used for all the line drawings except for when tinplate is being used (a scriber scratches off the layer of tin and can cause corrosion of the exposed steel), when a pencil does the job. The centre punch will be used to mark the positions of all holes to be drilled, and also as a prick in the surface of the metal to locate the point of the dividers (compass with scriber inserted) when drawing circles. The hammer is necessary to strike the punch and the use of the ruler is obvious!

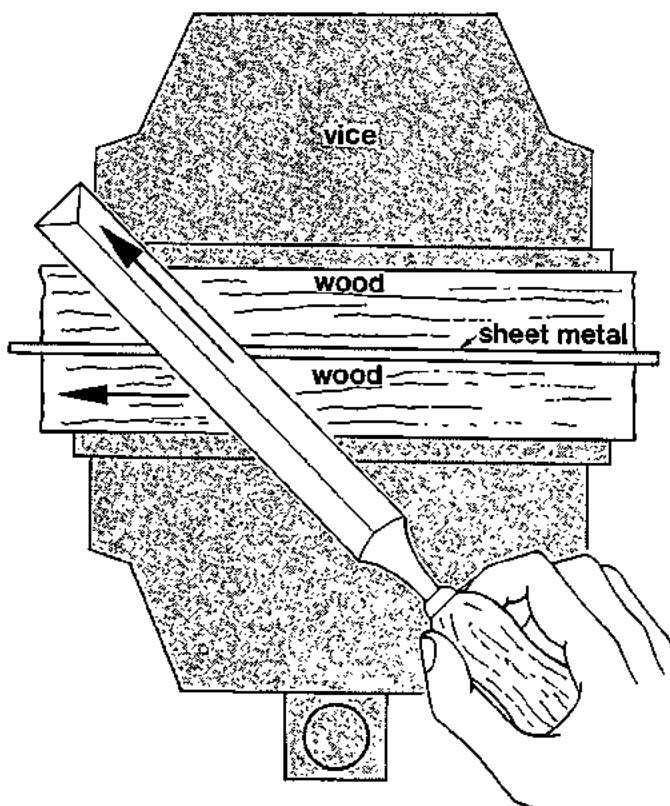
Once a few basic techniques of marking out are mastered they can be applied to more and more complicated shapes as the occasion demands, so it is proposed to describe how to mark out the bellcrank shape shown in Fig. 1 on to a suitable piece of material. The techniques needed are:

- 1) Marking a line parallel to an edge.
- 2) Marking a line square to an edge.
- 3) Drawing a circle.
- 4) Joining circles.
- 5) Centre punching.

Firstly, mark a line A-B parallel to the edge of the metal using the compasses with a scriber. The exact distance is not very important as long as it is more than 3/16 in. away from the edge. Now with your scriber, mark a point X on the diagram approximately in the centre. Using the square and scriber, mark a line at right angles across the centre of line A-B crossing it at point X. Now set your dividers at 1 in. and mark the position of the two leadout holes either side of X on the line A-B sticking one point of the dividers in X and drawing a small arc across A-B each side. The pushrod hole will be marked in a similar fashion with the dividers set at 1/2 in. The hole centres can now be punched; there are four in all. The punch should be carefully positioned by laying it over so that the exact position of the point can be seen, and when correctly located, raised to an upright position and then struck *once* firmly with the hammer. If you strike more than once without checking that the punch is located correctly between blows, there is a likelihood that you will end up with a succession of punch marks across your work. A circle of 3/16 in. radius (1/8 in. dia.) is now drawn at each corner using dividers. The three circles can now be joined together using the ruler and scriber.

It should be quite easy to adapt the few techniques described to mark out any number of shapes; undercarriage legs, tailwheel brackets, anchorages for struts, etc., to name but a few. As long as you have a straight edge to start with for your dividers to run along and your square to rest against, success should be yours. The mention of straight edges leads us on to the next part of this section on shaping metals. When using thin sheet metal the easiest way to prepare an edge straight is to use tin-snips, after firstly scribing a line with the aid of a steel ruler. Tin-snips are used exactly as scissors would be, and with care a perfectly straight edge right on the line can be achieved. If, however, you are not successful at producing an edge as straight as you wish for first time, you will have to use a file to true it up. With thin sheet some support is necessary, otherwise the pressure of the file will probably distort the edge of the

Figure 2 - Supporting thin sheet metal between wood when filing.



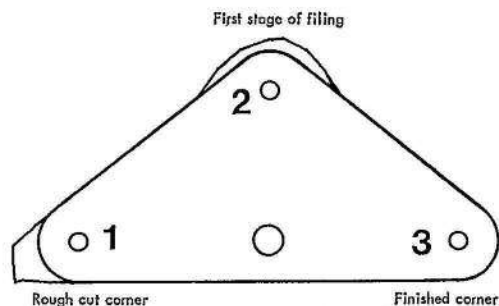


Figure 3 - Three stages of shaping a bellcrank.

sheet. Accordingly, find two scraps of wood of around $1\frac{1}{2}$ in. \times $\frac{1}{2}$ in. section and with one on each side of the piece of sheet, place the 'sandwich' in the vice. The pieces of wood should be arranged so that very little more than the waste metal to be filed off projects above them so as to achieve maximum support. Filing should be done with the file covering the whole length of the sheet with each stroke of the file (Fig. 2).

If tin-snips are not available the other alternatives are cutting with strong scissors (only for tinplate or very thin sheet, and then only if they are your own scissors!), or use a hacksaw, or even a fret saw. To hacksaw thin sheet successfully the metal ought to be well supported on the edge of the bench clamping down with a piece of softwood to spread the load and to protect the surface. Fret-sawing would be carried out using the same Vee shape support and sawing technique that would be adopted for wood cutting, but bearing in mind the comparative hardness of the metal and the fragility of the blade. Fret-sawing metal is really a technique that demands patience, a good initial supply of blades, and above all, a gentle touch. If there is a feasible alternative, use it.

Having prepared one edge of a piece of metal straight and then marked out the shape, the next stage would be to drill any necessary holes before making the piece of metal too small to handle easily whilst drilling. The exception to this order would be if some bending had to be done and holes had to line up in opposing parts. Holes would then be drilled after the shaping and bending.

If you are using a hand drill and thin sheet metal (up to $\frac{1}{8}$ in. thick) you could happily drill $\frac{1}{8}$ in. diameter holes straight through, but over $\frac{1}{8}$ in. diameter it is a very good idea to put a small pilot drill through first before the larger drill. Also the smaller-size drill will be easier to start off in the right place on the centre punch mark. If you are using a power drill then great care should be exercised when drilling small pieces of thin metal sheet. The small piece of sheet can very rapidly be transformed into a nasty sharp cutting device when the drill sticks in the hole, with little respect for soft fingers. Please, always hold your piece of metal in First stage in marking out involves using the engineer's square against the one 'true' flat edge. Note the use of a nail (properly sharpened) as a scribe - certainly cheap, but do keep resharpening it. Use a pencil on tinplate to avoid scratching off the tinplating.

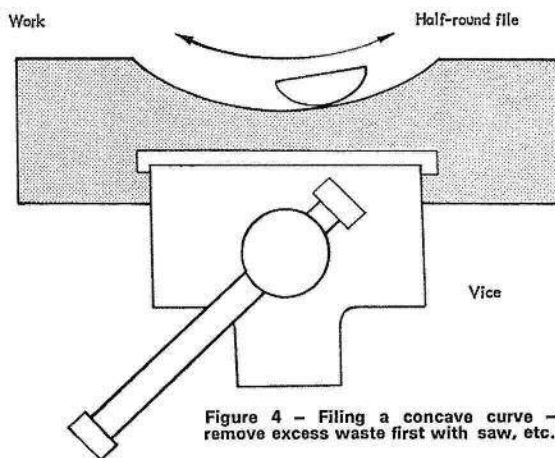
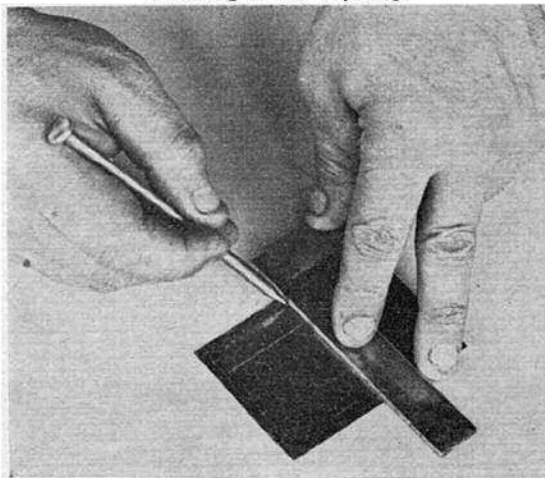
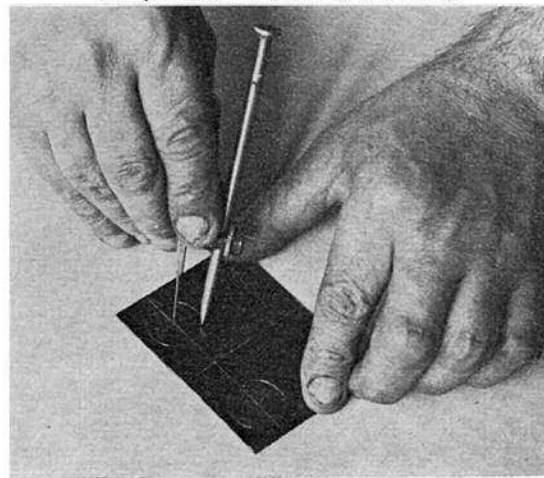


Figure 4 - Filing a concave curve - remove excess waste first with saw, etc.

a vice or clamp of some description before attempting to drill with a power drill - even a pair of pliers is better than nothing at all.

Having frightened off the more squeamish, let's return to drilling with a hand drill. It is very frustrating to try to drill metal with blunt drills and I suggest that if you wish to avoid purchasing new drills every five minutes you try to find a friend with a grinder who has 'the touch' for drill sharpening. When you start to actually drill your hole, check after only a few turns that you have, in fact, started in the correct place and then, if all is satisfactory, carry on. If not, as long as you have not drilled too far, a little heavy work with the centre punch and hammer should 'drift' the centre of the hole back into the correct place. Whilst drilling, do not be too concerned with trying to emulate the r.p.m. of a Rossi 15, but with keeping the brace upright and a steady pressure on the work. As the drill starts to break through the metal you should relax your pressure as this is the danger point for drill breakages and small work 'mangling'. After completing the hole you will invariably find a 'burr' on the reverse side which can easily be removed with a larger drill held and rotated in the hand.

When drilling largish holes (anything over $\frac{1}{4}$ in. diameter) in thin sheet metal it is essential to clamp it down to a piece of scrap wood, both to support the exact point of drilling and also to help prevent distortion of the surrounding material. When all holes are drilled, the shaping of the metal can be commenced. One edge, the edge used as a datum for marking out, should already be straight. On this bellcrank shape shown, the next stage would be to remove as much waste metal as possible by cutting, either with Second stage in marking out the bellcrank, this time using the nail scribe in a 'school-type' compass to act as dividers - again a cheap substitute for the proper article. Marking out must be prepared accurately - take care when taking measurements from your drawing.



DRILL SIZES			
Clearance hole for	Actual sizes in dec. inches	Metric Equ.ivalent	Drill No.
8 swg wire	0.160	4.1	20
10	0.1280	3.3	30
12	0.140	2.65	36
14	0.080	2.1	45
16	0.064	1.65	51
18	0.048	1.25	55
20	0.036	1.00	60
4 BA Thread	0.1057	3.7	26
6	0.1130	2.9	33
8	0.089	2.3	43

tin-snips or a saw as previously described. If you are using a saw, as the edge will inevitably finish up rough, try not to saw too close to the line, but allow for a small amount of cleaning up with a file. If using tin-snips, cut as nearly on the line as possible. When the shape is roughly correct, all the straight edges can be trued up and carefully finished with smooth gentle strokes of the file. File marks can be removed with a strip of emery cloth wrapped around a file so that you are using in effect a very fine abrasive file. Beware of rocking the file as you are liable to finish off with rounded edges instead of those clean square ones which give the finished article a professional look. The rounded corners should firstly be trimmed to the shape shown as corner '1' in Fig. 3 and then trimmed with a file to the 'threepenny bit' shape of corner 2 with each little flat being virtually on the finished line, and finally completely round off as in corner 3 and polish with emery cloth.

Corners and slots

So far only the making of shapes with all 'outside' curves has been tackled, but many of the required shapes will have 'concave' or inside curves and corners. If the curve is shallow the simplest method would be to use the curved side of the half-round file. In many instances the length of curve will be more than the width of the file, so after having marked out the shape, remove as much waste as possible with tin-snips or saw and then resort to the file. The whole width of the shape should ideally be completely covered with each stroke of the file (Fig. 4).

Slots and corners present no real difficulty as long as they are not too narrow or acutely angled. Thin material can be cut with tin-snips, thicker with a saw. Beware of cutting too far, especially with tin-snips, as they are prone to snapping shut and cutting past the desired point if care is not used. It is perhaps a good idea to carefully align the points of the snips with the finishing point so that if they do snap shut they can do no harm. If a narrow slot is required (Fig. 5) the easy thing to do is to firstly drill a hole and then cut down to the hole, cleaning up with a file as

Clamping a piece of thin sheet metal between the workbench and a piece of scrap wood. The wood prevents the work from being scored as well as supporting the metal along its length. Make the cut as close to the supports as possible. G-clamps are most useful, and may be obtained in a variety of sizes.

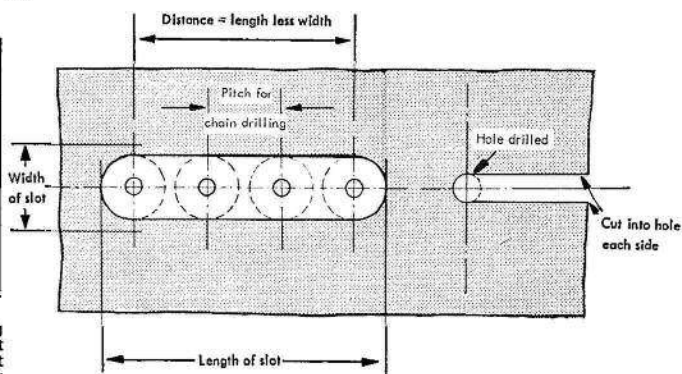
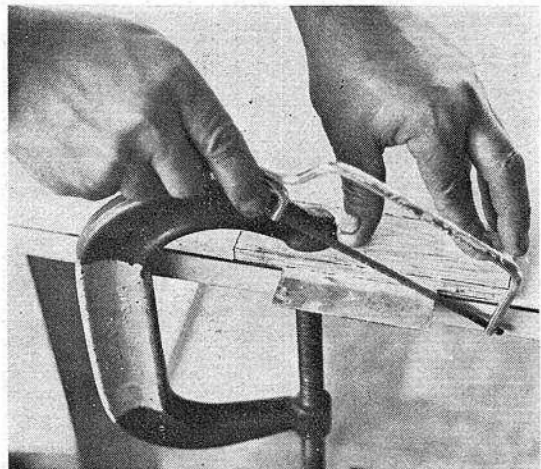


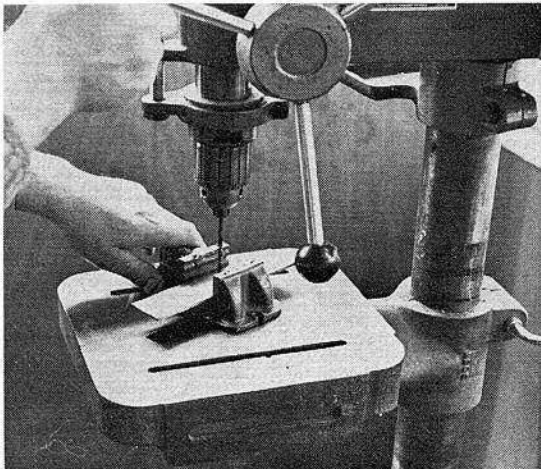
Figure 5 - Forming different types of slots in sheet metal.

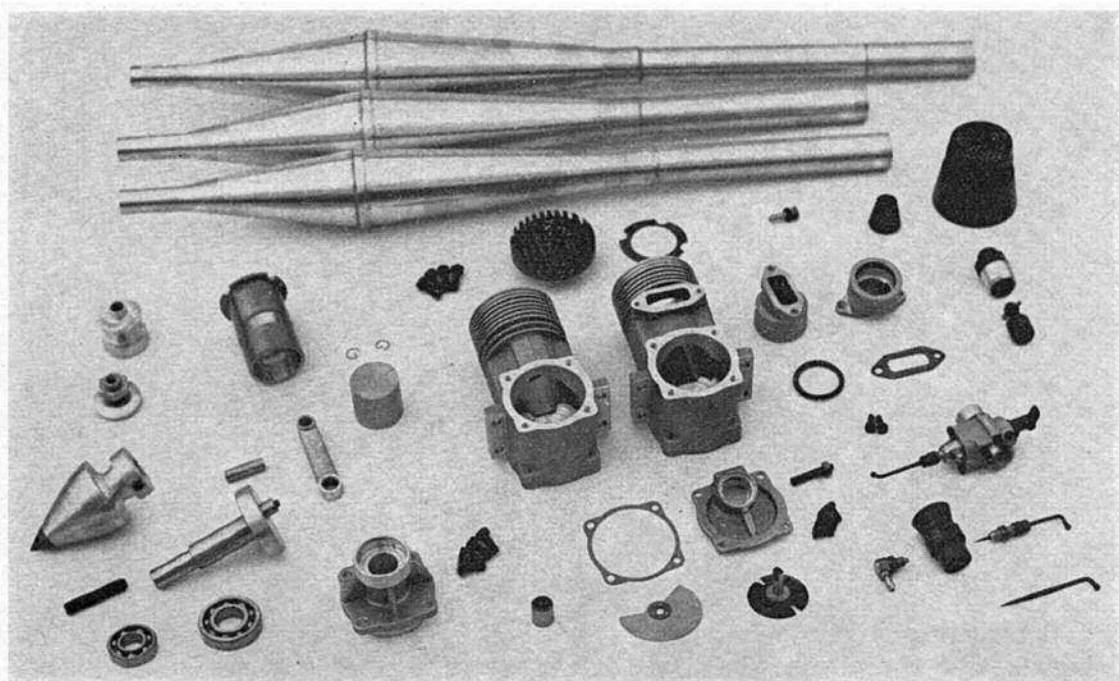
necessary. If very narrow slots are required, then either 'Swiss'/'needle' files or a 'warding' file will be needed.

This method is all very well for a slot which is open-ended but what of the slot right in the middle of a piece of sheet? The answer is very simple really, no, it *does not* mean pushing sideways with a power drill in the hope that your drill will turn into a slot drill, but it does involve drilling. Firstly, it is essential to carefully mark out the slot as shown in Fig. 5. A centre line is marked, and the length and width of the slot. Then centres for a line of drilled holes to remove most of the waste metal must be marked. To arrive at the position of the hole, a little simple arithmetic is necessary. For example, a $\frac{1}{4}$ in. wide slot 1 in. long will need four holes $\frac{1}{4}$ in. dia. to remove most of the metal. Please don't make the mistake of drilling the first hole $\frac{1}{4}$ in. from the end of the slot, remember that it will only be $\frac{1}{4}$ in., the radius of the drill. Now, having marked the first, the next three can be marked $\frac{1}{4}$ in. apart. A few lines back we said $\frac{1}{4}$ in. holes, but now we take that back because it is better to use a size smaller drill than the marking out was intended for, as this will allow for any small inaccuracies of marking out. The drill would then be 15/64 in. or the nearest size you have. When you have drilled all four holes, being particularly careful to get them started exactly on the centre punch mark, other waste can be removed with a file. This process is called chain drilling. With really small slots the drilling procedure would have to be followed by either an Abrafile or piercing saw and then Swiss or warding files. Curved slots can be made quite simply by marking the centre line of the chain, drilling on an arc of a circle.

To be continued

When using a power drill to form the holes, it is essential to hold the work in some sort of vice or clamp, even pliers are better than nothing. Do not hold in your fingers, as before the drill has passed right through the metal, it will stick and the whole lot be transformed into a lethal revolving blade. Be warned, and take care.





latest engine news

by Peter Chinn

New from France

One of the oldest established European model engine manufacturers are Moteurs Micron of Paris, who have been in business for some 30 years. Perhaps best known to older modellers for their 5 c.c. fixed-compression diesel first made during the German Occupation (and which powered a one-time world record holder), Micron engines have been of many types, both diesel and glow plug and currently range from under 1 c.c. to 10 c.c. displacement.

The present Micron line consists of seven basic types. These include the Meteor 0.9 diesel (0.94 c.c.); the Racing 2.5 diesel (2.46 c.c.) in a choice of plain or ball-bearing versions; the Micron 21 glow plug motor (3.63 c.c.), which can be obtained in a choice of standard or throttle-equipped versions and with or without ball bearings; the Micron M.29, M.35 and M.45, all based on an 18 mm. stroke with a choice of 5.10 c.c. (19 mm. bore), 5.94 c.c. (20.5 mm. bore) or 7.16 c.c. (22.5 mm. bore) and with standard venturi and needle-valve assembly or R/C carb; and the Meteor 51 (8.35 c.c.) in C/L and

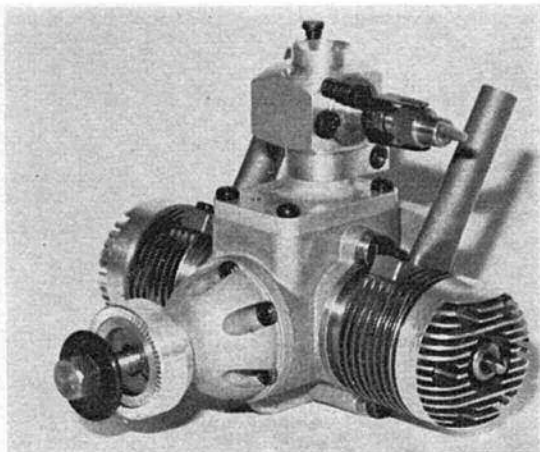
R/C versions. In addition, there are two entirely new and unique additions to the range, the twin-cylinder M2-24 and the four-cylinder M4-24.

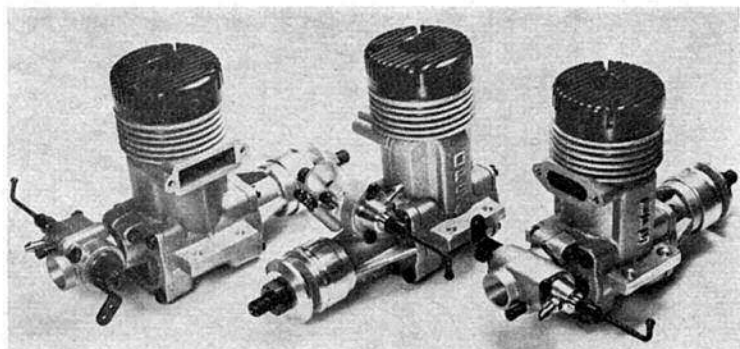
These are horizontally-opposed units based on 16 mm. bore cylinders and a 12 mm. stroke, dimensions which give an individual cylinder swept volume of just over 2.41 c.c. (hence the '24'

designation) and actual displacements of 4.83 c.c. for the Twin and 9.65 c.c. for the Four.

These motors, obviously, are likely to be of greatest interest to scale modellers (both C/L and R/C) and the M4-24 is the only four-cylinder engine at present available that comes within the FAI 10 c.c. capacity limit. Unfortunately it is rather heavy (730

Heading picture shows the components of the 1974 O.P.S. Speed-60 series engines, showing the additional parts that enable one of four models to be assembled. Right, the old-established French Micron company have recently introduced this 5 c.c. twin, the Micron M2-24. Exhaust pipes can be rotated to various positions. A 10 c.c. four-cylinder version, the M4-24, is also available. Both engines are very expensive.





Three of the many variants in the O.P.S. 40 range. Left to right, they are a 40-SLP, a 40-SLA and a 40-SFP. Each of these particular models is fitted with a throttle-type carb, but standard intake versions are also available.

grammes or nearly 26 oz., according to the manufacturer's specifications), probably because it uses lapped cast-iron pistons running in steel cylinders with integral fins. The M2-24 weighs just over 14½ oz. The cylinders on each engine are secured to a barrel type crankcase with detachable bell-shaped front housing secured with six screws. Each cylinder is fitted with an exhaust pipe which can be rotated to any convenient outlet angle. Heads are of aluminium and attached with six screws. Unlike the American Ross horizontally opposed twin, four and six cylinder engines, the cylinders are staggered to line up with the crankpins. Crankshafts are supported in ball-bearings and induction is via reed valves with mixture drawn from Kavan or Perry carburettors.

Running on the maker's recommended 5 per cent nitromethane fuel mixture, the engines are claimed to deliver 0.40 b.h.p. at 15,000 r.p.m. for the Twin and 0.80 b.h.p. at 15,000 r.p.m. for the Four. Suggested props are 10 x 6

for the M2-24 and 11 x 4 for the M4-24.

1974 OPS models

The Italian OPS company, having recently acquired factory premises very much larger than their original workshops, are planning substantially greater production during 1974. In the past, they have concentrated mainly on their Speed-60 rear-exhaust piped racing engines for 10 c.c. class C/L speed and boat use. These are now available in four models, together with a redesigned and much improved version of the OPS Ursus 60 R/C unit for normal radio-control model use, but considerably expanded sales are expected to result from the introduction of a new range of engines in the medium capacity classes.

The four Speed-60 engines consist of the 60-VAE (for control-line speed); the 60-RCB (for boats); the 60-CAR (for 10 c.c. class tethered racing cars) and the 60-RCA (a throttle equipped version of the 60-VAE for R/C). All are intended for use with tuned

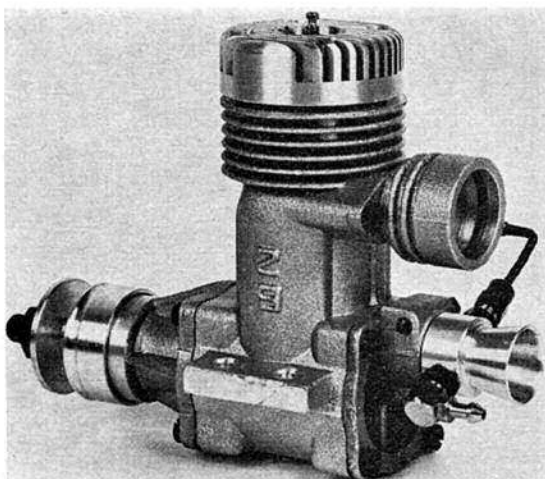
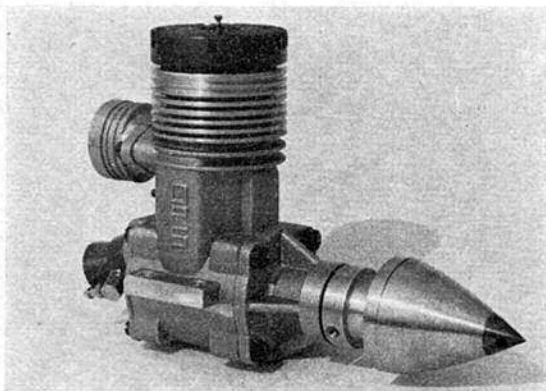
pipe exhaust systems and OPS claim outputs of no less than 2.75 b.h.p. at 23,000 r.p.m. for each, excepting the R/C aircraft version which is rated at 1.65 b.h.p. at 16,000 r.p.m.

Like the original OPS engine, the newest Speed-60 has a Zimmermann disc-type rear rotary induction valve and, of course, Schnuerle loop scavenging. Each version of the engine uses one of two main castings, so that the exhaust is located either at the rear, above the carburettor (for normal aircraft installations) or, alternatively, at the opposite end, above the crankshaft (e.g. for marine use). Normally, the aircraft version of the engine is set up to run on FAI fuel - which is the only fuel that is legal for Italian C/L speed contests - but a special nitro pipe is obtainable for use in events where nitromethane is permitted.

During 1973, OPS announced their *Progetto 40* ('Project 40') in which the aim is to cover just about every contingency so far as .40 cu. in. motors are concerned: control-line, radio-control, R/C pylon-racing, C/L rat-racing, piped control-line speed and marine use, both standard and racing.

A series of components, including two main castings, two crankshafts, two front bearing housings, two backplates and two cylinder/piston assemblies, along with a choice of two carburettors,

Below, latest version of the 10 c.c. O.P.S. racing engine: the 1974 O.P.S. Speed 60-VAE, while at right is the newest addition to the O.P.S. range, the Speed 29-VAA model. It is intended for 5 c.c. C/L speed work and is ported for use with a tuned pipe.



a tuned pipe and a flywheel, plus the various parts common to all versions, allow the 40 to be built up into any one of 16 different models. Indeed, instead of purchasing one or more complete engines, it is possible to actually buy the OPS 40 as a 'kit', enabling it to be assembled to suit any of the numerous applications mentioned.

There are four basic models in the OPS 40 series, each of which is subdivided into three, four or five versions tailored to individual applications. The four basic models are the 40-SLA, the 40-SLP, the 40-SPA and the 40-SPP. The first two letters of each suffix identifies the exhaust position: 'SL' stands for *scarico laterale* or *side exhaust* and 'SP' stands for *scarico posteriore* or *rear exhaust*. The last letter establishes the rotary-valve location: 'A' for *anteriore* or *front* and 'P' for *posteriore* or *rear*.

So far as standard (non-throttling) engines are concerned, the control-line — or, for that matter, free-flight — enthusiast has a choice of the 40-SLA with side exhaust and shaft type rotary-valve, the 40-SLP with side exhaust and rear disc type rotary-valve, the 40-SPA with rear exhaust and shaft valve, or the 40-SPP with rear exhaust and rear disc valve. This latter is also available in a special speed version with a different cylinder liner having ports timed for a tuned exhaust system.

As with all OPS engines, these 40 cu. in. models feature Schnuerle scavenging and, like all other current OPS motors, they are of the ABC pattern (ringless aluminium piston running in chromed brass liner). They all have a 21.6 x 17.8 mm. bore and stroke combination giving a swept volume of 6.523 c.c. or 0.3980 cu. in. Design layout broadly follows that of the 60 models except that the rear induction versions use a conventional disc valve (of Tufnol type material) within the crankcase, instead of the Speed-60's Zimmermann type assembly consisting of a thin steel disc running in a separate chamber.

A more detailed, illustrated description of these new OPS 40 models will follow in our next L.E.N. article.

Finally, the very latest OPS is a new 5 c.c. control-line speed engine broadly based on the 40-SPP Speed

and known as the OPS Speed-29. This has the same stroke as the 40, but with bore reduced to 18.6 mm., giving a displacement of 4.837 c.c. or 0.2951 cu. in. For this engine, incidentally, OPS are claiming an output of no less than 1.8 b.h.p. at 25,000 r.p.m., the highest specific output of any OPS to date.

Quiet Revolutions . . .

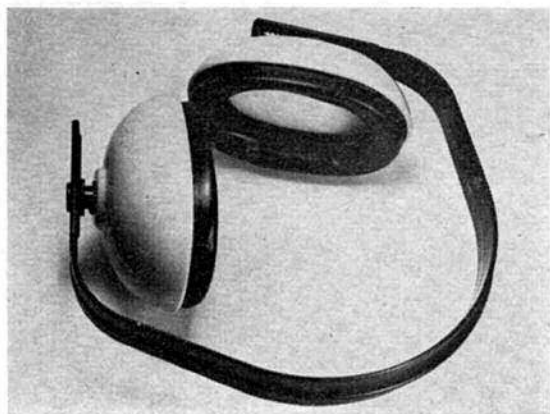
Small boys, we used to be told in our youth, should be seen but not heard . . . The same might be said for engine revs . . . Irvine Engines, who are the sole U.K. distributors of OPS motors have a new Japanese photo-tachometer (with which revs can be seen) and some ear-defenders (by which OPS and other pieces of high-speed machinery can still be heard, but with considerably less discomfort).

The tach is the Nisshin Tachometer, moderately priced at £15.50. It has its 'eye' mounted in the end of an extending tube, which telescopes into the body of the instrument and the meter is calibrated in three r.p.m. ranges: 0-6,000 r.p.m. (for checking idling speeds on R/C engines), 0-15,000 r.p.m. for general use and 0-30,000 r.p.m. for racing engines. These ranges are selected by a four-position rotary switch on the front of the instrument which is powered by the usual 9-volt PP3 battery. Photo-electric tachometers are not quite adequate for really accurate engine testing, especially so far as high speed motors are concerned, but they are very easy to use and, since they impose no load, are particularly useful for checking the revs of smaller and less powerful engines. For the more accurate testing of high powered motors, Irvine Engines offer the Deumo mechanical tachometer at £50.60.

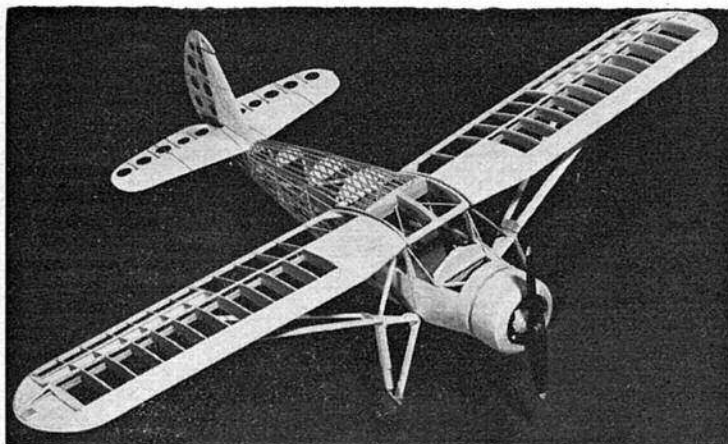


Recent addition to the photo-tachometer market is the Nisshin Tachometer sold by Irvine Engines. Reads up to 30,000 r.p.m. and has telescopic probe.

The ear defenders, appropriately named 'Sa-Fir', are of the headphone pattern and, having tried them during engine testing, we can vouch for their effectiveness. They are well made, are adjustable and have liquid-filled ear pads. They are comfortable to wear and, at 7½ oz., are quite a bit lighter than the Massey-Ferguson Amplivox Ear-Guards that we have been using for the past year or two. There can be no doubt that modern high-performance model engines, especially when being run in the workshop, are capable of producing dangerously high noise levels and some form of ear protection is very definitely recommended.



'Sa-Fir' ear-defenders. Strongly recommended to those who operate high-performance engines, especially during workshop testing.



FLYING SCALE COLUMN

by Eric Coates

Electric-powered free-flight version of the 'Fairchild Argus' by David Carpenter of Southampton, as described in text. Uses the Mattel Super Star power unit.

THE LAST Sunday in October was blessed with the kind of weather aeromodellers, and in particular scale modellers, dream of. Almost total calm all day and a nice hazy, warm, autumnal sunshine to accompany it. This was the scene at R.A.F. Odiham for the last major S.M.A.E. competition of the year, the Southern Gala. Notwithstanding these perfect conditions entries in the scale competitions were pitifully small. Probably the fog, which prevailed in more Northern latitudes, dissuaded a bigger entry. Noise restrictions on the airfield precluded any power flying before 12.15 p.m., therefore the only scale model to take the air in the forenoon, in these ideal conditions, was my silent CO₂ powered Ryan P.T. Again, as at Woodford in August, many heads were turned in amazement at this small model's flights which approached two minutes in duration and 300 ft. in altitude. I mention this form of propulsion again because things seem to be stirring, on both sides of the Atlantic, which may result in a more readily available supply of these marvellously sociable power units. . . .

With B.S.T. ending the previous night, combined with the late start and a marked lack of regular judges present on the airfield, flying time was very limited and, therefore, it was perhaps as well that only five entries were made in each of the classes.

Flying commenced on the stroke of 12.15 p.m. in the F/F event, with my D.H.9a making its customary long take-off run laden down with its pair of '250 lb' bombs which, as usual 25 sec. after roll commenced, were deposited earthwards in front of the judges as the 'option' manoeuvre.

Terry Manley flew the *Handley Page 0/400* for the first time in competition since the Nationals back in May. Unfortunately in flat calm the machine did not perform as impressively as it did in the wind at Lindholme on that occasion. It stubbornly refused to take-off, which destroyed its chances of winning the competition and insisted on flying in tight left-hand banks when hand launched. It did drop its large bomb effectively though, on its last flight, and performed a much more stable transition to glide than at the Nationals. Unfortunately it came to grief making a rough landing, on a disused hard standing, breaking its back on a hummock of grass. Still a very impressive performance though and sufficient to place it an easy second.

Winner of Eric Coates' accolade 'Outstanding R/C model of 1973' (strictly no prizes!) - Brian Taylor with his Spitfire Mk. I. He markets the plans for this design plus many other superb R/C scale models through his 'Digi-hangar' business.

After scrubbing the bottom out of his *Dornier Do 18* flying boat on the runway, A. C. Jansen flew his all red *Bristol Monoplane*, which recently decorously adorned the cover of this publication, into third place.

Both the remaining competitors, R. S. Oldridge and D. Carpenter, flew an *Albatros D.V.* and a *Thomas Morse S-4C* respectively, very well to record respectable scores; making it a full five out of five flight qualification. Something of a record I think in F/F Scale Competitions! It certainly kept the judges, Derek Goddard and Mervyn Tilbury busy.

After making our flights, lacking any other R/C judges, Terry Manley and myself found ourselves judging the Class II R/C event. One competitor did not show up, so only four entries came forth to the flight line. D. Cooper was first away with his *Republic P.47*. After a hair-raising take-off and wild cavortations around the sky it was obvious that something was woefully wrong with the controls of this machine. The pilot informed the judges that he had no elevator control and was making a forced landing. Using throttle only to lose height he seemed to be making a very creditable job of it until about 20 ft. up aileron control also disappeared and the 'Jug' peeled over into the sod, regrettably crumpling a wing in the process.

Most impressive flight of the day and I personally consider the most impressive R/C scale flight I have ever judged, was made by the *Spitfire Mk.I* of Brian Taylor. I have long been an admirer of Brian's models of W.W.II machines, which always capture the atmosphere of the subject and his flying is always



of a high standard. This, his latest model, is better than anything he has produced before. Well up to the highest of Class I standards he was flying in a class of his own in this competition, as the results show. From the taxi manoeuvre performed with the characteristic weaving necessary due to the upward pointing nose obstructing the pilot's vision, to the final circuit followed by a perfect landing, the performance was pure *Spitfire* to all who are familiar with that beautiful shape airborne. The wheels were retracted at exactly the right moment in the climb out after take-off, the aeroplane flew with exactly the right 'sit' and at the right speed throughout each manoeuvre, the throttle being used intelligently throughout the flight pattern – not left flat out as is so often the case. All that was missing was that nostalgic Merlin whistle. After that flight all that followed could only be an anti-climax.

Results

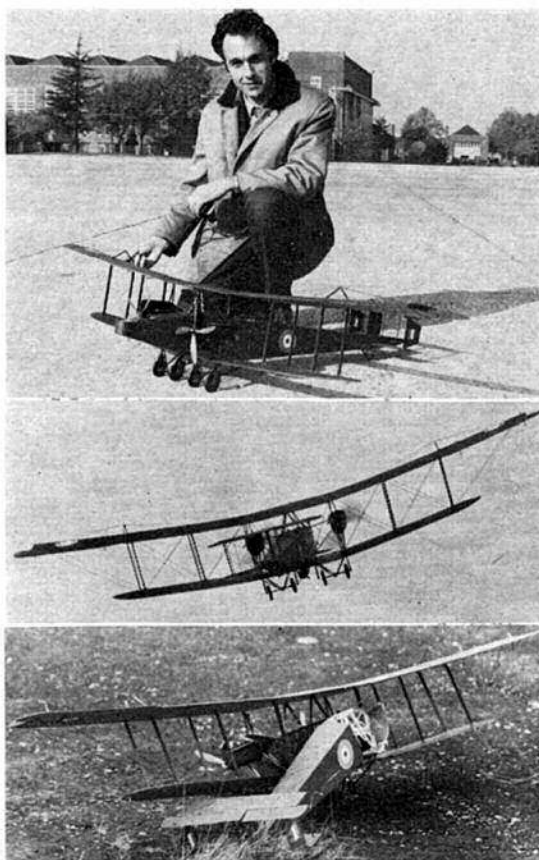
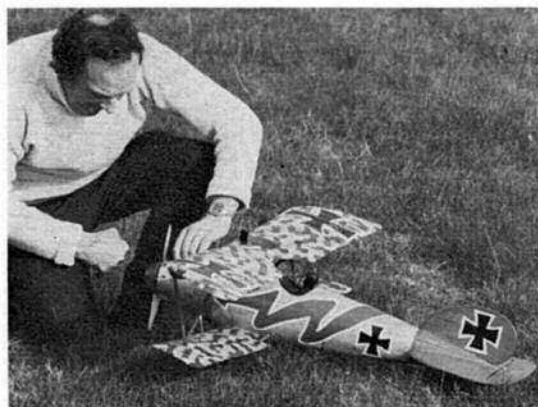
Free-Flight		Flight Static Total
1. E. Coates	<i>D.H.9a</i>	1045 740 1785
2. T. Manley	<i>H.P.0/400</i>	630 804 1434
3. A. Jansen	<i>Bristol M1</i>	730 464 1194
4. R. Oldridge	<i>Albatros D.V.</i>	365 570 935
5. D. Carpenter	<i>Thom. Morse S-4C</i>	470 442 912
Class II. R/C		Flight Static Total
1. B. Taylor	<i>Spitfire Mk.I</i>	1071 1250 2321
2. R. Brown	<i>Hawker Tomtit</i>	550 710 1260
3. T. Mellish	<i>Comper Swift</i>	696 530 1226
	* * *	

The final event, in the Scale Competition Calendar, took place a week later, on November 4th, in the gymnasium at Brize Norton. Most of the well-known indoor enthusiasts braved the blustery elements to the sanctuary of this building kindly made available to S.M.A.E. members by the R.A.F. Brize Norton Club. Although it may be somewhat restrictive in size, the gymnasium is a darned sight cleaner and warmer on a November day than Cardington!

As usual the morning was occupied with trimming and sport flying. The competition taking place in the afternoon.

Nothing very startlingly new appeared, which flew, since the Cardington meeting in September. I flew a *Druine Turbulent* built from one of the Peck Polymer 'Peanut' kits. The little machine flew well but duration was somewhat limited due to the fact that I had overdone the paintwork a bit and the thing was overweight – a fault, I might say, which could be levelled at about 75 per cent of models present.

I did not fly in the competition as my *Puss Moth's* flight pattern cannot be trained to conform within



Before, during . . . and after – Terry Manley's superb twin-engined F/F 'Handley Page 0/400' bites the dust. Quote from instructions received from our columnist 'Please print this one. I'm sure there are plenty like me who like a good prang photo. Terry won't mind.' Hope you're right, Eric!

the perimeter of the flying area, and I therefore assisted Derek Goddard in the judging.

The honours this time went to the best flyer: Andrew Moorhouse's *Curtiss Jenny*, one of the few competitors who managed to take-off and remain airborne for the required 15 sec. This combined with a respectable landing enabled him to establish a commanding lead over Vic Driscoll's immaculate *Wapiti* – winner of the Cardington meeting. This aeroplane was not flying too well – just scraping the necessary 15 sec. from a hand launch. Third place went to the diminutive all sheet *D.H.60 Moth* of Alan Callaghan. Beautifully made, in the Ken McDonough style, this 10 in. beauty did well to remain airborne for the 15 sec. compared to the repeated failures of much larger brethren.

Results

		Flight Static Total
1. A. Moorhouse	<i>Curtiss J.N.4.D</i>	110 148 258
2. V. Driscoll	<i>Westland Wapiti</i>	64 174 238
3. A. Callaghan	<i>D.H.60 Moth</i>	54 150 204
4. C. Hadland	<i>Heinkel He.46</i>	62 124 186
5. R. Oldridge	<i>Gloster Gladiator</i>	82 100 182
6. M. Reeves	<i>S.E.5a</i>	70 60 130

R. S. Oldridge fires up his 'Albatross D.V.'. Always a popular subject with its colourful paint schemes, this design is available from Aeromodeller Plans Service as Order No. FSP 646, price 75p post free.



Winner of the Brize Norton indoor meet, Andrew Moorhouse and his 'Curtiss Jenny' - one of the few present to achieve a take-off and a flight duration of 15 seconds.

Although this is the January issue it will, of course, appear on the news-stands during the last days of 1973 and, therefore, marks the end of the second year of *Flying Scale Column*. That the Editor continues to publish it month by month and to judge from the steady stream of correspondence I receive, I hope to think that the combination I offer is to the liking of the majority of flying scale modellers. I try to ring the changes as much as possible and deal with all classes of scale models but I unashamedly admit the column has a bias to my major interest i.e. free flight models. If any reader has any practical suggestions as to any changes or improvements in the Column he would like to see, I would be only too pleased to hear them.

* * *

In the January issue of 1973 I looked back on the happenings of the previous 12 months in the scale world and, therefore, I think it would be an interesting comparison to see what developments and new models, etc., have come to fruition in the past year. Without doubt 1973 has been a big improvement weatherwise on 1972 - which was just about the most awful I can remember for the scale modeller. During the high summer months of 1973 one couldn't go wrong in England. Night after night of warm calm weather. One in fact became quite blasé about the situation. Instead of rushing out to enjoy the odd calm evening, of a typical summer, one was able to pick and choose which night one would fly in any particular week. A most unusual situation in the British Isles.

In general the contest days were blessed with equally superb weather. The Nationals was a little breezy, but not impossible. With the exception of the *All Scale Meeting* on September 30th, which was a complete blow out, all other contests I partook in were flown in virtual flat calm conditions. Entries to competitions this season have been most unpredictable. The Nationals was well supported - F/F having its best entry for many years but after that things tailed off somewhat. The *Eddie Riding* attracted what must be an all time low of just three. R/C entries in S.M.A.E. competitions have been rather disappointing. As expected, with the introduction of Class II at the Nationals, the Class I entry plummeted to only 12. Class II however has hardly been the 'ball of fire' it was expected to be with only ten at the August 12th *Rissington* meeting and down to five at the *Southern Gala*. Perhaps the £1 fee demanded this year for R/C entries detracts all but the most dedicated. Control-line seems to be making a modest

Beautifully made in the Ken McDonough style (i.e. all-sheet, carefully decorated in ink and watercolours), this D.H.60 Moth by Alan Callaghan placed third at Brize Norton.

comeback. After several years of entries in the four and fives double-figure entries were much more common this year at all events.

Indoor free flight, introduced last year as an experiment, has now become firmly established. Each meeting, whether at Cardington or Brize, sees more and more interest. At first it was chiefly the outdoor F/F enthusiast who produced half-sized models for flying indoors but then one or two people who seem to specialise entirely in indoor jobs started making their presence felt. I found it very encouraging to see one or two faces who are normally associated chiefly with control line circles having a go on November 4th. Maybe at the next meeting we shall have an entry from a dyed in the wool R/C type! Perhaps in indoor, sheltered from the elements, we have the class which will bind the scale fraternity closer together. It saddens me to see the stupid bitterness which often prevails between R/C, F/F and C/L classes when flying together on the same field. Complete intolerance to the other fellow's mode of flying is all too common. I know it rankles sometimes for a F/F perfectionist to see old moneybags Bloggs throwing his ghastly overpowered, foam-filled, plastic covered apology for a 'Mustang' all over the sky but he is not typical of the average builder and flyer of R/C scale models and it is no reason to condemn the whole R/C fraternity out of hand. Similarly there are, I know, a few R/C flyers who consider everything which takes to the air, without the assistance of at least four channels of wireless wonder, to be 'kids stuff' beneath their contempt. I like to think that the majority of *true scale* modellers are interested in *scale models* foremost and the method of flying them is of a secondary consideration. It would be nice, therefore, if there were a bit more cross denominational enterprise in 1974. To start the ball rolling I will let it be known that the *Coates Design Office* is at present working on a brand new R/C scale model for 1974. Not, I repeat *not*, yet another R/C modification to a retired F/F model!

What of the models which were to be seen airborne in 1974? For my money the most impressive F/F model was the *H.P. 0/400* of Terry Manley. Entered in two competitions, in each it placed second but, as yet, a twin has to win a major event. Just as Jim Bridgewood and I, in the 1950s (as I recounted in the March edition) found them too much of a handful so has Terry this year and in 1971 with the

continued on page 44



ROLLED PLYWOOD BOOMS

a useful technique described by TREVOR FAULKNER

MATURE READERS of *Aero-Modeller* will no doubt remember a very smooth model featured in the April 1942 issue . . . a Ron Warring design which was also featured on the front cover of his book *Model Gliders*. The rather idealised painting by C. Rupert Moore (how these paintings evoked the atmosphere of idyllic summer flying days even in wartime!) showed this model gently airborne on a very slack tow, and demonstrated so ably the configuration which is still hailed as beautiful by most model glider fliers. Several scale and semi-scale models are now being kitted which have most appealing lines, but in many cases rely on injection moulding or glass reinforced plastic to give advantageous production line characteristics. These techniques really come into their own where double-curvature shapes are being created, but for the builder of any 'one-off' job, their utility for making single curvature forms is doubtful, and

certainly time-consuming.

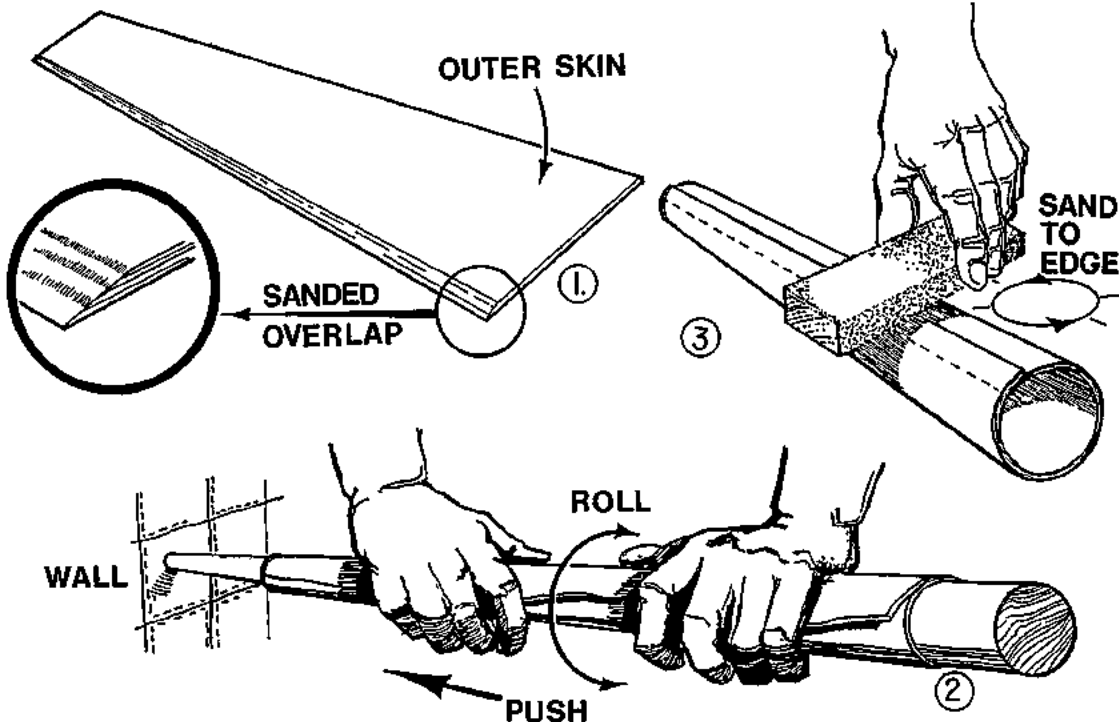
Having used rolled balsa tubes as fuselage/boom units for about ten years, and being convinced of the practicality of circular sections on a strength/weight basis, I decided to make a rather more substantial boom unit which would be grafted onto the G.R.P. front end of a prototype R/C soarer (as previously described in the September 1973 issue). During the course of construction, certain little manipulative tricks were developed. Their employment has made it possible for booms to be produced quickly and easily, and in the context for which the units are destined, weight has been reduced in comparison with the normal $\frac{1}{4}$ in. square spruce longeron, $\frac{1}{4}$ in. balsa sheet tapered box. 'Wetted area' is also much reduced (almost 25 per cent), which means less dope or finish, with a reasonably dent-resistant surface. Formers are unnecessary at intermediate points, and rigidity is very satisfactory.

The interior is smooth and uncluttered, allowing push-rods or cable linkages ideal access and movement.

Construction

Mark out the size of blank required, allowing a typical $\frac{1}{4}$ in. or $\frac{1}{2}$ in. extra along one long edge for an overlap. This overlap area should then be sanded to fade to a purely nominal thickness at the edge - see Fig 1. (Although BOTH edges will eventually be tapered, the material handles more easily if the second taper is left until later).

Soak the blank thoroughly (half an hour) in cold water, and meanwhile get everything else ready for use, as a more efficient job is possible with everything to hand. 'Everything' means your former, a supply of crepe bandage (nostalgic reminder of the rugby field and Sunday mornings spent with other unfortunates at the local Casualty



Dept . . .), a wall, and if possible a second pair of hands.

Now drain the bath (we all use the bath, don't we?), and give the blank a couple of minutes in really hot water. This seems to improve flexibility markedly.

Remove the blank, and begin to persuade it around the former. Work until the blank feels amenable to taking up the shape, and then transfer your attention almost exclusively to the narrow end. Press the blank into close contact with the former in a position where the blank can be felt to be seating all the way round. This will probably be slightly towards the 'fat' end of the former, but at this stage, the important factor is being able to take a sound two-handed grip to maintain this contact (Fig. 2). The narrow end of the former will protrude from within the blank for some way, and this end is then pressed against the wall whilst the hands perform an alternate rolling and tightening action as though a sheet of paper were being rolled up. The effect of the combined action (pressure and rolling), is that the blank will become more

tightly wrapped around the former, meanwhile moving down to the required position. (It is advantageous if the former continues to taper a little beyond the required finished limits of the work-piece; thus the job can be over-tightened a little to compensate for any springing tendency that the ply may have retained when it has dried). Now ask your assistant to begin to wrap the ply, using the crepe bandage. Wrap tightly and continue towards the thicker end, maintaining the ply in close contact with the blank by a repetition of the rolling technique should it attempt to slacken off. To finish the bandaging, simply tuck the end under itself . . . the friction will hold everything soundly.

Allow the unit to dry thoroughly, then remove the bandage. Slip the blank off the former (the curl will spring slightly but no matter), and wax the former well before replacing the blank preparatory to gluing the seam. (P.V.A. is ideal for use with ply in view of its slight elasticity when dry). Wipe off excess adhesive, and bandage a second time ensuring that the blank

is in exactly the right place on the former to give the correct finished dimensions.

Remove the dried blank after an adequate period (24 hours if possible, and preferably longer), sanding the proud area of the overlap in the manner shown in Fig. 3. If you intend to cover the boom, or dope it with any substance likely to shrink, replace it on the former for both the operation and a subsequently drying time. Remember . . . if it sets true, it'll stay true.

With a little experience, anyone should be able to carry out the processes involved with very little trouble. Refinements which can be envisaged include widening the seam overlap in areas into which, say, control surfaces will dictate cutting away later or tail and fin construction is made an integral part of the unit.

A typical boom using .8 mm ply, thirty inches long, and tapering from 2 in. to $\frac{3}{4}$ in. diameter without finishing processes applied, weighs about 2 oz. The strength is very adequate.

FLYING SCALE COLUMN

continued from page 42

Vimy. All due credit to Terry though; I think he has brought the F/F twin to the highest state of perfection I have seen to date. If the 0/400 could have been persuaded to rise off ground he could have won either of the two events he entered it in. I suppose I must take the bow for the most consistent F/F model in 1973. After a rather inauspicious start last year I managed to trim the D.H.9a to fly with the utmost consistency this season and succeeded in winning all five events in which I entered it. By far and away the best contest season I have ever enjoyed. One of the reasons for establishing a high flying score in each event was the simple bomb dropping mechanism I fitted which usually scored a full house for the 'option' manoeuvre. I will fully describe this mechanism in a future edition of the Column.

Most impressive C/L machine I saw airborne this year was the massive *Airspeed Oxford* of Derek Goddard. What a pity he didn't manage to fit a retracting undercarriage and furnish the cockpit and enter it for the Trials. It would have been a fine asset to the British World Champs Scale team next year.

I have already earlier in this column described what I consider to be the outstanding R/C model of the year so that only leaves Indoor. This I find extremely difficult to reach a decision on. Most impressive looking model was undoubtedly Vic Driscoll's colourful *Wapiti* but the flying performance leaves a lot to be desired. Perhaps all round Andrew Moorhouse's *Curtiss Jenny* should take the honours for rubber-powered machines. Of the CO₂ powered jobs there can be no doubt: Doug McHard's *Spitfire*.

CO₂ power has steadily grown in popularity in the

U.K. this last year - limited of course by the scarcity of the *Brown Junior* power unit. However to my knowledge at least six people now have at least one of these motors in this country - perhaps we may see more of them flying at next year's meetings?

Finally I must mention the exploits of David Carpenter of Southampton in trying to get an electric powered F/F scale model airborne. The power unit used is a spare electric motor, plus the Nicad cells from a *Mattel Super Star* ready to fly model. I saw Ron Moulton flying one of the first of these in the Cardington hangar last year. David built a beautiful *Fairchild Argus*, 1/12 scale giving around 36 in. span, for the motor. All-up weight, including cells, is 16 oz. - only a little heavier than one would expect a diesel powered version to weigh. Charging from a car battery, through a transistorised controller at 1 amp, for 9 min., gives a useful power run of about 1 minute 20 sec., turning a Cox 8 x 5 prop. Unfortunately the machine seems unable to perform any more than protracted glides at the moment. It is claimed that these motors give the equivalent power of an 049 engine. Having seen the *Argus* I am quite sure a Mills 75, which is not renowned as the most powerful 049, would fly it with ease so perhaps this is rather an extravagant claim. The last I heard was that the Nicads had disintegrated through trying to get more power into them but that he was still pursuing the project. I hope he eventually succeeds as there is a certain fascination about silent flight which, I might add, is also shared by the general public; although I don't think the F/F scale flyer can be regarded as the biggest noise maker amongst the aeromodelling fraternity by a long way.

John O'Donnell's

FREE FLIGHT COMMENT

★ ★ ★

It was wet at the York rally . . . here, Keith Proctor's rubber model gets a last-minute wipe-down before the launch – note how the model gets priority with the broom!



THERE ARE TIMES when I am asked how I manage to find material enough to fill my monthly column. In fact, this poses little problems – the usual difficulty being that of condensing sufficiently the backlog of contest reports without their degenerating into a mere listing of the winners. Often when other aspects of free-flight deserve consideration I have to decide what to omit.

This month is a case in point, as there are a number of interesting and possibly far-reaching proposals on the agenda for the forthcoming C.I.A.M. meeting. Since the necessary decisions will have been made long before this column appears in print, I have decided to postpone discussion until I know the outcome.

Before commencing on contest matters I would like to reply to the 'Readers' Letters' by Jim Moseley that appeared in the December issue. Some of his allegations can hardly

pass unanswered; especially as the tone of Jim's letter, not to mention its very existence, is sufficient to confirm the idea of discrimination – although not in the way he intended!

At Elvington I was singled out for query, presumably on the basis of 'information received' and promptly disqualified. The arguments raged over whether turbulators were a structural modification or merely a trimming device.

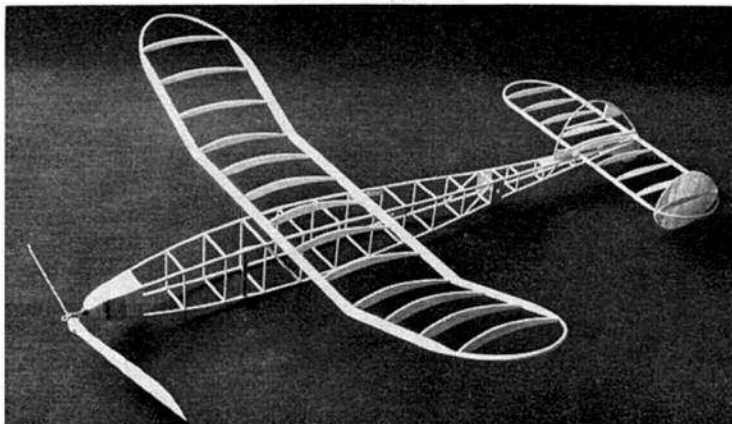
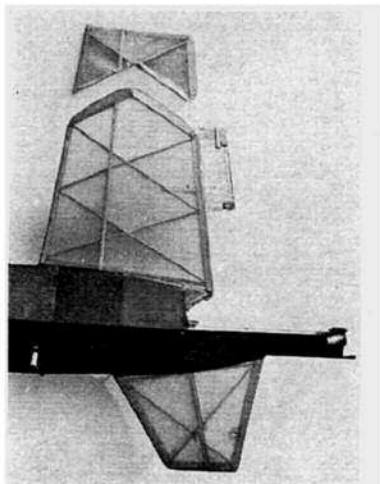
Plan designs are supposed to fly as presented. My *Scram* was built very closely to plan (far nearer the impossible 'exactness' of precise reproduction than most others I've seen) and glided at about 45 deg. After trying all 'normal' trimming techniques I fitted turbulators in a successful attempt to promote a glide. This transformed the model and gave it a level of performance way above 'Vintage' expectations. I see no difference in principle between a slab of $\frac{1}{8}$ in. packing under the wing and a piece of thread stuck on top – they are merely alternative ways of correcting deficiencies in the plan!

I've no doubt that it is the result, not the means, that has caused trouble. Nostalgic vintage notions did not run to the concept of the event becoming a real duration event – despite this being the exact application for the original design! Have I put back the clock with a little too much precision?

Jim, however, remains unconvinced, and his reply to the above comment is as follows:

'I note with interest John O'Donnell's reply to my earlier letter concerning the Vintage event at the N. Area Rally and am somewhat amused that 'its very existence' serves, in his opinion, to confirm discrimination. I have every respect for John as a contestant and his journalistic endeavours normally cover the free-flight aspect of modelling in a most worthy manner, by virtue of which his readership, including participants and organisers, expect fair and accurate reporting of events with credit or criticism allocated as deserved.'

Left, J. O'D. takes trimming to mean more than just using packing pieces – see his 'surgery' applied to the fin of his small Open Rubber job. Below, uncovered view of the controversial 'Scram' – to turbulate or not to turbulate, that is the question!





Top four places in the annual Spanish A/2 postal event went to British entries - seen here (left to right) the winner, our columnist John O'Donnell, with David Barnes, Alan Jack and Phil Owen. British entries have always fared well in this event, indeed the Whitefield club has supplied no less than three senior winners in the past.

However, if such a report contains inaccuracies or is shaded by partial coverage of the facts of a given situation in such a manner as to imply unjustified criticism, then the writer must expect correction as in this instance. Should John feel that his text be beyond reproach, then he may well feel discriminated against by any person challenging same, but it is to his credit that he has accepted clarification.

If I may quote further from his comment 'Plan designs are supposed to fly as presented'. In this one sentence John sums up the essence of Vintage flying and dismisses his case for the installation of turbulators upon his model thus rendering it beyond the terms of his own definition.

Past contest results have proved conclusively that Vintage has been a real duration event since its inception, in the course of which perfectly standard 'Scrams' have proved winners on occasions with high scores including, I believe, at least one 9:00; no doubt their builders will have their own comments to make in person following the doubt cast upon the accuracy of their machines.

Finally, I would refer back to my final paragraph in which I commented that acceptance of a model outside the terms of reference of the rules would create a precedent for others so inclined to utilise even greater licence in design interpretation.

The Scram design was resurrected by Ron Firth and presented as a plan in his *Model Aeroplane Gazette*. This was followed up with one design postal contests, the rules for which now permit '... the use of turbulators or disruptors on the wing for trimming purposes'. There are obviously other opinions than the one Jim presents.

Could I introduce a note of warning in case sentiment and emotion combine to give suggestions that vintage models 'should be built to plan' or some such rigid requirement. There is undoubtedly a fair amount of nostalgic affection for vintage, yet such interest could easily be killed by turning the event into a 'documentation exercise'. The situation in scale where a 'Peanut' entry has been seen supported by a copy of *Janes* and a file of other literature should serve as a salutary warning!

The Scram controversy has opened my eyes to the fact that I appear to interpret 'trimming' in a far wider sense than many other modellers. My methods are not limited to packing the noseblock, altering incidences, or moving the C.G. If I think it is necessary then I am prepared to revise wing wraps, add turbulators, reduce fin area, perform a variety of structural modifications, and even interchange components. The accompanying photograph of some fin 'surgery' is an illustration in more ways than one!

★ ★ ★

There have been contests every weekend throughout the past couple of months with sometimes a choice of attractions. It is convenient, however, to deal with events in sequence and start with the 5th S.M.A.E. Area Centralised Meeting held on 16th September. Like all such events weather variations throughout the country played an important part in deciding the outcome - with the North getting the better conditions. Of the three S.M.A.E. contests that for the Keil Trophy (Team Power) was by far the best supported. The need to field a full team provides some explanation for the numbers entered, whilst further interest arises from Pluggie Cup considerations. These effects increase the size of the entry - but not necessarily its standard.

Even the winning team from Northampton fell far short of a perfect score, and in fact failed to record a single treble! Consistency paid off however, and Messrs. Short, Cowley, Payne and Parry won themselves the Keil Trophy with a total of just under 32 minutes. Runners up were Leeds who enjoyed very flyable conditions at Topcliffe, but who could only get Alan Cooper into the fly-off (with his American Influenced '40' model). The power turn-out in the Northern Area was quite remarkable both for its size and for the number of mid-air structural failures witnessed. Further down the country, St. Albans edged out Anglia from third place by a mere two seconds. Conditions at Watton were reported as 'reasonable' with early mist, threats of rain, and poor visibility at fly-off time. On the South Coast at Beaulieu it was windy with both visibility and retrieving problems. Phil Ireland had a model disappear into low cloud at 50 seconds o.s. - a disaster that cost Southampton the Team Power award!

The individual scores in the Keil Trophy reflect the remarks already made. There were only eight trebles out of 84 recorded scores, with the best fly-off (4:48) being made by Pete Harris of Evesham. In many ways this was a wasted effort since there are no rewards whatsoever for the individual positions, and Pete has no club support for Team events. He did, however, take the N.W. Area's token prize for its domestic event. Runner up in the national event was Mike Green, now flying for Grantham instead of as a Country Member, with just over 43 minutes. Next were Roger Melville and George Fuller both of St. Albans.

A/1 Glider called for 5 flights to a 2:00 max and the now accepted weight requirement of 7.76 oz. (220gm). The event was remarkably well supported with 43 fliers. Nevertheless there were only two 'full houses', from Cliff James and John Cooper, and only one near miss - subsequent scores being comparatively low. The winning model was a simple square-tipped and stoutly constructed design, with a box fuselage to offset considerable influence from Tony Cordes' *Little Hinney*.

The Gutteridge Trophy Wakefield event proved to be something of a misnomer, as the trophy was withdrawn by the S.M.A.E. prior to the event through being too badly damaged to present - and more than difficult to get repaired. I found out these details some eight weeks after winning the event! Entries and determination were lacking in this event - perhaps through reaction after the previous weekend's International at Strubby. I flew with the Northern Area at Topcliffe and, at the time, was far from pleased with my efforts as I 'dropped' a couple of flights through launching into very poor air - rising bubbles notwithstanding! After this I ignored such aids and did rather better. The model used was the delayed-prop-release design that I have used occasionally over the past year. The next three positions were all taken by Topcliffe fliers, John Turner, Bob Hymers and Ron Pollard, presumably a good indication of the conditions there compared with elsewhere.

★ ★ ★

The last weekend in September had events on both Saturday and Sunday, and provided me with a couple of days that I would prefer to forget rather than have to describe! I attended the Northern Gala on Saturday, 29th September, and the Liverpool Gala the next day. The latter coincided with the South Bristol M.A.C. Gala held at Wroughton and featured as a photo report in last month's *Aeromodeller*.

Paul Fynn launches his conventional forward-fin magnet steered model at the Kolibri Pokal event — note the very small slope employed for the contest.

The Northern Gala at Rufforth was a disappointment in many ways. Featured as a major event in the S.M.A.E. Calendar, and apparently intended to attract the general public (if the existence of a printed programme is any indication), it was poorly supported both by modellers and laymen. There is no doubt that advance publicity was poor. Even the pre-entry requirement so beloved by the Society was waived by default — since no forms were distributed! Furthermore the experiment of holding this meeting on a Saturday has hardly proved a success. Work, shopping, and other domestic chores seem to provide a 'counter attraction' to many of those normally in the contest circuit. The final blow came in the form of strong winds — heralded by a pessimistic weather forecast!

When the events opened at 10 o'clock there were only a handful of people present at free-flight control. Those who flew early soon showed that maxs were far from difficult. With drift almost straight down the main runway, bicycle retrieving was easy. Russell Peers wasted little time and recorded a treble in Open Rubber before commencing on Power. The wind swung at times taking some flights over a downwind farm and a small but dense wood beyond. Concern about possible complaints caused control to be moved — but the 'hump' characteristic of so many airfields prevented enough of a move to avoid these hazards.

As the day progressed it became apparent that rubber was the only event that was going to need a fly-off. Russell Peers did 2:35 on his third power flight after a couple of maxs, but this was still sufficient to beat Brian Martin who had started with 2:27. Both were using Eta 29's, Russell in his familiar and several-year-old *Woodpecker* and Brian in a glass-fibre rod model. Pete Harris took third, again with two maxs and one otherwise. I was the only other flier in a position to overtake the leaders — until the conrod in my OS35 failed whilst about to launch for a second flight. Having found that the motor would still turn over with a fork-end to the con rod, I reckoned there was a chance the motor would still run. After all the firing loads would hold the bits together. This worked for one more flight of almost a max — but finished off the 'big end' in the process. In the past I have carried a spare engine — but it was at home on this occasion. When I tried to fit it subsequently I discovered that O.S. motors of different vintages are not interchangeable as regards bolt and bearer spacing!

Glider saw a mixture of good and bad flights. Martyn Cowley travelled up with John Cooper and they took the top two positions in convincing fashion, placing in the order given just three seconds apart. John ruined one model in the process when it put the nose down at the end of a weave on the line, and he towed it in (on the peritack) to 'save' the flight. Brian Baines had a similar occurrence on his first attempt at his third flight — needing little more than a minute to take third place and knowing he could not place higher. The retake was deliberately D/T'd early.

There were just four fliers in Rubber. It might have been one more if Martyn Cowley had not kinked a longeron winding and had the fuselage collapse in consequence. Jeff Anderson eventually matched Russell Peers' early treble, but returned with a fin-less model after some young boys had found it first. He produced a *Cats Whisker* vintage model for the fly-off, broke a motor winding, and then damaged



the rear fuselage trying to extract the winding tube! This left Russell to make a nominal fly-off to take the event and the once-coveted Caton Trophy. His flyover was D/T'd either too late or too early — depending on whether he should have aimed to land in front of the woods, downwind, or to clear them! The other two entrants comprised Ron Pollard and myself, both suffering from downdraughts on our first flights. I suppose I could claim to have placed third — but I feel it was really 'last but one'.

The Junior kit event was fought out between 10-year-old Mark Gibson and 13-year-old Nigel Tompkins who placed in that order! Both flew *Swans* and did well merely to complete five flights apiece. The York Club, at least, were quick to recruit the runner-up!

Notable for a S.M.A.E. event was the presentation of cash prizes to the winners — financed by charging an admission fee to the airfield.

★ ★ ★

The following morning saw the Liverpool Gala, held at R.A.F. Chetwynd, open in very windy conditions. As the five-flight A/2 event was held in rounds there was little opportunity for prospective entrants to hesitate. From what happened I should have chosen some other event — as I broke one model through towing it in, and promptly lost the other in a real monster thermal. Although watched down through binoculars, it could not be found — despite an excellent 'line' and much time spent searching. Five weeks later it was discovered by a farmworker, almost invisible in a clump of long grass in an empty-looking field!

The A/2 event was soon dominated by Terry Dilks, thanks to his first flight max being picked up by a farmer who then drove up to the 'drome' to report the model's whereabouts. After this Terry couldn't go wrong and eventually totalled some 14½ minutes with what the M.A.G. described as his J. O'D.-inspired winner. Perhaps I should say that the wind abated considerably from early afternoon. Runner-up was J. Watkins of Wolves who flew well following a slow start, and crept up almost unnoticed. Brian Picken was third, just ahead of Tony Evans.

Power was topped by Russell Peers with a treble using the same model flown at Rufforth. Pete Harris missed his second max by a few seconds — so was able to make a short D/T'd third flight to take second place without risk and still be well ahead of third man Brian Worthington. The combined Mini event was flown to '5 x 2' rules without a 'K' factor. Winner by just a single second was Julian Hopper flying ¼A power — and ousting Tony Slater's A/1. Third place went to Roy Roberts. Chuck Gilder saw the usual 'names' surpassed by Dave Barnes and Phil Ball.

Open Rubber had a four-way fly-off held in rapidly falling light. Mike Duce won with what was definitely the longest flight — but which was still clocked off o.o.s. a minute before it landed in some trees. Hamish Gunn was second with an unusual design featuring an elongated pylon (about three wing chords in length) and much dayglo — both features being intended to improve visibility. He got a few seconds longer than Russell Peers who was third. I made up the quartet — but was down to using my much-maligned *Scram* as my 'little' open model had ended in the worst of Chetwynd's woods on its third max. Not wanting to lose a third model that day I had a relatively modest D/T — about a minute more than the visibility I estimated was possible with such a small model. The timekeepers excelled themselves and saw the *Scram* descend on D/T a few seconds short of the prize list!

Mention must be made of the prizes as being pre-engraved trophies: they caused a substantial loss to be made at the

Ray Sutton certainly caused a stir at the Kolibri Pokal magnet-glider when he proceeded to fly his modified Kell-Kraft Chief — had excellent penetration and managed a five minute max, eventually placing 19th.





How many would recognise this as magnet-steered? Ray Sutton's modified Chief with rear fin steering gets the 'heave-ho'. Quite a contrast to the normal 'stick-and-throw' appearance!

meeting. Fortunately, the host club, Liverpool, seem able to withstand this.

As the next event was the sixth S.M.A.E. Area Centralised meeting, and I am still awaiting official results, this is a convenient point to leave discussion of domestic events – and pass on information from further afield.

Many British modellers have attended Continental contests, particularly in recent years. Naturally enough most events have been for the usual collection of F.A.I. rubber, glider and power. Rather less stereotyped was the Kolibri Pokal for magnet steered gliders that Brian Faulkner, Paul Fynn and Ray Sutton attended. Brian sent me a very long report (that I have had to precis severely) and a handful of photos taken by Hans Gremmer – well-known exponent of this class.

Whilst magnet models only arouse a minority interest in Britain, the class is well supported in parts of Europe. This year's 'Kolibri Pokal' had 42 fliers and even this was well down compared with the previous event in 1971. The actual site came as quite a surprise being a small hill no more than 150 feet high. In the light winds that prevailed for much of the two-day contest, slope lift was very limited and called for a light, slow-flying model. Some of the local exponents had a fleet of varied models to cope with different conditions. The site, in fact, would have been very poor if the wind had blown the 'other' way, with little height and woods dangerously close.

Flown to the F.A.I. system of five rounds with a five minute max, scores were naturally pretty high. Winner was Erich Morgenseir with 1,412 seconds out of a possible 1,500. The British contingent put up a respectable showing against such opposition. Ray Sutton made the best total of 1,036 seconds to place 19th – but certainly provoked much interest when he flew a KeilKraft Chief modified to incorporate rear-fin steering. Although far removed from the usual 'stick and vane' approach, Ray's model had excellent penetration and managed at least one five-minute max.

There was another side to this meeting as it also included a conventional A/2 contest – held at Wiener Neustadt in calm, hot weather. The less said about our showing the better, so I'm told like most Continental contests, the Kolibri had a flourishing social side of which the formal prize giving was only a part. All in all it was a very pleasant venture for the three G.B. participants – and well worth every bit of the 3,000-mile trip.

Other international news has appeared in the shape of the results from two postal events – both held in April 1973. In this sounds a long time ago, then one must remember the inevitable delays associated with the submission of scores, the collating of results and finally, their dissemination.

The Sky-Scrapers Postal Contest was for hand-launch (chuck) gliders, flown as three-man teams with each member's score being his best six flights out of ten. A one-minute max was used – and the winning team did, in fact, record a perfect 18-minute total. This came from the Junior Birdman of California: flying at San Ramon, otherwise known as 'Thermal City'. Paul Andrade and Marty Thompson flew in the morning with light winds and ideal thermal conditions – amply proved by Paul's best flight of 15:52 being recovered without D/T! Third man Dick Miller flew in what

they call wind! The New York Sky-Scrapers themselves fielded the second placed team, closely followed by the Dunham-Dunham-Ransom combination from Oklahoma. In fourth place was the Wigan, England club team of Barry Kershaw, Roy Roberts and Dave Yates – a very commendable performance. Individual results were also tabulated on two separate systems: aggregate (with ties being decided by taking the fliers next highest flight) and best single flight. Mark Badley took aggregate with eight maxs and Paul Andrade the 'long flight event'.

The other 'postal' was the Seventh Spanish A/2 Postal Event, divided into both 'juvenile' and 'mayores' – with 21 years being the criteria. There were Individual and Team classifications, plus an A/1 event for the 'youngsters'.

As mentioned in the September issue, there were some very high times recorded in this postal by N.V. Area fliers at Chetwynd on 29th April. Our hopes were fully justified as we gained the top four individual positions in the postal. I took first with five three's, plus four plus five plus six plus five minutes exactly (trying for the seven-minute max). This put me just ahead of Dave Barnes who did 4:40 on his ninth flight! Next two were Alan Jack and Phil Owen. The Liverpool Club were given the senior team award for a composite team including both Junior and senior members and inadvertently including Alan Jack. Perhaps the organisers regard teams as being those people whose scores are sent in together. This particular postal is notable for providing all entrants with souvenir pennants, and with distinctive awards for the individual honours. Surprisingly Britain has done very well over the years – with three senior wins to my club alone!

RESULTS

5th S.M.A.E. AREA CENTRALISED MEETING, 16th September 1973
 Keil Trophy – Team Power (29 teams): 1. Northampton 31:55; 2. Leeds 31:11; 3. St. Albans 31:04; 4. Anglia 31:02. Keil Trophy – Individual Scores (85 entries, 84 scores): 1. P. Harris (Evesham) M+4:48; 2. M. Green (Grantham) M+4:31; 3. R. Melville (St. Albans) M+4:08; 4. G. Fuller (St. Albans) M+4:39; 5. A. J. Gilder (47 entries, 43 scores): 1. C. James (Hayes) M+1:29; 2. J. Cooper (Southampton) M+1:06; 3. A. Cordes (Leeds) 9:50; 4. G. Madelin (Crookham) 8:38; Wakefield (ex-Gutteridge Trophy): 1. J. O'Donnell (Whitefield) 18:26; 2. J. Turner (Darlington) 17:58; 3. R. Hymers (Darlington) 17:48; 4. R. Pollard (Tyne-mouth); 5. D. Graves (Birmingham) 17:45. Pluggie Cup (after five events): 1. Norwich 1198 points; 2. Southampton 1063 points; 3. St. Albans 993 points; 4. Leeds 987 points.

Note: These are not an exact copy of S.M.A.E. version – corrections to names and number of Keil Teams have been made.

NORTHERN GALA, R.A.F. Chetwynd, Saturday, 29th September 1973
 Hamley Trophy – Open Power (10 entries, 9 scores): 1. R. Peers (Falcons) 8:35; 2. B. Martin (Tyne-mouth) 8:27; 3. P. Harris (Evesham) 7:53. C.M.A. Cup – Open Glider (7 entries, 6 scores): 1. M. Cowley (Northampton) 7:55; 2. J. Cooper (Southampton) 7:52; 3. B. Baines (R.A.F.M.A.A.) 5:59. Caton Trophy – Open Rubber (6 entries, 4 scores): 1. R. Peers (Falcons) M+1:35; 2. J. Anderson (Tyne-mouth) M+0; 3. J. O'Donnell (Whitefield) 5:38. Junior Kit – Glider (2 entries): 1. M. Gibson (Jarrow) 1:59; 2. N. Tomkins (York) 1:09.

LIVERPOOL GALA, R.A.F. Chetwynd, 30th September 1973
 A/2 Glider (5 flights): 1. T. Dilks (Falcons) 14:26; 2. J. Watkins (Wolves) 11:20; 3. B. Picken (West Lancs) 10:53. Open Rubber: 1. M. Duce (Liverpool) 2:45; 2. J. Gunn (Bristol & Glos) M+4:07; 3. R. Peers (Falcons) M+4:00. Open Power: 1. R. Peers (Falcons) 9:00; 2. P. Harris (Evesham) 7:30; 3. B. Worthington (Whitefield) 6:08. Combined Mini (5 flights): 1. J. Hopper (Stanstead) 7:35; 2. A. Slater (Leatherhead) 9:34; 3. R. Roberts (Wigan) 9:10. Chuck (5 from 9): 1. D. Barnes (Liverpool) 5:24; 2. P. Ball (C/M) 5L:0; 3. A. Slater (Leatherhead) 5:01.

10th INT. KOLIBRI POKAL Wiener Neustadt/Herzogenburg, Austria, 23rd-26th August, 1973
 Class F1E (42 flew): 1. Erich Morgenseir (W. Germany) 1412 seconds; 2. Albert Ruedlinger (West Germany) 1386 seconds; 3. Bernhard Schussler 1349 seconds; 19. Ray Sutton (Great Britain) 1036 seconds; 22. Brian Faulkner (Great Britain) 985 seconds; 26. Paul Fynn (Great Britain) 942 seconds.

U.S. SKY SCRAPERS POSTAL CONTEST FOR H.L. Gliders, April 1973

Team (23 scores): 1. Junior Birdmen, California (Thompson, Andrade, Miller) 1080; 2. Sky Scrapers, New York (Minassian, Allen, Kaufmann) 999 seconds; 3. Dunham-Ransom, Oklahoma (Dunham, Dunham, Ransom) 992; 4. Wigan M.A.C., England (Roberts, Yates, Kershaw) 968; 12. Northampton M.A.C., England (Cowley, Cooper, Evtat) 704 seconds; 13. Sittingbourne & D.M.A.C., England (Grey, Weeks, Ripley) 687; 20. Sittingbourne & D.M.A.C., England (Andrews, Monk, Harris) 460; 23. Swindon M.A.C., England (Bailey, Woodruffe) 224. Long Flight Event (25 over 60 seconds): 1. Paul Andrade, Junior Birdmen, California 952 seconds; 2. Joe Gschwend (Individual) New York 850 seconds; 3. Dave Monaster, San Lorenzo/Hayward, California 450 seconds; 5. Trevor Grey, Sittingbourne, England 351 seconds. Individual Agg. (66 scores): 1. Mark Badley San Lorenzo/Hayward, California 360+60+60; 2. Dick Miller, Junior Birdmen, California +43; 3. Marty Thompson, Junior Birdmen, California +42; 12. Roy Roberts, Wigan M.A.C., England 334.

21st ANNUAL SPANISH A/2 POSTAL EVENT, April 1973
 Team Juvenile A/2: 1. Letecko Modelarsky Club, Prostějov, Czechoslovakia 2,205 seconds. Team Mayores A/2: 1. Liverpool D.M.A.S., England 2,700 seconds. Individual Juvenile A/2: 1. Frantisek Nrubý, Letecko M.C., Prostějov, Czechoslovakia 840 seconds. Individual Mayores A/2: 1. Claudio Torres, Club de planeadores de concepción, Chile 900+58 seconds. Individual Mayores A/2: 1. John O'Donnell, Whitefield M.A.C., England 900+240+300+360+300; 2. David Barnes, Liverpool D.M.A.S., England +281; 3. Alan Jack, Liverpool, D.M.A.S., England 900+240+300+357; 4. Phil Owen, Liverpool D.M.A.S., England 900+240+169; 6. Barry Kershaw, Wigan M.A.C., England 894.



BETWEEN THE LINES

with Dave Clarkson

Demonstrations

Not the political type (I am writing this whilst just such a one is going on here - here being Czechoslovakia, as it happens - to celebrate the 30th anniversary of the Bolshevik revolution, but the club Model Aircraft type.

Most clubs do demonstrations at shows, etc., with the purpose of boosting club funds and/or doing a bit of public relations work. For many of the 'local' type shows, the space provided only allows the use of control line models. Frequently our 'demonstrations' are not quite what we would wish them to be, so it is with thanks to Stan Robinson of the Cosmo club in South London that we reproduce below some of the very interesting instructions written by Stan as the 1972 Demonstration Team Leader for the benefit of Cosmo's demonstration team:

Display Controller

He is responsible for organising the preparation of models and equipment immediately before and during the display and issuing any instructions to team members that shall be necessary. He is also responsible for timing, general co-operation between members and liaison with the show organisers.

Commentator

He is responsible for seeing that the crowd barrier is in order before the show starts, checking the microphone position and operation and then to give commentaries as required. Most important, he is to give warning, by means of the PA system, if any child or adult gets past the crowd barrier.

Team Members

It is important that members flying in the display prepare and test their models thoroughly and are able to start their engines from cold in approximately five seconds on command from the controller.

Members should carry out, to the best of their ability, any instructions given by the controller and no one else. The time for arguments is after the display is over. Motors cannot be warmed up before the display has started, but can be warmed up during the display at the controller's indication.

These are all sensible and necessary organisational instructions. It is notable that the Cosmo club are not ambitious with their programme, which consists of:

1. Solo Aerobatics - 1 model
2. Balloon Bursting - 3 models
3. Battle of Britain type combat - 2 models.

Their display is timed to last for 23 minutes. Remember, that a short, slick display gives a much better impression than a long, drawn-out one.

It is my feeling that most displays which fail to come up to expectations, do so because of an over-ambitious programme and too little organisation and preparation. Returning to the Cosmo programme, it becomes apparent how much organisational effort is required to put on a slick, continuous action display with the very simple and short display they perform:

Pre-display preparations

Approximately 20 minutes before the display is due to start the following jobs will be commenced.

1. Peg out balloon retaining net, blow up balloons and tie to their pegs. Place balloons and pegs under retaining net.
2. Lines and handles to be hooked up to models and laid out in order of appearance. Meanwhile controller is to locate and mark the centre of the circle.
3. Using one of the balloon-bursting models, four members of the team to mark out and peg balloon sticks, fix balloons to sticks and lay sticks flat on the ground.
4. Place stunt model in the circle and fill the tank.
5. Attach streamers to combat models and fill squeeze bottles.
6. Controller check that everything is ready and also check all lines, connections and models for safety.

It is noteworthy that the Cosmo team only consists of eight members plus the controller and the commentator. This is very sensible indeed; as numbers rise, the display leader increasingly becomes unable to control everything that is going on.

Thanks for your info., Stan, hope that your displays went as well as they should have done, and shall be glad to publish any simple ideas for improving displays that really appeal.

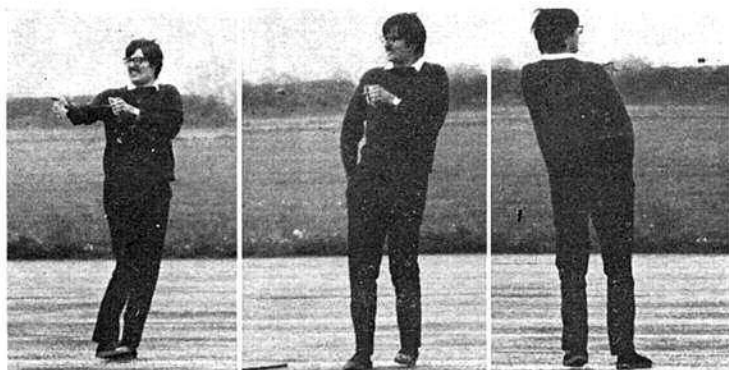
View Point - 'British Model Shop Balsa'

Most of us from time to time have a big grouse about 'British Model Shop Balsa', even I have been heard to call the balsa on display 'good for building houses, but not models'. But is it really that bad?

In the course of my travels, I have walked into model shops in Poland, Czechoslovakia, Finland, Japan and the U.S.A. In none of the model shops visited was the balsa any better than that I buy in my local model shop, and



Now confirmed as the British representatives in the F.A.I. team-race event at the 1974 World Championships are (left to right) Malcolm Ross, Derek Heaton, Richard King, Dave Rudd and the Brothers Tribe. Incidentally, the Editor owes his apologies to Alan Woodrow for criticising his flying style in the Team Trials report. Alan's performance in the speed pylon was impeccable - the 'unorthodox' pilot was, in fact, Pete Halman, who placed second. Also, third placed speed teamster David Smith wishes to point out that his club is Southend, not Lee-on-Solent. Sorry Folks!



Monoline? Nothing to it! John Dixon flies his 2.5 c.c. open class speed ship with seemingly nonchalant ease – even a casual 'right-hand in pocket' stance! Note the control 'button' in the two right-hand pictures – it has 'run down' the control unit to the end. Hope the next control needed is 'up', John!

in some all they had was spruce. Pity the poor Eastern European aeromodeller filling out his annual balsa requisition (and the Chinese one who has never seen the stuff) and reflect on how lucky we are.

It is a fact that those aeromodellers who demand the best balsa can get it in one way or another. I once asked Per Hasling how he selected his F.A.I. T/R wing wood, and he told me that he tripped around all of the model shops in Copenhagen for a couple of weeks with his scales and experienced eye and selected two sheets that were suitable out of the 100 or so examined. If the stock in my model shop is anything to go by, then we are better off in Manchester than they are in Copenhagen!

Some people, of course, give up on the quest for that perfect piece of $\frac{1}{8}$ in. sheet (straight grain, 51 lb. density and firm) and mail order it from SIG in the U.S.A. I just wonder how popular the SIG type service would be in the U.K., i.e. mail order of high quality, well selected balsa at, say, a premium of 50 per cent? Personally, I would hate it, because the occasional gem would disappear from the model shop stock and I would lose the great enjoyment I get out of looking through the stock frequently, and passing comments like *hearts of oak*, *floor boards*, etc. . . .

Motor Tuning

Copeman-Oliver, Rumpel-Super Tigre, Daly-MVVS, Haworth-ETA. What is it that distinguishes the 'tuned' motor from the standard? Why is it that some standard motors happily out-perform 'tuned' ones? What is this 'tuning' business all about?

The model aircraft engine is an engineering product. It is an assembly of many different parts all made to nominal size with \pm tolerances. By accident one can buy a standard commercial motor in which all of the parts mate *perfectly*, and this is the rare one-in-a-hundred 'good 'un'. Equally and again by accident, a real bad 'un' can be bought in which not one of the parts mate well! However, it is a fact that nearly all standard motors sold consist of a mixture of good and bad fitting parts. The real tuner (as opposed to the cosmetician) tries to identify the bad fitting parts and by a combination of re-working standard parts and by making new ones, the tuner attempts to make all of the parts fit well. By tuning, even the best tuner cannot make any motor better than that rare, standard good 'un', but he should make the *average* one good. It follows that if a manufacturer makes his standard product to exceptionally high standards, with really tight machining tolerances, then the tuner has little scope for improving mating fits – who has heard of a Bug! 15 tuner?

By experience, a tuner comes to know which parts of a particular model of motor usually fit badly and which fit well. It takes a long time to gain this experience, which is why most tuners specialise on one or two types of motor. However, there are general principles that apply to all motors to a greater or lesser extent, and we shall now look at these. The general principles are:

- (a) Correct shaft fits
- (b) Try to get the piston/liner fit correct at running temperature.

In addition, there are some less general ones like getting the head shape (less important) and volume (very important) right on a glow motor.

Firstly, I shall deal with shaft fits, and here I refer to twin ball-race shafts. There is almost nothing one can do

to a plain bearing shaft except the fitting of ball races, and that is a major engineering job – outside the scope of nearly everyone. Manufacturers vary in shaft fits. K&B generally fit shafts very well indeed (thank heavens – not a job for mere mortals); MVVS shaft fits are usually horrible and Super Tigre vary from good to really tight. The intention of the tuner is to get the shaft to spin smoothly with no tight spots and no 'waggle'. To achieve this he works away metal to remove tightness, replaces and/or sets ball races to remove waggle. This type of work is simple enough and requires no special facilities (it can be done by hand and using an electric drill), but it requires experience. I am not going to give details here for many obvious reasons, the most important being that I do not want people saying that I tempted them into ruining their motor by ham-fisted efforts at 'tuning'. All motor work requires care, knowledge and experience and not many of us have the required combination.

If shaft fits are easy, then the piston/liner fit is difficult. The factors that contribute to the correct fit at running temperature are complex and varied. The major problem is thermal distortion – it is easy enough to hone a liner true and circular and to lap a piston to fit it nicely; however, at running temperature the liner that is perfectly shaped when cold can (and usually does) bend into all sorts of peculiar shapes. The only person I know who has accurately gauged used liners is Dick Giles – and he has found that the liner bends backwards above the ports – this top 'bend' is in the order of magnitude of tenths of a thousandth of an inch. Insignificant you may say. It is not; the amount of bend is about equal to the difference in piston/liner fit between a new and a 'clapped' motor. The reason for this 'bend' at the top of the liner is simple to understand. As a motor warms up, a temperature differential builds up between the front and back of the cylinder because cooling



Half an 'Ironmonger' is better than none! Vernon Hunt walks away with the remains after a spectacular mid-air collision in the quarter-finals of the Stockport combat rally. Having exhausted his stock of these machines, he had to resort to his trusty 'Warlord' for the remaining bouts.

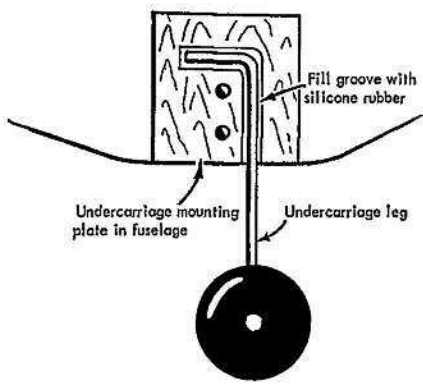


Figure 1 - Using silicone rubber to shock-mount team racer undercarriage leg.

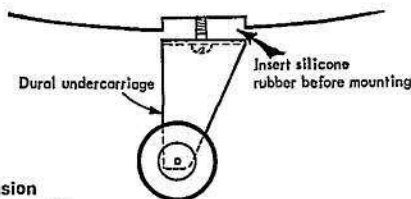


Figure 2 - Silicone rubber suspension for a stunter.

air is presented to the front of the motor only (especially true for a cowled motor), so the back of the motor gets hotter i.e. expands more than the front and the 'bend' disappears. All of this may seem of no consequence, after all everything is O.K. when the engine is hot. But is everything O.K. if a liner can bend as it warms up? It will certainly lose circularity. What can the tuner do about this situation? Certainly some are more able to re-work the piston and liner to give near ideal fits at running temperature. Most of the cure lies in metallurgy (there can be little doubt that the supremacy of the Bugl and Rossi 15 result from correct piston/liner materials selection), and the rest of it lies in piston shape. Where the manufacturer's materials are particularly unsuitable, the only solution is to change them. Take the K&B 15 as an example; if one hardens the liner and uses a soft cast-iron piston then piston/liner fit life is vastly improved and the maximum allowable running temperature rises. John Daly does this to his K&Bs as a part of his diesel conversion and so does Emil Rumpel as part of his Super Tigre conversion, and these motors go considerably better after conversion than before. Some great brain one day may be able to correlate the problem and the cure; I certainly would be pleased to enter into correspondence on the subject.

As pointed out above, piston shape seems to matter. At the Helsinki 1972 World Champs the 1-2-3 in both speed and team races had 'barrelled' pistons, i.e. relieved piston skirts and crowns essentially as described by George Aldrich in his excellent article in the 1968-9 Aeromodeller Annual. Think about it, a barrel goes up a bent tube easier than a true cylinder. I have seen quite savage barrelling on really good motors (i.e. discernible barrelling to the eye) particularly on many Rossi 15s.

With a properly fitted shaft, correct liner/piston metallurgy and a barrelled piston, a motor can be improved out of all recognition when compared with the standard. A real tuner can do this work; without John Daly doing such work on our motors we would have remained the also-rans that we were when we started. Look at the contest results: it is a rare occasion when a standard 'un-tuned' motor wins. The message is clear, if you want to win contests cultivate your motor tuner!

Make-it-Easy: Silicone Rubber

One of the more useful products of modern technology is silicone rubber. The type I am referring to is sold in tubes as bath sealant, available from most ironmongers, Do-it-Yourself suppliers, etc. It comes out of the tube as a thick pasty material that skins over quickly and sets to a nice rubbery consistency in about 24 hours. Being both fuel proof and heat resistant, it is an excellent insulator for heat, vibration and shock, and also an excellent adhesive for most things (e.g. metal to unpainted wood). Described below are two applications of particular interest to the racing and stunting fraternity. Many other uses exist for this very useful material, not the least being as a seal between wings and fuselages on 'detachable' models.

(a) Insulating Fuel Tanks against heat and vibration

When fuel tanks vibrate, the fuel froths and one gets very poor motor runs, particularly as the tank empties. Equally, if your tank is so placed that it can get hot (i.e. bolted to an engine pan), the fuel inside gets hot also, which means that its density goes down and the mixture supplied to the motor gets leaner. Many team-race men know both symptoms very well, and I wonder how many stunt men suffer without knowing the reason? The answer is to cover the whole tank with a layer of silicone rubber immediately before it sets (or whatever other mounting method is used).

(b) Insulating models against landing shock

If you use bent sheet dural undercarriage for stunters,

Eventual winner of the Stockport combat rally was Bob Morgan who received the Mainstream Trophy, thanks to his own variation of the 'Ironmonger'.

or the wire-held-in-a-groove-in-the-model type U/C mount for team racers, then put some silicone in before final assembly and hey presto! Nice rubber suspension. Diagrams 1 and 2 show how.

To overtake is illegal?

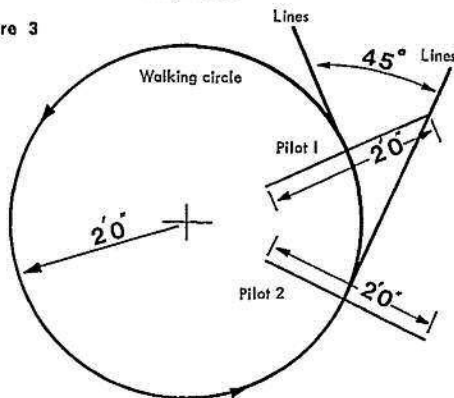
I refer, of course, to F.A.I. Team Race and this statement is based upon current piloting rules. The relevant rules are:

- The pilot must not walk backwards (i.e. he must walk forwards - not to walk at all is to obstruct).
- The pilot must keep his flying hand on the centre of his chest, except for landing and taking-off and overtaking.
- The pilot is allowed to take his hand off his chest for $\frac{1}{4}$ lap during overtaking.
- The pilot must not physically assist the model, i.e. must not whip, lead, lean on, etc.

A fair test for d) is to look where the lines are relative to the pilot's chest, i.e. centre to left - O.K., to right - whipping, and this is an almost universally applied standard (e.g. Helsinki World Championships).

To complete the basic data, I assume that all pilots are of equal size, walk on a two foot radius circle when flying and are two foot wide. Figure 3 illustrates flying to these rules with the pilot dimensions as stated. You will notice that Pilot 2's lines interfere with Pilot 1 when the angle between the lines is 45° i.e. $\frac{1}{4}$ th of a lap. If Pilot 2 is to overtake Pilot 1, and is only allowed $\frac{1}{4}$ of a lap in which to do so, (i.e. he can take his hand off his chest for a quarter of a lap - he cannot get past if he does not), then he must advance $\frac{1}{4}$ th of a lap on Pilot 1 in $\frac{1}{4}$ of a lap, i.e. he must be going *twice as fast* as Pilot 1. As we all know, such large speed differentials are almost unknown in FAI normal course of things, we must assume that overtaking T/R. Therefore, for a normal overtake Pilot 2 *must break the rules*. Since rules are not written to be broken in the in FAI Team Race is illegal...

Figure 3





Illustrated by Sherry

TEACHING AEROMODELLING

**Peter Miller describes
his experiences of
running a series of
Adult Education
Lectures**

LAST WINTER I had the pleasure of running an adult aeromodelling class for the Sudbury Adult Education Centre. The response was remarkably good for an agricultural area, where mechanical hobbies are very low on the list, and with over 50 per cent of the class members who had never before built a model now confirmed aeromodellers, I feel that it has been a success. An added bonus has been the changed attitudes of the general public, simply because the hobby is listed as an adult class.

For the benefit of those who would like to try the same thing, may I say that it is most rewarding, both in satisfaction and financially, and that apart from experience in free-flight, control-line and single-channel radio control, no qualifications are needed; so here is how to go about it.

The first step is to contact the Further Education Tutor for your local Adult Education scheme; he will probably ask you to come and see him. When you go, take some copies of *Aeromodeller*, *Scale Models* and *Radio Control Models and Electronics*, so that he can see that the hobby is sufficiently involved to justify classes. At this meeting, days and times of classes can be discussed. I found one two-hour session a week enough.

Once the classes have been agreed upon, you can think about publicity, which you should start about a month before the enrolment day. Publicity is vital with the lesser-known hobbies, unlike say, Women's 'Keep-fit' classes which are always over subscribed.

The Tutor can have leaflets duplicated for you, which may be distributed by model and toy shops, the Public Library and, best of all, at displays given by your club at Fetes. The local newspaper will normally run an article with photographs which should stress that previous experience is not needed, and that all branches of the hobby will be covered. I was able to persuade Anglia Television to film the Sudbury Model Flying Clubs' models in action, and then give me a four minute interview on the Magazine programme *About Anglia*, as this was the first time that such classes had been run to my knowledge.

Some Adult Education Authorities want you to take a part-time teachers course, but this is usually only a couple of Saturdays, and is quite useful. You will also be asked to attend at least one enrolment evening, to answer questions from prospective class members. This completes the formalities and now

you are ready for your class.

The first lesson must be spent describing, briefly, all the branches of the hobby, helping the class to decide what types they want to build, and listing tools, materials and so on. You will be talking for two hours non-stop, so prepare notes; just one word will remind you of each item.

At this stage, you will find out what branch each member is interested in trying first, and you can recommend kits and engines to suit. It will also give you an idea on how to plan further lectures. For example, in the unlikely event that all that the class want to build are rubber-powered models and gliders, you can skip a lecture on engines!



Publicity is vital!

It is not really advisable to let the class members build in the class, due to the risk of damaging structures on the way home if the glue is not fully dry. What with listening, and talking, not much gets built anyway, but they should be encouraged to bring their models in for comment and advice.

After the first lecture which, due to the amount to be covered, has to be all talking, you can give say, two half-hour talks on different subjects and answer questions for the rest of the time; you will have plenty!

Subjects such as covering, making cockpit canopies etc., should be actually demonstrated to the class but

leave the doping to the end, as some people cannot stand the smell! Always try to bring in models and equipment to illustrate the lecture, especially half-built models to show construction techniques. I set up a single channel outfit on a board with a scrap tail assembly, to show the whole thing working. Do not use the members' models to point out bad mistakes unless you are very tactful. . .

Try to feel what the class wants, and give it to them. If you insist on giving the lectures the way you want, and they do not like it, they will just stop coming. In other words, they can vote with their feet.

Not all the members of the class will necessarily be interested in taking up aeromodelling. Occasionally, a person joins simply because he is lonely and wants to make new friends, and your class appears to be more interesting or different. Do not ignore these people, try to bring them into the discussions, and make them feel wanted. They may never become aeromodellers, but you will have helped them in a far better way.

Another type you may come across, is the person who knows a little bit about the subject, and has to point out any mistakes or just tries to start arguments i.e. the traditional loud mouth. The treatment here is to jump on him hard and fast, or if you feel that it will work, suggest that he gives the next lecture as he knows so much about it. I am glad to say that I had neither of these types in my class!

It is a good idea to persuade a fellow club member to join the class, he can then tell you what the lecture was like from the front, which is a good guide to future talks, and if you are unable to get to a particular class, he can take over for the night.

My class consisted of eight people who had either never seen a model, or had done the odd rubber job, and one club member who had only been modelling for a few months. As the regulations stated that the class had to have at least ten members by the third week, two more club members stepped into the breach. They told me that they had learned some useful snippets, and had enjoyed the classes.

Of the eight who had virtually no experience, one is flying multi-channel radio, having converted from boats, even though I did not cover multi radio control, one is flying single channel radio control successfully, and three are now members of our club which is exclusively control line. Of these three, one has made about 100 flights with his first model and can fly

loops, bunts, eights and inverted. One has designed his own combat wing which, apart from slight tail heaviness, is OK, and the third is progressing steadily with his first model, still in one piece. The remaining three members have just faded from sight.

I have since been asked to give a further course, but due to pressure of work, I am unable to do so this year.

To summarise the most important points on giving lectures are:

- (a) Always prepare notes, so that you do not forget any vital points, and can give your talk in sequence.
- (b) Always try to illustrate your talk with models and equipment.
- (c) After the first week, never talk for the full period of the class. Reserve a period for dealing with people's problems and general discussions.
- (d) Use anecdotes to illustrate points.

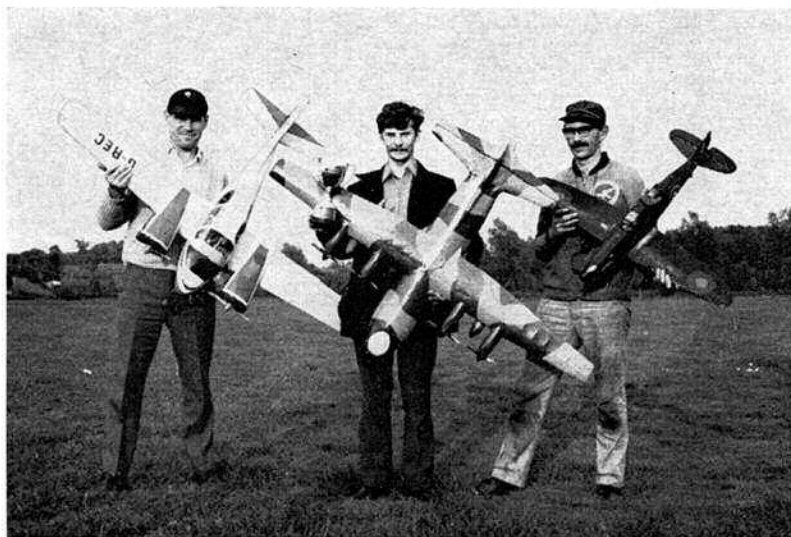
The lectures I gave over ten sessions were as follows:

- (1) The types of model, tools needed to start, materials, suitable kits, engines, R/C etc.
- (2) Basic building techniques, building from plans.
- (3) Engines: types, operation, care, buying second hand, faults.
- (4) Covering with iron-on plastic films, tissue, etc.
- (5) Basic design principles of C/L, F/F, and single channel R/C.
- (6) Scale models, choice of subject etc., scaling up drawings.
- (7) Achieving a good finish, moulding canopies.
- (8) Basic aerodynamics (by request), making fuel tanks.
- (9) Repairs.
- (10) First flights, trimming.

Bear in mind that the 'problem clinics' and discussions brought out a lot more basic construction than the lecture on the subject (2). Most of the other talks were of academic interest to the newcomers to the hobby, and as such provided interest beyond the 'Glue A to B' type of talk.

I hope that this article will encourage other aeromodellers to give evening classes. Those who do, will find that it is a most enjoyable way of spreading the word and improving the image of the hobby, not to mention profitable!





CLUB NEWS

The Sudbury M.F.C. is an all control-line group, with a strong interest in scale. Here are the winners of their 'Roy Alston Scale Trophy' with (l to r) Reg Cuthill plus Beagle Miles 218, built from AeroModeller plans, powered by two Enya 19s, who placed third. In the centre is the winner Art Dickinson with Hercules C130 - painted in the actual official paint! Drops five parachutes, too. . . . Second place man Peter (Dusty) Miller hides behind the Boulton-Paul Defiant, Fox 25-powered and with full cockpit detail even down to hydraulic pipelines!

THERE ARE few sports and activities which are not sustained and given purpose by a vital competition element, and model flying is no exception. I do not say that model flying for its own sake cannot be pleasurable and rewarding, particularly where there is a measure of experimentation involved, but competition does provide an objective or target, and gives a definite purpose to a group activity.

These reflections follow a visit to a well organised free flight meeting. The atmosphere was friendly and relaxed but heightened by the efforts of the competitors to get the utmost from their machines. Mostly the models, whilst beautifully built and meticulously prepared, were quite inexpensively produced, thus making for a democratic form of equality. The events, with perhaps the exception of F.A.I. Power, could have been won by a not too affluent junior, provided he displayed the necessary skill. And this is certainly an area of model flying in which younger people - or anyone else come to that - can participate without any great financial outlay. Why not find out more about this side of the hobby from your club?

Just the type of club we have in mind features in our first report. This comes from the P.R.O. of the **Timperley M.A.C.**, Mr. B. Faulkner. He informs us that this Cheshire-based club has always nourished a strong Glider interest, but as the club field is only available outside the crop growing season, club competitions for Glider (A/2 and A/1), Coupe D'Hiver and Chuck Glider, take place between October and February - chilly at times but usually calm. An associated free flight interest in the club is R/C Thermal Soaring, and on October 7th the Annual R/C Thermal Soaring event was held. This was an invitation meeting for clubs in the North and was fortunate in being blessed with ideal weather. An entry of 28 ensured a busy and varied day's flying. The team award was won by the Sheffield club, and the individual winner was Ron Donaghy with a high tailed model covered in solar film. Second was Trevor Faulkner flying a single channel Jedelsky wing glider. The club meets every Friday at 8 p.m., in the St. Albans Church Hall, Timperley. Free Flight and R/C Glider enthusiasts welcome.

Mr. Peter Dominic de Gale Miller writes to tell us that a whole year has elapsed since he sent in the last club report on behalf of the **Sudbury M.F.C.** He hopes to get it in before he is shot by the other members for dereliction of duty. Just by way of

variation to the previous report this Suffolk-based club is, with the exception of one radio heretic, exclusively C/L, with a strong Scale bias. In view of this a trip to the *Old Warden All Scale Day* was an absolute club 'must'. Eight models were taken along, and all flown at least once, with a touch of the spectacular provided by Art Dickinson's *Lockheed Hercules* five parachute drop. Displays at Fetes etc., are a club speciality, and have become so popular that a limit of six per season has been imposed. The usual programme starts off with Stunt and Scale. This is followed by a Combat mêlée, and then a fast *Cavalier* biplane stunter does a few high speed aerobatics, plus some low speed hovering. Finally a *Handley Page Heyford* bombs a bridge; the bangs being electrically detonated. And here's a bonus. The displays provide sufficient club funds for sub charges to be waived! A fine trophy, donated by a local business man, who is also club President, Mr. Roy Alston, has been set up as the *Roy Alston Scale Trophy*. This was competed for in September. There were nine entries, and the winner was Art Dickinson's *Hercules*. Second was Peter Miller's *Boulton Paul Defiant*, and third, Reg Cuthill's *Beagle Miles 218*. The event got a good notice in the local press. Prospective members are asked to write to Peter Miller, Red Cot, New St., Glemsford, Sudbury, Suffolk.

From Mr. H. B. Kendall, of the **Canterbury Pilgrims M.F.C.**, comes a letter informing us of a Rally the club held in October to celebrate its 25th Anniversary. He encloses a report of same from the pen of the Contest Director, Mike Adams, of which I can only give a brief resume. A Radio Control event this. An un auspicious start came with an overnight gale which flattened all the stands, stalls and toilets, but despite this all was in order on the day to welcome competitors from all over the South East. Emphasis was on fly-for-fun, and the not over-serious nature of the events reflected this. The first contest was most number of spins in one minute from take-off. Top performance at this form of aerial yo-yo was 'Woody' Woodley of the Anglia club, who spun no less than 45 times. The next event was all touch and go. Competitors were required to touch down and off as many times as possible in two minutes. 'Woody' Woodley, showing no signs of vertigo after his rapid series of spins, got down and up seven times to notch up another win. After a break for lunch, during which visitors regaled themselves on hot dogs and tea

served up by the Pilgrimages, the stage was set for the Limbo event. This was not quite the purgatory it sounds. Contestants were asked to fly under a seven foot high tape as many times as possible in two minutes. And guess who won? Yes, 'Woody' again, with a nine-under score. The next event was for take-off, three loops, three rolls, an Immelman turn, and land in the fastest time. Not 'Woody' this time, but Paul Rossiter in 29 sec. The grand finale was a hairy form of Stunt relay race, and was won by Paul Rossiter and Tony McCluskey.

The editorial of the Worcester M.A.C., newsletter sees a glimmer of optimism in the way the Press in general is taking a more realistic and serious view of aeromodelling. Some of the old 'toys for boys' attitude, together with the flippant news angle, is giving way to an acceptance of the hobby as a worthwhile leisure pursuit. What, of course, the publicists should not look at too closely are the mishaps, colourfully described in the newsletter as using the spinner as landing gear. One bit of insurance against such highly expensive forms of ploughing is the setting up of a transmitter pound, which Ken Long has volunteered to supervise.

We seem somehow to have overlooked a report sent to us from the Leatherhead M.F.C., back in July, so let us speedily make amends by covering their latest submission. This is written around three exhibitions which the club either staged or was concerned in. A small one in the Club hut attracted a fair number of visitors on a wet evening, and got a half page cover, including three photographs, in the local press. At the B.A.C.'s Sports Day Exhibition, Mike Keavill took first prize in the Flying model section, and Stuart Tucker first in Plastics. A really big event, though, which the club had a hand in, was the Model Railway and Hobby Show at the Dorking Hall, Dorking. The club had a 24 ft. x 9 ft. stand on which were displayed 58 exhibits covering all types of aircraft, including a 1913 vintage compressed air model. Other news is that the club has obtained the use of a local sports ground for C/L flying.

Derek Dowdeswell has sent us a report of the successes of the Glevum clubs Combat team throughout 1973. The team consists of Dave Cox, Tim Court, Mick Lewis, Frank Smart, Derek Dowdeswell and Mick Taylor. Between them they have secured places in many of the big national events and in a number of international contests. Top achievements were Derek's Nationals win, the first four places at the Burns Brown Rally, and 2nd, 4th and 6th places, plus two team prizes at the Dutch International Rally at Spaarndam. And in something I have heard nothing of this year, the R.A.F.M.A.A. Nationals, Mick Taylor placed second in Combat and won the Stunt event for the third year running.

Bill Draper, of the Nottingham M.A.C., has assembled quite a formidable document of all that has been going on in the club during the past year, which I will attempt to summarise. The club has quite a large membership, around 50, with interests of F/F, C/L and R/C nicely balanced and often commonly shared. Flying site is the well-known Wymeswold Airfield. This is suitable for all types, although there is a small sports field in Nottingham available for C/L. Finances are healthy, showing a fat bank balance. Meetings every Tuesday evening at the Russell Youth Club. There are regular contests for C/L and F/F categories throughout the year, but no mention is made of Radio events. The club is proud in having run the *Gold Trophy* at the '73 Nats, and

also for the part played in organising the Wymeswold Rally. Notable club success during the past season was the winning by Ken Oliver of the *Bullin Trophy* for Open Glider in the Area Meetings.

Where else would a club, styling itself the Concorde M.A.C., be established but in one of our aircraft groupings? Mr. Robin F. Morton, the Hon. Sec., of the new club, writes to tell us it is recruited entirely from employees of the various aircraft firms based at the Flight Test Centre, R.A.F., Fairford, Gloucestershire. Membership is described in jury terms as 'twelve good souls and true', but there is promise of more. The club is lucky in being able to obtain insurance through B.A.C. In fact, the club forms a section of the B.A.C., Sports and Social Club. The security demands do not permit outsiders to become members, otherwise membership would be much higher, particularly with all that flying space available. Not that the flying space is squandered; members are frugal in using only a small area of the field, although the unbounded stretches are there for free flight operation. Big advantage of working on the field is that knocking off time means flying time (Sorry, dear, I'm working late tonight), and, understandably, lunchtime C/L flying is popular.

The Leicester M.A.C., newsletter has been given a facelift, losing that rolled-off-the-jelly look to a brighter, clearer typescript and a livelier presentation. This large and booming club is as large and booming as ever, if not more so, according to the newsletter, with a high proportion of members active on the flying field. It is pointed out that the club, which covers most aspects of the hobby, is predominantly a sports-fliers affair, although participation in club comps is better than in most clubs. Members also do a bit of participating in outside events. A group took the long road to R.A.F. Odiham for the Southern Gala to enjoy a fine autumnal day's flying. Gerry Ferer's high climbing rubber model qualified easily for the fly-off, in which he did a creditable 5:30 to place fourth. But with models disappearing into the dusk he could have been luckier.

Keep those reports rolling.

Clubman

Contest Calendar

- December 26th CROOKHAM CLUB BOXING DAY F/F MEET. Open R/G/P, all-in Mini (1A, Cd'H, A/1). Venue: Chobham Common.
- January 13th NORTHERN AREA WINTER RALLY. A/1, 1A, Cd'H, HLG, Open R/G/P, Vintage, Goodyear and F.A.I. T/R, Combat. 10 a.m. start at R.A.F. Topcliffe - S.M.A.E. members only. Cash prizes or plaques. 25p per event (10p Juniors). Re-entry into N.A. events same rates.
- July 14th STOCKPORT COMBAT RALLY at Worth Meadow, Stockport.
- August 25th F.A.C.C.T. THERMAL SOARING MEET. Venue: Weston-on-the-Green Airfield near Bicester, Oxon (off A43). 20 prizes.

CLUB SECRETARIES:

Please forward details of your forthcoming contests or rallies as soon as possible to avoid duplication of dates and/or interests in next season's Calendar. Items for insertion in the Calendar must be received at this office by the 15th of the month, for publication in the next immediate issue. Details should be brief but explicit, and include exact location of venue.

"HARLEYFORD"

MODEL & ALLIED PUBLICATIONS LTD., P.O. Box 35,
Hemel Hempstead, Herts, England HP1 1EE

NEW! updated edition SPITFIRE

SPITFIRE—THE STORY OF A FAMOUS FIGHTER



THIS IS A "HARDBOUGHT" PUBLICATION

by Bruce Robertson
Two books in one; the story of the Spitfire and Seafire and their place in recent history, together with a study of the development of these aircraft from Merlin to Griffon engines, machine-guns to rocket projectiles, and the progress of the installation of their equipment.

The story is presented in 24 descriptive chapters, copiously illustrated and, additionally, interspersed with single and double page pictorial features. 'Spitfires Abroad', 'D Day to V Day', 'Arming the Spitfire', 'Servicing Spitfire', 'Seafires', etc. Its really extensive scope may be gauged from the fact that recorded for the first time anywhere are not only the 20,351 Spitfires and 2,468 Seafires built, but details of the full 25,091 and 4,052, respectively, ordered.

216 pages, 301 photographs, 6 pages drawings, 30 pages 1/72 scale tone paintings, colour plate. **£5**

CAMOUFLAGE

Aircraft markings in all their various aspects. Nearly 50 years of military aeronautical history of all nations. The warpaint of camouflage, the heraldry of insignia, the pageantry of unit markings in peace and the significance of code letters in war — all this and much more make a fascinating and informative book.

Page after page of colour work and detailed line drawings and photographs, plus 394 R.A.F. and Commonwealth Squadron badges. From the markings on a Dunne D1 in 1907 to an essay on the future of aircraft recognition markings!

234 pages, 600 photographs, 19 pages drawings, 23 pages in colour. **£4**

AIRCRAFT CAMOUFLAGE AND MARKINGS 1914-1944



THIS IS A "HARDBOUGHT" PUBLICATION

AIR ACES OF THE 1914-1918 WAR



THIS IS A "HARDBOUGHT" PUBLICATION

AIR ACES OF W.W.I

Biographies of 135 leading British, French, American, German, Italian, Belgian, Russian and Austro-Hungarian aces, and mention of over 1,000 others, each with his score. Also the background to the airforces in which they served and details of the aircraft they flew. Listed are those awarded the V.C., Congressional Medal of Honor and the Ordre pour le Mérite.

212 pages, 335 photographs, colour plate. **£3.50**

FIGHTER AIRCRAFT

Descriptions of 84 operational and experimental aircraft, incorporating much data not previously published. Tables of dimensions and performance figures, a list of units equipped with types described, and nearly 150 close-up photos of guns, mountings, engines, exhaust systems, cockpits and undercarriages.

223 pages, 702 photographs, 84 pages 1/72 scale drawings, colour plate. **£3.50**

FIGHTER AIRCRAFT OF THE 1914-1918 WAR



THIS IS A "HARDBOUGHT" PUBLICATION

ME HERON

1 c.c. DIESEL ... **£4.25**

A really EASY-STARTING engine for free-flight or control-line — and virtually unbeatable for POWER, RELIABILITY . . . and PRICE! Plus a super spec — super-finished bore, special high tensile crankshaft, long-lift, low-friction bearings, etc., etc. Weight 2.4 oz.

Twin silencers £1.35 extra



ME SNIPE

1.5 c.c. DIESEL **£4.95**

The same high-quality spec. with that EXTRA PERFORMANCE for sports models. Bore 0.505 in. Stroke 0.455 in. Displacement 1.49 c.c. (.091 cu. in.). Weight 3 3/4 oz. No other diesel in its class offers the same ease of handling, reliability and power — and VALUE FOR MONEY! Twin silencers £1.35 extra.

CHANGE TO A ME DIESEL FOR YOUR NEXT MODEL! HERON and SNIPE both supplied complete with integral tank.

DISTRIBUTED BY RIPMAX

AT YOUR MODEL SHOP

David Plane £1.35, 5 spare blades 13p post 13p
Expo Titan Tool Outfit—drill & accessories £10.20 p/pd
Extra Drill Sets £1.43. Balsa Stripper £1. Mini Vice £1.50 p/pd
Multicraft & Exacto No. 5 Knife 66p. Saw Blade 19p, post 5p
No. 2 Multicraft Set (7 tools) £1.75 post 13p. No. 5 £2.75 (13 tools, 3 handles, blades, saws). Major kit £5.25 post 22p
Buy a Wire Bender for the club room £3.57 post paid.
Adhesives — 5 min. size 39p. Superfast Economy £1.04
Zip Grip for scale detail fixing 61p, post 5p
Aluminum Devcon for crankcase repairs EK 30 75p, post 7p
DT Timers — KSB type, 6 min. £2.30, 20 or 30 sec. cut-off £2.40, all post 5p
D.C. Control line handle 56p, post 13p. C.I. Calculator 53p
3 yds. Fluorescent Orange Nylon £1.29, post 7p
1 yd. 43p, post 4p
Silver Swallow 2.49 £6.50, Rossi 15 w/pipe £38.25
Heads 1 & 3 85p
PAXOLIN sheet 6" x 4" 1/16 & 3/32 29p/pd, 1/8 37p 1/pd.
Rotary Bellcrank metal 34p p/d. Veco 2" 39p, 3" 44p p/pd.
Varley 7/9 2v. Accumulator — back at £2.80 p/pd.
Warlord kit £2.85 p/pd. Miniford £1.77 p/pd.
Mustard tin tank 17p p/pd. Large Stunt tank 100cc. 72p p/pd.
Solarfilm off roll 22p ft. plain, 25p Dazle.
Laystrate 70 ft. 3 strand 28p, 100ft. 3 strand 39p. 70ft. 7 strand 39p, 100ft. 7 strand 49p, post on all sizes 5p
Bobbins, bushes, dt fuse 16 swg thrust races now 52p — sorry
— post 4p. 1 1/2" Nylon wheel 24p p/pd.
6 CHATTERBOX, BROMLEY, KENT

AIRCRAFT LTD

BINDERS

£1.35
including
postage &
packing
and V.A.T.

FOR YOUR COPIES OF AERO MODELLER

In handsome red book-cloth with gold blocked name plate on spine to take 12 copies of your AEROMODELLER. Copies open flat and can be removed unmarked as required.

MODEL & ALLIED PUBLICATIONS LTD.
P.O. Box 35, Bridge Street, Hemel Hempstead,
Herts HP1 1EE



THE MIDLANDS LEADING MODEL SHOP - WORLD-WIDE MAIL ORDER SERVICE

S. H. GRAINGER & CO. CALDMORE MODELS

108 CALDMORE ROAD, WALSALL WS1 3RB, STAFFS.
(1 MILE FROM M6 MOTORWAY JUNCTION 9) TEL. WALSALL 23382

RADIO CONTROL

Swan Propo	from £60.00
Gem Propo	from £34.00
Skyleader Propo	from £85.00
Sprangbrook Propo	from £75.00
Futaba Propo	from £109.00
Remcon Kit Propo	from £98.00
MacGregor S/Channel	from £11.95
MacGregor	
Proportional	from £36.00

All types servos, actuators, deacs, etc.

ENGINES

Merco
Super Tigre
O.S. P.A.W
Enya
K&B E.D.
Rossi OPS
H.P. Veco
Davis Charlton
Webra

KITS

KeilKraft
Graupner
Topflite
Sterling
M.F.A.
Goldberg
Aviette
RipMax
Helgi

BOAT KITS

Aerokits
Billings
Veron
Monday
Graupner
E.D.
Norstar
Mainstream
Simplas

ACCESSORIES

Micro Mold
X-Acto
M.F.A.
DEACS
Electric Motors
Chargers
Boat Fittings
Tanks
Wheels

MATERIALS

Solder
Balsa
Humbrol
Fibreglass
Solarfilm
Nylon
Fuel
Paints
Buoyancy Foam

Fibre-glass Marine Models including the popular 1/12th scale Surfury and Cigarette Mail
Order catalogue 10p. Discount deals from £25. Paybonds accepted. Part exchanges.

HENRY J. NICHOLLS

308 HOLLOWAY ROAD
LONDON N7 6NP
Tel.: 01-607 4272

8 SOUTHGATE ROAD
POTTERS BAR, HERTS
Tel.: Potters Bar 59355

AND
SON
LTD

ESTABLISHED 1946

Have you seen The MODEL BUILDER? America's latest modelling magazine edited by Bill Northrop. A new mag with the accent on free-flight and control-line and a completely fresh outlook on modelling matters. 45p.

BARTELS props for free-flight. 7½ x 3¾ Revup; Cox; 7 x 4 Beck, all at £1.32
NISSHIN Video Tachometer. Accurate no-load. 6 - 15 - and 30,000 r.p.m. £15.50.
JAP SILK White, yellow and red. In stock now! per yd. 55p
SUPER TIGRE 15 Goodyear C/L racing engine. Available now! £14.50.

MAIL ORDER: Our Mail Order Department will send any goods advertised by us anywhere in the world. All overseas mail orders are TAX FREE. OVERSEAS VISITORS ESPECIALLY WELCOME

FLY A SAILWING

Send S.A.E. for
details to:

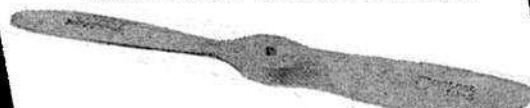
LEN GABRIELS

4 THORNLEA AVENUE
HOLLINWOOD,
OLDHAM,
LANCS OL8 3PX



RIPMAX PROPS

IRON BEECH CONTEST PROPS



9" x 6"	26p	10" x 8"	27p	11" x 7½"	29p	13" x 5"	35p
9" x 7"	26p	11" x 4"	29p	11" x 8"	29p	13" x 6"	35p
9" x 8"	26p	11" x 5"	29p	12" x 4"	32p	14" x 4"	38p
10" x 5"	27p	11" x 6"	29p	12" x 5"	32p	14" x 5"	38p
10" x 6"	27p	11" x 6½"	29p	12" x 6"	32p	15" x 4"	42p
10" x 7"	27p	11" x 7"	29p	13" x 4"	35p	24" x 8"	£2.80



RIPMAX-SEMO NYLON

7" x 4"	17p	7" x 8"	17p	8" x 4"	23p	9" x 6"	23p	19p
8" x 8"	19p	9" x 4"	23p	9" x 6"	23p			



RIPMAX-KAVAN NYLON

6" x 4"	34p	9" x 4"	45p	7" x 4"	36p	9" x 6"	45p
8" x 4"	42p	10" x 4"	50p	8" x 6"	42p	10" x 6"	50p
		11" x 6"	56p	11" x 7½"	56p		

AT YOUR MODEL SHOP!



'Joy-Plane'

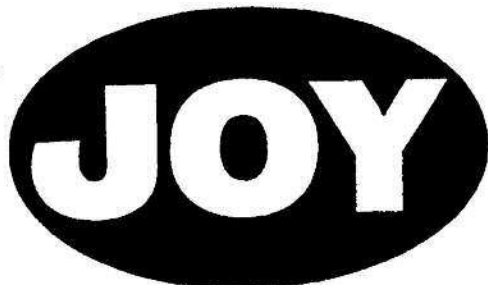
BALSA CEMENT

New and improved
quality. Very quick and
hard setting. Penetrates
deeply, and is heat resisting
and fuel proof. In tubes.

Made by Modellers for Modellers

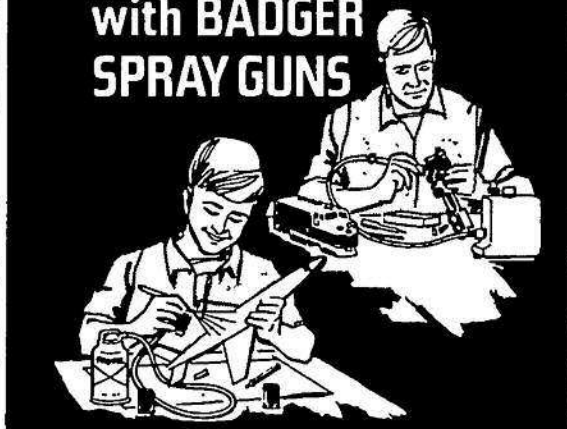


is the registered trade mark of TURNBRIDGES LTD., LONDON, S.W.17
manufacturers of quality products for STICKING, STAINING, POLISHING, PAINTING



KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

PAINT LIKE A PRO... with BADGER SPRAY GUNS



REAL VALUE FOR MONEY!



BADGER 250 AIRBRUSH

Airbrush and Air Valve are made of high-impact Delrin with metal control and adjustable paint tip. Vinyl hose. The small paint hose in the jar is Teflon for easy cleaning. A true economy-priced airbrush which can give you years of fine service. Complete with Hose and Valve.

price only £3.75!



BADGER 200 AIRBRUSH

Easy-to-use single-action AIRBRUSH adjustable from a very fine spray to cover large areas. Precision-made all-metal components with Teflon bearings and seals.

Airbrush only ... £11.80
with Hose & Valve ... £13.70
plus Propel ... £14.30

BADGER PRESS 'N' PAINT KIT

Comprises 250 Airbrush Hose & Valve, mixing jar, Propel can and 4 jars of paint. Price £4.75

ALL AT LOW PRICES!!

SPARES:

3 oz. JAR & cover 17p
2 oz. JAR & cover 17p
Jar Gaskets (3) 17p
TYRE VALVE ADAP-
TOR 55p
Jar Hose 17p
RIPMAX-BADGER
PROPEL each 39p
Individual spare parts
also available for each
gun.

BADGER COMPRESSOR

Lightweight oil-free diaphragm type
with footswitch £29.50
Hose and Fittings £2.10



BADGER AIR-BRUSH
DISTRIBUTED BY RIPMAX

**at your
model shop**

AERO-KITS

LARGE AND SMALL

FOR
BEGINNER OR 'PRO'
RADIO CONTROL -
CONTROL LINE -
FREE FLIGHT -
DURATION -
GLIDER -

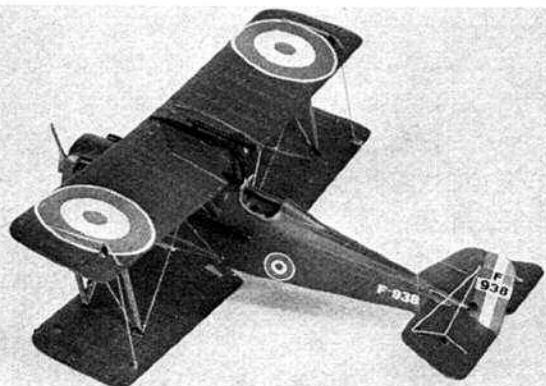
WE HAVE A LARGE SELECTION FROM ALL
MAJOR MANUFACTURERS
(PLUS THE PARTS TO COMPLETE THEM!)

FROM

W&H (Models) Ltd 01-935 8835
01-486 3561
14 NEW CAVENDISH ST.,
LONDON W1



Business Hours: Monday to Saturday - 9.00 a.m.-5.30 p.m.



January's edition of *Scale Models* starts off 1974 with the start of a new series dealing with aircraft of the Royal Air Force Museum. First feature shows how to model the SE5A. Eleven other types are scheduled for this year's issues. No less than SIX SCALE PLANS are published in this issue covering such varied topics as the Canberra B(1)8 (combined with a kit review), the classic Hawker Tomtit of the 'thirties, H.M.S. Bristol, the Guided Missile Destroyer, and the revolutionary Pyrene Pathfinder airfield fire truck.

Part two of the Hawker Hurricane review outlines camouflage and markings data plus an interesting alternate scheme for the Airfix 1/24th kit. News of the latest kits and diecasts, the saga of the Tecno F.1 racing cars (more plans here) a visit to Revell with an insight as to what's in their pipeline, and topical aviation matters in AIR NEWS.

The eagerly-awaited John Player Special Lotus by Tamiya is previewed in colour and regular diecast column, Autominology rounds off a varied survey of new material. Place your order now for the January edition which is on sale 7th December, price 20p.



N.B.: all quantities
quoted in U.S.
measures

**THE FINEST
MODEL
FINISH
YOU'VE
EVER SEEN**



SUPER EPOXY PAINT

... the ultimate model finish system!

K&B Super Epoxy Paints have been formulated for fast drying - NO LONG PERIODS OF WAITING - therefore they must be applied with a spray gun or an airbrush. K&B Super Epoxy Paint will give your model the most beautiful, tough, and durable finish you can imagine ... and with the minimum of work. The only way to finish your model plane or boat.

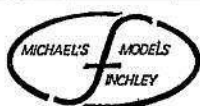
There are six basic colours and you can achieve 21 more by mixing, using the K&B mixing combination colour chart.

Basic colours: Yellow; Royal Blue; Orange; Red; Black; White; also clear.

Prices: Paints - 1/2 pints 66p; 1/2 pints 99p. Paint catalysts 1/2 pints 66p; 1/2 pints 99p. (Catalysts available gloss or satin.) Primer - 8 oz. 99p, catalysts 99p. Thinner - 1/2 pint £1.38; 1 pint £2.09.

IRVINE ENGINES

Unit 8, Alston Works, Alston Road, High Barnet, Herts.
Tel: 01-440 4809



MICHAEL'S MODELS

646-648 HIGH ROAD,
N. FINCHLEY,
LONDON N12 0NL

KK Phantom Mite 16" C/L Model Trainer

£1.34

0.8 D.C. Wasp Engine for above

£2.59

Warlord Combat Kit

£2.64

P.A.W. 2.49 for Warlord

£6.05

Paybonds accepted, Access Card and Barclaycard welcome

EASY PARKING CLOSED ALL DAY MONDAY
MAIL ORDER A PLEASURE PHONE 01-445 6531
All inquiries must be accompanied by s.a.o.

EVERYTHING FOR THE MODELLER

AIRCRAFT KITS BY: KEILKRAFT, VERON, MERCURY
BOAT KITS BY: AEROKITS, BILLINGS, NOR STAR

READY-TO-FLY AIRCRAFT

K.K. Hurricane £6.70

MOTORS BY: FROG, D.C., MERCO, O.S., E.D., P.A.W., COX
RADIO CONTROL: SINGLE CHANNEL OR PROPORTIONAL
BY MacGREGOR, LIST S.A.E.

POSTAGE: 10% of order up to £5, minimum 10p,
over £5 post free (U.K.)

JONES BROS. OF CHISWICK

56-62 TURNHAM GREEN TERRACE, CHISWICK W4 1QN
(Phone: 01-994 0858)

(1 min. from Turnham Green Station) Established 1911
Hours: Mon, Tues., Wed. and Sat., 9 a.m.-6 p.m.
Fri. 9 a.m.-7 pm Closed all day Thursday

EURO-MODELS: EXCLUSIVE

P.O. BOX No. 6

Twickenham TW1 2JD

'AEROPICCOLA' NEW AERO

ENGINE STARTER

No more bad language,
chopped fingers, non-
starts, rebound jars,
grated knuckles.



Patented
coiled leaf
spring coupled to
overrun clutch
protection will start
ALL engines.

Light alloy and steel construction, requires NO batteries, NO maintenance. Just wind and start every time.
Price £7.93 inc. VAT, price also includes Spinner Pins.
Post paid U.K. only. Overseas: Rates on application.

ST. LEONARDS MODEL SUPPLIES



ASTEROID

48" span A1 glider
with contest performance.
£2.20 inc. p&p

NOVA

78" span A2 glider.
Highest performing
kit available.

£4.40 inc. p&p



SATELLITE

48" span A1 glider. Ultra
simple for beginners.
£1.90 inc. p&p

Designed by JIM BAGULEY all kits have: Simple construction;
Detailed Plan and Instructions; Die Cut Ribs; Coloured Tissue.
Expert back-up advice if needed.

May be obtained from all leading model shops or direct from the
manufacturer.

To: ST. LEONARDS MODEL SUPPLIES,
10 IVY CLOSE,
ST. LEONARDS, HANTS (Tel: Ringwood 5873)

Please supply the following:

Asteroid kits = £

My address is:

Nova kits = £

Satellite kits = £

I enclose total £

CLASSIFIED ADVERTISEMENTS

All classified Advertisements must be pre-paid.
 PRESS DATE for February issue, 1974, 14th December, 1973.
 Private and Trade rate 5p per word (minimum 60p). Box Numbers 25p extra. Display
 box rate £2.50 per single column inch.
 Box replies to be sent care of Advertising Department, P.O. Box 35, Bridge Street,
 Hemel Hempstead, Herts, England HP1 1EE. Copy received after first post on 14th
 December will be held over until the next issue, unless cancelled in writing before
 15th of the following month. There are no reimbursements for cancellations.

FOR SALE

Ready to fly models for sale. Example: Aerobat
 with AM35, 19. For further details ring 021-429
 6734. K.

Miniature lead acid 2v. accumulators 1.4 in. x
 1.1 in. x .44 in. Two for 87p including p.p.p.
 Garfield, 269 Rye Lane, London SE15. KLM.

Super Tigre G20/15D B/C, not run in, few
 spares, £11. Mr. Rouse, 72 Baytree Road, Bath.
 K.

Investment opportunity, unobtainable Doo-
 side Mills Mk. II, boxed, perfect, black, silver
 head, £8.95, Box 926, Aeromodeller Office, P.O.
 Box 35, Bridge Street, Hemel Hempstead, Herts
 HP1 1EE. K.

Spark ignition and vintage diesels (especially
 multi-cylinder) wanted by keen collector - best
 prices paid - all types and countries. Contact:
 Peter Ross, 14 Blanford Close, London, N.2.
 Telephone: 01-435 1963. T/C.

TRADE

Laboratory Apparatus and Chemicals. Send
 stamp for list to Beck Scientific, 147 High Road,
 London N15 6DQ. Telephone: 01-800 7342. K.

Distributor required in England, U.S.A. and
 other countries to export and deal with your
 products in Belgium. De Troyer, Tombergh, 24
 1930 Zaventem. K.

Blackpool, south: models, kits, accessories.
 Harrowside Model Supplies, 43a Harrowside,
 H.P. available. T/C.

Plans enlarged or reduced and additional
 copies made. Send for details from Caulser &
 Co., 216 Goldhawk Road, London, W.12. Tel:
 01-749 3441. T/C.

Superb ballpen, pencils, combs, diaries, brushes.
 Goldstamped with club or personal name. Raise
 funds quickly and easily. Samples/details from
 Northern Novelties, Bradford BD2 2AF. G.R.

WOLVERHAMPTON MODELS & HOBBIES

Bell Street, Manders Centre,
 Wolverhampton
 Established 1957
 Tel. Wolverhampton 26709

Try us for return postal service
 on all advertised Aeromodelling
 goods, or call and see us at the
 Town's largest Model Shop.

WANTED

Amco 3.5 BB crankcases, ED Mk. II and
 Comp. Special tank bowls, and any ED 0.8 c.c.
 'Pep' spares. Ring 01-485 6937 evenings. K.

R. S & V ENGINES

buy all types of engines for cash.
 Send for best quotation by return.
 Send S.A.E. for our list.
 646-648 HIGH ROAD, N. FINCHLEY,
 LONDON N12 0NL
 Tel: 01-445 6531

Barclaycard Paybonds accepted
 Closed all day Monday Easy Parking

VINTAGE FLYING SCALE PLANS

Due to loss of our original printing facili-
 ties, we regret that prices will have
 to rise by approx. 25% end January.

BUY NOW BEFORE PRICES RISE!
 1935 Megows 12/15" plans. Waco, Cur-
 tiss Falcon, Fokker Triplane, B.A. Eagle,
 Lockheed Vega, Aerona, Tipsy, Polish
 Fighter, Me 29, Douglas 0-43, Vought
 Corsair, Fairchild 45 - 15p each
 All 12 £1 (U.S. \$4.00, Aus./N.Z. £1.40)
 Aeromodeller 11" Gregor FDB-1 (Aug/45
 issue), 20p (U.S. 75c., Aus./N.Z. 30p).
 Our own exact 1/4" scale 21" span 1914
 Austrian Albatros 2-seater 40p
 (U.S. \$2.00, Aus./N.Z. 50p, Europe 50p)

NEW THIS MONTH
 Burd 16" Seversky BT-8 trainer 15p
 (U.S. 50c., Aus./N.Z. 30p)

For our Scandinavian customers:
 Bucker Bestmann low wing (Swedish
 instructions) 20p (U.S. 75c., Europe
 25p).

All prices post free
 S.A.E. or International reply coupon for
 illustrated list of over 50 plans.

C. TISSIMAN
 8 GREYSTONES GRANGE CRESCENT,
 SHEFFIELD S11 7JL

Classifieds sell - or find what you need

Building the Turtle IV F.A.I. racer?
 Then you need the pan and canopy
 (special long-nosed version available
 for Bugl, Kosmic and K&B15s) . . .
 and a glass-fibre lower fuselage half
 will save you time. Also, a circular
 bellcrank, T/R wheel, pilot head and
 Quickfill (tank-filler plus auto prime
 and engine shut-off as well as fast-
 fitting finger valve) will be useful!

Thirsty engine? Try a Cox carb -
 nylon adaptors permit fitting to any
 engine.

Prefer 1/4 racing? Pans to suit Oliver
 Cub plus canopy as well as G.F.
 Fuselages.

All these, and other T/R items avail-
 able from:

HELMICH PRODUCTS
 Hudsonlaan 638, Eindhoven, (Holland)
 Send S.A.E. for price list of these high
 quality items.

The Advertisement Manager reserves the
 right to refuse or suspend adver-
 tisements without giving any reason.
 Every care is taken to avoid mistakes,
 but the publishers cannot be held liable
 in any way for clerical and printing
 errors or omissions. Receipt of 'copy'
 for publication implies acceptance of
 these conditions by the advertiser.
 Whilst every care is taken to exclude
 advertisements from doubtful sources,
 no responsibility can be accepted by
 the publishers for the bona fides of
 advertisers.

MICRO-X INDOOR SUPPLIES

FULLY COMPLETE KITS

Semi-Scale		
Glenny-Henderson	...	£1.60
Ryan M-1	...	£1.60
Taylorcraft	...	£1.85
Stinson Voyager	...	£1.85
Pilatus Porter PC-6	...	£1.85
True Flying Scale		
Farman Mosquito	...	£1.85
Pietenpol's Air-Camper	...	£2.05
Pilatus Turbo-Porter	...	£2.05
Waco Biplane	...	£2.05
Itch	...	£2.05
Peanut Scale		
Piper Vagabond	...	£1.50
Waco Biplane	...	£1.60
Itch	...	£1.50
Stinson 125	...	£1.50
Piper Cub	...	£1.50

All prices post free
 The usual indoor Duration supplies still avail-
 able - for free catalogue send large S.A.E. to:

LAURIE BARR,
 4 HASTINGS CLOSE, BRAY, BERKSHIRE

BOOKS

Free Flight News. 1974 subscriptions cost £1.80
 for 12 monthly issues, from Ian Kaynes, 11 Park
 side Road, Sunningdale, Berks. K.

Wanted. Aeromodeller Annual - 1966/67, 1967/68,
 1968/69. I will pay £2 for each. Marjory
 Vinko, Grizoldova 2, 62342 Rusa, Yugoslavia, JK.

American magazines by annual subscription.
 'Flying Models', £3.15. 'Model Airplane News',
 £4.55. 'American Aircraft Modeller', £5.50. Send
 stamp for complete list. Wilfen (Dept. 1),
 Howard House, Howard Road, London E11 3PL.
 Tel: 01-556 7776. T/C.

ATTENTION

All Types of Model Enthusiast

All your turning and drilling require-
 ments undertaken. One-offs and small
 batches. Estimates free.

Phone: Penn 3903 (Bucks)

THE SMALL-SCALE SERVICE

A S.A.E. brings you details of the Bob Peck
 Peanut scale kits and small scale accessories,
 i.e. wheels, props, rotary engine kits, etc.
 A 20p P.O. brings you the above plus the
 Bill Hannan catalogue of over 50 flying scale
 plans. Watch this space for news about the
 American Tern kits (Ryan PT 20 mentioned
 by Eric Coates in November issue) soon to
 be available.

MR. J. STENNARD
 Prince Rupert School, Rinteln, BFPO 29

GOLDEN AGE PLANS

Classic flying scale rubber designs from
 Magazines and kits of the thirties
 reproduced exact size in fine line black
 print on large sheets, Lockheeds,
 Bellances, Cessnas, Curtiss, Corben,
 Martin, Fairchild, Piper, etc. Plus
 Hawker Hart, Supermarine S6B, SE5,
 Fokker DR1, Camel, GeeBee, etc.
 Send addressed envelope and Inter-
 national reply coupon for illustrated list
 and prices to

Golden Age Reproductions
 P.O. BOX 13, BRAINTREE, MASS.
 02184, U.S.A.

CORNISH GLIDING AND FLYING CLUB
Gliding Courses in modern fleet from May
- S.C.A. Fully Rated Instructors - fine soaring
- lovely coastal airfield - ideal for a
different family holiday - Aerotows available.

Details with pleasure from:
The Course Secretary
The Cornish Gliding and Flying Club
Trevellas Airfield, Perranporth, Cornwall
Phone: Davoran 862518

BOB ASHBY

Secondhand Engine Specialist

All types of motors bought and sold.
Send that old or unwanted motor for
best quote by return. S.A.E. for list.
Moreroys House, 99 Dark Lane, Batley,
Yorks WF17 7PW
Tel. Batley 476709

ELECTRIC R.T.P.

Pylon head plans and instructions for
simple, reliable system, model plans,
motors, props, wheels, cable and etc.
S.A.E. for list

HARRY BUTLER (Models)

P.O. Box No. 3

Brockenhurst, Hampshire,
England, Telephone Brockenhurst 3034

SWANSEA

SWANSEA

SWANSEA

See Model Shop Directory

Why not try a Gliding Holiday this year?
Accommodation in a village inn, instruction
by professionals at our lovely site
in the Cotswolds. Bring your camera
and record the holiday of a life-time.

Write to:

Course Secretary,
Flat 1, The Red Lion, Kings Stanley,
Stonhouse, Glos.

Who is BINDING?

Authorised agent for standard
style binding of Aeromodeller
and other Model & Allied Publications' Journals, to whom
all loose copies of issues
should be sent, is:

Beaumont Aviation Literature,
11 Bath St., London, E.C.1

Charge per volume (including
index plus post and packing)
Aero Modeller, Model Boats,
Maccano (up to 1972) - £2.65.
Model Railways, Military Modelling,
Scale Models, Model
Engineer - £2.75.

NOW YOU'VE BUILT A MODEL

Why not build a full-size aeroplane?
Join the British Amateur Aircraft Industry,
THE POPULAR FLYING ASSOCIATION
and learn how to build your own flying
machine.
Read POPULAR FLYING, bi-monthly.
Specimen copy, 25p.

POPULAR FLYING ASSOCIATION,
Terminal Building, Shoreham Airport,
Shoreham-by-Sea, Sussex, England.
Shoreham-by-Sea 61616

Take a holiday gliding course with the
YORKSHIRE GLIDING CLUB

Fully residential Clubhouse with Licensed bar
- full-time professional instructors - wave
and hill soaring - modern fleet of gliders
and tug aircraft - winch and aerotow
launches - Falke motor glider.
Book now for 1974 season April to September.
For brochure write to: The Secretary,
Yorkshire Gliding Club, Sutton Bank,
Thirsk, Yorks. Tel. Sutton (Thirsk) 237

AMERICAN AERO-MODELLING MAGS

R/C Modeller 50p
M.A.N. 40p
Flying Models 35p
Scale Modeller 60p
Current - and some back issues available
from
THE AVIATION BOOKSHOP
11 Bath Street, London E.C.1

MODEL AEROPLANE GAZETTE

A monthly newsletter for aeromodellers.
Each issue contains at least 16 pages
of plans, contest results, one-model
contests, occasional photopages, etc.,
and is sent by post to subscribers.
Sample copy sent on receipt of 13p
postal order. Subscriptions for 1974
£1.50 or \$5.00 to MAG, 22 Slayleigh
Avenue, Sheffield S10 3RB, Yorkshire.

TOP ALLOWANCE ON FISHING TACKLE
AND PHOTOGRAPHIC EQUIPMENT
TOWARDS ANY MODELLING GOODS
MODEL ENGINES BOUGHT FOR CASH

ROLAND SCOTT LTD.

85 BOLTON ROAD, WALKDEN
NEAR MANCHESTER

DIESEL and GLOPLUG AERO ENGINES

DC Wasp 0.8cc	...	£2.38
DC Merlin 0.76cc	...	£3.38
DC Spitfire 1cc	...	£3.78
DC Sabra 1.5cc	...	£4.00
OS20 R/C	...	£9.43
DC Rapier	...	£8.25
ST G20/150	...	£10.00
P.A.W. 1.49 DS	...	£5.00
P.A.W. 2.49 DS	...	£5.51
P.A.W. 19 DS	...	£6.00
Vico 61	...	£25.41
ED Fury R/C	...	£25.76
Fox 25 R/C	...	£6.53
Fox 40 R/C	...	£9.00
Weber 61 R/C 10cc	£36.30	

Many more Aero and Marine.

New Zealand orders welcome.

Send 75p P.O. for Lists.

Duty Free - Export only.

THE MODEL SHOP (Guernsey)

No. 1, Commercial Arcade, Guernsey, C.I.

SCOTTISH MODELLERS

Have you tried our Mail Order service yet?
Our stock of Kits, Engines, Radios and
Accessories is comprehensive.

DUNN'S of PERTH

29 Scott Street

Tel: 24540

THE CHOICE OF CHAMPIONS

ETA

TRADE
MARK

You can now only buy the famous ETA
Range of engines direct from the factory.
Used throughout the world, so we
guarantee results!

SEND FOR
LEAFLETS
TODAY!

ETA Instruments Ltd.
289 High Street, Watford, Herts.
Tel: Watford 21725 or 23440

NJM

FOR RADIO CONTROL AIRCRAFT KITS & ACCESSORIES

PRICES	INC. V.A.T.	RADIO CONTROL BY MACGREGOR
SECOND-HAND EQUIPMENT		Single Channel from £13.95
OS Digital 4-channel propo. R/C		Digimac 1+1, 2 servos £42.00
Inc. 4 servos and Deacs £64.00		Digimac 2, 2 MR10Ps £52.00
Fox 36 R/C £7.25		Digimac 3, Tx, Rx, Deacs £49.00
OS 25 R/C £7.99		Digimac 4, Tx, Rx, Deacs £70.00
ETA 15 Incl. Sil. £9.75		MR10P servos each £11.00
		Micro Servo MR12P £13.00
		Kwikbit Spitfire 63", foam cored
		wings, suitable 40-63 engines £20.95
		Kavan El. Starter 12V £13.30
		Marx Luder Starter 12V £10.95

We wish all our customers a
HAPPY CHRISTMAS and a
prosperous NEW YEAR

Solarfilm 65p/yd.
Metalflake Silver, Gold 74p/yd.

EASY CREDIT TERMS THROUGH PAYBONDS & BARCLAY CARD
Second-hand equipment bought and part exchanged
STAMPED ADDRESSED ENVELOPE WITH ALL ENQUIRIES PLEASE
NORWOOD JUNCTION MODELS LTD. Hours: 9.30-6;
Wed 3 p.m. Fri 9.30-7
3 Orton Bldgs. Portland Rd., London, S.E.25 Tel. 01-633 4943

ADDLESTONE Tel: 45440
Weybridge
ADDLESTONE MODELS LTD.
8 & 8 HIGH STREET
ADDLESTONE, SURREY
All leading makes of Kits, Engines, R/C
Gear and Accessories.
Second-hand R/C Gear.
Paybonds accepted.
Late night Friday 6.30 p.m.

ALDERSHOT Tel: 26826
CONCORDE MODELS
134 VICTORIA ROAD
R/C Models - All Accessories - Main-
stream and Merco Area Agents

AMERSHAM Tel: 4030
R.E.H. PHOTOGRAPHY
61 SYCAMORE ROAD, AMERSHAM,
BUCKS.
R/C equipment, aircraft and boat kits
and all modelling accessories.
Cameras taken in part exchange.

AUSTRALIA Tel: 347 8029
RIVERSIDE HOBBY CENTRE
16 LITTLE LATROBE STREET,
MELBOURNE 3000
Radio Control Equipment, Kits, Engines,
Accessories. M.A.P. Plans, Books.
FAST MAIL ORDER SERVICE

AUSTRALIA Tel: 497087
**SEMAPHORE HOBBY
CENTRE**
12 HART STREET,
SEMAPHORE SOUTH, S.A. 5019
M.A.P. Plans, Books, Kits, Engines,
Accessories, etc.
Radio Control Equipment
Free Price Lists

AUSTRALIA Tel: (02) 533 3517
SILVERTONE ELECTRONICS
UNIT 6 No. 2 SCHOFIELD STREET,
RIVERWOOD, N.S.W. 2210
Manufacturers of Silvertone R/C equipment,
including the Silvertone Mark VII propor-
tional system. Silvertone Keyboard Frequency
control. Silvertone Fail-safe package. We also
stock a complete range of R/C accessories.
Mail Order.

AYLESBURY Tel: 85752
**TAYLOR
& McKENNA**
46 FRIARS SQUARE

BARNLEY Tel: 6222
DON VALLEY SPORTS
28 DONCASTER ROAD, BARNLEY
Model Aircraft, Boats, Cars, Railways
All makes of Engines
R/C Equipment
Postal Service

BARNSTAPLE Tel: 3766
**GALES
OF BARNSTAPLE LTD.**
88 Boutport Street, Barnstaple, Devon
(Opposite Main Post Office)
Comprehensive range of kits and
accessories by most leading
manufacturers. Mail order.
Multi car park near by.

BEDFORD Tel: 59652
BRYAN SCALE MODELS
74 MIDLAND ROAD
Railways, Aircraft, Boats, Plastic Kits,
Books, Magazines, paints, etc.
Part-exchange, second-hand, Repairs.
Early closing Thursday. Easy parking

BIRMINGHAM Tel: 4917
021-772
BOB'S MODELS
520.522 COVENTRY ROAD
SMALL HEATH, BIRMINGHAM 10
MODEL CENTRE OF THE MIDLANDS
RADIO CONTROL SPECIALISTS
Friendly help and Advice backed by
over 20 years' experience

BIRMINGHAM Tel: 7834
021-422
HOBBY SPOT
280 HAGLEY ROAD WEST, QUINTON
Plastruc Centre
Comprehensive stock of kits, engines
and accessories for C/L and F/P.
Paybonds - Access - Barclaycard

BIRMINGHAM Tel: 2369
021-444
KINGS HEATH MODELS
(Pearce's Newsagents)
8 YORK ROAD, KINGS HEATH
BIRMINGHAM 14
KeilKraft, Kits, Engines, Balsawood,
Paints, Airfix, etc.

BIRMINGHAM Tel: 5569
021-554
THE MODEL MECCA
204-206 WITTON ROAD,
BIRMINGHAM B6 6LB.
Kits, engines, accessories, R/C gear.
Balsa wood etc.

BIRMINGHAM Tel: 0872
021-327
**POWELL'S
MODEL CENTRE**
769 ALUM ROCK ROAD, WARD END
BIRMINGHAM 8
Personal attention of G. & F. Powell

BIRMINGHAM Tel: 5945
021-373
JIM DAVIS MODELS
332 MARSH LANE, ERDINGTON
BIRMINGHAM 23
We stock everything a modeller needs
to build and fly a Radio Control Aero-
plane, and advice

BIRMINGHAM Tel: 1653
021-427
THORNTON'S
Model Specialists
10-12 ALBERT WALK, HARBORNE
BIRMINGHAM
Veron, Keil, RipMax, Graupner Kits,
Radio Control Equipment, Boat Kits,
Model Railways, Racing Cars, etc.

BIRMINGHAM
TURNERS MODEL DROME
NEWSAGENTS
24 TEVIOT GROVE, KINGS NORTON
Radio Control equipment, KeilKraft,
Veron, Airfix, Frog, RipMax, Engines,
etc.

BRADFORD Tel: 26186
MODEL DROME
182 MANNINGHAM LANE
BRADFORD 8
Radio Control Equipment, Aircraft and
Boat Kits and all Modelling Accessories
Mail Order by return

BRIDGWATER Tel: 3632
JACK PALMER
36 ST. JOHN STREET
New to Bridgwater and the West.
We have a large range in stock. Air-
craft, boats, radios, engines and all
accessories.

BRIGHTON Tel: 418225
Brighton
HARRY BROOKS
15A VICTORIA ROAD
PORTSLADE, SUSSEX
The best stocked model shop in the
South - You want it, we have it

BRISTOL Tel: 557764
JIM BENNETT MODELS
351 CHURCH ROAD, ST. GEORGE,
BRISTOL 5
The only Radio Control specialist in
Bristol. Kits by Veron, Keil, RipMax,
Concord, etc. We buy, sell, and part
exchange engines, airframes, boats,
radio control, etc. Paybonds accepted.

BROMLEY Tel: 01-460 0818
AVICRAFT LTD.
6 Chatterton Road, Bromley, Kent
Scale Models our specialty, kits, engines,
Profile Publications, adhesives and finishes,
radio control, best stocks of balsa obtainable,
second-hand R/C and engines bought, sold
and part exchanged. Foam wings arranged,
tools, e.g. Dremel, spares for engines and
radio equipment. In fact
Almost Everything for the Modeller
Early closing day Wednesday

BURTON-ON-TRENT Tel: 64240
0283
J. & N. MODELS
22 DERBY STREET, BURTON-ON-TRENT
Largest model stockist within 25 miles.
Kits and Accessories for Aircraft, Boats
and Railways. R/C equipment, Books,
Plastic Kits.
Easy parking - Paybonds Agents.

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

CAMBERLEY Tel: 27362

**MODEL WORLD
(CAMBERLEY) LTD.**

Mike Young & Nev Coombs, proprietors
75 HIGH STREET, CAMBERLEY, SURREY
Comprehensive stock of Kits, Engines,
Radio Control Equipment, Spares, etc.

CARDIFF Tel: 29065

BUD MORGAN
22-24 CASTLE ARCADE
CARDIFF CF1 2BW

K.K., Mercury, Veron kits, etc. RipMax,
Futaba, McGregor, SImprop, Skyleader,
Radio Control equipment. Merco, O.S.
and all makes of engines. Paybond,
Barclaycard and Access cards accepted.

CARDIFF Tel: 0222 22245

THE MODEL SHOP
JOHN HALL LTD.
22/24 MORGAN ARCADE

Cardiff's leading Model Shop
Aero and Marine kits, engines, R/C and
accessories. RipMax, KellKraft, Veron,
Billings, M.F.A., Futaba, MacGregor, etc.
Humbrol, books, profiles, plastic kits, sil-
icon tubing, etc.
Credit terms.

CHICHESTER Tel: 83592

**PLANET MODELS AND
HANDICRAFTS**

109 THE HORNET, CHICHESTER, SUSSEX

Aircraft and Boat Kits, All Accessories,
Balsa Wood, Engines, Fuels, Finishes,
etc. Model Railways & Racing Cars.
Personal Service Mail Orders

COLCHESTER Tel: 45984

SATURN MODELS
(Cliff Goater & Peter Giles, Prop.)
20 SHORT WYRE STREET,
COLCHESTER, ESSEX.

ANGLIA'S NEW MODEL SHOP.
SPECIALISTS IN RADIO CONTROL FOR
AIRCRAFT AND BOATS.
PROMPT MAIL ORDER SERVICE

DEVON Tel: 2685

THE MODEL SHOP
56 FINE STREET, BRIXHAM

Vast choice of Airfix, Frog and Revell
Plastic kits and many at reduced prices.
Full range of 'Humbrol' accessories.
Headquarters Brixham Modelling Club.

DONCASTER Tel: 62524

B. CUTTRISS & SONS

MODELS AND HANDICRAFTS
40 DUKE STREET

Call and see our Shop

DUDLEY Tel: 57045

ACE MODELS
20 FOUNTAIN ARCADE, DUDLEY

For KellKraft, Veron, Mercury,
Revell, Riko, Frog, etc.
CLOSED WEDNESDAY

ESHER Tel: 01-941 0088

THE MODEL SHOP
111 WALTON ROAD,
EAST MOLESEY, SURREY

Model Aircraft, boats, accessories

EXETER Tel: 76935

**EXETER
RADIO CONTROL
MODELS**

35 SOUTH STREET, EXETER
EX1 1ED.

FAREHAM Tel: 4135

G. M. H. BUNCE & CO. LTD.
206 WEST STREET, FAREHAM

Aircraft, boats, engines, radio control
Engineers/woodworkers
tools and machinery

FARNWORTH Farnworth 74688

JOYCRAFT
29 HALL LANE, MOSES GATE
FARNWORTH, BOLTON

The shop for all your modelling needs.
Balsa Wood specialists, materials,
engines, aircraft and boat kits. R/C
equipment. S.A.E. for reply. Postal
service. We are here to serve 'YOU'.

GATESHEAD Tel: Dunston 805545
Whickham 887218

THE WOOD SHOP
(Models & Hobbies)
2 TOWER COURT, DUNSTON,
GATESHEAD, CO. DURHAM

Veron, K.K., Graupner, RipMax, Micro-
Mod, Fibreglass/engines & Ronytubes. Fox
engines, R/C equipment & accessories. Free
advice & flying tuition. Ask for Bill Gordon.

GLASGOW 041-632 8326

RIDELL BROS.
61 MOUNT ANNAN DRIVE
(Facing Mount Florida School)
GLASGOW S4

VERON, KEIL, BILLINGS, AIRFIX,
RIPMAX
Accessories, Balsa, etc.

GRIMSBY Tel: 0472 2574

EVINGTONS
5 ALEXANDRA ROAD, GRIMSBY

Large stocks of Radio Control equip-
ment, engines, kits, etc. Hire purchase,
Paybonds and Access accepted. Your
spare equipment sold.
Closed Thursday. Car Park 39 yards.

HARLOW Tel: 20213

At last, a specialist modelling shop at
ROD'S CYCLES & TOYS
109 THE STOW, HARLOW, ESSEX

KellKraft, RipMax, Solarbo Balsa, En-
gines, Fuel, Solarfilm, Billings Boats,
Airfix, Tamiya, Pyro, Aurora, etc.,
Early closing Wed, Open Sun, morning

HAVERFORDWEST Tel: 3175

MODEL CRAFT
15 CARTLETT,
HAVERFORDWEST, PEMBRS.

At last a specialist model shop in West
Wales. All popular makes always in
stock. Mail order? Certainly. S.A.E. for
lists please. R/C accessories, Aircraft
and Boat Kits, etc.

HEMEL HEMPSTEAD
Tel: 53691

**TAYLOR
& McKENNA**
203 MARLOWES

HIGHWYCOMBE Tel: 30741

KEENS MODEL SHOP
28 THE ARCADE (Upstairs)
TOWN CENTRE

The complete modern shop. Aircraft,
boats, cars, railways, radio control. All
spares, bits and pieces. Plus 28 yards
of How To Do It.
Paybonds, Barclaycard, Mail Order

HODDESDON Tel: 60000

KEITH'S MODEL CENTRE
3 BURFORD ST., HODDESDON, HERTS.

Nr. Clock Tower. Car Park close by.
Model boats, cars, aircraft & AFV kits.
wide range of Model Railways, Miniatanks,
Bellona and accessories.
ALL ASPECTS OF AEROMODELLING,
prompt attention to your inquiries.

HONG KONG Tel: K-680507

RADAR CO. LTD.
2 OBSERVATORY ROAD
TSMHATSUI, KOWLOON

The most complete stock in the Far
East. Agents for Veron, Solarbo, Kell
Kraft, M.K., Pilot, Sole Agents for
Graupner, O.S. Prompt mail order
service.

HORSHAM Tel: 61533

MODEL CORNER
30 NORTH STREET, HORSHAM, SUSSEX

Comprehensive range of Kits.
Veron, Keil, etc. P. & P. extra.
Overseas inquiries invited.

HUNTINGDON Tel: 0480 3328

**HUNTS ANGLING &
SPORTS (MODELS)**
18/19 HIGH STREET, HUNTINGDON

Everything for the Modeller. Kits, En-
gines, Parts, Materials, R/C equipment.
Specialist Engineers. Postal services.
Open 9-6 Monds/Sats, 5 minutes A1.

ILFORD Tel: 01-554 9142

AVIACOLOUR
MODEL SUPPLY SPECIALISTS

Specialists in Radio Control
466 EASTERN AVENUE, ILFORD, ESSEX
(1 min. from Gants Hill Central Line
tube station)

IPSWICH Tel: 51195

BOWMANS OF IPSWICH
37/39 UPPER ORWELL STREET, IP4 1HL
The R/PAX Model and Radio Centre
Aircraft - Boats - Cars - Accessories
All leading makes
World Wide Mail Order Service

IPSWICH Tel: 57106

R. & D. MODELS LTD.
25 NORWICH ROAD, IPSWICH,
SUFFOLK IP1 2NG
For radio - kits - engines - aircraft -
boats - cars - and specialist items.
THE MODELLERS' MODEL SHOP

KENT Tel: Ash Green 872136

THE HOBBY HOUSE
10 UPPER STREET NORTH,
NEW ASH GREEN, Nr. DARTFORD
Aeropics, Steingraeber, K.K., Airfix,
Riko, Farish, Peco, etc.
Barclaycard Easy parking
Closed all day Monday Mail Order

KINGSTON Tel: 01-546 4488

MICK CHARLES MODELS
World R/C Scale Champion 1970/71
124 CANBURY PARK ROAD,
KINGSTON-UPON-THAMES, SURREY
All leading makes stocked
Personal service. Mail Order.
Open: 9-6.30, Friday till 9 p.m. Sat. till
7.30 p.m. Wed. Close 1 p.m.

LEEDS Tel: 646117

FLYING MODELS
R. E. SHERWOOD,
88 CROSSGATES ROAD, LEEDS 15
Everything for the Aeromodeller. Come
to see our shop and park in comfort.

LEEDS Tel: 27891

THE MODEL SHOP
38 MERRION STREET
(Nr. Tower Cinema)
Model aircraft—boats—cars—railways,
all makes engine. Every accessory,
R/C equipment. Same day postal service

LEICESTER Tel: Leicester 21935

**RADIO CONTROL
SUPPLIES**
52 LONDON ROAD
Mail Order Specialists
Closed Monday
Open until 8.30 p.m. Friday
The Showroom of the Midlands with full
R/C service facilities

LINCOLN Tel: 25907

MODEL CENTRE
24 NEWLAND
THE ENTHUSIAST'S SHOP
Big Stocks of Kits, Engines, Balsa.
Accessories, R/C Gear, etc.
MAIL ORDER

LONDON Tel: 01-542 3062

**MODEL AND TOOL
SUPPLIES**
604 KINGSTON ROAD,
RAYNES PARK, S.W.20
Aircraft and Boat Kits, engines and
R/C equipment. All leading makes.

LONDON Tel: 01-520 4565

BRIDGE MODELS
1/2 STATION PARADE,
HOE STREET BRIDGE
WALTHAMSTOW, LONDON E.17
LARGEST SELECTION OF KITS IN
LONDON

LONDON Tel: 01-228 6319

E. F. RUSS
101 BATTERSEA RISE, LONDON S.W.11
Plastic Kits, Model Boats, Aircraft and
accessories. All leading makes in stock.
Friday open until 7 p.m.
Early closing Wednesday

LONDON Tel: 01-888 3048

G. & H. MODELS
459 LORDSHIP LANE, WOOD GREEN N.22
London's biggest model shop.
Mail Order - Access and Barclaycard.
48-hour Securicor delivery. Easy parking.
5 min. Wood Green Tube Station.

LONDON Tel: 01-560 0473

**RADIO CONTROL
SUPPLIES**
581 LONDON RD., ISLEWORTH, MIDDX.
Mail Order Specialists
Open each weekday end until
8.30 p.m. Fridays
Largest R/C stockists in the country
Own R/C service centre

LONDON Tel: 01-788 6497

J. & D's HOBBIES
118A UPPER RICHMOND ROAD
Nr. East Putney Tube Station
Closed Thursday
Open until 7 p.m. Friday

LONDON Tel: 01-959 2877

**H. A. BLUNT
& SONS LTD.**
MILL HILL CIRCUS, LONDON N.W.7
Complete range of model aircraft,
engines and accessories, boats,
cars and railways

LONDON Tel: 01-472 2471

**A. G. HERMITE
(MODEL SUPPLIES)**
633 BARKING ROAD, WEST HAM, E.13
Aircraft—Boat—Car—Plastic Kits & R/C
Saturdays 9 a.m. to 6 p.m.
Postal Service

LONDON Tel: 01-485 1818

AERO NAUTICAL MODELS
39 PARKWAY, CAMDEN TOWN, N.W.1
Main Agents for R/PAX, GRAUPNER
Full range of Timbers stocked and cut
ALL KITS AND ACCESSORIES FOR
AIRCRAFT AND BOATS
Closed Monday and Thursday
min. from Camden Town Tube Station,
Northern Line
LONDON'S LEADING MODEL SHOP

LONDON Tel: 01-892 2637

LEWISHAM MODEL CENTRE
45 LEE HIGH ROAD, LEWISHAM, S.E.13
A good selection of Kellkraft, Veron,
Graupner, Topflite, Giliotti, etc., always in
stock. All types of Engines, Accessories and
Spares; also single and multi R/C equipment.
Late night Friday. Mail Order a pleasure.
Paybonds and Barclaycards accepted.

LONDON Tel: 01-902 4823

WALLY KILMISTER LTD.
6-7 NEED PARADE,
WEMBLEY TRIANGLE, MIDDLESEX
Veron, Kell, RipMax, Aircraft kits,
engines, balsa, spruce, accessories,
Triang, Minitrax, Scalextric.
Closed Wednesday 1 p.m.

LONDON Tel: 01-852 2637

W. & H. (MODELS) LTD.
14 NEW CAVENDISH STREET, W.1
(Five minutes from Oxford Circus)
LEADING WEST-END STOCKISTS OF
ALL QUALITY MODEL AIRCRAFT KITS,
BOATS, RAILWAYS, MAIL ORDER

LONDON Tel: 01-607 4272

**HENRY J. NICHOLLS
& SON LTD.**
308 HOLLOWAY ROAD, N.7
We stock only the best for
AEROMODELLERS
Specialists in Radio Control

LONDON Tel: 01-703 4562

**MODEL AIRCRAFT
SUPPLIES LTD.**
207 CAMBERWELL ROAD, S.E.5
Business Hours:
Monday to Wednesday, 10 a.m. to 6 p.m.
Saturday 10 a.m. to 6 p.m.
Late night Fri. 7.30 p.m. Closed all day Thur.
Postal Service. Parking Facilities

LONDON Tel: 01-445 6531

MICHAEL'S MODELS
646-8 HIGH ROAD, N. FINCHLEY, N.12
Comprehensive stock of Kellkraft, Mer-
cury & Veron kits. Good selection of
engines and a full range of accessories
and woods. Specialists in second-hand
engines.
MAIL ORDER A PLEASURE
Closed all day Monday Easy parking

LONDON Tel: 01-850 4324

ELTHAM MODELS
Ian and Ray Stilling
54 Well Hall Road, Eltham, London S.E.9
The Model Shop with the friendly
atmosphere.
Full range of Aircraft & Boat Kits,
Engines, Balsa, Dope, etc.

LONDON Tel: 01-985 7952**WILRO MODELS LTD.**

22 CLARENCE ROAD, CLAPTON, E.5
 Hackney's Model Shop. Aircraft & Boat
 Kits, Radio Control & Accessories.
 KeilKraft, Mercury, Veron, Simples,
 Aerokits, Billings boat kits.
 Paybonds accepted.

LUTON Tel: 23182**AEROMODELS (LUTON)**

20 GORDON STREET,
 LUTON, BEDS.

Model Aircraft, Cars, Railways and
 Boats for the beginner and expert.

MACCLESFIELD Tel: 21473**WHEELS & WATER MODELS**

Park Mill, Hobson Street, Macclesfield
 Aircraft and boat kits by the world's
 leading manufacturers. Radio control
 equipment for beginners to experts.
 Paybonds, Access, Barclaycards,
 MAIL ORDER SERVICE

MAIDSTONE Tel: 51719

J. F. CARTER & SONS LTD.
 (THE MODEL SHOP)
 19-23 UPPER STONE STREET
 MAIDSTONE, KENT

Complete range of modelling equipment
 and accessories, including R/C.
 MAIL ORDER

MANSFIELD Tel: 25808**MANSFIELD MODEL SHOP**

9 TOOTHILL LANE,
 MANSFIELD, NOTTS.

Open 9.30 to 6.00
 Closed Wednesday all day
 Easy parking
 The Aeromodeller's Model Shop

MIDDLESBROUGH**MODELDROME**

265 LINTHORPE ROAD,
 MIDDLESBROUGH, TESSIDE
 Tel: Saltwells 3212

Radio Control Equipment, Aircraft and
 Boat Kits and all Modelling Accessories
 Mail Order by Return

MINEHEAD Tel: Minehead 3423**Minehead Sports & Toys**

(A. & J. Holman)

45 & 55 THE AVENUE, MINEHEAD

Model stockists, Aircraft, Boats, most
 leading makes, Kits, Engines and model
 accessories, Radio for the beginner and
 the expert.

NEWCASTLE Established 1924**THE MODEL SHOP**

(NEWCASTLE UPON TYNE) LTD.
 18 BLENHEIM STREET Tel: 22016
 NEWCASTLE UPON TYNE, ENGLAND

Pioneers of modelling
 Our Expert Staff are at your service
 MAIL ORDER

NORTHAMPTON Tel: 31223**THE MODEL SHOP**

(Super Model Aircraft Supplies)
 230 WELLINGBOROUGH ROAD,
 NORTHAMPTON
 Established 1937

Full range of model supplies, Swan,
 RipMax, MacGregor and Futaba Digital.

NOTTINGHAM Tel: 50273**GEE DEE LIMITED**

40 GOOSE GATE
 NOTTINGHAM

Everything for the aeromodeller at
 Nottingham's leading shop.

NOTTINGHAM Tel: 281903**PEGASUS MODELS**

171 BRAMCOTE LANE,
 WOLLATON,
 NOTTINGHAM

Closed Wednesday

OLDHAM**THE HOBBY LOBBY**

10 WATERLOO STREET, OLDHAM
 (Off Yorkshire Street)

Aircraft and Boat Kits, Engines, Model
 Accessories, Radio Control Model Rail-
 way, Everything for the Modeller.

OXFORD Tel: 42407**HOWES MODEL SHOP**

9-10 BROAD STREET, OXFORD

RipMax, KeilKraft, Veron, Graupner,
 Aerokits, Billing, Enya, Vaco, O.S.,
 H.P., Micro-Mold, Cox, glow fuel,
 R/C gear. Mail Order by return.
 Paybonds accepted.

PLYMOUTH Tel: 21851**PLYMOUTH
MODEL CENTRE**

11 OLD TOWN STREET,
 PLYMOUTH PL1 1DA

The 100% model shop for the
 South West

POOLE Tel: 3300**SETCHFIELDS**

21-25 HIGH STREET

For all Models including Rio and
 Solido

PORTSMOUTH Tel: 25049**RAY BROWN MODELS**

10 KINGSTON ROAD, PORTSMOUTH

Experience tells — years of pro-model-
 ling and contest flying in all categories
 at your service. Come see the best
 and get full personal attention from
 Ray Brown.

POTTERS BAR Tel: 59355**HERTS.**

HENRY J. NICHOLLS & SON LTD.
 8 SOUTHGATE ROAD,
 POTTERS BAR, HERTS.

Try the Hertfordshire Department of
 the well-known hobby shop for all
 your modelling needs.

READING Tel: 0734 477122**CHILTERN SPORTS
SUPPLIERS**

16 CHURCH STREET, CAVERSHAM,
 READING

The North Reading sports and hobbies
 centre. Always personal service and
 friendly advice.

READING Tel: Reading 51558**READING
MODEL SUPPLIES**

5 CHATHAM STREET, CAR PARK
 OXFORD ROAD, READING, BERKS.
 BERKSHIRE'S SPECIALIST MODEL
 SHOP FOR KITS, ACCESSORIES,
 ENGINES, RADIO EQUIPMENT.
 H.P. Terms available.
 You can drive right to us.

READING Tel: 50074**G. SLEEP LTD.**

22/24 KINGS ROAD, READING

For over 30 years we have had one of
 the largest Model Stocks in the
 South of England.

ROMFORD Tel: ROM 44508**HOME & HOBBY STORES**

144 NORTH STREET, ROMFORD, ESSEX
 We stock all that's best in modelling.
 Kits, engines, radio. Part exchange.
 Mail order by return. Paybonds agents.
 Open 7 p.m. Fridays
 No parking problems.

SHEFFIELD Tel: 581197**SHEFFIELD HOBBIES CENTRE**

141 LONDON ROAD, SHEFFIELD
 Main agents for Sprengbrock, Swan, Futaba,
 Watron, MacGregor, etc. Service facilities
 for all makes equipment. Vast range of kits,
 engines, accessories for planes, boats, cars.
 A veritable Aladdin's Cave of modelling
 treasures. 24 hrs. Mail Order service.
 Credit facilities. Open Mon.-Sat. & days.

SOLIHULL Tel: 021-744 3374**SHIRLEY MODEL SUPPLIES**

62 STRATFORD ROAD,
 SHIRLEY

Triang, Scalextric, Airfix, Balsa Kits,
 etc. Personal attention and advice to
 young modellers.

SOUTHAMPTON Tel: 0703-25665**R.G.L. MODEL SHOP**

R. G. LEWIS (SOTON) LTD.,
 17 HANOVER BLDGS., SOUTHAMPTON

Specialist in
 BOATS - CARS - AIRCRAFT
 RADIO CONTROL EQUIPMENT

Make it Legal...

get your R/C licence

Just in case some newcomers to the hobby are not aware, operation of radio control equipment requires a licence. This costs £1.50, but it covers a five-year period, so at 30p per year, the licensing fee can't be described as expensive.

Licence application forms are available from:

The Ministry of Posts and Telecommunication,
Waterloo Bridge House,
Waterloo Road,
London S.E.1.

SOUTHAMPTON Tel: 25919

HOBBY LOBBY LTD.
52 COMMERCIAL ROAD
CALL - WRITE - OR PHONE
Paybonds accepted
Open: Monday to Friday 9 a.m.-6 p.m.
Saturday 9 a.m.-5.30 p.m.

TRURO

COUNTY MODELS
THE CREATION CENTRE, BACK QUAY,
TRURO
Cornwall's model centre, large range of
aircraft, boats, engines and accessories.
Mail Order

WELWYN

**H. A. BLUNT
SONS LTD.**
38 FRETHERNE ROAD,
WELWYN GARDEN CITY, HERTS.
Complete range of model aircraft,
engines and accessories, boats, cars
and railways.

STAFFORD Tel: 3420

Everything for the Modeller at:
JOHN W. BAGNALL LTD.
SALTER STREET, STAFFORD
Multi and Single R/C, Kits, Engines,
etc. Paybonds welcome, special cash
prices for Radio. By return Mail Order.
Closed all day Wednesday.

TUNBRIDGE WELLS Tel: 31802

TELESERVICE
108 CAMDEN ROAD
Kits, Engines, Accessories. R/C Gear,
Balsa Wood etc.
Also Radio and Electronic components.

WIGAN Tel: 83206

TONY'S MODEL CENTRE
10 CHAPEL STREET,
PEMBERTON, WIGAN
Radio Control equipment, Aircraft, Rail and
Boat Kits and all your modelling require-
ments. Personal attention assured.
IT WILL PAY YOU TO VISIT US
Easy parking
MAIL ORDER SPECIALISTS

STAMFORD Tel: 4524

SPORTS & HOBBIES
4 ALL SAINTS STREET, STAMFORD
Lincs.
Stockists for: Keil, RipMax, Micro-Mold,
Veron Kits and accessories. Comprehen-
sive range of engines and radio control
equipment. Model railway and angling
supplies. Mail Order Service.

WORSLEY Tel: 061-790 6707 061-890 3030

ROLAND SCOTT LTD.
28 EAST LANCASHIRE ROAD,
WORSLEY/SWINTON, LANCs.
Save time - try us first for most items
advertised in the 'Aeromodeller' Pay-
bonds - Barclaycards, etc. accepted.
Send stamps for second-hand lists.

WOLVERHAMPTON Tel: 26709

MODELS & HOBBIES
BELL STREET, MANDERS CENTRE,
WOLVERHAMPTON
EXPERTS COME TO US
VISIT US AS WELL
WE HAVE ALL THE BEST IN MODELLING

STOCKPORT Tel: STO 5478

THE MODEL SHOP
280 WELLINGTON ROAD SOUTH
(BRAMHALL LANE CORNER)
Aircraft, Boats, R/C Equipment, Engines,
Railways, Car/Racing, Plastic Kits
Postal Service.

WALSALL Tel: 23984

AEROMODELS (WALSALL)
123 Wolverhampton Street,
Walsall, Staffs.
Plastic kit specialists and flying kits by
Keil, Veron, etc. Boats, engines and all
accessories.

WORCESTER Tel: 0905-26897

R.G.L. MODEL SHOP
(R. G. Lewis Ltd.)
6 FOREGATE STREET
Specialist in
BOATS - CARS - AIRCRAFT
RADIO CONTROL EQUIPMENT

SUTTON Tel: 01-330 2964

RADIO CONTROL HOBBIES
243 CHEAM COMMON ROAD
Worcester Park, Nr. Sutton, Surrey
We are well worth a visit. Agents for
Keil/Kraft, Veron, etc. With accessories
to back up.

WALSALL Tel: 23382

S. H. GRAINGER & CO.
CALDMORE MODELS
108 CALDMORE ROAD
Everything for the Modeller
Aircraft - Railways - Boats - Electric
Cars - Repairs - Overhauls - Spares -
Radio Control - Part Exchanges - Pay-
bonds accepted.

WORKSOP Tel: 2855

MODEL CENTRE
RYTON STREET
Main agencies for all Kits, Engines and
Radio Control equipment.
Mail Order Service.

SWANSEA Tel: 62877

SWANSEA MODELS & HOBBIES
11 Shoppers Walk, Oxford Street, Swansea
Beginners and experts welcome. We have
huge stocks of kits, materials and acces-
sories, the best engines and radio control.
Sheet balsa up to 4ft. x 6in., F/F and C/L
accessories, CAP plans, Solarfilm, Kwikcote,
nylon - everything to make the model plus
all the help that we can give. Access and
paybonds. Closed Thursdays, open till 6 p.m.
Fridays and Saturdays.

WATFORD Tel: Watford 43026

MODEL EXCHANGE
71 ST. ALBANS ROAD,
WATFORD, HERTFORDSHIRE
The shop with stock and expert advice.
Free radio and engine testing service.
S/H engines and radio bought and sold
any time. 'Performance spoken here'

YEOVIL Tel: 21083

THE DIGI HANGAR
79 PRINCES STREET, YEOVIL,
SOMERSET
THE NEW MODEL SHOP FOR THE
SOUTH-WEST. FOR RADIO, ENGINES
AND KITS - AIRCRAFT AND BOATS

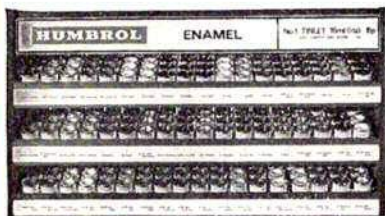
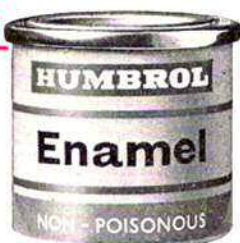
SWINDON Tel: 26878

J. & M. MODELS
2 CIVIC CENTRE,
SWINDON
Comprehensive range of goods to suit
all Aeromodellers

MODEL SHOPS EVERYWHERE

Get on the Aeromodeller map with your name and
address in the directory
P.O. Box 35, Bridge Street, Hemel Hempstead,
Herts, England HP1 1EE

HUMBROL
Enamel
Ask for it
by name



**LOOK FOR THE HUMBROL
PAINT LOCKER - NOW!**

Skill, patience and Humbrol Authentics...

A true match for any model. Formulated after careful research to give the nearest possible reproduction to the real thing, Humbrol "Authentic" colours bring true "authenticity" to your models.

This Junkers Ju 87B Stuka dive bomber, one of the most frightening weapons used by the Germans in World War II is given that realistic finishing touch with Humbrol "Authentics".

Bring your model to life with Humbrol "Authentics"—they're not only the right colour—they're non-toxic and the right price too—real value for money.

Ask for Humbrol by name . . . available from all leading Model and Toy shops.

Humbrol will be pleased to send you—FREE—colour cards and leaflets. Write to Mr. W. H. Stewart, Product Manager, Dept. 12, Modelling Division, Humbrol Limited, Marfleet, Hull.



HUMBROL

Look out for the Humbrol Hobby Chest Special Offer in your model shop—Now!

**START OFF
RIGHT IN '74
WITH —**

KEIL KRAFT

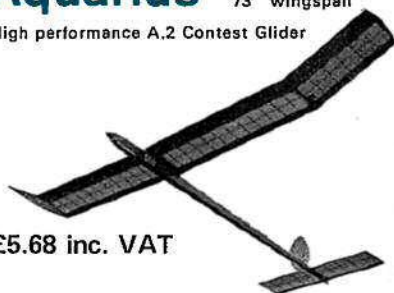
Ladybird 42" wingspan
Semi-scale Free Flight model



Ajax 30" wingspan
Rubber powered model



Aquarius 73" wingspan
High performance A.2 Contest Glider



Halo 42" wingspan £2.42 inc. VAT
PAA-LOAD Free-Flight sports
flier model



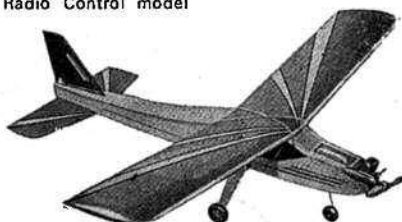
Wisp 20" wingspan
Pod & Boom built-up
glider



Scorpion 46" wingspan
Preformed
Radio Control
model



Outlaw 45" wingspan
Radio Control model



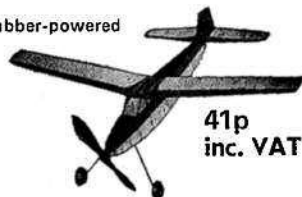
Gipsy 40" wingspan
A big model for rubber power



**KEIL KRAFT
ACCESSORIES**

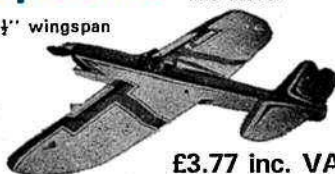
Playboy 20" wingspan

Rubber-powered



41p
inc. VAT

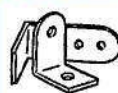
Spectre 40½" wingspan
Stunt Control
line model



£3.77 inc. VAT

Snipe 40" wingspan

Free-Flight engine powered model.
for small engines £1.74 inc. VAT



Control horns



Spinners



Wheels

Props.



Bellcranks



Fuel tanks



Bobbins



Collets



Pilots



Nuts & bolts



Fuel cans
& oilers



Control line



HOME OF THE WORLD'S GREATEST MODEL KITS & ACCESSORIES