MAY 1978 40p
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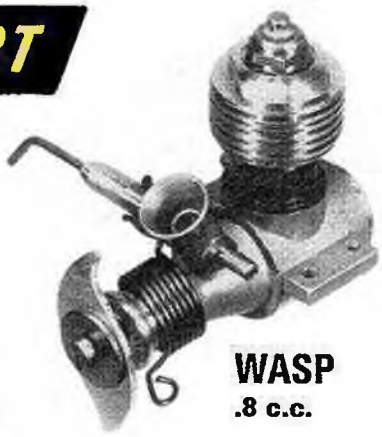
MAP HOBBY MAGAZINE

# Aero Modeller


## 4 FREE PLANS

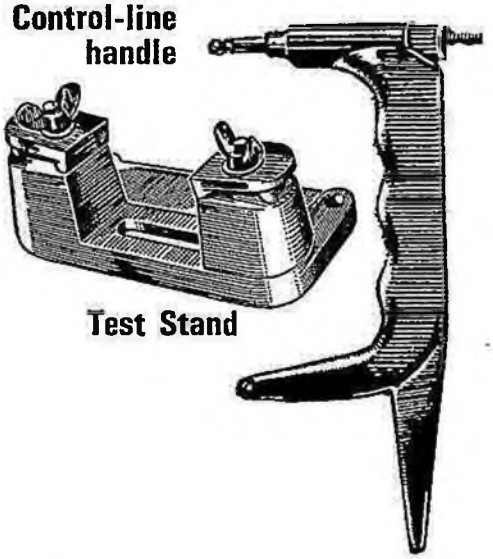
# QUICKSTART

DART
.5 c.c.



WASP
.8 c.c.

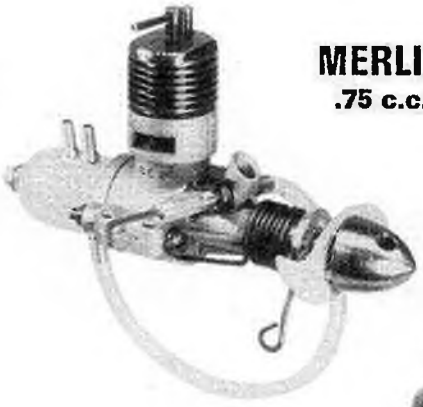
Control-line handle



Test Stand

## *The Motors for the Modern Modeller!*

**No spares-backing worries—if you have a Quickstart you can be sure of full and continuous use of your engine**



MERLIN
.75 c.c.

**SEE THEM AT YOUR MODEL SHOP**

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1.0 c.c.

SABRE
1.5 c.c.

# You can't beat a diesel

*Quality engineered for lasting performance*

**Retailers finding difficulty in obtaining our engines or spares can order supplies direct from the factory provided trade and bankers references are supplied.**

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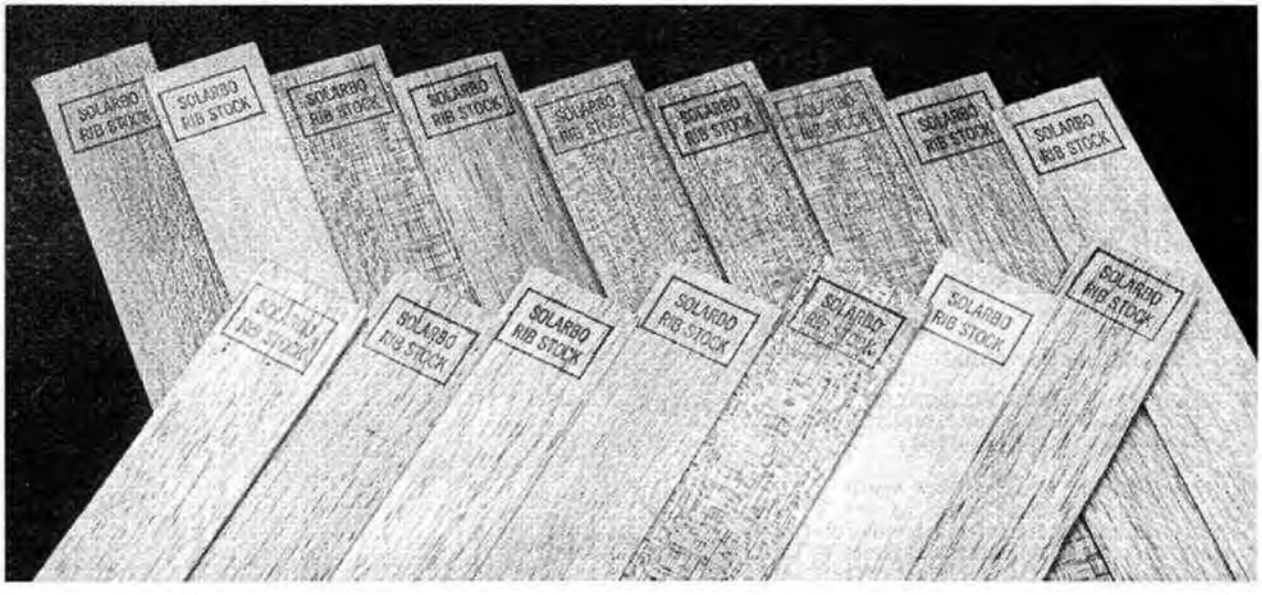
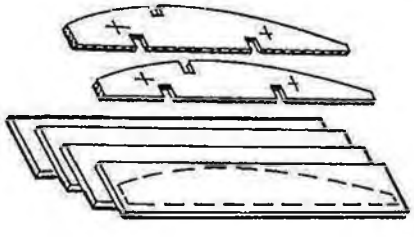
Ⓢ

# INTRODUCING...




# SOLARBO RIB STOCK



One thing stands out from your entries in our December contest. A lot of aeromodellers want quarter-grain sheet and it is not always easy to find. We have dealt with that problem at once!

You should now be able to find Solarbo quarter-grain sheet easily in every model shop. It's stamped Solarbo RIB STOCK and is available in $\frac{1}{16}$in., $\frac{3}{32}$in., and $\frac{1}{8}$in. thicknesses, 36in. long by 2in. wide. So now you don't have to sort through a lot of stock sheet. Go straight to Solarbo RIB STOCK when you want quarter-grain. For cutting ribs—and other parts that need to be stiff and strong.

We shall also be introducing other new sizes of Solarbo Balsa which you have asked for. All part of the Solarbo service—to make (Solarbo) Balsa models fly better!

**SLOGAN WINNERS:**

SOLARBO—THE ALMOST-READY-TO-FLY BALSA *N. Monk, Derby*
BEGINNERS AND EXPERTS ALIKE START AT THE SAME PLACE—SOLARBO *Stephen Alexander, East Kilbride*
SO STRONG—SO LIGHT—SO LARBO!! *M. Hirst, Barnsley*
IF IT'S WORTH BUILDING, IT'S WORTH SOLARBO *Philip Guest, New Malden*
FOR MODELS LARGE AND SMALL, SOLARBO BEATS THEM ALL *K. W. Holmes, Sittingbourne*
A FLYING START? SOLARBO WOOD, SO FAR, SO GOOD! *A. R. Wells, Hornchurch*
SOLARBO BALSA IS SO GOOD, BETTER BY FAR THAN OTHER WOOD *James Saunby, Nottingham*
SOLARBO BALSA GIVES YOU THE LEADING EDGE IN CONSTRUCTION *J. E. Heffring, Ascot*
YOU TRY YOUR BEST, SO USE THE BEST—SOLARBO *R. A. Shire, Cheadle*

A special prize also to Master Johann Haraldsson of Iceland. We found it impossible to read his slogan, but we think it was 'Solarbo—Hobson's choice!' (*We are not averse to a bit of ribbing!*)

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For 1.5 cc (·09 cu.in.) Diesel or Glow motor with rudder only (Single Channel or one Proportional) up to 2.5cc (.15cu.in.) with 2 Channel Proportional on Rudder and Elevator only. Also suitable for Free Flight with 1cc.

**46" span** (1168mm)

KIT PRICE **£19.50**

Kit complete with A.B.S. vacuum-formed cowl. Vintage wheels. Transfer decals. Pre-formed wing strutting and undercarriage. Die-cut balsa and ply parts. 30"×40" plan with instruction leaflet and diagrammatic assembly.

## AND HERE'S A BEVY OF POPULAR FAVOURITES — FAMOUS FOR UNRIVALLED POPULAR APPEAL AND REMARKABLE KIT QUALITY!

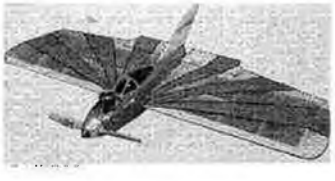
**COBRA** 122" span Near-Scale Soarer with fibreglass fuselage. Gottingen 426 section for superlative glide. Ideal for hillside & thermal. Kit Price £49.46

**SKYWAGON** Quickbuild pre-decorated and die-cut balsa parts. 23" span. Rubber driven plastic propeller. Ideal for Telco motors. Kit Price £2.27

**STUNTER** 30" span. Control-line for motors up to 1·5cc. Built up lightweight wing. Kit Price £6.48

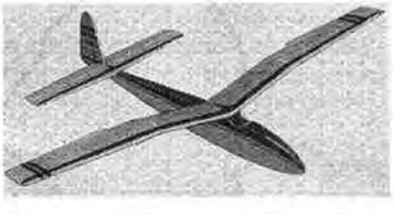
**CARDINAL** 35" span. Free-flight for up to 1cc motors. Ideal for Sport & Beginners. Kit Price £4.37

**DOMINETTE** 28" Primary Glider – built up wing, all balsa pre-shaped pod & boom, cut out tail surfaces. Ideal for first model. Kit Price £1.98



**BOMB-BAT** 25" span. Bat-wing stunter for motors 1 to 1·49cc. Highly manoeuvrable for Contest or Sport. Kit Price £5.44

**SKYLANE** 54" span. Stable and Scale for motors up to 3·5cc (·19cu.ins.) with 2 channel or 3 with motor control. Kit Price £21.95



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# Aero Modeller

*INCORPORATING*
**MODEL AIRCRAFT**

**May 1978** Volume XLIII No. 508


## CONTENTS






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**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, Hertfordshire HP1 1EE (subscription queries Tel: 0442-51740). **Direct subscription rate** £5.75 per annum, including index, $12.00 (U.S.) for overseas subscriptions.
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**Model & Allied Publications Ltd**
**P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE**
**Tel:. Hemel Hempstead 63841-2-3 (Mon.-Fri.)**




## Comment

Few readers will be aware of stringent and new conditions that threaten to jeopardise over 150 flying sites throughout the country. The requirements relate to Ministry properties needing a licence. They call for blanket use of silencers, increased distance from dwellings and shorter flying periods far more restrictive than the negotiated DoE Noise Code. If upheld, this would end F/F and Control Line flying as we now know it.

One club faced with such legislation quickly contacted local SMAE Area officials to instigate their help, being the only recognised model flying organisation with which government bodies are prepared to negotiate.

SMAE officials have pointed out the wide-spread injustice of a blanket ban, arguing that specific sensitive sites be dealt with on an individual basis. SMAE has a detailed knowledge of the DoE's Noise Code through involvement in its creation. Thus they were able to put the model flyers case successfully using the Code to protect flying activity.

The importance of such action is emphasised by the fact that these are the sites where the SMAE is eager to encourage use by the **average non-contest flyer.**

At a time of increasing legislation against model flying it is surely the time now, more than ever before, to support this national body.

### on the cover

*When Alex Imrie takes time off from flying BAC 111 airliners he relaxes with vintage and free flight scale models. This one combines both interests as the DH 60 G3 Moth Major represents the first 'plane Alex came into contact with when it force-landed from Macmerry (Edinburgh) near his Scout Camp in 1938. Converted from a Mercury Tiger Moth kit with revised wings and a new tail the model is powered by a Mills .75. Taken at Aeromodeller Jubilee day rally '77, the Moth will be back at Old Warden for this year's scale day on June 11th. Photo R. Moulton.*

### next month

Why not try Control Line racing. Plans feature design from one of Britain's top winning teams, plus Piloting techniques from Dave Clarkson. Comprehensive survey of paints and finishes, which to choose and how to use them, in our spraying series. Full details of forthcoming British National Championships together with all the latest news and views and information on a great new photo contest for the coming year. An issue not to miss. On sale 21st May.


*AeroModeller* is printed in Great Britain by Leicester Printers Ltd, The Church Gate Press, PO Box 20, 99 Church Gate, Leicester LE1 9FR for the Proprietors and Publishers, Model & Allied Publications Ltd. (a member of the Argus Press Group)
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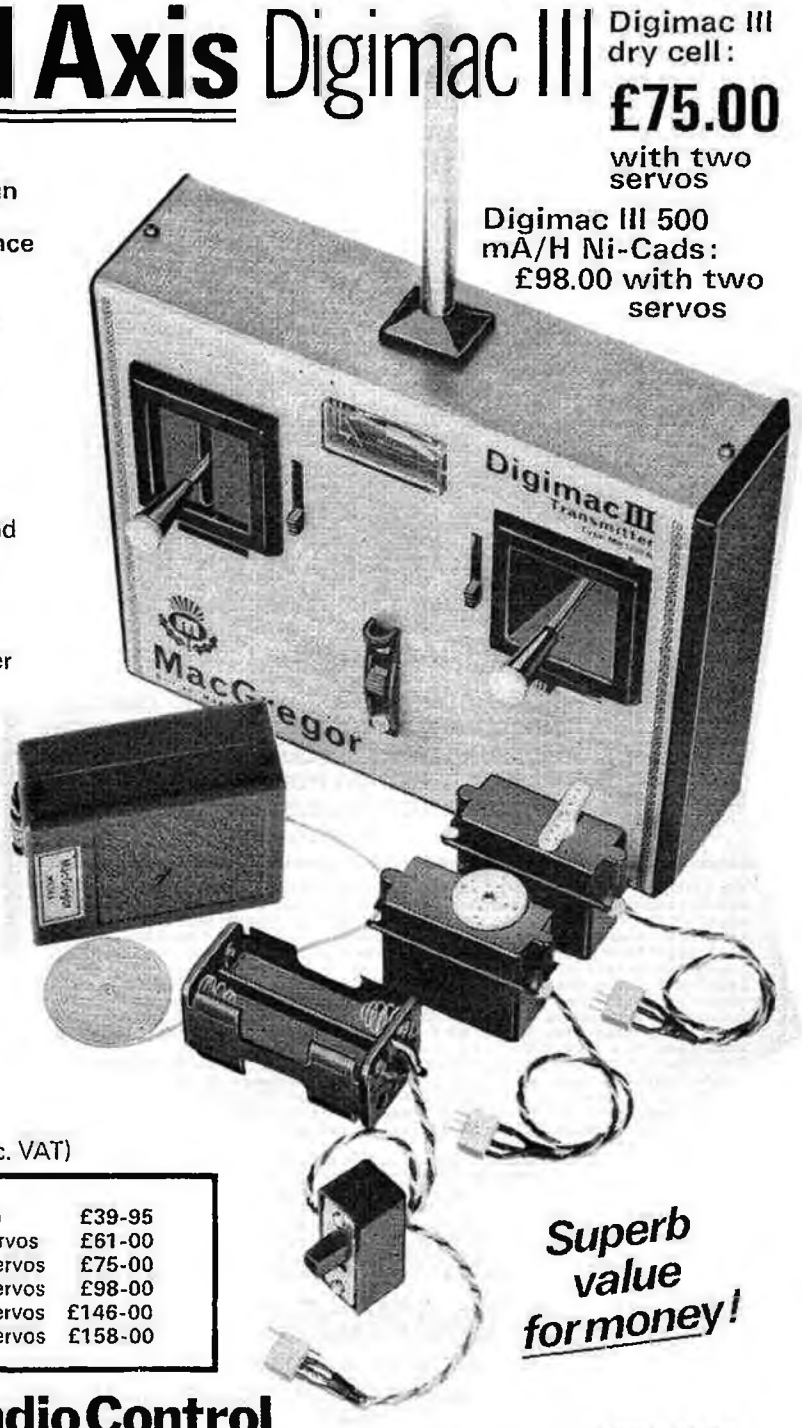


**Digimac Models and prices** (inc. VAT)

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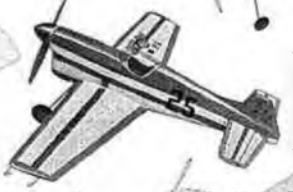

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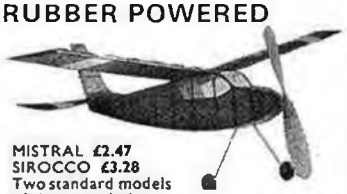

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## Irvine multi-strand Control-Line wire

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|---|---|
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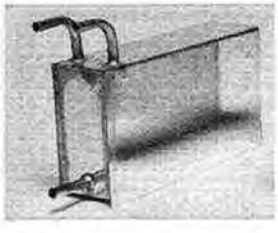
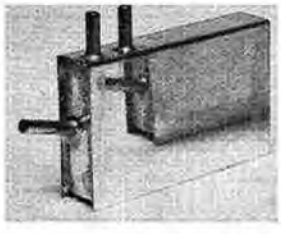
| 70ft Heavyweight ... ... ... ... ... ... | 65p |
| 100ft Heavyweight ... ... ... ... ... ... | 84p |

## Mercury Fuel Tanks

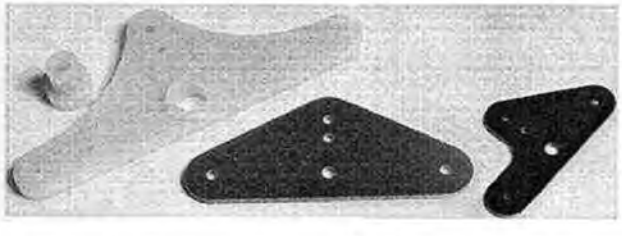
| | |
|---|---|
| 7½cc team race ... ... | 51p |
| 10cc team race ... ... | 51p |
| 15cc team race ... ... | 58p |
| ¼A Wedge tank ... ... | 51p |
| 1¼" Wedge tank ... ... | 69p |
| 2" Wedge tank ... ... | 62p |
| Combat Wedge tank ... | 69p |
| 2" pressure tank ... ... | 60p |
| 2¼" pressure tank ... | 69p |
| 3" pressure tank ... ... | 76p |





## Bellcranks

| | |
|---|---|
| Mercury 3" heavy duty ... ... | 19p |
| Irvine 1¼" paxolin ... ... ... | 9p |
| Irvine 2" paxolin ... ... ... | 14p |



## Sulivan Adjustable Control line handles

| | |
|---|---|
| P.85 — small adjustable ... ... ... | £1.15 |
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|---|---|
| Class A-B loop end kit ... | 65p |
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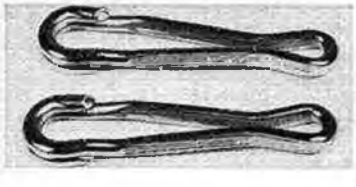

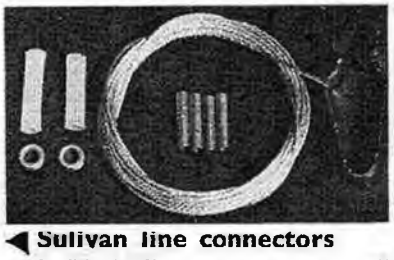

## Sulivan line connectors

| | |
|---|---|
| Small (packet 2) ... ... ... | 25p |
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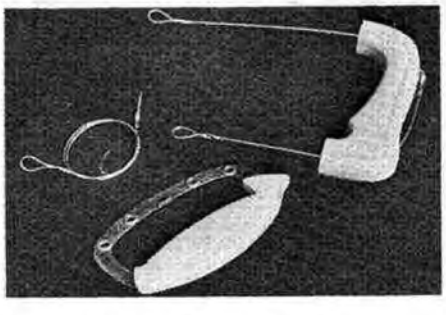

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| Smith/Fry Goodyear | £1.80 |
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| 8 x 4 or 6" or 8" | £0.48 |
| 9 x 4 or 6" | £0.60 |
| 10 x 4 or 6" | £0.70 |
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| Don's Quick Fills (limited amount only) | £0.85 |
| Rotary Bellcrank | £0.43 |
| Cox Conquest 15 | £45.00 |

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| | |
|---|---|
| Epoxy Resin Kit for Wings - Props | £5.23 |
| K.B. Polyester Resin | £5.95 |
| **Epoxycote** Fuel Proof Paint - Use with our 0·6oz. Cloth Colours: Red, White, Black, Blue, Yellow each | £0.75 |
| 0·6oz Fibreglass Cloth for Wings - apply with resin or Epoxycote ... sq.yd. | £1.90 |
| KB Fibreglass Cloth ¾oz, 2oz, 6oz pack | £3.25 |

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| E.D. Super Racer 2·4cc | £14.47 |
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| S.T. 46 stunt | £29.81 |
| MVVS D7 diesel | £18.25 |
| MVVS Schnuerle RV | £27.50 |
| Thunder Tiger·15 glow | £10.94 |
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| Rossi 15 RV Team Race | £44.50 |
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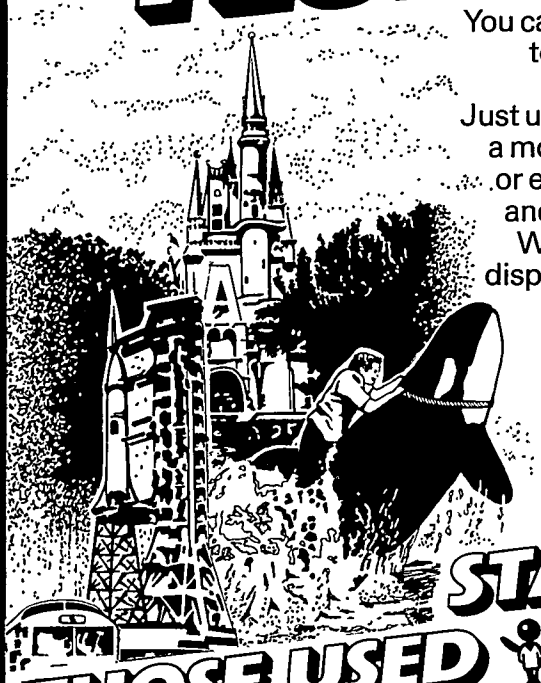

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CAMBRIA *HOBO* 28" span . . . **£2.25**
All balsa with die-cut & colour printed parts. Cambered wing and tail.

CAMBRIA *MERLIN* 33" span . . **£2.65**
Sheet balsa fuselage, built-up wing and tail. Precut balsa parts. Clear canopy.

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AI class glider with balsa box fuse, tissue covered wing and tail.

GRAUPNER *SONNY* 27½" span **£3.98**
All balsa with preshaped parts. Simple assembly. Superb flyer!

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43" span scale sailplane with built-up tissue covered construction.

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Open class high-performance towline sailplane. Balsa die-cut parts.

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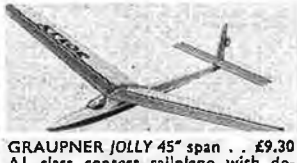
GRAUPNER *PILOT* 43" span . . **£7.35**
A really fully prefabricated kit with die-cut sheet parts, milled stripwood, plastic parts, etc, etc.

GRAUPNER *BEGINNER* 39" span **£7.35**
Ideal as a first built-up model. Quick-build plan, die-cut sheet parts, milled stripwood, etc, etc.

GRAUPNER *UHU* 48" span . . . **£8.50**
Latest version includes plastic fuselage shells and other parts, preshaped balsa parts, wire and other hardware.

STERLING *DIAMANT* 74" span **£8.95**
Superb scale sailplane with T-tail and high aspect ratio wing. Built-up, tissue covered construction.



GRAUPNER *JOLLY* 45" span . . **£9.30**
AI class contest sailplane with de-thermaliser. Converts to pylon power (Pylon mount price £1.90).

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GRAUPNER *NANCY* 49" span . **£11.25**
AI class sailplane with auto-rudder and D/T. All parts shaped.

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STERLING *CIRRUS* 87" span . . **£12.95**
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Quickbuild model with preshaped parts, canopy, adhesives, decals, etc.

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Semi-scale sailplane, ideal for R/C.

*CHILTERN* **£16.30** *MENDIP* **£16.75**
Two R/C or F/F sailplanes from Aviette. 66" span *Chiltern* is a soarer. 60" span *Mendip* a stunter.

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Updated version of this popular R/C soarer. Takes pylon mount (£2.50).

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CAMBRIA *CAPSTAN* 72" span **£18.95**
Near-scale soarer. Foam wings, pre-shaped balsa fuselage and tail parts. Die-cut ribs, canopy, etc.

## price range £20 to £30

GRAUPNER *KATY* 67" span . **£20.98**
A2 contest model with auto-rudder & dethermaliser. Die-cut sheet parts, milled stripwood, plus plastic parts, tissue, adhesives, decals, etc.

GRAUPNER *AMIGO II* 79" span **£22.50**
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Graupner **Cumulus** 110" span **£108.00**

**SEE THEM ALL AT YOUR MODEL SHOP**

# Heard at the HANGAR DOORS

Dutch Model Exhibition Utrecht, March 23rd-27th, covered all hobbies from R/C helicopters to electronics, steam trains to photography. This view of the huge halls taken during our visit illustrates the encouraging support for "Techniek in Vrije tijd" as it is called.

**WOODVALE 78** promises to be a superb celebration week. Events run from August 5-10th opening with a weekend extravaganza in which world leaders in R/C aerobatics will vie for special prizes in a spectacular three round demonstration. A Wakefield vintage demonstration will honour the Golden Anniversary of the famous trophy. Free Flight Scale international, Class II Scale R/C and the novelties for which Woodvale is renowned are part of a big programme leading up to the World Championships for all the control line and scale classes (except F/F). We met the event chairman, Arthur Searle, along with his vice chairman Roy Godfrey, PRO John Hannay and N. West Area Delegate Derek Heaton, on site to introduce them to FAI Chairman for C/L Doc Laird Jackson. 'Doc' was on his way to the CIAM approval meeting in Paris. Inspection of the smooth runway, neat grass surrounds and meeting officials, helped to convey full confidence in the N. West Area of the SMAE for what will surely be the biggest ever model meeting ever staged anywhere. 400 competitors are to be housed in the Liverpool University campus. Nearby Southport is briefed to aid those who seek hotels and social events are planned to make the week a memorable one.

**TRIALS AT DUXFORD.** Final preparations are now being completed for the Trials to select the British Team for this year's Control Line World Championships being held at Woodvale, near Liverpool, in August. Best news is the availability of Duxford, thanks to the co-operation of the Imperial War Museum and the Duxford Aviation Society, as the airfield also houses many of their static exhibits. Numerous aircraft are on show in this continuously expanding Historic Aviation Centre which includes Concorde 101.

All the control line events, speed, stunt, team race and combat will now be flown at this venue and the two safety cages first used at last year's Nationals will contribute to spectator safety. An invitation Helicopter and Class II Scale R/C event will add public interest and the date to remember is 7th May.

'Doc' Jackson, FAI Control line Chairman gets a full briefing from Derek Heaton beside Woodvale Control Tower. Airfield map on wall shows runway pattern. Modelling events will be along runway 35-17.


**INDOOR WORLD CHAMPIONSHIPS** have now been confirmed for August 26-28th to be held in the airship hangars at Cardington with Model & Allied Publications sponsorship. This now replaces the British Indoor Nationals previously scheduled for that date. Further details will be announced in due course but the event will in any case, be restricted to SMAE membership due to the disruption to flying conditions produced by an audience. For those seeking a more active role in the championships, the organisers are still looking for assistants and time keepers.

**WAKEFIELD JUBILEE.** Following growing interest in this event a competition with substantial prizes will definitely be organised provisionally in October by Bob Wells. Proposals are for pre-1954 rule models with a special prize for pre-1951 rule models, published designs *or* those conforming to the specification will be eligible, details to follow. One notable omission from last month's Wakefield plans list was of course John O'Donnells 'Borderline' D/512X price £1.30 so plan your building programme soon.

**PONTINS, SOUTHPORT,** was the venue for the Northern Model Makers Festival from March 23-31st and proved just how vulnerable aeromodelling is weather wise! What a blow-out! It was OK for the live steam trains, the ECRA slot cars, the Power Boats, R/C Yachts (and how!), the wargamers, model railway operators and indoor pool boaters; but anything less than a .60 R/C bomb was likely to be blown away. So, ever inventive, and led by Dave Hutchinson the redoubtable Scot, the aeromodellers turned to chuck gliders in the ballroom, and dare we say it – electric R/C cars. Southport has all the venues for all model hobbies but it certainly needs calmer weather for model flying and this Easter was more than cruel. Socially, the modellers' festival went like a bomb – here's to the next at Brean Sands in October.

**£1,000 ORNITHOPTER PRIZE** will be withdrawn in June if it remains unclaimed. This model makers' version of the Kremer Prize announced in *Aeromodeller* May 1974 offered the prize money to the first birdlike craft to cross the English Channel. Rules stated that propulsion must be derived substantially from oscillating surfaces similar to a bird's wing. So far there have been no takers.

Many successful ornithopters exist in the history of Aeromodelling. In the United States, free flight powered versions have been flown. As a final incentive an additional offer of £1 per metre has been offered to the furthest flying model.

**FREE FLIGHT POWER** engine stopping brake by Stafford Screen which we mentioned in the description of 'Hot Rats' FAI Power design last November was quoted as costing £2. Apparently the recommendation has been well taken but alas the price was wrong! Should have been £3. Those in need, please note.

TO THE MORE adventurous modeller, the construction of one's own compressed air supply system is nowhere as daunting as one might imagine. The photographs depict several approaches, carried out by a variety of modellers up and down the country. The schematic diagram shown gives the basic configuration and individual variations have been successfully built using parts that 'were to hand'.

The source of the parts must be our first concern, followed by the technical knowledge and skills required to complete the project. Quite obviously all parts can be obtained commercially, very often in bolt together format reducing construction to the level of Meccano. Bear in mind that by providing the labour content oneself, the final cost will be well below that of the assembled commercial product.

Great savings can be afforded by utilising ex-WD or other surplus to requirement items. The examples shown here have all been built (including the purchased parts) for less than £30 by such careful shopping for parts. Let us therefore consider what we shall need.

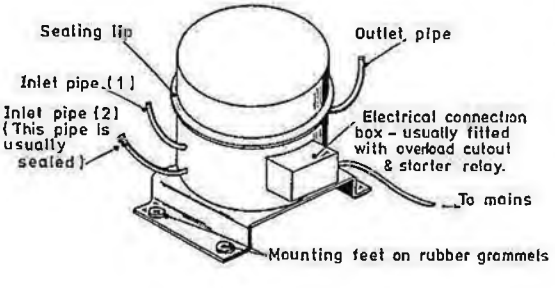

## Fourth instalment of a detailed series on the use, choice and techniques involved in spray finishing by IAN PEACOCK

### Air Pumps

Air pumps are readily available on the War Surplus market. They may often be salvaged from scrap heavy duty military trucks where they were used for tyre inflation and similar jobs. They often have the appearance of single cylinder two stroke engines. This type of pump is usually motorless, being belt, or gear driven, from an auxiliary power take-off from the lorry gear box (the air-brake reservoir from the same truck would also make a good air receiver!). Many sizes and styles abound and can often be had for a modest fee, and when fitted with a suitable pulley this type of pump may be driven by an electric or petrol motor of around ¼–½ hp. One may be able to solicit such a motor from the same dealer, failing which, try talking to a washing machine service rep. Many automatic washing machines are wound with two sets of windings – one to 'wash' (slow) and one to 'spin' (fast). If you can get a motor where the 'wash' winding has burnt out but the 'spin winding' is intact you will almost certainly be able to acquire it for its nominal scrap value.

Another handy source of pumps is the refrigerator, where under normal use the pump is used to circulate the freezing compound. Many of the older fridges have a motor-driving-a-pump-via-a-belt arrangement which has a similar appearance to the ex WD units. Most modern domestic refrigerators and freezers however have the motor and pump built as an integral unit which is completely sealed. These may vary both in shape and in size being mostly can shaped (about the size of a Party Four beer can) or roughly rugby ball shape and size. The units from the larger refrigerators and freezers having a greater output in terms of cu.ft./min although all produce about the same pressure.

Typical 'fridge compressor




The unit is attached to the cooling system as a one piece easy to replace service element, and faulty ones may often have the fault in the cooling system and not in the pump. A quick chat with your friendly neighbourhood service depot will, more often than not, yield a ready supply of such units for the price of a few beers. Cut away the cooling radiator and piping and presto – instant pump!

One word of caution, however: these units, in normal use, are self lubricating; that is to say, the lubricating agent is carried round the sealed system with coolant. Break this sealed chain, as we are doing, and the lubricant will slowly leak away, carried along by the air stream (producing oily air!!) and necessitating occasional top-ups (through the air inlet) with light machine oil.

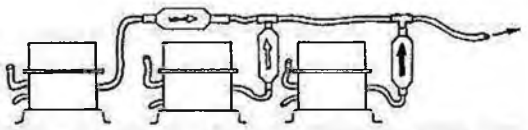
Some fridge pumps don't have exhaust valves and are designed only as circulating pumps, the inlet valve being in the piston crown. These types of pumps can be recognised by having only one union on the head, no externally removable valves on the head and an inlet union fitted in the crankcase. Conversion is difficult, leave these units well alone.

Fridge type of compressors are capable of very high pressure but have a poor flow rate. One such unit was tested to a pressure of many thousands of psi before it was disconnected for safety reasons. Its flow rate is such that one could run several airbrushes virtually for ever, but may prove inadequate for larger professional guns such as the Binks Bellows 920, or the De Villbiss MPS.

To discover if your compressor is going to supply enough air for your needs, first find out how much your gun or air tool uses. This is determined in CFM (cubic feet per minute). Working on the general basis of most compressors pumping to 100 psi, you will get approx 3½ CFM per horsepower or rather less from a petrol motor. Airbrushes use anything from 0.3 FCM; large guns Binks-Bullows 222/230 etc. anything from 6.30 CFM.

Various solutions present themselves, the gun can be used intermittently, allowing receiver pressure to rise between uses. Alternatively fit a much larger receiver, the sheer mass of air will act as a 'buffer' between the gun and the compressor.

Two or more fridge units can be connected in parallel. Each compressor will require its own one way valve, to



Multiple pump layout to increase flow rate. Note that a separate one-way valve is needed for each pump. Pumps & valve need not be of identical style.

stop any pressure 'feedback' from one pump to the next and to avoid the pump from having to start up against the back flow from its neighbour.

**Receivers**

Air receivers can be found under many different guises, fire extinguishers, empty calor gas bottles, or failed aqua-lung bottles (normally tested to several thousand psi) which are still quite suited to our use at around 100–150 psi. One character I know even plans to use an oxygen bottle from a Battle of Britain Spitfire (sacrilege!). Of these various options I used a fire extinguisher as it was to hand at the time. Fire extinguishers are made to high standards, are usually pressure tested to around 300 psi and often are glass lined to help stop corrosion. Operating therefore, at 100 psi max offers a 200 per cent safety margin.

Obtaining these items second hand is not too difficult but watch for signs of rust or other corrosion that will result in a weak and potentially dangerous tank. Most manufacturers frown on such misuse of their products and unless you are in the know, you are unlikely to receive much help from the suppliers.

Producing one's own tank is an area which needs viewing with great caution, as a poor quality reservoir is a major source of danger. Without proper equipment and skills it is best avoided. The one shown in the diagram and photograph was produced by a modeller, who in his employment, has access to these skills and equipment. It was based on a section of seamless steel pipe about 6in. in dia and having a ¼in. thick wall. This pipe was drilled and tapped to take the appropriate fittings and ¼in. thick steel end plates were welded in place. The entire unit was stove enamelled for durability. No provision was made to stop internal corrosion working on the assumption that it would take a year or two to rust through ¼in. steel by which time he could make a new one. Fortunately at his place of employment there exists facilities to hydraulically pressure test such tanks – an essential move.

To give you some idea of just how much stress they have to take, here are some figures showing static thrust on the end plates of different diameter receivers containing air at 100 psi; 6 in diameter 1750 lb; 10 in diameter 4500 lb; 12 in diameter 7000 lb; 14 in diameter 10,000 lb (4½ tons approx). Length of receiver makes no difference. As you can see, a weak receiver is a potential bomb.

**Fittings**

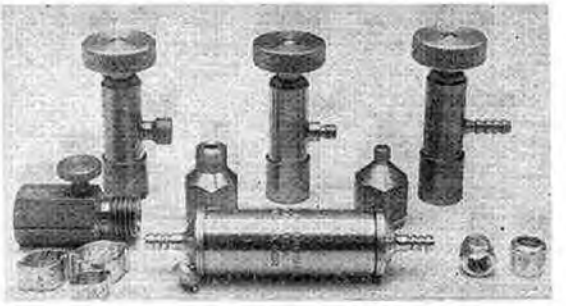
Regulators, gauges and valves may often be obtained in the surplus shops such as can be found in Tottenham Court Road and similar places although if all else fails, they are not too expensive to purchase new.

It pays to shop around for new parts and to check out stockists of industrial pneumatic parts as they sometimes offer identical equipment substantially cheaper than when it is packaged as spray equipment. 'Wade' or 'Schrader' are well known names in the pneumatics industry. Look up suitable stockists in the yellow pages of your telephone directory and shop around – you'll be surprised at what you will find, and when you go shopping – pick up the fittings, elbows, connectors, pipe etc., from the dealer at the same time. They should all be available over the counter and not too expensive either.

Use only nylon pipes of low pressure characteristics. The suppliers can tell you about these characteristics and you should choose a pipe with a fracture point of around 200–250 psi. Then, even if the safety valve jams, or anything else fouls up, the pipe will rupture with far less serious consequences than putting the tank into orbit.

**Safety**

It has been said before and cannot be repeated too often – *compressed air is dangerous.*



**A wide selection of adaptors is available; shown here are some of Microflame's excellent accessories together with Paasche's in line oil/moisture air filter (cylinder at front) all represent good value.**

Like most dangerous situations, however, a degree of detailed and thorough investigation beforehand can reduce the risk to an acceptable level. It might be worth checking with your insurance agent though, to see if you are covered in your house policy; after all, if you're airbrushing indoors and your compressor explodes and wrecks the joint, you might have a sticky claim on your hands. The safety blow-off valve is therefore of paramount importance. Whatever combination of parts are selected for a 'home-brewed' outfit, this item *must* receive the highest level of attention. Set it to blow off 5–10 psi higher than the pressure switch.

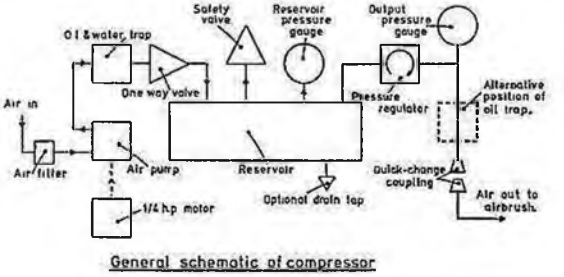
I would also stress here that all pressure vessels (wherever they are obtained from) should be tested to around 2–3 times the expected working pressure and should be re-tested at intervals of not more than a couple of years. Corrosion inside the various parts of a compressor will, in time, reduce the efficiency, but corrosion inside the tank will reduce your safety margin quite dramatically.

If you want to test an air receiver, don't just let fly with the compressed air and wait round the corner for the bang, 'cause it might just follow you through the wall. Tests are carried out with the receiver full of water and then pressurised, so if it does blow, it just goes pop and falls in half.

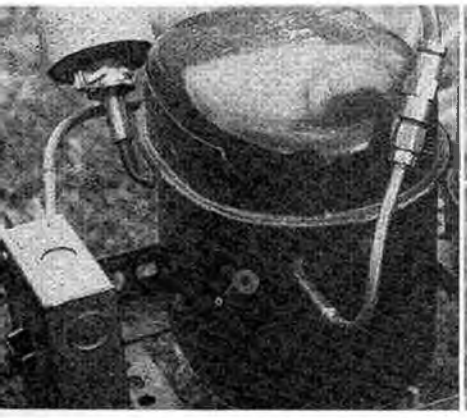
Many engineering firms, hydraulic and pneumatic companies, and even the local firemen, have pressure testing facilities. Whilst it is unlikely that you will be able to obtain a valid test certificate due to the vessel being improperly used, a test to satisfy your own piece of mind will usually only cost you a donation to the test department's beer fund! *Do it!!* It is for *your* health and safety and that of *your* family.

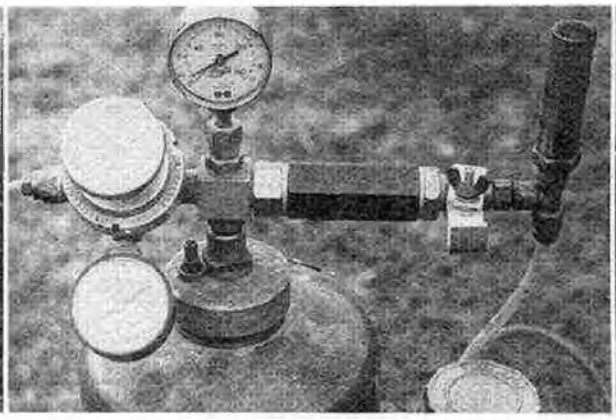
All this high-powered chit-chat about safety may well have left you deep in gloom and despondancy and convinced you to go back to your old, never-going-to-blow-up paint brush. Do not despair! Armed with the knowledge and skills common to the serious modeller throughout the world, a little careful preparation will reduce all the risks to an acceptable level.

So let's get down to the nitty gritty. Construction is quite straightforward being largely a question of connecting the pieces together with bolt on unions and bits of pipe. No detailed instructions are offered, due to the almost limitless variations to the theme. Diagrams and photographs show several tried and tested approaches but I'm sure there are many others that we do not know of, also giving valiant service. The basic principle, however, is the same throughout.




General schematic of compressor





Details above left. Pump with mains switch box on left supplied with fridge pump, cylindrical air filter at rear, extra inlet pipe blanked off in foreground. Centre, air from pump passes through vertical safety valve and horizontal hexagonal non-return valve, into cylinder with pressure read from gauge on top, output is regulated by knob on left, to pressure indicated by second gauge. Wing nut bracket will hold spraygun. Right, oil and moisture trap collects sludge in glass bowl with drain plug underneath.

In theory the best place for the oil/moisture trap is last in the line before the gun or airbrush. In practice, it works best if fitted straight after the pump. This has the advantage of keeping most of the oil and water from congealing in the tank and thereby helps to reduce corrosion. Purists would argue, that water condensing in the rest of the system will still appear in the paint. Perhaps the best answer is to fit a separator at both positions for the ultimate results.

Note also the optional tap to facilitate draining of any sludge from within the tank. Take care, however, when fitting these options, as extra holes drilled with gay abandon in the pressure vessel may well weaken it. It will be apparent from photos and sketches that maximum use is made of existing fixing points in the reservoirs that we have used. On my own unit, there was only one hole in the cap of the extinguisher, which, being glass lined, I was reluctant to drill. Consequently a christmas-tree affair of adaptors and tee pieces were screwed into this single outlet to service all the relevant needs.

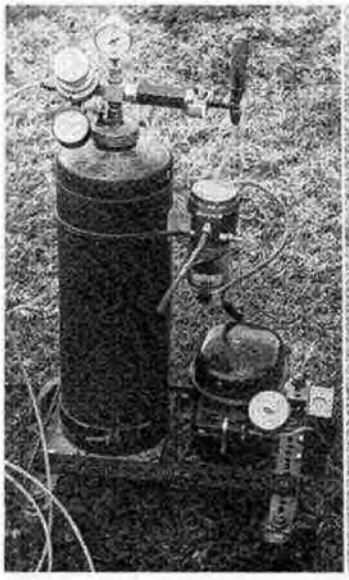
The sharp eyed amongst you will easily pick out the variations. Two pressure gauges are used on some units, only one on others. Quite obviously one needs to know the output pressure set by your regulator. The other gauge shows tank pressure and really is 'gilding-the-lily' as the safety valve limits the top end of this reading and the gun stops spraying when one reaches the bottom end. However, for the additional low level of effort, I still prefer to fit it, as it is good for the peace of mind to know what's in the tank.

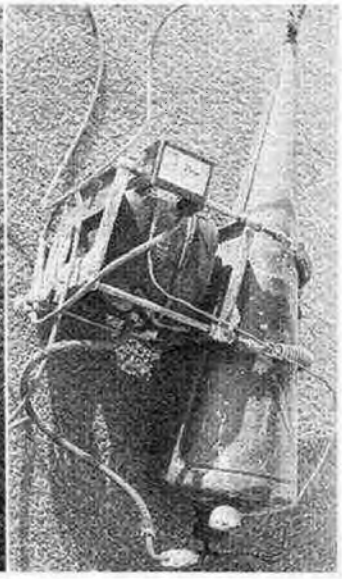
There appears to be little advantage in whether one mounts one's tank upright or horizontal, my own being upright on a Dexion frame and having castors from a defunct supermarket trolley, well it is defunct now at any rate! The well built ex-WD system shown is by Bob Horrell who runs Airedale Models in Keighley, Yorks. His unit also sports wheels, this time from a shopping bag on wheels – or in his case 'off' wheels! Bob, like me, fits an air filter to the inlet pipe. It is amazing how much balsa dust can otherwise be sucked into the air intake.

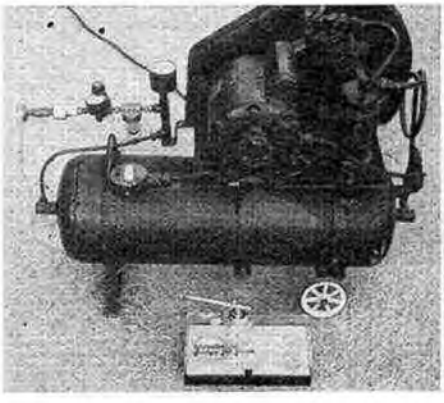
**Maintenance**

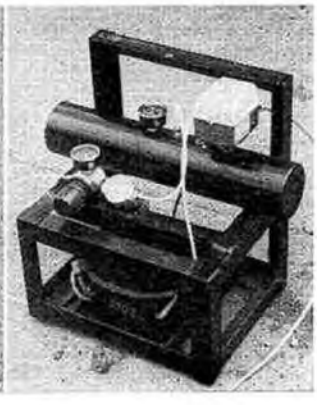
Little routine maintenance is needed with the home constructed unit provided it was well assembled in the first place. The compressor (if the fridge type) will need topping up with oil as mentioned earlier and from time to time check all unions, fittings, and joints and inspect all pipes for wear or chafing. Clean out any oil sludge from the tank every couple of years or so and have it retested. Beyond these simple points the unit should go on for ever. I have been using mine for about seven years and several others are known to me which are even older.

Finally our thanks to De Vilbiss for correcting our caption to the illustration on P158 March Aeromodeller which was in fact a section through a De Vilbiss JGA spray gun, our apologies for the mistake. Next month; choosing the paint.





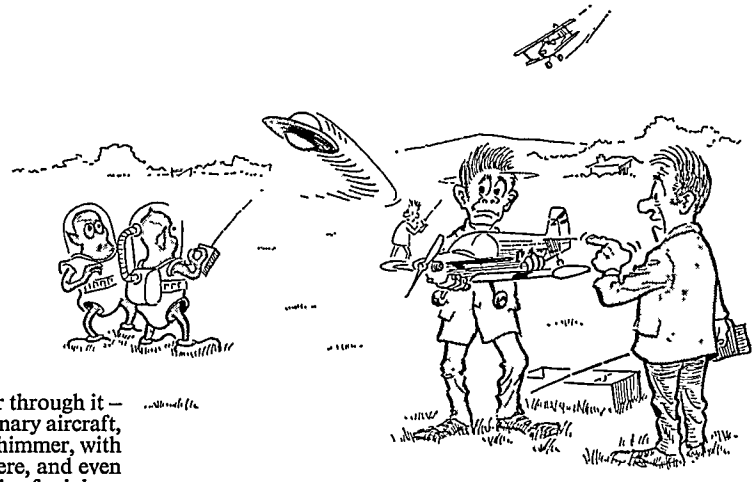




Home made compressors show diversity of approach. Above left Ian's own unit using fire extinguisher cylinder and standard fridge pump mounted on Dexion frame with wheels, details at top of page. Right, Guilford Model Flying Group using conical extinguisher offer the simplest solution. Far left, Bob Horrell used ex W-D parts, piston compressor, with shroud over belt drive from electric motor from washing machine, uses truck brake cylinder mounted on shopping trolly wheels. Left, Terry Healey's professional unit with self made cylinder from seamless steel pipe, box contains pressure operated switch which regulates fridge pump output.

# topical twists

by 'Pylonius'
Illustrated by Sherry



I wouldn't mind but I don't even believe in U.F.O's.

**Seeing it Through**

Looking at the Gossamer Condor – or rather through it – it is transparently obvious that this is no ordinary aircraft, for what we see is an indefinable polythenic shimmer, with a tantalising glimpse of a rib here, a strut there, and even the suggestive shape of a chassis, all in a dazzle of rainbow light. It is rather like an aerial strip tease with a figure of eight slowly revealing itself. Another immediate impression is that it is the work of an indoor enthusiast who having read one of those adverts about 'having built a model, now try your hand at the real thing', got cracking with the dope on an oversize bath tub.

Fascinating, too, is the way it is so characteristically American, in that the approach is so ruthless and ingenious. Nothing here of the elegant, conservative application to the problems of man powered flight of the formal British, or the brilliant adaptability of the dainty Japanese. It is the same sort of gutsy insight that junked spruce and oiled silk in favour of highly viable, highly flyable balsa and tissue, way back in the Twenties. It is also the 'let's cut out the hanky-panky' philosophy that gave our models the paddle bladed propeller and the beefy rubber motors that really got them reaching for the thermals. It is also the no nonsense way of looking at things which got the Wright brothers off the ground whilst other people were still dickering about with bird feathers and Leonardo De Vinci diagrams.

Come to think about it, this back-to-front machine is one that the Wright brothers could well have designed themselves, and may well have done so had the old Angel of Mercy tapped them on the shoulder. Drop all this involvement with engine powered flying, the Angel may have pleaded, if you develop that machine you'll only have the silly old homo saps bombing themselves to pieces from the air, and, worse than that, you will help to establish what will become the greatest affliction of mankind, the tourist industry. And think of all the huge Discordes of the future tearing dirty great holes in the delicate ozone layer. Concentrate on a man-powered machine instead to bring gently soaring man nearer to us angels rather than throwing him into the arms of old horny bonce down there.

Had we started man-powered flight in the early part of the century who knows where we might not be by now. Pedal aircraft might have been as commonplace as bicycles, but you may be sure that along the line some lazy so-and-so will have spoilt the whole beautiful, ecologically satisfying concept by tacking on a dirty big engine. Such is the nature of progress.

**Cold Comfort**

An ominous warning from the weather men that we are about to enter a mini ice age might well mean a more rugged time ahead for the model flyer. We are promised, or, rather, threatened with, a series of short, hot summers and long, cold winters, from which we infer that it will be either too hot to fly model planes, or too cold.

Now my style of model flying – and I am not alone – is strictly temperate zone stuff. When I see that wing warping sun turned up to full, head boiling candle power, and feel the hot sting of a rampant thermal on my cheek, I think of less energetic hobbies such as sun bathing or slot car racing. And when I look out from a cosy room at the snow falling and the icy wind blowing, I thankfully give up all thought of model flying for a spot of construction work, like gluing my nose to the telly.

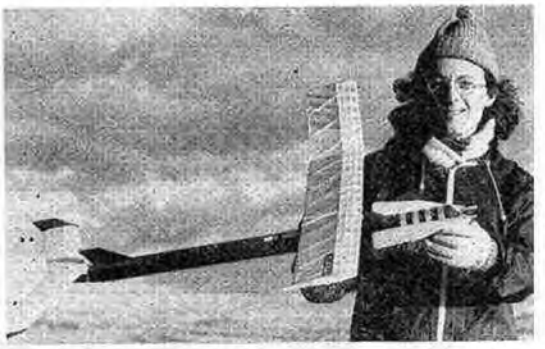
When I started out in model flying, which was shortly after the last ice age, the weather was all enticement. As is well known, the old ice age flyers built their models of spruce, oiled silk and any other weatherproof, waterproof materials they could lay their hands on, but when the climate came over all sunshine and smiles we could then build our models of more delicate materials – at times it was possible to fly indoor models over the local park. That was the age of the regular Sunday morning meeting when, with the certainty of a balmy, breathless day, you could enjoy all the fun of early model flying, including a romp with those little scale models which now can only be flown indoors.

The one consolation we have in the mini ice age prospect before us is that the weather forecasters are always wrong, particularly when they get over-excited by the sight of a snowflake, or two days without rain.

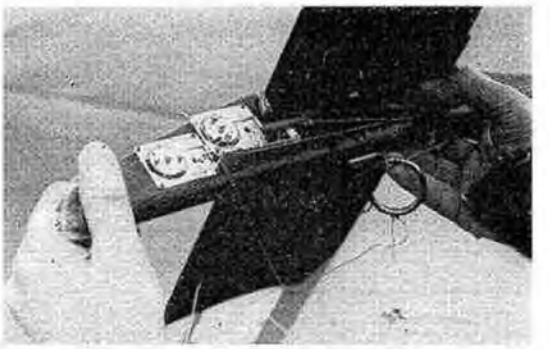
**Natural Break**

Now and again even the most industrious of us model builders surface from the sea of balsa chippings to savour the heady world of the telly commercials. Mostly the bloke content of our hobby rates the commercial according to its erotic content: the dishes at the dishes, and the nubile inhabitants of the exotic islands miraculously filled with coconut bars or iced cans of soft drinks. Even so we become aware of an ideal world of beautiful mums and handsome dads, wherein all the eight-year-old sons are model plane builders. Look in on the happy family, and you will see mum cooking instant soup, dad refreshing those parts the other beers cannot reach, and sonny boy working industriously at the framework of a model aeroplane kit. The manly dad, engaged as he is at the suitably hairy chested hobby of beer drinking, might be giving sonny a helping hand in the cause of family togetherness, but would not, of course, be directly involved in such a suitable-only-for-a-growing-lad pastime as model building.

All this fits in nicely with the public view of aeromodelling: the model plane being the sort of toy the well brought up eight-year-old can make for himself that is, if he has the right sort of body building, brain building breakfast food, health giving tonic drink and the other prescribed supermarket fare that will develop him into a robust, lager drinking adult. However, in the interests of all that we hear about the Trade Descriptions Act I would like to see testimonial proof that the supposed model building eight-year-old actually built the depicted model himself. Most likely you will find it was the work of a 65-year-old grandfather who hasn't even got a telly, and who lives mainly on home grown spinach.



Winner of Coupe d'Hiver at SMAE's Winter Mini Contest was Andrew Moorhouse with his unusual Lazy Lightnin' featuring twin fin swept tail and flat bottom sectioned wing, using full depth balsa spar using props laminated round a tin-can former.



Close up of John O'Donnell's new F1A glider which replaces his original Stowaways built in the 60s. Employs twin timers to overcome occasional D.T. failure, chance of both failing are not merely doubled but squared. Heavy tow ring aids release.

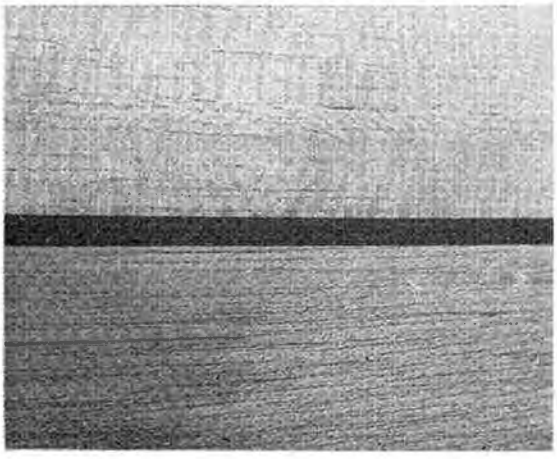
# THE FREE FLIGHT SCENE

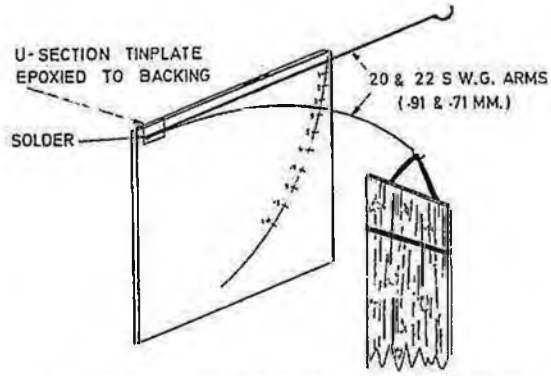
## This month: Martin Dilly

WEIGHT CONTROL is probably the single most important factor in free-flight model building, and it directly affects the performance of the aircraft. It is well worthwhile to regularly go through the racks of your local model shops, buying up all the good balsa you can find, whether or not you are about to start building next year's Wakefield winner that evening.

My own personal preference is to buy no strip at all, but to cut my own from sheet balsa; this way you can ensure that spars and longerons are matched for weight and stiffness, instead of having to search for strips that will produce a reasonably symmetrical fuselage, rather than an expensive, built-up pretzel. As any successful indoor flyer will tell you, the circular saw cuts on the surface of balsa produce a stress-increasing effect that considerably weakens the wood. Sanding a sheet on its two sides is far easier than removing saw cuts from all four sides of a small section strip. Use sharp scalpel and a long steel straight edge, the thicker the better, to help keep the blade perpendicular to the wood, to avoid irregularities. You can also produce non-standard sizes or tapered strips.

While straight-grained wood is normally what's needed for spars and longerons, a wide trailing edge is usually stiffer chordwise if it displays some signs of quarter grain on its wide faces. The photos show examples of straight- and quarter-grained balsa (also sometimes known as A-cut and C-cut wood), but do make sure the wood you select has consistent grain from end to end of the sheet. The characteristic speckled appearance of quarter-grain balsa is so rare in the wood racks as to be easily spotted as you leaf through a pile of sheet. Do ask the proprietor's permission to select the wood though, and avoid digging a finger nail into balsa to assess its hardness; it's far less effective than weighing, damages the wood and infuriates the chap selling it.






Having spotted the wood grain you want you need a simple means of checking its density before you buy it. There's no point in buying wood you will never use because it turns out to be too heavy. I have used a simple deflecting wire type of weigher for years that is very cheap to make. While not necessarily accurate enough for indoor building, it gives a good quick idea of wood weights in the shop. The calibration of the wire can be made with known weights, or else the full-size scale can be stuck on the weigher direct, a table showing weights of standard size sheets of varying densities being stuck on the back. Two wire arms are used to give a greater range to the instrument; wood can be attached to the hooked end of the beam either with a rubber band or a length of Sellotape.

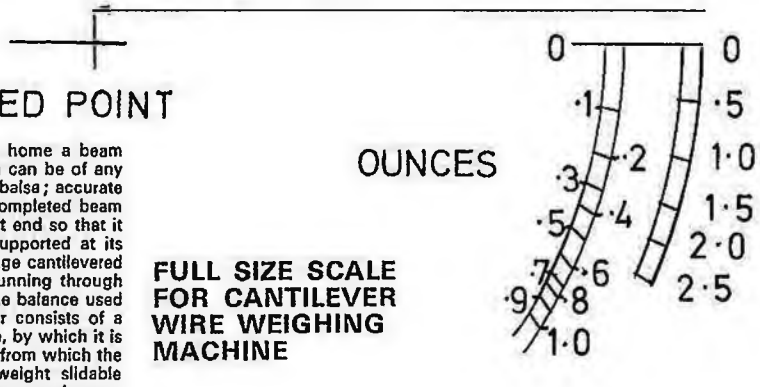
If this is all too much for you, it is also possible to weigh a sheet of balsa with a coin, a finger and a tape measure or rule. Assuming that the sheet is of uniform density, it will balance midway along its length; adding a coin of known weight at one end will displace the balance point, this displacement being proportional to the weight of the wood – the greater the displacement, the lighter the wood. For those interested, the equation is:

$$W = C\left(\frac{L}{2y} - 1\right)$$

where W is the weight of the wood, C is the weight of the coin, L is the wood length, and y is the displacement of the balance point from the centre of the wood. A 10p piece weighs 11 gms, and a calculator will make the operation simple.

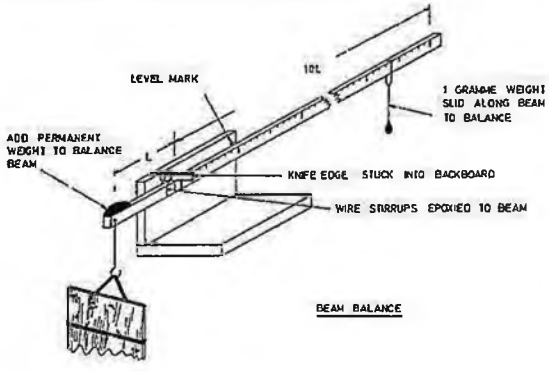
The current Solarbo output for UK consumption is cut to Imperial sizes, but marked with approximate metric equivalents; their wood for the overseas market is both cut and marked in true metric sizes and lengths.

**Contrasting grain patterns of speckley quarter grain or C - cut wood above the more familiar straight grained or A - cut balsa. Each exhibit different strengths and stiffnesses chosen for various structural requirements.**




**FULL SIZE SCALE FOR CANTILEVER WIRE WEIGHING MACHINE**

For accurate weighing of materials and parts at home a beam balance is the cheap and simple answer. The beam can be of any durable material, such as hardwood, metal or even balsa; accurate marking of the calibrations is important, and the completed beam should be balanced carefully by weighting the short end so that it remains horizontal in the un-loaded state when supported at its pivot point. The pivot itself can be either a knife edge cantilevered out from the vertical arm on the base, or a wire running through two holes in a stirrup at the centre of the beam; one balance used for many years by a well-known Croydon member consists of a yard of ¼in.sq. balsa, with a thread loop at its centre, by which it is hand held, and another thread loop at the short end from which the component is hung, with a thread-suspended weight slidable along the graduated beam. Whichever system you use, make sure that the pivot point is used as the starting point for the measurements, otherwise accuracy will be affected.




**AEROSOL CONTACT ADHESIVE**

If you are using foam cores for wings, have you tried Scotch-Grip Spray 77? Bryan Spooner has been using it with some success on F1C cores since it does not affect polystyrene foam, and I am halfway through an F1A wing; costing around £2 per can, it is intended mainly for the industrial market and should be used with very good ventilation, for health reasons. Do not use the spray too close to the foam, however, as it appears that the propellent does dissolve it, but normally evaporates before hitting the surface if used at the correct distance. One distributor for Spray 77 is Waygood Peerless, Airport House, Purley Way, Croydon CR9 4LS

Still on the subject of contact cements, have you used any Fablon recently? Next time, save the siliconised backing paper, which makes a handy slip sheet when you are contact cementing a large area like a sheet surfaced wing. After both surfaces are dry, lay the backing paper over the structure so it covers all the glued areas; place the glued balsa sheet over the paper and line it up exactly, before gradually sliding the paper out while pressing the exposed surfaces together. This method avoids things getting stuck together before alignment.

**The Ice Age Cometh! Above, Mark Harper prepares to launch John Coopers fly off winner, 2nd placer 14 years old Chris Parry's V dihedral model seen in background. Runners up Falcons, John Carter shelters in car hatch back while Russell Peers piles the turns on out in the snow.**

## SMAE CLUB CHAMPIONSHIPS

The blizzards on 12th February kept entries low for the Club Championships at Barkston Heath. In fact conditions were quite pleasant, as long as one kept moving, wore half a dozen layers of clothing, and was not put off by six inches of snow and frequent snow showers.

There were useful patches of lift, in spite of temperatures remaining below freezing throughout the day. Day-glo extremities on aircraft helped model location in the near white-out conditions that we had during the falling snow, as the sky and the horizon merged to produce a rather unreal sensation as one walked alone in the middle of the airfield. One A/2 came back with miniature snowdrifts against its turbulators, formed as it was carried back upwind. I came across Russell Peers' Open Rubber model lying in the snow downwind with the rear of its fuselage broken off as it D/T'd onto a frozen molehill, and with the tailplane missing. Mysterious two foot long streaks in the virgin snow led to the tailplane which had blown away, bouncing in the snow to end a hundred yards away in a hedge downwind.

Free Flight Sub-Committee chairman Mike Fantham had set two minutes as the maximum, and this resulted in three (Cooper and Parry of Biggles and Dilly of Croydon) having six minutes in Glider; two (Payne of Biggles and Peers of Falcons) in Power; and John Cooper as the only one of the seven rubber flyers to max out. Team points for this event are decided by the Plugge system, depending on the number of entrants in the event as well as the individual's position in it, so the fly-off was necessary to decide the scores. As sole Croydon representative, I opted to return my frozen Vega to its box and leave John Cooper and Chris Parry, flying a three week old Shoaf-airfoiled model with a straight-dihedralled multi-spar wing, to duel for top place in glider, John finally managing 2:11 to win. Trevor Payne's 3:18 from his ·40-powered model squeezed Peers into second place, with his Eta ·29 model newly sporting a glass-loaded nylon 9 x 4 Taipan prop. This gave Biggles their fourth consecutive Club Championships victory by winning all three classes to gain maximum points.

**Results**

| | | |
|---|---|---|
| 1. | Biggles (Cooper (OG), Payne (OP), Cooper (OR) | 300 points |
| 2. | Falcons (Carter (OG), Peers (OP), Peers (OR) | 204 points |
| 3. | Anglia (Hambley (OG), Wells (OP), Paveley (OR) | 182 points |

## CROOKHAM GALA

Although winter and early spring days are often ideal for free-flight and certainly are the best time of year from the crop viewpoint, the Crookham Gala at Bassingbourn on 26th February was held in the same windy conditions that had plagued the previous contests so far in 1978. People were clearly unwilling to drive long distances to risk aircraft in the poor conditions forecast, and entries were on the low side; organisers Fred Chilton and Reg Uden decided on three 2½ minute maxes for the Open classes and five twos for the combined FAI. In the latter event I noticed only Bob Wells flying Wakefield, the rest all flying A/2s.

In the stiff breeze it was very much a case of waiting for a lull and then straight up and off for the glider flyers; with the wind blowing diagonally across the airfield, models were crossing the various revetments and buildings in the middle, and several of them fell out of reasonable-looking lift that dissolved into turbulence downwind of the obstructions at about a minute and a half. Also lurking downwind was the lake that forms part of the Army's assault course; I spotted Noel Parry's A/2 floating upside down in the middle and by the time I reached the water's edge it had blown ashore, its wings at least half filled with water, making them double the normal weight. Noel spent most of the remainder of the day resignedly poking pinholes in the corner of every rib bay to let the contents drain out, prior to pinning the soggy wing down for a long dry out at home.

Russ Peers had a climb tighten up unaccountably as the torque dropped, and finally turn into a pretty convincing spiral dive, putting paid to his chances in Open Rubber, which needed a fly-off to give first place to Chris Batty with 2:50.

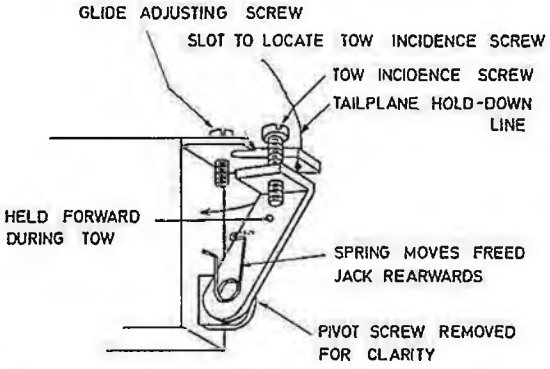
Crookham had provided some impressive-looking silverware on the trophy table, and with relatively high temperatures, the day was marred only by the wind, but all credit to them for another well organised event.

**Results**

*Combined FAI* – 1. J. Billam (Grantham) 7:35; 2. R. Miller (Northwood) 7:26; 3. J. Baguley (Norwich) 7:26.
*Open Power* – 1. T. Payne (Biggles) 7:28; 2. P. Harris (Birmingham) 6:42; 3. R. Peers (Falcons) 6:32.
*Open Glider* – 1. J. Cooper (Biggles) 6:51; 2. J. Carter (Falcons) 6:49; 3. M. Scott (Leicester) 6:48.
*Open Rubber* – 1. C. Batty (Bath) 7:30+2:50; 2. P. Ball (Grantham) 7:30+1:25. 3. R. Peers (Falcons) .....

A closing thought for this month. In the German Democratic Republic, A/1 gliders are flown as a junior class with a couple of rule additions: wing airfoils must be flat-bottomed, and only normal straight towhooks are permitted. A typical entry for the contest is 700, in a country with a population of only 17 million. The West German Kleine Uhu junior kit contest, organised by Graupner, attracts tens of thousands of entries every year, maybe partially because of the prizes totalling around £10,000, and has now been superseded by events for other simple F/F gliders, aimed at the under-sixteens. The resulting thrill and satisfaction that they get from competing, instead of merely flying a model with no purpose, helps to establish an early enthusiasm for the sport, and a better grounding in the basic skills of model building and flying. Perhaps the model trade in the United Kingdom should be collaborating far more closely with the SMAE to lay a solid foundation like this with our own younger model flyers, or are their eyes concentrating on the 'glossy box' end of the market?

**Other abominable snowmen present were Chris Grant far left holding Leicester Club mate Martin Scott's F1A glider an Ivan Horejsi design, while Bob Wells tramps back after retrieving his ½A power flight.**




### VARIABLE INCIDENCE TAILPLANES FOR GLIDERS

One of the problems that some models exhibit when circling on tow is excessive height loss, due doubtless to the combination of the tighter-than-normal turn radius, coupled with the added weight and drag of the towline, both tending to hold the nose down.

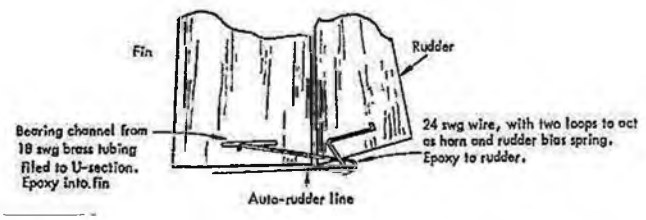
One remedy is to use a V.I.T. system that either goes more negative as the line tension decreases and the model circles on tow, or else one which holds the tailplane at a more negative angle throughout the tow, releasing it to the normal glide setting as the line drops away. Another is that used by some Soviet A/2s, which employ an aileron on the 'inside' wingtip, which droops as the model circle tows, so as to keep the tip up. Variable incidence tailplanes look like the easier choice (perhaps significantly, several of the Soviet flyers at Roskilde had gliders with ailerons taped up to be inoperable), and the 'negative-during-tow' approach avoids having to arrange for tailplane mounts to move against the pull of the D/T bands.

All that is really needed is an auxiliary jack to raise the tailplane trailing edge during tow, with a suitable means of ensuring that it swings safely back out of the way when the towline is released. The system that Australian team member Dave Simons used at the '77 World Champs uses the tension on the D/T line holding the tailplane down, to also force the light alloy jack rearwards when the V.I.T. line tension is released. The location of the jack pivot somewhat forward of the point where the upper end of the jack touches the tailplane also helps to ensure that there is an effective rearward force on the jack; a safety pin type spring looped round the pivot would make the movement still more positive. Laurie Burrows has used a different type of V.I.T. jack on his Wakefields, bent from spring steel wire with a loop at the lower end to act as its own spring; the use of steel allows a suitable nut to be soldered to it to take a fine adjusting screw. With an alloy jack the screw requires a hole to be tapped for it; I use a 12BA one, but you'll almost need a mortgage for the tap – mine cost £1.73 – and using it is a somewhat nerve-wracking operation. If you use a nylon screw instead (they are lighter than steel or brass, and also to some extent self-locking), 8BA seems to be the smallest obtainable, but try not to have more than about ¼in. of it extending unsupported; thin nylon screws can bend under the load of the D/T line holding the tailplane in the glide position, causing all sorts of puzzling and untraceable variations in tail incidence.

Dave Simons' neat installation features a locating slot into which the jack pulls for tow, which prevents sideways movement and similar incidence variations. A small piece of stainless razor blade epoxied under the trailing edge will prevent the screws digging into the tailplane; running the D/T line through a short length of tubing (I use rolled brown paper gumstrip) where it passes over the trailing edge avoids the cheesecutter effect when the nylon slices through the balsa if the tail has a knock on landing. Sketch above shows the principle of this system.

### AUTO-RUDDER SPRING HORN

New Zealander Bill McGarvey, who used to fly with the Croydon club until he returned home a few years ago, uses a neat combined rudder horn and bias spring. The forward end of the horn bears in a brass channel let into the side of the fin, formed from 18 swg brass tubing filed in half to form a U-section. This detail offers an alternative to bending z-shaped torsion bars from control-line wire to poke into the edges of the fin and rudder to give the offset. Mine always try to poke their way out of the balsa and into a finger. The New Zealand newsletter *South Island News* first carried this idea some time ago; although editor Paul Lagan has extended his contest flying interests to include R/C classes, and thus limiting the time he has available for editing newsletters, *SIN* is well worth getting hold of on its rare appearances.



# AEROBATICS

## by Glen Alison

FOAM WINGS have been with us for some time now but the use of foam need not stop there. It can be used for other components as well, such as tailplanes, elevators, flaps and even fuselages. If for no other reason there is a cost advantage but there are other benefits as well. A tissue covered open structure is always vulnerable to damage and can never be as stiff torsionally as a sheet covered item. Sheeted surfaces are easier and certainly quicker to finish, either in traditional sanding sealer and dope method or with the new polyester resin finishes with epoxy paint.

So, having decided on a sheeted surface for your next project, these are the choices: (a) a built up conventional structure covered in sheet balsa which is time consuming; (b) a solid sheet surface which is certainly the quickest but may have a weight penalty if you cannot find light enough wood. This is also the most expensive method as the cost of thick sheet balsa is almost prohibitive these days. Finally (c) a balsa covered foam surface, quicker than (a), not so quick as (b), but much cheaper and, more importantly, definitely lighter. Its advantage over (a) is that the sheet is uniformly supported by the foam and not intermittently by ribs, thus ripples are avoided when sanding.

So much for the theory, how about actually making one? I decided to make a tailplane/elevator assembly for my new stunter by this method. First decide the dimensions, mine was to be 24in. span with a total root chord of 7in. with equal leading edge and trailing edge taper to a tip chord of 5in. Root thickness was decided at $\frac{3}{4}$in., thus allowing $\frac{1}{16}$in. balsa covering the foam root thickness would be $\frac{1}{2}$in.

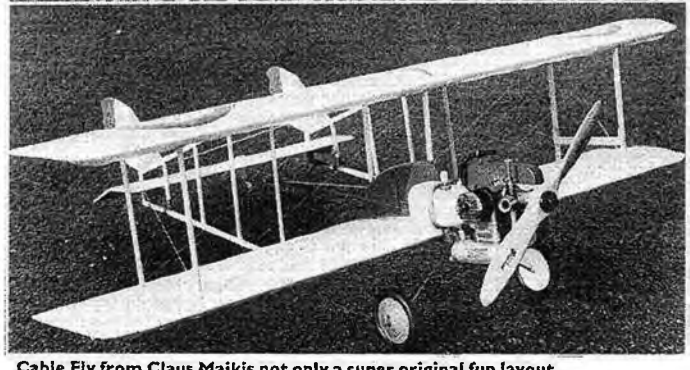
**How To Cut the Foam**

I expect most of you know that polystyrene foam is cut by a hot wire, just like a cheese cutter, and that the shape is defined by making the wire follow a template. For safety's sake, a low voltage is passed through the wire which gets hot due to its electrical resistance. A high resistance wire will be required at these low voltages (typically 12–30v) in order to get the correct temperature and this is available from model shops called Nichrome wire for a modest outlay.

I made a template from 'Formica' laminated plastic as it is possible to get a smooth finish to the edges where the wire will touch. This is important because any irregularity will make the wire 'ping' as it follows the template and create rough spots in the foam surface.

As the tail plane elevator was to be tapered both in thickness and plan I decided to follow the 'one end fixed' method of cutting the foam. This is where one end of the wire is attached to a fixed object at the imaginary intersection of the leading edge and trailing edge if they had been projected out to that point. The free end of the wire then follows the template which is attached to the root of the tailplane elevator being cut. This is better visualised by looking at the sketch.

When two halves have been cut then the elevator section is separated from the tailplane part so now you have four pieces of foam. The tailplane pieces should now be glued to the main spar which forms the false trailing edge along the hinge line. Use a good piece of strong wood here, don't compromise as it has to accept the horn mounting and the hinges as well as contributing greatly to the final strength of the tailplane.

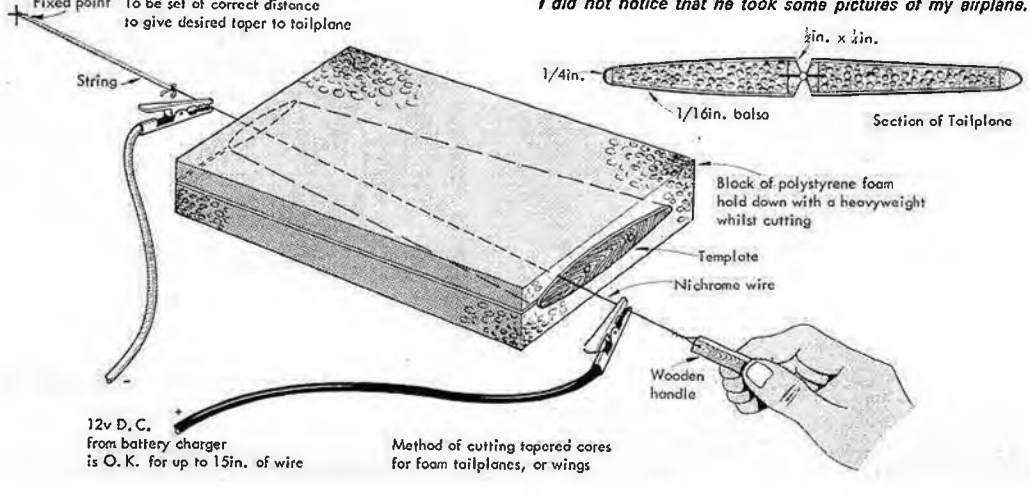


**Cable Fly from Claus Maikis not only a super original fun layout, but also fully aerobatic.**

For attaching the $\frac{1}{16}$ balsa sheeting top and bottom I used Copydex contact adhesive thinned out with equal parts of water. Apply thinly to both surfaces and allow to dry for several hours. Be careful when you assemble, it has got to be right first time! Add the $\frac{1}{2}$in.sq. leading edge at this stage and then the soft block tips go on last, and are sanded to contour. Total weight of the tailplane and two elevators was $1\frac{1}{2}$oz which is quite satisfactory. The finished article feels very stiff and no doubt the weight could be lowered a little further by lowering wood sizes and densities with safety. I am very pleased with the final result and shall certainly be using this method again.

I recently received a very interesting letter from my good friend Claus Maikis and so I will leave it to him to tell you some of his latest news.

*"Regular readers will know the name of Yves Fernandez, France (Strasbourg), who builds these fantastic airplanes. I met him the first time at Breitenbach (Switzerland) in '75 when I flew my Palatin. I did not notice that he took some pictures of my airplane. Three*



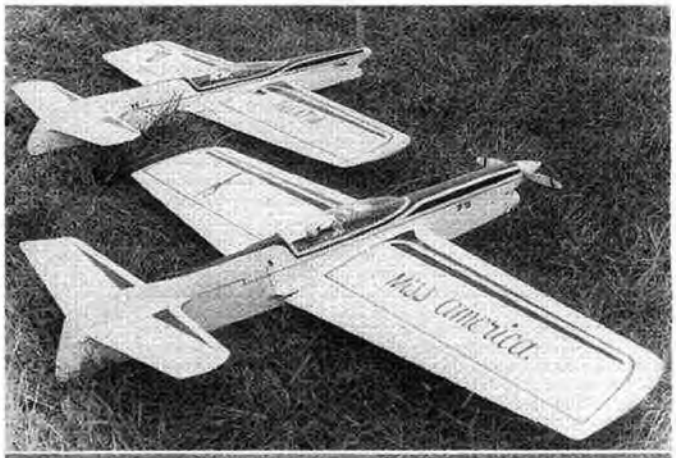
*months later I met him at a small French contest and he had built a very similar model, from the pictures only!*

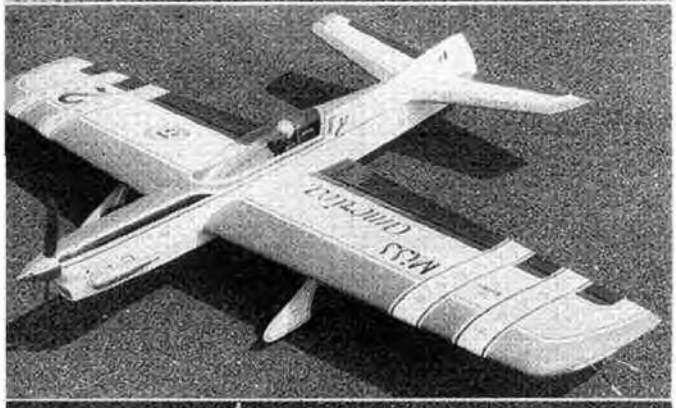
*"Half a year later I met him at a big contest in France, where he had two new models, one of these was the 'Miss America 2 with still a little Palatin influence. Again half a year later, Bochum '76, he had another new aircraft, the 'Scirocco'. This was a new design with tricycle undercarriage, spring action! home made! In '77 he appeared with his latest, the F16 (December '77 'AeroModeller') which he seems to like best. All these airplanes seem to have the same wing and tailplane geometry, ST46 and incredible finish. Sketches have appeared in the French magazine 'Modele Reduit d'Avion. How about this for activity and creativeness! Yves is a draughtsman and is the only control line flyer in his club and within a hundred miles or more.*

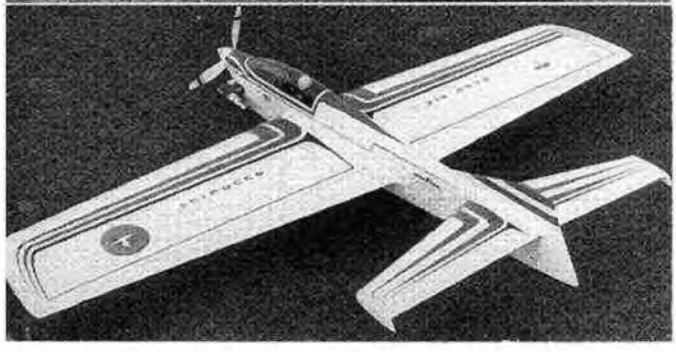
*"The other pictures show a little of my own 'fun' activity with aerobatic biplanes. Two pictures show a small (·15 engine) old timer, inspired by the French Farman biplanes of 1910 or so, but with a front engine as I don't know how to cope with a rear engine (CG position for instance) and anyway starting the engine is a lot easier this way. The name is 'Cable Fly', and people like it much more than my more serious airplanes. Of course, it will stunt almost as good as those machines in the good ole' days!"*

*Claus Maikis*

**Palatin at top built by Claus Maikis was the inspiration for an imitation built by Yves Fernandez from only a photograph. Miss America 2 and Scirocco further illustrated the prolific building of this French aerobatic pilot.**

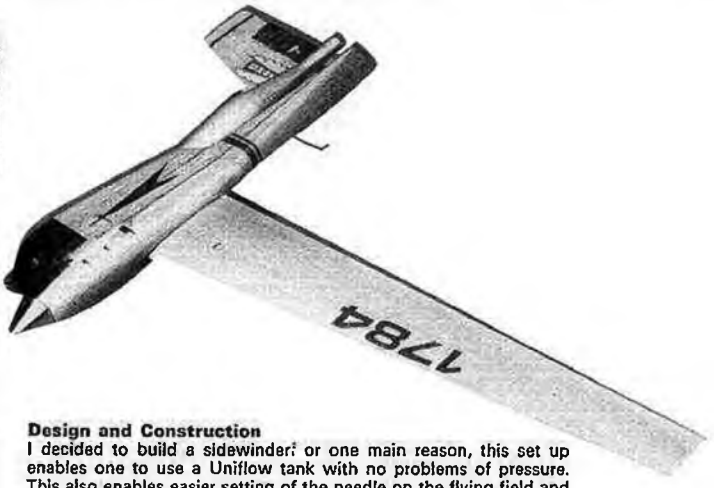






# SPEED

**by Dave Smith**




On analysing the Speed scene during the winter months of '77 – 78, it became apparent that the easiest class to score maximum points in during the 1978 season would be the 1·5cc category. The reason being that the British record of 114·2 mph has stood still for 10 years. Another reason is probably the lack of suitable motors, as the Cox ·09 in its present set up has probably reached its maximum performance. If there were sufficient interest shown I can see no reason why we couldn't have a split class i.e. Glows plus Diesels. I feel that this would encourage juniors to have a go as there are a few 1·5cc diesels around. One could then progress with a modified glow once they have mastered the art of flying in the pylon at a contest in front of two officials.

In the USA speeds have steadily been going up, and over there the ½A class only allows motors up to ·050cu.ins. Recently Nick Sher set a new AMA record of 121·67 mph using a modified TD049, beating the previous record of 120·11. The new US record holder used a Schnuerle ported motor reworked from a blank Cox liner in which he milled one exhaust port, two transfers plus a third port. This was fitted with a simple collector ring which screws up around the cylinder to which he attached his own home made tuned pipe. The flight was made using a ½A Glo Bee plug and a Cox 5½×4 prop on monoline control, the model weighing in at 5oz. Now compare that with the current British ·09 record and see what I mean about the potential of this small class.

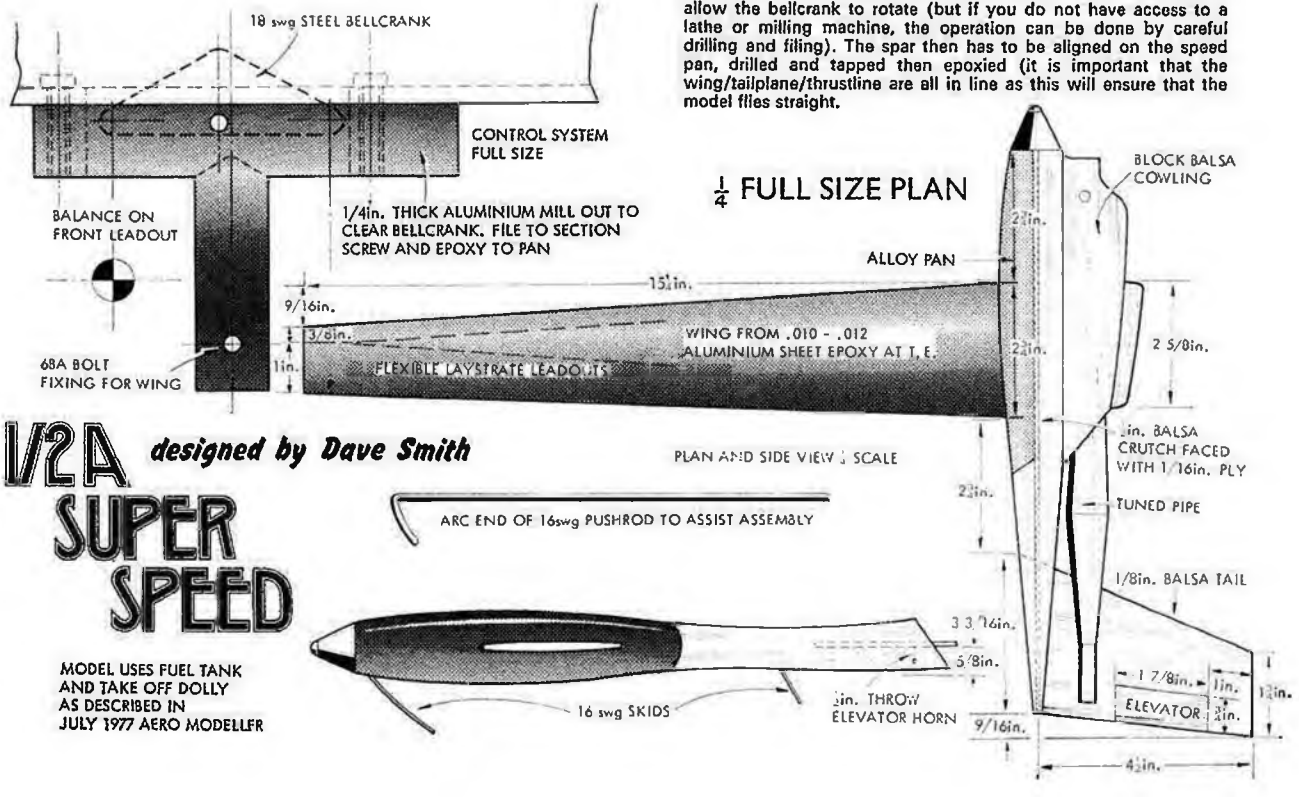
I decided that I would like to use a full Schnuerle/Rear exhaust motor with tuned pipe. The only motor in current production which comes anywhere near this specification is the West German Webra 1·8cc Schnuerle/Rear exhaust R/C motor. A friend of mine in Germany managed to purchase a motor for me and on arrival, revealed itself as being a very nicely built motor. I then rebuilt the motor by making a new piston/liner (with smaller bore to reduce capacity to 1·48cc), fitted a K&B 15RV carb and needle asembly, a new head, then designed and made a tuned pipe as per Kevin Lindsey's article in *AeroModeller* June 1966.

**Design and Construction**

I decided to build a sidewinder; or one main reason, this set up enables one to use a Uniflow tank with no problems of pressure. This also enables easier setting of the needle on the flying field and is less prone to flooding the motor when starting. As can be seen by the sketch the model is very easy to build; basically a crutch is cut from ¼in. balsa then faced with 1·5mm ply. The mounting nuts for the speed pan are made up by cutting brass tubes to length, then soldering 6BA nuts to one end of the tubes. The tubes are then epoxied to the crutch with bandage to strengthen. Carve a block of balsa and epoxy to crutch to form engine cowling. Cut out a hole for the carb and epoxy in a piece of aluminium tube which inside diameter is equal to the outside diameter of the carb. Sand an aerofoil section fairing and epoxy to top of cowling. (This fairing is important as it ensures a positive lock in the dolly and prevents the model coming in on take-off.) Next cut out and sand tailplane, make up elevator horn from 18 swg piano wire, epoxy to elevator and fit hinge.

Bend up push rod from 16 swg piano wire, attach to tailplane. Then epoxy to crutch making sure that tail is in line. Carve up a block which will fair in with speed pan and glue to rear of crutch. Strengthen the fuselage/tailplane joins with ¼in. wide glass cloth and epoxy.

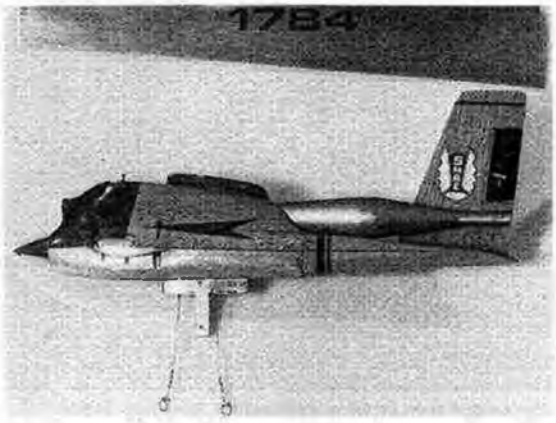
Next we must mark out and cut a piece of ¼in. thick aluminium which will support the bellcrank and wing, which in turn is screwed and epoxied to the speed pan. This assembly has to be milled to allow the bellcrank to rotate (but if you do not have access to a lathe or milling machine, the operation can be done by careful drilling and filing). The spar then has to be aligned on the speed pan, drilled and tapped then epoxied (it is important that the wing/tailplane/thrustline are all in line as this will ensure that the model flies straight.




## 1/2A *designed by Dave Smith*

## SUPER SPEED

MODEL USES FUEL TANK AND TAKE OFF DOLLY AS DESCRIBED IN JULY 1977 AERO MODELLER



**Left, the completed model, assymetric layouts are popular as the long inboard wing conceals more of the control lines thereby reducing drag. Above, the bellcrank control T piece is exposed by removing the hollow wire.**

My own wing is in fact from one of my old FAI speed models which I have cut down, but was actually made from ·010in.– ·012in. aluminium sheet, folded on the leading edge then epoxied at the trailing edge. The wing is secured to the spar with one 6BA screw.

Anybody contemplating building such a model may have difficulty in obtaining a suitable speed pan but if you hunt around I am sure you can find one which is laying in someone's workshop. Alternatively one could always re-design the model and incorporate engine bearers faced with aluminium plates. When it came to finishing I just gave the fuselage two coats of sanding sealer rubbed down, covered with lightweight tissue, then finished with two coats of two part polyurethane clear varnish. (This finish will stand up to any amount of nitro-methane so is ideal for an open class speed model.)

**Final Setting Up and Flying**

Having completed the model we can design and construct the tank to fit snugly inside. Best method of securing the tank is by cutting out a piece of 1mm ply slightly larger than the profile of the tank which is in turn sandwiched between the pan and fuselage. The tank itself is stuck to the ply with silicon rubber (used to seal baths and sinks); this will help to insulate the tank against undue frothing of the fuel. I used a scaled down version of my tank used for FAI speed which is drawn in the July 1977 issue of *AeroModeller*. Similarly a dolly shown in the same article will guarantee trouble-free take-offs. As we can use nitro methane in the fuel I have set my own motor up to use G-Max ML70 synthetic oil. This enables one to use as much nitro as one likes and with no fear of the fuel separating in cold weather etc. Another reason for using synthetic oil is that one does not have to de-coke the engine as the fuel burns very cleanly.

After a session on the test bed to run the motor in and find the optimum pipe length for fuel being used, we can assemble the motor/pipe/tank to the model. Before every contest I check systematically the tank, engine, pipe, model and make sure that the fuel tubing is not crushed when the fuselage is pushed over the engine and screwed to the pan.

Nine times out of ten the British contests are held on cold wintry days. There is nothing worse than fiddling around with a model in these conditions and the couple of hours spent in the workshop are really worthwhile.

When it comes to flying, select a suitable prop and make up a set of lines. I am using ·010in. lines at present and will change to thinner lines or grouped ones as the season progresses. There are many ways that you can take-off a speed model but it doesn't matter how many times you talk about it, only flying one yourself will enable you to discover the best method. Using a uniflow tank enables one to set the engine running fairly fast (as they richen up during the flight), this gives good power for take-off, as a sick motor circulating in the dolly is difficult to get airborne without jumping the dolly.

I usually blast-off with slightly down elevator on, holding the model in the dolly for approx one-third to half a lap, then a positive full up action of the wrist sees the model climb upwards, not allowing the model to gain too much height level off groove the model, find the pylon and hey presto! an official time is under your belt.

How's that for a fine show of chuckies, a little guidance from the teacher soon brings out the enthusiasm of the pupils.

# Schools over . . . Balsa out!

## John McAlroy's account of the club he runs at his school

I CAN remember when I was at school there was a very good model club, with enough enthusiasm to get over any problems. *Phantom Mites* were the rage, with some going on to APS designs like the *Razorblade* '64, *Unlimited* and, of course, the *Peacemaker*. Looking back it is obvious now that the club was as good as it was because of the time put in by a Mr Veitch, who was in charge. This therefore is the first point; a club in any school is only as good as the teacher's interest, if this slackens the club fails.

My first experience of running a School Model Club came back in 1968 at Rothwell Secondary near Wakefield. I took a Goodyear racer into the classroom one day and several members of the third and fourth forms showed interest. Next day grubby hands thrust grubbier engines into mine with questions like, "Dad says do you want this for a fiver?" and so on! One or two other lads came along to chat and I soon realised that there were more people in the school than I thought with a real concern for aeromodelling. They had never had a teacher with an interest before and so their own modelling had never come to light. We arranged to meet on a Friday lunch time and I found some had motors, many had models, untried and unflown in some cases. The Library where we met was cluttered with old team racers, gliders and rubber models and it was obvious that the formation of a proper Club was called for.

One point I must mention here is that we were very lucky at Rothwell because of the size of our playing fields; other not-so-fortunate school clubs have had to moderate their activities to suit their available space but it's amazing what can be done, even in small corners!

Our next idea at Rothwell was to actually get flying, so Friday night was set aside for this . . . speak nicely to your caretaker! Friday dawned bright and calm and although great fun, we had a 'smashing' time in many respects. We had learned the first lesson . . . slowly at first, trainers all round was the thing we needed. Thus, through no real prompting of mine Rothwell became a C/L flying club. F/F crept in later. One point in our favour was the sports-master's comment on the Monday after, "Every time you put one of those buzzers up", he said, "our team popped in a goal while the other school just watched you. We won 7–1, thanks!" So much for our rise to fame!

I then went to see the headmaster for a loan from funds and as he was an ex-RAF navigator he was enthusiastic and money was forthcoming. We decided to build a couple of Club trainers first that everyone could have a go with.

This led to a design called *Mirsad* that had a lot to do with the much later *Shimid* model. An old 1·49 Vibra-matic was pressed into service and the ensuing model was so easy to fly that most of the lads soon became proficient. Next came the building programme.

My room, L13, was a good modelling area as it had a fair-sized store-cupboard (another *must*) and was away from the main corridor, so models could be left sticking or drying without fear of casual passers-by disturbing anything. The type of models we needed were all-sheet rat-race models for engines ranging from 1cc to 3·5cc. We wanted strength, cheapness, simplicity and 'flyability'. Thus there appeared on the scene some weird and wonderful creations, all more or less following the same ideas though, and surprisingly enough they all flew, some better than others. From here on Friday night became RSMAC night and we went from strength to strength. Combat and Goodyear soon followed and here we made the ruling that all pilots should have some form of insurance, MAP being the most easily obtained and the most popular.

Two more Heatwave chuck gliders nearing completion receive a final sandpapering.

RSMAC pressed on during 71–72 and a great deal of enjoyment was had by all, but eventually my career called for a move and with some sadness I left Rothwell and the Wakefield area. My new school had a distinct lack of playing fields but after some searching a site was found in a nearby farmer's field that was to prove very suitable indeed.

The children at Daisy Hill, my new abode, were much younger, only 9-13 and thus after a shaky start a new sort of club emerged. More chuck gliders and fewer powered models was the order of the day. Through experience we have found that for HLGs the best size is about 18in. wingspan, using $\frac{3}{16}$in. balsa for the wing, $\frac{1}{4}$in. for the fuselage and $\frac{1}{16}$in. for the tail. Smaller models don't glide as well, especially after a beginner's launch and thinner wings break! Main problems we found at first were a lack of modelling knives and funds for glue. Again after much thought the following seem to be the best ideas – Borrow money from the school funds on a yearly basis . . . most clubs benefit from such funds, so Aeromodelling Clubs should as well. Buy balsa in bulk from shops that advertise reduced rates, or have words with your local model shop owner. Most will be willing to give a discount to young members, especially when larger items like engines come along. Sell balsa in 'pieces' to members at reduced rates where possible i.e. if school funds can stand it.

By 'pieces' we mean that as soon as the balsa is back at school we cut to chuck glider 'stock sizes' – e.g. $\frac{3}{16}$in. cut to 18in. length for wings, $\frac{1}{4}$in. cut to fuselage sizes, 18in. by 1in., and $\frac{1}{16}$in. cut to size for tailplane and fin. Thus 9in. of $\frac{1}{16}$in. sells for 5p recouping 20p for the sheet. We have found that this is the best way to go about selling balsa. Juniors can usually afford 5-10p or so for parts and build up the model over a week or so. They cannot afford 60-70p for three sheets of wood, but can afford the smaller cuts.

We have also found that polyhedral wings are worth it in the long run and $\frac{1}{8}$in. by $\frac{1}{4}$in. spruce under the fuselage helps to make them last. Weak points are usually the wing joints and the fuselage . . . but we've had no trouble using PVA white glue.

One thing we learned by experience is that although children are dying to try their new models, first flights are best done on calm days; this shows up any defect in the building, either in structure or dihedral angles and allows minor adjustments to establish a suitable trim. Don't let them hurl the creations straight into the sky as nothing is so daunting as seeing that new model loop straight into the ground behind them! Take it very easy at first.

Competitions are very well received but it is a good idea to let the members run it themselves. We usually have a scorer and three or four with stopwatches, who stand on the high points of our hill flying site, so as to have a good view all round. Flyers go up wind from them so they are well out of the way. Readiness for flying is shown by raising the HLG plan view to the recorders who call out that flyer's name, times the model and then reports to the scorer who writes down the result. Five flights from nine have proved to be the most popular rules, with only two models allowed per competitor. Four scorers with stopwatches are about the best number, as more only makes for confusion.

The basic skills of handling engines are soon learned and most of the lads are now fully familiar with all the working parts of their motors.

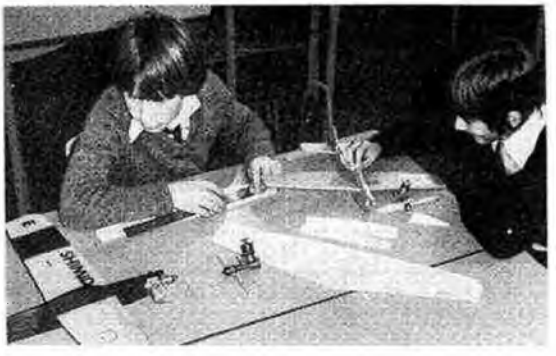
One idea we have used with much success is the giving of a trophy (made originally at Rothwell) for the longest flight in a competition. As the first comps of the year only give times of up to 30-40 seconds nearly all the members have a chance to hold the trophy that is until a longer flight is made. John Lumbard came in at the end of the year to win the trophy over summer with a flight of over a minute into a friendly thermal!

A system of points for placings is also run by the members, with points for flying, scoring and model building.

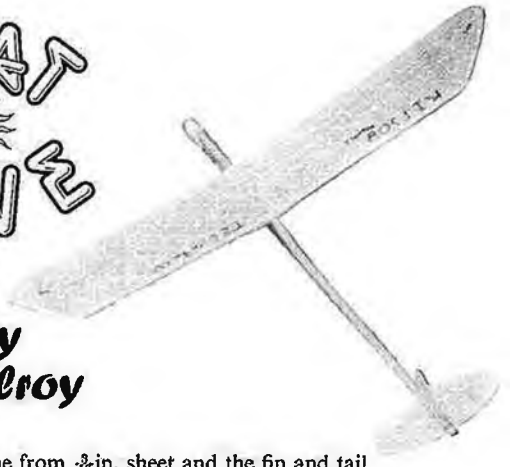
The members, where possible, should also deal with the selling of balsa, organisation of competitions and practice days and the PRO side of the club, showing the other school members what we do. We usually try to have one HLG competition, one kite-flying day and a general flying day per fortnight, with building time (usually at break-times). Wet days of course call for more building, so have a flexible programme! with the advent of kites and C/L models our club at Daisy Hill has progressed and is now known as the Daisy Hill Model Aircraft and Kite Society! We are even considering kite competitions, loops, eights, spot landing and take off etc.

When the weather is inclement many activities go on in the 'building sessions', repairing, starting from scratch, designing or just discussing that last thermal flight! We have a system, which could be, but isn't, termed a 'Buddy System', in which older and more experienced members help the younger newer members through the first few building steps of their first model.

Construction of another Shimid, wing tail and fin parts laid out on table, while dimensions are marked on the fuselage.







# SHIMID

## designs by John McAlroy

Construction is straightforward and follows the normal pattern for an all-sheet model.

Cut the wing from ¼in. sheet and the tailplane from $\frac{3}{16}$in. The fuselage is from ⅜in. medium balsa, measure and cut out areas for bearers, wing and tailplane carefully. Add the bearers and the ply facings and sand the fuselage to a smooth section.

Add the bellcrank support to the wing then plane/sand to section. Join the wing/tail/fuselage together using white PVA or epoxy; add lead-out guide and tipweight and cover entire model by brushing dope through tissue laid on wood. Add ply fin and elevator, give two more coats of dope and one of fuel-proof. Drill for 1 to 1·5cc engine, tank strap and bellcrank. Connect controls, instal tank and engine and transfers. Fly on calm day on 35ft lines.

Cut the wing shape from $\frac{3}{16}$in. sheet and the fin and tail from $\frac{1}{16}$in. Add the spruce to the 18in. x 1in. fuselage blank before cutting fuselage to shape. Glue the tail and fin to the fuselage after shaping and careful sanding. Plane and sand the wing to section, then cut across the dihedral breaks, sand edges to angles as shown. Pack up to dihedral, glue wing together and when dry, glue to the fuselage and add the important throw tab reinforcement.

Dope and sand the model until a waterproof finish is achieved and balance with lead or plasticine. Bend rear edge of tail up or down to adjust for a stall free glide in left hand circles if throwing right handed. Build up gradually to a more powerful launch.

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Control line coming into the club helps to expand the interest within the club, but one thing that is needed is a talk in the early stages of this to stop all the silly errors that you thought they'd never do . . . like putting engines in a vice and putting the tip weight in the inboard tip . . . oh, and the lad who decided to fly clockwise until he saw how lonely he'd be in a race! Some model shops are keen to help youngsters but some of the troubles we've had with larger stores selling totally wrong grades of wood and outsize or underpitched propellers, usually with the words, "This is just what you need, never mind what your teacher says," have to be seen to be believed! A clear note for the member is most necessary, or direct him to a shop you can trust.

Conrods and crankshafts are words which we take for granted, but a further period of instruction on the engine itself is a useful thing, if only to stop screwdrivers and pliers making their presence felt on the crankcase. Engines from 1cc to 1·5cc size we use, mainly because of the area of our site and its nearness to houses, but this of course varies from school to school. The most successful of these models has been the *Shimid*, a home-brewed effort with all-sheet construction and based on the idea of using as much school material as possible – e.g. thin ply, tissue and paste, bearers etc. Quite a few of these have been built and all have flown well.

Many, many articles have been written on how to teach Juniors to fly C/L and our method does not claim to be the best or better than any other; the only thing we say is that it has worked, not just for one member, but for those of different temperaments and abilities.

We start by showing the learner that if one's arm is raised up the lines and the elevator work together to produce an upward movement, similarly for down and neutral. Too many trainers are heavy and underpowered and lack of forward speed leads to hanging on the propeller with dragging lines and slow control responses, so that the lad has no real idea what his movements are actually doing. The *Shimid* design is built to fly at a reasonable speed, depending on the engine, and to have good control response. It also flies well at an angle of 30°–35° and this is a point to bear in mind when first starting. So many training schemes call for 'level flight' but fail to realise that it's only 6ft to the ground from there! At a higher angle there's more time to correct.

**Pilots with Shimids from the left E. Davies, A. Dufton, A. Slingsby, J. Lumbard, A. Swindlehurst and A. Watson all raring to get on with their flying.**

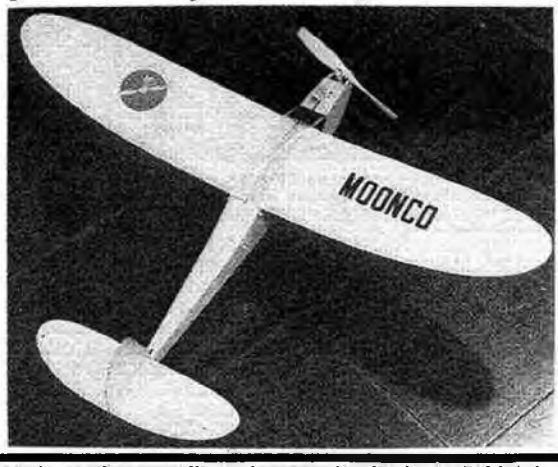
First attempts are best done by having the beginner in the circle with you while a good launcher *throws* the model into the air . . . not into the circle mind! Let the trainee put his hand round yours and gradually let him take more and more of the control. If he does appear to be losing control you can re-grip the handle. Let this be quite clear . . . at no point during the first few flights do you actually release the handle, merely let the lad 'fly your hand' as if it is just an extension of the control handle.

As confidence grows, and this may take four or five flights, ease your hand away from the handle until the pupil is on his (or her!) own. Two things can happen: if the pupil doesn't panic they may get three or four laps in, if he does he may crash. This is where a strong design pays off! At this point, if there is a crash it's usually caused by over-excessive wrist movement. Try again, it may take five or six attempts but the pleasure both teacher and new pilot feel after those first solo 20 laps or so is fully rewarding. Some are natural pilots, some take a week or so but the success rate is usually higher than the failures.

One fact that is worth deciding on from the start is that the first model must be totally expendable. As soon as the first one flies, start on another; because once flying, any break in learning usually puts the beginner back to square one. Engine, tank and controls can obviously be used

# Moonco Crossbow

## designs by John Kay




again, so the cost will not be excessive. Patience, I think is the key word with younger flyers, try not to lose your temper . . . though we can't all be saints!

Simple competitions are coming slowly for C/L now the members are becoming more proficient, most loosely based on ½A and Mini-Goodyear type organisation. Mini-Goodyear models are now finding their way into the club and I feel that this is a good follow-on for the next model. Some stunt models are also planned for the new season and a collective building programme with everyone doing one job towards the finished models.

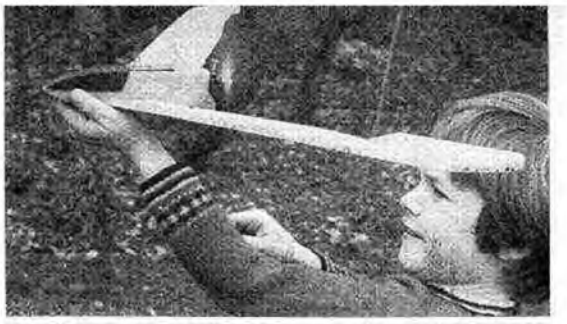
So, from what we have learned over the years, the following points seem most important:

Don't try to drag Juniors into a model club, take a few models into school and let them make the first moves . . . perhaps with just a little prompting. Go very gently at first if your members are fairly young (although I've seen 7-year-olds throwing 'chuckies' about with gay abandon!) Go for a good basic HLG of about 18in. span to make the most of the available wood. Polyhedral as we said before, is a good idea in spite of the extra effort. Thanks here to John Horton for his 'Baildon Bent' design, which has seen over 100 variations at Daisy Hill and Rothwell.

See if willing fathers can help with any materials if your school funds can't run to it. Amazing what help you can receive. See if the school fund will help with initial expenses; we usually plan on returning at least half of what we borrow, so we are only partly, not wholly, subsidised.

Involve the members, once interest is established, in as many types of modelling activity as possible. Children are fickle things and this outburst of interest must be maintained. We have spotting competitions, plastic model comps, indoor model comps with a 6in. maximum wingspan (some fascinating creations here – and they fly!) Designing 'forums', discussions, talks in wet weather on various subjects, building and covering demonstrations and the like. Encourage the use of fine sandpaper, give points for better building . . . remember better built models do fly better. (And the headmaster is more willing to advance further funds if he sees the money being used well!)

Go out to fly as much as possible, especially in the early days of the club . . . get that interest caught. Buy ear plugs, sleeping tablets and be prepared to give up your dinner-times, breaks and evenings . . . and the best of luck, you've formed a School Model Club!



**No noise! The silent $CO_2$ motor running at moment of launch. Left, the more traditional layout of the Moonco.**

MOONCO HAS been made to resemble a powered cabin model of the late 1940s. Crossbow is a smaller version of a 0·5cc diesel flying wing that has been flown for the last six years. The original flew away from a meeting at Old Warden last summer.

Both models are of simple construction, which make them suitable for a beginner or a father-and-son project. Being all-sheet construction enables them to be built quickly, and each of the originals was ready to fly in seven hours. Weight is a major consideration with $CO_2$ powered models and both planes should be made from straight grained medium soft $\frac{1}{16}$in. sheet balsa. When complete Moonco should weigh no more than 3ozs and Crossbow 2ozs, otherwise performance can suffer.

The constructional notes are written with a beginner in mind, so that the builder of a few models will find all the information required on the plans. I suggest that all the balsa is sanded prior to the parts being cut out, as this eliminates much of the sanding work later on and helps to keep the weight down. To avoid distortion, non-shrinking adhesives should be used on all flying surfaces. I would recommend PVA, fast-drying epoxies or one of the new cyanoacrylates.

Cut out fuselage sides and mark the position of the formers, and glue formers 4 and 5 in position, when dry add the other side, checking that the top of the wing mounting is level. Whilst this is drying, cut two 4in. long $\frac{1}{16}$in. sq. strips from the sheet balsa and glue to the inside edge of the cabin area to make an $\frac{1}{8}$in. wide wing mounting. Hold the rear of the fuselage together with a paper-clip or clothes-peg and check symmetry before adding former 6 and gluing the sides so that they taper equally. Formers 2 and 3 hold the $CO_2$ tank in position and whilst 3 is flush with the top of the fuselage, 2 is set $\frac{1}{8}$in. lower to allow clearance for the copper pipes to the filling nozzle. The engine former is made from two laminations of $\frac{1}{16}$in. sheet with the grain of the balsa at right-angles and then faced $\frac{1}{32}$in. ply. For ease of assembly, mark and drill the engine mounting holes before gluing the bulkhead into position. Use $\frac{1}{16}$in. sheet with the grain across the fuselage between former 5 and the tailplane mount on the top; and between former 4 and the tail on the bottom.

**It takes just a couple of seconds to refill the tank ready for another flight. Unusual swept wing design uses upswept tips for flight stability.**

The undercarriage is now bent over the plan and held in position by a fast drying epoxy, or alternatively the wire can be bound with cotton and cemented in position. Soldering the cup washers to retain the wheels is best left until the fuselage is finished. The original model used 1in. Kielkraft streamlined plastic wheels.

The deflector plates for the $CO_2$ tank cooling are made using $\frac{1}{16}$in. sheet joining the bottoms of formers 3 and 4 and from former 2 to a position marked on the plan. The remaining open panel is now filled in with $\frac{1}{16}$in. sheet, flush with the fuselage sides. Finally, the whole area between formers 1 and 4 is sheeted in. Two $\frac{1}{16}$in.sq. strips are cemented between formers 1 and 3, flush with the tops of the fuselage sides. A $\frac{1}{32}$in. ply plate is cut to cover this area and glued into position. When dry the whole fuselage is sanded all over and the sheet in front of the undercarriage is blended carefully into the fuselage cowling cheeks. Now the entry and exit cooling slots can be cut to form triangles, with their tops facing each other.

The trailing edge section should be cut to length and glued with the $\frac{3}{16}$in. edge to the front of the wing. When dry, a line should be drawn $\frac{1}{4}$in. back from the leading edge and another line marked $\frac{1}{8}$in. deep, measured from the top of the $\frac{1}{16}$in. sheet. Now this area is removed using a razor plane or scalpel (see plan for details).

The wing is built upside-down after first marking the rib positions. The front and rear of the wing should be packed as shown on the sketch. Non-shrinking adhesives should be used for the ribs and when dry the wing should be cut in the centre and re-joined with $1\frac{1}{2}$in. dihedral under each tip.

The tailplane and fin should be sanded, rounding the edges, and then gluing the fin in the centre line of the tailplane, using strips of $\frac{1}{16}$in.sq. at the joint for extra strength.

The fuselage and fin on the original were covered with tissue and the cabin outline added in black. The best method of applying the tissue is to lay it on the surface and brush in thinners to dissolve the banana oil, which acts as an adhesive. When finished, a further coat of banana oil should be applied to seal the tissue.

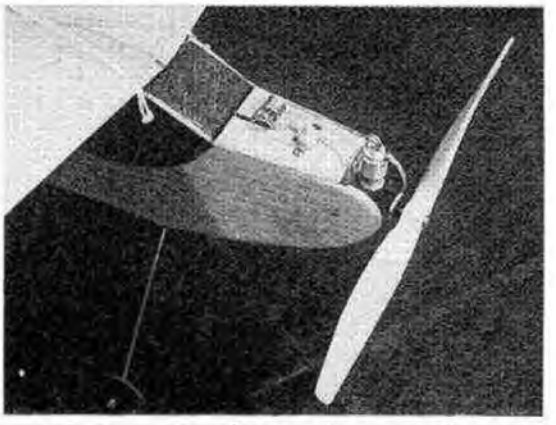
The top ply plate should be cut out and drilled to take the refuelling nozzle. A slot will also be required for clearance of the copper pipe from the fuel tank.

The engine should now be installed, using nuts and bolts. The down-thrust should be added, using strips of ply at the back of the engine; and side-thrust should then be added in a similar manner. The tank fits between formers 2 and 3 and is wedged sideways with scraps of balsa or a piece of polystyrene ceiling tile. The extra lengths of copper pipe should be wound round a piece of dowel to prevent kinking.

Wing and tail dowels should be cut to length and fitted. With the wing and tailplane held in position with rubber bands the tailplane saddle can be cemented, ensuring that both surfaces are correctly aligned. The fin must be keyed in position for consistent flights by letting a triangle of $\frac{1}{16}$in. balsa fitting between the fuselage sides, between the rear of the tailplane saddle and the end of the fuselage. This piece is glued to the tailplane.

The CG position should be checked and the plane weighted in the nose or tail to correct. The flying weight of the original was $2\frac{3}{4}$ozs.

The wing of Crossbow is built in a similar manner to that of Moonco, even to using the same rib section. The wing is made upside-down as before, but remember only to glue the first four ribs in each wing panel. When dry the portion of trailing edge should be removed to taper the wing and give progressive wash-out. The sheet should be cut next to the side of rib 4, $1\frac{1}{2}$ inch in from the trailing edge and bent up. Ribs 5 and 6 can be added and held in position whilst the cement is drying. Check carefully that both panels have an equal amount of wash-out. The up



**Close-up of motor installation. Tank is set in fuselage in front of cockpit, refill valve is mounted in the middle of the removable hatch top, just visible the undercarriage legs and wheels that permit take offs.**

ribs are laminated to form small inverted end fins. The wing panels can now be cut to form the 30° sweep-back and joined with $1\frac{1}{2}$in. of dihedral under each tip.

The fuselage sides and formers should be cut from $\frac{1}{16}$in. sheet. Formers 3, 4, 5 and 6 are of equal width, so that they can be cemented to the fuselage sides at the same time. The engine former is of similar construction to Moonco, being made of two laminations of $\frac{1}{16}$in. sheet, with $\frac{1}{32}$in. ply facing. The engine mounting holes should be drilled before assembly.

Opposite fuselage side should be attached then two strips of $\frac{1}{16}$in.sq. balsa should be added to the top of the fuselage sides between formers 2 and 4 to take the ply refuelling plate. When dry the shaped nose block should be added and tapered in plan form to fit the fuselage sides.

The fuselage should now be assembled on to the wing and the wing sheet between formers 2 and 3 cut out to allow the $CO_2$ tank to pass through. There are no deflector plates on this model, as the underside of the wing sheet performs this function.

Crossbow is a one-piece model and when gluing the fuselage to the wing care should be taken with alignment. Top and bottom should now be added, leaving only the space between formers 2 and 4 for the $\frac{1}{32}$in. ply plate. The fuselage should be sanded all over and the cooling slots for the $CO_2$ tank cut at the leading and trailing edges.

The original model was finished with two coats of banana oil and the fuselage tissue covered, as described earlier. The engine, tank and pipework should be installed, not forgetting the $\frac{1}{32}$in. ply downthrust packing at the back of the engine. Before flying the centre of gravity should be checked and the model ballasted if necessary. The all-up weight of the original model was $1\frac{1}{2}$ozs and no ballast was required.

Choose a calm day to test-glide. Launch the model into wind in a slightly downward direction. Trim for a flat glide and, in the case of Moonco, if there are signs of a stall, correct by adding thin shim of card under the leading edge of the tailplane. In the case of a dive, card should be added at the trailing edge of the tailplane.

Crossbow is trimmed by adjustment of the tip elevators, up to cure a dive and down in the case of a stall.

Both models were trimmed to fly right under power, in circles of 50ft diameter, opening up as the engine slows down, and turning left on glide. If the plane appears to stall under power additional down-thrust packing between the top edge of the engine back-plate and former should be added. The diameter of the circle is governed by the right side-thrust on the engine. The rudder (or in the case of Crossbow the tip elevator) is used to adjust for glide circle.

Crossbow has a far more lively performance due to the lower drag and weight and will keep climbing for nearly all of the engine run when filled from a fresh $CO_2$ sparklet bulb – so a name and address label is a sensible precaution.

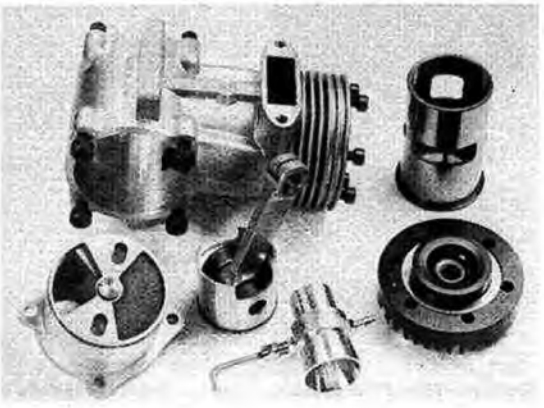
Peter Chinn's

# Latest Engine News

**OPS Developments**

For 1978, the Italian OPS company are listing eight basic models (designated 3·5-Speed, 29-SP, 40-SL, 40-SP, 60-Speed, 60-Ursus, 65-Speed and 15-Speed) and these are, or will be in the course of the year, available in a total of no less than 26 variants. However, excluding all R/C and marine versions, these are reduced to a total of seven models of interest to C/L and F/F enthusiasts. They are the **3·5 Speed SLA SPP** (3·46cc side-exhaust, front induction, non-piped); the **29 Speed SPA STD** (4·94cc, rear-exhaust, front induction, non-piped); the **29 Speed SPP STD** (4·94cc, rear-exhaust, rear induction, non-piped); **29 Speed SPP VAA** (4·94cc, rear exhaust, rear induction, piped); **40 SPP VAE** (6·52cc, rear exhaust, rear induction, piped) and **60 Speed SPP VAE** (9·83cc, rear exhaust, rear induction, piped) and **65 Speed SPP VAE** (10·75cc, rear exhaust, rear induction, piped).

Since most parts within each of the eight basic groups are interchangeable, however, it is possible, by purchasing extra parts, to convert from one type to another or to build up certain non-standard alternatives to the models listed. For example, the 3·5 Speed SLA RCA illustrated easily converts to the 3·5 Speed SLA STD and this, in turn, could be modified for piped timing by substituting the cylinder/piston assembly (OPS part no. 337) that is normally fitted to the piped marine engine.

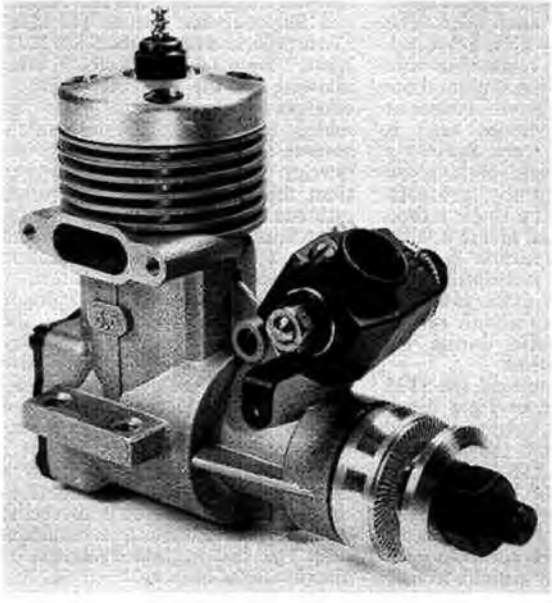


Squeezed out from April issue item on O.S. Max 60R-SR racing engine, the "other half" of this engine's finely finished parts.

The 65 Speed SPP VAE is a new OPS motor aimed primarily at the US C/L Speed market. Not yet in production, it should start leaving the factory in about three or four months' time. It is not merely a bored and stroked Speed 60: it has a new main casting with five (instead of three) transfer channels for the new OPS '1–3–1' scavenging system.

Incidentally, the 15-Speed mentioned in our opening paragraph is *not* the OPS 2·5 prototype exhibited at Nuremburg and illustrated in the April issue. It is a **15cc** (not ·15cu.in.) watercooled unit weighing 2¾lb and intended for 15cc class racing marine use.

OPS products are distributed in the UK by Irvine Engines of Barnet.

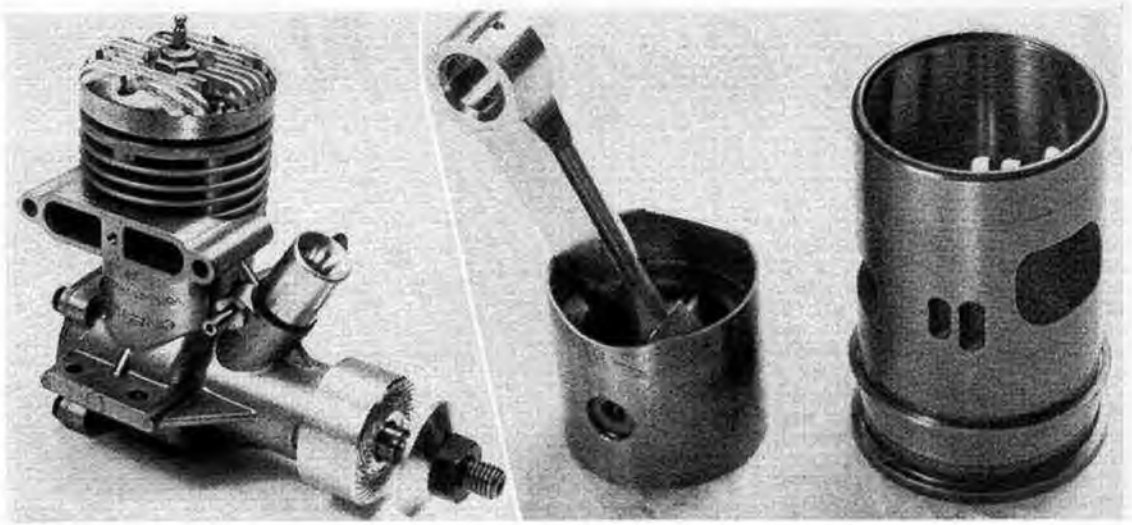


OPS 3.5 Speed SLA in its R/C version. The standard free-flight and control-line model is identical except for a plain venturi in place of the Perry carburettor

**ST35 - Carrier Deck Engine**

As control-line enthusiasts who have read Harry Higley's comprehensive article *An Introduction to Navy Carrier*, in the current *AeroModeller Annual*, will be aware, the most widely used engine in the United States for the popular 'Profile Carrier' category, is the throttle-equipped version of the Super-Tigre ST35. The rules for this event call for a plain bearing engine (i.e. one with a bushed or unbushed main bearing) of not more than ·36cu.in. and running on suction feed. There are not many plain bearing engines of less than ·36cu.in. displacement that combine a good top end performance with an ability to throttle down to a reliable low speed and, having recently tested one of the current ST35 motors, we can well understand its wide acceptance.

The ST35 was originally called the 'C35' ('C' for 'Combat') and was already well established when the Profile Carrier class was introduced. First offered in a choice of combat (with ST porting and deflectorless piston) and stunt (with orthodox crossflow porting and baffled piston) versions, it became available with a throttle type carburettor in the mid Sixties. The stunt type is no longer made and the R/C version is now based on the combat motor. Both, however, are still built around the original C35 main casting (with slight modifications) and are the only



**The Super-Tigre ST.35 Combat engine, the latest version of a design that goes back to 1961 but is still competitive. A recent option is the addition of Perry supplementary transfer slots in the cylinder liner. The traditional ST directional ports and deflectorless piston are retained.**

plain bearing Super-Tigre engines remaining in production.

Back in 1961 we tested one of the original C35 stunt engines and recorded a peak output of 0·54 bhp at 13,000 rpm on 5% nitromethane – and, of course, without a silencer (silencers were not in use in those days!). Tested under the same conditions, i.e. 5% nitro fuel, less silencer, our 1977 ST35 R/C recorded 0·68 bhp at approximately 14,500 rpm which is very good indeed for an engine of this size and type. Adding the current Super-Tigre silencer supplied for this engine (a 63cc expansion chamber with 7mm i.d. outlet) reduced peak bhp to 0·57 at around 13,700 rpm. Low speed pulling power was also good: maximum torque was realised at 8,000 rpm where figures of 53oz.in. (with silencer) and 59oz.in. (less silencer) were indicated. Prop revs recorded on 5% nitro, less silencer, included 11,700 on a 10 x 6 Top Flite maple, 13,200 on a 9 x 6 Top Flite maple, 13,600 on a 9 x 6 Power Prop maple, 13,800 on a 9 x 6 Taipan glassfibre-nylon and 15,500 on an 8 x 6 Taipan glassfibre-nylon – which gives some idea of the in-flight rpm that may be expected with an extra inch or so on prop pitch. Adding the silencer reduced these prop rpm figures by between 600 and 1,000 revs.

The Super-Tigre Mag-IV carburettor that is fitted as standard equipment on the ST35 R/C worked satisfactorily, although not quite so well as on some other Super-Tigre motors due to the fact that, on the ST35, the piston skirt clears the bottom edge of the exhaust port at TDC, thereby momentarily reducing suction at the carburettor and, at the same time, allowing traces of exhaust gases to enter the crankcase when the silencer is used. Safe idling speeds, with the silencer fitted, were around 3,000–3,200 rpm on 9in. diameter props.

Structurally, the ST35 features a one-piece crankcase/cylinder-jacket/front housing with a cast-in bronze main bearing bush for the 12·5mm o.d. crankshaft. The valve port is open for 195 deg of crank angle, closing at 45 deg ATDC and admitting gas through a 9mm i.d. gas passage. The flat crown deflectorless piston is of Meehanite, lapped to fit a drop-in steel cylinder liner. The piston is equipped with a 5mm o.d. tubular gudgeon-pin retained by wire circlips and the machined aluminium connecting-rod has bronze bushes at both ends. The cylinder head is machined from bar stock and has a bowl and squish-band combustion chamber with central long-reach plug. Our motor had a single 8 thou gasket under the head giving a fairly high nominal compression ratio of 12·5:1. We found it helpful, incidentally, to add an extra gasket of the same thickness to slightly reduce the compression ratio during the initial running-in period.

As previously mentioned, the ST35 incorporates the Super-Tigre directional scavenging system (first used very successfully on the 'Jubilee' model Super-Tigre G20/15 back in 1960), consisting of a single unbridged exhaust port diametrically opposite two very large steeply inclined transfer ports timed to open and close practically simultaneously with the exhaust. On our test model ST35, the measured exhaust and transfer periods were 136 deg and 134 deg respectively.

The only difference between the standard ST35 and the R/C model is that the latter is fitted with a Mag-IV throttle type carburettor in place of the plain venturi insert and needle-valve assembly. Actually the standard engine is normally supplied with two venturi inserts: one very large one (50sq.mm. area), for combat flying with a pressurised fuel system, and one extremely small one (only 7sq.mm), for more general control-line work including stunt and American 'Slow Combat' events. The Mag-IV throttle, as fitted to the ST35 R/C, has a 7·5mm i.d. choke which, after allowing for the spraybar, gives an effective choke area of approximately 16sq.mm, so one may safely assume that the standard ST35 will develop comfortably more power than the R/C version (one would estimate up to 10 per cent more) when fitted with the large venturi, and suffer a corresponding reduction when fitted with the small venturi.

Since the last Super-Tigre catalogue was issued, a modified version of the ST35 has appeared in which Perry supplementary transfer ports have been added to the cylinder. So far, we have seen this only in the standard version – which the factory has named the 'Combat-Perry' model – but we understand from Mick Wilshere, the UK Super-Tigre distributor, that the R/C version is also being made available with this modification. This should further increase its already useful output.

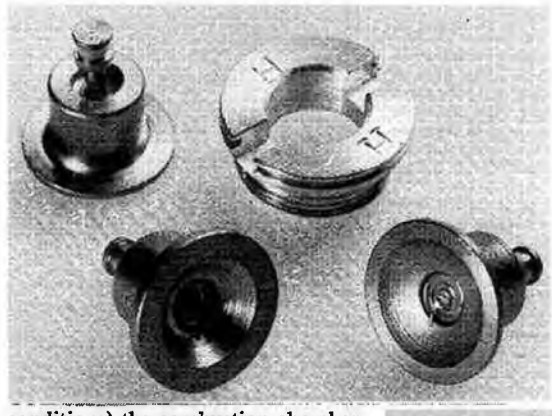
The Super-Tigre ST35 has a bore and stroke of 20mm x 18mm, which gives a swept volume of 5·655cc or ·3451cu.in. It has a weight of 224 grammes (7·9oz) in the standard version and 250 g (8·8oz) in its R/C version. The silencer adds 2·7oz to these figures.

**Fusite Glow-heads for Cox 049s**

The 'Glo-Bee' range of glow-plugs produced by the Fusite Division of the Emerson Electric Company, USA, is being expanded to include replacement glow-heads for Cox TD 049/051 and Cox reed-valve 049 engines. These (see photo) are of a two-piece design consisting of a replaceable drop-in glow head (which Fusite call a 'Glo-Button'), secured by a screw-in aluminium outer ring.

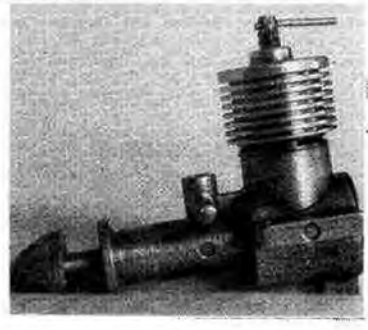
Glo-Buttons are available in two types, GB-5P and GB-5R. The GB-5P is the general purpose model intended primarily for the Cox reed-valve engines, such as the Babe-Bee, QZ and Black Widow. The GB-5R is for use with high nitro fuels only and although it can be used in the reed-valve engines, is really intended for the high performance TD shaft-valve models. In addition to its different combustion chamber shape, the GB-5R has the special alloy element material used for the latest Glo-Bee GB-4 racing plugs. These latter, designed for control-line speed, R/C pylon-racing, etc. on fuels containing nitromethane percentages of 50 per cent and upwards, are claimed to give appreciably higher performance and longer life, under racing conditions, than any other plug.

In a recent letter, Harry L. Roe of Fusite told us that both Glo-Buttons have been found to offer increases of between 1,000 and 2,000 rpm over stock glow heads, yet with extended element life. Incidentally, the blow-proof yellow glass seal will withstand pressures well in excess of those developed in any model engine and actually enables (under very dull conditions) the combustion chamber glow to be seen through the top of the plug.



Left: new Fusite Glo-Bee glow-head conversion for Cox engines, showing GB-5P standard insert "button" (left) and GB-5R racing "button" right. Said to last longer and give more power than Cox heads.

Below: another rare New Zealand built vintage engine, the Pepperell .21 diesel made in 1950. Slightly tatty-looking comp screw, needle-valve, etc., believed non-standard.



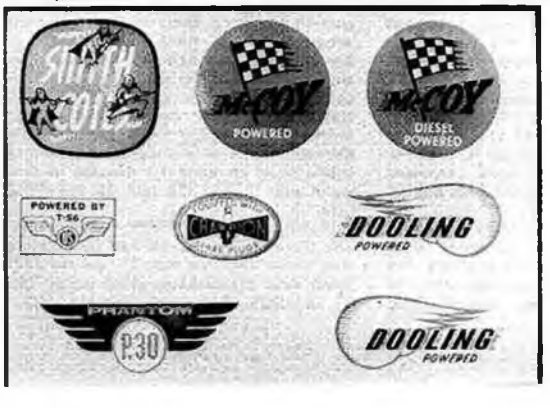
**Collectors' Corner - Pepperell Engines Again**

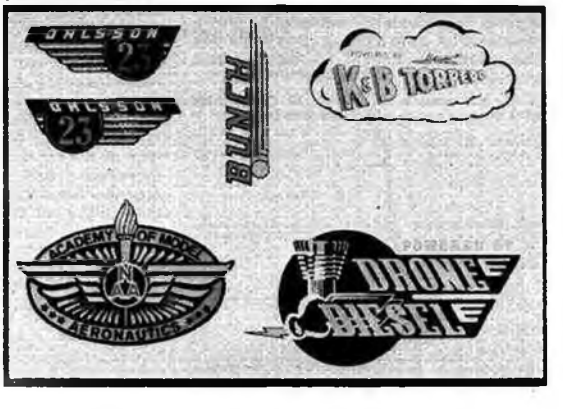
Just too late for a mention in the last LEN we received a letter from the noted Australian C/L speed veteran, Jack Finneran, confirming the origin of the 'Doolingish 19' illustrated in last September's LEN. Readers may recall that this engine was identified as a 1950 vintage New Zealand built Pepperell 19. Jack Finneran now tells us that he had one of these engines in his possession at the time for the purpose of evaluation as a speed motor and he sent along a photo which leaves no doubt that it is identical – outwardly at least – to the engine illustrated earlier.

Incidentally, Jack ('The Senior Citizen of Australian Modeldom' to quote his own words) tells us that he has now been modelling for 50 years. He flew the first successful i.c. engine model in Australia and, over the years, has built just about every type of model from microfilm to speed. A very successful contestant in the latter category in State and National Championships in Australia, he also competed in the American Nationals in 1967.

Ron Magill of Auckland, New Zealand, who was the first to recognise the Pepperell 19 from the earlier photograph of it, has now sent along a photo of another Pepperell engine that may be of interest to collectors. "*I don't know whether my photography is up to the standard required for* AeroModeller', writes Ron "*but it is the best that an instamatic can do.*" The engine, a radial port, shaft-valve diesel, is a Pepperell 21 – presumably ·21cu.in. or approximately 3·5cc. It carries the serial number 50710, which indicates, according to the Pepperell numbering system, that it was the 10th engine to be made in the month of July 1950.

**More reproduction vintage decals (see September '77 *Latest Engine News*). These cover Ohlsson 23 (pre-war), Bunch, K&B, Drone, McCoy, Dooling and Phantom P.30 engines, plus Smith ignition coils, Champion plugs and T-56 rubber, also AMA when it was under the U.S. National Aeronautic Association jurisdiction. Collection now numbers 23 full-colour decals on 3 sheets. Double set (six sheets) costs $7.50 from Larry L. Vance, 5066 Cindy Way, Las Vegas, Nevada, U.S.A.**



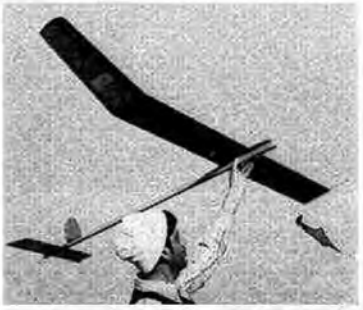



# WORLD NEWS

**29th INDIAN NATIONAL CHAMPIONSHIPS** – *by Sekhar Datta*

The 29th Indian Nationals was once again at Behala Airport, Calcutta. The 17th of December being a weekend the rally drew a sizeable holiday crowd. On Saturday morning the ground was covered with fog but by ten it had cleared up. Flying weather was perfect – generally calm with a light variable wind.

The first round happened to be the open duration for any type of model, for the 'Aeromodeller Challenge Cup', presented by Eaton Bray, UK. This event was mostly dominated by gliders, which finally took the top three places, but there were quite a good number of power model entrants. Sekhar Datta had a close win by 15 seconds with 'Lively Lady' over Mr P. Banerjee's G-90. At the same time the C/L speed event was being flown for the Joyoti Devee Challenge Cup. The majority of the models here were own-designed, and the cup was won by Mr S. S. Mistry. A rule of this even restricted engines to 2.5cc. Though keenly contested, compared to other years, the maximum speed attained has fallen a great deal.

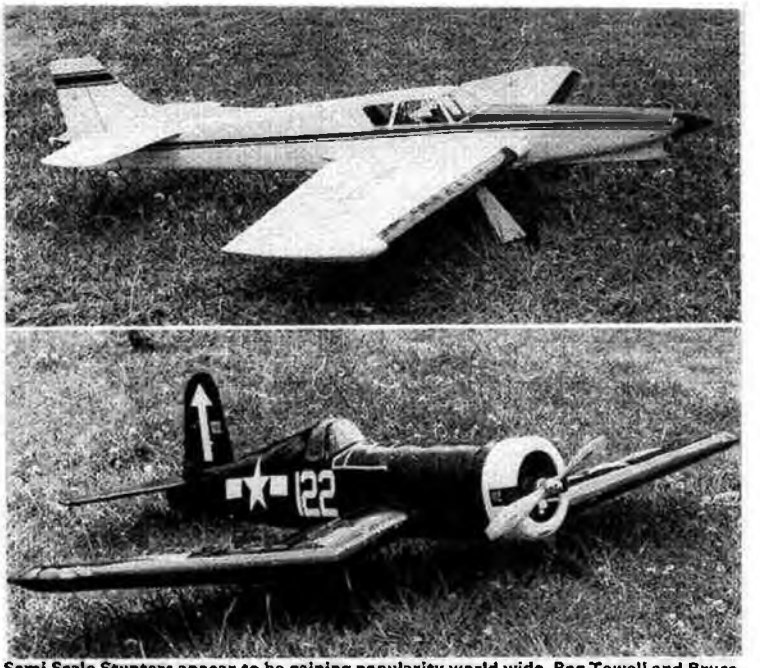


**Sam Banerjee displays his G-90 A/2, assymetric wing using all moving fin and offset towhook.**

The 'Junior Open Duration' for any type of model started soon after lunch. This event is for those below 16. Though the wind was a bit strong the flyers were not unnerved and put up a very good show and it was encouraging to see 14-year-old Falguni Bhumia win the cup for the second year consecutively with his A2 glider 'Lucifer'. The day ended with the payload competition, for the 'Aero Club of India Challenge Trophy'. The performance was moderate and it was won by Cadet P. B. Das with his 'Tomboy' powered by a 1.5cc frog engine, carrying a 7oz weight.

Sunday morning the 18th was full of bright sunshine unlike the previous day. The first event was Free Flight Power, the contest being won by Mr N. K. Joshi's 1.5cc engined 'Eliminator'. Construction defects accounted for quite a few crashes while one 'flew away' being caught in a thermal when on test flight.

**D. K. Bhowmick with two of the seven APS Meanderers which he has built.**



**Semi Scale Stunters appear to be gaining popularity world wide. Reg Towell and Bruce Ogden flew beautiful Piper Comanches and below Ray Ogle's Corsair which use F/F DT timer to throttle engine for realistic landings. See text below.**

Simultaneously the open duration glider contest for the Biswanath Challenge Cup attracted the maximum number of entries. Once again Sekhar Datta proved victor over P. Banerjee in 2nd place some 27 secs behind.

The two memorable days of hectic activity came to an end on a quiet and cheerful note, with the display of static drawn-to-scale models. This was keenly contested and the difference between the first three was a mere four points. Cadet Corporal S. Basu won it with his milk white, red-bordered, Concorde.

Organisation was, on the whole, very satisfactory and we would like to extend our thanks to Mr G. C. Roy and Mr S. Kumar for their co-ordination and co-operation in making this 29th NATS a great success.

**AUSTRALIAN NATIONALS**

*by Doug Harlow and Robin Hiern*

Some 400 individual competitors competed at the National Championships held recently from 28th December to 4th January, resulting in almost 1200 entries. This is not bad for a total MAAA membership of 4000 from an Australian population of 14 million. The influx of modellers plus families which swelled their numbers to around 2000 were well received. There was much support from the locals in Campertown, 120 miles west of Melbourne. As they constituted half the town's normal population they were a welcome boost to the local economy.

In the speed ovent a new FAI speed record was set by Robin Hiern at 143 mph (230 km/h) using a Rossi 15 ABC in a sidewinder model. The previous record has been broken three times now since Chris Noakes achieved 137 mph in England. Further records also fell in FAI team race, Huttan Oddy/Julius Reichardt lowered the best time to 4:02.0 using a Nelson engine. The Goodyear heat record of 3:05.0 and final of 6:44.0 is still held by R. Hiern/G. Sweetnam with their Rossi powered Argander Special, flown to US rules and set towards the end of 1977.

In Stunt some problems were experienced with turbulence from surrounding trees especially on the fourth and final day, but generally the standard was high and top places hard fought. Two juniors, Craig Yeoman and John Druzynski made a good effort at their first Nationals. Reg Towell and Bruce Ogden flew a couple of semi scale Pipe Comanches and Ray Ogle had a semi scale Corsair.

News also of the Australian team for this year's World Control Line Championships to which they hope to be sending full teams as follows:

F2A – R. Hiern; G. Burgess; D. Smith.
F2B – D. Harlow; D. Hanna; J. Tidey.
F2C – G. Wilson/R. Wilson; T. Geariadis/ D. Prior; H. Oddy/J. Reichardt.
F2D – D. Spain; D. Holmes; J. Stivey.
F4B – M. Nownham.

**30th NEW ZEALAND NATIONALS** – *Hamilton, 28th December to 2nd January 1978 – by Paul Lagan*

Hamilton, in the central North Island, is very close to being the centre of NZ's aeromodelling population. As a consequence, this Nationals attracted a record 240 contestants who could select from 44 events the class they wished to fly. The two Nationals previous to this (at Feilding) had suffered from very poor weather in contrast to what is normally expected for a midsummer meeting and all were hopeful that the sun would shine and the winds would take a holiday at Hamilton. Of the six flying days, two were spoilt by strong winds and some rain but the remaining days were generally pleasant with calm early mornings and light or moderate winds in the afternoons.

New Zealanders have flown FF events in mornings only with very early starts for the past 15 Nationals. Most are therefore quite accustomed to the frantic rush and frustration of trying to record a max in the unhelpful air of the first round at a time when even the cows are still slumbering. Newcomers to the Nats are invariably caught short if they arrive with anything other than a well-trimmed model or if they are tempted to spend even an extra 10 minutes in their warm cots before the rush to the flying field.

Highlights of Free Flight performances: The *Open Rubber* fly-off had five starters. One of the 'surprises' was 11 year old John Lagan (son of you-know-who) whose little St Leonard's 'Performer' powered with a

**Devon Sutcliffe's Open Rubber fly off placed continued for another 50 minutes on a 20 mile flight.**

couple of dad's old Wakefield motors put many 'pukka' Open models to shame. John went off very quickly at the start of the fly-off and scored a very creditable 4 mins odd and the remaining four flyers all launched into a grey sky and gentle lift to all go OOS in times around 10 mins. It was ironic that after the models had all been found (some days later in a couple of cases) the relative distance they had travelled was almost the inverse of the final placings! All credit though to Clive Gardner here who, with his win in Coupe and high placings in Wakefield and in Vintage Rubber, proved to be the best 'Elastic-man' at the Nats.

Probably the best flying of the Nats FF events came in the lowly rated (by some) but keenly contested Chuck Glider event. NZ rules call for six flights of 90 seconds max (all flights scoring). Anyone who has flown 'Chuckie' competitively will realise the difficulty of scoring 90 sec maxes in the class and will appreciate that the NZ record has stood for 12 years at around 8½ mins. Paul Lagan (the record holder) could be excused then from being a little smug at scoring five maxes and a 54 second flight in the contest with his 24in. span built-up wing 'Zingara' and Richard Weston's quite superb score of six maxes to relegate Paul to 2nd was achieved with very little piggy-backing on Richard's behalf.

Wakefield winner Bill McGarvey had a good FF Nats and showed great form when the wind picked up. He placed 2nd in a very close A2 contest (won by our Chuck Glider expert Richard Weston) and demonstrated his mature skill in selecting the moment of launch. Overall, Bill was second only to Paul Lagan in the FF Championship, Paul placing in the top three in 11 of the 15 FF events to annex this award.

All control line events in New Zealand are flown on a grass surface and models are generally prepared with this in mind. The Nats grass was quite good but warm weather caused it to grow fast enough to require mowing and re-marking daily. Quite a few new NZ records were established, despite the general unavailability of top contest C/L engines in NZ, the private importing skills of our top modellers was apparent as a necessary prerequisite to the events with many of the latest and best engines being in use.

Team Race expertise is concentrated in the FAI and Class B categories. This was the first year that Class B has been flown to 10km heats and 20km finals and the winning performance of Harvey Westland and Bruce Turner was head and shoulders above the opposition. They used Harvey's home-grown rear exhaust schnuerle ported .29 with open exhaust that Harvey now makes in limited production runs in Speed and Team Race variants. On the 0.4mm lines, the Westland/Turner machine was racing at 125 mph for more than 45 laps. Alan Barnes and Ron Brown led a strong New Plymouth contingent in FAI Team Race with Alan winning in a new NZ record 20km final time of 8:52 (grass surface remember). The first seven in FAI Team Race had heat times under 4 mins 50 secs.

**Kaiapoi clubsters, Trevor Henderson (beheaded) John Ogier, Harvey Westland and Bruce Turner between them placed 1st and 2nd in 5cc Speed using Westland engines. Circle is grass.**

Speed was once again dominated by Harvey Westland's fine performances – Harvey having recently teamed up with Bruce Turner – Bruce holds the handle and Harvey tweaks the needle. Good as their 5cc speed time of 169.5 mph is, this was with their 'second' model. The number one was too fast for Bruce to get into the pylon but did around 190 mph out of the pylon – this on a 0.6mm monoline. They used front induction Rossis for the winning FAI and 'Open' 2.5cc classes. Dave Willard was another speed record setter with an excellent 147 mph jet flight in an event that was before this Nats, looking like becoming obsolete.

**Displaying the remains after winning the Combat final, Ron Magill was also runner-up champ of champs.**

Ron Magill again won Combat, by good consistent flying during which he took advantage of his long reach and relative bulk – the 41 entrants in Combat flew mainly diesel machines but there was a smattering of fast glow models of the latest large foam trends. Jim Urry was beaten in the Combat final but scored a good win in FAI Aerobatics with third placer Robert Fenwick also winning Novice Aerobatics in a fine all-round performance.

Overall a very successful Nationals and one that was enjoyed by the contestants and the many families that come every year with tents and caravans to make the Nats a dual purpose vacation.

Championship awards announced at the prizegiving included Ron Magill as C/L Champ, Steven Williams as Junior Champion and Jack Godfrey as Scale Champion. Paul Lagan scored a mammoth total to become FF Champ and Champ of Champs but was given due notice from his 11 year old son John that he will need to look to his laurels – John being runner-up to the Junior Champion (NZ Juniors are categorised as being under 18 years old). Paul's proudest moment of the Nats however was the announcement of his election to life membership of the NZ Model Aeronautical Association – a rare and coveted award.

The next Nationals move to the 'deep south' at Invercargill – the first Nationals to be held south of Christchurch.

**THE 1978 TRANS TASMAN KAIAPOI NEW ZEALAND** – *by Phil Corfield*

Although the official competition started on Friday 17th February competitors were arriving as early as Tuesday the 14th. The Australian contingent, headed by team manager Warren Shurmer, brought with them various movies and slides from Australian and overseas competitors and consequently the film evening and bull session at the Wheelers carried on late into Thursday night. This set the tone for the whole meeting, the social side being every bit as important as the competition side.

In Speed most, if not all, competitors flew with Rossi FIs most with pipes. The Kaiapoi club's grass circles at the Kaiapoi domain, are at this time, probably the best in NZ. Getting the aircraft off the dolly and into the air smoothly proved no problem to most competitors.

Harvey Westland, representing NZ, was using his own 'breathed on' Rossi FI with pipe pressurised tank. His first run was just a practice compared to his second. On the second run everything worked perfectly. The takeoff was smooth and without incident with the motor, coming quickly onto the pipe once underway. Harvey made a smooth transition to the pylon and sat straight and level for the timed run. The result was a magnificent 231.2 kph (143.7 mph) and a new NZ record.

The first heat got under way at 10.15am. This was a two-up non-team event just to break the ice and to show how the jury, time clock etc would operate. The jury of Andy Kerr (Aust), Harvey Westland (NZ), and Darryl Flewellan (NZ) were positioned on an elevated platform roughly level in height with the two height markers on the opposite side of the circle. They had a field PA system at their disposal and just below them on a middle platform sat the three warning lights (courtesy of NZ Railways). To the left of the Jury's platform was a large starting clock which with a two minute sweep, horn and light for starting, stopping motors and starting the race worked very well indeed. This combined with the smooth grassed circle, well marked, made for a day of fair consistent racing.

One plane worthy of mention was that of Shurmer/Smith (Aust). Their aircraft has a similar planform to 'Bugis' 'Mosquito' but with a far bigger tailplane area. The fuselage is a full depth type with cabin type canopy. Warren runs a Nelson 15D and in his own words says "You can't go past a Nelson (pun) they are set up to race as they come. Don't touch them just start racing." However Warren says that the cooling must be set up dead right. The intake on Warren's aircraft is a wide trapazoid slot 18mm wide at the bottom and 8mm wide at the top. There is a 3mm gap between head and the bottom of the cowl but at the intake this gap would be 5mm. The intake doesn't close tightly around the motor but rather comes in at roughly a tangent point to either side of the cylinder fins i.e. starts closing in round the back of the motor. The outlet is as wide as the rectangular exhaust stub and curves from the bottom of the motor where the tins meet crankcase, down and along. Warren uses a McAnelly pan and

# READERS' LETTERS...

has an oval slot near the front for crankcase cooling 8mm wide and 15mm long. He also has an extra slot in the acetate canopy for an air supply to the carb.

The final, an all NZ one between Brown/Bolton (K&B), Barnes/Allen (Nelson) and Simpson/Ryan (Nelson) all got away to a fairly even and quick start. Disaster struck for both Simpson/Ryan and Barnes/Allen at their first pitstops.

Brown/Bolton had it made and ran out winners by some 34 seconds with a time of 9:06.9.

Sunday started with calm hot weather which continued through the day. However, there were problems with bumpy air in most places particularly high up, where warm air drifted in over the pine trees, which surrounded three sides of the ground. Right from the start the aerobatics day was markedly more active and colourful than either of the previous two days of competition. The crowd doubled on this day and must have run to 800 people. It was a magic day. One of those rare occasions when everything seems to be just right.

Ray Ogle from Australia with his large blue Corsair could have kept the crowd entertained on his own. The big aircraft with its now famous bent wings and slow precise flight pattern made its very own magic. Ray's Enya 45 was set up with a clockwork timer which throttled the motor back after six minutes, ready for the landing. The big Corsair floated in with the motor ticking over in true carrier deck fashion.

Murray Howell from Australia turned the crowd's attention more onto himself, than the aircraft he was flying. You see Murray is only 13. His plane is as big as he is. When he flies he has to lean back heavily with arm outstretched to stop himself from being pulled over. Murray is a competitor's competitor. He goes hardest when matched against strong opponents. Three of his four flights were magnificent, his low crisp pullouts being one of his strongest points. He couldn't be matched on the day in this department. Only lack of vast competition experience kept him out of the top three. With the guiding hand of Murray's father/manager and Murray's own determination to do better and strive for excellence, he must eventually get to the top.

The day surely had a carnival atmosphere for the crowd watching but amongst the competitors there was an intense struggle. With New Zealand and Australia locked at one all the pressure on both teams' flyers was great. Right up to the last hour of competition the match was a cliffhanger. Every new flight seemed to bring an improvement to each individual's previous effort. In the end NZ won out. The first time ever, with Peter Wheeler just beating Ray Ogle of Australia.

The prizegiving dinner was held at the Island Motel, Kaiapoi. It was more like a family reunion than a prizegiving. The comradeship between countries was overwhelmingly warm. Everybody had a ball, and probably too much to drink.

Team photos were taken, people moved everywhere and talked to everybody and eventually the last competition of the three-day meet was organised. It was called the jumping into the cold outdoor swimming pool with all your clothes on at 12.15 in the morning competition. Competition was fierce, with applause, cheers and laughter coming freely from the surrounding team supporters.

Dear Sir,

Interested to see your T/R column giving us some hard facts on dBA readings obtained from some *Competition C/L* models. (Dec. issue). Whether by accident or design, though, the article may lead some fliers to the wrong conclusion.

With such a previously contentious subject it's important to get the facts right to avert further dispute!

I hope your correspondent will accept the following three clarifications to his article.

*First:* dBA figures alone are not the sole criterion in deciding whether or not there is conformity with the Code of Practice on Noise. There can be several factors: Where the operators are; who they are; what they're trying to do; when it is; how many of them; how frequently occurring; what nearby barriers or Ambient noise level; and finally, in any case, only in the event of complaint would the Code be brought into action anyway!

*Second:* Sorry, Dave! the purpose of the Code is *not* specifically to reduce Noise. Quote: "The purpose of the Code is to describe how annoyance or disturbance (due to noise) may be minimised so that a nuisance is avoided." – (Para. 1.1). Quote: "The Code contains guidelines which if followed should ensure that noise nuisance is avoided in most circumstances. Its terms are not, however, intended as hard-and-fast rules to be applied to every site." – (Para 2.1).

To us Aeromodellers the difference between Noise and Noise Nuisance is of importance and is confirmed both in the Code and by the long prior negotiations with the DoE where it was abundantly clear that they were concerned with "Noise Nuisance" and not "Noise" *per se.*

*Third:* The DoE and other interested parties to the Code have recognised that "Competitive requirements (may) make the use of a muffler unreasonably restrictive." – (Para 5.2). Speaking personally, I have felt here an implicit recognition that an *unreasonable* noise complaint (say on a distant site, etc) could well be a nuisance to *me*!

So . . . Dave's C/L Competition models could all be exempt from the muffler requirements (given certain conditions) subject of course to the final overriding clause "Where nuisance is caused by flying unmuffled model aircraft at any site . . . (the exclusion should no longer apply)" – (Para 5.4).

One would not wish to belabour the Exemption clause, but its existence certainly gives a contrary impression to that in the article (i.e. "Class B are in trouble") and also reflects the DoE's desire to resist an inflexible approach to the Aeromodellers' problem.

It is accepted that reduction of Noise emission at source is the most effective and fundamental way of avoiding Noise rNuisance, but concentration on this aspect alone will nullify the essentially flexible nature of the Code's final format and may even militate against its correct use in the future.

As the Model Aircraft Code is one of the earliest to be completed, it may well set the pattern for other Sports which have the competitive/casual operation split. I for one await with interest the Motor sport C.O.P.!

Yours sincerely,

Mike Billinton

*My intent was to publish facts obtained precisely in accordance with the technical procedure of the draft Code as made available to me via my club from the SMAE. First comment - I may be utterly wrong but I just cannot reconcile what Mike says with what is contained in the Code. I think Mike's comment is quite correct. It is a sad fact that the vast majority of noise complaints are caused not by noise intensity but by its mere existence; in trying to make a definition of acceptability in terms of intensity, the Code may prove to be of great assistance. Mike's third comment highlights the problem for he points out the competition exemption but then, as an afterthought, points out the loophole whereby our exemption may well prove to be inapplicable. Surely what is needed is an official interpretation of the Code in simple laymen's terms. The present document is complex and open to variable interpretation.* Dave Clarkson

Dear Sir,

I wholeheartedly agree with Bob Wells' suggestion for celebrating the Wakefield Golden Jubilee. Might I also suggest that the SMAE ask the FAI for their cup back for the proposed event.

The FAI should have their own cup for their F1B rules. Until they got hold of it, it was the number one event. They lost no time in demoting it to No. 3 with the result that we lost a whole flock of top Wakefield flyers who packed up en bloc when the new rules were announced.

I certainly hope something comes of this suggestion and that some of the top men of that era get their '53 Wakefields out of mothballs to compete against the present day expetts.

*Dagenham. Essex* J. R. Holt

Dear Sir,

What a very worthwhile idea! The Wakefield Golden Jubilee (makes the old blood race!) Let's have an event based on the Old Wakefield rules, with a rubber restriction making it not so easy to get a max. Also undercarriage and ROG.

I have been modelling now for 40 years (since I was 10), and have built everything from 12ft gliders to peanut scale. However my old love is the 'real' Wakefield. There was more scope for individual designs with the old rulings. Things started to get out of hand with unlimited rubber and no restriction on wingsize. The modern Wakefield is three-quarters a manufacturer's job, with dural fuselage and manufactured nose assemblies. OK in their way, but most of the models are made up as if they had come from the same manufacturer. So let us have an Annual Event! based on the old rules.

It should bring back old exciting feelings of getting out the drawing board to design/build that all-out super winner. I'm busy with an F1B Wakefield at present, but I think the old Wakefield had something special. How about voluntary contributions to raise funds for a Vintage Wakefield Cup?

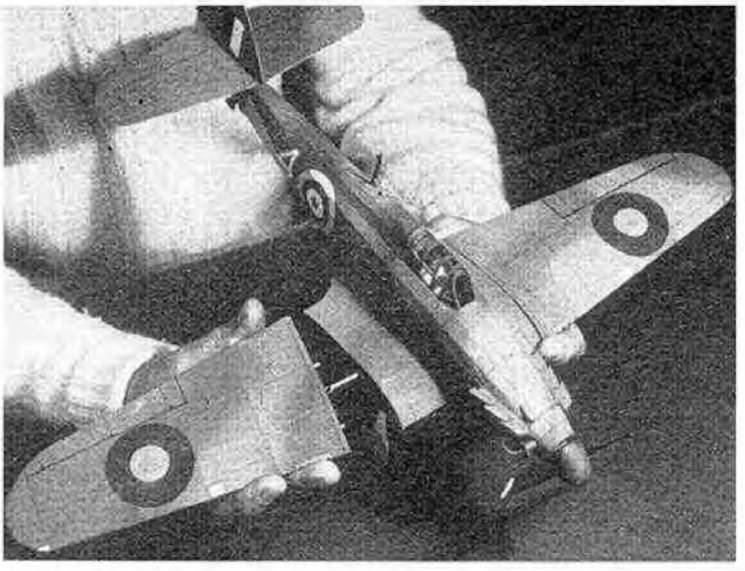
*Royton, Tyne & Wear* Stan Fairless

Dear Sir,

Whatever form it takes, something must be done to organise a Golden Jubilee Wakefield competition. Perhaps splitting them simply pre and post war designs, or up to say 1953. This would then encourage ones of the early '50s.

How about dragging out some art work from the 1952 Annual and reprinting in *AeroModeller*?

*Alford, Lancs.* John Brookes



This Keilkraft Hurricane was converted to $CO_2$ power by David Deadman. Knock-off wing panels are retained by rubber bands and locating stub dowels. Neat and realistic finish enhances model which flies very well.

**Alan Callaghan relates all the latest news and views on scale modelling topics**

# Scale Matters

DUE MAINLY to pressure from FF scale modellers in the United States together with some added enthusiasm in GB it is encouraging to report that the organisers of the Woodvale 78 World Champs have consented to run an event for FF scale models. This will be in the form of an Open International rather than a World Championship proper, and is to be held the weekend prior to the main RC and CL events. A full status championship requires a minimum of five countries with firm entries, and coupled with the need to hold team trials it is almost impossible to organise being already so near to the August date. The Open event is then the most practical way of making the most of this opportunity to spotlight a class of scale model rarely seen in large numbers. Control line scale also is not generally known for being a strongly supported class anywhere in the world but at World Champs level the standard of competition is very high with some quite superb and spectacular models having been seen in recent years – many of these being multi-engined subjects with lots of working features. I know that quite a few winners of the Superscale event at our Nats in recent years are still going strong. These ought to be ideally suited to the inconsistent weather conditions known here, and should be able to give a good account of themselves being flown on home ground (air?). The closing date for entries will be approximately six weeks before the event so there is ample time to smarten-up that tried and trusted model and get in some final trimming sessions when, hopefully, summer arrives. Anyone wishing to know more at this stage should write to me c/o this column and I will pass enquiries on to the organisers.

David Deadman at work on his 1:10 scale Udet Flamingo, approx. 40 inch span. Fuselage is built from thin ply and weighs 10 oz. with Mills 75.

Strange though it may seem, indoor flying in this country is not always confined to the winter months, and is as much dependant upon the availability of suitable sites as it is on seasonable habits. Our biggest site, Cardington, is at its best in midsummer when the weather is warm and the daylight long. Many smaller sites are frequently used throughout the winter and anyone living within the Nottingham area may be interested to know of a meeting on 30th April at the Chilwell Olympia Sports Centre, Nottingham. This is one of a number of events organised by Barrie Hotham (Tel: Mansfield 34127 for details of this and other meetings), who is keen to welcome new faces to join the regulars for a spot of scale flying. The hall is available from 10 am until 6 pm.

To date the use of Cardington by indoor scale flyers has been with the consent of the SMAE Indoor Committee. This body now wishes to limit its responsibilities entirely to the duration classes which means that at the time of writing no SMAE Indoor Scale events have yet been scheduled at this venue during 1978. Indoor Scale affairs are dealt with by the SMAE Scale Committee, but whether they should simply be transferred to the Indoor Committee as a solution to this problem is debatable since the difficulty only relates to one site. It is to be hoped, however, that between them they soon can resolve this little demarcation issue, symptomatic of our time, so that the genuine scale enthusiast in this very popular class who has supported SMAE events in the past at this venue will not become the eventual loser.

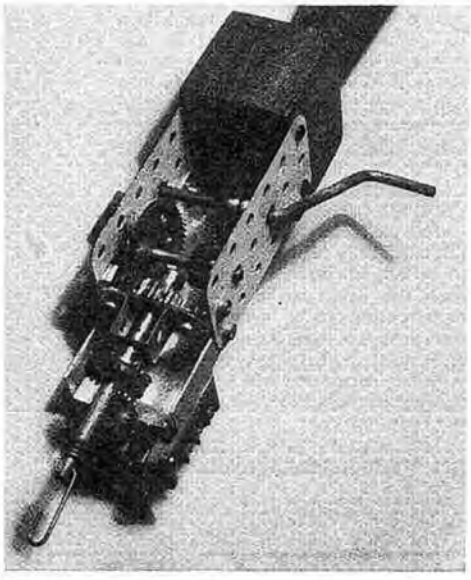
The item shown is not a relic from the Industrial Revolution, but in

APS "*Missel Thrush*" converted to rubber power by Andrew Moorhouse shown on test flight. Attractive subjects finished in red and white.

Albert Briggs DHC Hornet uses two throttled Oliver Tigers electrically operated by 3 line control, third at last years Nationals.

fact the rubber winder that I have been using with little problem over the last four years or so. A quick look around any indoor meeting will reveal a variety of winders – often as many different as there are people present, ranging from the humble drill through converted alarm clocks right up to the most expensive precision built imported items. My own is based on *Meccano* gears and gives a ratio of very slightly less than 8:1, which I find just about right for most models. Winding up a rubber motor too quickly overstresses the rubber, and winding up too slowly is a chore. Anyone familiar with *Meccano* gears ought to be able to work out the arrangement shown, and a simple handle is easily made. A plastic bicycle handlebar grip could be used (glued in place!) as an improvement. The gadget at the front driven by the small contrate gear is a digital counter with a reset button (essential) bought at an electrical surplus store for 25p, and was originally fitted to a tape recorder. The counter helps in many ways, but whatever kind of winder you have, it ought to be free enough in its bearing to allow some feedback of torque from the motor that you can feel as the motor reaches its peak. Self-engaging locking ratchets are of very little use.

**Indoor rubber winder using Meccano gears.**



The bussiness of designing a flying scale model is different in a number of ways from designing most other kinds of flying model. The majority of successful non-scale contest models are carefully developed over a number of similar prototypes in which many detail changes may be made and tested until the design is refined enough to give its best potential performance. Few of even the most keen scale modellers ever make more than one example of any chosen subject, and this kind of gradual development rarely occurs.

This being so, it is important to get as much as possible of a design right first time, not only for the sake of avoiding continuous repair sessions on badly-designed models when such time is far better spent in the very enjoyable task of adding those small details and markings that make a model interesting, but also to build confidence in one's technique so that at a later date some of the more difficult but attractive subjects may be tackled with ease. Eric Coates' excellent series of articles on building scale models previously published in this magazine (*AeroModellers* 1971-72) covers the ground admirably relative to larger outdoor models, but one or two basic principles detailed therein can easily be applied to other types such as small scale or indoor models.

One of the most difficult components to construct accurately on any type of scale model is the undercarriage. Any type of free flying model requires that it should be capable of withstanding the kind of abnormal stress loads that would give the designers of fullsize aircraft very nasty nightmares if scaled up proportionally. Because it is never possible to predict exactly how a free flying model will land on each occasion it is best to have the u/c designed in such a way that it will absorb any kind of landing shock from the front or sides. If your models habitually land backwards then the u/c is the last thing to worry about!

The torsion bar undercarriage has been known to modellers for many years, and it certainly seems to be the best in terms of longevity and relative ease of construction. *Figure* 1 shows the basic principle, and the loop of wire at the top may lie either vertically or horizontally according to the design of the rest of the model. Indoor models are particularly prone to very hard landing knocks, and having used this type of unit in many models over recent years I have found that it gives little or no trouble. The rear legs do not take any loads at all; they simply need a flexible connection at the axle location (such as a soft wire binding) and slot loosely into holes under the fuselage at the top ends. Extra leg strength is needed at these points to ensure that they do not slide out of location if the main legs accidentally get pushed forward slightly. On indoor models the rear legs need only be of balsa wrapped with tissue for extra strength, but on larger outdoor models they would be of wire thinner than the main legs and faired with balsa or spruce. Again on larger models it is possible to have some extra springing at the top in the form of rubber bands or tension springs to further help the main legs to return to their correct position. This is entirely unnecessary on a small model. A drawback of this design is that it is not possible to properly detail to exact scale the top ends of the rear legs with tapered ends and mounting brackets as would be the norm on the fullsize subject. Such a compromise is, however, worth enduring for the sake of having a unit that will absorb punishment better than any other type and which will consistently remain in good working condition following even the worst of landings. In choosing the right gauge of wire it is probably better to

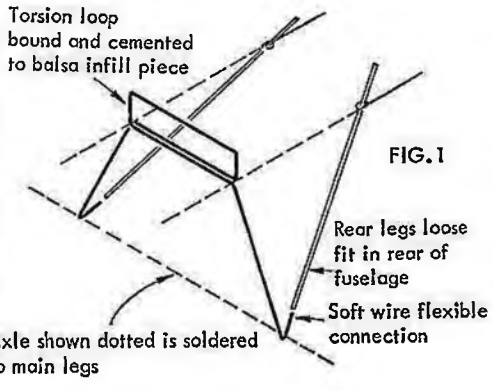
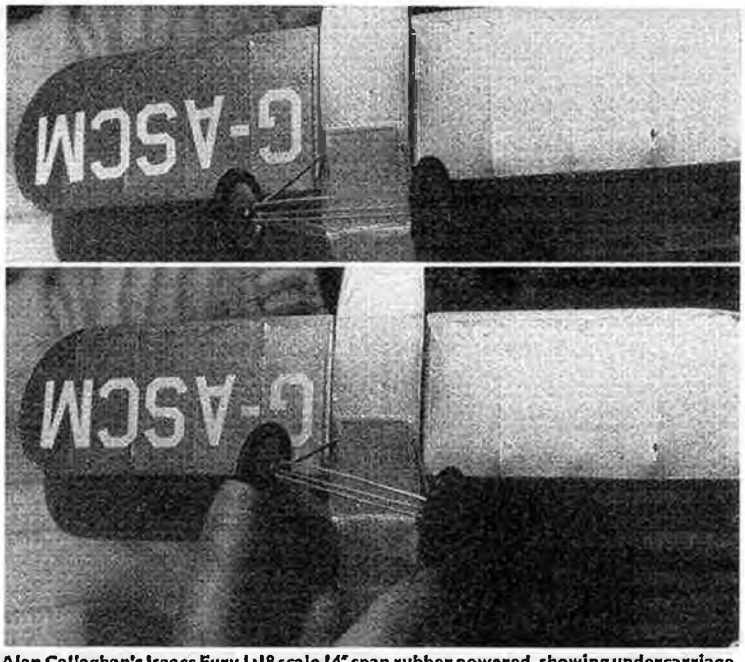



FIG. 1



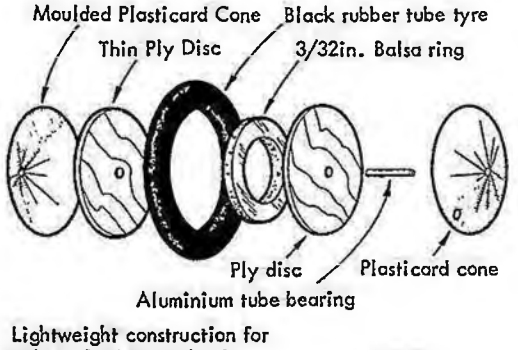
**Alan Callaghan's Isaacs Fury 1:18 scale 14" span rubber powered, showing undercarriage above in normal position and below with one leg at maximum deflection. Model is now four years old.**

err on the side of it being slightly thin rather than thick, since the latter will transfer more of the loads to the rest of the airframe due to its greater stiffness and is more likely to remain distorted after being severely deflected. This type of undercarriage is not always suitable for either control-line or RC models since its inherent springiness makes controlled smooth landings difficult to perform due to the way it will over-react to any given load.

Having arrived at a u/c structure that works well, the problem remains of how to make the wheels. Obviously the wheels should be as capable of taking adverse loads as the u/c, but one frequently sees examples that let down an otherwise quite presentable model, and which simply aren't up to the job. If a really accurate representation of the fullsize is to be attained, each pair made should be tailored to each model built. Quite good commercial items are available such as the Williams Bros products, but you then have to scale up your model to suit the wheels, which is not always the ideal way of doing it, and means that you cannot usually build a model to your desired scale. The Palmer Cord fabric-covered spoked wheel is probably the type most commonly found on the most suitable FF scale subjects, and many fullsize examples of these are to be found in the larger aircraft museums in this country for close examination. On large scale models these are not too difficult to reproduce once a suitable size of rubber tube has been found for the tyre, but on small models they can be somewhat tricky to make well. The usual method of turning the wheel from laminated balsa is only really suitable for very lightweight models. The construction shown in *Figure* 2 gives a wheel that will probably outlast the model itself, and is not difficult to make using only the simplest of tools.

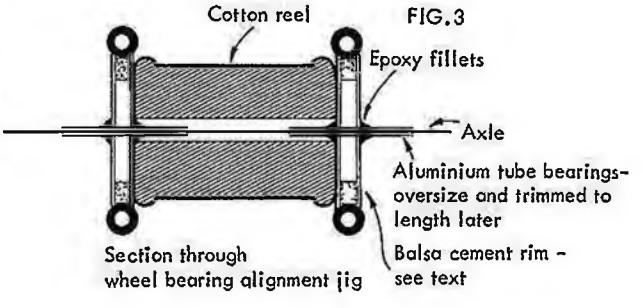
Construction is almost self-explanatory but two small refinements are worth emphasising. Once the ply/balsa/ply sandwich has been assembled the tyre should be made next. On small models black fuel-tubing is ideal and the ends should be butt-jointed with cyanoacrylate glue. Coat the rim of the wheel liberally with balsa cement and quickly put on the tyre before it dries. After about 15 minutes remove the tyre and a perfect rim will have been formed. On final assembly such a good rim/tyre joint means that only the smallest drop of cyanoacrylate will hold the tyre very securely in place. Before this stage, however, other things are to be done such as aligning the axle bearings properly. Aluminium tubing is an excellent material for this, being lighter than brass and no less hard-wearing by any significant amount. Make the bearings about three times their finished length and glue them to the ply discs with a generous fillet of 5-minute epoxy. To align them correctly, centre the wheels on each end of a cotton reel or similar suitable flat-ended cylinder and slide the axle wire through leaving it in place until the glue has thoroughly hardened. See *Figure* 3.

Next make the conical spoke covers and a good way to do this is to mould them in plasticard over a turned hardwood conical former using the familiar cockpit canopy moulding technique (described in *Aeromodelling Plans Handbook No.* 1). Spokes are added by scoring the back of the card with a blunt knife and steel rule, and if the spokes are gradually faded out towards the rim a quite convincing stretched fabric appearance is achieved. A small drop of epoxy near the hub is sufficient to hold them in place leaving the rim quite clean and free from glue. Also, they are neater again if painted before assembly. Remember to use enamels, though, as other paints may melt the plastic! With the cones in place the surplus ends to the bearings are trimmed off and the new ends filed flat. Add the tyre and a very neat little wheel is the result. It is at this stage that one remembers that it would have been possible to put perfect tyre-valve access holes in the plasticard cones with one of those very useful multiple-sized leather punches or a suitable size tube filed to give a sharp cutting rim.




Lightweight construction for Palmer Cord type wheels

FIG.2




Section through wheel bearing alignment jig

FIG.3

Tom Patrick seen winding the motor on his E-Z-B indoor model using Meccano geared winder see Scale Matters for details.

# B - SIMPLE

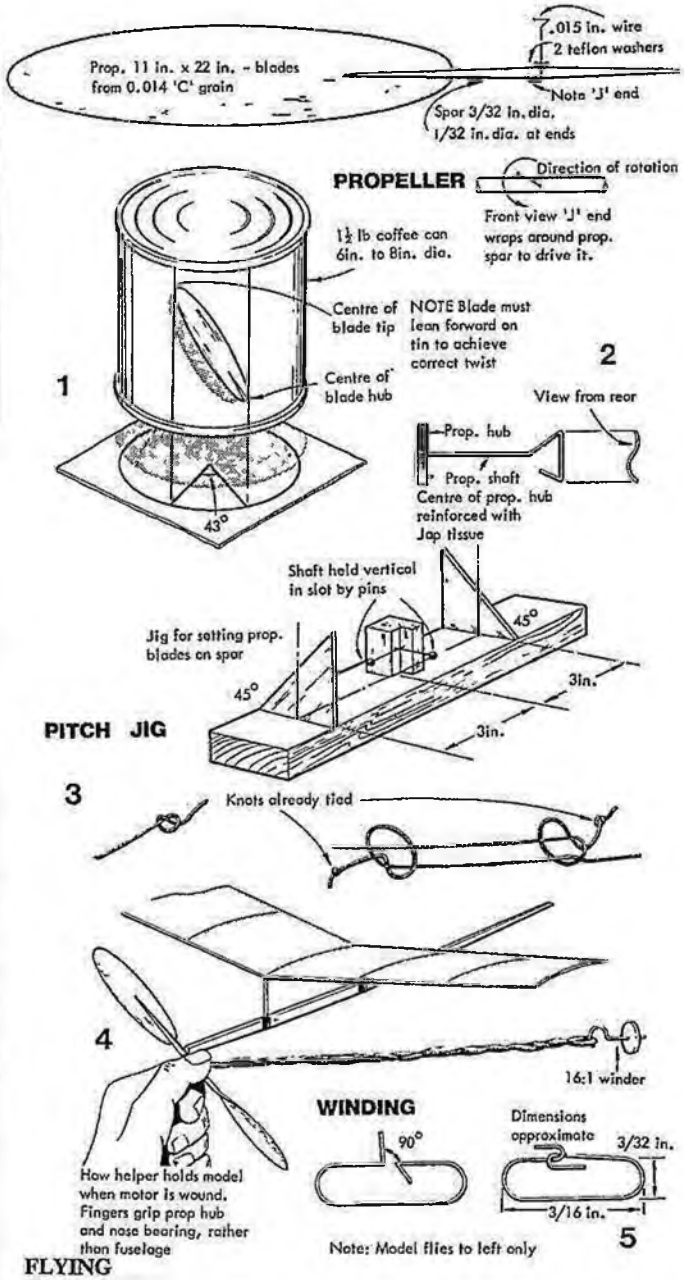
## Nick Zotov concludes his step by step guide to indoor model flying

**Prop**

Draw a circle the same diameter as your favourite can. From the centre of the circle draw two radii at an angle of 43°. Place your can directly over the drawing, and at the points where the two radii meet the circle, draw two vertical lines on the can (see *Figure* 1). Cut out the prop blades from the ·014in. sheet using the card prop blade template. Cut a $\frac{3}{32}$in. square strip, from the ·095in. sheet, the length of the prop hub. Taper it at each end for a 'cricket bat' splice fit into the prop blades. Soak the blades in water and bind the prop blades around the can, using cloth tape. Place in a 300°F oven for 20 mins, or leave overnight. Do not place in too hot an oven, otherwise the wood may char. Drill the prop hub centre with the sharpened end of a $\frac{3}{4}$in. length of ·015in. wire, held in a pin vice. Cut a 1in. length of similar wire, and bend one end into a square 'J' shape – see plan. Cement a $\frac{1}{4}$in. strip of cement-impregnated Jap tissue around the prop hub centre, wrapping round once. This will stop the prop shaft from pulling through under rubber tension. Insert the 'J' shaped wire, which acts as the prop shaft, and cement it in place. A further wrapping of tissue over the 'J' wire end secures it firmly in place. Use the pitch jig to aid you fit the blades to the prop spar, and cement them in place. Place two Teflon washers on the prop shaft then bend the reverse 'S' shaped prop hook, as shown in *Figure* 2. This will stop the motor climbing the prop shaft.

**Balancing**

Make up a 15in. loop of ·055in. rubber, and lubricate it. You will probably find that the conventional reef knot will not hold, because Micro X rubber lube is very slippery. One way of knotting, that will hold, is to tie an overhand knot at each end of the rubber strip wetted with saliva but before lubricating – now loosely tie each end over the other (overhand knot again) as shown in *Figure* 3. Thoroughly lubricate and gently pull so that the last two knots you have tied slide up to the knotted ends of the strip. Pull tight and trim ends. Place the prop in its bearing, and sling the motor between its hooks. Mark the balance point on the motor stick. Cement the wing post sockets upright on the left hand side of the motor stick – the front socket 2in. in front of the balance point, the rear one 1in. behind. Allow to dry – and the model is finished.



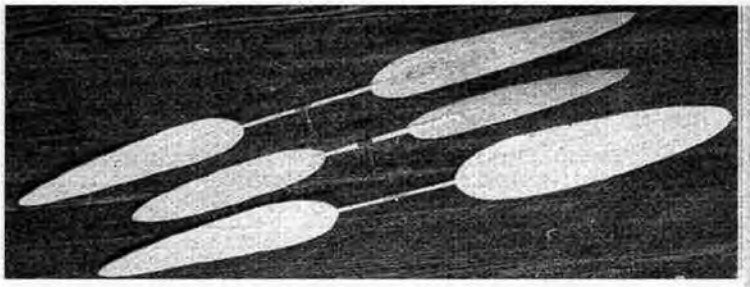

**FLYING**

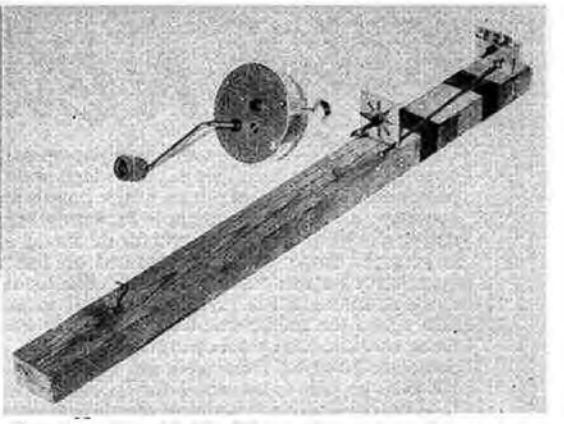
**Transportation**

You will have to carry the model to its flying site in a box, otherwise it will disintegrate when you take it outdoors! Within the box, locate the wing in wing post sockets (two holes drilled 3in. apart in $\frac{1}{4}$in.sq strip glued to the bottom of the box will do); the fuselage/tail assembly and the prop may be located in plastic foam blocks with slits cut in them and fixed to the box's interior.

**Incidence Trim**

As with any model, the best way to learn how to fly yours is to come along to a model meeting and seek help – we're a friendly bunch! However, the following notes may assist you. Carefully insert the wing posts in their sockets, ensuring that the long, washed in left wing really is on the left hand side. Hold the model as shown in *Figure* 4 and ask a helper to wind on 500 turns. *Gently* launch the model, which should cruise level or gently climb in a left hand turn. Wing incidence may be adjusted by sliding the wing posts in their sockets.





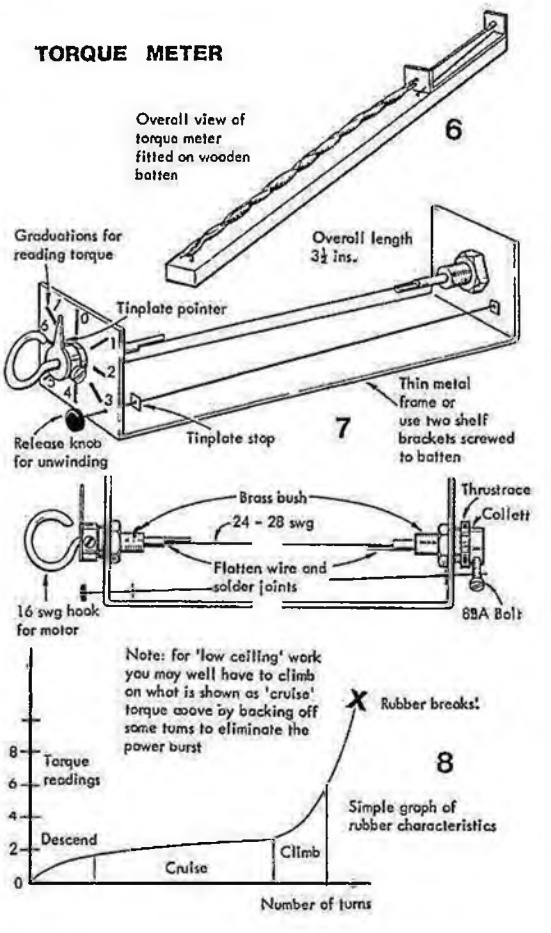
**Left, a selection of propellers tried by Nick - such experimenting will soon show which variation works best. Above, the completed torque meter seen with a commercial highly geared winder.**

### Motor Winding 'Off-Aircraft'

For more than trimming turns I advise winding the motor 'off-aircraft', thus permitting you to wind the motor without a helper, and more importantly, avoiding the hazard to the model of burst motors. Make up two 'O' rings from single strand 33 swg control line wire – see *Figure* 5. It is easiest to slip them onto the motor before making the loop. Now find a scrap piece of wooden batten just longer than the model's hook-to-hook distance, 9in. in the case of 'B Simple'. Mount two hooks 9in. apart on the batten, and mount it firmly to your work bench. Position one 'O' ring against the motor knot, and place it on the hook furthest away from you. Stretch the motor two or three times its normal length and begin to wind, moving in towards the batten hook as you do so. Finish winding with the 'O' ring against the batten hook and transfer the ring to the hook from the winder. Take your model, holding it by the prop hub and nose bearing as shown before in *Figure* 4. Take the 'O' ring which is *not* against the knot in the motor, and place it over the prop hook. Now, without stretching the motor, place the other 'O' ring over the rear fuselage hook. Your wound motor is now on the model.

### Torque Meter

Once you have used a torque meter you will wonder how you managed without one. Mine, illustrated in *Figure* 7, was designed by Dave Yates. The meter is used in place of the rear hook on the batten, see *Figure* 6. As you wind the motor, the pointer moves clockwise; should the motor break then don't exceed the breaking torque reading on the next attempt! The meter can also be used to tell with reasonable accuracy how high the model will climb – the greater the torque the greater the height. It can also be used to determine the quality of a sample of rubber. Good quality rubber will show an initial torque increase as turns are applied, stabilising at a moderately high torque for a large number of turns, and then a rapidly increasing torque value with further turns until breakage occurs (see *Figure* 8). As the motor unwinds, the torque/turns curve falls below the corresponding curve for the wind up. Where possible, therefore, you should wind the motor beyond the desired torque setting, and then back off turns. This maximises the number of turns for the torque obtained.




### Flight Trimming

The high portion of the torque curve is great for making the model climb away, hopefully to cruise just below the roof girders in the steady torque range. The model will descend in the low torque range, and should land with just a few turns on it. Determination of the correct prop/rubber combination is tricky. Here are a few points to ponder:

(a) The finer the pitch the faster the rate of climb. But the rpm increases, and hence motor turns disappear quicker.

(b) If your model comes down with a lot of motor turns left, something is wrong (though it shouldn't come down dead-stick, either). If it does, you could:

(1) Reduce the motor length. This will reduce the model's gross weight, and the model will fly higher next time. Good if it could use more height. Bad if it's already thumping the girders!

(2) Decrease the pitch. Again the model will tend to fly higher. In general, I'd try (1) first.

(3) Decrease the prop diameter and blade area. Not recommended, unless you are using a massive prop, until you have tried (1) and (2).

(4) Increase the motor cross-section but reduce the length so that the overall motor weight remains the same. Do this if your model was cruising nicely just below the roof girders, but had plenty of turns left on landing. The new motor will give better cruise torque, and hence you should stay up longer, provided you haven't sacrificed too much length for cross-section.

# CLUB NEWS

UPON SEEING some power radio flyers operating on an open space where such flying is forbidden and where the prohibition is clearly set out on notice boards around the common, it occurred to me how foolhardy they were to risk so much for themselves, and for the model movement in general. Power flying was banned on this naturised open space because the only area suitable for reasonable radio operating a flat area, fairly small in extent, was also where the public was wont to disport itself, sometimes in quite heavy concentrations. On this particular occasion, however, there were not many people around but even so, this is no excuse for flagrantly disregarding the local regulations. It is almost certain that any insurance cover the flyers may have had would have been invalidated by their actions. We know from previous hard experience what a deleterious effect such incidents have both in the area in which it occurred, and perhaps, throughout the country.

Naturally we have sympathy with lone wolves who have nowhere to fly but to run the gauntlet of illegal activity only jeopardises the good name of the whole modelling movement. To all such flyers we say "Come on you chaps, play the game, fly legally and safely". There is almost certain to be a local club nearby with proper flying facilities, or indeed it is not unknown for a handful of flyers to form their own group and search out a friendly farmer with a spare field, or even make an official approach to your local council for a municipal site.

Perhaps by way of defending the foregoing caveat against any charge of it being too censorious, I see from the winter edition of the Reading & DMAC's nicely produced and informative *Windsock* that the club has a Flying Proficiency Scheme for its radio flyers.

Mick Harris, the PRO, who sends us the club newsletter along with a report, informs us of a scheme to give encouragement to the younger club members. They are each given a 'Pluto' kit on the understanding that they build it to fly in a special club competition. Winner of the event to be the one putting in the longest flight. Any time left after that will be given over to see what the dads can do with the same models. For more advanced performers there are contests for Slope and Thermal Soaring. Slope goes on at Beacon Hill, but 'surface' flying has met with flying field problems. Happily, a new site for Radio and Control Line has now been acquired. Mick Harris says there are still a few vacancies in this lively and versatile club. If interested write to Mr D. Tiller, Secretary, 49 Albert Road, Caversham, Reading, Berks.

No particular flying site problems for the next club on our list: the Southampton based Woolston MAC. Nick Nicholls, the Chairman, sends us a report, together with the January newsletter. Mainly a control line club, they have their own flying site provided by courtesy of the Southampton Council, and for meeting purposes they have a club room at the Woolston Community Centre. A further 20 members is the worthy target set for the current year, with all ages and degrees of experience welcome. Fees are a modest £2.50, which includes insurance and the hire of the club room. Write to Mr N. Nicholls, 86 Denzil Avenue, Netley Abbey. Telephone Hamble 2792.

The Buckaneers Model Club operates in the new town

**OBITUARY**

It is with regret that we report the sudden passing of Mr R. W. (Ron) Tribe on Thursday, 16th March. As a keen Aeromodeller for many years he was well known by Control Line flyers throughout the country, and was a leading figure and life member of Cosmos MAC.

Our sympathies at this time are with Mrs Tribe and sons Ron, Pete and Mick.

area of Milton Keynes in Buckinghamshire and, according to the *Scimitar*, enjoys what could be described as a low noise area, in that there are none of the noise constituents of heavy industry, traffic concentrations and airfield pathlines to blight the near rural peace. This can be a mixed blessing, though, for in all that quietude the buzz of a model plane sticks out like the acoustic equivalent of a sore thumb – one very good reason why the club is giving the desired minimal noise level much attention, thus to pre-empt any complaints over their activities on the club flying sites, like Woughton and Nash. Oddly enough, I do a little flying on a remote farm site. It is a hilly area with woodland abounding, where noise seems to be 'swallowed up' more effectively than on the usual flat, open airfield site, pointing perhaps, to the highly relative nature of noise in general. Much discussion, too, in the newsletter on the highly topical subject of Displays. for which there is much pressure on the club from various local organisations. This is not to be ignored as the displays are a most useful source of club income. The rules and conditions which the club lays down for these events in the interests of safety and efficient organisation are given space in the newsletter, and it will be interesting to see how they compare with the standards set by the SMAE.

The Scottish Aeromodellers Association has its Areas, too, and from Dr J. E. Glen, the Hon Sec of the Association, comes news of the opening up of a new Area, the Northern Area, to cater for the growing numbers of members coming in from Dundee northwards. Dr Glen reminds us that the total strength of the SAA is 1,000. And, this, in terms of proportion, is quite impressive, since the Scottish population is but 10 per cent of the British Isles. Anyone interested in joining the new Area should contact the Secretary, Mr G. M. McIntosh, 23 Glenesk Avenue, Montrose, telephone Montrose (0674) 2035. As Dr Glen points out: Unity is Strength.

The other British Association, that of Northern Ireland, produces a nicely prepared, compact and well stocked newsletter. The Association began when the Ulster and Belfast clubs got together to promote model flying throughout the province. Since that time the Association has burgeoned into eight clubs. There is, for example, the Bainbridge Aeromodelling Club, which has been going only since 1975. On an almost self taught basis it is now a well established and prospering club of 29 members, with an excellent flying field and plenty of highly proficient radio flyers. An accompanying photograph depicting six cheerful stalwarts on the sunny club field shows a lot of nice, enticing open space around. Another club described is the somewhat remote North West Aeroplane Club, which, again, dates back to 1975. Members are fortunate in having one of the best flying areas in Ireland, and with the hills of Donegal close by, slope soaring is naturally popular. Apart from giving displays, member John McGonagle flew his Super Pox Box, fitted with dual tanks, from Buncrana to Londonderry, a distance of 15 miles. Transmitter was carried in a borrowed 2½ litre Citroen, driven by the Secretary. At times he had to whack up the car to 80 mph to keep in touch with the fleeting model. The Association's calendar for 1978 appears not to leave a Sunday throughout the season without one interesting contest or other, covering most aspects of the hobby.

On thus, by natural progression, to the long established Belfast MFC's *Nitro*, the editorial of which gives as a general club opinion of articles in the model press being either for absolute beginners or the competition expert, with nothing useful in between for the emergent model flyer. Is this a fair judgment? Well, I hear some people complain that the model press caters only for the raw beginners, and contrariwise the beginner grumbles about the articles

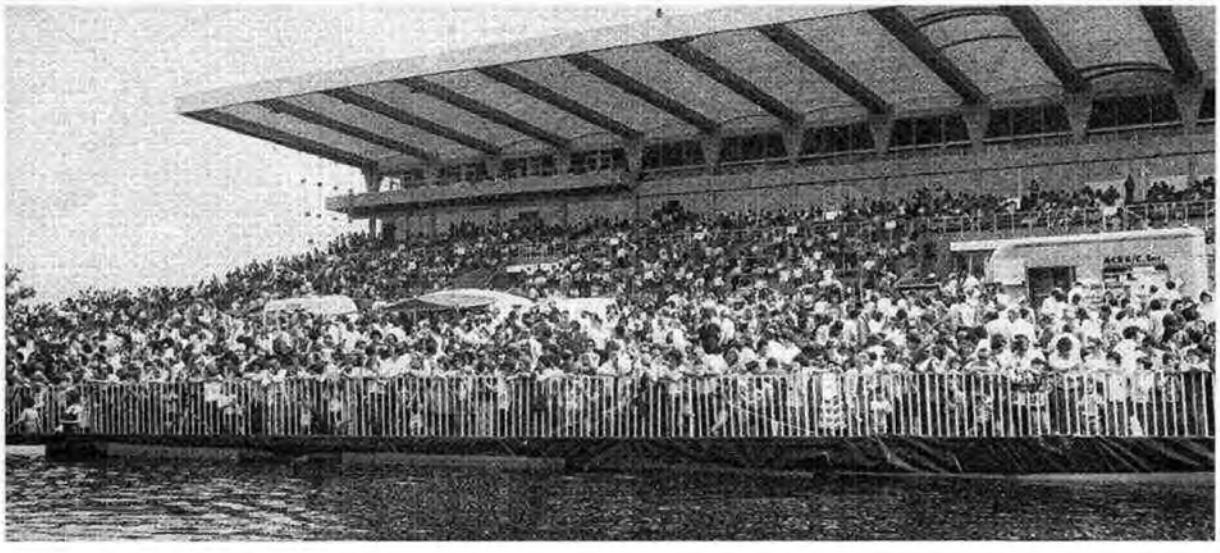
being all above his head. Between the two extreme views I see quite a lot of middle ground explored in the excellent model press we have in this country, which sets standards envied throughout the world. But anyone with suggestions to make for better and more varied coverage are always at liberty to express them to the ever receptive editors, so don't be afraid to get your pen out once in a while. The current newsletter is devoted mainly to Goodyear Racing and Slope Soaring, although FAI, too, is covered in the Nitro Grand Prix, scheduled for March.

Reading through the Three Kings aeromodellers' *Court Circular*, it occurred to me that I seldom see a control line model in action these days. Not in fulsome flight that is, but I do see the difficulties the learners have in getting airborne. It seems you need either a flat, hard surface for take-off, making the model vulnerable to severe damage through mishap or a bad landing, or an expert hand launch over grass when there is no expert launcher around. Quite a dilemma. Anyone thinking of taking up control line in any serious way is advised to join a club like the Three Kings where you will get all the help you need in getting your first model airborne. Wal Cordell's lively column welcomes the start of the flying season, and he asks is the C/L flyer properly equipped for the affray? Unless you have been wasting those precious winter building hours gawping at the goggle box you should have a nice clutch of models rarin' to go, including carrier, stunt, Goodyear and scale. A Goodyear event opens the season, but the big day to look forward to is the Open May Day event, where all they ask is a gypsyless site and a light wind blowing . . . But perhaps I'm chatting on long enough. I should pay heed to the 'thought' in the newsletter: "Don't talk! Build and Fly!'

Clubman

## Contest Calendar

| | |
|---|---|
| April 23rd | **MAINSTREAM COMBAT RALLY.** *FAI & ¼A.* Venue: Wigan. Contact: Ian Hutchinson, 579 Rooley Moor Road, Rochdale, Lancs. 061-624-2932 (day), Rochdale 30514 evenings. |
| April 23rd | **WOODVALE SCALE.** *Class II Scale R/C, F/F, C/L.* Venue: Woodvale. |
| April 30th | **ST ALBANS SPRING GALA.** *F1A, F1B, F1C, O/R, O/P, O/G.* Venue: Bassingbourne. Entry 50p. Contact: Pete Putnam, Wel. Gdns. 28926. |
| April 30th | **TYNEMOUTH F/F RALLY.** *All in FAI 5 flight no rounds O/R, O/G, O/P, Combined mini, HLG.* 10am start. Venue: Albermarle Barracks formerly RAF Ouston. Contact: A. Jack, 2 Melling Road, Cramlington Northumberland. Tel: 714773. |
| May 1st | **3 KINGS MAYDAY.** *Stunt, Class II Scale, Carrier & Profile Carrier.* Venue: Croydon Aerodrome. Contact: D. G. Woods, 133 Ravensbury Rd., SW18. 01-947-0752. |
| May 7th | **3RD F/F AREA CENTRALISED.** *F1B (Weston & Plugge) O/P (White) O/G.* Area Venues. |
| May 7th | **C/L TEAM TRIALS.** *F2A, F2B, F2C, F2D.* Venue: Duxford. Contact: Bob Horwood, 21 Burghley Rd., St. Andrews, Bristol 6. Tel: 0272 48869. |
| May 7th | **BKFA KITE FLYING RALLY.** (*no aircraft please*). Old Warden, Beds. |
| May 14th | **VULCANS F/F RALLY.** *All in FAI 5 flight O/R, O/G, O/P, Combined Mini, HLG.* 10am start. Venue: Elvington Contact: Brian Kenny 0742 57599. |
| May 14th | **INDOOR EVENT.** *EZB, Open Film.* Venue: Cardington. Contact: L. Barr. 0628 25595. |
| May 14th | **WOLVES C/L FLYNN.** *'Eyeball' scale, Stunt SMAE, Novice and Junior Carrier, SMAE and 3½cc Profile, Rat Race, 'Australian' and 'Slow', ¼A Combat (provisionally).* Venue: Lucas Aerospace Sports Field, Fordhouses. Wolverhampton. Contact: Phil McMahon, 46 Underhill Lane, Underhill Estate, Wolverhampton. Tel: 722826. |
| May 27/29th | **BRITISH NATIONALS.** *C/L, and R/C.* Venue: Barkston Heath. *F/F (European Trials) and R/C Soaring.* Venue: Cranwell. |



# THE ELMBRIDGE MODEL CLUB

proudly presents

## THE THIRD
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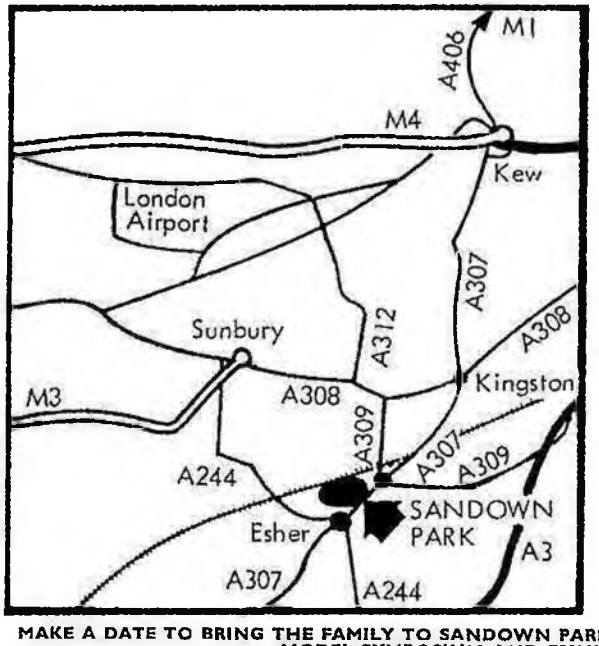
## SANDOWN PARK RACECOURSE, ESHER, SURREY
# May 13th and 14th, 1978

**Professional Demonstrations of Aircraft, Helicopters, Boats, Cars and other models under Radio Control. Car Racing Competitions, R.T.P. Demonstrations. Control-Line Demonstrations. Scale Radio Control Model Flying by Top Modellers. R/C Aircraft Display Teams. Mini Railway Rides (Harlington Locomotive Soc.), Small Gauge Model Railway layouts, by local Clubs. Preservation Societies. Slot Meter R/C Tanks and Boats which the Public can operate. Marine Demonstrations on the outside Boat Pool.**




**TRADE EXHIBITION**
**Exhibitors and Products represented in the Large Display Halls at Sandown Park include: Morris & Ingram (Badger), Flight Link Control, K&C Model Aircraft, Model Mail International, WIK Models, Power Max. Jim Davis Models, Harry Butler Models, Euro Models, Kaycee Distributors, Fleet Systems, Model & Allied Publications, Morley Helicopters, Mick Charles Distributors, Chris Foss Designs, Radio Modeller, Irvine Engines, Edmond Model Products, Micron Radio Control, Air Art Products, Dave Nieman Models, Wonder Wings, World Engines, Weston UK, St. Leonards Model Supplies, Micro-Mold, Skyleader, Stratos Models, Rojair (Jolly Roger Kits), Solent Sailplanes, Microflame, Sussex Model Centre, York Models, Gloy Adhesives, Flair Products, Viking Supplies, Addletsone Models, Sprengbrook, Olympic Models, MacGregor Radio Control, Bowmans, S.M.A.E., B.A.R.C.S., A. T. Lee, Live Steam Services, Rosefair Electronics Ltd, Rail Road Scenic Services, John Piper Ltd. CCW Model Manufacturing Co., and others.**

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**£1 per person. Children 5 to 16 years old and OAPs 50p. Under 5 free. Information or enquiries for Party Rates can be obtained from the Secretary, Elmbridge Model Club, 89 Marbles Way, Tadworth, Surrey.**

**HOW TO GET THERE**
**By Car: Sandown Park, Esher, is off the A3 London to Portsmouth Road, and is easily reached from the M3, via the A308 and A309. From the M1 via the North Circular Road, A406, to Kew Bridge, then A307 via Kingston to ESHER. By Bus: Green Line – 715, Red Buses – 206, 215 & 218. By Rail: Esher Station adjoins Sandown Park. Regular trains from Waterloo, Woking, Guildford and Portsmouth.**

**Display Commentary: DAVID BISHOP (of D.B. Sound)**
**Exhibition Announcer: MISS JULIE DAWN**

**MAKE A DATE TO BRING THE FAMILY TO SANDOWN PARK ON MAY 13 & 14TH 1978 TO SEE THE BIGGEST AND BEST MODEL SYMPOSIUM AND EXHIBITION IN GREAT BRITAIN**

# SHOP GUIDE

**READERS PLEASE NOTE:**
Due to soaring postals charges many retailers are unable to answer postal enquiries unless accompanied by a stamped addressed envelope.
★**Mail Order Welcome**

# MODELLERS — buy with confidence from these well-stocked shops

### AUSTRALIA

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

### AVON

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

**BRISTOL** Tel. 662544
BEV'S MODELS
35 WEST STREET, BEDMINSTER
10am–6pm. Late night Fri 7pm

**BRISTOL 1** Tel. 23714
MODELLERS DEN
65 FAIRFAX STREET
Open 9am–5.30pm Mon–Sat

### BEDFORDSHIRE

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

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

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

### BERKSHIRE

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

**READING** Tel. 51558
READING MODELS ★
5 CHATHAM STREET
9am–5.30pm each weekday

**READING** Tel. (0734) 586899
TRENTS MODELS ★
51 BUTTS CENTRE
9am–5.30pm Mon–Sat

**WOKINGHAM** Tel. (0734) 791047
LINCOLN MODELS & HOBBIES ★
85 BEANOAK ROAD
Open: Mon–Sat 10am–5pm
Wednesday 10am–1pm Friday 10am–8pm

### BUCKINGHAMSHIRE

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

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

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

### CAMBRIDGESHIRE

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

### CHANNEL ISLANDS

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

### CHESHIRE

**STOCKPORT** Tel. 061-480 5478
THE MODEL SHOP
280 WELLINGTON ROAD SOUTH
Open Mon–Sat 9am–5.30pm. Closed Tuesdays

### DEVON

**PLYMOUTH** Tel. 0752 21851
PLYMOUTH MODEL CENTRE
11 OLD TOWN STREET
9am–5.30pm Mon–Sat
Late night Fri 8pm

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

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

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

### DORSET

**BOURNEMOUTH** Tel. 763480
WESTBOURNE MODEL CENTRE
59 SEAMOOR ROAD, WESTBOURNE ★
Open: 9am–5.30pm Mon–Sat

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

## ESSEX

**BRENTWOOD** Tel. Brentwood 226787
ARNOLD'S GIFT CENTRE
4 High Street
Open: 9am–6pm. Half day Thursday

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

## HAMPSHIRE

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

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

**PORTSMOUTH** Tel. 25049
RAY BROWN MODELS ★
10 KINGSTON ROAD
Open: 10am–5.30pm. Lunch 1pm–2.30pm
Closed all day Weds.

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

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

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

## HEREFORDSHIRE

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

## HERTFORDSHIRE

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

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

**HERTFORD** Tel. 50101
MODELLERS WORLD ★
17 RAILWAY STREET
Open: 10am–5.30pm
Late Night Friday 7pm
Closed Thursday

**LETCHWORTH** Tel. Letchworth 73263
RO-ED MODELS
62 LEYS AVENUE
10am–6pm. Thurs open till 7.30pm. Closed all day Wed

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

## HONG KONG

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

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

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

## KENT

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

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

**GILLINGHAM** Tel. Medway 52703
AUDIO HYPERMARKETS
(Medway Model Centre)
16 Canterbury Street
Open: 9am–5.30pm Mon–Sat

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

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

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

## LANCASHIRE

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

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

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

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

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

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

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

**PRESTON** Tel. 718983
D. G. MODELS ★
291a PLUNGINGTON ROAD
NORTH OF BLACKPOOL ROAD
Open: 9am-5.45pm. Weds half day 12.30pm

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

## LEICESTERSHIRE

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

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

## LINCOLNSHIRE

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

## LONDON NORTH

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

**LONDON** Tel. 01-607 4272
HENRY J. NICHOLLS & SON LTD ★
308 HOLLOWAY ROAD, N7
Open: Mon-Sat 9am-5.30pm

## LONDON NORTH WEST

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

## LONDON SOUTH

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

**FULHAM** Tel 01-385 9864
PATRICK MODELS ★
107-111 LILLIE ROAD, SW6
Open: Mon-Sat 9am-5 30pm. Thurs 9am-1pm

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

**LONDON** Tel. 01-653 4943
NORWOOD JUNCTION MODELS LTD.
3 ORTON BUILDINGS
PORTLAND ROAD, SE25 4UD
Open: 9.30am-1.30pm – 2.30-6.00pm Mon-Sat
Early closing Wednesday 1pm

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

## LONDON EAST

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

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

## MIDDLESEX

**HARLINGTON** Tel. 01-897 2326
RADIO CONTROL MODEL CENTRE ★
214 HIGH STREET
Open: Mon-Sat 9.15am-6.30pm
Fri. 9.15am-8.30pm. Closed all day Wednsday

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

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

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

## NORFOLK

**AYLSHAM** Tel 3145
THE MODEL SHOP
PENFOLD STREET
9 00am-5.00pm Mon-Sat
Half day Wed 12.30pm

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

**NORWICH** Tel. 0603 42515
GALAXY MODELS ★
88 CATTON GROVE ROAD
Open 6 days a week

## NORTHANTS

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

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

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

## NORTHUMBERLAND

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

## NOTTINGHAMSHIRE

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

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

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

## OXFORDSHIRE

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

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

## SCOTLAND

**GLASGOW** Tel. 041-632 8326
RIDDELL BROS ★
61 MOUNT ANNAN DRIVE
Open 9am–6pm. Closed Tuesdays

## SOMERSET

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

## STAFFORDSHIRE

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

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

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

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

## SUFFOLK

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

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

## SURREY

**ADDLESTONE** Tel. Weybridge 45440
ADDLESTONE MODELS LTD ★
63 STATION ROAD
Open 9am–6pm. Closed all day Wednesday. Late night Friday 6 30pm

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

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

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

**WOKING** Tel. 66493
WOKING MODELS ★
9 GOLDSWORTH ROAD
Open 9am–6pm Mon–Sat. Closed Wed afternoon

## SUSSEX

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

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

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

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

## WALES

**CARDIFF** Tel. 29065
BUD MORGAN ★
22 CASTLE ARCADE
SOUTH GLAMORGAN CF1 2BW
9am–5.30pm. Early closing Wed 9am–1pm

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

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

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

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

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

## WARWICKSHIRE

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

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

**BIRMINGHAM** Tel. 021-444 2369
PEARCE'S NEWSAGENTS & MODEL SUPPLIES
8 YORK ROAD, KINGS HEATH
Open Mon-Fri 8am–6.30pm. Sat 8am–7pm
Sun 8am–1.30pm

**COVENTRY** Tel. 0203 76409
MODEL CRAFT
61 SPON END
Open: Mon-Fri 10am-5.30pm. Sat 9am-5-30pm
Closed Wednesday

**SOLIHULL** Tel. 021-744 3374
SHIRLEY MODEL SUPPLIES
62 STRATFORD ROAD, SHIRLEY
9am–6pm Mon–Sat

## WILTSHIRE

**CHIPPENHAM** Tel. 2466
CHIPPENHAM MODEL CRAFT LIMITED
65 New Road,
Open: 9am-5.30pm
Half day Wednesday 1pm.

**BRADFORD 8** Tel. 26186 ★
MODELDROME
182 MANNINGHAM LANE
9.30am-5.45pm. Closed Wed

**LEEDS** Tel. 457891 ★
THE MODEL SHOP (LEEDS) LTD
38 MERRION STREET
Open: 9am–5.45pm
Closed all day Monday

**SWINDON** Tel. 26878 ★
SWINDON MODEL CENTRE
2 CIVIC CENTRE, THEATRE SQUARE
(Next to Wyvern Theatre)
Open daily 9am–5.30pm
Open all day Wednesday

**DONCASTER** Tel. 62524
B. CUTTRISS & SONS
40 DUKE STREET
Open 9am–5.30pm. Closed all day Thurs

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

## WORCESTERSHIRE

**KIDDERMINSTER** ★
P. & R. MODELS
1 SEVERN GROVE
RIFLE RANGE ESTATE
Mon, Tues, Thurs, Fri, Sat, 9.15am–6pm
Closed all day Wed

**DONCASTER** Tel. 20767 ★
SOUTH YORKSHIRE MODEL SUPPLIES
313 BENTLEY RD, BENTLEY
Mon, Tue, Wed, Sat 10am–6pm
10am–8pm Friday. Closed Thurs

**YORK** Tel. 0904–34281 ★
YORK MODEL CENTRE
17 DAVYGATE CENTRE, DAVYGATE
Open Mon–Sat 9.00am–6.00pm
No half day

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

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

**YORK** Tel. 23704 ★
YORK MODELS LTD
69 EAST PARADE, HEWORTH
Mon–Fri 9.15am–6pm. Sat Closed 5.30pm
Closed all day Wednesday

## YORKSHIRE

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

**You can buy with confidence from the shops in this Shop Guide.** ★ *Shops offering mail order are denoted by an asterisk*

# CLASSIFIED advertisements

All classified Advertisements must be pre-paid.
Private and trade rate 12p per word (min £2.00). Box Numbers 50p extra. Display classified £6.25 per column inch (max 2in.). All advertisements are inserted in the first available issue. Box replies to be sent care of Advertisement Department, PO Box 35, Hemel Hempstead, Herts. HP1 1EE. There are no reimbursements for cancellations.

**The Advertising Manager reserves the right to refuse or suspend advertisements 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.**

## FOR SALE

**Aerofiles,** something completely new! The supermarine Spitfire and Messerschmitt BF109E cockpit interior profiles on two famous fighters. These profiles are good value, not the usual dim photographs taken from obscure angles, but clear concise drawings of all views, plus details of dials, and structure. Also a colour chart and close up details. Ideal for Modellers and Air Enthusiasts alike. Each profile costs 90p plus 16p p&p. Please send cheques, postal orders to: 'Aerofiles', 34 Farleigh Lane, Maidstone, Kent, ME16 9AY. L

**Vintage and other,** engine sale. Details and lists. SAE to Dillingham Cottage, School Road, Watlington, Norfolk. L

**Vintage engines.** Yulon 29, £25. Frog 500, £20. ED 1·46 (1953), £10. Tel: Keighley 0535 62938. L

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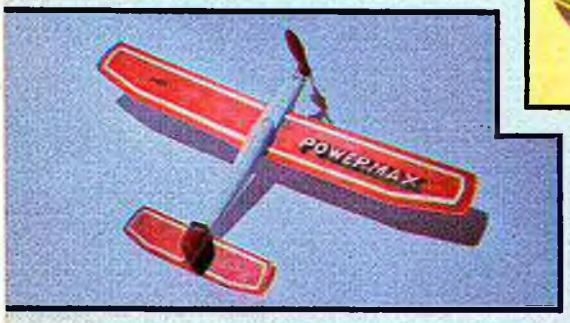


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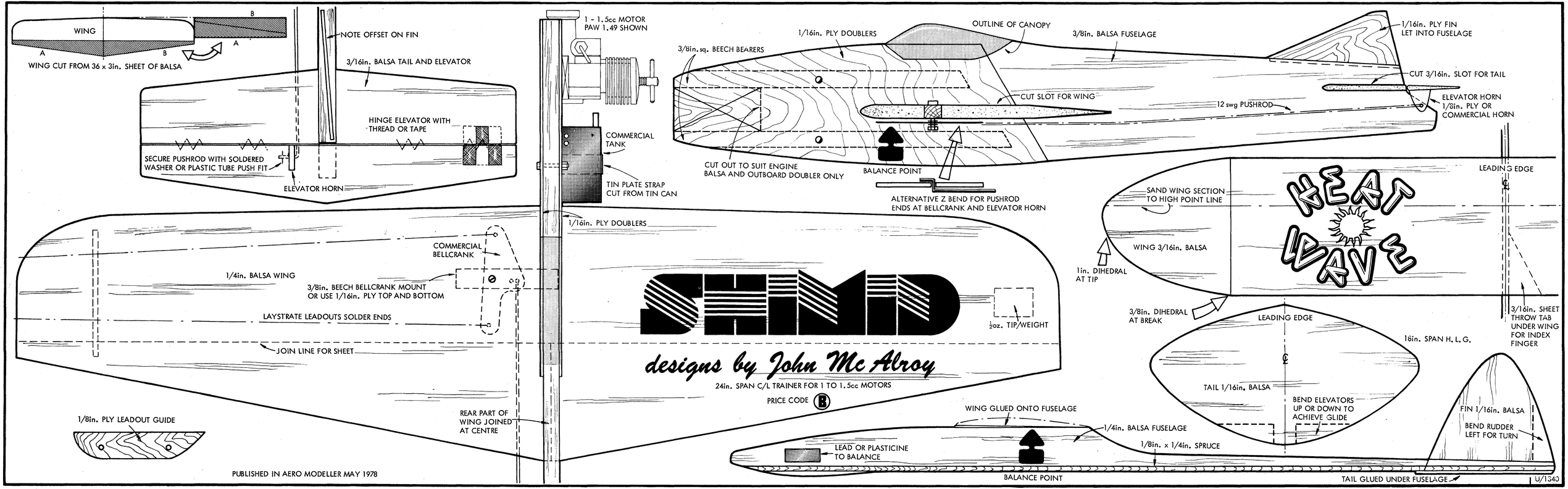


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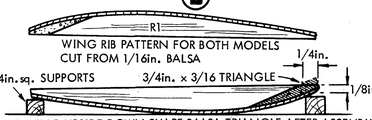


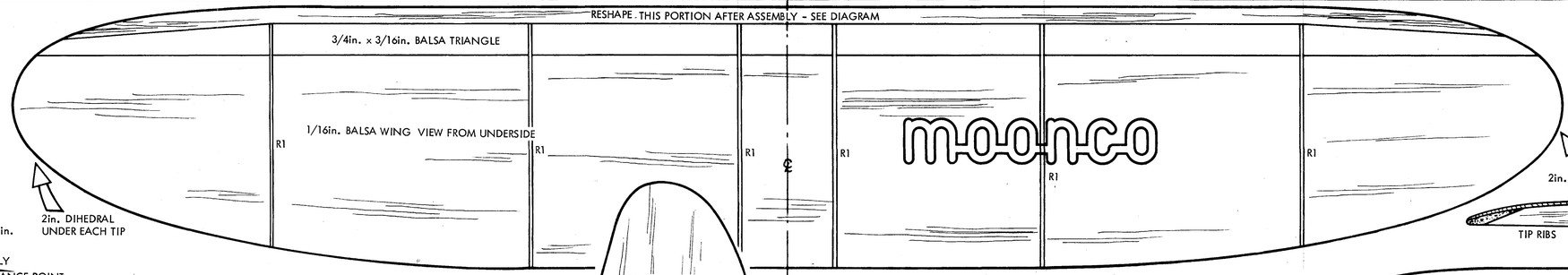


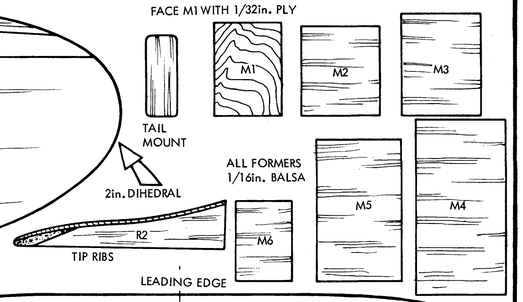


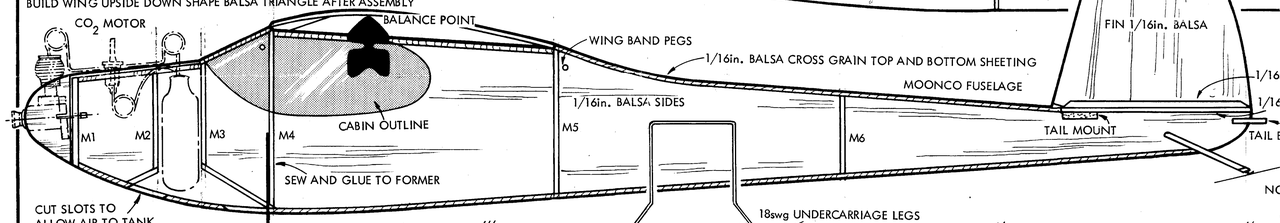


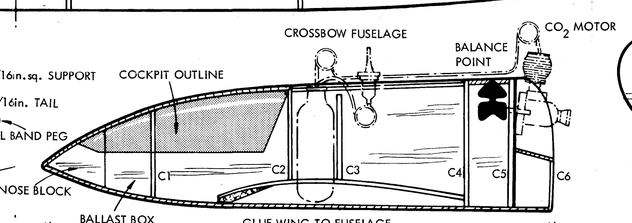


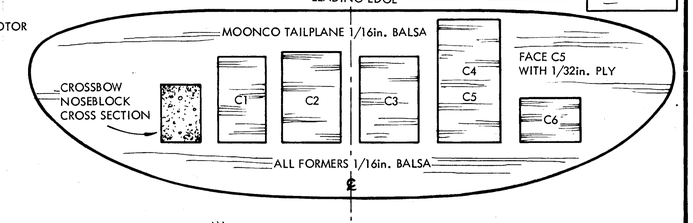


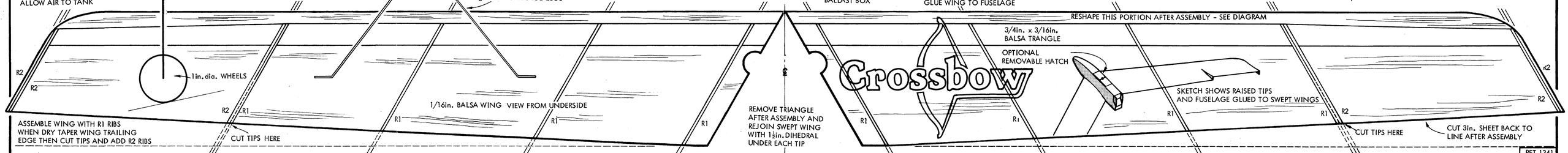


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