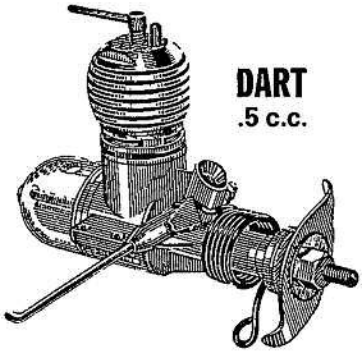
May 1974

Aero Modeller

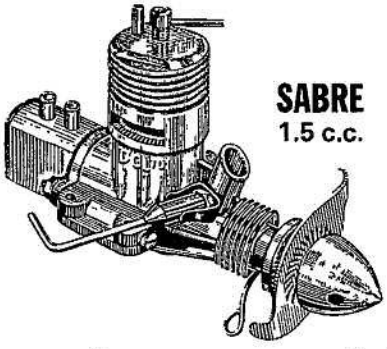
20p USA & Canada $1

INCORPORATING
MODEL AIRCRAFT

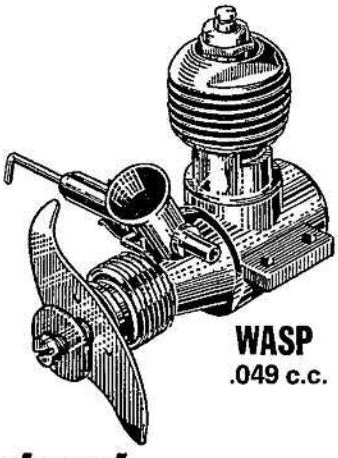
MAP HOBBY MAGAZINE



DART
.5 c.c.



SABRE
1.5 c.c.

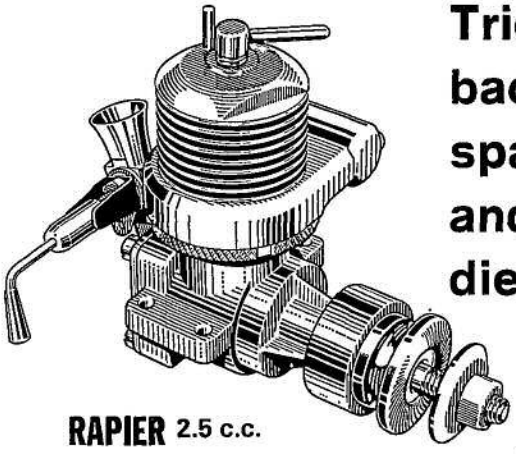


WASP
.049 c.c.

See them at your model shop!

QUICKSTART

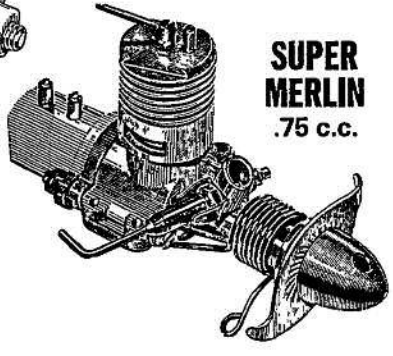
The Motors for the Modern Modeller! Quality engineered for lasting performance



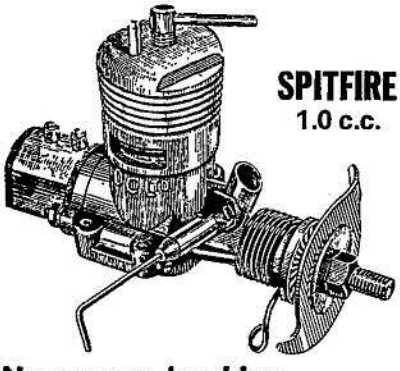
RAPIER 2.5 c.c.

Four versions – Aero standard or R/C marine, water-cooled, standard or R/C.

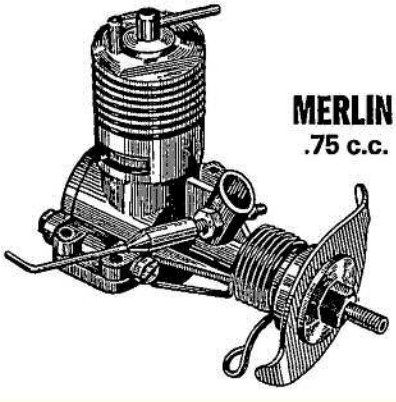
Tried and tested, backed by full spares service and years of diesel 'know-how'



SUPER MERLIN
.75 c.c.



SPITFIRE
1.0 c.c.



MERLIN
.75 c.c.

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Quality
Reliability
Economy

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Ⓢ

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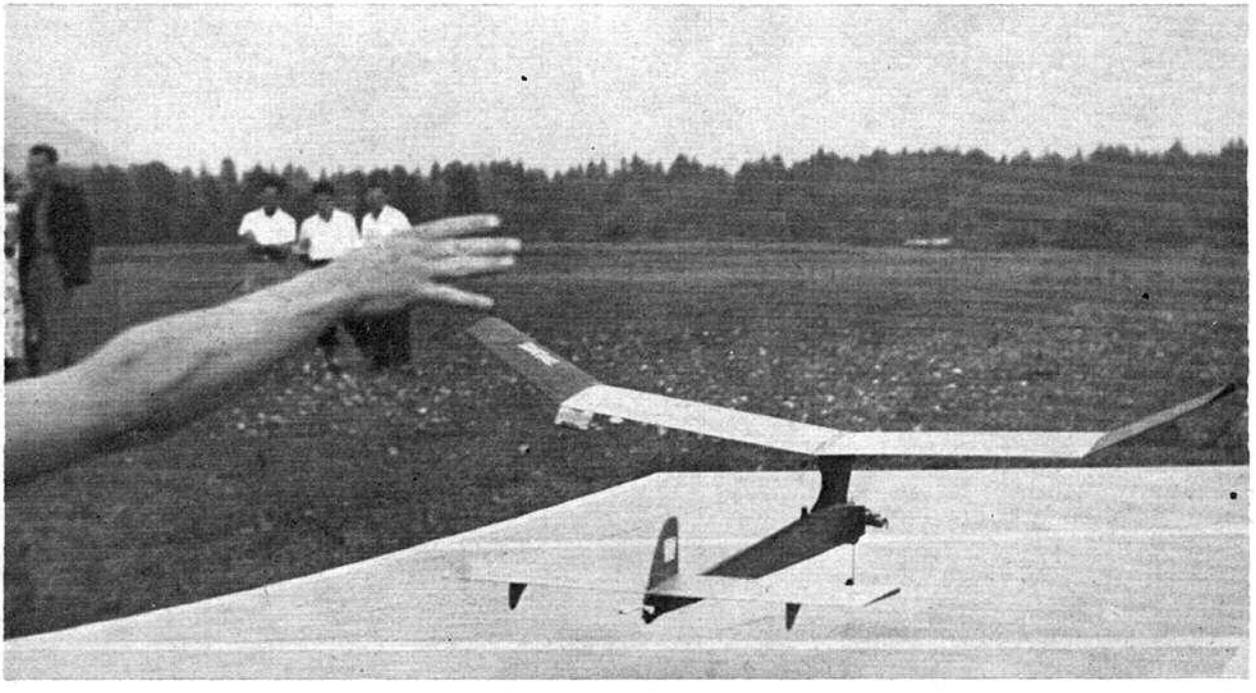

Some things are 'right' and stay right. Like the basic design layout of the F/F contest power model. Very little changed in twenty years or more, in fact. Yes – the pic is an 'oldie'. Contest modellers have almost forgotten what ROG (rise-off-ground) means now. And power modellers gave up fuse dethermalisers long before HM Government began to warn us about the hazards to health of smoking. (But tip-tail DTs are still the best.)

Balsa is in the 'oldie' class, too. But even more 'right'. It's a genuine structural material in its own right. Unbeatable for strength/weight ratio, unless you go to much more exotic – and very much more expensive – materials. And even these have their limitations.

The only real limitation with balsa is that it can vary a lot in quality. So the answer is always to buy the best. Solarbo balsa. Every piece genuine aeromodelling quality. And still about the least expensive aeromodelling structural material you can buy!

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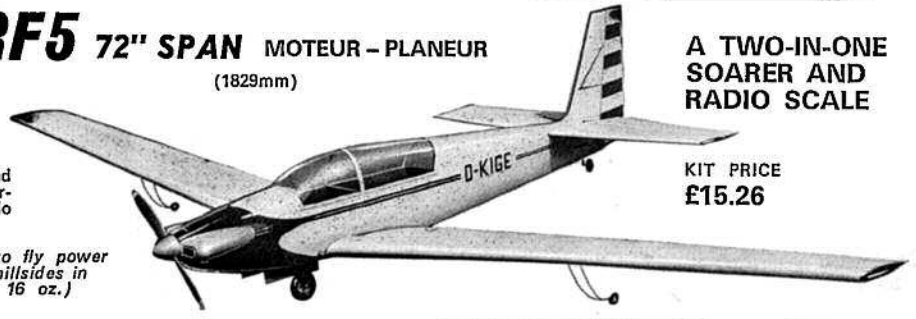

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KIT PRICE £15.26

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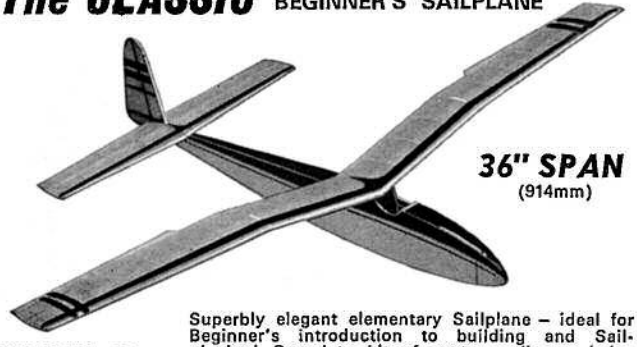


36" SPAN (914mm)

KIT PRICE 73p

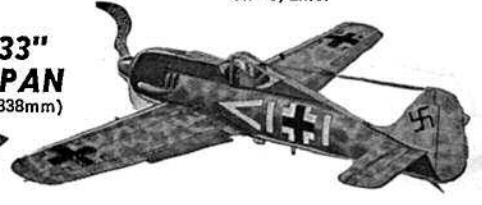
Superbly elegant elementary Sailplane – ideal for Beginner's introduction to building and Sail-planing! Complete kit of parts – die-cut balsa formers and ribs. Full layout plans.

COLT CONTROL-LINE TRAINER

19" SPAN (483mm)

KIT PRICE £2.89

Fully pre-fabbed all-Balsa part. For 1 to 1.4 motors on C/Line!

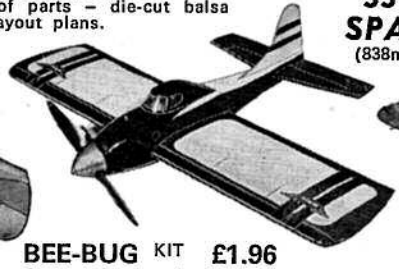


33" SPAN (838mm)

F.W. 190 A3 KIT PRICE £3.60

Combined Flap and Elevator Scale Stunter for 3-5 c.c. motors. Ideal for 'Glo-star'.

25" SPAN (635mm)



BOMB-BAT KIT PRICE £2.99

Bat-wing Lightweight Stunter for combat or Stunt. Ideal for Webra 'Record' or 'Sport-Glo'.

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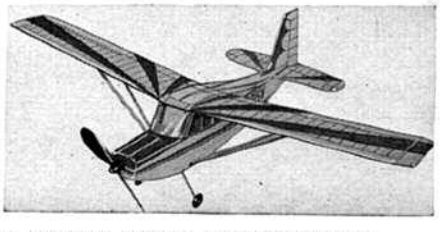

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Advertisement Manager **M. GRAY**

May 1974 Volume XXXIX No. 460

CONTENTS

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comment

Plans for the 1974 World Championships were authorised by the F.A.I. Models Commission officers in Paris at the beginning of April. First on the calendar are the Scale (Control Line and Radio Control) plus Indoor to take place at Lakehurst, New Jersey, U.S.A., from July 1st to 7th. After prolonged and most difficult negotiation, a Charter Flight has now been contracted for the European teams and supporters, returning to Gatwick on July 9th. Additionally, the A.M.A. is running events for vintage models, Open Indoor and Internationals for Pylon Racing and Thermal Soaring Glider to make the meeting a genuine 'Aerolympics' which promises to become the experience of a lifetime.

Next come the Control Line Championships at Hradec Kralove, Czechoslovakia, from 24th to 29th July. Great efforts have been made to ensure a high standard of organisation for this meeting where Speed, Team Race and Aerobatics take place on specially prepared circles. As for the trip to the U.S.A., the British group are travelling on a special group charter to Czechoslovakia. Which is a good thing, for the team that travels together starts off with common bond of unity that is an essential aid to success.

on the cover

Jean Jolly – a happy name for a very pleasant occasion – poises his streamlined Coupe d'Hiver model at Le Plessis Belleville for the 1974 Coupe d'Hiver International. Jean, from Chatelleraut placed well down the list of results in the very strong wind conditions which prevailed.

next month

Plans for Claus Maikis' attractive C/L stunter 'Loriot' – flies well in a strong wind too! Ron Coleman gives the benefit of his experience with rubber motors, while more practical advice is provided in our Beginners Series and Basic Metalwork feature. These plus regular, and not so regular, articles all appear in the *June* issue, on sale May 17th.

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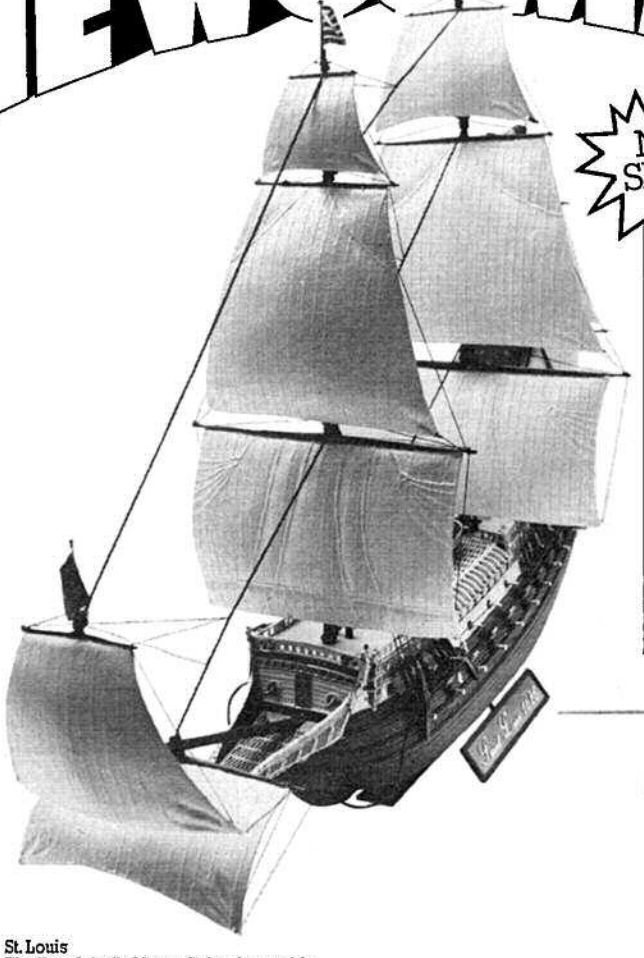
NEW SERIES



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

Two New Waterline Models

67 parts make up the highly detailed waterline model of HMS Hood, the largest British battlecruiser of the Second World War until she was sunk by the Bismarck.

The Bismarck, one of the German fleet's most powerful and heavily armed battleships was sunk in perhaps the most famous naval encounter of the War. The kit has 49 high definition parts.

These two clip-together kits are in 1/1200th scale.

SA 341 Gazelle
The SA 341 Gazelle is a streamlined 5-seater military helicoptor with the unusual feature of a tail rotor built into the tail fin. The 1/72nd scale kit has more than 40 parts and includes transfers for Army markings.

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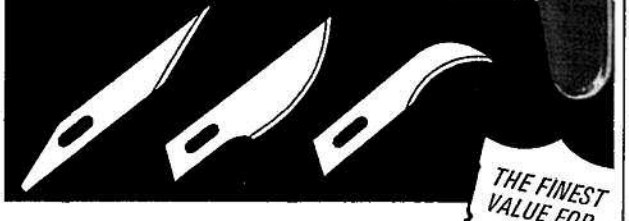

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5" × 4" . 0.08	9" × 6" . 0.32
5½" × 3" . 0.10	9" × 7" . 0.32
5½" × 4" . 0.10	9" × 8" . 0.32
6" × 3" . 0.13	10" × 4" . 0.38
6" × 4" . 0.13	10" × 6" . 0.38
7" × 4" . 0.17	11" × 4" . 0.42
7" × 6" . 0.17	11" × 6" . 0.42
7" × 8" . 0.17	11" × 8" . 0.42
8" × 4" . 0.25	12" × 4" . 0.62
8" × 6" . 0.25	12" × 5" . 0.62
8" × 8" . 0.25	12" × 6" . 0.62

3-BL TRACTOR

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6" × 4" .. 0.22	
7" × 8" .. 0.35	
8" × 6" .. 0.52	
8" × 8" .. 0.52	
9" × 6" .. 0.59	
10" × 4" .. 0.65	
10" × 6" .. 0.65	

3-BL PUSHER
alumn/nylon
6" × 3" .. 0.21

2-BL PUSHER
alumn/nylon

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SUPER Tigre Choice of Champions !

THE NAME THAT STANDS FOR SPEED & POWER

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

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

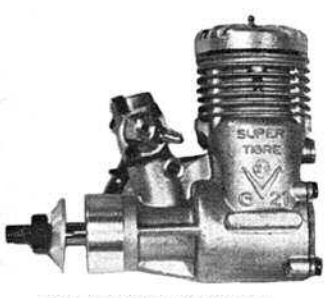
At the recent Italian championships the X15 did 238 k.p.h. on F.A.I. fuel on two lines .04mm diameter. The X29 did 258 k.p.h. and both are new Italian records. The factory at Pianoro is now working flat out to achieve 7,000 engines per month after the delays earlier this year.

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

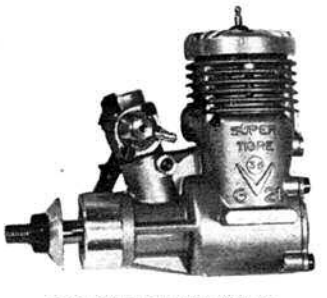
The picture below shows the four G21 series motors, one of the nice points about these is the interchangeability since all use exactly the same crankcase casting and hence fit the same engine bearers or radial mount. It is very versatile to have a 5 c.c. motor giving out .5 b.h.p. to a .46 cu. in.-7.6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

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

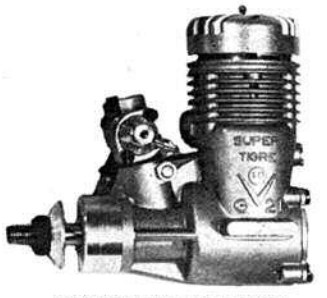
FOUR OF A KIND



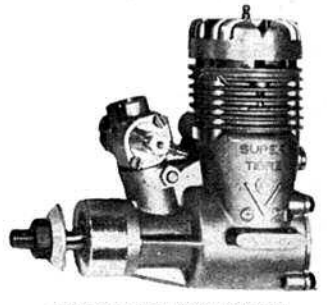
G21/29 F.1 R/C £17.55



G21/35 F.1 R/C £18.62



G21/40 F.1 R/C £18.62



G21/46 F.1 R/C £19.60

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G20/15 D R/C	...	...	...	...	£14.02	G21/29 R.V. ABC	...	...	...	£19.82	ST.35 S R/C	...	...	...	*...	£15.80
G20/15 G	...	...	...	...	£11.40	G21/29 F.1	...	...	*...	£14.02	ST.51 R/C	...	...	...	*...	£19.66
G20/15 G R/C	...	...	...	...	£14.02	G21/29 F.1 R/C	...	...	*...	£17.55	ST.56 R/C	...	...	...	...	£21.08
G15 F.1 w/spinner	...	...	...	*...	£14.50	G21/35 F.1	...	...	...	*...	£14.28	ST.60 R/C	...	...	...	...	£22.25
G15 F.1 R/C	...	...	...	*...	£18.13	G21/35 F.1 R/C	...	...	...	*...	£18.62	G60 F.1 R/C	...	...	...	...	£28.10
G15 R.V. D	...	...	...	*...	£18.02	G21/40 F.1	...	...	...	*...	£15.30	G71 F.1 R/C	...	...	...	...	£28.68
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Fuel Inlet Section	...	...	...	72p

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TERRY 41½" span	£13.10

Graupner gliders

BEGINNER 39" span	£4.00
FILOU 50" span	£7.15
Pylon engine mount	£1.30
JOLLY 45" span	£5.30
Pylon engine mount	£1.30
AMIGO 2 78¾" span	£12.25
Pylon engine mount	£1.70
Ditto in ABS	£3.40
FOKA 102½" span	£19.75
Canopy 90p Fuselage	£7.50
Wing grommets (10)	£1.40
UHU mark III 43½"	£3.75
DANDY 63" span	£10.20
Pylon engine mount	£1.30
CIRRUS 118" span	£27.50
Pylon engine mount	£2.10
R/C pack	£4.40

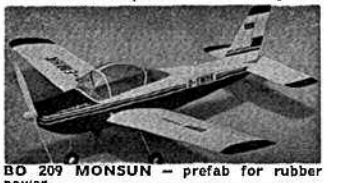
CIRRUS 118" span

A multi-purpose high-performance design for tow launch, slope soaring or powered glider conversion (with pylon mount and .09 or 1.5cc engine). Specially designed for R/C but also suited for free flight.

A real pilot's model – with a performance like a full size sailplane!

Quite a model! And confirmed by experienced modellers, the best sailplane they have ever flown! But that is the end result – look what you get in the kit! Finished fuselage mouldings in ABS plastic, pre-cut wood parts, moulded canopy, etc., etc.

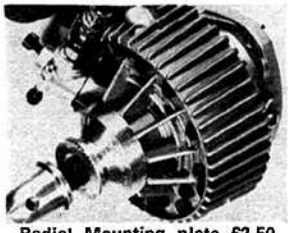
CARDINAL – preformed fuselage, wings, and other parts in precision-moulded high-impact plastic. Quite the most advanced power model kit yet!



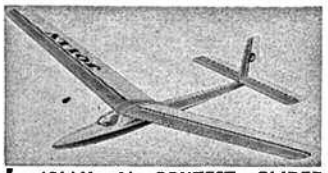
BD 209 MONSUN – prefab for rubber power.

THE GRAUPNER WANKEL ROTARY!

The revolution in model engine power with smooth, reliable performance. Speeds up to 16,000 rpm. Compact size – 3" diameter and 4" long – and easy to mount. Displacement 4.9cc. Maximum output 0.62 BHP. Weight (engine only) 310 grams. Recommended props 9 x 4, 9 x 5 and 10 x 4. Regard as the equivalent of a .35-.49 for matching to model sizes.



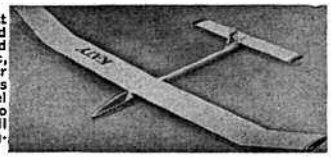
Basic engine	£64.50
Finned cooling ring	£2.20
Radial Mounting plate	£2.50
Special Silencer	£4.30



JOLLY AI CONTEST GLIDER 45" span. A 'class' model with excellent performance and superb towline stability. Equipped with dethermaliser. Specially designed for 'Quickie' assembly from die-cut and printed balsa and ply parts, wire parts, tissue, canopy, cement, decals, etc.

NANCY 48¾" span	£6.00
KATY 67¼" span	£11.45
CUMULUS 2800 110"	£62.00
Pylon engine mount	£2.10
R/C pack	£3.60
AS-K14 90½" span	£54.90
Canopy 65p Fuselage	£24.10
R/C pack	£6.00
HI-FLY 90½" span	£19.80
R/C pack	£3.00
Pylon engine mount	£3.40
Electric motor flight pack	£11.80
Installation pack	£4.00

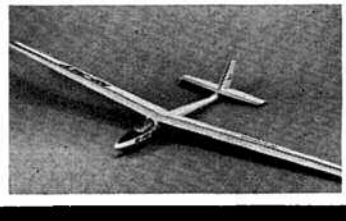
KATY A2 SAILPLANE
Ultra modern towline contest glider. Quickie kit includes milled fuselage nose, wing fairings and other parts moulded in plastic, die-cut balsa parts and all other items needed to complete this super high-performance model quickly and easily. Conforms to A2 specification and includes all the latest ideas in design. Wing-span 67¼". Length 39".



BELL 212 HELICOPTER!	
Fuselage Kit	£56.00
Engine & Mech. Kit	£153.50
Engine only (HB61 Stamo)	£56.75
Engine Silencer only	£7.60
Rotorhead only	£46.35
Main Rotor Blades	£3.20
Tail Rotor Blades	£1.15
Steering Rotor Blades (pr)	£3.30
Main Rotor Shaft only	£2.90

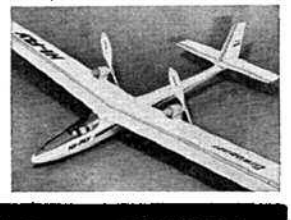
CONTROL LINE

MUSTANG 29¾"	£7.80
DORNIER Do 27 31½"	£9.70
F-W 190 38¾"	£11.70
KLEMM KL-107B 28½"	£8.00



ELECTRIC POWER!

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



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Heard at the HANGAR DOORS

BIRDCRAFT CHANNEL PRIZE. A person who wishes to remain anonymous has offered a prize of £1,000 for the first successful birdcraft flight across the English Channel.

The prize has been offered as a means of encouraging oscillatory propulsion which has so far not yet been put to any great use. It is hoped by the donor that the outcome will assist the study of animal flight and the related ecology.

The British Light Aviation Centre holds a copy of the regulations and will make them available to any inquirer. The rules state that the craft must derive substantially its propulsion from oscillating surfaces which must be constructed and must function in a similar way to the wings of a bird, or in a specified simpler manner.

Attempts can be made by any pilot holding a private pilot's licence and a F.A.I. competitor's licence and will be conducted under the control of the B.L.A.C. and in accordance with the F.A.I. sporting code. *Radio-controlled models are eligible.*

COMBAT INTERNATIONAL. Once more the Dutch *Daedalus* club is running its very popular contest at Spaarndam, this time the dates being 10th-11th August, 1974. Contest organiser Fred Meijer (of Aalbersestraat 10, Amsterdam) is keen to attract a large British contingent once more, but would also particularly like to see combat flyers from Sweden, Finland and Norway. From previous reports we know the organisation and prize-list to be first-class, so it's well worth making the trip.

NATIONALS 1974 will be held at R.A.F. Little Rissington in Gloucestershire (see map below), home of the Central Flying School and, of course, the legendary Red Arrows flying display team. As in previous years, the R.A.F. has been kind enough to permit camping on the airfield, which all adds to the 'atmosphere' of these Championships, and this should be prebooked through the S.M.A.E.'s competition secretary, Ian Bracken of 100 Torcross Road, South Ruislip, Middlesex HA4 0TF. The charge is £1 per head (50p for those under 16 years of age) and there is no additional fee for caravans. Those who do not prebook will have to pay £3 on the day, so there is a good incentive to book! Milk and bread deliveries will be made to the camp site.

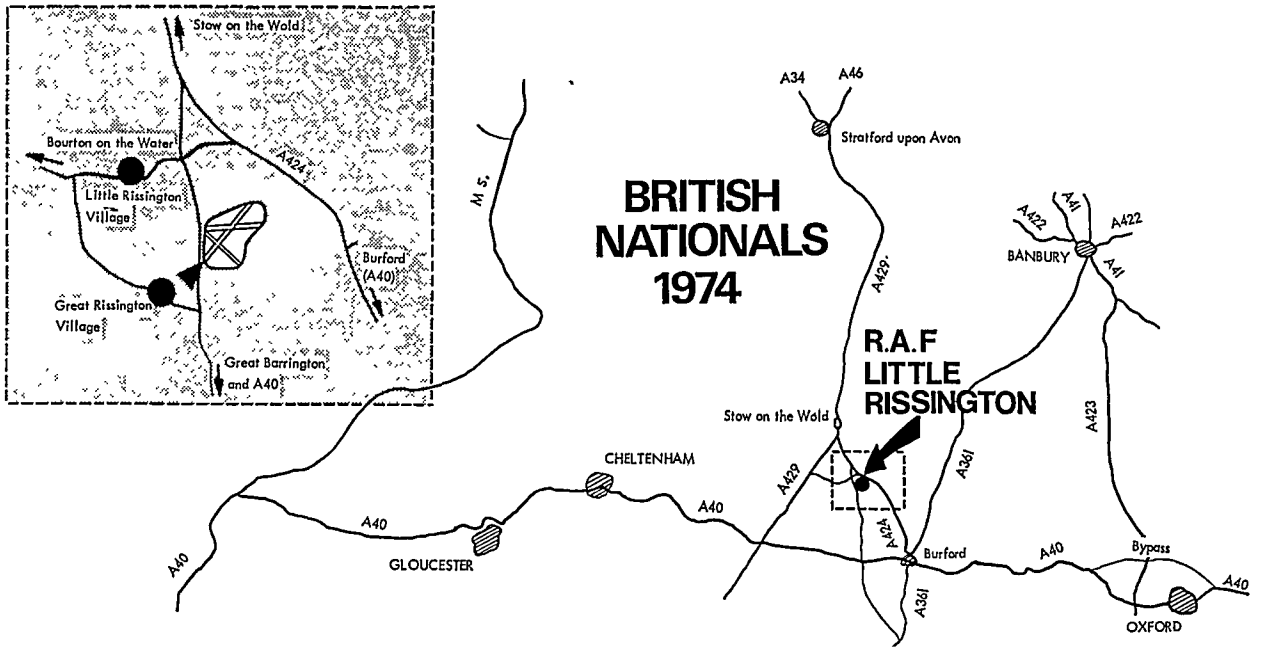
Due to the obvious restrictions in air-time for radio control caused by frequency allocations, thermal soaring will once more be held at a separate venue. This will be R.N.A.Y. Wroughton, near Swindon, but it is regretted that spectators cannot be admitted.

Nationals Programme

Saturday, 25th May
Free-Flight
A/1 Glider (12.00-5.30 p.m.)
F.A.I. Power (5.30-9.00 p.m.)
Open Rubber (6.00-9.00 p.m.)
Radio-Control
F.A.I. Aerobatics (from 12.00 p.m.)
Scale
Free-Flight Rd. 1 (from 6.00 p.m. or 6.00 a.m. Sunday)
Control-Line (from 6.00 p.m.)

Sunday, 26th May
Free-Flight
Wakefield (5.00-9.40 a.m.)
Open Glider (5.00-9.40 a.m.)
½A Power (12.00-5.30 p.m.)
Hand Launch Glider (12.00-5.30 p.m.)
Control-Line
F.A.I. Aerobatics
Speed
F.A.I. Combat — All from
Rat Race — 10.00 a.m.
Goodyear team race
½A team race
Radio-Control
F.A.I. Aerobatics — From 10.00 a.m.
F.A.I. Pylon Race
Scale
Free-Flight Rd. 2 (from 6.00 p.m. or 6.00 a.m. Monday)
Control-Line (from 7.00 a.m.)
Radio-Control Class I and II (from 10.00 a.m.)

Monday, 27th May
Free-Flight
A/2 Glider (5.00-9.40 a.m.)
Open Power (6.00-9.40 a.m.)
Coupe d'Hiver (from 5.30 p.m.)
Vintage (from 5.30 p.m.)
Control-Line
F.A.I. Aerobatics
Speed
F.A.I. Combat — All from
F.A.I. Team Race — 10.00 a.m.
Carrier Deck
Class B team race
Radio-Control
F.A.I. Aerobatics — from 10.00 p.m.
F.A.I. Pylon Race
Scale
Radio Control Class I and II (from 10.00 a.m.)



Trevor Payne's contest winning Open Power model. A 'hot' .40 cu. in. motor will pull this model really high!

FORTE is the result of two different approaches on how to get the most duration from a 10-second engine run; the first being an F.A.I. sized model, the second a 'medium' sized model, both powered by a K&B 40 motor. Each model had good potential, but unfortunately they both proved inconsistent – the smaller model was not rigid enough even though fully triangulated structures were used, leading to inconsistent climb patterns and wing breakage; the second model had a tuned exhaust system which gave a useful power increase but suffered from climatic changes, again leading to a poor power pattern.

The main consideration when designing *Forté*, was structural rigidity and reasonably simple gadgetry; you will notice the very simple variable incidence tailplane (V.I.T.) platform. This method of operation is preferred to the normal double-arm V.I.T. which the author has found, to his cost, will operate under acceleration even with very strong hold-down springs. The pivoting platform is not affected in such a way.

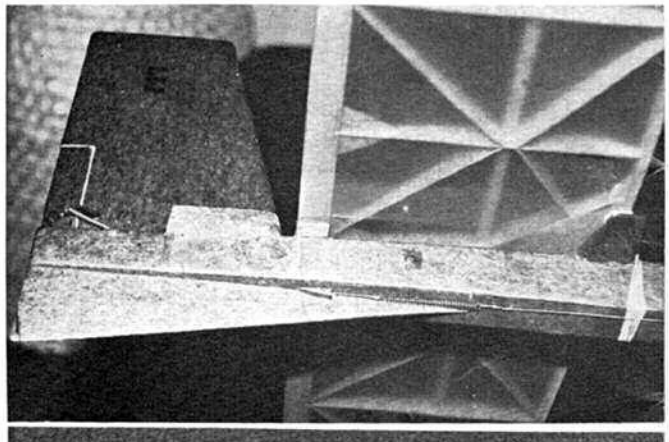
I always build the tailplane first, leaving the leading edge square until the unit is built – it is then an easy matter to carve and sand to shape. The trailing edge slots should be slightly oversize as I have found this leads to a more accurate structure. All joints should be cemented twice as this leads to a very rigid structure. When dry, sand tail to section using a block that spans one rib bay before adding hooks and reinforcing ply as shown.

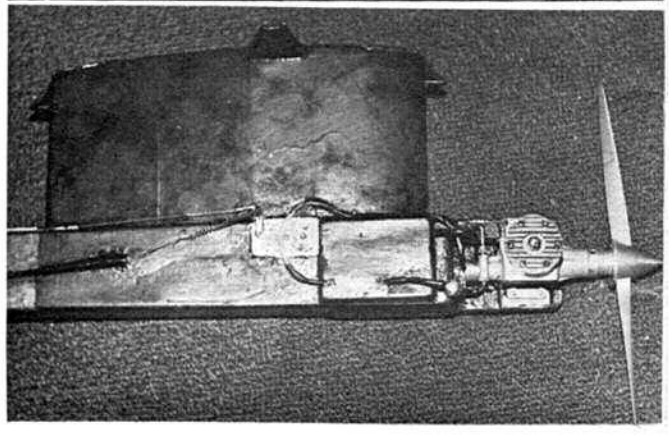
The wing is built using the same method, but make sure that the spars are a good fit in the ribs. Leave out the centre section sheeting until all four panels have been sanded to section, jigged up to the correct dihedral measurements and the ply braces added. Give a final sand all over then add all reinforcing gauze plus plywood.

The top and underfin are self explanatory; quarter grain sheet being used, but make sure to use balsa cement as this is not affected by moisture. Rudder pivots are epoxied in place, using pins to locate in place until dry.

The fuselage is built completely on its side in order to keep it straight and packing up the rear to suit the taper. Before adding the last side epoxy-in the bearers and tank; add plenty of soft block around this area. Next is the V.I.T. plywood area; pass the platform through its slot and epoxy in the pivot. Add the remaining fuselage side and when cement is dry remove from board, glue on tail mount, wing platform and pylon sheeting, wing dowels and cheek block. Sand all over before adding fins. The line guides are epoxied to the outside of the fuselage except for the V.I.T. guide which should be central. Cover entire nose area with bandage well cemented for extra strength.

Cover the tailplane with lightweight Modelspan tissue, likewise the fuselage. The wing is covered with heavyweight Modelspan tissue and two coats of full strength clear dope should be applied, followed by the fuel proofer.





Above right, auto rudder and VIT lines pass through 16 swg aluminium tubing – note spring on VIT line. Fuse de-thermaliser employed mounted on top of tailplane. At right, 'power end' of Trevor's model reveals K&B 40 – runs on maximum of 60 per cent nitro. Designer is left-handed, hence timer mounted on starboard side of fuselage – plan shows details for right-handed launches.

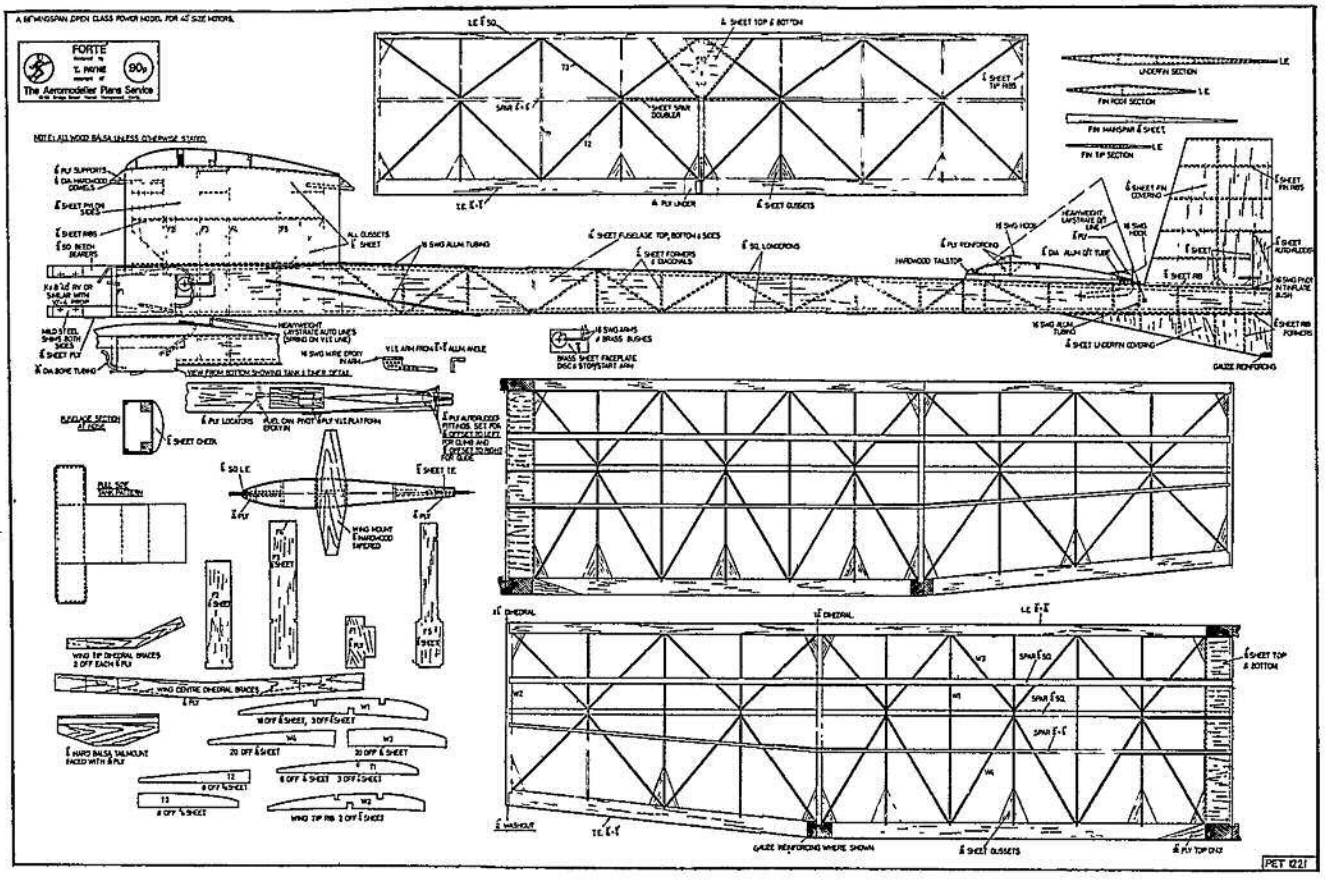
A Tatone 'Flood Off' timer is modified as per plan, using the original knurled operating knobs and on/off switch on a new faceplate and disc. Epoxy in the fuselage, then add all lines and springs as shown. Assemble model and check for adequate spring tension on V.I.T.; the centre of gravity should also be checked at this time while the timer is calibrated from 3-10 seconds *with the engine running*. The flood-off should be very positive.

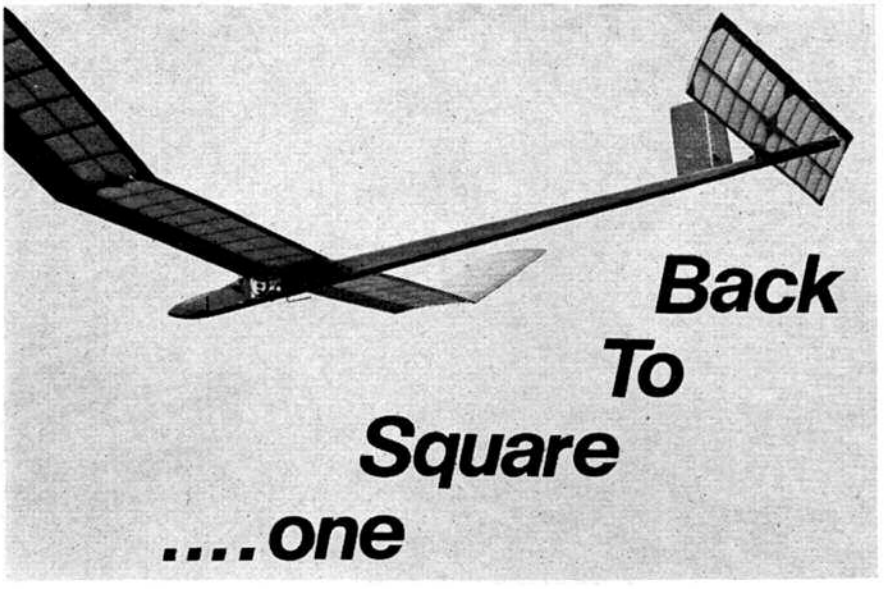
If the model has been built exactly as per plan, then no trouble should be experienced with trimming. A check should be made on the climb setting of the V.I.T. with a dead engine by hand launching the model hard and parallel to the ground. If all is satisfactory, then the model should climb very slightly, and have a tendency to turn towards the right. If any adjustments have to be made, use 1/64 in. ply as packing.

For the first power flight, check that all functions work correctly; the rudder should operate half a second before the flood-off and tail. If all is functioning properly, run the engine flat out on 15 per cent nitro fuel and launch at an angle of 60 deg., dead into the wind for a 3 sec. run. The model should hold this angle of climb and have a right bias. Correct any tendency to go flat with ply packing, rudder being used to correct any tendency to turn left. Continue using this fuel right up to the full engine run, then if all is still O.K. a maximum of 60 per cent nitro can be used. This fuel has been found to give the model an almost vertical climb without any alteration in trim. The guide trim may be altered by raising the V.I.T. mount, but the rudder setting shown on plan should not need any alteration. In normal air six minutes plus has been achieved off a 10-second engine run, so let this be your Forté!

Proof that it's a winner! Trevor collects the Short Cup at the S.M.A.E. Annual Prizegiving for winning the 1973 Southern Gala's Open Power event.

FULL-SIZE COPIES OF THIS 1/9th SCALE REPRODUCTION ARE AVAILABLE AS PLAN NO. PET.1221, PRICE 90p INCLUSIVE OF POSTAGE AND V.A.T. FROM AEROMODELLER PLANS SERVICE, P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE.





Back To Square ....one

Our beginner's series resumes! This month we detail the flying of our Asteroid A/1 glider.

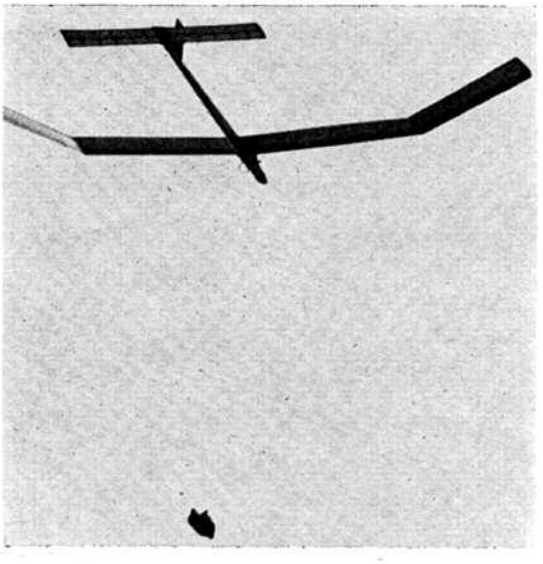
AT LAST, at long last, the wind abated and the rain held off so we were able to test fly our *Asteroid* glider! Fortunately, the day in question was virtually perfect for our purposes, being flat calm but with just a very light breeze at times.

We detailed the trimming and flying of a glider when we first flew the **Mercury** *Swan*, described in the May 1973 issue, but as the *Asteroid* is a little different with its auto-rudder, clockwork dethermaliser and no doubt superior performance, then we feel this is worth repeating. We will, however, assume that the model has had its 'pre-flight checks' consisting of checking the centre of gravity, and that the wing and tail are free of warps – all as described in that issue.

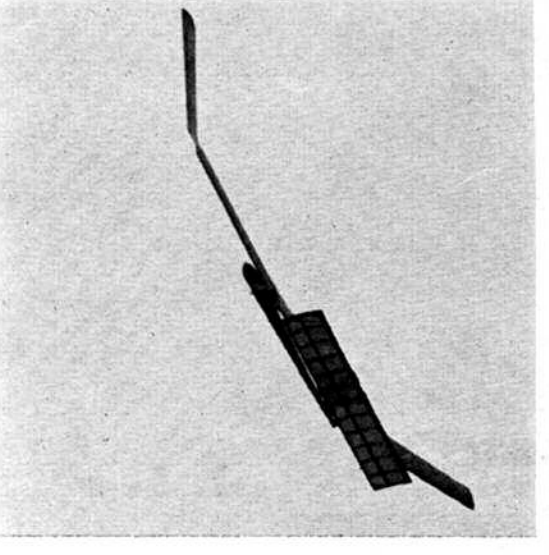
The only equipment needed was a handful of rubber bands, a few pieces of 1/32 in. ply, sized approximately ¼ x ½ in. to use as packing pieces, a small sanding block, some double-sided Sellotape (not essential, but useful) and of course the towline winch which was described in the February 1974 issue.

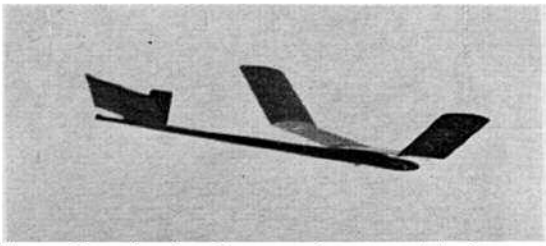
After assembling the model at the flying site, check carefully that the wings and tail are mounted squarely to the fuselage and that the tailplane pops up readily to the dethermalised position and is retained by the nylon line – as described in the January 1974 issue. Now lock the timer in the 'off' position, the auto rudder straight, and the tailplane in the normal position by inserting a pin through the brass tube – you cannot use the towline pin when hand gliding the model!

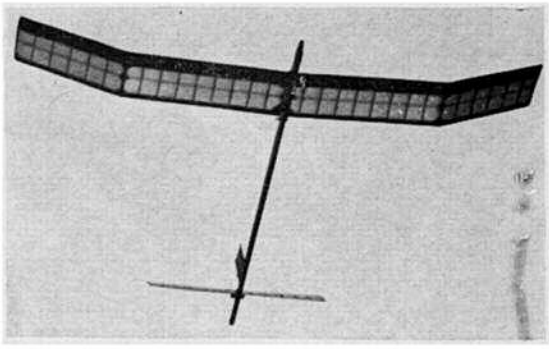
Up she goes! Our 'Asteroid' towed up nice and straight, with no tendency to veer off to either side. If it had, then this would have been counteracted by altering the 'neutral' position of the auto rudder.



The dethermaliser works! The camera has caught the model as its nose pitches up the instant the tail pops into the D/T position. This pitching movement looks quite severe – the nose suddenly rose several feet.







Above: Seconds after the nose pitched up following the dethermaliser tailplane action, the model regained normal flying altitude, although it rapidly, but safely, descended – at right it is seen almost falling into the photographer's lens – he was able to easily catch it before it touched the ground!

Face into wind and launch gently but firmly with the nose pointing slightly downwards and watch the result. Repeat this test glide several times to make sure that any poor results are not caused by your launch – which is quite likely! However, if you decide that the model is stalling (see *figure 1*) then using double-sided Sellotape, stick one of the 1/32 in. ply packing pieces under the leading edge of the tailplane. If it tends to dive (also *figure 1*), then place the packing under the trailing edge. The use of the double-sided Sellotape is to prevent the packing from falling out when the dethermaliser is later operated. At the same time, check that the model is flying straight – adjust the neutral position of the autorudder by moving the 'stop' pin if necessary.

Hand gliding may not be a very good indication of the trim due to difficulty of producing good consistent hand launches, but it does prove useful to show up any serious out-of-trim state.

When satisfied, then is the time to try a tow launch. Make sure that your helper knows his job (i.e. when you signal he walks forwards a few paces as you start to run, and simply releases the model with the wings level and the nose raised up by 20-30°. He must not push or throw it.) He should also know how the D/T timer and release mechanism works so as to check yourself.

Set the D/T timer for approximately a 20-second flight then pay out around 100 feet of towline as you walk into wind. When sure that you are pointing directly into wind, wrap a turn of the line around your index finger (to give you more 'feel'), signal your helper and run steadily into wind. If it is flat calm, you will need to trot at a reasonable speed, but if a bit of breeze is blowing, then you will hardly have to run at much above walking speed. Watch the model to determine how it is reacting and adjust your speed accordingly – do not try to pull the wings off – just keep the model climbing steadily until it is overhead. Should it begin to veer off course, then run in the same direction to correct this.

With the model overhead, slacken tension on the line, then 'flick' it off the hook. The model will now begin to glide in right-hand circles as the auto-rudder will have moved over as the operating pin on the tow-line was removed. Watch the flight carefully. Is it turning too tightly, or is it flying too straight? Is it stalling, or is it diving? Very soon, the nose will suddenly shoot straight up, then the model will settle itself back to its normal position but will sink rapidly to land quite gently – the dethermaliser has operated.

Before the next flight, remember your observations. If the model veered away from the straight on the tow, try altering the neutral of the rudder a little to counteract this. If the glide circle was too great, then move the second stop pin of the auto-rudder a little further to the right. If it stalled, add packing to the leading edge, if it dived, then add packing to the trailing edge. Make all adjustments slight.

Try again – still carefully noting the results and repeat making adjustments until the model glides in about 100 foot diameter circles (did you notice how that slight stall disappeared as the model flew in tighter circles?). Now it is quite safe to use the full-length towline (164 ft. if flying as an A/1 competition glider) and to set the dethermaliser time for as long as your flying field – or your energy – permits! Contests are normally flown to a two minute maximum, so there is no point in setting the timer for a longer duration as you simply stand more chance of losing your handy-work.

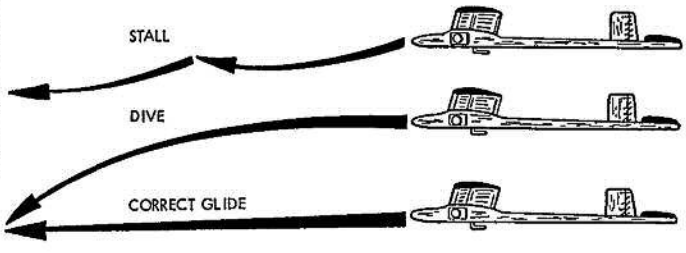
When quite happy with the glide you should glue the packing pieces permanently in place. However, if you had to pack up the leading edge, then it would at this stage be neater to sand away the block supporting the trailing edge by a similar amount, as this gives the same nett result.

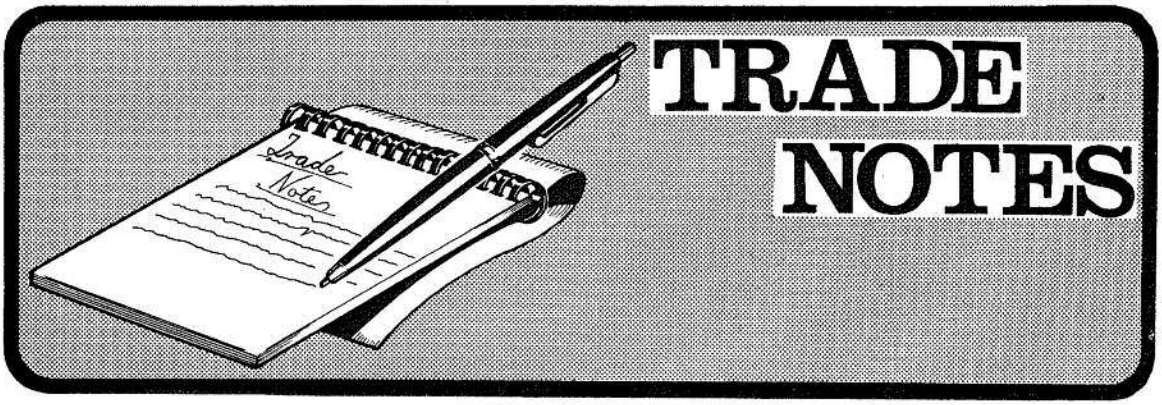
Now to check the trim again! With the model still flying in 100 ft. circles, try increasing the packing at the trailing edge by 1/32 in. at a time until a slight stall is observed – then remove the last piece of packing to rectify the situation. As a final check, deliberately stall the model off the line (by tugging hard to build up speed as it is overhead and making it 'zoom' off the line instead of gently 'floating' it off as normal). If the *Asteroid* does not recover its normal flying altitude after two stalls, then remove 1/32 in. of the packing. This should result in a contest-performance type glide. It doesn't? Well try experimenting some more!

Perhaps that all sounds too easy with nothing to go wrong. However, little problems can, of course, always arise, but our own findings with this model were that it flew extremely well, needing very little trimming; in fact just 1/32 in. under the leading edge of the tailplane gave a very satisfactory glide, while it towed up very straight and true and could be easily released without stalling. The D/T action we also found to be very safe – a violent stall was followed by a very flat descent.

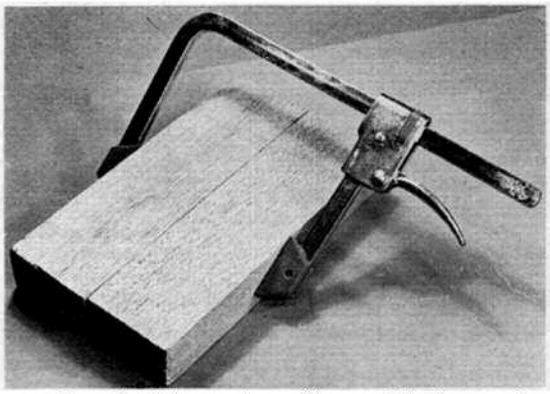
continued on page 240

Figure I — Different flight attitudes





Carver & Co.



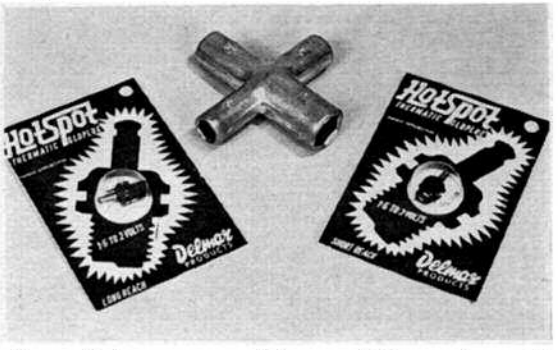
Snap-Clamp Novel G-type clamp with up to 8 in. jaw capacity, using unique lever action to lock tight. To use, just slide lower jaw up until in contact with workpiece, then pull the 'trigger' to lock. Jaw ends are fitted with tough nylon pads to prevent damage to work, and whole item is finished in bright zinc coating to make it rust proof. Lower jaw may also be removed and replaced in reversed position to act as an opening jack or expanding tool. Many uses in the model workshop and retails at £1·35 plus VAT from hardware or model shops. In case of difficulties, write to *Carver and Co. (Engineers) Ltd., Coppice Side Industrial Estate, Brownhills, Walsall, Staffs.*

Micro-Mold

Vac-Form Spinners Neat range of six two-part vacuum formed spinners, in 2 2¼, 2¾, 3⅛, 3½ and 3¾ in. diameters, supplied complete with fixing screws. Backplate must be drilled to accept crankshaft and cut away to clear the prop – easily done with a modelling knife. Nose piece is then trimmed likewise to clear the prop, and the two parts then held together with four self-tapping screws around the perimeter.

Micro-Mold claim that these spinners (which cost 66p for all sizes except the 3¾ in. at 69p and the 2in, diameter at 32p). are quite capable of taking the loads imposed by electric starters, and that as every care is taken to ensure an even wall thickness then there should be no risk of an out of balance unit. Available from virtually all model shops and could provide the 'neat' answer to your latest model.

RipMax Ltd.

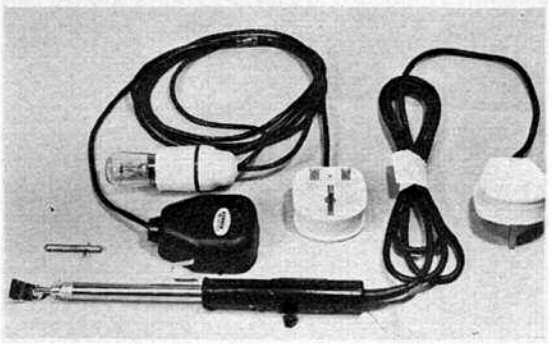


Hotspot Gloplugs are a new variation on an old theme – they consist of a conventional glow plug but with a (patented) soft iron element core, which is designed to control the element temperature and provide it with physical support. The iron core is rather like an idle-bar, except that it is 'L' shaped with the long arm of the 'L' passing down the coil, the short arm being welded to the plug's face. The principle involved is that the core will act as a 'heat sink' when the engine is set for maximum power which can cause elements to overheat, resulting in loss of power, while at the other extreme, the core will retain the heat when the engine is throttled back to the idle setting, when large globules of fuel tend to' douse 'the element. Manufactured by Delmar Products in both long and short reach guises, and for operation on 1½-2 volts, these plugs retail at 42p.

RipMax Box Spanner A four-way box spanner retailing at 59p which will fit the prop nuts of most engines in common use, as well as being ideally suited as a glow-plug spanner. Box spanners are ideal for these purposes as they cannot slip, so you avoid the 'rounded' corners caused by incorrect use of an open-ended spanner, or worse still, pliers!

The above two items are distributed by *RipMax Ltd.,* and may be obtained from any of their stockists.

H. J. Nicholls and Son Ltd.



Sealing Iron. Not so much a new product, more an adaptation of an existing one. Solon soldering irons have been almost a household name for many years now, and need no introduction to model enthusiasts. However, this has now been adapted to be used as a sealing iron with the various heat shrink covering materials such as *Solarfilm, Kwickcote, Unicover et al.* The modification consists of a small 'shoe' which is substituted for the normal soldering bit the iron is then plugged into the adaptor lead supplied (which incorporates a 25 watt bulb as a resister) to produce the correct temperature for sealing the film. It is emphasised that this tool is not designed for heat shrinking the film (an electric fire or gas radiant fire is recommended for this purpose) but simply for sealing the film along the edges and on control surfaces. It can also be used for adding colour trimming pieces. The small size of the shoe makes it ideal for working into small areas around control horns etc, while the tool can of course be used in the normal way for soldering purposes. Price is £6·60 including all plugs and sockets plus soldering bit from *H. J. Nicholls and Son Ltd. 308 Holloway Road, London N.7* and *8 Southgate Road, Potters Bar, Herts.*

Irvine Engines

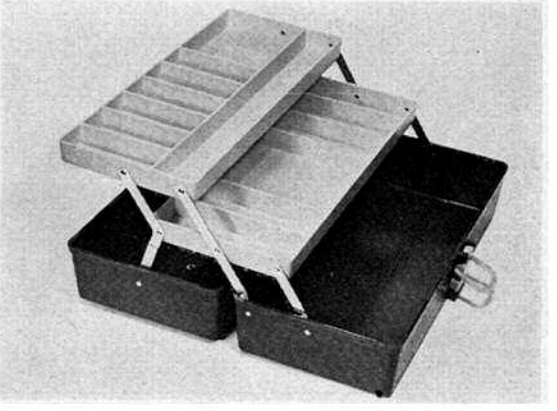
K & B Super Poxy Polyester Coating Resin is a new way of finishing your model, and should not be confused with ordinary laminating polyester resin – they are not the same thing at all. This resin, when mixed with its catalyst, may be brushed directly onto the bare balsa, sanded lightly when dry, then a second (and final) coat is applied and sanded down – very easy with this material too. The wood is now both fuelproofed and ready for final colour application, no primer being needed. Cost of 32 fl. oz. tin (with catalyst) is £2·15.

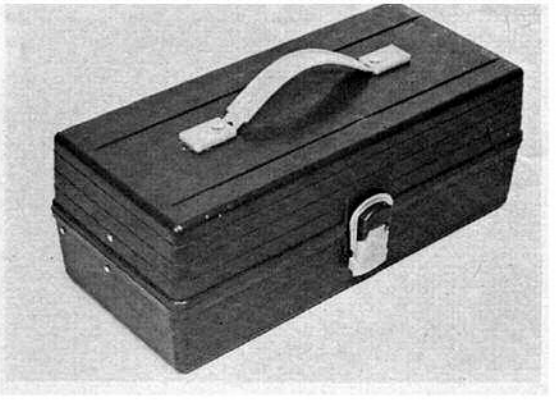
K & B Fiberglass Cloth Three grades of woven glass fibre cloth weighing ¾ oz, 2 oz and 6 oz respectively per pack, which measures some 36 x 38 ins. The two heavier grades may be used for general purpose reinforcement such as nose areas on larger powered aircraft or slope soaring gliders, joining wing halves etc., while the ¾ oz. cloth can be used for covering entire fuselages or sheeted wings when used in conjunction with the finishing resin described above, resulting in a very strong yet light structure. The lighter cloths cost £1·60, the heavy grade £1·50.

K & B Micro Balloons A fine powdery substance which when mixed with the same company's Polyester Coating Resin to form a stiff paste can be used for all filling purposes etc. and for forming smooth fillets. Quick drying (around 30 minutes, depending on amount of catalyst used and temperature) light and sands easily too. A tub containing a pint of these Micro Balloons retails at 80p.

The above K & B products are distributed in the U.K. by *Irvine Engines* and may be obtained from all good model shops. Informative leaflets containing much practical advice on the use of these products are available.

Humbrol Ltd.





Plastic Hobby Chests A special offer from **Humbrol Ltd.** is this excellent tool chest measuring approximately 13 x 6 x 5 in. high which opens up to reveal two trays and a lower storage space some 2½ in. deep. Perfect for many uses – even for storing all your Humbrol paints and adhesives! Actually, a very useful size of box and with the traditional one thousand and one uses – not the least being taking your flying equipment to the field. A particularly good design feature is that when the 'lid' is fully opened it sits squarely on the ground which prevents the box from toppling over should there be weighty objects in the trays. To obtain one, just ask your Humbrol dealer for a voucher whenever you buy a Humbrol product. Collect five such vouchers, then send with Postal Order or Cheque value £1·60 to Humbrol Ltd., Marfleet, Hull, Yorkshire HU9 5NE.

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

Nationals 1974

GOLDEN WINGS READERS, and others, will be interested in hearing about two new ideas which it is hoped will be tried out at the *S.M.A.E. British National Championships* at RAF Little Rissington over the 25th-27th May Spring Bank Holiday weekend (see page 227 for details).

The first is a 'build and fly' contest. It is *hoped* that a new large hangar will be made available in which, among other things, this new contest idea could be tried out. On sale in the hangar at a very low price would be a large number of identical kits, specially designed to be built on the spot and flown immediately (some of you may have seen or heard of the Academy of Model Aeronautics *Delta Dart* from which the above idea springs – the model is expected to be an S.M.A.E. equivalent). The models are to be rubber powered only, and fully capable of being built within 15-30 minutes by anyone aged from about 8 years old onwards. Their performance is quite remarkable and in the open air, three minute 'maxs' are not uncommon. Expert guidance and adequate building facilities would be on hand and the contest open to anyone young or old (separate prizes for juniors, of course) throughout the three days. Even if you do not win, at least you would end up with a model that flies!

The second idea is for a periodic 'information service' at each of the main areas of activity. The public address van which traditionally tours the Nationals airfield, would at certain times of the day, stop at pre-notified specialist areas and give information to spectators about the nature of the contests being run at that area, and answer any questions that may be asked about it.

Remember, however, that these plans are *not yet certain* at the moment. Both are being actively pursued but it is not possible to say definitely at present.

In addition to the **Junior Kit Contest** for free flight models to be held on Sunday 26th May from mid-day at the 1974 Nationals (described in the April issue) there will be a **Junior Control Line Stunt** event, the trophy once more being kindly donated by 'Pop' and Frank Warburton, while Bob Walker will again provide the organisation. The trophy is a most impressive American product, and will be presented on the day – and is for *keeps* (no need to return it for the following year!). The competition will be held on Monday 27th May.

The rules have been slightly altered from previous years (although the flight pattern itself remains unchanged), and are as follows:

1. No model or engine size restriction. Model must withstand a 10G pull test (i.e. ten times weight of the model), and may be flown on lines up to 60 ft. (max.) long.
2. Event will be held over grass, so any launching method may be used – wheels are not necessary.
3. Each competitor will be allowed two flights, the best single flight score counting. Two attempts of 2 minutes' duration per flight will be permitted to get airborne.
4. Manoeuvres (*a*) Four laps level flight, K=2. (*b*) Wingover, K=4. (*c*) Three consecutive loops, K=1, 2 and 3. (*d*) Four laps inverted flight, K=4. (*e*) Three outside loops, K=1, 2 and 3. (*f*) Horizontal eight, K=4. *(g)* Vertical eight, K=5 (*h*) Overhead eight, K=5. Each manoeuvre is marked out of 10, then is multiplied by the K or 'difficulty' factor.
5. No take-off or landing points will be awarded. Five minutes is allowed for the schedule, including time for two full laps between each manoeuvre.
6. Points will be awarded for quality of building and finish, with K factor of 5.
7. A handicap system will be used, based on the age of the competitor, who must be under 17 years old on the day of the contest. A competitor's score will be increased by 10% for each year that he is below 17, i.e. a 13 year old has 40% of his score added on.
8. Flying wing (combat) model flyers count as two years older for handicap purposes, i.e. a 16 year old has 10% of his score *deducted*.

   (*Note* – Manoeuvres, etc., are marked out of 10, then multiplied by the K (or difficulty) factor. Thus a horizontal eight worth 5 out of 10 is given 25 points.)

Entry to the competition is free, but competitors must have proof of third-party insurance cover for model aircraft flying (such as is provided by the MAP insurance scheme). The contest will be located near the other control line events, but on the grassed areas, and entries will be accepted up until 2.00 p.m. Don't be afraid to enter – it's all in fun, and you may surprise yourself too. . . .

Dear John,

I have been flying a glider which I have made up from bits and pieces of old models. The wings are from a very old Graupner Amigo and the tailplane is all that remains from a Contest Kit Inchworm. The fuselage I have designed myself, but the wing and tail platforms are in the same positions as the original Amigo. It tows up well, and the glide is quite flat, but all the time that it is flying, it seems to 'wiggle' the tail end. Why is this?

Bagshot, Surrey. P. Robinson.

When making up a fuselage to suit existing flying surfaces, it is a good idea to keep them in the same respective positions as the original – make sure that the angle of incidence of the wing and tail are in the same position, too. From your description, it sounds as if the trouble you are experiencing is known as 'Dutch Roll' – the usual cure is quite easy, just enlarge the area of the fin.

Dear John,

Recently I have seen several models with tinted canopies. These models were not built from kits and I have never seen coloured cockpit canopies for sale. Where can I buy one?

Harrow, Middx. S. Banks

Sorry, don't know where you can buy them either! However, you can colour them yourself, using a cold water nylon dye such as Dylon. Just take your canopy and place it in the smallest container you can find. Fill this container with water until the whole is immersed, then add the full packet of dye, plus a tablespoon of salt. Stir thoroughly then leave. After several hours take a look and see the colour change– - the longer you leave it in the dye, the darker the tint. Use only dark dyes, such as deep blues, purples, etc. The colour depth may not look too good at first, but if you paint the cockpit interior black this will emphasise the tint well.

Dear John Bridge,

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

NAME IN FULL .....

ADDRESS .....

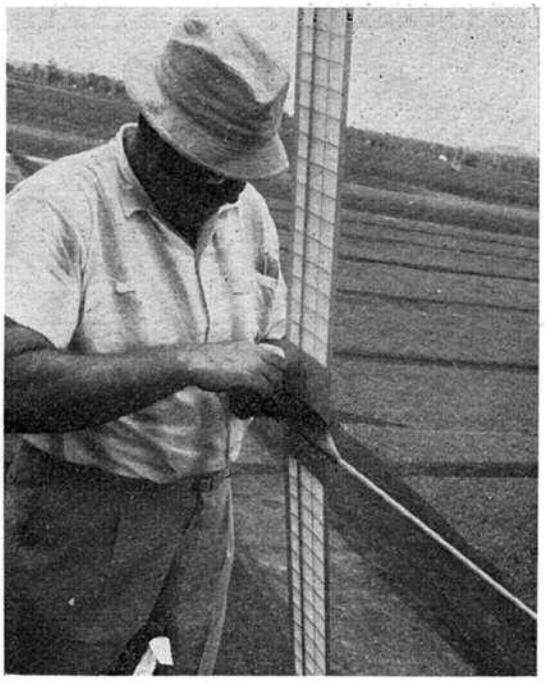
.....

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

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

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

5/74 15p in the £1 Rebate on plan purchase coupon for Golden Wing Members G.W. No. .....



JOHN O'DONNELL'S

FREE - FLIGHT COMMENT

Photos by Mike Mildren

For years, Australia's Tom Prosser has been one of the great all-rounders, and this year was no exception! At the 1973/74 Australian Nationals he placed first in R/C scale and F.A.I. pylon race, and third in A/2, Wakefield, F.A.I. Power as well as R/C thermal soaring. Beat that! It hardly needs saying that most of his models are own designs, including the A/2 which he is seen preparing at left.

AS THERE has been little contest activity in recent weeks, I can devote some space this month to 'comment' rather than keep solely to 'reports'.

First, however, it is appropriate to give the National results from the **S.M.A.E. Area Centralised** events held on 13th January which, unfortunately, arrived too late for inclusion last month. As was hinted when covering the *Northern Area Winter Rally* at Topcliffe, this venue was favoured with reasonable weather and consequently it provided most of the top places in the National results.

The A/1 event was a Topcliffe monopoly, with the top four places going to those who flew there. Winner was Tony Cordes with his third *Little Hinney*, differing from the A.P.S. version only in having an 'I' beam spar. Successive places went to Dave Yates, R. Scott and Peter Farrimond.

½A Power was very closely fought between Jim Mosely and Keith Proctor. Both had visibility problems on one flight, but the outcome was settled by Keith finding terrible sink on his second flight, down in only 1:11 from a fair climb. Third place went to Pete Harris flying with the N.W. at Chetwynd whilst Julian Hopper really struggled at Watton for fourth place. About to launch for his second flight, the wind detached the wing and pylon! The repair held for the next two flights!

I took the Coupe d'Hiver event with the delayed prop release model that I've flown for the past couple of years. Considering the amount of interest this model has caused, and the number of people who have inspected the 'mechanics', I am only amazed that there have been so few attempts to imitate it! Runner-up was John Watkins of Wolves, flying at Chetwynd, whilst Henry Tubbs filled the third position with an oldish model now fitted with V.I.T.

Chuck Glider was remarkable for the size of the entry; 38 scores, only one short of the total for the other three categories. Times were also close. Perhaps the new S.M.A.E. rules (5 from 9 with a one-minute max.) have increased the appeal of this class – or was it the weather? Top was Ray Clark of Grantham (remember his *Monster* in the December 1972 *AeroModeller?)* presumably flying at Barkston Heath along with K. Roberts, who made fourth place. In between came Chetwynd fliers Tony Slater and Roy Roberts. Clearly, the North and Midlands had the better weather on this occasion!

* * *

The North West's indoor activities this winter concluded with the *Third Liverpool Indoor Meeting* held on 3rd March, just a fortnight before the start of the Outdoor season. A change of venue to the Sports Hall at Worsley College of Further Education gave considerably more space but, unfortunately, also very draughty conditions.

Drift across the hall took little more than three minutes most of the day, and this had a disastrous effect on the scores in the Easy B rubber duration event. The winners apparently found an eddy part-way along one wall where drift was less! Top was Pete Redhead with a two-flight total of 9:48, followed by Dave Barnes and Roy Roberts. Only Pete and Roy managed to clear five minutes on their best flights.

Chuck glider was far less affected, and saw Mike Duce manage the hat-trick by winning yet again. This time he had a three-flight total of 78.9 seconds, substantially ahead of Roy Roberts, Brian Picken and Barry Kershaw. This event attracted 25 entrants, including 9 juniors, best of whom was Dave Roberts with 47.7 seconds. The level of activity brought back memories of the Indoor Nationals held 15 years ago in the Manchester Corn Exchange.

Keyhole scale was also well supported with 16 entrants. It was judged by John Bridge of Blackburn – recruited by the simple method of disallowing his 0.6 size KeilKraft *Ajax* and hence leaving him free to run the event! The rules put the accent on flying, with points for both pattern and duration. Tony Evans won with an orange *Auster* which did respectably in the static scale judging, and flew very well thereafter; a complete absence of dihedral seemed no handicap. Second and third were Joe Barnes and Pete Redhead, both with *Air Campers*, they apparently placed last in static points, but made it all up on the flying.

The *Eaves Cup* for the championship decided on a points basis over the last two of this series of meetings, was won by Mike Duce – thanks to flying all three classes. There is only one criticism I am prepared to make about this particular contest – its title! This was hardly accurate since I ran the meeting with help from John Bridge in scale and my wife, June, in recording. Perhaps this is why I dropped to fourth in Easy B!

* * *

For once, I missed the annual Coupe d'hiver trip to Paris – so what is reported elsewhere will be 'news' to me as well. The same weekend saw the *Chicago Aeronuts* again host **Coupe d'Hiver West** at Lewis University, Lockport, Illinois. Peter Sotich sent me results and a report that I will attempt to precis and/or quote.

'The weather sure left a lot to be desired as pertains to flying model airplanes . . . mostly cloudy with periods of sunshine and cloudiness . . . occasional periods of snow showers. High temperature for the day was 21° F and wind velocity was approx. 15 mph.' There were 15 entries spread over the three A.M.A. age categories. Open winner was Rudy Schuh with a five flight total of 184 seconds. He was the only entrant to complete his full quota of flights. If this doesn't indicate the conditions let me point out that no-one managed to clear the minute on any flight! British participation was provided by Dave Goodwin, whose model was proxied by Charlie Sotich – but 'one attempt' sounds very fatal.

With support from the University, and prizes from the trade, this meeting deserved a better fate. Maybe next year will be a third time lucky!

Merv Buckmaster, Australia's most prolific writer on F/F theory and statistics, seen with his elliptical-tip dihedral A/2 glider. This design feature was not incorporated for the sake of aerodynamic efficiency, more to eliminate the usual weaknesses at the normal dihedral break.

Newsletters

One of the ways in which I get to know what is happening in the free-flight world is through the various newsletters, pamphlets and handouts that I receive from both home and abroad. It is obvious that these publications provide much news and information – even though I endeavour to write my own column as distinct from merely representing a collection of choice extracts. Much newssheet material is, in fact, reprinted from other similar publications – occasionally to the extent that I reckon there would be a place for an aeromodelling version of the *Readers Digest*.

It has been suggested to me that a list of the newsletters available from clubs, areas and other sources might well be of general interest. Some publications are anxious to expand their subscription lists, and would welcome new readers; the obvious domestic examples are detailed in the table below:

Free-Flight News: Ian Kaynes, 11 Parkside Road, Sunningdale, Ascot, Berks. SL5 0NL. £1.80.

Model Aeroplane Gazette: Ron Firth, 22 Slayleigh Avenue, Sheffield SL0 3RB. £1.50.

Model Flying: S.M.A.E. Newsletter to members only. No separate subscription. (Membership £2.75 seniors, £1.10 juniors.) Membership Sec.: Ken Collins, 54 Belgrave Road, Wanstead, London E11 3QW.

However, there are many other publications, often with much interesting material, that may or may not be keen to acquire a wider circulation. Before attempting to list these in print I would like to establish the actual situation, so could I ask all news-sheet editors to let me know (directly or otherwise) whether or not they would like to be included in an 'available' list?

Obviously, I must have addresses and subscription rates, and it would be advantageous to have a few words describing the usual scope of the contents. This way might be much safer than my attempting to compile such a review.

F.A.I. (and other) Rules

Although the November 1973 meeting of the C.I.A.M. made few changes in the F.A.I. free-flight rules, there may yet be repercussions. The Russian proposals for two-minute maxs, 10 flights, and model specifications to suit were rejected – but the meeting acknowledged that there is a very real problem with models out-flying the available facilities. Consideration of this situation was referred to the F.A.I. free-flight sub-committee in the hopes of finding some acceptable counter-measures. Bryan Spooner has taken over my place on this sub-committee, and is endeavouring to sound out the views of British fliers.

Rather than discuss the detail of the Russian proposals (and variations thereon) it might be more profitable to consider the subject on a much broader front. Personally, I am coming to the conclusion that we are expecting too much from a single set of rules. To cater for both World Championship and domestic events, various size fields, and an almost infinite range of weather conditions is quite a task. Add preconceived ideas, National preferences, and a host of other factors – and it is hardly surprising that there is little sign of a universal solution.

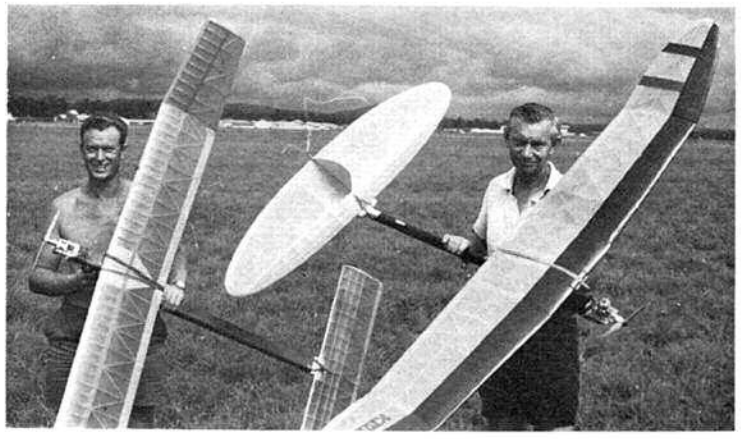
A specific example might help make my point. F.A.I. power is unquestionably a demanding event technically, with a performance potential of around double the three-minute max, and is viable enough at International level. This situation involves complex models, much gadgetry, and high performance, high-priced engines. Consequently, the class has become something of a status symbol on the home front, with very few exponents actually being prepared to participate under adverse conditions. The event is then hardly competitive in the true sense. Yet there are still cries that we should fly 'all F.A.I.' in the interests of improving our International standards. The collapse of our own contest programme would seem too high a price to pay.

Perhaps the time has come for a reappraisal of the whole free-flight contest situation. Most of the 'new' ideas that I hear amount to little more than a reshuffle of the numbers in the model specifications, quantity of flights and/or length of the maxs. These are usually opposed by those who prefer the *status quo*. These are narrow viewpoints, and are unlikely to lead to real progress. A wider view can be obtained only by considering first the real problem, and then the possible solutions.

Whilst free-flight contests are being decided almost invariably on duration, it is the distance flown that causes all the difficulties. Normal models trimmed for a circling glide cover a distance that is approximately equal to the product of duration and wind speed. Hence, the usual suggestions are to reduce model durations by restrictive specifications. This, of course, is the line taken by the F.A.I. and others for many years. The latest Russian proposals are merely another step in the same old direction. Even the outcry is well precedented as there has been similar opposition to almost every new restriction imposed on the models.

However, it is possible to do something about the other

David Tongway watches some circling swallows in an approaching thermal before launching for his final round flight at the Australian Nationals. He needed a max to clinch top place – and got it! Who said birds have no brains? Only 12 competitors flew in the Wakefield event which was held in good conditions although a wind developed towards the end.



A couple of monsters – er, the models, not their builders, that is. At left is Roy Summersby with model consisting of 'Hysteria 1000' fuselage and wings scaled from Basil Healy's 'Crowbar', using a HP40 for power. On his right is Dave Anderson plus 'Satellite 1000' designed by Bob Hunter, propelled by latest Schnuerle-ported K&B40. Both flown at Australian Nationals, Dave's placing second in Open Power.

factor involved in deciding the distance flown – the wind speed. Whilst this cannot be controlled directly, its effects can be sidestepped to quite a large extent by running contests at times when the wind is light. Invariably, this means flying very early or late in the day – and avoiding what could be described as 'office hours'. Over the years there have been spasmodic attempts to use this approach. The most relevant and successful example was the 1971 World Championships at Save, Sweden – when a very small field provided adequate enough in the calm conditions experienced at each end of the day. I understand our forthcoming Nationals are likely to be the next experiment.

There are obvious drawbacks to this scheme. Being human, few people (organisers or fliers) really like getting up in the 'small hours', and there are many other practical difficulties to be overcome. Perhaps even more important is the unfortunate fact that the technique is far from infallible. It can still be windy at first light – and then the usual problems still apply. The only real gain, then, is that there are less people about to complain of trespass!

Moreover, I think there is some danger in trying to equate 'small field' and 'rough weather' when it comes to writing contest rules. The usual restrictive specifications generally provide a better solution to the small field problem than to that due to wind. Small low-powered models (exemplified by Coupe d'Hiver) can provide interesting and worthwhile competition in limited space in good flying conditions. Conversely they make very poor rough-weather models as they are usually unable to climb through the ground turbulence without thermal assistance.

The next notion that I would question is that of demanding a multiplicity of flights. The present emphasis on thermal detection and utilisation has upset earlier concepts of consistency and reliability – at least under good conditions. On the other hand, bad weather makes a lot of flights into an endurance test. Many such contests are won by those competitors who persevere longer than the rest, but this is not supposed to be the object of the exercise! If the aim is to promote a competitive event in really windy conditions, I would advocate the opposite approach: a single flight contest, run like a fly off, would mean competitors were asked to risk one model once. With everyone flying and searching together there is surprisingly little likelihood of lost models. Such a concept does imply being able to 'ad lib' rules on the day – a revolution in itself!

One possible solution to the distance/duration dilemma has been heatedly discussed in the U.S.A. The idea is simply to fit radio to give some measure of pilot control. The advantages of R/C operated timer or D/T operation are obvious, as are the interference problems (the latter is far from insurmountable – technically at least). Steering the model in or out of lift, and back to base are logical extensions. These ideas seem to drive some hardened free-flight enthusiasts to apoplexy!

There is, of course, already just such an event in the shape of R/C Thermal Soaring – and trends are plainly evident. Duration as such seems to be disappearing as a criteria of excellence – which indicates that model performance (in the traditional free-flight sense) is becoming secondary to model control. This is inevitable and even necessary, with an event that is flown in sequence – or order of draw. Otherwise, once the aerodynamic problems in combining slow thermal flight with a high speed return are solved, the weather 'drawn' would be all-important. There is another factor in Thermal Soaring that is unfamiliar to the free-flight modeller – the influence of 'commerce' in providing a wide and constantly changing range of ready-made accessories, components, and even models.

Without wishing to be too dogmatic I feel that the use of radio in 'free' flight would change the emphasis, and hence the event, beyond recognition.

One recurrent suggestion diametrically opposed to new technology is the hardy annual of the precision contest. This puts a premium on consistency and predictability – and makes model design and performance of little direct importance. I think the drawbacks are self-evident, and that the precision approach is suitable for 'fly-for-fun' events rather than serious and demanding top level competition.

Having considered various possibilities, what remains? Really it all depends upon what is wanted – and when. Short term, it would seem better for those with small fields to use the 'mini' classes of Coupe d'Hiver and A/1 (and ½A power) rather than to reduce Wakefield and A/2 down to the same level of performance. In any case we hardly need two specification classes with the same performance and flight max. The use of short engine runs for Power would seem an easy solution.

A good long term answer is a lot more difficult. Some attempt to cut down the proliferation of events needs to be borne in mind. If there are to be any radical changes then plenty of warning needs to be given. With this proviso it should be posssible to set up 'new' classes to test particular attributes or skills, and to divert some emphasis away from thermal flying and back onto model itself. Need I say that of present day events those for A/1, A/2, Wakefield, Coupe d'Hiver, and even Chuck Glider are now 'thermal' contests: In contrast F.A.I. power has become a horsepower race – a concept of considerable appeal to the racing enthusiast but surely better suited to control line.

I would like to see a better spread of requirements on the following lines:

Thermal flying – A/2 glider
Trimming technique – Open power on short engine runs
Sheer out and out performance – Indoor microfilm
Basic aeromodelling skills – Open rubber, flown early or late

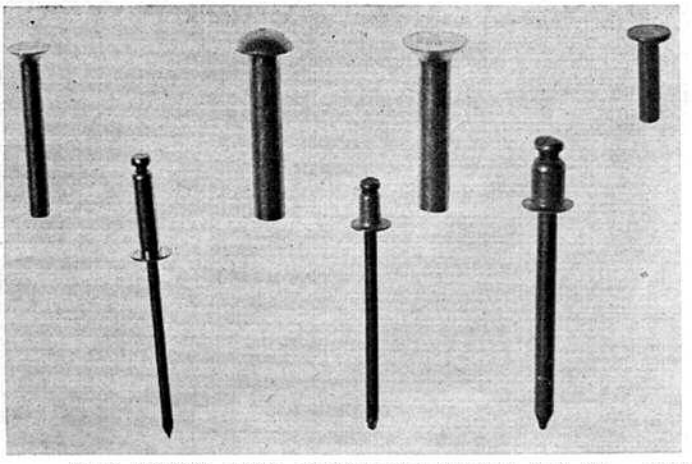
Any such rationalisation would mean dropping much of the numerical basis fundamental to our present approach. I reckon this is much too radical for the dyed-in-the-wool F.A.I. protagonist – but it might attract a lot of support from our present 'open' fliers, a group that fall only too well into the 'silent majority'. What about becoming vocal?

RESULTS

Coupe d'Hiver West – Lewis University, Lockport, Illinois: Junior, 1 Ed Mate, Jnr., 33 seconds. Senior, 1 Keith Gordey, 87 seconds. Open, 1 Rudy Schuh, 184 seconds. 2 Sherman Ovelmen, 161 seconds. 3 Phillip A. Hartman, 151 seconds (Proxy Jack Tisinai).

1st S.M.A.E. Area Centralised Event, 13th January 1974
Coupe d'Hiver (5 x 2 min.) 15 entries – 1 J. O'Donnell (Whitfield) 8:56. 2 J. Watkins (Wolves) 8:14. 3 H. Tubbs (Leeds) 7:36. 4 M. Sanderson (Grimsby) 6:27. **A/1 Glider** (5 x 2 min.) 22 entries – 1 A. Cordes (Leeds) 8:58. 2 D. Yates (Wigan) 8:39. 3 R. Scott (York) 8:04. 4 P.Farrimond (Wigan) 7:30. **½A Power** (3 x 3 min.) 16 entries – 1 J. Moseley (Leeds) 7:08. 2 K. Proctor (York) 7:01. 3 P. Harris (Evesham) 6:10. 4 J. Hopper (Stansted) 5:58. **Chuck Glider** (5 from 9 x 1 min.) – 1 R. Clarke (Grantham) 4:38. 2 A. Slater (Leatherhead) 4:30. 3 R. Roberts (Wigan) 4:18. 4 K. Roberts (Grimsby) 4:14.

3rd Liverpool Indoor Meeting, 3rd March 1974
Easy B (best 2) 13 entries – 1 P. Redhead (Whitefield) 9:48. 2 D. Barnes (Liverpool) 8:59. 3 R. Roberts (Wigan) 8:45. **Chuck Glider** (best 3 from 9) 25 entries – 1 M. Duce (Liverpool) 78.9 sec. 2 R. Roberts (Wigan) 69.6 sec. 3 B. Picken (Wigan) 69.0 sec. **Junior**, D. Roberts (Wigan) 47.7 sec. **Keyhole Scale** (16 entries) – 1 A. Evans (Liverpool). 2 J. Barnes (Liverpool). 3 P. Redhead (Whitefield). **Junior**, N. Branigan (Liverpool). **Overall Champion** (2nd and 3rd Meetings) – M. Duce (Liverpool).



BASIC METALWORK

Part IV of Bill Burkinshaw's practical series.

A selection of rivets: in the top row are countersunk, round or mushroom head and flat or pan-headed rivets. Below, there are three different pop-rivets – note the mandrel which passes through the hollow rivet.

THIS MONTH'S article consists of a follow-on from the previous article as well as being partially a side-step from the course I have followed up till now, in that I will mention some finishing techniques particularly of interest, I feel, to the scale modeller. Firstly, though, more on joining metals.

Epoxy Resin Glues

Epoxy resin glues have been a fact of life for some years now and more recently the quick setting varieties have found great favour with the modelling world. The disadvantage of the original types of epoxy resin for the average impatient aero modeller was the slow setting time – typically 24 hours at normal room temperature. But at higher temperature the reaction is considerably speeded up, e.g. 30 minutes at 300°F, a temperature easily obtained in a domestic oven and also a temperature that will not harm metals, glass or ceramics. The advantages with using normal setting epoxies seem to be firstly it is cheaper and secondly, whatever the adverts say, they do *seem* to be stronger, but not having conducted any controlled experiments I would not like to be too dogmatic about the strength aspect. The methods of using epoxy for joining metal again involves cleaning (yes, cleaning *again)* the metals to be joined both physically with emery cloth and chemically with strong detergent, carbon tetrachloride (*Thawpit, Dabitoff,* etc.), or even methylated spirits. Having cleaned something to bond it together, don't make the mistake of touching the surfaces to be bonded with your fingers because whatever you like to think, your fingers are greasy – and grease is the sworn enemy of epoxy resin bonded metal to metal joints. If possible, before degreasing the surface should be roughened up to give the epoxy a better key – a scriber will do or even drill small-diameter holes in the parts to be bonded. Mix up the two parts of the resin carefully and thoroughly making certain to mix equal parts of the resin and hardener. Apply the resin to the prepared joint and place the assembly in a pre-heated oven. Full instructions for the heat curing of epoxy resin are given in the instructions and should be carefully adhered to. The above instructions apply also to the use of rapid-setting epoxy resins except for the heating bit, they often set too quickly for me without using any extra heat. Employing epoxy resins, it is perfectly feasible to bond dissimilar materials together quite successfully.

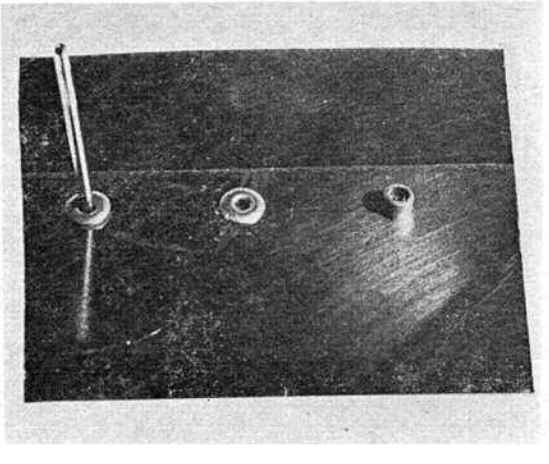
A further development in the adhesive field is the Iso Cyano Acrylate adhesive of which Devcon *Zip Grip* is an example. This is a very strong, extremely quick-setting adhesive. It is also incredibly expensive but has definite advantages and usages. It has little or no 'gap-filling' capability and any joint to be made with it must be very close-fitting; clearances must only be in the order of a few thousandths of an inch. The adhesive is applied by 'eye dropper' or hypodermic syringe in very small quantities precisely where required, then the two components are brought together and seconds later a permanent bond is achieved. If any has strayed on to your fingers they also are permanently bonded to your model! Joking apart, these latter adhesives are very quick setting and very powerful and I have seen cases reported where surgery was required to separate bonded fingers. No, not with a balsa knife either – at the local Out Patients department.

Riveting

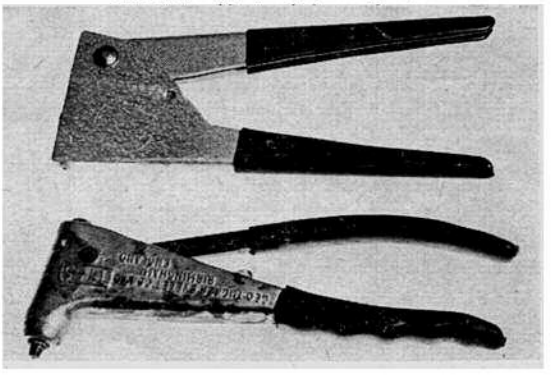
Upon reflection I think that really this section is also the scale modeller's prerogative although there are some applications for builders of other types of machine. The details below apply to rivets made out of most materials, but I would imagine that few aeromodellers would want to use anything other than light alloy rivets with sheet and bar stock. One word of caution: do not try rivetting piano wire as it is quite likely to shatter and send needle sharp particles flying all over the place.

The most obvious application for rivetting would seem to be an aluminium engine cowl and associated hinges etc., so the first decision to make is the type of rivet to be used. The common types are a) round or mushroom head, b) countersunk head, c) flat or pan head (see heading photo).

They are commonly sized from 1/32 in. diameter upwards and the proportions of the head are all related to the diameter, so that the appearance of the 'full size' should be able to be maintained on a largish scale model. If this is not possible because of relative sizes of prototype and model, then rivets can still be used but without allow-



Left, 'pop' riveting. At extreme left is the rivet placed in the hole from the top surface. The pop-riveting pliers have pulled the mandrel, forcing the enlarged end into the hollow rivet expanding it to grip the metal plates securely (centre). The excess breaks off. At right, threaded pop-rivet in place. Below, two types of pop-rivet pliers.



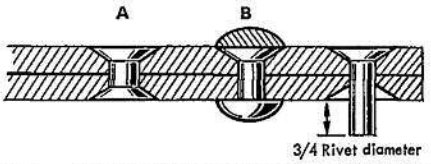


Figure I—Alternative methods of riveting

Right, a riveting snap – the lower cup-shaped recess fits over the rivet head as shown in figure III. The hole above suits the rivet's shank diameter – and is used to ensure that the work is directly in contact with the rivet, by placing it over the rivet and tapping with a hammer.

ing the head to show. *Figure I* shows alternative methods (a) shows a round head rivet hammered into a countersunk hole and (b) shows the same finished effect obtained by using a countersunk head rivet. Use whichever method is most convenient.

There is a little more to rivetting than placing the rivet through a hole and bashing it with a hammer! Firstly, one of the pieces of metal to be rivetted should be fully marked out to show the positions of the rivets – ideally the proportions in *Figure II* should be adhered to, but use your judgment to make sure that the joint is adequately held without using an excess of rivets. Having marked out one piece, one hole position on the second piece should be marked out. Now drill all the holes that you have marked out with a suitably sized drill i.e. for a $\frac{1}{8}$ in. (0.125 in.) rivet use a No. 30 (0.1285 in.) drill. The drill you will notice gives a clearance which the rivet fills by expansion when it is hammered. Now the rivet can be cut to a suitable length. The amount of protrusion of the rivet is calculated by the following: for round-head rivets, $1\frac{1}{2}$ x diameter, for countersunk head rivets $\frac{1}{2}$ x diameter.

This means that when the plates are de-burred and holes countersunk etc. the positioned rivet should project through the hole by this amount *(Figure I)* i.e. for an $\frac{1}{8}$ in. rivet, 3/32 in. will be needed to fill a countersink or 3/16 in. to

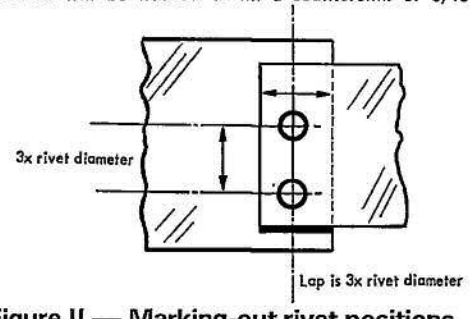
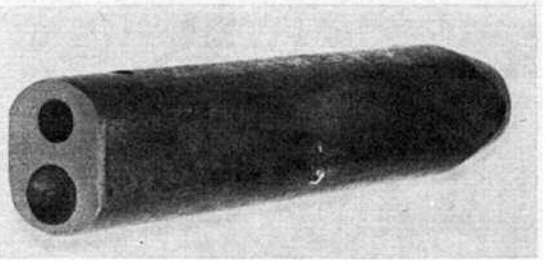


Figure II — Marking-out rivet positions

form a round head. Any countersink should be of such a size that the head of the rivet is slightly proud of the surface of the metal.

Having now cut the rivet to the appropriate length, some form of support is necessary before hammering is commenced. If a round head rivet is being used, a rivet snap is needed (as seen in photograph) but if countersunk or pan-head rivets are used, any convenient, fairly solid, piece of steel can be gripped in the vice to act as an anvil to hammer upon. Having set up some form of support, check that there are no burrs or rough edges to prevent the parts mating together, then carefully insert the rivet into the hole and commence to hammer the rivet straight down to thicken it out slightly. Then, with the ball pein of the engineer's ball pein hammer, start to spread out and work the rivet down into the countersink. Be careful at this stage not to rain indiscriminate blows onto the surrounding metal surfaces, otherwise you will have a lot of extra work with the file and emery cloth to remove them. When the rivet has completely filled the countersink it can be filed and emery clothed *flush with the parent metal (Figure I).*

Should a round head be required on both sides of the metal, a rivet snap is used to finish off the rivetting after the rivet has been shaped as well as possible by the ball pein hammer. This is not an easy thing to do and really should be avoided unless practised on scrap metal first. When the two pieces are held together with one rivet, any further rivet holes can be drilled in the second piece of metal, using the holes drilled in the first as a jig. This method prevents the possibility of pre-drilled holes not being in perfect alignment.



A much quicker method of doing the same job equally permanently would be to use 'POP' rivets. These are hollow rivets with a mandrel fitted into them – when the rivet is placed into position the mandrel is drawn through the hollow rivet by a special pair of pliers. The mandrel causes the hollow rivet to expand and eventually break off, leaving just the expanded pop rivet and the end of the mandrel inside it holding together the joint The particular advantage of these rivets is that they can be fixed without needing support for hammering on the reverse side.

Pop rivets will anchor firmly into plywood and I have used them successfully for fixing a sheet dural undercarriage onto a suitably positioned $\frac{1}{8}$ in. ply plate in the fuselage bottom, using large washers on the inside to help distribute the load. Having mentioned this application, I will allow fertile minds to think up a whole host of quick-

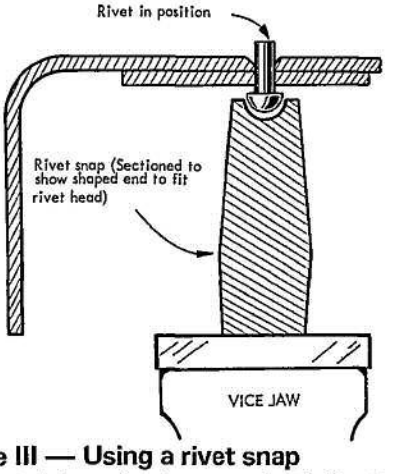
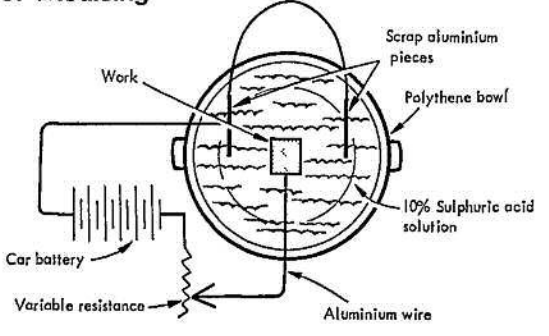


Figure III — Using a rivet snap

building techniques based on pop rivets! One further use would involve the use of a pop rivet which is combined with a threaded bush. By using this wonderful little device it is possible to instantly and permanently anchor a 4B.A threaded bush onto sheet metal or plywood. How about fixing four of these into the front bulkhead of an R/C model for the attachment of a radial mount, or onto plywood inserts for a really good cowling fixing without the need for messy epoxying of nuts with the risk of epoxy in the threads? Once again, I am sure these devices have great potential for the modeller. One word of caution, however, they cannot be inserted with the very cheap home-handyman pliers, they need a slightly heavier plier to insert them

Figure IV—Diagramatic layout for method of anodising



Effect	Metal	Chemical	Comments
Dull Black	Steel	Steam	Heat to red heat and hold in jet of steam from boiling kettle.
	Brass Copper	Copper Nitrate 1oz. Water 3oz.	Immerse for a few minutes. Does not flake or chip.
	Iron & Steel	Hypo-Photographic fixer	Immerse – boil for short while
	Zinc	Antimonious Chloride.	Immerse.
Shiny Black	Copper	1 part ammonium sulphite, 4 parts water.	Immerse for a few minutes. Brass goes steely grey colour.
Antique Brown.	Copper	Sodium sulphite solution.	Depth of colour depends on concentration of solution.
	Brass	Lime and Sulphur.	Mix into a paste with water. Cover and heat gently.
Green Patina	Brass	Vinegar, salt and sugar.	Brush over daily until satisfactory.
	Copper	Washing soda, water and vinegar.	Suspend articles in closed container. Pour vinegar on to soda.
Dull coloured	Aluminium	Caustic soda (sodium hydroxide)	Use hot, moderately strong solution. Immerse for a few seconds.

Table I—Colouring metals without anodising

Chemical colouring of metals

This section is particularly of interest to the scale modeller. I can see quite a problem with metal parts on a scale model in the now universal process of ageing. Natural processes take a period of years to give an aluminium cowling an 'aged look' or brass its patina so the natural weathering needs to be by-passed and speeded up. Also a piece of metal on a full size aircraft which is chemically 'blued' or blackened can be reproduced without resorting to paint. A word of caution on using these chemicals – **treat all of them as poisonous;** avoid any unnecessary contact with the skin and keep them off clothes etc. Some of the chemicals can be obtained fairly easily, others may take some perseverance to track down. For the schoolboy experimenter, see your science or craft teacher and you might find yourself with an interesting project on hand!

Two things not mentioned in the table are electro-plating or anodising. There is an excellent M.A.P. booklet on plating for those interested *(Electro Plating for the Amateur* by L. Warburton, price 75p) but for the experimenter the following information on anodising may be useful. Firstly, a method of faking anodising. Dip aluminium into caustic solution (hot) for a few seconds, rinse them, place in a bath of previously heated dye-stuff and boil up for a few minutes. You should find the surface of the aluminium tinted to some extent. Dylon dyes are excellent and provide a good range of colours. However, a proper job can be done with very limited equipment. A bath is needed – a polythene bowl will do well – a wire wound variable resistance of 10 watts or so, a car battery, some sulphuric acid and some aluminium wire to connect up with

Method

Attach by some suitable method, a length of aluminium wire to the article to be anodised to both suspend it in the bath and to conduct the electric current to it.

Clean the article to be anodised thoroughly with detergent, then etch in caustic soda solution. Suspend the work in a plastic bowl in a 10 per cent solution of sulphuric acid Connect the wire through the resistance to the car battery positive (+) and the car battery negative (−) to pieces of scrap aluminium sheet on either side of the work in the bath. Turn up the current until fine bubbles come off the workpiece. Leave for 20 minutes to give a fair depth of film, then dye chosen colour.

Polarity is important otherwise you will end up with anodised cathodes. Cleanliness is also vital. If the work blackens or darkens to any great extent while being anodised, turn down the current.

Next month: Cutting screw threads

BACK TO SQUARE ONE

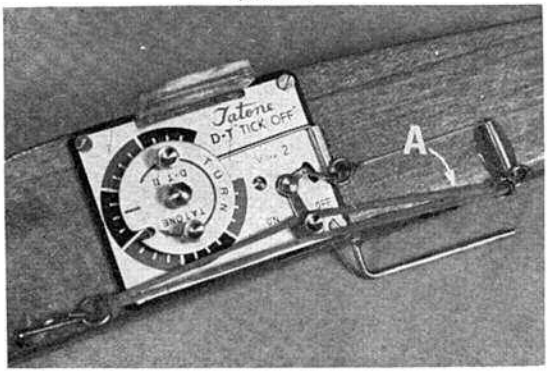
continued from page 231

Problems? Very slight, and one's we should have avoided! Firstly, the dethermaliser failed to operate on the first flight – which did not matter as the flight was only off a short line. However, this was easily cured as it was simply a case of the operating arm of the D/T timer not being fully uncovered by the rotating disc when it came to rest. This had been checked out perfectly many times before but it must have been bent while setting up the D/T operation. A quick bend-straight soon sorted that out!

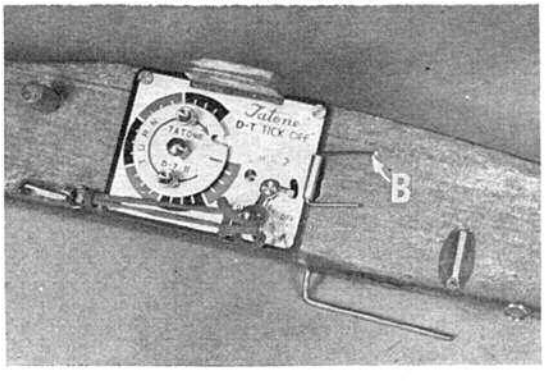
The only other 'failure' concerned the towline release. On a couple of occasions the line was very reluctant to detach from the model – but a sharp tug on the line solved the problem at the risk of stalling the machine. This was traced to being caused by too much tension on the rubber band from the timer off/on switch to the release pin, causing the pin to 'bind' in its tube. Solution was to substitute a slightly longer rubber band – and to check the operation more carefully next time!

Twice the model 'fell off' the line shortly after release by the helper – this being caused by too rapid acceleration of the tower causing the model to 'overshoot' and fall off the hook. Our fault too!

The cause of one 'anxious moment' when the towline seemed reluctant to part from the model, was caused by the rubber band marked 'A' being too taut, which wedged the release pin in the brass tube. Replacement with a larger band cured this, but it must have greater tension than the band used to pull the timer switch to the 'on' position.

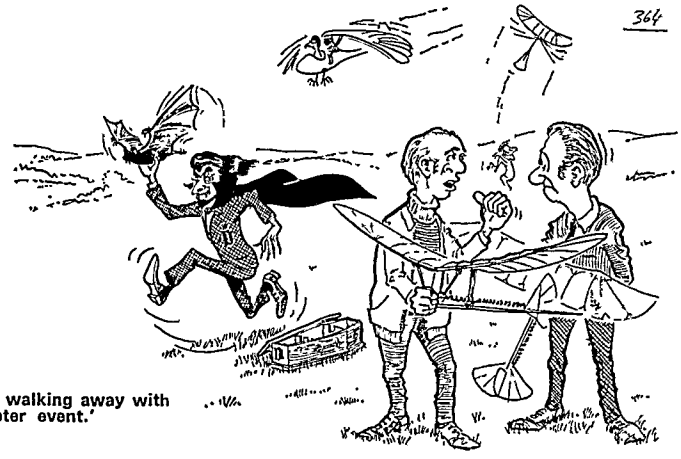


One other factor we discovered that could have caused loss of the model was the dethermaliser system failure. Really, it was very simple. The operating arm (marked B) was slightly bent so that when the operating disc had revolved to its run-down position (shown) the arm was not directly under the slit, thus the D/T did not operate. A slight bend cured this.



topical twists

by 'Pylonius'
illustrated by 'Sherry'



'That new member's walking away with the ornithopter event.'

Olympian Thoughts

It is something I have been dreading for years, but it had to come. I mean, of course, the *Aerolympics*. This does not, I hope, infer that the model flyer will be expected to launch a chuck glider at the top of a pole vault or to put in the fastest 1,000 metres retrieving time in the Wakefield event, but what it will certainly do will be to put our once humble hobby on the rostrum of International hysteria.

I've never been in favour of terming model flying a sport, for it seems to put the poor old model plane in the same category as hammers, shots and javelins. Part of the fun of modelling is to demonstrate what a gruelling time you have had in the workroom, and the old-time modeller could often be seen with a different type of chip on his shoulder than is carried nowadays. Covered in model dust you hold up your latest creation in your cement-caked fingers and cry *'Look what I've made!'* Admittedly, this is a chancy thing to do unless, of course, you are flaunting an R/C helicopter, as you may be sure that the kid next door has bought something much more impressive from the local model/toy shop, only awaiting dad to put in the radio control.

What I suppose I am resisting is the grisly idea of the sporting aeromodeller going into the model/sports shop to buy his fit-together Olympic contest model, or worse still the dishing out of standard plastic models to competitors on the flying field-cum-area. Thus, in the Radio Control area, the *Marathon Pylon Race* would rest purely on sheer, helldive piloting skill (it probably does already), and in Free Flight the athleticism of putting in 20 flights in a couple of hours, plus points for tactical ingenuity.

The loser in all this superficial display is the poor old home-made model which I, as an old fashioned pre-Olympic model flyer, think is what the hobby is, or should be, all about.

Left in the Wake

We read that a model which won the Wakefield back in 1937 is still in existence and this I regard as a marvellous act of preservation on the part of its owner. Model planes are, in the nature of things, fragile fabrications (or they were in the pre-missile days), meant for the fleeting pleasure rather than historic contemplation. Just think of the hazards: the rigours of the flying field, the beckoning of the fly-away skies, and the rough and tumble of family storage:

'I'm sorry dear But you know that old paper model you've got hanging up, or did have hanging up, in the box-room? Well . . .'

Since that famous model went into cold storage vast have been the changes that time has wrought in the model world. Model flying today does not conjure up visions of rubber models drifting lazily over London's green and pleasant land (before the row came to the Heath), but is synonymous with the zoom and roar of powered radio models receding further and further into the rural distance.

They were certainly the days if you liked the simple life. You came onto the field in your best Sunday togs not to do 14 proving flights, but to hope that the fattest thermal of the day had your name and number on it. And it was all so unsophisticated, with not a bubble machine in sight, and nothing more tactical than a bit of grease on the tail-skid.

One happy thought, though. If the fuel situation does get worse we may find ourselves back flying models on Heathrow.

Gassed Up

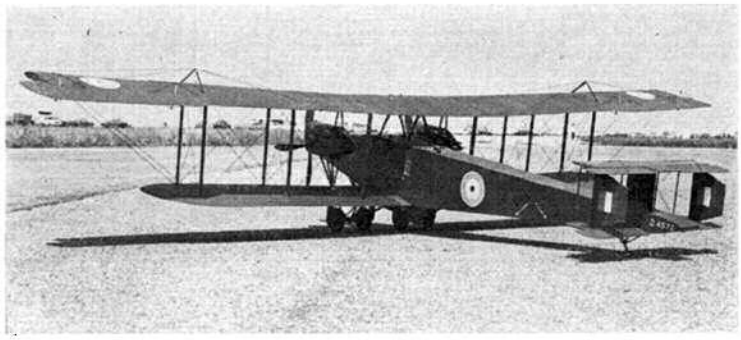
The particular attraction the vintage model has for me is that there ain't much of it; you can almost knock one out during the T.V. adverts. But not all vintage models are so accommodating in this way. Take, for example, those huge pre-War gasses which will be performing elephantine feats at the coming Aerolympics; they call for production on the grand scale, apart from leaving the local model shop, and your pocket, in an extremely depleted state. And just to add to the complication, they are fitting the monsters with very un-vintage radio equipment. The reason for this, I suppose, is that the world has become a bit more crowded since those spacious days when the original monsters started beating up the rubber contests, and you need some means of keeping them from the cars and people that now crowd up every square yard of space.

Durable Duration

It's an odd thing, but the most active side of our hobby, contest-wise, is that antiquated, chuck-it-and-run curiosity known as free flight. Goodness knows how many years it has been going, but they were throwing up split cane model against bamboo model when the Wright Brothers were in knickerbockers.

Basically the contest formula remains as simple as it ever was: just clocking the time each model stays clear of the deck. And things haven't changed all that much. The modern Wakefield might be a little less portly around its midriff and sport a few more gadgets than Monsieur Fillon's 1937 winner, but the game's the same.

The only twin-engined free-flight scale model that our columnist has actually seen fly recently, is Terry Manley's well-known Handley Page 0/400. This uses no 'gadgets' to balance the engine thrust, the Mills 75s used are so reliable that none are necessary!



ERIC COATES takes a look at the latest ideas, news and products on the scale scene

FLYING SCALE COLUMN

ABOUT A YEAR ago I devoted this Column to that challenge, which all true free-flight scale modellers seem to attempt at least once in their lifetime, the glamorous 'twin'.

Since that time many readers will have been impressed by the performance of Terry Manley's *Handley Page 0/400* at the Nationals and the Southern Gala last year. Unfortunately at the latter event it broke its back in a heavy landing on a disused hardstanding at Odiham, but I am pleased to report that Terry has now rebuilt the rear fuselage of this machine and hopes to compete with it again in the 'Super' at the Nationals this year.

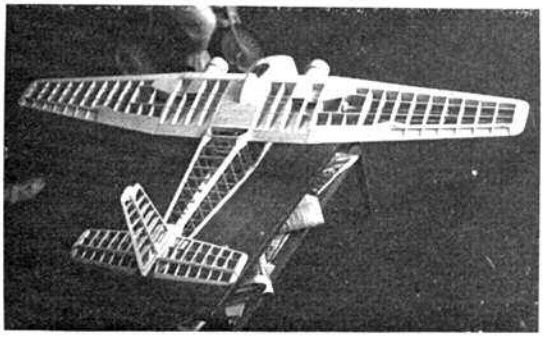
As regular readers of this Column will be aware, there are no fancy pendulum throttles or other automatic trimming devices on the 0/400 – Terry relies on the relatively inboard-mounted Mills 0.75 to run at perfectly even power throughout the flight, and cut simultaneously when the timer operates. To date he has not had a prang due to any problems with the engines, which is a wonderful tribute to Mills engineering of 25 years ago!

In the intervening year many readers have written to me suggesting all manner of wondrous ideas for the automatic regulation of twin engines and allied trimming devices. Some appear to be reasonably practical, while others I am afraid owe more to Emett than sound aeronautical engineering! No one, however, has demonstrated any of these ideas in a practical flying 'model – I have seen several twin-engined rubber-powered models perform in recent months, but the 0/400 was the only powered twin I witnessed airborne.

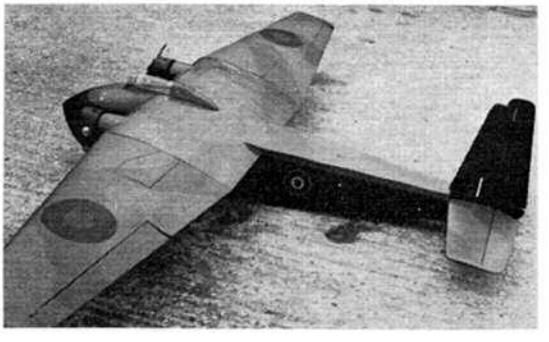
The most promising automatic trimming system I have had put forward to me is by Derek Knight of the Portsmouth Club and he is also rare in that he has had the courage of his convictions and built a model for it, although to date this has not yet been airborne. The prototype he has chosen is a most interesting machine – the *Hamilcar Mk.10*, a powered version of the famous wartime tank-carrying glider. I will describe the model more fully later, but first the control system.

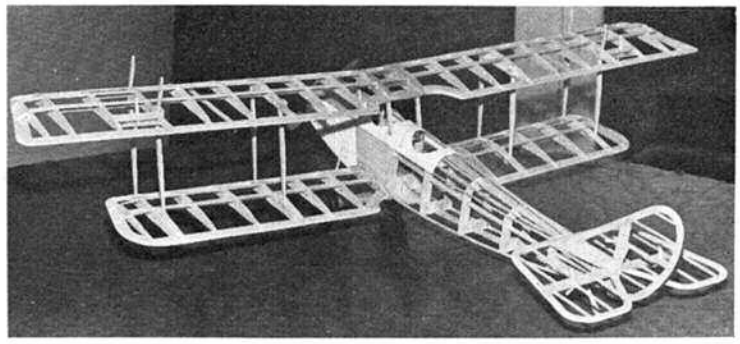
Derek has found that most small engines develop around 5 p.s.i. crankcase pressure and utilise this to power diaphragm type actuators as illustrated in *Figure 1*. These units have been designed with the possibility of mass production in mind, although the prototypes were turned on a lathe, albeit with some weight penalty. It can be readily realised that such an actuator has many uses other than for stabilising twins. Derek's *Hamilcar* is powered by a pair of McCoy .049 glow engines – a hole is first drilled into the crankshaft bearing diametrically opposite to the carburettor intake, then a piece of brass tube is epoxied into the hole and the actuator(s) connected up with neoprene fuel tube. Every revolution therefore a pulse of pressure is fed into the actuator from the crankcase. Pressure generated is thus proportional to the speed of the engine, and the displacement of the actu-

Structure of Derek Knight's Hamilcar Mk. 10 is quite conventional, although perhaps a little too 'beefy' – and thence heavy – for free-flight – looks almost strong enough for R/C with its sheeted 'D' box leading edge. One of the actuators described in the text can just be seen mounted in the wing, aft of the sheeting to the right of the starboard engine.



It's a big brute, isn't it! Two McCoy 049s are intended to fly this 54 in. span replica of the powered version of the tank-carrying glider. Wings are covered in thin cardboard, cheaper than balsa and more realistic-looking as it sags slightly between the ribs.





In the February issue, the Sterling 'E' series of scale kits were reviewed – this is the Curtis Jenny being built by 14-year-old Mark Hudson, who has incorporated the 'knock-off-wing' modification suggested by our columnist. Power is to be a Cox 049. Note plastic moulding supplied for cowl. Flying reports later!

ator proportional to the pressure. With the engine flat out the actuator piston is pushed out about ¼ in. and if the engine slows or stops the piston rod retracts. Any rotary shaft valve engine can be simply adapted in this manner.

Derek has connected four actuators up to operate rudder and ailerons as can be seen in *Figure 2*, although I personally think this is a little complicated and for a first try would just operate the ailerons; which are far more of an effective controlling force than the rudder. In Derek's set-up, with the engines stationary, both ailerons are drooped and the rudder centralised by springs. A complex double bellcrank system is used in which the lower crank has a floating central pivot to cater for the integrated fore and aft movement of both actuators with both engines running. The upper bellcrank has a fixed spigot but is locked to the lower crank in all rotary motion. In action, therefore, when the port engine only is running the rudder is biased to the left and the starboard aileron is drooped to compensate for the assymetric thrust. The opposite effect will occur if the starboard engine only is running. With both engines running at the same speed both ailerons are level and the rudder central and if either engine slows the right amount of corrective trim should be applied. It can be seen that the ailerons do not work in the true sense, but as outboard flaps only, Derek's idea being that as the speed of both engines is increased during trimming then a certain nose-down pitch is imparted as the ailerons are both simultaneously raised. This should obviate the necessity for downthrust. It all sounds very complex, but I think aerodynamically and mechanically the system is sound. It will, however, require very careful trimming, and I do not know if the *Hamilcar* possesses sufficient natural stability to get it through the initial tricky trimming stages.

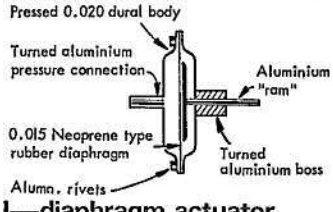


Figure I—diaphragm actuator

The outside diameter is 1.2 in., the stroke 0.25 in. The turned aluminium parts are pinned into place in the pressed body and the whole assembled, using 1/16 in. diameter countersunk rivets, sandwiching the diaphragm to form a leak-free seal.

A more conservative use of one of these actuators could be to compensate for the pitch trim changes necessary on most free-flight models between powered flight and glide. This is normally accomplished by downthrust – a terrible chore on a scale model if you do not get it right the first time. Also on low thrust line models this can be unsightly if excessive amounts have to be used, so how much nicer to have one of these diaphram actuators connected to the elevator, with a lost motion trimming device, so that the right amount of down elevator could be adjusted to suit the powered flight. Similarly the necessity for excessive sidethrust can be obviated by connecting one of these units to the rudder. I may try one of these units out on a single-engined model myself one day!

Derek's *Hamilcar Mk.10* model is 54 in. span and weighs 31 oz,, and as can be seen from the photographs the structure is conventional enough, if a little beefy. The interesting feature is that it is covered with 0.007 in. thick cardboard which fortunately sags just the right amount between the ribs, and the finished job looks realistically like the original plywood covering. Balsa skinning is always too stiff to achieve this effect. Derek reckons that the cardboard is comparative in weight to 1/32 in. balsa sheet and does not absorb anything like as much dope. This is a structural medium that could be put to good use in modelling all those beautifully plywood covered Miles machines produced between 1932 and 1948.

* * *

Plans are going ahead between the S.M.A.E. Scale and Indoor Technical Committees for the first Indoor Nationals to be held in the Cardington Airship Shed

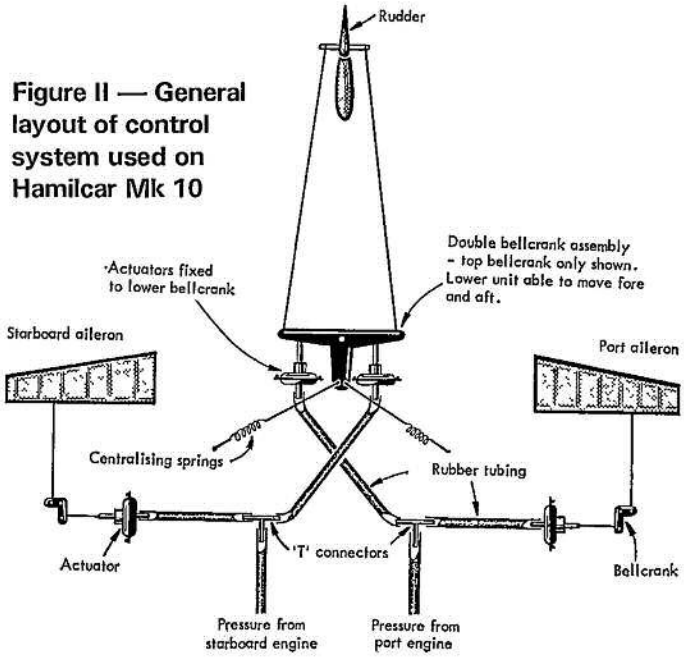
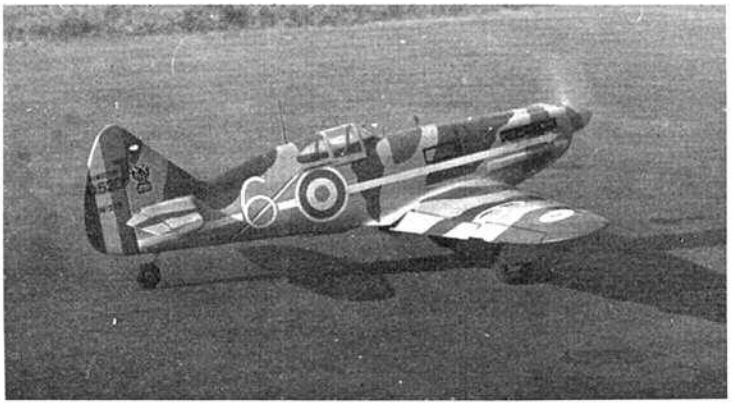


Figure II — General layout of control system used on Hamilcar Mk 10



Superbly-built version of an attractive, yet rarely modelled aircraft – the French Dewoitine 520. This control-line example, built by Czech enthusiast J. Ocenasek uses a 10 c.c. Tono glow engine, with throttle control, which is completely hidden by the bulky cowl – another point in the prototype's favour.

More control-line pictures from Czechoslovakia. Below is Z. Rehacek's contest-winning Handley Page Hampden, powered by a pair of MVVS 5 c.c. motors, while beneath that is B. Fejgle's Avia BH9 with an almost too effective camouflage paint scheme! The MVVS 60 is blended well into the exposed radial engine. Czechs have long been scale enthusiasts, and it is expected that their C/L team at the World Champs will be a very strong one.

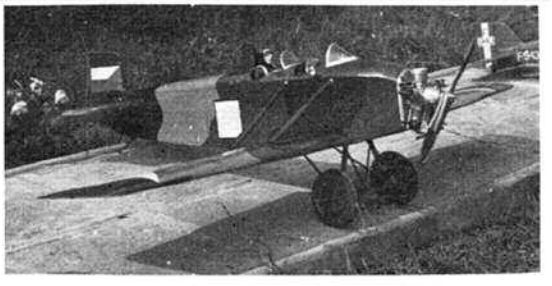
on 17-18th August. For scale flyers there will be a *Peanut* competition on the Saturday (limited to models below 13 in. wing span) and a competition to S.M.A.E. rules (max. weight 3 oz.) on the Sunday.

* * *

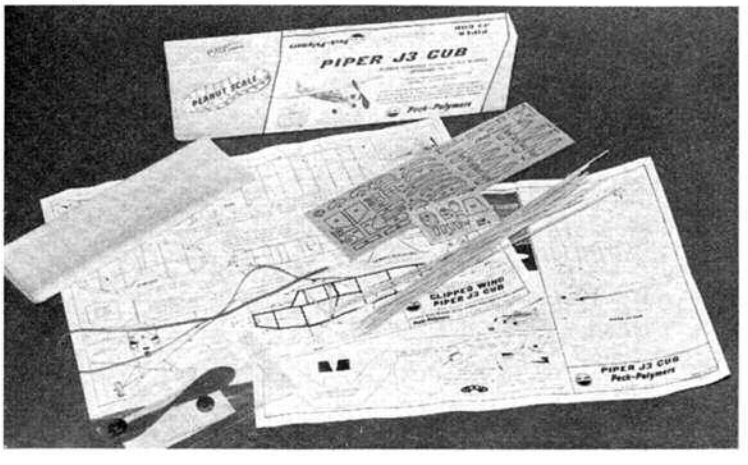
I have just received from John Stennard the latest **Peck Polymer** Peanut scale kit for review. This is for that most popular of all American light planes: the *Piper J.3 Cub*, but this is a Cub with a difference – a clipped wing Cub, as modified by Bob Olivers of El Cajan, California. I presume that Mr. Olivers modified the original to improve its aerobatic qualities by reducing the wing span from 35 to 28 ft. but he could have had the modeller's Peanut rules in mind because this enables a larger scale Cub (and hence more rubber in the fuselage) to be built within the 13 in. max. span limitation!

The kit is to the usual high Peck standard with excellent clean-cut stripwood of just the right grade, clear dye-line printed medium grade sheet, a 5 in. dia. Kaysun plastic prop, pre-formed prop shaft and nylon nose bush together with ample, good quality, yellow tissue. There is also sufficient $\frac{1}{8}$ in. flat rubber, and new to this kit it is a set of pressure sensitive decals – far superior to the *'cut out from coloured tissue thro' the plan'* variety in earlier kits. The plan is very clear and well detailed, while a full instruction sheet and 3-view general arrangement drawing are included: this latter item being invaluable for competitions.

I must correct earlier information I gave as to the marketing of these kits in the U.S.A. They are not marketed by Bill Hannan, but directly by **Peck Polymer** of P.O. Box Z 498, La Mesa, California 92041. European customers may find it more convenient to order from **John Stennard,** Prince Rupert School, Rinteln, B.F.P.O. 29, who supplied the review kit in question.



I have had many inquiries, following my mentioning on several occasions of CO_2 powered models as to where these miniature power units may be obtained. At the moment none are on the market. Bill Brown ceased a limited production run towards the end of last year, but it is expected that two new versions of this engine will appear later this year, after he has had a chance to build up stocks, but at this time none are offered for sale.



Contents of Peck Polymer's latest kit offering for the Peanut scale modeller – the clipped wing Piper J.3 Cub. A very clear plan, good cleanly-printed wood and Kaysun plastic prop are amongst the items provided. Just the job for indoor or calm evening flying sessions.

AIRCRAFT DESCRIBED Number 225

De Havilland D.H. 71 Tiger Moth

described and drawn by HARRY ROBINSON

THE FIRST de Havilland aircraft to bear the name 'Tiger Moth' were the racing and experimental machines built as flying test beds for the *Gipsy* engine, designed by F. B. Halford to replace the A.D.C. *Cirrus*. Construction of the D.H.71, as it was designated, began at Stag Lane early in 1927. Overall size was dictated as being the minimum required to house both engine and pilot, so the cockpit dimensions were in fact determined by sitting the Company test pilot, Capt. Hubert Broad, against a wall and chalking around him the smallest practical fuselage cross-section!

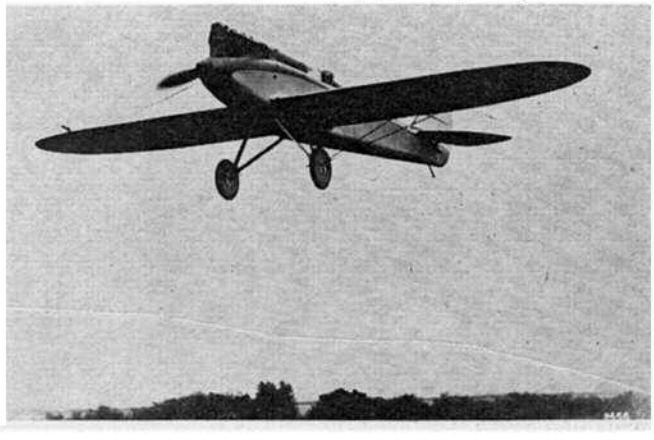
No more than a dozen people knew that the two aircraft were being constructed and only half that number saw the initial flight of the first machine (then fitted with a *Cirrus* engine) at dawn on June 24th of that year. Hubert Broad found the *Tiger Moth* handled well, apart from being generally oversensitive. After one or two flights a strip of sponge rubber was fitted into each control surface hinge gap, and following the third flight the aeroplane was returned to the factory to be fitted with the prototype *Gipsy* engine. The second machine, which remained *Cirrus*-powered throughout its life, was still under construction.

Both aircraft had been entered for the *1927 King's Cup Race* – the first registered as G-EBQU, to be flown by C. D. Barnard, while the second was registered as G-EBRV with Hubert Broad as pilot. Although the aircraft received their Certificates of Airworthiness the day before the race, the *Gipsy* engine was still awaiting Air Ministry approval and 'QU was thus withdrawn to be prepared for record attempts.

The 1927 race was flown on July 30th during the August Bank Holiday meeting at Hucknall. Visibility on that occasion was poor with gusty winds, but after a bumpy and prolonged take-off G-EBRV climbed away well. Later it was announced that Broad had landed at Spitalgate. It was, he said, 'So bloody rough' that at speeds over 140 m.p.h. every gust caused a movement of his hand on the control column, resulting in alternate diving and climbing, so he wisely descended at Spitalgate and withdrew. Despite conditions 'RV had averaged 162 m.p.h. before retiring, with only 80 h.p. available under the cowl. A bump on the ground had caused the over-long take-off, jolting the throttle partly closed where it remained for several seconds before being noticed.

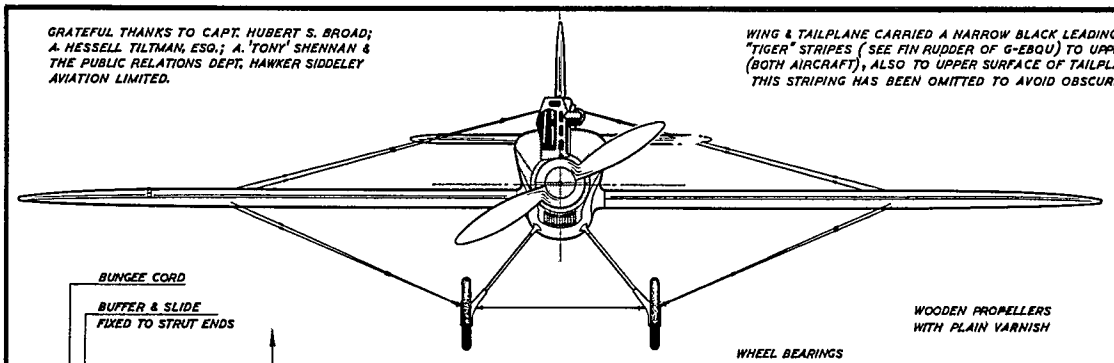
The following day Broad flew 'RV back to Stag Lane, then returned to Hucknall in 'QU about 6.40 p.m., having covered some 120 miles at an average speed approaching 180 m.p.h. Later, he gave a demonstration flight, taking off and climbing 'like a rocket', displaying the *Tiger Moth's* considerable

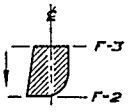
Heading: Flight picture shows the prototype fitted with the Gypsy engine replacing ABC Cirrus unit. Below left, reveals detail of Gypsy engine with distinctive carburettor intake – replaced with internal carburettor intake on altitude record attempt (Flight photo). Below right, the aircraft registered as G-EBQU takes to the air with company test pilot Hubert Broad at the controls. (Real Photographs Co. picture.)



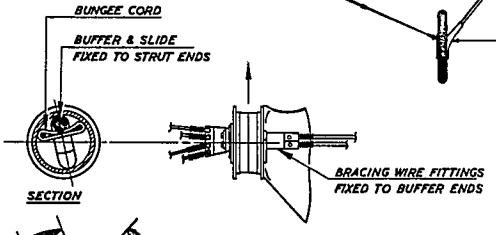
GRATEFUL THANKS TO CAPT. HUBERT S. BROAD; A. HESSELL TILTMAN, ESQ.; A. 'TONY' SHENNAN & THE PUBLIC RELATIONS DEPT. HAWKER SIDDELEY AVIATION LIMITED.

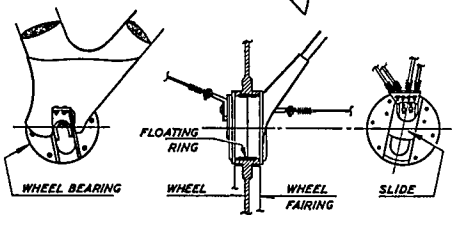
WING & TAILPLANE CARRIED A NARROW BLACK LEADING EDGE STRIPE, WITH "TIGER" STRIPES (SEE FIN RUDDER OF G-EBQU) TO UPPER SURFACE OF WINGS (BOTH AIRCRAFT), ALSO TO UPPER SURFACE OF TAILPLANE (G-EBQU ONLY). THIS STRIPING HAS BEEN OMITTED TO AVOID OBSCURING RIB DETAILS.





SECTION Y-Y: BETWEEN F-2 & F-3 ONLY



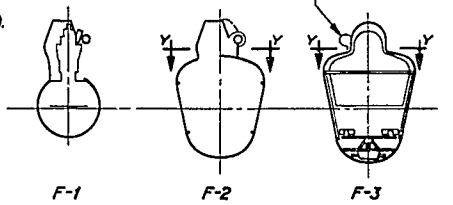


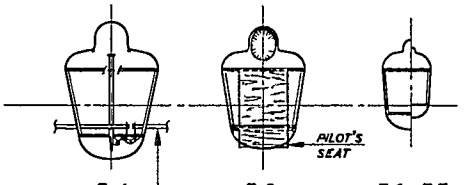
ARRANGEMENT OF WHEEL BEARINGS, SHOCK ABSORBERS & BRACING WIRE FITTINGS. THREE TIMES GIVEN SCALE.

WHEEL BEARINGS NATURAL METAL, EXCEPT FINAL VERSION (BLACK).

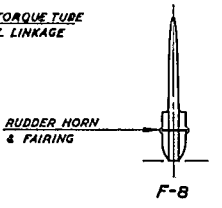
WOODEN PROPELLERS WITH PLAIN VARNISH

FINAL VERSION ONLY. SEE SHEET 2.



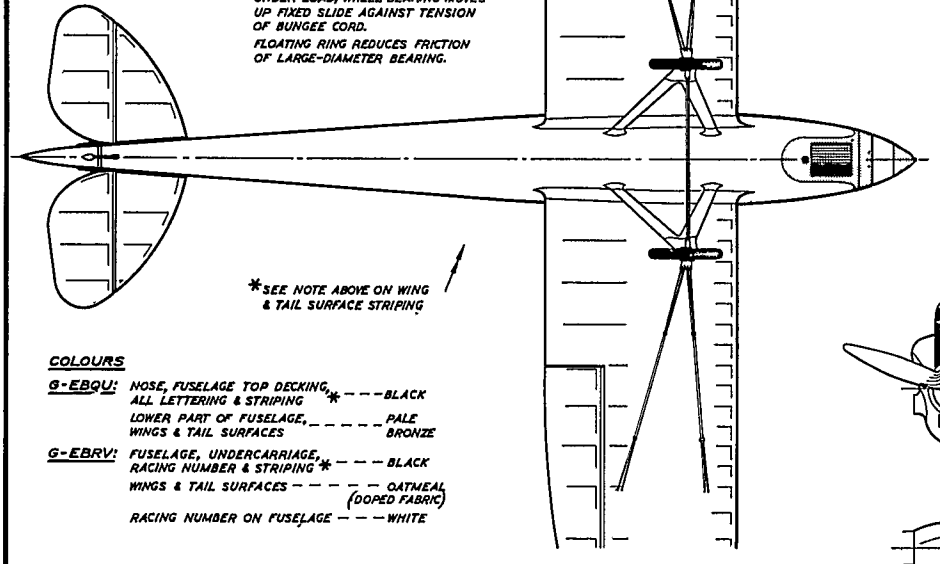


AILERON TORQUE TUBE & CONTROL LINKAGE



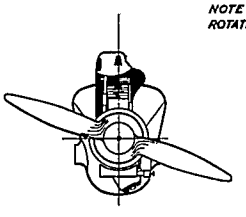
UNDER LOAD, WHEEL BEARING MOVES UP FIXED SLIDE AGAINST TENSION OF BUNGEE CORD.

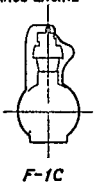
FLOATING RING REDUCES FRICTION OF LARGE-DIAMETER BEARING.



*SEE NOTE ABOVE ON WING & TAIL SURFACE STRIPING

NOTE DIRECTION OF ROTATION OF CIRRUS ENGINE

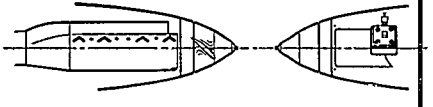


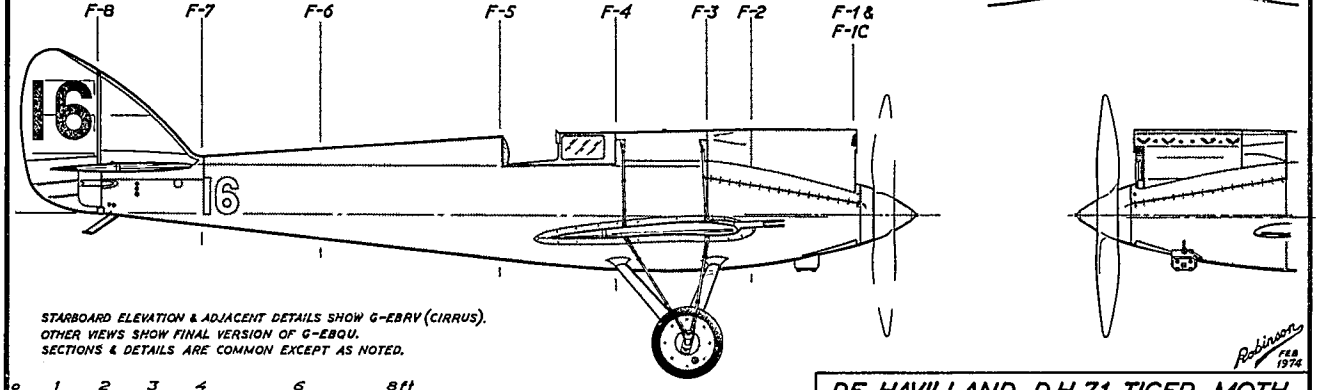


COLOURS

G-EBQU: NOSE, FUSELAGE TOP DECKING, ALL LETTERING & STRIPING * - - - BLACK
LOWER PART OF FUSELAGE, WINGS & TAIL SURFACES - - - - - - PALE BRONZE

G-EBRV: FUSELAGE, UNDERCARRIAGE, RACING NUMBER & STRIPING * - - - BLACK
WINGS & TAIL SURFACES - - - - - - OATMEAL (DOPED FABRIC)
RACING NUMBER ON FUSELAGE - - - WHITE





STARBOARD ELEVATION & ADJACENT DETAILS SHOW G-EBRV (CIRRUS). OTHER VIEWS SHOW FINAL VERSION OF G-EBQU. SECTIONS & DETAILS ARE COMMON EXCEPT AS NOTED.

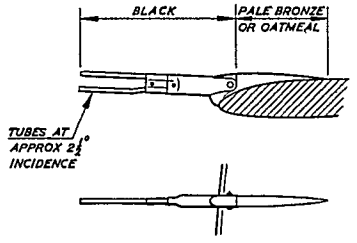
Robinson FEB 1974

0 1 2 3 4 6 8 ft

SHEET 1

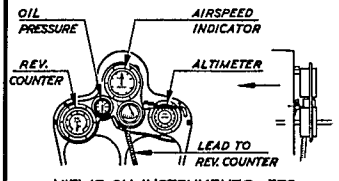
DE HAVILLAND D.H. 71 TIGER MOTH

RAF 15 AEROFOIL — ALL VALUES ARE IN PERCENTAGES OF CHORD																
STATION	0	1·25	2·5	5	10	15	20	30	40	50	60	70	80	90	95	100
UPPER	1·56	3·14	3·94	5·00	6·09	6·67	6·96	6·94	6·63	6·13	5·52	4·79	3·91	2·81	2·17	·94
LOWER	1·56	·76	·50	·18	·02	·18	·53	1·02	1·02	·71	·33	·06	·09	·21	·32	·94



AIRSPEED PITOT TUBE
THREE TIMES GIVEN SCALE

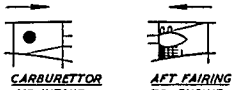
BRACING WIRES ARE OVAL SECTION, DOUBLED, BOUND WHERE SHOWN.



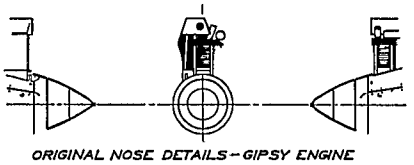
VIEWS ON INSTRUMENTS, ETC.

DATA

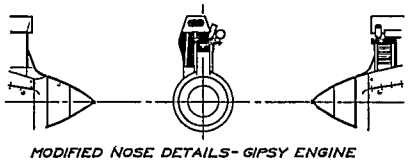
WINGSPAN	22'-6"
CHORD	4'-0"
WING AREA	76·5 Ft²
OVERALL LENGTH	18'-7½"
WHEEL TRACK	3'-11"
EMPTY WEIGHT	618 lb
LOADED WEIGHT	905 lb



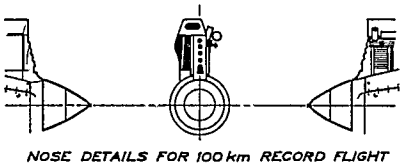
BOTH VIEWS APPLY TO THREE SETS OF NOSE DETAILS BELOW



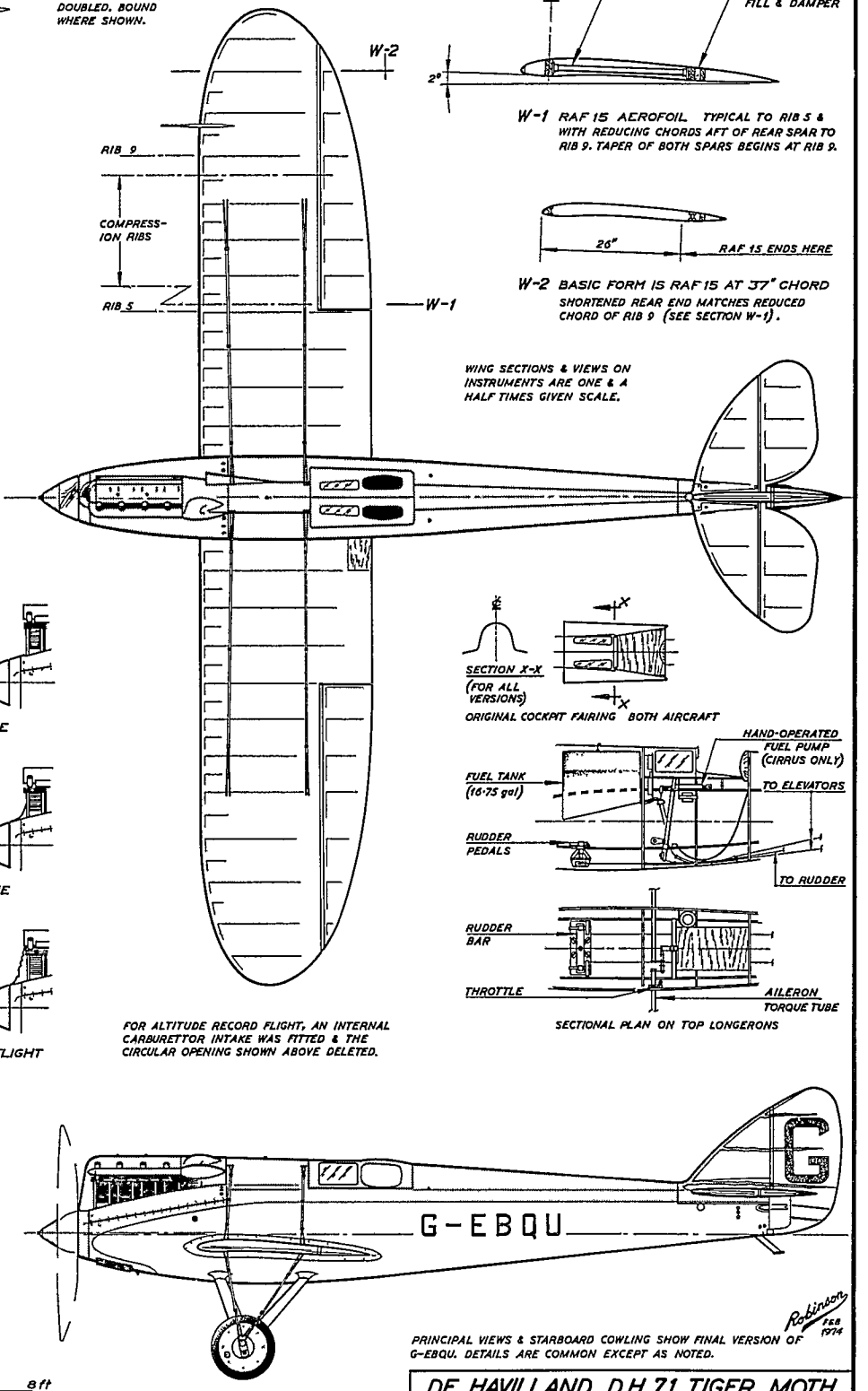
ORIGINAL NOSE DETAILS - GIPSY ENGINE



MODIFIED NOSE DETAILS - GIPSY ENGINE



NOSE DETAILS FOR 100 km RECORD FLIGHT



FOR ALTITUDE RECORD FLIGHT, AN INTERNAL CARBURETTOR INTAKE WAS FITTED & THE CIRCULAR OPENING SHOWN ABOVE DELETED.

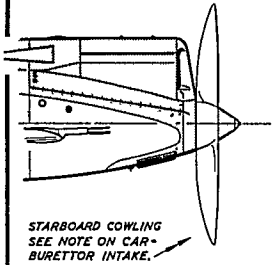
W-1 RAF 15 AEROFOIL TYPICAL TO RIB 5 & WITH REDUCING CHORDS AFT OF REAR SPAR TO RIB 9. TAPER OF BOTH SPARS BEGINS AT RIB 9.

W-2 BASIC FORM IS RAF 15 AT 37" CHORD SHORTENED REAR END MATCHES REDUCED CHORD OF RIB 9 (SEE SECTION W-1).

WING SECTIONS & VIEWS ON INSTRUMENTS ARE ONE & A HALF TIMES GIVEN SCALE.

ORIGINAL COCKPIT FAIRING BOTH AIRCRAFT

SECTIONAL PLAN ON TOP LONGERONS



STARBOARD COWLING SEE NOTE ON CARBURETTOR INTAKE.

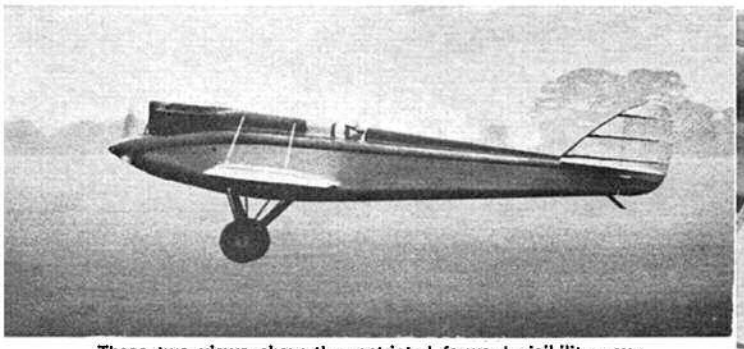
PRINCIPAL VIEWS & STARBOARD COWLING SHOW FINAL VERSION OF G-EBQU. DETAILS ARE COMMON EXCEPT AS NOTED.

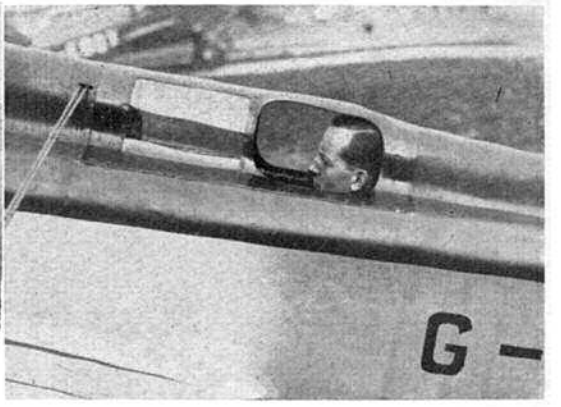
Robinson FEB 1974

0 1 2 3 4 6 8 ft

SHEET 2

DE HAVILLAND D.H. 71 TIGER MOTH





These two views show the restricted forward visibility covered by the extended engine cowling, but the slimness of the fuselage tended to help compensate for this. Above is seen the original open cockpit, while at right is the streamlined semi-enclosing canopy later fitted. (de Havilland photo.)

speed range and superb acceleration.

Construction followed conventional de Havilland practice – the wooden fuselage structure was plywood covered while the aluminium cockpit fairing was split on its centreline and hinged at each side. Heavy wooden bulkheads supported steel plate wing fittings with a fire-proof bulkhead between engine and fuel tank. Two-spar wings of basic RAF 15 section were built in two halves and fixed at the fuselage centre-line. Smaller wings spanning nineteen feet were built for pure speed work, but as it was feared that the landing speed – normally 60 m.p.h. – would be too high, the 'speed' wings were probably never fitted. The *Tiger Moth* certainly never flew with them.

Bracing wires were fitted in pairs to each wing spar and fixed to fuselage bulkheads and the ends of the rigid undercarriage struts. Shock absorbtion was by bungee cord housed within greatly enlarged wheel bearings, with a floating ring between wheel and bearing to reduce the friction resulting from the increased diameter.

The 5.23-litre *Gipsy* engine produced 135 h.p. in bench tests at 2,650 r.p.m. with a compression ratio of 5.5:1 – the D.H.71's fastest recorded speed was 204 m.p.h. between Stag Lane and Harrow Church. Apart from improved performance with the *Gipsy* engine, handling of both machines was similar and although forward vision was restricted by the extended engine fairing, the aircraft was quite narrow and Hubert Broad found 'the visibility was not so bad'. Having no flaps the landing approach had to be made close to the stall to prevent 'float' after flattening out.

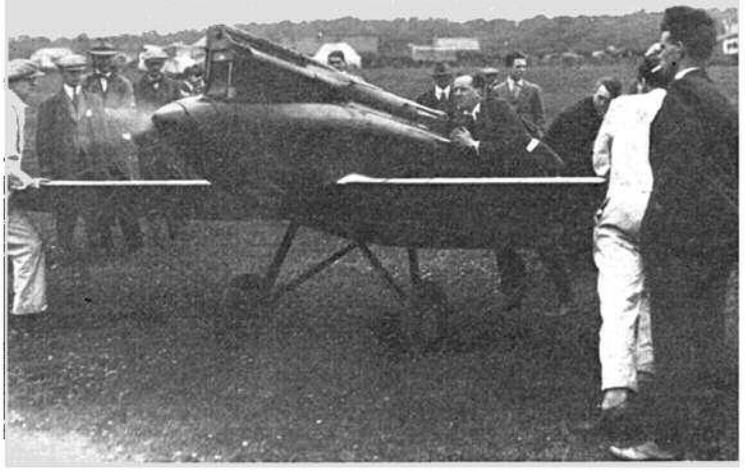
The 100 k.m. record flight was made about 8 p.m. on August 24th after a violent thunderstorm. Broad flew from Stag Lane to Twyford near Reading, made a three-point turn and returned to Stag Lane. His speed was 186.47 m.p.h. On August 29th Broad and G-EBQU created a British altitude record of 19,191 ft. but an unserviceable barograph and lack of oxygen equipment forced him to descend, although the aircraft was still climbing at 1,000 f.p.m. A semi-enclosed cockpit canopy and a more streamlined entry for cooling air were later fitted.

G-EBQU was exhibited at the 1928 R.A.F. Display and again at the *1929 Olympia Aero Show*. Taken to Australia in 1930 and re-registered VH-UNH, she crashed on September 17th while being flown for the first time by an inexperienced pilot at Mascot, N.S.W. The pilot was killed and the tail later used in a home-built aircraft. In 1928 G-EBRV, minus its engine, was suspended from the rafters at Stag Lane until used as part of an advertisement at Hatfield for the *1933 King's Cup Race*. It was then slung from the roof at Hatfield where it rapidly deteriorated until destroyed during a bombing attack in October 1940.

The *Tiger Moth* achieved 186 m.p.h. with 130 h.p. in the year the 875 h.p. Supermarine S-5 won the *Schneider Trophy* at 281 m.p.h. – 66% the speed on 15% the power at a tiny fraction of the Supermarine's expense! Only the economic misfortunes of the period prevented realisation of the *Tiger Moth's* true potential.

* * *

The author wishes to acknowledge the patient co-operation of Capt. Hubert S. Broad in preparing this article, also the help of A. Hessell Tiltman, B.Sc., FRAes, and C. Martin Sharp Esq. for permission to use his book 'An Outline of de Havilland History'.



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Captain Hubert Broad checks the r.p.m. of the Cirrus-powered Tiger Moth while it is restrained by the factory personnel. This version registered as G-EBRV was the aircraft flown by Broad in the 1927 King's Cup Air Race. (Flight photograph.)

LATEST ENGINE NEWS

by PETER CHINN

Super-Tigre X-15

Several months late, but now actually reaching the U.K. market is Jaures Garofali's reply to the Rossi 15, the Super-Tigre X-15. Mick Wilshere of **World Engines Ltd.**, the Super-Tigre distributors, kindly held back one of the first 50 to arrive here and sent it along for us to have a look at.

All the X-15's in the first consignment were piped C/L speed motors but it is supposed that the free-flight version will differ only in regard to the port timing, plus one or two minor details.

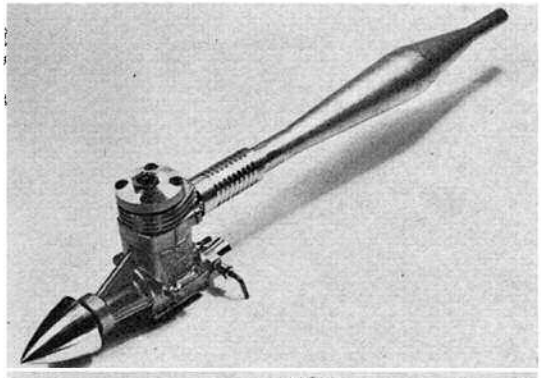
On opening the box, one is a bit surprised to find that the only literature that accompanies the engine is the same, now very much out-of-date instruction leaflet (in Italian only) that Super-Tigre have been issuing for upwards of a dozen years. Perhaps some specific recommendations appropriate to the X-15 are to follow – unless the manufacturer feels that the sort of modellers who will buy an X-15 are so knowledgeable that they need no advice from the factory . . .

When, in the September 1971 *Latest Engine News*, we dealt with previous 2.5 c.c. piped speed engines (i.e. TWA 15, Natalenko *Start*, ST G.15RV, Kosmic K-15 and Rossi R-15) we included some comparative data in tabular form. The same, therefore, has been done with the X-15 and the specification table shows data arranged under the same headings as used earlier. No information was provided by the factory and all data were therefore determined from inspection and measurement of the engine under examination.

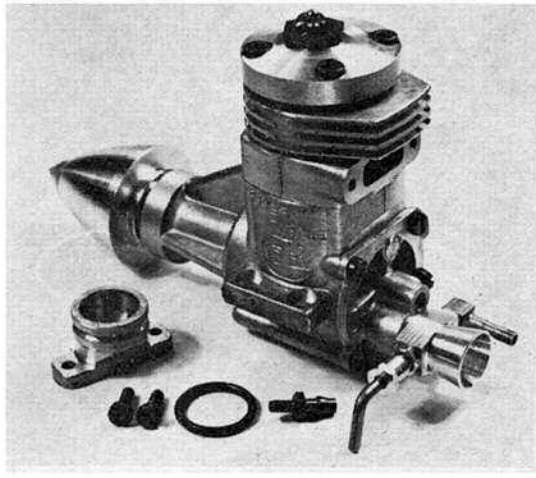
So far as its general design is concerned, there is nothing very unusual about the X-15 in terms of current speed engine practice. Like all with the exception of the G.15RV, it is a Schnuerle loop-scavenged motor with rear exhaust. As with all, except the Rossi, it has rear rotary-valve induction and like all except the TWA, it has a 15 x 14 mm. nominal bore and stroke.

One feature, however, does set the X-15 apart from its rivals. This is the design of the cylinder head and ignition plug. An unconventional arrangement is used by the Rossi, insofar as the glow filament is an integral part of a separate head insert with trumpet shaped combustion chamber. The Kosmic also uses a head insert, but with a conventional plug. The others use one piece heads with conventional glowplugs. The X-15 also has a one-piece head and a separate glowplug, but has a special type of plug to avoid spoiling the smooth contour of the combustion chamber. In this, the head is not drilled and tapped for the usual ¼-32 thread. Instead, the plug body, which is plain and has an o.d. of 8 mm., remains entirely above the combustion chamber, held down on an annular seating by a gland nut. There is a small (2.8 mm. dia.) hole in the apex of the trumpet shaped combustion chamber to expose the glowplug filament. Incidentally, the plug is not concentric with the cylinder axis but is offset forward 1.5 mm.

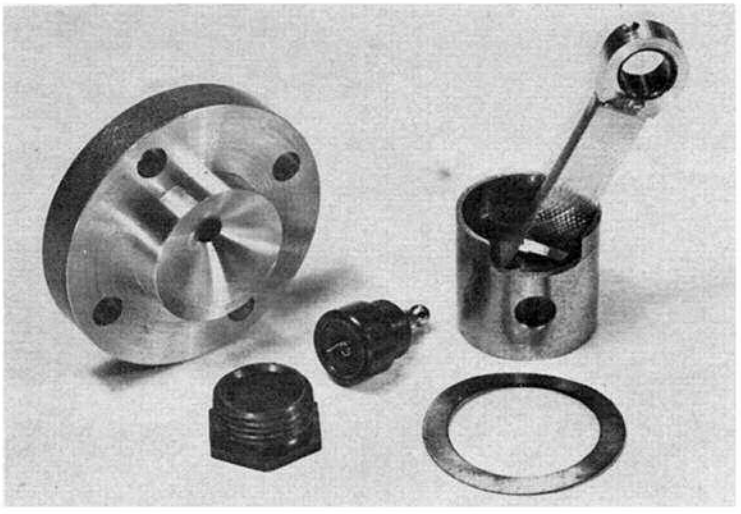
Unlike all the piped racing 2.5's previously examined, the X-15 features an ABC type cylinder and piston set-up. This gives the X-15 a considerable advantage in terms of reduced reciprocating weight and the cast aluminium piston and its gudgeon-pin weigh only 3.8 grammes. This compares with 5.8 grammes for the *Start*, 6.0 for the G.15RV and Rossi, 6.3 for the Kosmic and 6.8 grammes for the TWA. The actual engine weight on the other hand, is quite a bit greater at 192 grammes (7.0 oz.) or over



Super-Tigre X-15 speed motor complete with tuned pipe. Note strongly webbed front end and integral spinner assembly, both continued from G.15RV.



Super-Tigre X-15 is a Schnuerle-scavenged, rear exhaust development of G.15RV, rather than an entirely new design, hence 'G.15RV' on side of casting. Nevertheless, nearly all parts are new.



Unique X-15 head and glowplug design permits easy plug change, while preserving smooth combustion chamber contours. Ringless piston is aluminium rather than cast-iron.

8½ oz. with pipe, compared with less than 7 oz., with pipe, for the TWA, Kosmic and Rossi.

Apart from ABC (pioneered by Super-Tigre many years ago) S-T ancestry is clearly evident in the backplate assembly with its hardened steel counterbalanced disc valve running on a 4 mm. hardened steel pin, and in the crankshaft and crankcase. The shaft, which has an internally counterbalanced crank-disc, continues to use a 10 mm. main journal (as used by the G.15RV and large for a rear induction 2.5) but runs in a smaller o.d. bearing with 11 balls instead of eight.

A new departure for Super-Tigre is the separate cylinder jacket. Below cooling fin level the main casting, comprising crankcase and front housing, is externally the same as the most recent G.15RV – in fact the engine still carries the G.15RV lettering embossed on the side – but instead of embodying a full-length cylinder casing, the casting terminates immediately below the exhaust duct. A separate pressure-cast finned cylinder jacket surrounds the upper part of the cylinder liner and is installed between the crankcase and cylinder-head. Four 3 mm. Allen cap screws, 30 mm. long, tie the complete assembly to the crankcase. Interesting here are the asymmetrical cylinder fins, lengthened to provide extra cooling area at the rear of the cylinder, where the exhaust and reduced air flow cause extra heat to gather.

Dividing the cylinder casing in this way has, of course, been used by other designers recently as an aid to forming the transfer channels in Schnuerle scavenged porting systems. It was used, for example, in the prototype HP 40 engines and is featured by the new Taipan 15. In the X-15, the transfer channels are machined to shape. The cylinder porting follows the now familiar form of two main transfer ports, flanking the exhaust port, and angled to direct fresh gas away from the exhaust and toward the opposite side of the cylinder, where it is joined by an upward flow of gas from the inclined third port, in order to sweep the charge up into the combustion chamber. The X-15 transfer ports, third port included, are not as large as those of the Rossi, but the main transfer remains open for a slightly longer period. The exhaust periods of the two engines are about the same but the third port period on the X-15 is somewhat shorter.

The X-15 has a larger carburettor effective choke area (over 40 sq. mm.) than any other 2.5 we have encountered to date. Provision is made for fuel tank pressurisation, via untimed crankcase pressure, and a nipple to replace one of the backplate screws is included.

The ST tuned pipe for the X-15 has an inlet i.d. of 12 mm., an outlet i.d. of 8 mm. and a maximum o.d. of 28 mm. A neat pressure-cast outlet stub attaches to the rear of the cylinder casing and is used in conjunction with a machined aluminium sleeve and two O-rings to connect with the pipe. Effective pipe length (measured from the exhaust port) is adjustable between approximately 9.8 and 10.8 in.

We have not yet seen any official factory performance figures for the X-15 but, according to publicity issued at this year's Nuremberg Fair, the X-15 is rated at 0.90 b.h.p. at 30,000 r.p.m. – presumably on FAI fuel. This compares with Rossi's claim of 0.90 b.h.p. at 28,000 r.p.m. for the piped R-15. On this basis, one would need to trim props to allow the X-15 to unwind another couple of thousand revs, but the proof will, no doubt, be in the flying when the two engines meet in competition. The X-15 did, of course, make a quite promising start when pre-produc-

Data — Super Tigre X-15

Nominal Bore and Stroke:
15 mm. x 14 mm.
Nominal Swept Volume:
2.474 c.c. – 0.1510 cu. in.
Checked Weight, less pipe:
198 gr. – 6.98 oz.
Checked Weight, with pipe:
242 gr. – 8.54 oz.

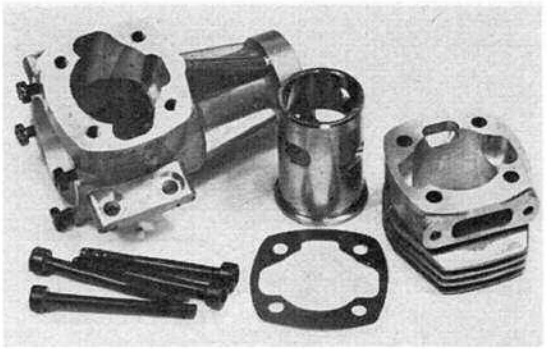
External Dimensions
Length from prop-driver face:
88.3 mm.
Overall Height, less plug:
67.8 mm.
Crankcase width:
28.0 mm.
Width across mounting lugs:
42.2 mm.

Bearings
Main (ball journal):
10 x 19 mm. 11-ball
5 x 16 mm. 6-ball
Big end:
Bronze bushed
2 oil holes
Small end:
Plain aluminium
1 oil hole
Disc valve:
Hardened steel 4 mm.

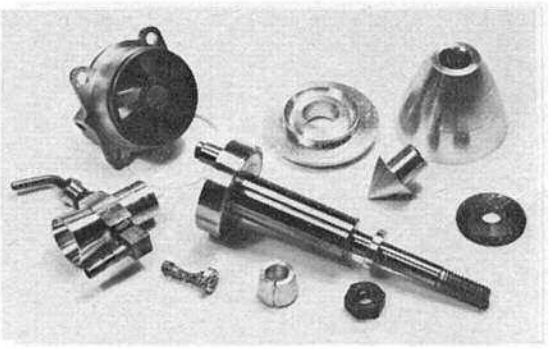
Crankshaft
Main journal dia.
10 mm.
Crankpin dia.
5 mm.
Piston/Conrod Assembly
Total weight:
5.7 gr.
Piston only:
2.8 gr.
Gudgeon-pin only
1.0 gr.
Connecting-rod only:
1.9 gr.
Gudgeon-pin dia.
4 mm.

Porting

Scavenging System:	Schnuerle – Rear exhaust
Induction System:	Rear rotary disc valve
Exhaust opens:	83.5 deg. BBDC
Exhaust closes:	83.5 deg. ABDC
Transfer opens:	67.5 deg. BBDC
Transfer closes:	67.5 deg. ABDC
Third port opens:	62 deg. BBDC
Third port closes:	62 deg. ABDC
Rotary valve opens:	38 deg. ABDC
Rotary valve closes:	53 deg. ATDC
Carburettor choke dia:	8.5 mm.
Effective choke area:	41 sq. mm. approx.



Transfer channels of X-15's Schnuerle port system are milled to shape. Cylinder fins extended rearward help to dissipate heat from hottest part of cylinder.



X-15 rotary-valve is familiar ST hardened steel counter-balanced type and admits mixture from a very large choke carburettor.

tion models took second and fifth places in the 1972 World Speed Championships.

Fox Filters

Among the many useful items with which the **Fox Manufacturing Company** backs up its engine range is a new fuel filter. This is available in two sizes and is machined from aluminium bar.

There is no doubt that fuel filters are an essential part of model engine operation. Fuel manufacturers may claim that their fuels are clean and pure, but they are still capable of obstructing a carburettor jet, especially in the case of castor-based glow fuels which tend to form a white flocculent type precipitate in storage. If the obstruction is insufficient to stop the engine, it will make the fuel/air mixture weaker which is worse, since it will cause the engine to run hotter and possibly result in damage through overheating. The damage need not be immediately obvious. It may appear later in the form of excessive wear, resulting in difficult starting and lack of power.

Whether you use commercial fuel or blend your own, the proper drill is to first strain the fuel through a filter equipped funnel and into the container that you use on the flying field. Assuming that a squeeze-bottle or similar container is used to inject the fuel into the tank, a line-filter should be fitted in the fuel tube attached to the bottle. After the bottle has been refilled a few times, you will probably become aware that fuel seems to be taking an awfully long time getting from bottle to tank – a sure sign that the line filter has clogged up.

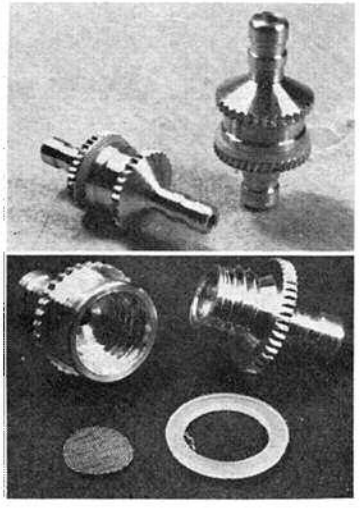
As a third line of defence, another line filter should be fitted in the fuel tube from tank to engine. (This may not be possible where, as in some small engines, the tank is an integral part of the power unit. In this case, an efficient filter on the refuelling bottle becomes vitally important.)

Some filters supplied for model use cannot be dismantled for cleaning, the idea being that one simply squirts some fuel through in the reverse direction to flush out foreign bodies. This works well enough but we confess to a preference for visually checking that the filter has been properly cleansed.

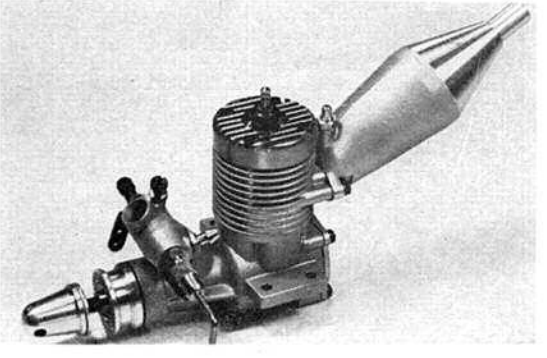
For many years we used the American Dynamic Models filters, which used to be obtainable in a wide range of sizes, including special types for fitting into the body of a fuel dispenser and another type built into a clunk weight for R/C tanks. The snag with the Dynamic filters, however, was that one needed a couple of spanners to unscrew them.

This is one of the simple but pleasing features of the Fox filter. It has coarse-pitch threads and prominent knurled rims on each half that enable it to be merely gripped between fingers and thumbs and instantly separated. Reassembly is equally quick and easy, the nylon washer between the two parts making a secure and leak-proof joint. The filter-screens are of a very fine mesh (we made it 140 to the inch with the aid of a magnifying glass) and the inlet and outlet ends of the filters are easily identified when they are assembled.

The smaller Fox filter is suitable for tubing up to 3 mm. or $\frac{1}{8}$ in. i.d. maximum and the larger for tubing up to 4 mm. or 5/32 in. i.d. maximum. Weights checked out, respectively, at 1.4 grammes (.05 oz.) and 2.1 grammes (.075 oz.)



Fox filters, above right, are obtainable in two sizes. They have fine mesh filter screens and are easy to undo with fingers for cleaning.



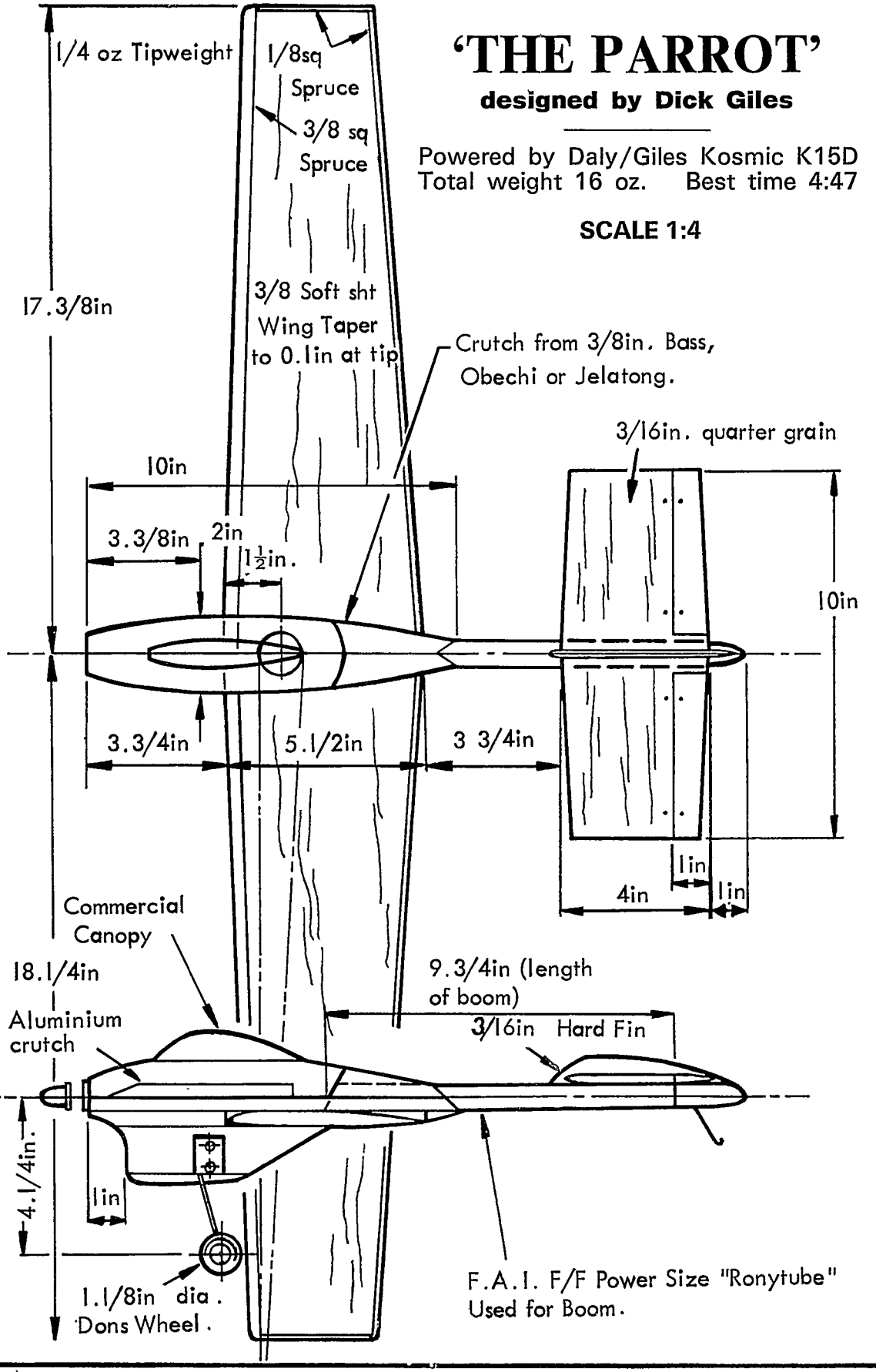
Right, the new Taipan 2.5 Schnuerle port rear-exhaust engine from Australia. Seen here with throttle carburettor for R/C Quarter - Midget class racing and with special Taipan silencer.

'THE PARROT'

designed by Dick Giles

Powered by Daly/Giles Kosmic K15D
Total weight 16 oz. Best time 4:47

SCALE 1:4



BETWEEN THE LINES

with Dave Clarkson

THE NATS ARE ON. I really got worried. Considerable thanks are due to the R.A.F.M.A.A. for helping so much in the provision of R.A.F. Little Rissington and also, of course, to the hard working S.M.A.E. officers. I sometimes think that we civilian aeromodellers do not realise how much help and assistance the R.A.F.M.A.A. has (and hopefully will continue to) give with the obtaining and, of late more pressing, the retention of the use of R.A.F. property for contest and club use. Well done all of you.

Further good news is that all of the events now have organisers. If we give the support they rightly deserve, then we should have a really marvellous Nationals (all pray for good weather, lads). One or two important notices concerning specific events follow for the benefit of those who do not receive copies of the S.M.A.E. Newsletter 'Model Flying' – particularly our hoped for foreign visitors.

Goodyear

Rule 9.5.10 is to be enforced and therefore all entrants are strongly advised to take their scale fidelity documentation with them. Event organiser, Bob Horwood has laid down the following as the sources 'acceptable to the contest director' so that as few problems as possible are found during the actual contest:

'I am willing to accept any 3-view published in model or full-size Aeronautical publications. I will also accept any published full-size plan provided that no alterations have been made to the outlines of the model. If any such alterations have been made, then a separate 3-view must be provided.' Quite clear, I think, no-one should have any excuses.

F.A.I. Team Race

As opposed to previous years, processing will be on a 'random' basis. At the contest director's decision any model may be processed at any time . . . so be careful competitors! To make it fairer than in previous years, the organisers are making available, before the actual contest and at a time and place that will be advised on the contest field, processing services. This will enable all of you who cannot afford a burette, calipers and ruler to make sure that your models are 'legal' before flying. We are fortunate that again Brian Turner has offered his services and this time will serve as Chief of Processing, also Peter Freebrey (who was Chief Juryman at the Helsinki World Champs.) has volunteered to be the Contest Director – really well qualified, experienced and fair organisers.

As one who has been C.D. of quite a few events (but never at the Nationals) I know how invaluable are those people who, without complaint, do the unpublicised but never-the-less vital jobs of rounding up and lining-up the competitors, checking lines, keeping back the crowd, time-keeping, etc. I am sure that all of the event organisers will welcome all offers of help no matter how inexperienced you feel you are, so offer, lads, offer!

The model with the smallest side area? Dick Giles' 'Parrot'. F.A.I. racer as described in text and drawn opposite.

The Parrot

Designed and built by Dick Giles of South Bristol MAC, *The Parrot* was quite one of the best designed FAI team racers seen in 1973. At Bochum, Dick with his then pit man Bob Horwood put in a 4:47 which I think to this day remains the best time ever using a Kosmic K-15 diesel Enough of this eulogy, here goes with a nice three-view (opposite) and also Dick's own words on the machine:

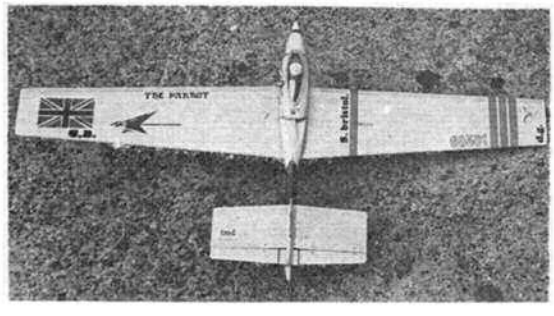
'The Parrot' was designed after the '73 Nats – the design being conceived as I was sitting in the van travelling home, thinking there must be an easy way of making a pod-and-boom Team Racer to compete with the Continentals. I wanted an aeroplane with the absolute minimum of bulk, yet with good strength. So I thought, espying a 'Ronytube' in the van, why not 'yer actual pod' and 'yer actual boom' – like the free flight boys do? It gives minimum side area, maximum strength at the right places and uses an absolute minimum of balsa – always difficult to obtain in the required quality. After looking at the Continental aeroplanes, it was obvious that lightness and ground handling were also major considerations, so the design evolved with a wing of very soft balsa (carefully sanded to section) and a long, detachable, rearward wheel undercarriage.

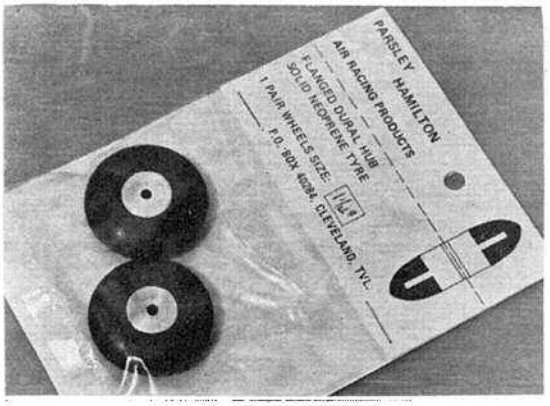
The model flew exactly in the way expected and, in spite of a very low all-up weight, is very safe in wind since the very low side area does not allow the buffeting encountered on 'full fuselage' designs. Points to watch for by anyone contemplating making a similar aircraft are as follows:–

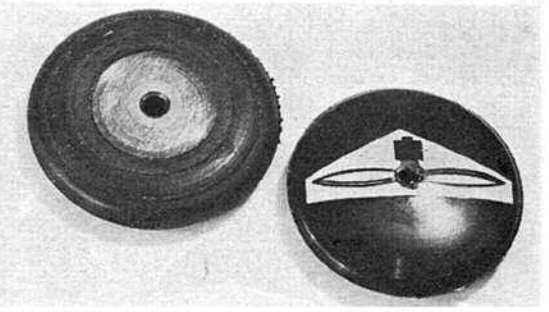
Be very careful indeed with the alignment at the top of the boom and the bottom of the crutch, also this joint must be made with epoxy. No other problems should be encountered by a proficient builder.

A new way of 'Glassing' wings

Those of you who studied the Metkemeyer's 1973 Nationals winning FAI team race will remember its remarkably 'floppy' wings. The wings were so flexible that the flying characteristics were rather unpredictable and when Bert operated the fuel shut-off, the wings 'flapped' in a truly bird-like fashion! It was, I suppose only to be expected since that model was, and possibly still is, the lightest team racer built to take a Bug! 15 – the model weighed just 16 oz. of which 10 oz. must have been motor/crutch unit. Rob Metkemeyer did not seem to be entirely satisfied by the results and, at that time, did not expect much in the way of model life. Well, one of the surprises of the 1973 Bochum meeting, for me anyway, was the fact that the same model still existed (and in fact won) and that most of the wing flexibility had disappeared – and yet the model was still very light indeed. I asked Rob what he had done and he and the inventor of the method – an Israeli team race fan name of Rosenburg – explained. To be honest, I found it very difficult to believe







A selection of team race wheels. At left, the Hamilton products described in the 'Goodies Directory', and above, two new wheels from propeller man Jurgen Bartels. Left is a rubber-tyred, metal hub version, at right, a very slim, nylon wheel, each 30 mm. dia. Price, if ordered with a prop, is DM2 or DM1.50 respectively, or add 1DM for postage.

what I heard, indeed I had no intention of trying the method out until club mate Graham Howard had a go. His results were so good that I tried it too, and it really does work! On my latest 'Sprint' racer the outboard wing has been glassed using the method and has become very stiff and strong while the weight penalty was minimal.

What Rob did was to strip the existing covering off the wing and generally clean it up. Then three layers of 1 thou. (about 2/3 oz. per square yard) glass cloth were stretched dry over the wing, and warm 'Araldite', in minimum quantities, forced into this new covering. Having been recovered, the wing was re-painted without rubbing down the glass before hand. The total weight added was less than 1 oz. In greater detail, the method used is as follows:

(a) Mix a small quantity of Araldite (a quarter of a standard DIY pack) in a mixing cup. Put the cup into a bowl of hot water (taking care that the Araldite remains totally dry) and allow it to warm up. Cut a working tool from ¼ x ¼ in. hardwood strip and chamfer the working end to a shallow chisel shape.

(b) Lay the sanded wing on a flat surface and have your willing helper(s) stretch the glass-cloth drum tight onto the wing.

(c) Using the working tool, transfer a small 'blob' of warm epoxy onto the selected portion of the wing (work from the middle towards the extremities). Vigorously and quickly scrape the epoxy into the wing such that no dry or shiny patches are left. You have to work in small patches of the wing to use the edhesive efficiently whilst it remains warm, and equally you have to work quickly since the pot-life of warm Araldite is quite short.

As you may gather from the above, helpers are essential, and no little application skill is required. I recommend practising the 'art' on a few pieces of scrap sheet before you do your 'super-wing' to get helper co-ordination and develop application skill.

The advantages of this method over the usual brushed-on polyester resin method are two-fold, namely a lighter finished wing and a stronger finished wing. This is due entirely to the use of Araldite since, being quite viscous even when warm, very little of the resin soaks into the underlying soft balsa and, secondly, Araldite is supremely tough and strong. Polyester resin soaks into soft balsa quite a long way (typically about 1/16 in.) which is very 'heavy' and is rather brittle when fully cured.

It is worthwhile remembering why we glass wings at all. If you are building your models really light (I only try hard on my FAI models) then you have to use the softest balsa available (4-6 lb. stock) for the wings and also thin the wings right down to ¼ in. or less average maximum depth. Such wings are very weak and flexible and need reinforcement if any real life is hoped for. Covering in light glass fibre cloth is the lightest way of getting sufficient reinforcement and by the method described here, even less weight penalty than normal is involved.

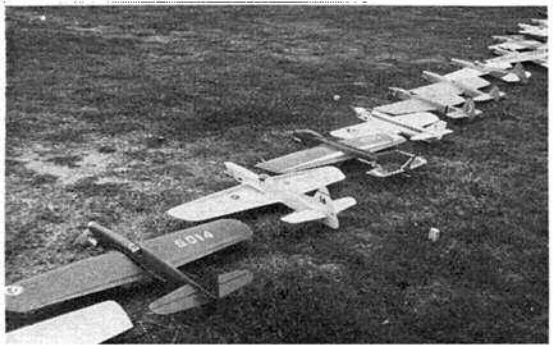
All of these comments about lightweight come to nought if you use heavy cloth and do not entirely avoid shiny spots. If you cannot get the '1 thou.' grade described, then two layers only of the ¾ oz. K & B cloth distributed by Irvine Engines or, as I used, one layer of the widely available 1¼ thou. cloth, should be OK. Work the warm Araldite in hard and fast, and be mean with the Araldite – if you use more than half of the standard DIY pack to do an entire wing, then you have used too much.

Choosing the correct Pitting station

This is rather a small aspect of control line racing but nevertheless seems to present the beginner with problems in that, in my experience anyway, most beginners choose the wrong pitting station. The explanations that follow really apply to models with rearward wheel undercarriages which are now the most popular type of U/C by far.

All of the problems concerned with pitting station selection centre around the take-off manoeuvre. With a rearward wheel U/C one can quite easily survive landings anywhere around the circle and even those into puddles, craters, etc. There are no real problems concerning landing and the location of the pitting station except the small matter of getting the model to your pitman! Figure 1 shows approximately the dynamics of the take-off situation, the effects described increase with increasing wind speed. Note that, in my experience, the best possible take-off position is one directly in the downwind parts of the circle.

Stunt line-up at the Australian Nationals demonstrates the 'sameness' of design: no dramatic differences between any. Engines used were all 35's or 40's from Enya, O.S., Super Tigre, Merco and Veco ranges.



F.A.I. combat finalists at Australian Nats. were (left to right) Garry Brume with Super Tigre powered Liquidator, John Massey and little more than half a Liquidator towed behind an Enya 15, and John Collins with an Eta 15 in own designed twin boom model.

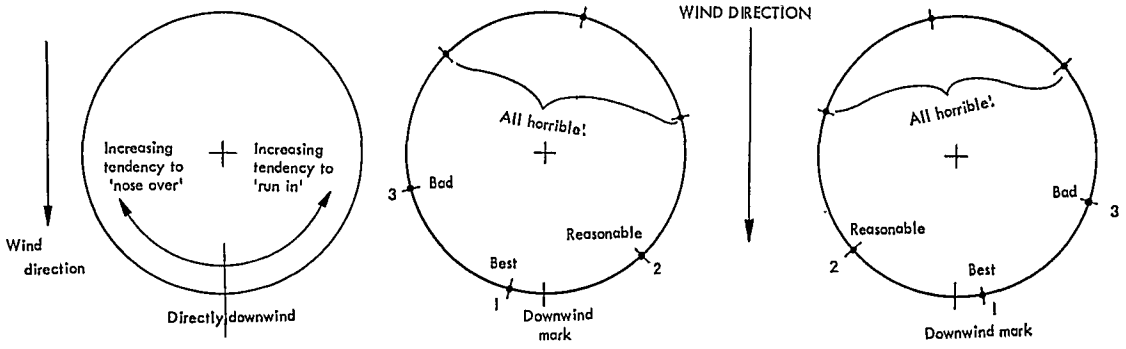


Figure I — Effects of wind on take-off positions

Of course, the best possible take-off position is only rarely available at a contest, even if one of the six pitting stations usually marked out on the circle is approximately downwind, then the chances of getting that station are one to three against! Therefore, it is very important indeed to also have a second preference for the pitting station i.e. one where you are quite happy to take off from as opposed to the one which you would love to take off from!

Second preference selection is a matter of judgment and is coloured by model characteristics, etc. However, the most important factor is still the nearness of the take-off position to the downwind mark. Even if this second preference is in front of the first, preference (i.e. in front of the downwind mark) in nearly all cases, this indicated second preference, is correct. See the sketches for illustration.

In the rare case when the 'best' position is right on the downwind mark, then I usually go forward for my second preference. At least from this position, the model will take off and if I as the pilot react quickly enough, then it will take-off in perfect safety. From the position behind, in very high winds, the model may not even take-off. Incidentally we now see why most organisers change to 2-up heats in windy conditions – the chances are very much better that two of the pitting stations will allow perfectly safe take-offs.

Two final points, especially for the benefit of newcomers. Firstly, if your pitting station is swamped in oil as can happen towards the end of the day or on very smooth tarmac, or if there are bad surface discontinuities just in front of the pitting station, then ask the Contest Director for permission to move the station the few feet necessary to clear these obstructions. When moving the station like this, always move it forward – you don't want to step back into that oily mess when catching the model do you! The second point concerns the order in which teams select their pitting stations. Normally the 'natural' system is used, where the CD allows the competitors to sort it out amongst themselves as to where they pit from, however if you are dissatisfied with the stations available, to you as a result of this 'natural' choice, then you are entitled to ask for a draw – see rules 10.6 a) and c) – and to get one. By drawing you have a two in three chance of improving your pitting station position, if you ask for a draw because you find only 'BAD' stations left.

Goodies Directory – Part 1

This is the first edition of what I hope will be a fairly frequent feature in this Column. I have started off with generally bits and pieces that will be of interest to most people. In the next edition of the Goodies Directory I hope to cover comprehensively the team race equipment currently available.

In publishing this Goodies Directory, it is not my intention to supercede normal advertising of commercial items. The items that will appear will be items that are specialist items not marketed in the normal commercial fashion i.e. not through the 'Trade'. Since such items are not normally available either at local or major type model shops, I hope that the service to the modeller provided here will be of use.

As a cautionary word of advice to all who wish to deal with any of the persons or companies named in this, and all subsequent editions, of the Directory. Many of the persons named are private individuals with very limited resources who offer their services for profit (obviously) but mostly because of their love for aeromodelling. Equally, many of the companies named do not specialise in the model aircraft business. In both cases replies cannot be expected unless you send S.A.E.'s (or International Reply Coupon's for foreign sources) and frequently replies may be very delayed. Capacity limits frequently come into play and delivery delays can be enormous. These factors are inevitable when dealing in this very specialist end of the market and it really helps no-one if an extended or unexpectedly delayed delivery of a specialist item causes solicitor's letters to fly (as has been the case before now).

So let us start. In alphabetical order always so as to show no preference (since mention of any item in this column does not imply any sort of guarantee).

Engineering Supplies

Specialist suppliers of all sorts of screws are invaluable especially for we modellers who get involved with all sorts of threads. If you want uncommon screws or Allen head screws try Allscrews Ltd. 270-274 King Street, Hammersmith, London W6.

Send an S.A.E. to K. R. Whiston at New Mills, Stockport, Cheshire SK12 58L (better make it a big envelope) for their catalogue. A mine of useful goodies, particularly for BA series, nuts, bolts and washers in a vast variety; tube bar and strip in aluminium, brass and steel; and a great range of sizes of Copper tubing ideal for making up tanks. Whiston's specialise in mail order so there should be no delivery problems here.

Lines

Now that metrication of rules is coming in (if only slowly, thank goodness) most line sizes are becoming metric and, unfortunately, most wire widely available in the UK is still 'gauge' wire. So for metric lines try **Aviomodelli**, Cremona, Italy who supply 0.3 mm. 0.35 mm. and 0.4 mm. wire nicely reeled up on 50 m. reels. Or for a UK source try John Gray of 136 London Road, Richmond, Surrey who supplies 11 lb. reels of both 0.3 and 0.4 mm. wire. For you Combat buffs who really go through quantities of 3-strand lines, try John for 1,000 feet reels of 3-strand wire!

Machining Services

One person who is really going to be snowed under with work is **D. H. Stapleton** of 21 Ravensbourne Drive, Chelmsford, Essex, who offers drilling, milling and turning services to order. Dave already does a lot of work for the F/F and R/C community. When you write, try to be obsolutely specific about what you want to achieve and, if possible, allow some flexibility on the detail design so as to make Dave's life a bit easier!

Motors and Spares

The one brand of quantity production motor that has been consistently unavailable by way of the normal commercial distribution channels has been MVVS. These excellent motors are now available from **Bob's Models**, 4 & 6 Oxford Street, Mount Pleasant, Batley, Yorkshire. Besides the motors (MVVS 2,5 D7 & G7 and MVVS 1,5D) a full range of MVVS spares are available including replacement ARD bearings. Tuned motors are also available for specific application. Also in stock are the following rare goodies.

— MVVS Wooden Props 180 x 80 and 200 x 200 mm. sizes.
— Glass fibre copies of these two props.
— Don's Quickfill valves.
— Cox 15 needles and needle valve assemblies.

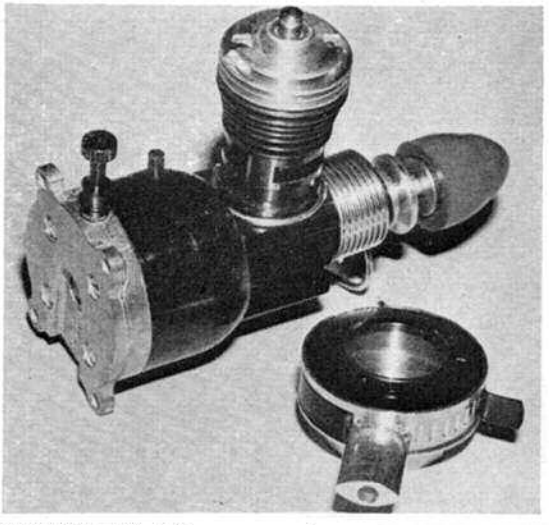
Wheels

As illustrated in the photo, wheels made fashioned after the Russian 'KNEB' T/R wheels are now available in quantity. For those not familiar with the design, the wheel consists of a machined dural hub incorporating a central flange around which is moulded a hard, neoprene tyre. Obviously this type of wheel is rather expensive to make but, unless attacked with a sharp blade, the tyre will never, repeat, never come off. These South African wheels are of really sturdy proportions and will be available in both 1¼ in. and 2 in. sizes although at present only the 1¼ in. is available. Write to (remembering that International Reply Coupon) Alan Hamilton, P.O. Box 123, Isando, Transvaal, Republic of South Africa.

Figure II — Selecting take-off positions in wind conditions

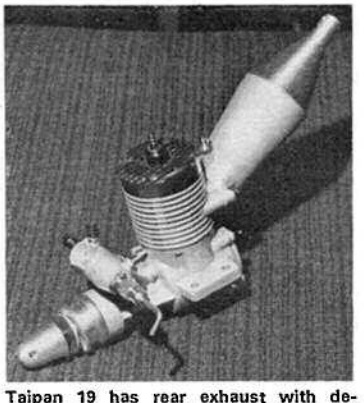
Nuremberg Trade Fair

YET MORE HELICOPTERS, ENGINES, READY TO-FLYs & KITS



Cox Black Widow 049 claims 2,000 r.p.m. improvement, is designed for aerobatics with stunt tank, has silencer with side stack.

NUREMBERG '74 may not have revealed spectacular new ranges of kits, radio control or engines as we have seen on previous occasions. Instead it presented an air of reality, based on sound business in a hard currency country where the modelling trade continues to expand at an enormous rate. It has been remarkable that each of the Toy Trade magazines have independently commented on the thriving business to be seen in the professionally arranged model trade stands of 'Hall C'. This in contrast to almost deserted toy trade halls. Yet the business being conducted was not in any way the crazy panic stuff that was typical of Brighton where orders exceeded production capacities, and few manufacturers could express confidence in getting paid promptly for the huge quantities they were being asked to supply. Nuremburg brought an air of sanity and stability at a time when all of Europe, and Britain in particular, was at the crossroads of economic development, seeking the right way to jump.

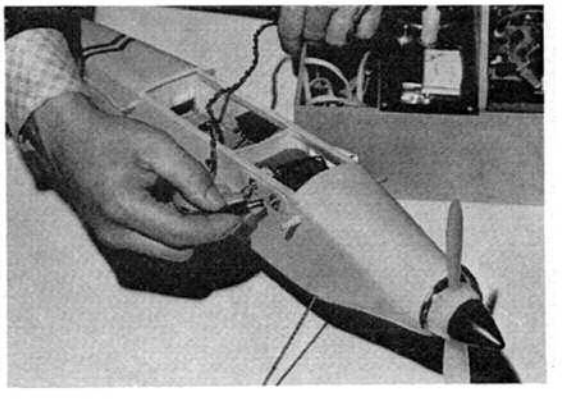


Taipan 19 has rear exhaust with designed silencer, ideal for inverted installation, has radio-control throttle.

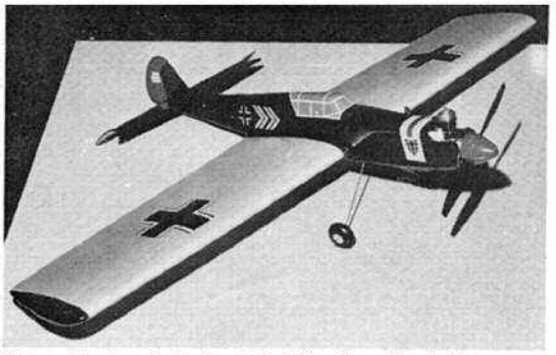
A summary of the general pattern of development might well be that R/C dominates and the helicopter has taken over from the glider. Electric power comes nearer to full acceptance, engines continue to appear in new shapes and guises and plastics have eclipsed the once dominant balsa construction to the point of almost total exclusion. The pity among all this is the very low volume of British goods on show.

In detail, one must open our account with the most siginficant entry by **Carrera** into aeromodelling. This huge concern, which has been primarily concerned with slot car racing and the toy field, produced a whole range of aircraft and boats. The aircraft vary from electric powered, ready-to-fly (free-flight), to 3-metre glass-fibre-fuselaged sailplanes. Complementing this is a series of proportional radio outfits designed to suit.

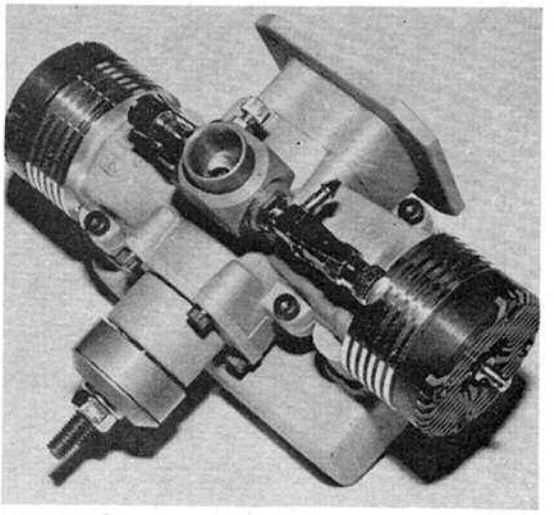
Graupner showed their 62 in. scale *Bolkow 209 Monsun* and the 63 in. *Maxi* trainer, while **Krik** have another veteran to add to the scale types, a fine *Bucker Student*.

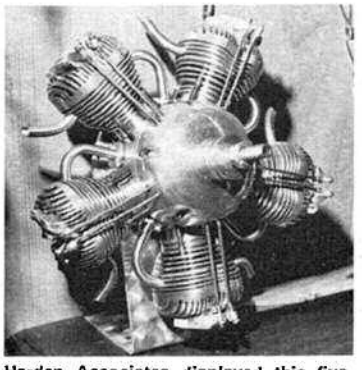


Left, the Carrera Draco, first of a range of new kits, here with electric power pod and trailing propeller blades. Right, Bob and Roland Boucher's Astroflight electric power units are coming to Europe in force.

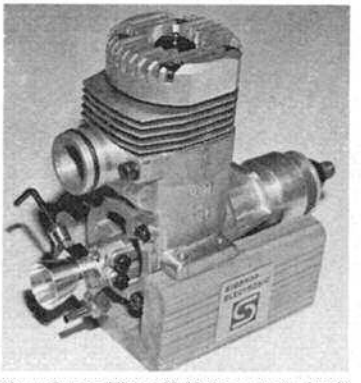


Above, latest ready-to-fly control-liner from Cox is the Super Stunter, based on Messerschmitt Bf109E, has new plastic foam wings with full symmetrical airfoil section and impact styrene fuselage, 31 in. span. Looks good and performance should way surpass that of the more usual ready-to-fly trainers. At right is the Buco 10 c.c. twin from Germany, to be distributed by Wik. Very clean die-castings, and complete with neat silencer just visible below crankcase. Will the single carburettor provide balanced induction to this layout?

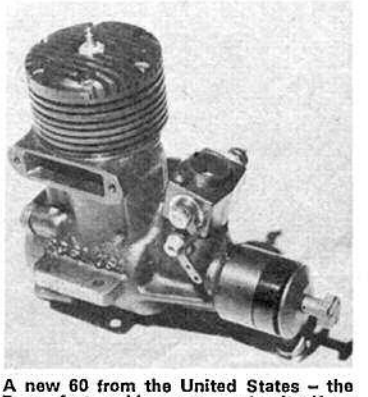




Harden Associates displayed this five-cylinder, four-stroke radial engine, looking for all the world like a Morton, but has glow ignition, and only of 10 c.c. capacity.



New Super Tigre X-40 has same basic features of the X-15 including the unconventional plug, described in Latest Engine News. Designed primarily for the R/C pylon racing class.



A new 60 from the United States – the Ross, fast making a name for itself as powerful, reliable engine for R/C aerobatics use. Same company as makes the famous 2-, 4- and 6-cylinder motors.

Topp, the glassfibre specialist, launched a crop of prototypes, the *Mig-21*, *Forga Magister*, *Fiat G5*, even a *Transall!* **Schuco** have a new trainer called the *Skylab* plus their previously announced *Bear-jet*, **Robbe**, a small stunter for 40 engines with retract gear, and, of course, the German enthusiasm for gliders is upheld by **Simprop** with their *Venus* and *Silver*. Belgian-based **Svenson** have scooped us with their kit of the *Islander* and continue to expand their range.

Naturally, engines were in evidence although all had been seen in prototype or pre-production form for some time, with the exception of the five-cylinder radial designed by Glenn Hargraves in this country, the OPS20 c.c. geared twin and a new prototype 60 from HP.

Most enterprising of the RTFs is **Cox's** stunter, reminiscent of the APS *Ambassador*, and giving great promise, while electric power by the Boucher Bros. was represented on three stands, plus **Graupner's** own *Hi-Fly* system, another from **Carrera**, and stories unconfirmed of others interested. Altogether an inspiring Nuremburg full of promise for the future of aeromodelling.

Dieter Schluter now producing the Gazelle Helicopter for his own Company, supplies optional collective pitch control, is based on Swiss Kurt Saupe's design from St. Gallen.

XXXth Coupe d'Hiver Inter

WINTER STRIKES THE TRADITIONAL END OF FEBRUARY ANGLO-FRENCH AT LE PLESSIS BELLEVILLE, NEAR PARIS

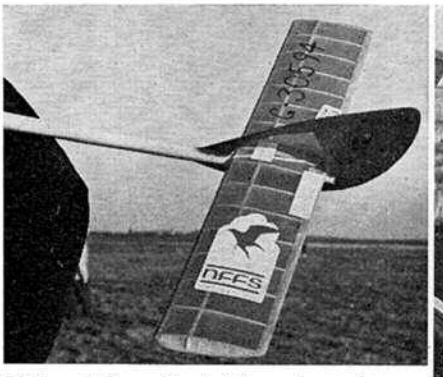
COOL WINDS of shrinking National Economics materialised in physical form at le Plessis – Belleville for a shivery and depleted Coupe d'Hiver. *Brrh* – was it cold – and windy too! About two-thirds of the entry actually flew, and most of those with well-worn and reliable models to stand the rigours. Yet, as ever, the Coupe was adventurous, enjoyable and remarkably sunny. The event was administrated by old friends in the *Union des Aero Clubs de L'Ile de France* – which is rather like the London Area of the S.M.A.E., and though relaxed to the point of a free-for-all (no weight checks noticed and the usual variety of javelin launches) there were no complaints at the results – only sincere congratulations to André Meritte for his consistent performance which thoroughly earned his

Above: André Meritte and his 'Gadjet Special' winner with wound balsa tube fuselage. Same model used for the six-minute fly-off flight in 1973. Left top: Roy Fleetwood's curved dihedral wing was one of very few unorthodox structures this year. Centre: our man in Paris, Brian Cox helps Ian Dowsett with Canadian Stuart Savage's model. Left: sole German representative, Erwin Neumann from Munich uses self-winding pylon.

nationals

CHALLENGE

André Meritte wins a tough contest



Tailpieces! Dave Goodwin's cutaway for the tipping tail takes a large slice of fin. Pierre Chaussebourg had Bob White's (U.S.A.) Coupe, but those thin (1/32 sanded thinner) fins, and frail blades kept it boxed.

first place. After a double max (and a disaster in which his second entry – the one which took him to the fly-off for a second-place tie in 1973, fluttered its wings as the blades shed from the root) we watched his third launch closely. The climb was far from the prop-hanging rocket zoom one expects of top continentals. It was a steady 50-60-degree right spiral, stable in the 20 m.p.h. breeze, climbing to 200 ft. or so for an unassisted 1 min. 55 sec. across the airfield and the ploughed outfields.

Our British group had been affected by rising prices and the stringent restrictions of a three-day working week which kept many of the regulars away. Newcomer Ian Sutton, who ordinarily operates as a lone enthusiast in Somerset, with occasional sorties to Ron Coleman's high level Cleeve Common, was at home in the conditions. Working entirely on his own, with a two-piece fuselage design, he took note of the Coleman thermistor and caught a riser with each of his entries and so placed both first and second of the British group. Actually, Ian Dowsett brought proxy-flown Stuart Savage's Canadian model to within a couple of seconds of Ian Sutton's best, and was lucky to do so as he just scraped the flight in before the timekeepers disappeared for their 2½-hour lunch! In contrast, the flight rounds were approximately 90 minutes each, which seems a little tough on those who travel long distances to compete. An Italian group, motored from Turin, Erwin Neumann came from Munich and the French travelled from places as far apart as Lille, Poitiers and Nice. The attraction of Coupe d'Hiver is well established, but one sensed a need for more emphasis on the contest rather than the midday gastronomy.

If any trend were said to be evident, it is that more Juniors are taking part, and most of the lads are sons of well-known fathers already proficient in the Cd. H. class. They seem to get more shepherding than does the average British Junior from his

The British Equipe, wind-blown, cold; but happy! Left to right: Roy Fleetwood (Northwood), Dave Goodwin (Sheffield), Ian Sutton (up from Somerset), Ian Dowsett and Dick Twomey (Northwood), Piers and Ron Coleman (Cheltenham).

Far left, Alain Landeau in classic pose with typical rocket climb. Left: Giulio Gastaldo, 1973 winner, uses fishing rod rear fuselage, Koster airfoils.

XXX'eme COUPE D'HIVER du 'Modele Reduit d'Avion'
24.2.1974 Le Plessis Belleville, Paris
Clear Sky 20 mph. Wind. 36-40°F

1.	A. Meritte	(F)	355
2.	J. Challine	(F)	335
3.	D. Rennesson	(F)	317
4.	C. Dupuis (Mrs.)	(F)	308
5.	J. Boizlau	(F)	307
6.	G. Trouvé	(F)	304
7.	G. Trouvé	(F)	300
8.	C. Dupuis	(F)	298
9.	C. Menget	(F)	295
10.	B. Brand	(F)	292
11.	M. Landeau (Mrs.)	(F)	285
12.	L. Giollito	(I)	284
13.	J. Griveau	(F)	281
13.	B. Brand	(F)	281
15.	D. Rennesson (Jr.)	(F)	275
16.	B. Boutillier	(F)	274
16.	I. Sutton	(GB)	274
18.	S. Savage (I. Dowsett)	(Canada)	272
19.	P. Meritte Jr.	(F)	271
19.	G. Gastaldo	(I)	271
21.	I. Sutton	(GB)	264

dad, and often the models bear striking resemblance in colour and standard to the paternal entry, but they certainly try hard and as the results show, these father and son teams feature prominently in Coupe d'Hiver.

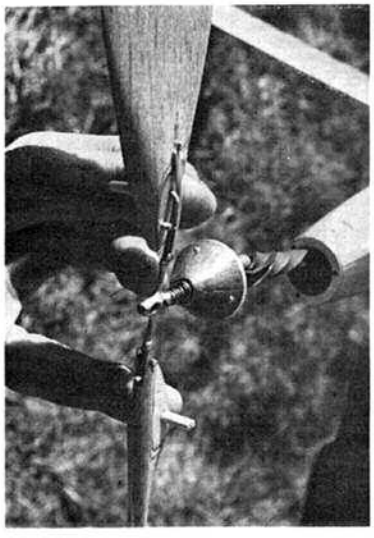
Unlike '73 when the return journey was a matter of initiative against the air traffic strike, the British group had an uneventful, if rushed, trip back – thanks largely to the provision of a hired car. But we must comment that it is normal for the Coupe d'Hiver International to coincide with the England-France Rugby Football match, and for that, this time, we are duly thankful. Had the custom been upheld, all at le Plessis Belleville would have been witnesses to the Ermononville disaster in the adjoining woods.

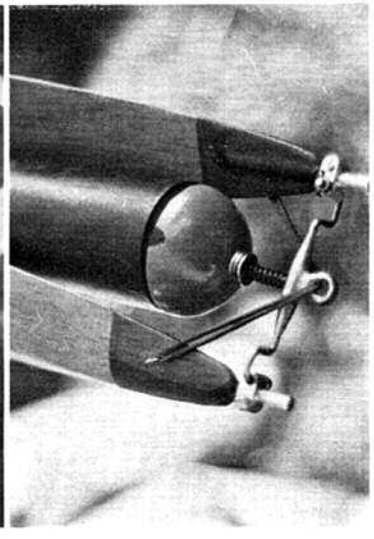
Britain's Best – Ian Sutton shows two-part fuselage, model completely self-operated, an ingenious design we hope to publish.

OTHER VISITING COMPETITORS' PLACINGS

27.	E. Neumann	(D)	248
29.	R. Fleetwood	(GB)	244
32.	L. Giollito	(I)	240
34.	Corno	(I)	238
50.	G. Gastaldo	(I)	206
54.	S. Savage (Proxy R. Twomey)	(Canada)	1
58.	R. Twomey	(GB)	158
63.	I. Dowsett	(UK)	140
67.	D. Linstrum (Proxy Chaussebourg)	(USA)	123
70.	C. Sotch (Proxy D. Goodwin)	(USA)	119
72.	P. Coleman	(GB)	114

35th D. Linstrum (Proxy D. Goodwin), 86th I. Balazarini (I), 88th I. Dowsett (G.B.), 95th R. Coleman (G.B.), 100th R. Coleman (G.B.), 102nd R. Twomey (G.B.).
Approx. 160 entries.





Top props, left: Gastaldo's improved prop on his '73 winner. Right: Meritte's 1974 winner, note the neat boss.

Part of the fine modelling exhibition staged by Reading Model Club in the Town Hall on March 2nd which attracted a large attendance and raised valuable funds for the future.

WE MAY BE going through a depressing period in our national life, but there is nothing depressing about the size of our postbag this month, suggesting that club life is flourishing as strongly as ever and a healthy flying season lies in store.

We begin on an upbeat with details of a new club. This bears the unusual name of the **Five Wells M.A.C.**, and is centred on Wellingborough, Northants. Bob Pooley, who sends along this report, has enclosed the club newsletter which is of ample size and clear production. Bob informs us that the club was formed at the beginning of the year by a group of free flight and control line enthusiasts, some of them late members of the now defunct Wellingborough M.A.C. The membership is not without zest, for it included some keen A/2 and Power contest flyers as well as free flight and C/L combat-sports flyers. There is also a strong junior contingent. The blustery wintry weather has kept flying in check so far – perhaps the club flying field site, on top of a hill at Doddington adds to the exposure problems. It certainly adds to the insurance problem for they share it with a flock of sheep! No clubroom so far but the Secretary's garage seems to make for a cosy cram in. However, in more spacious array, a lecture was given at a local boys' club on the principles of model building – *Aeromodeller* articles coming in useful. Anyone interested in the new club should contact the Hon. Sec. John Corbyn, 13 Campbell Road, Wellingborough.

One newsletter we always look forward to is the **British Aircraft Corporation M.A.C.'s** *Airlog*, but we do not see it all that often. The reason is given in a letter from the current editor, John Hanlon, which accompanies the February issue. It is all due to those prior commitments like painting, decorating, etc., which even the strongest willed modellers find hard to resist, but having put his house in order, as it were, Mr. Hanlon hopes to produce an *Airlog* every quarter. Revealed at the recent A.G.M., was the fact that the club membership peaked at 61 during 1973, covering most interests. Also revealed was a club noise problem. Imagine that amid all that full-size jet stuff!

From Surrey we have a report from Mr. C. R. Studer, the P.R.O., of the **Fleet & D.M.A.C.** Membership is at present 26, which now congregates at the New Civic Hall. The new meeting room will provide more scope for discussions and general activities, and new members and visitors from adjacent clubs are always welcome. Generally meetings are held on the last Thursday of the month, 8.00 p.m. onwards, but check with Bob Studer at Farnham 21976. The club appears lucky in having a multiplicity of fields for Radio flying, which are used in rotation so that local people will not have too much to complain about. Mr. Studer admits, though, that the club has found out the hard way that good flying discipline and behaviour is necessary in order to retain the co-operation of land-owners and local residents. The club gives regular flying demos, which are always well received, and have introduced a *Clubman's Cup*, won last year by Bun Welham.

Anyone who thinks that this country has lost heart will be reassured by the knowledge of the existence of the **Heart of England Aeromodellers**, thriving in the coronary, I mean Coventry area. Barry, R. Clay tells us that the group, with a nucleus of ten advanced Radio flyers, was formed last October. They are fortunate in having the use of some extensive farmland for thermal soaring. Generally, though, the policy of the group is to stage flying sessions in different parts of the Coventry Area, which, as in the last report, helps to keep relations sweet. By way of a change from the usual tales of complaints, their host farmer looks upon their use of the land as a 'good neighbour' act. Sad to say two Coventry model shops have gone out of business, making the supply factor in that city something of a problem. It is hoped that someone will come to the rescue. The club magazine, *The Circuit* which accompanies Mr. Clay's letter, is a real work of art as it is hand printed in small capitals. Very clear and personal, but surely there is at least one typewriter shop in Coventry!

Glad to see that the **Crawley & D.M.A.C.**, is still a going concern. Their report, to hand, comes from the P.R.O., John Willats. Last season, apparently, was a good one for the club, bringing in a large influx of new members to reinforce the Radio, F/F and C/L sections. This boosted the attendances at Hazelwich School on Thursday evenings. Winter meetings have been taken up with r.t.p. flying in the school hall, but contests for stunt, mouse racing, chuck glider, etc., are run during the season. The next club event is on April 20th, when a static exhibition will be staged at the St. John Church Hall, Crawley, to cover all aspects of club activity. Prospective members should contact John Dolding, 22 Loxwood Walk, Ifield, Crawley, Sussex RH11 8LZ.

I seem to remember the **Sittingbourne & D.M.A.C.**, as the club sitting in the midst of all that glorious flying space. Anyway, John Weeks has sent along the 15th issue of the club magazine, *The Bourne Flyer*, bringing our attention to the hectic year of club competitions the members have enjoyed. The events were well subscribed with no less than 19 participants appearing in the 'Best all Rounder' list. Top man was Trevor Grey, whose name can be seen elsewhere in the newsletter doing his all rounder stuff in combat, scale and chuck glider. Second man was Peter Harris, and third Doug Platt.

An intriguing point is raised in the **Leicester M.A.C.**, newsletter. We often speak of the model 'season' as coinciding with what we optimistically hope to be better weather, but now, for some reason, model flyers are much in evidence in the Winter but disappear during July and August. My own theory is the model flyer of today is a much softer creature than the fierce hobbyist of yesteryear and gets dragged off on

family holidays and wife-driven to house painting etc. The old full-time modeller never ventured out in the Winter so not to waste precious building time, but flew and flew the whole summer through. Reference is made to a pretty apathetic turn-out for the Area A.G.M., with few rank and file model flyers putting in an appearance. Officer recruitment suffered as a result; no Secretary being appointed. The new club P.R.O., Charles Toms, is hoping to put on some film shows and lectures to give purpose to the club evenings. The already successful Winter Building Competition is under way and a good turn out of models is expected at the various Stages of the event.

From the **Three King's** Court Circular comes an amusing piece from the Wal Cordwell column about an odd model flown by Ken Gardner. Described as a converted R/C job it was nearly reduced to kit form in flight, with practically everything moveable coming off a bit at a time, just like a stripper. Even so, the model was brought down safely minus elevators. Apparently, the model was based upon an *Ace of Diamonds* layout, being a sort of flying wing biplane with the tips straining to get at each other. It is suggested that the designer had several 'Double Diamonds' when he concocted it! Another story in the newsletter is by Derek Goddard, telling of a compressed air model event held during the war. As you know, in the wartime factories they turned out a few Spitfires and suchlike between batches of petrol lighters, but by way a change someone thought up the brilliant idea of turning their lighter making talents to compressed air engines and a competition was arranged. Alas, only one such powered model turned up on the day, with the unit made up from a cocoa tin. But it flew – not very brilliantly – and won.

A club listing in the **Scottish A.A.** newsletter records no less than 29 clubs in the Association. This encourages a well-filled Contest Calendar, and the one published in the newsletter for 1974 provides at least one event for almost every Sunday throughout the season, with a couple of two-day events thrown in for good measure. One branch of model flying that is taking on in Scotland is R/C Scale. In an explanatory article on this style of 'ultimate' modelling, it is pointed out that modern kits get your scale model onto the flying field quicker than in the old days of carving dummy engines out of cotton reels and beating cowlings out of cocoa tins. Sign of the times is a notice about running a bus to the Nationals. Reason: the high cost of petrol. It would be a pity if this factor keeps model flyers from attending the central events, and the one way to keep petrol costs down is to make up parties.

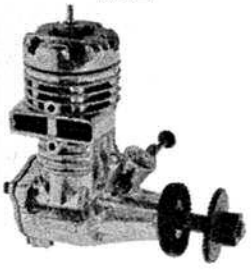
Those twin national curses, anarchy and vandalism are now invading the models scene, according to the **Worcester M.A.C.**, newsheet. A certain rogue element has taken to smashing up everything in the clubroom, including the kitchen sink. And that accompaniment of vandalism, graffiti, has been appearing indecorously on the club notice board. But while some may be up the pole, it is to round the pole that the more sober and responsible minds are turned. Roger Price has been performing a spot of electronic wizardry on the club device; one blessing of which is an overload trip as a safeguard against burnt out motors.

That's all space will allow this month, folks. Apologies for any omissions. **Clubman**

Contest Calendar . . .

April 28th	**S.M.A.E. 2nd C/L CENTRALISED.** F.A.I. T/R Combat, ½A T/R, Stunt, Speed. Venue R.A.F. Little Rissington, Glos.
April 28th	**MALVERN SOARING ASSOC. R/C CROSS-COUNTRY SOARING TASK EVENT.** West Malvern. Pre-entry 50p (40 max.) to A. Hobkirk, 216 Northwick Road, Worcester WR3 7EH.
April 28th	**ST. ALBANS R/C THERMAL SOARING.** Venue: Nomansland Common, Wheathampstead. First round 10 a.m. Entry 40p, to B. Rapier, 5A Aldrich Road, Harpenden, Herts. Quote frequency.
May 5th	**NORTHERN AREA C/L MEET.** Combat, Goodyear, F.A.I. & Class B Team Race. Details of venue, etc., from L. Davy, 14 Lansdowne Close, Baildon, Shipley, Yorks.
May 5th	**S.M.A.E. 3rd AREA CENT.** FIC (Power) Open R/G – Area venues.
May 5th	**LONDON AREA C/L MEET.** F.A.I., Goodyear T/R, Combat. Venue Charville Lane, Hayes.
May 12th	**S.M.A.E. INDOOR MEET.** Venue: Cardington.
May 12th	**N. BERKS R/C THERMAL SOARING.** Venue: Nr. Garford on A388 Wantage-Oxford Road. Pre-entry 50p, to P. Clarke, 7 Condwell Close, Grove, Nr. Wantage, Berks.
May 12th	**WOLVES MAC C/L FLY-IN.** Stunt, scale, combat, Carrier (provisionally). Close-cropped grass surface. Silencers essential. Inquiries to Glenn Sibley, 63 Emerson Road, Bushbury, Wolverhampton, Staffs. Tel: Wolverhampton 738556.
May 12th	**VULCANS F/F RALLY.** Open R/G/P, Mini Comp (with 'K' factors), H.L.G., S.M.A.E. members only. Venue: R.A.F. Elvington, Yorks. Prizes: Cash & Shields plus best Junior.
May 25th-27th	**BRITISH NATIONALS**
June 2nd	**KIRKCALDY M.A.C. C/L RALLY.** Combat Goodyear Stunt at Beveridge Park, Kirkcaldy.
June 2nd	**KARCS R/C OPEN SCALE DAY.** Perton airfield (4 miles S.W. of Wolverhampton on A41).
June 9th	**S.M.A.E. INDOOR MEET.** Venue: Cardington.
June 9th	**SOUTH MIDLAND AREA THERMAL SOARING** at Bassingbourne, near Royston, Herts. Pre-entry (40p, state freq.) to G. Dallimer, 10 Angle Way, Stevenage, Herts.
June 9th	**FELTHAM C/L MEET.** F.A.I., Goodyear, team race, combat at Charville Lane, Hayes.
June 16th	**AEROMODELLER ALL SCALE RALLY.** C/L, F/F & R/C welcome at Old Warden, Nr. Biggleswade, Beds.
June 16th	**S.M.A.E. 4th AREA CENTRALISED.** F.A.I. Rubber, Open G/P – Area venues.
June 16th	**GUISBOROUGH COMBAT RALLY.** Pre-entry 40p, details, D. G. Smith, 69 Sandmoor Road, New Marske, Redcar, Teesside.
June 16th	**BURNS BROWN COMBAT RALLY** at Stopsley Sports Centre. St. Thomas Road, Luton. Details/Pre-entry from P. Rabjohn, 23 Mardale Avenue, Dunstable, Beds.

The FOX 35



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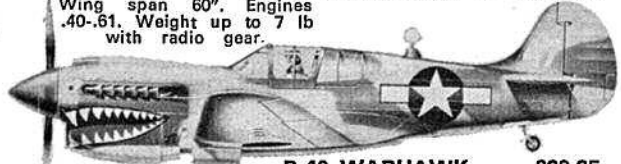

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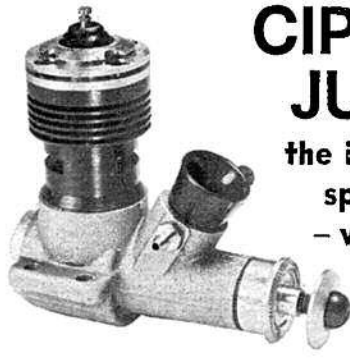

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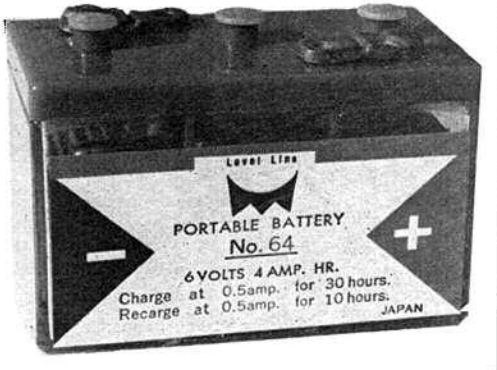

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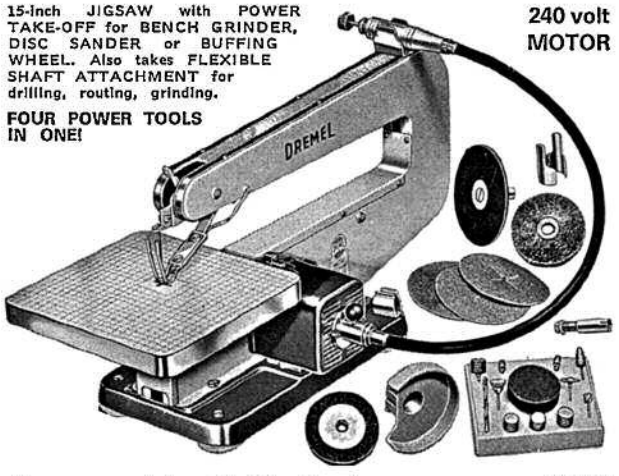

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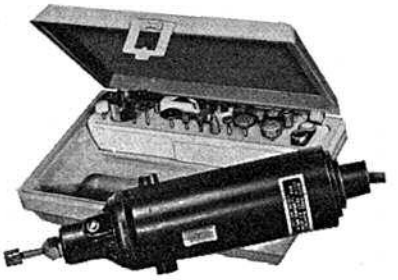

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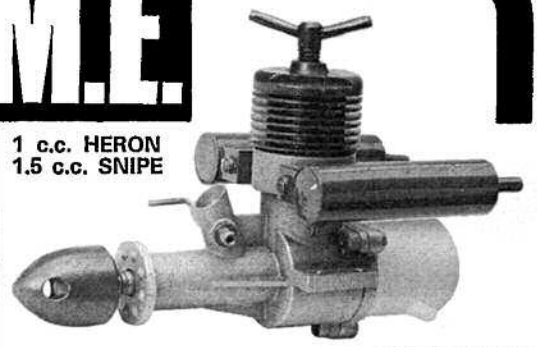

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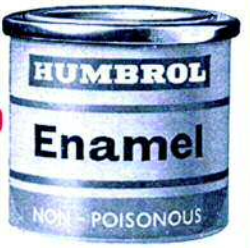

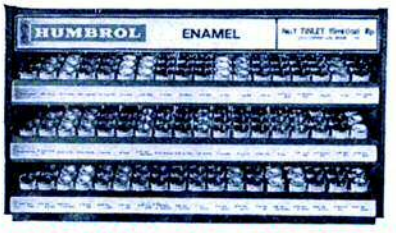

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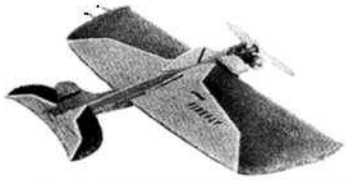

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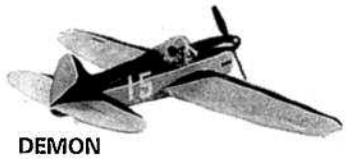

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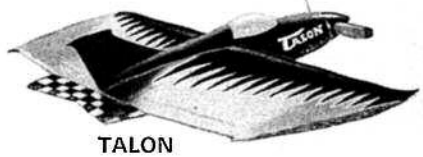

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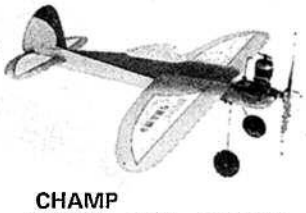

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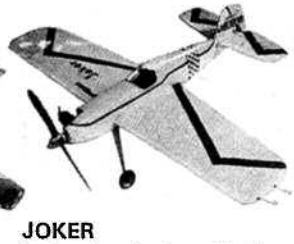

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