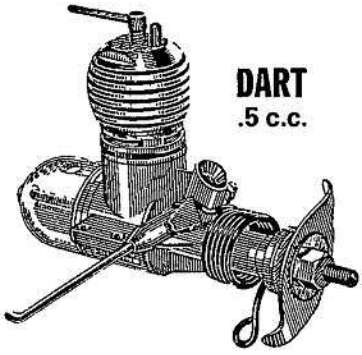
Aero Modeller

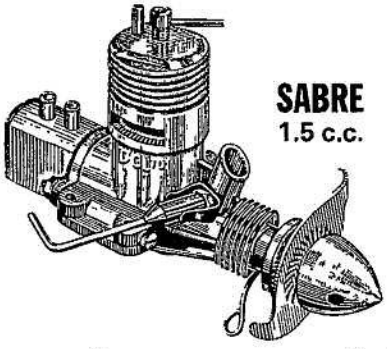
June 1974
20p
USA & Canada $1

INCORPORATING
MODEL AIRCRAFT

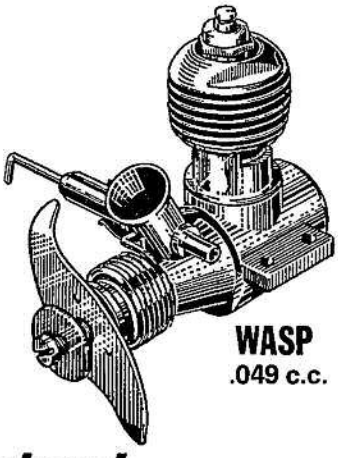
MAP HOBBY MAGAZINE



DART
.5 c.c.



SABRE
1.5 c.c.

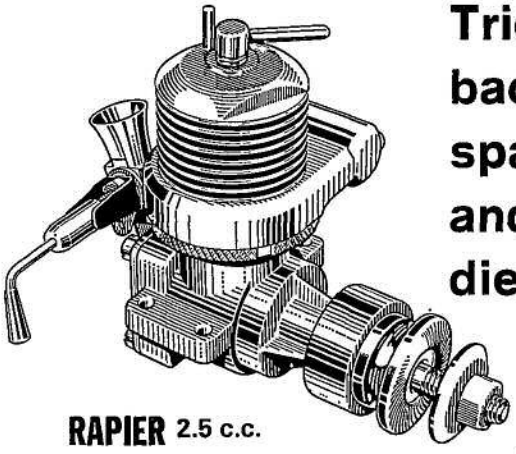


WASP
.049 c.c.

See them at your model shop!

QUICKSTART

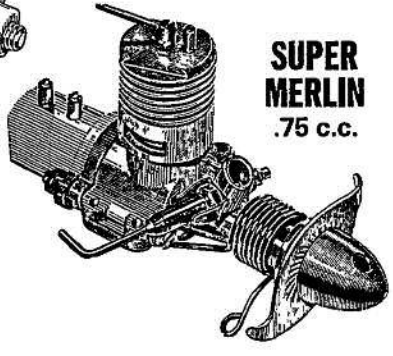
The Motors for the Modern Modeller! Quality engineered for lasting performance



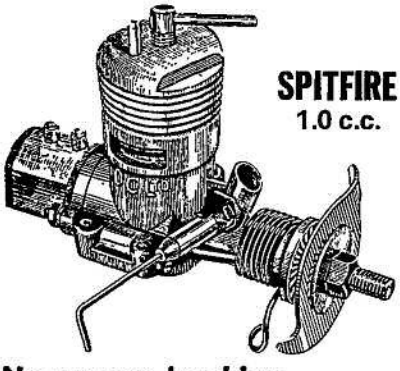
RAPIER 2.5 c.c.

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

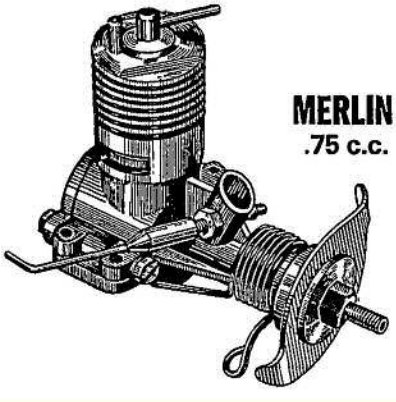
Tried and tested, backed by full spares service and years of diesel 'know-how'



SUPER MERLIN
.75 c.c.



SPITFIRE
1.0 c.c.



MERLIN
.75 c.c.

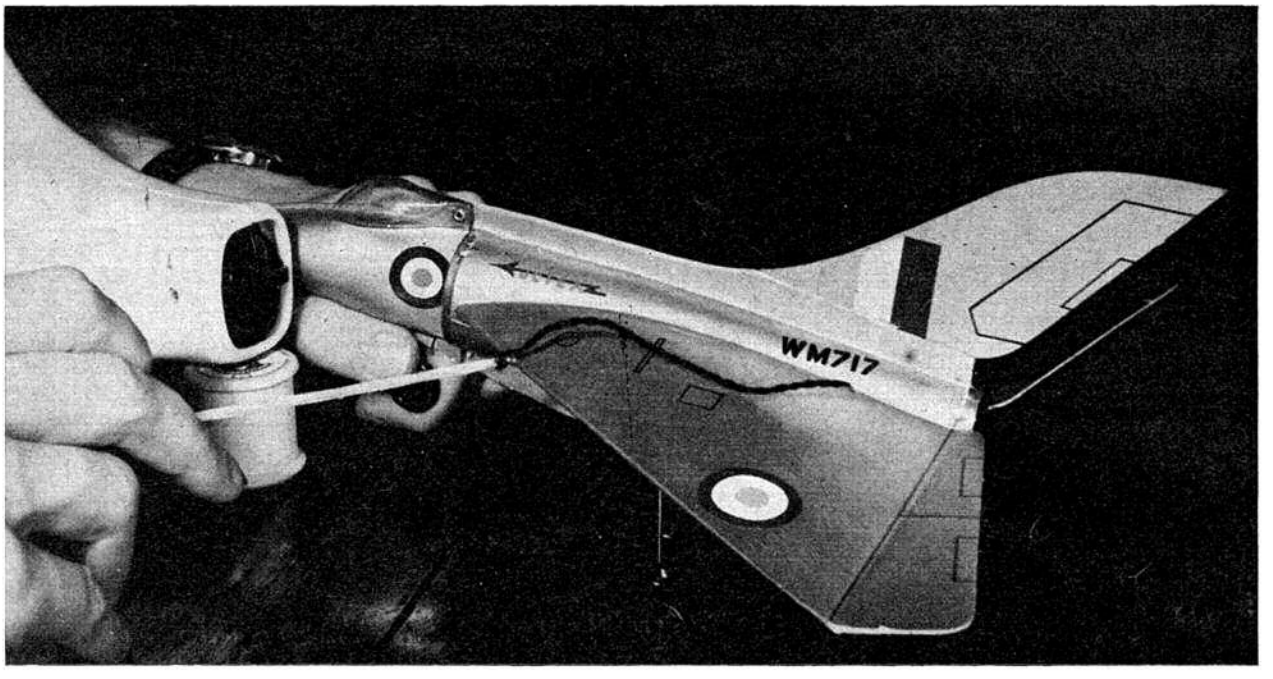
No spares-backing worries – if you have a Quickstart you can be sure of full and continuous use of your engine

Quality
Reliability
Economy

DAVIES-CHARLTON LTD. HILLS MEADOW DOUGLAS, Isle of Man

Ⓢ

SOLARBO



What's this . . . wind tunnel testing a model wing with a hair dryer? Well, it's a thought (and an interesting photograph!) – but that's about all. You are not likely to learn much this way, even if it *looks* scientific. (Our expert muttered something about 'turbulent flow' and 'false Reynold's Number' when we showed him the pic!). We could have added that it's not an all-balsa model, either!

That's really the way to learn about model aerodynamics. Build a balsa prototype and go out and test fly it. You can cut-and-try various shapes and find out just what does work best. And with '5-minute' epoxy adhesive, on-the-spot crash repairs are a cinch these days.

Balsa is the only rigid airframe material which does give you this flexibility for experiment. In fact, balsa is just about the best model airframe material there is. There's truth in the statement 'balsa models fly better'. Provided you always use the best *aeromodelling quality* balsa. And that means Solarbo Balsa, of course.

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46" span
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For single or two-channel proportional

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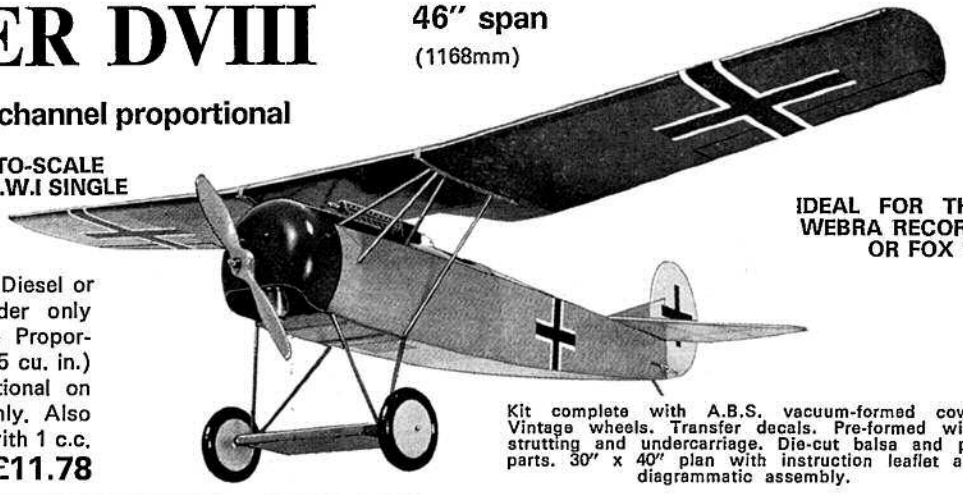

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For 1.5 c.c. (09 cu. in.) Diesel or Glow motor with rudder only (Single Channel or one Proportional) up to 2.5 c.c. (.15 cu. in.) with 2 Channel Proportional on Rudder and Elevator only. Also suitable for Free Flight with 1 c.c.

KIT PRICE **£11.78**

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

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VERON ARE DISTRIBUTORS (U.K.) FOR THE COMPLETE SOLARFILM RANGE OF IRON-ON COVER MATERIALS

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Size	Solid & Transp.	Gold & M'Flake
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72" (1829mm)
Penetration Soarer

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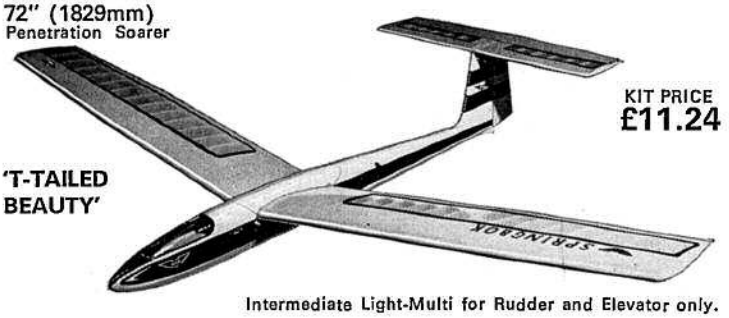


KIT PRICE **£11.24**

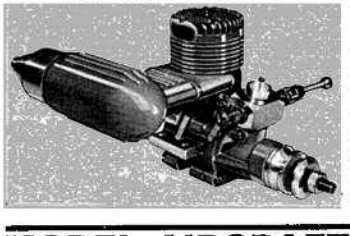
Intermediate Light-Multi for Rudder and Elevator only.

Webra

THE FINEST ENGINES FOR YOUR MODELS

CRAFTSMANSHIP AT ITS BEST – BACKED BY THE FACT THAT WEBRA HAVE BEEN THE POWER BEHIND MANY WORLD CHAMPIONSHIP WINS!

BLACKHEAD 61 R.C.



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BLACKHEAD 61 R.C.	37.98
BLACKHEAD 61 MARINE	45.46
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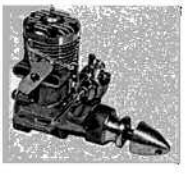
RECORD 1.5 c.c. R.C.	10.37

SEE THEM AT YOUR DEALERS!

R.C. GLO-STAR

ALL PRICES SHOWN ARE RECOMMENDED RETAIL



		£.p.
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GLO-STAR	1100/3	2.40
WINNER	1100/W	1.73
RECORD	1100/R	1.73
SPORT-GLO	1100/S	2.26

R.C. RECORD

MODEL AIRCRAFT (Bournemouth) LTD. NORWOOD PLACE, BOURNEMOUTH

Aero Modeller

INCORPORATING
MODEL AIRCRAFT

June 1974 Volume XXXIX No. 461.

CONTENTS

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comment

This column has from time to time found reason to emphasise the need for the British Model Trade to produce new Kits, Engines and Accessories in order to keep pace with world markets. Now, after the two trade exhibitions at Sywell and Kempton Park, we have cause to rejoice.

Hooray!

Not for years have we been able to note so many new items. The pattern of trading is changing and British kits are going to forge an export market which will reinforce the efforts made with plastic film covering materials, propellors and moulded nylon accessories.

Much of this welcome news is due to the enterprise of enthusiastic modellers who have seen the opportunities and taken their plunge into manufacturing. Good luck to them! They are following the example of every well established name in the model trade around the world. From small beginnings, come much bigger efforts – may their initiative flourish and prosper!

on the cover

Bright nose of a Jet Provost MK IV from the MACAWS aerobatic team of 1973, then based at R.A.F. Manby. Name is an amalgum of MA for Manby CAW for College of Air Warfare, the crest of which is seen in the rear fuselage. The team has since been disbanded and was photographed at the 1973 Biggin Hill Air Fair.

R.A.F. Red Arrows and the vintage pair (Bulldogs) resume displays – after fuel restrictions – on July 1st.

next month

Plans for top-performance A/2 glider together with return of our full-size plans features (we hope!) with attractive C/L stunter for 1.5 c.c. engines. Ron Coleman continues his series on rubber motors while other articles cover the design of control-line bi-plane stunters and the development of a rather different kind of glider! All this and much, much, more in July issue, on sale 15th June.

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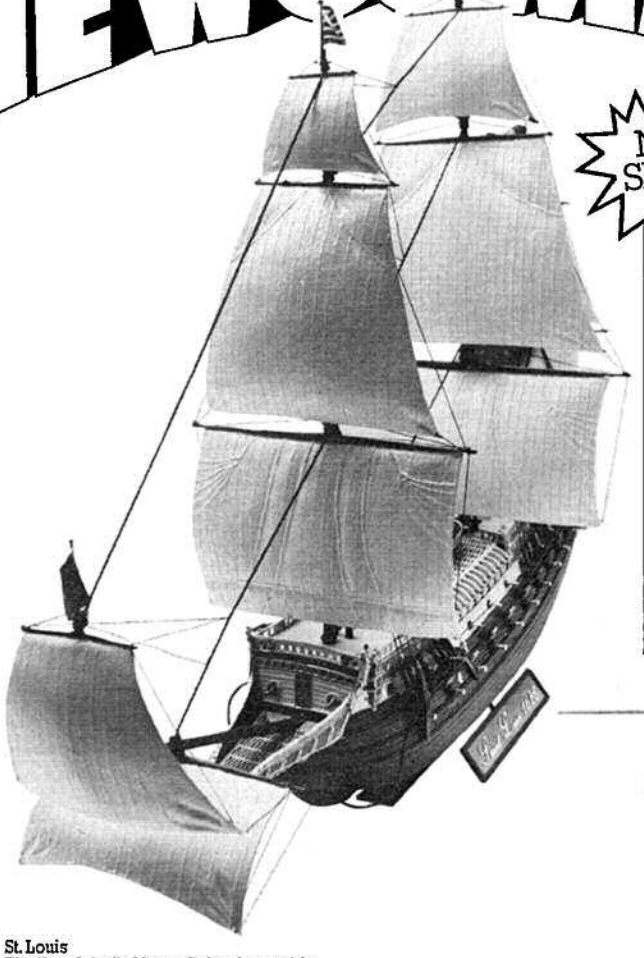
AIRFIX NEWCOMERS

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.

AIRFIX

The world's biggest range of construction kits

RipMax

TOP FLITE

¾in. scale .15 to .19 engines

P-40F WARHAWK £7.75
Super form fuselage with finished fuselage shells, die-cut balsa parts, hardware etc. A superb scale control-liner.
P-47 THUNDERBOLT 27in. span £7.75
P-51D MUSTANG 37in. span £11.10

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SUPER SCALE CONTROL LINE

35" CHANCE-VOUGHT CORSAIR F4U1 £8.50
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36" GREAT LAKES TRAINER ... £9.00

SCHWEIZER 1-34 ... £17.50
Giant 98½" span true-scale sailplane. A superb kit of this outstanding design – specially designed with R/C in mind!

70" SCHWEIZER 1-26D ... £13.25
42¾" SCHWEIZER 2-32 ... £2.10

FREE FLIGHT

Curtis Jenny JN4 32½" span	£4.25
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Diamant Sailplane 74" span	£4.25
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Citabria 33¾" span	£4.25
Piper Cub Super Cruiser 35½"	£4.25
Cirrus 87¼" span	£6.35

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Super Lancer SL-62 R/C 62"	£22.30
Citabria Super Scale 54" span	£15.95

GOLDBERG

CONTROL LINE

JUNIOR SATAN 29", .15-.19 engines £2.70
L'IL SATAN 19" span for .09s ... £2.10

Span 42"

SHOESTRING

Features 'Symmet-TRU' construction and shock-absorbing landing gear. Superb stunter £5.35

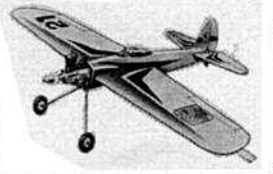
21" span
L'IL WIZARD

Easy-to-build stunt trainer for .049's. Profile-type fuselage. Preshaped parts. £2.70

RILEY WOOTEN 'VOODOO' £3.30

Pick of the Combat models with fabulous manoeuvrability and handling qualities. 36" span.

FOR .049 ENGINES



L'IL JUMPIN' BEAN £2.35
Span 21"
Another easy-to-build model.

CONTROL LINE NOBLER

50" span
.29-.35 engines
£10.00

Superbly balanced aerobatic design. Extensively prefabricated kit.

PEACEMAKER

46" span sleek stunter, kit features SUPER FORM prefabrication. Engines .19 up. Area 410 sq. in. Length 30½". £6.95

for COMBAT!

JR FLITE STREAK 31", for .15's ... £3.90
FLITE STREAK 42", for .29s up ... £4.95

42" span
SEMI-SCALE STUNTERS

HURRICANE £5.55 TIGER SHARK £5.55

CURTISS HAWK P6E is just one of the fascinating designs in the rubber-powered range — all easily convertible to control line or free flight power as well! Die-cut balsa, formed plastic parts, shaped wire parts, rubber motor, etc., etc.

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Aeronca C-3 35"	£3.20
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SE5A biplane 22"	£3.20
Jap Zero 24" span	£3.20
Spitfire Mk. I 24"	£2.65
Sopwith Camel 24"	£3.20
Beech Bonanza 22in.	£2.40
Ju 87 Stuka 20" sp.	£2.40
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Curtiss Hawk P6E 16"	£1.85
L-19 Birddog 17" sp.	£1.30

Superb scale models with IN FLIGHT ACTION FEATURES. Readily adapted to F/F or C/L power!

PT-17 22" span	£2.65
Corsair 24" span	£3.70
Ansaldo 19" span	£1.85
FW 190 24" span	£2.65
P-47 20" span	£2.40

Prices quoted are subject to change.

IF IT'S RipMax IT'S GOOD!

SEE THEM ALL AT YOUR MODEL SHOP

June issue of *Scale Models* carries a varied content to cater for most tastes; kit of the month is undoubtedly the new Datson 240 from Tamiya to 1/72 scale and we review the kit in detail and colour. The R.A.F. Museum features the first conversion in this popular series, a Spitfire 24 from Frog Mk XIV. Another conversion is for a United States Coastguard HH3E Helicopter and there is a beginner's guide to biplane kit modelling describing the Airfix Roland C-11. Reg Miles' Autominology details some interesting new and unusual models while on a slightly less serious note, a 54 mm model of David Bowie's is described. Readers' Showcase goes into colour this month, and what a variety of models there are too!

The Proteus Bluebird W.S.R. Car is drawn and the full fascinating story outlined by John Wood.

All regulars are in this issue: New To You?, Marine Modelling, Scale Mail, Cockpit Corner, Hints and Tips, and also as a bonus a round-up of the latest decals. On sale May 3rd.

MacGregor puts you in the Pilot's Seat.

"If only I could give it a bit of up elevator!"
Haven't you ever thought that to yourself when that beautiful free flight model you've spent all winter building does a sudden flip or catches a gust of wind. Just imagine how much extra fun it would be if you could have control over your craft.
Well, you can. With a MacGregor Radio Control outfit, you can put yourself right there in the cockpit and fly your 'plane just like the real thing!
And it needn't be expensive. With more than ten years' experience of designing and manufacturing best selling, top quality model control gear we can today offer you the finest, most comprehensive range of precision equipment in the world with something to suit every requirement and pocket.
A single channel outfit for instance with simple rubber driven escapements for both rudder and engine control can cost as little as £19! Or if you are more ambitious and desire more sophistication there are complete digital proportional outfits ranging from £42 right up to £150 or more, with a complete range of accessories and spares to suit any application. And of course all this is backed up by one of the finest and swiftest after sales organisations in the business.

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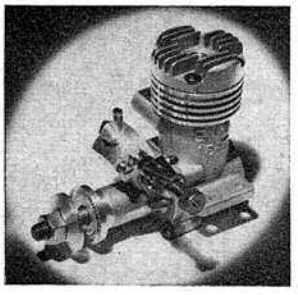
Write to us today enclosing a stamped addressed envelope for more details or call and see our products for yourself at your local model shop. We feel sure you'll want us to help you make your wish come true!

ENYA '74

IF IT'S RipMax IT'S GOOD!

the world's most wanted engines

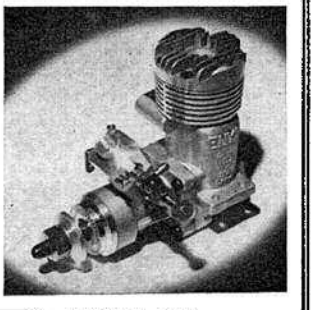


ENYA 15

Designed with sporting performance in mind! Plus really flexible throttle control for R/C! Weight 5.2 ounces only (with throttle). Easy-starting, fast-revving engine which develops over 0.33 BHP! R/C props 8 x 6 or 9 x 4.

ENYA 35

Two versions of this powerful 5.85 c.c. engine—plain bearing or ball race main bearing. PB version is supplied with alternative low (7.5:1) and high (9.1:1) compression heads to match straight or doped fuels. R/C props 10 x 6 or 11 x 4.



QUALITY SHOWS!

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Displacement .099 cu. in. (1.62 c.c.)
AIRCOOLED:
Standard £5.45
R/C version £6.95

ENYA 15
Displacement .15 cu. in. (2.47 c.c.)
AIRCOOLED:
Standard £6.45
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ENYA 19BB
Displacement .198 cu. in. (3.25 c.c.)
AIRCOOLED:
Standard £10.85*
R/C version £12.60*

ENYA 29BB
Displacement .299 cu. in. (4.91 c.c.)
AIRCOOLED:
Standard £12.70*
R/C version £14.70*
* NEW models, available June-July

ENYA 35
Displacement .357 cu. in. (5.85 c.c.)
AIRCOOLED:
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R/C version £11.95

ENYA 35BB
Displacement .357 cu. in. (5.85 c.c.)
AIRCOOLED:
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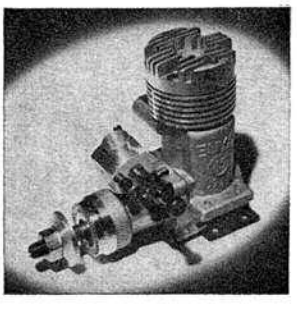
R/C version £15.70

ENYA 45BB
Displacement .457 cu. in. (7.5 c.c.)
AIRCOOLED:
R/C version £20.80

ENYA 60BB
Displacement .606 cu. in. (9.95 c.c.)
AIRCOOLED:
R/C version £26.80

SILENCERS

ENYA 09	£1.30
ENYA 15	£1.75
ENYA 19	£1.75
ENYA 29	£2.45
ENYA 35, 35BB	£2.45
ENYA 45BB	£2.45
ENYA 60BB	£3.00



ENYA 45BB

Now you are stepping up into the top performance class! Develops over 0.9 BHP, and has superb throttle response. Our personal choice for models up to 60 in. span. Weight 11.4 ounces. R/C props 11 x 5 or 11 x 6.

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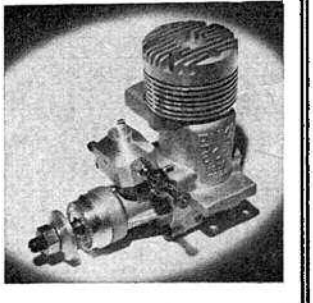

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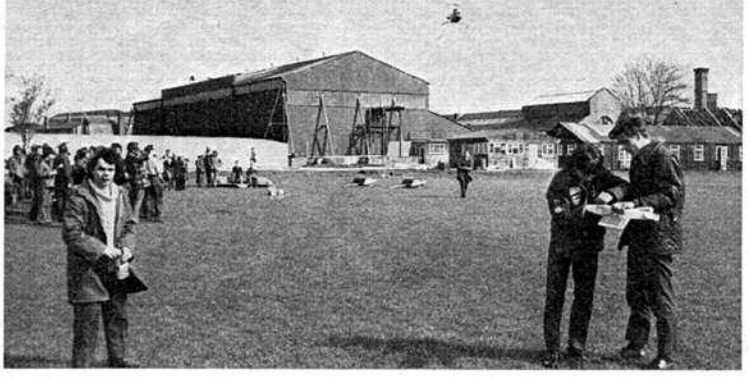


Historic Airfield – alas no longer for active aeroplanes – at Hendon was put to good use on March 14th when the Scouts held their model championships. In this view, Mike Daish demonstrates a Schuco Huey Cobra in the background while a scout competitor prepares his Control liner for flight.

FRED GUEST, known to so many of his modelling friends with affection as 'Uncle Fred', died at 10.30 a.m. on Tuesday, 30th April, at the age of 55. He had suffered a long and painful illness, the inevitable outcome of which had long been known to his family. His wife Rita especially went through a difficult time with fortitude and courage.

Fred will long be remembered for his beautifully finished models, from his just post-war Free Flight Banshees which he flew so expertly at Hounslow Heath to his later control-line models which set so high a standard of construction and finish; as well as his happy disposition, his rather dry sense of humour and his constant willingness to lend a helping hand to any modeller who asked for it.

He will be sadly missed, not only by his many modelling friends, but also by those firms in the Model Trade for whom he had for more than 20 years made some of our best accessories.

NEW YEAR'S DAY 1945: Historian, Richard P. Bateson, has been commissioned to write a book on the planning, execution and aftermath of Operation 'Bodenplate'. This surprise Luftwaffe attack carried out on 1.1.45 against Allied airfields in Belgium, Holland and Northern France resulted in the destruction of 500 odd aircraft of both sides. Those with knowledge of the planning, execution and aftermath of this raid, surviving eye-witnesses and holders of photographs taken on the day are asked to contact the author at 8 Lawford Road, Chiswick, London W4 3HS.

NEW SECURITY measures are now in operation at Bassingbourn. The only people allowed on to the airfield will be those whose names are on a list held at the guardroom. If you expect to attend any of the meetings to be held there this year, whether Area Centralised, or club or Area Galas please send your name, club and S.M.A.E. number immediately to: M. Dilly, at 20 Links Road, West Wickham, Kent BR4 0QW. This address applies for Free-Flight entrants only, whether or not they have previously applied for permission to use the airfield in 1973. Radio-controlled thermal soaring competitors using this venue should send the same information to: D. Dyer of 6 Pound Close, Blunham, Beds.

ROYAL AIR FORCE Model Aircraft Association's annual championships will be held at R.A.F. Colerne, Wiltshire, during weekend of 6-7th July. The event will be combined with a Station Open Day featuring sideshows, amusements and refreshments, but more important the Museum of Vintage Aircraft will be open on both days as an additional attraction. Admission to the airfield is free, and car parking will cost just 10p. Last year over 8,000 people attended and the sum of £1,000, the proceeds of all the events, was subsequently donated to local charities. Naturally, the competitions themselves are only open to R.A.F. personnel.

TWO NEW world records have just been certified by the F.A.I. Firstly, V. Miakinine of the U.S.S.R. flew his radio-controlled glider for a total of 25 hours, 44 minutes and 8 seconds, on 30th September/1st October 1973. A few days later (4th October) Miroslav Sulc of Czechoslovakia recorded an altitude of 1,960 metres with his free-flight seaplane (Class Flc). Congratulations gentlemen on your own endurance and retrieving abilities . . .

FOLLOWING our mention of the 'Birdcraft Channel Prize' in the May issue, we have been asked to remind readers of that other challenge for radio-controlled motorised ornithopters – the Natural Flight Race, details of which were published in the December 1972 issue. The first ever craft, conforming to the rules, which flys 50 metres will receive £20, the first to achieve 150 metres will likewise receive £20 as will the first person to fly around the No. 1 pylon of an F.A.I. pylon race centre and whoever completes a whole lap! We have not yet heard of anyone seriously taking up the challenge . . .

THE NORTHERN HEIGHTS club wishes to hold a re-union of all its past and present members around next October, and the secretary, Vic Botta, of 31 Hatfield Road, Rayleigh, Essex SS6 GAP, requests these people to write to him.

LAST MINUTE notes on the British Nationals, 25-27th May. It is stressed that the R.A.F. will not permit any cars on the runways at Little Rissington, while only competitors and certain officials will be permitted to drive on the perimeter track. Also, the site of the thermal soaring event has now been changed – it will now take place at Folly Farm, Notsgrove, which is just some five miles away from Little Rissington, Gloucestershire.

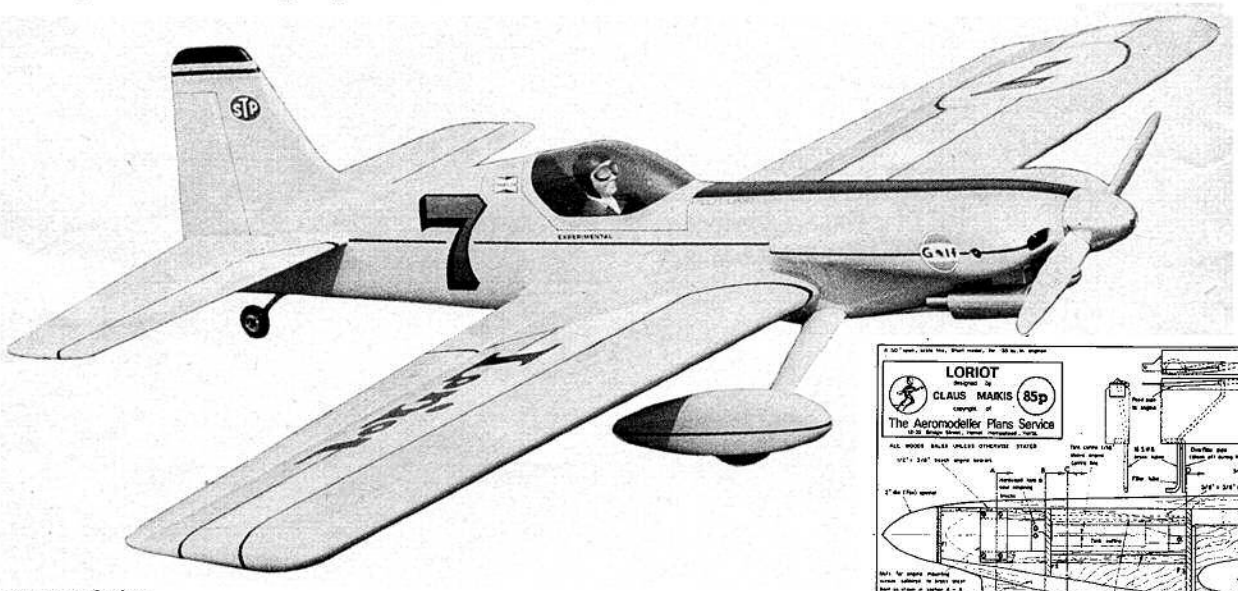
Loriot

by CLAUS MAIKIS

a 50 in. span control-line stunter for 0·35 cu. in. engines

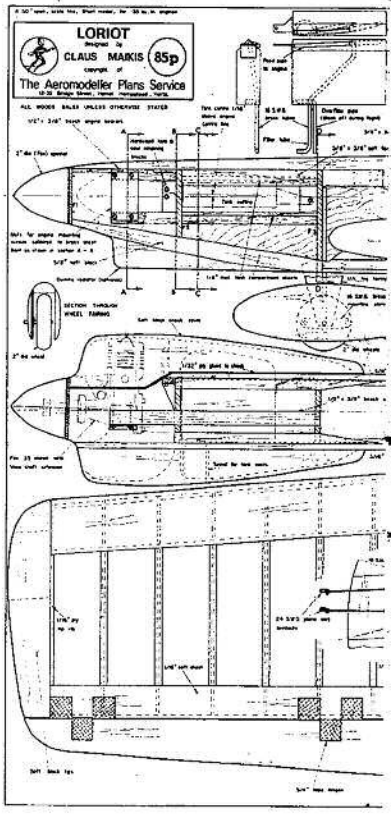
LORIOT is not the ultimate stunt model, it is neither the best aerobatic model I've seen, nor the smoothest ship I've flown, but it is a fast flyer producing sharp manoeuvres in a stiff breeze. This is what it was designed for; and it does just that. In short, it is my windy weather model.

The idea for a plane looking like this originated in 1965 when the pylon racing ball started rolling in the States. A *Nobler* with cheek cowls did the trick at first, but it was a long way from there to the present design.



I was slightly surprised to find *Loriot's* flight characteristics exactly as expected! First of all, I intended to increase speed noticeably. Therefore, the thickness of the wing was decreased to 12 per cent at the root. Also, the airfoil's point of maximum thickness was moved back to almost 30 per cent chord (including flaps). The tips remained at 14 per cent thickness at 25 per cent chord to prevent tip stalling at high angles of attack while for improved manoeuvrability, the tailplane and elevator size were slightly increased (by comparison to 'standard' *Nobler* sizes). Centre of gravity location at 19 per cent of root chord was intended to give a 'tame' level flight. To avoid a tail-heavy plane, the nose was lengthened by about an inch. Alas, I do not have any aerodynamic *raison d'être* for the fuselage – it simply represents a typical Goodyear shape. The sidewinder engine was chosen for a change as it 'disappears' modestly into the outboard cowl. Besides, I felt it to be a bit of a challenge to try this kind of installation – indeed it proved far from easy.

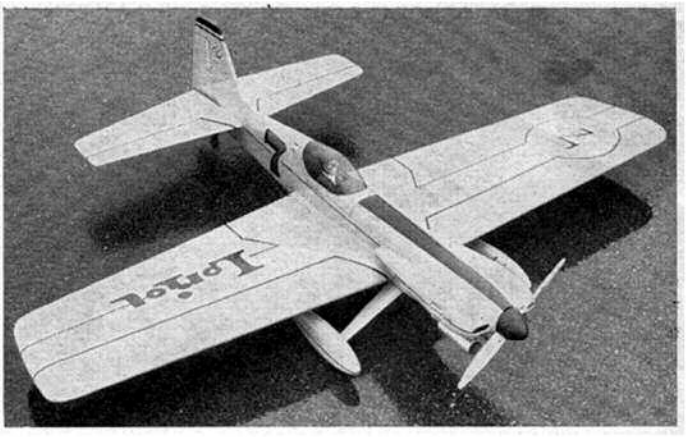
From my experiences of profile-type models I didn't remember any real problems although there proved to be quite a difference between a profile model with engine screaming full bore through all manoeuvres, and a high performance stunter. The idea of having the tank and engine centre-lines on the same level works only on the drawing board! I cannot explain it, but the result was much too rich an inverted flight and a severe cut-off at full-down elevator, e.g. inverted pull-out after the wing over. I must mention that in order to have the needle at



FULL-SIZE COPIES OF THIS 1/7th SCALE REPRODUCTION ARE AVAILABLE AS PLAN No. CL 1225, PRICE 85p (INCLUSIVE OF POSTAGE AND V.A.T.) FROM AERO-MODELLER PLANS SERVICE, P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS. HP1 1EE.

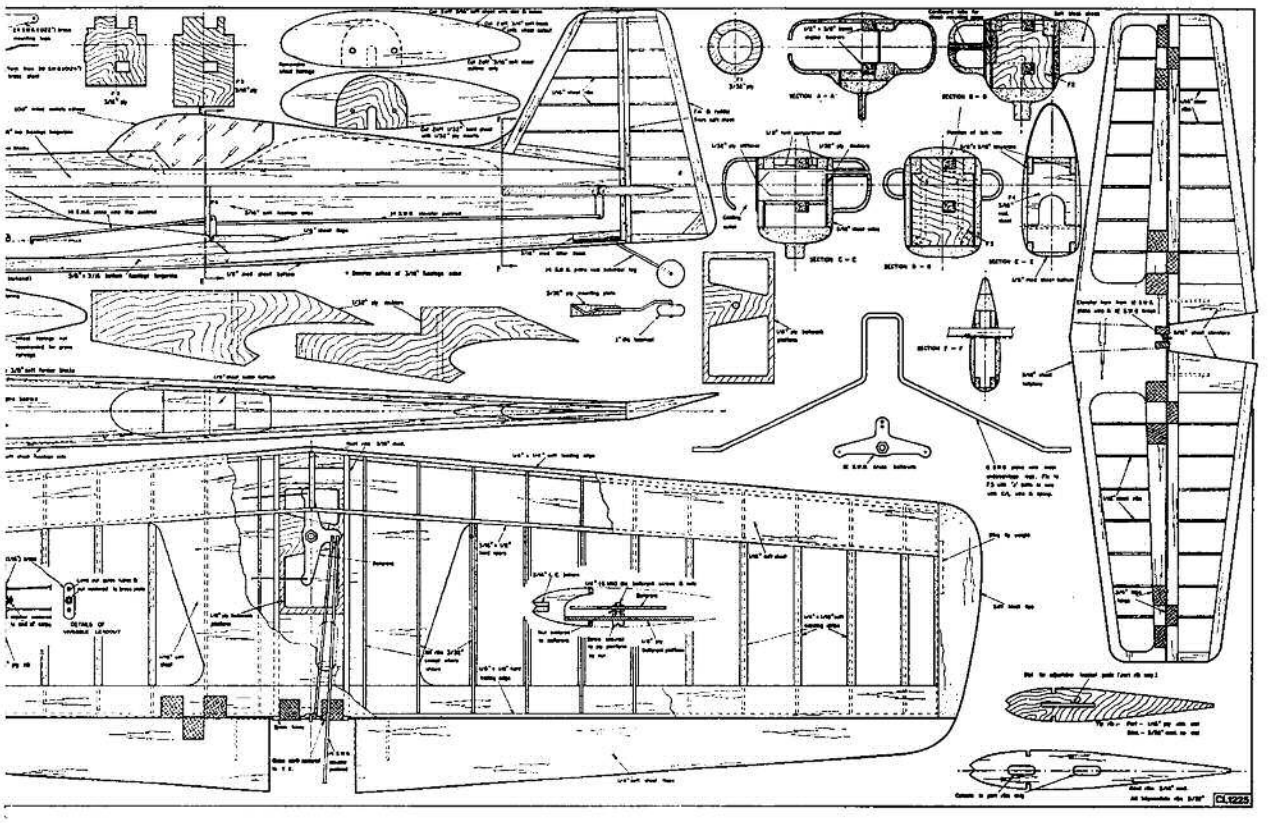
the fuselage bottom, my fuel line runs above the engine. The American Al Rabe suggests moving the fuel filter from the highest point of the bend of the fuel line between tank and engine and to install it nearer to the engine. As this was not possible in my model, I had to leave the filter where it was and concentrated my thoughts on the tank. The tank compartment of this plane is large enough to vary tank size, shape and location, so the tank was flattened, the length increased, and it was located directly to the top sides of the tank compartment. With another engine, bearer width and tank size, the problem might be quite different – better or worse! Keep this in mind when trying this design configuration. With my third tank – as shown on the plan – the trouble had not disappeared, but it was reduced to a degree which no longer affects flight characteristics at all.

Of course, the tank volume is not obligatory. The engine-run time is influenced by so many factors that you will have to decide this yourself. Among these factors is the propeller – the change from a German made plastic prop to an Italian wooden product of the same nominal dimensions increased the flight time from five to over seven minutes. So before cutting up the tank, a propeller change might well solve the time problem, as long as speed/flight characteristics are not altered. This brought me back to wooden props, which can be easily modified to one's specific demand. Careful measurements of several makes showed deviations from the nominal pitch: too little at the root and too much at the tip. Also it can become desirable to have a prop size between the available dimensions. If, for example, you have the desired speed with a 10 x 6 but your



engine lacks power in the climb, get an 11 x 6 and cut the diameter to about 10 inches.

Now for the actual 'work'. As the model is not in the beginner's category, a 'blow by blow' description of the building sequence will not be given, but here is some helpful advice. The wing produces no problems, and as it does not carry the landing gear, it can be built very light. If you decide to do without the variable lead out guide, then fix them in the most forward position shown. However, very little extra work is involved in making them adjustable, and they are highly recommended. The adjusting screw is secured by a soldered nut. The outboard block should not be hollowed, since you need weight here anyway. I prefer to make my bellcrank from brass sheet with a soldered nut as a bearing. The 'bearing screw' is bolted to the bellcrank platform which is carefully glued together with the ribs, spars, two half-ribs and



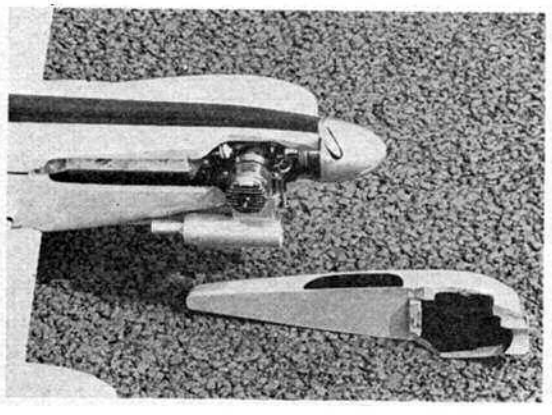
The pilot seems to be staring at the 'No. 1' pylon! Don't be afraid, Loriot is not that fast, but does like windy weather. There is not much room between the wheel spats and the ground so they should be removed when flying over grass. Wheels can then be changed to a bigger diameter to assist take-off and smooth landings.

leading edge joiners to make a really strong centre section. The flap horn runs in brass tubes, glued to the wing with glass cloth and epoxy.

Fuselage construction is a bit time-consuming. Start by gluing the engine bearers to the formers, adding the former-blocks and plywood doublers, using PVA glue. Add the top longerons, then join the fuselage at the tail end. Now the landing gear must be fixed with 'J' bolts or sew with control line cable, secured with epoxy. Apply tank compartment top and bottom sheets, trim former-blocks as shown. Install engine – see section A-A. Fill engine compartment with blocks around engine, allowing room for cooling and access to engine bolts. Add bottom block, tack glue top fuselage blocks and inboard cheek cowl. Rough shape outboard cowl with plywood stiffener then tack glue to fuselage and sand to shape.

The canopy can be formed by the aft fuselage block; this piece can later be cut off to use as a mould for making the canopy. For this purpose glue on excess block at the rear and bottom of the cut-away mould. If not done properly, the glue lines will show slightly on your drawn acetate. However, this method is more accurate than shaping the canopy mould separately. Unlike stated elsewhere, do NOT cover the mould with any material. Just sand smooth.

Now remove top blocks and cowls. Hollow both cowls as shown then form smooth transition from cowls to engine compartment, this will improve cooling. Cut through left fuselage side, matching the tunnel for the tank vents in the inboard cowl, which can be fixed now. Use small hardwood blocks, glued to starboard plywood doubler, as tank and cowl retaining block. A piece of cardboard tube and a small hardwood block takes the retaining screw of the outboard cowl. Don't forget the cooling outlet and muffler cut-out in the bottom of the cowl. Add front ring, former F1, cabin bottom and hollowed top blocks.



A plywood wall is necessary for the detachable cheek cowl in order to stiffen the completely hollowed item. It also serves to seal the tank compartment against oil. Note how easily accessible are both engine and tank, and that the tank's centre-line lies $\frac{1}{4}$ in. above the engine's centre-line. Allow $\frac{1}{16}$in. clearance between undercarriage fairing and fuselage for bumpy landings.

Install tailplane and wing now, watching for correct zero-zero setting and absolute free movement of control surfaces. Fuselage is finished by adding cut-off parts under wing, bottom longerons, tail wheel assembly, bottom sheet and dummy radiator – if you wish. Fin and rudder are made of scrap according to plan. Wheel stunt fairings are optional. If you fly only over grass, forget them.

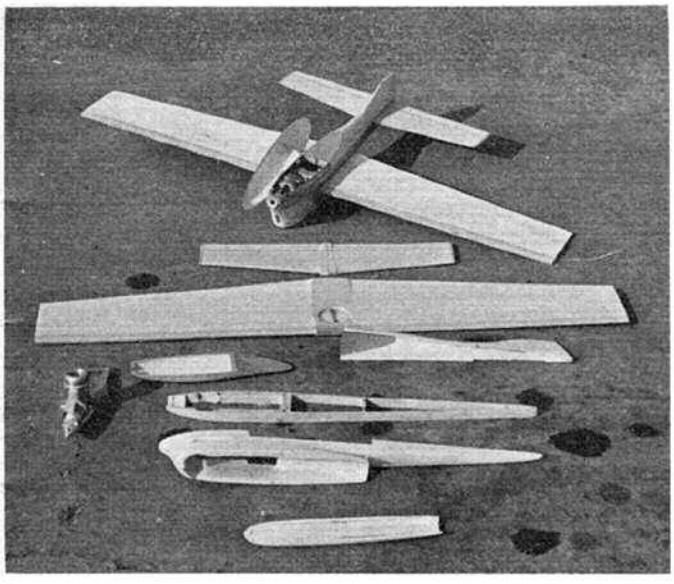
Give engine and tank compartment one coat of epoxy resin. Apply some coats of filler to the whole framework; open areas are covered with heavyweight tissue, entire model with lightweight. Add canopy. For the two following coats use dope which has been mixed with white dope – any colour appears much brighter when applied over white. Areas which are to remain white can now be finished, then covered with masking tape. Base colour used on the original was DUPLI-COLOUR car spray which is very light. After applying trim lines, decals and removing tape, add one coat of fuel proofer. My models tend to be on the heavy side (this one weighs 45 ounces) so if even I came out so low, you should be able to build this aircraft at around 40 to 43 oz! The tank operates on the uniflow system, so the overflow pipe must be blocked off in flight. The fuel line must run smoothly from the feed pipe, passing between cowl and former cut-out, to the engine. Cut out right fuselage side for tank lug, see pictures. Before assembling and flying the model, wait at least one week to allow the finish to dry thoroughly.

Each aerobatic aircraft has to be trimmed properly to perform well and to suit your own requirement. Besides adding nose, tail or tip weight or bending the flaps and elevator, the variable lead-outs are of great help. For a basic trim watch your wheels in level flight; if you see the outboard wheel behind the inboard, move the line guide forward. Continue until you lose line tension in manoeuvres, then go back to the last step. Enough pull through the wingover should be the criterion.

When arriving at the flying site, the experts usually ask me the brand of radio-control equipment, estimate my fastest race time over 10 laps, and look for the equipment access hatches. When they discover the lead-outs, all chins go down, down, down . . . !

BETWEEN THE LINES

by Dave Clarkson



Two of Jim Broad's F.A.I. team-racers under construction. Powered by an HP15D and TMA 15, both models finally weighed 16 oz. ready to fly. Low weight was achieved by careful wood selection and tissue finish. The blocks were hollowed to wall thickness of 3/32 in. apart from bottom duct which supports the undercarriage.

Detachable Nose Skids for Team Racers

The problem with mounting the nose-skid into a modern-type team racer is that there just isn't a logical, and strong, place to mount it in the nose of the model! I am sure that this has been the experience of most teams, since nearly all of the skids that I have seen are either motor or under-carriage leg mounted. One notable exception to this have been the Cooper/Green team, and Gerry Green of St. Albans revealed his secret here. Gerry's models have model-mounted detachable nose skids and the mounting method is obviously very strong, since Gerry is one of the few pilots who really makes his nose skid work very hard indeed; yet the mount has never failed.

All you do is to cut to length a piece of 10 swg. brass tube; flatten the tube carefully so that 14 swg. wire just goes up to it and then epoxy this flattened tube into a groove cut up the inside of the nose of the model from the fuselage floor to the crutch. Reinforce the mount with glass or nylon cloth patch and epoxy. The skid is a length of 14 swg. wire bent and then straightened a few times in different places on the part that is to go up the fuselage tube, and then finally bent back at its lower extremity. When the model is finished the skid is carefully tapped into the tube, using a hammer. When the skid wears out and needs replacing, carefully pull it out using a wrench and tap in a new skid. I hope the sketch explains all.

'B' Team Race Glow Fuels

The authorative articles on this subject were published in the November 1961 *AeroModeller* and June 1963 *Model Aircraft* written by Len Steward and Ron Lucas. If you really want to research the subject, then those articles are the place to start. I am not going to attempt to equal these articles but, nevertheless, in response to requests a rather basic covering of the subject is given below.

Any glow fuel consists of sometimes two, but usually three types of component – *Lubricant, Fuel* and *Combustion Improver*. As we shall see later, this analysis is a little simplistic, but it is a useful concept to keep in mind.

Lubricants

Mineral oils are almost unknown in glow fuels because of miscibility problems. We are, therefore, left with Castor and the synthetic-oils. Castor oil has in the past been the lubricant used most commonly because it is excellently suited for the job; unfortunately, castor oil has been rare and expensive due to successive crop failures, etc., and many of us have had to look at synthetics.

There are two widely available synthetic oils, Castrol MSSR and G-MAX ML-70, of which the Castrol grade is the more easily obtained. Of the two, only ML-70 seems at the moment to have an unblemised reputation, indeed, some speed men are quite wildly enthusiastic about it. The point about these synthetic oils is that, under the right condition, they burn – completely and cleanly. Ah ha! I hear you say, extra range – quite right, my friends, with a synthetic oil based fuel up to 10 per cent extra lappage is posible (and we all need extra laps). The minus side concerns highly technical aspects of Tribology. I suggest you read John Bristow's article on the January '74 issue of *Radio Control Models and Electronics* if you want to delve into some of the 'why's', but the 'what' is the possibility (some would say certainty) of very rapid piston/liner wear, especially in lapped piston motors like the ST G21/29 RV. There is now considerable evidence of this general deficiency in synthetic oils, however, the one exception seems to be G-Max ML-70. ML-70 has been formulated specifically to resist liner 'burning' in speed motors and, from the reports I have heard from speed men, it appears to do just this. If ML-70 is OK for speed men (when they get a lean run, boy, do they have a lean run!) then it is OK for we 'B' men; in my experience, anyway.

So for lubricants, if in doubt use Castor Oil. However, do have a try with ML70 – you may well be very pleased with the results. In any case, do not go below 18 per cent oil in your fuel, to be safe, use 20 per cent oil on a run-in motor and 25 per cent whilst running in.

Fuel

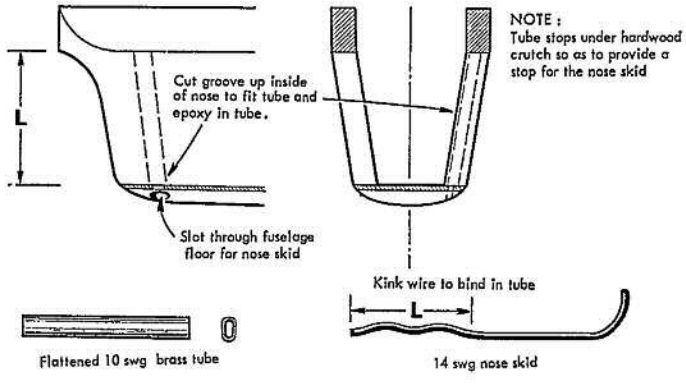
A more complex subject and one where most of the 'B' fuel secrets lie. Firstly, listed below are the 'fuel values' of various types of organic compounds.

	Kcal/cc of fuel
Aromatics	8-9
Paraffins	7-8
Ethers and Ketones	6-7
Alcohols	5-6

The standard fuel component in glow fuels is Methanol, it is an alcohol and therefore has a low 'fuel' value (5,19 kcal/cc to be exact). The reason why we use methanol as the standard can be seen from the following list of 'power values' referred to the same groups of organic compounds used above.

	cal/cc of air consumed
Alcohols	1.2 – 1.4
Ethers and Ketones	approx. 1.15
Paraffins	approx. 1.05
Aromatics	approx. 1.00

Figure 1 Detachable nose skid



First of Jim Broad's current series of F.A.I. racers, based on Russian Plotsin/Timofeev model. Tissue covered, the model weighs just 16½ oz. with its HP15D powerplant, despite repair jobs which indicate its hard life!

Methanol has other characteristics that have made it the standard ingredient, viz.
– *high latent heat of vapourisation* (gives high density, cold charge for extra power)
– *very wide combustion limits* (very easy needle setting)
– *cheap and widely available.*

The first two such characteristics are very useful, and for these reasons alone it is usual to put at least 30 per cent alcohol in any 'B' fuel. The rest of the fuel portion may be selected from a fair variety of components typically as listed below. Given with the list is the 'efficiency' of each organic chemical, i.e. the product of the Power and Economy values, with the highest value obviously being the best. Also given are the boiling points of each chemical. The boiling point is important since it dictates the 'volatility' of the fuel; if you are going to use a large portion of a low volatility (or high boiling point) component in your brew, then the overall volatility of the brew will have to be maintained by adding a small quantity of a high volatility component. This volatility balancing operation can be tricky, so for ones first attempts at a 'B' brew I suggest that you start with a low boiling range ingredient such as Benzene.

		Fuel Efficiency	Boiling Point °C
Alcohols	*Methanol*	7.4	65
	IPA	5.8	83
	Benzene	8.4	78
Aromatics	*Toluene*	8.5	111
	Styrene	8.8	146
	Cumene	9.2	152
Ethers	*Acetone*	7.3	57
&	*Ether*	7.3	35
Ketones	*Amyl Acetate*	8.1	142
Paraffins	*Heptane*	8.0	90

It will be seen that our old friend methanol is the most efficient alcohol and that the aromatics are the most efficient economisers. The high volatility additives are seen to be rather inefficient and therefore their use should be avoided, or at least minimised.

Combustion Improvers

Three types of additive may be used, viz:
(i) *Those that increase combustion temperature* – typically nitromethane
(ii) *Those that increase combustion speed* – typically propylene oxide
(iii) *Those that decrease initiation requirements* – typically Amyl Nitrite

Of these, Nitromethane is usually essential, Propylene Oxide normally is never necessary and only rarely is Amyl Nitrite necessary. (A type (ii) additive is only useful when very high revs and high nitro contents are used.)

Raising the combustion temperature can be most necessary, especially when using high aromatic contents in the fuel, since with these brews, heat release per cycle is down on even straight Methanol/Oil brew. If the engine runs too cold, then combustion may be partially 'quenched', resulting in large quantities of unburnt fuel being ejected. To get satisfactory running on a 'B' motor, a minimum of 5-10 per cent Nitromethane is commonly necessary – since this can be quite significant, here is the data for nitro,

Power Factor	2.49
Economy Factor	2.78
Efficiency	6.9

i.e. terrible for economy and not very efficient!

When using a high aromatic content fuel, incomplete combustion, i.e. 'sooty' burning, is often found. This is because aromatics have a very high initiation energy; in ordinary language they are very stable compounds and are, therefore, most reluctant to start burning. As in diesel fuels (where the same problem occurs although in a slightly different form), the cure is to markedly drop the octane number of the fuel by adding a cetane number/diesel Index improver. The most effective of such compounds are the organic nitrates and nitrites and the most popular one of these is Amyl Nitrite, although Amyl Nitrate, i-Propyl Nitrite, Ethyl Nitrite, etc., are equally effective. So if you are getting a very sooty exhaust, try up to 3 per cent nitrate to effect a cure.

Left: Winner at the Glevum combat rally, Richard Evans with attractively decorated 'Supermonger' – latest, very hot version of his well known 'Ironmonger' design.

Right, Malone of Nuneaton, seen here with his back-up pit crew, used this swept wing design called 'Device' to place second at Glevum combat meet.

Conclusion

I hesitate to recommend any one fuel formulae because so much can depend on the motor, etc., for the results achieved. However, as starters I suggest, mind you, only suggest, the following:

	Basic Brew	Mild Range Brew	Range Brew
Methanol	70	60	40
Castor or ML-70	20	20	20
Nitromethane	10	10	10
Benzene	—	10	30
Amyl Nitrate	—	—	+3 phr.

All of these components are obtainable from either G-Max, Griffin & George or your local friendly chemist. G-Max, whose address is 20 Beechwood Close, Ascot, Berks, sell over-the-counter only the following:

Methanol, Methanol/Nitromethane mixture, Propylene Oxide, ML-70 Oil, Acetone

all in bulk at very moderate prices. They do know of, I believe, people around the coun'ry who hold small stocks of some, if not all, of these, so you may be able to get G-Max components from a local source. Try this because it is really worth the effort.

Griffin & George and also Gallenkamps are national laboratory suppliers and will be located in your 'yellow pages'. They are very useful for obtaining the other chemicals. Needless to say that there is much more to 'B' team racing than fuel formulation. Indeed, I believe that Heaton/Ross who won 'B' at the '73 Nationals did so using Keil-Kraft Nitrex 15 glow fuel! However, if fuel fiddling appeals, then I hope that I have pointed the way.

One final point. Fuels and fuel components are highly inflammable and some components are toxic (nitro-benzene is one of the classic poisoner's poisons), so be very careful. Always mix up fuel in the open well away from fires and always store fuel and components in the garden shed, in proper containers and clearly marked.

Glevum Combat Rally

Hardworking P.R.O. of the Glevum Club, Frank Smart, is to be thanked for the following report of his club's first combat comp. from the depths of the Gloucestershire – Ham. Over to be exact. No, that's not the nature of the remaining sandwiches, but yer actual venue – honest!

The battle commenced with some 38 pre-entered red entries necessitating a preliminary round, spurred on with the thought of a total prize bag totalling some £45 of modelling accessories, vouchers, cups and trophies!

First round ran reasonably smoothly, although it was evident that flyers were in need of some ru-t removing, judging by the rate of collisions! A notable bout was fought between Wiseman of Stockport M.A.C. flying his own design *(Showgun)* against junior Andrew Walker, aged 13, of Alfreton and District M.A.C., with a *Warlord*. Andrew played the game well, and comes from a club with a 75 per cent junior membership (total 48 members) after amalgamating with A.C.E.

One of the most improved junior flyers since last season was 16-year-old Ian Perkins from the South Bristol stronghold who took on Veron Hunt of Alfreton (ACERS). It was evident that Ian had been busy over the winter, and with his *Ironmonger* well on song, took the advantage against Hunt's *Warlord* which was suffering motor-wise. Final cut was taken to win by Perkins seconds before the whistle in a low attack, even though he had won on ground time which Vernon had accumulated, plus a string cut early on.

The John Hammersley v. Whittle bout showed the variation in tactics, with John's Super Tigre G15 glow against the inevitable Tiger. With the speed and line tension advantage, John made good use of the upwind manoeuvres to 'kill off' the Oliver diesel, then made his attacks to win.

Most promising new team was the Bath M.A.C., which although having several different designs under way, did well to get one of their teams to fourth place.

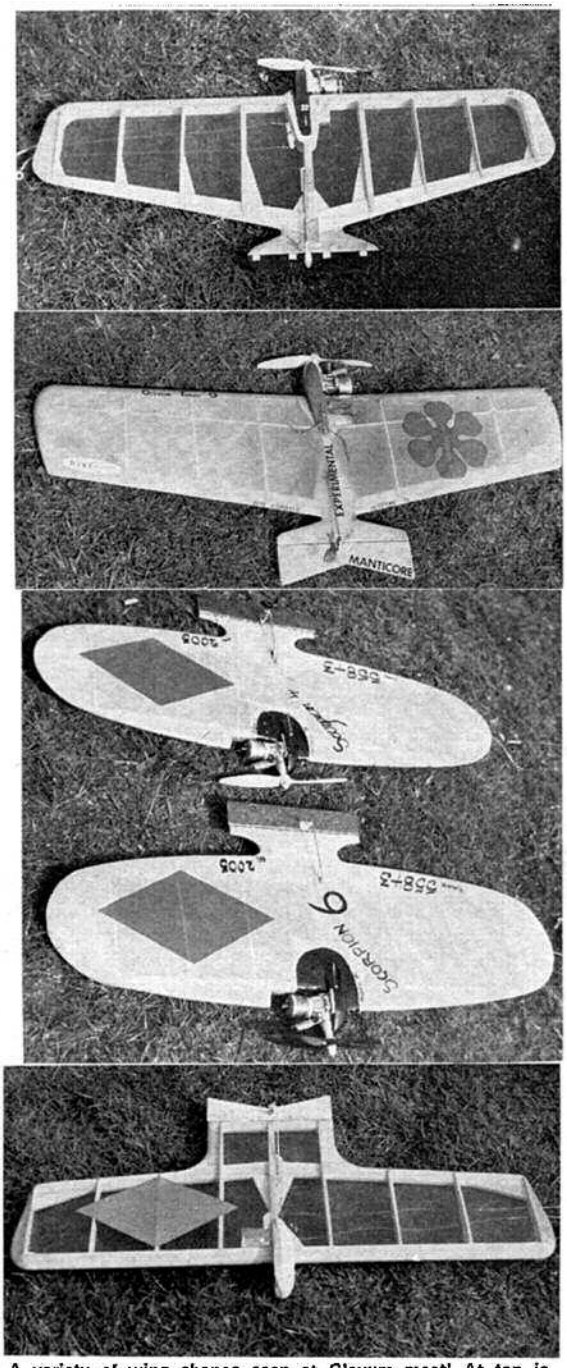
Luck comes in at times and Dave Wood of Stockport breathed a long sigh of relief after taking all of John Hammersley's streamer early, but the engines proved troublesome and a large amount of ground time was lost with both motors playing up.

In the quarter finals Mick Tiernan, now with A.C.E., lost to John James of Bath by only 12 seconds in a close-fought bout – Mick being credited with two really neat cuts.

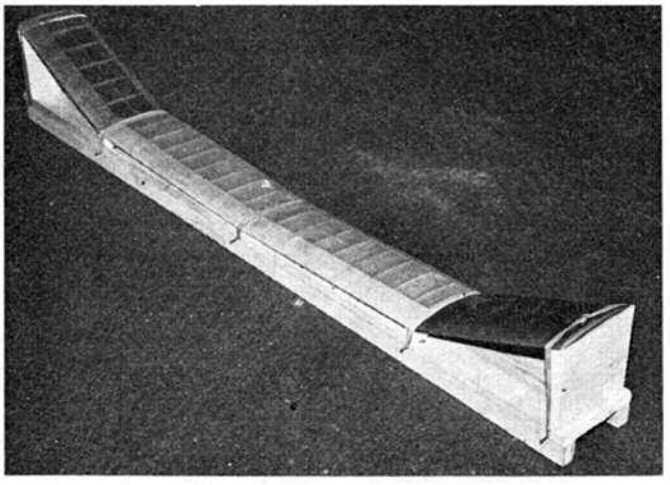
The semi-finals came up around 5 p.m. with just a slight breeze and the sun burning the faces of the scorers staring for cuts off the streamers.

Wood of Stockport v Evans of South Bristol proved to be an anti-climax with Wood's new design *Titan* turning inside Richard's *Supermonger* in both loops and bunts, but in fact,

continued on page 297



A variety of wing shapes seen at Glevum meet! At top is Dave Wood's 'Titan', nicely finished in orange Solarfilm with black and white trim – most impressive model of comp. Very fast and tight manoeuvring. Below is Tim Cobbald's experimental 'Manticore' design with swept forward leading edge. Below that are two unusual elliptical designs from Bath MAC. These 'Scorpion's' have conventional leading edges cut from ply, lightened, and with recessed engines. At bottom is John James' 'Normonger' – another modeller who takes advantage of Solarfilm covering for lightness. Easily stripped off for repairs too.



Back to SQUARE ONE

KEEP THOSE WINGS WARP-FREE WITH THIS SIMPLE JIG

The wings are held down on the jig by rubber bands looped over the wing and around the panel pins on the base. Store wings on this jib between flying sessions for warp-free surfaces.

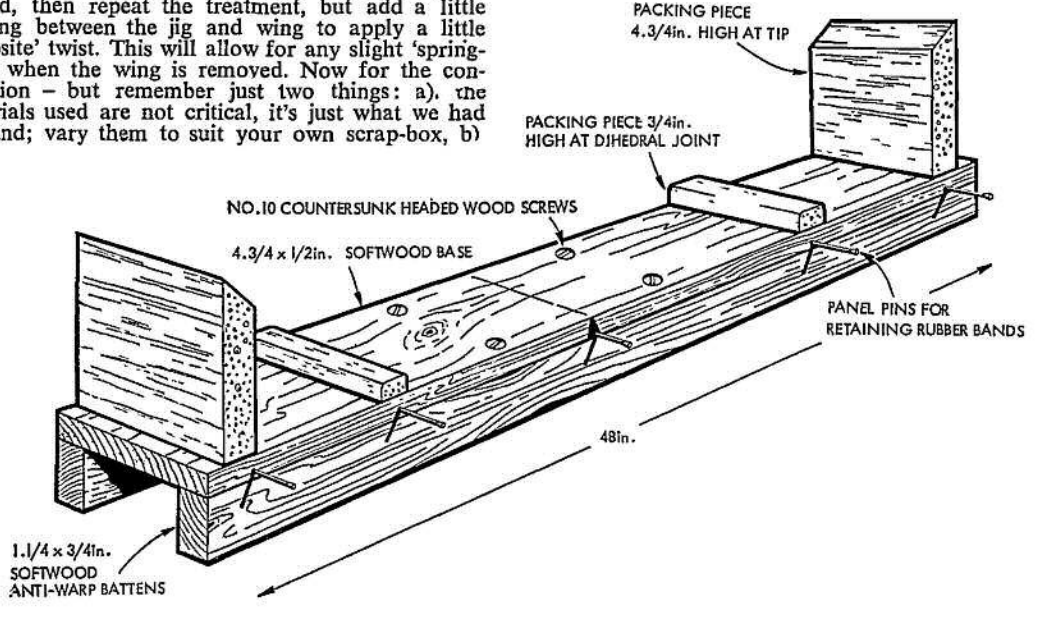
A WING JIG of course is not essential, but it is certainly a very useful 'de-luxe' item, and one which can be made in a very short time with few tools and a modest cash outlay. But firstly, what does it do?

Well, since covering and doping your wings, and having checked that there were no warps present, have you checked them again recently? Chances are that the wings will have twisted somewhat – most likely the tips will have a little washout i.e. the trailing edges may now be raised higher than the leading edge at the extreme tip, but even the main panels may be twisted. Actually, a little (up to ¼ in.) washout at the tips will not do any harm, but there is no point in trimming out your model perfectly one day only to have it warp before the next flying session. The jig described below will hold your wing true between flying sessions so over-coming these problems. A further advantage is that it may be used to remove serious warps. In this case, hold the wing over the steam from a kettle until thoroughly soaked – the tissue will all slacken off – but mind your fingers! Now place the wing on the jig, and hold in place with rubber bands and leave for 3-4 days to dry out thoroughly. The result should be a 'true' wing once more. If all the warps have not disappeared, then repeat the treatment, but add a little packing between the jig and wing to apply a little 'opposite' twist. This will allow for any slight 'spring-back' when the wing is removed. Now for the construction – but remember just two things: a). the materials used are not critical, it's just what we had to hand; vary them to suit your own scrap-box, b) a jig which is not true is useless – be sure that the baseboard is warp free and that the packing pieces are cut accurately. Sizes may simply be varied to suit your model, but this jig was built for our *Asteroid* glider wing.

Firstly, the materials needed. For the baseboard we used a piece of softwood ½ in. thick, 4¾ in. wide, and 48 in. long (haven't caught up with millimetres yet!) As we said before, this must be warp free – check carefully before you buy. To keep this wood straight we bought two 4 foot lengths of 1¼ x ¼ in. softwood to screw to the underside with a dozen No. 10 countersunk headed woodscrews. A few panel pins or similar, some scrap wood of any variety and a few rubber bands are all that is now needed – total outlay being around £1.75. All wood is extremely expensive these days!

Construction is clearly shown in the accompanying sketch, but this is the sequence we employed:-

a) Mark position of all screw holes on the plank, and drill through with ⅛ in. diameter bit.
b) Place plank on top of softwood battens, and using top plank as pattern and still using the ⅛ in. drill, drill the four 'corner' holes.



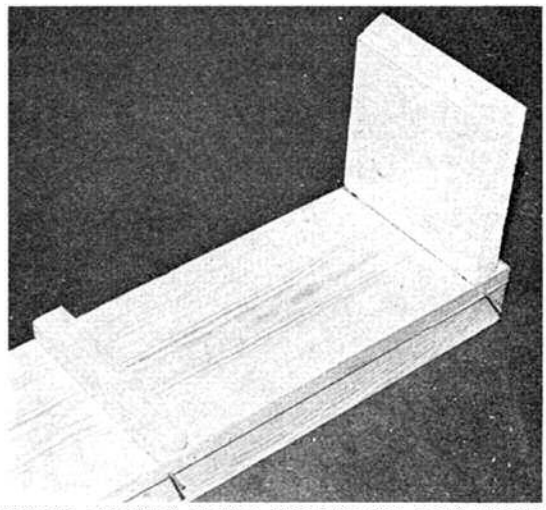
c) Drill out the four corner holes in the plank to $\frac{3}{16}$ in. diameter and countersink.
d) Attach the two battens with the screws at either end.
e) Now using plank as jig once more, drill the screw holes into battens with $\frac{1}{4}$ in. bit.
f) Remove screws and open out all holes in plank to $\frac{3}{16}$ in. diameter and countersink.
g) Now screw planks to battens permanently – glue as well if you wish.

This should result in a dead flat, warp resistant board – now to add the vertical support pieces. These may be of any material, but softwoods are preferred as they are easiest to chamfer. Actually, we 'cheated' and used scrap $\frac{1}{2}$ in. sheet balsa, but that is rather expensive unless you have balsa that is too hard to be of practical use.

Mark the centre of the board and place the wings on top, then mark the position of the dihedral breaks. If you made your model accurately, then each dihedral break should need packing up $\frac{3}{4}$ in., so cut your scrap wood to this height and chamfer the top edge to suit the angle of the wing so that it seats comfortably. Do the same for the tip supporting blocks – which should be $4\frac{3}{4}$ in. tall before chamfering. Glue these blocks in place. To hold the wing in place we simply used rubber bands passed around panel pins hammered into the edges of the baseboard and over the wing. Do not use bands of too great a tension as this may crush the trailing edges – just make them hold the wing firmly against the supporting blocks.

* * *

By now we hope we have given the beginner a useful introduction to the hobby via this series, and have pointed out a few hints that will help him on his path to a successful, and thus rewarding, form of aeromodelling. However, free flight gliders are just one way of finding fun and we next intend to guide potential control-line fliers along a similar path. But first we will deal with one factor that is common to all control-line models – an engine! We will detail the operation of both diesel and glow engines in future issues – so stay with us!



Note the chamfered packing pieces to give good support for the wing. Use a softwood for ease of forming this chamfer.

BETWEEN THE LINES

continued from page 295

Combat models go amphibious! One of at least three models which free-flighted at the Glevum meet being recovered from a nearby lake – not a method of engine cooling which George Copeman recommends! Line cuts which cause this sort of accident are an increasing safety hazard, but one which is hard to guard against.

this was the downfall of Wood – he took a string cut. He retired to save this supermodel to fly off for 3rd-4th place later.

The other semi-final, James of Bath and Malone of Nuneaton, came out with Malone on top. These flyers were evenly matched and although relatively unknown last year, put on a fine display of clean combat, despite what was at stake.

In the Finals, Richard Evans met the newcomer Malone and a fast exciting final finished the day with Richard taking four skilful cuts to win, the *Device* design of Malone not being quite up to shaking off Richard's well-tried model.

Italian Speed Trials

For many years now, the Italians, or at least Italian engines, have dominated the F.A.I. speed class at World and International class levels and for this reason alone the results of their first Team Trials for the '74 Champs are interesting. When you further consider that these Championships will be also a chance for the Super Tigre factory to challenge the Rossi stronghold 'in public', then they become all the more interesting!

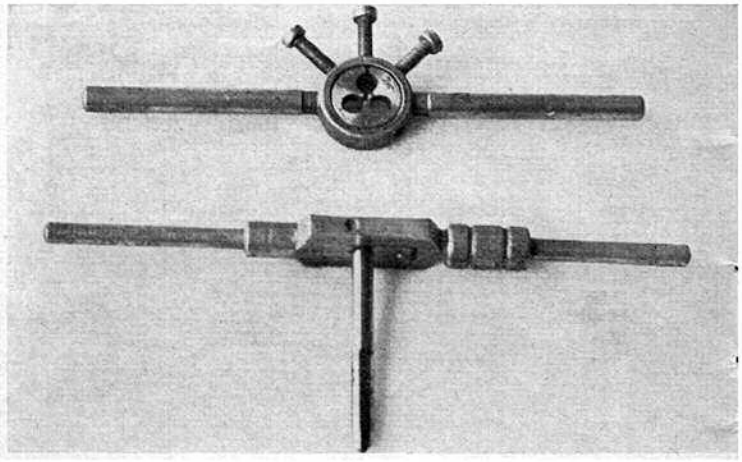
The contest itself was held in rather cold conditions which no doubt affected performance adversely, in which case the speeds achieved were even more impressive than they already seem! It is interesting to note that the Rossis used by the 'works' men were the 'old-type', i.e. not the latest rear-induction units that the factory have been playing with. Also, the top-placed Super Tigres were running at up to 32,000 r.p.m. using cropped 6 x 7 in. props. The results below do not necessarily mean that the top three will form the Italian speed entry – there may well be a second Trial. The O.P.S. used by Muzio is not a pre-production prototype, merely a 'bitza' assembled by Muzio for his own amusement.

Results:

1.	Pratti	*Super Tigre*	246 kmh
2.	Grandesso	*Super Tigre*	244 kmh
3.	Larcher	*Rossi*	243 kmh
4.	U. Rossi	*Rossi*	239 kmh
5.	Ricci	*Rossi*	238 kmh
6.	Corti	*Rossi*	230 kmh
7.	Ugolini	*Rossi*	228 kmh
8.	Muzio	*O.P.S.*	220 kmh
9.	Dusi	*Rossi*	193 kmh

BASIC METALWORK

Part 5 of Bill Burkinshaw's practical guide for the aeromodeller



Thread cutting die (top) and tap in their respective holders or wrenches. The two outer screws in the die holder locate the split die and close down the die when tightened, while the centre screw is used to open out the die when cutting oversize threads.

IN THIS article I will describe how metals can be joined together using threaded screws and nuts, and also with 'self-tapping' screws. I won't insult fellow aeromodellers' intelligence by describing how a nut and bolt works but will ask you to bear with me while I mention a few basic facts concerning terminology.

Sizing

There are numerous thread systems in use throughout the world, all having differing critical dimensions and no one-size nut that you are likely to pick up will mate with any other system's bolts, even though the same nominal size. The systems used are usually abbreviated for convenience, e.g. B.A. – British Association, B.S.F. – British Standard Fine and the nominal size usually is either an Imperial or Metric dimension, e.g. ¼ in. B.S.F. or 6 mm. S.I. (Systeme Internationale). This dimension refers to the maximum diameter of the threaded portion of the bolt (figure 1). The thread system used by aeromodellers in the main is the B.A. system which is, in fact, based on metric units. There are however equivalent Imperial size drills for all holes necessary for use with the B.A. system. The length of screw or bolt is determined according to the type of head: refer to the diagram for information.

Head Types

There are more than eight different head shapes for B.A. screws but only three of these are of major interest to us, they are: *Cheese head, Round head* and *Countersunk head*. Very occasionally you might find it necessary to use hexagon headed screws in an awkward engine installation, for example, where it is difficult to get a screwdriver on to a particular screw head. Incidentally when using a screwdriver to tighten up screws of any type it is of great importance (to the screwhead) to have a screwdriver which fits the head properly. Most screwdrivers of the small electrical type used by modellers for B.A. screws will respond to a file and a few moments spent getting the screwdriver a snug fit in the slot can save any number of spoilt screws. The slots incidentally are machined to a fairly close tolerance on manufacture so you should only have to file up one 6 B.A. screwdriver, one 8 B.A. The 'proper fitting' rule of course applies equally well to spanners, nothing ruins nuts more quickly than a pair of pliers. One of the best investments I ever made for engine installation was a set of 'Nut Drivers' – these are a 6 B.A. box or socket spanner mounted on a screwdriver type shaft and handle. Nuts can be wedged into the end with a piece of balsa and threaded onto engine mounting screws in places where the slimmest of fingers cannot reach.

Screw Materials

Most of the screws which you will come across will be made of either steel or brass. They may, however, be coated with a variety of metal plates, chrome, cadmium, blackened etc. The screw material should be chosen with its function in the model in mind, and the properties of the material from which the screw is made, given some thought. A lot of modellers argue that it is a good thing to use brass screws when mounting an engine, as in the event of a crash the screws, being comparatively weak, will shear and act as 'impact or energy absorbing elements' and perhaps prevent such things as broken crankshafts. Well I gave this practice up when I purchased my super nut-driver and perfectly fitting screwdriver, because I broke so many brass screws bolting the engine into my models! Seriously though, you should use a steel bolt for your bell-crank pivot, preferably with a brass tubing sleeve over it to avoid the threaded screw wearing the pivot hole oval and producing undesirable slop in control linkages. If you are using screws which have other than the bare metal finish and you wish to permanently lock a nut onto the bolt, or fix something else to the bolt, it is virtually essential to emery cloth all traces of the plating off the screw before attempting to solder to it.

Clearance Hole

In the table printed in the first article of this series I included a column headed 'clearance hole for' and below a list of commonly used bits and pieces which one might want to poke through holes. The list included 4, 6 and 8 B.A. thread. Why a special size for a clearance hole? Well firstly for us aeromodellers who don't locate parts together with dowels and other precision aligning methods, the bolt has to *align* the two parts being held as well as hold them. If we are bolting two parts together that need to be taken apart occasionally but also need to line up accurately on re-assembly the bolts must be a close, but not tight, fit in

Figure 1 – Screw Heads

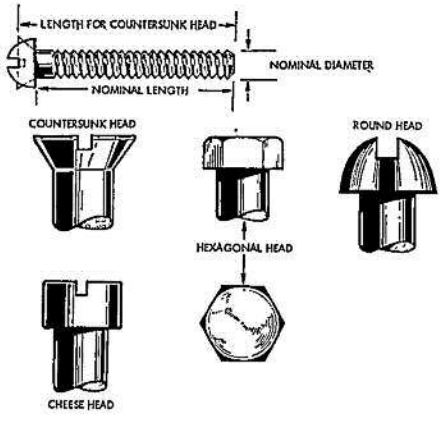


Table 1 Clearance and tapping drill sizes

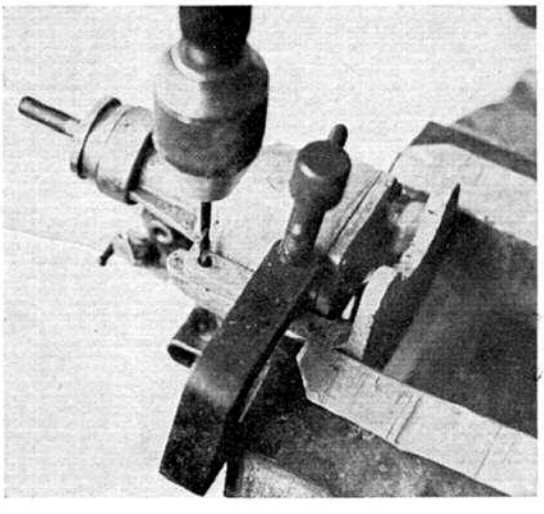
B.A. No.	CLEARANCE		TAPPING SIZE: LOOSE FIT		TAPPING SIZE: TIGHT FIT	
	No.	mm.	No.	mm.	No.	mm.
0	8	6.05	7	5.1	11	4.85
2	12	4.85	21	4.00	25	3.75
4	26	3.7	31	3.05	33	2.85
6	33	2.9	42	2.35	43	2.20
8	43	2.3	49	1.85	51	1.75

the holes. The sizes given in the table give a few thousandths of an inch clearance to the bolts size. Also a too-large hole does not give a bolt adequate support underneath the head when the nut is tightened and especially with wooden bearers (which are also weakened by over large holes) even with washers being used, can allow the screw heads to pull through the wood. And lastly the term 'clearance hole' is used to distinguish the 6 B.A. clearance size hole from the 6 B.A. 'tapping size' hole which brings me, very neatly I feel, to the process of cutting threads!

Cutting Internal and External Threads

I will cover cutting internal threads (nut-type threads) first. The thread is cut on the inside of a pre-drilled hole with a hard steel cutting tool called a TAP. You can see from the photograph that it is similar to a threaded screw but with flutes or grooves along its length which form cutting edges. There are two taps illustrated, one a TAPER TAP and the other a PLUG TAP. The taper tap tapers at the end as you can see and the plug tap does not. The taper tap is used as a 'first stage' cutter and the plug tap to open the whole thread onto the final maximum depth and complete shape. The end of the tap is square and this is to allow it to be gripped and driven positively by a tap wrench which is the name given to the tool used to hold taps. Tap wrenches will usually accommodate a variety of sizes of taps and are essential if you are to successfully cut threads without breaking taps. A simple tap wrench can be made with the aid of a short length of 3/16 in. or ¼ in. square mild steel bar and a couple of 6 B.A. bolts. The necessary dimensions are given in Figure 3 and the tap wrench should not be difficult for anyone to make after having had a little bit of metal-working practice. Do pay close attention to the two vee-shaped grooves across the bars however, as it is important for future convenience of use and accuracy of tapped holes that the tap is exactly at 90° to the tap wrench. Assuming then that you have a tap wrench you will need some taps of the sizes you will find most useful. I suggest 4, 6, 8 B.A. taper taps for a start unless you want to tap 'Blind' holes, that is a hole that does not go right through the metal, in which case you will need the appropriate-sized plug tap as well in order to cut thread right to the bottom of the hole. You will probably only be able to obtain high-speed steel taps but if you are able, try to buy Carbon steel. In either case buy cut-thread and not ground-thread. Carbon steel is cheaper than H.S.S. and cut threads are cheaper than ground threads. Both will break equally easily in the small sizes we are using! Before starting on your thread-cutting operations you will also need some suitable lubricant for the particular material you are cutting. For aluminium and its alloys – paraffin, Steel – 3 in 1 or similar lubricating oil, Brass – tallow or lard.

The use of lubricant helps achieve a good finish on the thread and cuts down wear of the tap. It is particularly important with aluminium as this metal tends to weld itself to the cutting tool. This means that quite often the tap becomes lodged in the work and is broken on attempting to unscrew it. One small advantage I have just remembered in using carbon steel taps is that if you break one off in a piece of steel you can anneal it and then drill it out



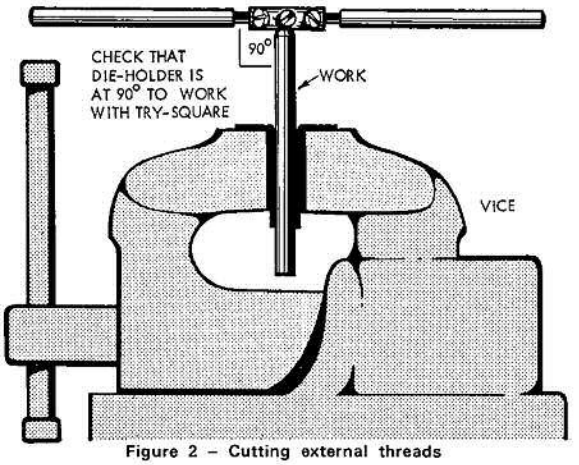


Figure 2 – Cutting external threads

to clear the hole for a second attempt. This is not possible with H.S.S. taps.

Method

From the table, select the correct size tapping drill for the thread you are using. Having marked out and centre-punched the hole position, drill to the correct depth with tapping size drill. Place the taper tap in the tap wrench, lubricate with appropriate lubricant and place the end of the tap in the hole. Make sure that the tap is upright then rotate the tap clockwise until you feel it bite into the metal. Slight pressure downwards will be necessary. When the tap bites into the metal continue in a series of half a turn forwards, quarter of a turn backwards, steps until you have reached the bottom of the hole or gone right through to the opposite side of the metal in the case of a through hole. If you are tapping a blind hole remove the taper tap from the tap wrench, replace it with the plug tap and cut down using exactly the same method as above to cut a full-depth thread right to the bottom of the hole. The purpose behind the half turn forward, quarter turn back, is to break off the swarf being formed as the thread is cut. If this is not done, the tap will become wedged solid and break itself.

At this point a few tips on fixing engines down onto metal-faced bearers, cast pans, cast motor mounts etc. If the engine being used has no exhaust stack on the side it is fairly straightforward. Clamp the engine onto the mount making certain that it is correctly bedded down and aligned. Using a drill which is a close fit in the mounting lug holes, mark the position of the bolt holes in the bearers. Remove the engine and on the marks you have made drill with the tapping size drill. If the marks are not a good enough location for the point of the drill you will have to centre-punch them first. For engines with die cast exhaust stacks you will have to be a little more ingenious. If possible try inverting the engine so that the mounting top faces of the lugs are in contact with the bearers. Or try a 'bent' centre-punch either a carefully pointed bent bolt or a tamper from a packet of wall-plugging compound.

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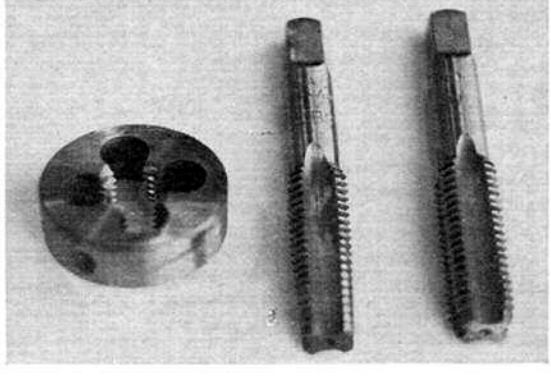
Left: drilling a cast aluminium engine mount to suit. Hold the mount in a vice and clamp engine in place inverted so as to enable engine holes to be drilled in situ without exhaust stack or cylinder head fouling drill chuck. Keep swarf out of engine though . . . ! Below, split die (left), taper tap – note tapering threads – and plug tap (right), where thread extends to bottom of tap.



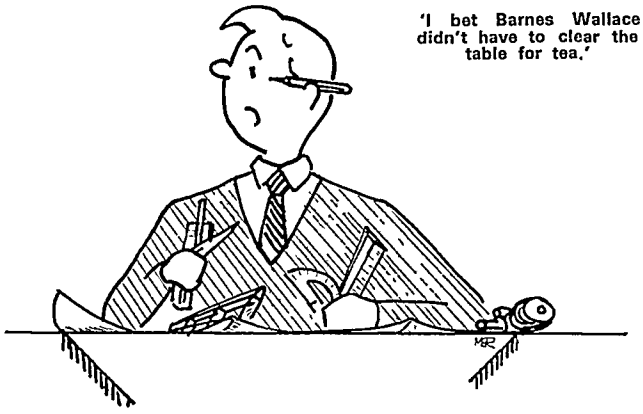
GADGET REVIEW

Readers hints and tips

THE STORAGE of control-line wire is a perennial problem for those who choose the circular-flight-path form of model flying. The cardboard disc upon which the three- and seven-strand cable is supplied is too small for convenience and besides it takes an awful long time to wind the lines back on at the cessation of the day's, or the model's, activity. Reader Ian Nichols of Malvern, Worcs., has a simple and cheap solution, drawn in **Figure 1.** Firstly, he cuts a disc from $\frac{3}{16}$ or $\frac{1}{4}$ in. sheet balsa, some 4 in. diameter (just possible from a piece of scrap sheet). Next he cuts two 6 in. discs from stiff card and sandwiches the balsa between them, using P.V.A. glue and making sure that the centres of each disc align. The 1 in. rim is quite sufficient to keep the lines on the hub. When dry, he drills two $\frac{1}{8}$ in. diameter holes opposite each other, on either side of the reel, and glues in 1 in. lengths of $\frac{1}{4}$ in. dowel. These handles enables the lines to be wound in or out very quickly. A rather more hardwearing unit could be made by substituting $\frac{1}{16}$ in. ply for the stiff card discs.

Another piece of equipment as vital in importance to the control liner as the lines themselves, is the actual control handle. Racing enthusiasts appreciate the value of a handle permitting closely spaced lines, as this 'gears down' the control movement and can really tame an oversensitive model. The handle used by Bob Moreton of the Urmston and District M.A.C. (**sketch 2**) can be made in a couple of hours, and enables line lengths to be easily adjusted too. Construction is quite easy, just take two pieces of $\frac{1}{2}$ in. pine (or similar) size 5 in. x 2 in., drill to accommodate the three 6 BA bolts and bolt together. Carve and sand to a comfortable shape – remembering to carve a recess for the thumb for maximum comfort. While still bolted together, drill holes along the partition line to accept 1 in. long brass tubing guides. Separate halves and epoxy these tubes to one-half of the handle. Now make up the heavyweight laystrate control-line wire lead complete with fishing swivel clips – this passes around the centre retaining bolt. The lead-out lengths are adjusted by pulling through after loosening off the two handle halves. When the bolts are tightened the leadouts are clamped tightly in position. Remember to finish off the job properly by giving three coats of sanding sealer plus fuel proofer to the woodwork.

Tears in tissue-covered wings are part of the free-flighters occupational hazards. For years Martin Pressnell of St. Albans has cut-out tissue patches as and when required; some square, some rectangular, some with corners clipped off, all to suit the shape of the hole. However, in the interests of neatness, not to mention time-saving on the contest field, he has standardised on patches by making them circular and cutting them out a dozen or so at a time, using a coin as the former. **Figure 3** explains all.



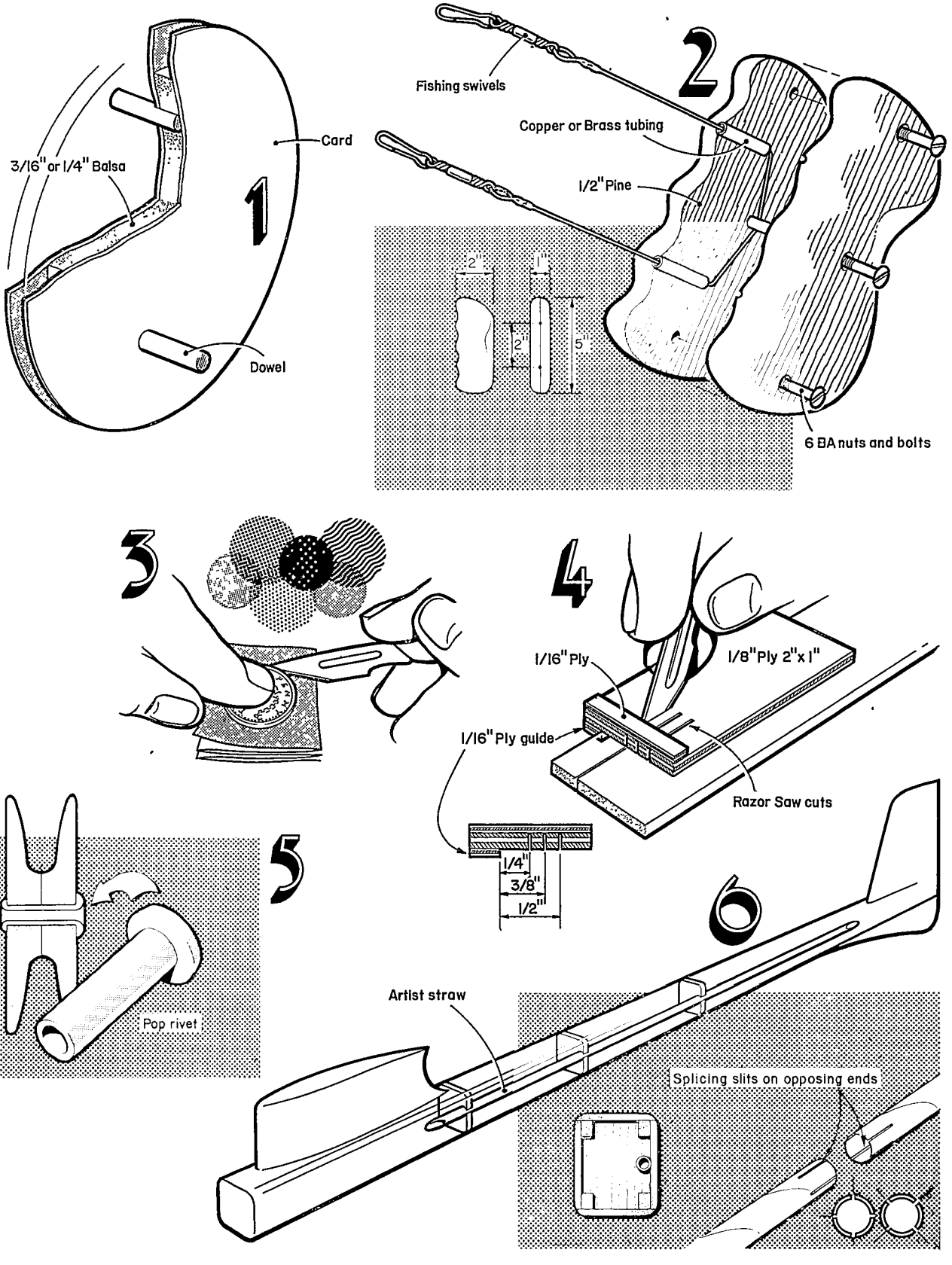
'I bet Barnes Wallace didn't have to clear the table for tea.'

Next to gadgets designed for connecting batteries to glow-plugs, the balsa stripper must rank as the favourite subject for inventive modellers! The advantages of cutting your own stripwood from sheet balsa are well known (it's cheaper and the strips will be of equally consistent quality) and the simplest stripper which we have seen so far is that produced by well-known C/L stunt flier Jim Mannall. Basis is a piece of $\frac{1}{8}$ in. ply size 2 in. x 1 in. into which razor saw cuts are made at one end, corresponding to the width of strip wood required (in the example illustrated in **Figure 4** opposite, $\frac{1}{4}$ in., $\frac{3}{8}$ in. and $\frac{1}{2}$ in.). A piece of $\frac{1}{16}$ in. ply $\frac{1}{4}$ in. wide is then glued across the end to stiffen up the saw-cut area, and a further similar piece glued to the underside to act as the guide. To use, just insert a modelling knife in one of the slots and with the guide running against the edge of the balsa sheet, draw the unit towards yourself keeping the handle upright. Left-handed modellers should make the slots at the opposite end of the ply slot.

Mr. A. Priddey of Westhoughton, Bolton, finds that some of the rubber-tyred wheels have split alloy centres held together with a tubular rivet. After prolonged service, the axle tends to wear through this rivet, but he finds that a Tucker pop rivet is a very good substitute. Firstly the hole in the hub is drilled out to suit the rivet's external diameter (use $\frac{3}{16}$ in. rivet in 2-2½ in. wheels – bearing hole is approx. 12 swg), then insert the rivet with mandrel removed. Use a centre pop to peen-over the edges of the rivet and the job is complete – see **Figure 5.** Incidentally, Mr. Priddy also finds pop rivets useful as wing-tip leadout tubes in control-line models – use a dab of epoxy when inserting them into the tip.

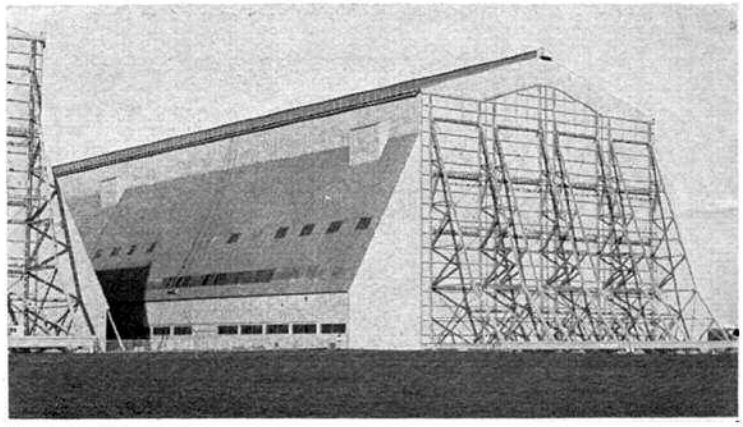
Power flyer J. Krell has a neat solution for internally mounted cable guides for auto-rudder and variable incidence tailplane controls. In Europe, long (metre) lengths of small i.d. soft aluminium tubing may be easily available – but this is not so in the U.K. or the U.S.A. A lightweight, easily obtainable, substitute is the ordinary paper 'soda straw'. Regular soda straws are spliced together to make up the required length as illustrated in **Figure 6.** Even better – artist straws come in long lengths in bundles and can be obtained from many hardware/toy shops.

To mount the cable conduit – line up the bulkhead and drill through with a $\frac{1}{8}$ in. diameter bit, then enlarge the holes with a fine soft rat-tail file so that the straw is a snug fit. The straw is best placed so that it touches one side of the fuselage through most of its length. To secure the straw to the balsa wood – scrape straw gently with a knife blade then apply a drop of glue. Should cables need replacing, the guide makes it a snap!


1
Card
3/16" or 1/4" Balsa
Dowel
2
Fishing swivels
Copper or Brass tubing
1/2" Pine
2"
1"
2"
5"
6 BA nuts and bolts
3
4
1/16" Ply
1/8" Ply 2" x 1"
1/16" Ply guide
Razor Saw cuts
1/4"
3/8"
1/2"
5
Pop rivet
6
Artist straw
Splicing slits on opposing ends

ERIC COATES'

FLYING SCALE COLUMN



The 'home of it all' – Cardington Shed, recently repainted externally. To get a true impression of its enormity, just take a look at the size of the lower windows!

AS THIS ISSUE appears on the news stands, the major event of the British Aeromodellers' calendar, the Nationals, will be just about with us. With the exception of the early and late flying sessions, in the F/F and C/L events, the mixture as far as the scale enthusiast is concerned will be much as before. It was hoped to introduce an indoor 'Peanut' event this year but lack of suitable hangar facilities at Little Rissingon precluded this. The indoor enthusiast, however, will be more than compensated by the two-day Indoor Nationals to be held in the Cardington Shed on 17-18th August. This meeting to my knowledge, the first of its kind to be organised by the S.M.A.E., will cater for all classes of duration models as well as scale jobs. The major scale competition, to S.M.A.E. Indoor Scale Rules, open to any rubber-powered model not exceeding 3 oz. total weight, will be held on Sunday, 18th August. The other competition, to be held on Saturday, 17th August, will be for Peanuts; i.e. rubber-powered models with a wingspan not exceeding 13 in.

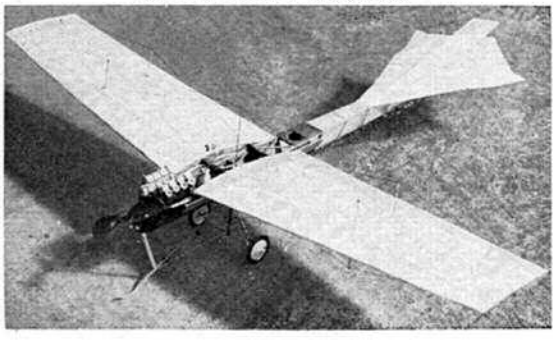
This will be the first 'official' competition organised by the S.M.A.E. for this class of model which in recent years is very well catered for in the U.S.A., where it originated and where many plans, kits and accessories, for these models, are readily available. As with all things to do with indoor models the British trade, both manufacturing and retail, has chosen to ignore this development and U.K. enthusiasts have had to obtain their requirements from the specialist mail order suppliers.

The Scale Technical Committee of the S.M.A.E., debated at some length the rules to be used for the August 17th competition. The American 'Peanut' rules appear to provide for a purely scale duration competition with only a basic scale qualification requirement for the models – no member of the Committee thought much of the idea of a contest in which few marks are awarded for static appearance of the model. From accounts received of competitions held in the U.S.A. it would appear that, in order to win, one has to produce semi-transparent ultra lightweights which are a travesty of a scale model to the true enthusiast. As I reported a couple of months ago the rules employed by a country's organising body tend to determine on what lines a class is developed. In order to nip the 'ghost' ships in the bud at the outset and promote decent miniature scale models it was decided, on a provisional basis for this first competition, to dovetail the standard S.M.A.E. Indoor Scale static rules to the aggregate duration achieved from three hand-launched flights. Each second duration counting as one point; the maximum score possible on the static side for a single-engined model is 110 points. To achieve a similar flight score will require three flights of an average duration of nearly 37 seconds – about the maximum for a reasonable lightweight Peanut. The scores should, therefore, be reasonably balanced between static and flying as are all the other S.M.A.E. scale classes. No marks will be given for the quality of flight, as in the open indoor scale event, therefore the two classes will be still of a very different nature, warranting two competitions. The rules will not be perfect; one can already think of many improvements – Eric Herbert pointed out to me only the other day that the 13 in. maximum span rule favours low aspect ratio machines in order to keep the wing loading down, but I think they will form a suitable base on which to get the class off to a reasonable start in this country.

* * *

With all the foregoing in mind I knocked up the clipped wing *Piper J3 Cub* from the **Peck Polymer**

Neat little Antoinette powered by a Brown CO_2 engine, built by Peter Smart of Blackheath.



An unlikely looking racer – John Blagg's 'Peanut' Waterman Gosling racer, built to 1/24th scale.

kit I reviewed last month. A very pleasant few hours' work too, it turned out to be, producing a delightful little model. I built it exactly as per plan, with the exception of reducing the dihedral from the rather exaggerated angle suggested, using all the kit materials. The yellow tissue proved to be excellent and the pressure sensitive decals a delight to apply. The 5 in. diameter Kaysun prop was ideally suited to the single loop of excellent quality $\frac{1}{8}$ in. rubber strip provided. A very pleasant rarity to find in a kit.

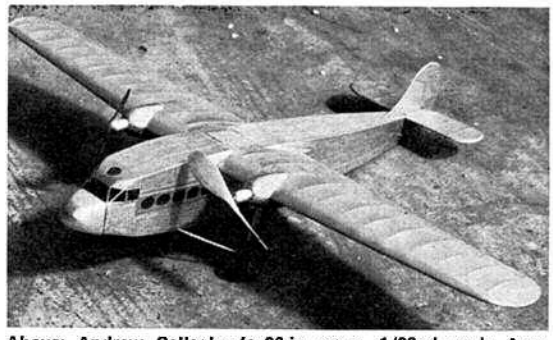
I trimmed this model out at the second S.M.A.E. indoor scale get-together held at Cardington on April 7th where it flew as well as it looked, flights of 30 seconds being recorded from 500 turns. The reduced dihedral proved to be no handicap to stability in the still conditions prevailing within the shed.

This meeting proved to be the best attended yet of scale enthusiasts at Cardington. It is pleasant to see the number of aeromodellers not normally associated with F/F scale who are now coming along for a day's pleasant informal flying in guaranteed calm conditions. All manner of scale models were to be seen that day, the quality of construction varying just as much as the variety of shapes. One thing about these non-contest get-togethers I have noticed is that beginners to indoor are not so reticent in bringing their far-from-perfect creations out to fly. When a contest is scheduled the average standard of model seen flying is higher, but the numbers much fewer.

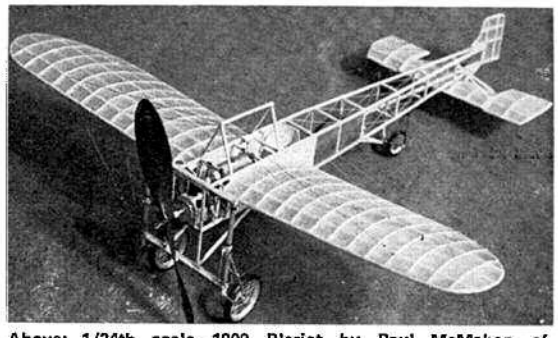
Many new machines were to be seen at the meeting. Regular attender John Blagg of St. Albans, had a superbly detailed *Demoiselle* built to 1/12th scale. The working rudder and elevator controls were connected to miniature control levers at the pilot's position (one can hardly call it a cockpit on this machine!). The wings warped in the correct manner by means of the lateral control wheel, connected by $1\frac{1}{2}$ lb. monofilament fishing line. In order to get the C.G. far enough forward – always the curse of these pre-historic aeroplanes – the dummy cylinders of the engine were filled with lead shot. Initial flights looked quite good; very stable but a little underpowered giving low durations. John also had a delightful *Waterman Gosling* racer, scaled up to 1/24, from Paul Matt's drawings, which results in 13 in. span or maximum Peanut size. This is one of those ideally suited low aspect ration machines, which the Peanut rules tend to promote, as mentioned earlier.

A new face at Cardington was Peter Smart of Blackheath who had a trio of CO_2-powered machines with him; all powered by a single, interchangeable, Brown CO_2 motor. This was one of the new production batch of single cylinder motors, the first I have seen in the U.K. All three machines flew well; a BE2a, an SE5a and an *Antoinette* monoplane. This latter machine I found most attractive in flight but, unfortunately, it struck one of the girders and fell to the ground rather heavily; doing its structure no good at all.

The substantial steel structures and cables currently being erected, by the fire preventative people who now use the hangar, are obtruding considerably into the available flying space (unfortunately this may be the last year we can use Cardington) and many models collided with them. The smaller and lighter models generally fly slow enough not to damage themselves, or if they do it is of a very minor nature. Once the span exceeds around the 20 in. mark, however, the risk is increased twofold: (a) the model's performance is greater making a strike much more likely and (b) the 'bouncibility' of a model

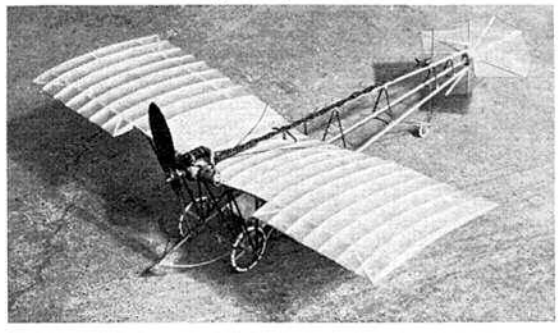


Above: Andrew Callaghan's 26 in. span, 1/32nd scale Avro 642 – ambitious project, especially for indoor flying.

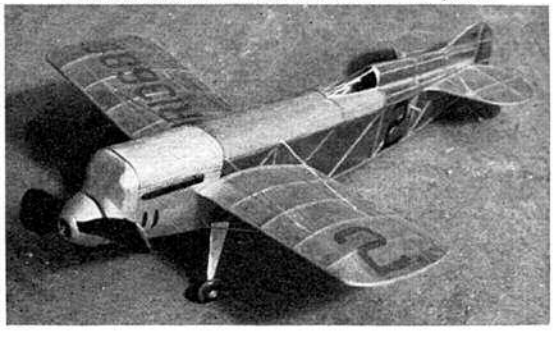


Above: 1/24th scale 1909 Bleriot by Paul McMahon of Peterborough, a very fine performer.

Below: John Blagg's 1/12th scale Demoiselle has working control surfaces connected by fishing line to controls at pilot's position.



Below: Another of Paul McMahon's 'Peanuts' – this a Wittman Bonzo, built from Bill Hannon plans.



Andrew Callaghan's Issac's Fury could be taken for a 'proper' free flight scale model (if not the real thing!) but who would believe that it is only 14 in. span! Flys extremely well too – in fact it is becoming quite a veteran now. Plenty of wing area and low weight contribute towards this, together with careful trimming of course . . .

diminishes roughly by the square of the span. My advice then, is to keep them fairly small.

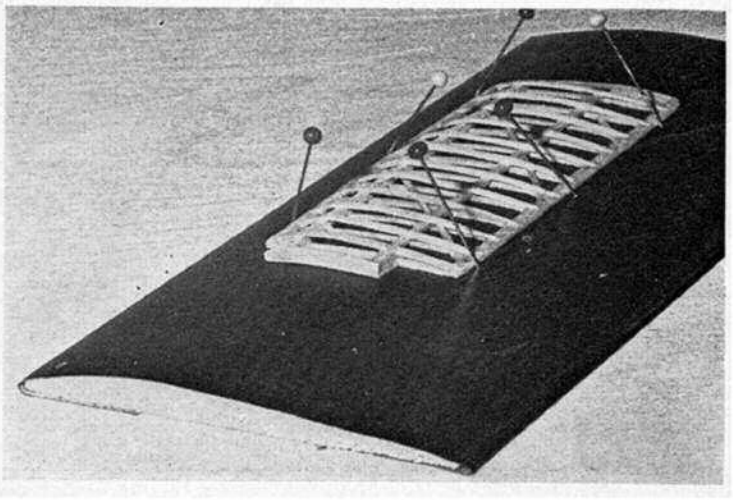
Terry Manley's new *Max Holst* observation machine came into the 'too large' category in my opinion, suffering accordingly. In fact it had destroyed itself before I managed to take a picture of it! It was around 26 in. span powered by a '4 strands of ¼ in.' motor driving a small prop via an old *Frog Interceptor* step-up gearbox. Between collisions it looked very impressive in flight and should have been capable of flights approaching the one minute duration mark.

Most ambitious machine I saw was the *Avro 642* built by another regular visitor – Andrew Callaghan. This 26 in. span, 1/32nd scale, twin was also powered by a single '4 strands of ¼ in.' rubber motor driving a step-up gearbox in the nose. Power was then transmitted back to the centre section, via a flexible shaft and outboard to the two propeller shafts, via pulley and rubber belt drives. I didn't actually see the model fly but did witness an 'engine run', the problem of all these tortuous drives for rubber twins is that so much power is lost in friction. Andrew's *Isaacs Fury* was flying again beautifully. When looking at the accompanying photo it is hard to believe it is only 14 in. span.

Another fine flyer was a 1909 *Bleriot*, built to 1/24th scale, by another newcomer to the Cardington scene – Paul McMahon of Peterborough. Paul also had two low aspect ratio Peanut racers built from Hannon plans – a *Whittman Bonzo* and another *Waterman*.

With not having any contest to organise I managed much more flying than usual myself. Apart from the *Cub*, I had airborne at various times of the day my *Puss Moth*, Tern *Porterfield* and the aged KeilKraft *Hurricane*. Flying so many rubber models can be a bit of a bind, always begging someone to hold it whilst one cranks on 600 turns or so with a wheelbrace. A simple bracket, clamped to any heavy structure, substitution of the conventional wooden peg with a piece of 18 s.w.g. aluminium tube and a 18 s.w.g. piano wire skewer, inserted through bracket and tube, effectively holds the model; as can be seen in the accompanying illustration. The wheels support the model at the front so it is a simple matter to align the wheelbrace to prevent the rubber chafing on the nose former. I am indebted to Terry Manley for my bracket – I must have made over 100 winds in it on April 7th!

There seems to be an unofficial competition going on at the moment as to who can produce the smallest practical flying scale model. Following my description, in the April issue, of Andrew Moorehouse's 6 in. span *Brown* B1 I have received details recently of an 8 in. span *Blackburn* 1912 built by Arthur Bailey of Cheadle. Whether it can be called a practical flying model is open to question as the best flight recorded to date is a mere 3 seconds! This diminutive model was built directly from the 1/48th scale *Aeromodeller* drawings of this veteran. The most interesting part of the model is the wing construction – this is built on a pre-cambered building board; in actual fact a piece of ¼ x 4 x 9 in. balsa, carved to a section similar to a chuck glider wing and then covered with Fablon. Pre-curved strips of 1/32 in. x 3/64 in. balsa are first laid at the rib stations drawn on the Fablon. The spars are then glued on top of these strips and further strips of balsa are laid and glued over the top of the spars



Wing of Arthur Bailey's 1912 Blackburn under construction – see text for details, but note size of components in relation to the glass-headed pins!

to form the upper contour of the ribs. Sounds a very interesting form of construction which could be scaled up. Saves cutting all those b . . . wing ribs out anyway! Arthur is now contemplating a $\frac{1}{16}$th scale version built on similar lines. That should crack the 3 second barrier I would hope!

* * *

I seem to have used nearly all my space this month on Indoor matters but I must just find room for one or two news items concerning the bigger brethren of the great outdoors.

On the domestic front three weeks after the Nationals the *Aeromodeller Scale Meeting* takes place on June 16th at Old Warden, Beds. In recent years the weather has not been too kind to this meeting. I hope we fare better this year as I find its informal atmosphere very useful to get to know face-to-face the many people who have written to me over the past years: many modellers who one never sees at any other competition during the year.

A month after this, on July 14th, the first of the S.M.A.E. All Scale Meetings for F/F, C/L and Class 2 R/C takes place at Little Rissington. The second such meeting, with Class 1 R/C substituted for Class 2, is scheduled for October 6th.

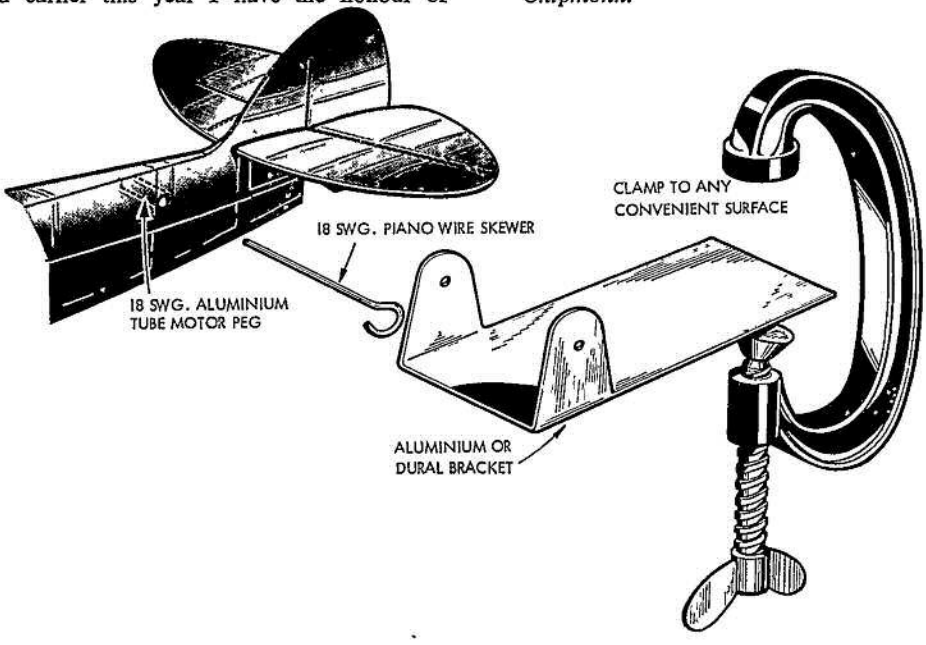
After my little grumble last year about the poor organisation of the *Eddie Riding* F/F Scale event at the N.W. Area's 'Woodford' meeting last year I am pleased to learn from Mike Reeves that his club, Whitefield, will be running the event this year on August 25th. I am assured that the organisation will be all that this most senior of all scale events deserves. It is up to the F/F scale modellers, therefore, to turn up in something like their former numbers to put this event really back on the map, try and make a special effort this year. I always try and make it and there can't be many scale modellers who have to travel farther than from Fareham to Manchester!

Finally, on the international front, the Scale World Championships are nearly with us. These are the centrepiece of the grandiosely named Aerolympics featuring Indoor World Championships as well as International events for R/C Pylon, Thermal Soaring and Vintage. All to take place at Lakehurst, New Jersey, U.S.A., between the 2nd and 8th July. As I mentioned earlier this year I have the honour of managing the British Scale Contingent. Due to varying circumstances three of the original members of the teams selected have had to drop out. Britain will now be represented by the following modellers:-

(a) RADIO CONTROL
Tony Lunt of St. Mary Cray, Kent, flying a *Fokker D.R.1 Triplane.*
Mick Reeves of March, Cambs., flying a *Cassut Racer.*
Brian Taylor of Chard, Somerset, flying a *Fairey Fulmar.*

(b) CONTROL LINE
Mick Reeves, again, flying his veteran *Zlin Aerobat.*
Ven Venables of Wolverhampton, flying a *Fokker D.8.*
Vic Wilson of Richmond, Surrey, flying a *Chipmonk.*

Andrew Callaghan 'runs-up' the motors of his Avro 642. Power is supplied by single skein motor consisting of four strands of $\frac{1}{4}$ in. flat rubber in the fuselage, driving a step-up gearbox in the nose. Power is then transmitted back to the centre via a flexible shaft and outboard to the two prop shafts! Let's hope that the friction involved does not lose too much efficiency.



RUBBER TECHNIQUES Part 1

RON COLEMAN PASSES ON THE BENEFITS OF HIS EXPERIENCE IN THE SELECTION, CARE AND HANDLING OF RUBBER MOTORS

WITHIN the scope of this title I intend to bring together a number of (hopefully!) useful pieces of information and advice which have a bearing upon the happy operation of rubber driven model aircraft.

This type of m was at one time the ma ay of aeromodelling but what with the attraction of the modern model internal combustion engine and change of fashion, rubber power now seems to be the domain of either the young beginner or at the other extreme, the expert competition flyer. Now that indoor scale is growing rapidly in popularity there is a new influx of experienced aeromodellers who have never had the benefit of a 'rubber education', and it is thus for the absolute beginner and this latter group that these articles are intended.

Away back, it was fashionable to have a nose gearbox to enable two or more skeins of rubber to be used with a smaller, higher revving prop. It was a 'ripping', heart-tearing spectacle when a fully-wound model stripped its soldered gear shafts on the climb . . . the rapidly unwinding motors smashing the cross braces out with the entire collapse of the fuselage, mid-air! Whilst many things have changed, the basic methods of operation of rubber motors must remain. Unfortunately, today good rubber is both expe difficult to obtain in tities of different wi. here is an incredible scarcity of rubber lubricant. It is surprising, too, how some old-fashioned rubber mode s hang on, whereas model shop k wledge and helpfulness beginner in 'rubber' appea scarcer than ever, along with the rubber strip, ball races, and ana oil! Perhaps one day soon, the model aircraft trade will awaken to the needs of the ung beginner, wh is tomorrow's captured custc

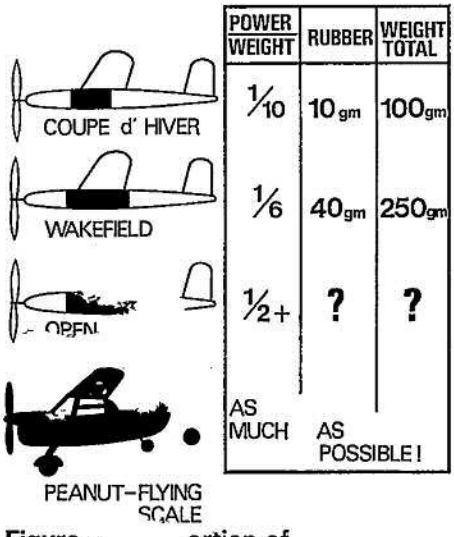
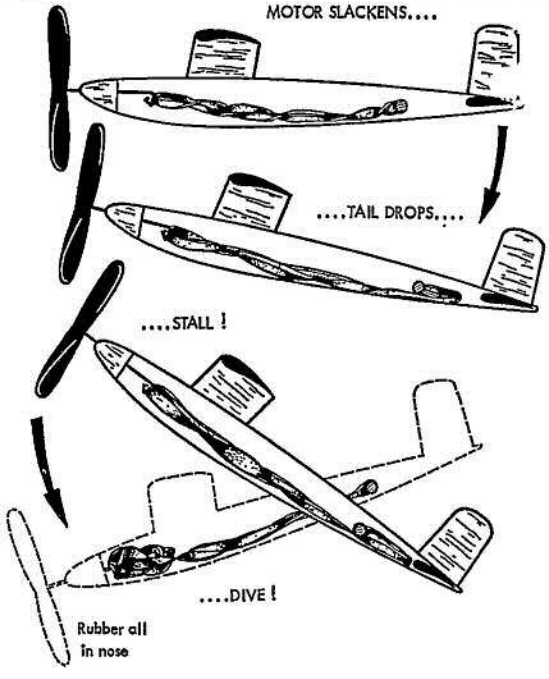


Figure – ortion of rubber

Figure 1 – Effects of non-pretensioned motor

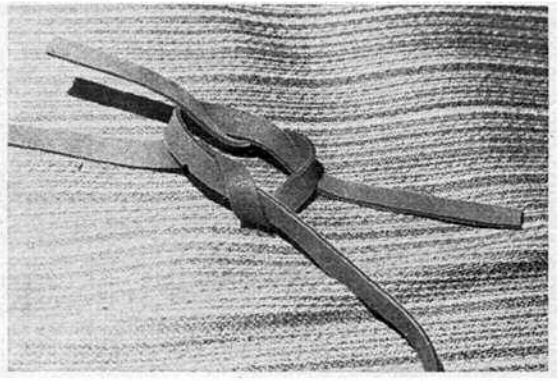


t. and le ends with nt excess length as it will slip slightly as it is tightened. Knot before adding rubber lubricant!

e-tens Rubber Motors

Pre-tensioning is a method of ing the extra length of a rubmotor in an evenly distributed, compact rope, or skein inside the fuselage. Without pretensioning, the excess length of rubber would flop about within the fuselage and destroy the glide (see Figure 1).

Obviously, the longer the airscrew can be kept turning – with effective torque – the longer the flight. 'Effective torque' in this instance refers to sufficient power to turn the propeller at a



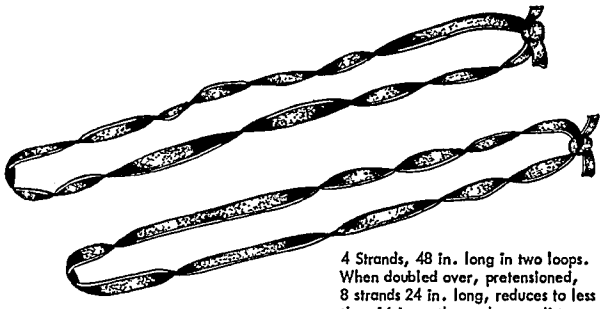
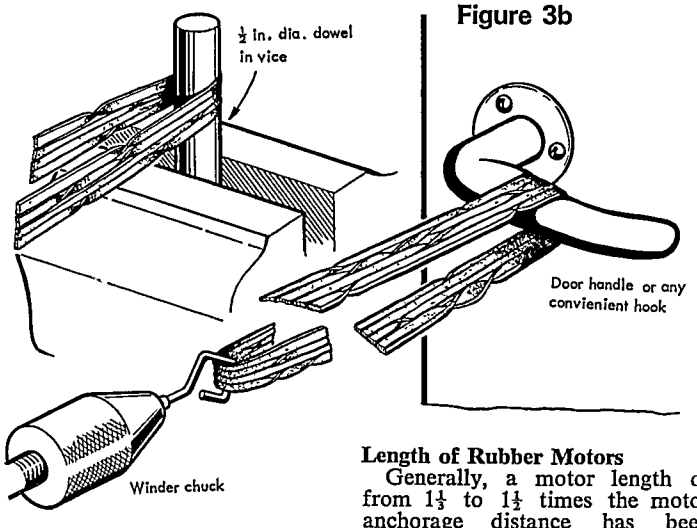


Figure 3a

useful speed which provides enough thrust to propel the aircraft. The greater the length of the rubber skein the more turns it will absorb, but the torque falls off as the length increases.

2) regulate the amount of rubber to be used for particular types, but the 'Open' class contest model, and the flying scale model both leave plenty of scope for ingenious airframe construction.

Figure 3b



By increasing the cross-section of the motor, i.e. by adding extra strands, the torque value can be maintained, but up goes the weight if we do this! We soon must reach the optimum value for motor/airframe weights: and we have always to remember that the very handling of the model requires a certain minimum strength to take pressure from fingers and hands, and also, in landing, impact stresses due to the model's weight and velocity.

It is here that aeromodelling contains one of its most fascinating aspects – the deployment of skill in designing and building light airframes. Skill in handling one's own brand of super-lightness is another way to flying success – we can pack more rubber into our model than the chaps who build heavily. Of course, competition rules (figure

Length of Rubber Motors

Generally, a motor length of from 1¼ to 1½ times the motor anchorage distance has been found to be most suitable. As the length exceeds 1½ times, so it is necessary to reduce the airframe weight, especially if the cross-section of rubber is also increased in order to maintain a desired torque. In 'Open' class rubber models, some exceptionally fine examples of low airframe weight and maximum power run, can be observed at any sizable competition event; witness the tremendous list of 'maximum' flights secured at last year's Nationals at Lindholme, very early in the morning, without thermals. Possibly the Open class model has reached its zenith of development; there is certainly no need for thermal-hunting qualities in the would-be competitor.

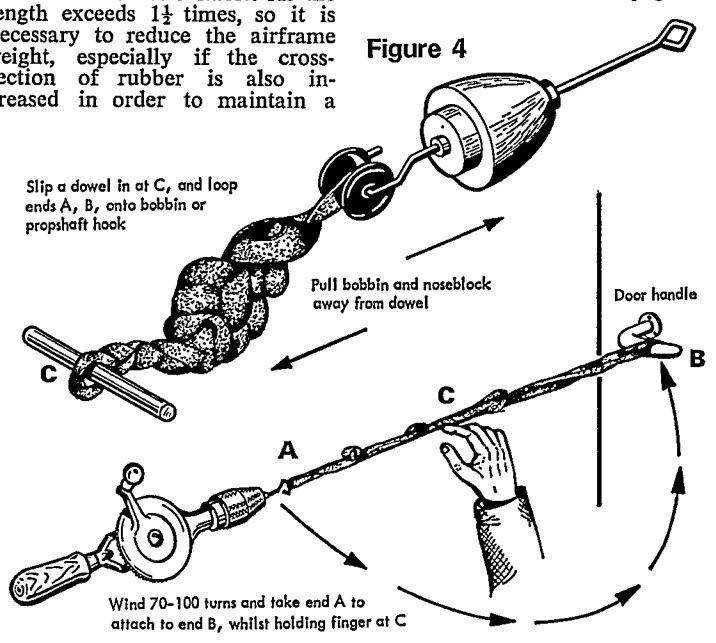
Rubber driven flying scale models are again becoming popular, especially the 'Peanut Scale' model with its tiny wingspan of 10 to 13 inches. Here, lightness of construction is surely crucial. Probably the realisation of the possibilities of free-flight with scale model aircraft in a large hall, without the need for a 50-mile drive to a suitable airfield, coupled with a fascinating low cost of production, the absence of noise or fuss and a tremendous scope in a large variety of types . . . these are the factors for the ever increasing interest in the diminutive flying scale model.

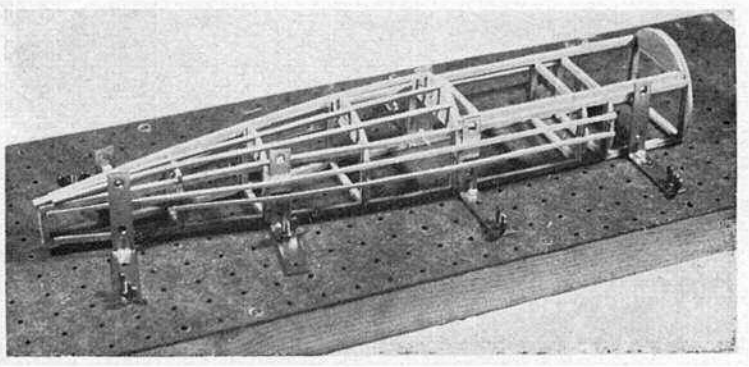
Method of Pre-tensioning a Motor

In explaining the process of pre-tensioning, it is perhaps easiest to take a typical example of a rubber motor, and relate all performances to this. Assuming that the example in question is destined for powering a lightweight duration model

continued on page 309

Figure 4





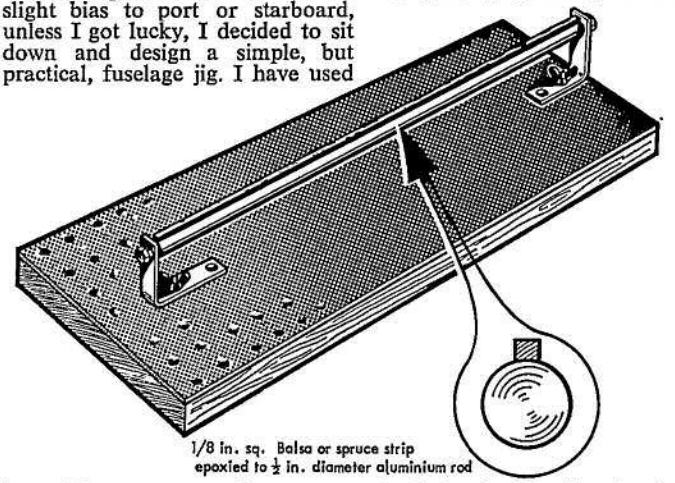
Do your fuselages look remarkably like bananas? They do? Then take the advice of Jack Arnould and spend a couple of hours making a jig, then in future . . .

BUILD IT STRAIGHT!

THIS FUSELAGE jig was built out of sheer desperation! After struggling with different types of fuselage construction (all balsa) and having them turn out with a slight bias to port or starboard, unless I got lucky, I decided to sit down and design a simple, but practical, fuselage jig. I have used four different types of construction: built-up slab-sided, built-up with formers and stringers added, circular cross-section fully-sheeted, and elliptical cross-section with stringers. All turned out dead true, and were built with considerably more ease and greater speed than any of my previous planes. The effect on the final flying performance can hardly have been anything but beneficial!

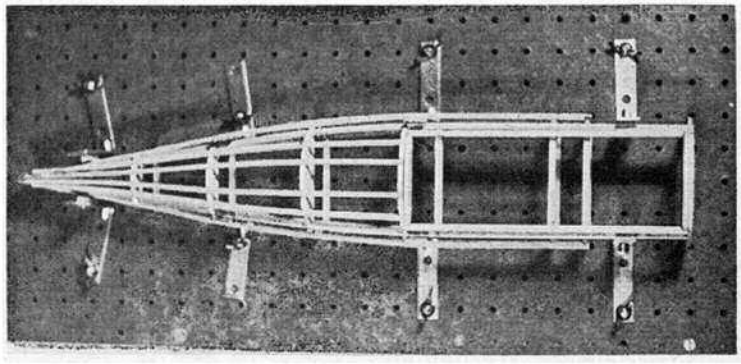
All that is needed is a piece of pegboard, some straight strips of hardwood, shelf brackets, wood glue, a length of aluminium rod, nuts and bolts, and wood screws. The total cost should not be more than £3 to £4, but will depend on what size jig you build.

Besides giving a true fuselage, it is a great aid when attaching stringers or planking as it leaves both hands free. If using the central aluminium rod on a circular or elliptical cross-section, the fuselage can be rotated on the jig as planking or stringers are attached enabling you to work on uninterrupted without waiting for the glue to dry. As it is all suspended, pins can be left in without being 'pushed over' as the fuselage rolls on the workbench – cause of all those unsightly 'splits' in the wood! It is also a help in aligning wings and tail to the fuselage.

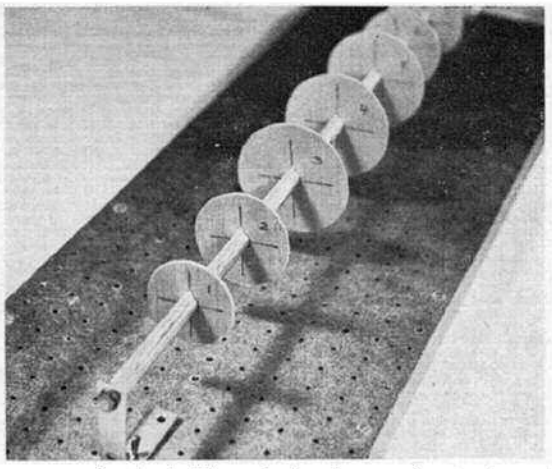


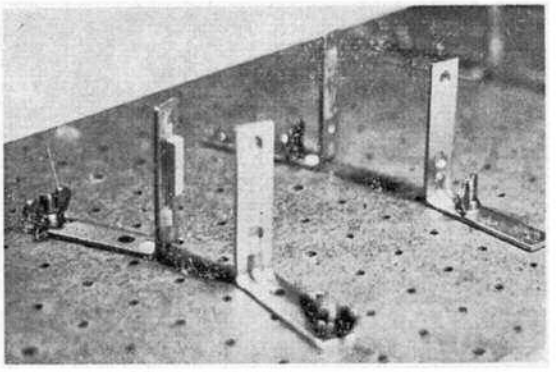
The whole success of this jig depends upon how true and rigid the base is made. Before starting construction decide how large a fuselage you can see yourself building in the future, and use this as a rough guide to determine the size of the base. Remember you can build a small fuselage on a large jig but not vice-versa. The actual dimensions are not important (mine is 36 in. x 12 in.) but keep the length-to-width ratio of approximately three to one, higher ratios than this will tend to give a flexible base unless you are going to use 'two by fours' for the frame! My frame is made of 1½ in. x ¾ in. strips; any hardwood will do but make sure they are straight.

The frame is glued and screwed together with right angle metal braces in the corners. Once the glue is dry, check the frame for



Heading picture and at right shows multi-stringered fuselage being constructed within the jig – note how brackets hold longerons in place while stringers are added later.





Left formers mounted on the aluminium rod – note how the spruce strip epoxied to the rod keys the formers upright. Above, the metal brackets are retained in place by wing bolts. If the holes in the pegboard do not coincide with the desired spacing, then use balsa packing on the brackets.

trueness by 'eyeball' and also by putting it on a table top and checking with a spirit level. Judicious use of a wood plane or wood rasp can true up any small errors. If the frame is more than $\frac{1}{16}$ in. out of true it's best discarded, and start again from scratch.

Once you are satisfied with the frame, attach the pegboard with $\frac{1}{2}$ in. wood screws. I used $\frac{1}{8}$ in. thick pegboard, but if you go to a larger size than mine, I recommend using $\frac{1}{4}$ in. pegboard. Larger sizes may also require a brace in the centre to stop flexing of the pegboard. Give the pegboard a coat of varnish and then a coat of paste wax, which will prevent any drops of model cement sticking to it as you build your models.

The aluminium rod used for the centre jig is $\frac{1}{2}$ in. diameter. If you build a jig much longer than 36 in. you should go to a larger diameter to avoid flexing of this rod. The rod must be drilled and tapped for small bolts to go in each end; size is not critical, I used $\frac{1}{4}$ in. bolts because I happened to have some and a tap to match! A $\frac{1}{8}$ in. square strip of hard balsa must be epoxied down the length of the aluminium rod to act as a key. This will stop formers from rotating on the rod as stringers or planking is attached.

Before building on this rod the former positions can be marked directly on the rod with a felt-tip pen and erased when the model is finished.

The angle pieces used to support the rod and also as supports for the rectangular cross-section fuselages are simple shelf brackets that can be purchased at any hardware store in various sizes. Before using check the angles, most are accurate but I have found one or two to be off a couple of degrees. The brackets are held to the pegboard with 1 in. bolts and wing nuts – use bolts of the correct diameter to fit the holes in the angle pieces. otherwise you will have a lot of drilling to do. The holes in the pegboard will have to be enlarged as needed. Note that 'as needed'. don't even think of enlarging all those holes at once! After building two or three fuselages and enlarging the necessary pegboard holes, you will be surprised how many have been done. If you find some of the holes in the base do not line up exactly where you want, then occupy the next outer hole and use balsa packing pieces cemented to the brackets to hold the fuselage sides in the correct position. An impact adhesive will be fine for the job – quick too.

This jig can also be useful after the fuselage is constructed to assist in lining up wings and tail surfaces. To do this. just remount the fuselage in the jig then accurate measurement can easily be taken as the wings or tail are attached, without fear of the fuselage moving and spoiling all your careful adjustments.

When not in use do not leave the jig on your work bench and pile a lot of junk on top of it as unless your bench top is absolutely flat you will end up warping the base. Best way is to store on its side in some out of the way spot, but not a damp cellar, please!

RUBBER TECHNIQUES

Continued from page 307

we have the following data:

Motor: eight strands $\frac{1}{4}$ in. Pirelli rubber.

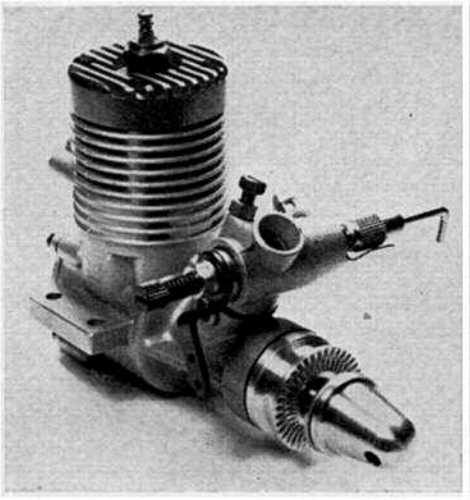
Anchorage distance: 16 inches.

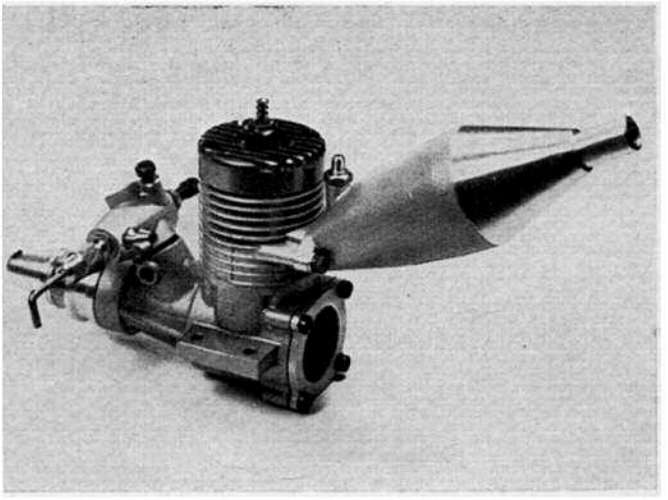
Strand length: $1\frac{1}{2}$ times anchorage distance = 24 inches.

First, make up two loops of rubber 48 in. long (figure 3A). Lubricate them and hook over a smooth door handle or other anchorage which will not cut the rubber – $\frac{1}{2}$ in. dowel in vice etc. – Figure 3b.

Now wind on 70 to 100 turns and bring the two ends of the motor together (figure 4) and hook on to the propshaft, hook, or bobbin, or end of loading stick (figure 5). The rubber will all twist up into a knotty ball. Hook the forefinger into the loop end C, and pull out from the fixed ends. The motor should now – especially if it is attached to a noseblock propshaft which can spin round – readily take up a compact plaited rope-shape as each half of four strands automatically twists about its partner. The motor length should be just short of 16 in. distance between anchorages. If not, then more pre-tensioning turns are needed. Try an extra 20 turns, but put on only enough turns to just bring the motor down to the required length, slightly short of the motor anchorages. Now, whatever the position or attitude of the model during flight, the plaited, or pre-tensioned motor cannot slip about in the fuselage to destroy the glide performance.

In a future article I will deal with the making of rubber lubricant in generous quantity, and the general preparation of rubber motors for contest flying.





PETER CHINN'S

LATEST ENGINE NEWS

Fox 19 Test – Postscript

It may be recalled that in the test of the American Fox 19 published in the April issue, quite outstandingly high b.h.p. was achieved at very high peak revolutions (17,000 r.p.m.), but that this was paid for in terms of rather rapid consumption of glowplugs.

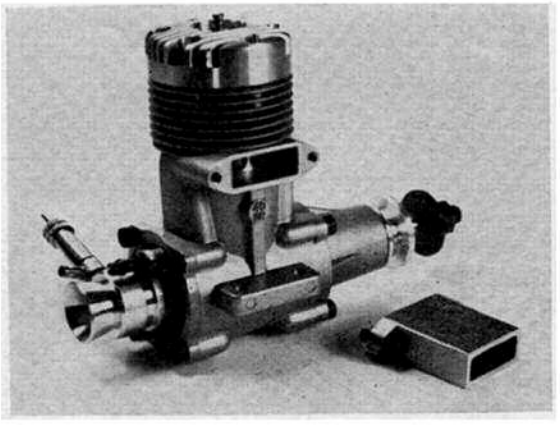
We mentioned this to manufacturer Duke Fox, when reporting our findings to him just before the test article was published, as we have always found, in the past, that Fox plugs were pretty good on all counts. The fact that they have been widely used in the U.S. in the hottest pylon racing engines obviously confirmed this.

Our guess was that a slight reduction in the 19's compression ratio, by substituting a thicker head gasket, would probably have cured the trouble. On the other hand, the 19 exhibited no other symptoms of an excessively high compression ratio such as a tendency to kick its prop off or bite one's fingers: in fact it remained quite docile and pleasant to handle.

Nevertheless, it appears that the answer is, in fact, to raise the head slightly. Duke Fox puts forward the theory that 'if the head gets too close to the piston by .010 in. or less, the squish sends out a shock wave that knocks out the plugs fast'. Slight variations in piston-to-head clearances at top-dead-centre are, of course, common in commercial model engine production and Duke suggests that, in this particular instance, the solution is simply to add an extra cylinder head gasket. The standard Fox head gasket for the .19 is .015 in. thickness.

So, if any British owner is finding that his Fox 19 is gobbling up plugs a bit too quickly at high r.p.m., we are sure that a polite request and a stamped and addressed envelope to John D. Haytree at Fox Manufacturing Company (U.K.), 40 Buckeridge Avenue, Teignmouth, Devon, will bring a spare gasket pronto. We have not checked with John on this, but we do know that he takes very seriously the matter of keeping Fox customers happy and deals sympathetically with all *genuine* problems. (All manufacturers and distributors get a proportion of unrealistic complaints.) In this particular instance we do not anticipate a rush for head gaskets as, from user reports on the Fox 19 reaching us, the average current production model is *not* giving plug trouble. To some extent this may be due to the fact that most users are probably not running their engines above 16,000 r.p.m.

Incidentally, there is no point



Heading pictures show two views of Burford Taipan 2.5-BB R/C engine from Australia. Standard version for C/L and F/F will be available – a likely candidate for Goodyear C/L.

Left, the recently introduced O.S. Max 40SR Schnuerle scavenged racing engine now has modified induction and exhaust timing and is more powerful than earlier models. Exhaust extension is an option.

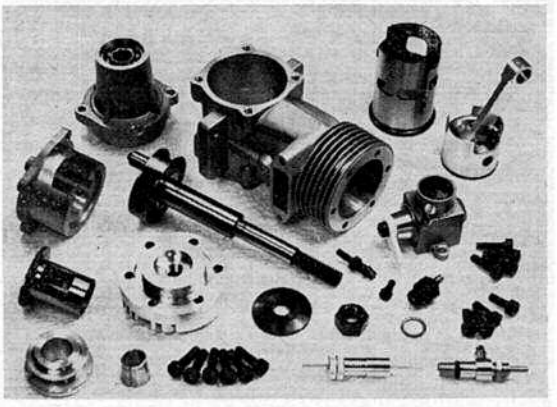
in adding an extra gasket if you do not have plug trouble as the resultant reduction in compression ratio may not only reduce power, but may also make the engine less willing to accept low nitro fuels.

Forthcoming new Fox products

Two new Fox engines are currently on the stocks and will, Duke Fox advises, be on the market this summer. One of these is a twin ball-bearing control-line combat motor and the other is the promised Hawk 60 R/C, supplementing the existing Eagle 60 but more expensive and with Schnuerle scavenging.

Also in the pipeline are some new Fox glowplugs. As most people will already be aware, the current Fox plug range consists of eight types: i.e. Standard Series (for use with dry cells or ni-cads) or 2-Volt Series (for lead-acid cells), both series being available in long or short reach, plus idle-bar long or short reach.

Now, these are to be joined, in a few weeks, by the Racing Series in three types – short and long reach plus long-reach idle bar – which have thick, short (only just over one coil) elements of a different alloy wound on a larger diameter mandrel. Fox Racing Series plugs draw considerably more current than the others but are claimed to be much more durable. A sample batch of these plugs arrived from America just a couple of hours before we started writing this article, so we hope to find out how well they perform under severe conditions over the next few weeks. Incidentally, the Racing Series plugs are easily identified externally by their nickel-plated body finish.



Parts of the O.S. 40SR (here with original 8.5 mm. choko carb). Dykes ringed piston with bronze bushed bosses. Drum rotary valve parts at left.

O.S. Max 40SR

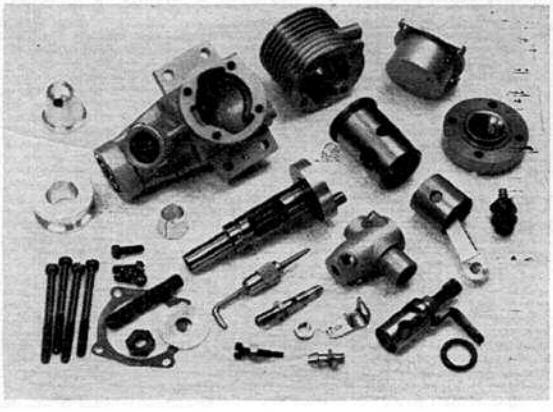
The new O.S. Max 40SR racing engine, which made its contest debut late last November when one of the first engines off the production line won the hotly contested 1973 All-Japan R/C pylon racing event, also got off to a good start in C/L rat-racing in the U.S.A. a month later when Bill Keller used one to good effect in both the 10-mile and 100-mile events at the 20th King Orange Internationals held at Jacksonville, Florida.

This contest and the similar event at the U.S. Nationals have, of recent years, been dominated by a continuing battle between the Florida Swamp Rat Team and the Midwest Rat Race Team, with the latter proving the more successful. All the top models on this occasion were powered by H.P.40 engines with the exception of Bill Keller's solitary O.S. 40SR which, in practice was timed at a promising 147 m.p.h. airspeed over the half-mile.

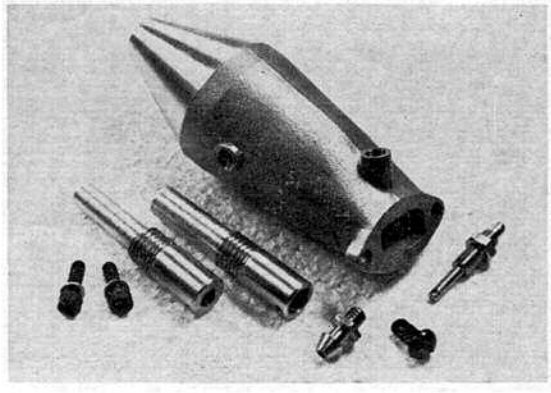
In the 140 lap race the winner was John Kilsdonk in a time of 4 min. 40 sec., an average of 128.6 m.p.h., followed by Keller's O.S., only two seconds behind at 127.7 m.p.h., the next three being 8, 10 and 12 seconds behind the winner. The 1,400 lap (100 mile) heats, however, very soon cut down the field with much 'equipment failure' and after two days hard going, John Ballard emerged as the winner with a slick 18-pitstop performance, in a time of 48 minutes, one minute ahead of Keller who apparently made a considerable impression in placing 2nd in both events with the same engine.

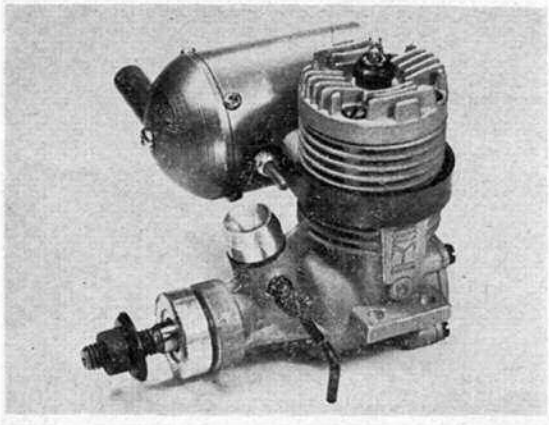
All the first few hundred O.S. 40SR engines produced had barrel-throttle type carburettors with 8.5 mm. chokes. As not even the pylon-racing people use throttles, however, subsequent production engines have been equipped with machined racing-

Parts of the Taipan 2.5. Note three transfer passages neatly cast into crankcase and cylinder jacket. Combustion chamber is shallow trumpet shape with narrow squish band.



Special Burford silencer for Taipan 2.5 has inter-changeable tailpipes, optional fitting for fuel pressurisation and a neat vertical priming nozzle.





For the well made 3.6 c.c. Italian Kosmic K-23, the importers, Irvine Engines, now offer a suitable small-size Powermax silencer.

type venturi intakes of 10 mm. choke diameter, increasing the effective choke area by a full 30 per cent to 65 sq. mm. (approx.).

Recently some further modifications have been made to the 40SR and these are now being incorporated in the next production batch. They include a 220 degree induction period timed 27 deg. ABDC to 67 deg. ATDC, compared with a 203 degree period for the earlier motors, and an increase in the exhaust period from 147 deg. to 156 deg. of crank angle. In this form, the 40SR has been claimed (by independent test – not by the manufacturer) to have the highest output of any stock production racing 40 available at the present time. We have one of these latest models for test and hope to be able to publish some results very shortly.

Basically, the O.S. resembles its major competitors in that it is a Schnuerle loop scavenged, rear rotary-valve engine with, of course, twin ball bearings. Unlike any of them, however, it uses a drum type rotary-valve (like the O.S.80) instead of a disc. Standards of construction throughout are very high indeed. The Max 40SR has a bore and stroke of 21.2 x 18.4 mm., giving a swept volume of 6.495 c.c. or 0.3964 cu. in. It weighs 275 grammes or 9.7 oz. Some further details can be found in this month's issue of *Radio Control Models & Electronics*.

1974 Taipan 2.5BB

This new Taipan engine, officially listed by the Australian manufacturer as the Taipan 2.5 c.c. Ballrace Glow Plug Engine and by the U.S. distributor as the Taipan 15-TBR Schnuerle, is the second of the Gordon Burford company's new generation of Schnuerle-scavenged motors. The first was the Taipan 3.5BB featured in the May 1973 AM Engine Test article.

The new 2.5 should be reaching the U.K. soon and it, too, will then be dealt with in the E.T. series. Meanwhile, a few comments on its design and construction may be of interest.

Our photographs show the Taipan in its R/C version and it has been developed with the requirements of 'Quarter Midget' R/C Pylon racing very much in mind, but a standard model for control-line and free-flight will also be available.

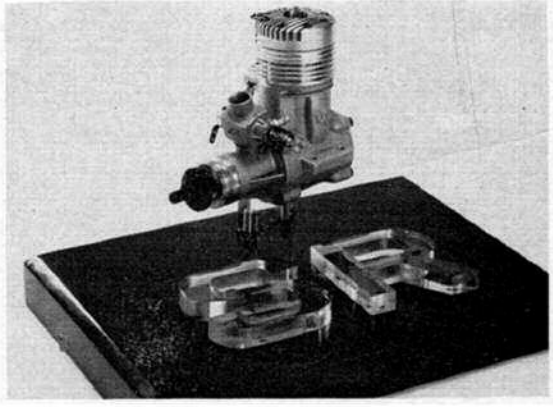
In general design and construction, the Taipan 2.5 is similar to the 3.5 except that the exhaust is located at the rear. As on the larger model, the diecast cylinder casing is made separately from the main casting, the two parts being aligned by the cylinder sleeve and joined by four long screws which pass through the head and jacket and into the crankcase casting. A conventional lapped piston is used together with a machined aluminium unbushed conrod.

The crankshaft has a 10 mm. main journal and a 7 mm. front journal and runs in ball bearings front and rear. It has a pressed-in crankpin and is of the internally counter-balanced pattern with an aluminium sealing rim. The carburettor is of the automatic mixture control type similar to that fitted to the 3.5 R/C and has a generous effective choke area of between 15-16 sq. mm.

The Taipan 15's silencer attaches directly to the rear of the cylinder casing with two screws and is quite unique in the way that it is angled sharply upwards. It consists of a cast expansion chamber with machined conical rear section and two interchangeable screw-in tailpipes giving a choice of approximately 10 sq. mm. (for maximum muffling) or 24 sq. mm. (for reduced power loss) outlet areas. Alternatively one can dispense with the tailpipe altogether and settle for approximately 36 sq. mm. The silencer is provided with an effective priming nozzle and an optional pressure fitting is also included.

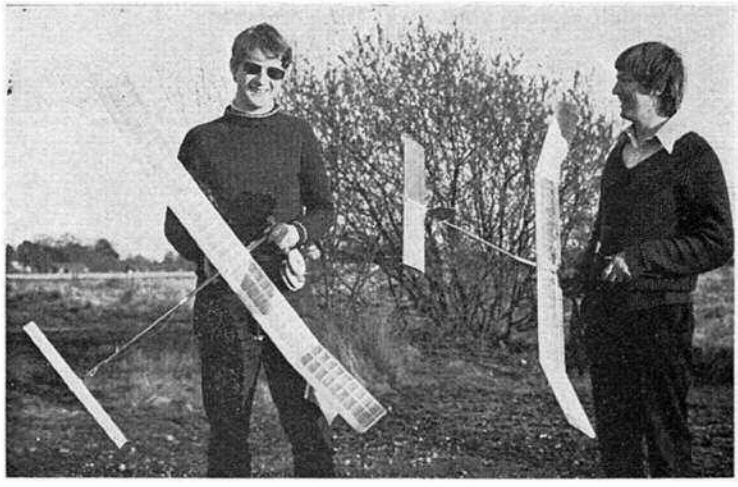
The Taipan 15 has a 15 x 14 mm. bore and stroke measurement, giving a capacity of 2.474 c.c. or 0.1510 cu. in. Bare engine weight is 6.3 oz., increasing to 7.3 oz. with silencer less tailpipe, or 7.5 oz. with silencer, tailpipe and optional spinner-nut added. Like the 3.5, this is a very nice looking little engine, attractively proportioned and well finished. It should have a performance to match.

A promise of things to come for the R/C enthusiast. First prototype of Schnuerle scavenged O.S. Max-60SR has proved extremely powerful. Delivery of production models not expected before 1975.



John O'Donnell's

FREE-FLIGHT COMMENT



A/1 finalists at the Northern Area Pannet/Vintage event were Martyn Wharrie of York (left) and eventual winner, by some 20 seconds in the fly-off, Whitefield's Pete Oliver.

BEING the first centralised contest of the season is usually an assurance of good support, with fliers 'raring to go' after the winter lay-off. The St. Albans' Spring Gala, held at Bassingbourn Old Airfield on 7th April 1974, had not only this predictable advantage but also the less seasonable one of good weather. These factors helped offset the effects of the increased price of petrol on travel costs – and attendance was good.

Events comprised the three F.A.I. classes flown in rounds, plus four separate Mini contests. Seven flights in F.A.I., and five in the others made for a long day – especially for anyone desirous of flying in more than one category.

The first F.A.I. round opened promptly at the announced time of 10.30 and ran till noon. These events were flown from a line, defined merely by a couple of markers, and hence intermixed the classes. Initially this permitted Wakefield and Power models to fly tactically under any A/2's that were towed upwind. There proved to be plenty of thermal lift so maxs were both easy and commonplace. Although pleasant enough the weather was in fact quite breezy, and models drifted well across the field – the first retrieval made it clearly apparent that it was going to be a tiring day. Due to the particular wind direction experienced, the irregular shape of the airfield and the absence of any runways, bicycle retrieving was impractical and recovery was perforce on foot!

As the day progressed the wind freshened somewhat and the pace began to tell on many participants. One hour rounds (for the second and subsequent F.A.I. flights) allowed little lattitude for any delay, especially as it was taking a full hour to retrieve long flights. This was despite there being open country at the end of the 'drome and hence no problems in locating models – it was simply a long walk.

The strong thermals were matched by corresponding downdraughts, and many fliers suffered in consequence. Analysis of the results revealed a surprising number of sub-minute flights, mainly but not exclusively, in A/2. It was also significant how participation tailed off as the rounds progressed, with very few fliers staying the course.

A/2 had by far the most support, with its 54 entries being more than the total for all other events combined. However only nine people made all seven A/2 flights – compared with about the same number who started off with three maxs. The inconsistency of the weather, and the glider's dependence on lift, are reflected in the scores recorded. The eventual winner was Dave Bailey of Swindon with a total of just a couple of seconds under 18 minutes. This included only four maxs compared with the five managed by the second and third place men, Mike Fantham and Pete Stewart. There were plenty of hard-luck stories, ranging from D/T timer failures (and resultant O.O.S. flyaways) to the person who managed five maxs but also two flights of only 30 seconds apiece.

Paul Lester's neatly finished Wakefield uses an all-sheeted wing and has a prop assembly made by Alan Cooper.

Wakefield followed much the same pattern of a good start and a poor finish. The fall-off was pronounced enough for me to win by over two minutes. I got six good flights from my old diamond fuselage model; plus a poor one from my modern sophisticated reserve that I was forced to fly in order to save retrieval time. Alan Jack was in the lead after five rounds, but two poor flights thereafter dropped him to second place. He flew a sheeted-wing design with timer operated gadgetry (except for the delayed prop facility that he has now discarded). Third place went to Trevor Grey with a gadget-free model utilising a Laurie Burrows glass-fibre fuselage.

The third F.A.I. category – Power – saw but two entrants make their seventh flight. Perhaps there is some connection between this and the amount of trimming witnessed in the morning. Russell Peers won, flying a brand-new model complete with Rossi, Ronitube, sheeted surfaces, etc. The only real deviations from current design practise is his use of a modified camera timer. Two mediocre flights in mid-afternoon kept his total down to 19½ minutes. Main opposition came from Roy Collins who persevered to clear 19 minutes, and secure second place. Ray Monks started off well with four maxs, but experienced damage to one model and timer trouble with another – and retired after the penultimate round. In fact he was still placed third, and could not have improved on this even with an extra max.

The Mini events had small entries, but a better completion rate than the F.A.I. categories. Perhaps five-two's were a more realistic undertaking than the 'seven x three' endurance test. Mini was flown as separate contests, not the combined event popular in the North. Coupé d'Hiver was closely fought between Ron Coleman and Len Ranson who placed in that order just ten seconds apart – and over two minutes in front of Tony Grantham.

½A Power was the usual TD049 benefit, with Pete Harris taking first place well ahead of Julian Hopper and John Hook. Scores were hardly high which seems typical of this class when using seven (or six) second motor runs.

Comment must be made regarding the chuck glider scores. Flown to a one minute max using the five-from-nine rules this event produced the only perfect score of the day. Julian Hopper was responsible, and still had a couple of launches in hand. Success came from efficient use of soap bubbles to mark lift with clubmates helping to pinpoint their exact location. His use of a vane D/T on his Ronitube *Sweeppette* is also noteworthy. The winning score rather overshadowed Pete Bayram's second place with 4:52 (including four maxs) and Andy Crips's 3½ minutes for third.

* * *

For some unspecified reason the Easter holiday weekend was ignored as a choice for the S.M.A.E. Two-day F.A.I. meeting – and this left the Sunday open for the Northern Area to hold its 'Pannett'/Vintage meeting. Originally

scheduled for Topcliffe this contest had to be switched to Elvington at rather short notice – the move resulted from a security clamp-down at Topcliffe following the M62 coach-bomb outrage, and the withdrawing of permission to use the 'drome from all 'outside' organisations. Nevertheless the re-located contest was well supported from the North West as well as the home area – but few from far afield.

Easter Sunday proved to be a very pleasant flying day indeed, starting off overcast and a little breezy, it rapidly improved. The wind dropped, and the afternoon was warm and sunny. Naturally enough there was much strong lift, and a number of models lost despite D/T operation.

The premier award was the *Pannett Memorial Trophy* for Open Power, and its possession was eventually decided by a six-way fly off. There had been much activity all day as fliers tried to perfect trim and/or keep pace with heat warps. There were a surprising number of wing failures witnessed during the afternoon.

The actual fly-off was disappointing, with but two good flights. Jim Moseley and Brian Martin flew at nearly the same time, but sufficiently apart for this to be decisive. Jim found real lift with his conventional (apart from a multi-coloured wing and a chequer-board tailplane!) TD049 powered model and recorded 8:47. In comparison Brian's ETA 29 Ronitube design was on the fringe of the thermal and only managed 4.41. For this day and age Brian's model is remarkable for being completely without gadgets (not even auto-rudder) and consequently uses an old-fashioned roly-poly style climb. Nevertheless the model is consistent, and has served its builder well enough for him to be contemplating a similar, but larger, 40 powered version for fly-offs! The other four fly-off participants had a variety of troubles. Derl Morley over-ran fractionally and stalled on glide, Alan Brown had his engine cut on launch, whilst Julian Hopper first damaged his best model testing and then after hasty repairs had the V.I.T. arm jump from under the timer disc on the actual fly-off and give a series of loops. These misfortunes let Ewan Jones take third place with a very modest two minute-odd flight.

Vintage was run to Northern Area Rules which prohibited the use of reserve models, but permitted additional entries with separate models provided they were of different classes (i.e. rubber/glider/power). Turbulators were specifically excluded. With previous experience in mind I got the comp sec. to check my Mick Farthing before paying my entry fee.

Thermals do not distinguish between old and new – and there proved to be a three-man fly-off in the vintage event. By the time the deciding flight was made, lift was decidedly lacking, and the results were something of an anti-climax. Winner was John Godden (who is Northern Area Comp. Sec. but who manages to fly thanks to help from family and club members) with the least fancied model of the trio – a Copland *Northern Star*. A real 'pre-war' design with free-wheel propeller, fixed two-wheel undercarriage, straight dihedral, etc., it flew suprisingly well on an old 40 jm Wakefield motors remade into 8 strands. Fly-off was 1:48, just enough to beat Ewan Jones (who miss-set his Elfin 1.8 to ruin the chances of his Mercury *Mallard*) and Frank Elton. The last named used a *Scram* with a most interesting (and somehow acceptable) modification – an asymmetrically mounted wing. Accidently off-set by half a bay, this alteration suited the model and vastly improved the trim compared with its correct design location. Frank admits this is a major change – but justified as an aid to trimming!

The A/1 glider event saw Pete Oliver and Martyn Wharrie manage five two-minute maxs, and subsequently fly-off for first place. Both flew in the same patch of poor air, and demonstrated the effect of the current weight requirement on the model's glide performance. Pete did 1:15 to win, whilst Martyn made a little under the minute. Considering he has had a year off modelling Pete has hit 'form' remarkably quickly, and this with a model completed only on the morning of the event. Most interesting feature was a large block of lead slotted through the pod at the model's C.G. Plenty of epoxy all over the lead certainly made it 'permanently affixed' and hopefully 'internal'.

Last and least of the official events was Coupé d'Hiver with but five entrants. I won with little difficulty, despite ruining my initial flight through being a little out of practice with my delayed-prop-release model. The next four flights more than compensated however, and gave a fairly respectable total. Mike Sanderson and Joe Dean took the next positions but couldn't find enough lift.

Added to the programme at the eleventh hour, and relying solely on word-of-mouth publicity, was an unofficial Open Glider event run by Pete Whitehead. This attracted 22 entrants and is a pretty fair indication as to what event is most popular. Re-entry was allowed for this (but not for the 'Northern Area' events) and helped one or two of the fly-off participants to qualify on their second try.

The fly-off itself was run to a new and novel idea. The participants were lined up side-by-side on the runway and told to start towing at a given signal. Obviously possible line tangles needed consideration, and fliers were told they could either take the score achieved, *or* make an immediate replacement flight with *another* model. In fact this situation didn't materialise and the fly-off was uneventful. Winner was John Billam of Grantham who found just a little thermal help to record almost 3½ minutes. His model was conventional – but used the renowned *Sans Egal* wing section. I came second with one of my pair of ageing A/2's – just a few seconds ahead of Keith Proctor's *Lively Lady*.

For once the prize-giving did not conclude the contests – as it was held *before* the 'unofficial' glider fly-off, a logical arrangement that could hardly be faulted.

* * *

When I wrote last month's Comments little was known about the proposed free-flight arrangements at our forthcoming Nationals. Since then, various details have appeared; initially via *Free Flight News* and other unofficial channels, and subsequently through the S.M.A.E. *Model Flying*. There is no doubt that the 'happenings' at the 1973 Lindholme Nationals have had considerable repercussions. None of the problems then encountered were new – but the reaction encountered was all but unprecedented. Putting the onus

Alan Cooper launches his large-area, American styled .40 cu. in. powered Open Power model at Northern Area meet.

Frank Elton displays assymetrically mounted wing on his 'Scram'. Model will not perform when wing is mounted centrally!

Barry Kershaw launches new Wakefield which features a Burrow glass fibre fuselage plus Cooper prop assembly.

John Godden winds his Bob Copland designed 'Northern Star' – son Alan holds. Won vintage 3-way fly-off at Northern Area comp.

directly onto the organisation, as distinct from arguing with the downwind retrievers, had immediate effects and considerable influence on this year's programme.

Free-flight needs lots of space in anything other than a dead calm. Reconciling this requirement with those of other events at a combined Nationals poses obvious problems – especially when the available airfield is far from large. The solution to be adopted at Little Rissington is to sidestep the problem by scheduling the bulk of free-flight activity for early morning or evening.

This arrangement will certainly permit full use of the available airfield space – and hopefully will give calmer weather than would flying during the day. Such a timetable curtails flying hours quite noticeably – and it is this factor that is only too liable to give trouble.

As published, the F.A.I. events are to be flown in seven short rounds, with an Open event held simultaneously. For anyone interested in both, this calls for ten flights in 3½ hours on the Saturday evening or in 4 hours 40 minutes on Sunday or Monday morning. Whilst it will be suggested that competitors should 'pick their events' I would point out that both Open and F.A.I. contests count for the Senior Championship – so some at least will attempt the impossible.

Fly-offs are to be held on the Sunday and Monday evenings instead of the usual arrangement of immediately following the contest flights. Whilst the reasons for the change are obvious it is a scheme that is unlikely to appeal to those who attend for just one day, or who have a long way to travel home on the Monday night.

On balance the early-and-late timetable is a very worthwhile experiment, and may well pose a good solution to the particular problems prevailing. However the number of flights demanded is likely to be excessive in any but ideal conditions.

What does seem inconsistent is the staging of Mini events on the three afternoons. This leaves these events to contend with all the difficulties already mentioned. Furthermore, the low maxs and performance will make the models only too liable to land in the C/L and R/C events that are in progress on the drome. Mention must be made of the intention to run ½A Power to 'experimental' rules of five flights 2:00 max and seven second engine run – typical of current Mini practice but hardly an approved change for an S.M.A.E. contest.

Equally unfortunate are the demands being made on the stamina of both competitors and organisers. A dawn-to-dusk schedule (with but two hours off in the late morning) is a lot to expect of anyone. Few people take well to rising early and I have vivid memories of weary, bleary, modellers staggering back for a siesta following the one early morning at Lindholme!

The inevitable question that must arise is what will happen at Little Rissington if it is windy early and/or late. There is mention in *Model Flying* of possible curtailment of the number of flights in the F.A.I. classes. Although expedient such 'ad lib' methods are unsatisfactory and make a mockery of the Rulebook (which fails to provide power for such eventualities). I would have thought that a few more lessons might have been learned from Lindholme.

Before leaving considerations of the Nationals there are some other points of interest that can be culled from the S.M.A.E. literature. The *Frog Junior Trophy* is now to be awarded for the highest aggragate over six eligible events, rather than for the best single event score. A clear case of now preferring quantity to quality, and a change I had never heard proposed. There has been no mention of the *Holberg Trophies*, at one time awarded as a points basis at the Nationals across the F/F – C/L – R/C spectrum.

Finally I have been assured that the F/F entry form contains a most disconcerting typographical error. The registration fee is *supposed* to be 40p per *competitor* and not per competition. This brings F/F into line with C/L – but not apparently with R/C! The latter incidently have a higher cost of living with which to contend.

* * *

There are other points about the year's Contest Calender that are worthy of note. The S.M.A.E. has been strangely silent about the two day F.A.I. meeting scheduled for 20-21st April. I am aware that there were severe difficulties in finding a venue, and that Sculthorpe was obtained rather too late for the normal publicity channels.

Nevertheless, prospective entrants expect to be told *something*, even if it is only that there are difficulties. Better still they need to be told where to get last minute information. After all, this meeting is being used to select our representatives for the European Championships. In turn this Championship is considered important enough to reschedule our first Trials to avoid a date-clash. None of this is consistent with a blatent ignoring of the need for basic information. Leaving notification to *Free Flight News* and other unofficial publications is inadequate.

Co-ordinating a contest programme is always a problem and the S.M.A.E. competition secretary quite rightly offers assistance. Nevertheless the S.M.A.E. itself has failed to avoid glaring date clashes such as moving the Trials onto the already announced date of the South Midland rally at Cranfield. Not everyone likes public rallies, but they form a very important part of the aeromodelling scene and they also matter a great deal to those attempting to make them a success. A similar conflict of interest will probably arise between the Southern Gala at Odiham and the South Bristol Gala at Wroughton. There even the venues are close together. After last year I know where I will be going!

Finally could I make one observation about the new S.M.A.E. Club Championship contest to be held on 30th June. This is an interesting concept and well worth trying – but I wish the S.M.A.E. had sufficient confidence in its own ideas to allocate the usual plaques as prizes. There is precious little material incentive to the present day contest flier – but most people like to fly for some sort of awards. If the National Society does not *appear* to regard something as mattering to them, how can the members be expected to treat it seriously?

RESULTS

ST. ALBANS GALA, Bassingbourn, 7th April 1974

A/2 Glider (54 entries): 1, D. S. Bailey (Swindon) 17:58; 2, M. Fantham (Richmond) 17:43; 3, P. Stewart (Crookham) 16: 52. **Wakefield** (17 entries): 1, J. O'Donnell (Whitefield) 18:36; 2, A. Jack (Southampton) 16:27; 3, T. Grey (Sittingbourne) 15:57. **F.A.I. Power** (13 entries): 1, R. Peers (Falcons) 19:35; 2, R. Collins (Anglia) 19:11; 3, R. Monks (Birmingham) 15:34. **Coupé d'Hiver** (7 entries): 1, R. Coleman (Cheltenham) 7:38; 2, L. Ranson 7:28; 3, A. Grantham (East Grinstead) 5:29. **½A Power** (7 entries): 1, P. Harris (Evesham) 9:08; 2, J. Hooper (Stansted) 8:11; 3, J. Hook (Southampton) 7:43. **Chuck Glider** (5 from 9): 1, J. Hopper (Stansted) 5.00; 2, P. Bayram (L.M.) 4:52; 3, A. Crisp (Oxford) 3.33.

NORTHERN AREA PANNETT/VINTAGE MEETING, R.A.F. Elvington, 14 April 1974

Pannett Trophy, Open Power (23 entries): 1, J. Moseley (Leeds): 9:00 + 8:47; 2, B. Martin (Tynemouth) 9:00 + 44:41; 3, E. B. Jones (Sunderland) 9.00 + 2:14; 4, J. Hopper (Stansted) 9:00 + 0:25. **Vintage** (15 entries): 1, J. Godden (Leeds) 9:00 + 1:48; 2, E. B. Jones (Sunderland) 9:00 + 1:43; 3, F. Elton (Leeds) 9:00 + 137. **A/1 Glider** (13 entries): 1, P. Oliver (Whitefield) 10:00 + 1:15; 2, M. Wharrie (York) 10:00 + 0:55; 3, J. Turner (Darlington) 9:25. **Coupe d'Hiver** (5 entries): 1, J. O'Donnell (Whitefield) 9:02; 2, M. Sanderson (Grimsby) 7:57; 3, J. Dean 7:25. **Open Glider** (22 entries): 1, J. Billam (Grantham) 9:00 + 3:28; 2, J. O'Donnell (Whitefield) 9:00 + 2:38; 3, K. Proctor (York) 9:00 + 2:31.

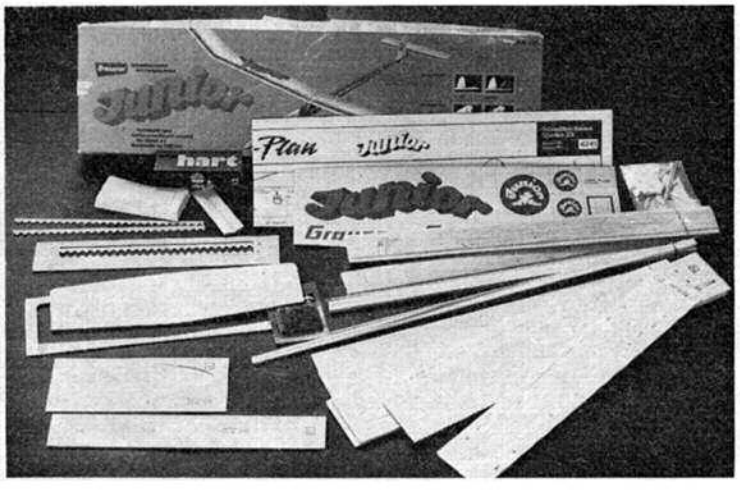
Aero Modeller

KIT REVIEW

Trevor Faulkner runs a critical eye over the RIPMAX-distributed

GRAUPNER 'JUNIOR'

Verdict? Pricey, but good!



Spread of components reveals excellent selection of wood, cleanly die-cut, and with plastic moulding plus shaped wing seat behind zig zag turbulator. Graupner employ personnel especially to check weigh the balsa sheet used in the wing. Good, clear, plan and first class transfers too.

PROBABLY the most expensive A/1 glider kit on the market, with a retail price approximately three times that of the price of its U.K. competitors, one is perhaps excused querying the potential sales figures of the *Graupner Junior* in this country. The absolute beginner is unlikely to spend so much on his original essay, whereas the seasoned campaigner is more inclined towards own-design jobs, or the construction of a version published in plan form which allows his skill in wood-selection to be exercised.

However, the commercial brains of the hobby world must have decided that there was an adequate outlet for a fairly exotic kit appealing to the 'middle modeller', an outlet which could justify the obvious expenditure upon die-cutting and milling tools, and absorb the extra cost implied by above-average timber selection.

I hope they prove correct, as this model breaks away from many accepted conventions in design, fabrication, and presentation. Unfortunately, the imported item suffers savagely from our present currency exchange rate; let us hope that at least some examples will be seen flying during the '74 season.

Design Conception

A higher than usual aspect ratio, coupled with a long nose moment make this model distinctive. Add to this the full-balsa construction and the Jedelsky wing, and there is the impression of a design owing very little to the kind of A/1 we usually see.

Fabrication

Die-cut and numbered ribs, fuselage sections ,fin and rudder parts are of excellent quality. Ready-made hooks, rudder horn and wing mount moulding (in plastic), with a transparent pack of alloy tube, nylon ribbon, rubber bands, pins, etc., give the impression of thorough provision of all the minor components likely to be needed. None of these items are skimped in terms of either quality or amount.

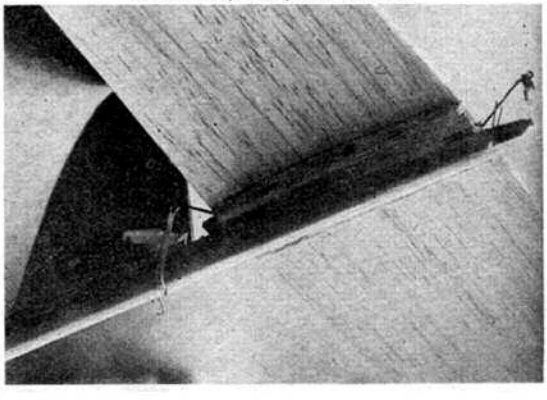
The most eye-catching piece of die-cutting is that of the saw-tooth turbulator (wish it were marketed!) The moulded wing front sections adhere to reasonably close limits in the areas where they join the rear halves and the pre-shaped spruce leading-edges. The traditional Jedelsky construction method had been modified to facilitate assembly by the less experienced, although I have one reservation about the result which will be covered later.

Presentation

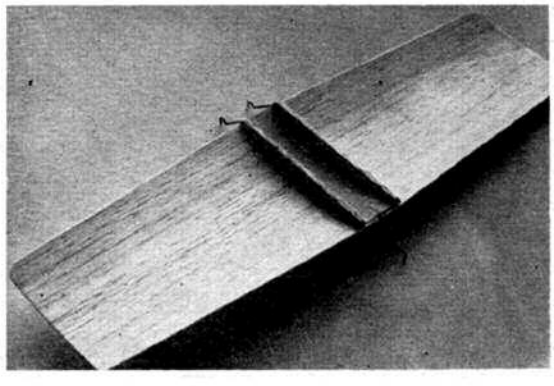
In my opinion, this leaves its competitors far behind. The plan (very easy to read) carries all part numbers and (in a differing code) explanatory details. These are duplicated in the excellent instruction booklets in German, French, Italian and English (a modeller's language course in miniature!).

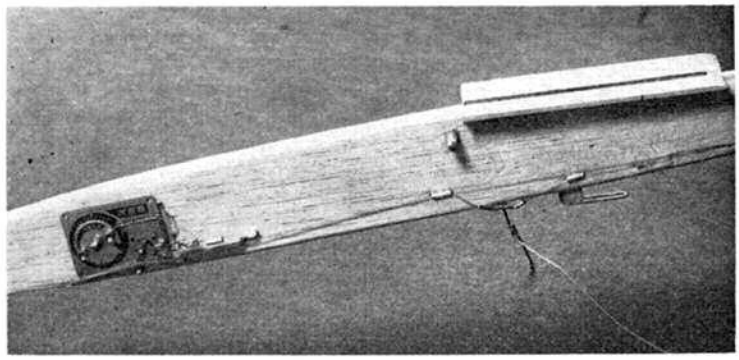
An exploded drawing, clear photographs and simple diagrams should, between them, provide more than enough information for the young builder. In only one or two details could the vocabulary be faulted, and

Modification: Twin-prong at rear of fuselage helps locate trailing edge of tailplane accurately. Pin on underside below rudder keeps tailplane forward.



Simple and tough; the fastest tailplane in the West! The piano wire hooks are sandwiched between balsa during construction for neatness and strength.





More mods! Fishing line (mono-filament nylon) gives extra function and greater reliability than plan version. Pin shown as used for hand-launched test glides. Test explains whys and wherefores of modification.

then the matter could be cleared by reference to the *Explosionzeichnung*.

Construction

Should really begin by reading *all* the descriptive matter. The fuselage is a basic spruce and balsa box, itself easy to build. I have doubts on the wisdom of using internal lines for dethermaliser and auto-rudder on a beginner's model, and I cannot endorse the idea of two braided lines sharing a small diameter alloy guide tube. (After building, I checked the friction involved, and promptly cut open the sheet sides near the tow-hook to fit nylon fishing line.) Neither do I favour the trigger-type auto-rudder actuator, so whilst re-fitting the lines, I arranged for an alternative and more positive method. (See *AeroModeller*, January 1974.)

The rear guide tube for the D/T line was bent after inserting a length of resin-cored solder to prevent kinking; this was then melted out.

I found the adhesive supplied (*UHU Hart*) rather quick-setting for the large sheeted parts forward of the wing mounts. These surfaces were 're-activated' by spreading with a thin layer of dope immediately before pinning together (had I not been in 'honour bound' to use the cement provided, I should have used P.V.A. for the whole fuselage assembly.

Tailplane

At this point I ventured away from the text instruction sequence. In explanation; this model has an 'on wood' finish, consisting of sanding-sealer and dope, or varnish, or enamel. This involves the builder in rather a lot of sanding which, in a model of this type, must be done properly in order to get a good finish, ,keep the weight down, and avoid distorting the structure.

The ready-curved sheet tailplane is more easily treated *before* the ribs are fitted, as support can be given whilst the upper surface is worked on, and there is no impediment to treating the underside in its entirety. The cement also bonds well with the cellulose finish I intended using. A rolled, flattened newspaper is a good support.

The sanding sealer was applied sparingly to both sides, the tail being supported on a tripod of pins until dry. Careful and thorough sanding preceded a coat of thinned dope well laced with Castor oil to prevent wood distortion and brittleness. This was then sanded with 360 grit used dry, resulting in a lustre finish in keeping with the model. D/T hooks were then pressed between the under surface and the ply centre section reinforcement. This secures them without stitching, patches of nylon, etc. Two ribs are then capable of maintaining the camber and acting as keys – very neat.

Wings

If you can imagine the trouble involved in sanding between the exposed ribs of a complete Jedelsky structure, the extension of the tailplane treatment to the wings will appear logical. The major point here is the need for equalizing coats top and bottom of sealer or dope to avoid distortion, and the introduction of the relevant camber to the $\frac{1}{16}$ in. sheet rear halves to avoid a big pinning-down job when fitting the ribs. The camber was invoked by binding the sheets all together over a $\frac{1}{16}$ in. x $\frac{1}{2}$ in. strip placed on a 2 in. scantling, using a crepe bandage. Left overnight, the required curve resulted, and final assembly was simple in the extreme. I doubt that anyone unfamiliar with this construction method would have cambered the stiff quarter grain sheet without considerable trouble, as the supplied balsa was harder than I use even on eight-foot span Jedelsky R/C jobs. (Incidentally, ALL ribs were sealed, and doped *before* separating them from their sheets, and this small expenditure of time resulted in lustrous ribs obtainable more quickly than if I had waited until building was complete).

Rudder/Fin

Again, the cement had to be kept soft, using dope (perhaps I work very slowly, but I have no doubt many beginners would be equally slow). The ribbon hinges called for accurate and neat glueing, avoiding 'ooze' onto the centre for free movement.

Summary

On the whole, a model which went together easily, but which could have small design and building sequence alterations to make it even easier. *A timer-less version should be shown on the plan.*

Weights (finished)

Fuselage, timer, ballast	3¼ ozs.
Wing.	3¼ ozs.
Tailplane.	¾ + ozs.

TOTAL 7¼ + ozs. needs ¾ oz. ballast at C.G. for A/1 processing).

Useful Modifications

High aspect ratio jobs must assemble consistently, otherwise trimming becomes abortive. Here, the method of wing location relies on a wooden moulded section engaging with a plastic-formed component, the whole being held by the bands provided. There was a little slack in the 'tongue and groove joint' between wood and plastic which allowed a full ¼ in. tip movement. The groove was diminished by cementing thin ($\frac{1}{32}$in.) hard strips either side. (Tissue would have been adequate, if well cemented). It is important, of course, in all free-flight modelling, to attend to the tail location. The small stop at the leading edge of the platform is, in isolation, inadequate for this, and so a two-pronged fork of 24 swg wire was secured at the trailing edge to locate the rear hook. In addition, a pin was used to ensure the correct 'bias' to the holding bands as with this hook formation, the tail can be 'walked' back away from its stop, rather like a monkey-up-a-stick toy, unless the bands are held forward. Other minute adjustments were necessary for perfect alignment of all surfaces, but these were peculiar to the model as an individual, and not the result of design features.

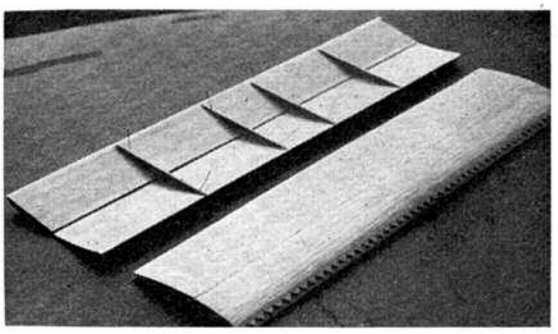
The rudder 'trigger' was built as shown and abandoned as too fiddlesome to get right easily. Recent *AeroModeller* articles illustrate the most popular contest-proven types of rudder release, and a version of this nature was employed. The plan does not illustrate the 'hold-off' function of timer realease which delays actuation until release from tow (perhaps Graupner's designers never hunt for lift on the line . . . or always wait with the downwind pack!)

The model was therefore modified yet again (see photo above) as per the January '74 *AeroModeller*.

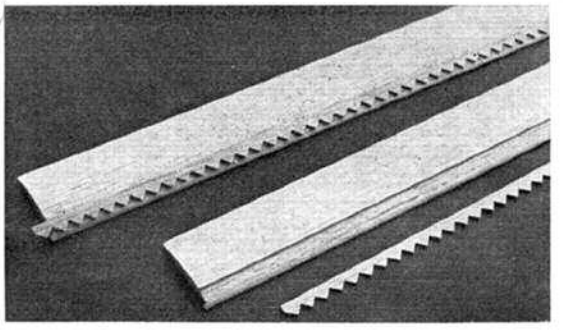
Flying Tests

The building was completed in mid-February, and the first reasonable day was bright but windier than would have been preferred. This was where the time taken on fool-proof assembly paid dividends. Hand glides were carried out with the rudder held straight, as for tow, using a pin inserted temporarily in the tube of the timer 'hold-off' facility. This showed that the trim was almost correct as built, and no packing was added before the first line-launch. Now wind gusting up to 15 knots is not the easiest kind for unknown models, so some 50 feet of line remained on the winch to be played out as required. The first launch showed the remarkable towing ability of the *Junior*. Despite a slight bias left, the model could be coaxed into wind easily by slackening off the line; it was held briefly, and then stalled off hard to check recovery. Two oscillations, and then a steady right turn, with a very reasonable spinning D/T after 15 seconds. The rudder was checked, and the left bias on tow found to result from a carelessly fixed neutral position. The alloy stop was bent to give a true neutral, and a second tow tried. This was splendid. The model was taken slowly to the top, letting out extra line as required. The flexibility of the wing gave the benefits of increased dihedral in gusts (greater stability), WITHOUT the flutter to which 'Jeddy' wings are reputed to be prone (and which I, after experience of a dozen versions up to 8 feet span, have never experienced).

The release was purposely smoother and into the natural turn – a splendid flight, ending a long, long way down wind on 20 seconds D/T. Although the flights were short, the characteristics had been established, and the Junior was ready for the hours of fine trim-



Typical wing panels showing the Jedelsky construction. Text explains Trevor Faulkner's pre-curving of the 1/16 in. sheet to simplify assembly. Wing section is pre-shaped.



Well finished and good quality material is supplied. Rebate gives greater than normal joint area in this version of Jedelsky construction – turbulator strip glued into sealed and doped rebate in background.

ming required to prepare a model for serious competition work. Only then will its true potential become apparent. *(Since this review, T.F. won his club's F/F comp, the* Junior *beating several A/2s.)*

Conclusion

A very nice model which rewards thoughtful builders. The final weight allows ballast at the C.G. for 'Formula Comps', if the paint job has not been overdone, but the box lid misleads in that (a) it shows a timer fitted, which could prove to be disappointing for the youngsters when finding it is not included in the kit and (b) a tailplane turbulator appears to be fitted . . . in fact, this is a decorative device as shown.

A sensible reading of the instructions should clear up both points, but I hope retailers will be interested enough to explain to the buyer that this, like any other glider kit, contains no clockwork timer.

The detail 'mods', explained will help to bring the models into line with basic competition flying practise, and avoid sources of error. The test-flying was done on a very heavy nylon line, so that wing is STRONG. Thank you, Johannes G.: it's been a lot of fun!

BASIC METALWORK

continued from page 299

If you wish to fit together two pieces of metal, one with clearance-sized holes and one with tapped (threaded) holes the usual method is to mark out only on the top one, centre-punch, then drill through both pieces clamped together with the tapping-sized drill. Then open out the top holes with the clearance-sized drill and tap the threads into the lower piece. This method ensures accurate alignment without the need to risk damaging the threads in the tapped holes by poking something through them to mark hole positions onto the second piece of material.

There are not as many occasions when cutting external threads (bolts) might be needed, but a little advice on how to cut them if they are required might be useful. External threads are cut with a DIE which is held in a DIE HOLDER. The type of die most commonly used is a SPLIT BUTTON DIE. Once again this can be made from H.S. Steel or Carbon Steel and have cut or ground thread form. Opt for the carbon cut thread if you have any choice. You will also need a die holder. This item of equipment is a little difficult to improvise and will have to be purchased. It is really essential; without the support of the die holder the die is very likely to split completely in half in use indeed, this can even happen if a poorly fitting die holder is used. The die holder has three screws in it; the die should be inserted lettering uppermost with the split engaging on the point of the centre screw, the two outside screws register in dimples either side of the central split in the die. Tightening the centre screw forces open the die and tightening the outside screws closes down the die. Opening out the die will cause it to cut an oversize thread and vice versa. It should be possible to make a perfectly fitting thread by starting with the die open and then closing it down little by little until the correct fit is obtained when tested against a finished nut. Use a lubricant with the die and ensure that the die runs true to the axis of the work; check with a square if necessary or a 'drunken' thread will result. A slight chamfer on the ends of the rod to be threaded will help to get the die started while the die should be started onto the rod, lettering side first, as this side of the die has a lead in much the same as the taper of the taper tap. The way to find out the correct size rod for any given size thread is quite simple – the nominal size of the thread is the size rod to use, i.e. for ¼ in. B.S.F. you need ¼ in. dia. rod. The sizes of rod that will take a BA. thread (almost) are as follows:-

3/16 in. – 2 B.A.; ⅛ in. – 5 B.A.; 5/64 in. – 8 B.A.; 1/16 in. – 10 B.A.

The two latter are very useful as push rod sizes and can self-tap very nicely into the nylon quick-links used so frequently for R/C work. Be sure not to try to cut threads on piano wire, it can be done but it does spoil the die. All the small sizes above are obtainable in mild steel welding rod form probably from your local garage.

Screw No.	Diameter	Tapping Size	
2	.086	No. 50	1.8mm
4	.112	No. 40	2.5mm
6	.137	No. 34	2.85mm
8	.163	No. 26	3.75mm
10	.186	No. 20	4.1mm
12	.212	No. 15	4.6mm

Table 2 – drill sizes for self-tapping screws

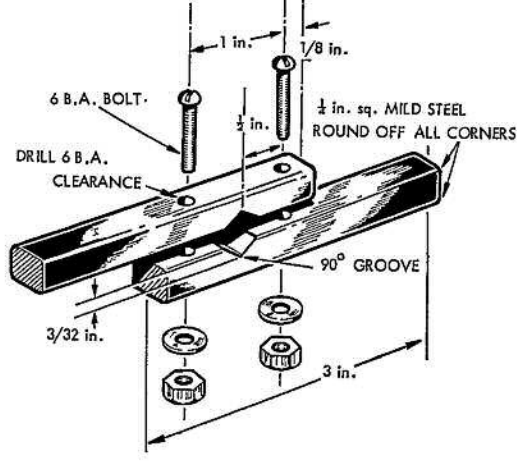
Self-Tapping screws

These are very useful devices especially in these days of glass-fibre fuselages and ready-formed plastic cowls. It is advisable to use the correct size drill, for the size of screw you select, by reference to Table 2.

The screw will hold sheet metal together or anything else to sheet metal. If you are using it to fix canopies etc. to glass-fibre fuselages, I suggest a piece of aluminium epoxied inside the glass-fibre as reinforcement, as repeated use could wear out the self-tapped thread. One last point for scale fans, Messrs. Kennions of Hertford sell bolts with under-sized hexagon heads, these might be useful where the hexagon head of that 6 B.A. bolt which is necessary for load-bearing work is too big for scale appearance. A 6 B.A. bolt with an 8 B.A. head could be just the job.

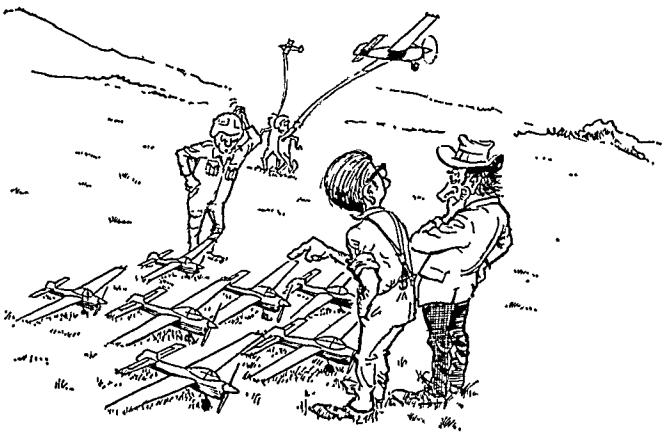
To be continued

Fig 3 Home-made tap wrench



topical twists

by 'Pylonius'
illustrated by 'Sherry'



'No, they're individually designed . . . !

Fly Past

Nowadays it is difficult to know whether you are living in the past or the present. Before anything is allowed to acquire a venerable cobweb or two it is hailed as an historic relic and given the full museum treatment. And in the world of aircraft the historians and curators are more active than anywhere else. That hangar you may see on the 'drome is unlikely to house any aircraft on the active list, but will be stacked to the rafters with the curiosities of man's short but glorious history as a flying creature. This explains why you see so many aeroplanes standing out on the airfield; there is just nowhere to put them.

Now, although the condition of my attic might testify to the contrary, we modellers do not generally store our relics nor pay homage to the glories of the past. The full-size world may preserve its Cody tree stumps but what sort of reverence was given to the Chobham Clump? Perhaps we have a more subtle way of linking-up with our past by building Vintage models, although there is some concern about the ability of the next generation to maintain the tradition, for there has been no change in model design for over ten years. Possibly, in the future, they will have to build vintage models of vintage models. Meantime, we will know that the past has caught up with the present when the first Concorde gets hung from the rafters, as seems now very likely.

Small Reward

When a few years ago I looked at the Scale scene, we were besieged on all sides by huge, multi-engined examples of the realist modellers' art. It was the Japanese, I think, who started the trend. It is a curious commentary on the perversity of human nature that the Japanese, who build their car and electronics factories right up to the picture-postcard mountains, should produce such large models for such little flying space, but then, they turn out absolute forests of golf clubs for their non-existent golf courses.

But perhaps we are just as perverse in this country. When, on all sides, came the protests against the large, noisy models, and we were being kicked off all the urban flying grounds as a result, we reacted by building our models even larger and noisier.

Looking again at the scene, things seem to have gone from the gor blimey to the ridiculous, for the new Scale cult appears to be for very tiny models, mostly rubber-powered. It is a known and observable fact that Scale models do not fly particularly well, which is why the model flyer, who puts flyability before appearance, doesn't copy the full-size stuff. It is equally well known and observable that small models are not particularly good flyers, leaving one in doubt as to the capabilities of models that are not only Scale, but small. Suffice to say, perhaps, at one event the only model to put in a semblance of a flight was criticised for looking too much like a model plane. Must be a moral there somewhere.

Skid Row

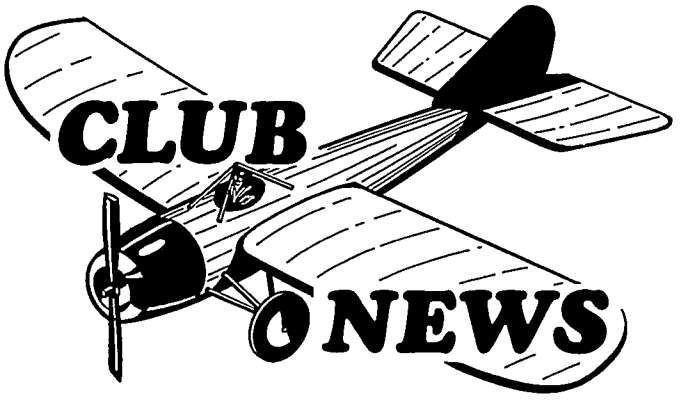
Radio might be sweeping all before it, but when we read about the skids being under Goodyear Team Racers, it is not that they are on the way out, but have acquired a device under the nose at variance with the general scale conformity to pre-war American racing machines. The idea, a little crude perhaps, is to protect the models against the very unscale like landings, which would not be unrealistic if the models were those of the Dam Busters' Bomb.

It has always puzzled me why Team Racers go in for Scale appearance since they circulate at such a dizzy speed that they could only be described as U.F.O.'s. The only consolation is that at speed you cannot see the goggle-eyed pilots.

Pressure's Time

We are always being promised, carrot on a stick wise, an age of leisure. Sociologists spend most of their time thinking up ideas of what to do with surplus humanity once the machines take over. But, oddly enough, the more automated we become the more we seem to have to do. If we think we have a few moments of leisure in which to console the sociologists by doing something creative, like building a model plane, we remember the car has got to be decoked or the spare room papered. Then, of course, there is that fiendish encroacher on constructive leisure time, the television. This commits you to hours and hours of compulsive viewing – in fact, club committees often have to change the club night if it conflicts with something like the *Forsyte Saga.*

These thoughts occurred to me on reading that the majority of models entered in a control line event were built from commercial plans rather than being own-design efforts. Surely part of the fun of true model flying is to get your brainchild down on to the old greaseproof from the 'Red and Gold' store, and it's a poor outlook if it's only the flying that counts and not your own spot of individual variation, whatever the pressures might be.



READING of an accident involving a powered radio model on a public open space, it occurred to me that anyone taking up the sport would do both themselves and the model movement a service if, before taking the model out, they would try to contact a club in the locality. Most clubs now try to give provision for safe flying and also help and guidance for the newcomer. Subscription fees, which usually include vital insurance, are only a few pounds per annum, and, as any club member will testify, worth every penny.

By way of making my point our first letter this month is from Mr. R. Wilson of the **North Cheshire Radio Modelling Group.** The club has been formed to provide flying facilities to a strictly limited number of radio enthusiasts in the area. The club has access to several excellent sites for Power, Thermal and Slope Soaring. If interested make contact as quickly as possible with Mr. Wilson at 92 Mottram Old Road, Gee Cross, Hyde, Cheshire, or phone 061-368-9621.

Yet another radio group with flying fields on offer is the newly-formed **Peterborough Area R/C Society.** Mr. R. S. Briggs tells us that the club already has a membership of 50, with a strong sideline in C/L Stunt and Sport, of which Mr. Briggs is an afficiendo. The club is hoping to start an R/C Boat Group, but already the boat is regularly pushed out as the clubroom is next to a pub. Mr. Briggs' address is 8 Stone Lane, Millfield, Peterborough, and his phone no. 67993. You could also contact the Club Secretary, Mr. Adrian Q. Lindley, Buckminster 478.

Dick Wickham, writes to give us information about the C/L side of the **Waveney M.F.C.** The club penchant is for the current trend in large Scale models, which make for colourful and impressive circuit flying. A fine example of the art is Dennis Whale's *Swordfish*, the gallant old biplane that did so remarkably well in the last war. It has an actual releasable torpedo. Another good flyer from the same stable is a scaled-up *Neptune* from Aeromodeller plans. But the model everyone is waiting to see in action is a B24J *Liberator*. It has a wing span of 81 in. and weighs 11 lb. Bill Staggles is the builder, and his son the one who takes the handle in what we hope is a Herculean grip. Other interests are Combat and Carrier, and another visit to Old Warden is planned this year. The club does its C/L stuff on Beccles Common, in the Norfolk Broads area. A warm welcome is extended to aeromodelling holidaymakers.

Another R/C and C/L club is the **Wakefield M.F.C.** Mr. J. Stanley informs us that the membership is around the 30 mark, and that a monthly programme of contests has been arranged throughout 1974. A Mini-Goodyear event has already been held, won by the experienced Goodyear team of Gerry Goddard and Brian Temporal. The club meets at the Wrenthorpe Village Hall around 8 p.m., every Tuesday. Big attraction is electric r.t.p. Models are mainly converted rubber scale kits, and the biggest fans are the R/C fliers.

More on C/L. John Noble, P.R.O., of the **Urmston & D.M.A.C.,** brings us up-to-date with news of his club's activities. Odd club contest feature is the necessity to hand launch in Goodyear and other normally ground-to-ground events. This is due to the uneven surface of their grass circuit. But although times are down as a result, there has been plenty of support for the recent spate of club competitions. A new event, which has aroused keen interest in the club is Goodyear, and the first win went to the Morton/Morton team, who did a time of 5.44 with their ETA powered *Deerfly*. Second was Ian Woods with an M.V.V.S. powered *Ginny*. The Ratrace event went the same one, two way; the pukka racing models easily outpacing the cluster of flying wings. Combat went to new member, Peter Coates, who is also proving himself a very competent stunt pilot. Other events were Chuck Glider, held in a gale, and F/F Scramble, which was won by Junior Mathew Greenhalgh flying a boomerang! More comps are planned for the future, with the emphasis on Goodyear, particularly in the Nationals.

Whatever the flying difficulties may have been, at least the **Buckaneers Model Club** have had a good social start to the year, according to *Scimitar*. The Dinner and Prizegiving went with a swing, and the slide and cine show provided by two members of the Shuttleworth Trust, giving an insight into the work of preserving and flying vintage aircraft at Old Warden, went down particularly well. Then in February the club had a coach outing to the R.A.F. Museum at Hendon. Plenty to see and marvel at, from the *Bleriot XI* of 1910 to a modern jump jet. On the model flying side, flying has been going on at Brickhill and Finmere throughout the winter. Brickhill, which relies on the good offices of a local farmer, is apparently somewhat restricted, with members finding difficulty in confining themselves to the small flying area prescribed. Good behaviour is the prescription for survival on the precious patch.

Good meeting rooms are expensive and not so easy to come by these days. The **Watford Wayfarers M.A.C.**, is of a mind to find a more inviting clubroom than the one they have at present, and this matter is discussed in their newsletter. The pub room has its appeal, particularly with a bar near to hand, but would cost £2 per night. Meantime flying goes on apace at the Moor, and the weather for the February Fly-for-Fun event was as kind as it could be. A good turn out, too, and no serious prangs to detract from the afternoon's enjoyment.

The **Flying Druid's** news sheet speaks of club meetings having been suspended as a result of the power restrictions, but should now be back to normal. Come to think of it, the season is opening, or rather has opened, in a much healthier state than was expected a few months ago. The emergency has been lifted, and petrol, although dearer, is again in full spate, and there is no reason why we should

not enjoy a normal summer's flying. Only fly in the ointment as far as the Druids is concerned is the tightening up of security on their flying field – cars being strictly confined to the parking areas. I have heard a similar restriction is to apply at the Nationals.

Membership of the **Concorde M.A.C.,** now totals a healthy 18, according to its March newsletter, and there are more members in prospect. Mr. R. F. Morton, the Hon. Sec., has just completed his C/L *Bearcat* after five months of work. Weight at 22 oz. puts it in the heavyweight class, but at least it looks good. What is wanted in the C/L sector is a good bouncible trainer. May I point out, though, that a good soft patch of ground is just as important as a rugged model. It's all red tape and fee paying these days (they just won't allow you to be affluent). The fee for the hoped-for clubroom is described as exorbitant, and the question of insurance in the big hangar has caused the postponement of the Indoor Scale Competition.

Slotting those club events into the general competition background can be quite a headache, and it is this problem that has been exercising the organising powers of the **Wolves M.A.C.** However, according to their newsletter, they have found enough space for 24 contests, spread fairly over F/F, C/L, Radio and Sport. Contest flying plays a vital part in club life, and to give an idea of the general standard, two members have qualified for international teams: Dave Day in F.A.I., R/C Pylon and H. G. Venables in C/L Scale. The newsletter includes a tall tale of a F/F modeller who, whilst flying on farm site, saw his model strike a cow three fields away. Startled, the animal made a dive for the sanctuary of the nearby river. Afraid that the farmer might be upset by a foundering cow, the modeller waded into the river and dragged the cow to dry land. On the next flight the glider landed near enough to the cow to again frighten it into the water. Again the modeller went to the rescue. Anyway, after an exhausting session he learned from the farmer that it didn't matter if the cow did go into the water as it had to cross the river to get home!

The **Leicester M.A.C.,** bulletin also lists a full and varied contest calendar, with events held both at Arnesby and Wymeswold. Out of season, the 'winter building comp', brought out a fine crop of models for the first (uncovered?) stage. Top man was K. Martin with a F/F Sopwith Triplane, and K. Pritchard second with a R/C Monterey Glider. There were 16 entries. The club membership is given at 74, and part of the attraction is the low club fees: only £1.50 for Seniors and a mere 50p for Juniors.

The pressures of modern mechanised living were brought home to some **Three Kings** model flyers in no uncertain manner. Their C/L flying circle was beaten up by a rampaging go-cart. Alarm turned to happy relief, however, when a rear wheel came adrift. Seems such intruders have no right on the Croydon patch, and this situation reminds me of an old R.A.F. field, where my local club had special permission to use. Dutifully we booked in at the guard house on each visit, then went out to join the footballers, dog walkers, vandals etc., who had unlimited access through the non-existent fencing . . . Circuit flying in miniature is one way to

describe electric r.t.p. so, understandably, it has quite an attraction for the members of a C/L club. Some of the small flyers, like the *Westland Lysander* and *Piper Cherokee*, are miniature editions of the type of attractive Scale model for which the club is well-known. And where better to see the latest examples of the latter than at the 'Model of the Month' comp? Winner this time was Dave Morbin's dark green 1½ *Strutter*. Stacks of highly polished aluminium. Under construction is a helicopter, based on the *Schuco/Bell-Huhey Cobra*. It is the joint effort of M. Aldous and H. Quek. Power is a Veco 61.

Heading *Circuit*, the **Hearts of England Aeromodeller's** newsletter, is a nice drawing of a model seaplane. Mr. Brian Wright, who produces the newsletter, confesses to a fascination for this type of model, wishing he lived near enough to a suitable stretch of water. But is this kind of flotatious flying more of a dream than a reality? A poor take-off is not a mishap but a calamity, and it's skin divers to the rescue if you happen to nose over on landing. Back on dry land the 'Heart' group of radio flyers, limited to ten in number, are happily flying on their pastureland site after having cut down the grass for a take-off strip.

Just a word about the **Cosmo A.C.** The club is centred in Bexley, Kent, and has about 30 members. New members are welcome at the Hustra Community Centre, Bexley, at 8.00 p.m. onwards on Fridays.

All the overseas newsletters I have been getting lately are so dreadfully out-of-date, seems it is not only to China to which slow boats operate. Anyway, there's a nice Wakefield in the January South Island News from New Zealand. It is by Jan Zetterdahl, a real aeromodelling work of art, but is all the refinement any advantage in blustery British weather? I attended a recent F.A.I. Rubber event, held in the usual English force-what-not-wind, and the square fuzz, bent wire prop shaft models, were performing better, if anything, than the super streamline/workshop models.

'Happiness is a Peanut Scale Biplane, according to *El Torbellino*, newsletter of the San Diego Orbiteers Club, which publishes one in its February issue. And perfect bliss if you could get such a tricky little thing flying, I should imagine. Lots of talk in the club newsletters about the Energy Crunch, and the effect it might have on those long-distance contest trips. So far all is well.

Clubman

Contest Calendar . . .

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 Bassingbourn, 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 9th	**FLYING DRUIDS R/C RALLY.** Helicopters, Class II scale, Pylon race (up to .20 cu. in. – 40 in. span) Limbo, Spot Landing. Pre-entry 25p per event to G. Dean 'Winter Hills', Deptford, Wylye, Wilts. Tel: Wylye 250.
June 9th	**BUCKANEERS C/L STUNT COMP.** Pre-entry 40p. Write to J. Mannall at 3 Totnes Close, Bedford, for details of venue.
June 9th	**LEEDS RALLY A/2,** Open R/P, Mini, Vintage Duration, H.L.G. Open Precision, C/L Combat, R/C Thermal Soaring at R.A.F. Elvington, Yorks. S.M.A.E. members only.
June 16th	**BURNS BROWN RALLY.** C/L Combat and aerobatics at Stopsley Sports Centre, St. Thomas Road, Luton. Details Pre-entry (25p), P. Rabjohn, 23 Mardale Avenue, Dunstable, Beds.
June 16th	**CANTERBURY PILGRIMS R/C RALLY.** Class II scale, Fun/Novelty at Graveny, Nr. Faversham, Kent. Details H. Kendall, Kingsdale, Shalmsford Street, Chartham, Canterbury, Kent CT4 7RD.
June 16th	**NORTH BERKS. R/C ½A PYLON RACE.** Venue Nr. Garford, on A388 Wantage-Oxford Road. Pre-entry 50p to P. Clarke, 7 Candwell Close, Grove, Nr. Wantage, Berks.
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 23rd	**FINCHLEY C/L GALA.** Combat, stunt. Venue Glebelands, Summers Lane, Finchley, N.3. 9 a.m. Pre-entry (25p) to J. Goodwin, 77 Gallants Farm Road, East Barnet, Herts.
June 23rd	**SOUTHAMPTON F/F RALLY.** Open R/G/P, and A/2 glider at Beaulieu Airfield.
June 30th	**S.M.A.E. CLUB CHAMPIONSHIPS.** Open R/G/P at R.A.F. Stradishall, Suffolk.
June 30th	**ELLIOTT C/L RALLY.** Scale, Stunt, Goodyear, Combat, Junior rat-race (up to 3.5 c.c., for 16 years and under). Venue: Elliott Bros., Airport Works, Rochester, Kent.
July 7th	**LONDON AREA C/L MEET.** F.A.I., Goodyear team-race, Combat at Charville Lane, Hayes.
July 7th	**LONDON AREA C/L MEET.** Class I Scale, Stunt, Navy Carrier at 10.30 a.m., Croydon Airport, Purley Way, Surrey. Silencers and insurance proof essential.
July 14th	**STOCKPORT COMBAT RALLY.** Venue: Warth Meadow, Stockport, Cheshire.
July 14th	**S.M.A.E. 5th AREA CENTRALISED.** Team glider, Cd'H, F.A.I. Power – Area venues.
July 14th	**S.M.A.E. SCALE.** R/C Class II, C/L, F/F. Venue: Little Rissington, Gloucester.
July 14th	**COLCHESTER M.A.C. THERMAL SOARING GALA.** Venue: Sir Charles Lucas Comp. School, Colchester. 11 a.m. start. Pre-entry (35p) to D. G. Sargent, 17 Old Heath Road, Colchester, Essex. State Freq.

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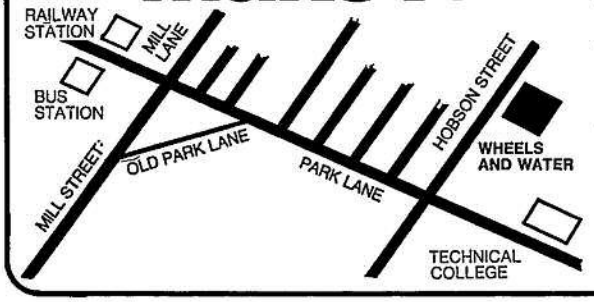

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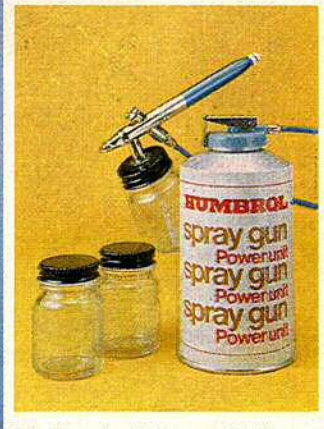

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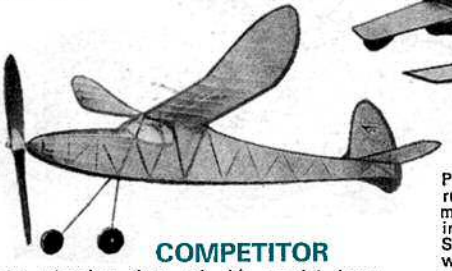

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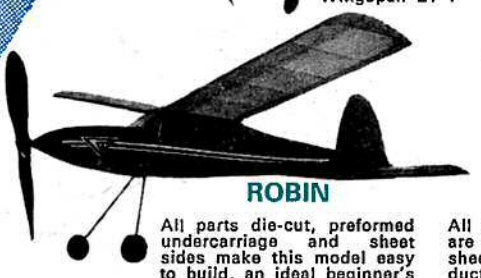
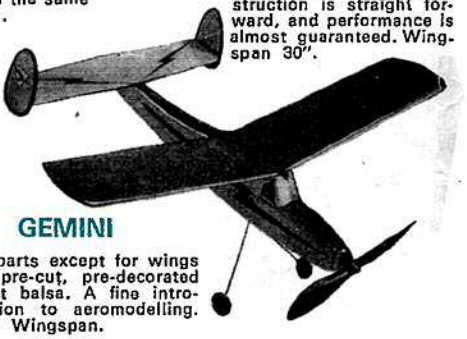


ROBIN

All parts die-cut, preformed undercarriage and sheet sides make this model easy to build, an ideal beginner's choice. 23" Wingspan.



GEMINI

All parts except for wings are pre-cut, pre-decorated sheet balsa. A fine introduction to aeromodelling. 21½" Wingspan.