

January 1976

Aero Modeller



30p USA & Canada \$1.50

INCORPORATING
MODEL AIRCRAFT



HOBBY MAGAZINE

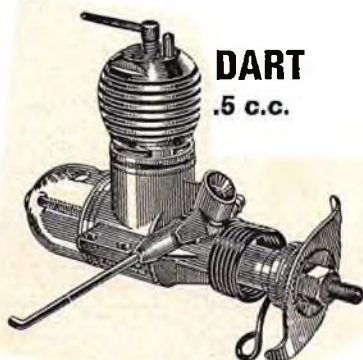


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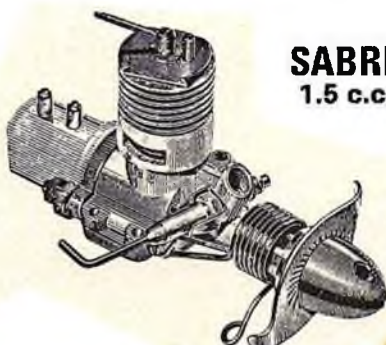
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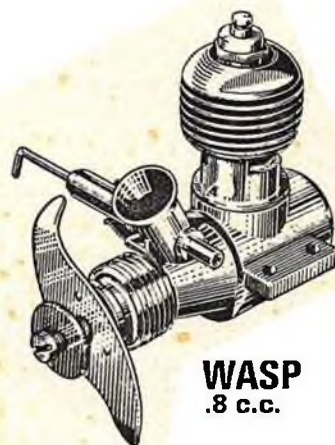
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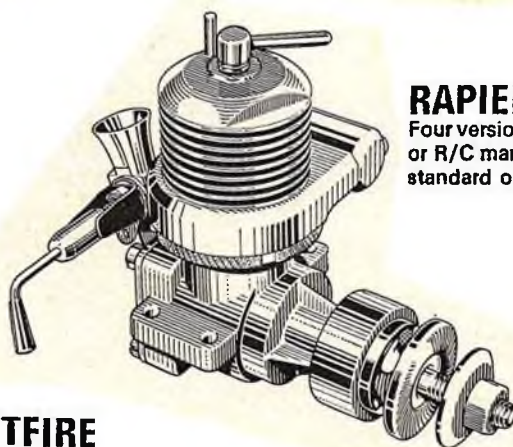
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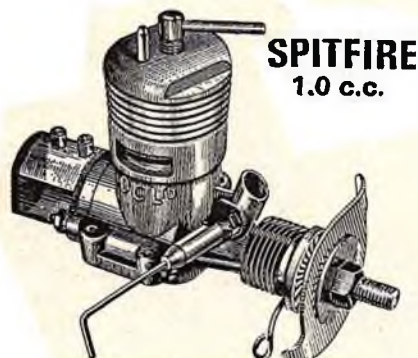
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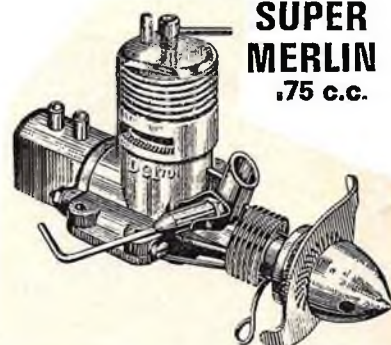
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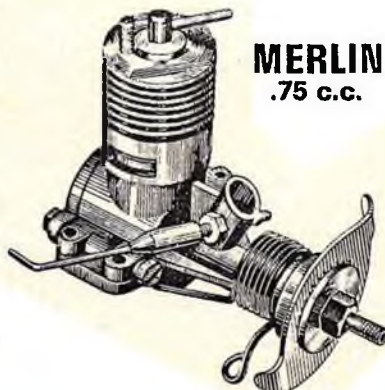
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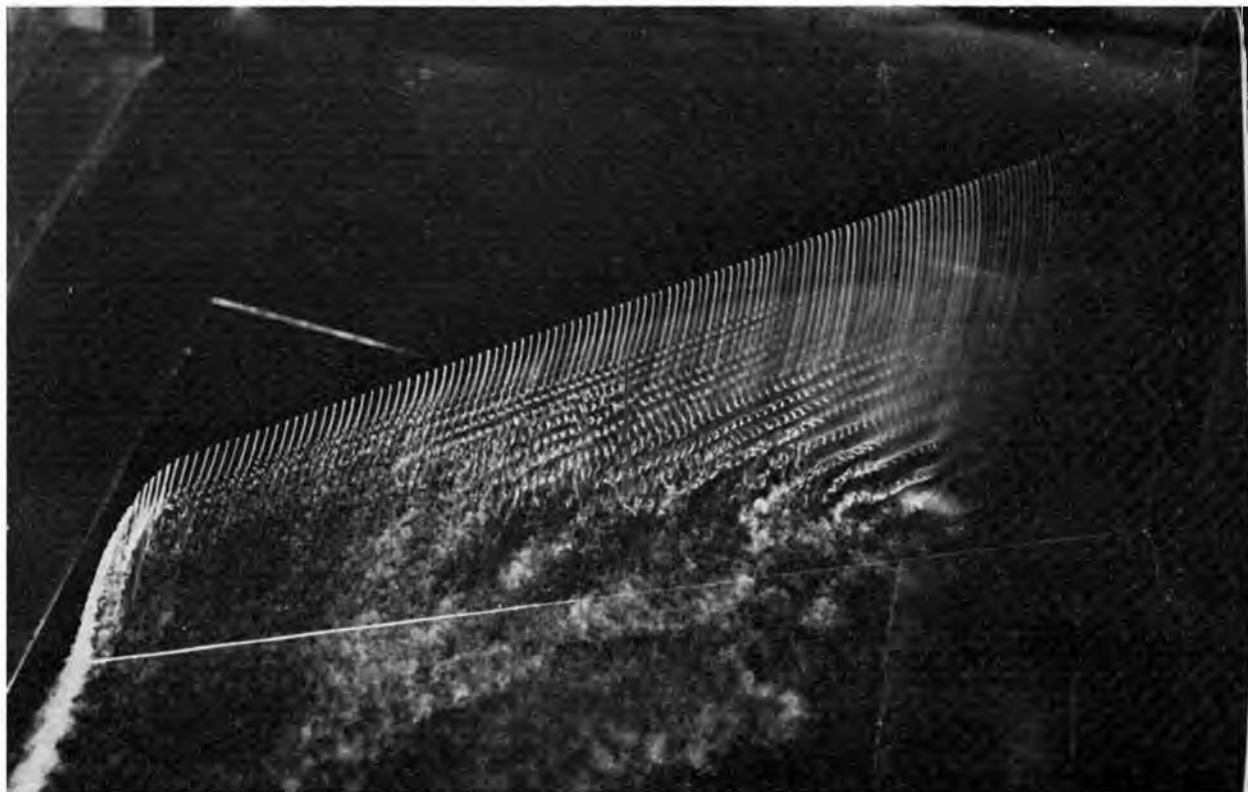
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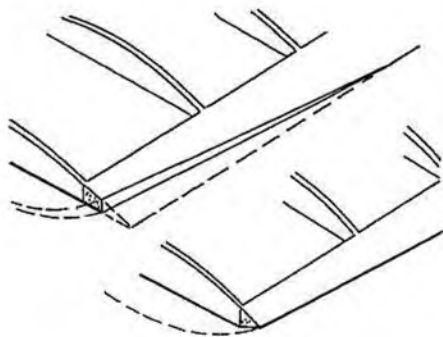


Here's a tapered sweptback wing on the point of stalling. The airflow has broken away almost completely from the region of the wingtip—and that's going to have a nasty result (you can almost guarantee that one tip will stall before the other).

A trick of the (aerodynamic) trade here is to introduce washout into the wing to delay the tip stall. That easy—using a trick of the (modeller's) trade. Use a wide balsa trailing edge section, cut a taper towards the tip and then sand in washout on the underside.

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Illustrated left — 'Glo-Star' 3.5cc
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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

January 1976
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Comment

Looking back over the World Championship results for 1975, we are struck not only by the performances of the individual winners, but also by the quality of the second-placed flyers.

For example, Austria's Hanno Prettner has been so close to top honours in the R/C aerobatics class in recent years that surely on form alone he must have been favourite. In 1971 he placed a surprise fourth, then two years later, after heading the first four rounds his helper miscalled a manoeuvre and he was relegated to third place, although as compensation he twice consecutively won the Model Airplane News sponsored meet at Las Vegas against the World's best pilots.

In free-flight the story is similar. Evergreen Wakefield flyer Bob White from the USA was fifth in '73 and third in '71, while Russia's Verbitski despite dropping his first round flight in '73 fought back to hold 16th place, whilst in previous years he placed 4th and 33rd respectively.

As for Canadian Peter Allnutt, his international efforts over the years in A/2 contests must surely have stood him in good stead for the number one spot, but alas this was not to be in '75.

All four are leaders and innovators in their respective fields and internationally highly respected. Bridesmaids we salute you. To the Victor the spoils...

on the cover

A unique photograph showing the contents of RAF Colerne's museum, shortly before it was disbanded pending closure of the Station. Taken by Senior Aircraftsmen Trevor Olmer and Ronald Phillips, using a Roliflex with a Tessar 1:3.5 lens. Details of the aircraft shown, plus information as to the availability of prints of this picture (of much higher quality, we should add!) are given on page 16.

RAF Colerne's location is the key to the crest, also depicted on the cover. Situated almost at the junction of Wiltshire, Somerset and Gloucester, it has taken elements from the arms of each to form its own crest. The motto 'Age pro viribus' is officially translated as 'Do your utmost'.

next month

More comments on the current combat scene—from the other side of the 'pond'. Kit review, details of installing the Maxaid circle-tow mechanism in a modern glider, latest news on man-powered flight plus regular features on scale, control line, free flight and engine topics. All this and more... in the February issue, on sale 16th January. Place your order now!

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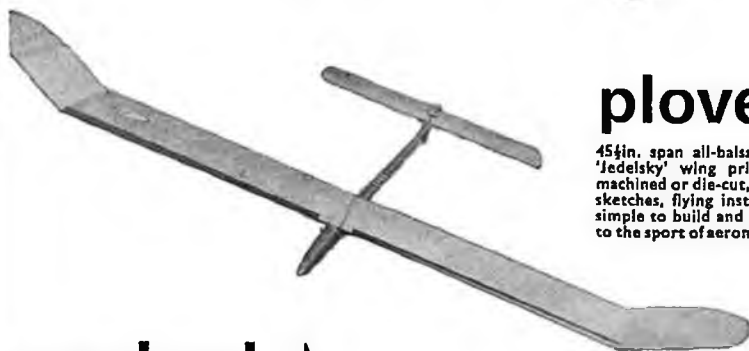
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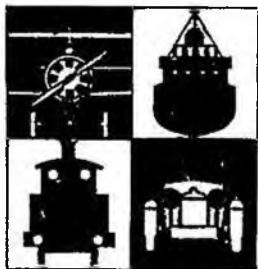


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(NOT OPEN SUNDAY)**

Once again the Seymour Hall will be a meeting point at the turn of the year for modelling enthusiasts of all types. Examples of every type of model-making will be on show, from the minute to the enormous. Competition classes cover the whole range of modelling, from live steam locomotives to military miniatures. Demonstrations, club and trade, will include workshop techniques, brazing, painting, etc., etc. through to wargaming and craft work. Visitors will be able to see and buy many of the hard-to-get bits and pieces, tools, publications, figures, kits, and the like, ask questions, chat to fellow enthusiasts and, of course, see some outstanding examples of model work.

The MAIN HALL will have a slightly different layout this time, improving, it is hoped, the flow of visitors and improving viewing. A main feature will be the traditional S.M.E.E. passenger railway in non-stop service with a variety of interesting locomotives on show and in action. The extremely popular S.M.E.E. workshop will be there, manned by experts, ready to answer your queries or discuss your problems (don't be shy!), plus a display of models running on compressed air.

This year the LARGE FLYING CIRCLE, balcony to balcony, will be the scene of electric flying competitions in addition to regular demonstrations of the latest developments in this exciting aspect of aero-modelling.

TRADE STANDS include some old favourites and some newcomers, and should offer something of interest to everyone. Demonstrations will be continual on many of these.

More such stands plus CLUB and SOCIETY stands appear in the BRYANSTON ROOM, again with scores of models on show and continual demonstrations. The third hall, the LECTURE HALL, will include craft work and more exhibits.

The BOATING MARINA, parallel with the main hall, will feature demonstrations of boats—you can bring your boat along for a run if you write to us beforehand to check dates and times.

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Price of admission at the door will be: 45p adult, 25p child inc. VAT. A child is regarded as anyone still at school. Children under five who have not started school and are accompanied will not be charged.

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J.R. MORGAN (left)

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J.R. SIMPLE SIMON (right)

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J.R. EL BANDITO (below)

Eighteen-inch wing span, semi-scale control-liner, designed for 0.75-1.5cc (.049-.09cu.in.) motors. Beginners will appreciate the ease of construction and the robustness of the design, while more experienced pilots will be pleased to find that it conforms with the 1/4A Goodyear racing rules! Kit is very complete, with all accessories such as tank, bellcrank, wheel, etc. — all for £3.95



J.R. PIRATE (above)

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J.R. BUCCANEER (above)

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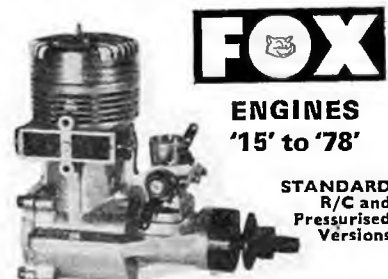
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1 3/8" - £3.34	1 3/8" - £3.54	1 3/8" - £3.34
1 1/2" - £3.54	1 1/2" - £3.77	1 1/2" - £3.54
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*P = Pressure

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Heard at the HANGAR DOORS



LIBERTY BELL is no ordinary Goldberg *Senior Falcon*. Made by Doris Rich, following talks at the '75 U.S. Nats, she was completed in ten weeks fitted with a K&B 40, Kraft 7 channel R/C gear plus a 32 ounce fuel tank and on 1st October set off from Kitty Hawk to cross the United States. Now every modeller knows that things just don't happen this way, and all who have a licence to drive a car will realise that crossing nine of the United States, covering 3,026 miles, is a feat in itself.

To start with, it was all very well to set off from the Wright Brothers Memorial, but how many realise that Kitty Hawk is an offshore strand of beach joined to the mainland by a long bridge? But friends, this event took place in America, and dare we say it, they simply do not know the word 'impossible' in those parts. For on 30th October, Bob Rich piloted his wife's model into the Los Angeles sports arena parking lot where none other than General Jimmy Doolittle signed the ceremonial scroll to record the historic occasion.

In 23 days of flying, the *Falcon* was airborne for 68 hours 48 mins. Their average speed was 51mph, she made 118 take-offs and landings and

crossed the USA on 16½ (US) gallons of Duke Fox's fuel. Only one change was made, and that was to fit a K&B Veco 61 at Fort Worth in Texas to combat headwinds.

This fantastic achievement is all the more remarkable for its coverage in *Model Aviation*, the official magazine of AMA – we received our printed copy only 13 days after the event took place!

'Liberty Bell' involved a train of helpers and was tracked by mobile caravans for control, publicity and organisation. Nationwide coverage by TV, Press and Radio will have placed modelling well to the forefront as a practical family participant sport in the USA. Thanks to Doris and Bob Rich plus all their sponsors and supporters who got off their backsides and really did something, another shaving has been eroded off the 'toys for boys' image.

Now lads – anyone for a jaunt up the M5, M6 from Taunton to Bonny Scotland?

PUBLIC RELATIONS AND MODEL FLYING. A seminar on this vital topic will be held at the Model Engineer Exhibition, Seymour Hall, London W1 on 10th

January, starting at 3.00pm. All SMAE Area and model club public relations officers are invited to attend in order to discuss the various problems to be faced, and methods of solving them. The SMAE Public Relations sub-committee will be there to discuss a national policy on such matters as byelaws, the press, local and national releases, and model flying's image as a sport. Those wishing to attend should send an SAE to M. Dilly at 20 Links Road, West Wickham, Kent, for further information.

SMAE SUBSCRIPTIONS. At the 1975 Annual General Meeting, the membership voted for the following rates to apply for the coming year: Full Member £4.50, County Member £4.50, Juniors £1.50, Associates £15.00 and in addition, there will be a £1.00 joining fee for new members. All rates include VAT. Incidentally, 'Women's Lib' raised its head, objecting to the different category for Lady membership. Hence both males and females now pay the same amount, whereas in the past ladies have paid the same rate as juniors. Equality has its drawbacks... Voting on the increases were very close – 1004 in favour, 916 against.

For years AeroModeller readers have chuckled at Ern Sherry's cartoons which have so superbly illustrated the 'Topical Twists' column, but his talents do not end there, as the photographs on this page show. He has just completed this 32 feet span tail-less hang glider from spruce and birch plywood and has successfully test flown it. The highly cambered reflex section is to Sherry's own design, and the 9.6:1 aspect ratio wing features slots extending seven feet from the tips. The best sink rate is around 3ft./sec. at 23mph, while the wing stalls at 17-18mph. Ern reports that landing is easier than he expected, but control is totally different to the normal aileron/elevator/rudder set-up, so he has to re-learn his reflexes.



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— G Y R A T I O N —

GYRATION was designed for use at displays given by the C/L section of the *Sudbury Model Flying Club*, the original idea being to represent a helicopter gun-ship and attack on 'rebel forces' with suitable ground explosions set up by the Club's pyrotechnics expert. In the event, the model's flight performance alone turned out to be a real 'show-stopper', so there is no reason why it should not be finished to represent an air-sea rescue, oil rig supply, or any other type of helicopter that takes the builder's fancy – even if you don't fly in public displays, build one to entertain your fellow clubmen, or just for the fun of flying it. I must confess to leaving my trusty *Crusader* stunter languishing in the garage most Sunday mornings this summer whilst experimenting in getting *Gyration* into, and out of, the most incredible in-flight attitudes imaginable.

Construction is straightforward, but some basic metal working tools are necessary for making up the bellcrank assembly as drawn. Some builders may prefer to use other methods, but it is vital that the mechanism is light and free in operation as *Gyration* often flies with virtually no line tension at all! The model is built around the engine bearer/main fuselage former assembly, and the bellcranks, throttle linkage and engine are all installed before the fuselage is built onto this main structure. Commence by glueing $\frac{1}{4} \times \frac{3}{8}$ in. balsa to the $\frac{3}{8}$ in. \times $\frac{1}{2}$ in. Ramin engine bearers, and then assemble to former F2–F5 making sure everything is square – the rotor shaft should be bent to shape and attached with soft wire binding and epoxy resin to F4 BEFORE fixing to bearers. When thoroughly

dry, the $\frac{1}{2}$ in. ply bellcrank mounting plate is epoxied between the engine bearers in front of F4. The bellcrank mechanism should now be made up and installed, it is based on one of the systems described by Mick Reeves in the November 1968 *AeroModeller*, and uses my adaptation of the pivot system described by Claus Maikis for his *Commodore* stunter, *AeroModeller* February 1973. (Moral – you can always learn something from *A/M*'s constructional articles, even if you don't build the model concerned). The bellcranks are cut from 16 or 18swg mild steel, drilled for lead-outs and pushrods, but centrepopped only at the pivot point. A square steel 4BA nut is soldered at the pivot point – use a good big iron, tinman's solder and Bakers Fluid. Once the nut is securely soldered, run a $\frac{3}{8}$ in. dia. drill through the nut and bellcrank, followed by a 4BA tap, started of course, through the nut. The bellcranks, now with 4BA threaded pivot holes, are mounted on brass bolts trimmed to length and locked with one nut each to the ply mounting plate and the throttle bellcrank. This method of mounting ensures smooth running bellcranks with little or no rocking at the pivots, and keeps the complete assembly nicely compact in the vertical plane. Once the bellcranks are installed, the throttle linkage can be made up, again using 16 or 18swg mild steel for the transfer links and soldering firmly to the 14swg piano wire cross-shaft. Make sure when fixing the brass tube bushes to the mounting blocks that no epoxy resin finds its way into the bushes; lightly greasing the cross-shaft ends will help to prevent this. A short length of elevator push-rod is mounted in the appropriate bellcrank to be joined with brass tube to the other section of the push-rod which is installed with the elevator at a later stage of construction. The engine is now mounted and the throttle linkage connected up, checked, and adjusted as necessary. It is as well at this stage to cover the engine exhaust and carb. inlet with adhesive tape, lock-nut the



engine in place, and make up the cowl fixing which is a short length of engine bearer epoxied to the front of F2, drilled and 'tapped' by running a 6BA bolt through the hole. The fuselage sides are now cut from 3in. wide $\frac{1}{8}$ in. balsa - note that they have a perfectly straight bottom edge that helps building, as one is able to work with the fuselage standing firm and square on the building board. Make sure to cut the tailplane slots and the cut-outs for the wing leading edge before the sides are glued to the main former/engine bearer structure. Once these joints are dry, the fuselage sides are drawn together at the tail and the remaining formers, tailplane, fin, cabin, jet engine and upper fuselage planking are all completed, the fuel tank installed and the detachable cockpit/engine cowl made up.

The model is now lifted from the board and the elevator and rear section of its push-rod fitted - ensure bellcranks and elevator are at neutral before soldering up the push-rod.

The stub wings are built by making up the planform with $\frac{1}{8}$ in. balsa sheet, the $\frac{1}{4}$ in. leading edge is glued on and the fuselage located and glued onto this part-built wing which is now completed by adding the pre-shaped trailing edges, $\frac{1}{8}$ in. sheet ribs, weight in the outboard tip and lead-out guide to inboard panels - thread lead-outs through ribs, add top $\frac{1}{8}$ in. sheeting and sand to shape.

The undercarriage should now be bent up and attached with soft wire binding and epoxy resin to its $\frac{1}{8}$ in. ply plate which in turn is epoxied to the underside of the engine bearers between F2 and F3. The fuselage sub-formers, ply tailskid, and bottom sheeting are added together with F1 and the soft block nose section under the engine, duly carved and sanded to blend the rectangular fuselage section into the spinner.

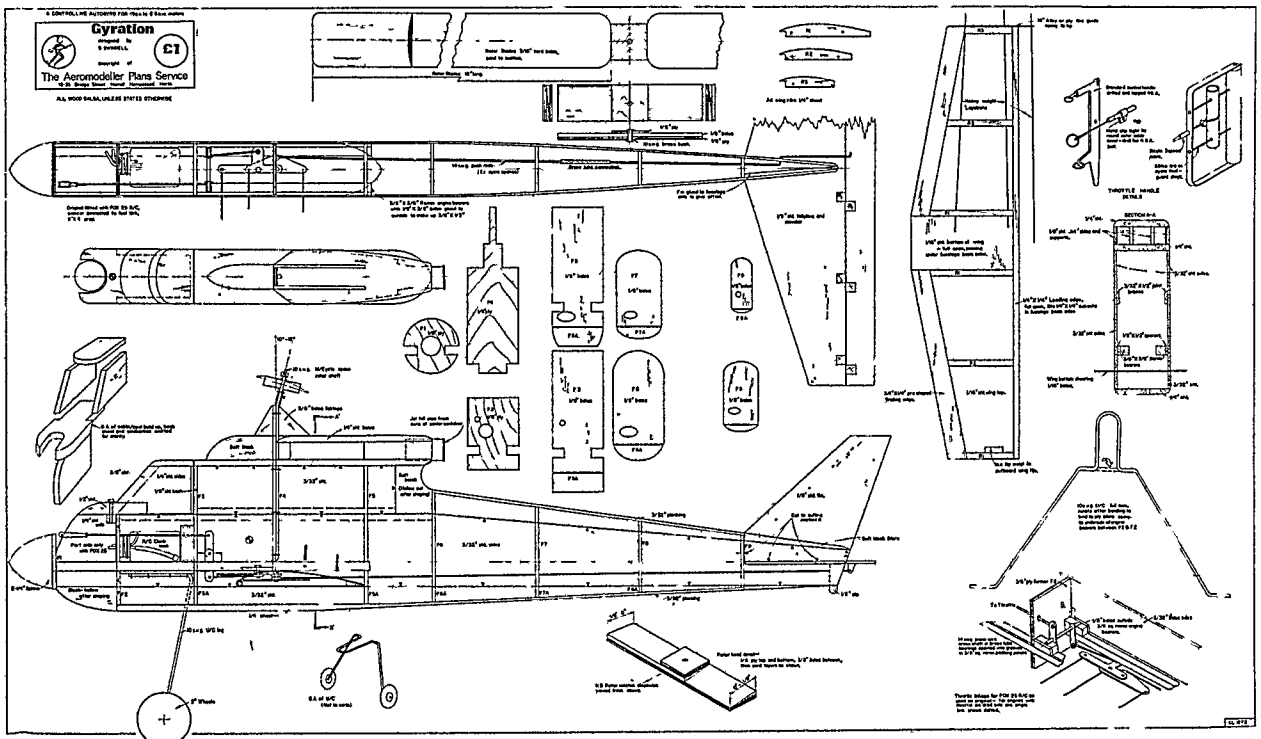
The rotor hub is built up as per plan; sanding the $\frac{1}{8}$ in. balsa to section can be tricky, I used a Cintride block, but a good wide sandpaper block should do the job just as well. If one has access to a vertical drill stand to ensure accurate drilling of the pivot bearing hole, so much the better. The bearing itself is simply a length of 14swg brass

tube fixed with epoxy resin. The blades are cut from good straight-grained, springy $\frac{1}{8}$ in. balsa sanded to a simple section as shown on the plan. After assembly the rotor should be balanced fairly accurately to reduce vibration in flight - do not be tempted to reduce the angle of the rotor shaft. I did experiments with a smaller angle, but the model refused to take off. Also, do not mount the rotor any lower either, the blades flex quite alarmingly in flight and a heavy landing can make them flex sufficiently to gouge chunks out of the upper fuselage decking, and at worst, break a blade. Finally, make sure that the retaining collet is secure - on its third flight the original *Gyration* lost its rotor because I had failed to check this vital point. Instead of plunging earthwards, the model accelerated in about half a lap to something approaching Mach 1, when the stub wings apparently provided enough lift to keep it flying straight and level at about five feet altitude and just as I was about to lose hope of controlling the beast, the motor cut and the resulting 'arrival' bent the U/C but fortunately did no other damage.

Because *Gyration* is not a 'normal' C/L model, the normal C/L fuel tank does not suit, so a clunk tank is used, pressurised from the engine silencer. Two connections only are required to the tank which is filled via the feed pipe - it is as well to disconnect the pressure pipe also to act as a visible overflow. Note that there is no cheek panel to the starboard side of the engine cowl, the silencer very effectively disguises this whilst leaving the plumbing easily accessible. The original model uses a Fox 25 R/C motor turning a 9x4in. prop. The pressure nipple is simply a threaded brass bush as used in rubber model nose-blocks, cut to length and fitted through a hole drilled in the outer casing of the Fox silencer; it is necessary of course to dismantle the silencer to do this. The silencer itself was made rather more effective by fitting a brass thimble, salvaged from an old electrical fitting, into the tail-pipe and drilling a $\frac{1}{8}$ in. dia. hole as the exhaust outlet. I don't know quite how many rpm or fractions of a horse-power this reduces the engine's output, but I do

continued on page 48

FULL SIZE COPIES OF THIS 1/8th SCALE REPRODUCTION ARE AVAILABLE AS PLAN NO. CL 1272, PRICE £1.00 (INCLUSIVE OF VAT AND POSTAGE) FROM AEROMODELLER PLANS SERVICE, PO BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE.



BOOK REVIEWS

PRODUCING a book for beginners to aeromodelling is by no means a simple task – there are just too many types of models, too many construction details and too much 'essential' information which should be incorporated. Regrettably, this would result in a book far too expensive to be a commercial venture – indeed a whole series of books would be necessary – and even then the subject could not be adequately covered in every detail unless the author spent literally years in its preparation. It is therefore always interesting to see how individuals tackle the problem, and the opportunity was recently provided by the arrival of two new publications which whilst nominally aimed at the same market, approach the subject in completely diverse directions and consequently complement each other, rather than compete.

How to Design and Build Flying Models by Keith Laumer

The author's name will not be unfamiliar to *AeroModeller* readers, as over the years several of his sports model designs have been published within these pages, as well as a beginner's 'building course'. This book, which has been completely revised since its original appearance in 1960, tackles the problem of starting aeromodelling in the traditional manner – i.e. the subjects of selecting a suitable design, making the framework, covering it and eventually flying (even repairing it!) are dealt with in a thorough manner. By necessity the various types of models are glossed over

Two new books aimed at rather different markets. At right is Keith Laumer's book, perfect for the young would-be modeller, while below right is Martin Dilly's informative title directed at those wishing to know what modelling is all about – its aims objectives and the modern approach to the sport of model flying.

fairly quickly but the book contains many worthwhile suggestions and advice as well as providing plans for both control-line and free-flight sports models. Perhaps our only real complaint is that the title of the book suggests that the 'design' and 'building' aspects share equal coverage – whereas in fact 'Designing your Own' occupies just one of the twelve chapters. Certainly a worthwhile book for the young beginner to the hobby.

Published by Robert Hale & Company, Clarkwell House, Clerkwell Green, London EC1R 0HT. Price £3.50.

This is Model Flying by Martin Dilly

No introduction necessary for this author of course – not only is Martin a regular *AeroModeller* contributor, but is known worldwide (literally) for his free-flight



RAF COLERNE

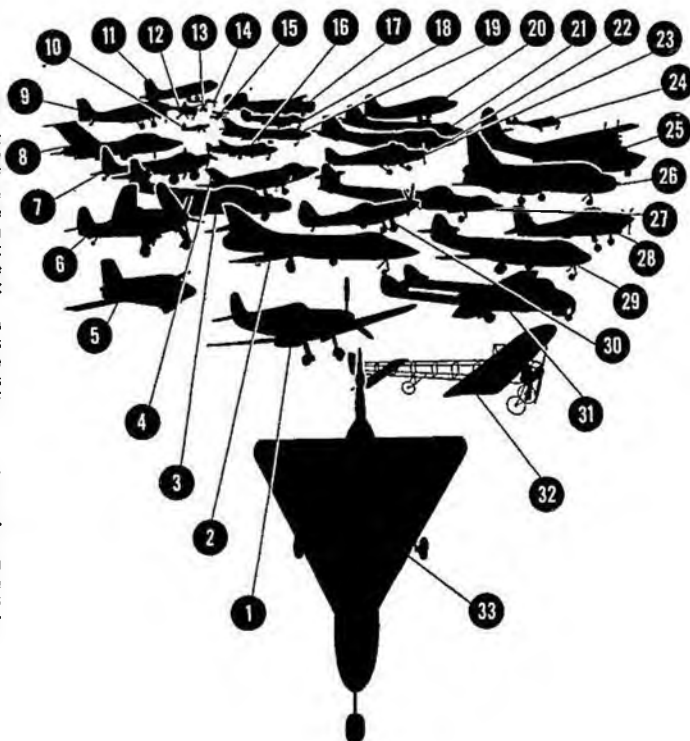
the picture on the cover

WITH THE imminent closure of RAF Colerne, due to the Defence economy, its fascinating museum of 33 aircraft is being disbanded and the collection dispersed to other RAF Regional Museums at St Athan (Cardiff), Cosford (Wolverhampton) and Finningley (Yorks). To commemorate this sad occasion, the entire contents of the museum were assembled for the photograph displayed on the cover – no mean task as there was quite a stiff breeze blowing at the time, and many of the older aircraft did not have brakes. In addition the lack of proper tow bars hindered the task, while the lightweight *Bleriot* and *Flying Flea* were in danger of being blown away – hence the airmen grimly holding onto the structure of these two aircraft while the picture was taken!

Full colour prints of the picture on the cover are available from NONPAS, RAF Colerne, Chippenham, Wiltshire – sizes and prices are: 14x11in. – £1.75; 8x8in. – 75p; 5x5in. – 40p (all prices are inclusive of post and packing). Make cheques and postal orders payable to NONPAS, RAF Colerne. Proceeds will go to the RAF Benevolent Fund.

Aircraft identification key

(1) Spitfire Mk 5B (2) Hunter Mk3 P1067 (3) Meteor NF Mk14 (4) Supermarine S10 (5) Me 163 Komet (6) Sea Fury (7) Mosquito B34 (8) Javelin F(AW) 4/9 (9) Dakota (10) Chilton DW1 (11) Hastings C Mk1 (12) Dragonfly (13) Campbell Gyrocopter (14) Heinkel He162 (15) Flying Flea (16) Vampire T11 (17) Liberator B24B (18) Meteor Mk4 (18) Hunter Mk2 (20) Valetta CMK1 (21) Canberra B2 (22) Canberra B(1)8 (23) Anson Mk19 (24) Vampire Mk6 (25) Catalina (26) Lightning 18 (27) Meteor Mk8 (Prone position) (28) Provost T1 (29) Hawker P1052 (30) Spitfire Mk24 (31) Vampire Mk3 (32) Bleriot XI (33) Handley Page 115.



prowess, and of course recently appeared in the BBC TV programme *Model World*. His book represents a radical change from all other books on model aircraft – it specifically does *not* detail building or flying advice. Instead, as suggested by its title, it describes to the reader the many and varied types of models flown – and perhaps more importantly, describes the problems and challenges that the builder/designer/flyer faces. Control-line, free-flight and radio control flying are all fully detailed in an informative yet easily understood manner interspersed by many anecdotes and quotes from well known modelling personalities. In short, Martin has done his homework well,

and presented it in a most palatable form. The book is not aimed so much at the young raw beginner, although this person would find much to interest him and inspire him to channel his interests into a particular sphere – but rather it is designed to explain to the more adult non-modeller just what is involved in our sport. Anyone with even a slight interest in modelling or aviation could absorb the contents, then on paying a visit to a model rally or competition, would comprehend exactly what the experienced flyers were doing – and appreciate the amount of skill and effort necessary to achieve their level of expertise.

Several excellent line drawings of models

are provided (the handiwork of Andy Crisp we note – another well known free-flight enthusiast and artist) but if we must find criticism, it must lie in the quality of the reproduction of the photographs, and perhaps a few more would have been welcome. Nonetheless, it is a most informative book, with a 'new' angle on the subject, and should be compulsory reading for the Minister of Sport and other civil servants who consistently refrain from recognising aeromodelling as a sport worthy of official support.

Published by Hamish Hamilton, 90 Great Russell Street, London WC1B 3PT. Price £3.40.

READERS LETTERS

Dear Sir,

Having just read 'Heard at the Hangar Doors' in *AeroModeller* for November, I feel that I must write to you regarding the 50 year old paper aeroplane.

I bought one of these 'Sail me' gliders at a shop in Leicester called the 'Family Fry Pan' in the High Street. The shop is still there today, and has a large frying pan over the front door.

You are quite correct as to the date, as I was about 10 years old at the time and was born in 1915. I had hours of pleasure out of this small paper glider, and if my memory is correct the price was 3d (old money). I was so delighted with it that prior to returning home to Fishguard I remember buying another to impress my friends on my return! The following year I tried to buy another, but no more were available.

It was shortly after this that I started building kits consisting of fine quality cardboard, all colour printed for cutting out and gluing together; I remember they had aluminium wheels and a propeller blank of satin walnut – even the bracing wires had to be made by cutting out thin strips of cardboard! The prices of these kits varied from 1s 6d to about 3s and I remember making over the years a Tiger Moth (monoplane) Bristol Lucifer (biplane). I used to buy these from a firm called W. E. Appleby of Jesmond Road, Newcastle upon Tyne. By winding up the rubber motor as far as I dared I used to have the satisfaction of seeing my creation taxi furiously over a very smooth surface and make a short hop of perhaps 20-25 feet. Oh happy days!!

I am still modelling, but often wonder whether with all the sophistication etc of today's kits the pleasure is really any greater?

R. R. Lewis

Fishguard, Pembroke

Dear Sir,

On reading in the November *AeroModeller* of the discovery of a 50 year old paper model plane, I thought readers might be interested in something else nearly as old.

I have a book by Joseph S. Ott, published in 1931 by The Goodheart-Willcox Co. Inc., Chicago, kindly loaned to me by Grant Longman who acquired it from the late Herbert T. Jackson, his father-in-law, whom Watford MAC oldtimers will remember.

I do not recall Ott's name from the magazines of the late 1930s when I first read *Flying Aces*, etc, although it is pretty certain that the plans in his book were conceived at the end of the 1920s. What I

am marvelling at is the inclusion, cheek by jowl with A-frame pushers and stick models of balsa and tissue flying scale models. This pre-dates the 'Golden Era' of kits. Moreover, the Ott models are better engineered as flying models than most of the kits were. They comprise a Stinson Monoplane, SE5, Fokka Triplane Sikovsky S39 Amphibian, Stout Sky Can (pusher) DH Interceptor (the original wire-braced monoplane Moth?) and Heath Parasol. Each is for three sizes and weights go from 1 to 6 ounces.

Can anybody in the UK or USA tell us more of Joseph Ott? He seems to deserve recognition as a pioneer with such as Grant. Will we find that he is the originator of the lightweight scale model?

An interesting passage in the book reads: "In England the use of balsa wood for model work is hardly known, and pine and spruce predominate, but since the Lord Wakefield Trophy was won by an American boy they also realise the value of balsa wood . . .".

Also, to help in identifying the date of writing it is interesting to note that he quotes stock sizes of balsa in 30in., not 36in. lengths.

Vic Dubery

Walton-on-Thames, Surrey

Dear Sir,

Following Dave Clarkson's comments in *Between the Lines* in the September issue, I feel that I must write in defence of the Speed event at the Nats, which was passed over in his summary as being 'definitely a minority interest' event along with Stunt.

Courtesy of the SMAE, I have the pre-entry figures for the Nats, which show that the interest in Speed is not so minor. A pre-entry of 52 was received for the 'Blue Riband Event' (FAI T/R for those who did not read the article) and, if you combine FAI speed and SMAE speed as in previous years (they were separated this year to allow time at the Nats for FAI Team Trials), a pre-entry of 47 was received for handicap Speed. In terms of popularity, Speed comes 4th out of 11 C/L events behind Combat (111 pre-entries); Goodyear (68) and FAI T/R. Stunt was fifth with 41.

I also have the entry figures for the Luffenham meeting which followed the Nats. At that 'do' there was an entry of 15 in FAI T/R and Speed tied with Combat for 2nd place with 12 entries apiece. All 12 entries recorded times.

It should also be borne in mind that at the Nats and Luffenham you had to break a National record to get in the top three of

Speed, and at Woodford the top two broke National records. An event which requires its competitors to break records to get a placing can't be doing all that badly!

However we are not complacent, and we are looking into ways of encouraging people to take up an event which, after the hurly burly and 'turn up on time or you're disqualified' attitude of team race, is quite peaceful and friendly. The immediate reaction might be to do away with monoline, but the feeling that two lines are not safe enough for Speed. To the layman it may sound daft to say that one line is safer than two, but remember that one line needs to be much thicker than the two that it replaces to get control on the monoline system, and that when you apply full 'up' (or full 'down') on a 2 line system you may be placing all the pull on that one thinner wire, which could well break. With the pull that we are now experiencing in Speed, if one line breaks then the weight of the model being thrown as a jerk onto the remaining wire will almost certainly snap it. The two models which came off at the Nats were both on two lines and I can only remember one monoline model which has left the line in the last 15 years.

Anyway, having said all that, I feel that there is room for a 'slow' speed event to encourage newcomers, restricted to two lines, no groupers and straight fuel. The size of the motor for such an event is the subject for some debate. Certainly .049cu.in. motors are very cheap, but they don't take too kindly to the average British wind force. Thanks to Pylon Racing, there is a wide choice of 40s available and they are comparatively cheap, and we hope, that in the not too distant future there will be a competitive British motor. Entry would be restricted to novices who could use the same equipment to compete against the rest of us, once they have become competent and no longer novices. We will have to be careful not to fall into the trap that the T/R people have, of inventing classes for beginners (½A T/R, Goodyear and now mini-Goodyear) that the experts gradually take over. I would be glad if anyone who is interested in getting started in speed could let me have their comments and suggestions – I will attempt to answer all letters.

To maintain the current level of interest in speed we have got to ensure a readily available supply of equipment, advice and experience, and by the way, monoline flying is not that difficult to learn for those who pass beyond the novice stage . . . even Steve Smith has managed it!

Martin Radcliffe

Chessington, Surrey



Bob Kinroy, Alwyn Greenhalgh, Evelyn Barratt, Rupert Moore, Peter Spence and Howard Boys provide a truly vintage atmosphere. Below, AeroModeller banner on John Bridge's Boxkite, with other types in company. Bottom, the Peter Powell stunters, are intercepting a modern intruder, the pair doing formation stunts.

L'a Belle Epoque

1909-1975

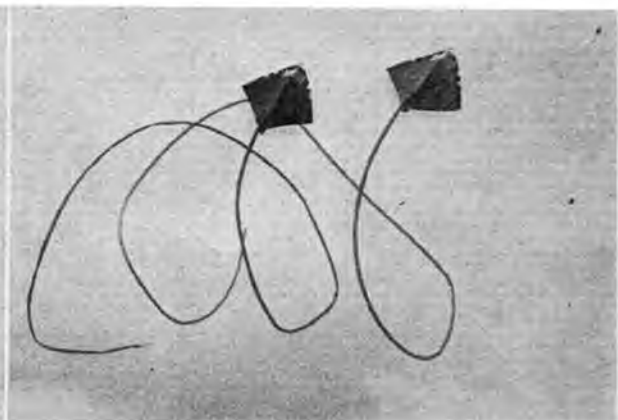
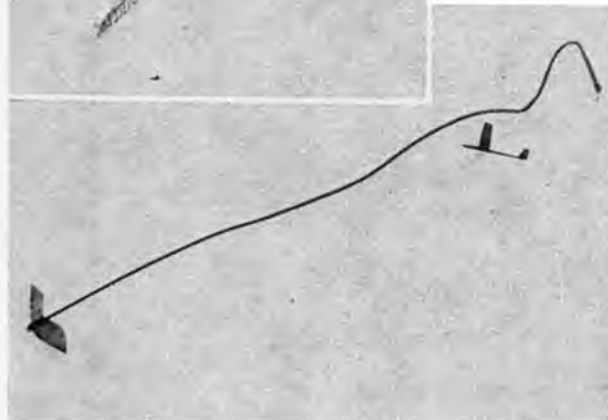
K & MAA days revived at Old Warden

FLASHBACK to the early days of the *Kite & Model Aeroplane Association* when contests were started by bugle call, and distance – not duration – was the arbiter, took place at Old Warden on 12th October.

Over 500 Kite and Vintage enthusiasts enjoyed a day that ranks among the most pleasant ever experienced at this picturesque venue. The sky was dotted with kites of all shapes and sizes by noon, and as the afternoon winds declined to a light breeze, even the lightest and most fragile of the early bird models found opportunity to aviate. It was truly reflective of article I in the K & MAA

regulations "to give a stronger impulse to the Scientific study of Kites and Model Aeroplanes" – a rule made almost 70 years ago!

Though most of the kites were traditional types, the talk of the day centred on comparatively new control liners, which cavorted at will through loops, figures of eight and tail chasing formations. They ranged from the standard 2 line 'Glite' to home designed 4 line hexagons but the stars were undoubtedly Don Dunford's and Peter Powell's which are now marketed. Don's is a vented Conyne type with a Vee centre box and clever aerodynamic refinements



which enable it to be precisely positioned anywhere at almost any attitude. To fly, one varies line tension, and the control line kite does the rest.

Peter Powell's Stunter is equally controllable but is now sold with a 75ft. tubular tail. This trails through the flight path in a state of semi-rigidity so that one can 'paint' a pattern in the sky. Peter linked two Stunters, and ran through 'formation' patterns with the Rogallo type to such effect that there was talk of linking up to seven for an Olympic Rings spectacular!

As many readers will have seen, both types have since featured on TV, and deservedly so. Other demonstrators included Ambrose Lloyd with his flexible sled 'Zammo' and a huge Parafoil that needs half inch rope to anchor it, while all day, a huge Brookite 'Master' winged double box soared highest to emphasise that with over 75 years of continuous production behind it, one can't beat the big cloth kites for sheer majesty. With Kites coming from places as far apart as Rochdale and Southampton the meeting was used to sound opinion for the re-formation of the pre 1909 *Kite Flying Associa-*

tion. Response was excellent, and a newsletter is expected to be 'launched' in time for the New Year 1976, with the next Kite meeting in April at Old Warden. (Interested parties are invited to send for the newsletter to A/M offices).

The model side of K & MAA day was equally impressive, not only for the numbers of genuine 'oldies' (including compressed air motors), but also for the replicas of Sidney Camm and Bragg-Smith monoplanes. Moreover, some of the flyers arrived in true period dress ranging from cricket club flannels and blazer with straw boater, to Alwyn Greenhalgh's very genuine de-mob Bowler Hat! Howard Boys dusted off a pre-war record tail-less and demonstrated remarkable fleetness of foot while in pursuit of the free flight model.

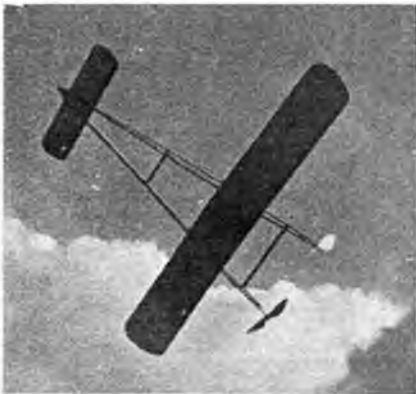
In the Vintage C/L circuit, Mike Beach, Ron Raddon, Pat Lloyd and others showed how kind the years have been to Jim Walker's Fireball, a Defender and de Bolt's Bipe. With control line, one can hardly go further back than that!

We are living in a surge of nostalgia and the return of the kite as a controllable, satisfying and relaxing



Don Dunford's control-line kite has remarkable precision, two lines guide it through all kinds of manoeuvres. Recently featured on the BBC 'Nationwide' programme.

hobby activity as well as the growing enthusiasm for vintage models, makes these meetings at Old Warden doubly enjoyable. Trouble is, as John Bridge said, "*Had so much fun with my kites and models, there simply wasn't time to see the real machines in the Shuttleworth Collection*". Here's to the next time!



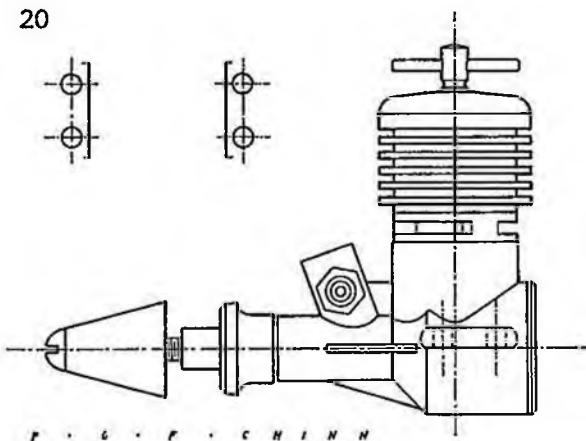
John Bridge's A-Frame, Howard Boys' tail-less record holder, Alwyn Greenhalgh with C. A. Rippon's Pusher and a Bragg-Smith A-Frame plus Peter Spence in contemporary dress for a Sydney Camm twin pusher.



ENGINE TEST

by Peter Chinn

OTM KOLIBRI



LOOKING BACK, recently, through the list of Engine Test articles published in the *AeroModeller*, we were surprised to find that it is more than five years since a report on a 'diesel' was last published in this series.

This, of course, emphasises the now almost overwhelming popularity of the glowplug motor and the fact that, nowadays, the introduction of a new model compression-ignition engine is quite a rare event. Most of the diesels manufactured in the UK have been around for a long time, some of them for more than twenty years. The design of the typical small diesel has not altered very much in this period, so it is no surprise to find that even a 'new' engine of this type from an East European country, looks much the same as a typical 'early nineteen-fifties' offering.

Such is the case with the little 0.8cc OTM Kolibri diesel that has been chosen for this month's report. The Kolibri is made in the USSR and is one of four types of Russian

made engines sold in the UK by The Modellers Den Ltd from their various West Country branches, over the past year or two.

Outwardly, the Kolibri, in contrast to some earlier Russian motors, looks quite neat and it is also very light for a .8cc diesel. Unfortunately, the quality of its internals was not so good in our test sample. The Modellers Den have advertised the Kolibri as 'a fascinating addition to your engine collection' and, on the strength of our findings, it is to collectors that we would be happiest in recommending the engine. It is not, we feel, suitable for a beginner (a point which The Modellers Den have, themselves, previously volunteered) because, like most very small diesels, beginners may find it tricky to start. On the other hand, we have heard of some experienced modellers using these little engines satisfactorily in small free-flight scale models and it may well be that our test motor was not a particularly good example.

Essentially, the Kolibri is a plain bearing, beam-mount engine with crankshaft induction and radial cylinder porting. The pressure cast crankcase is very light; less than 4oz. weight and perhaps a little too flimsy compared with the rest of the motor. The crankshaft has a 6mm main journal, with 3.5mm i.d. gas passage and a small, circular (3.5mm dia.) valve port that registers with a round intake aperture. The shaft is provided with a separate prop screw and the prop driver is pressed very firmly onto a knurled portion of the shaft. This could be difficult to remove, should one need to replace either the shaft or crankcase.

Cylinder porting consists of three radial slit type exhaust ports spaced at 120 degree intervals with internal flute type transfer ports below and between them. The piston is machined from cast-iron and has a flat crown. The gudgeon-pin is supported entirely in the 1.75mm thick

SPECIFICATION

Type: Single-cylinder, aircooled, compression-ignition radial-port two-stroke with crankshaft rotary-valve and plain bearing.

Bore: 10.5mm (0.4134in.).

Stroke: 9.0mm (0.3543in.).

Swept Volume: 0.7793cc (0.0476cu.in.).

Stroke/Bore Ratio: 0.857:1.

Checked Weight: 45 grammes - 1.59oz.

GENERAL STRUCTURAL DATA

Pressure diecast aluminium alloy crankcase with integral, unpushed main bearing. Hardened steel non-counter-balanced crankshaft with 6.0mm dia. journal, 3.5mm i.d. gas passage and 3.5mm dia. crankpin. Hardened steel cylinder having three radial slit type exhaust ports with three internal flute type transfer ports between them. Cylinder externally threaded and flanged at exhaust belt to screw into crankcase. Cast iron deflectorless piston with flat crown. Solid 2.5mm dia. hardened gudgeon-pin. Pressure diecast aluminium alloy connecting-rod with unbushed eyes. Cast-iron contra piston with flat underside. Machined aluminium alloy finned cylinder jacket with black anodised finish. Internally threaded to screw over upper o.d. of cylinder and fitted with compression screw for contra-piston adjustment. Machined aluminium alloy screw-in type crankcase backplate. Machined black anodised aluminium alloy prop driver pressed onto 5.5mm o.d. knurled portion of crankshaft. Crankshaft front end terminates in 5mm o.d. front end for centring prop. Prop retained by conical aluminium spinner and long 3mm round-head screw.

TEST CONDITIONS

Running time prior to test: 1 hour approx.

Fuel used: 40 per cent kerosene, 35 per cent technical ether, 25 per cent Castrol M castor-oil, plus 2 per cent amyl-nitrate.

Air temperature: 18°C (64°F).

Barometric pressure: 1028mb (30.36in.Hg.).

Silence used: None.



piston skirt, which is adequate, provided that the gudgeon-pin is of the correct length. On our test motor, however, the gudgeon-pin fitted was only 9.1mm long (cylinder bore- 10.5mm) and, after allowing for a 0.5mm chamfer on each end of the pin, only about one-third of the piston skirt thickness was actually being used to support the gudgeon-pin.

The Kolibri came complete with mounting screws and nuts, plus a combination tool that was supposedly intended for tightening or loosening the cylinder jacket, prop screw, backplate and cylinder. The tool worked well enough for the first two duties, but was a poor fit in the backplate slots and if we had, unthinkingly, used it on the cylinder, might have ruined both cylinder and piston. This is due to the fact that the keyed end, intended for hooking around one of the posts separating the milled exhaust ports, actually bears against the *inside* edge of the port and is almost certain to burr it. Any attempt to rotate the crankshaft would then badly score the piston. Clearly, a modification to the tool is called for.

Performance

As we have already remarked, the Kolibri, like many very small diesels, is not the easiest of engines for a beginner to learn to start, but the experienced diesel handler should be able to cope with it without too much trouble.

The instruction sheet issued with the Kolibri is printed in Russian, English, French and German. It quotes the normal operating speed of the engine as 9,000–10,000 rpm and, although this would be very much slower than one would normally operate a glowplug engine of similar capacity, diesels are usually quite happy slogging away at these more moderate speeds. However, we very soon found that our sample Kolibri would not hold a steady speed when loaded down to these revolutions and preferred to be treated more like a Half-A glowplug engine and allowed to have its head.

Maximum torque – just under 5oz.in. – was, in fact, developed at between 9,000 and 10,000 rpm but, as load was reduced and torque declined, the power curve continued to climb, finally flattening out at 15,000 rpm where an output of 0.062bhp was determined. This is a quite acceptable figure for a .8cc motor.

No actual prop size recommendations are contained in the manufacturers' instruction leaflet. If one were to aim at the 9,000–10,000 rpm operating speed specified, something in the region of 7×4 would be required. 8,800–9,200 rpm were obtained on various 7×4 Power-Prop wood and Taipan glassfibre reinforced nylon props, rising to 10,000 rpm on a 7×3 Top Flite wood. 11,400

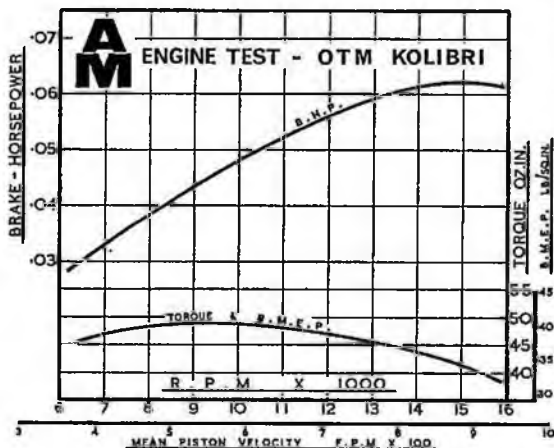


rpm were recorded on a 6×4 Tornado nylon and 11,800 on a 6×4 Top Flite nylon. Aiming for speeds that would get the engine up to around its peak output in the air, we obtained 13,000 on a 6×3 Top Flite nylon, 13,100 on a 6×3 Keilcraft nylon and 13,500 on a 6×3 Tornado nylon.

Examined at the end of the tests, we found that the abnormally short gudgeon-pin of our test motor had loosened from its press fit in the piston and was now free to float sideways. It could, in fact, move axially to the extent that, because of the chamfered ends previously mentioned, it was no longer supported at one end. This allowed the pin some vertical movement at that end and, as a result, considerable wear had taken place in the small-end of the conrod.

It is not known at what stage, during our tests, this movement may have become significant, but it is not unreasonable to suppose that, although the engine was still running satisfactorily at the end of the tests, slightly higher performance may have been achieved had this fault not been present.

It has to be admitted that if our test sample is at all representative, the Kolibri lacks the quality of Western equivalents. We understand it has, nevertheless, sold quite well during the several months that it has been available from The Modellers Den and doubtless many collectors who want to add a Russian motor to their collections will be content to overlook its shortcomings. *Power/weight ratio* (as tested): 0.63 bhp/lb. *Specific output* (as tested): 80 bhp/litre.





Amazing scene in the Danish camp as the team reassemble Koster's 'flapper' using parts from two wrecked models only half an hour before contest started. Modern adhesives now play a major role in contest flying.

THIS MONTH'S technical report starts off with a quick apology on behalf of *AeroModeller* and myself for the poor quality of the photographic reproductions in the World Champs report – more than a little was 'lost' during the printing process, but hopefully remedial methods are now under way.

As the last part of the series of articles on the '75 Bulgarian World

Bill Hartill kept himself busy collecting material for his forthcoming 'World F/F Review' annual to follow *Zaic Yearbook* traditions.



FREE FLIGHT TECHNICALITIES

PART TWO

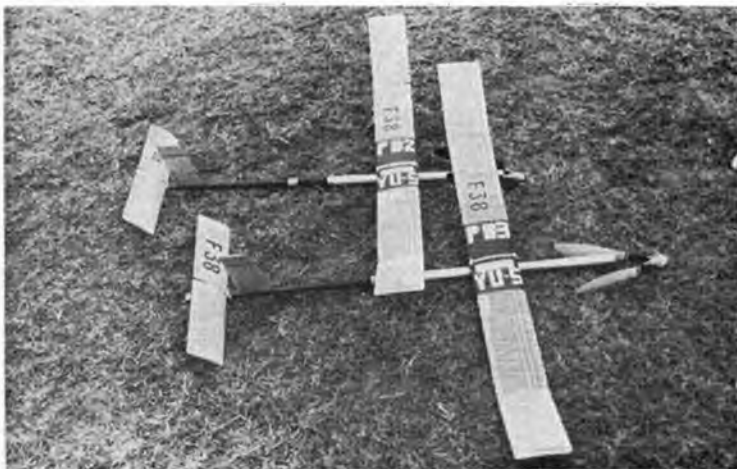
In which Martyn Cowley concludes his report on the 1975 World Championships, examining the latest in Power and Wakefield trends.

simple and straightforward designs. North Korean Paik Chang Sun used a design similar in layout to the one published in *Free Flight News* January '75. The model used prop stop auto rudder and fuse dethermaliser while the motor was wound with the props attached, using a simple protection disc on the prop shaft during winding in case of breakages.

Silver medallist Bob White used his familiar twin fin design models that feature no gadgets at all, and he also used a fuse D/T. Back home in America, Bob does all his practice flying over desert sand which precludes the use of any gadgetry and as he says, "if you can eliminate mechanical gadgets then you eliminate mechanical failure". His models are trimmed right-left using only warps and side thrust with a traditional clunk-clunk-click prop stop. In order to cope with the different length motors resulting from variations in rubber cross section, Bob uses a selection of cast bobbin stirrups of

Championships, we will be looking at F1B and F1C classes in more detail. Such is the pace of contest model design these days that recent innovative gadgetry is quickly assimilated on a global basis, and auto rudders and variable incidence tailplanes are now considered the 'norm'. The two leading models in Wakefield (F1B) however were the exception to the rule in that they were both very

Pair of Yugoslavian Wakefields display typical Eastern bloc layout with short tall moment and generally 'stubby' appearance. Metal motor tube is employed, and wing features extensive anti-warp construction. Fin is relatively thick and features airfoil section.





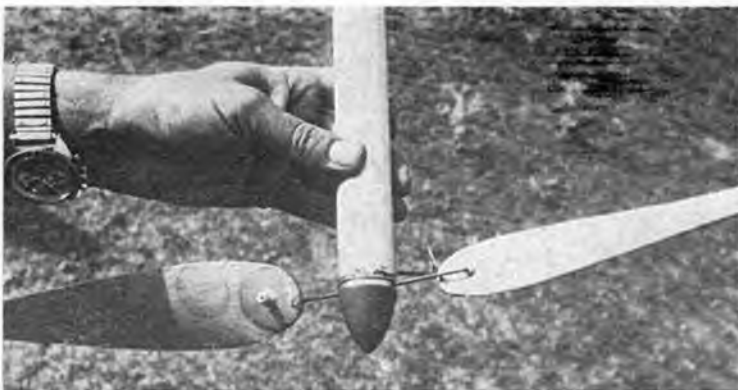
All French Rossis were fitted with fast warm-up sleeves over the cylinder head – displayed here as Dennis Ferrero's motor.

varying lengths to maintain the overall distance to the motor peg. Apparently big US thermals do occasionally spin his warp-trimmed models in, and although he has experimented with assymetric wing layouts, he still prefers his straight-forward, no gadget models. He actually used his No. 8 version that appeared in '73 at Weiner Neustadt but with a flat bottomed tailplane and slightly different prop shape to the one already published.

Probably the only new development in F1B was Dieter Seibenmann's version for a progressive movement VIT tailplane. Others before have used such methods as motor torque from the rear peg, but Dieter uses a simple modification to a standard Seelig timer to transfer the rotary timer movement into a linear action. The whole of the tailplane pivots about the leading edge, and increase in longitudinal incidence is controlled by a cam shaped yoke. The Seelig timer is modified by an extension to the 'functions' disc that allows controlled movement of a spring loaded slide which activates the tail cam progressively during the first five seconds of flight on a normal 30 second motor run. Dieter says this produces a smoother control from the power burst to cruise transition than with the regular two position sudden shift.

The D/T scroll finally releases the slide to allow full cam movement for D/T release. Dieter also used a variable incidence prop assembly beautifully machined and a tribute to Swiss craftsmanship. The whole Swiss team was similarly one of the best equipped in terms of hardware and accessories and their special offset

Bob White (USA) placed second in Wakefield with his familiar twin-fin design – model uses no gadgets at all. Neat self winding jig is employed.



Canadian Mike Thomas was again the only competitor using a delayed prop release mechanism. The modified timer is shown on page 24. Note the simple lever which restrains the propeller, and its operating line, seen in the picture above. With extra altitude available for very little weight penalty, it is surprising that this feature has not caught the attention of gadget-minded flyers.

yoke winders, as shown in the contest report, allows the props to be engaged with the strain still being taken by the winder, which is much quicker and safer.

The other major innovation in F1B gadgetry – Delayed Prop Release – was once again favoured by only one competitor, Mike Thomas of Canada who was also the sole protagonist in '73. The gain in height at launch and consequently in performance was quite noticeable, and why others have not followed suit remains a mystery. One of the problems of this approach is that with the props folded back alongside the fuselage they tend towards zero pitch, producing very fast initial revs until the prop has extended to normal flying diameter. Mike has overcome this with the use of a distinctive blade shape especially wide and strong at the hub that presents plenty of area even when folded back. The propeller hub wire is restrained by a simple lever, and again a Seelig timer is modified with another longer 'func-

tions' disc arm that allows finer setting up to produce the one second delay during the javelin type launch. Mike reached the flyoff with this model, and had he not launched well after the main bunch and missed their lift, might well have featured better in the results. A similar prop restraint lever was used by Frenchman Emile Gouverne as a type of panic button. Here the thumb held back a mouse-trap type wire frame that started the props as soon as the model was released, thus missing out on the real advantages to be gained. Gouverne also had a special still air model using 10 strands of Pirelli to give a 56 second run, using very high aspect ratio wings and high tail on a wire frame for a claimed performance in excess of a max.

One of the distinctive silhouettes to be seen were those of the Dutch contingent who favour ultra short noses, not normally associated with the rubber class. The models of Pym Ruyter typify this approach and in order to achieve this configuration





Pym Ruyter shows typical Dutch layout: timer mounted in forward pylon to give ultra short nose – note also how far props fold under wing.



Tail end of Dieter Seibenmann's model shows cam-shaped yoke and runner under tailplane that gives progressive VIT movement.

he uses an ultra light balsa tail boom, with the timer mounted in a pylon in front of the wing that still gives a 66% C.G. position. The whole rear end weighs only 17 grammes including the tailplane of 6 grammes.

Model design apart, it is the quality of rubber and design of propeller that is one of the most significant factors in determining F1B performance. Both of which are particularly difficult areas to assess without detailed design and performance data from the flyer. Quality of rubber and even source of supply is a sore point with F1B competitors world wide, and many were the stories of alternatives to Pirelli that are being tried. More or less anything that stretches seems to have been tried at some stage. However for the present Pirelli still reigns supreme, ranging from the usual 6mm, 14 or 16 strands to the unusual 30 strands of 3mm rubber used by the new World Champion Paik Chang Sun. Most seem agreed though, the torque test knowledge of each individual motor is essential, as performance can vary by 25% even with rubber from the same hank.

The 1975 F1C World Champion Lars Olofsson used two similar layout models, *Miss Muffet*, an undercambered version used for the qualifying rounds and the faster flying flat bottom sectioned *Uncle Remus* used to win the ultimate 4 sec fly off. Both of Lars's models reflected the current Scandinavian approach with triple fin layout, and angular planform, whilst Eugene Verbitski in second place reverted to his earlier elliptical shaped flat bottom section designs, with fixed wing surfaces, and was equipped with a pair of immaculate models with white painted upper surfaces and red tissue undersides. The attention to detail and workmanship was fantastic; even the tail mount formed an integral part of the tailplane leading edge so as not to disturb the airfoil shape. The models

also featured auto ailerons on the right tip panel – the principle being to achieve extra wash-in during the power phase, returning to neutral for the less critical glide. Eugene flies more of a spiral pattern than is normally fashionable today, and in fact the aileron movement was eventually trimmed out completely and therefore was not actually needed for the contest.

The major development in F1C since the last Champs was the wholesale adoption of prop brakes for quick termination of power runs, increasingly advantageous with progress through the fly-off rounds. This aspect of the technical report has effectively already been pre-empted by the publication of *Free Flight Scene* columns of *AeroModeller*. The sim-

plest and apparently most effective version, the plastic Tom Kerr brake,

as used by both World Champion Lars Olofsson and 3rd place Mike Burns to name but a couple. Other versions included the original Verbitski concept of a conical spring wound in the direction of prop rotation ending in a hooked pin that, when released, engages in a hole in the back plate of the spinner and rotation then winds it tight around the crank shaft for a very sudden stop. So sudden in fact that Eugene cut the motor .9 sec before releasing the pin when using a 10 sec run, and .3 sec for the final fly-off to avoid sudden damage to the motor; which is the fate that befel Sharin when the system made its debut in the fly-offs two years ago in Austria.

Modified timer on Mike Thomas' Wakefield – uses another lengthened functions arm that releases line to operate delayed prop release.



Top men in Power – Eugene Verbitski together with new World Champion Lars Olofsson (right) of Sweden.

Tail - both models

Of the other types, Broderson (and more recently Brakencroft) use the 'winding tight' principle, using friction instead of a pin to arrest the motion. The most complex version is the Hatchek brake, where a spring loaded pin engages and immediately stops the back half of the spinner. Energy is then absorbed by a ratchet type of clutch that is the connection between this and the propeller and front half of the spinner.

Once again there was a further increase in engine power, and on a broader front with everyone now using Rossis. There has probably never been such a one-engine contest before at world level. As this motor has now dominated for so long it was interesting to find no challenge from

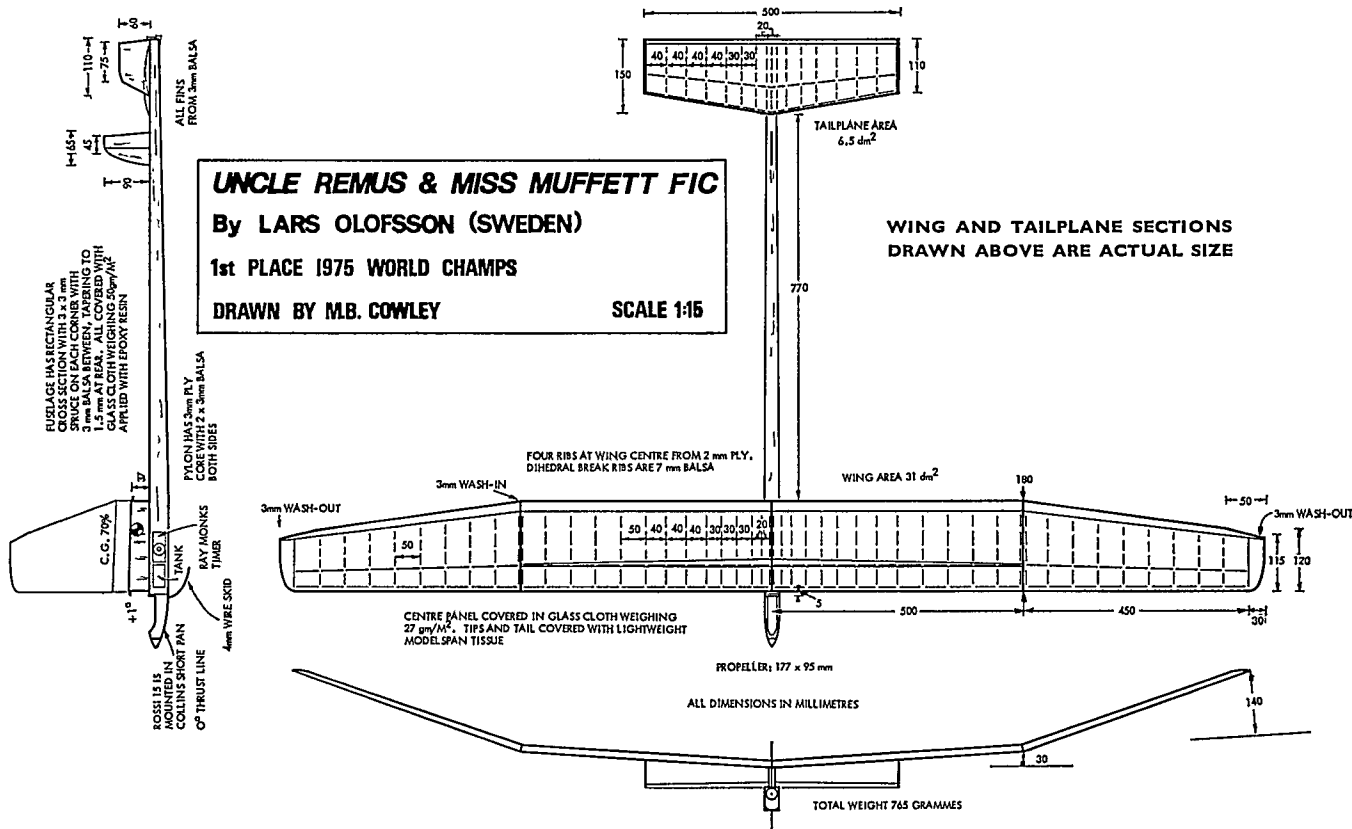
the Super Tigre factory, after their latest X15, obviously still available only in tuned pipe version, took the top places over Rossi at this year's C/L speed events in Italy. One also wonders how long it will be before single blade propellers might appear, as these have also been taking the top speed positions this year.

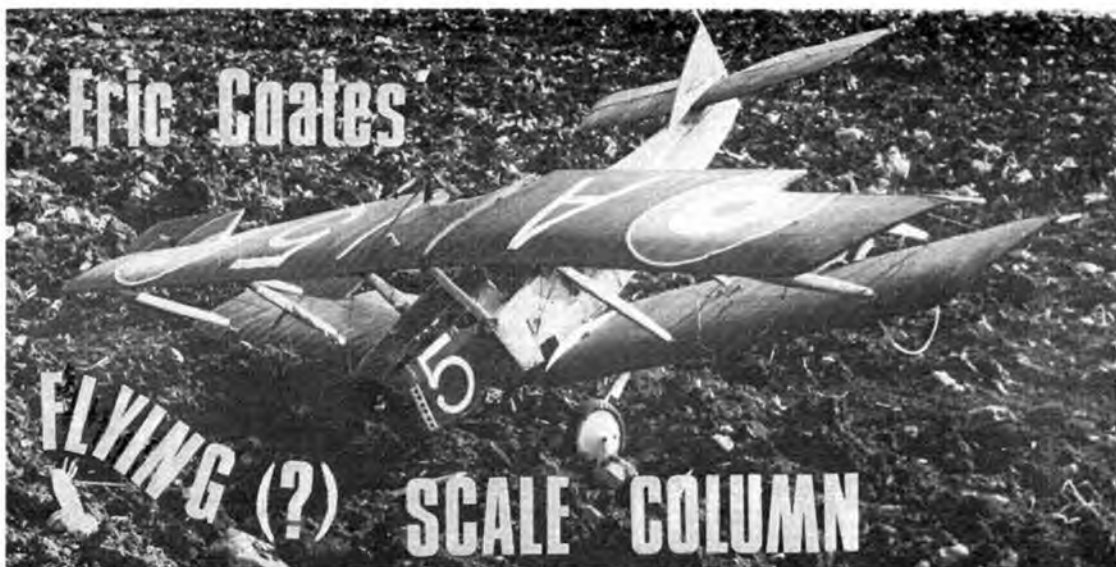
One interesting, simple, modification as used by all French teams was a metal sleeve cylinder head jacket with no cooling fins that produced a quicker heat-up time to running temperature. Many others used totally enclosed motors inside glass fibre cowls with no air cooling ducts to achieve a similar result.

The current position in F1C where model development has well out-

stripped the rules, has produced a very schizophrenic class. With models clearly capable of maxing off 6 sec. runs, the requirement to max off 10 sec. runs during rounds is hopefully a formality. The risk of sacrificing consistency during rounds with more exotic complex models in the search for increased performance was avoided almost unanimously, resulting in stagnation of design. Unfortunately the only 'flappers' present (by Koster and Verbitski) both failed to feature in the contest. The reduction to seven seconds will favour flappers, not only in the search for higher performance but also by eliminating those last few and crucial seconds

continued on page 29





UNFORTUNATELY THE RATHER windy weather of September continued through into the month of October in England, so finally destroying the last vestiges of the scale modeller's dream – a warm calm Autumn. On the 5th I attended the aptly titled 'End of Season Scale Meeting' organised by the South Gloucestershire club at the disused airfield of Chedworth near Cirencester. Only Class 2 R/C was featured on the menu which was just as well in view of the 20mph bitterly cold wind blowing. I flew the *Elephant* for what was to be the last time in 1975 at least. Unfortunately during the reversal manoeuvre one of those fiendishly clever pieces of Japanese high technology, known as a servo, decided to give up the ghost; leaving me with full aileron applied. Before I quite grasped the significance of the situation the *Elephant* had performed one complete barrel roll and was starting another, then with masterful skill and damned good fortune, I slammed the throttle shut, which eliminated power for further rolling, and managed to mush the model down to a crash landing in a convenient ploughed field. In actual fact the lousy weather of the past few weeks probably saved the model from total destruction for the ground was relatively soft, after all the rain, and the forward speed on impact was only a few mph thanks to the strong wind into which she was fortunately pointing. However, the vertical speed was far from minimal, and the model pancaked pretty hard.

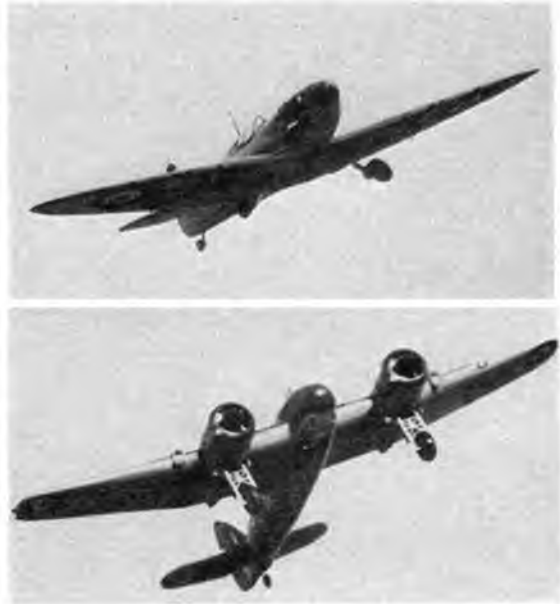
Naturally, I was rather annoyed at pranging the model after only one season's flying, and with the Ripmax trophy to be flown for the following week. However, positive achievement was accomplished in two fields. First, it enabled me to take some good 'prang' photos – I have seldom seen a model crashed in such a realistic manner with plenty of bent and twisted metal and the articulated jointed pilot (modified 'Action Man') hurled across the dashboard in a most gruesome manner. The whole thing was a miniature scene from the Western Front in 1917. Secondly, it enabled me to analyse the behaviour of the structure when subjected to excessive loading. Regular readers of this Column will know that I have progressively developed my constructional methods for F/F scale biplanes over the past 25 years, culminating in the D.H.9A published earlier this year. The effectiveness of this construction can be judged by the fact that this model has just completed its fourth successive contest season and only sustained very minor damage throughout its life. The aim behind my constructional methods is to produce a structure that will bend during a prang rather than break. I find this to be far more practical than 'knockoffability' which very often produces secondary damage due to pieces flying about. It is also very applicable for four bay biplanes such as the 9A when a rc-rig, after a prang, could take an hour or more.

Now the *Elephant* is the first biplane I have designed



The Great Elephant Prang! When our columnist crashes a model, he makes sure that even the final result is life-like, as shown in these genuine, guaranteed untouched-by-human-hand pictures. Note in the heading photograph how the wings have sagged – this is due to the working rigging wires having parted company, but no spars were broken. Indeed only one interplane strut broke and one anchorage point dislodged. At left, is the pilot who looks decidedly unwell – should have worn a seat belt! Rear cabane struts were damaged due to compression, and this was the worst structural damage encountered. Airborne again soon no doubt.

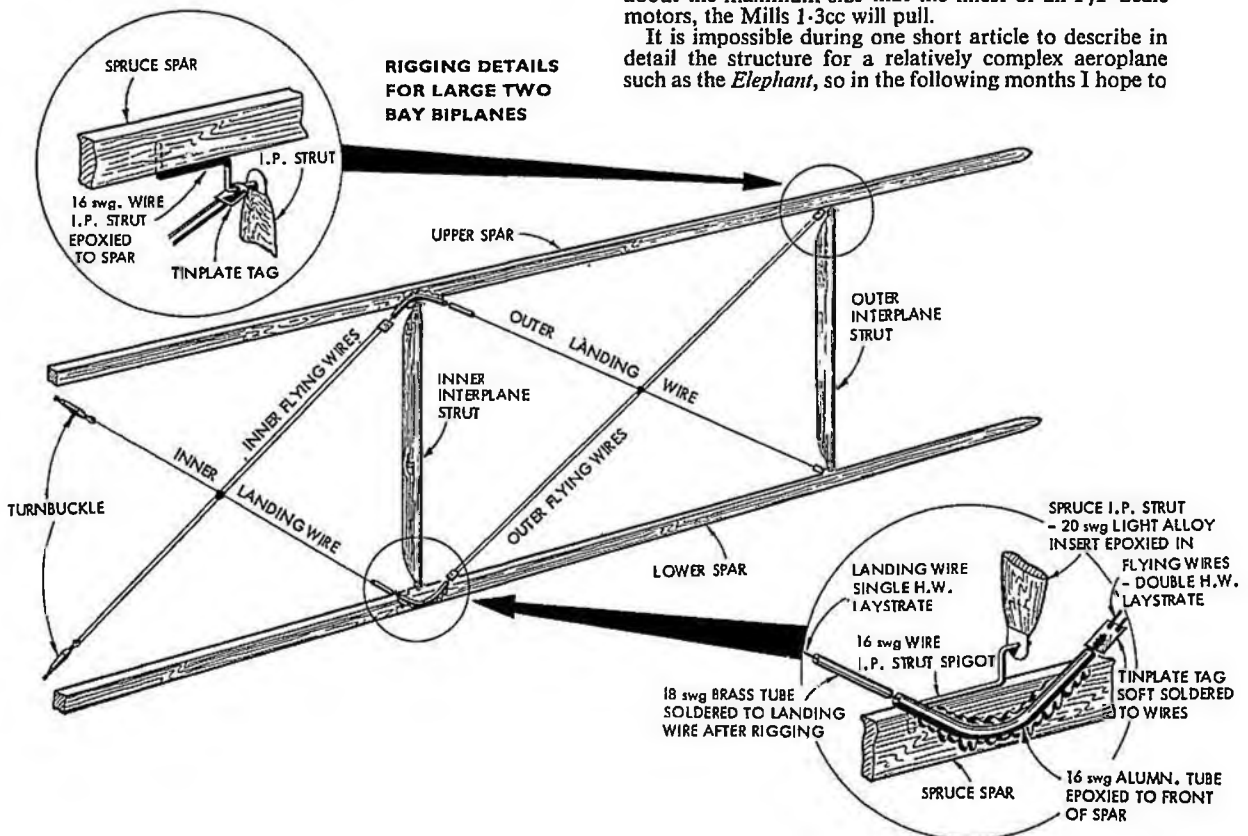
from scratch for radio control. It is also by far the biggest and heaviest (65in. span, 10½in. chord and 10lb.). I have judged many R/C Scale competitions over the past decade which has given me ample opportunity at close quarters to see how other people's biplane designs stand up to pranging stresses. Too often I have seen 'solid' structures, based on aerobatic model practice, i.e. thickened up section, cantilever one piece wings bolted to a solid cabane, come to grief after the mildest of cartwheels. At the other extreme, much more rarely mind you, I have observed the exact scale type of working structure where the wings are pin jointed to the fuselage and cabane and all the rigging wires, by necessity, have to work or the wings fold up. This still produces a 'solid' structure in which turnbuckles or wires have to break, or most likely tear their anchorages out. In either case the most minor of take off or landing prangs can result in an unserviceable model. This I think is the reason for the relative unpopularity of the biplane in R/C contests as compared with F/F where the 'double winger' completely rules the roost. With the foregoing in mind I, therefore, saw no reason why my F/F model methods of construction could not be scaled up for R/C and this, eventually, was the philosophy behind the structural design of the *Elephant*. Before going into detail on this model's structure, however, just a word about optimum sizes of model for both classes of contest. Within the limitations of the Air Navigation Act (max. weight 11lb.), generally the larger the model the more stably it will fly, particularly in windy conditions. With R/C models the maximum weight condition can be approached and a biplane of around 6ft. span, powered by the largest capacity (10cc) motors allowable under FAI rules, is the optimum. If one built a F/F biplane up to these parameters it would not last long at all. Even if one managed to get through the trimming stages, sooner or later a fast downwind landing would wreck it. My experience has shown that a biplane of around 50in. span



Top picture shows Brian Taylor's superb R/C Spitfire just as the wheels are being retracted — asymmetrically as per full size, naturally. Above is Mike Gilham's Beaufighter, also R/C, and powered by a pair of .40s, hence 'illegal' for SMAE contests. Unfortunately, wheels do not retract.

with a weight not exceeding 2½lb. is about the optimum. Within these parameters one can build a fair amount of detail, it is still small and light enough to stand a fair amount of rough and tumble if built 'flexible', and is also about the maximum size that the finest of all F/F Scale motors, the Mills 1-3cc will pull.

It is impossible during one short article to describe in detail the structure for a relatively complex aeroplane such as the *Elephant*, so in the following months I hope to





Ron Truelove of the Aylesbury club took second place in the C/L class at Rissington. In only his second contest flight. The Boeing F4B is most attractive in its bright colour scheme of yellow and grey, and scored highest static scale points. Uses an OS 50 R/C for power, and has home-made silencer hidden inside the cowl. Plans to be published in the near future.

look at a different facet in turn. This month I will just gloss over the major points to be examined in detail later. I must crave the indulgence of long established readers as many of the principles have been described in my earlier *Flying Scale Models* series, but as it is now five years since that series was published there must be many new readers, and techniques improve all the time.

The basic idea behind the structure of the *Elephant* is to use small flexible sections. To this end the major structure is piano wire and spruce strips; very often bonded together via brass tubes and epoxy resin. Apart from the tail where as always lightness is essential, balsa spars are not used. The fuselage longerons are $\frac{3}{8}$ in. square spruce with $\frac{3}{8}$ in. balsa sheet inserts forward. The main structural formers are $\frac{1}{2}$ in. ply. The cabane structure is 14 swg piano wire, braced with 18 swg and attached to the fuselage formers and centre section spars via epoxied brass tubes. A scale wing section is used which only allows $\frac{1}{2}$ in. \times $\frac{3}{8}$ in. spruce spars to be used. The interplane struts are cut from $\frac{1}{8}$ in. spruce sheet with 20 swg dural plate inserts at each end – these are attached to the spars via epoxied 16 swg spigots. Thus far the construction is virtually a scaled up D.H.9A. On this latter machine the rigging wires were each a single piece running from the outboard interplane struts a shallow 'U' shaped piece of tube epoxied to the spars adjacent to the inner interplane struts and terminating at the centre section. The wires were rigidly attached to the outboard interplane strut anchorages and via rubber bands to the centre section. 10 swg wire dowels running through brass tube, epoxied to the spars, attached the wings to fuselage. These dowels took about 60% of the lift load, the wing cell being stabilised by the wires – there being sufficient friction between them and the 'U' shaped tubes to prevent distortion in the air but allow free movement in a heavy landing. On the *Elephant* the wing dowels were increased to 8 swg but even so, these would allow too much flexure in flight, therefore the bracing wires were made to work rigidly in flight. All bracing wires were made from heavyweight Laystrate control line wire – the lift wires were doubled as in the prototype. Where the wires pass through the 'U' tubes at the inner interplane strut location they were prevented from sliding through by means of a small piece of tube slid on to the wires whilst rigging and soft soldered after rigging was complete. (See diagram). It must be realised that with this method of rigging what is a flying wire (doubled in this case) one side of the 'U' tube is a landing wire on the other for one set of wires and *vice versa* for others. The double wires are joined to single wires by means of small tinplate tags. Turnbuckles are used to anchor the wires to the fuselage/centre section; allowing things to be tensioned up nicely and any warps pulled out. Incidentally

the excellent American *Proctor* turnbuckles, in seven sizes, can be obtained from H. J. Nicholls & Son Ltd. All the bracing, therefore, is to all effects solid for normal flying loads. I must admit I have 'twanged' the odd soldered joint when I have pulled too much 'G' during the odd lousy manoeuvre, but the 8 swg dowels prevent a total airborne collapse. In the big prang of the 5th October, however, just about every rigging wire soldered joint parted, but only one anchorage point pulled out from its spar and one interplane strut smashed. No wing spars or fuselage longerons broke. The secondary undercarriage structure was completely wrecked, but the essential front struts acting as a torsion bar on the main fuselage frame was still intact. The worst structural failure was the collapse of the rear cabane struts in compression. This was due to the vertical inertia of the wings when contact was made with the ground – a most unusual stress case and one I am afraid I had not catered for. Nevertheless I was quite pleased with the way she had stood up to it – it could have been a complete write off if built 'solid'. As it is I hope to have her flying again early in 1976.

After all this, I could enjoy the rest of the contest as a spectator. This was won, inevitably, by Brian Taylor flying his *Spitfire 1a*. This was the first time he had used this fine model in competitions this year. Watching this machine airborne still gives me a thrill. When flown, under Brian's control, it embodies all the perfection and grace of flying of a real *Spitfire*. He didn't manage top flying score this time, being pipped by Fred Coulson flying his F4U, but a much superior static score gave him a clear lead. Another fine model I saw airborne for the first time was the *Beaufighter 1* of Mike Gilham. This was powered by two 40's and, therefore, is not eligible for SMAE competitions. The fixed U/C somewhat marred its excellent airborne flight performance.

* * *

Taylor and Coulson also fought it out again for the leading places in the Ripmax Trophy at the SMAE. *Autumn All Scale Meeting* the following week at Little Rissington. The result was the same. The event was very poorly supported with only five entries and, unfortunately, only four of these flew as David Vaughan could not manage to get the engine to perform in his superb *Wirro-way*.

Considering the pretty cold, rough conditions – as usual – this entry of nine in F/F was commendable. What was even more surprising was that seven of these made a qualifying flight.

I was first away with the D.H.9A and although a bit under-evaluated put in a steady flight, never exceeding 30



feet in altitude, to record 527 points. This put me in a virtually unassailable position as everyone else was more troubled with the wind. Next best flight was put in by Dave Clarkson flying his Sopwith 1½ Strutter now re-engined with an E.D. Racer. This provides plenty of power for take off and has transformed this machine into an excellent flyer to give it 3rd place. Terry Manley reverted back to his old faithful D.H.4 for this competition but it was rather overelevated in its first flight and stalled all over the sky for a rather poor 265. A steady flyer was the Puss Moth of Mr Jarvis; only monoplane in the contest. Its flight appearance, however, was spoiled by the rather flexible dihedral this model has. Although only a degree or so when viewed statically, this increased to about 8 degrees in flight – no doubt a great aid to lateral stability!

When the second round was flown, in the late afternoon, the wind was even stronger. After a long take off Manley's D.H.4 'straffed' the control tent (it was under-elevated this

Lone monoplane free-flight model at Little Rissington was by Mr Jarvis – nice steady flyer, but a flexible wing resulted in extra dihedral in flight which marred the realism somewhat.

time) before prancing the runway and smashing the tail-plane. The Puss Moth followed the same track as the D.H.4 but its aim was better and it thumped the tent side – luckily without damage to either. Only model, in fact, to record a score in this second period was Rex Oldridge's Albatros D.V.a, which as usual performed well in the wind to score 380 and lift it into fourth place.

Control Line was flown experimentally for the first time using the R/C Class 2 static rules. I don't know if this had any influence on the final results. It was a very close contest with only 37 points separating Vic Willson's mammoth 9ft. span Fournier R.F.4 winner (C/L version of the well known Mick Reeves' R/C machine) and Wal Cordwell's Tutor in third place. I suspect that if the models had been judged at the normal close quarters then a different result may have been declared. I personally liked the colourful Boeing F4B of Ron Truelove which, although having the highest static mark, had insufficient lead to counter the superior flight score of Willson. Soon to be published in *AeroModeller* incidentally.

R/C Class 1 (Ripmax Trophy)

		Best Flight	Static	Total
1.	B. Taylor	527	384	911
2.	F. Coulson	528	258	786
3.	J. Palmer	269	258	527
4.	L. Palmer	282	186	468

F/F Class 1

1.	E. Coates	D.H.9A	527	484	1011
2.	T. Manley	D.H.4	265	483	748
3.	D. Clarkson	Sopwith 1½	400	298	698
4.	R. Oldridge	Albatros D.V.a	380	301	681

Control Line Class 2

1.	V. Willson	Fournier R.F.4	479	456	935
2.	R. Truelove	Boeing F.4.B	455	465	920
3.	W. Cordwell	Avro Tutor	517	381	898
4.	B. Sexton	Cassat 3	243	429	672

FREE FLIGHT TECHNICALITIES

continued from page 25

motor run that often prove the undoing of so many models, even those unflapped, and will if anything make FIC flying easier.

FIC has been slow to take advantage of the progress of the pioneers in flapper design and the new rule proposals would get things moving again. Koster has clearly shown the direction with his designs, and more recently with his work with electronic timers. He spent much of the lead up to the Champs working on, and developing, electronic timers but a major failure a month before the event made him change back to mechanical systems with what ultimately proved to be disastrous consequences.

Top picture shows front end of Dick Lyon's 'Strutter' featuring dual wing mounts. Inevitable Rossi is fitted with Broderick prop-stop. Below is rear end of Verbitski's model showing attention to detail. Note tail mount recessed into leading edge.



The author's latest Peanut scale model – a Bristol Scout built to 1/24th scale, which results in a wing span of 12½ in. Covered with Jap tissue and powered by a single loop of 1th rubber, this little craft weighing 0.65oz. is currently turning in 20 second flights. Note how the spoked wheels (made as per this feature) set-off this superb model.



Dave Banks explains
how to give your model
that 'special' touch
by making a pair of

SPOKED WHEELS

CASTING MY EYE around for a suitable first Peanut scale subject in an old copy of *Flight*, I came across a drawing of the 1911 Caudron Racer. This looked as if it would make a great flyer when built to scale of ½ in. to 1ft., but there was one major drawback – the original had spoked wheels.

After a few hours of head scratching, mumbling to myself and reading the *TV Times* backwards, I came to the sad conclusion that the only reasonable way to make them was as per the full size.

As the outside diameter of the full size wheel was 27 inches, this gave a scale dimension of only 1½ in. for my model wheel. Slowly my thoughts gelled, and as I have the use of one of those excellent *Unimat* lathes, I decided on dural for both rims and hubs.

The big problem however was the spokes; each spoke would have a

length of ½ in. and require both of its ends secured without resorting to soldering. Firstly I experimented with fine wire inserted in holes on the rim and hub and securing with epoxy – this I found both messy and laborious and I eventually gave this up as a practical idea.

Some days later I was sorting through some fishing tackle (I am loony enough to do that too) when the thunderbolt struck! Picking myself off the balsa cement stained carpet, I realised I had found the answer to my spoke problem. Yes folks, not only can you use fishing line to attach hooks to, but it makes super mini-spokes as well. They don't call it lacing a wheel for nothing.

It's easy when you know how . . .

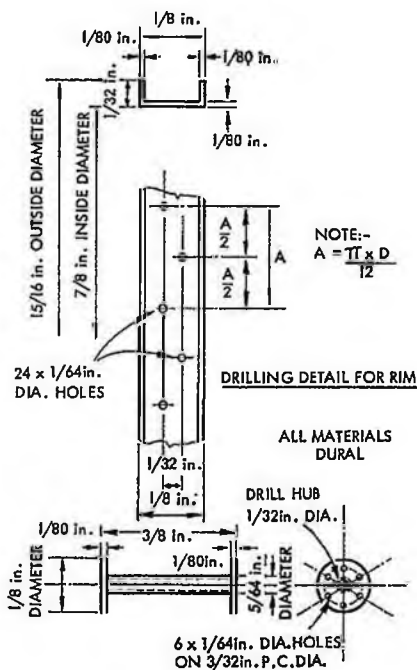
The dimension and number of spokes specified are typical only – modify the diagram to suit your own particular needs.

1. Turn or fabricate two rims and two hubs, as detailed in *Figure 1*.

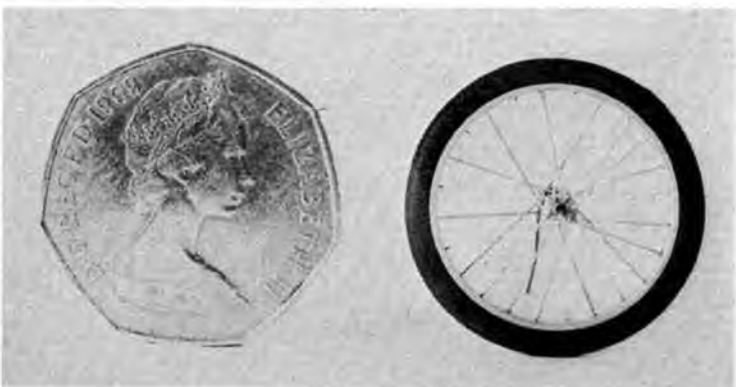
2. Make from scrap materials (wood or plastic) the assembly jig shown in *Figure 2* making sure that the hole for the rim provides a light push fit for same.

3. Drill rims and hub as per *Figure 1*, using ⅛ in. (or near size) drill held in pin vice; note that there is a total of 24 holes in the rim, staggered alternately as shown (*this is important*).

FIGURE 1
TYPICAL SECTION
THROUGH RIM



Wheel from the author's Bristol Scout compared with a 50p piece – hence just under 1½ times actual size! The finished pair weight around 2 grammes, hardly excessive (!) and well worth the effort as can be seen.



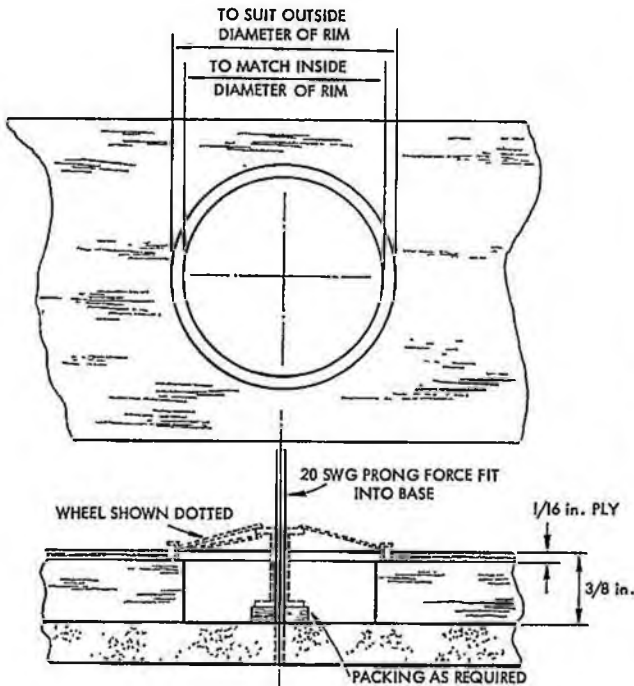


FIGURE 2 - Assembly jig

4. Insert rim and hub into jig (Figure 2) remembering to pack the hub until the required overhang is established above the rim. Note that many early aircraft had a symmetrical overhang on the hubs i.e. Bleriot monoplane, however 1914-18 aircraft often had unequal overhang on hubs (i.e. SE5). Either method can be employed on your model wheel.

From the fishing tackle store, purchase some 4lb. breaking strain fishing monofilament - this is obtainable in 25yd. spools and I recommend that you use one of the following brands: *Platil*, *Force* or *Perlon*.

5. Insert the pre-drilled rim into the jig (refer to Figure 3: this is the 'lacing' diagram). Cut off a three foot length of line and tie a knot in one end and then insert in a hole and

draw the knot up tight. Now continue lacing through the hub and out through the rim at hole (2). Fold over the rim, through hole (3) and now continue this sequence until you reach hole (12). At this point all 'spokes' will have a certain amount of 'sag' in them, so go back to point (1) and working your way around each spoke with a pair of narrow nosed tweezers, pull each spoke as tight as possible. When you are completely satisfied, remove the rim and hub. Don't worry that the assembly has sagged. Jump the line over to an adjacent hole in the rim then turn rim and hub over,

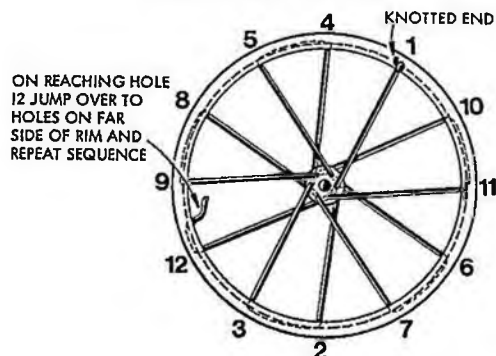
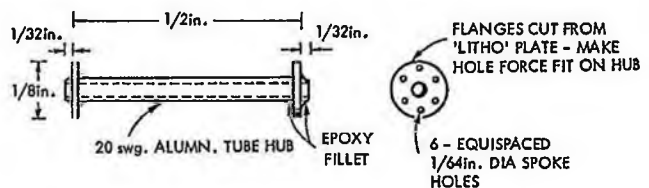


FIGURE 3 - Lacing diagram



▲ FIGURE 4 - Hub details (alternative method)

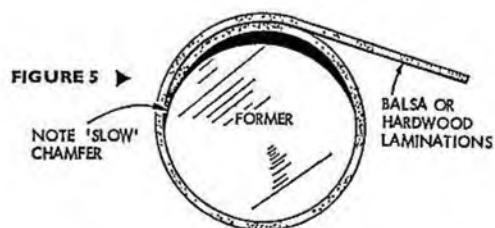


FIGURE 5



The first wheels the author made were inspired by his desire to build a 1/24th scale Caudron Racer. Not bad for a beginner to wheel building you must agree.

remembering to add or subtract packing pieces as required to the jig. Return assembly to jig and repeat the lacing sequence as before, tightening the spokes on completion of the lacing.

You will find that all the spokes are now taut and it only remains to pass the loose end under the spoke returns on the outside of the rim. Do this at least four times then snip off the surplus and your wheel is ready for painting.

6. For achieving a black finish, I recommend a 50/50 mixture of Matt Humbrol/Gloss Humbrol, while for a silver finish use Titanine silver dope. Both finishes are preferably sprayed to retain fine detail.

7. For tyres, obtain some 1/4 in. outside diameter rubber tube cut to length to give a 'sprung' fit on rim and butt joint ends with a cynoacrolate glue (i.e. *Zip Grip*, *Zap*, *Hot Stuff* etc.) remembering not to join your fingertips together in the process.

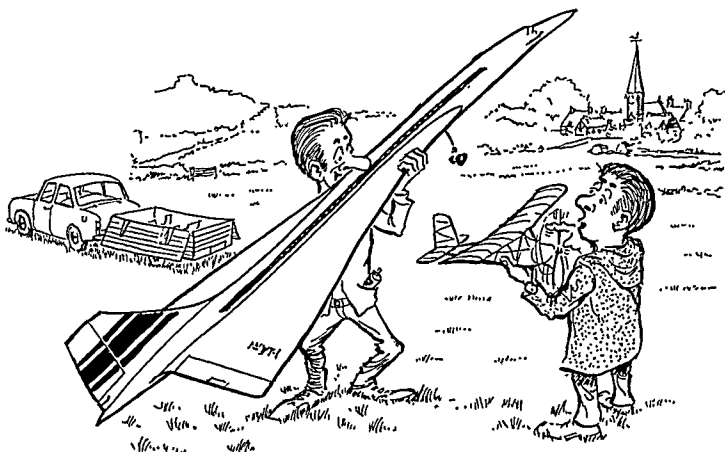
continued on page 36

topical twists

by 'Pylonius'

illustrated
by Sherry

"I've got clearance from the Air Ministry,
as long as I don't go supersonic over the
village."



World chumps

WHAT THE WORLD Free Flight Champs have gained in professionalism over the years, they have certainly lost in charm. All those experts flying their standardised, super efficient models leaves little room for the eccentrics and duffers who made such a joyous contribution to the old Wakefield scene. All who enter now are in with a chance, grimly notching up the successions of maxes in the specially sniffed patches of air. Gone are the old characters with their canards and six skein motors, the game lady competitor ready to defy tradition by launching the model the wrong way about, and the tardy purist winding up by finger. It's now all so scientific, with everyone scoring maxes like mad, when I can remember everyone crashing like mad in a spirit of carnival.

Then there were the colourful result sheets, not just cold statistics, but full of poetic model names: *Lurchin Urchin*, *Smoghog*, *Fatso*, and many other lyrical titles. A model wasn't just another stick and a wing as it is nowadays, but something of real character, almost like a pet dog – which is the way many of them performed. And the scores. Here again there was real character, with a number of self effacing nils, and evidence of quite a few who had crossed the world for a sub twenty second total. "Coo," we used to say, "*I could do better myself*." Nowadays, looking at the result sheet, we say, "*Coo, I think I'll take up plastic soldiers*."

Simply monstrous

At a time when beginners are opting for twelve foot span, four engined radio models, there comes a salutary shot across the billowing bows of the L-plate lashups from the Air Ministry. That piece of bulgeosity, says the regulations, might well have sized itself into yer actual flying machine class, and as such would need special clearance (likewise if it crashes). Obviously the chaps at the Ministry have enough trouble on their hands with Concorde, and do not relish a plague of monster models just at this time.

Now why we get these cuckoo type monsters stuck in our flying nests is that, in defence of our model flying freedoms, we react against any outside interference with a great show of solidarity – mostly above the ears. What has lost us friends and airfields more than anything else is the cry of 'treachery' that goes up whenever a small voice is raised in protest against the depredations of some low flying, noise rabid 'fellow' modeller. It is bad enough, the embattled modellers say, to get that thing from outside – we model flyers must stand together.

I make no bones about it – models powered by anything stronger than rubber bands make me nervous, and even the noise from a wobbly noseblock gives me the jitters. I am all for the quiet life, and my policy is never to fly anything that could hurt a fly or deafen a ladybird. I also reserve the freedom to object whenever anybody is behaving on the flying field in a way that diminishes my comfort and restricts my enjoyment. Four engined beginners beware.

Bygones dept.

The Dornier Do X Owners Circle is established for self help among the stalwarts who remain faithful to this lovable old flying boat. Problems of petrol supply and dry dock facilities are discussed by members on a mutual help basis. Just one North Sea oil well and a redundant naval depot is all that is needed to keep these handy little craft flying. Owners and sympathisers can get details from Tinker Smith, Flat 206b Peabody Buildings, Hoxton, London.

Fifty years on

When you read of that gallant little 1925 paper aeroplane challenging for model supremacy you can't help shedding a tear of regret for those brave days when you could earn the reputation of being a champion model flyer without ever having to exceed a flying duration of ten seconds, and if you did come spinning in at the end of it you could prove yourself a true aeronaut by saying that you terminated the flight on a spiral perpendicular. What is more you would not have to venture further than the village green or the rectory lawn to do it.

Now, if it isn't exactly blood, toil, tears and sweat to be just an ordinary model flyer, it comes very near to total commitment in struggling man hours and hard pressed family budget. Such is the time now needed to keep just one radio model flying that some people are seriously working out the economics of giving up work and going on National Assistance. And the amount of preparations are now so involved that some very keen aeromodellers never actually get to the flying field, which, when you consider the mischief caused by the few who do, is not such a bad thing.

And talking of paper aeroplanes, I wonder if it would be cheaper to make a model out of one pound notes than balsa, even if you had to use a sovereign as a nose weight.

Open 'fast' combat winners: standing are second placed Howard Rush (Nemesis), winner Sherwood Buckstaff (Asshole) and third placed Richard Stubblefield (Sodbuster). Kneeling, left to right are 4th and 5th men Mike Tallman and Greg Hissam, both of whom flew 'Stingers'.

Richard Wilkens describes his visit to the 1975 U.S. Nationals, when he travelled some 13,000 miles and lost!

Photographs by Tom Southern



"HEAD WEST YOUNG MAN"

THE IDEA — I was all booked up for a peaceful hitch-hiking tour of the States when the Americans, Charlie Johnson and Gary Frost who came over to fly in our Nats, suggested that I entered their 8 day US Nats at the Chennault Air Force Base, Lake Charles, Louisiana in August. "Come stay with me and bring some models", said Charlie in his subsequent letter.

THE ARRIVAL — six weeks later, after travelling from New York, I was standing on a hot dusty highway in Kansas with a sunburnt thumb, 2000 miles from Charlie's house in California, cursing the model box that contained the five models I had left after the Derby International. When I

eventually arrived after a short stop at the Grand Canyon, I flew one down at the local park, hit a pigeon with the lines smashing the model (the pigeon flew off) and set to work building some more, including my one and only *Fast Blasta* for the old Tigre 35 that Kevin Lindsay modified many years ago. Two weeks later after building three models between sightseeing tours and sharing a 2000 mile non stop drive across cowboy country, I arrived at the air conditioned dormitories situated four miles from the airfield that provided the excellent accommodation for hundreds of modellers. Few people were under canvas, not only because of the rains and snakes, but because the Americans use motels and huge motor caravans called campers much more than we do, and the dorms at less than £2 per night were very good value. I teamed up with Drew Lance from California and met many other combat flyers, some of whom were still building and making up lines in the corridors. On opening the box and showing our western cousins some FAI models, questions like "How fast does it go?" "What's wrong with your wing section?" and "What '35 are you using in these?" met with answers like "Is that important?" "Nothing, what's up with yours?" and "These are FAI models". This seemed to leave everybody confused and I had only to stay up till the early hours trying to explain our construction methods, general attitude to combat and why our FAI models are bigger than their fast combat models. The latest *AeroModeller Annual* would have been a godsend!

Our intrepid traveller traded models with Riley Wooten who gave up combat flying in 1968 after winning the Nats with this model — a vampire. It was his fourth Nats win. The model is made from expanded polystyrene and is paper covered.

THE SITE — Next morning after driving past local restaurants displaying huge "Welcome Model Airplane Enthusiasts" signs I was standing on, or rather sinking into, the combat site outside the all-concrete airfield. Louisiana is known by some as the Swamp State, and that was the state of the combat circle — a swamp. After the torrential rain showers there was a 2 foot deep pond, 10 feet from the circle. Frogs were hopping about, ants were biting, crawfish were eyeing up the invasion of modellers, someone saw a deadly water moccasin and someone else brought an alligator into the Nats HQ Hangar. So the scene was set for six days of combat: Junior, Senior and Open, Fast and Slow and FAI Open. Thirty-five of the 600 trophies were allotted to combat which was run by Gary James and Tom Southern of the *Miniature Aircraft Combat Association* (MACA) plus many other helpers during the six day thrash.

THE RULES — 'Fast Combat' rules differ considerably from those employed in FAI. Five minute matches, 60ft. lines, .35cu.in. glow motors, 100 points per streamer cut, one point per second air time, and a string-cut known as a 'kill' wins and ends the match. Streamers are 10ft. long with 4ft string leaders. One model and set of are only per match, previously pull tested to 35lbs. and inspected for airworthiness. Mid air collisions and line tangles that result in model destruction and the match. You start your motor during the five minute period and launch the model with the pilot outside the centre circle, pilots have one lap to get into this circle and models must fly round dead level 20ft. up until both pilots are in the centre, then you slog it out quickly. If you are first up you have a real advantage because your target is from the front of your opponent's model to the end of its streamer. If models collide the match ends and you win on air time, flying through the string gets you the kill and if you miss the string





Junior 'Fast' combat winners were, left to right, first placed Joe Kall (Shrika II), Doug Harris (Sneaker) who came second, third man Tom Fluker (Sneaker) and Larry Hoffman who came fourth with his Nemesis.

you get a cut . . . not bad!

In practice it is safer to go for one or two cuts, then the string. If your opponent's model lands you must fly dead level again (something I found very difficult to remember) for the sake of safety. Staying down (hit and run tactics) is perfectly acceptable and commonly used.

'Slow combat' has the same rules, but models are different. They must measure 2ft. from prop to elevator and have a profile unstreamlined fuselage and conventional tailplane, a wheel for take off and metal tank in front of the wing. The motor must run on suction alone and turn a 9x6in. prop. Some contests are held for 'Slow Slow', with two wheels and 11x6in. props, but these are even sillier, or funnier.

THE MODELS — Fast combat models are small (US FAI models are tiny) "Everything is a bit bigger back home in England where I come from" said I in my best Texan accent. Generally, all US models fly fast and turn comparatively wide, are complicated to build with 60-70 components and many precision fits, are difficult to repair but are smooth flying and directionally stable, allowing them to be steered through that 4ft. string at 110 mph. All are glow powered, running on as much nitro as possible; nearly all were powered by Super Tigres often running on wood props. Many models were designed by aerodynamic formulae which precludes large chord models because 'correct' 15 to 18% thick wings end up too thick and produce too much drag, and large span models mean heavy long thin structures that are complicated to build, expensive and prone to warp. So until flat or flatter sections are employed they are stuck with their American standard 350sq.in. wing area. Models varied but all were straight wing designs with a boom mounted elevator. There were however three exceptions. Bill Allen's models had a single brass tube boom that was replaceable and adjustable. The *Bosta* used by Bob Birch was an enormously complicated elliptical winged silk overall model with a tapering section which apparently gives a better performance over other designs, and the super simple *Shrika II* designed by Gary James and Greg Turpin

with tapering polystyrene wings on a built-up balsa centre section; a small step in tighter turning performance, but a giant leap in time-saving construction. You can build one in an evening! However this construction method, although light enough, now may run into weight problems later if everyone takes the hint and slaps another 100sq.in. on their wing area (which they probably will not do).

I used a scaled up *FAI Blasta*, 460sq.in. 44x11x1½in. wing with hollowed out ribs, spar web and leading edge (if it's going to break, let's make sure it *breaks*!) Its level flight speed of 95mph was below average, but it took an equal or less time to fly a figure 8 than most others and therefore fortunately looked presentable. Many people flew a *Nemesis II* built from a kit. Designed back in 1963 by Howard Rush, an aerodynamicist specialising in stability and control, it has become the standard 'Hot Ship' since the Riley Wooten *Voodoo* and does everything the US flyer wants. No models carried more than two minutes of fuel because it weighed too much, and most matches were over in one minute anyway. The very high humidity and temperatures in Louisiana prevented motors from giving their maximum power and made them too temperamental on high nitro fuels, speeds were on average 105mph in level flight.

Let battle commence

Holding Junior and Senior events is a good way of encouraging youngsters to the sport (and saves the older flyers the embarrassment of getting thrashed by some young whizz kid) and these events were held on the first two days.

Open Fast attracted 70 entries and was held on the third day by which time the rains had ceased, the pond had evaporated and the ants having cleared up their flood damage were biting harder.

By the end of the day I had realised what Fast Combat was all about — so much depends on your pitman getting you airborne first. Unlike FAI where if you are two cuts down you can stop and think a while before trying different tactics, in fact you must get ahead then get a kill as soon as possible. Belcranking is an American term meaning mid-air collision, i.e. one model gets its bellcrank displaced by the other.

Some flyers park their models overhead flying a consecutive loop pattern by holding on the upline; this allows them to fully concentrate on the target. When this presents itself in a favourable position, they streak down from above killing, chopping, missing or belcranking, depending on luck.

Among the last 32, and looking good were Dick Stubblefield the reigning champion and Sherwood Buckstaff from Texas with their one-flick-start pitmen. The Jive Combat Team with their Phil Granderson designed *Tarantulas* soon to be killed. Bob Burch flying a *Bosta* and Howard Rush flying a *Nemesis II*. No one attempted any 'wiggles' as such but there was a lot of good close following and cross cutting.

There were an equal number of matches won on air time alone with many motors failing to start. Any time a kill was made I found it difficult to believe it wasn't 80% luck. I was very lucky to reach the last 8 surviving two mid-airs, and scoring an accidental kill in the second round.

A rich run followed by ditching and a total equipment failure (through not checking the contents of the pit box beforehand) prevented me from having a good ding dong with Dick Stubblefield, who already having clinched victory on air time sportingly refuelled and flew solo again until the end of the match. He went on to fly Howard Rush whose *Nemesis* had clocked 120mph in practice before its motor blew up. This semi final was fast and furious with these two top flyers on form. Both models instantly airborne on the starting signal, Dick took a 1ft. cut in the



Top men in 'slow' combat were, left to right standing, second placed Larry Driskill, winner Richard Stubblefield and third placed Jim Finley. Kneeling are John Radlasi and Sherwood Buckstaff who came fourth and fifth respectively.



FAI Combat winners (standing, left to right): Jordan Segal came second to Howard Rush, while Mike Guthomson was placed third. Kneeling is our very own 'Wilkie' who came fifth and fourth placed Larry Driskill. Note how much smaller the US aircraft are compared with Richard's 'Blasta' design.

opening seconds and followed Howard for a short while, but got 'killed' in what appeared to be Howard's first real attempt at the target. The whole thing was over in less than a minute.

Sherwood Buckstaff flew Mike Tallman in the other semi and came off best after smashing his fifth model; one per round up until then.

The final between Howard and Sherwood was a typical, high quality, very short match. Both models streaked into the sky and mixed it with little following. One small piece of streamer drifted down followed instantly by another of a different colour. Then the models appeared to clip each other overhead and plant themselves vertically into the mud on opposite sides of the circle. The judges and time keepers gathered in total silence then declared Sherwood the winner — apparently his pit crew had beaten Howard's by a second at the start. Thus the new champ was chosen.

In the quarter final losers' fly off for fifth place I lost to Greg Hissem who was one cut up before we belcranked. He went on to take fifth place.

The night before FAI I was given the VIP treatment by Bill Allen and Tom Southern and over dinner was asked to advise them on the FAI rules. The suggestion that the judge should run the contest from the centre of the circle and use countdown cards at the start was accepted. The 35lb. pull test originally planned was dropped in favour of 20 times the model weight. The Americans' only real interest in FAI is that one day it will be used in the World Championships. Apart from this they regard it as an unimportant 'fun' event, which was reflected in the low entry of only 20. Because of this I found it difficult to take too seriously, although having a psychological advantage inasmuch that I had probably flown more FAI bouts than all of them put together, that my larger models turned inside theirs and appeared no slower. I relaxed, perhaps a bit too much, and frankly expected to win if my luck held out. My hottest looking opposition appeared to be Sherwood Buckstaff and Mike Guthomson of the Texan team who had the best models — about 280sq.in. at 11oz. with ST G 15s. The Jive Team, who marched onto the field and stood to attention wearing matching Tee shirts and plastic bowler-hats obtained from the local 'Pizza House' while they were inspected by their leader Phil Granderson, were fairly well organised in the contest. Many others used Fast Combat models with special

engine plates allowing ST 15s to be mounted in place of their usual .35s. Howard Rush jokingly entered a *Junior Satan* and a *Voodoo* with long glass fibre arrow booms and twin fins. Most models used surgical tube tanks that didn't give four minutes run, and one or two entered with only one model. Only Drew Lance used a Rossi glow which was modified, but it would not start. No one used streamer clips and most motors were overpitched with cut down 7x6in. props which are useless on Super-Tigres, slowing in manoeuvres. I first flew against one of the large Mexican contingent and scored a typical 'Wilkins useless FAI kill' in the first few seconds, whereupon running for a further two minutes from a Mexican popping, wide-turning model, got chopped before his motor gave up! After this first round the opposition was surprisingly tough and I almost lost to young David Aoyama whose model was, would you believe, turning tight! He later took fifth place in Senior Slow. My most exciting match in the whole Nats was with Bob Burch from Chicago, who was flying a 230sq.in. *Mini Nemesis*. After almost four minutes of following this little wide turning model, I had scored only two cuts and in each of the two 5 second periods that I failed to keep on its tail Bob instantly retaliated with a

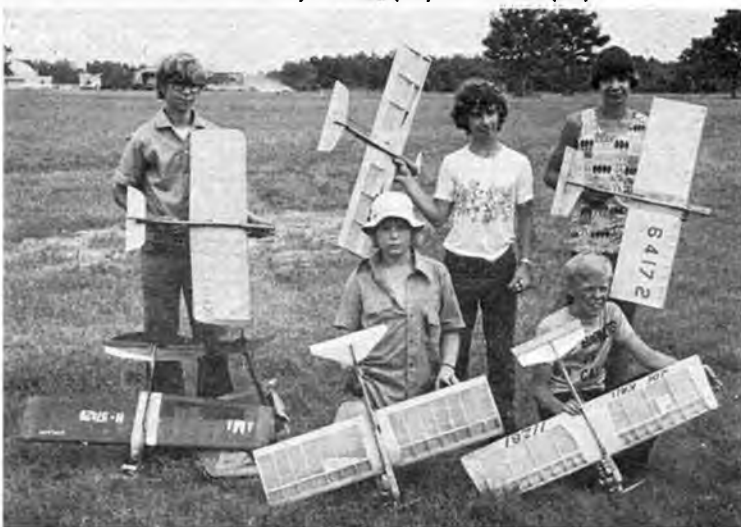
cut. A fine example of the typical American precision cross cutting while flying at right angles to the target. He lost due to only a very small amount of ground time.

Howard Rush and I flew in the next round both with bad motor runs. I couldn't help thinking of John Hammersley (who was probably asleep 6000 miles away dreaming of 10-0 victories over Bob Morgan) while poor old Drew Lance was trying to get a setting on the temperamental motor which was running on 30% nitro at the time. The match was very much a stop-and-start affair, but it was big exit time for the British hope as after hitting Howard's streamer many times with the wing and not the prop during one long slow low level lap, he scored a cut before both motors finally gave up. In the fly-off for fifth place I flew against Gary Stephens whose flying skill seemed far in excess of his small model's manoeuvring capability, and then Phil Granderson who I somehow only just got the best of unconvincingly in a scrappy match. The more fortunate flyers reaching the semi finals with Howard Rush were Jordan Segal and the Texans Mike Guthomson and Larry Driskill who were all flying well. Fast change Buckstaff had bitten the dust like many others who (perhaps instinctively) had chopped strings instead of streamers. The final four eventually sorted themselves out with Howard's *Junior Satan* making it his day.

Had an organised British team entered this event seriously my estimate is that they could have won it fairly easily, if only due to the fact that the US models this year were out-manoeuvred and their teams lacked professionalism, something that a few weekends practice will cure. However they have seen a large area model turn and 'wiggle', and they know what to expect if they do come to Europe. They have a year to produce a model that will outfly the one I left in the hands of Riley Wooten (that will not be difficult) and if they manage to tame the Rossi as well, I would not care to be on the receiving end of their 1976 World Champs team, if there is one!

Day Six was Slow Combat day with Junior, Senior and Open all being flown.

The top Junior 'slow' combat flyers were (standing, left to right) J. Swartzendrucker with a 'Flite Streak' who came second, Larry Hoffman who used a 'Mongoose' to win and John Wolfe. In front are Rusty Crawford (4th) and Joe Kall (5th).





Phil Granderson of the Jive Combat team with a bunch of Tarantulas – a very popular design with 'Fast' combat flyers. Judging by the vast quantity Phil has produced, the carnage rate is pretty high..

There were few entries again and those who were still enthusiastic battled it out for another 15 trophies. The rest, including myself, looked on from the shade, supping ice cool beer as the temperature soared into the 90s. Junior and Senior events were held in the morning while Open was in the afternoon by which time the organisers were well fed up with watching combat and were getting more cross-eyed every minute.

The poor ground conditions prevented models taking off, so all were hand launched. These heavier models still had

small wings and again were wide turning, the tightest being the Texan models which were the largest. Matches were pleasant to watch as there was plenty of time for pilots to work out manoeuvres, thus more tactical flying resulted and fewer mid air collisions occurred. The Kansas City 'Star', Jim Finley and John Radisi from Texas, almost stopped the other Texans from gaining victory but the consistent high quality of Dick Stubblefield's flying won him through and he is now Slow Combat champ after being Fast champ last year.

I couldn't help feeling sorry for many people who entered Fast and Slow combat after spending much time building intricate models, then travelling up to 2500 miles for only one or two minutes of combat if they were lucky. Some got killed in the first 15 seconds, and a few failed even to start their motors; there was no losers' fly-off.

Many lacked practice because of the vast distances separating the flyers and their understandable reluctance to risk these models combating for fun in the park. A raw beginner in Britain gets a minimum of eight minutes contest experience at any one meeting (assuming he loses twice) which is more than some American beginners get in a year with their fewer comps, greater distances between contest venues and ultra short matches. They fly .049 size also giving them four different classes to concentrate on but this may turn out good all round flyers instead of experts in one class. Many areas in the States have their own set of rules and I was told that the WAM fraternity in California fly FAL combat whereby if a streamer is removed points are awarded for passes through an imaginary streamer as if it were still there! How they count them is beyond my comprehension.

The MACA officials who incidentally publish an excellent newsletter, are rewriting the rules hoping to please everybody – I hope they succeed.

But for Charlie Johnson's kind offers of accommodation and building facilities and

his girlfriend Lorna's organisation of transport to the Nats I would never have been able to enter. I took no equipment at all to the States as I felt it was unwise to carry any that would only be used for three days out of six weeks. All I needed was borrowed from Charlie and the people I met at the contest. Had the trip been planned for a team, things would have had to have been worked out differently. Maybe a Trans Atlantic combat exchange programme could be set up whereby people wishing to offer accommodation to foreign flyers on either side of the Atlantic could be listed and perhaps MACA and the SMAE could act as an agency through which people seeking assistance could be put in touch with those offering it? You could expect a visitor to arrive at the airport very tired, fed up with carrying model boxes and equipment and looking completely and utterly lost.

In that situation a helping hand and a place to stay is a great advantage. The alternative is a taxi to an expensive hotel for the duration of the stay and travelling to the Nats by public transport or hired car with all the equipment. The Americans I spoke to thought the idea could work in the States, and it could extend world wide.

If you fancy a trip to the US Nats next year it will probably be at Dayton, Ohio only 400 miles west of Washington DC. An advance booking charter flight will be about £150 return to Washington, and Greyhound buses cost £25 per 1000 miles approx. Car rental shared between four or five is cheaper and better. Stateside food costs about the same as here. Dormitories at the contest this year were less than £2 per night. Contest registration fees are £7, then it's £1.50 per event. No prize money, but plenty of trophies and an endless number of friendly people to meet so head West young man and join in their bicentenary celebrations at the same time. Not forgetting Disneyland of course, which is almost better than combat flying!

SPOKED WHEELS

continued from page 31

Alternative method of wheel construction

For those readers not fortunate enough to own or have access to a lathe, I suggest the following alternative.

(a) Using 'Litho' plates (try your local printing press for old discarded ones) punch out four discs approximately $\frac{1}{4}$ in. dia. (a leather punch is useful for this). Drill holes for the hub and spokes, making sure that the hub hole is as good fit on 20swg aluminium tubing. Epoxy glue to aluminium tube, reinforcing with fillets of epoxy on both sides of the flange – see Figure 4.

(b) For the rims, use a circular former (tin cans, coins etc.) to match the inside diameter of the rim. Now cut strips of $\frac{1}{40}$ in. (approx.) hard balsa or hardwood (birch, beech or ash) $\times \frac{1}{4}$ in. plus wide, sufficient to

make four full turns around the former. Make a slow chamfer (see Figure 5) on one end, then soak strip in boiling water for at least one hour. Shake off excess water, apply white glue to top surface of strip and slowly pull around former, using rubber bands or tape to compress the laminations tightly together. Leave overnight to dry. Remove from the former, carve and sand to section (Figure 6) and add a paper strip to simulate the rim. Lastly drill for spokes as described previously.

(c) Spoke up the wheel as for the metal rim, but on removal from the jig add an extra lamination of wood to give the full thickness for the wheel. Carve and sand to circular

section and give two coats of sanding sealer before colour finishing to your requirements.

* * *

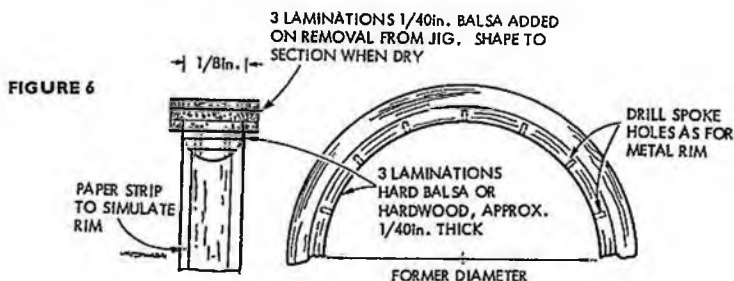
By using either method, you should now have a pair of tangentially spoked wheels about 2 grammes in weight, the strength of which will really amaze you, so make sure you make your next Peanut really be-spoke.

Material suppliers

Dural tube and rod – Smith, J. & Sons, 50 St. Joans Sq., London EC1.

Monofilament – any fishing tackle shop.

Rubber tube – most model shops. You will have to shop around for the right size.



BETWEEN THE LINES

with Dave Clarkson

Fastest survivors of the Class B '1000 lap' event organised at Rufforth by the Wharfedale club were (left to right) 'Big Roy' Everitt and Bill Cooke who were placed third, winners Tom Ridley and Roger Burns, with Kijo, 'sparks' man for the second placed Tynemouth team Smith' Hudson, standing between them.



UNDERSTANDING PROPELLER PITCH

Another educational piece which I hope will prove helpful to all users of props, more particularly to the users of fibre reinforced plastic props since these are more amenable to re-pitching efforts than either wood or nylon props. The first step is to define what 'pitch' is. My definition, referring to Figure 1, is that distance 'X' is the pitch of the point on the prop i.e. is the distance that point on the prop advances theoretically in one complete revolution. By 'true helical pitch' is meant that every point on the prop advances the same distance theoretically per revolution. A simple calculation illustrates the connection between pitch, rpm and airspeed:

rpm = 14,000 advance per minute = $6 \times 14,000$
pitch = 6 inches = 84,000 inches
i.e. airspeed = 79.5mph

It became apparent a long time ago that the most effective prop is one carrying a bit more pitch than such simple calculations would indicate. Thus the concept of 'slip' arrived, i.e. the prop does not quite make all of the theoretical advance each revolution — the prop 'slips' a bit. Ten per cent slip, or actual advance equals 90% of theoretical advance per rev, became a very commonly accepted figure. So to maintain the 79.5mph airspeed using 14,000 rpm, the best pitch according to the 10% slip concept would be 6.67 inches.

This theory was satisfactory, but it indicated that the pitch should be uniform right along the prop, and yet many found that reducing the pitch near to the prop hub gave better results. Indeed most good commercial props have the pitch reducing near to the hub. How to explain this one? It did not take the full-size aircraft prop designers long to discard the 'slip' theory and come up with the 'incidence' theory. The incidence theory treats the prop blade like a wing. Since the blade sections normally used are flat-bottomed or semi-symmetrical, it follows that a few degrees of positive incidence with respect to the airstream should give the best results, +2° incidence is a frequently quoted figure in full-size practice. Sticking to our calculated case, the incidence theory gives the following pitch distribution:

	1	2	3	4
distance from hub (inches)	6in.	6in.	6in.	6in.
zero incidence pitch	43° 40'	25° 20'	17° 40'	13° 30'
resultant blade angle	45° 40'	27° 20'	19° 40'	15° 30'
add +2° incidence	47° 40'	29° 20'	21° 40'	17° 30'
resulting pitch	6.43in.	6.50in.	6.74in.	6.97in.

Just to make sure that drag-producing tip stalling is avoided at our high tip speeds, the tips are usually washed out a bit. Washing out the tips by 1° in the above example gives the 4in. radius pitch at 6.50 inches.

The final aspect of pitch distribution that is perhaps more arguable than the rest of this article, results when the force components are resolved with regard to the actual blade angle (Figure 2).

Now, as 'x' gets larger, the proportion of the lift generated that actually acts in the forward direction gets less and less until, in the limit, when $x=90^\circ$, the thrust produced is precisely zero. It follows that at some blade angle, having a blade stall is not worth the effort and thus the outtrigger blades so popular with the Wakefield rubber model men and the big diameter spinners frequently seen on full-size prop-driven aircraft. In control-line work, such solutions

are usually not very practical (except in the speed classes) so arbitrarily a maximum blade angle should be set. Many modern props seem to have maximum blade angles in the range 45-50° but some exceptions exist, like the Bartels Fischer-Nilsche prop. However I have a preference for this maximum blade angle rule.

Following all of this, and calculating typical pitch distribution for two familiar cases i.e.

- max. blade angle 50°
- normal blade incidence +2°
- wash out tips by 1°

(a) FAI team racer

rpm = 17,000 i.e. no incidence pitch = 6.21 inches
speed = 100mph

	1	2	3	4
distance from hub (inches)	3.74	6.44	6.83	6.66
Calculated pitch (inches)	3.74	6.44	6.83	6.66

(b) Rossi 'Goodyear'

rpm = 23,000 i.e. no incidence pitch = 5.05 inches
speed = 110mph

	1	2	3	4
distance from hub (inches)	3.74	5.48	5.67	5.48
Calculated pitch (inches)	3.74	5.48	5.67	5.48

How good are these calculations? I noted in Graham Howard's *Ol Blue* Goodyear description that he had found his best results to come when using a 140mm. pitch prop and over 18,000 static rpm. Since, when I have heard his motor it has jumped (like most Rossi's do) a lot of revs on take-off, his air revs must be around 22,000, and converting the quoted pitch to inches i.e. 5.52 inches; I would say that the Rossi 'Goodyear' prop calculation is in fair agreement with practice.

The FAI prop calculation has less published practical data with which to compare. However I have heard the owners of audio frequency tachometers quoting typical air-revs around the 17,000

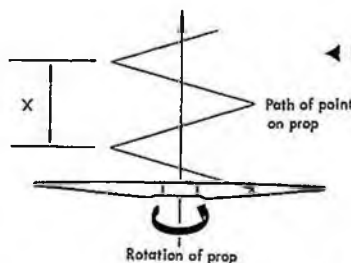
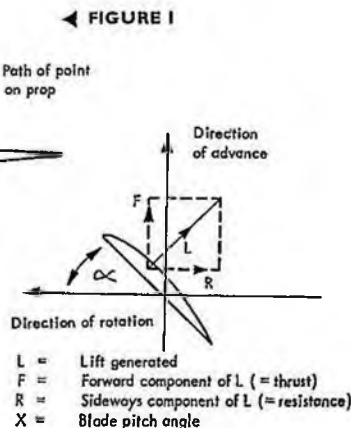


FIGURE 2





mark, and the big trend in recent years in FAI has been one of reducing pitch. Indeed Larsson/Rylin in Sweden are now quoted as using a 7½ in. diameter prop and yet getting 'high' revs. This can only mean that they are using well under 7 in. pitch, so maybe the calculation presented above has some validity.

I have gone into some detail here into the calculation of optimum pitch as well as into the basic significance of pitch. I hope this sparks off a lot of thinking because, for we control-liners with our highly developed and rule restricted models, the propeller is the one area where most of the remaining experimentation is yet to be done, a bit of theory always helps to point the way.

THE RUSSIAN CHAMPIONSHIPS 13th–23rd August 1975
Received by a rather tortuous route, and therefore a bit delayed in reaching us, are the following results for the control-line events.

F2A – FAI Speed

		Best speed
1. Tumanov	(RFSR)	232.25 km/hr
2. Maskov	(Ukraine)	232.25 km/hr
3. Baljan	(Armenia)	227.84 km/hr

F2B – FAI Stunt

		Total best 2 flights
1. Eskjin	(RSFSR)	2092 pts
2. Petrov	(Moscow)	1997 pts
3. Kontratenko	(Ukraine)	1969 pts

F2C – FAI Team Race

		Best heat	Best semi	Final
1. Maslov/Efrenov	(Moscow)	3:55	4:04	7:58
2. Krasnorutsky/ Kramarenko	(Ukraine)	3:57	3:55	7:59
3. Barkov/Surajev	(Ukraine)	4:00	4:02	7:59

The team race results are particularly interesting to me. Although the times are very fast indeed (faster than any team outside Russia without line groupers), they are no faster than the Russians have been getting at home for a few years now. As Hradec Kralove and more particularly Verviers and Pecs this year have shown, the Russians have little or no advantage in technology terms over the best of the Western Europeans. It would not surprise me if these

A smaller than-usual British entry attended the annual Bochum International, but nonetheless acquitted themselves well. Gordon Isles (left) placed third in FAI speed at 232 km/hr. (Pete Halman was just 3 km/hr. slower to fill 5th place), while Jim Broad and Ron Tribe were our best T/R team, placing seventh despite a 4:21 in the finals. At right is Jim Mannall who won the aerobatics event from a field of 24. Unfortunately the meeting at Utrecht in Holland just a week earlier prevented better British support for this popular German contest.

times were equalled or bettered in Western Europe in 1976. As a side thought for we ordinary mortals, the 7th place team at these Russian Championships placed with a 4:58 heat; at one contest here this year a 4:49 was not good enough to get into the semis.

NORTHERN AREA FAI GALA – Elvington, 19th October

Held on Elvington's enormous and fairly well surfaced runway on a cold, bright day with only gentle breezes, this contest produced some quickish times considering the lateness of the season. Despite the title, Goodyear was held although the lack of publicity meant a small entry, so FAI Team Race was the main interest.

FAI Team Race

The entry was big enough to make the running of two rounds of semi-finals seem sensible. From these emerged the finalists.

		Best Heat	Best Semi	Final
1. Horton/Haworth	(Wharfedale)	4:31	4:26	9:15
2. Sutherland/Woodside	(Norwest)	4:52	4:27	9:49
3. Langworth/Williamson	(Wharfedale)	4:27	4:36	9:58

Just pipped for a final place were Davies/Broadhead with their Mk II Bugl powered Sapavolov influenced model, they had achieved times of 4:36 and 4:37 earlier in the contest. Even more unlucky were Clarkson/Daly who with a 're-bored the night before' K&B had a 4:32 heat under their belts. However at the second stop in their first semi the model fell apart rather spectacularly (bits flew in all directions) when seemingly set for a fast time, using one of Jim McCann's new props.

In the final, Donald Haworth's ETA just didn't make his intended 40 lap schedule, Jim Woodside's K&B just failed to make his intended 33 lap schedule and Bernie Langworth's Mk I Bugl had a heavy cook-up (tut! tut! – no shut off); rather eventful and rather slow.

Goodyear

A small entry meant no semis at all, indeed semis would have been a bit of a waste of time since the top three were well ahead of the rest. The fastest heat was done by Clarkson/Daly in 4:37, who are now convinced that the Taipan 7 x 6 prop is quite as good as most GF props on their MVVS diesel.

In the final, 'Big Roy' Everitt just didn't have enough airspeed, so, despite a missed catch and one slow pit-stop by Clarkson/Daly and a motor cut on take-off by Horton/Haworth, the two faster machines saw him off.

		Final	Motor	Model
1. Clarkson/ Daly	(Norwest)	9:33	MVVS TRS	Ol Blue
2. Horton/ Haworth	(Wharfedale)	9:46	PAW 3.5 Spl	Johnson Spl
3. Everitt/Cooke	(Norwest)	10:09	Oliver Mjr	Argander Spl

A side comment on the current Goodyear scene is the fact that in John Horton's *Goodyear League Table* (issue no. 46), of the 35 teams who have gained points so far this year, no less than 23 started the year as Novices. In fact two of these '74 Novice' teams now occupy positions 4 and 5 in the 1975 List. Quite an achievement

Pete Tindall flew his own-designed Sabre at the Bochum International, using a Fox 40 for power – placed 13th eventually.



Dominique Martine from France flies this Billon-designed stunter, powered by an O.S. 50, came 8th at Bochum.



and boding well for the future. More news on the League next month.

1975 RUFFORTH '1000' B-TEAM RACE

Since no less than 11 teams considered themselves men enough to survive 1000 laps with their 'B' team racers, the organisers (Wharfedale club for the umpteenth time — keep it up!) as usual held two rounds of 200 lap eliminating heats to sort out six teams for the 1000 lap final. Flying both rounds of heats plus the final together with a modicum of practice involved over one hundred miles of flying; a fair test of men and machines.

The notable failures in the eliminators were Horton/Haworth whose ETA 2.8cc diesel just didn't have enough airspeed, thus making this the first '1000' for many years without a droning diesel in the final. Clarkson/Daly/Daly with their fast but tatty ST G21/29 RV powered model suffered terrible restart trouble, also failed to qualify. The six finalists to emerge were:

Smith/Hudson/Kijo	8:43	ST G21/29 FI
Heaton/Ross/Sutherland	8:46	ST G21/29 RV ABC
Everitt/Cooke	8:51	Enya 29 BB
Gardner/Wilson	9:36	Enya 29 BB
Ridley/Burns	9:37	ST G21/29 FI
Fitzgerald/Pickles/McAlroy	9:58	ST G21/29 FI

All six were inside last year's fastest qualifier, and the top five would have been inside the old '60 fast lines' 200 lap record established a long time ago by Dave Balch and Richard King (which would have been about 9:40 under our present rules). Further evidence of the pace in the heats was the fact that Heaton/Ross/Sutherland hit the 180 lap mark (normal final distance) in 8 min. flat — Smith/Hudson/Kijo were probably even faster — very very close to the present SMAE final record.

At 2.30 pm the six finalists 'La Mans' started simultaneously in two circles for the 1000 lap final. The organisers had split the teams on an airspeed basis, with the fastest three in Circle 1, to minimise overtaking. A wise precaution.

As the race progresses in Circle 1, Everitt/Cooke and Smith/Hudson/Kijo were very equal for speed both having around 105mph airspeed, but the latter team had the edge on range with around 50 laps per tank compared with the Enya's 45. Howling over these doing comfortably over 110mph for about 42 laps per tank was Heaton/Ross/Sutherland's ex-Alan Morris ST G21/29 RV ABC. Their much superior air speed was giving them a commanding lead over Smith/Hudson/Kijo (with Everitt/Cooke trailing, changing props three times) until on lap 917 during a take-off Derek tripped and fell, the model zooming up then vertically down at full speed into the runway. Needless to say, not one part of the model including the motor, survived *that* crash. So the Tynesiders pressed on to finish in a very quick time, trailed by the sole surviving Norwest team.

Circle 2 saw an even more unfortunate incident when, having completed 377 laps, the 'Mac-Fitz-Pickles' model did an 'Apollo' take-off causing an enormous line tangle. The result of this was the disqualification of the offending team, the retirement of Gardner/Wilson with a broken model, and a solo run to the end for Ridley/Burns, the only survivors of the tangle. Obviously flying most of the race solo helped them because they won, just beating the best in Circle 1.

1. Ridley/Burns	(Nuneaton)	Final
2. Smith/Hudson/Kijo	(Tynemouth)	48:22
3. Everitt/Cooke	(Norwest)	48:29
		53:56

Doing a time conversion job to allow for the slightly different race distances involved in the metrifying of our rules recently, the

Unusual stunt model seen at Bochum, with the large (sprung) monowheel undercarriage plus smaller wheels embedded in the wing tips was provided by one of the two Israeli entries.



'Star' of the German C/L International was Philippe Rouqule, who is just 13 years old yet placed fourth with his Stuka design built from a kit, and powered by an O.S. 30. Obviously a real threat to established names in the near future.

winning time would have been very close indeed to the old record and, had they finished, Heaton/Ross/Sutherland would have beaten foul luck to crash so near to the finish. Still, most of us enjoyed ourselves and look forward to doing the '1000' in 1976.

5TH GOODYEAR MARATHON — 12th October — RAF Driffield

This, the 'Stamina' event of the season for the Goodyear men, again saw a general raising of standards typified by Hutchinson/Leigh (my 'novices of the year') whose 1062 laps for the 1 hour 20 compulsory stop race was only sufficient for 10th place. Evidence of the toughness of this event is found in the fact that more than half the entry failed to finish, three with broken motors and no less than nine with broken models.

The calm, dry conditions allowed trouble-free runs and many took the advantage to really pile on the laps as the results for the point-takers show.

1. Clarkson/Daly	(Norwest)	1285	MVVS TRS	BooRay
2. McMahon/Myska	(Wolves)	1262	Rossi 15D	Argander Sp
3. Horton/Haworth	(Wharfedale)	1210	PAW 3-6 Spl	Johnson Sp
4. Allcock/Chambers	(Wolves)	1166	MVVS TRS	Deerfly
5. Everitt/Cooke	(Norwest)	1145	Oliver Major	Argander Sp
6. Daly/Clarkson	(Norwest)	1122	MVVS TRS	OlBlue

The 'unlucky' award must go to John Horton and Donald Haworth whose Taipan 3.5 BB Schnuerle RV diesel Special powered *Ginny* was doing 22.5 to 23 sec/10 laps in traffic and first-flick starting right up to the 52 minute mark and had put them well into the lead when the rear disc drive failed causing their retirement and consequent disappearance off the leader board.

John Heenan had to settle for 9th place at Bochum, using his new Maxi design, with Fox 40 powerplant.



The top three all had easy runs with all getting just under 25 sec/10 laps airspeed in their races. In their record breaking and winning run, the MVVS of Clarkson/Daly was really screwed out for range and sounded very ragged at times because of this. In contrast both McMahon/Myska's Rossi diesel and Horton/Haworth's PAW Special sounded really sweet throughout, the Myska 6½x7 prop obviously suiting the Rossi very well indeed.

This being the only event of the year in which swapping about for a second entry is allowed, John and I took the opportunity to have a second entry this way and once again proved that John is a far better pitman than me (also true the other way round on the handle!), great fun nevertheless. For this second entry we used a Taipan 7x6 glass-nylon prop clipped to 6½in. diameter and very good it proved to be, giving only a tiny bit less airspeed than our 'favourite' glass fibre Howard 170x180 prop. Quite a few teams were using this Taipan prop and were happy with it – definitely recommended as the best of the nylon props to use on a 2.5cc diesel in Goodyear. Odd really because its static pitch is only 5½in. but in the air it seems to pitch-up as the motor unloads resulting in very little revs increase between ground and air running – a most useful characteristic enabling easier ground setting of motors and conferring quite a degree of cook-up resistance in obstruction circumstances in a race.

Well, that is the 'Marathon' for another year, quite obviously one of the more popular events on the calendar if the entry of 35 teams is anything to go by. With the 1200 lap total well and truly passed, who is going to be the first to pass 1300? Maybe next year we shall know.

SPEED '75 (by Dave Smith)

With the meeting at Cranfield abandoned due to torrential rain Brian Blackwell arranged a speed meet at the Elliot club's site, (Rochester Aerodrome). Taking into account that there were no Northerners present, the turnout was very good – in fact as good as most meetings with 15 entries, 33 attempts and 24 official flights on this crisp, cold but dry Autumn day.

Results

		MPH	% of record	Motor
1. Irvine/Billinton	(Elliot)	169.5	98.5%	Irvine 40 (Prototype)
2. M. Radcliffe	(Feltham)	178.9	98.4%	OPS 60
3. D. Burleigh	(Elmsleigh)	166.9	97.2%	OPS 40
4. D. Smith (FAI)	(Elliot/Southend)	131.6	94.7%	Rossi 15



Tired of replacing expensive glow-heads on your Cox engines? Maple Models of Luton (see advert in this issue) can now undertake to drill and tap the burnt out head to accept conventional glow plugs – a useful feature as you can then scrounge a replacement on the flying field, should it become necessary!

Ron Irvine and Mike Billington flew as a team with one of Ron's new Irvine 40 Schnuerles. Using 68% nitro, ML70 synthetic oil and methanol the motor turned a 7x11½in. wood propeller. Ron setting the needle for every run. This is only the second time that this motor has been out and with more development obviously to come it is going to be a very competitive motor indeed.

Martin Radcliffe went the fastest he has gone in '75, recording a good run from his OPS 60 piped, conventional model. Rumour has it that Martin is taking up FAI speed next year – should turn a few heads!

Third place went to an up and coming flyer, Derek Burleigh, flying an OPS 40 on monoline, pitted by his brother Chris he recorded a good run very late in the day after suffering from troubles all day.

Worthy of note was Dick McGladdey's own tuned OPS 60 running on a mini-pipe – he must be the only speed flyer in this country who has been experimenting with mini-pipes and I was astonished to hear the pipe actually 'come in' halfway through the run. It is perhaps significant that all the top speeds were made on all-British Taylor glowplug. Another unique happening at this meeting was the fact that both the 1st and 2nd placed men both donated the prizes! Ivor Roffey was seen with his new lightweight model built for his works OPS 60 but as yet unflown.

Reflections over the year

Another season has come to a close, but what a year it has been. Superb weather has prevailed for nearly every contest and the new records established will be hard to break, especially if the weather pattern reverts back to its usual self next year.

If we analyse the speed scene, we will see that anybody contemplating success at most competitions next year could do well if they concentrated on the 29 classes. The current 29 record is 164.4mph – held by Brian Jackson for quite some time. It should be quite easy to reach 155-160mph with the new 29 piped motors which are available, making at least 92%–98% score on the handicap system. Good enough to get in the top four at most contests (especially as with the ratifications of the new records in the 049, 40 and 60 classes to be used next year, means that contestants will have to put in very high speeds to gain 90%+ scores).

As opposed to this year's conventional models, I believe we will see a lot more of the asymmetric layouts flying. If carefully built and sorted out they are very easy to fly and I believe definitely faster.

The use of 'line groupers for Open Speed' rule will be with us next year which will put us 2-line flyers on a par with the monoline boys. This will undoubtedly leave the Open classes wide open and give everybody a better chance as the monoline brigade have always had at least a 10mph benefit. Although it is time consuming and boring making grouped lines, I think that the extra speed which can be gained will be well worth the effort.

At top is the Smith/Hudson/Kijo entry in the Rufforth 1000 Class B team race, which placed second by just seven seconds. Motor employed is a Super Tigre G21/29. Below is the FAI team racer which Don Haworth and John Horton have been campaigning for the first half of the '75 season – motor is of course, an ETA 15, extensively modified by Don. Note the huge tailplane and short tail moment arm.



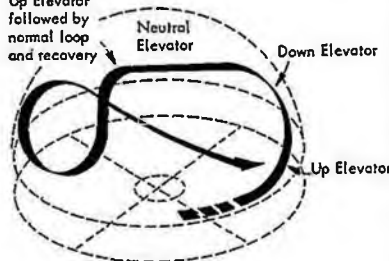
Are you between 10 and 16 years of age? Then don't delay, join today

PREVIOUSLY in this Column we have detailed flying three basic control line manoeuvres — a wingover, loop and horizontal eight. Now for the tricky one — inverted flying! Once fully mastered, inverted flying is not only very satisfying, as it opens up a new range of stunts, but it is also the key to success in C/L flying. When you are flying upside down instinctively, then you are *really* in control of your model and perhaps most important of all, will be better able to avoid a 'prang' if you get confused when trying a new stunt. So practise hard — it will be well worth it.

Inverted flying

When learning to fly the horizontal eight, you will have appreciated that when the model is upside down (following the first part of the manoeuvre) the controls are reversed i.e. 'up' is 'down' and 'down' is 'up'. With this previous knowledge, perhaps the easiest way of learning inverted flying is to simply stretch the figure 8 so that the model flies parallel to the ground, but upside down for half a lap before you apply gentle 'up' on the handle (causing the model to dive, remember?), then applying full 'down' to make the model climb up into the second loop of the 'eight'. Remember to fly this manoeuvre on the down-wind side of the circle, and if in trouble give full

Up Elevator followed by normal loop and recovery



Wind

down elevator to bring the model out in a loop at a good, safe height.

Another way to practise inverted flying is to simply stretch the top half of a loop, so that it resembles a 'sausage'. In this instance, flying down-wind, give up elevator

Letters . . .

Dear John,
I have just finished building my first control-line model, a Keil Kraft *Gazelle*, powered by a PAW 149 diesel engine. What size propeller should I use? Should I fly it on heavyweight Laystrate lines?

Luton, Beds. M. Dincan
With this engine/model, it would probably be best to use a 7 x 6in. nylon propeller. Do not use heavyweight Laystrate — this 7 strand wire is only for very big models, and would be much too heavy for the *Gazelle*. Suggest you use 40 to 45 feet of lightweight (3 strand) Laystrate control line wire.



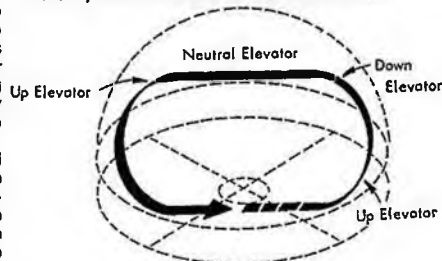
Maurice Moore bowed his way out of Junior Kit contests on 5th Oct by winning the Northern Gala with a St Leonards 'Performer' kit and an impressive score of 8min 25sec, having been beaten into 2nd place at Cranfield Gala on 14th Sept by brother Graham, who notched his third consecutive win at Cranfield in appalling conditions.

However, we now have Stuart (aged 9) flying unplaced as yet but very keen. Photo shows Stuart, Graham and Maurice at 1974 Nats — more details of Junior Kit contest for '76 soon!

until the model is half way through a loop (start quite high — at least 15 feet altitude). At this point the model will be on its back, but probably pitching its nose down as it attempts to complete the loop — so give a little 'down' control to bring the nose up and let it fly inverted. Take care not to over-control: keep your wrist rigid just as you did when you first learned to fly. After half a lap of inverted flying (and making sure that you have ample height), apply 'up' elevator again and recover in a half loop to normal altitude.

Actually, the writer did not learn inverted flying by either method — I cheated! The model I had was so battered and oft-repaired that it was too heavy and incapable of even looping. No longer concerned with the fate of the machine, I asked a friend to launch it inverted, and with some trepidation prepared myself for this first attempt at the 'impossible' — repeating all the time 'up is down, down is up'. Surprisingly, no real trouble was experienced — and as I only had to concentrate on keeping the beast level (well almost!) and not worrying about entering or recovering from such a position, the tank eventually ran dry while the ship was still airborne. Quite an achievement in those

days! After several similar flights I then tried my proficiency with a better model and was astonished to find that the 'bogey' of inverted flying was well and truly beaten. It really is not half so difficult as it sounds —



Wind

it's mainly a question of mind over matter — and the resulting pleasure from mastering this 'reversed control' flying made the effort more than worthwhile. Once again — practise hard, no matter which way you learn to fly.

Dear John Bridge,

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

NAME IN FULL

ADDRESS

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

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

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

1/76 15p in the £1 Rebate plan purchase coupon for Golden Wing Members G.W. No.....



The Free Flight Scene

this month: Bob Bailey
photographs by Martin Dilly

I HAVE BEEN gratified to hear that the material produced by Martin Dilly, Mike Warren and myself has, in general, been favourably received. Thanks for the compliments and please keep the feedback coming in – after all it is *you* who help us to write the articles and to provide what you want to see. We would like to help with any technical problems you have, so please let us know – via the Editor so that he can pass the queries on to the right person.

One difficulty has come to light so far – e.g. some people ask, what is an FAI power model? It should be remembered (by the experts) that the readership of *AeroModeller* is pretty wide and that a large percentage of readers are not active contest fans, so are not too clear as to the actual categories flown in free flight competitions. Therefore a quick summary, starting with the FAI classes (*Federation Aéronautique Internationale*).

F1A More usually known as A/2 glider, the model has to conform to area restrictions (wing+tail area must lie between 496–527sq.in.) which usually results in a wingspan of about 80in., and the maximum weight allowed is 14.46oz. (410 grammes). It is flown using a 164ft. (50m) towline.

F1B More usually known as 'Wakefield' since the World Championships are flown for a trophy presented by Lord Wakefield in 1928. The models usually have a wingspan of about 50in. to accommodate the total area (wings plus tail) of 294.5sq.in.; and have a minimum weight of 6.7ozs. (190 grammes) without motor and a maximum of 1.47ozs. (40 grammes) of rubber for motive power.

F1C Power models. A larger and heavier (minimum weight 26.6ozs., 750 grammes) model with a wingspan of about 75in., it is powered (usually) by a 2.5cc engine which, if glowplug, has to run on standard fuel with no additives. The usual engine is a Rossi which is very powerful (about 0.7bhp at 26,000rpm). Engine run during flight must not exceed 7 seconds (until recently 10 secs.).

F1D Microfilm covered indoor models. Maximum wingspan 25in. (65cm) and minimum weight 1 gramme, these models are very delicate and have to be handled with great care at all times!

A comparison of the typical times obtainable from these models (good examples thereof) is interesting.

F1A – 2½–2½ min. from towline height.

F1B – 3–4½ min. depending on how good the rubber is!

F1C – 3½–4 min. from a 7 sec. engine run.

F1D – 30–35 min. in a large airship shed like Cardington.

The other (outdoor) classes where specifications exist are:

Motorcogler – a class popular in Germany with a 1cc engine powering an A/2 size and weight model. 15 sec. engine run. Not yet flown in Great Britain but there is no real reason why not.

A/1 Glider – A smaller version of the A/2, the model must weigh a minimum of 220 grammes and have a total wing and tail area of 279sq.in. It is flown from a 164ft. line to a 2 min. maximum.

½A Power Engine size not to exceed 0.8cc (usually a Cox TD 049 or 051 is used) – these models are more forgiving than their larger brethren and they also bounce much better! Flown to a 2 min. max. with a 7 sec. engine run.

Coupe d'Hiver – A small rubber powered model pioneered by the French (translated as 'Winter Cup') it has 10 grammes of rubber and must weigh at least 80 grammes (FAI rules) or 100 grammes (French rules). Until this year, the models had to weigh 100 grammes so there are many 100 gramme examples still about. Flown to a 2 min. max.

These last three are called the 'Mini' classes. Typical performance figures for good examples are:

½A Power – 2½ min.

A/1 Glider – 1 min. 40 sec.

Coupe d'Hiver – (80g) 1½–2 min. with good rubber.

The other popular classes are 'Open' rubber, glider, and power where no restrictions are placed on weight, power or wing areas (other than the general SMAE rules governing maximum wing loadings and motor size) with the exception that gliders must be towed on 164ft. (50 metres) lines, and engine runs are restricted to 10 secs. All are run to 3 min. maxes. Full details of contest categories and rules are contained within the SMAE rule book – available free of charge to SMAE members – and anyone interested in flying competitively will need to join the Society (others too, but that's another story!)

FREE FLIGHT SUB COMMITTEE MEETINGS

(a) Engine runs

One of the more important items being discussed at these meetings is the question of timing engine runs. It has become increasingly apparent that it will be essential to train timekeepers in the procedure they should adopt in timing engine runs. Unfortunately, the committee has not yet reached agreement on exactly how this should be done – I had hoped for more reaction from readers on this topic, but response has so far been poor. The main proposal is to time until *all audible sound* has gone, and this seems the one with most chance of success, particularly with prop brakes where the cut-off is much cleaner than without.

Other proposals include the use of directional microphones, but the Bulgarians' experience has shown this to be quite impossible in the presence of other engines. No decision has yet been taken, and it is hoped that the two day FAI International will help throw some more light on the problem. Your comments please.

(b) Nationals

The committee is in favour of 'lengthened' Nats with everything on one field (7 days is proposed) or alternatively a split Nationals over 3 days with Radio, Scale, Aerobatics and Pylon on one field and Free Flight, Thermal Soaring and perhaps C/L on a second large airfield. Increasing the time for F/F from 2½ days as at present, to the full 3 days will alleviate the main problem of too many events in too short a time (two 5am starts is somewhat tiring, particularly in indifferent conditions such as we had in 1975).

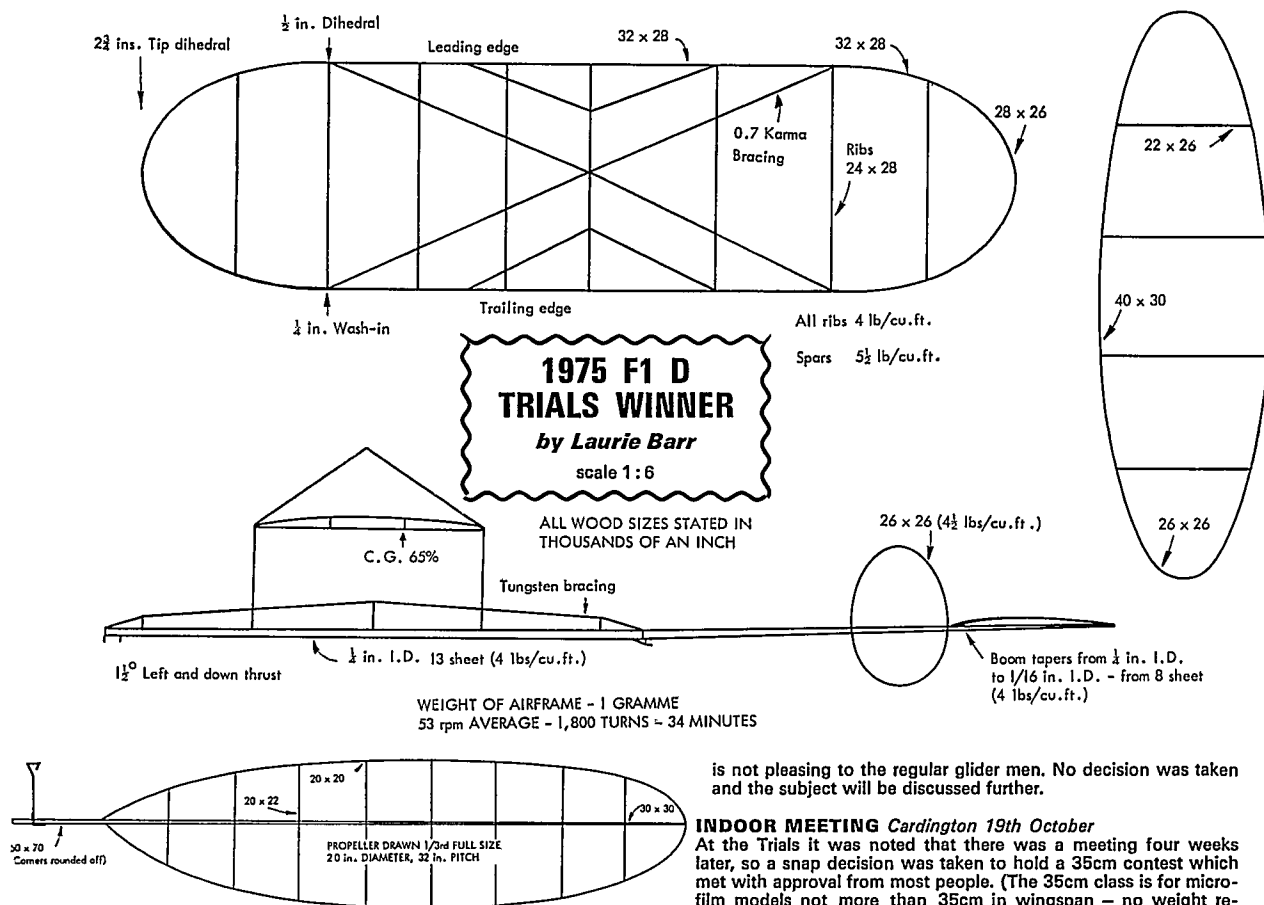
(c) World Championship Trials

The vexed question of timing the Trials has been discussed at length; the main problem being whether to hold the Trials the year before



Left: Roy Collins won FAI Power at Richmond Gala. Below A/2 contender line-up for the fly-off at the same meet.





is not pleasing to the regular glider men. No decision was taken and the subject will be discussed further.

INDOOR MEETING Cardington 19th October

At the Trials it was noted that there was a meeting four weeks later, so a snap decision was taken to hold a 35cm contest which met with approval from most people. (The 35cm class is for micro-film models not more than 35cm in wingspan - no weight restriction). Conditions were rather cold, and damp enough to make EZBs look rather limp as soon as the tissue soaked up some moisture.

Much trimming activity took place with only Laurie Barr and Martin Shepherd among those present having flown 35cm before (Martin holds the British record with 19:40. The major problem found by most was that the model banks over sharply to the left, stalls and then, as often as not, completes one or two victory rolls! Eventually most entered (6 in all) Laurie coming out on top with a best flight of the day of 19:24 and a total of 37:51. I managed second with a best of 18:04 in semi darkness and a total of 35:24. Martin Shepherd was third with 34:49.

I had some trouble with a collapsible motor stick so out came the Zap (a cyanoacrylate adhesive) to fix some strengthening pieces on the fuselage. A bit too much Zap went on, with the result that I ended up with a complete aircraft firmly attached to my left forefinger! I was offered a rusty razor blade (offer declined) and separated the model from my finger with a cleaner razor blade - there is no other method of separating a Zap joint. The 18:04 flight followed shortly afterwards!

Clearly a word of warning is necessary. A cyanoacrylate adhesive will bond only between mating surfaces, and does so in 10 seconds flat. Zap or Hot Stuff runs like water so must be handled very carefully. One has only to pick up the bottle with some glue on the outside and there one is stuck to it. These adhesives should only be administered in very small quantities and the bottle wiped with paper to remove excess adhesive. Do not get any on your hands. You have been warned!

FREE FLIGHT NEWS INTERNATIONAL 25th/26th October RAF Sculthorpe

Saturday 25th October saw an appreciable breeze but 50 yard visibility rendering flying virtually impossible - a situation which persisted until 2pm when the contest started with Wakefield. Power had to wait a while because models were going out of sight upwards at 5 1/2 seconds.

Each group of competitors flew from a given marker pole; these consisted of a set of cones plus two Wellies to make up the numbers! The contest started with Wakefield; there were quite a few maxes

the Champs or early in the same year.

If held the year before, there is ample time to prepare (probably too long to maintain the same drive and enthusiasm which exists before and during the Trials). There is plenty of time to make new models, but there is always the doubt as to whether to fly in a rather average contest (must keep them for the Champs - they take too long to build and sort out). In any case there is a real danger of not being on form at the right time.

If the Trials were held shortly before the Champs, it is quite possible to lose or break all models (particularly in the weather that seems always to prevail at the Trials) and get in the team. There is then little chance of rebuilding/re-trimming in time, particularly in the case of power, before the Champs.

A proposal has been made to attempt to resolve this dilemma. That is for a selection Trials to be held a suitable time before the Champs to select a squad of say six people for each class. It was also proposed (not by myself) that the previous team members be included in the squad, final selection to be made nearer the time depending on how well the squad members are flying. Your views on such a system will be appreciated.

As a footnote, I will add that if there is any topic which you wish to bring to the Society's attention, it is worth communicating with any of the SMAE Free Flight Technical Committee.

(d) World Championships 'post mortem'

Two main items arose here; engine timing and the line-cross rule.

(i) **Engine time** - it was agreed that the standard of timing at the Champs was poor. However it must be pointed out that the conditions were very difficult since it was frequently impossible to hear the engines when the models were high up, due to other engines running at the same time. It is intended that this subject be raised at the next CIAM (the FAI annual meeting to sort out rule changes etc) meeting.

(ii) **Line crosses.** The Committee agreed that the line cross rule is impossible to monitor fairly since the timekeepers have no chance of seeing the line touch anything else; this therefore gives unscrupulous people a chance to have as many reflights (in principle) as they wish. A grossly unsatisfactory state of affairs which

FIGURE I
Kowalski
6% Section

Chord %	0	10	20	30	40	50	60	70	80	90	100
Ordinate %	0	3.32	4.37	5.65	6.05	6.05	6.05	5.65	4.57	3.32	0

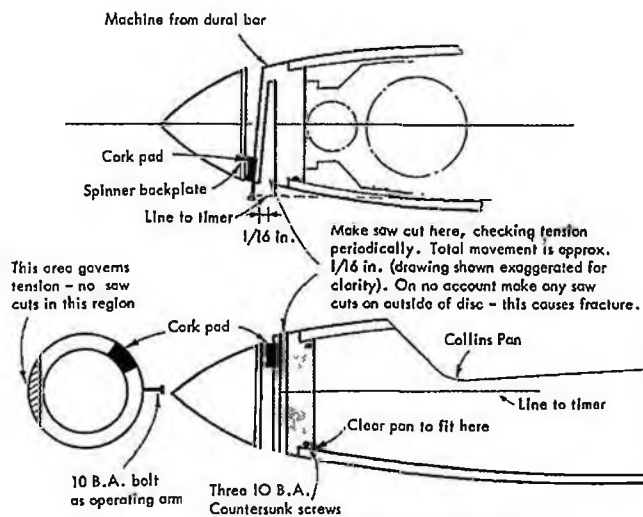


FIGURE 2 - Jack Allen's engine brake

in the first two rounds; Geoff Lafever was very unlucky to drop 7 secs. in the first round and 4 secs. in the second. Visibility was troublesome all day; quite a few flights went OOS even with binoculars at 2-2½ mins.; this applied to Wakefield and glider. All appeared to depend on where the models went relative to the mark.

In power, with only 13 entries, most maxed (off 7 sec. engine run - to 1976 rules). My luck was a bit thin and I retired very early on.

On the Sunday, the visibility was somewhat better but still poor. The first round saw conditions much as Saturday's - not too difficult for Wakefield and glider. The technique adopted with the bubbles was to have the bubble machine 50 yards or so upwind; at this distance the bubbles were not easy to see, so that the flyers walked forwards towards the machine, then when the bubbles indicated good air, the flyers walked back with the marker bubbles to the poles and then launched.

The second and third rounds in power saw most people fall by the wayside due to indifferent times or poor engine runs, or simply insufficient performance. There were some downdraughts, but not really big; the 7 sec. engine run places a premium on a high performance model, properly trimmed, to have any reserve for the required 3 minutes.

In the fourth power round, Ken Faux had the crankshaft shear at the induction port just before launching; since time was short for the end of the first 20 min. period in which one attempt had to be made, he assembled another model quickly, and on John O'Donnell's wise suggestion, made a non scoring attempt by doing a hand launch with the engine off, just before the hooter went. Ken then had 20 minutes to make his second attempt which maxed successfully.

The next Wakefield round saw Steve Marriott wind up a motor which had so much tension on that he had to call for assistance to hook the prop on (a 3 man job!). The model's subsequent climb with the extra torque was spectacular in a thermal marked by a sea-gull which took a long time to decide whether it was in lift or not and then decided against it!

Flyoff time brought forward two in power, three in Wakefield and eight in A/2. The power flyoff saw both Ray Monks and Stafford Screen, a relative newcomer to the free flight scene, do short engine runs of 5½-6 secs. Ray had the better climb and air to win with a 4 min. max. (progressive flyoff to 4 min., 5 min. etc., all off 7 sec. run - 1976 rules) whereas Stafford managed 3:05.

Wakefield followed next - Ron Pollard and Pete Williams flew close together with Ron higher all the way. Joe Barnes followed shortly afterwards with a better climb and a left turning glide causing a few raised eyebrows. It was found afterwards that the auto-rudder had failed to operate because of a small adjustment made after the last flight, although the failure didn't stop Joe from winning with a nice 3:28.

Glider saw little evidence of real lift; none of the models climbing to any extent but the top three remained at towline height for a long way, Tony Cordes emerging a clear winner with a 4 min. max.

The prizegiving was well worth the effort of competing thanks to the generosity of several people many free flight goodies such as timers, Ronytubes, props etc. were given as prizes. Among the more unusual prizes selected were Ken Faux choosing the Ronytube - A/2 will be Ken's next class (?). Ron Pollard chose the Fokker D VIII scale kit, and Brian Spooner the engine pan.

Elton Drew and Reg Latimer were doing brisk business with their Maxaid towhooks; along with the towhooks, they sell nylon coated steel lines at 30p for four metres. This line is ideal for autorudder and VIT systems since its length will vary very little with temperature and humidity which is always a problem with monofilament nylon in particular, since it can either tighten up or go slack on you without any warning which can be disastrous on a contest flight. Definitely recommended. Incidentally, they also do a good line in plastic sealable bags 3in. square - ideal for keeping indoor motors in.

INDOOR TRIALS TECHNICALITIES

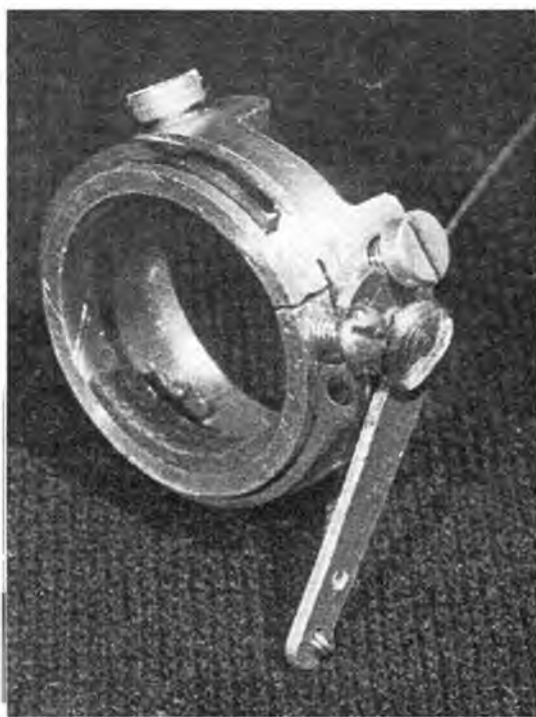
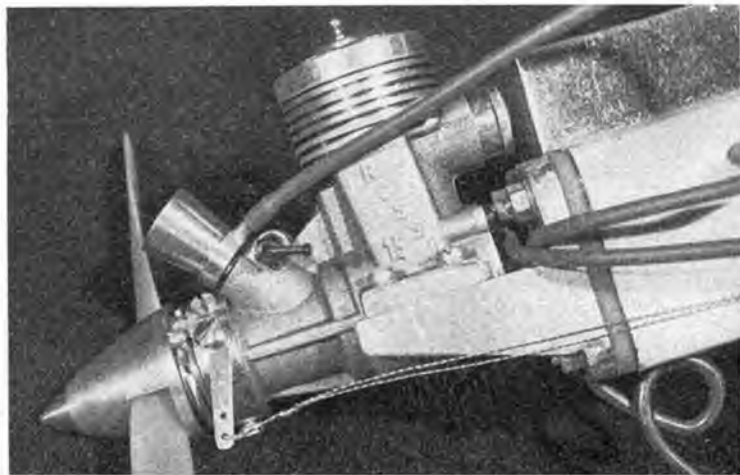
The accompanying drawing shows Laurie Barr's winning model. Laurie used two sets of wings during the weekend - on the Saturday he used a conventional 4% camber section with the high point at 40% chord; on Sunday he used the 6% double ended Kowalski section. These sections have the principal characteristics that the 4% climbs faster at the beginning and it is therefore easier to reach the roof, whereas the thicker Kowalski section has a slower climb but requires less torque from the rubber, to maintain a constant altitude - this is called the 'cruise torque'. Laurie said afterwards that he would have done better to use the Kowalski on the Saturday since the conditions were better and it was easier to reach the roof. On the Sunday, the conditions made it that much more difficult to get the altitude necessary for a really long flight.

I needed about 32 mins. on the last flight to make the team - not impossible but I made a bad error in choosing a motor that was about 10% too thin - result a poor flight of 23 mins. Yes, it is indeed that critical! The technique is to use a thicker and longer motor and forget about the first vicious burst; make the model climb as slowly as possible and still reach the roof. With a thin motor the power dies away too quickly and the model falls out of the sky.

To prove this I put in a thicker motor, wound up with not very many turns (about 1600) and did 31½ min. - after the contest, needless to say. Point made!

The Kowalski 6% section has ordinates as given in Figure 1.

Dick Johnson's engine brake, which is based on the Kerr system, shown both installed on the engine and separately - see text for details.





Pom-pom hatted Croydon members Don Thomson and Ray Elliot with Ray's large finned Wakefield, with swept back leading edge to wing tips, seen at FFn International.



Also at the Free Flight News International - Dave Greaves of Birmingham winds his triple-finned Wakefield, held by club colleague Pete Harris.



Stafford Screen, back in contest flying after 20 year break, celebrated the anniversary of his return with second place in Hans Seelg Trophy, using modified Veterano and Monks brake.

NORTHERN FAI RALLY 19th October Elvington (report by John Godden)

The weather was dry and bright all day with a light wind; however thermal activity, particularly until lunchtime was low. This made conditions easy for power (flown to a 10 sec. engine run despite the SMAE decision to change to 7 sec. immediately after the WJChamps) but difficult for Wakefield and Glider. Power had nine entries, Stafford Screen winning with a full house flying his *Veterano* and very well too. Ray Monks dropped 17 secs. on one flight (00S low down). Third went to a G15 although this motor has had its day with the introduction of the 7 sec. engine run.

Glider and Wakefield fared badly with the lack of definable lift present; only Tony Cordes managing 21:00 in A/2. All other glider flyers dropped at least two flights (mostly in the last two rounds). There were only two maxes in glider in the 6th round out of 20 flights and four out of 19 in the 7th.

John O'Donnell won Wakefield with only two maxes out of 18:39; Joe Barnes did four for 2nd and Ron Pollard two for 3rd place.

PROP BRAKES

Quite a few of these were to be seen at Sculthorpe, the Tom Kerr type (K&W) featured in my last article being the most popular. It gives a fairly positive cut off and is easy to fit. Ray Monks has a neat version wound from glass rovings inside a cylinder, it fits snugly inside the engine pan.

Jack Allen has kindly sent me details of a different type of brake, instead of gripping the prop drive radially, it pushes forwards onto the rear of the prop driver (see Figure 2).

The brake is machined as an annulus to fit into the front of the engine pan; then the annulus is cut through with a hacksaw leaving the shaded portion intact. The width of the saw cut allows the front portion to be pulled back clear of the prop driver; the saw cut is continued until the tension required to actuate the brake is a suitable value (around 8oz.) to be actuated by the timer. This brake has an advantage in that it is not fitted to the engine but to the pan, allowing quick and easy engine changes to be made if necessary. Fitting to the pan is done by three 10BA countersunk screws - a very tidy system.

Dick Johnson has also very kindly given me details of his prop brake, based on the Tom Kerr system. To quote Dick: "The brake is based on the nylon one now available. The only novel feature of the construction is the use of a 1/4 in. external circlip for springy pressure. However, it must be ground down slightly to reduce its strength. One eye may be removed for appearance, the other being used as a stop for the 'brake off' position."

"Several friction materials have been tried; the most successful is a rubber and cork gasket material. Incidentally, do not use five minute epoxy to fit the lining to the brake since it is attacked by fuel, so use the slow curing epoxy."

A few further notes may be beneficial. The front portion of the brake is cut just more than halfway round to separate the semi-circular ring holding the lining (see photo). The rear portion of the brake has a slightly larger diameter than the front portion to locate the brake squarely on the engine front ballrace housing. Two bolts key the brake to the engine ballrace housing. The circlip sits in a shallow groove in the brake to locate securely. Again a very neat system.

Results

Indoor Meeting

35cm microfilm (6 entries): 1. L. G. Barr 19:24+18:27=37:51; 2. R. Bailey 17:20+18:04=35:24; 3. M. Shepherd 17:45+17:04=34:49.

F/F News International

F1A: 1. A. Cordes M+240; 2. J. Cooper M+194; 3. B. Spooner M+180. F1B: 1. J. Barnes M+208; 2. R. Pollard M+161; 3. P. Williams M+107. F1C: 1. R. Monks M+240; 2. S. Screen M+185; 3. P. Bond 717.

Northern Area FAI Rally

Measham Trophy (F1A): 1. A. Cordes (Leeds) 21:00; 2. D. Hambley (York) 19:58; 3. G. Abbott (York) 19:33. E. Muxlow 'Wakefield' Trophy (F1B): 1. J. O'Donnell (Whitefield) 18:39; 2. J. Barnes (Liverpool) 18:21; 3. R. Pollard (Tynemouth) 16:51.

Jan van Rij, over from the Netherlands for the FFn International, used self-winding rig for his Wakefield, featuring Hoerner tips, auto rudder and a very short nose.



CLUB NEWS

READING OF YOUTHFUL model beginners looking to multi engine radio models for a first project, and then thinking of how few such projects reach any sort of finality, I wonder how we can impress on the young enthusiast the satisfactions and rewards to be attained at a less ambitious level. He should, perhaps, consider how few local open spaces are available for power flying, whereas the small, light model is much less restricted. One way we can get him to see things in a sensible perspective is by enlisting him as a club member.

Plenty of juniors, no doubt, abounding in the club from whence comes our first report, the Impington Village College MAC PRO, Derek Mayne, informs us that the club took part in a two day exhibition organised by the recently formed *Federation of Cambridge Model and Allied Clubs*. The exhibition, which was a great success, not only put the eight clubs of the Federation firmly on the map, but also boosted the Impington funds, much to the Treasurer's delight. Mr Mayne stresses that such local club groupings are effective in dealing with various authorities, carrying greater weight and importance than the single club voice. At the show the club featured in rtp flying and a static display, but the real show stopper was indoor free flight. The public find this form of near motionless flight most intriguing – something of a counterpoint to the speed and fury so often exhibited. President of the club – and its founder some 30 years ago – is that very individualistic designer, Ray Malmstrom. He is famous for his fly-for-fun models, so perhaps it is not so surprising that it has taken him three decades to achieve his first comp win, in f/f rubber. His reward: a silver cup, well deserved. The club meets every Friday at the College. Visitors welcome.

Whether you agree or not that model flying is a sport, there is no uncertainty of definition where the Leatherhead MFC is concerned. Mr Stuart V. Tucker, the Hon Sec & Treasurer, has sent along, together with a report, two photo copies of certificates awarded to the club for services to Sport by the Leatherhead Sports Council. One certificate is to that well known chuck glider expert, Tony Slater, and mentions his tailless glider win at the Nationals and the numerous 'chuck' events he has won or placed in during the year. On the other certificate, to the club itself, there is reference to the two first prizes won at the BAC's Sports Day by Junior member, Peter Bullard, with his Graupner *Amigo* power assisted glider. At the same event Mr Tucker, himself, gained a useful second prize for his cluster of five 1/72nd scale plastic models. Generally the club, throughout the year, has kept the model flag flying in various displays and exhibitions alongside more sporty sports such as angling, cycling and karate.

According to a letter in *Seadog*, newsheet of the South Eastern Area, the idea of using radio models for army target practice is no new thing. A projectile, fitted with radio, scattered a bevy of top brass when it went out of control on Salisbury Plain in 1918. That piece of early R/C was designed by a top boffin with a picked team, but now there is a wealth of commercial 'target' material available, and it is nice to feel that the radio model is a target itself as a change from using me as one. Switching

to another popular target, our flying fields, still no decision has been reached on the future use of Ashdown Forest, but meantime it's business as usual for the Area F/F events on the prickly old patch. Yes, and haven't we had some marvellous autumn weather to round off a season memorable for its many flyable days. The 5th Area meeting in September was no exception, with high times recorded in the light southerly wind. John West topped the National list in the Keil Open Power Trophy. The plan featured in the newsletter is of a Coupe D'Hiver model – much in fashion just now. Fairly conventional except for a whacking 5 degrees right thrust to compensate a left glide turn.

Coupe D'Hiver's also come in for a mention in Anglia MFC's *High Flyin*. Instead of flying off the Ajax Trophy with its little rubber namesakes, the one off model this year was Ray Paveley's elegant and successful Coupe design. The idea was to leave entrants with a model that would have other contest uses. Holidays, and the absence of Bob Wells at Sculthorpe, kept the entry down to a still not inconsiderable six. Weather was sunny, but with a stiffish breeze. Winner was Len Ranson. All these Coupe's knocking around suggests quite a fair club f/f interest. And proof of that were the two glider teams fielded at Bassingbourn during the summer: eight flyers in all. Scores in this event were used for deciding the Club Glider Champion. Top man was George Read. Question raised on the radio side of things: do you find fun flying boring, and need the stimulus of competition to sustain your interest? Opinion of the contributor in the newsletter is that fun flying is okay for trying out new ideas or perfecting aerobatic schedules, but repetition without objective can pall.

'Supershow' is the way the Concorde MAC described its exhibition and display at Moreton-in-Marsh. A muster of 27 various models filled the special marquee, with Chris Weston's 8lb. hovercraft as centrepiece. Unfortunately, like many a wayward modeller, it suffered skirt trouble, and was only briefly operational. Pete and Marcus Reeves activated the static display by building 'live' during the show. They brought along a fetching cluster of glider and rubber models, but the creative work was done on a half finished C/L *Spitfire*. And it was a *Spitfire* that featured in the C/L display, along with a *Spectre*, *Zero* and a *Bearcat*. By dint of a superhuman effort these were piloted four in a circle, much to the delight of the crowd and the amazement of the flyers, who'd never had four models up at one time before.

After coming from a depressing meeting where astronomical club fees were proposed to meet those costs which outsoar our hard pressed models, I was heartened and amazed by the exceptionally low fees asked by the Leicester MAC at its recent AGM. Considering the facilities offered, the top suggestion of £3 per annum for Seniors strikes me as surprisingly good value by any standards. One of the club amenities which obviously attracts many of the 141 members is the use of Wymeswold, and there is speculation in the club editorial about the possible effect on membership of losing this valuable site. Certainly you cannot blame people for opting for the clubs with today's scarcest resource: a good flying field. And on a good flying field you can, of course, put on a wide range of competitions, that is, if you also have a large and active membership. I see from results published that the club ran a free flight scale event – quite a feat – and also a Ladies' event – again quite a feat. Then in the wider contest field, the club glider team did some impressive flying to finish second in the SMAE Model Engineer Cup.

After all the mechanics of automatic systems that have been beguiling readers of *Free Flight News*, there seems something of a swing back to aeronautics in the October issue. One of the included plans, David Greave's Wake,

features a triple fin layout. He says that it gives a nice tight turn without that unforgiving right spiral. Pluralistic tail finning is no new idea, though. It was a common feature on American pre-war models, and sub fins were popular with Wakefield flyers in the fifties. Back to the mechanics. Circular tow units for gliders, difficult for anyone but the skilled home engineer to fashion, are now available through the Trade. Personally, I'm agin' all such commercial components, as they penalise the poorer modeller, apart from giving the hobby as hostage to commercial interests.

'The best laid schemes of mice and men' etc, was certainly applicable for members of the Wharfedale Club when they flew at the Woodford '75 C/L meeting. In spite of all the meticulous preparations the gremlins were at their most impish – models blowing over, backplates stripping, bellcranks going cranky, and even a tail falling off in mid-flight. Compensating this rash of calamities, the weather was kinder than the usual Woodford offering, and the club got its share of prizes.

Gremlins are not the only things to harass the model flyer – you can also be dogged by bad luck, like the junior who features in Sittingbourne & DMAC's *Bourne Flier*. He was being driven to the flying field by his mother when she had to brake suddenly. The quick pull up caused the family dog to fall off his seat and on to the lad's control line model, smashing it. Well, these things oc-cur.

No anxious eyes on the weather gauge if, like members of the Worcester MAC, you are turning for inspiration to the Great Indoors. According to their *Flysheet* newsletter, sent along with thanks for previous club coverage, by PRO Ian Nicholls, a demo in the indoor art is being given at a local school by veteran expert Reg Parham. Seems you do not need a high ceiling for long flights. Times of up to five minutes can be achieved under a 12ft. ceiling with first models to be found in the APS range, such as *Pennywise*, *Little Willy* and *Puck*.

In the Sussex RFC newsletter, *Flypaper*, there is an account of derring-do by glider maestros Ricky Shaw and Chris Foss. They took a marathon, neck-cracking trek across the South Downs in an effort to beat the club cross country gliding record. It was a fine Sunday afternoon, with a strong nor' easter blowing, and they toiled up hill and down dale for hour after long hour to cover a record eight miles – all the time with that model uppa uppa loft. They traversed more barbed wire entanglement than was found to be on the Western Front, but happily did not set up an all comers Ladies' record.

Somehow or other a report sent in by the Beaufort MFC, early in the year, did not reach me, so I can assure Mr G. F. Redman, the Secretary, that the omission from these columns was in no way intentional. As you will no doubt gather from the name, the Beaufort club

Contest Calendar

11th January

NW AREA INDOOR MEET. 'Eaves Silver Trophy' events: EZB, HLG, Keyhole Scale. Juniors up to age 15, over 12 must be builder of model. Soft footwear essential. Venue YMCA Gym, Hoghton St. Southport. Details from P. Branigan (Formby 74133).

7-8th February

NW AREA INDOOR MEET. Saturday, Micro-film. Sunday, 'Eaves Silver Trophy' events as above. Venue: Wigan Technical College Sports Hall, New Market Street, 25ft. ceiling. Soft footwear essential. Details J. O'Donnell (061) 427-3711.

7th March

NW AREA INDOOR MEET. Venue to be announced. Events as for January meeting.

is Bristol based. It has a clubroom in Chipping Sodbury, and three good private sites, one of which – mouth watering to me – is particularly suited to free flight. Interests cover the whole model aircraft spectrum, and a full social programme is laid on as well as flying displays at fetes etc, during the summer. Open to new members. Contact Mr Redman at 31 Westcourt Drive, Oldland Common, Nr Bristol, or ring him at Bilton 2515.

It is perhaps appropriate that we get a model report from Hereward the Wake's old hideout, Ely in Cambridgeshire. Mr Brian T. Knott is Secretary of the Fenland MAC, and he sends along a bunch of local press clippings which give a good idea of what goes on in the club, and the industry of the members – some quite youthful. Main interest would appear to be control line, and even the large, four engine *Viscount*, which outspans one particular snap, looks as if it had wires attached. Contrary to the press reports the boys do not put their models away for the winter, but do have a programme of film shows, quizzes etc, to pass away the long dark evenings.

A report from Tony Rogers, PRO, of the Western Area, reminds us that Elton Drew, of World Champ Glider fame, is still in winning form. He topped the Area Championship in FAI, with Tony Rogers in second place. Brian Silcocks of South Bristol won Open Power and Ray Inker the Open Glider cup. Open Rubber went to J. Gunn and Tony Comfort took the Chuck Glider Trophy. Tony also gives us a bit of Swindon news. For instance, that Jan Korda, the owner of the Swindon Model Centre, gave a Club 20 kit to the winner of the Radio pylon race held at Wroughton. Lucky recipient was Dudley Pattison, of Swindon, with an average speed of 60.2 mph. Lots more on the 'honours' list but space is getting scarce.

Sorry for any omissions and curtailments from a rather large mailbag.

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GYRATION

continued from page 15

know that it leaves more than enough to fly the model, and more importantly in this noise-conscious age, reduces the Fox's rather raucous bark to almost a gentle purr.

Finishing is left to the individual builder; the original was sanded, given two coats of full-strength clear dope followed by a further sanding and then covered with heavyweight *Modelspan* attached with 50/50 clear dope/thinners. A further coat of full-strength clear dope was followed by Olive Green cellulose. The rotor is black with yellow tips and the windscreen and cabin windows are painted on in black, US Army Star and Bar markings complete the decor. Fuel-proofer is matt polyurethane. Ready to go, but without fuel, *Gyratation* weighs in at 36ozs. and the CG came out exactly as per plan without the aid of ballast.

Fly on 50ft. lightweight *Laystrate* lines with the throttle handle of your choice; I prefer to use the two handled system I first saw being used by Mick Reeves at Old Warden this year. Mine is made up using a standard DC control-line handle, drilled and tapped 4BA. A cycle three-speed cable is attached with a 4BA bolt through a simple clip which holds the cable outer to a handle adjustment. The other end of the cable is attached to a handle made up from a length of broomstick and a squared-off U-shaped strip of 1/4in. mild steel. A length of alloy tube running on two slide-bars, ex bicycle mudguard stays, has the inner cable wrapped round and clamped with a solderless nipple, a relic of my motorcycling days. One advantage

of growing old is that one has more years' accumulation of useful junk, a point *Pylonius* will appreciate I'm sure! The two-handled system allows one to concentrate on the actual flying with the right hand, a simple squeezing action with the left hand works the throttle.

Gyratation will fly in almost any wind strength within reason, it was one of the few control-liners to brave the blustery conditions at Old Warden on the *AeroModeller Scale Day* this year, but is at its best in light to moderate winds which help to maintain line tension when hovering in the downwind half of the circle. In flat calm conditions the model will hover, but all three lines then sag like overhead power cables on a hot day, and one must be ready for a quick step back to get line tension and the throttle open. One of my favourite tricks is to throttle back and apply up elevator until the model is actually hanging on its prop, it will then sink gently onto the elevator where it can be held in a sort of sit-up-and-beg attitude (I have yet to find an assistant to balance a ball on the spinner at this stage, but I'm working on it – and if you will believe that you will believe anything). On opening the throttle it will lift slowly off vertically and once clear of the ground a quick stab of down elevator will bring the tail up to resume normal level flight. With a suitable surface to operate from, *Gyratation* can be brought in to land on a closed throttle in a very steep helicopter-like descent with very little ground roll, held at rest, and provided the throttle is opened while the rotor is still spinning, will take off again with only a short forward run, a manoeuvre which has never failed to bring a spontaneous round of applause from spectators. *Gyratation* in short is a great fun model – just the thing for any jaded control-line man who feels that he has done it all, it is also quite economical to build – what more could one ask?

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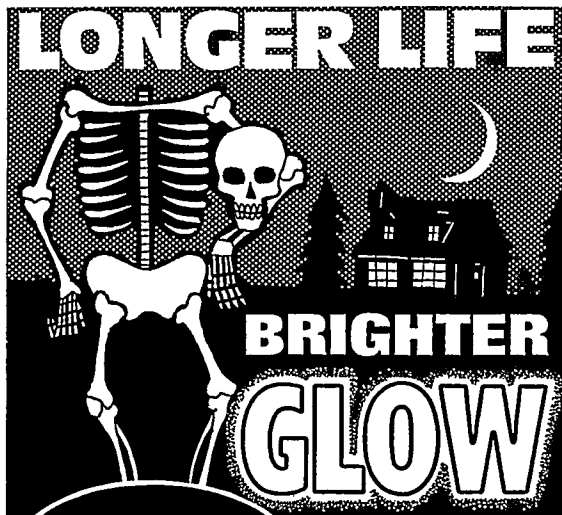
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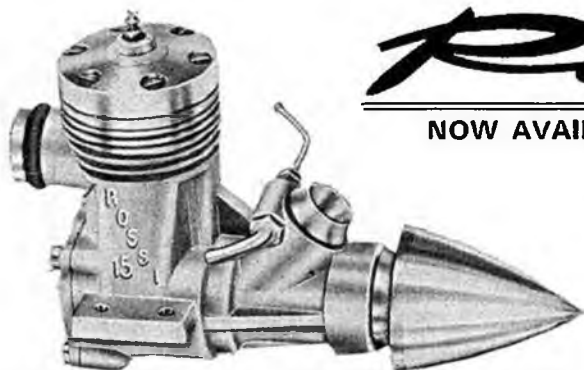
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