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HOBBY  
MAGAZINE

# Aero Modeller

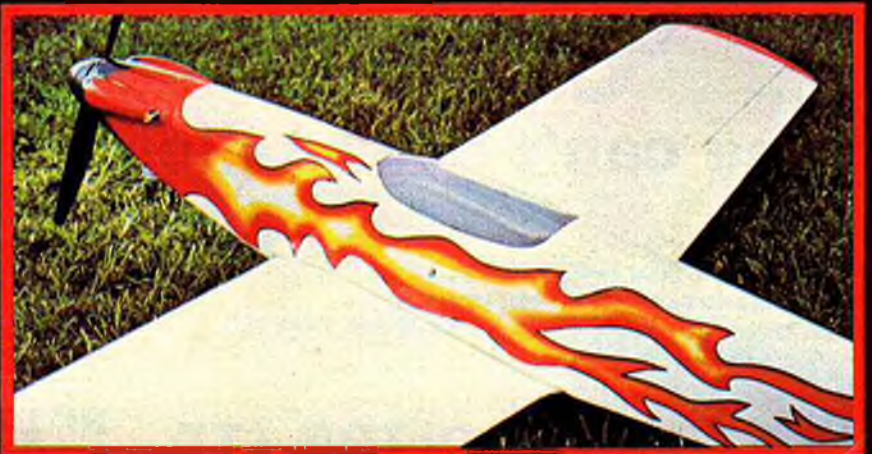
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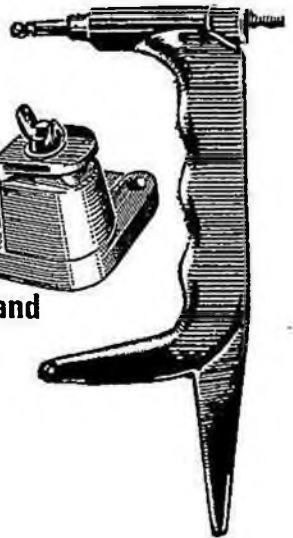


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It's also a sport where Balsa plays a vital part. (Who ever heard of a good chuck glider being built from anything but Balsa? Even a paper aeroplane or paper dart flies better if made in Balsa!) Meticulous balsa selection to keep the weight of a 20-22in. span model down to about three-quarters of an ounce. And have the fuselage strong enough.

Plenty of scope for trying different shapes, too, with Balsa. Like trying higher aspect ratios . . . curved sweepback on the leading edge . . . even straight dihedral against polyhedral. Also modifying aerofoil sections by cut-and-try—or just copy a Wittman section with its upswept forward undersurface and maximum thickness well forward. Then try to improve on it!

If you can beat 60 seconds indoors consistently you are doing very well indeed (and you can also count yourself as being pretty fit!). But the target duration to put you right at the top is half as high again—1 min 30 secs. Every one of those extra seconds is hard to achieve, but wonderful when it happens. Ron Wittman himself—who set a 1:30 world record in 1974—found that adding washout to the wing tips put two or three seconds on to his flight times.

What you can rely on where performance counts, though, is Solarbo Balsa. It's the starting point for every good flying model—and especially chuck gliders!



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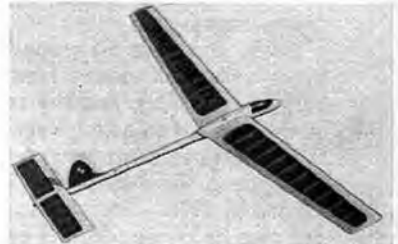
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# Aero Modeller

INCORPORATING  
**MODEL AIRCRAFT**

**July 1978**

Volume XLIII No. 510

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## Comment

Model flyers are a conservative lot, they learn the hard way by trial and error. New ideas are often slow to catch on. It is many years since CO<sub>2</sub> motors first appeared. Now at last their popularity is growing as the innovative modeller flies them both indoors and out. Already well established for small flying scale models, they have recently achieved remarkable durations indoors. Larger plastic props and 4 minute motor runs from standard equipment have produced flights over 6 minutes. Outdoors too, they are currently being used in events such as the CO<sub>2</sub> Scramble at the Nationals. This form of power supply lends itself admirably to the Scramble concept where the competitor is expected to accumulate the greatest duration possible within a half-hour period. Flights of less than 30 seconds do not count. Winning scores amount to over 10 minutes airborne time. With other ideas for twin engine, even twin cylinder and larger fuel capacity and thoughts of more performance from balsa propellers, it will be interesting to watch developments. If you are working on any interesting projects you might like to write and tell us.

## on the cover

Super custom paint jobs from Ian Peacock. Top, mural sprayed through cartridge paper masks. Middle, APS Dominator uses lace as stencil framed within pinstriped silhouette. Bottom, dramatic styling with freehand flame out. More Custom ideas inside.

## next month

Bumper issue. **TWO FREE PLANS.** John O'Donnell's P-30 class Rubber Model and Dave Scott's '77 Nationals winning 1/4A combat model **PLUS** '78 Nationals Report with 'How to spray paint scale finishes' and 'Why Do Models Fly' some theories on model aeronautics together with regular features, news and views. What an issue! Get yours July 21st.

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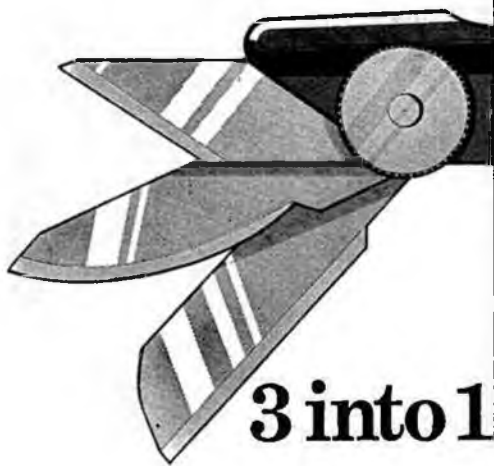
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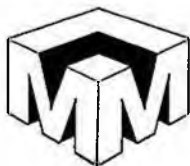
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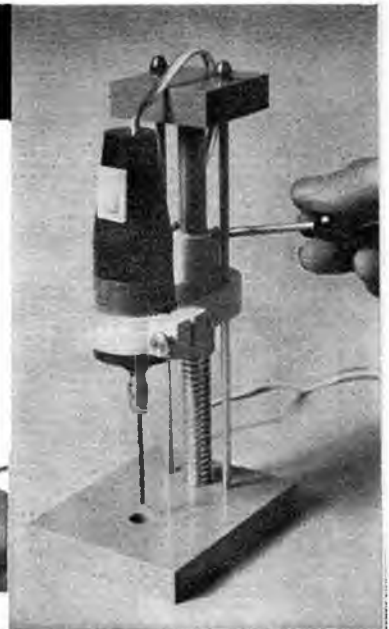
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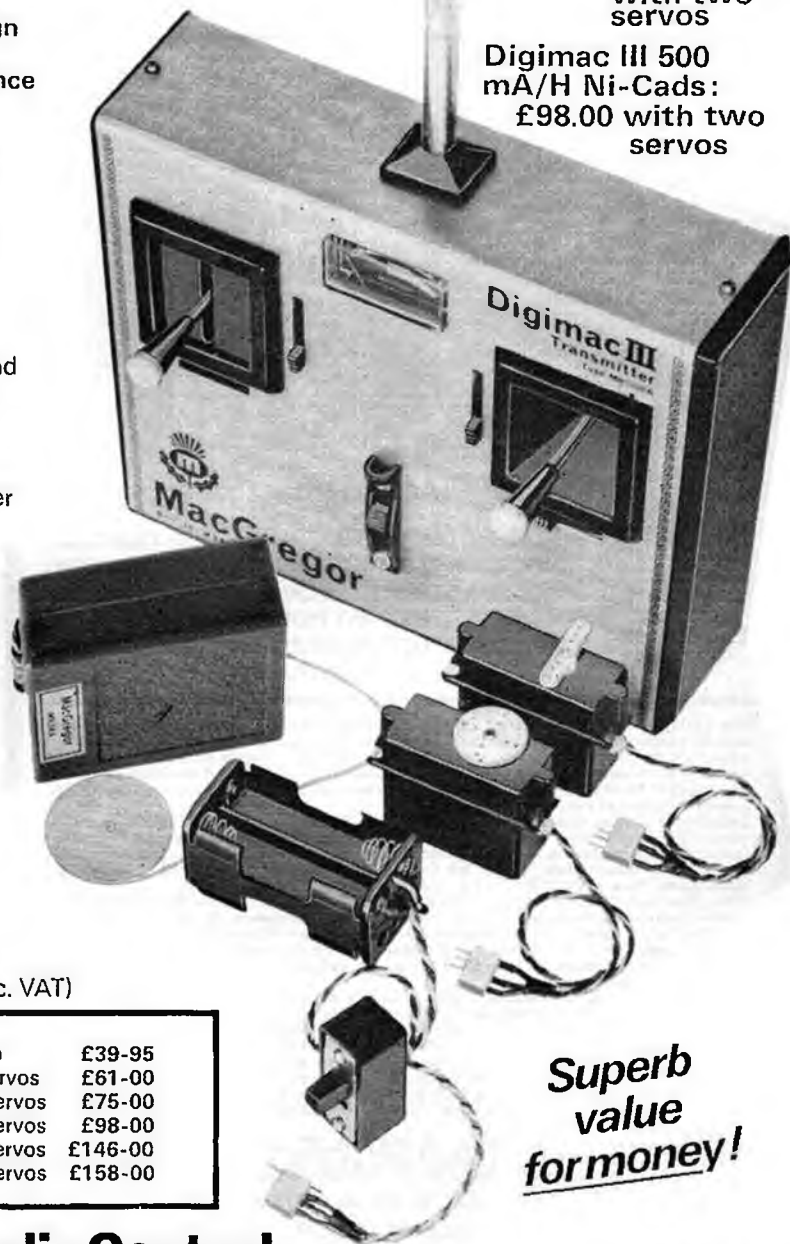
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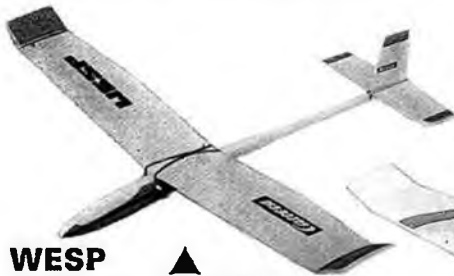
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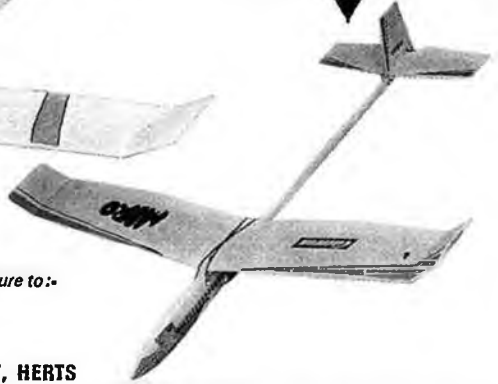
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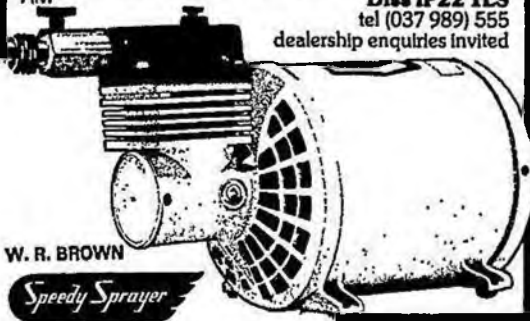
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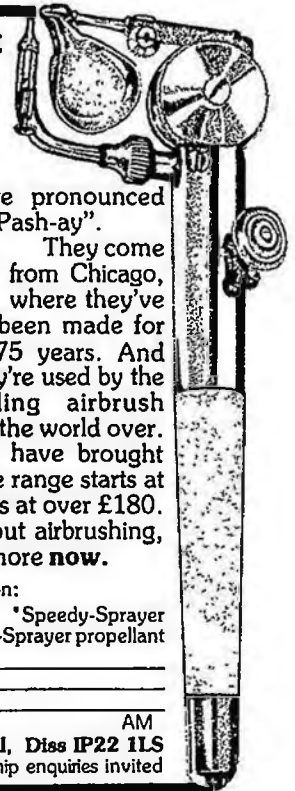
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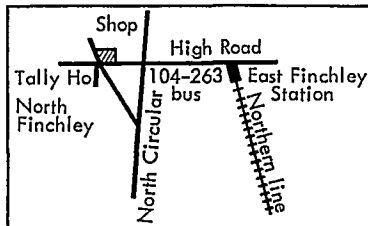
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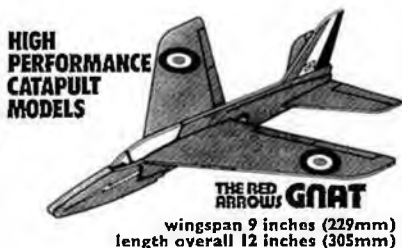
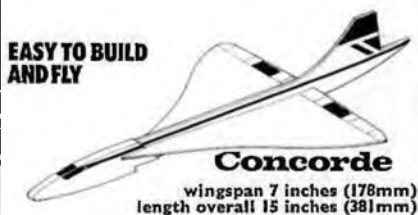
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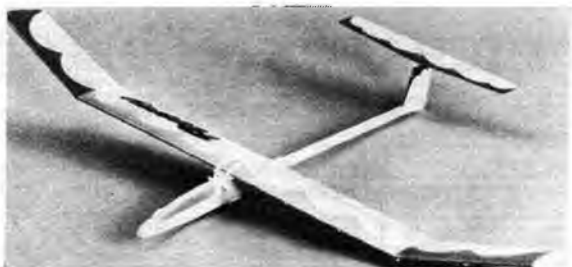
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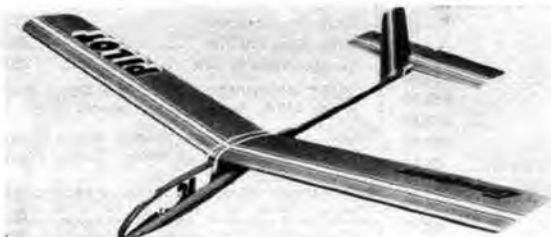


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## AI CONTEST!

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## A2 CONTEST!

KATY is one of Graupner's best high-performance designs with built-up tissue covered wing and tail; all-balsa fuselage with pre-shaped nose section and misc moulded plastic parts. Ribs, etc. are die-cut. Span 67in. KATY features an auto-rudder and dethermaliser. Price £20.98

## A2 CONTEST!

Although an older design, the performance of Graupner's AMIGO II is hard to beat. That's why it stays a top favourite (and also easily adapts to radio control). Span 79in. Area 693sq.in. Kit includes die-cut sheets, milled and slotted strip, shaped wire parts, etc. Price £22.50





## Heard at the HANGAR DOORS

**BRITISH NATS 1978** proved to be an epic three day, two aerodrome meeting. Cloudless skies, a soft breeze and blistering sunshine made the best yet in terms of weather and location. Paradoxically, the secular interests of control-line, radio control and free flight reduced the spectacle to a series of mini-rallies – of which free flight was easily the greatest supported. It was essentially a participant Nats, where involvement inevitably tied the modeller to his particular scene. A mobile spectator could have seen a nine-ring control line area, moved on to a runway swept by three overflying radio control events at Barkston Heath then taking a ten minute drive to Cranwell, where the upwind perimeter was lined by thermal soarers and free flight. The broad spread gave competitors more room than ever before: but the old Nats atmosphere lingered only in the enormous camp site where caravans now rival frame tents for popularity – such are the trends of today. Surprisingly, the entries showed a downward trend, although the winning standards were exceptionally high. A full report will appear next month to give details of new records and individual achievements. For the time being, our congratulations go to the event organisers for a job well done, and to the SMAE Council for excellent overall planning. The twin field venue is now thoroughly proved to be the best approach to the 'split' Nats. All that needs to be done is to announce the 1979 venues and dates as soon as possible, and if it is to be a return to hospitable Lincolnshire, then we're sure it will be a popular choice.

**WOODVALE '78 LATEST:** Entries are said to be pouring in for the World Championships at Woodvale and by all accounts, this combined Control Line plus Scale meeting is going to attract an enormous number of enthusiasts from overseas. Two very important innovations are the supporting Class II scale event for which a very valuable new trophy has been announced – donated by Castrol Ltd. It is very fitting that Castrol should be so generous in what is actually the Golden Jubilee year of the famous Wakefield Trophy, which came from their original founder, Lord Wakefield in 1928. Design of



Bob Peck and his wife Sandy (to the left of our photo) were guests of honour at the recent 2FSA meeting held at David Deadman's home where many notables in the free flight scale world gathered. Ken McDonough is readying his magnificent Douglas O-38 rubber scale (APS Plan FSR 1123 £1.55 incl. postage) before Bob's film show (see 'Scale Matters').

this new trophy and also for a new trophy for the World Championships in Control Line Combat is to be the responsibility of the Sculpture School at the Department of Fine Art, Liverpool Polytechnic. A competition has already been launched for the two designs and it is expected that the wealth of talent for which the Northwest is famed, will produce a really outstanding pair of trophies. This is yet another example of enterprise on the part of the organising committee of Woodvale '78.

**FF SCALE Class II** open international at the Woodvale World Championships will run from 17:00 hrs on 5th and 6th August. *AeroModeller* will be presenting a special Trophy and entries should be received by 30th June, fee £5. For further information and a copy of the rules contact Mike Duce, 20 Granville Road, Southport PR8 2HJ, Merseyside.

**SCALEDOWN '78**, after 2 years of planning, has taken off with promise of a spectacular 4-day festival at the Rotherham Arts Centre from 29th September to 1st October. Exhibits range from model aircraft to military figures. Many classes are open for entry. Individuals, groups and loan events are listed in the forms available through J. Turner, Arts Centre, Rotherham, S65 1JH. Scaledown '78 brings a great opportunity to all modellers in S. Yorkshire, Notts. and Derbyshire to show what they can do, and with facilities for demonstrating R/C boats and aircraft, it should provide a great stimulus for all modelling activities. Take note all clubs in

the district – *take part.*

**VINTAGE DAY**, at Old Warden, will not be held on Tuesday, 29th August. Don't worry though, the incorrect date printed last month should have read Sunday, 20th August, when Vintage fans will all head for the Shuttleworth Museum Airfield at Old Warden to fly, Vintage Rubber Glider and Power, R/C assisted Old Timers and compete for the Fireball Trophy for Vintage Control Line.

**VINTAGE PHOTOS** could win you free Kodak film for life! A competition entitled 'All Our Yesterdays' launched by our sister magazine 'Photography' asks for old photos taken prior to 1938. Of interest to our readers who might have old aircraft photos suitable for the 'Transport' and 'War' sections of the contest. You might be surprised what turns up in those old photo albums.

**HOME WORKSHOP SPECIAL** now on general sale should prove a valuable source of inspiration and ideas to all modellers, who are either setting up or improving their own facilities. For the ambitious modeller – how to build an extension, convert lofts or modify sheds, an extensive survey of tools and equipment plus lots of simple advice on maximising existing space, keep a lookout for a copy.

**JONES .605** glowplug engine is the latest addition to the MAP range of drawings for the home made motor enthusiast. Rather large for the average reader, details of this motor appeared recently in *Model Engineer* May 5th and 19th editions giving full details of its construction.

Try a

# Swift Half

Ken Faux's latest  
Triple Fin 1/2 A Power design

FLYING 1/2 A Power has always given me a great deal of pleasure. The models have good performance at a relatively low cost and flying them is not the nerve wracking experience that FAI and hot open power models give you. 1/2 A model designs have not changed very much over the last ten to fifteen years, the 1/2 A Train and Mini Weaver to name a couple, are still very capable of winning present day contests!

When I designed the Swift Half I intended to use all the modern techniques currently used on FAI designs, hoping to arrive at a superior model performance. One only has to compare the performance of a top class FAI design of today with an old design like a Night Train and the difference is apparent. The basis of this design was my 1974 FAI model that had given me a good deal of success having accumulated thirty-eight consecutive maxes in round flights during 1974-75. The design was quite different from the standard design approach to FAI models in this country at the time, which featured single rear fins, low aspect ratio wings and large tail planes. I decided to build a model to the Scandinavian approach with triple fins, long moment arm and high aspect ratio wings, and a small tail plane. This design approach is now considered the norm, with few people still flying old style models.

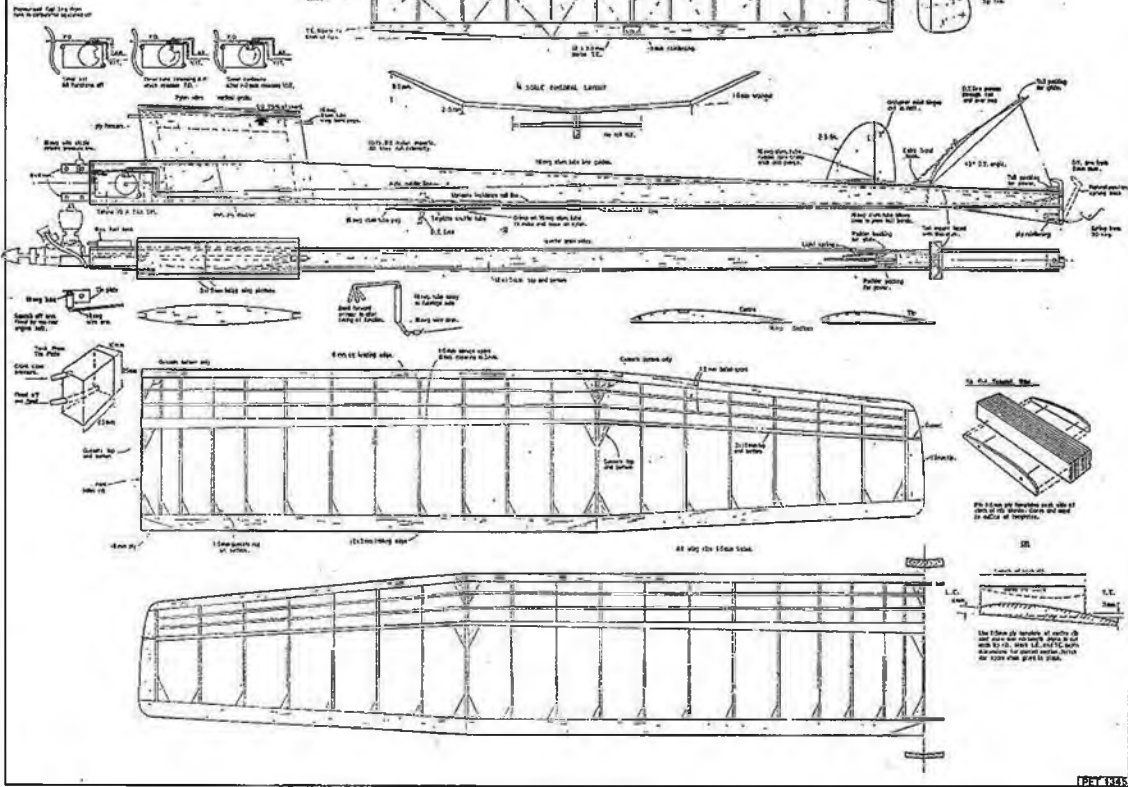
So back to the 1/2 A design which was drawn up to similar proportions with an emphasis on keeping the weight as low as possible. In my opinion the weight of a 1/2 A model is one of the most important things contributing to high performance. I aim at an all up weight of 5oz and this model originally weighed 5.25oz at which time it had a very fast climb. It now weighs 5.75oz due to having new centre panels on the wing with spruce spars instead of balsa ones, and the climb though still fast by any standard is a little slower. The modifications of using spruce spars was necessitated after several mid air wing collapses after the model went flat at the top of the climb. Maybe hard balsa would be strong enough with a good vertical grain web.

The model uses all the usual gadgetry found on power models these days VIT, AR, flood off. At one stage it even boasted a three position variable incidence tail system to improve the transition. On this, the tail incidence went more positive as the engine cut to bunt the model off the top of the near vertical climb, and then 2 seconds later moved to the glide position. I fitted this gadget to test it out before trying it on an FAI model and it worked very

well. However in the fly-off for the Frog Senior Trophy 1977 the model flew a fine stunt schedule and I put this down to the tail moving when it should not, and converted the airplane back to a conventional two position VIT system. Since then, it has been reliable.

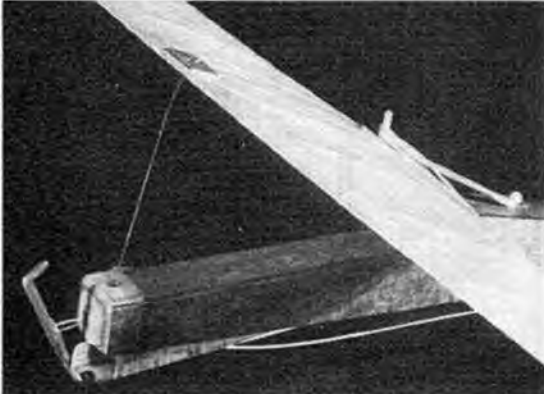
The model has not been used in many contests, and hence does not have a long list of wins under its belt, but the potential is obviously there. In fact when asked what the still air time was off seven seconds, I had to admit that I didn't have any idea. Next time I flew the model I gave it one flight just before it became dark in still conditions, and on an engine run of 6 seconds the model landed at 3.40. I cannot say that there was no lift or sink, but it was as dead as most quoted still air times are tested in. I really don't know what times one expects from a 1/2 A airplane but this seems pretty reasonable to me, especially in view that one is only after 2 minute maxes. Also this flight was made using FAI fuel, as that was all I had with me that day, and the little Cox engines are not too happy without nitro greatly reducing power.





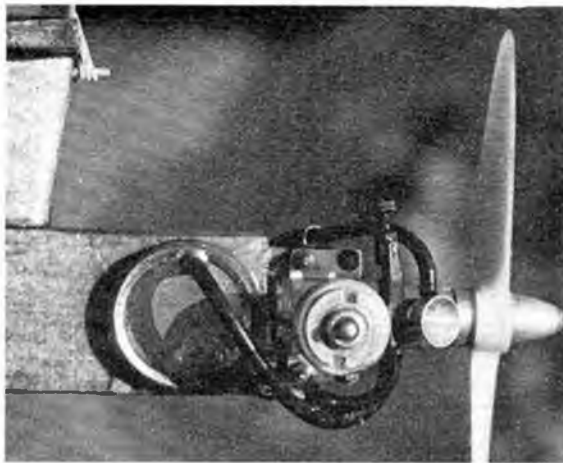
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Triple fin tail details, clearly visible are diagonal glass strands used to keep tail rigid. Note tubes under tailbands allowing lines to run through untrapped, also D.T. arm sprung back off tailplane allowing instant D.T. after power run. D.T. Arm, held back by spring, mounted on small under fin. VIT line passes through hole in tail and loops over band peg also restricts tail movement during D.T. seen below.



I will not give a glue part A to part B account of the construction as this is not a beginners model. Flyers experienced enough to fly it will already be capable of building it without detailed instructions. However I will give a few points of importance regarding material selection, weights, etc.

Wings, are very straight forward to construct. Quarter grain wood (of about 8lb-10lb/ft<sup>3</sup>) should be used for the TE, ribs and gussets. As mentioned earlier the centre panel spars can be made from hard balsa instead of spruce to save a little weight but if this is done a 1.5mm vertical web must be placed between the main spars. The wings are covered with light weight model span and given four or five coats of thinned dope (40% dope 60% thinner). Ensure that the tissue pores are filled and that the tissue does not slacken off in damp air. On the original model fuel proof dope (Pactra Aerogloss) was used, therefore no fuel proofing was required. If normal dope is used a coat of thinned Tufcote or similar will not add much weight. The only warps acceptable in the wing is about 1.5mm. washout in the port wing tip with all other panels flat. This suits the straight pattern climb. Tailplane, again the basic structure is conventional. Wood for the tail ribs and TE should again be quarter grain of about 6-8lb/ft<sup>3</sup>. The centre rib should be harder. Care must be taken to ensure the centre and tip ribs are straight and vertical as these affect the positions of the tip fins. Add the tip fins and LB mount after the tail is covered with jap tissue. Three coats of this dope 40/60 fill the pores. One unusual though by no means original feature, is the use of glass strands to give the tail greater tensional rigidity. These



Engine/Tank detail, original used Jetex tin. Top tank inlet comes from pressure tapping on Cox 049 crank case, lower pipe connects to T junction which feeds needle valve and flood off tube set in mouth of carburettor.



Timer details, slot in face plate releases arms in sequence as it unwinds anti-clockwise. Auto rudder and flood off first, followed 2 secs later by variable incidence tail, which also acts as instant D.T. when trimming.

can be stripped from the glass cloth or roving and applied with thinned dope and an artists brush. The tip fins that are glued on after doping must be of good quality 1.5mm quarter grain sheet. The tailplane naturally must be flat.

Fuselage, I use straight grained balsa of about 8lbs/ft<sup>3</sup> for the top and bottom and quarter grain balsa of about the same density for the sides and pylon sides. The fuel tank on the original airplane is fabricated from an old jetex wick tin (remember them?) However any small tank of similar proportion may be used. I like to use a tank with a feed pipe at the bottom back and pressure feed pipe at the top only. This goes for all my models FAI as well. With only two vents, less goes wrong. In the feed line I place a 'Tee' pipe soldered up from brass tube or available from auto spares shops, one half goes to the needle valve the other half passes under the timer arm and on to the flood off. To fill the tank it is best to take the pressure tube off of the tank and use this as the overflow while one fills the tank through the flood off pipe at the engine end. Ensure that the fuselage especially around the area of the engine, is well proofed against fuel.

The timer used in the original model is a Tatone 1/4A tick off modified to actuate release arms from under a disc as opposed to using the standard squash off. Any Tatone or KSB engine timer can be similarly modified. Some people may not think flood off and pressure feed are worth all the apparent trouble, over squash off. However, flood off gives an instant stop and with squash off it is difficult to stop the engine before the tail moves to the glide position which is essential to give a good transition.

On the original airplane the auto rudder kicks over at the same time as the motor cuts and the tailplane goes to the glide setting some 1.5-2 seconds after this. All credit for the neat timer arm system goes to Dave Pymm whose models I first saw five or six years ago.

Trimming. When the model is completed put on the wing and tail and ensure that they sit firmly without any chance of rocking or moving. Make sure that the wing and more importantly the tailplane are perfectly square with the centre line of the fuselage. Test that the systems of AR, VIT, DT, and flood off all work 100% before even considering flying, this includes checks made with the engine running. Set up the model so that on the power setting it has about 1° longitudinal dihedral, decalage or whatever you like to call it. Ensure warps are correct and that everything is straight. For the first flights I forget all about the glide, just do not connect up the DT line. This means the model will DT about 2 seconds after the motor cuts. I never test glide my models. For the first flight I

have the motor running flat out, launch at about 80°, and give an engine run of 1.5-2 seconds DTing straight away afterwards as just mentioned. Gradually lengthen the run doing any necessary adjustments to give a straight climb with a slight tendency to go to the right. Once I have sorted out the climb one can start connecting up the DT line and thinking about the glide mode. One or two test glides in long grass will give the approximate setting. Keep the DT short for the first glide and make any necessary adjustments.

At this stage you will be ready to wipe the floor with the opposition with a model that as yet I have not had time to get the most out of. Very best of Luck!

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L. Kunert displays a superb Pe-3bis span 900mm, a real lightweight at 110 grammes producing flights of up to 80 secs. Right: M. Sojak with his Super Marine Spitfire pictured at the All State Championships in Czechoslovakia.

# Scale Matters

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

A FEATURE OF this column in recent years has been to include the latest news on scale flying (mainly rubber) from Czechoslovakia sent to us by Ing. Lubomir Koutny from Brno. Whether there is an acute shortage of model diesels or glow motors in that part of the world, Lubomir has yet to tell us. Perhaps it is that the majority of modellers featured in the reports submitted simply prefer the quiet, clean, and controllable performance that rubber motive power provides. It certainly does not limit or deter Czechoslovakian builders from choosing some interesting subjects, as the most recent group of photos show. Together with the photos was sent an article on the trimming of outdoor rubber scale models, and which is full of practical advice and information obviously acquired over numerous seasons flying.

Approximately sixty different builders took part in the various competitions held throughout 1977, which indicates that scale flying is as

attractive to modellers in Eastern Europe every bit as much as elsewhere. Some of the more unusual subjects chosen include a number of twins, and these seem not to feature complicated drive systems and gears etc., but two entirely separate rubber motors which together with carefully made props are very finely matched when trimming the model. That the system works better than most would anticipate is proved by L. Kunert's Petlyakov Pe-3bis (You'll have to swot it up!) which at 90cm wingspan and 110 grammes is apparently capable of flights of 80 seconds duration. Lubomir's own D. H. Hornet does only (!) 50 seconds due to having a sprayed enamel finish that has pushed up the weight more than expected. Just as interesting, though a single-engined subject, is his Russian SI-4. The real version of this aircraft had its undercarriage linked to the lower wings which retracted upwards resulting in flight with something that looked like a parasol

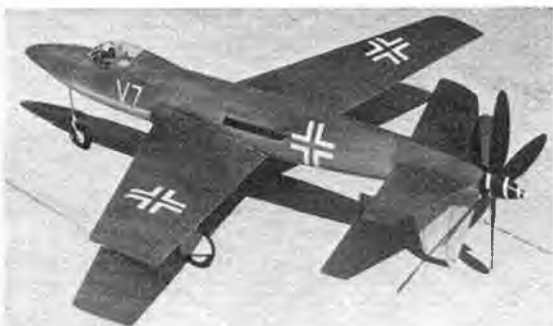
winged aircraft with a retracted conventional undercarriage. Lubomir has modelled this quite cleverly by having the model rigged as a biplane with the U/C down for ROG flights, and the lower wings together with the wheels are removed entirely for hand-launching. This model is 43cm span and weighs 30 grammes.

A very interesting pusher subject again by Lubomir is a project designed by Dornier which I believe was never built. This was the Do-245 which featured a tricycle undercarriage and cruciform tail-plane.

Other more conventional subjects include a competition-winning Helio Super Courier by Peter Koutny; a very attractive-looking Supermarine Spitfire by a gentleman whose name I unfortunately cannot decipher; an Austro-Hungarian CC1 biplane seaplane which appears to be rubber powered but I cannot see how enough rubber can be contained in the engine pod to provide enough power to

Ing Koutny's De Havilland Hornet, spray finished with Humbrol enamels, gives flights of 50 secs. Right: The Soviet mono-biplane SI-4 in take off configuration constructed by Ing Koutny, span 430mm flies for 60 secs.





Dornier Project Do-245 with monocoque fuselage weighs 70g and is reported to fly very fast. Right: George Worley holding his father's own design Douglas O-46A destined for Icc diesel power. 1:12 scale model is 45in. span and weighs 20oz as shown.



make it fly; a Siemens-Schuckert radial-engined biplane is included which is quite similar to a Nieuport. Of particular interest is a canard built in Poland in 1909, (name not supplied) that is 45cm span and features a four-wheeled undercarriage. This is apparently an excellent flier having been built in two versions by different modellers one of whom won the last of the year's competitions with it with a flight in the region of 70 seconds.

The essence of most of these models seems to be a simple, light-weight structure that is neatly finished either in coloured tissues or with a very lightly sprayed finish, and with much time spent on trimming them to fly particularly well. None of them seem to be the result of very lengthy hours spent super-detailing down to the last nut, bolt, and bracket and they are in marked contrast to the typical type of model seen at contests and meetings in this country. Both approaches are probably due in some way to the prevailing weather. Past reports from Ing. Koutny have indicated that warm days with gentle breezes are much more frequently to be found over there than in the UK, and so having to simply be resigned to a quota of more bad flying days than good, we get much more time to spend at the building board!

Whether scale model fliers are able to put in more or less airtime with their models than other types is a debatable point, but it certainly seems that they are the least reticent in coming together to share ideas and notes on techniques when the opportunity arises. The '2FSA' group was formed especially to encourage this but it seems a great pity that such meetings that take place around the London area are out of reach of many modellers with interests equally as strong as those able to attend.

A special occasion took place on 12th May at the meeting, held for the first time at David Deadman's home, when we were happy to meet in person Bob and Sandy Peck from California who manufacture the well-

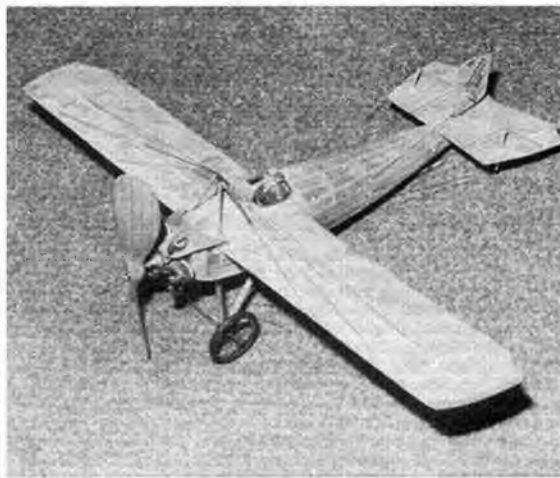
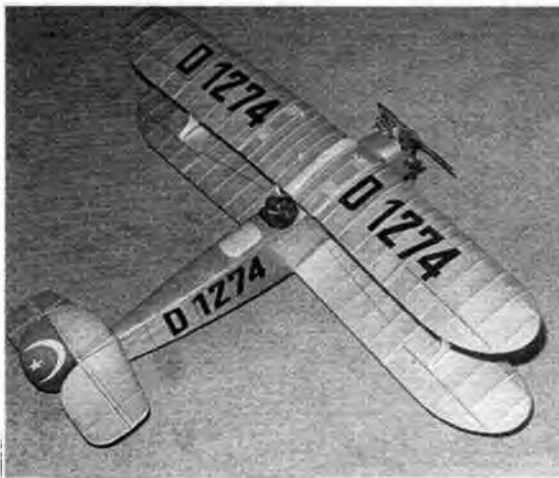
known range of peanut scale, walnut scale, and simple sports model kits, as well as being main distributors in the USA of virtually all the best accessories, plans and CO<sub>2</sub> motors for the small scale enthusiast. After losing a whole day from their scheduled visit due to problems with their 747 at Chicago, Bob and Sandy were having a very busy time visiting people and places in England before continuing on to Germany and France. '2FSA' members and other guests arrived very much in force to make this the largest gathering yet held, and with models in numbers to match. With so much to see and so many to talk to there was simply not enough time to take everything in, but the impression that scale flying (mainly FF here!) is alive and thriving was very apparent. The only thing lacking in this country is the right kind of weather at the right time and this was emphasized by Bob showing us some very interesting Super 8 film of the San Diego area, where they live, together with some typical model flying sessions where blue skies and light breezes are as common as our rain and wind. Included in Bob's film were scenes showing that the Queen Mary is still with us; some stunningly sad footage of the charred remains of the San Diego Aerospace Museum and Library which was recently damaged very badly by fire and which is a

terrible loss to all aviation enthusiasts in that part of the world; a good selection of model flying shots at such places as Torrey Pines where full size hang-gliding first began to make a comeback since the days of Otto Lilienthal; and Lake Elsinore - one of the most popular FF scale flying sites in California with a beautifully calm and shallow stretch of water - and where the biggest problem in flying small scale models seems to be finding them again after landing in the long grass and flowers! Some scenes from Peck-Polymers 'at work' were included as further interest and it was altogether a fascinating glimpse of Bob's activities in an area that is fondly regarded as the home of American FF Scale.

Following Bob's film were two others assembled during many seasons of flying by John Palmer, whose name is well known to those whose interests go back several years and whose FF scale models in terms of accuracy and quality of construction would stand him in very good stead in any competition today. Excellent photos of John's models were to be seen for many years on the walls of Henry Nicholls model shop, and these days John is frequently to be seen still flying at Radio Scale events. The great number of different models and flying sequences in John's films makes it impossible to recall individual items at only one viewing but



Aps Waco biplane by Wal Cordwell is conversion from FF scale plan. Features working flaps and throttle control via Roberts 3-line system. Red white black colour scheme.



David Deadman's Udet Flamingo. Scale 1:10 (metrication has arrived!) Power is Mills 75 and fuselage is natural varnished 0.5mm plywood with silver wings and red rudder with white insignia. Right: Immaculately-built peanut scale 1911 Caudron racer by Dave Banks. Specially dyed tissue covering and spoked wheels by the builder.

there was no doubting the quality of range of subjects that included numerous rarely-modelled aircraft.

Of the actual models on display at the meeting I was quite unable to cover everything, but several new ones were apparent amongst the fairly well-known general display.

The construction of George Worley's new Douglas 0-46A is now well under way and even in its uncovered state the very handsome proportions and smooth detail design are clearly seen. A rubber-powered version of an extremely good design by Doug McHard of this aircraft is available from the 'X' list in the APS range and dates back to 1953. George's model is, however, an entirely original design based on his own plan scaled from drawings by William Wylam and at 1:12 scale works out at 45in. wingspan. The model is to exact scale, i.e. tail areas, dihedral, undercarriage length, etc., and is destined for 1cc diesel power if George can manage to locate a good ED Bee. A suitable alternative to this would be a ME Heron which is still currently available, with the added bonus of purpose-built silencers being obtainable the design of which would allow all the exhaust mess to be piped away as well as reducing the noise to a muffled hum. Having used one of these motors for some time I can vouch for them being excellent performers once properly run in. The 0-46A as shown weighs 20oz, and a timer is incorporated which will release a parachute flare once the model has gained altitude. With this aircraft type's usually bright colour scheme to look forward to, this model should be quite an eye-catcher.

David Deadman's new Udet Flamingo is now very close to being ready for its first test flights with

mainly details on the dummy engine remaining to be added together with adequate fuel-proofing in the right places. One has to consider quite carefully how to proof a model like this in order to not lose the attractive qualities of the simulated varnished plywood, doped fabric, and natural metal panels. The best fuel-proofers are naturally very glossy and unsuitable, but even though the motor is a diesel traditionally said to not require all-over proofing, a lightly sprayed coating of a semi-matt polyurethane varnish should keep the neatly applied colour scheme in good condition for some time to come. It is not the easiest thing to repair a polyurethane-coated model when it is necessary to re-dope any repaired patch, but I know of no semi-matt cellulose fuel-proofer to use in its place, and despite much that is said to the contrary diesel fuel can still make an un-proofed model appear very grubby after a while.

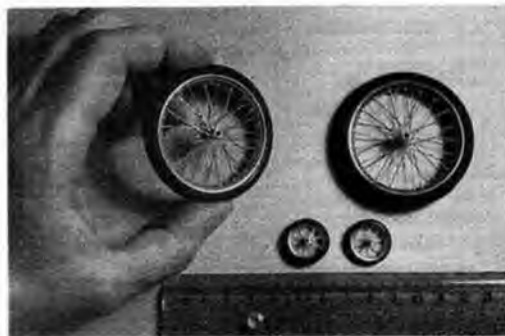
This 1:10 scale version of the Flamingo is one that I very much look forward to seeing in the air before too long.

The range of accessories and goodies that Bob Peck distributes, as mentioned previously, is quite large. At this meeting he brought along a number of new items including some excellent propellers suitable for peanut scale models. These 6in. diameter props are now moulded in silver instead of the previous green plastic, and a quick weight test showed them to be approximately 2 grammes each. These should keep any peanut model well out of a nose-dive!

Without doubt the most luxurious items he handles are the beautifully-made spoked wheels produced by Fulton Hungerford in a range suitably sized to cater for all from the

most minute peanut scale model up to a quite large radio or control line craft. In the accompanying photo are a pair of wheels with stainless steel spokes formed from a single piece of wire, aluminium rims, and silicone rubber tyres. The spokes are hand-threaded on a jig and the wheels run very freely with no perceptible trace of wobble. Those shown are 24in. diameter making them suitable for many a 1:12 scale WWI fighter, and for comparison a smaller set of wheels for rubber models is also included in the picture. Note that though they are only approximately 20mm diameter, they are not the smallest in the range! These little gems have turned balsa tyres and silk thread spokes and together weighed roughly 0.6 of a gramme. None of these Hungerford wheels are inexpensive, but if you wish to give yourself a treat - if you regularly fly small scale models you should be able to afford to since their low cost is an incidental and undeniable advantage - write to The Modellers' Den for a price list of these together with many other things related to small scale model flying.

Spoked wheels by Fulton Hungerford for the larger model seen with a pair for peanut scale subjects. Large ones have stainless steel spokes aluminium rims and solid silicone rubber tyres.

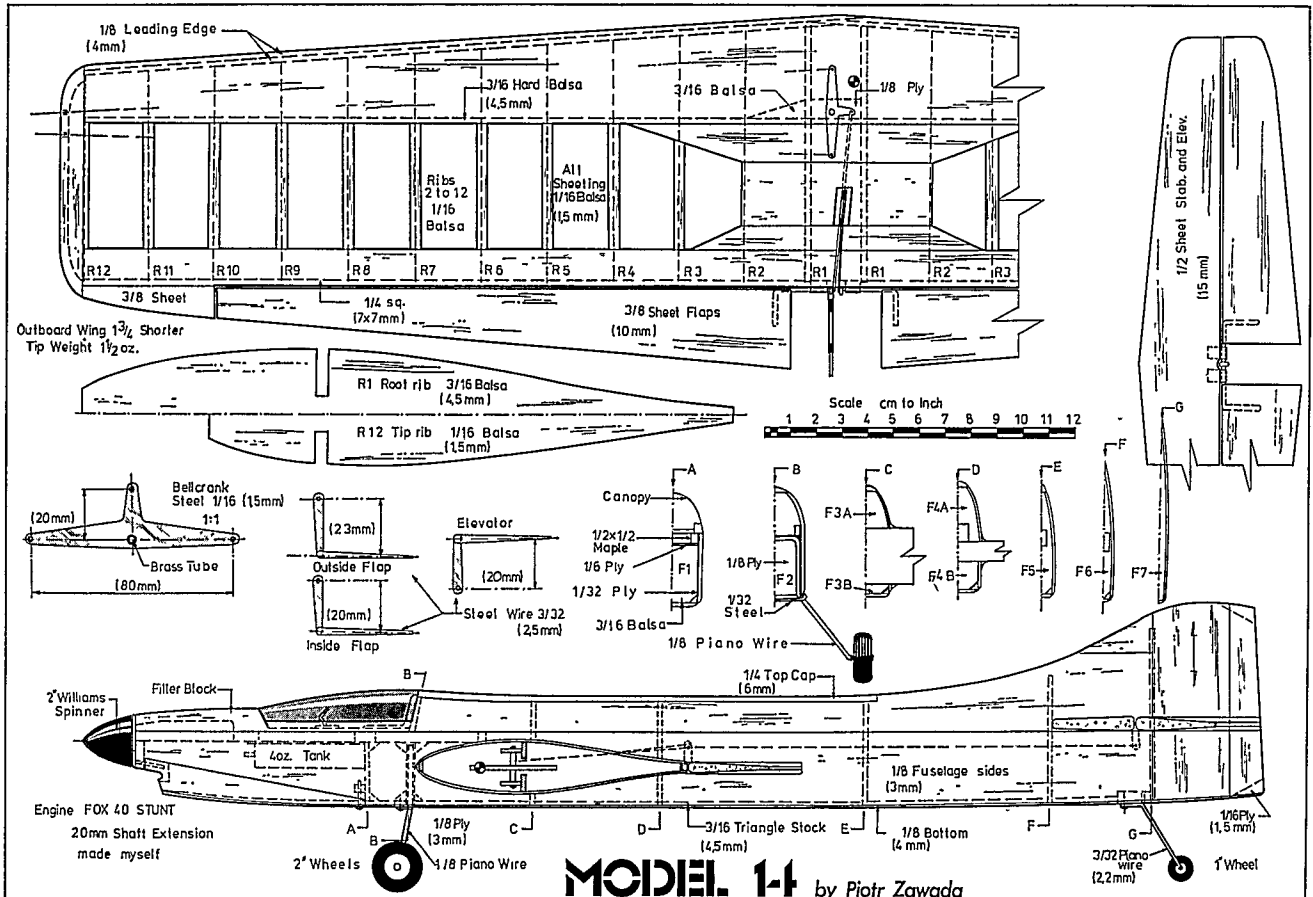
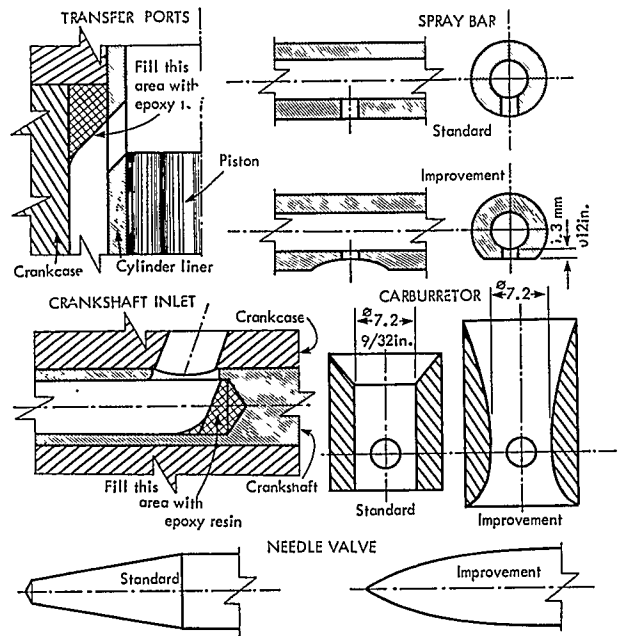


## AEROBATICS

by Glen Alison

IT IS NOT often that we hear news of the stunt scene in Poland so it was especially interesting to receive a letter recently from Piotr Zawada who hails from the town of Poznan. He sends details of his current model with which he won the Polish Championships in 1977. It is called, simply, Model 14 and is of very smart appearance with modern styling. Constructionally it follows standard 'Western' practice for the most part. For the fuselage sides he uses a wet moulded technique to get an oval section. The  $\frac{1}{16}$  in. balsa sides are soaked in warm water and then, when sufficiently pliable, fastened to a male mould and left for a few days to thoroughly dry out. The fuselage sides are then permanently shaped for assembly. Apart from the improved appearance obtained there is the further benefit that the curved sides are naturally stronger and stiffer, than flat surfaces. (Think about it, you never see a flat panel on a car, for instance).

From an aerodynamic point of view it has one very interesting feature and that is the use of a reflex wing section, i.e. where the surface behind the point of maximum thickness is concave rather than convex or flat. But this only applies to the root section, it changes to a more conventional section at the tip although maintaining a constant 20 per cent thickness ratio for the whole span. Personally I've often wondered if this might be a good idea, it should certainly make the flaps more effective. This is because the section blends in better where the flaps are hinged and there is therefore a much smaller change in the airflow direction as the air passes from the wing to the flap, and I believe that less drag would be induced.



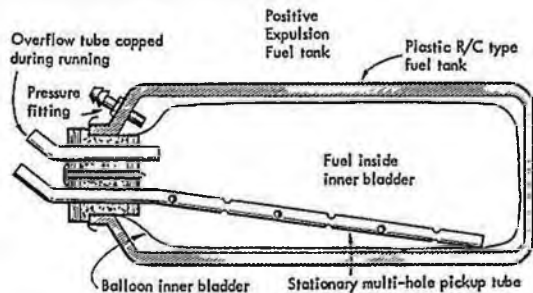
**MODEL 14** by Piotr Zawada



# FROM THE HANDLE + FROM THE HANDLE + FROM THE

The use of differential flaps is very unusual these days. For the uninitiated, this was a system developed by Bob Palmer many years ago in California as an aid to line tension when flying in windless conditions. Basically it works as follows. The inboard and outboard flaps each have a separate horn and are driven or actuated by separate pushrods which are joined together close to the bellcrank. The inboard flap horn is about 1/4 in. shorter than the outboard and this has the effect of giving greater flap movement and therefore greater lift on the inboard wing which theoretically gives an improvement to line tension. As on Piotr Zavada's model a larger inboard wing was very popular in those days and I think this complicates the issue. The opinion of most fliers I know who have tried it, is that any benefit is not worth the complication and with all the wind we have here in England it is not necessary any way. The trend now would seem to be to have a moveable rudder to help maintain line tension high up in the circle when 'down' control is being applied.

The model has a wingspan of 1500mm (59in.), wing area of 44dm<sup>2</sup> (680in.<sup>2</sup>) and weighs 1500g (53oz). His engine is an old type (1974) Fox 40, quite a few of these were popular with British fliers a couple of years ago but tended to give problems such as siezing when inadvertently run too lean. However he has made the following modifications to his motor: Compression ratio reduced to about 8.2:1; improved gas flow by filling dormant areas in crankshaft and cylinder liner with epoxy resin; turned a new venturi; modified the needle valve shape; waisted the spray bar. He claims that these modifications give greater flexibility in the manoeuvres over a standard engine.



More and more aerobatic fliers these days seem to be turning to plastic R/C type clunk tanks. Problems can be caused through excessive vibration from the engine frothing the fuel, leading to air in the supply line, which affects the consistency of the motor run. One neat solution to the problem is to use a large balloon inside the clunk tank to contain the fuel so that air and fuel never have a chance to mix. Unlike the familiar pacifier set-up the larger balloon exerts no pressure on the fuel; instead crank case pressure produces the feed in the normal way. The balloon when filled contains no air and numerous feed holes prevent the supply being blocked as the balloon collapses.

However a word of warning on choice of tank as not all clunk tanks are the same. The ones to look out for are those supplied with a soft white rubber expanding bung which fits into the neck of the tank. With time, the rubber decomposes and breaks away in little pieces into the fuel! I had heard of this phenomenon from Ted Fowler some time ago but had not experienced it myself until recently. In fact I only realised it when looking at the fuel filter. It is one of the new Sullivan 'Crap Trap' filters which consists of a length of transparent plastic tube with ferrules at each end, for the fuel tubing. Inside the tube are two cup shaped gauze washers which are clearly visible, as is any dirt which they retain. They can easily be cleaned by removing from the fuel line and back flushing with a squeeze bottle etc. I thoroughly recommend them.

The Sullivan 'Crap-Trap' in line filter, fuel passes first through coarse then fine, filter cones, to ensure clean supply to needle valve.



The fastest trio in Speed, Gordon Isles left, Dave Smith centre and Pete Halman right, at the end of a very close contest.

## THE C/L TRIALS

This year's Trials was held at the Imperial War Museum's Aircraft Museum at Duxford, making the selection of our British team something of a public spectacle. Thanks to the help and co-operation of the management at Duxford the meeting was a great success with two safety cages providing a theatre for the racing events. Informative handouts from SMAE kept the public informed as to the object of the exercise and the rules for each event. Only the weather let us down producing cold blustery flying conditions. For the first time ever, Combat, now an official FAI World Champs event, was added to Speed, Team Race and Aerobatics. The problems of selecting a team are always difficult being a combination of a flyer's past record and the ability to perform well on the day under the pressure of a major competition.

## F2A SPEED

At a time when the majority of British speed flyers are still addicted to the open classes, FAI continues to attract only a select group of dedicated specialists. However the standard of competition was very high, producing an extremely hard close fought battle for the top honours.

The trials gave the final chance of improving the best scores achieved at each of the four FAI contests held last year. The final results proved so close that only hundredths of a second decided third place. Highest individual flight speed achieved during the series of contests went to Pete Halman at 147 mph, followed by Gordon Isles 146 mph, then Dave Smith with his flight of 143 mph. Results were eventually decided by averaging the five best scores one from each contest. Models used were a variety of designs based on the German asymmetric sidewinder layouts using high aspect ratio metal skin wings. Motors were predictably Rossis subjected to a variety of modifications.

The team will be hard pressed to match top world performance with the current record standing at 157 mph. Only a truly exceptional individual performance could challenge the top five places expected to go to the Germans, Swiss or USA flyers, and a place in the top ten would still be quite an achievement for our flyers.

## F2B Aerobatics Report by G. Alison

This year entries for stunt were 'invited' on the basis of results obtained in last year's three centralised competitions plus the Nationals. The reason being to avoid a glut of entries because of the Champs being in England. Flyers were given points on the basis of 12 for 1st place, 11 for 2nd, 10 for 3rd, etc, for each of the competitions. Each flyer's best two results counted, thus the top 10 were selected and invited to compete in the trials. In the event one flyer declined and as 11th place was a draw they were both invited, producing 11 flyers, including the previous team who were automatically allowed to compete.

Three rounds were flown with the total of the best two flights to count and there were five judges. The usual system operated of discounting the highest and lowest scores for each flight to eliminate bias. There was very little new or exciting in the models or equipment in use, most pilots sticking to tried and trusted systems. Ken Burton and Pete Galloway did have new versions of their 'Falcon' design which now features the fuselage wet moulded from 3/32 sheet balsa, to an oval section, which certainly gives a stiff and light result.

Flyers seemed to be suffering a little from nerves and were flying 'safe' in the first round. Ken Burton's Enya 40 stopped early in his flight, giving him some problems to sort out. John Newnham had to call an attempt after failing to get his Merco going but at the second go he showed us all how it should be done by scoring 979 to lead the first round and indeed that was the highest score of the whole event. In round two the weather had definitely worsened so there was very little improvement in any of the previous scores. Ken Burton again suffered engine failure but this time was unable to

# HANDLE + FROM THE HANDLE + FROM THE HANDLE



Top Team Jim Woodside and our own Racing columnist Dave Clarkson, flanked by runners-up Steve Smith back with his old pitman Colin Brown to the right and Malcolm Ross and Derek Heaton left.



A very experienced aerobatic team led by John Newnham kneeling with his Nobler, Jim Mannall left and Pete Tindal each flying their APS plan designs Nimrod and Chipmonk.

avoid crashing. Neville Dickenson also had problems with his Enya when it suddenly ran lean and eventually seized. I had problems with my Super Tigre when it stopped after executing a sharp inside pull out. I suspect that the plug-fuel combination was wrong for the conditions as I had no previous trouble of this kind.

The third round was rather an anti-climax as several flyers declined to perform as they already had their two good flights in and saw very little reason for continuing.

So the 'Old Firm' of John Newnham, Jim Mannall and Pete Tindal took the first three positions to get the team places with scores of 1930, 1890, 1878 respectively. Bill Draper and John Lynch took the next two places with 1779 and 1771, a very close fight for the reserve team member's position, this going to Bill. At the World Championships they'll be facing tough opposition from the Americans and Russians who must be favourite for the top places with other challenges coming notably from Italy, France and Czechoslovakia. Following existing form it will be quite a task to make an impression on the top ten but I am sure we all wish our Team members the greatest of success at Woodvale; naturally we'll all be there to support them.

## F2C Team Race Report by R. Horwood

This event was held on an old hangar base which provided an adequate though not perfect surface but, despite the fears of some competitors, only one team suffered and this from water lying on the surface rather than from protrusions, although a stiff breeze gave rise to bad turbulence.

For the first time, in the team race section of the trials, a qualifying standard was set for the meeting though in the end several teams flew in pairs other than those in which they had qualified. The standard was in general high and tended to improve as the meeting progressed and what looked like a foregone conclusion was altered in the last three rounds.

The scores carried forward from 1977 season were only allowed to those teams who qualified in the same pairs used at the trials and this left Heaton/Ross with a commanding lead which looked to be unshakeable, their nearest rivals Smith/Fry having parted to form two new teams. Several interesting items of equipment were in use, foremost amongst these being the now readily available Nelson motors, a couple of two part head Bugles, a Russian style single blade prop, an Austrian designed retracting U/C system and, perhaps most striking of all, a highly asymmetric model from Steve Smith complete with an all flying single side tail and beautifully streamlined wing and tail roots.

Of the Nelson powered models only Clarkson/Woodside's looked really impressive the other Nelson's lacking either range or speed enough to make them winners. Clarkson/Woodside performed smoothly and efficiently throughout the meeting starting with a 4.09 and finishing with four times all under 4.10. Their performance deservedly put them into first place at the end of the day. Smith/Brown also flew well but after two rounds it was obvious that the old model they were flying at that stage was incapable of much better than 4.15 and so out came the new model. The first time was not too good but the last three were good enough to win them

second place with their fifth time of the day being a new record at 4.00.6. The performance from Heaton/Ross was somewhat disappointing with them unable to do better than 4.12 on the day but this added to their carry-forward times was sufficient to win them third place.

Of the others, Fry/Harknett, fourth at the end, steadily improved during the day and had their early round times been of the same standards as their last two times they may well have snatched a place. The Tribes, complete with Russian style single blade prop and Austrian Retract gear (which stayed retracted!) failed to find their best form and could finish no better than 6th. Deserving of special mention was the performance of Langworth/Broadhead who flew together competitively for the first time at the trials and after three rounds looked good enough to take one of the places and only the good performances of the Feltham teams in the last two rounds robbed them. Rudd/King were, as always, consistent but their Rossi lacked the airspeed to make them really competitive and they ended in 5th place.

Finally I would like to thank all those who helped the meeting to run smoothly, finishing on time after 30 heats and two hours of breaks for practice. In particular I would like to thank Steve Haycock, Mike and John Daly, Gerry Green, Alan Cooper and Chris Coote and all the competitors who co-operated well with us.

## F2D Combat

The Trials set out to test flyers in many different ways, not the least of which is the ability to make the superhuman effort required in Combat these days to prepare a whole fleet of models and equipment for FAI flying. Notable absences from those invited to fly were Richard Evans and Richard Wilkens who find they can no longer maintain this commitment, whilst several other flyers present were also clearly unable to afford the building time to come properly equipped. Combat is no longer solely about flying skills, many of our top flyers being handicapped by insufficient preparation.

The new ground rules are proving very unpopular, further throwing the emphasis away from pilot skills. Many bouts were won in the air by superior pilot skills only to be lost by excessive ground penalties. Bob Morgan was certainly an early victim of this new styled scoring. Is Combat destined to become team racing with streamers, dominated by athletic pitmen with hot gloves, where a first flick restart is worth as much as a cut?

Below: The Tribe brothers flew this model with retractable undercarriage and single blade prop. Dave Willis with his Rossi powered Boomerang models, glass cloth centre covering made them really tough, used vac-formed pacifier pods soon to be commercially available.



# E + FROM THE HANDLE + FROM THE HANDLE + FROM

The contest itself was 'seeded' into A & B groups of six, each pilot to fly all the other groups, giving everyone six bouts. Following form, the expectation being that the top six in the 'A' group should win all their bouts over the 'B' group but Combat is not that predictable. Such seeding was naturally open to debate as Group 'A' pilots had the advantage of generally easier bouts over the 'B' group pilots.

An important bout came when Mick Lewis, Group 'A' met Dave Willis, top flyer in Group 'B', each having won three bouts. Mick won but his total of four wins still proved insufficient for a chance of a team place.

With such an elite gathering the standard of combat was naturally high but the skills of the individual bouts was overshadowed by the drama of the outcome. At the end of the day four pilots were equal with five wins each, to fly off for the three team places. Steve Malone, Vernon Hunt, Mick Tiernan and Dave Wood were to fly two bouts with a losers' re-fly. The Malone/Hunt bout produced brilliant top class combat, two cuts each; Malone having two less ground points was declared the winner, that's one second differential! However when the watches were checked, not allowing for rounding off the seconds, the actual difference was 3/10th of a second. The organisers considered this was too close and ordered a re-fly.

Meanwhile Wood v Tiernan produced the first team place for Mick Tiernan. The Malone/Hunt re-fly started badly for Steve, being left on the ground at the start and finally losing the bout to Vernon Hunt, producing the second team member. The fly-off for third between Wood and Malone was to be a sudden death affair with only one team place left. However the result was pre-empted with a dramatic retirement from Steve Malone disenchanted by the number of models he was consuming and the way his luck was running with the scorers.

So an inconclusive result to the day's proceedings especially considering that the SMAE is not necessarily bound to nominate the top three flyers from the Trials for the actual team.

The consensus of opinion as the first World Combat Championships draws near is that the rules are still far from ideal. FAI rules have complicated the event and the scorer's job. Split seconds can decide the outcome, limits that are finer than the scorers are able to accurately record, and had the Trials been run strictly to the rule book, many would-be winners could have been disqualified for minor rule infringements. All of which points to an exciting and eventful World Champs for Combat.



Our highest hopes of a World Champion rest with our Combat Team, Mick Tiernan, Dave Wood and Vernon Hunt in this event so long dominated internationally by British flyers.

## RESULTS

### F2A Speed

1. G. Isles 15.53 sec (144 mph); 2. P. Halman 15.82 sec (141 mph); 3. D. Smith 16.025 sec (139.6 mph); 4. B. Jackson 16.032 sec (139.5 mph).

### F2B Aerobatics

1. J. Newnham (Rolls Royce) Nobler Merco 35 1930 pts; 2. J. Mannall (Buckaneers) Nimrod Merco 35 1901 pts; 3. P. Tindal (Dagenham) Chipmonk ST46 1878 pts; 4. C. Draper (Nottingham) Hawk Enya 40 1779 pts.

### F2C Team Race

1. Clarkson/Wood (Norwest) 4:04.2 4:04.0 4:06.7 4:09.0 12:23.9; 2. Smith/Brown (Feltham) 4:00.6 4:02.0 4:09.0 4:13.0 12:24.6; 3. Heaton/Ross (Norwest) 4:02.0\* 4:08.0\* 4:12.0\* 4:12.4 12:34.4; 4. Fry/Harknett (Feltham) 4:07.5 4:09.0 4:15.0 4:15.4 12:46.9.

\*Denotes scores from 1977

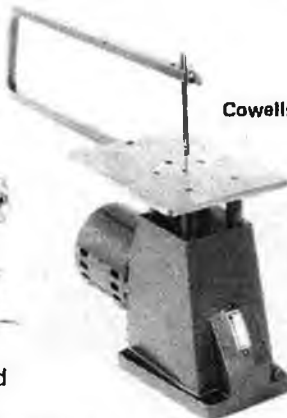
### F2D Combat

V. Hunt 6 wins from 7; M. Tiernan 6 wins from 7; D. Wood 6 wins from 8; S. Malone 5 wins from 8.

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TO DATE we have looked at the equipment and paints available to the modeller in his quest for a better finish, but what of the techniques of application?

Quite obviously 'practice makes perfect' and nowhere is this more true than in the realms of spray painting. Also of paramount importance is the pre-finishing technique

used, for no amount of fancy paintwork will ever cover up a bad surface. In fact the very thinness of one's paint layer when properly sprayed, tends to exaggerate any defects in the surface beneath!



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

Pre-finish depends how much weight one can afford. Methods used by the experts are many and varied but traditional ways are still considered the best. The balsa outer surface of the model is prepared to as smooth a finish as possible using progressively finer and finer grades of garnet paper and finishing with an ultra fine flour or wet and dry paper. Any small blemishes and dents should be filled with filler and re-sanded, polyfiller works quite well. When completely satisfied with the results, apply one layer of lightweight model tissue brushed on with clear dope. Japanese tissue requires far less coats to fill its surface for the weight conscious. Sand lightly between each coat, finally spray on an overall coat of primer, to suit the requirements of the top coat. Flat this primer coat down with 400 grade wet or dry paper preferably used wet. At this stage a near perfect surface should be evident and the first light coat of the final colour may be applied.

Some modellers prefer to use sanding sealer before the tissue, some preferring both. A good trick is to use the first colour coat applied thinly, as a final check to flatness. Using a very fine wet or dry paper, preferably on a large sanding block, lightly sand the entire structure until the colour is removed and the primer shows through. Any low areas will remain coloured and may be singled out for individual rectification with primer or filler.

Ian Peacock applies an outline using the Beugler Stripper. Finished model shown on the cover. Notice all the practice stripes done first on rough paper behind.



Tissue and fabric covered surfaces require only marginally different treatment in that several coats of dope are usually sufficient to seal the pores in the surface ready for painting. Some tissue becomes hairy when first doped, again Jap tissue is much smoother and has one side already smooth and shiny. Extreme care is needed when rubbing down with ultra fine paper to avoid going through the tissue or nylon covering at the high spots such as ribs and formers. It is often possible to skip the primer stage on these open structures having chosen a suitable tissue colour to start with.

**Practice.** Once surface preparation is complete, the top colour coats may be added, remembering several thin spray coats are more satisfactory than one thick coat. Watch out for the common errors in spraying from using the paint with insufficient thinners or too thick a coat. Practise first on a few sheets of paper to save the frustration of a ruined model. Practise to become conversant with both various finishing techniques and mastery of the equipment, is all important. Most manufacturers offer instruction booklets; 22 *Airbrush Lessons for Beginners*, describing virtually all the essential steps to good airbrush use may be obtained from Microflame (UK) Ltd, see advertisements for address, for 75p inc postage. Badger, De Vilbis and Binks Bullow also offer good instruction leaflets. Many of the simple lessons, dot and line practice and tone work may seem a little fatuous when one's new model is sitting in the corner just crying out for a coat of paint. Be patient.

Several examples of custom finishes are shown on this month's cover and many of these effects are quite simple to achieve with a little practice. Indeed some of them by nature of their asymmetry are easier to do than the conventional colour schemes. Many of the techniques shown are also easy to touch up after the inevitable(?) flying damage. Many customising ideas are shown in *The Art of Customising* available from Calbrook Cars (see last month) and two new books from Badger also cover the subject well. Most techniques rely on some form of mask or stencil and time spent in accurately preparing these will really pay dividends.

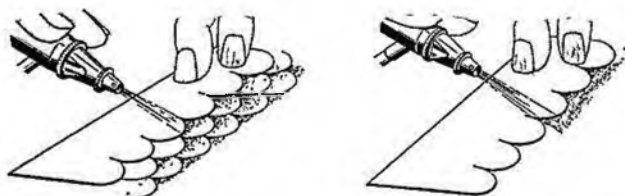
Pinstriping is very simple and looks great, whether single line or complex 'spaghetti junction' style. These stripes are achieved by masking with narrow tapes as used by artists and draughtsmen called Chart Pak or from auto-spare shops. They are moderately stretchy and will therefore



negotiate compound curves. Free hand striping can also be done with specialist tools such as the Beugler Striper (From Calbrook Cars) which works on a paint filled wheel principle. The tape method, however, is favourite and either positive or negative stripes may be achieved. With a steady hand try spraying along the length of a piece of  $\frac{1}{8}$  in. wide tape, allowing the spray pattern to extend to a total width of about  $\frac{3}{8}$  in. Removal of the tape produces a 'negative' pinstripe with soft furry edges in the contrasting colour. To obtain a 'positive' stripe, lay down the  $\frac{1}{8}$  in. tape and add additional tape close up to each side. Removal of the original tape will leave a  $\frac{1}{8}$  in. wide parallel gap, alternatively use special auto striping tape that has a removable centre strip. One can then spray the required colour remembering to seal the edges of the tape first. Multiple colours and multiple stripes are merely an extension of this basic technique. Many specialist tapes are now available on the motor car market such as refraction tape that shines like the colours of the rainbow, fluorescent and chrome tapes of incredibly high visibility.

**Fogging.** The edge of most patterns or designs is usually clearly defined with a solid edge but by spraying, colours can be blended one into the next. A soft feather edge will often impart different visual characteristics to the model as does the design of the pattern. Whilst camouflage patterns were applied to confuse the eye and break up the outline, good customising may be applied to create the illusion of change of shape. Fogging is one such an illusion. Often only one edge is fogged, the other being masked with tape, demanding a steady hand and good gun control.

Lace painting is remarkably effective and takes little real skill, perhaps that's why I like it so much. Here again the outline is defined first with pinstripes and/or fogging and the colour allowed to dry. Before removing the masking stretch a piece of lace curtain material tightly across the surface to be painted and tape in place, then airbrush through it! Remove the curtain and presto, instant lace pattern. A variety of lace curtain patterns is available and the ubiquitous paper doyley may also be used.

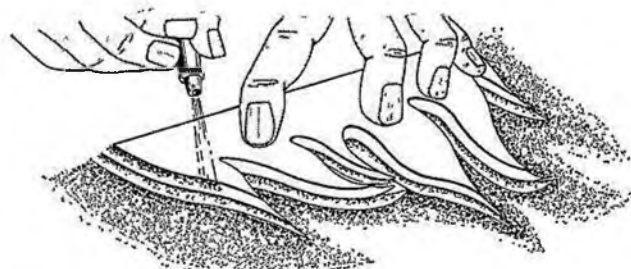


Simple paper mask with semi-circular scalloped edge used to create fish-scale effect. Spray over lightly then move mask half a scale sideways and down then repeat.

**Fish Scales.** An effective pattern easily obtained from a paper stencil mask. The outline may be pinstriped or fogged to leave a centre panel to be filled with 'fish scales'. The mask may be cut from cartridge paper to produce the desired pattern which is not stuck down to the model but merely hand held, pressed onto the surface. Self adhesive circular jam jar labels can be stuck onto card such that a series of scallops is produced. Only the lightest dusting of colour is needed for this effect. Apply one line of scales, move the mask half a scale sideways and half a scale down and spray again. Repeat this process until the area is full. This is in fact quicker to do than it is to write about.



Spraying through lace produced these attractive letters on Virginia Baddeley's model, daughter of Air Commodore Baddeley.



Another paper mask, this time with flame design. Various shades of colours can be used for each successive overspray.

Candies and Pearls mentioned last month are exotic colours and styles of paint imported under the *Metalflake* label by Denis Ferny at Calbrook Cars. Many of these paints are translucent relying on a base colour reflecting the light through the top colour. Flip-flop for example relies on a trick of the light to refract reflected colours, and on compound curves the eye sees a veritable rainbow changing with the angle of view. Any colour base coat may be used although white, silver and gold are favourite. A variation in base coat is also quite startling. Try a white base coat with, say, wing and tail leading edges picked out in silver or gold. Overspray with a candy colour, applied lightly and the final colour shade will change where the base coat changes creating a most pleasing optical illusion. With *Metalflakes* be careful which grade you use, as some of the larger and more brilliant flakes will only pass through the larger nozzles and may well jam up and damage finer quality airbrushes.

**Acrylustration** is a technique for 'lifting' pictures from colour magazines, pin-ups and calendars. Only good quality paper is suitable for use in this way but many magazines are quite suitable. The trick is to spray the page with a special lacquer, from Calbrook Cars, and when dry float the page on a bowl of water. The paper will eventually soften enabling the lacquer, with the printing ink attached to it, to be *carefully* peeled away. A special adhesive is supplied with this lacquer to fix the picture to the model. Great care must be exercised when handling the film of lacquer and printing as it is substantially thinner than the average transfer and will break very easily. Once fixed to the model a further coat of lacquer will seal the picture prior to any additional paint-work being added.

**Transfers.** There are a lot of commercially available transfers about these days but they always look what they are – add on goodies. Here again, confusion-of-the-eye, is all that is needed and a quick coat of lacquer to fix the transfer, followed by a frame of pinstripe, fogging or whatever turns you on, completes the illusion.



Example layout for ribbon design; mask off and cut outline and separate panels; remove alternate ribbon panels and spray; repeat for remaining panels; fill in dark corners.

Ribbons are a really eye catching decoration and although long winded to describe, are really quite simple to do in practice. For most model size ribbons the entire mask is best made from Frisk film or similar, with the basic pattern drawn on with two fine tip fibre pens banded together with a balsa spacer to provide parallel sides to the ribbon. Stick the film to the model before drawing the ribbons then lightly cut into the film with a sharp balsa knife. Remove the 'odd' ribbon sections, retained for later, and spray in thin gentle strokes across the ribbon to create the shading. When dry, replace the film sections, remove the 'even' sections and repeat. Finally remove the 'back' sections of the ribbon and spray these areas a little darker. A good tip with any of these custom finishes is to use a cardboard template to draw around to get the basic outline. This will ensure that the pattern is the same on both wings.

**Murals** are the most striking of any custom finishing job and surprisingly require less technical expertise, although a drop of artistic experience is useful. Obviously a good artist can sketch out a picture freehand whilst we lesser mortals have to resort to tracing ideas. The very name of the model may well conjure up an idea for a picture. Again Frisk film is the favourite medium for cutting masks and stencils, but many of the simpler murals can be achieved using stiff paper. The graveyard scene on the cover was done in about 25 minutes using paper templates and matt enamels as they dry quickly. A circle was drawn and cut from cartridge paper for the moon. The light clouds in the sky and across the moon were airbrushed in grey across the rough torn edges of a



Fuselage side covered with Frisk film to mask off a ribbon design. Finished design below is outlined with negative pinstripping.

sheet of newspaper. Foreground detail, grass, tombstones etc were cut into another sheet of paper and fogged over in dark grey (almost black). The cemetery gates required two separate stencils cutting as it was not possible to achieve the whole effect in one go. Light mist rolling across the foreground was added free hand. Finally details such as the bats in the sky were added with yet another paper stencil. In fact one of the bats was used to cover up a blemish in the sky where I had spilt a drop of paint.

The fact that a mural is, by its very nature, an asymmetric picture removes much of the need for exact symmetrical balance required for conventional decorative styling and offers the modeller a degree of licence where careful adaption of an error can quite easily disguise its presence!

A final word of caution, however, with any of these customising techniques. I have found over the years that have led to the preparation of this series, that many custom jobs suffer from excessive detail which spoils the overall effect. The simplest schemes are often the most striking and many of the over complex schemes that emanate from abroad, particularly from the USA cram in so much detail and so many techniques, that they become overly fussy and lose all the impact.

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**NEXT MONTH:** Camouflage, weathering techniques and markings for exact and semi scale models.

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Simple masking tape and newspaper used to protect model while spraying a cockpit.



# topical twists

by 'Pylonius'  
Illustrated by Sherry

## Access to Fame

There is not much you cannot buy nowadays. There was a time when no chap worth his salt would think of using a noseblock on his Wakefield other than one he had made with his honest, if not always too dexterous, hands; and if it did get around that he was operating an acquired piece of mechanism he would be shunned on the flying field by all true blue, build-it-through-and-through flyers. But those days of high moral purpose are, alas, over; your credit card now gives you Access to those parts of the model that, once, only the finest skills could reach.

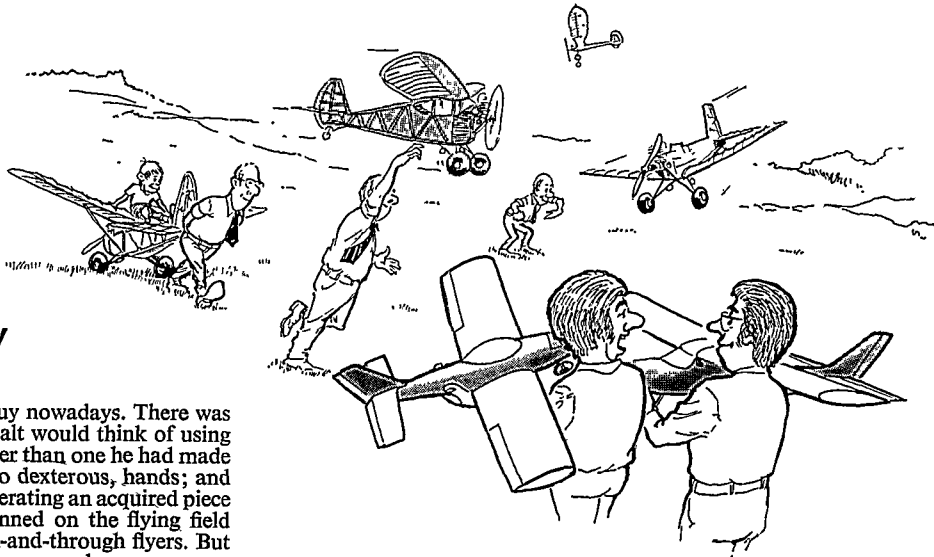
This thought occurred to me on seeing an advertisement for a circular tow hook system. Nothing is sacred. The innermost secrets of the modeller's art are now on offer for a few paltry pounds. Everything has its price. We no longer think hobbywise but in commercial terms. I think it may have something to do with the sameness of our models. A Wakefield model is the sum of a number of universally adopted components with not a vestige of design flair left to gladden the eye. And the Radio model and Thermal Soarer are just as standardised. The sad fact is that, however inventive you may be, you are not likely to improve on the efficiency of the standard product, so is it really worth the while to go through the laborious business of building it yourself when, for a modest outlay, you can acquire it ready made? It is not the way you build it that counts; it is the way you trim it or pilot it that is important. In fact the building chore is becoming just a bit beneath the dignity of the prima donna performer on the flying field. Can you imagine that flambuoyant character, carrying all before him, ludicrously engaged in the cutting out of wing ribs? It is like Ben Hur knocking up his own chariot in the woodshed.

The time is surely coming when we finally lay down the balsa knife and allow the last tin of dope to solidify on the shelf. When affluence will ultimately triumph over the pride of handiwork. Even the assembly of models may be eventually taken out of our increasingly reluctant-to-work hands by computerised robots. Such robots may become a common accoutrement of the model shop: your radio model complete and ready to fly for a small extra cost, with the added delight of watching Robby the Robot putting it together. Taken one step further and you could have your own computerised flight schedule – just point the aerial in the right direction and you are a champ.

Wonderful to think of it. You could put in a hefty day's contest flying whilst staying at home doing the garden. But wait – what is that computerised gadget on the new lawnmower?

## Flappery Will Get You Nowhere

I cannot say that I find it in the least surprising that no one has yet taken up the challenge of a cross Channel flight with a flapper model for the £1000 on offer. It is a bit much to ask. Even a specially built conventional model takes some drifting over all that choppy water, and when you look at the history of the ornithoptering machine, model or full size, you are led to the uninspiring conclusion that wing flappery is strictly for the birds. Aviation through the ages is littered with the embarrassed remains of over-optimistic attempts at bird-like flight. All that was needed, so it was thought, was a spread of feathers



"They used to actually build the things themselves in those days, with some stuff called balsa wood".

and a pair of bulbous biceps to wing your way to fame and fortune, but it was all too easy to fall flat on your face.

Whatever you may have been told at school about the birds and the bees, all similarities with the human species stops at the wings. The birds and the bees get by, but who knows that they might not operate better had nature endowed them with jet or rotor systems rather than up and down flap. We do know that flapping systems, when mechanically rather than biologically applied, are cumbersome and inefficient. Just imagine a Jumbo, or should it be Dumbo, jet flapping its way across the Atlantic. Or, for that matter, a flap-flap model soaring over the English Channel?

Any attempt to secure the prize should not, of course, be made during the grouse shooting season. Even so, the setting up of the apparatus necessary for the undertaking, with all the complexities of cross Channel communication, tracking boats and other paraphernalia, would make quite a hole in £1000, and then it could all come unstuck by a flight of jealous seagulls.

## Dig Model Flying

"SMAE? I suppose that stands for Some Mothers 'Ave 'Em – and some wives, too, come to that."

"Funny, eh! It stands for the Society of Model Aeronautical Engineers."

"Engineers? Don't tell me you call all that cutting up of bits of balsa wood engineering! The only engineering you do is on the family budget so you can spend more money at that silly model shop. Odd, though, it was supposed to be a sport last week, when you were up at the council."

"Well, it's engineering in one way and sport in another."

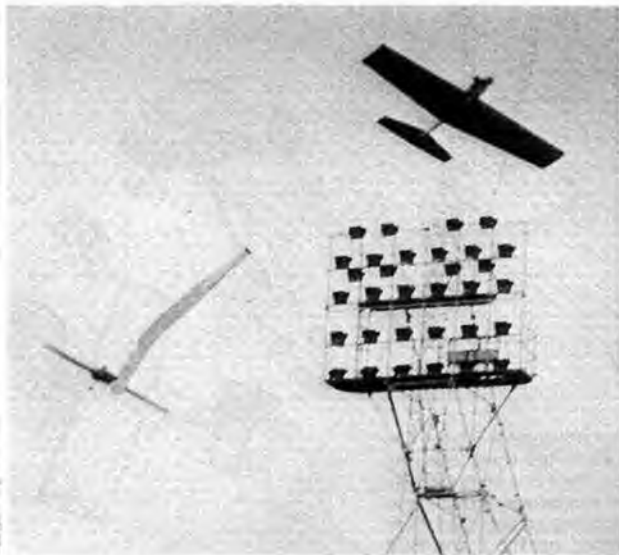
"Don't make me laugh. Sport means chasing after things, and you gave that up when you married me – I hope."

"Well, it's not so much a running about sort of sport as a cultural sport. And I don't see why we shouldn't qualify for a grant. After all you can get one for gardening."

"You may be all right there, the way your models plough up the flying field, although that patch of weeds you call a garden out there wouldn't get you very much, not unless you applied for a land reclamation grant."

"Well, it seems to me that you only have to kick a ball about or dance around in a smock for them to simply throw the money at you."

"Oh, and you want to add to the waste of public money. In my opinion you throw too much private money away on your expensive toys without starting on the public money as well. And, in any case, they'll have it all back off you in no time – in income tax."



What's a groundsman Ern? Eric Morecambe about to chase intruders off the pitch. Centre: Another cut coming up, as the models tail chase keeping the 100,000 football fans cheering and shouting their team on. Right: Ipswich pit crew Alan Marshal, Frank Smart, Stewart Sparkes and Kelly Hennoq make ready the fleet of Aerostars; note twin smoke flares on nearest model.

# THE 1978 CUP FINAL DISPLAY

*Photographs by Ron Moulton, Mike Fantham and Ian Dowsett*

MODEL FLYING at football matches is not a new event, way back in the '50s model planes appeared before the crowds at Wembley. The Wonder Wings display team was originally formed to appear at the 1977 Cup Final, and now it would appear that control line flying demonstrations are becoming increasingly popular with football crowd audiences, as quite a few clubs up and down the country are being asked to give shows.

The important thing to remember is that you're providing an entertainment. Spectacular flying that could have aeromodellers standing on their toes following the action will leave a football crowd unmoved unless they're allowed to participate by shouting or cheering their team on. A good PA system, together with well informed commentators with pre-rehearsed programme and information is essential. Technicalities may come later, albeit in layman's terms, but the crowd must be told the object of the flying presented to them.

Realising the man in the middle is more than a human anchor but actually steers the model through the sky may sound obvious to aeromodellers. But remember, most will sadly never have seen anything like this before - we are just "models on strings" until we tell them how it's done. Outlining the shapes in the sky as they happen prove the skill of the pilot and illustrate the object of the exercise. Even a simple phrase like "upside down flying" allows the

penny to drop for a crowd who may not have even noticed the model was going round the other way! They soon start realising how difficult each manoeuvre is to perform. Commentators should avoid the trap of getting too technical about the planes themselves - simple information and an exciting commentary are preferable to a monologue of specifications.

With combat, right from the take-off, it must be made clear which team is which and get the crowd cheering and counter-cheering to encourage their own side. They'll soon learn what a good bit of flying looks like and soon learn to OOOh and AAAh at near misses as well as cheer to the actual scoring of cuts. In the space of ten minutes they will change from football fans to control line fans but variety is the secret of the programme and even spectacular flying can ultimately leave the crowds bored unless variety is introduced.

Over the last 12 months, the show has been seen by a live audience of  $\frac{1}{3}$  million. As yet but a small step in the promotion of model flying. Thanks to the efforts of the display team members we raised another bonus for SMAE funds, and gained a second set of tracksuits for use this year by the British Control Line Team, thanks to the work of Ian Dowsett who secured them from Ken Bar-

John Newnham had an anxious time starting a reluctant motor in his Nobler stunter assisted here by Steve Webb. Right: Now what comes after the vertical eight? Pete Tindal casually consults flight schedule as model cruises in front of crowds.







Skywriting orange smoke flares. left: an easy-to-follow trail for the crowds to recognise each manoeuvre. Right: Real action in the Ipswich pits as the team races to keep the fleet airborne. The model being returned to the pits on the right has just had its tailplane chewed off by an Arsenal model.

rington Sportswear at short notice prior to the display.

Now, little under a year later, we were back at Wembley for a repeat performance. This year's Final, between Arsenal and Ipswich attracted a fresh 100,000 spectators to Wembley enabling us to present an almost identical display to the one seen last year.

By coincidence, the Cup Final weekend clashed with the date set for the Trials to choose the British Control Line Team, making a tough choice for many of the top UK flyers invited to perform. Fortunately, top aerobatic pilots Pete Tindal and John Newnham decided it was an event not to miss, and reigning British combat champion Vernon Hunt and John Berry the Provisional World Champion, plus Jim Carolan and Phil McKelliget stepped into fly combat.

Having only one practice day under our belts the week before, the day itself finally dawned, with all the magic that a day at the Cup Final produces. Overnight rain kept many of the early morning fans away allowing us easy access into the Stadium by 10 o'clock, necessarily early because the Stadium soon becomes inaccessible due to thronging crowds outside well before the match.

With little to do by way of preparation the flyers had the morning to themselves being entertained watching ITV's Dickie Davies and Brian Moore being plagued by 'Head Groundsman' Eric Morecambe and his linesman Elton John during live pre-match coverage. Soon, however, it was time for the show and once the players had observed the now traditional annual trampling on the lines ritual, we were free to start the display.

A tense moment for John Newnham as his motor reluctantly burst into life and the two aerobatic models were away. Conditions being near ideal in the calm Stadium with each model leaving a blue smoke haze clearly visible against the backdrop of the crowds all round.

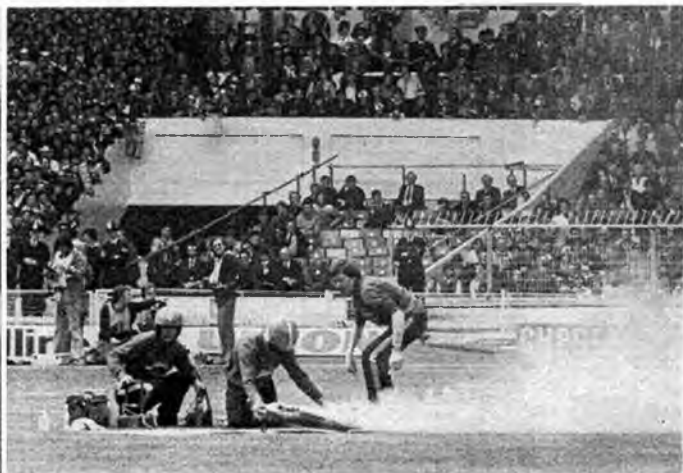
Vernon Hunt the man who gave Arsenal their only victory of the day, back in the air for some more cuts. Right: Jim Carolan sets off another smoke flare for Arsenal pit crew John Whittle and Wally Wallace while Philip Beal disappears in the smoke

A fine display of precision flying by these two pilots coordinated by an excellent commentary from Alan Bowley and Manfred Walker explaining each manoeuvre. Different airspeeds gradually produced manoeuvres slightly out of sequence with each other allowing first one model to perform to the commentary then the other to mimic the pattern allowing a second view and giving a kind of instant replay of each manoeuvre. First to land back on the turf was Pete Tindall to an appreciative round of applause followed shortly afterwards by John Newnham, again receiving an enthusiastic response.

As the two combat teams spilled onto the pitch, rival Arsenal and Ipswich chants filled the air and the flyers waved acknowledgment back to the fans to encourage the cheers. They may have started off football fans but they were soon converted to being combat fans as each cut was received by a massive roar and show of team banners.

Ipswich pilots John Berry and Phil McKelliget were hard pressed to contain the aggressive flying of Vernon Hunt, backed up by Jim Carolan. Arsenal fans were in no doubt as to who was winning as they chanted songs from their end of the Stadium. The experienced pit crews kept the show rolling smoothly in the air as they raced furiously to keep the fleet of models serviced and airborne. All too soon the show was over leaving only the match itself to round off another memorable day at Wembley.

Once again we failed to lure the media with the spectacle of model flying. At least we got a short mention on TV and received quite good coverage on the radio including a long spot on LBC which included a pre-recorded interview with Martin Dilly giving details of the forthcoming World Champs at Woodvale. Model flying has yet to receive its recognition as either a spectator event or a sport in its own right, let's hope we do better at the World Champs now they've seen what we can do.





## Peter N. Scott reconstructs Col. C. E. Bowden's Famous 1935 Biplane

THE IDEA of building a replica of Col Bowden's 1935 *Mouse* biplane design originated in 1972 after locating a copy of F. J. Camm's *The Model Aircraft Book*. The design was shown in reduced 3-view form; after receiving a polite reply from Newne's that "... considering that nearly 40 years and a World War had passed since the book had been published," they could not supply full-size plans. Therefore the job of scaling-up the 3-views began.

That in itself was a time-consuming task; and for one reason or another, construction was not commenced until 1975, with the intention of entering the completed model in the 'Model Engineer' Exhibition. However, the problems involved in trying to safely transport the model from Switzerland to England were prohibitive, and so not until the Spring

of 1976 were flight tests commenced.

At 4½lbs all-up weight, complete with Brown Jr and an original Bowden-type metal prop (still legal in Switzerland), the *Mouse* flies slowly and sedately, and certainly re-echoes those early days at Faireys. Flights of reasonable duration are possible, thanks to the model's delightful ability to fly with the motor throttled back, in low-altitude circles around the operator — while the likelihood of thermal loss is small!

This 9cc petrol-driven model biplane was designed by Captain Bowden to be entirely dismantled and if a heavy landing is made the various component parts will get knocked off. We can refer back to the original article of 1935 to learn of its construction.

First of all a full-sized drawing should be made up, from the outline

drawing, of the fuselage in side elevation, the wing and tailplane, taking great care to locate thrust line and angles of incidence of mainplanes correctly.

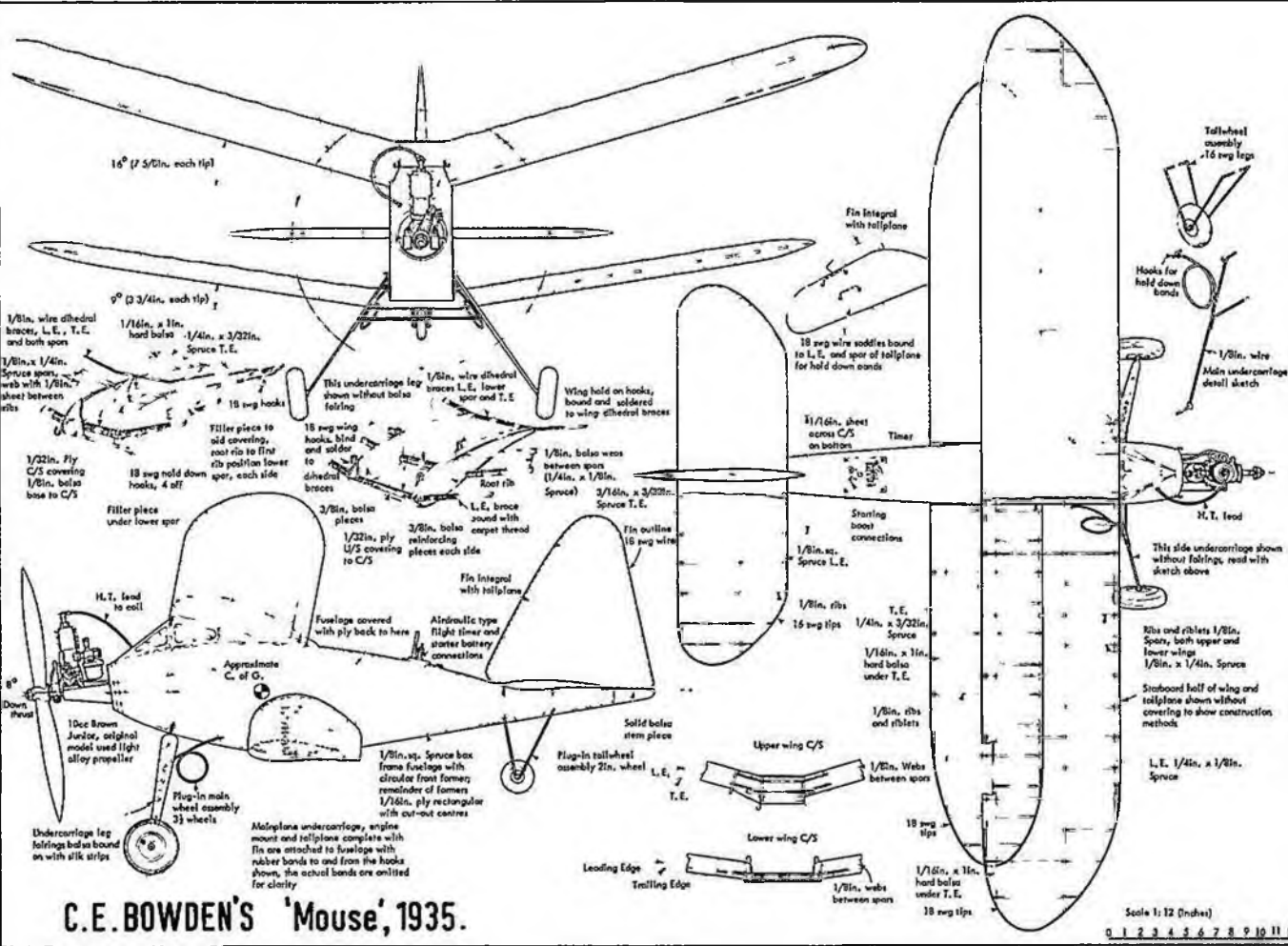
The fuselage formers are stuck and bound at their corners to the longerons. Nos 2, 3, 4 and 5 formers are all made of ¼in three-ply wood in the form of rectangles, the centres being fretted out for lightness, leaving rims of about ½in. The distances between formers vary from each other. The uprights strengthen them and lie alongside the formers. Cross-pieces of ½in x ½in birch are glued in to strengthen the tops and bottoms. The forward part of the fuselage is made very strong, as it has to take engine loads as well as undercarriage mountings.

The undercarriage requires two brass tubes to be bound and glued across the fuselage bottom at Nos 2 and 3. These tubes are of ½in internal diameter to receive the wire prongs of the detachable undercarriage legs. Two smaller brass tubes across the fuselage at formers No 8 and No 9 accommodate the wire prongs of the detachable tail-wheel mounting in the same way. The undercarriage can therefore, also be taken off and floats fitted if the owner later desires to experiment with the model as a seaplane.

Next a small cabin must be erected on top of the fuselage to act as the platform for the top mainplane. The angle to the thrust line must be carefully adhered to in order to ensure the correct angle of incidence. The cabin is constructed by gluing two uprights of ½in balsa across the top of the fuselage supporting a platform of ½in balsa. Finally the cabin sides and a V-shaped front of 1mm ply wood with windows of thin celluloid are stuck around the cabin. Next the

Peter Scott who is also the secretary of the International Model Aero Engine Collectors Society based in Switzerland, holds his replica of Col C. E. Bowden's 'Mouse'.





**C.E. BOWDEN'S 'Mouse', 1935.**

front end of the fuselage, from No 1 former to 15 1/2 ins back, should be covered with 1mm three-ply wood.

The engine used in the original was the American 'Brown Junior' two-stroke of 10cc which weighed 6 1/2 oz, less propeller and mounting, but the tank, coil, and condenser add a further 5 1/2 oz. It was capable of between 4,000 and 5,000 rpm with a suitably low-pitched propeller.

The engine must be run in its upright position with cylinder uppermost. The motor is bolted to a circular disc of 1/2 in ply, at the rear another piece of ply in the form of a square fits into the forward bulkhead of the fuselage, similar to a rubber model noseblock. Wire hooks are placed on the engine mounting and on each side of No 2 bulkhead of the fuselage, to allow rubber bands to retain motor. The coil and condenser are fixed to the floor of the fuselage inside by wiring retaining straps, and are positioned to the rear of No 2 former. Wires are led out to the engine with plenty of slack to allow the engine to be knocked off or taken off its detachable mounts.

The timing mechanism to control

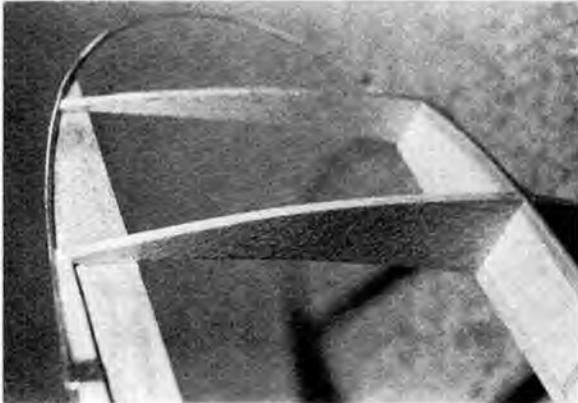
the duration of flight is most essential. Wires must be carried back to No 6 former where the timer is fitted to the top of the fuselage. The action of screwing up or unscrewing the milled head controls the speed of the air-leak operating the 'dashpot'. Two sockets for the detachable plugs allow the model to start up from an accumulator on the ground.

The two main undercarriage legs of 1/2 in diameter spring steel wire are bent inwards at the tops to form prongs to place into the forward brass tubes already located on the fuselage.

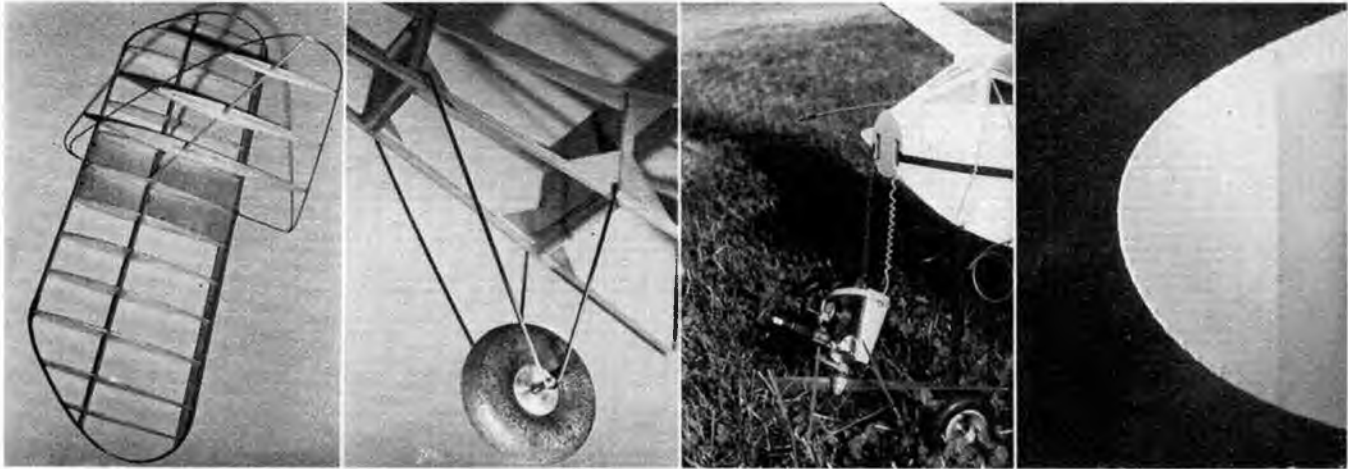
The bottom ends of the legs are bent outwards to form stub axles for the wheels. Elastic bands are used to keep the two legs tight against the fuselage. A cross-bar is carried between the legs, made of the same spring steel wire, and bound to the legs with florists' wire and soldered. From this point two rear spring legs are also attached, by binding and soldering, with their rear ends turned inwards for 1 1/2 in to form prongs to insert into the rear brass tube fitted to the fuselage.

The wing section is both high

1/2 scale copies of the above drawing together with full size rib outlines are available as Plan PET/1346 price 60p plus 20p postage from Plans Service, PO Box 35 Bridge St. Hemel Hempstead HPI IE.



Right: Close up of 18 swg wire wing tips. The exceptional undercamber is clearly evident.



**Details of construction: Left - completed tailplane and fin prior to covering; plug in tail wheel assembly; engine bolted to knock-off mount which is then elastic banded in place; stitching visible on tips and ribs.**

lifting and stable, and varies slightly for top and bottom wing, as each wing has a slightly different function in the design of this model. The ribs are kept of uniform chord, except at the tips and are made of  $\frac{1}{8}$  in balsa, riblets are used between ribs. The two wing halves are joined with the correct dihedral using shaped wire with hooks bound and soldered on, to take elastic bands that keep the wings in position on the fuselage. The tips are formed from 18 swg spring steel piano wire bound on to the leading and trailing edge and glued. The fin is built up of a wire outline of 18 swg wire, balsa streamline shaped ribs are inserted at equal distances, and is covered with silk on both sides.

The fuselage is a straightforward job to cover, but the wings, tailplane and fin are decidedly tricky. This is due to the heavily under-cambered airfoil section, coupled with the wire framework of the fin outline and wing/tail tips. The only solution is – as per the original – to stitch the silk

covering to the fin outline and each wing/tail rib individually; this calls for considerable patience and yards of silk thread. One coat of full size glider dope was called for originally, but in practical terms with today's products three coats of undiluted cellulose dope proved adequate. The use of heavy weights to hold down the structure and prevent warping is, however, essential!

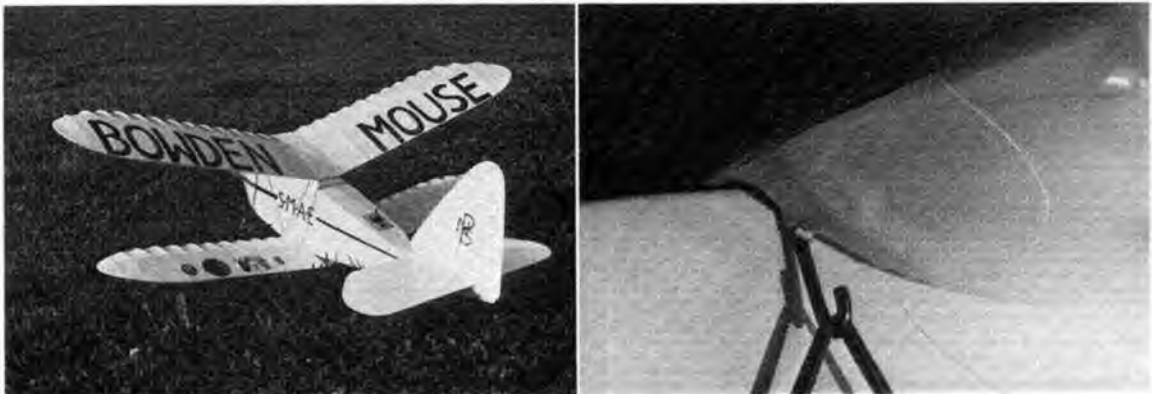
Since the writer is not of the apparently fashionable opinion that a model aeroplane need only be viewed from several yards distance, a considerable time was devoted to achieving a good paint job. A wide, soft brush makes light work of the large areas involved; rubbing down with ultra fine wet-and-dry paper (used wet and lubricated with soap) results in a good surface finish – but go easy over the rib profiles!

Trim on the original was red-on-white, whereas this replica uses black-on-white. Whilst purists may hate the name emblazoned across the wings, and the liberal use of transfers,

the fuselage trim at least is authentic! One concession to modern materials was the addition of small local-reinforcement pieces of white 'Fablon'-type material around the wing and tail hook positions – a strong rubber band, on breaking, makes a lethal projectile as far as a piece of doped silk is concerned. The model when complete is assembled by placing the wings and tailplane upon the fuselage using elastic bands of sufficient strength to just bear the model when lifted by a wing.

No claims are made for this model to be 100 per cent unique – indeed Mike Beach had a replica (but differing in several important detail points) at the 1975 Bowden-Haggart meet. However the constructional details are identical to those of 40 years ago – and the result is an 'antique' model aeroplane which, whilst perhaps not an intrinsically beautiful design, does look like a 'Model Aeroplane'.

**The completed model may well be familiar to British readers who have seen Mike Beach's version at meetings. Fablon patches used to protect the surfaces near band hooks, a useful tip which could be adopted for modern models!**





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# Latest Engine News

## K&B 3.5 Free-Flight Engine

Now available from the UK importers, Irvine Engines of Barnet, Herts, is the standard non throttle version of the K&B 3.5cc engine that was the subject of the *AM* Engine Test report in the March 1978 issue. As was mentioned at that time, the differences between the standard and R/C aircraft versions of the K&B 3.5 are small. Much of what was written about the 3.5 R/C in the March issue therefore applies also the standard model.

The differences are confined solely to the intake and exhaust systems. The R/C engine's Perry carburettor is replaced by a plain machined aluminium venturi intake and conventional needle-valve assembly. Unobstructed by a spraybar, the standard intake has an effective choke area of approximately 47sq.mm, which is more than three times that of the R/C engine and, by any standards, is very large for a motor of 3.5cc swept volume. As was suggested in the test report, this increase in choke area should add at least 5 per cent to the engine's peak bhp: in fact a 10 per cent increase might not be an excessively optimistic estimate.

Although this engine has been listed in the UK as the K&B 3.5cc 'Stunt' (possibly a misprint for 'Standard') its choke area makes it totally unsuitable for C/L stunt work and it is intended primarily as a free-flight contest engine for non-FAI events. Unlike the R/C and marine versions, it is therefore supplied without a silencer: instead, it has a short, pressure-diecast aluminium exhaust stub pipe that takes the place of the silencer adaptor. (This could



The K&B 3.5 free-flight engine. Unquestionably the most powerful 3.5cc F/F motor at present available.



be used as an adaptor for a tuned pipe although the engine's exhaust period, already fairly long at 150 degrees of crank angle, has not been modified to take full advantage of a pipe.)

At a checked weight of 199.5 grammes or 7.04oz, including exhaust stub, the K&B 3.5 free-flight engine is only about 1.3oz heavier than a Rossi R.15 and requires only slightly wider (about  $\frac{1}{16}$ in.) bearer spacing. It could therefore be used as an alternative to the Rossi in an FAI size model for open free-flight. The last Rossi *Normale* that we tested produced 0.72 bhp at 26,000 rpm on straight FAI 80/20 fuel. Current models are probably developing a little more than this. Our K&B 3.5 R/C delivered 0.73 bhp at between 21,000 and 22,000 rpm when running on 5% nitro fuel, so, on straight fuel, the standard engine might not produce a very much higher peak output than the Rossi, but it would turn a larger and more efficient prop in doing so. These K&B ABC engines

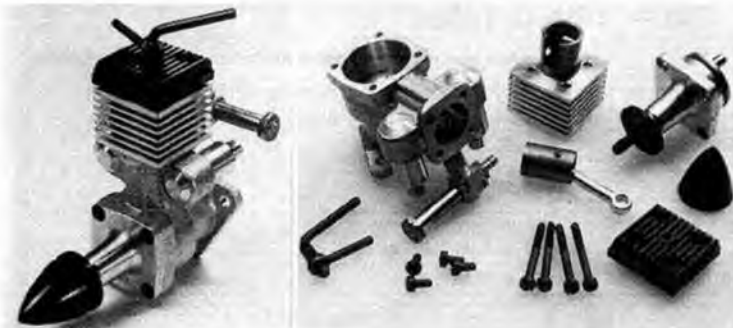
are, of course, intended for operation on high nitro fuels (50 per cent or more of nitromethane) and our tests have shown that a 50 per cent nitro fuel can boost the output of the 3.5 by between 20 and 25 per cent. We would therefore expect that, in a free-flight model, one of these engines, running on 50-60 per cent nitro would be capable of producing around 0.95 bhp in the region of 24,000 rpm.

## Revised Pfeffer 0.6

The Czechoslovakian Pfeffer 0.6 Diesel has been made for many years now and, in 1973, a small number were imported for sale in the UK. We acquired one of the early versions in 1971 and this was later described in the LEN columns.

It is some time since Pfeffers were obtainable in Britain but, recently, an improved version was received from Austria, very kindly donated for the writer's collection by Vaclav Horcicka of the Hirtenberger (HP) company. This retains the original model's distinctive square finned cylinder jacket and matching square head but incorporates one or two interesting modifications. The most obvious of these are the neat built-in twin 'silencers'. These consist of machined aluminium expansion chambers pressed into housings cast onto the sides of the main casting, in place of the plain square ports of the original model. They have 2.7mm i.d. x 4.5mm o.d. outlets to which silicone tube exhaust pipes can be added, enabling cleaner and quieter operation to be achieved—a nice feature for a small free-flight scale model, for example. Another modification is the longer, upwardly inclined rear intake, a change made necessary by the need for the needle-valve to clear the silencer outlets.

The latest version of the distinctive looking Czechoslovakian Pfeffer 0.6cc diesel. Note built-in silencers and triangular mounting plate. Internally it follows vintage diesel design with piston controlled induction and a very long stroke.



Mr Pfeffer, who makes these little motors virtually single-handed, has been building model engines for very many years and was responsible for the Letmo engines of the early post-war period. The 0-6 in fact is reminiscent in many respects of diesels of that era. It has a very long stroke and uses the traditional 3-port two-stroke layout in which the induction port is located in the lower part of the cylinder at the rear and is uncovered by the piston skirt. In the Pfeffer, of course, as in many early 3-port diesels, there are actually four cylinder ports since the exhaust is divided between two diametrically opposed ports, while the transfer port is in the form of a vertical slot in the front of the cylinder liner and is fed from a channel in the casting.

The square finned cylinder jacket has generous cooling area and is closely fitted to the cylinder liner for efficient heat dissipation. The head, also of machined aluminium, now has a black anodised finish (earlier models were red) and the complete cylinder assembly is tied to the crankcase with four long 2mm screws. The flat crown piston has a very long skirt and is coupled to a machined aluminium conrod by a pressed-in gudgeon-pin. The crankshaft has a 5mm dia journal and a 3mm dia crankpin on a plain crankdisc and runs in a separate housing that is secured to the crankcase with four 2mm screws.

The Pfeffer has a bore and stroke of 8 x 12mm, giving a swept volume of 0.6032cc or 0.0368cu.in. Checked weight of the example illustrated was 50.2 grammes or 1.77oz.

#### New Davis Diesel Developments

In addition to the diesel conversions for Cox .049 and .020 engines mentioned in the February issue, Davis Diesel Developments Inc are now manufacturing a conversion kit for the Cox .09 engines. Since the Cox Tee-Dee is one of the most powerful 1.5cc class glow engines on the market, it will be interesting to see how the Davis Diesel version measures up to existing diesel 1.5s. According to DDD literature, a typical Davis converted Cox 09 will swing a 9 x 4 prop (make unspecified) at 11,000 rpm. Compared with the figures we obtained in tests of both the TD 09 and Cox Medallion 09 glow engines, this is an immense improvement so far as the ability to swing relatively large props is concerned. Our original test model TD 09, despite its very high peak output (over 0.28 bhp at nearly 20,000 rpm on 30 per cent nitro fuel), was quite unhappy on anything larger than an 8 x 4 and neither the Tee-Dee 09, nor the



Above left: DDD conversion for Cox 049/051 and 09 engines are now available with lever for R/C control of compression adjustment. Above right: New DDD accessory is this starter spring for Cox TD 049/51. Suitable for both glow and diesel converted units. Left: Davis Diesel (DDD) conversion of the Cox Pee-Wee .020 engine.

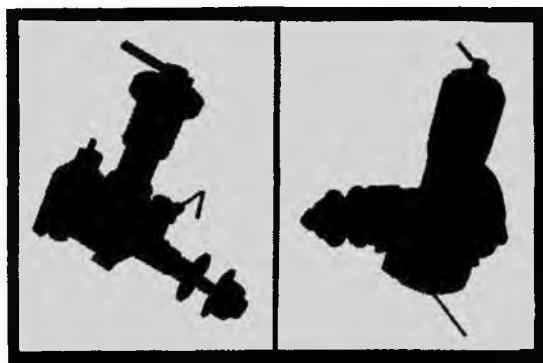
Medallion 09 were found to be capable of more than 8,000-9,000 rpm on various 9 x 4 props. Clearly, the 11,000 on a 9 x 4 claimed for the DDD conversion would require a very large increase in torque and it would be interesting to know how well this improvement is maintained under the lighter loading of smaller props.

Robert Davis is now also offering a 'throttle' version of his diesel conversion system, to suit either the .049/.051 or .09 Cox engines. This consists of an independently adjustable arm on the compression screw for coupling to a servo. Using the compression adjustment as a very effective means of controlling engine rpm is feasible because of the DDD system's use of flexible fluoro-carbon seals instead of a tightly fitted contra

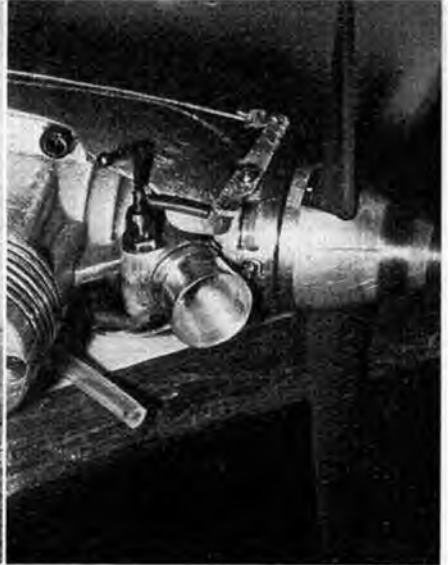
piston. The kit also includes cylinder flange washers to enable the cylinder to be raised, thereby lifting the lower edge of the exhaust port to eliminate sub-piston air induction.

#### Silhouettes

Frequently asked to identify old and sometimes obscure model engines, we thought that it was about time we retaliated. See photo. The unforgettable shape of the British beginner's diesel on the left will be easily recognised, especially by older readers. The one on the right, from the same era, is of American origin and a bit trickier. No prizes for correct answers but if any readers who fancy that they can identify both motors care to write their solutions on post-cards, we will publish names, along with details of the two engines shown, in the next LEN.



How many readers can identify these two engines? See item under 'Silhouettes'.



A wide angle 25mm lens still captures all the picture in a confined space, Nottelmann of West Germany hangs his model on the scales at the 76 indoor World Championships assisted by Peter Freebrey. Centre: Fast film 400ASA and shutter 1/1000 sec. freezes the action as Andy Crips launches his FIC power model. Right: Flash allows the use of small aperture F16 despite using slow 125ASA film, necessary for a sharp picture when really close to the subject in this case Alain Roux's engine seen in Denmark.

# PHOTO TIPS

by Mike Fantham

There are two main variables in film choice; film *type* and film *speed*. The difference between manufacturers is a case of personal preference – to find that which best suits taste and pocket.

**Film type**, Three varieties are in common use; colour negative film for colour prints; colour positive film for slide transparencies and monochrome negative film for black and white prints. Prints may be made from slides but are more expensive than prints from colour negatives and the quality is not as good.

So your choice of film type depends on the form in which you want the final results. If you cannot decide or need to be flexible, shoot colour film, preferably transparencies, the other types may be copied later. However if you start with monochrome negatives, no easy method of getting colour from black and white is available!

**Film speed**, The second variable, is a concept which needs some explanation. When light falls on the photosensitive emulsion, with which films are coated, chemical changes occur which later processing can convert to an image. The sensitivity with which the film reacts to the light is called the speed. Fast films react quickly and need less light to make a picture than slow films. We pay for the advantage of higher film speed with a loss of image quality. All photographic images are made up of individual grains of metallic silver of different sizes. The faster the film, the larger and more apparent this granularity of image becomes. Grain also becomes more apparent as the picture size is increased for an enlarged print or large projected slide image.

Film speed is measured on two scales; the ASA scale is used in England and America and the DIN scale is used elsewhere. A slow film is 25 ASA or 15 DIN and a fast film is 400 ASA or 27 DIN.

Mike Warren's FIA tail appears almost half as large as the wing distortion is caused by using a 25mm wide angled lens too close to the subject. 125ASA film used for normal day light shots.



Every time the film gets twice as sensitive to light (it takes only half as long to form the image) the ASA number doubles and the DIN number goes up by three.

## Film Choice

Fast film is chosen for use in conditions of low light, dull days, late evenings or indoor shots without flash. Fast action shots that require very fast shutter speeds to freeze the action also require faster more sensitive film to enable short exposure. For still life photos or on really bright sunny days a slower film with finer grain gives higher quality results and 'sees' more detail, avoiding black shadows.

## Lens Aperture and Shutter Speed

Two features of the camera affect the amount of light that reaches the film. Firstly, aperture of the lens, the size of the hole through which the light passes is adjusted by an iris diaphragm to give a variable size hole. Secondly the shutter speed, the time for which the film is exposed.

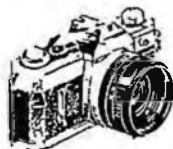
The larger the aperture or the slower the shutter speed, the more light reaches the film and vice versa. Both of these quantities may be varied to ensure that the correct amount of light reaches the film, for any given daylight condition. Increasing one requires a balance reducing the other. Some cameras offer no control over aperture or shutter speed and pictures may only be taken under a narrow range of conditions, usually in sunny weather. Others allow small adjustments, often by setting to different weather symbols. Full control of both aperture and shutter speed is available on more complex cameras. The right amount of light for a correct exposure may be achieved by various combinations of the two controls, a slow shutter speed and small aperture being equivalent in terms of exposure to a fast shutter speed and larger aperture.

Shutter speeds are measured in fractions of a second, usually in the series 1, 1/2, 1/3, 1/15, 1/30, 1/60, 1/125, 1/250, 1/500, 1/1000. Each time is about half the previous one, while apertures are measured in 'F stop' numbers usually in the series 1.4, 2, 2.8, 4, 5.6, 8, 11, 16, 22 . . . The amount of light passed by the lens is halved for each step up in F stop. The equivalence of shutter speed and aperture steps means that the exposure given by 1/500 at F2.8 is the same as 1/15 at F16.

## Lens Aperture Choice

For a close up photograph or whenever the depth of field must be controlled, the aperture will be the major consideration. The effect is that when the lens aperture is made smaller the depth of field increases, all other things being equal.





# MODEL PHOTO COMPETITION

★ Win Super Prizes

A/M  
JULY 1978  
MODEL PHOTO COMPETITION  
Colour or Monochrome Coupon

## RULES

1. The theme of the competition is to select the photograph judged to be the best pictorial presentation of Aeromodelling. All submissions must be certified as the work of the entrant, by signature on the rear face or mount.
2. There are two competition classes:
  - (a) Colour slides which should preferably be vertical format 35mm, or larger.
  - (b) Black and white prints of any size up to 10 x 8 ins., negatives need not be provided.
3. The following information must accompany each entry:
  - (a) Sender's name and address,
  - (b) full details of the model, location, builder, event, title or caption.
4. Entry is free. Each entry (however many pictures it contains) must be accompanied by a contest coupon taken from an issue of AeroModeller magazine. There is no limit to the number of entries that may be made - but remember that quality will count, not quantity.
5. Clearly mark the entry "Model Photo Competition" and send to AeroModeller, 13-15 Bridge St., Hemel Hempstead, Herts.
6. Proof of postage cannot be held as proof of receipt by AeroModeller. While every care is taken of material received, this journal cannot take responsibility for any loss or damage to entries whatever the cause.
7. Entries can only be returned after the judging if suitable postage and packing is provided.
8. The Judges' decision is final in all matters and no correspondence can be undertaken in connection with the contest.
9. Entry to the contest implies full acceptance of all rules.
10. AeroModeller reserves the right to publish any photo during or after the contest. Copyright of all entries rests with the entrant.
11. Closing date for entries 29th September, 1978. Winners will be announced in December AeroModeller on sale 17th November, 1978.

Prizes include: Kodak's latest EK100 instant camera and film, with other prizes of Colour transparency, Black and White Kodak film and Instaplus pocket EF1 camera with flash unit supplied by importers and distributors Paul Plus Ltd, members of the Photopia International Group. Cosina Compact 35S camera supplied by Photographic Instruments Ltd. Photographic equipment and accessories from Patterson Products including a THERMO-DRUM print developer, for colour or black and white, Micro focus finder and bottles of developing chemicals and accessories. Other prizes include Photography Year Books and AeroModeller Annuals from Argus Books.

Depth of field is simply the zone of acceptably sharp focus in the picture and it extends both in front of and to a greater extent behind the point on which you actually focus the lens. Depth of field increases as the aperture decreases and as the distance of the point of focus from the camera increases. So for close-ups a small aperture is required, otherwise the depth of field will be small, and this will tend to require a slow shutter speed vulnerable to camera shake. The answer is to increase the light or steady the camera and subject firmly by using a convenient rest or tripod. The extra light can be provided very easily by a flashgun which is especially useful 'in the field'.

A shallow depth of field can be useful in isolating the subject from the background, this effect is especially noticeable with long focal length lenses, and can be very pleasing.

### Shutter Speed Choice

Usually the shutter speed will be decided by the speed of movement of the subject or considerations of camera shake, which becomes more important as the lens focal length increases. This is because lenses with larger focal lengths tend to cause more image magnification and we all know how hard it is to get a steady image in large binoculars when hand holding them. A tripod can alleviate this problem however, both for big binoculars and long focal length lenses.

With a fast moving object, like a high powered model aircraft, there are two ways of reducing the blur caused by the fact that the subject moves while the shutter is open. The first method is to reduce the time it takes to make the pictures by using a faster

shutter speed in conjunction with a larger aperture, the second is to pan or move the camera in unison with the subject. In this way it is possible to get a controlled degree of blur in the background, to suggest movement, but keep the subject sharp. A shutter speed of 1/125 will 'stop' an indoor model but a control line speed model would still travel a few inches even during 1/1000 of a second exposure and panning would be vital. The general rule would be to keep your shutter speed as high as possible for action shots unless depths of field become a problem or you are after some deliberate blurred effect. Another rule is that to avoid the effects of camera shake, the slowest shutter speed should be about 1/(lens focal length mm) so for a 50mm lens, 1/60 is a safe minimum for hand held pictures; this is a good rule of thumb.

Finally, as an example of how all these features can combine, imagine a situation where you want to photograph a fast moving subject with a long focus lens and still get good depth of field to allow for focussing problems due to the motion. A fast shutter speed and small aperture will be required calling for a fast film even in bright daylight. It is possible to further increase film speed artificially by special processing and I use this technique to photograph indoor flying at Cardington without flash, rating 400 ASA film at 1600 ASA. Black and white and slide films may be 'pushed' in this way but colour negative film is more difficult. Do make sure that you get film exposed in this way processed correctly (or do it yourself).

I hope this has given some insight into film choice, although I have barely scratched the surface. You will have to turn to the specialist photographic press such as *Photography* for further details.

John O'Donnell launches his Nats fly-off, 400 ASA film 1/1000 sec. shutter speed. Wing appears kinked due to an illusion created by partial masking by propeller.



Bud Romak FID World Champion inside Cardington. 400 ASA film uprated to 1600ASA (developed in Acuspeed) to compensate for dark interior. 135mm telephoto lens at F4 gives shallow depth of field, near tail half and background out of focus.





# Fly it again Sam...

Colin Watts Streamline Cyclone powered by a Madewell 49.

**ACTUALLY, SAM** is not a who it's a what. The Society of Antique Modellers (it's the models that are antique, not the flyers) is a collection of people from various backgrounds and ages who are all dedicated to preserving vintage free flight models. Of the various types, power is most popular with rubber and glider also flown, being any designs, plans or kits first published prior to 1942.

SAM is now over 3000 members strong world wide, divided into what are called Chapters and we here in England are the first official group outside the United States, although many have been individual members for a number of years.

We have been designated as Chapter 35 and at our first meeting, 30 modellers of all ages enrolled, and offer a monthly magazine, rule book and decals for a fee of £2.50. Some of our members are planning a visit to this year's SAM Championships in America this summer so we're looking forward to the news they will bring back of modelling the other side of the water.

Flying meetings average one a month throughout the year where we chat, swop and most important fly. One of our recent winter meets was attended by some 40 models on show. Powerhouses, Cumulus, Mercury, Trenton Terror, Bowdens, etc. All the designs one usually sees in the pages of pre-war issues of the Flying Aces, Model Airplane News or Aero Modeller. Recently one or two of the larger model shops have had enquiries about old timer models and these have been passed on to us thereby swelling our mailing list.

Younger modellers are also finding a new interest in the classic lines of these old aircraft. Mark Hinton with his Eastern States Gas Champ and Mike Newall with his Powerhouse for instance, and Simon Watts (12 yrs.) with his Cyril Shaw design 'Envoy'.

We have a large number of plans available for genuine enquirers, also available where to get Trexler wheels and certain spares and of course swapping for that Motor you have always cherished.

With a few exceptions, the origins of Power Model Flying are as American as chewing gum or Benny Good-

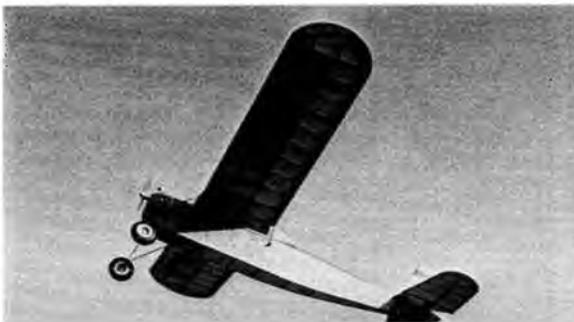
man! Before looking in any detail at the Models and Modellers that started a whole new sport, it is interesting to look briefly at what was required to build the earliest Power Models. Firstly, money – Model Petrol Engines were costly, more than one weeks wages by middle class American standards. Balsa wood was also expensive in the early 30s by comparison with later standards. Access to flying sites was then, and remains, a vital factor and when models are in the 10ft to 12ft span category, large open sites and a car to transport them are the order of the day; in this respect middle class America was averaging about one car per family as against one car per twenty families in England.

The many Air Races and record breaking flights that were then popular gained much space in local and national papers and much radio air time. America was air minded, youth organisations obtaining good class technical recruits for the flying services, magazines such as 'Air Trails' which was basically about full size flying, started model flying sections, mostly aimed at young teenagers, not least, cheap model plane kits that any boy could make and 'they really fly' (even by modern peanut standards!) were available for about 30c nationwide, by post. Into this spawning ground of enthusiasm stuttered the first engines, and a new American phrase was born, the 'gas model'.

To be historically accurate about who made the first successful power model flight is just impossible; sometime in 1932 in England Edgar Westbury built a 25cc petrol engine for a Col. C. E. Bowden to put into a large Biplane called the 'Kanga' – perhaps simultaneously Bill Brown in America produced the Brown Junior 10cc for Maxwell Bassett to use in high wing cabin designs called 'Miss Philadelphia'.

With the benefit of hindsight I can say that Bill Brown's design was better than Edgar Westbury's but only marginally so. However, throughout the history of aviation, both full size and model, it is not always technical merit that wins the day, but the social climate that decides which will fail or succeed. So it was with em-

Aerial shot of Alan Morris' Trenton Terror (Miss Trenton) pre-war Air Trials. Right, Jack Law fires up the Brown Junior engine in his Ben Shershaw designed Scientific Mercury.





Jacks Law releases Scientific Mercury watched by Peter Fisher (Performance Kits). David Baker launches his Porlock Puffin, another Col. C. E. Bowden design from a 1937 Aeromodeller, this one fitted with Futaba single channel radio assist.

byronic power models, American modellers were ready there and then but British modellers in general were not ready until 1939 or so, and then of course the war intervened. In 1935 when an income of £5 per week was very 'middle class' indeed an imported Brown Junior was £6.10s. but I don't think it was price alone that deterred some modellers. At this period we were fiercely English and all that was American was considered loud and brash. The modelling press of the period had an attitude that was really quite anti-American, to make matters worse some influential writers of the period published their own designs which were so unsound both structurally and aerodynamically that even if anyone had actually been able to build one its chances of flying were minimal!

If all this talk of these wonderful old models has rekindled an old passion or perhaps awakened a new interest, you might like to get in touch with us, or come along to one of our meetings.

We're always pleased to hear from vintage enthusiasts SAM 35th Chapter Secretary, David Baker, 22 Ellington Road, Muswell Hill, London N10. Tel. No. 01-883 9013.



**WAKEFIELD JUBILEE CONTEST** 15th October 1978. Venue: RAF WATTON (on B11 08 East of Watton, Norfolk).

TO COMMEMORATE the 50th Anniversary of the original Lord Wakefield Trophy contest for rubber driven duration models, a Jubilee year event has been organised to reawaken interest in flying these old rule Wakefields. Two events will be run WAKEFIELD PRE '51-PRE '54 as well as current FAI F1B Rules.

The E. W. 'Ted' Evans Memorial Wakefield Trophy has been re-allocated to this event by the committee of the South Midlands Area of SMAE. Considerable interest is being shown by Vintage and Free Flight enthusiasts in England and proxy flyers can be arranged for overseas readers wishing to participate as in the good old days. Those considering building a model specially for the event might note that pre January '51 designs are also eligible for SMAE Vintage events.

Subject to the availability of accommodation it may be possible to arrange a static exhibition of some of the original models at Watton on the day of the competition. Pre 1951 Rules. Total area of main plane 200in. sq. ±10sq. in. (meaning built surface area no allowance for dihedral). Tail area not to exceed 33% of wing. Minimum cross section overall length of fuselage squared, divided by 100. Minimum weight including rubber 8oz.

1951-1953 Rules. Total area of horizontal surfaces 17-19 dcm sq. (263½-294½in. sq.) minimum fuselage cross section 65cm sq. (10.075in. sq.) minimum weight including rubber 230 grams (8.113oz).

Pre 1954 Contest Rules. All flights to be timed by official timekeepers. All models to take-off unassisted from three points in contact with ground. Maximum time of 10 minutes per flight allowed from allocation of timekeeper to card being returned to control. Motors must not be wound before timekeeper allocated. (Exceeding time limit constitutes an attempt - two allowed per round). Maximum flight time 4 minutes. 2 models allowed.

Current F1B Rules. Total area of horizontal surfaces 17-19 dcm. sq. (263½-294½in. sq.) Minimum weight of model (less motor) 190 grams (6.70oz) Maximum weight of motor 40 grams. (1.41oz.)

Current F1B Contest Rules. Flight may be timed by timekeeper of competitor's choice. Models may be hand launched. Models to be launched from starting line. No limit on time taken to make each flight during each round. Maximum flight time 3 minutes and 3 models allowed.

Models Eligible for Contest. From the above it will be noted that a Wakefield designed to pre 1951 rules may be outside the 1951-53 specification. It may be too small in area or if the fuselage is short it could be too small in cross section; the weight requirement was also less. However, for this contest both may be entered but a model to the pre 1951 specification must be a published design and in accordance with the SMAE Vintage rules. The entrant must provide proof of publication date (prior to 1st January 1951). Models conforming to the 1951-1953 rules may be own design. Models to both rules will be flown in the same event with a special prize for the highest placed pre 1951 design. All models will be liable to processing. Both Contests will be held in rounds alternating between pre 54 and current rules starting at 10am. Entry fee 50p. No re-entries, further details from Bob Wells, 26 Nelmes Way, Hornchurch, Essex.



Ken Faux launches his FAI power model during the Halifax Trophy event. All competitors over-ran in the fly off by using 7 second runs instead of the Rule Book 4 secs. Some competitors then took an extra second attempt on 4 secs. to cause confusion for the organisers. Centre, Dave Taylor reached the fly-off in the Gamage Cup at Bassingbourne and scored a flight of 5:17 in his first ever fly-off. Design is Mike Fantham's 'Rubber Boots' packed with 16 strands of rubber. Right, Mike Bulls latest coupe with Gottingen 415 flat bottom section rolled balsa fuselage with extra bulge to meet cross section rule uses 18in. x 22in. prop.

## Free Flight Scene

### 2nd SMAE AREA CENTRALISED CONTEST

These contests are always rather hard to report, since several venues are used around the country, and the results collated centrally by competition secretary Dave Stapleton; half a dozen stamped, addressed envelopes, one for each event, will bring you the complete results. April 16th was a calm, dullish day over most of Britain, and this was certainly the case for the Midland area flyers at Barkston Heath; the gentle lift let people max out in Open Glider, including Birmingham's Dave Greaves. Flying the A/2 he used in the 1972 European Championships, first published in Free Flight News in March 1973, and now equipped with a circle tow hook based on Ian Fairgrievies' design, Dave circle towed for ten minutes in the fly-off and finally zoom launched into gentle lift. Tony Cordes liked the look of the same patch of air, and the two gliders circled together with Dave's model turning back over the timekeepers; Tony landed at 23:35, but Dave Greaves' final time when he landed three-quarters of a mile away was 51:25, which seems likely to stand as Britain's longest-ever fly-off flight for some time. Congratulations! Using quite a thick airfoil, with maximum under-camber at about 57%, and peak top camber at 34%, the overall thickness is almost 8%, section camber being rather greater than the Shoaf; the mainspar has 4 x 6 spruce on top and 4 x 8 underneath, with 2mm webbing at the rear of these two members. A 2 x 4 spruce spar is located 20% back from the leading edge, which is carved from 13 x 10 balsa, and a 2.5 square balsa spar prevents tissue sag on the upper rear surface. Twin 10 swg wire joiners run direct in the ply ribs, and are not tied structurally to the spars; cg is at 54% and the tailplans is undercambered.

Perhaps we in the UK should adopt the record system successfully used in the United States by the AMA, where total times in all officially-sanctioned contests are taken as eligible for consideration as national records. Your own opinions on this would be welcomed.

### ST ALBANS GALA - Bassingbourne - 30th April 1978

It has been quite surprising how many days we have had this year with a nasty cold north/northeast wind blowing, and this particular day was no exception. The trouble is, as regular Bassingbourne flyers know, the upwind wood behind the golf course is remarkably efficient at producing turbulence at A/2 line height. As you move briskly upwind to get your A/2 towing nicely it suddenly pulls so hard that you reverse direction - and then the line goes dead slack. Result, model with conventional tow hook - no I don't mean circle - slips off! Not easy!

It was not a day for high scores; Pete Putnam as contest director opted for a 2½ min max for everything - 3 Open and 3 FAI events. Even so, the gliders failed to max out, probably because of the above mentioned turbulence. I certainly had no luck, putting both models out of action with sillies such as landing among saplings and ripping all rudder adjustments off.

Hard luck story of the day goes to Paul Barnett aged 16 who had a very nicely built Dixielander; the mainspring on his KSB timer broke, he borrowed his father's timer and modified the engine stop system to squeeze off. He proceeded to get his second max but the D/T fuse was set too long and the thermal was too good! Result, lost model and no reserve.

Tim Gray lost one rubber model, saturated another in the water which was in plentiful supply all over the airfield and had to use a Wakefield for the open rubber fly off, placing 3rd for his efforts. Roy Collins gave one of his FAI power models a ducking and several others did the same. Garry Madelin got his three flights in open glider done in the last half hour and came 3rd. Ivan Taylor made the longest trip to Bassingbourne and maxed out in Wakefield to win - congratulations. Then to the fly offs for open power and rubber.

In Open Power Dick Johnson opted out leaving Jon Fletcher and Fred Chilton, Jon flew his new light ¼A for a very fine 4.15 just off the 'drome. Fred flew a bigger FAI size model but missed the good air for 2.23. John had firmly believed and been advised to the effect that it wasn't worth flying ¼A in open power!

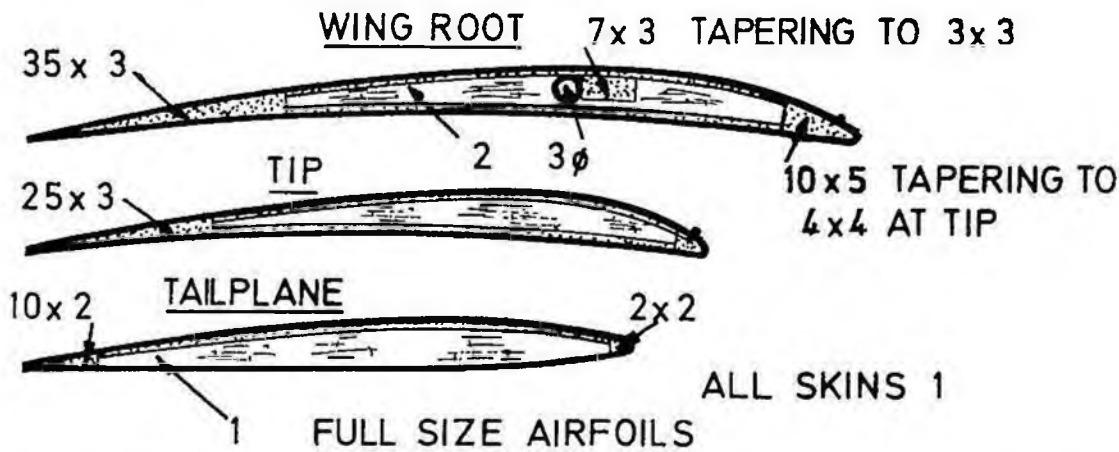
Open Rubber saw the evergreen dynamic duo Paveley and Wells battling it out; this time a very nice 4.53 for Bob to win comfortably despite some adverse banter about the standard of covering of his model.

### Results

**Open Power** - 1. J. Fletcher M+4:15; 2. F. Chilton M+2:23; 3. R. Johnson M+0:0. **Open Rubber** - 1. R. Wells M+4:53; 2. R. Paveley M+3:32; 3. T. Gray M+1:30. **Open Glider** - 1. M. Dilly 7:02; 2. M. Harper 6:49; 3. G. Madelin 6:02. **F1C** - R. Collins 9:14; 2. P. Bond 8:40. **F1B** - L. Taylor 12:30; 2. D. Hiperson 11:56; 3. R. Paveley 10:41. **F1A** - 1. J. Baguley 11:08; 2. R. Miller 10:56; 3. D. Hambley 10:04.

### Postscript

Paul Barnett's model lost with no name and address was returned to Bassingbourne via the local police. Who did they have on that job? Marvellous!



THIS MONTH we present three-view drawings of the aircraft that Jean-Claude Neglais used to win the 1977 Pierre Trebod Wakefield event at Marigny. Reading some of the recent correspondence on proposals for a 50th anniversary Wakefield contest rather makes me wonder why some of the effort isn't put into a British-run event to the present rules, having a similar prestige to the Trebod held in France. Are we to believe that all those people lurking in waves of nostalgia outside the current contest scene are not capable of building and flying a Wakefield good enough to match the standards the North Koreans have set the world? Surely not! However, if there really are lofts all over Britain stuffed with old-rule Wakes, then by all means let us have a Vintage event for them.

I have heard it said that 'old' Wakefields required more attention to strong light structural design than the present type built to the 40 gms rubber specification. The motor weight reduction allows the use of a timer, resulting in increased D/T accuracy, essential for flying in small fields. Use of a dural or fibreglass motor tube improves burst resistance meaning that the handling of the whole aircraft is far less nerve-wracking than was my Korda Wake in 1950.

Good structural design and light building is just as vital as ever in order to keep tailplane and tip weights low, so as to improve thermalising and gust recovery.

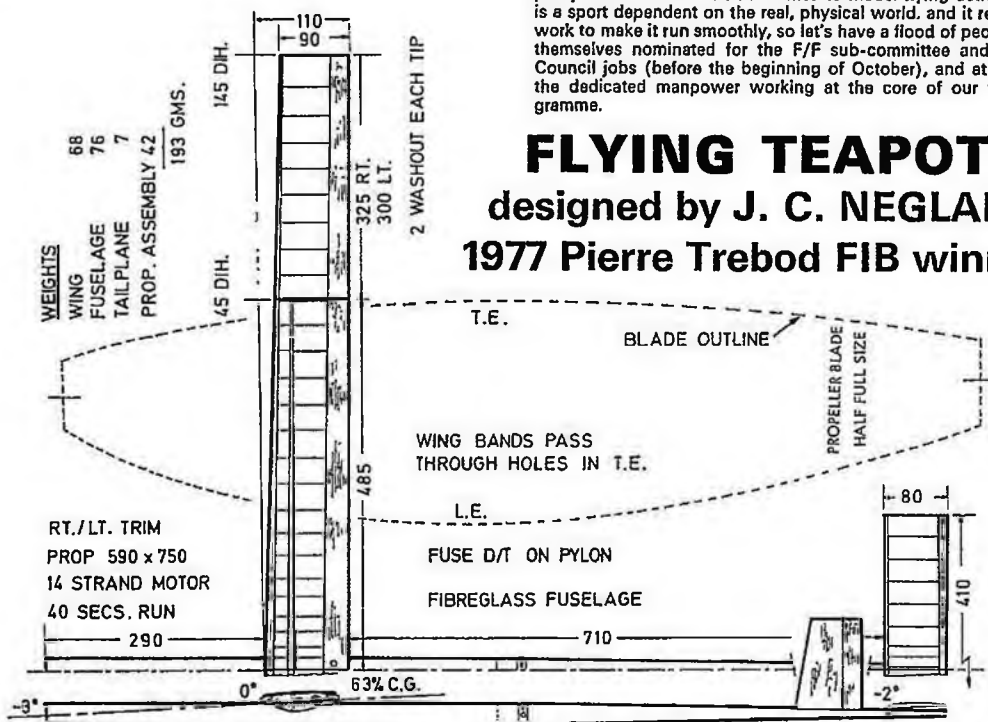
As for the suggestion in last month's readers' letters that the SMAE should ask for 'their cup' back from the FAI, I feel it is worth pointing out that the present FIB rules attract entries from over 30 nations at the World Champs, and the rules have been developed over the past 50 years to achieve this level of popularity internationally. The old rule Wakefield contests never attracted entries on this scale; the early Anglo-American rivalry may have been fun but it was hardly a world championship. I personally feel that it is largely because we in the UK continue to fritter our abilities away in non-FAI events that our performances are so often so far behind the world's best.

With good free-flight sites scarcer than hens' teeth in the UK, and reliable manpower to look and negotiate for new ones even scarcer, one thing that is needed is for more people with free-flight interests of all sorts to involve themselves with the SMAE's F/F programme, especially at the early planning stage. With the current appalling lack of preparedness marring this year's contest programme more dedicated people are needed, to each do a small part of the organisation, instead of leaving it all to about four people, with the resultant muddles and lack of continuity. In spite of the current craze for ESP, and similar loony-fringe pseudo-scientific rubbish, telepathy doesn't work when it comes to model flying activities. Ours is a sport dependent on the real, physical world, and it requires real work to make it run smoothly, so let's have a flood of people getting themselves nominated for the F/F sub-committee and the other Council jobs (before the beginning of October), and at least have the dedicated manpower working at the core of our flying programme.

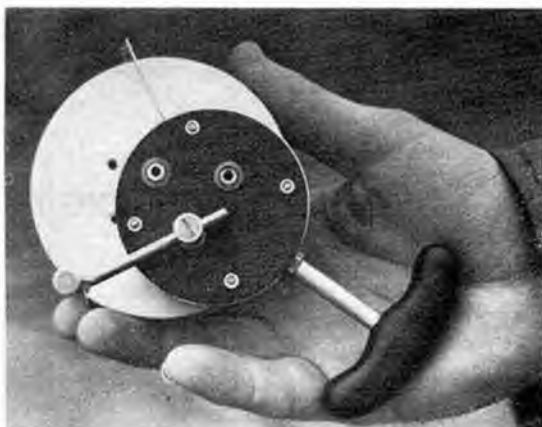
## FLYING TEAPOT

designed by J. C. NEGLAIS

### 1977 Pierre Trebod FIB winner







### MORE FROM MAXAID

Maxaid Modelling Products, in the person of Elton Drew, recently showed me the prototype of what to me is the neatest glider winch I've yet seen. Weighing about 6 ounces, it is designed for maximum pocketability, having a folding handle that will be locked on the production version by means of a knurled nut that can be hand-tightened. Thus the whole winch can be easily slipped into a pocket when you have finished towing, since the handle folds flat against the winch body when not in use. Brass gears in nylon bushes are used, having a ratio of about 9:1; the spool can be easily removed via another knurled nut, so you can substitute another pre-spooled lighter line if you fly both A/1s and A/2s. A T-shaped handle is fitted to give a more positive grip in use, which is certainly better than the more usual handle in line with the extended towline, which can slip out of the hand in moments of panic, resulting of course in a lost flight. When circle towing, my own preference is to let the winch dangle from the crooked little finger of my left hand, leaving the remaining fingers free to hold loops of line ready to pay out as required, and my home-made winch has a pistol grip to allow this.

The price for this prince among winches is expected to be £8.50, and spare spools will cost £1.30 available from mid June; address of Maxaid Modelling Products is 2 Downfield Close, Alveston, Bristol BS12 2NJ. Personally I would paint a winch like this a highly visible orange as soon as I got it, so it shows up if dropped or mislaid.

For people who prefer a braided polyester towline to nylon monofilament, Maxaid also have 50 metre spools of this, priced at 80p; breaking strain is quoted as 50lbs (23kgs) and for a given load polyester line has far less stretch than nylon of the same breaking strain, and some people prefer this as a thermal-feeling aid. Elton says that this is so consistent that if you make up a polyester line two feet less than the 164 feet needed it will extend to the correct length under the 2kg applied load used during the line pull test. In case you haven't used this type of material before beware of the interesting tattoo-cum-friction-burn effect that can occur as the line is pulled fast through your fingers, try wearing a glove!

### A POCKET WEIGHER

After the do-it-yourself weighers we featured in this column in the May *AeraModeller*, we now have news of a commercial weigher that is ideal for in-shop wood weighing as well as checking light components. The photograph shows the device, which consists basically of a counterbalanced D-shaped scale like a protractor suspended from the hand at its centre, and with the object being weighed hung from a clip at one end. The scale is non-linear, with values at the upper end being compressed, and is graduated up to 3.5 ounces (100 grams); only 3½ in (9cm) long this weigher comes in a plastic case, and can be obtained from Richard Cedar, 52 Abbottswood Road, London, SW16, for £1.40 plus 10p postage and packing.



Following our article on careful wood choice comes this super compact pocket size weigher ideal for selecting wood at your local model shop. Available from Richard Cedar, 52 Abbottswood Road, London SW16 for £1.50p including British postage.



In response to the request for more information on how to make this or do that, etc., we on the Free Flight Scene have compiled a list of items which we can discuss; for this month I have selected one that we haven't touched on yet — folding propeller assemblies for Open Rubber, Wakefield or Coupe d'Hiver.

### Propeller Assemblies

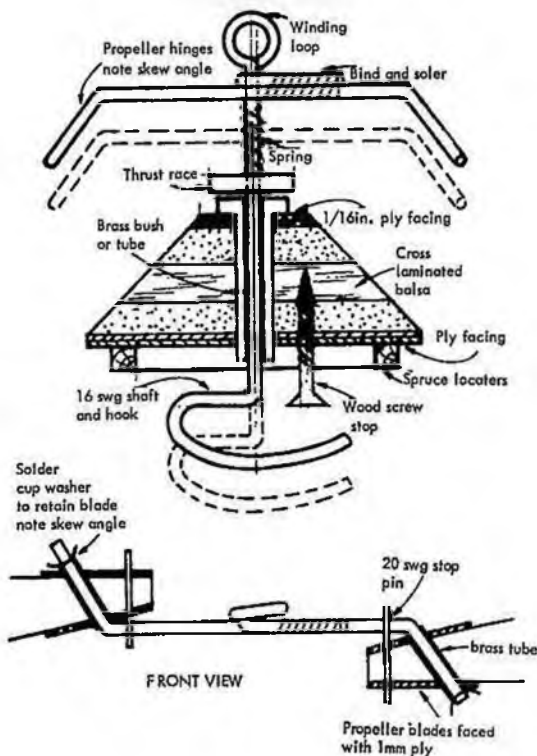
The following is aimed principally at Open Rubber, but is equally applicable to Coupe and can be dressed up a bit for those neat spinner enclosed Wakefield assemblies. Since I personally have never relied to any great extent on machinery facilities, all the items described here are relatively easy to make.

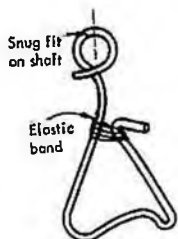
The simplest assembly of all is — the tension stop. The propeller shaft (usually 16g wire) has a loop built in at the front to allow a hand-drill winder to be used. The hub on which the blades fix has the ends bent at an angle to form the hinge-pins about which the blades fold. Notice that these hinge-pins are skewed; the skew angle must be the same when viewed from the top and the side about 25°, allowing the blades to twist as they fold to sit flat along the fuselage sides without sticking out and causing drag. The spring between the hub and the thrust race operates the tension stop on the back of the noseblock; initially the wound motor pulls back and compresses the spring but as the tension in the rubber motor dies off, the shaft is pulled forward by the spring so that the hook at the rear catches on the woodscrew stop. This stop is so positioned to ensure that the propeller stops in the right place for the blades to fold flat every time. This position can be adjusted by setting a twist in the shaft for small adjustments or relocating the stop for bigger adjustments.

The propeller blades themselves clearly need restricting to prevent them from rotating too far forward when the propeller is thrusting. The blades will in any case require facing with 1/16 in. (0.8mm) ply to prevent the hinge tubes from working loose as they otherwise assuredly will. These facings can be used to hold wire stop pins which allow the propellers to swing forward to full diameter but no further.

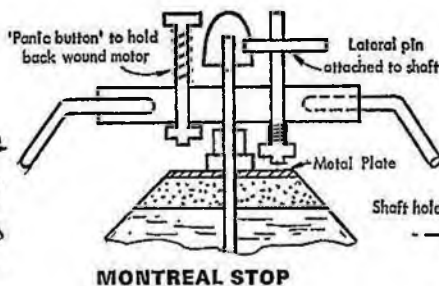
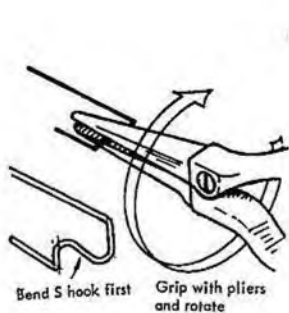
You will note that all moving parts are metal to metal contact — metal to wood is useless and will wear rapidly, giving the one thing we don't want — sloppy fits.

### TENSION STOP





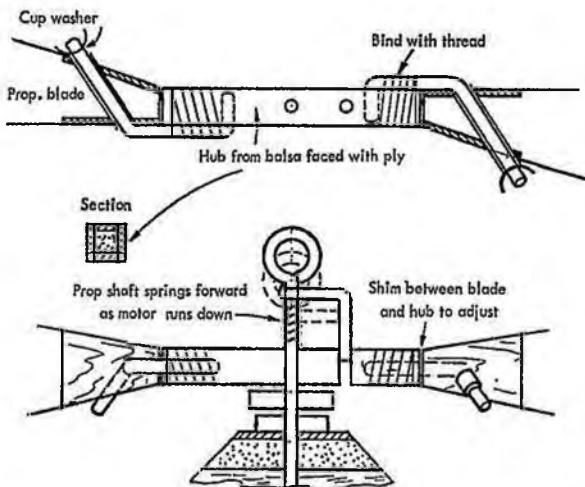
**S HOOKS**



**MONTREAL STOP**

Hooks are the simplest way of attaching the rubber to the prop assembly. The most important point is the S shape; the S must be 'the wrong way round' when viewed from the rear. If the S is the alphabetical way round, it will actually help the rubber to 'climb' up the hook and go off centre, which is exactly the function the S is trying to prevent. The wire must be covered with neoprene or thick rubber tubing otherwise it will cut through the rubber when it is fully wound.

The above system is neat and relatively crashproof but has one disadvantage. At the end of the motor run, the whole propeller moves forward (this may be up to 3in.) and so moves the CG balance point forward. With the propeller generating so little power, the model is under-elevated and may lose height unless well trimmed.



A variation which eliminates this forward movement employs a solid hub (balsa veneered with ply), the hinge-pins are wire but are now separate and fitted to the hub with thread binding. This time it's the shaft that slides forward through the hub, which remains in contact with the thrust race. Since the hub is solid, no wire stops are needed for the blades since the hub does the job - much neater. The rest of the assembly is as before. I used this system myself during my open rubber days; it is simple to make, neat, and light.

The above systems both use a tension stop to halt the propeller - so called because gradual reduction in the motor tension determines when the propeller stops. The system used for Wakefields these days - called the Montreal stop - operates on motor torque which is the desire to untwist from a wound motor.

The motor drives the propeller via the shaft, lateral pin acting as the fold pin. When the motor is wound, the torque jams the fold pin in its tube. When the pin is pulled forward against its

spring, the spring is not powerful enough to pull it back, and it stays forward. When the motor runs down, the torque dies off and releases the pin allowing it to move back onto the face plate. As the propeller is still rotating slowly the pin travels round until it locates in the hole in the face plate, and having stopped the propeller now folds.

Another pin can be used to hold the propeller stationary when the motor is fully wound while the flier waits for that vital lift to come through and is lightheartedly called a panic button. With everything else set as before with a wound motor this pin is then pushed back into the hole in the noseblock. The motor torque holds it in place so that the propeller can be released without the motor running down. To launch, hold propeller again, take up the torque by rotating the propeller slightly backwards, whereupon the hold pin springs forward out of the face-plate hole.

**CO<sub>2</sub> DURATION - A NEW INDOOR CLASS**

Since CO<sub>2</sub> motors became generally available again, thoughts at Cardington turned to wondering how long it would be possible to keep a lightweight model powered by one of these motors in the air. Expectations were initially in the 3 min mark. The Indoor Tech Committee elected to hold a contest at Cardington after the serious stuff - the Indoor Trials - was over. Owing to publication errors in the well known mags many people didn't bring their models. As a result, there were only three entries - Ron Green, Steve Bennett and myself. Ron eventually won (two flights from six as per usual) with around 7½ mins total; this immediately indicated something of the potential performance. Ron and I used Sleek Streak props, these being better than the originals. Ron's model was 4ft span, mine 3ft. and both weighed about 28g all up. Geoff Lefever turned up at the next meeting with a similar size model with a wide bladed prop of the same diameter (6in.) and pushed the best time up to 4.50.

Some new models appeared at the last meeting in April, much bigger and with cotton braced wings, but testing troubles have prevented their potential from being assessed yet. At this meeting, I managed to break 5 min in practice with the 36in. span model but couldn't get the charges right for the comp flights; otherwise more could have been achieved. Models up until now were tissue covered.

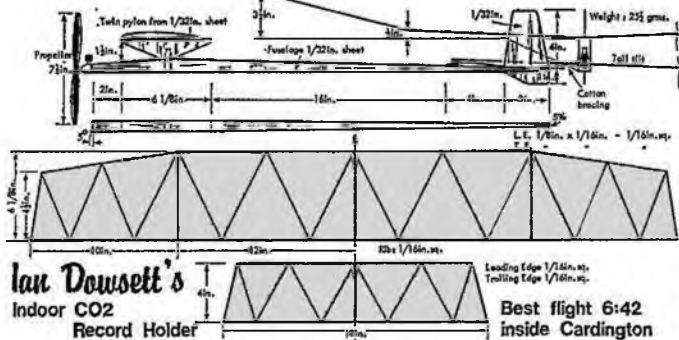
Ian Dowsett had been studying these efforts for some time and came up with a somewhat different layout - EZB type wing ribs and tapered tips (no round outlines) and covered in ½ thou mylar. The model has a larger prop - the Super Sleek Streak 7½in. dia prop - and weighs 26g. The wing section not shown is about 5-6 per cent camber (estimated) and tail section 3-4 per cent.

As you can imagine, the glide is superb (much better than an A/2) and the large prop allows a long run. Ian has pushed the best time up to 6.42 with a motor run in excess of 4 mins from the standard charger.

The next logical development is a balsa prop - how big? I don't know yet, we shall have to wait and see. We have arranged an extra CO<sub>2</sub> contest at Cardington on 30th July - make a note of that and come along and have a go. The models aren't that difficult to build; standard outdoor building technique is used - no indoor 'specials' are necessary. You will need to transport the model in a box - the one for your outdoor jobs will do nicely.

Incidentally, Telco are taking a keen interest, and it is on the cards that we shall receive a trophy for an annual CO<sub>2</sub> event - can't be bad.

**Ian Dowsett with his CO<sub>2</sub> indoor model, which made an amazing 6:42 flight on its first day's flying!**



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# CLUB NEWS

THE PARTICULAR ALLUREMENTS of radio control are, perhaps, all too evident to dwell upon, but contrary to popular belief, radio is not the be all and end all of model flying: free flight, too, has its beguiling aspects, though in a less dramatic form. One of these, and an important one, particularly for the beginner, is the low weight that can be achieved. There is no 'payload' of radio gear and batteries to carry, and this lower weight, size for model size, means slower speed, less vulnerability to damage and safer margins when flying on public open spaces. There is in free flight also the challenge of trimming out a model to a particular flight pattern with the correctives inherent rather than operated from outside. Free flight also allows a wide range of cheap, quickly built models to be produced, witness the growth in popularity of 'Peanut' and other small rubber, CO<sub>2</sub> and electric powered models, whilst for competition purposes the free flight model still reigns supreme.

The first report we have to hand comes from Mr Boyce Malton, the newly elected PRO of the Peterborough MFC. Main event looking back was a members-only Combat contest, in which there were a remarkable 30 entries, and with refreshments laid on by the lady members and a prizegiving ceremony to close the day, the event had a nice gala flavour about it. Coming to the AGM, the increase in the club fees to £4 is described as a necessary but 'tragic measure'. Now, since this fee includes insurance, use of the flying field and general club amenities, it seems to me extremely low - many of us have to think in terms of five times that amount. Mr Malton assures us that the club atmosphere is a most friendly one, with a wide range of age groups. Meetings are held on Friday evenings from 8.00 pm at the Lincoln Road Youth Centre, near St Paul's School, and anyone is welcome to attend. Flying sessions are held on the river embankment, near the Rowing Club, on Sunday afternoons.

Our next report comes from Mr C. Learwood, of the Basingstoke MAC. This is mainly a Radio club with an 80-large membership, split approximately 50/50 between Power and Glider, with just a sprinkling of free fliers. The club Chairman and leading light on the flying field is Al Wisher, whose name featured prominently in the top free flight placings some years back, and who, since his conversion to Radio Glider, has continued to keep his name in the top placings. Just now he is the main talking point in the club, having established a new club Thermal Soaring record of 1 hour 38 mins 35 secs, which is more than a bit wearing on the upper vertebrae. And just to show that this wasn't just a case of getting the controls stuck he placed 1st in the Soaring meet at Tangmere and 2nd at St Albans. But even the wizards of the electronic joystick must have their diversions; and a strain relieving Chuck Glider comp is planned for June to take in, it is hoped, a record entry of 24. Model flying may not be all beer and skittles, but the Basingstoke evening out at the local was just that. It was down draughts all the way for the Glider boys versus the Power boys in the skittle alley. Needless to say it was run in rounds. Another item in the club newsletter to catch our attentions was a quote from the pioneer power modeller, Col C. Bowden, made back in March 1944. Looking to the future he said he could

not envisage masses of wireless controlled models flying . . . not for some time to come. Perhaps he was not far off the mark, for radio control developed slowly until the big transistorised breakthrough – which could not possibly have been foreseen – occurred in the '60s. His other idea of a slower revving 15cc engine to carry the extra radio gear, rather than a smaller hotted up one was again based on ponderous valve type radio gear, although, for scale flying a large, slow revving prop on a long stroke engine does add a flavour of realism. Just to close the Basingstoke report Clive Learwood says the club welcomes new members, who may contact him at 0256 22570.

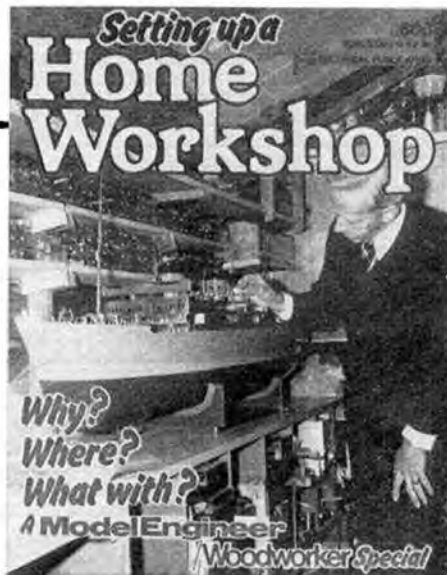
Flying field troubles continue to plague the existence of the Watford Wayfarers, according to their latest newsletter. The new Hillingdon Bye Laws appear to more than somewhat over-stringent, but although the immediate prospects are pretty dim, there is a gleam of hope for the future. Member John Sharman approached the Leisure Officer of Watford Corporation to enquire of the model flying possibilities within the Borough. The outcome was an assurance from the said gentleman that he would look into ways of amending the present bye-laws to include radio flying on already approved control line sites, or even setting aside a piece of council owned land for that purpose. Coming to the actual flying of these little models that are causing all the bother, a good competition idea mooted in the club is that of a two tier entry system, experienced and non-experienced, as a means of countering the oft expressed comment, "I would enter but I don't stand a chance." Flyers would remain in the lower group until they have made three placings in the top three, after which they would be elevated to the upper group.

It is a well known fact that weather conditions over our island, whilst invariably abominable, are more abominable in some parts than in others. This has a bearing on attitudes towards Area Centralised events. Generally it has been accepted that conditions average out over the season to give all areas a fair portion of the good and the bad, but we now read in *Northern Area News* that the feeling up there is that the South gets all the fine, calm weather that is going, with the North left out in the blowy cold. This is leading to a concentration on the parochial events that are usually run parallel with the SMAE events, at the expense of the latter. Now, I don't know what hard, meteorological evidence there is to substantiate this weather difference belief, but I would think that you could concede a small temperature differential with wind speed averages very much of the same order. But if the March winds did cool enthusiasm for the first Area Centralised meeting this was not evident in the A/2 Glider event, which attracted an encouraging 21 entries, and not all that wild rush to support the local combined mini event, which could only muster a field of six.

The editor of *The Bourne Flyer*, the newsletter of the Sittingbourne & DAMC, has a witty and accomplished hand with a drawing pen. This month he has enlivened the cover with a 10cc powered flying elephant to make a change from the usual elevated 'orse. The diving Dumbo is watched by a delighted sun, complete with curly corona (it needs a drink with all that heat). Notice is served on members that four stumps in the corner of the car park is the site of the new club hut. Hut seed has already been sown, we are told, and developments are awaited. On the thought that Farnborough grew out of a single stump, we are reminded that British Aviation got off the ground, as it were, when the Short Brothers produced a catapult launch biplane to capture the prize of £1,000 for a circular flight of one mile offered by the *Daily Mail*. The flyer in this 1909 epic was J. T. C. Moore-Brabazon. Flying on a circular course of a lesser distance the club MiniGoodyear

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event in April saw plenty of comedy and drama. It was won by a junior, Rob Platt, obviously a chip off the old balsa block, and it was Dad Doug who pitted for him. Later in April there was a bout of Club 20 Pylon Racing. There were five entrants to face the foggy conditions. Winner was John Ripley.

Stuart Lodge, Chairman/PRO of the Bath MAC, reports a bit of a downbeat in membership figures and general club tone; something which he fairly attributes to the long trough of foul weather which has kept most of us grounded. However, the late flush of spring has brought with it warmer, calmer air, and already the flying fields are astir. Adding a further note of cheer the Bath club is soon to take up residence in its new club quarters at the Bath and Leisure Centre. The good facilities here and its central position will, it is hoped, improve recruitment, particularly of juniors. Just now free flight is enjoying an upswing, but unfortunately to the detriment of control line. This has meant fewer suitable models for club displays, so it's a case of 'come back control line - all is forgiven'.

Again from the West Country comes a newsletter from the South Bristol MAC, kindly sent to us by J. Hinton. Two reports of meetings reveal just how much we rely on kindly weather for the pursuit of our interests. The Area Free Flight Meeting at Merryfield in mid April was blessed with the sort of weather we model flyers dream about: warm, sunny and with light winds. Result: a high entry and a satisfying day. Coming a week later to the Mini C/L comp at Whitchurch, the wind just blew and blew at something between 20-25 knots, making things as difficult as could be. But model flyers have a way of surviving such vicissitudes, and with a good spirit going and everybody joining in on timekeeping, lap counting

etc, a good afternoon was had by all. If there is a moral here it is to take the weather as it comes.

*Court Circular*, the newsletter of the Three Kings Aeromodellers reports of an 'occasion' which brought good publicity to the club and gave members a chance of contributing to a worthwhile cause. A team of C/L modellers was invited along to appear with a couple of R/C helicopters for a display as part of the sponsored walk programme organised by the Variety Club of Great Britain. Before a terrific audience, including celebrities, military bands, pop groups etc, Alan Callaghan and others put up a colourful, trouble free performance under a benevolent shining sun. Another occasion reported is the Elmbridge Open Day, but here the turnout for C/L Scale was very disappointing; only three people participating. The weather was there, the prizes were there, but the models just weren't. Brought up in the old school as I was I have always felt it a point of honour to enter a contest if I possibly could; to try to match my enthusiasm to that of the people who had gone to the trouble to stage the event.

Taking in the excellent content of *Nitro*, the newsletter of the Belfast MFC, I came across a comment on the present day state of aeromodelling, saying that the standards at the top internationally are set by specialists who concentrate only on their particular class. This may be true of Radio, and perhaps C/L, but such top free fighters that I know are just enthusiasts without any special access to high technology. You do not have to be a millionaire or technical expert to excel in Slope or Thermal Soaring either. A lot of youngsters are frightened off by the sheer weight of technical expertise they see around them, but once they learn what it is all about in a good club they often find that much of it is well within the encompass of their own abilities. Clubman

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## Contest Calendar

June 18th	<b>SCALE TRIALS. R/C &amp; C/L.</b> Venue: Duxford.	July 9th	<b>INDOOR MEETING. F1D Open Microfilm.</b> Venue: Cardington. Contact: Laurie Barr, Tel: 0628 25595.
June 18th	<b>2nd C/L CENTRALISED. F2A, F2B, F2C, F2D, Goodyear.</b> Venue: Contact Bob Horwood, Tel: 0272 48869.	July 9th	<b>FINCHLEY C/L GALA. F2B, F2D.</b> Venue: Glebelands, Summers Lane, North Finchley. Entry £1.00 (pre-entry 75p). Contact: S. Tothill, 35 Brent Way, Finchley, Tel: 01-346 4764.
June 18th	<b>INDOOR EVENT. EZB, Peanut, HLG (Sweepette).</b> Venue: Cardington. Contact Laurie Barr, Tel: 0628 25595.	July 9th	<b>WITHAM MAC C/L GALA. F2C+Novice, Stunt, Carrier.</b> Venue: Essex Showground. Contact: P. Burgess, 42 Blunts Hall Road, Witham, Essex. Tel: 516881.
June 18th	<b>ELLIOTT C/L RALLY. F2B, F2C &amp; Goodyear.</b> Contact: Peter O'Neill, 1 Hillingdon Rise, Sevenoaks, Kent.	July 15/16th	<b>PETERBOROUGH 1/2A COMBAT RALLY.</b> Venue: P'boro River Embankment. Seniors 50p, Juniors 30p. Contact: Sturmer, Tel: 0733 73807.
June 24/25th	<b>1st F/F WORLD CHAMP TRIALS. F1A (Aeromodeller), F1B (Premier), F1C (Aeromodeller) in rounds.</b> Venue: Salisbury Plain. Contact Mike Fantham, Tel: 01-736 7163.	July 16th	<b>2nd F/F WORLD CHAMPS TRIALS. F1A, F1B, F1C in rounds.</b> Venue: Contact Mike Fantham, Tel: 01-736 7163.
June 25th	<b>VINTAGE &amp; F/F REUNION FLYING.</b> Venue: Chobham Common. Contact: Don Read, 21 Guildford Road, Farnham, Surrey. Tel: Farnham 23400.	July 23rd	<b>3rd C/L CENTRALISED. F2A, F2B, F2C, F2D, 1/2A, Goodyear.</b> Venue: Contact Bob Horwood, Tel: 0272 48869.
June 30th	<b>F2C EVENING CONTEST.</b> Burton Wood, Warrington. Contact: J. Woodside, 15 Heathfield Road, Liverpool 15.	July 30th	<b>RAF MAA INDOOR CONTEST. CO<sub>2</sub> and Peanut Scale.</b> Venue: Cardington at 10 am. SMAE only. Access 50p, contests 25p. Notify Flt. Lt. Zotov, HQ Strike Command, RAF High Wycombe, Bucks, Tel: 26200 ex. 2258.
July 2nd	<b>LEEDS RALLY. OJR, OJG, OJP, K Factor Mini, Vintage, Eyeball F/F Scale.</b> Venue: Elvington. SMAE only. Contact: Tom Hargreaves. Tel: Mirfield 494485.	July 30th	<b>W. AREA RALLY. All in FAI 5 flight no rounds OJR, OJG, OJP, HLG.</b> Venue: Woodbury Common. Contact: B. Silcocks, 2 Derham Road, Bishopsworth, Bristol.
July 2nd	<b>SOUTHAMPTON F/F GALA. F1A, OJR, OJG, OJP, Mini.</b> Venue: Beaulieu at 10am. Contact: Doug Gordon, Tel: Chandlers Ford 67168.	August 5th	<b>INDOOR MEETING. EZB, Manhattan, HLG (Sweepette)+CO<sub>2</sub>.</b> Contact: Laurie Barr. Tel: 0628 25595.
			<b>RAF MAA THURSTON TROPHY. F1B.</b> Venue: RAF Abingdon, 10 am. SMAE only. Notify F. Sgt. J. Toohey, Supply 4b (2), HQ Strike Command, RAF High Wycombe, Bucks.

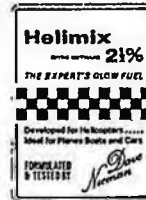
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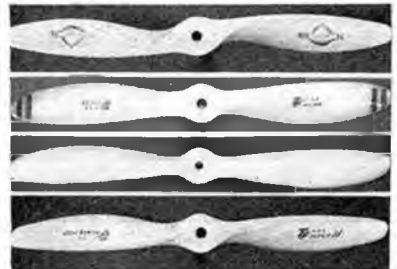
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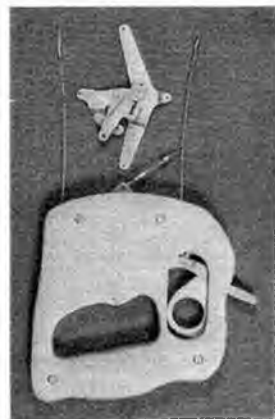
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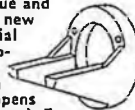
# RIPMAX



HIGH QUALITY AIRCRAFT ACCESSORIES

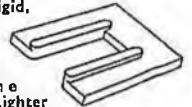
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Rigid and tough. True and accurate! Cast in a new lightweight material with excellent damping properties ensuring no drop in performance (as happens with aluminium mounts). Engine can be fitted with self-tapping screws (or bolts if you prefer).  
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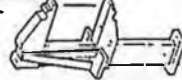
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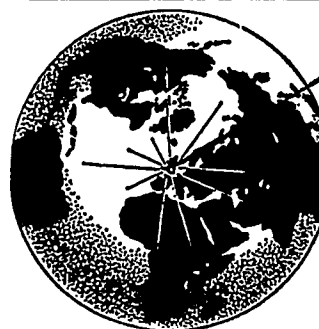
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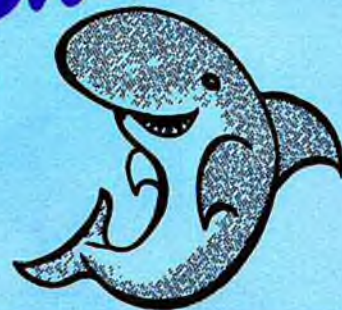
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