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Editor	<i>Geoff Clarke</i>
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Cover: Sleek, state-of-the-art control line stunt designs just demand a stylish colour scheme and an attractive model - here Jayne Heigold takes time out from selling Argus Classified Advertisements to present Glen Alison's Challenger, his latest for '89. Factor governing successful stunt designs are analysed by Claus Maikis on p.306.

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HANGAR DOORS

F/F Nats news

All roads lead to RAF Barkston Heath on the holiday weekend of 27-29th May, for once again the Free Flight Nationals is ready to run. The programme, which appears below, is almost identical to that of 1988, but note that CO₂ duration will not – repeat, not, be taking place. Thanks to Dave Hip-person of the Free Flight Technical Committee we can pass on more news...

The Junior Kit contest will be staged on the Monday under the direction of Jeff Anderson. There is an increase in permitted wing-span for gliders; models up to 55in are now eligible. The rubber model limitation remains at 40in.

We learn that it is hoped to organise the prize-giving for Saturday and Sunday's events in the 'beer tent'. Surely a popular move! Awards for 'FAI Day' will take place, as usual, at Control.

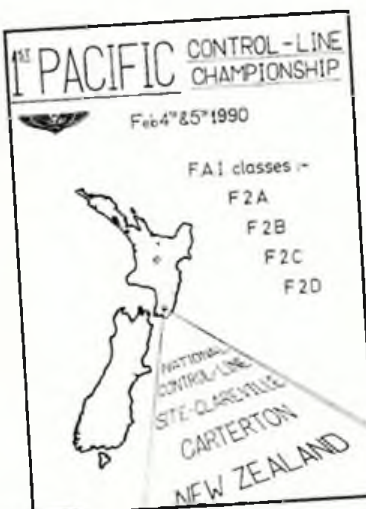
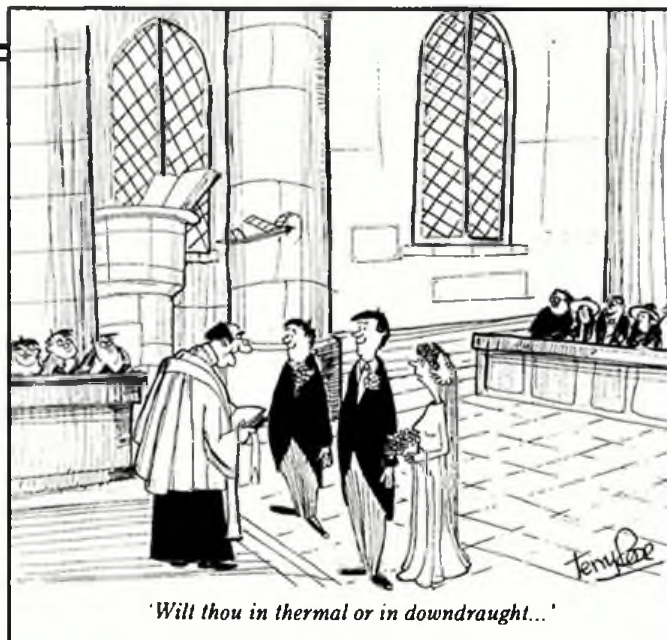
The aim this year is to produce a much more sophisticated computer print out, with scores processed in 'minutes and seconds' as well as 'seconds only'. Volunteer operators are sought – actually, generous expenses will be paid – by Ian Bracken. Call him on 01-263 9849.

Another honour for Maarten

Maarten van Dijk of the Netherlands, the winner of the first World Junior F1A Championships at Leszno, Poland last August, has been awarded one of the first two Junior Pilatre de Rosier prizes by the Federation Aeronautique Internationale in recognition of his achievement. The other award goes to Czech junior parachutist Kveta Lnenickova, who won her class in Turkey. The awards, named after the pioneering eighteenth century French balloonist, will be presented during a hot air balloon event in France in July. Congratulations, Maarten.

Big chance for Junior flyers

If your eighteenth birthday falls after 1st January 1990 you could be representing your country at the World Junior Free-Flight Championships next year. After the global enthusiasm shown for the first such event last year in Poland, Yugoslavia will be organising the 1990 Championships from 20-26th August at the huge dry lake bed at Mostar, about fifty miles north of Dubrovnik. Classes



a great experience, whatever your age, and if the Mostar Championships are anything like the Leszno ones it will certainly be a memorable one!

More details will appear in the BMFA's newsletter and this magazine. Let us know how your models are progressing in the months between now and April 1990, and let's have a strong British team to make up for our absence at the first Junior World Championships. A letter to the BMFA at Kimberley House, Vaughan Way, Leicester LE1 4SG will put you in touch with your nearest free-flight club; flying with experienced people is the quickest way to learn, so tap into their know-how right away as you prepare to meet the world's best.

Top of page: Terry Rose's view... **Centre:** The first Pacific C/L Champs will be at Carterton, New Zealand, on 4-5th February next year. **Below:** Lord Thomson of Fleet (left) with Canada's Peter Allnutt and the three World Cup trophies for (left to right) F1C, F1A and F1B. See Triple boost for the World Cup.



will be F1A glider, F1B Wakefield and F1C Power, with teams of three flyers eligible in each. The British Model Flying Association will hold the Junior team selection trials next Easter at a venue to be announced, so you have almost a year to build your models and practice your flying techniques. You may use up to four models at the event.

As with any British World Championships team, the entry fees of \$310 per flyer will be paid by the Association, and this includes food and accommodation while you are competing at one of the best free-flight sites in the world. It is also hoped that at least some of the team members' travel costs will be met; this could be a fine opportunity for the model trade to support the young flyers who will be supporting them in the future. Spectators can also be accommodated at Mostar, so this could be a chance for a family trip to a superb part of Europe for a holiday while helping a son or daughter break into the world's most popular air sport, model flying. Meeting other flyers from all over the world in friendly competition is

More from NZ

C/L flyers down-under may happily anticipate the First Pacific Control Line Championship on 4-5th February 1990. Choice of weekend coincides with New Zealand's 150th Anniversary. The National C/L site at Carterton is the venue; the event will mesh with the 3rd Pacific F/F Champs. Classes are F2A, F2B, F2C and F2D. Fancy a NZ flying summer? We'll pass on details...

Scaledates

Vic Willson sends details of BMFA Scale Control Line competitions. RAF Abingdon on 7th July (contact Vic himself for details on 0734 471964) is the venue for all-comers; and the C/L Scale World Champs Team Trials is at RAF Hullavington on 17th September. Entries for the latter to Eric Coates, Arosa, Liberty Road, Newtown, Fareham, Hants, plus £10 entry fee.

Brian Peckham

Aeromodelling lost a devoted friend with the death of Brian



Peckham at the end of March. Best-known in recent years for his support of radio control scale - remember his splendid Robinson Redwing at the '88 ME Exhibition and the R/C Nats? - Brian's interests spanned the whole range of aeromodelling, latterly with a notable emphasis on Vintage as a relaxation from more intense activity. His unquenchable enthusiasm and cheerfulness was fuelled by the amazing rate at which he could produce models; the prolific Peckham being responsible for many ever-popular designs, including a selection for our companion magazine Radio Modeller. His earliest published design, the pretty Anita F/F biplane (Model Aircraft, January 1960) established an attractiveness of line which was never to desert his

draughting pen.

Brian will be sadly missed. Our condolences to his wife Anita and to his family.

Triple boost for the World Cup

Lord Thomson of Fleet, the newspaper owner, was one of the model flyers present at the 1939 Wakefield finals won by Dick Korda, and the experience clearly stayed with him. After a meeting with Canada's Peter Allnutt recently he has very generously donated not one but three magnificent silver cups for the F1A, F1B and F1C classes competed for in the highly successful World Cup each year as part of the FAI's competition calendar.

In a letter to FAI Director General Dr. Cenak Kepak he explains his enthusiasm for model flying. In particular, we applaud the following comment:

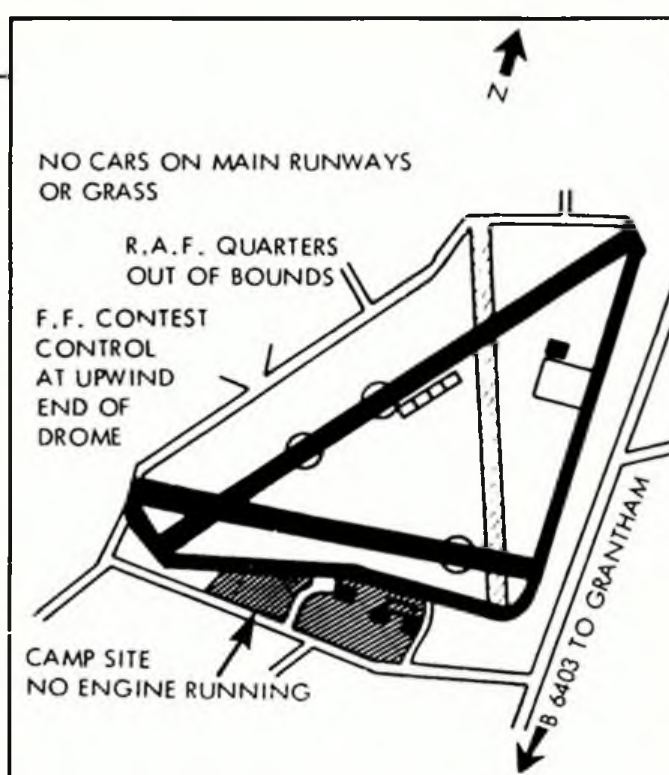
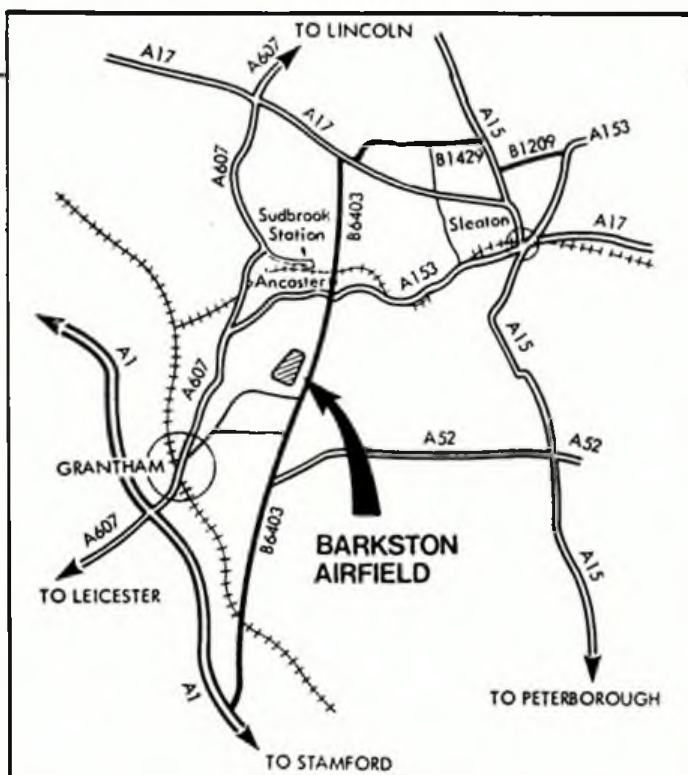
'The concept of having a World Cup competition based on the accumulation of points garnered over an entire flying season is a sound one which will provide the greatest possible opportunity for these trophies to be won through



Above: News of F/F at the Australian Nationals in this month's Free Flight Scene - but room here to show one flying site inhabitant who chose to come out and play with the ankles from time to time. Left: Circular airflow emblem indicates strong C/L flavour of the Belfast MFC, hosts of the 1989 F2B Home International on 27-28th May.

consistent excellence. As we all know, this hobby is fraught with risk. Dreams can be shattered in a moment after countless hours of skilful preparation. The World Cup provides a tomorrow and aeromodellers, as much as any group of enthusiastic devotees, are an irrepressible lot who ask only for another chance... I am proud to be associated with this spirit through the presentation of these trophies. May they be an inspiration and reward to many deserving aeromodellers in years to come.'

At the April CIAM Plenary meeting the three trophies were donated to the FAI on Lord Thomson's behalf by Peter Allnutt, who is on this year's Canadian F1A team for Argentina; F1C winner Thomas Koster of Denmark was the only winner present at Paris in person, and he received the Thomson Trophy from Dr. Cepak to the applause of some thirty nations. Glider winner Stefan Rump and top Wakefield man Walt Ghio had their trophies presented to their nation's delegates.



What's what at the Nats

Saturday 27th May: Mini Day

A/1	: British Airways Trophy
Coupe d'Hiver	: 308 Trophy
1/2A Power	: Hales Trophy
HLG (Chuck Glider)	: HLG Trophy

Sunday 28th May: Open Day

Open Glider	: Thurston Trophy
Open Rubber	: Model Aircraft Trophy
Open Power	: Sir John Shelley Trophy
Vintage	: Jubilee Trophy
Open Junior	: Frog Junior Trophy
Women's Cup	

Monday 29th May: FAI Day

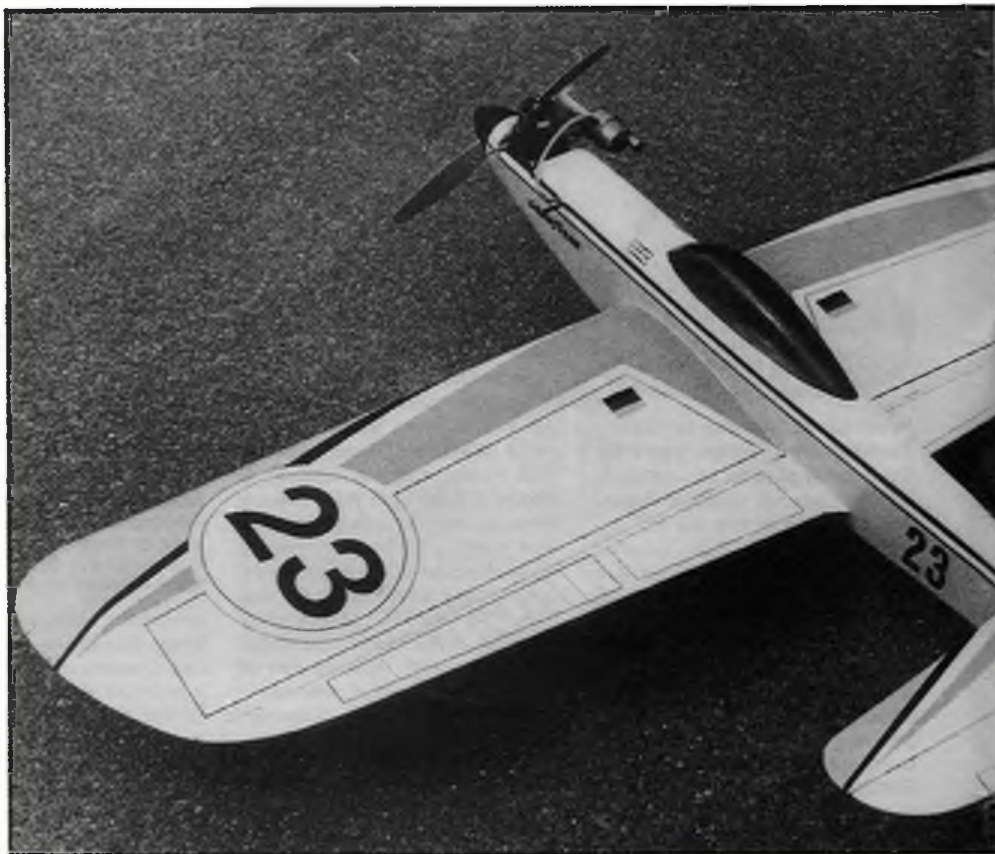
F1A (Glider)	: Ronytube Trophy
F1B (Rubber)	: Boxall Trophy
ie, Wakefield	
F1C (Power)	: Eddie Cosh Trophy
Slow Open	: Falcons Trophy
Power	
Tailless	: Lady Shelley Trophy

TO THE uninvolved onlooker it might appear that control line design has not progressed much since the arrival of the Nobler design. The truth is that when George Aldrich built his aeroplane he was light years ahead of his time. It's extremely difficult to improve upon such a design. Of course, modern creations are the result of constant, subtle improvements – and an increased knowledge of aerodynamics. As one Swiss flier recently put it: a good aerobatic pilot can only improve if he happens to get a better aeroplane. The reverse is true, too. Only when a flier has reached a certain level of skill (and knowledge) is he able to design a better aeroplane.

Read all about it

A lot of books have been written about model aerodynamics. The problem is that most are in technical language not possessed by the average reader – and they are loaded with complicated formulae. I often regret that authors seem unable to use straightforward language. Even complicated things can be explained simply. Formulae are OK, but they're only half the truth. If, for example, a formula states 'the stability factor is the product of moment arm multiplied by tailplane area', nobody tells us that we cannot simply double the moment arm to achieve twice the measure of stability. If we did this, the result would be just a tail-heavy model, difficult – if not impossible – to fly. Instead, we need to know which measure will create that compromise which tries to get the best from two worlds.

With this in mind the following thoughts were gathered and put in order. As usual, only a small part is the product of my own thoughts. Most was learned by trial and error; by reading what others had written; and (by far the greatest part) in discussion with aeromodelling friends from all over the world.



This is not a fully comprehensive article, but I'll be pleased if a newcomer gains some basic knowledge about stunt aerodynamics, and is compelled to follow the right direction.

Though most aspects of model design are connected to others, and cannot be looked upon separately, I will explain in logical order for clarity. Let's begin with the wing.



Aerobatic Design

Part I

Build better stunters! Claus Maikis takes a close look at what's involved



Left: 'Minimum type aerobatic design - rectangular wing, sheet tail. Flies well but less happy in corners than craft with swept wing leading edge.

Centre: Wolfram Reuter's Stratege has long nose and short tail moment. Almost impossible to fly; overshoots corners. Insufficient control and stability.

Bottom: The opposite - Gilbert Beringer's Caudron with short nose and long tail moment. Short-span flaps produce less lift, but less induced drag too; no vortices at tips.

Aerofoil affairs

The wing is what causes an aeroplane to fly; and it is the aerofoil that makes the wing work. It therefore pays to spend some thought on it. Several design parameters should be considered.

Section thickness

Section thickness is one factor that strongly influences lift and drag. Within reasonable limits, lift increases as does aerofoil thickness - but so does drag. Thinner aerofoils possess less drag, but produce less lift. Also, the boundary layer separates at lower angles of attack with thinner aerofoils. When performing the corner of a stunt manoeuvre, the angle of attack soon reaches a degree where the wing stalls if it is insufficiently thick.

An excessively deep section doesn't produce much more lift, but excess drag instead, which slows our model too much in a sharp corner. Unless your engine is very powerful, your model will not climb out fast enough after a sharp corner at the bottom of a manoeuvre. A good, average figure is thirteen per cent (which is exactly what George Aldrich chose for his Nobler). Below twelve per cent should be avoided. The upper limit is around twenty per cent. And remember that flap chord is included in the total wing chord (and thus the aerofoil length).

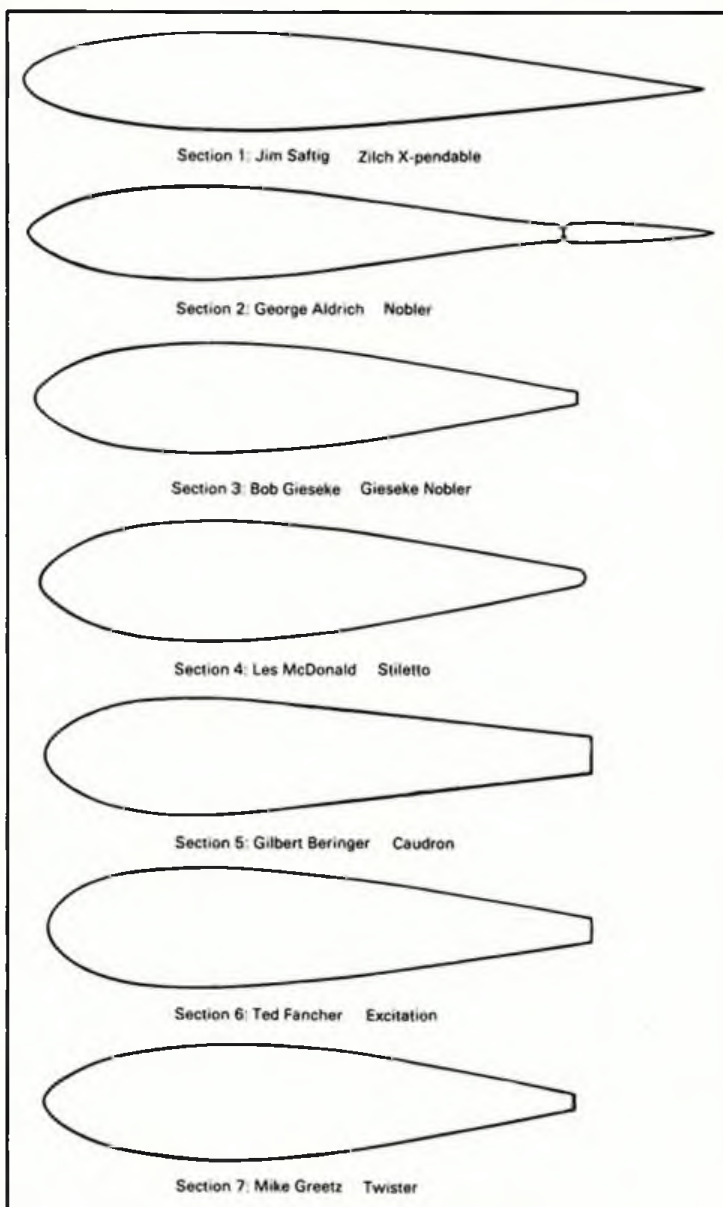
The point of maximum thickness largely governs the aerofoil shape. A forward location necessarily gives a blunt front end which

induces a fast, high, build-up of pressure. In turn, this causes an early change from laminar to turbulent airflow. Turbulent airflow can overcome speed and pressure increases without flow separation, so higher angles of attack are possible. However, turbulent airflow produces more drag. A rearward point of maximum thickness gives less drag but it cannot function at such a high angle of attack. An acceptable figure is 25 per cent. High point location also effects the shape of the rear part of the aerofoil. More about this later.

Nose radius of the section is another topic constantly discussed by the experts. Normally, a sharp nose will give a more sensitive model, while a rounded leading edge should make for more tolerant flight.

But things are not that easy. Al Rabe once stated that he flew a model with a very blunt leading edge - and it was extremely sensitive. Many fliers have reported good results with aerofoils of nose radius slightly larger than that of the Nobler design, whose wing section is very similar to the NACA 0018, but possesses a more pointed nose and a thicker trailing edge (to accept the flaps). Nose radius of the 0018 section (eighteen per cent thick) is approximately 2.5 per cent of the chord.

All these factors work together, and influence each other. A change in one direction will alter everything else. If a design is to be changed, only one modification at a time should be tried, and the results of this single alteration carefully assessed. Much knowledge has been gathered over the years



by many pilots; but not everything can be explained scientifically. However, you cannot doubt the evidence reported by skilled fliers. Jim Mannall, for example, noted that his aeroplane flew more smoothly if the aerofoil section was flattened aft of the point of maximum thickness.

Recently Gilbert Beringer tried an aerofoil which he had borrowed from the full-size CAP aerobatic aircraft. Here the high point occurs early, at 20 per cent of the chord. It seems impossible to stall this wing. Al Rabe experimented with a section that was heavily cambered aft of its maximum depth. He wanted to create a smooth transition of section to the flaps when deflected. Both are top pilots, and both systems apparently worked – so who can argue?

Basically, I'm convinced that extremes are never a good solution. Even today I recommend the Nobler-type aerofoil, by all means change to suit your own theories, but bear in mind the consequences described above...

Change of section

Don't forget one important design feature. To enhance aerofoil efficiency, the aerofoil section can be changed from root to tip. Because of tip vortices, caused by air curling round from the bottom to the top surface of the wing, the wing tips will stall first at high angles of attack. To avoid early flow separation, we can use a different section which will allow a higher angle of attack before this happens. This means a thicker aerofoil and/or a more forward high point. Conversely, we can use a thinner section (with rearward high point) at the root, maybe gaining the benefit of less drag where the wind is deepest. But note that Detroiter wing construction produces a surface with exactly the opposite aerofoil distribution! Since Les McDonald has won three World Championships with this configuration, we must accept that the aeroplane flies well. You must decide for yourself what to believe!

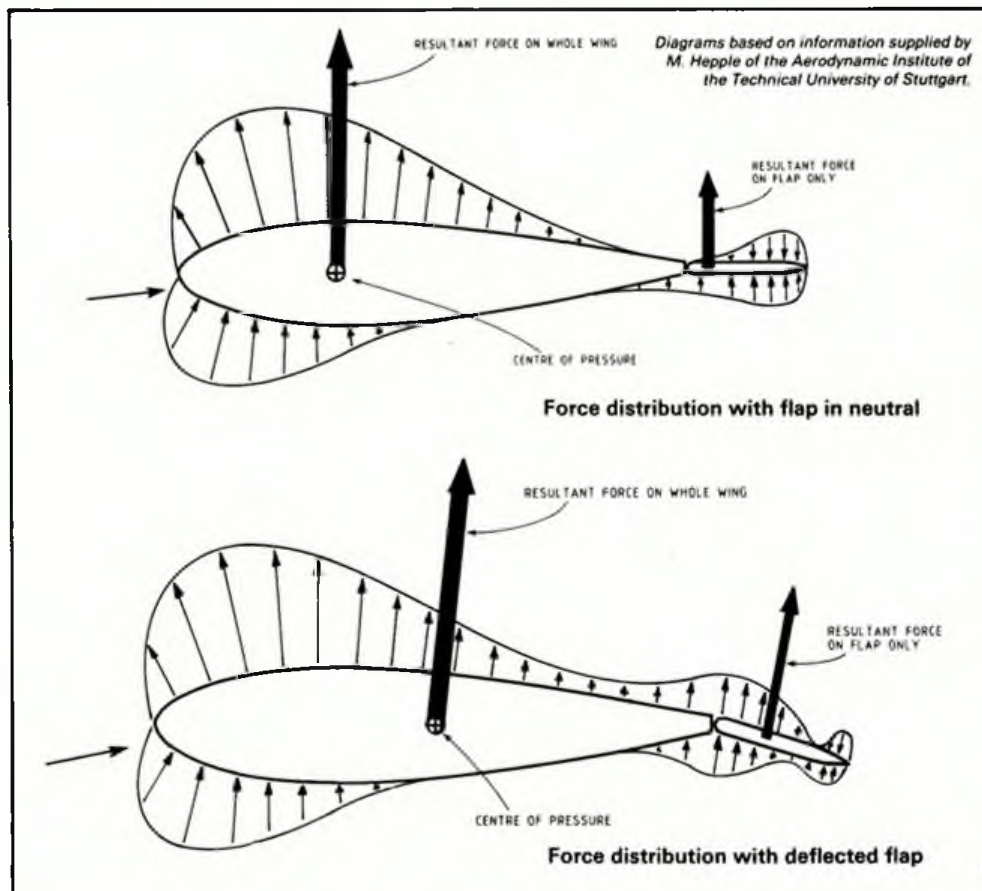
Plan your planform

The easiest wing to build is of rectangular planform. Alas, it doesn't meet all of our requirements. We have to consider matters of stability, even though our models will fly in a circle, tethered by lines. Centrifugal force doesn't solve everything; over the years, pilots have sought progressively to reduce model speed to the point where its influence is not high. Also, in windy conditions, sudden gusts in sharp corners, or during high-level manoeuvres, line tension is reduced, sometimes even disappearing momentarily, and the aeroplane has to fly on its own. Here stability in yaw is important. We need a swept-back wing leading edge; tip chord must be decreased to lessen induced drag. A useful side product is that less weight at the tips keeps inertia low; and load distribution is better with a tapered wing.

Do we build a fully swept wing? This can move the whole planform so far forward that we run into problems with location of the tank compartment, so a planform of nearly equal taper at leading and trailing edges is the most practical solution. Elliptical planforms may look pretty, but the increase in efficiency is not proportional to the time and effort needed to build.

Aspect ratio

This facet of design was considered unimportant until some years ago when the Adamisin brothers built aeroplanes with



higher than usual aspect ratio (this is the ratio of chord to span, or wing area to the square of span – actually the same ratio; both formulae are useful for different reasons). A commonly-used figure is 5:1, chosen – of course – for the Nobler. Up to 6:1 is recommended. Higher values should be avoided in the interests of maintaining structural rigidity. The advantage of high aspect ratio wing increases, lift increases proportionally more than it does on a wing of lower aspect ratio. This is a desirable feature in corners.

For a given wing area, the wingspan is increased, which improves roll stability. As an extra benefit, the line guide is located further from the centre of gravity; this also helps prevent the model swinging about on the end of the lines.

Wing area

This is one factor by which wing loading can be controlled. The other, of course, is model weight. Stunt fliers never seem able to control the latter so we have to play around with area. It's generally accepted that we should strive for a figure of 40gm/sq.dm. (that's about 13oz/sq.ft.). Performance will suffer if wing loading is higher, and a lower figure is hard to achieve. I know a few flyers have been able to build light aeroplanes, but generally they have returned to craft of average weight.

A model with very low wing loading is badly blown around in windy weather, but a heavy model causes problems in high wind – and in calm conditions. Naturally, the wind always waits for our contests...

Bearing all this in mind, I would recommend a wing of relatively small area; a larger wing may increase weight and drag more than is desirable. A smaller wing is easier on the engine. For many years the Italians have followed this school of thought. Their models, of average weight but smaller wings, have been notably successful. This is also the correct approach to four-stroke engines, and the drag of a larger wing might just be

too much. And what is average? Simply go by existing figures for published designs and you won't go far wrong.

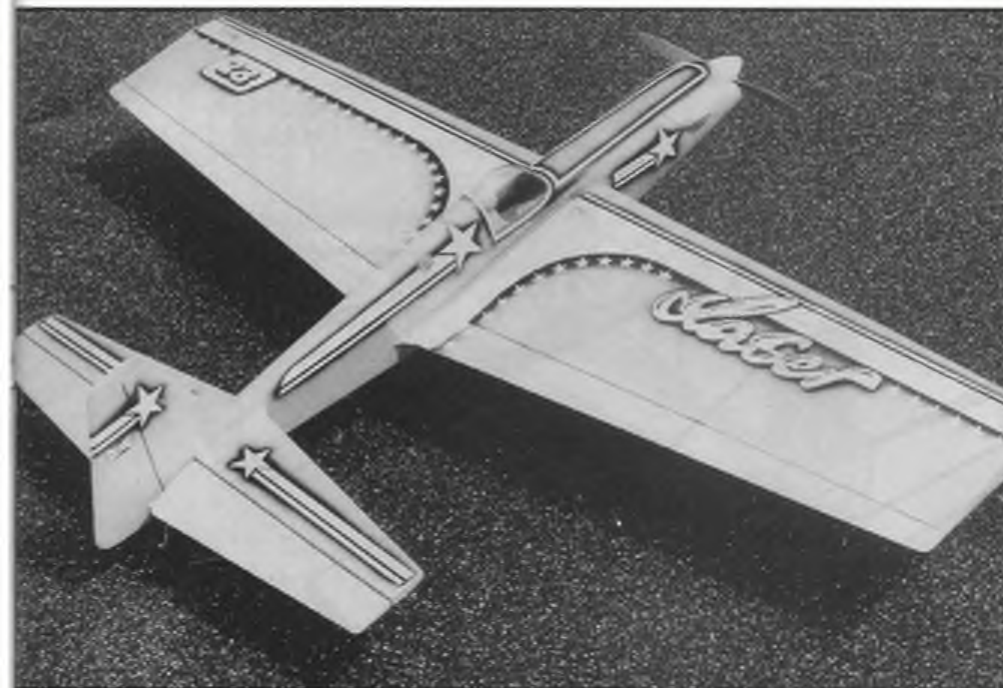
Symmetry of line

Whether you choose a symmetrical or asymmetrical layout is an age-old controversy. Because the outboard wing panel flies faster than the inboard one, it produces more lift. Theoretically this would cause our model to fly in an inwardly-banked attitude. To solve this problem, fliers long ago decided to make the outboard panel smaller. This works quite well. It has been said that the fuselage, which flies tangentially to the circle – acts like a windshield and deflects the airflow with the front, port side, thus leaving the inboard part of the outer panel in disturbed air and, as a result, less lift. Thus some modellers prefer a symmetrical layout, feeling that lift distribution is automatically correct. Our models are simply too small for this to happen. The angle that the nose makes to the circle is hardly measurable. I'm convinced that the airstream hits our models from directly ahead, so I still insist on the asymmetric layout to compensate for unequal lift.

Of course, we need equal lift in corners,



Eric Janssen's *Fourty Six* incorporates design features by America's Big Jim Greenaway. Very large flaps, with small deflection, should produce less drag, and maybe less flow separation at hinge line.



The author's own Laser; low aspect ratio wing. Designed to look good! Disadvantages: high induced drag, large centre of pressure travel.

too. Here the outboard wing is moving hardly any faster, so a reduced-span outboard panel might cause problems. However, all can be resolved with flaps...

Flaps

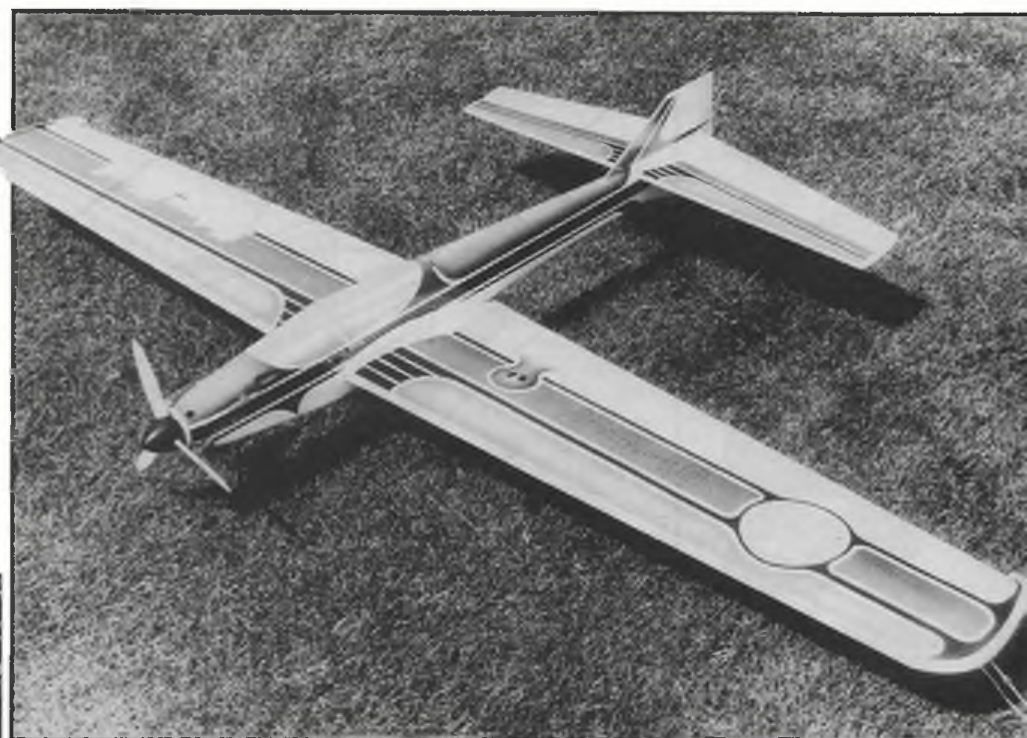
Wing flaps are the means by which the aerofoil section is changed from symmetrical to cambered; more lift is produced, which is helpful in corners. As with every control surface, efficiency depends on reasonable area rather than great deflection. More than a certain deflection causes little additional lift, but much extra drag. Wide flap chord seems preferable, but for a given flap area, we have to choose between span and chord. We need to change as much of the wing's section as possible, so the greatest possible flap span is the logical choice. Chord thus

depends on the required percentage of total area. Ted Fancher recommends a flap chord of up to twenty per cent of wing chord at each station. A reasonable flap area is automatically created.

Remember that the greater the flap area, the more load is placed on the control system; the 'feel' of the aircraft is changed, and flight characteristics alter. NACA's own data advises us more than twenty degrees of flap deflection.

When flaps are deflected, lift distribution along the aerofoil is changed. More lift is produced at the rear of the section, and the centre of pressure moves backwards. This increases the force which tries to turn the model in the opposite direction to that required. So large flap area, or great deflection, actually reduces the ability of our aircraft to fly sharp corners. We therefore recommend narrow flap chord to keep centre of pressure travel small.

I wouldn't like to use full-span flaps. Strong tip vortices already act on the thick wings we use, and to deflect a flap right at the tip

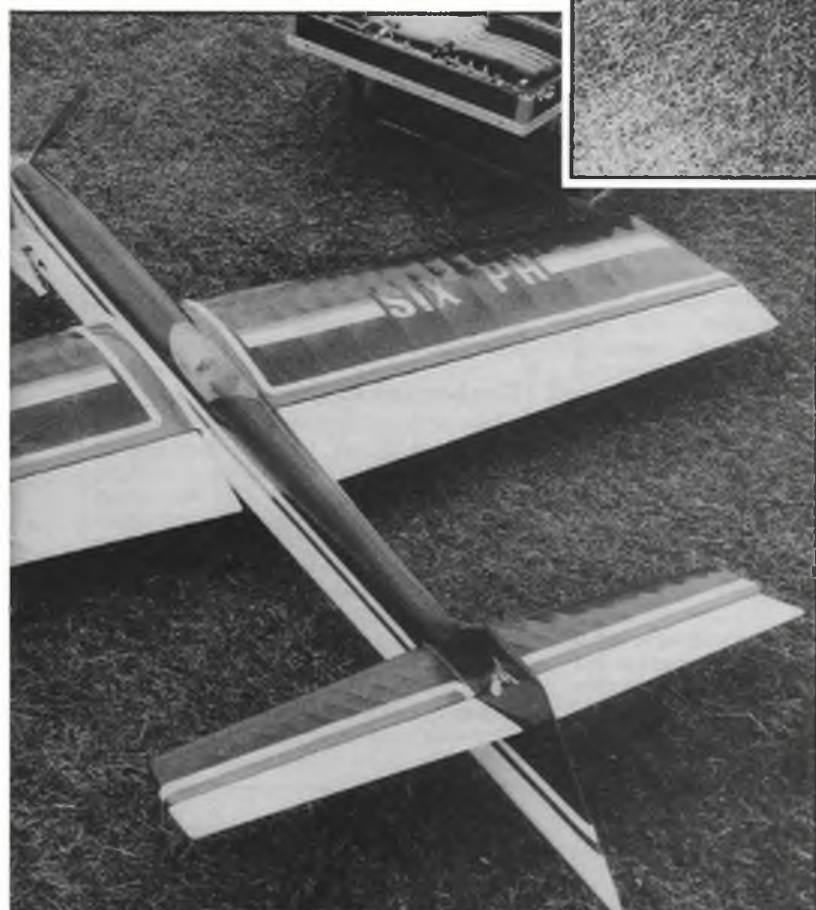


Above: Henning Forbech's ultra-high aspect ratio wing is more efficient, but rigidity is a problem.

would increase drag even more. A smaller angle of attack at the tips (washout) is desirable, not the washin of flap deflection. Keep the tips flap-free! Some enthusiasts use this part of the wing as a trim tab for fine-tuning the flight.

Many years ago Bob Palmer tried asymmetric flap deflection (more movement inboard) but the idea has not caught on. For a start, two flap horns are needed; but still the results are the opposite of what we required today. Remember - asymmetric wings produce unequal lift in corners. Now we can use a larger outboard flap to remedy this. If this offends your aesthetic eye, you could try differential flaps (more deflection outboard). However, this is possible only with short-span flaps in order not to interfere with horizontal flight. This is a most practical solution if you prefer wings with a swept trailing-edge, where you have two horns anyway.

To be continued...

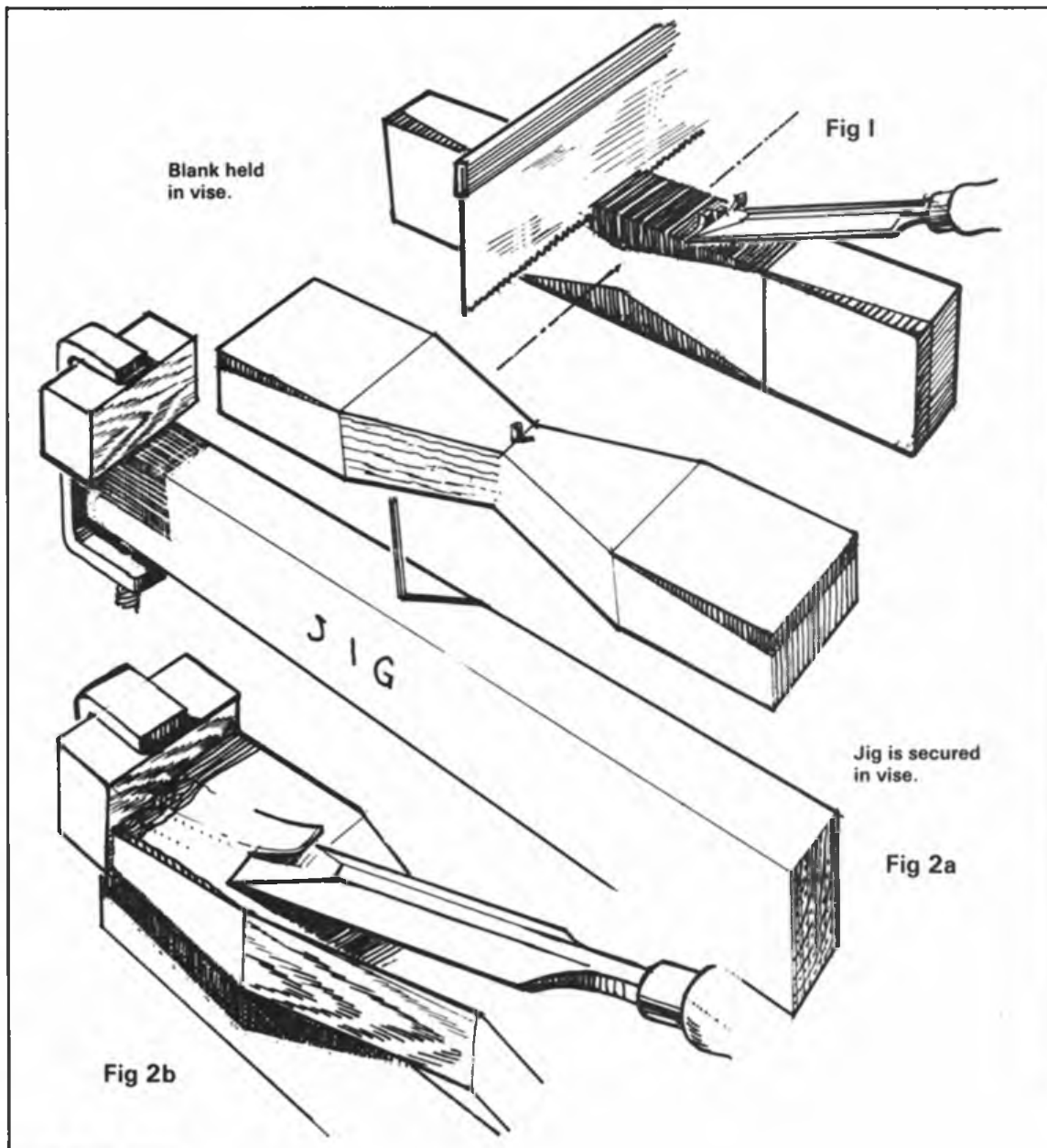


THE CARVE-UP

Trevor Faulkner takes us back to basics -

carving hardwood propellers for rubber

models



SELECTIVE use of woods, other than balsa, for rubber model propellers confers many advantages. Spruce, bamboo, obechi and birch are already in common use, either in the usual strip, sheet or block form, or as simple or multiple laminates.

Resilience, rigidity, flexibility and surface hardness are all varying factors to be usefully assessed. Appearance may also be enhanced. Before the advent of the complete palette of modern adhesives now available, constructional skills were somewhat more demanding. In the early days of aeromodelling, when balsa was almost unknown - and was considered an unsuitable timber - assembly techniques were very different. Builders had to become accustomed to manipulating intractable materials.

Familiarity with a material leads to optimum exploitation, but, conversely, perfectly acceptable materials may often be ignored, which is not only inhibiting but a great pity.

For and against

Let us consider the advantages of a hardwood airscrew. Given the correct cut and type of wood, blades may be carved very thin and yet retain strength. It is easy to produce a prop lighter than its commercial equivalent; or the carving may be arranged to produce extra noseweight if desired. Absolute flexi-

bility of choice!

The disadvantages revolve around the lack of choice of suitable wood in model shops. Basic carving techniques may also be lacking - but not after you have read this article!

I have always worked on the assumption that if the prop can be held comfortably, shaping, cutting and finishing are greatly aided. The hand is the most satisfactory holding device yet invented; softer than the material being carved (or, more accurately, whittled) it is capable of an infinite, but natural, range of grips and positions. When a harder material is involved, other tools are useful.

Timber selection

Most of the wood sizes we require may be classified as 'offcuts'. Check out local cabinet makers, shopfitters, schools and evening institutes. Don't overlook skips and house-clearance shops in your search for mahogany or walnut; indeed, the most common wood you will discover is likely to be a mahogany type, close- and straight-grained, easy to cut and with a delightful finish. Legs of stools, drawer fronts and sideboard main members are a good source.

Consult the sales sections of magazines such as *Woodworker*, where small quantities of 'turning' timber are advertised. And don't forget The Balsa Cabin, who can supply blanks of jelutong.

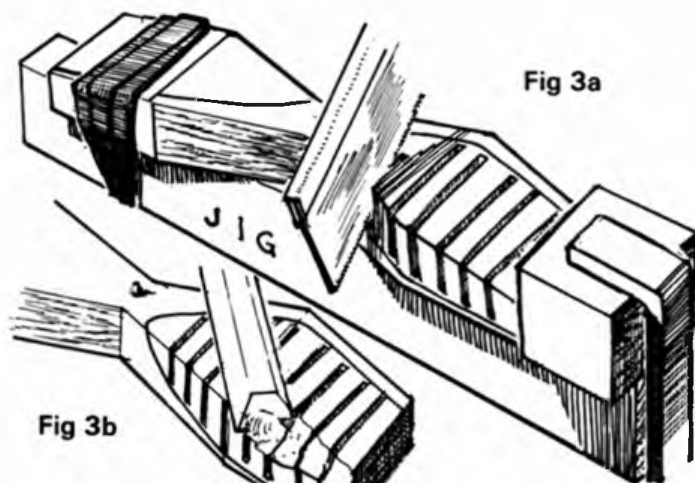


Fig 3b

Fig 3a

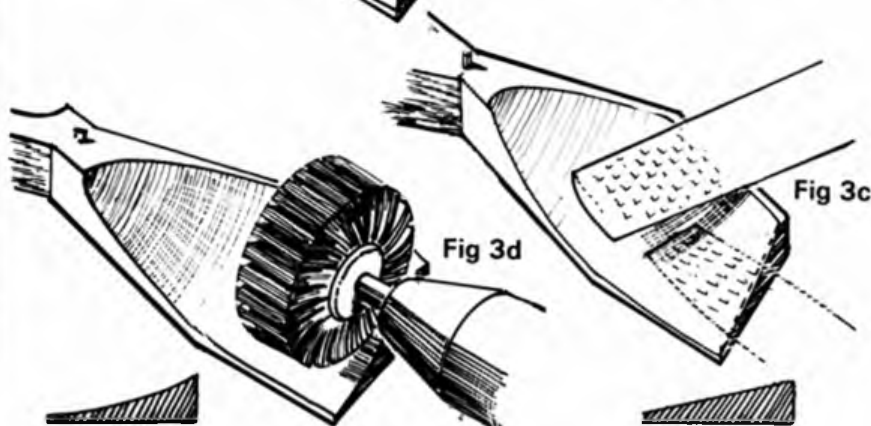
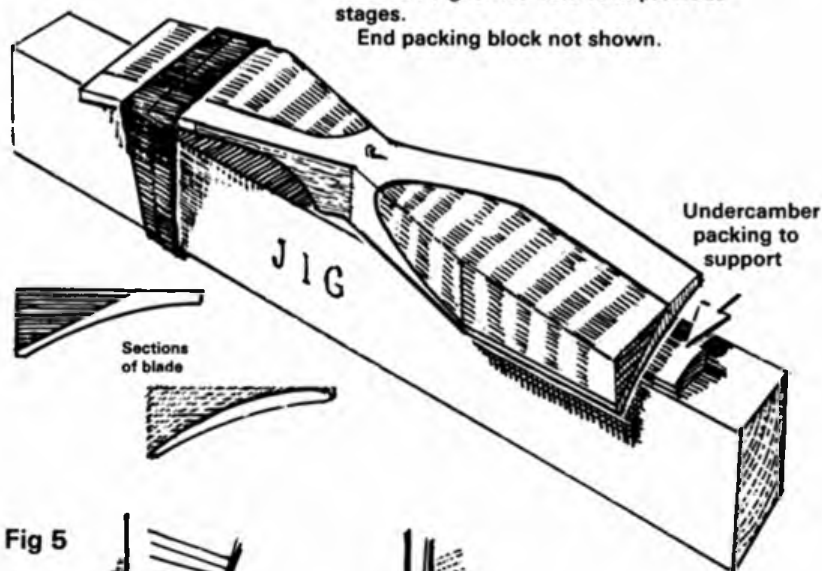


Fig 3c

Fig 3d

Blank front face marked for waste removal. Jig is vise-held as in previous stages.
End packing block not shown.



Undercamber
packing to
support

Sections
of blade

Fig 5

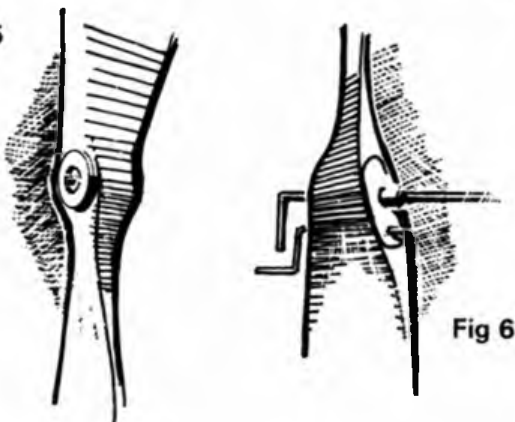


Fig 6

Tool up

The following tools are essential:
Vise: small saw (preferably, the kind known as 'dovetail' - your razor saw will rapidly wear out); a small G-cramp; hand drill; flat chisel, preferably bevel-edged (1/8in is ideal); rasp or curved 'dreadnought' file; small file; sanding block and abrasives; jobbers' bits to suit prop shaft and tube (see later); scrap wood, nominally 2 x 1in, some two inches longer than the diameter of the prop to be carved; a few broad rubber bands which may be sliced from an old car inner tube; and a set-square, marking tools and ruler. If the prop blank has to be produced from a bigger piece of wood then a larger saw and a smoothing plane will be needed.

Most of the above will already be in the home workshop or beneath-stairs cupboard. Desirable, but not essential, are a spokeshave, a small (and preferably, worn) flap wheel and an electric drill.

The carve-up

Reduce the timber to the required blank size. Several layers of masking tape on the metal jaws of the vise will help prevent marking the wood. Mark out prop profiles as required. Mark prop shaft position and carefully drill to fit a brass tube which itself must be a close fit on the prop shaft. Insert tube and cut back 1/16in proud on either side of the blank. Check that the blank revolves symmetrically on a length of prop shaft wire. If it doesn't, slightly enlarge the hole, pack with wood dust, micro balloons or baking powder, plus cyano, to correct.

Make vertical cuts across the grain to help avoid splitting when removing waste wood. See Fig. 1. Pare down each segment with the chisel. Clamp the holding jig in the vise. Drill a hole for close, 'interference' fit of prop shaft wire. Offer up the prop and clamp in place with a scrap piece of wood against the blank. (Fig. 2). Chisel the end of the blank, then reverse and repeat. (Fig 2b).

Turn the blank face-down on the jig. With chalk, mark the area to be removed. Be sure that you are cutting a left or right-hand prop, as required! Wrap rubber bands around the jig and the end of the prop not yet being shaped. Make sawcuts to assist in waste removal. (Figs. 3a and 3b). Rasp or spokeshave undersurface to the outlines keeping the surface flat. Check this with a ruler against the light. To incorporate undercamber, use the rasp again or hollow with a small flap wheel. Check constantly! See Fig. 3b again.

Mark the line of maximum camber on the front surface of each blade. Mark waste for removal, and assemble blank as before, but with front faces uppermost. Pack scrap strip between blade and jig before wrapping with bands to prevent damage. Make sawcuts as before, and remove waste wood. Carefully shape the landing edge from camber line. Repeat for second blade. Make a preliminary balance check; gently remove material to correct, if necessary.

Sand blades to finish. Dampen the prop to raise the wood grain; when dry, finish with fine paper and dope or varnish to suit.

Lastly, if your prop has a circular hub to match a spinner, cyano suitably sized washers to front and rear of the blank, and carve down to these. Small sections of tinplate, drilled to accept a short length of brass tube, may be epoxied to the front and back of the hub as the basis of a clutch freewheel system. See Figs. 5 and 6.

High

potential

Multi-engine electric

topics examined by

Chris Coote

WHAT ABOUT twins, or other multiple engine types, for electric power? The sheer controllability and predictability of electrics should mean that the problem of asymmetric thrust is much reduced. Also, it seems very attractive to use a single battery pack and thus ensure that the motors stop together. However, there are one or two pitfalls, and odd phenomena need to be understood before reliable operation can be achieved.

Let's comment on the variation of motor speed which may occur when switching in extra motors. Derek Knight (of KP fame) has asked me to explain why it was that the motors on his twin-engined Cessna Bobcat seemed to slow down once the second motor was switched on. The common battery pack was of twice the capacity of a normal, single one, and each motor was connected to it in parallel so as to receive the same voltage as in normal, 'single' situation (see Fig 1). When the first motor was switched on it went great guns - rather better than normal in fact, but when the second one was activated both slowed down to a speed slightly below normal expectation. Why was this - and could anything be done to regain the super performance of the first, solo engine operation? A little thought on the subject of internal resistance provided the answer to all this.

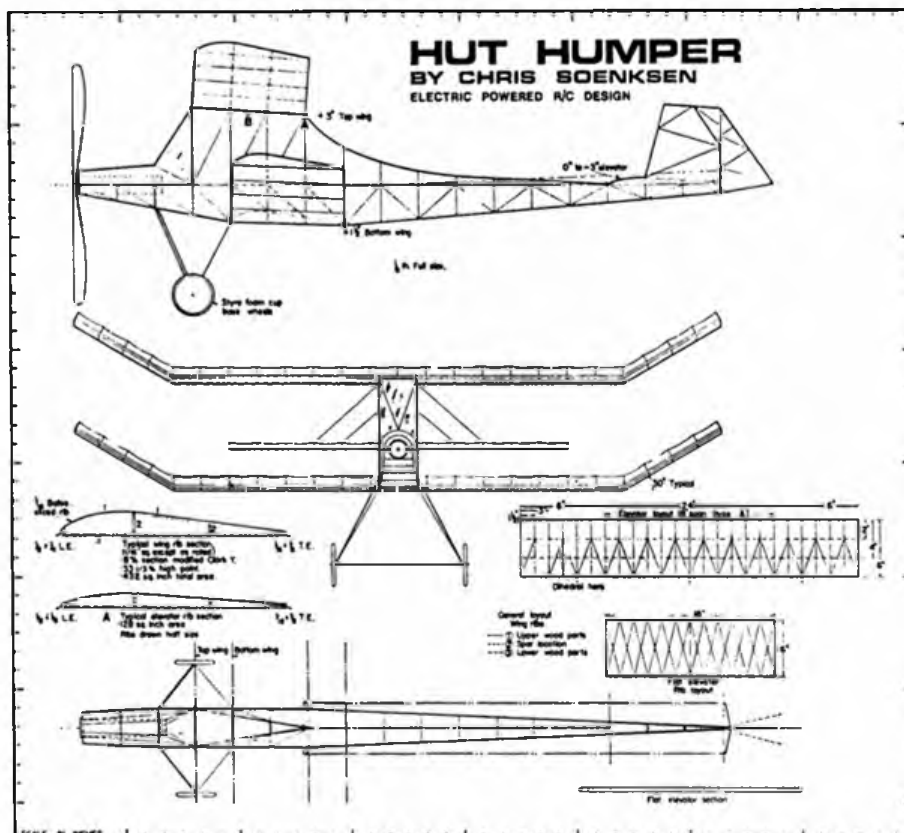
In order to fathom out what is going on we have to go back to lessons learned in the first article, and good old Ohm's Law. Now you all remember this, don't you? Ohm's Law says that to drive a current through a component of given resistance, a certain voltage is needed. In other words, to get a given current through a resistance will mean that some of the available battery voltage will be wasted, or dropped, in that component. The equation governing all this is simply stated as:

$$\text{Resistance} = \frac{\text{Volt drop}}{\text{Current flowing}}$$

This can be rewritten as:

$$\text{Volt drop} = \text{Resistance} \times \text{Current flowing}$$

Thus we can easily calculate how much of the battery voltage available to drive the motor is wasted in getting the fairly heavy current needed for flying, to flow round the whole circuit, including getting it to flow through the battery itself. Every bit of the electrical circuit has some resistance to current flow, including the battery. The resistance in the batteries is known as the internal resistance. The value of this



A look back to twenty years ago. Chris Soenksen's Hut Humper was one of the first Indoor R/C electric craft - pretty, too...

resistance is very low for the nicad batteries we use, and is often ignored in simple circuit calculations.

However, in the case of electric flight we are pushing the technology to its limits; in particular, we are drawing large currents from often tiny batteries not really designed for this type of work. This combination of large current and low voltage means that the internal resistance effect is noticeable. Let's take the example of the original problem to illustrate the point. We know that the standard KP01 motor draws about 2.5amps on full load with a three-cell battery pack of, nominally, 3.6 volts. This battery pack is made up of three cells in series (see Fig 2). Standard 50mAh cells have an internal resistance of 50/1000 (50 thousandths) of an ohm each. Three cells connected in series thus possess a total internal resistance of $50 \times 3 / 1000 = 0.15$ ohms. At a current of 2.5 amps the volts dropped, or lost, in the battery will be $2.5 \times 0.15 = 0.375$ volts. This leaves only 3.225 volts to get to the motor and drive it. The twin setup involved a change to 100mAh cells with an individual internal resistance of only 30/1000 or 0.03 ohms. Thus three cells in series have an internal resistance of $0.03 \times 3 = 0.09$ ohms. One motor running at 2.5 amps implies a volt drop of only $0.03 \times 3 \times 2.5 = 0.225$ volts. This leaves 3.375

volts to drive the single motor significantly faster than it would with the 50mAh cells (only 3.255 volts are available with these). When the second motor is switched on the total current doubles to 5 amps and this now has to flow through the single battery's internal resistance of 0.09 ohms. Thus the volt drop is now $0.09 \times 5 = 0.45$ volts, leaving only 3.15 volts for the motors - significantly less than the single motor situation and thus resulting in reduced prop rpm!

So what could we do to overcome this? One solution would be to use batteries with a lower internal resistance. Usually this means a bigger battery. However, if we still need three cells to supply the correct voltage this will lead to a larger and heavier payload. This may or may not be feasible, so if we wish to keep to the original battery capacities the best solution is to retain 50mAh cells but connect them with balancing wires such that two three-cell packs are connected one to each motor and in parallel with each other (see Fig 3). This seemingly quirky arrangement is necessary because of the overall reduced internal resistance of the smaller, parallel-connected cells compared to the single, larger ones. This may not apply to all multi-motor applications, but all the figures I have seen for nicad internal resistance seem to suggest that parallel-connected smaller cells are

always a better proposition than an equivalent-capacity single cell. So the neat answer to Derek's original problem would be to use the standard arrangement of 50mAh battery packs, one for each motor, and put in an extra pair of balancing wires to connect the two packs in parallel to ensure that both motors can run down together and share the energy from either pack. Under normal flight conditions the only current flowing the balancing wires is the mismatch between the demands of each motor. Thus the balancing wire can be of quite small and light section.

Wire you asking!

This brings us quite neatly to the subject of wiring and the sort of cables to use in our installations. As a general rule I would recommend that you use multistrand, PVC-insulated wire of adequate size so as not to induce too much wasteful resistance in the circuit. Remember – even with the smallest motors we are dealing with currents of at least two amps, and with the 380 type motors, ten amps is not too unusual. However, when we come to twins there can be a surprisingly large amount of wire involved, particularly if you choose a central battery location. The lightest wire for current-carrying capacity is single-stranded copper with a varnish or shellac-type, painted-on insulation. This is exactly the same stuff that we use to wind the armatures of our motors. With modern, flexible coatings the insulating layer is surprisingly resistant to damage by abrasion or flexing of the wire. If the wire itself is well supported in the model by passing it

through pin holes in the formers, or by spot glueing it to various bits of the structure, then the installation can be made quite crashproof. The end connections need a bit of care also since they are potentially the weakest point. It is a good idea to try and form a mechanical connection by wrapping the bared end of the strand around the relevant terminal before applying the soldering iron. There is then no reason why the wiring should not last the life of the model. You will have to take care if you delve into the depths of the fuselage with a metal object like a screwdriver – it's all too easy to scratch a wire and cause a short.

I recently investigated just such an installation in a four-engined model. The main battery pack was carried (very appropriately, I thought) in the bomb bay, connected via single-strand wire of about 24swg. The motors themselves were cannibalised from Stomper-type toy cars. The model itself is still in the development stage but initial testing showed an absolutely straight takeoff run with all four engines running, the main wheels just lifting from the floor. Certainly there were no problems with asymmetric thrust on this one; it just needs another cell to give the urge to fly. We will keep you posted with progress, perhaps after the Indoor Nats!

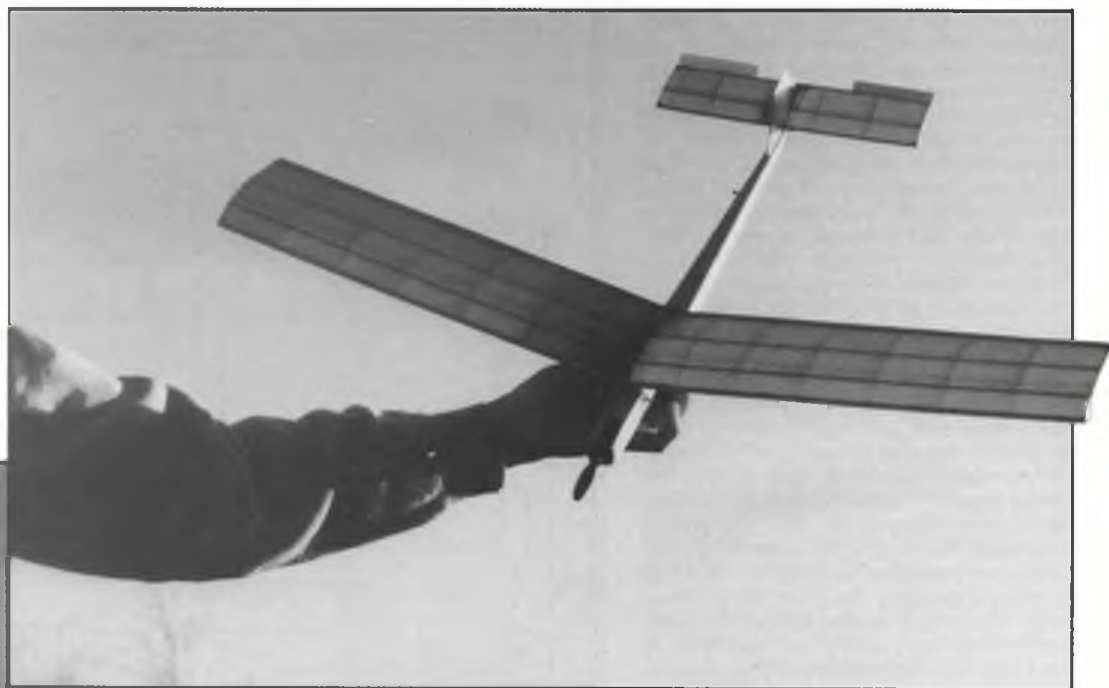
Multi-engine switching

I have been asked about the question of switching and fusing on multiple-engined models. Theoretically, each battery should be protected with its own output fuse, and each

motor with its own, smaller, input fuse. This is shown in Fig. 4. The snag with fuses in our type of application is that they do add significant resistance to the circuit and can markedly downrate the performance. Thus the fewer fuses the better, both from the weight and the resistance points of view. The most usual form of failure which will cause a battery pack short is stalling a motor in a crash or heavy landing. The system wiring is so simple that for all practical purposes we can forget about protecting against failures, and can this eliminate the battery fuse (Fig 5). The individual motor fuses will then protect each motor in turn whilst allowing the other to continue to run. This can influence the decision as to whether to use a parallel-connected or series-connected system. In the case of the latter system (Fig 6) we only need one fuse rated at the current consumption of one motor. If the fuse does blow the the whole circuit is broken and all motors will stop together. This is what we normally require. See Fig 5. This system does mean that the whole of the 'fault' current can flow through the good motor before the fuse eventually blows, perhaps causing some damage. In the case of the parallel-connected system, the motor fuses still have to be rated to carry the full load current of one motor, but a motor short will lead to most of the current from the central batteries being diverted to blow this fuse, whilst the good motor, being starved of current, will slow down, receiving no damage.

On balance I prefer the series connection since it eliminates the fuse, one more

Two by Dave Hanks. At right is a simple duration F/F model for direct-drive Mabuchi 140 power; below he displays his scale Eastbourne Monoplane, powered by a Stomper toy car motor, as detailed in the March 1989 column.



troublesome component. Also, the currents flowing in the whole wiring system are smaller (equivalent to only one motors-worth) and thus the problems of resistance and volt drop in the wiring are reduced, as is the drop caused by battery internal resistance. Any failure will cause all motors to stop and the battery to be isolated, which is a good thing in aircraft. The disadvantage is that more cells (although of a smaller capacity) will be needed for a central battery pack. This may cost more initially; but it is a price worth paying. The main on/off switch can easily be incorporated and, once again, it has only to be rated at one motors-worth of current,

High potential

since in the series connected setup the same, 'single motor' current flows in all parts of the circuit. Note that the multiple motors will only run at the same speed if their own resistances and characteristics are equal. Motors of nominally the same type are OK like this, but don't try to organise a trimotor setup with a single central large motor and two smaller wing motors without thinking it through carefully first!

The 'parallel' setup, shown in Fig 5, ensures that the same battery voltage is applied to each motor. Thus motors of a similar voltage/speed characteristic will run at the same rpm. However, if a motor fails and starts to short out (as in a stalled situation) then this motor's resistance will fall to a low value and draw large currents from the battery. This will cause the available voltage to the other motors to fall because of the internal resistance effect in the battery, and the good motors will slow down a bit, though they will continue to run. The central battery pack must be of cells of such a size that they can supply the sum of all the motor currents. Thus in a four-engined type using even the smallest motors the cells must be good for ten amps or 50, and the interconnecting wiring and main switch must also be capable of this high current carrying capacity.

So having got your wiring system sorted out to your own preference, the final thing is to select the size, or rating, of the fuse(s). As mentioned previously, any fuse in the circuit is going to add resistance. The smaller the current rating of the fuse, the greater this resistance will be. In order to provide maximum protection we need to use fuses of as low a rating or size as we can get away with. This is because even with normal flight currents we are pushing our motors fairly near their limits of current-carrying capacity. Thus in a fault situation any increase of current, due to shorting out, is liable to cause internal damage to the windings or brushes. Ordinary cartridge-type fuses will not blow at their nominal-rated current, for several minutes. In fact, to make them blow within a few seconds it is necessary to pass about four times their rated current through them.

Diagrams at right show aspects of 'twin' electric systems described in text.

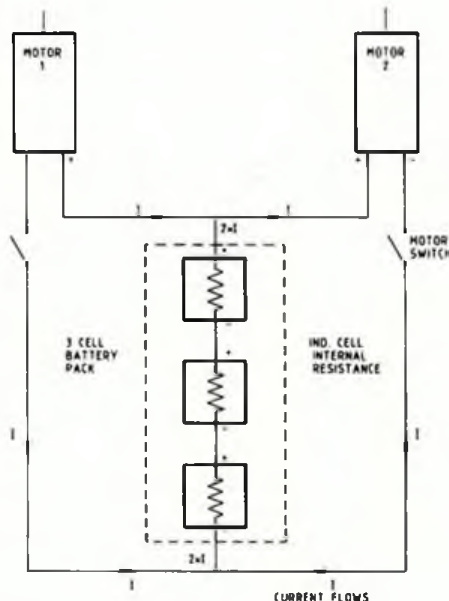


Fig 1: Single battery pack; parallel connection

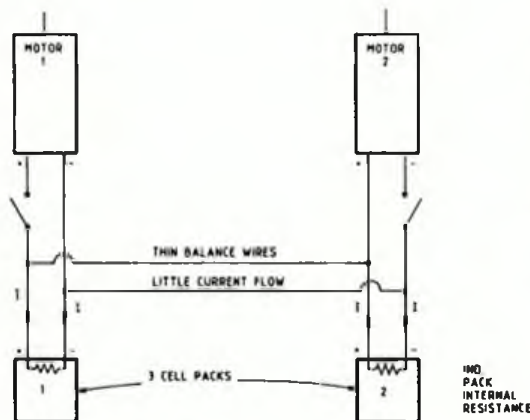


Fig 3: Twin battery pack; parallel connection

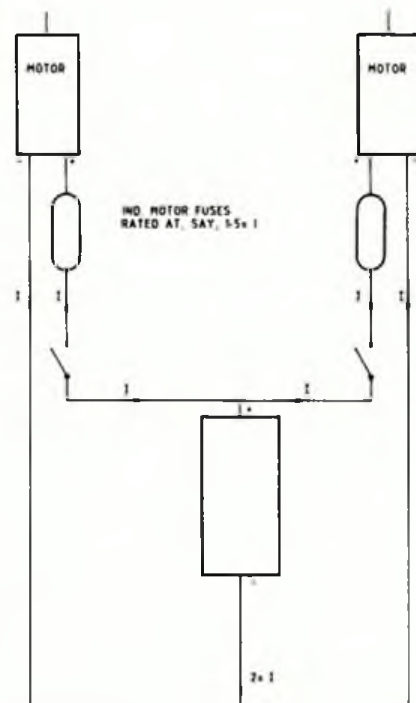


Fig 5: Simplest fuse arrangement; parallel system

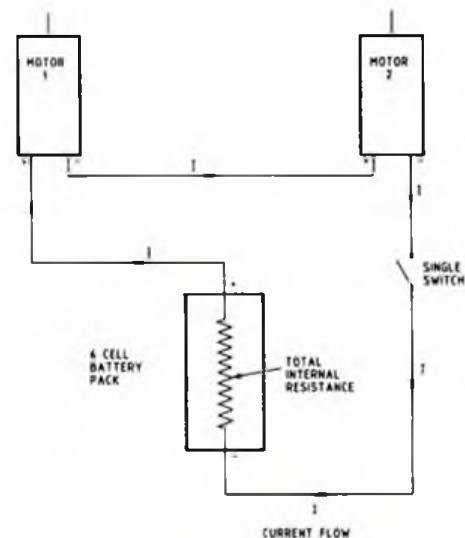


Fig 2: Single battery pack; series connection

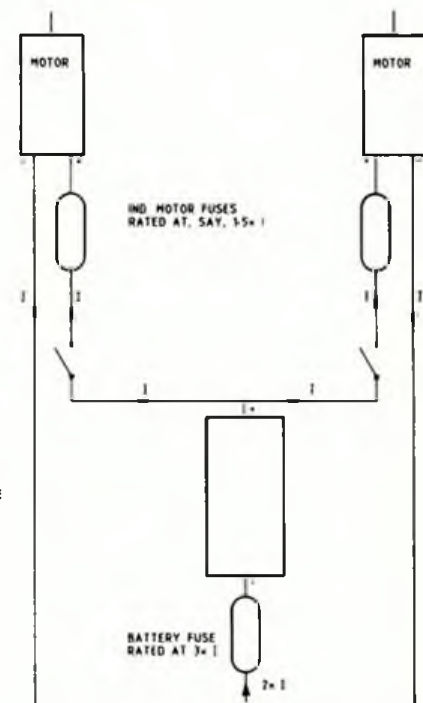


Fig 4: Maximum fuse protection, parallel system

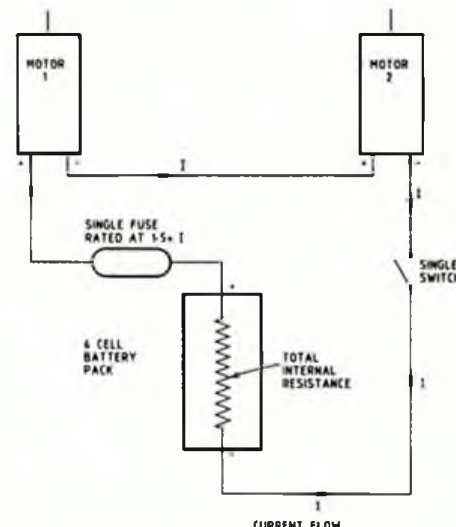
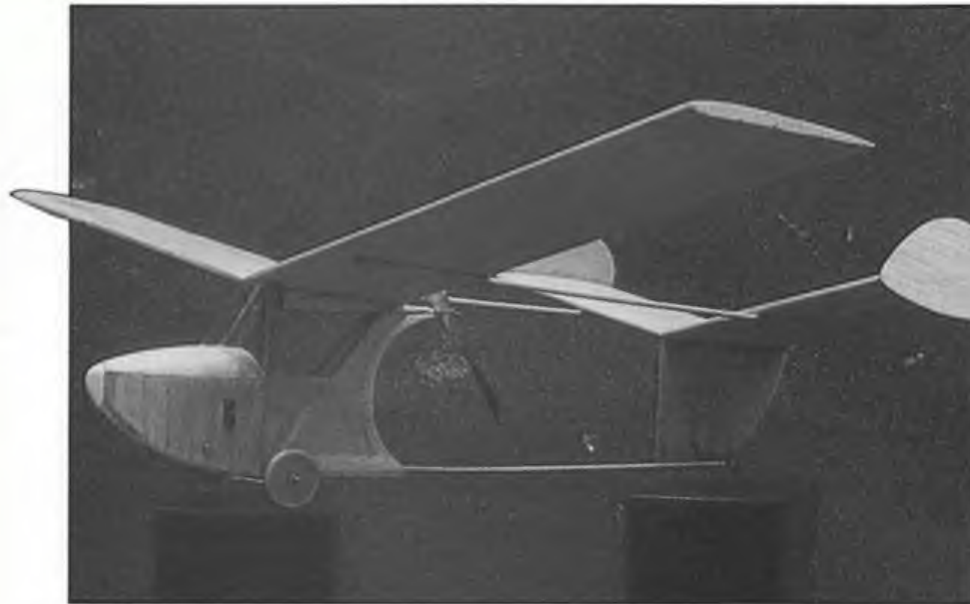
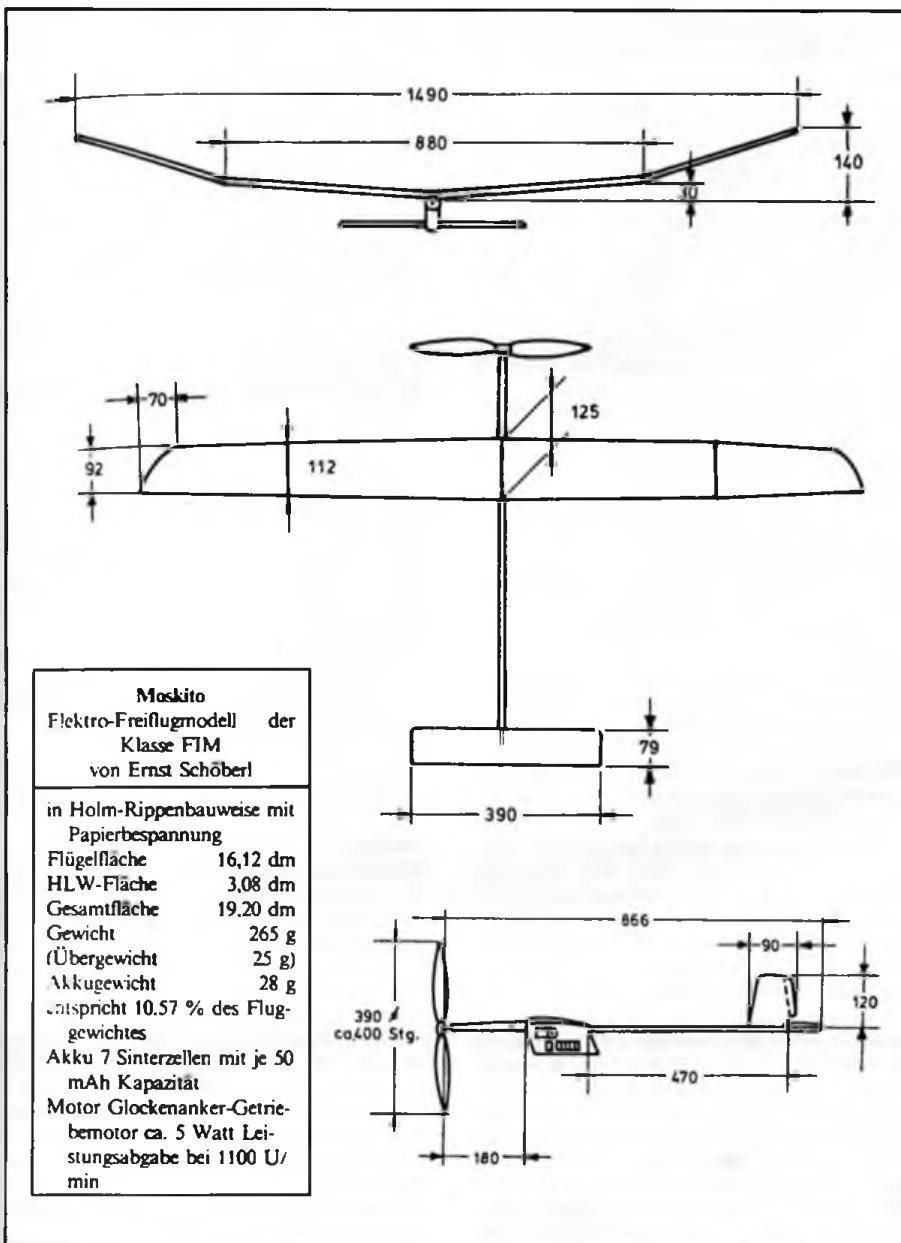


Fig 6: Simple single fuse for series connection



Above: From California, Philip Stanson's perky all-sheet-and-wood, 26in free-flight was recently lost OOS! Geared camera motor (similar to KP 01 unit); 6in North Pacific prop; three cells. Below: From the latest issue of Flugmodelltechnik, details of a record-breaking F/F craft which we will feature in more detail soon.



Thus you can see that if we want to protect our motors from even slight increases in current, the fuse ratings will have to be pretty close to the normal flying current. This will give a significant increase in circuit resistance and thus a slowing-down of the motor. Like all things in life you have to make a compromise; a small enough rating for adequate protection, large enough not to affect flight too much. Personally I tend to go for a fuse of perhaps 1.5 times the normal flying current rating. I use small open fuse holders which take 20mm glass fuses. These are available in ratings up to 10amps and are thus OK for up to 380-type motor installations which I run at seven to eight amps. Larger systems can use the more standard 1.25in fuses (as in cars). It is probably worth investigating the use of the latest car blade-type fuses which are commendably small and light. The problem may be to find a holder for them. If you are satisfied to use the fuses only for ultimate protection, I suppose you could just solder them in place, but I would find it infuriating to have to curtail my day's flying just because of one small mishap early on! If anything can break or fail it will, in my experience, so make sure it is all easily replaceable on the field.

Finally, what do you use to connect together all the various bits and pieces in such a way as to be able to easily replace them? Obviously with an all-soldered assembly of motor, battery, switch and fuse, there is no way you can change bits on the flying field unless you have one of those natty, portable soldering irons. Also, particularly with the larger outdoor type systems, we are dealing with significant currents of the order of five to ten amps or so. Thus any removable connector system has to be capable of handling these sort of currents with minimal losses. In the 'professional' world of wiring-up it has long been accepted that crimped or squashed connections, if properly made under controlled conditions, are better than soldered ones. Indeed, all the mains electricity passing around the country at 440,000 volts flows through crimped connections. The most useful electrical tool I possess is a simple pair of hand-crimping pliers that came blister-packed, with a selection of crimp-on end fittings, from a car accessory shop. These used to be quite hard to find, but I note in my recent shopping trips that even the big chain stores like Halfords, and the DIY superstores (B&Q, Texas, and so on) are starting to stock them. Prices seem to have come down a lot; only £2.99 in one shop I noticed. The best type of crimp-end fittings for repeated connection/disconnection are circular cross-section plugs and sockets. These seem easier to disconnect than the more usual 1/4in Lucas flat, car-style affairs. I usually put socket-type connectors on battery leads (so they cannot short out inadvertently in my tool box!) and pins or bullets on the motor leads.

Over to you...

Don't forget to write or phone with any queries or tales of success - or disaster. I have already had some queries to deal with, answers to which have been contained in earlier articles. If you have not followed the whole story so far I am sure the nice people at ASP can get you some back numbers; and if you have missed out on the odd issue why don't you take out a subscription! It's no more expensive than buying individual issues.

READERS' LETTERS

Positive thinking

Dear Sir,

I must put pen to paper, for you have published some incorrect information about Indoor Hand Launch Gliders and the Sweepette Trophy in February's *Aeromodeller*. John O'Donnell's comments about lack of participation could easily be accepted in their entirety, particularly as John has always been a leading advocate of positive thinking. But the fact is – I have lost count of the times that I have flown in the Sweepette Trophy; and on all but one occasion, two launch sites were needed to allow the competition to finish on time.

In view of this, I disagree with John's conclusion that because there were only three entries in the class at Wigan, the Trophy has become an embarrassment and should be returned to its donor. Even if interest was nil, this would still be negative thinking – and I would certainly not insult Mr Hines in this way. Don't forget that Lee Hines, one of America's leading HLG fliers, donated the Trophy to create interest in the class at a time when its following was nil. In other words – positive thinking. A gamble? Yes – but without this commodity, nothing gets started, let alone done.

The positive attitude shown by the Indoor Technical Committee in diverting the Sweepette Trophy to a Low-Ceiling event, effectively to prevent it becoming even more intensively a contest for top athletes, extends to holding it at a different location each year, thus giving the maximum number a chance to win. Having said all that, to imply that Indoor HLG is blessed with ever-increasing entries is wrong. Still more positive action is needed...

Organisers should allow a 45-minute trimming period, with only one model in the air at a time, to allow all modellers to keep their models in one piece for the competition. *Aeromodeller* should publish information on this class of model – and how to win with it. See me for the solution! (OK. GC.) The Indoor Committee should remember that we need a competition that allows for different levels of ability...

Werrington

Mick Page

Welcome back

Dear Sir,

During the late sixties, my long-suffering father and I became involved in aeromodelling. Being a young lad interested in anything scientific, it seemed to me the obvious thing to 'get into'. Dad was interested because he'd been in the RAF during the war, and knew about planes. Together, we built quite a squadron of planes plus one air-sea rescue boat. It all started with a plastic C/L job which I'd gained by swapping my Monopoly set. Soon after, the motor found its way into a KK Gyron, complete with single channel radio control. A few other models found their way off our work bench: a glider, and even an autogiro. All had one thing in common. None ever flew!

Looking back, our modelling days were nothing but a catalogue of disaster. First of all, it took us about four hours of sore fingers, trying to start a glow plug motor before it dawned on us that a battery would help. Our single channel Gyron was obviously what was called for. Result: it crashed much faster. Our glider was much too small for the radio gear. It had a flight angle akin to that of a half brick, but was much less resilient on landing.

A boat had to be the answer. Not so much to go wrong, you see. We even had one successful voyage. It was after re-fuelling and trying to re-start the engine that our modelling days came to an end. After an hour of pulling, tugging, cursing and swearing, our motor finally decided to burst to life at precisely the same instant it also decided to part company with its mounting. Try to imagine a motor at full pelt, describing a gentle arc through the air. Try also to imagine the awesome silence shortly after the motor hit the water...

I lost interest in modelling for some twenty years.

So what, you may ask, tempted me back to the baksa and Elastoplast fraternity? Well, here I was at the tender age of 'thirty hmmm', with a wife, two children and a Christmas holiday coming with a little – just a little – spare time on my hands. I had also recently moved to a charming little cottage in the country, and just outside the door was a beautiful, verdant green, rolling meadow: model flying for the use of. A quick visit to my local model shop was called for. After a quick recce through the shop and the December issue of *Aeromodeller* I came to the following, astonishing conclusions.

(a) Very little had changed over the years. Even the kits were the same. Twenty years ago, a two channel R/C outfit cost about £50; four channel about £20.

(b) The effective fall in the value of R/C equipment hadn't resulted in a total demise in all other types of flying.

(c) Very few new revolutionary materials or concepts had come on the scene.

(d) There didn't appear to be as many model shops.

(e) There were many enthusiasts who got a lot of pleasure from flying relatively cheap models with rubber power or CO₂.

On my way to the shops to buy my first model for twenty years, I decided to set myself two targets. Firstly, I was going to build a rubber-powered model and make it fly. Secondly, within the next year and a half, I would enter a competition and not come last. The latter accomplishment was obviously going to be far more difficult to achieve as in my issue of *Aeromodeller* there was no mention of the F8V class; Open Kamikaze, a class, which going on past form, would be just up my alley.

In exchange for my hard-earned cash, I was given a Guillow's Cessna 180 'build by numbers' kit. I had never heard of this brand. I must say that it was a delightfully straightforward kit to build. I most liked the complete 'idiotproofness'. The plans assumed no previous knowledge, and told you exactly which bit to stick to what bit, and in what order. I strayed from the plan in just one way. Plastic iron-on film was just in its infancy when I last made

a model, but I thought that it would be worth a try, if only because it would be less smelly than dope. Now the man in the shop told me that I wouldn't need any tissue paste or anything to stick it into place. Well this method didn't seem to work for me; however, a little bit of white glue certainly seemed to do the trick. I'll certainly use this material on any future models.

I also kept my building sessions down to very short periods of time, thus minimising frustration and stupid-mistake time. I started building on Boxing Day and finished on 25th January. I don't think I ever spent more than half an hour at work on it.

I then had to wait for the perfect day. Saturday, 28th January started wet and windy, but by two o'clock it was almost flat calm. This was it. The big moment. I took myself, plane, Richard, (my son) and a little plastic chuck glider that Santa had brought him up into the field. First – the test flight. Not a bad glide really, but constantly swerving over onto its left wing on landing. Eventually, snap; and the support strut broke. Walking down the mountain towards home, I couldn't help but notice that Richard was doing much better than me!

A quick squirt of glue and half an hour later, I was back; but the same old problem persisted, and the inevitable breakage. Back to the drawing board. Then I remembered. I had borrowed a book from my local library; *The Aeromodeller's Handbook* by Les Netherton. He suggested not just checking the CG from wingtip to wingtip but also by balancing fore-and-aft. When I checked this, one wing was heavier than the other. Plasticine to the rescue and back to the field.

By now, the setting sun was right on the horizon. A gentle test flight proved most successful. About fifteen yards, straight and true. Should I try again and risk another breakage? What the heck! I put about 80 turns on the motor and let it go. Fantastic. A perfect curving flight with a wonderful three-point landing at the end. The moment that I had waited twenty years for...

Taf's Well

Mid Glamorgan

Phil Edwards

Help needed

Dear Sir,

Having spent several months building control-line models for my collection of rather old British engines – silencers are a problem! – I now am finding difficulty in locating a suitable flying site. A local club caters only for radio control and doesn't really want me cluttering up their airspace.

Could I appeal to anyone who knows of such an area (free from high-tension lines, houses and dogs) to let me know? I am prepared to travel up to twenty-five miles to get airborne, and I would dearly love to hear from other C/L pilots. Until then I'm well and truly grounded!

Claines, Worcester
Geoffrey Crump
(Letters will be forwarded. GC.)



Wakefield winner Ole Torgersen winds for the fly off on home ground – or ice!

HOLIDAY ON ICE

LAST YEAR I closed the report on the 1988 Holiday on Ice meeting with the question – would I go again? The answer was Yes – and I will probably go in 1990. Hopefully this report will encourage a few more; several prospective competitors from Great Britain asked questions but none followed through.

Neither Bernard Aslett or Gerry Pink could make this trip, but David Oldfield and myself decided we were going regardless. As in 1988, the trip could not be confirmed until the last few days. Norway had suffered from a mild winter with little ice or snow. Two weeks prior to the event there was a period of heavy rain and the scant amount of ice on the lake was flooded to a depth of several centimetres. Veger Nereng persuaded the rest of the organising committee that it would freeze in time for the contest. The fact this report has been written proves that his hunch was right.

Last year David and I hired clothes for the cold, but now we invested in our own equipment. This means we will definitely have to go again to make the expenditure worthwhile! However, there was one vital purchase we failed to make. More of this later! We kept warm despite temperatures falling to minus six degrees centigrade and a severe chill factor at times.

Tight times?

Remembering the tight time schedule in 1988, we decided on an earlier flight time; this also proved to be cost beneficial. The normal standard fare from Heathrow to Oslo is £224 return. We chose APEX at a return price of £169. To help with security clearance I telephoned – and confirmed in writing –

our requirements for the model boxes. It was very gratifying to find that not only were we expected but there would be an easy passage. My new, super light box had to be opened for a quick inspection, which turned into a long chat with several interested officers and other passengers. We were able to take the boxes on trolleys right up to the gate, at which point they were taken by a pair of baggage handlers after we had given clear and detailed instructions.

Mike Woodhouse

reports on a Norwegian

adventure

Arrival?

The flight to Oslo on the Scandinavian Airlines DC9 was on time and uneventful (the return home was by BA Boeing 757). We left Heathrow at 10.45 with partially overcast and breezy conditions to arrive at Fornebu airport where it was calm, bright and sunny. It was warmer than London and there was no sign of snow or winter – apart from the unmistakable hiss of studded car tyres. We took the airport bus to Oslo central railway

station, arriving in sufficient time to have a bite of lunch.

As we approached the platform and the train for Gjøvik we came upon a guy with what could only be a model box. We thus introduced ourselves to Jean Boissimon from France. Jean was to be the sole French representative; he had travelled all the way from Nantes by train. The journey (of just over two hours) to Gjøvik was very pleasant and relaxing; last year we had travelled in the dark and missed the very picturesque views. Despite the steady journey north there was still little evidence of the expected winter conditions. The railway winds steadily along the shores of several lakes, and we were consoled by the fact they were mostly frozen. We decided things would be OK when we saw a local inhabitant sitting in the middle of a small lake and fishing through a hole...

We arrived at Gjøvik at 4pm in what looked like perfect conditions. Tor Bortne and Nils Schmidt Andersen were there to meet us and take us to the Hodvtun (Hostel). After the initial greetings came the questions:

Question 1: 'Is the ice OK?'
Answer: 'Yes.'

Question 2: 'Will the weather stay like this?'
Answer: 'It should remain flyable.'

We were to find out later exactly what Tor's definition of 'flyable' was!

Preparations

We checked in at the Hostel, had a meal and set about preparing for the following day

and renewing last year's friendships. Apparently the winter had been very mild by Scandinavian standards, but Finland had been wet and windy, giving little opportunity to trim models. The Finns did not believe there could be ice this far south so few were coming to the contest. For some unknown reason there was to be no Danish representation; overall, the entries were down on 1988. If you stayed away you missed out badly!

This year the ice was thicker, up 50 centimetres in places. Now Tor confessed that last year the ice had been less than ten centimetres thick. The steel ice was covered in a thin layer of crisp snow and walking might prove a little treacherous, an understatement as it turned out! We drove out to the lake on a beautiful, calm, clear and sunny morning; everything looked set for a perfect day's competition. This year we were to fly further north on the lake; in fact on the other side of the viaduct that spanned the lake at a narrow point. We drove past last year's 'site' noticing that it was under water - 400 metres of water, to be precise! We parked by the side of the lake and unloaded. As last year the bulky gear was transported on the start line by snow scooter. I took approximately two steps on the ice. Approximately two, that is, as my second step was completed with me

...and right, Mike winds for the fly off. Below: Ossi Kilpelanen's distinctive, all-composite F1B failed to shine.



Left: Our reporter's F1B used for his first four flights. Eventual second place made the journey worthwhile...



Above: Norway's Torsten Bjornstad prepares his F1B maxed in the first round. Left: Cenny Breemann (Netherlands) flew this impressively invigorated F1A into 5th place.

sitting on the ice. I lost count of how often I fell over, but at least a padded jacket and trousers insulate against bruises as well as cold. Next year I will invest in a pair of crampons for my boots.

Testing...

Camp was set and test flying begun. It was calm - but where was last year's buoyant air? The models flew just like at home but for the expected thick air to be present the weather must apparently be dull and overcast

F1B

2	O Torgersen	N	180	180	180	180	180
3	M Woodhouse	GB	180	180	180	180	180
4	B Eimar	S	180	180	180	180	180
5	L Ericsson	S	184	180	180	180	180
6	J Wold	N	144	180	170	180	180
7	F Seja	BRD	180	180	180	180	180
8	M Eriksson	S	180	189	111	170	180
9	T Bjørnstad	N	180	134	134	147	180
10	T Skjulstad	N	160	100	189	107	180
11	T Linkola	SF	82	179	146	180	180
12	O Kilpainen	SF	138	120	149	113	141
13	H Bjørnstrøm	S	102	84	124	142	138
14	P Sundstedt	S	40	104	65	180	109
					86	168	116

1	T Bortne	M									
2	G Agren	S	180	180	180	180	180	180	180	180	1260
			180	180	134	180	180	180	180	180	1214

F1A

[illegible]

...and competing

By the time the second round began there was increased cloud cover and a light drift from the south. Throughout the day the breeze steadily picked up and cloud cover gradually became more dense. At this time, according to Ossi Kilpelanen's thermistor, the temperature was minus 6.3 degrees Centigrade. This, coupled with the chill factor, made it feel a bit cold! Lest I give the wrong impression, it is a 'dry' cold so if one has the correct clothes on it's not too unpleasant. Bror Eimar went down whilst winding for his fifth flight, being dragged across the ice by the part-wound motor towards the model, conjuring up memories of 'Jaws'! Per Thomas Skyjultstad suffered the effects of the new 'attempt' rule, when his model dived in hard when the VIT system failed to operate; he recorded 11 seconds. Under the 1988 rules this would have been an under 20-second attempt, allowing a further go. This new rule is going to have a significant effect on results. His disaster put Per Thomas out of the medals and ruined his 'local' battle with Jan Wold, for at the time of the disaster their scores were tied. As the day wore on the light breeze increased, and the models were going a long way. I now began to appreciate the size of the lake, for despite how far downwind one walked, the shore to the north still seemed miles away. Apart from the difficulty in walking like John Cleese, retrieving was easy. Dark, and brightly coloured models, show up on the ice. One can spot the discontinuity of the models

Wakefield was another story. Three of us had perfect scores: Ole Torgersen of Norway, Bror Eimar of Sweden (last year's winner) and myself. We were given the choice of a flyoff under darkening skies and increasing wind, or waiting to risk the weather on Sunday. We chose to postpone our efforts. I was delayed on the lake as the pegs to my stooqe were frozen solid in the ice and had to be hacked out!

The evening at the hostel passed very pleasantly with prizes being presented to all except the top three in Wakefield who would get our rewards on the ice the next day. One of the biggest rounds of applause was for seven-year old Vidar Nereng, the youngest competitor. Everyone received a souvenir certificate and commemorative stickers. As usual, model boxes were opened to disclose their contents. Amongst the exhibits were the new-generation of models of Dutchmen Sommers and Breeman. Although of their usual style, the wings were Rohacell covered in Kevlar. A detailed article on the two-year development of these structural techniques is promised for later in the year. The wings are about 5 per cent thick, very light (170 grams) and stiff. One unusual feature is that a very fine carbon tow has been woven into the Kevlar covering at 45 degrees to give a geodetic effect; laborious to carry out, but imparting tremendous strength and stiffness to the wing. Jan and Cenny claimed that the

Other boxes also offered interesting prizes, like the Kevlar-D-box and carbon capped wing of Stefan Rump. After his previous win in the World Cup, Stefan is taking the 1989 event even more seriously. I was very interested in this type of structure; after the initial experiments I have made in the same techniques it looks, to me, to be a sensible development. Frank Seja showed his Wakefield complete with its foam and Kevlar structure. In the UK we will need to keep up with these technical advances. However, one needs to build for flying as well as development; Frank has spent so much time on experiment he has only one model.

What to do with the rest of the day? Most left for home, whereas David, Frank Seja and I were invited to dinner by the Rogersens; we went to bed rather late but full and happy. A final thank you to all involved in the 'Holiday on Ice' and see you next year. To everyone else - don't miss it!

FROM THE HANDLE

Jim Woodside runs an eye over Team Trials and the Review of the Year...

SUNDAY 2nd April at Three Sisters was a day for ducks! Everyone who took part in the F2C Team Trials - a trial in every sense of the word - deserves congratulations. Heavy rain fell all day, resulting in several miserable hours for those trying to fly Team Race. That it was all conducted with patience and forbearance says much for their spirit and dedication.

The Jury consisted of Derek Heaton, Dave Rudd and John Noble. Race Marshall was Richard King. Roger James and myself carried out the processing; all models presented conformed to the specifications.

Understandably, times were slow as teams opted for caution and easy landings. At the end of the ordeal the first two places were secure, with seasoned campaigners Steve Smith and Colin Brown ahead, but the last race of the day was a real cliff-hanger, with the three teams in contention for the final place. Langworth/Campbell claimed the spot, just six seconds ahead on average, from Team reserves Fitzgerald/Thomason.

Eurochamps Team Trials: F2C

1 Smith/Brown	Average time: 3.47
2 Sladdin/Gardner	3.56
3 Langworth/Campbell	4.02
4 Fitzgerald/Thomason	4.08

Review of the 1988 Racing Year

Although no longer active in team race, John Horton is still, I am glad to say, producing his comprehensive tables of the year-long battles around the circles.

I am sure that you will not need to be reminded about the awful 'summer' of '88; every comp seemed to run under adverse conditions. Let us hope that this year will bring more favourable weather. Here's a summary.

1/2 A

Nineteen teams turned out to contest the four competitions. By far the biggest problem facing flyers is the lack of suitable 1.5cc engines. The first three teams all used non-standard motors, although what constitutes 'standard' now that Olivers have suspended production of their range of engines is a debatable point. Perhaps PAW will see a market niche for a quality ball-race motor...

1 Heaton Haworth	12 pts	Dragon
2 Langworth/Broadhead	10	Oliver Special
3 Lorimer/Ross	7	Ross

Class B

All but down and out, the oldest of the racing classes (in terms of rules) is in serious need of a boost. Only two comps, plus the long standing Wharfedale 1000, took place. The SMAE have introduced some rule changes to favour the use of lighter, cheaper and more easily available motors. This season will show if the decline is halted.



Malcolm Ross and Ken Morrissey were victorious in the first British Goodyear competition at 3 Sisters on 17th March. Here's Ken in pensive mood at last year's Nats...

1 Clarkson/Needham	11.1/2pts	ST29
2 Langworth/Campbell	11	OPS
3 Fitzgerald/Thomason	8.1/2	OPS

Goodyear

The two variations of Goodyear remain dominated by the main, innovative team. The achievements of Clarkson/Needham will now be enshrined as the rules have now been changed for both classes in 1989. Dave and Ed have been able to take any performance 2.5 glow and turn it into a star diesel. Rossis gave way to ADs and latterly the superb Irvine 15, which holds the record heat time.

Open GY

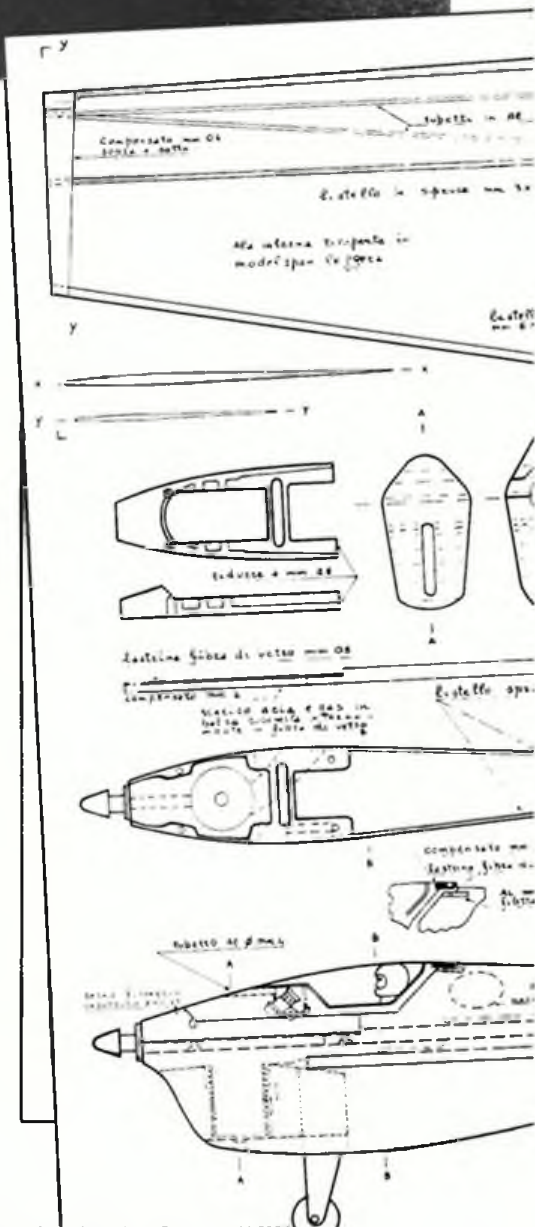
1 Clarkson/Needham	36 pts	Various
2 Crozier/McAlpine	26	Rossi
3 McPeake/Robson	15	Rossi

Class 2 GY

1 Clarkson/Needham	13	PAW
2 Broadhead/Worgan	5	PAW
3 Daglish/Daglish	4	PAW

FAI Team Race

The premier event seems to be going through something of a trough at the moment. Engines and ancillary equipment remain fairly easy to obtain but the spirit seems to have deserted many previously strong teams and no new teams have moved over from any of the feeder classes. Perhaps the running of the 1989 European Champs in the UK might give a fillip to what is, in my opinion, the most rewarding class of all.



1 Sladdin/Gardiner	27 pts	Nelson
2 Smith	24	Cipolla
3 Fitzgerald/Thomason	15	Nelson

Best all-rounders

Based on the five categories available.

1 Clarkson/Needham	63.1/2 pts
2 Fitzgerald/Thomason	31.1/2
3 Crozier/McAlpine	31
4 Langworth/Campbell	29.1/2
5 Sladdin/Gardiner	27
6 Smith/Brown	27

Congratulations to all concerned; our special thanks to John for all his hard work in compiling these tables.

The first BMFA C/L Centralised Meeting: Three Sisters, 17th March

The main point of interest at this meeting was the introduction of the new Goodyear class - British Goodyear, which replaces the old Class 2 category. To introduce a much needed sense of racing the C/L sub-committee had decided to allow a range of ball-race motors of British origin. On the experience of this meeting I am inclined to the view that

the new rules are successful. Not only did the class have the biggest entry of the day, at eighteen but a goodly number of onlookers expressed the intention of building a model to the new formula.

By far the most popular engine was the new PAW 2.5 twin ball-race motor. Most were 'factory tuned'. Also seen were a selection of Oliver Tigers, ETAs and a solitary ED Racer.

Fastest of the day, and hence record holders, were Ross/Morrissey, using a PAW BB, in of 3:48. As Clarkson/Needham had qualified for the final of FAI TR they declined their place in the final, which let in Heaton/Woodside, using an ETA left over from days of Heaton/Ross!

So a rule change was vindicated on this occasion, and it could be that by the time of the August Nationals, Brit GY could be the most popular class. Should you be hesitating, remember that the only change has been to allow a range of previously disbarred motors. The models remained as easy to build as previously. The obvious motor choice is the PAW; these can be ordered through your local shop or direct from the factory for £51.75. Factory tuning is £8 extra.

British Goodyear

- 1 Ross/Morrissey
- 2 Cotterall/Worgan
- 3 Heaton/Woodside

PAW BB
PAW BB
ETA

... Claus Maikis

switches on the video

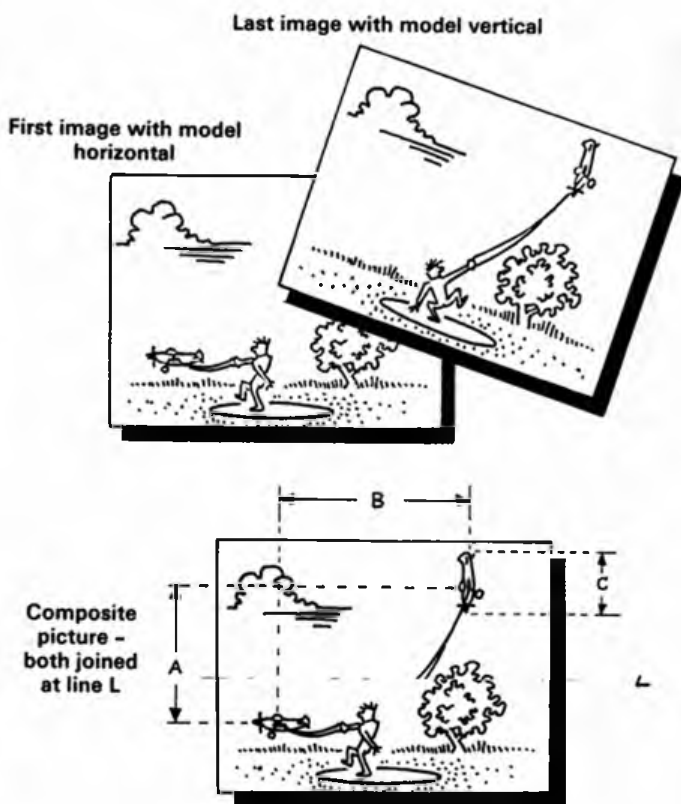
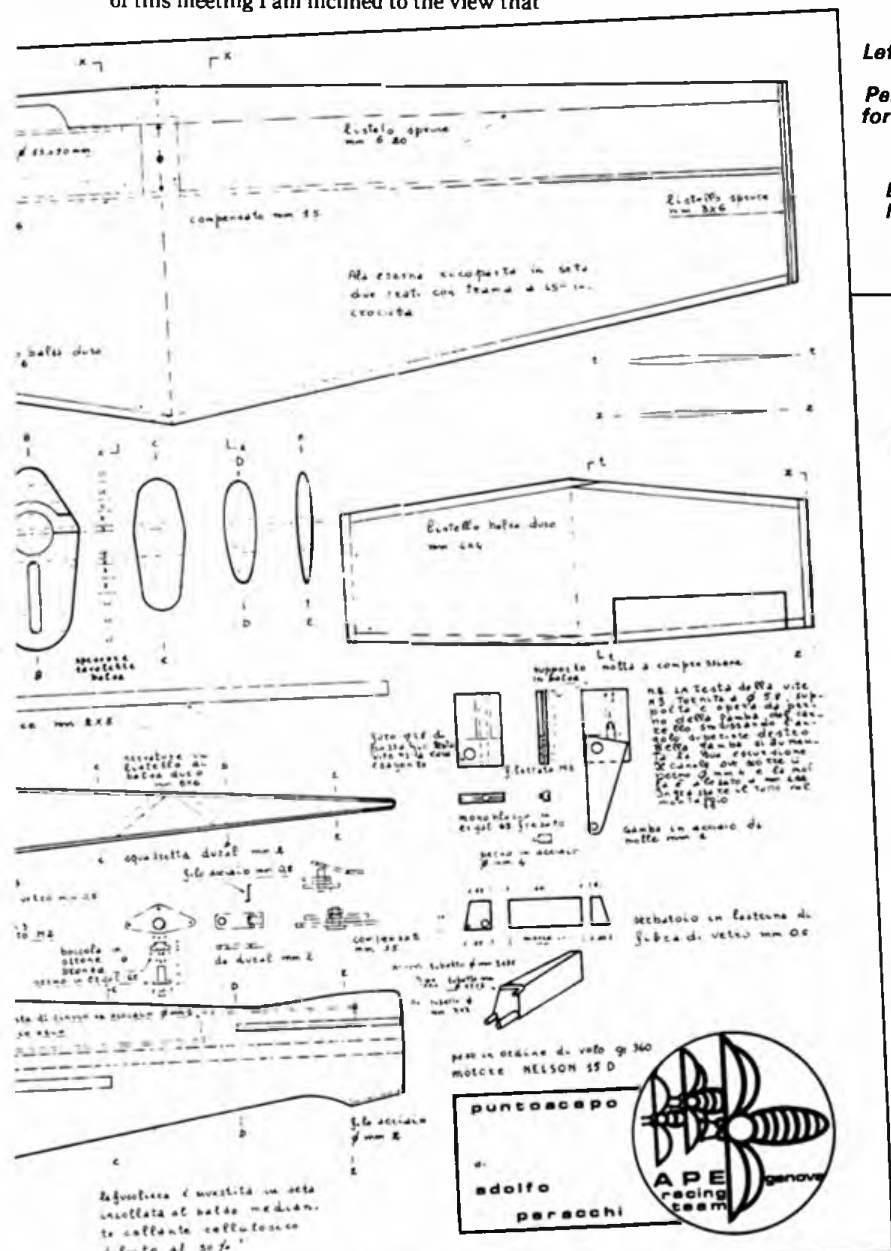
again...

WATCHING videos gives me crazy ideas sometimes. Notably, the 'advance frame' facility - so useful in determining aerobatic manoeuvre times (see May's From the Handle) made me think about the answer to a question which has bothered me for years. We all know that nobody actually flies the mythical five-foot-radius corner in square manoeuvres. Apart from the fact that no wing would ever withstand the flight loads, human reaction probably wouldn't allow such tight corners to be flown. The American enthusiast Bill Netzeband made some tests many years ago. Flying light-equipped models at night, Bill took photographs of the flight path, fixing his camera at the 'time', or 'B' setting, and has proved that the actual corner radius is much larger than the rulebook target. But just what size is it?

Advancing slowly through the video of a model flying the square loop, I froze it at the picture showing the aeroplane in its last

Left: *Secrets of Adolfo Peracchi's F2C for Nelson 15D power.*

Below: *Claus Maikis' video analysis*



Now a line is drawn at ninety degrees to the model's longitudinal axis, running through the centre of gravity position in each case. The centre of the corner is where the lines intersect, and the length of the lines represents the radius. (A and B) As we know the fuselage length (C) we can easily work out this figure.

One less-skilled flier managed figures with corner radii of up to nine metres (about 29 feet). Tony Salathe and Attila Morotz, two pilots well-known for their sharp corners, even could fly corners of no smaller radius than 5.5 meters, or eighteen feet! Revealing,

Simple Scale! Meteor lightplane hails from Modelar magazine. Wing section worth a second glance...

Now - if only I had a video to record my own schedule. Then I could remedy those last errors and finally become a good pilot...

F2B at 3 Sisters

Nev Dickinson used his last years No.1 model, its Merco 60 running clean and took an early lead. The rain and drizzle came in as Peter Coates put his repaired Maxi to task

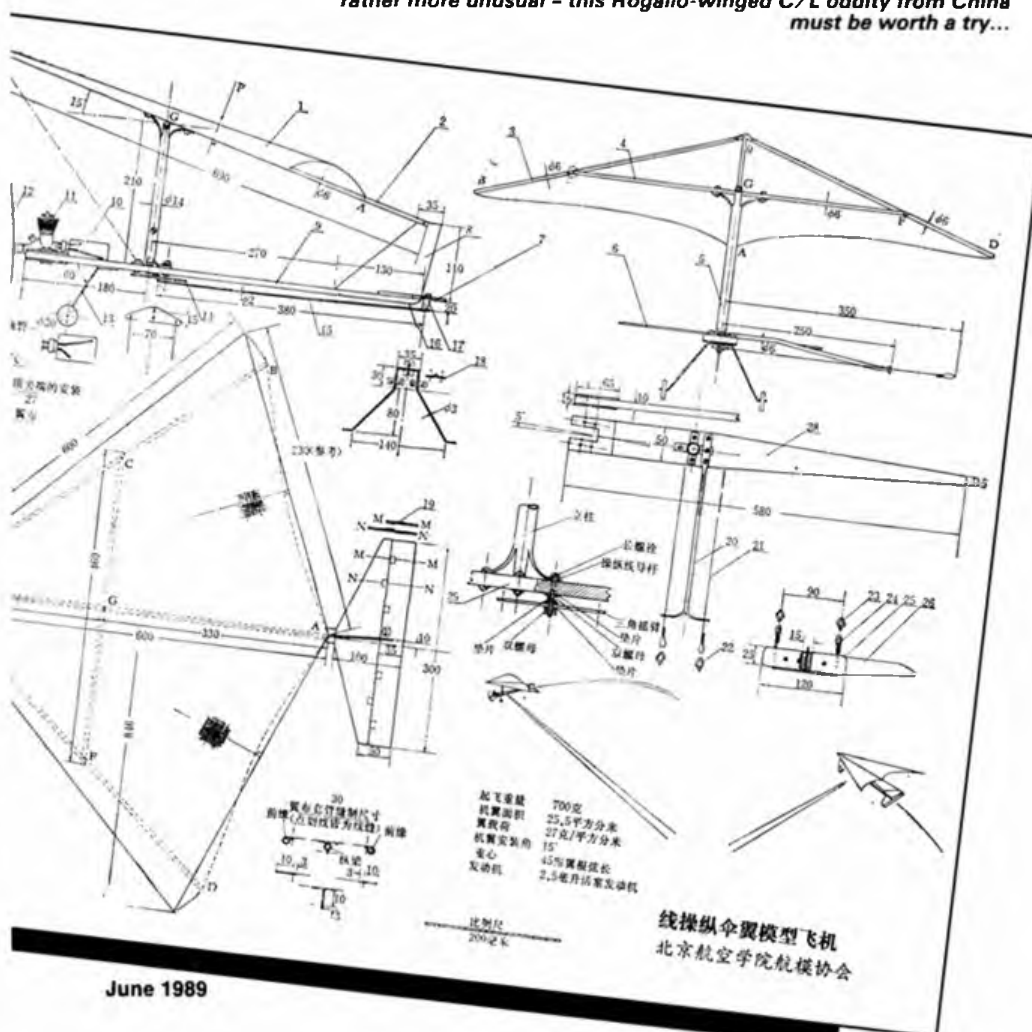
Nick Evans brought out his new Magnum. The ST60 was running lean; a fast schedule ended with an overrun. John Handscomb (Richard's father) flew his first F2B contest with an Enya 45 powered Samba, but omitted the vertical eights in a memory lapse. Bill Draper used his '86 Superhawk, but Enya SS40 powered, to take the lead from Dickinson, using just the right amount of power for the wind, followed by Tony Eifflander with last year's Freebird which was another to burble on over time. Another Freebird, this one powered by OS FP40 and piloted by Barry Pickles followed with a full schedule but was troubled by the wind. Finally yet another OS powered Freebird was flown by Jeff Smith, but he was not so lucky and an apparent control failure caused the model to drive straight into the tarmac on the first pull-out from the wing over with total destruction the result.

Round Two was flown in the same order but starting part-way down the list with Richard Handscomb. His diesel died on the inverted pullout from the wing over and





Above: World Champs winner Xiangdong Zhang displays his state-of-the-art F2B. Stunning finish! Below: From the same country, but rather more unusual - this Rogallo-winged C/L oddity from China must be worth a try...



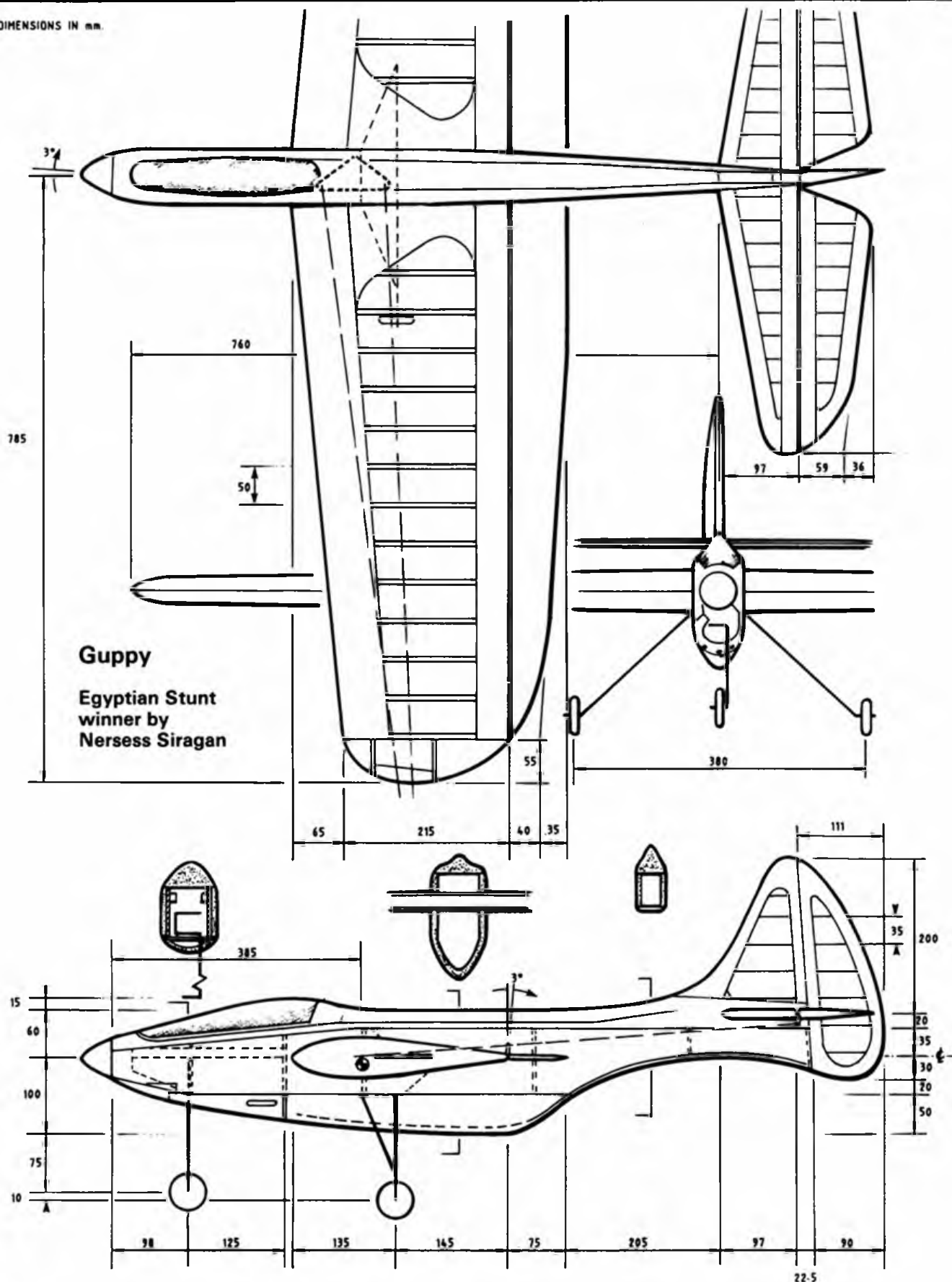
Richard was forced into an inverted landing, making the grass without damage. Nick Evans was not quite so lucky. His motor died in the verticals and on landing inverted he hit the rocks around the edge of the tarmac, removing the fin, but without major structural damage. John Handscomb made a full schedule, followed by Bill Draper who maintained his lead despite a marginal drop in points. Tony Eifflaender still could not stop his motor in time, throwing away valuable points; and Barry Pickles suffered a marginal drop. Jeff Smith drew out his second Freebird (I am told that the OS40 Freebird combination is almost standard in the Whitefield club) but his motor cut in the loops to curtail the flight. The competent schedules from Barry Robinson and Nev Dickinson earned points to take second place in the round, and the last flyer in the round, Peter Coates, raised his score a little to hold 5th position.

The weather worsened during the lunch break and the promised 25-35 mph winds arrived in time for Round Three. Contest Director Reg Lowe delayed the start by fifteen minutes but the wind persisted. Bill Draper opened the round in rough conditions with a full schedule but some very high speed manoeuvres and a drop in score because of loss of precision. Tony Eifflaender tried to back off his power slightly to hold down the speed build up, but the diesel overcooled in the high-speed manoeuvres and slowed to a burping run in the air. The low airspeed proved a positive handicap in the wind so Tony put the plane down on the grass for safety. Barry Pickles tested his Freebird as far as the triangles then touched the ground at the bottom of the manoeuvre to stop the prop and causing slight damage to the tail. The squall was now easing a little, though it was still windy. Jeff Smith decided to withdraw and Barry Robinson put in another competent schedule, but the Irvine insisted on running eight seconds over time to lose landing points. A steady flight in the breeze from Nev Dickinson earned the highest score in the round and confirmed his second place position, the Merco pulling well and straight. Richard Handscomb had been trying to obtain a setting during lunch time but his diesel insisted on overcooling in high-speed loops in the cold wind, so he withdrew. The remaining flyers decided not to risk damage and so the event closed with a win for Bill Draper with Nev Dickinson, Tony Eifflaender and Barry Robinson closely grouped close behind. A series of unfortunate accidents and unpredictable motor runs were generally caused by the combination of cold, wet weather and strong winds, causing excess speed or motor overcooling.

F2B at the First Centralised contest, 3 Sisters

1	C.W. Draper	1988	1955	1803	3943
2	N.C. Dickinson	1858	1927	1881	3808
3	A.C. Eifflaender	1872	1916	491	3787
4	B.P. Robinson	1806	1927	1779	3733
5	P. Coates	1817	1855	-	3672
6	N. Evans	1548	1146	-	2694
7	B. Pickles	1339	1314	547	2653
8	J.A. Handscomb	1250	1295	-	2545
9	R. Handscomb	1655	48	-	1703
10	J. Smith	46	221	-	267

Judges - Reg Lowe and Dot Dickinson
Scorers - June Draper, Cathy Eifflaender and Angela Draper



HERE ARE more details of Nersess Siragan's Guppy - a stunt winner from Egypt. Specification is as follows. Wingspan is 1545mm (just under 61in.) and all-up weight is just 1480gm (approximately three pounds). The OS 40 drives an 11x5 fibreglass prop, but a bigger, and slower motor would be even better, says Nersess. Indeed, the design could take anything up to a 60 thanks

to large wing and tail area. Line length is nineteen metres, or 65ft. Prevailing conditions in Egypt are calm (sigh!) so the model is trimmed to fly relatively fast. Note that the flap horn is angled back three degrees to overcome the vertical moment caused by the high tail - and to make possible equal inside and outside figures. Differential flap deflections are: 35 degrees 'up' and 40 degrees

'down'. Elevator deflections are 45 degrees each way.

Guppy certainly must present an unusual profile in flight. That deep belly could house a tuned pipe; Nersess' comment that it looks like a pregnant duck in level flight is an honest assessment! Interesting stuff - let's see more individual designs like this. A dimensioned sketch and brief details only, please.

AVIA



BH-25J

IN 1925 the Czech Ministry of Public Works (Ministerstvo Verejnych Praci, or MVP) invited tenders for a new airliner to be powered by the Lorraine Dietrich 12CC engine. The Avia company responded with the BH-25 project, and construction of this five-passenger craft began at the end of 1925. First flight of the machine, registered L-BABA, was on 17th July 1926.

Acceptance by the then-new Czechoslovakian airline Ceskoslovenska Letecka Spolecnost (CLS) was swift and the BH-25 entered service on the Berlin-Dresden-Prague-Vienna route in March 1927. Avia built five aircraft, designated BH-25J, for the Walter Jupiter engine, a lighter powerplant which enabled an extra passenger to be carried. Registrations were L-BABB to BABF. Wings and tail were silver, the fuselage was light blue; registrations were black overall. Undercarriage struts were brown. In later years a dark blue fuselage with white 'outline' registration letters was the adapted scheme.

L-BABD crashed near Kassel on 9th May, 1929 but the others remained in CLS service until 1931, by which time the fleet had

Antonin Alfery's Peanut scale airliner from

Czechoslovakia is ready to rattle the rafters...

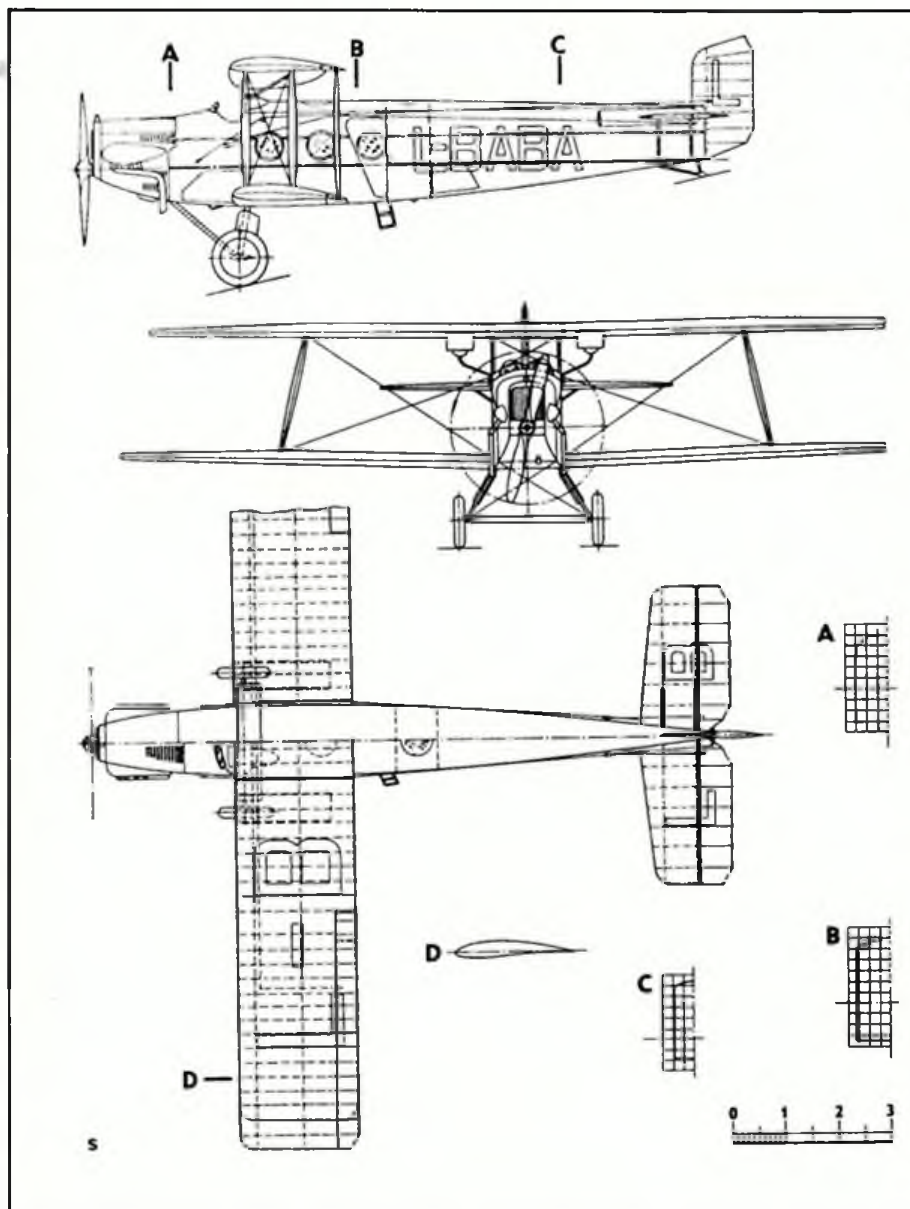
accumulated 5575 hours of flying time, covering a total distance of 771,587km. Six more BH-25Js were sold in Romania. All were powered by Gnome-Rhone Jupiter engines.

Now to the model...

The original was built for a Peanut Airliners contest in 1987; it won the event with a best flight of eight seconds. Subsequent trimming boosted duration by a further ten seconds. The only deviation from scale is the small amount of dihedral.

Traditional balsa construction is shown on

the plan although the original fuselage was built from 1mm. polystyrene foam sheet. Difference in weight is negligible. Assuming you choose to follow the plan, build two identical sides from 1/16in.sq. balsa; join one over the other on the protected drawing, with 1/16in.sq. spacers and 1/32in. sheet top formers. Fuselage decking is from 1/64in. balsa. Nose contours are formed from 1/32, 1/16 and 3/16in. sheet where noted. The longitudinal strips along the fuselage sides are added after covering. Windows are best represented by circles of darker tissue; if you go for foam construction they may be cut out



and glazed! Thinned Humbrol enamel was used on the original fuselage; coloured tissue is the alternative.

...wings next

Ribs are cut to pattern with the aid of the template. Lower strips are glued in place between leading and trailing edges, then front and rear spars are added, followed by the tops of the ribs. After the wings are covered, paper strips are doped on at every rib station to represent the full complement. See plan. Differential washout is employed; 1/16in. at the port wing tips, 3/16in. starboard. This is far more satisfactory than using positive on the left tip; models so equipped often fail to recover after hitting the ceiling or other obstructions. Tail surfaces are entirely straightforward. Again, paper strips represent all the ribs after covering.

Prop and power

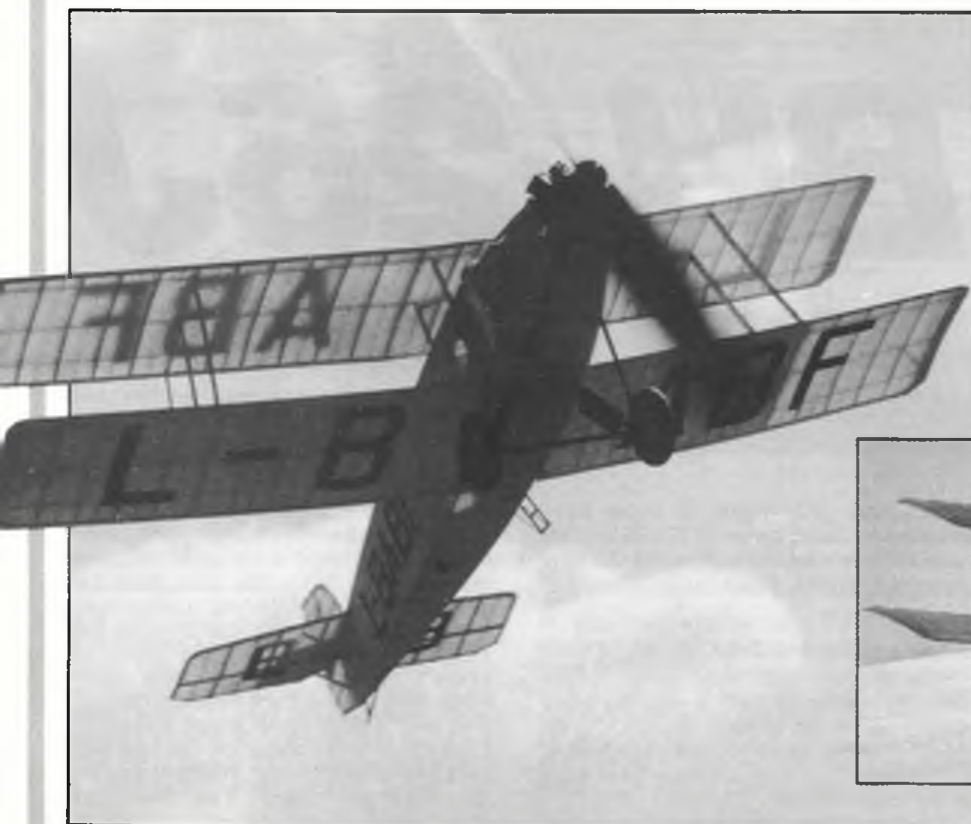
Balsa prop blades are carved to shape and covered with tissue. The system detailed allows pitch adjustment; thirty degrees at the tip seems optimum. Of course, you may substitute a commercial plastic equivalent of six inches diameter. George Wallbridge of SAMS, who can be contacted on 0763 88384, is an ideal source (their free catalogue, available for a 9 x 7in. envelope and 28p stamp, is compulsory reading for all F/F aeromodellers). Nose block assembly is straightforward. A single loop of 1/16in. rubber, up to three times the length from hook to rear peg, is a good starting point.



Rubber thickness will influence power output; loop length affects duration. Experiment to suit your own flying site. Flight trim is a left turn under power and during the glide.

Enjoy this early Eastern European airliner!

*Three-view at top, from Vaclav Nemecek's splendid book **Ceskoslovenska Letadla 1918-1945**, was the inspiration for this 13in. model. Photographs show the straightforward lines of this pleasant craft - an unfamiliar shape to British eyes.*



George Stringwell's nifty miniature of a 'fifties favourite is just right for the KP 01 electric unit

I AM a great fan of Vic Smeed's designs in general, and of his 1953 Bowden winning Pushy Cat in particular. I never did build one first time around; as an impecunious schoolboy I could not afford the relatively expensive Mills 0.75, having to make do with an ED Bee. Using this in Pushy Cat would have meant carving a pusher prop, which, at the time, I deemed to be beyond my abilities. In fact, I never did own an original Mills 0.75. By the time I was affluent enough they had gone off the market. However, the advent of the Irvine Mills in 1987 was my chance, a strong hint to my lady wife produced one in my 1987 Christmas stocking (eat your hearts out all those who got hankies and socks) and there could only be one model to build for it!

Pushy Cat

Thanks to advancing age, not to mention congenital laziness, coupled with a desire to keep the model in one piece, I decided on radio-assist. I was, however, determined to make this as unobtrusive as possible, and limit it to rudder only. The only amendment during building was to assemble the forward fuselage around a 1/8 x 1/4 in balsa crutch, to replace the strength lost by the fitting of the bottom hatch necessary for radio access. With a Futaba two-channel receiver, single tiny Fleet micro servo and a 150 mAh nicad (all of which was a snug, but not difficult fit in the narrow fuselage) the all-up weight was 14.5 ounces, four ounces more than Vic's original; but it still felt light enough. Originally the rudder comprised the whole of the sheet extension at the rear of the fin. Response with this was rather, er, abrupt; so it was subsequently changed so that only the bottom 50 per cent moved. The rudder response is still entirely adequate! It is amazing (to radio fliers at least) how little rudder these free-flight conversions need.

As the delightful Irvine Mills loosened up, the model's performance got better and better. A run of around three minutes now takes it to a dot in the sky, and it will even thermal soar in the right conditions. It can be flown around close-in, control-line fashion, if desired, and it does delightful 'wheelie' landings on any half-decent surface. I had great enjoyment re-discovering the lost single-channel arts of 'wiggling' and 'landing off a turn' in order to produce a flare-out and smooth touch down (some of my 'proportional-only' modelling friends finding it hard to believe that this was possible!). I must say, though, that it is so much easier with proper proportional rudder than it used to be with escapements, or even pulse rudder. The Irvine Mills is an absolute gem; even flicking it backwards in an awkward installation is no problem, it starts first or second



PUSHY KITTEN

flick every time and runs really sweetly with great flexibility and plenty of power.

So much for the R/C Pushy Cat... what about the real subject of this piece, Pushy Kitten? Well, my wife once again showed her imagination and grasp of things aeromodeling at Christmas 1988 when a KP01 electric unit appeared amongst my presents - she really is a sweetheart! What a super little power unit. Anyone who likes flying model aeroplanes should really have one of these devices; I cannot speak too highly of them.

What's the charge?

After making up a charging battery with the resistor supplied and four old 1.2 Ah cells which I had to hand, I carried out some workshop tests (on Christmas Day, of course!) to establish length of run/charging time ratios. These so enthused me that I did a hasty conversion on my 2/5th size CO₂ Junior. Test flown on the glorious Near Year's Day 1989, the performance was just perfect. Looking at the little 'J60' that evening sitting alongside the Pushy Cat on the storage rack I wondered...could I re-wire the KP unit to run backwards?

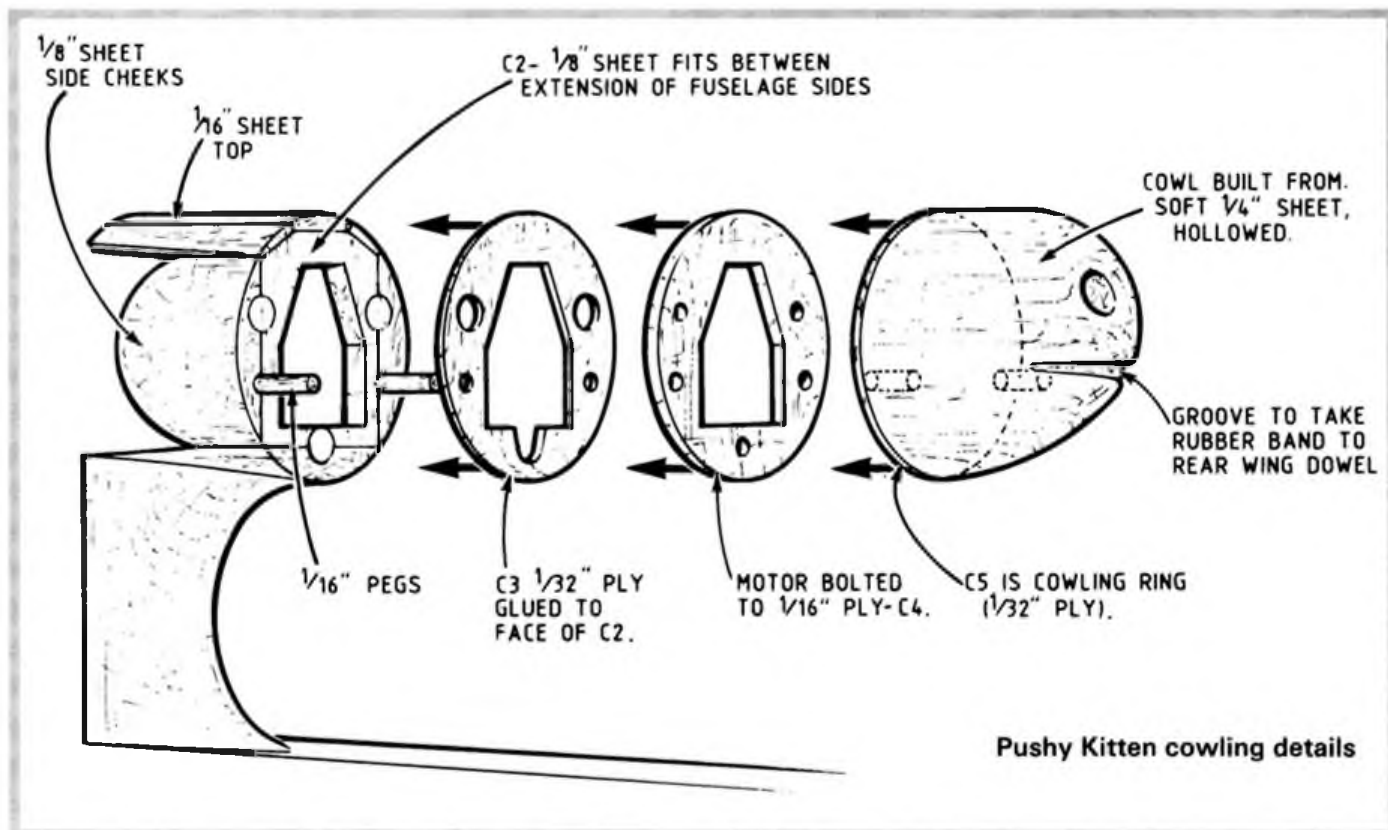
The answer was not totally straightforward. The KP's 'push for off' shaft switch

arrangement precludes a direct conversion. However, a telephone call to Derek Knight (how does he remain so amazingly courteous and helpful with idiots like me ringing him up with stupid questions all day?) solved the problem, and he made me up a special 'pusher' version without the shaft switching arrangement, and wired so that an extension charging lead acted as a switch, the motor only starting when this was removed. The unit arrived a few days later. A quick test run filled me with enthusiasm, and the Pushy Cat plans were rapidly scaled to 5/8th full size to produce a wingspan of 27.1/2 inches.

The structure generally follows the original faithfully, the only area of change being around the engine mount, which is adapted to accept the KP as a push-in installation, fully cowed. It was in this area that the only problem occurred, since even though I raised the thrustline as much as possible from the original, it was still impossible to accommodate the relatively larger prop of the electric unit at this scale. With misgivings I cropped some 3/16in off each blade and re-balanced it. I need not have worried.

Just amazing!

Test flown in a flat calm weather window on the stormy weekend of 25/26th February, the model amazed me by flying straight off the board, requiring only a little left trim tab



to perform a perfect 'right/left' pattern, flights being consistently between 70 and 90 seconds on a five minute charge. Whilst this pattern is fine for calm conditions, the change from right to left turn during the power run-down can result in a protracted straight phase. For small field flying either right/right or left/left would be better, but this will require thrustline and/or warp adjustments.

As for construction, there is nothing difficult. Very little wood is required to build a model like this, so do take the trouble to pick the right quality - light and firm for the fuselage sides, nice and springy for the wing spars and good and light everywhere else.

Build the left and right wing panels separately, then prop and pin them in place over the plan and join them by building the

centre section. I used soft 1/16in ribs on the original, but spacing is close enough to permit the use of 1/32in alternatives if you prefer.

The fuselage is best assembled using some form of jig, however rudimentary, otherwise it is very easy to build a banana! The fin is constructed separately over the plan and the top sheeting slotted to take the LE and spar, whilst the TE fits between the end of the fuselage sides. The method of mounting the electric unit is clearly shown in the separate sketch; this is a push fit, with two 1/16in dowels serving to align the motor mount former and the cowl, which is built up and carved from soft sheet, whilst a single small rubber band from the rear wing dowel around the cowl holds everything firm. Of course, with the unit pushing, there is no fear of it coming adrift even without the

rubber band, but I have used exactly the same installation on the tractor mini-Junior 60 with complete satisfaction.

The tailplane is straightforward, if a little fiddly in this very small size. My Pushy Kitten is covered in lightweight modelspan, white wing and tail with blue trim, red lettering and blue fuselage (deliberately chosen as the 'mirror image' of the blue and white finish on my full-size Pushy Cat). Jap tissue would be fine for the wing and tail, but lightweight modelspan is a better bet on the all-sheet fuselage.

As shown on the plan, I decided to split the battery tube from the back of the motor unit and mount it on the moulding provided with the unit in the fuselage bottom, to get the CG a little lower. It would probably be OK mounted behind the motor, but I have not tried it like this, so you are on your own. Don't forget to mount the prop backwards!

All the data

Checked out on some very accurate electronic scales, my model weighed a total of 106 grams, broken down into; Wing sixteen grams, tailplane six grams, fuselage 84 grams. The undercarriage, which uses somewhat thicker dural than ideal, and a rather heavy pair of wheels, accounts for eighteen grams of the fuselage weight, and I was prepared to replace this unit, but in view of the flying performance, I will not bother! Similarly, some experimentation with propellers might, in view of the cut-down diameter, yield greater performance - but who needs it for sport flying?

I hope that Vic Smeed will forgive me for pirating his design; I can assure him that the flight characteristics are a credit to the original, and I know that this one model that is going to give me a lot of fun.

P.S. No doubt it would also be fine with CO₂, since these motors will run backwards as well. Do try to keep the weight right down for a CO₂ version, though.



Neat, efficient layout of Pushy Kitten (seen above with George's Pushy Cat) makes it ideal for small-field flying. Derek Knight (of KP motors) tells us that he can supply a 'pusher' version of the KP 01 unit for no extra charge. Contact him for details; see advert elsewhere in this issue.



BALSA CUTTINGS

Cyano de Bergerac takes a sharp scapel to aeromodelling matters of moment

An ill-favoured thing, sir, but mine own

Now don't leap in with the words of Prison Officer Barraclough in *Porridge* - 'I moost say I think you're being a little oonfair to a very well-meaning body of men and women.' This is not an unfeeling attack on the FAI, CIAM, CIA or any oother well-meaning set of initials. Not much it isn't! It's another look at the Don't Bother To Build It Yourself rule. Well, let it first be acknowledged that *running* aeromodelling - that essential behind-the-scenes work which worthy folk labour at in their unpaid spare time for more kicks than ha'pence - is a very, very difficult business. A dash of appreciation and a touch of understanding are important ingredients to add to any criticism of how it's being done. With these present in due measure, and with all respect, let it nevertheless be suggested that the philosophy behind the ruling that in International competitions, models may be entered and flown by persons who did not build them, is mistaken. Now obviously the average modeller couldn't care less about Internationals, or perhaps quite a lot of other competitions into the bargain. Because the outcome of their deliberations is reported, he knows that high priests of the movement exist, that they formulate laws, and that they subsequently tinker with them for better or worse. However, much of this legislation is less than gripping, and some really unworthy modellers even excuse themselves from a close study thereof altogether. But this is different. Suddenly the question is asked - and it is being asked here and now - into exactly what state of mind is aeromodelling drifting when one can fly - not in some tripey little three-club Sunday morning comp where they seem to have more sense, but in the topmost contests - a model built by *somebody else*! It's disturbing when aeromodelling's own Parliament seem to have become strangers with a way of thinking which has led to this extraordinary concession to people whose notions about competition flying are so alien. Who are these people? Are there many of them? What sort of poke do they have that they can swing this? Is it supposed to be a Good Thing? Presumably so, for have not the British represenatatives reported that they had to oppose the proposition that the principle should apply to internal events here as well? And do you believe what you are reading?

Like their makers, all models have defects, great or tiny, but does anybody ever build one and not feel proud of it? Or not try to do better next time? Don't let's get carried away and get all dramatic, but there's no harm in claiming that a bit of self-respect blooms out of a job well done - and why shouldn't it? And are you sure that this element, which is one of the more rewarding and dignified aspects of our hobby, is duly

recognised by this drift? Oh, dear, it's questions, questions, questions, isn't it? And here's another, prompted by a letter from Mr E.S. Colley of Pontefract. With the valuable forthrightness for which his part of the country is famous he concludes his run-down on the situation with the words: '*...but why anyone would want to enter a model he had not built himself passes my understanding.*' Indeed yes, Mr. Colley, and not only yours. So the last question is, are these people we are talking about aeromodellers at all?

Don't say goodbye unless you really mean it

Everyone was flying on even-numbered channels when along came a late arrival whose only crystal was an odd number, 71. Would it be all right to fly on adjacent channels? Like 70, 71 and 72? Well, maybe, maybe not. A careful practical test was carried out with everyone strictly on the qv whilst 71 switched on and the fliers on either side of his signal watched their models like hawks. Not a glitch, not a flicker. And his own model suffered no interference either. It was okay. He could launch. Everything was all right, and remained so. Almost. Mister 71, having been the last to turn up, decided to stay on for a bit when the others worked their gliders up to a good height then began to pilot them in leisurely fashion in a stroll across the fields back to their hotel for lunch. (Oh yes, - all top league stuff, this). When the departing group were some distance away, Odd Man Out still on the slope turned his glider downward and, forgetting everything that Mother taught him, sailed it over them in a gesture of cheerio.

At this separation, the transmitters on his next-door channels swamped his signals good and proper as soon as he flew over them. Result, instant Chinaman (Wun Wing Lo) followed by large puddle of balsa. If you must fly on adjacent channels - trannie-holders of the world, unite! Divided, you fall.

He can't have been beaver-brooking away

Last Sunday morning saw the passing of yet another week without Our William producing his famous bomb-dropping rubber-driven FW 190 with gears, Moore Diaphragm and unique retraction feature. (Probably retracts the bomb after dropping it.) 'Well, get a move on, boy,' says the Comp. Sec., just as though it was any business of his, which it wasn't. 'The war'll be over soon.'

Oh, don't start all that again

Surely one of the oddest quirks of our language concerns an aeroplane. Well, not exactly an aeroplane, perhaps, but certainly a thing which whizzes through the air. For well over a decade we have been saying 'Of course, he always goes by Concorde.' Why just 'Concorde'? More than twenty of those hell-boiling noisy predatory-looking unbelievably expensive tokens of Anglo-French mutual esteem were built, and if (inexplicably) you fly in one of them, you fly in *a* Concorde. Roll on the day when you fly in *the* Concorde. Should you do so, you could find yourself sitting next to the body who helped to co-ordinate the whole complex business of the design. He is an aeroplane man from way back, who won a DFC piloting Hurricanes.

Coming to Old Warden this season? Beware - here's Terry Rose's view...



SCALE MATTERS

Bill Dennis builds a biplane, tries blue foam

and lays on the Litespan

IHAVE recently been building a simple power scale model of the Halberstadt D.II. For the first time ever I am now living somewhere where I can literally walk out to a flying field to take advantage of those calm summer weekday evenings, when the smoke from a burning Jetex model would rise vertically. As a result, the Halberstadt was intended to be light, low-powered and slow-flying.

I can't think of any biplane simpler than this one - no riblets, nor even separate elevators or rudder to worry about. The only area which made me stop and think was the forward top decking of the fuselage which has a lot of double curvature, a difficult and tedious job to draw out and construct with balsa planking. Block balsa is an alternative, but it is very expensive and usually too heavy, so I used blue foam. This isn't a new idea; indeed, it has been utilised extensively by Paul Briggs and Barry Hetherington. Paul actually builds entire aeroplanes from the stuff. Its intended use is as an insulating material, so it is available through builders' merchants, although you may have to buy rather a large sheet - share it round among your friends! Its density compares very favourably with balsa, and it is extremely easy to shape using sharp knives and coarse sandpaper. Having no grain, you can slice away at the stuff from all angles. My particular job took under ten minutes to sculpt. When satisfied, brush on a slightly-thinned coat of PVA and then cover with tissue using the same adhesive. The use of cellulose-based products will, of course, quickly leave you with a mess of molten plastic! A more durable finish for a power model would be a layer of light glass-cloth applied with thin resin. If weight is a critical factor, the foam can be hollowed out to a thin wall. It will feel alarmingly floppy but things improve greatly once it is stabilised by glueing it to a structure.

On with Litespan

For covering the Halberstadt I decided to try this new material from the Solarfilm company. I first saw it at Old Warden last year where a modeller was happily demonstrating its strength by dropping coins onto a wing from about two feet. The film comes in a variety of colours and costs 95p per 36 x 20in sheet - you will also need a jar of Balsaloc adhesive. Each pack of film contains a set of detailed instructions; but briefly, the procedure is to apply Balsaloc to the outline of the structure and let it dry before laying the panel in place and tacking it down with an iron set at moderate heat. It is important to get the film on smoothly

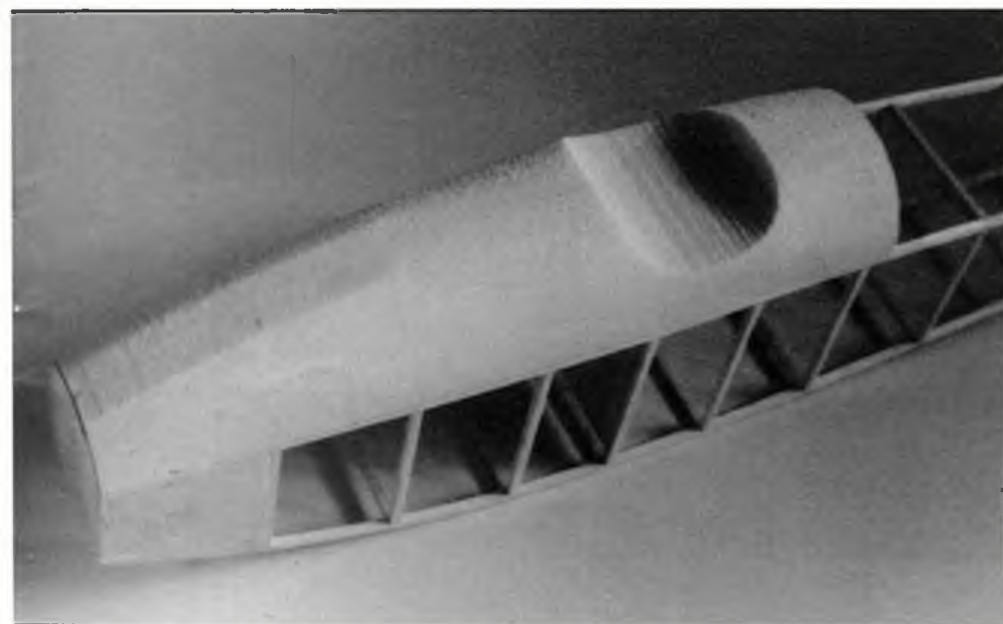
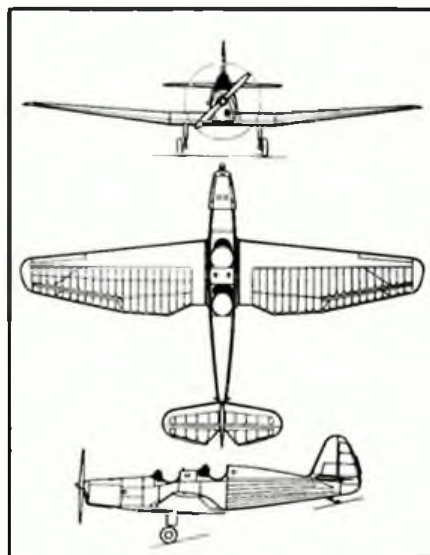
and quite tightly because there is little shrinkage once heat is applied. I found this stage quite difficult, but things went better when I engaged a second pair of hands to tack the film down while I worked along the panel, tightening clockwise.

When the job was finished, the covering was not as tight as I would have liked, but this is partly due to lack of experience. The film certainly doesn't add much rigidity to



Heading. More from Czechoslovakia - Antonin Alfery's Peanut Fairey Fulmar in flight. Ten-gram model makes flights of around 50 seconds. Left: A reminder of just how complicated C/L scale gadgetry can be; the internals of Podgorski's Tu-2 at the 1978 World Champal Below: Unusual Kaspar-Bleriot by Karol Vins is based on the original machine in the National Technical Museum, Prague. Right: Polish CSS-10 looks a fair contender for F/F Scale...





Above: Another rarity - the Russian T-22 could pass as a Topsy design to the uninitiated. Left: Blue foam decking on Bill's new Halberstadt DII - see text.

a structure, and compound curves are out. At this stage I had my doubts about the usefulness of Litespan on scale models but then I spoke to Eric Coates who has just finished a F/F Sopwith Pup using a combination of this film and tissue. First the model is covered with lightweight Modelspar and given just one coat of dope. Balsaloc is then brushed onto the leading edge, trailing edge and ribs, and the film is applied over the tissue and heat shrunk. The tissue imparts rigidity and the film gives strength. No further dope is required and so the finish is lighter than silk and tissue (and cheaper). Eric says the major advantage is that light structures are much less likely to warp. Finally, the 'antique' shade is perfect for representing clear-doped linen, so that's one obvious reason for giving it a try.

FREE FLIGHT SCENE

News and views for the competition flyer

presented by Dave Hipperson

First Area Centralised Event: 19th March

With the Area contest calendar back to its usual Spring/Autumn format, at the insistence of Areas, there could hardly be complaint when almost two months of flyable weather broke with a vengeance a few days before the first meeting. This event brought the first March winds, but at least the climate was similar across the country. Western venues suffered some rain, the Midlands and North had the most wind, and in the far South, drift direction was at its most awkward on the limited-area sites.

Flyers in Scotland and the North-east were all but blown away, although some very effective flying came from the North at Church Fenton. Dickson of Darlington, a relative newcomer, won the KMAA despite an alarming wing fold on his 'number one' model after four straight maxes. His reserve, a Flashback variant, still did enough on the last flight. Alongside him the Morley Club

fielded a keen team to group three of its members in the top twenty. Lewis, Davitt and Judge took enough Plugge points to earn their club a creditable, high start in this year's lists.

Another new name was doing well at Merryfield. With the Bristol & West contingent rather more depleted than usual it fell to Keith Burt (also flying modified Flashbacks) to take top honours, and eighth place nationally, despite the turbulence – such a feature of this west-country site in the prevailing wind. Back-up efforts from Audley and Drew kept the Plugge spirit alive, but not strongly enough to take their usual lead. This year Crookham started best, with some very controlled flying by Madelin, James and Steward, despite a most uncooperative wind direction at Beaulieu which put models into thick woods at just over the max. Indeed, Gary Madelin D/T'd his last two flights early so as not to fly into them. In so doing he may well have lost himself the KMAA, but has saved his models – crucial with the World

Champs in a couple of months. Runner-up in Glider was John Oulds, who flew at Ashdown Forest, dropping time only on his third flight.

Rubber flyers were not so keen, and scores suffered accordingly. Witnesses have since remarked on how easy Mark Croome made it all look at Merryfield. Three maxes and a comfortable five-minutes-plus in the flyoff, despite a stalling glide and the onset of rain, topped the results by a mile. This is Mark's first year with B&W; he was most impressed with the back-up from his clubmates in the flyoff. Further north there was even more activity but the weather was tougher. At Barkston Heath the stiff and turbulent south-westerly got really angry by mid-afternoon, catching all those who hadn't finished their flights and worrying the flyoff qualifiers. Of the two in Rubber, only Phil Ball got away, and that was into dreadful air.

Two had also maxed out at Church Fenton – Ferer and O'Donnell, the latter contacting severe turbulence after a day of relatively simple maxes. Gerry Ferer's flight of nearly four minutes was enough for second National spot.

Although the weather was not dissimilar to last year's, it was encouraging to see entries up slightly in every class – particularly Power, despite the new, shorter



First SMAE Area Centralised Event 19th March

FIA for the KMAA Trophy and Plugge points (65 flew)

1 P. Dickson	Church Fenton	11.48
2 J. Oulds	Ashdown Forest	11.24
3 G. Madelin	Beaulieu	11.12
4 C. James	Beaulieu	11.04
5 G. Turnbull	Sculthorpe	10.57
6 B. Lavis	Barkston	10.56

Open Rubber - no trophy (20 flew)

1 M. Croome	Merryfield	7.30 + 5.14
2 G. Ferer	Church Fenton	7.30 + 3.47
3 P. Ball	Barkston	7.30 + 2.38
4 J. O'Donnell	Church Fenton	7.30 + 2.36
5 W. Bealas	Barkston	7.30
6 T. Dobson	Barkston	7.13

Open Power for the Frog Senior Trophy (17 flew)

1 S. Screen	Barkston	7.30 + 4.26
2 D. Cash	Ashdown Forest	7.30 + 4.05
3 R. Peers	Barkston	7.30 + 3.00
4 J. Hopper	Sculthorpe	7.30 + 2.40
5 P. Watson	Barkston	7.30 + 2.32
6 D. Cox	Beaulieu	7.30 + 0.06

Plugge points after one event

Crookham	272
B&W	244
Birmingham	239
Vikings	234
Morley	224
Anglia	216

permitted engine run! Bearing this in mind, the performances were very good. Screen, Peers and Watson fought out a three-way flyoff at Barkston in the howling, 35mph-plus gale. The other qualifiers, Derek Cash - back strongly after a long spell of 'going normal' to bring up a family - Julian Hopper and

Derek Cox made their final at Ashdown, Sculthorpe and Beaulieu respectively. Cox had been most unfortunate to have a model lifted by the public after his last flight, and so was down to an ill-running reserve which let him down. Hopper managed only 2:40, but Derek Cash made over four minutes; still not enough to win because Screen flew for nearly four-and-a-half minutes, giving himself an enormous recovery job.

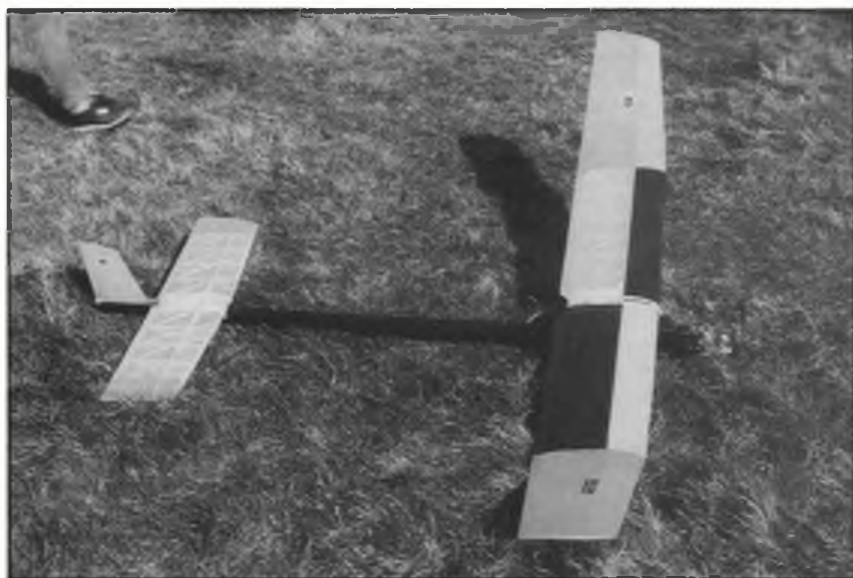
SMAE Easter Two-day meeting 25-26 March: Salisbury Plain

The weathermen were hastily modifying their forecasts after some 'finger-out-the-window' technology had been applied, as the 40mph gales that preceded the Easter holiday gave way to warm, spring-like weather. Understandably, many had been put off attending the first day. Most who turned up the following morning spent time trying to convince themselves (and anyone else who would listen) that 'It was quite windy where we were yesterday - it couldn't have been calm here'. Sorry guys: it was; and those who believed the TV forecasts ought to come, no matter what they say, next time.

Nevertheless, nearly fifty flew in the opening rounds of FAI with no less than a

dozen in FIC. Full scores in this class were predictable but the others showed a high standard too, Fantham and Peers maxing out in each of the disciplines. The second day was a mixture of classes, as last year: Open events all day and on top of that, the final three rounds of FAI. The choice for those wanting to fly in both classes was difficult, as the breeze increased to around 15mph. To start an Open event at the conclusion of FAI was to say the least, pushing luck bearing in mind the wholly pedestrian retrieval system. Probably for this reason few placed well in both Open and FAI.

The obvious improvement in the weather had dawned on one and all by the second day, and attendances were massive by typical Easter standards. In fact it all made a fitting last visit to this part of the plain, with the big entry making full use of the facility. Three-minute maxes in everything were comfortably accommodated by the enormous soft grass expanses, the downwind terrain looking and feeling positively inviting. Where else could you say that? Even flights of over four-minutes-plus usually landed somewhere safe, although a small road at about that distance caused some aggravation in the form of the occasional Sunday motorist rather too eager to retrieve models that he might see land - then driving off swiftly before the



Opposite page, left: Ray King's F1C at the Easter meeting. Consistent until scores came apart on the last two flights. Opposite right: John Oulds was second in the KMAA Trophy at the second Area meeting and made the Open Glider flyoff at Easter. Top left: Beautiful .40 model from a new name - Chris Harris of the Crookham Club. Left: Complex DPR (delayed prop release) system on Phil Uden's F1B. Blades are slightly folded back on launch. Above: Phil Ball made a few test hops with this Amco 3.5 powered Slow Open model at Easter.

owners arrived. Phil Ball had a rubber flight so treated but miraculously another flyer spotted the getaway car and flagged it down. Mark Croome wasn't so lucky - his model was missing after it had come down very close to the road on his second max.

The breeze had the rubber and glider FAI scores tumbling. Peers, the overnight leader in F1B, picked a mediocre patch for his first flight then cross-wind launched his second and nearly came in. This lapse dropped him to third, with Gerry Pink keeping very steady with all his flights in good air. His dropped time (only ten seconds down) was made half-way through the first day, Neil Cliff also got in above Peers with some fine flights on the second day despite damaging two models and having to risk a different, though practically identical, wing on his remaining fuselage and tail in order to finish. Some of Neil's damage came from a fast landing into quite soft grass when the rigidly plugged-on wings didn't give



sufficiently, and a tip was untidily torn off. The top three in Glider also flew exceptionally well. Jim Baguley and Mike Fantham must have been pleased with their efforts, showing good form so close to the World Champs.

When the FAI events came to a close half-way through the afternoon there was a surge of flying in Open, and many benefitted from the calmest part of the day when the wind was sometimes hardly above 10mph, and lift easy to spot. So it was that flyoffs filled up well despite the decent max and a fresh wind. Amazing how encouraging a little sun - plus with a vast grass site - can be.

The flyoffs

F1C resulted in a three-way tie - Faux, Screen, and Watson all had perfect 21-minute totals. As is becoming the form when an F1C flyoff is imminent - even at a World Champs - the rule book goes out the window. The CD, who should have scheduled a four-minute-max round as a matter of course was talked out of it by the three involved who convinced him that a later five-minute max round might expedite matters (only an

unlimited flight would have been a legal alternative). That infringement should have rendered the matter a three-way tie instantly as no one made an effort in the mandatory four-minute round (indeed it could have done, had there been a protest). However, there were greater powers about to be unleashed on these unsuspecting three than could ever have been imagined. After a day of reasonable thermals, but nothing excessive, nature was holding its trump card for this moment. In rapidly reducing breeze, now no more than 10mph there was a flutter on the flight line as thermistors twitched and all three launched into beautiful patterns and with accurate engine runs. Models circled away under what was now clearly a very powerful and dark thermal cloud. Watson's and Faux's climbed well on the glide as the minutes ticked away, but Screen's model was rising so fast there was a distinct chance of it penetrating the cloud itself before the five-minute max. There was no doubt that the models would do the necessary time. Screen DT'd early at about 4:30 (what a time to do that) - but his model was a mere speck by now, some 45 degrees away from the time-keepers, and the descent was a laborious affair. The upshot was that we saw none of the contestants again that evening - rumours of 10-minutes-plus flights abounded, which would have put the models in the forbidden, danger zone, well beyond the perimeter road. As none of them returned to fly a second model in the next round - which all of them had ready - it was once again a three-way tie for top spot; just as it would have been if they hadn't bothered in the first place...

This enormous patch of lift had scraped the barrel completely clean for any more such air that evening. The Open flyoffs were thus held in the longest lasting patch of poor (even positively sinking) air that I can ever remember. It felt cold and thick with minimum buoyancy let alone lift. Martin Gregorie's early launch in the Open glider flyoff may actually have caught the tail end of the F1C thermal as it resulted in a near four-minute flight and clear victory against the other five, none of whom scored three minutes. Keith Burt came closest, once again beating club mate Rod Audley, by launching at the same time but off to one side of him.

Rubber involved nine fliers Anthony Ball's fairly early flight in air spotted by John Cuthbert represented an on trim model in nothing much better than a neutral patch of air. Every other model flown - and some were launched right at the end of the period - flew into severe sinking air; large models floundering and small ones climbing briskly and plummeting. Times were all very similar. Alan Cliff, the only other Junior, was doing enough to beat the rest, including Gerry Ferer who wisely waited till the very end, presumably observing the debacle that the others were making of it. Shame to see John O'Donnell's first very big (320sq inch) Open Rubber model suffer so in the turbulent sink on its first outing - hope it hasn't put him off!

Open Power (which had managed a flyoff, despite the shortened run) was in perhaps slightly better air but with strictly no lift. Wain's early flight looked fine. Peers had the best climb but Trevor Payne's model was

gliding very slowly at low attitude. It was close; but Peers took it again five seconds.

SMAE Easter Meeting: 25-26th March

F1A (22 flew)

1 M. Fantham	20.37
2 C. Sharmen	19.32
3 J. Baguley	19.03

F1B: Mick Duce Trophy (12 flew)

1 G. Pink	20.50
2 N. Cliff	20.04
3 R. Peers	18.35

F1C (12 flew)

1 K. Faux	21.00 + 5.00
2 S. Screen	21.00 + 5.00
2 P. Watson	21.00 + 5.00

Open Glider (15 flew)

1 M. Gregorie	9.00 + 3.48
2 K. Burt	9.00 + 2.55
3 R. Audley	9.00 + 2.50
4 J. Carter	9.00 + 2.48
5 J. Oulds	9.00 + 2.18
6 P. Williams	9.00 + 1.13

Open Rubber (17 flew 9 in flyoff)

1 A. Ball	9.00 + 5.47
2 A. Cliff	9.00 + 3.54
3 G. Ferer	9.00 + 3.51
4 P. Ball	9.00 + 3.35
5 M. Stagg	9.00 + 3.13
6 J. O'Donnell	9.00 + 3.12

Open Power (7 flew)

1 R. Peers	9.00 + 3.54
2 T. Payne	9.00 + 3.49
2 F. Wain	9.00 + 3.09

Australian Nationals

Ex-patriot Jon Fletcher - he of the timers - has sent us a detailed report of the Australian Nationals held in gloriously hot weather at the start of '89. To make it fair for all the aeromodelers spread thinly over such a huge country, the contest is held in a different State each year. This year it was Queensland's turn, the contest taking place at Amberley, near Brisbane.

There were shades of the American equivalent, where despite such a large country the venue itself was rather restricted; an operational F-111 airbase with many cordoned-off areas and dog patrols. Like the Americans, the Aussies make a week of it. The first day is devoted to processing Vintage models, settling in and catching up on the gossip. From then on events are mixed and spread around for the next six days, including some Indoor events flown at a sports stadium the other side of Brisbane in the evenings, and even one outdoor night event!

Mostly the weather was very warm - up to 35 degrees Centigrade - but often quite cloudy, and not windy until the very last day. Actually, Jon emphasised that the better weather for flying was undoubtedly when the breeze did pick up a bit; it was much easier to recognise the patches of lift. In some of the dead calm spells the downdraughts were horrendous. Many of the classes are flown to five flights. That includes the conventional Open events as well as the Minis. FAI is always seven flights (and all of them in one day, too; those who complain when we do this in the UK please note!) As a consequence events often started early - on one day, to



At the Aussie Nationals:
above, Dave Thomas
launches his Woodpecker-
inspired K&B 40 powered
Open model. Found a
huge hole in the last
flight. Left: Senior Champ
after days of hard flying -
Bryan Taylor, seen here
with his Goldberg Viking
1/2A Power model.
Below: Pete Nash gets
away in F1C.



cope with 1/2A and F1C, they began at 4am!

Well known glider flyer Vin Morgan took A/2 and A/1 with very high scores in both. Gary Odgers won Coupe convincingly with a full score on a difficult day after a bad time in both Open Rubber and Wakefield. Our reporter won HLG and Open Rubber despite dropping three seconds on one of the five three minute maxes. He D/T'd himself early out of F1C, then despite doing the same again on the first flight in 1/2A power on the same day went on to win that class with a string of four maxes. Despite winning Peanut Scale as well he didn't make National Champ. That was Brian Taylor, who flew in just about everything, and won a lot too. Ben Lewis won

the overall Junior Championship with a standard that sounds very impressive, bearing in mind that all his performances were against the Seniors. He was fifth in A/2, seventh in Indoor HLG, second in F1B, sixth in 1/2A power, second in CDH, sixth in Peanut Scale and second in P30!

Open Power was a head-to-head battle between the Hopper-inspired models of Roy Summersby and the Peers-based designs of Dave Thomas. Each made four maxes (three minutes, with 10 secs run) until enormous holes sucked them down on their last flights. Just how powerful these downdraughts were is illustrated by Dave Thomas's time of only 89 secs off a full run. He was second;

Summersby won.

The outdoor night event was a thirty-minute Scramble for diesel power models up to 1cc, with a two-minute max. In Jon's own words 'At night, in the grass, one is spoilt for choice as to which species of deadly snake to tread on!' This added hazard didn't deter the entry although they were certainly outnumbered by the crowds that turned out to watch the spectacle of a couple of dozen lunatics trying to kill themselves in the dark. Models, some none too well trimmed but all flown with lashings of enthusiasm, were all bedecked with lights.

Contestants were visibly tiring by the end of the week's activities. I am not the least bit surprised...

Wot's it cost, mister?

It might appear that I have a go at the F1C flyers rather too often. Perhaps it is that we are not flying the class to the best set of rules. As to cost - just how much *are* they worth? If the answer is 'Too much to risk in a contest; then shouldn't contests be different? Just after the ill-fated three-way launch in F1C at Easter, I heard a flyer exclaim that 'Now there is £900 worth of models in the air'. Presumably he was considering only the cost of the parts! Any builder knows that the actual cost of the raw materials make up but a tiny fraction of the value of the model. Surely some £300 worth of hardware takes a lot less to earn at one's chosen profession than the model takes to build in one's all to valuable spare time? I would guess that costing the man hours at a paltry £5.00 per hour the average top line FAI model, whether it be Glider, Rubber or Power is worth between £500 and £750 in labour alone. If you are lucky enough to earn nearer £15 per hour then the value in labour becomes astonishing. Against this the cost of a motor, timer, and odd bits-and-pieces pales into insignificance.

So why is it that only the power flyers go in for histrionics when asked to use their models for the very purpose for which they were intended? Sure - they most often finish up facing a fly-off; so perhaps there is a cause of returning to a progressively shorter run rather than the progressive max.

Whatever is done, the model needs to be used in contests if the breed is to be encouraged and improved and the rules need to be adjusted to encourage this participation.

What's Happening

27-29th May **British Free Flight Nats:**
RAF Barkston Heath
Saturday: A1, CDH, 1/2 A, HLG.

Sunday: Open G/R/P. Vintage, Womens Cup, Frog Junior

Monday: F1A, B & C (6am start)
Slow Open Power, Tailless (10am start)

Contact: Gerry Le Vey.
Tel: 0904 705647

11th June

Fourth Area Central Event:
Area Venues, Slow Open Power for Astral Trophy, Open Glider for Plugge Points, and Model Engineer Trophy for Teams. CDH - no Trophy.
Contact: SMAE Comp Sec or Area Comp Secs.

David Ackery reports on the New Zealand Nationals



KIWI CAPER

CARTERTON was again the venue for the New Zealand Nationals. This time – like the rest of the country – it was battered by a fierce storm; but despite this, all events were completed with as much enthusiasm as ever.

The NZ Nats is a combined F/F, C/L and R/C meeting, and just about every class in the rulebook is flown. This makes for a very busy programme, but New Zealand aeromodellers tend to be all-rounders. Even if they specialise in a particular class they usually will have a go at something else. The interaction between F/F and C/L enthusiasts is particularly good.

The FFOXY programme for Juniors (see Hangar Doors, February issue) has been very well received – many have been built by adults too! – and this momentum has been reflected throughout the F/F classes, which have shown quite a jump in entries. Interest is particularly strong in the simple events such as chuck glider, aggregate, P-30, and A/1. Free flight scale is also popular.

Champions were Paul Coghlan in C/L (fresh back from the UK) and Rod Lewis, who took F/F Champion and Champ of Champs. Top club were the Auckland Free Flight Club who managed just to get ahead of Wellington in the final two days.

Nationals spirit

Forceful point is that, thanks to the NZ Tech Committee, a purpose-built C/L circle has been built at Carterton. Much fund-raising needs to be done – but the circle is there. The right choice... Looking at the NZ Nats coverage, we particularly enjoyed reading Flypaper, the daily – yes, daily – newsletter. Some of the comments therein summon the true spirit of an 'all-in' Nationals. Examples? We learn that John Danks was pitting in the Goodyear event, and caught a real scorcher of a landing; the expression as he sat holding a wing while the rest of the aircraft completed another half lap was priceless... And all you musical model fliers out there ought to know that one Sharyn Willard turned a few heads playing a guitar with a Taipan 7x6 prop as a pick!

Over now to our photo coverage to give a flavour of this comprehensive event.



Above: Flyoff drama in Open Rubber – John Poletti blew a motor – and fuselage – on half turns. Quickly he assembled this Vintage model; delay meant better air and second place!



Above: Quantum Leap by Dave Wright is a stylish stunter for ST.60. Wing is removeable.



Above left: the FFOXY contest. Organiser Rod Lewis was delighted with the response. FFONZ hats proliferate! Above: Up and away - Nick Brown's fine Rubber Scale SE5a takes the air.

Below: Paul Coghlan and Glen Lewis took top spot in 1/2A Team Race. Sesqui-powered model was within five seconds of the NZ record.



Above: Betty Malkin about to launch in the Ladies' event - she finished in top place. Husband John fumbles for the lighter...

Below: Brent Yates of Auckland flew this neat Earl Stahl High Climber in Vintage Rubber.



Above: Richard Dalziel came to the Nats to fly Combat (he also won Chuck Glider!). New side-exhaust Nelson diesels resulted in very competitive models. Left: F2B winner was John Ryan from Rotorua. Model is Not a Nobler with OS40FP. Lots of practice makes the difference...

VINTAGE CORNER

Alex Imrie defines

Vintage, looks at its

development and talks

bargains

RECENTLY I took two free flight models to a local club evening and also showed some colour slides featuring the late 1930s American competition scene. The audience were attentive, as the evening progressed, but half-way through the showing (admittedly a somewhat tricky operation, since the thick pre-war slides could not be loaded *en-masse* into the projector cartridge but had to be inserted individually) a break was called. In fact, we never did resume since members drifted off into discussion groups and concentrated around various other models that were on show, including the Club Secretary's Douglas Dauntless. Many enthusiasts enjoyed a look at my Brown Junior equipped Miss Philadelphia V, and the Elf-powered Miss San Diego, but despite having explained that these were free flight models, there were repeated questions about the type of radio and servos used. Most chaps did not believe that the models actually flew on their own without external control. How, they wondered, could this be done? It was obvious that the main interests of the club (which, I venture to suggest, is a typical present-day one) and mine, although both model aeronautical, were as similar as chalk and cheese. In all fairness, a small proportion of new members (mostly of the grey-haired mature type) knew what I was about, and engaged in long dissertations about their early model experiences; and once they got going, the enthusiasm that they still retained for this branch of modelling was obvious. I particularly recall one gentleman who told of his first engine purchase. It was a Frog 1.75cc petrol engine. For over a year he had been saving up to buy this, but getting the money together was a difficulty not really appreciated nowadays. A 'flu epidemic came to his assistance, for when all the other office employees were laid low, he carried on doing the necessary and kept the business ticking over. An appreciative 'whipround' took place on the return of the staff to work and this boosted his finances to the exact amount required (£3. 15s. 0d, or £3.75p). Not having any money for non-essentials like bus fares, and quite unable to contain his excitement, he ran the four miles to his local model shop, got the engine and ran all the way home again, but then could only look at the motor

since there was no immediate cash available for batteries, petrol or oil! Eventually he did get the engine to run and later flew it in a Keil Kraft Rover and had a marvellous time, the thrill of which had not been dimmed by the passage of time.

Ab initio

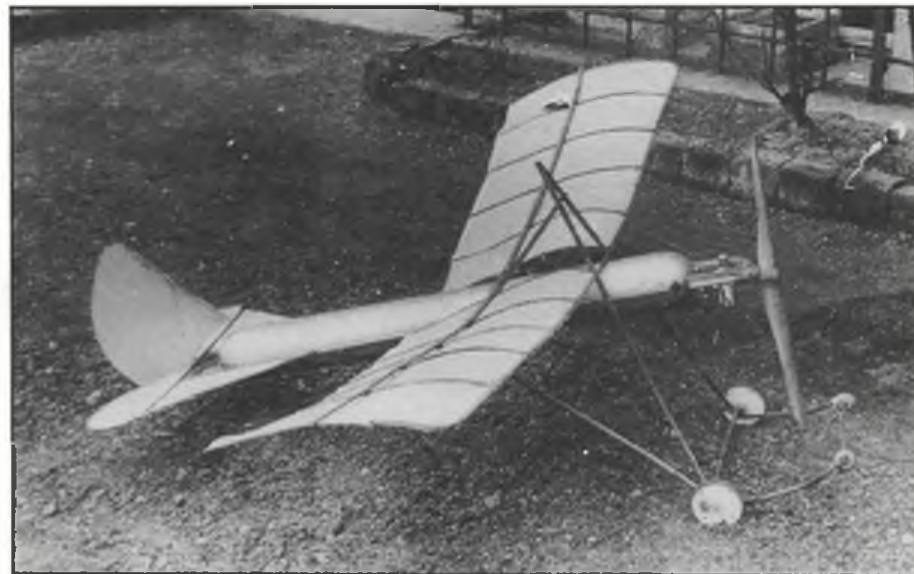
As far as Vintage is concerned one would think that these chaps, many of whom last modelled around 40 years ago, would automatically slot into the present day scene. Not so. Usually, they are left to fend for themselves, and the vocabulary that we use is almost a foreign language to them. They can recall one or two names from the past, but are generally completely out of touch with what the Old Timer scene is all about. Even if they join SAM 35 (as had a few that I recently spoke to) they find that there are no explanatory notes to allow them to slide easily into the hobby. The most burning questions were: 'How about plans availability, and where can we get old engines?' To them Texaco is the name of an oil, since they have never heard of a fuel allotment competition; the 'X'-List they consider to be a list of hush-hush designs (it is!); and a cut-off date could well be an amputation deadline! Bearing in mind that there is a continuous need for instruction, it is planned to devote



A regular performer at late 1960s Vintage meets was D Bailey of Swindon with his Frog 100 powered Hi-Ball, a fine-performing 36in 1948 design by Pete Neate. Plans are available from ASP for £4.10 including postage. Quote ref PET 271.

parts of this column periodically to brief explanations to help such modellers pick up the reins where they left off. If this all seems boring to those of our number who know all the answers today – just remember that you may have had an easier transition to Vintage if it grew up around you. To these one-time modellers, many of whom are now retired and at last have time on their hands, and who see aeromodelling as an ideal occupation, we say, Welcome Back; it is a pity it has been so long. I am also pleased to see that steps are being taken in recent issues of SAM 35 to alleviate this need. There is a never-ending need for basic information, since the mere names of models and quoted wingspans don't tell the tyro Vintage modeller much. One hopes that this trend will continue. We in our turn will keep in mind the returning one-time modeller – and the complete beginner.

Compressed air again! This German model, built by Otto Reder, powered by the Autoplan 3-cylinder engine was flown at Gottingen in demonstrations to famous aerodynamics Prandtl and Betz in 1915.



How it all began

The Vintage movement was born out of a desire to recreate models of a bygone age that had, for a variety of reasons, made a special impression. It really started when two model clubs in California introduced an inter-club contest for so-called Old Timer designs in 1962. The instigators were overwhelmed with the response that this brought. It seemed that many modellers still had old magazines, plans and engines in their vaults and perhaps because of a certain staleness that had crept unknowingly into their modelling attitudes, needed only this idea to rejuvenate their real enthusiasm. In very short order examples appeared of designs that had long since apparently passed into history. These were seen by others who remembered the old models, and they in turn followed suit. The fever was contagious and spread through the whole modelling community.

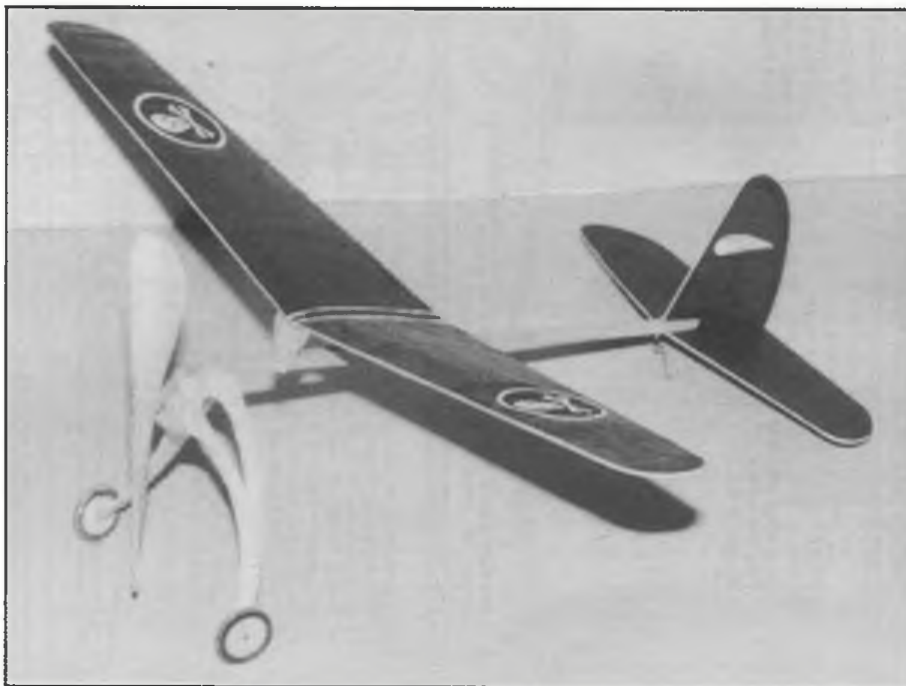
To cater for this interest the Antique Model Association was formed; in 1965 it changed its name to the Society of Antique Modellers (SAM) in order to prevent confusion with the US governing body, the Academy of Model Aeronautics (AMA). SAM encompassed clubs, known as Chapters, that specialised in this type of model. Information for members was contained in the Society's organ SAM Speaks, and since enthusiasts' requirements were then not being met by the model aircraft industry a number of enterprising individuals began to supply items like engines, plans and kits for the ever expanding number of modellers attracted to the models of yesteryear. The UK Chapter, SAM 35, who produce their own monthly magazine SAM 35 Speaks, was formed some ten years ago and has generated an interest here that has continued unabated to the present day. Currently it encompasses some 900 members out of the 3000 world-wide SAM membership. The easiest way to find out about Vintage is to participate. My advice to any modeller with a leaning towards the old model designs is to join SAM 35. Not all modellers are attracted to organised or club activities. The hobby has always had a large number of 'lone hands', and the dispersed nature of SAM 35 membership means that this still obtains. Club-like gatherings are arranged locally, and it is really up to the individual to choose if he wishes to indulge in group activities or go solo. The common bond is the monthly magazine, compiled voluntarily by dedicated Vintage enthusiasts, which is, without doubt, the finest journal in the entire SAM organisation. Subscription is £12 per year (£15 for overseas members). Send an SAE to the Membership Secretary, Les Duffy, 9 Queens Road, Wellington, Somerset TA25 9AW for further details.

Vintage columns

As perusal of current model aircraft magazines will show, many have regular specialist columns on the subject of old time models. Newcomers might find the individual approach of these contributors confusing. This is explained by the particular magazine theme; thus journals primarily for R/C reflect this interest in their Vintage writings, or at least examine the old designs in this regard. General aeromodelling magazines cover the



Charlie Havis launching his Bob Woollett designed Phoenix at last year's Vintage Weekend at Old Warden. If you missed that Vintage high-point note the dates for this year - 19/20th August.



This Comet Phantom Flash stick ROG model was built by an American reader. Build one from your scrapbox using the plan overleaf.

whole aspect limited only by the source material available, so rubber-powered models and gliders get an airing, as well as those of the powered variety. Then some magazines have scale and control-line columns, so Vintage models do get some coverage there; in fact such is the amount of interest that Vintage items are liable to appear anywhere. All this is a far cry from the initial efforts of John Pond (one of the 'instigators' mentioned earlier) who started the ball rolling in the Engine Collectors' Journal with his 'Gas N'Oil' pages 25 years ago, when the very mention of the subject to editors of many established model magazines was met with a glassy-eyed stare and the mumbled excuse that the initial enthusiasm for old time models was a 'flash in the pan' that would not survive, and was certainly not worth devoting valuable magazine space to. John proved them wrong. His Plug Sparks column in Model Builder is in its sixteenth year. We all owe a considerable debt of gratitude to John's untiring efforts on behalf of the whole Vintage movement.

Butcher shop

We have all seen Vintage engines that have been 'through the mill', and quite apart from damage resulting from wear and tear, it is not unusual to find engines with bits cut off, shortened intake pipes and so on. I have a Baby Cyclone that once was viciously attacked with a file. Projections on the rear of the cylinder, like cooling fins and bumps cast in the cylinder to take screws for securing exhaust stack and transfer cover have been filed almost flat. One can only assume that this peculiar attention was to get the engine into the airframe, not only really close to the front bulkhead, but right up against it! Other candidates for removal include names case into cylinders and crankcases - maybe in these cases the one-time owners wanted to show off the engines to an uninformed public with the implication that they had made them themselves... Mike Patience's Elf Corn cob and Neil Webster's Ohlsson Miniature both suffer in this respect, and I have a Brown Junior that has had the

NOTE: WING INSIGNIA IS CUT FROM PLAN

CONSTRUCT WING IN TWO HALVES OVER PLAN JOIN TOGETHER AS SHOWN IN DETAIL. BELOW: COVER WING WITH TISSUE ON TOP ONLY.

CUT WING TIPS FROM PRINTED BALSA SHEET
CUT OUT TO REDUCE WEIGHT



LEFT WING PANEL
1/16" SQ. BALSA TRAILING EDGE

CUT RIBS FROM THE PRINTED BALSA SHEET.

THE ROG IS STILL POPULAR AFTER MANY YEARS OF SUCCESSFUL FLYING. MANY NATIONAL CHAMPS HAVE BEGUN THEIR MODEL BUILDING CAREERS WITH THE ROG.

IF DESIRED, 1/16" SQ. BALSA MAY BE USED INSTEAD OF CAMBERED RIBS THAT ARE CUT FROM THE PRINTED SHEET



1/16" SQ. BALSA LEADING EDGE

BROKEN LINES SHOW POSITION OF ELEVATOR

RIB D (2 REQUIRED)

RIB A (2 REQUIRED)

BROKEN LINES SHOW PROBABLE POSITION OF WING ON MOTOR STICK

1/8" X 1/4" MOTOR STICK

SAND EDGES

RUDDER

WING MOUNT

CUT INSIGNIA FROM PLAN

BEVEL EDGE OF LANDING GEAR STRUT TO FIT MOTOR STICK

BENT PIN SERVES AS AXLE

NOTE: AFTER WING MOUNTS ARE GLUED IN PLACE, RUB COLENT INTO THEM LIGHTLY WITH FINGER TO INCREASE THEIR STRENGTH

CUT 3/16" BALSA STRIPS

CUT ABOVE INSIGNIA FROM PLAN AND GLUE TO OPPOSITE SIDE OF RUDDER

DETAIL OF WING MOUNT

REAR WING MOUNT

CLIPSETS

RUBBER BAND

PROPELLER SHAFT

WINGTIPS ARE 1-3/8" HIGHER THAN AT CENTER OF WING. THIS GIVES THE WING DIHEDRAL, WHICH MAKES THE PLANE A STABLE FLIER.

RUBBER BAND HOLDS WING IN POSITION

ELEVATOR

FRONT VIEW

PITCH GAUGE

BEND PIN AS SHOWN. PUSH INTO MOTORSTICK AND APPLY CEMENT. GENEROUSLY THIS SERVES AS REAR MOTOR MOUNT AND TAILMID

TIE ENDS OF THE RUBBER TOGETHER AND HOOK AROUND REAR MOTOR AND PROPELLER SHAFT.

GLUE TWO HALVES OF WING TOGETHER

ABOVE SKETCH SHOWS HOW DIHEDRAL IS GLUED IN WING BLOCKS ARE PLACED UNDER THE WING UNTIL THE JOINTS ARE DRY. EACH TIP SHOULD BE 1-3/8" FROM THE WORKING BOARD.

WORKING BOARD

CUT OUT NOSE PIECE TO REDUCE WEIGHT

ENTIRE WING NOT SHOWN

WINGTIPS ARE 1-3/8" HIGHER THAN AT CENTER OF WING. THIS GIVES THE WING DIHEDRAL, WHICH MAKES THE PLANE A STABLE FLIER.

CUT OUT SCORE AND CEMENT ALONG SCORE LINE. USE GAUGE

INSERT SHAFT THRU BUTT AND PROP BOND SHAFT AND CEMENT LANDING GEAR STRUTS BEFORE CEMENTING TO MOTOR STICK

FRONT END DETAIL

PROPELLER ASSEMBLY

CUT OUT ALONG INNER LINE WITH A RAZOR BLADE TO REDUCE WEIGHT

COVER ELEVATOR WITH TISSUE ON TOP

1/16" SQ. BALSA

CUT ELEVATOR TIPS FROM THE PRINTED BALSA SHEET

WHEEL IS SLIPPED ON PIN BEFORE PIN IS BENT

GLUE WELL

AXLE DETAIL

2/4" WHEEL

ENTIRE WING NOT SHOWN

WINGTIPS ARE 1-3/8" HIGHER THAN AT CENTER OF WING. THIS GIVES THE WING DIHEDRAL, WHICH MAKES THE PLANE A STABLE FLIER.

CUT OUT SCORE AND CEMENT ALONG SCORE LINE. USE GAUGE

INSERT SHAFT THRU BUTT AND PROP BOND SHAFT AND CEMENT LANDING GEAR STRUTS BEFORE CEMENTING TO MOTOR STICK

FRONT END DETAIL

PROPELLER ASSEMBLY

CUT OUT ALONG INNER LINE WITH A RAZOR BLADE TO REDUCE WEIGHT

COVER ELEVATOR WITH TISSUE ON TOP

1/16" SQ. BALSA

CUT ELEVATOR TIPS FROM THE PRINTED BALSA SHEET

WHEEL IS SLIPPED ON PIN BEFORE PIN IS BENT

GLUE WELL

AXLE DETAIL

2/4" WHEEL

ENTIRE WING NOT SHOWN

WINGTIPS ARE 1-3/8" HIGHER THAN AT CENTER OF WING. THIS GIVES THE WING DIHEDRAL, WHICH MAKES THE PLANE A STABLE FLIER.

CUT OUT SCORE AND CEMENT ALONG SCORE LINE. USE GAUGE

INSERT SHAFT THRU BUTT AND PROP BOND SHAFT AND CEMENT LANDING GEAR STRUTS BEFORE CEMENTING TO MOTOR STICK

FRONT END DETAIL

PROPELLER ASSEMBLY

THRUST BUTTON CONSTRUCTION

NOTE: FOR BETTER FLIGHTS, THE TRAILING EDGE OF THE LEFT WING PANEL SHOULD BE WARPED DOWN SLIGHTLY AT THE TIP, AND THE RUDDER SHOULD BE TURNED AS SHOWN IN TOP VIEW. THIS ADJUSTMENT ALSO COUNTERACTS TORQUE OF PROPELLER.

PHANTOM FLASH ROG.

WINGSPAN 16" | LENGTH 11 1/4"

DRAWN BY *Art Kline* | KIT NO. A-1

name neatly removed from the crankcase. Why? The obliteration of serial numbers is sometimes for the sinister motive of preventing identification; but it only does this to the naked eye. The act of punching the number on in the first place changes the molecular structure of the metal immediately underneath, and if we take the trouble of using X-ray or ultra violet lamp dye testing the number can still be read. However, in other cases the 'modifications' may have been attempts to improve the engine's performance, as the following account shows.

Back in the February 1987 Vintage Corner we showed what appeared to be a doctored



Mills 1.3 which had only four cooling fins. The photo was submitted by Ron Magill of New Zealand, who appealed for information. This was kindly supplied by M D Redler of Cheltenham twelve months later and we are pleased to feature it here. This knowledge was entirely new to me, my diesel ignorance being due to spending too much time fiddling with coils, condensers and sparking plugs! Over to our correspondent:

'When the Mills 1.3 was at the height of its popularity in 1947-1949, I was at the Royal Aircraft Establishment at Farnborough where numerous aeromodellers were experimenting and occasionally making their own versions; a task not beyond the ability of many an apprentice. I am not at all sure that all or any of the 1.3 Mk1 engines had any marking system; mine certainly has not. The one shown in Vintage Corner would appear to have alternate fins machined off for control line flying as, after a couple of circuits, the basic engine could become too cool and would lose power. My own was sold to me for this reason, the seller buying an ED 2cc Mk II instead. Later my boss (NK Walker of LSARA fame) suggested that I could improve it by filing away the crankcase, like the Mills Mk II which was yet to appear. Also I was advised to file away the crankcase below the exhaust at 45 degrees; a modification which the manufacturers evidently thought might cause structural troubles or difficulty in machining. The result was certainly worth while as the engine was even easier to start and more flexible with a wider speed range at both low and high rpm.'

June 1989



Opposite page: The plan for this 16in model was drawn by Joe Konefes and can be enlarged to full-size by selecting 'A3 enlargement' on your local copier. **Above:** A look back: R Silvier of Southgate tuning the Eta 5 diesel in his White Wings at the 1947 Bowden Trophy.

All original Mills diesels that I have seen bear serial numbers on their mounting lugs. Brian Welch of Luton, who owns several, concurs. He is also of the opinion that these numbers denote a system whereby the date of manufacture can be deduced. This was apparently common knowledge in the St Albans Club when Brian was a member in the 1950s.

Possibly the engine obtained by Ron Magill had its serial number removed somewhere along the line, and the serial of M D Redler's engine may also have been removed in the cleaning-up process that he mentions. To illustrate the system, Brian quoted Mills serials 14720 - the first digit is the month of manufacture, the second and third digits show the year, while the last two numbers are the engine number in the production batch. Using this method 100 engines (00-99) would seem to be the batch limit since no

six figure groups are known to either Brian or the writer. However, this is obviously not the whole story since a random check of some engines reveals serials that don't fit into this scheme of things. Perhaps Brian's suggested system works for a particular period only? Two Mills Mk I engines that I have looked at are numbered 2163 and 7429 respectively; these could be serial numbers without any obvious code. Can any reader please enlighten us further?

MECA meeting

The sixth Swapmeet of the UK Chapter (No. 13) of the Model Engine Collectors Association, held on 19th March in the Leisure Centre at Mansfield, was well supported and almost 200 enthusiasts whiled away the day buying, selling and exchanging engines, kits, plans, magazines and books.



Another 1947 photo - National Senior Champion N Standing with his neat Wakefield model on 20th July 1947 at that year's Northern Heights Gala.

Not only were available wares displayed, but many collectors brought along recent acquisitions for show only. Replica engines in particular attracted much attention. Ken Ford produced his first completed Lindberg Hornet, of which he plans to produce ten in all. Mike Beach had a number of Chunn's with him, all brass parts nicely polished and fitted to reproduction wooden test blocks just like the originals, and Phil Cox had a whole range of his own design small motors, each one as beautiful as the next. As previously mentioned in these pages, this sort of meeting is almost the only source for items long since gone from dealers' shelves; boxes of cylinders, pistons, crankshafts, connecting rods and crankcases for engines that were out of production thirty or more years ago were rummaged through by all seeking such elusive bits. Not everyone was successful, but I saw a good number of people who found replacement parts for their engines; this means that the motors will be able to be used again in the manner for which they were made, instead of becoming inert paper-weights. In this respect the vintage swap-meets perform a noble function. People also bring along kits purchased many years ago; the same applies to engines and other impedimenta. Buyers are happy, since items usually change hands at a fraction of the prices normally asked; and the sellers are pleased too, being able to realise some money on items that had, after the first flush of enthusiasm, only gathered dust in lofts and workshops. It is a Scotsman's delight, restricted only by the depth of one's sporrans. All modellers tend to buy more than they really need, so there is an abundance of such material, but owners are often not moved to advertise it for sale. The swapmeet seems to stir them into action and suddenly untold goodies are available again! Alan Whitehead of Bolton showed the wings and fuselage of Ed Rogers' Shadow, a substantial low twin-pylon tee-tailed power model (on p.645 of the October 1947 *Aeromodeller* Ed is pictured with this model during that year's Bowden competition). Despite the missing tailplane I am sure that one of our plans draftsmen will soon measure and draw up this design. Maybe someone will have even built one in time for Old Warden later this year – remember the dates; 19-20th August. Alan also had an example, the first I have seen, of the pre-war British Johnson Minor petrol engine, which was obviously based on the 16cc Forster 99. So if you are interested in model aircraft engines, you should really join MECA. Yearly subscription is \$22 (£13.75 at present rates of exchange). Write to Keith Harris, 21 Burns Lane, Warsop, Mansfield, Notts NG20 0PA for further details. Members get six bi-monthly swapsheets full of the very sort of thing that covered the tables at Mansfield; all dealings are protected by a strict code of practice. Next swapmeet same venue on 10th September 1989... Don't miss it!

Right: Alan Whitehead with the fuselage of the 1937 built, 78in free flight model. The Shadow by Ed Rogers. The Johnson Minor petrol engine with its ancient Chauviere propeller is in the background (see text).



Above: One of the most shapely C E Bowden designs, this Mills 1.3 powered 48in span Satellite was made by Paul Lidster and is seen at the 1987 Vintage Weekend. Plans available from Phil Smith.



Above left: Don McGhee of Denver hand-launching his Playboy 70, powered by an Ohlsson and Rice 60 ignition engine. Doc Nichol photograph. Above: OS 90 FS powered Alpha Corsair, built by Eut Tileston, taking off in the 1986 John Pond Commemorative Contest. Note the textbook 'no-push' release! Left: Dick Stouffer shot of the Super Cyclone installed in Ed Rangus' Buzzard Bombshell, seen at Bong in 1984. This engine, first made by Aircraft Industries at the end of 1939, has been reproduced by Pesco (1965), Remco (1971) and finally by Super-Cyclone engines since 1984.



FLYLEAVES

Bristol Aircraft since 1910

by C.H. Barnes (Putnam, £20. ISBN 0 85177 823 2)

The third edition of this old favourite contains minor additions, mainly to update Britannia and Freighter news as their flying careers draw to a close. Poignant introduction photograph is an in-flight shot of the ill-fated Duxford Blenheim restoration.

Otherwise it is the mixture as before, with full reference to all aircraft from this manufacture – a notably wide sweep of designs from the Anglo-French Bristol Zodiac of 1910 to the Bristol 188 supersonic research aircraft and Concorde involvement until absorption into British Aerospace. First published in 1964, this volume shows its age only in three-view presentation; they are a little small, and rather heavy-handed, by today's standards. The aeromodeller will have to search elsewhere for material to scale up, but inspiration is here aplenty. Someone just has to try the astonishing Bristol Racer of 1921!

GC



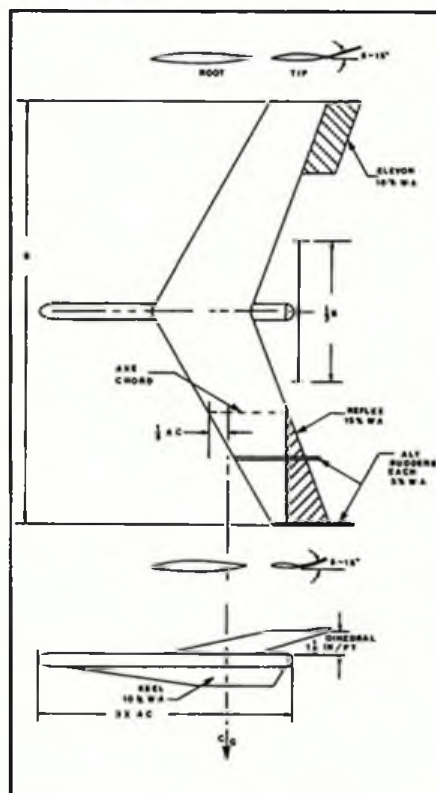
Rubber Powered Model Airplanes

by Don Ross (published by Motorbooks International, Osceola, Wisconsin 54020, USA. ISBN 0 87938 325 9).

This is a super little book. In bright, cheery style here is all the beginner needs to know about the delights of building and flying rubber models. A variety of craft is detailed, providing a graduated course along which safety to steer with minimal trauma. Simple, all-sheet construction via Jedelsky wings progresses to built-up construction, and an exposition of advanced types via enthusiastic text. And this is no re-hash of old bones. Augmenting the basics is a variety of up-to-date hints and degrees to help the enthusiast

get the most out of this fascinating branch of aeromodelling. Removable undercarriages, cyano moulding, carved foam and more besides is packed into this handy volume. Advice on designing your own aircraft is a go-ahead conclusion. Although undeniably of American flavour, the appeal is universal. Good value for the bookshelf!

GC



Above: Flying-wing design parameters from Rubber Powered Model Airplanes by Don Ross. Right: Amelia Earhart's Kinner Canary – main subject of the latest Peanuts and Pistachios volume.

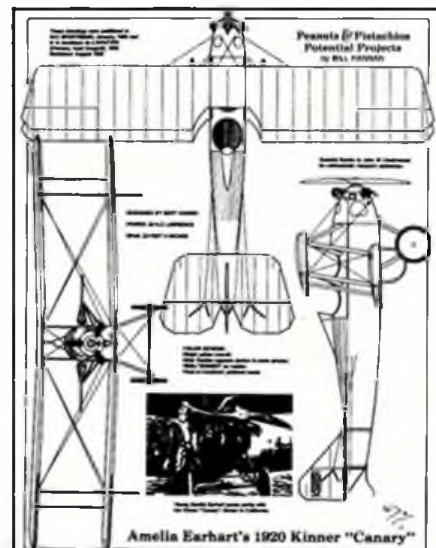


International Peanuts & Pistachios, Volume Four

compiled by Bill Hannan (Published by the author at Hannan's Runway, Box A, Escondido, CA 92025, USA. ISBN 0 9611652 6 X)

Yet more inspiration, this time for builders fascinated by tiny scale flying models. Bill Hannan has done it again! Delightful feedback from readers of Volume Three proves the captivating charm of these labours of love – and yes, we mean the books and the models. A photo gallery of craft (including, we must say, Antonin Alfery's Avia BH-25J presented in this issue of *Aeromodeller*) is backed with a selection of full-size plans for models and projects, notably Amelia Earhart's Kinner Canary biplane, and the Miles Sparrowhawk, drawn in Harry Robinson's style familiar to *Aeromodeller* readers. Advice on propeller construction is just one good reason for buying this gentle publication; and how pleasant to learn that, with support from the small-scale fraternity, all looks set fair for the next in the series. Splendid stuff!

GC



WHAT'S ON



21st May
ASP LARGE MODEL DAY RC
Venue: Old Warden Airfield. Come and see the best and biggest at our first flying date of the season! Contact: Aeromodeller Telephone: 0442 66551.

21st May
MORLEY & DMAC VINTAGE F/F MEETING FF
Venue: RAF Church Fenton. Vintage cabin Duration for models up to 60in. Proof of authenticity required. BMFA members only. Contact: Stan Horne. Tel: 0532 610429.

21st May
WHARFEDALE OPEN AEROBATIC EVENT CL
Venue: Ilkley. F2B and Class II. Contact: Jeff Smith. Telephone: 0532 663432.

21st May
MORLEY & DMAC VINTAGE EVENT FF
Venue: RAF Church Fenton. Vintage Cabin Duration for models up to 60in span. Authenticity must be proven; plans, etc. must be provided. Contact: Stan Horne. Tel: 0532 610429.

21st May
THREE KINGS C/L SCALE FLY IN
Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. Stand-off and Profile Scale classes. Silencers and proof of insurance essential. Contact: Wal Cordwell Tel: 01-764 1661.

27-28th May
1989 HOME INTERNATIONAL F2B EVENT CL
England vs Scotland vs Ireland. Venue: Holywood Road, Belfast. Contact: John Hamilton. Tel: 0247 461717.

28th May
NUNTEATON MAS CONTROL LINE STUNT EVENT CL
Venue: Clifton, Northants. F2B and Class 2 Aerobatics. Contact: Dick Downes. Tel: 021-440 7244.

27-29th May
BMFA BRITISH NATIONALS FF
Saturday: A/1 for British Airways Trophy, CDH for 308 Trophy, 1/2A Power for Hales Trophy. HLG for HLG Trophy.
Sunday: O/G for Thurston Trophy, O/R for Model Aircraft Trophy, O/P for Sir John Shelley Trophy, Vintage for Jubilee Trophy, Women's Cup, Junior Open for Frog Junior Trophy.
Monday: F1A for Ronytube Trophy, F1B for Boxall Trophy, F1C for Eddie Cosh Trophy. FAI events start at 6am. SOP for Falcons Trophy, Tailless for Lady Shelley Trophy.

3-4th June
3 SISTERS GALA CL
Venue: 3 Sisters. Open Speed, F2B and Class 2 Aerobatics, F2C, Open GY, British GY, A Combat, F2D Vintage A and B T/R, OTS, Midge Speed. Contact: John Noble. Tel: 061-790-4056.

4th June
CARDINGTON INDOOR MEETING FF
Venue: Cardington Airship Shed. All-in Index and fun-flying. Contact: Bob Bailey. Tel: 0438 723642.

4th June
BLACKPOOL AND FYLDE SCALE FLY IN RC
New, improved format. Same friendly atmosphere. Semiscale. Venue: Blackpool Zoo Flying Site. All welcome. Contact: Chris Bromley, 31 Belmont Avenue, Blackpool, Lancs FY1 4BE. Tel: 0253 25080.

11th June
FOURTH AREA CENTRALISED MEETING FF
Venue: Areas. SOP for Astral Trophy, O/G for Plugge points and Model Engineer Trophy for teams. CDH. Contact: BMFA.

11th June
WHARFEDALE OPEN MINI GOODYEAR CL
Venue: Dewsbury. Contact: Jeff Smith. Telephone: 0532 663432.

11th June
THREE KINGS C/L SPORT AND VINTAGE DAY
Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. Vintage Stunt, Midge Speed, Vintage A Team Race, Concours, Silencers and proof of insurance essential. Contact: Wal Cordwell Tel: 01-764 1661.

17-18th June
ASP SCALE WEEKEND RC, CL, FF
Venue: Old Warden Airfield. Not to be missed for the most delightful weekend of scale fun flying ever! Awards for best models, informally judged - but just come along and enjoy. Watch out for more news. Contact: Aeromodeller. Telephone: 0442 66551.

17-18th June
OXFORD MFC F/F RALLY
Venue: Port Meadow, Wolvercote, Oxford. Saturday events at 7pm: Champagne fly-off for A/1 and CDH. Chuck glider comp. Sunday from 10am AI and CDH in 1ve rounds. HLG, five flights, no rounds. Vintage Rubber (up to 34in), three flights, no rounds. Vintage Glider (up to 72in or A/2), three flights, no rounds. 50m towline. Tailless Rubber or Glider (50m towline), three flights, no rounds. Trophies for top junior and rally champion. No bubble machines, Thermistors or Streamer Poles. Contact: Andrew Crisp. Telephone: 0865 53800.

18th June
CHILTERN CUP C/L AEROBATICS EVENT CL
Venue: Slip End recreation ground, near Luton. F2B, Class 2 Aerobatics, Vintage Aerobatics. Contact: Rex London via Glen Alison on 0923 772675.

18th June
F1E TRIALS RESERVE DATE
Venue: Sheffield. Contact: BMFA.

24-25th June
MODEL & CRAFT SHOW 1989
Venue: West of England Exhibition Centre, Shepton Mallet, Somerset (A371 between Castle Cary and Shepton Mallet). Indoor and outdoor traders' exhibition and display, demonstration flying, R/C, C/L, F/F outdoor and indoor, plus model boats, cars, railways, collectables, military modelling, crafts, how-to-do-it, lectures, weekend campsite and disco on Saturday evening. Contact: 1 Dibdin House, Mingard Walk, London N7 7RT. Tel: 01-263-9849.

1-2nd July
NORTHERN MODEL SHOW
Venue: Ripon Racecourse. Aircraft displays of all types including helicopters and seaplanes, yachts, submarines, buggies, model engineering, etc. Traded stands, refreshments, amusements etc. Admission £2.50 adults £1.50 children. Open from 10am - 5pm. Contact: Organisers Office, 75 West End Avenue, Harrogate, N. Yorks. HG2 9BX.

2nd July
WHARFEDALE CLASS A DIESEL COMBAT CL
Venue: Ripon Racecourse. Contact: Bob Walker. Telephone: 0423 884505.

2nd July
FOURTH BMFA CENTRALISED (PROVISIONAL) CL
Venue: TBA. F1B, F2C, Open GY, British GY, F2D, Handicap Speed. Contact: BMFA.

1-2nd July
RAFMAA/BMFA F/F MEETING
Venue: RAF Barkston Heath
Saturday: (a) F1A/B/C in rounds, concluded on Sunday.
(b) Champagne flyoff for F1A/B/C.

Sunday: 1/2A, A/1, CDH.
Contact: Flt Lt Julian McCormick. Tel: 0526 42581 x 249.

2nd July
BMFA C/L SCALE EVENT CL
Venue: RAF Abingdon. Contact: Vic Wilson. Tel: 0734 471964.

2nd July
MORLEY INTERNATIONAL F/F DAY FF
Venue: Heath Common, Near Wakefield. Mini-Vintage, Dart Duration for 0.5cc diesels, A/1, CHD, P-30. Contact: Stan Horne. Tel: 0532 610429.

9th July
BMFA SUMMER MINI MEETING FF
Venue: Barkston Heath. A/1, CDH, HLG, 1/2A Power. Experiment Mini Vintage (small cash prizes) not plaques; does not count towards Senior Champs points. Contact: BMFA.

9th July
MORLEY INTERNATIONAL SILENT DAY FF
Venue: Heath Common, Wakefield. Events: P30, Mini Vintage up to Wakefield size, CDH, Dart Power. Contact: Stan Horne. Tel: 0532 610429.

16th July
ROLLS-ROYCE MAC VINTAGE C/L MEETING
Venue: RR Airfield, Hucknall, Notts. Events: Oil Time Stunt, Classic and Open Midge, Vintage A and 8 Team Race. Contact: Terry McDonald. Telephone: 0332 511273.

16th July
ASP GOLDEN ERA DAY RC, CL, FF
Venue: Old Warden Airfield. All the fun of the twenties and thirties! Scale and vintage models all welcome. Lympe Scale 89 competition. Period costume desirable. Do come! Contact: Aeromodeller. Telephone: 0442 66551.

16th July
KNAVESMIRE FREE FLIGHT ANCIENT AND MODERN MINI EVENT FF
Venue: York Racecourse. Contact: John Pool. Tel: 0757 703060.

16th July
BMFA S.E. AREA OPEN FREE FLIGHT EVENT FF
Venue: Ashdown Forest. Contact: Mick Howick. Harriers, Hare Lane, Blindley Heath, Lingfield, Surrey RH7 6JB.

16th July
CARDINGTON INDOOR MEETING FF
Venue: Cardington Airship Shed. All-in index and fun-flying. Contact: Bob Bailey. Tel: 0438 723642.

23rd July
3RD NORTHWEST VINTAGE SWAP-MEET
Venue: Memorial Hall, Chester Road, Northwich, Cheshire. New venue with bar and restaurant. Bring anything to do with model aircraft. £1.00 entry, 10.30 to 4.30. Signposted from M6. Free car park. Contact: David Lloyd-Jones. Tel: 056589 3170.

23rd July
BRUMFLY 89
Venue: RAF North Luffenham. Contact: Stafford Screen. Tel: 0384 396535.

25-30th July
1989 CONTROL LINE EUROCHAMPS CL
Venue: 3 Sisters. Contact: BMFA.

30th July
BMFA CLUB CHAMPS FF
Venue: Driffield, O/G, O/R, O/P for Club Champs. Contact: BMFA.

30th July
OXFORD MFC DREAMING SPIRES GALA FF
Venue: Port Meadow. Silent Vintage, Vintage HLG, Open Tailless (not power), Scale (motors under 1.5cc). Contact: Charlie Newman. Tel: 086 77 3020.

30th July
SHUTTLEWORTH MODEL GROUP OPEN DAY FF, CL
Venue: Old Warden Airfield, Biggleswade, Beds. 9am - 6pm. General model flying of all types. Contact: Mick Staples. Tel: 0223 241978.

5-6th August
WOODVALE INTERNATIONAL RALLY
Venue: RAF Woodvale. International R/C events. Trade stands. Vintage Car Rally. Competition and Camping. Contact: John Armstrong. Tel: 051 5266857.

6th August
CARDINGTON INDOOR MEETING FF
Venue: Cardington Airship Shed. All-in Index and fun-flying. Contact: Bob Bailey. Tel: 0438 723642.

19-20th August
ASP VINTAGE WEEKEND RC, CL, FF
Venue: Old Warden Airfield. The annual pilgrimage. Two days packed vintage fun. Informal awards, ASP and SAM 35 competitions. More news to come. Don't miss it! Contact: Aeromodeller. Telephone: 0442 66551.

19-20 August
PLUMPTON MODEL SHOW
Venue: Plumpton Racecourse. 10am - 6pm both days. Everything from Chuck Gliders to jet R/C models. Many more attractions including full-size Cric-Cri demonstration. Cars, boats and planes; trade stands, bar and fair ground. Live band of Saturday evening. Return coach trips to Brighton. £20 family ticket (after 6pm, Friday until Monday morning) or £2.50 per day (adults); £1.50 per day for children and senior citizens. Contact: Dave Bishop. Tel: 095 977550.

27-29th August
BMFA RADIO CONTROL, CONTROL LINE AND SCALE NATIONALS
Venue: Barkston Heath. Details to follow. Contact: BMFA.

26-27th August
BMFA INDOOR NATIONALS
Venue: Cardington Airship Shed.
Saturday: (a) E2B for Houlberg Silver Trophy - Best 2 from 6 flights.
(b) Index for Manhattan Cabin, Flyrod (Novice only), HLG, Pennypine, Novice Pennypine, CO, Duration and PND. Best single score from 6 flights.
(c) CO, Duration for Sparklets Trophy. Best 2 from 6.
(d) CO, Duration for Sparklets Longest Flight. Best flight from 6.
(e) Fun flying.
(f) Sweepstake Trophy for Indoor HLG - now an index event for (i) Special rules models, 18in min spar, 22in max spar, 10gm max weight; and (ii) 12in max HLG.
(iii) Open HLG.

Sunday: (a) F1D for Aeromodeller Trophy. Best 2 from 6.
(b) 1990 F1D W/Champs Trials - first three flights; best 3 from nine to count.
(c) Fun flying.
Contact: Bob Bailey. Tel: 0438 723642.

17th September
WALSALL MAC F/F SCALE DAY
Venue: Essington. Contact: Geoff Spencer. Tel: 021 556 3376.

17th September
INDOORS AT CARDINGTON FF
Venue: Cardington Airship Shed. F1D W/Champs Trials - second three flights, best 3 from 9. Fun flying too. Contact: Bob Bailey. Tel: 0438 723642.

17th September
BMFA C/L SCALE WORLD CHAMPS TEAM TRIALS
Venue: RAF Hullavington. Entry fee: £10. Contact: Eric Coates, Arisa, Liberty Road, Newtown, Fareham, Hants.

1st October
EAST COAST MODEL AND LEISURE EXHIBITION
Venue: Richmond Hotel, Richmond Drive, Skegness. All types of modelling on display. Contact: C. Firth, 7 Laythorpe Avenue, Skegness, Lincs.

1st October
THREE KINGS C/L SCALE DAY CL
Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. FAI Scale and Profile classes. Best WWII. Silencers and proof of insurance essential. Contact: Wal Cordwell. Tel: 01-764 1661.

22nd October
MORLEY & DMAC ANNIVERSARY MEETING FF
Venue: Driffield Vintage Power Duration. Vintage Plus 10 Duration for 1950s power models. Other events too. Free entry. Prizes. BMFA members only. Contact: Stan Horne. Tel: 0532 610429.



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W/S 27" £2.25

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We accept
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Write your advert in **BLOCK CAPITALS** indicating the section you wish it to appear in, **INCLUDING YOUR NAME AND ADDRESS** and send it to: **AEROMODELLER, CLASSIFIED ADVERTISEMENT DEPARTMENT, ARGUS HOUSE, BOUNDARY WAY, HEMEL HEMPSTEAD, HP2 7ST. Nick Peters Tel: 0442 66650.**

FOR SALE

THE PEATOL LATHE

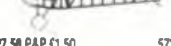


£120 including 3 or 4 inch chuck Milling attachment and other accessories available Centre height 21 1/2" distance between centres 9" Please send S.A.E. for full details

Peatol Machine Tools, A.M. 19 Kington Road, Harborne, Birmingham B17 8PS Price inc VAT

VINTAGE and collectable model engines. Call in to Godalming RC Models, 3, & 3A Bridge Street, Godalming. Shop hours 10.30am - 5.30pm Mon - Sat. The Shop with the stock.

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£27.50 P&P £1.50 57" span 880.25 motors plan only £4.40 1-3 Function R/C or F/F. Pre-cut components detailed plan & instructions

Just for a laugh! **REVOLUTION 35'** dia. 048 Powered F/F Rotary Wing Flying Machine - Pre-Cut components, detailed instructions. **B.E. PARK (MODELS)** 14 Hornsea Road, Percy Main, North Shields, Tyne & Wear. Phone 081-257 0753

SERVICES

COX, E.D. FOX, P.A.W. Quickstart Motors, Spares and Service. John D. Haytree, The Haven, Rixey Park, Chudleigh, Devon. TQ13 0AN. Tel (0626) 852330 Access, Visa.

CLASSIFIED ADVERTISING TERMS & CONDITIONS

Our terms for new advertisers (semi-display and lineage) are strictly pro-forma payments until satisfactory reference can be taken up (excluding recognised advertising agencies).

Cheques and P.O.'s should be crossed and made payable to **ARGUS SPECIALIST PUBLICATIONS** and sent to:

**THE CLASSIFIED DEPT
ARGUS HOUSE, BOUNDARY WAY,
HEMEL HEMPSTEAD HP2 7ST.**

There are no reimbursements for cancellations. Advertisements arriving too late for a particular issue will be inserted in the following issue unless accompanied by instructions to the contrary. It is the responsibility of the advertiser to ensure that the first insertion of every series is published correctly, and corrections must be notified in time for the second insertion, otherwise the publishers will not accept liability or offer any reduction in charges.

All advertising sales are subject to Government Regulations concerning VAT. Advertisers are responsible for complying with the various legal requirements in force eg: The Trade Description Act, Sex Discrimination Act & the Business Advertisements (disclosure) order 1977.

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Kavan, M.F.A., Ripmax, Veron, Zinger, Multiplex, Irvine, Humbrol, Micro-Mold, Kell-Kraft, SOLARFILM, etc.

FUTABA R/C SYSTEMS

W.J. OWENS 41 Main Street, Bray, Co. Wicklow.
Tel: Dublin 863664. Wed. - Closed 1pm

WANTED

WANTED - Ready-built model aircraft, boats, yachts, cars, steam-driven models, also engines, kits, radio control equipment etc. If you are selling up, Tel: Godalming 21425. T/C

MODEL AIRCRAFT Engines? Private collector of British diesels will pay fair market prices if you have any engines (or old books) for sale. Please phone Chris E. Escritt on 0234-712648 (evenings) to discuss.

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Our toys are fractionally bigger than yours. Why not give them a go?

1, 2, 5 and 7 day courses are available all year, from £80 to £350.

Whether you're a total beginner, or have had a go before, our full-time professional instructors can teach you something new. Booker Gliding Club is just 35 minutes from Central London, at

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P.S. Booker is the busiest light aircraft and vintage airfield in Britain.

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Tring Road, Dunstable,
Beds. LU6 2JP. (0582) 663419

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Apply:
Course Secretary (AM) Derby & Lancs.
Gliding Club, 116 Chorley Road,
Sheffield S10 3RL.
Tel: 0742 301831 (7pm - 10pm)

0442 66650 TO ADVERTISE

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Why not build a full size aeroplane? Join the Popular Amateur Aircraft industry with the **Popular Flying Association** and learn how to build your own flying machine. Send 75p for information pack.

POPULAR FLYING ASSOCIATION
Terminal Building, Shoreham Airport,
Shoreham by Sea, Sussex, England.
Tel Shoreham by Sea 61616

AIRBORN Hang-gliding and Paragliding Centre (Pennines). Weekly holiday beginners courses. For brochure telephone 0442 834989 0836 270242

EVENTS

Model & Craft Show '89

Saturday/Sunday, 24/25th June 1989
Royal Bath & West Showground,
Shepton Mallet (on A371 road)

Outdoor and indoor demonstration flying and static displays - Radio Control, Control Line, Free Flight outdoor and indoor, including Scale; PLUS model boats; cars; railways; collectables; military modelling; craft demonstrations; and much more...

Indoor and outdoor traders' exhibition Films, Bar and refreshments. Saturday night disco
Camping from Friday pm to Monday am; adults, £5, accompanied children free
Day entry, adults £3, acc. children free
Contact: 1 Diddin House, Mingard Walk, London N7 7RT tel: 01-263 9849

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FOR THE AUGUST
ISSUE IS 13TH JUNE**

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(TALGARTH)**

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Nuneaton, CU10 8PT. Tel. 0674711 463 (Day)
0674711 254 (Evenings)

PEAK SCHOOL OF HANG GLIDING TRY THE FRIENDLY PROFESSIONALS For further FREE Information

contact:
**PEAK SCHOOL OF
HANG GLIDING**
The Elms, Wotton,
Nr. Ashbourne,
Derbyshire DE6 2AF

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- FAST MAIL ORDER

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MAIL ORDER HOTLINE 06845 80100
Ideal gifts for all ages.

TO ADVERTISE YOUR PRODUCTS IN AEROMODELLER MAGAZINE



**0442
66650**

or write to

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ARGUS HOUSE
BOUNDARY WAY
HEMEL HEMPSTEAD
HP2 7ST**

look!
low prices

THE MODEL SHOP
(Guernsey) 18 Fountain
Street Gurensay, C.I.

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New Zealand orders welcome.
Send 50p P.O. for lists. Duty free-
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TOWLINE GLIDER



£19.95
(Postage & Packing £2.00)

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SCUNTHORPE,
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Step by step building, trimming
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MARKET — FORMULATE YOUR SUMMER
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PETERS ON 0442 66650**



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ARGUS HOUSE, BOUNDARY WAY, HEMEL HEMPSTEAD
HP2 7ST.
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PLEASE DEBIT MY ACCESS/BARCLAYCARD NO

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DATE -



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Name

Address

..... Daytime Tel. No:

Signature Date

☐ FOR SALE ☐ WANTED ☐ GENERAL ☐ CLUBS ☐ BOOKS/PUBLICATIONS ☐ OTHER (Please state) _____[illegible]

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THE COMPREHENSIVE MODEL MAKERS GUIDE

Rates: £11.30 for 12 series
£12.35 for 6 series (exclusive VAT)

Classified Advertising Tel. no. 0442 66650

SUSSEX

BRIGHTON Tel: 0273 26790
MODEL AERODROME
37 WEST STREET, BN1 2RE ★
Open Mon-Fri 9am-5.30pm
Sat 9am-6pm
We Accept Am. Ex., Access, Barclaycard

REPRESENT YOUR COUNTY

E. SUSSEX

CRAWLEY Tel: 0793 540331
MODEL AERODROME ★
36 THE BOULEVARD
W. SUSSEX RH10 1XP
Open Mon - Sat 9.00 - 6.00pm
American Express

SOMERSET

SOMERSET Tel: 0963 50433
SOMERSET MODELS
THE TRIANGLE
CASTLE CARY
SOMERSET
Open Monday - Saturday 9 - 5.30
(Lunch 1 - 2)

SHROPSHIRE

MODEL WORLD Tel: 0691 655560
103, BEATRICE STREET
OSWESTRY ★
SHROPSHIRE SY11 1HL
Open: Mon-Sat 9.30-5.30
Fri 9.30-8pm

WE HAVE RATES TO SUIT ALL ADVERTISERS
0442 66650

TYNE AND WEAR

NEWCASTLE UPON TYNE
Tel: 091 232 2016
THE MODEL SHOP ★
18 BLENHEIM STREET
Mon.-Sat. 9 am-5.30 pm
Open 6 days a week.

YORKSHIRE

LEEDS Tel: (0532) 646117
FLYING MODELS ★
88 CROSSGATES ROAD
CROSSGATES
Mon.-Sat. 6 am-6 pm.
Sun. 8 am-1 pm.

SCOTLAND

GLASGOW Tel: (041 221) 0484
DUNNS MODELS ★
3 WEST NILE STREET
Open: Mon.-Sat. 9.00 am-5.15 pm.

HONG KONG

HONG KONG
RADAR CO. LTD. SHOP No 245 ★
OCEAN GALLERIES, HARBOUR CITY, CANTON ROAD.
TSIMSHATSUI. Tel: 3-680507
Open 10am-6pm Closed Sundays

COPY DEADLINE FOR THE AUGUST ISSUE IS 13TH JUNE

COUNTIES

KENT

MODEL AERODROME
UNIT 223 Tel: 0622 691184
STONEBOROUGH CENTRE ★
MAIDSTONE, KENT
Open Mon - sat 9am - 6pm
American Express Barclaycard Access

DISCUSS YOUR ADVERTISING WITH NICK PETERS ON
0442 66650

BUCKINGHAMSHIRE

AYLESBURY Tel: 0296 83529
MID-BUCKS MODELS ★
34 LOWER FRIARS SQUARE
BUCKS HP20 2TH
Open Mon - Sat 9 - 5.30pm
Thurs 9 - 1.00pm

SWANSCOMBE Tel: 0322 843182
SWANSCOMBE MODELS
2 THE PARADE
Open: Mon, Tues, Fri, Sat 9.30am-6pm
Wed 9.30am-1pm Thurs 9.30am-8pm
Access - Barclaycard

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

CAMBRIDGESHIRE

CAMBRIDGE Tel: (0223) 845477
CAMBRIDGE MODEL CENTRE
40 HIGH STREET
TRUMPINGTON ★
Open: Mon.-Fri. 9.30am-5.30pm
Saturday 9.30am-6.00pm

TELEPHONE
0442 66650

MIDDLESEX

HARROW Tel: 01-863 9788
THE MODEL SHOP
190-194 STATION ROAD
Mon.-Sat. 9.30-6.00
Wednesday 9.30-5.00

WEST MIDLANDS

WOLVERHAMPTON 0902 26709
WOLVERHAMPTON MODELS + HOBBIES
1 MEADOW ST
CHAPEL ASH
Open Mon-Sat 9 - 5.30
Mail Order Welcome

DEVON

PLYMOUTH Tel: (0572) 263133
RUNWAY SOUTHWEST ★
22 FRANKFORT GATE
CITY CENTRE
Mon. - Sat. 9 a.m. - 6 p.m.

ROMNEY MARSH MODELS
KEMSFIELD Tel: 023 373 3662
POUNDHURST ROAD,
RUCKINGE
ASHFORD
Open: Mon - Sat 9 - 5.30pm

SURREY

MODEL AERODROME
UNIT 30 Tel: 0483 578682
THE FRIARY CENTRE ★
GUILDFORD
Open Mon-sat 9am-6pm
American Express Visa Access

LONDON

LONDON Tel: 01-228 6319
E. F. RUSS
BATTERSEA RISE SW11
Open 9 am-6 pm
Early closing Wednesday 1 pm.

EWELL Tel: 01-393-3232
MICK CHARLES MODELS
192-194 KINGSTON ROAD
Mon., Tues., Thurs., Sat., 9.30-5.30
Friday 9.30-7.00
Access Barclaycard Mail Order

ESSEX

HAINAULT Tel: 500 3891
MODELAND
219 NEW NORTHE ROAD,
IG6 3AG
Open Mon, Tues, Wed, Sat, 9-6pm
Thurs - 9-1pm, Fri - 9-7.30pm
24 hour mail order specialists

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

GODALMING Tel: (048 68) 21425
GODALMING RADIO
CONTROL MODELS
3 & 3A BRIDGE STREET
10.30-5.30 Mon-Sat incl. lunchtime
Evenings & Sunday by appointment

BRADFORD Tel: (0274) 726186
MODELDROME
217 MANNINGHAM LANE
BRADFORD, BD8 7HH
Open 9.30am - 5.45pm
Closed all day Wednesday.

CHELMSFORD Tel: (0245) 442164
RADIO ACTIVE (MODELS)
100 MAIN ROAD
BROOMFIELD
Mon, Tue, Wed, Thur, Sat 9-6
Barclaycard & Access

LONDON Tel: 01-205 0817
AEROMODELMART ★
165 CHURCH LANE
LONDON NW9
Open 7 days a week Mon-Thur 9-5
Fri-Sat 9-6 We are now closed on Sundays
Instant Credit - American Express

BRIGHTON Tel: 0273 430751
HARRY BROOKS (3 lines) ★
15 VICTORIA ROAD
PORTSLADE
Monday - Saturday 9am - 6pm

UPMINSTER Tel: (040 22) 50272
RADIO ACTIVE (MODEL & LEISURE CENTRE),
54 ST MARY'S LANE,
UPMINSTER. Open Mon, Tue, Wed,
Thurs, Sat, 9am-6pm
Fri 9am-7pm
ESSEX

TO ADVERTISE RING
0442 66650

MODEL AERODROME LTD
4 SUSANS ROAD Tel: (0323)
EASTBOURNE 644001
E. SUSSEX BN21 3HA
Barclaycard, Amex, Access

ALL SHOPS MARKED WITH AN ASTERIX PROVIDE MAIL ORDER SERVICE

HAMPSHIRE

PORTSMOUTH Tel: 0705 827117/
FRATTON BARGAIN 750774
SHOP
171-173 FRATTON ROAD, FRATTON
Open 9-6pm 6 days a week
Access, Visa, American Express, Diners Card

LONDON

LONDON Tel: 01-703 4562
MODEL AIRCRAFT SUPPLIES LTD ★
207 CAMBERWELL ROAD SE5
Open: Mon.-Sat. 10 am-6 pm.
Fri. 10 am-7.30 pm.
Closed all day Thursday.

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**Improved Quality
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Now Included**

New Packaging



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St Stephens Trading Estate St Stephens Road Canterbury Kent CT27JB Tel: (0227) 450756 Fax: (0227) 450133

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Links to the plans

The issue comes with two free plans (AVIA BH 25J, Pushy Kitten) printed front/back on a pull out banner of four sheets. The banner is not included in this document.

Hut Humper by Chris Soenksen

In HIGH POTENTIAL

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Moskito by Ernst Schoberl

In HIGH POTENTIAL

[Document Page: 15](#)

Puntoacapo by Adolfo Peracchi

In FROM THE HANDLE

[Document Page: 21](#)

Meteor by J. Placek

In FROM THE HANDLE

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Rogallo Oddity CL

In FROM THE HANDLE

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Guppy Egyptian Stunter by Nersess Siragan

In FROM THE HANDLE

[Document Page: 24](#)

Avia BH 25J by Alfery

FF Rubber Peanut Scale Airliner

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Pushy Kitten (Vic Smeed former author) by George Stringwell

George Stringwell's miniature of a Fifties favourite for a KP 01 Electric power unit

[https://outerzone.co.uk/plan_details.asp?ID=9404 ...](https://outerzone.co.uk/plan_details.asp?ID=9404...)

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Comet Phantom Flash stick ROG

In VINTAGE CORNER

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