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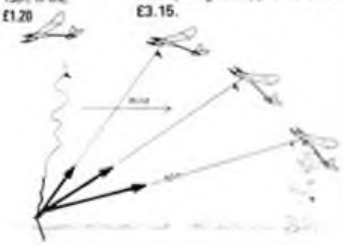

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Aeromodeller

JANUARY 1983

MAP MODEL DIVISION MAGAZINE

Editorial Director TONY DOWDESWELL
EDITOR COLIN RATTRAY
Graphics LORNA CULLEN

Advertisement Director M. GRAY
Managing Director RON MOULTON

Comment

ALTHOUGH the economic news casts its gloom over hobby activities like aeromodelling just as much as any other part of life's pattern, there are indications coming through that aeromodellers' natural innovative powers are, as usual, overcoming the handicaps of recession.

In short, despite cash restrictions, keen enthusiasts are still modelling and that's good news indeed. Aeromodeller Plans Service has experienced an amazing flood of demand during early Autumn '82 which for us at least, is as good an indication as any that our aeromodelling hobby is healthy.

And it's all sides of the flying model aircraft hobby that are 'go' it seems, not just the much commercialised radio control field. Our Plans Service sells just as many Aeromodeller Plans Handbooks as we do R/C Plans Handbooks — again an indication that the non-R/C aeromodelling hobby is actively enjoyed by so many.

We have found that aeromodellers will invariably discover a way to pursue and enjoy their hobby whatever the restrictions, from the strictly financial to the practical difficulty of finding somewhere to fly.

So let's all look forward to a truly enjoyable aeromodelling year for 1983. The patterns of our hobby are changing but we are all aeromodellers, enjoying a great hobby-sport.

So let's get on with it!

Editor.

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On the Cover

'Savoy,' the APS control line stunt model featured in this issue held by the West German designer Claus Maikis. Inset: Ray Monks, member of the British F1C team at the European Free Flight Championships, launches his model which gained fifth place. Full report of the competition in this issue, page 16.

Next Month

Our main feature will be a super scale APS plan for a CO_2 powered Gloster Gladiator designed by Stan Cole, whose models have appeared many times in the pages of Aeromodeller. Another interesting project for scale free flighters will be a full-size plan to build a CO_2 powered ducted fan MiG15. All the latest news to reach the office on the competition scene as well as trade and book reviews. On sale January 21 1983, price 70p.

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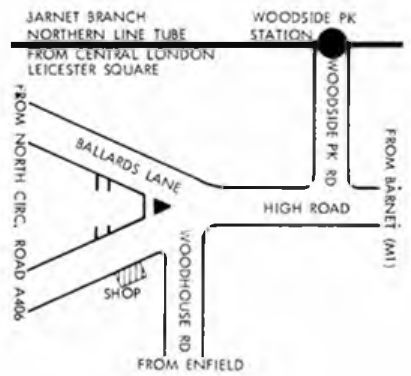

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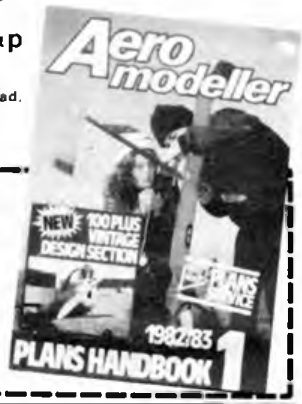

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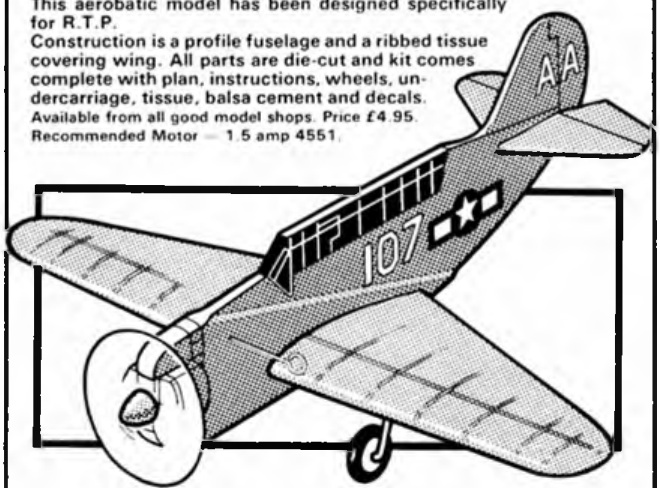

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Hangar Doors

THE SUPERGLOY CHUCKIE CHAMPIONSHIP

DPR Models and Henkel Chemicals, manufacturers of the Supergloy range of products, have combined their forces to organise a National Model Flying Competition for youngsters under 13 years of age. DPR will be holding preliminary competitions throughout the year which will include the British Nationals Free Flight Championships and various Model Makers Festivals. Details of these will appear in Aeromodeller "What's Happening" column.

It is also the intention of DPR Models and Henkel Chemicals Ltd. to assist model shops, schools, clubs and members of the public to run their own Chuckie Competitions. Further details and a poster may be obtained from the organisers on receipt of a large SAE.

Each finalist will receive a Supergloy T-shirt and a complimentary DPR model kit. The outright winner will receive the Supergloy Chuckie Championship Trophy and an electric powered radio controlled model aircraft, second Futaba radio control outfit, third model aeroplane powered with a CO_2 engine.

Rules

1. All competitors to be under 13 years of age at the time of the competition heat.

2. The model should be built from the standard DPR Models 'Chuckie' kit, without any modifications to the construction or alterations from the original shape other than crash damage. It must include doublers, stickers where possible, with no undercamber allowed on wings, etc.

3. All competitors are allowed three flights each. Their best flight time will count as their overall score.

4. The person who achieves the best flight-time will be the winner of that heat. In the event of a tie, a fly-off will be necessary to establish first place.

5. The stopwatch should be started when the model leaves the competitor's hand and stopped when the model either lands or collides with a wall or item of furniture. The clock should not be stopped if the model hits the ceiling unless it becomes attached to a light fitting or similar.

Entry forms are obtainable from DPR Models, Competition Secretary, National Supergloy Chuckie Championship, Unit 9, The Vanguards, Vanguards Way, Shoeburyness, Essex SS3 9QY.

David Shepherd, OBE, internationally renowned wildlife and live steam artist will open the 1983 Model Engineer Exhibition.

52ND MODEL ENGINEER EXHIBITION

The Exhibition opens at the Wembley Conference Centre on January 1, 1983.

The official opening will be made by David Shepherd OBE, the locomotive and wildlife artist. As in previous years there will be a packed programme of films and lectures as well as the many superb bargains that can be purchased from the trade exhibition area. The model entries for this year's show are up in numbers on last year so there should be plenty of interest in all categories of modelling.

A few of the films and lectures of special interest to aeromodellers are listed below, but I should stress this is only a selection from many. If you want a full list of events a Model Engineer Programme will be on sale December 17, Price 60p. This is well worth while having so that you can plan your visit and note trade names and addresses for items you may want to purchase at a later date.

Film and lecture programme

Saturday January 1
17.15-19.00 "Special Effects and Science Fiction Models for films and TV." Lecture by Mat Irvine.

Sunday January 2.
14.00-15.00 "Model Painting by Airbrush." Lecture by Ian Peacock.

Monday January 3
15.15-16.30 "Aero Engines of the First World War." Lecture by Professor Dennis Chaddock.

Tuesday Janury 4
12.00-13.00. "An Introduction to Aeromodelling." Lecture by John Stroud.
15.15-15.45. "Flyaway" and "Wings and Things." Film.
17.15-18.15. "Model Aircraft for Films and TV." Lecture by David Boddington.

Wednesday January 5
18.00-19.00. "Modern Radio Control Techniques." Lecture by Roy Lever.

Thursday January 6
12.00-13.00. "An Introduction to Aeromodelling." Lecture by John Stroud.
18.00-20.00. "Special Effects and Science Fiction Models for Films and TV." Lecture by Mat Irvine.

Friday January 7
15.15-16.15. "Model Aircraft for Films and TV." Lecture by David Boddington.
17.15-19.00. "A History of Indoor Flying Models." Lecture by Reg Parham.

Saturday January 8
16.00-17.00. "Model Painting by Airbrush." Lecture by Ian Peacock.
17.15-19.00. "A History of Indoor Flying Models." Lecture by Reg Parham.
All day. Round the Pole Flying. Bristol and Gloucester ATC. Plus anyone wishing to fly their own model.

Sunday January 9
14.00-15.00. "RTP for ME!" Lecture by Derek Farman.
All day. Round the Pole Flying. Stalham High School. Plus anyone wishing to fly their own model.

SMAE GET A BOUQUET

The Ashton Model Aircraft Club, in recognition of the work done by the SMAE during the past 60 years wishes to mark the Diamond Jubilee by donating £100.00.

The chairman on behalf of the Society has thanked the Ashton MAC for their generosity.

SMAE WINS PLANNING APPEAL FOR CLUB PRIVATE SITE

The Northampton MAC has just regained the use of its private site as a result of a Planning Appeal handled on the club's behalf by the SMAE.

The club is a typical radio-control 'sports flying' group and had been carefully operating within the DOE Noise Code on a private site for a few years.

However a persistent complainer managed to get things stirred up locally to such an extent that the club was forced to apply for planning permission — which was then promptly refused. When the club asked the SMAE for help, the SMAE Flying Site Liaison Officer, Ray Favre, advised that an appeal before an inspector should be sought and that he would be willing to represent the club at the appeal if required.

After several weeks of preparation, work-

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ing closely with a few club members the case was put before the DOE Inspector at a one-day public hearing — with Ray Favre taking club witnesses through their evidence and cross-examining opposition witnesses.

After a nervous six week wait, the inspector's decision was a complete success for the appeal — the DOE Inspector granted planning permission on almost exactly the same terms as the SMAE had proposed.

Ray Favre said, "We are all naturally delighted with the outcome. Although I felt we had a good case, the decision can never be predicted confidently because the actual happenings at the hearing are all important. However familiar we are with the procedure, each hearing is unique and it is always a tough day. For the average modeller, coming to it new for the one and only vitally important time, it can be a nasty shock and I know the Northampton Club witnesses were very pessimistic as a result of their exposure to, for them, bewildering cross examination from the opposition. However our good preparation plus the SMAE's previous experience in these matters pulled things through."

Roy Nudds the SMAE General Secretary also attended the hearing to listen in as it was fairly close to Leicester. Roy said "It was the first opportunity I had had to experience such a hearing and I must say it was an eye-opener. The average model club probably wouldn't stand a chance if they attempted to handle an appeal on their own and the real strength of the SMAE's experience was so evident." He continued, "We now get a steady flow of clubs seeking advice on flying site problems and, fortunately, very few get to the level of an appeal. But the SMAE is there when necessary. Advice on flying site problems is the single most important thing the SMAE does for the 'sports flyer' and we now have a list of over 150 clubs who have benefitted from SMAE help on this front directly. When someone asks what the SMAE does for the non-contest flyer, tell them that! It's surely worth at least associate membership for every club member?"

1983 F/F WORLD CHAMPS

World Championship for free flight '83 are being planned for September 28 to October 4 at Goulburn, New South Wales, Australia. This encouraging news, to be confirmed at the FAI Models Commission meeting in Paris, finally settles the doubts which have troubled Aero Clubs through '82. It gives the MAAC a long-sought opportunity to fulfill the honour of being host to the Wakefield contest — a wish often expressed since those glorious successes of Alan King and Bond Baker back in the 1950s. It also breaks from the European/USA dominance of free flight locations and gives Australia its chance to show an equal capacity for organisation and facilities. TV reports of the Commonwealth Games at Brisbane, and the packed Australian modelling magazines, instil a confidence which promises the opening of a new era in International aeromodelling. Further details in Free Flight Scene in this issue.

AN UNUSUAL CHALLENGE AT STONELEIGH

The Model Craft and Country Show was such a success last May when it was held for the first time at the Royal Showground at Stoneleigh in Warwickshire, that the joint organisers, Model & Allied Publications Ltd. and the Royal Agricultural Society of England, are extending the event to a third day to incorporate the Whitsun Bank Holiday Monday. The actual dates will be May 28-30, 1983.

The organisers are also combining the event with a fund-raising promotion for the Cancer Research Campaign, whose Youth Action are planning a "Get Sponsored to the Great Picnic" event in the Showground during the Model Craft & Country Show.

First held in July 1981 at Windsor Great Park in the presence of Her Majesty The Queen, the first Great Picnic involved young people becoming sponsored to travel by land, water, and permission allowing — air, to the event. So successful was the first "Great Picnic" at Windsor that it is to be repeated at Stoneleigh. Prizes for both groups and individuals will be presented to those who are judged to have come up with the most unusual method of getting sponsored. Those who both as groups and individuals, raise the most amount of money, and those who arrive in the best lifesized model of any mode of transport, will also win prizes.

Picnics will be provided free for the first 1500 sponsorees on each of the three days of the show, who arrive between 12 noon and 3pm and of course entrance to the show is free for those who are sponsored.

MAP and the RASE are providing space in the showground free of charge for this fund-raising activity. In keeping with the general interest in prototype transport, the Cancer Research Campaign will be arranging for the presence at the Model Craft & Country Show of many vintage traction engines, fair organs, girocopters, vintage cars, hot air balloons, and a country and western wagon train. It is hoped that members of the Royal Family will attend on one of the days of the event.

For readers wishing to help a most worthy cause, and help themselves to free entry, and with luck a free picnic at the Model Craft & Country Show, sponsorship forms can be obtained from Michael Heyland, Department AM Cancer Research Campaign, 2 Carlton House Terrace, London SW1Y 5AR. Just send an SAE for a sponsorship form, and further details.

The organisers are planning many developments of the Model Craft & Country Show which will make it even more attractive than the first show, which received universal praise for its family content. Full details of all the different aspects of the show and other modelling and craft events will be published in forthcoming issues.

MORE BALSA

AMERANG Ltd. are pleased to announce that on October 12, 1982 they purchased a controlling interest in Plantation Wood (Lancing) Ltd. It is their intention to expand the production and marketing of Solarbo Balsa Wood and its allied products throughout the World, and also place special emphasis on its position in the United Kingdom.

MODEL CLUB LIVES

In the May 1982 issue of AEROMODELLER, it was stated that the Torbay Model Aero Club was no longer in existence. This is not so. For anyone who lives in the area there are meetings held each month on the first Wednesday of each month at Buckfastleigh Town Hall at 7.30 p.m. The club has several good flying sites and are involved in all areas of aeromodelling.

If anyone is interested in joining the club or arranging a joint competition, they should contact Mr. J. T. Duffy, at 'Pentagon,' 5 Hoyles Road, Wellington, Somerset TA21 9AH.

January 2
HIGH WYCOMBE MAC C/L STUNT COMPETITION — *OPEN - NOVICE* Venue High Wycombe Clubhouse with bar available on site Contact Terry Bradley High Wycombe 31810

January 8
INDOOR EVENT — *E2B, HLG & SCALE* Venue Colne Valley Leisure Centre, Slaithwaite, Nr. Huddersfield 11am-6pm Contact Dennis Davitt Tel 0532 675433

January 8-9
RTP flying at the Model Engineer Exhibition Venue Wembley Conference

January 16
WHITEFIELD HOUR MARATHON ANY MODEL GOES 52ft 3in lines, no compulsory stops, 2.5cc diesels and over to be silenced. Also HLG Venue Littleton Road Field, Salford Contact M. Daglish Tel 0610766 5313

January 23
SMAE NORTHERN AREA WINTER RALLY *R/C STAND OFF SCALE & THERMAL, F/F O/R P/G, MINI VINTAGE, C/L FAI AND GOODYEAR, V/A AND STUNT* SMAE members only on airfield Venue Church Fenton Contact Tom Chambers, Northern Area Delegate

February 6
CRAWLEY INDOOR MEETING Contact J. A. Dolding, 22 Loxwood Walk, Ifield, Crawley, Sussex RH11 0HY

February 13
INDOOR MEETING *E2B, HLG, KEYHOLE, SCALE* (for Scale Rules see 'Aeromodeller' Feb. '75) Venue Wigan College of Technology, Parson's Walk, Wigan Start 11.00 6.00pm Contact Dave Yates Tel 0942 214725

March 6
INDOOR EVENT — *E2B, HLG & SCALE* — Venue Colne Valley Leisure Centre, Slaithwaite, Nr. Huddersfield 1.00-7.00pm Contact Bernard Hunt Tel 0484 862353

EVENTS

January 1-9
MODEL ENGINEER EXHIBITION Venue Wembley Conference Centre. See full page advertisement in this issue Contact MAP, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts. HP2 4SS.

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Stomping at the Savoy

By Claus Maikis

WE STUNT FLYERS are often accused of being able to talk about dress fashion, colour combination and cockpit detail only. This remark is a slight understatement. Actually the range of discussion themes is much wider, it can even include rational considerations. What a happy situation if you are not forced to chase after the best technology, latest development, newest information, to keep on a par with the competition. If you only start a new construction when you've got the inspiration or the urge to do so. If you stand at your dealer's, holding that gleaming new engine in your hands, turning it over to hear that lovely 'smack' from the exhaust port, and then dreaming of that exciting new ship which can be built around it. After you've built that exciting ship, you easily find a scientific excuse for its technical features. So far, I've built two aeroplanes around my Super Tigre ST60. Here follow the purely rational, scientific reasons for building the SAVOY.

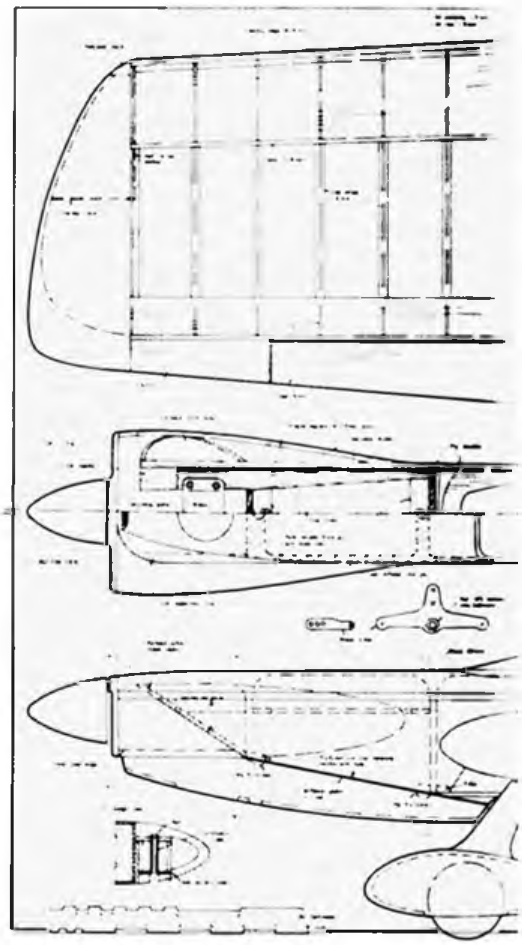
For many years the Americans have stressed the importance of a very powerful engine for precision aerobatic aeroplanes. It seemed that they were ready to make every effort to get the highest performance from their engines. For a long time, I wasn't convinced of this. Now after about 15 years of flying Super Tigre 46 — which I still rate as one of the best stunt engines — I must admit that I've changed my mind. I'm now beginning to challenge my engines a little bit more. I enlarge the venturi diameter to the point where the engine still starts well and draws fuel reliably. The desire for more power comes from several reasons.

Firstly, the world champion uses more power — pardon, that is not a good enough argument. Let's start again.

Firstly, during recent years, lap times of competitive stunt flying have steadily risen, that means; slowed down. For the average pilot, a slow flying aeroplane is easier to control. In order to obtain the slow lap time, you open the needle and set the engine at low rpms. While this works for level flight, you will soon run into trouble in vertical climbs. You have simply set your engine in a lower performance range. In the climb (especially after a hard corner which slows the engine down a little) there isn't sufficient power to overcome gravity which now acts against flight direction. Flying speed will decrease, lines will go slack — you know all that. Now a more powerful engine will overcome these problems. More power doesn't necessarily mean higher revolutions. I think by now it is generally accepted that control line stunt flyers don't need revolutions, but torque. That's why OS40 users set their liners at a lower height; the exhaust timing is reduced, thus allowing the expanding gas to push on the piston for a longer time. This modification increases torque. An easier way of getting more torque is — to choose more volume.

Secondly, after trying a larger number of propellers, I have found (at least on my models) that 'more' prop will help the flying characteristics of the aeroplane. Independent from the brand I have always had better results with a prop of bigger diameter and/or larger blade area. My aeroplanes always fly much smoother. While they lacked some sharpness in the corners, I had a definitely increased line tension. Now I could easily increase sharpness by adding some weight to the tail (smoothness in level flight remained almost the same) but the added 'pull' remained. I'm still experimenting with props, but I feel a prop with big diameter, large blade area, and round tips is a good point to start with. To use that kind of prop

Engine compartment, showing that Claus carved his model on the inside as well as the outside!



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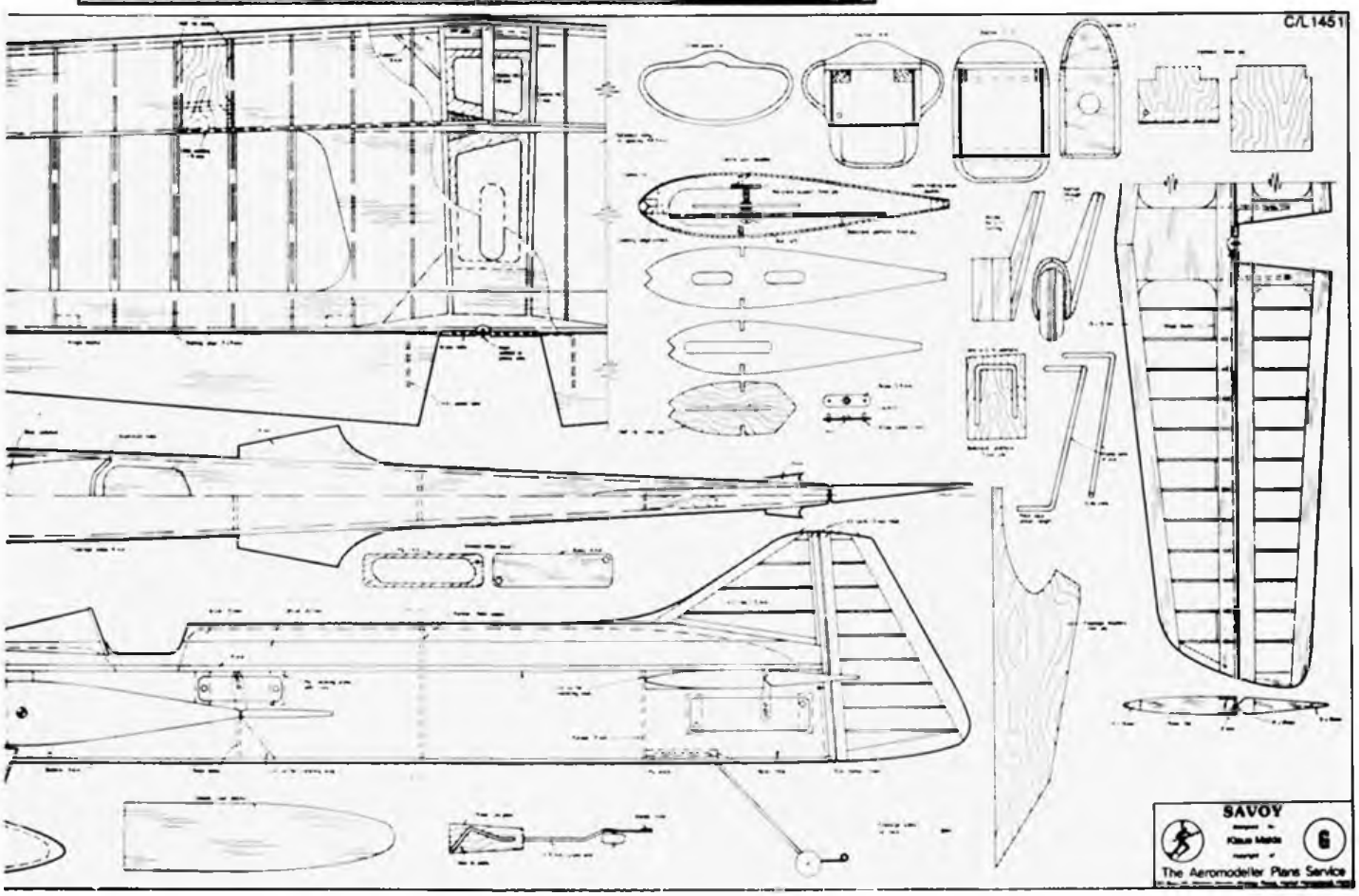
you need lots of torque. This too favours a large volume engine.

Thirdly, a big diameter propeller works more efficiently. The centre of the prop is covered by our usual 2in. dia. spinner, anyway. The blade root hardly produces any thrust, and if it does, there is still a thick fuselage to destroy any clean airflow. The bigger the diameter, the less is the percentage of lost propeller efficiency. This calls for as big a diameter as the engine can handle.

Recently, choice of stunt engines has widened considerably, as you will see at stunt competitions. To me, it is no surprise to see an increased use of big, powerful engines. In England and France, the Merco 49 is popular, 'Atlantic' models are powered by 60 engines, as are some new American aeroplanes. I have recommended the OS45 to some newcomers in Germany. To my surprise, these flyers didn't have any problems with this motor. Right out of the box, without any modifications (after a short running in of course) this engine runs so steadily, reliable and powerful with a nice sound. If I had not already settled on the ST60, I'd like to try the new OS50 which should be an excellent stunt engine. The ST60 is by far the lightest 60 at 350gm (about 12½oz) with stunt carburettor. The engine starts extremely well and finally seems to give us all the power we need.

An airframe that will make good use of all that power cannot be quite so small. There might be some transportation problems with these dimensions, but for a competition flyer this is never an argument. After all, SAVOY is not much bigger than the usual 46 size ship. Actually I would prefer to use the ST60 in a 46 size model, but since I know that I cannot build lightweights, I used basically the same dimensions of an aeroplane built some years ago named 'Crescendo'. Its flight characteristics pleased me very much, but windy weather flying was strenuous and athletic with its heavy weight. After returning to the 46 engines and building several models (which didn't fully satisfy me) it was time for a second try now. In the meantime I had learned a tremendous amount which supposedly could boost the performance of a new design. I will mention some of these features which are used in this design. Alas I cannot guarantee that they will help you too. After all, you might already be where I have finally arrived.

My last aeroplanes had a more or less



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pronounced tendency to be sensitive in level flight, but very sluggish in corners. Not knowing a cure for this paradoxical behaviour, I discussed the problem with Bruno van Hoek. He suggested I should make a larger tailplane. While I didn't feel it was too small (I think I have more area than average) this solution seemed logical. The larger tailplane will add stability in level flight, and it will add manoeuvrability for corners. I also returned to the larger (relative to previous models) stabiliser and smaller elevator layout. The tail moment was increased even more. I had not dared to do this with the 46 size models, but with the heavier 60 engine this was possible. Several flyers had made remarks about my long nose moments, which had also been chosen with a correct CG in mind., With the 60, a short nose was possible too. I didn't change root and tip/chord and airfoil. The span was increased to 156cm (61½in.) which has also increased the aspect ratio slightly. Theoretically a higher aspect ratio should be an advantage since the induced drag is reduced. The swept back wing tips allow me to extend the flaps span for a greater part of the wing but still leaving the wing tips without flaps, which I prefer. I use equal span flaps on an asymmetrical wing (outboard wing is 2cm shorter). On one of my aeroplanes I have found that it threw the outer wing tip 'out' of the manoeuvre after sharp turns (by 'out' I mean away from the centre of manoeuvre). This motion could be cured easily by a reduction of tip weight. Alas this automatically reduces line tension. In order to fly with as much tip weight as possible, I fly now with more flap action (lift) on the outboard wing, thus the equal flap span. The wing centre line is 1in. off the engine centre line, which makes for a very long undercarriage considering the large props I expected to use. One thing I have found to be important is the position of the control horns relative to the push rods. The axis of the flap horn should be vertical to the axis of the pushrod in neutral position. The same applies for the elevator horn, but since angles (rod axis to longitudinal axis of aeroplane) are much smaller here, installation is not so critical. It is difficult to explain that with words but if you make an oversize drawing, you will easily find out that deflections to both sides from neutral are different with the horn just vertical to wing centre line (longitudinal axis). Of course, bellcrank position (height) and horn length have a big influence here. Finally for the shape of this aeroplane there are some strong technical reasons which will certainly impress the aerodynamically minded enthusiast. The look of that open cockpit, the simulated engine cowling and the wheel pants obviously create a nostalgic image, and mix quite well with the otherwise clean, purposely shaped lines, which tend more to a modern aerobatic philosophy. Hopefully, I can please all judges now.

The super paint job which was greatly admired at the 83 British C/L Nationals. Note how the extensive line work gives added interest to the overall appearance

To close with the technical part, I will mention the 7mm inner diameter venturi with a 3.5mm outer diameter spray bar. The engine drinks at least 180cm³ (about 6½oz.) of 5% nitro fuel. The tank is 110mm long, 65mm wide (including wedge of 10mm), 27mm high, and is mounted about 3mm off the engine bearers. There is about 20gm of tip weight, additional to a less hollowed tip block, and 30gm lead in the tail, where I would like to add even more, but overall weight is already too high — as ever! — with one additional clear coat (50gm) because the intended last coat ended up like sandpaper. I will not tell you the weight but I am sure you're able to build this aeroplane much lighter than 1900gm (about 67oz.)! Of course with that weight the model cannot be flown as slowly as I would like to. Apart from this, I was pleasantly surprised by the flight characteristics. The best feature is the clean exit from corners, the model stays steady and straight, without that obstinate 'jump' I had to cover up with other models. On the other hand, the aeroplane seems to be sensitive around the longitudinal axis when flying in gusty wind. Perhaps a result of the increased aspect ratio? The biggest prop used so far is a three blade 12 × 6 made from Top Flite props. I am sure the engine can handle still more, but ground clearance doesn't allow the use of a 13in. prop safely on the rough site I usually have to fly from.

Now let's talk about some more interesting things. How to keep the parts white, how to obtain a high gloss surface, or how to find a name for your aeroplane for instance? Do you like that wonderful French countryside south of the Lake Geneva? Do you spend your vacations in noble three star hotels? Or do you prefer songs of Louis Armstrong?

If you like all this, you also may like 'Stomping at the Savoy'.

Above: this is the sort of detail on a well-finished model that helps to lift it above the norm.

Left: components of the wheel spats and undercarriage streamline fairings.

Right: this front view shows the generous air intake. Note how the engine cylinder just protrudes below the cowling.

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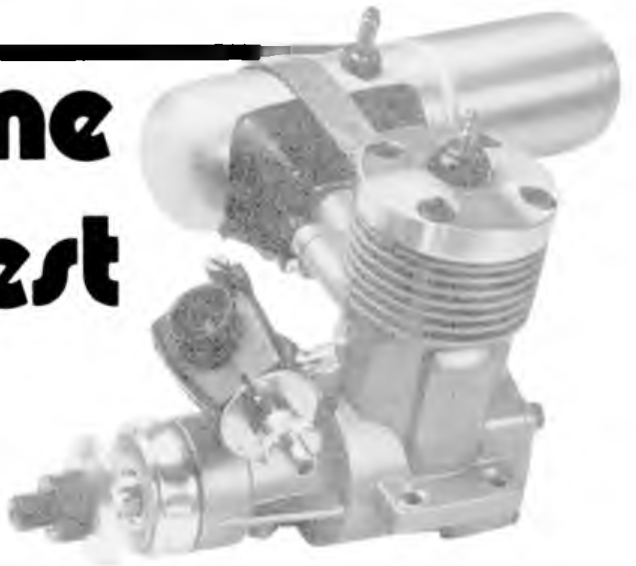
Engine Test

OPS 2.5 SLA



With standard venturi and needle-valve replaced by Perry carburettor, engine becomes 2.5-SLA-RCA model. Engine has non-pipe timing and for general use can be fitted with effective OPS-092 silencer.

by Peter Chinn

Although this is the sixth OPS engine we have tested, it is the first to be featured in the AEROMODELLER Engine Test series. The Italian OPS company is now in its fifteenth year of engine manufacture but, for most of this period, its successes have been mainly with engines applicable to modelling activities outside the general scope of AEROMODELLER; notably in radio controlled pylon racing, in model power-boating and in model racing cars, both radio-controlled and of the tethered variety. Many national and international competition successes have been achieved in these classes with OPS engines ranging from 3.5cc to 10cc capacity and up to 15cc in the case of the marine classes.

Now, however, with its new, smaller, 2.5cc range, the OPS company are bringing their products to the attention of another group of modellers, specifically those interested in control-line combat, free-flight power and small radio-controlled models and in FAI control-line speed.

There are three basic models in the range. All are front rotary-valve motors with (like every OPS to date) an ABC type piston/cylinder construction. The most powerful is the rear-exhaust 2.5-SPA-VAE model which is intended purely for control-line speed use and is timed for operation on a tuned pipe. The other two models have 'non-pipe' port timing. The 2.5-SLA is obtainable either in an R/C aircraft version (2.5-SLA-RCA) or as a standard engine without throttle type carburettor (2.5-SLA-STD). The 'SLA' (for *scarico laterale, anteriore*) indicates that this model has a side exhaust and front intake. The 2.5-SPA-RCA and 2.5-SPA-STD are the rear exhaust *(scarico posteriore)* equivalents of the SLA engines.

The engine submitted for test was a 2.5-SLA and was supplied with both a Perry carburettor and a standard venturi and

SPECIFICATION

Type: Single-cylinder, glowplug ignition, Schnuerle-scavenged two-stroke with shaft rotary-valve and side exhaust. Crankshaft supported in two ball bearings. Throttle type carburettor with automatic mixture control (2.5-SLA-RCA only).
Bore: 15.0mm (0.5906in.)
Stroke: 14.0mm (0.5512in.)
Swept volume: 2.474cc (0.1510cu in.)
Stroke/bore ratio: 0.933:1
Measured compression ratio (full stroke): 9.8:1
Measured compression ratio (exhaust closed): 7.2:1
Measured port timing:

Exhaust period	145°
Transfer period	124°
Third port period	126°
Rotary-valve opens:	35° ABDC
Rotary-valve closes	60° ATDC

Checked weights:
205gm — 7.3oz (STD)
225gm — 7.9oz (RCA)
291gm — 10.3oz (RCA Plus silencer)

GENERAL STRUCTURAL DATA

Main casting: Pressure diecast aluminium alloy, comprising crankcase, front housing and full-length finned cylinder casing with beam mounting lugs and 12mm i.d. intake boss.
Crankcase backplate: Pressure diecast aluminium alloy with O-ring seal, supplemented by paper gasket and secured with four 2.5mm cheese-head screws.
Crankshaft and bearings: One-piece hardened and ground crankshaft with 12mm o.d. main journal, 7mm dia. front journal and 4.5mm dia. crankpin on circular crank-web with unsealed peripheral counterbalancing slots. 7.5mm bore gas passage fed from rectangular 13.4mm long valve port. One 12 × 24mm 10-ball steel-caged ball journal bearing at rear. One 7 × 19mm 8-ball brass-caged ball journal bearing at front. 22.5mm dia. machined aluminium alloy prop driver on aluminium split taper collet. Shaft end threaded ¼-28 UNF.
Piston and connecting-rod assembly: Ringless gravity-cast aluminium alloy piston with flat deflectorless crown, plain skirt and fitted with fully-floating 4mm o.d. hollow gudgeon-pin retained by wire circlips. Machined aluminium alloy connecting-rod, 30mm between centres and bronze bushed at big end.
Cylinder liner: Brass, with hard-chrome plated tapered bore and located in main casting by 22mm dia. flange at top. Single unbridged exhaust port, flanked on each side by transfer port angled away from exhaust and slightly upward. Single steeply-inclined third port diametrically opposite exhaust. Nominal wall thickness 2.0mm. Bore taper approximately 0.05mm.
Cylinder-head: Two component. Machined combustion chamber insert with deep 9.5mm dia. bowl surrounded by 2.7mm wide sloped squishband. Plain, non-finned outer component. Soft aluminium 0.2mm head gasket. Head assembly secured with four 3mm socket-head cap screws.
Carburettor (RCA model only): Perry adjustable automatic mixture control type with moulded plastic body and brass throttle barrel. Choke diameter 6mm. Effective choke area 21sq mm. Carb secured in intake boss by cotter pin and nut.
Venturi/needle-valve assembly (STD model only): Machined aluminium alloy venturi with six peripheral jets fed from tangentially mounted spraybar which also secures venturi in intake boss. Choke diameter 4mm. Effective choke area 12.6sq mm.
Silencer: Not included with engine. OPS-092 silencer — as supplied for OPS 3.5-SLA — used for tests. (Cylindrical expansion chamber type with perforated conical internal diffuser and separate adaptor assembly to exhaust duct consisting of bolt-on diecast aluminium alloy adaptor, silicone-rubber block and two-piece steel strap. Silencer has brass outlet nipple for pressuring fuel tank.)

TEST CONDITIONS

Running time prior to test: 30 minutes approx.
Fuel used: (i) 75 per cent methanol, 25 per cent castor-oil (running-in); (ii) 75 per cent methanol, 20 per cent castor-oil, 5 per cent nitromethane (tests).
Glowplugs used: OPS 1.5 volt long-reach hot type.
Silencer used: OPS-092.
Air temperature: 22°C.
Barometric pressure: 761mm (29.97in.) Hg.
Relative humidity: 71 per cent.

TEST RESULTS (2.5-SLA-RCA):

Power output, gross: 0.57 bhp at 24,000 rpm.
Power output, net (OPS-092 silencer): 0.44 bhp at 20,000 rpm.
Torque, gross: 26oz.in. at 20,000 rpm.
Equivalent b.m.e.p.: 68lb./sq.in.
Torque, net (OPS-092 silencer): 23oz.in. at 17,000 rpm.
Equivalent b.m.e.p.: 60lb./sq.in.
Specific output, gross: 230 bhp/litre.
Specific output, net: 178 bhp/litre.
Power/weight ratio, gross: 1.15 bhp/lb.
Power/weight ratio, net: 0.68 bhp/lb.

MANUFACTURER: OPS Motori, Casella Postale 129, 20052 Monza, Italy.
U.K. Distribution and Service: OPS Distribution Ltd., 512 Berridge Road, West Huyson Green, Nottingham.

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OPS 2.5-SLA in its standard or STD version with 4mm peripheral jet venturi. Note engine's substantial proportions

needle-valve, enabling it to be assembled either as a 2.5-SLA-RCA or 2.5-SLA-STD version.

As will be evident to anyone familiar with the well-established OPS 3.5 engines, the 2.5-SLA is closely based on the 3.5-SLA model. In fact, the engine's body casting is produced from the same dies as that of the 3.5. As a result, the OPS 2.5 is a little larger externally and heavier than some of its 2.5cc rivals. On the other hand, this does mean that there is rather more scope for future development than commonly exists in most 2.5s.

For example, over the past few years, crankshaft main journals have steadily grown larger (e.g. 9mm, 9.5mm, 10mm, 10.5mm in the case of 2.5s) to enable valve ports to be enlarged in accordance with the demand for more performance. Recent moves (e.g. Rossi R.15, as well as OPS 2.5) are towards a 12mm shaft. Actually, this size appears to be slightly ahead of the present state of the art, so far as the rest of 2.5cc contest engine design is concerned, but is likely to become the norm as other design parameters are upgraded.

Another advantage of using the 3.5 body casting is that the cylinder casing, designed to accommodate a 16.6mm bore cylinder liner, has enabled the 2.5 version to use a very much thicker cylinder wall. The case bore is unchanged at 19.0mm, so that the wall thickness for the 2.5's 15.0mm bore liner is increased from 1.2mm to 2.0mm. Theoretically, this should mean more even heat transference, reduced risk of distortion and, perhaps more important, ports whose deeper angled edges provide more positive directional guidance for the gases entering the cylinder. Like all OPS motors, the 2.5-SLA is of the Schnuerle scavenged type and therefore depends on accurate port alignment for efficient scavenging and recharging of the cylinder.

Another result of adopting the basic configuration of the 3.5 is that the connecting-rod, which has the same length, between centres (30mm) as that of the 3.5, is, when applied to the 2.5, very much longer than normal, being equal to 2.14 × stroke, compared with an average, for most engines, of between 1.7 and 1.9 × stroke. Although one school of thought would regard this as being undesirable in view of the fact that it adds to the engine's already large primary compression chamber volume, it does offer some mechanical advantage in reducing rod angularity and piston side thrust and also means that slightly deeper ports can be used for a given port timing.

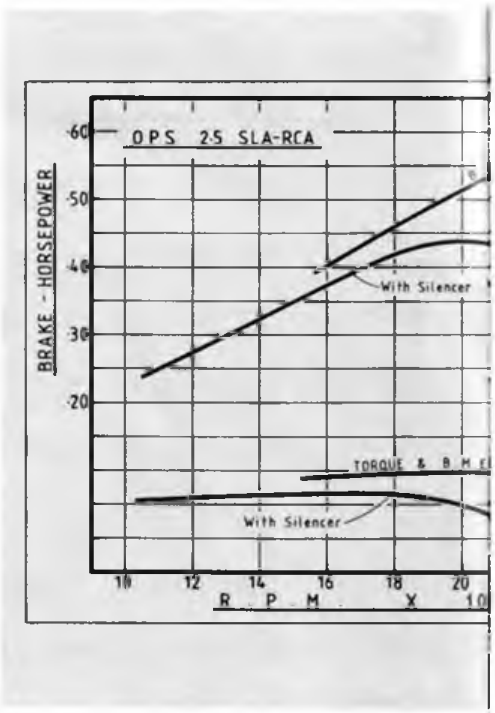
Incidentally, while on the subject of excessive crank chamber volume, it is interesting to note that, in order to reduce this slightly, the peripheral counterbalancing slots in the crankweb were originally covered by a sealing ring but, contrary to theory, the engine was found, in the manufacturer's own words, to 'rev better' without it and it has therefore been omitted from the production model.

PERFORMANCE

Literature supplied with the 2.5-SLA consisted of the manufacturer's standard 4-language (Italian, English, French and German) booklet as issued some time ago for the 3.5, .29, .40, .60 and .65 OPS models, plus a supplementary leaflet covering the 3.5. A 2.5cc rear-exhaust model, inspected after tests were completed, was accompanied by the same written material, which suggests that the manufacturer has not yet issued specific instructions for the new 2.5cc engines. However, it would appear that one can safely assume that the general recommendations for the 3.5 also apply to the 2.5 in regard to fuel, running-in, etc.

OPS motors are normally set up to run on a straight FAI fuel and our initial tests were therefore aimed at determining whether this also applied to the 2.5. The engine was run-in on straight fuel and then checked on 5, 10 and 20 per cent nitro. It was found that 5 per cent gave a small improvement (amounting to 3-4 per cent more bhp than with straight FAI fuel) but that adding more nitro made very little difference. For example, even with 20 per cent nitro, revs on a 7½ × 3¾ prop were raised by only about 200 rpm — equal to an improvement in power of only 3 per cent. For the subsequent performance tests, therefore, our standard 5 per cent test mixture was used.

A series of prop rpm checks was first run off with the engine in its STD version — i.e. with standard 4mm multiple jet venturi. It



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Second left: OPS 2.5-SLA is built around sturdy OPS 3.5-SLA main casting. Backplate has O-ring seal as well as gasket. Left: like all OPS motors, 2.5 features Schnuerle scavenging and ABS piston/liner assembly. Note large diameter crankshaft and two-part cylinder head.

was soon evident that this is an engine that is at its best on the smaller prop sizes. Typical prop rpm included 13,100 on an 8 × 5 Power prop, 15,100 on an 8 × 4 Power prop, 16,400 on a 7 × 4 Zinger, 18,100 on a 7 × 4 Power prop, 18,800 on a 7½ × 3¾ Bartels and 21,000 on a 7 × 3½ Bartels.

As already noted, the choke area of the Perry carburettor fitted to the RCA version is appreciably larger than that of the STD venturi and, despite the better shape of the latter, switching to the Perry carb gave an appreciable boost to performance. It was therefore decided to run the dynamometer tests on the engine in RCA form instead.

The performance curves plotted from the results obtained confirm the OPS's preference for being given its head. Maximum torque was indicated at an unusually high 20,000 rpm and peak power came out at just on 24,000 rpm. So far as prop rpm are concerned, we obtained 13,800 rpm on an 8 × 5 Power prop, 16,000 on an 8 × 4 Power prop, 20,200 on a 7½ × 3¾ Bartels glassfibre-epoxy and 22,400 on a 7 × 3½ Bartels glassfibre-epoxy.

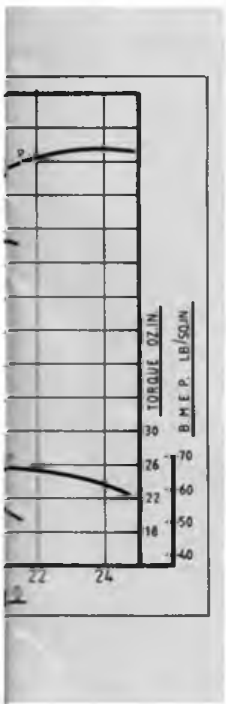
The peak power output, determined from the tests, of 0.57 bhp at 24,000, while not quite reaching the maker's claim of 0.65 bhp, is, nevertheless, very good for a 2.5cc R/C engine running on 5 per cent nitro fuel.

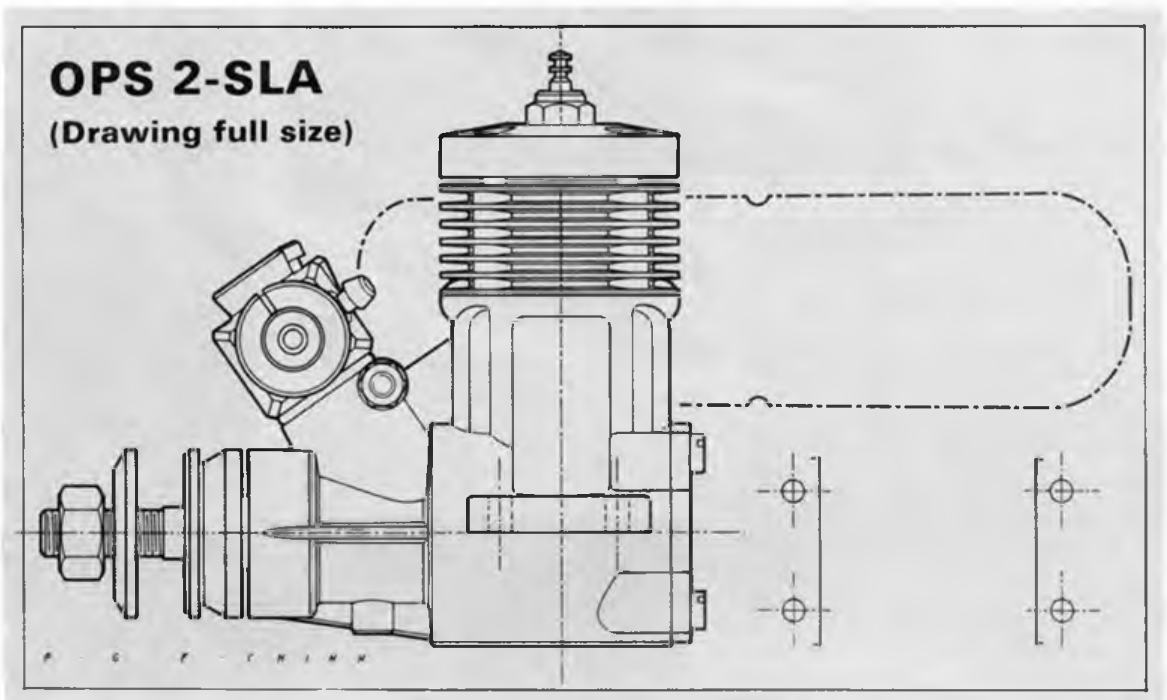
Curiously, adding the OPS-092 silencer caused an appreciably greater top-end power loss with the 2.5-SLA-RCA than it had done with the original 3.5-SLA-RCA model tested nearly five years ago. The loss was modest enough when the engine was loaded down to the lower end of the power curve but built up as load was reduced, so that peak bhp was lowered by nearly 23 per cent. Even so, the engine's peak output is still above average by 2.5cc R/C engine standards.

The OPS's handling qualities were very good. When cold — and especially when the engine was brand-new — the inherent tightness, at the top of the stroke, of a ringless aluminium piston in a chromed brass cylinder liner, made it a bit sticky for hand-starting on a small prop. However, warm restarts were easy enough, even on a 7 × 3½, and response to the electric starter, hot or cold, was always instantaneous. Fuel suction was, as one might expect, somewhat marginal due to the engine's large crankcase volume and (especially in the case of the RCA version) relatively large choke area, and a pressurised fuel system, quite obviously, is desirable.

The throttle worked well. Idling speeds were in the 3,500-4,000 rpm bracket which is not too high when viewed against the engine's naturally high operating speed. Response to needle-valve adjustment was a trifle slow and the needle itself is uncomfortably close to the prop, but the engine is otherwise pleasant enough to handle.

Running qualities were also good. The OPS fired smoothly and maintained steady speeds and modest vibration levels. Stripped and examined at the end of the tests, it was found to be in excellent condition.





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Free Flight Scene

1982 European Free-Flight Championships report by Martin Dilly

It is hard for a team manager to give an extensive report of a European Championships at which he was actually working, so this will inevitably consist of scattered impressions.

The site at Zulpich, West Germany is farmland on a plateau about 50 miles south-west of Cologne, while the organisation operated from the local R/C club's permanent headquarters and mown grass patch — marked, incidentally, on all local maps as the model flying area, just as were other amenities like water sports lakes and football stadiums — most of the contest flying site was rolled stubble, with a little maize and beet. Being on a smallish plateau, there were problems with roll-over turbulence, especially on the first and windiest day, when F1A was flown, several people being fooled into thinking that ridge lift was a thermal. Processing and general organisation was smooth, so much so that the British team, scheduled sixth out of 18 in the processing timetable, was finished half an hour early!

Practice

We had two days of good flying weather to practice in before the contest, and the F1C flyers in particular flew intensively. One of Dick Johnson's processed aircraft was climbing stubbornly flat and, rather than waste time on it he gave it to Ray Monks to trim whose aeroplanes were flying well, and was free to re-trim another one. Dick meanwhile got a fourth model sorted out, which we had re-processed later in place of the original one. Such is the sensitivity of high-performance power models that half a turn of a 10BA tailplane incidence adjusting screw was making a difference, and that is about 5 thou!

Dick was also getting through Rossi's a bit fast; one had a crankpin shear from the crankshaft web and on another the spinner backplate separated from the propeller driver, with which it is integrally machined, presumably as a result of the braking inertias fatiguing the metal.

The Soviet team were trimming near us and had an impressive array of very similar dural-skinned models, all of them 'bunters,' but were having transition problems, even in quite light drift. Launching a model that actually does climb vertically is very hard to do accurately, because of the configuration of the joints of the human arm; a lean backwards from the waist is helpful, but hard to judge. It was observed that Mozerskij's model left his hand slightly backwards, past the vertical. Their bunt trigger arms were enclosed in neat transparent hemispherical covers on the extreme rear of the fuselage. They also had a sample of a new F1C 2.5cc engine, with a very neat 'production appearance' pressure die-cast crankcase, which included an integral housing for the propeller brake; called the OMNS, from the designers' initials, both top team race men Onufrienko and F1C team member Nakonetschni were among the four-man team involved in this new motor's production in Kiev.

Tom Køster, the sole Danish F1C flyer at Zulpich, also attracted a lot of interest during practice, with a new model using an all-moving fin, symmetrical tailplane and a very thick Eppler airfoil for the wing, which also featured narrow-chord flaps, held to a reflexed position during the climb and lowered to the original laminar flow section for the glide. Both the wing and the tailplane were skinned with dural foil but the wing structure was unusual, female moulds were used to form the glass-cloth/balsa/dural upper and lower skins, those for the polyhedralled tips being assembled with no internal structure at all. The timer, of course, was a programmable on-board micro-computer, but even with absolute repeatability like this, one is still left with the engine run timing problems caused when another engine is running simultaneously, masking the sound of the actual cut.

Above left: Wakefield winner at the 1982 European Championships was Alexander Andrjukov of the USSR. Note the launch angle which matched the initial climb. Above right: victorious Soviet Wakefield team Zulpich. Winner Alexander Andrjukov with model, Jevgenij Gorbanj (centre), team manager with walkie-talkie, and Stepan Stefantschuk.

On the evening before the Championships began, there was an impressive opening ceremony in the Zulpich sports arena; two uniformed brass bands played as the teams marched past, there was folk dancing, balloon releases, aerobatics and parachuting displays, C/L and R/C flying demonstrations and speeches by numerous civic dignitaries, all watched by local spectators who paid about 50p each to do so. It was obvious from the array of politicians, mayors and community leaders that in West Germany a European model flying championship is, properly, seen as an important event for a district to 'catch'; it received extensive press coverage — about half a page a day for four days in two daily papers — and the fourteenth century town gate towers even had banners across them announcing the Championships.

1st Comp day

The glider day dawned dullish, with about 10-12 knots of wind coming up from the third round. Only ten of the 52 flyers maxed on the first round, none of them British; both Lepp and new Soviet team member Gennadij Orlov dropped on this round. Interestingly only three people maxed on

Above left: electronic timer for gliders produced by Thomas Køster, weighs 17.5 grams, rechargeable batteries weigh 17 grams. Start switch at bottom of picture can be installed in front of swinging-type towhook, timer can be set in six second steps, up to a nine minute 54 second maximum. A single charge is sufficient for about 400 timer runs. Above right: new Soviet F1C engine features integral brake and flood-off nipple. Built in Kiev, both Nakenoechni and Onufrienko were involved in the design. Right: bunt mechanism of Soviet F1C model is enclosed in transparent dust cover. Below: new F1C model by Tom Køster of Denmark used a laminar flow Eppler airfoil and flaps which moved up for climb, reverting to this profile for glide. Dural foil covered wing is built in female upper and lower surface moulds, the tips consisting only of shells, with no internal structure.

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The winning British F1C team at the European F/F Championships were (left to right) Ray Monks and Stafford Screen of Birmingham and Dick Johnson of Freebirds, seen here with trophies. They were the only team to max out at Zulpich.

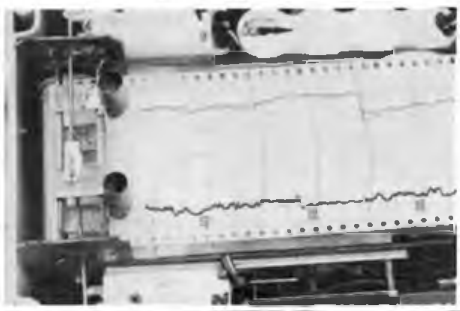
both the first two rounds — Borell of Sweden, Crha of Czechoslovakia and Breeman of the Netherlands, who had usually been well up in the results of the 1982 European Open Internationals.

Chris Edge of Welland Valley, flying for Britain for the first time, had a line tangle in round two, which was unravelled from his ankles by Phil Ball, acting as his runner and lift spotter; Chris then launched very hard under Lepp's glider, producing some spectacular wing flutter, and both maxed. The next round he towed in and damaged a wing; Mike Warren also towed in, but without damage, re-launched after deciding against what looked like a good patch of air, full of circling swallows, and found even stronger lift on his own, which the birds then flew over to share.

While Chris Edge had processed three models best suited to light windspeeds, only to have quite rough air to fly in for most of the day. Andy Crisp's lowish aspect ratio Flashback (MAP plan number G1331) seemed well-suited to these conditions and scored straight maxes for the final five rounds. It was perhaps fortunate that he broke the wing on a model possibly designed for stiller air.

Meanwhile, the downwind recovery team was working hard; we were lucky to have available each day at least one man who also competes in another sport, and was thus at a high level of fitness; Stafford Screen is a weekend footballer, Phil Ball plays squash and runs, and Andy Crisp runs and rows. Without their cross-country stamina the team results might have been very different. The British supporters, too, played a vital role downwind; all had come to Zulpich at their own expense, basically to watch Europe's top model flyers in action, yet they spent a lot of their time out in the fields, locating and recovering the team's models and keeping high Britain's prestige in the SMAE's Diamond Jubilee Year.

Among the incidents during the glider day, West Germany's Hermann Motsch, was hit during a vigorous zoom launch by Lepp's model, the impact shearing right through the Soviet model's wing. Several times people were misled by soaring buzzards, but when a model was launched in the vicinity it usually became clear that the birds were ridge soaring rather than thermalling. By the end of round six only Cenny Breeman and Ivan Crha had full houses, with past World Champion Viktor Tchop ten seconds behind. The seventh round resolved the contest, when Crha was down at 2 40 and Tchop at 2 03, leaving Breeman with a perfect score as the individual winner. In the team event the British managed to beat the USSR by a scant four seconds, after Orlov scored a zero on one flight and two more around the minute mark. The Czechs, as team winners, had a strong trio of flyers — all of them holders of the Master of Sport title; Ivan Hořejší yet again placed in the top ten, which he has done in five of the seven World Championships he has flown in; Pavel Dvořak, the 1971 World Champion, was using an updated Mark 44 version of his Saper with long tapered tips, but now with a fully-sheeted, carbon-reinforced wing; Ivan Crha, who has been flying gliders with rather thick Wortmann airfoils, reverted to a more orthodox wing for the conditions at Zulpich.



Above left: concealed timer on Lepp's A/2 uses a spiral labyrinth disc since timer rotates several times in three minutes. Notches in periphery release rudder hold arm (lower right), while D/T hold-down line is wound onto the spool at top right, locked by wire arm that moves radially across disc till released. Note audio buzzer to right of timer. Above right: Phil Ball used this Snoopy timer to operate VIT on his Wakefield, placing fourteenth. Left: Germany's Karl-Heinz Sauer used this neat chart recorder showing thermistor and anemometer traces for thermal detection. Two R/C servos drive the pens, and the electric paper drive is geared down via a Seelig timer gear train. Below: Giora Herzberg of Israel used a propeller start trigger to utilise all the first power burst. Dural arm at left holds stationary till model leaves the hand.

Wakefield day

Light drizzle at the start of the Wakefield day stopped before flying began, about 15 minutes late; this was to the British team's advantage, as we were still rigging winding stooges and windbreaks and loading motor cartridges when the starting rocket was fired. Next time perhaps electric cattle prods will be among the team manager's kit . . . Phil Ball was away first, launching with World Champ Lothar Döring on the adjacent position, but relying on his own thermistor readings. Both maxed. Reading the thermistor was made simpler when we realised that it was sensitive to nearby walkie-talkie transmissions! Döring was having D/T problems, his tailplane popping up just after launch on a couple of flights, both landing at under 20 seconds, chased by frantic Germans trying to catch the gyrating aircraft while it was still only an attempt.

Bob Wells was flying an old reliable model without auto-rudder or v.i.t., but had problems with it on a practice day; it seemed very sensitive to launch direction, although the glide was ideal for the gentle lift at Zulpich. After three maxes the problem returned, as the wind swung slightly after the fill as the thermal passed; the resulting very tight turn under the initial burst of high torque put the model in for a heartbreaking 20 seconds.

Ball had some luck on an early round when his fuse D/T popped at 2 55, but at enough height to do 3 15 to the ground. Phil used a high aspect ratio solid balsa winged model with Snoopy timer tripping the auto-rudder. Newham Beaumont used one of his distinctive models with an underfin, tapered, slightly sweptback wing with elliptical dihedral, and a tailplane with curved sweepback and, again, elliptical dihedral — rather a George Perryman appearance, in fact. His winding style was also unusual; near the end of a wind he slowed right down to a winding rate of about one handle turn per five seconds, just the opposite of Doring, who wound at very high speed, taking about half a minute from start to finish.

But it was the Soviet Wakefields that clearly had the edge on the rest of the field; they were launched very hard and vertically, and seemed to keep on climbing that way for a long time. As one of the British spectators remarked, they go up faster than a lot of British ½A power models. The flyers are all young, with the advantage of having flown together as a team extensively before the Championships; at least once during the fly-off's a model with a fully wound but tiring motor was handed to their team manager while a fresh motor was wound, ensuring that there would always be a model ready to launch the instant the

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air turned good. Only when the second model was ready was the first allowed to run down. The wings used a D-box structure, with rib spacing of less than an inch, and tailplanes were covered with aluminised polyester film; this would both reflect heat and thus minimise warping, and also allow moisture to be quickly wiped off to reduce stalling tendencies. Motor tubes were either glass or dural, and the rear booms were built-up, polygonal tissue-covered structures; motor winding was done with propellers attached and a protection disk clipped between prop and motor to prevent damage.

One technique that might help is the start-on-launch propeller lock; not only does this allow the very first few turns at high torque to be used to fly the model, rather than in the hand, but a single-handed launch lets more muscular energy go into the throw itself, and that means more height.

Fly off

This was a five-way one, and only Bulgaria's Sasho Jordanov dropped on the four minute round; although eventual winner Alexander Andrjukov clearly outclimbed the others, 1980 winner Alain Landeau's immaculately-built model was gliding very well with little apparent thermal help.

In F1C the difficulties of actually hearing the engine stop soon gave us problems; on round one Ray Monks had over seven seconds registered by the apologetic German time-keepers, and it was certainly impossible to distinguish one motor from another with several running at once. We had two more over-runs during the day, but luckily for flyers and retrievers the final day was the least breezy, and there were rounds when there was little obvious lift. A wood of poplars about a quarter of a mile downwind gave us a few tricky moments during the contest and on round five Stafford Screen cleared it by only 50 yards, but the maxes steadily built up for us until at the end of round six, Britain was six seconds ahead of the USSR. Monks was away for our nineteenth max, but we then had a long wait for good air for the remaining two; at last about 40 minutes into the 50 minute round, one of a group of buzzards ridge soaring a few hundred yards upwind decided to start to circle and slowly drifted towards the launch line. A dozen or so Rossis fired up, the startled bird did a rapid course alteration as the aircraft howled up to his altitude, and about 60 per cent of the entrants were into the fly-off, including the entire British team. Their meticulous checking and double-checking of the weather, the models and the systems had a lot to do with this first team win for Britain since 1965; before anyone flew, another flyer checked the aircraft, with special attention to the timer arms and settings.

With 23 people in the fly-off and only 15 launch points and sets of timekeepers, there arose an organisational problem; the drift was still towards the wood, and, sure enough, it claimed Dick Johnson's model when set for a certain four minutes on the first fly-off round. This led several team managers to ask for the line to be shifted and this was done to some extent for the five minute round, which still left 14 flyers in contention for the individual title. By now there was a thin mist forming in the low ground downwind and there was less than an hour to sunset. Ray Monks had put his 'bunter' into the ground under power, and the British became disconsolate until I rapidly reminded them that FAI rules allow attempts during fly-offs; another Monks model was launched and maxed, though World Champion Andras Meczner had now dropped out.

The sensible course now seemed to be to postpone the rest of the fly-off till early the following morning, as provided for in the timetable, and half a dozen team managers discussed this urgently with the contest organisers in German, Russian, Italian, French, Swedish and English; the points on visibility, approaching dark and the wood were made and appeared to be accepted. Then with no warning the contest director looked at his watch and fired the signal pistol for the start of the next fly-off period, right in the middle of the discussion. At times like this a team manager's lot is not a happy one and eight of them scattered back to the flyers ready to pack up for the evening, with the 15 minutes already ticking away.

Ray and Stafford launched within seconds of each other and, as the models glided slowly down in the evening air, the wood rose into the bottom of our binoculars' field of vision; twice Stafford flew behind it and twice emerged again after nine seconds, so the timing continued. Ray flew into the top of a 90ft poplar with the watches showing 5:10. Winner Vaclav Patek of Czechoslovakia used a dural foil covered aircraft with a folding carbon fibre propeller, and was the only one to manage the full seven minutes on the final round.

The following morning saw an epic recovery of the tree-bound Monks model by Biggles member Mick Edwards, who prudently came to Zülpich equipped with tree-climbing irons, and brought the model down without a scratch on either it or him. In the evening the public closing ceremony was delayed due to the absence of the Soviet and Bulgarian teams for reasons which seemed unclear, and the podium-mounting in F1B and F1C looked a little bare as a result; the defectors turned up at the rather frugal 'banquet' at which we were all subjected to a 24 piece brass band and troupe of local girls going through a somewhat Teutonic mock Carmen Miranda routine, after which the 120 or so dBs of noise faded away to allow the normal post-Championships talking to get going.

Results

F1A

1.	C. Breeman	Netherlands	1260
2.	I. Crha	Czechoslovakia	1240
3.	H. Motsch	W. Germany	1210
4.	S. Puttner	W. Germany	1207
5.	M. Karanovic	Yugoslavia	1201
=6.	I. Horejsi	Czechoslovakia	1193
=6.	V. Tchop	USSR	1193
8.	P. Buchwald	Denmark	1180
9.	V. Milkoev	Bulgaria	1178
10.	L. Stilligoi	Italy	1170
11.	**A. Crisp**	**Great Britain**	**1159**

28. M. Warren, GB, 992; 39. C. Edge, GB, 901.

F1B

1.	A. Andrjukov	USSR	1260 + 240 + 241
2.	A. Landeau	France	1260 + 240 + 212
3.	P. Ruyter	Netherlands	1260 + 240 + 186
4.	J. Gorbani	USSR	1260 + 240 + 164
5.	S. Jordanov	Bulgaria	1260 + 146
6.	I. Ben Itzhak	Israel	1248
7.	S. Stefantschuk	USSR	1241
8.	E. Balzarini	Italy	1237
9.	B. Soderstom	Sweden	1233
10.	B. Eimar	Sweden	1207
14.	**P. Ball**	**Great Britain**	**1187**
37.	**A. Wells**	**Great Britain**	**1022**
40.	**N. Beaumont**	**Great Britain**	**993**

F1C

1.	V. Patek	Czechoslovakia	1260 + 240 + 300 + 360 + 420
2.	M. Rocca	Italy	1260 + 240 + 300 + 360 + 397
3.	N. Nakonetschni	USSR	1260 + 240 + 300 + 360 + 389
4.	S. Reda	W. Germany	1260 + 240 + 300 + 360 + 381
5.	**R. Monks**	**Great Britain**	**1260 + 240 + 300 + 360 + 310**
6.	G. Venuti	Italy	1260 + 240 + 300 + 360 + 297
7.	L. Braire	France	1260 + 240 + 300 + 360 + 295
8.	H. Lindholm	Sweden	1260 + 240 + 300 + 360 + 241
9.	**S. Screen**	**Great Britain**	**1260 + 240 + 300 + 360 + 240**
10.	T. Køster	Denmark	1260 + 240 + 300 + 360 + 234

21. R. Johnson, GB, 1260 + 222

F1A Team Results

		secs
1.	Czechoslovakia	3550
2.	W. Germany	3373
3.	Netherlands	3341
4.	Denmark	3275
5.	Yugoslavia	3212
6.	Israel	3053
7.	**Great Britain**	**3052**
8.	USSR	3048
9.	Sweden	3035
10.	Bulgaria	2976

F1B Team Results

		secs.
1.	USSR	3761
2.	Sweden	3588
3.	W. Germany	3556
4.	Netherlands	3499
5.	France	3471
6.	Finland	3452
7.	Israel	3449
8.	Italy	3441
9.	Bulgaria	3434
10.	Denmark	3428
11.	Austria	3366
12.	**Great Britain**	**3202**

F1C Team Results

		secs.
1.	**Great Britain**	**3780**
2.	USSR	3774
3.	Yugoslavia	3747
4.	W. Germany	3744
5.	Czechoslovakia	3740
6.	Sweden	3715
7.	Hungary	3703
8.	Bulgaria	3702
9.	Italy	3645
10.	France	3556

Southern Gala ... Odiham ... 3.10.82 ... report by Dave Hipperson

Anyone attending this year's Southern Gala for the first time may have been forgiven for not recognising it as the SMAE's second most important Free Flight event. Indeed at times one wondered whether the organisation themselves were aware of it! The perennial problem of helicopter movements bugs Odiham but perhaps rather more fuss is made about it than absolutely necessary. This year's interruption was short and at the start of the event. However had the organisation invested a little more effort in planning an infallible way of communicating what was expected and a little less energy into excited gestures of anger, mostly at the innocent, when models were inadvertently flown during a helicopter's landing more than half a mile away, then a certain amount of friction might have been avoided. It was a bad example too to see a contest director driving all over the grass of this FOD sensitive site!

By all the laws of nature the entire day should have been a washout but although the days before and after were just that, this particular Sunday cleared of low cloud at the start of the event and amused us with total calm for at least half the day. The breeze eventually picked up from the South West but never exceeded 10mph. Once this happened it was inevitable that retrievers brush shoulders with the Radio section. They seemed to be at great pains to demonstrate their 'skill' but just as enthusiastic to point out how terribly dangerous it all was despite this 'control' they are supposed to have — strange contradiction. The instincts of self preservation amongst retrievers fortunately avoided any confrontations other than verbal.

Attendance was excellent and entries were spread fairly evenly over all the classes but with a definite trend towards the rubber events and away from power. Understandably, with such exceptional conditions, it was to be a test of no mistakes to survive to the flyoffs, HLG being the only exception where Julian Hopper's full score topped the list but was closely chased by at least

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three others with four maxes each. Actually the scores in all events were very high. In Coupe no less than seven people bettered 9.50, in Open Rubber only three people *didn't* achieve a full score and in Open Power only one single sub-max flight was recorded!

The afternoon breeze lessened as the finish time of 5pm approached and the organisation had the unenviable task of moving control to a more strategic corner of the drome, trying to communicate this fact to the contestants and stay on schedule. The flyoffs got underway at 5.30 but not without considerable stress to competitors who were not kept well enough informed of when periods began or ended. Added to this, the notorious Odiham hump looked like playing an important role in the timekeeping until the CD decided to allow timekeepers to walk to the top of it no matter from where their chances were launched. A number were seen not to avail themselves of this facility so one wonders just how many knew of it.

The events were grouped in pairs. Open Glider for the Pilcher Cup and A1 for the Ripmax Trophy were away first. The air did not feel particularly promising as Martin Dilly zoom launched confidently after a short tow upwind of the waiting pack. Most who followed him either collided with each other, tangled lines or simply did not reach his extra altitude. This was apart from Simms who glided off a little lower and held a similar pattern to take second only a few seconds short of Dilly's 4:37. Chris Parry topped A1 during the same period.

Coupe d'Hiver and 1/2A were grouped next. Once again it was impossible to be precise about the periods although the timekeepers seemed to know but would their word have been accepted as final had there been a dispute? Coupe was two way between Hipperson and Kaynes, the former finding a calm, warm patch almost immediately he had wound whereas Kaynes flew later after holding the motor for a few minutes and picked poorer air to record a little under two minutes — more than a minute behind the winner. Trevor Payne repeated his Nats success in 1/2A with a fine pattern and a reasonable dead air time. The drift was dropping noticeably now and second place man Baggott flew only a fraction of a second before the final hooter — the only one your reporter heard incidentally. A clean pattern to high altitude managed to pip Screen who had flown first, into third place.

Thankfully there was a short pause between these and the final pair of flyoffs while Bob Taylor gathered sufficient willing timekeepers. By the start of this Open Power/Rubber combination it was a calming 5mph drift. In Power for the Short Cup Stafford Screen was once again away first and very high on the climb but too early for the best air. Hopper launched some 30 seconds later and made amends for the mistake at the Northern Gala his 40 model climbing to an astonishing height in one perfect spiral and skidding off the top in the textbook approved fashion. By contrast the glide from this huge model seemed almost motionless. This was real Open Power and a complete answer to Screen's earlier flight. The model was in bouyant air and the resulting 8½ minutes was nearly three minutes more than he needed. Baggott also benefitted from this better patch of air but from a lesser climb and was third with a little over five minutes.

Coincident with this, Rubber for the Flight Cup and the largest flyoff of all was underway. The models that got away early with the Hopper power flight seemed to benefit from lift at least on the climb. Both local lads Howick and Lee — the same two that had topped the Gamage results earlier in the season — were high and gliding away. Many that followed were to score between five and seven minutes — these were not to be enough. The mighty Carter monster collapsed in the air as had Ball's tapered model earlier in the day. It was said that both had been weakened by a mid-air collision the two had at an ill-fated one flight dawn shoot-out a week or so earlier.

Carter's model was now reduced to twitching matchwood all over the Odiham runway. Everyone else apart from Derek Wain who had trouble got away but a number were not quite on trim. Hipperson possibly flying the oldest model launched nearly last and in a little over two minutes climbed to a considerable height, then descended very slowly for almost a quarter of an hour against a clear sky to comfortably clear the Odiham village but probably not the wood behind it. The score was a couple of minutes more than Howick's earlier flight.

These flights had left the field somewhat sparse of contestants many of whom were still battling with unco-operative barbed wire in an attempt to get out of the drome and then back in again with their models. Not surprisingly a prize-giving just didn't happen which after all the effort was rather a shame. The deadline for aerodrome clearance had been rumoured to be 6pm so competitors retrieving late were somewhat nervous that they might be either thrown off or locked in. As it turned out there was no trouble but with a little more information from the organisation and more realistic schedules at the end of the day this worry could have been allieviated. With a bit more foresight on timing and equipment and perhaps an official indoor prizegiving so that at least contestants would be able to discover where they placed before they left for home — the Southern Gala could feel like the major event it is supposed to be.

Results

Open Glider (31 flew — 13 flew off) — **Pilcher Cup**

1. M. Dilly	Croydon	9:00 + 4:37
2. W. Simms	Crookham	9:00 + 4:25
3. P. Cameron	Crawley	9:00 + 3:48
4. P. Stewart	Crookham	9:00 + 3:08
5. D. Cox	Crookham	9:00 + 2:52

Open Rubber (22 flew — 12 flew off) — **Flight Cup**

1. D. Hipperson	Grantham	9:00 + 13:12
2. M. Howick	East Grinstead	9:00 + 10:50
3. N. Lee	East Grinstead	9:00 + 10:12
4. M. Pressnell	St. Albans	9:00 + 7:02
5. C. Chapman	B&W	9:00 + 6:29

Open Power (7 flew — 6 flew off) **Short Cup**

1. J. Hopper	Freebird	9:00 + 8:29
2. S. Screen	Birmingham	9:00 + 5:47
3. R. Baggott	Birmingham	9:00 + 5:10

A1 Glider (17 flew — 5 flew off) — **Ripmax Trophy**

1. C. Parry	Biggles	10:00 + 2:22
2. Smith	C/M	10:00 + 1:43
3. K. Taylor	East Grinstead	10:00 + 1:33
4. G. Madelin	Crookham	10:00 + 1:12
= J. Carter	Falcons	10:00 + 1:12

Coupe d'Hiver (17 flew — 2 flew off) — no trophy

1. D. Hipperson	Grantham	10:00 + 2:56
2. I. Kaynes	Croydon	10:00 + 1:47
3. B. Spooner	Croydon	9:56

1/2A Power — (14 flew — 5 flew off) — **Quickstart Trophy**

1. T. Payne	Biggles	10:00 + 3:36
2. P. Harris	Birmingham	10:00 + 3:03
3. S. Screen	Birmingham	10:00 + 2:55

HLG — (9 flew) — no trophy

1. J. Hopper	Freebird	5:00
2. J. Buskell	Crookham	4:58
3. W. Simms	Crookham	4:56

Sixth Area Meeting . . . 26.9.82 . . . report by Dave Hipperson

Has there ever been such a wind? Gales, albeit warm gales, swept the country but the North had the best or rather least of it. A mere stiff breeze in the morning increasing steadily to something around 25mph blessed both Albermarle and Driffield. Elsewhere it was furious all day and at times very wet. As the weather pattern was centred around a low in the Western Channel it was reasonable to expect Beaulieu to have it very rough indeed. They did — reporting 40mph gusts! At Ashdown in the South East where they received similar weather but over a worse site no one flew at all despite East Grinstead's standing in the Plugge results. Leeds, led by top scorer John Godden and flying at Driffield, managed a very creditable total in Team Rubber for the Farrow Shield but were pipped by Anglia flying in similar wind but probably worse turbulence at Watton. Credit goes to everyone who bettered 8½ minutes this day. Barkston had it extremely windy but not excessively turbulent and this enabled Mike Brown of Birmingham to put together a winning total in A2 for the SMAE Cup. This actually comprised one max and a couple of good two minute flights, two of a minute odd and a great deal of determined work. Another winner here Pete Harris took 1/2A with the astonishing total of only three seconds less than a full score. Admittedly he had retrieval help but his flying technique and trim appeared to make a mockery of the wind. Had a sudden wind shift not coincided with his last flight he could quite easily have returned a perfect score!

All the Biggles team were in action at North Luffenham and stayed comfortably ahead in the Plugge to retrieve this club award from Birmingham who fielded no rubber flyers but held onto second place because of a slightly lower than expected performance from Grantham who finished third.

Results

A2 Glider — SMAE Cup (9 flew)

1. M. Brown	Birmingham	10:41
2. C. Parry	Biggles	9:59
3. M. Gilmore	Grantham	5:17

Open Rubber — Individual (25 flew)

1. J. Godden	Leeds	8:46
2. L. Auckland	NYFFG	8:40
3. A. Wells	Anglia	8:38

1/2A Power — no trophy (6 flew)

1. P. Harris	Birmingham	9:57
2. J. Hopper	Freebird	5:20
3. R. Moore	Biggles	4:07

Team Rubber — Farrow Shield

1. Anglia	Wells, Neil, Pavely	24:41
2. Leeds	Godden, Davitt, Davitt,	24:17
3. Falcons	Peers, Carter, Dilks	22:20

Final Plugge List

1. Biggles	1281pts
2. Birmingham	972pts
3. Grantham	945pts
4. East Grinstead	808pts
5. Crookham	715pts

Bill Gieskieng's Folder by Martyn Cowley

Bill Gieskieng is not an ordinary competitor. Every few years he likes to arrive from Milehigh, Denver at an event with models that will blow the opposition to pieces. He is just limbering up for another assault on F1C after developing his series of *Nemises* flappers from the 1970s.

Folding HLG's in the hands of the Stay brothers have recently pushed up the world's single flight score to 98 seconds! Bill too has experimented with HLG's, then catapult gliders, rubber and 1/2A versions, in order to painstakingly discover the peculiar flight geometry of this unique configuration.

The variable geometry produced by having half the wing area with a symmetrical (doubled) aerofoil for the climb, and an enormous span thin cambered section for the glide requires other corrective changes to operate. Simultaneously, Bill uses a parallel motion wing pylon which puts the folded wing forward giving 100 per cent chord CG for the climb, with the pylon swinging backwards and upwards to position the glide CG at 35-40 per cent wing chord. The percentage tail area is effectively twice as large for the folded wing compared to when the wing is 'open' and the same is true of the rudder. Earlier versions used a folding fin to reduce unwanted fin area but now Bill uses tip winglets which help overcome this problem. The rearward effective CG during climb

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Opened out for glide, Gieskieng's model spans 96in. with thin undercambered section. Tubular spars contain sprung lines to activate winglets.

Left: gull wing breaks at dihedral intersection. Elastic band tension over carbon fibre plates opens wing.

Above right: the maestro, Bill Gieskieng, holds his latest F1C folder in power configuration; six panel wing including winglet, folded to give symmetrical section climb mode. Note parallelogram pylon now forward and low behind engine pan giving 100 per cent chord CG for the climb.

Right: pylon swings upwards and backwards into glide mode to give 35-40 per cent chord glide CG. Inverted rib under centre section locates tip panel when folded.

allows a vertical axial roll using rudder instead of wing warps (which are difficult to cope with) and the CG shift for glide naturally gives improved stability.

Constructionally the model seems to have a million man hours of carbon fibre moulding. In mind-boggling Gieskieng tradition, every part is designed from scratch. Each wing rib has carbon caps, top and bottom, assembled in a jig. The section has a double undercamber with 'flamingo' type bulge to accommodate tubular carbon fibre spars — which double as internal guides for wing opening spring mechanism!

Each wing panel has slight curved dihedral, so when folded, the leading and trailing edges are in a sprung condition closing any air gaps. LE and TE are carbon balsa composites and the TE has a Gurney type 90° flap. All the parrallelogram pylon mechanism is moulded from carbon fibre, as are much of the remaining components.

Bill qualified for the 1982 US team finals but did not have his two new folders ready for the event. Unfolded, the wingspans 96in. and should glide like an A/2 competition glider. When he finally gets these models working — it's just a matter of time — there are going to be some pretty shaken F1C flyers.

Tremendous effort Bill, keep up the good work, we await further news with interest.

1983 World Championships

Latest news is that next year's World Championships will be held at Goulburn, about 90 miles south-west of Sydney, Australia from September 28 to October 4 1983. Accommodation will be at a teachers' training college nearby and entry fee for team members and managers will be a very low $50 (US dollars, that is), with supporters paying $300 for the full period. On-the-spot organisation on behalf of the FAI will by by the New South Wales Free Flight Society and the Model Aeronautics Association of Australia. It is planned that there will be Open International Free Flight contests in the same region on the weekends before and after the Championships. These will, of course, be open to any flyers holding a 1983 FAI competition licence; in Britain these can be obtained from the SMAE competition secretary, Kathy Watson, 39 Bowhill Grove, Leicester, LE5 2PD.

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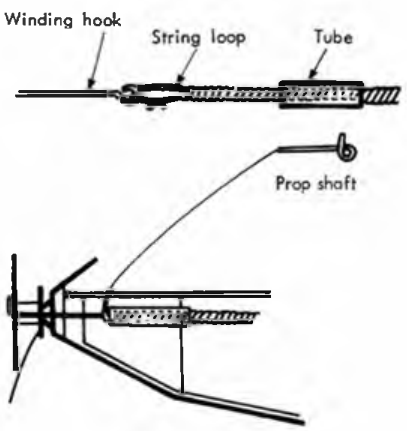
AEROMODELLING TECHNOLOGY

Here are a few modelling tips received from readers. If you have any ideas worth telling others, why not send them in and win a year's free subscription to Aeromodeller?

Prevent rubber motor bunching *by John Bray*

SMALL scale rubber models often have narrow nose apertures which can cause difficulty if the motor bunches around the propeller shaft.

I have overcome this problem by dispensing with the traditional 'S' hook and replacing it with a loop of strong wool or string. The hook on the propeller shaft is made small enough to allow a piece of rubber tube (cycle valve tube etc.) to be slid over it. In use the motor is wound and then hooked onto the propeller shaft via the loop. The rubber tube is then slid over the loop and about ½in. of the motor. This encapsulation keeps the front end of the motor to a small diameter preventing fouling of the fuselage during the power run.



Metalised Mylar/Melinex Covering *by Trevor Faulkner*

This method is advantageous because of its reflective properties, lightweight and weather-proofing. The big disadvantage is that it lends only minimal strength to structures — unlike tissue. So — combine the two.

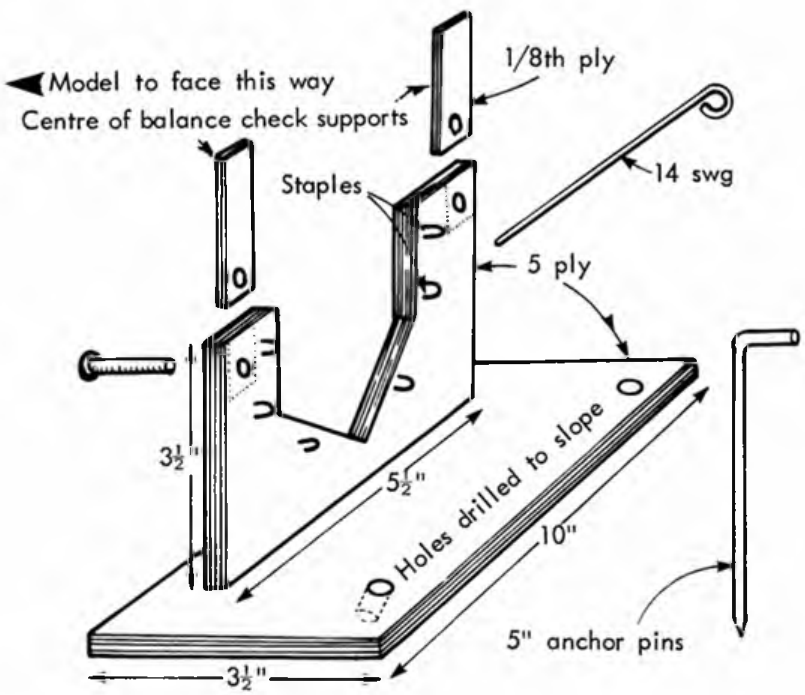
First, cover the compartment with tissue, and dope as normal.

Second, thin Evo-Stik with cellulose thinners (about 50%-50% for a start), then experiment with more thinners/less Evo-Stik using scraps of Mylar and balsa to test). Then brush, a layer of thinned Evo-Stik on all the tissue where it touches the structure and leave to dry. Use a small watercolour brush for this.

Cut out Mylar/Melinex as you would your tissue. Find out which side is metallised by scraping one corner with a razor blade or scalpel. Hold the sheet up to light. If a clear patch has been revealed, that shows the 'metal' side has been scraped. The metal side is placed in contact with the *dry* Evo-Stik. Set a domestic iron on low, ('nylon' or 'rayon'). Gently touch the toe of the iron onto one section of film where it contacts the tissue-covered frame. This reactivates the contact cement and tacks the film in place.

Tension the film to another point, heat and tack. (It is best to work from the centre towards the ends as films don't shrink much). Eventually, run the iron 'toe' along all structural members. Finally, with the heat turned up a little, carefully 'float' the iron about 1/16in. above the plastic to shrink.

This technique saves on doping, as the tissue need not be entirely damp-proofed. The film is supported and its puncture-resistance is improved.



Combined Self-Winder and Bench Support *by Joe Wilde*

Originally this winder and support for checking the centre of balance point was designed to bolt on top of a flight box. However, it was also found to be very satisfactory if pinned to the ground with wire anchor pins. These can be made from heavy gauge wire, such as coat hangers are made from. Obviously the dimensions shown on the drawing only allow for quite a small model. If it is to be used for a large model and the height is greatly increased, it will be necessary to fix a gusset between the vertical support face and the base. It is also a good idea to sand a radius at the top of the centre of balance supports to save accidental puncturing of the wing covering. These supports of course swing down and out of the way when not in use.

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Clamps and Cramps *by John Howard*

Basic idea and type of application

Many modellers will know about the usefulness of the humble wooden spring clip clothespeg for holding parts together whilst the glue sets. However the 'Pinch' is not always strong enough, but this can be readily increased by slipping rubber bands over the jaw end of the peg.

Whilst repairing models I found developments of the peg principle very handy, and now employ them for construction purposes also.

Sketch 1 shows the basic clamp. By prising apart the ends 'A' and 'B,' and inserting for instance, the two halves of a split elevator, perfect alignment and distance between the two halves may be firmly established, whilst the joining dowel or wire is fitted. By prising open say end 'A,' a custom made clothespeg is produced.

Sketch 2 shows how parts to be glued in inaccessible places may be held enabling bridging over existing obstructions to be achieved.

Sketch 3 shows how by using two rubber bands, a 'cramp' can be made for say, pulling together fuselage sides whilst the glue sets.

Versatility

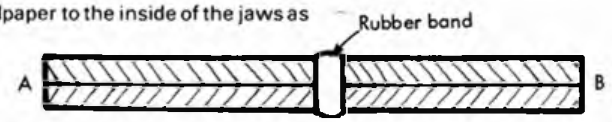
Clamps and cramps of all sizes and power are to hand if you have some bits of wood and some rubber bands, i.e. from clamps utilising say 1/16in. square balsa with shearing elastic for the rubber band, to lumps of 4 × 2 oak utilising strips of lorry wheel inner tube for the rubber band.

The structures do not get weakened by pinholes or dented by rubber bands when it is possible to use these clamps instead.

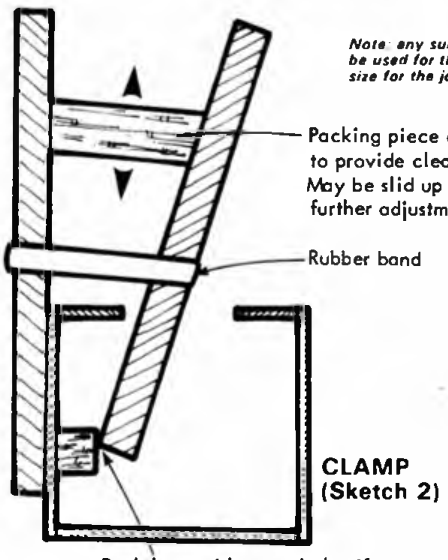
Final comments

A worthwhile refinement is to stick fine grade sandpaper to the inside of the jaws as this eliminates any skidding.

The devices mentioned are only a very few based on the clothespeg principle, and I am sure that as I have found out myself, once tried out, dozens of other variations on the theme will suggest themselves.



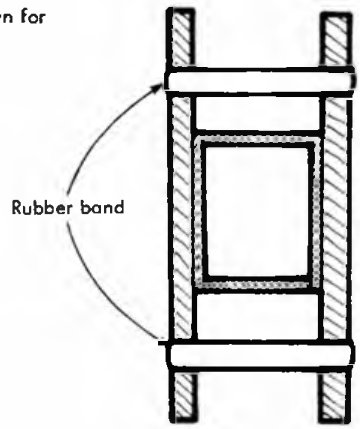
BASIC CLAMP (Sketch 1)

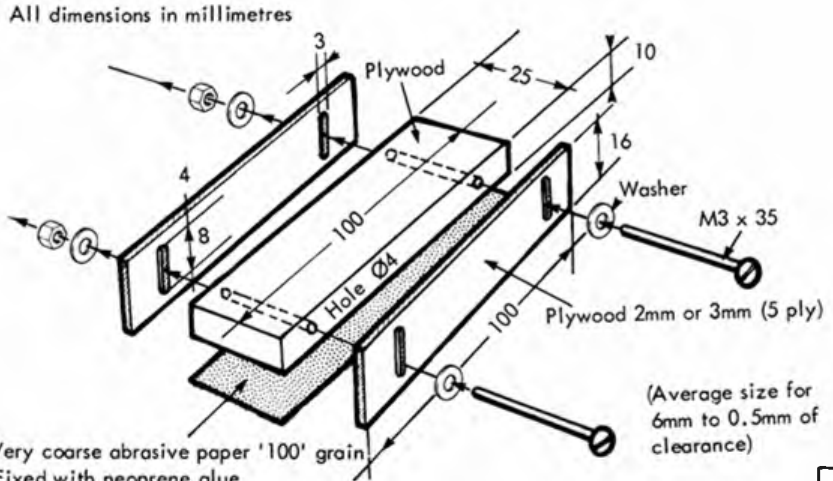


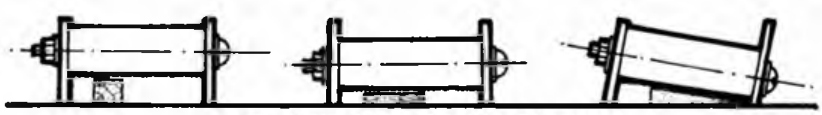
Note: any suitable piece of wood can be used for the clamps and made to a size for the job.

CLAMP (Sketch 2)

CRAMP (Sketch 3)







End views of sanding block in use

Adjustable sanding block *by Gerald Nocque*

It is always nice to receive comments from our overseas readers and this super idea from Gerald Nocque of France is most welcome. The drawings are self explanatory but a few words won't come amiss.

A piece of plate glass would be ideal to use the sander on and also ensure that you have a perfectly flat surface. Remember, that if you sand strips of balsa one side only, they will set into a curve. Therefore it may be a good idea to set the sanding gauge at a rough dimension for one side and than turn the strip over to finish to the final dimension. Setting the height can be done with strips of piano wire in place of the wood or if you are trying to match to existing materials use a strip of that.

This idea could be very useful to the indoor modeller who requires very thin sheets to cut ribs etc.

Lightweight Winding Tubes *by Trevor Faulkner*

Use plastic welding rod containers. These will deform slightly to pass through restricted nose formers, are smooth and strong. Available down to 3/4in. o.d. and often scrapped by specialist welding firms.

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16½in. span rubber powered model with a lively performance by Ray Malmstrom

All you require to start building this most unusual design is one sheet of 0.8mm balsa and half a sheet of 3mm balsa, plus a few odds and ends! Why not make one tonight? The propeller and bearing can be obtained from companies that advertise in these pages.

A MODEL AIRCRAFT that features a different, or unusual lay-out, never fails to attract a lot of attention on the flying field. Unfortunately not all 'out of the ordinary' models live up to their fond owners' hopes when it comes to the crunch of getting up 'into the blue vault of heaven'! However have no fear about VeeBipe — it flies as consistently and well as any of its 'run-of-the-mill' contemporaries of similar size and power. So build one — and enjoy that great feeling of 'standing out from the crowd'.

Construction

VeeBipe is simple to build. The plan gives all the building information necessary, but perhaps a few additional hints may be of help in building the intriguing little flying machine. So here goes!

Cut all parts from *medium* grade balsa. Check the 1/32in. (0.8mm) sheet is flat and free from warps or twists. Cut the basic fuselage (**Fig. 1**) from 1/8in. (3mm) sheet. Form the rear rubber anchorage from 20swg wire. Cement in place, noting cement skin. Bend undercarriage leg from 20swg wire, add small balsa wheel, (retain on axle with tight fitting electrical tubing or blob of cement). Press top of undercarriage leg into fuselage and cement. Cut nose doublers (A) 1/16in. (1.5mm) sheet, and cement either side of nose. Hold with pins until set. Cut a 20swg brass bush to length, with a hacksaw, smear cement on bush, and insert into front hole. Reinforce fuselage with strips of tissue doped on. Here an important point. *Do not* use full strength dope, but a 50/50 approximate mixture of dope and thinners. This applies to all tissue doped on this model. None of the flying surfaces, or fuselage, should be doped at all. Add reinforcing pieces **B, C,** too both sides of fuselage.

Cut two lower wing panels 1/32in. (0.8mm), cement along centre line. Raise both panels on dihedral jigs **X** (**Fig. 2**). Hold with pins until set. Reinforce centre join with two layers of tissue doped on; first top and then bottom. Cement lower wing to lower cut out in fuselage. Jig **Y** will help you get the wing aligned 'correctly' (**Fig. 3**). Hold with pins until lower wing is set. Cut out upper wing from 1/32in. sheet (0.8mm). Reinforce leading and trailing edges with tissue (**Fig. 4**). Cement upper wing to fuselage and both lower wing panels, again reinforcing joins with single layers of tissue, top and bottom. Cut tailplane and fin from 1/32in. sheet (0.8mm), reinforce with tissue strips as shown and cement accurately in place, checking alignment with fuselage and wings. Form the propeller drive shaft hook (from 20swg wire), insert from behind nose doublers, add a small washer and a 6in. dia. light-weight Peck Polymer propeller (available from Modellers' Den or SAMS). Bend over front of shaft so that motor hook is just clear of nose doublers. Check that hook revolves freely. Make up motor from 42in. of 1/8in (3mm) flat rubber into a loop. (Pirelli or FAI rubber is excellent). Smear rubber lubricant on motor, hold loop, so that the join is in the middle. Pass one end behind rear anchorage wire, and loop both ends over front hook. Balance model (this is important) by pushing a pin attached to a length of thread into the balance point (indicated by black arrow on plan). Suspend the model. It must hang level. Add weight to nose or tail if necessary. Our original VeeBipe needed a tiny piece of lead (fixed with EvoStik) under the tailplane (see plan). Put a tiny drop of oil on the propeller shaft.

Flying

Test glide over long grass on a calm day. Launch smoothly into wind from shoulder height. If you have balanced your model correctly it should touch down about 20-25 feet ahead. If the glide path is too steep, slightly bend up the rear edges of the tail-plane. If the glide is too shallow and the model 'stalls', add a little weight to the nose. Too sharp a turn can be corrected by slightly bending up the leading edge of the wing tip on the *inside* of the turn. Breathing on the 1/32in. sheet will achieve this. Incidentally our VeeBipe needed no trim adjustments. When the model is gliding correctly, wind up the motor about 120-130 turns. VeeBipe should make a gentle climbing turn to the left, followed, when the motor has run out, by a nice flat glide. It is important of course, for a really good glide that your model has a free-wheeling propeller. (Peck Polymer props have a free-wheeling cam moulded on). Increase turns by about 30 with each flight, up to about 350 turns. With a well-lubricated and run-in motor, VeeBipe will take about 400 turns. Flight duration is around 45-50 seconds. Best flight to date has been 61 seconds. Good luck — and Happy Landings!

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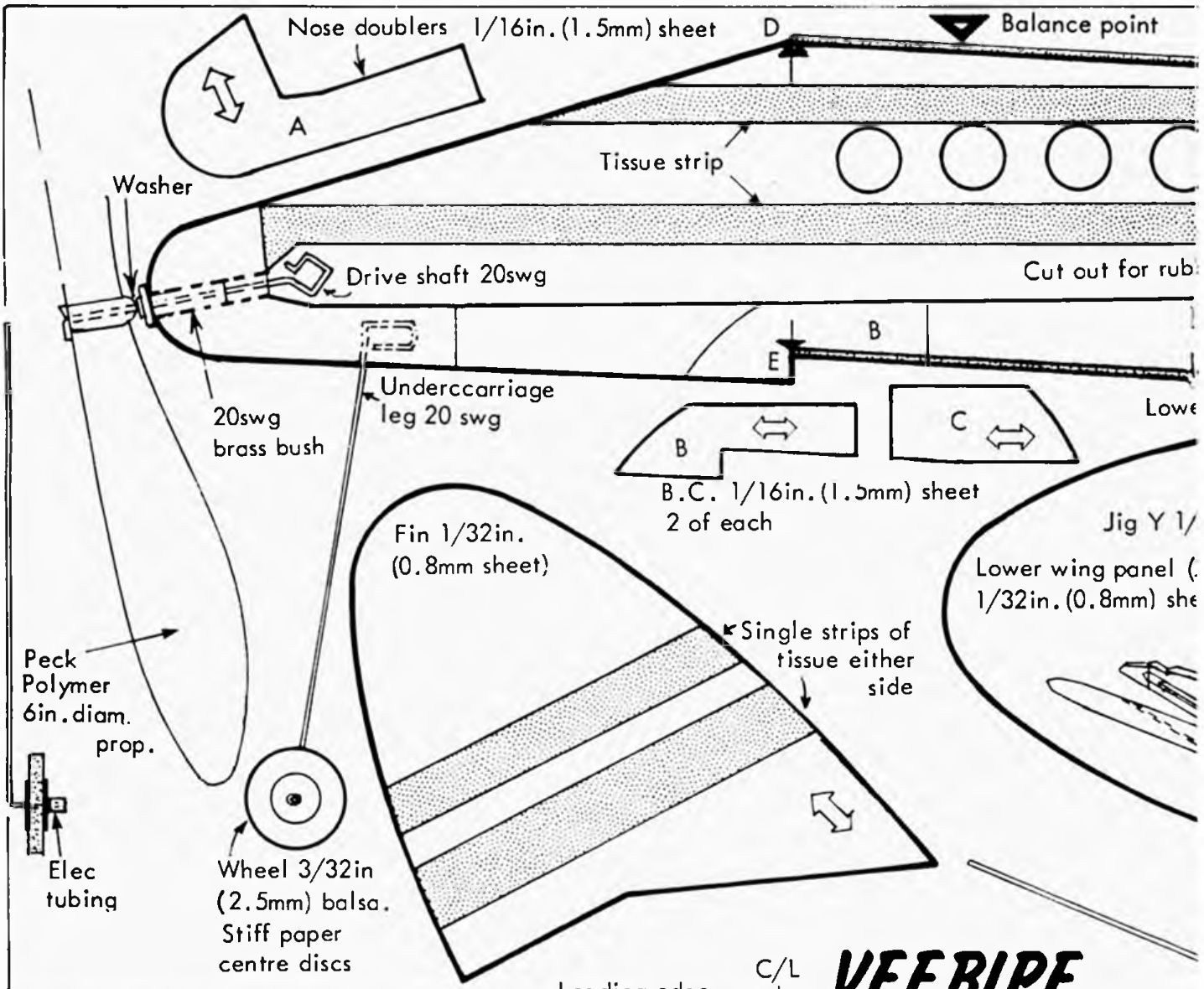


VEEBIPE

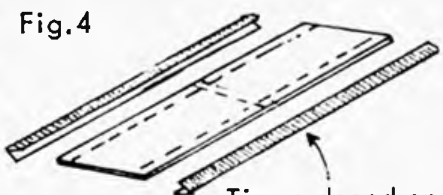
Length: 14½in.
Span: 16½in.
Weight: ½oz.
Power: 1 loop (4 strands) 1/8in (3mm) flat rubber strip

Indicates grain direction

Designe
Ray Mal

Dihedral

Fig.4



Upper wing panel 1/32in. (0.8mm)sheet
Half of panel shown

Tissue doped on leading and trailing edge

Please do not dope fuselage or any of the flying surfaces of this model.

Dope on tissue strips with mixture 50/50 dope and thinners

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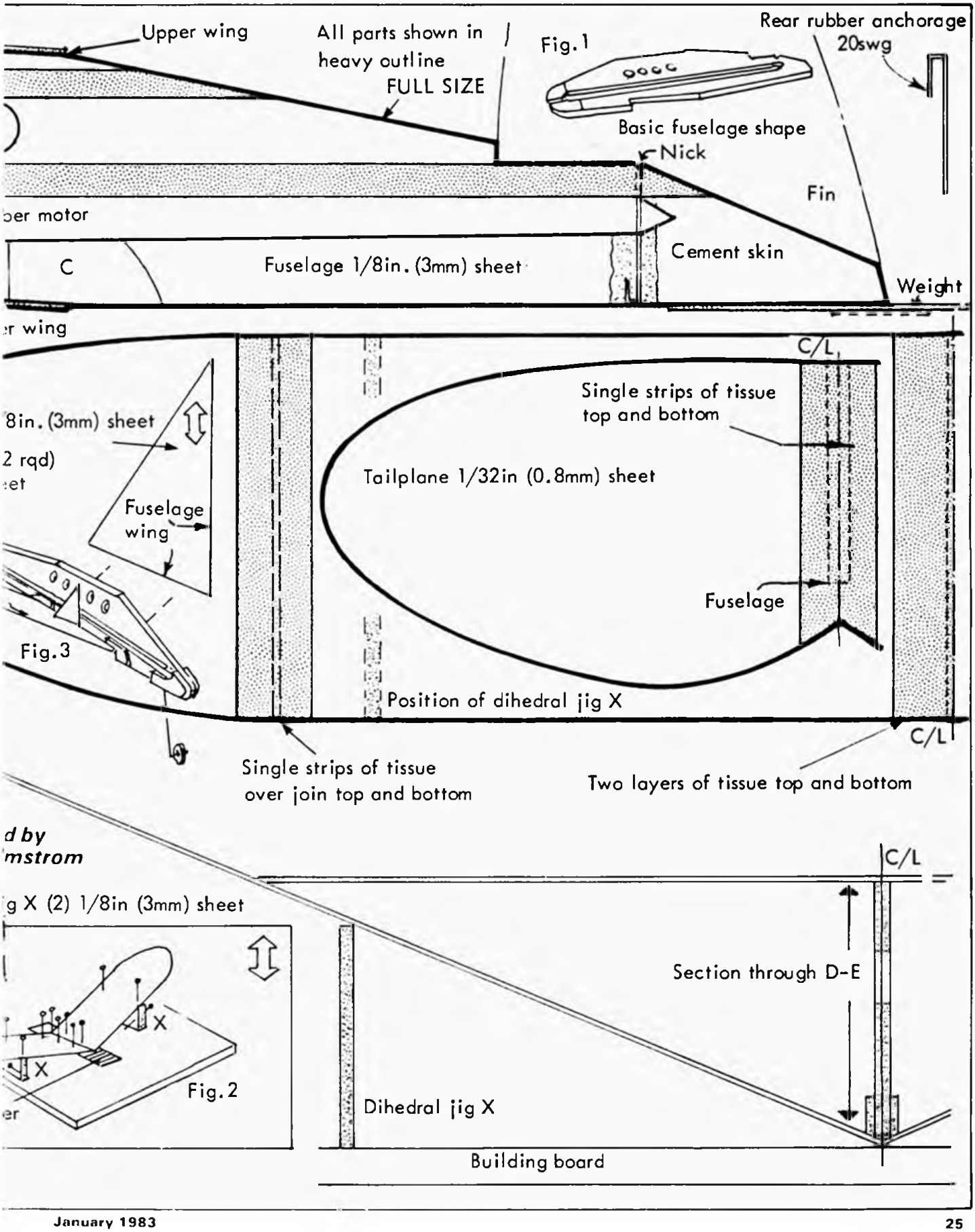

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by
Alex Imrie

SAM 35
First National Exhibition

A general view of the main hall at SAM 35's First National Exhibition at Shefford. Photo by Ron Moulton.

Some 230 models on display at The Samuel Whitbread School at Shefford in Bedfordshire on Sunday 17 October presented a magnificent show. The models were mostly of the vintage type although some non-vintage types were also to be seen. In each category there were three classes: power, rubber and glider and there was also a display only class. In addition to the static display, radio models were flown on the sports field, and indoor models were flown all afternoon in the school gymnasium.

The judges were Howard Boys, Bob Copland and Pete Neate, all dyed-in-the-wool aeromodellers of great experience and I did not envy them their job! In the time available it was only possible to judge the entries on 'overall merit' which was the only way to tackle such a massive undertaking. The main factor that did emerge was that the general standard was extremely high, all models being built and finished in a manner that won the top praises of the judging team. This was all the more remarkable when one remembers that absolutely no sifting was done. Models were entered and displayed 'off the cuff' and it really is a feather in SAM 35's cap that this organisation has so worthily brought out the very best in the members' building abilities.

There is no need for me to comment here on the non-vintage models and scale models, other than to say that they were excellent, but my great personal delight was to note the large number of vintage models that one had seldom before seen 'in the flesh'. It is obvious that many vintage modellers are ferreting out obscure designs and it is the pure variety of these that is the spice of this vintage movement. It is not possible to mention them all but amongst the rubber models I got a real kick out of Big Stuff, The Harding Biplane and the GB-2 Flying Boat. From the power models Megow's Soaring Eagle, The 1935 Dennis Fairlie design, Miss Delaware and the Comet Interceptor were to me, rare birds. Seeing the Sunnanvind amongst the gliders brought quite a lump to my throat, having built one of these fine Swedish sailplanes in 1946. Another aspect of the entries that was pleasing, was the fact that many modellers had entered several models, this I think shows the enthusiasm that powers the vintage scene, modellers had really entered into the spirit of the thing. Pride of place in this respect must go to the Humphreys' family, apart from a number of compressed air engines that Jack had on show, this family had entered no less than fifteen models, seven of them over 7ft. span, their home in Northampton must have been quite empty!

Right: first Scottish Vintage Fly-in. Bill Archer at left with the Copeland Farastar. Just look at that space, not a house or tree in sight! Below: Sid Sutherland leans out the De Long 30 in his Korda Powerhouse before launching at Odiham last year. Below right: Club Duration by Bill Archer from Inverness at the Scottish Meeting. (See text).

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Left: Bruce Duncan of Perthshire, wearing the T-shirt designed for the first Scottish Vintage Fly-in with his Mick Farthing towline glider. Right: Vintage Day Old Warden. Last time Ron Prentice flew this own design was when he won the All-Herts Rally in 1948. This C/L model was described in the Ian Allan publication 'Model Aeronautics.'

The afternoon rushed past, the public jostling for position at the trade stands, and over 400 of them squeezing into the gym to see Alwyn Greenhalgh do his practical demonstrations on the history of aeromodelling. The storm conditions had not halted the radio men, and more than once I saw a dripping Steve Blake return from the sports field to get behind his stall again. If asked, he could have detailed the marked reversed wind gradient that was producing the most unusual turbulence outside that was separating the men from the boys!

In a side room amidst the general hub-bub members of the Model Engine Collector's Association showed, talked, and traded in old and rare engines, and at the SAM desk a brisk sale of plans was taking place, and names and addresses of new members were being jotted down.

All too soon it was all over. Alwyn Greenhalgh announced the award winners, exhibitors checked out their entries, and apart from the good local press coverage and photographs of this very fine exhibition it has passed into history. If ever an event warranted a longer life this was it, and perhaps next time might it not be possible to spread it over two days which would allow the full lecture treatment by Alwyn Greenhalgh, etc., and more fully justify the very fine efforts of the organisational committee?

Thanks are due to many people, but especially to Dave Baker whose brainchild it was, and to the hard working Eastern Region SAM 35 members as well as to the Parents and Staff Association of The Samuel Whitbread School. Finally I would like to thank the SAM 35 members who rose to the occasion and supported the event so nobly. Good on you SAM 35!

Vintage Award Winners

Class A Rubber

1. K. Miller	Copland Wakefield
2. D. Havinden	G B-2
3. L. Hoy	Big Stuff

Class B Power

1. J. Humphreys	Valkyrie
2. N. Barker	Bill White
3. J. Humphreys	Super Buccaneer

Class C Glider

1. J. Marshall	1939 Glider
2. G. Welch	Chief
3. T. Markham	Sunnanvind

Unorthodox

1. J. Wilkins	Manx Monarch
2. J. Humphreys	1930 Joe Ott Compressed Air Model

Left: Dave Deadman lets the Hornet go! The tailskid of Sid Sutherland's Taibi design is already off the ground. Taken at last year's Old Warden Vintage Day. Below left: Jock Wright from Kirkcaldy with his four ED Competition Special powered scale control-line Lancastrian at an earlier Scottish meeting, Stirling Rally August 21 1949. Below: Brian Hewitt at last year's Vintage Day at Old Warden with his Humming Bird powered by an original green head Allbon Dart. Model designed by Colonel Bowden was described in Model Aircraft magazine.

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Left: cover of this eagerly awaited publication depicts the Molecule, a 42 inch span design by Louis Garami that was described in December 1939 Air Trails. Right: Gerry Ketchell's APS Cloudline (plans available from MAP No. D/122X) at last year's Old Warden Vintage Day.

Scots, Wha hae!

Bruce Duncan has submitted this account of the First Scottish Vintage Fly-in that was held at Newbiggin near Edinburgh on 22 August.

"The event was dominated by rubber powered models. Two KK Senators, Club Duration, Parastar, Jackdaw and a 1937 Flying Aces Moth.

Despite the strong wind which persisted most of the day, many enjoyable flights were made. Judging by what people were saying about Sam Wright's Jackdaw, the next fly-in will be dominated by Jackdaws.

Bill Archer, another rubber lover, had many top notch jobs with him but only flew three. The art of cloud scraping was demonstrated by two power models, a Mercury Matador and a Scorpion. On the lighter side, my 'Mick Farthing' and George Blair's 'Lulu' fitted with a clockwork DT, were the only towline gliders, outnumbered by a swarm of chuckers.

At the end of an enjoyable and educational day, Duncan Cameron (owner of a Stentor 6), presented well designed T shirts to those most outstanding in authenticity, consistency, stubbornness and many other academic achievements."

Wanted — flying sites

When restrictions are imposed on the use of aerodromes it is always the aeromodellers who first feel the pinch. Once upon a time the promotion of airmindedness had such a high priority that the aeromodelling movement (one of its best fosterers) was assured of help from all quarters. Nowadays airmindedness seems to be an out of date phrase and finding a suitable place to fly model aeroplanes is a hard uphill battle. Thought could be given to the use of moorland, although the terrain might be rought, portable take-off boards could be used. We would disturb nobody, and remember in such places, there are few trees. Take a look now at the group photo of the First Scottish Vintage Fly-in . . . this might be the way we have to go. We are pleased to report that Aeromodeller Vintage Day will take place as usual at Old Warden on August 15, 1983.

South Midland SMAE Vintage Meeting

Mike Parrott submitted the following report on this meeting which was held at RAF Henlow on Sunday, 3 October under ideal weather conditions.

"Though this was an area meeting for R/C Assist, Free-Flight and Control Line, no C/L flyers turned up and very few radio models were present, as a result it was decided that there should not be any formal competitions.

Amongst the radio models T. Markham's 1935 Dennis Fairlie design flew well once he had sorted his engine out. Brian Downham's scaled up KK Scorpion put up some pretty flights, also two Mills 1.3 powered Bowden Meteorites flew well — both on rudder only as did a Mercury Galahad. Sid Sutherland's Taibi Mercury barked its way across the sky urged along by a Forster 99 petrol engine. Mike Parrott, with a KK Junior 60, and Gerry Johnson, with a Custom Cavalier, made many consistent flights and several other flyers flew these models during the day.

The free flight boys had a ball, the air seemed constantly full of aeroplanes. There were several KK Gipsys, a Korda Wakefield and D. Knight's Jackdaw all going well. A real treat was T. Havinden's GB-2 rubber driven twin flying boat designed by H. S. Sayers — beautifully built and finished in blue and white. Ken Tansley's T9 made many consistent flights, also Ray Alban's Rambler and a trio of Mercury Magnums seemed forever in the air.

One thing that did strike me was the very high standard of finish and workmanship on all the models, also the professional way they were flown. Another thing was the lack of young fliers, most of us being genuine antiques — it would seem that several people who have not been very active for some years are now enjoying flying vintage aeroplanes. Perhaps it is the low key type of flying meeting that is attracting them back to active modelling again.

Awards were made at the end of the day based on general interest, and the fly for fun activity, backed by the informal examination of models that took place during the meeting. Results were:

Rubber

1. K. Fordham	Californian Champ
2. D. Knight	Jackdaw

Free-Flight

1. J. Law	Spearhead
2. R. Alban	Rambler
3. T. Havinden	GB-2

R/C Assist

1. B. Downham	KK Scorpion
2. S. Sutherland	Taibi Hornet
3. T. Markham	1935 Dennis Fairlie"

SAM 35 Yearbook

One of the major decisions taken at SAM 35's Annual General Meeting in Bristol was to approve publication of the Society's first Yearbook that was mentioned in this column in October last.

The price has been fixed at £3 (discount for SAM members) Add 40p for postage and packing and send your order to SAM 35's new Treasurer, Tony Hogan, 7 Crowborough Close, Warlingham, Surrey. Cheques should be made payable to SAM 35.

Old Stager returns

Typical of many elderly modellers being recruited to the ranks of the Vintage movement is Mr. G. E. Stephenson of Newcastle-upon-Tyne who writes:

"I have recently built the Korda Dethermaliser (55in. span), a possible competitor for the Lanzo Stick in Vintage Rubber. I am still trimming but have been delighted with its performance. It had one very tentative flight on Aeromodeller Vintage Day — got away safely after a very poor launch, and landed intact only to be cartwheeled by that awful wind some 40yds. along the ground before I could get to it — wiping off the tail — hence only one flight!

Peter Michel is now building one and it will be interesting to see how it performs in the hands of a real competitor. I have only just come back to free-flight rubber (last rubber model was in 1939) by way of R/C

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Above: Les Hoy's model biplane designed by L. Harding and described in "Models for Flying" by L. H. Sparey and C. A. Rippon. Right: G. E. Stephenson of Newcastle-upon-Tyne with his Korda Dethermaliser which was described in February 1942 Air Trails. (See text).

slope and thermal soaring, but this seems to be happening more and more these days — perhaps it's the relaxed atmosphere which the Vintage movement carries with it. I'm certainly enjoying my aeromodelling more than ever now."

Vintage Wakefield

Derek Ridley has kindly supplied the following report on this event which was held at RAF Odiham on 3 October under perfect conditions in conjunction with the SMAE Southern Area Gala.

"Although the conditions were good the morning was sans thermals. The humid dead air affecting most models. Vic Dubery's 'Judge' Wakefield was no exception, and it demonstrated sink with a capital S, in fact most modellers' flight times were very dependent on long motor runs.

The Rubber controversy continues between FAI and Pirelli. At the last count FAI appears in the lead, with a rather torquey steep power curve, against the shallower Pirelli one. The currently obtainable Pirelli is just on consistent, it seems to 'die' and break too easily, especially in warm conditions. FAI on the other hand is more reliable. Rubber performance is obviously very important in Vintage Wakefield competition. When the standard of models and flying is high, accidents have more impact. A real disaster being Peter Michel's beautiful 'Copland GB-3' with 700 turns on board; a parting soldered prop shaft joint, result: a totally destroyed former and stringer fuselage. Peter's cool comment, 'Well these things happen' most people, myself included, would have wept incessantly!

A total of three flights from all the entries resulted in a popular win for John Meaney flying 'Korda' with 416 secs., second Peter Michel with reserve model; 'Houlberg ISIS', 384 secs., and a good third from keen rubber man, Mike Kemp flying his Swedish 'Blomgren' design with 369 seconds. All received lovely SMAE plaques from Beverley Snook, president of the Royal Aero Club. The most popular design was the KK Gipsy followed by the Korda.

Most model events create pleasant memories and surely seeing Vic Dubery's Red and Yellow 'Judge' Wakefield climbing silently in the sun against a blue sky epitomises them all . . . and must recruit more aeromodellers to the delights of Vintage Wakefields."

Lost!

Dave Deadman has recounted the loss of yet another rare engine and his letter contains some interesting points. The engine was an Oliver Battleaxe fitted to a Junior 60 which was clear doped with blue trim. Fitted with Futaba radio operating rudder only the model was lost on 19 July in the Hartcliff area of Bristol after a fly-away from Whitchurch:

"Cards were placed in local shop windows, the Police were helpful and the local model shop alerted. Radio-West gave us a spot on the air, but so far without any response.

The sad part is, of course, the loss of such a rare engine. I have only ever lost two models and both had engines on loan from good friends who thought it was a shame not to use them.

For authenticity, the Junior 60 had proportional rudder, arranged to look like an escapement — with vertical arm working a wire yoke on the trim-tab size rudder. The small rudder was adequate for most events, but could not cope with the highly turbulent air in a huge thermal. It might not have got away from us had I used a bigger rudder and fitted elevator control as well. In future I shall make authenticity secondary to efficiency."

Needless to say, anyone knowing anything about the whereabouts of this model or engine are kindly asked to pass on the information, in order that Dave can arrange a retrieval.

Below left: twin pusher launched by R. Walden at Old Warden. Model won last year's Danny Sheelds Twin-Pusher Trophy. Right: Ray Alban with his Keil Kraft Gypsy at Old Warden. This model has become one of the most popular Wakefield models seen at recent vintage meetings.

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More about AERODYNAMICS

By Martin Simons

It is fortunate for Aeromodeller to have a writer on the subject of aerodynamics, who is not only an aeromodeller but a professional aerodynamicist. Martin Simons lectures in the subject at the University of Adelaide, South Australia and has published books specifically about the little known subject of model aerodynamics. His last published material in Aeromodeller, was in the June 1981 issue. Here are some further comments by Martin on the subject.

IN **Fig. 1**, a symmetrical wing profile is shown at zero angle of attack in an airflow of steady speed. It will produce no lift. It might be the fin of a model aircraft, or a tailplane carrying no load. The airflow around the profile is shown as a series of smooth flow lines or 'streamlines'.

Consider the two vertical lines marked **A-A** and **B-B**. A little thought shows that exactly as much air has to flow past **B-B** in each time unit, as the amount that came in past **A-A**. If this did not happen, air would pile up somewhere rather like snow piling up when a snow plough pushes its way through. Air is a fluid and does not heap up in such a manner. It accommodates itself as far as it can as smoothly as possible. Between **A-A** and **B-B** there is a steady state and, for the sake of understanding what goes on aerodynamically we may consider this to be a closed system. Nothing changes, no energy other than that contained in the air flow itself, is added or taken away, the flow continues steadily all the time until we decide to change it.

Inspection of the diagram shows that the stream flow lines some distance away from the wing profile, are straight. The air moves from points like **A1** to **B1** by the shortest possible route. In the neighbourhood of the wing, the streamlines are curved. The air divides and flows round the profile. Some of the air actually touches the wing, and tries to stick to it in the same way as treacle sticks to a spoon which is moved through it, though of course air is less sticky, or less viscous, than treacle. This small layer of air nearest to the wing skin is called the boundary layer, and we shall study it later. For the moment however, we shall ignore it and look only at streamlines such as those marked **A2-B2**, **A3-B3**, etc.

The streamline **A2-B2**, because of the presence of the wing, is obviously longer than the straight streamline, **A1-B1**. Yet the first rule still applies, exactly as much air must move along this line in each time unit as moves along the straight lines. The same mass of air passes **B2** in each second, as passes **B1**. Since the air has further to travel, it must speed up between **A2** and **B2**. The same applies to the streamline **A3-B3**. This one passes on the other side of the wing, but it has to follow a curved route and so must speed up exactly like the air going along **A2-B2**. On *both sides* of the symmetrical profile, the flow speeds up in order that it can flow past the **B-B** line in step, so to speak, with the rest of the air in the regions unaffected by the wing.

To make any moving mass accelerate, that is, to make it move even faster, requires a force. In a system like that sketched in **Fig. 1**, with no energy being added or subtracted, the force required to accelerate the flow along the curved streamlines, has to be extracted from the air itself. The air contains energy in two forms. One form is due to its speed of flow. To accelerate the flow, this energy must be increased which means a loss of energy somewhere else in the system. The only other source of energy available is in the form we usually measure as *air pressure*. This is the energy of the innumerable tiny particles or molecules of air which move rapidly to and fro in all directions. The pressure force felt by objects and surfaces exposed to the air is actually the sum total of the many millions of blows struck on the surface by these moving molecules. This is the only available source of of energy for the flow to draw on when it is compelled to accelerate past the wing. Some of the energy that appears as pressure has to be

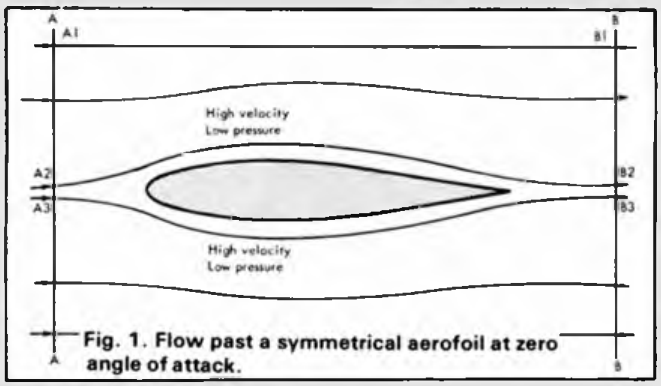

Fig. 1. Flow past a symmetrical aerofoil at zero angle of attack.

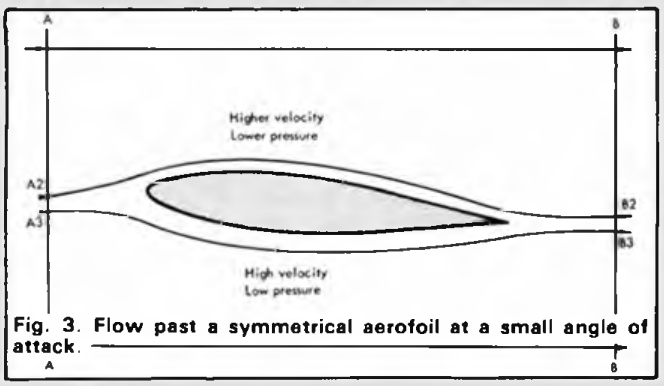

Fig. 3. Flow past a symmetrical aerofoil at a small angle of attack.

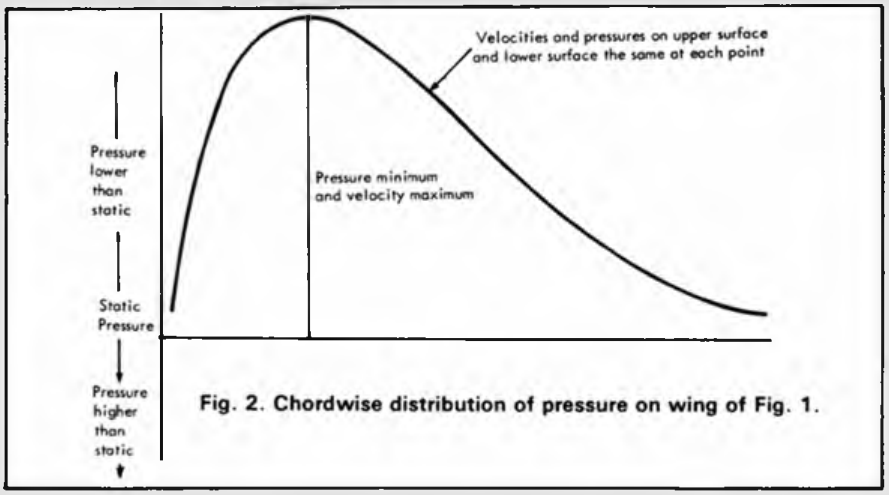

Fig. 2. Chordwise distribution of pressure on wing of Fig. 1.

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converted into the force required to accelerate that flow. Hence as the flow speed along the streamline rises, the pressure falls. As the flow slows down again, the energy extracted is returned and so pressure rises again.

As the air flows past a symmetrical wing profile at zero angle of attack, then, the flow on both sides has first to speed up and subsequently return to the normal velocity by the time it reaches the **B-B** line in the diagram. Hence *on both surfaces of the wing, pressure will fall.* With such a symmetrical situation, the flow on both sides is identical so the pressure drop is exactly the same above and below the wing (or, if it is thought of as a vertical fin, on left and right hand sides). Since the pressure drop is exactly equal, the forces on the two sides cancel each other out, there is no resultant lift force. As the flow leaves the wing it returns to the same speed as the general airmass and the pressure returns to the normal or so-called 'static' value which can be measured in the flow at some distance away from the disturbing influence of the wing.

If measurements are made on a wing, either in a wind tunnel or on an aircraft in flight, with special instruments, the speed of flow at each point above the surface, and the corresponding pressure, can be found and the results plotted on a graph such as that shown in **Fig. 2**. Using a horizontal line as a base to represent the 'static' pressure, the drop of pressure at each point along the wing chord is plotted as a distance above the base line. The separate plotted points are joined by a line to give a visual impression of the general variation. The same thing can be done with the flow velocity and the graph is the same. The smallest change of velocity is matched by an appropriate change of pressure. Hence it is not necessary to plot two such graphs. The plot of pressure across the chord can be used to represent the change of velocity and vice versa, providing it is always remembered that the curve represents a drop of pressure associated with a rise of velocity. This is indicated, when the two plots are combined, by the figure scale on the left hand axis of the graph. The curved line of such graphs in no way represents the air flow direction. It is merely a diagrammatic way of showing how the pressure and velocity of the flow in the streamlines passing near the wing, change from place to place. Quite often in modelling books and magazines, drawings are produced which imply that the flow over a wing actually leaps upward, like the lines of these graphs, leaving below a huge empty space labelled, carelessly, 'low pressure'. These drawings are utterly misleading. Since the pressure drop on both surfaces is the same in the present case, the two separate plots appear as one line on the diagram.

The graphs of speed and pressure should be examined carefully. The flow accelerates up to a peak or maximum speed and then falls gradually again, the pressure falls to a minimum and then rises gradually. The peak speed and hence the minimum pressure, occurs close to the thickest part of the profile, as sketched here. It is not very hard to guess, then, that if the profile drawn had been of a different shape, with the maximum thickness further back, then the velocity peak and the pressure minimum would also tend to be further back. This has important effects on the boundary layer flow, which will be looked at later.

In **Fig. 3**, the situation sketched is slightly different. The symmetrical section is now set at a small angle of attack to the general flow stream. The air still is shown flowing round it smoothly, and this means, as before, that it increases velocity to keep its 'date' with the general flow by the time it reaches the **B-B** line. The pattern of the streamline above and below (or on either side) of the section is now slightly different, but it is not enormously changed. The flow lines on the underside are still generally longer than the straight lines like **A1-B1**. Hence the flow under the wing has to accelerate, and that means the pressure below the wing will necessarily be less than the 'static' pressure. The difference is that the flow lines above the wing are longer still, so the flow has to accelerate more and there is a greater pressure drop on that side. Now when the pressures are plotted on the usual sort of graph, the two surfaces, although *both* have lower than static pressure, are different (**Fig. 4**). The lower surface has low pressure, but the upper surface has even lower. The *difference* between them is what produces the lift force.

It is quite important to remember that while people often speak of the high and low pressure sides of a lifting wing, this is only a relative matter. A lifting wing often has lower than static pressure on both sides, but the upper surface will have lower pressure than the underside. Lift is produced by the difference in total pressures between the two sides, the actual value relative to the static pressure is not very significant in this respect.

In **Fig. 5** the same profile is shown at a higher angle of attack, and it is easy to see that the difference between the two surfaces is greater, so more lift is produced providing the general flow speed remains, as we said at the beginning, the same. (On a real aircraft of course, the speed of flight would normally be reduced as the angle of attack increased, other things being equal.) Even in this situation, the general pressure on the underside is still not higher than static, but it is much less than the upper surface, where the streamlines are much more curved and the flow has to accelerate more rapidly and then slow down more suddenly, to get to **B-B** at the right time and right speed. If the angle of attack is increased still further, there will begin to appear, on the lower side, some pressures which are actually higher than static; in this case it will be true to call the lower surface the 'high pressure' side of the wing. But it is very likely that the flow on the upper side will at this angle, find its task impossible. If the angle of attack becomes too great and the route for the upper side flow, too long, the air tends to break away from the smooth flow pattern and the wing begins to stall.

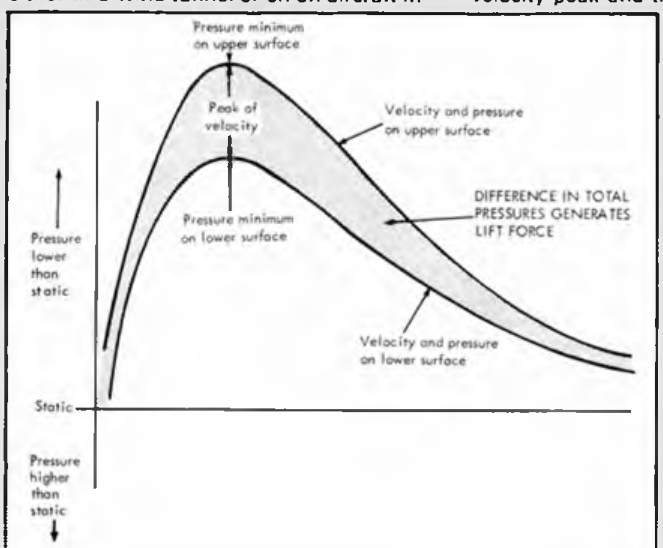

Fig. 4. Chordwise distribution of pressure on wing of Fig. 3.

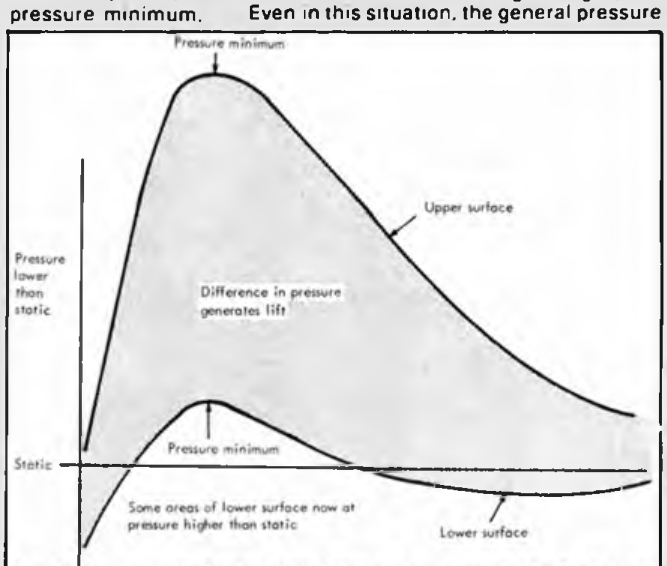

Fig. 5. Pressure/velocity distribution on a symmetrical wing at high angle of attack.

Next month, Martin Simons continues his article on practical aerodynamics with a study of the cambered wing profile.

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SCALE MATTERS

by Alan Callaghan

Hugh Swatton on his first flight with his DH Mosquito. Power is two OS Max 40's and the undercarriage is fixed. span 63in.

Three Kings Club Open Day

Perfect flying weather was the order of the day on October 17th at the Three Kings C/L Scale Open Day at the club's Croydon Airport flying site. Only a very mild breeze developed during the afternoon to occasionally liven up the almost flat calm air, and the temperature was well above average for the time of year.

In an easy going contest atmosphere, the excellence of the weather was matched by the general attendance as well as the number of recorded entries. No less than fourteen models were entered in the main event, Class II scale, and six took part in the novel Profile event first run at the club's autumn meeting last year. I actually counted twenty-two full scale models on the ground at one point, not including the profiles, and very much doubt if this number has ever been exceeded at any other C/L scale event previously held in the UK including any Nationals competition.

Apart from most of the regular known C/L scale flyers, a strong contingent of new faces from the Marlborough Model Flying Club competed well on the strength of two large impressive twin subjects — a *V-A Wellington* and a *D. H. Mosquito*. They also left quite an impression on the eardrums with a planned flying display that performed a dramatic bombing sequence on some card buildings which were demolished using an electrical system to set off bird-scaring charges as used by farmers. With more pure entertainment value than even the most immaculate scale models this sequence goes down very well at fetes and flying displays.

The *Wellington* was built by Dave Rogers together with other club members as a group project, and was flown in the contest by C. Bradford. At 2200mm (86½ inches) span and nylon covered, it weighs in at 5.7kg (12lbs 12oz). Power is supplied by two OS Max 35s, and although on paper it would seem otherwise, the model certainly was not underpowered. Once airborne it was one of the quickest in the circle on the day despite the extra drag of the fixed undercarriage. With no complicated working features and using a standard Roberts 3-line Flight system for reliability, the model is also much used for demonstration purposes. The *Mosquito* by Hugh Swatton used the same proven control system and is powered by a pair of OS 40s. Although smaller at 63in. (1600mm) span and weighing only 7lb 4oz (3.2kg) it was not noticeably faster than the *Wellington,* but despite the, again, fixed undercarriage, it nevertheless looked very handsome in the air. The additional excitement of a second twin engined subject running on full song and flying well contributed much to the contest.

Taking third and fourth places overall, the *Wimpy* and the *Mosquito* could not quite catch up with the scores returned by two of the least complex models in the event, namely Geoff Burkett's *Hanriot HD1* and Norman Ashford's *Arado 66* biplane which placed first and second respectively. Norman's flying skills secured the highest flight score whilst Geoff pipped him at the post by only one per cent of total score by virtue of his higher static mark. The highest static score went, not unexpectedly, to Mick Staples' superb *Bristol Bulldog,* but by a surprisingly small margin, and Mick's best flight was only good enough to secure him fifth place at the end of the day. Electronic gremlins put paid to Ron Truelove's by now much admired *Hawker Typhoon* when his transistorised control system decided to

Right: Paul Leith's Westland Wessex FF airliner in silver/black scheme has now made several successful test flights on its DC Dart power. Twin outboard engines are dummies.

The Marlborough MFC's 'Wellington' flown by C. Bradford comes in for a landing at Croydon Airport in the class II C/L scale. There's an excellent Wellington drawing (for R/C) in the Plans Service, 86in. span, ideal for conversion - maybe this is one?

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work to rule — its own that is. Luckily this was all discovered following an engine start but before the model was released for take-off on its first official flight. An attempt was called and Ron later flew the model with everything 'fixed' but not on a contest flight.

Possibly it was the same gremlin that hitched a ride on Wal Cordwell's *Beech Staggerwing* causing the undercarriage to lock up on its first flight. After a prolonged series of laps with the gear up, a very slow approach with full flaps enabled Wal to put the *Beech* down on the one small patch of model-pre-serving grass projecting into the roped-off tarmac enclosure.

With such a good entry and the winner happily taking home a trophy and a new RC 40 engine, the event went very well and now deserves as secure a place on the contest calendar as the Knokke Trophy at the Nationals has for superscale control-line models.

Concurrent with this class II contest, a much simplified event was run for Profile scale models which attracted six entries. The idea behind this is to attract more people to the idea of Scale C/L flying, but without the need to have a laboriously built superscale model at ones disposal. It is ideally suited to the younger modeller who likes scale models. The most unusual subject entered was the *Supermarine S6B* by Geoff Burkett, which simply slides along the ground on its reinforced floats for take off. I had a flight with this model and it was very easy to do. The proposing take-offs and landings are in fact not unlike the real thing according to the archive film I've seen, and there could be scope to run a special Schneider Trophy profile event using this type of model flown over tarmac. Visions of *Macchi-Castoldis, Glosters,* and *Curtiss Navy Racers* spring to mind!

With the only twin entered, a *Westland Whirlwind* powered by two PAW 149s, Derek Bird emerged the winner from P. Robards with a *Hawker Hurricane*. Any C/L orientated club looking for a simple scale event to run would do well to consider this kind of thing in future.

Results Class II C/L Scale

			Static	Flying	Total
1	Geoff Burkett	Hanriot HD1	540	512	1052
2	Norman Ashford	Arado 66	475	566	1041
3	C Bradford	V-A Wellington	510	513	1023
4	Hugh Swatton	D H Mosquito	460	490	988
5	Mick Staples	Bristol Bulldog	570	408	978

Results Profile Scale

1	D Bird	Westland Whirlwind
2	P Robards	Hawker Hurricane
3	W Cordwell	Fokker Dr I
4	G Burkett	Supermarine S6B
5	B Cordwell	Beech Staggerwing

More from Czechoslovakia

Multi-engined subjects are much to the fore in the latest news from scale enthusiasts in Czechoslovakia. Once again Ing. Lubomir Koutny has provided a large batch of photographs of some attractive subjects showing that F/F rubber scale continues to flourish in that part of the world. With only enough space to cover a couple of models this month it is hoped that others will be included in future Scale Matters.

Two of the most interesting are the *Bellanca Tri-motor* racer, and the second *Miles Libellula,* the canard twin *M39B*. The *Bellanca* was built from a Koutny plan by L. Stranik and is 27½in (700mm) span. In competition at Brno flight times of 70 seconds are claimed, and with such obviously lightweight natural tissue finished construction there seems little reason to doubt this kind of performance. A close look at the size of propellers used gives a clue as to how it is achieved. The overlaps on the central prop are almost fifty per cent, and for those experts who love to theorise on the need for contra-rotating props for stability purposes on F/F multis, what is to be made of this with two left hand and one right hand rotating?

Close inspection of the *Miles* photograph reveals some kind of monocoque construction to the fuselage and engine nacelles. These could possibly be of balsa sheet but no construction details are given. Unlike the typical finish seen on Czech models, a fully painted camouflage scheme has been applied to the *Miles*. Again built to a design by Ing. Koutny — obviously a prolific draughtsman — this model to 1:20 scale won its first competition at Brno, and by all accounts flies as well as it looks.

Occasionally pausing to consider the problems that Czech modellers may have in finding documentation on such rare subjects as these, one may well ask why such challenging subjects rarely grace the entry lists at contests in the UK where the wealth of aviation literature available makes the accurate building of all but the most wholly obscure subjects a relatively painless task. Occasionally one may see the more unusual models built purely as sports flying types and readers referring back to the April issue may remember the uncovered airframe photos of Paul Leith's *Westland Wessex* airliner. This model is now almost completed as the latest photo shows and its has had several trial flights apparently without any real problems. With a wing span of 41½ inches (1050mm) is weighs in at approximately 12oz (340gm) and has in fact been powered by a DC Dart and not a Merlin as originally intended. Although it was definitely not built as a contest aircraft, this will not prevent it being quite an attraction on any flying field.

Errata

In the August issue of Scale Matters a photo was included of a Peanut Hawker Fury by E. Fillon of France and said to have been built from a plan by Roger Aime. M. Aime has written to point out that the model was, in fact, designed by M. Fillon himself and I would like to correct this small, but important, detail. Apologies are due to both gentlemen.

Left: this very lightweight Bellanca Tri-motor racer was built by Junior L. Stranik. Note the overlap on those props! Below L. Kunert's Miles M39B Libellula built from a Lubomir Koutny plan appears to have moulded balsa fuselage and engie nacelles.

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FROM THE HANDLE

Jim Woodside reports . . .

FAI Team Race — Do we need rule changes?

Two documents in current circulation illustrate a school of thought which gathered support at the 1982 Swedish World Champs. Roughly speaking, the trend of opinion in certain areas is that F2C is becoming too . . . followed by a various list which includes fast, difficult, exclusive, dangerous, etc. Firstly let us look at the documents.

1. Derek Heaton's: F2C — Where to Now? Derek was a member of the '82 team race jury — a jury which was recognised as strict (overly so in the opinion of some nations) but nonetheless, one of the best juries in recent years.

2. Walt Perkins' latest edition of Gator Tales — a TR newsletter well worth an investment. Albritton Perkins have achieved world class performances despite the 'handicap' of being 'marooned' on the American continent.

Team Racing — where to now?

At each of the recent World Champs model performance has been increasing, as one would expect. In itself the increase between consecutive World Championships is not a problem. However when viewed over, say, a period of ten years, a different picture emerges:

Fastest heat	Ninth place	Year
4:16.4	4:40.2	1972
4:04.5	4:16	1974
3:56.7	4:12.5	1976
3:44	3:59.4	1978
3:29.2	3:50.4	1980
3:23.9	3:39.9	1982

or to put it another way it all happens in approximately one minute less!

There is no doubt that the increased airspeeds and thus reduced race times are contributing to:

(a) more incidents in the pilots' circle.

(b) reduced reaction times available to avoid incidents.

(c) less time available for juries to adjudicate races fairly.

With this increased performance has grown the necessity of looking more and more critically at piloting conduct to ensure that all competitors are allowed to compete equally. This is, of course, as it should be. However it does put more stress on the teams, which when linked with all the other possible rule transgressions can take away a fair slice of the fun element. If a hobby or sport ceases to be fun it becomes hard work and then it is only a small step further for many teams to consider giving up racing.

The time has come when we, the competitors should consider this question: "Is this increased performance killing the event?" There are two areas where changes could be made to ensure that the future of Team Racing remains attractive to lots of competitors and not just a small hard core, these are —

(1) Reduce the maximum airspeed.

(2) Look at the rule book and take out the harshness from rules that neither increase one competitor's performance nor hinders the other competitors.

With regard to reducing the airspeed there is no simple solution. With the many Continental standard size flying circles it would appear impractical to increase the line length. To change line diameters and/or model size will certainly have some effect — but would it be enough to justify the changes? On the face of it, it would appear that reducing the engine size to 1.5cc could be the solution — I wonder what the engine manufacturers would do? Not to mention the teams with large engine investments? I am sure that the immediate effect of an engine size reduction would be the loss of some competitors — would racing survive if entries at world championships were to drop further? If the commercial manufacturers are not prepared to go along with 1.5cc then we must stick with 2.5cc. Any moves in this direction must be after consultation with the manufacturers.

Personally I see little alternative in the long term other than a reduction to 1.5cc but I would view the short term effects with a great deal of trepidation!

Turning now to the rulebook if we can take out the harshness we can probably extend the useful life of the 2.5cc engine.

I suggest that the following rule changes be brought in as soon as possible.

(1) Scrap the semi-finals. Run three rounds of heats for all competitors with the total of the best two heats being the qualifier straight into the final.

The rule change will eliminate the difficulties that sometimes occur in semi-finals with teams trying too hard. It reduces the advantages that can be gained by a lucky draw or two up or part solo heats. It eliminates the current problem of reflies in the semi-finals. But most important of all it gives all competitors 50 per cent more interest in the world championships with three flights instead of two.

(2) The present elimination for pilots having a foot out should be changed to: Foot out during take off — elimination. Foot out on landing — warning.

The reason for the current rule is safety. It is a far more dangerous situation when the engine is running on take off than on landing when the engine is stopped and the pilot is fully aware that he must land his model inside the 19.6m flight circle. (There is already the penalty of elimination for landing outside the flight circle and therefore the safety aspect of landings is already amply covered).

As well as the above two rule changes I suggest that the following two points are put into the Jury guide.

(1) Warnings for low flying should only be given when more than one team remains in the race.

The rule concerning low flying is again a safety point but it should be borne in mind that there is no danger when only one team is flying and the other two have either retired or finished i.e. no attempt to take off is made by the other two competitors.

Low flying should only be classed as a flagrant breach of the rules **(4.3.14h)** when safety is affected.

(2) Handle on the ground **(rule 4.3.7n)** clearly it is not practical to literally put the handle on the ground. The intention is to prevent the possibility of obstruction to either another pilot or model. It is acceptable for a pilot to demonstrate his awareness of this problem by keeping part of his controlling hand in contact with the ground for a substantial part of the pit stop or start of race when no other models are in the vicinity of his pitting area. When another model is landing or taking off normally it is the responsibility of the stationary team to ensure that no obstruction occurs. If obstruction occurs then the offending team can be eliminated under rule 4.3.14m.

If you are interested in F2C think about the original question. If you agree with these proposals — *say so!* If you don't agree — *still say so!* If you have other points — *make them!*

There was plenty of talk at the 1982 Champs about the future. Now is the time to start implementing any changes that are agreed necessary.

Perkins' Gator Tales — August '82

. . . so I'll climb on the soapbox for something I feel is very important. The popular topic of discussion in Sweden was the higher model velocities in all the 2.5cc events and the attendant 'danger' this represents. The emotion to "do something" was very high and the common denominator solution is to reduce the engine size to 1.5cc. Having listened to the arguments, I have the uneasy feeling the CIAM may indeed "do something" in response to the emotion and not consider the *real* problems, alternate solutions, and what impact this proposed 1.5cc engine size will have on the modellers and engine manufacturers. Even worse, the engine reduction is being proposed as a 'safety' measure which means it will be in effect in 1983 if adopted!

I believe the CIAM feels the pressure to *take action*. Adopting the 1.5cc engine size, across the board (including free flight), would be a *very* easy thing for them to do as it *seems* to be the consensus opinion. I am not sure, however, the average modeller understands the full measure of what this means. Very few of the CIAM members are actively competitive modellers so none of them will have to buy all new engines or build new models. They do, I believe, respond to the active modeller's opinions so please read the following and then contact your CIAM representative with your views.

There *are* detail problems with each of the 2.5cc events but only one of them is *solely* caused by increased model velocities. Each event's problems should be examined individually and a rational solution sought to solve *that* problem. If the logical solution is to reduce the engine then do it! Here are the major current problems that are getting the attention and the possible solutions.

Combat — Yes, model velocities are up, but no combat pilot I know is complaining — they all want all they can get! If for some reason there is too much rotational speed then the simple solution is to lengthen the lines. Combat is not usually constrained by the flying facilities and any soccer field can accommodate longer lines. The cost would be minimal as the lines are replaced regularly anyway.

The *real* problem I see with combat is the danger of 'fly-away' models. The *positive* way to strengthen the connection between model and pilot is to increase the line diameter. There are only so many variables to adjust and this move will produce the same *net* effect as going to a smaller engine: 2.5cc engine + larger line = 1.5cc engine + present lines. The cost of new models and engines is much more than new lines!

Speed — Rotational speeds *are* too fast; 1.31 seconds per lap seems to be placing undue emphasis on physical ability and/or age. Reducing the engine size to 1.5cc is *one* way of slowing the models down, assuming all other parameters remain the same. Another solution is changing the model parameters to bring the size up to the present size of team race models. This would add emphasis to model design and construction as well as slow down the speeds. I believe the speed modellers should be heard as they can better assess the relative costs of new models and engines. *Please note:* there is no safety problem with speed, the models are flown in cages and all helpers must leave during the flight. The laws of physics protect the pilot.

Team race — The *real* problem with team race requires some definition. A stopwatch will verify increased model speeds and it is not hard to imagine how this places demands on the pilot (who has to contend with two other pilots of unknown ability and still fly 'cleanly'). The central question of how much emphasis *should* be placed on piloting skill, or even how much skill is *now* required, demands a subjective answer. It is an historical fact however, that back in 1965, when the fast teams were producing 4:15 times, a great "Too fast, too fast" cry went up that resulted in the 7cc tank. That slowed things down but now, 17 years later with fast teams doing 3:30 times, we hear the *same complaint*. It is now *obvious* the speeds that yield 4:15 times *are not* (and *were not*) 'too fast.' Could it possibly be true that today's speeds are equally *not* 'too fast'? It appears the *perception* of 'too fast' depends on one's ability to

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cope with the results of that speed.

Philosophically, team racing is challenging and interesting *because* it is *difficult* to do well. Financial ability, building skill, design knowledge, piloting skill, determination, mechanical ability, analytical skill, diplomacy, access to materials, and organisational and managerial talents are *all* parts of the overall T/R equation. Many teams can do well because they can compensate for weak areas by adjusting the others to achieve a balance. If the CIAM this year removes the need for piloting skill then why wouldn't they next year change the rules to limit the money a team could spend, or the hours they could devote to building, or adopt a standard design model, or limit the engine design, or not allow certain materials, or etc. An observer of AMA racing events will notice this sort of rule-writing and the result is very bland racing.

If analised, the piloting problems *perceived* today are a *combination* of model speed *and* the difficulties of flying cleanly in three-up traffic. The problems are magnified as the disparity in piloting skill and/or model speed increases. Seldom is there is a problem in a race between teams of similar ability at either end of the experience spectrum. It is the confusion caused by constant passing, trying to fly cleanly, and high 'closing' speeds that leads to trouble. An outstanding example of this was the simultaneous triple-crash in Sweden involving the very fast Russian team of Kramarenko/Kusnetzov. Kramarenko was constantly executing an unorthodox passing manoeuvre, presumably to avoid a whipping foul, that the two other pilots could neither comprehend nor counter. Their lack of skill resulted in the sudden and dramatic end of the race. Speed, per se, was a minimally contributing factor, they could have been in just as much trouble at scaled down speeds.

If the CIAM wants to attack this situation then they should strive to solve the *real* problem: the disparity of model speed and or experience allowed with our present "luck of the draw" system of selecting the heat race competitors. The Team Race Jury could be required to group the teams according to relative abilities. They should do this in private and could use any subjective means they desired. Three groups should be sufficient. The number in the groups should ideally be divisible by three. They should strive for one two-up race or two two-up races, depending on the entry number. The draw for *heat races only* would then be done within the groups. Reflys should be done within groups if possible, if not,then return to the present drawing method. All other aspects of event administration would remain the same with semi-final and final participants determined by race times only. This system should result in closer competition and heat times — 'charity' races would virtually disappear. Best of all, this would not cost *anyone anything*. The only thing this proposal does require is the courage to admit the *real* problem and the resolve to take *positive*, though somewhat unconventional, corrective action. At least all teams would have the opportunity to race comfortably and to progress up the experience ladder at their own pace.

What might happen to team race if we go to 1.5cc engines? First, most models and engines are obsoleted. Some manufacturers may offer retrofit kits to the tune of $150-$200 each. This will allow some engines to be raced. Most manufacturers will devote their energies to developing a proper 1.5cc glow engine for use in speed, combat, and free flight. T/R will be left to its own devices for a while as the manufacturers go after the real money. The same people who win now will build their own engines and will continue to win. When the manufacturers build 1.5cc racing diesels they will either be inferior to the 'specials' or there will have been a break-through and they will be successful. Guess where the model speeds will be? You guessed it — right back where they are now! Then, if things go the same way, a .049cu.in. engine size will be adopted and we can go around again!

There are alternatives to the 1.5cc engine proposal that will have the same temporary effect as reducing the engine size, but at a vastly lower cost and with less confusion.

— *increase the line diameter* — cheap, easy, effective and safe.

— *double the model size* — let aerodynamic restriction reduce the speed (for a while), we all build new models anyway, it wouldn't cost that much more to build bigger ones. Also there would be room in the fuselages to accommodate mufflers if they are ever needed.

To summarise, I don't think T/R rotational speeds are too fast and they are certainly NOT dangerous. Piloting skill *is* one variable in T/R and pilots who are put in situations they can't handle get in trouble. Reducing the model speed *may* help those pilots. Removing them from situations they can't handle *will* help them. *Cure* the *disease*, don't *treat* the *symptoms*.

There is danger in T/R and it should be addressed *immediately*. Exposing the people presently allowed in the racing cage to the danger of 'fly-away' models should not be allowed. The Swedish organisers recognised the problem and moved the lap counters and timers outside the cage. The CIAM should adopt this as policy *now*. They should also require protection for the mechanics and team helpers who must stay in the cage. Simple wire barricades at each pit station would suffice.

Thanks for hearing my views. *Please* call your CIAM representative and express *your* views.

Digested all that? Main points are:

1. TR airspeeds are up to a point where some pilots are in trouble and juries are finding race administration problematic.

2. Hence need for rule changes.

3. Engine size reduction to 1.5cc advocated — main weaknesses here are:

(a) engine development will soon see the 0.5bhp 1.5cc.

(b) non-availability and/or cost will diminish the number of teams competing.

4. Amend the application of low flying and handle off ground rules.

5. Eliminate semis and replace with three rounds.

6. Seed teams into first, second and third class teams for initial races amongst the competitors in each class.

7. Increase model sizes and/or the line diameters.

Personally I *like* the idea of three rounds, *hate* the idea of 1.5s on cost grounds, *understand* the seeding notion but think it would be devisive and would not *mind* larger models.

It is well understood that competitors compete and rulemakers make rules but if YOU want the kind of rules you think fair and favourable, then heed Derek and Walt's advice and instruct your CIAM delegate on your views and how to use his voting mandate. Your six Nelsons have cost you £600 and six years wait. Think about it!

NASS — North American Speed Society

Motto. Dedicated to the advancement of control line speed.

NASS is an interest group for the betterment of C/L speed as the high-toned motto makes clear. That such groups can be successful is well known both here and in North America where C/L aerobatics have benefitted from the activities of CLAPA and PAMPA respectively. Now Speed fliers are invited to band together.

Chris Sackett is the man in the hot seat. Already he has collected over 110 speed fliers under the NASS banner. The main benefit for non-continental American enthusiasts will be the quarterly called 'Speed Times.' Annual fees for those over 19 years is $15. Contact: Chris Sackett, Box 82294, North Burnaby, BC, Canada V5C 5P7.

New FAI Team Race Heat Record

Hard on the heels of Shapavalov-Onufrienko's superbly consistent flights in Sweden, the Metkemeyer Brothers really 'got in on' in the Coppa d'Oro (Lugo di Romagna) September 12 1982.

The FMV seemed to revel in the Italian heat, setting a 3.22.5 in the semis, taking 1.4 seconds off Barkov-Suraev's previous best set at the 82 Champs. Congratulations.

Result:	Heat	Semi	Final
1 Metkemeyer Bros	3.31.1	3.22.5	7.02.6
2 Rossi Bros	3.35.1	3.35.9	7.21.1
3 Cipolla Bros	3.43.4	3.37.6	DNF

The organisers assure me that there is no truth in the rumour that only brothers are allowed to make the finals!

UK Trials for Europ Champs 1983

A whitewash for club Feltham — truly mighty Feltham rule (for a while!).

1 Smith Brown	Feltham
2 Gray Haycock	Feltham
3 Fry Thorpe	Feltham
4 Wilston Gardiner (reserve)	Tynemouth

Good luck to the team for the Champs to be held at the Utrecht site during July 83.

Verviers International August 14 and 15, 1982

Not only did Rob and Bert Metkemeyer put in a heat record but come close to Shapovalov-Onufrienko's final record during the Belgium International held on the Wegnez site used for the 1977 European Champs.

Result:	Heat	Semi	Final
1 Metkemeyer Bros	3.32.1	3.30.3	6.59
2 Van Uden Bros	3.48.5	3.44.7	3.02
3 v.d. Weerd-Wakkerman	3.46.7	3.45.3	DNF

Wot? only two sets of brothers!

Encore!

Bochum International 1982 — September 25 and 26.

Cold, wet and windy this year with an entry of only ten. Times reflected the conditions with the Metkemeyers again in the lead.

Result:	Heat	Semi	Final
1 Metkemeyer Bros	3.36	3.52	7.55
2 Surugue Broad	4.04	3.55	8.18
3 Martin Vogel	3.57	3.59	9.43

The Northern Gala September 12 1982

Thanks to Jeff Smith, PRO of the Wharfedale Club, for the results. The day was one of high winds which meant that all heats were flown two-up until the finals, when the winds did abate a little.

Jeff makes the very valid point that faced with the difficulty of finding willing and able volunteers to help run events, poorly run contests will continue to be the norm. Top fliers should step down from competing while the less able but aspiring are coached and encouraged in these contests. While it is true that this might help, our basic problems are, I think, two-fold!

1. not enough new blood entering the sport;

2. lots of small contests where both contestants and organisers are in short supply.

From my own experience I must say that it is not too hard to get helpers for the Three Sisters International but find similar problems over the small events. Any comments out there?

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Wharfedale Trophy FAI Team Race

		Heat
1. Smith Brown	7:34	3:40
2. Heaton Woodside	8:03	3:46
3. Fry Thorpe	DQ	3:42

1/2A TR Budapest Trophy
1. O'Neill Bollen, 2. Hill Metcalf, 3. Heaton Woodside.

The OS 40 FSR Stunt Engine

James Hunt won the 1978 World Champs using his familiar Genesis design which had just been fitted with a converted RC 40 FSR. A three blade prop and small venturi 'tamed' the engine enough to give a powerful but steady run. About two years ago, the OS factory introduced a version of the 40 specifically for C/L stunt to complement their long established 35s. The intake timing of the shaft has been reduced to restrict the tendency to two stroke. The motor is now well established and has been adopted by such US aces as Hunt and Werwage.

Not content with an already good performance, two modifications are available for the serious stunt pilot.

Firstly engine manufacturer Henry Nelson will hone and chrome the OS liner at a cost of $20 plus handling costs. This is said to give a much improved engine life.

Secondly speed flier Vic Garner will machine the existing piston to accept custom made Dykes rings, again to increase usable life and better compression at lower revs.

Seen at the American Nationals - Walt Perkins' Mercedes left, and Tom Knope's Porsche.

In the photograph of my own engine, which features both of the above mods, two external changes are obvious. The large and heavy silencer has been changed for a mini stub silencer from J & H Designs and Sales.

Also, advantage has been taken of the fact that the front housing can be removed and the engine reassembled with the exhaust facing the outside of the circle when the engine is in the inverted position. A cleaner, less oil soaked model should be the main benefit.

The engine costs about £40 and the mods and silencer will add about £25 or so. Obviously the standard engine is excellent but the mods are perhaps worth considering by the committed stunt flier.

Chrome plating: Nelson Competition Engines, 729 Valemont Drive, Verona, PA 15147, USA.

Cost: About $20 plus postage.

Dykes rings: Vic Garner, PO Box 573, Livermore, California 94550, USA.

Cost: About $15.

Stub silencer: J & H Designs, PO Box 599, Saddle Brook, NJ 07662, USA.

Cost: $15 + postage.

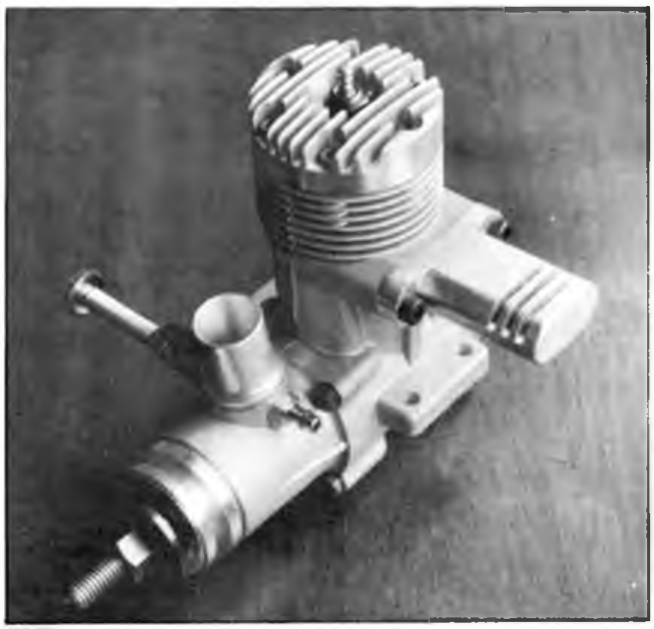
If you wish to have a piston-liner set modified, I suggest that you contact Vic Garner direct as he can take care of the chrome plating service and this will save both time and confusion.

Tailpiece

Only at the American Nationals! Personalised car number plates like you wish you could order. On the left, Walt Perkins FAI F2C on a Florida plate (Mercedes), right Tom Knope's Porsche is a Washington registration.

Stunt

My favourite model of the 1982 season was Dion Beesley's model called SIRIUS. Span is 60in., the wing featuring Detroiter construction and swept forward trailing edge. Engine was the popular ST46 and the weight 56oz. Finished in white with lilac contrast.



Left: OS FSR Stunt - chrome liner by Nelson Engines, Dykes ring by Vic Garner and J. H. Designs mini-silencer. Note engine has been 'turned around' from normal configuration. Below: Dion Beesley with his Sirius.

1/2A Combat meeting Sunday October 10 Report by Chas Windows

The weather for the last meeting of the year was almost perfect. Unfortunately there were only two clubs competing (Lincoln and Peterborough) with a total of eight flyers.

Flying got underway at 11am with a bout between Brian Waterland of Peterborough and Dave Coe of Lincoln which was won by Dave with one cut each and a score of 293-276.

Bout two was an all Peterborough bout between Rob Roy and G. Hobbs, it was an easy trip to the next round for Rob with three cuts to nil and the score was 500-174.

Bout three was another all Peterborough affair and a very easy win for Niel Gill against Chas Windows. Chas was flying worse than usual — he had motor trouble for most of the bout.

Bout four was Mark Jarrett versus J. Willows of Lincoln and Mark won by two cuts to nil with a score of 405-127.

Round Two Bout One

Dave Coe of Lincoln versus Mark Jarrett of Peterborough was won by Mark on ground time by 180-116. There were no cuts and as can be seen by the score, the pitmen were kept very busy in this bout.

Round Two Bout Two

Between Niel Gill and Gerry Hobbs, this was another easy win for Neil with three cuts to nil and a score of 514-116. Gerry had some motor trouble.

Round Two Bout Three

This was one of the best bouts of the day between Rob Roy and Jeremy Wallows of Lincoln. Rob won by five cuts to nil but it was nowhere near as one sided as the score of 672-162 suggests.

An elimination bout between Dave Coe and Chas Windows, was lost by Chas Windows as his motor was not running very well, the score being 240-40.

Round Three Bout One

Between Rob Roy and Mark Jarrett, this is what you would expect in a ½A combat by two flyers who have flown so often against each other. Rob won by three cuts to two and they were at one another all the time.

Bout Two

Neil having another easy bout this time with Dave Coe of Lincoln, winning by 307-92, but not without mishap as both models were completely written off.

The fly-off was between Mark Jarrett of Peterborough and Dave Coe of Lincoln and as the score suggests, 340-40, not a very good bout.

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Michigan State Meet competitors with their Chuck Rudner-designed 'Ronguers.' Left to right: Ron Colombo, Mark 'Riley' Daniels (1974 National Champ), Bill Lajack (1982 National Champ) Matt Martino (Mr. 3rd Place), Jim Morway, Ben Henderson and John Baluchi. Above: 'Conan the Barbarian,' an OS 36-powered slowby Paul Smith, had its statistics written on the wing. Second in MACA Nats, first in Michigan State Meet.

The Final was between N. Gill and Rob Roy and was quite good but after an early pass when Rob took all of Neil's streamer, it was only a matter of time before Neil took two cuts to win the bout — the score was 388-274.

Results

1st N. Gill (Peterborough)
2nd R. Roy (Peterborough)
3rd M. Jarrett (Peterborough)
4th D. Coe (Lincoln)

The motors used were all PAWs of various marks, and one or two had slight modifications but as the results show, it was good flying which won the event. The size of the models for ½A events are about the size of F1A and diesel A of about three years ago and fly at about the same speed as the old ½A models.

Michigan Exchange Clubs State Meet. Utica, Michigan, USA, September 12, 1982
Report by Paul Smith

This is the big one for Detroit-area competitors. A Triple-A contest in front of thousands of fans, including families, friends, and co-workers. There are a total of 35 events, including control line, free flight, rockets, and radio control. As usual, the contest was held at the Ford Motor Company Utica Test Track. Despite hard times, that company continues to support model aviation. Rain was forecast for the great day, but as always the weather was perfect. Control line was represented by four categories, combat scale, novice race, and novice stunt.

Novice Race

Is a special event originated by the Cloudbusters Club. The rules are simple: the most airtime in ten-minute period wins. A start and two pit stops are required, but there are no restrictions on the airplane except basic safety rules.

The event allows the beginner to practice the pitting skills required for combat and racing under contest conditions. Paul Jackson won with a time of 9:04, very good considering that the pilot has to leave the centre three times to flick the prop. The Ferguson family took second, third and fourth with 8:18, 8:12, and 8:01. Pretty good scores for a new local event.

Scale

National champion Ron Sears won both precision and sport class with his Stearman and his Thunderbolt. Second in precision went to Bill Logan of Canada with his Corsair II. Even the short grass gave his prop-jet model a tough time on landing. Mike Welsham's nice Enya 40-powered B-25 took second in sport.

Combat

FAI combat made its first appearance at the state meet with ten flyers. Two Canadian entries gave the event some international interest. The Cox Conquest still reigns supreme in Detroit, even though Dave Lovgren tried to buy his way to a win with a high-priced Nelson 15. Dave had some nice 'type-Vernon Hunt' models. He was accompanied by Ron Malcolm. These two Canadians will give the old reliable FAI team some trouble next year. The author took first with a modified Superstar equipped with aluminium bar-stock engine mounts.

The slow event had 20 entries and was also won by the writer. The model was the 'Dragon' as featured in the February 1981 *Model Aviation*.

Results

Precision Scale — 5 entries
1st R. Sears 516
2nd W. Logan 441
3rd R. Spaulding 285
4th M. Welshans 114
5th S. Welshans 89

Sport Scale — 3 entries
1st R. Sears 165
2nd M. Welshans 124
3rd W. Logan 122

Novice Stunt
1st R. Branch 349
2nd D. Ferguson 289.5
3rd B. Guertin 281.5
4th F. Carlise 116.5
5th A. Adamisin 110

Novice Race — 6 entries
1st P. Jackson 9:04
2nd T. Ferguson 8:18
3rd J. Ferguson 8:12
4th J. Ferguson Jr. 8:01
5th C. Hiller 5:23

Slow Combat — 20 entries
1st P. Smith
2nd L. Scavone
3rd W. Gimmy
4th S. Kott

FAI Combat — 10 entries
1st P. Smith
2nd R. Morse
3rd M. Martino
4th R. Colombo

Fast Combat — 24 entries
1st W. Gimmy
2nd M. Daniels
3rd M. Martino
4th J. Wasik

Bill Logan's Corsair II powered by a prop-drive 60 in the nose. Flies with very jet-like style. Came second in the Michigan scale event.

Mike Welshams' nice Fokker Eindecker III at the Michigan State Meet. C/L precision scale.

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DAVE DAY'S SHOP TALK

The latest in products for the modelling scene

PECK-POLYMER PROPS.

These moulded plastic props for rubber powered models are available in the following diameters and prices 4¾in. (18p), 6in. (23p), 7in. (27p) 8in. (32p) and 9in. (46p). The shape is well designed and efficient, and the hub incorporates a simple free-wheel, available from SAMS.

PECK-POLYMER PEANUT SCALE KITS

These well-known flying scale kits are available from St. Albans Model Supplies (S.A.M.S.). The latest release is Butch Hadland's version of the Lacy M-10 (see kit review Nov. '81 *Aeromodeller*). All kits include full size plans, scale 3 view, selected balsa, tissue, plastic propeller and wheels, etc. Photo shows 'Gypsy Moth' kit which also includes a moulded acetate fuselage top decking. Models available are: Pietenpol Air Camper, Clipped Wing Piper 'Cub', Nesmith 'Couger', P.51D 'Mustang', Zero, Gypsy Moth, Ganagobie and Lacy M-10 at 13in. span and Miles M.18, Druine 'Turbulent' and Andreason BA4-B at 12in. span all priced at £5.49.

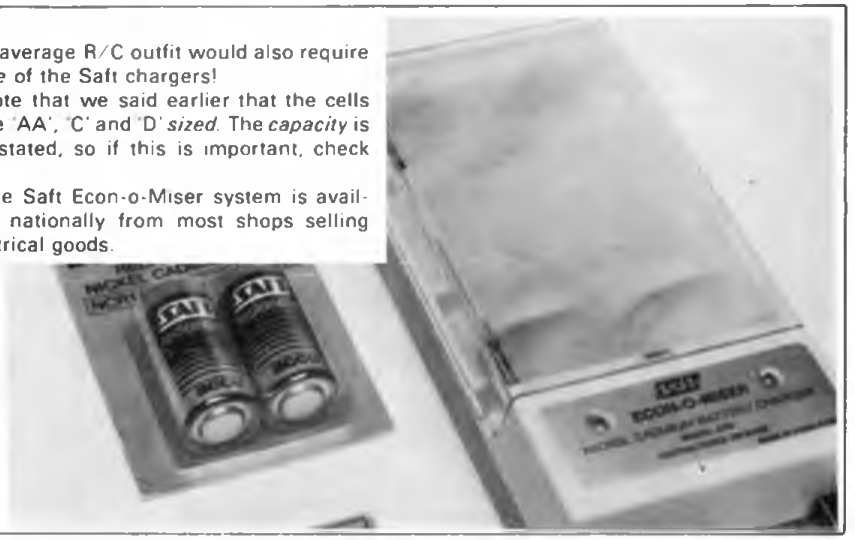
SAFT BATTERIES AND CHARGERS

You may have noticed that a number of manufacturers have launched a range of rechargeable ni-cads and chargers on the market. One such manufacturer is Saft (U.K.) Ltd., who have just launched their Econ-o-Miser system, which has been advertised in the national press. It consists of 'AA', 'C' and 'D' *sized* cells and a charger. These have many uses in the home and workshop and will save a considerable amount of money compared with equivalent dry batteries.

It would be unwise, however, to suggest that these have many modelling uses, most R/C equipment has built-in charging facilities and it would be tedious in the extreme to remove batteries for charging. The average R/C outfit would also require *three* of the Saft chargers!

Note that we said earlier that the cells were 'AA', 'C' and 'D' *sized*. The *capacity* is not stated, so if this is important, check first.

The Saft Econ-o-Miser system is available nationally from most shops selling electrical goods.



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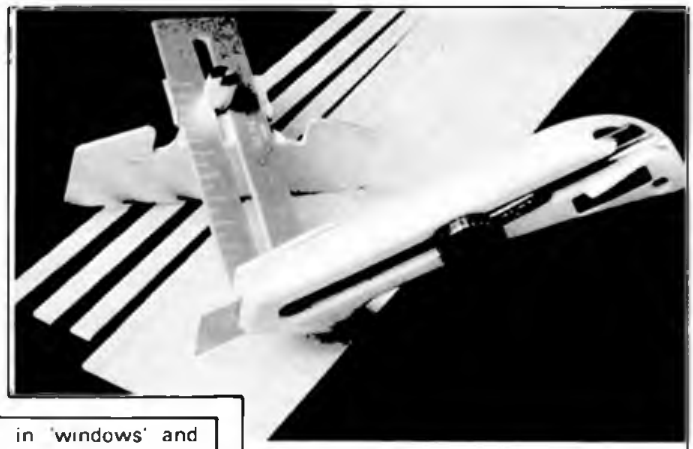
PULSAR MODEL 44 NOISEMETER

With noise attracting more and more attention, the need for a means of measuring noise levels becomes increasingly important. The Pulsar Model 44 is a high quality, precision instrument, which, at just under £200 in basic form is unlikely to appeal to individuals, but is well worth considering for a club purchase.

An unusual feature of the instrument is a form of auto-ranging whereby the figures on the scale appear in 'windows' and change as the unit changes range. Thus a linear scale of 35dB covers the total range of 40-135dB and it is virtually impossible to mis-read the scale.

Switches select 'A' or 'C' weighting networks and 'Impulse', 'slow' or 'fast' response speeds. The unit also has 'memory' and 'hold' facilities.

Further details are available from Pulsar instruments, 40-42 Westborough, Scarborough, North Yorks, YO11 1UN. Telephone (0723) 71351.



OLFA KL TRIMMING KNIFE

For trimming knife, read balsa stripper; at least that's what it looks like and that's what it is. However, it is a very sophisticated one, since the blade retracts for safe storage; sections of blade can be broken off to produce a new edge and it has a calibrated scale with a metal guiding edge. The handle is a substantial acrylic moulding.

Distributed by Microflame (U.K.) Ltd. and available from model shops, priced £6.07.

QUICK SOLDERING IRON CLEANING

For those who do a lot of soldering the usual damp sponge cleaner has the disadvantages of rapidly becoming loaded with solder and, unless used carefully, can cause solder 'spray'.

The Elvo 'Clean-o-Point' eliminates both of these problems by wiping the soldering iron tip between two sponge rollers and catching surplus solder in a specially designed receptable, allowing the solder to be re-used.

Although not cheap at £32.00, this is about half the cost of a *good* soldering iron.

Available from Anaconda (U.K.) Ltd., Unit 11, Sketchley Lane Industrial Estate, Hinckley, Leicestershire.

SUPERLINE

Imagine, 7 strand flexible control-line wire .42mm (.016in.) diameter, with brass-plating for easy soldering and available in lengths of up to 1000 metres from a British manufacturer!

No, it's not a dream! Superline is available from H. J. Nicholls & Son and from Michael's Models in 30, 500 and 1000 metre reels at £1.20, £13.95 and £25.95 respectively.

Trade enquiries to Modelec, 19 Felix Avenue, London N.8.

This line was used to achieve 2nd place in Combat at Genk and 3rd and 4th places in Combat at Rixensart.

RVE 4 STROKE

This 10cc 4 stroke glow-plug motor has been available for some time, but demand has been such that the manufacturers have only now been able to spare one for our examination.

An interesting innovation is the use of a vertical shaft drive to the rotary valve in the cylinder head, which makes a very compact unit with no tappets to adjust.

The motor is supplied complete with a slide carburettor and exhaust stub and costs £125.00.

Available from Newstock Service Co., 45 Newport Street, Nelson, Lancs.

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25 YEARS AGO IN AEROMODELLER

By Dave Day

Editorial comment centred on the recent meeting of the FAI Models Commission when Britain made an unsuccessful attempt to have World Championship events returned to an annual basis. World Championship status was granted to Radio Control (Aerobatics), C/L Team Racing and C/L Aerobatics with the first events due to be held in 1960. The number of flyers constituting a team was reduced from four to three.

'Hangar Doors' contained news of 'Gadget' Gibbs' successful attempt on the British and World C/L Speed records with his 5cc Carter motor. Speed achieved was 152.4mph (244kph), this being on two lines with unrestricted fuel.

Where Plans Service introductions were concerned, this was very much a F/F contest month with Mike Green's 'Heat-wave', the '57 Nationals Power winner (55¼in. span for Frog 249); 'Little Auk', a rubber duration model for ROG or ROW by John Trinder (30in. span); and 'Topscore', a 73in. span A/2 glider by John Hannay which won the 1957 Team Trials.

Wot! No scale models? No, but the cover photograph (black and white, beautifully tinted to look like a colour photo!) and 'Aircraft Described' No. 88 were of the Edgar-Percival EP-9 described by Doug McHard, an absolute natural for a scale model.

The same might be said of 'Aeroplanes in Outline' No. 53 in which C. W. Cain described the Nord-Aviation 1500 'Griffon', a canard delta jet aircraft ideally suited to a ducted fan model.

'Stunt Developments' by Ron Moulton had a considerable impact on this writer (then a mere lad!), describing as it did the prototype Bob Palmer 'Thunderbird' (with radial cowl), Henri Stouff's kit-built 'Thunderbird', Pete Russell's '334G' (then all-conquering in this country) and George Aldrich's immortal 'Nobler'.

For those who constantly ask about the writer's restoration of the prototype 'T Bird', a major obstacle has been that all soldered joints in the tank and controls have assumed a putty-like consistency and must be replaced if the model is to fly again – have patience!

Part III of P. L. Gray's 'Decor Detail' continued on the subject of WW1 German aircraft finish with authentic colour schemes for Fokker D.VIIs, Pflaz D.IIIs, Roland C.IIIs, Junkers D.Is and Albatros DVs. Also included were general notes on twin-engined machines, naval aircraft, Austro-Hungarian types and a list of prefix codes for military aircraft.

Ron Warring's 'Engine Analysis' (No. 43) covered two comparable sized motors. These were the Hungarian ALAG X-3 diesel engine (.185bhp at 12,700rpm) and the German Webra 2.5R glow motor (.202bhp at 13,200rpm), both of 2.5cc capacity.

'Transmutone' was a constructional article for an up-to-date, state-of-the-art, R/C receiver for multi-channel reed control, utilising one valve and two transistors and needing only 22½v H.T. supply!

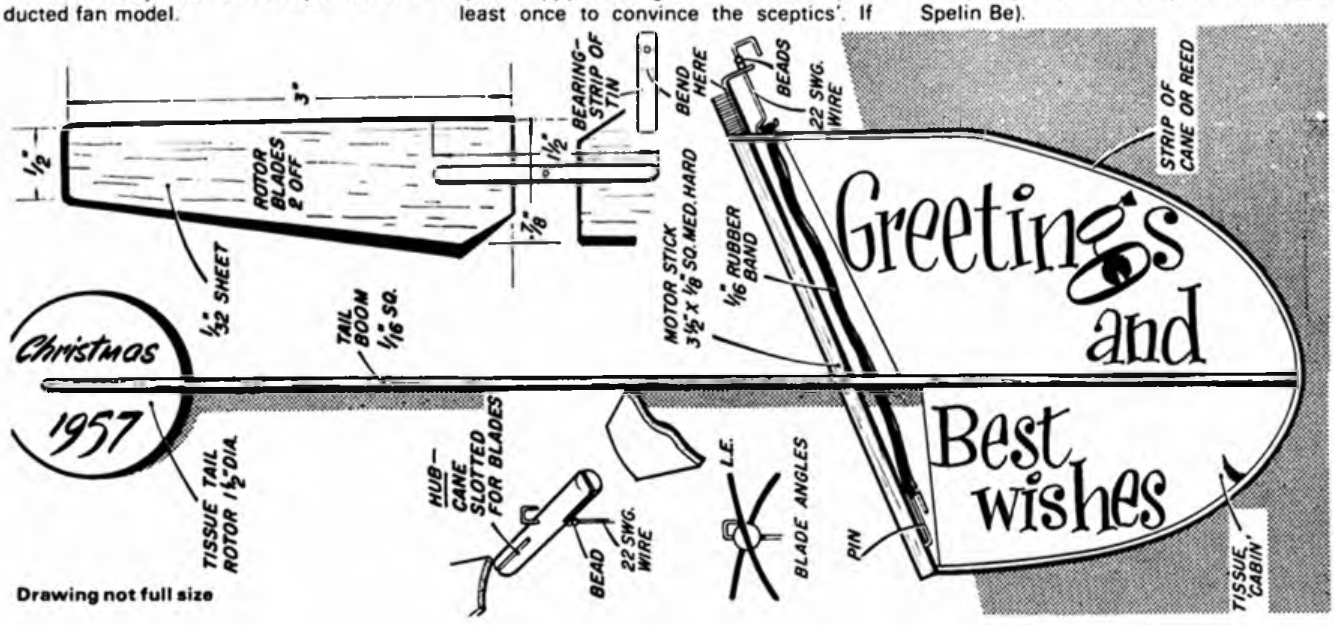
This was probably just right for RAAF Sgt. Morley, based in Singapore, who was building an R/C scale C-130 'Hercules' for four Frog 149 glow engines with throttle control on the inners and three channels serving elevators, rudder and retracting undercarriage.

'World News' contained this quote from the builder "Even is it does not fly, I shall be quite happy building it, and it must fly at least once to convince the sceptics". If you're out there Mr. Morley, tell us more.

A seasonal feature was a flying Christmas card in the shape of a rubber powered helicopter, designed by F. G. Boreham (see diagram below).

'Out of the Rut' described a St. Albans slope soaring meeting at Ivinghoe Beacon (the first?) and a hydro meeting at Lucerne (bang up to date!).

'Readers write' . . . contained an interesting letter to Pete Holland, designer of the 'Crums' model (?) in the December 1957 issue, written by the designer of the 'Soapsud' (December 1950 A/M) who challenged Pete to a contest to establish which was the superior model. The letter ended thus: "I cannot alow the fair name of 'Soapsud' to be desicated; she as always floan kleen, has never been scrubbed, and I shal expekt 'Crumbs' to be likewise well bred. Yores trewly, E. (Larfin Boy) Humphrey, (1964 Champ. of Staincliffe Spelin Be).



Drawing not full size

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RTP Flying at the ME Exhibition

by Derek Farman

Bill Brock who ran the 1981 RTP at the Model Engineer Exhibition poses with just a few of the models, which includes some built by students of the Stalham High School. The 1983 RTP show will be worth seeing as there will be two days (Saturday 8 and Sunday 9 January) of concentrated flying by the ATC and Stalham High School.

Introduction

This is an account of the building of the Electric Round The Pole models which were flown at this year's Model Engineer Exhibition by students of Stalham High School.

It will not be a 'how-we-stuck-what-to-what' article, but rather of how I organised the project for the benefit of any other teachers or club organisers who might be thinking of a similar undertaking themselves.

Background

It is now six years since we began to specialise in RTP at Stalham. During that time, two of the pupils have won first prizes at the M.E.E. for their RTP models, we have made six television appearances and have given over 50 public performances at a wide range of social events — trade fairs, RAF open days, fêtes, exhibitions and on visits to other schools.

General Principles

From the outset, I knew that it would be essential to strike a balance between how much the project would become 'mine' and how much it would belong to the students, remembering that their age range lay between 12 and 15. On the one hand, I did not want to monopolise the undertaking but on the other, I was no keener on letting them have complete carte-blanche. In the end I decided to lay down general guide-lines, yet allow them to employ the maximum amount of ingenuity within those guide-lines. Thus, I was able to maintain control of the project, yet the students could still play their own individual parts within it.

Equally important was the need to establish a precise aim — 'To build "X" number of models within six months', and to get the logistics right. In the case of the latter, this meant a number of factors in the absence of which the whole undertaking would have foundered. These included, the need for a group of willing modellers with sufficient experience to work within fine degrees of tolerance, space within which to both work and store materials, hard and fast times for building sessions, good sources of reference and of course the tools and materials. I also set a cash limit of £5 per model, excluding the motor.

With the above clear in my own mind, I was then able to break the forthcoming programme down into three stages: *(1) Design and Drawing; (2) Construction; (3) Flying*

Design and Drawing

Although I thought that a theme to the project would be a good idea, I had an open mind on what it should be. In the event, it was the students themselves who made the decision after one of our girls won the Junior RTP prize at the 1981 Exhibition with her Blackburn Monoplane and yet another showing of 'Those Magnificent Men' on television. The pre-First World War era!

I then pointed out the restrictions that this would impose as regards specifications for the models and let the students solve the problems among themselves.

The result was as follows. The models would have to be big enough to be seen from a distance yet of a size within the limits of our equipment. They were to be of a constant scale and of sufficient variety in appearance to prove of interest to the non-aircraft specialist. Lastly there was my problem of matching skills to aspirations.

Then came the research into the various available types and here a good reference source is essential. After much deliberation we came up with these flying machines as potential subjects; Blackburn Monoplane and Bleriot XI (in our flight line already), Martin-Handasyde No. 4, Morane-Saulnier Type G, REP 2bis, Eastbourne Monoplane and Deperdussin. This took care of the monoplanes. This left the Tabloid and Caudron Type A to represent the biplanes and the Avro Triplane along with the Phillip's to stand for the 'multi's'.

With that decided there came the moment to start work. I had already warned the builders that the project would take several months, which was just as well for they soon discovered that there was not a dearth of commercial kits or plans and that they would therefore have to build completely from scratch. The students then fell into two categories — those who felt confident to draw up their own plans and those who were not. To suit both, I drew up four designs for the latter, stressing the maths involved and the actual drawing techniques. By the time I had completed the last, the remaining students knew enough to go away and start on their own.

Fortunately, all those involved were experienced builders so they had a good working knowledge of actual building techniques. Even so, I tried to encourage 'simplicity and regularity' form the word go, i.e. concentrating on a simple strong yet light airframe and forgetting about the scale details until the end as far as possible. I also encouraged as much standardisation as possible to save materials, time and effort.

With every assistance from the Technical Drawing department, all plans were completed by mid-June 1981. We could now go onto the next stage.

Construction

At the outset I did something that was to save a tremendous amount of time later. I consulted each building 'Team', got them to draw up their individual material lists, and after buying the necessary in bulk, together we 'Kitted' each model. This had the other advantage of allowing me to maintain control of what was happening — very important when you have perhaps fifteen keen youngsters all working on different models at the same time, and you can only be in one place when you are needed in several.

Again it is essential to have all materials and tools readily to hand. Nothing is more frustrating than to be kept waiting for the next visit to the model shop in Norwich for urgently required supplies. I also found it useful that they were all building to 1/12th scale, for each could keep an easy visual check on how the other models were progressing.

As regards where we worked, we were very fortunate in having my large classroom at our disposal with its enormous storage space. Because two-thirds of our pupils have to 'bus' each day from outlying

Continued on page 46

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Vintage Revival

DRYAD

By H. E. White B.Sc.

This challenging project was first published in Aeromodeller, February 1946, and included a cover painting of the model by C. Rupert Moore. As stated in the original article, this is by no means an easy model to build, but what a super structure!

Construction

Hull

The basic form is made by building two sides over the plan. Two formers are made (entitled basic formers on the plan) and glued in place with the hull sides upside-down and positioned over the plan view. Cross pieces are then added to the top of the hull and the bow and stern joined together. Great care should be taken to ensure this stage of construction is accurate. The next stage is to insert the forward keel and the central stringer aft of the step. At each former position, fit the pairs of struts that form the triangular keel supports both fore and aft of the stops. Now add the stringer formers and then the stringers, checking at all times to ensure the hull remains square.

Modern cyano glue will make the job of fitting stringers and sheet over the compound curves, a much easier job than it was in 1946.

Wings

This is a very interesting structure, having no leading edge but relying on 1/32in. sheet balsa planking which is then continued back to the main spar, top and bottom. It is suggested that strips of 1/16in. wide and 1/8in. wide 1/32in. thick are used to form the elliptical leading edge, over the acute curve part.

Note: the wing is constructed over the plan in the usual way and must be pinned firmly in place.

The top main spar, rear spar, trailing edge and top leading edge sheeting are fitted and the tip blocks which are cut slightly over size. Now with the wing still left firmly held in place over the plan, construct the motor nacelles.

Motor nacelles

These are quite straightforward, consisting of two longerons pinned down over the plan, with half round formers and stringers added. When set, remove from the board and make a tracing of the plan section of the nacelle. This tracing is now used to mark the position and shape of the nacelle on the wing. Cut out the space for the nacelle in the wing and insert and glue in the motor nacelle. Add the various strengthening stringers making sure the wing remains in place at all times. Add gussets, sheeting and cap strips as shown, then remove the wing from the board and complete the bottom of the motor nacelle and leading edge sheeting, etc.

Completing the wing

Make one length of rectangular balsa tube, enough for all the boxes required. Set the wing up on the board at the correct dihedral angle and build up the wing root inserting the boxes and cutting them flush with the end rib. Complete the sheeting, emplacements for wing floats, runners for the wing fixing and boxes for the bracing struts.

Fin

The very fat aerofoil section of the fin is made in a half section. Before completing the structure, ensure it is a good fit to the hull.

Tailplane

This is constructed over the plan in the usual way but does require careful setting up when fixing to the fin.

Covering

If the model is going to be flown from water, it is best to clear dope the whole structure and also use clear dope as a glueing agent for the tissue.

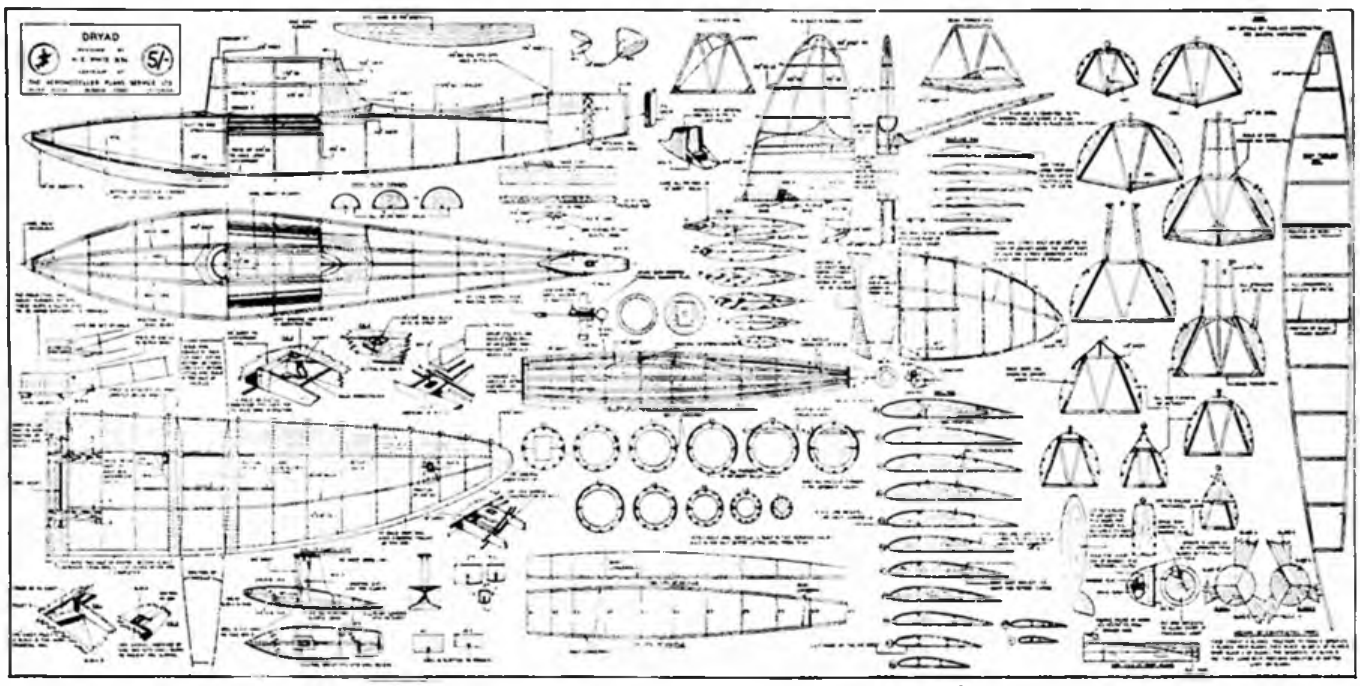
Propeller

Full details are given on the plan for the construction of this three blader.

Power

The model was powered by 1oz of rubber in each nacelle. No dimensions given other than the skein was 22ins. long and pre-wound.

A copy of the original more detailed instructions, published in the February 1946 Aeromodeller, can be obtained from the editorial office, price 55p.



Full size copies of the plan reproduced here are available from Aeromodeller Plans Service, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts. HP2 4SS. Order No. WP/230X, price £2.00 plus 45p postage and packing.

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Friday 10 am-7 pm
Sat 10 am 5 pm

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THE MODEL SHOP *
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**Shops offering a mail order service are denoted by an asterisk*

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Continued from page 41

rural settlements, no building was possible after school and the difficulties of getting half-completed models to and from school in the buses can easily be imagined. This meant that all work had to be done in dinner-breaks. As it happened, this was to prove to be an advantage. It was easy for me to keep a constant eye on progress and all damage that might have been inflicted in daily transit, avoided. Moreover, because the models, as they neared completion, had to be left out, they provided us with good publicity throughout the rest of the school. Classes would come to me for their weekly history or sociology lessons, enquiring about the progress made on particular models. In this respect it is worthy of note that even allowing for a civilised community in the school, not a single model or article of equipment was ever touched at any stage of the building programme.

As predicted, the actual construction of the models took nearly four months. Some of the builders devoted well over 60 hours to their particular models. At long last, however, they were completed, and everyone could stand back and admire the 'Flying Line'. It was impressive, but the problem remained — would they fly?

Flying

Any thoughts that because they all had a common power-plant (a push-fit, geared Mabuchi 333), the machines would all present the same trimming problems, was soon dispelled. All preliminary flight testing was done in our excellent Sports Hall on 25ft. lines. At this stage, the models all looked 'half-dressed' for they were still unrigged. I prefer this for in the event of a mishap, it is easier to effect repairs with the minimum amount of detail in the way. Once the trimming was complete, then all the scale 'Goodies' could be added. With that done, the models were again flight tested and final adjustments made.

The only real snag encountered was with the Phillips Multi-plane. This was not unanticipated for as its philosophical builder put it: "We want the show to be authentic so we can't have everything flying. I bet the original didn't get off the ground either!"

How well the models subsequently performed was witnessed by our appreciative audience at Wembley.

Evaluation

With the show over, I inevitably asked myself what the students got out of the project. Their handicraft skills developed enormously, this was obvious, leaving them with the skills and confidence to tackle other branches of aeromodelling. They had learned the basic principles of scale-drawing and all the maths that is thereby involved. Basic methods of historical research were heavily involved in the chase for scale detail and information on each model. The principles of flight themselves had been thoroughly explored. All of the students had needed to master simple electrical circuitry to set up the equipment to fly their models. Each person involved had found their ingenuities stretched to solve problems as they arose, so their ability to recognise snags, how to analyse them and then solve them developed enormously. Far more difficult to quantify, were the social advantages gained by a group of 'country mice' coming to the big city to show off our wares. Such experience opens up social contacts and eyes to a much bigger world than that of East Norfolk.

Above all, there was the element of fun and enjoyment. Without those, no model, taking 60 hours or more to build, would ever get completed.

The Organ-grinder

So much for the students, what of me? What did I get out of it? Certainly not money and a great loss of time that stopped me from building on my own account. On the other hand though, I did have the opportunity of working over a prolonged period with a pleasant, gifted and rabidly keen bunch of youngsters. The time and effort was made worthwhile by seeing the pleasure of them not only gaining new and more complex skills, but then unselfconsciously using them to produce some outstanding work.

If any reader is in the position of wanting and being able to mount a similar project themselves, then bearing in mind the organisational points I have tried to outline, then go ahead. Remember, plan well ahead and keep control of the programme. This should result in you effecting a successful completion to your project and the retention of your sanity!

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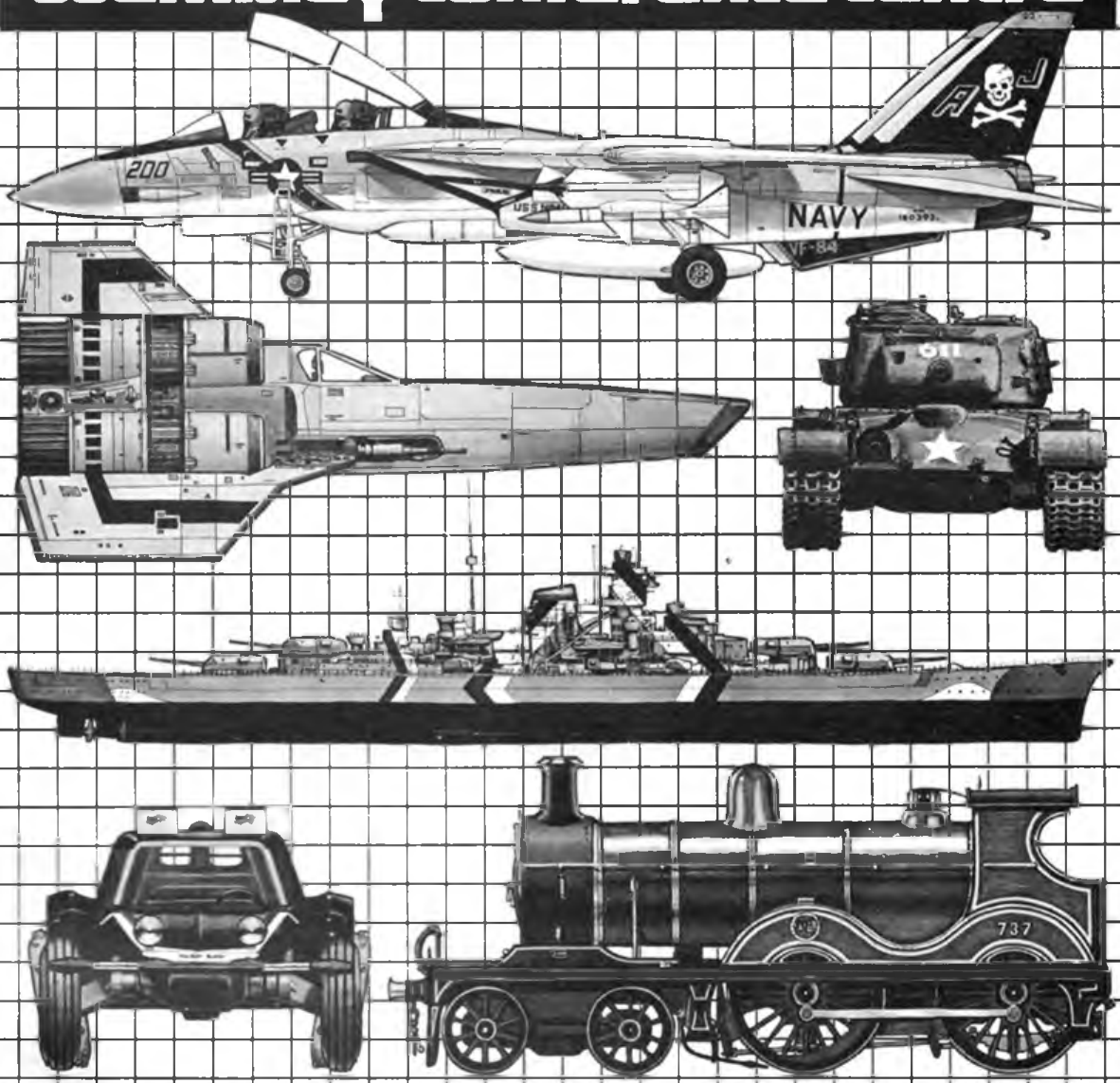
Model Engineer Exhibition

1-9 Jan '83

Open 10am-7pm
Late night Thurs. 6th until 9pm

Wembley Conference Centre



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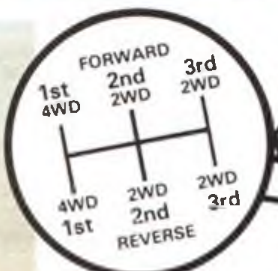

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VEEBIPE

Length: 14½in.
Span: 16½in.
Weight: ½oz.
Power: 1 loop (4 strands) 1/8in (3mm) flat rubber strip

Designed by Ray Malmstrom

Nose doublers 1/16in. (1.5mm) sheet

Balance point

Upper wing

All parts shown in heavy outline FULL SIZE

Fig.1

Rear rubber anchorage 20swg

Basic fuselage shape

Nick

Fin

Weight

Tissue strip

Washer

Drive shaft 20swg

Cut out for rubber motor

Cement skin

Fuselage 1/8in. (3mm) sheet

20swg brass bush

Undercarriage leg 20 swg

Lower wing

B.C. 1/16in. (1.5mm) sheet 2 of each

Fin 1/32in. (0.8mm sheet)

Single strips of tissue either side

Jig Y 1/8in. (3mm) sheet

Lower wing panel (2 rqd) 1/32in. (0.8mm) sheet

Fuselage wing

Fig.3

Peck Polymer 6in. diam. prop.

Elec tubing

Wheel 3/32in (2.5mm) balsa. Stiff paper centre discs

C/L

Single strips of tissue top and bottom

Tailplane 1/32in (0.8mm) sheet

Fuselage

Position of dihedral jig X

Single strips of tissue over join top and bottom

Two layers of tissue top and bottom

Leading edge

Upper wing panel 1/32in. (0.8mm) sheet Half of panel shown

Fig.4

Tissue doped on leading and trailing edge

Please do not dope fuselage or any of the flying surfaces of this model.

Dope on tissue strips with mixture 50/50 dope and thinners

Indicates grain direction

Dihedral jig X (2) 1/8in (3mm) sheet

Grease proof paper

Fig.2

Section through D-E

Dihedral jig X

Building board

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