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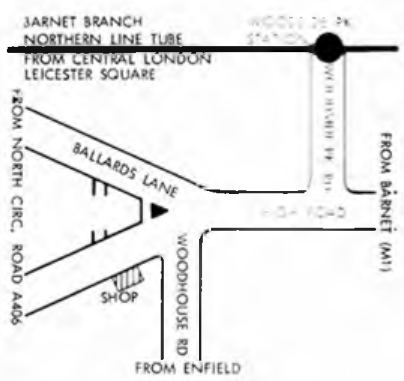

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Aeromodeller

FEBRUARY 1983

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EDITOR **COLIN RATTRAY**
Graphics **LORNA CULLEN**

MAP **MODEL DIVISION MAGAZINE**

Advertisement Director **M. GRAY**
Managing Director **RON MOULTON**

Comment

DEPENDING on one's personal viewpoint, competitive aeromodellers will be either pleased of fairly chagrined at the decisions, or, for the most part the lack of them at the December FAI Models Commission meeting in Paris.

More detailed analysis of proceedings will appear in Aeromodeller next month, but a preliminary outline of the most fundamental decisions is important for those who need to know the latest word as early as possible.

There have been moves afoot for some time now to curtail the performance of both FAI free flight power models and FAI control line team racers by the simple expedient of reducing engine capacity for 2.5cc to 1.5cc. Proposals in the CIAM agenda to make such changes in either class were defeated and those who prefer the models and engines they already have can breathe again — for the moment anyway. Control line combat fliers can look forward to a new ball game however, with a bigger heavier model with a compulsory minimum size of propeller which should have the effect of bringing all those diesel engines back into favour.

Australians have been pressing for a World Championship 'down under' for many years and have finally overcome the objection of geographical isolation which has been the disqualifier up until now. Confirmation that the 1983 World Free Flight Championship will be held in Australia finally satisfies the right to run such an event, earned as a result of Australian wins in F/F World Champs during the 1950's. Congratulations.

Britons can also look forward to a UK run World Championship this year with the hosting of the World R/C Glider Champs at York. Much work and planning has already gone into this event, including the use of the intended venue for an International glider event late in 1982, which proved the suitability of the site, and we look forward to a well supported World Championship event in the best traditions of the aeromodelling sport.

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On the cover
Stan Cole's magnificent Gloster Gladiator for CO_2 power. Building instructions for this APS design are published in this issue on Page 64.

Next month
We start our first, in what will be a series of photo competitions with the winner receiving a Cosina SLR camera. Our APS design is for a DH Fox Moth. This model is primarily for Free Flight but can also be fitted with radio control. All our usual news, trade and book reviews. On sale February 18, 1983, price 70p.

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Aeromodeller Magazine (ISSN 0001 9232) is published monthly by Model & Allied Publications Ltd., P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead HP2 4SS, England. Tel: Hemel Hempstead (0442) 41221. Second class postage paid in the U.S. at New York, NY USA Mailing Agent: Eastern News Distributors Inc., 111 Eighth Avenue, New York, N.Y. 10011. **Distribution** to North American hobby and craft stores, museums and bookshops by Bill Dean Books, Ltd., 166-41 Powells Cove Blvd., Post Office Box 69, Whitestone, NY 11357, USA. Tel: 1 212 767-8632. **Distribution** to news stand sales by Eastern News Distribution Inc., 111 Eighth Avenue, New York, N.Y., 1011 U.S.A. Tel: 1 212 255 5620.

Advertisement Offices: Model & Allied Publications Ltd., P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Hertfordshire HP2 4SS. Tel: Hemel Hempstead 58117. **Subscription Department**: Remittances to Model & Allied Publications Ltd., P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts HP2 4SS (subscription queries Tel: 0442-51740). **Direct subscription rate** £11.20 per annum, including index. Overseas subscriptions £12.20 or $28.00.

Change of address, US Postmaster: Send address changes to Model & Allied Publications Ltd., P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Hertfordshire HP2 4SS, United Kingdom.

AEROMODELLER incorporates the MODEL AEROPLANE CONSTRUCTOR and is published on the third Friday of each month prior to date of publication.

Aeromodeller is printed in Great Britain by Leicester Printers Ltd., The Church Gate Press, P.O. Box 20, 99 Church Gate, Leicester LE1 9FR. Mono origination by Multiform Photosetting Ltd., Cardiff, for the Proprietors and Publishers, Model & Allied Publications Limited (a member of the Argus Press Group). Trade Sales by Argus Press Sales and Distribution Limited, 12-18 Paul Street, London EC2A 4JS.

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FOURNIER RF — 4
Long wing of the full size used to advantage in this semi-scale design to produce an excellent sport stunter Plans show both foam core and conventional balsa rib wing construction 55in span (1397mm) model is a refreshing shape in C L stunters 3 5cc (.20 cu in.) motors
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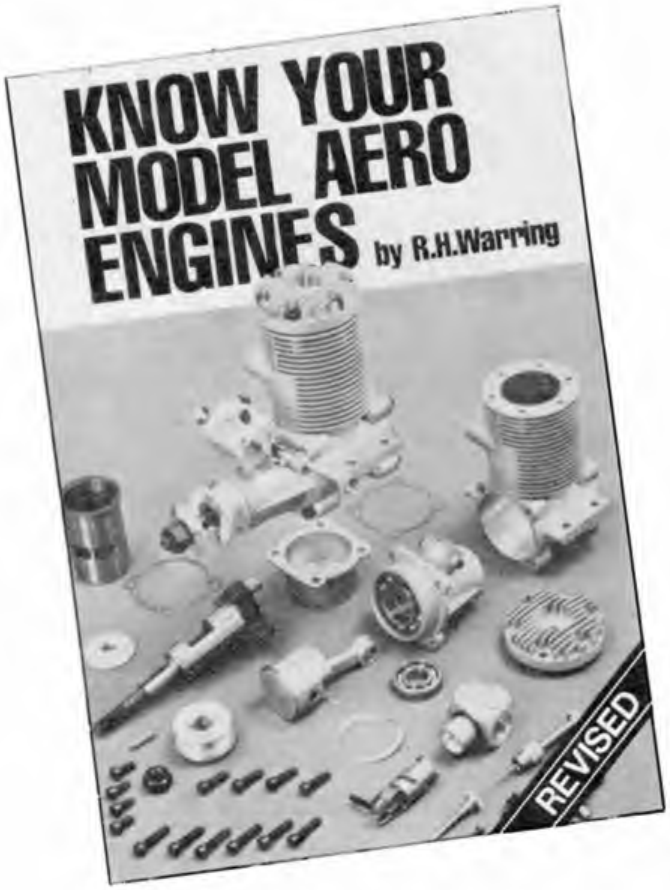

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KNOW YOUR MODEL AERO ENGINES, by Ron Warring (former engine test writer for *Aeromodeller*) first appeared five years ago, since when much has happened in the model engine field. This new, enlarged and revised edition covers four-strokes, multi-cylinder engines, big ones and CO_2 in addition to the usual single cylinder diesels, glow and spark ignition engines.
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The Castle Drake Caravan Park, Woodbury, Exeter, Devon EX5 1HA, is run by Alan Parker, an avid aeromodeller. Alan is offering special terms to any club who would like to organise an aeromodelling holiday. There are 25 caravans on the site, all with mains services, most of them one to four years old. Further details may be obtained from the above address.

SAMS

SAMS model shop have decided to concentrate their efforts completely on the mail order side of their business. This means that their shop situated in Hatfield Road, St. Albans, will be closing down at the end of January 1983.

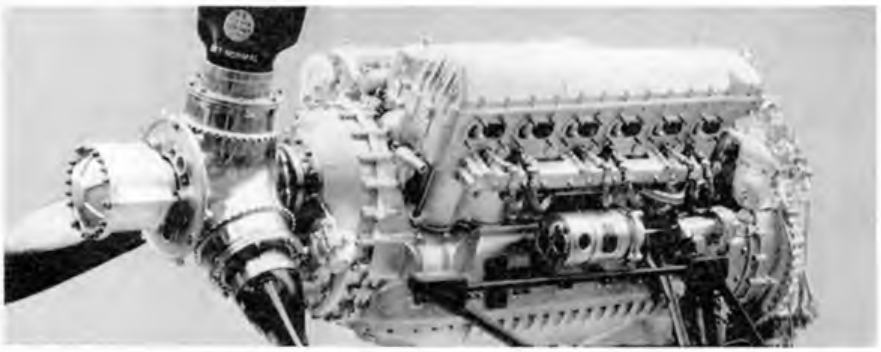
Their new address for mail order is: 2 The Drive, Blackmore Road, Wheathamsted, Herts. Phone Kimpton 832011. Note: a 15p or 20p charge will be made for any order, depending if you require first or second class postage.

GOSSAMER ALBATROSS

Currently on display at the Science Museum is the original Gossamer Albatross (the reserve aircraft remains in the USA). Suspended over the main hall, the 93ft. span ultralight man-powered aircraft which won the £100,000 prize for first man-powered flight from England to France is on loan to the Science Museum, South Kensington, London for some time to come. Modellers will immediately appreciate its achievement when this amazing machine is seen.

ROYAL AERO CLUB AWARDS

Congratulations to Alwyn Greenhalgh who was awarded a Silver Medal by HRH Prince Andrew on December 9 in appreciation for his contribution to aeromodelling over the years from 1933 to date. A member of the Wakefield Team, when aged 11 in 1936, Alwyn went on to enjoy a career as a Fleet Air Arm Engineer and since 1960 has set about the task of collecting historic aeromodelling items. Since 1963 he has been the official historian of the SMAE and his current collection includes over 70 models and innumerable artefacts dating back to 1908. On the same occasion, the Royal Aero Club Bronze Medal was awarded to Sean Bannister, for his outstanding work in thermal soaring competitions. Finishing third in 1977 and second in the 1981 World Championships, Sean has been a team member on three occasions and National Championship winner in 1975, '76 and '80. Congratulations to two worthy recipients.



This 1/5th scale working model of a Merlin XX to Hurricane II specification, was made by Barrie Hares and appeared on the cover of the January 1983 issue of Model Engineer.

Barrie started building the engine in 1976 and reckons he has spent about 6,000 hours in the construction! All systems function correctly with the exception of the supercharger. Special features include fully working four pole 12 cylinder magnetos and Platinum electrode spark plugs. We will publish further details of this fantastic piece of engineering in our report on the Model Engineer Exhibition. The Merlin is a genuine runner.

C/L SYMPOSIUM

At the Control Line Technical Committee meeting on December 12, 1982, and following suggestions made to the Committee, it was decided to hold a symposium covering all C/L disciplines in late February.

All interested people should send £1.00 to R. Horwood, 21 Burghley Avenue, St. Andrews, Bristol, BS6 5BL, if they wish to attend and enclose a note of any suggested items for the agenda.

The date and venue will be circulated to interested parties in early February if sufficient interest is shown.

FLAPPERS — AGAIN!

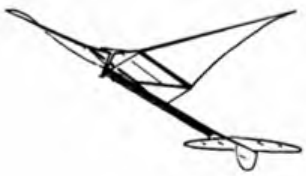
An International Contest for Ornithopters is being arranged by David W. Erbach of Winnipeg, Manitoba, Canada with simple but attractive rules. It is for any Ornithopter which must be rubber powered and having a maximum supporting surface of 1,000sq. cms (155sq. in.). Half of this area can be used as a fixed supporting surface leaving the remainder as flapping surface for propulsion. The Postal event will be judged on maximum duration of a single flight there being no limit on the number of flights which may be attempted and the duration of the contest is from December 1, 1982 until December 1, 1983! Such an open regulation permits unlimited attempts. We expect that David will receive a large number of best flight claims in his mail by the closing date of December 15, 1983.

Longstanding readers of AEROMODELLER and the AEROMODELLER ANNUAL will know how the subject of flapping wings has emerged with regularity each decade. Our last major feature was in December, 1972 when we described two competitions which were obviously too ambitious because there were no entries! Going much further back, the introduction of flapping wing plans started in the 40's and a number of drawings are available through APS. The toy or ready-to-fly ornithopter is now commonplace through the marketing efforts of Airfix in this country, Wham-O in the USA and Rumbeyke in France. Plastics made the monocoque body possible which could stand the enormous torque loads of a short motor to drive the toy wings and they fly extremely well. These models all date back to an original patent in the name of P.H. Spencer (designer of the famous Grumman Sea Bee and subsequently the Spencer amphibian). P. H. Spencer's patent US 1,907,887 was originally filed in October 1932. But he wasn't the first such patentee as there have been many others including a unique one by the Birdman of Los Angeles,

AEROMODELLER PHOTO COMPETITION

Starting next month we are bringing back 'Fliar Phil' to judge our new photo competition. For those readers too young to know 'Fliar Phil' he used to judge the model of the month selection of photographs, published in Aeromodeller around the late 40's. Our new competition is geared to encourage all of you to show off your best model or action shot that has an interesting aeromodelling feature. All entries should include as many details of the model as possible so that 'Fliar Phil' can impart some useful information. As you can see from the corner flash on the cover we have a super Cosina SLR camera which will be given to the photo considered best of the month.

Following photo contests will also have a Cosina camera as a prize, so don't delay, send in your entry now. Black and white or good colour prints are acceptable and should be sent to: Aeromodeller Photo Competition, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts., HP2 4SS.



Harry Laverne Twining, Secretary of the Aero Club of California who made an ornithopter as long ago as 1910 and had it patented in 1912 and this one was man-carrying! We would give every possible encouragement to David Erbach and urge readers to write to him at 1738 St. Mary's Road, No. 702, Winnipeg, Manitoba R2N 1G8, Canada for entry details.

1983 WORLD CHAMPIONSHIPS FOR F3B SAILPLANES

The United Kingdom has the go ahead to host the 1983 World Championships for Radio Control Sailplanes at York during the period July 31-August 6, 1983. Some 25 different nationalities are expected to participate in what will be the most important RC Soaring event to have been staged in this country.

Venue for the flying is the centre of York racecourse — the 'Knavesmire' — a mown grass area some 800 metres × 400 metres in size, whilst the official accommodation will be at York University, Hestlington some two miles from the flying site. Facilities for caravanning and camping have been arranged on a grass area — the 'Bustard-thorpe' — right alongside the racetrack.

Competitors at this soaring event will be competing for the 'Houlberg' Individual trophy and the Baron Mike Donnet Team trophy. Six rounds of flying are planned spread over five days giving each pilot 18 flights in which to accumulate points at the Speed, Distance and Duration tasks. Current World Champion is Dwight Holly, USA whilst West Germany are holders of the team award.

Contact: Geoff Dallimer at 36 Farthing Drive, Letchworth, Herts. 04626 78745 evenings or Mike Proctor at 8 Church Rise, Holtby, Yorks. 0904 53227 daytime.

NEW TROPHY

The encouragement of model flying by commercial concerns is always welcome. It is therefore of particular interest to record that the Sheffield Magnet Company has recently offered to donate a trophy expressly for Class F1E (Magnet-steered) gliders.

During a long association with F1E fliers, the management has maintained a keen interest in the sport, dealing rapidly and efficiently with small production runs of specialist components, all of which have been produced to the highest standards.

This tradition of quality and courtesy typifies the best in British industry, factors which are acknowledged by increasing numbers of customers amongst the ranks of European enthusiasts.

An SMAE supported contest for magnet-steered gliders (F1E) is to be run in late summer/early autumn of this year. Exact venue and date will be announced in What's Happening when confirmed.

A FREE-FLIGHT HOLIDAY IN YUGOSLAVIA

The two international free-flight contests in Yugoslavia on August 20 and August 27 are on the biggest and probably the best flying sites in Europe, if not the world. The first, the Soko Cup, sponsored by the country's largest aviation company, SOKO-Mostar, is on the enormous dry lake bed at Mostar, about 60 miles north-west of Dubrovnik on the Adriatic coast, and is the site used for the 1980 European Championships. The following weekend the Memorial Izet Kurtalich will be at Livno, on an even larger site consisting of flat grass about 10×20kms (6 × 12 miles), and is the likely venue for the 1984 European and 1985 World Championships.

The two contests are an ideal way to combine the fun of top-class model flying in FAI classes F1A, F1B, and F1C with a holiday in a most attractive and reasonably-priced part of Europe. Both contests are on the Open International Calendar of the CIAM, and further details will be published as soon as we receive them.

Current APEX return from London to Dubrovnik is £203, but if a group of ten or more go then the fare will be substantially less, probably around £120. A fly-drive car scheme is also possible, and transport of normal free-flight size model boxes is unlikely to be a problem. Contact Martin Dilly before March 31 if you are interested, his address is 20 Links Road, West Wickham, Kent, BR4 0QW.

What's Happening?

FEBRUARY 1983

January 23
NORTHERN AREA WINTER RALLY C L FAI GOODYEAR AEROBATICS R C THERMAL SOARING FLY FOR FUN AEROBATICS SCALE FLY IN F F O R O G O P VINTAGE DURATION COMBINED MINI 10am start SMAE members only on airfield Venue Church Fenton Contact John Godden Tel 0532 521007

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

February 13
INDOOR MEETING *EZB, HLG KEYHOLE SCALE* (for Scale Rules see Aeromodeller Feb '75) Venue Wigan College of Technology, Parsons Walk, Wigan Start 11 00am 6 00pm Contact Dave Yates Tel 0942 214725

February 20
EXPERIMENTAL CENTRALISED *OPEN RUBBER, GLIDER AND POWER · NEW CLASS OPEN POWER* Contact SAE to Tony Cordes, 27 Haddon Road, Hazel Grove, Stockport Cheshire Provisional venue North Lussenham

February 27
GRANTHAM GRAND PRIX OPEN RUBBER OPEN GLIDER OPEN POWER COMBINED FAI five flights Starts 10am Prizes guaranteed Venue Barkston Heath Contact P Ball Tel 0332 665361

March 6
INDOOR EVENT — *EZB, HLG AND SCALE* Venue Colne Valley Leisure Centre, Slaithwaite, Nr Huddersfield 1 00-7 00pm Contact Bernard Hunt Tel 0484 862353

March 13
FIRST AREA CENTRALISED *KMAA CUP F1A Glider (Plugge Points) OPEN RUBBER FROG SENIOR TROPHY OPEN POWER* Contact Area Competition Secretary

March 27
SECOND AREA CENTRALISED *HALFAX TROPHY F1C POWER (PLUGGE POINTS, OPEN GLIDER GAMAGE CUP OPEN RUBBER* Contact Area Competition Secretary

April 3/4
EASTER CENTRALISED CONTEST *SUNDAY F1A, F1B F1C (five rounds) MONDAY OPEN RUBBER OPEN GLIDER OPEN POWER* Contact Dave Hipperson Tel 01 207 0179

April 30/May 1
EUROPEAN CHAMPS TEAM THRILLS PART 1 *F1A, F1B, F1C (seven rounds)* Contact Dave Hipperson Tel 01 207 0179

May 7/8
MUNSTER R C CHAMPS Venue Corron Waterfall, Co Cork

May 8
THIRD AREA CENTRALISED WESTON CUP — F1B Wakefield Open Glider White Cup — Open Power Contact Area Competition Secretary

May 14 and 15
BRISTOL AND WEST WOODBURY WEEKEND GOLDEN JUBILEE EVENT Saturday 14 7-9pm Champagne' fly offs for OPEN RUBBER OPEN GLIDER and OPEN POWER Sunday 15 10am start OPEN RUBBER OPEN GLIDER, OPEN POWER VINTAGE PRECISION (S BRISTOL RULES) and All in FAI (five rounds) with a special prize of £30 for the top F1B flyer Contest and accommodation details from Elton Drew, 2 Downfield Close, Alveston, Bristol BS12 2NJ Tel 0454 415092

May 21/22
THERMAL SOARING NATIONALS Venue Mallusk Co Antrim

May 22
C L NATIONALS Venue Craigavon,Co Antrim

May 28/30
NATIONAL CHAMPIONSHIPS

June 4/5
ULSTER R C CHAMPS Venue Nutts Corner, Co Antrim

SMAE PRIZE GIVING 1982

Imposing array of trophies fronts the top table, with Air Commodore R. J. M. Alcock, President of RAFMAA speaking on behalf of the guests.

AFTER a surprisingly smooth AGM on November 27, '82 at the Post House, Leicester, celebrations went on through the evening for about 150 members, guests and prizewinners. Being the Diamond Jubilee Year, a highlight of the evening was the presentation to the society by Alwyn Greenhalgh of a framed letter dated 1922. This was written by Harold Perrin, then Secretary General of the Royal Aero Club, and it delegated authority to the SMAE for the administration of aeromodelling in the UK.

The number of trophies held by the society is legendary, yet each year, new designs are created and awarded. The modern designs, beautifully made, and symbolising their purpose, blend with the mixture of engraved cups, shields and silver bowls. In his speech, Group Captain Joyce of RAF Cranwell congratulated Nats officials for the way in which both Cranwell and Barkston Heath have been left clean and tidy after the two great 1982 Nationals events. As a surprise gesture, SMAE Chairman David Goodwin presented a cheque for £350 to Group Captain Joyce for the RAF Benevolent Fund in appreciation for the magnificent co-operation of the Service.

The real Dick Miles — winner of two speed classes at the Nats including the Ralph Gould memorial made a point that we'd published someone else's image in his name last November!

G Capt. R. L. Joyce, Officer Commanding Basic Flying Training at RAF Cranwell (left) receives a £350 cheque for the benevolent fund from SMAE Chairman, David S. Goodwin in appreciation for the NATS facilities.

Below: Sue Coy of the Freebirds, winner of the Women's Challenge Cup added glamour to the occasion amid all the masculine machismo.

Below: Family business for the Hippersons who gathered the Flight Cup, Model Aircraft Trophy, Weston Cup, Premier Shield and a couple of Sparklets CO2 trophies to keep clean.

Below: Mrs. Alcock ponders how Stafford Screen could carry the Aeromodeller Power Bowl, Sir John Shelley, Astral, Frog Sr. Cups plus the Eddie Cosh Memorial and Senior Championship Cup!

COUPE D'HIVER INTERNATIONAL

Sunday December 5, 1982 at RAF Henlow, Bedfordshire

Over the past eight years that Aeromodeller has been running the Coupe d'Hiver Anglo-French Challenge, we have never had such a good attendance, sixty entries in the 100gram event and a fabulous 106 in the 80gram.

We were again fortunate in having RAF Henlow as a venue, which is an ideal airfield for the competition. The day was overcast but not cold and with very little wind, although half an hour after the flight line had been positioned, the wind did veer to the west, but after this initial move, it remained stable all day.

It was interesting to note there were many new faces and also well known power and vintage flyers in attendance. We were also very pleased to have one French competitor, Stephane Chateau, who also flew proxy for his club-mate Louis Gaudin in the 80gram class.

Several competitors had only finished their models the night before, so were having to spend a considerable time trimming out the models. Even the old diehards had been refurbishing their models: Andy Crisp had made a new colourful fuselage and Norman Marcus had a most innovative design model that incorporated a slim fibre, underslung motor tube and was fitted with a three-bladed folding propeller.

80 gram

By 10.40a.m. flying was well underway and it soom became apparent that there was some lift about. In the first round there were thirteen maxes recorded and many flights of around 100 seconds. By mid-day the lift was even better and at the end of round three there was a total of fifty maxes recorded on the board. As might be expected of this demanding and difficult class of model, it was the well-known regular competition flyers who were in the lead, but at this stage there were many still in with a chance of winning.

Junior flyer Anthony Ball was well up in front having gained one score of 93 and 2 maxes, in fact outdoing his father Phil Ball at this stage by 23 seconds.

Around 2.40p.m. there were still several results to come in to compete round 5, but it began to look as if a fly-off would be necessary. John Spooner, Mike Chilton and John O'Donnell (who was flying proxy for Frank Monts of USA) all had full house scores, which gave us some cause for worry as the weather was now beginning to deteriorate and as the competition was due to finish at 3.30p.m. it looked as if the fly-off would take place with very little light.

Our fears were justified; by 3.15p.m. heavy rain was falling and by 3.30p.m. it was almost impossible to read the score cards — even if you could keep them dry! However our three stalwart finalists — John O'Donnell, John Spooner and Mike Chilton — set off in the rain apparently undaunted. Mike Chilton was first away, the model climbing very well and achieving a 2.00. John Spooner followed in the same way and made a super flight of 2.06. Then there was a wait; John O'Donnell must have launched almost at the end of the 15-minute fly-off time, achieving a magnificent flight in fine style of 2.42 to win the Aeromodeller Cup.

100 gram

For the second year running Ian Dowsett, flying proxy for Steve Savage of Canada, has won the 100 gram Bernard Boutillier Trophy with a full house score of 360 seconds. Ian reported that the model flies so well he is thinking of building one for

John O'Donnell, flying proxy for Frank Monts (USA), gives a terrific heave in the fly-off to win the 80 gram class. Note rain and dark conditions. Below left: Ian Dowsett flying proxy for Steve Savage (Canada) won the 100 gram class for the second year running. Centre: Mike Evatt away to a good start in the 80 gram but couldn't find the lift. Right: Martin Dilly piles on the turns in great style, despite his hasty journey back from the FAI meeting in Paris. Paul Masterman observes.

himself! Roy Miller was a close second, dropping one flight to give him a score of 354 seconds. Martin Dilly and Phil Ball were also very unlucky as they both had two maxes each, but dropped their third flights badly which put them out of the running.

Prize-giving

The RAF made available a large hangar for the occasion which also had a suitable dais. There were a good range of prizes donated by the companies listed below for which we thank them warmly. We would also like to mention two individual donations, a winder made and presented by Dave Stapleton, and a copy of "Aerofoils for Aeromodellers" presented by the author Martyn Pressnell.

It was a most fitting conclusion to a day of free flight at its best, a perfect example of trust in timing and keeping to a strict specification.

Above left: Norman Marcus' 100 gram model which incorporated a three bladed folding propeller and understung fibre motor tube. Above right: two well known modellers, John White of the Blackheath MAC left, and Vic Dubery right. Below right: Phil Siddall with his vintage 1949 'jump' model. The plan for this model, designed by Frenchman J. Morissett, who won the Coupe d'Hiver in 1949, was first published in the Aeromodeller Annual of that year.

Our thanks also go to the RAF for making the whole event possible.

At the end of the prize-giving, there was a rather special presentation of a book given to Dave Hipperson from John O'Donnell. The book was signed by all on the field and with its double edged title of 'Hippo's Coup' was most appropriate, as Dave won many competitions in 1982 and is of course a regular writer on Free Flight in Aeromodeller.

Ian Dowsett who is a professional modeller, has agreed to make a new base for the Aeromodeller Cup, with engraved plates of all the winners over the past years, and also engraved plates for the Bernard Boutillier Cup. A point that many may not realise is, Ian in fact designed and made the Aeromodeller Cup in 1975.

Below left: Dave Greaves was very unlucky as he only dropped one flight in the 80gr which pushed him down to sixth place. Centre: Russell Peers was another competitor who managed to gain several maxes but dropped badly on his other flights. Right: Mike Chilton was first away in the 80 gram fly-off with his trusty Artoo. Helper dried the wing as best as he could in the pouring rain. Tough types these Cuppers!

Prize contributions were received from: Model & Allied Publications

Morris & Ingram
Turnbridges Limited
Henkel Chemicals Ltd.
Humbrol Limited
Model Aircraft (Bournemouth) Ltd.
Micro-Mold Limited
Mid-Wales Mfg. Ltd. (Cambria)

Above: the only French competitor at the meeting, Stephane Chateau, who flew in the 80 and 100 gram. Stephane also flew proxy for fellow countryman Louis Gaudin. Below: John Cooper who placed fourth in the 100 gram class.

Coupe d'Hiver 1982 results . . .

80gr (Aeromodeller Trophy)

106 entered, 77 flew	**1**	**2**	**3**	**4**	**5**	**Total**
1. F. Monts (USA) (proxy J. O'Donnell)	120	120	120	120	120	600 + 162
2. J. B. Spooner	120	120	120	120	120	600 + 126
3. M. Chilton	120	120	120	120	120	600 + 120
4. G. Ferer	120	120	120	120	114	594
5. D. Hipperson	120	113	120	120	120	593
6. D. Greaves	120	120	120	105	120	585
7. P. Carter	120	120	100	120	120	580
8. D. Davitt	120	120	109	120	103	572
E. Hawthorne	120	105	107	120	120	572
10. I. Kaynes	101	102	120	120	120	563

11. P. R. Harris 562; 12. D. Neil 558; 13. B. V. Rowe 558; 14. A. Crisp 554 and R. Miller 554; 16. G. Sharp 546; 17. D. C. Roache 542; 18. G. Davitt 541; 19. P. Ball 540; 20. A. Ball (J) 533; 21. R. Pavely and B. Peers 528; 23. S. Screen 527; 24. J. Brookes 518; 25. I. Dowsett 510; 26. P. Lumsden 508; 27. M. Bull 503; 28. M. Howick 497; 29. K. Fordham 491; 30. B. Colledge 480; 31. N. J. Beaumont 476; 32. N. Marcus 474; 33. R. Chilton 470; 34. B. Horsley 468; 35. J. Ellis 466; 36. P. Michel 460; 37. A. Wells 457; 38. N. Dixon (J) 452; 39. P. Masterman 447; 40. K. Taylor 436; 41. S. Chateau 435; 42. P. Siddall 431; 43. S. Philpott and A. C. Gibbs 428; 45. J. Bailey and R. Elliott 417; 47. J. Billam 415; 48. V. Dubery and M. F. Molton 413; 50. J. Cooper 411; 51. M. Evatt 407; 52. N. C. Lee 400; 53. M. Dilly and S. Dixon (J) 397; 55. M. Dixon 394; 56. G. Neil (J) 392; 57. C. Blanch 390; 58. K. Proctor 389; 59. R. C. Uden and A. Garbett 384; 61. S. Billam 364; 62. J. Nash 359; 63. L. Ranson 358; 64. F. Chilton 355; 65. M. Brown 354; 66. K. G. Smith 331; 67. D. Bartle 305; 68. R. Johnson 295; 69. H. Stones 285; 70. P. Bixby 274; 71. A. Cliff (J) 261; 72. I. Cliff (J) 255; 73. R. McLoughlin (proxy I. Cliff) 231; 74. A. Chilton 223; 75. P. Putnam 209; 76. Louis Gaudin (proxy S. Chateau) 139; 77. J. White 134.

Results

100gr (Bernard Boutillier Trophy)

60 entered, 41 flew	**1**	**2**	**3**	**Total**
1. S. Savage (Canada) (proxy I. Dowsett)	120	120	120	360
2. R. Miller	114	120	120	354
3. J. Cooper	112	120	117	349
4. M. Dilly	120	89	120	329
5. N. J. Beaumont	120	113	91	324
6. D. Hipperson	120	82	120	322
7. I. Davitt	102	111	108	321
8. F. Monts (USA) (proxy J. O'Donnell)	120	96	100	316
9. M. Chilton	96	112	102	310
P. Ball	70	120	120	310

11. D. Greaves 305; 12. D. C. Roache 297; 13. P. Ball 295; 14. I. Dowsett 292; 15. J. Cooper 291; 16. I. Kaynes 285; 17. P. Carter 274; 18. E. Hawthorne 273; 19. R. J. Kenward 271; 20. D. Davitt 267; 21. G. Ferer 265; 22. J. Brookes 264; 23. S. Chateau 261; 24. J. Billam 258; 25. S. Philpott 252; 26. S. Billam 251; 27. B. Peers 244; 28. A. Ball (J) 240; 29. B. Peers 236; 30. L. Ranson 219; 31. J. Ellis 214; 32. A. Crisp 207; 33. R. C. Uden 203; 34. D. Hipperson 202; 35. A. Wells 201; 36. M. Evatt 194; 37. A. Crisp 188; 38. N. Marcus 187; 39. M. Evatt 172; 40. I. Davitt 155; 41. D. Greaves 103.

Junior Results

80 gram	**1**	**2**	**3**	**4**	**5**	**Total**
1. A. Ball	93	120	120	105	95	533
2. N. Dixon	93	61	93	96	109	452
3. S. Dixon	78	69	79	76	95	397
4. G. Neil	43	81	85	84	99	392
5. S. Billam	42	70	42	90	120	364
6. A. Cliff	53	74	52	26	56	261
7. I. Cliff	34	56	71	68	26	255

100 gram	**1**	**2**	**3**	**Total**
A. Ball	85	80	75	240

KIT REVIEW

A high wing cabin design for CO_2 or .020 glow motors from Moorhouse Kits.

By Jim Woodside

A SCALE model of a model! Actually this kind of exercise is becoming ever more popular and SAM recognise a competition class for 020 Replica where the PeeWee and TD engines by Cox hold sway. There is good sense in this, as the models look period with all the pleasure this involves but have two advantage: (a) small size and cost, and (b) easily available cheap engines in either glow or CO_2 form.

As some of you may know, I am more closely associated with the round and round stuff of team racing. The Nationals of '82 was not the most personally pleasant event I have attended on account of troubles of various sorts. However a visit to some of the smaller trade stands did much to salve my flagging enthusiasm. The kit in question was purchased 'over the counter' at the stall of Ben Buckle's Vintage Plans and so we can assume that it is a 'standard' product. The Telco motor was purchased at my local model shop. Initially this had a defective charger but Telco Systems replaced this within three days by post. The motor has been excellent and can only be recommended.

Before turning to the kit I would like to say a word or two about glues. With the exception of the undercarriage mounting, on which epoxy was used, and the laminated tips which used PVA, the entire model was built using cyano glue. I have used this glue extensively in the last couple of years and am now converted to its use. Despite its cost the joy of building at speed and at almost zero weight increase, more than compensates. Small inaccuracies can easily be filled with sodium bicarbonate (baking powder) before applying the glue.

The kit comes in a card box with outline three views of the skeletal model. Inside are two rolled plans, white modelspan and a piece of coloured tissue trim.

The wood in my kit had been carefully chosen for its purpose with strip wood in various hardnesses and the rib wood in 1/32in. quarter grain. The printing on the wood was crisp, clear and accurate. By the way, I found a single edged razor blade the best instrument for cutting out the ribs and chopping longerons to length. I strongly recommend that you spend some time studying the plan and sorting out the wood into its various uses. The plans are well drawn but information is placed in the 'open' spaces — again, read it all.

To complete the wings, tailplane and fin, it is necessary to laminate the curved edges from 1/32in. strip, for which formers are necessary. I made mine by photocopying the relevant parts of the plans, cutting out the sections and gluing to hardboard before shaping. Candle wax rubbed into the edges stopped the PVA adhering to the hardboard. It is a good idea to make these parts first. The wing panels are built direct over the plan but pre-shaping the leading edge roughly to section will help to avoid breaking any delicate glue joints when final sanding is undertaken. The panels are joined by a small flat centre panel which seats over the cabin.

The fuselage construction follows time honoured traditions of two flat basic sides, which are joined by small cross pieces. Take care to choose longerons of equal hardness and no trouble should be experienced with achieving equal curvature when the sides are drawn in. Thin acetate is provided for glazing the windscreens. Rather than glaze the sidescreen from the outside, I glued them to the inside using dope as the adhesive — the final result was quite effective.

Having lightly sanded all components to a smooth finish, the model is ready for covering. Rather than use the white tissue in the kit, orange jap tissue was substituted with black contrast trim. Well thinned dope and banana oil gave an all up weight of 1.7oz complete with engine, and a pair of Williams Bros. scale wheels used in preference to the original plastic ones supplied.

Flying

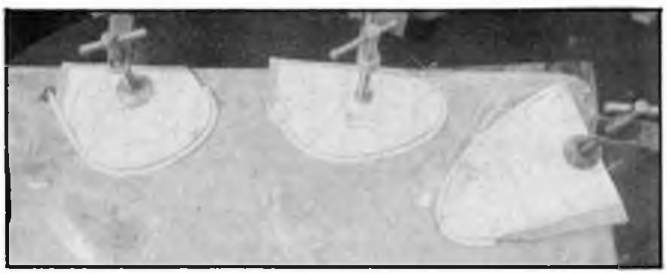
It flew right off the building board! Well, not quite but almost. A little packing under the wing trailing edge cured any stall tendency on the test glides. Later, left rudder was added to give the correct amount of turn for the glide and as a result of this, some right thrust was given to the Telco motor. Gas charges were all that was needed to give a good climb. By the way it is possible to 'tune' the engine revs by adjusting a cam on the crankshaft. Certainly modest runs are quite sufficient.

In summary then, a model which I very much enjoyed building and flying. It represents good value for money when one considers the quality of the contents. Well worth investigating.

Details: kit cost £5.50 available from Ben Buckle Plans or direct from Andrew Moorhouse, 2 Cavendish Place, Bath, Somerset.

Telco CO_2 about £9.50 at most shops.

Williams Wheels at 70p from Flair Models or local model shops.



Hardboard templates used to laminate tips of wings, tailplane and fin outline. Note use of clamps to hold templates in position and position of pins holding the laminated strips in place.

An 18in. span super scale design for the Telco CO_2 motor or similar power unit.

Gloster Gladiator

by Stan Cole

The numbers of Spitfires and Hurricanes on strength was all to "few" at the outbreak of war in '39 and many other types were pressed into service to augment their fighting power. One such type was the Gloster 'Gladiator,' a chunky little 'bipe already obsolescent in 1939, but nonetheless destined for action in a number of theatres of war and to be responsible for the destruction of many German and Italian aircraft. The prototype depicted here is that of F/O H. E. Vickery and served in the Norwegian campaign. By employing acetate mouldings and careful selection of 'light stock,' the finished model weighed only 2¼oz. With a wing area of some 120ins.² the lightly loaded model flies well with a standard Telco CO_2 motor. The model may be finished 'full house' with dummy engine, sliding canopy and rigging etc. I found the super reference given on the 'Aeromodeller' scale drawing No. 2714 helped enormously, but remember all items should be kept as light as possible.

Fuselage

Start by building the basic crutch from medium ¼in. x 1/16in. stock, up to former **No. 1** (engine sub-frame comes later), next add fuselage formers **1** to **6** followed by 1/16in. sheet spines, the undercarriage will have been bound to former **No. 1** using strips of mm ply to take the stress of the nylon thread binding. Former **4** has a sub-former at the rear as a seating for fuselage stringers. Next add 1/16in. sheet cockpit 'platform' and add 1/32in. soft sheet from former **1** to **4** leaving a cut-out for lower wing as shown in the side view. Cut out also aperture for canopy; this is followed by the addition of 1/16in. sq. stringers from former **4** to end of fuselage. When dry, cut out a slot for the tailplane, and also for the gun troughs and line with notepaper, add former 1A to former **1** to locate front fuselage moulding.

Next build engine 'sub-frame' from ¼in. x 1/16in. and "cement" this to former **1** together with front fuselage moulding and cowling location ring. Next add engine bearers (1/16in. x ⅛in. hard) and motor mount. The cowling is also an acetate moulding and is a 'push-fit' over the cowling ring for easy removal. The cockpit aft fairing is again an acetate moulding and is added next. The entire fuselage is now skinned with lightweight modelspan and given one coat of 75% clear dope. Next add the canopy (fixed or sliding to choice), pilot, compass and cockpit interior "green primer" finish. Cut hole in fuselage front moulding to take CO_2 bottle and install engine.

Wings

A few pointers apart from the obvious shown on plan. Make a 1mm ply rib template to ease rib manufacture. This can also be used by shifting down by a width of 3/32in. a time on 1/32in. balsa sheet for making the 'split ribs' L.E. riblets.

Although Stan's prototype model is fully rigged and finished in authentic colour scheme, it only weighs 2 oz.

Wings, Tailplane, Fin & Rudder

Keep these components light (medium soft) building as one piece but leaving hinge lines *'dry'*. When completely dry, split through hinge lines and add thin aluminium hinges. Cover in one piece with lightweight tissue and slit through hinge lines again after 75% clear doping. Skin the wings with lightweight modelspan and also give one coat 75% clear dope. At this point all components may be painted in the chosen livery (I used thinned matt Humbrol enamel) prior to assembly.

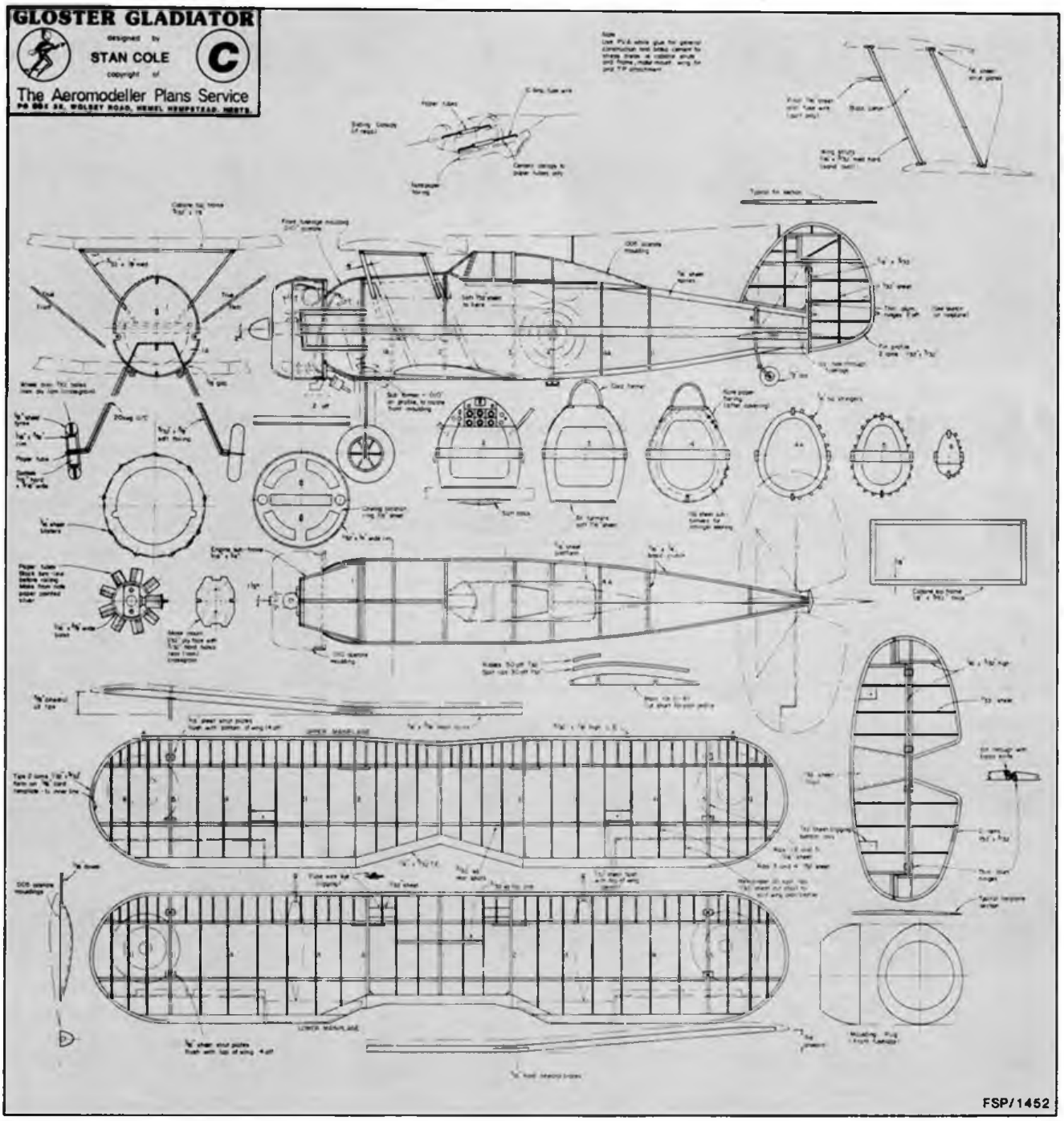
Assembly

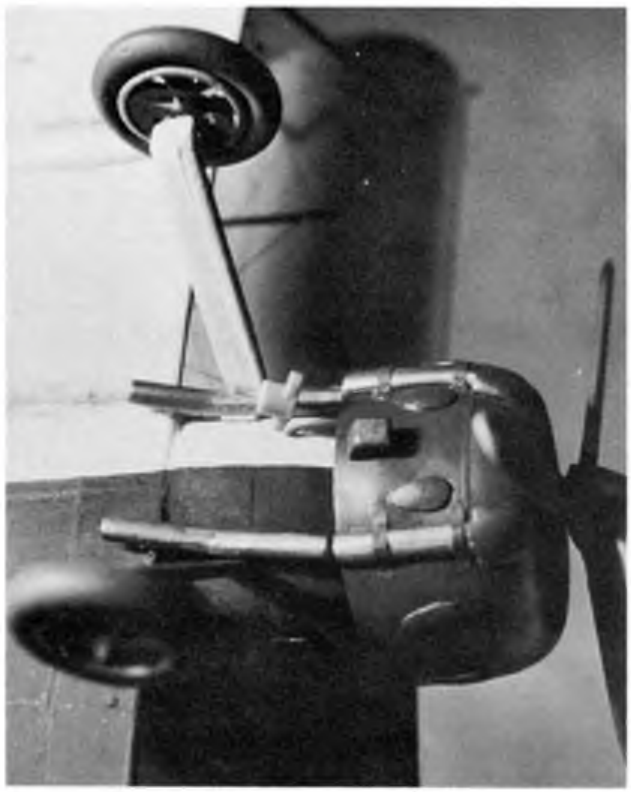
Fix the cabane struts to the fuselage (slot through sheeting) with cabane top frame, cement top wing to cabane frame followed by bottom wing, fin and tailplane (check squareness in all 3 axels), add wing struts and rigging and scale details, i.e. cowling blisters, oil cooler, exhaust pipes, machine guns, aerial, pitot and tailwheel. Roundels and registration letters, etc. may be made from plain white contact or Fablon with red and blue areas applied with ink bows (matt Humbrol — thinned). Note: underwing gun pods are made from acetate mouldings.

Trimming

As always check the centre of balance is about the same as shown on the plan. Make

The plan reproduced here to quarter scale is available from the Aeromodeller Plans Service, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts., HP2 4SS, as Plan No. FSP 1452, price £1.50 plus 45p post and packing.





Left: this underside view of the nose shows the CO2 filler protruding from the rear of the cowl. Top: details such as the pilot's name which can be seen on the side, and the compass within the cockpit, go a long way to achieving a realistic looking model. Right: this view of the wheels shows just what can be achieved with a balsa laminate construction.

initial glides over the proverbial long grass and adjust the trim with elevator or rudder. When satisfied that you have a reasonably good glide, try a power flight with 2 or 3 charges of gas only, keeping the motor upright. It should be trimmed to fly in left-hand circles, tweeking the rudder as necessary. If built as per the plan, there should be no need to adjust the side or downthrust of the Telco motor.

As a tribute to the designers of the original aeroplane, the Gladiator conforms aesthetically to the sound aircraft design adage "if it looks right, it probably is right". In my book, the 'Gladiator' certainly fits this bill.

Right: cockpit hood slid back to reveal interior detail. Below left: uncovered structure. Note cowl moulding frame in the top right hand corner. Below right: simple bu effective dummy cylinders surround the Telco cylinder which is in the vertical position.

Engine News

by Peter Chinn

The 'Sesqui,' an entirely new and distinctive looking 1½cc diesel from Australia.

Enter the One-and-a-half 1½

When the Australian Taipan factory ceased production in 1976, Australia lost her only indigenous model motor. Now, happily, the Aussies have another engine of their own, the Sesqui 1.5cc high-speed diesel.

The Sesqui (the name, of course, is derived from the Latin denoting one and a half) is being produced by our old friend 'Ivor F' who, collectors will remember, was responsible for the 1,000-off *Doonside Replica Mills* 75 engines a few years ago. The Doonside-Mills parts were produced at the Taipan factory but, for the Sesqui, Ivor has set up his own manufacturing facility, although former Taipan manufacturer Gordon Burford has been closely involved, having been responsible for the design of the engine and its tooling. As in the case of the Doonside-Mills, the Sesqui is starting life in a 'limited edition' collector's version, for the benefit of the original one hundred subscribers to the project, after which a Mk.II version is expected to continue in steady production.

The engine has been designed for performance and, especially for a diesel of only 1.5cc, is very 'state-of-the-art' so far as layout is concerned. It features a Schnuerle-plus-third-port scavenging system with rear exhaust, a twin ball bearing crankshaft and a rear rotary drum valve. The drum valve has two pick-up slots so that the crankcase backplate can be fitted with the inclined intake upright or inverted — as best suits upright or inverted installation of the engine.

As can be seen from the photographs, this is a purposeful looking little motor. The one-piece crankcase/front-housing/cylinder casing is an investment casting with sturdy beam mounting lugs, a rigidly braced front end, three parallel transfer channels and a rectangular divergent exhaust duct. The crankshaft, carried in steel-caged shielded bearings front and rear, has a 7mm dia. main journal, a 5mm dia. front journal and a 4mm dia. pressed-in crankpin on a T-type crankweb.

The drop-in cylinder-liner has an extremely thick (1.9mm) wall section which is good both from the point of view of high resistance to distortion and improved gas flow through the greater effectiveness of angled ports. The contra piston has a flat underside and the complete cylinder assembly is held down with four Allen cap screws through a machined aluminium head. The compression screw is operated with an Allen key instead of being fitted with a tommy-bar. The lapped cast-iron piston has a flat crown and the alloy con-rod is permanently installed in the piston with a pressed-in solid gudgeon-pin that is finished flush with the pistol skirt o.d. The rotary-valve has a 7mm o.d. x 6mm i.d. drum with a large rectangular valve port that registers with a rectangular port in the backplate. The backplate is fitted into the crankcase with an O-ring seal.

According to our measurements of the engine examined, the Sesqui has a bore and stroke of 12.2mm x 12.5mm, giving a swept volume of 1.461cc or 0.0892cu.in. Checked weight was 132.5 grammes or 4.67oz.

Individual production samples of small diesels tend to vary more widely than do the larger glow engines and it is not unusual to find top-end differences, on a given prop, of a thousand or even two thousand rpm. With commendable frankness, Ivor admits that, whereas, on a 7x4 Taipan prop, his best specimens of the Sesqui turned up as much as 17,800rpm, his worst recorded 15,000. Atmospheric differences could, of course,

Another example of the Sesqui. This one is owned by Ray Victor of Brockley, London SE4, from whom these engines are available to UK customers. Also shown are parts of the Sesqui. Note thick-walled Schnuerle scavenged cylinder, drum type rotary-valve and sturdy main casting.

OPS 2.5-SPA STD uses many parts from the SLA version and produces the same power, according to the manufacturer. Below, stripped down OPS 2.5-SPA shows nice finish of individual components. The OPS 2.5-SPA STD. Built around a new main casting, the 2.5-SPA is a rear exhaust alternative to the 2.5-SLA model featured in last month's Engine Test report.

account for some of this discrepancy, but one has to accept that even the best small diesels can vary quite a bit. In any case, if the prop used (and props can, of course, vary a great deal in power absorption) is anything like our examples of the Taipan 7x4, even 15,000 is by no means poor. In terms of power output, 15,000 on this prop could equal around 0.20bhp, while 17,800 could mean as high as 0.34bhp which is outstandingly good (better, in fact, than we have ever achieved with any 1.5cc diesel) *but we must stress that these are extrapolated figures only.*

Sales of the Sesqui 1.5 in England are being handled by Ray Victor of 21 Vesta Road, Brockley, London SE4, to whom any enquiries from U.K. residents should be directed. The price of the engine is somewhat dependent on the value of the pound sterling at the time of purchase, but is nominally set at $55 in U.S. currency and is therefore likely to be somewhere in the £30-£35 bracket at present exchange rate levels.

OPS 2.5 SPA

Last month's issue featured an Engine Test on the OPS 2.5-SLA-RCA motor. As then explained, there are three basic models in the 2½cc OPS glowplug engine range and, as an alternative to the side-exhaust 'SLA' model, one can obtain an otherwise similar model in the shape of the rear-exhaust 2.5-SPA. Like the SLA, this is available in a choice of STD (standard) or RCA (throttle equipped) versions.

The U.K. agent, OPS Distribution Ltd., sent along a 2.5-SPA-STD model for examination and, just for the record, we are including some photos of it. This, it should be emphasised, is the standard 'non-pipe' engine — *not* the 2.5-SPA-*VAE* racing engine that has the same main casting but a differently ported cylinder liner, a special cylinder-head, a spinner assembly, an exhaust adaptor, special (optional) high-speed bearings and is rated by the manufacturer at approximately *double* the power output of the other models.

As one might expect, the use of an entirely new body casting for the SPA version has brought with it some changes to the motor's specification compared with that of the SLA. For example, the intake port is narrower and, as a result, the induction period is shorter and the timing different according to our measurements, it is now 45 deg. ABCD to 55 deg. ATDC. On this example there was also a very slight difference in cylinder port timing (exhaust 146 deg. of crank angle, transfer and third ports 124 deg.) but this is such a small difference as to be of no significance.

Checked weight of the OPS 2.5-SPA-STD examined was 206 grammes. It goes without saying that this is a well engineered motor, solidly proportioned and nicely finished.

E.D. News

Users of E.D. diesels will be interested to know that E.D. Electronic Developments Ltd., has a new address, namely, Charlton Works, The Green, Hampton Court Road, East Molesey, Surrey. Back in 1965, Ken Day, a nephew of one of the founders of the original company, twenty years earlier, rescued E.D. from oblivion after ownership had passed through several hands and gave it a new lease of life.

Since that time, the emphasis at E.D. has tended to be mainly on the marine models, including the 5cc 'Viking' and 'Sea-Lion' and 3.5cc 'Super Hunter' and 'Otter', but that old favourite with aeromodellers, the 'Racer', or '2.46', is still around in both standard and 'Super' versions and in air-cooled aircraft as well as water-cooled marine models. The 'Super-Fury', for many years one of the best 1.5cc diesels, was also continued until 1980 when, sadly, the firm responsible for producing its castings managed to lose its costly dyes and it had to be withdrawn from production. We understand that some parts are still available for the Super Fury but not, of course, crankcases, stocks of which have now been exhausted. Spare parts for all the current models are readily obtainable.

Ken Day ran E.D. as an offshoot of his existing engineering business and introduced a number of additional model products, including the 'Power Pipe' and 'Quiet Pipe' exhaust systems, designed by Kevin Lindsey, and the E.D. AMC (automatic mixture control) carburettor that is standard equipment on the powerful and finely engineered Redshift 60 manufactured by Fisher Engineering of Sheffield. Although Ken has now retired from day-to-day participation in the running of E.D., he will continue to have a connection through the new management and will, we imagine, be available to offer, when required, the benefit of his long experience in the production of this old-established British make.

Diesel wax again

In the May 1982 issue, we published part of a letter from a reader in Australia asking for suggestions as to how the waxy precipitate that occurs (during storage) with diesel fuels containing Castrol M and amyl-nitrite (repeat, nitrIte, not nitrAte) might be eliminated. This is an old, old problem, of course. It first arose more than thirty years ago when shortages of amyl-nitrate caused amyl-nitrite to be widely substituted. Rather surprisingly, amyl nitrite was frequently recommended by engine manufacturers who did not, however, warn of its disadvantages and the problems (mainly blocked jets) arising therefrom. Waxy deposits occur, in fact, with any diesel mix containing both amyl nitrite and a castor-oil based lubricant. Filtering is no answer since extracting the offending sediment is only a temporary cure: the wax begins forming again during subsequent storage.**

In the course of commenting on this problem in the May issue, we mentioned having experimented, many years ago, with various castor-based lubricants in addition to Castrol M and speculated that while, at that time, all of these had produced similar results, the type of lubricant used might possibly have some bearing on the problem today, since the oil companies do, from time to time, change the formulation of their lubricants. We pointed out that the additives in proprietary lubricants are usually put there to deal with some problem outside the realm of model two-stroke engine fuels and added that, although we had found the technical departments of the oil companies very helpful, it was obvious that "the last thing one can expect them to consider is whether any change in the formulation of one of their lubricants is likely to have an adverse effect on the suitability of their product for use in a model engine fuel in the presence of other chemical additives".

It was, therefore, most interesting and, from the modeller's point of view, quite gratifying, to receive a letter addressed to the Editor from Mr. Robert Tweedale of the public relations department of the Burmah-Castrol Company, which ran as follows:

"Dear Sir,

I refer to the article on Diesel Wax in your May issue and, through the columns of Aeromodeller, I would like to reassure Mr. Chinn and other readers that Castrol M and MSSR are very much intended to be used by modellers and are not formulated primarily for use in larger two-stroke engines. Because of this, any changes in the formulation would be directed towards preventing the type of problems outlined by Mr. Chinn.

"Occasionally, owners of larger engined machinery ask for M and MSSR in order to take advantage of their solubility in methanol fuel, but such is the frequency of these calls that modellers' needs continue to call the tune. We do, of course, have a range of oils suitable for use in today's full-size two-stroke engines.

"If readers require additional information on the application of M and MSSR, they should contact:

"Consumer Relations Department,
Castrol Limited,
Burmah House, Pipers Way,
Swindon, Wiltshire SN3 1RE."

How nice to know that model engine enthusiasts rate so highly! Actually, Castrol was the number one firm that we were thinking about when we mentioned the helpfulness of oil companies. Because of the support that its founder, Charles C. Wakefield (later Viscount Wakefield), had given to all sorts of records and achievements in the world of motor racing and aviation — including the donation of the trophy (the Wakefield Cup) for the world's first international model aircraft contest — it was to the Castrol company that we first turned for technical advice on lubricants very many years ago when first experimenting with model engine fuels. Prior to the Second World War, the company had been most famous for its Castrol 'R' castor-oil based racing lubricant. Older readers, sporting motor cyclists in particular, will undoubtedly remember 'R' for the unmistakeable exhaust aroma that it produced, but 'R' subsequently became a compound lubricant which would not mix with the methyl-alcohol based fuels that came along after the war for high performance model two-strokes, both spark ignition and glow-plug. However, in response to our request, Castrol very kindly began supplying a straight castor-oil for the new glow engine fuels.

Shortly after this, a demand sprang up for a castor-oil lubricant for the new small two-stroke racing motor cycles that were then operating on a methanol and oil mixture. As a result, Castrol began marketing Castrol 'M' which was, to the best of our recollection, our straight model engine lubricant, plus an additive. For a while, on Castrol's instructions, we placed special orders with the Castrol head office for 'Castrol M without additives', until it was decided that standard Castrol M was equally suitable.

Now, of course, M is widely recognised as being one of the best lubricants available for model engines of all kinds and it is most interesting to know that it is currently produced primarily for the model engine market. Castrol MSSR is rather different. A synthetic oil, it was developed by Castrol's Austrian subsidiary and first appeared in 1970 in certain overseas markets, becoming available in the U.K. just in time to provide an alternative to M during the period when a world-wide scarcity of castor-oil resulted in an acute shortage of castor-based lubricants.

**The solution to this 'home-brewer's' problem, as explained in the article in question, is to substitute isopropyl-nitrate. IPN is available through Model Technics stockists.

For fans of the baby diesel. The Czechoslovakian Pfeffer 0.6cc diesel is available in plain bearing and (left) ball bearing versions. Details in our next 'Engine News.'

MiG 15

A ducted fan free flight model for the Telco Turbotank 3000. Designed by R. Madgin.

Fuselage Construction

The fuselage is circular in cross-section throughout.

Start by cutting half-discs of medium/hard balsa with the grain perpendicular to the straight edge, and strengthen these with strips of scrap balsa cemented on either side.

The edges of the formers should be either waxed or smeared with vaseline so that they do not become part of the ultimate structure.

The formers should then be pinned upright over the plan in their respective positions.

Narrow strips (tapering from perhaps ¼in. at their widest to about 3/16in. at each end) of 1/32in medium balsa are then planked over the formers, pinning and gluing as you go. I used 'white wood glue'.

Two such half-shells should be constructed identically.

Don't worry that they do not retain their ultimate shape when removed from the formers.

Before assembly of the fuselage halves, the complete wing/engine mount structure must be constructed, together with the fan etc.

Wing tongue/engine mount assembly

This is cut from 1mm ply, slotted and glued together. Check that your engine's tank will fit the recess.

The 1mm ply engine mount ring is then added together with the ply gussets.

Screwing the engine to the mount is probably useless as it will more than likely be torn out on the slightest crash. We therefore have to resort to more crude methods and I tied mine in with terylene string. This should be tied round the engine just in front of the square mount-plate, and looped back round the ply mount, pulled tight and retained with epoxy. This is repeated on the other side.

N.B. — The string must go right back to the back of the complete assembly,not round the mount ring.

Fan Construction

I was stuck here, so I looked all through the kiddies' toys, the old hair-dryer, etc., but to no avail, so I made my own.

I'm sure my fan is not the most efficient, and it probably isn't the optimum size but it works well enough.

Cut two identical slotted discs from 1mm ply as shown and mount them on a bolt, separated by a bush or a nut and clamp them to this spacer with two more nuts.

Offer up one of the blades so that it slots into the discs at an angle. (mine are set at 45 degrees for want of a better guess!)

Rotate one of the discs slightly until the required angle is obtained. You will find that at least one of the discs needs its slots trimming due to the fact that the blades are flat and do not follow the spiral/helical shape that the slots invite.

When satisfied with the discs' respective positions, epoxy them to the separating spacer, without undoing the retaining nuts on either side until set.

Now carefully add the blades so that they are equi-spaced and equi-angled trimming the disc hub as necessary. Spot glue with balsa cement and lay the assembly flat and adjust while the cement sets.

I don't think it matters whether the blades point slightly forwards or backwards or not as long as they all do the same.

When satisfied with the blade positions, copiously fill the area between the blades at the hub with epoxy and leave to set.

When set, the fan may be attached to the engine with a wide washer to protect the ply disc from the screw-head.

N.B. — At this stage check the outside diameter of the fan to see that it is about 1/8in less than the diameter of the fuselage at this point. If not, then trim the blade tips with nail clippers. Construct a fan guard-tube out of 1/16in or two layers of 1/32in sheet. This will ensure that the blades do not impinge on the inside of the fuselage during and after construction, and is removed completely at the end of construction.

Final fuselage construction

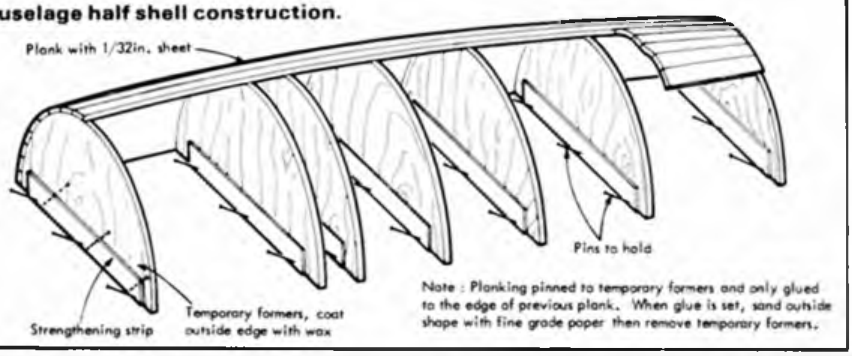
To assemble the fuselage, cut 0.5mm shallow recesses along the edges of the fuselage shells where the wing tongues protrude, and cement the engine assembly to one of the shells. The fan guard-tube should fit snugly into the half-shell.

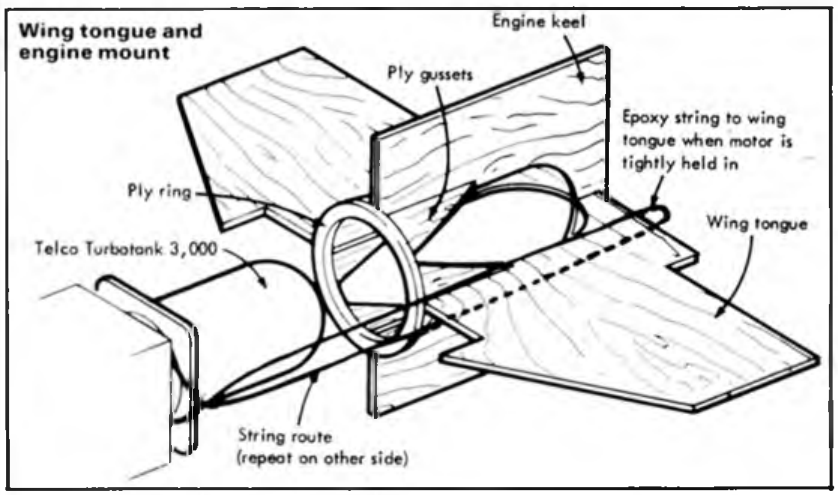
Present the other half-shell to the assembly to check that it will meet round the fan guard-tube. If not, the gaps will need filling later with splinters of balsa.

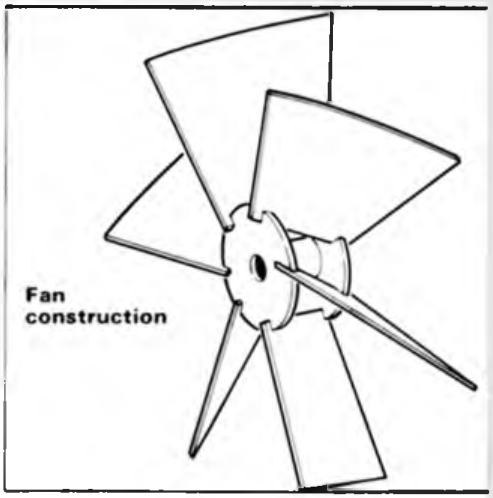
Now assemble the fuselage and hold the shell in place on the other with masking tape, and when satisfied with the positioning, introduce cement to the join and work in with a finger.

An unusual (but somewhat necessary) addition to the structure, is the 1mm ply 'cooper's band'. This is the long curved piece shown on the plan. (Inside radius 8in.). This should be soaked in water and then wrapped around the nose of the aircraft and marked to get its exact length. It should then be joined at the ends with

Fuselage half shell construction.







epoxy and left to set in the corner of a vice's jaws.

The band is then slid over the nose and glued in position, any protruding balsa being trimmed from the nose.

At this stage the whole fuselage is doped and tissued and doped.

Throughout drying, the air-intake and exhaust-outlet need to be kept circular, and this is achieved by inserting any suitable conical objects, such as tough beakers (nylon so they won't stick).

Cut the access hatch out with a sharp blade and stick it to an oversizepiece of note-paper (being ¼in oversize all round) and retain the hatch in position with masking tape on two sides if you can think of a better way of doing this I would be grateful to know of it.

Cockpit Canopy

This is an opportunity to try out the old 'make your own' technique.

Carve the required shape from balsa block, dope and fill this until a smooth finish occurs. Then plunge this through some acetate sheet from a bubble pack or somewhere that has just been warmed and made soft under the grill. This acetate must be stapled or pinned to a flat piece of balsa in which a hole has been made being just larger than the plan shape of the cockpit. Alternatively convert a commercially available canopy from your local model shop.

Wing, tailplane and fin

The wing is fairly conventional and of course includes the wing-tongue boxes. I used spruce for the wing leading edge and the main spar. This gives a very tough structure that will take all the knocks that this plane is bound to receive.

The tailplane is cut from 1/16in. medium sheet in two pieces butt-joined and slotted into the fin which I made from medium 1/32in sheet profiles joined at the leading and trailing edges by t.e. section balsa strip. The fin tip was filled with scrap.

Final assembly

With the wings in place, hold the fin in place (with tailplane glued to it) and trim the fin bottom edge so that it fits well. Mark the outline of the fin base on the fuselage and then remove the tail assembly. Now apply epoxy and reassemble ensuring all is square.

Finish

When sanded, tissue-covered and doped, hang your MiG from some convenient lamp-shade or whatever in a dust free atmosphere and then shake your aerosol of Ford Silver-fox and give the whole airframe a light dusting. The initial bright appearance will soon dull after a couple of days leaving the plane looking even more like those blurred shots we get from photo-reconnaissance.

Flying

All flying of this model should be done over rough grazing type land (without the cows or sheep) since the fragile structure will not stand up to much heavy impact.

Test-glide the model and adjust the nose weight to give a long, flat, fast glide.

Nose weight should be added under the nose to keep the c.g. as low as possible, though lateral stability is only a problem at low speed when 'dutch rolling' occurs.

Open up the hatch and grasp the engine between fore-finger and thumb. Don't put any stress on the airframe itself. Have the throttle setting on fairly high but not so high that the run has finished before you have time to launch the model. Fill the tank and close the hatch.

Now put your mouth to the air-intake of the plane, and blow with a quick hard puff. You can't blow it too hard but if too lightly there is a risk that the engine might bounce off compression and run in the wrong direction, but this is rare.

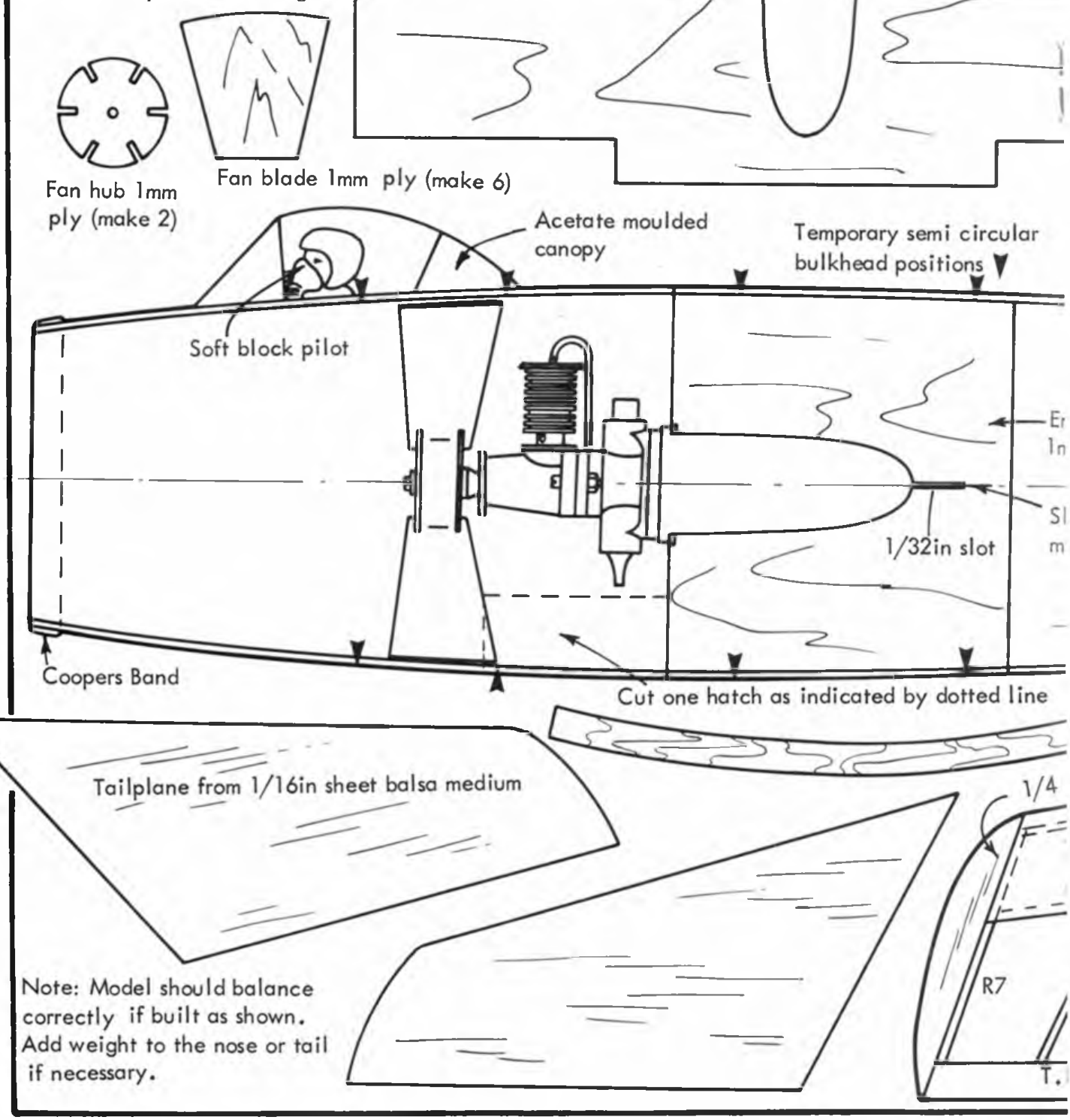
Launch the model with a smooth decisive push in a slightly nose-up attitude, across wind and banking away from the wind. Best results are had in a strong wind if the model is trimmed for only a slight curve so that the greater part of its flying is down-wind.

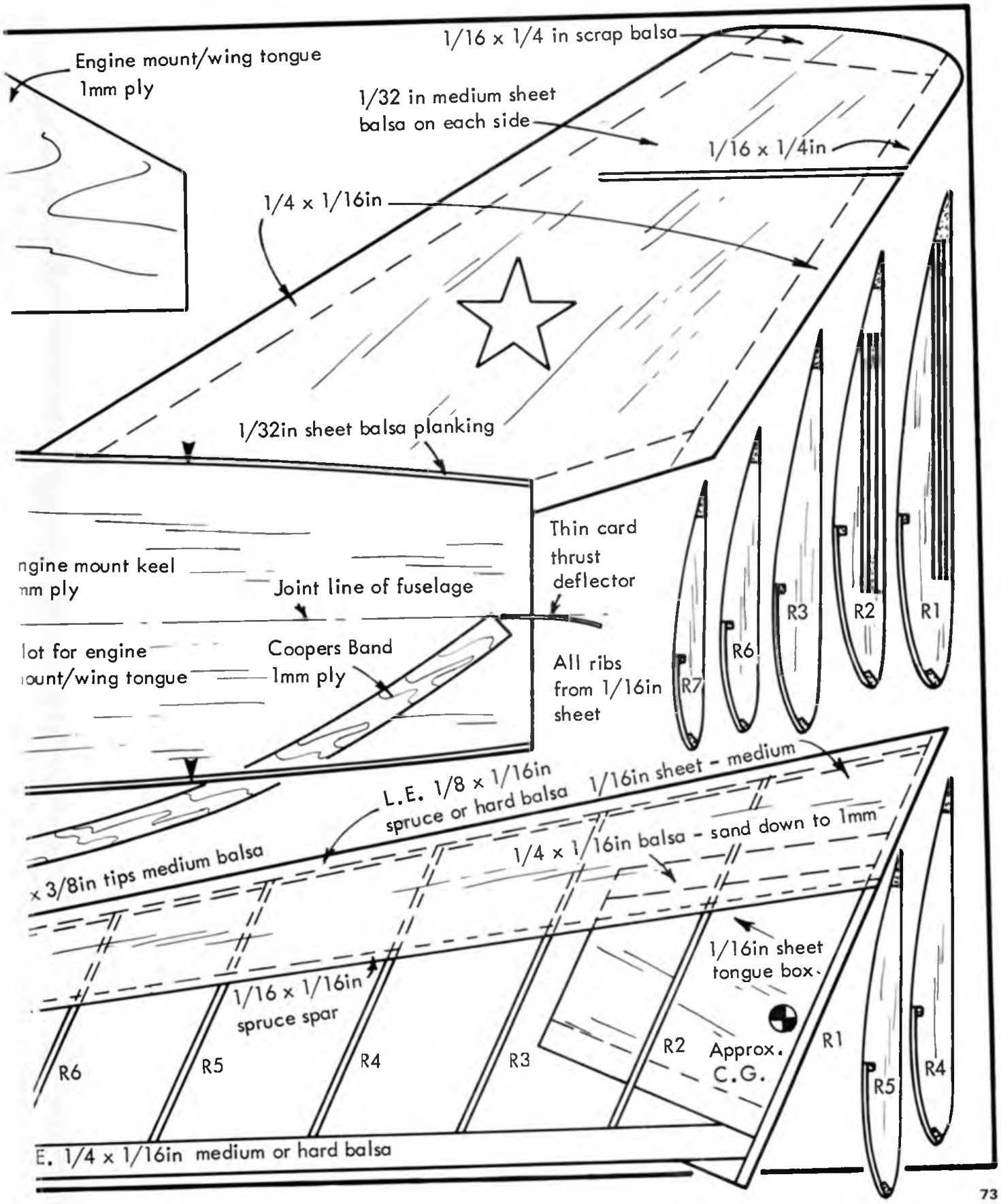
You might like to try a different angle of incidence on the tailplane from that shown on the plan; well! Experimentation is the name of the game!

Right: rear views showing the card vane positioned in the exhaust to adjust for up and down thrust. Below: this front view illustrates the lack of dihedral and close fitting of the fan to the inner wall.

MiG 15

DUCTED FAN
FREE FLIGHT MODEL FOR CO_2
ENGINES by Richard Madgin





SCALE MATTERS

by Alan Callaghan

Peanut Scale Spitfires galore! Left Paul Briggs with his test model and super detailed version. Right Peter Frostick with an unpainted and a painted foam pair. Centre front Butch Hadland with his CO$_2$ version and at the rear, Chris Chapman joins in with his immaculate prototype Hurricane.

INDOOR SCALE AT MILTON KEYNES

It is a debatable point that indoor meetings should be regarded as successful only according to the strength of numbers of modellers in attendance. Whereas some meetings, particularly those held in sports halls, really must have a very strong attendance in order to be financially viable these days, it does not automatically follow that the most financially successful are the most enjoyable from the flyers' point of view. For any given indoor site there is an optimum number of flyers that can be comfortably accommodated without getting in each other's way, and it could be an interesting exercise to try and work out an ideal floor area : model flyer ratio for the future guidance of contest directors.

This particular meeting was most enjoyable for several reasons. Unlike the previous occasion when part of the floor space was obstructed by some kind of fairground stall in the process of being dismantled, Middleton Hall was empty and fully usable this time. For some unknown reason the attendance was below average for this site, judging by the fact that only approximately two and a half sides of the hall were occupied by flyers and their equipment. This did mean that most people had plenty of room to fly in as some of the duration and scale flying sessions overlapped. To the uninitiated it may seem odd, but indoor flyers usually carry as much flying tackle as seen in other flying discipline, and probably a bit more besides. Camping chairs, picnic tables, 'Workmates,' and the occasionally seen converted folding ironing board (an ideal 'base') are all part of the scene before we ever get to the models and their containers.

Whether it was by luck or good judgement, the day benefitted by co-inciding with the end of British Summertime, thus giving the last-minute midnight oil burners a useful bonus. By six o'clock in the evening, however, most people had actually stopped flying seemingly through exhaustion, and conditions were then ideal for those with stamina for a bit of extra trimming and practice as the meeting wound down.

The scale events were not exactly oversubscribed, but the numbers were just about right for the conditions. There were twelve entries in Peanut, seven in CO$_2$, and ten in Open Rubber. All events were run to the Miami 'checklist' type of judging schedule, where contestants mark their own models by simply ticking off a list of relevant features on the basis of does the model have them or not. Quality of construction and finish were then marked separately by the contest director, Butch Hadland, and the original score multiplied by this figure gives the final total. This method of scoring does leave room for criticism but the one advantage it has is that large teams of judges are not required and models are not held up on judges' tables for long periods at a time. The flying in all three events was judged simply for duration by a nominated timekeeper. Again, this is not the best way to judge all types of indoor scale flying but in the absence of knowledgeable and experienced flight judges, is probably the next best thing.

Turning to the models themselves, it seems that more people are tackling the more challenging subjects for a change, which certainly makes it more interesting from the reporter's point of view. No less than five Peanut sized Spitfires were to hand, as seen in the group photo. Paul Briggs had two which we saw earlier this year, one of which has an undercarriage

Left author's Boulton and Paul P9 is 18" in span for rubber power using very lightweight construction in conventional materials. Above this Ansaldo SVA5 was built by Mike Hall of Walsall for CO$_2$ power. Features sheet balsa fuselage and Xerox paper covered flying surfaces.

manually retracted for flight. Butch had a nicely finished example for a Campus A-23 CO_2 motor, and Peter Frostick had two all-foam versions, the simpler one of which amazed everyone by putting in flights of 50 seconds plus. This is flown without an undercarriage with scale dihedral, and an only slightly enlarged tailplane. Such is the way that flying skills have progressed with these small models that only a few years ago most people, including the experts, would have regarded this performance as quite impossible. Inspired by this foam test model, Peter is now building a balsa version with a baked sheet fuselage that weighs 1.9 grams more or less straight from the mould.

Adventurous building techniques formed much of the attraction of the large Ansaldo SVA5 for CO_2 power by Mike Hall of Walsall MAC. This impressive looking model features a fuselage skinned in 1/32in. sheet balsa, and the flying surfaces are covered in 100gm/sq metre Xerox paper using methods outlined by Mike Hetherington earlier this year in the SMAE 'Model Flyer' newsletter. This construction gives beautifully thin and realistic wings and tailplanes especially where wire trailing edges are represented, and also provides a very good base on which to apply the complicated colour schemes as commonly found on Ansaldos. Similarly, the sheet covered fuselage makes life easier when applying the very intricate squadron and personal insignia also used. Mike's model is built to his own design, 1:18 scale, and at 558mm (22in.) span, weighs approximately 85 grams (3oz) complete with standard Telco power. Still in the process of being flight tested when seen, it looked a very promising subject for future contests.

Already known for his superb conventionally built models, Doug Hunt of Nottingham MAC is now having a try at all-foam construction with a new Sorrell Hiperbipe built from thin polystyrene foam sheet and decorated with felt pen and water colours. The benefits of foam as a medium can be seen in the weight of the finished model, less rubber, of 3.5 grams, although the subject is proving to be rather tricky to trim despite this.

There are those who find it difficult to accept this kind of 'foam-built' subject as true scale modelling, but it really only boils down to a question of interpretation of the original aircraft. It is rather like comparing an accurate pencil sketch of an object with a laborious realistic oil-painting of the same thing and assuming that one must automatically be better than the other. The sketch is quite capable of capturing the essential character of the subject without any minute and fastidious detail being shown at all. The simple foam model can be as accurate as any other kind of outline and proportions, and the greatest effort is put into getting good flying performance at the expense of detail and scale textures. Rick Granger's fleet of foam subjects always draws a lot of attention particularly due to good flying performances, and many people, particularly the general public, find them most memorable.

Above: Mike Colling keeps an eye on the opposition as he shows tiny condenser paper covered Caudron does 26 seconds from a take-off. Left: Peter Frostick launches his all foam Peanut Spitfire test model on one of its 50 second flights – superb flyer. Right: Doug Hunt's 3.5 gram all sheet foam Peanut Sorrell Hiperbipe. Looks very potent but is not so easy to trim.

As for performance in the ultra-mini league, Mike Colling's 200mm span condenser paper covered 2.8gram Caudron was putting in 26 second flights from take-off, and provided great fun in the process. Other models that caught the attention were Brian Horsefield's Sopwith Camel from a Veron kit flying well with a Turbo Telco to an all-up weight of 50 grams. Pete Iliffe's Stearman from a Sterling kit looked very handsome in its blue/yellow scheme, and Butch Hadland's new Sperry Messenger for a Campus A-23 CO_2 motor was very fine detailed and neatly painted.

Under the overall contest directorship of Bernard Aslett, the meeting was relaxed and informal, useful prizes were awarded in all events down to third place, and everyone seemed to have a good time.

One unwelcome item of news is that heavier charges are to be made in future for the use of this public open space, yet our contest organisers are probably the only people making use of the hall without making a commercial profit as a result. After Cardington, this must be the finest indoor flying site in the south of England, so if meetings in 1983 are to continue to be sucessful, your steady support is needed.

Results

CO_2 (7 entries)

		Static	Flying	
1.	N. Peppiatt	Sopwith Tabloid	459	79
2.	M. Hall	Hannover CLIII	266.5	99
3.	D. Day	Howard DGA	327.25	52

Peanut (12 entries)

1.	P. Frostick	Piper Cub	396	118.3
2.	R. Oldridge	Monocoupe	364	98.25
3.	M. Hetherington	Fokker DVIII	340	89
4.	F. Houvenaghel	Cougar	301.5	115
5.	D. Day	Lacey	262.5	116

Open Rubber (10 entries)

1.	N. Peppiatt	Lacey	352	135
2.	C. Chapman	Fokker DVIII	389.5	50
3.	A. Callaghan	Boulton& Paul P9	323.75	53
4.	K. Bates	Piper Cub	256	60
5.	P. Iliffe	Baby Ace	246.5	63

Free Flight Scene

Two World Champions. 1981 Wakefield champions Lothar Dorling of West Germany launches during European F/F Championships at Zulpich, with Israel's Ben Itzhak who won at Taft in 1979, setting timer in background

Open Internationals Europe 1982
Report by Martin Dilly

The summer free flight contest circuit in Europe has now become one of the season's high spots for anyone who wants to do more with their holidays than broil on a beach. This year a sizeable British contingent, augmented by Bill Hartill from California, headed to Czechoslovakia for the fifth South Bohemia Cup at Sezimovo Usti, about 50 miles south of Prague. Competitors at this well-run contest are both accommodated and fed as part of the modest entry fee; this year the entry list included a full nine man team from North Korea, as well as flyers from Austria, Canada, Czechoslovakia, both Germanys, the Netherlands, Italy, Hungary, Poland, Sweden and the USSR.

The smallish grass airfield where the contest is held is the home of the Tabor Aero Club, which caters for gliding, parachuting and aerobatics, as well as for model flying. This year a stiffish breeze kept flyers well exercised, and a large pine forest downwind saw a lot of activity in the later rounds; lift-picking was difficult, and only two glider flyers maxed out. In the Wakefield the Korean Kim Jeng Sok was the only full-scoring flyer, with his teammate and past World Champion Kim Dong Sik second. Britain's triumph came in F1C however, when Ken Faux of Freebirds topped a five-way fly-off, just nine seconds ahead of Rumania's Popa Cringu. With the drift carrying aircraft to the forest it was lucky that the contest as resolved in the four minute round.

To give an idea of the sort of organisation behind a contest like this, the programme, in four languages — German, Czech, Russian and English — lists 18 people from the Sezimovo Usti club, each with a definite organisational responsibility, plus 50 timekeepers. For several of us, the one we will remember best is the gent who signalled the start of each round. Before firing the signal flare pistol, he alone of the 300 people on the airfield, solemnly donned a crash helmet, presumably to guard against falling pyrotechnic debris from the green flare, against which everyone else was unprotected.

The Czech technical sports organisation Svazarm, which covers activities like skiing, rifle shooting, motor cycle scrambling and sailing, as well as the air sports, handled the overall co-ordination, but there was also backing from the local factories and town councils. How pleasant if we in Britain could have just a fraction of this sort of support for model flying, which many other countries see as having a long-term benefit to the community.

The following weekend our flyers from Sezimovo Usti had migrated to the vast, flat maize and melon fields of Poitou in France for the Fifth International Days of Free Flight — a two day contest for the three FAI classes plus Coupe d'Hiver that attracted 38 British entries, the majority of whom can't wait to get back next year. But for dropping a mere one second on Joe Barnes' first Wakefield flight Britain would have swept the board in FAI, for Mike Fantham won F1A in a fly-off with Martin Gregorie of Freebirds, and Ken Faux using a Nelson 15 in a triple-finned bunter, again won F1C, this time from France's Denis Ferrero. But there were a few heart-stopping moments for Mike and Ken. When Fantham's model landed on an early round both timekeepers' digital watches registered between 3.00 and 3.01. Faux had had some rather low

Above: neat tow-line load tester used by European Championships organisers at Zulpich. 2kg weight rests on micro-switch in circuit of battery-powered bicycle hooter. When tow-line load reaches 2kg hooter sounds. Left: Ray Monks' F1C cowling uses a piece of nylon mesh moulded into the fibreglass to keep dirt out of the Rossi air intake

Results Fifth South Bohemia Cup

F1A — 90 flew

1. R. Barta	Czechoslovakia	1260 + 125
2. Z. Jancar	Czechoslovakia	1260 + 77
3. P. Dvorak	Czechoslovakia	1254

16. M. Fantham, Richmond — 1149; 20. G. Madelin, Crookham — 1128; 35. M. Gregorie, Freebirds — 1073; 55. M. Dilly, Croydon — 902.

F1B — 39 flew

1. Kim Jeng Sok	N. Korea	1260
2. Kim Dong Sik	N. Korea	1209
3. J. Libra	Czechoslovakia	1201

F1C — 36 flew

1. K. Faux	**Freebirds**	**1260 + 240**
2. P. Cringu	Rumania	1260 + 231
3. V. Hajek	Czechoslovakia	1260 + 165

Fifth Journees Internationales de Vol Libre en Poitou

F1A — 104 flew

1. M. Fantham Richmond 1260 + 240 + 300
2. M. Gregorie Freebirds 1260 + 240 + 72
3. J-P. Laureau France 1249
5. P. Williams, Richmond — 1216; 15. M. Dilly, Croydon — 1142; 19. B. Baines, RAFMAA — 1129; 21. P. Owens, Liverpool — 1128; 23. A. Le Vey, NYFFG — 1122; 40. B. Nicholson, Liverpool — 991; E. Drew, Bristol and West — 949; 47. G. Le Vey, NYFFG — 921; 58. D. May, Bristol and West — 804; 59. D. Bartle, NYFFG — 803; 69. I. Kaynes, Croydon — 723; 73. C. Abbey, Leicester — 666; 80. S. Marriott, Biggles — 602; 93. D. Oldfield, Watton — 409; 98. W. Simms, Crookham — 306.

F1B — 52 flew

1. G. Nocque	**France**	**1260**
2. J. Barnes	**Liverpool**	**1259**
3. A. Zeri	**Italy**	**1244**

6. I. Taylor, Falcons — 1204; 10. I. Kaynes, Croydon — 1170; 13. J. Abbey, Leicester — 1162; 15. S. Marriott, Biggles — 1157; 22. R. Peers, Falcons — 1119; 33. M. Evatt, Biggles — 1048; 38. G. Pink, Bristol and West — 975; 40. M. Woodhouse, Watton — 907; 44. H. Gunn, Bristol and West — 717.

F1C — 13 flew

1. K. Faux	**Freebirds**	**1260 + 240 + 300**
1. D. Ferraro	**France**	**1260 + 240 + 60**
3. M. Iribarne	**France**	**1239**

Coupe d'Hiver — 32 flew

1. A. Nouge	**France**	**600 + 180**
2. L. Dupuis	**France**	**600 + 119**
3. G. Ambroso	**France**	**591**

5. I. Keynes, Croydon — 583; 8. R. Peers, Falcons — 561; 25. M. Dilly, Croydon — 476; 26. D. May, Bristol and West — 452.

transitions during the contest, but was saved by his glide, but the tables were turned in the five minute fly-off round, when Ferrero's elliptical-dihedralled aircraft went very flat after a five second run and scored only a minute, while Ken went on to do the full five and win.

The contest was nicely rounded off with a fine banquet and socialising in the village hall; speeches by the Lady Mayor and others showed that the community regarded the event as a prestigious one for the locality, and several local companies and banks had presented trophies.

The Junior A/2 contest attracted no British entries, maybe next year even more British flyers and their families will discover the fun of contest flying at Poitou.

Bob Bailey reports on EZB Development

This year has seen considerable change in EZB layout as flown at Cardington compared with previous years. This was the first full season for which the 1·2g rule as originated in the Northern Area has been in force.

Removal of the restrictions on covering material has meant that microfilm or microlite can be used with a saving of about 0·2g for microlite and more than 0·3g for microfilm compared with condenser paper. These are large percentages of the airframe weight and permit considerable stiffening of the structure, which has been somewhat modified as a result.

Motor stick lengths and tailboom lengths have increased dramatically. From typically 9in. each (225mm) they have increased to 12in. (35mm).

Tailplanes have increased from typically 22sq.in. to 29sq.in. in area and from 10in. to 16in. span — the result is a 'tandem wing' type model with the balance point 70% or more behind the wing trailing edge!

These models are generally very stable and handle the power burst well and there seems to be no doubt that they are aerodynamically more efficient than the more conventional layout despite the increased weight of about 50%.

In September, Bernard Hunt set up a superb new EZB record in Cardington of 22mins. 23secs. This time is considerably higher than that achieved with the more conventional layout! Bernard Hunt comments:

"The practice flights (at the Indoor Nationals) made it clear that the model was something special as I was able to reel off a string of 18-19 min. flights from barely half shed height.

The Nationals EZB competition was flown on the following day in bad conditions with turbulence and terrible drift from a howling gale outside. I flew conservatively ... to do 18.37 and 18.40 from about 80ft. Alas JO'D and Laurie Barr flew more ambitiously and turned in 19 mins. • flights, so I had to (aim) nearer the roof and managed 19.54 on my 4th flight.

Two weeks later I was back at Cardington having repaired the damage and increased the prop pitch to 29½ins. (my props use plug-in blades so adjustment is easy). The first test flight showed a significant improvement from the higher pitch prop with a 19 minute time from only 80 feet using a gentle wind on the motor 15·5ins. by 1·09g Dowsett Pirelli and 1,925 turns. ... I hung around for an hour or so hoping for the air to warm up a bit (warm air at the top of the hangar seems to give longer flights) which it did to give a very pleasant 69°F. I gave the motor from the previous flights a really big wind, squeezing on 2,190 turns and backing off 30 (launch torque 30g cm) and launched somewhat uneasily, wondering whether the structure/flight pattern would stand the tight motor and high torque. I need not have worried as the model went up in a smooth, fast, wide spiral reaching half shed height in about 1 minute and levelling out 10 feet under the centre catwalk (the highest point) after 7·8 mins. ... The model drifted over a 30 feet high (at least) warehouse-like structure and then to one side. ... Laurie Barr talked me out of steering and the model agreed by drifting back towards the centre. At 20 minutes the model was still 50ft up. ... Eventually it landed on a clear area of the floor. The four watches showed 22mins. 23secs. which is certainly a new British record and to the best of my knowledge, has not been exceeded anywhere else in the world!"

The attached drawing shows Bernard's record-holding model which is microfilm covered. It is noteworthy that the tailplane is so light when film covered that the centre of gravity cannot be put back as far as indicated by the standard means of calculating the CG position (constant margin of stability or CMOS, colloquially known as Cosmos!

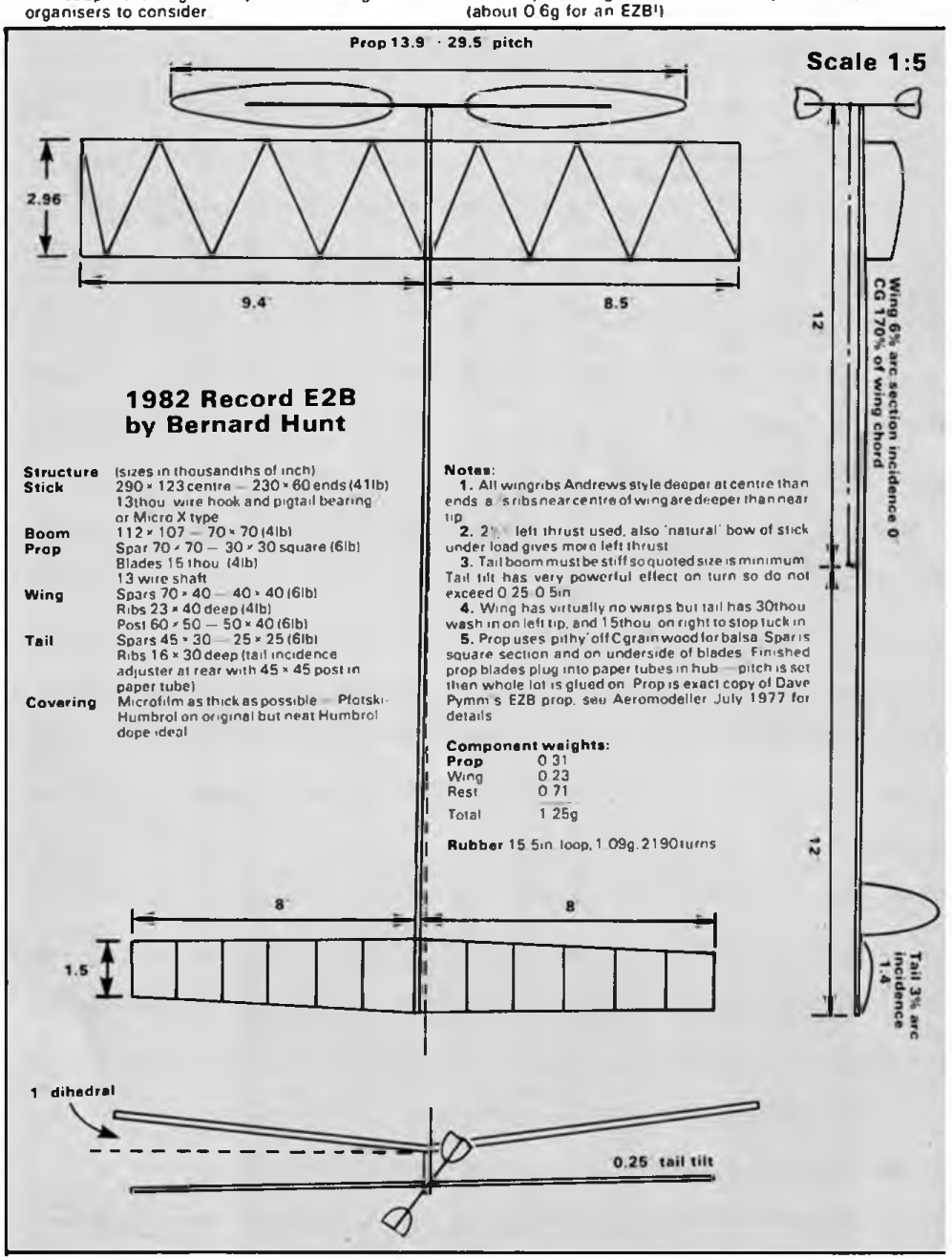
A quick note on low ceiling events. The 1·2 gram rule was designed to reduce performance but didn't! Bernard has suggested carrying ballast equal in weight to the rubber motor, which is reasonably easy to process via a go-no go balance. Bernard also suggests penalties for ceiling scrubbing e.g. 10 sec. deductions per touch — basically a good idea but requires constant vigilance from the timekeepers who would not be able to fly at the same time, as often happens.

A couple of thoughts for your low ceiling event organisers to consider.

I have just read in *Free Flight News* about a rule proposal for EZB from Belgium, namely 45cm. maximum span, 7·5cm. maximum chord, maximum motor stick length 23cm., minimum weight without rubber 1·2g. Flying surfaces shall be rectangular and no wire or wood bracing shall be used. Covering can be anything except microfilm. Solid wood construction.

The reason for introducing provisional rules for the class for Open Internationals is that interest in EZB is growing and also it is suitable for almost any size of hall, which is not true for the beginners formula for F1D.

Basically the rule is sound, but no mention is made of tail area maximum (to outlaw true tandem wing layouts) or of prop construction. Also, why eliminate microfilm covering and limit the stick length? The latter I think is unnecessary and the former reduces the choice of covering. Condenser paper is becoming extinct, microlite is tricky to handle, so the best bet then might be ¼-thou. mylar. Clingfilm is unfortunately too heavy (about 0·6g for an EZB!).



Spinners? Tissue? Glass-cloth?

Many Wakefields today use propeller units enclosed by the now-unobtainable Graupner snap on polythene spinners; users will be glad to know that Mike Woodhouse has had some similar polythene spinners produced that fit the original grooved base and Mike's own manufactured hub assemblies. The spinners, in white now, rather than red, cost 99p each. Mike, whose specialist free flight items supplement the stock at your local model shop, has added a long sought commodity to his list — black Japanese tissue, in the lightweight Lite Flite grade at 15p per 450 × 600mm sheet. This brings the colours now available to seven — red, orange, yellow, green, blue, white and black. The slightly heavier grade Medium Flite, in white only, is 30p per 600 × 900mm sheet, and Super Flite is 32p for the same size, but not in black.

Mike also has 0·7oz/sq yd (20 gm/M²) glass cloth at £2·75 per square yard. His range includes 3·5 and 6mm Pirelli rubber, winches, silk and double adhesive coated Mylar for rudder hinging. His address is 12 Marston Lane, Eaton, Norwich, Norfolk NR4 6LZ; a stamped addressed envelope will bring you a complete list.

Top of the Power Trials from right to left Stafford Screen, Ken Faux and Ray Monks. Both Ken and Ray had a little trouble in the fly off!

Free Flight Trials . . . Sept. 18th, 19th and Oct. 23rd. Report by Dave Hipperson

The framework around which these Trials were conducted was to put it politely — flimsy. That is not to say Paul Masterman didn't make stout efforts as CD. He did, particularly with the equipment and instructions at his disposal. For the flyers it was neither encouraging nor acceptable to commence a fourteen flight event, spanning four days grouped in two weekends, not knowing how many flights would be expected on each day — when or if any! Moreover it confused the 'number of models' rule. Questions put to the Technical Committee on this matter were either hedged around or ignored.

Weather for the first bout began with such uncharacteristic warmth and calm that quite a relaxed atmosphere developed immediately. So relaxed in fact that a number of flyers were actually seen asleep on the flight line around lunch time. It was suggested that a Champs venue of Australia could hardly be taken seriously. The opening 5 rounds slotted up with half an hour for each in the usual glider, rubber, power order fitted comfortably into the first day, but it was very much a thermal picking contest. The standard was understandably high and the pattern in power had emerged already with three men making full scores followed closely by Johnson 7 secs adrift. In glider two had perfect 15 minutes — one of these being Cooper but in Wake no less than five had maxed out.

The second day dawned very calm with murky low cloud but happily not bad enough to affect even power model visability so the flying went ahead. Glider found this round difficult with well less than half the field maxing in the flat calm, but there was gentle lift by the time the Wakefields were launched. Things were beginning to change here however with some of the more fashionable short nosed models having trim problems, usually caused by props hanging up on wings. This was not Burrows' problem, however he did glide straight and drop a vital 7 seconds on this round. Others in trouble included Pollard who had had some very odd flights the day before with what appeared to be an out of phase auto rudder. This time it let him down 35 secs short. Power continued with the top three maxing and Bailey not far behind Johnson after a slight drop on the last flight the evening before. The day continued with worsening horizontal visability and the CD took the bold step of allowing timekeepers to follow models. This virtually eliminated OOS flights except when timekeepers were sluggish. It was becoming very much a game of no mistakes in Power and Wake and fluctuating fortunes in Glider where the lead was held by Cooper but following places were hotly contested by Philpott, Gregorie, Crisp and Madelin. Conditions vertically were very stable, the solid damp air allowing the best models to max comfortably at virtually any time during the rounds. This didn't stop showers of models being launched together. An uninitiated observer could have misunderstood the event as a spot landing contest when nearly 20 Wakefields d'd down almost wingtip to wingtip in the missile compound downwind.

Eventually with light and visability fading fast it was expected to end after 9 flights, but conditions lifted a little to allow one more which did in fact thin it out in Wakefield at least. The glider flyers were getting the measure of the conditions and all those in contention maxed apart from Madelin who had also dropped a little on the flight before. The leading three of Faux, Screen and Monks continued their unbroken score in Power and after some field repairs to a model damaged on the downwind fence Bailey dropped only a little time to stay 5th behind Johnson. Many had dropped by the wayside in Rubber after the good start. Greaves made his first mistake with a disastrous flight of little over 2 minutes, Howick had dropped 20 seconds on the flight before and European Team member Beaumont who had maxed steadily had the very first flight on the first day of 159 spoiling his score.

After these 10 flights Cooper led glider followed a little way below by Philpott and Gregorie. Screen, Monks and Faux held full scores in Power and Hipperson led Wakefield with the only full house and Burrows that 7 seconds behind. After him came half a dozen with only 20 seconds or so short — it was very tight.

It was interesting to see who thought it worth the trip to Albermarle Barracks — Ouston Newcastle for the final four rounds. The most Northerly of English venues turned out to be a picturesque but rather small drome built on anything but flat land just West of Newcastle and some 1,000 feet in the hills. This morning and the start of the two days allocated to finish off the four flights began calm and very cold after a considerable overnight ground frost. By the time the flying got underway the breeze had begun to pick up and the glider boys had the unenviable task of sampling the rarified atmosphere. Both Gregorie and Philpott maxed and now led the field of some 24 who had been whittled down from the original 48 starters. Cooper came out and had trim troubles at the very worst moment. After an enthusiastic launch in respectable air his stall never damped out and he was down in little over two minutes — Philpott was in the lead.

Ray Monks had livened things up a bit with a spectacular and almost complete bunt on a trimming flight just before the power round began, and was therefore reduced to a lesser model. This was the only real hiccup in Power and as it turned out he maxed the first official and held onto his three way lead with the others. There were only 7 power flyers who had thought it worth continuing in these 2nd Trials. Rather more had come to fly Wakefield again. Sixteen thought they could catch the leaders and they must have been somewhat encouraged when Taylor dropped nearly ¼ minute on this first flight and Howick and Spooner dropped ½ a minute each. Hipperson too made a tentative flight after breaking a number of motors. Substantially underwound the model was just not the usual height losing 16 seconds and slipping into 2nd place behind the maxing Burrows.

The wind then increased considerably, some clouds appeared, control was moved to a more advantageous location regards runway length, but very much 'over the hump' so timekeepers were once again allowed to walk. This time to the brow of the hill. Very sensible. With a breeze of approaching 15mph at its worst and the day warming, if only a little, thermalling models were going out of the drome, dangerously close and in many cases into a wood a few fields out.

Philpott held his lead in glider with a max as did Burrows in Wakefield. Pollard — fourth until then — was in all manner of trouble with his model waffling about low down after launching in lift. The trim alterations were put down to numerous

Top of the Wakefield Trials from right to left Dave Hipperson, Ivan Taylor and Mike Howick

broken strands and the model was on the ground in 95 seconds — he was out. The top handfull in power all maxed and nothing changed but Harris who was really out of it anyway, was unlucky with a short run on a poor power pattern that hit strong lift and then failed to dt until well after 4 minutes — very high indeed. The model was never located.

Bailey also dropped a little more time in power on this flight and two more poor flights to end the day were to place him a disappointing 6th after a good start.

The penultimate round had the glider scores upside down again. Cooper and Gregorie maxed but Philpott now beginning to show the signs of nerves, flew too late for a clearly marked thermal that he had not seen and was down in 2 16 to exactly equal Cooper's total. The top five in power maxed and the top four in Wake did likewise, but not without a lost model or two particularly Taylor who was in the distant wood and down to a reserve for the final flight. As there had been few delays and the weather had remained relatively co-operative the final rounds took place quite early afternoon but the breeze was already beginning to slacken and the sun still shone particularly on some people!

Final rounds in Trials are inevitably full of incident and it would belittle the power flyers ability to gloss over their performances on this last flight. They made it look easy — it certainly isn't. For the first time your reporter can remember a Trials class was to be decided by a fly-off after Screen, Monks and Faux all maxed. Since the fourth round the month before where Dick Johnson had dropped that 7 seconds he had maxed every flight and was waiting for anyone of the leaders to slip. It says much for his determination that he kept up the pressure right to the very end and finished 4th. Had he made the flyoff with his reliable models he would most certainly have been in the Team, but more of that anon.

Glider was actually taken first and Gregorie made sure of at least a place by maxing immediately, so Philpott and Cooper came out for this final flight with identical scores 1 minute 41 secs. below a full house after 13 flights. Steve flew first and launched in respectable air, but sank steadily for a flight that numerous witnesses made a little under 2½ minutes. Now Cooper could win. He waited longer and towed on his own and when he released, disaster, the model straightened and stalled madly a number of times before settling down. It looked like a 2-minute flight was on the cards, but his air picking had been correct even if the model was still off trim. Quite low down it recovered and held on for just over 2 40, he was 2nd and had pipped Philpott into 3rd which was a terrible anti-climax for Steve not only because he had led for those last few rounds, but because it seems that his model did actually max. It was seen to dt by the owner and a number of other flyers who actually went as far as to congratulate Steve on his win before he returned upwind to discover the awful truth about half a minute of his flight that mysteriously went missing.

Less than 30 seconds separated the top four Wakefields as they came out for the 14th. First of the leaders away was Mike Howick on his own in a thermistor read thermal that never took the model high, but was comfortable all the way. The others had wound and were holding. Next to break was Taylor following a poor flight from club-mate Peers. Ivans model settled into good air after about 30 seconds and others followed. All maxed but Burrows and Hipperson were not amongst them. They still waited. Then another few launched and this time Burrows went with them — they looked reasonable, but Hipperson waited another 30 seconds before releasing in a calmer patch. The Burrows flight was decaying and after a promising prop run the model began to sink sharply and it was down in 2 10 to leave Hipperson high in the better air and ahead again in Wake when it mattered most — on the 14th. Burrows dropped to 4th an exact reversal of the final flight outcome of the Trials in '67 when the same two were trying for the same Team.

Power went to a fly-off much later in the afternoon when the three involved were happy that the wind had abated enough to lessen the risk of model loss. Screen went first with a perfect pattern and pull-out. Faux followed probably in better air, but stuttered on the run and went flat and overan. Monks went last and also rather flat then stalled enormously as the VIT came in. The nose dropped and the model came in vertically with that characteristic whistle as the speed built up. He was in the air for only 15 seconds and had another broken model to go with the one earlier in the morning.

The lapse in concentration from the last two looked very much like relaxation after the days continual tension. Had Johnson been in the fly-off it could have been very different. Stafford's early flight therefore won, and he cautiously dt'd promptly to have the model actually on the ground in little over four.

Results:

F1A — Glider A2

1.	M. Gregorie	Freebird	40 07
2.	J. Cooper	Biggles	40 03
3.	S. Philpott	Biggles	39 44
4.	A. Crisp	Biggles	38 55

F.B. — Wakefield

1.	D. Hipperson	Grantham	41 44
2.	I. Taylor	Falcons	41 19
3.	M. Howick	East Grinstead	41 10
4.	L. Burrows	C/M	41 04

Results:

F1C — Power

1.	S. Screen	Birmingham	42 00 + 4 00
2.	R. Monks	Birmingham	42 00 + 0 15
3.	K. Faux	Freebird	42 00 + OR
4.	R. Johnson	Freebird	41 53

East Anglia Wakefield Day . . . 14.11.82 . . . Report by Dave Hipperson

Promise of a fair if crisp and breezy day attracted many to this annual Wakefield occasion where Pre51, 54 rule own designs and F1Bs all had a place. The first round was a leisurely two hours but models were obviously going to outfly the short dimension of the drome so the max was set at a very conservative two minutes. This gave few problems for F1Bs as lift and sink were slight. It also gave the Vintage Wakefields a chance of a relatively easy max although some flying 54 rule own designs made a mess of it. Last year's winner only just clearing the max after stalls and an early DT and this year's eventual winner actually recording 1.58. At that point he could have had no idea how things were going to turn around during the day.

With attendance and entries actually up on last year and many far travelled contestants equipped with numerous models this event is obviously a major attraction now. So much so that when, halfway through the second round, the wind increased and the rain began it did little to deter anyone. The top F1Bs maxed again but those having to ROG suffered tremendous carnage — particularly those not used to handling such powerful models so close to the ground. It was interesting to see the best launches were usually from those that fly vintage regularly.

They made good ground against the contest buffs here. Nevertheless many beautiful airframes were wrecked and thousands of hours of repair work were created in a few minutes. The two minute max didn't seem so silly when the contest was being won and lost on the launches. Graham Neil was particularly unlucky on this round to have his own design 54 rule model ROG just, then stall and brush the ground only to climb away nicely again after the watches had stopped. Phil Ball too was in trouble, mysteriously running out of time before he was able to get his vintage model away again thus missing a flight completely. The rain was coming in earnest now and a D/T failure took Hipperson's 54 ruler miles off the drome and lost it long enough to saturate it completely and make its final flight impossible. After three rounds of F1B four people still had full scores (six minutes) and as the rain intensified the wind swung and reduced considerably so that at last a three minute max was practical even if difficult. Ian Davitt's final 54 rule flight was simply beaten out of the sky by the rain for 2½ minutes but many faired worse with sodden structures giving trim problems. Chris Hawke was flying a stretched *Isis* in an event that allowed him an own design. His 2 45 at this critical stage jumped him into the lead for the *Ted Evans Trophy* — no one could catch him despite his unbelievable dropped flight earlier when it had been much easier. Davitt's flight was enough to hold Pete Michel down to third. Pete was also flying an *Isis*.

In Pre 51 John Godden's *Dusty* turned in a creditable flight of a little under 2½ in the pouring rain and he moved to the top chased by Laurie Burrows with a 2 18 after eventually persuading his *Vansteed* to take off! Ball had continued after his missed second flight and a fine max now brought him up to third, his *Hi-Ho* showing what could have been had he not fallen foul of the clock halfway through the day.

F1B was flown to a fourth round and mercifully the rain eased a little. Greaves and Bailey spoilt their full scores a little going now for three minutes and only Roy Miller could max out. Thus, after flying most of the day to a very low max there were still no flyoffs. The organisation seemed visibly relieved by this as well they might have been as by now everything and everyone as very wet. It says much for the enthusiasm and good humour pervading that quite a crowd gathered for a very umbrella covered prizegiving where cash, plaques and the *Ted Evans Trophy* were handed out. The contest had offered an intriguing mixture of events which caught imaginations often to the extent of encouraging some people to try too many classes at once! It was impressive to see so many vintage models flying competitively and encouraging that more had built own designs to fit the 54 rule event which was the original idea. With the usual very high standard of organisation who knows next year with good weather they might run out of space on that fancy scoreboard rather than on the aerodrome!

Results

Pre 51 Wakefield (18 flew) (7 mins possible)

1.	J. Godden	6 23 — Dusty
2.	L. Burrows	6 18 — Vansteed
3.	P. Ball	5 00 — HiHo

F1B (21 flew) (9 mins possible)

1.	R. Miller	9 00
2.	J. Bailey	8 58
3.	D. Greaves	8 45

Own Design 54 Rule Wakefields — Ted Evans Trophy (8 flew) (7 mins possible)

1.	C. Hawke	6 49
2.	I. Davitt	6 31
3.	P. Michel	6 09

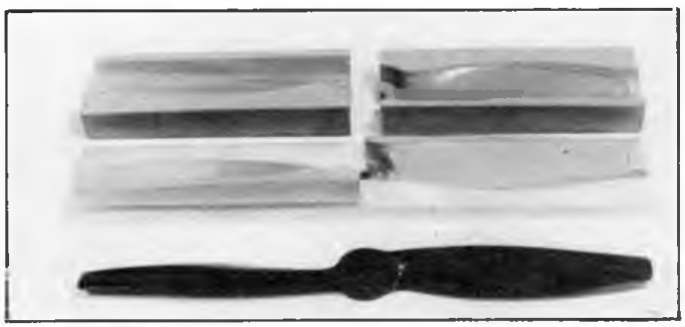
Bristol and West Woodbury Weekend

After the success that a number of Bristol and West members have had in running events on Woodbury Common in the past two years they are planning something even more elaborate. On May 15 they are running three Open events plus a five flight combined FAI contest with a special £30 prize for the top F1B. There will also be a Vintage precision event. That's fine as far as it goes but if you get there Sunday morning you may well have already missed the best part as the night before, at 7pm, there is to be a Champagne fly-off in the three open classes. There will then be wine and glasses awarded at a barbecue which will follow at an adjacent holiday caravan park not coincidentally run by ex-free flighter Alan Parker. As if that wasn't enough the bar at the park will be open for the evening and accommodation for the entire weekend will be available there at a very much reduced rate to those that book in advance. This could be a tremendous weekend if the weather is anything like the usual. Everyone interested is advised to contact Elton Drew — 2 Downfield Close, Alveston, Bristol BS12 2NJ as soon as possible for full details.

MOULDING CARBON FIBRE PROPELLERS

By Jim McCann

AN ARTICLE of mine, published in Aeromodeller of May 1972 detailed the preparation of moulds and the moulding process to produce carbon fibre propellers. The response by interested modellers was overwhelming, and has been sustained over the last ten years. Now 10,000 props later it is opportune to revise in detail and extend the system in the light of experience gained and the queries raised by others. For those who have entered the modelling scene since 1972, it is not necessary to go hunting for the original article as all will be revealed again, and up-dated as required, plus suggestions for an interesting and different method of mould preparation.



The three part mould as described in this article, made from plastic padding. The finished propeller is shown in the foreground

About 1970, the shortcomings of nylon and other props became a source of major concern as competition motors rapidly became more powerful and operated at very high rpm; blade-shedding was prevalent, damaging motors and models and very dangerous. About this time glass fibre props started to appear in very small quantities, in a limited range of sizes, and rather expensive. This stimulated the start of the home-made glass fibre props, some being acceptable but the majority had most of the faults it is possible to incorporate, such air bubbles, voids and areas of dry fibre. The successful production of props then became a challenge, and much time was spent in developing a system to produce a high quality accurate product with relative ease, providing the job is tackled with care. After a couple of years learning the hard way, with everything that could go wrong actually occurring, an acceptable method was evolved.

In 1971 I was introduced to carbon fibre, then hailed as a wonder material, and still living up to its original promise. The manufacturers at the time, alas no longer with us, were very co-operative in supplying information and helpful data sheets etc, and now the properties of carbon fibre are so well known as to hardly warrant repetition, but reference to the *April '72 Aeromodeller* will provide more information.

The first impression on handling a CFRP moulding is one of immense strength and rigidity. To ensure that these impressions were not a fallacy and to stress to the limit a CFRP prop, a series of tests was arranged with the Materials Strength Department of Newcastle-upon-Tyne Polytechnic. The props, picked at random from my stock, were of the Cox 7in × 3½in. type, a composite of carbon fibre on the outer surfaces, where its properties are best utilised, with a core of glass fibre rovings. A prop was clamped in a tensile testing machine, the clamps being specially machined to match the blade camber, and bolted by the centre hole, the anticipated fracture point lying between the centre hole and the mid point of the blade, where the clamp was positioned. The prop finally broke across the centre of the hub, the load being 0.4 tons. Further tests for torsion and bending produced similar high figures. From these results it was calculated that these carbon fibre propellers will be safe up to 200,000rpm. A wonder material indeed, and one which must provide the ultimate in safety and efficiency.

The making of a suitable mould for propeller production is usually the difficulty and deterrent to would-be moulders. The moulds produced by the following method will yield excellent copies of the original prop over and over again, which are comparable to a good commercial product. The mould will reproduce every detail of the pattern exactly so if using a wooden pattern take great care to fill the grain and polish to a high gloss, and remember, if the pattern is specially carved, it is only necessary to make one blade, as by reversing the pattern two absolutely identical blades will be reproduced.

The following materials are recommended for the moulds.

Base. The most satisfactory is aluminium alloy strip, ¼in. thick and 1½in. wide, length about 1in. more than the prop diameter.

Centre rod. Silver steel is best, the diameter of which is the size of the hole in the prop centre.

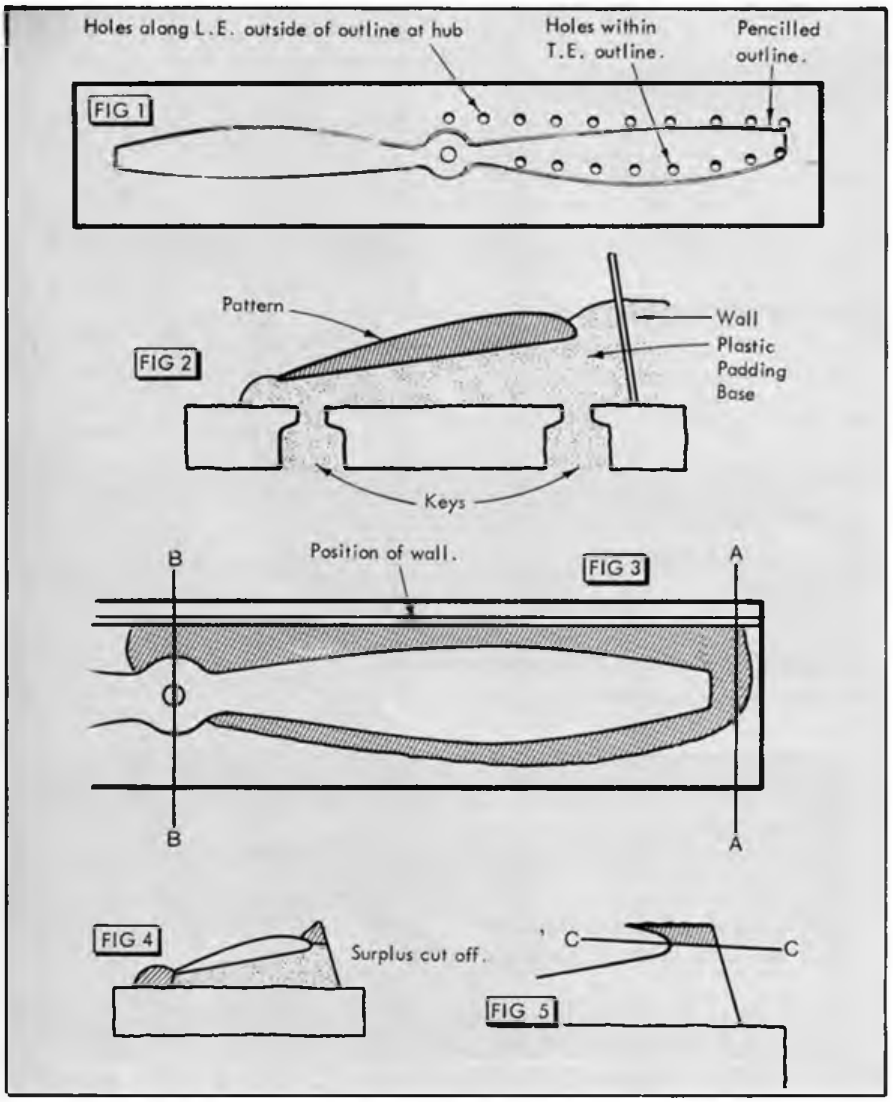
Mould material. Many types of polyester pastes and fillers were tried and rejected usually on grounds of poor reproduction and/or poor mechanical strength. *Plastic padding* now used exclusively has proved ideal in all respects. The finest detail is reproduced exactly, the surface is hard, has a high gloss and it is more than strong enough. Several of my moulds have produced over 500 propellers each and are as good as new. Plastic padding comes in two grades, hard and elastic. Hard is the one to use.

Release agent. Polyvinyl acetate in alcoholic solution is specially prepared as a release agent, and is ideal for use throughout the whole process. The PVA type is dyed blue, so there is a visual check on complete coverage while another advantage is that being water soluble, it can be washed off with warm water.

Making the mould

Firstly the base. Drill a hole the size of the centre rod in the middle of the base plate, ensuring that it is vertical. Put the centre rod in its hole and place the pattern prop in position. Using a wax based pencil draw the outline of the prop on the base and remove the prop. Within the outline of the blade at the trailing edge and in a straight line along the leading edge, drill ⅛in. holes as shown through the base. At the hub ensure that these holes are outside the outline of the leading edge. From the back of the base counter sink 3/16in. diameter about halfway through. These are to form 'keys' to hold the lower surface of the mould **(see Fig. 1 & 2)**.

Now clean the upper surface of the base plate removing all traces of oxide with emery cloth, and degrease with detergent and carbon tetrachloride. Do not touch the cleaned surface with the fingers. Coat the



pattern prop all over with PVA release agent and allow to dry. Prepare sufficient plastic padding to fill the space between the bottom of the blade and the mould and to provide excess material along the leading edge where the mould is extended. If in doubt, prepare more than necessary — the wastage must be accepted, for the mix must be made in one go. From the underside of the mould, force some of the mix through the holes of one blade only until it appears on the top surface, then spread a good helping on the top in excess of the blade area, especially at the leading edge. Spread a fairly thin layer on the back of one blade, being very careful not to trap air bubbles next to the blade. Place the centre pin in the hole, place prop over it and press the 'spread' blade onto the mix in the mould. A piece of sheet aluminium or Formica, previously treated with PVA is now used as a boundary wall at the leading edge of the blade to build up the plastic padding as shown in **Fig. 2**. This wall is ⅛in. from the blade at its nearest and is parallel to the edge of the base. Ensure that sufficient of the mix is spread to beyond the tip and beyond the centre, as in **Fig. 3**, the shaded area being the extent of the mix. The wall should be maintained at an angle of 10 degrees from the vertical, towards the prop, for reasons explained later.

While the plastic padding is setting, the prop must be firmly held onto the base with one hand while supporting the wall with the other. When the PP has set to the firm gel stage, carefully remove the wall, and now, working very quickly with a modelling knife, cut away the plastic padding along lines A-A and B-B. Still working quickly, cut the surplus plastic padding away from the trailing edge of the blade, holding the knife at an angle of 10 degrees from the vertical towards the blade, and then trim off the excess at the leading edge, as in **Fig. 4**.

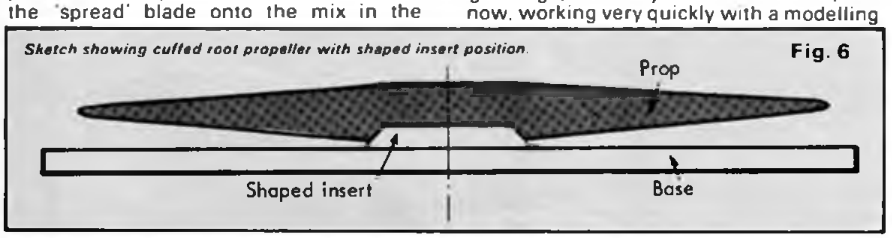
Next, carefully remove the prop by first removing the centre pin and then gently ease the prop out by twisting so as to ease up the trailing edge of the blade and withdraw backwards. The mould at the leading edge will now resemble **Fig. 5** with part of the mould overhanging. Using 400 grade wet or dry (wet) rub down to line C-C which passes through the radius of the leading edge. This line C-C is at 10 degrees to the horizontal. The reason for these 10 degree tapers is to provide an easy release when the mould is opened — release is almost impossible from a parallel.

Now we have the lower surface of one blade formed. Wash the release agent off the pattern, re-coat and allow to dry. Repeat the procedure for the lower surface of the other blade, this time ensuring that the pattern tips are the same height from the base. This is important to ensure a true running prop. When both lower surfaces have been prepared, we can now tackle the matching tops which I have found easier to make in two parts, split across the centre line.

Wash off all the old PVA and recoat the pattern, centre rod and the lower mould all over and allow to dry. Place the pattern on the mould and insert the centre rod. Prepare and coat with PVA a wall for each side of the mould about 1in. high and the length of the base. Mix a good helping of plastic padding and with the side walls in place carefully pour in and spread the plastic padding ensuring absence of trapped air and that the pattern is completely covered (one blade only). Make sure that the plastic padding goes down to the base at the sides and is beyond the tip end of the lower mould and just past the centre rod. The thickness of the top should be ¼in. to ⅜in. The upper surface of the mould tops must be absolutely flat, so it is advised to prepare another PVA coated strip of metal so that when the side-walls are in place, using G clamps, the 'roof' will form a flat surface. This is required so that when clamping during the actual moulding stage, the mould can be clamped firmly without stressing the mould as would occur if the top were to be left lumpy and uneven. When at the firm gel stage, remove the walls, trim off at the centre and the tip along lines A-A, B-B as in **Fig. 3**, and clean up the corners of the mould adjacent to the walls. Allow to harden and cool. With the blade of a knife between the base and the top mould, carefully separate and remove the top, then wash off all the old PVA and recoat all parts completely. Replace the pattern on its base, centre rod inserted, and place on the new top half and repeat the top casting procedure. In this case the first top forms the wall at the centre. When set, the mould must now be marked to ensure that the tops go on the ends for which they were made. I do this with a shallow saw cut on one side, cutting into the base and the side of the top mould as may be seen in the photograph.

The mould is not quite complete at this stage. The final step is to cut down with a

Sketch showing cuffed root propeller with shaped insert position. **Fig. 6**

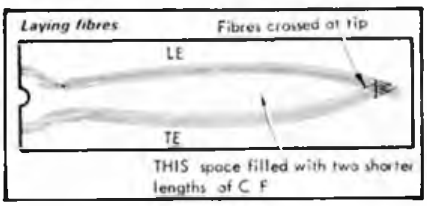


Above Larsson original with large hole for sleeved prop nut, and double diameter centre rod used to make mould

Below TR prop with hub faces trued with copper discs

small file the part of the mould between the blade tip and the end of the mould. When cutting down this part do not go flush with the blade surface. Leave a slight ridge; this provides an outline of the blade when removing the moulding flash. The cutaway is to allow the strands of carbon fibre to pass through the mould in the laying-up stage.

The fore-going is virtually a re-print of the text as published in 1972, when the method described catered quite nicely for own requirements, which was for free flight props, of low pitch and relatively simple in shape. As the word spread and demand for other props arose, such as Team Race and C/L Speed, modifications to the basic method became essential to cater for cuffed roots, conical hubs, engraved moulds for prop identification and to produce from the same mould props with two sizes of shaft holes. Each of these requirements is of sufficient importance to treat them in greater depth.



Cuffed root props

Once we move to the high pitch props as is usual in control-line classes, it is no longer possible to simply place the pattern prop on the base and try to build the volume under the hub with plastic padding. Another piece of the base metal is cut and angled to fit under the hub and fit snugly up against the cuffed roots, as in **Fig. 6**.

The shaped insert is best held in place by using 8BA screws from the underside countersinking with clearance in the base and tapping into the insert. Position these screws in such a place that they come through where the plastic padding is to be sited. If the screws are left protruding, they form an additional key to support the plastic padding. In addition it will be necessary to shape the walls, when moulding the lower profile of the blade, to sit neatly on the base and insert.

In the case of a speed prop specifically for a Rossi engine, the insert actually used was the spinner back-plate/prop driver, complete with split collet. This produced a prop exactly matching the Rossi spinner, and had matching driver serrations.

Conical hubs

Team race props, not using the usual spinner assembly, are often formed with a conical hub, to blend in with the front of the pan and the prop nut. If the hub area is moulded as outlined, this will produce an overhang which will effectively lock the pattern to the mould, and removal is impossible. In this case, when the first half of the base has been prepared, ease out the centre rod and the prop can be angled and eased out with care. The next stage is to remove material from the hub area, at an angle back to where the blade LE meets the hub, as in sketch **Fig. 6**.

At this stage check that the prop can be lifted out vertically, sliding it up the centre rod. If still fouling the mould, carefully remove material from the inner face to provide clearance. The angle formed provides a pattern to form a similar angle when producing the second part of the base.

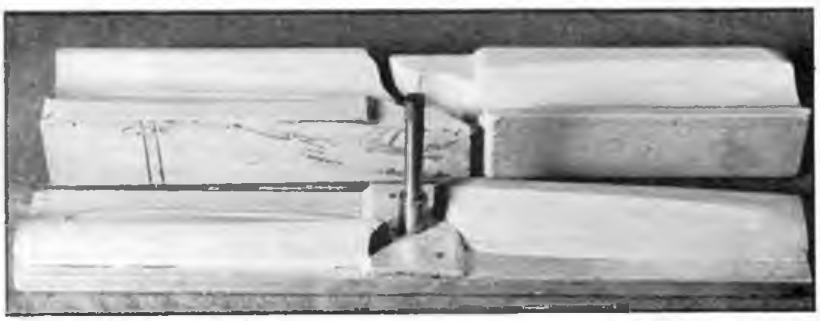
With conical hubs, it is virtually impossible to form free-hand an accurate cone with truly circular base. A simple way out is to make two metal discs of the required diameters, drilled centrally with the correct sized hole, and epoxy them to the upper and lower faces of the hub. When set, fill in gaps and irregularities with platic padding and allow to harden. Careful filing, finishing with wet or dry, will produce an accurate hub. This is done when preparing an original pattern or when truing up an existing prop prior to moulding.

In the case of the prop in the photograph, showing these discs, I found in my pocket two copper discs of the correct diameter, worth a total of 1½p! These were smoothed off on one side and centrally drilled, a cheap and easy way out.

Engraved moulds

Often it is desirable to provide a means of identifying props, and what better time than during the moulding process? This can be done in three ways. The first method is to

Metal experimental TR prop originally mounted on conical hub turned from in ply. Below mould for a Larsson prop. This mould illustrates built up centre for cuffed root, double diameter centre rod and engraved identification on rear hub



cut into the pattern prop before moulding, and the pitch and diameter figures will be reproduced in the mould and imparted to the moulding. Wooden patterns are not suitable for this method, but are most suitable for GFRP patterns. The engraving can be done simply using a hard sharp implement.

The other two methods are direct marking of the mould, and note that in these cases the engraving must be done in mirror image, so that reproduction will be the 'right' way round, when viewing the finished article. In the traditional manner, the information can be placed near the LE of one blade, cutting into the mould with a sharp pointed tool, going slowly and carefully, gradually cutting deeper as required. Finally the metal base, round the back of the hub can be marked. This is best done before any mould-making is done, for reasons of easy access.

A Burgess engraving tool makes things easy, and this is the method personally preferred. Again a reminder to start from right to left, writing backwards both in direction and in the form of the letters or numbers.

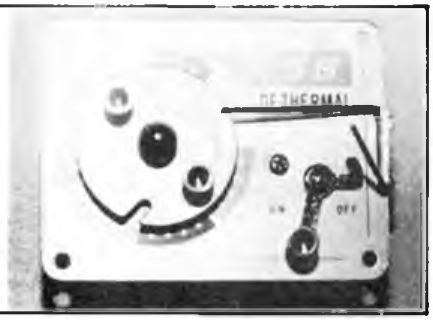
To be continued next month

DAVE DAY'S SHOP TALK

The latest in products for the modelling scene

D/T TIMER

We have been asked several times recently about the availability of dethermaliser timers. The KSB Timer is available from St Albans Model Supplies at £5.60. This is a scroll type clockwork timer giving up to 6 minutes operation. For those not familiar with a scroll type timer, this has a mousetrap type release which engages with a spiral scroll, thus it can give several turns of operation and allowing greater accuracy.



FLAIR RIGGING WIRE

Nylon covered stranded steel wire suitable for scale rigging wire is available from Flair Products, via your local model shop, in four metre packs at 55p.

WILLIAMS ACCESSORIES

Flair Products are now importing the well-known range of Williams Accessories of which the following is a small selection. ⅜in. scale cylinders

CYLINDERS

A pack of five moulded cylinders suitable for building dummy engines for small scale models. Price 64p.

WHEELS

Also available in various types and scales. ¾in. diameter vintage types cost 67p per pair, 1¼in. diameter in the same scale cost 88p per pair, while 1in. diameter smooth profile type cost 77p per pair. Available from model shops.

PILOTS

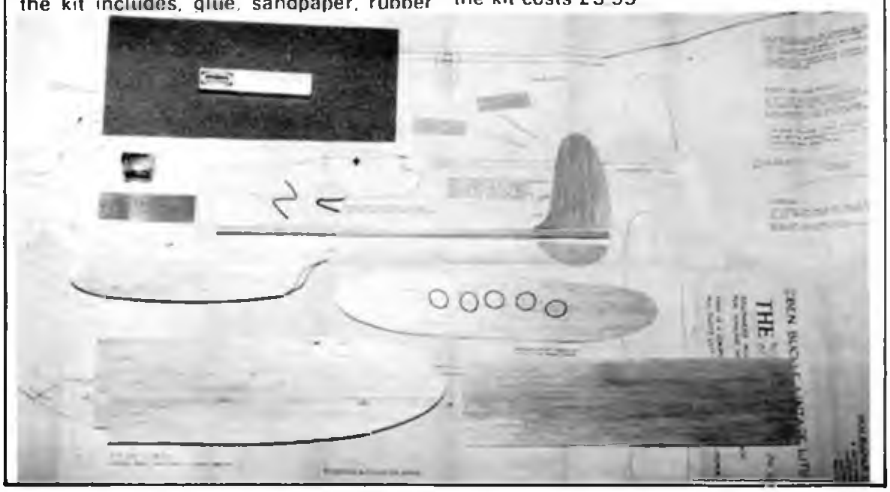
Available in Sportsman, Military or Racing types in various scales. A 1in. = 1ft. scale Military and Sportsman costs 86p.

PECK-POLYMER RUBBER

Peck Polymer rubber is available in packs of [illegible]in., [illegible]in. and ⅛in. width • 16 feet long at £1.25 per pack, available from SAMS.

BEN BUCKLE 'MERLIN'

Well known Vintage plan exponent, Ben Buckle is producing this kit for a 34in. span, all sheet, beginner's tow-line or hand-launch glider. All parts are cut to shape and the kit includes, glue, sandpaper, rubber bands, Plasticene nose weight, etc., plus a full-size plan which includes trimming and towing instructions. Distributed by Flair Products and available from model shops, the kit costs £3.99.



More about AERODYNAMICS

By Martin Simons

Last month Martin Simons illustrated the aerodynamic effect around the symmetrical wing profile. This month he continues the study with a comparison of the air flow over the cambered wing section.

A POINT of importance is that the flow velocity peaks of the two surfaces of a symmetrical wing, are opposite each other, even at angles of attack where lift is being produced. This means that the centre of pressure of the symmetrical wing profile, does not move about, so long as the flow does remain streamlined. The point at one quarter, or 25%, of the wing chord from the leading edge, is called the aerodynamic centre of any wing profile. With symmetrical wing sections, providing there is no flow separation, the centre of pressure is always at this 25% position, that is, the centre of pressure coincides with the aerodynamic centre. This is very important since it means that the symmetrical profile is neutrally stable. If the angle of attack increases, perhaps because of a gust or in a radio controlled aircraft, as a result of control movements, the lift will still act at the same point and will not tend to pitch the wing either nose up or nose down. Neither will it make any attempt to return to where it was before the disturbance and so it will be just as easily upset again. A wing with positive stability will always tend to return to its original attitude, the angle of attack at which the aircraft has been trimmed and which it will try to hold despite gusts, turbulence, etc. A wing with negative stability will magnify any disturbance, pitching up or down very quickly, not holding its trim at all. Neutral stability is neither one nor the other.

If the symmetrical wing section does begin to stall, the centre of pressure will move, but usually backwards, not forwards. This is good, as a rule, because the backward movement of the lift force tends to push the trailing edge upwards and reduce the angle of attack towards normal again, a stable movement. Unfortunately, as soon as the flow settles down again, neutral stability returns and the wing alone will not settle down for long in any one position. Some sort of stabilising device, such as a tailplane (not the *only* such device available, of course), is needed to keep such a neutrally stable wing at a more or less constant angle of attack.

We may now think about cambered wing profiles, bearing in mind that everything that has been said in the article published last month about flow and energy, etc., will still apply.

If the wing section is only slightly cambered, the kind of flow patterns produced at various angles of attack will not be very different from those associated with a symmetrical profile of similar thickness form. As the camber is increased, the differences become somewhat greater, but the same general principles still apply. In **Fig. 1** a slightly cambered aerofoil is shown at a small negative angle of attack, the angle at which it produces no lift. The total flow pattern, shown by streamlines, is not much different from that round the perfectly symmetrical form at zero lift. Because of the camber, however, the pressure and velocity curves, shown on the graph, are different **Fig. 2.** Two lines have to be plotted on the pressure graph, one representing the upper surface and one for the lower surface. Since there is no lift, the *totals* of the pressures above and below the wing, are exactly equal and the vertical forces cancel each other out. This negative angle of attack, measured geometrically from the chord line of the profile, is called the aerodynamic zero for the profile. For many purposes it is more useful to measure angles of attack on real wings in flight, from this aerodynamic zero, rather than from the geometric chord line. (Also, with sections like the Clark Y, the geometric datum line often used is not even the true chord line, which leads to vast confusions and muddles unless the modeller remembers that the true aerodynamic zero is the angle at which the wing produces no lift, measured relative to the true chord.)

Although the section is producing no lift, the way in which the pressure is distributed above and below the wing is very important. Over the front part of the aerofoil, ahead of the quarter chord point (i.e., in front of the aerodynamic centre), the pressure above the wing is actually greater than the pressure below. This produces a downward force. Behind the aerodynamic centre, the curves of pressure cross over and there is a resultant upward force. The two forces are equal, so in the vertical direction they cancel out (the section is at aerodynamic zero, no lift). They do, all the same,

Fig. 1. Flow past a slightly cambered aerofoil at aerodynamic zero (no lift).

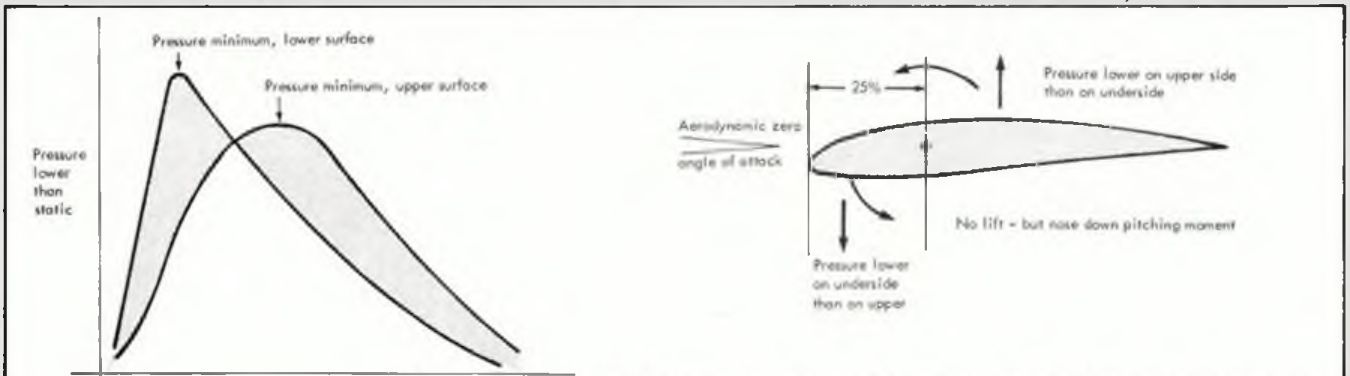


Fig. 2. Pressures and pitching moment of a cambered aerfoil at aerodynamic zero.

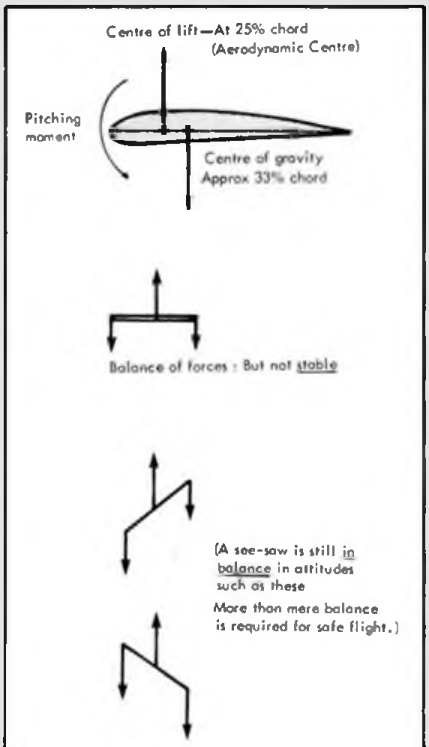


Fig. 3. Balancing out the pitching moment by positioning centre of gravity aft of centre pressure.

even at higher angles of attack. If the wing is allowed to have its own way, it will always tend to pitch right over, nose first, until it reaches a negative angle of attack. To prevent this, various ways of balancing out the negative pitching moment have been worked out and are adopted on ordinary aircraft. One common device is to position the centre of gravity of the whole aeroplane slightly behind the aerodynamic centre, at about one third or 33% of the wing's mean chord. In most normal aircraft, trimmed in this fashion, this c.g. position turns out about right. The lift acts at the aerodynamic centre, together with the pitching moment trying to turn the model into a dive. The centre of gravity positioned aft of the aerodynamic centre, acts like the balance on a see-saw and provides a force acting against the pitching moment. **Fig. 3.** Such a trim condition is balanced, although it may not be stable: that is, any gust or irregularity in the air can still upset the model. Just as with the symmetrical profile, a stabiliser of some sort is usually required as well. Balancing out the nose down moments of cambered aerofoils, is not at all the same thing as making the model *stable* in such a way that it always returns to level flight when it is left to itself. Stability will be considered in a later article.

In **Fig. 4** the cambered wing is shown at a more positive angle of attack, so that it will produce some lift. Since the flow pattern at this angle is not very different from that round a symmetrical profile at a similar *aerodynamic* angle (measured in both cases from the aerodynamic or no-lift angle), the cambered profile *does not*

An increase of two degrees in angle of attack, produces twice as much lift as an increase of one degree, and so on, so long as no flow breakaway occurs. In the same diagram, the line marked C1 shows how a profile with slight camber behaves. It produces zero lift at a negative angle of attack, but the slope of the line is exactly the same as the symmetrical profile. This line has also been cut off before the flow begins to break away; what happens near the stall is another question, but for the moment it must be noted that the profiles behave very much alike except that the cambered wing has a negative pitching tendency. The lines labelled **C2, C3, C4,** show sections with more camber, and the same things apply to all these.

Granted, if the camber was increased a great deal it would eventually be impossible for the flow to remain streamlined and then the lift curves or lift straight lines, would not behave in such a simple way. All the same, using normal wings and normal angles of attack, the diagram does represent the truth in practical terms. At the same time, the diagram includes some information about the drag, showing that for cambered profiles, the ideal angle of attack, that where profile drag is least, is achieved together with some positive lift.

What happens when streamlined flow begins to break down, will be the subject of a future article. This will require us to look more closely at the boundary layer, the thin layer that tends to stick to the wing surface and which determines, to a very large extent, whether the streamlines can keep going or not.

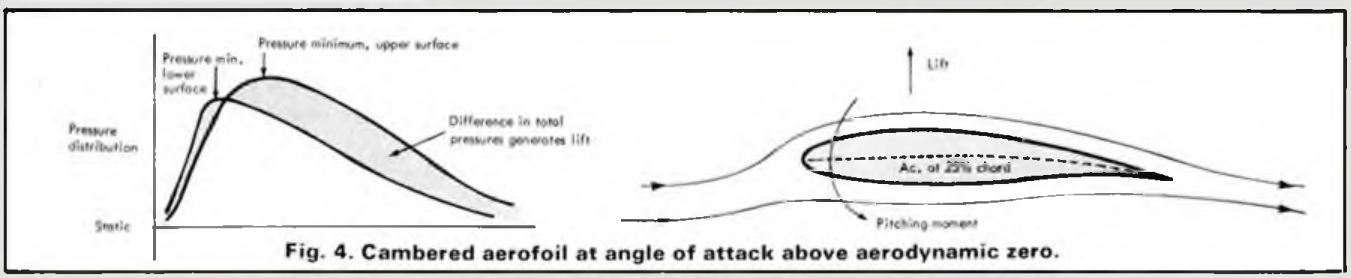


Fig. 4. Cambered aerofoil at angle of attack above aerodynamic zero.

constitute a couple of forces which tend to pitch the wing, rotating it about its aerodynamic centre and turning it to a more negative angle of attack. This is the most important difference between a cambered profile at aerodynamic zero, and a symmetrical profile at aerodynamic zero. In a wind tunnel this nose down pitching tendency or *pitching moment* can be measured and it should be no surprise that the more cambered the profile is, the greater the negative (nose down) pitching moment becomes. Symmetrical profiles have zero pitching moment at zero angle of attack. Slightly cambered profiles have slight nose down pitching moments, highly cambered profiles have large nose down pitching moments, measured always at the quarter chord position. On wind tunnel test graphs, these pitching moments are usually plotted as moment coefficients, the curve referring to them being labelled, as a rule 'cm,' just as the curves relating to lift and drag are labelled cl and cd.

This nose down pitching moment produced by camber, never disappears so long as the wing is operating normally and streamlined flow continues. It is still there

produce more lift than the symmetrical wing at the same aerodynamic angle. The lift is the same. However, the cambered profile, if correctly chosen for its particular function and correctly trimmed at its ideal angle of attack (see Part 3 of this series), will produce *the same lift with less profile drag.* In other words, the cambered profile will be more efficient at this particular angle of attack, than a symmetrical profile would be, even though both could produce the required lift.

This is summarised in a simple graph, **Fig. 5.** Assuming still that we have a constant speed of streamlined flow and wings of the same total area, the way in which the lift force produced by symmetrical and cambered wings varies with angle of attack, can be shown diagrammatically. The line marked S, shows how a symmetrical profile behaves: zero lift at zero angle of attack, and a rise in lift as the angle of attack rises. The graph has not been continued up to the point where the streamlined flow begins to break down. Note that the slope of this line on the graph is constant, i.e., it is a straight line at a definite angle and does not wobble about.

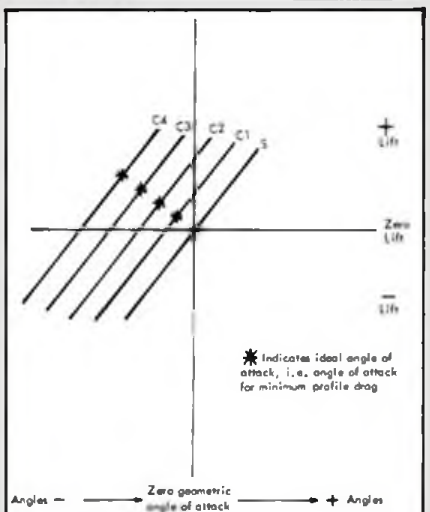
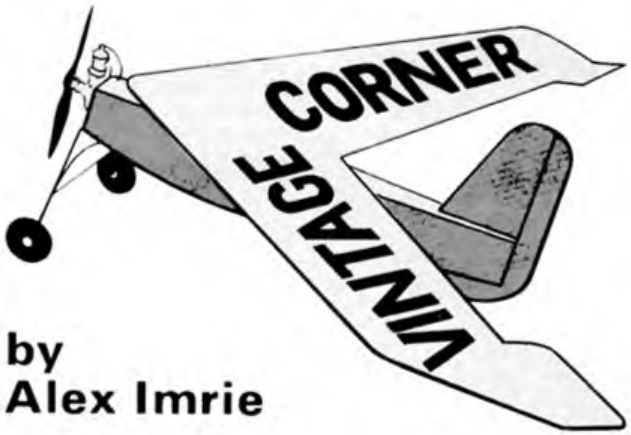


Fig. 5. The lift 'curves' of symmetrical and cambered aerofoils in relation to angles of attack: assuming no flow breakaway.

E. W. Little (see text) with his original 1942 'Wizard' power model which resembles Bill Atwood's California Champ of 1935. If you look at August and December 1946 Aero modellers, you will see other photographs of this model, and a younger Wilbur Little!



by Alex Imrie

VAN HATTUM LOOKS BACK

(The name of this Dutch modeller will be well known to many readers, he started building models 60 years ago, and his 146th design was recently described in Model Aviation. He must have been one of the earliest SMAE overseas members . . . when your membership number is 108 you can afford to look back!).

"Today you go into a shop, select your balsawood, spruce, glue, tools, paints, dope, not to mention an engine, radio-set or anything you fancy. But it was harder in those days, although suppliers like A. E. Jones of New Oxford Street did have quite a lot in stock; even so you still had to do a lot of work before some material was ready to become part of your model.

We used a fair amount of bamboo, that wonderful basic stuff for wing-tips, tail-planes, fins and undercarriages. You got it from the florists, who offered it with the required distance between the 'knots,' but it had to be split and split again until you finally got something like 1/16in. perfectly round lots; the last stage was with a bit of broken glass, file and sandpaper. It was ideal for an undercarriage, strong, yet light and . . . removable so the legs did not take up space in the box or tear the tissue covering. They went with a fairly tight fit into rolled and glued paper tubes, glued to the fuselage members. Pelly-Fry once lost one leg of the Stork in flight, could not find it, and fitted the other leg where it opposed the torque and made a perfect ROG!

It was not only a job to prepare bamboo, but piano wire also demanded effort, for it was sold in rolls and had to be straightened before you could use it. In these days when wire is sold in straight lengths, it is difficult to explain that this operation required know-how. In the older days I once took a model club under my wing. They had started a series of stick-and-string models, but given it up. The steel wire 'wings' were still nailed down in outline on the building boards. I suggested taking them off, but when that was being done, the wings twisted around themselves in a cloud of dust and rust, for they had never thought of straightening the piano wire first. So we changed over to balsa in the accepted technique.

Before the balsa era, a fuselage consisted of three-ply formers with as little material left as possible and these were drilled and tied with thread to the longerons; about the most tricky way to build and today I would not have any part of

Left, Fred Hempsall (see text) who designed 'Black Magic', an attractive cabin power model that was described in September 1947 Aeromodeller. Plans are still available as PET 377 and the design was recently kitted by Vintage Model Scene. Below, Joe Ott's 1930 compressed air model built by Jack Humphrey and seen at Shefford, uses three plastic bottles in series instead of the usual piano wire bound copper or brass foil container.

Above when the ban (which was to last for four years) was imposed on flying petrol models from August 1940, Colonel Bowden produced his 'Big Stuff'. Model was described in December 1941 Aeromodeller and plans are still available as D.114. Les Hoy built this fine example seen at Shefford. Right, Vic Dubery with his rubber flying scale 'Waco Custom' designed by Stephan J. Graffeo and described in that May 1936 copy of Flying Aces that he is clutching so firmly!

it. Making the formers meant use of a fret-saw, trimming by file, etc., so a minimum number was the order of the day. Weight counted a lot — so we thought — so the space between the ply ribs was generous.

Glue? At first it was Croid Liquid Glue, which was liquified by putting the tin in hot water. A good glue, but not one you could expect to make a reliable joint within a few minutes. Later we got Ambroid 'cement' and off we were.

Let nobody think that we were pioneers, giants on a small scale, but we learnt to persevere and, moreover, it was just the state of the art; there was just no other way if you wanted a model, and we certainly wanted that. If you can now order a foam wing and fibreglass fuselage, why not? But we liked the building after our own design and the flying to follow, even if that did not always meet with our expectations.

From the old days we lost those lovely turnbuckles and beautiful wire spoked wheels, bentwood propellers, but the past always keeps something for itself. Even the distant days and friends."

MANX TALES

Peter Fisher was well known for his Performance Kits Fly for Fun Days at Old Warden, and for being the organiser of the much lamented Biggleswade Common vintage meets, writing from his new address in the Isle of Man, he extends an invitation for all vintage modellers to visit him. Peter's letter included two photographs and a potted history of two 'old stagers' who are still active in the hobby today, he writes:

"Mr. Wilbur Little now resides at Colby IOM, and in the photograph he is seen holding his original 1942 'Wizard' model, which won the Irish Nationals, in that year, in Dublin, powered by an Ohlsson 23 sideport petrol engine. The model is of 53½in. span, and still has its original silk covering and ABA transfers! It is currently powered with an OS Max III .15 and fitted with single channel R/C and is still flying. Sadly the original engine was passed to a collector.

Mr. Little founded Ulster Model Aircraft Supplies in 1939, and produced the 48in. span 'Skylander' glider kit. The name of the company was changed to Sky Products in 1940, and in 1942 became ATO Modelcrafts. ATO stood for All Types Of! I remember these kits as a boy, and admired their ATO 30 and ATO 36 sailplanes (the latter retailed for 6/9 (34p) in 1947). These kits were designed by Mr. Little, who designed all the ATO kits except the elegant ATO 52, a shoulder wing high tailplane sailplane, which was designed by his shop manager. At this time ATO were manufacturers, retailers and wholesalers and was the only important model aero company in Northern Ireland. They also sold Cloudcraft, Veron, Skyleada, Keil Kraft, Megow and kits by Model Supplies Stores of Manchester.

In 1948/9 the ATO-22 and 28 rubber powered models sold for 5/6 (27½p) and 7/6 (37½p) respectively and the ATO-52 at 17/6 (87½p). The latter was much admired by myself at the time. Purchase Tax stopped production in 1951 but the company continued in the wholesale and retail business. They wholesaled the Skyleada 'Bantam'

Left, Engleman designed California Champ 1939 Wakefield described in May 1940 Air Trails with its builder K. Fordham at Shefford. Right, Josh Marshall, President of the Hayes and District Model Aero Club at the Shefford Exhibition with the glider and winch that he built in 1939.

Left Buccaneer Standard by V S Turnbull of the Carlisle and District Model Club, seen at Old Warden on Vintage Day sheltering in the lee of a corrugated iron boundary marker. Note the butterfly wing decoration. Above the writer's Kalper 32cc diesel powered 'Dwarf' designed by Dave Hilliard in 1949. Plans for a CO2 powered version appeared in November 1983 Aeromodeller.

which sold for 25/- (£1.25). I built one of these excellent 44in. span cabin free flight models in 1948, and using an original Mills 1.3Mk I.I managed to win the Eton College Aeromodelling Society Open Power competition, which was held on Leavesden aerodrome in the same year. The 'Bantam,' designed by Ron Warring, had a Davis aerofoil section.

Mr. Little moved to the Isle of Man in 1972, and is still an active aeromodeller, concentrating mostly on R/C, but still with a vintage flavour, his latest model being a very attractive semi-scale job, which has a resemblance to the Corben Super Ace. ATO Crafts are still in being, purely as a model shop, and the interesting ATO kits, are now a thing of the past.

Mr. Fred Hempsall has lived in Port St Mary IOM for many years. He told me that he originally designed and built three 'Black Magic' models, and I can remember them flying very well, at Fairlop. This design is so well known that no further reference to it is necessary, except to record that Fred has just bought one of the replica kits by Vintage Hobby Scene, and is pleased to note that the original plan is incorporated. Not everyone knows that Fred also designed the 'Spartan,' the prototype flying in 1936. This was an excellent cabin job of 5ft. span, made by Halfax Kits at Green Mount Works Halifax, Yorks. He also worked for Astral Kits, as a freelance designer, and designed the 'Shufti' for them, using the early Movo D2 diesel.

The photograph taken in October last, outside 'Woodland Towers' (the name of Peter's fairytale castle home) shows Fred holding the Performance Kits 'Ziz,' which is Micron Meteor 9cc powered. This is a 'Vintage Style' model, which one day might get into production! This much flown model has had over 1000 flights, and is covered in PK orange and yellow nylon. The mice pilots were made for me by Mrs. Douglas Bader.

A final note for vintage flyers. PK three-colour transfers are available from these works (Onchan, Isle of Man) post paid, at four for 50p, and are authentic for all ancient Performance Kits.

You may be interested to hear that Harry Hundleby, who used to be editor of the Aeromodeller at Eaton Bray had a chat with me recently. He has dwelt in the Isle of Man for many years, having come over to work with Davies-Charlton Ltd., and subsequently opened a business of his own here, which he still runs."

HISTORY OF AEROMODELLING

Amongst vintage enthusiasts interest is high in ascertaining the reasons for various designs, who designed them etc. But even when one has access to a comprehensive library it is sometimes not possible to provide all the answers. Once one gets involved in this time consuming task it is all too easy to arrive at conclusions that seem to fit the bill yet are inaccurate, if these findings are then perpetuated they can further distort the true facts. The historical researcher is only as good as his sources and it pays to remember that everything printed is not the gospel truth! Contact with contemporary aeromodellers is often an invaluable means of obtaining information that has not previously been recorded, and this avenue should be explored wherever possible.

In an effort to document the story of early aeromodelling as fully as possible, old photographs, film negatives and related material is required for the period prior to December 31 1950, with special emphasis on pre-1939 modelling. Anything sent on loan will be carefully handled and returned by registered mail after use.

Left Firebrand designed by D. E. Parker and described in May 1941 Aeromodeller seen at Old Warden Vintage Day. Thought to be the machine of Keith Bushnell but this is not confirmed. Below Dave Baker takes time off from editing 'SAM 35 speaks' to indulge in some winter time flying with his Flying Aces Stick model, described in that journal in September 1936.

Above: MAP's Ron Moulton had to climb into the 'rigging' to get this aerial view of part of the Shefford exhibition! Right: Bill Dean flying the prototype Keil Kraft Gipsy in the 'Model Exhibition Cup' at Fairlop during the 1949 British Nationals. This is a popular model today being still available as a kit.

Many vintage designs are being re-drawn nowadays with obvious differences from the original plans, a case in point is Colonel Bowden's famous Kanga Kub. surely someone, somewhere must have one of the original drawings that were sold before the war by Kanga Aero Models of Birmingham. Many old plans have surfaced in recent years with the increasing popularity of the vintage movement, but there are still serious gaps in this material especially from the 1930s.

Can any reader shed any light on the whereabouts of F. A. Lowe previously of Beeston, Notts who was a prominent modeller in the Midlands before the war? Another modeller that we desire to contact is George H. Upson, a competition flyer of the early 1950s. There are many others, can you help? All and any assistance will be most gratefully received.

SAM 35

Readers wishing to join this organisation that is "dedicated to the preservation of vintage model aircraft" are advised that the 12 month subscription of £6.00 (cheques to be made out to SAM 35) should be sent to the SAM 35 Treasurer, Tony Hogan, 7 Crowborough Close, Warlingham, Surrey.

SAM COMPETITIONS

Even more competitions are planned for 1983 and in addition to the Rupert Moore Memorial Trophy and the Danny Sheelds Twin-Pusher Trophy a C. A. Rippon Trophy is planned. This will be for the Cruiser Pup model one of Rip's famous designs and drawings are available from Terry King, 47 Metcalfe Road, Cambridge. The trophy itself will incorporate awards gained by C. A. Rippon at the various Model Engineer Exhibitions over the years and the badge of his famous old club Northern Heights. There will also be a Wakefield Cup for pre-1950 Wakefield models, run on the usual duration lines. The third new award will be known as the Earl Stahl Shield and this should prove highly popular due to the use of free plans to SAM members. Every month (commenced in December issue) a half size Earl Stahl plan will appear in SAM 35 Speaks for one of his flying scale low wing models that were described in Model Airplane News during 1940/1.

The entrant need only send an SAE to obtain the full size plan of his choice, and no additional documentation is necessary. Models will be judged on their flying performance only and super detailed scale models are not expected. It is interesting to note that all the above mentioned five competitions are for rubber power, a sure sign that the 'rubberears' amongst us are pressing forward, and although early days yet, there is no truth in the rumour that some SAM members are trading Brown Juniors for hanks for real good Pirelli!

HELP WANTED

Readers of this column will notice that some modellers seem to get a lot of attention while others are never mentioned. The reason that we have 'regulars' is because of the high incidence of their involvement. If you build and fly regularly, you too will receive recognition if you write in telling us of meetings and models and submit photos of your activities. We need this information if Vintage Corner is to present a true cross-section of the hobby. Frequently, contributors send the identical material to Vintage Corner as they send to SAM 35. Although our readership circles are not necessarily the same both the editor of SAM 35 Speaks and myself try to avoid the unnecessary duplication that this can cause. The more material that we have available the easier will be our task of co-ordination, so please send in anything that you think will be of interest to our readers.

Right: Brian Fettett's Red Zephyr powered by the Rocket 46 petrol engine, pleasingly finished in the red and white 'sunburst' scheme as seen in the old Scientific advertisements for this model. Below: Geoff Clarke with his Kalper 32cc powered 'Oomph' at Old Warden. This model, designed by Mons. F. D'Huc Dressler, was described in the French magazine Le Modele Reduit D'Avion in January 1949.

25 YEARS AGO IN AEROMODELLER

By Dave Day

Regular readers of this column, will be aware of the saga of the Wakefield Trophy which was originally awarded for *annual* competition and later became the trophy for the World F/F Rubber Championships. British feelings were upset when the FAI made World Championships a bi-annual event and the SMAE made an unsuccessful attempt to have these returned to annual status. One result of this was a threat to withdraw the Wakefield Trophy from the FAI and run it as a separate event.

Aeromodeller's Editor felt that this would be a retrograde step which could only result in the devaluing of the Trophy and felt we should "swallow an unpalatable decision" and hand over the Trophy unreservedly, and "thus perpetuate one of the classics of competition modelling." Happily, this is precisely what happened.

Probably the most important feature of this issue was the introduction to the Plans Service of George Aldrich's immortal 'Peacemaker' design, which accompanied an article on C/L Combat in the USA. Designed for 2.5 to 3.5cc motors, the 36½in. span model became one of the commonest sights on British flying fields for the next decade.

Other Plans Service introductions were a 60in. span F/F scale model of the Westland 'Lysander' for 1.5-2.5cc engines by the Aeromodeller staff and 'Meanderer' an 8ft. span towline glider by Jim Baguley.

Scale drawings in this issue were the Curtiss F11C-2 Goshawk ('Famous Biplanes' No. 13) to 1/48 scale by G. A. G. Cox, and the Pfalz Dr.1 Triplane by P. L. Gray to 1/72 scale. The latter aircraft was an intriguing device with an eleven cylinder Siemens-Halske SHIII *radial* engine (as opposed to the then more usual *rotary*) which was geared to an enormous propeller via 1:1 gearing. Both the motor and the propeller turned at only 900rpm. The logic of this arrangement escapes me; can anyone explain? The wing arrangement on this aircraft was also unusual in that the centre of the three wings is a very narrow chord. In fact, the layout is more like a biplane with an extra wing added.

"Aeromodelling Step by Step" featured timers and provided an interesting insight on the number and variety of these which used to be available.

There was a lot of ducted fan research going on in 1958 and one interesting approach was the work done by John Coatsworth on *centrifugal* fans. 'Model News' showed as its 'Model of the Month' John's latest effort which was a 23½in. span *twin-engined* Gloster Javelin weighing 16oz. Lest there be any doubt — yes it was a free flight model!

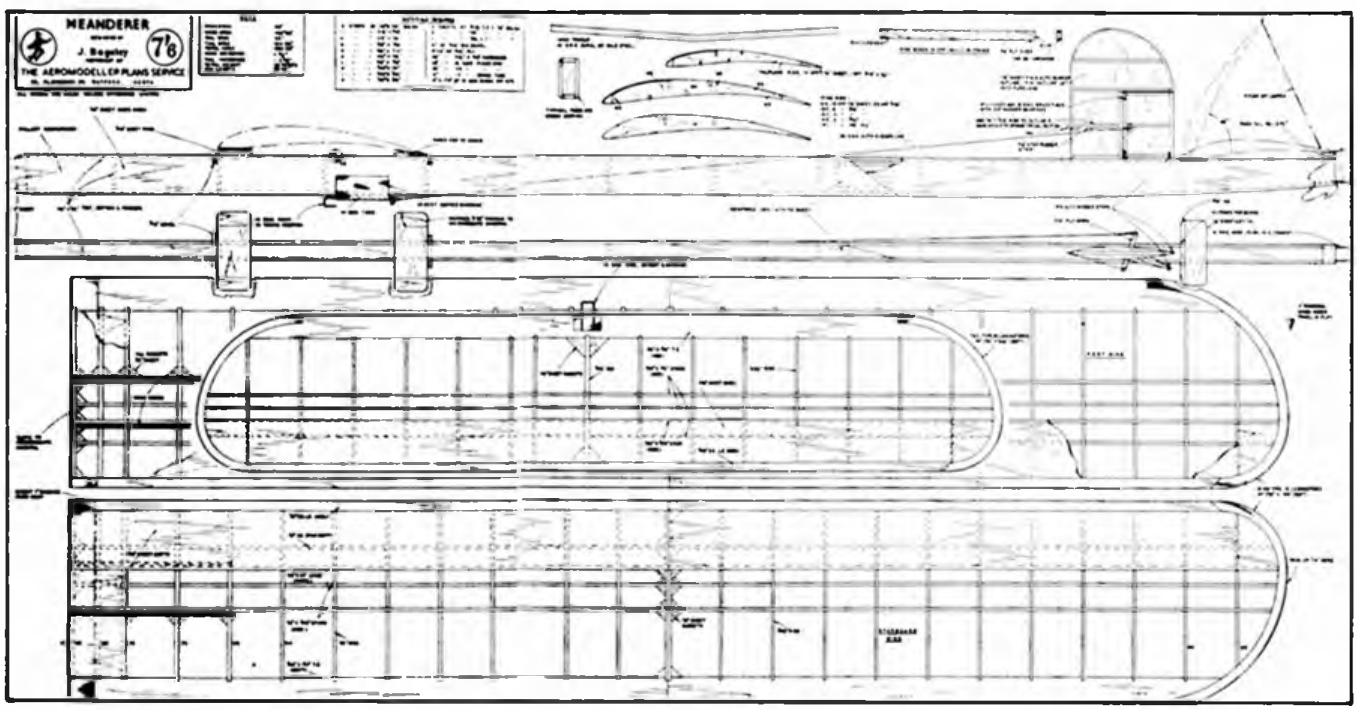
'Decor Detail' gave colour details for the Douglas A-26 'Invader,' and gave a table of squadron markings for WWII types such as the Hurricane, Spitfire, Typhoon, Mustang, Tomahawk, Kittyhawk, Wellington, Lancaster, Stirling, Mosquito, Beaufighter, Halifax, Whirlwind, Boston, Lysander and Defiant. Very useful!

'Engine Analysis' No. 44 by Ron Warring tested the modified version of the Frog 2.49BB diesel, which produced .2525BHP at 14800rpm.

As noted previously, the most notable change in the last 25 years has been in the field of R/C Technology. 'Radio Control Notes' was still involved in such topics as relay design and how to squeeze a crystal oscillator into a tobacco tin by using one of those new transistors. Another feature was the design of valve based multivibrator circuits for use with pulse-proportional systems.

The achievements of the O'Donnell brothers during this period became Legion, so much so that John became better known as 'O'Winnall.' This was well illustrated by a story in 'Club News' concerning the North Western area annual dinner where the four top glider men in the area were blindfolded and given paper gliders for a small contest — needless to say John won!

The Plan No. G/683 reproduced here can be obtained from Aeromodeller Plans Service, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts., HP2 4SS, price £2.95 plus 45p post and packing.



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FROM THE HANDLE

CLAPA League Results for 1982

Bill Draper won the Open Stunt League with 9 first places from 12 competitions, thus retaining the trophy. Bill first won the League in 1978, held it jointly with John Lynch in 1979, was second to Pete Tindal in 1980, and won it again in 1981.

This year's Novice Stunt League winner is Ken Reeves with 4 first places from 6 competitions. Ken is also from Nottingham MAC and flies an Enya 45 powered *"Superhawk"* built from Bill's plans. This must prove the success of Bill's design which has been developed over a number of years. Ken Reeves was 2nd in last year's Novice League which was his first full season of control line aerobatic flying. He has now topped the promotion table 3 times and is therefore 'promoted' into the open competition.

Bill Draper has this year presented to CLAPA a shield to be awarded to the Novice League winner which will be officially presented at the CLAPA Championships in 1983.

The CLAPA leagues are tabulated from all advertised contests throughout the year on a basis of 50 points for 1st place, 49 for 2nd, 48 for 3rd and so on with a flyers best 7 competitions counting in the Open League and 4 competitions in Novice. This year 18 Open and 15 Novice competitions were flown. International competitions and competitors with non-standard scoring systems are not taken into consideration.

The *Spitfire* trophy for the most improved flyer based on improvement in Open League position and the observations of the CLAPA Committee throughout the season has been awarded for 1982 to G. Pearce who achieved 11th place in the league having only flown in 6 competitions.

As well as compiling the league tables, the CLAPA Contest Liaison officer keeps a record of all control line aerobatic contest dates in order to try and avoid clashes and would request that all contest organisers contact him before fixing the date of their competitions. CLAPA also wish to encourage all organisers to include a novice event on an equal footing with open events to provide more opportunities for the up and coming flyers.

Anyone interested in joining CLAPA should contact G. Alison, 62 Berry Lane, Rickmansworth, Herts. Contest Liaison Officer is Reg Lowe, 49 Commons Close, Newthorpe, Nottingham NG16 2BU.

Open League Stunt (18 contests, best 7 count)

Competitor	No. of Comps.	Points
1 C. W. Draper	12	350
2 N. Dickinson	13	343
3 A. Tipper	14	338
4 G. Alison	7	317
5 P. Illiffe	7	315
6 R. King	7	300
7 B. P. Robinson	6	292
8 T. Taylor	7	292
9 R. Quilter	7	289
10 R. B. Lowe	7	275

Results Novice League Stunt (15 contests, best 4 count)

Competitor	No. of Comps.	Points
1 K. N. Reeves	6	200
2 T. Ellis	5	199
3 R. Illingworth	8	195
4 T. Bradley	4	190
5 D. Pardoe	4	189
6 M. Williams	3	143
7 J. Allcock	3	142
8 R. F. Wilson	3	140
9 N. Worley	3	139
10 A. Brough	3	138

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MiG 15

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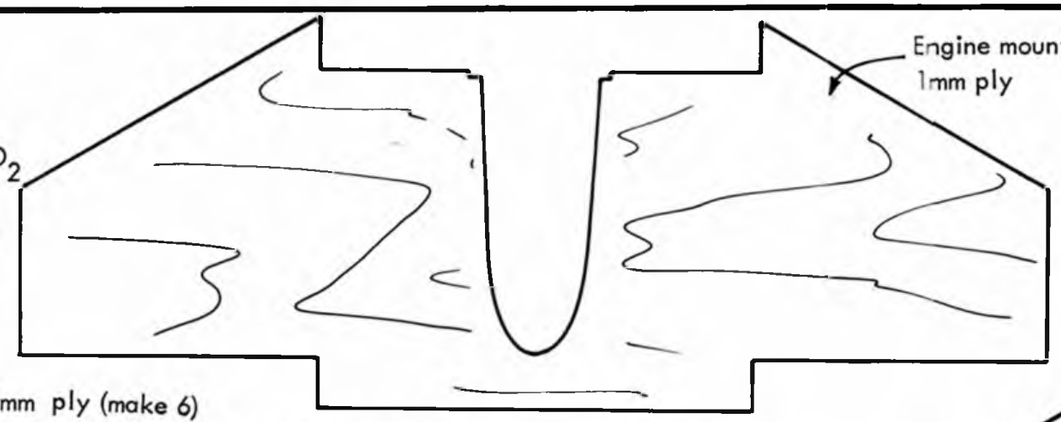

Note: Model should balance correctly if built as shown. Add weight to the nose or tail if necessary.