October 1985
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AERO MODELLER

MODEL PUBLICATION

SCALE IN SPACE
The Star of the Model Rocketry Classes

SCALE TWINS FOR RUBBER POWER
Techniques for success

CONTROL-LINE EURO CHAMPS
Full report

FULL-SIZE PLANS
Control line Kamikaze Ohka for 1·5cc

DOUBLE PEANUT TREAT
Farman 400 and Caudron 272/5

JETEX -a look back

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October 1985

Volume 50
Issue 597

ISSN 0001-9232

AERO MODELLER

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Cover:
One of the best European spacemodellers is Van Kutuha from Czechoslovakia, seen here with his superscale model of the Saturn V. Model is powered by two 40 Ns engines, weight is 495 grams and scale is 1/100.

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ABC

Advertisement Offices: Argus Specialist Publications Ltd., Golden Square London W1R 3AB. Tel: 01-437-0626.

Postmaster: Send address changes to Argus Specialist Publications Ltd., P.O. Box 35 Wolsey House, Hemel Hempstead Herts HP2 4SS England.

Subscriptions: Direct subscription rate including index. Home £24:70, Overseas sterling £26:50. Overseas dollars (U.S. or equivalent) $34.00 from Infonet Ltd., Times House, 179 The Marlowes, Hemel Hempstead, Herts. HP1 1BB. Tel: (0442) 48434.

Overseas Availability: Second class postage paid in the U.S. at New York, USA.
Mailing Agent and distribution to news stand sales by Eastern News Distributors Inc., 111 Eighth Avenue, New York NY 1011 U.S.A. Tel: 1(212) 255 5620. 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 BY 11357 USA Tel: 1(212) 767-6632. USA Subscription agent Joseph J. Daliedu, 4314 West 238th Street, Torrence, CA 90505

MAP **Model & Allied Publications**

A Division of Argus Specialist Publications Ltd.
PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts. HP2 4SS. Tel: 0442 41221.

HANGAR DOORS

Above, Winners all! This group shot was taken after the Team Race Final at the European Control Line Championships. Front row: Brown/Smith, Heaton/Woodside and Nazin/Kuznetsov. Behind them, officials and timekeepers. The three gents in dark glasses (incognito?) are the Team-Race Jury, left to right, Bob Horwood, Pietro Fontana and Per Hasling.

Euro Champs

The European Control Line Championships held at Three Sisters, Manchester is reported on elsewhere in this issue and was an outstanding success. Not only were there some fine wins and placings for British fliers but the overall organization was applauded by everyone present.

It is very difficult to single out individuals within such a complex organization. The SMAE officials, the Greater Manchester Council, the Wigan Metropolitan Council, Padgate College, Local Clubs, Sponsoring Organizations, let alone individual aeromodellers. All these gave unstintingly to make a success of the event.

Aeromodeller is sure that modellers throughout Europe would wish us to put in print their thanks to all the above for their expertise and dedication to the cause of Aeromodelling. Great Britain has a very fine record for running first class International Championships...long may it last.

TV Model Magic

Channel 4: Starting at 5.30pm on Monday, 16th September will be a weekly series of six programs covering various aspects of modelling; railways, model engineering, boats, cars and of course aeromodelling.

The programmes are designed with the modeller in mind rather than for the unititiated beginner, so we should all pick up a few hints and tips! At least that is the intention, TV programs often have a wonderful build up (or hype!) and when seen by one who knows a little about the subject – tell you nothing new!

The series of programs is to be supported by "the book of the series", published by Argus Books...who better! As most of us will be at work at the time of the broadcasts, it is to be hoped that they will be repeated at a time more convenient to the person they say they are aiming the series at! But then everyone has got a video recorder these days haven't they...

Spar-Es Update

The 'Spar-Es' event at Barkston Heath on 4th August suffered from the wet and windy weather, perhaps to a greater extent than the Wakefields. Turbulence was very evident in the area where most of the launches took place – fast climbing Wakes had some advantage since the air smoothed out above 70-80ft or so and they were up and settled quicker, but the little 'Spar-Es' models rarely got above 20-30ft.

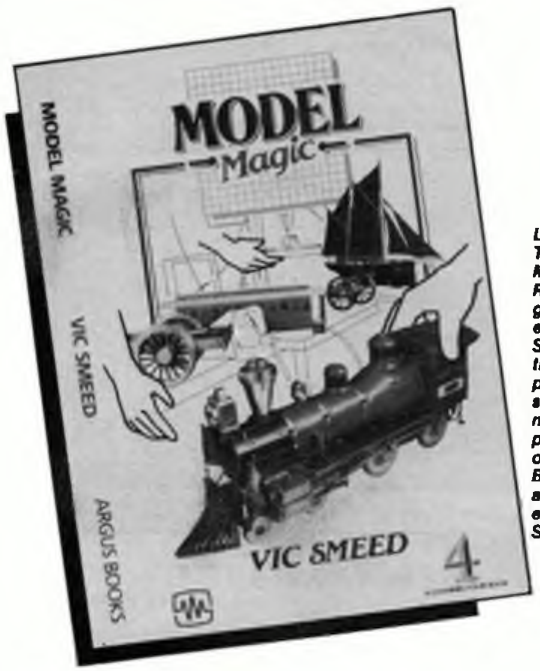
In fact several examples were never taken out of the cars and there were only four entries, only two of which returned three flight totals. The winner had carved a prop of increased pitch and the second model used a plastic prop: both used six strands of 1/8in. rubber.

It was clear from conversations that the suggested four strands of 1/4in. flat is too much if *FAI Supplies* rubber is used: the model in the March issue was tried with some elderly synthetic rubber but subsequent trials with *FAI* indicated a *considerable* difference in power. Presumably the ten strands of 1/8in. specified on the original plan was also synthetic! Winner Chris Strachan totalled 1:52, with a longest flight of 46 secs. Second was Alan Wiggs with 1:08.7 total. Ramon Alban mentioned that he'd had one flight of two mins plus in a big thermal but averaged about 35 secs. under normal calm conditions...

SMAE F/F Experts' Forum 85 The Papers

At the 1985 *Model Engineer Exhibition*, six successful British free-flight competitors gave talks and 'show-and-tell' presentations at what is planned to be an annual event, the *SMAE* F/F Experts' Forum. Frequent F1B team member Ron Pollard talked on Soviet Wakefield development and illustrated it with one of the current, ultra-stiff-winged models flown by the USSR team last year; Laurie Barr spoke on indoor building techniques; Mike Fantham told the large audience 'How to Win Glider Contests'; Ian Kaynes presented a paper on measuring the stiffness and predicting the flutter characteristics of a Wakefield wing in wet and dry conditions; Martin Gregorie's paper was on F1A glider design using computer assistance and Stafford Screen was still speaking on F1C techniques when the time allowed in the Wembley Conference Centre ran out.

The fact that almost all the audience stayed throughout the 1¾ hours showed that there was some fascinating material presented; now the five papers by all except Laurie Barr, have been collated and are available from Mike Fantham, 68 Overdale, Ashtead, Surrey KT21 1PT at £3.50 plus a large stamped addressed envelope. Any surplus income will go to the indoor and



Left, the book of the T.V. series - Model Magic (see above). Right, no we haven't gone into heavy engineering but Bob Symes, the beard on the right, is the presenter of the series of TV modelling programmes starting on 16th September. Beard on the left is award winning model engineer John Stubbs.

outdoor free-flight team travel funds.

Next year a longer slot is planned at the *Model Engineer Exhibition*, which will both give speakers enough time for a fuller treatment of their topics, and also allow time for questions. Meanwhile, if you have done some work which other free-flight enthusiasts would find interesting, please send brief details to Mike Fantham *before* Sept. 30th.

Boomerangs

Earlier this year we published an article on Boomerangs that seemed to catch many peoples interest (a comp at the Nats next year?). For those that want to look a little further into this interesting subject there is a 'Boomerang Making Workshop' at the Horniman Museum and Library on Saturday 19th October. This is followed up on the Sunday with a 'Boomerang Throw-In' at Dulwich Park. Last April's event had competitions for accuracy, catching, shortest time, maximum time, unusual boomerang and best made boomerang. Sounds great fun and is not expensive to attend.

More details from: Elizabeth Goodhew, Keeper Education Services, *The Horniman Museum and Library, London Road, Forest Hill, London SE23 3PQ*. Telephone: 01-699 1872.

Coupe 85

Make a date in your diary NOW. Aeromodeller's Coupe d'Hiver International will be on 1st December at RAF Henlow. Get out that balsa and start building your winning model, we even have the perfect choice for you in Free Flight Scene this month! We have put in a request for an improved selection on the weather front this year but your prayers would be greatly appreciated too...

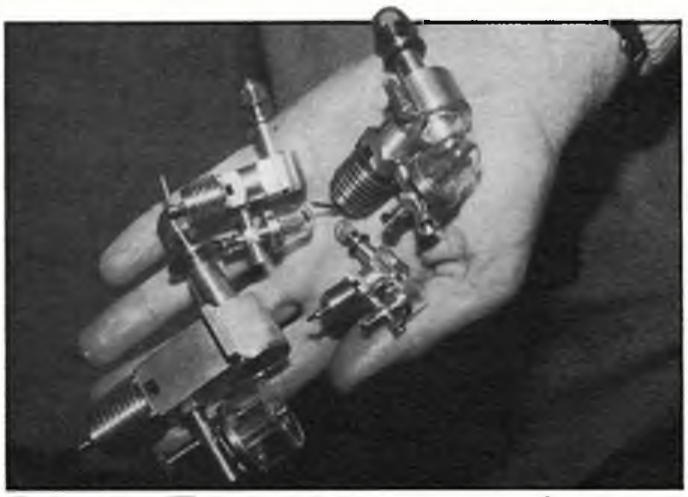
Further details on entry, fees, how long you will have to wait at the gate etc will follow in the coming months...so watch this space. Participation from abroad has been a little thin for the last few years, so if you know someone who might like to come, why not write and invite them over for a few days...they could always do their Christmas shopping in London...

Contest Dates

We are now approaching the end of the main contest season for aeromodelling in 1985 (sob, sob). Many clubs and societies will already be thinking of dates and events for next year. As soon as you have anything definite please let *Aeromodeller* know! This year several of our more important dates came in too late for us to give them the coverage they deserve...

What's On is there for YOUR use so please keep us informed as soon as you can. Remember that we are not clairvoyant so include the following vital information:

Date
Title of event
What comps (if any)
Venue
Contact name
Contact telephone



The Derek Giles, Mills Replica Collection grows and grows! Derek has even now added a 5cc to this range of 0.3, 0.75, 1.3 and 2.4cc sizes and reports that the classic Mills characteristics of easy starting, smooth running and fuel economy run right through the range, the largest motor (5cc) running for 17 minutes on 1½oz. of fuel.

Contact address
Special notes

Keep your entry short and concise and last but not least remember that *Aeromodeller* takes some time to produce, so if possible send information in AT LEAST two months before the event.

What's in...

Having just asked for entries to out What's On column, it might be an idea to mention that *Aeromodeller* is always on the lookout for articles or plans to publish in the magazine. Don't keep it to yourself share it with others... Although we like typed articles, this is not a necessity - providing we can read your writing! Plans do not have to be inked and of immaculate draughtsmanship, we have very competent people to do this too.

You will not get rich by writing for Aeromodeller but you will have the satisfaction of seeing your own creation in print and the added satisfaction of knowing that the model or idea that has given you so much fun is also available to many, many others. So how about it, pluck up your courage, pick up that pen and go...

If you are not sure whether we would be interested then you can always pick up the telephone and talk to the Editor...much better than writing as he is only there Monday to Wednesday and has very little time to write letters!

What's On

September 14, 15
2nd ANNUAL HIGHLAND SPLASH-IN.
Venue: Loch Insh. Contact: Duncan Cameron. Tel: 0497 810844. For all types of waterplanes: fun fly, record attempts, F/F, C/L and R/C Budget accommodation or camping - possibility of coach from London

September 15
CARDINGTON INDOOR MEETING
Comps: EZB, F1D, 35cm, Open Microfilm (all index); Scale. Venue: Cardington, Beds. Contact: Laurie Barr, 4 Hasting Close, Bray, Berks. Tel: 0628 25595. Names and addresses together with car reg. number - MUST be registered before th event.

September 15
DISPLAY TEAM CONTEST
Venue: Old Warden, Nr. Biggleswade. Contact: Radio Modeller. Tel: 0442 41221. For teams of three or more models flying a 20 minute display.

September 15
DUXFORD FLYING DISPLAY
Venue: Imperial War Museum Duxford. Tel: 0223 833963. From vintage biplanes to modern jets. Adults £3.00, Children, OAPs £1.50.

September 15
SMAE NORTHERN GALA
Free Flight: OR, OG, OP, combined Minis Venue: RAF Driffield. Contact 0904 705647.

Control Line: ½A, FAI, B T/R. Venue: RAF Dishforth. Contact 0536 661068

Radio Control FFF, Stand-off scale, Thermal. Venue: RAF Elvington, Contact Malton 2580.

September 15
C/L AEROBATICS — DOUG BLAKE MEMORIAL TROPHY
Comps: Open, Novice. Venue: Slip End, Luton. Contact: Glen Allison. Tel: 0923 772675.

September 22
SMAE 6th AREA FREE FLIGHT EVENT
Comps: 1/2A, F1A, Team Rubber (Plugge). Venue: Area Venues. Contact: Local Area Comp Sec OR SMAE on 0533 58500. SMAE Members only. Competition Licence required.

September 22
RAF SWANTON MORLEY MAC INDOOR FLY-FOR-FUN
Comps: 'Battle of Britain' Scale for rubber or CO_2. Venue: RAF Swanton Morley, Dereham, Norfolk. Contact: Chief Technician Jim Worner. Tel: Swnaton Morley 391 (ext. 384) Fly-for-fun: 'phone for full details.

September 22
SHEFFIELD VINTAGE COMP
Venue: Sheffield Flying site off A618. Contact: Dave Hanson, 23 Meadowhead, Sheffield S8 7UA. Insurance required: Spectators welcome.

September 22
THREE KINGS CONTROL LINE SCALE DAY
Comps: Scale and Profile. Venue: Old Croydon Aerodrome. Contact: Derek Bird. Tel: 01-874 6394. Silencers essential.

September 29
WHARFEDALE 1000 CLASS 'B' TEAM RACE
Venue: R.A.F. Dishforth. Contact Jeff Smith, 45 Avenue, Leeds West Yorks. LS8 1LE. Tel: 0532 66342.

September 29
WARWICK '85 VINTAGE FLY-IN
Comps: Class 4 precision, Flying 15, F/F. Venue: Warwick Race Course. Contact: T.J. Masters. Tel: 0926 497705. Principally fly for fun NO control line. Comps, pre entry £1 each.

September 29
SMAE SOUTH MIDLAND OPEN THERMAL COMPETITION
Venue: RAF Weston on the Green. Contact: J Shaw, Alvera, Witney Road, Freeland, Oxon OX7 2HQ. Also for BARCS League: Entry £2.00: Send SAE and frequencies: SMAE Members ONLY.

September 29
CARDINGTON INDOOR MEETING
Comps: 'All In' (Index). Venue: Cardington, Beds. Contact: Laurie Barr, 4 Hasting Close, Bray, Berks. Tel: 0628 25595. Names and addresses together with car reg. number - MUST be registered before the event

September 29
ROLLS ROYCE VINTAGE FLY-IN
Venue: Rolls Royce Airfield, Hucknall, Notts. Contact: C V Bedson, 6 Fairview Ave., Underwood, Notts NG16 5GD. Tel: 0773 710193. R/C Assist only: Optional Texaco Event: Send SAE for details.

October 6
SAMS 3rd INDOOR FLYING DAY
Comps: Scale (Rubber, Peanut, CO_2), EZB, Peanut Duration, HLG. Venue: Watford Leisure Centre. Contact: SAMS. Tel: 0438 832011. Entry £2 for flyers: 60p spectators: Events 75p per event. Flying starts 9.00am.

October 6
VINTAGE CONTROL LINE RALLY
Venue: Rubery Hill Hospital, Rubery, Nr Birmingham. Contact: Peter Martin. Tel: 021-444 7964. General flying for all SAM 35 and SMAE members. Fun Comps to SAM 35 rules.

October 13
HESWALL MAC OPEN C/L STUNT COMP.
Comps: F2B, Novice and Junior Stunt, C/L Scale. Venue: Neston Recreation Centre, Neston, Wirral. Contact: Jim Major. Tel: 051-355 4075.

October 13
NORTHERN AREA FAI F/F.
Comps: F1A, F1B, F1C. Venue: RAF Driffield. Contact 0904 705647.

October 20
DIESEL 'A' COMBAT
Venue: The Embankment, Peterborough. Contact: B. Waterland. Tel: 0778 343722.

October 20
DUXFORD FLYING DISPLAY
Venue: Imperial War Museum Duxford. Tel: 0223 833963. Historic aircraft from the Duxford Collection. Adults £2.50, Children OAPs £1.50.

October 27
MERCURY MIDGE COMPETITION
Venue: Three Sisters. Contact: Pete Farrimond. Tel: 0942 34068. Comps for Vintage Midge and Open Midge

November 17
FALCONS FREE FLIGHT GALA
Events: OP, OG, OR, Vintage. Venue: R A F. Lindholme, Nr. Doncaster. Contact: Russell Peers. Tel: Crewe 60893.

PHOTO PRIZE
Model News With Fliar Phil

Wood for the Winner

100 Sheets of balsa, nearly 200 lengths of strip wood — some prize!

All you have to do is send Fliar Phil your photograph – good quality black and white or colour prints will do, with your name and address plus details of the model, its construction etc on the back. Post your entries to Aeromodeller Photo-Prize Feature, P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead Herts HP2 4SS. Photos will be returned after publication.

1


4


3

A LITTLE STORY which happens to be true! At a model aircraft meeting, the public were admiring a line-up of models. All were single wingers except one, a biplane at the end of the line. A wee lad dragged his father over to it and said, "Look dad, here's one with a ROOF on". Maybe not a bad description of the biplane! Herewith this months 'line up'.

Photo 1

A great model (it spans 9ft in fact!) of a great little aeroplane of yesteryear – the *Aeronca* C3. This excellent photo comes from Tim Chard of Forest Hill London. *OS* 'Gemini' powered. Weight 11lb scaled up from an *Elite* plan. Tim's comment: "Fabulous flier" Thanks for a fabulous pic Tim. Photographed from just the right angle, it could be 'for real'.

Photo 2

Stirring up memories of the days when 'rubber power was King', is this 'Talisman' from an old *APS* design. Shown fitted with the original propeller, Brian Godwin of Cinderford, Glos, who sent the photo, says it flies better with a smaller prop. Achieving the right prop/rubber combination is often the secret of maximum performance. Obviously Brian has solved the problem.

Photo 3

Control-Line stunt fans you are not forgotten! This stunt model is a *Midwest* 'King Cobra' of 48in wing span. Mr J Ford, of Solihull, West Midlands writes to Fliar Phil 'original *Fox* 35 powered, it now has an *Enya* 35. Tissue covered, it is a smooth performer'. Mr Ford adds 'the trike undercarriage is a real boon'. The USAF markings undoubtedly enhance its 'business-like' look.


2

Photo 4 WINNER

There is no need to go into the photographic ingenuity that Peter Miller of Sudbury, Suffolk employed to produce this 'aerial' study of his 1/12th scale *Pitts* 'Special'. Sufficient to say that the result is a most dramatic picture. Peter informs FP that the model is built exactly as per the full size aircraft-the cockpit being detailed to the 'last stitch'! A worthy winner... Perhaps you could get an advertising fee from Messrs Dunlop Peter!

Photo 5

Just 'Hover around' folks because here is something different! In reply to Fliar Phil's plea for the unusual, Robert Dulake of Hornchurch, Essex has come up with this photo of his hovercraft. Hovercraft are entitled to a spot in this feature - after all they are FLYING machines! Details are: Power, *Allbon* 'Dart', driving a clipped *Keil Kraft* 7 × 6in. prop, a 15cc *Keil Kraft* T/R tank. Hover height 5/16in, speed 4-5mph Thanks for 'the unusual' Robert.

Photo 6

Maybe you can tell *Stork* from butter - but you may have a job distinguishing this 1/4 scale *Piper* 'Tripacer' from its big brother, John Phillips of Whitchurch, Shropshire who sent FP the photo, gave these details: 86in span, 25lbs weight, 22 *Tartan* engine with *Multiplex* RC. Originally from a *Cambria* kit, John has considerably modified his model, basing it on a real 'Tripacer' - Echo Victor - he discovered at the Lanc's Aero Club.

Photo 7

No one would describe this *Andreson* as a beautiful aeroplane but it has an appeal all its own. This CO_2 powered Peanut Scale *Andreson* was built from a free plan in *Aeromodeller*. It could be described as a 'long-range version', because Peter Bull of Kilkenny Ireland (who sent the photo) has fitted it with TWO tanks - getting duration of up to three minutes from his standard *Telco* motor!

No room for more now — BUT more next month. Stay tuned!

Remember folks, this is YOUR feature and Fliar Phil needs YOUR photos to keep it going!

A MAJOR COMPETITION has two essential parts: the contest organisation and the accommodation. Essentially the outer and inner man. Competitors at Three Sisters thi. July, agreed that both sides of the equation had been balanced and supplied in full measure...

It would be hard to describe the initial wilderness of spoil heaps which once constituted the competition site. Five short years have turned an eyesore into a sports arena and nature park the equal of any. Wigan Council and the soon to be dismantled Greater Manchester Council must be thanked for their foresight and investment in the project.

In more recent times Ken Morrissey has put in countless hours of time to improve the site facilities and our relationships with other users. Thanks must also go to the Chief Site Warden Brian Corrigan and his wife, for their support, guidance and advice.

That the four contests ran smoothly and to time is proof of the hard work put in by the contest directors Richard King, Ken Morrissey, Reg Lowe, Dave Campbell and Vernon Hunt.

Finally, Gerry Evans and his staff at the North Cheshire College (Padgate) must be singled out for providing good rooms, good food and ales at such modest rates that some people thought they might as well move in permanently.

Contest and Event Directors, Circle Marshalls, Time-keepers and Processing Officials all play a vital part in the running of a successful event. Add to these the modern electronics, displays and computerised results and you have a potential recipe for disaster...not so as Three Sisters, everyone concerned deserves a hearty vote of thanks for a very smoothly controlled and successful Championships.

The top five men in speed : left to right Molnar (Hungary), Hungarian team-manager, Scheikalin (USSR), Kohaniuk (USSR), Mult (Hungary) and Szegadi (Hungary) All of these top five speeds fell within 1.8% of one another!

1985 European Control Line CHAMPIONSHIPS

Three Sisters, 9-12th August. Reports by Pete Halman, Bill Draper, Dave Clarkson and John James

F2A — Speed

At the start of these Championships, we all expected another Hungarian victory: they had, after all, provided the Champion for the last three years in two World Championships and a European Championship. They could, therefore, be reasonably expected to do about 280 kph.

In 1982 the Bulgarians had shown promise and ability in Sweden. The Polish team could also be expected to do well. The Italians, spearheaded this year by Othello Vita and Stephano Zanin running *OPS* 15's, had also shown promise by winning at Breitenbach in June.

The Russians, on past form, not expected to be in the top three, turned out to be the proverbial dark horses! Kept out of the World Championships in the USA for political reasons, they came here with good speeds in training and, using very well prepared equipment, collected both first and second places.

The weather was typical Three Sisters in that it was warm, wet and windy! The position of the speed circle (just down wind of a high bank) leads to considerable turbulence over the circle itself and this was to prove the undoing of many fliers.

Round One

There were mixed fortunes in round one. Double World Champion Sandor Szegedi (Hungary) found flying in a blustery wind far from easy and, as a result, was too high and his first flight was thus disallowed. Kohaniuk (USSR) had no such problem and recorded the winning speed of 281.9 kph (175.16 mph) first time out...

Left, Dick McGladdery (UK) relieved at having made a scoring first round flight. Right, winner Kohaniuk's model, stripped down for processing after winning flight.

Dick McGladdery (U.K.) and Peter Halman (U.K.) recorded their best times in this round: Dick at 244.0 kph and Peter at 263.9 kph. Paul Eisner (U.K.) did not, however, manage to get a flight in. He was, unusually for him, having bad fuel feed problems.

Other notable fliers who failed to enter an official time in this round included Josef Mult (Hungary), the defending Champion (this time flying a *Moki* engine instead of the *Rossi* Mk III) and the whole of the Italian Team.

Round Two

Weather for Round Two was similar to the day before but very much windier. In fact the wind led to a request by the Hungarian Team Manager for a wind check... which turned out to be well within the limits laid down by the FAI.

In this round only three fliers improved on their first round times. They were Kitipov (Bulgaria) with 271.7 kph, Vita with 256.2 and Paul Rietbergen (Holland) with 246.4. This left the major placings unaffected with Kohaniuk ahead of Sergai Schelkalin (USSR), ahead of Jozef Molnar (Hungary).

During the practice following Round Two, the Hungarians were working hard on Jozef Mult's and Sandor Szegedi's planes. Not only were their personal times at stake but also the coveted team prize.

Round Three

This round saw the fruits of much hard work as both Mult and Szegedi turned in times of 277.1 kph and 278.0 kph respectively. Chojnaki (Poland) put in a time of 264.9 kph to pip Peter Halman for tenth place.

While Dick McGladdery had succeeded in recording good steady times, Peter Halman had been unable to repeat, or better his first round flight. Like Paul Eisner, he too had fuel feed problems which later were shown to be because of dirt in the fuel line. Indeed Paul, who had worked extremely hard all week (even going to the extent of making a new tank), was still having trouble. He did, however, manage to record a time, albeit only 211.5 kph. Those who see Paul flying regularly know that nine times out of ten he can guarantee a good run. It appeared that this was not to be his week.

In conclusion; what did we learn? Simply that there is no single simple answer (we all knew that before we went but hope springs eternal!). The Russians all used different engines but with carbon propellers. The Hungarians used *Rossi* and *Moki* engines with large, thick wooden props. Kohaniuk's engine used a five port liner: two transfer, two boost and one exhaust and set to run at 36,000 rpm on 6¼in. pitch. He used an inflight telemetry system during testing to monitor rpm. The superb engineering even went as far as the pan - not cast but machined out of solid!

1985 will go down as the year *Rossi* domination was ended. Following Vita's win at Breitenbach (by my reckoning, the first major F2A win by anything other than a *Rossi* since 1971) and now a Russian victory at Three Sisters, the field is more open than it has been for fifteen years.

Right, latest 'Tango' by Luciano Compostella (Italy), placed first in F2B. Power ST 46, prop 10×6 Tornado three-blader. Wing is detachable and model weighs 1700 gms.

F2B — Aerobatics

The weather was bright and sunny for practice and the early rounds but became duller on the final day, the wind followed a similar pattern throughout being reasonably calm during the early morning but becoming much stronger and blustery by mid-day and throughout the afternoon.

With only one aerobatics circle available, practice facilities were limited on site. During official practice on Tuesday many teams declined to practice at their official times due to the wind, but the circle was full during early mornings and evenings.

Several mishaps occurred during unofficial practice. Ammitzboll of Denmark lost line tension and wrote off his model, whilst Holland's Rob Baeten suffered a lead-out failure, with the resultant crash after a series of loops. His plane re-appeared the following day after a team repair effort with the use of much cyano and epoxy.

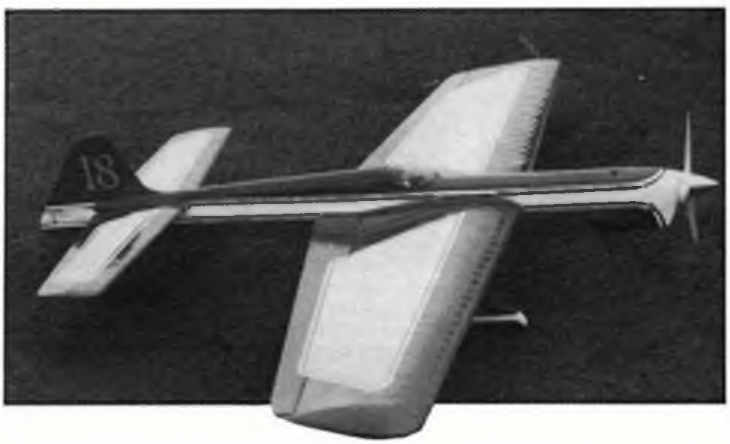
Contest Director, Mike Feaver was assisted by wife Gwen on the sums and members of the Nottingham club in the general running. Warm-up flights for the judges were flown by British Team reserve Nev Dickinson who also assisted in time keeping. Judges were J. Van Ommeren (Holland) M. Harvey (U.K.), J. Liska (Czechoslovakia), L. Gregori (Italy) and J. Bensch (Belgium).

First Round

It fell to Italian flyer Salvatore Rossi to make the first official flight with a clean well controlled flight, which was to hold the lead for most of the morning. Salvatore had built the model in 20 days (or sleepless nights!) just prior to the contest, and the aircraft had only just been test flown before setting off for the U.K. A remarkable achievement.

After a slow flight by Krizka (Czech), Marc Lavalette (France) out in a typical high powered schedule with his big handsome 'Panter', weighing 1950gms (69ozs), the heaviest model of the contest, pulled by an *OS* 45 FSR. Thorhauge of Denmark forgot his triangles, making a large dent in his score and towards the end of the morning Ove Andersson of Sweden took over the lead with a steady looking flight using his last years 'Shark' based model with *ST* 46 and tricycle undercarriage.

He was immediately followed by Britain's Barry Robinson flying his big 'Northwind' to good effect, pulled by a *Merco* 61 and then Henk De Jong (



Left, 3rd place in F2B was taken by Henk de Jong (Holland) using this Bill Werwage (USA) design - 'Juno'. ST 46 motor, 10×7 Graupner three blader, weight 1470 gms.

Speed — F2A

Individual

			Rnd 1	Rnd 2	Rnd 3	Best
1	A. Kohaniuk	USSR	281.90	0.00	279.90	281.90
2	S. Schelkalin	USSR	279.30	279.30	276.70	279.30
3	J. Molnar	HUN	278.20	259.40	0.00	278.20
4	S. Szegadi	HUN	0.00	260.90	278.00	278.00
5	J. Mult	HUN	0.00	0.00	277.10	277.10
6	H. Kitipov	BUL	270.60	271.70	267.90	271.70
7	Y. Pisarchuk	USSR	270.50	0.00	0.00	270.50
8	G. Nowakowski	POL	269.30	266.70	0.00	269.30
9	G. Kabbakov	BUL	267.70	0.00	0.00	267.70
10	T. Chojnacki	POL	263.00	261.80	264.90	264.90
11	P. Halman	U.K.	263.90	0.00	0.00	263.90
12	S. Zanin	ITL	0.00	262.20	263.50	263.50
18	R. McGladdery	U.K.	244.10	0.00	233.6	244.10
23	P. Eisner	U.K.	0.00	0.00	211.50	211.50

Team Placings

1	Hungary	833.3
2	Soviet Union	831.7
3	Poland	797.0
4	Bulgaria	792.0
5	Italy	775.2
6	United Kingdom	719.5

Above, U.K. F2B team, left to right, Bill Draper, Barry Robinson and Tony Eiffiaender, relaxing after finals, having learnt that they had placed third in the team classification.

Left, 'Shark' based model flown to second place by Ove Andersson (Sweden) ST 46 motor, 1700 gms. Main difference from original 'Shark' is the increased tailplane area.

Holland) moved into second spot with an *ST* 46 powered 'Juno' weighing only 52 oz one of the light models...

The afternoon's flying was opened by Jan Skrabalek with another slow flight in conditions becoming more difficult, the Czech flyers were notable for appearing to fly slowly with very quiet motors.

Dziuba of Poland lost a lot of points due to flying insufficient laps between manoeuvres, in particular after take off, during inverted and prior to the overheads. Newcomer to the Italian team, G. Demarchi flew extremely sharp corners again using the almost inevitable *ST* 46.

Bill Draper moved briefly into fourth position with his 1675 gm 'Superhawk' with *Enya* 45 but went down a notch only two flights later when ex-champion Luciano Compostella put in his usual cracking high speed, sharp cornered performance to move into the lead, using last year's 'Tango' with detachable wing and *ST* 46, swinging a *Tornado* 10 × 6 three blade at high rpm.

Piotr Zawada from Poland, flying a most beautiful 'Laser' model, was unlucky to lose the clover due to a spluttering motor in what would have been a high scoring flight. No mistakes by UK team man Tony Eifflaender whose *PAW* 35 diesel powered 'Freebird' whizzed through the turbulence with ease. The round closed with Compostella in the lead, resigning champion Stan Czech in 6th place and UK flyers in 5th, 8th and 13th positions.

Second Round

This was opened by Dziuba (this time counting his laps), but with only a small increase in score. Most flyers continued to score at a similar level to their Round 1 scores.

During a small flurry of rain Cid-Fuentes of Spain had his sunglasses suddenly mist over during the square loops, losing sight of the model and flying it into the ground. Inexplicably the Judges cancelled the flight due to jettisoning, but after a quick appeal by the Contest Director, the FAI Jury ruled that jettisoning had not occurred, since the aircraft had flown apart as a result of the crash and the score was upheld.

Conditions were rather more difficult through most of the day and most of the leading flyers dropped their scores a little. A problem arose during the early afternoon when Rossi's engine kicked off the prop during starting and he called an attempt, followed immediately by an attempt by Krizka. Marc Lavalette's motor flooded during high speed loops, and after Stan Czech had flown there followed a long delay since several flyers had withdrawn due to the windy conditions.

Although Rossi went out onto the tarmac to fly, one Judge refused to accept the flight until three official flights had been flown, the event was held up for over an hour until Salvatore Barille's flight time, when he came out to break the deadlock. The FAI Jury sensibly ruled later that after an attempt it would be sufficient for the flyer to go back three official flight times, even if no flight had taken place...

Towards the end of the round Andersson found good weather to put in another steady flight and take over the lead by 4 points from Compostella. Tony Eifflaender's flight looked better than the score suggested and he and Giza Egavary (West Germany) were eased out of the fly-off by increases from Jan Skrabalek and Wenczel of Austria, the latter's model still bearing the scars of an argument with a goal post at Utrecht in 1983!

Finals

The fly-off morning started dull, with wind conditions a little quieter than the previous afternoon. Eric Janssen (Holland) opened, using two attempts as the prop kicked off on the first but taking the second immediately... setting a high standard. Teammate Henk de John followed, giving his all in concentration and set the highest score of the contest so far.

The wind soon developed again and was rather variable, and scores again dropped until Bill Draper piled on the pressure with a high score, followed immediately by Barry Robinson with an even higher score with a big fast flight.

With the varying wind it was a gamble on how to set engines or choose props. Bill opted for a finer pitch windy weather prop whilst Barry continued with his big pitch fine weather prop...

Stan Czech made a challenging flight with his *ST* 46 powered 'UNO' but had a lot of ground to make up. Marc Lavalette found a good patch to put in a real boomer, a fast flight setting the highest score of the contest and pulling him up some seven places.

Andersson had slipped a little and Compostella's consistency regained the lead in typical high speed style.

Jan Skrabalek opened the last round but could not repeat his earlier performance and with his slow model, aborted some of the high level manoeuvres in the blustery wind. Indeed the first seven flyers in the round dropped their score including Draper, Lavalette, Czech and Rossi.

Henk de Jong managed to reverse the trend and two flights later Ove Andersson's big effort with another well controlled flight heaved his total score above the Dutchman, back into second place. Not to be outdone, Compostella stamped his authority on the contest with another fast snappy flight - the highest score of the round.

The event closed with Luciano Compostella a fairly comfortable and very popular winner, with Ove Andersson just keeping Henk de Jong at bay to take second place. The Italians took the Team Prize with the Czechoslovakian's just holding onto second place ahead of the U.K. in third place.

The event was closely contested with only a 4% score change covering the first ten places. UK flyers Bill Draper, Barry Robinson and Tony Eifflaender finishing in 5th, 6th and 16th places respectively.

Not an event for the traditional lightweights. Most of the more successful models were in the order of 1600-1700 gms the lighter models tending to bounce in the turbulence. Indeed all the UK team elected to fly their heavier models in the contest, despite having lighter aircraft available. Most popular engine was the *Super Tigre* 46, and with only three exceptions (one 35 and two 60's) the engines were all in the 40 to 46 range.

F2C — Team Race

The chit-chat at Championships is as much an integral part as the flying and this Event was no exception. Much of the pre-contest talk was of those who would be flying - particularly those from the Soviet Union, back on English soil for the first time in almost 20 years; always welcome, great sportsmen and with formidable equipment.

Even more the talk was about those who would *not* be flying, for unlike previous European Championships, non-European entries (China, Australia and Canada) were not accepted because of the scale of the European entry.

Then the famous names who failed to qualify, like the Metkemeyer brothers from Holland who did not put together a motor good enough for their trials and the Rossi brothers from Italy who broke a motor in every qualifying race in the selection procedure...

The competition as always, started with official practice in the contest circle, on the basis of 10 minutes per entrant. Official practice is always keenly watched for it shows the potential of the competitors and identifies those to watch in the competition.

The weather at Three Sisters is frequently a trial for Team-Race competitors, for the wind tests landings and take-offs, and cool heavy air makes finding the right compression and sufficient range difficult.

Many of the teams spent their official practice finding out how difficult the usual Three Sisters weather is, for many of them seemed set-up very close to the edge and so had to 'venturi down'. The British teams revealed little in official practice for neither Smith/Brown nor Langworth/Haycock flew and Heaton/Woodside flew their unprocessed third model.

The winners of this official practice competition were the teams from the Soviet Union. On a quickly found light setting Kuznetsov showed 18.4 sec/10 laps (18.8 sec/10 laps holding back) for 39 laps with his very competent looking new pilot Nazin; his flying wing model having retracting undercart, carbon fibre fuselage, and front exhaust motor.

Below, Neatest catcher in the U.K. - Jim Woodside, body swayed to allow smooth follow through, left foot and right knee already in position. Pilot Derek Heaton has been trying to win a Euro-Champ for 15 years - 2nd this time... what next...

Aerobatics — F2B

Individual

			Rnd 1	Rnd 2	Rnd 3	Rnd 4	Score
1	L. Compostella	ITL	2799	2782	2779	2817	5616
2	O. Andersson	SWE	2742	2803	2737	2750	5553
3	H. De Jong	HOL	2731	2652	2809	2814	5545
4	M. Lavalette	FRA	2645	252	2869	2594	5514
5	C. Draper	U.K.	2694	2686	2771	2708	5466
6	B. Robinson	U.K.	2660	2637	2798	2793	5458
7	E. Janssen	HOL	2674	2652	2772	2713	5446
8	S. Rossi	ITL	2718	2655	2701	2641	5419
9	S. Czech	CZ	2677	2569	2734	2595	5411
10	J. Skrabalek	CZ	2513	2677	2709	2205	5386
11	S. Barille	BEL	2640	2534	2670	2740	5380
12	G. Demarchi	ITL	2642	2479	2724	2467	5368
16	A. Eifflaender	U.K.	2614	2504			2614

Team Placings

1	Italy	16,401
2	Czechoslovakia	16,087
3	United Kingdom	16,041
4	France	16892
5	Netherlands	15,497
6	Poland	13,806

Left, Team Race Finals, right to left Nazin 3rd (USSR), Heaton 2nd (UK) and Smith (UK). A great final race that could have gone to anyone of the three, all action, good pitting a sight to be seen... and remembered by everyone else.

avoid lines already on the ground or because the pitting mechanic acts so as to obstruct the progress of the landing model.

All juries have their prejudices and this one was hard on pilots who made life difficult for other pilots, by hogging the middle or by walking around their handles! This disease is endemic in England but it was the Spanish pilots who suffered most at this contest. A prejudice in favour of fair and equal opportunities for all pilots is no bad thing...

Round One

This took place in windy, sunny weather and provided the inevitable crop of disappointments - those who for one reason or another did not manage to get anywhere near an optimum engine setting. Notable amongst these were the Bulgarians Tinev/Rachkov in Heat 3 who retired after 47 laps and the Russians (Barkov/Suraev in Heat 5 who only managed 3:58.3.

Heat 5 also saw a rather unfortunate incident when Derek Heaton (UK) took rapid avoiding action to avoid the Russian model and in so doing operated his fuel shut-off... forcing Jim Woodside to carry out an unexpected pit stop! This resulted in a time of 3:50.1 and a protest by the UK Team Manager for a re-fly. This was not upheld - putting considerable pressure on this team to achieve a good time in the second round.

Heat 6 saw further disappointment for the Russians when Shatalov/Mazniak's model irretrievably ran into the circle right at the start of the race.

Heat 7 turned out to be a cracker with Smith/Brown although flying a little lean, recording 3:39.2, the Van Uden brothers 3:48.3 and Fischer/Straniak (Austria) overheating in lap 95

Also under 19 sec/10 laps and sufficient range, were Shatalov/Mazniak. The show of the contest came from 1976 World Champions Barkov/Suraev: out of the box came the model, Suraev started it *and* his stopwatch and timed from start to overheat. The watch obviously said the time was too short, for off came a bit of compression and the start to overheat was re-timed.

Now, his watch must have given the right answer, so he turned in the needle a couple of turns to line up with a scribed mark on the fuselage and Barkov went into the circle...

Off went their model for 33 and a bit laps at 17.4 sec/10 laps on a perfect setting and back into the box went the model. Those of us who were privileged to witness this demonstration of perfection have something to remember for the rest of our lives. However perfection is but a fleeting thing as the next days were to show...

Official practice revealed the *Cipolla* motor to be by far the most popular, and for most users it gave near 19 sec/10 laps airspeed for just two stop range. They did seem to be critical on settings, for many struggled to find good ones.

Few *Nelsons* were seen and many of them not in standard form. Particularly impressive of the *Nelson* users were the Van Uden brothers from Holland who showed airspeed in the mid 18's for just 25 laps and Delor/Surugue (France) who were just under 19 sec/10 laps for 35 laps. A lot of the

Cipolla's were just as good but no-one came near to the Russians, leading to some gloomy predictions for the actual competiton.

Wednesday saw the racing start under the watchful eyes of an experienced Jury comprising:- Bob Horwood (England) - Chief Juror, Per Hasling (Denmark) and Pietro Fontana (Italy). They did their difficult job well, for only one flying-related protest was made and no protest succeeded. In the diffficult area of ruling on take-off/landing incidents they did particularly well giving clear and correct decisions very quickly.

Such incidents are millisecond occurrences and arise either because the landing pilot does not

Left, left and below, Mr 'Cool' Kuznetsov (USSR) shows his catch-pit-launch technique. He and his new pilot Nazin never looked as if they would make a mistake ... and never did. Krasnorutsky engine could just not hold settings long enough for the 200 lap Final.

Left, 1976 World Champions Barkov/Suraev (USSR) - the team that had the best model but nothing to celebrate... Above, the lengths some people go to, to get the cooling right - the Van Uden brothers (Holland) show vanes everywhere on their typically Dutch flying wing.

for 3:46.5. Heat 8 saw the unlucky Samuelsson/Axtilius break a prop... on Axtilius finger.

The fastest time in Round One came in Heat 4 when Nazin/Kuznetsov proceeded from a 'coldish' first tank to finish like a rocket for a time of 3:33.4.

Round Two

Typical Three Sisters weather - overcast, windy and damp. An unsettling prospect for those teams that has not recorded times low enough to ensure a place in the Semi's! As always this round, is make or break time, for such teams...

Heat 1 saw disaster for the Russian team of Shatalov/Mazniak as they collected a set of lines at their first stop together with the associated disqualification... no team prize for the Soviet Union this year.

Poor engine setting again took its toll with a number of teams recording in excess of four minutes. The pressure to record a low time forcing some to try too hard with the inevitable result of a disqualification.

This same pressure also causing the occasional misjudgement that results in loss of time or worse. Such was the case for Barkov/Suraev in Heat 10 when after a first tank doing 17.6 sec/10 laps, Barkov tried to land his model in half a lap! Not surprisingly the catch was imperfect and the model rolled irretrievably into the circle. Not only was this unnecessary but with only 31 laps on the clock - an extra gliding lap would have been beneficial...

Heat 4 saw the Van Uden brothers record 3:43.4, this with a 3-stopper and poor restarts! Heat 5 gave a slightly undercompressed Smith/Brown 3:40.1 and Voghera/Menozzi (Italy) overcompressed, 3:48.3 - proving just enough to get to the last Semi-Final place.

Best race in this round was Heat 6; Heaton/Woodside, Pennisi/Zana (Italy) and Marschall/Kuckelkorn (West Germany). All having good races with the first two clinching places in the Semi's with 3:36.6 and 3:39.8 respectively.

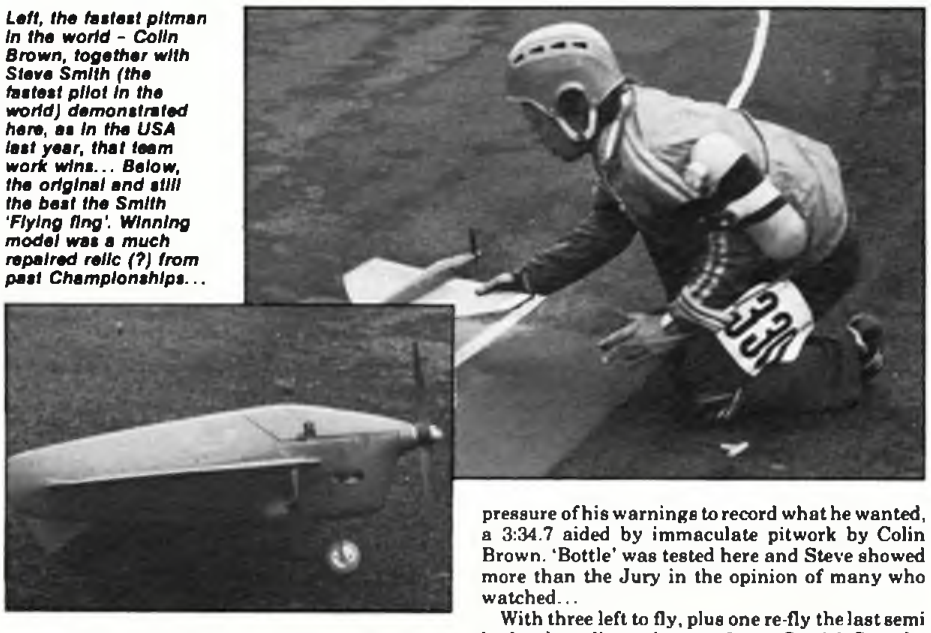
With the inevitable reflys, the last two heats (both scheduled as 2-up) were redrawn - this caused some consternation to the U.K. team Langworth/Haycock as it resulted in a poor starting position. A later protest regarding this was over-ruled by the FAI Jury leaving the U.K. team with 11th position overall.

Semi Finals

The Semi-Finals are where the real racing happens and this 1985 European Championships lived up to expectations: real racing - hard, fast and dramatic - a real test of 'bottle' for all involved, including the Jury! These Semi-Finals and the Final made the Friday a day to go down in history.

Nazin/Kuznetsov, amazingly the Soviet Union's only representative in the Semi-Finals, started in Semi 1, popping and banging as usual but this smoothed out in their second tank to have them rocket to the finish, but two reluctant re-starts had them finish in 'only' 3:38.8.

Meanwhile Fischer/Straniak and Magli/Spirazzini (Italy) were performing to the potential of their models, the first finishing nicely in 3:43.1



Left, the fastest pitman in the world - Colin Brown, together with Steve Smith (the fastest pilot in the world) demonstrated here, as in the USA last year, that team work wins... Below, the original and still the best the Smith 'Flying fling'. Winning model was a much repaired relic (?) from past Championships...

whilst the later pair spoilt their time by pitting on lap 99!

Semi 2 was a pleasure to watch with Voghera/Menozzi, Heaton/Woodside and Delor/Surugue finishing in 3:39.3, 3:38.4 and 3:41.4 respectively, the Italians having a fault free run, whilst Jim Woodside suffered a reluctant motor at the start and Roland Surugue the same at both stops.

Semi 3 was less satisfactory, for Smith/Brown again had a lean run to record 3:45.9 whilst Pennisi/Zana went off badly undercompressed to record the only 4 minute plus time in the Semis. This race ended for the Van Udens at lap 75 when part of their model's wing fell off in a catch, leading to the inevitable DQ.

The second round of semi finals started with Voghera/Menozzi, Nazin/Kuznetsov and Fischer/Straniak in Semi 4. Again the Russians started cold and slow with their first tank and finished like a rocket, but slightly better stops improved their time to 3:38.1. A mistake by pitman Menozzi at his second stop, when he released his model right under the gliding model of Fischer/Straniak (causing a missed catch by Straniak), resulted in the big DQ for them and a refly for the Austrians.

Semi 5, Make or break time for current World Champions Smith/Brown, for their first round time was already not enough to put them into the final. Pennisi/Zana suffered 'poor setting disease' to the extent that they pulled out before finishing. Steve Smith flew hard for a fast time, collecting warnings for whipping and walking around his handle. Bruno Delor suffered, for his motor overheated and with it his chance of a final placing.

Meanwhile Steve bore on, not relaxing under the pressure of his warnings to record what he wanted, a 3:34.7 aided by immaculate pitwork by Colin Brown. 'Bottle' was tested here and Steve showed more than the Jury in the opinion of many who watched...

With three left to fly, plus one re-fly the last semi had to be split to give two 2-ups. Semi 6. Saw the Van Udens blast on with their 3-stopper but their last stop was not good and their chance had gone, for it was only a 3:41.9. The Italian last hope, Magli/Spirazzini with the only flying wing model used by any of the Italians flew faultlessly to record 3:38.7, but this was not good enough (by just 0.3 sec) to make the Final.

Semi 7, Fischer/Straniak made a small improvement... but not enough... to record 3:40.5 whilst Derek Heaton perhaps caught the legacy left by Steve Smith, as for reasons unseen by most - he got the big DQ at lap 95 for walking round his handle. Their first round 3:38.4 was good enough...but their DQ'd 3:36.5 would have meant second segment choice in the final - an important point at Three Sisters final when the wind blows...

Finals

The three best teams in Europe came out for the final at 4:15. Could Smith/Brown become double Champions? Could Jim Woodside match Colin Brown's incredible re-starts? Would Kuznetsov's motor overheat? Yes, No, Yes were the answers, in a superb final which had drama right to the end for Smith/Brown had to glide the finish with the other two eating up their small lead. The time lost by 'Mr. Cool' Kuznetsov in having to take compression off at his third stop and perfect ground work by Smith/Brown meant a British 1-2 confirming their Team Prize victory. A lovely final to finish the best last day of a Championship that your reporter has seen and what a result for we British!

F2D — Combat

With twelve Countries and 34 of the best fliers in Europe entered in Combat, the scene was set for an eventful few days and this was going to be no easy Championship to win. Watching the teams in practice, the most impressive appeared to be the Russians, all of whom had fast, home made engines and very tight turning models.

Other teams to look out for were the Swedes, Germans, Dutch... and of course the U.K. team who looked very well prepared. With Tony Frost using the *Cipolla*, Neil Gill with the *USE* and John James with the *Nelson*, and all three flying with Pete Grange produced propellers, speed wasn't going to be much of a problem.

Round 1

Always the worst round for the fliers, as it is psychologically important to win your first bout. It therefore produced some exciting combat and some interesting results. Fred Meyer (Holland), second in last year's World Championships beat reigning European Champion Beliaev (USSR). Ostman (Sweden) who was flying one of the most impressive models of the contest also beat the Russian, Jasmontas. First of the British to fly was Tony Frost who was unfortunate to lose to Niskanen (Finland). John James beat Johnny Dubell (W. Germany) by three cuts to two and Neil Gill beat Mata (Spain) after a close bout.

Team Race — F2C

Individual

			Rnd 1	Rnd 2	Semi 1	Semi 2	Final
1	Smith/Brown	U.K.	3:39.2	3:40.1	3:45.9	3:34.7	7:24.5
2	Heaton/Woodside	U.K.	3:50.1	3:36.6	3:38.4	DISQ	7:31.6
3	Nazin/Kuznetsov	USSR	3:33.4	3:50.0	3:38.8	3:38.1	7:38.6
4	Pennisi/Zana	ITL	3:43.3	3:39.8	5:10.7	DISQ	
5	Van Uden/Van Uden	HOL	3:48.3	3:43.4	DISQ	3:41.9	
6	Fischer/Straniak	AUS	3:46.5	DISQ	3:43.1	3:40.5	
7	Delor/Surugue	FRA	3:47.8	3:47.3	3:41.4	4:00.9	
8	Magli/Spirazzini	ITL	3:48.2	4:52.0	3:57.2	3:38.7	
9	Voghera/Menozzi	ITL	4:03.7	3:48.3	3:39.3	DISQ	
10	Visser/Buys	HOL	3:50.2	3:50.8			
11	Langworth/Haycock	U.K.	3:52.7	DISQ			
12	Marschall/Kuckelkorn	FDR	4:06.5	3:53.6			

Team Placings

1	United Kingdom	11:08.5
2	Italy	11:16.3
3	Netherlands	12:08.1
4	Sweden	13:06.4
5	USSR	
6	FDR	

Round 2

The first round in which pilots actually go out of the competition, saw the British team come through with a clean sheet. Ostman lost his first life to Neil Gill in a very fast and furious bout in which either flier looked good enough to win. Ten fliers lost their second 'life' in this round including both the Bulgarians, two of the Italians and two of the Finnish team.

Round 3

Thursday morning, saw Tony Frost flying against Ostman. Tony was winning when his streamer appeared to fall off. The jury made him bring his model in and it was then found that his string had in fact broken and not fallen off. Although the Jury error did not affect the result of the bout; rather than allowing the score to stand, the Combat Jury ordered a refly. Unfortunately for Tony, Ostman won this, which put Tony out of the event.

Right, the Champion, Russian Necheukhin with second place Trifonov (also Russian) walking past in the background. Left, Rasmusson launches fellow Swede Ostman's combat model for fatal 'first life knockout bout' against Neil Gill (UK) in Round 2. Below, typical 'Munich' model of West Germany, Dubell – uses very light CTM motor.

John James was due to fly against Fred Meyer when just before the bout, it was announced that Fred had been taken ill and the bout was postponed, and eventually cancelled. Sadly, he was later taken to hospital where he spent the night under observation. He was allowed out again the following day but it had already cost him his bid to become European Champion.

This round also saw Johnny Dubell excelling himself by taking six cuts from World Champion Loet Wakkerman (Holland). At this stage there were only six fliers left with no lost 'Lives' including two of the Swedes and John James and Neil Gill. Forstner (W. Germany) also kept both his 'lives' by beating Trifonov (USSR) by four cuts to two.

Round 4

This saw the demise of the first of the Russians when Franke (Sweden) beat Jasmontas. The remainder of the Russians continued their onslaught with Beliaev beating Ostman by four cuts to one, Necheukhin beating Forstner by three cuts to one and Trifonov having a walk over, with Meyer still in hospital.

John James beat Roura (Spain) with both pilots taking one cut but Roura spending more time on the ground. Neil Gill lost his first 'life' to Loet Wakkerman when, after following Wakkerman for most of the bout he unfortunately had a pacifier explode in his model and then a blown glowplug which cost him too much ground time. This left John James one of only four fliers with two 'lives' out of the ten left in the competition.

Round 5

The remaining Russians go through unbeaten: Wakkerman was disqualified after ungentlemanly conduct in the centre circle, when he prevented Trifonov from untangling his lines - by flying as high as he could whilst standing on tip-toe! Trifonov solved the problem by grabbing Wakkerman's lines and holding them under his arm whilst he cut his own lines away. He even earned a round of applause for his quick thinking...

John-James lost his first bout to Necheukhin after beating him by two cuts to one but having his model fold a few seconds after Necheukhin removed a large part of his trailing edge. The resulting ground time lost him the bout. Neil Gill added another win to his tally by beating Rasmusson (Sweden) with both fliers taking two cuts but Neil just winning by eight seconds ground time. This left Necheukhin the only flier in the last eight still with two lives.

Round 6

Now we unfortunately saw the demise of the remainder of both the British and Swedish teams. John James lost to Beliaev by five cuts to two. Neil Gill again lost through no fault of his own when his motor blew three plugs during the bout.

This left Forstner to fly Beliaev... Fostner's laid back approach failed him here and Beliaev beat him fairly easily. Trifonov beat team-mate Necheukhin in a very exciting bout but as this was Necheukhin's first loss he stayed in the competition, leaving the Russians to sort out the first three places among themselves.

With only three fliers left, this left the organisers with a problem as to how to sort out who should fly who! After much deliberation it was decided that Trifonov should fly Beliaev to give one of them a place in the final. Both models were in the air straight away but Beliaev's motor cut almost immediately. It took him nearly two minutes to get back in the air again and then Trifonov crashed and spent the rest of the bout on the ground.

Although no actual combat had been flown, this gave Trifonov the win. Then, a rather odd thing happened. Trifonov, the winner, asked if the bout could be reflown as he felt unhappy about the quality of the bout. The organisers agreed and there followed one of the best bouts of the competition with Trifonov emerging the winner again, this time by four cuts to two.

Finally

The Final therefore, was between Necheukhin and Trifonov and was again an excellent bout with Necheukhin taking five cuts to Trifonov's three after a full four minutes of combat, a rare sight in any final let alone one as important as this.

It was generally agreed that the Russians deserved to win the event as their models were slightly superior and their motors that little bit faster than everybody else's. The other point which some teams could improve on was overall pitting ability. Quite a few bouts were lost due to lack of speed in getting models back in the air and it was noticeable that the top teams all had excellent pit crews. This was one area in which the British scored highly with the pit crews getting their fliers airborne very quickly and therefore giving the pilots the maximum opportunity to win the bout.

Below, using the new Cipolla 'Super Combat' motor, only recently introduced and seen here in Giulio Benincasa's model. Motor weighs 130 gms and is claimed to have very high power, to be very, very strong and only needs 10% oil!

Combat — F2D

Individual

1	N. Necheukhin	USSR
2	I. Trifonov	USSR
3	V. Beliaev	USSR (Reigning Champion)
4	R. Forstner	FDR
5	M. Franke	SWE
6	J. James	UK
7	T. Rasmusson	SWE
8	N. Gill	UK
17	T. Frost	UK

Team Placings

1 USSR
2 Sweden
3 UK

VINTAGE CORNER

WITH ALEX IMRIE

SVAS Model Day

So far this year the weather has been unkind to free-flighters, and we have had to put up with wind velocities much farther up the Beaufort Scale than the ideal O (less than 1 mph). Sunday 21st July at Old Warden was no exception and a moderate or fresh breeze persisted for most of the day (Beaufort Scale 4-5). Since the wind direction was Westerly the full force of this wind was felt in the middle of the aerodrome, no refuge being obtained in the lee of the trees.

Not until evening did the wind abate somewhat, and this was merely for a short period before the onset of rain, however, a PA announcement made before this, advised that model flying was to cease and that the aerodrome was again open for full-size aircraft. None turned up although a *Stearman* and a *Jungmann* flew over the landing area in formation. So the use of the aerodrome was denied us when the weather was at its best...

It has not always been so and I have memories of much flying being done at Old Warden in the still of the evening, well into the dusk, tea brewed and model plans examined in the beam of motor car headlights being the closing activities of an *SVAS* Model Day.

Why can't we be allowed to use the aerodrome in the evening, on the understanding that model flying will cease automatically and runways cleared when a full-size aircraft joins the circuit? The chance of an arrival without warning is remote, since the field is PPR (Prior Permission Requested) meaning that aerial visitors have to get the OK before departing for Old Warden.

Originally, the *Shuttleworth Veteran Aeroplane Society's* model meeting used to be held for flying scale models of aircraft types associated with that organisation, but with the passage of each year the number of models present in this category has diminished to such an extent, that one is lucky to see any of these at Old Warden on *SVAS* Model Day. Where have all the 504Ks, 'Hinds', 'Gladiators', *Bristol* 'Fighters', 'Moths' and 'Swallows' gone? There are *MAP* plans for all these Shuttleworth prototypes and more, readily available, so why has this worthwhile aim been lost sight of?

In addition to the above interest the *SVAS Model Group* has always made the aerodrome available on such occasions to sports models generally, and the vintage men in particular were never slow to take advantage of the chance to fly their models, so much so, that once again this year the meeting was a true vintage gathering.

As usual, apparently because it falls between two major events (*Aeromodeller* Scale Days and *Aeromodeller* Vintage Weekend), the meeting was not overly patronised, which is a pity, because it is one of the best vintage meets of the whole year. Those who have never attended do not know what joy they are missing...

This is a journey back in time, no hectic pace here, battling with multitudes of people against the fairground hubub of continuous Public Address announcements... Due to the low numbers of enthusiasts there is time to speak to modellers (and to listen to them as well!), study their models and watch most of the flying, and this results in a very relaxed fly for fun meeting.

Right, Clive Ridley with the largest of the 'Soarer' gliders kitted by Keil Kraft. This design was also available in 48 inches span as the 'Soarer Minor' and in 36 inches span as the 'Soarer Baby'.

Above, Mick Farthing Lightweight Glider' built by Bob Walden, this 40 inch span good performing pylon model is held by Bob's 'team-mate' Ron Knight.

Below, the plan for Ken Slothers' Towline Glider was given away free in Aero Modeller for July 1939, this example was built by Tom Andrews from Holloway, North London.

Control-Line

The only competitions that seemed to be operating during the day were in the control-line field, one for flying scale models where a *Hawker* 'Fury', *Fokker* DVIII, *Fokker* Dr1 and *Sopwith* 'Pup' (Shuttleworth type!) were seen, as well as a fine 'Blenheim' IV: the other was a carrier event that showed both the high and slow speed characteristics of the models involved.

Even some vintage control-line models made an appearance, and what looked like an 'Arkansas Traveller' (designed by H A Thomas and described in the first *Ian Allan Model Aviation* magazine in 1948) was observed thundering around the operator, whose oblique stance showed that with that power and speed there was no problem with line tension despite the gusty wind. Pete Wright emerged from the past, and flying a 'Phantom' (Bill Dean *Keil Kraft* design from 1947) provided the nostalgic touch in this section, but one would have thought that there should have been more vintage control-line models.

Right, appropriately registered Earl Stahl 'Skyfarer' by Don Knight made many fine flights – performing like a duration model.

Left, another good flying Stahl high wing scale model was the Stinson 0-49 (July 1941 MAN) built by Chris Strachan of Waterbeach, Camba.

Gliders

There is a growing number of these engine-less models at all vintage meets nowadays, due no doubt to the impetus given this branch of the hobby by Clive Ridley via his column in *SAM 35 Speaks*. While I was talking to Mrs Ridley and admiring the 40 inch span *Frog* 'Vanda' Mk II that she was holding, Derek himself came in from the aerodrome, a towline winch in one hand and a fine specimen of the 60 inch span 1947 *Keil Kraft* 'Soarer Major' in the other.

Other machines seen in this class included Ken Stothers' 'Towline Glider', a 60 inch span beauty finished in red and natural (banana oil on tissue) fuselage made by Tom Andrews from Holloway. This model was built from the plan given away free is *Aeromodeller* for July 1939 and is the first example that I have seen. Tom had omitted the peculiar wire skid of the original and had also fitted a dethermaliser.

Out on the aerodrome Bob Walden and Ron Knight were flying a beautiful example of Mick Farthing's 'Lightweight Glider', a 40 inch span design, first described in the September 1943 *Aeromodeller*, and an ancient 'Sunnanvind' was performing well for Bert Parsons from Stock near Chelmsford, while Peter Michel, the *SAM 35* Membership Secretary, was towing up his 'Lulu' in a most competent manner.

Jetex

There is also an increasing interest in this form of power, brought about by the fact that some real enthusiasts spend their time exploring every avenue to find motors, fuel and wick. Additionally, J Emmett of 18 Wensleydale Gardens, Hampton, Middlesex, TW1 2LU is actually making new 'Jetex' motors, producing fuel and wick. Because of the difficulty in manufacturing the last named item he has also devised a means of ignition employing a normal glowplug!

Such is Mike Wilson's keenness that he has made a 'Mijet' model from memory, and I saw this machine whistle its way across the aerodrome in a number of giant consecutive loops. This design was the first model kitted for the 'Jetex' 100 in 1948 by *Wilmot, Mansour & Co*, was of approximately 18 inches span and used a larger wing of about 23 inches with the 200 motor. An original kit is eagerly sought (for which Mike will give his back teeth!) an original plan or a mere xerox copy thereof would be of great help. If anyone can assist with these or any other 'Jetex' items please contact Mike Wilson direct at 126 Birkbeck Road, Enfield, Middlesex, EN2 0EP, his is a worthy cause...

Flying Scale

A number of modellers had brought along their Earl Stahl designs, hoping to get some trimming flights in before the '*Aeromodeller* Vintage Weekend', although the weather was not given to this pursuit...

Phil Brooks had both his Rearwin Speedster (January 1940 *Model Airplane News*) covered in red tissue with white registration lettering and his *Fairchild* PT-19 (December 1940 *Air Trails*), finished in US Army Air Corps style of blue fuselage and yellow wings.

Don Knight not only brought his 'Magistar' (February 1942 *MAN*) - another Shuttleworth type! - complete with a Snoopy pilot in the rear seat, but also a *General Aircraft* 'Skyfarer' (November 1941 *MAN*). The last named, flew in a remarkable

Right, like father like son! Tony Penhall with his seven feet span Brooks' 'Skyrocket', decorated in exactly the same manner as his father's machine 47 years ago.

manner, making flights of around one minute on 600 turns, it was appropriately registered G-BULK in keeping with Don's bulk buying activity which results in cheap selling of model materials for *SAM 35* members.

Peter Foulsham from Biggleswade also flew a 'Speedster' and a fine Stahl 'Spitfire' (August 1940 *MAN*), his 'Speedster's' windscreen was cut from a plastic lemonade bottle fixed with *UHU* balsa cement, a neat way to get the compound curves of this component without any loss of strength.

Right, Tom Andrews with his Frank Ehling designed 'Skipjack' an attractive semi-scale model from May 1947 MAN. Built to 3/4 original size, the model uses the Mills .75 diesel.

Frank Ehling design (May 1947 *MAN*) originally of 45 inches span, Tom's model powered by a *Mills* .75 diesel is built to the reduced span of 34 inches.

Another model seen for the first time was Mick Radford's little known late 1940s 'Ardent Air', a compact business like looking machine of 33 inches span, originally for the glow plugged *Arden* .099, Mick also uses the trusty *Mills* .075.

Other models that come to mind were the red and cream 'Simplex' built by John Webb from Luton, and John Kay's 'Sunbeam' fleet of Vintage Style models. The largest is 48

Although not quite vintage, a 'Walrus' amphibian (May 1957 *Aeromodeller*) in its uncovered state drew my attention to Mr and Mrs P Scorey from Harpenden. This couple of keen aviation enthusiasts have raised £2300 over the last two years for the *Shuttleworth Collection* by holding Lucky Dip side-shows at the Old Warden Open Days, a feat of personal endeavour that will help to keep the full-size vintage machines in flying condition.

Yet another Shuttleworth type was represented by a Fred Longbon designed 'Flying Flea' (December 1963 *Aeromodeller*) and although not vintage this machine has provided a lot of entertainment with its furiously turning flight pattern at past Scale and Vintage Meets, here it was again still doing its stuff, built by Derek Hughes from St Albans.

Above, full Circle! Peter Michel refuels the ED 3.46cc diesel powered 'Junior 60' that started life as an R/C Assist model and is now flown in its original design configuration of free-flight. Right, Don Knight launching his Ken Willard designed 'Drake Flying-boat' complete with a Snoopy pilot. Model was described in November 1951 MAN and this enlarged version is powered by the DC 'Spitfire'.

Free Flight Power

A varied assortment of models were present, amongst them Chris Goodley's 'Wasp' (April 1938 *Aeromodeller* and July 1981 'Vintage Corner'!) powered by a self-made 'Hex Head Brat', an engine built while working in Hong Kong. Chris is a keen small ignition engine man and also built an *Elf* 'Corncob' during his sojourn in the East. He was also flying a 'Black Magic', an attractive high wing cabin model, plans of which are still available as PET/268 price £3-25p plus 50p postage.

It was good to see Jack Frost back on the field following his recent illness, he certainly had not lost his touch and his GWW Harris' designed 'Miss Farnboro' was performing in the same old reliable manner. The biggest model present was Jack Humphreys' 'KG 2' of 10 feet span which braved the elements but suffered a heavy landing which loosened the engine.

Tony Penhall had his 7 feet span 'Brooks Skyrocket' with him, this model powered by an inverted *Brown Junior* 'Model D' was initially made in 1979, but has now been recovered and has a new fuselage. It was built from the articles in *Model Aeroplane Constructor* (February/May 1937) and is finished in exactly the same manner as his late father's model which won the Southern Counties Challenge Cup on 5th August 1938. Tony's father's machine was powered by the 18cc *Comet* petrol engine and needless to say he would like to acquire a *Comet* for this model in order to complete its authenticity.

Peter Michel was flying an orange and yellow *ED* 3.46cc diesel powered 'Junior 60' with a difference. Originally made as an R/C Assist model Peter admits that he got fed up with its staid controlled flights and discarded the extras fitted for this purpose, and has returned to the excitement of free-flight!

Tom Andrews had his 'Skipjack' with him, first one that I have seen, this being a inches span and is powered by the *DC* 'Spitfire', the 27 inch version named 'Sunlite' is *Telco* CO_2 powered while the model in its original size of 34 inches is fitted with an *ED* 'Baby' and it was in this size that the design appeared as a free plan in *Aeromodeller* some five years ago. All these models were nicely finished in red and cream (natural).

An unusual sight at Old Warden was Don Knight's version of Ken Willard's 'Drake' flying boat (November 1951 *MAN*) which in its original size spanned 36 inches, Don has enlarged the model to 48 inches and has also extended the name to 'Draken'! Power is a 1cc *DC* 'Spitfire', and in keeping with his 'Magister' already mentioned, there is a Snoopy at the controls!

A number of *Keil Kraft* 'Pirates' were seen, one of them powered by a .75cc *DC* 'Merlin' was flown by Brian Welch to whom we apologise for getting his name wrong in the August issue. Another by John

Saunderson from Nottingham used an *ED* 'Baby' and was accompanied by a *Mills* .75 equipped 'Southerner Mite' another *Keil Kraft* design by Bill Dean, that Maestro to whom we are forever grateful for bringing out so many shapely power models (and rubber ones too), during his time with *Keil Kraft* before he left for sunnier climes in the USA!

Another model worthy of note, although not of vintage type, was *SAM 35* Swiss member Ernst Schlachter's 'Oini', an attractive tailless design given away free in *Aeromodeller* in days gone by, the example seen was *Cox* .020 powered and was made by Brian Hunt from Wolverhampton.

Rubber Duration

Phil Brooks had his Stahl 'Hurricane' (July 1940 *Flying Aces*) performing well, but his 'Wattie' (December 1942 *Aeromodeller*) did not appear to be behaving itself as it should. Two old timers were fielded by Arnold Senior of Oldham, an 18 inch span *Peerless* 'Junior Endurance', which design created a record for its class in 1935 and a Ted Evans' 1938 'Firefly' of 32 inches span. Brian Welch was seen with another oldie that is sometimes still available as a kit, this is the *Veron* 'Fledgling' a 24 inches span typical small rubber duration model that flies well.

Plan Fare was the title of a Harborough booklet published in February 1946 and is much sought after nowadays. It contains many designs that had appeared in *Aeromodeller* during the war years that had not previously been sold in the *Plans Service* as full-size drawings. One of these was 'Little Willie' a 28½ inch wingspan simple duration model by the Rev. W P Wylie, Tom Andrews, brought one along, the oddly raked wingtips making the model look like a fuselage Warneford!

Some 'Cruiser Pups' were to be seen, obviously being tuned up for the *SAM 35* competition for this type that will be held during the Vintage Weekend, but there was a complete dearth of Wakefield models, the reason for which I am unable to fathom.

CO_2

Many models designed for the sub-miniature diesels have been given new leases of life with the present range of CO_2 motors, one such is the 'Squib' designed by Ron Warring and published in the *Ian Allan Model Aviation* series magazine *Model Planes Annual* 1949. Originally for the *Kemp* 'Hawk' diesel of .2cc, I was unable to see how the *Telco* powered version built by Sam Skitt of the Bilston Club from Wolverhampton performed.

Dick Hardwick's boy Alan lost his *Telco* 'Turbo 3000' powered 'Oclet' vintage style model, so it must have flown well enough (too well!) although I did not witness this 'flyaway'.

Another modeller using the *Telco* 'Turbo 3000' was Mike Fish from Bingham near Nottingham who had it fitted in his 22 inch span version of Paul Plecan's 'Simplex'. This model weighs only 50 grams and Mike tells that flights of 1½ minutes are common on 45 seconds power runs.

Derek Hughes had a nice *Telco* powered *Ryan* PT-20 in US Army Air Corps markings made from a *Megows'* plan and a good flying own design of the *Westland Hill* 'Pterodactyl' Mark IV also fitted with *Telco*. There is something about tailless models that makes them especially fascinating and Derek's model is no exception and makes fine stable flights.

Radio Control

Only a few models of this breed put in an appearance and Michael Conrad of Willesden supplied most of them! Apart from his 'Bowden Contest' he had two sizes of 'Scorpion', the large one at 68 inches span being powered by an *OS* 40 four-stroke, and his original 44 inch span example of this 1946 *Keil Kraft* design used the *PAW* 1.49.

Above left, Dick Hardwick's son Alan lost his Telco powered 'Oclet' earlier in the day and is seen here holding his father's enlarged "Pal" a Walter Musciano design fitted with a PAW .8 diesel. Right, Vince Redfern with the transmitter about to fly his R/C Assist Mick Smith Mercury IV an 8 feet span classic oldie plans of which are still available as PET/504 price £7-20p plus 60 postage.

He also had a 66 inch span 'Brooks Bipe' with a *Saito* 45 four-stroke while his fifth model was the Earl Stahl designed *Fokker* DVIII. The *Fokker* was powered by an *OS* 25 FSR driving a 12 by 4 inch propeller, and was made from a *Ben Buckle* plan. This model had the all red finish that so often is used by the modeller of German WWI fighter aircraft. The main reason for using this colour scheme is that it saves all the labour involved in creating that tiresome lozenge pattern camouflage.

To the best of my knowledge only two actual aeroplanes out of the thousands of fighters in use by the Germans in 1917-1918 were so coloured and even they were not entirely coloured red and were not of the *Fokker* DVIII type! The dihedral too, rather spoils this model, which of course, needed it as a free flight machine when it emerged 45 years ago, being described in June/July 1941 *MAN* and later in the book *Air Age Gas Models*.

Aubrey Scott made many flights with his *Piper* L4, a nicely cowled *Irvine* 40 provides the power and the model although only six feet span looks like a real aircraft in flight, due to keeping the speed down. This machine has been flying steadily for the last four years and has proved to be a very reliable R/C scale model.

Another R/C design of note was a Mick Smith 'Mercury IV' powered by a *Merco* 61 Mk I. Built over 10 years ago by D Jackson of Walsall, Vince Redfern of the Market Harborough Aero Club now owns the model and flew it in proper R/C Assist style, the machine only having throttle and rudder controls. It was a pleasure to see him fly using a minimum of control inputs, the model's inherent stability did all the work, which is as it should be. When the tank was empty, he brought the 'Mercury' in *dead stick* and landed it at his feet, providing an object lesson to all vintage R/C aces. Well done Vince.

One feature of this meeting was that although the number of modellers was small, all appeared to have brought several models with them, some had half a dozen machines usually of various types, and it was not unusual to see a modeller out on the field, first with a glider, then with a rubber model followed by a power driven machine. I am sure that had an empty hangar been available some of these chaps would have brought along a microfilm model as well!

This, I think, was one of the essential differences of this meeting, it seemed to attract *real* aeromodellers, who not only try the various branches of the hobby, but my observations showed that such enthusiasts (probably because of the sheer variety of their interests) not only build beautiful models, they also seem to get excellent flying performance from all their efforts. Thank goodness we still have such devoted enthusiasts, how I envy their industry and skill.

BOOK REVIEWS

Scale references or a good read
Some of the latest aviation titles...

Gloster Meteor

By Chaz Bowyer: Published by Ian Allan Ltd. Published £8.95 ISBN 0-7110-1477-9.

The Gloster Meteor was the first jet aircraft to enter service with the Royal Air Force and was the only Allied Jet to take an active part in World War II.

However, the Meteor arrived too late to make a significant contribution to that war effort and by the time the Korean conflict flared, other aircraft had surpassed it.

The Russian-built MIG-15 outclassed the Meteor at high altitudes and it became necessary to relegate it to a secondary role.

Chaz Bowyer's book details the long service history of the Meteor in his typical style. Chapters are devoted to each variant from the early experimental types, through combat and peacetime service to the many 'one-offs' at Farnborough and other Establishments.

Heady days, setting World speed records were followed by humble unmanned target drone work. The Meteor also appeared in night fighter and trainer roles and its multi purpose career eventually concluded as a target towing aircraft for the Royal Navy.

The book includes detailed production listings, including conversions and provides comprehensive records of the equipping of individual squadrons.

Fourteen countries outside of the UK received Meteors and the aircraft must have provided thousands of pilots and engineering staff with their first experience of jet aircraft.

Lavishly illustrated this book, which is the second in a new series by Ian Allan Ltd., will undoubtedly have a very wide appeal.

SAC

By Bill Yenn : Published by Arms and Armour Press. Price £6.95 ISBN 0-85368-688-2.

The Strategic Air Command (SAC) as it is organised today controls two thirds of the United States' nuclear arsenal. Land-based ICBMs and airborne systems, including cruise missiles, are controlled and maintained via a vast chain of supply, control and operating bases.

This book provides a history of the SAC from its formation soon after the Second World War to the present nightmare world of deterrents. Unlike many contemporary books there are no finely detailed lists of individual units and their equipment. Instead, the reader is given an interesting view of the political and technical backgrounds involved in the selection of equipment and determination of policy and tactics.

In December 1972 the SAC carried out intensive heavy bombing raids on North Vietnam incurring considerable losses of personal and aircraft in the process. Several personal accounts of individual airmen who took part are included in the latter part of the book. These vivid stories which have not been widely published before, provide a stark contrast to the operations in WWII which resulted in the creation of SAC.

Spitfire Strikes

By Johnnie Houlton : Published by John Murray Ltd. Price £12.50
ISBN 0-7195-4178-6

Johnnie Houlton is one of the thousands of men who came from the 'Dominions' of Australia, Canada, New Zealand and South Africa to join the war against the Axis Powers. Their contribution was enormous and 'Spitfire Strikes' tells the story of the war as experienced by a fighter pilot from New Zealand.

After initial training in his home country, Houlton was seconded to the Royal Air Force in 1941 and very quickly moved into a Spitfire squadron.

His extremely varied career saw him in action over Malta, in North Africa and back to Europe in time to participate in the D-Day landings and the ensuing battle. It is the sheer variety of the author's own career, with the added experiences of his close friends and colleagues (on and off duty!) which makes this book so interesting and entertaining.

There are also interesting appendices describing effects of ground attack missions and details of a curious project to build floating airfields using material formed by combining ice and wood-pulp! An intriguing link with today's aviation scene, is that the author's personal Spitfire ML 407, survived the war and became a familiar sight at airshows in its peacetime role as a two-seat trainer.

'Spitfire Strikes' is a delightful book which should take a place among the best accounts of wartime fighter action.

Warbirds

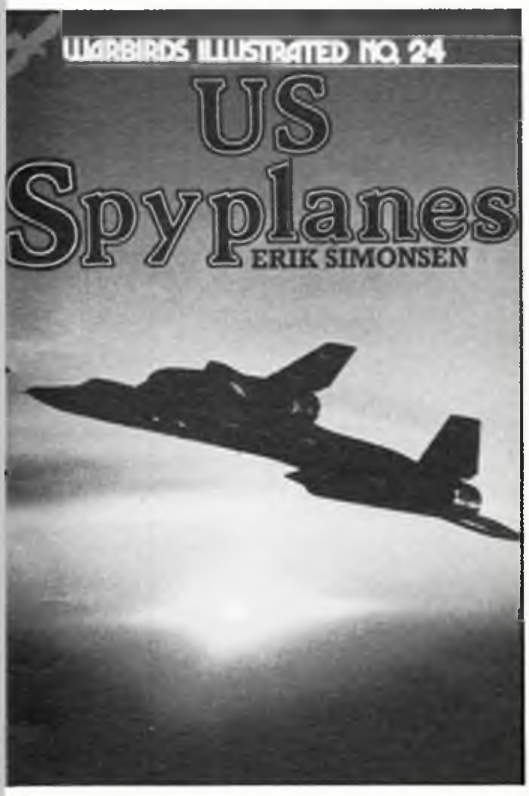
"Warbirds illustrated" is a series of single subject, photo collections, usually containing approximately 72 pages of photographs, including some colour plates. Each volume is soft-backed in a 8¾in. × 7¼in. format. Published by Arms and Armour Press, the U.K. price is £3.95 per volume.

No. 24 : U.S. Spyplanes

By Erick Simonsen, ISBN 0-85368-626-2.

Many previously unpublished pictures of the United States most secret aircraft are reproduced in this book. The U2, SR71, Blackbird and many derivations are shown in a wide range of roles and with a surprising amount of variation in 'squadron' markings.

It is a remarkable fact that the two aircraft which dominate the book, the U2 and the 'Blackbird', were designed by the same man - Clarence 'Kelly' Johnson. This brilliant engineer also led the design teams

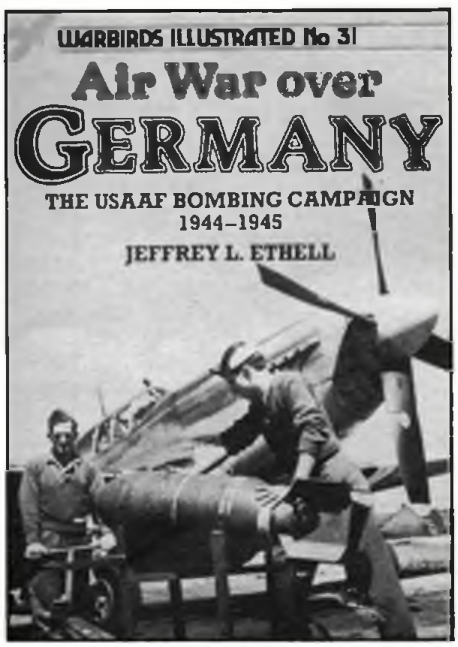


for the P-38 'Lightning', P-80 'Shooting Star' and the F104 'Starfighter'. Just one of those would have been enough for other mortals!

No. 32 : 'Mirage'

By Jean-Pierre Decock, ISBN 0-85368-705-6.

Over 2000 Mirages of an almost bewildering variety, including VTOL and swing wing have been produced by Dassault since the aircraft first appeared in 1955. The aircraft is a remarkable tribute to the ability and determination of the French aviation



industry which had to recover from the ravages of World War II.

Jean-Pierre Decock has compiled a collection of photographs which concentrates on delta wing versions of the Mirage. The colour plates feature some the export versions of the aircraft which is now operated by many air forces, including Australia, Belgium, Brazil, Egypt, Israel, Libya, Pakistan, Switzerland and Zaire.

Development of the aircraft continues and it may be that the author will soon be able to fill another volume with later types...

No. 33 : British Naval Air Power, 1945 to the present.

By Paul Beaver, ISBN 0- 85368-710-2.

The author acknowledges that this is a vast subject to attempt to cover in one volume. The sheer quantity of high-quality material available and the scale of Royal

Naval activity in the beginning of the period concerned must have made it hard to decide what to leave out of this book.

As example of the difference between the 1950's and now can be seen in the case of the 'Sea Hawk'. Over 400 of these beautiful aircraft were built for the Royal Navy *then*, compared with an initial batch of 34 Sea Harriers for *today*!

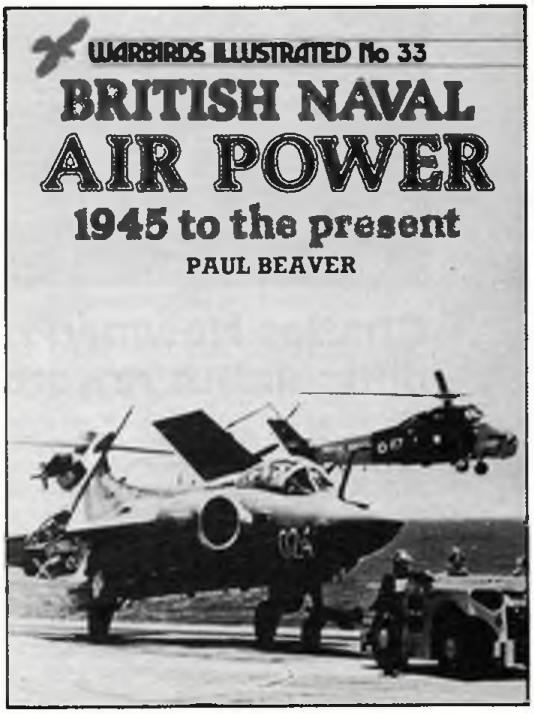
Paul Beaver has managed to convey the development of British Naval Air Power and its decline quite well and the selection of pictures will provide ample discussion points among students and former Navy men.

Vintage Warbirds

Arms and Armour Press have also introduced a new series of books which follow the 'Warbirds' pattern. The pioneer days of aviation are illustrated in 'Vintage Warbirds' and the first two titles in the series are **'The RFC in World War One'** and **'The German Army Air Service in World War One'**. The books are in the original Warbirds 8¾in. × 7¼in. format, have 64 pages and are priced at £4.95 in the U.K. Both volumes have been compiled by Raymond Laurence Rimmel.

The two books provide fascinating collections of photographs showing the aircraft and the men who maintained and flew them.

Scale model enthusiasts will be delighted to find some of the detail presented in rare pictures gleaned from private collections.



Rubber Driven Scale Twins

Charles Newman passes on his hard earned experience on this difficult but rewarding subject...

My experience with rubber-driven twins began in the middle of Old Warden in 1973. Whilst I had seen a good many such models in old magazines. I had not seen one in the flesh and so was most interested when I came across Richard Falconer and his P38. Following our conversation, he offered me the plans. A model was duly produced which flew very well and from then on I have been hooked on twins.

The rubber driven twin is a somewhat challenging project, combining as it does, a number of problems and some advantages. The problems usually more than outnumber the advantages but model aeroplanes would be exceedingly boring if they were always easy to build and fly.

My experience of twins is over ten years, although most of it is concentrated into a couple of those years. In that time, it has been possible to define certain types of practical model, certain problem areas (in selection of the type of construction, plus operation and trimming), and some advantages. This article is basically a summary of thoughts and activities over the last decade, and it should be stressed that unlike a good deal of the material which appeared in the magazines in the forties it is totally based on experience on the flying field.

Approaches to twins

Essentially when classing twins, they fall into two broad categories: twin boom and nacelle types. Many people considering a twin project, would automatically go for the twin boom option. Oddly enough, depending on the prototype, this may not be a wise choice. One of the first things I discovered with my first twin, the P38 designed by Richard Falconer, was the amount of weight which had to be put into the the nose. Twin booms mean two rear fuselages, two tailplane-to-fuselage joints at points on the airframe which are difficult to make strong *and* light (eg halfway up the fins - *FW* 189). The nacelle type twin obviates this - my B25 has weight in the tail instead!

The second point which I noticed was critical - was propeller position. How much clearance between the motor and the fuselage is there? And how far back from the nose are the props? If the clearance is not that good and the props are a long way aft, you are likely to have problems. Paddle blades and/or gearboxes will be needed.

If one is to consider gearboxes, remember that they both need to run equally well (or badly!) and that the model needs to be a good size, at least 36in in order not to have fiddly gearboxes. Frankly, having tried both approaches, I would favour a subject which can take direct drive.

Staying with drive for a moment, there are a number of *APS* designs with remote drives ...'Halifax' - motors running spanwise; 'Envoy' - motors directly driving props via bent springs). The latter method will at best give only short flights. Remote drives seem to have too many problems with inefficiency, weight, complication, inaccessibility unless the model is large, and a lack of servicability. Moral of this paragraph is that with or without a gearbox, keep the motors straight behind the props - keep it simple and light!

Finally, do not view subjects totally from the 'twin' point of view - consider dihedral, tail areas and moments and overall bulk. For example, the 'Breda' 88 is a good subject from the 'twin' point of view, but in all other respects as a rubber model, it is a non-starter. At the 1982 Nationals, Mike Hetherington attempted to fly a beautiful

Above, Richard Falconer's P 38 'Lightning' getting up and away at Woodvale in 1978. Right, when considering a twin, there are additional points of concern compared with single motor machine. Very important is the motor datum relative to the mainplane. The internal volume of the nacelle rear is also highly relevant. This shot of a Grumman S-2F 'Tracker' shows the type to be excellent in both respects - very long underslung nacelles with broad flat tail ends.

Britten Norman 'Islander'. This model had its power in the fuselage, with Moore drive to the props. Though high wing and with generous tail areas the model totally lacked dihedral and would always drop a wing - very disappointing for so nice an effort.

So, do not restrict yourself to twin boom subjects unnecessarily. Consider carefully the method of drive. Only indulge in complications if your expertise in metalwork is up to it and you can keep it *light*. A decision should be made at the outset as to just how 'scale' a model you wish to build. Even with stressed skin subjects, tissue covered stringers really is the preferable method of construction. If you must have a more realistic job, then the Hetherington paper skin system would be well worth trying.

Another good twin-boomer is the FW189. Despite the complexity of the fuselage, the general layout is good, particularly as the booms project beyond the fuselage, allowing large props to be used. Model is 42in. span and occasionally managed 49 secs when in its prime...

Now you choose

Actual selection of subject should depend on firstly your ability as a modeller, and secondly, a precise analysis of the subject aircraft. Probably the single most important area is maximum propeller diameter; close set booms or nacelles should be avoided, particularly if nacelles are short (*DH* 'Dove', *Avro* 'Anson', *Miles* 'Gemini'), even assuming reasonable competence as a modeller. The next most important area is the nature of the booms or nacelles themselves. Overall length is obviously important but so is the nature and size of the cross-section (fig 1).

How far beyond the leading edge do they project? The P61 would be a poor choice as the booms only project a relatively short way in front of the leading edge, resulting in virtually all the motors being aft of the CG. With nacelles rather than booms, how far aft do they go and what sort of internal space is there in the rear extremities? Clearly, to make the most of the full length of the nacelle, it is helpful if the rear end is not too pointed.

Now we come to a subtle point, which the uninitiated may not notice to begin with: how does the nacelle or boom join the wing - is it above, slung below, or centred on it? If it is the last-mentioned (eg *Vickers* 'Wellington'), then avoid the subject. The reason for this is merely that one does not want the motors to pass *through* the wing spars, as that will only lead to a weak, heavy model. Obviously, if you intend to use gears anyway, the line of the motors may be raised or lowered sufficiently to avoid the wing structure. Unfortunately even with deep, underslung booms or nacelles, the risk of motors chafing against the trailing edge in particular, is always there.

Another consideration is whether the nose of the fuselage projects beyond the nacelles or not. Short-nosed subjects such as the *DH* 'Hornet' have an edge as the propeller diameter may be increased overscale (ssh - don't tell the judges!), so that there is only minimal clearance between the props.

Remember that the bigger the props, the more power they can absorb. Coupe d'Hivers tend to have short motors with big props rather similar to the requirements of most twins. There are a few aircraft that have no centre fuselage at all, the P82 'Twin Mustang' being a good example. From an aerodynamic point of view, this is great - less drag and less weight too. But, although the P82 can be fitted with good-sized fans, it is very difficult to launch - there is simply nothing to hang on to. Richard Falconer did a P82 and found this out the hard way. The model was damaged before reaching its full potential mainly due to persistant bad launches.

The rubber twin, peculiarly, is one type of model where glazing needs to be a consideration. A good many of the possible subjects are military aircraft with turrets or bombadiers' positions in the extreme nose. (B25, 'Invader', 'Mosquito IV' etc.) One must remember then, that a twin will not necessarily have a solid balsa nose-block at its foremost point. On balance, it is more likely to be clear plastic. If your chosen subject has a long nose which projects beyond the props, and the nose is glazed, consider carefully how the glazed structure will take the bashing which you have in store for it...

A rounded moulding such as that on the 'Mosquito' is fine - such mouldings are surprisingly strong when fitted to the fuselage and if broken, a replacement can be made and fitted easily. However, if your subject has a glass-house nose, made up from many panels with a complicated frame (*Ju* 88, *Do* 17 etc), it may be better to think again. Such structures are weak and very difficult to repair.

With types with noses shorter than the nacelles, such as the *FW*189, it is possible to get away with it. My own *FW*189 has never suffered any damage to the 'glass-house' at all, though the prop-blocks have taken some rough treatment. Solid noses such as those on the P38 and the *Fokker* G1 are very much to be prefered, though.

Undercarriages are a problem with twins because although they are valuable prop savers, they are very expensive on weight and drag. Only one of my twins has ever had

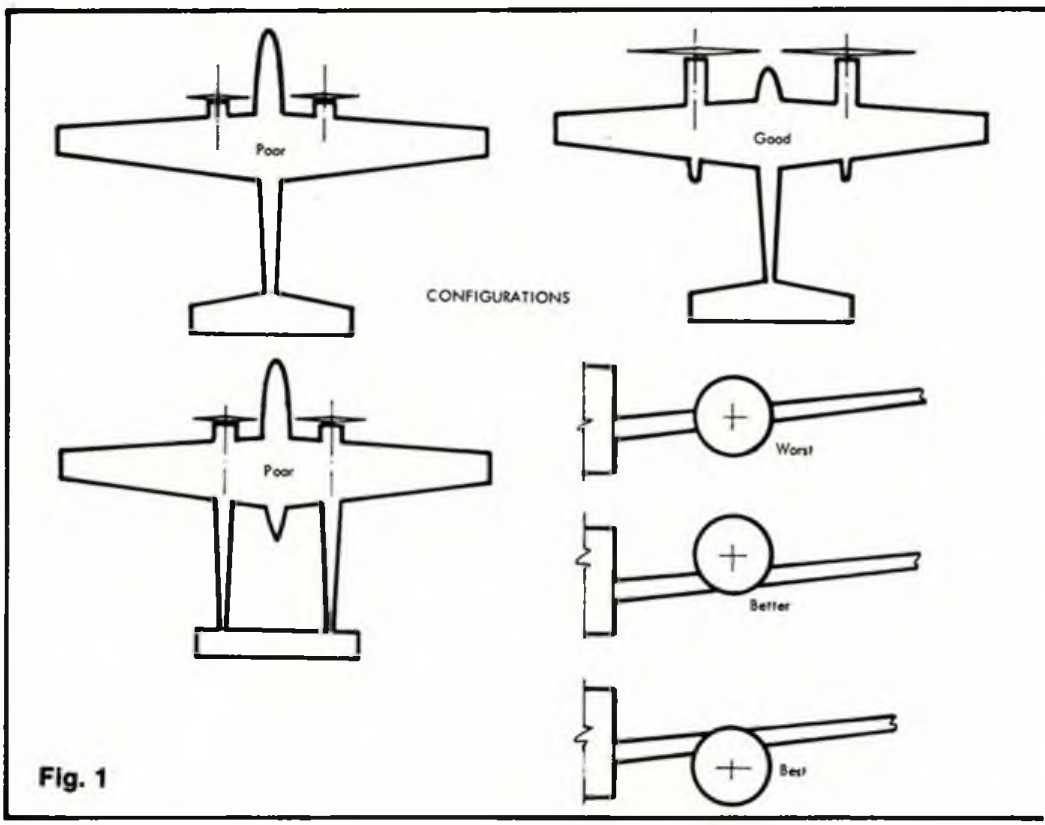


Fig. 1

wheels. It should be said that an additional personal reason is a preference for deleting undercarriages from models of subjects with retracts. One other problem area of U/C's for twins is the preponderence of subjects that sport tricycle wheels. Nose-legs contribute even more drag and weight, and create further headaches when it comes to adequately fixing them to the airframe.

Additionally, types with tricycle gears tend to sit lower on the ground, producing propeller clearance problems should you need to increase the propeller diameter. If you must have an undercarriage, try and make it a tail-dragger. The *Fokker* G1 would be a very reasonable choice.

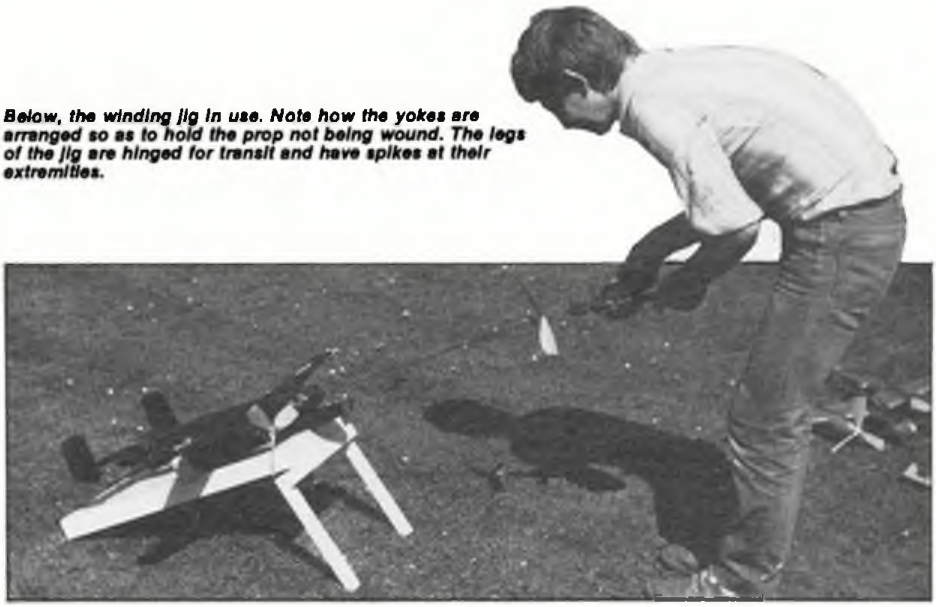
Taking all the above into consideration, a survey of subjects yields us these aircraft as adequate potential for rubber twins. Some of them do have rather better features than others, but with care all of them are viable as models.

Nacelle/Types	Twin Booms
Buckingham/ Brigand	P38 Lightning
B25 Mitchell	Fokker G1
B26 Marauder	FW 189
A26 Invader	P82 Twin Mustang
DH Hornet	
DH Mosquito	
F7F Tigercat	
Welkin	
He 219	
S2F Tracker/Trader	
A20 Boston	
Vickers Armstrong 432	
SJ2 Savage	
Sturgeon	

Ground handling

One of the biggest problems with rubber twins manifests itself the moment that you try to fly the beasts - God gives you two hands but four would seem to be nearer to specification for the 'twin flyer'. Answer: a winding jig. This enables you to fly single-handed and at leisure. So mistakes will not so easily be made.

The jig should be *larger* than your existing model to allow for larger future projects. Base it on a flat plate or table (see fig 2). Make up removable twin yokes to take the two rear motor dowls. Such a jig may also be used for single motor machines. Use bolts with countersunk heads and wing-nuts to retain the yokes to the jig chassis. More important, at the rear end, is the retaining plate, through which stakes or screwdrivers should be pushed firmly into the ground.



Below, the winding jig in use. Note how the yokes are arranged so as to hold the prop not being wound. The legs of the jig are hinged for transit and have spikes at their extremities.

There should be two fixings to the ground otherwise the jig will swing about when you are winding a twin. My own jig has folding legs which incline the chassis and thus the model, making for easier winding. Once you have constructed the necessary jig, load the model with rubber.

When making up motors, always use strip from the same batch of rubber. Pretension them, as one noseblock dropping out will spell disaster, if the model is at any height (yes, rubber twins *can* climb!).

While attaching the propellers to the motors, ensure that they are arranged so that the *inboard* blades are going *down*. The props should be made contra-rotating to eliminate torque effect. In addition, there does seem to be some benefit to be gained with air flow over the empennage. The greatest advantage, however, is that contra-rotating props make the model very much easier to launch.

Though I have seen several models flying successfully with both fans revolving in the same direction, it has to be said that one is throwing away the one key asset of the twin. A model which is torque-free is simpler to trim power on. Such a model may also have a degree of flight programming *wound* into it by the simple expedient of putting fifty more turns on one motor.

Winding the rubber twin is not a critical business at all. A disparity in the number of turns on the port and starboard motors is no problem provided that it is not great (ie hundreds of turns) and it will add interest to the flight pattern. One can get away with a lot more with a rubber twin as there is no motor to die on you in flight or go sick with the usual consequences.

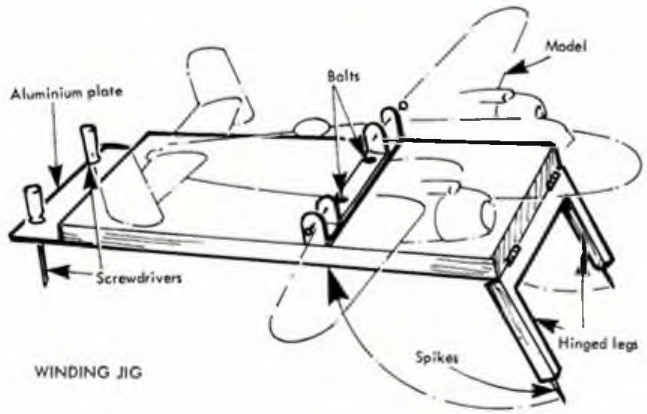
Above, the winding jig should be large enough to handle various models. Illustrated here are three yokes (single motor, 'Lighting' and Mitchell respectively) which are bolted to the jig as required. The use of wing-nuts makes for quick changes of yoke.

However, when flying in windy or gusty conditions, it is preferable to do an accurate count of the turns on each motor to make sure that they are equal. Assuming that the model is basically stable, a disparity of turns is safe enough. However, in rougher conditions, the essentially variable flight pattern produced by unequal power may well result in so much matchwood, somewhere downwind.

Before going on to describe launching techniques, a few other aspects relating to winding should be discussed. As one of the motors will need to be wound the 'wrong' way, it is important that the chuck on the winder does not loosen and release the hook. This is not merely related to the safety of the model but also your helper, should you be using a human winding jig. Slightly bending the rear of the hook shank and tightening the chuck as much as possible should suffice unless one is dealing with very large motors. In such a case, the hook should be fitted with a restrainer.

Next, be very careful to wind the motors in the *correct* directions. Over the years, I have

Fig. 2



WINDING JIG

Above, removing the wound model from the jig. Note the author's left hand retaining both props as the model is lifted away.

both wound the motors in reverse and, on one occasion when an onlooker engaged me in conversation at a critical moment, wound both motors the *same* way. In the former case, the model attempted to fly backwards; in the latter, my P38 indulged in a high-speed flat spin straight from my hands - the model was seriously damaged and the onlooker wandered off muttering something about twins being a waste of time! So, ensure that you wind each motor in the right direction. Precise counting is far less important.

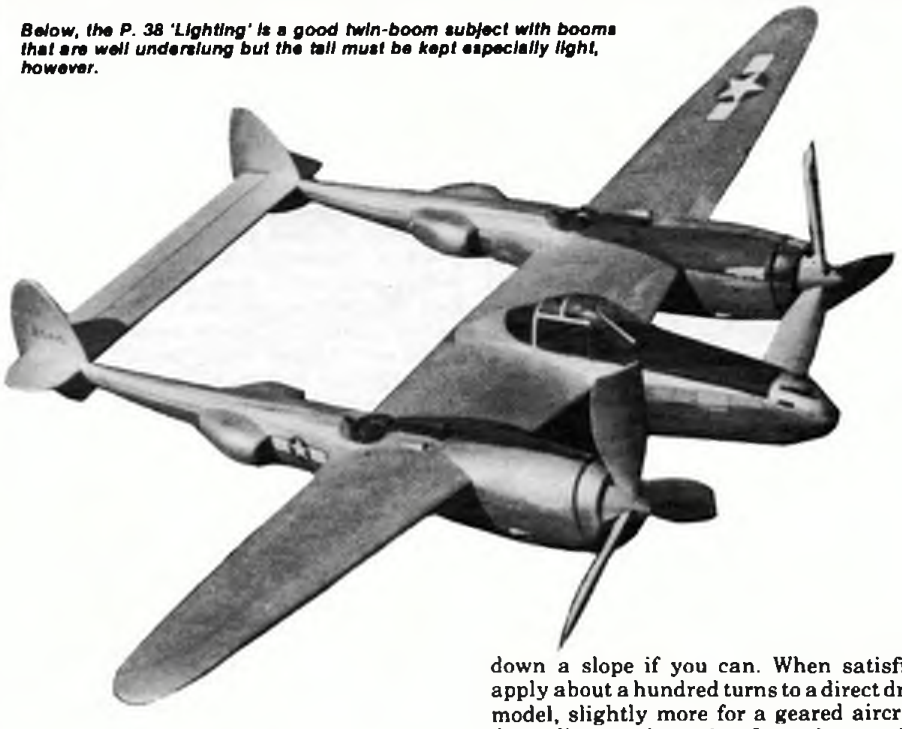
Finally, when complete and ready to go, load the model and fully wind it a few times at home. This will enable you to check out the jig *and* the model. Be careful to check that the motors do not get fouled up in the nacelles when running. If they do, try to remove the offending piece of airframe if possible. Whilst a good deal of the average structure of a model is to aid construction and thus becomes partially redundant on completion, hacking away at main spars is definitely not on and you may have to live with some chafing of the motors.

Practice makes perfect...

If all is well, it is now time to search for the traditional meadow full of long grass. It is at this stage, that one has to come to terms with launching the beast - after all, one has to hold the fuselage and two props, and release the model in a controlled fashion! Practice handling the model with the motors wound, particularly removing it from the jig and raising it to the launching position. Assuming that one is right-handed, the fuselage should be held in the usual manner with the right hand. By spreading the left hand, unless the model is enormous, it is quite easy to restrain both props with the tips of your fingers and thumb. The model can now be launched in the usual way. Again, practice actually releasing the model with only a very few turns on board, before committing yourself and your creation to the Big One.

It will be noted from the above that propeller pins and other forms of inhibitors have not been mentioned. I have never found these to be necessary. In fact, I regard them as an unnecessary complication and something else to get lost in the grass. In order not to let the props run away on the ground, simply lay out the winding jig so that it has enough forward length to foul the props, but only just enough, otherwise winding is difficult. Pins through the rear dowl tubes will hold the model down satisfactorily, there usually being enough tail moment to ensure that the model cannot lift, until the pins are removed. (A good tip is to paint the pins red and attach them to the jig with elastic, so that they do not get lost in the grass.)

Below, the P. 38 'Lighting' is a good twin-boom subject with booms that are well undersiung but the tail must be kept especially light, however.

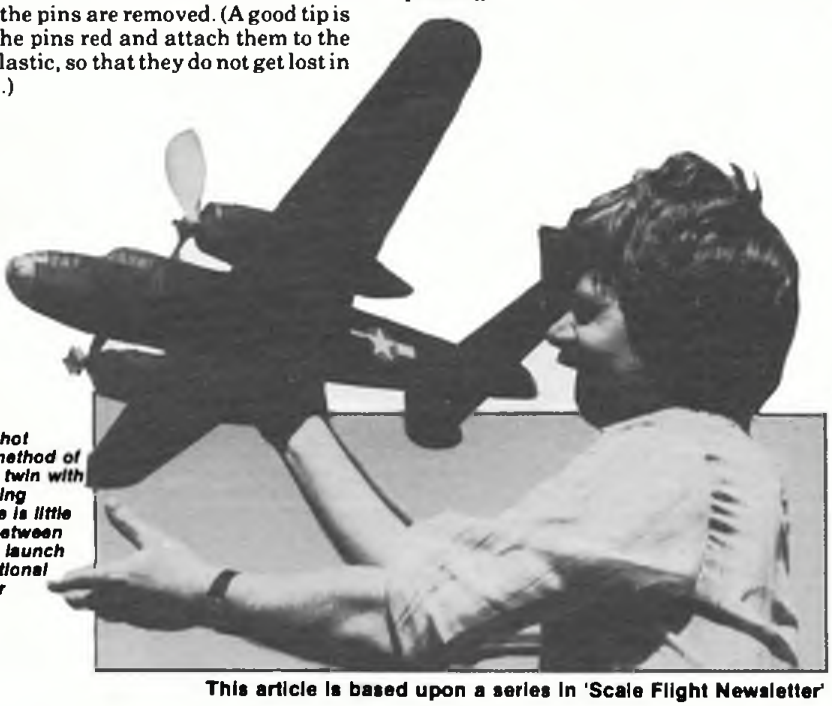


Flight and trimming

Long grass really is a strict requirement for these twins. Owing to their layout, twins will accept far less punishment during cartwheel landings than conventional models. They are considerably less flexible and have more 'points' which can foul the ground. As a result, the early flights should be undertaken with some care. Also, avoid wind, particularly gusty conditions as an inexperienced launcher will find this difficult to cope with.

Test glide with a fairly forward CG. Check that the model flies straight. Fly into wind down a slope if you can. When satisfied, apply about a hundred turns to a direct drive model, slightly more for a geared aircraft, depending on the ratios. Launch smartly - you will probably be surprised how quickly a twin flies. Both my nine ounce *FW* 189 and five ounce B25 fly pretty quickly.

On the first powered flight, the likelihood is that the model will stall under power. Pack both blocks and try again. Quite a lot of packing seems to be the rule with twins -



Right, this shot shows the method of launching a twin with contra-rotating props. There is little difference between this and the launch of a conventional single motor machine.

This article is based upon a series in 'Scale Flight Newsletter'

probably to do with the position of the props relative to the CG and the proximity of the props to the wings. Once an even climb is achieved, increase the turns, say to two hundred.

The model will probably stall again but by this stage you may begin to witness another advantage of the twin - the blown wing and tail produce a very unusual stall, which occasionally loses little height and sometimes even seems to gain it, albeit with the model mushing a good deal. Beware, however, as the power-off stall can be very different, with a recovery requiring much height, especially if the prototype is long nosed.

Once one has worked up to full power, a turn can be induced to control the stall and to add interest to the flight pattern. This may be achieved either by putting a few extra turns on one motor, as previously described, or one can employ the downthrust technique. Briefly, this method works as follows. If you want the model to fly right, remove a little downthrust from the right-hand motor. If the model is still stalling, add a *small* amount of downthrust to the motor on the *inside* of the turning circle. This takes a little getting used to, but it does work, allowing you to wind on full turns to each motor.

At the end of the power run, the model is almost certain to stall as it makes its transition to the glide. This I have found to be the most tiresome problem of all with twins (apart from remembering to carve 'handed props'!). There seems to be three ways of tackling the transition problem. Firstly, and to some extent the easiest option, is to try and achieve a very long power run and land under power. This, however, is only really practical for twin boom models fitted with gearboxes. This was my approach with the *FW*189, having flown it direct drive first.

The second alternative is the in-flight variable incidence elevator. My P38 was experimentally fitted with such a device for a while. One motor peg was fitted through slots instead of the usual holes, and tensioned with a small band to move rearwards as the motor unwound. To this peg was connected a pushrod linking it to the hinged elevator. Movement was a little jerky, but with care, this method will work well enough. Setting it up can be pretty hairy though - my P38 performed a tight loop during trials to calibrate the system! However, this is really only viable for twin boom subjects. Finally, pendulums. This system is really only applicable to nacelle type twins, as the linkage is too complex for twin booms. As there is no rubber in the fuselage of the nacelle model, one can fit a pendulum of good proportions with good leverage. Pendulum operation needs no further explanation here. So far I have not tried this method in a twin.

Once gliding, do not be surprised if the model comes down fairly quickly - many prototypes are very draggy and do not glide well. It is important that on the glide, both prop-blocks stay in situ and freewheel. Should one fall out or cease to freewheel, the model is sure to spiral in.

After the model has landed, let both motors fully unwind before returning it to the winding jig. This is both better for the rubber and prevents any great disparity of power between the motors.

Conclusion

The twin can be an entertaining project which need not be as tricky as one might think. It should be apparent from the above that a considerable proportion of the success or failure of a project will be decided before the first balsa is cut, not only by subject choice but also the basic thought behind the model - always keep it as *light* and *simple* as possible.

Unfortunately there are not many published designs for rubber twins, and of those available, most are a complete waste of time. The wartime *APS* plans for the 'Beaufighter' and 'Envoy' are unlikely to offer much performance. Richard Falconer built the 'Beaufighter' a few years ago and found it very unstable as well as very limited on power. The small *APS* P38 is hardly a scale model but does offer some mileage as a first attempt. The American magazine *Flying Models* publishes the plan from which I built my B25. Whilst the model flies well, the plan itself (number CF101), is very badly drawn, the nacelle formers being useless as shown.

The *Guillows* and *Comet* kits should be avoided like the plague, with the possible exception of the *Comet* A26 'Invader', which built light, stands some hope. Basically, whilst I certainly recommend perusing other published drawings, the best chance of success will come with a DIY design.

In this article, I have specifically avoided the push-pull twins, as there are fewer problems with this layout and they effectively handle like a single motor model. If anyone reading this has any experience of such aircraft, perhaps they would like to write and share it with us...

Control Line PICTORIAL

Control Systems: Ian Peacock explains how to make these vital components as reliable as possible...

C/L Systems within the model consists largely of four items

1. Leadouts
2. Bellcrank
3. Pushrod(s)
4. Elevator (flap) Horns and Hinges.

1. Leadouts

Leadouts can be from rigid or flexible wire. *Always* use wire (steel for preference) *never* use thread, nylon fishing line etc as it has too much 'give' in it resulting in a 'spongy' feel to one's flying.

Rigid line (18-24 swg piano wire dependant on model size, weight and performance). Terminate end of leadout as shown (fig 1). Always make at least two whole turns around wire when completing termination loop.

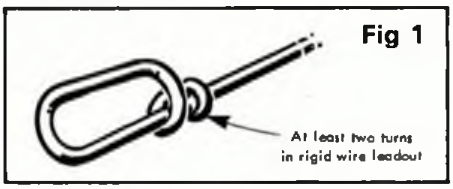


Fig 1

Flexible Line Heavyweight *Laystrate* is adequate for most models. Cycle three-speed cable may be used for *very* large or *very* heavy or high performance aircraft. Terminate ends in twin loops, bind with fuse wire and solder.

Leave adequate ends.

Take care not to cut the leadout - easily done in a moment of haste!

Note that binding becomes progressively smaller until it finally covers only the single leadout (fig 2).

Use *hot* iron (fig 3) and *only* resin cored solder as supplied for electrical work. Do *not* use acid based fluxes or solders.

Some experts will tell you that solder makes for a brittle point where the solder stops and this is susceptible to fracture on multiple bending. In practice the leadout remains predominantly straight in use (it doesn't flex a lot!) and the stresses are taken along the leadout and these fractures simply do not happen. I have twenty year old leadouts with no sign of imminent breakage.

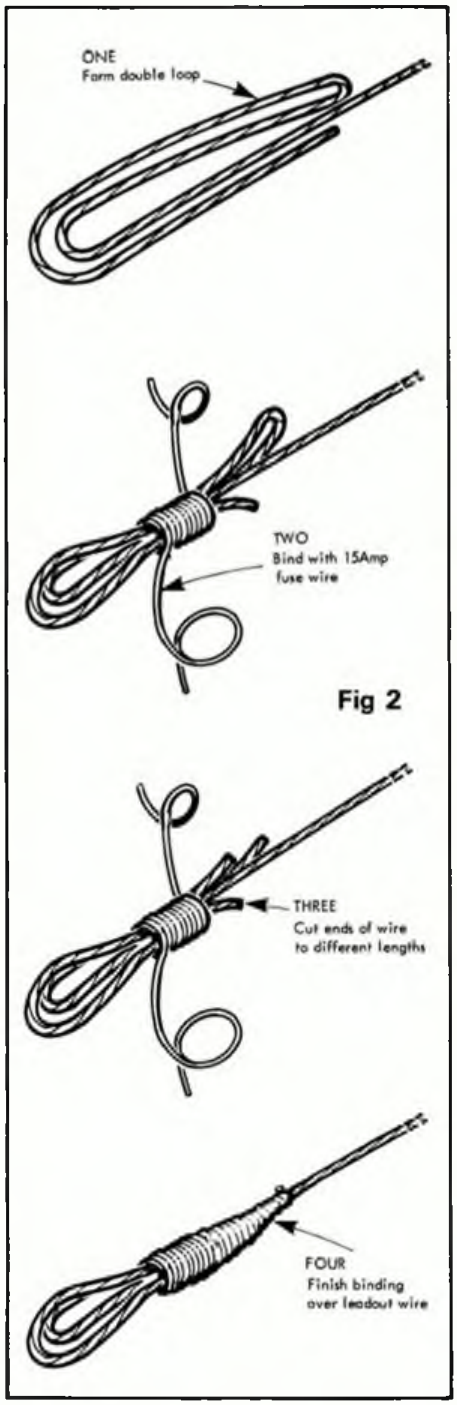


Fig 2

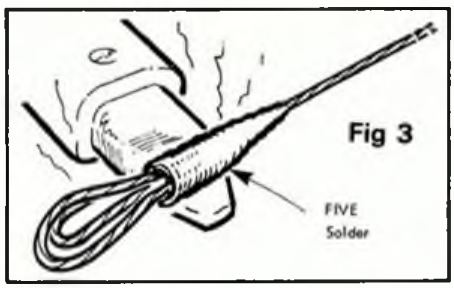


Fig 3

2. Bellcrank

Bellcranks can be made from any light, wear-resistant material. e.g. *Dural* (*not* aluminium), *Tufnol* (not less than 1mm thick up to 1.5cc and at least 3mm thick for 7.5cc and over) epoxy glass, nylon, steel - not very light - but very strong. For most cases the plain triangle shape will suffice.

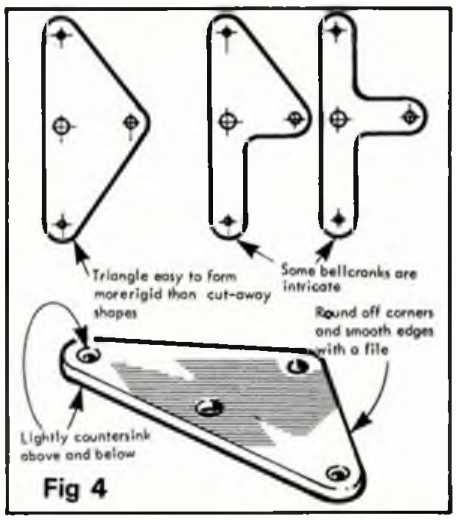
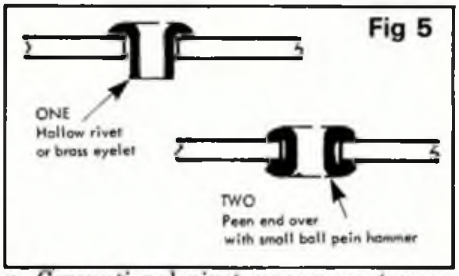


Fig 4

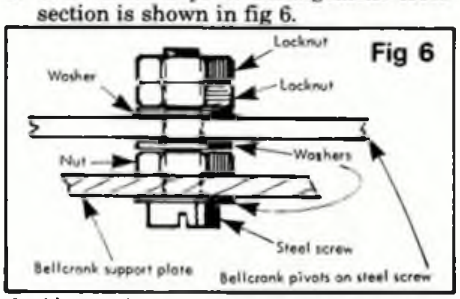
Useful Tips

a. Leadout holes will benefit by *lightly* countersinking both sides (fig 4) when flexible leadouts are features (not necessary with rigid leadouts).
Because leadouts are under tension - these holes need not be an exact fit but can be oversize.

b. For good wear characteristics (particularly if the model is expected to last any length of time!) then hollow rivets may be used to bush the leadout holes (fig 5). Use those similar to those found in R/C servo mounting kits. Push Rod holes need to be a good close fit (but *not* tight.) The pivot hole needs also to be a good fit.



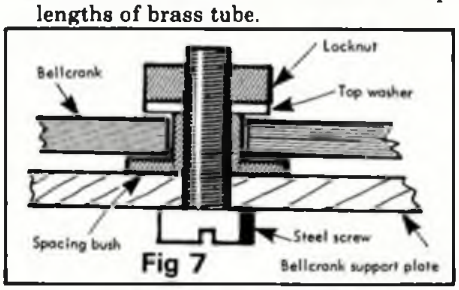
c. Conventional pivot arrangement cross section is shown in fig 6.



d. Alternative arrangement cross section.

Bush (fig 7) allows greater surface area for pivot. Also has smooth bearing surface (when crank pivots on screw, threads cut into the bellcrank causing wear and slop over a period of time).
Note: some commercial products use this technique (*Micro-Mold* for example)

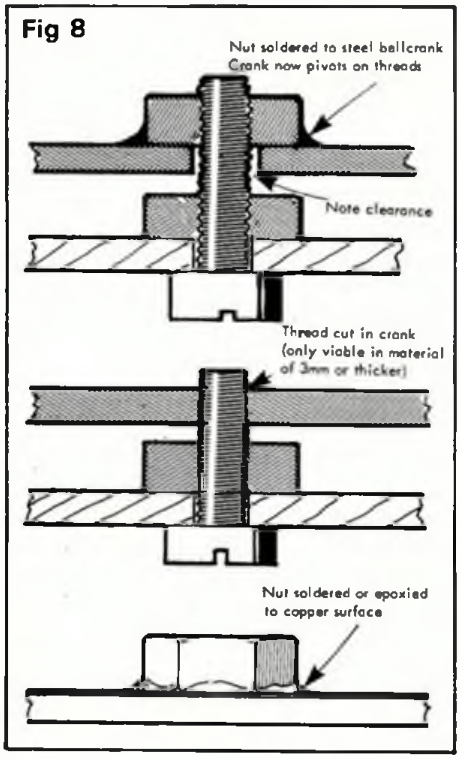
Home made bushes can be turned on a lathe or can be fabricated from scrap lengths of brass tube.



e. A Similar Alternative:-

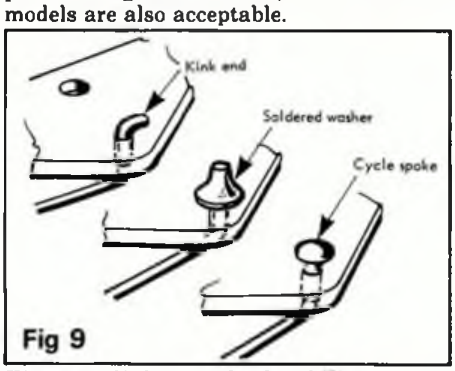
Note that in both these cases - increased bearing and decreased wear results. The bellcrank actually rises and falls on thread as it rotates but the movement is of no significance (fig 8).

If using epoxy glass for bellcrank (e.g. printed circuit board material) then the nut may be epoxied to top surface of bellcrank. Similarly cyano glues (thick type) may be used to secure nut to bellcranks made of dural, brass, tufnol etc.



3. Pushrods

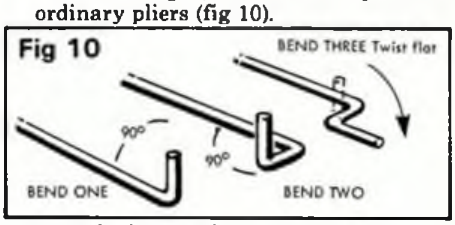
With only the odd exception, pushrods are rigid. (exceptions being push/pull cable control). Push rods should be 16 swg piano wire (or thicker on bigger models). Wooden pushrods e.g. 1/4in. dowel, as used on R/C models are also acceptable.



Three reliable methods of fitting pushrods to bellcranks are:-

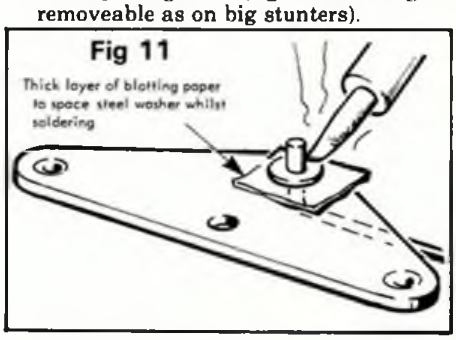
a) 'Z' bend, b) Solder steel or brass washer to push rod, c) Ready formed 'end' of bicycle spoke (fig 9).

a. Use specialist 'Z' bend pliers (see Micro-Mold catalogue) or use two pairs of ordinary pliers (fig 10).

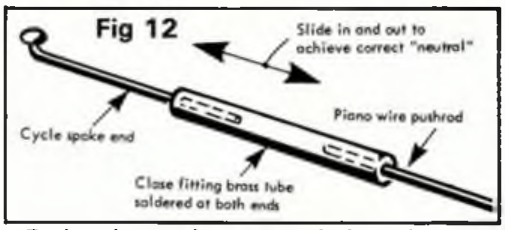


b. Use thick (two layers) blotting paper washer to 'space' the steel washer. Remove when solder has cooled. Clean wire and washer with fine sandpaper. Use only *non-acid* based fluxes and solders. Blotting paper may be wetted to stop heat transfer when nylon bellcranks are used (fig 11).

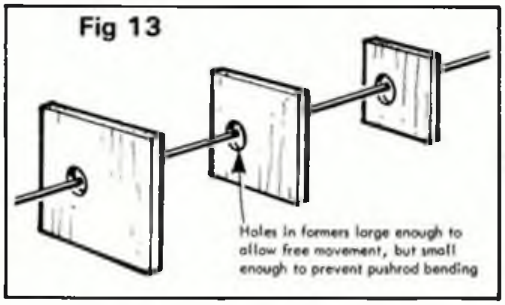
Never use R/C type adjustable clevises on totally enclosed control systems:-wear or breakage of a nylon snap link will require cutting into the structure to affect a repair. R/C fittings are fine where they are on the outside or where the bellcrank is easy to get at (e.g. when wing is removeable as on big stunters).



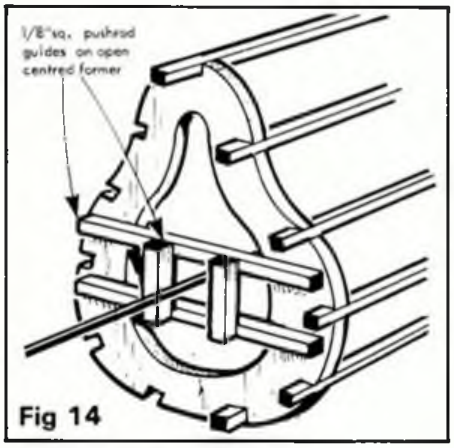
Push rods may be joined (fig 12) along their length to:- a) enable them to be made long enough.
e.g. when bike spokes are used for push rods ends, and b) to enable accurate 'neutral' push rod to be achieved.



Push rods may be supported along their length (fig 13) to avoid bending under load (results in poor elevator response). N.B. Where tube joints are used, ensure that joint does not 'catch' on formers.



On open structure fuselages - push rod supports can be made by fitting horizontal and vertical cross bracing with thin square section strip balsa (fig 14).



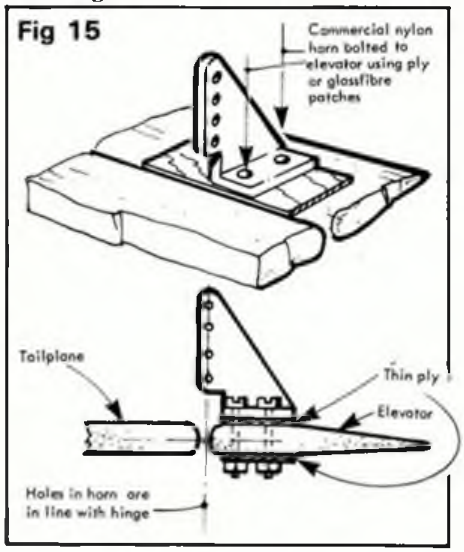
4. Horns and hinges

One piece elevators

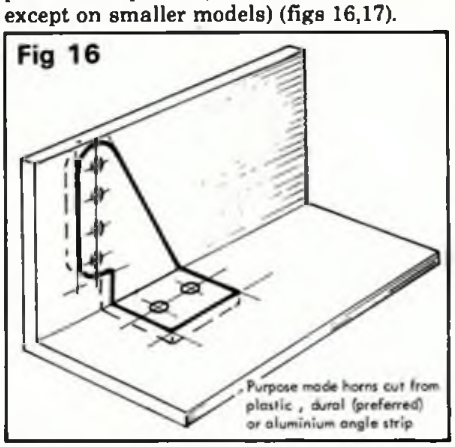
Split Elevators

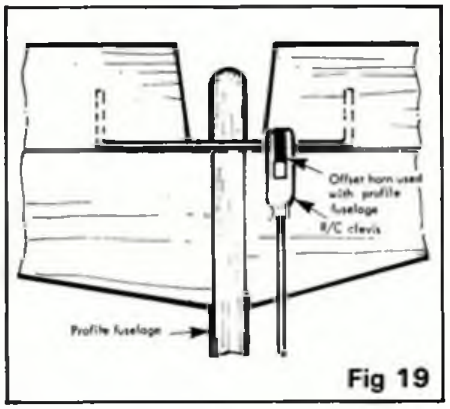
Commercial units (fig 15) may be metal horn, brazed or silver soldered to wire joiner or nylon horn glued or screwed to wire joiner.

Home made system - cut horn from 16 swg or 18 swg brass and braze or silver solder to



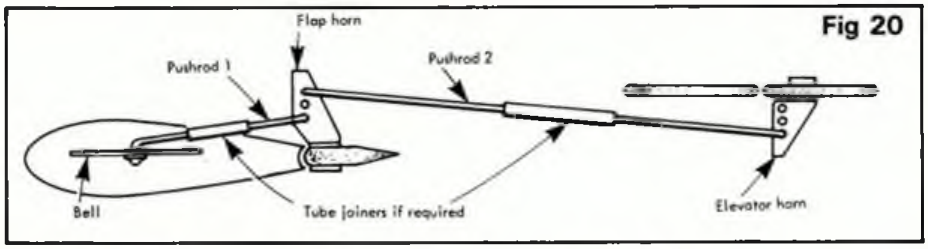
piano wire joiner (*do not* use soft solder except on smaller models) (figs 16,17).

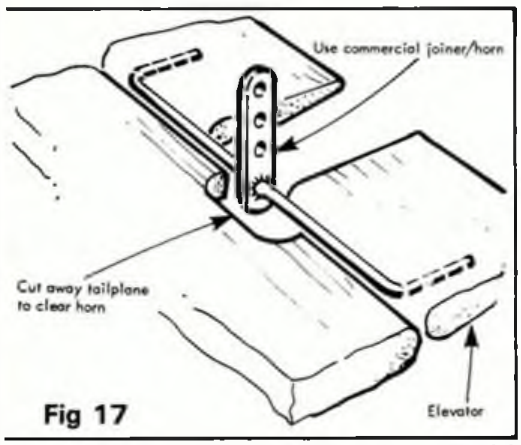


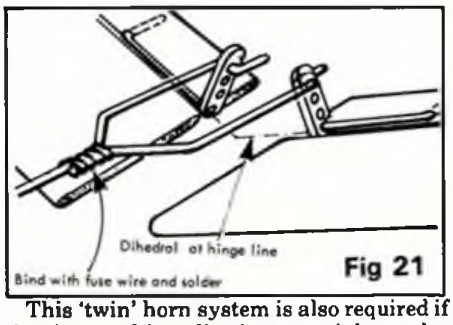


Flap Horns (fig 20)

Use the same technique as for elevators 'V' tails require twin horns (fig 21).

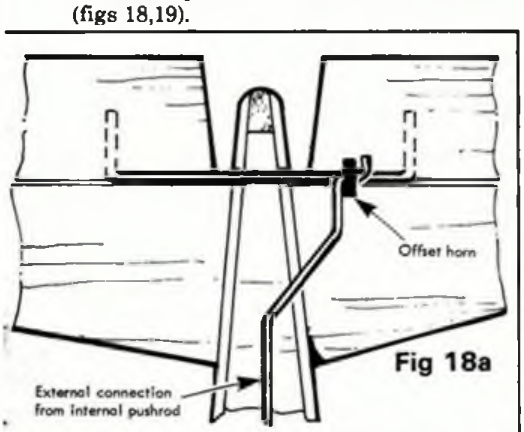


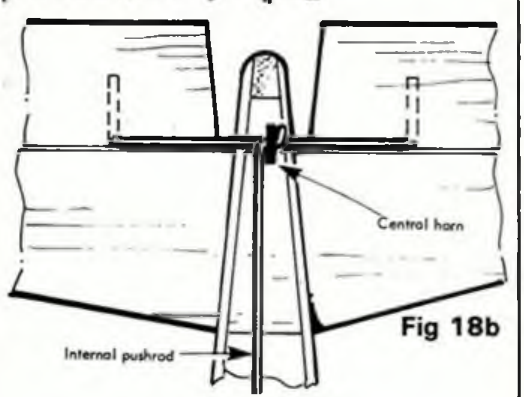


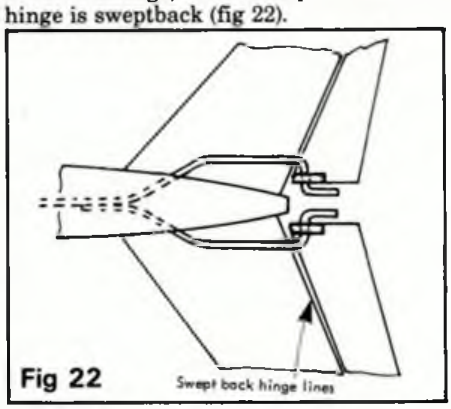


This 'twin' horn system is also required if the elevator hinge line is not at right angles to the fuselage, i.e. if tailplane/elevator hinge is sweptback (fig 22).

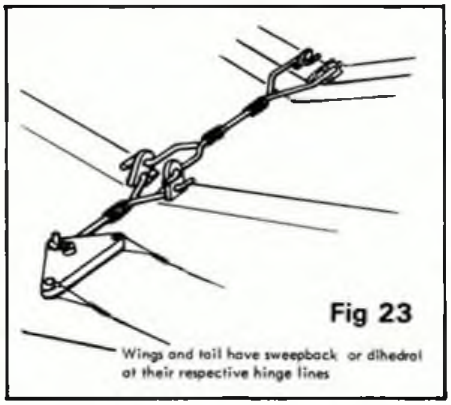
Horn may be central or offset to suit model (figs 18,19).





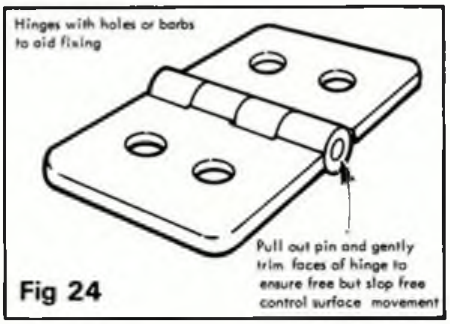


Note: If wings have dihedral (or the trailing edge is swept forward or back) then 'split' horns will become necessry. If both wings and tail have dihedral then both flaps and elevators need this treatment (fig 23).

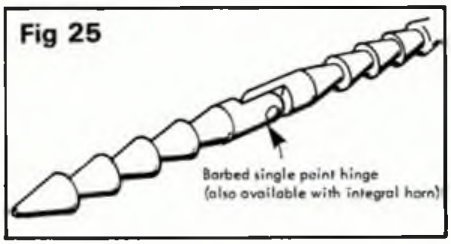


Hinges

Control line surfaces should be freely hinged for smooth and trouble free flying (when disconnected from pushrod, surfaces should be hinged freely enough to drop under their own weight! Therefore:- avoid using *Mylar*, nylon or similar 'living hinges' as used widely in R/C. Instead use 'pinned' hinges as in fig 24 (also of R/C origin).



This type of pinned hinge is also suitable, furthermore they can be bought with moulded horns...(fig 25).



Whilst modern commercial horns/hinges are perfectly acceptable (particularly on larger models) the older traditional approaches are still valid:-

Over and Under System

Use linen or nylon tape 1/2in. wide (can be up to 1in. on larger models) in strips typically 2in. long. Glue to top and bottom of tailplane and elevator as shown (fig 26).

(*Hint*: Mark out hinge position with pencil and rule to ensure that hinges are square and in line. Higgledy-piggledy hinges look untidy!)

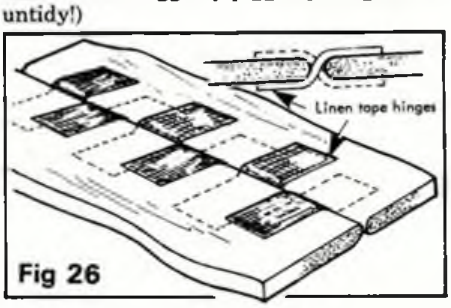
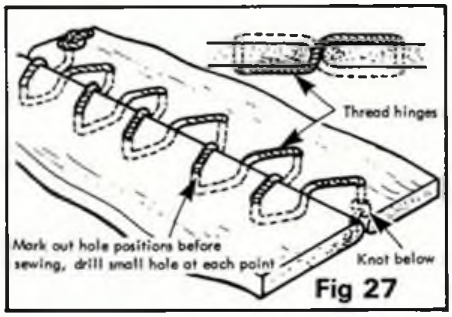


Figure of Eight Sewing

Sew with waxed thread for preference, but nylon thread will do (fig 27).



Left and below, not a difficult model to build, the 'Ohka' will serve as a good trainer – and semi-scale as well!

OHKA!

A Kamikaze Control Liner?

A 1.5cc powered flying bomb by Jym and Dave Leddy

THE YOKOSUKA MXY-7 'Ohka' (Cherry Blossom) was designed by the Japanese during World War II as a piloted missile intended for suicide attack. The mark II on which our model is based made its first powered flight in November 1944 and its first operational use was on 21st March 1945.

The first section contained a war head of 2645 lbs of high explosive. The second section contained the cockpit which was equipped with only very basic controls and instrumentation and the third section contained three solid propellant rockets. The 'Ohka' was carried to its area of operation by a specially adapted GM42 'Betty' twin engined medium bomber. Once released the 'Ohka' would glide to the target and when in a dive it would accelerate to over 500 mph by firing the rockets.

Our model is not quite so fast but still has a handy turn of speed with a good 1.5cc motor on 35ft lines.

Wings

Cut out all the parts and glue the 1/16in. ply reinforcing centre piece to the main spar. Pin the main spar to the plan on one side (with the other half of the spar up in the air!) and add the ribs, leading and trailing edges. When this has dried unpin from the building board and build the other side. The wing is now covered in 1/32in. balsa sheet and the wing tips are added after this sheeting is completely dry. The wing can now be covered in lightweight tissue and then put to one side.

Fuselage

The fuselage is built on a 1/8in. balsa spine. Cut to shape, up to and including F8, and pin over the plan. The two 3/8 × 3/8in. bearers are glued to the spine but are *packed up* 1/16in. with scrap balsa. This will ensure that the bearer face is *on the centre line*. Now add former halves F3B - F8B except for F4 lower. When all is dry remove from the plan and add all 'A' formers, the tank and F-2. Glue in the block between F7 and F8. This can be slotted and grooved to allow for the elevator joiner and control horn. At this stage the bellcrank can be bolted to the upper bearer.

Tail Unit

The tailplane and fins are all made from 3/16in. balsa. Although the sheet between the two elevators could be strengthened it is about the only part of the tail that has not been repaired on the original model, in spite of all the flying with many different pilots. Don't worry about the small size of the elevators, they are quite effective.

Fit the tail unit to the 1/8in. spine on top of the supporting blocks and ensure that there is sufficient room in the slot to allow free movement of the elevator. If you are going to cover the tailplane in lightweight tissue it is best to do it at this stage. When you are satisfied with the movement glue the tail in place and when dry connect the elevator to the bellcrank with the 16 swg piano wire push rod.

Back to the Fuselage

Now is the time to fit in the wing. Take great care to ensure that it is *square*. We made a model for control line of the *Bachem* 'Natter' and failed to notice the wing had dropped 2° before the glue set. The model was finished and test flown by our mate Bryan Shelley and he swears there could never be another model like that (he has since moved out of the area!). Formers F4L can now be added and when the wing fixing is dry, the fuselage can be covered. This can either be planked with 1/4 × 1/16in. balsa strips or can be covered in moulded panels of 1/16in. sheet. For this process, panels of 1/16in. medium balsa are cut oversize, and after soaking in hot water are taped around suitable formers. They are then left to dry overnight and when dry can be trimmed, fitted and glued in place. Soft block is glued between formers F1 and F2 and sanded to shape. The lead outs are made from control line wire and must be fitted *before* the panelling is complete.

When all the covering is complete *and dry*, make the diagonal cut shown on the plan which removes F8. Fill in the hole with 1/8in. sheet and add three dummy rocket nozzles made from scrap balsa.

Finishing

The original models were covered in lightweight tissue and given several coats of sanding sealer. Grey enamel paint was applied as the main finish with black under the canopy and at the rear end. The final finish was matt polyurathene varnish. The canopy was cut from a larger commercial moulding and I think would have looked better with a pilot under it...

Flying

Balance on the front lead out and fly on 30-35ft lines. Take off can be hand or dolly launched, we have tried both. The 'Ohka' is fast but stable and creates quite a stir, although people don't seem to want us near carrier competitions with it...

Left, seen here flying at the Aeromodeller Scale Days at Old Warden, the 'Ohka' is a simple model to fly. Not recommended for loops or bunts but has been known to wing-over!

SCALE MATTERS

Free Flight with Bill Dennis

New Models

I recently spent a few days in the Midlands and I took the opportunity to visit some of the lads from the Nottingham Club, which is something of a hotbed of activity on the rubber scale scene. An impromptu meeting was held at Paul Briggs' house, which is worth an article in itself!

I saw several models at various stages of construction, most of which will hopefully be ready for the Nationals. Last year in this column I made the comment that rubber models were being built too small. That may or may not be the reason why all the models I saw or heard about were big – in some cases over 49in span.

Right, we look forward to seeing the finished article... Doug Hunt with his Fairchild 'Argus', the rounded nose contours are shaped in blue foam. Below, Barrie Hotham's delightful peanut 'Lublin', built from plans in American magazine 'Model Builder'.

The most advanced was Mike Hetherington's *Fokker* DVIII. This was ready last year, but it suffered some damage during trimming just before the Nats. It is about 40in with a great deal of wing area. In fact the wing was, to me, the most impressive feature. The original was of course, ply covered and this is difficult to reproduce realistically, especially on a model where weight is critical. Balsa sheeting can look too smooth and featureless, as well as being heavy, while tissue covering simply would not do. Mike used 2mm polystyrene foam, which I assume is that used for wall linings and is available in rolls. There was just a little sag between the ribs and this looked most convincing. The section at this scale is about 1½in thick at the centre, and Mike has kept the scale zero dihedral but has put all the taper on the bottom surface.

Because of the obvious C.G. problems, Mike has used two short motors linked by gears at the noseblock and driving a scale diameter propeller with lead cleverly embedded in the hub. A nice touch is the rotating rotary engine. All-up weight, including rubber and ballast, is 11oz. which gives a loading of 6oz/sq. ft. Mike reports a flying speed of 10mph, which must be about right, but he hasn't yet cured an incipient left turn which doesn't respond to sidethrust.

I have mentioned before the problematic feature of *Fokker's* being the apparently high angle of incidence of the tailplane. Mike did what I do, which is to set wing incidence according to a line drawn along the bottom of the airfoil, and was rewarded with a colossal stall. The real angle of incidence of course is from the point of entry to the trailing edge, and the *Fokker* wing flat on the board starts with about 3°!

I thought the *Fokker* was big until Doug Hunt produced an enormous *Fairchild* 'Argus' in an advanced, but uncovered state. The structure is conventional, if a little generous, and the model uses a return gear midway down the fuselage. Less advanced was Paul Briggs' 1/12 scale 'Hurricane'. Paul has been wrestling with the fuselage cross sections on the *APS* three-view which are apparently not too accurate, and when I saw it he had only got as far as winding the fuselage formers and mounting them on a ½in square jigging rod. However, at the time of writing the fuselage is more or less complete and the model should be ready for the Nats.

Paul does have one or two other models, including a larger version of his *Sopwith* 'Triplane' with a spun and engine-turned cowling that defies description. I hear it made a low-level (like 6 inches) fly-past over the World Champs F1D team's models at Cardington recently!

In the umbrella stand were two 'Halifax' fuselages – one balsa and one foam – and he had a working rig of the improved transverse power drive system to all four propellers. It seemed practical but very heavy.

Least advanced of all with his latest project is Barrie Hotham, who has only completed the documentation for his 'Hawk Moth'! – but at least this is the right order to do things.

He had two very nice peanut models from the American *Model Builder* magazine, namely a 'Lublin' and a 'Saiman' biplane. The latter in particular has ideal proportions for a larger model.

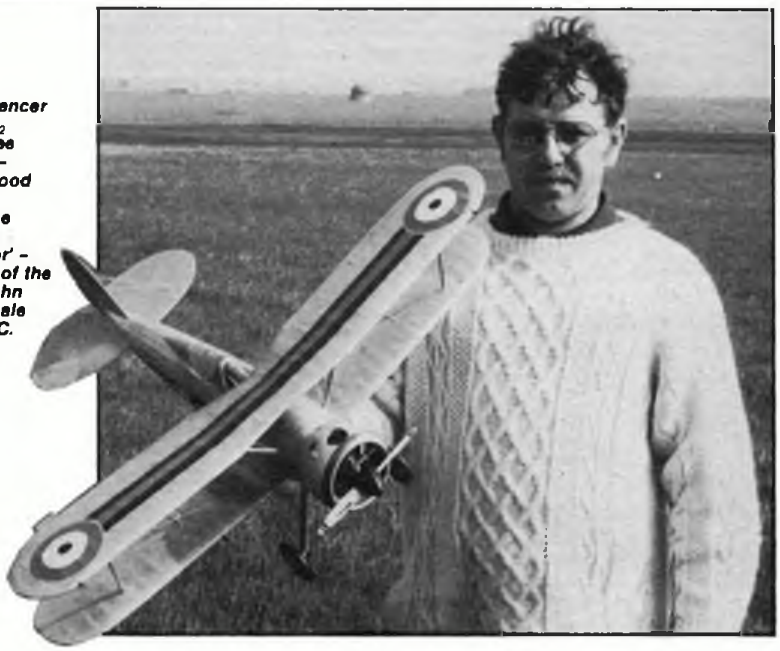
Barrie uses *SIG* contest grade balsa, bought direct from the USA, and he very kindly gave me some samples. This is certainly the best balsa I have ever seen, particularly in the 1/32in sheet and 1/16in square sizes. By the time you have paid carriage, duty and *vat* it is undoubtedly expensive, but is worth it for rubber scale models. Certainly it must be most satisfying to work with such quality materials.

Wheels

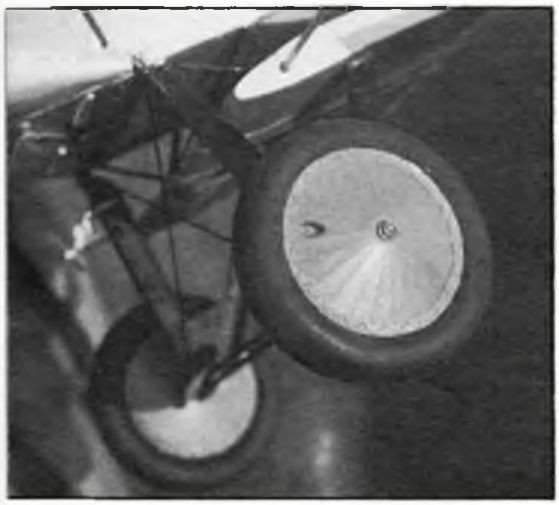
Canvas covered wheels as seen on older aeroplanes are traditionally represented on models by glueing a number of triangular 1/32in balsa spokes onto the basic wheel disc. The major drawback with this method is that even with such thin balsa, the 'spokes' inevitably look too thick at the scales we use. Additionally, I find it a little tedious, which is why I often steal the wheels off previous models (together with their pilots) for the new project.

Michael Smith showed me a different approach which is both simple and extremely realistic. The basic wheel is made up in the usual way with a central core of, say, 1/4in balsa sandwiched between two discs of thin ply. Then, instead of adding spokes, another disc of soft balsa is glued to the outside, followed by the brass axle bush. This disc is then sanded to the shape of the cone, either with a sanding block or by spinning it in a drill.

The positions of the spokes are marked around the rim and then button thread is wrapped around the wheel in a continuous radial pattern, starting at the hub, going out and around the rim and over the hub on the other side. Keeping a firm grip on the last turn with a piece of tape, PVA glue is brushed over the thread to stick it to the cone. When dry, the thread is cut away where it crosses the hollowed rim.



Above, Geoff Spencer launches his CO_2 'Siskin' at the Free Flight Nationals - proved to be a good flier. Right, John Simpson with fine example of APS Gloster 'Gladiator' - powered by one of the 'new' AM 10s. John also has a 1/5 scale example with R/C.



Above, close up of wheel on Michael Smith's Bristol F2B - built as described in the text...

Then comes the clever part. A large piece of silk or nylon is applied to the cone with plenty of dope, and the overlap pulled very tightly on the other side. Twisting it helps as well. When dry, the covering will be firmly stuck to the cone, with the thread 'spokes' clearly showing. Lacing around the rim, and the valve hole can then be added as required.

Twins

Elsewhere in this issue is an article by Charlie Newman on rubber powered twins, and it was suggested to me that a few notes on diesel twins might be of interest. Few such models have been seen flying, although I seem to have printed many 0/400 plans for various modellers...

I have built two successful twins, both powered by *Mills* .75's, with a wing area of around 725 sq. in and an all-up weight of 38 oz, giving a loading of 7.5 oz/sq. ft. In fact it was Terry Manley who arrived at these figures on his pioneering 'Vimy' and 0/400, and I just copied them. Note how two .75's add up to more thrust than a single 1.5cc engine.

Such loadings work well on high-drag biplanes, but I have no idea what to aim for with a 'clean' monoplane. My guess would be to reduce loading even further with lower weight, since drag will be low and flying speed could become excessive.

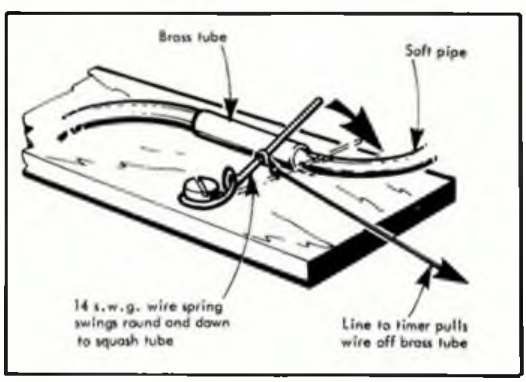
The larger models have good stability, but they are really only suitable for calm conditions since they are vulnerable in fast downwind landings. I have heard rumours that *PAW* are working on a 0.5cc diesel, and two of these may make a smaller model practical.

I have stated before that when choosing a subject, the only cast iron rule is that it should have two or three fin/rudders, since if there is no slipstream over these surfaces the model will be directionally unstable, about which you can do nothing. I am afraid that models of 'Dragon Rapides' are out for this reason - never mind those pointy wings! Tail areas are less critical, and as little as 8% of wing area has worked. I feel more secure with the engines mounted midway between the wings, but have no evidence to support this theory. Has anyone out there actually flown a H.P. 'Hannibal' free flight with the engines on top?

I have not tried contra-rotating propellers simply because I am not confident of getting two opposite-handed propellers of identical characteristics. They are not necessary, and in fact I have had no trimming problems (except with a single fin model!).

Structures are conventional, but the centre section must be well braced with 22 swg piano wire, even if non-scale, in order to prevent vibration. In this respect also, vertically mounted engines are preferable to horizontal.

The last and most important subject is engine control. Again following Terry's lead, I use no throttling devices to



counteract assymetric thrust - I don't believe they can be practical. A pair of decent engines should be able to run at constant speed, and they are easily synchronised by ear. All that is needed is a reliable cut-out device. I use a dethermalizer timer with a longer release arm to give more deflection. The arm is connected by wires and bellcranks to the fuel feed pipes which kink closed when the timer trips. Squashy tubing must be used, of course, and some experimentation with wire length and strength of pull will be necessary. On my next model I will use a different method which I saw in *SAM Speaks* and is shown in Fig. 1.

Twins certainly add an extra dimension to scale flying. In fact I found singles rather dull after building mine. I would be very interested to hear details of other successful twins.

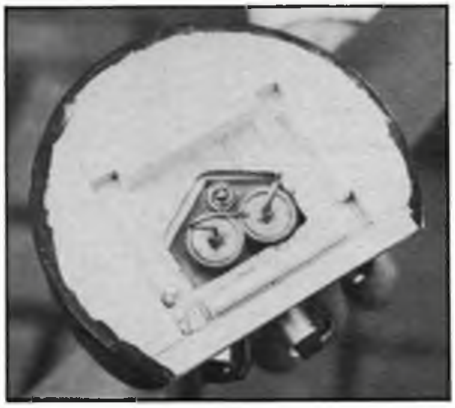
For the future I think electric power is the way to go, but knowledge about this subject is still sketchy in this country.

Scale Data Sources on Soviet Aircraft

If you have ever thought that a Soviet aircraft would make an unusual scale model the thought of obtaining accurate drawings and scale details may have deterred you. The *SMAE*'s P.R.O., Martin Dilly, himself a free-flight contest flyer, has discovered a couple of good sources, and is prepared to try to locate and copy, at cost, the material you need.

The *Science Reference Library*, off Chancery Lane in London, has a vast range of publications on aviation, including most of the world's model flying magazines. These include two Soviet ones, *Krilya Rodina* (Wings of the Homeland) and *Modelist Konstruktor*, which is rather like the US magazine, *Mechanix Illustrated*. Both of these often contain highly-detailed drawings of Soviet aircraft from about 1910 to the present, rather in the style of the 'Wylam Masterplans' that used to appear in *Model Airplane News*.

They carry a lot of information on panels, rivet details, cockpit interiors, fuselage frames, undercarriage mechanisms and so on. Aircraft covered in 1984 included the *Su-MiG*-15, *MiG*-23, *Il*-2, and the I-15 used in the Spanish Civil War; in previous years a lot of World War 2 aircraft have been detailed. The current year or so of issues is shelved on the third floor of the Library, which is usually open till 9.00pm. *Modelist Konstruktor* is shelved at TD42(R)2, for instance, but a microfiche system will reveal the location of anything else you require. Contact Martin, c/o *SMAE*'s Leicester office, if you would like his help with any project, quoting your SMAE number if you are a member. *SMAE: Kimberley House, Vaughan Road, Leicester.*



Above, the rear face of Mike Hetherington's Fokker DVIII nose block, showing twin motor hooks and gears - stepping up the prop speed.

Above, Mike Hetherington's Fokker DVIII, with foam sheet covered wing. Undercarriage is being repaired following slight trimming damage...

AEROMODELLING TECHNOLOGY

Practical modelling ideas from Aeromodeller readers

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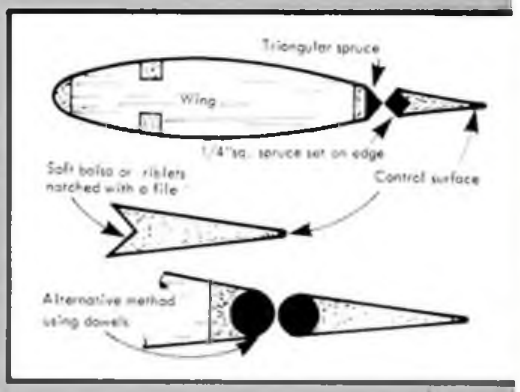
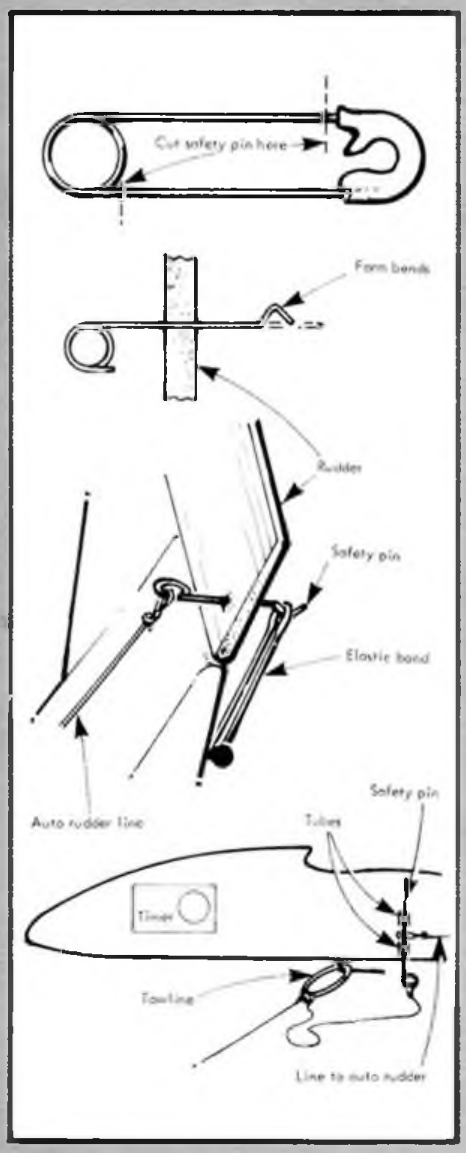
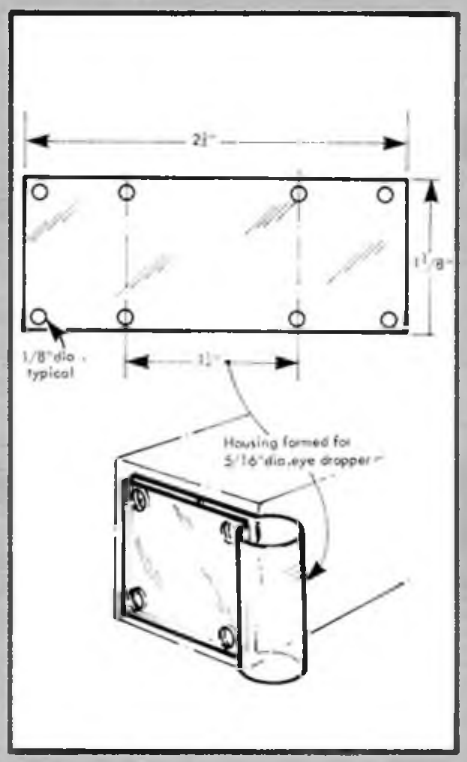


Handy safety pins...
C Huck — Cirencester

Safety pins come in several sizes, already have neatly formed loops and are of soft metal that is easy to cut and bend if necessary but are strong enough for many uses by the aeromodeller...

Two ideas for their use on a towline glider are shown here. Surely you can think of many others...





Eye Dropper Tank Holder
Donald H Ross - U.S.A.

Most modellers have trouble mounting an eyedropper tank securely to the fuselage right near the engine. Rubber bands dissolve in fuel and metal mountings don't let you see the fuel level. Here's a simple method. Use 'Mylar' approximately .005 thick, easily obtainable in most art supply shops. Any other clear, fuel proof plastic will do. For an .020 *Cox* 'Pee Wee' cut to approximate dimensions shown and punch or drill oversized holes on both sides to duplicate engine mounting pattern. Then, fold over the plastic (without creasing it) and mount to firewall behind the engine.

The sleeve thus formed will hold an eye dropper firmly and show the fuel level at all times. This method will not hamper thrust adjustments. A larger size will do the same job for an .049 engine. Mine have been used for two seasons with many flights and show no signs of wear. The 1⅛in. dimension is correct for 5/16in. dia. eye dropper. Adjust for different sizes.

Simple hinge lines
Laurence McMurdie - Sussex.

My pet hate is sanding control surfaces to form an accurate hinge line! I took a ¼in. square spruce strip and set is precisely on edge, where it was joined by the 1/16 in. sheet lower surface of the control surface, itself bevelled to meet the angle. Advantages are a ready made hinge line, and the facility of being able to use a harder wood for greater torsional stiffness. Using spruce also anchors the hinges more firmly when hinging. I usually file a flat surface onto the hinge line, and use a commercial slotter but all normal systems of hinging will work as well.

An alternative system similar to the above is to use dowels just use a round file to form the seating ...

Tail boom transition
T Faulkner — Sheffield

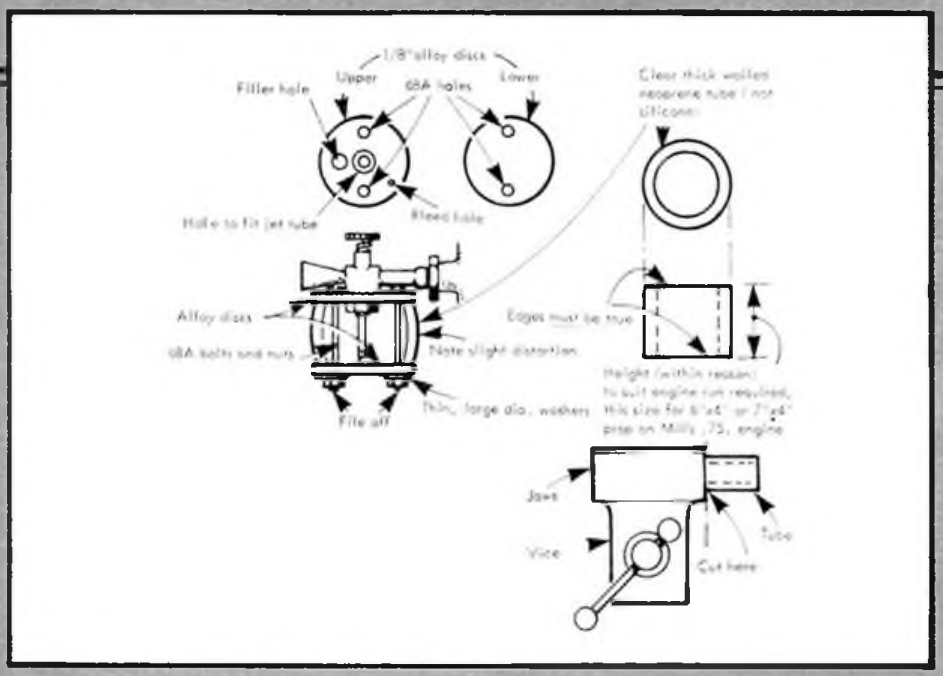
Certain types of model use small diameter rolled balsa tail booms. These have the advantage of light weight, (less balsa less finishing material) and can also be more resistant to localised pressure.

The problem of joining such a boom to a larger diameter component e.g. motor tube - can be solved in several ways - this method gives a more elegant joint than many...

Sizes suitable for Coupe d'Hiver model are quoted. Numbers refer to drawings:

1 Mandrel (billiard cue - narrow end) with very soft 1/16in. sheet soaked, wrapped and joined as normal. Rear may be sanded if required.
2 Approximately 6in. of 1/32in. medium balsa, rolled and glued at wide end of boom.
3 End of boom marked radially. Masking tape wrapped around 5½in. from front edge. Boom is sliced into eight sections - 5½in. long. Boom is removed from mandrel.
4 A former is made and pushed onto the mandrel the boom is replaced and the sliced strips are splayed out around the former and glued in position. Filler strips are cemented in place to complete the conical shape.
The masking tape is then removed and the boom finished as required.
5 Detail of finished boom section.

The method of fixing the boom to say, a motor tube can take the form of a glued-in plug which can then become part of a fixed or removable two part fuselage unit.

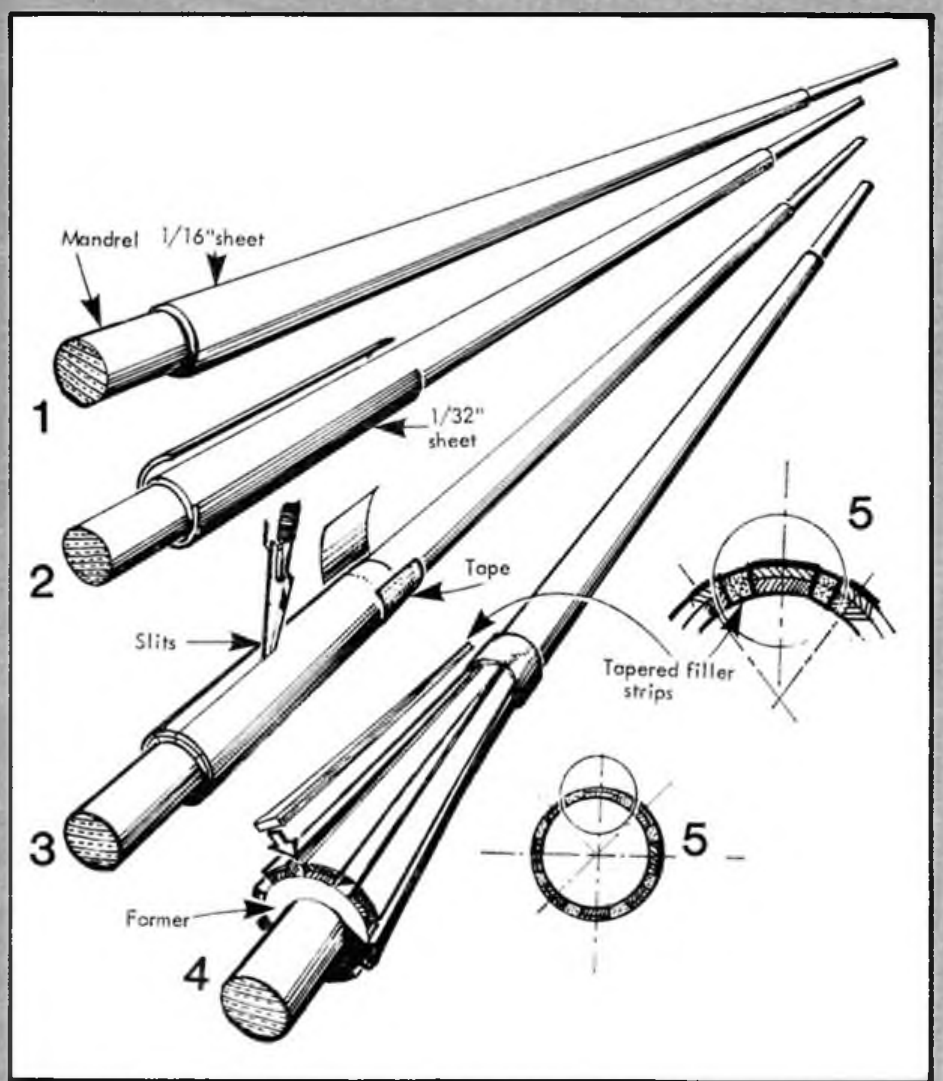


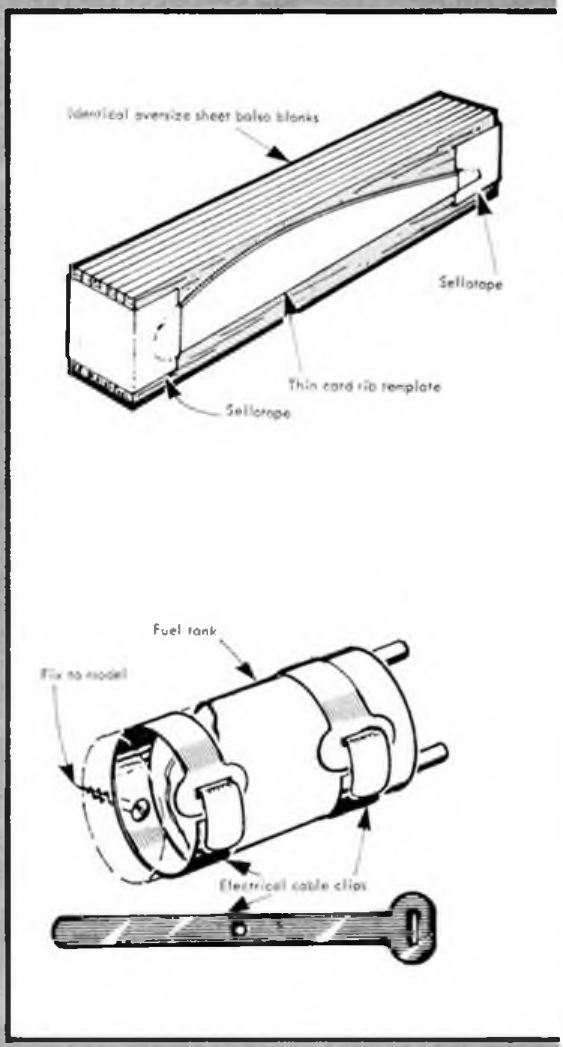
Tanks for Mills .75
E W Clarke — Sunderland

Over a period of time the integral fuel tanks on the ever faithful *Mills* engines may be lost or damaged. This idea from Mr Clarke enables a neat replacement to be constructed.

It would be ideal to get the 1/8in. aluminium alloy discs turned in a lathe but an accurate shape is not critical, so sawn and filed shapes are acceptable - even square! The large bore *neoprene* tubing is normally available from DIY shops. An accurate cut on the tubing is important and Mr Clarke recommends cutting with a razor saw, using the edge of a vice (see diagram) as a guide.

The tightness of the 6BA nuts/bolts clamping the tubing is fairly critical - too loose...leaks, too tight...leaks - but correct assembly is not difficult to achieve. If you have persistent leakage the seal (and 6BA bolts) may be sealed with rapid set epoxy.





Quick rib...
P A Scorey — Harpenden

Two tips from Mr Scorey...both fast and convenient to implement: A quick method of cutting out a limited number of identical ribs can be achieved by the following method.

From thin card cut out a pattern rib and attach it to the required number of identical, oversize, rectangular pieces of sheet balsa with *Sellotape* (at the ends). Roughly shape the rib with a razor saw. It will be seen that at this stage the pieces are still held together at the ends despite having cut some of the *Sellotape*. Now get it to the vice and finish the shaping with a small plane, file or sanding block making sure not to cut into the cardboard.

Cut the ribs to the exact length and by so doing the finished ribs automatically release the perfect shape(!) and bear no pin holes.

Quick tanks...

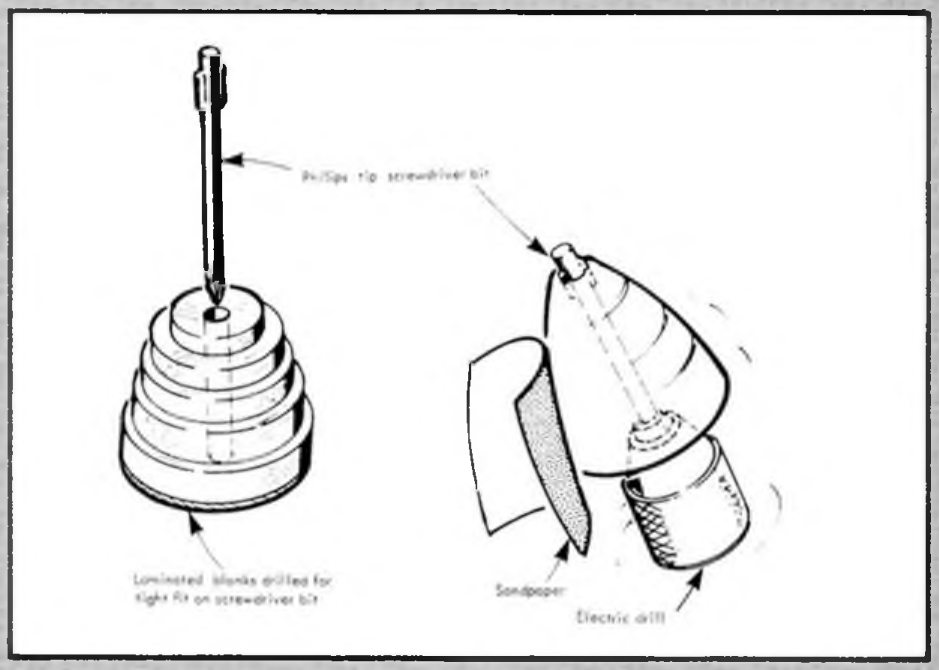
A fuel tank can be held in position and released at any time by the use of electrical cable clips screwed or pinned to a fuselage member. There must be countless other uses for these clips in aeromodelling...

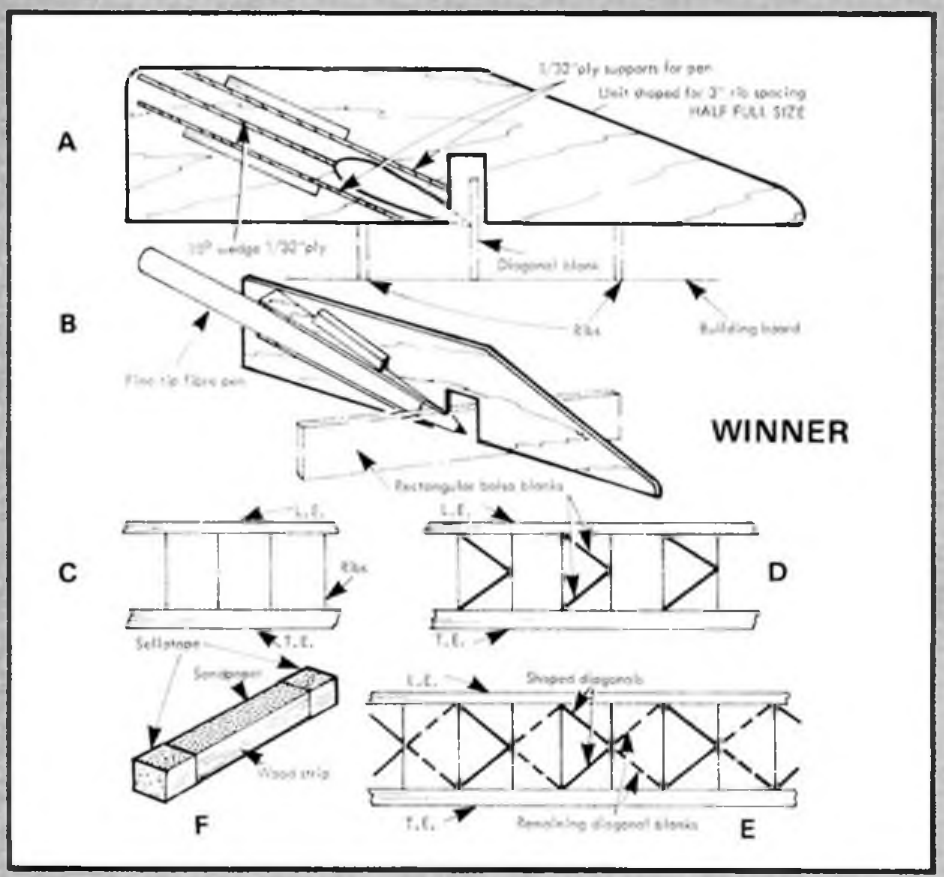
Simple nose cones
J A Munro — Troon

This idea will produce neat symetrical nose cones time after time. You will need an electric drill and a screwdriver bit from those multi function tool kits that have one handle and a selection of screwdrivers, bradawls etc. The cross-head or awl are best. These 'bits' have a key at the base to stop them rotating in the handle.

First prepare your nose block blank from approximately round laminations of balsa (the grain going in a different direction on consecutive laminations). A lamination of 1/32in. ply at the base will assist accurate seating especially if you may need to use packing to provide side/down thrust later.

Drill a vertical hole through the centre of your blank to be a tight fit round your 'screwdriver bit', push this 'bit' firmly through the hole so that the 'key' is forced into the balsa. Mount in your electric drill (preferably mounted on a stand if you have one) and apply coarse, medium and then fine sandpaper - hey presto!... one more perfect nose block! This same method may be used for wheels or cowls...





Easier 'girder' construction
C R Plant — Cleveland

Warren Girder and Union Jack geodetic structures in wings and tail planes can be quite difficult to build, especially for tapered planforms, where plotting the diagonal sections is particularly tiresome.

Here is a gadget that makes this type of construction 'a piece of cake'. The device itself will take a few moments to construct and is shown in 'A' and 'B'. Now follow these simple steps...

1 Lay down the leading and trailing edges on the plan and fit all the normal 'front to back' ribs ('C').
2 Fit and glue balsa rectangles in position in alternate bays as shown ('D'). The bottom of the rectangles lie on the plan and the tops stand proud of the 'normal' ribs at maximum thickness.
3 Mark the diagonal rib profiles on the rectangles using the gadget shown in 'A', 'B', as follows: First fit the pen into the channel so that the top lies in line with the straight edge of the slot. Place the device on the wing such that the slot straddles one of the diagonals and the straight edge rests on the 'normal' ribs on either side. Finally mark the profile on the diagonal by moving the device along the ribs keeping it parallel to the leading edge - but moving across so as to keep the pen in contact with the diagonal.
4 Repeat for all the diagonals and then cut along the marked lines with a sharp balsa knife. If the wing is undercambered temporarily remove the wing from the building board and repeat the procedure on the underside.
5 Fit rectangular diagonals to the remaining positions ('E') and repeat procedure from 3) above.

Note: it is important not to fit all the diagonals at stage 2. as this will make it impossible to traverse the rib profile completely due to interference with adjacent diagonals.

6 Finally line up spars with slots cut in the 'normal' ribs, and cut appropriate slots in the diagonal ribs to suit.

Another dodge to further improve the above system is the sanding block shown in 'F'. Mr. Plant usually uses one of 1/2in. square section and about one inch longer than the 'normal' rib spacing. The *Sellotape* at each end stops your normal ribs being sanded but enables the diagonals to be sanded to perfect shape using the two 'normal' ribs at either side as guides.

If using this last idea, cut your diagonal ribs very slightly oversiz (just above the marked line) to enabl sanding down to exact shape.

FREE FLIGHT SCENE

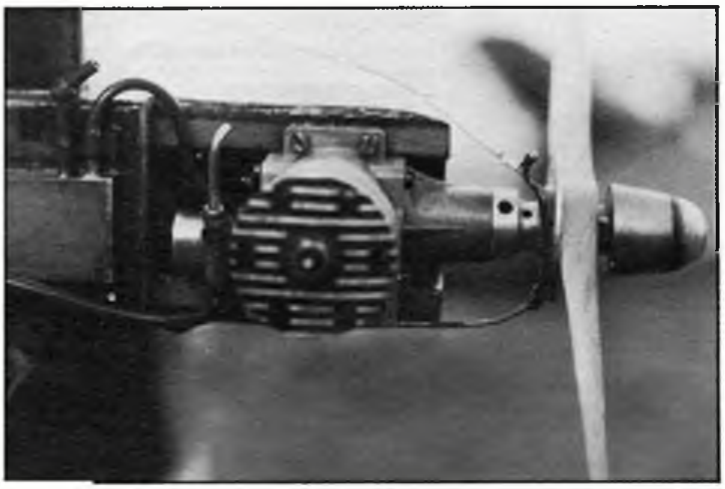
Prop Brakes... Flood Off Systems

Following on from last month's brief explanation of VIT we move on naturally to flood off systems and prop brakes...

Flood-Off: the modern racing glow motor works best and in some cases only, when fed with fuel under pressure. There are numerous ways of pressurising the fuel feed - bladder or pacifier tanks are simple and were quite popular a few years ago. However, by far the most usual now is to take a tapping off the crankcase and connect it to the tank thereby using crank case back pressure to do the job.

This of course necessitates a hermetically sealed fuel system - ie: no open vents otherwise fuel will be squirted out and the motor will not be pressurised. So the pressurised set-up works - now how do you stop the motor cleanly. Squeeze the fuel line and there is every chance fuel will still be 'pressurised' past the restriction and even if it isn't the cut-off is usually a slow strangulation at best.

A way around this was to just release the fuel pressure somehow by releasing a clamped tube vent to the tank. This effectively returns the set up to a non-pressurised arrangement and certainly the motor stops eventually. But far better to use this vented fuel and deliberately aim it into the air intake of the motor. Thus the pressure is released by venting raw fuel straight into the air intake. Flood-off!



Left, a prop brake set-up on a K&B 40 - here in released position. The brake pad is a thin sliver of cork that rubs on the aluminium disc mounted behind the propeller.

The motor stops very quickly indeed and the fuel feed cut off can be dispensed with as with every revolution, another squirt of fuel is injected into the air intake - there's no way it can run even *with* a fuel feed. It is important however, to ensure that the pipe into the tank that connects to the flood-off nozzle is always in contact with fuel in the climbing attitude just like the fuel feed to the venturi has to be.

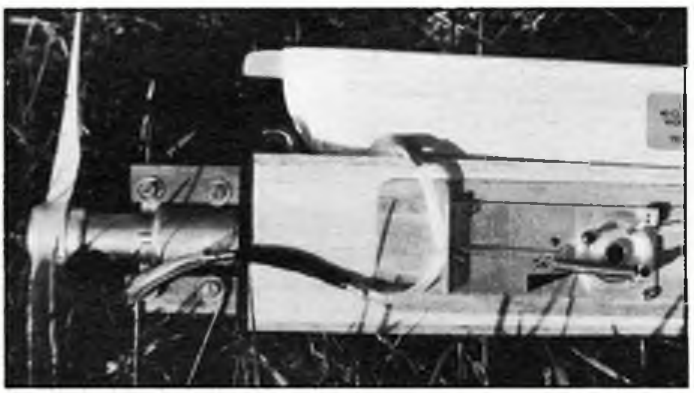
So the motor stops dead with flood-off. Well, it always used to but in the last ten years or so as rpm began to rise dramatically, a typical good FAI Motor might be pushing 30000 rpm at the end of the climb, so the inertia of the prop and moving components of the engine are sufficient to run the motor on quite a few turns...

On a seven second run that can be half a second of burble - either an over run or a waste of the power run. Hence a brake is applied to the engine coincident with flood off. There are units available to fit most 2.5cc FAI motors but here I have illustrated a simple system you can make yourself (Fig 1). The photographs show a K&B 40 with an aluminium plate clamped between prop and driver. The brake pad is a thin sliver of cork glued to a small metal plate which in turn is soldered onto a 16swg wire spring clamped to the engine bearers.

In the released position (as you see it in the photos) the spring effect allows the cork brake pad to exert a considerable pressure on the brake disc. You will notice that further revolutions of the engine will tend to encourage the pad to bite rather than be pushed away. For the period while the engine is required to run, the free end of the spring is pulled back so that the pad does not interfere with the disc.

The actuating line in this case is a length of multi-strand control line wire as it has to exert a considerable pull to overcome the spring effect and any elasticity would pose a problem. The other end of this line connects to a pivot arm on the face plate of the timer along the same lines as we illustrated last month for VIT. Once again the moments of inertia should be kept in mind as the torques involved here are considerable...

Keep the arm that tucks under the face plate as long as possible and the leverage of the actuator line about the pivot as short as possible, to minimise load and drag on the timer disc. With care one actuation arm on the timer can do both the flood-off and prop brake functions.



Left Ken Smith's clever 'quick DT' facility on his Slow Open model. Note slot in plate and actuation arm top right and 'strangled' fuel line.

Although my diagram shows a long rubber tube connecting the tank to the engine flood-off point, it is recommended that as *little* flexible tube as possible be used. Far better that, for as much as possible of the route, the fuel should be in brass tubing and that goes for the engine feed too. Rubber tube is prone to split and puncture. Such damage will cause very erratic running on a pressure feed system!

What is more, it is *vital* that the fuel is injected accurately into the air intake and therefore the last few inches at least will need to be brass, as it will be necessary to secure that end *firmly* to the engine. In the photo's it is actually impossible to see the flood-off tube at all, as it comes through from the other side of the fuselage and is routed directly into the rear intake of the K&B where it can never be knocked out of line. Front rotary induction motors are a little more difficult but at least you have the prop blast to assist in force feeding!

Slow open — Instant D.T. system: The rules for Slow Open do not allow V.I.Ts, flood-off or prop brakes. However, with a little ingenuity you can use some of their principles to effect a very useful quick DT system. As mentioned last month VIT facilities can allow the use of an almost immediate DT off the top of the power climb which is both safer for initial short run

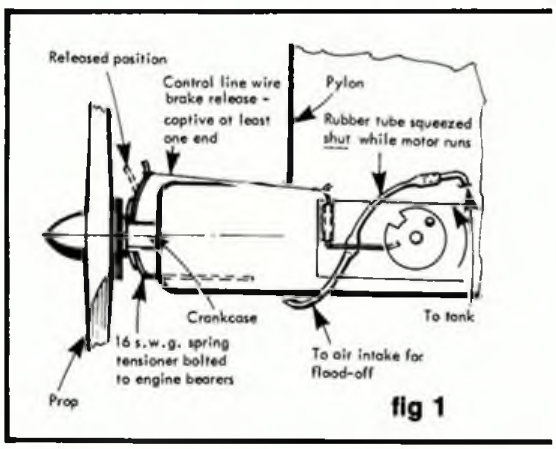


fig 1

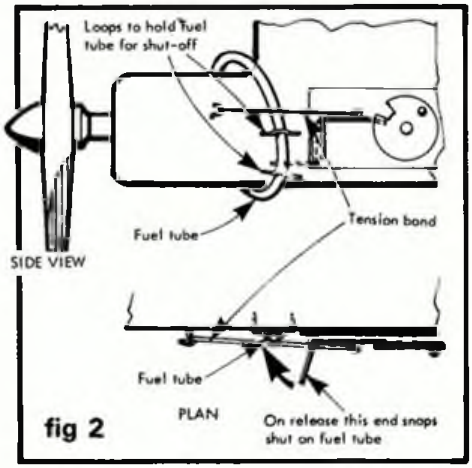


fig 2

flights and very convenient for trimming the power phase on a windy day or in a small field.

You will require a disc type timer system with a releasing lever rather than the conventional squash off.

It is then a relatively simple matter to arrange a form of mouse trap device released by the timer plate in the same way as the VIT lines were released in the full system. This, can then trigger a snap shut squeeze-off on a convenient soft portion of the fuel feed system. Of course the springing of this snap shut device must be quite powerful if it is to reliably shut off the fuel feed (fig. 2).

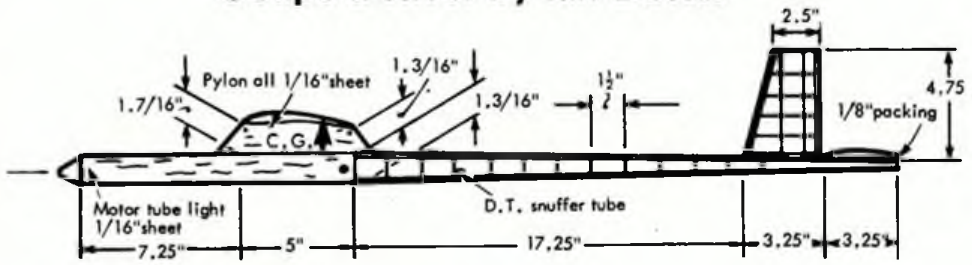
A rather novel alternative idea is shown in the photographs of Ken Smith's Slow Open Power model. The disc with slot and arm to actuate the DT (a few seconds after fuel shut-off), are top right on the faceplate of the modified camera timer. A coil spring is attached to one of the knobs on the disc. As the timer runs and the disc revolves and the spring remains slack... fuel is allowed to the motor. Just before the DT actuates, the spring is tightened and this strangles the fuel line by way of a wire loop which passes out through a vertical flange in the end of the timer faceplate, around the fuel tubing, and back again. The disc has a stop so that it cannot revolve past this pointof maximum tension, otherwise it might be possible for the motor to run on...

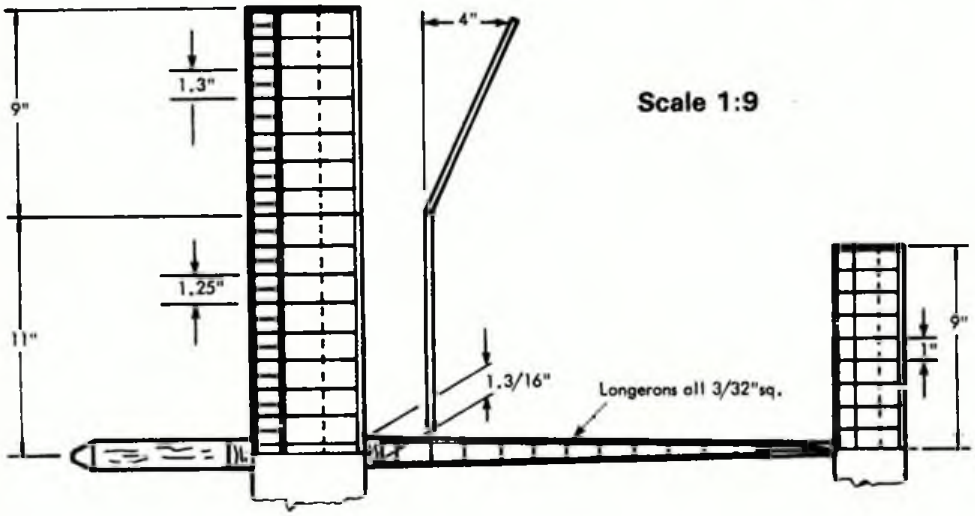
Thrust Races

Fliers of rubber powered models will be pleased to hear that Tim Gray is producing his thrust races again. They are available in three sizes: for 16 swg, 14 swg and 1/8in. shafts. This latter version having eight balls, the smaller two sizes having six. In my experience, Tim's races appear to be about the toughtest, smallest and lightest available, that will do the job reliably. They are available from him at 29 Stockingstone Road. Luton. Beds. LU2 7ND. The 16 and 14 swg units are £1.50 each the 1/8in. size is £2. Cheques with orders, plus 20p postage and packing per order.

It should be understood that these are limited quantity production runs - there will doubtless be plenty for everyone eventually but please do not order *too* many of each size, on your first order, otherwise delays for everyone will result. One more plea. If you are enquiring from abroad - particularly if you live in another time zone - please calculate the time in England, before you phone him. Last time he produced these

Coupe d'Hiver by Ian Davitt



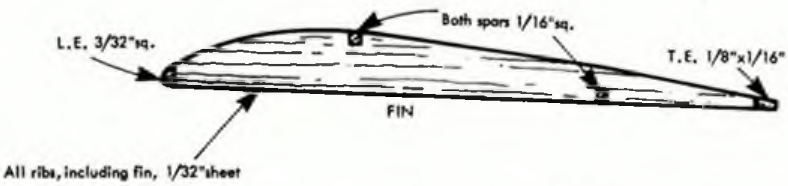


Scale 1:9

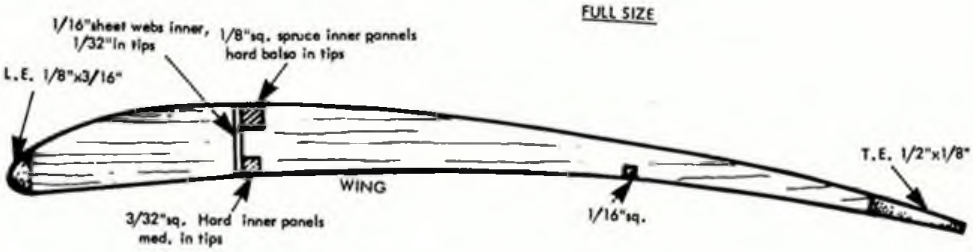
DATA

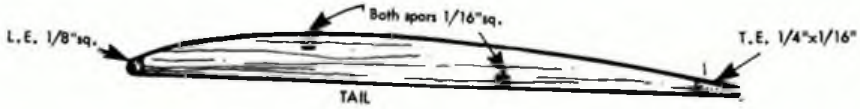
Weights	Fuselage	25g
	Wing	25g
	Tail	5g
	Prop	16g
	Total	71g

Prop: 16½. D × 19½in. P carved from ½in. sheet.
Motor: 6 strands ¼in. Pirelli - 33 sec prop run CG 70%
Warps: All flat but for 3/16in. wash-in on Port Inner Panel (Original model flew left - left with opposite to normal direction prop rotation).



FULL SIZE





races he received telephone calls from as far away as Australia. . .usually in the middle of the night!

Ian Davitt's Coupe d'Hiver

It will be remembered that Ian was the centre of some excitement at last year's Nationals when he won both the Model Aircraft Trophy for Open Rubber and the 308 Cup for Coupe d'Hiver. The performance in this latter class reflecting just how good he had become, particularly in poor conditions.

The model here is the one he used and I have seen it outfly the opposition most spectacularly in even rougher and more turbulent weather. Only recently he appears 2nd in the SMAE Area Centralised Coupe event once again held in strong winds.

Above, Martin Kinder had some success with this ultra short nosed A2 in the early part of the year. On this occasion he flew 'pilot' at Barkston in the 4th Area event glider flyoff and comfortably out performed both qualifiers there!

Ian along with his father Dennis has developed this design over the past ten years, through some dozen or so prototypes. Propeller ideas were taken from John Godden and some further modifications to the overall layout came when he met Tim Gray and myself around '77.

The Davitts had themselves a winning design by '79 and proved it by topping the *Aeromodeller* 80 gram event that year in the most turbulent conditions that I can ever remember prevailing at a contest. Dennis was flying this time, although Ian and his brother were top placed Juniors with earlier designs. (Lovely group photo page 83 Feb '80 *Aeromodeller*!)

This was the Mk 5 Dennis flew, and further mods have been to tidy up detail and increase the wing chord to 5in. - previous models being 4½in. Even with this width the comparatively low aspect ratio gives only 200 sq. inches of wing - about the minimum if a good glide is to be achieved. Certainly still air performance is there - comfortably over 2:20.

The *Benedek* 7406f section is hardly unusual now, but the large amount of wash-in maybe. Ian and I both discovered how this can improve rough weather stability *and* still air performance a couple of years ago and quite independently too.

Otherwise, the model is straightword with dead square wing, tail and fin tips making no concessions to appearance. A flat centre section is not normally favoured nowadays by anyone but the Russians. Like Spooner's model a few months ago, Ian favours a built up rear fuselage although there is a little sheeting to the rear.

The asymetrical fin on the drawing *is* the correct way around as it is designed to induce a *left* glide. This model also turns *left* on the power for no reason other than that Ian is left handed and hence naturally winds up in the opposite direction to usual. Hence the prop revolves *clockwise* and all trim is reversed as a consequence.

There is no reason why the model should not fly just as well with conventional prop rotation and right-right pattern as long as the warps are reversed.

There was a time when Ian persevered with conventional prop rotation on *some* of his models but this did introduce some spectacular confusion. In the heat of the moment at the Nationals some years ago he got as far as launching an F1B wound in reverse! The heave he gave it pushed it out a good 20ft before the prop 'bit' and slammed the model into reverse. I believe he even caught it, but I do know the whole incident was over in such a split second that only he and I witnessed it!

Above, the Falcons secret weapon. Nigel Dilks - timekeeper - he also retrieves, climbs trees and can withstand hours waiting on the other end of a towline even in freezing conditions. Here helping Russell Peers at one of his two glider flyoff appearances this year.

Oxford Rally...23rd June

Port Meadow is situated north east of Oxford and actually *inside* its ring road! Nearly a mile long and perfectly flat grassland it is a mere 600 yards wide and that direction coincides with the prevailing wind. On past occasions balmy weather has boosted entries to record proportions, this year the fresh westerley and promise of heavy showers seemed ominous...

Those that attended had little to worry them however. Organiser Andy Crisp very sensibly reduced the max to keep models - even the ones in lift - on the site, although turbulence still made life very difficult in the early stages and did little to encourage entries particularly in Cd'H.

Just about 2.30pm the sky darkened and brought a long, though thankfully light, shower. After this, much calmer and more muggy conditions lasted through to the finish. Many of the vintage flights then took place, as this was the only class unrestricted by rounds. Hipperson's 'Bazookas' twizzled by successfully three times and Aslett's huge 'Sky Queen' plodded across the meadow on low turns. Both completed full scores along with Ted Hopgood's Wakefield.

After two rounds the max in Mini was upped to two minutes, as models were now safely staying within the bounds of the field and lift, although more general was also lighter. John Cooper dropped a mere ten seconds in A1 and Pete Lumsden did a little less to top Cd'H above another well known 1/2A flyer - Stafford Screen. Stafford damaged his number one model on the first flight of the day when an over energetic heave folded the wing.

A flyoff was required only for Vintage and to limit the chances of unnecessary model loss Crisp once again chose right, when he set a three minute max for this. As it turned out no one quite reached this figure. Hopgood hit poor air after a fair climb and Hipperson who followed with a 'Bazooka' had a small hiccup in the climb and no help on the glide. Aslett who had had to leave early left his 'Sky Queen' in the capable hands of Dave Greaves. Like a good proxy flyer he did nothing rash, once again opting for reduced turns. The run was still very long and its excellent glide was enough to clinch a win.

At first glance Port Meadow might appear an unsuitable site for any sort of free flight contest in rough weather, however Andy Crisp's intelligent CD'ing controlled the event well and produced a real, yet not too risky competition. His prizes were excellent too. Bottles of wine and hand made earthenware bowls fashioned and decorated appropriately by the CD himself. Success or failure for the event was quite obviously of great concern to him. The loosers were those that did not attend...

Results

A1 (8 flew)

1.	J. Cooper	8
2.	D. Wain	8:38
3.	G. Smith	7:28

Coupe d'Hiver (5 flew)

1.	P. Lumsden	8:1
2.	S. Screen	7:41
3.	A. Gibbs	6.39

HLG (9 flew)

1.	F. Sims	2:5
2.	G. Smith	2:4
3.	E. Burge	2:4

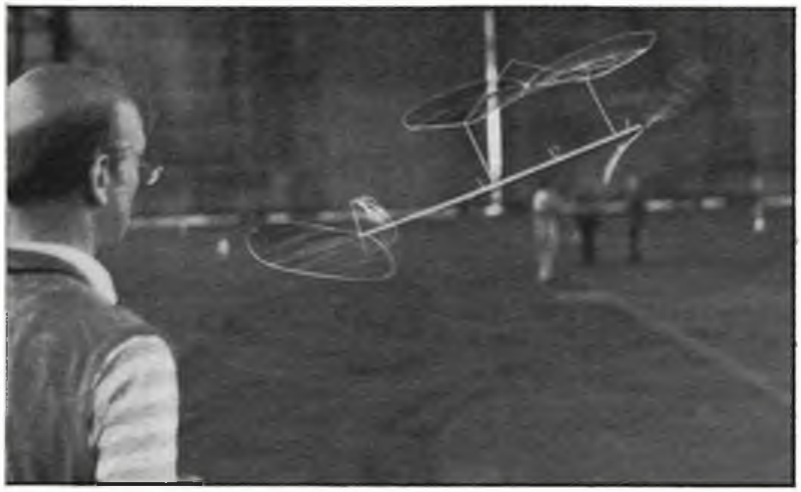
Vintage (6 flew)

1.	B. Aslett	6.00 + 2:56
2.	D. Hipperson	6.00 + 2:26
3.	T. Hopgood	6.00 + 2:26

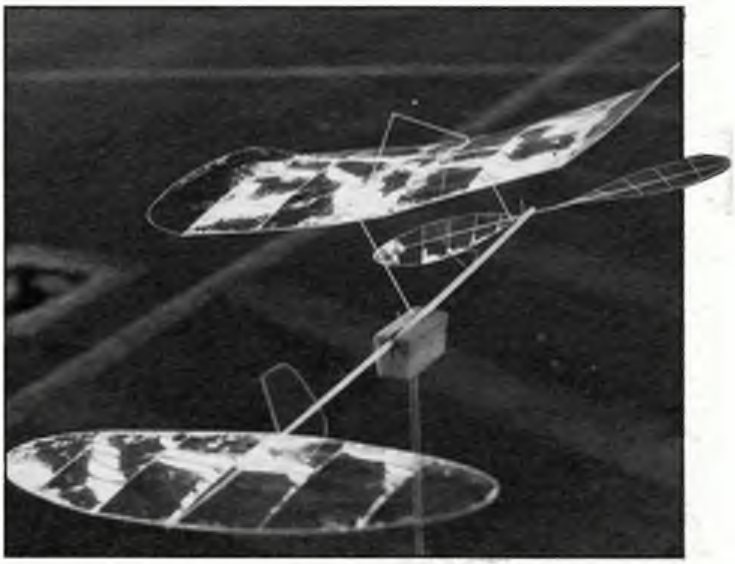
Cardington...30th June

With temperatures in the low seventies °F, EZB fliers were able to approach the 22:23 record and easily eclipse the other competitions in the third of this year's Index events flown for all microfilm classes. What was extraordinary however, was the closeness of the result - surely the nearest thing ever to an indoor flyoff situation.

Results	Cardington
1. R. Bailey	21:08 (94.43% of ahead time)
2. B. Hunt	21:05 (94.18% of ahead time)
3. L. Barr	21:03 (94.04% of ahead time)



Below, Bernard Aslett launches in microfilm - note distortion of tail as it absorbs full torque load of wound motor.



Above, Derl Morley's microfilm model at rest in its stand at Cardington June 30th meeting.

Club Champs
Salisbury Plain...7th July

Phil Ball succeeded in withstanding the pressure of being Chairman of the Free Flight Technical Committee that has so affected his performances this year, just long enough, to show us the most sensational day's Open Rubber flying on record!

Glorious sunshine and almost zero drift all day and into the evening helped create large flyoffs despite the four minute max. (Dave Greaves the CD was all for setting five minutes at one stage!)

A novel experimental glider event run alongside the main classes waived the 'builder of the model rule.' It had been hoped that this might have attracted novice glider flyers 'having a go' with someone else's model. It failed to...and the winners were the usual seasoned veterans, although Pete Watson did get into the flyoff using club-mate College's A2.

Numbers in power, the first flyoff of the main events, had been a little curtailed by the large max - even Screen having a lucky one, off a mere 4 second run! It was he who flew first, into buoyant air, his red and white model making best use of it, with wide sweeping glide turns of sometimes as much as two minutes duration.

Harris launched one minute later, was lower but had a large more boldly coloured model. He was also in the lift. Screen's eventual 13 minute DT and near 17 minute flight was right on the margin of visability. Harris had drifted more slowly and DT'd a little later to clinch it. Incredible flights...

Rubber assembled 13 participants and on reflection the good conditions could have changed little since the power flights. Most seemed to launch into slightly rising air - the ideal day for slow sink models!

Peers had one; a very new and neat 400 square incher and he launched it first. It was high and gliding very steadily almost overhead. Most of those that followed, looked to record a little above still air times. A perfect example being Phil Uden who had qualified with an F1B and continued in the flyoff with one. His flight of 3½ would suggest a little help but not much.

By now most had flow and were down. The sky was clear except for Peer's model a mile away and still at considerable height. Ball had qualified earlier with a conventional sized model but extraordinary flights. In the process he had exceeded an hour air time...

His first max refused to come down in much under a quarter of an hour and his second was a pin prick in the bottom of a cumulus cloud right overhead for over half an hour, eventually landing at 42 minutes. This was chased and retrived! His last flight was a mere six minutes.

For the flyoff it was obviously time for the 'big taper model'. He launched with three others towards the end of the round. Apart from his, the best of this bunch - John Bailey - cleared 8½ but Phil needed a great deal more than this to win as Peers' model could *still* be seen at a good height.

The tapered aeroplane was comfortable after its two minute plus run but not in anything like appreciable lift. It glided away very slowly losing no height. When at the end of the flyoff period the hooter sounded, Peers' model was still airborne and still high...landing some six minutes later at a staggering 21:37.

Ball's model was still at climb height - a mile downwind and clear even to the naked eye...giving no signs of descending whatever (he had done about 12½ when Peers' landed). Phil's flight then continued, hardly drifting, hardly dropping and was eventually seen down clearly at 28:25 - the longest *SMAE* Open Rubber flyoff in history!

The last flyoff, getting started well before the rubber models were down, gave the third win of the season to Fantham. His fine time, when compared to his opponents, would suggest that his towing and thermal picking ability is getting very sharp indeed.

A quick glance at the results was enough to show that Biggles had won the Club Champs honours, but credit must also go to Falcons who because of unavoidable absenteeism in their ranks had to depend solely on one man and *still* placed 2nd. Peers continuing undetered after a 4th in his main class of power - to make the glider flyoff - and produce the second longest rubber flight.

Results (Main events flown to 4 minute max)

Open Glider (25 flew . . 11 flew-off)		
1. M. Fantham	Richmond	12:00+5:30
2. J. Cooper	Biggles	12:00+3:27
3. C. Sharman	Bristol & West	12:00+3:20
4. I. Lee	East Grinstead	12:00+3:15
5. C. Edge	Crookham	12:00+3:08
Open Rubber (24 flew . . 13 flew off)		
1. P. Ball	Grantham	12:00+28:25
2. R. Peers	Falcons	12:00+21:37
3. P. Chapman	Freebirds	12:00+13:30
4. J. Bailey	Biggles	12:00+ 8:39
5. I. McDonald	Biggles	12:00+ 8:09
Open Power (15 flew. . 3 flew-off)		
1. P. Harris	Birmingham	12:00+17:57
2. S. Screen	Birmingham	12:00+16:54
3. J. Bailey	Biggles	12:00+ 2:53
Experimental Open Glider (no builder of the model rule)		
1. C.F. Williams		9:00+4.35
2. J. Cooper		9:00+3:34
3. M. Fantham		9:00+3:03
Club Champions		
1. Biggles - (Cooper, Bailey, Bailey)		
2. Falcons - (Peers, Peers, Peers)		

OTHER RESULTS

Crookham Gala, Beaulieu...30th June
Results

Open Glider	
1. P. Bayram	9:00+11:20
2. C. Sharman	9:00+ 8:33
3. C. Edge	9:00+ 4:35
Open Rubber	
1. N. Lee	9:00+8:22
2. N. Marcus	9:00+7:57
3. J. Carter	9:00+4.56
Open Power	
1. J. Hopper	9:00+6.35
2. S. Screen	9:00+6:20
3. R. Peers	9:00+4:25
FAI (Combined classes)	
1. P. Bond	15:00
2. G. Madelin	14:50
3. C. Edge	14:35

SMAE Senior Champion positions after 9 events (up to and including the Club Champs)

1 D. Hipperson	25pts
2. P. Harris	13pts
2. S. Screen	13pts
4. R. Peers	12pts
4. A. Jack	12pts
6. P. Ball	11pts

ADVERSE YAW!

A regular, irregular view on the world of aviation from Ron Moulton...

NEWLETTERS are like a combined expression of all the senses within a Club, they reflect the sight, hearing, touch, taste and, of course, are the voice of the activity. A dull newsletter never survives, the bright ones seem to go in two or three year cycles which is normally coincident with the editorial enthusiasm.

Above, above right, thirty years ago? Seems hardly credible that the Druine Turbulent's first visit to Elstree was back in 1955 when Harold Best-Devereux demo'd the designer's own original and so set many a home builder on their way to economic aviation. Here's Harold with our own free flight scale model of the Turb, – still in popular demand through plans service as FSP613 price £3.00 plus 40p post and packing.

It's a thankless task in almost every case. Material has to be gathered, rarely comes voluntarily and the collation is a labour of love. I enjoy reading every line of all the newletters we receive because they give a grass roots feeling of how the activity is running in the home country as well as overseas.

It's surprising how many highly original ideas come out of this source. For example, would you believe that we have to look to the Maxecuters of Washington D.C. in the U.S.A. of course, for the proposal that there should be a Spitfire Commemorative Event in 1986? The Maxecuters announce in their newsletter that they will sponsor an international contest on the basic rules that any group of at least five individuals would be eligible to hold a local event and any specific individual can only fly in one event...

All the models have to be rubber powered scale of any mark of Spitfire and the groups are free to create their own detailed rules to determine their winner. Then for each event a group photo of all the planes and their builders has to be sent in to the Maxecuters to be eligible, and there should also be a good quality pic of the local winner.

Naturally, all of these will be published in due course in the *Max-Fax Newsletter*. The start of the event is March and it will run through to the end of July next year but results have to be submitted, wait for it, no later than September 15th 1986. The rewards? Well each local winner gets a free years subscription to a very fine Newsletter.

There, the gauntlet is down lads, the Spitfire was British wasn't it? Then how come we've let the Yankees take over! They could so easily have chosen any of their fighter contemporaries of the 35/36 period but I guess the beautiful shape of the Spitfire has eclipsed the opposition.

What wonderful years 1935/6 must have been if we're to take note of all the 50th anniversaries. Tiger Moth, Dakota, Hurricane, Me 109 as well as the Spitfire have all been publicised this way. Boeing's Model 299, the YB-17 should be included, also the Catalina and Lysander. Each of these legendary types is safely preserved and so too are the Taylor (Piper) Cub, Bücker Jungmeister and variations of the Pou de Ciel or "Flying Flea" which celebrate their half century.

There were quite a few unmemorable types emerging from the hangars of that time, – and some beauties like the Short Empire Flying Boat, the Fairey Feroce and Bristol Blenheim. If elegance were to be the arbiter for celebrating the mid 30's then the Luscombe Phantom and Chester Jeep would take my personal accolade.

Around that time a keen 16 year old was fresh out of College and working with Latimer-Needham at the Luton Aircraft Company. Inspired by his first air experience in an Avro 504, he went on to fly with the famous, to pilot almost 200 types and to become a highly qualified aero engineer of international respect. Sadly, that most total aviation person, our old friend Harold Best-Devereux died following a sudden illness on 28th July.

Our connection with H. B-D goes back to the first meeting of the ULAA (Ultralight Aircraft Association) where Harold was extolling the virtues of French designs (except those with incomplete, spring-loaded rudder circuits which he abhored) and his tenacity was ultimately rewarded (if that's the right expression) with the Chairmanship of the Popular Flying Association.

It's now just 30 years ago when we modelled Roger Druine's own Turbulent which Harold "borrowed" to boost British interest. To see what could be done by Harold with a mere VW engine at that time was an inspiration that led to Rollason's production line at Croydon. Independants first bought a full set of plans at only six guineas a set! H.B-D's aplomb, and dry wit made him a favoured speaker. He could recall devastating experiences and convert them to both entertainment and education. Ever a devotee of Henri Mignet, Harold became an authority on the Flea and all the later derivatives. He was an ambassador for Britain when among the EAA enthusiasts, especially at Oshkosh when a bowler hat and rolled brolly seemed perfectly natural to his bearing and true-blue accent.

Yet he could equally adopt the bright yellow baseball cap and zipper jacket to fly his Wittman Tailwind G-BDBD. Honoured in his own time by French, U.S.A. and British organisations, H. B-D's encyclopeadic knowledge is irreplaceable. Many a modeller has cause to appreciate his

generosity with information for scale modelling. His was a very full 50 years of aviation experience. Our sympathies go to Helene and their son and daughter.

Yo,— Yo, — Ho!

We get all manner of requests. Among a recent patch was a plea from Chester Smith out there in Wasco, Oregon, U.S.A., for info. on a military observation type called the YO-50. He saw one at Sheppard Field, Texas back in 1941 and wanted to make a model of it at the time but there simply was no information. The description was radial engine, tandem open cockpits, long fuselage, long landing gear, very slow flight due to the wing slots and flaps. To cut our exchanges of correspondence short, Chester has exhausted the references we were able to give him and is still on the chase for this ideal subject for scale modelling.

He located details of the Ryan "Dragon Fly" YO-51, which fitted the description admirably. There was a 3-view in "Model Airplane News" of March '42, a description in "Aviation" and plenty of photos. But Chester also wanted data on the YO-50 which we could tell him was a Bellanca type. and he eventually located a photo and data of this remarkable subject for flying scale. Big glazed cockpit, Ranger inverted Vee engine, simple undercarriage, big span fully slotted across the leading edge and adequate tail surfaces on a square section fuselage would make it just right for any kind of flying scale model from CO_2 through to large scale R/C.

Does anyone out there have the drawings? Wright Field photographed it in 1940. Chester obtained some operating instructions out of the Air Force Museum, sufficient to make the appeal even greater with statements like "Take off speed 30.5mph" and "Ground run 130ft". So where, oh where does one go to for the rest of the data to get a decent replica into the air? I'd be only too pleased to forward the info. to Chester. Maybe we could start a Bellanca mystery type revival?

The dear old Desoutter is emerging as a new favourite, it's a news item in the Shuttleworth Organisation where one last remaining UK registered example exists in pieces and is currently being restored by members of the Society. The chunky proportions make it perfect for scale, even if it is a little ugly but the simplicity tends to compensate. By strange coincidence, it's featured in the *Scale Staffel Newsletter* this month all the way from San Diego, California, where Walt Mooney, Bill Noonan, Bob Peck and Co. have the best possible eye for good subject matter.

Spreading the wings

When the Ace of R/C gliding, Rolf Decker demonstrated his extended wing, multi-purpose glider for F.A.I. events at the World Champs in Australia earlier this year, he opened up many a new thought and reminded a few of us of things gone past. The French were always a whiz at producing one-shot prototypes with features like extending leading edge and trailing edge chord expanding wings and the Makhonine made history in its time for its extending wing span. The designer came out of Russia with engineering qualifications and got into aviation in the early 30's...

He produced a monoplane for an equally experimental Lorraine 12 cylinder "W" shape water-cooled engine and the wing was made so that the outer panel could slide inboard and inside the main centre section. First test took place in '31 but it seems the Chief Pilot at the time changed his interest and others took over in the subsequent couple of years. Nothing more was heard so that one has to suppose that they ran out of finance and maybe a little structural integrity. The difference is that Decker's wings slide inboard with the outer panel acting as a sleeve over the inner, - must make for much better solidity where it matters most.

Low speed aerodynamics

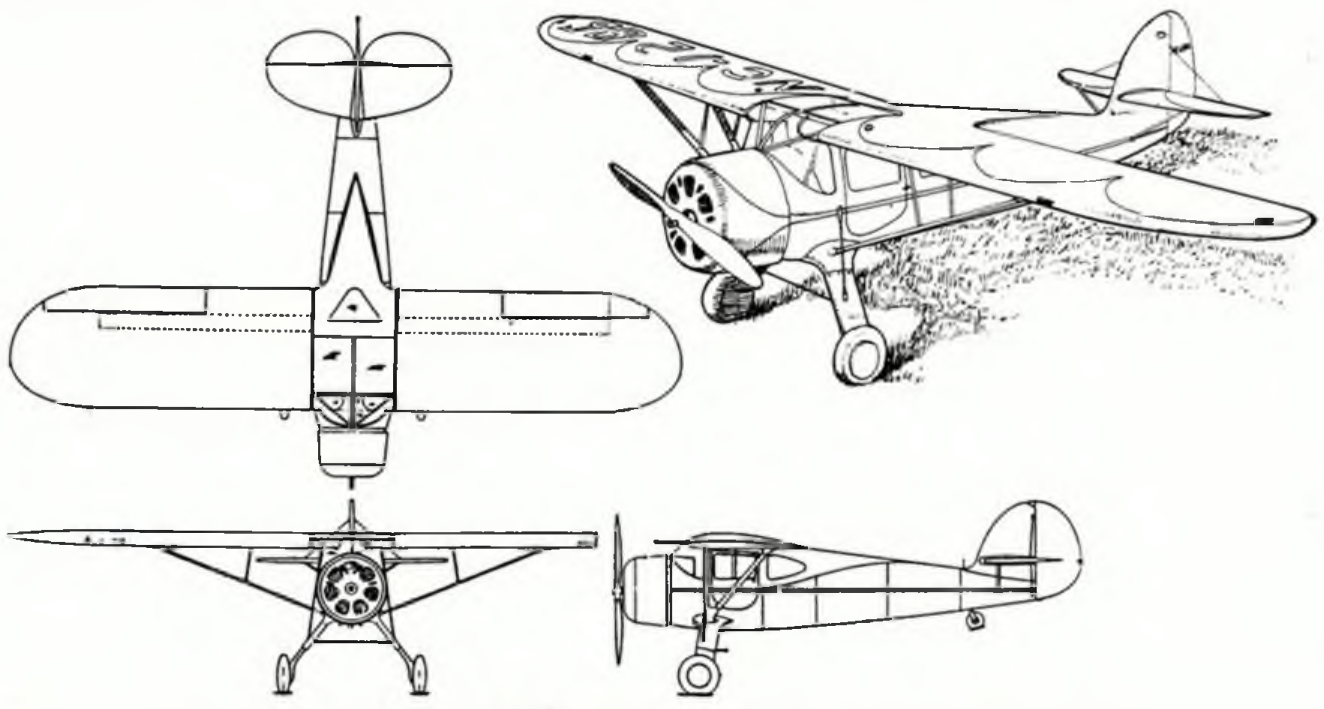
The Royal Aeronautical Society has announced its invitation for papers to be submitted for an international conference taking place in London 16th and 17th October, 1986. The objective is to exchange views on research results and problems with low-speed flight covering RPV's, gliders, man-powered and microlight aircraft, airscrews and naturally, model aircraft.

The last time we attended anything approaching this was in the days of the good old LSARA when dynamic models were produced from Saunders Roe Laboratories and hydrogen peroxide dry rockets demonstrated in the august surroundings, sufficient to get the chandelier glass tinkling. We don't expect it to go that far, but in the intevening years, the Wortmann Lecture in connection with man-powered flight was a milestone in low-speed aerodynamics education. So we can expect this session to be specially elevating.

Intending contributors should contact the Society with an abstract of no more than 500 words on their proposed paper. The programme for the two-day session is to include lectures by distinguished specialists and as the conference is international, one would hope that the lecturers will come from those great centres of research in the U.S.A., U.K., and Germany. As Paul MacCready has proved through his amazing machines, we've a lot yet to learn about low-speed aerodynamics.

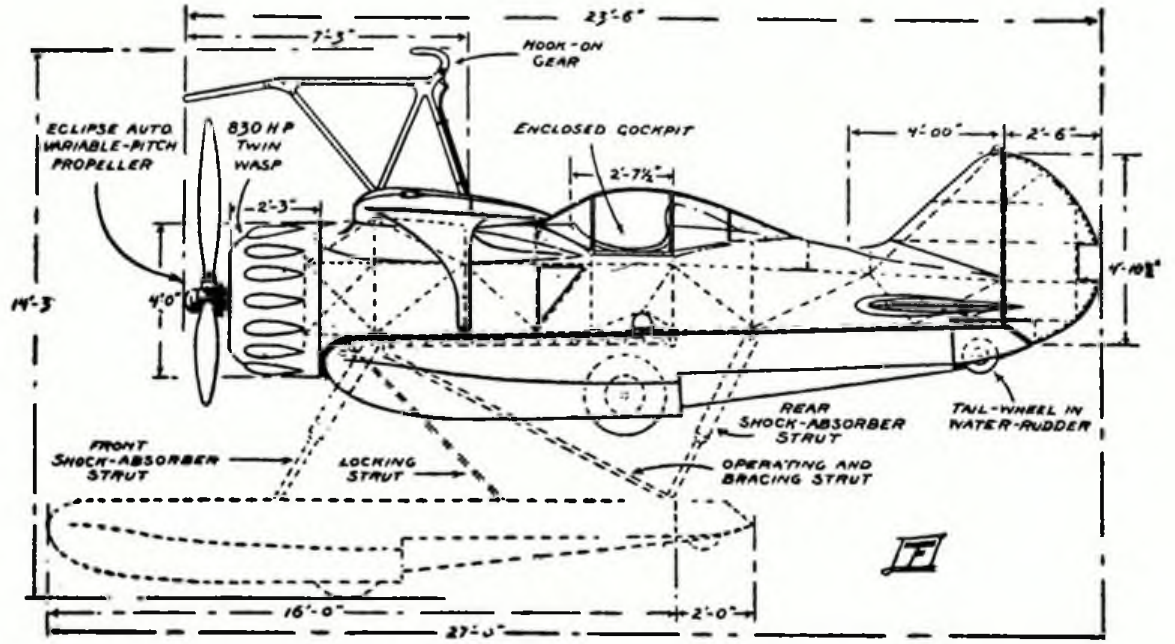
Sadly, a pioneer of this research, Norman Walker passed away in Washington in July. As N.K. Walker, he was a major contributor to *Aeromodeller* along with Peter Paine and Mike Gates and Bob Annenberg. Their papers are still treasured by the theorists. While one cannot change the basic research data, introduction of the computer has brought with it many a new thought on airfoil shapes and wing plan forms, some of which is beginning to rub off in our competition performance models. I only hope that the model enthusiast aero-dynamicists are not going to fight shy and hold back from taking part in this, the first move in countless years, to seriously study a subject so close to all our hearts.

Factory drawings of the elegant Luscombe 'Phantom' and a very neat sketch from the DC MaxFax newsletter put out by the DC Maxecuters. Included in their May/June issue were plans for a Brown CO_2 25 inch design by Rolfe Gregory. The 'Phantom' was way in advance of all contemporaries but paid the penalty of incorporating a fancy flap and the first serious attempt at reducing landing gear drag. 22 were made, a few still survive, approaching 50 years old.



The New Eaglet

For Bill Barnes' fans who were mystified by the wrong side view in last month's 'Adverse Yaw', we hasten to correct the omission with this drawing. Note the retracting amphibious landing gear, hook for airship operation and curvaceous lines...all from 1935.



Refs; *Nax Fax, 20008 Spur Hill Drive, Gaithersburg 0879, USA. Royal Aeronautical Society, 4 Hamilton Place, London W1V 0BQ.*

FROM THE HANDLE

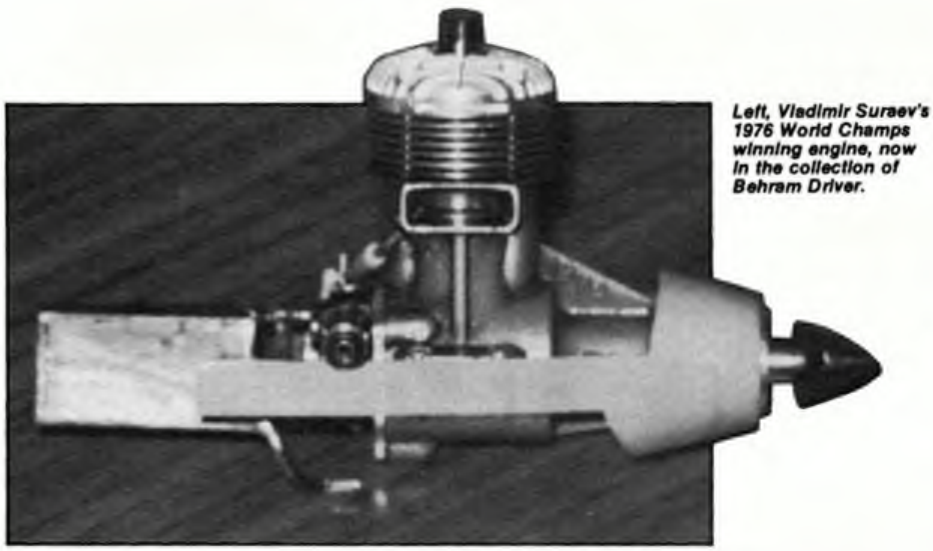
CONTROL LINE NEWS

Racing with Jim Woodside

I am writing this a couple of days after having competed in the European Control Line Champs. I am sure that when the *Aeromodeller* report appears it will praise it as an excellent contest. From my point of view the F2C was a superbly run affair - the result of the effort by a team of about 15 experts in the field. These experts were British.

Now this raises an odious comparative question. If by effort, so much can be done, why has the 1985 domestic *SMAE* racing programme been so poor? Essentially an *SMAE* meeting consists of the same hard core who gave so unstintingly of their time and effort for the Champs. And yet this year has seen the following:

1 Late starts and even later finishes.
2 Some of the lowest entries for years.
3 No semis run in any category
4 In some cases finals not even run - although it must be admitted that the weather has played a wet, chilling part.



Left, Vladimir Suraev's 1976 World Champs winning engine, now in the collection of Behram Driver.

5 Lack of good jury standards.

Having given the matter considerable thought I am of the opinion that it is lack of discipline by both organisers and competitors which has brought this about...

Those contests which are most successful have two common elements: strict, fair application of the written rules and a timetable which is followed. This way those whose responsibility it is to run the competition will grow in experience and confidence. Similarly the competitor learns to fly when he has to; not when he indicates readiness. Some years ago Dave Clarkson and myself, under the influence of the Dutch example, attended some meetings where we deliberately raced a setting achieved in practice days before the contest. Results - something like 90% of optimum at worst. In short, organisers need not be too sympathetic towards pleas for more practice.

The *SMAE* selection procedure for FAI teams already mean that the organisers for F2C exist. They can usually also cope with 1/2A T.R. As Goodyear now has two classes within itself and is run at every *SMAE* meeting then the GY enthusiasts should be looking at providing their own organisers from within *their* ranks. This will spread the load and speed things up. So my proposals would be as follows:

1 That wherever possible the FULL rules regarding rounds and semis be applied.
2 That rules covering pilot and mechanic conduct be always applied.
3 Where only one circle is available no more than two separate events will be flown.
4 When three events or more are scheduled (Open GY and Class II GY, will be treated as separate events), then two circles will be operated, each with its own organiser.
5 A timetable to be drawn up and *adhered* to. Racing to start at 10.30am prompt, with rounds to be run at intervals to ensure that no finals take place *later* than about 5.00pm.

It can be done - I have even run some of them myself. However, it does require a genuine desire by you, the competitor for a better meeting. Ask for it. Better still, offer to help make it happen.

Fessel-Flug: Modell Flugzeuge an der Stahllitze

Yer wot? I said Control-line Flying: Flying models on steel cable. 'Fessel-Flug' is a rare item - a new book devoted to control-line flying. It is written by Axel Jungherz and its 199 pages contain 24 colour shots and 143 line drawings/monochrome photos. I can think of no other publication since Ron Moulton's 'Control-Line Manual' to deal exclusively with the art of CL flying.

Nine chapters deal with basics and then specific current advice on the main divisions of control line activity. Of course it helps to be able to read German to get the most from these chapters...

However, for modellers with some knowledge of the sport, they can still enjoy the book for its illustrations and photos alone.

Fessel-Flug by Axel Jungherz: Published by French-Veriag, Stuttgat. ISBN:3-7724-5390-2

The ISBN should make the book available through most good bookshops. Grant and Cutler, Buckingham St., Strand, London carry an excellent German language section and should be able to supply.

Gillot Products

Tim Gillott's models often show a clean pair of heels (elevators?) to the opposition in U.S.A. racing events, particularly Rat Race and Goodyear. I have personal evidence of the ferocious power of Tim's 15's and 40's. He really can extract the power from a racing glow engine...

For some time Tim has been providing specialist services to the 'go faster brigade'. Specifically these are carbon fibre props, model accessories such as valves and cut-offs and custom engine rework. The important address is: Gillot Products, 22712 Picador Dr., Salinas. California 93909. U.S.A. Phone (408) 484 1692.

Super Collector

Collecting old engines by members of the vintage fraternity is now a familiar activity. However here and there is the highly specialist collector of a single type of engine. Behram Driver has chosen to collect 2.5 team race diesels. What makes this mania all the more remarkable is that Behram lives in Dubai - hardly a centre for T.R. activity. Despite being so far from the racing a nearly complete set of *H.P's/Bugls* has been garnered in, as well as the odd Russian special. The photo shows a prize item reputed to be Vladimir Suraev's 1976 World Champs winning motor.

Personally I am glad that people like Jim Plaunt in the U.S.A. and Behram Driver are prepared to spend time and money in gathering these motors together. The competitive life of a top motor is very short; often ending as cannibalised spares for other engines. While this is understandable from the committed racers' point of view it is often an act which is later regretted. Many years ago, having given up Combat, I sold my *Oliver* 'Tigers'. What a mistake - it took me years to get some replacements...

If you have any T.R. diesels to boost this collection or you just want to correspond the address is: Behram Driver. P.O. Box. 614, Karamah, Dubai. U.A.E.

Stunt with Claus Maikis

Merry Old Merco

Everything comes to Merry Olde England two hundred years later, so I was told. It would be highly interesting to come back two hundred years from now and look at what's happening in Great Britain. Maybe the British stunt pilots will then discard the good old *Merco* 49 and switch to those more modern stunt engines which those Continentals are sorting out today.

In the meantime, there are still enough *Merco*'s around to keep people busy trying to improve the running characteristics of this motor. Outside of Britain - especially the French, have used it with quite some success. Apart from the big names, Yves Fernandez has spent a lot of time working for improvement of the engine. His friend, Armand Kuentz produced most of the parts developed by both of them. Armand is well-known in the Eastern French and West German stunt scene for his superb machine work. A lot of stunt flyers in this Alemannic area fly with his mufflers, shaft extensions, spinners and carburettors on their models. The *Merco* of Yves Fernandex features extensive modifications of which most cannot be seen...

Those outwardly recognisable are the easily mounted shaft extension, the two-ring piston, and the two plug head. Yves reports definitely improved smooth running, with the new head and better compression and cooling with the new piston with two rings.

Armand was kind enough to provide his drawings for the benefit of those stunt flyers determined to enrich their life with a *Merco* 49 for another two hundred years...send an s.a.e. to *Aeromodeller* for the drawings.

Muffler in disguise

If someone is looking for an address in aerobatic control line aircraft design and production, he should knock at Yves Fernandez' door near the City of Strassbourg, France. You'll find him either in the aircraft cellar or in the wine cellar. While his models may not be as world famous as the Alsation wines, they are certainly as admirable (for stunt flyers, at least). Among highly original creations you sometimes find a quite familiar shape and colour scheme. Busy as he is, Yves doesn't hesitate to build an exact copy of another flyer's design now and then. 'Mikado' is one of these aeroplanes...

Those familiar with the French stunt scene will easily recognise Marc Lavalette's 'Panter Mk. 1'. The model was built from Lavalette's plan. That means, shape, dimensions and airfoils are exactly the same. There may be minor changes in construction which don't alter flight characteristics. The purpose of this is to see how other models fly, to learn about the flight characteristics of other flyer's designs, and to decide whether design details of other aeroplanes should be adopted to one's own designs. An excellent idea, and something I'd prefer to do, too, if I'd only be even more crazy and build even more aeroplanes. Maybe as reverence to Lavalette, Yves chose a similar paint scheme. But here's where similarity ends.

Besides the extraordinary finish, two cheek type cowls attract the attention of the onlooker. After removing the actual engine cowl the interior of the fuselage nose is a surprise. A highly modified *Merco* 49 with a home-made muffler. Apart from the clever design the sight of the muffler is a feast for the eyes... The muffler is made from brass tubes and sheet. The curved adapter has a fitted mounting flange and can be screwed to the engine. The other end is connected to the expansion chamber. There are some baffle sheets inside, and a small diameter tube forms the outlet. The tubes are short pieces of *brass* fishing rods. Yves bought only the parts with the required diameter. Wall thickness is thin enough so as not to increase weight too much. All parts are silver soldered. The whole unit is cleaned, filed, sanded and polished in a meticulous manner. For better cooling the muffler has a matt finish. The tank is made with the same workmanship, but highly polished. If you want to clean your teeth and brush your hair on the field, ask Yves to remove his engine cowling...

Yves has made similar mufflers for different aeroplanes and engines. He has never had any problems. Care should be taken to leave enough room between the muffler and the fuselage parts. This allows for better cooling and prevents the muffler burning the insides! With a muffler of this type - the narrow 'elbow' and cowled too - the engine may run a little hotter. Schnuerle ported engines seem to like this. One should be careful with some of the side-ported engines. Some kind of deflector might help lead air to the muffler body. Yves has installed a deflector behind the muffler to force the air *out* of the slots at the *bottom* of the cowling. That way the hot air cannot heat up the tank.

While I don't feel disturbed by the sight of the muffler hanging out 'in the breeze', this surely is a more elegant solution. It certainly helps to keep the noise down a little, too. Has anybody given up fishing lately? I'm searching for some little used fishing rods. Brass, that is...

There are quite a large number of specialised model aircraft books available on the Continent. Some months ago we mentioned some from Poland, that seen here is from Germany - what an incentive to learn another language!

Left, the Rolls Royce of mufflers? Not only is the muffler 'crafted' rather than constructed but the model itself, based on Marc Lavallette's 'Panter', is itself a work of art (see heading photo).

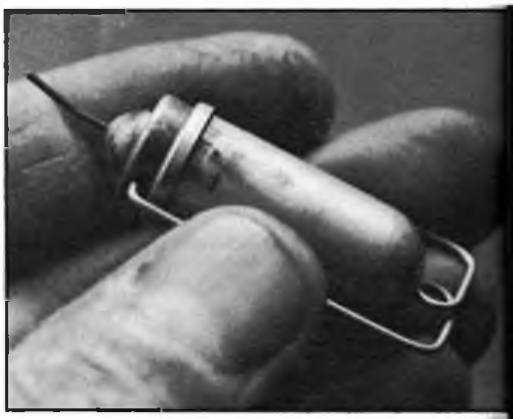
IT IS INTERESTING to note that an article, in the September 1983 issue of the *Aeromodeller*, made reference to a possible reappraisal of the Laws governing the manufacture and use of rocket motors in models.

Compared with the article by Howard Boys, in the July 1947 issue of the *Aeromodeller*, the situation appears to have deteriorated, as far as the modeller is concerned, for Rocket units of the gunpowder type, were actually on sale in 1945 and a firework manufacturer was contemplating the production of ready made units.

During the 1960's certain Rockets were launched, by a team of modellers with fuel, was a result of a financial investigation. It was not in any way as a result of legislation concerning explosives.

Despite the work of *Wilmot and Mansour* the originators of *Jetex* Motors, we still have a resurgent interest in the earliest form of fuel, employed to obtain a jet reaction, 'Gunpowder' whose application to model aircraft is limited. (At the Launch Pad may disagree there ... Ed.)

Surely a much safer and more realistic flight of good duration would be achieved employing motor and fuel of the *Jetex* type.



Right, the smallest of the Jetex units was the 'Atom 35' seen here, note the 'blow back' marks indicating use at some time, with worn washer or weak spring.

Whatever happened to JETEX?

Ken Brothwell looks back at the wonderful world of this miniature rocket motor that many would like reintroduced...

Left, the 'Paaloader' used '100' type fuel and was constructed all from steel, note the 'leaf spring and roller' tensioning system.

Above, this was the standard Jetex '50', aluminium alloy case and used split asbestos washer between collar and end cap.

official sanction, but using a fuel supplied by *D. Sebel* the manufacturers of *Jetex* products. It is quite likely that the use of gunpowder was overshadowed by the much safer, and consequently more successful, development of *Jetex* which eventually suffered a sad fate, for reasons unknown by most people, and whose history I am trying to piece together.

Contrary to popular belief, however, the halt in the production of *Jetex* motor and

This is no way meant to undermine the work of model rocketeers as at present gunpowder is the only available source of power within reach. Indeed, they should be congratulated, for their success with the Health and Safety Executive, but it is a pity so little is publicised concerning the interest that still exists in *Jetex*.

Tip of the iceberg

Certain enthusiasts were lucky enough to be in at the beginning such as J. Wilson who bought one of the first '100' motors with the 'Mijet'. He has just about every motor in the range, as boxed, with spares for flying purposes.

There are still enthusiasts searching for a *Jetex* Motor, ususally a '50', C. Atkins, who has not seen one for 25 years, who considering making one whereas B. Palmer did, using fuel, gaskets and wick for dimensions!

D. Carpenter is a collector, 'Par Excellence', who, unlike some, does not hide his treasures. David has displayed his collection at libraries, exhibitions and vintage rallies. He became interested in the products of 'Wilmot and Mansour' as a local history project, and managed to contact some of the original members of the firm, including Mike Ingram who designed some of the small tailored models such as the 'Voodoo'.

Fortunately, Mike had kept a model of each of the projects, with which he was involved, and with help from others, they have managed to make up quite an interesting display including the prototype *Jetex* motors and one of the original rocket powered drones which *Wilmot and Mansour* developed at Beaulieu airfield during the War.

Naturally, enthusiasts are loathe to part with the equipment and *Jetex* powered models are still being flown at meetings, this being a measure of their commitment to such a power source.

Motives differ as some 'admire the Jet shape', 'wish to fly small scale Jets', 'have an interest in the *Veron & Keilkraft* range',

Left, the Jetex '50c', can still be found in the odd model shop, it had an all steel case and deflector collar. Corrosion is a problem with these - they must be carefully cleaned after use...

such as D. Connely, 'seek a change from CO_2 and RC'.

Many respond to adverts for plans, so the interest still exists, even abroad. I have mentioned perhaps, the tip of an iceberg as there still appears to be a demand for rocket motors of the *Jetex* type. But, whilst the interest in *Jetex* is not dead, in some cases it does appear to be grounded by lack of fuel, wick and spares.

Fuel for thought

When compiling information with respect to weight, duration and thrust from a variety of sources, it is difficult to obtain consistent results. One obvious explanation is that we are dealing with four versions of the fuel, ie original standard, revised standard, redspot, *Ripmax/Sebel* variety and maybe even *Graupner*.

Wilmot & Mansour marketed their fuel in cardboard boxes, *Sebel and Co* used tins but a recent purchase came in a neat plastic case which, I was assured, originated from *Sebel*. This also highlights a problem that may be met by enthusiasts who purchase fuel of unknown origins.

As far as the fuel in my possession is concerned, standard fuel tends to be yellowish brown and is longer than that manufactured by *Sebel/Ripmax* which tends to be reddish brown.

Sebel warned modellers that their fuel and that of *Ripmax* should be used with a coarse mesh gauze and only in motors with a steel main case, the '50C', '50R' and 'P.A.A.', but steel cases were supplied to replace the older ones of Duralumin, and could be purchased separately. Nonetheless, modellers are using *Sebel* fuel, in dural motors, without adverse effect but for how long remains to be seen.

Spares and accessories

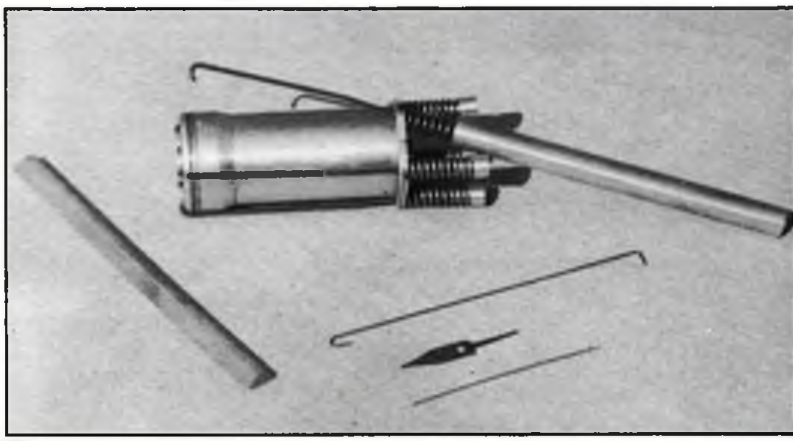
1 Other items which may well ground a motor, for their want, are gauze and asbestos washers. But, considering present legislation concerning the latter, an alternative may have to be found. Auto Engine Gasket material is one possibility.
2 The cleaning stick was presumably of hardwood and is easily manufactured by the modeller, as is the gauze extractor hook.
3 An essential item was the venturi cleaning wire, apart from the 'Jetmaster', which had its own special scraper. such items are essential and were used for resizing the venturi of the motor.

Having access to a Nikon Profile Projector, I was able to check the sizes on the motors in my possession.
This was easier said than done, as the holes were far from round, but then I was using a 50X enlargement! Table I gives the wire sizes required.

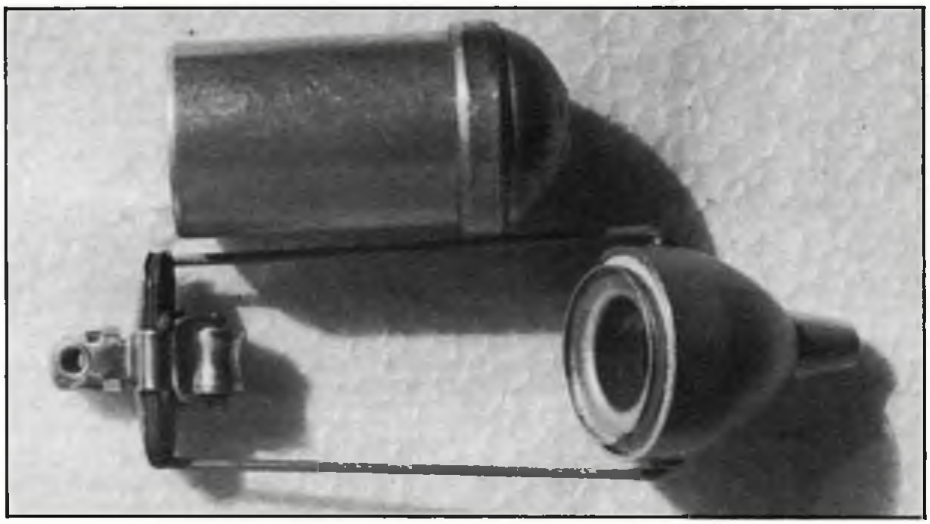
Standard 50 **50C** **35**	**20 s.w.g.**
P.A.A.	**18 s.w.g.**
350	**17 s.w.g.**

Table I

Left, one of the larger units - a Jetex '350' (3.5oz thrust). A very useful unit but as with others of its kind needs regular, careful servicing.



Below, the 'Jetmaster' a very neatly made unit utilising the same tension system as the 'Pasloader' but with aluminium alloy case - note chamfered lip to body. Right, the 350 again shown here with several of the Jetex accessories used for cleaning etc. - note the strange shaped 'Jetmaster' reamer...



Alternative sources

All the motors were available in America via *American Telasco* and *Polk Hobbies* in the U.S.A. and *Academy Hobby* supplies in Canada (*Model Craft* hobbies). Having read of only one motor, the '50', being designated as export, it was like the '50B' but shorter, I assume this was the first. However, motors were manufactured there and known as the 'PSST 50' and 'Double PSST 50', but used fuel and wick supplied from the U.K. The only manufacturer I know of, that could have produced these, was the *Dempster Co.* who produced a turbo prop version.

In Australia, a '50' version was manufactured, though no longer marketed, employed machined front and back halves, which screwed together, and incorporating a spring loaded relief valve at the rear, which was a method advocated in the early days of *Wilmot and Mansour*.

Within the last 4 or 5 years, *Jetex* type '50' and '150' motors have been made in Japan, known as 'Tiger Rockets' - Type 'A' and Type 'B'. They were boxed as model rocket engines and employed fuel and wick of Japanese origins. The fuel burned much cooler than that of *Sebel* and *Ripmax*, therefore an aluminium alloy was employed throughout and weight was comparable with the '50B' and 'Jetmaster'. Construction was based on the Standard '50', scaled up for the '150', and thrust of the '50' version is reported to have been equal to the '50C' by *Sebel*. They have been said to be expensive, hence their not being imported into the U.K., and were not widely marketed in the U.S.A. or Canada.

David Axler is a keen *Jetex* enthusiast in Canada whose collection, reflecting the high regard he has for this form of motive power, is the largest I have come across so far. Having collected *Jetex* accessories since 1950, he feels that the Japanese motors would be the best route to take in order to re-establish a miniature rocket motor back on the U.K. market.

The thrust/weight ratio was superior to the British motors, though he did not supply

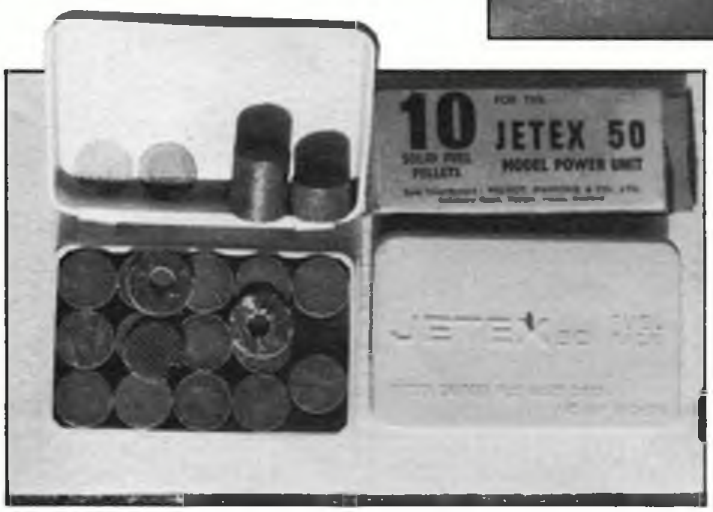
Left, Jetex fuel came in many forms of packaging - now of great interest to the collector! - The size of the '350' fuel enabled the user to choose whether to use one, two or three pellets per flight. Below, two varieties of the '50' fuel pack, here too (Jetex 50c) was the option of multiple pellet loads...

details of duration. Rinsing after use, cleans the motor down to the base alloy, and the motor stayed as new. There was no heavy crusting as occurred with the '50C'.

The wick was excellent, and still is, after storage, unlike the *Wilmot & Mansour* variety. All were worth the money he paid and if the motors are no longer being manufactured then U.K. firms may be urged to seek and purchase all rights.

Remarketing Jetex

It is thought that there may be problems associated with acquisition of patent rights,



Left, the fuel packs came complete with spare asbestos cap washers and gauzes, a necessary addition as the life of these components was limited to only a few 'firings'.

but this has not deterred the interest of manufacturers, particularly with respect to the motors, but with the fuel and wick, there is another problem.

Some three years ago *'Cambria Models'* contacted Mr. A.A. Judge, with a view to the remarketing of *Jetex*, and he was able to supply them with details of the motors and wick. *Cambria* then began negotiations with a firework manufacturer to produce the fuel and *ICI* to produce the wick. Little has been heard of the venture since Mr. Judge visited the firm, whilst on holiday, when he was informed that the prices quoted for the manufacture of the fuel and wick were exorbitant. Mr. Judge has since assured me that 'Cambria' went thoroughly into the possibility of starting up *Jetex* and concluded that it was not on!

The fly in the ointment

Originally there was no objection to the sale of *Jetex* by the safety inspectorate. The fuel was even considered safe enough to be sent by post.

But things are different nowadays and there may well be grounds for an objection to the original specifications. Manufacturers, such as 'Unwin Pyrotechnics', consider *Jetex* fuel "a Class 1, Div 2 explosive not transportable by post". They also followed in their letter that "The Home Office operates a ban on model rocketry". (The flying of model rockets is no longer judged against the law, but as yet it is illegal to import the motors...Ed.)

What's more *'Pains and Wessex'* state that "the Explosives Act prohibits the reloading of rocket motors except in approved manufacturing premises". To confuse matters further the Health and Safety Executive, in a reply to enquiries by *Pains and Wessex*, state that this was the problem with *Jetex* but that they have been receiving considerable interest in changing their ruling. Whether these are misassumptions or based on recent legislation is difficult to establish. However the interest shown, in the change of ruling, may be related to model rocketry.

Considering the situation, as it stands, motors and fuel are not the main problem. It is the lack of wick which has led to the 'grounding' of many *Jetex* models and even the old stock tends to be brittle. The wick is in fact the 'fly in the ointment', said to cause problems that were never satisfactorily resolved, in that, it is definitely classed as an explosive. Establishments used for the manufacture and storage of explosives must be licensed, registered and the production fragmented.

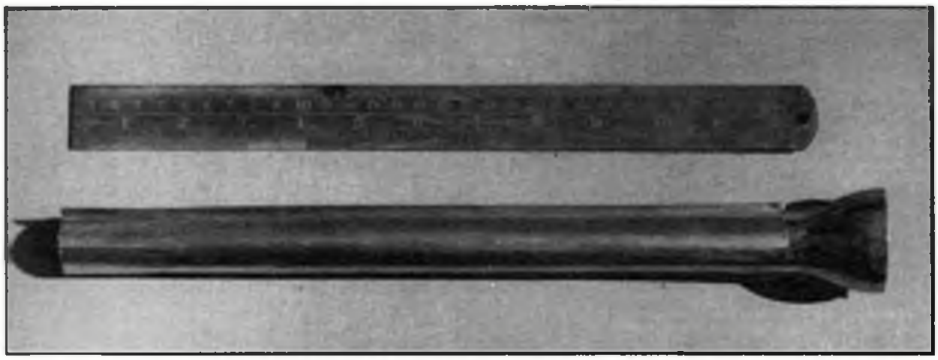
But an important point here is that there are certain relaxations for explosives other than gunpowder. The safest course of action, I would think, for any manufacturer would be a trial batch of wick. Sales of this rare item would surely be a measure of possible demand.

Electric ignition

An alternative solution to the lack of wick is the use of electrical ignition (fig. 1) as this is employed in model rocketry and should be investigated further. With gas producing fuels however, the venturi is very small and does not encourage the use of a return lead.

Furthermore, the use of gauze on top of the fuel does not allow easy extraction of a filament.

However certain modellers in the U.S.A. and Canada are using electric ignition wire, by *Jim Crocket Model Accessories*, it is very successful and eliminates a major



manufacturing problem. I have not received any further details of this method but here are a few thoughts on the topic.

Don't bother with a return lead as the motor case can be used as an earth. Try different ratings of fuse wire with dope as insulation.

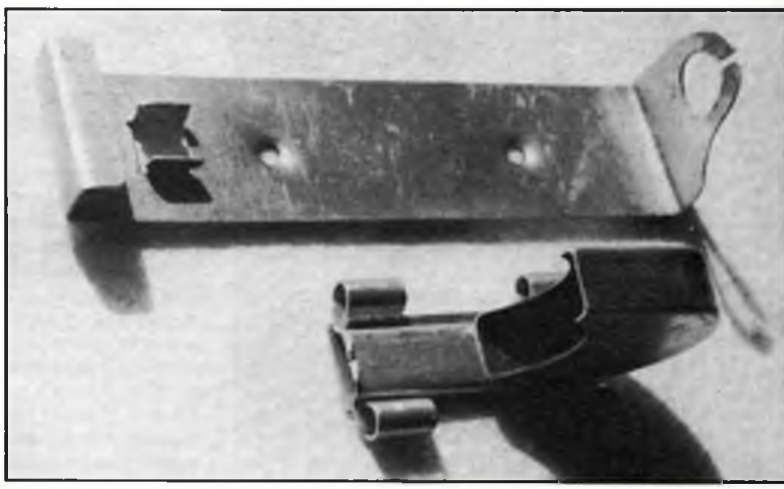
Motor windings are insulated and these could be tried. Experiment with different diameters and different voltages the intention being to ignite the fuel before the wire melts.

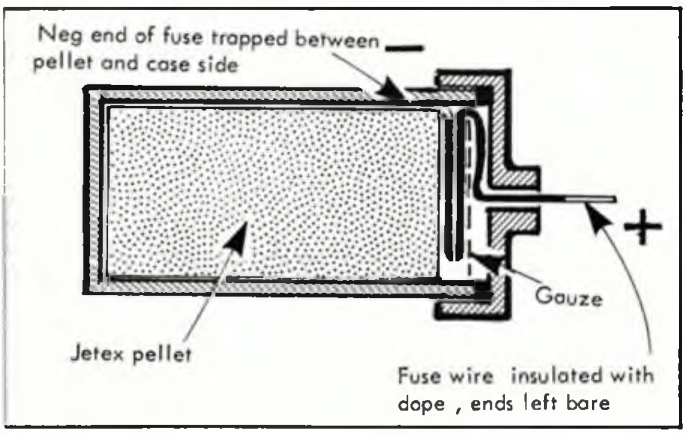
Conclusion

With every power unit there are bound to be disadvantages as well as advantages, rocket motors give us the advantage of torque free thrust, no winding or swinging and the unit does not suffer in a crash. But one must admit, when reloading *Jetex*, that it does seem an awful lot of trouble to go to for a comparatively short duration, hence the appeal of gunpowder units. However, the heat and thrust of gunpowder units does not make them suitable for models of a conventional structure.

Jetex fuel, however, being a gas generating fuel, cannot explode and presumably does not come under the same restrictions as gunpowder rockets.

Far above, the thrust of the Jetex motor could be increased by directing the exhaust through a specially shaped augmenter tube. That shown here was for the 'Jetmaster' but a smaller variety was available for the '50c'. Above, the ignitor wick also came in numerous different packages and is now very rare! Different diameters were available for the different sized motors.





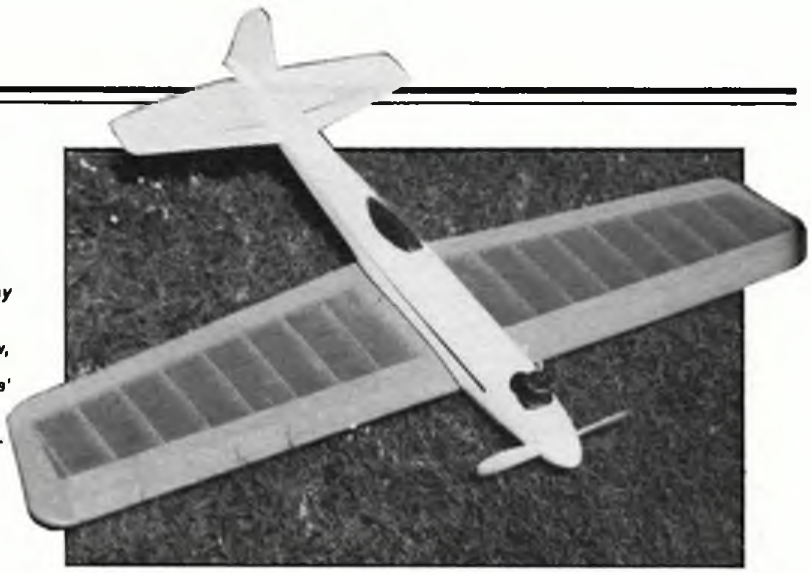
Above left, the shape of the fuel pellets and the coarseness of the gauzes varied - giving the keen user quite a lot to experiment with! Note the pellet on the right with marked hollow (for extra thrust!). Above right, the regular clip for the 'Jetmaster' looked good but often resulted in motors 'flying out'.

High running costs was the main criticism levelled at *Jetex*, when it was compared with the contemporary piston engines, but, considering present day prices of oil and the elimination of wick costs with electric ignition, I don't think there would be much to choose between the two.

It is simply a case of novelty and application. Why else do people use CO_2 motors as they fair no better when compared with piston engines. Admittedly development work and quality control costs money, which is added to the production costs, and the price has to be attractive but the overriding argument is that *Jetex* had no serious rivals in this country. *Jetex* was the only successful form of rocket motor for small free flight models, and it still is.

MIND THE LINES

with Andy Brough



Right, the streamlined outline of 'Flica' (APS C/L 363) has always attracted attention. This one was built by Bernie Moseley of Guildford Model Flying Group. Below, Matthew Noble 'tweaking' his 'Midge' - running gear is needed to maintain line tension on take-off'.

Midges as Three Sisters

John Noble, one of the organisers of the Three Sisters Gala, has sent details of the 'BIG' event of the weekend namely the Midge speed event: over to John.

'Without a doubt this was the Big event at this year's Gala! Just about everybody came to fly, watch or offer to help and advise, not all exactly useful!

To accommodate the 'Schnuerle Brigade' an *Open* class was run as well as the *SAM 35* rules event. By that well known law of nature the special proved to be the slower class...so first the results:

SAM 35 Class

1. Ken Fleming/ Ken Morrisey	*PAW*	86.5 mph
2. Sid Robinson	*PAW*	86.1 mph
3. Derek Heaton	*AM* 15	80.35 mph

Open Class

1. Russ Grindly	*Novo Rossi* Glow	75.0 mph
2. John Noble	*PAW*	66.2 mph

The bi-plane format appeals to most of us - even if our interest is team-racing. This is the Keil Kraft 'Scout' Team Racer from 1950, the kit then cost £1.12!

That Russ recorded a time, is a great tribute to cyano and epoxy. Twice the plane flew apart in the air and twice it was rebuilt. A *Graupner* 6 × 6 cured the vibration and after that things were O.K. Virtually all the 'Midges' suffered landing damage on the grass, a strong feeling arising that next year we should fit skids and use the speed circle (Dollies?). We could also, then use the pylon which could save a bit of argument... *(Its supposed to be fun... Ed!)*

What struck me most was that speed is not just a matter of engine power. The faster models also had a good glide. Perhaps then, 'Midges' aren't just bricks on strings, and aerodynamics are important. Peter Farrimond's special did manage four laps after the elevator came off, so they can't be all that unstable!

Other entries were from Gavin Heaton *AM* 15, Doug Arnold *AM* 15, Peter Farrimond *PAW* (first C/L flight for a decade!) and Ken Reeves *PAW*. Thanks to all who braved the downpour - see you again next year'.

John mentions a very interesting point regarding bricks on strings. Some years ago the late Mike Reeves built a speed model for a standard *DC* 'Merlin' (0.75cc). Mike was very interested in aerodynamics, both full size and model, and built the model to test a theory that a very light model coupled with a fairly rearward centre of gravity would produce a *fast* model. I think the plane flew on 35ft lines of 8 thou wire but the speed was about 80mph! There's a moral there somewhere. Should have some more 'Midge' news next month.

Juggler

After reading my bit on 'Getting the Beast to Fly', Mike Rolls passed on some information regarding his experience with a 'Juggler'.

'I was interested in your comments on the 'Juggler' and the wing flexing problems - my own tissue covered 'Juggler' did not display this fault, and as you say the wing is very thin. I found it a rather disappointing model in that the addition of a silencer, fixed undercarriage (for flying over concrete), and metal tank (because the balloon only gave two minute engine runs), pushed the weight up from 20ozs to 25ozs.

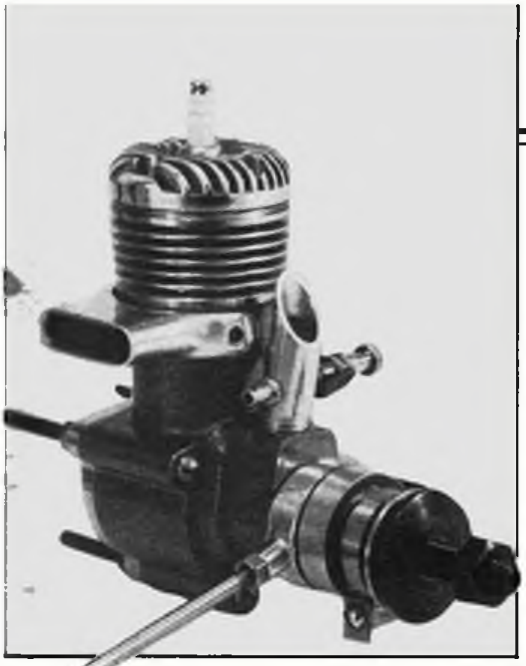
At this weight the model (not too surprisingly perhaps) proved to be too heavily loaded and despite improving matters by sawing off the undercarriage and saving two ounces, it eventually 'fell out' of the bottom of bunt number five with fatal consequences. Power was a *McCoy* 'Stunt 29' of 1950's vintage which fortunately survives for something more forgiving'.

Thanks Mike, I know the feeling on bunt number five, as the plane gets progressively lower on each bunt. My 'Juggler' weighs 27oz covered with *Solartex*, tin tank and *Frog* 500 with silencer. The performance is soggy, but with a *Merco* 29 it becomes quite spritely, but never a model to rave over, particularly on the glide...as it doesn't!

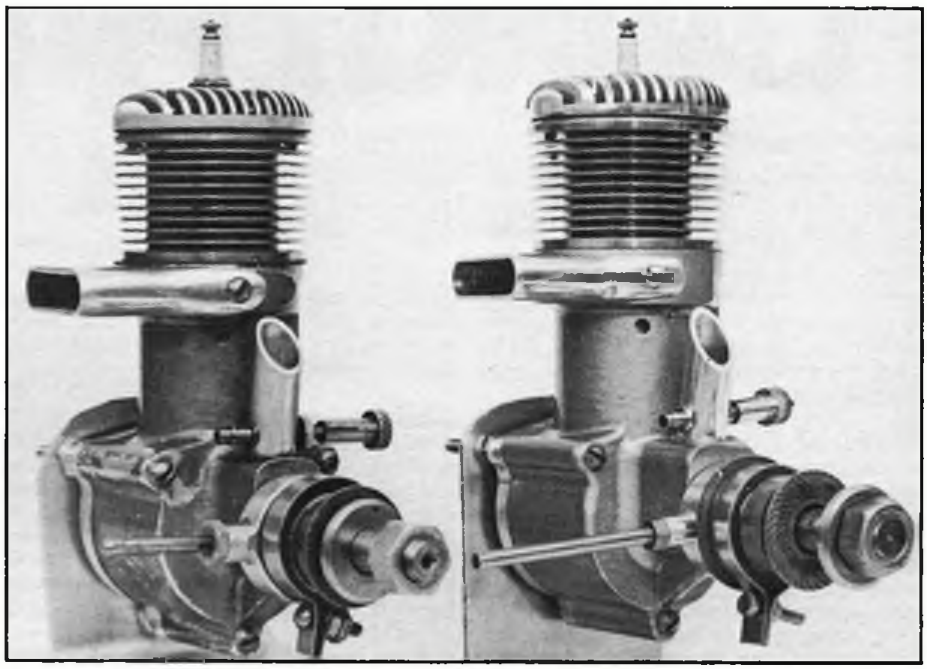
OOPS!

It's smack hands time. Several people wrote (shows somebody reads this column) to point out that the picture of John Perry and his 'Taurus' (July '85) did not show an electric starter. Not the least of those who wrote was John himself and he explained that in fact the 12V battery is needed to supply an electronic glowdriver... we were only poking fun John!

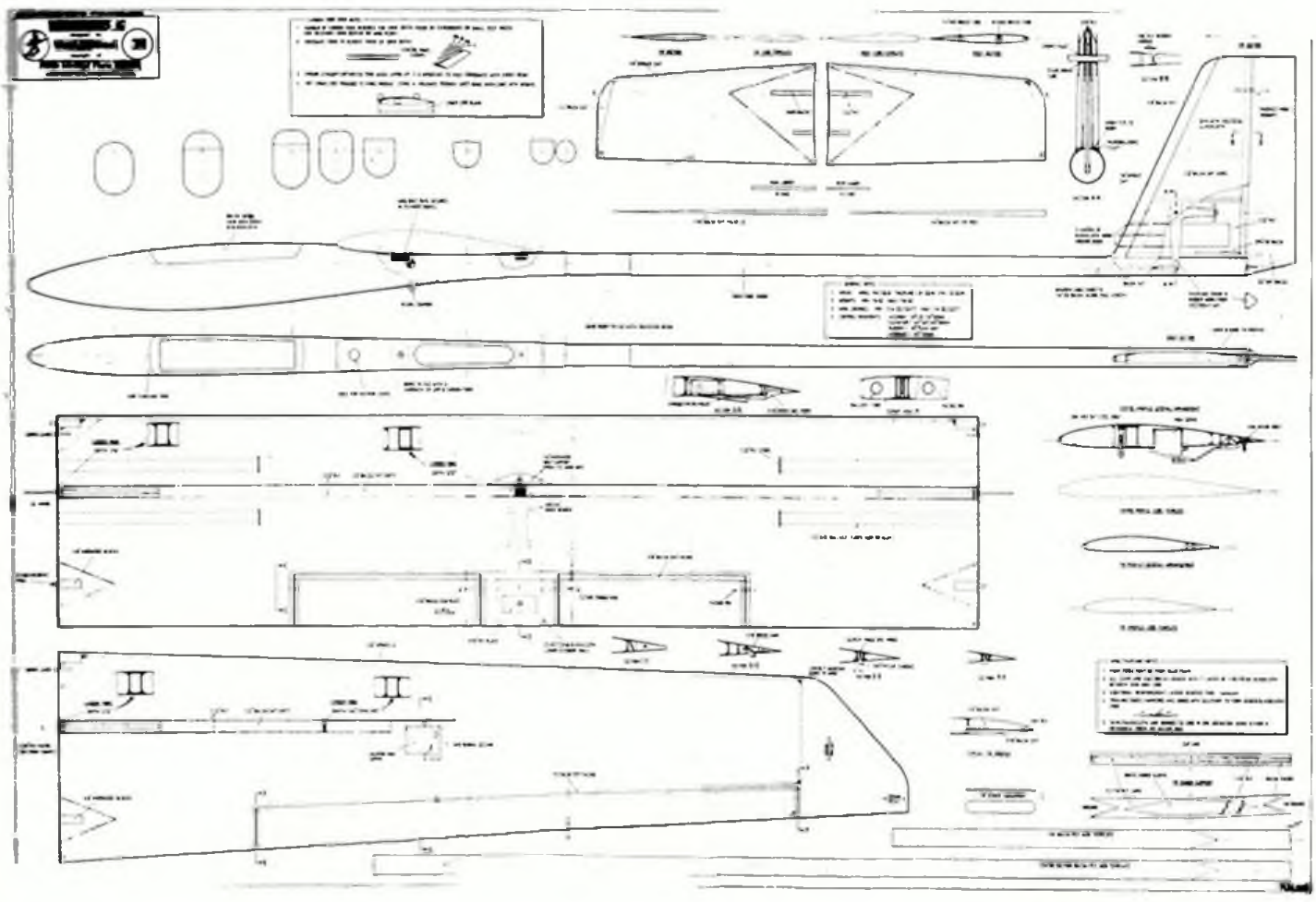
Another who wrote in John's defence was Mike Rolls of the Three Kings club. He pointed out that the 'starter' was a rather large squeeze bottle needed to fill the 'Taurus' big fuel tank. John, by the way, came second in last year's Old Warden Vintage Stunt comp despite forgetting much of the unfamiliar schedule on his first flight. The 'Taurus' is in fact able to make a good account of itself in the F2B schedule. Mike says that watching one doing triangles and square eights on 90-100 foot lines is quite something!



A few months ago we showed a picture of Brian Hewitt holding what we called his 'Stunt Queen'. Sackcloth and ashes - the actual model was his 'Stunt King', *Yulon* powered, with which he won the Gold Trophy in 1949. Of course the 'Stunt Queen' was the model with which he won in 1950. A far more attractive stunter, again for the *Yulon* and *Frog* 500, *ETA* 29, *AMCO* 3.5 etc which was kitted by *Keil Kraft*. I don't know who has the rights to this plan now, but it would be a great addition to the *APS* range...



Vintage engines or at least replicas are often the aim for the vintage control line flier, fortunately there are firms like Dunham Engineering ready to fulfill our needs. Above left, Dunham Orwick 29 fitted with wrap around exhaust stack and polished venturi tube. Above, a pair of Orwick 64s...on the left an original and on the right the Dunham Orwick 64... Below, full-size copies of this 1/5 scale plan of the 'Juggler' may be obtained from Aeromodeller Plans Service, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts., HP2 4SS. Cost £2.30 plus 50p post and packing. Please quote plan number CL/389 when ordering.



AT THE LAUNCH PAD

SPECIAL

John Wheddon

Scale Model Rockets

Scale models of any aeronautical subject present the builder with the most challenging set of problems to be overcome... and model rockets are no exception. Not only must the model truly represent an original full size rocket in the greatest possible detail but the completed masterpiece has to be launched at high speed. No gentle hand launches over long grass for rockets!

Choice of Model

Choosing a suitable prototype to model is both very easy and at the same time rather difficult. There have been hundreds of different rocket vehicles built in many countries for military, meteorological work and scientific research.

The scientific sounding rockets built to carry experimental payloads into the Earth's upper atmosphere are usually ideal scale subjects. Long body sections and large payload bays with often, four large fins - produce exactly the right combination to ensure satisfactory flights.

These rockets were designed to fly simply (and cheaply) within the atmosphere and with much of their flight at subsonic speeds, have to obey the same physical laws as our models. Suitable rockets of this type include the British 'Skylark' and 'Skua', American 'Tomahawk', ARCAS and 'Nike-Smoke', the Canadian 'Black Brant' series, 'Veronique' from France (where else?), the Polish 'Meteor' series and a whole range of Czechoslovakian rockets known as 'Sonda'.

Military rockets, especially many air-launched types do not always make such good scale subjects because they often feature fins on the forward parts of the body and sometimes have no fins at all. This is because these rockets have on-board guidance systems, which provide control by signalling pitch and yaw commands to these fins, or to swivelling thrust nozzles. Fitting fixed replicas of the front fins to a model rocket may adversely affect the centre of pressure and could result in dangerous instability.

However, ground launched, so-called 'tactical' rockets like the American 'Honest John' and the infamous German V2 do make interesting and successful flying models.

Space vehicles like the 'Saturn' launcher for the 'Apollo' moon rockets, European Space Agencies 'Ariane' and the Soviet 'Vostock' launchers are much more difficult subjects. There is scope for an enormous amount of detail and again because of their complex on-board automatic guidance and control systems, fins are either small or absent. Scale modellers usually overcome this problem by fitting clear plastic fins to provide adequate stability.

Where to Start?

The major manufacturers provide a variety of scale model kits. These make a good starting point for building scale types and with good attention to detail finish, a very satisfactory model can be obtained.

Progressing a stage further, *Competition Model Rockets*, a specialist company run by Howard Khun - a World class scale modeller, produce a contest standard kit of the 'D-Region Tomahawk'.

Building from Scratch

After selecting a suitable subject it is vital to obtain as much information as possible about the original. Not microscopic internal detail drawings but adequate all-round external views are required. It is very frustrating to have a blank area of model body tube which should carry a notice or logo...if only a complete picture of the original could be found!

There is a wide range of reference books (Jane's for example) which provide basic dimensional information such as length and body diameter. As the work of data collection progresses it is useful to make cross checks from one source to another, since it is not unusual to find quite large discrepancies in published data!

Generally, one of the best ways to obtain data is to meet and talk to other rocket builders - most are only too pleased to compare notes and swap information.

Model Size

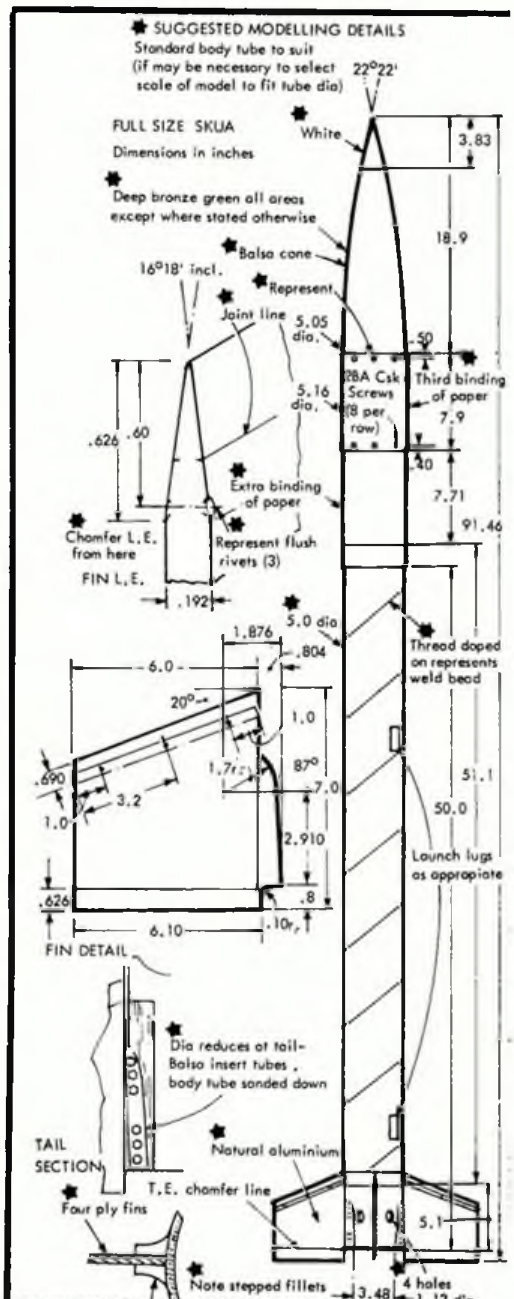
After collecting sufficient information on a particular rocket it is necessary to decide how large the finished model should be. A basic rule is to build rockets to suit a particular engine size. This sounds obvious advice but the opposite method, of building the rocket first and then searching for the right thrust/delay combination...usually results in compromise, followed by a crash!

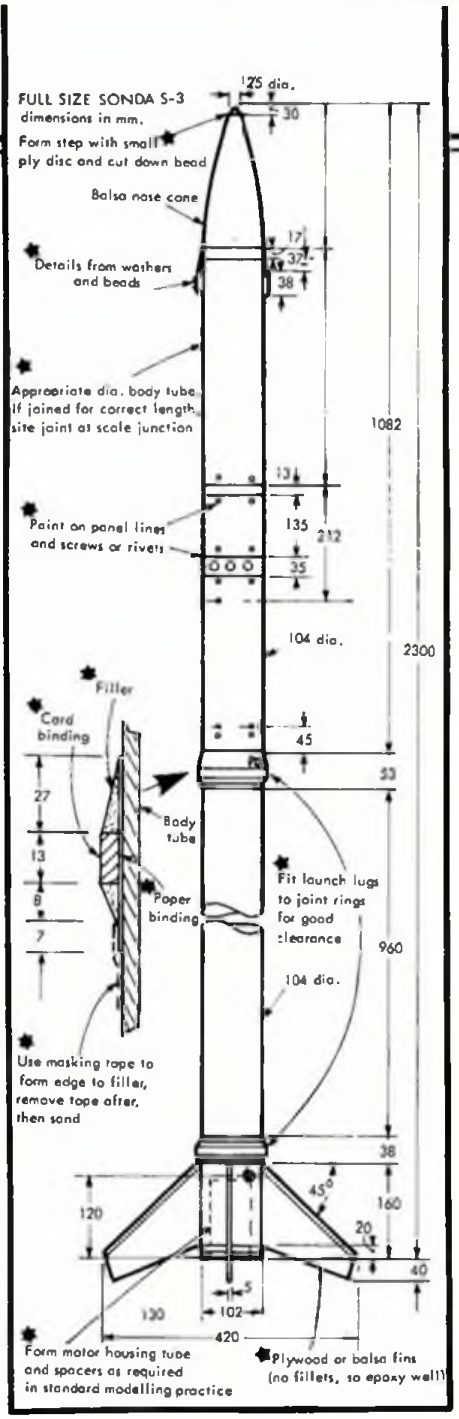
The 'Sonda' S3 which I built for Scale Altitude contests using 'C' (10 N sec) engines is a useful example. A standard body tube was chosen to suit an 18mm diameter engine. This tubing has an external diameter of 19.5mm whilst the 'Sonda' S3 body diameter is 104mm. The simple fraction 104 divided by 19.5 gives a factor of 5.33 which means that 1mm on the model equals 5.33mm on the original 'Sonda S3'.

This factor can then be applied to all the known dimensions of the original and a set of working drawings can be produced. The scale is referred to as 1 : 5.33.

Obviously, it is necessary to 'round' the scale dimensions obtained so that practical and measurable figures result. However, this process needs care to ensure that a build-up of errors does not occur with a resulting oversize total length for the model although it is built up from 'accurate' sections.

Ian Dowsett's 'Skua' and on the right full-size 'Skua' dimensions.





Above, John Wheddon's 'Sonda' - built for Scale Altitude events, a relatively simple model with good potential. Left, dimensioned drawing of full-size 'Sonda'. Asterisks on both 'Sonda' and 'Skua' indicate 'suggestions' for the modeller...

Mercury-Redstone by Nigel Parry-Jones

These notes are not intended as a comprehensive construction guide for the Mercury-Redstone model but are intended to serve as explanatory notes for details not covered by the notes on the drawings.

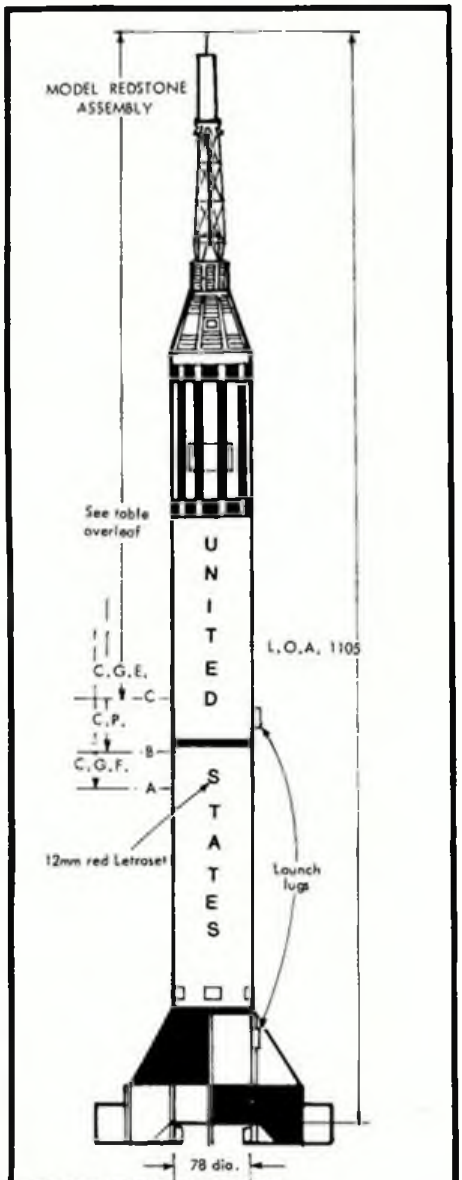
First of all, an important warning: The model shown in the drawings is still *under development* and, as such, is not fully flight rated. The prototype has a small static margin (i.e. the distance between the centre of gravity and the centre of pressure, represented in this case by the centre of lateral area) and is near the upper permitted weight limit. Initial flights have been successfully carried out using one F36 engine. The Centre of Gravity position shown was obtained using this type of engine and should not, under any circumstances, be any further back from that shown.

The Redstone booster: This is constructed using the technique known as 'balsa wrap' and to do this, you need a suitable former. I use a length of 3in. plastic drainpipe which has been well coated with silicon car wax. The selected balsa sheet (1/32in. nominal) is brushed with hot water and taped with masking tape around the drainpipe.

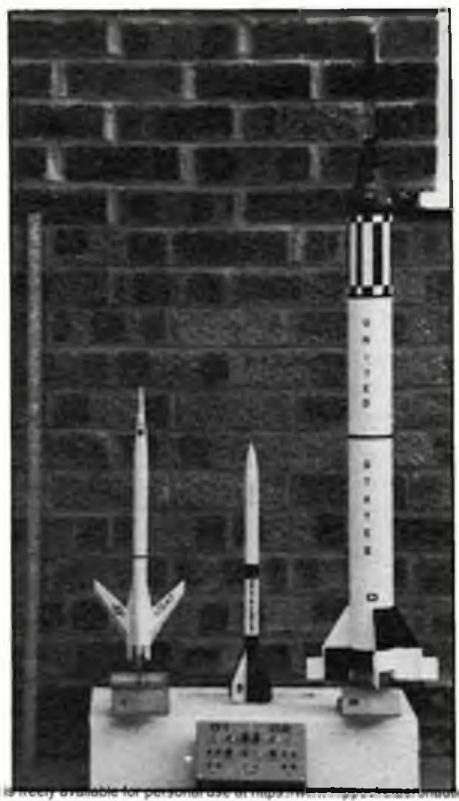
Leave it for a few days to dry and then cut suitable lengths and thicknesses to form the first lamination of body tube. This can then be glued around the drainpipe and held with more masking tape, white P.V.A. glue (thinned with water) and hope. This should be left for several days to dry.

The next stage is to repeat the process with polystyrene foam veneer, available from D.I.Y. shops. I decided to try this material as an experiment but found that there is no real advantage in its use, so if you wish you can leave it out - unfortunately you'll have to either find a former of a suitable size or rescale the drawings shown, as the dimensions will change in proportion to the reduced body diameter!

Finally, you can add the outer layer of balsa in the same way as before. Again, the assembly should be left for several days to dry. The tube can then be slid off the drainpipe with a little coaxing and can then



Below, some of Nigel Parry-Jones' stable of space-models, he obviously has a preference for scale (or semi-scale) types. The 'Mercury Redstone' (see text) is shown on the right. Metre rule on left gives some idea of size.



Finish

Actually building and finishing scale models is a matter of personal skills and patience. Accuracy, workmanship and standard of finish are qualities which are checked and evaluated by Judges in scale competitions. However, for non-competition fliers there is still the satisfaction of knowing that the model is as far as possible a true replica of a favourite full size rocket.

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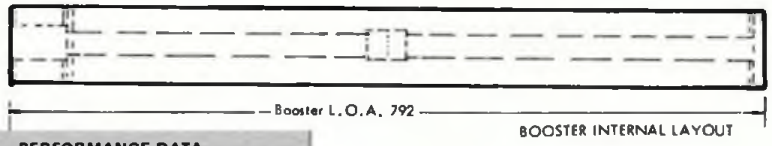
In the sixties *Bristol Aerojet* produced a series of sounding rockets which included the 'Skua'. Your editor, Peter Freebrey, produced a fine scale model for 'E' (40N sec) engines which won first place in the Scale Altitude Class at the 1974 World Championships, achieving an altitude of 678 metres.

In 1980 Ian Dowsett modelled the same prototype but to a smaller 1 : 6.365 scale and gained eighth place in the 'C' (10N sec) Scale Altitude event at the World Championships that year... Not content with that, Ian flew the same model in the 'B' (5N sec) event at the 1983 Canadian Nationals and was finally rewarded with a first prize-winning flight of 289 metres.

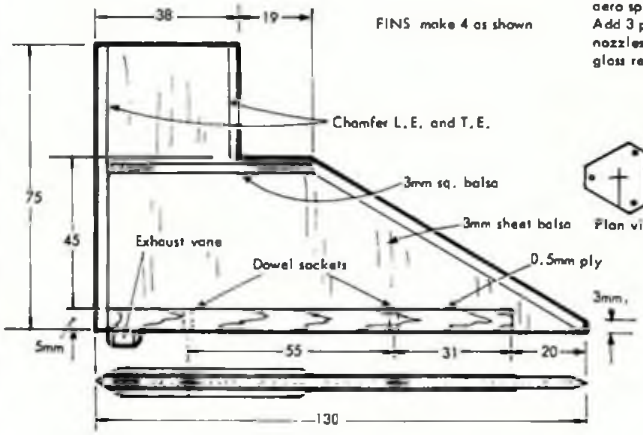
Mercury-Redstone by Nigel Parry-Jones

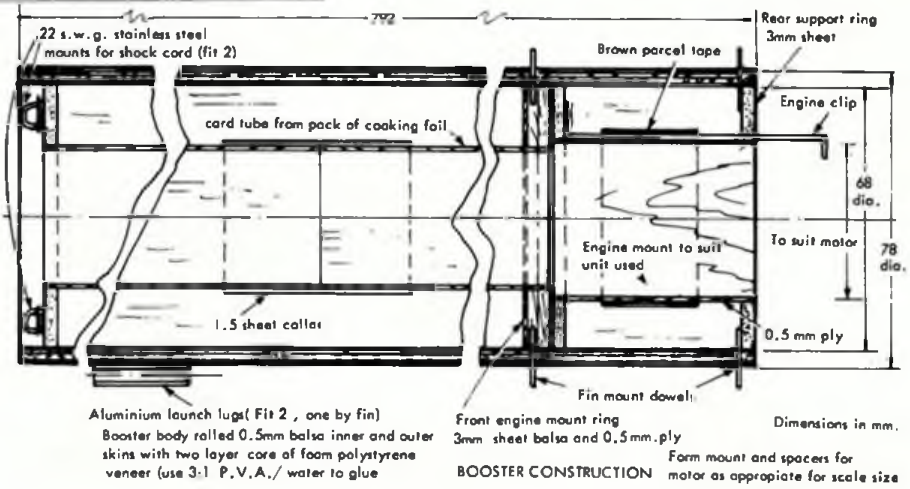


BOOSTER INTERNAL LAYOUT

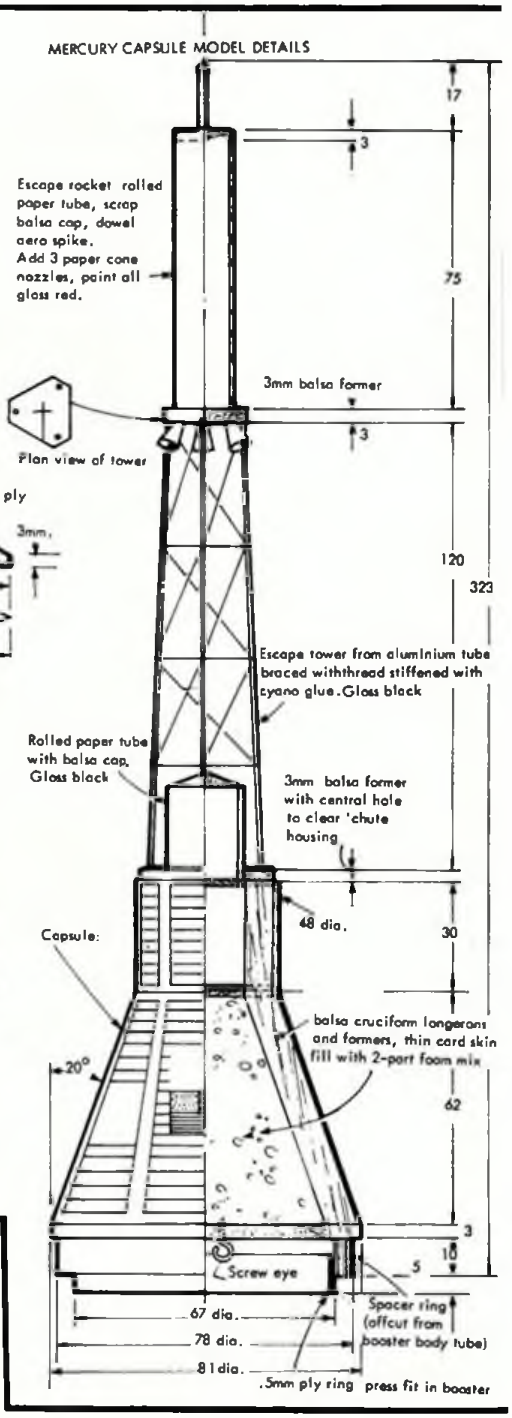
PERFORMANCE DATA

CGF	Centre of Gravity assembled model with F36-5 motor	= 765mm
CGE	Centre of Gravity of assembled model without F36-3 motor	= 675mm
CP	Geometric Centre of pressure	= 728mm (±16mm)
M	Mass of assembled, loaded model complete with 'chute	= 390 gram
MC	Mass of Mercury capsule and escape tower	= 40 gram
MB	Mass of unfuelled redstone booster	= 250 gram
H	Max. altitude	= 159 metre
T	Flight time to max. alt	= 7.2 sec
CD	Nominal drag coeff	= 0.95
P	Propulsion	= 1 × F36-5





BOOSTER CONSTRUCTION



be trimmed. The engine mount may then be fitted but I have deliberately left out too many details of this as I believe that most space modellers will have their own preferred method.

I used a series of 3mm balsa formers to fix the mounting, and the tube for the F36-5 motor was made from ultra-thin (0.5mm) plywood which is available from most good model shops.

After completion of the internal fittings, the body tube should be covered with tissue and given two to three coats of thin Polyurethane gloss varnish. The four fins are then fitted (these are sub-assemblies and can be made while the body tube dries) and the booster can then be painted.

I used an aerosol can of white epoxy paint, and the black roll patterns were applied (after masking off the appropriate areas) using black enamel paint. The national markings were done using red rubdown *Letraset*. Most of the glue joints were made with white p.v.a. glue, or cyano-acrylate 'super-glue' N.B. the polystyrene veneer will dissolve if it comes into contact with the super glue, so be careful...

The Mercury capsule: The capsule is made from a cruciform set of longerons with three formers. A card cone is then made and the end cut off so that it can slip over the cruciform structure. After gluing this in place, a small amount of two-part epoxy foam is poured into the capsule and allowed to set. The excess is then trimmed off. The joint between the 'Redstone' and the capsule is made from a short length of body tube off-cut and a ring of thin ply.

The escape tower and gantry looks complex but is quite easy to construct using the quick-setting quality of super glue. The gantry structure is completed using thread soaked with super glue – this also adds considerable strength to the structure. The capsule is then painted with thin polyurethane varnish and finished with black enamel. The gantry and escape tower may also be varnished and painted gloss red.

Recovery equipment and other items: The recovery equipment consists of one 30in. diameter parachute and shock cord. I had originally planned to use 2 × 30in. chutes, but there is insufficient space to fit two chutes in the exhaust tube and so the single chute will have to do. The chute is made from *Mylar* sheet, cut from an ordinary bin liner and the eight shrouds are from unsingeable linen thread.

The shock cord is made from flat cotton covered elastic and is about one metre long. The links which attach the chute to the shock cord/capsule, and the shock cord to the booster are of stainless steel and were obtained from a fishing tackle suppliers. This source also provided the stainless steel wire for the shock cord mounting on the booster and also the motor clip on the engine mounting.

I have been unable to find a direct equivalent for the chute wadding as supplied with American kits, but after a bit of thought decided that glass fibre tissue (the very thin variety) might be suitable. However, I have recently found that John Stewart from the Paisley Rocketry Society has developed a method of making chute wadding using *Kleenex* tissue soaked in a strong Alum solution and carefully dried.

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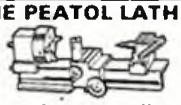

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Appendix: Links to the plans

The original magazine comes with three plans (OHKA MXY7, Caudron Luciole, Farman 400) printed front/back on a pull out banner of four sheets. The banner is not included in the document.

OHKA MXY 7 by Jym & Dave Leddy
Full size plans for semi scale control line model
https://www.hippocketaeronautics.com/hpa_plans/det ...
Document Page: 28

Caudron Luciole by Emmanuel Fillon
FF Rubber Peanut (no article)
https://www.hippocketaeronautics.com/hpa_plans/det ...
Document Page: 28

Farman 400 by Emmanuel Fillon
FF Rubber Peanut (no article)
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Document Page: 28

Coupe d'Hiver by Ian Davitt
Presented in FREE FLGHT SCENE
Document Page: 36

Luscombe Phantom
Presenred in ADVERSE YAW
Document Page: 40

New Eaglet
Amphibious. Presented in ADVERSE JAW
Document Page: 41

At The Launch Pad by John Wheddon
John Wheddon brings you three possible subjects for scale model rockets (Skija, Sonda S-3, Redstone)
Document Page: 50