MODEL MAGAZINE

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SANDOWN PARK 1986

MODEL SYMPOSIUM & EXHIBITION
SATURDAY 10th & SUNDAY 11th MAY
SANDOWN PARK RACECOURSE, ESHER, SURREY, 9.30 a.m.-6.30 p.m.

The Elmbridge Model Club's Eleventh 'World Famous' Trade Exhibition and Display of Working Models. No other Exhibition open to the Public has so many Manufacturers, Distributors & Importers actively Demonstrating their products under one roof.

The Aeromodelling side of the Exhibition is well covered by continuous Displays of Radio Controlled Powered Aircraft, Gliders, Helicopters & Scale Models, also Displays of Control-Line flying by National Champions of Aerobatic & Combat Models. Members of the Public can also have 'Tuition' on the Control-Line circle. International Displays include HANNO PRETTNER, 4 times World Aerobatic Champion, EWALD HEIM, European Helicopter Champion, New this year, this 'OPS AEROBATIC Team' from Italy and Multiplex Display from Germany. ALL THESE DISPLAYS CAN ONLY BE SEEN AT SANDOWN PARK. With over eighty 'Trade Exhibitors' and forty non-Trade stands. All classes of Modelling is catered for, be it Aircraft, Boats, Cars, Railway & Engineering Exhibits & Displays.

The Exhibition Halls cover over 44,000sq.ft. and most of the Displays can be seen from undercover! All this and more for the Family & Enthusiast.

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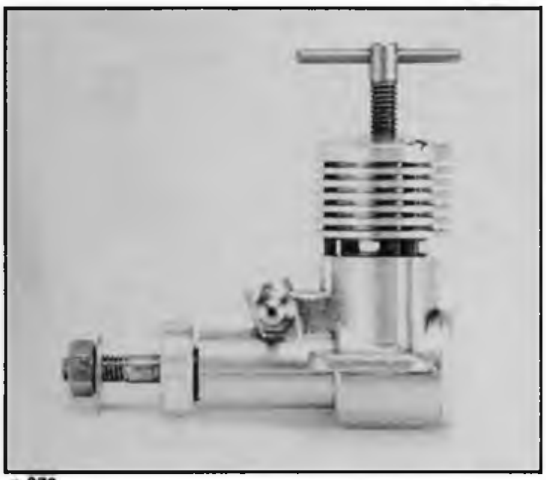
MAY 1986

Volume 51

Issue 604

ISSN 0001-9232

AERO MODELLER



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Group Editor *Alec Gee*
Graphic Design *Jenny Hine*
Advertisement Manager *Jim Carrigan*

Cover
Vintage Coupe d'hiver flying grows in popularity. A favourite subject is the Ailbass, designed by Rene Jossien in 1951. Peter Michel, Jean-Marie Piednoir and Geoff Clarke are seen with their versions of this stylish low winger at the 1984 Aeromodeller Winter Cup meeting.

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 £25.10. Overseas sterling £29.00. Overseas dollars (U.S. or equivalent) $38.50 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 5820. 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. Dalledu, 4314 West 238th Street, Torrence, CA 90505.

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HANGAR DOORS

Up, up and away – a classic launch by Trevor Payne. Stirring stuff... see you at the F/F Nationals?

1986 SMAE National Free Flight Championships

It is confirmed that the annual jamboree will again be held at the conveniently central site of RAF Barkston Heath, about five miles north-east of Grantham on the B6403, over the three-day Spring Bank Holiday weekend May 24th-26th.

This is Europe's biggest model flying event, so there will be plenty to see. You can, of course, come just as a spectator, but taking part doubles your enjoyment. Any SMAE member can now take part without needing a competition licence. Entry forms are available from the SMAE at Kimberley House, Vaughan Way, Leicester LE1 4SE. Closing entry date is May 3rd. Pre-entry costs £2:00 per event; juniors are *free*. Registration for seniors (over 18 on 1/1/86) is £5:00; £2:00 for juniors. Entry on the day is double, except for members of foreign clubs. Camping fees are: competitors £4:00; non-competitors £5; juniors free. Spectator admission is £1 per day.

Competitions are listed below, but it's worth pointing out that the Junior Kit contest is open to any under-16's flying any kitted rubber model of under 40ins. Wingspan or any kitted glider of under 50ins. Flying will be from 10-4 on Monday, May 26th.

See you there!

Date Change

The Oxford MFC F/F Rally which was originally fixed for 14-15th June has been changed to 21-22nd June to avoid a clash with the RAF Championships.

SMAE Free Flight Nationals

Saturday, May 24th	308 Trophy	Coupe d'Hiver
	British Airways Trophy	A/1 Glider
	Hales Trophy	1/2A Power
	Sparklets Trophy	CO_2 Duration
Sunday, May 25th	Model Aircraft Cup	Open Rubber
	Thurston Cup	Open Glider
	Sir John Shelley Cup	Open Power
	Lady Shelley Cup	Tailless
	Jubilee Cup	Vintage
	Frog Junior Cup	Open R/P/G
	Women's Cup	Open R/P/G
	Falcons Trophy	Slow Open Power
Monday, May 26th	Ronytube Cup	F1A Glider
	Fred Boxall Memorial Trophy	F1B Wakefield
	Eddie Cosh Memorial Trophy	F1C Power

What's on..

3/4/5th May
BRISTOL AND WEST WOODBURY WEEKEND.
Venue: Woodbury Common, Nr. Exmouth, Devon. Contact Elton Drew, 2 Downfield Close, Alveston, Bristol BS12 2NJ for contest details, camping instructions and accommodation booking forms. Comps: May 3 — Champagne Fly-offs for Open Rubber, Open Glider, Open Power and Vintage Rubber. (5-8pm). May 4 — Open Rubber, Open Power, Open Glider, Vintage to SMAE rules (10am start). May 5 — Combined FAI rounds, Vintage to South Bristol rules (8am start).

4th May
TONBRIDGE RADIO FLYERS OPEN THERMAL SOARING COMP.
BARCS rules, entries on all frequencies except 27 Mkz blue and green with alternative. Contact: Keith Miller, 18 Bounds Oak Way, Southborough, Tunbridge Wells, Kent TN4 0TX. Entry Fee: £2.00 with s.a.e. A hand launched glider comp. will also be run. Entry 50 pence with Open entry or on the field.

4-5th May
Model Aircraft Rally at Holker Hall and Park, Cark-in-Carmel, Grange-over-Sands, Cumbria, LA11 7PL. (Tel: Flookburgh 328 (044 853) Enthusiasts from all over the North of England will display their scale models (R/C). Contact: Mrs. Carolyn Johnson.

4th May
GRANTHAM & D.M.A.S. VINTAGE DAY
Comps: C/L: Fly for fun; Class A & B Team Race (Grantham Rules); Vintage Class 1 Speed (1986 SAM 35 Rules); possibly Vintage Stunt. Venue: R.A.F. Barkston Heath. Contact: Dave Campbell. Tel: 0455 611724. All SMAE and SAM 35 vintage C/L flyers welcome.

11th May
THREE KINGS C/L SCALE FLY-IN.
Stand-off and Profile scale classes. Venue: Old Croydon Aerodrome. Contact: Derek Bird. Tel: 01 874 6394. Silencers essential.

18th May
SAA C/L TEAM RACE
Comps: Open Goodyear, 1/2A, FAI. Venue: Newhouse. Contact: Neil Munro. Tel: 0875 344026.

24-26th May
1986 SMAE NATIONAL F/F CHAMPIONSHIPS
Venue: RAF Barkston Heath. Contact: SMAE, Kimberley House, Vaughan Way, Leicester LE1 4SE.

1st June
WHARFEDALE OPEN MINI GOODYEAR
SMAE rules but Open models eligible. Venue: Dewsbury. Contact: Jeff Smith Tel: 0532 663432.

1st June
S.E. AREA'S R/C "FLY FOR FUN" DAY.
Venue: Ardingly, Nr Haywards Heath, Sussex. Details S.A.E. to M. Richardson, 64 Grange Close, Horam, Heathfield, East Sussex.

1st June
WALSALL M.A.C. SCALE DAY
Comps: F/F, C/L and R/C. Venue: Walsall Airport, Bosty Lane, Aldridge, Walsall, West Midlands. Contact: Malcolm Taylor. Tel: 0922 415316.

1st June
THREE KINGS C/L SPORT & VINTAGE DAY
Classes: Vintage Stunt, Midge Speed, Fly for Fun. Venue: Old Croydon Aerodrome. Contact: Derek Bird. Tel: 01 874 6394. Silencers essential.

7-8th June
3RD WEST MALLING MODEL AIRCRAFT SHOW
R/C and C/L aircraft plus cars, trains, trade stands, etc. Admission £2:00 adults, £1:00 children and OAP's. 10:00am-6:00pm. Contact: 58, Salisbury Road Tonbridge, Kent. Tel: 0732 350691.

8th June
North London MFC Scale Day. R/C scale at the club's flying field at Baldock, Herts. Snacks will be available and prizes awarded. Entry will be £1 on the day. Contact Richard Barley, 44 Orchard Avenue, Berkhamsted, Herts HP4 3LS.

8th June
3rd ANNUAL HUDDERSFIELD & DISTRICT VINTAGE EVENT
All vintage event will be R/C assist and classes will include Taxaco, Precision and Duration. It is also hoped to run Flying Fifteen this year and radio frequencies are restricted to odd 35MHz Yellow, Green, Blue or U.H.F. only. Refreshments will be available on the field all day and further details are available from Colin Thompson, 132, Slaithwaite Road, Meltham, West Yorkshire HD7 3PW. An sae would be appreciated.

14-15th June
RAFMAA SMAE THURSTON TROPHY
Comps: F1A, F1B, F1C, (1/2A, A1, Cd'H on Sunday) 11:00am start on 14th. Champagne Fly-offs on 14th. Pre-entry £1:50 per event. Camping on Saturday night. Venue: RAF Barkston Heath. Contact: Gil Hart, 12 Argosy Road, Lyneham, Wilts, SN15 4AP (send SAE).

15th June
SHEFFIELD VINTAGE COMP.
Comp: SAM League event but open to any vintage modeller. Venue: One mile from entrance to Rother Valley Country Park, A618. Contact Dave Hanson. Tel: 0742 740316.

15th June
SAA C/L TEAM RACE
Comps: Open Goodyear, 1/2A. Venue: Newhouse. Contact: Neil Munro. Tel: 0875 340026.

15th June
MEON VALLEY SOARING ASSOCIATION OPEN EVENT.
Cross Country. Venue: Butser Hill, Petersfield, Hants. Contact: Ken Sapsed. Tel: 0705 453688. Entry Fees: £2.00 non-members, £1.00 members. Frequencies: 35 Mhz, even numbers only, two sets of crystals.

15th June
THE OXFORD M.F.C. FREE FLIGHT RALLY.
At Port Meadow, Wolvercote, Oxford. Classes A1 Glider, Coupe d'Hiver in rounds starting at 10.00am. Hand Launched Glider and Vintage – no rounds. N.B. Vintage is rubber and glider combined, span limit on rudder 36in. No power models to be flown. Contact: Andrew Crisp 30 Portland Road, Summertown, Oxford.

22nd June
BLACKBURN & DMAC SUMMER FLY-IN
Scale/semi-scale or unusual model rally. Excellent prizes. Entry £1.00. 10:00am start. Venue: Witton Country Park, Blackburn. Contact: Michael Winder, 27, Belgrave Rd, Darwen, Blackburn, Lancs, BB2 2RP.

22 June
PETERBOROUGH MFC.
Class: Diesel 'A' Combat. Venue: The Embankment, Peterborough. Contact: Mick Taylor. Tel: 0733 204484.

28/29th June
THREE SISTERS C/L GALA
Comps: FAI T/R, Goodyear, Stunt, Class 2 Goodyear, Novice Stunt, Diesel Combat (Mainstream Trophy), Vintage T/R A & B, FAI Combat, Open Speed (incl. Jet), Mercury Midge Speed. Contact: John Noble. Tel: 061 790 4056. Events start: 12.30pm Sat. 9.00am Sun.

29th June
PAISLEY TROPHY
Class: Open F/F. Venue: Newbigging, Nr Carnwater. Contact: Ron Sabey. Tel: 0698 429170.

6th July
PETERBOROUGH MFC
Classes: C/L Stunt and Midge Speed. Venue: The Embankment, Peterborough. Contact: Mick Taylor. Tel: 0733 204484. SAM 35 Rules.

6th July
WALSALL M.A.C. VINTAGE DAY
Comps: R/C Assist and F/F. Venue: Walsall Airport, Bosty Lane, Aldridge, Walsall, West Midlands. Contact: Jim Shelley. Tel: 0922 28553.

12/13th July
C.L.A.P.A. CHAMPIONSHIPS
COmps: Open Novice Stunt, Profile and Scale Carrier, C/L Scale. (C.L.A.P.A. members only). Venue: Essex Show Ground, Nr Braintree. Contact: Pete Burgess. Tel: 0376 516881. Camping available. Pre-entry from Pete at 42 Blunts Hall Road, Witham, Essex CM8 1LY.

13th July
SAA C/L TEAM RACE
Comp: Open Goodyear, Class II Goodyear, FAI. Venue: Newhouse. Contact: Neil Munro. Tel: 0875 340026.

13th July
North London MFC Vintage Day. R/C only (no free flight) Vintage character models. Barbecue will be available - bring own food. Contact Richard Barley, 44 Orchard Avenue, Berkhamsted, Herts HP4 3LS.

ASP

1986 MODEL FLYING EVENTS

GET SET FOR ANOTHER MODEL FLYING SEASON AT OLD WARDEN!

The ASP calendar of events for 1986 gets under way in exciting fashion on May 18th at Old Warden Aerodrome Biggleswade, Bedfordshire, idyllic home of the famous Shuttleworth Collection. Running through to September, this year's series of ASP Fly-for-fun spectaculars includes all the old favourites plus some new events covering a broad spectrum of model flying enjoyment. Come and sample some Old Warden model magic yourself!

SUN. 18 MAY - LARGE MODEL SPECTACULAR AND GOLDEN ERA MODEL FLY-IN

A colourful combined repeat of two very popular events from last year - the fancy dress fun of the Golden Era festival for scale models and vintage designs of the 1920s-30s and the big scale excitement of Large Model day. Come along dressed for the occasion or compete in the not too serious contests - or simply to enjoy a wonderful day's flying among friends.

SUN 6 JULY - MODEL HELICOPTER FLY-IN AND SILENT FLIGHT DAY

A new event for the '86 season, this is your opportunity to fly or watch helicopters in action and enjoy the peaceful delights of electric powered models and gliders. Both facets of the R|C hobby are growing in popularity and July 6th will represent an ideal chance for those who aspire to learn more and for those already 'hooked' to indulge their passions!

SAT 21 & SUN 22 JUNE - SCALE WEEKEND

A classic event which attracts scale fans in their thousands for two days of uninterrupted flying and friendship. This highlight of the modelling calendar is famous for its relaxed atmosphere and breathtaking diversity of model sizes and types and, like all of the ASP Old Warden events, everyone is welcome to come along and fly that latest creation or simply watch the flying and drink in the excitement.

SAT 15 AND SUN 16 AUGUST - VINTAGE MODELS WEEKEND

Nostalgia reigns supreme at ASP's young at heart, old time favourite. This is one of the fastest growing events in our annual calendar (it expanded from 1 to 2 days last year) and is now firmly established as **the** fixture for vintage fans from all corners of the country. You'll see again hundreds of classic designs from aeromodelling's golden days, meet old friends, relive modelling memories and have two unforgettable days of flying in the sun.

SUN 14 SEPTEMBER FOUR STROKE FLY-IN

Four-stroke model engines - and the many advantages in scale effect and low noise levels they offer - are becoming increasingly popular, particularly with big scale enthusiasts. This new for '86 event by ASP provides an opportunity for four-strokers to show off their models, compare notes and generally enjoy model flying in Old Warden's relaxed atmosphere. The turn-out should be good (even higher if **you** come along) so, whether you're flying or simply spectating we can promise you a great day!

Join your favourite magazines at Old Warden!

ORGANISED & SPONSORED BY —

There will be a limited number of trade stands at all events and a car boot sale at Vintage Weekend. Camping and caravan facilities are available (phone 076 727 288 for details). Gates open at 9.00 am; flying starts at 10.00 am. Proof of insurance essential and models over 5kg weight must have CAA exemption and may be required to demonstrate effective failsafe facility. Frequencies: legal aircraft frequencies only. Pre-entry *not* required and any enquiries must include an s.a.e.

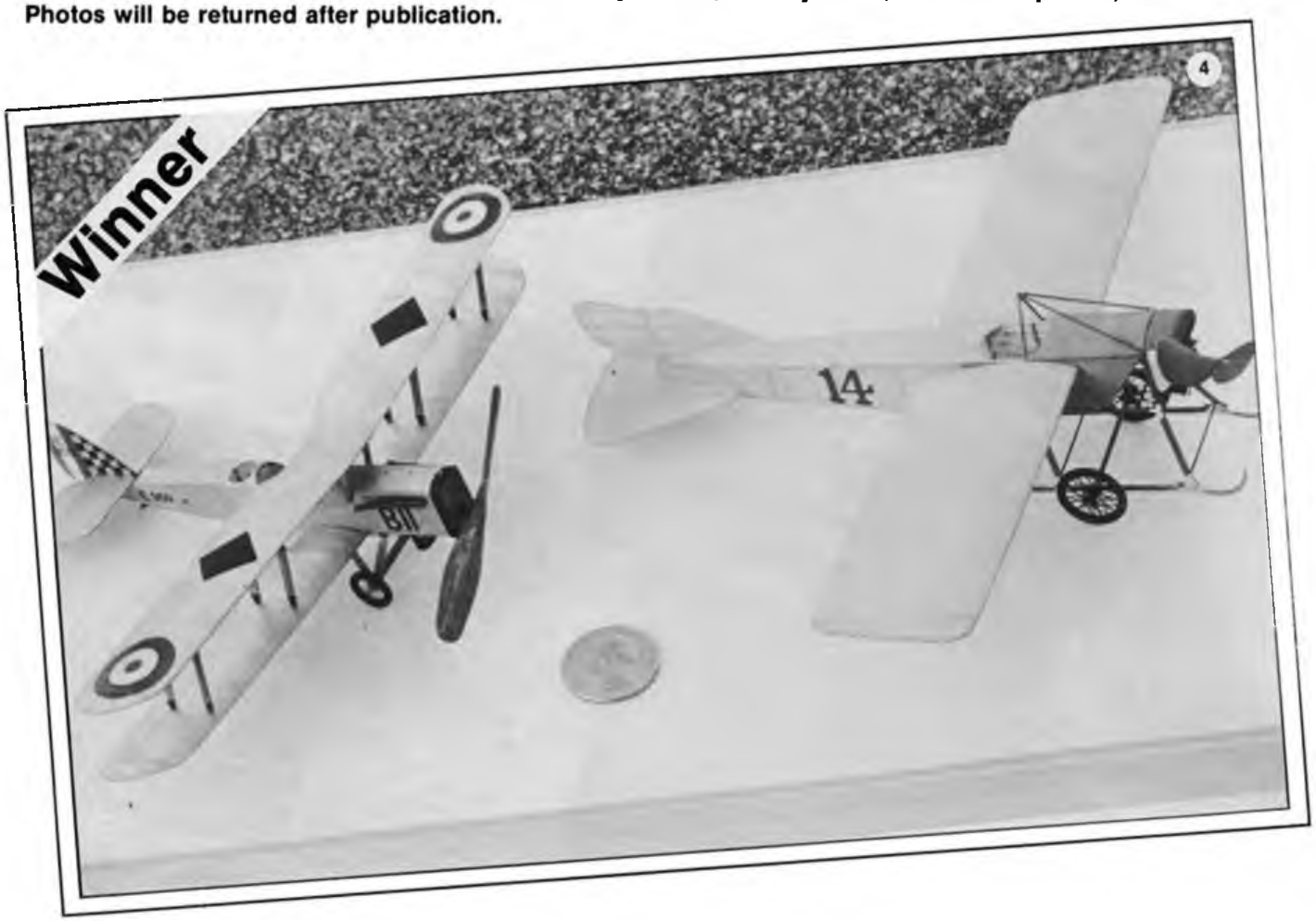
Organisers: ASP Ltd, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts. HP2 4SS.

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.



One of the nice things about running this feature is the kind letters (accompanying the photos) that F.P. receives from *Aeromodeller* readers worldwide. Naturally, he would like MORE!! So wherever you live, if it is in a semi-detached igloo, a mud hut with all mod cons or wherever, *and* have a photo of your aeromodelling masterpiece, organise a carrier pidgeon or a 747 and let Fliar Phil have it! Now to this month's international selection!

Photo 1

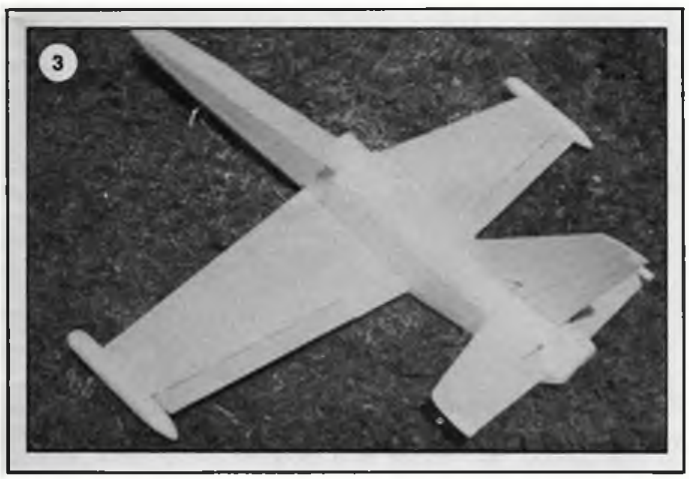
The pilot of this WW1 Sopwith Camel obviously knew his stuff; he finished his landing run just before ending up in the flower bed! This beautifully constructed Camel comes from Mr I Robertson of Newport, Gwent. For those interested (and that means all of us), details are: Built from an MAP Plan, 53in span, OS 40RC power, Sanwa 3 channel R/C, weight (less radio) 5lbs. All set for an OP Mr Robertson!

Photo 2

Can the lady standing beside this Piper Cub be the pilot? Actually (by means he has NOT disclosed!), Ron Elliott of Dundry, Bristol, Avon has photographed his lady wife in front of his latest model Piper Cub (power HB 15, Futaba R/C), standing on the tarmac at Lulsgate Airport. Ron says 'Yes, I'm still modelling at 61'. Well that gives Ron about another 40 years of aeromodelling. Great pic Ron. Thanks!

Photo 3

A most interesting model featuring sheet balsa construction. Displaying the typical lines of a modern jet fighter, this L39 Albatros comes from Mr D Goodwillie of Chatham, Kent. Details are: Span 58in, engine 10cc, 4 function R/C system. No question about it, when your Albatros reaches for the sky it will be an 'attention grabber' Mr Goodwillie. F.P's thanks for the other pix you sent him.



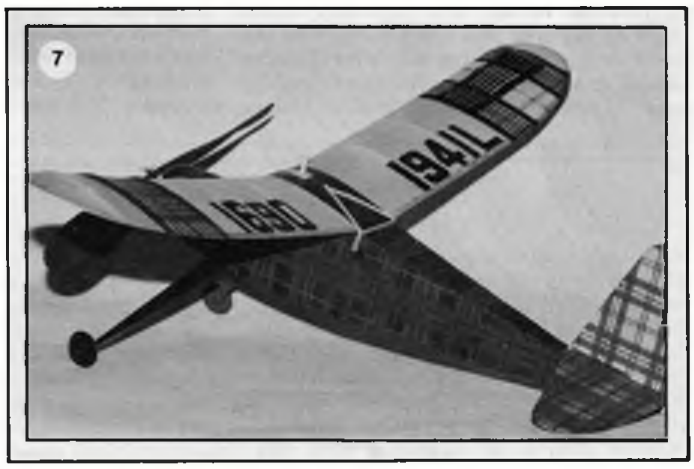


Photo 4 Winner

Never before featured in *'Photo Prize Model News'* the 'Pistachio' class of flying scale models! Around *half* the span of the popular Peanut class, these two Pistachio cuties are by Otto Kuhni of California, sent to F.P. by Bill Warner of Santa Monica USA. On the left, a DH9a (1.7 grams); on the right, a Bristol Prier (2 grams). Both span 8in. Flight times 15-25 secs - tiny but beautiful. This month's winners! Congratulations Bill, and Otto.

Photo 5

'You must be bored with the old DH Moth, but here's another one' - so starts Dennis Simpson's (of Lewes E. Sussex) letter, sent with this fine photo. F.P's *never* bored by a fine model, Dennis, and your Tiger Moth certainly is that! Differing from other 'Tiggies' F.P. has published, this one is *electric* powered. It spans 44in, weighs around 43ozs and has 3 channel miniature radio. Flight times about 5 mins.

Photo 6

This photo sent by Mr L W Rogers of Rednal, Birmingham, is of his 1/12th scale Miles 'Kestral'; it was the prototype of the Miles 'Master' which Mr Rogers helped to build during WWII. No, it is NOT an R/C model - it is powered by geared rubber motors! Built from an *Aeromodeller* plan, it sure puts rubber powered scale jobs back in the model aviation scene Mr Rogers!

Photo 7

It is F.P's guess that readers will recognise the model - a Pacific 'Ace'. BUT they will never have seen one covered in *five* different Scottish tartans! It comes from Duncan McRae of Winniepeg, Manitoba, Canada. Duncan says 'The five tartan colour scheme was used to win a bet with a flying buddy'. Bet your flying buddy didn't feel so good when he saw your 'tartan decorated' Ace, Duncan.

That's all for now. Be seeing you!

F1A Glider Technicalities

Martyn Cowley describes the latest trends seen at the 1985 World Free Flight Championships.

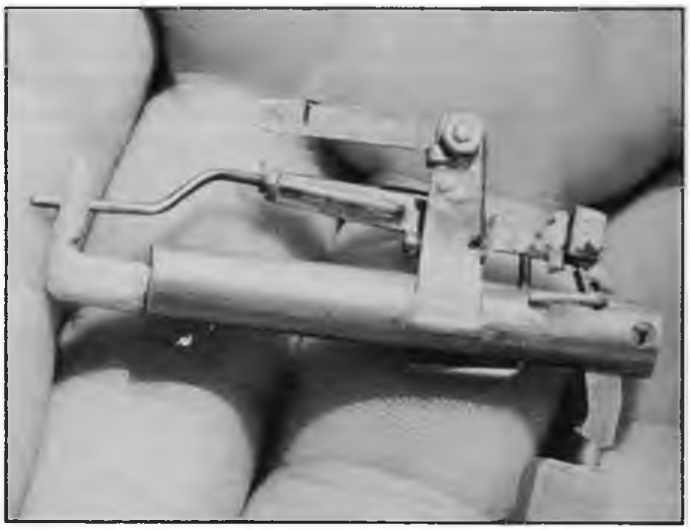
Chinese Champions

The models flown by the winning pair, Yue Liang and Kai Sun of China, represented conventional F1A design with detailed refinements. Their models were superbly trimmed and appeared to glide both slowly and very stably. Recovery from zoom launches was immediate and I can't remember having seen a single stall.

One of Yue's models was fitted with a new impulse latched towhook which is truly original (Figs 1 and 2). This device makes accidental releasing due to high wind or gusts impossible and offers the first major design improvement since the original latched Russian hook.

In the calm conditions at Livno, the Chinese were using timer operated V.I.T's to produce an additional 3mm (1/8in) incidence during circle tow, which drops immediately upon release.

Beneath the surface of these apparently all wood gliders, the Chinese have made considerable use of carbon fibre structural reinforcement. The main spar has two plies of pre-cured carbon caps, typically .012in thick on top and one layer (.006in) on the lower spar, with another single layer on the top of the rear spar. The wood used is actually not balsa but Tung wood, a Chinese equivalent, a little denser but which is used in thinner wood sizes to compensate. A typical weight is about 85gms (3oz) for a wing half.



Right, Yue Liang's impulse latched towhook prevents model releasing accidentally in wind.

The covering is also a little unusual, being bamboo tissue, which has longer fibres than regular modelling tissue, making it stronger. The tissue is applied dry and is never water shrunk (to avoid warps). Their choice of a modified Babic airfoil is also unusual but has remained a favourite with them since it was used on the Chinese models at Taft. This year's results confirm the potential of this vintage section which they turbulate with a 1/32in dia thread at 9% which seems surprisingly far back.

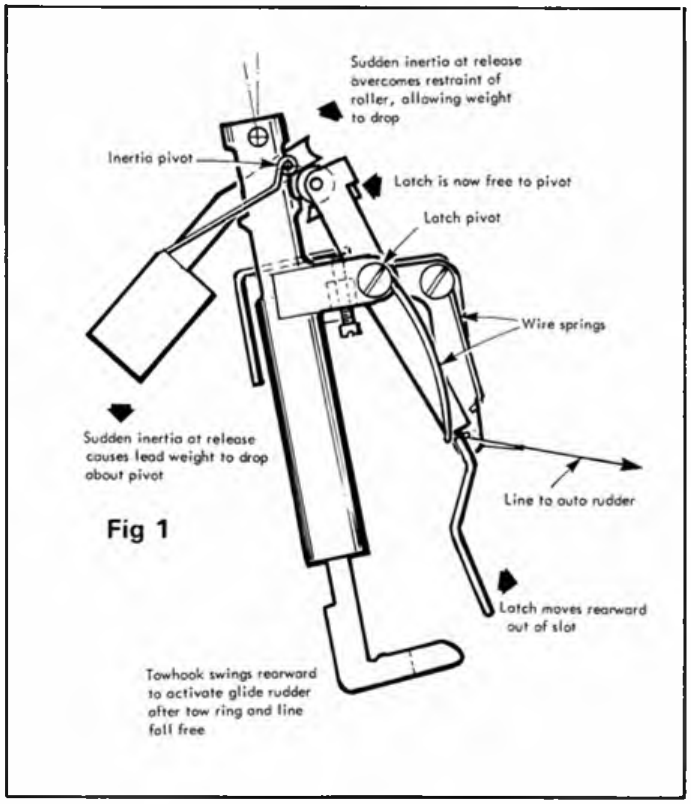


Fig 1

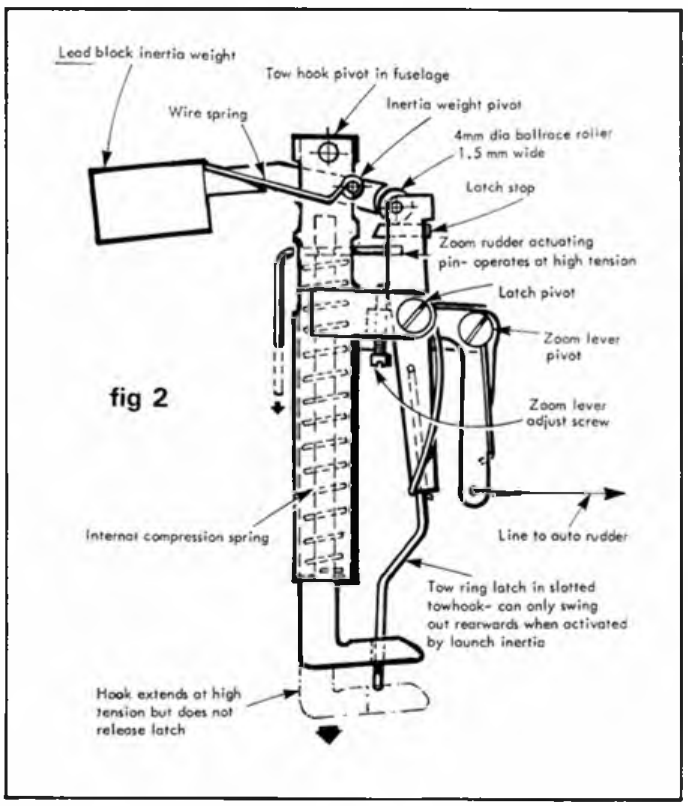
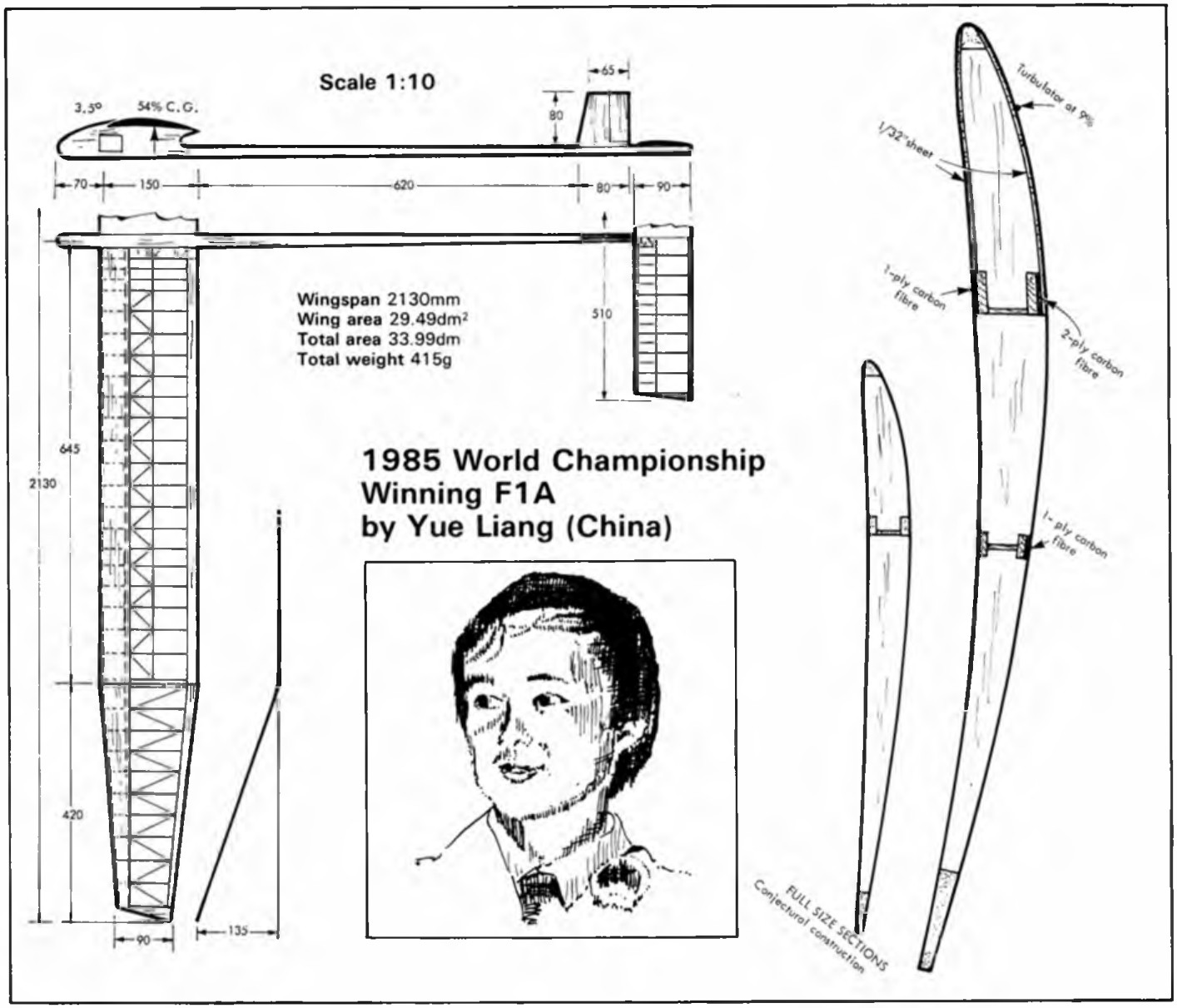


fig 2



Above happiness is flying an F1A: Australian Vin Morgan, 4th at the Livno Champs.

Vin Morgan's 1985 model.

The two models used by Vin, attribute much of their configuration to Andres Lepp's 'AC-29' and 'AL-34' designs. Vin increased dihedral and used upper surface invigorators to improve reliability. He flies with 4mm (5/32in) wash out in the left centre panel, both tips having 8mm (5/16in) wash out. Vin finds that using this considerable differential incidence improves zoom launches and is more forgiving of variations in airspeed at release; keeping the inside wing up to fast launches, and dragging round quickly into the glide if too slow.

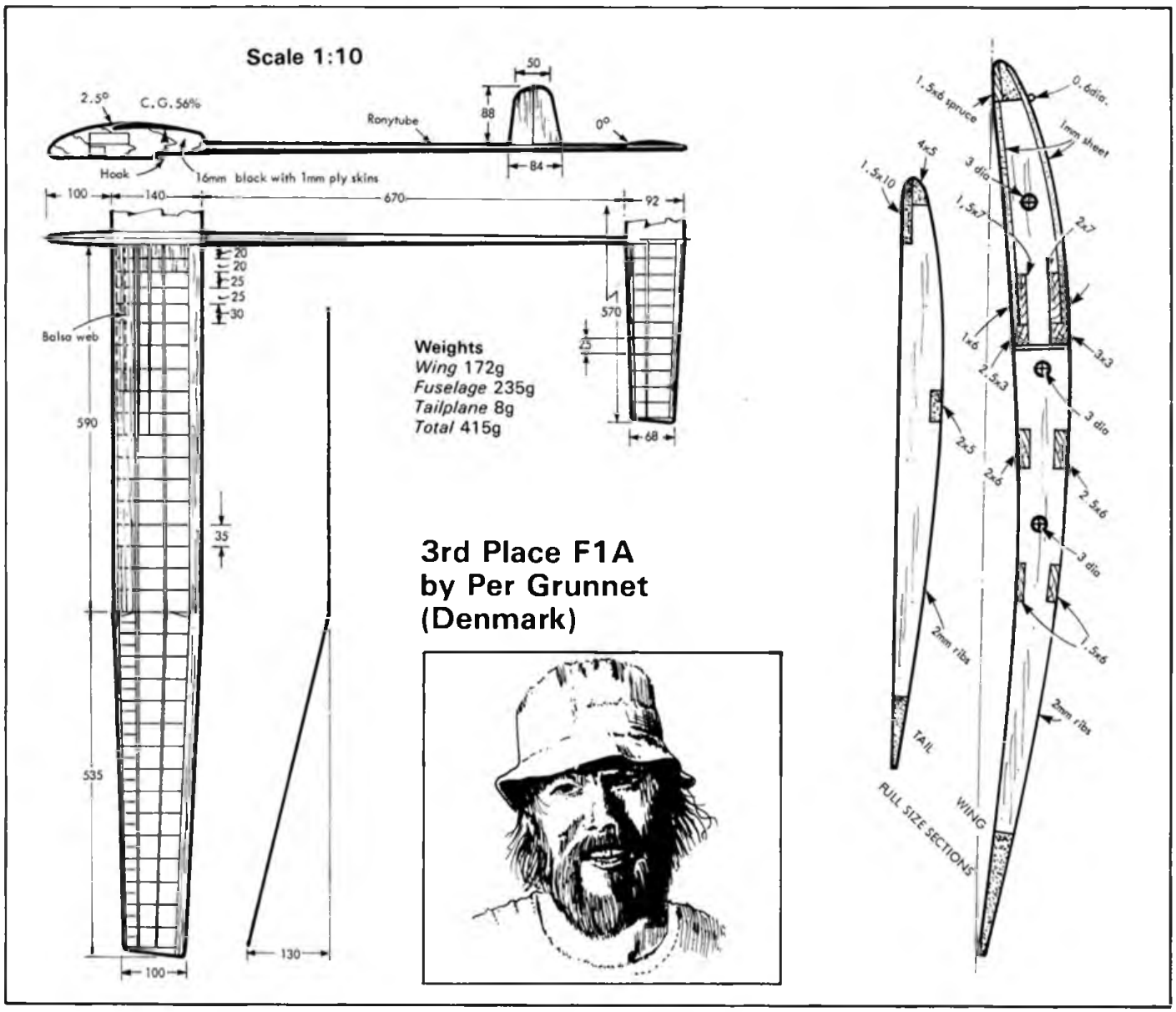
Vin says he continues to suffer from warp changes on his glass covered balsa structures and future models will be *Rohacell* foam. A recent change to a box fuselage of 3mm (1/8in) balsa tapering to 1.5mm (1/16in) covered in glass has dramatically improved the model over the original which used a quite flexible arrow shaft. Vin uses a *Bradley* towhook and *Koster* timer, together with his own radio locator beacon. This airborne transmitter weighs just 10 grams and I believe they are still available from Vin at:- 531 Canning Street, North Carlton 3054 Australia.

Per Grunnet's 'Andante'

Closely related to 'Cirkéline', his winning model at Taft in '79, Per's latest model 'Andante' illustrates the development of the design towards higher performance. An intermediate model 'Celeste', was designed to be much more robust. Built in 1980 it has full D-box sheeting with internal diagonals in the centre section. The 'Andante' represents a lightened structure with wings weighing only 172gms (6ozs) and a wing span stretched from the original 2084mm (82in) 'Cirkéline' and 2130mm (84in) 'Celeste' to the present 2250mm (88½in) - measuring the panels flat. Early flights showed inability to recover from stalls, with a rearward CG until trim was established at 56%. But still air time remained low until Per experimented with turbulators, which he had also found necessary on his earlier designs.

The transformation was complete, with excellent glide performance which Per describes as "seeming to dance in the air", responding to the faintest lift.

The Danish Team also put great emphasis on pre-event training and flew simulated contests on each practice day. Their experience showed them the need to accurately centre in the early morning thermals, which tended to fade out before three minutes at Livno.



Advances in wing construction

Without doubt, the biggest single advance in F1A at Livno since the event in Australi, was the widespread use of innovative composite construction. Indeed this year, the trend can be said to have encompassed all three classes: 1985 was the 'Composite Champs'. The use of carbon fibre and *Kevlar* or even glasscloth with foam plastics are allowing greater design freedoms - greater strength and stiffness...at a reduction of weight, and if that wasn't enough quite often in building time as well!

Russian Kevlar D-box wings

Trend setters in F1A for over a decade, the Russian flyers were again pushing forward the frontiers of model design with their very high aspect ratio *Kevlar* D-box wings. Victor Isaenko, famous for his sliding plate towhook and 1975 Champion Victor Tchop both had models of 2000 to 2500mm (87 to 97in) wingspan which they used throughout the event.

Victor Isaenko's straight taper wing, from 150mm root to 100mm tip chord (5.9 to 3.9in) spans 2465mm (97in!). The airfoil is only 6.5% thick and the wing weighs just 180 grams! (6.3oz). Such a model simply could not be built, and be torsionally stiff enough for fast zoom launches throughout the day, without resort to such composites.

The leading edge structure on Victor's models consist of two laminations of 120gm/m² (3.5oz/yd²) *Kevlar* cloth at 45° resulting in a laminate thickness of 0.24mm (.010in). The D-box is cleverly layed up with wet epoxy inside a 'V' shaped mould which incorporates a leading edge radius of 2mm (5/64in). After initial curing, *Kevlar* is used to cover the upper and lower D-box back to the spar in one piece - a perfect leading edge. The *Kevlar* is flexible enough at this stage to accommodate the upper and lower surface camber while it is glued to the front ribs and spar (Fig 3).

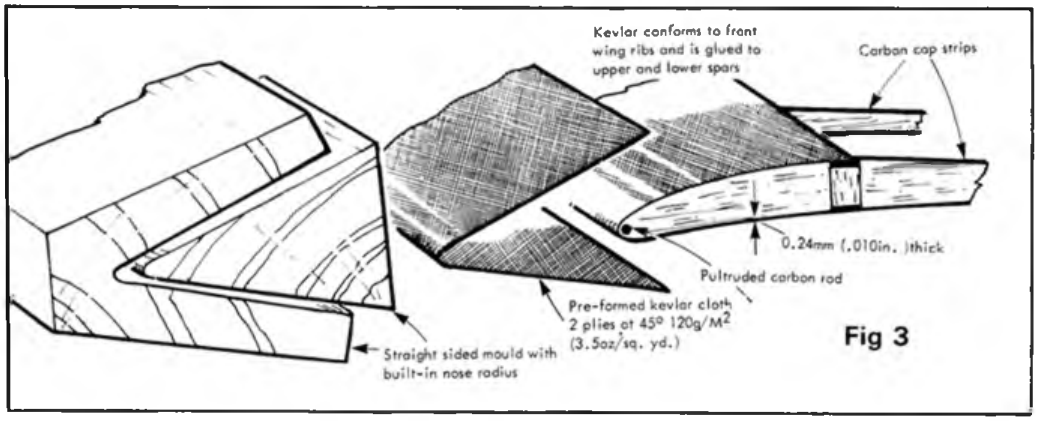


Fig 3

The spar is 7 × 1mm (1/4 × .040in) carbon fibre tapering to 4 × 1mm (1/8 × .040in) at the dihedral break and 2 × 1mm (1/16 × .040in) at the tip. The spar caps are fully webbed with vertical grain balsa and two 3.5mm dia (5/32in) wing rod tubes are tied to front and rear of this web with glasscloth. The wing ribs are also individually capped top and bottom with 0.12mm (.005in) carbon to ensure airfoil accuracy and strength and three caps extend over and tie into the mainspar. Carbon is also used to reinforce

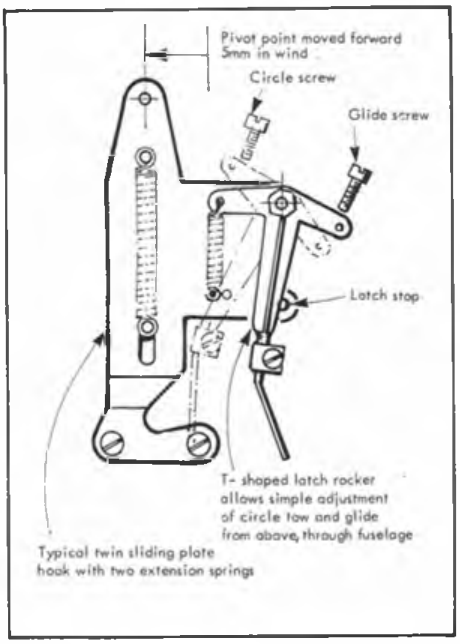
the balsa wing trailing edge... Altogether a remarkably elegant structure - how long before this joins the Russian Hook as standard equipment for the serious competitor?

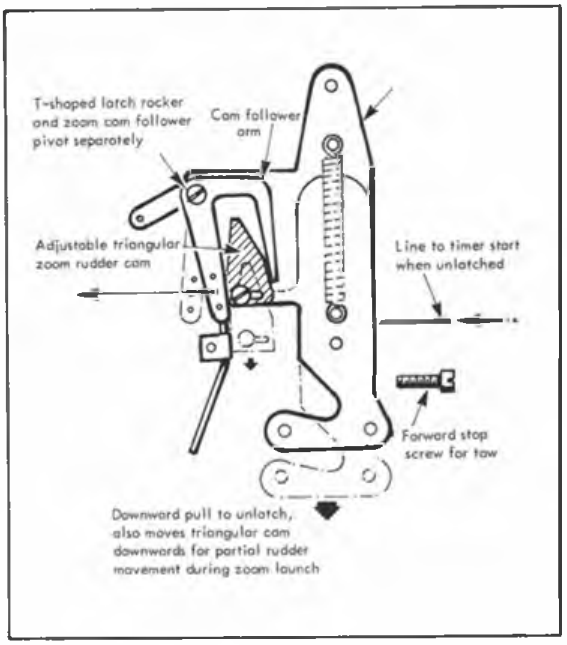
Ribless foam shells

For many years now, Dutch flyers such as Peter de Boer and Arno Haken have favoured balsa sheeted wings similar to power models. Now Allard van Wallene has brought this approach up to date using modern materials to produce a ribless construction.

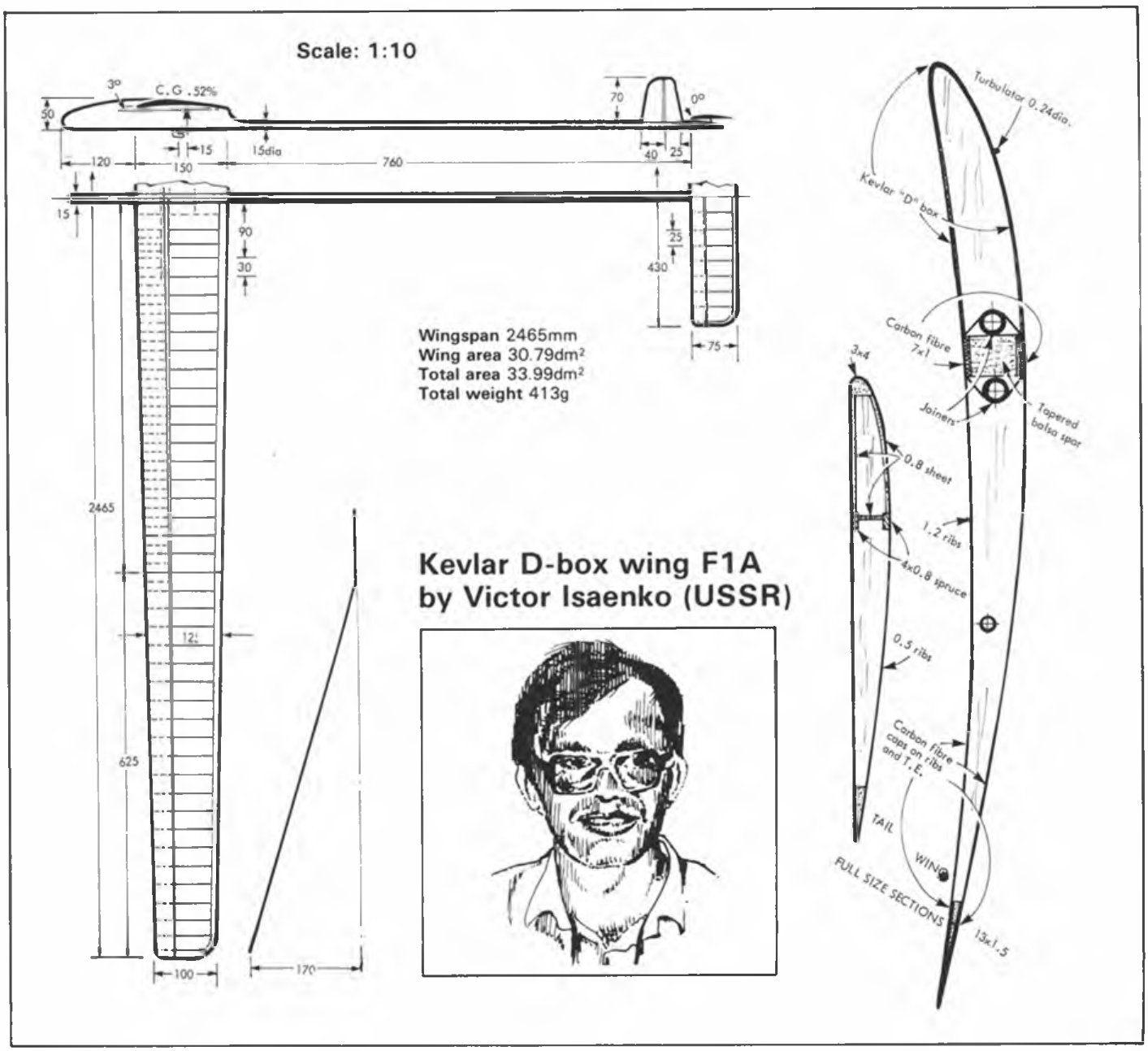
Allard makes his moulds from 50mm (2in) thick 38kg/m³ (2lb/cu ft) styrofoam hot wire cut, to produce one mould each for upper and lower surface camber. The skins are then laminated using 25 or 40gm/m² (3/4 or 1oz/yd²) glasscloth at 45° wetted out with long cure epoxy such as *Shell* 'Epilkote' thinned 50% with Methanol. 15gms (½oz) of epoxy will wet out a typical wing panel.

1.6mm (1/16in) thick, *Rohacell* Foam is used (about 3lb density). The glass/foam/glass sandwich uses thin PVC sheets as a release film, while being placed between two





Above, latest refinement in sliding plate towhooks from Victor Isaenko, originator of the idea, allows simplified adjustment screws in model.



flat flexible plastic sheets .4mm (.015in) thick. This assembly is placed between the moulds together with a 4mm (1/8in) foam rubber sheet pressure pad. The moulds are then clamped together with wingnuts and threaded rod between sheets of thick plywood to form the skins to the airfoil curvature (Fig 4).

Allard used to lay up the spar caps wet in grooves sanded into the skins but now he makes them separately. Spar caps are pre-cured undirectional carbon fibre, .55mm (.020in) thick tapering from about 9mm (3/8in) at the root glued to a full depth balsa or *Rohacell* foam web, wrapped with glass cloth or preferably *Kevlar* roving.

The outer surface moulds for upper and lower surfaces are then re-used to assemble the skins and spar by the same clamping method, using epoxy and microballoons. The leading edge is balsa strip carved to shape and the rear shells are chamfered and laminated together at the trailing edge. A typical weight is about 75-80gms (2.6 to 2.8oz) per wing half (Fig 5).

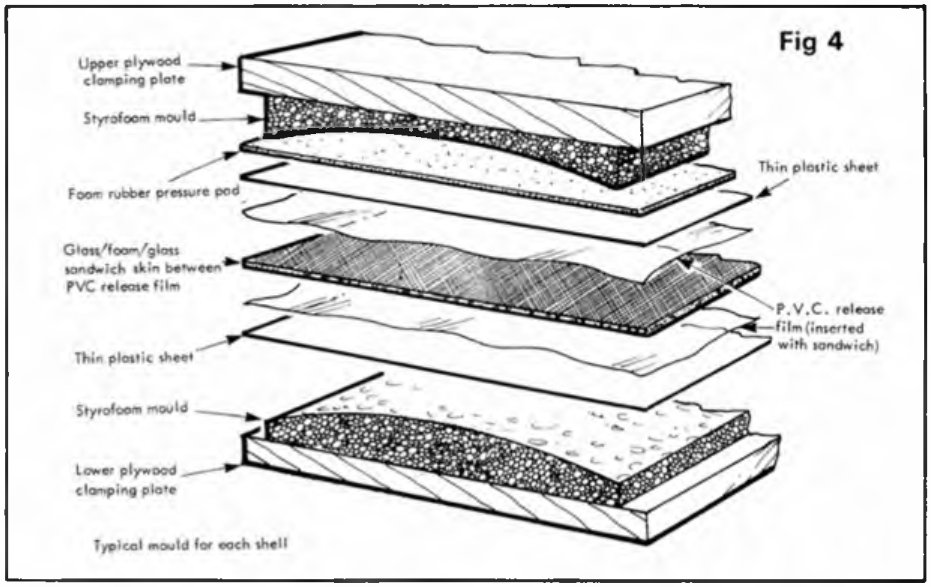


Fig 4

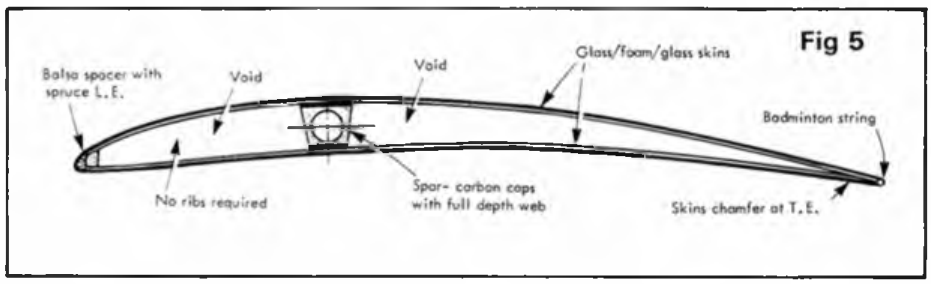


Fig 5

New timers

Allard also manufacturers small batches of electronic timers, with some nice features; being very compact at 20 × 64mm (¾ × 2½in), waterproof and lightweight at 15gms (½oz). An extra beeper function is switched on after DT. These timers use miniature switches to adjust flight time and two types run on either 9v dry cells or 6v Nicads. Availability is limited by Allard's spare time and price is 80fl, with Nicads 30fl extra from Allard van Wallene, Dreef 9, 3628BJ Kockengen, Holland.

Glass skinned foam cores

Belgian Leo Reynders, himself an International winner at Zulpich in 1984 was flying long span models constructed from solid foam cores, skinned with light glass cloth. Leo uses 33kg/m³ *Styrodur* (2lb/cut ft styrofoam) which he hot wire cuts to the full airfoil shape. The centre panels are then covered with 80gm/m² glass (2oz/yd²) with 40gm/m² (1oz/yd²) for the wingtips and 27gm/in² (¾oz/yd²) for the tailplane.

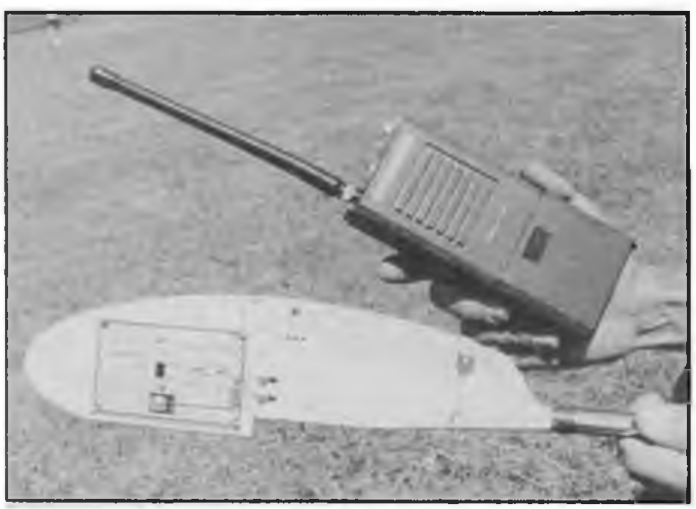
The main wing spar is carbon fibre, using 25k tows, tapering from seven at the root to two at the dihedral break and one for the tip and tail. The carbon spar caps are let into flat grooves cut in the upper and lower surface and a full depth web of 1mm ply-wood completes the I-beam spar. With the spar in place the glass cloth is wetted out on 0.2mm (.008in) *Mylar* film before laying together onto the wing cores, this produces a superb surface finish. Leo uses *Shell* 'Epikote', although any good slow cure (6-24 hour) epoxy should be fine. He also uses a homemade vacuum pump made from old refrigerator parts, but simply weighting the cores flat in their foam offcuts would be an alternative. The finished weights of 110gms (3.9oz) per wing half are acceptable, considering the high aspect ratio 2300mm (90.5in) wingspan, although the tailplane at 11gms (.4oz) is a trifle overweight and also probably over strong! Incidentally, Leo favours an asymmetric plan form, the left wing, being inside the glide turn, is 40mm (1.6in) longer.

Airfoils

A further surprise with Leo's models and many others is their choice of *Eppler* airfoils. Although highly successful on R/C gliders which operate at higher Reynolds numbers, the *Eppler* series has typically fallen short of performances predicted by Prof. Dieter Altgaus in studies at the University of Stuttgart, when used on smaller, slower flying F/F models. I have yet to see these sections work on models with traditional built up structures, however, with the exceptional accuracy and surface finish with this type of skinned foam construction Leo has used *Eppler 61*, *71* and *72* on different models with great success.

The choice of *Eppler* sections are further validated by Finland's Matti Liltame who also uses *Eppler 61*. His wings also achieve

Below left, prototype electronic timer with radio locator beacon from Jim Bradley (USA) could become available later in 1986. Below right, Bored with circle towing? Then why not watch T.V! Directional antenna helps 1983 Champion Matt Gewain (USA) track his model. Opposite page, top, distinctive elliptical tailplane on 4th place Uwe Rusch's model uses flat plate aerofoil. C.G of model is at 46%.



extremely high surface finish and accuracy by a different method. Matti's wings are covered with 0.8mm (1/32in) balsa sheet which is first layed up with 27gm/m² (¾oz/yd²) glass cloth and wet epoxy laminated face down on a flat glass table. This process literally achieves a glass-like smooth shiny finish for the outside of the balsa. While the epoxy is still soft, soon after 'curing', the sheet is wrapped fully around the leading edge, covering upper and lower surfaces with one seamless piece. The balsa has a 3mm (1/8in) spanwise groove at the leading edge to facilitate bending around a 1mm carbon fibre rod which ensures a constant leading edge radius. Respected Czech flyers Ivan Horejsi and Ivan Crha, now also use this construction method.

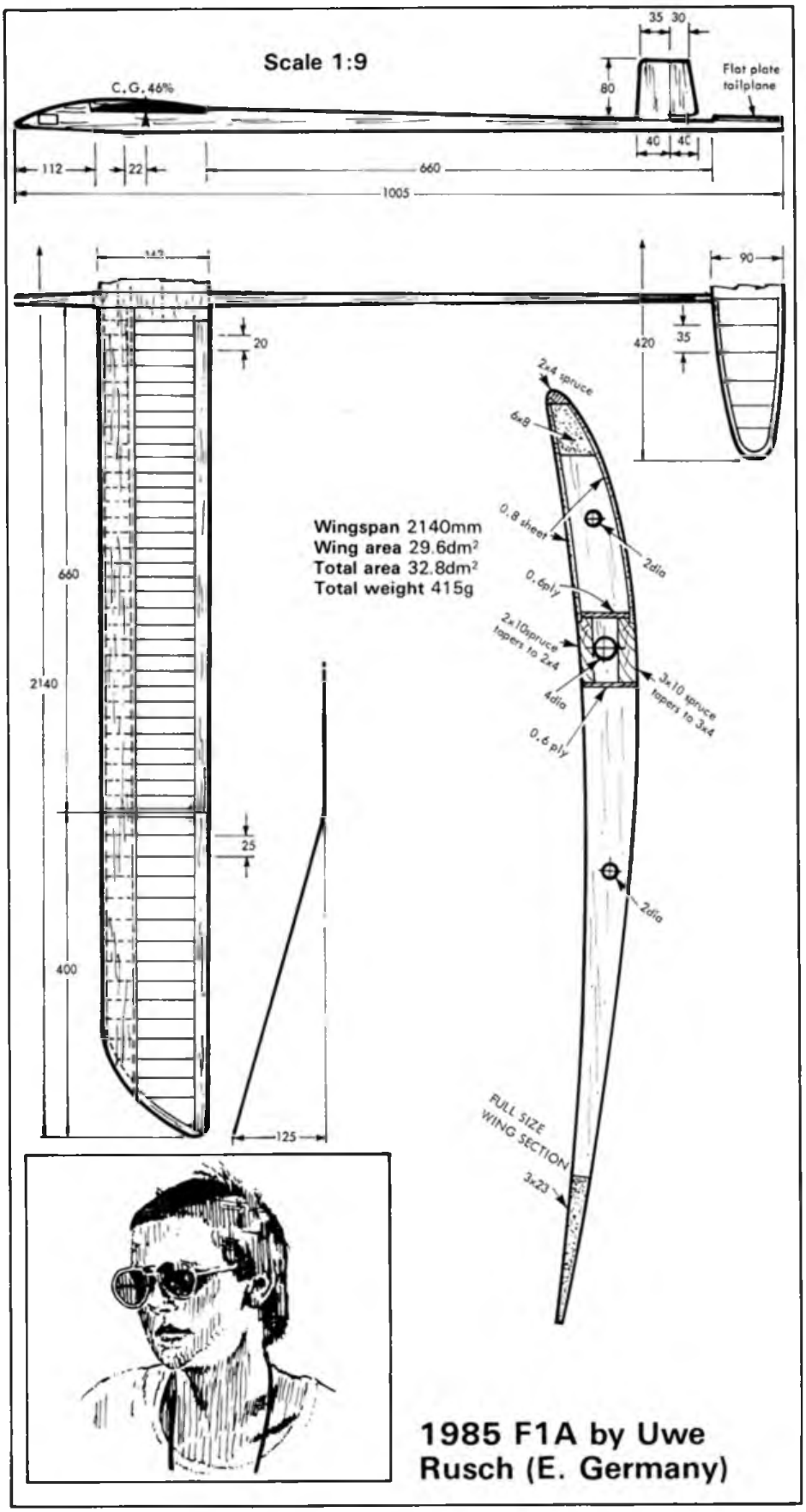
Stabilisers

The current FAI rules which limit total surface area, encourage the use of maximum wing area for efficiency with the minimum remaining area used for the tailplane to achieve adequate stability. The old arguments for larger 'lifting tailplanes' not being valid in modern FAI. Now a growing number are experimenting with CG position and semi or fully symmetrical tail sections in an attempt to optimise stability and reduce drag. Many flyers are using 6 or 7% thick symmetrical tail airfoils, with the CG at 40 to 50%. 4th place flyer Uwe Rusch used a thin flat plate tail with the CG at 46%. Over the past 6-8 years there has been a growing trend towards semi-symmetrical tail sections, typically with a thin sheet strip on the underside at the leading edge to allow a smooth 'Philips entry' to be shaped up towards the leading edge.

Radio Nordics

R/C? Well not exactly, but more flyers are turning towards airborne radio transmitters to help locate and retrieve models downwind. It should be noted that without special licences or permits, this is not necessarily legal in all countries. Retrieving turned out not to be a problem at Livno but many had come prepared. Vin Morgan benefitted in the marathon fly-offs with such a device and the Dutch have long used them.

On the U.S. team Jim Bradley was using a prototype electronic timer and locator which he hopes to market perhaps in 1986. Provisional pricing for the timer would be about $50, and with the locator about $80, or if bought separately about $35 for the locator. The system is designed to utilise a standard C.B. radio modified with a directional antenna and new crystal at a price of about $100 but of course you should only need *one* of those! Matt Gewain was using a commercial unit, used to track wild life, with an investment double that of Jim. However his transmitter weighs less than 10gms (½oz) with a lithium button cell which runs for two days having a range of 100 yds on the ground or up to a mile if in trees. Matt's ultimate fly-off model also was equipped with flashing strobe lights to maximise time in evening conditions against the dark hill in the background. His tactics were sound - it's a pity the reigning Champ wasn't in at the finish.



1985 F1A by Uwe Rusch (E. Germany)

Kit Review

SKY HOPPER

Vic Smeed reviews this electric powered free flight model from Japan

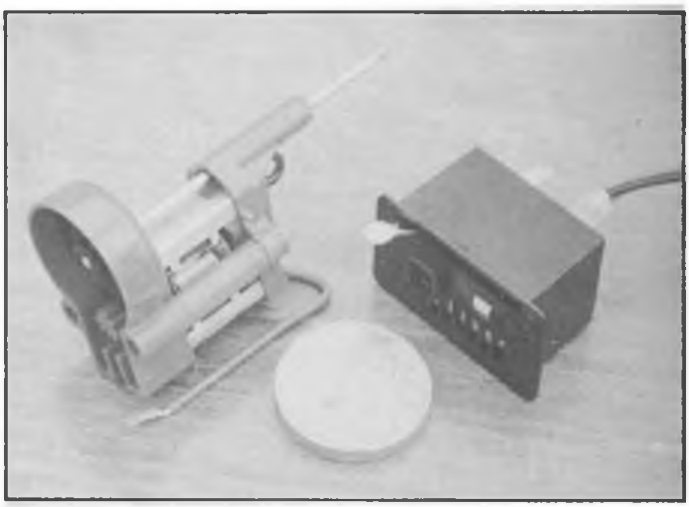
This is an intriguing kit (by Union Model Co. Ltd., Tokyo, imported by Amerang) because of its tiny electric power unit. There is a sub-package which includes a little rectangular motor (approx 3/8 × 5/8 less than 3/4in), a ready-assembled battery unit with two miniscule 50mA nicads, switch, charging contacts and wiring all complete, and a dry battery charger case. Apart from these and the wings and plan, the main box seems fairly empty, but, on removing the sub-pack, half a dozen polythene bags are revealed. In fact, the kit is complete down to the two miniature tubes of adhesive and rubber bands to hold the wing. Nothing extra is needed, unless you wish to colour the balsa parts and the acetate faring, except a knife and, for one operation each, a small hammer and pair of pliers, plus a means of making six small holes through balsa and a small cross point screwdriver. Even glass-paper is supplied.

The colourful box lid includes illustrations of a finished model, with additional painting, it says, though it doesn't mention the king-post and rigging wires on the model shown and nothing of these appears on the plan. There is a list of features, in English, sort of, some of which take a little sorting out. It does say "Super detailed scale model plane", which is stretching things a bit, and "Suitable for ages 12 years and over" - elsewhere it says 10 years and, while either may be true for flying the model, few 10 or 12 year olds would find construction easy.

There is a plan 30 × 20½in, which might seem a lot for a 19½in model but it does include illustrations of everything in the kit for identification, general building hints and step-by-step drawings, all copiously captioned - in Japanese - plus full-size keyed structural three views. There is also a separate 'check list' of dos and don'ts and trimming/flying notes, also in Japanese. Review kits sent in by importers are frequently pre-main stock samples and do not therefore include the English instructions which will be appearing in distributed kits, although in the present case, with English on the box, translated instructions might have been expected inside.

Perhaps it is felt that the stage drawings are sufficiently clear, and in most cases this is so. A complication, however, is that there are five parts on the two injection moulded sprues which are not used in this kit, and one part which is only provided to cover the thread end of the prop-shaft while it is tapped with a hammer to drive the other, knurled, end into the larger gear of the reduction pair. Establishing which of the two tubes is balsa cement and which suitable for polystyrene is a matter of trying on a scrap piece of plastic; the bottom of the fin has to be reshaped and this provides some scraps. There were two fins in the sample kit, and two prop-shafts. The latter is intentional (presumably a spare in case one gets bent) but the second fin may have been accidental, unless it is the part most prone to damage?

The design is rather different from normal, the fuselage consisting of a built-up balsa nacelle carrying a flat platform beneath on four aluminium tubes about 1/8in o.d., with the tail surfaces on an outrigger made from three more tubes and a tube strut at the front. The motor plugs on to a moulded housing glued to the front of the nacelle and the battery box and undercarriage are located in cutouts in the bottom platform. Balsa quality and die cutting for the nacelle parts are first class and the method of assembly provides automatic location of all the aluminium tubes. Flying surfaces are all coloured expanded



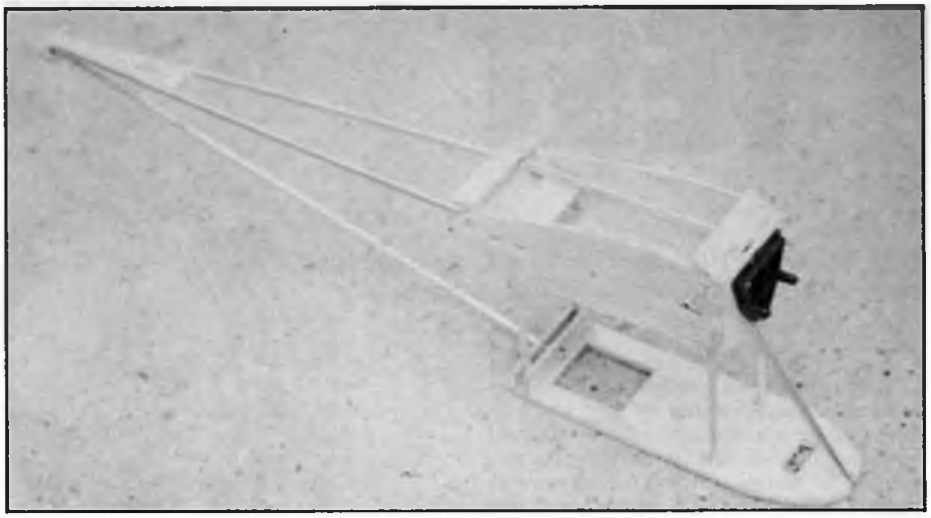
polystyrene and the wing comes folded in one piece, having to be opened out and glued to the dihedral shown. A further moulding fits over the centre section and, after trimming away part of the c/s l.e. (another head-scratcher initially!) the wing fits snugly on its seating on the nacelle. The larger of the two adhesive tubes appears to be similar to what is sold as 'universal adhesive' and seems to stick the plastic and the aluminium bits satisfactorily.

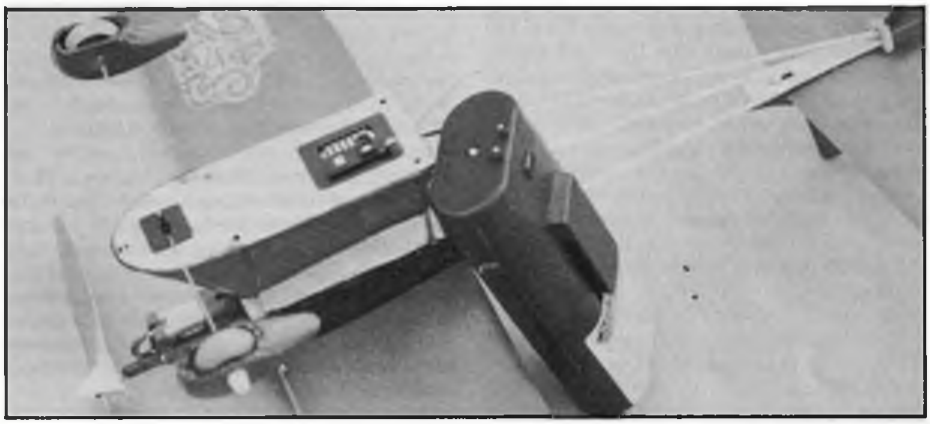
Mouldings are supplied to make up the motor unit which incorporates a 4½:1 reduction. The front one incorporates a long prop-shaft bearing and clips to secure the motor leads, which are already in place on the motor. Holes have to be made in the nacelle front bulkhead to pass the wires from the battery box and twisted joints, protected by sleeving supplied, mean that the motor and power supply can be removed without cutting any wires. The prop, a 5¾in. dia plastic moulding obviously originally produced for rubber power (it has the free-wheel cams), slides on the shaft and is locked by a neat screw-on spinner which in turn has a tiny glued-on nose cap.

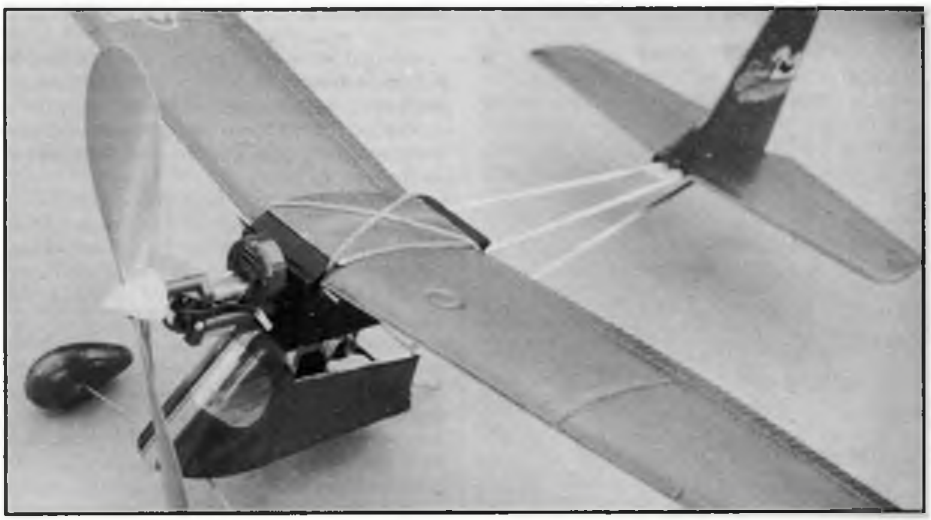
Polystyrene spats, moulded in halves, enclose moulded wheels and fit on a pre-formed undercarriage which plugs into a plastic box fitting in the base platform. Moulded pips forced on the axle ends and short vertical bends in the wire, glued to the spats, hold all secure. Reinforcement is provided by two rectangular patches over the vertical wires and these are printed and die-cut on the decal sheet - a bit of a puzzle till it was discovered that the 'decals' were printed on self adhesive film. A short length of wire needs bending for the tailskid. The fin bottom, as mentioned, is modified and the fin and tailplane glued in place on the end of the outrigger.

This is as far as the plan instructions go, but the box illustrations show a wrap around fairing and there are two shapes drawn on the plan, plus a sheet of thin acetate in one of the packets which obviously relate to this. It is the least satisfactory structural part of the plan and flying test sketches omit it, but it does enhance appearance and must have some aerodynamic advantage. A strip of scrap balsa cemented to the top straight side edges and to the four tubes would be an improvement, and it also needs to be coloured to become visible.

All that remains is to assemble the contact parts of the charger box (study the drawings carefully, especially two hollow rivets which fit inside coil springs) and obtain four UM-2 (clock size) dry batteries. Charging is by holding two spring contacts on the charger against contacts on the battery box for not more than 60 secs., making sure that the polarity is correct by matching moulded shapes on box and charger. According to a graph on the box, this should give a 25 sec power run at 2500 motor rpm (555 prop rpm). The box also gives model weight as 2.11 ozs and ours was close at 2.2. There will be three fat little screws left over, by the way, and these are for ballast if needed. Our model balanced as specified but has a steep glide and would not climb under power. It was felt better to score (with a sharp blade) the underside of the moulded elevator line and introduce a touch of up elevator (glued when finalised) but probably all three screws positioned at the base of the fin would have achieved satisfactory flights.







Far left, very complete kit includes a drycell charger for the tiny rechargable flight battery. Left, one pound coin gives some idea of the size of the Skyhopper's motive power. Top above, construction is very easy with light alloy booms for rear fuselage. Above middle, the charger has simple keying system to ensure correct charging polarity. Above, charged up and ready to fly...

It would appear as though the moulded wing and tail units are second use of moulds originally made for a different model, probably a rubber powered Cessna which would probably use the same prop. Performance of Sky Hopper is about on a par with what might be expected from a moulded 19in rubber model, ie a reasonable climb for perhaps 20 secs followed by a glide of 10-15 secs, ideal for a small area of 100 yds or so square. The specially made parts - the moulded gearbox and ready-made battery unit - are the outstanding parts of the kit and deserve attention. Used in a lightweight 120-140 sq in model, perhaps an adapted P.30 rubber design, quite respectable performance could be achieved.

It was noticed at the M.E. Exhibition that Proops has similar motors on their stand (at four for £1!) in two types, one with flat spring brushes and the other with carbon brushes and also fitted with an 8t pinion. With a 36t or larger gear and a pair of lightweight ni-cads the wherewithal for small electric FF experiments exists.

The Sky Hopper is a cute looking model and our review sample has attracted a lot of interest. As something different for construction and fun flying it can be recommended, but its major role may well be as a pointer to a new direction of development in powering small and inexpensive models...

ENGINE TEST

PAW 80: Mike Billinton takes a long overdue look at this most popular diesel engine.

Gig Eifflaender's smallest production diesel has been available to modellers for some 4 years, so this delayed test was conducted more as a matter of record than of providing up-to-date information. In any event, the results arrived at appear to confirm the already high reputation of this engine.

As some readers may know, the PAW 1cc diesel appeared a year after the .8cc version, and essentially is a 'bored and stroked' variant of it - within the same crankcase. This was achieved by increases to bore and stroke dimensions (.038in and .016in respectively). In fact, the only distinguishing mark between the two engines is a stamped number in the aluminium rear cover. An idiosyncracy of the 1cc engine was the actual measured capacity of only .92cc ... similarly, this .8cc engine has an actual undersize of .737 cc cylinder capacity.

However, the test engine's performance was such as to suggest that Gig Eifflaender continues to place rather more emphasis on getting his engines to operate well than on achieving a set of precise dimensions which often have little relevance in a 'sports' engine of this style. A more practical way of looking at it could be to say that approximately .018in is available for any future cylinder rebore before the .8cc capacity is reached. There was little evidence, though, of the test engine becoming a likely candidate.

Small differences in port timings between the two engines were noted:-

	.8cc	1cc
Exhaust	130°	140°
Transfer	110°	130°
Induction		
Opens ABDC	66°	62°
Closes ATDC	39°	25°
Total	153°	143°

Mechanical details

Constructionally, the PAW .8cc diesel follows the well-proven and mechanically solid layout which has become the familiar PAW trademark since the mid-Fifties.

Crankcase: An aluminium alloy die-casting comprising housing for crankshaft and support for lower cylinder. The main bearing is the case material, ie a full-length plain bearing giving long life and more than adequate support.

Crankshaft: Of hardened steel with a ground finish. Crankpin web and main-shaft are all one piece, and junctions between them are heavily radiused to reduce stress at these points.

Cylinder liner: Fabricated from the same material as the shaft. It has three equally spaced exhaust ports and three combined transfer ports and passages. Exhaust timing at 130° is low and has 10° lead over transfer port opening.

Piston: Constructed from spheroidal cast iron, subsequently ground and then lapped to final fit to liner.

Connecting-rod: Turned from high-duty aluminium alloy. Though featuring neither bushes nor lubricating holes, the large volume of lubricating oil usual in model diesel operation makes more elaborate rod detail less necessary.

Contra-piston: Also in cast iron. Interestingly (and logically) the combustion chamber shape is similar to most glow-plug engines, ie a flat annular squish band surrounding a central 'top-hat' chamber. The earlier idea of using shallow conical piston top and matching contra-piston chamber in conjunction with the annular ported diesel liners no longer seems in favour at the PAW premises.

Performance

It is inevitable that the smaller the engine size, the more chance of variability of performance between samples; and the markedly good results from this .8cc test motor are felt to indicate a particularly well set-up engine.

At certain points its performance out-ran the earlier tested PAW 1cc engine (*Aeromodeller*, November 1984), and its ability at the high RPM end certainly outstripped that of the bigger engine.

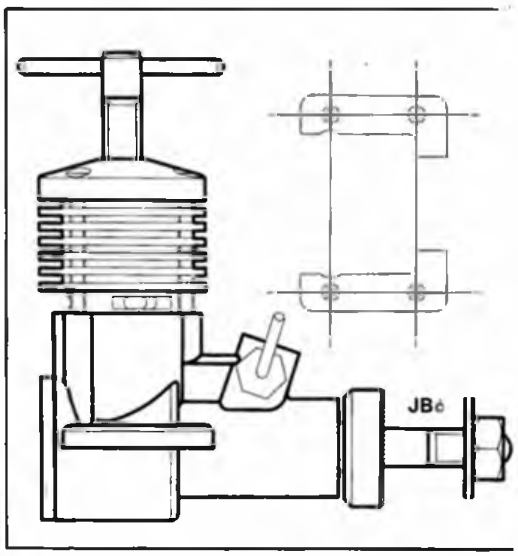
Possibly, lighter piston weight, increased induction period, and slightly larger transfer passages may all have helped to keep power charging on above 20 000 rpm.

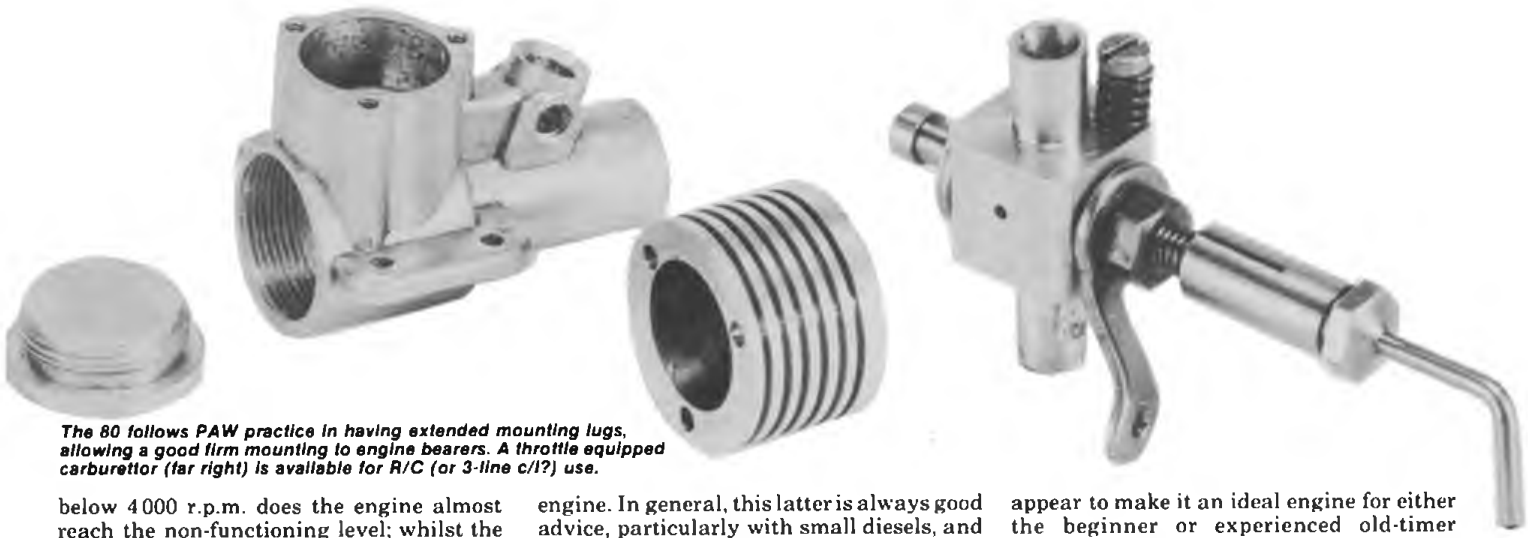
Fuel used throughout was Model Technics D2000 sports special diesel mixture. Torque figures were monitored from 2 000 to 23 000 r.p.m. and showed a maximum of 7.8oz ins. at 11 800 r.p.m. - ie at an appreciably higher r.p.m. point than the 1cc engine's 7 300.

Equally the maximum b.h.p point appeared at the higher r.p.m. of 19 500 compared with the 1cc engine's 18 200 r.p.m. Actual power level itself was almost identical - at .121 b.h.p.

Again much in evidence was the extremely wide r.p.m. band uniquely resulting from the *variable compression* diesel. The torque graph suggests that only

As with other engines from PAW, the 80 is built to last, the crankshaft and cylinder liner both having generous proportions.





The 80 follows PAW practice in having extended mounting lugs, allowing a good firm mounting to engine bearers. A throttle equipped carburettor (far right) is available for R/C (or 3-line c/l?) use.

below 4000 r.p.m. does the engine almost reach the non-functioning level; whilst the h.p. graph shows 22000 r.p.m. as the point beyond which equally it would be pointless to go. The widest range of propeller sizes to fit within those extremes is from 10 × 4in to an almost unuseable 5 × 3in. Whilst the 10 × 4 would just give an operable result for a slow flying, lightly loaded vintage-style model of around 40in span and 12ozs weight, a more effective size for more normal operation would be 7 × 4in or 8 × 4in.

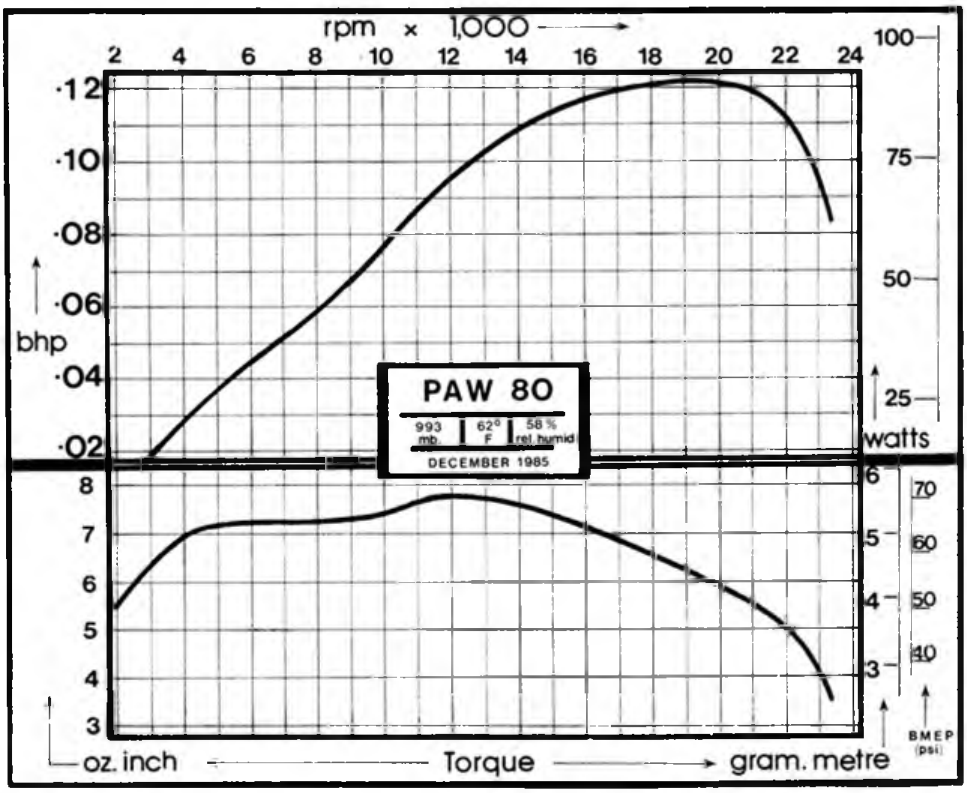
General performance levels improved slightly with time, though it must be said that the PAW 80 was eager to go 'out-of-the-box' - which probably reflects the fact that this manufacturer adopts the relatively rare practice these days of running every one of their engines prior to despatch, and so overall viability of each unit is ensured and control settings are left at their optimum running positions.

The manufacturer advises against over-tightening of cylinder bolts and *strongly* against unnecessary dismantling of the engine. In general, this latter is always good advice, particularly with small diesels, and those engines which have no really precise method of axially re-aligning cylinder and lapped pistons together.

Compression screw adjuster was precise in action, easy to operate and never unscrewed involuntarily. As the photo shows, it is also sensibly large in relation to the engine size; in fact, it is designed to fit the fingers rather than the engine. The needle valve, however, is rather difficult to approach when the engine is running, though it is quite robust and positive in operation. As the range of fuel settings possible is quite wide, then this problem is not severe - because the needle can be turned, say, ¼ turn either way whilst the engine is stationary.

Summary

The PAW 80 proved to be another fine performer, in addition to being a constant and exemplary starter. Vibration levels were low and overall its characteristics appear to make it an ideal engine for either the beginner or experienced old-timer needing a simple, trouble-free unit for general sports use in any area of aero-modelling - whether Control line, Free flight, or even R/C - for which use a throttle-equipped carburettor is available. Finally, the current retail price continues to make this range of engines - and the 80 in particular - extraordinarily good value.



PAW 80 Diesel

Dimensions & Weights

Capacity	.045 cu in (.737 cc)
Bore	.4016 in (10.2mm)
Stroke	.355 in (9.0mm)
Stroke/bore ratio	.884/1
Timing Periods	- Exhaust 130° - Transfer - 110° - From Induction - Opens - 66° ABDC - closes 39° ATDC
Squish band angle	0° - Total 153°
Squish band width	.079in (2mm)
Crankshaft dia.	.2813 in (7.14mm)
Crankpin dia.	.1545 in (3.92 mm)
Crankshaft bore	.18in (4.57 mm)
Gudgeon pin dia	.1093 in (2.77 mm)
Connecting rod centres	.71in (18 mm)
Height	1.85 in (47 mm)
Length	1.85 in (47 mm)
Width	1.16 in (29.5 mm)
Width between bearers	.740 in (18.7 mm)
Mounting hole spacings	.45in × .93 in (11.4 mm × 23.6 mm)
Mounting holes	.084 in (2.13 mm) (8 BA)
Frontal area	1.37 sq ins (8.83 sq cms)
Weight overall	2.4 ozs (68 gms)

Performance

Max. bhp - 1.21 at 19500 rpm (Open exhaust)
Max. Torque - 7.8 oz ins at 9700 rpm (Open exhaust)

Rpm on Standard propellors:

10½ × 6 Graupner nylon	- 3750
8 × 6 Zinger	- 6348
7 × 6 Zinger	- 8161
8 × 4 Zinger	- 8209
7 × 6 Topflite	- 8280
7 × 4 Master	- 10250
6 × 3 Master	- 16140
5½ × 4 Cox	- 16700

Performance Equivalents

BHP/cu in	- 2.68
Bhp/cc	- .16
Oz in/cu in	- 173.3
Oz in/cc	- 10.6
Gm metre/cc	- 7.6
Bhp/lb	- .8
Bhp/kilo	- 1.77
Bhp/sq in frontal area	- .088

Manufacturer

Progress Aero Works
Park Mill,
Hobson Street,
Macclesfield, SK11 8BE
Price: £16.68

SCALE MATTERS

Free flight with Bill Dennis

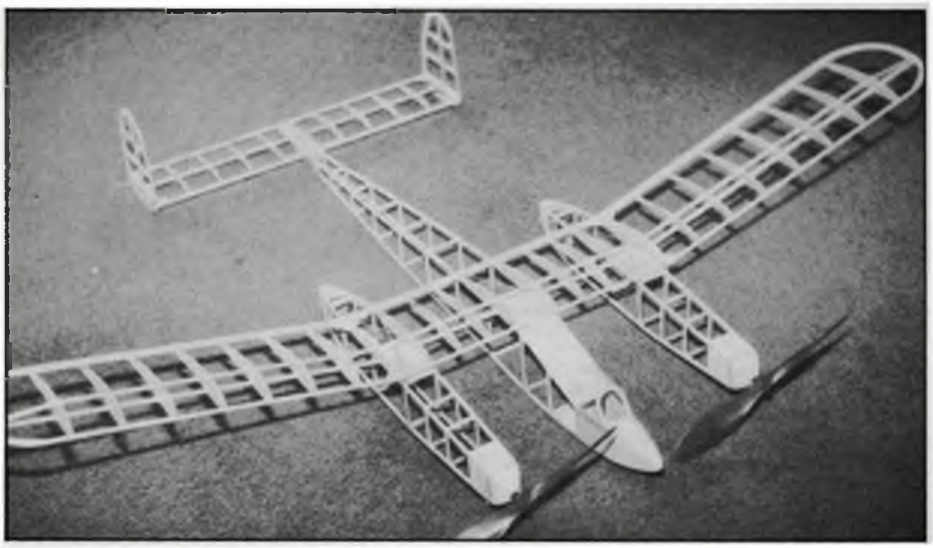
Charles Newman has sent details of the 'Dreaming Spires' Free flight scale meeting to be held at Port Meadow, Oxford on 27th July. The host club is Oxford MFC, and there will also be vintage events. The combination of vintage and scale will, I am sure, be a very good one.

"There will be several scale events, as follows:-

1) Rubber power (minimum wing span 15in)
2) CO_2
3) Power/electric (max. engine capacity 1.5cc)
4) Twin rubber scale.
5) Mass Launch (rubber and CO_2 combined)

Documentation will be required for events 1-4, to a minimum standard of a 3-view, two photos and colour details. There will be no minimum qualifying flight time, but there will be a duration element in the flight scoring. All flights will be hand launched. The mass launch event will probably be chaotic, but certainly fun - all models launched at the same time, and the last one down wins the champagne!

Port Meadow is a very noise-sensitive site, and the guidelines on flying power models will be strictly enforced. Only models entered in the competition will be allowed to fly, with no ground running of engines. Note the maximum engine capacity of 1.5cc, but do not turn up with a Cox 09 powered Concorde, or you will be sent down "...



Charles Newman's 'Pipistrelle' may not be scale but it'll teach you all the basics of rubber twin flying - besides, it's a fine performer...

Events like this and the Walsall club meeting must be supported if F/F is to flourish. For a long while it has been obvious that, while the big SMAE events like the Nationals - indoor and outdoor - are well supported the other meetings on the calendar have withered. The way is open for interested clubs to run their own events, perhaps using experimental rules, and in this way, the SMAE meetings and private enterprise will complement each other and generate enthusiasm.

It will be interesting to see the response to the rubber powered twin event. Charlie has long been interested in this type of model, and his recent article on the subject resulted in two long letters from the USA where the class is popular. I have included a photo of the freelance rubber twin designed and built by Charlie and for which plans are available from SAMS. Although not a scale model, it would be an excellent 'primer' for anyone interested in having a go. By all accounts the performance is phenomenal and the model is very simple to trim.

Top, this large Zippy Sport by Lindsay Smith was 5th in Open Rubber at Crawley. Below, Peter Frostick's Buhl Pup placed 1st in the same event.

Top, Nick Peppiatt's perky Halton CLA3, 4th in Open Rubber. Below, flights completed and ready for judging. G. Oulds' Peanut scale Piper J3.

Indoor with Vic Willson

For a change my contribution to this month's *Scale Matters* concerns mainly free flight items, but I'm sure that Bill Dennis will excuse the intrusion - I might even persuade him to give some impressions of a control line event during the season!

Having been a regular visitor to the Southern Area indoor meeting held at the Crawley Sports Centre early each season I have come to look forward to it as an occasion when there is time to talk scale 'shop' without the usual pressures at outdoor meetings during the summer. In fact, it has been noticeable how many 'outdoor' flyers, in various disciplines, either just turn up for a look round or enter one of the various classes catered for.

This year, however, for one reason or another there were fewer people present, perhaps because of a lack of publicity (due, I understand, to some hard bargaining over the charge for the hall, which left confirmation of the date until the last minute).

The scale entry lists this year were shorter than usual, with four in CO_2, five in Open Rubber and 15 in Peanut, but what the entry lacked in numbers was certainly made up for in quality. The standard of the top models was as high as ever and the competition very close. The scale flying sessions were interspersed throughout the day with the duration classes and trimming periods, giving everyone, as far as possible, a fair amount of 'floor' time - especially those canny enough to enter two or three classes.

CO_2

Outstanding of the CO_2 models was Nick Peppiatt's well known Sopwith Tabloid which made a long, high flight just grazing the roof before descending to a spontaneous round of applause. This flight was the highest scoring in the CO_2 class and, together with a good static score, proved to be a winning combination.

Butch Hadland, on the other hand, seemed to have several problems with his Mr. Mulligan, the most serious of which was its failure to take off and, although Butch had top static score, it was insufficient to make up for a hand launch which resulted in an unaccustomed fourth place.

The indefatigable Lyndsey Smith, after a shaky start with his attractive Fairchild Forwarder, made a good second flight and, although the model had the lowest static score, this flight was enough to take second place.

David Deadman's De Havilland Puss Moth appeared to be either underelevated or underpowered and was unable to qualify for a flight score. A pity, this, as the aircraft apears to be an ideal subject with generous wing area and not too bulky a fuselage.

Open Rubber

Open Rubber saw some frantic activity to achieve respectable flight times from some of the models and the eventual winner was Peter Frostick with his exquisitely constructed model of the Buhl Pup, the major attraction of which is the sheet balsa fuselage and the superb finish which, together with the dummy pilot and fine flying performance, make for a truly realistic representation of the full-size machine.

Also at Crawley was Derek Knight's all red Peanut Hawker Hunter, here seen receiving attention to its tail end...

Closely following Peter was R.C. Metcalfe with a very nicely built and airbrushed Taylorcraft in blue with a very pale blue trim and registration, again with a fine flight performance.

Third place went to Butch Hadland with his well-known Lacey M10 which gave its usual impressive flight performance after an uncharacteristically poor take off.

Nick Peppiatt's Cranwell CLA3 finished in fourth place after a good, stable flight with this model of the parasol winged prototype finished in silver with black registration letters. Bringing up the rear in 5th place came Lyndsey Smith with his comparatively large model of the Zippy Sport which, although an 'ugly beast', would appear to have ideal proportions for a model, but on the evidence of Lyndsey's example, seems to have various trimming difficulties. Unlike most of the indoor scale models described here, the Zippy has detachable (knock-off) wings which, in the event, proved to be a wise precaution as it hit the floor very hard on several occasions, but survived to fly again!

Peanut

Peanut had much the largest entry of the scale classes and, although traditionally the accent is on the flying rather than super static models with heavy finishes, there were, nevertheless, some very fine models to be seen.

The winning Farman Moustique of Nick Peppiatt was a prime example with dummy engine, pilot and a finish that, although allowing the structure to be seen, had sufficient depth to give an air of realism.

Butch Hadland entered a model of the Morane Type H which, with its low aspect ratio wings and very small tail surfaces looked like a tough challenge; however its performance belied its appearance as second place testifies. Third place was taken by Peter Lee with a Lacy M10 and was rewarded for a busy day as Peter had brought along quite a collection of models (not all scale) and flew continually most of the day - an illustration of one of the main attractions of this type of meeting. G. Oulds filled fourth spot with a fine example of the Piper Cub J3 finished in the (almost) mandatory 'Cub' yellow with black trim.

Other models worthy of mention were Derek Knight's Hawker Hunter with propeller on the nose and G. Whitefield's Wright Baby seaplane. Derek's Hunter is the result of several years' development and, although not 100% accurate in outline, is most impressive in the air flying fairly fast in a nicely banked turn.

G. Whitefield's Wright Baby seaplane is an exercise in construction techniques and, due to its transparent covering, the extensive structure is available for all to see, including an unusual four bladed prop. All in all, a very enjoyable day and many thanks to Norman Couling and his tireless band of helpers for staging this annual event at a time of year when outdoor activity is at its lowest ebb.

Don't forget the Indoor National Championships at Alumwell Sports Centre Walsall, 27th April - all enquiries to Doug Sheppard, 13 Luckington Road, Monks Park, Bristol.

Indoor with Vic Willson

Control line

Not much activity to report at this time of year, but at the most recent meeting of the SMAE Scale Technical Committee a decision was taken to abandon the proposed Control Line World Championship Team Trials scheduled for RAF Wyton in March.

This decision was made on the basis that there were still only three entries and, in view of this, the British team will therefore be: Mick Reeves - Zlin 526A, Ron Truelove - Heinkel 210 Uhu, and Chris Bradford - Douglas Dakota.

These modellers will be funding the trip entirely at their own expense and I'm sure that all readers of this column will join me in wishing them the best of luck for the Championships in Norway 14-20 July 1986.

Also at the same meeting, the SMAE contest fees were fixed for the '86 season. These are £3 for F/F and C/L scale and £4 for R/C scale - higher than last year but that's the price of abandoning the Contest Licence fee and I'm sure that the new system will be welcomed by most competitors.

Crawley Indoor Scale Results — 2nd February 1986

CO_2 Class

1. N. Peppiatt	Sopwith Tabloid
2. L. Smith	Fairchild Forwarder
3 D. Deaman	D.H. Puss Moth
4 B. Hadland	Mr. Mulligan

Open Rubber

1 P. Frostick	Buhl Pup
2 R. Metcalfe	Taylorcraft
3 B. Hadland	Lacey M. 10
4 N. Peppiatt	Cranwell CLA 3
5 L. Smith	Zippy Sport

Peanut

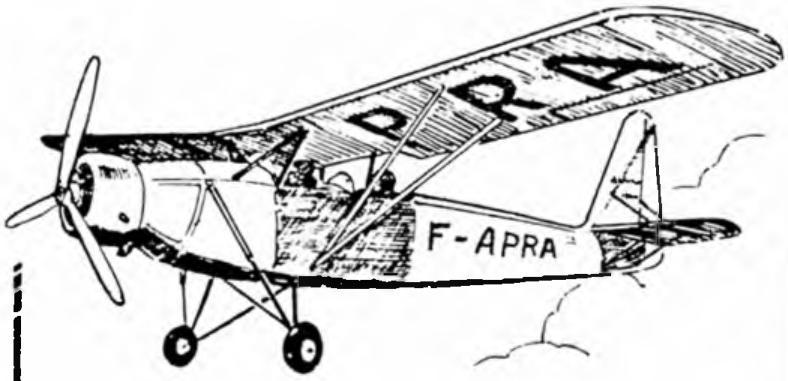
1 N. Peppiatt	Fairman Moustique
2 B. Haldan	Morane Type H
3 P. Lee	Lacey M. 10
4 J. Oulds	Piper Cub J3

Le Cricri

Salmson D6

A scale peanut by E. Fillon

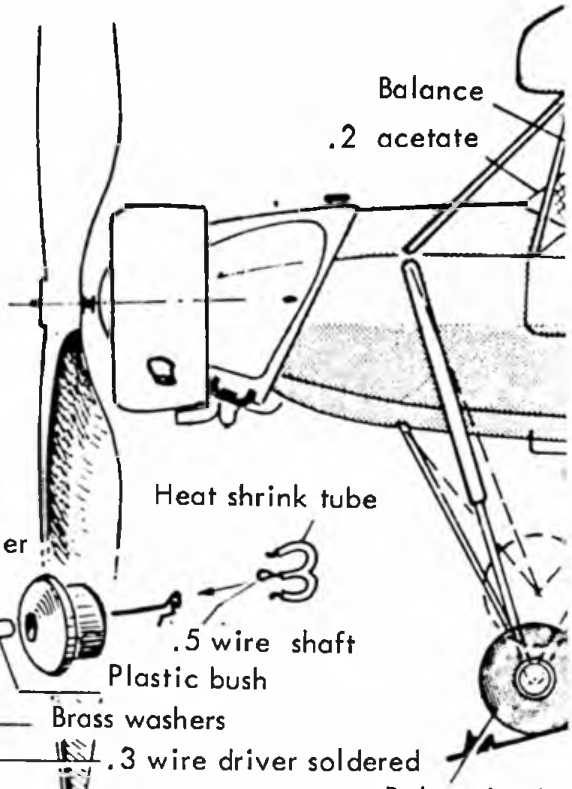
The French Arachide

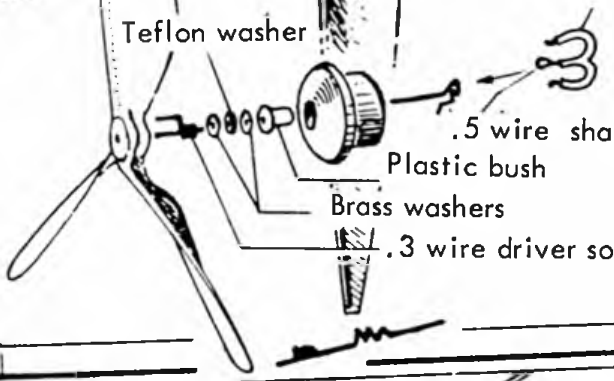


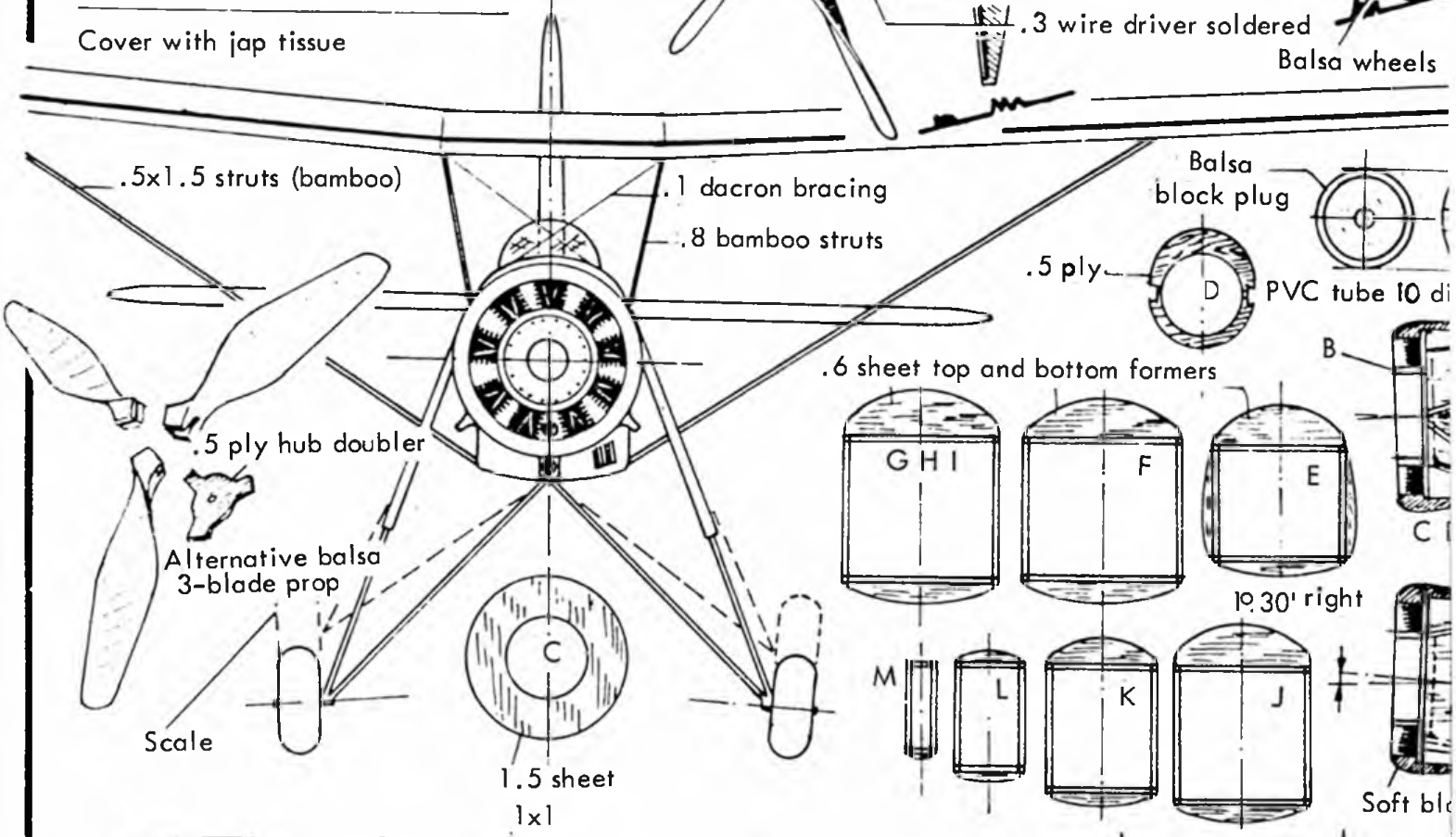
Other registrations

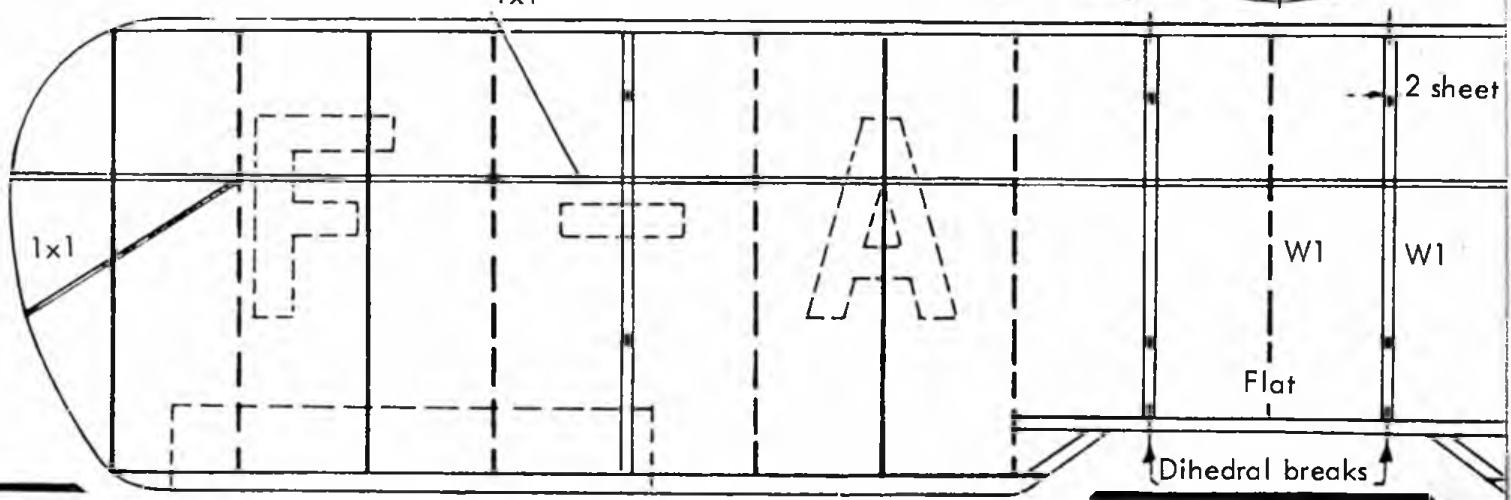
F-AOTR, F-AOXG and F-APSY

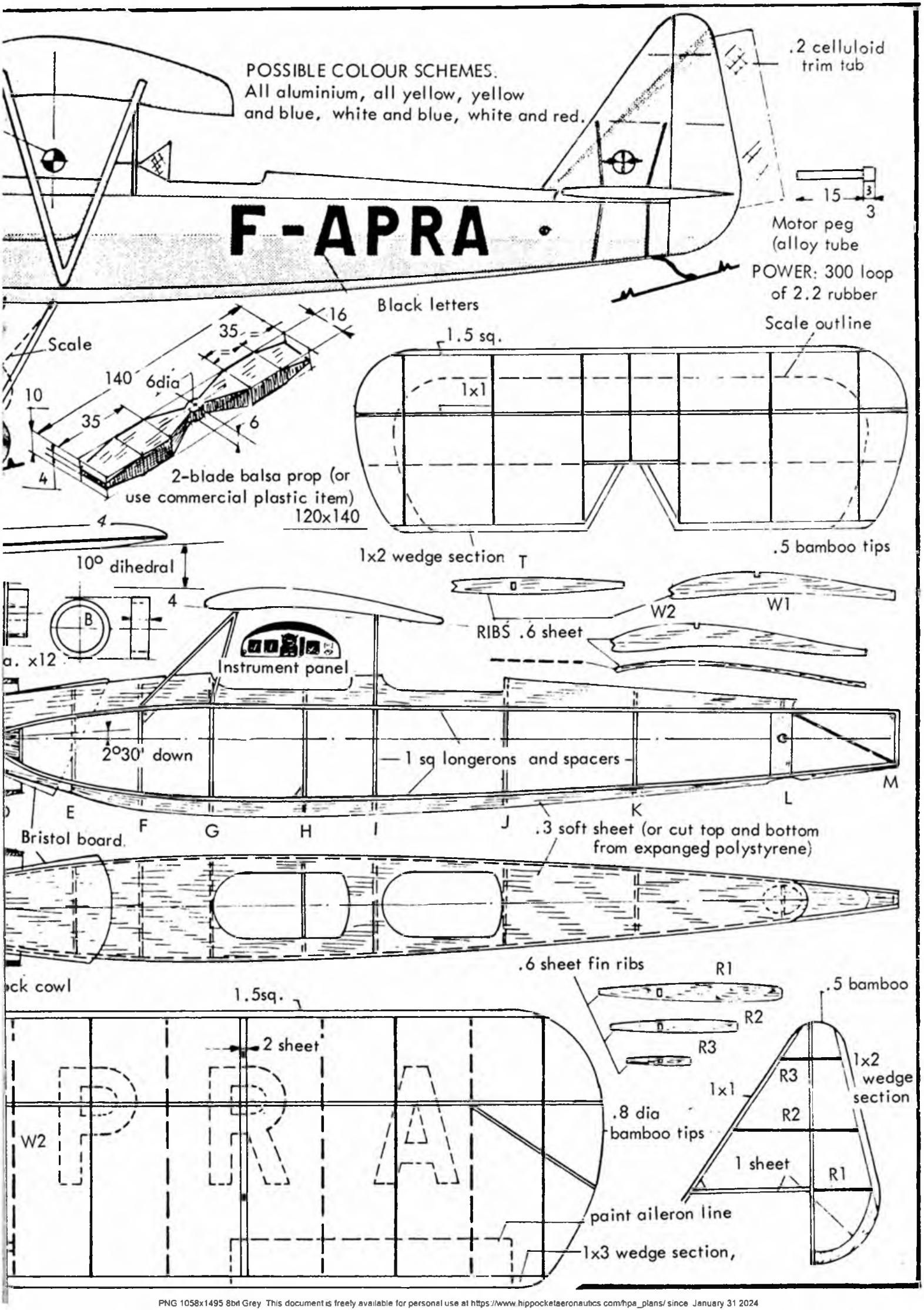
Cover with jap tissue











VINTAGE CORNER WITH ALEX IMRIE

The Vintage Years of Fliar Phil

Ray Malmström celebrates his diamond jubilee this year - his contributions to the hobby are well known, and vintage enthusiasts who thumb through old magazines cannot fail to have noticed his cartoon work both as article illustrations and as caricatures in series like "Caricaplanes" and "Aerobods of Note", not to mention the countless model designs (there were over 500 of them during the last 50 years), that appeared in many publications world-wide including *Aeromodeller*, *Model Aircraft* and *Meccano Magazine*.

His model designs were often caricatures in the true dictionary meaning of the word and had "characteristic traits exaggerated in a ludicrous way". He did this to such good effect that most of us have built one or more of his models sometime or other. One thing all his designs had in common was that they all flew. They were simple yet "different" and were aimed mainly at the younger modellers and most of them could be built from the scraps of balsa left over from building "conventional" models, thus cost was never a factor that might have suppressed the desire to construct a Malmström design.

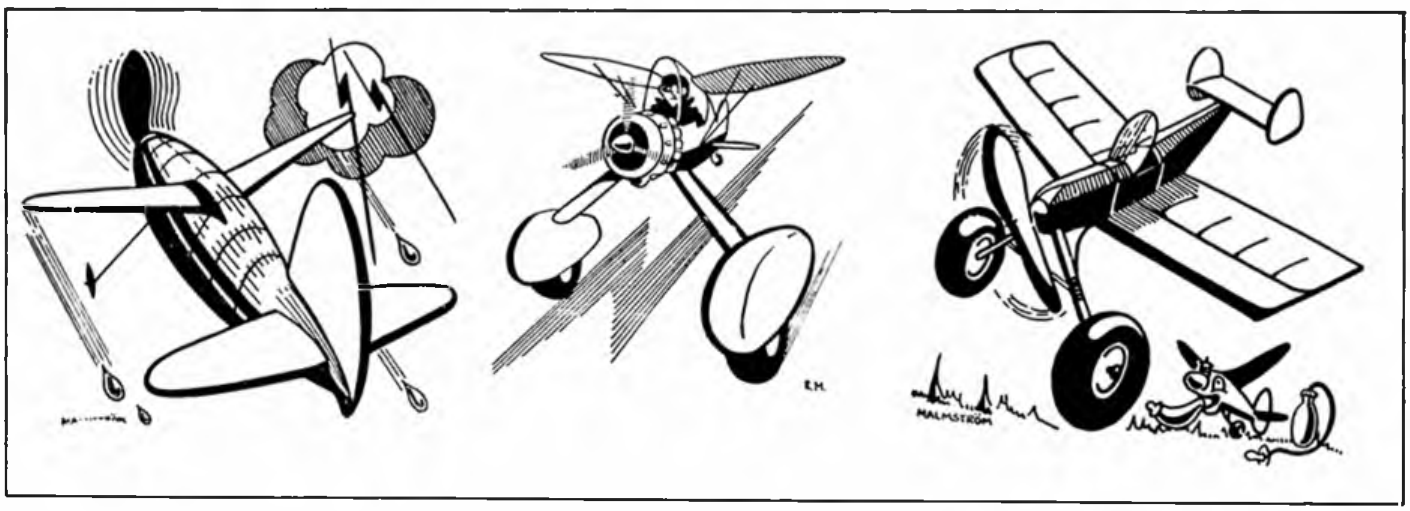
Ray's earliest contribution to *Aeromodeller* was the 'Pee-Wee', a baby indoor duration model of 8 inches wingspan that appeared in the November 1940 issue. It was followed by 'Horus', 'Tom-Tit Triplane' and the 'Avenger', the latter being the simple indoor forerunner of the 'Kestrel' and 'Merlin' twins. The 'Avenger' had mere sticks for motors, a profile fuselage and a high mounted "T" tail, altogether like a Westland Whirlwind; it was produced at the time when there was great interest in the indoor evening flying that included much of the RTP (Round the Pole) variety. His attractive 'Kestrel' appeared in August 1944 *Aeromodeller*; being presented in half-size meant that for some time it was a chore to enlarge and one wonders how many readers built a model of this nice looking twin-engined (and twin-fuselaged) fighter of 21 inches wingspan.

Its high speed flights of 20 to 30 seconds duration were "due reward for those who built it". Another smart design in similar vein appeared in the February 1945 *Aeromodeller*, the 20½ inches span 'Merlin Mk 1' twin-motor fighter-bomber, again regrettably presented in half-size. Ray's description tells us the reasoning behind this type of model. "...an attempt...to create a model that follows, without being a copy, the general layout of a type of aircraft that has won battle honours in every theatre of war... In conclusion, the designer...believes that future development of, and research into, the hobby of aeromodelling must, and eventually will, be directed to the production of models that are in real truth *MODEL AIRCRAFT...*" *This is the semi-scale approach that was common both before and during the war, but which gradually lost support due to the rapidity and ease with which flying scale models of real aircraft could be produced especially after the coming of the miniature compression-ignition or diesel engine.*

In October 1946, a full-size plan appeared in *Aeromodeller* for his twin-engined civil machine called 'Athene' whose shapely fuselage was built on the keel-system of construction; if lightly built and fitted with efficient propellers, the power contained in the 8 inch long engine nacelles should, especially with today's know-how, produce a high-performing feeder-airliner. Ray was one of the old school who continued to make semi-scale models with "exaggerated characteristic traits" and never stopped using rubber power because of its obvious simplistic appeal to beginners; however, he quickly saw the advent of the small diesel and Jetex units as providing the ideal means of powering his creations and designed accordingly.

Another practice that he developed regardless of the page size at his disposal was to show important parts full-size, and some of his layouts in books and magazines are masterpieces of this art. Possibly his most famous creation was Fliar Phil - the antics that this cartoon character got up to were legion, yet all the situations could be identified with the hobby. *Aeromodeller's* popular "Photonews" of the wartime years concerned full-size aircraft, but with the easing of the war situation it slowly gave way to "Model News", a keenly read photographic section entirely devoted to models.

When we look at the 1945 issues of the magazine we see that this is merely a page of photographs with short captions, but, from January 1946, this feature boasts a "Malmström" cartoon title, a different one being drawn every month for this purpose right into the 1950s - well past the end of the vintage period. More detailed captions now appeared as "Selected Items by Fliar Phil" and the amusing commentary by Ray on the photographs submitted by readers was to long remain a popular *Aeromodeller* item. As present day readers know, a "Photo Prize" version of "Model News" has appeared since March 1983 run by the same



Above, 'Mentor Mk I' control line primary trainer for the Amco .87 diesel was designed and built July/August 1947 and weighed 6½ oz. Ray commented "...light on the lines, control poor since model climbed too well..."

Above, scale model of the DH 84 'Dragon', examples of which were sold to Jersey Airlines' pilots to help pay for flying lessons in 'Gipsy Moths' during the 1930s.

Above, group of Model Air Squadron members at Histon Fete in June 1947. Models were flown by Mowbray, Malstrom, Cliff Allen and Collins, last named with his Howard Boys designed rubber powered Westland 'Lysander' at right.

irrepressible Fliar Phil.

Apart from the activities mentioned, Ray found time to produce a number of books for which he wrote, drew and photographed the entire contents. These included the four *Eagle Books of Model Aircraft*, *Model Boats*, *Model Cars* and *Model Space-craft*, also two books published by Arco, one on Model Space-craft and the other on Aeromodelling. All these are sought after by collectors nowadays. His "space-age" contributions led to a series of models printed in colour on the back of an international breakfast cereal company's products, and Ray admits to nipping secretly into Tesco's to admire his handiwork on the shelves!

Art and Aeroplanes

Grandfather Malmström was a Swedish boot maker who took an English wife and settled in this country setting up a business in London; a son, Ray's father, was also business-minded and kept a toyshop in the Southsea area of Portsmouth and in the late 1920s stocked various flying toys including some of the Appleby card model aeroplane kits. It was the sight of these excitingly boxed models that fired Ray's imagination and, as we shall see, started him off on aeromodelling. But there was also school, and, after attending St John's Secondary School, the young Malmström studied art at the Southsea College of Art, and apart from continuous model building, naturally developed an interest in full-size aviation.

A fascinating aspect of his early modelling, which showed a business-like approach, concerned his offer to the pilots of the air service operators running to the Isle of Wight and Jersey to make scale models of their machines. He sold models of the DH 84 Dragon to pilots of Jersey Airlines who operated that type from Southampton and Portsmouth, and to the pilots of Southampton, Southsea and Isle of Wight Aviation Ltd operating a de luxe Westland Wessex, Monospar and Fox Moth to the Isle of Wight, miniatures of their aircraft. With this money he was able to take flying lessons with the Portsmouth Aero Club on Gipsy Moths, and also, when space allowed, he accompanied F/O Brown on flights in the Wessex.

With the approach of war, as his art studies allowed, he undertook work of national importance when he joined the Auxiliary Fire Service and it was during this period that he made the 'Pee-Wee' indoor model which was flown in the confines of the Fire Station. Enterprising Ray sent the design to *Aero Modeller* and it appeared the following year, his first published design. Finally he took his art teacher's diploma at Brighton in 1939 and this led to an appointment as junior art teacher at Kendal Grammar School.

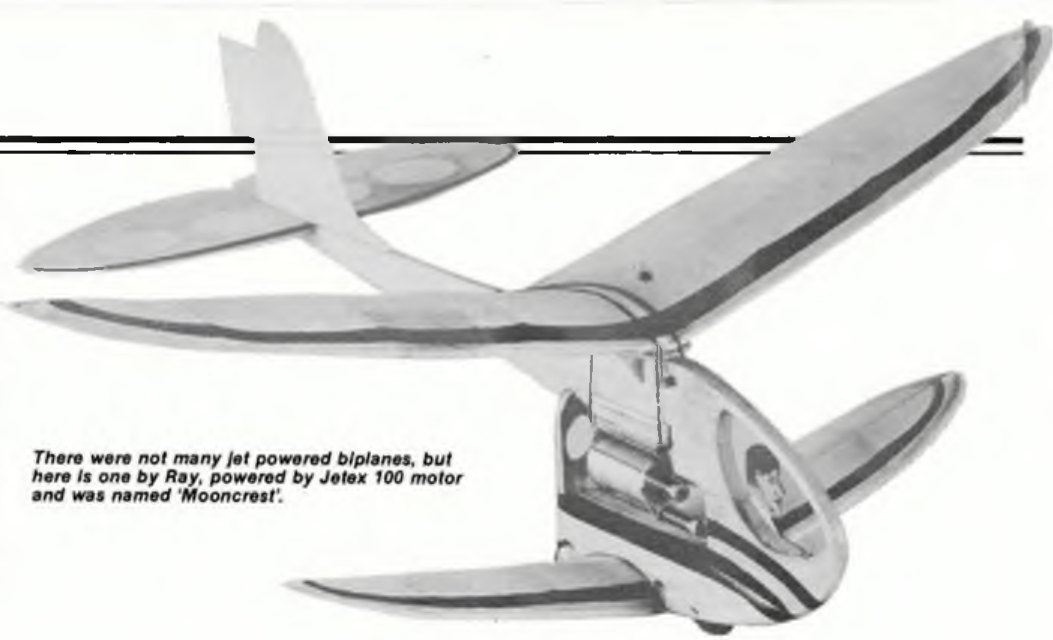
The outbreak of war made this employment of short duration, but Ray found time to form and run an active model aeroplane club at the school. However, soon in 1940 he entered the RAF and AC 2 Malström was trained as an armourer serving with No 249 (Gold Coast), 71 (Eagle) and 56 Squadrons. One of many interesting stories that he tells of his RAF service took place at North Weald when, as a corporal, he was working on a Hurricane IIC armed with four 20mm Hispano cannon. The CO brought an Air Ministry photographer out to the aircraft and allowed him to sit in the cockpit while Ray lingered nearby. Suddenly the guns went off with a shattering roar as the photographer caught up the firing button with his camera gear. Ray was stone deaf for three days! Eventually the RAF found out that he was a trained teacher and Ray was sent to a training unit and eventually became a sergeant armament instructor but was demobbed shortly afterwards.

He returned to teaching in 1946 when he took up an art teacher post at Implington Village College which is close to Cambridge; he was to remain there for 40 years and finished up as head of art studies. Needless to say, he lost little time in forming a model aeroplane club at the school - this rejoiced under the name of Model Air Squadron with himself as CO. Hundreds of youngsters

Far above left, Fliar Phil the cartoon character first appeared in Aeromodeller 40 Years ago, here he is on the club's flying field with Impington Village College buildings in the background. Far left, a selection from 'Caricaplanes'. D A Russell's ⅛th full-size 'Lysander' (April 1945) with Bob Copland's Wakefield streamliner at left (July 1946) and M R Knight's 'Kamlet' (November 1946). Left, a page from Ray's scrapbook which is a fine record of his vintage years.

passed through that club and Ray regularly gets letters from aeromodellers all over the world who were his pupils. Some of the founder members are still in the club which is a very successful one and attracts enthusiasts from all over Cambridgeshire who regularly travel up to 50 miles for an evening session.

Members include Mick Reeves, internationally famous R/C flier, Henry J Nicholls and the SMAE Treasurer Robin Gowler. Ray always attends and brings a clutch of indoor rubber models to fly in the school hall in winter and on the playing fields during summer evening sessions. He still teaches part-time at the College and is still building models carrying on the tradition he started so long ago.



There were not many jet powered biplanes, but here is one by Ray, powered by Jetex 100 motor and was named 'Mooncrest'.

Ray looks back

Although the foregoing is an attempt to tell something of Ray's background, just how the youngster from Southsea with the Swedish name started into the hobby is best related by Fliar Phil himself. Here he indulges in a bit of nostalgia:-

"I was about 12 years old when my father, dear soul, succumbed to my repeated onslauaght and bought me my first model aeroplane kit. And what a kit! An all-cardboard affair, designed, I feel, by someone who certainly had little aeronautical knowledge, but made up for it with an immense and touching faith in the gods! It was *supposed* to build up into a model of the fascinating little Wee Bee I Beardmore monoplane! God - that cardboard resembled good quality sheet iron! Only a particularly evil smelling virulent variety of fish glue could hold it together.

My father, sweat wreathing his bald but noble napper, did indeed manage to get the fearsome aerofoil section (?) wing to stick, but unfortunately only to the backside of his trousers - this act of unquestioned dedication was achieved by accidentally sitting on it. The resulting model was, in the light of subsequent efforts, a catastrophe that put WWI, the Wall Street crash and the General Strike rather in the shade. But bless its reinforced cardboard heart it set me out on our great hobby of aeromodelling.

Early days included flying the inevitable Warneford spruce and silk jobs, and then on to that great design by dear much respected 'RIP' - the Cruiser Pup - my model of which departed this life a couple of thousand feet up over Portsmouth Harbour, 12 minutes OOS. Long flights with a Burd Thermalider (cost of kit about three bob (15p) - with a machine or saw-cut balsa propeller), an introduction to the joys of scale with a Captain Pages Racer - a Comet kit from Sweetens in Blackpool, and a monstrous 5 feet span rubber-powered (!) Rearwin Speedster - another dreamboat from Burd - and it flew!

Recall the days when it was considered a sign of moral turpitude (not to say indecency) to turn up on one's local flying patch with a Wakefield, that sported less than a couple of dozen sylph-like stringers encasing its streamlined figure. Flew Copland's 'GB3' and Stott's 'Flying Minutes' with success. Built Cahill's 'Clod-hopper' (ugly brute!) - the model, not the bloke - but it tried conclusions with some decidedly unfriendly telegraph wires which did absolutely nothing for its subsequent trim! Great streamliner days those - until Dick Korda wrote "finis" to the streamline syndrome with his slab-sided masterpiece.

About this time helped to run the Portsmouth MAC and founded the Kendal Grammar School MAC. Lots of keen aerobods - but then yours truly (*and* some of his senior pupils) got mixed up with the RAF and a five year stint assisting a few million others to put Hitler's mob where they couldn't rock the civilised boat again.

Back in the teaching biz once more, founded the Impington Village College MAC in 1946 - and, like the famous brand of whisky, (thank you, I don't mind if I do!) IVCMAC is still going very strong. Got aeromodelling included in the official curriculum and discovered what a help it was to both the bright lads, but *especially* to those whom educationists describe rather delicately, as "the less able". There was nothing "less able" about 'em when they got the feel of balsa in their souls and the lovely reek of dope up their "hooters"! Even the headmaster smiled as their gliders glided and control-liners circulated, and the free-flight jobs washed out most of the glass in the greenhouse of the gardening section! Now some of the lads of those days - and since - are designing and building better than the "'ole-man"!

So I get beaten often, and that is right and proper - and gives me a lot of satisfaction. Good to see the younger generation taking up the challenge. Some say that I can still give them a run for their money. Perhaps - or maybe they are just angling for a cuppa at

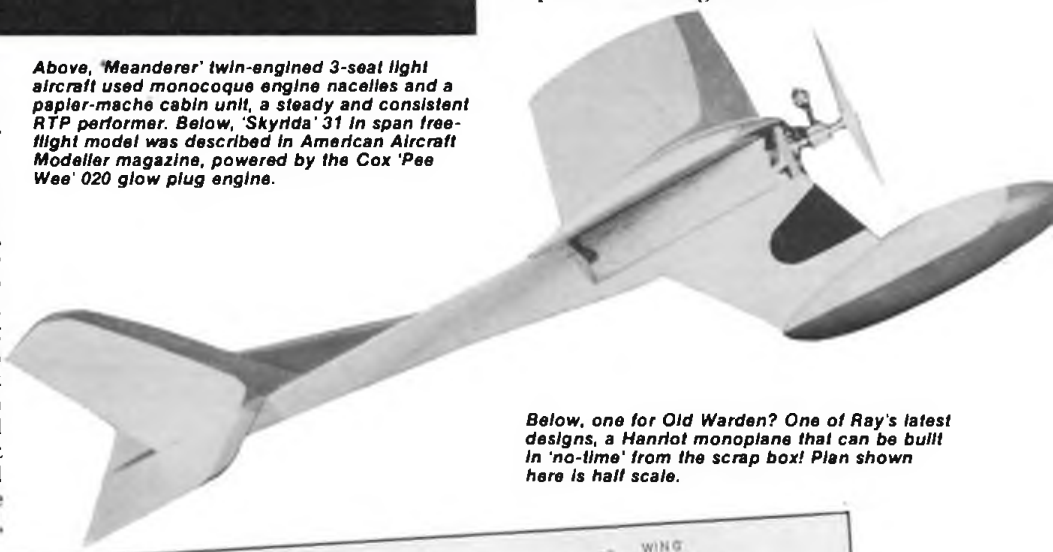
Below left, 'Demon' twin-motor semi-scale RTP rubber model designed June 1946, this photograph appeared in his own 'Model News' in January 1948 Aeromodeller with suitable comment! Below right, 'Mamba Mk I', 34 inch span, weight 5 oz. A most successful flier in both free flight and RTP, each motor was 6 strands 17 inches long of 3/16 in rubber, free-wheels were completely enclosed in the large diameter spinners

my expense in the College Common Room!

Hell of a lot of memories - contests, meetings, rallies, demonstrations, static displays - AND, above all, the privilege of knowing some of the "greats" - P E Norman, Pete Wright (high-speeds and head-gear), Bill "Gipsy" Dean, George Fuller (dream weaving aloft), Rushy, Houlberg, Evans, Boys, Towner and those *still* prominently "in-the-vigour" as the Chinese used to describe their warriors in battle - Henry J, Norman Butcher, Doug McHard and perhaps I ought not to mention a very likely lad - Ron Moulton (he might think I am after a loan!) All of them aeromodellers who set standards and technical achievements for me and the rest of us lesser mortals that, alas, I could seldom, if ever, emulate, but whose influence I have been eternally grateful for - and, indeed, continue to be.

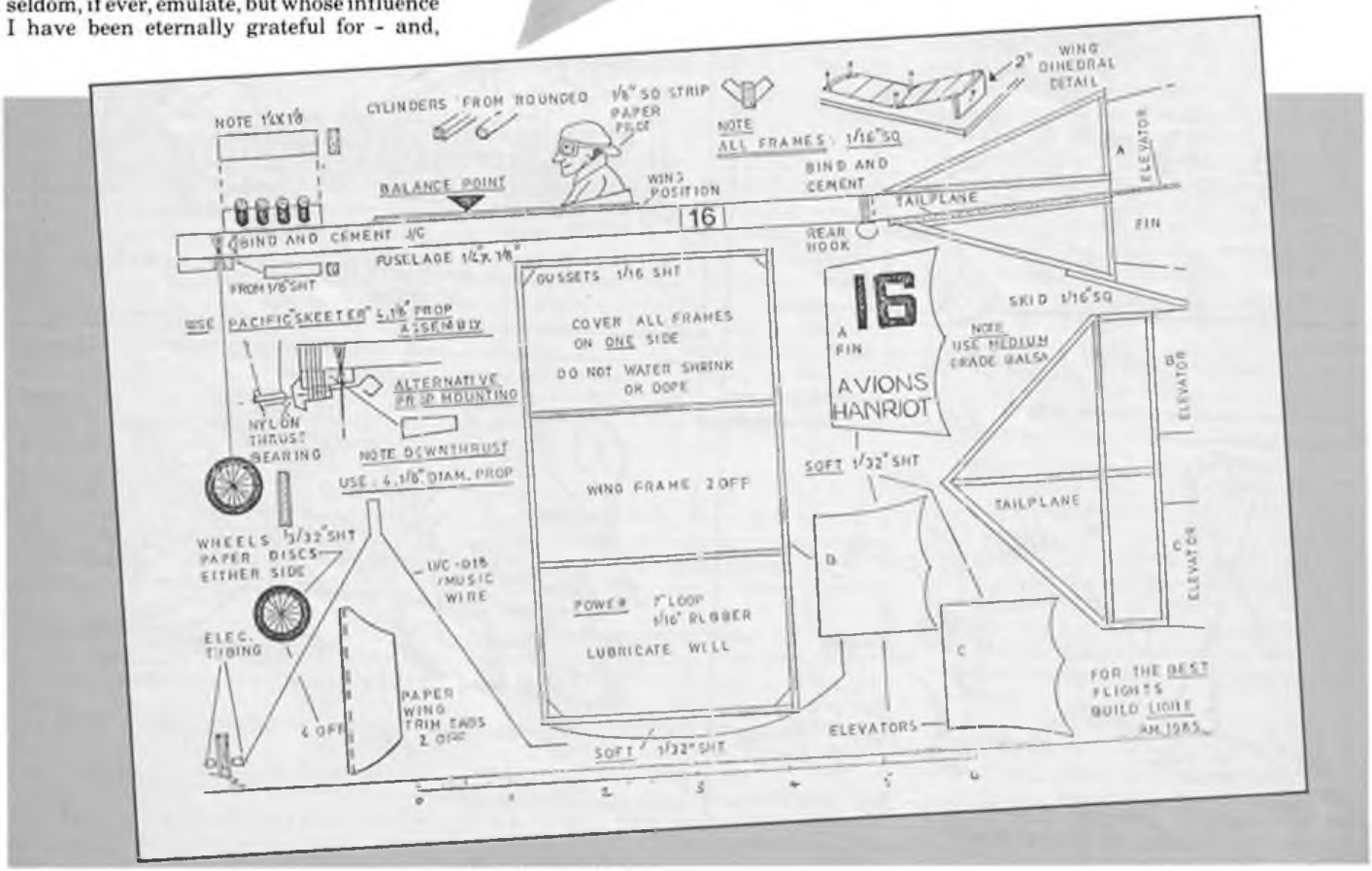
My cartoon period (not to be confused with Picasso and his "Blue-period"!) for *Aeromodeller* and *Model Aircraft* was a lot of laughs. Cartoonists sometimes say they lack friends, but I never did a cartoon of an aerobod without making a new one - which says a lot for the real friendliness of the aeromodelling fraternity, for some of my efforts could hardly be described as *flattering*!

On Ron Moulton's suggestion, at one of the All-Herts Rallies (and what Rallies they were), I produced a profile Comet glider with John Cunningham's face up front, which was presented to him at the prize-giving. Did a similar effort for Dave Kneeland and have a feeling it found its way, as a bit of a giggle, into the pages of *Model Airplane News*. In "Aerobods of Note" I remember one on the then Editor of *Aeromodeller*! Hope I've been forgiven for that one!



Above, 'Meanderer' twin-engined 3-seat light aircraft used monocoque engine nacelles and a papier-mache cabin unit, a steady and consistent RTP performer. Below, 'Skyrida' 31 in span free-flight model was described in American Aircraft Modeller magazine, powered by the Cox 'Pee Wee' 020 glow plug engine.

Below, one for Old Warden? One of Ray's latest designs, a Hanriot monoplane that can be built in 'no-time' from the scrap box! Plan shown here is half scale.

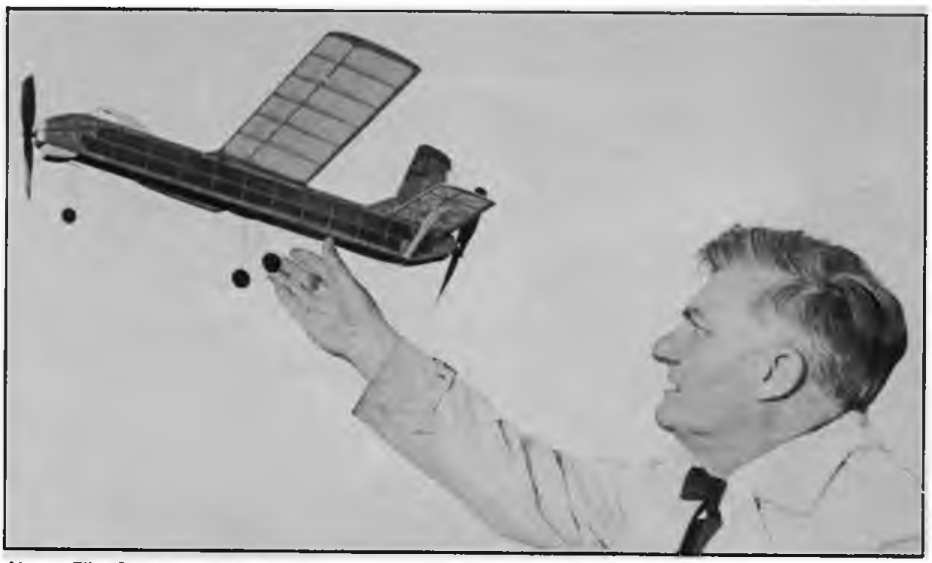


Must get back to that new job taking shape on my drawing board. This one *is* really going to be my best model yet. Hell! It should be - I've been trying hard enough for sixty years!"

Malmström Model Competition

It is planned to celebrate Ray's diamond jubilee of aeromodelling by holding a special "Fliar Phil Outing" for models of his own design during the Vintage Week-end at Old Warden in August. Not only will this event mark 60 years of Fliar Phil but will also be a "birthday" function for the Impington Village College MAC of which Ray is President, formed 40 years ago and as already mentioned, still going strong. Although details are not finalised at time of writing, it is envisaged than entrants' models will be sticker-marked on entry to the aerodrome and flown freely during the day. Judges will circulate the flying areas and determine those models that most reflect the Fliar Phil spirit in decor and flying ability. Sounds as though this low key fly-for-fun outing could be a joyous undertaking...

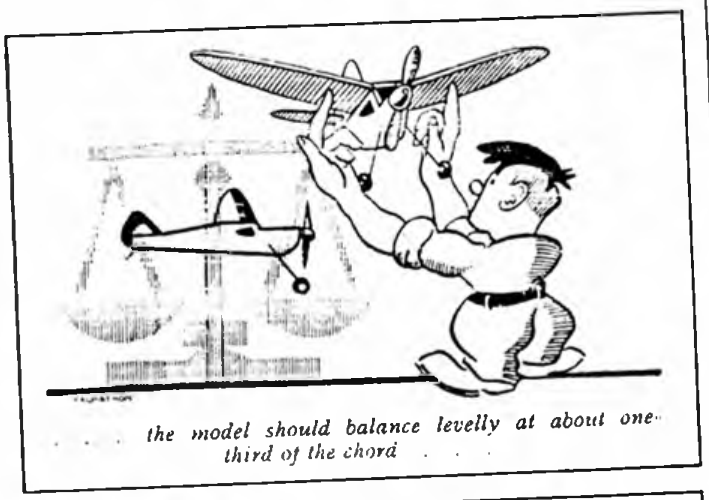
Any of Ray's designs are eligible and photocopies of full-size plans are available from the IVCMAC Chairman Dr Dennis Sharman at Honey Hill Cottage, West Wratting, Cambs. (Telephone: West Wratting 447) who will gladly supply these free of charge on receipt of an SAE. Readers who request a number of specific plans are asked to kindly enclose a small donation to the Club funds to help defray expenses. Dennis has compiled a list of models which is being continually added to and this includes many designs from the 1950s and 1960s as well as the seven vintage models named in the first part of this article. Readers who can supply additions might like to assist in order that all 500 plus designs are eventually listed in Dennis' compilation.



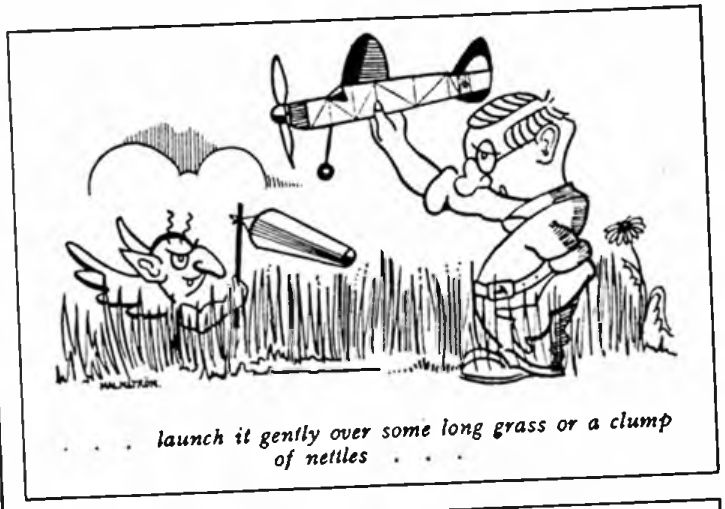
Above, Fliar Phil himself! Ray launches his excellent performing 'Coaxair' 26 inch span rubber model fitted with coaxial propellers.

Although it is quite in order for anyone to turn up at Old Warden on Sunday 17th August with a suitable model and take part in this "bean feast", readers are invited to contact the IVCMAC Secretary Peter Hoskison at 11 Brownlow Road, Cambridge, CB44 3NG (Telephone: Cambridge 355873) for further details and up-to-the-minute news on the event.

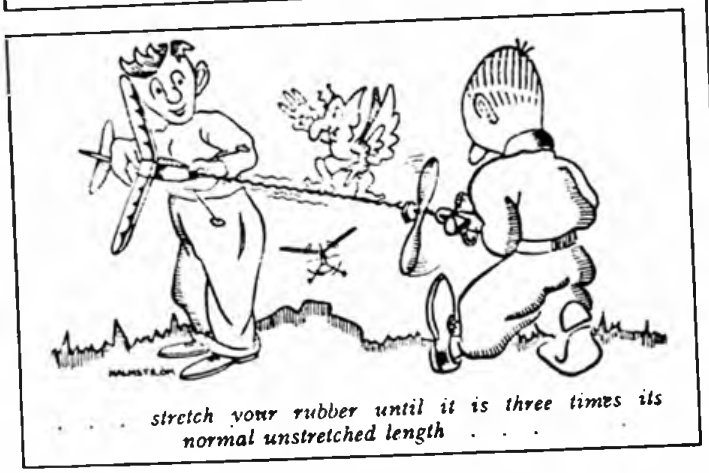
Below, some of Ray's cartoons used to illustrate 'How to Fly that Model' an Aeromodeller article in March 1946.



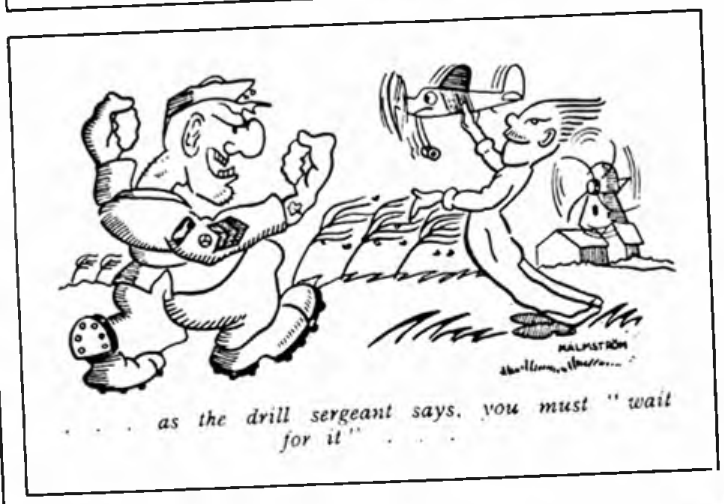
. . . . *the model should balance levelly at about one-third of the chord* . . . .



. . . *launch it gently over some long grass or a clump of nettles* . . .



. . . . *stretch your rubber until it is three times its normal unstretched length* . . . .



. . . *as the drill sergeant says, you must "wait for it"* . . .

'Orpheus' and 'Proteus' by John Buskell are high performance hand launched gliders. Build them from this month's full size plans and add some power to your elbow!

Mythical HIGH FLYERS

History

These two models stem independently from my Indoor models of Circa 1978. 'Proteus' was actually an unsuccessful indoor model but when converted to outdoor use by the addition of a tipping wing dethermaliser and a trim tab on the port wing tip, it became by far the best chuck glider I've ever had.

'Orpheus' was developed from the ex-indoor record holding model (see *Aeromodeller* December 1978) and was conceived as a calm air outdoor model (some hopes!).

Two developments have taken place since 1978; a) The position of maximum thickness of the airfoil was moved backwards until a tendency to tip stalling was encountered. Now, the position of maximum thickness moves forward with decreasing wing chord. There are good aerodynamic reasons for this, but possibly they aren't relevant at the moment. b) The model is rigged with negative incidence with respect to the bottom of the fuselage (which is straight). The thought here was to reduce drag at launch (supposing that the line of action at launch is parallel to the fuselage bottom). This has an interesting side effect of making the model glide nose high and making one think that it is gliding better than it is.

Construction

Producing a chuck glider is straight forward aeromodelling requiring only a few tools;

1. A sharp modelling knife
2. A sharp razor-plane
3. A sharp chisel (½in bevelled edge is ideal)
4. A razor-saw
5. A variety of sanding blocks with good flat surfaces (coarse, medium and fine)
6. A piercing saw (for the D.T. keel)

Its worth spending a bit of time preparing some templates:
A card template of half a wing and a card template of half a wing from the trailing edge to the step line. Also card templates of the tail and fin.

Finally, three 1/32in ply templates of the airfoil ahead of the step, split to provide top and bottom templates (see plan).

Materials

Choose your wing wood according to how good you think your arm is. If it's good, use slightly harder wood for the centre sections and light stuff for the tips. Alternatively, go for a nice even grained wood of about 6lb/cu ft for the whole wing. Forget *really* light wood - it's of no benefit!

I recommend quarter sawn wood ('C' grain) for all flying surfaces but it isn't absolutely essential so long as the wood used isn't pithy (breaks clean like a carrot) or too heavy. Table I shows material selection.

Wing

It's worth spending a bit of time preparing wing. I wouldn't go as far as recommending using a micrometer or anything like that. But the check templates referred to earlier are worthwhile.

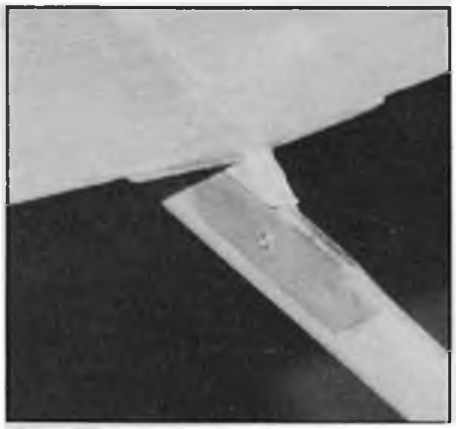
Start by preparing a full-size blank using the half wing template. Taper the thickness of the blank towards the tips until the very tip is 5/32in or so thick (hint; plane an equal number of shavings off each half). Remove all the planing and saw marks with a sanding block. Steam some 1/8 × 1/16in spruce strip to fit along the leading edge and glue it on with PVA or aliphatic resin glue. Prepare the spars from 1/64in ply (make them a little deeper than necessary. Then they're easier to handle). When the leading edge is dry, mark out the step line using the rear wing template. Then, using a bit of broken hacksaw blade or a fine flat needle file, score out the grooves for the spars. Allow them to stand a little proud and be careful not to go through at the tips. Then glue in the spars and allow to dry.

Sand off the spar tops flush with the blank top surface (fig 1 **Note: all figs are depicted on plan**). Carve and sand the lower surface using the three check templates. Remove a little material from the trailing edge of the tips to act as washout. Then carve the front upper surface to shape and remove the bulk of the wood from behind the step line (figs 2, 3).

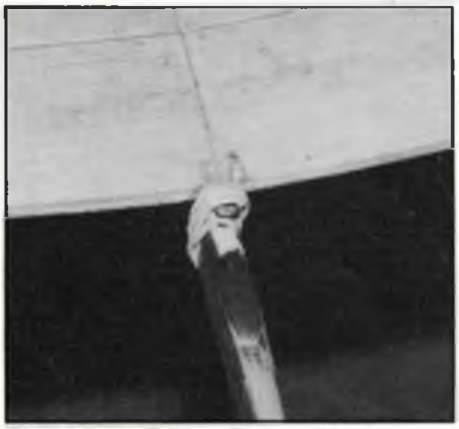
Use the chisel to form the step to about ½mm (a bit less than 1/21in) depth (not too critical - fig 4), finish in a straight line to the trailing edge (fig 5). Finish with fine wet and dry garnet paper to remove all marks and apply 50/50 dope/thinners, rubbing down carefully between each coat until a smooth finish is achieved (it doesn't have to be glossy). Saw the wing into its four parts and apply any colour/trim to the tips etc., using light spray coats from a car-type aerosol four coats of dope and two lights coats of spray paint in limited areas are usually sufficient. Use one of those good sanding blocks to sand the polyhedral angles. Then glue the tips first and finally join the two halves when the tips are dry - use an epoxy glue here.

The Rest...

Cut the fuselage out in two parts; the main body and the movable wing seat separate from it. The wing seating surface on the main body should be *accurately* prepared with respect to the bottom of the fuselage, as



Above, DT mechanism, note how ply forms sturdy box, pin and wing can be removed - handy!



Above, wing in flight position, band holds wing very firmly. Wire saddle stops it 'strangling' the fuze.

Above, wing in dethermalised position. There is no tension band or spring - so pivot must be very free...

should the tail seating.

The movable wing seat should be fitted to the underside of the wing and then a spigot carved on one end to fit the snuffer tube. Fit the two together and offer them up to the wing with the end of the snuffer tube level with the leading edge and trim to allow a ½in overhang beyond the trailing edge, finish as figure 6.

Saw a slot out of the movable seat for the keel which is prepared from 1/16in *Dural* - make sure the slot is vertical and in the middle. Glue the seat with the snuffer tube to the wing ensuring that the wing is straight and level. When dry, ensure that the bottom of the wing seat and the bottom of the snuffer are level. Prepare the 1/16in ply side plates and glue these to the snuffer tube making sure that a good filler of epoxy is trapped between the wing, the snuffer, and the side plates - be very careful to ensure that the side plates are *vertical* and use a piece of scrap balsa to keep them parallel - important, this. Finally add the keel - use epoxy for all these joints.

Turning to the main body, cut a notch out of the fuselage to receive the pivot of the keel then rebate the fuselage to receive the two levels of ply reinforcement around the pivot.

Shallow rebates will have to be cut to receive the side plates. When everything fits together nicely, glue on the two levels of reinforcement around the pivot and then cut a shallow rebate underneath the snuffer position and stick on a piece of 1/32in ply to act at a hard point for the snuffer tube to lie on when the wing is lashed down. Assemble the wing onto the fuselage with the keel in its slot and drill through for the pivot pin. Choose a drill bit such that the pivot pin (a piece of 16swg brass tube) is a tight fit. Remove the wing and relieve the hole in the keel with a needle file to be a running fit on the pin.

Shape the rest of the fuselage with a nice taper towards the tail and nose and an 'ovalish' cross section (*not* the tail seat though). Cut a slot in the nose to receive lead ballast and finally apply a few coats of dope (50/50 dope/thinners) and rub down to achieve a good finish.

Use the templates to cut out the fin and tail and sand these components to profile. Join the tail at the dihedral angle shown. A little carving and fitting will be necessary to fit the tail to the fuselage.

Assemble the wing to the fuselage (use an elastic band). Then glue the tail on lightly with balsa cement. Viewing from the front, ensure that the tail is tilted slightly to give the desired glide turn - *Left* glide if you're *right* handed and vice versa - raising the port tail tip will give a left turn (that's the right hand tip as you look from the front) clear?! Attach the fin ensuring that it's vertical and straight.

Finishing Touches

Use 18 or 20swg wire to form the saddle for the DT band and epoxy into the leading edge of the wing (see photo). Add a patch of light glass cloth or nylon impregnated with epoxy over the areas shown on the plan.

Epoxy on the trailing edge reinforcing triangles underneath the wing. Note: I've shown an arrangement suitable for two fingers behind the wing (index and middle) - it is more normal just to use one finger (index) behind the wing - if you intend to use the latter, increase the length and thickness of the reinforcing triangle. Add patches of medium wet and dry where you grip the fuselage and a patch of aluminium foil underneath the fuse position.

Balance the model to the balance point position shown with lead shot glued into the slot in the nose and a little Plasticine for fine adjustment. Balance laterally as well with little bits of Plasticine on the wing tip as necessary (if it requires big bits, you've done something wrong!) Finally, reinforce the nose around the slot with a patch of epoxy soaked nylon or glass cloth. Finished weight should be in the range of 1½-2oz.

Flying

Choose a calm day and a large flat area that you can run on (*not* concrete). Test glide to verify initial settings. Eliminate stalling or diving by *careful* bending of the tail trailing edge. Aim for a very gentle turn (left if you're right handed, remember) by bending the trailing edge of the rudder. *Use the dethermaliser from now on.* Increase launch power (hard test gliding if you like) applying a little bank into the glide turn. Adjust as before to achieve wide glide circles of 50 metres or so diameter. If the model demonstrates a tendency to wing over on these low power launches in the direction of the glide turn, then form the trim tab on the inside tip and flap it down a few degrees. If that doesn't work, kill the tendency with the rudder and restore glide turn by increasing the tail tilt (which is why you haven't glued it on too well).

As you build up power, reduce bank, and increase elevation at launch. Kill any tendency to loop with adjustments to the tail trailing edge and compensate on the glide with the removal of a little Plasticene - don't be tempted to go too far down this path or a loss of stability in lift will result.

If you're confident, start throwing hard, applying a little opposite bank. As set-up according to the plan, neither of these models roll much. My models transition to glide going straight down wind. But adjustment of chuck gliders is as much trimming to suit yourself as trimming for performance: in other words, don't adopt a throw attitude or trim which is uncomfortable - you could hurt yourself.

Competition Flying

If you fancy flying a competition or so, you'll have to watch out for the acknowledged starts. It's interesting to watch them, because by and large the ones that do well are *not* the biggest throwers. Flying chuck gliders depends more than any other class on the combination of model/picking the moment/reliability. The introduction of physical power merely introduces another factor.

As a matter of interest I would rate the top five *throwers* in terms of launch power as:

1. Bill Simms (if he can shed some weight!!)
2. Me
3. Phil Ball
4. John Tipper
5. Julian Hopper

Notice that the wily Mick Page, three times National Champ since 1979, doesn't figure. Don't be ashamed - have a go!

Table 1 — Material Selection

COMPONENT	WOOD SIZE	DENSITY	WEIGHT	COMPONENT	WOOD SIZE	DENSITY	WEIGHT
WING	⅛×3×36	6	1.5oz (43gms)	TAIL/FIN	1/32×3×36	6	0.375 (11)
WING	⅛×4×36	6	2oz (57)	FUSELAGE	¼×1×36	15	1.25 (35)
WING	⅛×3×36	7.5	1.875 (53.5)	FUSELAGE	¼×1×36	20	1.67 (48)
WING	⅛×4×36	7.5	2.5(71)				
WING	⅛×3×36	5	1.25 (35.5)				

OTHER MATERIALS:
PLY - 1/32, 1/16 & 1/64
TUBE - 3/16 I.D. light alloy (thin walled)
16 swg hard brass
WIRE - 18 or 20swg
WIRE - 18 or 20 swg
SPRUCE STRIP - ⅛ × 1/16

Skyshark

Build this really tough semi-scale control line trainer for 1.5cc engines by Glynn Guest

Right, 'Skyshark' has one of the toughest fuselages that Aeromodeller has seen in a long time – wood from the timber yard and not the model shop!

Left, Glynn's original model used R/C 'clunk' tank but normal C/L tank may be preferable...

AS AN INTRODUCTION into powered model aircraft the control line model has much to commend it. Modest in terms of cost and operating yet with the appeal of, to use the popular jargo, "hands on" control. At least these were my thoughts when I tried to lure some of the students at my Sixth Form College away from their instant and superficial pastimes.

It was some 15 years since I last built and flew control line models but, thankfully, the basics had not changed in that time. A trip to the local model shops proved to be a disappointment since they seem to cater mainly for the R/C enthusiast nowadays. This forced me back to the drawing board, which upon reflection was no bad thing. The design requirements were for a cheap but robust model with an undercarriage, the smooth all-weather pitch was too good to miss! After a few sketch designs an all sheet profile type of model seemed the best way to go.

Models based upon full size aircraft always seem to look better than totally freelance designs. This gave me the opportunity to use the *Douglas* A2D 'Skyshark' as the basis of this design. This was a little known carrier attack aircraft designed for the US Navy. It was intended to replace the 'Skyraider' but problems with the gearbox connecting the twin turbo-prop motors and the advent of effective pure jet aircraft resulted in its cancellation.

My only suitable motor was an *OS* 10, perhaps a little on the small size but always reliable and surprisingly powerful. This limited the model size to a wingspan of 24 inches (600mm) which is still a handy size. In order to keep the design as simple as possible it was necessary to sacrifice some of the flying performance. Timber and plywood provided the main structural materials and only one sheet of expensive balsa was required. The resulting model has proven to be a rugged beast (*I'm not surprised...Ed*). Extensive testing, in other words lots of crashes!, revealed only one weakness in that the tail could be knocked off in extreme conditions. For this reason I have lowered the tailplane on the plan from the top of the fuselage into a slot.

If you intend to fly over grass then leave the undercarriage off. It saves a little weight and avoids tripping the model over when landing. But, ensure that your helper can give this hefty model a firm launch, it will not fly out of your hands!.

Construction

Since this model is somewhat different, it seems wise to give more detailed building instructions than might be usual.

Fuselage: starting in the economy vein the fuselage was cut from a 20in (500mm) length of timber of nominal 3 × ½inch (75 × 12mm) section. Mine came from the cheapest source of all, the scrap box! Any similar size could be used provided it is straight, knot free and not *too* heavy.

A jig or band saw is a great boon here since they quickly produce clean and square

Continued on page 299

AIRCRAFT DESCRIBED

Fairey Postal Monoplane

No 266: Harry Robinson tells the eventful story of this elegant inter-wars record breaker

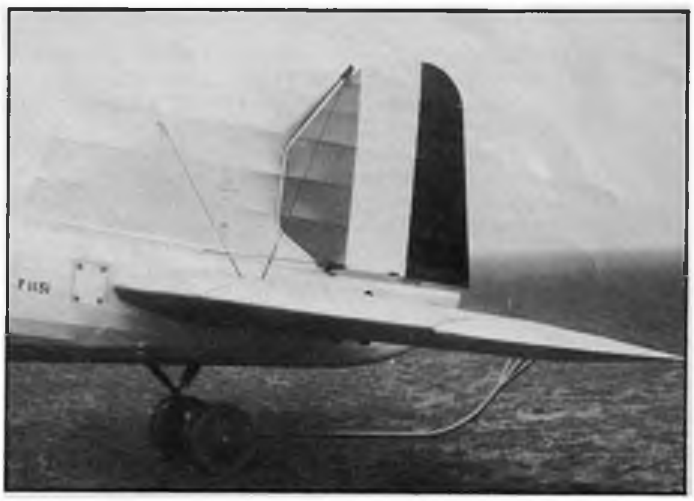
BETWEEN THE WARS, aviation records for fastest, highest and farthest were held in considerable esteem. British interest in the distance record began in 1927 with the conversion of two Hawker Horsley torpedo bombers: the first attempt by Flt Lts Carr and Gillman began on May 20 and ended in the waters of the Persian Gulf after flying some 3420 miles, marginally in excess of the 3353 mile record held by France...but a few hours later Charles Lindbergh landed at Le Bourget after his 3590 mile solo flight across the Atlantic.

Two further attempts with the second Horsley were unsuccessful but in December the Air Ministry issued Specification 33/27 which called for a range of approximately 5000 miles, gross weight of the order of 16000lb including at least 1000 gallons of fuel, with positive stability in all axes, adequate instrumentation and survival equipment. Use of the Napier Lion engine was suggested.

Under the direction of Chief Engineer Major T M Barlow, Fairey Aviation investigated three parallel designs: biplane, low-wing monoplane and high-wing monoplane. Notwithstanding the biplane's considerably lower structure weight, the cantilever monoplane was chosen because its thick wing allowed space for the necessarily large supplies of fuel, oil and water, thus avoiding use of a large-section fuselage. The high-wing position was chosen because it allowed a gravity-feed fuel system and made pumps unnecessary, although wind tunnel tests showed the low-wing position was slightly more efficient aerodynamically.

Cleanness of form, good streamlining and the elimination of parasite resistance were paramount requirements. All necessary openings were carefully designed with these considerations in mind: landing gear struts, while unavoidably large, were few in number and fully streamlined, although wheel fairings were abandoned because of their size. Construction began in the spring of 1928 but the final decision to fit the Lion XI engine was not made until early October, after consumption tests of the Rolls-Royce F.12B engine by Fairey's Chief Test Pilot Capt. Norman Macmillan showed it offered no advantage over the Napier Lion.

The well-tapered wing of the Fairey Postal Monoplane (a soubriquet employed to satisfy a Treasury unaware of the value of records) was a one-piece structure built about two box spars. These were of spruce with massive flanges connected by diagonal



This page, right, smaller fin and rudder originally fitted to the first machine – compare with heading photo. Opposite page, clean lines of the Monoplane are strikingly apparent. Bottom photo shows K1991 at Cranwell before the flight to Abu Sair. (All photographs, Flight/Aeroplane Monthly).

two-ply webs and close-spaced vertical diaphragms. A patented system of pyramidal steel-tube bracing connected front and rear spars, distributing loads throughout the range of flight attitudes and ensuring torsional rigidity. Nearly 1 000 gallons of fuel, engine oil and reserve water were housed within the wing in twelve separate tanks. Incidence varied from zero at the root to -1½° at the tips where washout was concentrated. The comparatively low aspect ratio of 7.5 was chosen because at higher values structure weight became prohibitive. Long-span two-piece ailerons were cable operated.

The long fuselage truss was of welded steel tube, faired to a generally oval section with conventional formers, stringers and fabric covering to give a slender, well-streamlined form. The landing gear consisted of a massive streamlined oleo unit depending from beneath each wing and braced to the lower fuselage longeron by two faired radius rods. It would have been mechanically impossible to make these units retract into either wing or fuselage but their parasite drag was held to a minimum since their removal would have added some 1 000 miles to the range without additional fuel.

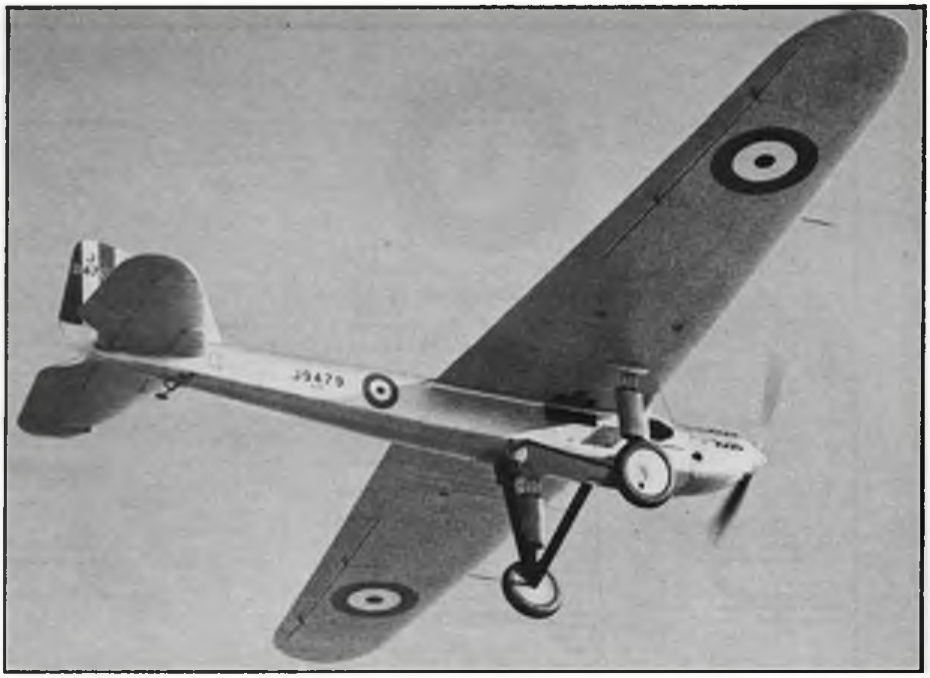
The variable-incidence tailplane was in two parts: the thick main surface was hinged to a small fixed forward segment and incidence could be varied in flight via a screw-jack mounted beneath the rear spar. Spars were of similar construction to those of the wing with similar pyramid bracing. Balanced elevators were built as a single unit on a common spar.

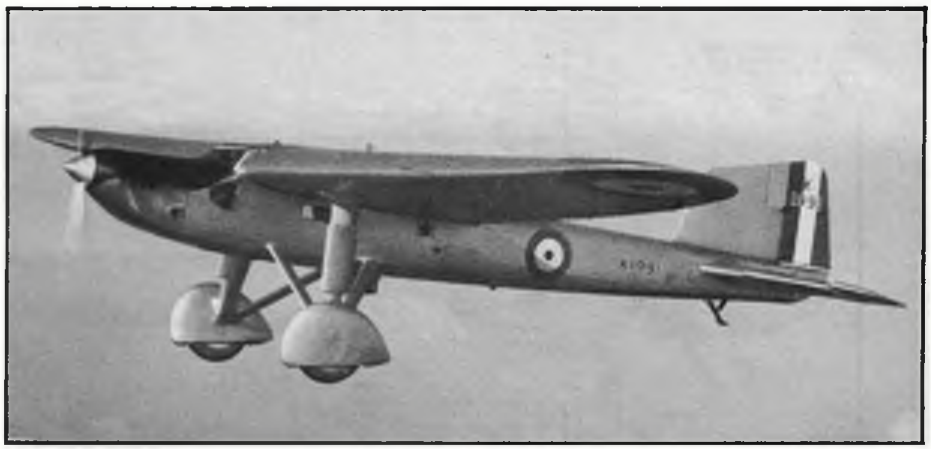
Vertical surfaces were remarkably squat and angular with a large inset rudder balance. Spars and edges were of steel tubing joined by pinned sheet-steel fittings: ribs were of built-up spruce. The section was quite thin and partly flat-sided: the fin was offset to starboard and braced to each outboard end of the tailplane forward segment by two streamlined wires.

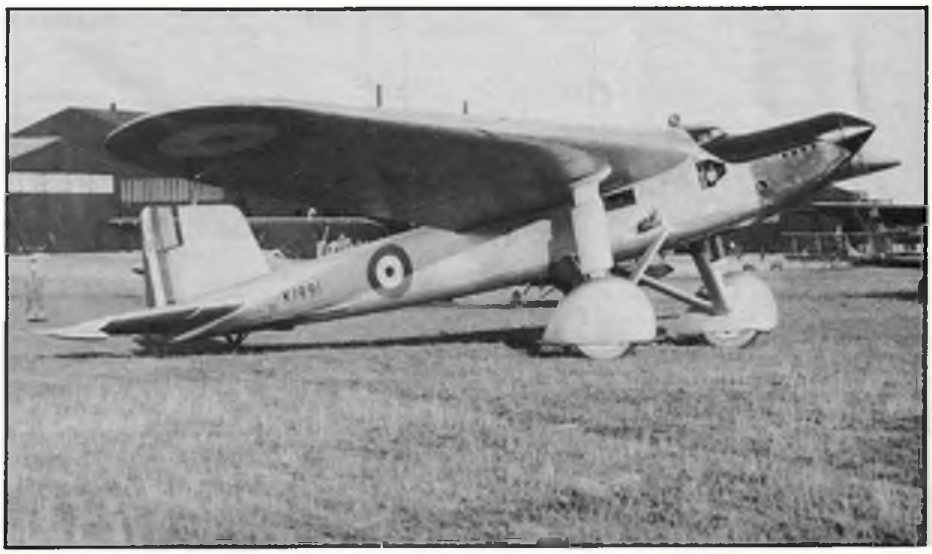
The Postal Monoplane's nose was built "as standard 3F" and for the record a 570hp Napier Lion XIA engine with increased compression ratio was installed. Thus powered, the initial rate of climb at full load was expected to be only about 140ft/min and calculated still air range some 4 800 miles. Engine cooling was by means of a retractable radiator mounted on vertical rails at the rear of the cabin and extending below the fuselage.

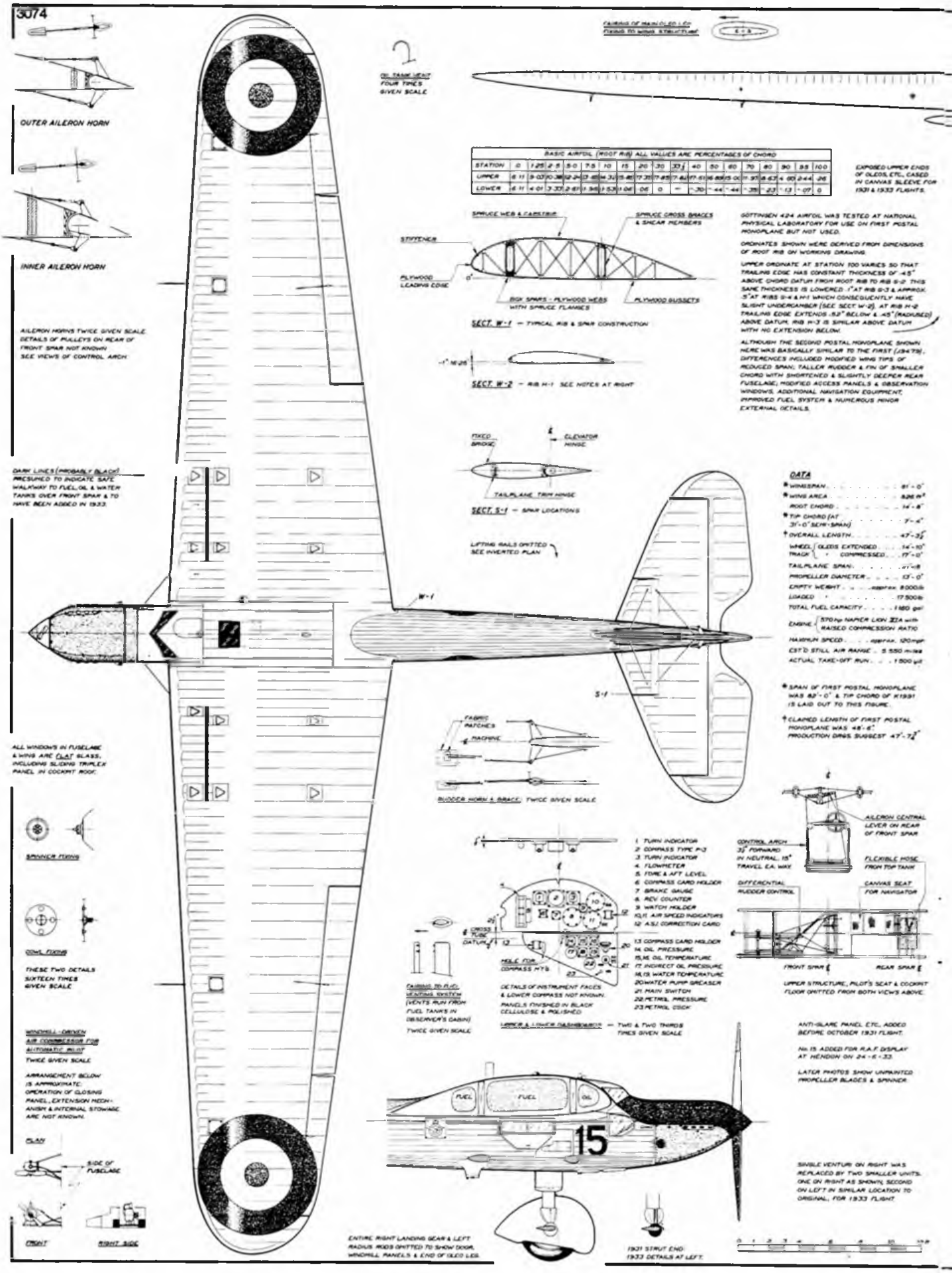
Fairey's Postal Monoplane J9479 was built at Hayes, then transported by road to RAF Northolt for assembly. Its first outing, "finished in shining silver dope", was on October 30 and limited to taxying by Macmillan; the first flight was made by Sqn Ldr A G Jones-Williams, the chosen first pilot for the record attempt. Testing was completed by Macmillan between November 20 and December 7.

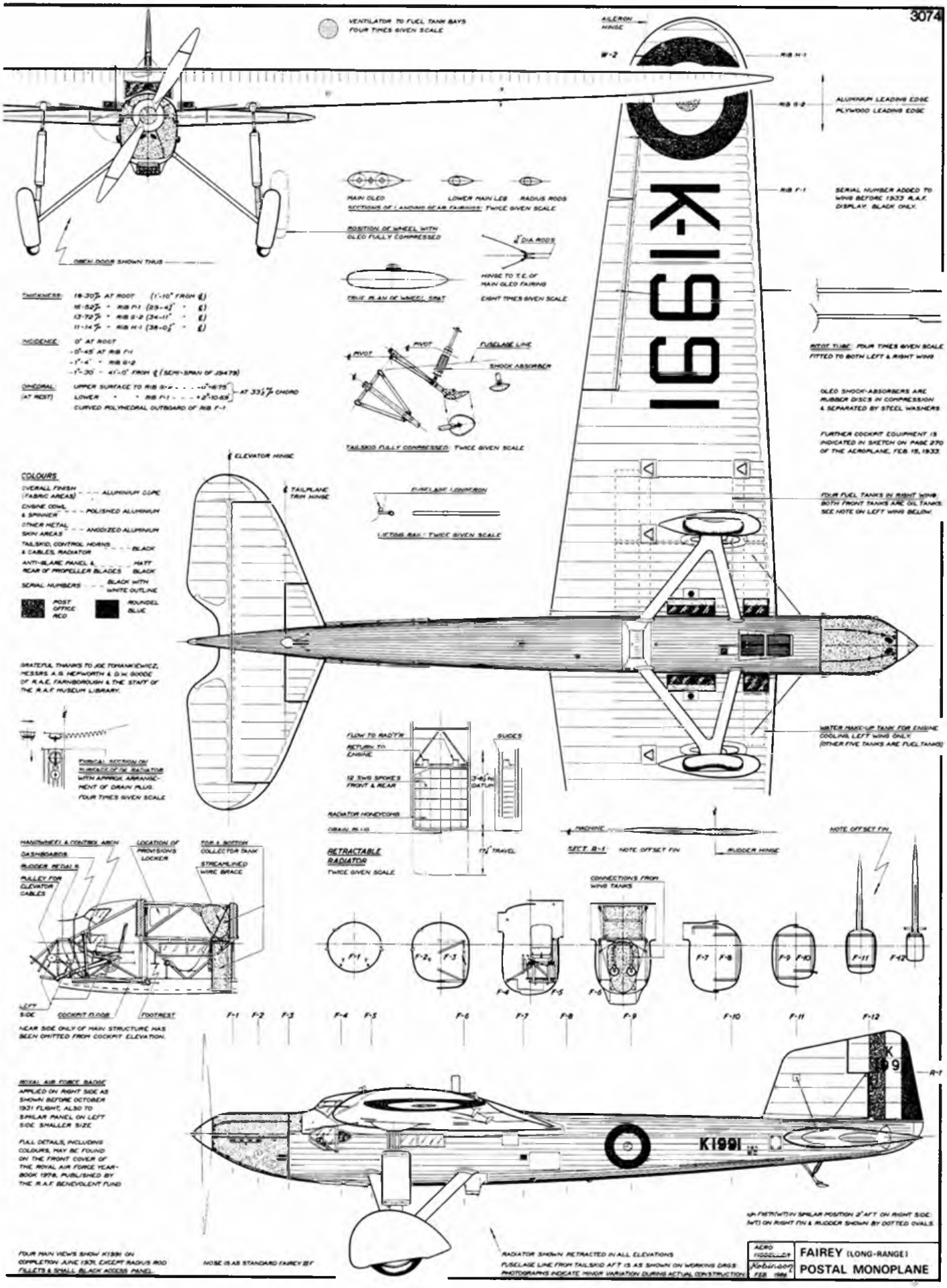
Initial plans for routes and crews were changed more than once and then postponed, both because of unfavourable weather and for engine replacement. A twenty four-hour proving flight originally scheduled for early December 1928 did not take place until March 22-23, 1929 when it disclosed that exhaust fumes were entering the cabin and that a still-air range of over 5 200 miles could be expected. By this time the record stood at 4 460 miles and a flight to Bangalore in southern India was planned. When a take-off test at full load proved

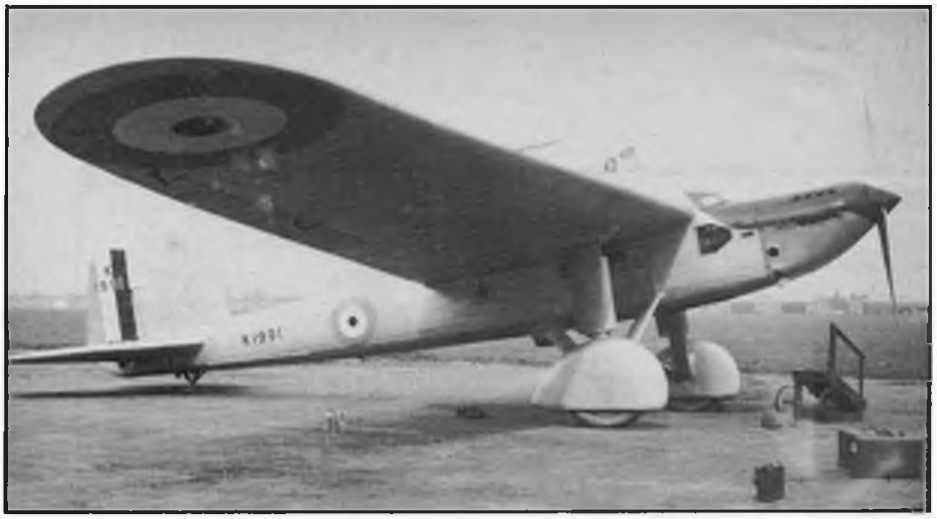












Top, preparation for flight. Note the RAF ensign. Middle, consider the size of those aileron horns! Bottom, resembling a bird of prey in this view. K1991 shows off its enormous spats.

abortive it was decided to make the India flight at a reduced weight of about 16000lb... preferably with a downhill take-off into a 10 mph wind.

Jones-Williams and Jenkins finally left Cranwell at 9.37 am on April 24. Istanbul was reached after sixteen and a half hours, Baghdad after twenty seven and Karachi in some forty eight hours. Shortly afterwards it was realised that with only six hours fuel remaining and some 650 miles still needed to break the record there was no alternative but to return to Karachi where J9479 landed with just 83 gallons of fuel remaining.

On this first non-stop flight to India, 4 130 miles had been covered in 50 hours 37 minutes of near-impossible conditions. Both crew members had worked continuously without sleep, the turn indicator venturi was lost, the special climb/descent indicator and instrument panel lighting became unserviceable and beyond Baghdad bad weather forced the Postal to lower altitudes, headwinds reduced groundspeed and occasional heavy turbulence was encountered. The flight home was made in easy stages and took almost five weeks.

Modifications to improve crew conditions included a new pilot's seat with greater adjustment and enlarged fin and rudder with modified balance surface, so the Postal could be flown feet off. The pneumatic bed intended for the "off-duty" crewman was replaced by a reclining canvas seat, suitably padded. A new Lion engine was installed, radiator surface increased and a radio transmitter added. The record, meanwhile, had been increased to 4912 miles by Dieudonné Costes and Maurice Bellonte in the Breguet 19TF "Point d'Interrogation".

Carrying enough fuel to cover the 4975 miles from Cranwell to Cape Town at an average speed of 86 mph, the modified Postal Monoplane left Cranwell at 7.50am on December 17, 1929. By 4am Jones-Williams and Jenkins had overflown Marseille and radioed their position as 50 miles north-west of Sardinia. Average speed to this point was 112mph and with a following wind it was estimated that the Monoplane would pass over Tunis at about 7pm. Some time after 8pm, during a local storm, the aircraft struck the leeward side of a peak in the Atlas Mountains. Both crew members were killed. Examination of the wreckage - barograph, instruments and log-book - revealed a faulty altimeter, giving finally an error of over 2000ft, as the probable cause of the crash.

In July 1930 the Air Ministry decided to build a slightly improved Long Range Monoplane since the 4975 mile record was well within its capabilities. Designing a new aircraft would have been expensive and taken at least two years. The new Monoplane was built to Specification 14/30 as K1991 and retained the enlarged fin and rudder finally fitted to J9749. Wheel spats were added and each wing tip was reduced in span by just 6"! The improved fuel system included a collector-box for all tank vents, to reduce losses from evaporation and surging. Navigation equipment was improved and for the record the RAE developed a two-axis automatic pilot driven by compressed air from a retractable windmill pump.

Sqn Ldr O R Gayford and Flt Lt D L G Bett left Cranwell at 7am on October 27, 1931 for Abu Seir in Egypt. This proving flight of 2857 miles was completed in 31 hours 15 minutes: K1991 flew on to Khartoum and returned to Britain in easy stages, making a forced landing in fog near Saffron Walden. With the record now standing at 5012 miles the Monoplane was repaired and the auto-pilot installed. Tests of a Fairey variable-pitch propeller proved inconclusive.

Weather conditions to the Cape remained unfavourable until early 1933 but at 7.15am on February 6, Gayford and Flt Lt G E Nicholletts left Cranwell with K1991 at an all-up weight of 17500lb. Average speed as far as Tunis was 110mph with navigation mostly by dead-reckoning until positive landmarks were sighted in Nigeria and the Cameroons. On the second night the auto-pilot went unserviceable: later adverse winds reduced groundspeed and aggravated navigational errors. Walvis Bay, some 800 miles north of Cape Town was reached with only 10 gallons of fuel remaining. 5410 miles had been covered at an average of 94mph. On February 12 the triumphant Long Range Monoplane flew to Cape Town, then returned over Imperial Airways' route via Cairo to arrive at Farnborough on May 2.

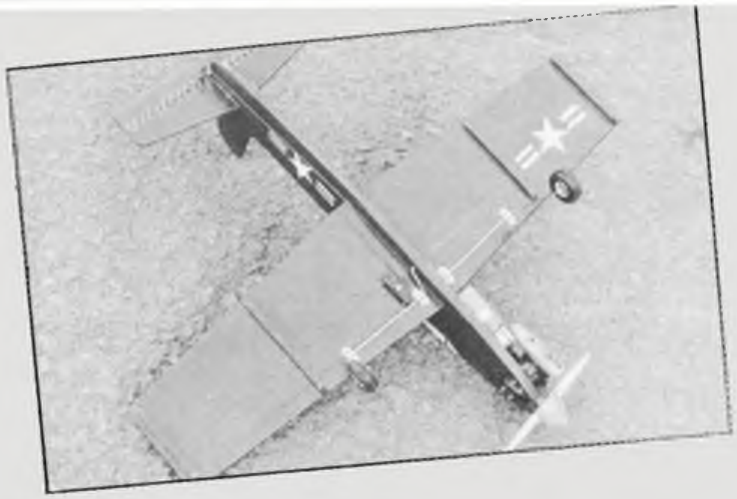
The Monoplane appeared at the 1933 RAF Display on June 24 at Hendon, as event 15. On August 7, Codos and Rossi landed Bleriot 110 "Joseph le Brix" at New York, after a flight of 5657 miles. Proposals for increasing the Monoplane's range included fitting the Bristol Phoenix compression ignition radial engine and even a Junkers Jumo, but these modifications would be uneconomic and of doubtful value. A completely new design was evidently necesssary, but it was not until November 1938 that two Vickers Wellesleys flew 7162 miles from Egypt to Australia and the distance record returned to Britain.

A 1/32nd scale dye-line print of this 1/96th scale drawing is available from Aeromodeller Plans Service, P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts HP2 4SS. Price £4.00 plus 55p post and packing. Please quote Plan No. 3074.

CHARACTERISTICS

Wingspan (J9479)	82'-0"
Wingspan (K1991)	81'-0"*
Root Chord	14'-8"
Wing Area (J9479)	826ft²
Overall Length (J9479)	47'-7¾"*
Overall Length (K1991)	47'-3½"*
Tailplane Span	21'-8"
Wheel Track	14'-10" to 17'0"
Empty Weight	Approx. 8000lb
Loaded Weight	17500lb
Total Fuel Capacity	1160 gal

* From Fairey production drawings.



Left, the wing too, utilises some tough wood, ideal for bolting on the undercarriage.

cut edges. The slot for the wing can be most easily cut by drilling 3/16 inch (5mm) diameter holes at the end, then cutting between them with a jigsaw. Similarly a hole at the end of the tailplane slot is a good idea.

The nose cut out needs to be a snug, but not too tight, fit for your motor. Take a little care to get the motor, wing and tailplane slots parallel. Now is the best time to drill the holes for the motor, undercarriage (below the wing slot) and the tail skid. Likewise, the lower corners and rear of the fuselage can be rounded off.

Wing: the leading section of the wing is cut from what the DIY shops call *plywood*. I must confess that a softwood core with two surface veneers hardly justifies this term but it is strong and cheap enough for our needs. This can be cut out using a jig or band saw or a metal straight edge and heavy duty knife could be used with care.

The rear portion of the wing is cut from balsa sheet. A light grade of balsa is adequate and if you can get it, stiff quarter grain wood is ideal.

The two wing pieces are glued together taking care to keep them flat. The best way to do this is to use weights to hold the wing parts on a flat surface until the glue sets. A sheet of polythene under the wings is a sensible precaution to avoid sticking it to the flat surface. I used PVA woodworking glue on this model, it being economical, easy to use and strong.

Wing-Fuselage Joint: the wing should be a snug fit within the fuselage slot, if not then carefully remove any tight spots. Do not be mean with the glue at this, perhaps the most important joint in the model. Any surplus glue ought to be wiped off with a damp cloth.

In anticipation of some rough landings it appeared prudent to drill two holes vertically up into the fuselage and through the plywood wing section. Into these holes two wood dowels were glued to 'peg' the wing in place. A *belt and braces* engineering philosophy maybe but it is going to take some effort to separate the wing and fuselage now!

The ¼inch (6mm) square hardwood wing stiffener strips need to be stuck to the undersides of the wing. These strips prevent the ply-balsa joint from splitting. The strips must be parallel to the fuselage with the ends rounded off. Also, note that the two strips on the inner wing need holes drilled first for the leadout wires *before* glueing to the wing. It is sensible to temporarily fit the bellcrank to ensure that everything is in line.

Undercarriage: this uses the torsion bar principle for springing...and numerous rough landings have failed to defeat it so far. Steel wire, 12swg (2.3mm diameter) is cut and bent according to the diagram on the plans but remember to make right *and* left handed wires. Yes, I produced two left handed ones at first and once bent, steel wire cannot be straightened out.

One end of the wire is fixed into the previously drilled hole in the fuselage. Saddle clamps hold the wire to the underside of the wing. The ply wing section looked too thin for screws so I used cut down bolts. When satisfied with the undercarriage it is advisable to remove it before completing the model. It can be a hindrance and you only have to take it off before painting the model anyway.

Final Construction: the tailplane and elevator are cut from balsa sheet. The tailplane must be stuck *squarely* into the fuselage slot. Resist the temptation to fix the elevator to the tailplane, it is far easier to do this *after* painting the model.

The fuselage top decking, including the cockpit, is made from soft balsa. This piece can be laminated from scrap balsa and sanded to the correct thickness after sticking to the timber fuselage.

The vertical fin and dorsal spine, also from balsa, are glued to the fuselage top. Note that the fin must be off-set with the rear edge ¼ inch (6mm) out of line with the front. I found that this, along with the motor side thrust, was sufficient to ensure adequate line tension.

With the airframe complete, all the corners can be rounded off except for the motor cutout. It is adequate to just radius these corners, any attempt at producing streamlined sections will not significantly improve this model's aerodynamics.

Surface Finishing

Paint primer or undercoat could be used to seal the wood surfaces but I prefer dope. Not perhaps as cheap and definitely smelly but it is quick and always seems to penetrate and toughen the surface layers better. Either way, three or four light coats, sanding down between each, ought to suffice.

Painting this model is very easy, dark (Midnight) blue all over. A matt paint is preferred since it has greater covering power than gloss. The cockpit was painted in with white for contrast with the blue. The insignia and Navy markings were cut from white self adhesive plastic film, again very cheap but effective.

Fuelproofing was obtained with polyurethane varnish, left over from renovating some furniture. Rather than use a paint brush I always use a small piece of foam plastic, dabbed into the varnish and wiped over the model. This gives a thin but adequate coat of varnish. Be warned though, as some plastics are slowly dissolved by the varnish, not a real problem if you can work fast enough. Do not forget to paint and fuelproof the elevator separately.

Continued from page 293

Assembly

The elevator must be fixed to the tailplane, my favoured method is a sewn hinge using boot thread. Alternatives can be tape or plastic hinges, the aim being for a free movement without any sloppiness. A small plastic control horn is fitted to the lower surface of the elevator. Fit the undercarriage next, along with the wire skid. The wheels can either be fixed in place with soldered washers or collets. The bellcrank needs to be securely bolted in place, again the aim is free movement with minimum slop. A stiff wire push rod connects the bellcrank and elevator horn. The pushrod must be adjusted until the elevator is level when the bellcrank is parallel to the fuselage. With the leadout wires fitted, the whole control mechanism must be able to move freely with no risk of fouling at any point. A good check for this is that the elevator should fall under the action of its own weight, thus moving all the wires etc, (when the fuselage is held horizontally).

Finally the motor and tank are fitted to the fuselage. The motor bolts in place with washers under the front bolts to provide some side thrust. Since the timber is relatively soft, it is advisable to use large washers on the side opposite to the motor so as to spread the compressive load. The fuel tank was secured with an aluminium strap screwed to the fuselage side. I used a R/C clunk tank but a metal C/L tank might be preferred. The optimum tank position is with its top parallel to the carburettor inlet.

A propeller, nylon of course, spinner and silencer completed the model. The spinner saved the model during one spectacular nose first landing and ought not to be omitted. Even the silencer will act as a 'nose skid' in the event of rough landings!

Flying

My first choice of propeller was a 7 × 6in, this produced the most thrust but made the carburettor setting very critical. So it was back to the 8 × 4in propeller which seems to suit this motor no matter what model it is in. Running flat out, the motor could just generate sufficient static thrust to equal the model's weight, about 20 ounces (0.6kg), so I did not expect too much in the way of aerobatics.

The model was flown on 40 foot (12m) light-weight lines. The brisk acceleration and leap into the air on the maiden flight took me a little by surprise, I had really thought it might have a long ground run before painfully staggering upwards. In fact the model proved to be quite agile - provided you keep the speed up. This I can only attribute to an adequate wing area combined with, for a control-line model at least, a rearward centre of gravity. With a good 1.5cc motor, loops and wingovers are just possible but need both care and confidence. Life with a 2.5cc motor up front might be a little more exciting...

In conclusion

The 'Skyshark' design has met my original requirements of a cheap and tough model with which to introduce a novice to control line flying. The nature of its construction also lends itself to a group project, for example several fuselages could be cut out together using a bandsaw. I must admit to being tempted to enlarge the basic design for a '20' or even a '40' motor, if only to find out if these crude designs have any size limitations.

HOLLAND'S HINTS

There are many ways of building...this series offers groups of sketches from Peter Holland's construction notebook. Each of the series deals with related details in the enthralling business of making various types of aircraft...

by Peter Holland

ALTHOUGH slab sided, built-up frame fuselages were discussed last time, these few wrinkles may be helpful when contemplating the rounding of the top to give a more satisfying shape to the model. A prime requirement when planning a model is to have support for the top decking where it will be most effective, without adding excess weight. Thus we have secondary formers of light construction, either forming the upper part of main, highly stressed formers, or on their own, relying on the sheet box sides of the simple fuselage to offer strength towards the tail end. **Sketch A** indicates this combination of formers.

Doubling

Where light formers are to serve as more than just to support the top deck, thin sheet may still be used, but doubled at the areas where short grain would be buckled by sideways "squeeze". This type of load might occur at wing leading and trailing edges, tailplane leading edge and the part where over-enthusiastic gripping takes place during launching! **Sketch B** gives some examples and shows a gusset to spread the load where, for example, a tailplane L.E. might be positioned.

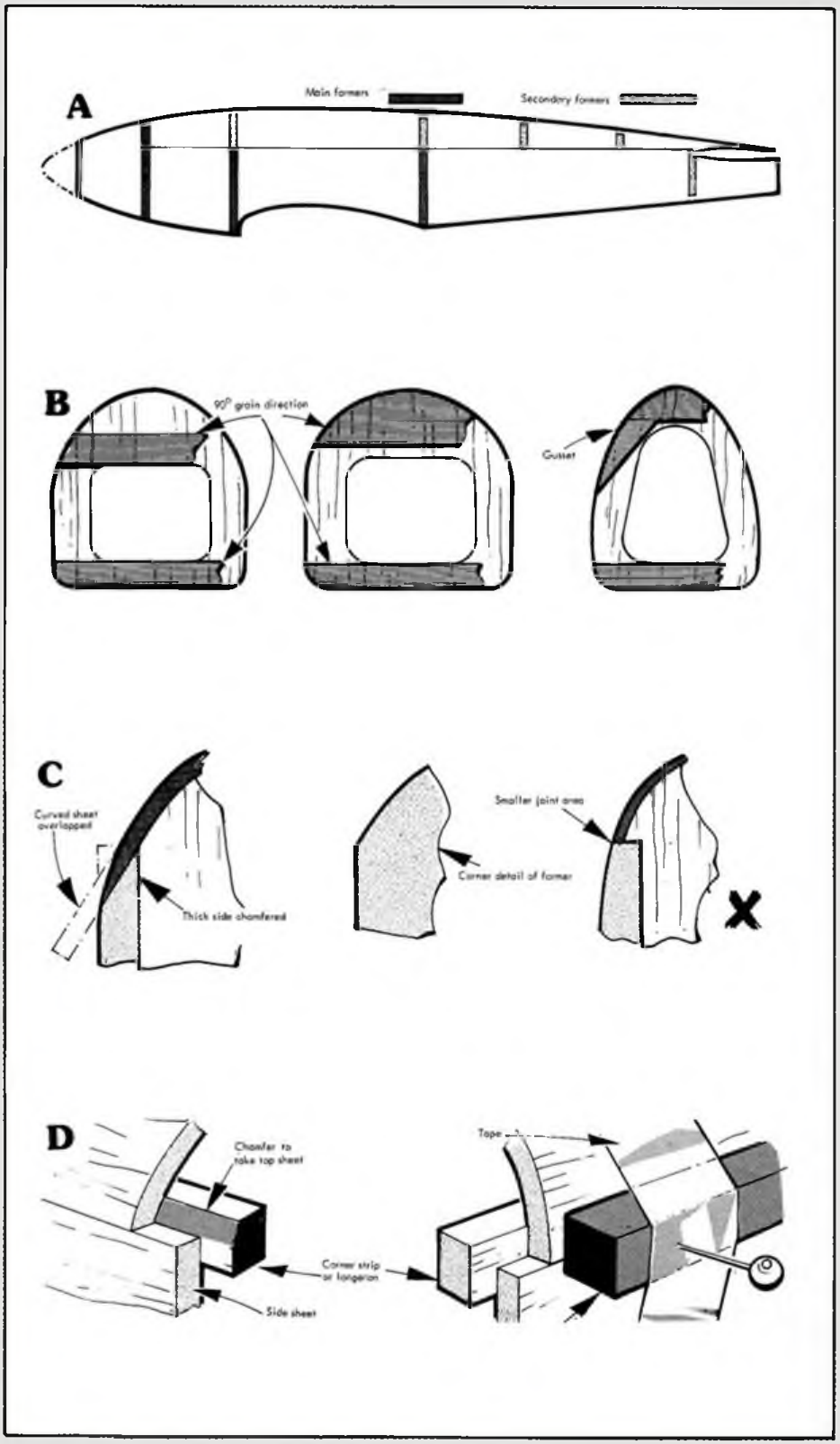
Joints

Although some plans indicate a plain butt joint between side and top sheeting, a better policy is to ensure that there is a lap joint, offering greater gluing area. This is shown in **Sketch C**. Notice how the thicker fuselage side sheet is chamfered to align with the inside face of the top sheet decking. This avoids a tight radius at the edge of the thin sheet, where it might split during fixing. Once fixed, it can be sanded to blend into the side, but be sure that a sandable glue is used - some types of P.V.A. woodworking glue go rubbery and leave a ridge when sanded.

Also shown in the sketch is the appropriate shape of the former where the sheets meet and that risky small area joint with accompanying notch in the former (unnecessary with the right type of joint.)

Clamping

If the side sheet is already fixed over a longeron or corner strip, then the latter may be chamfered to accept small radius or angled top sheet, where, projecting above the line of the side sheet, it will offer more support. **Sketch D** shows the detail and how to use a temporary strip to clamp the edge of the curved sheet, which now has adequate gluing area. Take that *Sellotape* or masking tape over the top and underneath, or it may peel off with the tension whilst your back is turned... There's nothing so annoying as to have to undo a joint to get it reset properly.



More about wings

A simple built-up wing, sometimes seen of control line models, has a really beefy central spar so that fabric covering or tissue follows a smooth line without being interrupted by surface spar lines. **Sketch E** shows the system, but avoid a sloppy fit at the spar. When all the ribs have been positioned, apply glue to the spar next to the ribs, slide the ribs by bending, or slide the spar, so that the glue is drawn into the joint (cyanoacrylate glue finds its own way in). It is important to leave enough wood above and below the spar, otherwise the ribs may be broken in assembly or the covering sag may allow the spar to show as a ridge. Structurally, this is not so strong as the next to be described, but it is quick and simple.

Building order

Where the construction is more involved, the right order of assembly will help one to get it together with the minimum of fuss. **Sketch F** shows a typical built-up wing with flat bottom and sheeted leading edge, combining with spars and web to make what is known as a "D box" wing (being the section of the leading edge part which forms a rigid structural unit).

If the ribs are to be cap stripped underneath - this adds strength and makes covering easier - these strips may be added at the same time as ribs, leading and trailing edge. The lower leading edge sheet may also be fitted at this stage if the wing is truly flat bottomed. Next comes the lower spar followed by ribs, upper spar and webs in each bay. After drying for a spell, the top sheeting and cap strips can follow, but it is a mistake to go too far in one stage, or joints may be disturbed by the pinning of adjacent new ones.

Leading and trailing edges

Suppose the leading edge is not flat on the board - even the so-called flat bottomed Clark Y section has a raised leading edge if properly built - so some variations come into play.

Sketch G suggests packing on the building bench and pre-chamfered lower leading edge sheet resting on a strip of *Sellotape* which is ready to be wrapped over the leading edge strip, so preventing the latter rising or the glue escaping underneath. Alternatively, the sheet can be added after finishing the top sheeting and removing from the board.

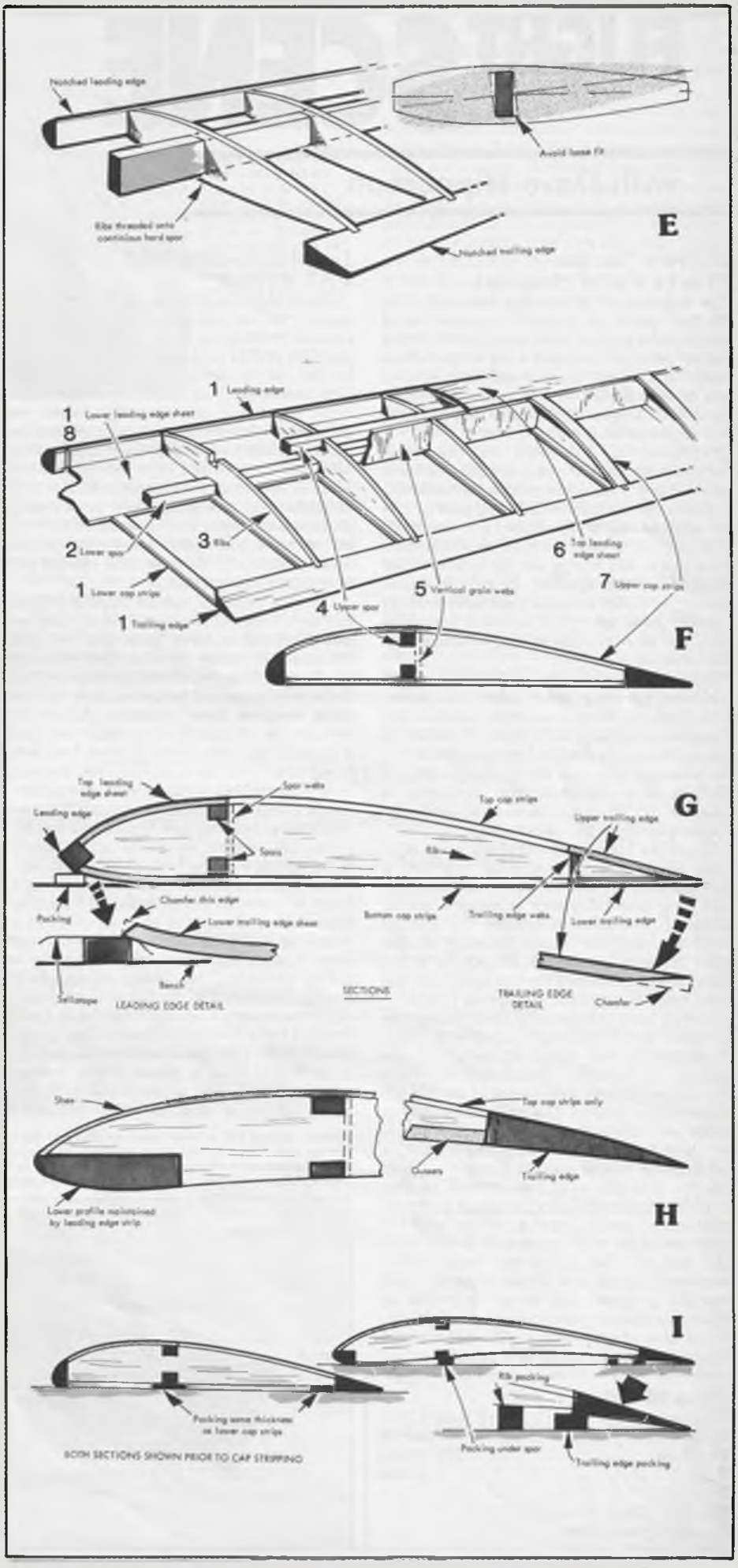
Lighter trailing edges can be made by building these up from two strips of sheet, chamfered as shown. It does not matter whether the top or bottom sheet is chamfered, so long as the chamfer is inside. Little webs can then be added between each rib - this time with the grain spanwise.

Thin wings

Thin aerofoils require a different approach. The lower leading edge serves as undersheeting, spars are flat and certainly webbed, cap strips may be on the top only and a large section trailing edge augmented with gussets to support those thin rib ends...All as seen in **Sketch H**.

Packing

If lower cap strips are to be fitted last, then the ribs will need to be packed up at spar and trailing edge, so will the trailing edge itself if the wing is undercambered as indicated in **Sketch I.**



FREE FLIGHT SCENE

with Dave Hipperson

Warrior No. 32 F1A by Colin Sharman

The original in this series was based on Zachs Euro Champs winner and constructed in 1981. It is from here that the rather unusual all sheet wing construction came. Since then the original Zach section has been replaced by a Hansen and there have been slight increases in aspect ratio and moment arm.

However, it has been in the wing construction that the major changes have occured and Colin reckons now that with the extensive use of carbon fibre and pine he has an unburstable wing which will not warp and can be relied upon in any weather. Needless to say wings are jig built and the progressive rib spacing is an important factor, as Colin realised that with a sheet surface wing, every rib meant a long glue line. The more ribs the more glue and hence the more weight.

Ribs are spaced quite widely in the tips with the covering sheet taking the spanwise loads as there is no spar out that far. The sheet is covered with 18 gm, *Wanitschek* glass cloth applied with *Aeropoxy* resin over the inboard 300mm of the centre panels and *Tufkote* over the rest. (the *Aeropoxy* is thinned 50/50 with methanol and the *Tufkote* thinned with acetone).

There is a higher aspect ratio version with even fewer ribs in the wing tips and a thinner (6%) section but the rough weather last year precluded any extensive testing although it seems to exhibit the similar viceless handling characteristics of the other models. Like Chris Edge's A2 a few months ago it proved itself a match for the dead conditions at the European Trials.

It was here incidentally that Colin was involved in the line tangle business to which I referred in my report of the event. He points out correctly that I got the story wrong and he was *well aware* of the SMAE rules on this subject. His reflight was taken solely as a precaution as he was in doubt as to which rules the CD was going to apply - not because he was unclear himself. Colin reports that the next two models in this series are already nearing completion...once again with subtle improvements to the structure rather than the design. The tailplanes have boron-reinforced spars and *Mylar* covering and the *Seelig* timers are being up-graded to electronic ones for accuracy and reliability. He is also exprimenting with pre-covered wing sheeting prepared in a press!

Data Sheet

Weights:-
Wing ..... 185 grams
Fuselage ..... 224 grams
Tail ..... 8 grams
Warps:-
Port Tip - 6mm Wash out.
All other panels flat

Hatschek style Tow Hook
20mm in front of CG
CG at 56% chord

Learing to live with FA1 Rubber

Those about to stock up again for the new season will be pleased to hear that at the time of writing at least (end of Feb), the supplies of *FAI* rubber in this Country seem to be of a very consistent quality. Comparing samples from the two main mail order sources I can actually detect less difference in performance of sample batches than I would have normally expected from different parts of the *same hank of Pirelli*. That is not to say its wonder stuff - it all exhibits that annoying early power surge and reduced overal torque compred to *Pirelli* but we have to live with it now - *Pirelli* is no longer made and there is little chance of it ever again being made.

On this point of rubber supply I would advise - if contest use is envisaged - that you buy from either Dave Stapleton - or Mike Woodhouse simply because that way you can be sure from what batch you are buying. Both people can tell you when they received their supplies from America. Across the counter at a model shop may be quite adequate but one never knows how long they have had their stocks and knowing how little rubber strip is sold nowadays I would guess in most cases that is a fair time. *FAI* rubber is better now than it was say five years ago - you would be at a distinct disadvantage if you bought any that old.

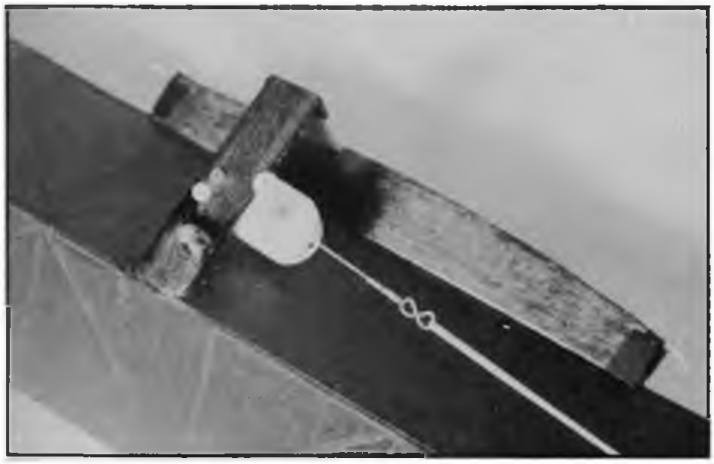
So, facing the fact that we are going to have to come to terms with *FAI Supplies* type rubber we ought to look at ways of handling its characteristics. I have always been a staunch opponent of gadgets on rubber models - too many things to go wrong. Anyway I never believed they were really necessary even on Wakefields. Using *Pirelli* I have always considered the 'power' phase to be best considered as an assisted glide rather than a power climb. I would certainly be happy to continue with that policy were it not for the difficulties

encountered in achieving an efficient trim using *FAI* rubber.

The characteristic of *FAI* is that on unwind it delivers a whole chunk of its total power store very quickly then tails off fast to low power cruise. To generalise and simplify we could say it delivers 25% of its wound energy in say the first 10% of the prop run rather than *Pirelli* which we could say releases only 15% over this period leaving far more to be spread over the cruise portion. It is doubly important therefore that if we hope to achieve high performances with *FAI*, it is essential that we don't waste this burst. Just taming it may not be sufficient - we should harness it to climb - but how?

One way around the problem is to re-strand the motors into longer and/or thinner configurations. But this is actually only a partial cure and aggravates another problem. Although a higher aspect ratio motor will indeed reduce initial torque when fully wound, it will subdue the cruise section even more and hence lengthen the run substantially often finishing up with such a low propeller speed as to be less helpful than were the blades to fold altogether! I have actually gone in the other direction - not unusual for me is it? I make FAI motors up slightly *shorter* than their respective *Pirelli* counterparts as this run lengthening has

Above, typical VIT arrangement on Cd'H or Wakefield. Nylon line holds down tail, another holds in 24swg wire trigger. First timer action is to release tail 'hold down' line (with loop). On release, TE rises and catches on wire trigger. Trigger released to activate DT. Below, similar systems installed on small Open Rubber models - next to no weight penalty.



Left, plastic 'Tomy' timer simply bolted to pylon of small Open Rubber model will give a very light DT timer. The light coloured pin acts as a 'timer off' switch. Entire assembly, including nylon lines, only weighs 3 grams.

become unacceptable with my already long running models. Trimming the initial burst then has to be a compromise of thrust directions and incidence.

Variable pitch propellers: These have been experimented with by various top fliers over the past 20 years or so with numerous aerodynamic theories being wheeled out to support their choice. They have never caught on universally - that may be about to change. As we saw before, if the prop pitch/motor cross section ratio is kept large we tame the burst nicely but finish up with a hopelessly long and ineffective cruise.

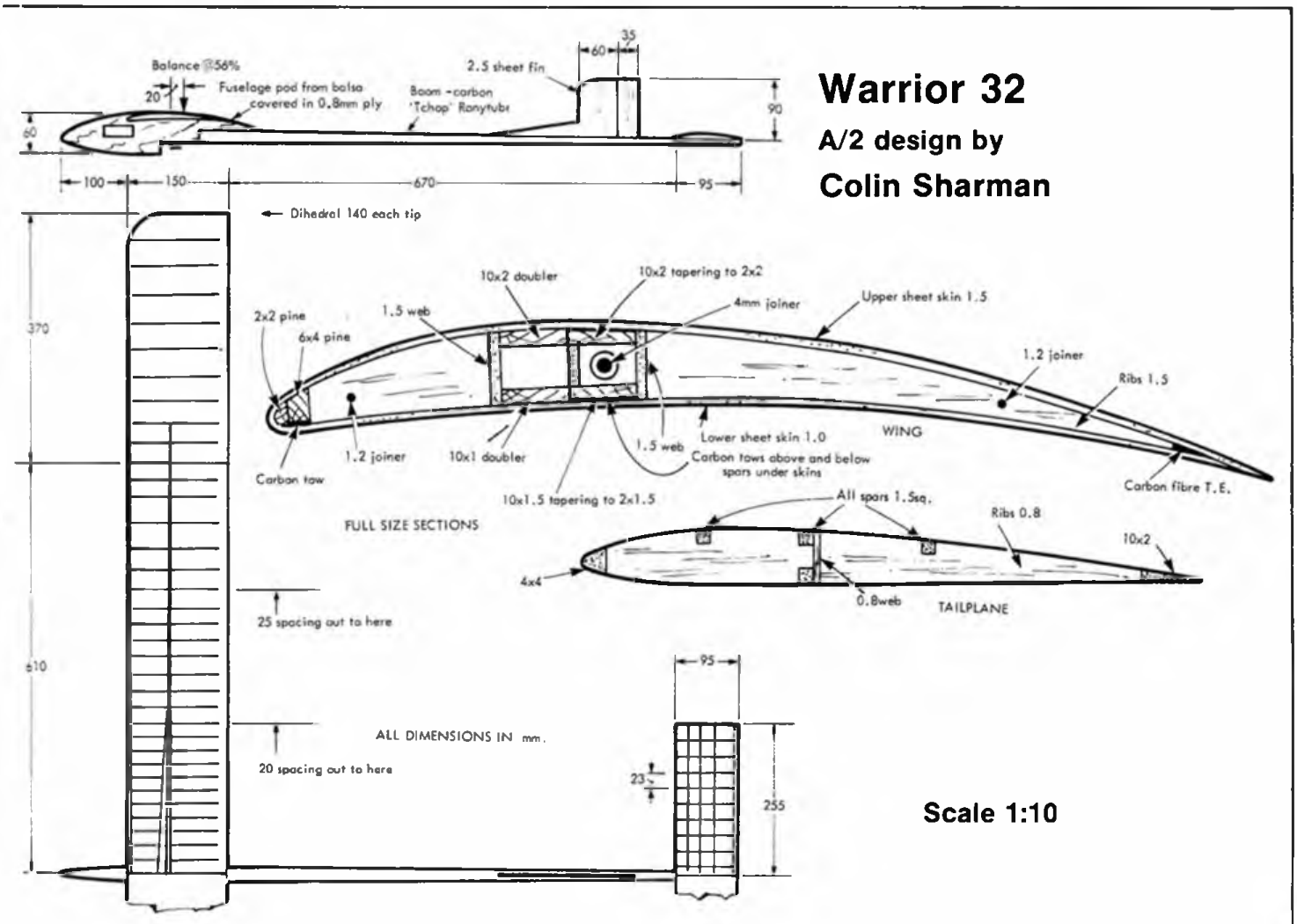
However if we were able to reduce the pitch of the blades after the burst has gone, we could maintain prop revs and static thrust in the later part of the climb without flying at crazy speeds at the beginning. Favourite would be a mechanical pitch variation system that preferably operated on motor torque so that variations in different motors were automatically compensated for.

This could be relatively foolproof but with the disadvantage that the prop is only going to be operating at the pitch for which the blades were designed for a portion of the flight. The remainder of the climb will be a compromise which may not be the most efficient way.

Such a system would probably be most beneficial to models that were required to fly fairly slowly. Large flyoff Open models and calm air Coupe d'Hivers would appear the obvious examples and props would be best designed around the pitch at which they were operating for longest. That is unlikely to be the initial first few seconds - more likely the mid-cruise section.

Variable Incidence Tails (V.I.Ts): Up until now, not a favourite of mine but they do offer a very efficient way of handling the power burst particularly on faster flying models such as F1Bs, small Open Rubber and all weather C d'Hivers. The inherent problem with FAI being that we get too much power at the beginning of the run inducing a strong looping tendency in the model flown on full turns at the incidence settings arrived at for the best climbing cruise. This nasty looping tendency can then be further aggravated to the point of crashing or at least gaining no height for some time if the model is flown in a high wind.

You finish up with that very wasteful ground clipping loop to start the flight. I have actually taken to *reducing* power on windy days to get around this, rather than using a powerful motor which in good trim would theoretically climb the model above



the ground turbulence more quickly... This loop may also manifest itself as a tight right hand turn but essentially the loop comes first and it is this that can be tamed so effectively with VIT.

VIT simply allows the incidence of the tail to be increased a controlled amount for the first few seconds of the flight. This keeps the nose down even in a wind and allows a steep initial climb with as much nose down pitching moment as is required to handling the power burst stage. An underelevated model which the climbing - VIT equipped - model essentially is, is also more inherently directionally stable and hence tends to fly straighter, thus not only is the loop controlled but so also is that tight initial turn (or wing over to be more accurate). Against this it follows that the model will be flying very fast in this VIT mode and hence must be rigid enough not to flutter, and strong enough not to break.

However, as I see it, the biggest drawback may be the loss of that 'natural' trim characteristic of the gadgetless model which I know to centre into lift so well. I watched a number of VIT equipped Wakefields at last years Trials launched alongside mine and climbing well but moving just enough up-wind to *drop out* of the lift into which my 'around and up' trim centred. Perhaps it is a case for using VIT for either dead calm or very windy weather.

Now the small plastic (Snoopy) timer is freely available and proven to be reliable, VIT is certainly practical on any rubber model. Both the timers and VIT systems as such, have been dealt with before but experiments with how much VIT and for how long it is applied can be interesting. From my initial experiments it would appear that both variables can be critical (example Pete Fauser's comments on timing VIT in the issue before last). Ideally they may best be adjusted for the conditions prevailing at the moment of launch and of course are also very tied up with the torque of the motor.

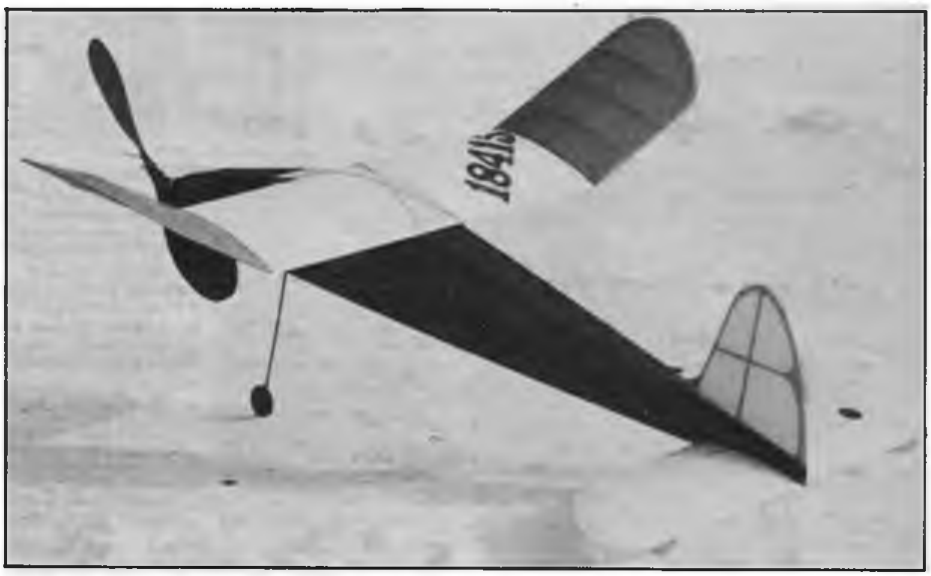
Looks like a whole new way of making a mess of the climb but to use *FAI* efficiently, something like this is going to be necessary.

The Falcons League

As an alternative to the *SMAE* based Senior Champtionships the Falcons Club are running a very comprehensive league for 1986. It embraces far more events than the *SMAE* table. It is to be decided on *all* events that are *not* official *SMAE* ones. Quite a collation job for the Club! The winner will receive a trophy for one year and £50 cash prize.

Events to count will be:- Grantham, GP, Kay/Pannett, Spring Odiham, Woodbury, Port Meadow, RAFMAA Champs, London Gala, Wells Wakefield Day and Falcons, South Coast, Crookham, Tynemouth and Birmingham Galas, Aeromodeller Coupe Day, Scottish Nats, Northern Area FAI, and Midland Fun Day.

It is realised that a number of the above events may not be run or classes may be different in detail to those advertised but it is whatever *actually run* on the day that will count. Points in each class will be distributed 1st - 8 points, 2nd - 6 points, 3rd - 4 points and 4th - 2 points. With points awarded no matter how few entries are received. However, they do introduce one novel idea and that is to limit point scoring on any one day to one class only.



Above, during the winter, Dave had time to build this 'Senator' from an original plan supplied by Mike Kemp. Weighs 80 grams including 30 grams of FAI Supplies rubber. With a 13in freewheel prop it climbs for over a minute and has already exceeded 3 minutes in sub zero conditions.

In other words you are invited to fly in as many as you like but only your highest placing each day will count and only in one class. One presumes also that events flown over a number of days, as has for instance, been the practice at the RAFMAA Champs recently, will be counted as if the flights were all made on one day but it might be worth checking that it doesn't entitle one to score in two classes!

Altogether very good news, particularly for the contestants that need a little more incentive to fly in the non-*SMAE* events when the weather is nasty. It can do nothing but good and we are indebted to the members of the Falcons who are investing both the money and effort into this venture. They hope to be able to bring us progress and a leader board as the season unfolds.

Builders of the model rule

In *SMAE* events it is necessary for competitors to have built their own models. To quote - 'Entrants must be the constructors of the model except...' Those exceptions don't include any Free Flight classes - yet! Understandably with increasing availability and use of pre-constructed components it could be argued that there is good reason to lift this restriction now. We certainly don't want any rules so openly flouted as to bring them and others into ridicule.

After all, almost all of us, certainly to a greater or lesser extent, break this rule sometimes during the season. For instance for some time now pre-moulded fuselage tubes and booms have been widely used and prop assemblies have been available off the shelf for just about as long. Its gone much further than that now with the advent of preformed, custom designed solid balsa wings panels and prop blades. Should there be a rule change?

Just what constitutes building the model anyway? It is quite legal to fly a kit built model so it could be argued that two glass-fibre tubes, a prop assembly, solid wing panels and prop blade blanks merely comprise a comprehensive kit and not even all bought from the same source. No one has ever expected us to cut down our own balsa trees or extrude our own piano wire - so just where do we draw the line?

The truth of the matter is that the present rule draws the line rather satisfactorily because it doesn't *define* 'construct'. If the rule was lifted the situation would change radically. We would by implication also be removing the *trimming* stage. Competitors would, up to the permitted maximum number of course, be able to borrow complete models freely from other competitors during the course of an event.

It would effectively be an invitation to 'instant proxy' flying. A competitor dropping a flight could enlist the help of an assistant, wife or club-mate to re-fly the model(s) again under his close scrutiny - in other words they launch, he does the rest. Think of the possibilities at the Club Champs and the Area team events - pandemonium.

However, I don't see why certain comps could not be run separately for competitors using anyone's model. Some have suggested that the Women's Cup and Junior events at the Nationals should be opened up in this way but that would probably result in a glut of winners using expert Daddies' or Hubbies' models. In some ways that would be the worst place for such an experiment putting genuine builders at a terrible disadvantage. Perhaps a few selected glider events could be tried - where there is already more emphasis on the flyer's ability and dare I say fitness - than the construction of the model. However this was actually done at the last Club Champs and despite being well advertised in advance, attracted minimal response.

No, I think the rule be best left alone and by precedent the world 'construct' should be taken to include assembly from purchased part-finished components if necessary.

If we allow a free-for-all we could see prolific builders attending meetings possibly with large numbers of winning lightweight designs and 'renting them out' for the fly-off. Certainly I could enjoy myself immensely in such circumstances but I don't think it's quite the spirit of the thing...

Australian Vintage Rules

Those who remember John Fletcher, will be pleased to learn that since his moving out to Australia a few years ago he has become just as effective in Antipodean events. According to the free flight digest - *Free Flight Down Under* - he is a force to be reckoned with in all the classes he flew in the U.K. plus Slow Open Power although he's still boring them with stories from the 1980 British Nats where, it will be remembered, he won both ½A Power and Open Rubber fly-offs! What appears particularly interesting from this journal however is the publication of Australia's first Vintage Rules. As we know already this is the class that taxes the ingenuity of the rule makers to the maximum. Vintage seems to be a 'walking loophole' everywhere.

A synopsis of the Aussie ones runs thus:- Cut-off date 31st December *1954* and events to be flown as separate classes when sufficient entries are received. Minor detailed alterations are allowed along the lines of our rules but 'No change or modification shall be permitted if in the opinion of the CD such changes would improve the flying quality of the model'. A rather onerous responsibility laid at the feet of the CD but I doubt if anyone would risk turbulators!

For Rubber models, propeller and front ends must be as per the plan. I think our phase of "clutches and free-wheelers may be to the competitors choice" has allowed too much variation on the front end - their ideas are better. Maximum rubber weight as per plan or less. If not stated 100 grams max. That might rule out the really big lightweights but my Lanzos only use 100 grams. For Power models, motors pre '55 and modern copies of same as long as they don't incorporate mods to improve performance; another difficult one to enforce.

I don't see any requirement for ROG, but they have introduced a natty bonus scheme for models older tha the cut-off date. This is where scoring gets complicated - with maxes at 180 secs two seconds bonus is awarded for each year a model pre-dates the '54 cut-off. This then pre-supposes that the contestant can prove the *actual* publication date rather than just that it is pre-'54. A model receives no bonus score if not flown of course - the bonus scheme only coming into force when an official flight is recorded and however much bonus the design warrants it takes the score up to the max and no further - the scheme still applies at fly-offs.

Such a bonus system although sounding great in principle instantly gives almost anything designed by Chester Lanzo an even bigger margin of advantage! The editorial also bemoans the fact that now, with some field experience of the rules they are finding that although intending to stimulate the 'fly for fun' element they have instead created a situation that necessitates considerable calculation and not a little arguement to arrive at the result!

I have always thought a bonus scheme for ROG was a good way of pleasing both the purist and the more cautious but competitive flyers. I tried such a thing at the Vintage Wakefield event I ran a couple of years ago at Beaulieu. I simply gave a 20 sec bonus to all official scoring *ROG* flights. That is flights of over 20 secs. This allowed each competitor a choice for each flight. It seemed a good balance on the day too, as at least one competitor managed two maxes from ROG this way and then crashed the model on the last flight when it got breezy and he should have plumped for hand launch. Whereas on the other hand another flier hand-launched all his flights and hit bad air on the last to drop a max that would have made it had he ROG'd and benefited from the 20sec bonus. There is no doubt that ROG is most satisfying in calm conditions and horrendously risky in a wind. Those that can do it consistently should be rewarded for their skill...

SMAE Winter Mini... Driffield...16th Feb

Although past Winter Mini meetings have inevitably had a poor attendance record, this event suffered additionally from very harsh conditions even though the snow blizzards forecast fortunately failed to materialise. Conditions over the two or three inches of frozen snow were very erratic although despite the cold easterly wind not impossibly turbulent. This characteristic has got to be one of Driffield's best features - remember last years Northern Gala!

Mike Cook stuck out the near freezing conditions as CD all day but he was no doubt relieved that no events went to flyoffs. Although only two classes had a full *SMAE* points scoring compliment of six the most extraordinary performance of the day must be Steve Philpott's incredible nearly perfect total in CO2. Anyone who has tried to fly CO2 in conditions anywhere near freezing will know that it is nearer impossible than just difficult. Steve had admitted to me the night before that he had been doing a little experimentation in this direction - he seems to have discovered something...

Gordon Beal had a good day taking both HLG and A1, the later using his Nats winning model of a few years ago and Phil Ball 'Hi Ho'd' Russell Peers' 'Lanzo' off top slot in Vintage after Russell had been unlucky with damage on his first two flights and got the final repair a little bit wrong, then picked a bad patch of air to drop his last flight.

Very encouraging to see Slow Open so well supported with Chas Plant becoming a regular feature now at the top of the list with his larger than average and very well trimmed 'Hotspur'. Coupe D'Hiver was simlarly well supported although some of the back markers were making frantic flights in the closing minutes with an eye to picking up stray SMAE points. Gerry Ferrer dominated, though mostly by way of not making a bad flight were most of the field had at least one around 30 secs spoiling their scores. *Thanks to Ian Davitt for above information.*

SMAE Winter Mini Meeting

Results

A1 Glider

1	G. Beal	9:10
2	J. O'Donnell	7:32

C D'H (7 flew)

1	G. Ferrer	8:10
2	P. Harris	7:07
3	P. Ball	6:58
4	I. Davitt	6:20
5	A. Ball	5:05
6	J. Carter	5:01
-	D. Davitt	5:01

1/2A Power

1	P. Harris	8:34
2	R. Peers	7:39

HLG

1	G. Beal	1:01

CO2

1	S. Philpott	9:39

Vintage

1	P. Ball	7:30
2	R. Peers	6:53
3	T. Chambers	6:06

Slow Open Power (7 flew)

1	C. Plant	7:30
2	S. Fielding	7:03
3	P. Ball	7:02
4	R. King	7:00
5	J. Carter	6:49
6	C. Hickmott	4:34

AT THE LAUNCH PAD

with John Wheddon

Model Rocketry in the classroom

The very first sighting of a model rocket usually results in immediate questions about height and speed. When different styles of rocket are flown together at displays or competitions there is a direct comparison of performance which also raises a varity of questions.

Curiosity and a high interest level in the subject are two important factors which a teacher can draw upon to capture the attention of a class. Model rockets certainly attract attention and curiosity of onlookers, young and old, but just what aspects can be explored for educational purposes? It's interesting to examine the possibilities in some detail.

In schools and colleges in the United States, model rockets have been used as an exciting way of introducing a wide range of technical and practical subjects. That this is a very effective way of teaching quite advanced topics can be illustrated by the success of one particular group of modellers at the Massachusetts Institute of Technology. There, in the course of their studies, the Rocket Society members produced a large number of designs, built and developed the models and achieved considerable success in U.S. domestic and international competitions.

The various stages of their work were properly recorded in report form for assessment by college tutors and much of the material has been published in the Society's Journal. One member of the group, Guppy Youngren, became America's first rocketry World Champion in 1978, winning the boost-glider event at Jambol, Bulgaria. Guppy is not the only M.I.T. student to achieve this type of success since several others have now attained world status.

The design skills developed through model rocketry at M.I.T. have been put to further important use by the same group of modellers. This time the attraction was the Henry Kremer Prize for Man Powered Aircraft in the Speed category. The team leader for this winning project, John Langford, is also a highly skilled rocket modeller. He has represented the United States as a member of the scale model team and has also been the team's manager. Ron Moulton reported on the group's marvellous achievements in the May 1985 edition of *Aeromodeller*. Although noting John Langford's aeromodelling background, Ron did not mention the model rocketry connection - quite a change, rockets to man-powered aircraft!

Rocket flight

Before actually building and flying a model rocket it is valuable to examine why it works at all. Text books will quote Newton's Laws in the usual dry terms but our rocket flight will actually demonstrate important first principles very clearly indeed.

Consider the rocket at rest on the launcher. It has a certain weight which must be overcome by a force acting in the required direction of flight. Ignition of the engine results in the generation of gases which are expelled through the engine nozzle. A reaction force, equal and opposite to the engine force then acts upon the rocket which accelerates away from the launcher.

Pavel Horacek (left) seen here preparing his model of the USSR 'Soyuz' at the Czechoslovakian Nats. Brother Miroslav supports the model. Czechoslovakia has widespread educational support for model rocketry and many vocational courses for all age groups.

Throughout the engine burn, the thrust force continues to accelerate the model, the final velocity being dependent upon the rocket's weight (gravity effects) and the aerodynamic drag acting upon it. (**Fig. 1.**). The drag forces opposing the rocket are the result of many factors which can be investigated in some considerable detail. Think about air density, the shape of the rocket, its cross-sectional area and, most important, its speed.

What happens at the end of the rocket engine burn? The rocket certainly does not come to an immediate stop. It has now acquired momentum, dependent upon its weight and velocity, which causes the rocket to continue upwards opposed by the same two villains, gravity and drag. In due course the situation reaches a state of equilibrium at peak altitude. Then the situation is reversed and the rocket starts to accelerate downwards.

Somewhere near this peak altitude it is hoped that the engine's ejection charge will fire to deploy a parachute for a gentle return to ground level. It is interesting to compare different sizes of parachute and streamer and also to imagine what happens when the recovery device does not work and the rocket returns in a 'clean', high speed, condition!

Some readers might recall that the effect of gravity in an airless environment was demonstrated during one of the Apollo moon landings. An astronaut standing on the lunar surface dropped a feather and a solid ball side by side. That must have been one of history's more expensive experiments!

Mathematics

Ugh! An all-too-common reaction, I suspect, when pure maths is considered as a subject on its own. However, because of the relativity 'pure', uncomplicated nature of rocket flight, maths can be used to tell us a lot about what is happening to the rocket in its flight. Height, speed, centre of gravity and centre of pressure position can be readily calculated. The necessary formulae are available in various standard textbooks and, at higher levels, can be derived from first principles.

Height measurement in its most simple form is shown in **Fig. 2.** The nicely stable rocket is launched on a calm day and flies directly over the launch point. An observer at the Tracking Point measures Angle A using a simple, elevation-only sextant made from a standard school protractor. After

measuring the base length B, a simple scale drawing can be made and a good estimate of the rocket's altitude will be obtained.

At this stage trigonometry can be introduced to speed up the process by means of the basic formula:

$$h = B \times \text{Tan } A$$

As in all aspects of model flying, our climate does not often provide us with calm days and, consequently, our rockets tend to arc away from the launch point rather than ascending vertically. To obtain a good estimate of height in this situation it is necessary to use another tracking station. The trigonometry problem is rather more difficult as shown in **Fig. 3**. Note that it is necessary to measure the horizontal displacement or azimuth angles X and Y as well as elevation so a more complicated measuring instrument is required. This type of simple theodolite should be well within the capabilities of an average school workshop, however.

Two-station tracking introduces some interesting and more advanced trigonometry too. Remember that we require to calculate height OX. Angles a, b, X and Y are measured during the flight, angle Z is derived and the baseline z is established beforehand.

Then, from the Sine Rule:

$$\frac{Y}{\text{Sin } Y} = \frac{x}{\text{Sin } X} = \frac{\text{Baseline z}}{\text{Sin } Z}$$

The distances x and y can be obtained and then used to calculate the height OX. Of course, two values will inevitably be obtained and it is necessary to average them to produce an acceptable result. Interesting discussions can arise around acceptable variations in this kind of calculation. International contest rules permit 10%!

It will also be appreciated that a fair degree of organisation is necessary to make the business of altitude tracking work at all. Trackers have to be aware of the moment of launch, angular measurements have to be relayed to a central calculating area and impatient modellers have to be advised of the result. All this makes a subtle way of introducing communication skills too!

Speed

Suppose that we are flying an Estes 'Wizard' rocket, built from the simple, beginners - level kit. The Estes catalogue suggests that 'Wizard' will reach 1600 feet altitude when flown with a C6-7 engine. The time from ignition to peak altitude is approximately 8 seconds so it can be seen that the rocket's average speed for its short, upward journey is 200 feet per second. That is 136 mph.

The maximum speed reached by 'Wizard' is much higher than this. We have already seen that the rocket is accelerated throughout the engine burn time which, in the case of C6-7, is 1.66 seconds. So the rocket achieved maximum speed only 1.66 seconds into its flight.

Engine manufacturers provide full details of the expected performance of their products and, if it is accepted that these are correct, we can actually calculate the maximum speed. It is necessary to make some assumptions, especially about aerodynamic drag and it is important to weigh the model accurately in its launch-ready trim.

Once the calculations have started it is easy to get rather carried away with the amount of information which becomes available! For example, burnout altitude, burnout (maximum) velocity, coasting time to peak altitude, coasting altitude and, of course, finally, total altitude.

Predicting performance

From the above it is apparent, I hope, that one of the really useful aspects of 'classroom' rocketry is that sound maths and scientific principles can be used to predict the flight performance of any model with any particular engine. After the theory it is possible to fly the model and obtain sufficient data to compare actual with predicted results. In fact, that is the basis for a competition class known as Design Efficiency in the United States.

Advanced topics

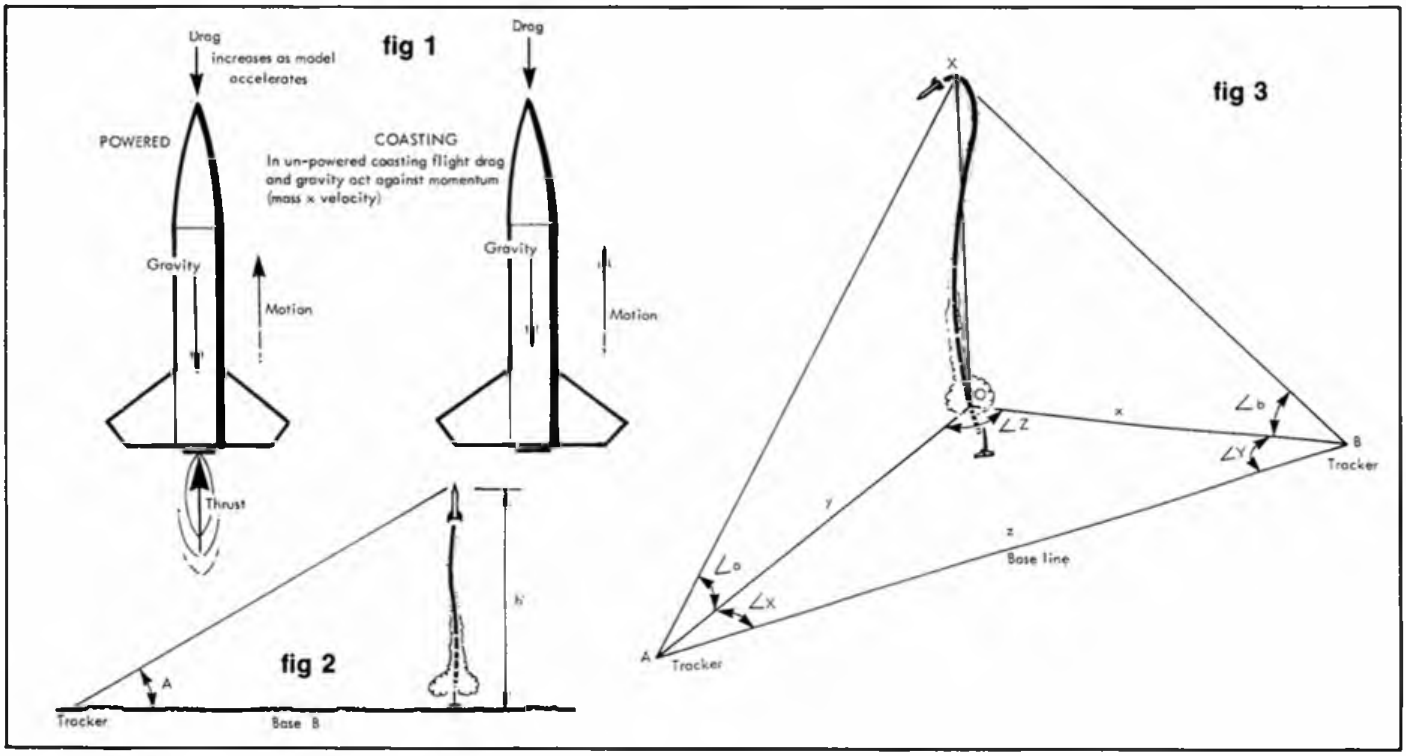
The scope for interesting experimentation centred on model rocketry is very great indeed. For example, it is possible to instal telemetry equipment in a rocket to transmit information about the flight. A wind tunnel would make a challenging design and construction project and would provide some actual information on drag forces rather than the assumptions we are forced to use. Another very worthwhile exercise would be the production of an engine test stand. We know that, due to production tolerances, engine thrust is often well below that stated on the label - it would be intriguing to know just how far below. . .

Computer applications

Full-size space flight is completely dependent upon computers. Model rocketry can function without them but a computer can make the hobby a lot easier! All of the performance calculations mentioned can, of course, be made in a fraction of the time taken by manual methods. There are plenty of other possibilities too. Stability calculations, optimum weight analysis for highest speed or altitude can be programmed.

All this and more. . .

This article has really only scratched slightly below the surface of the educational possibilities of model rocketry. Constructional aspects have not been discussed nor has the matter of arranging an electrical supply for a launch system. It is hoped, however, that sufficient pointers have been given to arouse the curiosity of the teaching profession among our readers.



Combat with Frank Smart

Above, not only does Frank Smart's engine pod add to the strength of the engine bearers but it looks good and reduces the drag!

Engine pod

Pod design is generally governed by engine mounts and we have seen a variety over the years. The Americans favour radial, but now the adjustable plant on metal angle beam mounts are most popular. The British on the other hand have been with beam mounted engines for a decade using hardwood bearers and a ½in thick balsa backing. Even when the dramatic change to glow and foam models came in the mid 70s we were still using the same pod which on foam has very little strength value apart from taking away some vibration. Engine nuts were either concealed at the back or bolts were used permanently, with both prone to stripping in the heat of the moment and difficult to replace.

In 1976 I built a foam tile version of my *APS* 'Hot Pants' design as a trainer with a reduced span. On this model the first alternative pod was fitted; although very simple it was not aerodynamic and was heavier than necessary. Since then the design described here has been developed and well tried on various models. The amount of work is roughly the same, slightly cheaper in materials but fits are much better and there are benefits on the field, both in efficiency and safety.

Construction is carried out in two stages: a) making up the hardwood bearers and ply backing, tailored and then glued to the model; b) building on to the model the wing-pod brace, using quick setting two part epoxy glue throughout.

It is understood in the first instance that the pod will be mounted onto a conventional centre balsa fuselage of a covered model whether foam or balsa construction and for accuracy the fuselage left square or in the case of pre-moulded leading edges built up square.

Stage a (Off Model): Commence by cutting materials and making up the engine bearers in the normal way complete with 1/16in ply backing and inset medium balsa nose block (fig 1). *Do not* cut away ply 'D' yet to receive wing, nose block *must not* be omitted.

When dry, shape out minimum of balsa block 'C' to receive engine, smooth with sandpaper and seal over with epoxy glue. Drill bearers and fit desired back fixings, pull up tight with the bolts using small dabs of epoxy glue to retain nuts, washers, etc.

Clamp in vice and shape off bearers 'A', 'B' (fig 2), leaving minimum of 1/16in at rear. Now cut out ply between bearers 'D' for a tight fit on the model and glue in position with desired offset.

Stage b (On Model): Make up the brace in layers of balsa gussets, starting with a centre hard ½in sheet 'E' glued into position, then using scrap light sheet top and bottom, build up to thickness of wing (fig 3, 3a), when dry sanding balsa to blend leading edge to a sharp front edge.

Make up cardboard template to determine true shape to make final top and bottom 1/32in plywood braces, notch around engine nut fixings, allow for slight overlap to front edge and note grain for ease of bending (do not wet or steam bend).

Finally, glue ply braces in position one at a time starting with the underside of the model. Using template, mark area to be glued on the model with soft pencil.

Spread epoxy glue on the model and, working quickly, pin the ply brace to the model along the two long edges, following

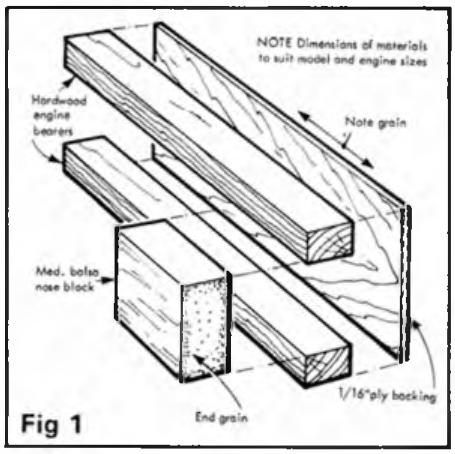


Fig 1

leading edge profile and then finally front edge (fig 4).

When entirely dry trim off surplus with sanding bat or fine file. Then repeat procedure for top side. Blend edges on the wing and butt to bearers with epoxy fillet smoothed out with wet finger prior to setting. Finally, sand and give two coats 'Tufcote' fuel proofer.

Some of the immediate advantages would seem to be:

1 Bolts can be cut to exact length to reduce weight.
2 Weight can be securely fixed to alter

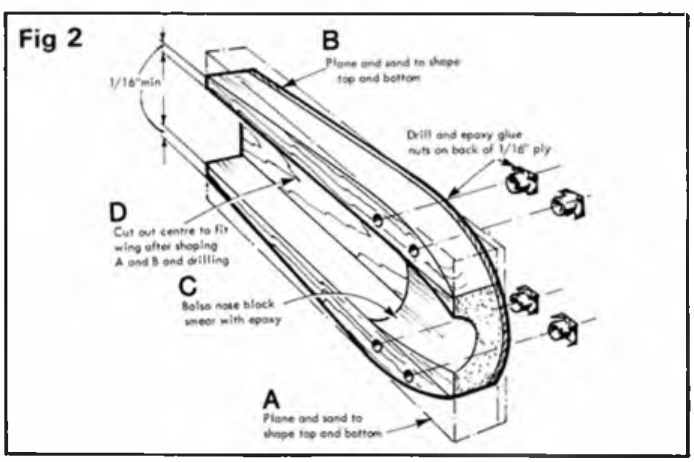


Fig 2

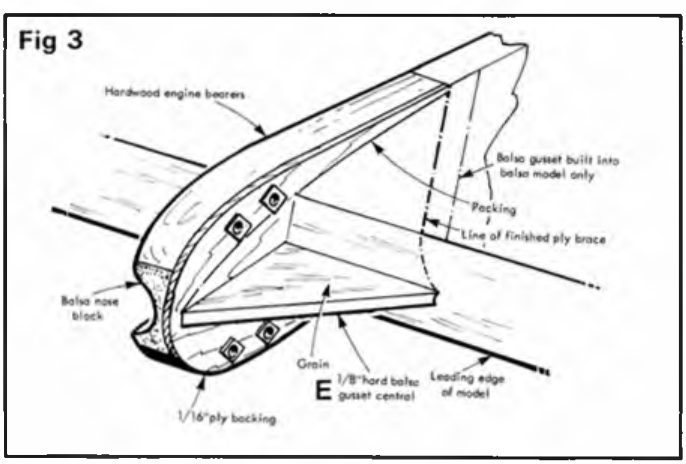
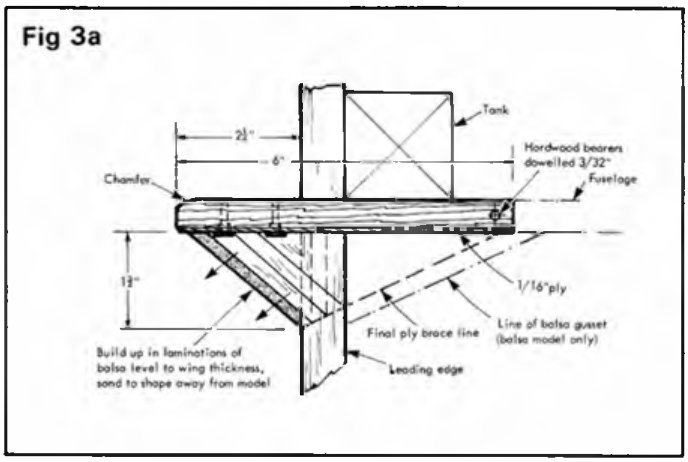
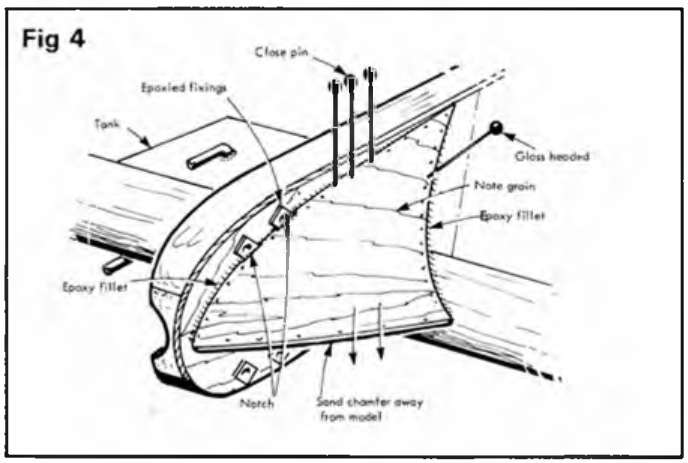


Fig 3





balance if tail heavy.

3 Bolt can be used for fixing secure streamer hook tucked in behind engine bearer.

4 Engine/bellcrank safety wire can be easily fitted for FAI.

5 Much safer pitman grip to pod.

6 Nylon covering not required.

Stunt with Claus Maikis

Seal of approval

Compression is a thing we aerobatic flyers are really dependent on. It's one of the components of engine power and it also accounts for the starting qualities of our motors. Since most of our engines have ringed pistons, it is the rings which actually seal the combustion chamber and I hold them responsible for a good compression. Alas, a good ring is as easily found as the proverbial needle in a haystack. I remember one of my *Super Tigre* 46s which blew five rings in about six months before I found one that held compression. In that process, I sometimes was in doubt whether it was the ring itself, or the installation of the ring which caused my problems.

At that time I had some correspondence with a certain George Aldrich (yes, the 'Nobler' man). Mr Aldrich had long before turned to speed flying and I was asking some advice from him for my (speed and stunt) engine problems. He gave me some detailed instructions on how to instal a ring - you need the aid of many fingers, several thumbs and a few finger tips and finger nails. By the way, Mr Aldrich mentioned a special tool which he had produced for installing rings but I don't know what his tool looks like. After some head scratching I decided to make my own (fig 5).

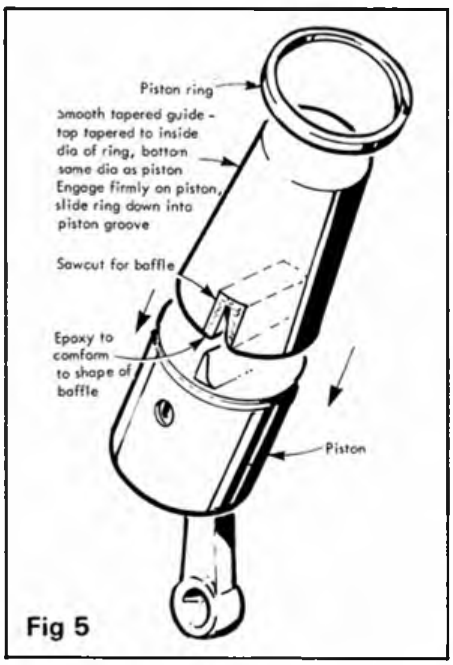
It's simply a tapered cylinder with the bigger diameter exactly that of the piston. I turned the cylinder out of an aluminium rod on a small lathe but nylon or even wood may be used, whichever you prefer. If you use wood be sure that the surface is very smooth. The ring should glide smoothly, without stopping. Perhaps some finishing (varnish or wax) might help. Since the *Super Tigre* piston has a baffle, there has to be a slot. This slot is difficult to produce exactly. I cut an oversize slot with a hacksaw. This slot was filled with epoxy resin, then the cylinder was fixed to the top of the piston. After curing, there's an excellent fit of the tool to the piston. With this tool, installing a ring is almost as easy as shown in figure 5.

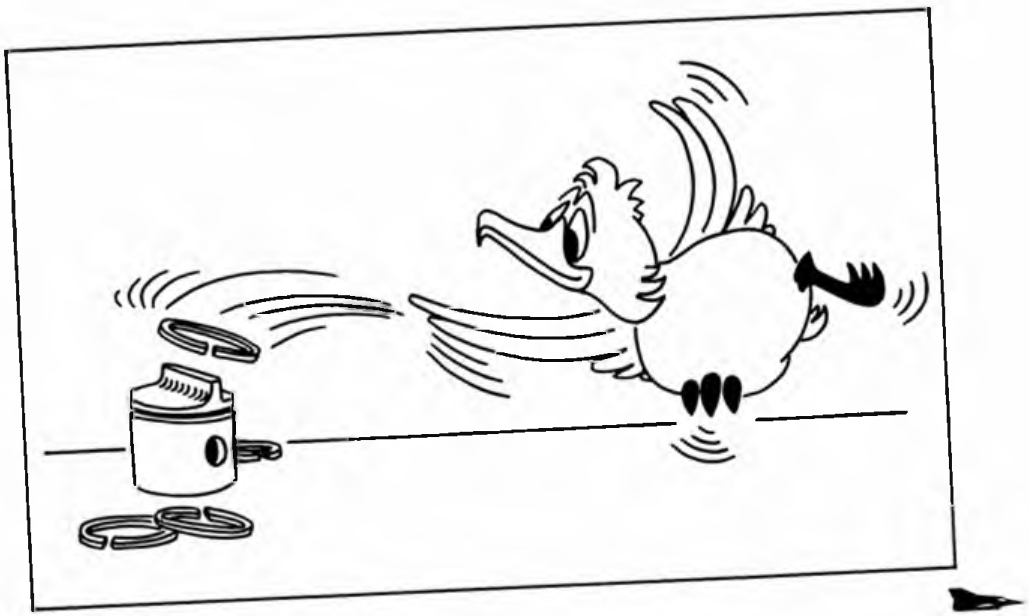
Above right, this simple gadget will fit Super Tigre piston rings in seconds - and no broken finger nails...

Bellcrank location

Recently I had a conversation with a newcomer to aerobatic flying. He had a few questions about bellcrank installation and location in a stunter. In his opinion, bellcrank location in a model had an influence on flying characteristics. It took me a lengthy discussion and a few sheets of paper to explain the whole situation.

It seems that this topic has stirred the brain of generations of aerobatic flyers, despite the fact that the American Bill





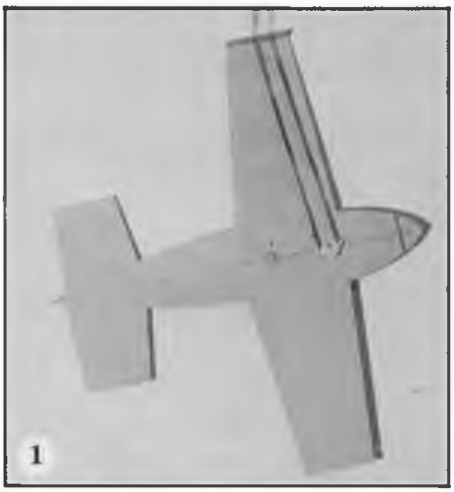
Netzeband had solved this problem many years ago. Mr Netzeband proved that the location of the bellcrank does not influence the flight attitude of the aircraft. Actually it's the location of the line guide and centre of gravity of a given model, which govern the behaviour around the yaw (vertical) axis.

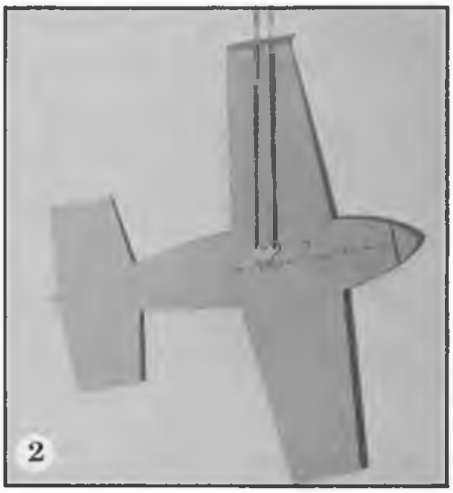
The principle is quite easy - it is the principle of the pendulum. The pendulum *always* hangs with its centre of gravity vertically below its fixing point. What is gravity for the pendulum, is centrifugal force for our aircraft. Centrifugal force pulls the model away from the fixing point - the handle - and acts on the centre of gravity of our model. For those who are not easily convinced I've built a simple 'model' from cardboard to illustrate the basic principles (see photos at right).

There are two aspects to consider - bellcrank location and centre of gravity location and each has two options - forward and rearward. So this makes for four possibilities. For the photos, I made a 'model' of thin cardboard. The CG was a piece of lead mounted on the rear face of the model - it's visible by the mounting bolt.

The photos show:

The photos show:
1 CG rearward — bellcrank forward
2 CG rearward — bellcrank rearward
3 CG forward — bellcrank rearward
4 CG forward — bellcrank forward.





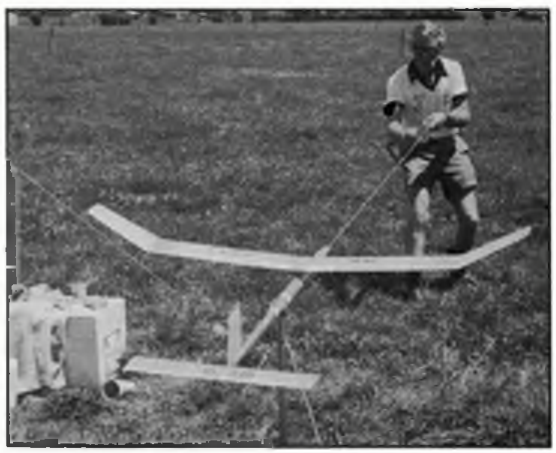
I hope this clears up this situation once and for all.

Now I'm fully aware that the lines do not run in a straight line from handle to CG depending on model weight, speed, line length and line thickness; the drag forces our lines to form an arc. The lines enter the wing tip of our model at an angle which is generally judged to be about 3°. That is the reason why we set the line guide at an angle to the horizontal line through the CG - about 3° backwards! This ensures that our aircraft fly tangentially to the flight circle. That's why an adjustable line guide is so helpful. It permits you to control the position of the longitudinal axis of the model - thus line tension and flight characteristics. Bellcrank location has *nothing* to do with that.

Of course it's not advisable to mount the bellcrank just anywhere. As can be seen in the photos, a bad mounting location can cause the lead outs to kink, which means bent lead outs (if you use piano wire). It also causes an increase in friction when moving the controls. This will make control difficult, especially at low line tension. So the bellcrank should be installed as near to the CG as possible (if you know where that is!).

38th New Zealand NATIONALS

Stephen Williams prowls the N.Z. Nats and captures the highlights



The New Zealand Nationals are always held in the week after Christmas (mid-summer), and there is a "holiday" atmosphere around the flying field and camping ground. UK visitors can be assured of a friendly welcome (and good weather!) should they decide to holiday there. . .

The 38th New Zealand Nationals were held this year in Ngatea, about 50 miles southeast of Auckland. This was the first time for some years that the event was held so close to Auckland (the main population centre) and it drew over 250 competitors to compete in 50 events over five days.

Free Flight

As it was last year, Free Flight was dominated by the Auckland Free Flight team. F1A produced the best set of conditions for a contest; blowing a gale, heavy rain, then four rounds of very hot, calm conditions! In fact, apart from the first day, the weather conditions were very good throughout the week. F1B also produced a good contest, with each of the top fliers "duffing" one round to give very close results. Hard luck award would have to go to Dave Ackery in A1, who scored a full house (5×120) then 180-240-360-105, but was disqualified for his model being about 3 grams underweight! The most popular events were Hand Launch Glider and Aggregate. New Zealand "chucky" rules are 6 flights (all counting) with 90 second max; Richard Dalziel's score of 476 to win was exceptional.

Control line

Good to see a resurgence in Combat flying, both "NZ rules" and FAI, with many good bouts throughout both competitions. Also good to see a large number of junior flyers in 1/2 A Team race. The speed events were again dominated by Bill Bell, who set a New Zealand record in Class 4 (60) speed of 284 kmh with his monoline Rossi 60 model on his way to winning four of the six speed classes. The team race events were dominated by the New Plymouth club flyers (as usual), but times were slower than last year.

Scale

You can usually rely on Peanut night to produce a few unlikely models, but this year was a disappointment, with a procession of Laceys and Tailwings. The best of the scale events was the Large Scale Radio models. These really justify the name "miniature aircraft" rather than models, they even SOUND like the original!

Prizegiving

Champion club (for the ninth time) was the Roskill modellers. Overall champion Rod Lewis, Free Flight champion Roger Gibbs, Radio champion David Smith, Control-line champion Neil Lickfold, Scale champions Rod Lewis and Bruce Keegan and the Junior champion was Paul Noble-Campbell.

Heading photo: Open Power winner Roger Gibbs launches; top left, Aubrey Haines' Virginia Champ gets away; top right, F1A winner Rod Lewis; middle, Owen Dwyer prepares for the Combat final; below, Alan Barnes winds his winning F1B

Seasonal weather gave an extra zest to this Winter Cup Event

Coupe Maurice Bayet

Formidable! That was certainly *le mot juste* for this, the first Maurice Bayet Coupe d'Hiver contest. Couple d'Hiver means "Winter Cup", and there will surely never be a more wintry competition. Overnight snow gave an extra covering of a couple of inches, which would have been fine except for the wind that came with it. The leafless trees were bending in the bitter breeze, straight from the northern plains of Russia, as coupe flyers, including a small British contingent, crept from their hotel on the edge of the enormous airfield of Reau-Villaroche to the south-east of Paris to scrape the snow off their cars.

The "in" joke was that Bayet, in whose honour and memory the contest was held, had arranged the weather as a special test of character. The day before, wouldn't you know it, had been perfect...cold, yes, but with pleasant sunshine - no drift to speak of, and that wonderful flying field at hand for trimming. But it was not to be on the great day, when the highest recorded temperature was minus three degrees and when the ground was found to be so iced up that several competitors were unable to hammer in their winding jigs. They were therefore forced to resort to the traditional method of hand-held winding of which Bayet, the originator of Winter Cup flying, would naturally have approved...

The contest attracted an entry of 100, of which sixty-five flew. Among the first off was Peter Michel of SAM 35, the British vintage outfit. His Wakefield-sized model found good air and maxed easily in the chill murk that was gathering in the distance as early as 10 a.m. Other first-round maxes followed from Andre Meritte of the Paris club P.A.M., Bernard Boutillier (U.A.C.), Louis Dupuis (V.L.M.), Freddie Nikitenko (P.A.M.), Roger Garrigou (Cheminots) and David Beales of SAM 35, who is a newcomer to coupe d'hiver.

So - despite all, the lift was there, and the chase was on. Flyers knew that in this, and a special class for vintage (pre-1956) coupes, they had to complete two flights before 2 p.m., thus avoiding the administrative nightmare of a rush late in the afternoon from competitors waiting for an improvement in the weather. As it happened, this was to the good, for conditions held long enough for four of the first-round leaders to max again - Meritte, Boutillier, Dupuis, and Michel.

Heading, the complete Winter Cup flyer...Bernard Boutillier with a selection of models, left, Peter Michel prepares to let go.

Then, with plenty of time for the 2 p.m. cut-off, out came the delightful little vintage coupes, many of which were flown by their designers who had been led back to the fold by the newly-formed Four A group - the Association des Amateurs d'Aeromodeles Anciens, which played a leading role in the organisation of the contest. Levasseur, Dupin, Goetz, Beissac, and, of course, the great Emmanuel Fillon, were all having a great time. But their models, so small by modern standards, had to struggle in the daunting conditions, and none could better 90 seconds. It must be remembered, though, that these designs were intended originally for low-key competition. Additionally, all flights were R.O.G. which, in the increasing wind, caused problems in both classes.

Towards midday, the wind increased to about 15 mph, gusting to 20 mph - and the chill factor was taking its toll among competitors, spectators and timekeepers alike. Icicles were dangling from the cars. One of the English brigade, young William Beales from Greenwich, found that the ends of a broken F.A.I. motor had frozen together. He was seen parting them as one would peel a banana. Fortunately, central control had been established in a large disused wooden building, the interior of which, though scarcely above freezing point, felt centrally-





Top left, Emmanuel Fillon, one of the few who managed to hammer his rivaling stooge into the frozen ground; middle, contest director Michel Pierrard watches as Boutillier prepares for the off; top right, Fillon with a replica of his 1943 design; below left, David Beales ready to ROG French-style; below right, what the well-dressed Coupe d'Hiver pipeman is wearing... George Matherat gets away clearly.

heated compared with the bleak flying field. Here Michel Pierrard and his merry men established their command H.Q. and, equipped with an Amstrad computer, two VDUs and print-outs, set a standard of contest organisation that will be hard to beat. Liaison between H.Q. and the poor devils of officials on the field was first class, and competitors, stamping in from the cold, were supplied with a continually updated read-out on one of the VDUs. Outside a pizza van did a brisk trade throughout the day, and the result was a jolly atmosphere that will always be remembered. Bayet had scored again...

By 2 p.m., the start of the third round, the mylar strips were horizontal and virtually useless. Competitors and officials crouched wherever they could find shelter, and powdery snow was swirling across the runway. The temperature was down to minus seven and it was decidedly unpleasant out there. Dupuis went out to the take-off area, touched the tail of his model on the ground in the approved French manner, and launched R.O.G. into a patch of nothing. He was down in 67 seconds. Peter Michel misjudged a gust and four seconds later his model plunged inverted into a small snow drift. No damage. He got it right next time, but there was just no lift about and he recorded 87 seconds - a very fair flight for all that. Meritte and Boutillier followed and each clocked 90 seconds - a fly-off!

It should be noted here that the leading models were being lost to the naked eye at anything approaching a max. The timekeepers, so helpful and long-suffering (you could always spot the timekeepers; they were the ones with blue faces) were not equipped with field glasses, and on that day binoculars really were essential for the longer flights when, obviously, the final seconds were so vital. The fly-off itself was a bit of a let-down. Meritte could manage only just over the minute, and it looked odds-on Boutillier. Then an extraordinary thing happened. Bernard, the best coupe d'hiver flyer in all France, launched well - only to see the prop seize up after four or five seconds. He, of all people, had had a front-end bunch, and the contest went to Meritte.

ASP's own Ron Moulton had presented a trophy for the furthest-travelled competitor. This was awarded to Louise Molla from Grenoble, who had made a journey of 320 miles in order to participate.

Lack of support from foreign parts was a disappointment, particularly since live-wire Jean-Marie Piednoir had put out publicity in four languages. He got promises, but not competitors, from places as far afield as Germany, Italy and Saudi Arabia. But then, the weather *was* awful. Next year - and this is intended to be an on-gong event - it's got to be better, and British coupe d'hiver flyers should note now that the Bayet is an event not to be missed. **Continued on page 315**

READERS' LETTERS

Something to say? Take a break from the building board, put pen to paper and let's all share your view.

Ready to intercept - Stan Cole's Spitfire (APS plan MA 376)

The Spit makes a low-level pass "somewhere in England"

Spitfire celebration - an APS original

Dear Sir,

With the advent of the anniversary of the initial flight of the Spitfire upon us, I came across some original pics of the APS Spitfire which I designed and flew in the early sixties, including one photo taken recently. As you know, the model was first published in Model Aircraft *by my good friend and colleague Doug McHard - then editor of the above publication. I just thought that any would-be builder of the APS Spitfire may be spurred on by seeing the original model being put throught it paces. Hoping that this material may be of interest to* Aero-modeller *readers and, most important, in the hope that, in some small way, it might encourage younger modellers and further the interest in this most fascinating hobby of ours.*

Hounslow, Middx. ***Stan Cole***

To encourage the novice...

Dear Sir,

Discussing the importance of awards for juniors one day, with a fellow F/F competitor, I expressed my opinions that junior awards of some sort should always be given even if only one junior enters as, surely, every encouragement should be given to the youngsters. My colleagues said I was wasting my time; we were 'the last of the few' and the future generation were just not interested in aviation! Now that can't be true; you have only to get within 10 miles of an air show and you will be stuck in a traffic jam for the rest of the day. No, the answer has to be something else.

I think firstly, we must look at the school environment. No longer do we have a metal-work teacher, a woodwork teacher and an art teacher. We now have an 'arts and crafts' teacher who has to cover a greater span of materials but with little or no importance given to handicraft skills. This includes writing. It appears that the teaching profession gave up writing skills after their total failure with me thirty years ago. Incidentally, can you read what teachers write on your youngster's school reports?

Secondly, our younger generation no longer whittle a piece of wood or know how to tie recognisable knots in a piece of string. Their skills lie in the realms of pushing buttons and understanding the weird language of the computer.

I think it is true to say that the very few teenagers taking part in F/F today are accompanying competing parents and there is no other recruitment path, and if this is indeed so we are following the path of the dodo.

So what can we do to encourage youngsters or any other new participants to our sports? Let's face it, the sheer amount of skilled work required to build a competition modern F/F model puts most people off. Of course, to combat this we have introduced P 30, Wigan 70, S.O.P., etc. Unfortunately these classes were immediately dominated by some of our most accomplished aeromodellers, who should have stuck to the more demanding classes, and we were back to square one.

I wonder if novice classes may be an answer, run on lines something like this; a novice would be anyone who has not won a F/F event in the last 5 years in a competition with over 5 entries. No extra events need to be run, just have a novice award within the existing events. The award itself does not have to be expensive - a decent printed card with Top Novice, such and such event then "you are now an expert".

My final suggestion would be for the Aero-modeller *to publish full-size plans of particularly suitable models for the novice class. I know this has occasionally been done, Mr Freebrey's A1 being a good example.*

Perhaps Aero Modeller *would consider giving an award at the Nationals to genuine novices using a published design. . .*

Scarborough, Yorks. ***Len Auckland***

Good service - praise for PAW

Dear Sir,

I feel I must write to you about the excellent service that PAW give on their engines. How about this for speed! I posted my PAW 1.49 on Thursday 27.2.86 last post, for reboring. I also requested a dome spinner nut for a 2.49, a job in itself, a one off set-up and all bearing in mind it was over the weekend. I received the 1.49 back rebored and new 2.49 spinner nut and the old bits on Monday 1st post 3.3.86!! Need I say, everything was to PAW's usual high standard. I have used their motors for manay years and always had the highest standard of service.

Abridge, Essex. ***Johnny F. Hall***

Another 'viewpoint'

Dear Sir,

I read with interest Martin Dilly's views on various matters and wonder if the real crux of the problem is one of finance. Perhaps one should look around to see what is going on in other organisations. The general idea now is to muster more strength and finance by, wherever possible, joining together with other organisations to produce a larger organisation which has greater 'clout', for want of a better word, and by doing so, operate in a more economical manner.

For instance the Institution of Civil Engineers and the Institution of Municipal Engineers are now one organisation. The Institution of Water Engineers, The Institution of Public Health Engineers, and the Institute of Water Pollution Control are in the process of amalgamation consideration which no doubt will occur.

Is there a case for the S.M.A.E. to consider joining up with the R.Ae.S. or other organisation if there is one, so as to act under a much larger "umbrella" thereby being more effective, or would the reverse occur?

I do not agree with Martin Dilly's definition of a competitor. They compete to win, as they should do, and there is no encouragement for the so-called sports modellers to attend at the airfields, to enjoy flying their models non-competitively, on competition days. Why cannot the two fly on the same airfield at the same time? Surely a sports modeller would not object to a reasonable payment on the day for flying on an airfield, which monies could be used for sending our star competitors to represent their country. With an S.M.A.E. membership of 16000, most of whom are not competitors there has to be something done for the latter otherwise things will go on as they are now, with nobody satisfied apparently.

Old Earswick, Yorks. ***B. E. Pettinger***

Winning – are sports flyers disinterested?

Dear Sir,

*Martin Dilly flies a number of kites in his "Viewpoint" (*Aeromodeller *Feb '86) but the largest bears that old legend "competition is good for you" and another wonders why "sports flyers" do not appreciate "competition flyers" more.*

My personal view is that, although the competitions are carried on using model aeroplanes, a lot of sports flyers feel that it is the winning that really counts and the models are merely a means to an end. To see what I mean, turn back to page 108 of that same Aeromodeller *and read on from "SMAE senior championship". I think you will agree that there is a lot about the will to win but very little about model aeroplanes. Compare that with Alex Imrie's report of, say, a vintage day at Old Warden and I think you will see my point. Competition and non-competition flyers are just not on the same wavelength and I think this is the root cause of the differences between them. The mass of modellers are not hard-hearted and selfish as suggested in the article's heading – just disinterested.*

Martin makes the point that people do not enter contests for the intrinsic value of the prizes. I agree, but they do enter for the value of the ultimate prize, being declared the winner! They presumably fly in national and international contests for that same reason; the fact that 'political' labels indicating their country of origin are hung on them is not necessarily a good thing; look at the bad feeling that surrounds much international sport nowadays.

Replying to one of Martin's side-swipes, I agree with him that a priority for the SMAE is the re-introduction of a newsletter and I too hope that this will come. However, at the present I presume its lack to be a matter of economics rather than policy. I would also like to comment on the objects of the SMAE as Martin has quoted them. I see eight areas of activity for which the SMAE was established and only one of these relates to contests! When did the SMAE last promote a model meeting or exhibition I ask, but we do not see hordes of sports flyers up in arms. Maybe we are just not as militant as our competitive brethren. . .

There is one final point on which I must comment. Martin bemoans the fact that there is no "visible pyramid of achievement" to attract youngsters into the hobby. This is arrant nonsense, Martin! I don't suppose one youngster in 10,000 takes up aeromodelling because he wants to fight his way to the top and any that did would deserve to be dismissed as a "pot-hunter".

Having been allowed to let off steam, I will end up by saying that I would be delighted an an individual to contribute to a team travel fund even though I do not feel at the present stage of finances that it should be an SMAE responsibility. I look forward to seeing a contingent of competition flyers explaining their point and collecting donations at the 1986 "sports" meetings.

Enfield, Middlesex ***Brian Downham***

Under a Cub's wing – static judging Australian style

F/F Scale down under

Dear Sir,

The enclosed pic was taken at the 39th Australian National Championships, during the static judging for free flight scale. The 1:1 Piper Cub was not an entrant but just background, because static was held in the Drage Airworld Museum!

In contrast to the British scale scene, where evidently rubber is supreme, the Australian Rules require only i.c. engines in free flight. The event was won by Gary Odgers with a beautifully built and detailed APS Albatros DV. Local rules permit a hand launch for a qualifying flight with a bonus for R.O.G. Six attempts are allowed. Gary managed several excellent flights, including an R.O.G. and the Albatros proved itself a slow, stable and realistic flier, despite the lack of dihedral.

Second was Jim Fullarton, who also managed to R.O.G. his D.H.53 Hummingbird and demonstrated a steep, turning and rather fast flight pattern. Third place went to Col Colyer with his hand launched APS Sopwith Tabloid-Schneider Trophy seaplane. Unfortunately there was no stretch of weather available to try a R.O.W. This is another slow and stable flier.

My own scratchbuilt Rumpler C IV had engine problems and refused to fly until the seventh attempt. Too late to qualify!

Power F/F scale is still reasonably popular here but competitions are few and not many enter these. As the minimum number of entrants for a Nationals event is five, this is a real problem. I also entered C/L scale but this event was scrubbed when only three models were presented to the Judges.

The main scale events at the Australian Nationals were Peanut, R/C Stand Off (not FAI) and R/C Mammoth, all of these events being very popular and well contested.

Victoria, Australia ***Gary Sunderland***

Coupe Maurice Bayet

continued from page 313

Meanwhile, the vintage flyers were still battling it out. At the end, only 13 seconds separated the first four places, the cup going to Bernard Levasseur with a total of 206 seconds.

One final weather note: As the prize-giving was going on, a fierce and rather frightening blizzard set in. Roads on the long journey back through Paris were littered with crashed and abandoned cars. Now if that snow belt had arrived early in the day it would have rendered flying impossible. All of which gave rise to fond speculation that Maurice Bayet had played his cards right – from start to finish.

Details of the winning models will appear in a future edition of Aeromodeller.

French Coupe d'Hiver Results

MODERN (80g)

Position	Name	Rd. 1	Rd. 2	Rd. 3	Total
1	A.Meritte	120	120	90	330
2	B.Boutillier	120	120	90	330
3	P.Michel	120	120	87	327
4	L.Dupuis	120	120	67.2	307.2
5	A.Meritte	120	103	72	295
6	F.Nikitenko	120	74	100	294
7	B.Brand	91	120	69	280
8	C.Weber	99	105	71	275
9	C.Weber	109	60	100	269
10	B. Brand	110	120	39	269

(*After fly-off)

VINTAGE (80g., PRE.1956)

1	B.Levasseur	89	69	48	206
2	J.P. Beissac	89	70	32	191
3	P.Michel	56	59	74	189
4	B.Boutillier	82.2	64	37	183.2
5	P.Dupin	48	72	54	174
6	A.Renneson	72	38	63	173
7	E.Fillon	64	46	44	154
8	A.Renneson	60	47	39	146
9	S.Vanet	44	41	47	132
10	C.Goetz	40	47	26	113

MAURICE BAYET CHALLENGE CUP

1, P.A.M. (919 sec); 2, V.L.Moncoutois (856 sec); 3, SAM 35 (683 sec); 4, Romans (658 sec); 5, 4A (623 sec); 6, Cheminots (516 sec).

WOMEN'S CUP

1, M. Landeau (247 sec); 2, L.Molla (158 sec); 3, Riberolle (120 sec).

JUNIORS

1, Stephane Landeau (114 sec); 2, Cecile Robert (100 sec); 3, William Beales (SAM 35, 98 sec).

RON MOULTON TROPHY (Furthest-travelled competitor)

Louise Molla (from Grenoble – 320 miles).

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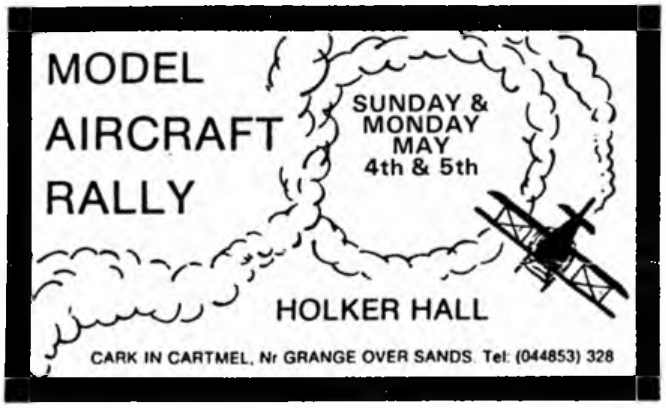

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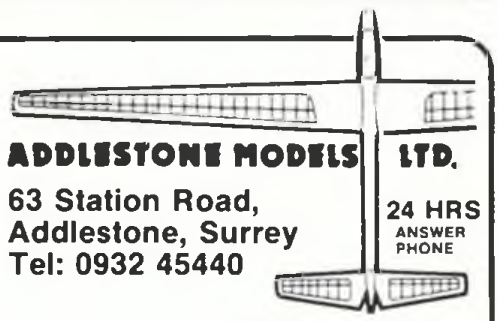

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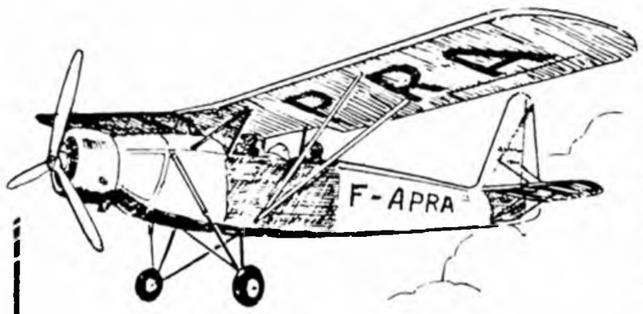
Le Cricri

The French Arachide

Salmson D6

A scale peanut by E. Fillon



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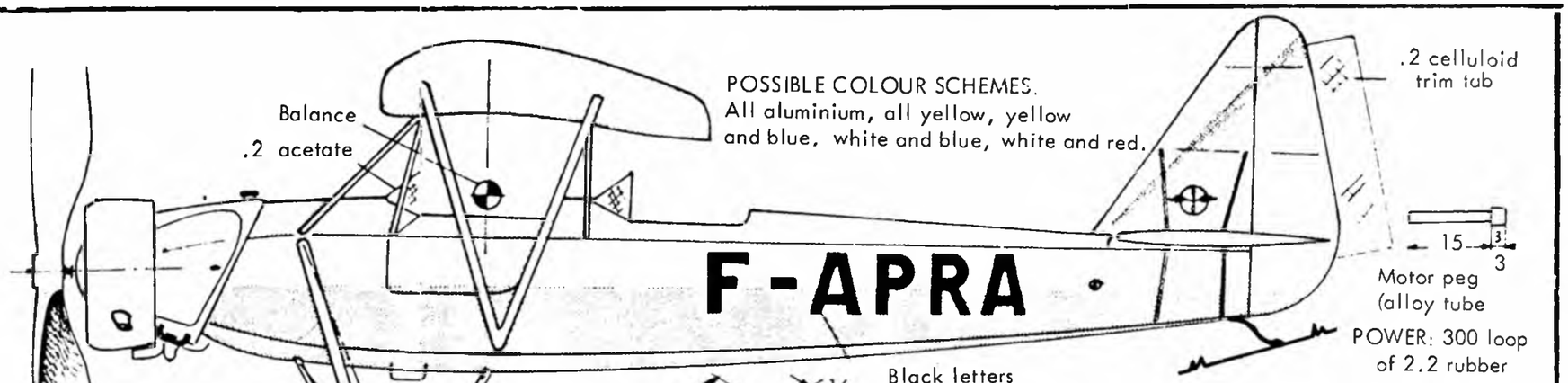

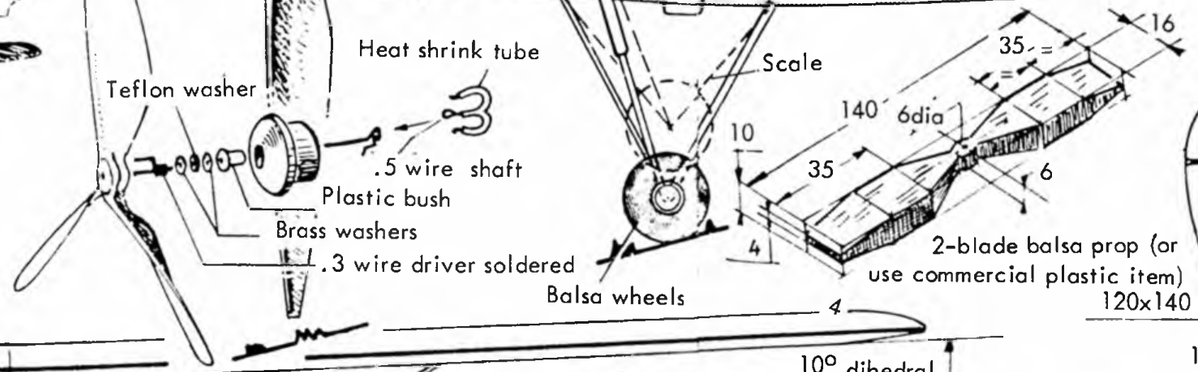

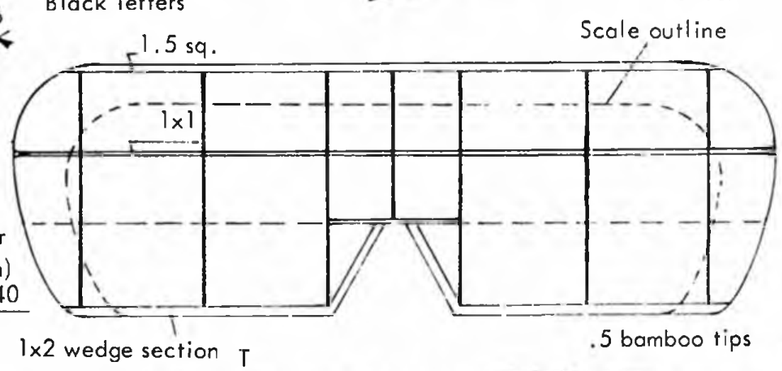

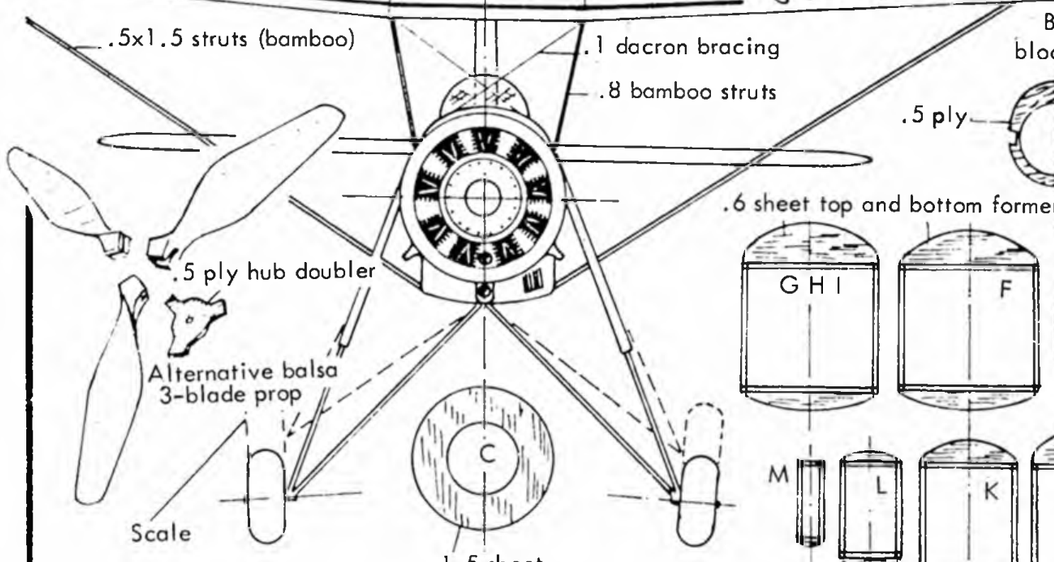

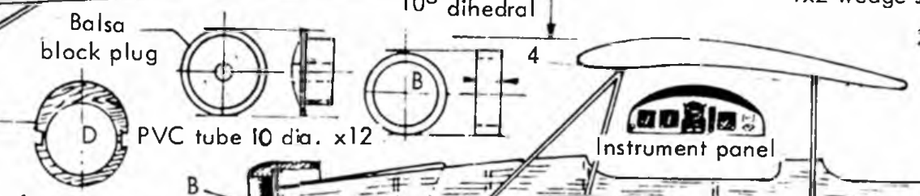

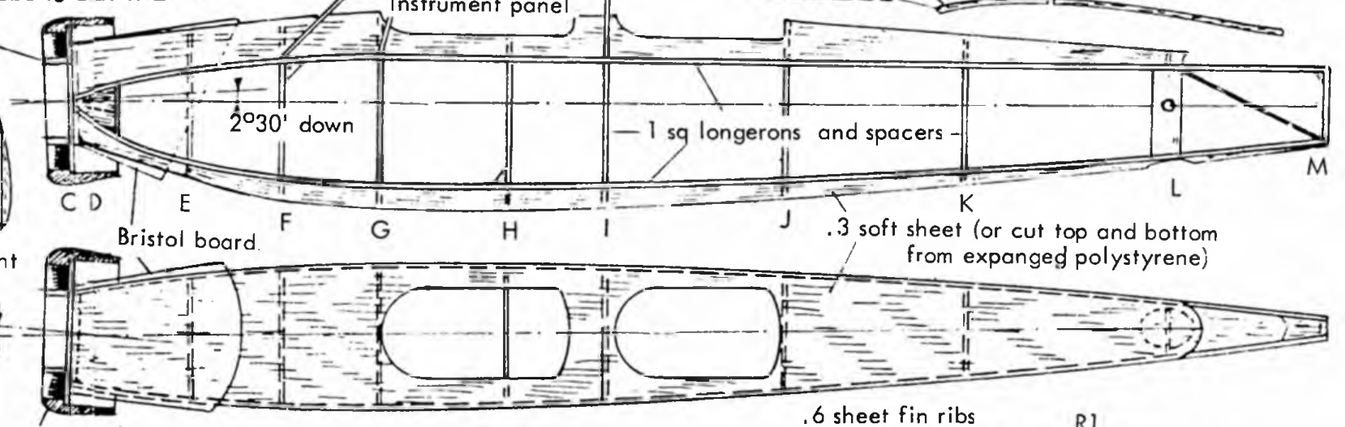

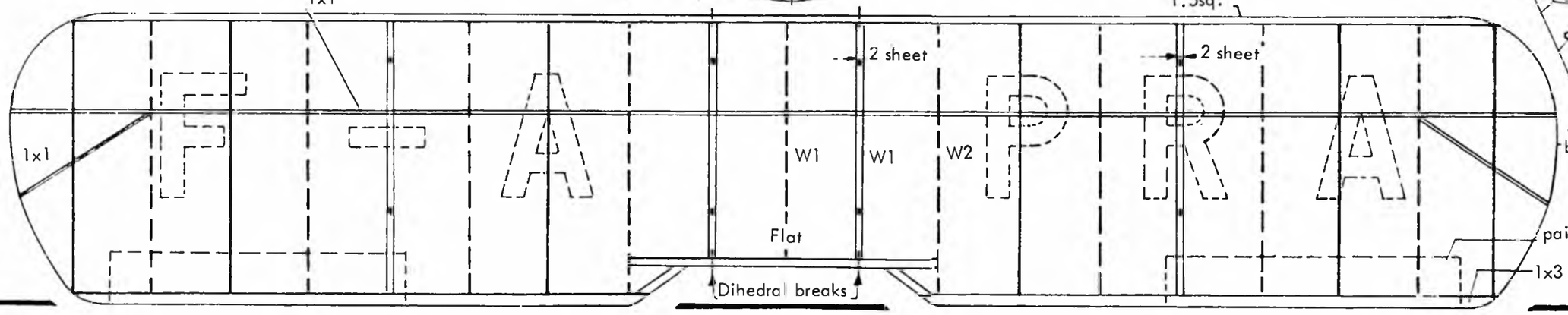

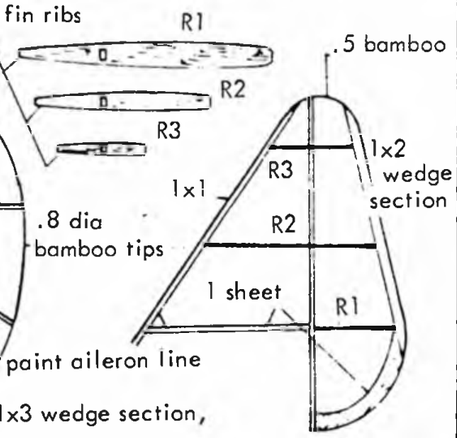

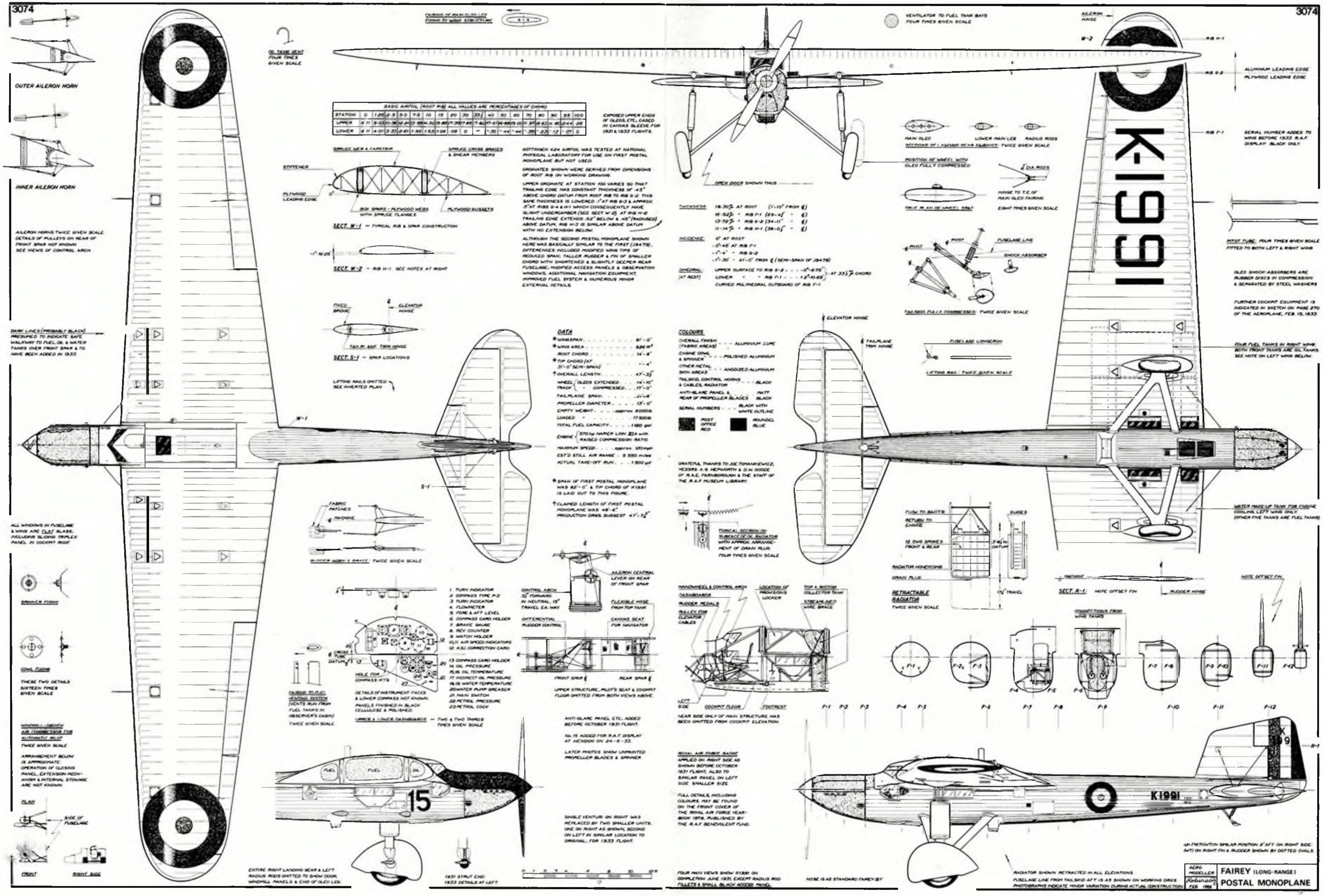

Appendix - Links to the plans

The original issue comes with three free plans (Proteus, Orpheus, Skyshark) printed front/back on a pull out banner of four sheets. The banner is not included in this document.

Le Cricri (Salmson D6) by Emmanuel Fillon
FF Rubber Peanut
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