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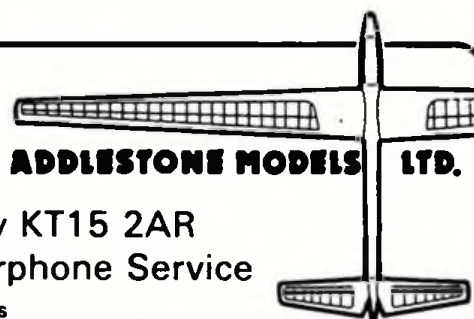


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AERO MODELLER

April 1985

Volume 50
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Cover:

Laurie Bagley's hitherto unpublished painting of a classic Tiger Moth manoeuvre dates back almost 25 years and is a tribute to the artist whose work is greatly missed. G-ANDA served as T7269, 1940-1945 at Looe, Cornwall, North Luffenham, Yeovil and Hucknall, - producing many embryo pilots. After storage it was civil registered from 1953, serving 7 owners, ending with the famous Tiger Club at Redhill when written off in a forced landing.

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April 1985

HANGAR DOORS

Free Flight Nats

As can be seen in Whats On the Free Flight British Nationals will be held at R.A.F. Barkston Heath on May 25th, 26th and 27th. The format for the competition programme will be Sat 25th - Mini: Sunday 26th - Open: Monday 27th - FAI. There will be camping and all the usual facilities (including rain?).

Junior Kit Contest: There are also two further competitions on Monday 27th, open to all contestants who are under 16 years old on the day of the comp.

- 1) Junior Kit - Rubber, open to all kitted models with a wingspan not more than 40 ins.
- 2) Junior Kit - Glider, open to all kitted models with a wingspan not more than 60 ins.

Maximum times will be announced on the day and towlines must not be longer than 50 metres. Check in at Free Flight Control for details and entry.

54th Model Engineer Exhibition

No we are not advertising the next Expo in '86 we just want to congratulate the organisers for a job well done. The aeromodelling content was about the same as last year but the overall quality of the models, lectures and demonstrations seems to get better and better. The exhibition had over 50,000 visitors this year and with record business done by the trade stands, record attendance at the lectures, film shows and the model car racing circuit it can only augur well for next year.

Hip, Hip, H...

FFF (Free Flight fliers ... fanatics?) will be pleased to learn that Dave Hipperson, who has been missing from the pages of

Below, and above right, Reg Parham, one of Britain's grand old men of the indoor scene, is now almost a fixture at the Model Engineer Exhibition. His lectures and demonstrations are always entertaining and informative...keep it up Reg.



Aeromodeller for the past few months - is to return in May with a regular flow of ideas, reports, plans and things free-flight. How he manages to get to all those competitions we shall never know, but if he is not visible at your event, why not send him some details (photos?) of what happened. Likewise, should you have any free flight suggestions, hints, tips, complaints (never!) send them to Dave either via us here at *Aeromodeller* or direct to: 35 Anthony Road Boreham Wood, Herts. WD6 4NF.

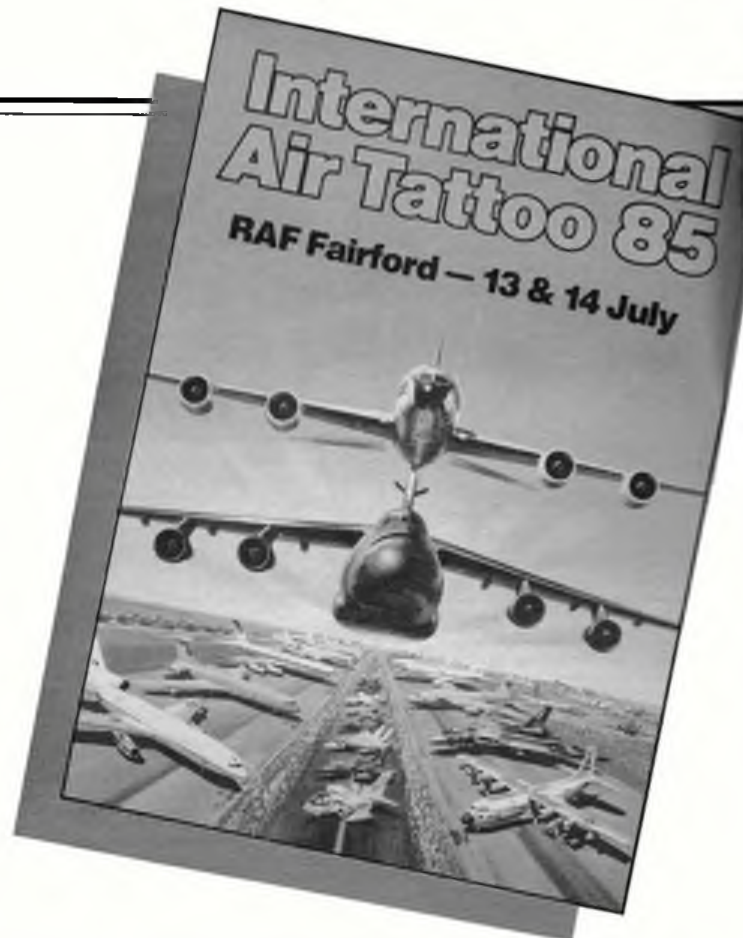
Diesel Combat '85

Since the introduction of the British Combat Championships, Peterborough M.F.C. have been the mainspring in keeping this class ticking over. They have run four comps a year and have shown all too clearly that the BDCC are what a lot of people want. Now one of the prime organisers - Liz Gill - is expecting another type of event that will take up most of her time in the near future. This has made Peterborough MFC not only start knitting baby socks but has also made them realise how much they have depended upon Liz for the Champs.

They are far from a lazy bunch but feel that it is about time the BDCC moved around the country during the year. Peterborough are running the first comp on 14th April ... How about some offers from other clubs to run a BDCC comp after this? Either write c/o *Aeromodeller* or give Brian Waterland a buzz on 0778 343722.

Caption ... owch!

Our apologies to all concerned in the caption appearing in February's Hangar Doors associated with the SMAE's annual awards. Especially Mrs. Pauline Snook who appears to



Make a date now! 13th and 14th July 1985, these are the dates for this year's International Air Tattoo. This biennial event has in the past been held at RAF Greenham Common but this year will move to a new site - RAF Fairford, near Cirencester, Gloucestershire. All proceeds go to the Royal Air Force Benevolent Fund so, make a date now!



have two husbands! The correct wording follows:

Presentations at the SMAE's Annual Prizegiving on 24th November were made for the Society's major competitions and awards. Above, David and Janine Rawlins receive the Arthur Mullet Trophy from SMAE Chairman Dave Goodwin. This was awarded for their unstinted efforts in promoting aeromodelling amongst youngsters all over the Country. The competition awards were presented by Mrs. Pauline Snook, wife of the Chairman of the Royal Aero Club. A few of the winners are shown here. Left, Dave Hipperson, 3 trophies for Open Rubber,

Wakefield and CO₂. Above far right, to Julian Hopper, 2 trophies for Open Power plus the Club Champs. Far right, Messrs Whorton and Short for Novice Goodyear. Right, to Jessica Nash for Ladies combined R/G/P. Below, what must be the collection of the year went to Stafford Screen, 4 trophies for FAI Power and 1/2A Power plus - surprise, surprise the Senior Championship Cup.

Tiggy rewritten

When George Cox discovered in 1960 that the only way to draw the D.H. 'Tiger Moth' accurately was to measure one in every detail he had little notion how

influential his work was to become. Thanks to the legendary 'Wingco Arthur', the doyen at Fair Oaks, George, with Ron Moulton, had access to G-AIIZ a Tiger survivor among the dying breed of the 60's. (Subsequently taken to Hong Kong and now returned, in camouflage rather than as the original 'Bus Driver's Aero Club' LPTB aeroplane) George's drawings inspired dozens of kits - and many plans. They were used for full scale restoration and recognised as the only accurate 3-views available anywhere. - Until a few modellers took up the third generation of the 'T.M.' story. As Stuart McKay relates to this issue, the 'Tiggy' entered a new

Vintage aircraft and cars will also be displayed.

Trade exhibitions by model manufacturers, distributors and retailers will be augmented by flying displays, and special displays by invited modellers add to the interest and excitement. On the Sunday the special displays include the *Avon Team*, large models, a Vintage cavalcade, duo-aerobatics, helicopters and scale models.

Advance ticket sales are available from the *Barnstormers Flying Circus Ltd.*, 15 Council Street, Wollaston, Wellingborough, Northants. Price: adults £1.50 (£2.00 on the day) children £1.00 (under 14). Please enclose an S.A.E.

12th at the Three Sisters site near Manchester.

National teams from 20 or more countries will be competing in speed, aerobatics, team-racing and combat classes, and the current World Champions in team race, Steve Smith and Colin Brown, will be in action.

Running an event as important in the international calendar as this one is a major undertaking for the SMAE and your offers of help will be most welcome. One of the nice things about competing in a big event abroad is the radio, control-line and free-flight enthusiasts, who pool their efforts to make the contest run smoothly.

One flier's memory of a free-flight contest in Czechoslovakia is being driven at high speed across a field of state-owned beans by a motor-bike rider who was the local R/C aerobatics champion. Probably very good for the kidneys, but not the normal method used to retrieve a glider from downwind.

If you can be part of the organising team in any capacity, please drop a line to Bob Horwood, who will be in charge of the Championships organisation, c/o the SMAE, *Kimberley House, Vaughan Way, Leicester.*

The event is already being generously supported by Greater Manchester Council, and will help to boost the prestige of our sport locally and nationally.

1985 Membership

Roy Nudds, the General Secretary, reports that memberships coming in during the first few weeks of the New Year are 240% up on those during the same period last year! While the staff at Kimberley House are delighted that so many of you are joining and re-joining, even with the new computer membership system this sort of rush will mean some delay.

Please bear with them and rest assured that you are fully covered by all the SMAE membership benefits from the date your application or renewal is received at Leicester, or, in the case of members through affiliated clubs, from the date your secretary receives your fee.

If you were a member prior to 1984 and have not received your 1984 edition of the Members' Handbook (the one with the blue cover) during last year, please send a stamped, addressed envelope at least 8 in. x 5 in. to the Leicester office, marking the one enclosing it 'Members Handbook' and quoting your membership number.

The handbook, free to all SMAE members, is full of information on matters like safety, frequencies, noise,

achievement awards, and the organisation of the Society that does the hard work that lets you fly model aircraft today.

Those who have up-rated their basic membership to competition licence standard receive any of the contest rule books free; these cover all model flying disciplines, and cost £1.50 each if you do not have a competition licence.

Another New Area

Prompted partly by the price of petrol and partly by an increase of clubs in the extreme south-west of the country, the former Western Area of the SMAE has been divided into two. The new South-Western Area covers clubs in Devon and Cornwall, while the Western Area will be responsible for model flying in Avon, Somerset and the area south of the M4 in Wiltshire.

Actual geographical boundaries are, of course, flexible, since clubs have quite a wide catchment area and it may be more convenient to work with one SMAE Area rather than another. Details of the regular monthly Area committee meetings are not known at the time of writing, but a quick call to the SMAE's office on 0533-58500 will up-date you.

If you live in either the South-Western or the Western Area do get along to your local meetings and get the full benefit of your SMAE membership. The people who do the planning and the work are not some sort of faceless zombies; they are enthusiastic model flyers like you.

Both the Areas will of course send a delegate to SMAE Council meetings, the expenses of this being funded by the Society nationally; make sure they are properly briefed, preferably by you. If you are not sure that your own club will have a delegate at Area meetings, go yourself; there's no limit on numbers and new faces are always welcome.

Technical Committee Chairmen

Each model flying discipline has a specialist SMAE technical committee to look after its interests; normally each consists of six experts elected by the entire membership of the Society. Chairmen, who you should contact via the Leicester office, are waiting to help you with any problems or look at your suggestions or offers of help with event organisation.

R/C Power - Peter Burnage;
R/C Glider - Richard Douglass;
Free-Flight - Phil Ball; *Indoor* - Bob Bailey; *Control-Line* - Bob Horwood; *Scale* - Eric Coates.



Reg Parham - still at the M.E. Exhibition, was joined here by *Aeromodeller's* own tame (can you ever tame a Scot?) vintage columnist Alex Imrie. Sadly we have forgotten the name of the model Alex is holding...perhaps some enterprising reader could send us copies of the plan...

lease of life in the late 70's, and now, thanks to Den Bryant who has a personal interest in the oldest survivor G-ACDC and Peter Harrison and Maurice Brett who've built 'Tigers' up from 'scrap' we have the complete, abso-definitely, finite drawings - with every acknowledgement to George Cox whose basic work could not be faulted - a tribute to research and dedication of a truly Total Aviation Person.

Cranfield R/C Expo '85

Cranfield Aerodrome hosts the fourteenth consecutive R/C Expo - previously held at Sywell Airport - on Easter Sunday and Monday, 7th and 8th April. The format is slightly different this year to cater for the people who have a preference for model displays and for those who enjoy the full-size air display as part of the entertainment. Sunday will be a model only day while Monday will include the former *Barnstormers Flying Circus* (plus other participating aircraft).

All the best Jackie...

One vital part of a magazine is an efficient and smoothly operating Advertisement Copy Control Department and *Aeromodeller* has been extremely fortunate in having the services of Mrs. Jackie Jackson for 14 years! Sadly Jackie is retiring, leaving a hole in our organisation that will be noticed by both our staff and the many advertisers with whom Jackie has dealt with so efficiently over the years.

We will all miss Jackie's thorough, businesslike approach and wish her a long and enjoyable retirement...

SMAE Snippets...

European Championships for Britain

Any major international model flying contest is well worth visiting, whatever your particular model flying interest. This year the United Kingdom is hosting the European Control-Line Championships from July 8th to

**What's On
is over the page**

What's On

March 24

SMAE 2nd AREA FREE FLIGHT EVENT
Comps: OR, OG, F1C (Plugge) Venue: Area Venues. Contact: Local Area Comp Sec. OR SMAE on 0533 58500. SMAE Members only: Competition Licence required

March 24

SMAE SOUTHERN AREA INDOOR SCALE MEETING
Comps: Open rubber, Open CO₂, Peanut. Venue: HMS Daedalus, Lee-on-Solent, Hants. Contact: M Leach. Tel: Emsworth (Hants) 5364. Flying from 1300 to 1800 Hrs. Flyers £1.00. Spectators 50p. Juniors FREE. All names and car registration numbers must be known one week prior to event.

March 24

SMAE CONTROL LINE RACING
Comps: Goodyear, Class 2, 1/2A TR. Venue: Newhouse. Contact: R Thorpe. Tel: 06988 5516.

March 31

SHEFFIELD CLAMS CONTROL LINE GALA
Comps: Goodyear, FAI TR. Venue: RAF Lindholme. Contact: John James. Tel: 0709 588476.

March 31

CONTROL LINE F2B STUNT AND CARRIER EVENT
Venue: Gipsy Corner, Braintree, Essex. Contact: Pete Burgess. Tel: Witham 516881.

April 6-7

SMAE EASTER TWO DAY FREE FLIGHT MEETING
Venue: RAF Sculthorpe. Contact: Phil Ball. Tel: 0332 865361. SMAE Members only: Contest Licence required.

April 7

SHEFFIELD 'JUNIOR 60' COMP
Venue: Sheffield Flying site off A 618. Contact: Dave Hanson, 23 Meadowhead, Sheffield S8 7UA. Insurance required: Spectators welcome: Single model comp but any engine or radio.

April 14

PETERBOROUGH DIESEL COMBAT COMP
Venue: The Embankment, Peterborough. Contact: B Waterland. Tel: 0778 343722.

April 21

LARGE MODEL SPECTACULAR
Venue: Old Warden, Nr Biggleswade. Contact: Radio Modeller. Tel: 0442 41221. Watch large models in spectacular flight, come and fly yours.

April 21

SAA CONTROL LINE RACING
Comps: Goodyear, Class 2, 1/2A TR. Venue: Newhouse. Contact: R Thorpe. Tel: 06988 5516.

April 21

THE GRANTHAM GRAND PRIX
Comps: Free Flight - OR, OP, OG, HLG, Combined FAI Control Line - FAI TR, 1/2A TR, Goodyear. Venue: Barkston Heath. Contact: Free Flight - Phil Ball 0332 665361. Control Line - Dave Campbell 0455 611724. Trophies for OR, OP, HLG and first prizes of engraved Crystal Goblets!

April 28

SMAE FREE FLIGHT SPRING MEETING
Comps: A1, Cd/H, 1/2A, CO₂, HLG, Vintage, Slow Open Power. Venue: RAF Barkston Heath. Contact: Phil Ball. Tel: 0332 665361. SMAE Members only: Competition Licence required.

April 28

SMAE SCALE INDOOR NATIONALS
Comps: Peanut, Open Rubber, CO₂, Venue: Alumwell Centre, Walsall. Contact: Doug Sheppard, 13 Luckington Road, Monks Park, Bristol BS7 0VT. Pre-entry only: registration 50p, each event £2.00. Non competitors £1.00. Send SAE for entry forms.

May 4-6

BRISTOL AND WEST WOODBURY WEEKEND
Comps: OG, OR, OP, F1A, F1B, F1C, Vintage Rubber, Vintage Precision. Venue: Woodbury Common, Nr Exmouth, Devon. Contact: Elton Drew, 2 Downfield Close, Alveston, Bristol BS12 2NJ. 'Champagne' fly-offs on 4th at 5pm. Caravan accommodation and camping. Sunday barbeque - Write (enclosing sae) for entry forms, details and costs.

May 5-6

FUN FLY IN AT HOLKER
Venue: Holker Hall, Cark-in-Cartmel, Grange-over-Sands, Cumbria LA11 7PL. Contact: Carolyn Johnson. Tel: 044-853 328. Fun competitions, camping - write for entry forms, details and costs.

May 12

SMAE 3rd AREA FREE FLIGHT EVENT
Comps: OG, OP, F1B (Plugge). Venue: Area Venues. Contact: Local Area Comp Sec. OR SMAE on 0533 58500. SMAE Members only: Competition Licence required.

May 12

BARCS LEAGUE OPEN THERMAL COMP
Venue: Springfield Park, Kidderminster. Contact: Andrew Jones, 4 Lyndhurst Drive, Kidderminster, Worcs. Entry Fee £2.00: Insurance required.

May 18-19

LEISURE LAKES MODEL CLUB 1985 SEAPLANE EVENT
Venue: Mere Brow, Tarlton, Lancashire. Contact: E A Johnson, 35 Holmwood Gardens, Formby, Merseyside L37 1NH. Tel: Formby 73496. Fly for fun competitions, entry to the Leisure Lakes area £2.00. Camping at modest rates: Write for more details.

May 19

GOLDEN ERA MODEL FESTIVAL
Venue: Old Warden, Nr Biggleswade. Contact: Radio Modeller. Tel: 0442 41221. For model designs of the 1920s - 1930s. Period costume is encouraged!

May 19

SAA CONTROL LINE RACING
Comps: Goodyear, Class 2, 1/2A TR. Venue: Newhouse. Contact: R Thorpe. Tel: 06988 5516.

May 25-27

SMAE FREE FLIGHT BRITISH NATIONAL CHAMPIONSHIPS
Venue: RAF Barkston Heath. Contact: Phil Ball. Tel: 0332 665361. SMAE Members only: Contest Licence required.

June 2

FINCHLEY DMAC CONTROL LINE GALA
Comps: Stunt, FAI Combat, Slow A Combat. Contact: S Wadkin, 5 Brockland Hill, Hampstead, London NW 11.

June 9

SMAE 4th AREA FREE FLIGHT EVENT
Comps: Cd/H, F1C, Team Glider (Plugge). Venue: Area Venues. Contact: Local Area Comp Sec. OR SMAE on 0533 58500. SMAE Members only: Competition Licence required.

June 16

SAA CONTROL LINE RACING
Comps: Goodyear, Class 2, 1/2A TR. Venue: Newhouse. Contact: R Thorpe. Tel: 06988 5516.

June 22-23

AEROMODELLER SCALE WEEKEND
Venue: Old Warden, Nr Biggleswade. Contact: Aeromodeller. Tel: 0442 41221.

June 23

THE OXFORD MFC FREE FLIGHT RALLY
Comps: A1, Cd/H (in rounds) Vintage (rubber and glider combined), HLG, Rubber Scale Duration. Venue: Port Meadow, Oxford. Contact: Andy Crisp, 30 Portland Road, Summertown, Oxford. Tel: Oxford 53800. No power models to be flown. Champagne Fly Offs on Saturday 22nd June at 1900 Hrs for A1, Cd/H, HLG.

June 23

BLACKBURN & DMAC SUMMER FLY-IN
Venue: Wotton Country Park, Blackburn, Lancs. Contact: Ray Stott, Adelaide Street, Crawshawbooth, Rossendale, Lancs BB4 8PW. Scale, Semi-Scale or unusual model rally, a fun day for all. Good prizes, small entry fee on day.

July 7

RADIO MODELLER FUN FLY-IN
Venue: Old Warden, Nr Biggleswade. Contact: Radio Modeller. Tel: 0442 41221.

July 13-14

YORKSHIRE SCALE MODELLING WEEKEND
Venue: Newby Hall, Ripon. Contact: Robert Thorn, 22 Chatsworth Place, Harrogate, N Yorks. Various modelling competitions including helicopters, control line, boats, off road racing and model railways and wargaming.

July 14

CANTERBURY PILGRIMS AIR SHOW
Venue: Gravely, Nr Seasalter, Kent. Contact: D R Auslin, 4 Wykeham Road, Sittingbourne, Kent. Tel: 0795 27008. Write for details and pre entry.

July 21

OLD WARDEN SVAS OPEN DAY
Venue: Old Warden, Nr Biggleswade. Comps: Vintage CL Scale. Contact: M Staples. Tel: 0223 241978. Vintage models, all welcome especially FF and CL.

July 21

SMAE WESTERN AREA FREE FLIGHT RALLY
Comps: OG, OP, OR, HLG, Combined FAI, Combined Mini, JO. Venue: RAF Merryfield. Contact: C Sharman. Tel: 0452 855806.

July 28

FACCT OPEN THERMAL COMPETITION
Venue: RAF Weston on the Green. Contact: N Webb, 13 East Street, Fritwell, Nr Bicester, Oxon OX6 9PX. Also for BARCS League. Entry £2.00. Send SAE and frequencies: SMAE Members ONLY.

August 3-4

WOODVALE INTERNATIONAL RALLY
Venue: RAF Woodvale, Nr Southport. Contact: John Armstrong, 71A Clent Avenue, Maghull, Liverpool. Tel: 051-526 6857. Write for details of competitions, entry forms, camping etc.

August 4

DUXFORD MILITARY PAGEANT AND FLYING DISPLAY
Venue: Imperial War Museum Duxford. Tel: 0223 833963. Adults £3.00, Children, OAPs £1.50.

August 11

SAA CONTROL LINE RACING
Comps: Goodyear, Class 2, 1/2A TR. Venue: Newhouse. Contact: R Thorpe. Tel: 06988 5516.

August 17-18

AEROMODELLER VINTAGE WEEKEND
Venue: Old Warden, Nr Biggleswade. Contact: Aeromodeller. Tel: 0442 41221.

August 17-18

PLUMPTON MODEL SHOW
Venue: Plumpton Race Course. Contact: Dave Bishop, DB Sound, 17 The Square, Tatsfield, Kent. 300 mph Dutch Jets, Helicopter rides, Aeroplanes, Cars, Boats, Rockets, Microlights, Live steam trains - Fun for the whole family. Camp or Caravan - £15.00 (if pre booked).

August 24-26

SMAE CONTROL LINE, SCALE AND RADIO CONTROL BRITISH NATIONAL CHAMPIONSHIPS
Venue: RAF Barkston Heath. Contact: SMAE Comp Sec. Tel: 0533 58500 or 0533 412368. SMAE Members only: Contest Licence required.

September 1

SMAE 5th AREA FREE FLIGHT EVENT
Comps: A1, F1B, Team Power, Plugge. Venue: Area Venues. Contact: Local Area Comp Sec. OR SMAE on 0533 58500. SMAE Members only: Competition Licence required.

September 8

OLD WARDEN SVAS SILENT DAY
Venue: Old Warden, Nr Biggleswade. Contact: M Staples. Tel: 0223 241978. All welcome but NO IC engines in any form.

September 15

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

September 15

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

September 22

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

September 22

SHEFFIELD VINTAGE COMP
Venue: Sheffield Flying site off A 618. Contact: Dave Hanson, 23 Meadowhead, Sheffield S8 7UA. Insurance required: Spectators welcome.

September 29

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

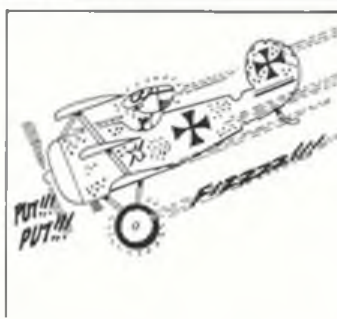
September 29

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

October 20

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

THE RED BARON FLIES AGAIN...





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No. 2 - Model Boats

The world of model boats covers Sailing craft, Yachts, Paddle steamers, Trawlers, Tugs, Launches, Warships, Submarines, Liners and Hovercraft - in addition to non-scale sports, competition and hydroplane models. Plans for all of these types - and cars too - are illustrated in the Model Boats handbook. Feature articles include advice on scaling-up plans, hull construction, engine selection and classifications for model yachts and power boats.

Plans Handbooks are available from Plans Sales, MAP P.O. Box 35, Hemel Hempstead, HP2 4SS. Price of each Handbook is £1.25 plus 30p postage.

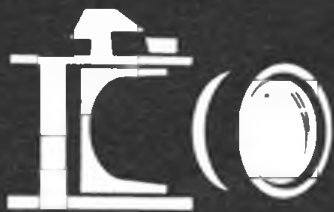


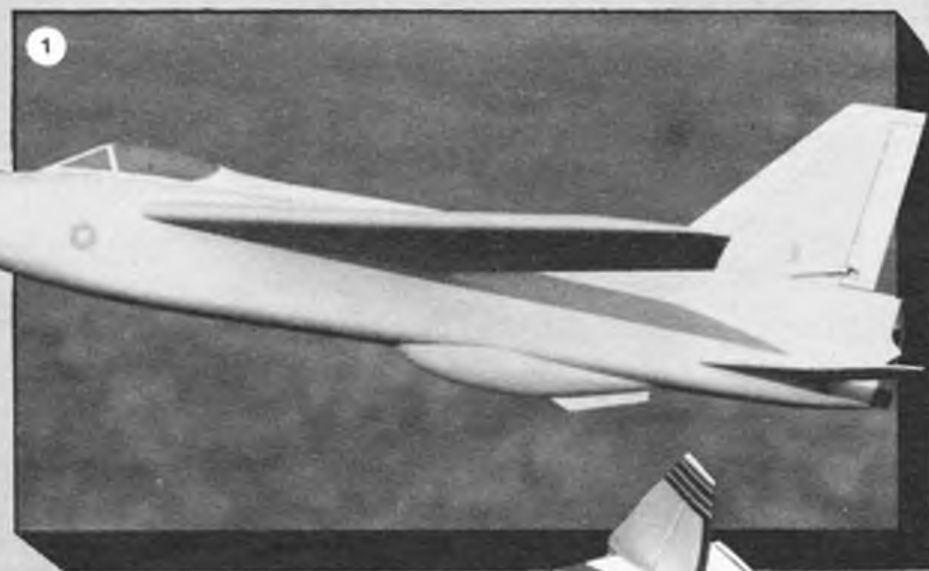
PHOTO PRIZE

Model News With Fliar Phil

Now Wood for Winners

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.



GENIUS has been defined as: 'The infinite capacity for taking pains'. When Fliar Phil sees the infinite care, and painstaking attention to detail, aeromodellers lavish on their models, he cannot but conclude that (although they would be far too modest to consider themselves as such), a lot of aeromodellers come into, or at least pretty near to, the 'genius' category. Fliar Phil feels that this month's selection helps to prove his point.

Photo 1

We kick off with an 'in-flight' photo of a slope soarer 'Lightning F. Mk. III,' belonging to Mr. R.M. Green of Walsall, West Midlands. Of mixed balsa and polystyrene construction. Span 37½in. Weight 28ozs. R/C on rudder and elevator. Mr. Green's 16 year-old son, Gary, was the photographer. F.P. feels Gary must have acted with 'lightning' (!) speed, (camerawise) to get this excellent photo.

Photo 2

Despite the size (90in. span) of his 'Akromaster', Mr. Graham Powsell of Lisvane, Cardiff has managed to squeeze into the picture'. Good for him! Fliar Phil is grateful to his daughter, Wendy, for the photo. Wendy must be a well informed young lady, on the subject of aeromodelling, because she supplied these details: Model built from a Skyway's kit. Weight 15lbs. Power: 'Tartan Twin', with J.R. radio.



Photo 3

This 'indistinguishable from the real thing' model, is the skilled work of Mike Clews of Maidenhead, Berks. Mike's superb ducted fan 'Hawk' is from Paul Gray's (M.A.P.) plan. Power is a K & B 7.5 driving a Turbax fan. Weight 6¾lbs. Mike writes: "Still working up courage to let it lift off from its dolly by itself." Take heart Mike — F.P. knows how you feel!

Photo 4

Where would our great hobby be without those happy aeromodellers who contribute to it, a delightful touch of humour? This



unusual (!!) photo comes from Monsieur J.C. Debuissou (Aero Club du Dauphiné Aeromodelisme) of Grenoble, France. It tempts F.P. to ask "which way did the witch go?". In his witty letter Monsieur Debuissou says "She flies well with Jean Philippe Gargat operating the four channel R/C." Power: 10cc engine. Span 2.4 metres. Length 3 metres. *Fantastique* Monsieur Debuissou! Merci, et bon chance mon ami.

Photo 5

Now a look back to the past with Colin E. Read of Coventry, West Midlands. The model is his elegant and efficient gull wing free flight sports model. Built in the late fifties, it features a balsa structure with jap tissue covering. Span 38in. Power: Merlin .76cc diesel. Colin had a number of his designs published in *Aeromodeller* and *Model Aircraft* in the 50s and 60s.

Photo 6

A remarkable action photo (No not one from the Air Ministry's archives of WW II!), from Ivo Ceresnak of Brno-Lesna, Czechoslovakia. It shows Dipl. Ing. Koutny's 'BF 109 E', and his pupil Simek's *Hawker 'Hurricane'*, in flight over their local airfield. F.P. believes that both are rubber powered and display painstaking attention to detail. An inspiration to all rubber-powered scale model fans.



Photo 7 Winner

Knowing the D.H. 'Fox Moth' fairly well (having flown in one, just delivered from the factory, many moons ago!) Fliar Phil could hardly believe this photo was of a model. To prove it is, Mr. C. Newman of Wheatley, Oxon, supplied these details: A 44in. span free flight model. 1/8th. scale. Power: *Webra 'Winner'* 2.5cc diesel (with timer controlled throttle). Fully upholstered cabin. Photographed at the SMAE Scale Day 1984. A winner indeed.

Look out for more of the best of aeromodelling pics next month.



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

AIRCRAFT DESCRIBED

De Havilland Tiger Moth



**No. 263 – The de Havilland DH 82A Tiger Moth drawn by
Dennis Bryant and described by Stuart McKay, Secretary of the Moth Club.**

The 'Tiger Moth' is born

When, on Friday 22nd 1925, Capt. Geoffrey de Havilland took off from the muddy confines of his factory aerodrome at Stag Lane, he may not have realised that the new aeroplane he was testing would change the fortunes of his company, and put a different complexion onto the face of private and club ownership throughout the Empire and beyond.

Captain de Havilland had called his design number 60, 'Moth'. It was a name he alone chose, although most other company decisions were made only after consultation with his senior staff. 'Moth' reflected the Captain's interest in natural history and was entirely apt. It was a name quickly accepted by the general public and soon became the generic term applied to every small biplane seen in British skies.

The first DH60 'Moth' was built entirely from wood, and was powered by a 60hp 'Cirrus 1' engine. It employed some novel features including the ability to fold back its wings, and the prototype machine was fitted with a self starter, although this was soon discarded. It had been evolved after consideration of previous designs available to the private owner which had all been too



1947 visitor to the 'Model' Aerodrome at Eaton Bray, this Royal Navy Tiger Moth shows the typical left rudder bias when parked. Those background buildings were home for MAP 1946-51.

big and cumbersome, or, following the famous Light Aeroplane Trials at Lympe, too small for practical purposes.

The Air Ministry's subsidised Light Aeroplane Clubs formed around the 'Moth'; the first being the London Aeroplane Club in August 1925, and a host of famous names

purchased machines for private use. With greater utilisation, improvements were incorporated, notably increase in engine power.

In 1928, de Havillands unveiled their 'Metal Moth', the DH60M. It utilised the wing panels and centre section structure of its forebears, but the fuselage was re-designed for construction in square section steel tube with round section cross members and rear decking hoops. Wooden stringers were attached and the whole covered with fabric which gave a more rounded appearance. Although intended for the export market, a batch of DH60Ms was ordered by the Royal Air Force, and served with the Central Flying School, amongst others.

Eddie Ridding took this posed photo to demonstrate ease of entry and exit for pilots, due to wing sweep.



Aeromodeller

De Havillands had recognised the need for a 'Moth' type military trainer, and proposed a 'Metal Moth' fitted with a 'Gipsy II' engine, but modified to carry military stores. The wings were re-designed to cope with the extra weight and the flying wires were attached to a common point at the front door root end fitting of the lower mainplanes. This move was significant in that it permitted easier egress for the occupant of the rear seat should he need to leave the aeroplane quickly by parachute. Wires and centre struts still shrouded the front cockpit however, although with an

Much folklore attaches to the actual birth of the aircraft that was submitted, but there is no doubt that a deal of time was spent with an airframe in a hut at Stag Lane Aerodrome before one, then a second aircraft, were ready for testing at Martlesham Heath in September 1931.

The entire centre section geometry was changed in that all struts were re-positioned forward to the front doors. This would allow the instructor to escape more easily. Such a major change necessitated some compensation for the shift of the Centre of Gravity, and the easiest solution was to sweep the wings. Trial and error persisted and shortening the rear spars in all four mainplanes then resulted in a staggered biplane with a sweep measured at nine

which were tested at Martlesham. Six further aircraft were built and exported to Sweden as DH60T 'Tiger Moths'.

Meanwhile, the Martlesham tests confirmed that the tips of the lower wings of their aeroplanes were trailing dangerously close to the ground, and aileron damage was possible during taxi manoeuvres with the tail down. The simple solution was to re-rig with dihedral on the lower wings, at which point the manufacturers decided that their invention had been modified sufficiently from the original DH60 to qualify for a new DH designation. The number extracted from the file was DH82, and the first machine built to the new evolved design was G-ABRC. Hubert Broad test flew the prototype from Stag Lane Aerodrome on October 26th 1931, and the Air Ministry immediately placed an order for 35 aircraft. The DH82 'Tiger Moth' was to be the new basic trainer for the Royal Air Force.

Left, no slats on racing Tiger No. 21 which displays the inevitably kinked rudder outline and lifted trailing edge of lower wing roots.



New Zealand Agri-Tiger ZK-BJ1 (was N6811) with lower wing spray bars photographed by Ken Meehan. Colours were black and yellow.

exhaust system running vertically downwards from the engine, it was possible to build doors into both sides of the fuselage for the first time. This machine was designated DH60T, 'Moth Trainer.'

In 1931 the Air Ministry issued Specification 15/31 for a new basic training aircraft. de Havillands took what was essentially their DH60T and viewed it in the light of the Air Force requirements.

inches at the interplane struts. The C of G was still not satisfactory, and rather than manufacture yet another set of spars, the top wings only were swept a further two inches.

With the exception of the 'Gipsy III' engine and the wing position changes, the resulting aeroplane was still a basic DH60T, but the name 'Tiger Moth' appeared on the two machines (G-ABNJ and G-ABPH)

The 'Tiger Moth' in production

The first 'Tiger Moths' were delivered to RAF Grantham in November 1931 painted in the colours of the day: silver overall with RAF roundels, serial and rudder stripes as standard. The batch was powered by the 'Gipsy III', and each fuselage was constructed with the deeper crew door at the front cockpit, and fabric covered stringer turtledeck. Military export business was brisk, but mostly for the aeroplane in its trainer role, although de Havilland did offer the aircraft equipped for gunnery, bombing and photographic missions. A single seat 'Tiger Moth' with a machine gun occupying the front cockpit was developed as a fighter for the Persian Air Force.

A mere handful of civil 'Tiger Moths' were built, released to professional air circuses in the main, but in 1934 a new version was announced, fitted with the more powerful 'Gipsy Major' engine, and all production was again directed to the military. The DH82A, known as the 'Tiger Moth' II in

The oldest Tiger - at Redhill, the Tiger Club base in Surrey where Dennis Bryant was able to research his drawings.



'CDC in earlier days with silver finish and a blind flying hood at what looks rather like Fair Oaks. Below, an over-view of Peter Harrison's rebuild 'JVE gives tank and top registration not usually seen.



RAF inventories, made provisions for a blind flying hood attachment on the rear cockpit, and the rear doors were re-profiled to prevent fouling of the frames.

The depth of the front doors was reduced after re-design of the front fuselage side frames, and the fabric decking was replaced by a light ply structure.

The prototype DH82A, G-ACDA, was allocated to the de Havilland School of Flying at Hatfield, one of several civil operated Reserve Flying Schools which

were busy during the expansion period. Each had large numbers of 'Tiger Moths' on strength by 1937. 'Tiger Moth' production was transferred to Hatfield. Licences were sold for local production in Norway, Sweden and Portugal and the Canadian arm of the de Havilland company built a few DH82A models.

Three aircraft were built up from parts by members of the de Havilland Technical School at Hatfield and used by the London Aeroplane Club, which had by now become part of the DH organisation. One aeroplane was assembled in New Zealand.

After war was declared in 1939 production at Hatfield accelerated, but space was required more urgently for 'Mosquito' work, and under emergency measures, all UK 'Tiger Moth' production was transferred to the Morris Motors factory at Cowley near Oxford, and continued uninterrupted until 1944. Assembly lines were set up in Australia and New Zealand where the basic DH82A model was built with some local modifications incorporated, and DH Canada re-designed the aeroplane as the model 82C, which with its covered and heated cockpit, brakes and tailwheel (and in some cases American 'Menasco' engine) was the ultimate development.

Generally, it is accepted that about 8800 'Tiger Moths' were completed, with the Morris contribution amounting to just over 3500.

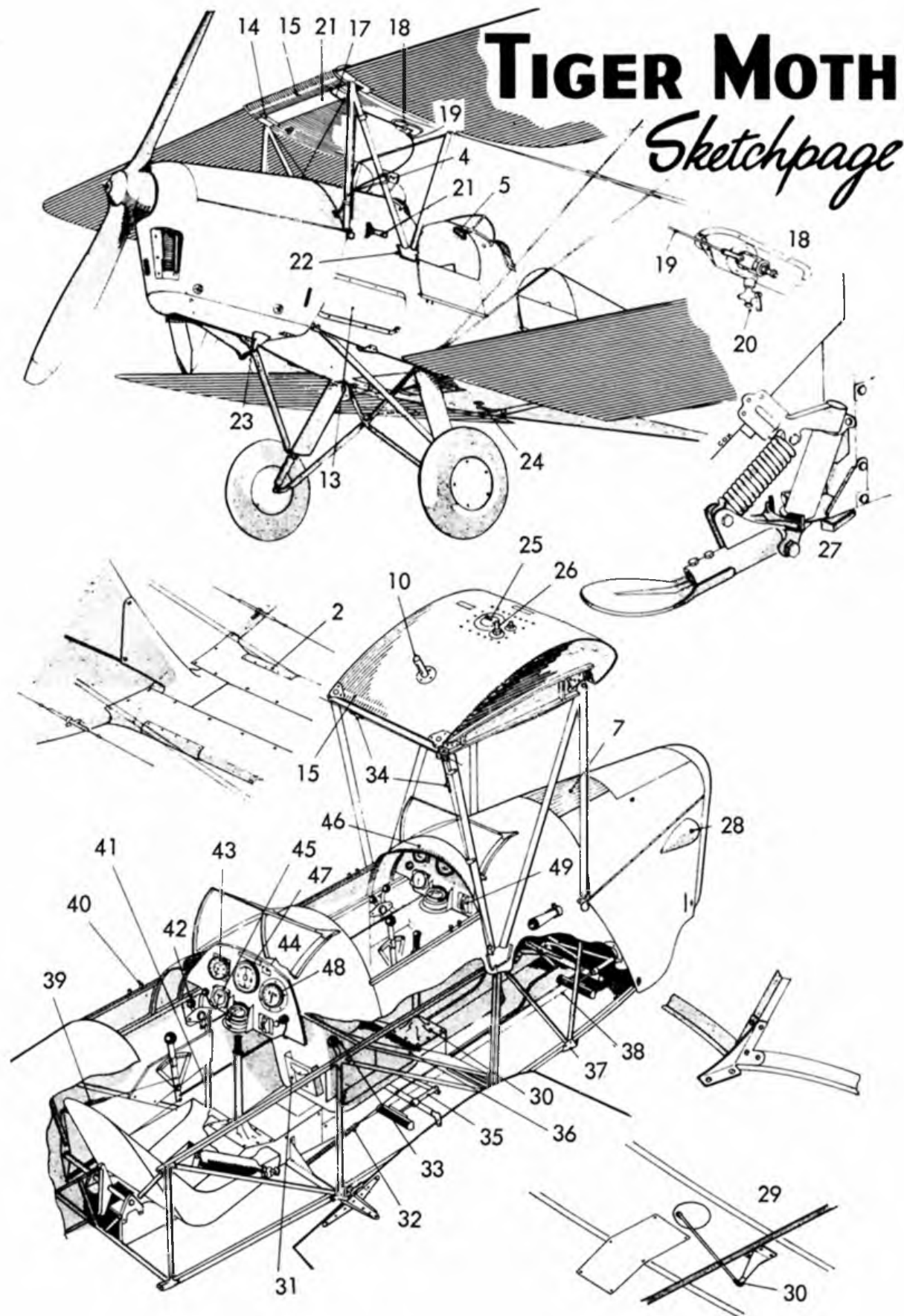
The 'Tiger Moth' trained unknown thousands of Allied airmen in every continent, and was in service in Britain from 1931 until 1953, when the remaining Reserve Flying Schools converted onto the 'Chipmunk'. Hundreds of surplus aeroplanes in the UK, Australia, South

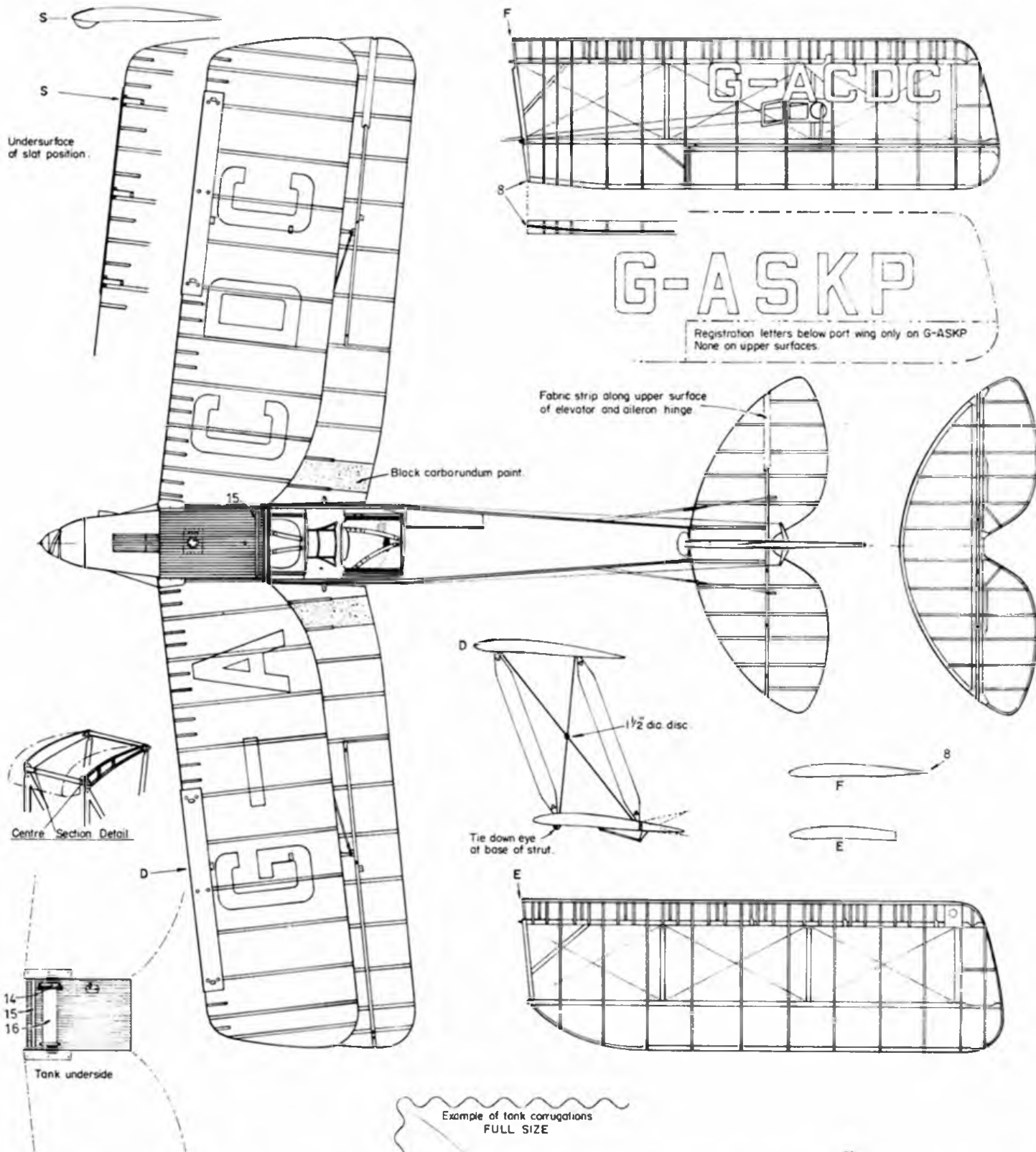
KEY TO DRAWINGS

1. First-aid stowage
2. Chafing plates on anti-spin strakes
3. Leather-covered crashpad
4. Rear view mirror
5. Handgrips in front cockpit only
6. Slot for safety harness
7. Corrugated step plate
8. T.E. slopes up from aileron to root
9. Intercom and baggage stowage
10. Fuel gauge
11. Slots
12. Magneto switches
13. Oil tank mounted externally for cooling
14. Metal retaining plates
15. Corrugations flattened locally to give a smooth strip
16. Flat cover plate over spar channel in tank
17. Connector pipe across bridge of tank
18. Fuel sump
19. Fuel shut-off rod
20. Drain cock
21. Venturi on both sides
22. Pressed aluminium fairing
23. Overflow pipe fairing
24. Steadying arm for aileron return cable
25. Filler cap
26. Overflow valve
27. Skid detail
28. Carburettor air intake
29. Aileron cam detail
30. Leather cuff
31. Map pocket
32. Spring bias on rudder
33. Slot locking lever
34. Slot locking handgrips
35. Parallel action rudder pedals
36. Front seat mounted in diagonal bulkhead
37. Jacking pad
38. Rudder linking rod
39. Spring bias for tail trimming
40. Door catches
41. Tail trim connecting rod
42. Throttle
43. Air speed indicator
44. Deviation card holder
45. Altimeter
46. Crash pad
47. Turn and bank indicator
48. Engine speed indicator
49. Oil pressure indicator (red)
50. Pull tab for first-aid access
51. 3/4in. x 1/2in. wood strips
52. Pitot tubes

Typical of many club line-ups, this trio of Midland Aero Club Tigers in pristine condition have yet to lose the rudder profile or have their cowlings and oiltanks crushed, a badge of honour for most hardworking Moths.



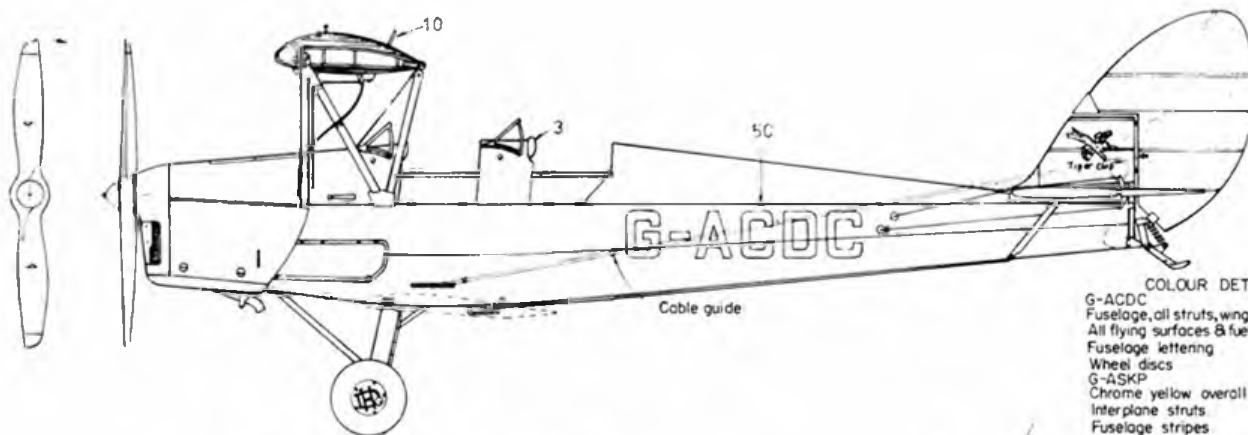




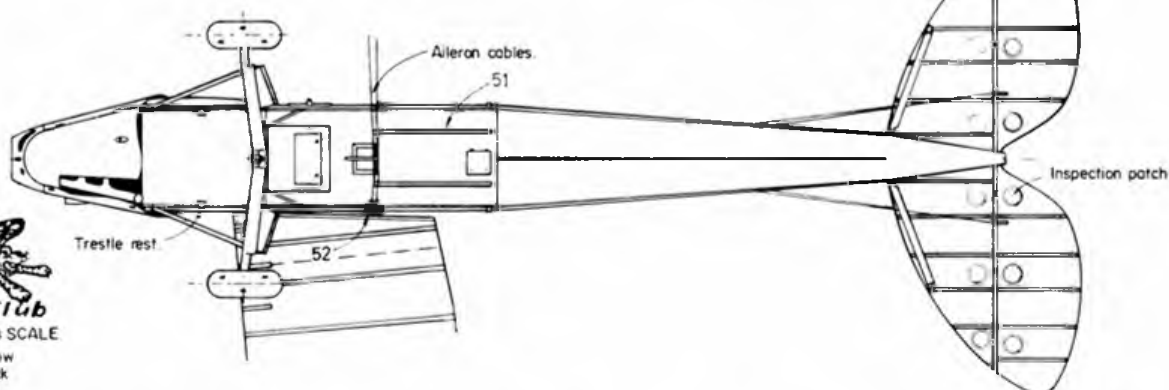
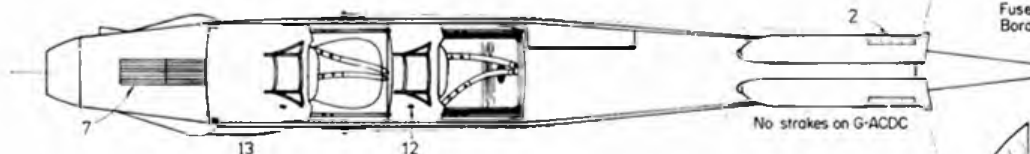
Span 29' 4"
Length 23' 11"
Height 8' 9 1/2"
Chord 4' 4 3/8"
Tailplane span 9' 10"
Track 5' 3"
Wing area 239 sq ft
Airscrew 6' 4" dia

SPECIFICATION

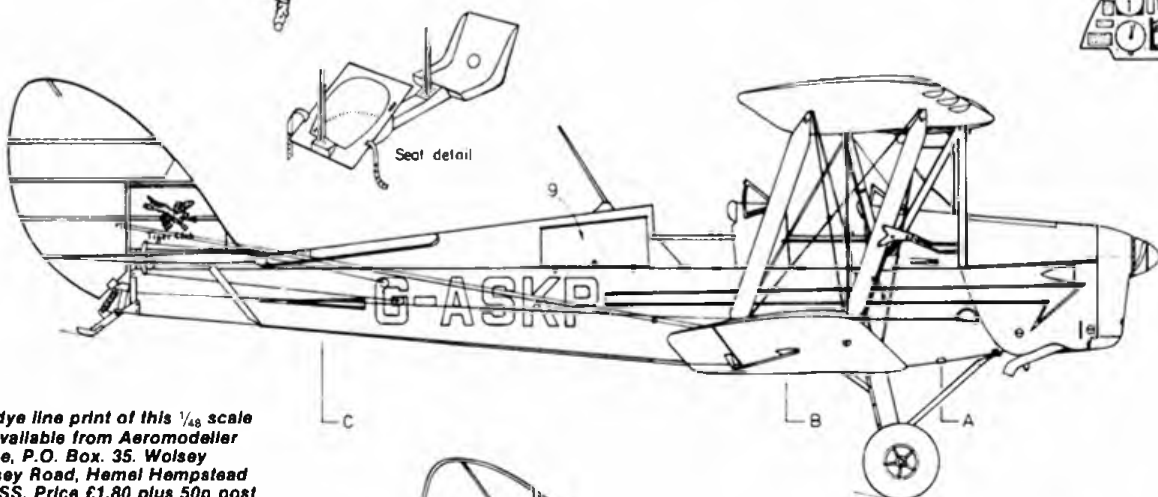
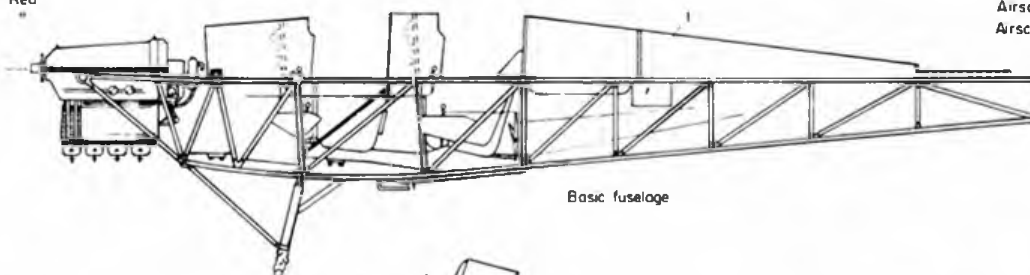
Normal weight 1,650 lb
Maximum weight 1,825 lb
Maximum speed (Sea level) 110 mph
Cruising speed (at 1,000 ft) 94 mph
Range (15 gall tank) 302 miles
Stalling speed 43 mph
Rate of climb (Sea level) 798 ft/min
Service ceiling 15,800 ft



COLOUR DETAILS
 G-ACDC
 Fuselage, all struts, wing lettering, Dark Red
 All flying surfaces & fuel tank Silver
 Fuselage lettering White
 Wheel discs Silver
 G-ASKP
 Chrome yellow overall except
 Interplane struts Mid Blue
 Fuselage stripes "
 All lettering "
 Fuselage underside & U/C legs Black
 Border of fuselage stripe White



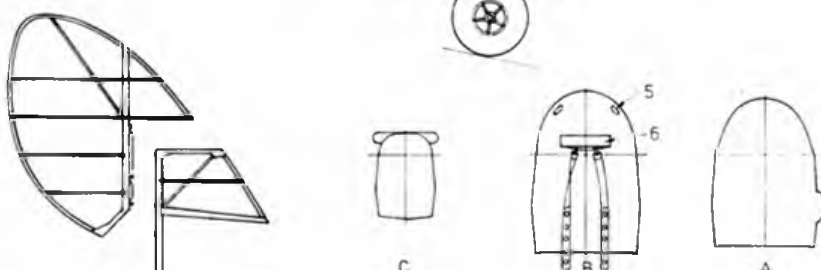
Cockpit interior — — — — — Dull Green
 Airscrews — — — — — Grey
 Airscrew tips — — — — — Yellow



A 1/24 scale dye line print of this 1/48 scale drawing is available from Aeromodeller Plans Service, P.O. Box. 35, Wolsey House, Wolsey Road, Hemel Hempstead Herts HP2 4SS. Price £1.80 plus 50p post and packing. (Price Code C). Please quote plan No. 3066 when ordering.

Acknowledgements

George Cox for the original drawings,
 Peter Harrison, Maurice Brett, Stuart McKay, M. Gambrell and M.J. Abbott for additional detail and checking - and to all Tiger Moth owners for keeping them flying.



Africa, India, New Zealand and to a lesser degree Canada, were offered for disposal. Most of the late production Morris aircraft had been stored after test flying hours only had been logged, and many of these found their way to recuperating air forces as gifts from the British Government. Others were released in batches and sold singly or in massed lots to almost anybody who could afford the £50.00 asking price, and provide transport to remove the dismantled machines. In Australia and New Zealand, hundreds of 'Tiger Moths' were converted to crop sprayers. Flying clubs bought a 'Tiger' or two to fly and a pair to be used as spares. After twenty years, the aeroplane was entering the second stage of its long life.

Cockpit interiors, rear (right) and front (left) as restored on 'JVE' illustrate minor differences in position of instruments and magneto switches, also the rudimentary 'joystick' and flight envelope notice of 45-160 mph!



Below, although the cowling around the Gipsy Major is simple in general shape, the Starboard panel is rarely produced accurately by scale modellers - note the lower edge which is relieved to clear the exhaust.



Rudder cables (doubled) run back from the rear pedals. Rear spar bracket is external and vee'd flying wire shackles bolt to vertical brackets on front spar (left). R.Ae.S. Historic Aeroplane and CN plate for 'CDC' are on starboard decking.



Civil 'Tiger Moths'

The very fact that so many whole aeroplanes and hundreds of tons of spare airframe and engine parts had been released onto the civil market at knockdown prices was a lifesaver for many of the flying clubs. But there was a bottom to the barrel.

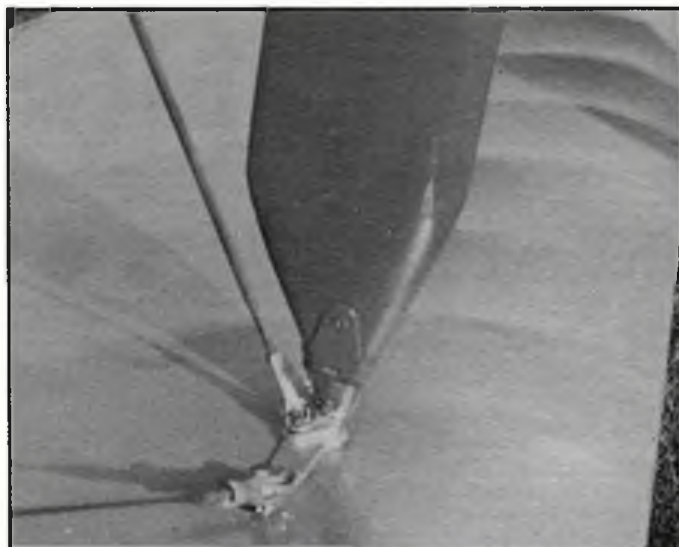
In Australia, crop sprayers wrote off hundreds of 'Tiger Moths' in accidents or

through chemical corrosion. Some were replaced by new aeroplanes built entirely from spare parts. The rate of attrition in New Zealand was steady but not so fierce. In the UK, crop spraying was a minor industry, and most of the few 'Tiger Moths' engaged in spraying suffered more from financial collapse rather than anything more severe, although there were occasional fatalities. Clubs continued to train pupils on 'Tiger Moths' until the sudden lifting of import restriction released a veritable flood of modern American light aircraft onto the home market, and the popularity of the 'Tiger Moth' as a

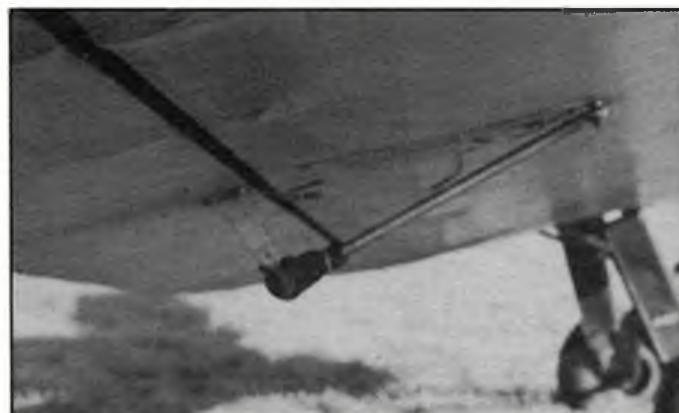


commercial enterprise sank to an all time low. Whole aeroplanes were burned at bonfire parties, and no film featuring World War I fighters was complete without its squadron of gaudily marked and converted 'Tiger Moths', almost always representing the 'enemy'. Perhaps it was a realisation that the type could become extinct that caused the world to sit up and take note. The popularity of the 'Tiger Moth' as a privately owned vintage aeroplane probably began in Australia when it was discovered that aeroplanes were being exported to the USA. Lobbyists arranged for an official ban on 'Tiger Moth' exports to anywhere. Undeterred, an enterprising American

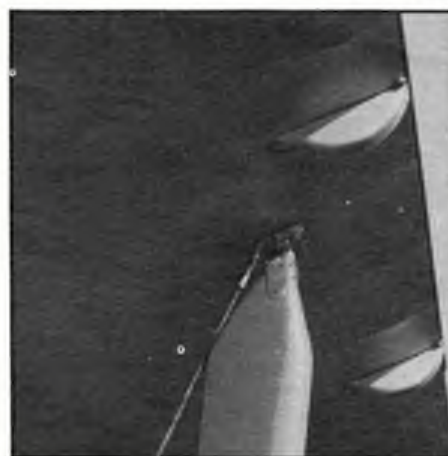
Right, Interplane strut fittings also carry landing and incidence wire brackets. Wires vary in size - beware quarter-scalers! Below is the pilot head on starboard strut.



Below, aileron differential operates by use of a circular crank plate on underside of lower panels (below) a feature once unique to Moths. Leather gaiter keeps the dust or mud out of aileron horn/pushrod bearings.



In descending order! Rudder & Elevator cables reflect mid-twenties simplicity also the lift strut bracket bolted through tail leading edge. Club badge is on 'CDC'. Upper strut end and slat mechanism shrouds (right). Photographs by Den Bryant and Ron Moulton.



airline pilot with roots in Europe, scoured continental aerodromes and purchased more than 100 'Tiger Moths' in all conditions, and together with tons of spares, sent them to the USA in a convoy of containers. In 1985 the situation is that the UK, Australia and the USA can each sport just over 100 'Tiger Moths', not all airworthy. New Zealand, Canada and South Africa have a healthy interest but with lower numbers, and continental Europe and the odd machine dotted throughout the rest of the world, account for the sum total believed to be about 600 safe examples.

The £50.00 surplus aeroplane of the early fifties reached a British record of £20,000 by 1982 and then dropped back slightly. In the USA, where the 'Tiger Moth' is just one of so many vintage types on the market, the prices have varied with the fashion of ownership, but currently stand at anything between \$20,000 and \$40,000 depending on

condition and location.

But the 'Tiger Moth' is not a cheap aeroplane to operate. Petrol consumption is on average, some six to seven gallons per hour, with an appetite for oil depending on the condition of the rings. Insurance can be 5% of the declared hull value per annum, and hangarage on licensed fields a further £1,000 per year.

The modern owner is one who has the knowledge and interest to maintain the aeroplane himself, under supervision. Clubs, such as the de Havilland Moth Club, encourage owners to take part in events as well as offering technical advice and the opportunities for bulk buying of consumable spares.

Fifty-four years after its birth, the 'Tiger Moth' is passing into ownership of the third generation of pilots who have learned to fly on her. Aeroplanes are being re-built to such high standards that at least another half century of life is inevitable!

TIGER MOTH SPECIFICATION

Span	29ft. 4in.
Length	23ft. 11in.
Height	8ft. 9½in.
Chord	4ft. 4¾in.
Tailplane span	9ft. 10in.
Track	5ft. 3in.
Wing area	239 sq. ft.
Propeller	6ft. 4in. dia.
Normal weight	1,650 lb.
Maximum weight	1,825 lb.
Maximum speed (Sea level)	110 m.p.h.
Cruising speed (at 1,000ft)	94 mph
Range (19 gall.tank)	302 miles
Stalling speed	43 mph
Rate of climb (sea level)	798 ft./min
Service ceiling	15,800 ft.

VINTAGE CORNER

WITH ALEX IMRIE

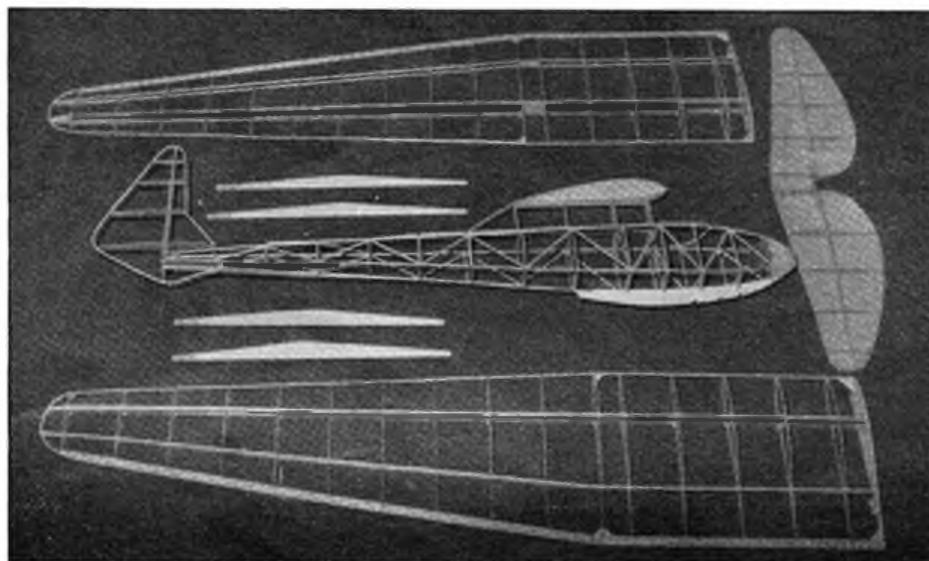
More Vintage Abroad

Roberto Marzoli, from Acore near Milan, and a SAM 35 member, has kindly sent details of vintage activity in the northern part of Italy. This is presently concentrated in the Friuli region and the strongest support seems to come from the Bergamo club, whose Falchi group contains a number of vintage fans, and are led by Giorgio Rabaglio.

This group have recently completed a series of 'Movo' gliders, M3, M4, M8 - M10, the M4 being built by Paolo Riboli from plan remnants unearthed by Roberto. The designer of the pre-war 'Movo' M4 is Arve Mozzaini, a prominent Italian modeller who has built some hundreds of models since he took up the hobby in 1932. His 'Moar 43' design, a 2.40 metre span elliptical winged monocoque beauty is described in the current SAM 35 Yearbook and later this



Above, SAM Champs. Class B Free Flight Cabin, Wayne Cain lets his 'Brooklyn Dodger' go (powered by OS .25 converted to spark ignition).



'Movo' M-4 glider before covering built by Paolo Riboli and flown at the vintage meeting held at Udine in Northern Italy (See text).

year Arve plans to use the original engine, (a modified Brown 'Junior') to power a replica of his original 'Moar 43'.

A first vintage meeting had been held in 1983 but only a few enthusiasts attended. At Udine on 23 September last for the second

vintage meeting, larger numbers were expected, especially since the meeting had received some publicity in the pages of the *Modellistica* magazine, however, bad weather and other model flying events in the area, combined to restrict the attendance to some 15 modellers.

It is a fact that vintage always seems to 'take-off' at its own speed, then gathering momentum, becomes a sizeable movement.

This has happened in other countries, and we confidently expect that Italy will not be any different.

It had been hoped to be able to use the military aerodrome near Udine named Campoformido, which is rich in aviation history: apart from being the home of the first Italian aerobatic teams flying Fiat CR 20 biplanes in the early 1930s, the aerodrome had also housed the colourful Albatros fighters of German Jagdstaffeln during 1917. Unfortunately the low numbers of participants prevented the military authorities granting permission for the use of Campoformido, and the meeting was held at the local R/C club ground, which was not overly large for the gliders, which formed the bulk of the type of models present. Even the weather was unkind! No sun drenched Italian skies favoured this meeting, and the persistent rain had a dampening effect on the flying.

However, as is common with all vintage assemblies, the chin-wags were highly productive and enthusiasm for the "old-timers" was such that Rabaglio, announced there and then details of the 1985 vintage meeting. This will be held early in September close to Bergamo, and we look forward to hearing more about this function, and more from Roberto generally, who is currently spending all his spare time



Left, SAM Champs. Class B Free Flight Cabin Bruce Norman tunes the O & R 23 in his 'So Long' before release. Right, SAM 35 stand at Model Engineer Exhibition (see text).





Left, Sai Talbi designed this 'Brooklyn Dodger' in 1941, seen here cranking up the O & A 23 at Bong in Class B Free Flight Cabin event.

tracking down vintage material and 'historical celebrities' for the good of the Italian vintage movement.

Aeromodeller Vintage Weekend

Well, we finally got two days for vintage! Lets make it a success by attending Old Warden on both 17th and 18th August, and bringing along as many vintage models as possible. It would be nice to see more young people attending, so don't leave your family at home. You still have time to initiate them

Right, Joe Konefes designed the 'Buzzard Bombshell' in 1940, still flying this design, now with R/C and Super Cyclone power in Class B Cabin Ignition R/C event.



Class B Glow Ignition R/C, Bob Erpeiding's 'Gulf' powered by OS 25 on 'sky grabbing climb'



information on that model I cannot comment further.

A fair number of vintage models always find their way into the flying model section of exhibits, and this year was no exception, for the most part highly finished, they seemed out of place there, and for sheer excellence and variety the SAM 35 stand won the day as far as model aeroplane exhibits went.

The number of models displayed by this organisation increases with the passage of each year and some 200 models were counted on show this year. A large number

bore patches and oil stains that one does not normally associate with exhibition finish, but thank goodness, they had not been recovered and redoped for the show, the scars displayed conveyed the right impression to the onlooker that told of 'things achieved'!

Since modellers take such a delight in building models in any old size that takes their fancy, it was no surprise to see a double-sized Keilkraft 'Ajax' amongst the SAM 35 models, equally the very small CO₂ powered versions of famous free-flyers are really flying scale models, in fact one

into the simple procedures of vintage building via beginners' models like 'Ajax' and 'Achilles', thank goodness that both of these designs are still around as kits after some 45 years.

Remember that a youngster's involvement in making one of these models will recruit him to the hobby in a more satisfying way, than the mere purchase of one of the rather crude ready to fly things that seem to abound on Vintage Day.

Model Engineer Exhibition

It was a peculiar fact that vintage type models were to be seen all over the exhibition area at Wembley this year: who can but say that the very fine 1/4 scale Bentley rotary engine shown on the general engineering stand was not from 'our period', or the fine Vickers 'Viking' G-AHPA? Also there was an interesting machine on the SMAE stand powered by compressed air, fitted with a funny small tapered air container: this model was labelled as a "CE Bowden" design, but not having

Below, 'New Ruler' by Cliff Betz takes off in the Class C Pylon event, powered by McCoy .49 spark Ignition engine.





'Jimmy Allen' models. Karl Spielmaker SAM Champs organiser with his 'Skyraider' at left, with James Alaback and his 'Bluebird'.

actually needs a tape measure at one of these shows in order that it can be ascertained that a particular model is being shown in its original size!

One design seen in its actual size and form was M R Knight's 'Kinglet', there was also an uncovered replica by Bill Maloney, which exhibited some departures from the old state of the art, but these had been documented and could be noted on the original 'Kinglet', also on the stand, shown by Cyril West.

Two models that I saw for the first time, both happened to have been built by Mick Radford, these were Bill Winter's 'Wog' and the 'Hermes' by Halifax (I wonder if the blue pencil merchant will change that to Halifax again?) then there were Veron's 'Fantail', 'Manx Monarch', 'Challenger', 'Frog Jupiter', 'Ladybird Special', and dozens more, truly a good show. Yet, a great puzzle to me remained that Boeing B17G, it served as a good sunshade, but who had the nerve to suggest, allow, and exhibit such a monstrosity on the SAM stand?

Finally Reg Parham's talk on the history of the indoor model was a treat not to be missed, the flights of his demonstration models being an indispensable part of his lecture.

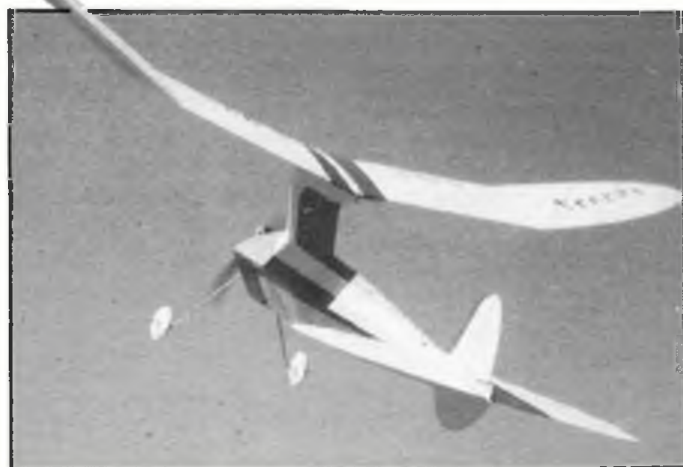
SAM Champs (USA) 1984

Dick Stouffer is an 'all-aviation' guy and is involved in replica and experimental activities, being on the Board of Directors of the EAA Aviation Foundation. He is also a fine cameraman and when he went along to last year's SAM Champs after a ten year break, he sent us some of his impressions, in both word and photo.

Of necessity we have had to curtail this report, but over the next few issues we will be showing some of his excellent photographs, that well illustrate the state of the 'old-timer' or vintage art in the USA.

The SAM Champs occupied four days of competition at Bong Recreation Area 20 miles west of Kenosha, Wisconsin, during last June. Three of the four days were subject to much wind so that on one day all R/C events had to be called off. However the

Right, Dave Schooley from Canada flew this 'Diamond Zipper' with OS .60 four-stroke in the Texaco event.



following day, the weather was a model flyer's dream and all cancelled events were rapidly flown off under clear blue skies with zephyr breezes of less than 5 knots, and in conditions of regular thermal development with temperatures of up to 80 degrees Fahrenheit.

these have been kept fairly brief.

Class A is up to .200 cubic inches (up to approx. 3cc)

Class B is up to .300 cubic inches (up to approx. 5cc)

Class C is up to 1.20 cubic inches (up to approx. 20cc)



R/C Texaco processing line. All models being checked for weight and corresponding fuel allowance before flying.



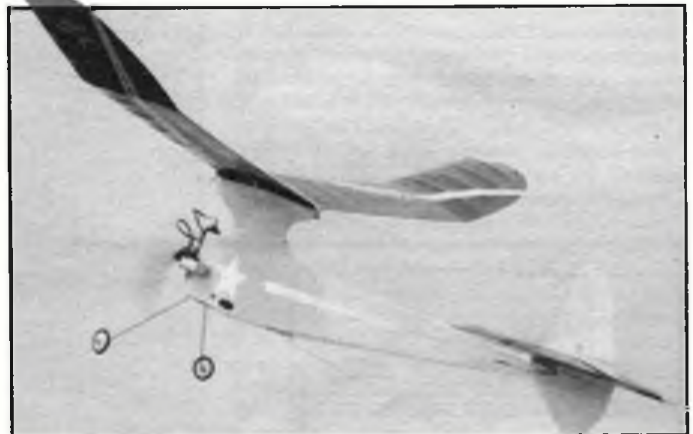
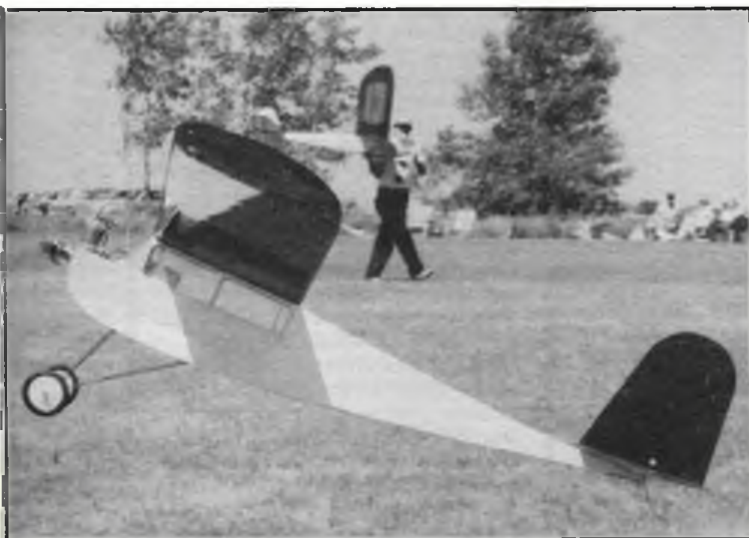
Woody Bartelt gets his 'Comet Zipper' away in the Class C Pylon Free Flight event.

participants and visitors could concentrate on the old engines instead! A good number of young modellers attended, in fact ages ranged from 15 to 83 years! Also a number of old timers were present, this group including Joe Konefes (designer of the 'Buzzard Bombshell'), Sal Taibi ('Powerhouse' and 'Pacer' designer), Chester Lanzo (designer of well known rubber and gas designs including 1938 R/C model) and Jim Cahill (1938 Wakefield Trophy winner).

It is not possible to list all the results but some details of the more popular events are given below:-

In free-flight the .020 replica Class proved the most popular with 50 entries, won by Willard Smitz with his 'So Long' after a fly

Slag engine is an engine of the cheaper variety that was made without a steel cylinder liner, usually these aluminium pistons running in aluminium liners, rapidly lost compression (and power) and became almost impossible to start after only about 30 minutes running! In recent years such motors have been re-worked but it is not known if such hotted-up versions are allowed in this competition.



Above, Dan Schnelder's 'Thermal Thumper' powered by Arden .19 flying in the Class A Pylon R/C Ignition event.

off against Larry Schaeffer and his 'Strato Streak'. Class A Cabin had 38 entries, and Class B Cabin was close behind with 34 entries, first three places in the latter event being won by 'Brooklyn Dodgers' (Sal Taibi design from 1941), the maestro himself winning Class C Cabin with his 'Playboy' from a field of 27 entries. The pylon events were also well patronised, there being 34, 36 and 35 entries respectively in Classes A, B and C.



Jimmy Allen was a popular 15 minute late afternoon radio programme in the USA in the mid and late 1930s, Jimmy was a pilot/adventurer. A gasoline company sponsored the programme which also produced several model aeroplanes with flying surfaces of some 200 square inches, weighing 5 or 6 ounces. So the SAM Jimmy Allen event is a duration event for such models, fondly remembered by the old timers!

A points system was used to mark up the various sections of competition flights and all ties were broken with "fly-offs". The 30 seconds Antique event had four competitors in a tie for first place with 360 points each, while the rubber stick event had 5 first place winners that required more than one fly off to determine first and second places.

Running in parallel with the SAM Champs was a Model Engine Collectors' Association 'Collectogether' or swap meet, so when the wind became too troublesome

Above, 'Turner Special' powered by OS .60 4-stroke Ignition engine gets away in the Texaco event for Wayne Belcher. Right Tim Banaszak, third place in the Slag Engine event, lets his Thor .29 powered 'Cyclone' go in a nice hand launch.



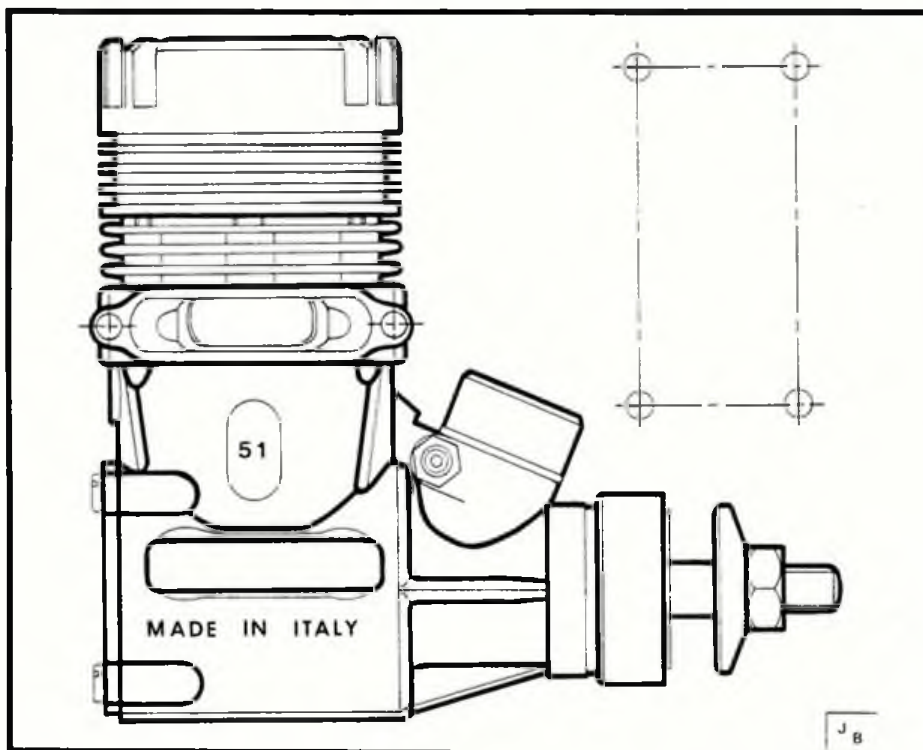
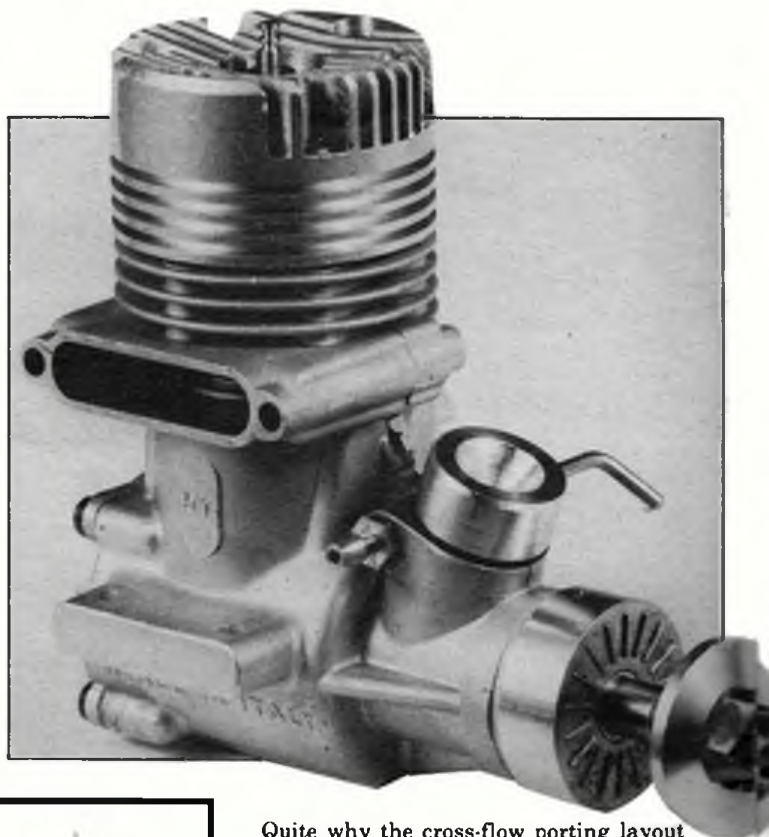
ENGINE TEST

Como 51: Mike Billinton looks at this control line stunt engine from Italy.

THERE HAS BEEN perverse irony in the lack of test results from this source specifically referring to Control-line motors. Happily, opportunity to test an example of Control-line Aerobatic (FAI Class F2B) motive power in the shape of the *Como 51* now allows for some rectification, and, having tested recent examples of engines in that other FAI Aerobatic class (F3A R/C), has pinpointed the quite different power-plant philosophy which has developed to suit these two pilot-controlled aerobatic classes.

For a variety of reasons the R/C class has arrived at use of quite advanced, high-power, Schnuerle-porting tuned pipe engines

Right, the Como 51 has a good pedigree and its appearance and clear thought for what is required should encourage the use of this engine in stunt circles. Below, Full size drawing and mounting details. The Como 51 retails at £59.94.



(built occasionally on racing engine lines), whilst the C/L class has remained wedded to earlier, less powerful cross-flow ported designs invariably fitted with standard silencers. Also a feature has been the use of 'bored-out' or 'stroked' oversize engines fitted within small crankcases, which may well be a 'Darwinian' natural selection, because such layouts can provide improved characteristics with rich four-stroke running due to relatively restricted transfer passages.

The *Super Tigre 46* is a well-regarded

example of such a layout, and the *Como 51* follows much the same pattern though its overall size is more in keeping with its capacity. That there are some similarities between these two engines is not surprising - the *Como* is in fact produced under separate contract by *Super Tigre* of Italy. The significant difference between them is the use by the *Como* of 'modern' Schnuerle porting - in a class where the exemplary four-stroking performance of the old-style cross-flow engines still holds away.

Quite why the cross-flow porting layout restricts the large degree of motor acceleration in transition from four to two-stroke, so characteristic of the Schnuerle ported motor, is unclear; though commonsense suggests it is a consequence of the quite different directions given to incoming gas flows in either layout, *ie.* - the purposely designed Schnuerle porting causes gas transfer streams which find themselves increasingly less likely to escape from the exhaust as rpm and gas inertia increase. Conversely the cross-flow layout leads to gas streams which are likely to suffer from increasing loss through the exhaust port as rpm rises, just because the transfer stream is pointing across to the exhaust - and the old style piston crown baffle only partially offsets this disadvantage.

These points are the main reason for the known superior BMEP figures of the Schnuerle motor, whilst paradoxically the relatively inefficient cross-flow motor provides an almost perfect match for the control line aerobatic aircraft.

In C/L Aerobatics the ability to operate the motor at just the correct degree of rich 'four-stroking' in level flight and which then translates reliably without excessive overspeeding into a more powerful two-stroke proper, during upward vertical manoeuvres (and vice-versa on the return down) all contributes to accurate and constant speed 'patterns in the sky' and thus helps to gain best judging marks. This seeming 'under-use' of the motor's capability suggests that, at the very least, any dynamometer test of a glow two-stroke stunt motor should take into account the four-stroking (or rich fuel/air ratio) performance. Then at a later date it will be interesting to compare the figures arrived at here with say the typical diesel's low-speed,

Above and right, full size photos will give some idea of how you fit the Como 51 into that new stunt model you are designing...

high-torque performance, or even with a four-cycle engine proper. However it would seem difficult to improve upon the good match between the oscillating rich-to-lean performance of the two-stroke cross-flow motor and the specific C/L Stunt class requirement.

Mechanical detail

Crankcase: An aluminium alloy one-piece pressure die-casting, which externally deceptively suggests a cross-flow engine - Internally though it has a Schnuerle transfer layout. Single boost and two separate side transfers. All three are shallow cross-section, indicative of the need to keep gas velocity sensibly high even at the normal low rpm used in C/L stunt. Twin ball bearings, with the front one being rubber-sealed.

Crankshaft: In Ni-chrome steel - selectively hardened. Crank-web not fully cut-away, to improve crankpin support.

Piston: High-silicon alloy - cut-away at base to facilitate gas access to transfers at bottom of stroke. Gudgeon-pin is heat-shrink fit into piston, which taken together with front ball race seal to crankshaft, has resulted in very close primary crankcase compression seal.

Liner: To *Super Tigre's* recent design layout, this brass chromed part is of 'low flange' style allowing piston to reach to top of liner at TDC. Exhaust timing at 156° gives 15° overlap over transfers, and leads to quite a low effective compression ratio of 7.76:1.

Cylinder Head: Turned and milled in aluminium alloy - and sits atop, and is located by, the liner flange. A slightly angled squish band gives very close piston clearance of .005ins. at piston circumference, increasing to .012ins. maximum. In spite of this tight clearance, the use of a deep (5mm.) bowler-hat combustion chamber results in a quite low geometric compression ratio of 10.9:1.

Connecting-rod: Machined in high-duty aluminium alloy. phosphor-bronze

bushed at both ends.

Carburettor: Specially sized for C/L aerobatic use, this is a small bore (4.4mm) simple venturi - hence will give good suction. *Super Tigre* here use four small peripheral fuel holes issuing at some 3mm. downstream of the choke's minimum diameter, thus arguably not at the supposed best position at the maximum velocity/maximum restriction point. For sure though, *Super Tigre* have verified that this lower position is better and certainly it

worked strongly and effectively during test. In this C/L small bore carburettor application, the needle valve control itself proved very linear, accurate, and covered a sensibly reduced 3/4 turn either way - rich to lean. When used in conjunction with a silencer pressure fuel system, this range narrowed to a small 1/4 turn either way.

Performance

A variety of propellers were used after the early minutes of the brief running-in period required with ABC engines.

Comparing open exhaust with silencer operation, these showed interesting variation in rpm suppression, which was only confirmed later during the torque tests, as being a clear function of silencer design.

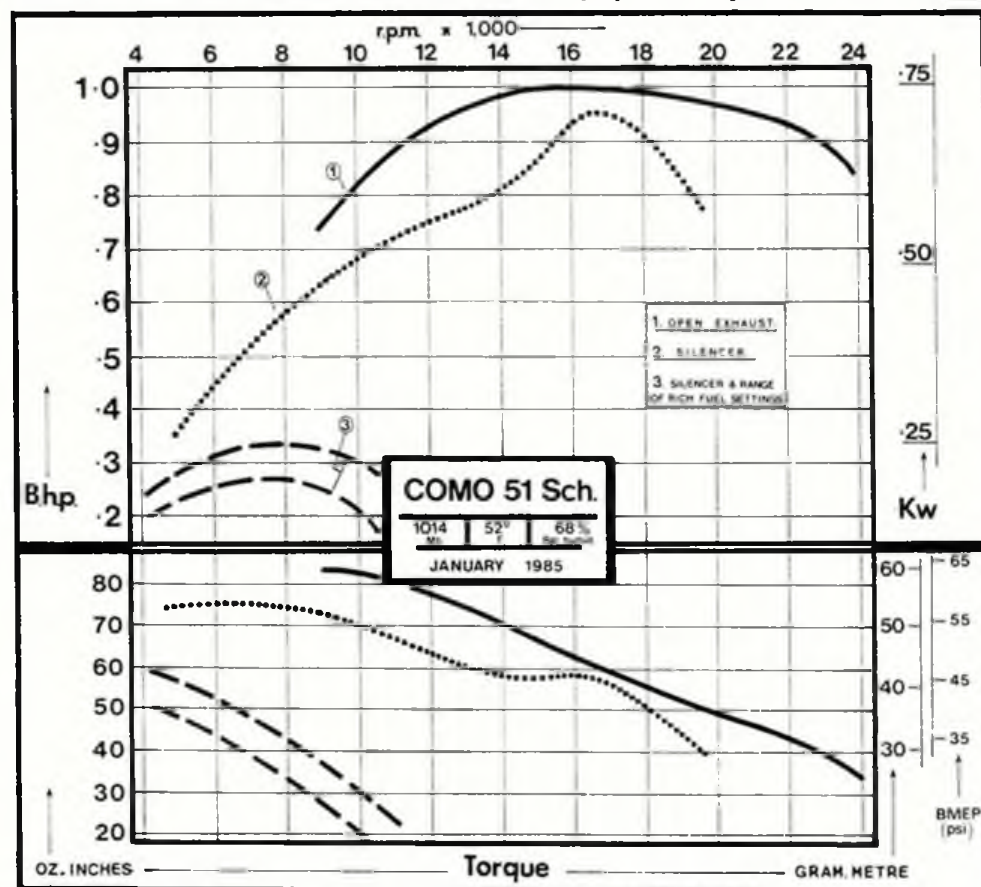
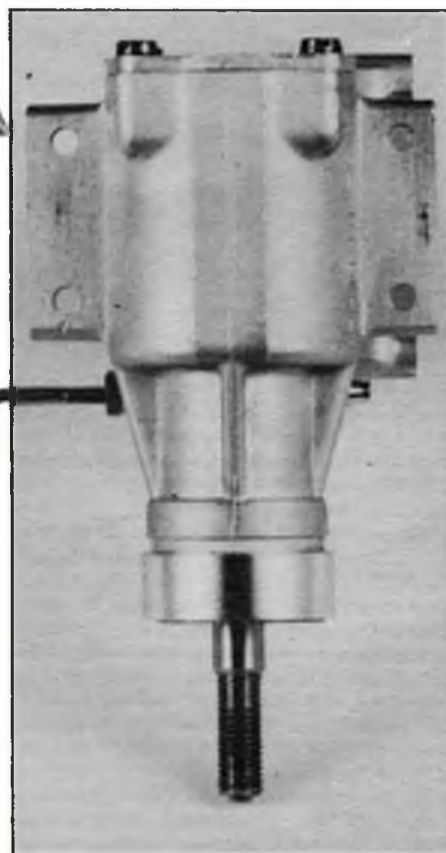
Test 1: Open Exhaust: 5% nitro methane; 20% castor oil; *Super Tigre* long reach plug.

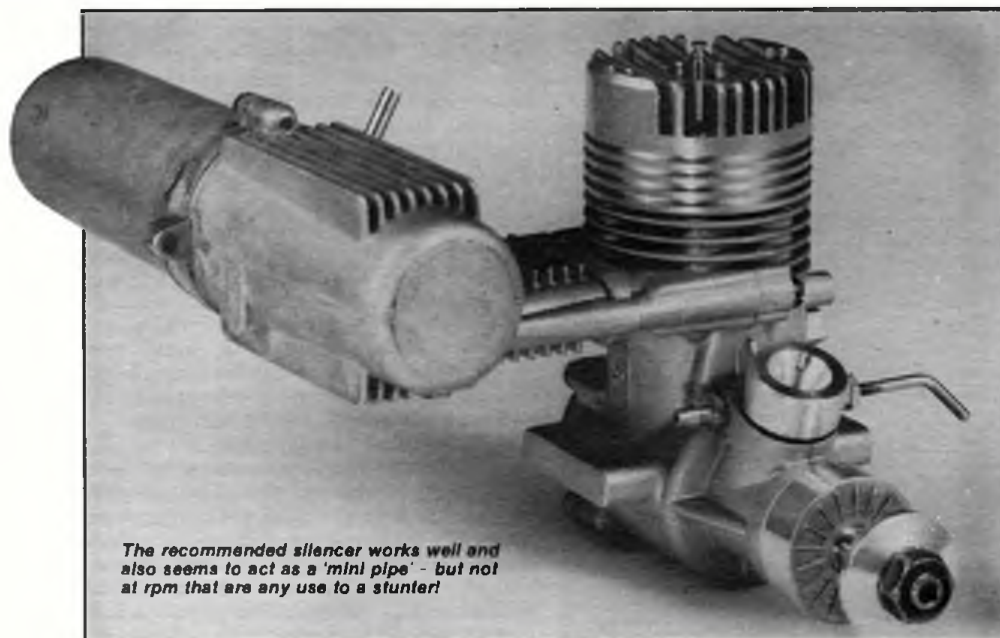
These torque figures were measured from 9,000 to 24,000 rpm and revealed maximum bhp of 1.00 precisely at 15,130 rpm. Rather unusually that peak was followed by a slow decline in bhp until 22,000 rpm was passed, due to a slight recovery in rate of torque decline past 17,000 rpm. Similar patterns of operational behaviour have been noted on a few other two-strokes, though as yet no common factor has been pinned down as accounting for it.

Test 2: Standard silencer: fuel and plug as Test 1.

In this format, rpm and torque figures were repressed as expected. Not anticipated however, was the marked torque recovery between 14,000 and 17,000 rpm. On double checking, and re-run of tests in this area - plus reference to the propeller rpm figures - it was clear that the silencer itself was causing a boost in power in the 15,000 to 17,000 rpm area - in similar fashion to a minipipe effect. The approximate length from piston face to end of silencer is 6 1/2 ins., which would lead to acoustic resonance around these rpm.

Unfortunately this has virtually no relevance to any stunt pilot, because the standard propellers likely to be used (around





The recommended silencer works well and also seems to act as a 'mini pipe' - but not at rpm that are any use to a stunter!

unexpectedly low - and probably serves to prove that two-strokes are not at all efficient unless they are two-stroking. The figures suggest that the degree of 'under-use' a stunt engine gets is considerable, with at most one third of the potential maximum power being used as it cruises rich around the control line circle.

Summary

The 'Como 51' is built to *Super Tigre's* customary high standards - so, for stunt use this must mean exceedingly long life, given the cool rich running prevalent in this class.

It also proved attractively flexible on the dynamometer at least and should give a good account itself in its chosen sector. Whether however, its own virtues will allow it to supplant the much favoured older style cross-flow engines is not, fortunately, a subject for this test report.

Como 51 Schnuerle Stunt Dimensions & Weights

Capacity	- 507 cu.in. (8.32 cc.)
Bore	- 906 in. (23mm. nominal)
Stroke	- 7873 in. (20mm. nominal)
Stroke/Bore ratio	- 87/1
Timing Periods	- Exhaust - 156°
	- Transfer - 126°
	- Boost - 120°
	- Induction Opens 32° ABDC
	& Closes 48° ATDC for Total 196°
Combustion volume	- 84 cc
Squish clearance	- .005 in.
Squish band width	- .178 in.
Squish band angle	- 0° for outer 1mm ring, then 3° balance
Compression ratios	- Effective - 7.76/1
	- Geometric - 10.9/1
Carburettor bore	- 4.45 mm.
Crankshaft main diameter	- 5898 (15 mm. nominal)
Crankshaft minor diameter	- 275 in. (7 mm. nominal)
Crank nose thread	- .247 in. x 28 TPI (1/4 UNF)
Crank bore	- .386 in. (9.8 mm.)
Gudgeon pin diameter	- .197 in. (5mm. nominal)
Crankpin diameter	- .237 in. (6 mm. nominal)
Connecting rod centres	- 34 mm.
Height	- 3.54 in. (90 mm. nominal)
Width	- 2.14 in. (54.3 mm.)
Length	- 2.90 in.
Frontal area	- 5.46 sq. in.
Overall weight	- 11 1/4 ozs. (less silencer)
	Silencer - 3 1/2 ozs.

Performance

Maximum BHP	1.00 at 15,130 RPM (Open Exhaust/5% Nitro.)
	.96 at 16,650 RPM (Silencer 5% Nitro.)
Maximum Torque:	83 oz. ins. at 9,093 RPM (Open Ex/5% Nitro.)
	74 oz. ins. at 7,600 RPM (Silencer/5% Nitro.)
RPM on Standard propellers:	Open Ex Silencer
13 x 6 Toplite M	8,912 8,387
12 x 8 Graupner	9,629 9,196
10 x 8 Ripmax Beech	11,520 10,680
10 x 6 Robbe Dynamic	12,820 11,730
10 x 6 Tornado Nylon	14,140 12,730
10 x 4 Taipan	15,300 14,710
9 x 6 Master	15,310 14,600
9 x 4 Zinger	17,230 16,720

Performance Equivalents

BHP/Cu. in. - 1.97
 BHP/cc. - 12
 Oz. in./cu. in. - 163
 Oz. in./cc. - 9.97
 Gm. metre/cc. - 7.12
 BHP/lb. - 1.42
 BHP/Kilo - 3.13
 BHP/sq. in. frontal area - .18

Manufacturer:

Super Tigre SRL
 Bologna,
 Italy.

U.K. Distributor:

Tigre Engines,
 Unit 10,
 Paramount Ind Est.,
 Sandown Road,
 Watford
 WD2 4NV.

11 x 6, 12 x 6) will be well short of this rpm point in flight - even at maximum rpm - let alone when running in the over-rich mode. So the finding is quite academic, though could be of potential use if harnessed at lower rpm points.

Test 3: Standard silencer: fuel as Test 1. Both previous tests were of torque and rpm with fuel mixtures optimised for maximum power. As discussed earlier, this mode of operation is rarely used in C/L stunt, except possibly for the brief moments as the model climbs vertically and the motor then 'leans out'. Therefore as some sort of bench-mark against which to compare future test results, a set of torque figures was arrived at here, with fuel air mixtures set rich.

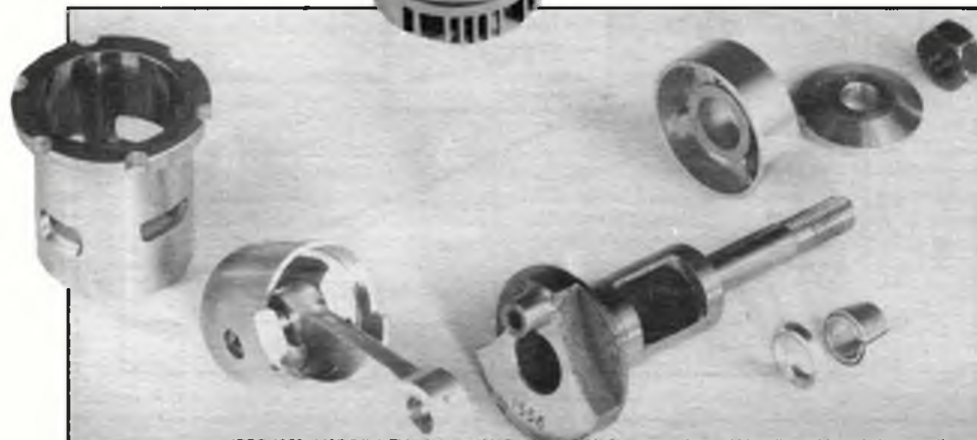
Actual four-stroking during this 'low-power' test proved difficult to identify audibly; 'ragged' running was more the sound, and so final needle settings were

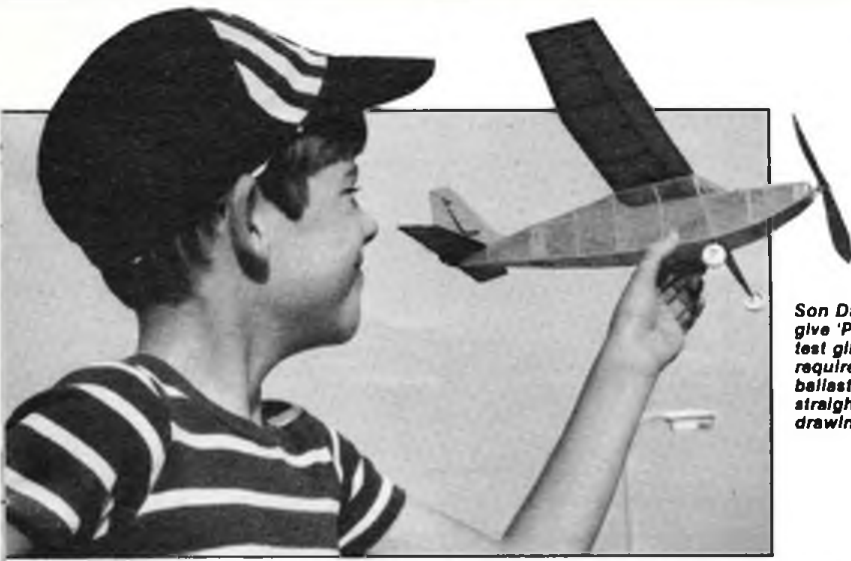
pitched some half-way between the position where the motor's clear desire to accelerate away into a clean two-stroke and the even richer setting leading to a certain slowing down to complete stoppage. Stable four-stroking was in any case more difficult to maintain with the following plugs: *Fox L/R*; *Taylor L/R*; *OPS 'Special'*; *OPS 300* and *S.T. L/R*. Fortunately a fair improvement followed the fitting of an OS four-stroke plug (it figures!), which clearly maintained its heat more effectively under the impact of the excess fuel cooling. Moreover, maximum rpm's on 12 x 6 and 13 x 6 propellers were maintained in spite of the use of this seemingly 'over-hot' plug for flat-out running.

The rich running torque tests covered rpm from 4,400 to 11,000. Going higher in rpm was, in the event, pointless - as torque was declining at an alarming rate. The final brake horse power result was, to this writer,



Left and below, once disassembled the Como 51 discloses well machined and finished components suggesting a long and reliable life when installed in a stunt model.





Son David, about to give 'Placid' its first test glide, model required no extra ballast and flew straight 'off the drawing board'

PLACID

Build this simple, 17½ inch span model for rubber power – by Richard Preston

'Placid' was designed to be an attractive one piece cabin model using traditional construction methods for strength and lightness. The pleasing lines come from giving the model a modern swept back look and a combination of curves that blend the straight lines of the flying surfaces into the fuselage. All very poetic but it has produced a model that is very pleasing to look at when flying. The one piece structure does away with the weight adding wing dowels and rubber bands and the model is light enough to bounce without harm. However, being 'one piece' the final assembly instructions should be followed carefully to ensure that it goes together with ease.

Construction

After having greased the plan with soap or candlewax to prevent the cement sticking to it, start by building one side of the fuselage directly over the plan as follows:-
Fuselage: Pin out the upper and lower longerons in position and then cement all the vertical spacers, rubber motor support, nose side sheeting and fillets. When this is

dry, build the other fuselage side directly over the top of the first side and leave to dry. Before removing both sides from the plan check that the wing and tailplane seatings are at the correct incidence.

Carefully remove the two sides from the plan as one unit and then separate by running a sharp blade down between the sides. Trim off any excess blobs of cement and check that all the vertical spacers are secure. Cement the 1/16in square cross braces to formers F3 and F4 and then cement these formers into position on one fuselage side making sure that they are positioned vertically. Cement the other fuselage side on the formers F3 and F4 and leave to dry, a quick eyeball check should be made to ensure that the fuselage is square and that the sides are both lined up in relation to each other.

Pull the nose section together and cement former F1 into position making sure that the built-in down thrust angle is retained. Pull the tail end section together and cement. When the basic fuselage cage is dry, the nose top decking formers F2 and the instrument panel should be added followed by the nose top decking. Cement all the fuselage cross braces into position. The undercarriage can now be cemented into position on former F3, additional security can be achieved by binding the wire to the former or smearing it with a small amount of epoxy glue. Carve the nose block to follow the contour of the existing nose section and then cement former F1A into position. Carefully ease the nylon nose plug into the nose block and then make up the propellor and shaft assembly.

Wing: Build each section of the wing separately, directly over the plan. Start by positioning the lower main spar, trailing edge and wing tip over the plan, cement all the wing ribs into position making sure that the inboard rib is angled inwards using the dihedral template. Cement the upper main spar and leading edge into position and allow to dry.

Remove the wing section from the plan and build the opposite wing using the same method. Build the centre section directly over the plan making sure that the dihedral brace is correctly positioned. When all three wing sections are dry, cement the wing panels to the centre section making sure that they both have an equal amount of dihedral. Remove any surplus cement, then sand leading edge and trailing edge to shape.

Tailplane and fin: construction is straightforward, build both items directly over the plan making sure that they are warp free. Remove both items from plan and sand the leading and trailing edges to shape.

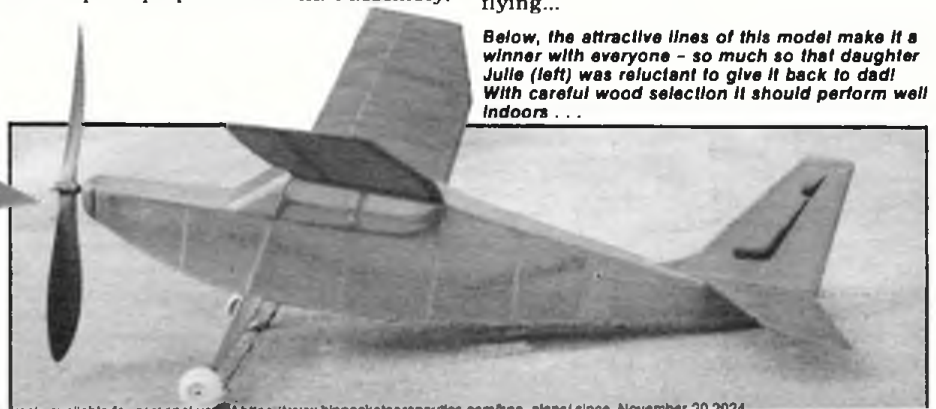
Final steps: Cover the whole structure with lightweight tissue using which ever method that you prefer. Water shrink the tissue and when dry, check that no warps exist. Dope the fuselage with slightly thinned dope and the flying surfaces with a 60/40 dope/thinners mixture. When dry, check again that no warps exist and remove if necessary. Cement the tailplane into position followed by the fin, ensuring that they are both *square* to the fuselage. Cement the wings into position, again making sure that they are *square* and have equal dihedral when viewed from the front. Carefully cement the windscreen into position round the cabin area.

Flying

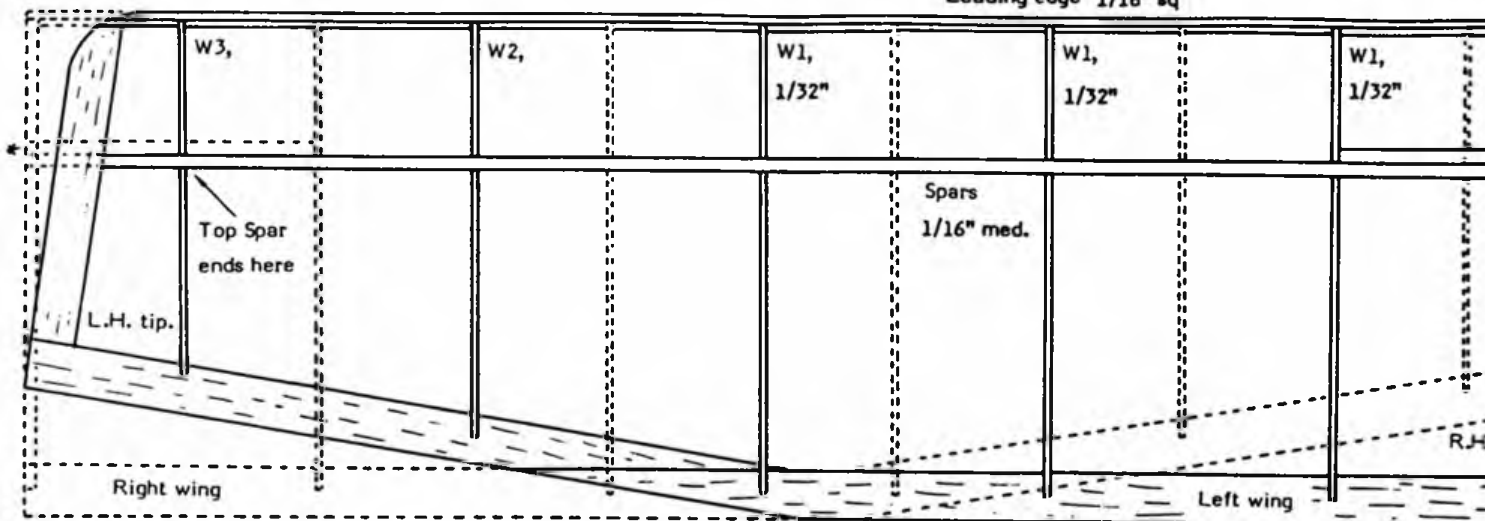
Make up a motor of 3/16in flat rubber and well lubricate before installing in the fuselage (Check that the model balances in the position as shown on the drawing). Test glide over grass to obtain a nice flat glide, a small adhesive tape trim tab can be added to the tailplane trailing edge if necessary. When a satisfactory glide has been obtained the initial powered flights can now take place. Wind on about 100 turns and launch into wind, closely observing the flight pattern. If the model stalls under power then add a thin piece of packing behind the top of the nose block to increase the downthrust angle. If the model turns sharply to the left under power then add a thin piece of packing behind the left hand side of the nose block to give some right thrust. Make these adjustments in small increments until a good steady climbing turn to the right is achieved. Gradually increase the number of turns up to a maximum of 500, preferably using the stretch winding method.

The model has proved to be very stable and extremely forgiving, even when launched by a 'non-modeller' and, as stated at the beginning, it looks great when flying...

Below, the attractive lines of this model make it a winner with everyone – so much so that daughter Julie (left) was reluctant to give it back to dad! With careful wood selection it should perform well indoors...



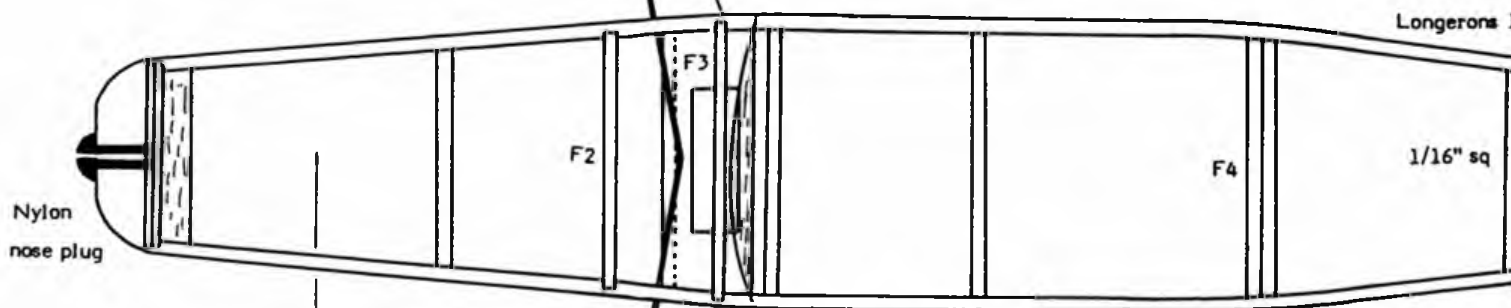
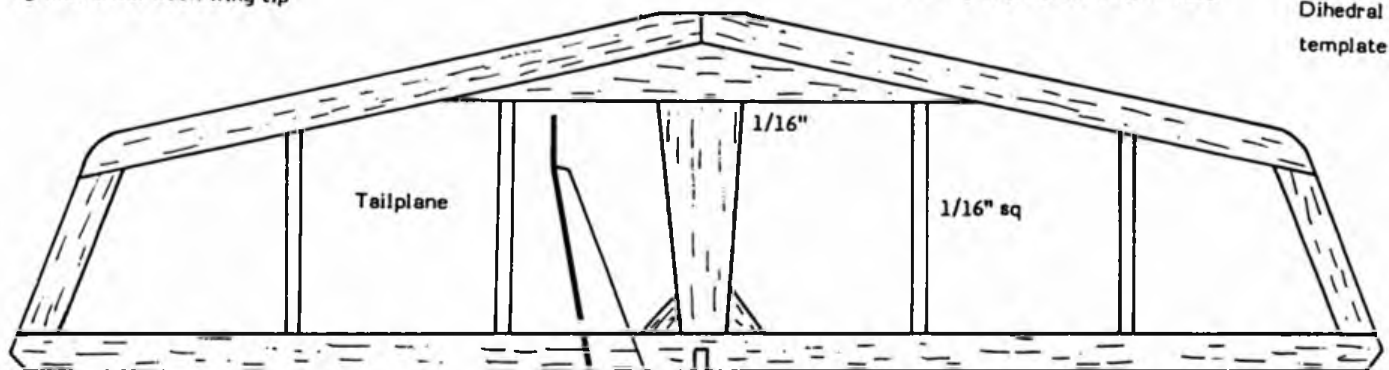
Leading edge 1/16" sq



1 1/2 inch under each wing tip

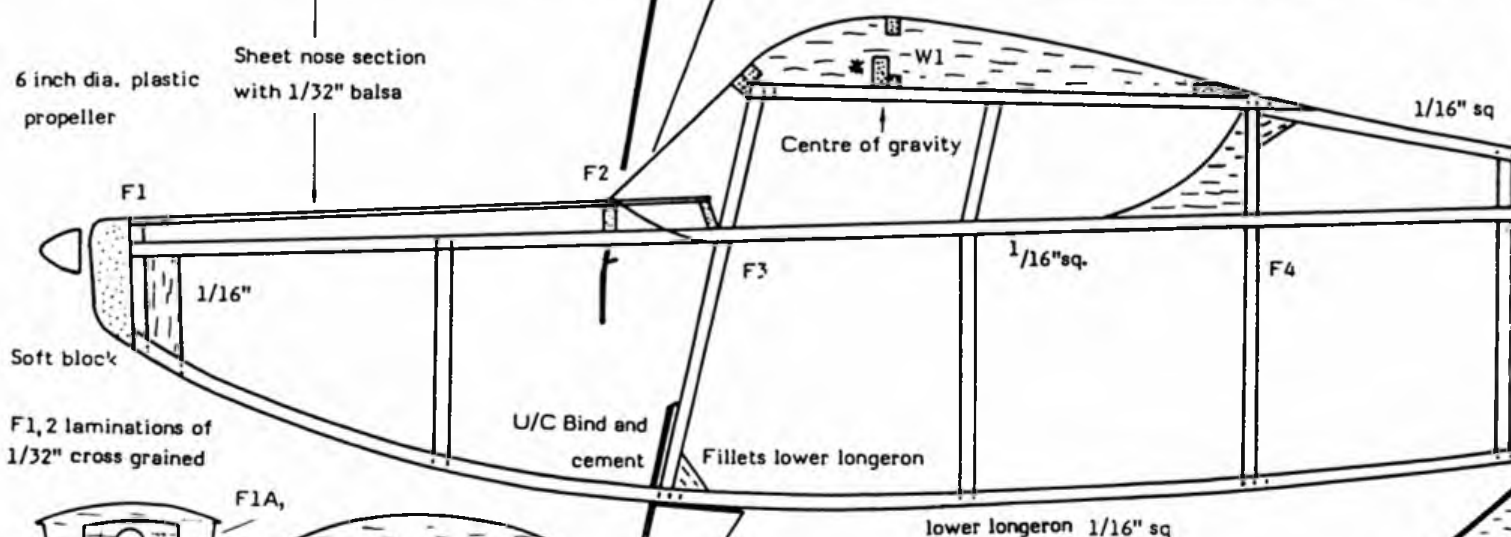
Trailing edge 1/16" x 1/4" med

Dihedral template

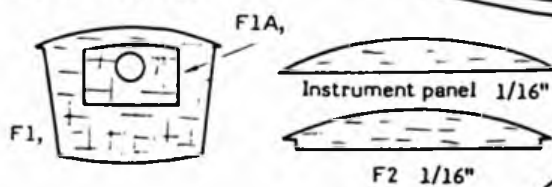


6 inch dia. plastic propeller

Sheet nose section with 1/32" balsa



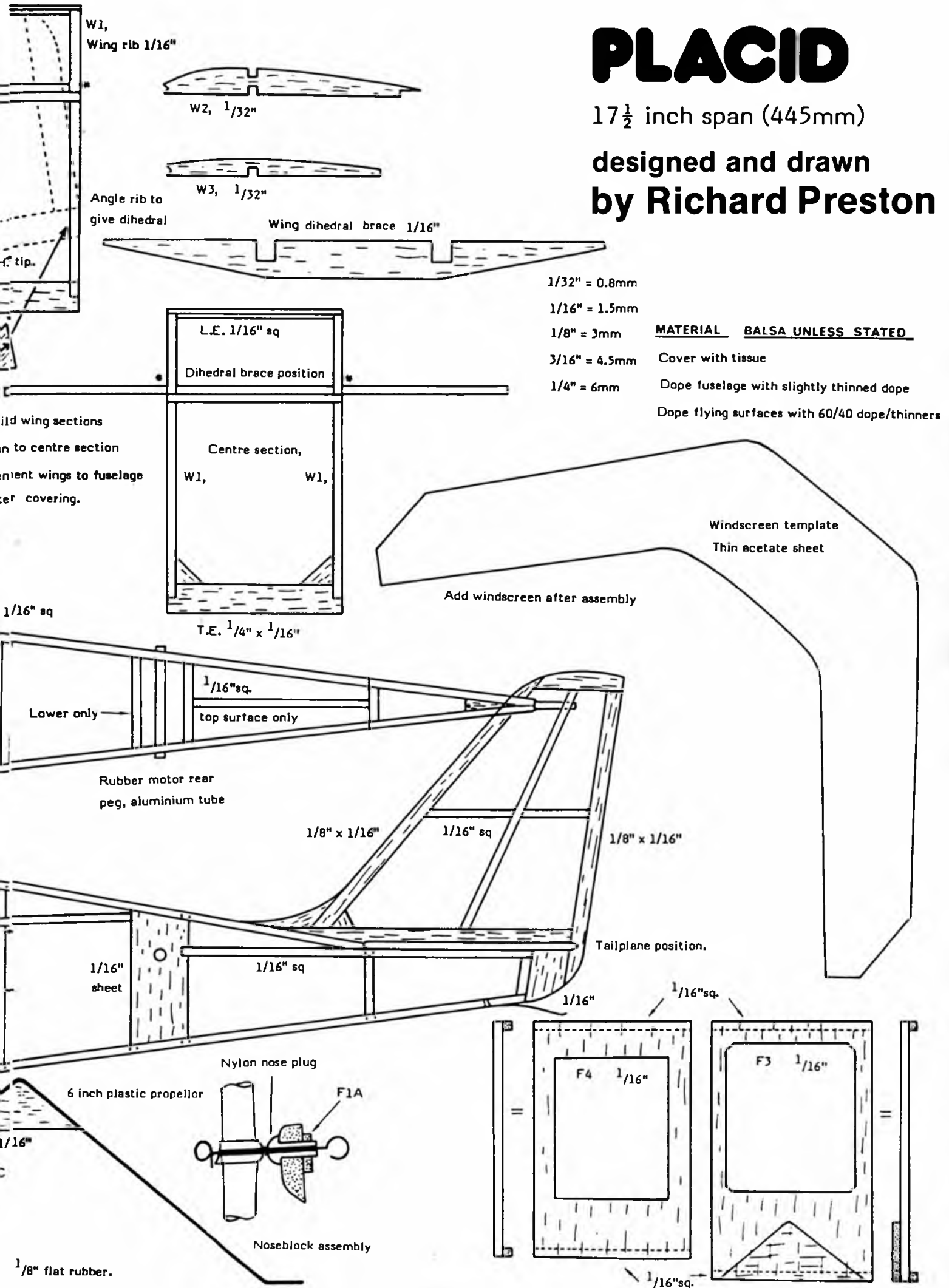
F1,2 laminations of 1/32" cross grained



PLACID

17½ inch span (445mm)

designed and drawn
by Richard Preston





Maurice Wharekawa tuning up prior to flying this magnificent example of 'New Ruler' in Vintage Gas.



Free Flight

Free Flight is very strong in New Zealand at the moment, spearheaded by the Free Flight Auckland Region Team (FFART!). The standard of flying, particularly in the FAI events is very high and produced some good contests. Technology is well up to overseas standards, with most hardware being produced locally by modellers. In F1A Rod Lewis set a new NZ record of 1260+240+300+221. Top three models in F1A

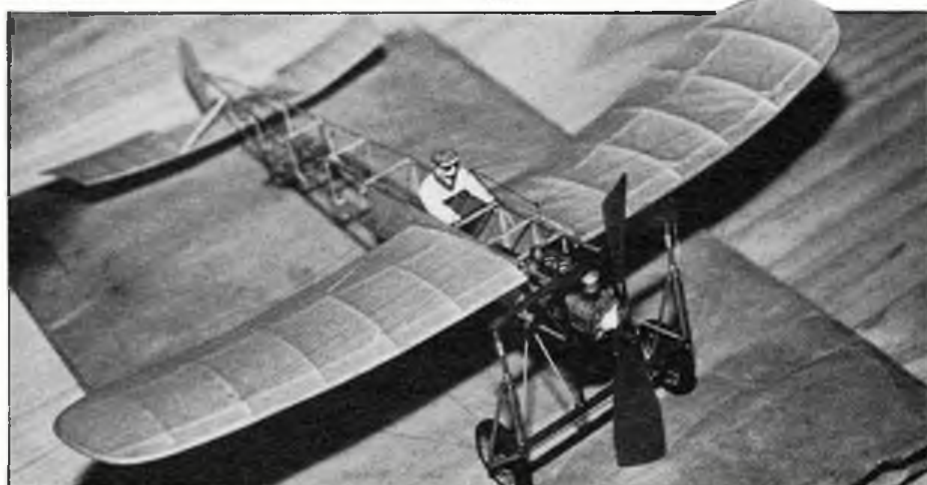
37th New Zealand NATIONALS

Stephen Williams, Aeromodeller's tame Kiwi, brings you the highlights of the latest N.Z. Nats.

HELD AT CARTERTON in the heart of the Wairarapa in the week 28th December through 3rd January 1985, the 37th Nationals were blessed with perfect weather, and this combined with an excellent venue made for a memorable meeting. The indoor and control-line sites are actually part of the camp-site, whilst the Radio and Free-flight sites are just a few miles up the road.

An innovation this year was the use of a computer (BBC Model B) for result processing, using software written by two modellers.

Right, Martin Baker MB5 by Kim Webby - started life as a stunter but is now flying in class 2 (stand-off) control line scale. Below, 1911 Cessna, Peanut Scale by Dennis Tristram, put in flights of around 50 secs. Was last years winner but only managed 5th this time.



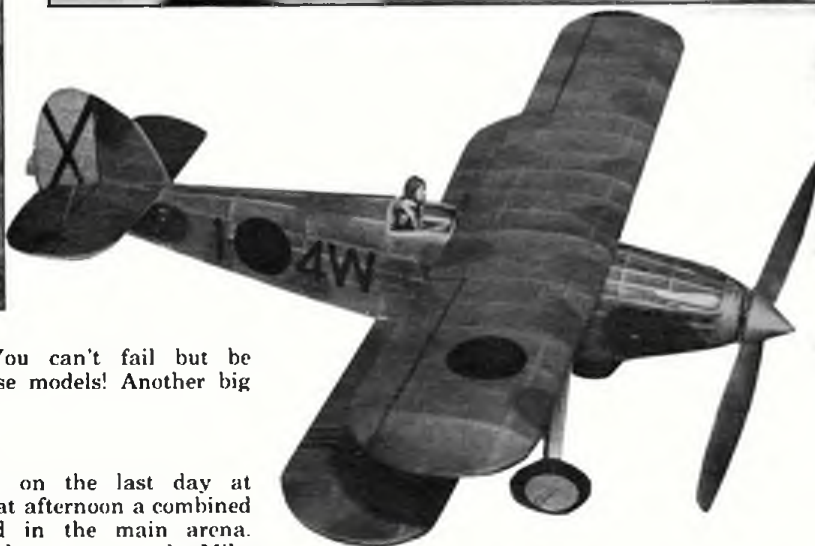
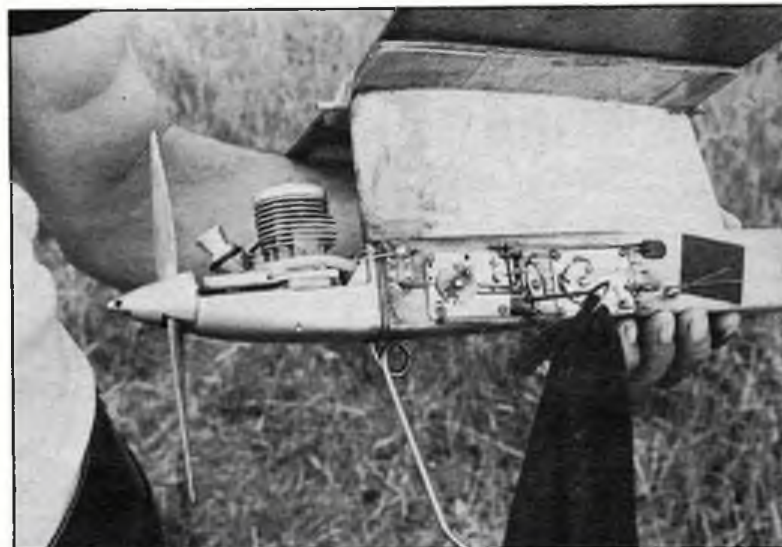
all used circle tow/zoom launch. Rod also won Open Power and Hand-launch glider.

Control line

Control-line was at a very low ebb this year with a combination of low entries and a low standard of flying. Combat was something of a joke with most bouts consisting of solo runs, a result of inexperienced flyers attempting to run very quick glow-powered models without enough preparation. Speed was worse, most classes barely had three entries who actually flew!. FAI team race is usually the premier C/L event with a number of teams of world class but a combination of circumstances resulted

Below, Glenn Stewart releases Dick Willard's pulse jet speed model - did its best flight at 12.01 a.m. on New Years Day! Note ear defenders and skid take off...

Right, 'poor mans Seelig' on Ian Weston's power model. Below right, close up Dave Ackery's F1A glider showing circle tow/zoom towhook, produced locally by Rob Peters. Below, Rod Lewis (left) and Rex Bain (right) in Open Power. Both models are 'Hi-Fi', in Rods case scaled down to 78% (linear).



Above, this year's winner in Peanut Scale - Hawker 'Fury' built by John Poletti.

in six (!) models being written off during the heats which made for an anti-climatic final won by the Elder/Low team from the South Island. Aerobatics made a welcome change from the other C/L events with all entries flying well and putting on a good show for the public.

Radio

Radio modellers make up 80% of the NZMAA membership, but entries in Radio made up only 15% of the total. Best supported class was Thermal A (NZ rules) with over 40, quite a beautiful site to see the sky literally full of thermalling gliders.

Scale

Favourite with the crowds was Peanut Scale and it was nice to see a "real" scale model winning it instead of an 'Ajax' look-alike. John Poletti's winning model, a Hawker 'Fury' finished in Spanish civil war markings, captured first place in both flying and static categories. An innovation this year was the flying of free-flight scale in the late evening in the main camp-site arena. Radio scale this year had two classes; F4C

and "biggies". You can't fail but be impressed by these models! Another big crowd-puller.

The Display

Flying finished on the last day at lunchtime, and that afternoon a combined display was held in the main arena. Organised and with commentary by Mike Lynch, this was a real success marred slightly by a few showers of rain.

Prizegiving

Overall champion was Rod Lewis of the Roskill club, Junior champion was Paul Noble-Campbell and champion club was Wellington (yet again!).

This year all the Nats results were collated using this BBC Computer set up. Those interested in aeromodelling computer applications please write to Stephen Williams c/o Aeromodeller.



MINI MAGNET



If you have any sort of local slope. build this lightweight magnet steered glider by Peter Dolby.

Magnet Steered Gliders (FIE)

I am sure many readers will have heard of Magnet Steered Gliders even if never having seen an actual model, but for those who are not so familiar with the class here is a brief outline of some of the main aspects. Magnet models are free flight gliders flown from hillsides facing into wind and like hang gliders rely on lift created by the hill to maintain the flight. As the name implies a steering unit, using a bar magnet is employed to correct any in-flight deviations from a straight into wind flight path.

The unit in principle is quite simple, a bar magnet is pivoted to act like the needle of a

compass. This is mounted in the nose of the model directly under a fixed front fin, the magnet will naturally seek a north/south alignment, so with the model held in the direction it is intended to fly, the steering rudder is fitted to the magnet, in a neutral position, thus if the model is moved away from this line, the magnet will seek north turning the rudder for in-flight correction.

The torque produced by this action is very small, but is sufficient, providing bearing friction is kept to a minimum. This ability to self-steer keeps the model on its flight path into wind; so the art of magnet flying becomes one of pre-setting the flying speed,

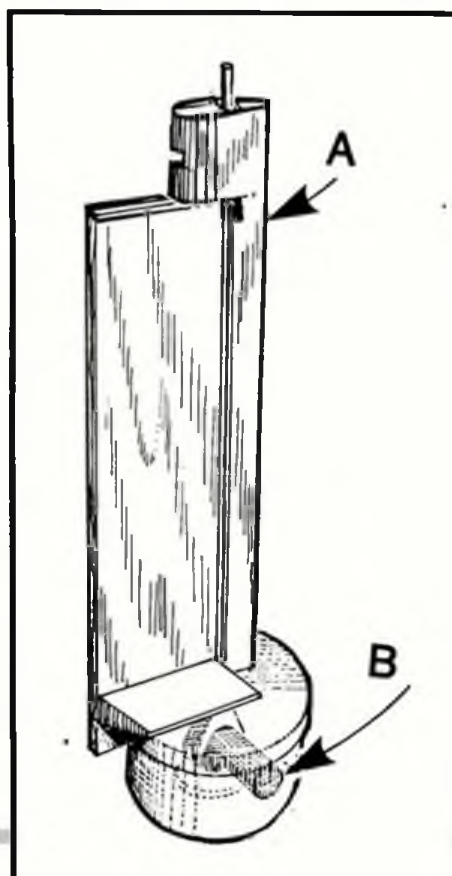
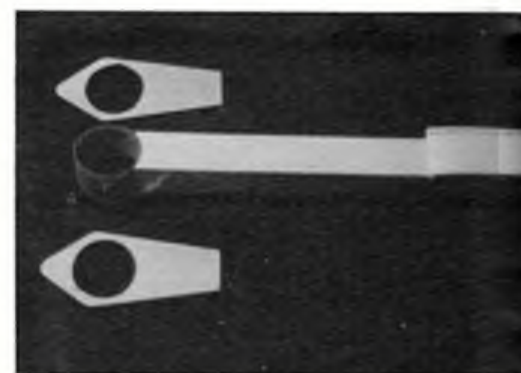
on calm days, when its performance could be more easily assessed. The models construction is quite simple and not too far removed from normal free flight practice, the only thing which warrants special attention are fin alignments and keeping the flying surfaces as warp free as possible.

The magnet unit as drawn is one produced in Germany but available from Trevor Faulkner, it is supplied complete with front fin and rudder and simply requires fitting to the model.

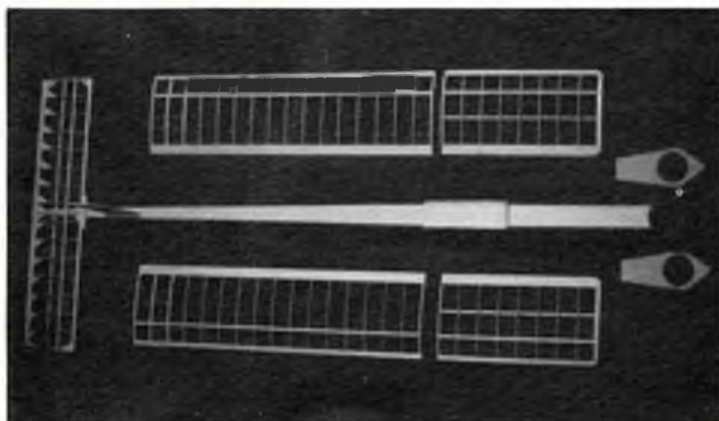
Covering is entirely lightweight *Modelspan* for wing, tail and most of the fuselage with just the area of the front pod covering in heavyweight *Modelspan*.

A fuse dethermaliser was used on the original model mainly to save weight, but the fuselage will easily accept a clockwork timer if preferred. Just a reminder to anyone using fuse, many hillsides are high fire risk areas in summer so *always* fit a reliable snuffer tube, better safe, etc...

Initial flights were made in about 5 m.p.h. winds after first establishing a flat glide over level ground. Early flights from the slope indicated that the model was more susceptible to ground level turbulence than its larger counterparts, and was easily thrown off line, this proved to be no real problem as the steering unit is effective enough to quickly correct this. The weaving pattern is reduced as smoother air is encountered as the model gains height.



Left, sketch showing the magnet/steering fin unit 'Rudder' 'A' is connected to magnet 'B' and is free to turn as the magnet turns. Above right, the components for the steering unit housing. Right, Mini-Magnet almost ready for covering, showing ultra simple structure.



i.e. by adding ballast and generally trimming to match the wind speed on the day and so keep the model within the narrow band of lift on the hillside.

Mini Magnet

'Mini' was built out of a desire for change, I have been flying magnet steered gliders for some years, and although FAI rules impose few restrictions on the design and size of models, the norm has tended to be of A 2 or larger areas. The potential of such a small model was a little unknown, so it was decided to make it as light as possible for use

To conclude, 'Mini Magnet' flying proved to be great fun for a minimum outlay, much was learned about small model performance, which was far better than expected. No great changes of layout are being considered for the next model except perhaps a heavier version to cope with higher wind speeds. The major disadvantage which emerged for a model of this size was one of visibility on the ground, much of the areas where I fly are covered in bracken and the model was on several occasions only found after a lot of searching, the next model will be most

Aeromodeller



Peter's son Lee with completed model ready for flight testing in the local hills around Sheffield.



Above, steering unit out of its plastic 'pill box' showing the chunky bar magnet that does all the work. Left, steering unit installed in model, note unit may be removed for installation in second (third?) model.

certainly fitted with a buzzer!

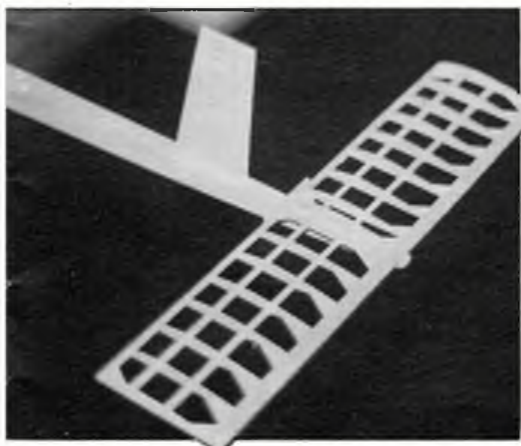
The small steering unit described and other larger units are obtainable from: Trevor Faulkner, 5 Birchitt Close, Bradway, Sheffield.

Construction

The wing construction is pretty straightforward, built over the plan in the usual way. The front of the trailing edge is packed up with balsa strip (greased with candle wax) to suit the undercamber. I use P.V.A. adhesive on most of the model, mainly because of the stresses incurred with shrinkage when using solvent types.

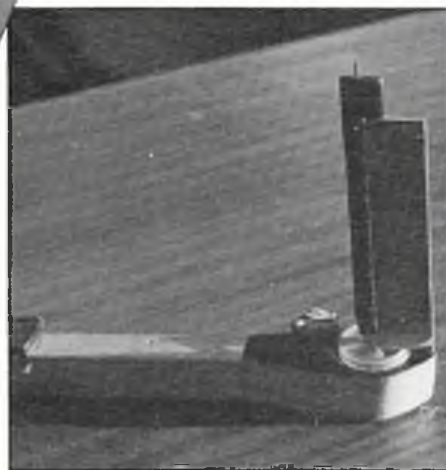
I produce wing and tail ribs by cutting round a slightly oversize blank template made from 1/16 in. ply, the blanks are then sandwiched together with finished size metal templates either side, the whole lot

Below, rear end of 'Mini' with 'sensible' tough construction of the tailplane - do not omit the gussets!



sanded to finished size and spar slots cut in. Just a small point, but I often find that wood density alters across the width of a sheet so I cut ribs from what I consider to be the 'stiffer edge' first, these are then numbered in pairs, (in the order they are cut W1, W2, etc.) and kept in numerical order, through to the finished stage. (W1's to wing centre).

On completion of the tailplane and the four wing panels, cover with lightweight *Modelspan* and apply three coats of 50% dope, 50% thinners pinning down to the board between coats and leave pinned for as

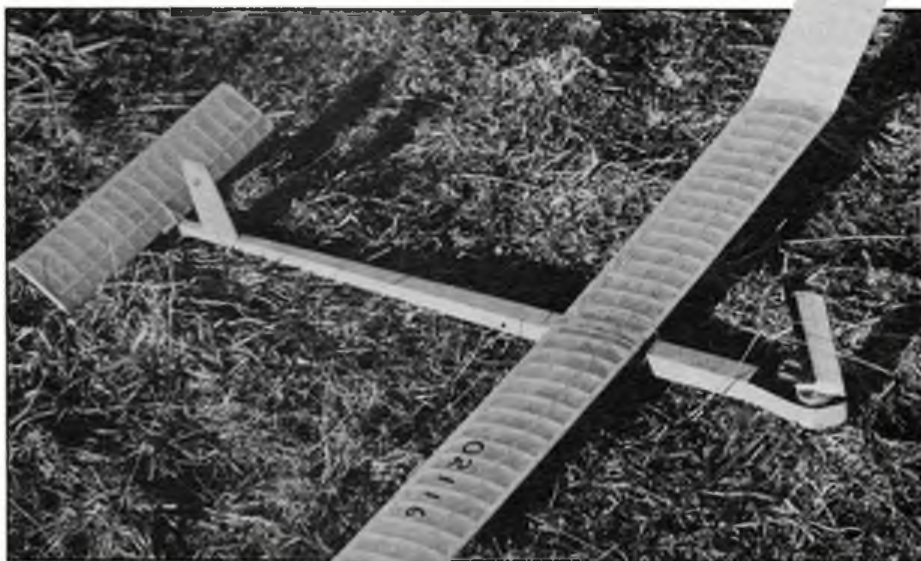


long as possible before epoxying wing tips to inner panels.

The fuselage sides are cut from medium 1/32in. sheet and the 3/32in. x 3/32in. strips glued to the top and bottom edges. The 1/16in. formers cut from hard 1/16in. sheet with the grain *horizontal* are fitted, between the two sides. These will keep the fuselage square in section but special attention should be paid to keep it as *straight* as possible before adding top and bottom sheeting.

The tube which holds the magnet unit housing is made by rolling a strip of 1/64in. plywood around the plastic housing of the unit with a slight overlap, it is then glued and lightly held with rubber bands until set, this gives a reasonable fit and makes it easy to remove the unit for use on other models. The fuselage is also covered in lightweight *Modelspan*, except for the pod area at the

The finished model is functional rather than beautiful, note the tailplane is in the dethermalised position do not forget the d/t...this model can GO...



front, (this is covered in heavyweight *Modelspan*) and given three or four coats of 50/50 dope, thinners.

When the whole model is completed and before dashing off to the slope...some time should be given to checking the C.G. position. The balance point on magnet models is open somewhat to experiment, to suit various conditions, but it is as well to establish a starting point! The original was initially set up at 50% chord but later moved to 60% after trials. Also check your dethermaliser to make sure it is foolproof and properly extinguishes in the snuffer.

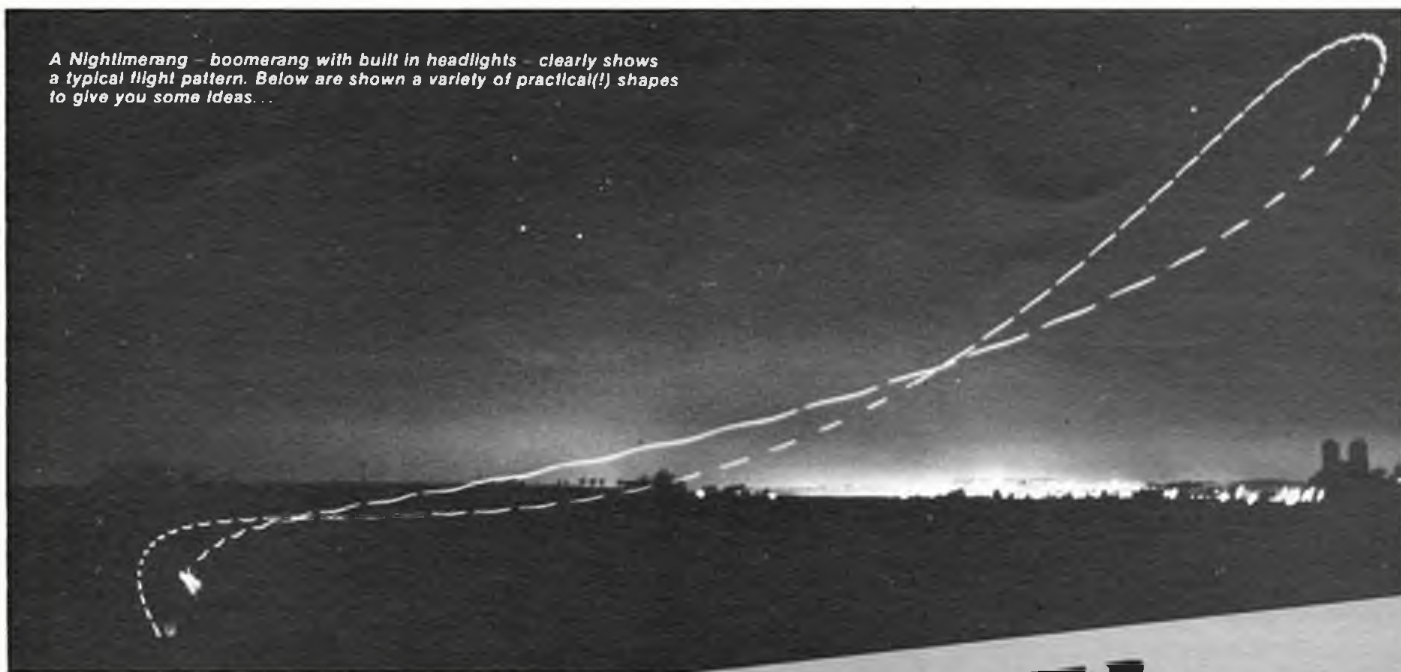
I always fit dethermaliser lines externally, because of personal experience during competitions (they also break during the last rounds of competition... Murphy's Law).

Trimming

Choose a calm day for trimming over level ground to establish the flattest glide possible by adjustment of tailplane trailing edge packing, once this is established...off to the slope. I often find it is safer to start initial flight trails at the bottom of the hill and gradually work upwards, flying on short dethermalisation and making mental notes of the adjustment made.

In conclusion Mini Magnet proved to be simplicity itself in construction and flying has been great fun on those calm summer evenings, why not give magnet a try in '85...but be warned it is *addictive*.

A Nightlimerang – boomerang with built in headlights – clearly shows a typical flight pattern. Below are shown a variety of practical(!) shapes to give you some ideas...



BOOMERANG!

Michael Hanson invites you to go walkabout with this practical approach to the boomerang!

I'VE ALWAYS BEEN INTERESTED in unusual flying machines and as a result hacked out my first boomerang some fifteen years ago. I took it out to a lonely field, had an idea of how it should be thrown, furtively glanced over my shoulder to be sure no-one was looking and gave it a hurl ... It's probably rotted away by now ...

I next tried adding aerodynamics and didn't lose my second one. Now I'm a little older and perhaps a little wiser but have never lost my wonder at what happens. Chuck away hard a piece of wood and in a few seconds have it hovering over your head ready to be caught, is pretty incredible.

The beautiful and subtly curved flight (above) is the result of an amalgam of aerodynamic lift and gyroscopic precession together with a few more abstract physical phenomena, but you don't have to understand to appreciate.

Boomerangs or boomerang like objects have been around for millenia and have been found in several locations dotted over the globe such as Western North America, India, Ethiopia, Holland, and even King Tut. had some snazzy gold tipped boomerangs hidden in his tomb.

Most of these boomerangs flew fairly straight and were used for hunting or fighting. However, the returning boomerang I deal with here is from the outback and it's worth remembering this very sophisticated flying machine was developed by primitive bushmen.



How do they work?? Well, more than a brief explanation makes your brain hurt. It's been said that 80% has been adequately explained but the remaining 20% is still a subject for discussion, argument or bafflement. Basically the boomerang is a bent helicopter's rotor. It is launched spinning in a near vertical plane...i.e. like this/, not like this -, when viewed from behind the thrower.

Off it goes heading towards the horizon. The upper arm in flight cuts through the air at a greater speed than the lower one. Thus more lift on the upper arm. Tending to tilt the boomerang over? No. Because it is spinning rapidly it acts as a gyroscope and precesses i.e. turns to the left (from a bird's eye view) and starts following a circle. Spinning in a near vertical plane won't give much of an upward lift component so due to another precession it 'lies down' i.e. transfers from spinning in a vertical plane to a horizontal one.

This compensates for a slowing down of the rate of rotation. After about 8 sec. it should end up with no translational motion but spinning over your head and if you're brave...drop into your hands. The rate of rotation is about 10r/s and it leaves the thrower at about 25 m/s on average.

A typical flight is a curved orbit that sends the boomerang 30 m. from the thrower. Mind you, that's a typical flight but some boomerangs can manage 40 sec. or more and the World distance record is 114m. there and 114m. back. With a circular orbit that makes about a 1/2 Km flight path, (for more details of flight theory see items 2,4,5,7,10 or 11 in the bibliography).

There are two types of returning boomerang - right handers and left handers. The anatomy of boomerangs is shown in Fig. 1. Both arms provide lift but

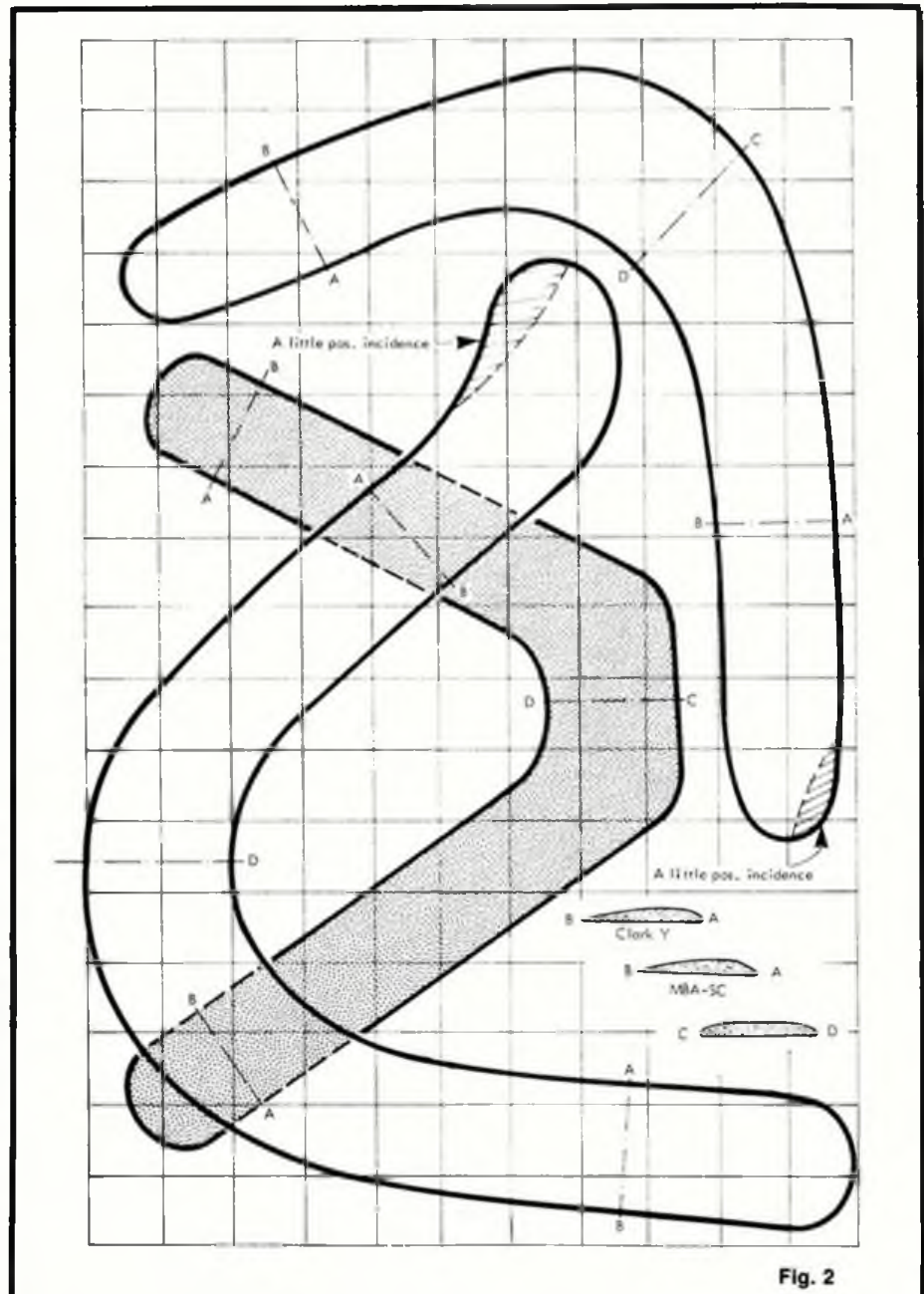
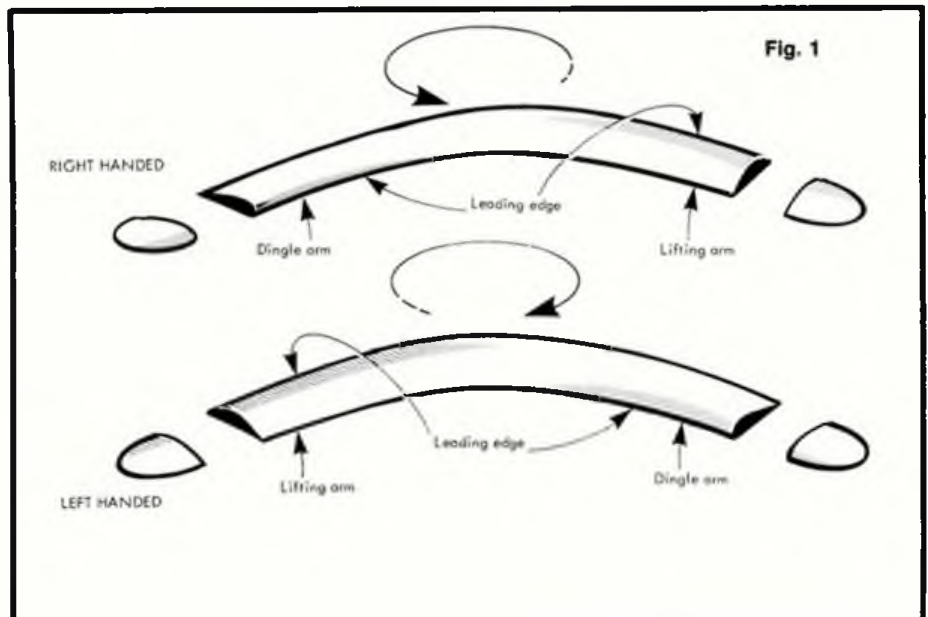


Fig. 2

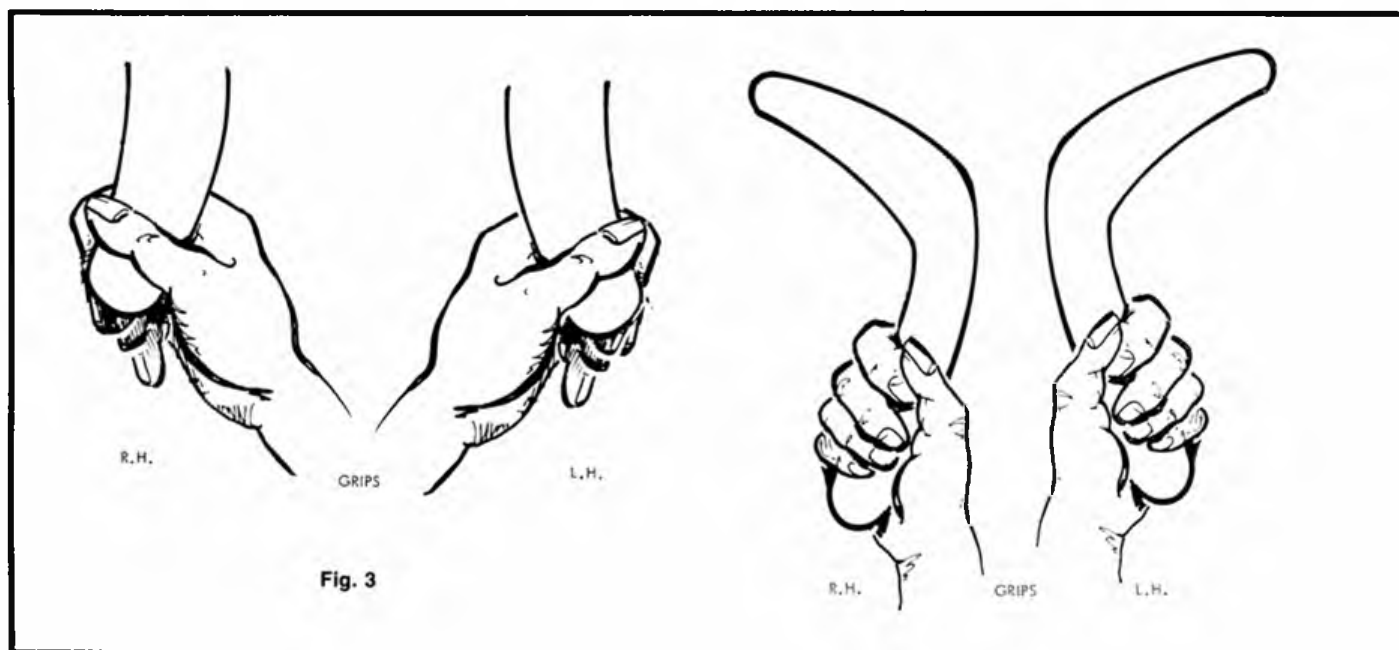


Fig. 3

the terms lifting arm and dingle arm are traditional. The R.H. version rotates anti-clockwise (viewed from the cambered surface) and the L.H. one clockwise. Note that the L.H. one is the mirror image of the R.H. one. If you happen to be cack-handed view the plans, not the writing (!) in a mirror. The plans are drawn for R.H. machines but the mirror image is a L.H. one.

A hotch-potch of aerodynamic lift, wake effects, gyroscopic precession etc. stirred in the right proportions and spread onto plywood make a boomerang boomerang. Use good birch 5 ply. It's expensive but the best. In this metric age 6 mm. is ideal. The planform shape isn't too important. Take care over the cross section though. The section used for boomerangs is by no means optimised but a Clark Y-ish or MBA-SC (Modern Boomerang Airfoil-Semi Crude) will do.

The squares in the drawing (Fig. 2) are 2.5 cm. (1 in to we traditionalists) and the sections are shown for a few positions. Most sheets of ply are non-planar so make the concave side the top (curved) surface of the boomerang. This results in a small amount of dihedral which is O.K.

Shape the underside first. This involves just a small amount of positive incidence on some (see fig. 2). When you've done that do the top. I use a coarse sanding disc in an electric drill. Others make do with a coarse file or spokeshave or *Surform*. Each to his own. Finish off with fine sandpaper. You should end up with something like in the picture opposite. When you've cut it, carved it, shaped it, filed it and sanded it don't finish it till you've tried it. (Got it?).

Anyone from 9 to 90 can hurl a boomerang provided reasonable co-ordination is there. You need a large field, free of obstructions and a calm day. Keep away from expensive or awkward objects such as cars, windows, people and trees. In fact one of the most powerful forces in the universe is that of an errant boomerang straining to implant itself in the most inaccessible branch of the most densely foliated nearby tree (H.L. Mayhew).

Firstly determine the direction of what wind there is, then rotate yourself so you are facing about 45° to the wind direction. (Fig.

4). Hold the tip of either arm (it doesn't matter which - choose the one that feels most comfortable) so that the flat surface of the boomerang faces your palm (fig. 3). Now you've got to launch it so that it leaves you spinning in a near vertical plane.

Don't launch it so it spins in a horizontal plane. You need a fairly vigorous throw with a snappy spin. A bit like a tennis serve but spin it too. If it runs out of steam and falls to the ground part way round the orbit, throw it harder or don't launch it quite so vertically. If it goes round too much and carries on past you then put less effort into the throw. If it soars way up high then you are probably launching it too horizontally. Vary the angles of launch (a, b and c in figs. 4, 5) till you're getting hurl perfect. The thrower is the target. All power to the elbow...

As I've said, virtually anyone can throw a boomerang well but to throw it consistently well, takes a bit of practice. The World record for consecutive catches stands at 653 by Rob Croll during the Australian National Championships. Catching is easy. As it hovers near you trap it between outstretched palms - make a boomerang sandwich (fig. 6). Although its translational motion won't be much it will still be spinning wildly so approach catching with caution.

Boomerang contests are now regularly held in the U.S.A., France, Holland, West Germany, England and Scotland and even Australia! The British Boomerang Society issues newsletters to enable local boomerangers to receive information and notification of the increasing number of boomerang events. Info. on the B.B.S. can be had by sending a s.a.e. to: B.B.S., 9 Bowood Drive, Wolverhampton, WV6 9AW.

Ply is not the only material that can be used for boomerangs. Aborigines used to select a curved branch or root so that the grain was always parallel to the edges. Glass fibre, aluminium sheet, plastics, even whale bone has been used. Perspex makes an almost invisible seethrumerang. Small torch bulbs and a small pencil can be embedded in the wood to make a nightimerang. (heading photo). The distance a boomerang goes before returning

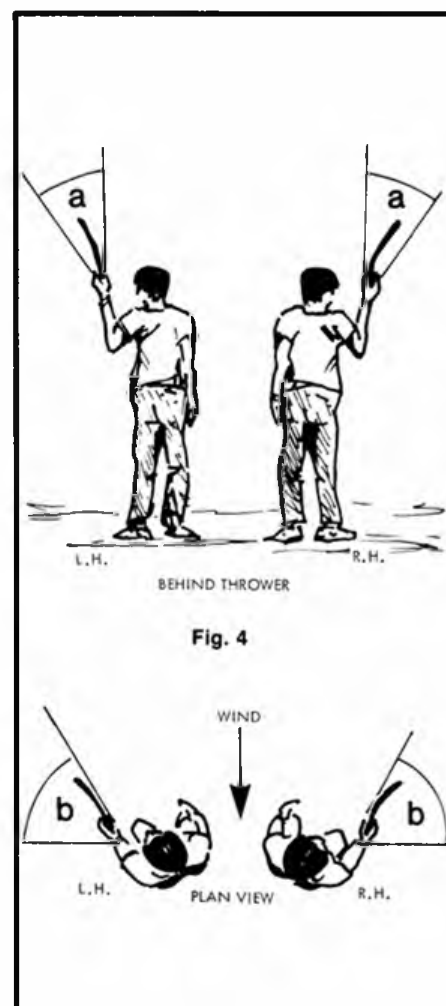
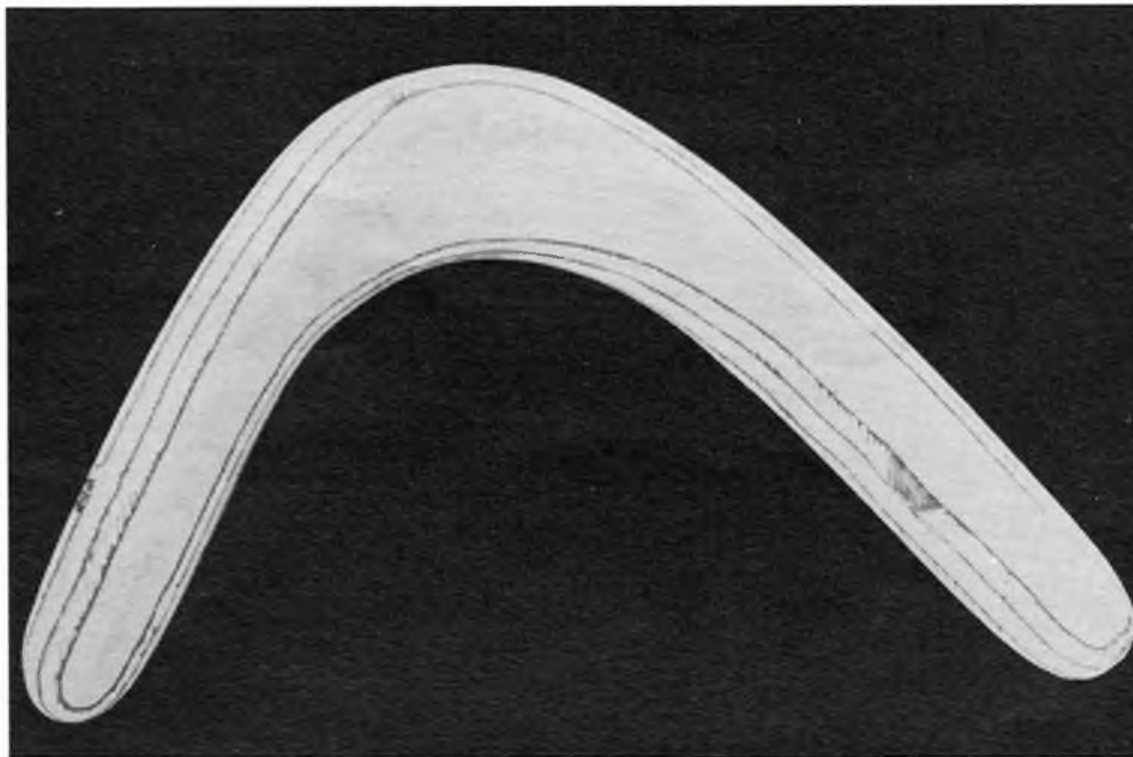


Fig. 4

can be increased by adding weights to the tips and sometimes elbow.

Some names of note in the boomerang world include:- Sir Lorin Hawed B.S.C., Ph.D. etc. who got fed up with being an atomic scientist in the U.S.A.. He went for a walkabout down under and opened a boomerang factory. He is president of the Mudgeeraba Creek Emu



Carving a boomerang from beech ply makes it very easy to see how the airfoil is built up - just study the laminations in this photo.

Racing and Boomerang Throwing Association.

Joe Timbery and a few others can catch boomerangs with their feet.

Len Stewart of Cupar, Fife can catch boomerangs one handed with ease.

The late Frank Donnellan could launch and catch boomerangs blindfolded. He used to knock an apple off his head with a returning boomerang à la William Tell, so too can Barnaby Ruhe.

Nick McAuliffe has managed 400 consecutive catches.

Mike Forrester of U.S.A. has had a

boomerang fly for 50.8 sec..

Adri van der Berge of Holland managed to get 14 boomerangs in the air before the first hit the ground.

Barney Ruhe of the U.S.A. has juggled with two boomerangs 161 times - without one touching the ground.

The following sell boomerangs to non-D.I.Y.ers:- Michael Hanson, British Boomerang Connection, P.O. Box 1, Cumnock, Ayrshire. - Send a s.a.e. and Davro Enterprises, 50, Salisbury Road, Walmer, Deal, Kent. - send a s.a.e. *May your returns be many and happy.*

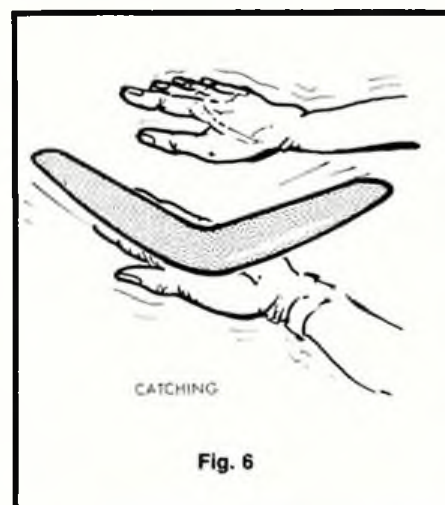


Fig. 6

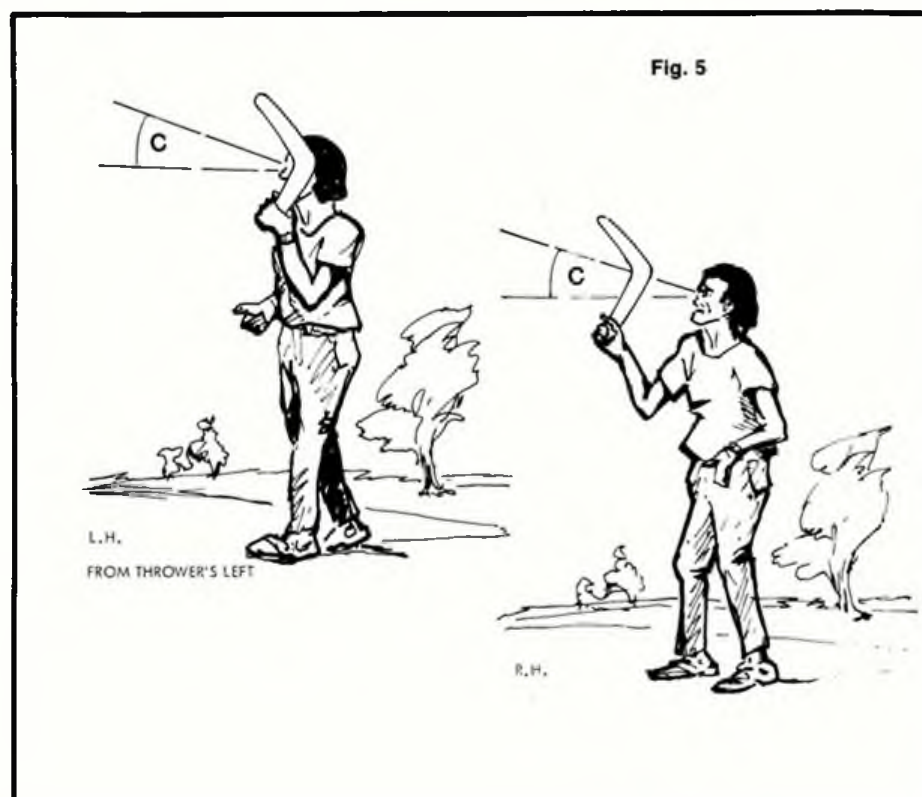


Fig. 5

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MIND THE LINES

with
Andy Brough

Into the future

I suppose with more and more column inches (not mm. you'll note) of your favourite magazine being taken up with vintage matters, many people may wonder what contribution the vintage movement makes to the furtherance of aeromodelling. None you say, it's all been done before, you can't turn the clock back. It's true you can't go back but you can take stock of where you are and where you are going.

What the vintage movement has done is almost to re-introduce aeromodelling bringing with it the traditional skills and materials and has persuaded modellers to get out of the rut they were in and into building models covering all aspects of aeromodelling. Many vintage enthusiasts build radio, free flight and now, increasingly, control line models.

Until recently it was looking as though control line modelling was becoming extinct, except for a few competition modellers, but now we have radio modellers building vintage stunters. This cross fertilization of interests can only be beneficial and help to break down the

VINTAGE CONTROL LINE

- 1.5 (DS type only) DC 'Sabre', ME 'Snipe', Frog 150, AM 15 (including the new ones) and JB 'Atom'.
- 2) Models may fly anticlockwise or clockwise.
- 4) 35ft lines made out of 0.015 in stranded wire, that is centre line of model to centre line of handle.

SAM 35 - Old Time Stunt Events

Object and Intent:

1. To perpetuate and preserve the model aircraft designs used during the era in which stunt flying was advancing from the early freestyle events to the precision aerobatic flying of today.
2. To provide an event for the many modellers who like stunt, but for one reason or another, are not able to build and practice for the SMAE Precision Aerobatic Events.
3. It is also felt that for the newcomers to stunt flying, this event will serve as a stepping stone, to the current Precision Aerobatic Events, as does the SMAE Novice/Junior Competitions.

Rules for Competition Aircraft

1. Design must have been available in kit or plan form prior to December 31st 1952.
2. No modifications shall be permitted other than structural changes to strengthen aircraft.



A triumphant Brian Hewitt with winning stunt design 'Stunt Queen' we don't think you'll need three guesses to know what engine was used...

- b. A bonus of 15 points for a design up to 31.12.49.
 - c. A bonus of 20 points for an aircraft design which does not include operating wing flaps.
 - d. A bonus of 10 points for the use of an operating spark ignition system.
 - e. A bonus of 10 points for the use of a biplane.
 - f. A bonus of 10 points for the use of an engine of the correct era.
- Note* In sections a, b and f the contestant is to provide proof or the bonus points will not be awarded.

4. In deference to non modellers, mufflers should be used where possible.
5. Muffler pressure is allowable.
6. In order to adhere to the principles accepted in F/F and R/C Assist, scaled up versions of control line aircraft are acceptable, so long as Aircraft Rules 2 and 3 apply.

Little and Large

In the last column I talked about the modern practise of scaling vintage models, up for R/C and down for CO₂, and how as far as I know this is not done with C/L models. But just think for a moment about all the designs and kits that were made in various sizes; Slicker, Southerner, Buccaneer, Skystreak, Monitor, Stuntwagon, Madman and many more, so even though designs of the vintage era were prolific it must have seemed necessary to cater for several sizes of engines with one particular design. It therefore doesn't seem out of place to enlarge a vintage design to suit a particular engine. To prove my point I quote from the 1948 *Aeromodeller Annual* "A number of variants exist, and it is suggested that proportions be scaled up to suit engine to be fitted." So not only can scaling designs be



Bridget McCann with future husband Peter Russell's stunt design 'Barn Door' seen here in two versions 58 and 78 inch spans. The smaller started life with a Fox and ended up with a McCoy 60, larger version sports a Hornet and was fully aerobatic (1950's style) flying at 65 mph on 100ft lines.

barriers - particularly those between radio and control line flyers.

Rules

Having generated all this feverish control line activity, we will have to introduce you to a few rules so you can enter some of the light hearted competitions, we call get-togethers... The rules are those adopted by SAM 35, with the stunt rules provided by Ron Prentice. The 'Midge' rules were published in the December issue but the engine rules have since been revised.

SAM 35 - Mercury Midge Speed Event

- 1) Allowable engines 1.5cc plain bearing diesels designed before Dec. 1950 PAW

3. Any modifications which, in the opinion of the judges, significantly change the appearance and or performance of the aircraft as originally designed shall not be allowed.

General

The 1951-52 AMA Rules for Precision Aerobatic Flying (we will print these in a future Mind the Lines...Ed) shall be used with the following exceptions:

1. All current SMAE Safety Rules (pull test, line dia, etc.) shall be applied, with the exception of Rule 4.1.3.
2. No appearance points shall be awarded.
3. In order to enable older designs to be competitive, bonus points as stated below will be awarded.
 - a. A bonus of 25 points for a design up to 31.12.48.

considered vintage but it's also a lot of fun looking at old designs wondering how they would perform enlarged, a 48in. 'Small Fry' powered by a 'Valkyrie' ('Big Fry') or reduced to CO₂ Small Small Fry. (see February *Aeromodeller*...)

with Ian Russell

Vintage 3 in 1

Being a genuine vintage modeller (grey hair and all!), I seem to have been 'sweet-talked' by a silver tongued Dave Baker into running a control line contest for SAM 35! The event will take place on 4th August at R.A.F. Halton. It will follow a well tried format used by Feltham D.M.A.C. and is known as a '3 in 1' contest. This means: one model, to be used for three different disciplines - stunt, speed and rat-race. The

model to be used is the APS 'Unlimited', but care must be taken to build the *right* 'Unlimited'! This plan was up-dated in December 1980 and this version is *not* acceptable!

Basically, this is a 'fun' event and internal structure is not so important, providing the model looks like the plan shown here.

I think 'hot' engines for the event would be the *Webra* 'Speedy' or the OS 10 FSR or if you prefer older motors the OK 19 or KB 15.

Copies of the 'Vintage Unlimited' plan are available from *Aeromodeller* at a special price of £1.80 (price Code C) plus 50p for post and packing. Please quote Plan No. CL 1486 and write to *Aeromodeller*, not the Plans Service - to save confusion with the other 1980 version!

'3 in 1' Rules

Model: 'Vintage Unlimited' (CL 1486) Outline as per original. The December 1980 'revival' plan CL 369 will *not* qualify unless the fuselage is added.

Motor:

As on plan. 1.5 - 3.5 c.c. unmodified.

B. B. glows of 2.5 c.c. or more must be pre-1959.

B. B. diesels of 2.5 c.c. or more must be pre-1964.

(Entrant's responsibility to verify this).

Propeller:

Nylon only. Unmodified. Same propeller (or same type) for all sections of the event.

Lines:

46ft. 8 1/4 ins. (+ or - 3 ins.) 20g. pull test.

Event:

A Feltham D.M.A.C. 3 in 1 contest, such as the present Feltham club runs each spring and autumn, to start the season off and wind it down each year.

One model. One propeller, which may be changed for an identical type if damaged.

1) Speed:

9 laps. whipping allowed

2) Stunt:

S.A.M. Schedule

3) Feltham

Rat Race: As many laps as you can in 5 mins.

High flying allowed: Whipping allowed: Loops don't count: Laps inverted are taken off.

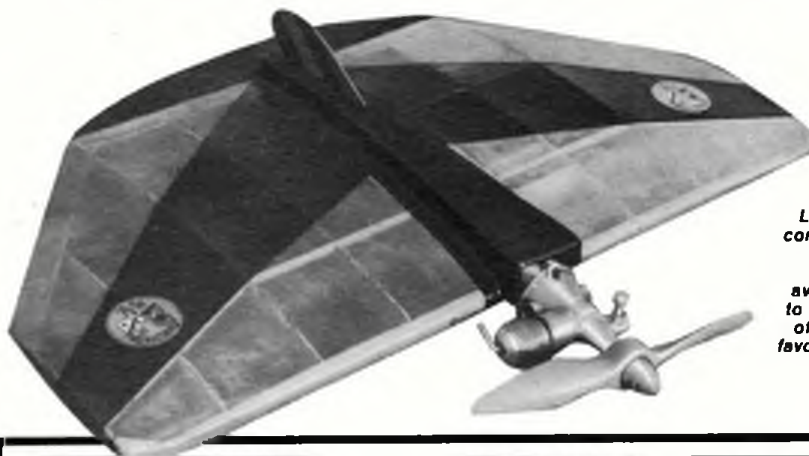
Heat normally 4 up. Pit men must wear S.M.A.E. legal protective headgear. (possible availability of helmets being investigated).

Prizes

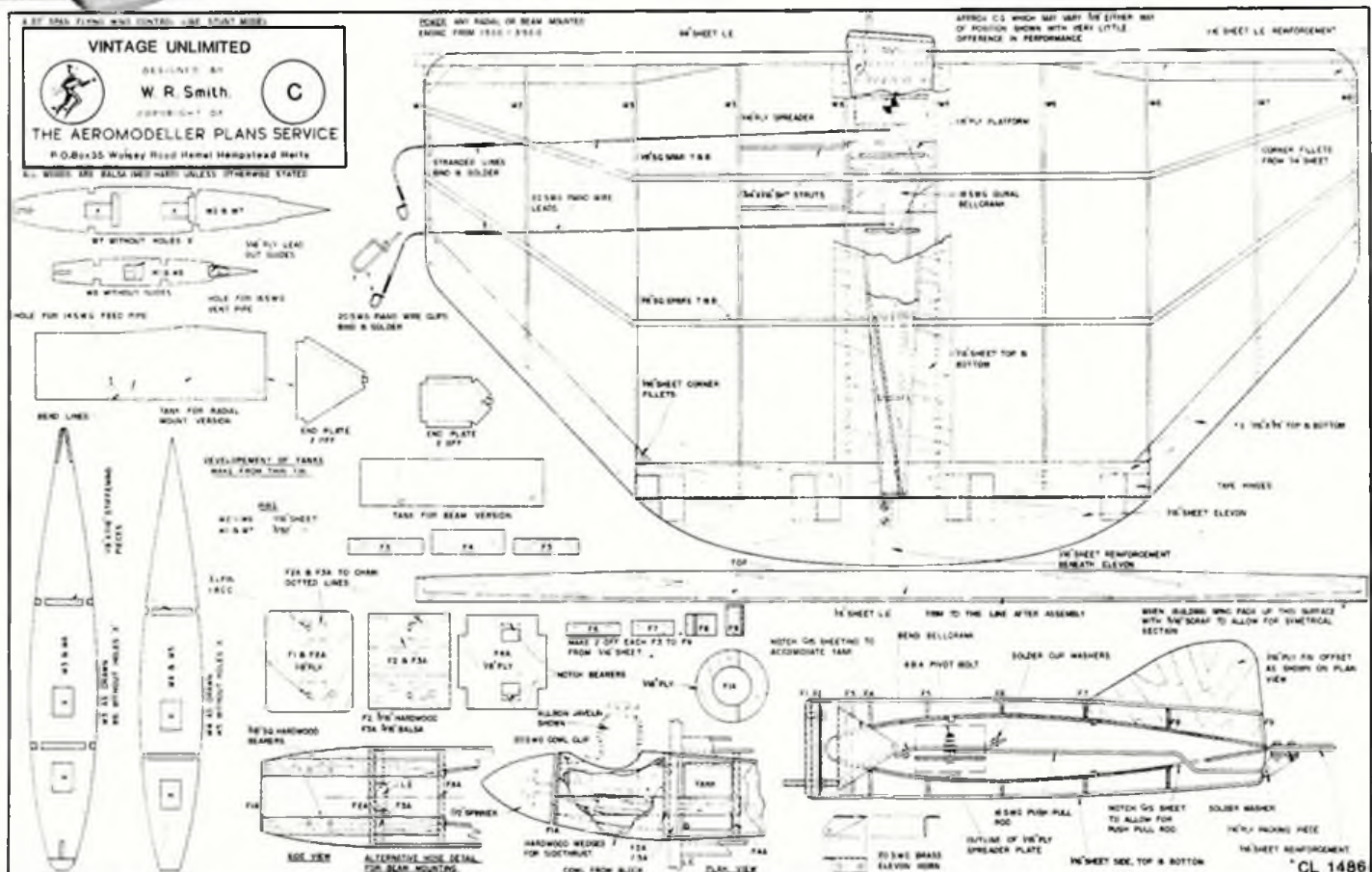
a) The 'Feltham Unlimited' Trophy. Returnable.

b) Small replicas for 1st, 2nd and 3rd places.

The rules are simple and relaxed, but will be rigidly applied.



Like old soldiers, old control lines don't die they just fade away...for awhile...coming back to full life again is one of Aeromodeller's old favourites - 'Unlimited'.



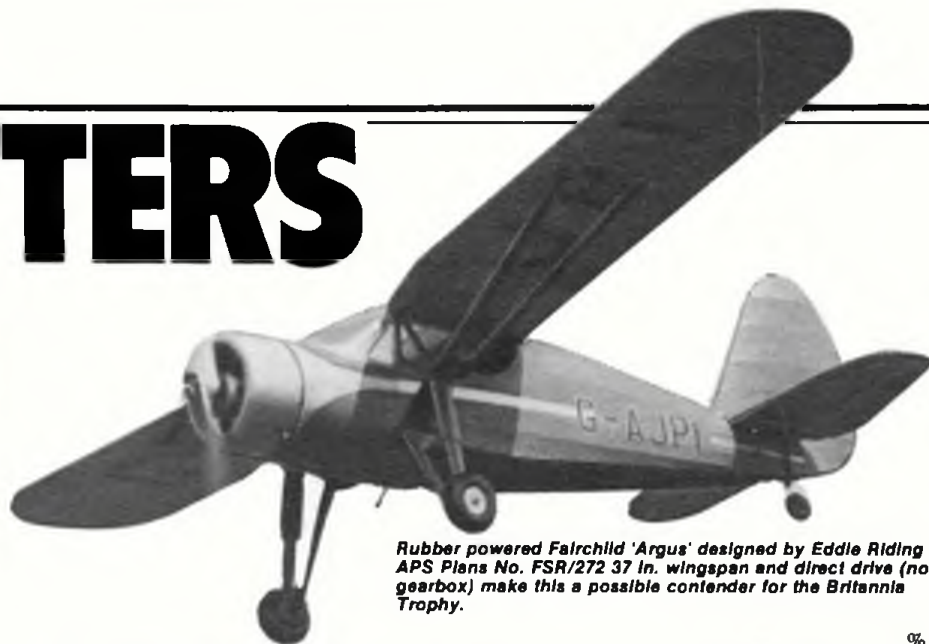
SCALE MATTERS

Free Flight with Bill Dennis

Vintage Scale

SAM 35 will be holding a contest for rubber powered vintage scale models at the *Aeromodeller Scale Day* at Old Warden on Sunday June 23rd. While the event is only open to SAM members, I understand that instant membership will be available on the day at half the annual fee (£4.50). At stake is the 'Britannia Trophy', which was originally donated by Sir Peter Masefield for an aircraft recognition competition.

The organisers have deliberately framed the rules to give a different type of contest, in that the only thing to count is flight duration. As such, it is not really a scale contest at all, but a duration event for vintage scale designs. Models must have been published before 1st January 1951.



Rubber powered Fairchild 'Argus' designed by Eddie Riding APS Plans No. FSR/272 37 in. wingspan and direct drive (no gearbox) make this a possible contender for the Britannia Trophy.

repaid with a lower placing, since duration will be reduced!

The range of subjects tackled pre 1951 was enormous and designers were not put off by little things like aerodynamic considerations or sheer complexity. To encourage the building of the more challenging types, a series of percentage bonuses will be added to the flight score, which has a max of 60 seconds:

		%
a) Wingspan	Under 20 ins.	40
	20-30 ins.	20
	Over 30 ins.	Nil
b) Two or more mainplanes	Low wing monoplane	20
	Other	10
c) Flying boat or amphibian	Floatplane	40
		20
d) Model driven by 2 or more		
	airscrews off the centre line	150

So what to build? Members of SAM 35 will probably be aware of several sources of obscure plans, but the non-member will rely on the APS range which is quite large. Turn to the 'X' list and consider the designs prefixed FSR with a date prior to 1951. I thought it might be an idea to look at a few of these designs with regard to their flying and bonus potential.

The safest bet is a high wing monoplane of reasonably large span. Of course, these will attract little or no bonus, but that is what it is all about. Two designs by Eddie Riding - the Westland 'Widgeon' and Fairchild 'Argus' look very practical and I have seen examples of each flying extremely well at the Nationals. Both should be capable of 60 seconds, and the



Left, another possible subject for the Britannia Trophy is the Heinkel He 51 (APS Plan No. FSR/141). Below, 'Lightning' built by Czech modeller Paul Stranik, in size about midway between the two versions in the Plans Service. Paul's model is certainly capable of 60 sec flights - even with all that scale detail.

The models must be built to the original plan, using specified materials (cane, bamboo, etc.) where these are available. Certain modifications, however, are permissible, but only to improve practicability and stability. These mods include component attachment methods, enlarged noseplugs, local reinforcement, and the moving forward of rear anchorages to reduce nose ballast. Where tail surfaces are 'clearly inadequate' (!) they may be enlarged to a maximum of 25% of the wing area. Free-wheeling and ready-made airscrews may be fitted, as well as a dethermaliser. Finally, a gearbox must be fitted if used on the original. Personally, I feel the gearbox requirement is a mistake since this will put many people off the designs which feature them. An article on this subject by Trevor Faulkner appeared in *Aeromodeller*, December 1982.

There are several advantages with this type of contest. The organiser's job is very simple, since no subjective judging has to be done. The modeller does not have to design his own aeroplane, nor be concerned with its accuracy or realism of flight. Any effort expended on detailing and paint finishes will be



structure is very well thought out. I personally would alter the wing mountings to wires in tubes, and the use of thin ply cabane struts on the 'Widgeon' is somewhat optimistic. Both these models feature direct drive. Another worth considering is Eric Fearnley's *Heston 'Phoenix'* revisited by Don Knight in the May 1983 *Aeromodeller*.

The *Taylorcraft 'Auster'* and *'Puss Moth'* look fairly lightweight and airworthy, but both have gearboxes. The former also sports a bi-convex wing section, about which I have my doubts.

The old bi-plane designs would, I think, be vulnerable, especially over the short grass at Old Warden. Bi-planes are ideal for realistic flight, but less so for duration. Rupert Moore's *'Tiger Moth'* is large and complicated, with V.I.T. (!) and the patented Moore diaphragm (see article this issue). This clever invention was a way of splitting the rubber motor in two so that the bulk of it is forward, so reducing the need for ballast.

'Typhoon' of Rupert Moore. This famous model sported a retractable (up and down) undercarriage and tailwheel. A similar type is Towner's *'Harvard'*. I remember sitting in Mike Hetherington's tent at the Nationals one year as the gathering of experts pondered over the *'Harvard'* plan. No matter which way up it was held, no one could figure it out. Since no bonuses are given for gadgets, I feel these are no-hopers!

The multi-engine types are bound to attract attention. There are two ways to go. The first is the direct drive system, with separate motors for each propeller, as featured on the *Lockheed 'Lightning'*. Richard Falconer had one at the Woodvale World Champs and it looked very impressive for the couple of seconds it was in the air! The short duration was due to a trimming error, and I believe Richard did in fact have success with the model. More recently Charlie Newman has been experimenting with this method in his *'Marauder'* which has flown well. Charlie has written a very useful article in Scale

you need to be good at making systems, since a bodge-up will not work. Rupert Moore's *Short 'Scion'* is an example of this type, whereby power is transferred via gears at the nose, and thence by a series of cranks back to, and across, the centre section, and again forward to the propellers. The only model featuring an indirect drive with any potential that I have seen is Mike Hetherington's *Britten Norman 'Islander'*. The propellers worked well, but the model was unstable due to lack of dihedral and, probably, its single central fin. Of the two types, I think the direct drive offers the best hope of a high flight time - all you may get with the other is an extended glide, and a burst motor may cause you to give up aeromodelling.

As for the *Handley Page 'Halifax'* - aaargh!

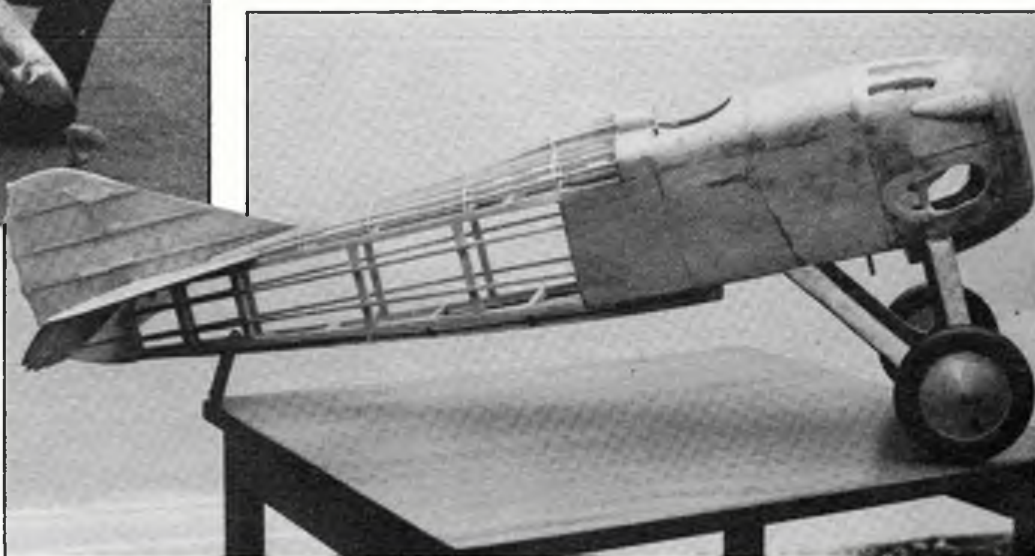
Let's hope for calm weather, long grass and no dogs at Old Warden.

Control Line with Vic Willson

By the time you read this column the 1985 Contest season will be just about to begin, so I will start with a list of some events for your diary. Even if you haven't got a model to enter please come along and support the events. If you are a beginner at scale modelling you will pick up all sorts of good ideas by just watching and the 'experts' are always willing to dispense advice if approached at the right time (not on the flight line!) All the events are run in a very friendly atmosphere without any high pressure tactics and as a consequence are very enjoyable.



Left, Ron Truelove with Heinkel 219 'Uhu' - only when you see Ron in the picture do you really get a feel for the size of this project. Below, opposite end of the scale (in complexity and weight) is Wal Cordwell's 40 inch span Spad 13.



Eddie Riding's *BE2C* is another huge model, simpler, but again rather vulnerable and I'd hate to fly one in a breeze. The *Bristol 'Fighter'* and *Fokker DVII* are smaller, with more bouncability and would get another 10% wingspan bonus.

A better way to get a few points would be the low wing monoplane. Since dihedral is invariably increased, stability is less of a problem than on a true scale model. The *'Moth Minor'* is attractive with a long nose, direct drive, and sensible construction. The *BA 'Swallow'*, on the other hand, is ghastly. Described in the current handbook as being simple to build, it has a gearbox, and each rib is a built-up Warren girder with 13 parts! Furthermore, the fuselage shape may be too inaccurate even for the vintage scale enthusiast to 'swallow'.

The *Voughts 'Kingfisher'* is very impressive with an interesting structure, making use of wound formers as in *'Coplands Wakefield'*. The *Miles M48* is attractive, with a sheeted fuselage and more than ample dihedral. Both these designs feature gearboxes. I suppose no description of such types can ignore the *Hawker*

Flight (see Scale Matters, August 1984) giving plenty of practical tips, the most practical being to use contra-rotating props with the inboard blades coming down - not for aerodynamic reasons but so that both props can be held by the spread fingers of one hand for launching (think about it!)

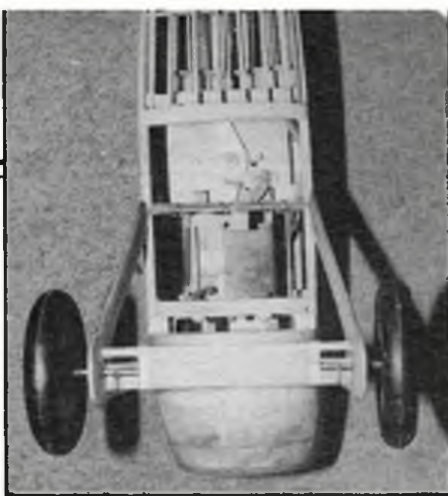
The *'Lightning's'* construction is fairly straightforward, but all twins will take more time and care to build. The other type of twin is that using mechanical linkage from one or more motors in the fuselage to outboard propellers. To tackle one of these,

14th April

Spring Gala, RAF Odiham, Hants - Free Flight Scale. (Exact event to be decided 'on the day').

28th April

SMAE Indoor Nationals, Alumwell Walsall (just off Junction 10, M6) - Peanut, Open Rubber and CO₂. Pre-entry to D. Sheppard, 13 Luckington Road, Monks Park, Bristol. Tel: (0272) 697595.



9th June SMAE Scale Day, Carter Barracks, Amesbury, Wilts - Grass field for Free Flight, tarmac area for Control Line.

Provisional 7th July SMAE Summer Scale Meeting, RAF Abington, Oxon - Free Flight, Control Line (& Radio).

11th August SMAE Scale Day, Aston Down airfield, Glos. - Radio Control 'Light Scale'.

24-26th August SMAE Nationals, RAF Barkston Heath, Lincs. - All classes (Pre-entry).

7/8th September World Championship Team Trials, Elvington airfield, Yorks. - Control Line (& Radio Control). Pre-entry

The list only includes those events organised by the SMAE Scale Technical Committee for Control Line and Free Flight Scale. Any queries regarding these events, please contact me at 16 Cardinal Close, Reading, Berks, RG4 8BZ, tel; (0734) 471964.

There are, of course, many more scale events throughout the Summer, ranging from 'fly-ins' to competitions and a glance at the *Whats On* ... column at the front of this magazine each month will usually provide an event almost every weekend.

To enter the SMAE events it is necessary to be a member and also to have a competition licence, but for many of the events organised by individual clubs neither of these is necessary. The events listed here will all be run to the current SMAE Scale rules. This mention of rules brings me on to a new Scale class which is being promoted this season, Radio Control 'Light Scale', which it is hoped will bridge the gap between Free Flight and Control Line Scale and the International Radio Scale class.

An inaugural event is being run at Aston Down on 11th August, followed by another at the Nationals at the end of August.

With the continuous development of the sophisticated R/C scale model, with ever increasing size of motors and all up weight, (shortly to be raised yet again to 7 Kg by the FAI) it is felt that the time is ripe for the introduction of a simple class to be known as 'Light Scale'. The maximum weight of the model will be restricted to 3 Kg (6.6 lb.) and the engine capacity to 4 c.c. (0.25 cu. in.) two strokes and 6.5 c.c. (0.40 cu. in.) four strokes. The models will be judged statically

and in flight, as per the International (semi Stand Off) class.

This new class should promote the building of relatively lightly loaded, simple models, which can be easy to fly and comparatively easy and quick to build. The class should appeal to the newcomer to Scale modelling as well as the experienced modeller looking for something more relaxing to fly. Although models built to the Club 20 Scale rules are eligible for the new competition it is felt that the new specification is less restrictive; allowing the eminently more suitable small four stroke motors to be employed rather than the high revving, racing two stroke '20'.

By utilising the existing International



Above left, view from underneath Wal Cordwell's Spad 13 showing installation of Williams' 3-line bellcrank. Left, main undercarriage leg retract mechanism and wheel doors on the Heinkel 219.

rules, for static and flying, 'Light Scale' and 'International Scale' competitions can be run in parallel, at the same venue, utilising the same set of judges. As well as being economical, in terms of organisational effort, such combined competitions can only be beneficial in the cross fertilisation of ideas as well as providing for potential World Championship scale flyers. Finally on the subject of competitions, the 1986 Scale World Championships will be held in Norway (at a venue near Oslo) during early June or August and there will definitely be a Control Line event.

Two approaches

Now on to some models, firstly Ron Truelove's superb Heinkel He219 'Uhu' and secondly Wal Cordwell's latest project - a Spad 13. These models represent two extremes of the Control Line Scale model; the Heinkel being almost the ultimate in multi-engined electronic technology and the Spad representing the more traditional approach of the lightweight model with basic three line controls that can be built quite quickly and used for 'sport' flying as well as competitions.

The Heinkel 219 is a slightly obscure but unusually interesting subject for a model and had been on Ron's modelling short list for many years, but had been held back principally due to lack of documentation and the complexities of the undercarriage mechanism.

Although at one stage a semi-scale, possibly aerobatic version was seriously considered, the sheer challenge of 'doing it properly' eventually proved too much to resist. Despite the rather ugly and ungainly appearance of what was the

first purpose-built night fighter, the beast does have some good features when considering a competition scale model. Firstly a twin with radial annular radiators which have the advantage of being large enough to hide model engines and only require a grill mesh in the front. Secondly despite its complexity the undercarriage is sturdy and well spread, with large wheels and when (eventually) retracted not only 'cleans up' the aircraft, but actually transforms its character dramatically as anyone who has seen it fly will testify - the long slender fuselage and 'stag horns' aerial array giving it a distinctly sinister appearance. Thirdly the plain flaps are easier to construct and

operate than the more exotic types (although the fact that there was provision to droop the ailerons did not become apparent until later) and finally there was a version fitted with a drop tank which makes a comparatively simple flight option, requiring only a simple release mechanism.

During the winter of 81/82 Ron set about designing the nose wheel mechanism without which the whole project would have been a non-starter. Working out the operation of this retracting and twisting leg was a real brain teaser. The basic geometry of retracting the undercarriage leg and turning the wheel through 90° as it entered the wheel well was worked out with the aid of pieces of dowel and tube. This was followed by a plywood mock-up nose section (to scale), which took approximately 6 months to complete, with a practical nosewheel assembly incorporating springing and other scale details.

Attention then turned towards the main undercarriage. 3½ ins. Rojair wheels were chosen mainly because of their light weight (four wheels!) and it was decided not to have any suspension, which enabled the legs to be rigid enough to withstand the high side loads that all control line models impose due to their circular path on the ground.

The awkward 'Y' shaped legs are piano wire frames within a resin/micro balloon casting. The lower 'stirrup' is a hollow lump of aluminium securely epoxied (slow cure) to the leg with a piano wire axle. A useful saving in weight was achieved by using only one motor (mounted in the

The Heinkel 219 ('Uhu') bellcrank installation showing arrow shaft push/pull rod to elevator.



starboard nacelle) to retract the undercarriage, this being linked to the other side by a torque tube.

With both these units running reliably in their plywood rigs by late '82, the next task was to design and build the airframe around them. The fuselage is a fairly standard former/sheet construction, apart from the front cockpit which being open top and bottom is built as two narrow side boxes of 0.5mm ply. The removable wing centre section with the nacelle structures was then built by Easter '83.

The outer wing sections and tail surfaces were then added and the controls installed. At this stage it was decided to make it possible for the model to be converted to R/C at some later date, but the only reliable way to ensure that this would be possible was to literally build the receiver and the servos in at this stage and then convert the model to control line operation. This allows both the rudder and ailerons to be installed, using closed loop wire systems. For control line operation they are fixed with anchored 'kwick links' in place of servos for trimming adjustments.

The flaps (including droop aileron connections) and throttle servos remain in place for both R/C and C/L operation. Both wingtips are removable to allow tip weight and lead-out guides to be removed or installed.

Aluminium 'arrowshaft' tubes are used for the elevator pushrod, throttle and undercarriage linkages.

The two engines used are standard *Irvine* 40 R/Cs installed on alloy mounts angled at approx 45° in order that the tuned pipes could run down the scale flame damper

tubes. Pressure fed from standard clunk tanks the *Irvines* clock up a respectable 13,000 r.p.m. on 10 x 6 glass filled nylon propellers and using 10% nitro fuel. This proved to be a set-up giving ample power for a good flight performance, but not sufficient to fly the model on one engine.

During the autumn of '83 Ron decided to step up the pressure and attempt to have the model ready for the World Championship Team Trials (5th/6th May 1984). This required a maximum effort, shove all else to one side, one foot in the divorce courts, building programme during the winter months ... In an attempt to save time lithoplate (0.005 in aluminium) was adopted as the skin covering, removing the time consuming task of grain filling and smoothing down required to achieve a similar finish on balsa sheet. Unfortunately this change of covering necessitated the addition of some extra balsa support structure and large overlaps of the skin, this without a doubt being a major contribution to the high airframe weight.

Cockpit detail was added in the upper regions only and a special pilot was designed to cover some of the nosewheel mechanism and the retract motor battery. The canopy was vacuum formed over a hand carved mould and hinges to one side as on the full-size aircraft.

A mould was made to produce the radiator grills, but their weight and complexity forced the installation of simple, lithoplate rings...

The undercarriage doors are operated, as per prototype, by the undercarriage legs, but proved to be a constant source of trouble during the first few flights, suffering from

premature closure. They operated perfectly on the bench, but not in the air and both sets of door mechanisms were eventually replaced, together with the main retract motor, which occasionally refused to operate.

Unfortunately these teething troubles were still being sorted before, during and after the World Championships at le Bourget and not until the British Nationals did the undercarriage work reliably.

At both these competitions the good and bad points of such a complex model were highlighted - when it works it's marvellous, when it doesn't it's a disaster and the outcome is clearly shown by the flight scores.

In contrast to the complexity of Ron's model, and to avoid the sort of problems experienced with the Heinkel, Wal Cordwell is building a model of the *Spad* 13. As the photographs show this uses conventional balsa and ply construction resulting in a very reasonable airframe weight (uncovered) of 2 lbs.

The wingspan is 40 ins. and power will be provided by an ancient OS 40 RC. The structure is well advanced and the 'Williams' 3 line bellcrank is installed beneath a ply plate as shown in the underside view. If the 'ready to fly' weight can be kept to a reasonable figure the model should be capable of a loop which with the third line throttle control should enable it to gain a respectable flight score in competition this season.

As the model progresses through its various stages, covering, painting, test flying, etc., I will try to follow its progress in this column.



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FREE FLIGHT SCENE

Bob Bailey reports

Watford indoor meeting

Watford Leisure centre indoor meeting 1

This event was held at the Watford Leisure Centre, the first time that this venue has been used for an indoor flying event. Despite this, the attendance was somewhat thin, presumably an occupational hazard for first time use of the hall.

I can assure all those who thought of coming along and didn't that the flying conditions were very good. However, the girders provide plenty of hang up chances for EZB, so attempting to 'ceiling scrub' was not generally a good tactical move.

Since I don't fly scale, I can't comment much on the scale events, except to say that Peanut was run to the Butch Hadland format where competitors mark up their scale points form for the more obvious features like ailerons or no ailerons. The hall was adequate in size for the largest CO₂ powered models, although aircraft of this size make an appalling noise when they hit

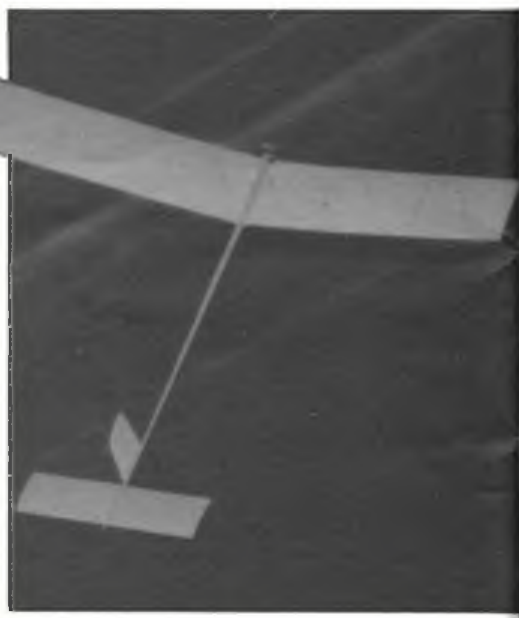
couple of seconds or so behind Ron Green. It was a very good and closely fought contest, although announcement of each good flight time would have helped the spectator participation. This last comment applies to most HLG contests and not just to this one.

EZB followed straight afterwards; I soon found that girder nudging was too much for a microfilm covered, boron braced wing I had built, so it will stay in the box for Cardington. An old tissue covered wing was dug out to replace the film covered one.

As I intimated earlier, this had to be an 'only just touch' contest, somewhat more difficult to fly than hitting the ceiling with impunity. Some flights made perfect landings on the basketball backboards which were winched up to be horizontal near the ceiling, others scored the odd basket (surely worth 2 points). Retrieval was generally no problem since the baskets could be lowered easily. The contest was well supported with around ten entries.

Best times were somewhat dependant on getting away with hitting and flying above the lower girders. Ron Green did the best flight of around 9½ mins. I went the wrong way by trying to fly with a very light motor of 0.9g or less and the best was around 8½ min. Considering that nobody had flown a 'just touch' type or EZB contest for a long time, long flights were much more difficult to get than might have been expected and the standard of flying was generally good.

It was a most enjoyable day's flying; thanks to Dave Yates and Mike Colling for making the long trip from Wigan and especially to SAMS for underwriting and running a well organised event.



Mark Croomme's model on the way to a stupendous 12:56, a new record for indoor CO₂.

Cardington '85

As I write (16th January) No. 1 shed has just changed hands and presumably not under RAE Farnborough control. Your Indoor Tech Committee is negotiating for the use of either No. 1 or No. 2 shed for the coming season, starting up in May. We are going to run our contests, apart from the ones for which there are trophies, to an index system.

Some segregation of 'heavies', e.g. CO₂, Peanut, Duration and Manhattan, from the 'flimsies', i.e. F1D, 35 cm and Open Microfilm is necessary to avoid the odd argument between the two types - no prizes guessing which will win! Placing in the contest will be decided by the fraction of the best flight time against a 'standard time' for that class of model. For instance, the performance index of a flight of 11 mins. against a standard flight time of 10 mins. will be 110%.

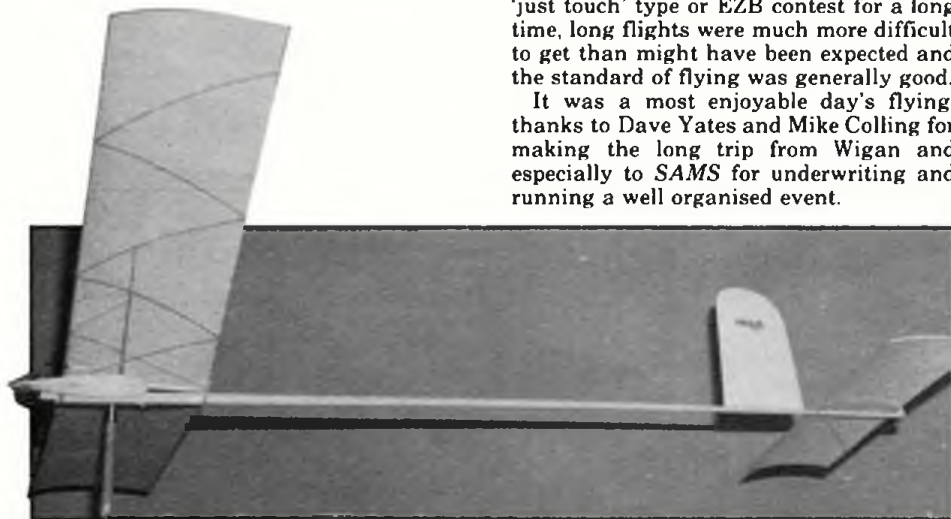
The Indoor Tech Committee will determine the standard flight time for each class; this will be based on, but will not necessarily be, the existing UK record for that class. Watch this space for further details.

Please note that EZB is the most popular class and will therefore be eligible to be flown at all events - to help boost the numbers in Cardington. We are hoping that two scale meetings can be arranged and that SAM 35 will come along and fly at one of the events in mid-season.

In addition, the Trials for the '86 World Champs will be flown over a single weekend to simulate actual World Champs conditions with 3 flights on each day. Followers of the Cardington scene last year will notice that the system is essentially as per last year, but is being refined (we hope) and anomalies ironed out as far as possible.

Mark Croomme's Indoor CO₂ record holder

As some readers will have already heard, Mark made a systematic attack on the Indoor CO₂ record, which stood at 7:28 to Ian Dowsett. Mark's new approach to CO₂ caused a vast improvement - in fact he



Mark Croomme's CO₂ Record Breaker resting between flights! Note the diagonal bracing to stiffen the thin polystyrene sheet used for the flying surfaces.

the wall, but little damage appears to be done. It was certainly good to see a wide variety of models.

Quite a few people were flying HLG, but obviously the models to beat were the 'Upstart' and derivatives from the Northampton club. I folded the wing on my best model in practice, tried to mend it, but folded it again despite more carbon on the wing.

Best times in practice were around 40 sec., with the possibility of getting a model to pull out above the lower girders and go on to glide down. Three flights each were done from each side of the hall with the lead changing hands more than once. Mark Benns finally got a 40 right at the end, to pip Mike Page by less than 0.8 sec. I brought up the rear, last but not (I hope) least, the odd

Results

Open Rubber Scale

- | | |
|-------------------|--------------|
| 1. Gordon Hannah | - Antoinette |
| 2. Major L. Smith | - Spearfish |
| 3. M. Leach | - Cranwell |

CO₂ Scale

- | | |
|------------------|------------------------|
| 1. Mick Staples | - Bristol Bullet Scout |
| 2. Nick Peppiatt | - Sopwith Tabloid |
| 3. M. Leach | - Hanza Brandenburg |

Peanut Scale

- | | |
|------------------|------------------------|
| 1. N. Peppiatt | - Farman Moustique |
| 2. John Whatmore | - Eastbourne Monoplane |
| 3. P. Lee | - Lacey M10 |

EZB

R. Green and R. Bailey withdrew from the prizes to allow 3, 4 and 5 to be 1, 2 and 3.

- | | |
|---------------|-------|
| 1. Dave Yates | 14:56 |
| 2. H. Metcalf | 13:16 |
| 3. P. Lee | 12:06 |

H.L.G. (best 2 of 6)

- | | |
|-------------|-------|
| 1. M. Benns | 79:01 |
| 2. M. Page | 78:26 |
| 3. R. Green | 73:79 |

positively obliterated the existing record time - more of that anon.

Mark very kindly sent me notes, photos and a plan - very many thanks - the following is extracted from them.

At the outdoor Nationals in '84 Mark lost his model - in all that rain and wind, its a wonder it flew at all - that prompted him to work on propellers. He only turned up at Cardington in July with a foam 'lash-up' (Mark's own words) that immediately showed promise with 5:20.

The next visit saw the area dropped from 400 to 300 sq.in. maybe a pair of scissors helped! Weight has reduced to 1.25oz; a 10ins. x 9ins. propeller helped to get seven flights over 6 mins., the best 6:29.

A new model was built for the meeting at Cardington on August 19th ... instant success - 7:29 at low altitude. The first problem showed up when a slight throttle increase on the Telco put the model through the roof in 4 mins. The throttle setting was very sensitive for trim between 'no climb' to 'too high'. Temperature was 80°F plus.

September 16th again a good day with 65°F. Mark installed his other Telco and

Although of ultra simple construction one can only wonder how such a flimsy wing can hold the camber shown here - so correctly! Perhaps there is more to the construction than meets the eye...

adopted a different trim technique - find a nice low throttle setting which just maintains altitude and then reduce the pitch a shade to allow very slight rpm increase and a nice climb. This worked amazingly well, resulting in flights of 11:02, 10:52 and 10:42. A slight further decrease in pitch resulted in over-cooking and hitting the catwalk at 7 mins! Propeller size 12 ins. x 9 ins. single blade folder.

The last Cardington meeting of the year on September 30th was again quite a reasonable day - 65°F. Mark tried an even bigger propeller of 14.6 ins. diameter on the same model and motor. One short low level flight to establish the throttle settings, backed off pitch and confirmed a slow climb.

Timekeepers were called for and the result was a magnificent 12:56. The motor runs incredibly slowly and like a rubber powered indoor model, the CO₂ model descends somewhat as the power drops. It is not easy to tell when the motor stops, since if freewheels to some extent.

The glide seems to be as good as any other indoor CO₂ model, taking around 3 mins. to glide in from near the catwalk, i.e. 150ft.

altitude. It would seem therefore that the propeller has a lot to do with it - I wonder how much improvement there is to come ...

Construction

Wing: Cut rectangles of polystyrene wall lining and glue (with PVA - not cellulose, e.g. balsa cement) ribs on to one end of each. Glue rectangles end to end thereby sandwiching the ribs. Trim leading and trailing edges straight using a straightedge and glue LE and TE strips on.

The result is a floppy venetian blind type slat. Stiffen with surface 1/64 in. x 1/8 in. diagonals until the wing withstands flight loads. This can be tried by test glides across the lounge into the curtains! The photos show short spars at the centre - these will be very effective if placed top and bottom, in preventing wing fold and the diagonals provide much needed wing resistance to twisting (torsional rigidity).

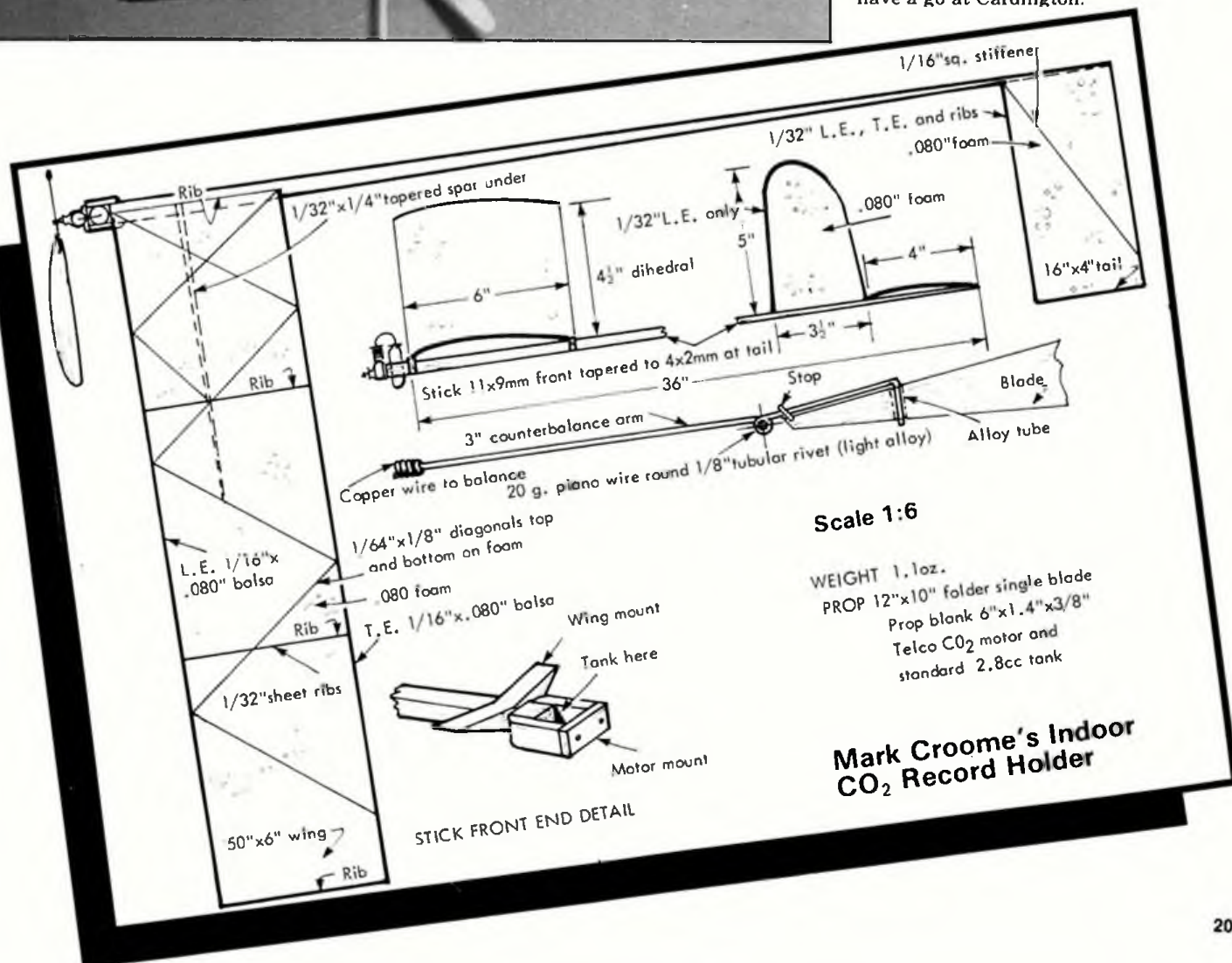
Tail: This is built in the same manner as the wing but with a single diagonal member along the bottom.

Model weight breakdown:

Wing.....	10g
Fuselage.....	4g
Tail.....	1.5g
Motor + tank.....	12g
Propeller.....	3.5g

Total **31g**

As I'm sure you will agree, a remarkable effort by Mark, pointing the way forward to a lot of interesting CO₂ flying; - let's hope that more people build some models and have a go at Cardington.



FROM THE HANDLE

CONTROL LINE NEWS

Racing with Jim Woodside

Constructional technique

A minor problem associated with the button type bellcrank is forming neat, narrow but fairly deep slots (1/8in.) through the inboard wing. The normal approach is to cut free a triangle of wood and form grooves in its edge with blades, files sandpaper, etc. The illustrated tool does the job easily, neatly and accurately. Thanks are due to my friend Mike Broadbent for dreaming up the idea and fabricating the prototype.

The photographs should be self-explanatory. The cutting blade was ground from a piece of high speed steel salvaged from a power saw blade. The trench in the base plate is machined or filed to bring the centre of the blade to the centre of the wing blank. The blade is prevented from twisting by the edges of the trench. The amount of projection of the blade controls the depth of the groove. The 6 B.A. washers shown in the disassembled shot are used as spacers between the clamping bars; this preventing the base from being curved upwards. A device well worth the making, repaying its construction many times over.

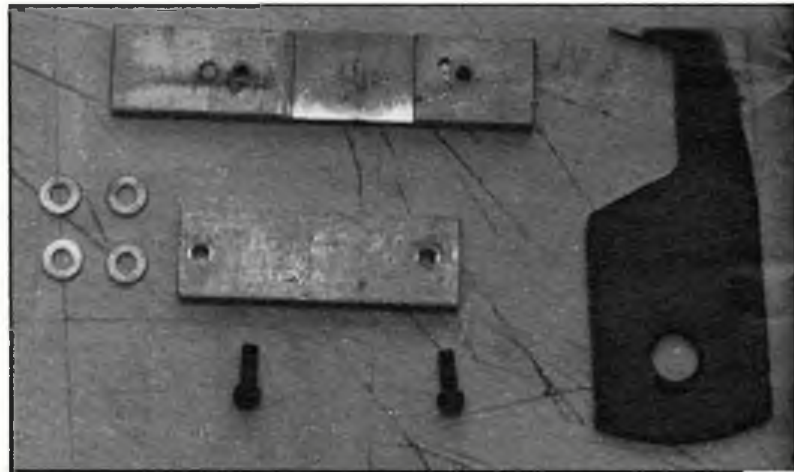
The U.S.E. engine power tester

All of us read with interest the engine tests conducted by such maestros as Peter Chinn and Mike Billinton. Like me you have probably wondered just how powerful is your own best racing motor. Well, thanks to the busy and industrious U.S.E. engine factory, you can. The Engine Power Tester

This fine example of a replica Elfin 2.49 is made by Dunham Engineering - they are available with or without the black crackle finish to the crankcase.



Dis-assembled grooving tool (see constructional technique) showing the cutter ground from a power saw blade, the alloy base plate and associated clamping bar.



was constructed to help in the testing and development of the U.S.E 15 and 21 racing motors. The factory will carry out engine power tests for 35 guilders, plus a realistic extra amount to cover return postage.

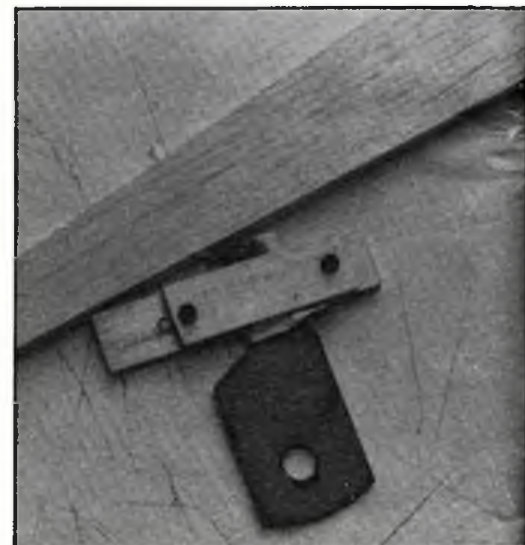
Although I do not have any specific detail of the test rig's construction it appears to be built along conventional dynamometer lines. However, the E.P.T. incorporates an automatic engine starter and can simulate a windspeed of 100 k.p.h. inside the closed compartment. If you can stand to learn the truth about your Nelson, Rossi or Cipolla box it up with the relevant monies to: U.S.E., Floridareef 17, 3565 AM Utrecht, Holland.

The current prices of completely tested U.S.E. engines are as follows:- 15 Mk II R, 315 Hfl; 21 Car, 265 Hfl.

Dunham Elfin 2.49

I first mentioned this engine in late 1984 in conjunction with an article on the roots of teamrace. I have now had the opportunity to test one of these engines at first hand. This production unit fulfils the expectations of the prototypes - well made in high quality materials. As an added bonus the Dunham Elfin is now also available in a black-crackle finish, which lends an air of distinctive sophistication.

The performance of the replica is also very acceptable - especially when one considers that they are aimed at vintage type models. My own engine has had less than ten minutes running and is still tight in the piston-sleeve fit. However, it is still turning an 8 x 6 prop. at 10,250 r.p.m. Highly recommended. Dunham Elfin 2.49 in black-

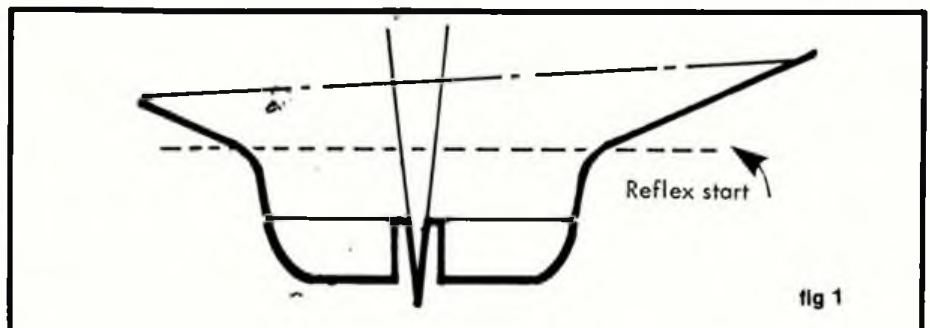


The grooving tool in operation, used here to make leadout tracks in a solid team racing wing. As an idea of scale, power saw blades are about 1 inch wide.

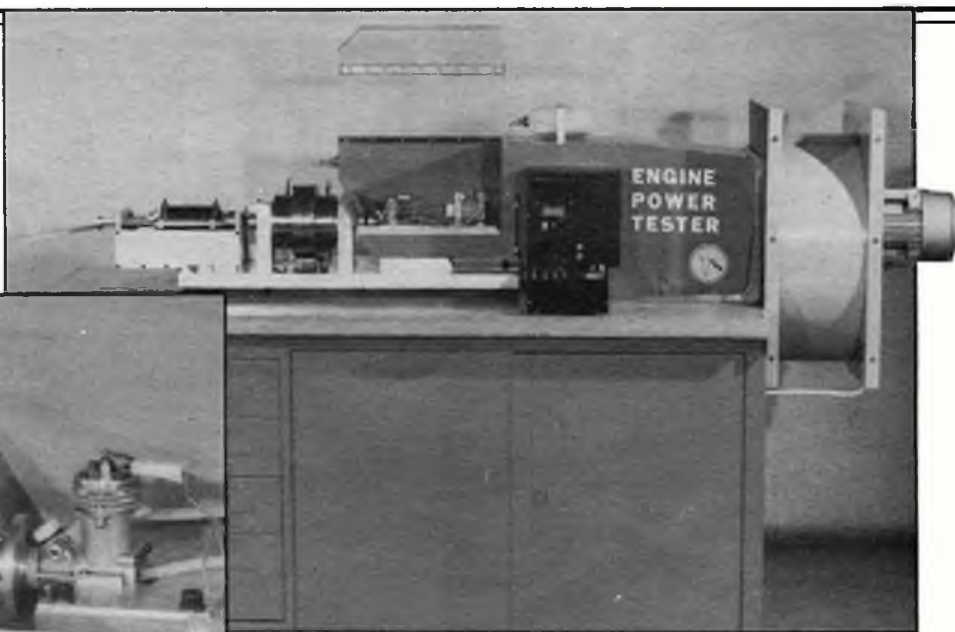
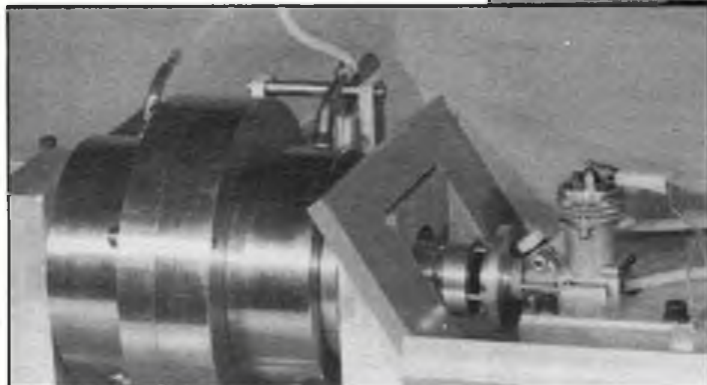
crackle finish is £43.50 plus V.A.T. from: Dunham Engineering, 12 Lawns Avenue, Orrell, Wigan WN5 8UQ.

Ouch...

Kobus F2C Racer: A sketch of this successful Dutch model appeared in the January edition; the main feature being the reflexed trailing edge. However, the plan view showed the reflex as an oblique line to the fuselage centre-line. Wrong! This line, on



Right, the Dutch U.S.E. Engine Power Tester, complete with airspeed generator (big fan?) to the right of the picture and automatic starter to the left. Below, close up of the engine mounting and eddy current dynamometer.

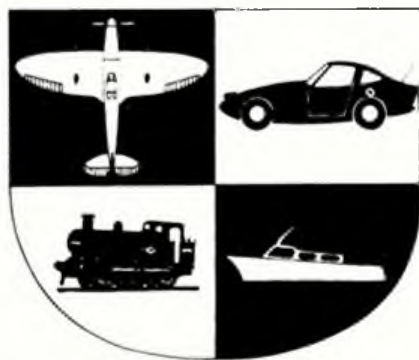


the full-size plan, indicates a joint in the planks. The reflex begins at the flap-like part of the wing planform (fig 1). The full length fuselage crutch is carefully shaped in order to force the semi-symmetrical root section into the S-shape. The first stage is to cut the acceptance for the wing into the crutch at zero-alignment. When this is achieved, the reflex shape is made,

starting at 3/4 chord.

Oliver Tiger Mk III: A most mild rebuke came my way from gentleman engine manufacturer John Oliver Jr. Some months back I said that the much loved Mk III Tiger was back in production. Not quite true. Oliver Engineering have (and will) produce small batches of Mk III's but on extended delivery. Furthermore, the price I quoted

was that of the Mk IV. The price of the Mk III is, in fact, higher to reflect the problems of special setting up. John was apparently inundated with orders! Those interested in purchasing a new Mk III are advised to contact the factory for specific details of price and delivery on the next batch. John Oliver Engineering, 250 Ringwood Road, Ferndown, Dorset.



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AT THE LAUNCH PAD

with
John Wheddon

Model Rocket Construction

One of the many positive aspects of model rocketry when compared with aircraft modelling is that the newcomer to the hobby usually achieves a successful first flight, even if the model has not been made to the best possible standard. This is definitely not the case with model aeroplanes, especially those of scale appearance where many novices must have been completely discouraged by such an unsuccessful first attempt.

This difference is not just due to the relatively simple form of rocket flight which is more predictable than that of model aircraft - not to mention the fact that normal model rockets, require little or no trimming. Rocket construction is basically easier, quicker and makes use of simple, uncomplicated components and materials.

Body tubes are usually made from thin walled, spiral-wound paper tubing. The major manufacturers supply a variety of sizes, ranging from tubes which are a snug fit over the 'mini' 13mm diameter engines to almost 4 ins. diameter (100 mm). The specialist supplier, *Competition Model Rockets*, produce a series of lightweight tubes which are sized around the various engine diameters. *CMR* also supply tubes which are a sliding fit over each of their standard sizes. This is a very useful feature, especially for making joints and tapered sections in rocket bodies.

For scale models it is possible to make tubes by wrapping paper strip or balsa wood around a suitably sized former. This is rather beyond the scope of this column at present however, the subject will be discussed in detail in a later article. Table I lists the tubes supplied by the American manufacturers, *Estes* and *Centuri*, giving the codes used and showing the internal and external diameters available. The standard length supplied is 18ins. - metric units have not arrived in the USA yet!

Nose cones are supplied in a bewildering variety of shapes and sizes based upon each manufacturers range of body tubes. The most common material is balsa although kit models often feature moulded plastic cones

which, of course, have the advantage of being ready to use without finishing and painting. Ultra-light nose cones, moulded in a plastic rather like ping-pong ball material, are produced by *Competition Model Rockets* for contest and high performance work.

Engine mounts deserve more than a little attention. In the simple case where the body tube is just large enough to accept the engine all that is needed is a simple thrust ring glued into the tube so that the engine will protrude about 1/4 in. (Fig. 1). The protruding portion of the engine provides a useful, if not vital, grip for removing the engine after

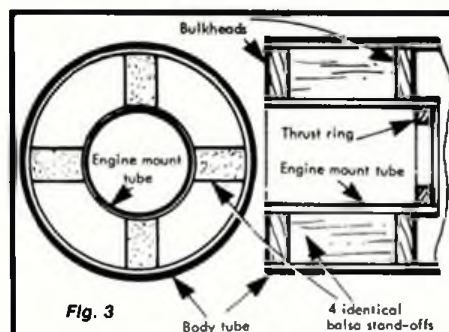


Fig. 3

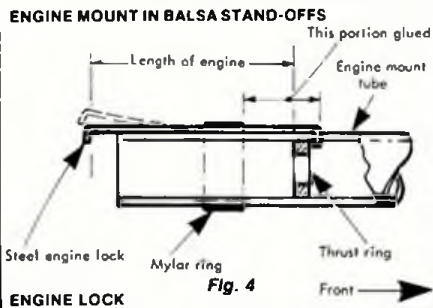


Fig. 4

flight. The thrust rings are supplied as separate items or can be made by cutting slices from spent engine casings.

When the rocket body is larger than a standard engine diameter it is necessary to mount the engine in a short section of tubing, complete with a thrust ring. The engine is then supported inside the larger tube on centring rings or in a built up assembly. (Fig. 2). It is also possible to support the engine mount with pieces of balsa (Fig. 3), but care should be taken to ensure that the engine is central in the main body tube and, most important, the mount should incorporate some form of bulkhead to seal in the ejection gases. Omit the bulkhead and it is almost certain that the parachute will not deploy!

Engine mounts as described are available as separate items from the major manufacturers and often incorporated into kits.

Engine locks are a very simple way of keeping the engine firmly in place during thrust and ejection. The lock is made from a



John 'at the launch pad' Wheddon preparing a high flying sports model ('C' engine) which he lost O.S. on the next flight at this British Space Modelling Association meeting.

1/8 in. wide strip of springy steel with each end turned over (Fig. 4) so that an engine will just fit between the two short end pieces. The lock is placed on the engine mount tube with one end glued into a small slit. A Mylar ring is then slipped over the tube to finally fix the lock into position. The front portion of the lock forms a thrust-stop and the rear part, which can easily be moved aside for fitting or removing the engine, restrains the engine during the ejection charge.

Contest modellers usually dispense with this type of engine lock and instead wrap adhesive tape around the engine to make it a tight fit in the body tube.

Fins are usually made from balsa, although 1/32 in. ply is often more suitable if durability is an important consideration. Kit models, especially 'beginner' types often have one-piece moulded plastic fin assemblies - at the expense of added weight, of course.

When using balsa fins it is important to ensure that the grain lies generally parallel to the fin leading edge (Fig. 5).

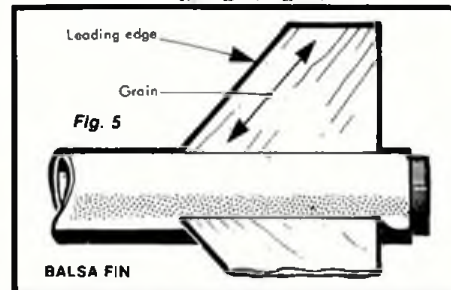


Fig. 5

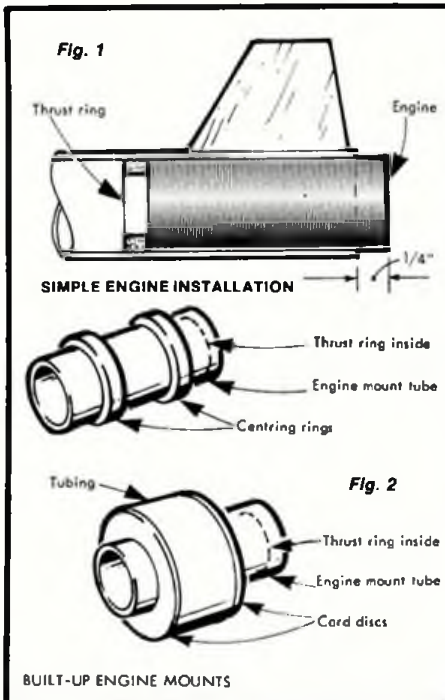


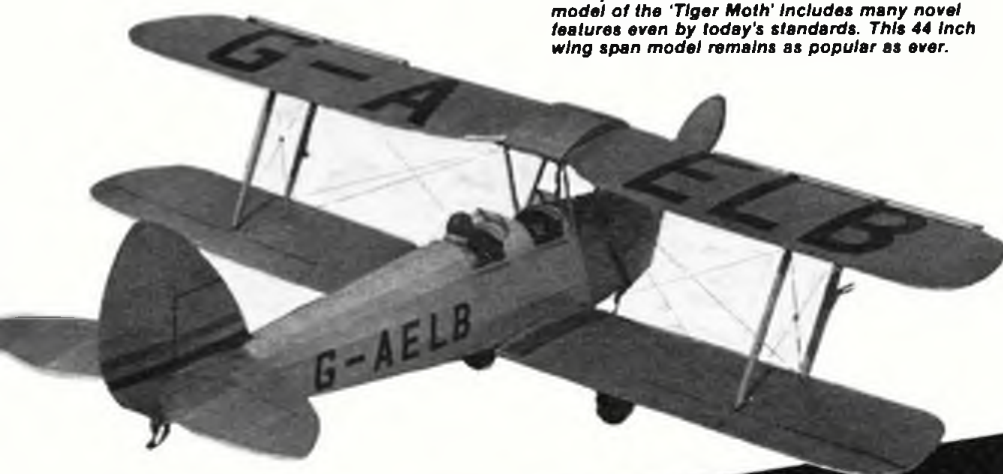
Fig. 1

Fig. 2

Type	Estes I.D.ins	O.D.ins	Length ins.	Series	Centuri I.D.ins	O.D.ins	Length ins.
BT-5	.515	.541	18	No. 5	.515	.543	18
BT-20	.720	.736	18	No. 7	.715	.759	18
BT-50	.960	.976	18	No. 8	.865	.908	18
BT-55	1.283	1.325	18	No. 10	1.000	1.040	18
BT-60	1.595	1.637	18	No. 13	1.300	1.340	18
BT-70	2.175	2.217	17.5	No. 16	1.600	1.640	18
BT-101	3.896	3.938	16.5	No. 20	2.000	2.040	18

Table I - Body Tubes

C. Rupert Moore's rubber driven 1/8th scale model of the 'Tiger Moth' includes many novel features even by today's standards. This 44 inch wing span model remains as popular as ever.



A TALE OF TWO TIGERS

Two of the most popular Aeromodeller plans have been these two versions of the de Havilland DH 82 'Tiger Moth'. The rubber powered model by C. Rupert Moore appeared as long ago as 1943 and the diesel version by J.W. Coasby based on this earlier 'Tiger' followed in 1954. It would be impossible to have a 'Tiger Moth' issue without referring to these models and reproducing the original plans...

Rubber Powered Version by C. Rupert Moore.

THE MODEL described here is a second and greatly improved version of the original appearing in Plans Service in October, 1943, and incorporates the "Moore Diaphragm", a self-adjusting tailplane, a "knockoffable" false nose and airscrew, and other unusual features. In order to deal fully with certain features I shall have to skim over the more usual portions.

The Structure

The centre-section struts are the key unit of this biplane, and, therefore, the top longerons are cut to allow them to continue unbroken to the bottom of the fuselage. The joints are reinforced with ply biscuits. The two sides, complete with centre-section struts, are built on a board and then assembled with temporary spacers in the top. Aft of the pilot's cockpit the stringers are braced with 3/32 sq. balsa after being fixed.

The Wings

Dihedral and sweep-back differs on top and bottom wings, so sweep-back is built into wing peg boxes and dihedral into the

wing pegs themselves. These peg boxes are wide to prevent breakage of pegs. The interplane struts are hinged in such a way that the top plane folds on top of bottom for transport.

The Undercarriage

The undercarriage is a structure of piano wire, faired with balsa. Every joint should be tinned first, bound with fine copper wire (fuse wire) and soldered solid. The rubber band shock-absorbers pass through two holes under the motor cowling to a wire saddle, located through two holes, at the bottom of bulkhead No. 1. These rubber bands are tied with thick thread to their attachment loops on the undercarriage. *Note* - the holes under the cowling are much closer together than their attachment loops, which causes the rubber to absorb much of its own backlash. The wheels are my usual laminated paper structure (so is the pilot). A half model of the wheel is turned in wax or plasticine attached to a 1in. oversized disc of plywood, through the middle of which is a bolt to facilitate holding in the chuck of a lathe or twist brace. The brace, if used, is

held in a vice and convenient sized boxes used as tool rests. When the half wheel is finished, a cardboard wall is stuck round the edge of the plywood. Fine plaster of paris is mixed; about 2½ desertspoons to 2/3rds large cup of water, added by sprinkling into water. A film of plaster is brushed over the half wheel to prevent bubbles, and then the whole poured in. When set, remove from plywood and carefully remove model. With very slow heat, the mould should be dried out, painted, and, when dry, greased. The pressing is made from five layers of newspaper, the first being soaked only in water, and the others in Gripfix. Press from the middle outwards and over the edge like a

hat brim (all five layers). Gripfix the inside, press in second layer and Gripfix - third - fourth and fifth.

After three or four hours, temporarily fill back of pressing with plasticine and turn out and allow to dry hard. *On no account use artificial heat.* When dry, banana oil inside and out and cement thick celluloid washers inside and out of hub. Lay pressing on its "brim", trim off. Make and cement a balsa hub inside one of the pressings and allow to dry. Cement the edges and hub end and bring the two halves together. Thread on an axle, and, by twisting the pressings, adjust till wheel spins true. Edges can be pinned temporarily. Over the joint paste ½in. strip of newspaper and over that again a black bias binding tread, using 50-50 Durofix and banana oil. Give four coats black dope. Remember when making moulds or taking pressings, vaseline prevents sticking.

The Gearbox and Nose Block.

The gear box and false nose are separate units, joined by powerful spring clips. The propeller shaft is cut in halves in order that the whole false nose and airscrew can knock off in case of obstruction. The rear half engages the front half of the propeller shaft by means of a simple fork and T-piece. Gears are used to throw the rubber motor below the internal structure.

Step-up gears were tried out but found a disadvantage. The lower shaft has 1/16in. (or more) forward travel and is spring-loaded. The top of the spring is so shaped that it comes into contact with a curved T-piece on the end of the top shaft, as tension dies away, the curved ends of this locking plate allow the spring to ride over it for several revolutions.

Before soldering the airscrew driving plate, the airscrew should be turned to a horizontal position, so that it locks itself there out of the way. A freewheel on a model of this weight-airscrew ratio is less advantage than a good landing. The ½in. three-ply base plate is cut and built up with

plug portion behind and also in front. It is then drilled to take brass-screwed bushes and also $\frac{1}{8}$ in. holes for spring clips. The top shaft is cut a little too long. All shafts, gears, driving plates, etc., should be sanded bright with glass-paper. Inside the gear axle hole should be cleaned with suitable drill and the gear teeth painted with coloured dope. This makes sure solder sticks where it is wanted and does not stick to the gear teeth.

Tin the front $\frac{3}{4}$ in. of the shaft and wipe off all surplus solder with a clean rag while molten. Slide on gear and solder in place. Make the cross-pieces which hold the driving fork prongs by folding a strip of 20 s.w.g., brass double and drilling both together. Drills are easily made by filing piano wire to a square taper point. Build up between plates and also right up to gear face with two or three layers of fine tinned copper wire (fuse wire). It is wise to bind round the plates themselves. The holes for the prongs should be aligned by pushing match sticks through, then solder into one solid unit. Prongs should be cut, tinned and put in place (ends should touch gear face) and soldered. The other end of the shaft should be tinned and well wiped.

Put shaft in its bush and thread on paper washer (to prevent solder sticking to bush end). Next, put on locking plate and build up behind and up the face of plate, a conical collar of fuse wire, $\frac{3}{16}$ in. long and $\frac{1}{8}$ in. diameter, and solder solid. All soldering is done in this way.

Soft solder will not stand the strain of a heavy motor unless it is spread over a considerable area, so use fuse wire generously. One or two points about the lower shaft: To allow for $\frac{1}{16}$ in. travel, use cardboard in place of the paper washer. A $\frac{3}{8}$ in. tin disc is soldered behind this card on which the spring rides. Behind this is a

$\frac{1}{16}$ in. bore brass collar (or fuse wire). Behind this again is the 16 s.w.g. silver steel or soft iron rubber loop which is also bound on and soldered into a solid unit.

When these gears are in place a plywood box is built up round the gears, which are on the front of the base plate. This box acts as a locating plug for the false nose. The $\frac{1}{16}$ in. plywood false nose back-plate should be cut to fit exactly over this box and then trimmed to the outside. The nose should be roughed out, well oversize, and the $\frac{3}{4}$ in. shaft hole drilled right through it. Carve out block to fit snugly over box.

Fit powerful 20 s.w.g. piano wire clips through gear box and clear wood from side of false nose cavity to accommodate them. Screw on doubled tin catches, then nose should snap on and off with considerable force.

The airscrew shaft should be made complete with driving plate. The bearing for this shaft is a brass bush which is screwed tightly through the centre of an $\frac{1}{8}$ in. thick plywood disc, and a locknut added. This bush projects forward and the back of the airscrew is hollowed out to clear it. With the false nose in place and the propeller shaft in its bush, place the disc on the front of the false nose. Add washers until the end of the propeller shaft just touches fork shaft. Cement back of the disc well and, spinning the shaft between the fingers, move disc about until it turns freely with no stiff positions. The false nose can then be shaped up. Leave $\frac{1}{4}$ in. of shaft beyond the airscrew and use plenty of fuse wire: it will need it. Finally fix the locking spring.

Covering, Doping and Colouring.

The fuselage is covered with heavyweight tissue, the wings with medium, and the tail

and rudder with lightweight. Watershrink everything and give two coats of banana oil (half thinners). Coloured dope was sprayed on with a Flit spray. The model is in the livery of the Liverpool and District Aero Club and is an early version of the Moth. Fuselage: all struts and undercarriage - medium chrome; wings, tail and rudder - silver; registration letters - black; rubber bands - top: grass green, middle: gold, bottom: burnt umber (chocolate). Airscrew - silk covering: ocean grey; boss: french polished; L/E. (brass): gold-tarnished green.

Rigging.

Assemble the wings and check dihedral and sweepback by plan. The struts should be eased to take their natural angle and bound in position. The incidence wires should be cut to length and fitted and then the struts faired. (28 s.w.g. piano wire is used throughout for bracing.) Cut flying wires, fit at strut lugs and form loop at attachment end so that wire is $\frac{1}{8}$ in. too short. A stout thread loop goes through wing to rubber tension band. Cut and fit landing wires in a similar way, $\frac{1}{8}$ in. too short.

The Tailplane

The adjusting mechanism is well shown on the plan. Care should be taken that the tail in gliding position is as on plan, and packing under spar added to allow only 1mm. travel to "power" position. This packing can be cut away and downthrust removed gradually with experience.

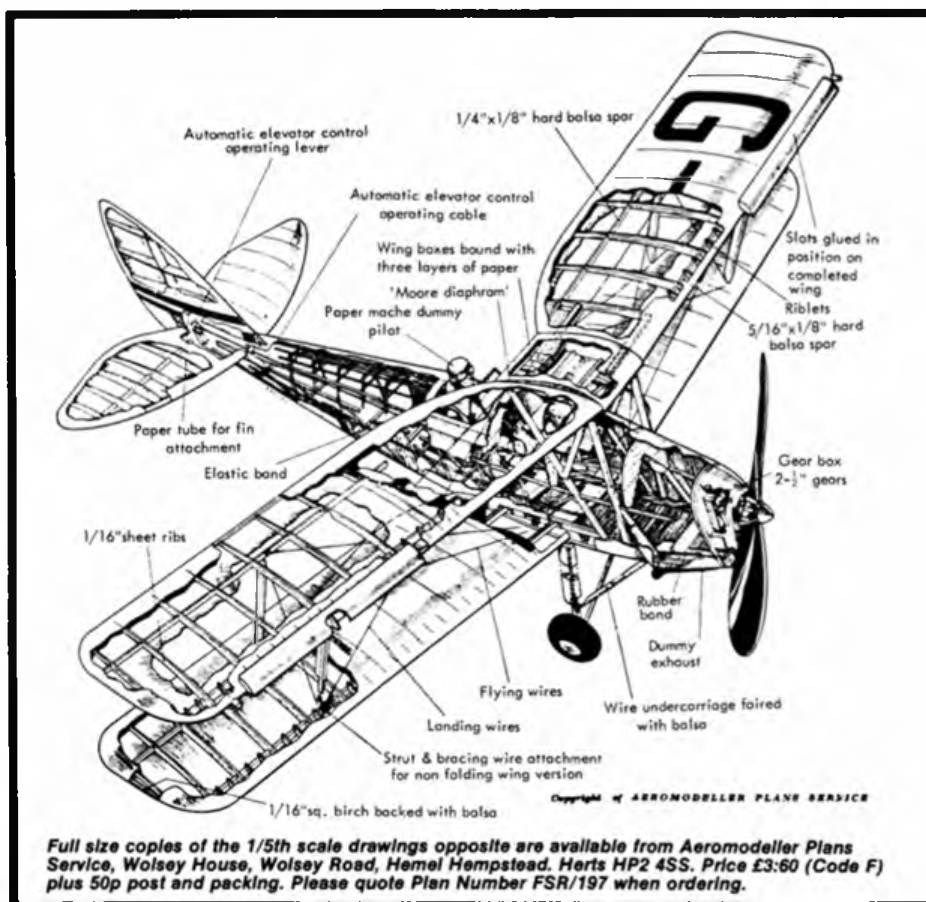
The Rubber and "Moore Diaphragm" (Patented)

To overcome the necessity of ballast, I have evolved a method of installing the rubber so that a greater mass of rubber is in the front half of the motor. This is simply done by fixing a bulkhead or diaphragm, at right-angles to the rubber line, halfway between the front and rear rubber anchorages. In this diaphragm is a circular hole in which is located a circular plug, through the centre of which is a shaft running in a brass bush. This plug is free to dislocate and locate itself when winding and does so without help automatically. A very much overlength motor is divided into two unequal skeins (ratio about two to one), but containing an equal number of strands. These skeins are pre-wound and attached to the plug, the long skein in front and the short behind. The attachment is by means of pig-skin (soaked in castor oil) stitched firmly to the plug shaft ends and similarly to gearbox and tail shackle. When wound and nose block is in place, the plug prevents the short skein pulling the long skein through the diaphragm: hence there is *twice* the weight in front of the diaphragm.

The leather ends prevent all rubber bunching.

Testing

Check for centre of gravity as plan. (If necessary temporarily ballast.) Add $\frac{1}{16}$ in. packing at top of nose block and give 100 turns. Lift tail and fly off ground. Adjust downthrust, adding 50 turns at a time only. C.G. can be adjusted finally by adjusting ratios of rubber skein lengths. Full duration tests have been impossible owing to poor quality rubber, but at pre-war rates, allowing 63 per cent. airscrew efficiency and 700 turns, power flight alone should be 700 feet, i.e., 38. to 40 secs.



Engine Powered Version by J. W. Coasby.

The diesel version of the 'Tiggy' was drawn by J.W. Coasby and based upon C. Rupert Moore's original rubber powered version retaining the same scale (1/8th) and wingspan (44ins).

OF ALL THE aircraft that have borne R.A.F. roundels, the one dearest to most hearts is the De Havilland 82 Tiger Moth. Thousands of pilots have received their aerial baptism in the rear cockpit of a "Tiggy" and such was its service versatility that, in case of dire necessity, it became an operational bomber in the cause of defending the British Isles in 1940. Fighter pilots delighted in throwing the squadron "relaxation" Tiger around the sky between duty calls for it was, and still is said, that the true sensation of flight is only felt when the wind roars about one's ears and the slipstream buffets the cheeks as an open cockpit Tiger is put through its paces.

Modellers, too, have a soft spot for this, the almost original of "swept-wing" aircraft, and for many years the A.P.S. plan for a rubber-driven accurate scale version by C. Rupert Moore has been one of the most popular *Aeromodeller* scale plans. Many were the conversions made for diesel power, and great the variety of engines used in such a modification. Requests for a special conversion plan were met with this introduction to the A.P.S. range of an entirely new drawing, type-tested with two prototypes, and made as accurately to scale as only the closest study of the full-size aircraft permits.

The original prototypes were powered by motors well known to 'vintage' enthusiasts - the E.D. 'Bee' and the Allbon 'Javelin'. There are several very suitable engines available to today's builders and those that come readily to mind would be the P.A.W. 100 and 149 and the recently reintroduced A.M. 10 and 15. This model is a docile and stable design that could very well be powered by even larger motors should the need arise.

A typical flight pattern is a smooth left hand circle after take-off or handlaunch, with a slow rate of climb up to perhaps fifty feet in 20 seconds. With a pair of dummy pilots in the cockpits, the Tiger can hardly be distinguished from the real thing as it occasionally jerks its wings a fraction to correct the bank just as though a midget pilot was applying a spot of aileron. The 'Javelin' version would hold altitude in a circuit no more than 50 feet across and flying like a Goodyear racer around

imaginary pylons. Also tried - was how much elevator packing could be added for maximum range of trim, and as much as 3/8 inch can go under the trailing edge without untoward effect. This, then, is a tried and tested design that is as flexible and as insensitive to trim as any scale model of our knowledge. For the modeller with a little building experience, and a zest for making something accurate in detail with plenty of opportunity for a fine colour finish, the Tiger Moth should be an absolutely first choice.

Constructional details are stencilled on the full-size plans to make it self-explanatory; but a few points of emphasis would not be amiss for the prospective builder.

The 'Javelin' version was finished 'all yellow' but with Oxford University Air Squadron insignia on the port cowl and 1947 type roundels (see text). This model was built by John Darnell seen below left, test flying the original model back in 1954.



Key unit of the fuselage structure, which is built in the customary sides-box-top former system, is the wing centre-section strutting, and every care should be taken to see that each important joint is securely bound or soldered as the case may be. Any movement here can nullify all the care and attention devoted to the rest of the model as dihedral sweep-back and incidence of the top wings depend on accuracy in centre-section assembly. Wings are of normal structure, the multiple false leading edge ribs adding scale detail as well as maintaining an important part of the scale aerofoil. Dihedral and sweep differs on top

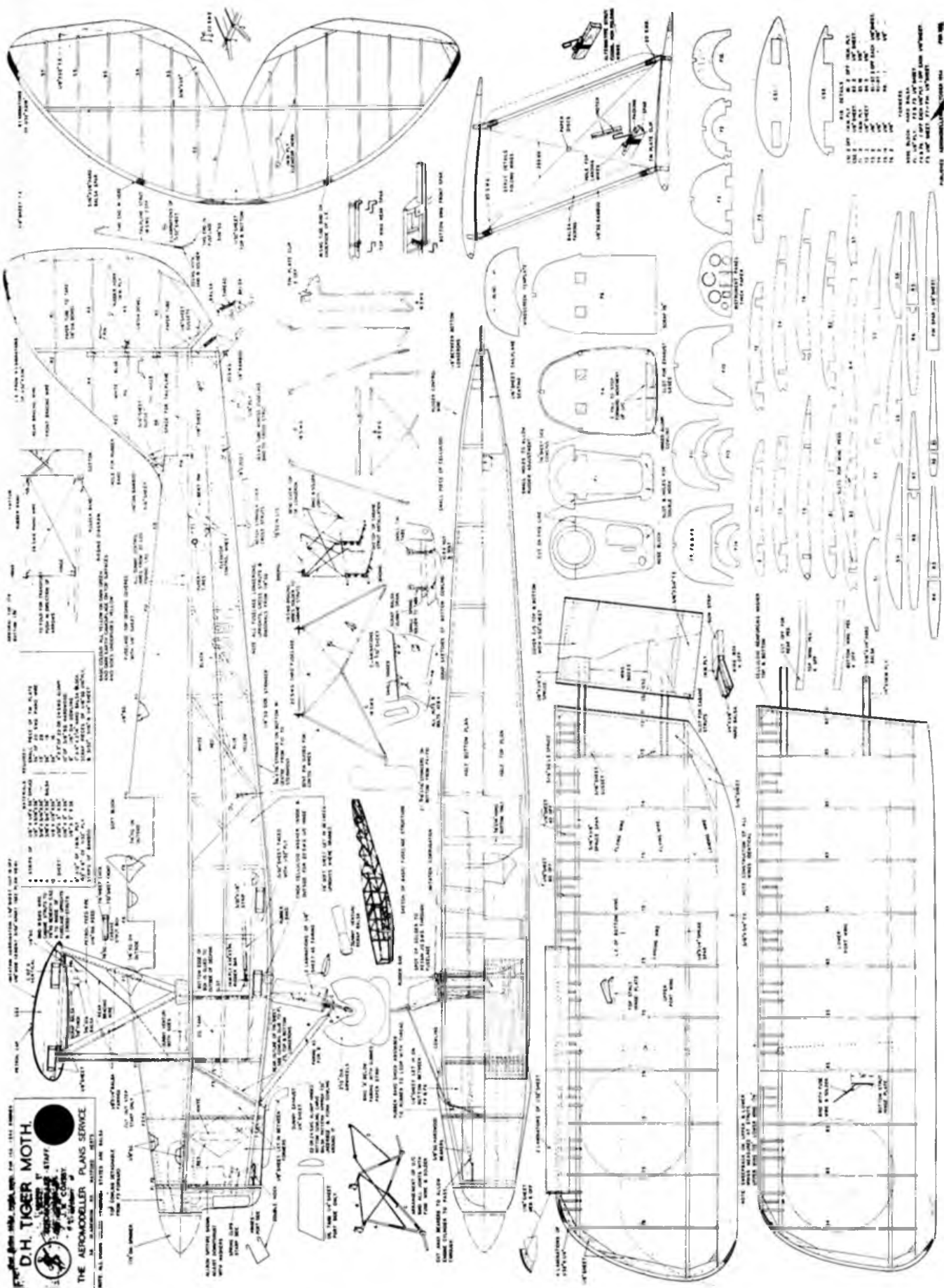
be added in the form of dummy venturi tubes, control wires, exhaust, etc., after covering with lightweight *Modelspan*.

Colouring the Tiger allows as wide a range as any modeller could desire, for apart from service aircraft, civilian D.H. 82's have appeared in décor varying from all-red to all-silver with intermediate combinations of blue and cream, green and silver, etc., according to the whims of clubs or private owners. Service colouring was used for the two test models and the 'Bee' version bore the markings given on the plan which are for a 1939 vintage trainer, over an all trainer yellow scheme. The 'Javelin' version was also all-yellow, but with the Oxford University Air Squadron insignia on the cowl, and 1947 type roundels plus the large registration and code lettering in black on the fuselage side. Strictly speaking, all aircraft with these markings should also carry the tailplane strakes fitted to later Tigers.

Copies of the 1/5 scale drawings opposite are available from Aeromodeller Plans Service, Wolsey House, Wolsey Road, Hemel Hempstead, Herts HP2 4SS. Price £4.40 (code G) plus 50p post and packing. Please quote Plan Number FSP/555 when ordering.

Aeromodeller





ONS • SECTIONS • SECTIONS •

A GREAT DEAL of extremely high class rubbish is spoken or written about aerofoil and their selection and performance under the conditions that exist around a model aeroplane!

No, we are not trying to imply that the many aerodynamicists who have applied themselves to designing and flying models are not accurate and truthful in reporting their findings, determined either theoretically or empirically. The majority of them are dead right whilst expounding about their particular choice of wing section **BUT** and it is a big '**BUT**', does the *average* modeller, competition or sports, have a template on hand when he shapes that 3/8in square piece of balsa he is using for the leading edge? Or does he first trim away the excess wood with his balsa knife and

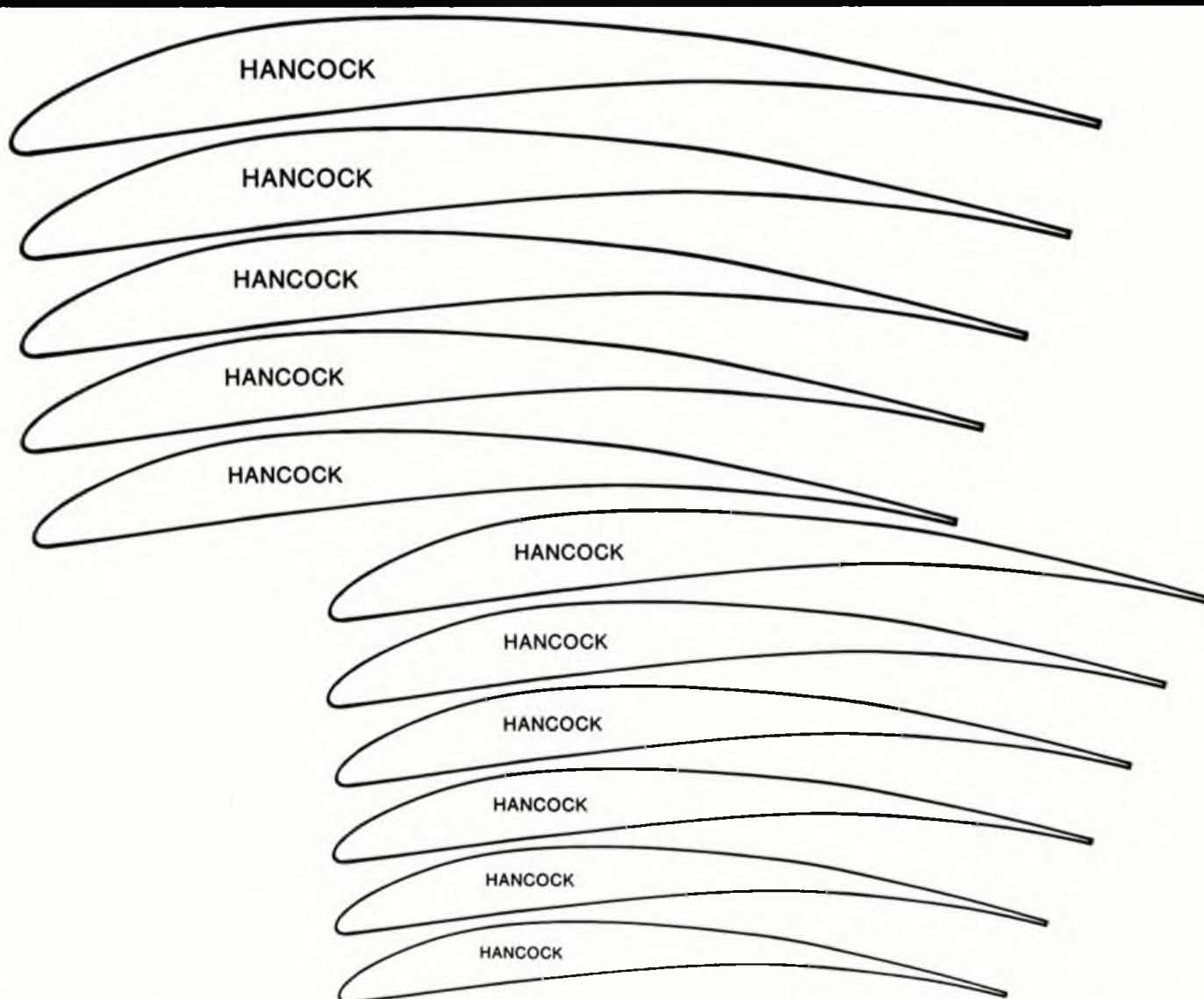
then sand away the rest, so that the top surface of the wing blends into the L E neatly? Did the trailing edge really have a blunt end with a 1% radius? Or should it taper to a very fine point? Does it matter? The simple answer in the vast majority of cases is probably no!

Almost anything will go up in a thermal and the 'still air' performance from many 'reasonable' sections is only different when the trimming procedure for the model has been exhaustively carried through. How many of us have actually, progressively altered the CG and the wing/tailplane incidence to find the optimum positions... or do you get the CG about right and shim the tail a bit to get rid of that incipient stall?

Please don't think that this is all intended to pour cold water over the small percentage

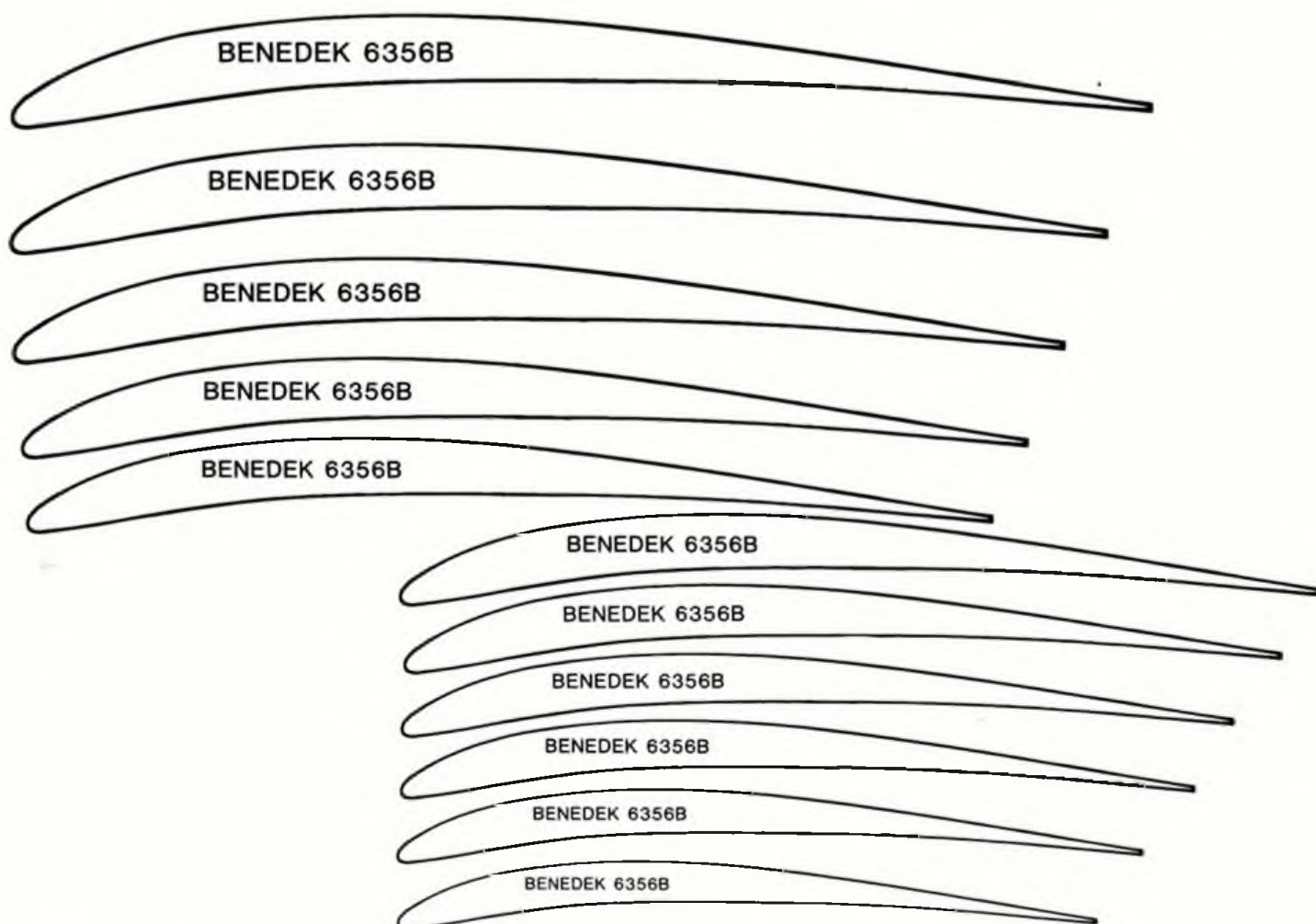
of modellers who really know what they are up to. It is merely to suggest to the majority that they should choose wing sections from a different viewpoint. There is little point in choosing an airfoil that has a small maximum thickness 4-5%, unless you are going to build the structure to suit - possibly even using carbon fibre trailing edges and webbing. Much better to use a slightly thicker section that you can build accurately using more conventional materials. Consistency (from wing to wing) and trimming will pay greater dividends than an inaccurately built and used, modern exotic section.

Some of us have little fads in wing section choice, that have little to recommend them other than "I prefer a rearward maximum camber..." or "I like the look of..." Often



Section	HANCOCK																	
Station	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
Upper	0.8	2.3	3.5	5.3	-	7.6	-	10.4	-	11.5	11.7	11.4	10.3	9.0	6.7	3.9	-	0.8
Lower	0.8	0	0	0.4	-	1.0	-	2.4	-	3.6	4.5	5.4	5.5	5.1	4.1	2.5	-	0

SECTIONS·SECTIONS·SECT



Section	BENEDEK 6356B																
Station	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	100
Upper	0.7	2.18	3.14	4.55	5.65	6.53	7.78	8.55	9.0	9.15	8.96	8.23	7.1	5.75	4.08	2.23	0.22
Lower	0.7	0.03	0.15	0.42	0.78	1.12	1.85	2.45	2.92	3.25	3.57	3.65	3.5	3.0	2.22	1.19	0

these rather unscientific choices coupled with care in building and trimming result in a perfectly viable model.

One thing that this modern day and age does give (well perhaps not give!), is the home computer and even programs for some of them to draw out our chosen sections. One particularly interesting program is a new one that *MAP Software* (who else!) have just brought out - called 'Multifoil', Price code J (£6.00 + 60p post and packing) and is for the *Sinclair 'Spectrum'* computer.

This program contains some 24 sections for you to print out either to the screen or to a ZX Printer (or *Alphacom 32 Printer*) - these may or may not suit your needs! Fortunately there is the facility to enter your own co-ordinates - and save them for future use. Once told what to do, the program will print out sections to the size that you ask, even

taking into account tapered or elliptical (!) planforms. Also in the process, indicating spar positions and compensating for skin thickness!

Now so far, this is just fine, although other programs will also give a similar performance. Where 'Multifoil' comes into its own, is that you can also modify the sections with respect to thickness and camber and of course length.

This facility makes for some very pleasant hours spent in front of your TV display! Take 'Clark Y' give it some camber, thin it down - hmmm, quite a respectable section, and that was just using 'Clark Y' as a basis. Playing this way with your favourite aerofoils can yield all sorts of interesting possibilities! Perhaps they are not all practical and also in view of what was said above, perhaps they won't produce 1985's

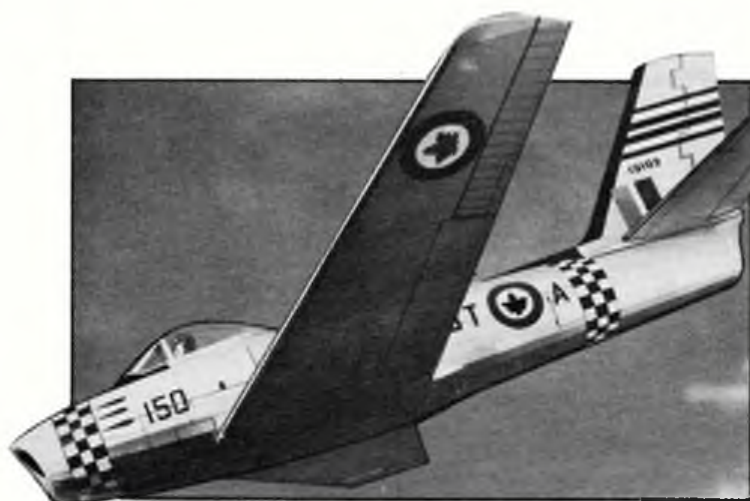
'wonder section' but it does enable you to 'zero in' to an airfoil that is 1) what you like and 2) at least based, upon some proven (?) section.

Shown here are two of the sections that you might find interesting/useful. Both sections are fairly 'old hat', but are proven sections for gliders. One is 'thickish' and has a rather rearward point of maximum camber, the other is 'thinish' and displays a more forward point of maximum camber. Co-ordinates are given so that you may either construct your own (modify them with 'Multifoil?'), or use them as templates. The sections are drawn to different chord sizes to hopefully suit your present needs. If you have a particular request please let us know and we will endeavour to find it and include it in a future issue.

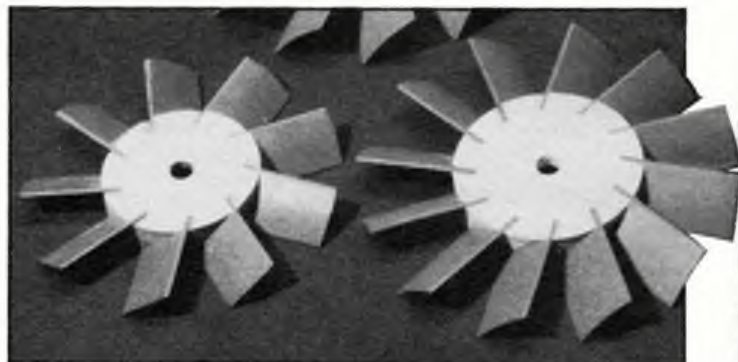


SHOP TALK

NEW MODEL HOBBY PRODUCTS REVIEWED



Left, the ducted fan 'Sabre' although not vintage is an impressive flier in the same series as Veron's 'Lavochkin 17'. Below, ducted fan impellers types 'A' and 'B' suitable for .5cc and 1cc motors: available from Phil Smith.



Vintage plans

With the continued interest in vintage modelling, it is not surprising that modellers cry out for some of the proven 'oldies' that originally came out as kits. The earlier Veron range has always been a good starting point for the potential vintage flier. For many years Phil Smith produced, drew and generally kept a watchful eye on this company's products, he now has available a number of plans at very reasonable prices. These include such classics as 'Stentorian', 'Comet II' and 'Streaker'. There are also several ducted fan models one of which the 'Lavochkin 17', we believe was the first kit produced for this type of propulsion and appeared in 1948. To complement these plans, Phil has reintroduced the fibre bladed impellers to suit motors up to 1 c.c. To get the latest details and price list send a s.a.e. (9 in. x 4 in.) to Phil Smith,

bending of materials for some time, but usually these have been heavy workshop items and have consequently had a pretty heavy price tag! C.Z. Scientific Instruments Ltd., have recently introduced an extremely useful 'Universal Metal Bender' that comes within the financial range of the modeller, and has a good specification. The 'Universal' is fairly compact, measuring only 25 cms when extended and will bend pipes and rod up to 10 mm diameter and shape sheet metal up to 40 mm wide. This mini-bender comes ready to use with an assortment of mandrels and grooved bending rollers. The 'Universal' has a recommended price of about £29.95 and should be available from stockists of C.Z. tools (DIY shops etc) Should you not see one of these locally, write for details of your nearest stockist to: Hobbyat Department, C.Z. Scientific Instruments Ltd., P.O. Box 43, 2 Elstree Way, Borehamwood Herts WD6 1NH.



A 'Comet II' built from plans available through Phil Smith (see Vintage Plans) This model was the 'granddaddy' of the CO₂ replica published in December '84 Aeromodeller.

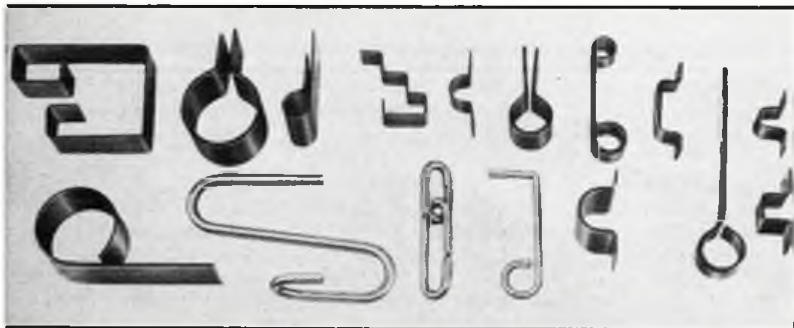
addressed envelope (9 in x 7 in) together with the necessary postal coupons. SAMS: 2 The Drive, Wheathampstead, Herts, England.

R. M. Brooks

The R.M. Books range includes such well known titles as Radio Control Slope Soaring by Dave

Hughes and Radio Control Thermal Soaring by George Stringwell. These, together with four other R.M. titles have been acquired by Micro-Mold, better known for their kits and accessories. The entire range of R.M. Books will now be on sale at reduced prices ranging from £4.95 to £5.50.

Below, the 'Universal Metal Bender' from C.Z. Scientific Instruments together with a selection of mandrels and grooving rollers. Left, some of the shapes that the 'Universal' can help you bend.



32. Verwood Crescent, Southborne Bournemouth Dorset BH6 4JE.

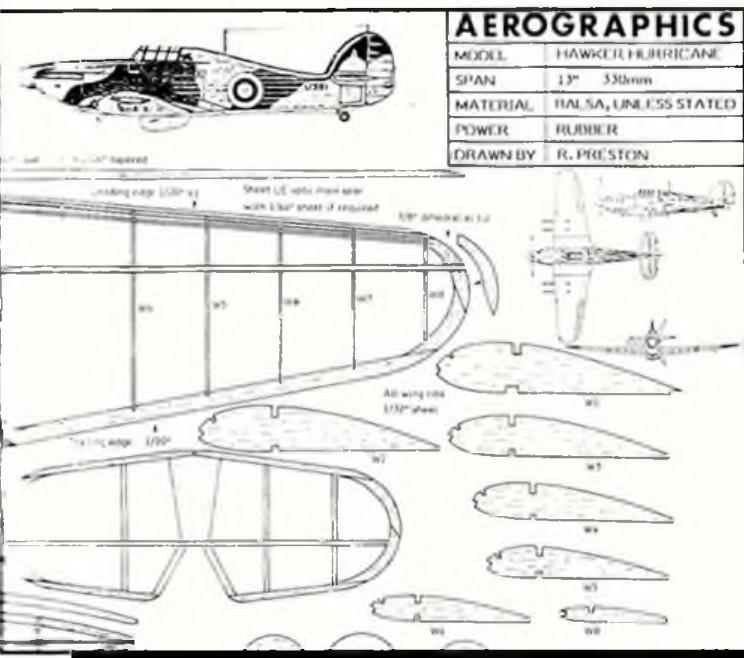
Round the bend ...

Bending heavy gauge wire or strips of sheet metal accurately can cause us all problems! There have been tools to assist in the

SAMS en francais

Well known for their supply of materials for the free flight and indoor flier, SAMS of Wheathampstead now have their 1985 catalogue fully translated into French. This is available free of charge on receipt of a self





AEROGRAFICS	
MODEL	HAWKER HURRICANE
SPAN	13" 330mm
MATERIAL	BALSA, UNLESS STATED
POWER	RUBBER
DRAWN BY	R. PRESTON

Hurricane peanut

Aerographics of Chippenham regularly provide us modellers with a steady flow of interesting plans for small models. Their latest efforts are towards a range of Peanut Scale models of WWII subjects. The first to appear is the *Hawker 'Hurricane'* - 13 inch wingspan, which will sell for £1.60. To complement this plan there will also be available a pack of printed wood, containing fuselage formers, wing ribs and other hard to mark out items. Price of this 'wood pack' is £1.00

Books and yet more books

The Complete Microlight Guide by Ann Welch. Published by *E.P. Publishing Ltd.* 160 pages, lots of colour illustrations and colour photos. Hardback 8 1/4 in. x 8 1/4 in. Price £7.95.

Not perhaps an immediate choice of title for the modeller, but assuming that many modellers often 'migrate' to full size flying, via the intermediate step of Microlights, then this book becomes the essential companion.

If you are only thinking of Microlights let alone buying one, or even know someone who might, then consider this book!

Ann Welch, a knowledgeable expert compiled this complete, concise encyclopaedia of the rapidly growing sport. Many photographs illustrate popular types of Microlights available, lots of close-up detail shots leave one in no doubt about the points being made in the text. Coloured illustrative diagrams show approach patterns, cloud formations and weather

Left and below, two of the 'R.M. Books' titles for the R/C model enthusiast. Other titles cover helicopters, Scale aircraft and general R/C.



and it is designed to take away the chore of accurately transferring awkward shapes from the plan to balsa and consequently should speed up production of the finished model. For brochure of plans plus a sample (I) send a s.a.e. (9 in x 4 in) to *Aerographics*, 43 Chamberlain Road, Chippenham, Wiltshire SN14 0TF.

April 1985



prediction, very concise and clearly presented.

Excellent value, spread the word, it will become the Microlighters' Bible.

Guide to Homebuilts. 9th Edition. by Peter M. Bowers. Published by *TAB Books Inc.* 250 pages, b & w illustrations. Soft covers, 8 1/4 in. x 5 in. Price \$11.50.

This specialist publication is aimed at the homebuilt aircraft movement, indeed a standard yearbook for them, now in its 9th edition. Doubtless the really ardent scale modellers will find many ideas and solutions between the covers.

To be scrupulously fair the text is very complete and the photos fascinating. Subject headings vary from, Types of machines, Construction Methods, Design, Flying, through to Costs and Legal Requirements. As one might expect from a publication originating in the US, the chapter on availabilities and costs might be misleading for the UK.

It holds good general interest, but is most valuable if you have a 'hands on' project in the garage. **The Complete Guide to Rutan Aircraft.** 2nd Edition by Don & Julia Downie. Published by *TAB Books (USA)*. 232 pages. Soft covers 7 1/4 in. x 9 1/4 in. Price \$13.50.

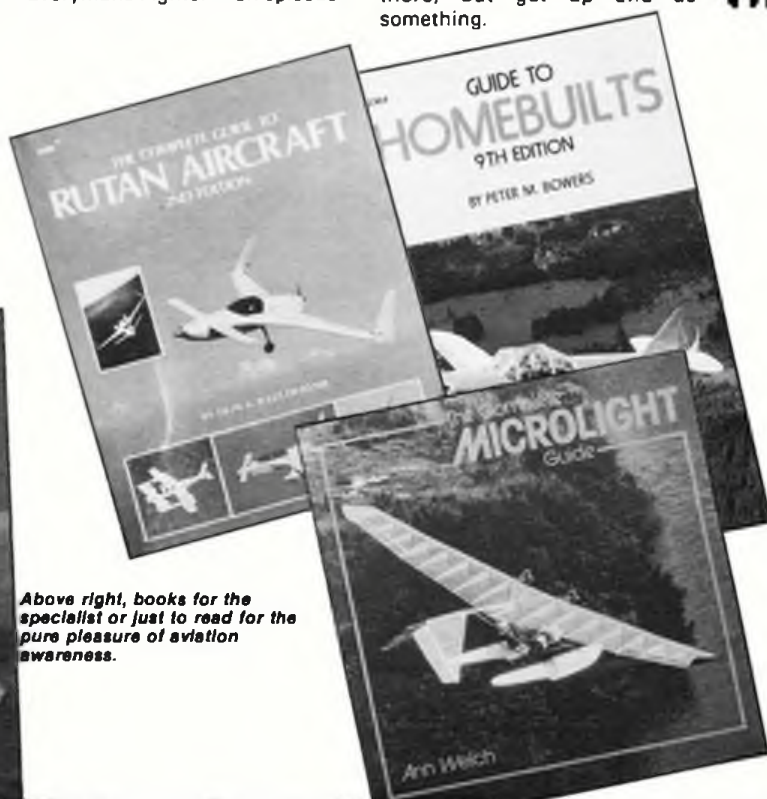
This soft covered publication is effectively a historical anthology of Burt Rutan, and indeed the whole aviation orientated Rutan family are included where this is a relevant connection. There can't be many yet to become aware of the sleek and often unconventional designs attributable to this man. The text details his flying career from the USAF, to civilian engineer, then into the employ of Jim Bede that one time exponent of home built BD-5's 'Everymans Fighter' - an episode

which could probably be the subject of a separate book or two. Rutan's main involvement at Bede Aircraft was with the BD-5J a jet powered version, and notably the most successful derivative to date. At the same time Rutan was building and developing his first design 'Vari Vigen' influenced more than a little by the *SAAB J-37*.

In due course the 'tail-first' became a trademark of Rutan designs. After 'Vari Vigen', which had used conventional constructional materials and was taken up by many homebuilders, came the main breakthrough in homebuilding techniques, that of the composite styrofoam/glass-fibre 'Vari-eze'. This futuristic design and its construction created a wave of enthusiasm, almost like that of Henri Mignet and his 'Flying Flea' 50 years prior. From this success sprang rapidly the 'Quickie', the 'Long-Eze' and 'Quickie Two'. These four designs have been dubbed 'Rutan's Star Wars Fighters', and have been constructed in large numbers in the USA and Europe.

Since then, designs have continued to be equally innovative, the 'Grizzly', the 'AMS/Oil Racer', the 'Defiant Twin', 'Soltair' motor glider, the 'Lotus' microlight, up to the prototype 'Beech Starship', and 'Voyager' his long distance record breaking contender. All these aircraft, together with various lateral developments, and the reasoning behind them, have detailed data and description.

This is a very readable book, no doubt of primary interest to Rutan builders, but also of inspiration to general aviation fans if only by examples of what can be done if you don't just sit there, but get up and do something.



Above right, books for the specialist or just to read for the pure pleasure of aviation awareness.

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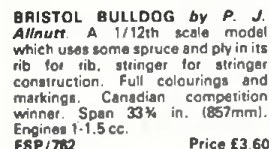
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