Aero modeller

APRIL 1982 60p
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MAP MODEL MAGAZINE

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NEW CONCEPTS IN KITES

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Aero modeller

APRIL 1982

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MAP MODEL DIVISION MAGAZINE

Advertisement Director M. GRAY
Managing Director RON MOULTON

Comment

The more we are together . . .

FEBRUARY edition of the American *Model Aviation* magazine celebrates a record 82,763 membership for 1981 and looks confidently forward to a new record of 85,000 for '82. Yes, that's right — 82,000 plus members of a national aeromodelling organisation!

Obviously American aeromodellers have a considerable sense of togetherness as they phrase it which has fostered regular AMA membership over the years, with benefits which have affected all American aeromodellers — AMA members or not. For example, as a direct result of AMA negotiation, R/C modellers in US may look forward to 50 new channels this summer — and that's only one example.

Our own SMAE is, in essence, much the same kind of national aeromodelling organisation — delegated by the National Aero Club to oversee organised aeromodelling activities for the benefit of all aeromodellers. Yet SMAE membership hovers annually at the 5-6,000 mark and although no-one could expect a membership comparable to AMA's, it ought to have a lot more than it has. The regularly encountered negative attitude is that "the SMAE does nothing for me."

Yet surely it's not a question of what can be obtained from our national organisation, but what members can collectively achieve within the organisation — the more we are, the more we can achieve, and the sky's the limit if you see what we mean!

Step one is to get the joining habit — write to SMAE, Kimberly House, 47 Vaughan Way, Leicester LE1 4SE — it could be the most constructive bit of aeromodeller you ever did.

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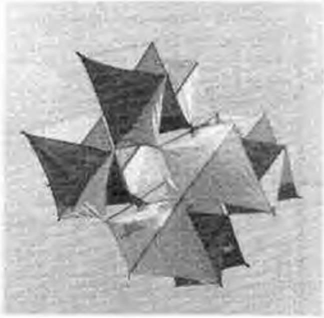

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On the Cover

Our article in this issue 'Learning to fly stunt,' could lead you to be a champion control line flyer, like Australian modeller John Tidey seen here with his 'Miss Laura.' Inset, two Sig Chipmonks built by Terry Taylor and Bob King

Next Month

Dave Hipperson, top scorer in the 1981 SMAE Results, has designed a super sports rubber powered model capable of over three minutes duration There will also be a full size plan insert for a profile C/L stunt model as well as a full size plan for a Vintage miniature 'Rambler' CO_2 model. On sale April 16, price 60p

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The Nitty, Gritty... Detail & Scale

Detail & Scale is a new series that should prove invaluable to the modelling enthusiast. Each volume provides detailed, technical and accurate coverage of some of the world's great aircraft.

Emphasis is placed on the details of aircraft and how they affect its operational capabilities. The illustrative material reflects this emphasis, with over 100 photographs, both colour and black and white, plus line drawings, of cockpits, radar, landing-gear, avionics bays, control surfaces and pylons. In addition, there is a brief, historical summary of each aircraft, kit and decal reviews, technical data and, when possible, scale 5-view drawings.

F-4 Phantom II
by Bert Kinzey

This, the first volume in the Detail & Scale Series, presents the most accurate and detailed coverage of the F-4C, F-4D and RF-4C available anywhere. Among the unique features in this volume are close-up photographs and line drawings of cockpit interiors, radar and avionics installations, armament, landing gear, wheel wells and ejection seats—all taken direct from either official flight manuals or McDonnell Douglas, so accuracy is assured. Special consideration is given to the detail differences between the variants and sub-variants of the aircraft.

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B-17 Flying Fortress
by Alwyn T. Lloyd and Terry D. Moore

The second volume in the series presents probably the most detailed coverage of this famous bomber ever published. The authors have dug deep into the manufacturer's files to find a mass of photographs that have never before been published. They show not only views of prototypes and production models, but also close-ups of cockpits, instrument panels, crew compartments, bomb bay interior, power plants, bomb-sights, landing gear, armament. . . . The colour pages feature photographs and also a series of highly-detailed cut-aways of the aircraft's compartments, and there are 27 line drawings, most at a constant 1/144th scale.

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Whatever your modelling interest, make a note in your diary now to visit the Midlands' own new modelling and craft exhibition.

Jointly staged by the Royal Agricultural Society of England and Model & Allied Publications Ltd., this great weekend event will demonstrate the best of what midland modellers and crafts people can achieve. Each of the seven exhibition halls will concentrate on different aspects of these hobbies. In one hall model engineering and woodworking, in the next model railways, boats, aeroplanes and cars, in another, military modelling and wargaming and in others gem crafts and all the other crafts.

Out of doors, live steam tracks, model car championships, model buggies, model boats in action and all types of model flying including helicopters, will be demonstrated.

A packed programme of lectures and films throughout the weekend will stimulate and inform visitors. Midland and National Modelling Societies will be exhibiting models and actively participating in all the events.

Whatever your modelling interest you are going to enjoy your day out with your family or friends.

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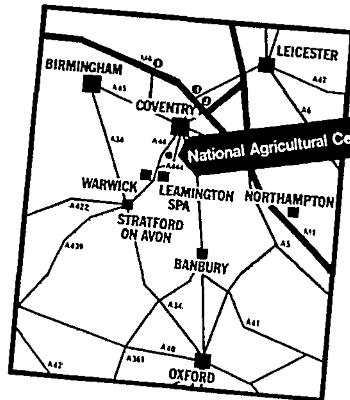

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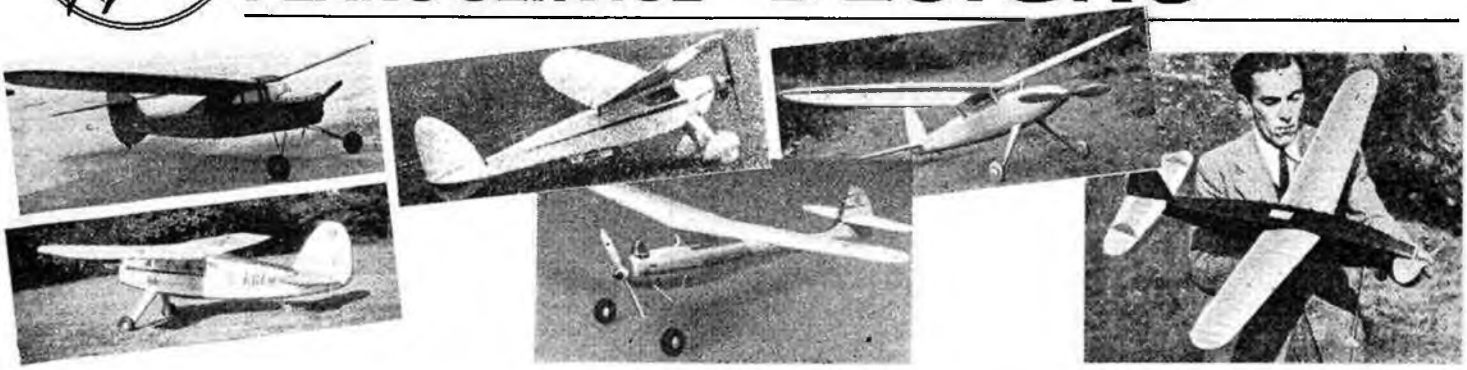

POWER MODELS

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Bucks Duck	77"	A. Day	Oct '49	PET/337	£2.25
Ethereal Lady	48"	Vic Smead	Jan '48	PET/291	£2.25
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Aeromodeller Wakefield	40"	Alm Staff	April '48	D/288	2.25
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Lulu	50"	J. Roberts	Nov '49	G/338	£2.25
Waco Hadrian	50"	O. G. Lee		G/219	£1.85
Walthew Glider	29"	R. Scott	Dec '49	G/341	£1.85

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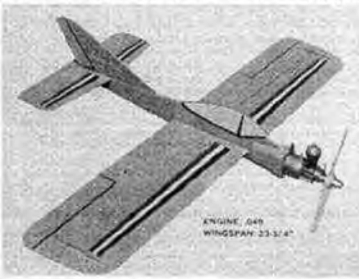

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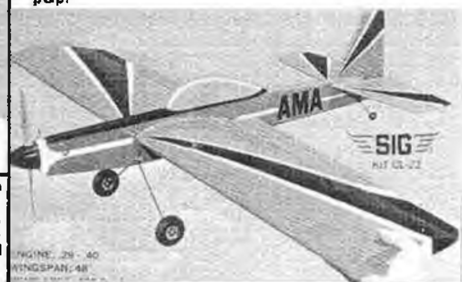

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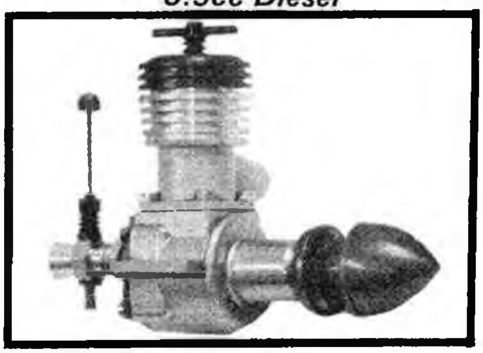

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Hangar Doors

This fine aerial view of the Royal Agricultural Society of England Showground at Stoneleigh gives a foretaste of the exciting meeting organised for May 22/23 where M.A.P. in conjunction with R.A.S. are organising the Model Craft and Country Show. The photo was taken by Dick Blenkinsop of the Coventry & District M.A.C.

New P.R.O. for S.M.A.E.

The S.M.A.E's new P.R.O. Cyril Fry, is one of those interesting 'T.A.P.' (Total Aviation Persons) having worked in the aircraft industry since 1933 until his recent retirement. Cyril worked on those famous biplanes of the '30s including the Hawker Hind, Audax and Fury, the Gloster Gauntlet and the better known Gladiator. He was also lucky enough to be involved with such then household names as Amy Johnson, Jim Mollison and Tommy Rose. His aeromodelling activities were then interrupted by the second world war when he was posted to the desert to argue the toss with a chap called Rommel.

Upon the cessation of hostilities he married, took up aeromodelling again and helped to start the Cheltenham Model Aircraft Club. He became their first Chairman and was the first in his district to attempt radio control, building Walt Good's *Rudder Bug* using an E.D. three valve single channel receiver and a Frog 500.

Cyril' interests are currently (not necessarily in any order of preference) thermal soaring, rubber duration, Wakefield, CO_2 and R/C generally, although he stresses that he is very much a 'Sunday' flyer.

He feels that the strength of the Society will only be increased provided it recognises that the majority of aeromodellers in the country are people very much like himself who fly purely for fun. Having recognised this, the S.M.A.E. must ensure that it caters equally for the fun flyer. Cyril is convinced that all model flyers need to band together for their mutual benefit and, as with industry today, one needs a 'union' to ensure that best representations can be made to the various authorities. In this way there is still a lot that can be done for the sport flyer. Cyril welcomes suggestions from all aeromodellers no matter how mundane they may seem. He will be only too pleased to lend an ear and will welcome all the help that he can get. He feels, quite simply, that a few new brooms might be just what is needed to give the National Society a boost! Write to Cyril Fry at 7 Benhall Gardens, Cheltenham, Glos.

CLAPA

The Control Line Aerobatic Pilots Association was formed to help newcomers and perpetuate this side of our hobby. Last year they organised several events which were most successful and of course, produced their regular newsheet 'Claptrap'. This contains: contest dates, contest results, plans and designs, building techniques, readers letters, etc. It also runs a Clapa League for Novice and Seniors with trophies for the winners and the most improved flier of the season. New members are most welcome; fees are Juniors £2, Seniors £3.50 and overseas members (all categories) £5.

Members joining after the start of the year will receive all back issues of 'Claptrap'.

Special Concession for advance ticket holders to the 1982 Model Engineer Exhibition

Due to the exceptionally bad weather conditions and the national rail strike, quite a large number of advance ticket holders, particularly from Wales, the West Country, the Midlands and the North, were unable to travel to the recently held Model Engineer Exhibition.

The organisers, Model & Allied Publications Ltd., are therefore making an exceptional concession which will allow all such ticket holders to use their ticket(s) to visit the 1983 Model Engineer Exhibition. This concession is of course, an exception to the general rule by which advance ticket bookings are non-returnable, and applies only to those who have retained their tickets.

Those who, in the meantime would like to visit the next major modelling exhibition spanning all the modelling hobbies, are reminded that the MODEL, CRAFT & COUNTRY SHOW will be held on May 22nd and 23rd at Stoneleigh, the headquarters of the Royal Agricultural Society, near Kenilworth, Warwickshire.

Schneider 81 Video

Andy Trowbridge, Chairman of the Beaulieu Committee, is offering the loan of a 40 minute video tape of the Calshott Schneider 81 event.

The film is mainly of R/C model flying and is a chance for those who participated and attended, to see themselves in action and also the marvellous 'Super Replica' and of course the 'Trophy'.

Andy does require the postage cost and a 1oz. tin of Condor tobacco per loan. Any club or individual should write to Andy Trowbridge, 7 Shirley Towers, Church Street, Shirley, Southampton.

Peter Donavour-Hickie

† Those readers who have memories long enough to recall the Festival of Britain and exciting days of Control Line Scale in the early 50s will be especially saddened to learn of the early death at 55 of Peter Donavour-Hickie. Peter's involvement in modelling and aviation took him away to the Continent and Ireland so that comparatively little had been heard of his activities until we ran the feature in February '80 on the Pitts Special and his pioneer model of the *'Little Stinker'*.

We last saw him at the Schneider Trophy Reunion, Calshott where he renewed many contacts with old acquaintances who will now miss him dearly.

Our sympathies are extended to his two sisters.

Our new sister-mag

From the April 1982 issue, a NEW re-styled MODEL RAILWAYS magazine will be hitting the bookstalls each third Friday of the month. The new magazine has more pages, with extensive use of colour, fully illustrated stage-by-stage constructional features and articles which are angled to lift the standards of the less committed railway modellers.

First of the re-launched issues includes a description of High Dyke, one of the most successful large British exhibition layouts, plus Iain Rice's monumental survey of 4mm scale motors and, for beginner and established modeller alike, the start of a series on basic electrification in a fact-packed issue. It's on sale *now!*

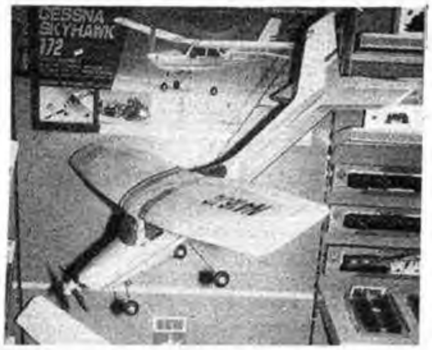
Dave and Janine Rawlings at their stand.

1982 British Toy & Hobby Fair

This annual trade show held at Earls Court, London, is the largest shop window for new World products to be seen in Great Britain. Amongst all the high flyers it was good to see Dave and Janine Rawlings with their range of DPR models, which included a new free flight glider kit of built-up construction. We shall review the model in detail in a later issue.

Veron had a new R/C glider on show, the 'Vixen', a re-design of their very popular 'Impala'. This will also be a model that will be given a full kit review as soon as we receive a sample. Also on the Veron stand were the range of improved Thunder Tiger engines and the glow version of the PAW 1.49.

The new R/C electric powered Cessna from Kohnstams.



Webra electronic ignition system.

Jack Williams Ltd. were showing the latest innovation from Webra, an electronic ignition system. An English technical description was not available with this first sample but briefly, there is a sensing inductance device epoxied into the outside of the engine crankcase backplate, which is triggered as the crankshaft conrod pin passes. This switches a small black box of electronics powered by a 4.8v pack which gives the spark. There was no apparent advance and retard controls.

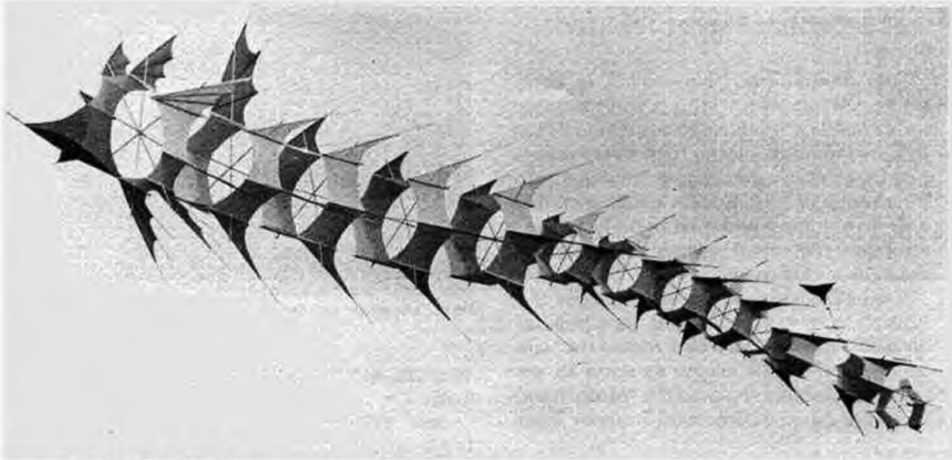
Richard Kohnstam Ltd. had a ready-to-fly R/C electric powered Cessna 172 and we understand the geared motor will be available separately as a spare; good news for all electric flight enthusiasts.

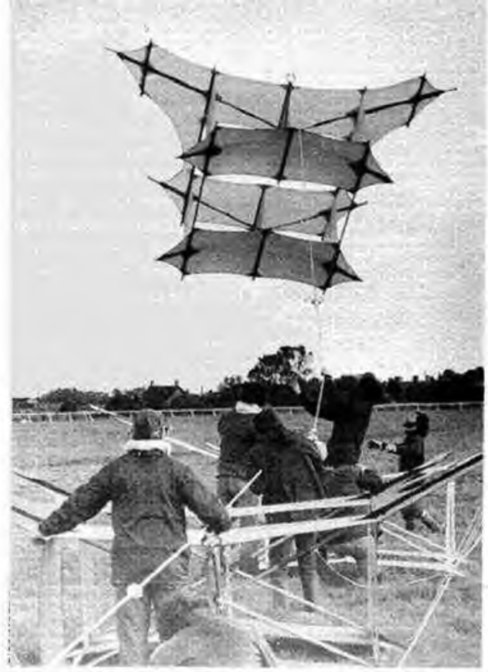
What's Happening?

April 4
PETERBOROUGH MFC COMPETITION 1st ROUND CLASS A BRITISH DIESEL COMBAT CHAMPS. Venue: Peterborough Embarkment. Contact: Brian Waterland. Tel: Market Deeping 343722.
April 4
CONTROL LINE EVENT *STUNT & NOVICE, CARRIER.* Venue: Essex Showground Car Park. Contact: Peter Burgess Tel: 0376 516881.
April 11/12
SYWELL R/C EXPO.
April 11/12
EASTER HOT-AIR BALLOON EVENT — Balloon Races, parachuting, microlite aircraft, kites and other aerobatic activities. Venue: Holker Hall, Clark-in-Cartmel, Cumbria. For further information: The Manager, Tel: (044 853) 328.
April 18
BRITISH NATIONAL INDOOR SCALE MODEL FLYING CHAMPIONSHIPS AND INDOOR SCALE FLY-IN. SMAE NATIONAL COMPETITIONS FOR PEANUT SCALE, OPEN RUBBER SCALE & CO_2/ELECTRIC SCALE. Venue: Middleton Hall Shopping Precinct, Milton Keynes. 10.00am-6.00p.m. Pre-entry this year, SAE to Barrie Hotham, 46 South Park Avenue, Mansfield, Notts NG18 4PL. Tel: Mansfield 34127. Fee £1 per event, non-competition flyers £1 each. Closing date for entries 1st April 1982.
April 18
SMAE SOUTHERN AREA R/C FLY-IN (FIREBIRDS). Contact: Pete Willis, 72 Witt Road, Fair Oak, Eastleigh, Hants. Tel: Eastleigh 695111.
April 25th
TYNEMOUTH TEAM RACE RALLY *FAI, GOODYEAR, POSSIBLY ½A.* Venue: Albermarle Barracks (ex. RAF Ouston) — Entry to Airfield by special pass only. Contact: R Wilson, 77 Oakfield Road, Whickham Grange Estate, Newcastle-on-Tyne NE16 5QP. Tel: 0632 881127
May 1/2
MUNSTER R/C CHAMPS. Venue: Waterfall, Co. Cork. Contact: K. Townsend, Beechwood, Church Lane, Greystones, Co. Wicklow.
May 2
1ST ELLIOTT RALLY *FAI TEAMRACE, ½A TEAMRACE, GOODYEAR TEAMRACE, CARRIER, AEROBATICS, SPEED.* Venue: Marconi Avionics, Rochester, Kent. Contact: Peter O'Neill. Tel: Sevenoaks 57899.
May 2/3
SPRING MODEL AIRCRAFT RALLY AND FLY-IN — Best All-round Model, Best Scale Model, Best Sports Model, Best Bi-plane, Best Helicopter, Best Multi-Engined Model, 'Tree Tops' award. Venue: Holker Hall and Park, Cark-in-Cartmel, Grange-over-Sands, Cumbria. Contact: Tel: (044 853) 328.
May 6
SMAE SOUTHERN AREA *R/C CLASS 2 SCALE.* Venue: Beaulieu. Contact: Dick Hall, 21 Peak Road, Clanfield, Hants. Tel: Horndean 593048.
May 9
SMAE SOUTHERN AREA *R/C FLY FOR FUN AT BULLS BUSHES* (Basingstoke). Contact: Bill Edwards, 35 Browning Close, Basingstoke, Hants. Tel: Basingstoke 25492.
May 15/16
7th SANDOWN PARK SYMPOSIUM — Sandown Park.
May 16
PETERBOROUGH MFC COMPETITION *2nd ROUND CLASS A BRITISH DIESEL COMBAT CHAMPS.* Venue: Peterborough Embarkment. Contact: Brian Waterland, Market Deeping 343722.
May 22/23
IRISH THERMAL SOARING NATS. Venue: Mallusk, Co. Antrim. Contact: K. Townsend, Beechwood, Church Lane, Greystones, Co. Wicklow.
May 22/23
3 SISTERS INTERNATIONAL *F2A, F2B/F2C/F2D.* Contact: Gordon Isles. Tel: Prestbury 48196.
May 23
SMAE SOUTHERN AREA *OPEN FORMULA MOUSE AT HMS DAEDALUS (LEE BEES).* SMAE members only. C/L Team Racing to rules published in August 1981 Model Flyer, but with £15 engine limit. Pre-entry required. Contact: Mick Harvey, 10 The Croft, Stubbington, Hants. Tel: Stubb 5232.
May 23
IRISH CONTROL LINE NATS. Venue to be announced. Contact: J. Molloy, 57 Auburn Road, Dun Laoire, Co. Dublin.
June 13
ULSTER R/C CHAMPS. Venue: Nutts Corner, Co. Antrim. Contact: K. Townsend, Beechwood, Church Lane, Greystones, Co Wicklow.
June 13
SMAE SOUTHERN AREA *NOVICE R/C THERMAL SOARING AT CATHRINGTON (WALTHAM CHASE).* Contact: Howard Metcalf, Brook Cottage, Winters Hill, Durley, Hants. Tel. Durley 447
June 12/13
LEINSTER R/C CHAMPS. Venue: Fairhouse, Co. Dublin. Contact: K. Townsend, Beechwood, Church Lane, Greystones, Co. Wicklow.
June 19/20
SCALE DAYS. Venue: Old Warden.
June 20
LEINSTER C/L CHAMPS. Venue: Blackrock, Co. Dublin. Contact: J. Molloy, 57 Auburn Road, Dun Laoire, Co. Dublin.
June 20
SMAE SOUTHERN AREA *C/L STUNT AT HMS DAEDALUS (LEE BEES).* SMAE members only. *FAI AND NOVICE* pre-entry required. Contact: Mick Harvey, 10 The Croft, Stubbington, Hants. Tel: Stubb. 5232.
N.B.
Sat. 16 Oct.
WITCHFORD MEETING. Events to be announced. Contact: Martin Dilly, 20 Links Road, West Wickham, Kent.

FREE FLIGHT

March 28
THE TONY PANNETT TROPHY *OPEN POWER, JACK KAY TROPHY, JACK KAY TROPHY, A2 GLIDER + VINTAGE DURATION.* Venue: Church Fenton. Contact: John Godden 0532 521002.
April 10/12
EUROPEN TEAM TRIALS for *FAI plus O/R/G/P on 12th.* Details F/F Sub Committee P. Farrimond Tel: 0942-34068.
April 18
MIDLAND AREA F/F GALA: Venue: RAF Hemswell Contact: Mike Coomes 0949 42034. Events to be finalised.
April 24
SMAE SOUTHERN AREA — INDOOR FLYING AT COLLEGE OF FURTHER EDUCATION, Southampton. Gym shoes must be worn. Contact: Howard Metcalf, Brook Cottage, Winters Hill, Durley, Hants. Tel: Durley 447
April 25
2ND AREA CENTRALISED SMAE *(F1C/FAI POWER) TROPHY + PLUGGE POINTS, O/G AND O/R FOR GAMAGE CUP.* Area venues.
April 25
ODIHAM SPRING GALA *(Usual F/F events).* Contact: N. Couling Tel: 0323 53116
May 2/3
RAFMAA/SMAE FREE FLIGHT COMPETITION *Sunday: F1A, F1B, F1C* 5 rounds. Start 10am. Champagne fly-off at 7pm plus still air, progressive max, event for F1C. Weather permitting. *Monday: Sunrise event for F1A, F1B plus OPEN RUBBER/GLIDER/POWER/A/1, VINTAGE/HLG* 10am-5.30pm. All events open to SMAE members. No pre-entry. For timetable SAE F.S. Baines, MSF, RAF Leuchars, Fife, Scotland. Tel. 033-483-471 Ex 420.





NEW CONCEPTS IN KITES

by Ron Moulton

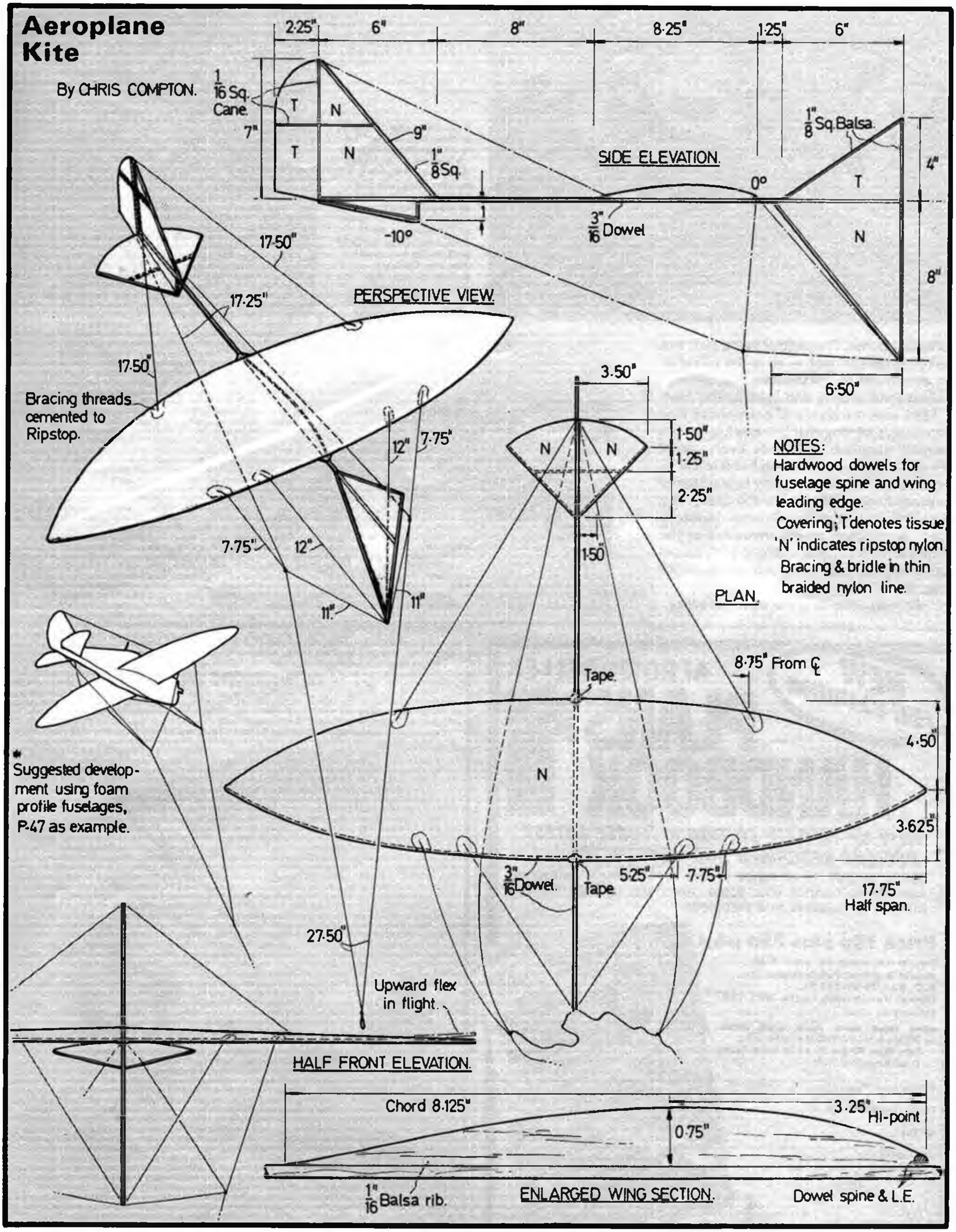
So what's new? Lots we can tell you — because the simple Kite has been ingeniously developed into imaginative shapes using new materials. Glass fibre and carbon reinforced rods, ripstop nylon, plastic fittings and discovery in design have revolutionised old concepts.

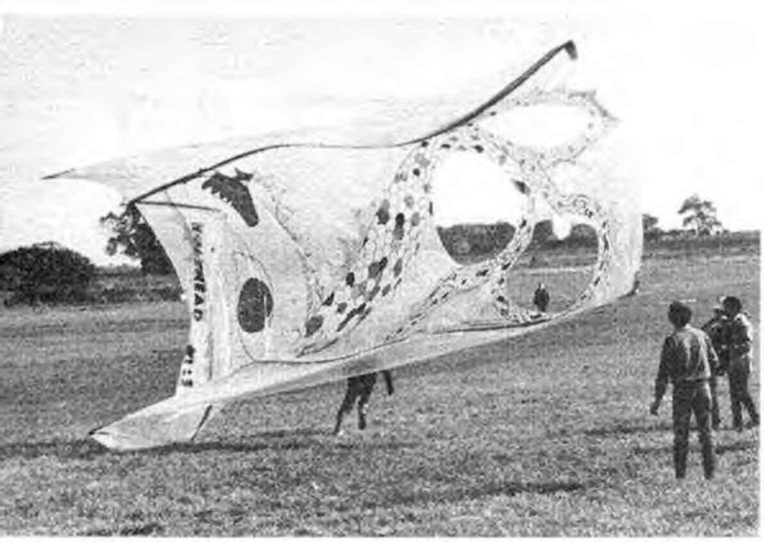
An aeromodeller started the 'Aeroplane Kite' interest in the U.S.A. when he wanted to fly *indoors*! It was Bill Bigge, an indoor champ who worked out the shape with its unusual forward *vertical* area. He towed the slow flier aloft in the Lakehurst Airship hangar during a World Champs and shook a few diehards with the performance. Then Chris Compton takes the concept a few stages onward for outdoor operation, and believe us this one stays up in a mere whisper and yet is rock steady in even a stiff breeze. Artist Pat Lloyd interprets ultimate development into World War Two fighter profiles, and why not?

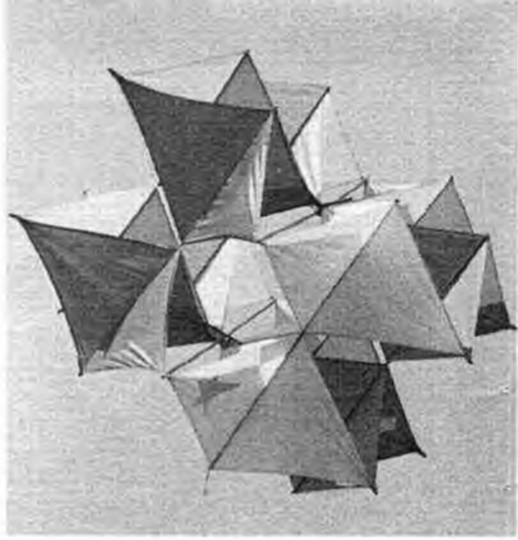
Other developments involve shapes to satisfy the eye using the rich colour of ripstop. Peter Waldron is a master of designs, his snowflake 'Prof Waldof' types are currently the rage for export. So too are the Vertical Visuals by Mike Pawlow and Jilly Pelham as seen in the leading photo. This enormous 70ft. long Dragon (or is it a sea serpent?) flows out nearly horizontally, undulating as it flies. There's as much work in this one as in a detailed scale aircraft. It takes a couple of hours to assemble.

Then there's the move to lifting cameras using motor drive and 2 function radio control for excellent aerial shots. At least three kite fliers are in business now, taking commissioned views of factories, building sites and archaeological surveys. One team has a train of man-lifting Cody kites which require a weighted Land Rover or tractor to

Heading: brilliant colours and enormous length are not obvious here in the Sea Serpent by Vertical Visuals, a classic example of new shapes in kites. Top right: the Cody train built by Dave Turner of the Kite Store, London. The basket (right) can be controlled by movement of the rigging. At least three other Cody kites are needed above this 'lifter.' Below: Japanese team unroll their giant Shirone festival kite at Parliament Hill, London. It's about eight times the size of the version (left) which carries a wedding message from Japan to The Prince and Princess of Wales.


Aeroplane Kite
By CHRIS COMPTON.
2·25"
6"
8"
8·25"
1·25"
6"
1/16 Sq. Cane.
7"
T
N
9"
1/8 Sq.
1/8 Sq. Balsa.
SIDE ELEVATION.
0°
4"
8"
3/16 Dowel
-10°
1
17·50"
17·25"
PERSPECTIVE VIEW.
17·50"
Bracing threads cemented to Ripstop.
12"
7·75"
7·75"
12"
11"
11"
6·50"
3.50"
1·50"
1·25"
2·25"
1·50
NOTES:
Hardwood dowels for fuselage spine and wing leading edge.
Covering; 'T' denotes tissue. 'N' indicates ripstop nylon.
Bracing & bridle in thin braided nylon line.
PLAN.
Tape.
8·75" From ℄
4·50"
3·625"
17·75" Half span.
* Suggested development using foam profile fuselages, P-47 as example.
3/16 Dowel.
Tape.
5·25"
7·75"
27·50"
Upward flex in flight.
HALF FRONT ELEVATION.
Chord 8·125"
3·25" Hi-point
0·75"
1/16 Balsa rib.
ENLARGED WING SECTION.
Dowel spine & L.E.





Vast sled made by pupils of Holyhead School has to be launched sideways – it's about 45ft. high!). Amazingly it rights itself but not without a few hectic moments! Typical of the multi-cell types is this one at a BKFA rally at Old Warden, Beds. where meetings are held on first Sunday each May and October. Below: it's that Jap Giant again – with appreciate audience to witness the unrolling.

act as an anchor. The thrill of being aloft in a basket is exceptional — so is the effect of the motion on the passenger.

Most enterprising and spectacular even of 1981 was the arrival of a Japanese Kite team with a ceremonial Shirone kite which weighed hundreds of pounds. Every part of this giant (43ft. × 38ft.) was hand made — even the paper and jute bridle by traditional methods handed down over the years. The huge kite is now at the Science Museum store, Wroughton where members of the British Kite Flying Association* will restore it after rain damage and put it on display for open days.

* *BKFA enquiries c/o the editorial office.*

The winners of the February Spot the Balance Point Competition are: T Ross of Kenton, Nr Exeter Stephen Prike, of Loughton, Essex. Staff Sergeant Yates from BFPO 41 Peter Bull, of Kilkenny, Eire. Mr. A. Haughey, Colchester, Essex. Mr. L. J. Snow, Wokingham, Berks. P E. G. Stimpson, Ipswich, Suffolk. Peter Byers, South Shields, Tyne & Wear C. T Sharp, Sandbach, Cheshire. F. Abraham, Accrington, Lancs. Jeremy Wiltshire, Boston Lincolnshire. T. G. Bunn Northwich, Cheshire. Each will receive a pack of balsa containing 18 sheets of $\frac{1}{16}$in., 16 sheets of $\frac{3}{32}$in., 6 sheets of $\frac{1}{8}$in , 4 sheets of $\frac{3}{16}$in., 4 sheets of $\frac{1}{4}$in. and 4 sheets of $\frac{3}{8}$in.

The winners of the March Spot the Balance Point will be issued in the May 1982 edition of Aeromodeller

Book Reviews

An Illustrated Anatomy of the World's Fighters compiled by William Green and Gordon Swanborough. Published by Salamander Books, price £8.98 Hardback size 310 × 220 mm.

This is a beautifully illustrated book featuring cutaway perspective line drawings, each reproduced over a two page spread. The initial chapter gives a history of the fighter and is well illustrated with full colour photographs and diagrams.

For the scale modeller of World War I and II aircraft, the large perspective drawings with immense detail, combined with small three view orthographic line drawings and technical information, offers invaluable reference material.

At £8.98 this book is of exceptional value, which we can thoroughly recommend.

Yorkshire's Early Flying Days by Donald Nelson Redman, size 220mm × 180mm, published by Dalesman Publishing Co. Ltd., price £3.25.

Here is a most fascinating study; it provides a unique record of an exciting period of local aviation history. It shows how after the formation of the Yorkshire Light Aeroplanes Club in 1909 (only six years after Orville and Wilbur Wright's first successful powered flight) the enthusiasm of local engineers and others was captured, membership exceeding 200 in one month!

Apart from mentioning the successful aviators such as Graham White and Bob Blackburn, some of the more bizarre characters are mentioned, such as Richard 'Bobby' Allen, the flying policeman, who for years was convinced that if he pedalled fast enough on his cycle fitted with wings, it would fly.

The many black and white photographs depict workshop scenes, crashes, engine detail, and interesting flying and static views of aircraft. Altogether a most interesting little book.

E. M. 'Matty' Laird's Super Solution, published by EAA Aviation Foundation, P.O. Box 469, Hales Corner, Wisconsin 53130, U.S.A. Price $5.95 postpaid, paperback, size 215mm × 275mm.

E. M. 'Matty' Laird was a leading designer and manufacturer of racing aircraft in the late 20s and early 30s. This book describes the trials and problems encountered with the development of his 'Super Solution' design and its eventual success, when flown by Jimmy Doolittle, it won the Bendix Trophy for a flight from Los Angeles to Cleveland in 1931.

The story goes on to describe the recent reconstruction of a replica 'Super Solution' for the EAA Air Museum. The photographs, cutaway perspective line drawing and information, give a most comprehensive study of the aircraft, which is ideal for the construction of a model, but unfortunately the most important reference not included is that of a three view plan of the aircraft. *Hirsch Scale Drawings of Buena P.K. California have all the Lairds in their list – Ed.*

This aircraft would make a super Control Line Scale Model and we are sure a letter to the EAA will secure a three view, which together with the well illustrated book would give a most comprehensive set of reference.

"Aviation in Ulster" by John Corlett published by Blackstaff Ltd., 3 Galway Park, Dundaland, Belfast DT16 0AN. Size 225mm × 180mm, price £6.95 Paperback.

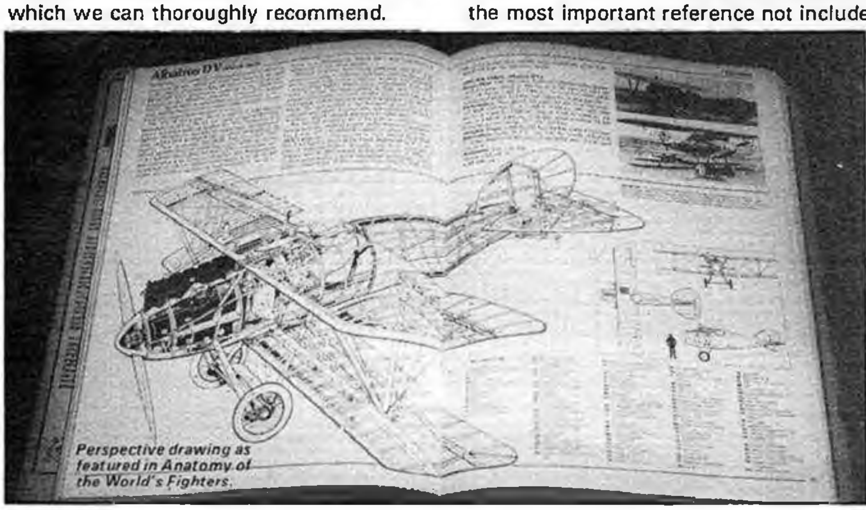
It may come as quite a surprise to many to learn how much Northern Ireland has contributed to aviation over the year.

John Corlett relates stories of early balloon flights in Ulster as far back as 1824 and of the individual achievements of such notable characters as Harry Ferguson and Miss Lilian Bland with their heavier-than-air machines.

This and many other stories of World record flying achievements add colour and richness to this essentially historic book of aviation development in Northern Ireland.

There are many good black and white photographs throughout the book illustrating aircraft right up to the 80s.

A book that has obvious appeal to every Irishman and is of interest to any follower of aviation history.



Perspective drawing as featured in Anatomy of the World's Fighters.

LEARNING TO FLY CONTROL LINE STUNT

Alan Dorrell continues his series of articles with 'Calamanda,' a tough stunt trainer with high and low wing versions. Suitable for engines of 2.5- 3cc.

Fuselage

This is a simple box structure of ⅛in. sheet balsa (medium) with extensive $^1/_{16}$in. (1.6mm) plywood doublers that reach back to the trailing edge of the wing. The doublers are glued with 'impact' adhesive; make sure you have two 'sides', left, and right. Bearers, if used, are of ½in. × ⅜in. beech or similar and the ⅛in. ply bulkheads are epoxied into place. Stringers along the corners of the box help transfer the stresses from the doublers. Bellcranks must be strongly mounted. I recommend a box structure for two reasons. Firstly, it is far more convenient for mounting a rubber band retained wing; secondly, in the event of impact loads (crashes), the stresses are spread out whereas a profile often shatters, particularly at the trailing edge of the wing.

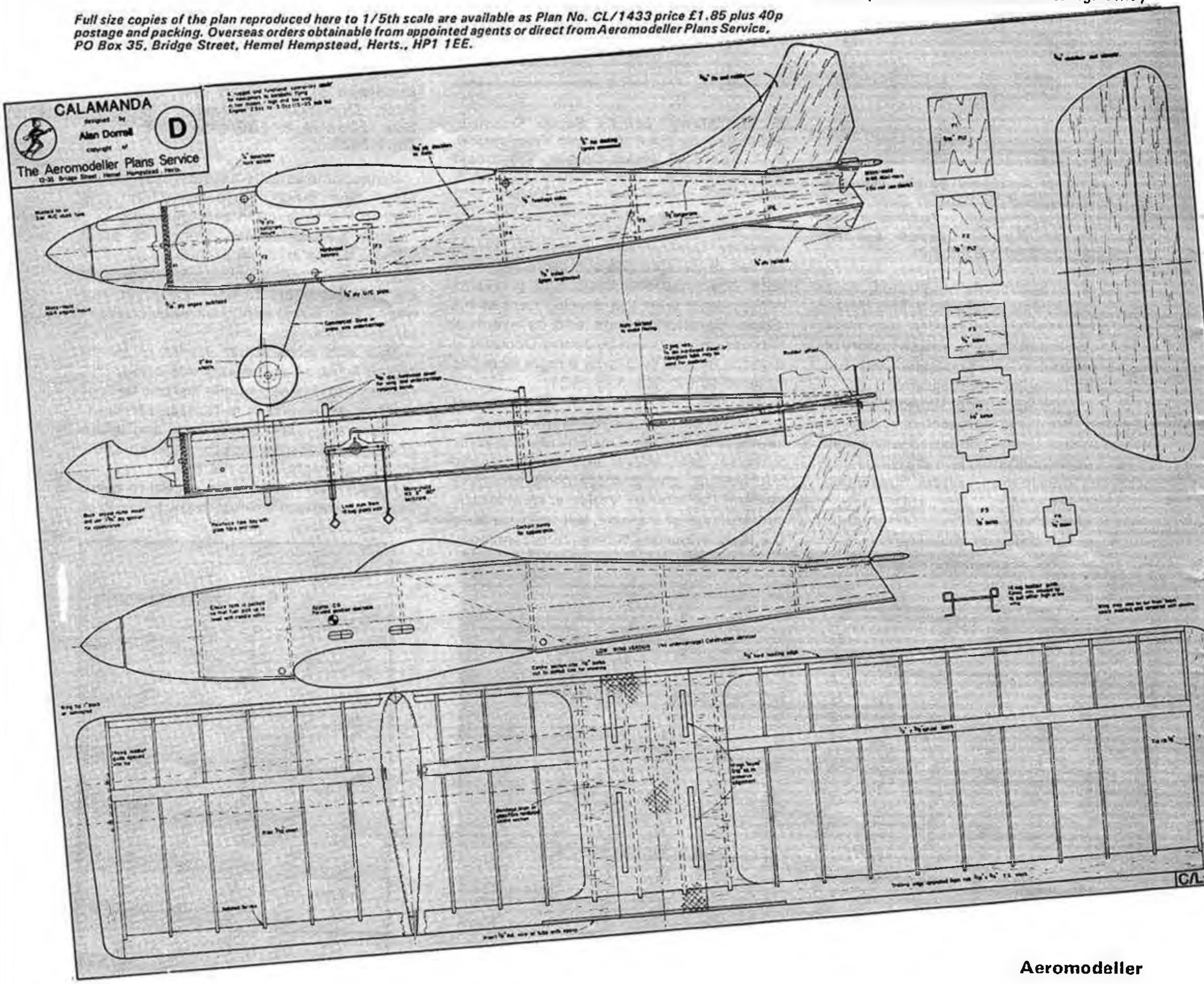
Tailplane

This is simply made from $^3/_{16}$in. medium sheet balsa. My recommendation for hingeing is to use monofilament nylon fishing line in the time honoured zig-zag method (**Fig. 1**). Just make sure your tailplane is in perfect alignment with your wing mount.

Wing

A conventional structure using balsa wing ribs and *spruce* spars. The lead out guide is bent from 14swg piano wire and bound to the wing tip and epoxied. Which way up depends on whether you do the high or low wing versions of the model. The centre section of the model is sheeted and reinforced with linen, bandage or glass fibre tape and resin before covering. It may

Full size copies of the plan reproduced here to 1/5th scale are available as Plan No. CL/1433 price £1.85 plus 40p postage and packing. Overseas orders obtainable from appointed agents or direct from Aeromodeller Plans Service, PO Box 35, Bridge Street, Hemel Hempstead, Herts., HP1 1EE.



be possible for you to have a foam wing cut, or maybe utilise one panel of a parallel chord R/C wing. If the built up structure is used, cover with nylon, fuselage as well.

The wing and the undercarriage are mounted with rubber bands tightly tensioned. Do *not* be tempted to use clamps or wing bolts à la R/C. If you thump the model in, chances are the wing and fuselage will separate with relatively little damage as the rubber bands snap. You will need a good supply of bands however. Extensive damage may only be confined to one major portion of your aircraft, thus making replacement more economical.

Let us now look at the model we have built. If you have chosen the high wing version with the undercarriage, it will bear some resemblance to the multitudinous radio-control trainers one sees advertised, and with good reason. The solution to the problems of learning are very similar. In the event of a 'prang,' wing and undercarriage knock-off easily. The side mounted engine has a chance of avoiding the wing. A bulkhead mount can be an engine saver.

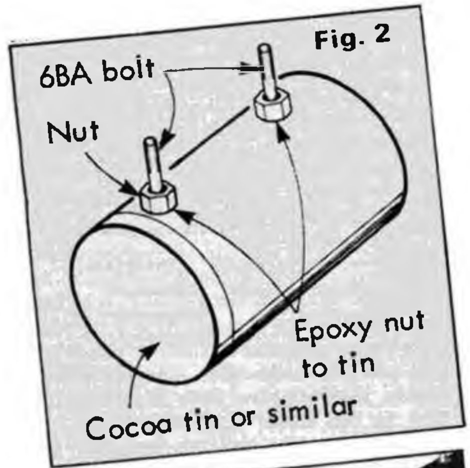
If the low wing version is used, the engine may be mounted upright, as it is out of the way of both the wing and the ground (unless the 'landing' is inverted).

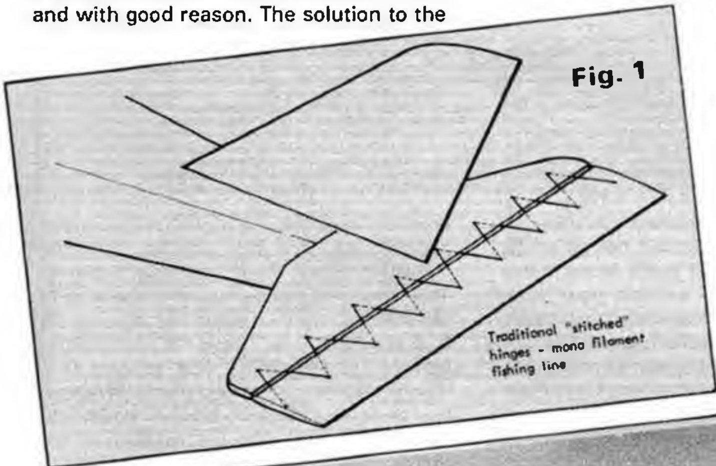
The model will be fairly heavy, say 28-30 oz. for about 320sq. in. of wing area (14oz./sq. ft.). With its thick wing section it will fly fairly slowly with a 2.5 to 3.5 cc diesel or glow motor. A low pitch prop. (9in × 4in.) will help as well.

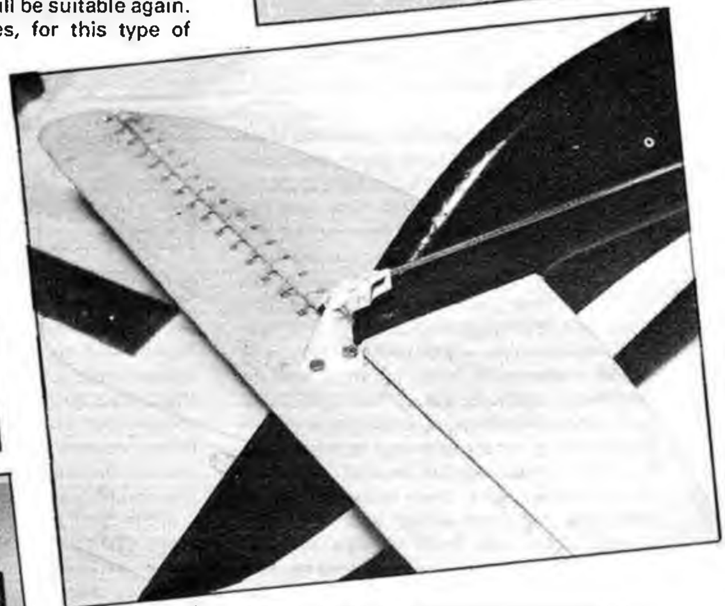
Check again that everything is square on. Make 'keys' to assist the wing to keep its alignment. Oh! and don't forget that everything should be thoroughly fuel proofed, especially around the engine bay.

Equipment

Before we go out flying, let us examine the rest of our equipment. I am still taking it for granted that you have only flown a beginner's model round and round successfully, so you may be assuming the handle and lines etc, will be suitable again. Probably not, the lines, for this type of model should be of stranded steel wire. 'Lightweight Laystrate' or its equivalent. The problem with stranded lines is that they will 'kink' if mishandled. One kink and they are useless. They must *NEVER* be reeled or unreeled like a piece of string but carefully unrolled or rolled up on some form of reel or drum. A simple method is to use an old cocoa or treacle tin with two pegs (6BA nuts and bolts — epoxied or soldered) projecting out of the side, (**Fig. 2**). One end of the lines can be looped over the pegs and when fully reeled up the other ends can be secured with rubber bands. Some good commercial handles are available or you can make your own as illustrated in the photograph.







Above: Tailplane of 'Peacemaker' showing nylon monofilament fishing line 'hinges.' Also shows use of R/C horn and 'swing in' keeper on pushrod.

Left: items from the author's field kit - rag, home brew and commercial diesel fuel, filler bottle, kitchen towel roll, toolbox, homemade line reel, made from a plastic wheel, homemade adjustable C/L handle.

You will want a small 'squeezy' plastic bottle with a thin spout to fill your tank with. Even with the spout provided it can be wasteful trying to fill the tank from a commercial ½ or 1 pint tin of fuel. Anyway, if you are going to do a lot of flying, and that surely is the intention, you will buy your fuel in ½ to 1 gallon (2½ or 5 litres) or, possibly, 'brew' your own.

If you are using glow, you will want an accumulator or Ni-Cad battery, not dry cell. Incidentally, glow motors are thirstier than diesels and you may want a slightly larger tank to get the same flight duration from them. You will need a small tool kit containing pliers (snipe nose for preference), suitable spanners and screwdrivers, a modelling knife, spare nuts and bolts some epoxy, scraps of balsa etc., spare glow plugs, spare propellers (use nylon — not wood or fibre filled — at this stage), fuel tubing and any other useful bits you can think of. With the exception of the propellers, I use a tin box 7in. × 4in. × 2in.

which holds all this, even for my R/C models. It is also advisable to take plenty of cleaning rag and/or paper towelling or handkerchiefs and an old washing up squeezy bottle with watered down detergent in it. For a really good cleanser, a touch of vinegar and a touch of domestic ammonia can be added. Get into the habit of cleaning your model thoroughly at the end of a flying session, if not between flights. That is how expert flyers seem to manage to keep their masterpieces so immaculate. Also it is nice to clean your own hands with the mixture. If you drive you will not make your steering wheel greasy. Make up your lines to a length of 50ft. for this model. If the model does not 'feel' right at fifty feet, the lines may be shortened, say, by two feet at a time until in straight and level flight you feel comfortable.

Flying

When you are happy that the model feels okay in straight and level flight, and your engine is performing well, it is time to take a deep breath and go for that first 'loop'. A little breeze can be helpful. Ensure that it is blowing on to your back when you perform any manoeuvres, that is with the exception of a 'wing-over', but more of that later. The wind will help maintain line tension during your aerobatics. Commence with your model reasonably high, about fifteen to twenty feet altitude, but not too high. Then, as I have already said, with the wind on your back, give 'up' elevator to cause the model to climb. Keep 'up' in until the model is over on its back, then increase 'up' to complete the loop while you still have plenty of altitude. Then release 'up' and regain 'straight and level' while you recover your equilibrium. The result probably looked nothing like the polished loops you see a practised control-line flyer performing, being very distorted as shown in the diagram. However when you are ready, try again, then again. Eventually you will be able to perform creditable loops, maybe from a slightly lower height, say ten feet, and maybe even some consecutive ones. Remember, however, that you are twisting your lines around each other doing repeated loops. Lines in good condition will

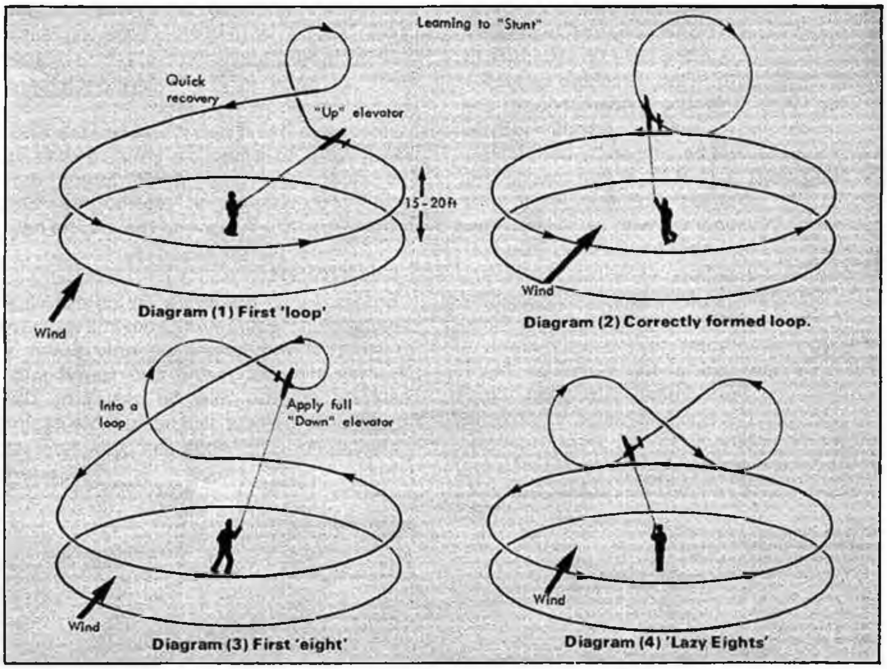


Diagram (1) First 'loop'
Diagram (2) Correctly formed loop.
Diagram (3) First 'eight'
Diagram (4) 'Lazy Eights'

operate with a phenominal number of twists (up to thirty) but will not go on for ever. So do not do too many loops in one flight, and carefully untwist your lines immediately you have landed. Incidentally, the correct aerobatic schedule is devised to ensure that many manoeuvres cancel the twists caused by previous ones. I believe you will find about three twists in the line at the end of a complete 'pattern'.

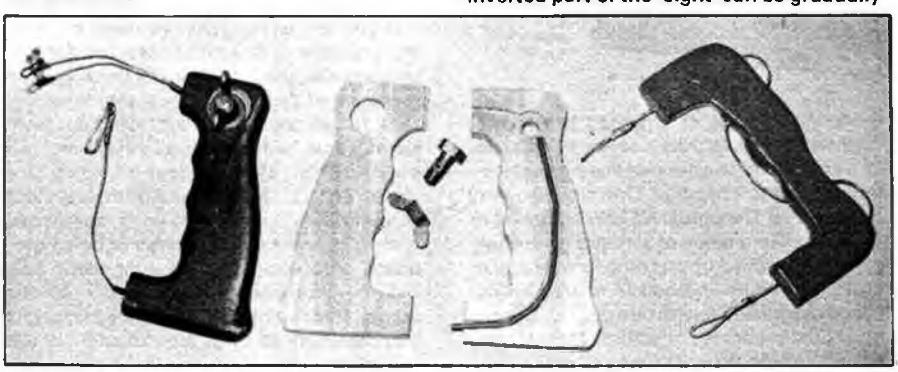
After the loop, we progress to the 'lazy eight'. When you are ready enter a loop, follow it round for two thirds of the circumference, then snap full 'down' onto your handle. The model will have been inverted in a slight dive when you do this and the 'down' will, in actual fact, make the model climb upwards in the inverted position. Keep 'down' on until the model recovers into 'straight and level' albeit at a higher altitude than before. Again this first 'eight' will be crude, resembling a lop-sided cottage loaf. As before however, keep practising until you can perform a smooth transition from one half of your eight to the other as in the diagram.

The next diagram shows how the inverted part of the 'eight' can be gradually extended until you will find that you can fly a whole lap, then two, and so on, in the 'inverted flight' mode. Having mastered 'inverted', get yourself used to the idea of landing this way. Use the 'Calamanda' for this purpose. Apart from line or control failures (which should not happen to a careful modeller), the most common reason for stunt models crashing, is when the motor cuts in an awkward part of the manoeuvre. I have crashed myself, trying to regain 'normal' flight when my engine has stopped in or near the inverted altitude. Be calm, and land the plane upside down. At worst you may knock the fin off, gain a few grazes or break a propeller. All preferable to a complete 'write off' which otherwise is the usual result.

The challenge of 'inverted' flying being met quite painlessly, without searching one's soul about trying to remember to deliberately reverse your control movements, by this time it should have become a natural set of reflexes, you should be able to perform the second part of your 'eights' alone so producing the outside loop or 'bunt'. To complete your education you must now practise standard horizontal eights, which consist of performing a normal loop first. When this loop is complete, continue as though to perform a second loop. When the model is pointing vertically upwards, however, the loop is reversed into a 'bunt'. Again, study the diagram. This correct 'eight' forms the basis of all the precision manoeuvres of the schedule with the exception of that known as the 'hour glass'. By the way, figure eight manoeuvres obviously neutralised any twists in the lines caused while performing them.

The remaining manoeuvre to perfect is the 'wing over'. Unlike the others, this

The author's custom made adjustable controlline handle on the left. Another version at right with component laid out in the middle.



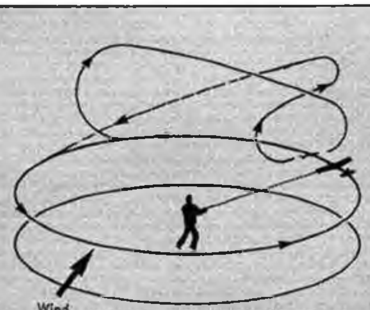


Diagram (5) Learning 'inverted'

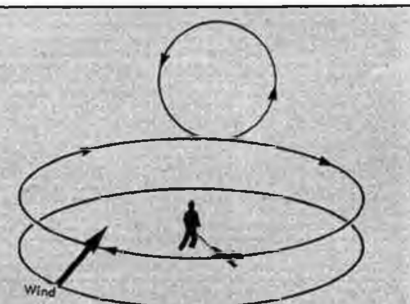


Diagram (6) Outside loops (Bunts) from inverted

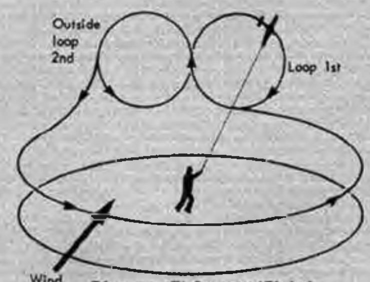


Diagram (7) Correct 'Eight'

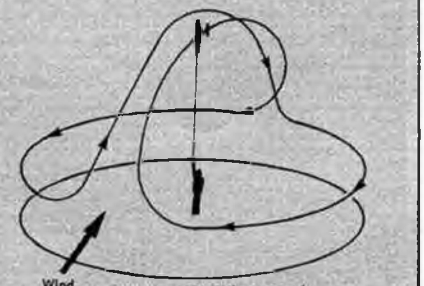


Diagram (8) 'Wing-over'

cannot be done with the wind blowing on your back. If the wind is not too strong, the 'wing-over' is commenced up-wind so that the finish benefits from the added line tension down wind. In stronger winds some flyers prefer to fly cross-wind. The true wing-over commences with a 'square' corner from normal straight and level flight, bisects the circle vertically over head, and is brought out in another 'square' corner into inverted flight for half a lap when the corners are reversed and the model bisects the flying circle a second time to be restored to normal straight and level flight. Naturally, to perfect your wing-overs, you will gradually increase the angle at which you fly your model across the circle until you can truly bisect it, then practise your exits into 'inverted' flight.

You will now have gone as far as you can with your 'Calamanda.' In fact you will probably have had great difficulty with the 'wing-overs' due to the model's high wing loading (a heavy model with a small area wing). You should be competent and reasonably comfortable with your model in the basic manoeuvres described. You may have been lucky enough to have achieved this with the one model, maybe you have had to replace a part or two, or even the whole model. Being modellers as well as flyers, you may have wished to build different planes for a change. Besides my own 'Spartan' (M.A. 378X) there is a design called 'Black Chiffon' (CL 486X) which features the detachable wing.

The next step is to go to the opposite extreme and build a simple, lightly loaded, flapped stunter so that you can progress to squares. Unlike the 'Calamanda' this model is built purely to fly and not to resist crashes. I ultimately flew too close to the ground with mine and it shattered into little pieces. But then, if you hope to fly precision stunt, you must learn to fly precisely. There is a useful saying in successful modelling — 'simplificate and add lightness'. This needs to be the watchword for the next model or so.

SHOP TALK

The latest in products for the modelling scene

New F/F Glider

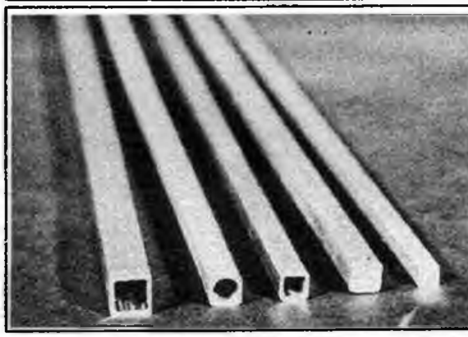
D.P.R. Models have widened their now extensive range of small chuck gliders and simple rubber powered models to include this larger glider entitled 'Rare Bird'. The model has a span of 900mm and is of balsa and ply built up construction. Good quality wood is used throughout the kit and all parts are die-cut. As with all of David Rawlings' designs for D.P.R., this has also been conceived with the newcomer to aeromodelling in mind. Building is made clear by the well drawn plan and illustrated instruction booklet.

It is unusual these days to find a tube of balsa cement, tow line, pennant and ring included in the package; in fact the only extra required to get the model flying is a small tin of dope and thinners.

An ideal model to introduce the hobby of aeromodelling and represents good value at £5.99.

R/C Control Snakes

Micro-Mold have introduced a new plastic control linkage known as Blue-Rod. It consists of a plastic tube casing and a plastic inner tod which has eight longitudinal ribs. Die to these ribs, there is rather less friction than would be the case with a round rod. Blue-Rod is sold in 30in. and 48in. lengths, each pack includes 2M studs to screw into each end of the rod for attaching metal or nylon clevises. Price DP66 30in. 78p, DP67 48in. 97p.



Alloy Extrusions

A useful range of allow extrusions are now available from Ripmax. The square section rod is available in five different forms; ⅜in. and ¼in. solid, 15/32in. sq. with ¼in. sq. inside and ⅜in. sq. with 5/16in. diameter inside dimension. Obvious applications are for wing box mountings on large gliders, etc. Prices: TSO1 ¼in. sq. ID, 80p; PSO2 ⅜in. sq. ID, 90p; TSO3 ¼in. sq. OD Solid, 50p; TSO4 ⅜in. sq. OD Solid £1.00 and TSO5 ⅜in. sq. with round hole, 90p.

SCALE MATTERS

by Alan Callaghan

Control Line Scale World Championships

For the first time since the event was held in Sweden during 1976, there will be a Scale World Championships for Control Line models in Kiev, USSR, from the 24th-31st August 1982. Support is assured from Eastern Bloc countries and it would be nice to think that a team could be sent from Great Britain. The Team Trials will be held at RAF Wyton on 2nd and 3rd May, and entries should be sent to: Eric Coates, Arosa, Liberty Road, Newtown, Fareham, Hants., together with the entry fee of £5.00. Any enquiries about the trials should be made to Vic Willson on Reading 471964.

* * *

The ubiquitous high-wing cabin monoplane has probably been the most popular and successful form of introduction for many people to the attractions of F/F Scale modelling, and it is not by accident that the majority of F/F sports models are also based upon this configuration. This layout, with the centre of gravity being below the centre of lift, offers so much in terms of inherent stability that it is easily the best type of model upon which to learn the art of careful free flight trimming using motor thrustline, c.g. location, and control surfaces to achieve steady reliable flight performance.

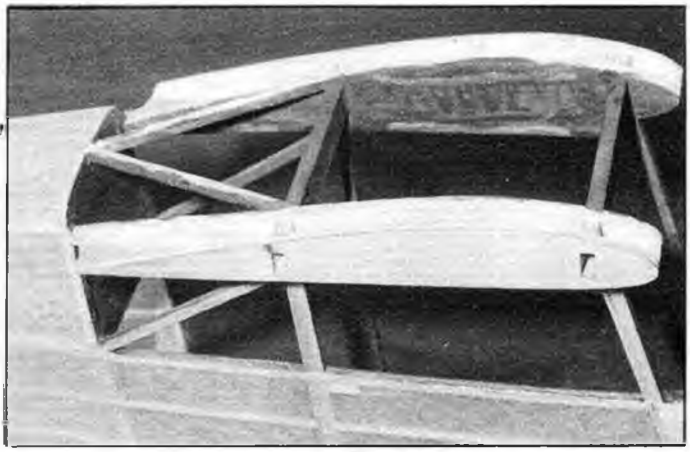
In terms of the detail design of the airframe, this configuration however, is not altogether without constructional problems of its own. When model airframes are designed for outdoor use, it is wise to incorporate knock-off components such as wings and tailplane — occasionally the undercarriage, too — so that a certain amount of shock-absorbency is maintained in the event of a bad landing. The inclusion of knock-off parts in the structure usually means that extra fittings and fixtures are required on each individual component of the model and this requires more materials which inevitably adds more weight. It is always easier to make a one-piece construction airframe lighter than one that breaks down. This is one of the reasons why most of the best designs for indoor scale flying are so made. In indoor flying of almost any kind where one cannot gain the advantage as one can outdoors of climbing to altitude into wind, the lighter the model is the more potential it has for better flight performance. The fact that normal indoor flying hazards such as brick walls, steel girders and hard floors are, unlike grass, totally unyielding is a secondary consideration, normally overcome by all we conscientious flyers who always try those initial test flights outdoors over long grass on a calm day. No?

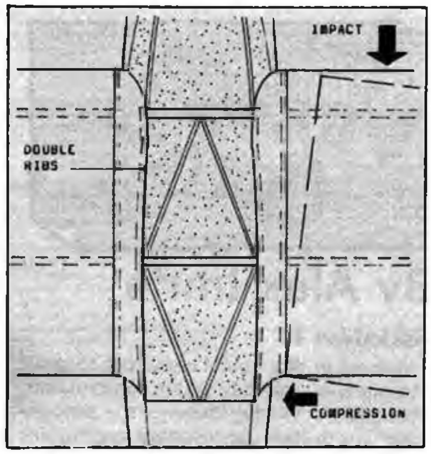
One extra worthwhile aspect of the model that dismantles easily is of course, that of easy storage. Not everyone has the space to keep a range of large models fully rigged in flight configuration, not to mention the problems of transportation.

To return more specifically to the high-wing monoplane, the most important part of the construction is undoubtedly the cabin roof and wing-root assembly, whether the wings are permanently fixed or not. Most lightplane cabins have a glazed roof for reasons of increased visibility in the fullsize subject. This means that if a model has detachable wings, then some careful detailing is required if the method of attachment is not to be too conspicuous at all times. The visibility works both ways!

Below: youthful interest seen at the 1981 Nats. Knokke trophy event involving Derek Bird's 'S.A. Bulldog' and Wal Cordwell's 'Bristol Blenheim.' Right: this basic fuselage structure is a 'Westland Wessex' tri-motor airliner for FF scale by Paul Leith. Spanning 1050mm it will be DC Merlin powered and makes an unusual and challenging subject.

Left: placing fourth at the 1981 Nats. Superscale event, Michael Smith releases his 'Sopwith 1½ Strutter' under the watchful eyes of judges Dave Clarkson and Doug Hunt. Right: this contre-section/wing root of a 1:10 scale Rearwin Speedster by the author shows the double ribs and hollow box spars as detailed i the text.



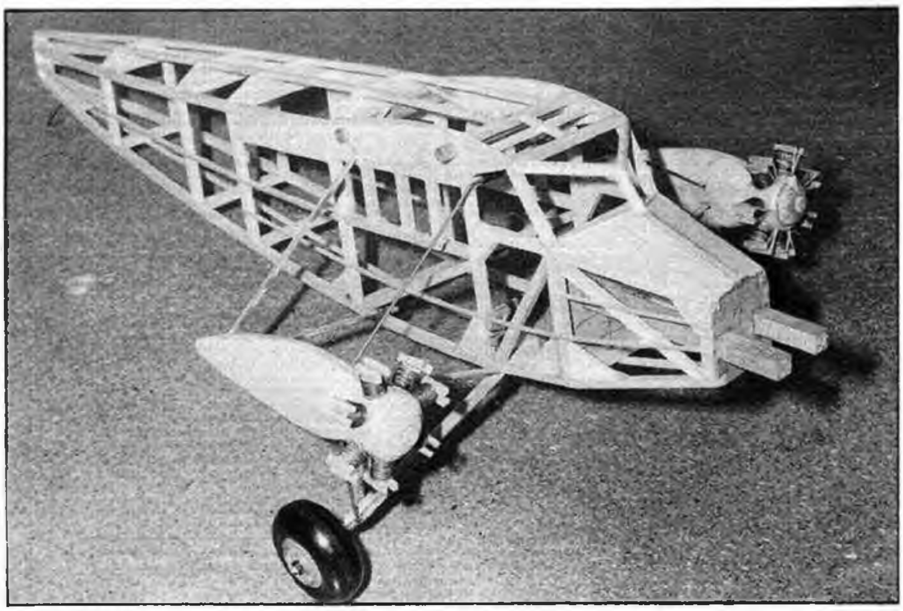


Nothing lets down such a model so badly as the sight of crude wire hooks and elastic bands where one should only see a neat scale assembly of spars and ancillary framework. I encountered this problem on a 1:10 scale Rearwin Speedster for rubber power that has been on my building board for some time. An additional difficulty on this subject is that a pair of broad and carefully tailored wing-root fairings are used to blend in the wing section with the cabin roof. The Speedster is one of the most carefully detailed of all the early American lightplanes and in its day, its superb performance was due much more to good clean aerodynamics than the brute power of its Menasco engine.

To make the wing roots as strong as possible on the model, the fairings have been built as part of the cabin centre-section instead of the wings where they would normally be. This allows the wings to break cleanly at the first rib of the parallel chord inboard sections, and two full 2.5mm thick ribs can be incorporated to reinforce the centre section on each side of the fuselage. The wings are held on here by the usual rubber bands, but the necessary wire hooks are buried within short rectangular stubs that are extensions of the wing main spars. These stubs protrude from the inner end of the wing and locate in built-up rectangular hollow box spars running across the cabin roof. The bands are hidden within these. The stubs offer a very precise means of location and consequently a very careful check can be made on the angles of incidence of each wing. Any misalignment can easily be rectified by carving away and building up the top and bottom of the stubs as required.

With any type of knock-off wing system, be it either a friction-held plus-in plate, or the rubber-band retaining method, the greatest forces exerted on the fuselage in a rough landing are at the trailing edges of the wings at the roots. As the wing tip is forced backwards in a typical bad landing, it causes the T.E. to dig into the fuselage and if for example, the retaining bands are over-strong and do not give or break with the impact, much damage can be caused to a weak fuselage at this particular point. Consequently one should always include somehow a very hard cross-brace here if a convenient former is not already there and can itself take the compression loads. As bad luck would have it on the Speedster, the nearest former is some 10mm behind the T.E. of the wing and a separate additional cross-brace would be all too visible through the cabin roof. This was another reason for doubling up the root fairing ribs which are about 8mm apart, for between the ribs on the underside of the wing, the fairing is made of hard balsa sheet with the grain running span-wise. This has the effect of greatly strengthening the top longeron of the fuselage side and hopefully will do the trick.

All too often one omits to detail the inside of a fuselage, especially of a rubber model, but with large areas of glazing as part of the design it becomes unavoidable. To try to maintain a little more of the scale appearance, the interior of the cabin is lined with dark blue Ingres paper (available in a wide range of colours from a good artists' materials supplier) with the woodwork of the superstructure being painted in matt enamels to match.



For those interested in statistics, the Speedster is 38in. span with a wing area of 205sq. in. and the weights of its components break down as follows: wings, 18gm each; tailplane, 5gm; find and rudder, 2.5gm; ailerons, 3gm together and fuselage 105gm. All of these parts are covered and doped ready for the colour scheme.

It was not intended from the outset to build an extremely light model — much weight could be saved over these figures — but a model which should be able to cope reasonably well with the inconsistencies of typical Sunday flying weather in the U.K. The fuselage may seem heavy but the design does incorporate a good deal of compound curved sheeting around the nose section together with bulky spats and undercarriage legs and the weight also includes the Trexler airwheels. With most of this weight concentrated at the front of the airframe, very little dead ballast should be necessary to get the C.G. in the right place.

Vintage Corner

By Alex Imrie

Jackdaw II

Interest in this model continues to grow and many are already under construction. The builder of G-AEIL shown in the January issue was the late John Butters (not Putters as originally stated) a gifted art student who worked for Mr. Rupert Moore before joining the De Havilland drawing office at Hatfield. John was a keen member of the St. Albans club and did in fact design the original club transfer.

One of the first Jackdaws to be built following the re-issue of the plans is the example made by the SAM 35 Treasurer, Peter Michel. Readers may have seen the framework of this model on view at the SAM 35 stand at the Model Engineer Exhibition. Trevor Faulkner has also built a Jackdaw and he has kindly contributed the following information and his thoughts on the construction, which will be of interest to other builders.

"When the plans arrived and were examined, I began to have a few niggling doubts over the constructional methods advocated. Given the fact that the majority of us are spoiled by the 'easy-fix' methods of building now taken for granted, there still seemed to be numerous snags.

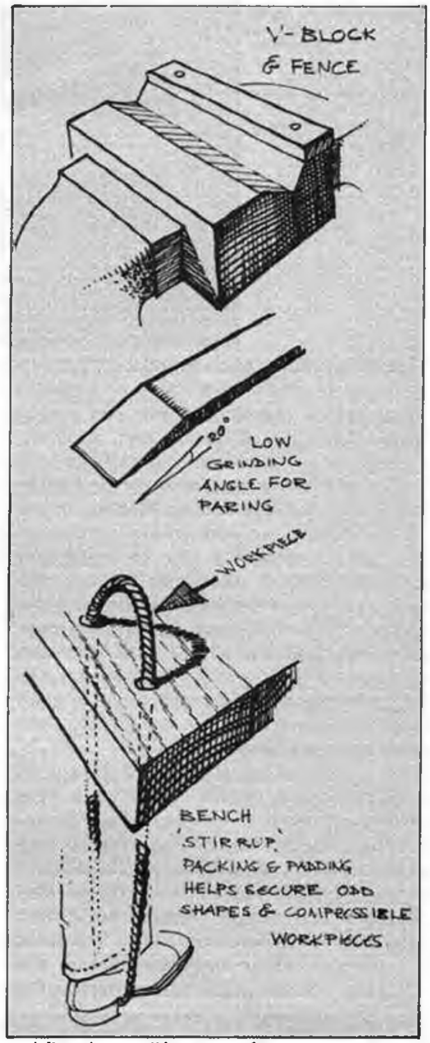
On occasions like this it is a great help to belong to a Society like S.A.M. where one may correspond with a fellow enthusiast and discuss points by letter. My fears were not solitary, nor were they considered groundless by Peter Michel, S.A.M's ace rubber flier. Neither of us could see the claimed performance as likely without thermal assistance, (although Peter's lightweight might prove to be a modern version capable of 2 minute flights).

Vic Dubery sends this photograph of a contestant at the Yorkshire Evening News Model Flying Festival in the early fifties and asks whether anyone can identify the boy or his model. Is he still a modeller? Where is he now?

On the constructional side neither of us liked the wing fixing, the free-wheel system, or the wing-ribs. Fortunately, an old issue of A.M. (March 43) shows a framework which differs from the plan in leaving in position the 'temporary' rear spar, no doubt substituting balsa or spruce for the card used for jigging purposes. This spar prevents ribs sagging and helps to keep a constant section.

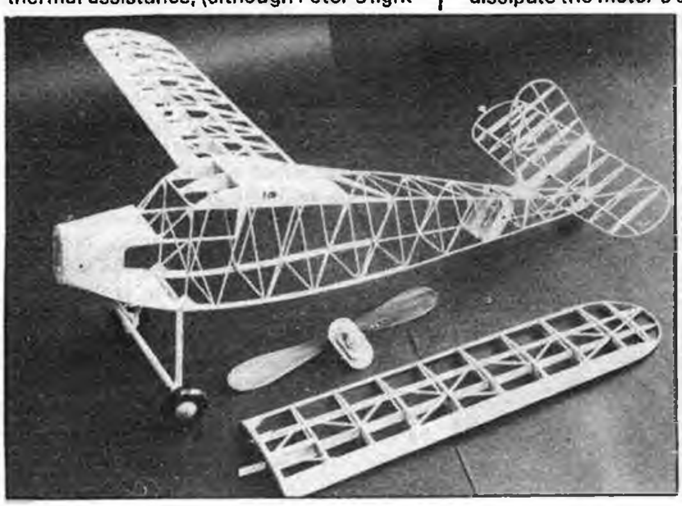
Gears were a problem. Eventually I discovered that slot-car spur sets were available to give a choice of the right ratios. (Once upon a time, gears were to be had in every good model shop). All the slot gears required was to be bushed down to 16swg with the common brass tube (which is *still* available as a modelling necessity), and soldered to the shafts.

The free-wheel specified was likely to dissipate the motor's energy in friction, and

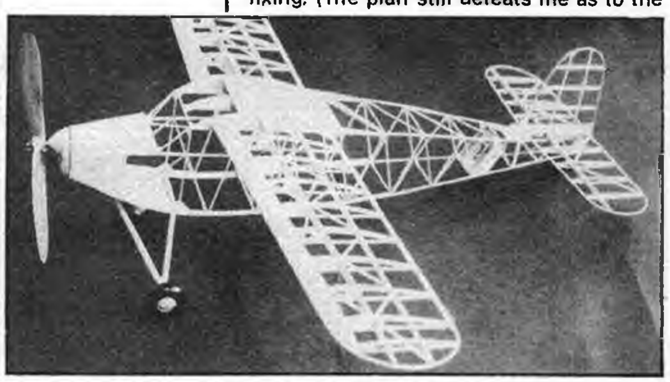


so I fitted a modification of the conventional hingeing hook type which I've used on rubber scale models in the past.

In order to dodge wing fixing problems, (wire hooks fastened to $\frac{1}{16}$in. sq. cross bracing did not appeal), I opted for a vertical box and tongue version which allowed me to have detachable wings with no visible fixing. (The plan still defeats me as to the



Trevor Faulkner's beautifully built Jackdaw with his modifications. Left shows the tailplane set at D/T position.



intended mode.)

As the drawing indicated ⅟₁₆in. spruce or birch for fuselage construction I decided to have a shot at this old-time technique, and here a problem appeared. Most of my spruce strip twisted through 90° along its length. By careful selection, four pieces were sorted out, but anyone selecting materials would be well advised to check for quality if only a limited amount of the stuff is being bought. When completed the fuselage is very strong, and it's obviously well-considered design makes me wonder how other weak features got into the act at all.

The stab/rudder unit relies on two ⅟₁₆in. bamboo pegs locating into a section of the tail mount. Rather vulnerable, and best modified. At the same time, provision for a D/T was built in ... an optimistic safety measure, but one never knows.

Real fun was had with the prop! Walnut 'or similar' wood is recommended. As a bit of 20-year-old satin walnut was to hand I tried to produce a passable prop. as per spec. It took about three hours, but the satisfaction was considerable. The big problem is holding the blank during shaping, closely followed by the critical matter of tool preparation. Simply stated, if you can't shave with it, don't use it! I found a ½in. bevel edge chisel with a very low grinding angle ideal. A vice, and a block of wood with a low fence, (½in. strip of deal nailed to its far edge), proved extremely useful, as did my workshop 'stirrup', a rope which passes through two holes in the bench and which holds irregular shapes effectively. Sanding sticks (abrasive sheet glued to rods of various sections) simplifies final shaping.

Like my correspondent, I could not entertain the wire rear shackle for the motor, nor could either of us see how it could ever have been regarded as a practical possibility. Both of us plumped for an alloy tube fixing. I also used a centralising guide which keeps the rear bobbin in the middle of the tube, away from fuselage sides.

To summarise, I think the Jackdaw looks a delightful aircraft, has an excellently engineered fuselage and involves enough 'real' building to provide plenty of recreation and reward. Like other models from the past, it has constructional clichés which have been superceded, and, if one is not too puritanical, provides a chance for modest innovation within the spirit of the thing. It was interesting to read in A.M. December 81 of the draughting errors in the Viper. This seems to have put people off *building* the model, although plan sales were obviously good. Having started a 'Miss America' (a 1936 design by Frank Zaic) I found that, on comparing three sets of drawings, that blueprints *from the original* showed every rib ¼in. short. This is not funny on a 12in. chord model, and demonstrates that time spent really studying plans is not wasted."

SAM 35 speaks

Latest issue to hand has an interesting contribution from A. A. Judge in which wartime activities of FROG are recounted. During the period this famous concern made models for the government ranging from solid recognition types to large gliders for target practice and even larger cordite rocket motor powered machines. How these later experiments gave us Jetex and the story of the early Frog engines starting with the petrol '175' makes very interesting reading. Sixteen pages of vintage news also includes a reminder from Mike Beach of the appeal of control-line, and one has to admit that this type of vintage flying has a great deal going for it. Perhaps we will see a resurgence of interest in this field now that Mike has spelled out the main areas in which this type of vintage flying scores — i.e. low cost, easy transport, availability of suitable engines, and almost all-weather flying.

Finally, readers are reminded in a subtle way that unless Peter Michel the SAM 35 Treasurer at 56 Lynwood Grove, Orpington, Kent, receives their £6.00 subscription for 1982 along with their membership card and an SAE, their names will be removed from the mailing list — since no vintage enthusiast wants to miss his copy — ACT NOW!

Readers' comments

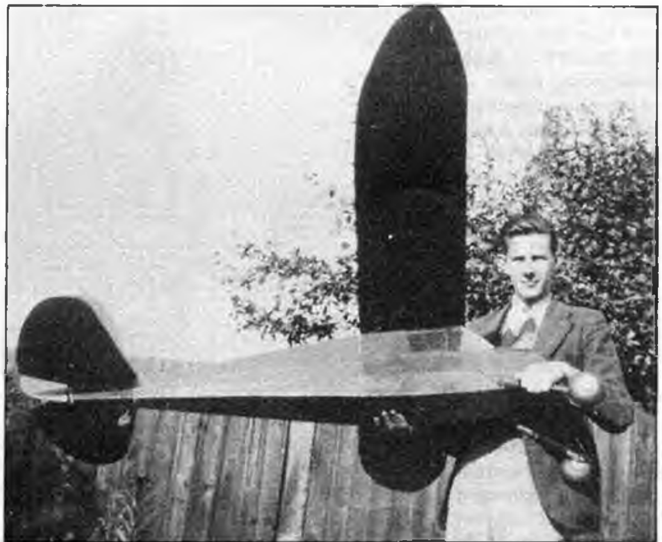
As the number of letters from enthusiasts continues to increase the following excerpts show the variety of topics that a cross section gives:

Hugh McQuiston from Kilmarnock desires to recreate Henri Varache's HV450 now that the plan is again available from

Above: a few years ago there was talk of making the drawing for this fine looking Fairey Facula available, but Fred Longbon's beautifully built example seen here on Old Warden aerodrome is the only one seen to date.

Above: Les Hoy with his Paul Lindberg designed 49in. span Cloudbuster. This model which looks a handful, was described in February 1939 Popular Aviation. Below: this Czechoslovakian Silver Arrow designed by the late Jaroslav Vyskoul of Prague was built in 1962 by Ivan Gause from Sweden who uses a Letna 6.3cc petrol engine to power it.

Below: Ray Albion, SAM 35 Chairman, gets his Gilbert Shurman designed Rambler away at Chobham Common. This 6ft. span model is a fine stable flier and was described in September 1939 Flying Aces.



Above left: a youthful John Patridge proudly holds his Megow's Flying Quaker over 40 years ago. Above right: original Cloud Elf built by Mr. S. Ford from Newbury, seen at Old Warden during a 'Vintage' day. Right: six feet span Dennyplane Junior does not seem to be a popular choice despite its semi-scale appearance (looks like a Fairchild Argus). This nicely built radio assist version seen at Old Warden, builder not known.

the Aeromodeller Plans Service. However, he is puzzled by the appearance of the engine which is said to be the famous 5cc Micron. Photograph comparisons (there is a good photograph of the engine on page 95 of 'Model Diesels' by Laidlaw-Dickson) not only show a difference in the location of the cylinder head screws, but the cylinder head and fin shape is different to production 5cc Microns. Can any reader confirm these differences and so help Hugh to reproduce a true replica of Henri Varache's machine?

Following a 40 year loss of contact vintage modellers Bill Archer from Inverness and John Partridge from Ealing are once again in touch with each other thanks to joining SAM 35. Both were members of the Ealing and District MFC in the late thirties at the time when Mr. L. B. Mawby was secretary. (Mawby was a leading autogyro modeller and described his Rotator IV in this magazine in October 1940) Bill is still very much a rubber type and has a Copland Parastar, but would like to build a replica of R. N. Bullock's 1938 Wakefield; can any reader help with the loan of plans for this model? John on the other hand is a power modeller and flies a Junior 60 on a regular basis.

The photograph of Cliff Billington with his Skyscraper in the January Vintage Corner stirred reader Ivan J. Gause from Sweden to write and tell us how, when he was a member of the IPRO team in Prague during the war he built a Schulmann Skyscraper powered by a Letna 6.3cc petrol engine for the 'Nationals' there in 1944. The model did not fly, due it was thought to excessive weight, but Mr. Gause intends to have another go and we look forward to news of his efforts in this direction.

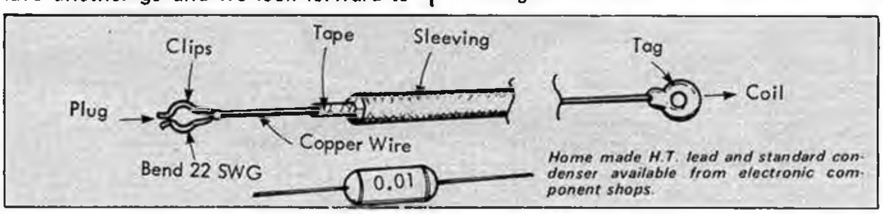
Reader R. Wilson from Stockport send in this contribution:

"HT leads — Coils — Condensers! Don't pay £1.50 more for condensers, obtain them from your local radio shop, a .01µf capacity condenser should only cost 10 to 20 pence, HT leads you can make yourself from heavy gauge copper wire wrapped with insulating tape, then run sleeving along it. You can also easily make your own clips etc. (See attached sketch).

"If one is adaptable one can also make a coil. Iron core — secondary and primary windings. Cover with tar ensuring that you keep the three leads outside for HT, battery and contact breaker, then insert into a cardboard tube.

If the model is big enough use electronic spark or coil from 50cc Japanese motorcycle. Six volt battery use 4 × 500mA Ni-Cads. Points can be made from motorcycle or motorcar points — all easy!"

I am sure that readers would welcome this sort of information in considerably more detail, especially on the construction and winding necessary for efficient coil making. So how about it Mr. Wilson?



Home made H.T. lead and standard condenser available from electronic component shops.

Spark ignition

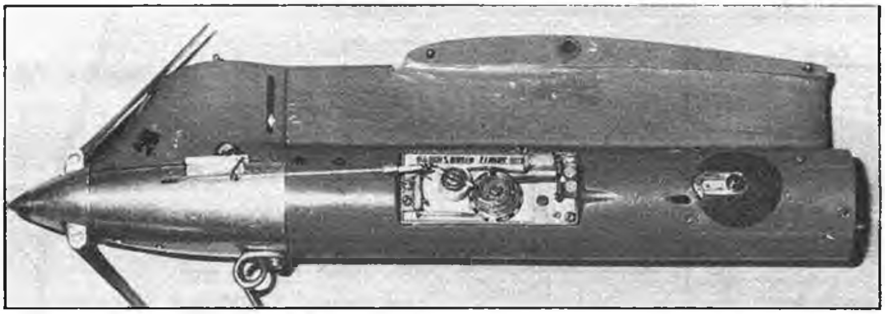
The current prices of old petrol engines is enough to frighten off any vintage enthusiast, and while it is nice to be able to fit an original engine to your handiwork, more and more modellers who want to fly petrol engines are using glow plug motors modified to take contact breakers. While it could be argued that this is not true vintage, no one can dispel the practicality of such an approach with abundant spare parts for these engines all easily available. Readers interested in this form of power unit, should be able to pick up an engine suitable for modifying fairly cheaply. They are then advised to contact advertisers in this journal who offer to perform the modification at reasonable cost.

Vintage get-together

This was held as usual at the Downs Farm Youth Centre in Hatfield on Sunday, 6 December. Due apparently to insufficient publicity, the attendance was lower than at similar previous meetings, but this did not prevent those present enjoying themselves. Once again books, engines and magazines changed hands and it was refreshing to see some vintage models of types that we have not previously seen at our meetings amongst them being Brian Ferret's Red Zephyr and Jack Law's Garami Skylark. Again thanks are due to Malcolm Baird for his usual behind-the-scenes activities without which these functions would be a lot less enjoyable.

F.A.I. Free Flight Power Technology

BY MARTYN COWLEY

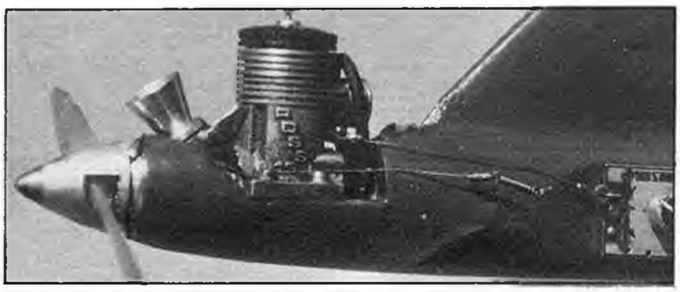


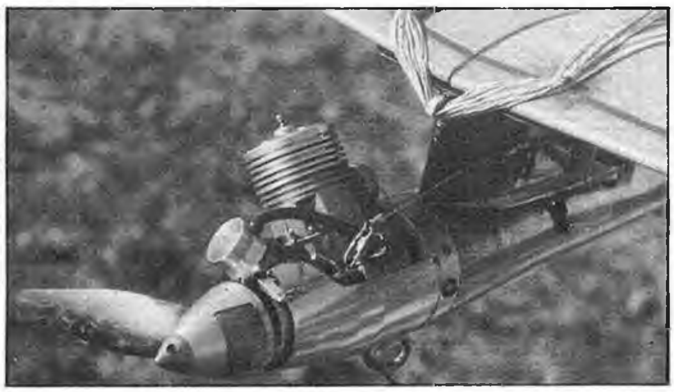
One of nine identical cloned front ends on Cuban teams' models reflects coach Eugene Verbitsky's two year stay to train their flyers!

A dramatic change was apparent in class F1C at '81 World Championships, with a quantum leap forward in sophistication and technology. New motors, folding and single blade propellers, metal skinned wings using carbon fibre and bunting transition climbs had, since the last event just two years ago, become universally accepted. Though none of these innovations was in itself totally new, the availability of new materials and communications amongst modellers world wide resulted in F1C power being the fastest advancing discipline of the three international Free Flight events.

New motors

For many years now, F1C flyers have faced the dilemma that the best power plant, the Rossi 15 MkII, has not been in production, with spare parts virtually unobtainable. The Cox Conquest, introduced some time ago, failed to meet expectations for reliability and consistency — although some individual motors proved good. So it was certainly welcome news to have not one, but two motors, suddenly appear in production! The long awaited new Rossi was finally released, and to many, was met with more than a little disappointment. In practice, many have found that although initial runs are very fast, the rpm drops off with continued use, suggesting some problems which have yet to be sorted out by the manufacturers. The other new motor to appear is the Nelson 15 glow manufactured by Henry Nelson in USA, famous for his World Class F2C diesels. Henry's glow version was recently described in detail in Jim Woodside's "From the Handle," page 479 September 81 Aeromodeller, and although only a few examples were present, due to very recent release, they did appear to have great potential over the best of what's left of the world supply of Rossis. The other new motor, which appeared two years ago — the AD15, was being flown primarily by Mario Rocca, seventh this year, and the Chinese team who were improved out of all recognition taking third individual and second team prize! The AD15 however remains in very limited production and appears to be eclipsed for the moment by the other new alternatives.





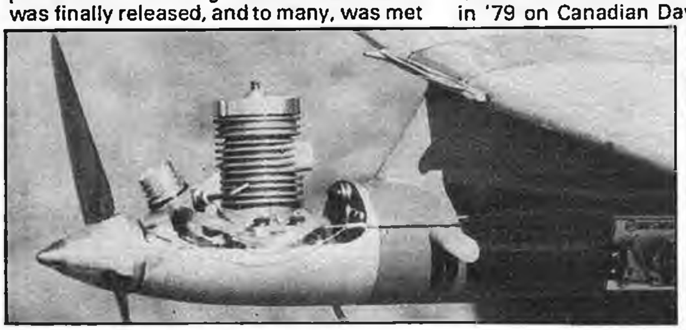
Above: long awaited new Rossi 15, distinguished by black anodised head, failed to live up to expectations. Trumpet air intake on Anton Webber's motor claimed to boost power by 500rpm. Right: single blade prop gives higher efficiency with less drag on glide than two blader as used by Saukenon, Finland - new folding props may be even better!

Propellers

Making their real debut at a World Champs, folding propellers were standard equipment — with 15 of the 27 competing countries using them! Used by Verbitsky from 1978 onwards and appearing at Taft in '79 on Canadian Dave Sugden's model (see details page 213 April '80 Aeromodeller), their wide acceptance no doubt comes from the success at the 1980 European Champs. Most chose blades made from carbon fibre, with glass and Kevlar numerically less popular. The practical advantages of folders goes — no detectable loss of power — likely gain in glide performance, certainly no detriment — equally important, no broken props on DT landings! The important point with folders is not have a forward stop which might artificially stress the blades, but to simply let centrifugal force fan the blades out to full diameter. An F1C prop typically produces 1.5kg thrust and 100kg radial load at full rpm.

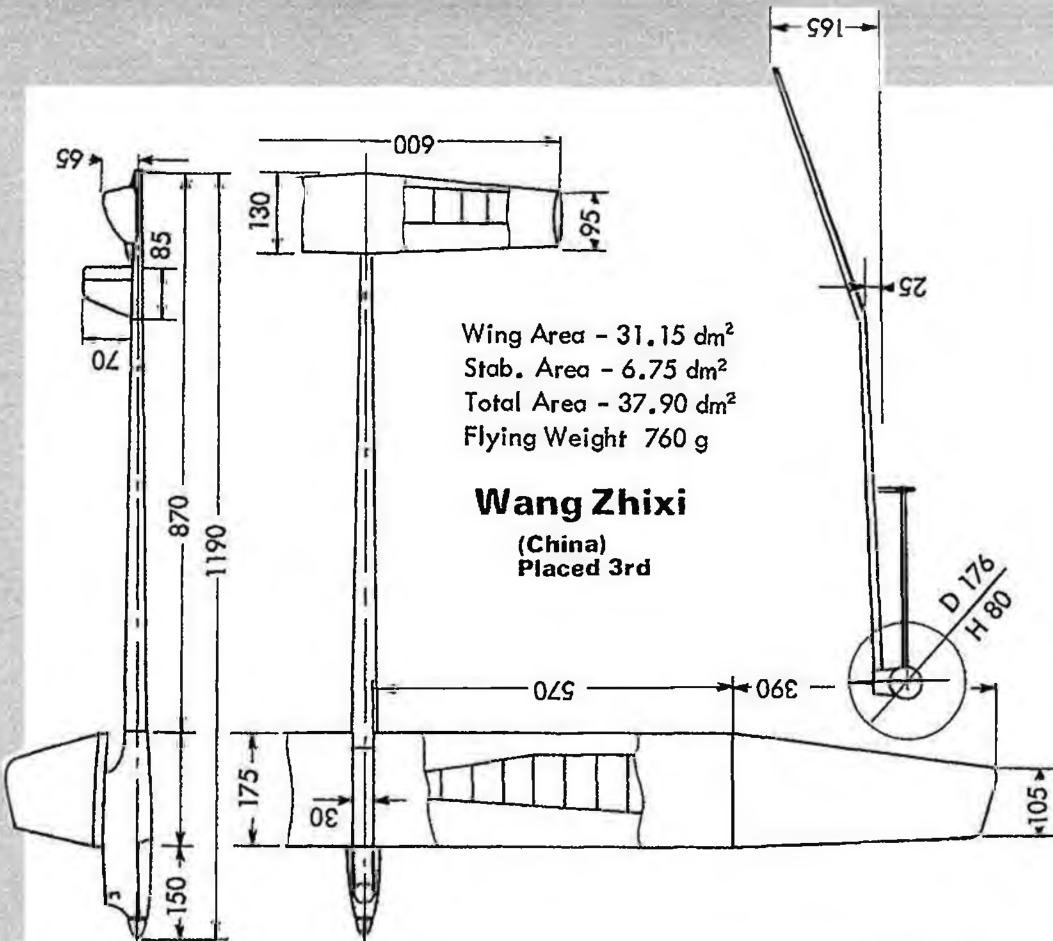
New materials

With the continuing search for structural integrity at even higher speeds using thinner aerofoils, the goal of increased rigidity combined with light weight has not unnaturally led towards composite structures. Sheet balsa covered surfaces were popularised by the Germans over a decade ago, and surface treatment of light glass cloth, 20gm/m², with epoxy is now



Left: alternative F1C motor of the future, Henry Nelson's 15 glow, as used here by Australia's Bill East. Below: extremely clean front end from New World Champion Andras Meczner, Hungary. Note minimal engine enclosure faired into wing pylon with prop blades folded back alongside alloy pan.

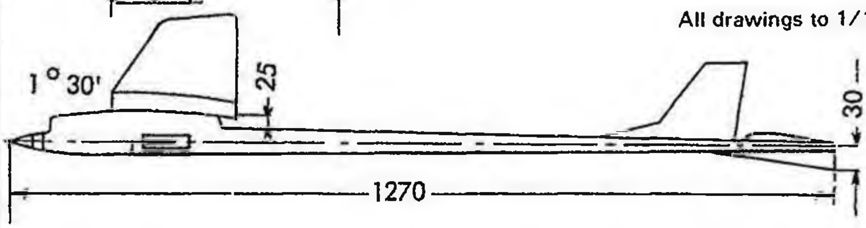
F. WORLD MODEL

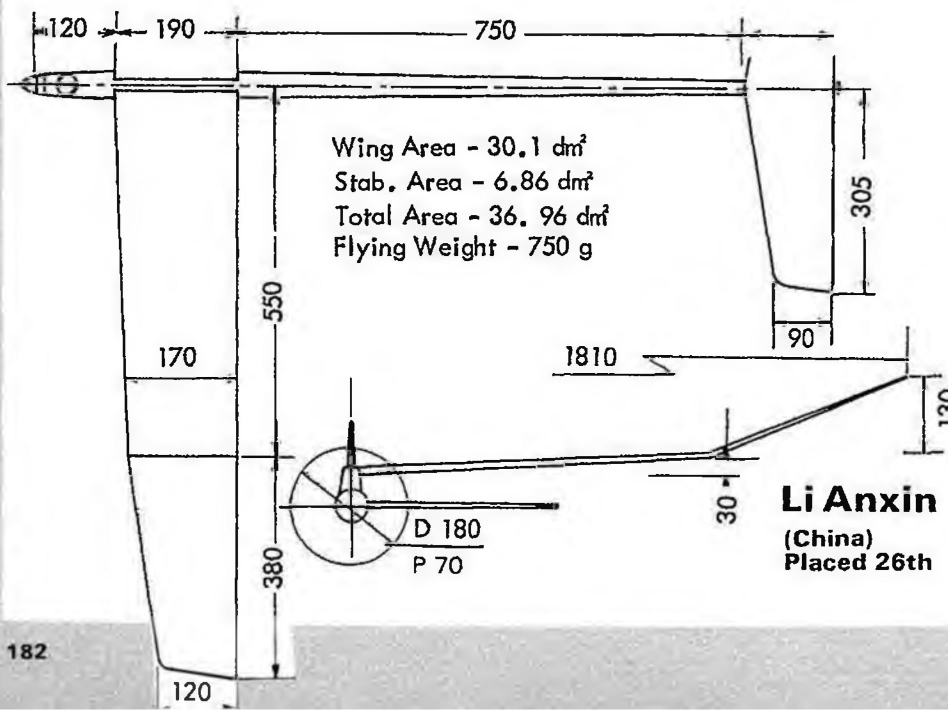


Wing Area - 31.15 dm²
Stab. Area - 6.75 dm²
Total Area - 37.90 dm²
Flying Weight 760 g

Wang Zhixi
(China)
Placed 3rd

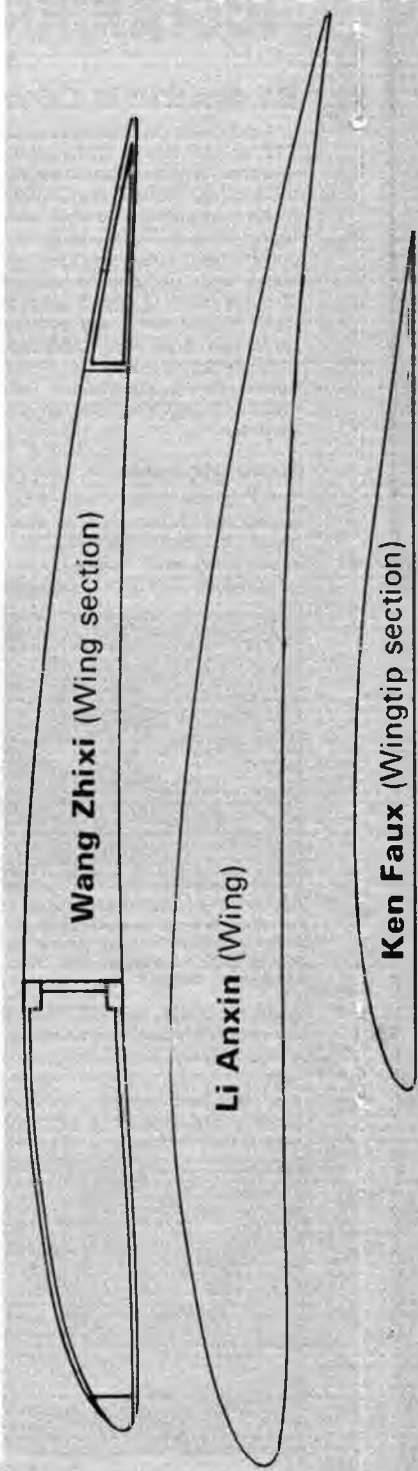
All drawings to 1/12th scale



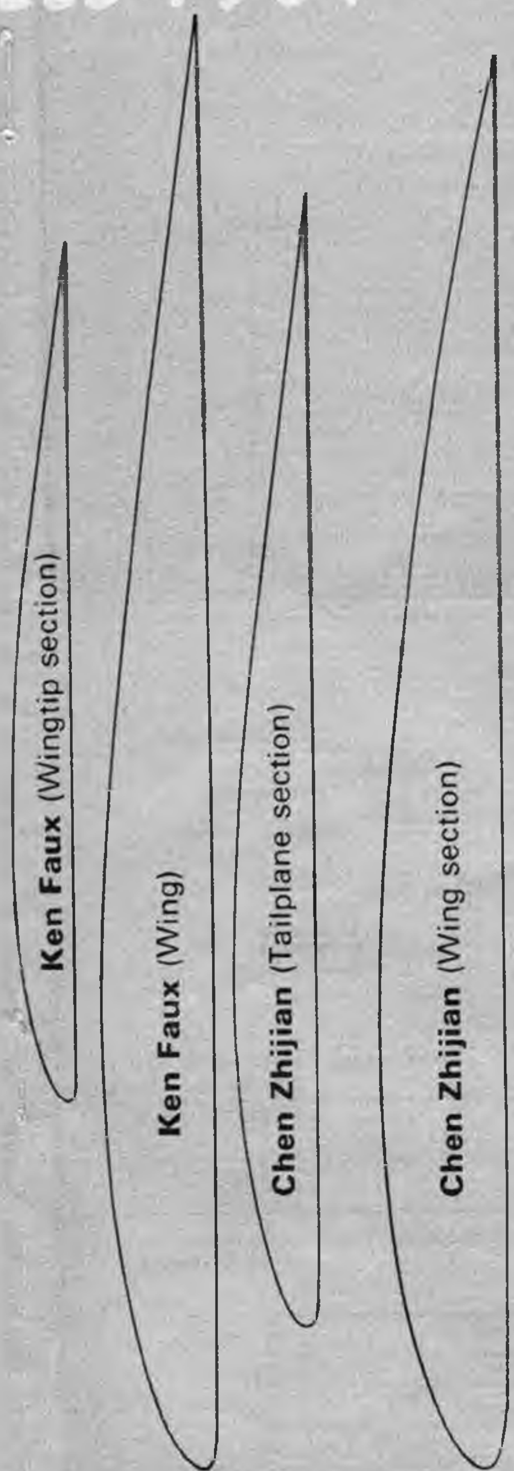


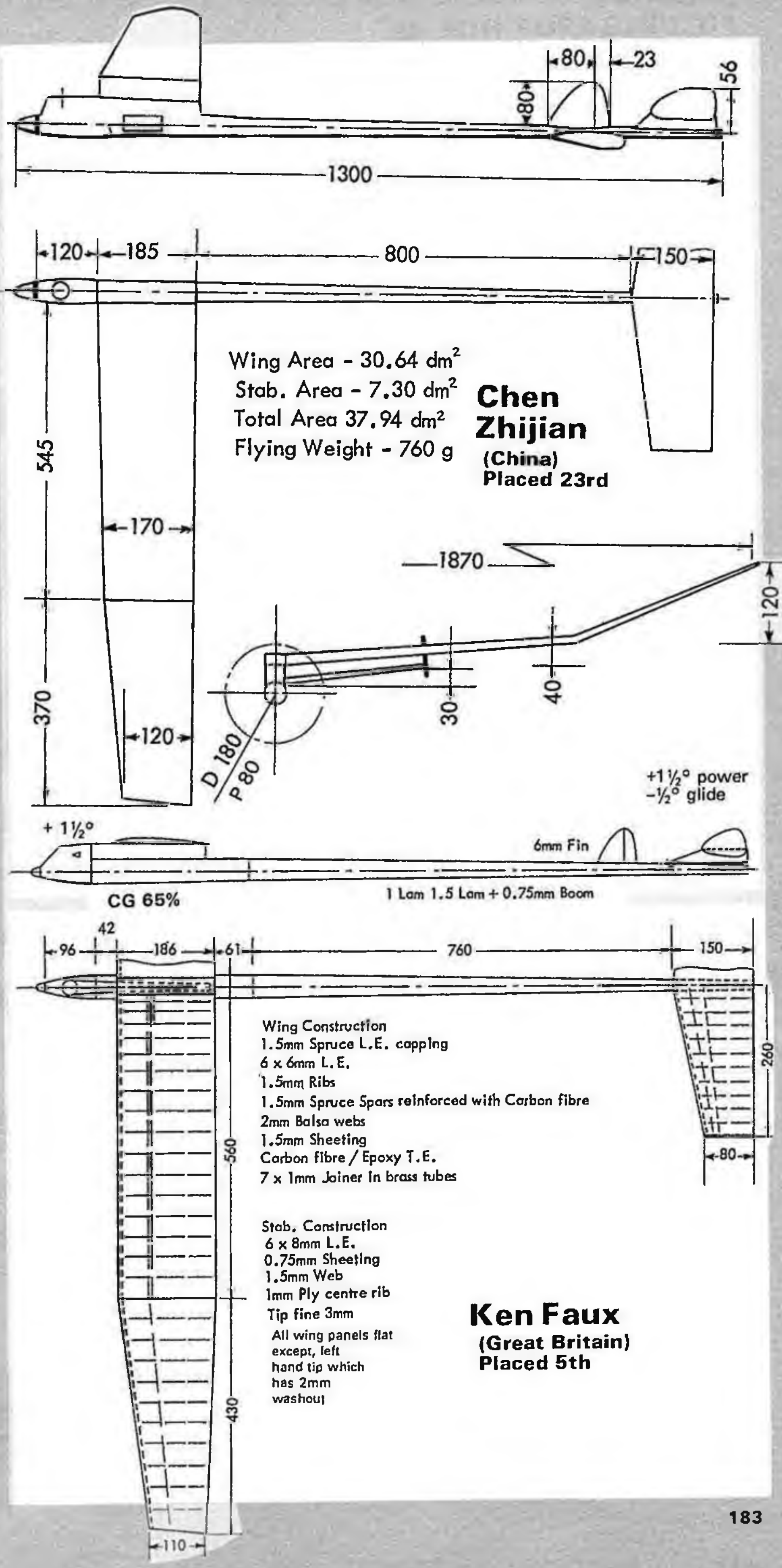
Wing Area - 30.1 dm²
Stab. Area - 6.86 dm²
Total Area - 36. 96 dm²
Flying Weight - 750 g

Li Anxin
(China)
Placed 26th

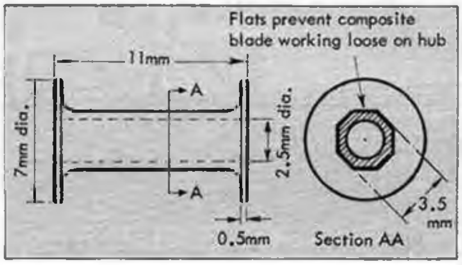


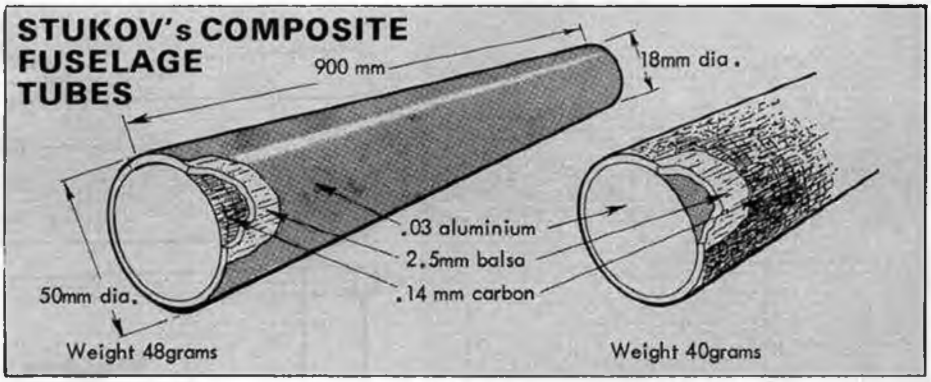
F. 1C.
LD CHAMPS
ELS 1981



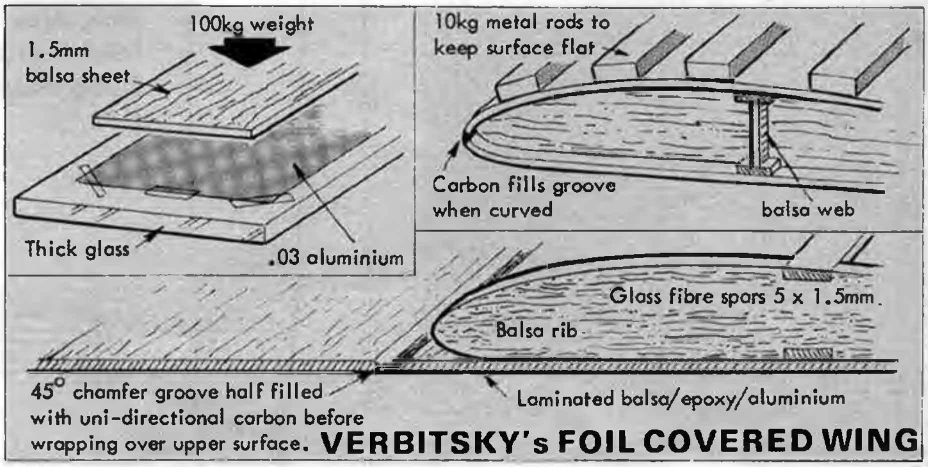


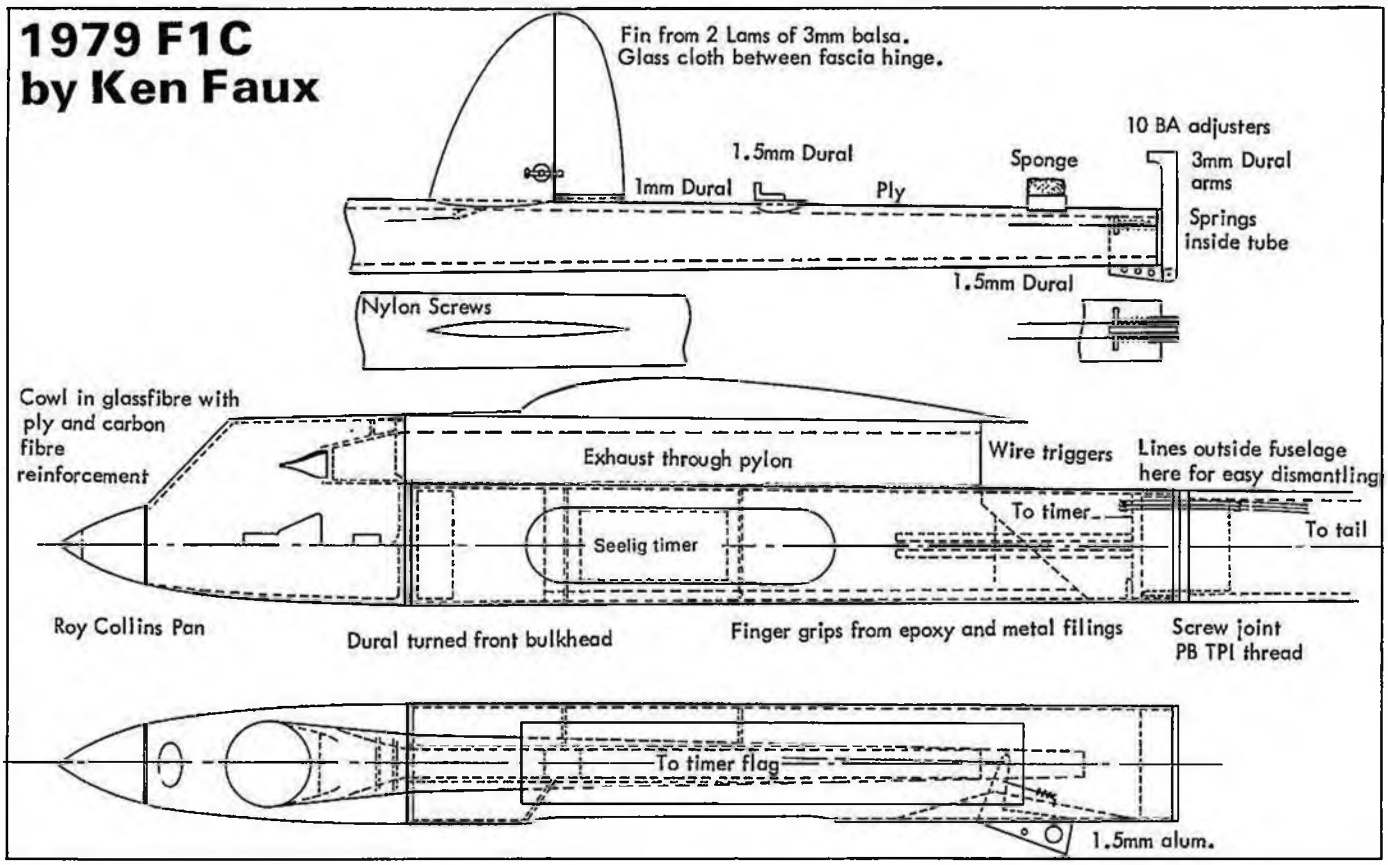
STUKOV's FOLDING PROP HUB



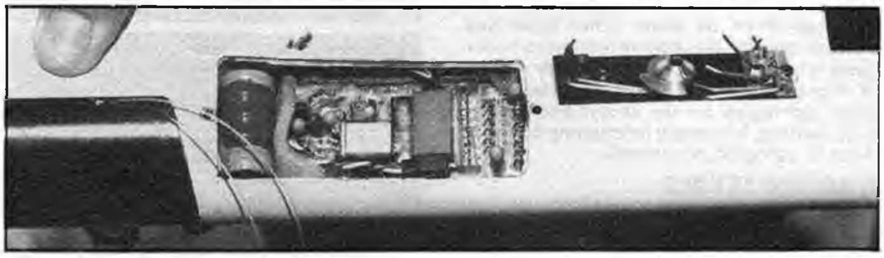


standard. Now following the lead of the Russian models, metal foil covering has also gained general acceptance in F1C. A hard grade aluminium foil (not turkey foil!) typically .03mm thick is used, bonded to the balsa sheet prior to assembly of the wing. Verbitsky prepares his wing sheeting on a flat glass plate with the aluminium foil first smoothed down and taped around the edges, before laminating the balsa with epoxy (.2gm/dm^2) and weighed down with about 100kg! Eugene now uses carbon fibres in a groove along the LE. Wing ribs are glued to the bottom sheet before the carbon is added and the continuous sheet rolled round the LE to form the upper surface, held down with 10kg strips of flat metal until dry. The Russians have also been developing new construction techniques for tapered fuselage booms using aluminium foil and carbon fibre laminated with balsa. Weights for a 900mm tube tapering from 50mm to 18mm vary between 40-48 grams. Epoxy accounts for about 8-9 grams so too does the carbon. Tubes are assembled on tapered mandrels with wet epoxy, hand wrapped with mylar





and adhesive tape until cured. The rigidity of all these composite techniques has to be seen to be believed.



Right: box of tricks programmes, stores and recalls model trim and transfers memory to airbourne circuit in model. Note freely hinged prop blades, forward of running position. Below: the Bionic model! Thomas Koster has the technology – only model damage after rough downwind landings spoiled his chances after faultless operation of new era electric timer.

Bunting climb

Another major change appeared with power to glide transition. Verbitsky first used bunting transition in Austria in '73, but again the 1980 European Champs proved its effectiveness and now almost everyone seems to be using it. When it works, the model climbs truly vertically for the 6-7 seconds engine run before receiving positive incidence on the tail for 1.5-2 seconds, performing an outside loop into glide. However the extremely rough weather in Spain often meant that models were not always still pointing upwards after the motor cut, with usually disastrous results following the application of down elevator! Many made the tactical error of using model and trim better suited to still air type fly offs during the turbulent thermally rounds when consistency is really the only requirement. But bunters are sure to sweep the board at the next calm Championships having seen how the models do perform, when all goes well. Most bunters used 2-3° downward movement of tail. TE for two seconds for a wide outside loop; however Mario Rocca believes more height can be gained with perhaps as much as 10-15° movement acting suddenly for .5 seconds but allowing a 1-2 second delay for further vertical height gain after flood off.

Meczner's model

Andras Meczner's win in F1C reflects the World class status he has achieved over many years of successful competition. His model was trimmed in a more stable conventional spiral climb, using the wing incidence mechanism he has developed since 1972. Originally he dropped the TE of the inboard righthand wing, but he now finds better performance from raising the trailing edge of the outboard left hand panel. Andra's model is trimmed for the rudder to cut in .2 seconds before flood off with the incidence differential continuing for another three seconds before wing and tail move together.

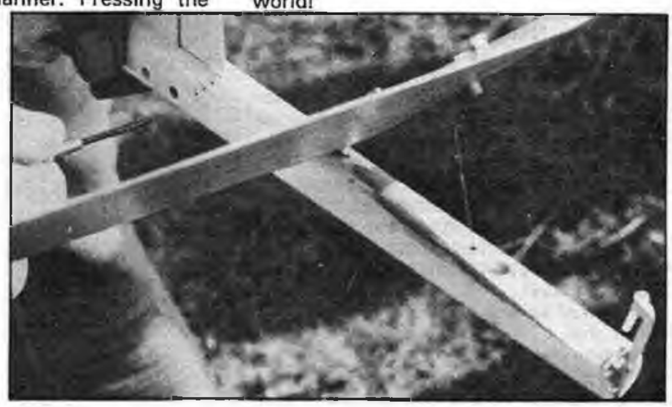
Above left: aluminium foil balsa skinned wing shows very thin undercambered section as used by Russians with very little internal structure. Note black carbon fibre strip leading edge. Above right: wing incidence mechanism on Meczner's model lifts trailing edge wire to wash out left wing during right spiral climb.

Koster's timer

The next revolution in Free Flight was heralded by Triple World Champ Thomas Koster with his new SEVEN-UP design which incorporates a fabulous electronic timer. Thomas has not just popped a battery inside for ballast — he has developed a very advanced (by model flying standards) programmable memory circuit with the advantage that most of the heavy hardware is left on the ground, and only the minimal memory and servo motor accompany the model on the flight — saving precious weight.

Heart of the system is a box of electronic tricks with keyboard and LED visual display of each function. The unit stores a different memory for each model, so first the model prefix is typed in to recall and display the memory for engine run and brake, auto rudder, bunt and VIT and DT with two extra functions that Thomas hasn't yet used! Any of the time delays can be changed independantly — power settings by .1 second and DT timing by four second increments, with crystal controlled time sequences as accurate as a wristwatch!

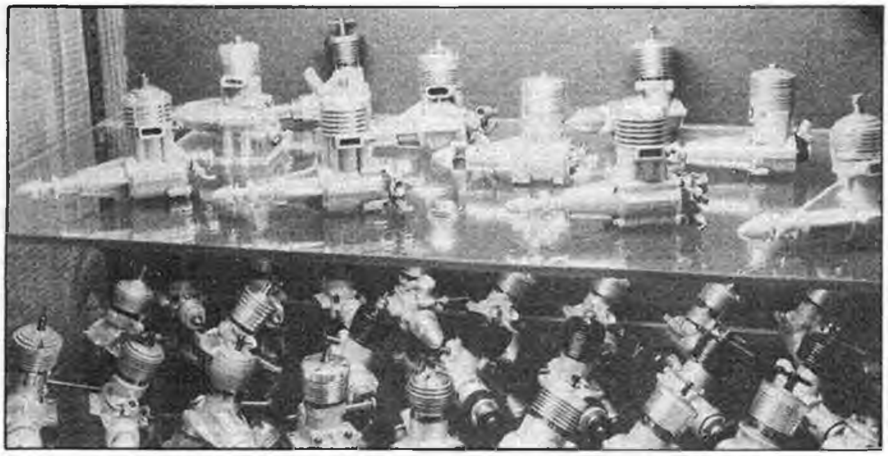
The mechanical actuator in the model uses a miniature R/C type servo motor controlled by the electronics in the model. A release disc on the shaft of the servo motor advances in 35° jumps, activated by a one volt step in signal, to release wire arms in the conventional manner. Pressing the model launch throw button returns the servo to 0° automatically by resetting the voltage to 0. The model unit is then ready to have its memory reactivated by the ground based keyboard box. Model trim was typically flood-off, brake and bunt simultaneously at about six seconds (35° movement) giving a visual indication of motor cut, AR followed after .2 seconds (70°) with VIT 1.5-2.4 seconds later (105°). The weight of the airborne timer electronics and servo is about 25 grams and it fits in a sprung channel inside the fuselage, packed with rubber for vibration damping. Without doubt electric timers will become a normal modelling accessory in the future. The only question that remains unanswered is how far Thomas Koster is ahead of the rest of the world!



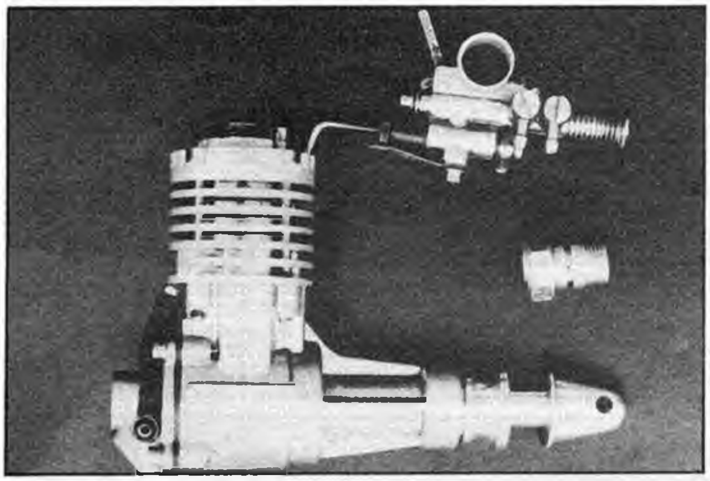
Right: totally enclosed adjustments for flight trim on Koster's new SEVEN-UP design helps reduce unwanted drag.

FROM THE HANDLE

JIM WOODSIDE reports



Above: Jim Plaunt's impressive collection of 2.5 team race diesels. The top shelf houses the 'Stars' (refer to text).



Pares Bros. 15D engine. Note the cylinder head includes the contra piston and adjusting slug.

FROM THE HANDLE — RACING

I have noticed that my file is overly full with items that somehow have been put back too often as some other topic has claimed priority. So with no further excuses I publish a 'pot pourri' of items to say thanks to those who have taken the trouble to write, apologies for the delays and please keep writing. It is really interesting to know what is going on elsewhere.

ENGINE ITEMS

1. The UFO15. Thanks to Richard Ong of Singapore for this one. The engine is of Chinese origin, costs £35 in Singapore and is possibly made by the Silver Swallow people who made a 2.5 diesel some years back. The case looks to be very like a Rossi 15 RV but with larger cooling fins. Piston-liner is of ABC type, the backplate is Tufnol with a K&B style drum. Weight is 162gms. Richard reports that the engine turned 19,000rpm as delivered on a 3.2mm carb and 7 × 4 prop. Could this be the start of the Far East challenge in TR? The Chinese teams have made very impressive appearances in recent world champs in control line aerobatics and free flight.

2. Pares 15D. I am not sure what mark or model number this should be as the Pares Brothers have made many 15s over the years. This one was in the possession of Ian MacIntosh at last year's Three Sisters International. The engine is based on Nelson 15 type dimensions and porting design. The cylinder lead is of the type including the contra-piston and adjusting slug. The multi-valve system came from an earlier Bugl-style engine — some of you may remember that not only was the tank filled and the engine primed but also the front bearing was lubricated! A processor's nightmare. I have not heard any news since last May — perhaps Ian could keep us up to date please.

3. Dave Nixon 15D. A home grown product this time. Dave has been developing this engine for about 18 months and is hoping to have some new units ready for the '82 season. The '81 prototype had quite promising performance. The crankcase which is a home made die casting, is like a hybrid BG-Nelson, the shaft is titanium and the liner AAC. We wish Dave the best of luck — perhaps we might again have a UK made product. Dave Campbell assures me that Dave is not the oldest pilot in TR — he only looks that way!

4. Drool at the engines: while I must admit that I have never been inclined to collecting engines, Jim Plaunt's collection of 2.5 team race diesels is very desirable as well as being a piece of our history. The photograph shows the top shelf which houses the 'stars.' Front row: the Bugl Story with HP15D, Bugl MkI, Bugl MkII and BG15. Back row: at left the ARM15 — the grandfather of the Nelson; third from left is Knasnorutki's 1966 winning engine at the World Champs. The other shelves below house complete sets of Olivers, Webras, Super Tigres, Jenas, Microns . . .

5. Mystery engines: turn to page 41 in the January '82 Aeromodeller — a picture of two engines wrongly captioned "pre-production side ported Schnuerle Oliver Cubs." They are in fact, two engines from Jim Plaunt's collection and were made in England, perhaps in the early 60s. If anyone recognises them would they let me know the details and I will pass them on to Jim in the USA. Both engines are 2.5 diesels and TR inspired. They could have been made in Northern England and at one time were owned by prop-maker Jim McCann.

SHOESTRING '74 PLAN

In the January edition, I mentioned John Neal's plan for the above Goodyear TR model. However, a note from John informs me that he moved to South Wales to take up a new job. John is also interested in forming a new team — any pilots in the Swansea area, please. New address is: 3 Church Street, Llanolybie, Ammanford, Dyfed SA18 3HZ.

JENSEN PROPELLERS

Flemming Jensen, the maker of high quality propellers for teamrace and speed has a new address. Orders and enquiries should now be sent to Flemming Jensen, Lindebugten 23, DK-2500 Valby, Denmark.

FACES AND PLACES

New Zealand:

Thanks to Graham Lovejoy of Manawatu

Australia v. New Zealand, F2C Alan Barnes' pits - the jury watches. Superb facilities at the New Plymouth Club, only two minutes' walk from the NP Airport terminal.

for results and information. ½A racing seems to be very popular with the fraternity. Alan Barnes turns out some pretty potent Cub conversions.

SATRN (Speed and Team Racing Newsletter) is an interesting duplicated type magazine to spread news and tips co-ordinated by Des McAnelly. New Zealand now has an excellent TR facility at New Plymouth which is the venue of the Trans Tasman (Australia v. New Zealand) TR contest. Better still the circle is two minutes from the airport, an important consideration when long distances are involved. Strangely Kiwis have difficulty in obtaining items like IPN, amyl nitrate and the like.

South Africa

No need for introductions here — the photograph shows Dave Clarkson's SA. FAI team-race record holder. The model is the latest in the line of Dave's Sprints. Engine is a Nelson AAC. Pitman was Basil Menges.

Australia

Thanks to Paul Cameron for his regular letters. The 35th Australian Nats has just taken place at Horsham, Victoria. At the moment FAI Team-race seems to have declined in standards with only two teams just shading under 4 minutes. We know Australia has the talent (remember 1978?) — perhaps a shot in the arm of enthusiasm is the missing ingredient.

Above: New Plymouth Champs, New Zealand Easter 1981. Left to right: Paul Squires, Graham Lovejoy, Michael Squires, Lyall Gozzin with ½A models. Below: who said Team Race lacked grace and elegance? John Broadhead shows how. Below left: Dave Clarkson's South African FAI Team Race record holder. Engine is Nelson AAC.

Australian Nationals Results

FAI — 16 teams		Best Heat	Best Semi	Final
1 Hunting-Lacey	Vic	4.11	3 59	8 07
2 Hunting-Lumsden	Vic	3 56	4 03	8 40
3. Crawford-de Chastel	QLD	4 19	4 10	DQ

Almost all the models were Smith Wings

Goodyear TR	Best heat	Final	Engine
1 Fitzgerald-Fitzgerald	4 35	9.22	ST X-15
2 Howard-Dietzel	4 30	9 43	Nelson 15G
3 Hunting-Hunting	4 43	10 25	MVVS D

A Team Race (14.2m lines, 90 lap heats)	Best heat	Final	Engine
1 Hunting Hunting	4 25	8 31	Cub
2. Fitzgerald-Fitzgerald	4 19	8·59	Cub
3 Lumsden-Nugent	4 28	DQ	Cub S

THREE SISTERS RECREATION SITE

As most regular readers will know, the control line flying facility at Three Sisters was completed last year, and was used for several competitions during 1981. However it must not be forgotten that the site is an amenity, an expensive one at that, and is open for practice sessions during the week and most Saturdays. The best way to thank Manchester Council, the SMAE and all concerned, is to give the site regular use. This is also the best way to keep aeromodelling in good standing, paving the way to improvements in ancilliary buildings and facilities.

At a recent site users' meeting it was decided that a yearly fee should replace the rather cumbersome fee-per-session system used until now. Details:

Yearly fee: £5 per head.
Eligibility: SMAE members only — cards to be produced — from any area.
Model types: All classes of control line models, some free flight is allowed but not radio controlled models.
Photograph: A passport type photo will be needed to have affixed to the pass.
Contact: Chief Warden, Three Sisters Recreation Area, Bryn Road, Ashton-in-Markerfield, Wigan, Lancs. Phone: Wigan 720453.

Several enthusiasts in the North West have also felt that the founding of a model club base at the site would be a good idea. It is also thought that the club should aim at attracting local young people to the hobby rather than encourage competition excellence only. If this sounds for you, contact Pete Farrimond on Wigan 34068.

Don't forget the Control Line International to be held on Saturday and Sunday May 22/23. Speed, Aerobatics, Team-race and Combat are scheduled. Spectators welcome (even that victimised non-SMAE member!).

'Thoughts on "B" racing'

'B' had declined markedly since the introduction of the SMAE silencer rules. Most teams opted for tuned pipe silencers, which increased speeds as well as raised the model weight to a point where physical strength has become a major factor.

I think that 'B' should have a maximum engine size re-fixed at 3.5cc — after all, the rules were formulated for engines like the ETA 29, which was a light engine of about equivalent power to the modern 19/20s. The modern 29s like the OPS are very powerful and heavy.

The dyed in the wool 'B' people want to stick to the 5cc rule. However, this strict adherence to capacity rules has already killed off interest in events like Rat Race in the USA where speeds are into the 140mph range — more appropriate to outright speed flying than racing. Perhaps John's call to keep 'B' alive might provoke some response to a proposed change in the rules?

My suggested rule amendments would be:

1. *max engine size 3.5cc (0.20cu. in.);*

2. max tank size 20cc (30cc at present);
3. line diameter to be 0.35mm (0.4mm at present);
4. conventional silencer only – if required.

JOHN HORTON reports

Wharfedale 1000 1981

Not much C/L 'B' racing in '81, but the '1000' was a day to remember for the few there who were also present at the 1st 'Rufforth 1000' back in 1960. Alan Laurie was pilot for the legendary Dugmore/Bell team of 'Novocastria' back in '60 when they finished 2nd to Horton/Haworth/Moulding of Wharfedale, a little humiliated by the latter's secondhand Frog 500! Alan was back for another go, this time as mechanic to Martin Sladdin, and grimly determined to finish the race (assuming he could qualify). Dave Nixon, who in recent years has also had a 'finishing problem', came 4th in 1960 (didn't finish!) as pilot to Mick Ellis and his brother Dennis who operated another Frog 500. John Horton and Don Haworth returned to the '1000' after a three year absence, armed with the usual old FAI 'Tortoise'. Don had bored out one of his 'Dragon' home made special 2.5cc diesel cylinders to 2.6cc but it was still fitted with an FAI size carb., so ultimate range was its criterion although it was faster 'on the bench' than his old 2.8cc ETC (brought as a spare).

The 'pitch' was a bit damp after overnight rain, but it was bright and sunny with the usual nip in the air for this event. Soon the mighty roar of the 29s filled the air as practice commenced and the serious business of extracting the range accompanied by all the smells, some familiar and some new. The '1000' atmosphere was all there!

In the first 200-lap heat, Wilson/Gardner (favourites for '1000' '81) broke Nixon/Campbell's 1977 record (8:31.6) with a relaxed 8:23.1 Sadler/Russel, now regular attenders of this event, had similar airspeed to Tynemouth but their slower stops resulted in 8:50.7. Sladdin/Laurie, with slightly less airspeed, only did 9:34.9, mainly due to reluctant re-starts. However it was to be just fast enough to put them in the final, which is where Alan would start his ambitious task of completing the distance.

Greg Sadler has a difficult race, flying with the Tynemouth pilots; Dick Wilson's style and Martin Sladdin's over-enthusiasm causing him problems until Martin got 'bawled at' (as usual) by 'orty. This combination of pilots, who didn't 'get on' was noted re the final trios.

The second heat was an all Wharfedale 2 up (nobody else ready). Mike Fitzgerald and Steve Williamson had restarting problems with their OPS for 11;57.0. John and Don did a 1 stop 9:4.7 (personal best and diesel record). They had managed nearly 120 laps per tank in practice but Don had it set for 110 laps.

The third heat was between Needham/Schofield and Nixon/Campbell but neither finished. The Grantham 'Daves' were going well when they were caught in Stockport's (?) lines at 134 laps and upset their own control system. Needham/Schofield retired at 82 laps with all sorts of bother, including what appeared to be a 3in. dia. prop!

In subsequent heats James/Horward did 11:28.9 with various problems unresolved and scratched from round 2; Needham/Schofield got 'sorted' for 2nd fastest with 8:27.2; Nixon/Campbell also qualified with 8:46.8 and 'Fitz' and Steve missed out on the final, 7th with 10:19.2. Pity they may have survived the '1000' but they both were nevertheless involved. Mike took over the flag from 'Orty' "to see fair play" and Steve found battery employment with Alan Laurie.

The final trios were arranged by Wharfedale, joining Tynemouth in one circle whilst the rest were left to 'get on' in the other. Everyone seemed happy with this arrangement. Martin was reminded of Alan's 21 year ambition which was to take priority over anything Martin had in mind. It worked; he was a good lad. Then there was the usual overlong delay before the start of the '1000' whilst record cards were prepared, lap counters 'pressed', fuel mixed, stores and spares laid out, pilot refreshments put handy, and natural functions performed. Tynemouth also had a paddle in a 'dubb' (Yorkshire dialect for puddle) near their segment. They had chosen rear (smoothest?) but it hadn't quite dried out and needed assistance. A Wharfedale club 'Mini-Goodyear' event at the same venue held things up a little but eventually Mike and John assembled everybody and everything together on the grid for the start which Mike skillfully arranged and achieved for 3.30pm precisely.

So we were off on the 22nd '1000' and all in the air almost simultaneously. What a din! Don and John could hardly hear their 'Dragon' but it seemed to be O.K. as they were not being overtaken all that often. Their reason for concern was that a backfire in warm-up had split the prop. on Don's finger, which had to be changed. (The propeller not Don's finger!) Was it set right?

After only 5 minutes into the race Dick and Ian had established a slight lead on all but Needham/Schofield and possibly John and Don, who were now due for their first stop at 110 laps. After about 8 minutes, Martin and Alan dropped back behind the rest due to a loose needle, giving a rich run and having to be tightened. This problem occurred four times during the race and kept them in last place most of the time. Meanwhile the other Tynemouth team were disputing the lead with Needham/Schofield who were dominating circle 2 but Dave Nixon thought otherwise and 'Fitz' had to shout at him for persistent high flying. 10 minutes into the race and the order was:

Wilson/Gardner, just clear and 4 stops done;

Needham/Schofield, challenging with 5 stops done;

Horton/Haworth, just leading the scrap for 3rd with 1 stop;

Nixon/Campbell, having done 5 stops;

Saddler/Russell, on their 4th stop with a tight engine, reluctant to start;

Sladdin/Laurie, also in the pits (4th stop) still tightening their needle.

Russell's engine became tighter and more difficult to restart at every stop and on the 7th it had seized completely and they retired. Just prior to this the Grantham racer had touched the deck and required repairs to the undercarriage and a new prop. Only one model airbourne in circle 2 was noted with satisfaction from circle 1 where all was well at the moment.

So at 20 minutes the order was:

Wilson/Gardner at approx. 470 laps (8 stops).

Needham/Schofield at approx. 440 laps (10 stops);

Horton/Haworth at approx. 400 laps (3 stops);

Nixon/Campbell at approx. 340 laps (9 stops);

Sladdin/Laurie at approx. 310 laps (8 stops) (another 'needle' delay);

Saddler/Russell at approx. 299 laps rtd. (7 stops).

No change at 30 minutes. Dick and Ian led with 718 laps and were on their 12th stop whilst Marin and Alan were last with 501 laps, also on their 12th stop. However the Grantham pair were having trouble with binding lines which was to cause their retirement at their next stop with 586 laps. Tough luck Daves!

The 'Circle 2 Gremlins' now attacked Needham/Schofield who required a prop change, then their wheel came off causing them to lose contact with the Tynemouth leaders. So at 40 minutes gone the order was:

Wilson/Gardner at approx. 970 laps and one stop to go;

Needham/Schofield in trouble at about 850 laps (19 stops);

Horton/Haworth challenging for 2nd with about 825 laps (7 stops);

Sladdin/Laurie out of touch with only 682 laps (16 stops);

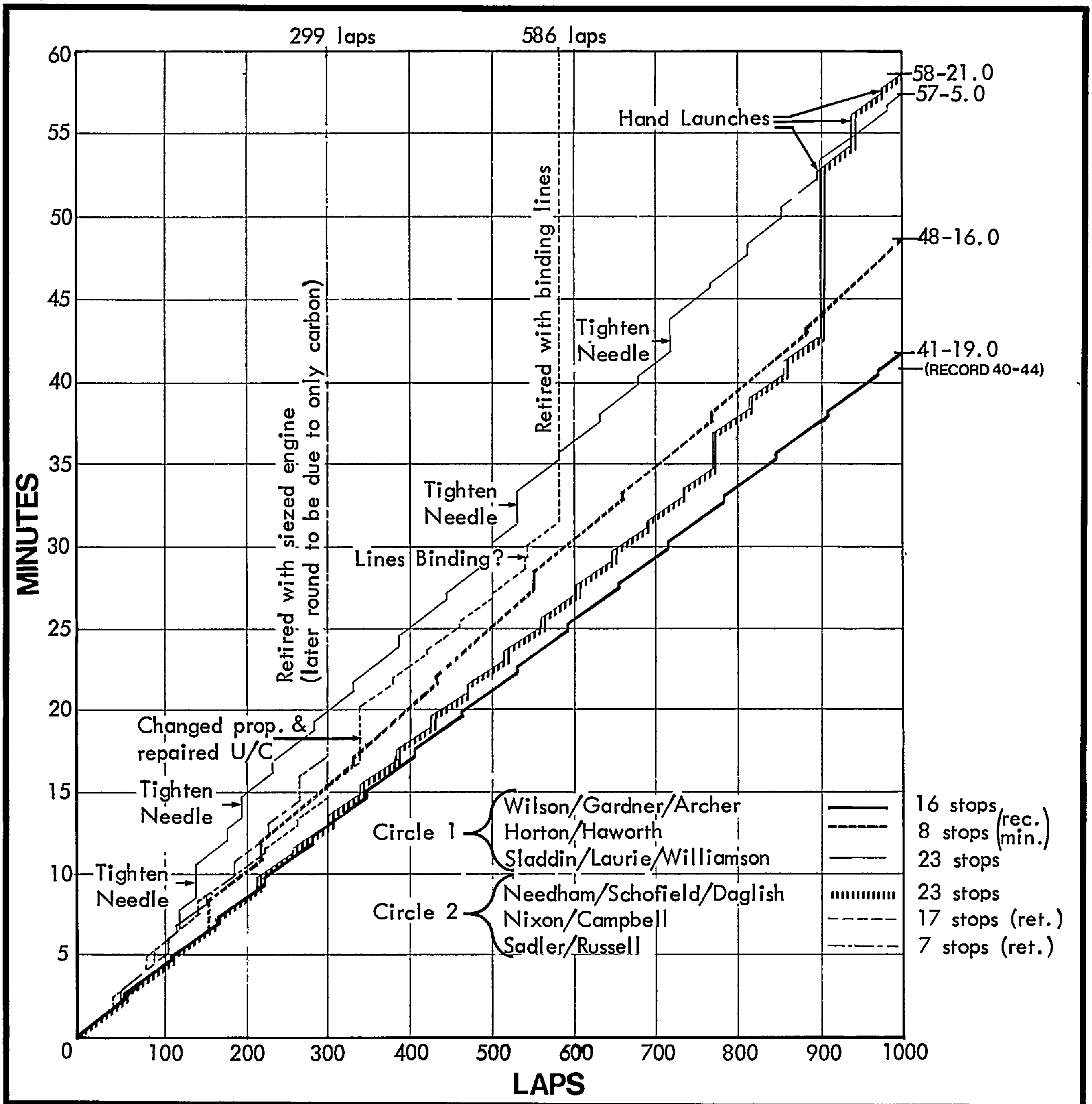
Dick and Ian (with assistance from battery man Dave Archer) won in 41:19.0, again outside their 1979 record of 40:44.0. John and Don were very pleased to finish second with 48:16.0 and a very hot 'Dragon' doing 114+ laps on the last tank due to a tactical error.

By now Needham/Schofield were in a state of utter chaos. Or as noted politely by the lap counter (Graham Howard?) in 'General Disorder'. Others (not gentlemen) would have been excused more obscene remarks on the lap counter's progress sheet. Most of us missed this high drama. They were already having to hand launch, no wheel, and then the refuelling system required refuelling! Panic! Would the model survive the crash landings? It did and they finished the race in under the hour with 58:21.0 but meanwhile in the other circle Sladdin/Laurie had finished before them with 57:5.0. Alan was delighted.

My (John 'Horty's) personal recollections of our trouble free ru in circle 1 with the Tynemouth lads are haunted by one memory. The occasional sideways glimpse, a blurred close-up image of Dick's tortured face as he hung on to 'Suzie Wong', a pop-eyed beetroot with open gasping mouth. We gave him plenty of room to keep changing his style for easing the aches and cramps. No complaints though, except that they had after all chosen the wrong segment (The Dubb). It had a bump just before Ian made the catch. Dick tried it fast and slow but Ian still had trouble and the precious seconds wasted may have got them nearer their record.

Martin kept getting a rich run and I believe I actually overtook him a couple of

1981 WHARFEDALE 100



times. He then went missing for a couple of minutes while Alan and Steve tightened the needle again. At least he got a rest!

Our run was uneventful until near the end. Don decided the setting would be left alone and we would come in at 110 lap stages as that was easy to remember (220, 330, 440, etc.) I agreed without giving it any thought. Our initial apprehension re the pre-race prop. change, was soon dismissed, but at our fifth stop (557 laps) Don took off a little comp. and inspected the model. All O.K. At about ⅔ distance, just after our stop at 662 laps, I thought next at 770, then 880, and finally 990. 990! That's daft, only 10 to do! We should have been doing 111 lap stages to bring us to 999 and eliminate that stop. I think it dawned on Don after our stop at 772 because he left me up till 886, then tweeked the needle (114 required) and crossed his fingers. We made it, although the 'Dragon' didn't like it and went semi-hard after only about 200 laps but kept going reasonably well to give us our best time ever for the '1000' (diesel record) and also of course a record minimum number of stops.

So we all look forward to next year's event which will definitely stay 'B'. Thoughts of making it FAI were quickly evaporated by the enthusiasm, even if it means the '1000' becoming an annual one-off as it nearly was in 1981.

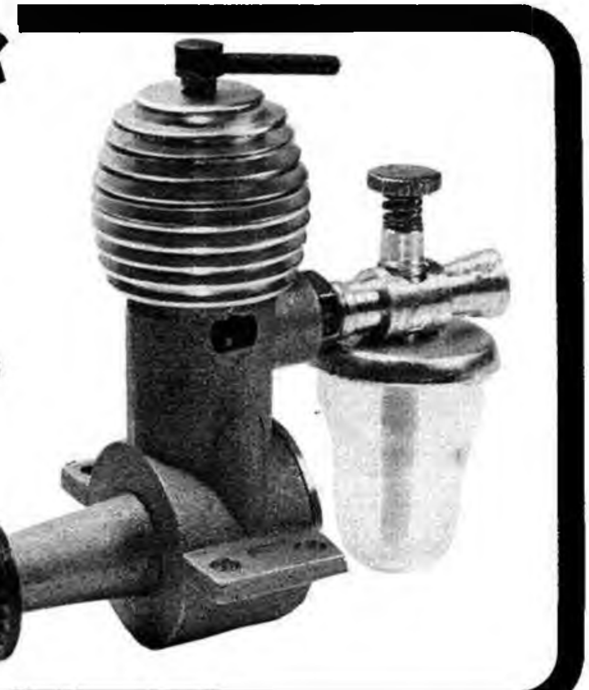
If there are others without 'hairy' 29s, don't forget there is no minimum capacity rule for the '1000' (Don, please note). This allows 2.5cc engines to compete but they must fly on standard Class B diameter (and length) lines. We wondered about changing this for '82, to FAI diameter lines for up to 3.0cc? Having reminded you of this approach, converted FAIs will still have to go a bit as this year's final 'cut off' time was 9:34.9.

Thanks to all for coming whether you flew or lap counted; hope to see you all (and others?) for the 23rd this year. Let's keep 'B' alive.

Engine Test

by Peter Chinn

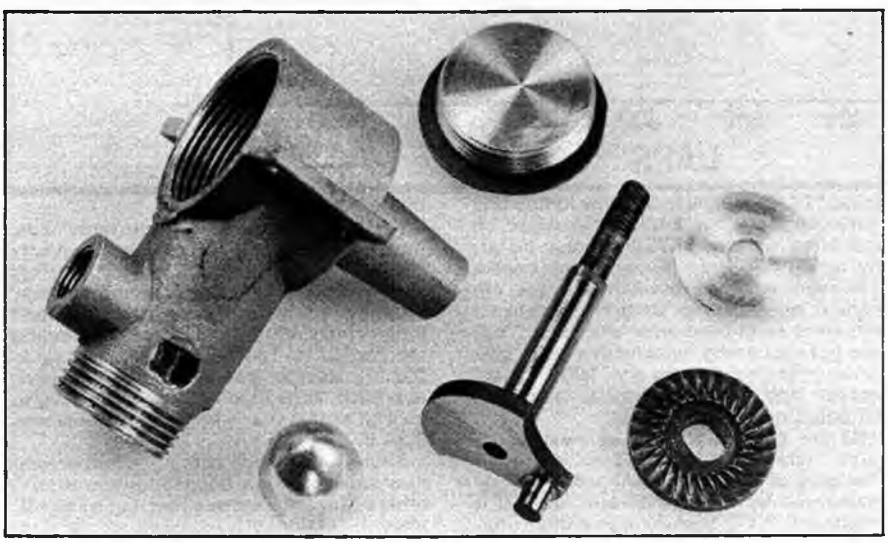
INDIAN MILLS .75 REPLICA



Heading: now made in India, the Mills 75, a long-time diesel favourite, was designed and originally manufactured in England.

The British-made Mills 75 has come to be regarded as something of a classic among model diesels. It dates back to the late nineteen-forties and was finally withdrawn by the original manufacturers, Mills Brothers (Model Engineers) Ltd. of Woking, after 15 years' production. In those 15 years, tens of thousands of newcomers to the hobby had their introduction to power modelling with a Mills 75. We had several of these engines through our hands, the last in 1960 when it was tested for the old *Model Aircraft* magazine and, in 1979, as part of a review of beginners' diesels and glow engines for AEROMODELLER, half a page was devoted to a condensed repeat of that earlier report.

The disappearance of the Mills engines from the market in 1964 was not due to uncompetitiveness or lack of demand for them. Four years earlier, Mills Brothers had been absorbed into a larger light engineering organisation, the Ayling Industries Group and, as a result, were eventually obliged to drop model engine production in order to devote more attention to the sub-contract work for the aircraft industry to which the group was committed. There seemed little likelihood that the Mills engine would ever reappear. Sometime later, however, there arrived on the scene an Indian businessman and model enthusiast, Mr. Suresh Kumar. Mr. Kumar set about obtaining the manufacturing rights and tooling for several discontinued small British diesels, including certain Allen-Mercury and Frog motors, as well as the two Mills diesels.



Left: bottom end components showing main casting, backplate, crankshaft and prop drive parts.

MILLS .75 REPLICA SPECIFICATION

Type: Single-cylinder compression-ignition two-stroke, with induction via piston-controlled port. Bronze bushed main bearing. Simple needle-valve carburettor with bowl type fuel tank.
Nominal bore: 0.330in. (8.38mm)
Nominal stroke: 0.520in. (13.21mm)
Nominal swept volume: 0.0445cu. in. (0.7288cc)
Nominal stroke/bore ratio: 1.576:1
Compression ratio: Variable by movable contra-piston
Checked weight: 57.2 grammes (2.02oz) including fuel tank

GENERAL STRUCTURAL DATA

Gravity diecast aluminium alloy crankcase/cylinder-casing unit with bronze-bushed main bearing and threaded boss for intake assembly. Crankcase threaded at rear for screw-in backplate. Top of cylinder casing threaded for cylinder jacket. Counterbalanced one-piece case-hardened steel crankshaft with 3/16in. dia. journal 1/8in. dia. solid crankpin and 4BA propshaft thread. Steel prop driver keyed to shaft by two diametrically opposed flats on front end of crankshaft journal. Drop-in hardened steel cylinder located by flange and retained by machined aluminium finned cooling jacket screwed onto top of main casting. Lapped piston with stepped crown and pressed-in solid 3/32in. dia. gudgeon-pin. Machined aluminium alloy connecting-rod with plain eyes. Machined aluminium alloy carburettor body with translucent moulded plastic fuel tank of 3ml capacity.

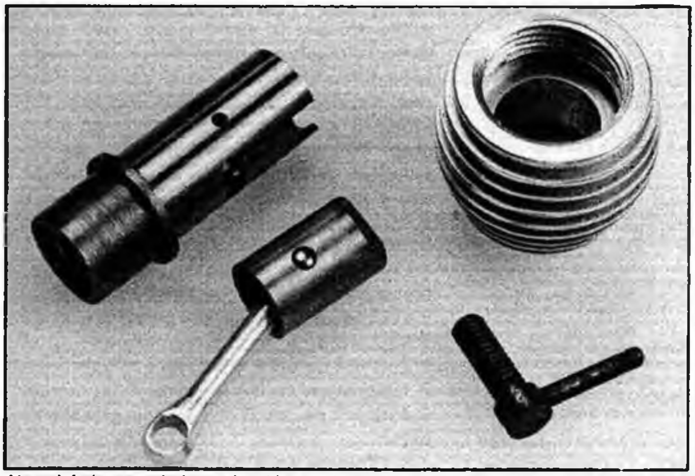
TEST CONDITIONS

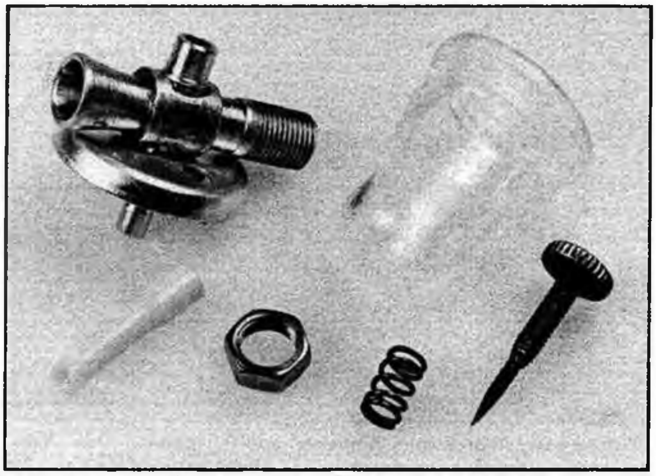
Running time prior to rest: 30 minutes
Fuel used: Model Technics D-2000
Silencer: Nil
Air temperature: 23°C (74°F)
Barometric pressure: 765mm Hg
Relative humidity: 74 per cent

TEST RESULTS

Power output, gross: 0.048bhp at 9,800rpm
Torque, gross: 6.2oz. in. at 6,000rpm.
Equivalent bmep: *57lb/sq. in. at 6,000rpm
Specific output: *68bhp/litre
Power/weight ratio: 0.38bhp/lb.

*Based on actual checked swept volume of test motor.





Above left: long-stroke layout is evident from lengthy cylinder and piston. Cylinder jacket and compression screw also shown. Above right: carburettor and tank parts. Carb can be coupled to larger separate tank if required.

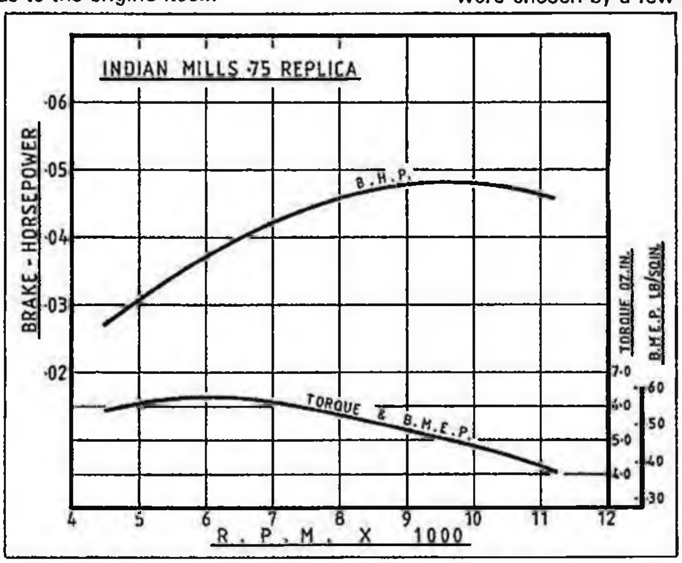
In due course, these engines were put into production by one of Mr. Kumar's companies, Aurora Model Mfg.Co.Pvt.Ltd. For several years these were sold only in the Indian home market but, as manufacturing experience was gained and standards improved, the Calcutta based factory was emboldened to offer them for export and, in due time, the Mills 75 and, later, the 1.3 as well, found their way back to the U.K. where they are now distributed by Irvine Engines Ltd.

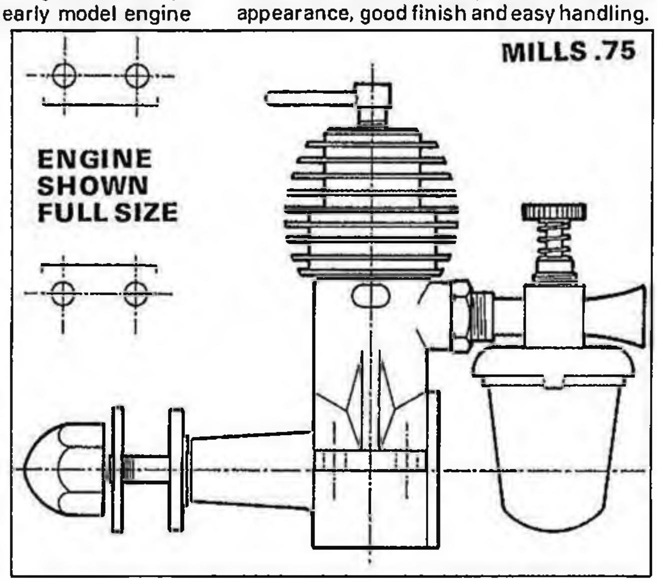
In its basic design, the Mills is, of course, more than a trifle old-fashioned. It is of the three-port or side-port type, i.e. fuel/air mixture is admitted into the primary compression chamber (crankcase) via a port in the lower part of the cylinder, controlled by the piston skirt, instead of through a rotary-valve or reed-valve as in practically all modern model two-strokes. Also, it has, like so many of the earliest model compression-ignition motors, an extremely long stroke (nearly 1.6 times its cylinder bore) and this traditional design is reflected in a decidedly spindly look to its component parts, as well as to the engine itself.

Structural details of the engine are summarised in the data table and the way in which the components go together is apparent from a study of the parts photographs. Basically, this Indian made engine is a true replica of the P.75 type Mills which was first announced in December 1949. For the record, we should, perhaps, add that the very first production model Mills 75 actually appeared a year earlier and was a different design: basically a scaled-down version of the 1.3cc MkII model, including a crankcase machined (instead of cast) from magnesium alloy to which a square-flanged cylinder was secured with four screws, the finned jacket screwing onto the cylinder rather than over the crankcase.

One difference between the earlier Mills and the Indian replicas is that all the British built motors used magnesium alloy crankcases (chromate-treated to protect them from corrosion — hence their black surface finish), whereas the Indian made engines have their castings made from a conventional aluminium alloy. This is of little consequence to the user. Magnesium alloys were chosen by a few early model engine makers, because of their low density and easy machinability. Commercial magnesium alloys have specific gravities of about two-thirds that of aluminium and the Indian Mills 75 has a crankcase casting that is one-sixth of an ounce heavier than that of the original British version. This is combined with other minor differences to make the Indian engine about a quarter of an ounce heavier. Thirty or so years ago, in the heyday of free-flight, low weight was something that engine manufacturers were keen to exploit. Today, a quarter-ounce saving is scarcely significant, even in an engine weighing a mere two ounces.

The original Mills Diesel (the 1.3cc MkI) appeared in the autumn of 1946 and was one of the very first British model compression-ignition engines on the market. In that eager immediate post-war period, when the demand for model engines far outstripped the available supply, it was quickly followed by a rash of rival products; many of them of indifferent quality and performance. In this atmosphere, the Mills won approval for its neat appearance, good finish and easy handling.





Fuel-tank/carburettor assembly can be rotated through 90 or 180 degrees for side or inverted operation.

Those early impressions, however, subsequently gave rise to something of a Mills myth: namely a reputation for precision and consistency that would certainly not stand up to any comparison with the products of today's leading manufacturers. It is true that, at a time when there were a lot of motors that were tricky to start, the Mills engines were invariably very easy to handle (a quality for which they were deservedly regarded as the Number One beginners' engines) but they did vary a great deal as regards power output and comparisons of individual examples, produced over the years, indicated some surprising variations in such basic dimensions as cylinder bore and crank throw, as well as port timing.

The 75, in particular, seems to have been produced with wide variations in bore and stroke measurements, both from the originally quoted factory figures of 0.335 × 0.516in. (0.0455cu. in. or 0.7453cc swept volume) and from the nominal figures, given in all Mills Bros. literature from 1950 to 1964, of 0.330 × 0.520in. (0.0445cu. in., 0.7288cc). Variations in port location and piston skirt length, as well as in piston stroke, also caused some engines to have a short supplementary air induction period, as the piston skirt cleared the bottom edge of the exhaust ports, while others did not, and these discrepancies resulted in considerable differences in port timings in general.

So far, only a single example of the Indian replica of the Mills 75 has come into our hands. This had the standard factory quoted bore of 0.330in. but a shorter stroke of 0.498in. (reducing the effective displacement, in fact, to just under 0.70cc) and no supplementary air induction period. Measured port timing indicated an exhaust period of 124° of crank angle, a transfer period of 100° and an intake period of 104°. It is with this engine that our present report deals.

PERFORMANCE

During the ten years that followed the introduction of model compression-ignition ('diesel') motors, these engines far outnumbered glowplug engines on the UK market. Now, the positions are reversed but, for the young beginner starting with a small free-flight or control-line model, the small diesel still has much to commend it. All that is needed to run it is some model diesel fuel — any kind will do — and, if it is a Mills, it will almost certainly be easy to handle.

Our Indian Mills test motor started easily and ran steadily. Because its variable compression control allows ignition of the fuel/air mixture to be advanced or retarded, according to load, a diesel will run happily on a wide range of prop sizes including much larger sizes than are practicable with an equivalent capacity glowplug engine.

A diesel of the older three-port long-stroke type, like the Mills, will also reach its maximum power at somewhat lower revolutions, so there is no point in fitting it with the sort of prop that would be appropriate to one of the popular .049 class (0.8cc) glowplug engines. It is, in fact, likely to be difficult to start on such a prop and the raw beginner will probably find that the Mills 75 is easiest to handle on an 8 × 4 prop. We would regard a 7 × 3 as the smallest practical size, the preferences being for a 7in. dia., 4 to 5 in. pitch for a control line model and a 7 to 8 in. dia., 3 to 4 in. pitch for a free-flight model.

Checked rpm figures obtained with our test motor included the following:

5,100rpm on a 9 × 4 Robbe glassfibre-nylon
5,900rpm on a 9 × 4 Zinger-maple
6,250rpm on an 8 × 5 Zinger maple
7,100rpm on an 8 × 5 Power-Prop maple
7,400rpm on an 8 × 4 Robbe glassfibre-nylon
7,900rpm on an 8 × 4 Power-Prop maple
8,000rpm on an 8 × 4 Cox glassfibre-nylon
7,500rpm on a 7 × 5 Zinger maple
8,200rpm on a 7 × 5 Power-Prop maple
8,200rpm on a 7 × 4 Zinger maple
8,750rpm on a 7 × 4 Top Flite nylon
9,100rpm on a 7 × 4 Power-Prop maple
10,500rpm on a 7 × 3 Top Flite maple
10,800rpm on a 6 × 5 Top Flite maple

Starting qualities deteriorated sharply on the 6 × 5. From being docile and easy starting on the larger sizes, the reduced 'flywheel' effect of the light 6in. diameter prop gave the Mills a tendency to snap round and 'bite' one's fingers. However, it will be noted, by comparing these prop rpm figures with the performance curves obtained from our torque tests of the engine, that, on both the 6 × 5 and the 7 × 3 props, the engine was, in any case, running well over the speed at which it delivers its maximum power output. Add to this the fact that static prop rpm can be expected to pick up, by about 10 per cent, in flight and it will be seen that there is no reason for using such small prop sizes.

Incidentally, as no rotary intake valve is used, the engine runs equally well in either direction and, if required, can therefore be used in a pusher installation with a standard prop.

No silencer is supplied for use with the Mills 75 but it runs quietly enough to make such a device unnecessary under normal conditions.

Free Flight Scene

DAVE HIPPERSON reports

Open Rubber design comparison

It has been almost 20 years since the last detailed analysis of Open Rubber design trends. That last one appeared in the February 63 issue of Aeromodeller and was compiled by John Pool and Ron Firth. It had been inspired by the previous year's Nationals flyoff in which 14 contestants achieved three four minute maxes and flew off in very calm overcast conditions. During those intervening two decades sights have been set appreciably lower as the three minute and more recently the ludicrous 2:30/2:20 max hardly demanded much of models thus nothing stimulated design progress. The 'Open Rubber Trophy' of the past few years has increased enthusiasm considerably to the point, incidentally, of this year the eventual winner missing out the last two major SMAE Open events so that he might be sure of having models to fly in it!

As this comparison may be referred to for some time to come and time dulls the memory some brief details of what went on might be in order. Conditions all day were 5mph or less with light patchy lift dying away towards the end of the day. Contestants had been through a 3:00 minute and two 4:00 minute maxes followed by a final 5.00 minute max. All those flyoff qualifiers plus a few extra are detailed here. A number of them had switched to their flyoff models for the last max. The models here are their biggest (best?) or in some cases only model — that accounts for the nine flyoff contestants. Russell Peers and John Fletcher although not placing were thought to have such interesting models as to include them. Fletcher's most certainly the largest and using the most rubber! Bernard Aslett won the Champagne flyoff with an excellent flight very late on and his model along with that of Laurie Barr is included because of their considerable experience with indoor. Their approaches to power/weight and trim are particularly interesting.

Ball's winning model was quite obviously designed for very calm and will inevitably be illustrated and discussed for some time to come. Mark Croome however used a very big model on all flights although not quite the size of his 'Cabaret Star.' His maxes were with a model of a mere 400sq. in. and from its past record we know it can fly in a wind. Bob Wells used a smaller model on the first two flights. This model here is his old very light flyoff aeroplane. Relatively conventional in layout but highly powered for the structure. John O'Donnell did not design his model for out and out Open contests such as this — it is a 'special event' Wakefield built to the '53 rules which

Russell Peers' Standard Fly-Off Model.

although imposing a Wakefield weight and a 10sq. in. fuselage cross section minimum allow as much rubber and as little airframe as the builder thinks he can get away with. What results in John's case is a fast climbing model particularly well equipped to deal with ground turbulence by not staying in it longer than a few seconds on the way up! As with all fast flying models if it goes badly wrong on the power it can be in trouble. Lee and Scruby's models follow current conventional patterns if a little underpowered for their areas. Godden, Gibbs and Walker opted for the small approach all with rapid climbs from areas of 200 or just under using economical amounts of rubber. Godden's was particularly impressive although he is quick to point out that five minutes is about 'it' in dead air.

Russell Peers' conventional model (No. 33) is large, light, moderately powered and well proven in many seasons of flying. His new tapered version climbs very fast and made an impressive appearance in the Champagne flyoff despite still being at the trimming stage. Bernard Aslett's set up was rather different and it certainly paid off in the dead calm at the end of the day. His model is large, very light indeed and highly powered. To make things even more exciting it has a CG off the back of the wing! You may not be surprised to learn that a smaller version that he was using during the day and similarly rigged picked up a stall due to a motor bunch and dropped the last max. It's a knife edge trim for a model with a long motor. Laurie Barr produced his famous Licorice Stick (APS plan and articles Aero November '74). His new version is even lighter particularly the fuselage (diamond longerons) and would represent the highest power to weight ratio on the field. Very much along the lines of Wells — the old school. Last and largest was John Fletcher's scale up of the now legendary Bob Bailey model of '66. Still rather at the experimental stage and perhaps in trouble on prop configuration and heavy structure.

If one were contemplating a single model that is going to stand a chance in the flyoffs than the Wells-Barr direction is sound but obviously frail. You may be limiting yourself to calm days only. If you can run in two directions than a far cheaper, more handleable and comfortable way of making maxes at least up to 4 mins would be the Godden, Gibbs, Walker route. Models of this size are not such a 'big deal' to fly and therefore you are more likely to get them properly trimmed. Don't go for too long a prop run — 1:30 would be ideal — 60 seconds is too short Alan. It is quite easy to produce very robust and light models of this size. Walker's model is a little heavy but then he powers it well with more than its weight in rubber so the losses are likely to be in the glide. Using small models during the day, however, necessitates building another larger type for flyoffs.

The standard, even if not necessarily the ultimate, has been set by Ball. In dead conditions (anything under 3mph) a very large clean and lightly loaded airframe can give eight minutes give or take a bit from a two minute plus prop run without the need to go above 5oz of rubber. Remember climb speed will be slow and the model will always look a lot lower if it isn't actually lower in fact. Prop size and speed become critical as does air speed and flow turbulation effects. These large light models seem to like coarse pitch slow props and although turbulating the wing might sound elementary — gains might be available at these speeds if the prop were turbulated too.

Also remember that any propeller has its ideal and most efficient speed as does a wing. Often improvements can be found by 'tuning' the prop with more or less motor torque until the ideal combination is found. Conversely changing the pitch diameter ratio and leaving the motor alone would do the same thing but takes longer. Whether it is essential to go as large as 400sq. in. plus remains to be seen but the big flyoff model has certainly arrived and not a thousand miles from my suggestions in the April 1979 issue of Aeromodeller. Thanks for doing the development chaps — and thanks also for all the information in this table on which everyone co-operated so quickly.

OPEN RUBBER DESIGN ANALYSIS

	L. Barr	J. Fletcher
Name	'Licorice Stick'	
Wingspan	54"	72"
Chord(s)	5"	7¼"
Tip	Square	Eliptical
Section	9% under-cambered	Bailey 1966
Dihedral	Poly	Poly (9" total)
Ribs	Union Jack	Straight
Spars	Two	Two T Sec/One I
CG	85%	70%
Incidence	+1½°	0°
Tailspan	19"	25"
Chord(s)	4¼"	5½"
Tip	Square	Square
Section	8% flat bottom	9% flat bottom
Ribs	Straight and diagonals	Straight
Spars	One	Three
Incidence	-1½°	-2°
Fin height	6"	7¼"
Chord(s)	4½"-3"	7¼"
Tip shape	Radiused	Eliptical
Fuse LOA	48"	72½"
Motor section	33½"	60"
Nose	14"	24"
Tail moment	24¾"	35¾"
Section	Diamond	Diamond
Wing mount	Streamlined Pylon	Midland Type Pylon
Motor	114g (4oz)	200g (7oz)
Make	Pirelli	'Sams' Orange Pirelli
Length	48"	64"
Strands	16	20
Prop	24½"D × 37"P	28"D × 24"P
Prop run	2.00-2.10	2.00-plus
Weights	23g wing 20g fuse 20g prop. 4.25g tail Total 67.25g Built 1981	55g wing 66g fuse 49g prop. 12g tail Total 182g Built 1981

	R. Peers	R. Peers	B. Aslett
Name	'No. 33'	'Fly-catcher'	
Wingspan	60"	65⅞"	63"
Chords	5½"	5½"-3½"	6.95"
Tip	Square	Square	Square
Section	10% thin highly cambered + turbulated	9% under-cambered 1/32 sq. turbulator	9% Phil Ball — slight under-camber
Dihedral	Poly 8½"	Poly 5½"	Poly
Ribs	Straight	Straight	Straight
Spars	Four	Two (webbed)	Two
CG	80%	80%	107%
Incidence	0°	0°	+2¾°
Tailspan	26"	26"	26"
Chords	4"	4"-3"	5½"
Tip	Square	Square	Square
Section	6% flat bottom	6% flat bottom	8% flat bottom
Ribs	Straight	Straight	Straight
Spars	Two	Two (webbed)	One
Incidence	-2°	-2°	+1°
Fin height	7½"	7¾"	6.9"
Chords	6"-3½"	6-3¾"	5" (asymetric sec.)
Tip shape	Square	Square	Square
Fuse LOA	57"	41⅜"	60"
Motor section	45⅜"	44⅞"	49"
Nose	17⅜"	17¾"	17"
Tail moment	30⅛"	32⅜"	30"
Section	Diamond	Diamond	Diamond
Wing mount	Midland type Pylon	Midland type Pylon ½" high	Midland type Pylon
Motor	140g (5oz)	140g (5oz)	135g (4.8oz)
Make	Pirelli	Pirelli	Pirelli
Length	Pretentioned down to 38"	Pretentioned	60"
Strands	Usually 18	Usually 18-20	14
Prop	24"D × 30"P	24"D × 30"P	24"D × 36"P
Prop run	1.45min.	1.25min.	2.20mins.
Weights	36.5 wing 37g fuse 32g Prop. 8g Tail Total 113.5g Built 1979	33.6g wing 31.8 fuse 26.5g Prop. 5.3g Tail Total 97.2g Built 1981	30g wing 33g fuse (and fin) 20g Prop. 9g Tail Total 92g Built 1981

	P. Ball	R. Wells	M. Croome
Name			'Cabaret Star'
Wingspan	77"	52⅛"	72"
Chord(s)	7"-5" taper	5"	7"
Tip	Round	Blunt round	Square
Section	Thoman F4 turbulated	NACA 6409	9% thick slight under camber
Dihedral	Poly	Poly-total 6"	Poly 7½" total
Ribs	Straight + riblets	Union Jack	Union Jack
Spars	Two	Two	Four
CG	75%	75%	65%
Incidence	+3°	+1½°	+2½°
Tail span	27"	20"	28"
Chord(s)	5.6"-4.4 taper	3¾"	5"
Tip	Square	Blunt round	Square
Section	Thin flat bottom	9% flat bottom	9% flat bottom
Ribs	Straight	Union Jack	Union Jack
Spars	One	One	Two
Incidence	0°	0°	0°
Fin height	8"	6"	8"
Chord(s)	6"-4" taper	5"-3¼" taper	6½in-5"
Tip shape	Square	Radiused	Round
Fuse LOA	62"	50¼"	56¼"
Motor section	46"	41½"	40¼"
Nose	19"	17¼"	17"
Tail moment	30.4"	24¼"	28⅛"
Section	Diamond	Square	Diamond
Wing mount	2 piece wing plugs-on	Runners	Midland type
Motor	140g (5oz)	120g (4oz)	140g (5oz)
Make	Pirelli or FAI	Pirelli	FAI or Pirelli
Length	52"	56"	52"
Strands	usually 20	usually 14	16-20
Prop	26"D × 40"P (schwarts)	22"D × 28"P	30"D × 48"P
Prop run	2.30 mins. approx.	2.00 mins.	2.15 mins. approx.
Weights	42g wing 30g fuse 22g prop. 8g tail 4g odds Total 106g Built 1980	22.6g wing 28.3g fuse 20g prop. 5½g tail Total 76.4g Built 1966	59.4g wing 49.5 fuse 35.4 prop 14g tail Total 158.3g Built 1980

	J. O'Donnell	N. Lee	D. Scruby
Name	'Minaxi'		
Wingspan	46"	53½"	48"
Chords	5"	5"	5"
Tip	Radiused	Square	Square
Section	Davis med	Trip stick	11% Davis type
Dihedral	Poly.	Poly.	Poly.
Ribs	Straight ribs	Straight	Straight
Spars	4 — 2 top, 2 bottom	Two-webbed	2 top — 1 bottom
CG	67%	90%	90%
Incidence	0°	+3°	+2½°
Tailspan	18.2"	23"	18"
Chords	4"	4"	3¾"
Tip	Square	Square	Square
Section	10% flat bottom	Clark Y Type	10% flat bottom
Ribs	Union Jack (Melinex covered)	Straight	Geodetic
Spars	One at 35% on top	One at 35% on top	One top — one bottom
Incidence	-2½°	0°	-2°
Fin height	5.7"	7"	6¼"
Chords	4.5"-2.6"	4½"	4"-3¼"
Tip shape	Square	Eliptical	Square
Fuse LOA	50"	51"	44"
Motor section	41½"	37"	36"
Nose	16.15"	15"	13¼"
Tail moment	24.85"	17"	21¾"
Section	Diamond	Diamond	Diamond
Wing mount	Large streamlined pylon	Midland type pylon	Small balsa pylon
Motor	128g (4½oz)	110g (3.8oz)	85g (3oz)
Make	Old Pirelli or Dowsett Pirelli	Pirelli	Pirelli
Length	56"-61"	50"	44"
Strands	usually 14	usually 14	usually 12
Prop	21.8"D × 25"P (Helical)	22"D × 27½"P	20"D × 25"P
Prop run	1.45mins.	1.45mins.	1.50-2.00mins.
Weights	36.8g wing 48.6g fuse 30g prop. 5.6 tail Total 121g Built 1978	26.2g wing 26.2g fuse 23.4 prop. 7.8g tail Total 83.6g Built 1981	25.5 wing 30g fuse 28g prop. 7g tail Total 90.5g

	J. Godden	A. Gibbs	J. Walker
Name			
Wingspan	41"	41"	41"
Chords	4½"	5"	4¾"
Tip	Round	Round	Round
Section	Carter Knight	11% flat bottom	Davis type
Dihedral	Tip 4½"	Poly.	Tip — 4½"
Ribs	Straight	Union Jack	Straight and bracing
Spars	Two top one bottom	One	Two (top)
CG	80-85%	75%	75%
Incidence	+3°	0°	+3½°
Tailspan	18"	16"	18"
Chords	3⅜"	3½"	3½"
Tip	Round	Square	Square
Section	8% Clark Y type	9% flat bottom	Clark Y type
Ribs	Straight	Straight	Straight
Spars	One top one bottom	One	One
Incidence	+1°	-2°	+1°
Fin height	4¾"	Tip fins — 3½" ×	6"
Chords	3¾"	3½"	4-3"
Tip shape	Eliptical	Triangular Elipses	Radiused
Fuse LOA	42"	38½"	44½"
Motor section	32½"	31½"	36"
Nose	14½"	11"	10½"
Tail moment	19½"	19"	21½"
Section	Square	Square (sheet sides)	Round Tube
Wing mount	Sheet pylon	runners ½" high	1/16th sheet pylon
Motor	60g (2.1oz)	50g (1.76oz)	80g (2.8oz)
Make	Pirelli	Pirelli	Pirelli or FAI
Length	50"	40"	44"
Strands	Usually 8	Usually 10	10-12
Prop	18"D × 23"P	20"D × 24"P	20" × 30"P
Prop Run	1.35min.	1.00min.	75-80secs.
Weights	20.5g wing 23g fuse 16.75g prop 4.75 tail Total 65g Built 1977	18g wing 22g fuse 16g prop 6½g tail Total 62.5g Built 1981	19g wing 27g fuse 23g prop 6g tail Total 75g Built 1979

BOB BAILEY reports

Nagoya Cup, Nov. 6th/8th 1981

I am indebted to Ray Harlan who is in the U.S. Indoor Team for the World Championships to be held in Romania later this year (I don't know the date yet but Indoor News & Views quotes September). This competition was the first of its kind to be held in Japan and was much welcomed. Over to Ray Harlan for the following report:

"The American Japan Goodwill Indoor Model Aircraft Competition, a special international contest, was born from a dream by Shigeyoshi Nonaka, Japan's premier indoor modeller. The object was to see if the 30 metre Trade Centre at Nagoya would be suitable as a future World Championship site and to see the flying style of some of the best U.S. indoor fliers. Many months of planning preceded the extravaganza. The contest was sponsored by Chubu-Nippon Broadcasting Corporation (CBC), Toyo Stora Sales Company and Japan Model Aeronautics Association.

The original invitation went to Pete Andrews, Bud Romak, Erv Rodemsky and Jim Richmond, all World Champions. Neither Pete Andrews or Jim Richmond could make it so Ray Harlan and Cezar Banks were chosen. Stan Stoy was also invited to demonstrate his talents with his folding wing HLGs. Jim Kagawa was the U.S. team manager and interpreter and kept us informed on arrangements and climate etc. Bud Romak had to go into hospital for a while but was able to go.

After landing at Tokyo, everyone was worried about transporting boxes on the Shinkansen, Japan's 125mph train to Nagoya and whether the 90sec stop would suffice to move everything off! Yasutoshi Bamba, one of Japan's best fliers, solved the problem by arriving at Tokyo with his van, stacking all the boxes in it (a neat trick) and then driving for six hours to Nagoya with George Honda, while we relaxed in high speed luxury.

At Nagoya, Mr. Karasawa, the longtime Japanese team interpreter, hired a porter who with the aid of two straps ran ahead with six large boxes. At the exit, we were met by Mr. Takanashi of CBC and a large van to take us to the Trade Centre. This magnificent building is practically free of obstruction and has a stairway along the inside of the roof which pivots at the top to make every part of the roof accessible.

Models were soon flying but cool air and some ground turbulence slowed things down but there was very little drift up top. Twenty-five minutes was cleared but nobody recorded 30 minute flights.

A 15km trip took us to CBC's lodge. A small foyer ended abruptly with a step on which was a line of slippers. No shoes inside the lodge! Jim Kagawa instructed us on proper evening dress — yukatas and kimonos. A sumptuous welcoming banquet was preceded by some short speeches. A few mutterings of 'what is this stuff' were heard but everyone soon began to delight in the subtle flavours of Japanese cooking. A Japanese banquet is more than food; it is a work of art with each dish masterfully decorated and set in its prescribed place. The dishes were complemented with Ahashi beer and warm saki, both of which helped us to master the use of chopsticks! It is polite to keep your host's glass full and he is obliged to reciprocate. Afterwards Hisoshi Oishi entertained with guitar and sang Japanese songs and Country and Western tunes. He spoke almost no English but his sound came straight from Nashville.

Still suffering from jet lag, we were up at dawn and initiated in the Japanese bath, fed directly from hot springs. After 5 minutes, we were 'warmed to the bone' and left the cooker looking like boiled lobsters. Breakfast was a mix of fried eggs, bacon and Japanese delicacies.

At the Trade Centre the morning was reserved for Pennyplane, EZB and some unorthodox classes including a Japanese class with a table-tennis ball as payload. HLG was flown and Stan Stoy showed why he had travelled halfway round the World. He fine tuned throughout the morning and a quick conference decided to allow him a short extension into the F1D period. First there was an 89.6 second flight; then after a few more tries, came one of Stan's best launches. The model unfolded with hardly a trace of a stall — 93 seconds! Stan had finally beaten Ron Wittman's 90 second record set in 1973.

Jim Kagawa encouraged us to crack 30 minutes by suggesting that if we did not, the only honourable thing to do would be to endure a certain Japanese ritual involving a short handled knife!

A choice of 3 or 4 flights between 1pm and 6pm was offered. Timers had been instructed in the finer points by Mr. Ito, the chief judge. The first flights saw Banks set the pace with 34:33. soon we heard Rodemsky hollering out; his model had disappeared into one of the 18 triangular roof vents. Bamba retrieved it, restricting damage to a broken wing. This served as a warning not to get too close to the ceiling where convection currents were strongest. As 6pm approached Banks was in the lead with 68:26. No-one felt that he had reached his potential; the best motor sizes had not been found. However Erv was the only one not to reach 30 minutes.

The next day found the air cooler, about 62°F. Drift was negligible above ground turbulence. The 'heavies' had the air until 11.0am when F1D was scheduled. Many unusual models were flown, including Nonaka's flapping chicken. Banks turned in 12:09 in Pennyplane and 10:21 in Novice Pennyplane, followed by Bamba at 10:10, to lead both events. The most dynamic flier was Hiroshi Oishi who never seemed to have less than two models in the air at any one time — EZB, flapper, payloaders and Pennyplane. When F1D started, there he was with a video recorder!

Rodemsky started with a 33:46, a good start after a disappointing first day. Harlan improved with 33:40 and Banks hung one which he felt really could have set the pace. On his 5th flight, Romak came 'on song' with 34:03. Harlan's 5th got too high and was sucked into a vent. Luck was on his side as the model nosed up into the vent, tailslid out, stalled and rolled without collapsing the wing and recovered in safe air without displacing the circle. A touch down at 34:28 put him within 18 seconds of Banks. On his 6th flight, Banks couldn't quite reach 30, Romak hung, dashing his hopes of catching the leader, Rodemsky went into a vent again but tailslid out à la Harlan. The circle moved and the model hung on a girder before he had a chance to steer it.

With only 10 minutes left to launch, Harlan finished breaking motors and finally wound one to satisfaction for his last flight. The model stalled in ground turbulence for some 45 seconds without showing promise of getting away. He caught it, tweaked the tailplane and relaunched. The model headed skyward and peaked near the top. All other models had finished their last flights. At 20 minutes it looked promising; at 30 it was clear that it would clear the 34 minutes needed to win.

Meanwhile a large brass band together with more than 100 uniformed baton twirling girls, waited patiently for the closing ceremonies. As the model touched down for 34:47, the band struck up and the show commenced. The teams lined up, we were thanked for coming so far, and the Japanese were thanked for hosting such a magnificent event. The U.S. had taken the top four F1D places, Cezar Banks had won Pennyplane, and Novice Pennyplane, and Stan Stoy had set up a remarkable new record in HLG.

Why had we done so well? Nonaka has cleared 40 minutes in Cardington, Bamba 39 minutes twice, one in Cardington and once in Santa Ana, California. At Nagoya the Japanese maintained their role as hosts and often stopped flying to help us. Heavy ground turbulence and the cool conditions made it difficult to find the right power.

The following day we were given a tour of 400 year old Nagoya castle and the CBC facilities and were given parting gifts. A truly memorable contest and a perfect example of hosting by the Japanese".

Hideyo Enomoto's F1D Category 1 World Record Holder

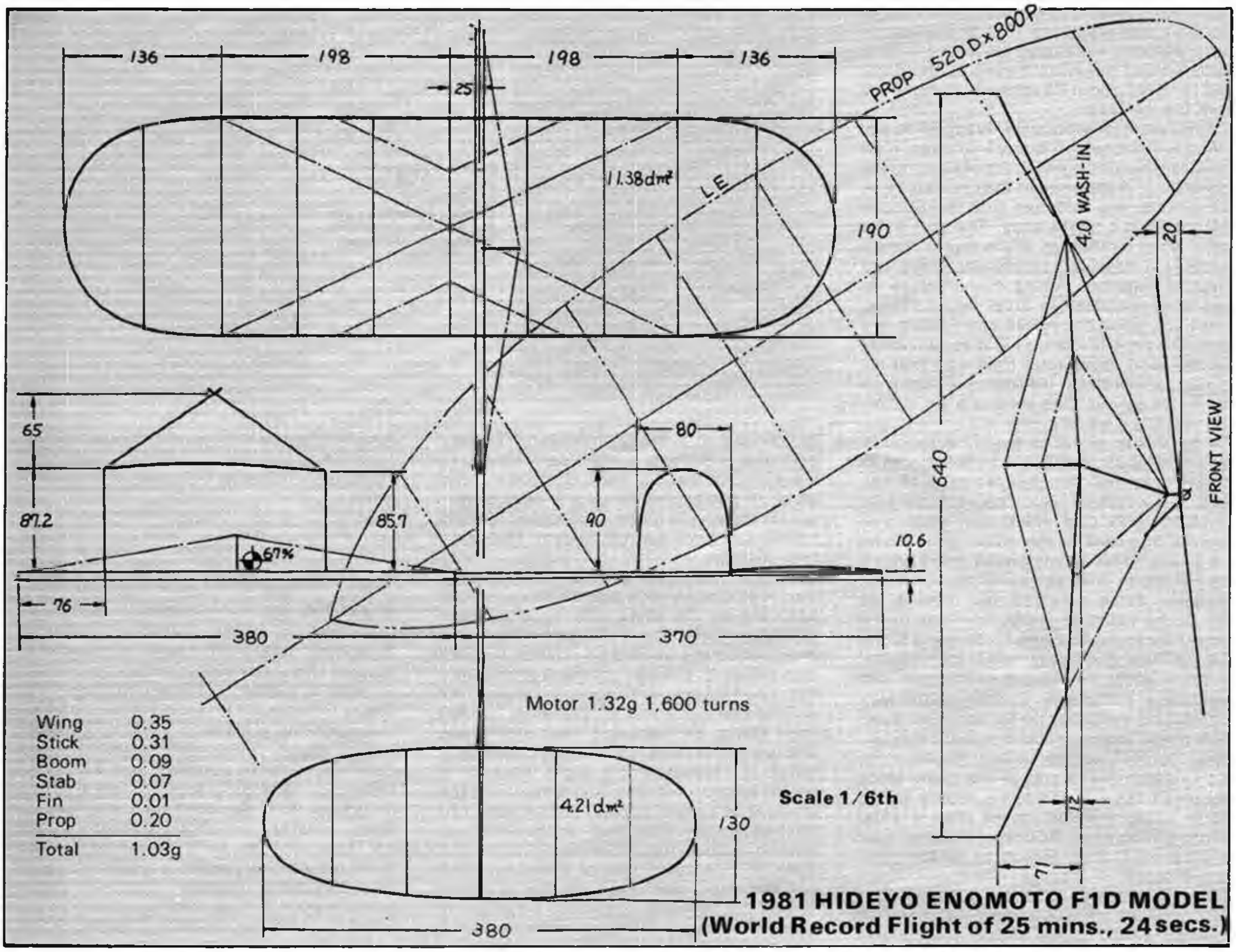
While on the subject of Japanese indoor flying, it is worth noting that although they didn't beat the Americans this time, they are fast becoming a force to be reckoned with. More use of the Nagoya site can only be beneficial. Wish I could have been there!

The World record flight in a hall of not more than 8m altitude of 25mins 24secs. is a quite remarkable achievement. It is very

Results

	1.	2.	3.	4.	5.	6.	Total best two
1. Harlan	31:10	32:30	28 50	33:40	34·28	34·47	69:15
2. Banks	34:33	30:17	33:53	13:51	31 48	29 41	68:26
3. Romak	2:15	32:03	30:32	26:16	34:03	11 41	66:06
4. Rodemsky	7:45	13:44	29:00	33:46	31:13	8.53	64:59
5 Matsuzawa	17:49	28:05	22:43	17:42	20:10	27:55	56:00
6. Yamazaki	18:23	24:28	23:53	17:07	6·23	18·01	48:22
7. Ichiyama	23:04	22:47	20:18	23:48	—	—	46:52
8. Nonaka	23:28	2:40	22:37	—	—	—	46:05

9. Odigiri 44:56; 10. Bamba 44 54; 11. Sawada 28:46.



1981 HIDEYO ENOMOTO F1D MODEL (World Record Flight of 25 mins., 24 secs.)

likely that the model bumped around on the ceiling for quite a considerable time; certainly the hall would have to be very well insulated from outside weather changes since these usually cause rapid drift at the top — difficult enough for an EZB, let alone an FAI microfilm model which stays up twice as long!

The model itself is quite conventional in layout and construction, with more ribs in the wing and propeller than most of us use here in Britain. The propeller at 21in. × 32in. is somewhat smaller than we usually use in Cardington (typically 22in. × 36in.). Breakdown of component weight is the same as we have all arived at in Britain. the wing section, although not shown on the drawing, appears from the photo in June 81 *Aeromodeller* (see Hangar Doors) to be about 4% in thickness.

It is a pity that we don't in general get the chance to fly F1D anywhere other than Cardington (where we shall be using No. 2 shed this year). The only comparable recent experience I have is flying an F1D at Barkston Heath last year in the main hangar during the F/F Nationals where I managed a 17 minute flight with an 'old banger' which only just touched once — that without really trying hard to match motors etc.

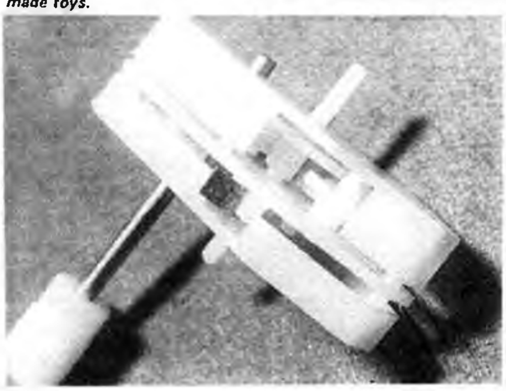
The cost of hiring a hall for a contest, the small number of F1D fliers and the long time taken to get the flights in, precludes flying F1D at a standard low ceiling contest.

MARTIN DILLY reports

Ultra-light timers (formerly Snoopy timers) re-visited

Further investigation of the all-nylon clockwork drive mechanisms of various cheap toys has revealed more possibilities for the free flighter. First, in general, avoid swimming whales, turtles, penguins and similar aquatic toys; their motors have no escapements, and rely on the drag of the water on the rotating flippers to slow the rundown. Removed from the carcase, they run for about one second. Zip! Similarly, hopping Woodstocks are best avoided, as they use a springloaded foot instead of an

The drive mechanism can be carefully eased apart just enough to allow the muffler to be removed for weight to be added to it. The type shown has internally moulded pins, which permit the shells to separate gradually, while keeping the gears in place. Right: the escapement from a typical nylon clockwork drive mechanism, fitted to cheap Hong Kong made toys.



actual escapement to slow the motor. What we want are wagglers. The Snoopies are comparatively expensive (around £1.80 in some shops) but have a well-made motor that runs for about 25 seconds as removed from the carcase.

If you want to remove the 'waggler' to add a lead weight, which is more compact than the glass-headed pin method of slowing the unwinding, mentioned in the October 1980 F/F Scene, you will find that the Snoopy motors have a slight snag. The two outer nylon shell mouldings of the motor, which contain the bearing holes for the gears, are snapped together during manufacture by means of moulded-in snap hooks. Thus, when you prise the hooks apart there is a tendency for the dismantling to be rather sudden, and more total than you had intended, assisted by the residual turns on the motor spring. One second it's a motor, the next it's a kit of parts.

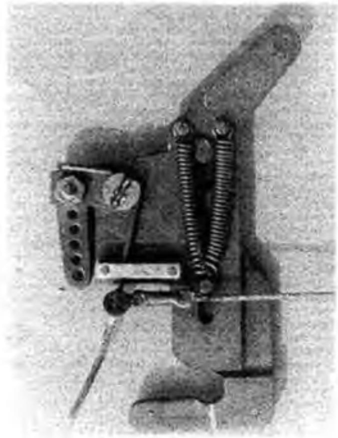
A far easier motor to modify is found in the small robots that live in bubble packs in chainstores and the cheaper sorts of toyshop. Their motors have integral taper pins moulded with one shell, that push into sockets moulded in the other. This allows the shells to be slowly eased apart with a scalpel blade just sufficient to allow the 'waggler' to be removed, but leaving the rest of the works in place. You may find it necessary to slightly trim away some of the shell to allow the newly weighted 'waggler' to move freely, but a bit of experiment can produce a timer that weighs about four grams and runs for three minutes. Even with these bubble packed robots, though, check before you buy; in one Woolworths, in the same packs and at the same price (about £1.00) I found some robots had a motor using a nylon rather than a steel winding knob shaft. You need the steel type to take a 10 B.A. thread to attach your output scroll.

Also powering a robot, but this one featuring self-waggling arms, you may find a motor giving much higher torque and using more substantial gears. This type is slightly larger than the type mentioned above, but runs for about 40 seconds. However, it uses an eccentric lead weight as a speed governor, rather than an oscillating escapement, and I cannot at present see a way to add mass to slow the mechanism, since other gears are too close to the governor. It looks like a good basis for a ½A engine timer, though.

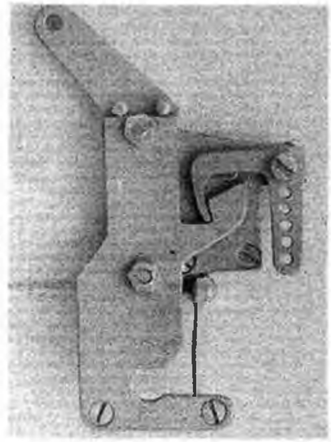
With a total weight of about 4.5 grams with a scroll, these cheap timers suggest some interesting uses. For instance, how about four in parallel, to give a quadruple-redundant safety factor, and all for about the same weight as a single conventional D/T timer, and at a lower price? Prop start delays on Wakefields or Coupes, rudder holds for zooming A/2s, hand-launched glider D/Ts and v.i.t. systems, even programmed flight for indoor scale, are all possible. I would welcome reports from readers on their own successful modifications of these toys.

A mystery solved

The photograph on page 653 of the December Aeromodeller will make more sense with some explanation and also with its twin, showing the same Soviet towhook from the other side, to which the caption refers. Here, to clarify, are both photos, which are of a hook that Gerry Le Vey acquired at Burgos; while clearly similar to the standard Isaenko hook, this one has the pivot re-positioned to give a rake angle, which allows the glider to be towed upwind before the hook swings back to the circle tow position.



Soviet circle towhook acquired at the 1981 World Free Flight Champs by Gerry Le Vey. See mystery solved for a detailed description of how it works.



Instead of having the two springs mounted one on each side of the assembly, both are on the same side, resulting in a slimmer hook. The thick stranded cable attached to the latch wire pushes forward into the timer to interrupt the waggler until the latch opens and springs backwards, pulling the cable out of the timer, which then starts. Perhaps the most interesting feature of the hook is the auto-rudder cam, which is shaped with a slight 'hook' to it, which would have the effect of *reducing* the amount of rudder applied as the hook unlatches under the final acceleration of launch, rather than increasing it. It may well be that some sort of timer-operated rudder delay was used on the glider to which the hook was originally fitted; some Soviet A/2 flyers also favour a reduction of decalage (the angular difference between wing and tailplane incidences) during the zoom launch, either by a v.i.t. system or by a wing waggler. This could be of use in killing any stalling or looping tendency, so that the energy imparted to the aircraft by the zoom launch (basically the flyer's muscle power) is converted as far as possible to an altitude gain beyond the 50 metre line length.

Finally, the towhook in the photographs is hard anodised, so the dural plates will resist wear better as they slide against each other.

1981 National Free Flight Society Symposium Report

Comprising papers presented at the US Nationals near San Antonio, Texas in August, the 14th NFFS Symposium Report is now available in Britain through Free Flight News.

Among the goodies in it are articles on power model design and trimming, John Gard on rubber duration and propeller efficiency, the Stoy Brothers on thermal detection, Ron St. Jean on structureless foam construction, Jean Wantzenreither on low aspect ratio tailplanes, Bob Hatschek on circle hooks, a survey of recent low Reynolds number tests of high-performance airfoils, and a piece on the psychological aspects of contest flying.

Ron Pollard's 'Vitar' is honoured as Wakefield of the year in the NFFS Top Ten feature and, to my personal satisfaction, György Benedek receives a special award for the major contribution made to free flight by his work on airfoils; an article describes their development. Sympo 14 is available price £4.50 from FFN, 8 Blenheim Court, Farnborough, Hants.

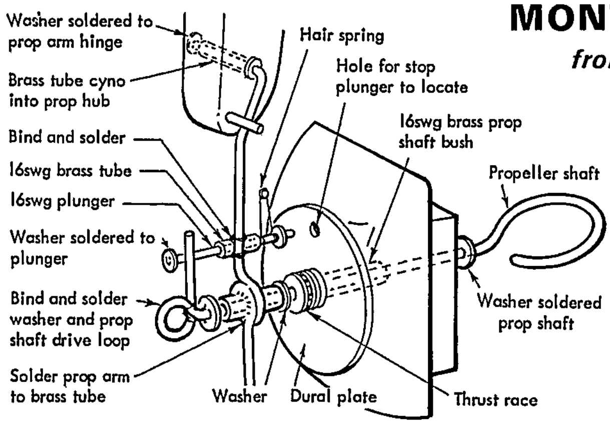
The SMAE Council working for you at the first meeting of 1982: at centre rear are (left to right): Vice Chairman John Long, General Secretary Roy Nudds and Chairman Dave Goodwin.

AEROMODELLING TECHNOLOGY

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

MONTREAL STOP

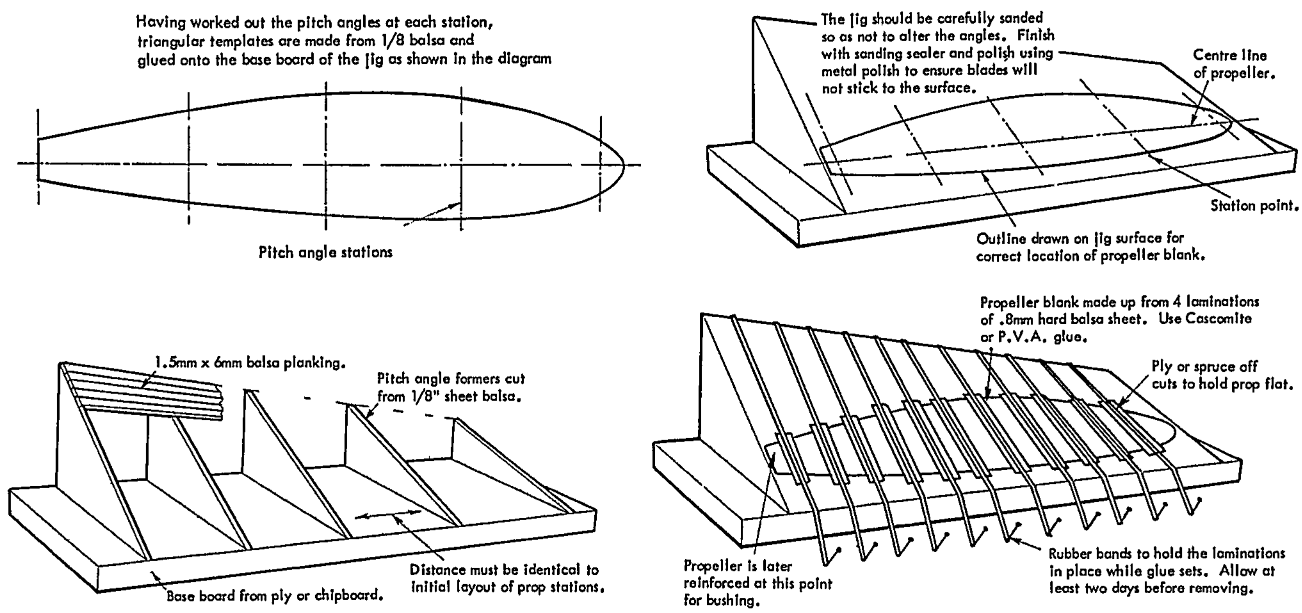
from Mike Woodhouse



Montreal stop for contest rubber use, made from piano wire. This system allows a roped motor to be used which is completely unwound before the prop blades fold.

A JIG FOR BUILDING RUBBER MODEL LAMINATED PROPELLERS

from Mike Woodhouse



PROPELLER LAMINATING

Most rubber flyers produce their props from either block or thick balsa sheet. This method is very wasteful of timber which is difficult to obtain in a sufficiently good quality. Since I developed a satisfactory propeller by laminating, I've not produced a propeller by any other means.

I believe, when correctly carried out, propellers can be produced by laminating to at least as good a standard as those produced by conventional means. The advantages can be summarised as below:

1. Better control of wood selection — by using $\frac{1}{32}$in. sheet a greater selection can be made. It is difficult to find block, let alone that of good enough quality, and how can one spot flaws that lie hidden within the block?
2. Strength is greater than the conventional prop due to the wood grain being diverted along the length of the blade, no short grain caused by carving.

Against this, the arguments of the difficulty of twisting sheet and warping caused by the glue used in the process. I hope in the ensuing paragraphs to either discount these fears or at least make my critics take another look.

PROCESS

As with all laminating, the first prerequisite to success is an accurate, in the case of propellers a strong, former. The finished result is only as good as the former. Time and care spent here will be rewarded with a former that can be used to produce prop after prop. The former must be exact as any error in twist will be automatically transferred to the props produced from it. My former is built on a base of $\frac{1}{4}$in. hardwood with triangular formers of $\frac{1}{8}$in. balsa planked over with $\frac{1}{16}$in. sheet balsa cut into $\frac{1}{4}$in. wide strips.

Step one is to produce a drawing of the formers from the propeller layout — the prop shown is purely fictional. The shape and pitch angles of the propeller is the subject for articles by others more technically qualified than myself.

FORMER

A DRAWING of the shape of the blade and the and angles is produced.

Cut out the pitch triangle in hard 1/8in. sheet cut 1/16in. short on top to allow for planking.

Draw centre line on base board and pitch stations, and glue the templates in place. Ensure that the pitch template is in the correct position.

Plank the templates with 1/16in. sheet. When set sand smooth taking care not to alter angles. The surface should be sealed with sanding sealer and polished to prevent blades sticking.

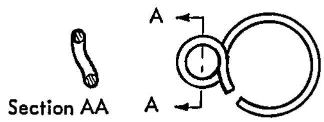
The next evening can be spent producing something! This is where my ideas have changed somewhat. Previously I specified soft balsa, I now use hard timber. Stiff blades are better aerodynamically than soft flexible props. Using hard 1/32in. sheet, four layers will laminate quite well with persuasion — the reason for a strong former! I still prefer Cascomite as the glue. Glue the laminations together, then strap to former on the correct place. To hold the sheet down I used strong rubber bands attached to drawing pins on the base board, and off cuts of 1/4in. spruce to hold blades flat.

Allow several days to set before removing the assembly from former. The blades can be finished by the addition of scrap balsa and ply to the hub, bushing out for wire hangers. Sanding is aided by comparing each blade and the way the laminations shape out, the glue line looking like contour lines on a map.

Final finish is up to the constructor. My preference is for a hard smooth finish with plenty of glass, which I obtain by covering with lightweight tissue and many coats of very thin dope.

ANTI HOOK CLIMBER

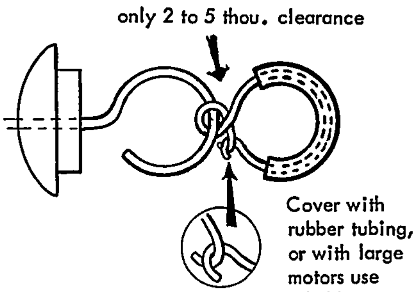
from Brian Faulkner



Rubber Hook (Loose type)

The small loop present an inclined plane when viewed at 'AA' with a twist which can be compared with a right hand 'clockwise' spring as shown below.

If the spring is rotated clockwise with the same direction as a rubber motor, it will climb up a curtain ring placed inside the spring.

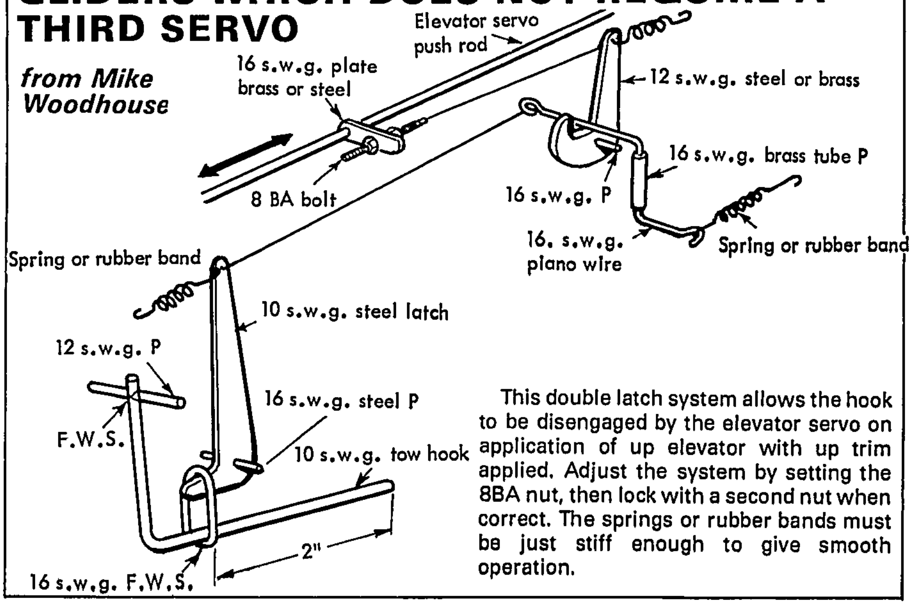


Not drawn to scale

With the small loop bent opposite to the first example as shown above, there is less chance of the 'S' hook climbing the shaft. A further point which is important to avoid the loose hook climbing, is to wind the small loop to be a very close fit onto the prop shaft hook, only some 2 to 5 thousandths of an inch clearance is advised. The completed assembly should be as shown in the above diagram. Note the prop shaft hook is as large as can be sensibly accommodated within the nose of the fuselage.

A TOWHOOK RELEASE SYSTEM FOR R/C GLIDERS WHICH DOES NOT REQUIRE A THIRD SERVO

from Mike Woodhouse

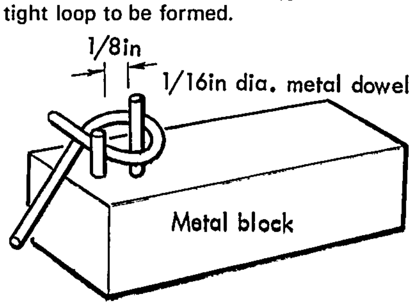


This double latch system allows the hook to be disengaged by the elevator servo on application of up elevator with up trim applied. Adjust the system by setting the 8BA nut, then lock with a second nut when correct. The springs or rubber bands must be just stiff enough to give smooth operation.

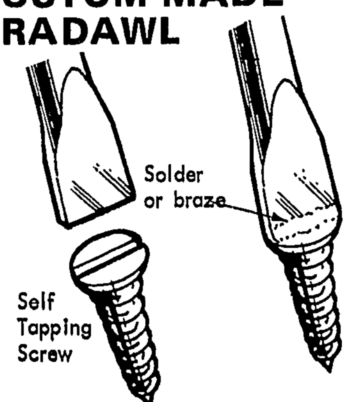
WIRE BENDING JIG

from Brian Faulkner

An easy method of bending wire widely known amongst experienced 'wire benders' is this simple jig. By carefully selecting a block of mild steel about 1in. × 1in. bar say 6in. long two 1/16in. holes can be drilled 1/8in. apart after 'centre spotting' before drilling. Two 1/16in. pegs can then be driven into these holes. One peg should protrude 3/8in. and the other 5/8in. to allow a tight loop to be formed.



CUSTOM MADE BRADAWL



The advantage of this idea over a standard bradawl is, that a tapped hole can be made in inaccessible places to suit the screw being used.

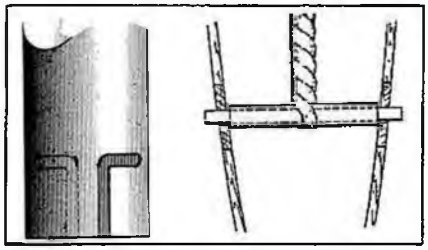
Complementary to this is another tip. Cyno screws to the screwdriver and break free after screwing home.

ALTERNATIVE RUBBER MOTOR MOUNTING
from Jeff Anderson

I WAS interested to see your notes on rear motor pegs for fat fuselage (p.162 March '80 Aeromodeller) but there is an easier way! Use a tube on the peg and the peg will not then be moved about by the motor. I use this system and find that it works well, and one can get away with quite thin pegs even in large models (1.5mm dia. dowel for a 500mm span indoor model — powered by eight strands 1mm sq.). There are a number of advantages:

1. The twisting, bending stresses on the rear peg are overcome and the tube converts all the moments into *shear* load on the peg — I haven't tried it but I suspect that even hard 1.5mm balsa dowel would do.
2. When used in conjunction with a winding tube the motor is easily withdrawn when broken. There is none of the trauma of easing the tube forward and then unwinding a little bit at a time — simply withdraw the motor peg and the winding tube comes out complete with broken motor, and the tube which was on the peg is locked in the notches of the winding tube by the broken motor.
3. The whole system works like a cartridge loading system as used by some Wakefield flyers. The little tube acts as a bobbin for the rear of Multistrand motors and motors can be loaded in the winding tube and inserted in the fuselage without having a rear hatch cut in the tissue.

The tubes I use for the peg are made from aluminium tube but I have also used *Ronytube* offcuts from HLG Rods (thin end) or hollow knitting needles may provide another source.



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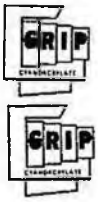

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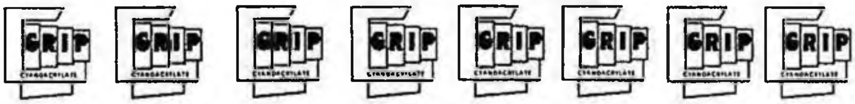
Economical to use — you only require a small amount at a time. That also means that GRIP ADDS ABSOLUTELY MINIMUM WEIGHT WHEN YOU ARE BUILDING CRITICAL LIGHTWEIGHT STRUCTURES: The glue you CANNOT afford to be without in your modelling workshop — or for domestic repairs.

20 grams (0.7oz) plastic bottle at the exceptionally LOW price of only £2.10.



HERE'S SUPER BALSA

You know the quality of Balsa in Graupner kits — now enjoy using RIPMAX-GRAUPNER PREMIER GRADE Balsa for ALL your models. Produced in Graupner's own modern mill right on the spot in Ecuador — and shipped direct to Ripmax in sealed containers for distribution to UK modellers. Really SUPERB quality and finish.

Check it out at your local model shop. You will see what we mean! Premier grade balsa at realistic prices. In all the standard sheet sizes.

36 x 3 x 1/32"	36 x 4 x 1/32"
36 x 3 x 1/16"	36 x 4 x 1/16"
36 x 3 x 3/32"	36 x 4 x 3/32"
36 x 3 x 1/8"	36 x 4 x 1/8"
36 x 3 x 3/16"	36 x 4 x 3/16"
36 x 3 x 1/4"	36 x 4 x 1/4"
36 x 3 x 3/8"	36 x 4 x 3/8"
36 x 3 x 1/2"	36 x 4 x 1/2"

Feel the smoothness of the finish! See how precisely each sheet is machined! Above all, look at the quality of the balsa. It feels right, looks right, is right. We guarantee you will be delighted when you start using Ripmax-Graupner SUPER BALSA.

RIPMAX TWISTERS

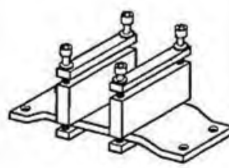
Dependable, powerful starters with guaranteed HIGH TORQUE. The STANDARD (14kg-cm torque) starts ALL engines up to low compression .90's. But we have added two more to the range. The 100 watt COMPACT (9kg-cm torque) for starting engines in the .049-.040 size range (with less demand on your starter battery). And the MIGHTY with a massive 20 kg-cm torque for even quicker starting of large engines (especially helicopter engines).

TWISTER COMPACT £21.95; TWISTER STANDARD £25.95; TWISTER MIGHTY £29.95

THE STARTERS THAT START YOU AT REALLY LOW PRICES!

NEW ENGINE TEST STAND

Designed by world-champion R/C scale modeller MICK REEVES, originally for his own personal use and then modified to take ALL sizes of engines up to 15 cc. That's the version now produced by Mick Reeves Models.



It's a safe, non-slip engine mount in heavy duty all-metal construction. Base screws to your workbench or a separate baseboard. Mounts can be adjusted quickly and simply to match any beam-mounted engine. Price £6.99

COX

GLOW ENGINES THAT SET THE STANDARD for PRECISION . . . and POWER! NOW DISTRIBUTED BY RIPMAX

Manufactured to tolerances measured in millionths of an inch under the strictest quality control. We are particularly pleased to include these fabulous engines in the RIPMAX range. They represent TREMENDOUS value for money!

TEE DEE .020 .049 .051 .09

Developing maximum power at approx. 22,500 rpm with only a minimal running-time. One minute is usually sufficient (or 5-15 minutes at most). You can fly with them straight away.

MEDALLION .049 .09 .15

If you want contest-engine performance, this is your choice. The MEDALLION .15 is the largest and the most powerful engine in the Cox range.

FIVE more engines to choose from. The tiny PEE WEE .020 with integral tank and available in standard form or WITH THROTTLE. The BABE BEE .049 and the BLACK WIDOW .049 — both with integral tanks for radial mounting. Plus the QRC .049 complete with SPECIAL MUFFLER.

STANDARD ENGINES:			
PEE WEE	.020	(0.33cc)	£12.25
BLACK WIDOW	.049	(0.82cc)	£12.95
TEE DEE	.020	(0.33cc)	£20.95
TEE DEE	.049	(0.82cc)	£22.50
TEE DEE	.051	(0.84cc)	£22.50
TEE DEE	.09	(1.5cc)	£24.55
MEDALLION	.15	(2.5cc)	£19.25
MEDALLION	.09	(1.5cc)	£16.95
MEDALLION	.049	(0.82cc)	£13.65
BABE BEE	.049	(0.82cc)	£9.90
ENGINES WITH THROTTLE:			
PEE WEE	.020	(0.33cc)	£13.65
MEDALLION	.09	(1.5cc)	£16.95
MEDALLION	.049	(0.82cc)	£13.65
ENGINE WITH MUFFLER:			
Cox QRC	.049	(0.82cc)	£12.85

CHECK THEM OUT AT YOUR LOCAL SHOP!

BEST BUYS AT RIPMAX STOCKISTS

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