

AERO

MODELLER

HOLIDAY ON ICE

Top contest news from Norway

Sandown Show preview

FFOXY LADY

Build our competition glider

ON YOUR MARKS!

German extravaganza photo report



F/F Nationals Update
More on compressed air

ISSN 0001-9232



06



ADDLESTONE MODELS LTD

63 STATION ROAD
ADDLESTONE, SURREY
KT15 2AR
TEL: 0932 845440

MAIL ORDER: POSTAGE UK ONLY

Engines & Kits under £15 **£1.60**
Kits over £15 **£2.60**
Other Items **£1.20**
Credit Card Holders Phone For
Immediate Despatch
EXPORT SENT V.A.T. FREE
S.A.E. with all enquiries

HOURS OF BUSINESS

9am - 6pm. Fri. 6.30
Closed Wed. all day
EASY FREE PARKING

PRICES SUBJECT TO
CHANGE WITHOUT
NOTICE.



ESTES MODEL ROCKETS

STARTER SETS
NEW! Screaming Eagle 1, over
1200 feet! **22.95**
NEW! Gemini Star Raiders 1
includes two rockets, Gnome &
Laprechaun. *Super value fun at*
only **£28.95**
Ideal Starter Set - Vagabond 1
now in at **31.05**
Sizzler 1 **33.30**
Space Shuttle 2 **38.30**
NEW! Rascal 1 **38.95**
NEW! Meteor 1, nearly 1 1/2 feet
tall! **38.95**

NEW IN! D ROCKETS AND

ENGINES, AT LAST!!
MAGNUM 2 - includes see-
through payload bay, 1/4 mile
altitudes, with speeds up to 459
ft. per sec.!!
For the ultimate Rocketry
experience, **only £43.65**

ROCKET KITS

Number denotes skill level.

NEW TO RANGE! JUST IN!!

Meanie 1 **4.95**
Meteor 1 - Big! **8.20**
Athena 1 - No painting
required! **8.30**
Silver Streak 2 - 18" tall! **8.65**
Alien Space Probe 3
Exploration Craft **13.65**

Designers Special -

75 pieces! **34.45**
Saturn V - 4, uses D-12.3
Superb Semi-Scale **58.10**

Yankee 1 3.95

Wizard 1 **3.95**
Javelin 1 **4.45**
Alpha III 1 **7.75**
Sizzler 1 **7.95**
Big Bertha 1 **9.10**
Mini Mean Machine 1 **7.95**

Bullpup 12D 2 **7.20**
Voyager II 2 **7.95**
Ranger 2/D **8.05**
Space Shuttle Columbia 2 **11.55**
Helicopter 2 **10.30**
Eggs press 2 **10.30**
Novapayloader 2 **7.85**
Blackbird SR71 3 **14.30**
Stealth 3 **9.10**
Mercury Redstone 4 **15.00**

All Rockets and Starter Sets require
paint & glue and sets also need 4 x
AA alkaline batteries

ENGINES

1/2 A3 - 2T **3.80**
1/2 A6 - 2 **3.85**
A8 - 3 **3.80**
A8 - 5 **3.80**
B4 - 2 **3.80**
B6 - 4 **3.80**
B8 - 5 **3.80**
C5 - 3 **4.10**
C6 - 7 **4.40**
C6 - 5 **4.40**
D12 - 0 **7.00**
D12 - 3 **7.00**
D12 - 5 **7.00**
D12 - 7 **7.00**

BOOSTER STAGE

A10 - 0T **4.00**
A10 - 3T **4.00**
B6 - 0 **3.80**
C6 - 0 **4.10**

ACCESSORIES

Recovery Wadding **2.10**
Parachute 12in **2.20**
Parachute 18in **2.75**
Igniters **2.10**
Launch Pad II **14.30**
Electron Beam
Launcher **17.55**
Allittrak - Altitude Finder **14.40**

ENGINES - COX

New Queen Bee 049 **36.99**
with Throttle/muffler
Tee Dee 049 **29.99**

Black Widow 049 **19.99**
Babe Bee 049 **17.99**
Pee Wee 020 **15.99**
049 Glow Head **2.95**
Glow Clip **1.85**

P.A.W.

80 Mk 2 **23.00**
100 Mk 2 **23.00**
149 DS - 4 **26.45**
149 Contest 4 **28.75**
249 DS4 **27.60**
249 Contest 4 **29.90**
249 DS BR **35.65**
19DS - 4 **29.90**
19DS BR **37.95**
29DS (inc Sil) **42.55**
35DS (inc Sil) **44.85**

P.A.W.B.B.

249 DSBR **35.65**
19 DSBR **37.95**
249 R/C A/C BR W/Sil **42.55**
19 R/C A/C BR **44.85**

PAW R/C

80 R/C A/C **27.60**
100 R/C A/C **27.60**
149 R/C A/C (inc Sil) **31.05**
249 R/C A/C (inc Sil) **35.65**
249 R/C A/C BR (inc Sil) **42.55**
19 R/C A/C (inc Sil) **37.95**
19 R/C A/C BR (inc Sil) **44.85**
29 R/C A/C (inc Sil) **46.00**

NEW PAW

Vintage 80 Classic **28.75**
Vintage 80 Classic R/C Hi-
Torque **33.35**
80 mk 2 BR **27.60**
100 mk 2 BR **32.20**

NEW! PAW Competition

Engines - Twin Ball Race
Mounted Crankshaft

80 TBR **46.00**
100 TBR **46.00**
249 TBR **49.45**
19 TBR **51.75**
249 TBR-GY
Combat Special **51.75**
NEW! AE .2cc **55.25**

BOOKS inc. PAF

Fifty Years of
Aeromodelling **7.25**
Model Flying - The First 50
Years **8.25**
Aircraft Plans Handbook **2.75**
Ben Buckle Plans Book **2.75**

NEW ROCKETRY MANUALS

Estes Catalogue **1.65 inc PAF**
Second Stage - Advanced
Model Rocketry - incl six
computer progs! **8.95 inc PAF**
Handbook of Model Rocketry,
5th edition 367 pages of
fascination! **14.49**

KITS TO BUILD RUBBER

POWER K.K.

Achilles **5.49**
Robin **5.49**
Compellor **7.49**
Ace **8.49**
Gemini **5.49**
Eaglet **5.49**
Senator **7.49**
Ajax **8.49**
Pixie **5.49**
Gipay **10.99**

Back in stock

Union Electric Bellanca **17.99**
Champion **17.99**
Cessna 150 **17.99**

CONTROL LINE

MODEL - HOB
Mustang P51 **17.95**
Smousen **18.95**

Baron **29.95**
Yeyito **15.95**

TOP FLITE

Baby Flite Streak **9.95**
Flite Steak **19.95**
Junior Nobler **19.95**

PEGASUS

MiniLord **9.95**
Warlord **12.95**
Veron Colt Trainer **11.99**

NEW

Free Flight Ben Buckle
Vintage 34" 5 - 1cc
Pirate **16.45**
Airsail Sportsman 20" .75 -
1.5cc **12.99**
Airsail Showman 23.5" .75 -
1.5cc **15.99**
Airsail Heron Gas Buggy
48" 1 - 2.5cc **24.95**
Gieseke Nobler 50" **54.95**

COVERINGS?

- Try Litespan, very light but
strong **£1.00** per sheet 36" x 20"
choice of colours: Yellow,
Orange, Red, Blue, Black, DK
(WWI) Green, Cream, Silver,
White.
New Fibafilm **£4.20** per roll
Light but added stiffness!
Balsaloc Adhesive **2.21**

OLD VINTAGE FAVOURITES

RETURN
with thanks to Ben Buckle and
to KK Plans!
BB Pirate 34" 0.5 - 1cc **16.45**
BB Bandit 44" 1 - 1.5cc **19.25**
BB Outlaw 50" R/C 2cc **24.20**



"Fly-in Festival"

at
HEMSBY HOLIDAY VILLAGE,
Nr. Gt. Yarmouth Norfolk

2nd - 9th June 1990

Attention all Model Aircraft Enthusiasts!

Enjoy an action-packed holiday with all the fantastic Pontin's Summer attractions and excellent facilities you'd expect, plus an opportunity for all flying enthusiasts to enjoy their favourite past-time - model aircraft flying.

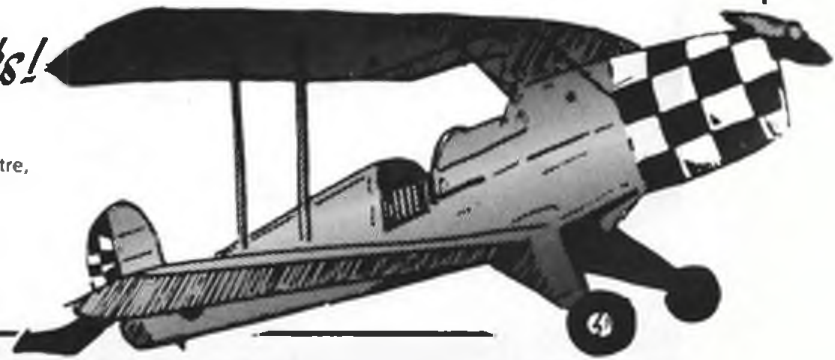
- Expert Flight Controllers in attendance.
- Long daylight flying hours - June's Lazy Summer days give everyone a chance to become airborne!
- All types of aircraft welcome.
- Families and Clubs alike welcome.

- Choose Self Catering or Half Board with a well-stocked shop and handy launderette on the Centre. Flying demonstrations, instruction, advice and film shows - something and everything for the whole family including Pontin's own 'special brand of entertainment' and top cabaret, day and night.

*Book Now -
and enjoy the best of both worlds!*

TEL: 0772 621621

For further details contact Pontin's Hemsby Holiday Centre,
Beach Road, Hemsby, Norfolk. Tel: 0493 730698



JUNE 1990
Volume 55
Issue 653

ISSN 001-9232

AERO MODELLER



p.316



p. 342

Editor	<i>Geoff Clarke</i>
Editorial Assistant	<i>Andrea Silver</i>
Group Editor	<i>Alec Gee</i>
Art Editor	<i>Ron Cunningham</i>
Design	<i>Peter Kirby</i>
Advertisement Manager	<i>Alan Cole</i>
Advertisement Copy Control	<i>Marie Quilter</i>

Cover: Last year's Free Flight Nationals at RAF Barkston Heath was notable for superb weather, which heralded 1989's fine summer. Super teamwork seen too, epitomised by the Falcons Club efforts - in turn largely masterminded by Terry Dilks, seen here between rounds in Wakefield. Let's hope for an awesome '90 Nats - see p.350 for update!

ASP

Argus Specialist Publications

Argus House, Boundary Way,
Hemel Hempstead, Herts HP2 7ST



HANGAR DOORS	News, views and opinion	304
DIFFERENT STROKES	We try a new compressed-air kit free-flight	306
VINTAGE CORNER	Concluding part of Alex Imrie's tribute to the late J.F.P. Forster	308
HOLIDAY ON ICE	Mike Woodhouse goes to Norway	312
FLYLEAVES	Read all about it!	315
LOOK BACK IN ANGER	The growth of Vintage Combat assessed	316
SCALE MATTERS	Inspiration from Czechoslovakia	322
BALSA CUTTINGS	Cyano de Bergerac nosing about	325
MIDGE EXTRA	John Duggen reports on Vintage Speed down-under	326
HIGH POTENTIAL	More on electric flight matters	336
FROM THE HANDLE	Claus Maikis picks up the plastic	338
WHAT'S ON	Diary dates for all!	341
ON YOUR MARKS	We visit Nuremberg and Dortmund	342
PACIFIC CHAMPIONSHIPS	Jon Fletcher reports on the first World Cup event	344
FREE FLIGHT SCENE	A look back to a pair of popular interests, hints and tips and a featured F1B	346
1990 FREE FLIGHT NATIONALS	Latest news before the big one!	350

The publishers cannot accept responsibility for unsolicited material. The contents of Aeromodeller including all articles, designs, plans, drawings, photographs and all copyright and other intellectual property therein belong to Argus Specialist Publications. All rights conferred by the Law of Copyright and other intellectual property. Publications, and any reproduction requires the consent of the Company © 1990 Argus Specialist Publications. UK Distribution by SM Distribution Ltd, 6 Leigham Court Road, Streatham, London SW16 2PG. Telephone: 01-677 87111. Telex: 261643; Fax: 01-677 0136.

Advertisement Offices: Argus Specialist Publications, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST. Tel: 0442 66551.

Postmaster: Send address changes to Aeromodeller, c/o Mercury Airfreight International Ltd Inc, 2323 Randolph Avenue, Avenel, NJ 07001, USA.

Subscriptions: Direct subscription rate Home £23.40, Europe £28.20, Middle East £28.40, Far East 330.20. Rest of the World £28.70 or US \$50.00. Airmail rates upon application from Intonet Ltd., 5 Riverpark Estate, Billet Lane, Berkhamsted Herts HP4 1HL. Tel: 0442 876661/4.

Overseas Availability: Second class postage paid at Rahway N.J. USA. Postmaster: send address corrections to Aeromodeller, c/o Mercury Airfreight International Ltd Inc, 10B Englehard Ave, Avenel, NJ 07001. Distribution to news stand sales by Eastern News Distributors Inc, 1130 Cleveland Road, Sandusky, Ohio 44870. Distribution to North American hobby and craft stores, museums and bookshops by Bill Dean Books Ltd., 166-41 Powells Cove Blvd, Post Office Box 69 Whitestone NY 11357, USA. Tel: 1(212) 767-6632. USA Subscription agent Joseph D D'Alleida, Wise Owl Worldwide Publications, 4314 West 238th Street, Torrance CA 90505.

HANGAR DOORS

Interscale 1991

Indoor scale on the international? Begins to look like it. Back in April the first meeting of the SMAE Interscale '91 Committee was held at Nottingham University to investigate just this. The likely costs, and the philosophy of the event itself, were fully discussed, and will be summarised in Scale Matters shortly. Suffice to say here that viability was proved – and the decision to proceed was taken. Nottingham University's Sports Complex, which consists of two large halls suitable for indoor flying, has been chosen as the venue on the weekend of 21st-22nd September 1991. Of course, these details have yet to be confirmed. To attract as many individuals, from as many countries as possible, is the aim, with competition for Open Rubber Scale (SMAE rules), CO₂/Electric and Peanut Scale. Proxy flying has not been supported, apart from a special Pistachio class, which enjoys world-wide support; thanks to these models' small size, postage is relatively easy and a healthy entry to be expected.

This is an event we wholeheartedly support. We'll keep you posted...

Kentish Combat

Given the ever-increasing interest in control-line it's the right time to announce a new event for Combat. Not much notice, actually, but worth doing nonetheless. Thanks to Dave Harrison for the following information.

For many years the British Diesel Championship was run efficiently and successfully by the Peterborough Club, until, 1988 when the organisers decided it was time to let others have a go. Unhappily, no-one

responded with the result that few events (and no championship) were staged in 1989.

Good news for '90 is that (thanks to the efforts of Chris Bishop) a new trophy, the Soundcraft Delta British Diesel Combat Trophy, has been accepted by the BMFA for competition over eight meetings plus the Nationals. The majority have been, or will be run at Centralised meetings, but the third event will be run at Elm Court Garden Centre, near Gillingham, on 20th May as detailed in 'What's On'. Organisers are the Medway Club who first decided to stage an R/C display in aid of the ITV Telethon charity appeal, but were pleased to offer the site for one of the Diesel A meetings. Not a bad venue for a family day out...

Newly-adopted Diesel rules are as below.

1. Line length 13.5 metres (hand to model centre).
2. .34mm minimum line thickness (old laystrate).
3. Any 1.5cc engine glow or diesel ballraced or plain but must be run on suction. (No pressure of pacifiers).
4. Any commercially available nylon or glass filled nylon prop. No all glass props. Props may be reworked to suit engine requirements.

It's wise to stress the new line length of 13.5 metres (approximately 44ft 3in). Dave tells us that most of the entry money will also pass to the Telethon. Prizes should be finalised by the time you read this. We do know that Tony Eifflander has donated a PAW motor.

Two stipulations will be enforced. All flyers will have safety straps fitted to thier handles. These must be used. Also, proof of insurance will be demanded.

Sounds fine to us!



Interest in Vintage control-line continues apace. The Peterborough meeting in April was a fine season-opener. Here's a fragment – Dave Day's collection included this Barnstormer, Lynx and Kombat Kapers. Dave hopes to stage a 'Kapers' contest – watch for news...

Thanks very much (1) ...

Alan Whitehead tells us:

'I don't often feel compelled to write but Mr Imrie's excellent article of the life and times of J F P Forster compels me to do so. It was enjoyable and the photos, many of which I have never seen before, made it come to life.

'I suspect many modellers enjoy a flashback to the past; it is certainly what keeps me buying Aeromodeller.'

Good to know we're doing something right!

Thanks very much (2) ...

And Dick Smith had this to say:

'I've been taking Aeromodellers since 1957, when I was eleven years old. I looked forward to its arrival with real pleasure then, and many of the old issues are as familiar as a favourite novel.

'A few years ago I stopped my subscription. The magazine seemed in terminal decline, less and less content, higher and higher price.

'But I've restarted my sub once more, and look forward once more to its arrival on the mat. The last four issues since Christmas have been terrific. Lots of Aero technicalities, Combat, Goodyear Speed even! The Free Flight stuff of Dave Hipperson has been a real eye-opener. I'm even thinking of recovering my old Dixie-lander. For me the mixture now is ideal – don't change it.'

Thanks very much (3) ...

Lastly, from George Aldrich:

'I must proclaim your series on control-line speed by Dick McGladery. This has to be the single, finest article on the subject ever printed,

ever, ever, ever! Seldom is any subject so well presented, and I doubt better anywhere. Congratulations to you all!

And we've some great stuff lined up. Stay with us!

Come in, Barry Haisman

Ivan Cameron, one of the old Liverpool MAS crew, who indulged in a fair amount of F/F years back, seeks contact with Barry Haisman, who emigrated to Canada in the 'fifties, where he maintained his aeromodelling activities. Last known address was in the Pierre Fonds region of Quebec, but we know Barry stayed for a while in Malvern, here in the UK, early in 1986.

If anyone can help, please let Ivan know at 73 Stanley Lane, Eastham Village, Wirral, Merseyside L52 0A0.

Fred Hemsall

We are sad to learn of the death of Fred Hemsall, probably best known to Aeromodeller readers as designer of the APS Black Magic. But there was much more to Fred's activities, as John Dennis of the Manx Model Flyers reminds us.

'With great sadness we advise that well known aero modelling personality and President of the Manx Model Flyers Club, Fred Hemsall, died aged 64 during March. Fred had not been enjoying good health for some while and the winter just proved too much for him.

'Many older aeromodellers will remember Fred well; he was one of our keenest members; a prolific, if highly individual builder, who made many models that are still flying today and could well be flying for a long time to come.

No caption necessary, really...



'Fred's interest was always in scale and semi-scale aircraft, slow flying and usually quite large. His own-design, quarter-scale Piper Cub from the late 70s was, we believe, the first such large size model on the Island. In the early 80s Fred designed and built a model of the Blackburn Monoplane, with plug in wings and about as marginally powered as the original. None of us who saw it will forget the display on Port St Mary Golf Course, where Fred's monoplane set off up the first fairway and a bit uphill, never gaining take-off speed and eventually disappearing behind a bunker, whereupon the transmitter was put on the ground. But low and behold the monoplane circled the bunker, reappeared coming down the hill and took-off on its own! Control was quickly regained and we all enjoyed a slow display of a lovely model.

'Beneath a gruff exterior Fred was always a very kind person and did many favours for beginners and experts alike, but Fred will always be remembered in aeromodeling circles, internationally, as the designer of Black Magic, a beautiful high wing, semi-scale monoplane, originally intended for free flight but

kitted by Flair a few years ago for three-channel radio control. Black Magic will be a lasting tribute to Fred Hemsall; we hope there will be examples flying in British skies for a long time to come.'

Our deepest sympathy to Fred's wife Ada in her loss.

Devon Rally cancellation

George Fuller writes to tell us that the Devon Rally, scheduled for 22nd July, has been postponed in order to avoid a clash with Brumfly 90. Accordingly, we have removed it from the Contest Calendar.

Go Gliding — Try FFOXY!

Our full-size plan this month is for FFOXY, a neat A/1 towline glider by New Zealanders Rod Lewis and David Ackery. This model has been successfully chosen for a variety of one-model contests, notably for Junior fliers, in that country, under the auspices of the FFONZ — Free Flighters of New Zealand.

Inspiration came from the CLAP programme first seen in France, which has not only resulted in dozens of youngsters having a



'They're both yellow, anyway' department: unaccountably, we've lately taken to referring to Andy Stephenson's Wittman Bonzo, top, as his Hot Canary (below). Here they are, the right way round. Not much difference, really. Below: Thought we should share Ray Malmström's latest sketch-work with you...



FFOXY A/1 MATERIALS LIST

- * 1 sheet 36"x3x1/16" balsa — hard straight grain for fuselage sides
- * 2 lengths 30"x3/8"x1/8" balsa — hard, straight for fuse, top & bottom
- * 1 piece 3/8"x3/8"x163mm hardwood (pine) for towhook mount
- * 1 piece 20mmx36mmx3/8" hardwood for noseblock (alternatively 3/8" marine ply)
- * 150mm of 3mm dowel for wing & tailplane rubber bands
- * Scrap 1/16" ply for tailplane mount
- * 12"x1/8" quarter-grain sheet balsa for fins, rudder, wing mount
- * 9"x3/8" balsa sheet for fuselage pod core
- * 2 lengths 36"x3/4"x3/16" shaped Trailing Edge — nice and straight
- * 2 lengths 36"x1/4"x1/4" very hard straight balsa for Leading Edge of wing
- * 6 lengths 36"x3/32"x3/32" v. hard straight balsa strip for wing spars
- * 1 length 36"x1/8"x1/4" spruce or as above for top spar in wing centre panel
- * 1 length 36"x1/16"x1/4" spruce or as above for bottom spar in wing c/panel
- * 1 length 36"x1/8"x1/4" hard straight grain balsa, top spar in wing tips
- * 1 length 36"x1/16"x1/4" hard str. grain balsa, bottom spar in wing tips
- NOTE: If you really cannot get any strip spruce then make both top and bottom spars in wing centre panel from the hardest 1/4"x1/8" balsa you can get.
- * Scrap of 1/32" sheet balsa for infill behind L.E. of tailplane
- * Scrap of 1/16" sheet balsa for wing spar webbing and gussets
- * 1 sheet 36"x3"x1/16" medium density quarter grain balsa for wing and tail ribs
- * Scraps of 1/4" and 1/8" soft/light balsa sheet for wing and tail cap ribs
- * Scrap of 3/16" quarter grain balsa sheet for dihedral wing ribs
- * Scrap of 1mm ply for tailplane D.T., hook and T.E. protector on wing
- * 1 length 36"x1/8"x1/16" medium straight grain balsa for tailplane spars
- * 12" of 3/8"x1/8" shaped T.E. for tailplane
- * 12" of 1/8"x1/8" hard str. grain balsa for v/plane L.E.
- * 100mm of small diameter aluminium tube for guides for D.T. and A.R. lines
- * 2m of light monofilament nylon (5kg is about right) for D.T. and A.R. lines
- * 50mm of 20kg monofilament nylon fishing line as towline
- * 7 small self tapping woodscrews for towhook, timer and start pin bracket
- * 5mm diameter keyring to use as towline ring

thoroughly good time model flying, but has produced not a few who could capably reach national flyoff level. FFOXY, a true A/1 glider, is slightly smaller than the preferred French craft, but is very easy to build, is rugged and tows and flies well. Just the thing for youngsters!

Exceptionally this month we have published just the plan, with the materials listed here, to allow sufficient time for youngsters to study the plan and accumulate the goods. Instructions come next month — with news of our FFOXY competition, to be held in the autumn. Stand by!

- * 4 small split rings (about 6mm diam. — get from fishing gear shop) for use on ends of Autorudder and Dethermaliser lines
- * Short length of 16swg piano wire — bend to shape for start pin
- * Scrap of 16 swg aluminium sheet for towhook and start pin bracket
- * Scraps of sheet lead for ballast and some epoxy to encapsulate it
- * 2 polypropylene hinges for rudder hinges
- * 1 K.S.B. 6 - Minute Dethermaliser Timer
- * 2 of 3mmx16mm long nylon bolts as rudder adjusters
- * Short length 22swg piano wire — bend to shape for start spring for D.T. timer
- * Small piece of brightly coloured lightweight cloth (nylon is ideal) for pennant on towline. The rules say it must be 2.5 square centimetres minimum area, so use a piece of 250mm x 100mm or slightly larger
- * 2 sheets of lightweight tissue. Modelspan is great to use if you can find it. Peck Polymer and Jap types are slightly harder to apply but you can still get a range of bright colours.

RECOMMENDED TOOLS

- * Modelling knife — X-ACTO or P.O. Instruments type
- * Glass headed pins
- * Metal straight edge and rule — at least six inches long
- * Nice flat building board — say 1m x 600mm minimum — coreboard with ply faces. You must be able to push the pins into it. DO NOT cut on it!
- * Blocks and strips of wood to make into sanding blocks. Cut and glue good quality abrasive paper to these blocks and strips — use contact cement. Recommended grades — 80 grit for coarse shaping and 220, then 360 grit for finishing.
- * Small drills, small screwdriver, needle-nose pliers, wire cutters
- * Soft artists type brush for doping
- * Small flat file and some Emery - boards as used for fingernails are useful
- * If you can afford it, a Safety Cutting Mat is very nice to use and the 'Self-healing' type are great and do not blunt your knife. An A3 size one is suitable — get from Art supplies shop.

DIFFERENT STROKES

modeler's condition, distributed by Powermax, put through its pump-up paces

THIS is important news. The world is, as never before, attuned to global friendliness. Clean, fresh power is the demand for the 'nineties. And what could slot more effortlessly into this than the recycling of air. Hardly a new idea – but an updated one.

What's new?

About five years ago, the first new sightings were reported. Ready-to-go cars and boats, featuring plastic motor units and air reservoirs excited much comment. Aeromodelling enthusiasts wondered how the technique might adapt to model flying. Yet achievable output seemed low and the difficulties high. But now we have a workmanlike powerplant, handily manageable, ready for all to use. In recent months we have featured the Z-Model engine, sold in the UK under the Powermax label, which Doug McHard has so enthusiastically tried with his 40-inch Piper Super Cruiser. But here we look at one of the most straightforward power models ever – Jonathan, produced by the same company, an austere but enchanting pop-bottle-fuselaged, sheet-surfaced free-fighter which surely must appeal to all.

Of course, compressed-air power is nothing new. Its use as a motive force for model aeroplanes reached its zenith in the 1920s and early '30s. Motors were constructed from brass; most effectively in three-cylinder form, a handy and well-balanced arrangement. Air reservoirs were relatively lightweight, brass-shim tubes, wire bound for extra strength at minimal extra weight. Performance was often impressive, although models had to be large but light to carry the load of motor and tank, and were not the most penetrative of craft in a breeze.

This type of craft attracts enthusiasm today. Engineering skills required to create a workable motor are easily assimilated and experiments with 'Tizer' plastic bottles has proved an

alternative to the tedious business of soldering-up an airtight reservoir, but experiments they largely remained, despite the efforts of the devoted few. Now, commercially available, is a happy little craft, as simple to build as you could wish, capable of generating great enjoyment for absolutely zero cost once the initial expenditure is over. To be fair, don't forget that gliders do this for even less and rubber models come close. But here we're discussing a craft with a real, working motor; and especially for the younger enthusiast, that means real business.

What do you get?

A handful of parts is all that's needed to create this 'ecological air propulsion creation', as the instruction leaflet describes the model. The clear plastic tank, actually of soft-drink-bottle origin, carries a spruce boom upon which are mounted the wings and tail assembly, and at the nose via a moulded housing, the motor unit itself with all its plumbing. Assembly is a matter of minutes, rather than hours.

Let's examine the components. Reservoir and boom are already fixed together. Ready-cut slots accept the fin and tailplane, both of flat-plate section cut from medium-weight balsa sheet. Triangular wedges set at the dihedral angle create a wing platform. The wing panels them-

Ready to go! Jonathan about to be released for more air-time. Simple craft performs well; attracts incredible interest.



selves are each from two pieces of balsa sheet with the join along the line of maximum camber. The aft position is, sensibly, of lighter grade. Substantial root ribs provide ample gluing area and set the wing camber, which is maintained on each panel by a single sheet rib at semi-span. The instructions are quite clear – indeed, there is little to go wrong, although translation into English provokes a grin occasionally... Notes on balancing Jonathan, painting and finishing (we didn't bother) and the all-important pumping instructions are soon absorbed.

A real air-plane

The bicycle-type pump provided in the kit connects via a valve just behind the engine. A sticker on the tank warns the purchaser not to exceed 7 Bar pressure. This equates to over sixty pump strokes – in itself, considerable effort. A simple safety valve is provided. This proved erratic in operation and it was simpler to set a limit via the pumping action.

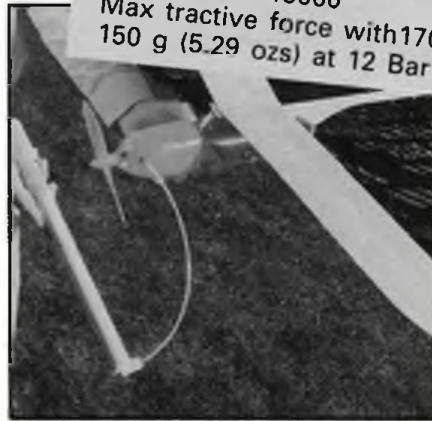
First try caused a touch of apprehension, the reservoir emitting all sorts of creaking noises as various stresses in the walls were released. Nevertheless, pressing-on resulted in a drum-tight reservoir, and a brisk flick of the prop gave a gentle run of twenty seconds. Gently increasing the pressure proved that nothing serious was going to happen – so on with the tests!

It's quite clear

First, though, a brief word about the motor. Full details of its construction and operation were given in the April issue, so suffice it to say here that air enters the cylinder via a valve in the cylinder head actuated by a pin atop the piston. A spring encloses this pin, and, cleverly, this means that the air valve is opened ever earlier as the reservoir pressure decreases, allowing air to enter the cylinder for a longer period. Efficiency is high as a result. A thin rubber diaphragm closes the head ports when air is admitted, but as the piston rises the ports open, releasing any residual pressure in the cylinder. Actually, piston and con-rod are not physically connected! At low pressure the piston often fails to travel to what would normally

MAIN FEATURES AND PERFORMANCE

Single-cylinder engine (plastic)
 Displacement: 0.65 cc (0.04 cu. in.)
 Bore: 10 mm (0.39 in.)
 Stroke: 8 mm (0.31 in.)
 Weight: 7 g (0.25 ozs)
 Overall dimensions: 36x26x41.5 mm (1.42x1.02x1.63 in.)
 Feeding pressure: 1 → 12 Bar (14.2 - 170.7 p.s.i.)
 Max R.P.M.: 15000
 Max tractive force with 170 mm dia propeller (dia 6.7 in.):
 150 g (5.29 ozs) at 12 Bar (170.7 p.s.i.) of feeding pressure



Cycle-type pump plugs in as shown. Build up those arm muscles!

be described as 'bottom dead centre', so it is eventually met by the con-rod's 'little end' as it rises again. A bit odd at first sight, and a touch clattery, but the advantage is that frictional losses are reduced.

The biggest charm of all is that the whole of the cylinder and crankcase is moulded in clear plastic, enabling all the rotating and reciprocating within to be viewed in action. As we were to discover, this appeals enormously to the younger enthusiast.

Fly, fly, fly

No problems here. Once freshly assembled, just a touch of tail ballast was needed to achieve a reasonable glide. Gentle power trials revealed no need to alter thrustline angle, although there is provision for so doing (and the instructions mention that it may well be necessary at higher pressures). Our Jonathan performed well in

climbing turns to the left, with a rubber-model-like transition to glide as power runs down. Fifty pump strokes were enough for merry flights of over forty seconds – quite enough for our recreation-ground trials and easily sufficient to delight our band of fetchermites, who appeared from nowhere and loved their introduction to ozone-friendly flying!

The simplicity of refuelling and lack of apparatus needed to get Jonathan 'scrambled' – apart from the pump – means that appeal to the youthful is high. Jonathan is, indeed, a fine introduction to powered model flight, and a splendid motor 'demonstration piece.' Are there any disadvantages? We found that the wing panels tended to split along the sheet join, but repairs were easy. The reservoir's vulnerability to puncture must be respected (we experienced no trouble). Presumably, the cycling and recycling will eventually bring reservoir failure but this should be well ahead of the working life of the motor. We'd like to uprate the model slightly by sanding the wings and tail to section; and there's sound basis for new, built-up surfaces of greater area, and lighter weight, for even higher performance.

Now – where's that stirrup pump Doug McHard was talking about last month...

Z Model Jonathan produced by Z Model, via Solferino 1, 31020 Frescada (TV), Italy. Our sample provided by Powermax, Millet Street, Bury, Lancs. Price £35.00



Left and right: Two views of the business end. Prop is thin and efficient. Inset: The box to look out for in the shops!



VINTAGE CORNER *Special*

Evocative shot on Neptune shortly after taking-off the sea near Porlock. Note the dihedralled tailplane, and the fine appearance of the model which was Doctor Forster's favourite 'bus.



Alex Imrie concludes his appreciation of the late Dr J F P Forster with a look at wartime – and later – activities

WHEN Doctor Forster's first article on petrol-powered flying-boats appeared in the March 1940 *Aero Modeller*, he was embarrassed to be called an expert in this field, and when that journal's proprietor, D A Russell, requested him to describe the construction of P-6 which appeared in the August issue, he was amused at the coincidence of Rupert Moore's front cover painting by the selection of '...Royal Blue for my boat, whose name, by the way, has been Blue Bell for 40 years...' when neither Russell nor the artist could have known that! At this time he was asked to provide working drawings of his flying-boat for publication, and he decided to incorporate lessons learned from P-6 into a completely new design, the first hint of which is shown in the August 1940 article, where it is named Osprey. The new flying-boat was six feet span with built-in wing-tip slots,

and was powered by the 6cc Baby Cyclone. The outline of the tail unit was changed, and the hull swept upwards at the stern to place the tailplane further away from the water. This model, which was P-9 in Doctor Forster's stable was named Mermaid, and when the *Aero Modeller* Plans Service first released drawings for it in April/May 1941, the prototype was still under construction, not actually being finished

until June. As a result, the photograph used to advertise the design was that of the earlier P-6 which then became generally accepted (incorrectly) as Mermaid. Later, Doctor Forster altered his own Mermaid to have the same wing fixing as that developed for P-10 (see below) and with this modification called his model Mermaid II; thus the published design became retrospectively Mermaid I. Plans for this historic model are still available from ASP as WP/162X price £7.35 plus 60p postage.

Spitfire!

P-10 was a monocoque-fuselage, low-wing monoplane powered by a buried Ohlsson 23

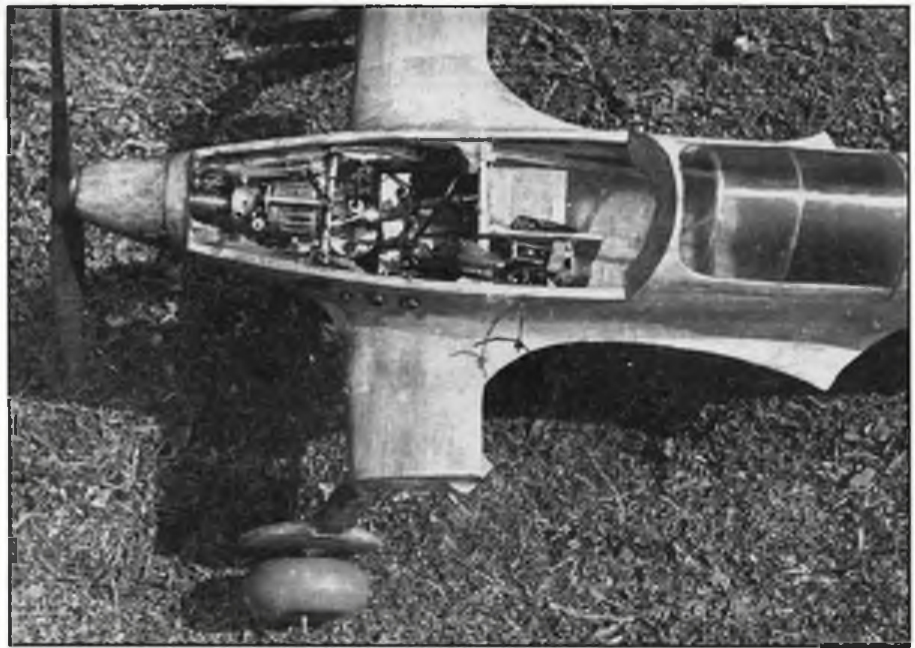
The prototype Mermaid ready for covering in June 1941. This model, P-9 in JFP's series, was specially designed as a beginner's petrol-powered flying-boat incorporating experience gained on P-6. Shown here with a 6cc Baby Cyclone, it was later powered with a variety of engines. The first flotation tests or all Doctor Forster's flying-boats were performed on the garden fishpond in background.





Doctor Forster in April 1942 with P-10, his experimental low-wing model, a semi-scale Spitfire, that was used to evaluate several features that would be used on a near-scale Spitfire. Note wing-tip slots and clipped wings, the latter to receive lightly glued-on, knock-off tips.

driving the propeller via an extension shaft. It embodied features that would be required in a scale low-wing fighter, a type of free-flight power model, that, it was thought, would be in great demand after the war. The craft was referred to as a semi-scale Spitfire. The vulnerability of the realistically faired low-wing had to be catered for by providing a knock-off method that was secure enough to retain the wings under the expected higher-than-usual flight loads, yet allow them to 'give', without damaging the scale-type fairing fillets on wing-tip landings or collisions with obstructions. The fixed centre-section extended only to the main spar with short locating tongues at outboard corners. Because the engine was buried completely to hide it inside the nose cowling a knock-off nose block (to protect it from blows transmitted from the propeller) was fitted to the extension shaft. Individual, backwards shock-absorbing undercarriage legs were fitted to the fixed centre-section, sprung by elastic and completely enclosed, as were, of course, the wing attachments. Access to the engine, ignition components like coil and condenser, clockwork flight timer and Doctor Forster's own four-volt miniature lead/acid accumulator, and wing and undercarriage rubber bands, was via a large top panel removed by half-a-turn of a screw with a thumb nail. In order to eliminate unseemly slots for engine controls, a rack-and-pinion was fitted to the contact breaker. Air intake and needle valve were also extended to apertures on the top cowling. Completed in 1942, the model could unfortunately not be flown under power because of the wartime restrictions mentioned earlier, but extensive gliding tests were undertaken, when the model was deliberately glided diagonally into a hedge. It also made several wing-tip cartwheel landings when glided into the side of rising ground.



It withstood such adventures without damage, all the carefully worked-out crash-proof features providing the desired protection. After the lifting of the power model flying ban restriction in September 1944, P-10 performed well, but had rather to take a back seat since P-11, a near scale Spitfire II of 63 inches span (for which P-10 had been the test vehicle) was now the centre of attraction. Made during 1943, the Spitfire, powered by the 6cc Baby Cyclone was built as nearly as possible to scale using, as a basis, the W A Wylam drawings published in February 1941 Model Airplane News. The area of the tail surfaces was increased by 10 per cent.

This model was described in *Aeromodeller*, December 1943. Plans were available from the Aeromodeller Plans Service from April 1944 for 10/6, but due to increased demand for plans generally, this was reduced at first to 9/6, then to 8/3! The model weighed 4.1/2lbs and glided at a speed estimated as just under 25mph. At the design stage the wing loading target per square foot had been twelve ounces, but when ready to fly the actual figure had increased to 15.1 ounces per sq. ft. Initial test flights provided some hair-raising moments until safe height was attained, and on the third flight the Spitfire followed in the wake of old P3 some eight years earlier when it headed out into the Bristol Channel! Using a clockwork timer that had a history of stopping, but which Doctor Forster hoped would be kept going because of engine vibration, the Spitfire climbed in easy circles of some 250 feet in diameter and drifted out to sea at about 1000 feet up, the engine still going strong - showing, indeed, that the timer

The 'engine-room' of P-10 showing its inverted Ohlsson 23 with extension shaft and knock-off nose-block. The integral centre-section stubs provided a firm anchorage for the shock-absorbing undercarriage legs; and the short tongues for wing location can be seen at the main spar. The wing, joined in the centre, was retained by rubber bands to fuselage hooks.

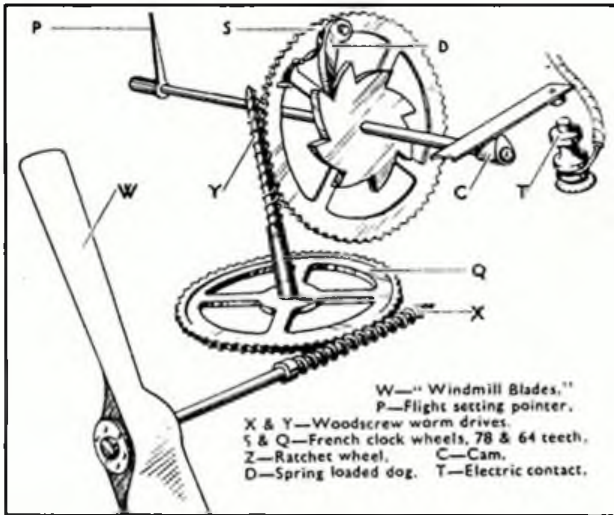
had ceased to function. Following some hectic rowing exercise, the model was eventually retrieved over a mile out to sea, and after a week in the airing cupboard was flown again, this time with much less fuel in its tank!

Author, author!

Ever since he acquired his first engine in 1937 Doctor Forster had not only lived and breathed petrol models 24 hours a day, he had keenly investigated the technical aspects of as many different types of engines as he could lay his hands on. Because of this 'concentrated indulgence', he was better suited than most to write a book about the handling of engines and he did this admirably in his volume *Petrol Engines for Model Aircraft* which was first published in 1943. For the generation of young modellers growing-up in an engine-less WWII, many of whom had never even seen a petrol engine, this was manna from heaven. His writing held a sort of magic, quite impossible for later-day enthusiasts to understand. So it was that he had a strong following, and it was his honest disclosures of his own failings and mistakes that endeared him to would-be members of the 'Oily-fingered Brigade'. In writing the book he sought to encourage the



P-11 was a flying scale model of the Spitfire II powered by a buried 6cc Baby Cyclone. Plans were available from Aeromodeller Plans Service, and despite Doctor Forster's warning that it was not an ab initio petrol model, some beginners at power model flying chose it as their first model! One wonders how they fared . . .



Left: This ingenious brass slipstream timer overcame the salt-water corrosion problems that plagued normal clockwork timers on flying-boats. Driven by a windmill 'propeller' at 2500 rpm it gave accurate timing up to two minutes and was used on both Mermaid and the later Neptune flying-boats with success.

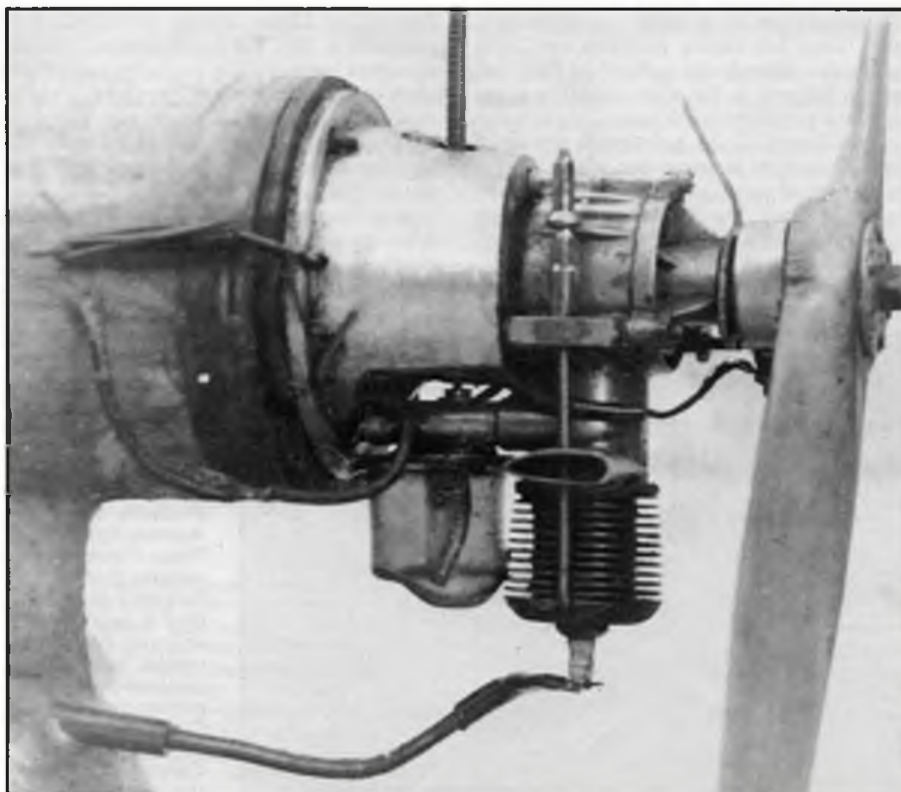
ways claimed that his interest in petrol engines was a means to an end, one can sense in John Forster's writing a deeper feeling for them than that. In this book he writes 'In return for all the hours of pleasure given to many thousands of petrol modellers... despite the roughest handling, all these little engines ask of their owners is commonsense in their operation and management. If the pages of this little book should help any sinners to their engines to mend their ways, something will have been done by the writer towards discharging the heavy debt of gratitude owed to the ever-increasing family of two-stroke model aero engines...'

Neptune

In the Autumn of 1944, CEB was in Porlock on sick leave, and having received a Microdyne Super Atom engine of only 1.47cc he just had

production of engines specifically designed for model aero use by looking at engines that had previously been available and the difficulties encountered in their installation, cowling and operation using a practical no-nonsense approach. He used a physician's manner to investigate ignition troubles and differentiated between symptoms and physical signs of misbehaviour, emphasising that attempts at treatment, without reasoning out the real problem was 'quackery!' His 'Passive Resistance' and 'Furiously cranking the airscrew...' descriptions of dealing with flooded engines, and, 'Haphazard fiddling with the needle without a real appreciation of what is going on...' in mixture control considerations, are gems of expression! Quite the most readable book in the old Harborough range, it is also the best treatise on how to handle early commercial spark ignition engines that has yet been published. Although he al-

Right: This enlarged version of CEB's Kangette elliptical winged biplane for the 1.47cc Super Atom engine became P-12 in the series. It had a long life as a sports free-flight model and was eventually modified to take radio control. Note wing-tip slots on both wings.



Left: Forster features! Ohlsson 23 (No 1796) on an aluminium cone mounting for Mermaid. This item was made from part of the wreckage of a Junkers 88! Failure of the spot welding that held the cylinder liner to the crankcase was overcome in the manner shown by fitting two cycle-spoke cylinder retaining rods!

to design a vest-pocket model for it. Named Kangette, this materialised as an elliptical winged biplane of only 32 inches span, and since CEB's own building materials were in store he got Doctor Forster to build it for him. Shortly afterwards the doctor also obtained an example of this fantastic little motor which had a very high power/weight ratio and he built a 36 inch version of Kangette and named it P-12. Later the size of the top wing was increased to 42 inches and the top wing previously used became the bottom mainplane! This pleasant interlude and the enjoyment of flying P-8, P-10 and the Spitfire, did not diminish the lure of the flying-boat, and although Doctor Forster had many sessions flying Mermaid II, he was acutely aware of its shortcomings, especially in regard to stability on the water. In designing P-13, which was named Neptune, he departed from some of his established principles. Previous boats had the wing placed atop the fuselage cabin and also used a large amount of dihedral which meant a correspondingly large fin, but these side areas, despite the correcting



THE MERMAID

DR. FORSTER'S HIGH PERFORMANCE FLYING BOAT

Mermaid featured as No. 3 in Ray Malmstrom's 'Caricaplanes' series in Aeromodeller, appearing in the May 1945 issue, by which time work was well advanced on an improved type of flying-boat.

help from sponsons, could be troublesome when at rest on the water in variable winds. Also it had never been possible to ensure that the interior of hulls remained absolutely water-tight and moisture had played havoc with ignition equipment carried in the hull to obtain a low centre of gravity. Now he determined to carry all the heavy ignition gear, including the miniature lead/acid accumulator which he always used, in the engine nacelle, being prepared to lower the centre of gravity by ballasting if necessary. In order to reduce the side areas of wing and tail, less dihedral was used and the wing carried on a pylon similar to that used on the full-size Dornier Do 18 flying-boat. There were changes in the hull lines of Neptune and the hull bottom too was based on the Dornier, where the vee-section of the bow reduced to become a flat-bottomed planing surface only half the width of the hull at the step. The forward step and the steps on the sponsons were dispensed with altogether. The shortest span wing with the necessary area meant that the ideal wing plan had to be elliptical, and Doctor Forster built the Neptune wing over his Spitfire wing plan drawing, the wing-tip slots being retained. Span was 64 inches. Powered by a Brown Junior and later with an Ohlsson 60, Neptune possessed first-rate stability on the water thanks to the new features, and lateral stability in flight was good, but the downwash from the parasol wing meant that longitudinal stability was not too easily obtained, and initially the model tended to fly in a tail-down attitude.

Further experiments in 1946 produced P-14 which was named Mermaid III. The main difference between this and Mermaid II were a lengthened tail boom and a change to a single-stepped hull and step-less sponsons, which greatly improved the take-off, but although P-14 combined some of the best features of Neptune and Mermaid she did not have the appeal of the previous boat, and Neptune remained Doctor Forster's favourite model. He says '...I was very proud of Neptune, I really

P-13, named Neptune and seen here nearing completion, incorporates several features of the full-size Dornier Do 18 flying-boat. The beautiful lines of this model are apparent. Its elliptical wing was actually made over Doctor Forster's Spitfire wing plan drawing.



In his element! Doctor Forster readies Neptune for the session of flying that resulted in the series of fine action photos taken by J Burgoune that appeared in December 1945 Aeromodeller, and later issues too.

think her lines are beautiful and she flew and took-off so well...' The all-silver model with crimson undersurfaces of hull and sponsons was displayed at the Second National Model Aircraft Exhibition at Dorland Hall at the end of 1945 and won a special award; it was fully described in a two-part article in June/July 1946 Model Airplane News.

Radio Control

During the next few years he continued to model, keenly examining examples of new



engines that were now available, despite experiencing the obvious disappointment of noticing that their layouts did not measure up to the ideal model aero engine that he had advocated years before. He undertook a great deal of flying into the early 1950s until due to professional and family commitments he had to restrict his participation, then, more-or-less give up the hobby. When his son grew up and was old enough to show an interest in the models that were suspended in the workshop, he persuaded his father to fly them: so P-8, P-10, Spitfire and Neptune flew again. However, it was not long before Doctor Forster decided that chasing models over hill and dale was too much like hard work and he naturally fell for radio con-

trol, something that he had been very keen on, but had only been able to dream about in the old days. He modified many of his models to take RCS Digi-3 equipment, finding the main problem was a means of keeping sea-water out of the electronics in Neptune, especially in instances like this: 'In my excitement at getting everything working at once, I forgot to pull out the transmitter aerial and she got out of range: Result, full right rudder and a cartwheel crash into the sea...' The advantages of glow-plug ignition were freely utilised, and he used an OS.19 in his enlarged Kangette biplane (P-12) and fitted it with tricycle landing gear '...it flies, lands and takes-off like a charm and does the tightest loops you ever did see!' But, as with free-flight, his greatest enjoyment was with flying-boats, and these he flew either from his boat Blue Bell, at Porlock Weir or from Minehead Promenade where he waded out into the shallows: '...it is a highly satisfying sight and achievement to do a decent take-off and landing close alongside under full radio control, instead of having to row for miles after her, as

Neptune and Mermaid II (P-14) at rest on the water in 1946. Both boats were all-silver with crimson hull and sponson undersurfaces. The windmill of the 'Forster Slipstream Timer' on Mermaid can be seen at the end of the engine nacelle. Neptune carried hers on the rear of the wing mounting pylon.

in free-flight days.' When it could be arranged he had flying sessions with his fellow 'Petroleer' C E Bowden, who brought '...any sort of model small enough to stuff into his little Morris 1000.' So these two enthusiasts carried on into their advancing years, still experimenting, and enjoying to the full the hobby that had first brought them together some forty years before. A partial incapacity due to cartilage trouble in one knee caused a period of relative disinterestedness in model matters since this prevented him from doing any active flying, which was '...the thing that has always interested me most.' Later, further ill-health meant that he had to give up the hobby. His Spitfire and Neptune have been preserved and it is hoped will be restored to their original condition. The writer is in possession of P-10 and it is planned to renovate this historic model to its former glory, complete with knock-off nose-block extension shaft for its Ohlsson 23.

Doctor Forster will be remembered for his efforts in promoting interest in the power model at an important period in its history; his name will be forever synonymous with petrol models, and he has left a rich legacy of their development.



THE third Holiday on Ice event took place on Lake Mjosa 120 kilometres north of Oslo on 17-18 March. In common with the UK and the rest of Europe Norway has had an unusually mild winter. At one stage there was doubt that the ice would be thick enough to take the weight of the flyers and their equipment. Because of this consideration the flying took place as far north on the lake as possible; in fact, almost in the outskirts of Lillenhammer, the site of the 1994 Winter Olympics.

We had hoped that there would be a larger contingent from the UK this year but despite various enquiries, the only addition to Dave Oldfield and myself was Lez Brambley who just came along for the trip. He says he will be taking a model in 1991!

Ice? What ice?

Having made the journey on the two previous occasions we were able to make plans that ensured a trouble-free arrival in Gjovik. We had allowed plenty of time by booking on Scandinavian Airlines 10:30 flight from Heathrow to Oslo (a two-hour flight). I had previously contacted the airline by both telephone and letter advising the special nature of our luggage. This contact paid a worthwhile dividend in that we were taken through all the controls and checks right up to the aircraft side by a member of the SAS staff. We had left London on warm sunny spring morning to find that Oslo was only marginally cooler with a temperature of nine degrees C, sunny and a moderate breeze from the South and no signs of ice or snow anywhere.

The second part of the trip was a 120 kilometre two-hour train ride. In 1989 we met a French flyer at the railway station; this year we met Cenny Breeman of Belgium waiting for the same train. On the journey North we saw some evidence of ice and snow, and spirits rose when we spotted someone fishing through a hole he had made in the ice on the surface of a small lake. At Gjovik we were met by Nils

Mike Woodhouse manages to keep his feet in Norway

Scmidt Andersen; we booked in at the hostel at 18:30. The evening was spent renewing old and making new friendships, discussing the condition of the ice and speculating on the weather. Some of the Norwegians had been out to fly and check the thickness of the ice. Apparently it was between 35 and 45 centimetres thick, and extremely slippery, the previous weekend had brought a snowfall of some fifteen centimetres which, in the mild conditions, quickly melted covering the ice with a layer of water. A couple of overnight frosts froze in water to produce a clear, flat, shiny surface. The expenditure I had made on spikes for my boots would not be wasted.

Kickers

Their event was programmed to be run over Saturday and Sunday. The apparently late start of 11:00 is a necessary evil on the lake. Setting-up control and organisation takes longer than on an airfield as all the equipment has to be either carried to the middle of the lake taken out by snow scooter. Flying is from the middle as the wind direction is always up or down the length due to the effect of the mountains along the eastern and western edges. Vegar Nereng, driver of the scooter, had trouble on the ice with traction and spectacularly spun the machine and its train of sledges. Other methods

of travel across the ice were (in the case of Janna Forsman) ice skates; and another approach is to see a 'kicker'. The kicker, or snow bicycle, is the ideal way to travel. It looks like a walking frame on skis complete with a large parcel shelf on the front. To propel the device one simply scoots across the ice, one foot driving and one foot on the runner. Very little energy is needed to drive the device even when returning against the wind. Many flyers operated in tandem, one sitting on the front and holding the models, the other providing the propulsion. Not being in possession of such a vehicle I simply dragged my box along the ice. It took a lot less effort than carrying, and moved so freely that I did not notice a passenger in the shape of Cenny Breeman who got on board for a ride!

Tests

I was empanelled on the jury to decide the length of the rounds and the use of the increased maxes. As the wind was blowing at about 10-12 mph and the forecast was for worsening weather through the weekend we decided to try to get all the flights in on the Saturday using one-hour rounds, to be reviewed if required. The last round maxes would be lengthened, if necessary; with flyoffs on the Sunday. In event there was only one perfect score so the need for the extended max and flyoffs never arose. Recovery on the ice presents different problems and is usually only the function of distance as there is nowhere for the model to hide; it just sits there on the ice visible from a considerable distance. The very smooth and slippery surface of the ice presented a new problem, as models landed and just kept on going downwind. My first test 'flight' probably went as far on the surface of the lake as it did in the air. Timekeepers sometimes had great difficulty in knowing the precise moment that the model landed. In the sixth round Bror Eimar of Sweden lost his model through this phenomena. The model was seen to land for a max



Heading: Subject of observation in this icy scene is Dave Oldfield's F1B. Our columnist's model is in the stooage at left. Above left: Ossi Kilpelainen's high-tech Wakefield has heardly a piece of balsa in it - finished three-quarters of the way down the list, though... Above: Ole Torgerson, top in F1B last year, dropped his first flight horribly this time. Left: Hakan Broberg's straightforward F1B is a Tilka derivative. Below: Frank Seja assembles his array of electronic gear - shortly afterwards the thermistor pole pulled out of the ice and toppled over...



well across the lake but had disappeared by the time he had got downwind. The model was presumed to have been swept away by the strengthening breeze to the end of the lake several kilometres distant. When we left on the Monday the model was still missing.

The weather was overcast with the sun threatening to break through, which it did from time to time during the day. The wind was from the South blowing at about 10-12 mph which increased by early afternoon only to reduce again at the end of the day. The temperature was well over freezing probably reaching as much as plus five degrees C. In these conditions there was likely to be some light thermal activity. At times a 'heat' haze could be seen on the ice and the occasional, but very pronounced, warming of that breeze could be felt. Those calmer warm moments, as I found to my cost, provided 'down' rather than 'up!' there better air was present when the wind was smooth and steady and colder.

Contests

The F1A and F1Bs were mixed on the poles. The three F1C flyers were put together on one pole at the end of the line. The difficulties of moving and fixing equipment to the ice meant that the usual round by round migration from pole to pole did not take place. Fixing the winding stooze to the ice was not difficult, provided one had a brace and bit and a hammer. The appearance of the ice was not unlike frosted glass. One could see into it but not through it. The above-zero temperatures resulted in a thin film of water on the ice which, unless one had spiked footwear, was extremely slippery. The fixing of the stoozes had to be checked regularly as the relatively warm metal fixings melted the ice loosening their hold, with in a couple of cases, disastrous results. Frank Seja's remote thermistor pole collapsed and Ole Torgersen's stooze broke free completely demolishing his model in the process.

The contest progressed without any major hitches. The F1A fliers were trying through prolonged towing to find the better air. In the initial rounds there was no real lift. All those that maxed only just cleared the three-minute barrier whilst at the same time the propensity of scores in the 160 to 180 bracket indicates the stillness of the air. A good model well trimmed with an accurate zoom launch is a prerequisite to a max in such conditions. With F1B the decision has to be made as to whether one should wind, wait and try to identify the very marginally better air or, alternatively wind and launch immediately relying on model performance and the general steadiness of the air. There was a considerable variation in the performance between the best and the worst of the F1Bs. The difference in the climbs was quite marked. Bror Elmar's model climbed well, but he spoilt his score by the incorrect hooking up of the models systems. Ole Torgersen, the 1989 winner, was going well after a first round crash put him out of contention. The F1Cs, with their high performance, were having no trouble putting in the maxes.

One interesting new piece of equipment made its appearance on the flight line. Frank Seja had an electrically heated muffler over the motor tube. The theory being that FAI rubber delivers more power if a high ambient temperature can be maintained. The muffler gets quite warm and has been known to melt nylon system hold-down lines. In Norway the system had side benefit of keeping Frank's hands nice and warm whilst he decided when to launch the rest of the field made do with keeping their rubber out of the air until needed. A mixture of rubber was used - both grey and

F1A										
1	Jan Somers	NL	180	149	180	180	180	180	180	1229
2	Olf Edlund	S	166	167	180	163	180	180	180	1216
3	Cenny Bræeman	B	180	136	180	180	180	180	178	1214
4	Lars Larson	S	180	180	180	132	180	180	180	1212
5	Per Findahl	S	180	150	180	180	180	180	161	1211
6	Jes Nyhegn	DK	180	180	173	170	136	180	180	1199
7	Mikael Holmbom	S	166	180	126	180	180	180	176	1188
8	Pieter de Boer	NL	180	180	125	180	180	180	162	1187
9	Henning Nyhegn	DK	180	180	158	120	180	180	178	1176
10	Vegar Nergren	N	180	110	172	180	172	180	175	1169
11	Lars O. Danielsson	S	180	141	176	177	180	139	150	1143
12	Herbert Hartmann	S	180	180	122	121	180	180	174	1137
13	Mauri Tuure	SF	119	180	177	180	167	180	118	1121
14	Tiomo Pajunen	SF	180	124	162	180	180	180	91	1097
15	Vidar Nereng	N	164	180	170	85	142	180	171	1092
16	Bjørn Melby	N	180	122	122	158	180	180	140	1082
17	David Oldfield	GB	150	106	180	180	180	135	135	1066
18	Leif Ericsson	S	158	150	180	173	180	93	123	1057
19	Lars G. Olofsson	S	180	171	100	123	180	180	122	1056
20	Nils Wallertin	S	180	133	122	180	180	129	113	1037
21	Svein Olstad	N	133	176	145	164	144	124	126	1012
22	Anders Klemetsen	N	150	138	174	149	44	180	122	967
23	Michael Dahlin	S	98	145	180	180	180	99	67	949
24	Holger Sundberg	S	138	54	180	150	180	104	94	900
25	Bo Nyhegn	DK	30	163	142	180	153	114	109	891
26	Deniz Varhos	S	90	139	142	110	149	131	105	866
27	Dag E. Larsen	N	157	95	98	132	145	104	104	835
28	Atle Klungrehaug	N	149	143	13	158	180	105	22	770
29	Sverre Klemetsen	N	97	125	61	27	180	124	133	747
30	Jan A. Hager	N	547	585	0	21	74	118	110	718
31	Ance Somers	NL	74	0	151	163	180	142	7	717
32	Espen Melby	N	166	120	53	122	58	75	43	637
33	Tord Klungrehaug	N	180	100	43	20	102	81	95	621
34	Hans Ahlatrøm	S	0	40	0	0	45	34	0	119
F1B										
1	Frank Seja	N	180	180	180	180	180	180	165	1245
2	Per Thomas Skjulstad	N	180	180	180	180	180	182	172	1234
3	Bror Elmar	S	180	180	164	180	180	180	158	1222
4	Mike Woodhouse	GB	180	180	180	105	180	180	158	1163
5	Janne Forsman	S	178	180	180	128	150	180	165	1161
6	Arne Lønness	N	150	180	180	93	180	162	159	1104
7	Ole Torgersen	N	4	180	180	180	180	180	180	1084
8	Mikael Eriksson	S	180	158	180	180	180	180	10	1068
9	Tapio Linkosalo	SF	116	96	123	180	180	177	180	1052
10	Pekka Saari	SF	112	176	110	180	180	134	138	1030
11	Hakan Broberg	S	80	146	180	180	180	136	91	993
12	Ossi Kilpelainen	SF	160	180	180	96	180	101	95	992
13	Leif Ericsson	S	150	152	70	110	180	146	172	980
14	Valdemar Falk	S	180	115	90	174	161	133	113	966
15	Jan Wold	N	130	5	109	166	180	163	180	933
16	Nils E. Hollander	S	85	120	92	110	140	175	129	851
F1C										
1	Ken Phai	USA	180	180	180	180	180	180	240	1320
2	Gunnar Agren	S	180	180	180	180	159	180	240	1299
3	Tor Bortne	N	180	180	180	180	180	180	173	1253

tan FAI, whilst I used up some of my remaining Pirelli. Per Thomas Skjulstad and Jan Wold used Chinese as they found it to be better than FAI in the cold conditions.

Turbulence

Towards the middle of the contest a period of definite lift was present. This lift was accompanied with a hitherto unknown period of turbulence. The patches of warm air could be clearly felt and one has to assume that these sudden changes were the cause of the turbulence. Several fliers, including myself, were caught out by the turbulence. My F1B looked OK for the first few seconds, sufficiently so to tempt Ossi Kilpelainen to follow, it was then battered down for less than two minutes. A few of the F1As had tow trouble in the turbulence the father and son duo of Anders and Sverre Klemetsen both suffered two-ins.

The air towards the end of the contest started to deteriorate as the humidity increased. The extended max was therefore not required as those who still had perfect scores in F1B now dropped time. In F1C the four-minute max was needed but a bad launch and poor pull-out gave Tor Bortne a score under three minutes and third place. As in 1989 Young Per Findal was unable to get a seventh round max to win the event, a max would have given him victory by one second, so Jan Somers repeated his 1989 win. Saturday and the contest were over.

Conclusions

The prizegiving took place later that same evening in the hostel. The trophies this year were pieces of rock with a suitably inscribed plaque attached. Ken Phair from the USA, the F1C winner, on receipt of his prize, pledged his intention to return in 1991.

The evening concluded with the usual discussion over model design and structure. The F1B winner Frank Seja explained his model and the back up equipment. The model users state of the-art techniques, a Rohacell wing covered in Kevlar and carbon fibre prop blades. The prop blades are very strong and stiff yet weigh only six grammes for the pair. My balsa and glass blades weigh that for each blade! I will have to try his technique. Apart from this I saw nothing new, most people flying last year's models. To finish things off Gunnar Agren showed a large selection of slides taken over the 1989 season.

The Sunday was devoted to a dip into Norwegian culture followed by an evenings entertainment at the Torgersen's. The trip home on Monday was uneventful only being spoilt by the baggage handling staff at Heathrow, who despite the labels proclaiming 'with care - fragile' managed to inflict an inordinate amount of my model box.

Finally: thank you to our Norwegian friends; see you in 1991. To make the contest perfect can you please provide some snow?

E FLYLEAVES

The Hot Air Balloon Pack

by Ray Batchelor (Penguin Books, £9.99.
ISBN 0 14 095332 9)

Most of us have wanted to; some have actually progressed as far as making a basic one; but very few aeromodellers have achieved the success of launching a multi-coloured 6ft diameter sphere for flights of up to ten minutes. What we are talking about? Why – Hot Air Ballooning of course.

In 1988 Penguin launched their own HAB pack – it's a slim, 32-page book plus a start wallet of printed red and yellow tissue. The book tells how and the tissue saves all that bother of plotting out the gores and marking the seams.



Well written and illustrated, the test starts with a little history, then some theory and the full instructions for assembly of the tissue pack. All we needed were a pair of sharp scissors, drafting tape, a Pritt Stick and a large area of floor space. We soon confirmed the warning to keep curious cats out of the way!

Made in under two hours (given no interruption) and with close attention to Ray Batchelor's practical advice, we headed for the fields with a wad of cotton wool, a bottle of meths and our impressively huge bag of slightly crumpled tissue on a gloomy but dead still autumn afternoon.

Soaring success! Thoughts turned to flaming potential disaster as the chequered globe lifted to 500ft and headed in the direction of a local farm! All subsequent launches have, needless to say, been restrained by a light nylon monofilament line. One fascinating reaction came from hitherto hidden observers who materialised out of nowhere. 'Got one of those, wondered if it would work if I made it' was a typical comment. Others pressed for info and were surprised that this was a kit form balloon. Our advice was not to hold back any longer – if, like the former, you already have one but have dithered over putting it together, then get sticking right now. Or if you've wanted to try a HAB but didn't know how, then go for this Penguin that really flies, and you'll be hooked on hot air for ever. How's about a grand balloon race at the Nats? **RGM**

Soartech 8, Volumes 1 and 2

by Michael S Selig, John F Donovan and David B Fraser.

Obtainable only by mail directly from the publisher: Herk Stokely, 1504 North Horseshoe Circle, Virginia Beach, VA 23451 USA. Cost for non-US buyers: \$US20.00 surface mail, \$US32.00 airmail.

It has been known for some time that Michael Selig, already famous for his profile designs, was engaged on wind tunnel research into model aircraft wing sections at Princeton University. The original intention was for a small project but, in partnership with John Donovan and David Fraser, the Selig study expanded to absorb several years' work by three dedicated enthusiasts, supported by a large number of model aircraft builders who have constructed and supplied the actual test pieces and some of whom have given financial aid. The results have now been published as **Soartech 8**. Not only have many well known sections been tested and re-tested, but Fraser, Donovan and Selig have designed a large number of profiles, and tested them, in the light of the new understanding reached during the program.

No serious model aircraft builder or flier can afford to be without this information.

Soartech 8 is in two volumes, containing 398 pages, and is extremely cheap. Even at the \$US32 airmail price it is very good value and would be worth very much more.

I cannot speak highly enough of the work that Selig, Donovan and Fraser have done and it would be impossible to exaggerate its importance. They have tested 54 aerofoil sections at Reynolds numbers from about 60,000 up to 300,000, thus covering most of the range needed by modellers. In most cases they have not been content with the one profile but have tested it with flaps, or trip strips, or zig zag strips, or bump strips, in different positions and in one case with a pneumatic turbulator similar to those now used on full-sized sailplanes. As a check on themselves they have tested different models of the one profile and re-tested, after an interval of months, the same test piece to assure themselves that the results were repeatable. Profiles have been measured with different covering materials. The actual number of different profiles tested at Princeton is therefore 164, each at several different Re numbers. There has never been anything like this before. Where the same section has been tested in other laboratories the Princeton results correlate well, especially with the Stuttgart results. The quality of the work done is very high indeed.

A point to be well borne in mind is that the model wings tested at Princeton have not been built by professional pattern makers but by model fliers. A most interesting aspect of the report is the comparison made between the models as actually supplied and the official ordinates of the sections. For the first time it is possible to find out what effects small errors in the workshop actually have on the behaviour of the wing in the air. A special apparatus was used to measure the departures of the profiles from the ordinates, and every section so meas-

ured is plotted to show where the model differs, as they all do slightly, from the perfect form. The tables of ordinates in the report include both the ideal figures and the measured ordinates from the models themselves.

The models usually differ from the ordinates by a few hundredths of an inch, but often less, in fact, than the thickness of the line on an ordinary drawing. In a few cases the model was rather less accurate than this. For instance, the Eppler 193 wing model tested turned out to be closer to the ordinates for E205. (The present writer noticed some years ago that there was hardly any difference between these two well-known sections, except near the trailing edge, where a small warp could easily make a 193 into a 205, or vice versa.)

Except for a few tissue-paper covered open frame 'free-flight' profiles tested at Stuttgart (published in Vol 2 of *Profilpolaren für den Modellflug* in 1985), all previous wind tunnel tests, though very valuable in themselves, have been regarded with slight suspicion by practical modellers because they have felt unable to reproduce the profiles with sufficient accuracy. This is no longer the case. It is now certain that with care and good workmanship, the ordinary model flier can build a wing which will reproduce in the air the drag and lift figures similar to those predicted by the Princeton tests.

The first volume of **Soartech 8** contains a brief and simple introduction to wing section theory, with a description of the test apparatus and a discussion of each aerofoil section tested, with comments on its suitability for various purposes. This volume also contains all the ordinates and comparison plots.

The test charts and tabulated results which go with them, occupy the whole of Volume 2, over 200 pages.

The point stressed by the Princeton group is that no one section will answer for all applications. It also needs to be said that the sloppy terminology used by some modellers will have to be completely avoided in future and replaced by proper understanding of terms like camber, thickness form and a very little boundary layer theory. To comprehend the test charts is not hard, if the reader is prepared to give a little careful thought and some study to elementary model aircraft aerodynamics. (There is at least one simply written book available on this subject!)

The choice of wing profile must be made from a basis of good information and that information is now available.

Soartech 1 to 7 inclusive, are also still available from Herk Stokely. The costs are (US \$ Overseas) #1,2,6 \$10.00, #3,4,5,7 \$8.00, airmail. Again, the value is very high and every serious sailplane flier should have the full collection. **MS**

Computer Software

The Sailplane Design 3 computer program by David Fraser, one of the Princeton research team, is advertised as incorporating all the Princeton tests and others, and comes together with a 49 page user's manual. It is intended for the IBM PC, XT, AT, PS/2 or clones.

The cost is US\$37 for overseas orders. This writer has ordered a copy and the disc. If this program does all that is claimed it should be an important advance.

Sailplane Design 3 Software is available from David B Fraser, 1335 Slayton Drive, Maple Glen, PA 19002, USA **MS**

LOOK BACK IN

Anger

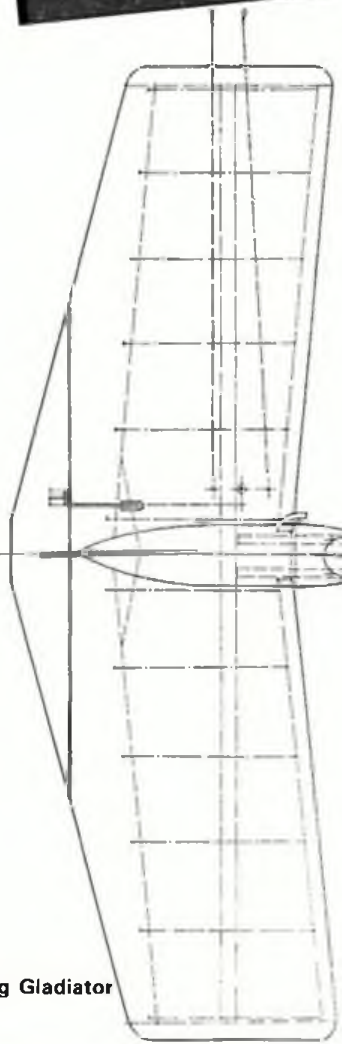
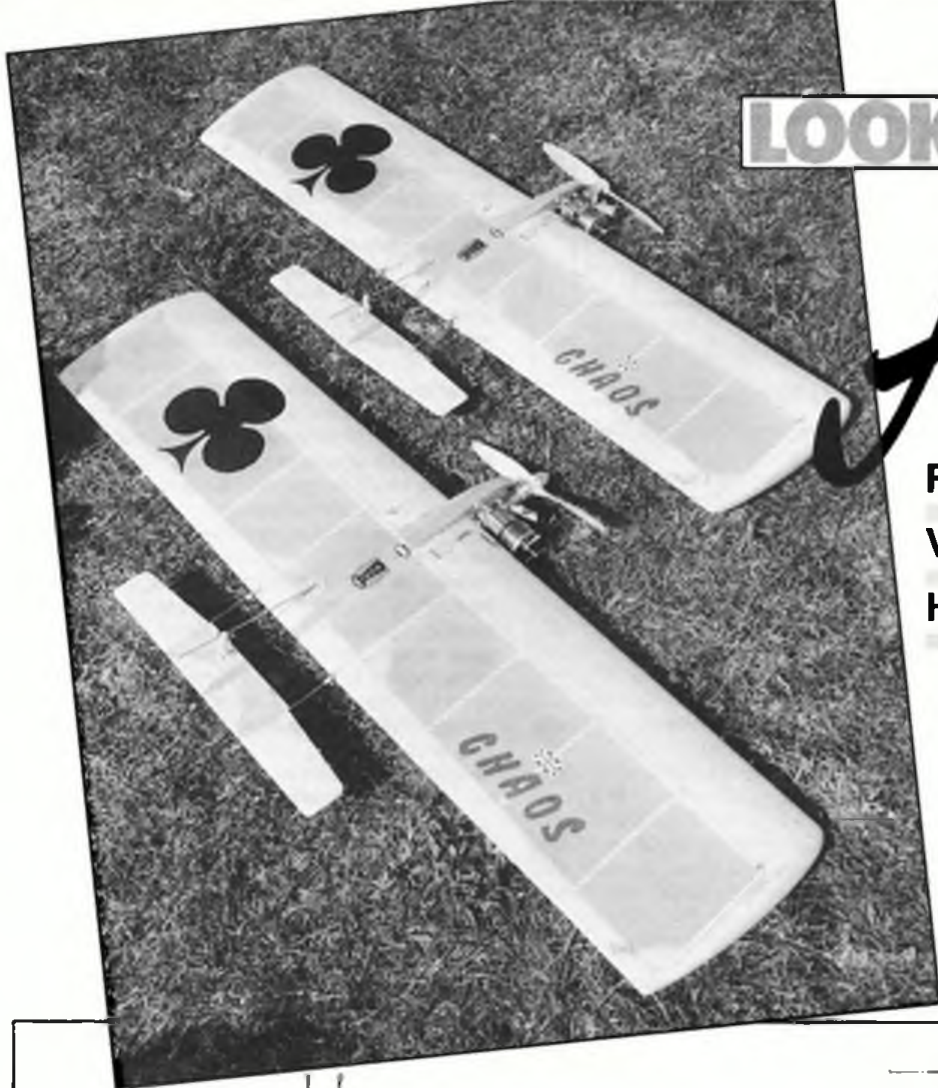
Frank Smart surveys the Vintage Combat scene.

How can you resist . . . ?

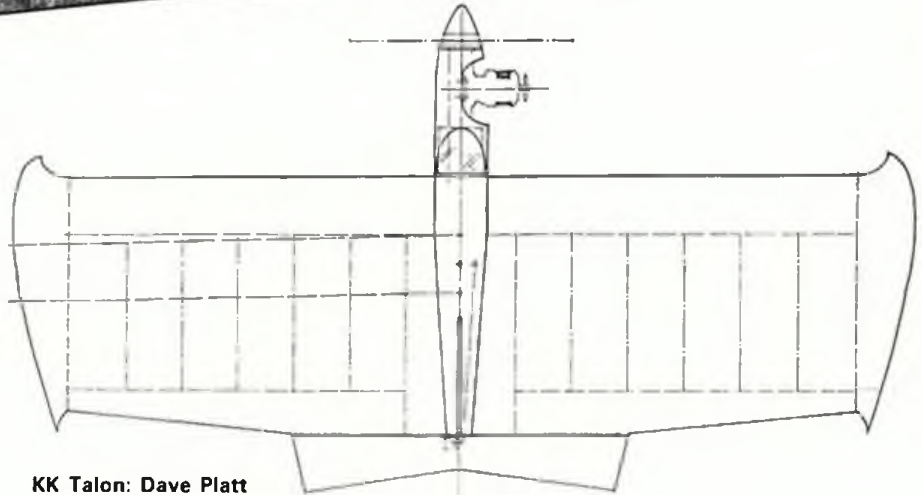
IT had to happen. Perhaps as a reaction to the ultra-fast, super-tight turning (and often expensive) F2D craft of today, a healthy flurry of activity has resulted in the appearance of Vintage Combat models in the current control line circuit. And who knows – a dash of nostalgia may well have had a lot to do with it, too.

Choosing a cut-off-date as late as 'pre-1971' opens up a vast field of likely subjects. Competitors are now making serious moves towards choice of subject, perhaps slightly adapted to suit flying styles and available motors.

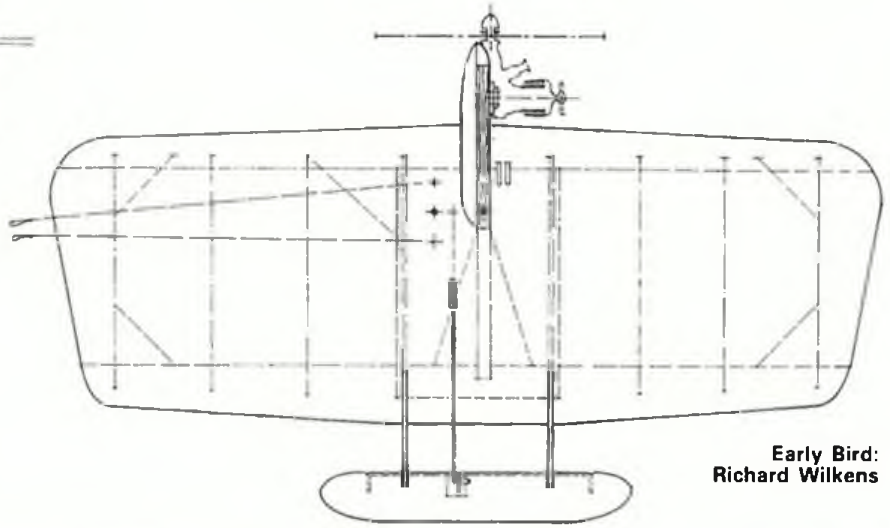
Interest in Vintage at Three sisters on 1st April exceeded that in F2D. Strong support was



Frog Gladiator



KK Talon: Dave Platt



Early Bird:
Richard Wilkens

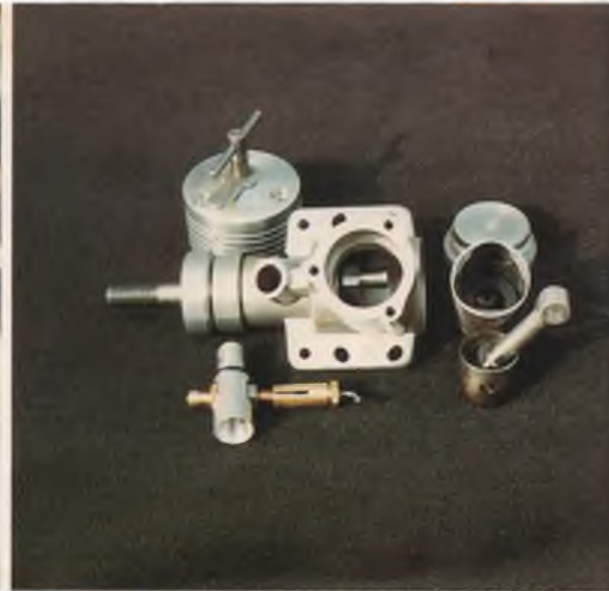
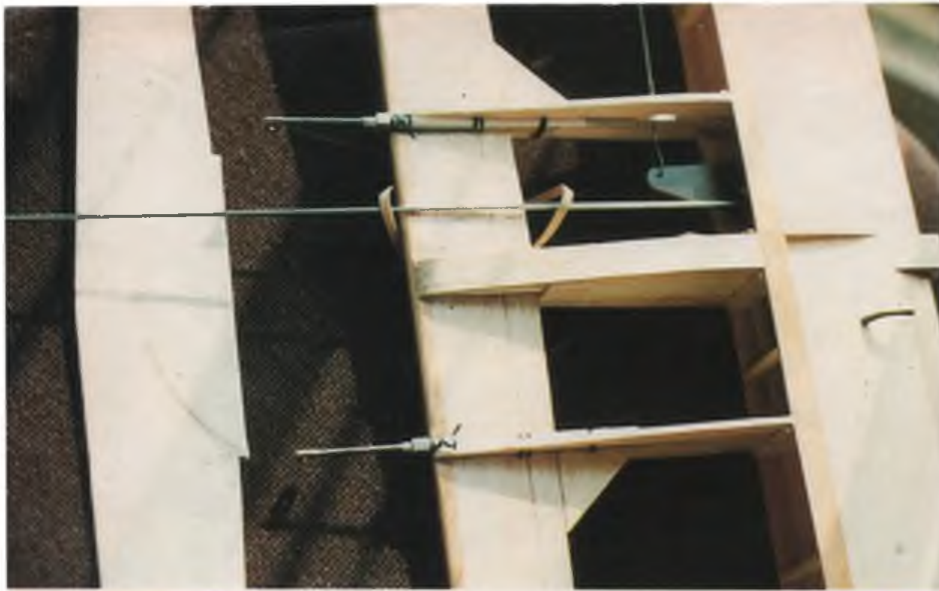
Opposite page: A nice pair - Frank's duo of Chaos combat craft from 1963. Below: Oliver Tiger IV provides the urge. Right: 'Original' Liquidator during restorative surgery.



Above: The Chaos duo again, seen at the Peterborough meeting on 1st April. Centre right: Dave Willis also chose Chaos but went for ST G21-15D power. Far centre right: Warlord is another potentially-winning choice. Despite battle damage seen here, this one finished its bout at Peterborough. Right: Steve Malone readies his PAW 2.49 TBR Warlord.



June 1990



Top left: Note 0.040in ply on top of Chaos' elevator: underneath too; guarantees something left to control model even after 'wind-air' removes outboard sections! **Top right:** Robust components of PAW 249 TBR – a fine choice. **Above left:** Simple wing construction – benefits from thread binding with cyano at strategic points, such as at tips. **Above centre and right:** Centre section and engine pod close-ups reveal straightforward layout; easy access to mounting bolts and nuts very much an asset.

also evident at Peterborough Vintage Day the following weekend. Several 'faces from the past' were in evidence! Peterborough results were as follows:

- 1 Steve Malone Warlord PAW 249 TBR Nylon covered
- 2 Dave Harrison Chaos PAW 349 19D Nylon Covered
- 3 Frank Smart Chaos PAW 249 TBR Nylon covered
- 4 Stuart Vickers Warlord PAW 349 19D Iron-on fabric

What's the choice?

Enormous, as our table shows. For Peterborough, Steve Malone chose the Warlord for durability – and because of its excellent contest record. I decided to go for the model with largest wing area to allow room for structural alterations, so Chaos (a 1963

design by ex-Aeromodeller editor Peter Freebrey) and the Ruter-Ess from 1968 were built.

Remember, whichever you choose, that the majority of models suitable for Vintage Combat were designed for contests involving two models per bout. Current 'Vintage' rules demand one model per bout, with three models permitted for each event; so strength is an absolute must, especially bearing in mind the 'ground point' penalty rule. My aim was to try building techniques in current Russian style – without foam, of course! Low wing loading is essential, so try for a finished weight of 16-17 ounces. The original specification of Chaos quoted 17-18ozs; mine came out an ounce under that, thanks to the following modifications:

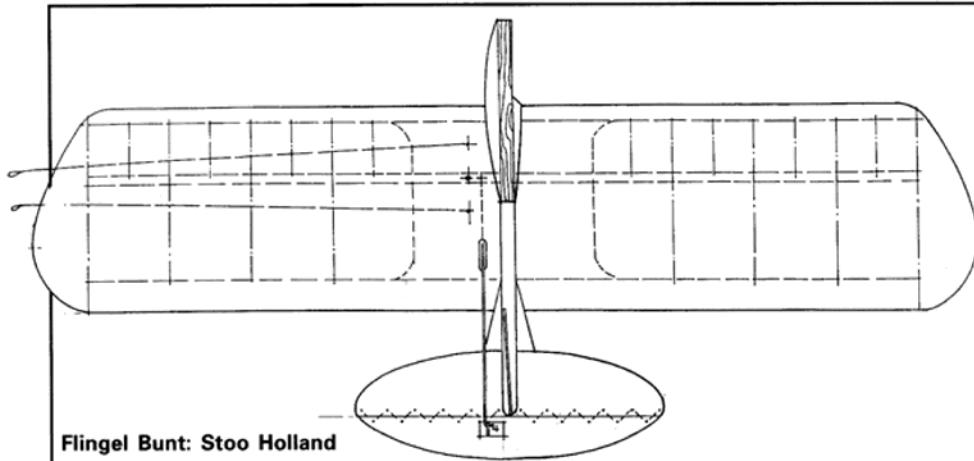
(a) Substitute a single 1/8in ply bellcrank

mount, laminated from two layers of 1/16 ply, for the double 1/8in ply mount specified. Piano wire leadouts are replaced by seven-strand wire. The pivot bolt is trimmed to minimum length.

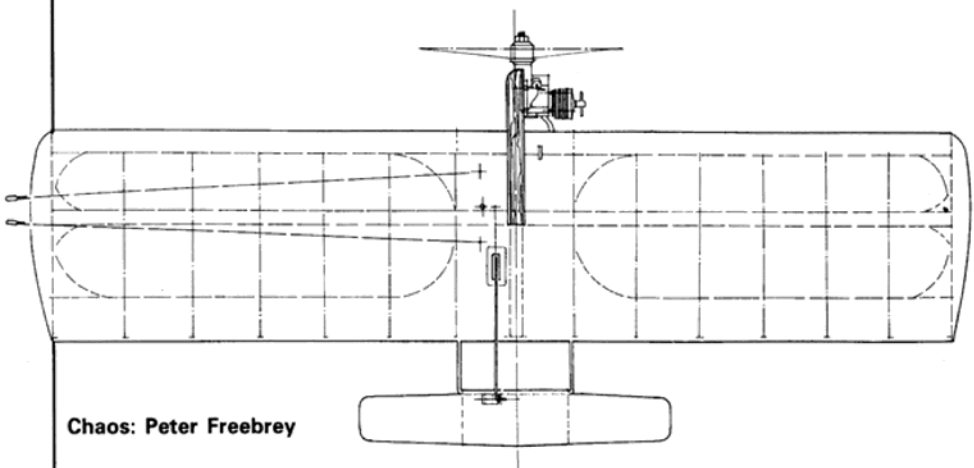
(b) Ply boom supports are omitted; engine bearers are shortened, and the 1/1in sq beech spacer omitted.

(c) A light, pre-formed leading edge (LE), reinforced on the back edge with 0.04in ply, is laminated from tapered spruce, 3/16in diameter at maximum width. This replaces the specified construction.

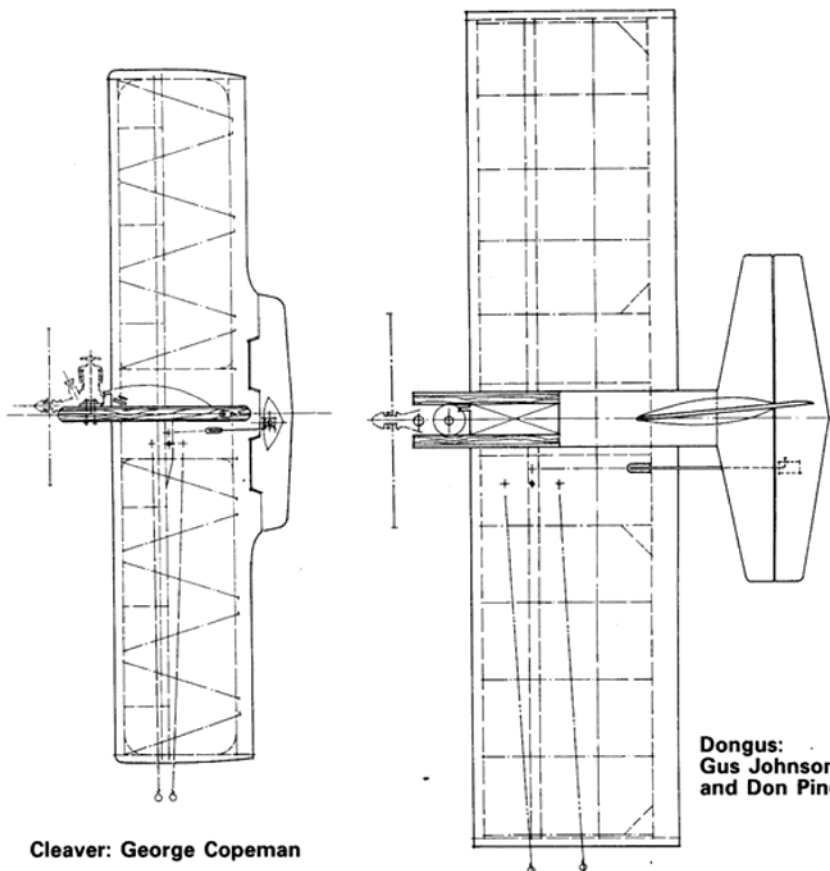
(d) The double 1/2 x 1/4in balsa spars are replaced by spruce or lime equivalents, 1/2 x 1/8in maximum, tapered and bound at the tips with strong thread, cyanoed to fix.



Flingel Bunt: Stoo Holland



Chaos: Peter Freebrey

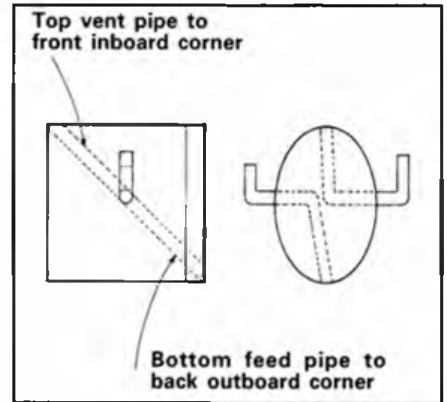
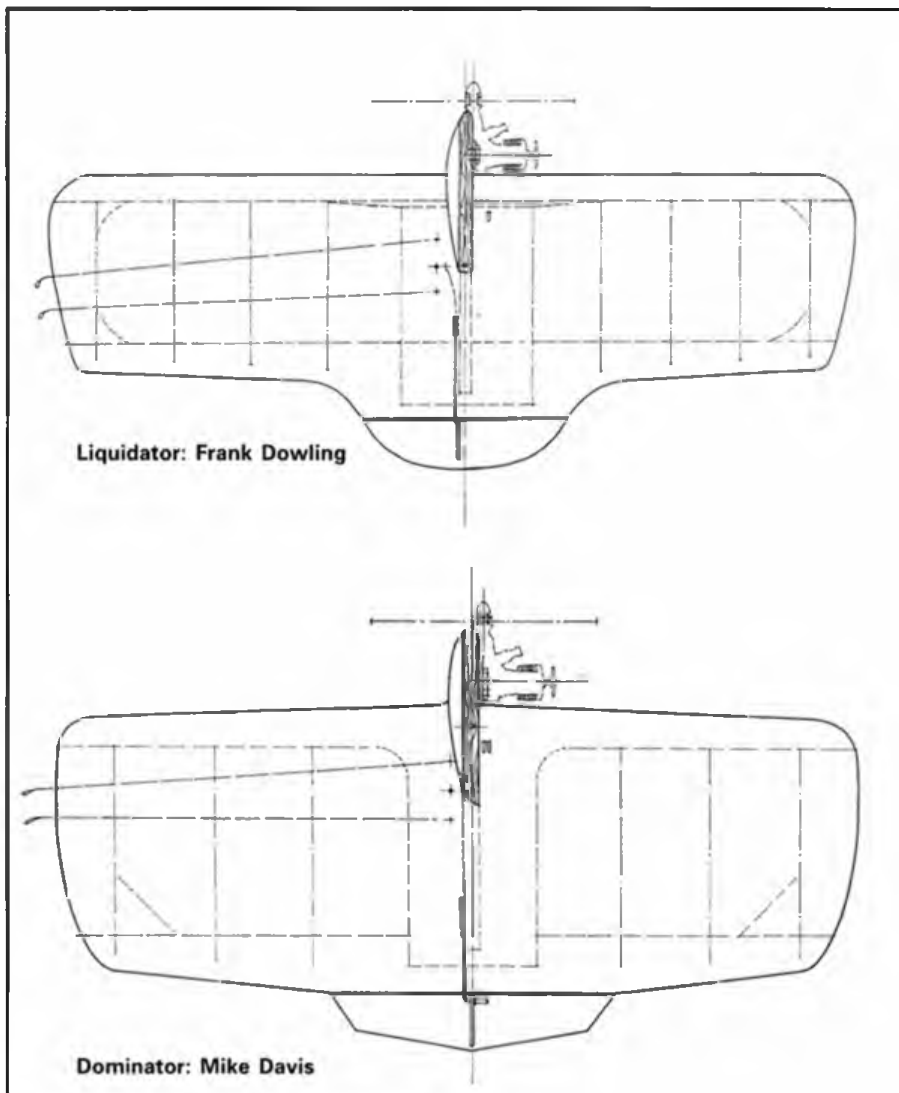


Clever: George Copeman

**Dongus:
Gus Johnson
and Don Pinckert**

Provisional Rules for Vintage Combat

- a A vintage combat model must be built in accordance with a design which was published prior to Jan 1st 1971 or was kitted prior to that date.
- b No modifications to the outline are permitted but changes to the structure are permitted to correct weak points in the original design. Such changes must be carried out using constructional techniques that were commonly used at the time that the model was in use. The use of glass, carbon, kevlar or boron fibre reinforcement is not permitted. Modern adhesives are permitted.
- c The model shall be covered in a material that was available at the time the model was in use. i.e. tissue, nylon fabric, silk fabric, terylene netting or a combination of them. The use of modern coverings such as "Solarfilm", "Solartex", "Micafilm" etc. is not permitted.
- d Control line length from the grip of the control handle to the thrust line of the model shall be 15.92 metres \pm 0.04 metres. Only two line control is permitted and each of these lines shall be of a minimum diameter of 0.34mm.
- e Streamers shall be of crepe paper, 25mm wide and 3.0 metres long, attached to the model by 2.0 metres of string.
- f A contestant will be allowed to use one model per flight with a maximum of three models per contest.
- g Two pitcrew are allowed per contestant and they will be required to wear safety helmets throughout the contestant's flight.
- h A contest shall normally be run by a referee (overall timekeeper) and one scorer per contestant.
- j A contestant's flight commences with a 30 second period for engine warming after which the engine must be stopped. This is followed by a further 30 second period for last minute adjustments and refuelling. The last 10 seconds to the starting signal shall be counted down by the referee. The flight shall last 5 minutes from the starting signal and its completion shall be signalled by the referee.
- k A contestant whose pitcrew fails to start his engine within 2 minutes of the starting signal will be eliminated.
- l Scoring will commence at the start signal and finish at the completion signal.
- m 1 point will be deducted from a contestant's score for every full period of 15 seconds that his model is not airborne during the flight period.
- n 5 points will be added to a contestant's score for each single cut of the opponent's streamer or string with knot.
- p Contestants will compete against each other in a knockout competition chosen by random draw. The losers of each of the first round of flights will be allowed to compete in a further losers refly round. The winners from this round will be drawn with winners from the first round to provide a second round of contests. The rounds will continue until 8 contestants are left so that quarter, semi and final rounds provide an overall winner.
- r A contestant will be eliminated from the contest by the referee if he deliberately attacks his opponent's model rather than its streamer or performs dangerous manoeuvres with his model near the opponent's pitcrew.



Mustard-tin tank. Traditionally reliable! Solder all seams. 1/8in diameter copper pipes used.

centre rib first; then tips then front and back edges, overlapping in normal style. 'Difficult' overlaps may be stuck with balsa cement. No pins – no dope fumes so far....

Dope and fuel proof in a well-ventilated room, or outdoors if bubbles appear they must be ironed-down between coats when dope is dry.

Ruter-Ess may be given the same treatment. Incorporate 1/2 x 1/8in spruce fuselage spars top and bottom. Engine mounts on both models are vulnerable; I chose a tougher system as shown in the photographs.

You may think some of these modifications drastic. Why not let us know?

Motor matters assessed by Steve Malone

Observation of the vintage Combat class at the 1989 Nationals left me with the definite feeling that this was not destined to be the Oliver Tiger benefit fund that I, for one, had anticipated. Whilst it is true to say that a number of competitors did use the classic Oliver Mk IV to good effect, a number of other makes were also in evidence, illustrating the fact that motor technology is just as important in this event as in FAI combat.

This led me to question: what criteria should one consider when selecting suitable and eligible motors for this event? Two factors spring immediately to mind. Firstly, performance. The motor must be at least as powerful as your opposition's motor, preferably without the need for any modification from standard trim. Secondly, durability. The motor must be able to withstand the abuse which combat flying inflicts. Following on from this, a good spares and repair service is essential if one is to keep the motor serviceable for competition use.

Consideration of these criteria led me to purchase a PAW 2.49 TBR, having been particularly impressed by its potential at the 1989 Nationals where it was used by both the second and third-placed competitors. I was also mindful of PAW's 'by return' spares arrangements.

Examination of the motor reveals some considerable development has taken place recently. The most obvious change is the use of a 12mm diameter counterbalanced crankshaft, running in twin ball races. The liner is of typical PAW arrangement, having three large-volume transfer ports equally spaced internally around the circumference. The steel piston is a lapped fit in the liner.

As a guide to performance, Tony Eifflander kindly tested my motor for me prior to despatch – giving the following results:-

Aero Modeller

Eligible models

Unlimited	A.M.369	Dec.80,	p656-658
Shrike	A.M.634	Sep.56,	p484-485
Duellist	A.M.648	Mar.57,	p150-151
Sword	A.M.674	Oct.57,	p510-519
Pedro	A.M.704	Aug.58,	p412-413
Komm-Batt	M.A.288	Aug.58,	p278-279
BlackGhost	M.A.295	Nov.58,	p360-361
Rogue	A.M.716	Dec.58,	p643
Peacemaker	A.M.687	Feb.59,	p68-70
Razor Blace	A.M.729	May59,	p222-223
Dongus	A.M.789	Feb.61,	p74-75
Cleaver	A.M.799	Sep.61,	p466-467
Chaos	A.M.-	Jun.63,	p294-296
September Warrior	M.A.385	Nov.63,	p334-335
Sennapod	M.A.389	Mar.64,	P90
Razor Blade '64	A.M.729	Jul.64,	p332-333
Flingel Bunt Streamer		Jan.65,	P20, 22-23
Eater	A.M.883	Jun.65,	p280-281
Early Bird	M.A.1022	Sep.65,	p232-233
Dominator	A.M.093	Dec.65,	p581
Turncoat	A.M.926	Feb.67,	p74-75
Ruteress	A.M.989	Dec.68,	p657
Liquidator	A.M.998	May69,	p230-231

The Proposition

A.M. Annual 55/56, p88

Schuco-Hegi 160

A.M. Annual 59/60, p83

Pallisandra A.M. Annual 60/61, p77

Pallisandra C/L Manual 61 p131

Zack-Zack C/L Manual 61 p131

Falco A.M. Annual 63/64, p106

Piraia A.M. Annual 65/66, p46

Kanibnle A.M. Annual 68/69, p92

Satana A.M. Annual 69/70, p32

Apache A.M. Annual 70/71, p72

Bradshaw Model Products

Wildcat Contest Kits

Combat King

Gladiator

Frog Firebird

Keil Kraft Talon

Keil Kraft Toreador

Mercury Warlord

Pegasus Warlord

Top Flite Flite Streak

(e) To improve wing efficient, LE sheeting of 1/16in balsa was added. This compensates for the removal of the centre sheeting, four ribs and sundry gussets.

(f) Centre rib is laminated from ply and balsa, bound at the trailing edge (TE) with thread, and cyanoed.

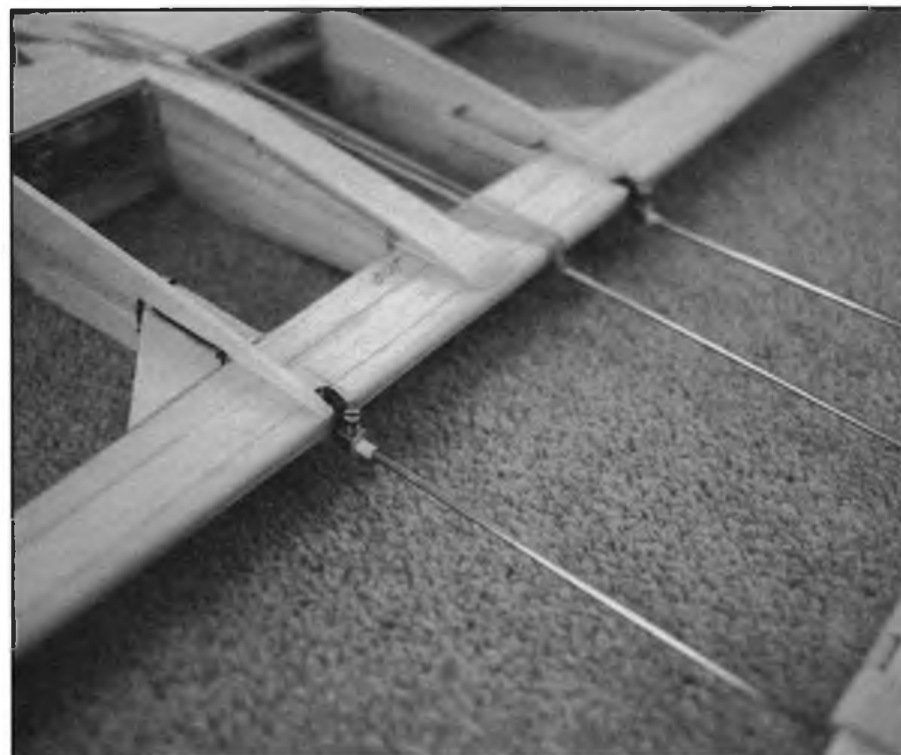
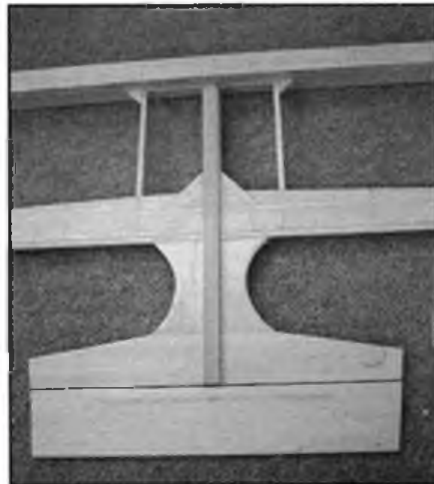
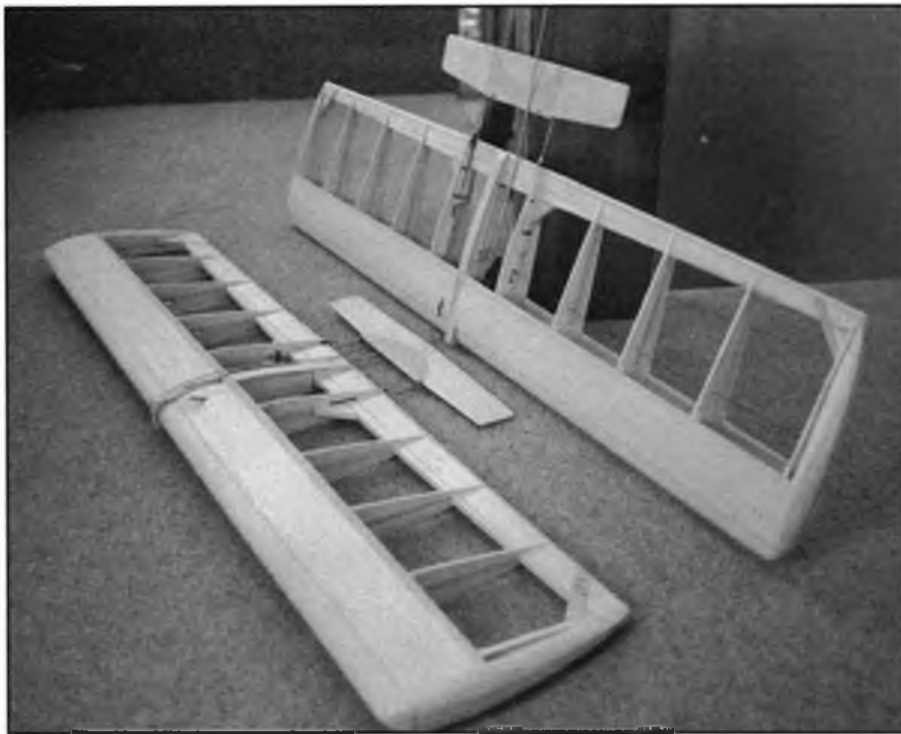
(g) Leadouts are raked back and engine pod offset incorporated. Heavier wood in the outboard wing panel will compensate for removal of tip weight. This set-up allowed upwind flying and excellent 'inverted' in windy conditions.

(h) A 'conventional' 1/4in sheet TE replaces the 3/32in equivalent; 1/4in sq spruce backing is retained. Boom tubes are bound to the top of the TE and the spruce reinforcement with thread, and glued with epoxy.

(i) The elevator is cut from hard 1/8in balsa, reinforced with 0.04mm ply top and bottom, before covering in nylon.

(j) Cover model in lightweight nylon. Silk is expensive but a saving on weight can be made thanks to its closer weave. Iron-on fabric is acceptable, but beware – the model's balance will be affected, so prepare to add ballast where necessary.

The Chaos models were covered 'dry' in two panels after pre-doping the areas that will be in contact, sanding overall, coating framework perimeter and centre rib with Balsarite – except around motor mount. Spread cyano on the fabric at points where holes must be cut; punch through when dry. Iron down the nylon at the



Eligible motors

The engine shall be a diesel of 2.5cc maximum displacement if constructed with ball/roller races or 3.5cc maximum displacement if constructed with a plain bearing crankshaft. Engines permitted under this definition (any mark or model, unless otherwise stated) are as follows:

- A.M. 25
- A.M. 35
- D. C. Rapier
- E. D. Racer
- Elfin 249
- Enya 15D
- ETA 15
- Frog 249
- Oliver Tiger Mk.II,III,IV
- O.S. 15D
- PAW 249
- PAW 19D
- MVVS 2.5/1958
- Rivers Silver Streak
- Super Tigre G20/15D
- Super Tigre G30
- Taifun Orkan
- Webra Mach I,II

The engine must be fitted with a domed safety spinner nut. Only section fuel feed systems are permitted. The propeller is to be a commercially available 8" diameter x 6" pitch item. Modifications to it, other than enlarging the hole in the hub, are not permitted.

Top left: Chaos models took two weeks of evenings to get this far. Centre ribs of 1/4in x 1/8in balsa are capped to 'flush up' with LE sheeting. Far left: Large tail of Ruter-Ess needs reinforcement. Bind main fuselage spars with thread close to hinge point, too. Left: Chaos elevator may be aligned horizontally with wing as shown. Shim brass is bent and soldered around wire; drill retainer hole accurately! Below left: Underside of Chaos, showing five-amp connectors and locking screws. Laminated balsa/ply fuselage is bound at TE prior to fixing last layer of balsa.

Prop	RPM
7in x 4in	19,000
8in x 4in	15,000
8in x 6in	13,600

Having selected a motor, how can consistent performance be obtained? It is essential the motor is firmly mounted to eliminate any vibration. Then one must consider the fuel tank. For vintage Combat the Colmans mustard tin tank is ideal, and is still available from many model shops.

All suction-feed motors tend to run lean through inside manoeuvres (loops), and richer in outside manoeuvres (bunts). Motor settings are therefore a compromise between these two tendencies. This is not difficult to achieve provided a suitable fuel tank is used, and the motor is fitted with the correct size venturi.

As a guide to obtaining a good setting on the ground, simply start from a rich motor setting and lean out gradually, sharply dropping the front of the model periodically. If the motor richens as the nose drops then lean out a further quarter of a turn, and repeat until no difference in engine note is detected.

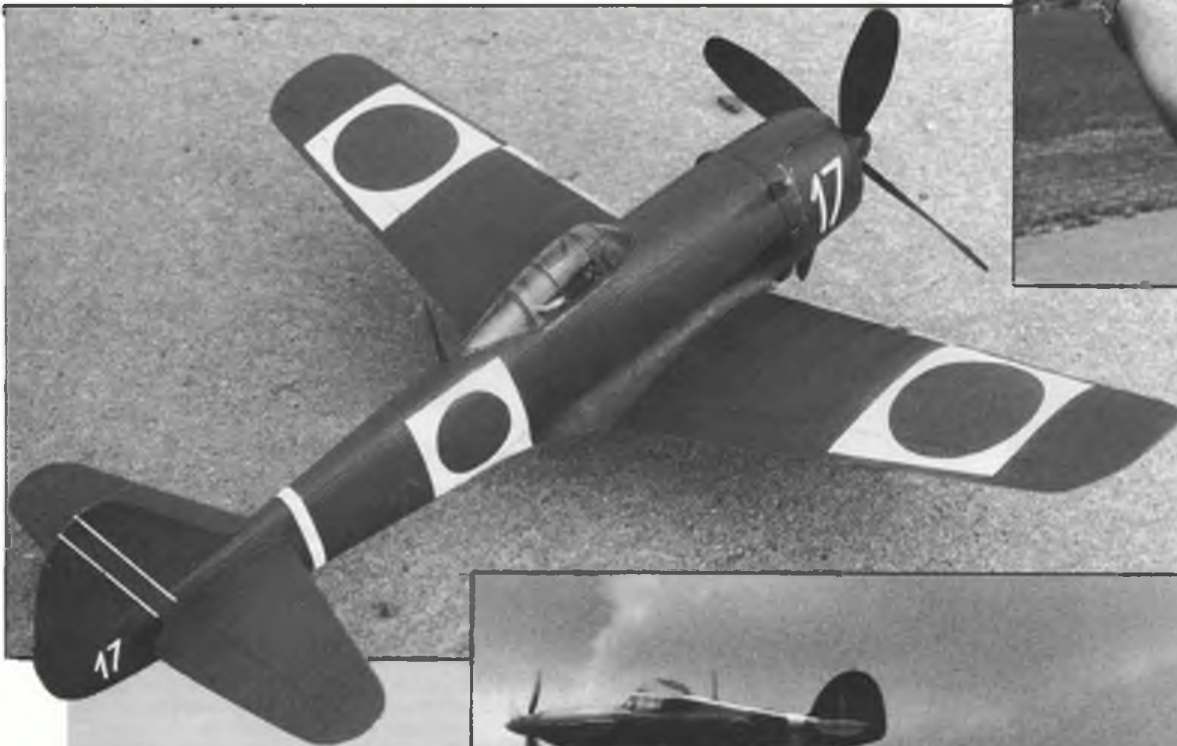
The rest is really up to you, and lots of practice!

SCALE MATTERS

A fresh batch of photos from Czechoslovakia affords us the chance to enjoy some top-line rubber scale models



Above: Zdenek Poduska's P-51B is his first model! All-foam construction means it's relatively heavy at 65gm but model flies stably for up to 45 sec. All photos this page: Ivo Ceresnak.



Above: Beautifully sharp Nakajima Ki-84 Hayate by Vladimir Kunert has topped 75 sec; weighs 53gm, including 16gm of rubber. Right: Vladimir's son, Vladimir junior, launches his Hurricane on its way to another seventy-second flight.



Left: Another subject by Vladimir Kunert (senior!), this Aichi A6M Grace spans 720mm and weighs 110gm with 25gm motor. Flights in excess of 110 seconds are regularly achieved, which accounts for the incorporation of a parachute D/T (actually hidden in the ventral radiator). The majority of rubber scale models in Czechoslovakia are built to 1/20 scale; prop diameter is limited to 35 per cent of span.



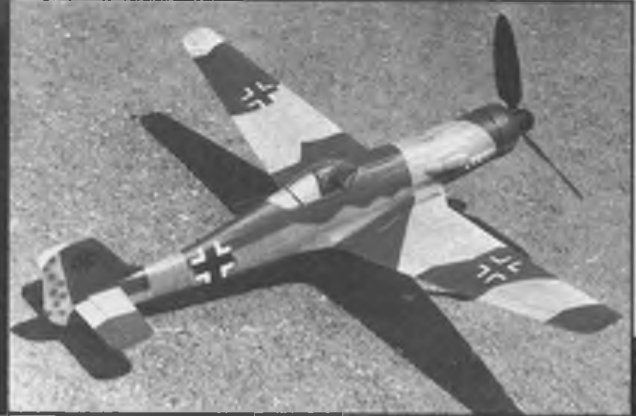
Above Unusual subject – Tomas Hainl's Bell P-63 Kingcobra is in 'target plane' orange. Multi-stringered fuselage shows careful workmanship.
Left: Boulton-Paul Defiant by Jiri Merta sprouts a variety of details. Flight time averages around one minute.
Below: And this looks just great! Pavel Stranik's Mc Donnell XP-67 spans 850mm, is 673mm long and weighs 93 grams. Careful trimming has resulted in 70-second flights. There's certainly immense charm in models like this; purists may care to enter the debate in favour of opaque finish versus the 'stained glass window' approach that is so popular in Czechoslovakia. More overleaf!



A further quartet of Czech delights. Right: P-51D Mustang by Jiri Merta carries much detail and is carefully weathered – still manages in excess of one minute, however. (Ceresniak photo).



Left: Peanuts are also popular. This is Peter Mikulasek's Curtiss floatplane, for which over 50 sec duration is claimed. Below: Ta 152 is a fine Rubber Scale subject. Vlaimir Kunert (junior) built this fine example. (Photos by Lubomir Koutny).



And rounding up a catholic selection of WWII types is this Macchi MC-202 Folgore by Kunert (again!). Would there be any support for a one-scale competition for similar craft in the UK? Let us know . . .



BALSA CUTTINGS

Cyano de Bergerac looks to the future...

The Way Ahead

There doesn't seem to be a lot of risk of our running out of explanations of our national body's change of title. Apart from a rather unexpected commercial for BMFA sweatshirts right at the end, Martin Dilly devoted a whole column and a bit to this in March Readers' Letters, writing partly from the PRO's viewpoint. This he is well able to express, having been SMAE PRO when this change started to happen. He also ably expresses disappointment over some diehards (amongst whom your columnist seems to be numbered) whom he sees as fighting a rearguard action for the retention of the old SMAE name which, Martin says, is dishonest now we have been so long so much detached from aeronautical engineering. Well, a concern for honesty will do us all the greatest credit, however lamentably long we may have been about embracing it, but are we going to be able to handle it? You've got, side by side, the finest model traction engine ever made, and a rather amateurish-looking own-design 48in glider with wrinkled tissue and a wavy paint job. The traction engine bloke might be the greatest *machinist* in the world, but the 14-year-old creator of the aeroplane could be the better *engineer*. Is it honest for the BMFA to take a stand at the *Model Engineer* Exhibition? Suppose it must be – page 127, March 89 *Aeromodeller* carries a picture of Martin Dilly sitting at it, looking as honest as the day is long. Perhaps the justification lies in the fact that a chap turns up at the Exhibish every year selling dried rose petals. His kind of engineering may not be much to look at but it sure smells good.

Martin writes of the one thing we are all supposed to have in common – 'an enthusiasm for model flying.' Yet to many, flying is just something done by a model when they've finished it, and, faced with a grim choice, they would rather build than fly. Some of the most exquisite examples of the acromodeller's skill would not fly a yard. Because these people don't have the same adventures as those whose first love is flying, perhaps they don't have the same need or inclination to join the national body, and perhaps it was adequately honest, as well as neater, to leave the Building bit out of the new title, although this contemplation of what may be reality brings with it a faint, sad hint of Them and Us.

Some of the confusion, says Martin, is due to the diehards persisting in the use of the title SMAE instead of BMFA, 'or at best implying that we can use either.' And 'We have not, as *C de B* suggests, adopted an additional working title, by the way, although to read some of the *BMFA's* literature lately you'd never know it.' Too right you'd never know it – 'additional working title' was not a suggestion, it was a quotation. Maybe White Men with Great Silver Birds speak with forked tongues? Please redirect grumble to P.D. Freebrey, Editor, *New Model Flyer*, published by BMFA, and refer to

Volume 1, Number 1, Feb 89, Editorial, front page. 'BMFA/SMAE. The use of an additional working title for the Society was proposed and passed... For everyday use, either title may be used... It's like being called George James Smith but preferring your nickname of Jamie. You can sign your letters as Jamie, or own a shop called Jamie's Togs.' Good grief, yes, and you could flog BMFA sweatshirts there, too.

Now this column doesn't in the least mind dying hard, either as freedom-fighter or terrorist according to your point of view, but is not too keen on being martyred when it really couldn't care less what the Natbod is called – League of Toy Anti-Gravity Device Adherents if you like. If BMFA serves us best, fine – everybody say BMFA. It's only the fifth name change the outfit has had since 1909 anyway. Balsa Ctng's concern, in a paragraph headed *Correct for drift?* last July, centred on the *reason* for the change of name. The Natbod, to its credit, is trying to equip our movement for its passage through the Nineties. Clearly it envisages that this will bring us into situations where our chances may pass us by whilst we are tediously explaining what our title should have made clear at once. We don't want 'Will Councillor Mrs. McDuff please explain to the Committee what a model engineering society wants to use the playing fields for? I thought engineers built bridges and that they'd be more at home thirty feet above the by-pass, ha ha.' That the Natbod is totally dedicated to serving our best interests is beyond question, but – *drift?* Is there, possibly exemplified by the hope of wooing the Sports Council, a drift towards a philosophy with the ultimate aim of obtaining recognition by the government of aeromodel-

ling as a Sport, with capitaless, funds and facilities? Now, and not ten years hence, is the time to ask – do we want this? What are we going to do with any money we get? Will it be lots? Will we start to depend on it, and live a life of worry that in the next cut-back, we shall be out on the street? Would the special spirit of aeromodelling flourish unaffected in the atmosphere of encroaching requirements, formalities and restriction which are the lot of the public pensioner? You wanna be like Kent Opera? You have to plan ahead and commit yourself – you do – your grant is chopped – you're busted! The BMFA speaks of The Way Ahead, Which is our way? Let us choose one which will permit us to preserve the independence and unique character of our hobby. When buying our ticket for this journey Ahead, we should pay for it ourselves. We can well afford to.

What we cannot afford is to let slip this opportunity to say what isn't said nearly often enough – thanks, Martin Dilly, for all you have done and do for us.

From the minutes...

'In what he hoped would be the last words on this subject, the Chairman reminded Members that this was a democratic club with a right of free speech for all, and stated that he didn't want to hear any more people saying that it wasn't.'

Fun for Future Fetchermites

Little Boy Blue got stuck up with glue. None of his relatives knew what to do. All except Wilberforce John Alexander. He got it off with a circular sander.



'Do be careful, darling – it says here that the stains will never come out...'



MIDGE
Extra

John Duggan tells us of
Midge Speed developments
down-under

Year	Motor	Plane	Speed
1988	Alag x 4	Midge	91.6mph
Hunter Valley Champs	Alag x 4	Midge	96.2mph
State Champs	PAW DS1	Midge	88.0mph
Singleton MFC			
2 small contests at Ryde/Epping			
1989	Alag x 4	Midge	97.6mph
Hunter Valley Champs	PAW DS1	Basic Midge	102.5mph
State Champs	PAW DS3	Basic Midge	96.0mph
United Model Aircraft Club	Bicentennial PAW DS3	Basic Midge	96.0mph
Singleton MFC	Bicentennial	Basic Midge	96.0mph

The highest speeds achieved for motors used are as follows (contest conditions):

AE 1.5	88.0mph	(too heavy)
Alag X 4	97.6mph	(ABC version)
Cipolla JR	94.0mph	
Elfin 149 Replica	81.0mph?	
PAW DS1	102.5mph	
PAW DS3 Bicentennial	98.9mph	
Taipan 1.5	80.0mph?	
Silver Swallow	95.0mph	

Model weights range from:

Alag X 4	124 grams	(Complete, ready to fly)
PAW Basic Midge (winning models)	160 grams	(Complete, ready to fly)
Cipolla JR Midge (without spinner fitted)	155 grams	2nd at South Australian States 2nd at Singleton 1989

Majority weigh 160-180 grams; some up to 210 grams

VINTAGE Speed enthusiasts everywhere will be interested in the latest development in Midge Speed down-under. The basic design, so familiar to those who choose to battle with what is a fundamentally fragile structure, is retained, but a small number of modifications are incorporated to toughen things up a bit. This Basic Midge, as the class is known, is also easier to build. Another claim is that the outboard elevator renders take-off a safer affair.

Stan Pilgrim's 'Basic Midge' has achieved 98.9 mph with PAW DS3 Bicentennial power.

The AE 1.5 appears on the list, as does the Cipolla Junior and Alag X4. The Elfin replica and Taipans are to be expected; the solitary Silver Swallow has performed creditably – and this is a motor which could well be popular in the UK, bearing in mind its renewed availability from Eastwood Model Supplies. Lines used are the three-strand Aeroflyte Lightweight Laystrate, 35ft long (actually measured from the propeller centre to the edge of the control handle handgrip. Most contentious of all is the statement that whipping is allowed 'up to a point'...

What's What?

What are these mods? First, a small amount of wing-tip weight is incorporated (though not by all modellers, it must be said). Instead of burying the leadouts in the wing – and thus permanently sealing the bellcrank system within the fuselage – the controls are mounted on top of the wing, with the bellcrank (of similar size to that originally specified for the Midge) located behind the motor. The balance point is relatively far forward, laying between the leading edge and the front leadout.

Elsewhere in Ausie

The above rules are not the NSW CLAS (Control Line Aircraft Society) Rules, but they do conform with them. South Australia (SAAA) Rules are identical, but the model is flown over grass and a Speed Pylon is used. Two further suggestions should be noted: electric starters should be disallowed (!); and each entrant should be allowed to enter two models per contest – but the fastest time of one model only may appear in the results (this model to be nominated by the contestant after flying).

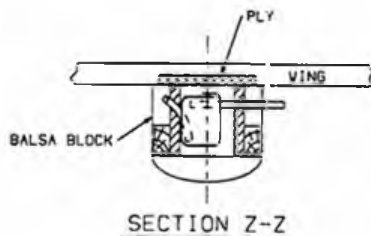
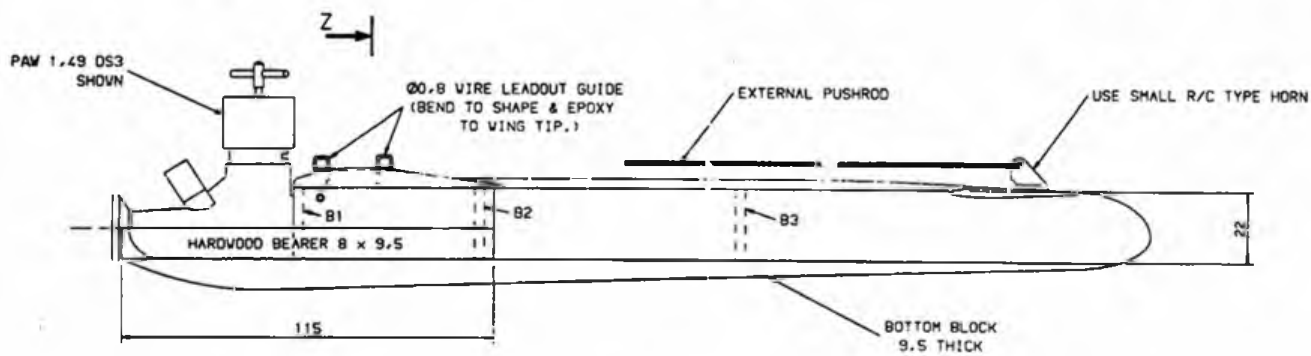
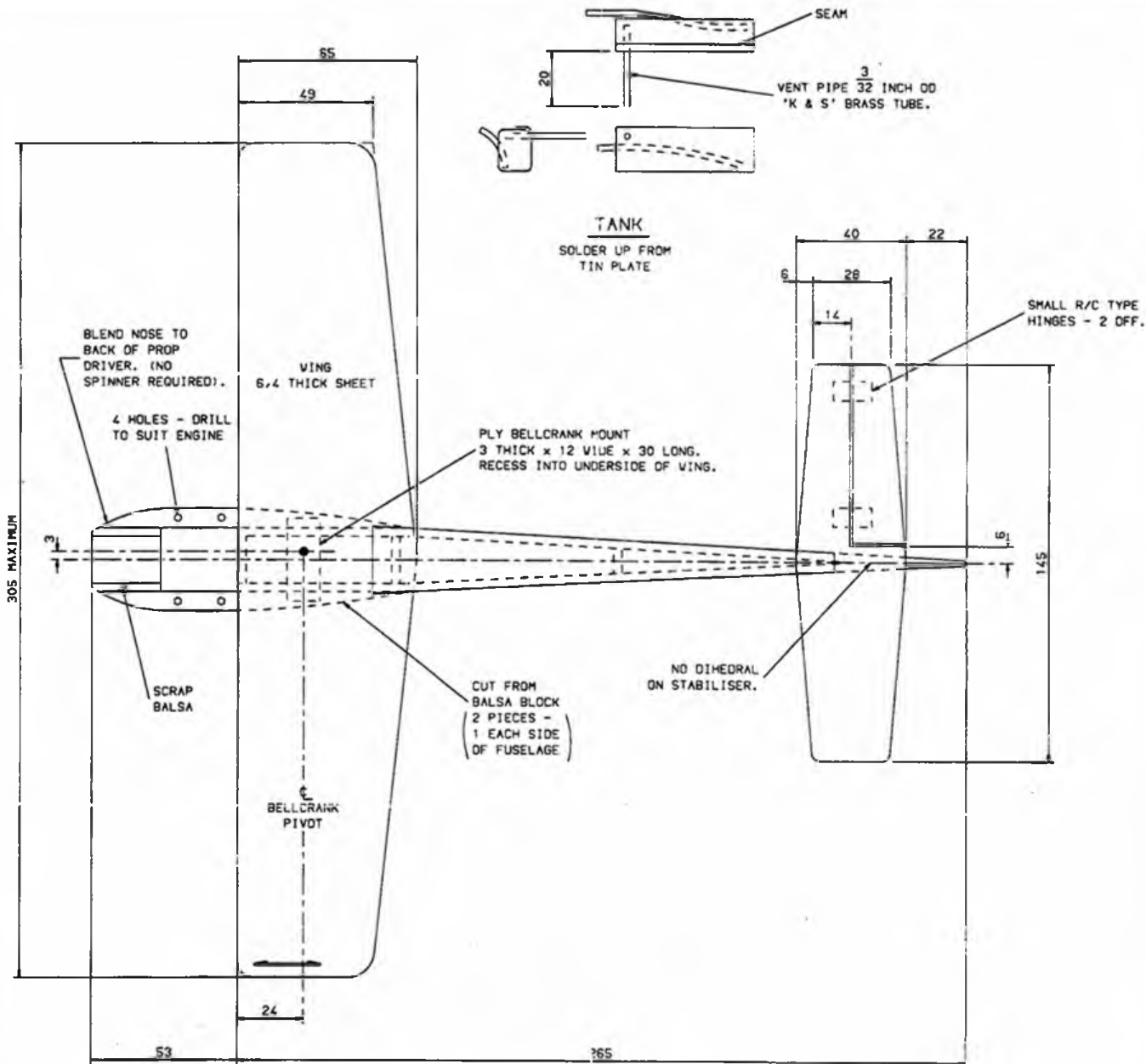
Low model weight is very important – indeed, this is the crucial point in the quest for Midge success. A maximum of 170 grams is the target. The majority of Aussie Midges weigh between 160 and 180 grams; one or two are extremely heavy at around 210 grams all-up.

All the rules

Midge flying in NSW conforms to the following rules. One or two interesting points arise. Motor types used reflect a catholic taste.

All the gen

The following Midge contests have been held in NSW to date: (see table at left)



ALL MATERIAL 3 THICK BALSA UNLESS OTHERWISE STATED.

SCALE FULL SIZE
DIMENSIONS IN MILLIMETRES

CLAS BASIC MIDGE

High

potential

GOOD news this month for all electric fans is that MFA (Model Flight Accessories, to those unfamiliar with the initials) have recently announced a geared version of their excellent '02' small electric motor. As regular readers of this column will confirm, I have long been an advocate of geared systems for electric flight due to their greater overall flight efficiency. What you lose in the gearing, you more than make up for in the greater thrust efficiency of a larger slow-revving propeller.

MFA were in fact the pioneers of commercially available electric power packs for R/C models in the UK. Their first '540' type units, sold together with a nicad battery pack, were available as long ago as 1977. It is only fitting that they should now announce what I think is going to be the new standard UK free flight and small R/C flight pack for 1990.

What is really encouraging is the marketing of this product at a price lower than that previously asked - although how long that this situation can be maintained in these inflationary times is anybody's guess. I was fortunate enough to be on the phone to MFA at about the time the first production units were coming through, and so obtained an early sample for trial. By the time you read this, ample supplies should have reached the shops; if not, badger your local model shop proprietor to phone an order through, or get one by direct mail order.

So what is it with this unit which has made me so enthusiastic? Primarily because it fills a gap in the 'geared' market between the tiny (and superb) KPO1 and the various hefty 340 type motor based systems aimed really at the sports C/C market. This new geared '02' is just the right size to put into all those sports and scale F/F power models designed for 0.8-1.5c engines. My own solution to this missing motor size has been to rewind Mabuchi 360s, and make my own gearboxes as shown in previous 'High Potential' articles.

Alternative

The only alternative available commercially has been the Acorns geared 380 unit designed for their ARTF moulded foam Cessna R/C sports models. This unit, with its rather thin plastic mouldings, performed well if treated gently, but was not too crash resistant. This brings me to the second main set of encouraging features on the new MFA unit. It is above all else a well engineered little piece of equipment.

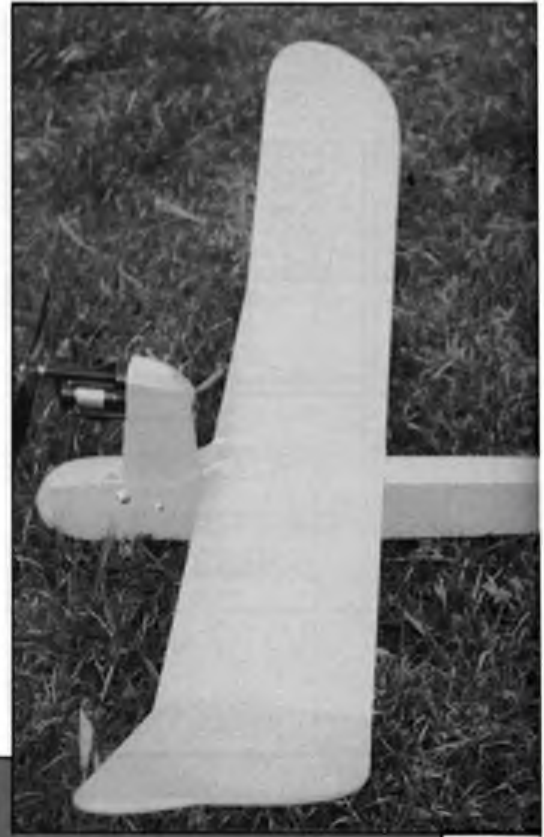
The basis of the combined gearbox and motor mounting is a sturdy moulding in engineering plastic containing bearings for the prop shaft. These bearings comprise a ball race at the front to take both prop thrust and axial load, plus a simple 'oilite' type bronze sleeve at the rear. The shaft itself is a solid bit of 4mm diameter silver steel, unlikely to bend in a crash, but easily replaced if you do manage to damage it. The front end is threaded for a standard prop nut and is backed by a large diameter moulded prop driver.

This means that absolutely conventional moulded nylon power type propellers can be bolted on directly, rather than Acorns type solution whose the special prop boss itself was

Chris Coote

welcomes electric motor developments

internally threaded to match the prop shaft. This meant that the use of props other than the special films type had to be via some specially made up adapter or similar. The MFA 02 motor itself mounts into snug fitting counterbore in the rear of the housing and is attached by the usual two M3 screws into the front face of the motor. This means that other motors with the same case of can size diameter can be used also. Thus the lighter Mabuchi 360 based units such as the old Astro 02 and the current 'Hi-Line' Imp could be geared in this way, or the higher powered 380 derivatives such as the Kyosho AP29 and similar could be used for even more urge. The drive pinion is simply grub screwed to the motor shaft, with tiny hexagonal socket screws. My outfit even came with the appropriate sized thin hex or allen key type wrench to assist the disassembly process! MFA tell me that the gearbox unit is available as a separate unit for £5.95 making this a very cheap



Top: Peter Lang's own-design, all-sheet sports soarer is 48in span. Union Turbo MO-7 motor/gearbox; six 600mAh cells. Above: Our columnist's 'Demoiselle-style' microlight for K&P O1 power. Right: Couldn't be much simpler, could it...

way of upgrading to geared performance. The complete unit with motor should be around £10 and a complete flight pack with 5 pence flight pack, switch/charging harness and so on for around £20. Excellent value for money this straightforward and easy to use unit. The main moulding even incorporates a set of beam mounting lugs so that you can bolt it into an old model - there really is no excuse for not converting to electric now!



You may well ask: how does it go compared to the standard ungeared unit? Well the best illustration I have of that is my first trials of the unit in my old C/L test bed. Using six pencells, with a model flying weight of over 320gm (12oz+) flight duration was over three minutes with sufficient power to maintain a thirty degree line angle. This implies good F/F climb power for over three minutes on 600mAh capacity bells.



Derek Hardman's large Potez Indoor scale craft features single K&P motor with flexi-drive to twin props. Hmmm...

prop on for cells is of the order of five amps. The latest motor looks like a scaled down version of my big Graupner 600 with a drawn metal case and metal end cap containing separate carbon block brush gear. What surprised me was the relative lack of ventilation holes for cooling – maybe the solid drawn case is deigned to act as a heat sink. Anyway this should be of no concern in short motor run free-flight situations, and seemingly works OK in longer run R/C applications in the standard Union kits such as the Decathalon and Mini-Coupe.

For free-flight purposes flight cells of 150mAh should be OK with the benefit of reduced weight compared to the 450mAh types used in the standard R/C packs. The sports model shown in the photograph in the December issue has in fact flown successfully with a variety of cells in the 100 to 150mAh range, and with varying numbers of cells to give either high power contest type climb (five cells) or a more sedate summer evening (or even winter afternoon!) calm cruising type flight.

The complete motor gear unit plus thin blade props is available as a spare part from Amerang. The reference for the motor is MO-07. From the Japanese information I have the following details energies:

Gear ratio	2.66:1
Prop rpm	6,000
Prop size	180mm dia x 145mm pitch
Power pack	6V/600mAh (5 cells: note this is for miniature R/C)

The original versions used plastic bearings for the main prop shaft and if you recall I mentioned a problem with lubrication failure leading to overheating and eventual melting of the plastic bushes. Union have obviously had the same problem since the bushes are now made of metal!

Price for the motor alone seems to be the same as for the whole motor/gear unit around £12. I would suggest that this outfit is ideally suited to some of the larger rubber scale jobs, say up to 36in span. I am thinking of putting one in a 'Grasshopper' a design by Earl Stahl for a 33in span high wing monoplane.

Pics!

Finally this month a couple of pictures of my 'microlight' inspired semi-scale sports model for KP01 power. This was designed after see-

ing a picture of some all-sheet versions of the veteran 'Demoiselle' aircraft, by my American pal, Phil Stanson. My model was designed with a built up wing structure to keep the weight down for possible indoor flying as well as normal outdoor sort F/F.

In fact the whole thing only weighs in at just over 50gm with a three-cell flight pack. The pilot really makes the model, and is just a simple paper profile coloured in with felt tip pen. The additional side area does not seem to affect things too much. I have started to draw up some simple plans for this little model, so be patient and you too will be able to go microlighting electrically soon!

The under-wing shot clearly shows the simple layout with ample room for either the new short or older style long battery packs. The charging socket has a speed control trimming resistor cyanoed to it, and mounts through a small ply plate glued to the upper longeron. The fuselage is a simple triangular structure made of 3/32in square spruce, although hard 1/8in square balsa would be an effective substitute.

The twin rudders are out of the main prop blast; this makes trim tab adjustments fairly non-critical. In fact, I have had to use nearly 1/8in left offset on each rudder trim tab to obtain a suitable tight turn in the confines of a hangar. The wing is a simple monospar structures assembled around 3/32in x 3/8in hard balsa spar and trailing edge, with a 1/2in x 1/8in leading edge and Clark Y type section. Wing incidence is simply set by the 3/16in thick sheet front wing mount.

Tail unit is glued direct to the top of the main fuselage longerons, and the motor is set with no down or side thrust at all. The model would fly well on only three cells at this weight. I have to use the speed control trimmer quite a lot. Outdoors on fullpower, a D/T is a must – I have used a falling-wing type with no damage so far to model or motor. In fact the only crash damage so far has been a crunched front motor unit bracket when I hit the wall indoors on a very cold day. The plastic shattered, but all was repaired by return post when I sent it off to KP for treatment.

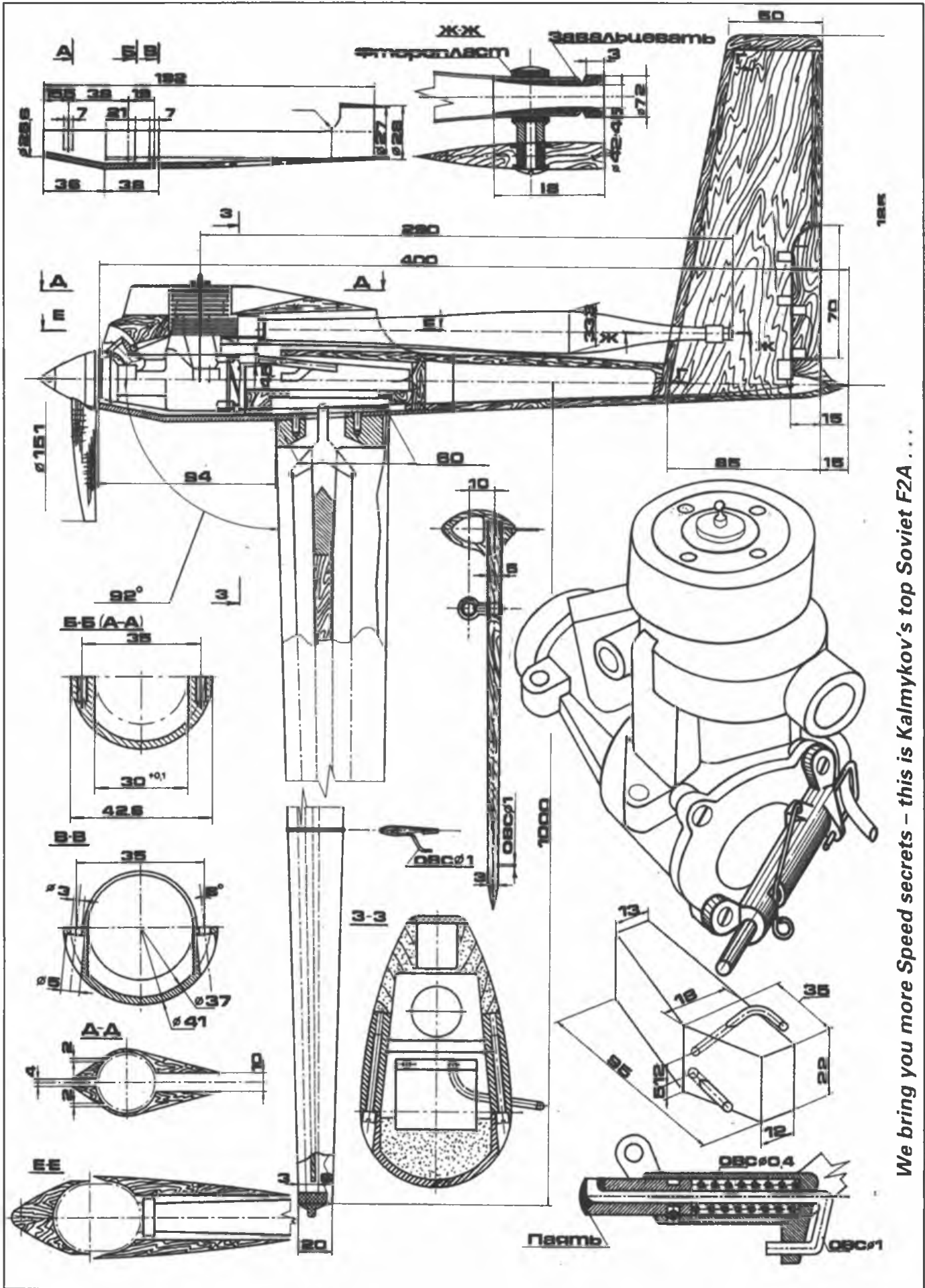
That's all for this month; keep sending in the information and telling us all what you are up to in the world of electrics!

Smaller 270mAh cells should still give over one minute run, and would be the optimum size for F/F, giving a total system weight of about 180-190gm with a high-power six-cell set up. Because I used a six-cell pack (which I happened to have ready to use) rather than the recommended five-cell layout, I was careful not to overload the motor. Note that 'underpropping' is safe with electrics but they burn and melt when you overload them with too big a prop. For my test flights, I used an old Taipan 7 x 6 cut-root, glass-filled nylon power prop. MFA hate that on five cells, ordinary nylon props up to 9 x 6 may be used – which would certainly suit the larger vintage and more gentle flying sports models.

Changes

Moving down the size scale slightly, the geared Union unit that was pictured in the nose of Doug Sheppard's sports model in the December issue, has come in for a few changes. Thanks to correspondence received from modellers in Scotland I understand that a higher powered, but similar sized unit is now available, with the seemingly inevitable 'turbo' appellation. I followed this up with the importers (who are Amerang, by the way) and they did send me a spare motor for examination together with a couple of useful looking propellers. The motor in Doug's original red plastic cased unit is a standard Mabuchi 280 can type rewound with a hefty piece of 26swg wire.

Current drain on the recommended 7 x 4



We bring you more Speed secrets – this is Kalmykov's top Soviet F2A...

FROM THE HANDLE

Claus Maikis selects props and gets moulding with the best

IF YOU'VE ever tried out several propellers on your stunter, you will have noticed what a big difference in flying characteristics the right - or wrong - prop can make. It's really worth spending a few hours to get it right. That's one reason I try every new propeller on the market. Of course, if you fly on rough ground, with tufts of grass and other obstructions, you may get through quite a few props. Also, if it's windy, your take-off can be critical and may cause prop damage. I remember the '86 Nationals when many fliers (including me) drastically reduced the diameter of their props at the start of their sequence. This can be dangerous with wooden props; in extreme cases the airframe may be destroyed because of excessive vibration. A plastic or nylon prop is a much more robust choice. Even if the tip is scratched, the model will still be flyable.

Choose your weapon

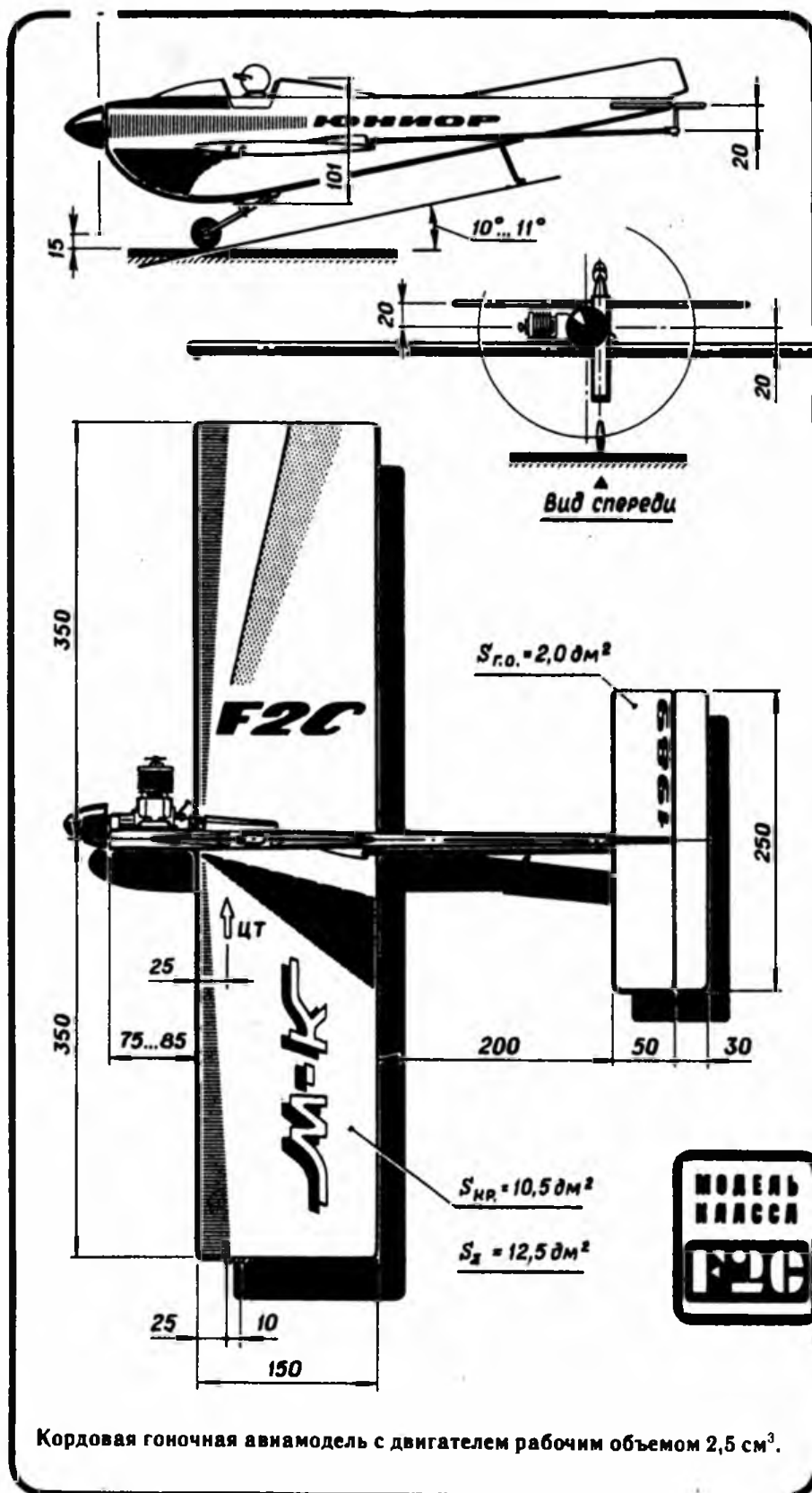
A wide choice of plastic props is available. Careful searching will also reveal glass-fibre examples (so long as it's the two-bladed variety that you're looking for). The situation is a bit different if you favour three-bladers. The market is simply not big enough to support a large range, particularly in the sizes we need. However, a look at the Australian magazine *Airborne* reveals a regular advertisement for a certain Mr Bollenhagen's products. He offers a huge selection of glass and carbon fibre propellers. Over in the States Tom Dixon has flown these props for quite a while now - and he recommends them highly. At the last World Championships I discovered that some of the American fliers also rated them highly. Jim Casale even used a four-blader (as I recall, an 11 x 7.1/2) on his ST.60. This features very narrow blades and is razor sharp. Jim doesn't dare not to USE a chicken stick...

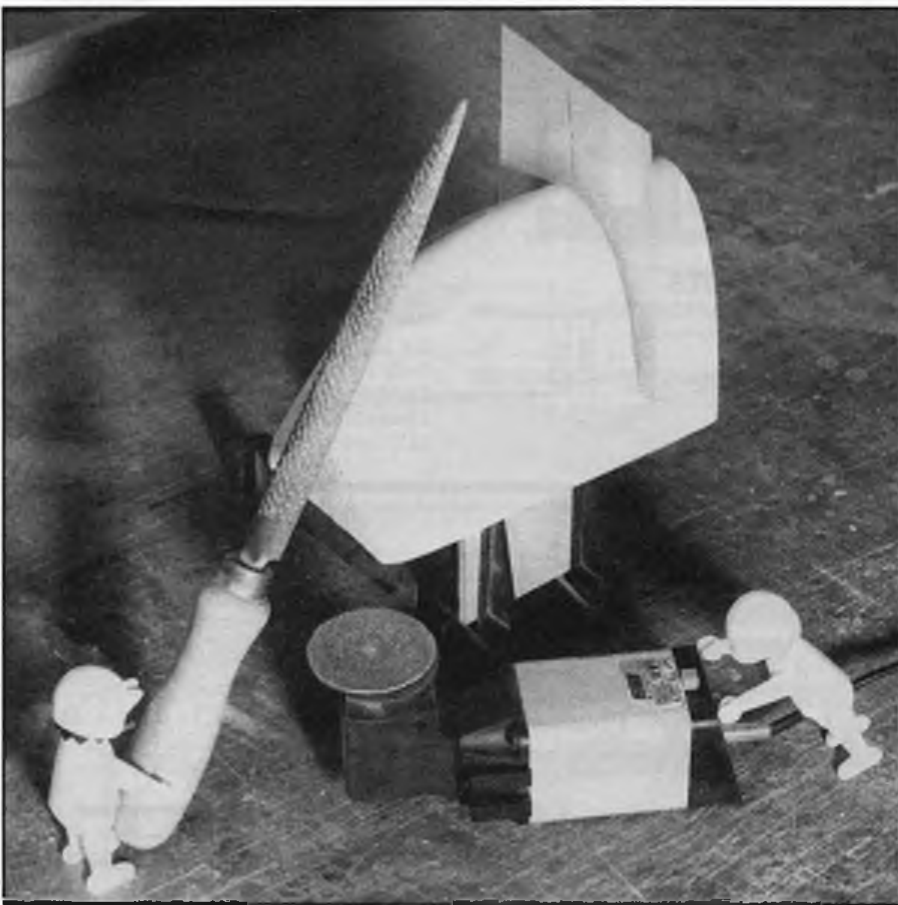
I wrote for a list of Bollenhagen products. It is almost endless. Besides Speed, Team Race and large RC props, there's a large inventory of other types, in three and four-blade format too. All are GF or CF, and they may be purchased ready-balanced if you wish. Perhaps the pitch seems a touch high at first glance, but the narrowness of the blades counters this. At the last US Nationals four out of the first ten places were achieved with BOLLY props - including winner, Ted Fancher. I've just acquired a 12 x 6.1/2 glass prop. The workmanship is excellent - indeed, I've yet to see a better GF prop. Naturally, the unbalanced version is cheaper; as it takes only a few minutes to get it spot-on there is little reason to pay more.

If you've ever spent several evenings producing your own wooden three-blader, just

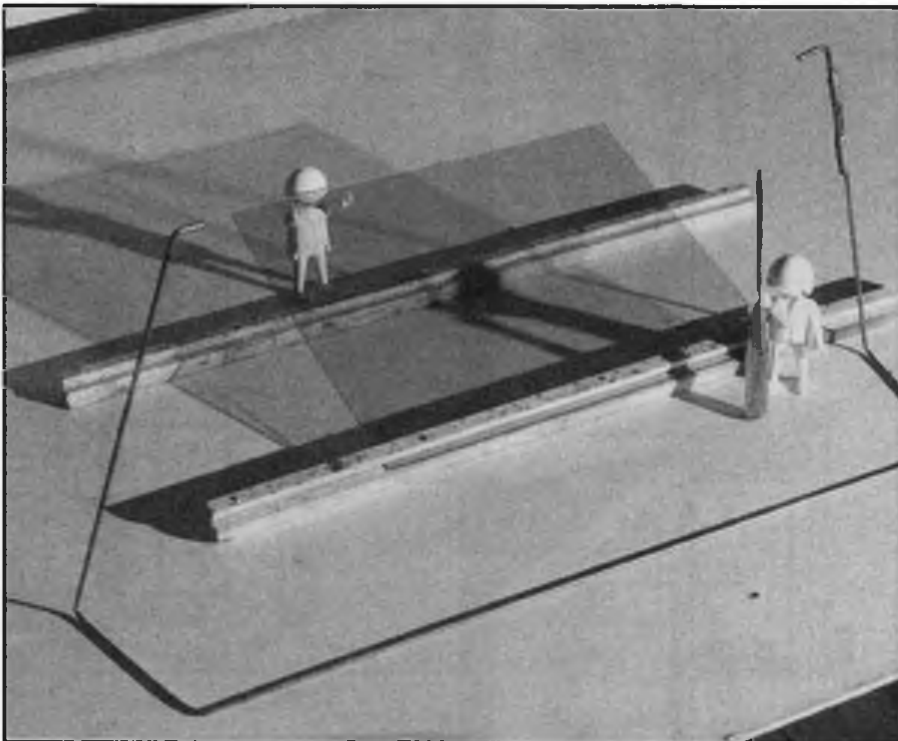
A Goodyear by any other name? Seen in the pages of a contemporary Soviet magazine, this straightforward design might well serve as a handy Team Race trainer.

to break it the following weekend (as I have) then you'll be happy to get such a ready-made device. Interested? Contact Les Bollenhagen at the following address:
Bolly Props
11 McKinley Street
Elizabeth Downs
5113 South Australia.





Above: Judicious filing to shape, with the aid of templates, ensures an accurate canopy mould.



Plastic sheet is clamped to wooden spars as shown. Wire frame (one half of which is shown here) locates in spar ends to create inverted 'Y' struts and horizontal handle. Hold as you would a domestic iron.

How to pull – your canopy...

Long, long ago it was possible to visit the local model shop and select a suitable celluloid canopy for that latest creation. The choice of shapes and sizes was wide. These days, although there's plenty of variety, little is available to suit our .60 size craft (not to mention smaller ones). We have to be our own manufacturer. No problem! All we need is easily available; you may even find everything in your scrapbox.

Years ago I wrote a short description of how it's done. Now the time has come for precise instructions. I stole Dave Clarkson's idea to have little helpers for the hard work while I took the photos.

Get it right

The only real problem is to find a suitable plastic sheet. My preferred method of canopy pulling means that most types of plastic cannot

be used. However, the advantage of my method is its extreme simplicity; female moulds are not required – nor is such exotic gear such as vacuum pumps. Green and blue cellulose sheets from Graupner work extremely well, as does the clear SIG offering. You'll have to test the others for yourself!

How's it done? A heated sheet is pulled over a mould, which is fashioned from a balsa block. This mould must be larger than the desired size to allow for trimming the edges. Several blocks may be glued together to avoid unnecessary expense, but care must be taken to avoid gaps. The tiniest imperfection will show up on the finished canopy. A baseplate of 3mm ply serves as a support, enabling the mould to be clamped in a vice. Take care to shape the mould carefully, checking frequently with templates. Finish with very fine glasspaper. Although some enthusiasts advocate lacquer or resin, I prefer to work with the plain wood, because it allows the hot sheet to slide easily over the surface.

Get it hot

Heat the plastic sheet in the oven. A simple wire frame holds the sheet, as shown, via two wood spars. Each spar consists of two lengths which are screwed together, clamping the sheet between. Holes at the ends accept locating pins on the frame, allowing the sheet to hang freely. Maximum dimensions are dictated by the size of the oven!

Time to think over the procedure. Everything will happen very quickly or the sheet will cool, preventing satisfactory forming. Work out which hand will hold what. Now clamp the mould in the vice. Preheat the oven; I work with 175 degrees Centigrade for about ten minutes. Use this as a basis for your own experiments. The right moment is easily judged – the sheet goes floppy and starts to smoke (and smell). Don't wait too long. If the sheet gets very soft it will be difficult to handle the frame, and even if you succeed you will get a thin canopy. And use thick gloves. Everything will be hot!

Work quickly. Open the oven; pull out the frame; grab the upper beam and hold everything horizontal. Place it centrally over the mould and pull down with equal pressure on both beams – lightly at first, then harder as the sheet cools. You have about five seconds! Once you get it right, hold everything in place while the sheet cools, for it will shrink slightly, hugging itself to the mould for perfect shape.

Obviously, much depends on the style of the canopy. If the curvature is gentle, shaping is very easy and only light pressure is needed. If sharper curvature is present, it may be necessary to enlist help to negotiate these areas with more force. Whatever you do, never release the beams once the main shape has been created. You will immediately destroy all your efforts...

Once the canopy has cooled, be careful not to merely pull it from the mould. You may crack it at the edges. Cut around the mould until the canopy can be released easily. The surplus will be much thicker, and harder, than the formed shape.

Your pizza, next evening, may have a slightly strange taste. Nevertheless, you have found a very easy way to produce that glasshouse for your new aeroplane...

WHAT'S ON

19th May
OXFORD MFC 21ST ANNIVERSARY SHOW
 Venue: Exeter Hall, Kidlington, Nr Oxford. All model aircraft types, RTP flying, adults £1.00. Children OPAs 50p. Contact: C Newman. Tel: 086 77 3020. Raffle: One-hour flight in hot air balloon! On-board champagne.

20th May
GILLINGHAM COMBAT MEETING
 Venue: Elm Court Garden Centre, near Gillingham. Take Gillingham turn off on M2; venue is half a mile. 1/2A and Diesel A Combat. 1/2A to new rules. All flyers must use safety straps provided. Proof of insurance essential! Contact: Dave Harrison. Tel: 0689 32121 x286 (H): 0322 58519 (W).

20th May
MODEL 90
 Venue: Hurst School, Baughurst, Tadley, Hants RG26 6LZ. Model Exhibition - all types. Aircraft, Boats, Military, Railways, Architectural, etc. Model flying, boat pool, etc. Contact: K Searle. Tel: 0734 812254.

20th May
INDOOR FLYING AT CARDINGTON
 Venue: Cardington Airship Sheds, Index and league. Contact: Bob Bailey. Tel: Stevenage 723642. Essential to ring before attendance.

20th May
SECOND RAYNES PARK MAC VERON CARDINAL F/F MEETING
 Venue: Chobham Common. All Veron Cardinals eligible. 1cc max power. Ratio competition. Club transfer must be displayed. Best of 3 meetings to count. Contact: Alan Jupp. Tel: 01 669 9497.

20th May
WHARFEDALE & DMAC OPEN AEROBATICS EVENT
 Venue: Dewsbury F2B and Class 2. Contact: Jeff Smith. Tel: 0532 664432.

20th May
ASP LARGE MODELS FLY-IN
 Bring and fly the biggest and the best! No free-flight models at this event; CAA rules demand that we use all the field for the R/C craft. Contact: RCM&E. Tel: 0442 66551.

20th May
THREE KINGS C/L SCALE FLY IN
 Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. Stand Off and Profile Scale classes. Silencers and proof of insurance essential. Contact: Wal Cordwell. Tel: 081 764 1661.

26-28th May
BMFA FREE FLIGHT NATIONALS
 Venue: RAF Barkston Heath. Top competition at this central airfield; three full days of activity for Mini, Open and FAI.

26/27/28 May
WEST MALLING 1990 INTERNATIONAL AIRSHOW FOR RADIO CONTROLLED MODEL AIRCRAFT
 Venue: West Malling Airfield, Kent. 10.00am-6.00pm each day. Admission charges £3.50 Adults. £2.00 Children/OAP's advance tickets £3.00 & £1.50. All in camping passes (including barbecue) £8.00 Adults, £4.50 children/OAP's. Contact: WMMAS, 58 Salisbury Road, Tonbridge, Kent. TN 10 4PE. Tel: 0732 350691.

3rd June
INDOOR FLYING AT CARDINGTON
 Venue: Cardington Airship Sheds, Index and league. Contact: Bob Bailey. Tel: Stevenage 723642. Essential to ring before attendance.

3rd June
NORTH LONDON RADIO CONTROL MFC SCALE DAY
 No venue given. Prizes. Entry £1.00 on the day. Proof of insurance needed. Contact: Richard Barley, 44 Orchard Avenue, Berkhamsted, Herts. HP4 3LG.

3rd June
BLACKPOOL & FYLDE RCMS SCALE DAY
 All welcome. Venue: Not supplied, but contact: A Dawson. Tel: 0253 506613.

10th June
THREE KINGS C/L SPORT AND VINTAGE DAY
 Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. Vintage Stunt, Midge Speed, Vintage 'A' T/R, Concours, Weatherman. Silencers and proof of insurance essential. Contact: Wal Cordwell. Tel: 081 764 1661.

10th June
WHARFEDALE & DMAC 1/2A COMBAT EVENT
 Venue: Dewsbury. Contact: Jeff Smith. Tel: 0532 664432.

17th June
CHILTERN CUP EVENT CL
 Venue: Slip End, Luton. Open Stunt, Vintage Stunt, Novice Stunt. Contact: Glen Alison. Tel: 0923 772675.

16/17 June
THE OXFORD MFC FREE FLIGHT RALLY
 Venue: Port Meadow, Wovencots, Oxford. Saturday from 7.00pm progressive champagne fly-offs for A1 & CDH also HLG Comp, Sunday from 10. am A1, CDH both in 5 rounds. HLG, Vintage HLG, Tail-less, Canards Combined, Vintage Rubber (34in Max span) Vintage Glider (A2 or 72in max span). No thermistors, Bubble Machines, Streamers on poles, or power models to be flown. Contact: Andrew J Crisp, 30 Portland Road, Summer-town, Oxford, OX2 7EY. tel: 0866 53800.

23-24th June
ASP SCALE WEEKEND
 Venue: Old Warden Airfield. The world's best fun-fly scale meeting for R/C, C/L and F/F! Don't miss it! But Scale Models only, please. Contact: Aeromodeller, Tel: 0442 66551.

24th June
THIRD RAYNES PARK MAC VERON CARDINAL F/F MEETING
 Venue: Chobham Common. All Veron Cardinals eligible. 1cc max power. Ratio Competition. Club transfer must be displayed. Best of 3 meetings to count. Contact: Alan Jupp. Tel: 01 669 9497.

1st July
FOURTH RAYNES PARK MAC VERON CARDINAL F/F MEETING
 Venue: Epsom Downs. All Veron Cardinals eligible. 1cc max power. Ratio competition. Club transfer must be displayed. Best of 3 meetings to count. Contact: Alan Jupp. Tel: 01 669 9497.

1st July
SMAE F/F SCALE MEETING
 Venue: RAF Abingdon. CO/Electric, Rubber, Power. Contact: Charlie Newman. Tel: 086 77 3020.

1st July
WHARFEDALE & DMAC CLASS A DIESEL COMBAT EVENT
 Venue: Dewsbury. Contact: Jeff Smith.

1st July
CONTROL LINE SCALE MEETING
 Venue: RAF Abingdon. Contact: Martin Fardell. Tel: 0454 412486.

8th July
INDOOR FLYING AT CARDINGTON
 Venue: Cardington Airship Sheds, Index and league. Contact: Bob Bailey. Tel: Stevenage 723642. Essential to ring before attendance.

15th July
OXFORD MFC DREAMING SPIRES GALA
 Venue: Port Meadow. Silent vintage F/F events: L/W Rubber (under 36in span), Glider (up to A2 size), Chuck Glider. Plus Silent Open Tailless. F/F scale events: CO/Electric, rubber and power up to 1.5cc max). Absolutely no power models unless entered in F/F scale event. SMAE membership required for insurance purposes. Contact: Charlie Newman. Tel: 086 77 3020.

8th July
NORTH LONDON RADIO CONTROL MFC VINTAGE DAY
 No venue given. Vintage character models. No F/F. Proof of insurance needed. Contact: Richard Barley, 44 Orchard Avenue, Berkhamsted, Herts. HP4 3LG.

15th July
ROLLS ROYCE MAC VINTAGE C/L MEETING
 Venue: RR Airfield, Hucknall, vintage T/R A and B, Old Tyme stunt, Vintage Speed. Fun Flying over grass and tarmac. Contact: Terry McDonald. Tel: 0332 511273.

15th July
ASP GOLDEN ERA, MODEL FUN FLY
 Venue: Old Warden Airfield, Plenty of room for craft from those glorious twenties, thirties and forties. Scale and Vintage equally welcome! Contact: Aeromodeller. Tel: 0442 66551.

15th July
MORLEY INTERNATIONAL SILENT DAY FF
 Venue: Heath Common, near Wakefield. Classes: P-30. Mint-vintage (up to Wakefield size). CDH, Dart Power. Maybe Chuckie. Contact: E Whitehouse, SAE to 29 Church Street, Royston, Berneley, S.Yorks, S71 4QU. Tel: 0226 726335.

15th July
KNAVESMIRE FREE-FLYERS ANCIENT AND MODERN SILENT MINI EVENT
 Venue: York Racecourse. 10.00am start. Classes: A/1, CDH, CO Duration, Mini-Vintage Rubber, Mini-Vintage Glider, HLG, Handicap Flying Scale, Mini tail-less, P-30, Achilles kit Contest, Best Junior, Possibly more. Contact: John Pool, 8, Sycamore Road, Barlby, Selby, North Yorkshire, YO8 7XB. Tel: 0757 703060.

22nd July
INDOOR FLYING AT CARDINGTON
 Venue: Cardington Airship Sheds, Index and league. Contact: Bob Bailey. Tel: Stevenage 723642. Essential to ring before attendance.

22nd July
MAGNIFICENT NORTH-WEST VINTAGE SWAPMEET
 Venue: Winnington Park Recreational Club, ICI Complex, Northwich, Cheshire. Bring anything to do with model aircraft; magazines, books, models, engines, radios, etc. Dayglo signs for J19, M6. Entry £1. Note the new venue. 10.30 start. Contact: D A Lloyd-Jones. Tel: 056589 3170.

22nd July
BRUMFLY 90
 Venue: RAF North Luffenham. 10am start. Competitions will be flown in rounds from a line. Classes: Open Power, Open Glider, Open Rubber, 1/2A, CDH, A/1. Send SAE, and submit name, telephone number, BMFA number and car registration before 15 July to Stafford Scraen, 66 Stevens Close, Wollescote, Stourbridge, West Midlands. Tel: 0304 396535. Identification will be needed on the day.

29 July
NEWBURY & DMAS ANNUAL VINTAGE DAY
 Venue: Newbury Racecourse, Newbury, Berks. Control line and R/C Vintage ONLY. A full day's flying in a relaxed atmosphere. All welcome! Proof of insurance essential. Contact: Mark Bees. Tel: 0635 46426.

5th August
INDOOR FLYING AT CARDINGTON
 Venue: Cardington Airship Sheds, Index and league. Contact: Bob Bailey. Tel: Stevenage 723642. Essential to ring before attendance.

5th August
THREE KINGS 21st ANNIVERSARY + REUNION DAY
 Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. General C/L flying and get together for all Three Kings members past and present silencer and proof of insurance essential. Contact: Wal Cordwell. Tel: 081 764 1661.

18-19th August
INDOOR NATIONALS
 Venue: Cardington. 'Heavy' models on Saturday; microfilm on Sunday. More information to follow.

18-19th August
ASP VINTAGE WEEKEND
 Venue: Old Warden Airfield. The annual pilgrimage! Meet friend sold and new - see and fly those super designs from yesteryear! Collectors corner is a new feature for 1990. Model flying at its informal best! Contact: Aeromodeller. Tel: 0442 66551.

25-27th August
BMFA R/C, C/L AND SCALE NATIONALS
 Venue: RAF Barkston Heath. Three days of top competition. 1989 had more entries than the previous year - '90 promises to beat that! Come and add to the control-line revival - and watch top Scale and R/C in action. Contact: BMFA. Tel: 0533 440028.

2nd September
INDOOR AT CARDINGTON
 Venue: Cardington Airship Sheds, Index, league and Kenny Penny. Contact: Bob Bailey. Tel: Stevenage 723642. Essential to ring before attendance.

9th September
NORTH LONDON RADIO CONTROL MFC ELECTRIC FLY IN
 No venue given. Electric models only. No F/F. Proof of insurance needed. Contact: Richard Barley, 44 Orchard Avenue, Berkhamsted, Herts. HP4 3LG.

15-16th September
F1D EUROCHAMPS TRIALS
 Venue: Cardington. Contact Bob Bailey. Tel: Stevenage 723642. Essential to ring before attendance.

15-16th September
ASP FOUR STROKE WEEKEND
 Venue: Old Warden Airfield. Informal action for four-stroke enthusiasts! Great fun for all! Contact: Aeromodeller. Tel: 0442 66551.

16th September
SMAE MIDLAND AREA RALLY
 Venue: Sutton near Eynsham, Oxford. R/C events:- Class 1 precision, Flying 15. F/F events:- 1/2A Power, Coupe, A1. F/F vintage events:- L/W rubber (36in span max), glider, chuck glider. Plus old time stunt C/L. Signposted from Eynsham roundabout on A40, West of Oxford. Contact: Charlie Newman. Tel: 086 77 3020.

16 September
SMAE F/F SCALE MEETING
 Venue: RAF Hullavington. CO/Electric, Rubber and Power. Contact: Charlie Newman. Tel: 086 77 3020.

16 September
CONTROL LINE SCALE MEETING
 Venue: RAF Hullavington. Contact: Martin Fardell. Tel: 0454 412486.

23rd September
DOUG BLAKE TROPHY EVENT CL
 Venue: Slip End, Luton. F2A Stunt. Contact: Glen Alison. Tel: 0923 772675.

30th September
THREE KINGS C/L SCALE DAY
 Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. FA1 Scale and profile classes, best military. Silencers and proof of insurance essential. Contact: Wal Cordwell. Tel: 081 764 1661.

28th October
SMAE INDOOR SCALE MEETING
 Venue: Alumwell Centre Walsall. 08.30 to 17.00. Peanut, Open Rubber Scale, CO/Electric Scale, Air Racing, Biplane Kit Scale and Jet Prototype flyoffs. Entry on the day. Contact: Doug Sheppard. Tel:- 0272 697595.

On your marks!



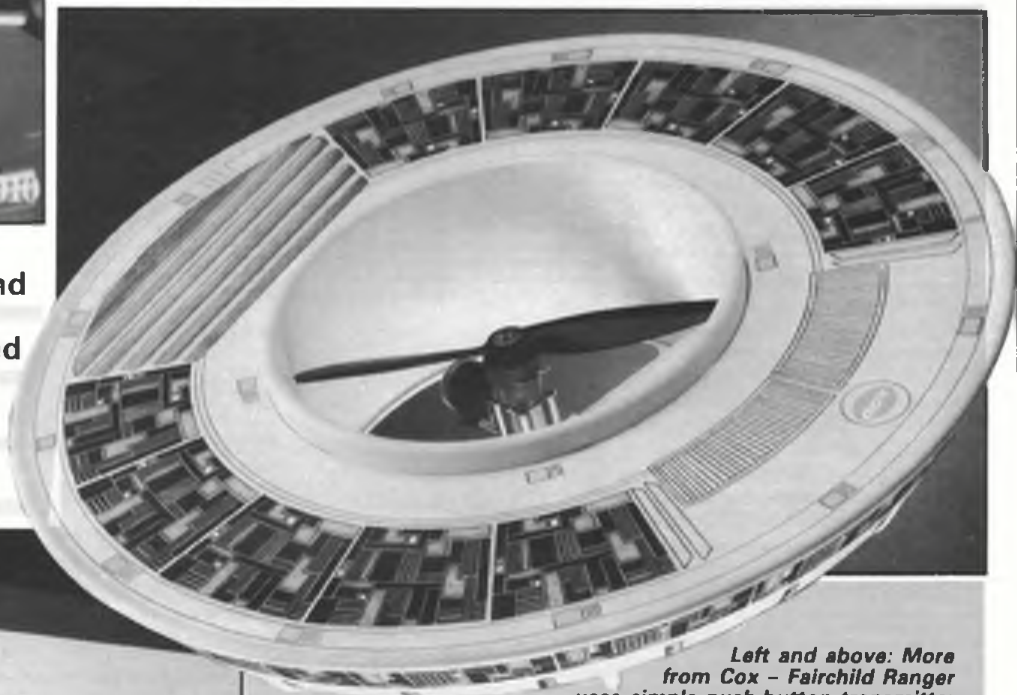
ein Modell



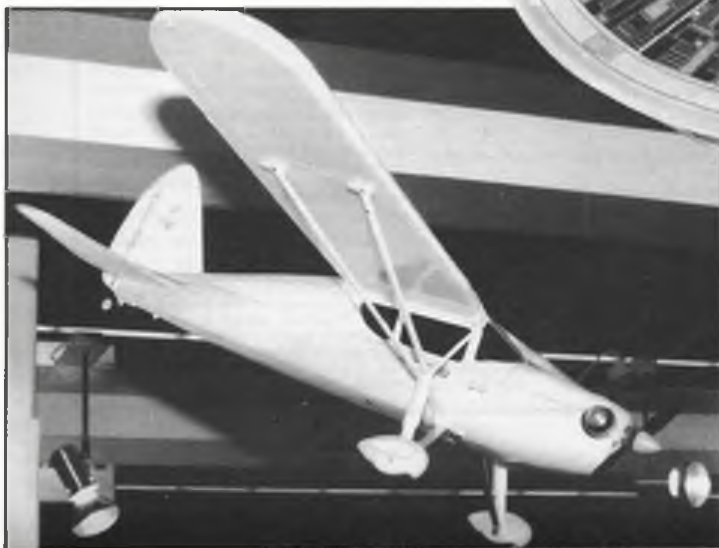
Helli glider features wing and tail built directly on plan which folds over to form top surfaces. Soon to appear in UK. Left: Multitude of rockets shows international appeal. Below left: Back again - Cox TD .010 has resumed production. Below: Racks of wings - supermarket mix'n'match aeromodelling by IBA was popular at Dortmund.



Nuremburg and Dortmund
- two great shows visited
this year. Here are some
highlights . . .



Left and above: More from Cox - Fairchild Ranger uses simple push-button transmitter to give 'left' and 'right' rudder; .049 Space Probe twirls by torque reaction. Opposite, top left: Piper Seneca is typical of small R/C craft in Germany - twin G-Mark 2cc 'boxer' power. Top right: Helium blimp cavorts via R/C and swivelling motors. Centre left: Exaggerated-wing Jodel heads Electra - two Teutonics for R/C sport. Centre right: Large-scale Stosser looks good. Bottom left: Hefty Turbo Porter is nearly 3m span for 60cc Super Tigre. Bottom right: Fierce F-104G pulse jet was a Dutch showstopper.







Left-hand column, top: Second team in Glider; Michelle Le Vocq (Belgium), Rod Lewis (NZ) and Martyn Gregorie (England). Below that: Geoff Higgins, second in F1A with Dutch-influenced, colourful craft. Above: Geoff Higgins, Malcolm Sexton and Phil Crump, respectively 2-1-3 in F1A. Right: Jon Fletcher (Australia) launches in the down F1C flyoff.



THIRD PACIFIC F/F CHAMPIONSHIPS

David Ackery reports on the first World Cup Event, Carterton, New Zealand: 3-5th February

THE first Free Flight World Cup event of 1990 was a total success, comprising friendly atmosphere, memorable social events and superb weather. A closely-fought, well organised contest left everyone with the feeling that everything had gone just right.

Good weather on practice days allowed all to sort out their equipment and the power fliers especially made good use of this time. Friday afternoon saw registration, plus time to enter, arrange camping, buy tee-shirts, stickers, banquet tickets and more besides. That evening the timekeepers' briefing took place, followed by the contestants' meeting for briefing, introduction of officials – and the chance to answer a multitude of questions. This was followed by supper which gave everybody time to chat and get acquainted in a relaxed, informal manner.

Here we go...

Saturday morning was calm and dewy for the start of F1B and F1C. Early on there was some thick air around and with a good model it was possible to max comfortably. For Round Two there was some gentle drift and gentle lift if you were careful; after that it got tough!

The breeze came through (seven metres per second) and under a cloudless sky the temperature pushed into the 30s. Flights were going high and chases were long. Often the model could not be found before the next round

and it was necessary to come back, fly a reserve, and then go after them both. Exhausting in the heat – but fliers battled on.

The Australian F1C team flew impressively. Their Russian-style foil bunters looked unbeatable and if something was a little off pattern they were saved by wandering into good air or by an over-run. However, in Round Seven reality caught up with Dave Thomas. From a brilliant climb he ran straight into a downer and was back on the ground in just 85 seconds. Peter Nash and Jon Fletcher both maxed out; the flyoff was set for 06:30 the next morning.

Wakefield was a matter of just maintaining flights, holding concentration to avoid mistakes and then checking the scoreboard at the end of the day to see how you had fared. Col Collyer spoiled his chances by dropping the last two flights and Paul Lagan also missed badly in Rounds Six and Seven when the wind had dropped somewhat. David Ackery made one mistake in Round Two when he went on some fluffies that were not really going up. The winner was a very happy Richard Blackham who picked the lift well all day for his superbly engineered Russian style Wakes.

Flyoff time

Sunday dawned crisp and calm for the F1C flyoff. Motors were a little reluctant to go being set for the afternoon heat but after some initial

problems both managed a satisfactory test flight. Jon Fletcher got away first for a straight up-and-down flight of 225 seconds. Peter Nash had blown a motor on the test flight and hastily assembled a spare aircraft. He launched just before the end of the period and it grooved up beautifully, the air was now slightly buoyant and he glided on to make the four-minute max.

...and F1A

F1A began at 07:30. Contestants were quickly in the air checking it out. Although still cool there were some helpful holding patches and it was definitely worthwhile searching them out. By the end of round one the drift had settled towards a row of trees and a change was required. In less than thirty minutes the whole organisation was moved to a new field one kilometre to the south and flying resumed without disruption. Conditions were very pleasant with just enough drift to make towing easy. Lift was quite obvious. There were six with double maxes after Round Two and the weather was so kind that the pundits had them all pencilled in for the flyoff already. Round Three was a doddle. It was easy to piggyback another glider in lift and just about everybody maxed. then it started to get harder. There were some enormously powerful thermals that would try to pull you out of your boots and sent the glider spiralling up like a wayward skyrocket. But they did not last long and quickly turned to downdraughts to push the glider down just as fast. Rod Lewis and Paul Lagan both suffered from these. With hindsight it was the big, slow gentle thermals that were the safe ones; when they came they covered most of the field and made it look easy as people could launch into them from anywhere. As the day wore on it became hotter and calmer. The refreshment caravan did a brisk trade. Its presence was greatly appreciated by all the competitors. The drift faded completely and towing became

continued on page 350 ▶

F1A: Individual

		1	2	3	4	5	6	7	Total
1 M. Sexton	RG89	180	180	180	180	180	180	180	1260
2 G. Higgins		180	163	180	180	180	180	180	1243
3 P. Crump	SS	180	142	180	180	180	180	180	1222
4 G. Curtis	NZ	132	180	180	180	180	180	180	1212
5 M. Gregorie	EI	129	180	180	180	180	180	180	1209
6 R. Wallace		180	180	180	180	95	180	180	1175
7 A. Edwards	AUS	167	107	180	180	180	180	180	1174
8 M. Le Docq	EI	78	180	180	180	180	180	180	1158
9 I. Weston	RG89	180	180	180	71	180	180	180	1151
10 R. Anderson		180	180	180	180	180	58	1138	
11 P. Lagan	NZ	180	180	180	160	180	180	75	1135
12 W. McGarvey	RG890	155	180	180	71	180	180	180	1126
13 R. Lewis	EI	180	106	180	180	180	114	180	1120
14 C. Collyer	AUS	171	180	180	180	180	180	39	1110
15 P. Nash		116	180	180	180	180	85	180	1101
16 M. Giles	NZ	180	86	180	180	180	180	74	1060
17 T. Magee		104	180	180	85	180	180	129	1038
18 J. Thomas	AUS	180	180	180	48	57	180	180	1005
19 C. Murphy	SS	137	180	33	144	180	180	141	895
20 D. Chambers	AKC	152	180	180	0	59	180	93	844
21 J. Magill		102	111	134	180	180	57	3	767
22 M. Baynes		110	180	164	180	12	64	56	766
23 M. Haliday	AKC	121	77	48	154	180	53	35	668
24 M. Lawrence	AKC	60	180	33	77	145	47	36	578
25 W. Manson		99	92	180	68	2	14	78	533

F1B: Individual

		1	2	3	4	5	6	7	Total
1 R. Blackham	AUS	210	180	161	167	180	180	180	1258
2 D. Ackery	NZ	210	100	180	180	180	180	180	1210
3 C. Collyer	SS	210	180	180	180	180	159	114	1203
4 B. Chinchella	AGO	128	180	180	180	153	180	180	1181
5 P. Lagan	NZ	210	180	106	180	180	87	31	1024
6 A. Bryant	AUS	174	153	180	119	180	180	3	989
7 J. Coombe	AUS	197	110	121	164	68	180	147	987
8 W. McGarvey		118	180	180	158	143	-	180	959
9 J. Malkin	NZ	133	167	140	180	3	90	155	868
10 D. Chambers	AKC	177	180	180	180	-	-	-	717
11 A. McKenzie		106	180	143	67	180	-	-	676
12 C. Bruce	WHA	123	163	117	179	-	14	-	596
13 J. Hanson		210	131	180	3	3	-	-	527
14 G. Baynes	AGO	184	142	180	2	69	-	-	557
15 M. Haliday	AKC	4	94	101	94	-	124	74	491
16 A. Thomas	AGO	155	166	169	4	-	-	-	484
17 S. MacDonald	WHA	174	147	102	3	-	-	-	426
18 A. Macdonald	WHA	91	110	137	-	-	-	-	338
19 M. Giles		66	123	1	-	-	-	-	190

Team

1 RG89	Argies 1989	3537
2 EI	Equipe Internationale	3487
3 NZ	New Zealand	3407
4 AUS	Australia	3289
5 SS	Southern Slashers	2217
6 AKC	Auckland Colts	2090

Team

1 AUS	Australia	3537
2 NZ	New Zealand	3487
3 AGO	Aussie Golden Oldies	3407
4 WHA	Whakatane	3289
5 AKC	Auckland Colts	2217

FREE FLIGHT SCENE

Ken Faux reflects on a change of direction and anticipates fresh demand . . .

FOR as long as most free-flyers can remember the Third Area Centralised event has included an event for FAI class power models (F1C). In its wisdom, and without direct consultation to the people who would be affected, the Free Flight Tech. Committee decided to take the F1C event out of the 1989 calendar and to give the Astral Trophy to a Slow Open Power event at the Third Area Centralised event. Over the last couple of years there has been a great increase in the number of people taking an active interest in F1C. This makes the loss of the event seem totally unjustified. At the only other F1C Area Centralised event held this year there was an entry of thirty-one, all of whom flew.

To mark the Third Area Centralised event this year members of Anglia and Birmingham clubs decided to hold an unofficial F1C event at Barkston Heath. This was organised 'over the phone' a week or so before the date, which unfortunately limited the number of participants. To allow flyers to help their clubmates get their Plugge Cup Glider flights in early we decided to hold our contest in the afternoon. Four one-hour rounds commenced at 2:30. A two-and-a-half minute max just allowed models to land on the field, and was used for all rounds.

Six people flew, including Stafford Screen and Roger Baggott - fresh back from representing Britain in the World Champs in Argentina. At the close of the four rounds Stafford Screen and Ken Faux had both maxed out. They

decided to fly off to a five-minute max, thinking it sensible in the conditions. Retrievers were organised to spot the models down as they would almost certainly be into crops. Stafford changed from his old, wood-winged model to one of his latest foil models powered by a side-exhaust Nelson 15. Ken remained with his high-aspect-ratio, single-fin model powered by a MkIII Rossi 15. They both launched simultaneously at 7.05pm, Stafford climbing much higher than Ken. This was a combination of newer generation models and engines, and Ken having a bad engine run. They both settled into fine glides in average air.

Ken's model went behind a building to score 4:29 whilst Stafford went on to max, confirming that five minutes was a wise decision for the max. Both models were retrieved without problems from the crops. We really should organise ourselves on the retrieving front more often...

Everyone who flew in this event enjoyed themselves. It will be run again next year if anyone is interested in joining in. Contact Ken Faux at 47, Arkwrights, Harlow, Essex, CM20 3LT.

(We take this chance to look back at two '89 events that were squeezed out thanks to lack of space, but well worth support this year. Usual service resumes next month with Dave Hipperson's Woodbury Weekend report. GC).



. . . and Stafford Screen reminds us of a Midland favourite

BIRMINGHAM MAC held their annual competition for Open and Mini classes at North Luffenham on Sunday, 23rd July. The weather was extremely hot and the wind light and variable. In fact, very few official flights landed outside the field.

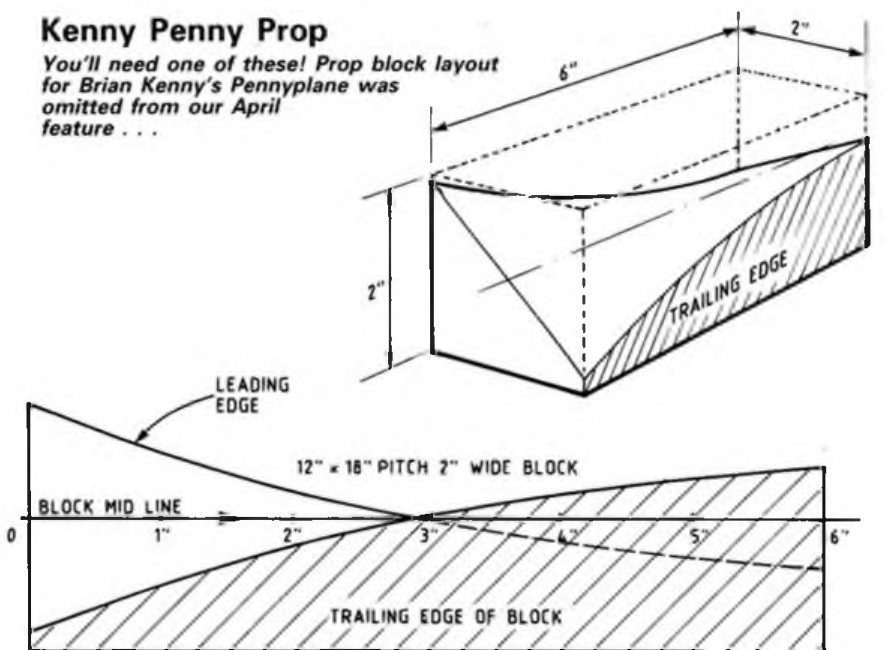
The attendance was a little disappointing since it had been published for some months and a lot of thought had been given to arranging a competition to be flown in the Summer, on a relatively small airfield with a minimum of risk to losing the models; nevertheless, an entry of 72 did compare favourably with the previous year.

The experiment of progressive fly offs in all classes, coupled with flying for a line in rounds



Kenny Penny Prop

You'll need one of these! Prop block layout for Brian Kenny's Pennyplane was omitted from our April feature . . .



LAYOUT OF BLOCK TO PRODUCE 12" DIA. x 18" PITCH PROP BLADES.

BY USING PROP SETTING JIG, PROPS OF HIGHER PITCH MAY BE PRODUCED. THIS RESULTS IN NON-HELICAL PITCH DISTRIBUTION BUT GIVES A VERY EFFICIENT INDOOR PROPELLER.



Brumfly '89 pics show, left: Pete King (in sunglasses) admiring Richard Uden's winding technique. At right: Phil Ball's essay into Open Power was a winner. Summer's coming . . .



Left: Back to last year's informal Barkston F1C meet - Stafford Screen's Model No. 33 was used in flyoff. Craft was awarded a Silver Medal at the '89 M.E. Exhibition and flew in Argentina. Nos. 30, 31, 32 and 33 are similar!

Above: Derl Morley and Mike Brown prepare for the third Glider round at Brumfly '89. Below: Neil Cox gets ready in Open Rubber, assisted by Mike Bull.



Right: Style! Mrs Joe Flynn gets husband's glider away after being persuaded to stay for the flyoff. Got third place, too!



Above: John Williams awaits the thermal in Open Rubber.

and a code of conduct for model retrieval, may well have been unpopular with the 'traditional' flyers. However, the general consensus of opinion was that the format was successful and should be persevered with.

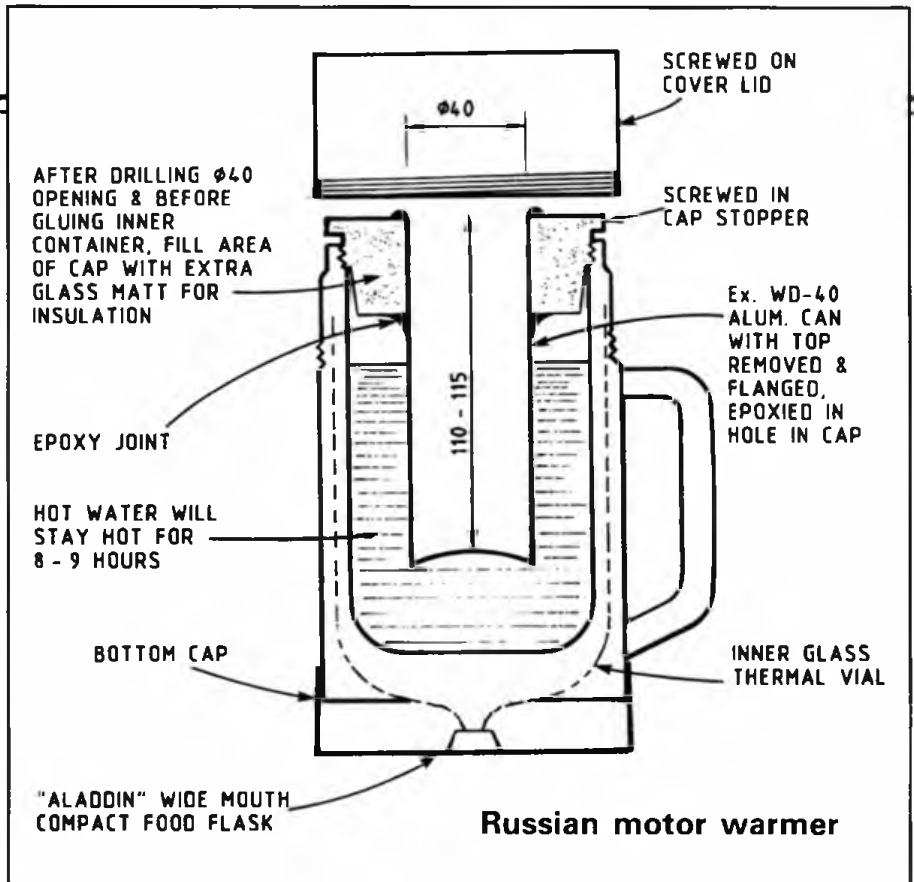
The largest entries were in Open, Glider and 1/2A Power with a continued fall in the popularity of A1 Glider. 25 per cent of the entries made the flyoffs.

The progressive flyoff was practical because of the long hours of daylight.

The Mini classes increased in one-minute increments and the Open in two-minute increments. The only change from the printed programme was in the flyoff sequence to accommodate competitors flying in two classes.

Most of the classes were won by the flyers currently in form. The exception being, possibly, in Open Power where Phil Ball registered an impressive win with 40 powered model equipped with gentle bunt mechanism. In Coupe, Peter Gaunt was the only flyer to max out; he did not need a sixth flight...

All winners received balsa wood with either thinners, glue or wine supplement. The prizes were presented by Sue Coy, the only lady entrant.



Brumfly 1989

Open Power (12 flew)

- 1 P Ball 11:30 + 5:00
- 2 R Peers 11:30 + 3:23
- 3 M Lester 11:30 + 2:58

Open Glider (17 flew)

- 1 J Cuthbert 11:30 + 5:00 + 3:04
- 2 B Colledge 11:30 + 5:00 + 2:32
- 3 J Flynn 11:30 + 5:00 + 2:08

Coupe d'Hiver (9 flew)

- 1 P Gaunt 10:00
- 2 D Davitt 9:47
- 3 G Ferr 9:42

Open Rubber (16 flew)

- 1 J Carter 11:30 + 5:00
- 2 N Cox 22:30 + 4:47
- 3 G Bryant 10:00 + 2:06

A1 Glider (6 flew)

- 1 J Cuthbert 10:00
- 2 C Sharman 9:28
- 3 N Parry 7:49

Keep your cool! A Soviet gadget reported by J P van Leuwen

AT THE F/F World Champs in Argentina it was noticed that the Russians used an electric blanket over their fuselages prior to flying, in order to keep their FAJ rubber motors warm. This is not new for Queenslanders, for we have been using this technique for some time. The idea is to put on those extra ten per cent of turns without torque increase. The simple warmer shown here is cheaper to make - and operate - than a blanket. An Aladdin food flask was used on the original; readers in parts of

the world other than Australia will have to find their own substitute! The water remains hot for at least eight hours if the cover is left on as

much as possible. A hot motor gives a better torque curve, and more turns can be put on, giving a longer motor run.

Dave Hipperson updates Tomy Timer affairs with a useful mod . . .

More Tomy Toy modifications

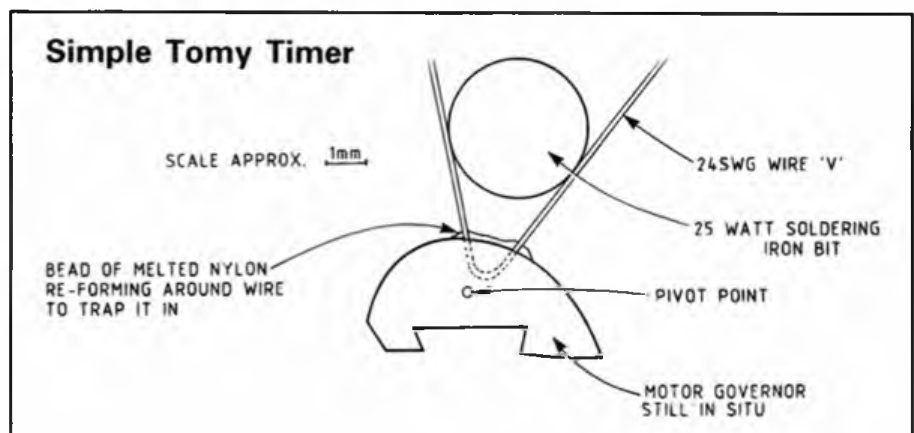
For those now conversant with the advantages of the Tomy toy DT system there comes a further step forward in simplification.

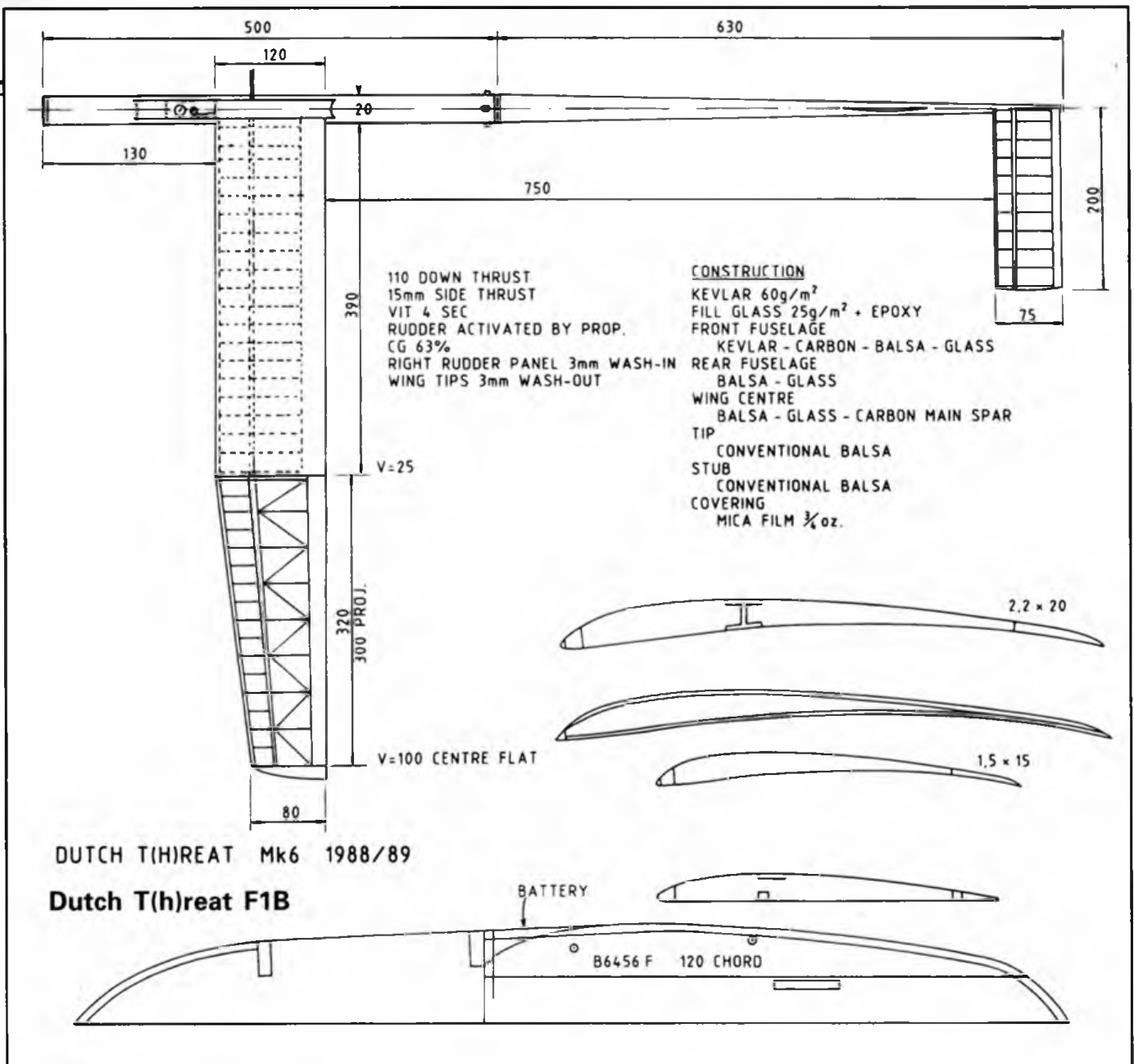
My system, published in 1988, uses twin bent pins fitted into hot-spiked holes in the governor and then bound together to form both a claw to resist falling out, and also to present arms on which small weights can be added to regulate the timer to a satisfactory speed. Ian Dowsett - who incidentally should have some more motors in stock about the time you read this - has improved on this idea.

He suggests using a piece of 24swg wire in place of the pins. This is bent into a sharp 'V' of between 30 and 40 degrees. Both ends are kept long although they need to be no more than a couple of inches. The timer is held firmly but gently in a vice and the pointed end of the 'V' offered up (or probably down) onto the top of the governor. A hot soldering iron with a bit

of about 1/8-3/16in diameter is then rested in the 'V' (the ideal seems to be a 25 watt iron). The wire heats up gently enough to start smelting the spot on the governor at which the 'V' penetrating the governor. This is slow enough to be controllable. When the wire has sunk in about 3/32in the soldering iron is removed and the nylon allowed to cool. As the 'V' is pushed in, the nylon will have melted and reformed around the back of the wire thus trapping it in the governor permanently. No need for any glue. The wire can, if necessary be removed by reversing the operation but it is unlikely that it will be necessary. The wire arms thus affixed can be bent to the desired shape, cut off at the required length and finished with either lead shot weights, pin heads or whatever is your favourite ballasting system.

This has proven to be not only a much quicker way of weighing the governor but also far less likely to go wrong.





. . . and Mike Woodhouse examines a top Wakefield

Technical Notes from Cambrai and Arnhem

One of the benefits of flying in these International contests is the chance to compare ones abilities with a wide range of flyers and hopefully learn for the future. I think it is fair to say that those on the British contest circuit favourably with those on the Continent, but there are exceptions.

I watched the F1Bs of Zeri, Hacken and Ruyter flight after flight at these two meetings. Their models consistently climb higher than the British models. I know that they did not win the events in question, owing to circumstances on the day. However, their models have the capability to record higher flight times than most of the rest. Why is this so? Although they fly together in Holland the models and trim are very different. However they are similar in the standards of workmanship and attention to detail. All three have models that are very well built and maintained and down to weight.

Pim Ruyter has been developing the model shown in the drawing over the past twenty years. The layout is a little conservative with a wing chord of 120 mm. Only VIT and auto rudder are used; there are no other functions. Apart from Urs Schaller Pim is alone in using the Benedek b6456f section in F1B. He has, I know, tried other sections but always returns to his favourite. This section needs careful construction if it is to remain warp free. This been achieved by fully sheeting the centre panels and carbon rib caps in the tips.

Pim's other trade mark is the pod in front of the wing. This carries both a timer and radio

location beacon.

In general, F1Bs seem to be moving towards thinner wings. One section being tried is that designed by ex-European Champion Cenny Breeman for F1A. Anselmo Zeri is one of those using it to achieve both a good climb and glide.

Excess weight is a killer. A few grams overweight can cut many metres off the climb. A year or two ago a paper on this subject was published in the American NFFS symposium report. I substituted the parameters of my model in the equation and boosted the weight - each extra gram appeared to be worth about half a metre!

WAKEFIELD PROP. BEREKENING PATTERN

Pitch: 570mm.

Diameter: 600mm.

Correction: 5 degrees.

RADIUS mm	PITCH degrees	CORRECTED PITCH degrees	CORRECTED PITCH mm
30	71.70126	76.7	797.47
60	56.51983	61.5	694.90
90	45.22773	50.2	679.39
120	37.08876	42.1	681.01
150	31.16507	36.2	688.91
180	26.74767	31.7	699.80
210	23.36395	28.4	712.36
240	20.70624	25.7	725.94
270	18.57202	23.6	740.18
300	16.82502	21.8	754.88
330	15.37113	20.4	769.92

1990 BMFA NATIONAL FREE-FLIGHT CHAMPIONSHIPS

Come to the Free-Flight Nationals to see the best in UK competition flying! Once again this event is to be held at RAF Barkston Heath, probably the country's top site for F.F. This is an active RAF base so all competitors and spectators are asked not only to respect air force property but to obey instructions regarding movement about the airfield. Three days of contests are grouped as follows:

Mini Day: Saturday, 26th May

Events
 A/1: British Airways Trophy
 Coupe d'Hiver: 308 Trophy
 1/2A Power: Hales Trophy
 HLG: HLG Trophy
 CO2: Sparklets Trophy

Open Day: Sunday, 27th May

Open Glider: Thurston Trophy
 Open Rubber: Model Aircraft Trophy
 Open Power: Sir John Shelley Trophy
 Vintage: Jubilee Trophy
 Open Junior: Frog Junior Trophy
 Women's event: Women's Cup

FAI Day: Monday, 28th May

F1A (Glider): Ronytube Trophy
 F1B (Rubber): Boxall Trophy
 F1C (Power): Eddie Cosh Trophy
 Slow Open Power: Falcons Trophy
 Tailless: Lady Shelley Trophy

All entries have now been accepted – but there's plenty of room for spectators. Further details from the British Model Flying Association on 0533 440028.



Just for a change – a look at Control activity as results are processed and posted.

When? 26-28th May inclusive

Where? RAF Barkston Heath, near Grantham, Lincs.

◀ continued from page 345

harder as every direction seemed to be downwind. Flights went straight up into orbit or flopped dismally off the line to be flapped furiously. Sometimes the flapping helped. The last round saw placings drastically change as mental exhaustion caught up with people. Rex Anderson had been flying so well all day and seemed certain to make the flyoff; it was disappointing to see him crash out of contention with a flight of just 30 seconds. The only person to max through was Malcolm Sexton who flew all day in his usual composed, quietly efficient manner. A well deserved win by the best glider flier in New Zealand.

Technicalities – and after

That evening a technical seminar was held at the campground. Dave Thomas and Jon Fletcher spoke about foil covering, explaining how easy it was once you were set up, and all the advantages it gave. Noted speed flier and engine builder Alan Barnes gave a talk about motors, how to care for them, use them properly and tune them. Richard Blackham showed how his DPR mechanism worked and how simpler forms of it could be made by those without his machine skills. The seminar was extremely popular. Speakers were only too willing to share their knowledge and the audience was very receptive to this exposition of state-of-the-art technology.

The prizegiving banquet was held at the Solway Park Hotel on Monday evening. An excellent meal (and drinks) was greatly enjoyed by everyone and live music gently wafting in the background provided just the right accom-

paniment without overpowering conversation. An impressive array of silver was awarded and the organisers must thank Futaba who generously sponsored the event and whose support was so important in making this a top class event.

A plans book will shortly be published with

model drawings from all competitors and photographs of the event. If demand for the previous plans book is any guide this one will quickly become another collectors' item. Enquiries can be made to George Curtis, 31 Glamorgan Drive, Torbay, Auckland, New Zealand.

F1C: Individual

		1	2	3	4	5	6	7		
1	P. Nash	AUS	240	180	180	180	180	180	240	1560
2	J. Fletcher	AUS	240	180	180	180	180	180	255	1545
3	D. Thomas	AUS	240	180	180	180	180	85		1225
4	P. Smith	NZ	177	180	180	180	70	180	164	1131
5	I. Weston	NZ	229	115	180	24	86	26	107	767
6	D. Tristram	NZ	111	54	6	62	88	46	170	537

Team

1	AUS	Australia	3865
2	NZ	New Zealand	2435

A/1

1	C. Murphy	101	120	120	36	80	457
2	N. McDougal	120	120	41	91	30	402
3	R. Anderson	65	69	54	71	120	379
4	P. Crump	71	64	120	-	120	375
5	R. Wallace	120	29	20	47	33	249
6	M. Lawrence	90	44	-	-	-	134
7	T. Taylor	83	28	-	-	-	111
8	M. Haliday	-	4	-	-	-	4

P30

1	G. Baynes	63	120	100	283
2	A. Thomas	120	111	46	277
3	C. Murphy	45	71	40	156
4	N. McDougal	58	38	52	148

Trans-Tasman challenge: Australia



SANDOWN PARK 1990



Model Symposium & Exhibition
SATURDAY 2nd & SUNDAY 3rd JUNE
SANDOWN PARK RACECOURSE, ESHER, SURREY. 9.30am-6.30pm.

The Elbridge Model Club's 15th. World Famous Trade Exhibition and Display of Working Models. No other Exhibition open to the Public has so many Manufacturers, Distributors & Importers actively demonstrating their latest Products under one roof. With Three Floors and Four Exhibition Halls, we are able to show more general Aircraft Modelling activities. Be it Control-Line in the Parade Ring of R/C Aircraft Power, Electric & Gliders, Helicopters, one the Display Flight Line. Main Overseas attractions include 7th. return visit by "HANNO PRETTNER" Six times 'World Aerobatic Champion, New this year 'Wolfgang Matt' European Aerobatic Champion, and many other well known names from America and Europe. There will also be a full days programme with Displays of Radio Controlled I.C. & Electric Car Racing, Boats, Yachts & Submarines. Railway Layouts and Engineering. With over 110 Trade Stands, plus many Club & Societies Display Stands, one will find the Largest Selection of Model Engines, Radios, Kits & Ready to Fly Models ever seen in this country with nearly half a mile of Stand Frontages, all of which is UNDER COVER. All this and more for a full days out of the Family and Enthusiast.

Ample FREE CAR PARKING from 8.00a.m. Gates Open to the Public at 9.30a.m. to the Display Grounds and Exhibition Halls. Boats and Cars Displays from 9.30, Flying Programme starts at 10.00a.m. ESHER British Rail Station Open both days, with FREE return Bus Service from Station to Sandown. 20% Reduction on Admission to B.R. Ticket Holders.

We have to announce a Admission price increase of 50p this year, the last increase was in 1988. Car Parking remains "FREE" but we cannot accommodate any Public Overnight Caravaning. Nearest Camp Sites, or Hotel/Guest House accommodation list on request.

ADMISSION: ADULTS £4.00, CHILDREN (5-16 years) & OAP's £2.00
FAMILY TICKETS: 2 Adults & up to 4 Children/OAP's - £10.00
Tickets may be had in Advance to save Queuing and the FOLLOWING DISCOUNT TICKETS CAN ONLY BE OBTAINED IN ADVANCE. Upto 22nd May 1990.

Two Day Tickets: Adults £6.00, Children/OAP's £3.00
CLUB PARTY RATES: 10 to 20 Persons (including Children/OAP's)
Adults - £3.50, Children/OAP's £1.75 21 Persons and over Adults - £3.20, Children/OAP's £1.60

The above Special Rates can only be obtained in Advance from: Mr. G. Hazelwood, 46, Wrens Avenue, ASHFORD, Middlesex TW15 1AP. Cheques/P.O. made payable to 'ELMBRIDGE MODEL CLUB' ALL ENQUIRIES S.A.E. for Reply.

PROUDLY PRESENTED BY THE ELMBRIDGE MODEL CLUB

**NEW ARRIVAL
FOR 1990**

STEAM CLASSIC

THE NEW MAGAZINE FOR LOVERS OF STEAM

**COVER PRICE:
£1.50
PUBLISHED:
2nd FRIDAY OF
EACH MONTH**



AEROS
SPECIALIST PUBLICATION

DON'T MISS IT

THE VERY LATEST
ARGUS PUBLICATION

COLLECTING SCALE MODELS COLLECTING

THE MAGAZINE FOR THOSE WHO TAKE
THEIR COLLECTING SERIOUSLY



COVER
PRICE
£1.60

COLOUR FEATURES THROUGHOUT!

PUBLISHED
4TH FRIDAY OF
EACH MONTH

FIRST ISSUE 25 MAY DON'T MISS IT

- The complete recipe for *all* your collecting needs
- All facets associated with the hobby covered
- Offers the kind of photographic coverage overlooked by other publications
- Monthly listings of new models
- Regular features on shows and trends
- Competitions!! with SUPER PRIZES
- Enjoyable to read, Accessible in style



CONTROL LINE HEADQUARTERS

SIG STAINLESS STEEL LINES

INC. REEL AND CONNECTORS

SH-451 8 thou x 52ft x 2 lines	£4.95
SH-454 12 thou x 52ft x 2 lines	£4.95
SH-455 12 thou x 70ft x 2 lines	£6.20
SH-456 15 thou x 52ft x 2 lines	£4.95
SH-457 15 thou x 60ft x 2 lines	£5.45
SH-458 15 thou x 70ft x 2 lines	£5.95
SH-459 18 thou x 52ft x 2 lines	£5.45
SH-460 18 thou x 60ft x 2 lines	£6.75
SH-461 18 thou x 70ft x 2 lines	£6.95
SH-463 21 thou x 70ft x 2 lines	£7.95
SH-447 27 thou Lead-out wire in 6ft length	£1.10
SH-441 Plastic Reel	£1.90

TOPFLITE C/L KITS

GIESKE NOBLER 50" span	£69.95
JUNIOR NOBLER 40" span	£26.95
TUTOR 45" span precision aerobatic trainer	£39.95
FLITE STREAK similar to Peacemaker 42" span	£26.95
BABY FLITE STREAK 24" sp	£13.95
COMBAT KITTENS 22" span two kits	£18.95

GOLDBERG C/L KITS

LITTLE TOOT 16" span biplane	£14.99
SHOESTRING STUNTER 42" sp	£34.99
SWORDSMAN 1818" span	£14.99
LIL WIZARD 21" span	£14.99
STUNT MAN 23 23" span	£14.99
LIL JUMPIN BEAN 21" span	£14.99
LIL SATAN 19" span combat wing	£14.99

ENGINES

OS 25FPS	£38.80
OS 35FPS	£48.90
OS 40FPS	£51.50
OS 46 SF ABC Stunt	£75.40
TRY US FOR MERCOS 30. 40. 60.	

SIG C/L KITS

MAGNUM 60" span aerobatic	£72.20
AKROBAT 51" span stunter	£51.10
SUPER CHIPMUNK 53" stunt	£53.95
MUSTANG STUNTER 50" stunt	£49.95
BUSTER Goodyear racer for sport and fun 24" span	£17.50
SHOESTRING Goodyear racer profile fuselage 28" span	£17.50
BEECHCRAFT STAGGERWING 18" 049	£11.95
DEWEYBIRD 22" span suits Cox 049	£11.50
SKYRAY for Cox 049 23" sp	£9.50
BANSHEE ideal introduction to Class 2 Aerobatics with flaps and elevator 48" sp	£36.95
TWISTER similar to Banshee	£36.95
AKROMASTER 34" span sports	£17.95

R/C KITS

ASTRO-HOG Long standing low wing sports design	£81.60
CLIPPED WING CUB 56" span	£81.20
RYAN STAR 72" span	£119.95
SMITH MINIPLANE 44" span	£76.50
SKYBOLT 51" span biplane	£86.50
LIBERTY SPORT 57" span superb scale biplane	£89.50

ACCESSORIES

SIG CATALOGUE 1990	£3.99
SIG 3" NYLON BELLCRANK	£1.50
SIG 2" NYLON BELLCRANK	£0.75
SULLIVAN CONNECTORS Lg	£1.20
SULLIVAN CONNECTORS Sm	£1.20
C/L HANDLE all plastic	£4.75
C/L HANDLE inc metal frame	£4.99

C/L KITS

MODELHOB MUSTANG 249	£17.95
MODELHOB BARON 19	£26.95
MODELHOB SMOUSEN 249	£17.95

The Model Shop

230 Wellingborough Road Northampton NN1 4FJ Telephone: (0664) 31223

All orders post/packing FREE Export deduct 13% P&P at cost
Access Visa Diners Amex

BINDERS

£6.80
Inc
P&P

FOR YOUR VALUABLE
COLLECTION OF
AEROMODELLER
MAGAZINES

B
I
N
D
E
R
S

- ★ TOP QUALITY
- ★ SMART
- ★ EASY TO USE

ASP
READER SERVICES
ARGUS HOUSE
BOUNDARY WAY
HEMEL HEMPSTEAD
HERTS HP2 7ST
Telephone your order
(0442) 66551



Please supply AEROMODELLER BINDERS @ £6.80 each inc P&P

Total £..... (Please make cheques/postal orders payable to A.S.P.)

NAME

ADDRESS

Or debit my ACCESS/VISA Expiry

Please allow 28 days for delivery

now open

At last! The very first museum dedicated to Model Aviation. A tribute to man's ingenuity in the air and in scale. See our vast range of fascinating models spanning almost 90 years of civil and military aviation. Meet enthusiasts and master craftsmen too.

With only rare exceptions all the models have flown. And many will again through out the season. Watch our Flying Visits, when we call the expert Flyers from all over Europe to show off their talents.

Visit us soon. Take time to stop over in Loopers where you'll find good wholesome and homemade refreshments, and plenty of friendly folk to swap yarns with!

Goosedale is for modellers, aviation enthusiasts, and all the family Come and see for yourself.



**the
MODEL
AVIATION
museum**

Where Models Work

Goosedale Moor Road
Bestwood Nottingham
NG6 8UJ England
Tel (0602) 632175

Directors M G G Wand V Wand
Registered No 275948

With Compliments

when & how to visit

We're open seven days a week right now, from 10.00 through to evening. Use the Map here to find us - and please phone if you'd like any further information.

ADULTS £2.50, CHILD, O.A.P., etc £1.20



VINTAGE PLANS SIGNED THIS MONTH BY THE DESIGNER TOMMY KENNEDY

VINTAGE AIRCRAFT PLANS

M.S. Privateer MKI Powered Highwing Monoplane. Span 6'6"	£7.50
M.S. Privateer MKII. Powered Highwing Monoplane. Span 4'6"	£3.00
M.S. Bee Powered High Wing Cabin Monoplane. Span 4ft	£3.00
M.S. Hornet. Powered Semi-scale Monoplane. 40" span	£3.00
M.S. Wasp Powered Semi-scale Biplane. 40" span	£3.00
M.S. Hawker Fury 1/24 Scale Rubber Powered Biplane Fighter	£1.50
M.S. Hawker Hurricane 1/24 Scale Rubber Powered Fighter	£2.00
M.S. Supermarine S6B 1/24 Scale Rubber Powered Seaplane	£5.00
M.S. Hawker Fury 3/4" to 1ft Scale Rubber Powered Biplane Fighter	£3.50
M.S. Hawker Demon 3/4" to 1ft Rubber Powered Biplane Fighter	£5.00
M.S. Spitfire Mk XII 3/4" to 1ft Rubber Powered Fighter	£5.00
M.S. Comper Swift. 1 1/2" to 1ft. Scale Rubber Powered Monoplane	£2.00
M.S. Flying Flea 1" to 1ft Rubber Powered Model	£2.50
M.S. Arrow Active 1" to 1ft Scale Rubber Powered Single Seat Biplane	£3.00
M.S. Lockheed Vega 1 1/2" to 1ft Rubber Powered Scale Monoplane	£3.00
M.S. Midge 24" Span Rubber Powered Low Wing Monoplane	£1.50
M.S. GnatII 26" Span Rubber Powered High Wing Monoplane	£1.50
M.S. Gnat 20 Span Rubber Powered High Wing Monoplane	£1.50
M.S. Gemini 25" Span Glider	£1.50
M.S. Albatross 41" Span Glider	£2.00
M.S. Swift 36" Span All Sheet Glider. Towline Launch	£3.00
M.S. High Speed Hand Glider 15 1/2" Span Chuck Glider	£1.50
M.S. Sports Coupe 30" Span Rubber Powered High Wing Monoplane	£3.00
M.S. Sportster 24" Span Rubber Powered Sports Model	£2.00
M.S. Dragonfly 30" Span Rubber Powered High Wing Monoplane	£2.00
M.S. Keeplane 30" Span Rubber Powered Parasol Monoplane	£2.00
M.S. Spitfire MKI 1/24 Scale Rubber Powered Monoplane Fighter	£2.00
M.S. Spitfire Prototype 3/4" to 1ft Rubber Powered Fighter K5054	£3.00
M.S. Magister 1/24 Scale World War 2 Trainer Rubber Powered	£2.00
M.S. Viper 30" Span Model Designed for Jetex 100-200	£3.00
M.S. Gloster Gladiator Span 16"	£5.00



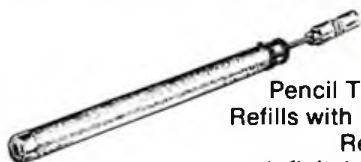
THE MODEL SHOP

BRITAIN'S FIRST ESTABLISHED 1924

18 BLENHEIM STREET, NEWCASTLE UPON TYNE
091 2322016 SHOP OPEN 9.30 - 5.30 Mon - Sat

Reader Offer

The Versatile Microtorch



Pencil Thin Microtorch
Refills with Lighter Butane
Reaches 1300°C
Infinitely variable flame
"GS" Approved

only £7.00 inc p&p

Lightweight but robust the Microtorch is ideal for those smaller jobs and emergency repairs. Just pop it in your tool box and you are prepared to carry out a bit of Silver Soldering, even when miles from your workshop. The extended brass burner allows you to provide local heat to even the most inaccessible areas, whilst the pen style construction is easy to hold.

The Microtorch is filled by normal lighter butane fuel and will give approximately 20 minutes working time on a single fill.

Aeromodeller Reader Offers, Argus House, Boundary Way,
Hemel Hempstead, Herts. HP2 7ST

Please supply Microtorch ROME8 @ £7.00

Please supply Both ROME15 @ £11.50

Cheques/P.O. payable to A.S.P. or debit my Access/visa

Expiry Signature

Name Address

Allow 28 days for delivery (U.K. only overseas upon request)

Aeromodeller Reader Offers, Argus House, Boundary Way, Hemel Hempstead, Herts. HP2 7ST.

Helping Hands with glass magnifier



6 Ball joints for all angles
Nickel-plated fittings
Heavy cast-iron base
Alligator Spring Clip's
lock at any angle

**only £5.95
inc p&p**

**BUY BOTH items at the
very special price of
£11.50 inc.**

Telephone orders 0442 66551



T
O
P
Q
U
A
L
I
T
Y
T
O
P
V
A
L
U
E

SCOTLAND

FOR YOUR ESSENTIAL
AEROMODELLING SUPPLIES
YOUR *FIRST* REQUIREMENT
VISIT

DUNN'S MODELS

3 WEST NILE STREET
GLASGOW G1 2PR
Tel: 041-221 0484

SAMS "OK CHAPS...SCRAMBLE"

For the NEW SAMS
CATALOGUE!

SAMS 60 pages with over 1500 items
tailor made for all Indoor -
Outdoor - Vintage - Free
SAMS Flight. Make sure of your FREE
copy. Send 9 x 7 SAE (40p) to:
SAMS The Chapel • Sandon •
Buntingford • Herts SG9 0QJ
Tel: 076 388 384
answerphone

THE AVIATION BOOKSHOP

HAS

THOUSANDS OF BOOKS
THOUSANDS OF MAGAZINES
in many languages — as well as
THOUSANDS OF PHOTOGRAPHS

all on Aviation: WW1, WW2, Civil, Military, Engineering,
Aero Modelling, Navigation, Pilotage, Helicopters,
Meteorology etc.

Call in — or send £1 for large catalogue

THE AVIATION BOOKSHOP
656 Holloway Road, London N19 3PD

Tel: 071-272 3630

Access and Visa welcomed



FLY MODEL AIRCRAFT — OR WANT TO?

The British Model Flying Association is
the official UK body. Write now for details
of our extensive network of clubs
nationwide for tuition, achievement schemes, sites,
information, competitions and other activities.

We can help you with radio controlled models, power,
electric, scale, glider (thermal and slope), helicopters,
large models, small models too, not forgetting free flight
and control line.

£2m insurance plus many other benefits —
SAE with an idea of your interests to:
BMFA, 31 St. Andrews Road, Leicester, LE2 8RE.

Be
Quiet!

Use an EFFECTIVE
silencer



PAW

249 AND 19 TBR ENGINES. TWIN BALL RACE



TBR	£49.45
TBR - R/C	£56.35
TBR-G	£51.75

Fully tuned for
Goodyear and Combat

TBR - GT	£60.95
•5 b.h.p. @ 20000 r.p.m.	

TBR	£51.75
TBR - R/C	£58.65

All 'G' (Goodyear) models have lowered Needle Valve
position for best fuel feed in side mounted installation.

'G' models will not convert to R/C.

All R/C with Silencer.

PROGRESS AERO WORKS
UNION MILL, UNION STREET,
MACCLESFIELD SK11 6QG.
TEL. 0625 - 23891



IF AN ADVERT IS WRONG, WHO PUTS IT RIGHT?

We do. The Advertising Standards Authority ensures
advertisements meet with the strict Code of Advertising Practice.
So if you question an advertiser, they have to
answer to us.

To find out more about the ASA, please write to
Advertising Standards Authority,
Department X, Brook House,
Torrington Place, London WC1E 7HN.



This space is donated in the interests of high standards in advertisements.

AERO VIDEO SERVICE

MODELLER

**An exciting range of modelling videos
Now at even better prices!**



TVRC01 LEARN TO FLY RC HELICOPTERS with Ian Mount
Master of the rotary wing RC model takes novice helicopter pilot through all the stages of learning to fly his model, including setting-up gyros and controls. This 60 minute video charts the progress from installation, initial buddy-box training, hovering & circuit flying, finishing with a breathtaking demonstration by Scottish & British Champion Ian Mount.
Duration 60 minutes **£14.99**

TVRC04 AIRBRUSHING - with Ray Habgood.
Equipment and techniques demonstrated on a Lexan car bodyshell, and a mural on your favourite models wing.
Duration 30 minutes **£9.95**

TVRC08 1st EUROPEAN DUCTED FAN FLY-IN
This spectacular ducted fan event held in Genk, Belgium in July 1988, must be the best gathering of fan models ever. With models from all over Europe, and the best pilots flying, this is a video for every fan enthusiast, and for scale modellers too! With many interviews and good close static shots, and even one or two crashes!!
Duration 58 minutes **£14.99**

TVRC10 10th P4C WORLD CHAMPIONSHIPS
All the excitement of the 1988 SCALE World Championships held in Gorizia, Italy. In this video we look at the top scale models in the world, and talk to some of the teams and pilots who built them. With plenty of close-up shots to show all the perfect detail, and plenty of exciting flying, probably the best video of scale ever made, and a must for scale flyers. Narrated by David Boddington.
Duration 60 minutes **£14.99**

NEW RELEASES

TVRC23 SANDOWN SYMPOSIUM '89 Duration 60 minutes **£14.99**
This model symposium is the largest of its kind in Europe. Introduced by Michael Bentine, it features model aircraft, helicopters, stock car racing, off road buggy racing, model boats and novelties, all controlled by radio, indoor model railways and table-top modelling. The main feature of the show is the return of World Champion Hanno Pretner, in this exclusive interview with David Boddington he describes his aerobatic manoeuvres and how he won the Tournament of Champions in Las Vegas again!

TVRC24 SHOWSTOPPERS '89 Duration 60 minutes **£14.99**
Cranfield - West Malling.
Cranfield welcomes the return of the AMT Frisch Team from Germany and some of the large scale models at the show. Organised by the Barnstormers Flying Circus, it has to be an exciting show. West Malling International Model Airshow is an annual event with teams from all over Europe. With giant RC models of a Dakota DC3, a Constellation, DC10, Corsair and Tornado ducted Fan with swing-wing and a host of other showstoppers!

TVRC25 European Large Scale Duration 60 minutes **£14.99**
Le Ferre Alais, Paris
Europe's largest gathering of large scale radio-controlled model aircraft. Featuring a vintage model replica of the Wright Flyer, some fine examples of the high standard of modelling in the aircraft include a 3/5 scale Fokker DR1 Triplane with a 400cc engine and what a way to end! Some superb formation aerobatics by a Super Chipmunk duo and many interviews and superb scale close shots after all they are full size aircraft in miniature!

TVRC28 Build the RCM&E Hawk 98 minutes **£14.99**
Economical Ducted Fan
This video has been produced to assist in the construction of the RCM&E plan Hawk No. 1450 and a pack consisting of canopy and foam wings from ASP Plans Service. In addition, Turbolan, presenters of this video can supply the K&B 45cu in engine and Micro Mold fans as used in the construction in this video. Designed to assist in your first ducted fan model, this video has been produced as part of an economical plan pack.

For the very first time on video

The Beginners Guide to R.C. Aircraft

3 Volumes of educational videos - produced by T.S. Video Productions and Ian Peacock



TVRC20 BEGINNERS GUIDE TO RC AIRCRAFT ...

VOL 1 Building the Airframe
Now, you have chosen to build and fly your first RC model aircraft, Ian Peacock shows you some of the latest types of models, and takes you through the stages of building an economical training aircraft.
Duration 60 minutes **£9.99**

TVRC21 BEGINNERS GUIDE TO RC AIRCRAFT ...

VOL 2 Covering, and installation of radio and engine. Now you have completed your airframe, you need to know how to cover and finish-off. Ian Peacock shows you a range of covering materials and how to apply them. You will now require an engine and radio-control, Ian shows you some of the radio-control units and engines suitable for your first RC model aircraft, and how to install all this into the airframe correctly.
Duration 60 minutes **£9.99**

TVRC22 BEGINNERS GUIDE TO RC AIRCRAFT ...

VOL 3 Up, up and away!
In this third part of this beginners series, Ian Peacock shows you the safe and recommended way to start and fly your first RC model aircraft. How to trim your airframe, engine and radio, and how to progress through the learning stages of flying your first RC model aircraft.
Duration 60 minutes **£9.99**

Please note: Videos prefixed TVRC available in VHS and Betamax formats for European and PAL/NTSC formats RCM&E Reader Services, Argus House, Boundary Way, Hemel Hempstead, Herts. HP2 7ST. Please indicate on the order form the type of tape required.
Postage - inclusive of UK postage.
Overseas - Europe: Add £2.00 per tape.
Worldwide: Add £5.00 per tape.

****Video's by TS Video productions.**

**AM Readers Service, Argus House,
Boundary Way, Hemel Hempstead HP2 7ST
Tel: (0442) 66551**

Please supply Video Cassettes, Order Code Price £

..... Video Cassettes, Order Code Price £

Overseas Postage (See details of rates above) £

I enclose my cheque or Postal Order payable to ASP for £
Please debit my Access - Barclaycard

..... Expiry

Name

Address

Please indicate Tape format VHS BETA PAL/NTSC (See above) Please allow 28 days for delivery
AM/JUNE 90

MICHAELS MODELS

MAIL ORDER HOTLINE 081-445-6531

Licensed Credit Brokers



Licensed Credit Brokers

646-648 HIGH ROAD
NORTH FINCHLEY
LONDON N12 0NL
TEL: 081-445 6531

Open: Mon.-Fri 9am-6pm.
Saturday 9am-5.30pm.

DIESEL ENGINES		TWIN BALL RACE		CONTROL LINE ACC. cont		IRVINE ENGINES GLOW cont		
P A W STANDARD		80 TBR	RC	£50.80	SULLIVAN Connectors Sml Pr	£1.10	21 RE ABC Speed	£88.75
80 Mk II	STD	100 TBR	RC	£50.80	Connectors Lge Pr	£1.10	(We can now offer the)	
100 Mk II	STD	*149 TBR inc sil	RC	£56.35	Lead Out AB	£1.75	(IRVINE 15 R ABC FF/Combat)	
149 DS-4	STD	*249 TBR inc sil	RC	£56.35	Lead Out CD	£1.75	(converted to diesel)	£119.75
149 Contest-4	STD	* 19 TBR inc sil	RC	£58.00			IRVINE ACCESSORIES	
249 DS-4	STD	(* PAW Including Silencer)			LAYSTRATE WIRE		15 Size Tuned Pipe	£21.40
249 Contest 4	STD	*****			70 ft 7 Strand HW	£2.95	20 Size Tuned Pipe	£20.80
D19 DS-4	STD	CIPOLLA			100 ft 7 Strand HW	£2.45	20 Size Muffled Pipe	£27.50
*29 DS inc sil	STD	2.5cc Combat Special Diesel		£214.95	LW	£2.15	IRVINE SPARES - 15 R ABC	
*35 DS inc sil	STD	*****			100 ft 3 Strand LW	£2.75	Gold Head	£3.22
SINGLE BALL RACE		NEW ENTRY from IRVINE			SUPERLINE dia.	length	ABC Piston/Liner - 15 FF	£26.75
80 Vintage Classic	STD	*****			Sgl Strand .3mm	35mtrs	ABC Piston/Liner - 15 Speed	£26.75
80 Mk II BR	STD	20 ABC R/C Diesel Inc Sil		£62.65	Sgl Strand .3mm	500mtrs	(Full IRVINE spares available)	
100 Mk II BR	STD	*****			Sgl Strand .3mm	1000 mtrs		
149 DS BR	STD	A M DIESEL			3 Strand .33mm	35mtrs	EPOXY RESIN - SP RANGE	
249 DS BR	STD	1 cc inc Tank/Silencer		£28.95	3 Strand .33mm	500mtrs	T-SP1131 SP113 250g	£4.95
19 DS BR	STD	1.5 cc inc Tank/Silencer		£29.95	7 Strand .4mm	35mtrs	T-SP1132 SP113 500g	£7.95
TWIN BALL RACE		A E from D J ALLEN			7 Strand .4mm	500mtrs	T-SP1135 Micro Balloons 40g	£2.25
80 TBR	STD	.5 cc Diesel		£27.60	7 Strand .4mm	1000mtrs	T-SP1137 Ltwt Gls Cloth 2yds	£5.95
100 TBR	STD	1.0 cc Diesel		£26.50	7 Strand .45mm	35mtrs	T-SP1140 Wing Joining Kit	£1.75
149 TBR GY	STD	1.0 cc RC Diesel		£29.50	7 Strand .45mm	500mtrs	T-SP1141 SPX 5000 Epoxy Resin	£6.35
149 TBR GY Tuned	STD	1.5 cc Diesel		£27.60	7 Strand .45mm	1000mtrs	T-SP1151 Carbonfibre 50mm/1m	£1.95
249 TBR	STD	1.5 cc RC Diesel		£36.80	FOX Connector 4Pk Lge/Sml	£0.75	T-SP1152 Carbonfibre 50mm/2m	£3.75
249 TBR GY	STD	CIPOLLA 1.5 cc Diesel		£29.99	GLOW ENGINES		T-SP1153 Carbonfibre 400x500	£5.95
249 TBR GY Tuned	STD	MERCOR inc Silencer			O S STUNT - PLAIN BEARINGS		TREXLE AIR WHEELS	
19 TBR	STD	30 Stunt		£34.95	10 FPS	Glow	Size 1 (1 1/4" - 1 3/8")	£3.95
P A W RADIO CONTROL		35 Stunt		£39.95	15 FPS	Glow	Size 2 (1 1/2" - 1 5/8")	£3.95
PLAIN BEARING		40 Stunt		£44.95	20 FPS	Glow	Size 3 (1 3/4" - 1 7/8")	£4.65
80 Mk II	RC	50 Stunt		£54.95	25 FPS	Glow	Size 4 (2" - 2 1/8")	£4.65
100 Mk II	RC	61 Stunt		£69.95	35 FPS	Glow	Size 5 (2 1/4" - 2 3/8")	£5.75
*149 DS-4 inc sil	RC	EXPECTED SOON			40 FPS	Glow	Size 6 (2 1/2" - 2 5/8")	£5.75
*249 DS-4 inc sil	RC	30 Diesel Stunt		£44.95	46 SFS ABC DBR O S	Glow	Size 8 (2 3/4")	£6.50
* 19 DS-4 inc sil	RC	30 Diesel RC		£49.95	M V V S DOUBLE BALL RACE		Size 9 (3")	£10.95
* 29 DS inc sil	RC	CONTROL LINE ACCESSORIES			2.5cc FI/RE	Glow	Size 10 (3 1/2")	£12.50
* 35 DS inc sil	RC	Sullivan J S 1 Handle		£4.25	2.5cc RI/RE	Glow	Size 11 (4")	£13.95
SINGLE BALL RACE		Sullivan J S 2 Handle		£4.25	3.5cc FI/SE	Glow	Pump	£7.95
80 Vintage Classic	RC	*****			6.5cc FI/SE	Glow	(Size 1-6 for Free Flight Only)	
80 Mk II BR	RC				IRVINE ENGINES GLOW		*****	
100 Mk II BR	RC				15 R ABC FF/Combat	£84.75	NEW FROM A.E. 2cc DIESEL	£55.25
*149 DS BR inc sil	RC				15 R ABC Speed Piped	£105.50	*****	
*249 DS BR inc sil	RC							
*19 DS BR inc sil	RC							

POST & PACKING: UK - Engines 95p., F/F Kits £2.00, Vintage Kits £2.75, Accessories 75p. Overseas - Deduct 13% on orders over £25.00. Postage & Packing at cost.
PAYMENT: UK - Cash (Registered Mail), Postal Orders, Cheques, Visa, Access, Am Ex, Diners. Overseas - Currency (Registered Mail), Sterling Cheques/Bank Drafts, Visa, Mastercard, Am Ex, Diners. Credit/Charge Card orders - Please quote Expiry Date. All orders despatched within 1 day. If stock not available for immediate despatch customers will be notified of the delay.

AEROMODELLER Reader Service

NEW COMPUTER SOFTWARE FROM THE USA
USE YOUR PERSONAL COMPUTER TO HELP
DESIGN YOUR MODELS

Plot and print wing ribs on your Dot Matrix printer



LOOK WHAT IT CAN DO:

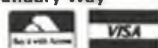
- ★ Plot standard wing ribs to 45in. chord from a library of 40+ sections
- ★ Modify library sections in thickness and camber as required
- ★ Plot individual ribs for tapered chord wings
- ★ Plot spar, LE, TE positions and skin thickness on ribs
- ★ Allows input of ordinates for additional sections

PLUS

The Model Design Program enables you to do all of the above and

- ★ Plot ribs for wings with differing root and rip sections
- ★ Plot ribs with washout
- ★ Print wing or tail plans to scale (even full-size if your printer permits)
- ★ Plot fuselage sections - rectangles, circles, ellipses and combinations of shapes

Order from: AEROMODELLER Reader Services, Argus House, Boundary Way
Hemel Hempstead, Herts. HP2 7ST.
Telephone:- 0442 66551 for Credit Card orders



Kindly mention AEROMODELLER when replying to advertisements

Aero Modeller

Now 3 library disks of section data available including RAF, NACA, Quaback, Eppler, Goettingen, Ritz, Girsberger, Selig and many more sections, 180 in all.

AVAILABLE FOR IBM COMPATIBLE COMPUTERS ONLY (needs a printer for output of data) Any IBM Compatible computer with MS-DOS 3.2 or later Operating System, a 5 25in. 360k Disk Drive and an Epson Compatible printer, e.g. Amstrad PCs 1640 etc.

Prices Airfoil Plot £15.00 inc. VAT & Postage RORM10
Model Design - £25.00 inc. VAT & Postage RORM11
Data Vol. 1 - £7.00 inc. VAT & Postage RORM12
Data Vol. 2 - £7.00 inc. VAT & Postage RORM13

Please supply Qty RORM10 - Airfoil Plot @ £15.00 inc.
Please supply Qty RORM11 - Model Design @ £25.00 inc.
Please supply Qty RORM12 - Data Vol. 1 @ £7.00 inc.
Please supply Qty RORM13 - Data Vol. 2 @ £7.00 inc.
Total £ Expiry Date

Or debit my Access/Visa

Signature

Address

U.K. only (overseas upon request)

Please note your name may be used for marketing purposes

CLASSIFIED advertisements

Private and trade 49p + VAT, minimum 15 words. Display box rate £10.00 per single column centimetre (minimum size 2.5cm). All advertisements are inserted in the first available issue, unless specified otherwise.

Write your advert in **BLOCK CAPITALS** indicating the section you wish it to appear in, **INCLUDING YOUR NAME AND ADDRESS** and send it to: **AEROMODELLER, CLASSIFIED ADVERTISEMENT DEPARTMENT, ARGUS HOUSE, BOUNDARY WAY, HEMEL HEMPSTEAD, HP2 7ST.**

We accept
Access/
Barclaycard
For more
information
call
**CHARLES
UCHEOBI
ON
0442 66551**



FOR SALE

REPLICAS AND ORIGINALS OF CLASSIC GERMAN CONTROL LINE KITS (1955-1960):

Ultra Stunter (1.5cc) Repl	DM 109
P6 Mew Gull, T.R., (2.5cc) Repl	DM195
Hegi 60, Schuco Combat 2.5cc, Repl	DM79
Me 109 H (2.5cc) Repl	DM 175
Meteor Stunt 2.5cc (Aeronaut)	DM 65
Matador Stunt 2.5cc (Aeronaut)	DM 74
Komet Stunt 5-6cc (Aeronaut)	DM 102
Original Graupner C.L. Handle	DM 48

DIESEL & CO. ENGINES:

Pares 2.5cc RVD DM 235, RVT DM 285	
Original Webra 1.5cc D DM 170 (RC DM 178)	
FMO 1.5cc Diesel Boxer Twin RC	DM 450
FMO 6cc Diesel Boxer Twin RC	DM 630
Russian Mk 17 Diesel 1.5cc	DM 63
Modela CO: - Engine 0.27cc	DM 56

Only DM Eurochecks or JMO accepted 64 page catalogue DM 5.-

AMZ - Im Strasser Feld 29 D - 512 Herzogenrath, F.R. Germany, 00492406/5952

VACUUM FORM MODEL PARTS TO COMMERCIAL STANDARDS



A NEW LOW
COST QUALITY
MACHINE TO
FORM 228 x 305
x 6mm (max)
THERMOPLASTIC
SHEET.
RING FOR BROCHURE

C.R. Clarke
& Company (UK) Limited
MIMMAMFORD, DYFED SA18 2LS TEL 0269 593860

SAMS

INDOOR, FREE, FLIGHT, VINTAGE.
SAMS 1200 ITEM CATALOGUE
90/91, YOURS FOR THE ASKING.
SEND SAE (9x7 + 30p stamp)

SAMS

The Chapel, Roe Green, Sandon, Nr
Buntingford, Herts SG9 0QJ
Telephone (076) 388 384

Available also in French. Overseas send 4
Postal Coupons. Sorry no callers

FOR SALE PAW Engines New:
1 49DS £15 29DS £30 Run/in 80#
£10 19DS BR £25 tuned 2.5g/y
£40. Tel: Ken Baker 081 691 0497
eves/WE.

**TO ADVERTISE
CALL 0442 66551**

THE PEATOL LATHE



£140 including 3 or 4 jaw chuck, Milling attachment
and other accessories available. Centre height 2.1".
Distance between centres 9".

Please send SAE for full details
Postal Machine Tools, A.M., 19 Kemplow Road, Harborne,
Birmingham B17 8PS Price inc. VAT

WANTED

WANTED - Super Tigre G21/46
preferably boxed or little used.
Please phone 0803 522 308 Day
or 06477 296 Evening.

For Sale

TELCO CO2 -

The entire manufacturing divi-
sion is available as a complete
package - comprising of all
moulds, tooling, and jigs, etc.

Serious enquiries only please

For further information write
to M. D. Hodge at:-

CHART HOBBY DISTRIBUTORS
CHART HOUSE - STATION ROAD
EAST PRESTON - LITTLEHAMPTON
WEST SUSSEX - BN16 3AG

PLANS

PLANS Flying Scale Model
Aircraft, by H.J. Towner. Send
S.A.E. for price list. Authentic Scale
238 Kings Drive, Eastbourne,
BN21 2XE E. Sussex.

ACCURATE SCALE PLANS FOR CO₂ FLYING MODELS

22" CURTISS JN4A (JENNY)
18" SE5A
18" FOKKER DVII
20" LUTON MINOR
18" TIGER MOTH
20" VICKERS WALRUS
20" HAWKER HURRICANE
26" CO₂ IE SPORTSTER £2.20
£3.20 EACH INC. P&P (UK)

STAN COLE

5D, MAGDALA ROAD,
ISLEWORTH, MIDDX,
TW7 7DD

GLIDING COURSES

ELATION LEISURE SPORTS

- ★Paragliding
- ★Hang-gliding
- ★Micro-lighting★



Now for the first time under one roof you can
experience all three of these exciting
adventure sports over the beautiful Wiltshire
Downs

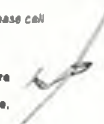
For details: Send 20p s.a.e. to
Elation Leisure
The Old Barn, Rhyia Lane, Lockeridge,
Marlborough, Wiltshire SN6 4EF or Tel: 0672
88555 or 0860 248 555

Try Somewhere Different...

Visit our edge top gliding site at Nympsfield
in the Cotswolds. We can teach YOU to fly at
our superbly situated scenic site. We have a
residential clubhouse, bar and professional
instructors. Treat yourself to an excitingly
different holiday. Courses run from mid April
to October.

For further information please call

Stan Franklin on
0453 860342/860060
or write to the
Bristol & Gloucestershire
Gliding Club,
Nympsfield, Stonehouse,
Glos. GL10 3TX.



**IF YOU WOULD
LIKE TO
ADVERTISE
YOUR COURSE
TO
AEROMODELLER
READERS, CALL
CHARLES
UCHEOBI ON
0442 66551
TODAY**

WANTED

WANTED - Ready-built model air-
craft, boats, yachts, cars, steam-
driven models, also engines, kits,
radio control equipment etc. If you
are selling up, Tel: Godalming
21425. T/C

SERVICES

AM, COX, FOX, P.A.W., Silver
Swallow, Motor Spares & Services.
John D. Haytree, The Haven, Rixey
Park, Chudleigh, Devon. TQ13
0AN. Tel (0626) 852330 Access,
Visa.

IF YOU'RE
READING
THIS -
SOMEONE
COULD BE
READING YOUR
ADVERTISEMENT!

WHY NOT
FIND OUT
THE
ADVANTAGES
OF
ADVERTISING
IN
AEROMODELLER
BY CALLING
CHARLES
UCHEOBI
ON 0442 66551.

OR WRITE
TO US
AT THE
FOLLOWING
ADDRESS:
ARGUS HOUSE,
BOUNDARY WAY,
HEMEL
HEMPSTEAD
HP2 7ST.

Model Shop Directory

THE COMPREHENSIVE MODEL MAKERS GUIDE

Rates:- £11.85 for 12 series
£13.00 for 6 series (exclusive VAT)

Classified Advertising Tel. no. 0442 66551.

TYNE AND WEAR

THE MODEL SHOP
BRITAIN'S FIRST EST 1924.
18 BLENHEIM STREET
NEWCASTLE UPON TYNE
NE14AZ Tel: 091 232 2016
Open Monday - Saturday 9.30 - 5.30

WILTSHIRE

MELKSHAM MODELS Tel (0225)
19 BATH ROAD 703311
MELKSHAM
WILTS SN12 6LL
Mon, Tue, Thurs, Fri, Sat 9.30am - 5.30pm
Closed all day Wednesday

TO ADVERTISE CALL
0442 66551

BEDFORDSHIRE

LUTON Tel. (0582) 28435
MAPLE MODELS I
62 FOUNTAIN ROAD
BEDS LU3 1LY
Mon to Sat 9.00am - 5.30pm
Late evening Wed to 7.30pm

HERTFORDSHIRE

MODEL CITY Tel (0727) 64654
129 HATFIELD ROAD
ST. ALBANS
HERTS
9-5.30pm Mon - Sat
VISA ACCESS

LONDON

LONDON Tel: 071 703 4562
MODEL AIRCRAFT SUPPLIES LTD
207 CAMBERWELL ROAD SE5 ★
Open: Mon - Sat, 10 am - 8 pm.
Fri. 10 am - 7.30 pm
Closed all day Thursday

BUCKINGHAMSHIRE

MILTON KEYNES Tel. (0908)
MAPLE MODELS II 678153
692 SILBURY BOULEVARD
CEN. MILTON KEYNES BUCKS
Mon to Fri 9.45am - 5.30pm Sat 9 - 5.30pm
Late evening Thurs to 7.30pm

STEVENAGE Tel. 0483 743530
MODELS IN MOTION
57 HIGH STREET
OLD STEVENAGE, SG1 3AQ
Out of hours: 0836 208090
Kyosho, Tamiya, Parma, Demon, Schumacher

LONDON Tel: 071-607 4272
HENRY J. NICHOLLS & SON LTD.
HOLLOWAY ROAD N7 ★
Open
Mon, Tues, Wed, Fri 9.30am-5.30pm
Saturday 9.30am-5.00pm
Thursday 9.00am-1.00pm (half day)

YORKSHIRE

LEEDS Tel: (0532) 646117
THE MODEL SHOP
(late Flying Models) ★
88 CROSSGATES ROAD
CROSSGATES, LEEDS LS15 7NL
Mon. - Sat. 6 am - 5.30 pm

CAMBRIDGESHIRE

PETERBOROUGH Tel: 0723
ORTON MODELS 68200
36 HERWARD CENTRE ★
CAMBS. PE1 1TF
Open Mon - Fri 9.30 - 5.30 Thurs 9 - 6
Sat 9 - 5

KENT

CANTERBURY Tel: (0227) 453896
CANTERBURY MODEL SHOP
4 BUTCHERY LANE ★
Open: Mon - Sat 9am - 5.30pm

MIDDLESEX

HARROW Tel. 071 863 9788
THE MODEL SHOP
190-194 STATION ROAD
Mon-Sat 9.30-6.00
Wednesday 9.30-5.00

BRADFORD Tel: (0274) 726186
MODEL DROME ★
217 MANNING LANE
BRADFORD, BD8 7HH
Open 9.30am - 5.45pm
Closed all day Wednesday

CORNWALL

FALMOUTH Tel: 0326 317475
HARRY BROOKS
MARKET ON THE MOOR
THE MOOR
FALMOUTH, CORNWALL
Open every day except Sunday

LONDON

LONDON Tel: 071-228 6319
E.F. RUSS
BATTERSEA RISE SW11
Open 9am - 6pm
Early closing Wednesday 1 pm.

HARLINGTON Tel. 081 897 2526
HEATHROW MODEL CENTRE ★
214 HIGH STREET
UB3 5DS
Mon - Sat 9-6pm
Fri - 7pm

SCOTLAND

GLASGOW Tel: (041 221) 0484
DUNNS MODELS ★
3 WEST NILE STREET
Open: Mon. - Sat. 9.00 am-5.15 pm.

ESSEX

CHELMSFORD Tel: (0245) 442164
RADIO ACTIVE (MODELS)
100 MAIN ROAD
BROOMFIELD
Mon, Tue, Wed, Thur, Sat 9-6
Barclaycard & Access

CAMDEN TOWN Tel: 081-458
AERONAUTICAL MODELS 1818
39 PARKWAY NW1 ★
Mon-Fri 9.15-5.30 Sat 5.00pm
Londons leading model specialist
American Express

WEST MIDLANDS

WOLVERHAMPTON 0902 26709
WOLVERHAMPTON MODELS &
HOBBIES 1 MEADOW ST
CHAPEL ASH
Open Mon - Sat 9 - 5.30
Mail Order Welcome

WALES

ABERGAVERN Tel: 0873 2566
ABERGAVERN MODEL SHOP ★
32 FROGMORE STREET
NP7 5AL
Open 9.00am - 5.30pm Monday - Saturday
Sanyo Nicad Batteries Distributors
Under nra Management

UPMINSTER Tel: (040 22) 50272
RADIO ACTIVE MODELS
UPMINSTER LTD
54 ST MARY'S LANE, UPMINSTER
ESSEX Open Mon, Tue, Wed, Thur, Sat,
9am - 6pm Fri 9am - 7pm

KINGSBURY Tel. 081 205 6177
AERO MODEL MART 205 0817
165 CHURCH LANE (24 hr) ★
NW9 8JU Fax: 081 200 7438
Mon-Thurs. 9-5 Fri - Sat 9-6
Access - Visa - Instant Credit

SURREY

EWELL Tel: 081 393-3232
MICK CHARLES MODELS
192-194 KINGSTON ROAD
Mon., Tues., Thurs., Sat., 9.30-5.30
Friday 9.30-7.00
Access Barclaycard Mail Order

HONG KONG

HONG KONG
RADAR CO. LTD. SHOP No 245 ★
OCEAN GALLERIES, HARBOUR
CITY, CANTON ROAD.
TSIMSHATSUI Tel. 3-680507
Open 10am-6pm Closed Sundays

If you cannot find the exciting new **DREMEL® Tools** at your local shop ask the Nationwide DREMEL Distributors for free catalogue and prices:
MICROFLAME HOBBY & CRAFT TOOLS • DISS • NORFOLK IP22 3HQ • 0379 644813



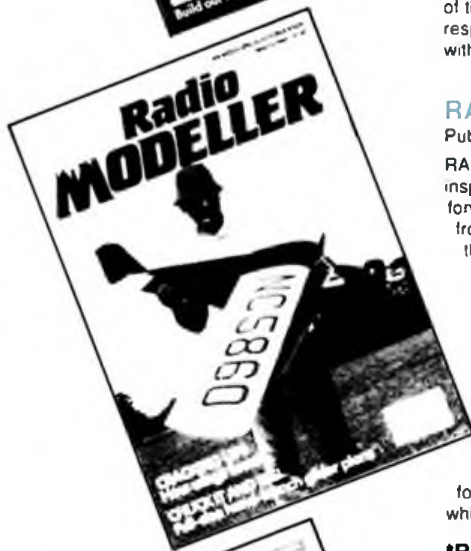
Rates: Lineage 49p + VAT per word. Min 15 words. Display box rates £10.00 per single column cm (minimum size 2.5cm).
Write your advert in BLOCK CAPITALS in the grid below, specifying the section you wish to appear under including your name and address in the word count and send it to: **AEROMODELLER CLASSIFIED ADVERTISEMENT DEPARTMENT, ARGUS HOUSE, BOUNDARY WAY, HEMEL HEMPSTEAD, HERTS. HP2 7ST.**

ALL CLASSIFIED ADVERTISEMENTS MUST BE PRE-PAID.
THERE ARE NO REIMBURSEMENTS FOR CANCELLATIONS.
I enclose my Cheque/Postal Order for £ for insertions, made payable to Argus Specialist Publications.
(* Delete as necessary) or
PLEASE DEBIT MY ACCESS/BARCLAYCARD NO. EXPIRY DATE
£ for insertions

Name
Address
Post code
Daytime Tel. No:
Signature Date.....



Subscribe NOW... here's 4 good reasons why!



RCM&E

Published Monthly - SUBSCRIPTION PRICE: UK £18.00

First of the world's specialist magazines on radio control and now in its 30th year, still the leader. RCM&E is a modeller's favourite and covers all aspects from gliders to helicopters. It has the best possible reputation for in-depth reports, with action photography, much of it reproduced in full colour. Engine reviews, new products, books, plans and regular columns on all R/C flying descriptions, ensure that RCM&E readers are well satisfied with up-to-the-minute information on a fast moving hobby. Free plans, drawn full size are a regular pull-out feature and special offers and free gifts further increase the value.

AEROMODELLER

Published Monthly - SUBSCRIPTION PRICE: UK £23.40

Famous for its in-depth coverage of model building and flying, AEROMODELLER not only encourages the beginner by means of 'how-to-do-it' features and plans, but fuels the enthusiasm of the expert by keeping him abreast of the latest developments and competition reports worldwide. Maintained by a backbone of regular features, each the responsibility of an acknowledged expert in the field, every issue is augmented by a strong selection of special articles with emphasis given to the widest possible photographic coverage. Every month at least one full-size plan is published.

RADIO MODELLER

Published monthly - SUBSCRIPTION PRICE: UK £18.00

RADIO MODELLER covers every aspect of radio controlled model flight in a practical manner which encourages and inspires. Exciting use of colour and the regular very high standard of articles, features, new model designs and straight forward expert guidance, give RADIO MODELLER a well-deserved reputation for emphasising the pleasure to be had from the hobby by R/C Modellers of all levels of ability and expertise. Power model and gliders, slope soarer and thermal, waterplanes and helicopter, they're all explained in simple language which removes the mystery from construction and flying.

RADIO CONTROL SCALE AIRCRAFT

Published alternate monthly - SUBSCRIPTION PRICE: UK £13.50

By combining scale radio control model know-how with full-size aircraft information, RADIO CONTROL SCALE AIRCRAFT has become a winner. Selective features many in colour, include innovative scale construction, internationally famous designs, engine tests, detailing and finishing to high standards, superscale plan features, full-size plan subject each month and superb action photography. Full-size aeroplane information covers marking details, structural information, close-ups and prototypes suitable for modelling in scale drawing form kits and product reviews, outstanding models described and international news, are part of the regular content which is rapidly becoming essential reading worldwide.

*Rates refer to subscriptions sent post free to UK addresses. Overseas rates on application.

Please commence my subscription to
with the issue. I enclose a cheque/money order for
£ made payable to ARGUS SPECIALIST PUBLICATIONS
or debit £ from my Access Mastercard/Barclaycard Visa No.
 Valid from to
Name
Address
Postcode

Signature
Cut out and send this form with your remittance to:
The Subscription Manager, Argus Specialist Publications, Argus House, Boundary
Way, Hemel Hempstead, Herts. HP2 7ST

AM/5



FIBAFILM

iron-on, heat-shrink covering material

A FIBRE REINFORCED POLYESTER FILM

FOR MODELS THAT RELY ON THE COVERING FOR TORSIONAL STIFFNESS e.g. SAILPLANES, VINTAGE MODELS, LIGHTWEIGHT 'ELECTRICS' ETC.

COLOURS - White, Yellow, Orange, Red, Blue In appearance these are like heavyweight tissue with a full gloss finish. Rolls size 72" x 29".

ALUMINIUM - a shiny, textured 'sheet-metal' appearance. A very realistic 'metal' finish for scale models of aircraft such as a Mustang, Thunderbolt, Vampire etc. Also to represent 'polished alloy' cowlings on models of aircraft such as a Hawker Fury. Roll size 72" x 27".

Fibafilm is light (only 2/3 weight of Solarfilm i.e. about 40 gm per sq. metre or just under 1 1/4 ounce per sq. yard). It is not adhesive backed (to save weight). Instead the adhesive (Balsaloc) is applied to the airframe with a plastic sponge and allowed to dry. The Fibafilm is then ironed in place and shrunk tight with extra heat. It is paintable with Solarlac (and probably most other paints). It can be trimmed with Solartrim. It will 'contour' around double curvature such as wing tips by stretching whilst heated with the iron.

For sample and colour swatch send a S.A.E. to

ACKHURST ROAD, CHORLEY, LANCS. PR7 1NH.



THE BIGGEST REVOLUTION IN 50 YEARS OF POWER

(THATS WHAT WE BELIEVE!)

AS
FEATURED
IN THIS
ISSUE

IF YOU WANT REAL, CHEAP, EXCITING FUN FOR ALL POWER FLYING ETC....

POWERMAX - Z IS IT!



Runs for up
to 2 minutes!



Jonathon ARTF Balsa model.
Just stick the ready made wings together, pump
up the air tank and fly!!

JONATHON KIT£35.00
P&P £3.00

MOTOR & RESERVOIR KIT
.....£24.00
P&P £1.50

**JOIN THE REVOLUTION
NOW!**

**MEGA MODELS, Lancaster House, Bentinck Street,
Farnworth, Bolton. BL4 7EP.**

TEL: 0204-792921

FAX: 0204-792922

Kindly mention AEROMODELLER when replying to advertisements

Appendix - Links to the plans

The issue comes with a free plan (FFOXY) printed front/back on a pull out banner of four sheets. The banner is not included in the document. The plan is referenced only in HANGAR DOORS and the building article is announced with the July 1990 issue.

MIDGE EXTRA by John Duggan

CL Midge Speed developments down under. Dimensions in millimeters.

[Document Page: 26](#)

FFOXY by Rod Lewis, Dave Ackery

[https://outerzone.co.uk/plan_details.asp?ID=8295 ...](https://outerzone.co.uk/plan_details.asp?ID=8295...)

[Document Page: 5](#)

Top Soviet F2A by Kalmykov

Quote: We bring you more speed secrets ...

[Document Page: 30](#)

Soviet Control Line model marked as F2C by Unknown

Seen in a soviet magazine. The design might will serve as a handy Team Racer trainer. Presented in FROM THE HANDLE.

[Document Page: 31](#)

F1B - Dutch Model by

FF Rubber. Sketch presented in FREE FLIGHT SCENE

[Document Page: 41](#)



Nationals
Update
More on
compressed air

ISSN 0001-9232

