

Aero modeller

JANUARY 1980 45p
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Aeromodeller

JANUARY 1980

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MAP **HOBBY MAGAZINE**

Comment

ALTERNATIVE TECHNOLOGY – a project for the 1980s. With a new decade of Aeromodelling before us we are tempted to look towards the modeller of tomorrow. The natural curiosity and inventiveness of model makers, coupled with the new materials that technology has to offer are continuously changing the construction of model planes as we once knew them. The skilled use of natural materials, balsa wood, tissue, silk, dope etc will always have a place in the modellers' repertoire,

but increasingly the use of modern lightweight expanded polystyrene foams, glass cloth and resin, carbon and Kevlar fibres, plastic films and instant adhesives offer an alternative technology. We know that many of our readers are involved with professional modelmaking or parallel technologies in their working lives or are perhaps simply natural innovative modelers in their spare time.

We would like readers to help us update the technology of model plane construction and start by asking our readership what projects they are engaged upon. We are interested in the low energy use of

new materials, and techniques that do not rely upon machine tool shop facilities; but in the same manner as balsa and tissue kitchen table modelmaking, offering tomorrow's aeromodeller the advantages of a new technology be it speed of construction, improved strength or reduced airframe weight. Alternative sources of motive power also come to mind, although not new, electric flight and CO₂ offer great potential for development in the future. If you have knowledge of such techniques which you would like to share with other readers, write to our Editorial office outlining your interests.

Contents

- 14 HANGAR DOORS
- 15 LETTERS
- 15 WHAT'S HAPPENING
- 16 KITTY HAWK III
- 19 CO₂ – IT'S A GAS
- 22 AERO ACES – FLYING HIGH
- 26 R/C SPORTS FLYER
- 29 SISTER KATE
- 30 FREE FLIGHT WORLD CHAMPIONSHIPS, TAFT, USA

On the Cover

Out in the sunshine at Taft, veteran US team member Bob White practices with his now famous *Vol Libre* twin fin Wakefield, as used for the AMA logo for the 1979 World Free Flight Championships. Sadly, at this year's Championships, Bob was down-draughted during the third round to miss a chance of a place in the fly-offs. See page 30 for full story of the Champs.

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Volume XLV No 528

- 40 TOPICAL TWISTS
- 41 FROM THE HANDLE
- 44 SCALE MATTERS
- 45 TRADE REVIEW
- 48 CLUB NEWS
- 50 CAPTION CONTEST
- 57 CLASSIFIEDS
- 58 SALE & SWOP SHOP

Next Month

Double scale feature on the famous Pitts Special S1 Biplane with Aircraft Described drawings from Pat Lloyd plus AFS plans for a Control Line aerobatic scale model. World Champs Technicalities looks at the top Gliders at Taft. Plus lots more news in R/C Sport Flyer, Aero Aces Flying High for Juniors, Control Line, Free Flight and Scale modelling. On sale January 18th 1980.



Page 16

Page 26



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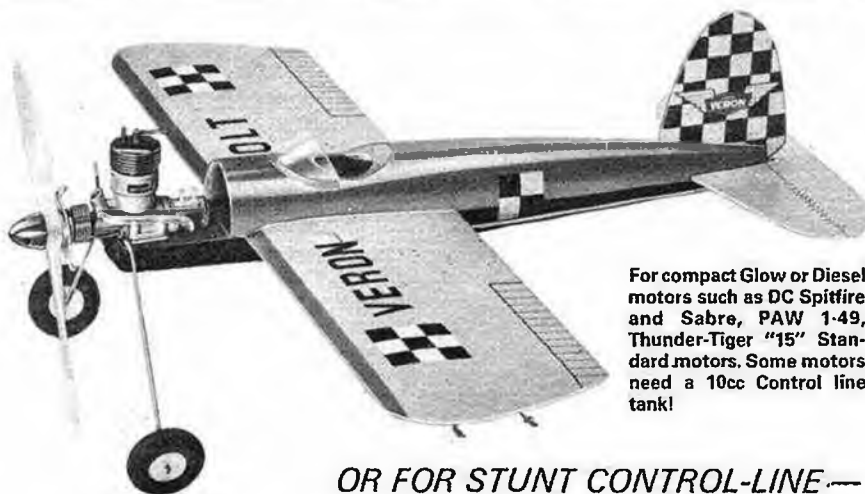
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Veron - BUY AND FLY THE BEST!

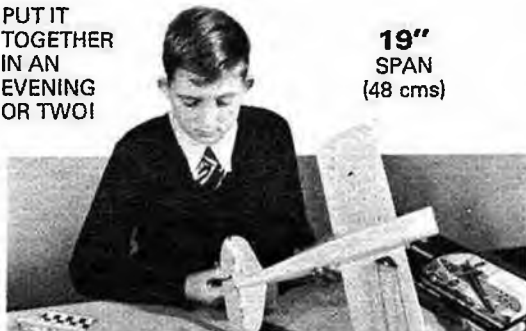
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EVENING
OR TWO!



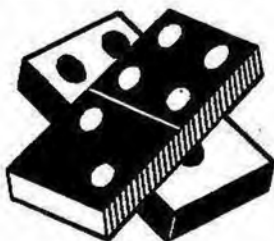
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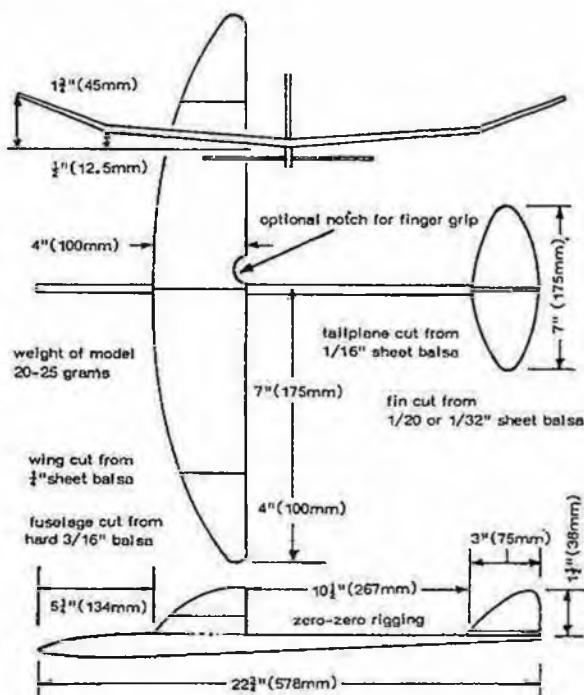
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SOLARBO



Select your Balsa very carefully when it comes to indoor chuck gliders. Almost automatically, of course, that means you go to the Solarbo rack at your local model shop (or your home stock of Solarbo, if you are a really serious modeller), and make your first selection from there. The lightest $\frac{1}{4}$ " sheet you can find. Really light $\frac{1}{16}$ " Rib stock or $\frac{1}{32}$ " quarter-grain sheet.

The really fussy aeromodeller (and potential contest winner or record breaker) will not be satisfied with that. He will pick several sheets of each size. Take them home. Then weigh them individually on a sensitive balance to pick out the lightest specimens of each for his 'best' model. After all, he has a target weight of just under 1 ounce for a 22 inch span all-sheet model.

That's the size of a modern high-performance indoor chuck glider with a flight time potential of up to 60 seconds (provided you have a large enough indoor flying site!). A typical plan to follow is given opposite. We have included dimensions in metric as well as English (thousands of Continental aeromodellers are also dedicated Solarbo balsa users!).

Carve and sand the wing to a nice flat-bottom aerofoil section with a slightly upswept, rounded leading edge. Try to get the finished weight down to $\frac{1}{2}$ ounce or so. Note that only moderate polyhedral is required (and this will be better than plain dihedral, even if it does mean two extra wing joints).

If you are using $\frac{1}{16}$ " Rib Stock for the tail surfaces, sand down to $\frac{1}{20}$ " after cutting to plan shape and taper off the edges.

Cut the fuselage from hard $\frac{3}{16}$ " sheet. No need for balance weight. Trim and sand the rear fuselage if the finished model works out tail heavy. (That's why we recommend hard sheet for this part). No need to dope or wax polish the finished model. That only adds unwanted weight with no benefit to performance.

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THE PEOPLE WHO KNOW HOW TO DESIGN KITS!

Take a model from the lower end of the price range, for example. The UHU (£9.85). It's a beginner's model. A towline 'trainer' with a proven contest performance. Auto-rudder and D/T are standard features. A 'class' design in itself!



The kit is designed with equal care—to make assembly quick and dead easy. Nacelle shells are precision plastic mouldings, ready to fit together on the tailboom. Balsa sheet parts are die cut, and all stripwood milled to size. Other plastic mouldings and complete 'hardware' items. Adhesives, Decals. A really complete MODERN kit.



now let's take the new MINI-NIMBUS

THE KIT CONTENT is fabulous! The fuselage is a finished epoxy-glassfibre moulding with integral fin. There are other finished mouldings for seat, console, canopy frame—and a clear canopy. Die-cut balsa ribs and milled stripwood for making the built-up wings. Pre-shaped tail parts. Hardware items. Covering tissue. Adhesives. Decals.

THE MODEL itself is true-scale with all-moving tailplane, working rudder, elevators, spoilers for R/C—and even optional AERO-TOW RELEASE. Two span sizes—130" span with low-drag tips for optimum cross-country, slope soaring performance. (Kit price £104.50). Or 138" span, giving a 20:1 aspect ratio wing (Kit price £148.50).



CIRRUS 75

Here's another new high-performance R/C sailplane—only just available in the UK. True-scale again, and 111½" wingspan. Featuring T-tail and designed for rudder and elevator control. That means foam wings can be used to cut building time to a minimum. Needless to say, there's nothing to compare with it in its class!

Items available separately:
Canopy £4.75 Fuselage £44.75
Con. Frame £4.25 Wings (pr.) £50.60
Tail Plane and Rudder £19.55

THE KIT again includes a finished moulded fuselage with integral fin. Foam wings, all-moving tail and rudder are balsa-veneered, smooth sanded. Tail parts are further cut out to reduce weight. Kit also includes wing mounts, hardware items, etc. Kit price £101.75.



GRAUPNER'S LATEST BEGINNER'S MODEL

Another NEW Graupner kit which has just become available is the 31½" span PESO (left) featuring prefabricated parts, decals, etc. A simple, highly efficient towline/soarer. Kit price £7.15. Check it out at your local model shop!



GRAUPNER JOLLY 45" span £10.75
A1 class contest sailplane with dethermaliser. Converts to pylon power (Pylon mount price £2.25).



GRAUPNER NANCY 49" span £12.95
A1 class sailplane with auto-rudder and D/T. Die-cut and printed balsa.



GRAUPNER JUNIOR 53" span £13.80
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GRAUPNER KATY 67" span £24.60
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GRAUPNER DANDY 63" span £20.95
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GRAUPNER BETA 77" span £36.50
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*Prices for complete outfits are with FD28M Servo(s).

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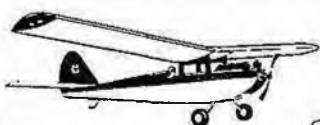
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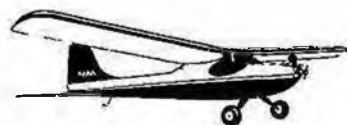


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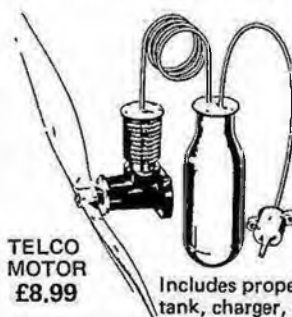
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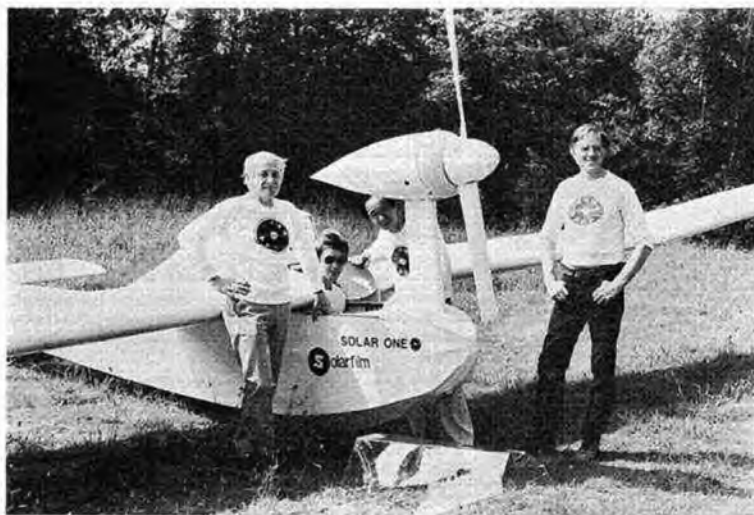
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FAI Team Race	£2.66
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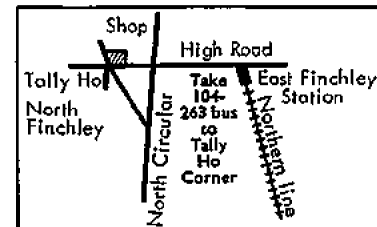
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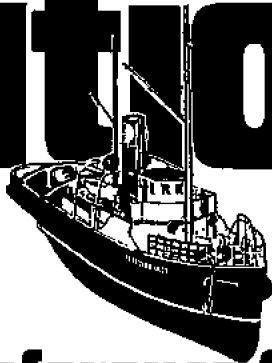
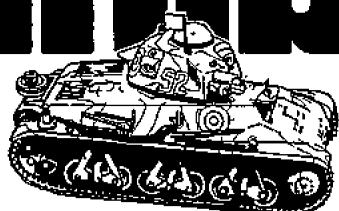
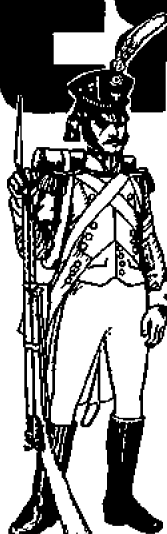
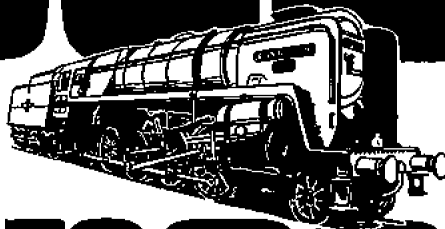
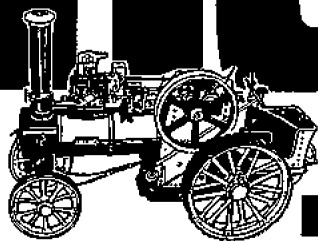
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Model Engineer Exhibition



Wembley Conference Centre
2-12 JANUARY, 1980

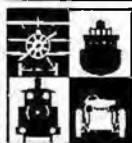
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49th Model Engineer Exhibition

Wembley Conference Centre
2nd - 12th January, 1980
(Except Sunday 6th)

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The Exhibition will open at 11.30 a.m. on 2nd January and 10.00 a.m. each day thereafter (except Sunday 6th) and close at 7.00 p.m. except on Monday and Tuesday 7th and 8th, when the Exhibition will remain open until 9.00 p.m.

ADVANCE TICKETS

Advance tickets and advance party tickets at more favourable prices are available on all days direct from the Exhibition Manager, Model Engineer Exhibition, at the following rates:

	ADULT	CHILDREN
AT DOOR	£1.25	75p
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Please also note that trains to and from Marylebone on the Princes Risborough line stop regularly at Wembley Complex Station, three minutes walk from the Conference Centre. Car Parking at 55p for the day is available for thousands of cars between the Wembley Stadium and the Conference Centre.

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RAeC VICE-PRESIDENT VISITS CHINA

China's participation in the World Free-Flight Championships at Taft coincided with a visit to Peking by Fred Marsh, vice-president of the Royal Aero Club, aimed at establishing sports aviation contacts with the Chinese Aero Association, which includes model flying in its responsibilities to the Chinese government.

SMAE chairman Ray Favre and Martin Dilly prepared briefing papers for the visit, and a tentative invitation for a Chinese team to compete with a British one during 1980 was included. The Chinese fly all FAI classes, and at a general aviation display Mr Marsh saw C/L aerobatic and combat flying as well as R/C aerobatic displays; this took place at Shahe military airfield 50km north of Peking, in front of 35,000 spectators. From his report it is clear that model flying is seen as an important part of sport in China and that, after ten years of stagnation during the cultural revolution and its aftermath, model flyers there now receive a lot of official help; they are very eager to learn from other countries' experience, and have asked the SMAE some interesting questions. How many air sports share the same airfield? How do we select teams, and what special training is given to those selected? How many contests does the SMAE organise each year? What programmes exist through which the SMAE promotes model building and flying in schools?

How sad that there is not enough financial and manpower support in Britain from government, the model trade, and from model flyers themselves for the SMAE to do many of the things that need to be done, and to which the Chinese clearly attach so much importance in their own country.



The new ME Exhibition Silver Medal to be awarded to models of outstanding merit in any category.

The Chrysalis Biplane Human Powered Airplane was the work of the Massachusetts Institute of Technology students started early in 1979 as a step towards the £100,000 Kremer Cross Channel prize. After the prize was won by Gossamer Albatross on June 12th with no remaining prize, the craft was simply flown for recreation by over 30 pilots making more than 300 flights. Chrysalis used a foam polystyrene, glass fibre covered propeller designed by MIT's Professor Eugene Larrabee. Photos above show sunrise flights piloted by "Guppy" Youngren with left, the craft being prepared for flight by John Langford, John Flynn and "Guppy" at the Hanscombe Air Force Base, Mass., one of its many flying sessions before "disassembly" this Autumn. Photos Bob Parks.

M.E. EXPO DATE

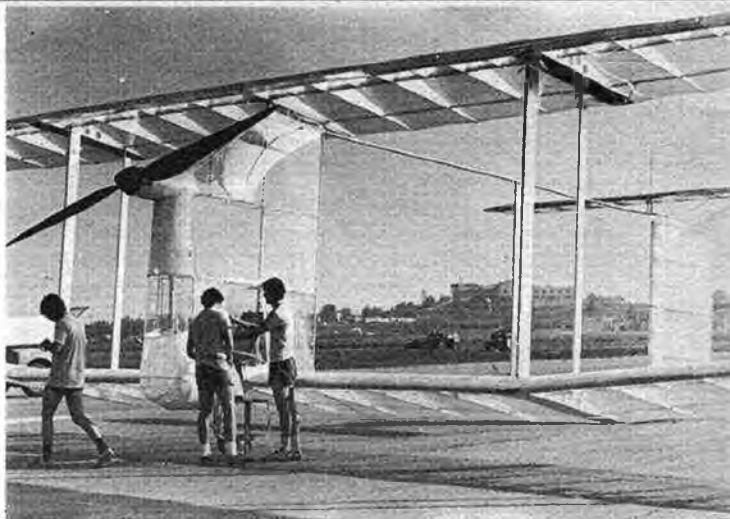
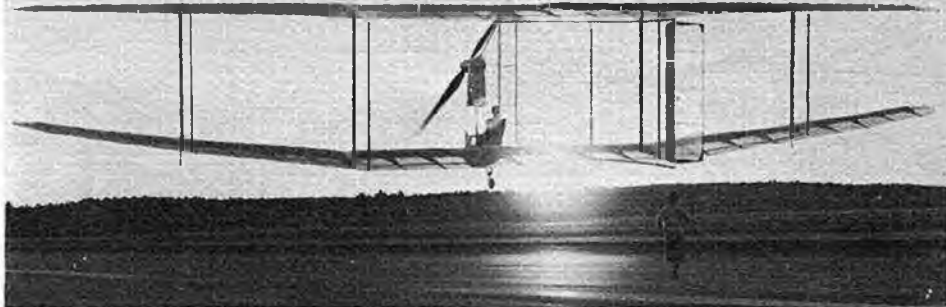
The Model Engineer Exhibition held this year once again at the Wembley Conference Centre will be opened by HRH The Duke of Gloucester on January 2nd, and runs until January 12th except Sunday. Of prime interest to *Aeromodeller* readers are: the static model exhibition including Flying and Non-flying models and scale subjects; the film and lecture programme on model flying topics; and the electric RTP flying in the main auditorium.

SEVERN SUITE LECTURES AND FILM TIMETABLE

Wednesday 2nd Jan 14.00-14.45: "I fly them, I break them, I fix them", "180 is Max" (films).
Thursday 3rd Jan 13.00-13.45: "I fly them, I break them, I fix them", "180 is Max" (films).
14.00-14.45: RTP in Schools and Clubs - Derek Farman.
Friday 4th Jan 17.00-17.45: "180 is Max", "Flight Fantastic, Flyaway" (films).
Saturday 5th Jan 12.00-12.45: CO₂ for the average modeller - Ian Peacock.
13.00-13.45: Spray Painting for Modellers - Ian Peacock.
Monday 7th Jan 12.00-12.45: CO₂ for the average modeller - Ian Peacock.
13.00-13.45: Spray Painting for Modellers - Ian Peacock.
14.00-14.45: RTP in Schools and Colleges - Derek Farman.
17.00-17.45: "I fly them, I break them, I fix them", "180 is Max" (films).
18.00 - 18.45: Society of Antique Modellers - Alex Imrie.
Tuesday 8th Jan 13.00-13.45: Society of Antique Modellers - Noel Gordon.
17.00-17.45: "I fly them, I break them, I fix them", "Flight Fantastic" (films).
Friday 11th Jan 17.00-17.45: "I fly them, I break them, I fix them", "180 is Max" (films).
Saturday 12th Jan 12.00-12.45: Society of Antique Modellers - David Baker.

MAIN AUDITORIUM. INDOOR FLYING

Monday 7th Jan, every hour: Electric RTP flying.
Tuesday 8th Jan, every hour: Electric RTP flying.



A HOME FOR DE HAVILLANDS

An appeal is to be launched to raise funds for the housing of as many de Havilland aeroplanes as possible at Old Warden Aerodrome near Bedford. A list has already been drawn up which includes fifteen different types of aircraft presently owned by, on loan or promised to the collection in prospect of a new hangar being built. The current list includes a DH83 Fox Moth, a DH84 Dragon, DH85 Leopard Moth, DH88 Comet, DH89a Rapide and a DH90 Dragonfly and of course, two DH82 and DH82a Tiger Moths. The future of this proposed world centre for airworthy historic de Havillands now rests with the response to this appeal. The target is £35,000 and details for making donations should be sent to the Trustees of the Richard Ormonde Shuttleworth Remembrance Trust, Old Warden Aerodrome, Nr Biggleswade, Bedford.

APOLOGY FROM HANWELL

The Hanwell and District Model Society would be grateful if all people who made a fruitless visit to their publicised Exhibition would accept the Society's deepest apologies for the inconvenience and irritation that the cancellation caused. Notices of cancellation were sent to all Club Secretaries and individuals who had been invited to attend, requesting they notify anybody they thought may be attending, but it would appear that many still undertook the journey. Please accept their apologies.

Letters

THE OTHER FLYCATCHER

Dear Sir,

I feel that I must report a most remarkable chain of circumstances arising from the publication of the June Aeromodeller wherein I was privileged to be, together with my C/L Flycatcher, the subject of the cover.

An old aeromodelling friend of mine, Ian Ledger, whom I had not seen or communicated with since 1956, and who is not now an aeromodeller but still occasionally purchases a copy of *Aeromodeller*, just happened to purchase the June copy and recognised me. He wrote a letter to me via your offices which you duly forwarded.

It turned out that he is now a Lieutenant Colonel in charge of '70 Aircraft Workshop' of the REME at Middle Wallop, he having been an apprentice at the old Gloster Aircraft Co. when I was there in the drawing office. He further revealed that there was to be an 'Army Air Day' at Middle Wallop on July 27th/28th and invited me to be his guest.

Now appears the most remarkable coincidence, there was a full scale flying replica of a Flycatcher at Middle Wallop to be flown in the display and he could guarantee my being introduced to the builder and pilot, and to get me at close quarters with the machine. I knew that a replica was being built but had no idea that it was ready to fly.

Needless to say, arrangements were hastily made, and my son Brian and I presented ourselves to Lt. Co. Ledger bright and early in the morning. He duly received us and lunched us, and much reminiscing was undertaken, and then we headed for Middle Wallop – the air display – and THE FLYCATCHER.

Lo and behold, before the display proper commenced, the Flycatcher appeared, took off, flew around, landed and taxied up to the static display line where I was introduced to the pilot, Mr John Fairey, a relative of the pioneer founder of Fairey Aviation Ltd., Sir Richard Fairey.

The ensuing discussion revealed that Mr Fairey and two associates had spent two years building the aircraft at a cost of some £50,000, the flight we had just seen was only the third, the previous two flights having revealed some fuel tank leakage problems – now resolved. The aircraft handled well and was pleasant to fly. Amongst their data used towards building the machine was the original *Aeromodeller* of May 1955 wherein was featured my plans of the 1in 1ft free flight Flycatcher still in APS plans range. Remarkably, the replica carried the same squadron markings as mine, and the registration number used was only 1 removed from that on my CL model on the June 79 cover!

The full scale replica is fitted with a single row Wasp motor and propeller, I believe from a Harvard, and this led to a departure in scale outline. The original Flycatcher was fitted with a double row Armstrong Siddeley Jaguar but the replica replaces the rear row with an extension of the fuselage forward, wherein the required ballast is fitted. Thus the front undercarriage legs and the front cabine struts on the replica appear

Stan Perry, who appeared on our June 79 cover, poses alongside full scale replica of the Fairey Flycatcher similar to the aircraft which he modelled to 1/16th scale for Control Line flying. Below, aircraft takes off for display on only its third flight!



some 15ins aft of the engine bulkhead, whereas on the original and on my model, they appear directly at the engine bulkhead.

The replica then undertook its official display flight – its 4th – and turned in a handsome flight, including a high-speed, low-level, down-wind run, the sun glinting on the silver finish in a grand manner.

I have a full sequence of photographs of the replica and I enclose one which shows me with the aircraft. Needless to say, what with being featured on the cover of the *Aeromodeller* and now this marvellous follow-up experience with the replica Flycatcher, I feel that the year of 1979 has been a vintage one for me.

Bishops Wood, Staffs.

Stan Perry

ADVICE FROM SPARKLETS

Dear Sir,

Sparklets supports the development of CO₂ motors, however, we must stress the care that needs to be taken in handling CO₂ gas. CO₂ in bulbs or cylinders is at high pressure, about 750 psi at 20°C (68°F) and rising to 1900-2000 psi at 40°C (104°F). This latter temperature is readily achieved in sunny weather in the back of a car. Therefore we recommend that CO₂ appliances are completely designed, manufactured and tested by competent engineers. Sparklets take great care in designing their products and test them hydraulically; NOT PNEUMATICALLY as failure under pneumatic test could be catastrophic.

We would like to stress the following points taken from Ian Peacock's article 'Cheap Sources of CO₂ Power' in the November issue.

1. Do not braze or weld an adaptor to a sparklets bulb or use such adaptations. A high proportion of the bulb strength is the result of work hardening during its manufacture. Brazing or welding will anneal the bulb and remove the work hardening thereby weakening the bulb. Even if hydraulically tested, a

lot of strain will be applied to the bulb in use and this will have a long term weakening effect.

2. The Twin Nut Adaptor and the Telco Adaptor on the long hose as depicted are not suitable because of the way in which the Telco Adaptor is being used. The Telco Adaptor was designed to accept the end thrust resulting from gas pressure on the bulb neck dia. (8.6mm). In the design shown the gas reacts against a dia. of 22mm i.e. 6½ times the area. Thus the axial load on the thread is increased 6½ times!
3. Any cylinder that is sealed with a 'frangible disc' must NEVER be removed from any adaptor until the cylinder is completely empty. Only cylinders with a self closing valve similar to the Sodastream cylinder may be removed from their adaptors whilst the cylinder contains gas.
4. A 1in BSP is not a suitable alternative for .860 x 14 TPI thread, its use could be dangerous.

CO₂ used correctly in well made adaptors or charger units is a safe commodity. To take short cuts, not pressure test, or design without knowing the rules, and CO₂ can be highly DANGEROUS.

Finally we would like to correct the company's title, it is SPARKLETS INTERNATIONAL and we are a subsidiary company of BOC LTD.

Sparklets International

Peter Coombs

MORE PEN PALS

Dear Sir,

I wish to start a correspondence with any English aeromodeller. I am twenty years old. I am interested in miniature flying scale models with CO₂ engines.

I can offer to swap books about the history of aircraft, periodicals and plans and Modela CO₂ engines.

Looking forward to your replies.

Seydlerova 971

Pavel Jelfinek

500 02 Hradec Králové II
Czechoslovakia

Huddersfield. Contact: D. Davitt Tel: 0532 675433.

Feb. 24th

CROOKHAM GALA – OG OR OP ALL-IN-FAI (5 flights no rounds). 10am start SMAE only. Venue: Bassingbourn. Contact: Fred Chilton Tel: 0494 718314.

March 1st

PORTSMOUTH DMAC STUNT SATURDAYS – CL AEROBATICS for beginners and experts £1 entry. Monthly trophy. 2.30pm start. Venue: Old Airport. Contact: Tom Airey 096279 455.

March 2nd

NE AREA INDOOR MEETING – EZB, IHLG, SCALE, NOVICE DURATION. 12-6pm. Venue: Spennymoor Recreation Centre. Contact: Jeff Anderson Tel: Stokesley 711200.

March 16th

FF 1ST AREA CENTRALISED – F1A (KMAA & PLUGGE), O/P (FROG SENIOR) O/R. Venue: local area. Contact: Mike Fantham Tel: 01-736 7163.

April 5th

PORTSMOUTH DMAC STUNT SATURDAYS – CL AEROBATICS for beginners and experts £1 entry. Monthly Trophy. 2.30pm start. Venue: Old Airport. Con-

tact: Tom Airey Tel: 096279 455.

April 5th-7th

FF CENTRALISED THREE DAY. SAT. CLUB CHAMPIONSHIPS – O/G, O/R, O/P. SUN/MON EURO TRIALS F1A, F1B, F1C. Venue: Barkston Heath. Contact: Mike Fantham Tel: 01-736 7163.

June 15th

NOTTINGHAM MAC CL-FLY-IN – STUNT, NOVICE & CLASS 2 SCALE. 10am start. Individual and Team prizes. Venue: Basford Hall MWW Sports Ground. Contact: V. R. Ward Tel: 07737 5052.

June 22nd

AEROMODELLER ALL-SCALE DAY. The biggest and best event of its kind held anywhere with hundreds of flying scale models to be seen. R/C, F/F & C/L. Venue: Old Warden, Beds.

EVENTS

5th/6th April

MODELS FOR ALL EXHIBITION – static exhibits plus Electric RTP. Probably Yorkshire's largest model hobby exhibition jointly organised by Huddersfield & DMAC. Venue: Huddersfield Sports Centre.

What's Happening?

CONTESTS

Jan. 6th

DEBDENAIRES OPEN MEETING – IMPROMPTU EVENTS EZB, PEANUT AND IHLG DEMONSTRATION ELECTRIC RTP. 2pm-7pm. Venue: Debden Community Centre, Loughton Hall, Rectory Lane. Contact: R. G. Harris Tel: 01-502-2542.

Jan. 13th

NORTHERN AREA INDOOR MEETING – EZB, SCALE, IHLG. 10am-6pm. Venue: Slaithwaite Leisure Centre,

**1/12 scale 780mm span
for .5cc motors**

**FREE
FLIGHT
SCALE**

**by John
Coker**

THIS DESIGN for the Kittyhawk, was inspired by the success of the same Free Flight scale Supermarine Spitfire VB (APS Plan No MA/376, price £1.55 inc P&P) designed by Stan Cole, which led Cedric de la Nougerede into designing the P-51B Mustang (APS Plan No FSP 1367, price £1.55 inc P&P) published in *Aeromodeller* June 1979 edition. The structure is very similar to both the above-mentioned models as I see no point in changing something which has proved to work so well.

For keen scale types the only deliberate deviations from the full size are an increase in dihedral of 3°, the tailplane is 25mm further aft than scale and the fuselage is slightly deepened to accommodate the flat bottomed section. In fact the model seems to be quite stable in pitch and so I wonder if moving the tailplane aft (which was done to counteract the long nose) was really necessary — let me know if you're brave enough to try it!

The original model flies quite happily on the D.C. Dart and 7 x 4 propeller as shown on the plan as I suspect that more power could cause problems — above all I think that light weight is of prime importance in a model such as this and so every attempt should be made to keep the weight down.

FUSELAGE

Begin construction by building the 12 x 3 mm crutch over the plan view, this can be cut from a sheet of 3mm medium balsa which saves money and ensures consistent hardness. When dry remove the crutch from the plan and add formers F2 to F9, the spines and the engine bearers. Fit the centre section ribs CS1, CS2, the LE, TE and then sheet the top of the centre section to inboard of where the fuselage sheet will meet it. The fuselage should be

sheeted next, this is not difficult if tackled patiently. Work in sections and moisten the outside of the balsa panel before gluing in position with PVA white glue. Use plenty of pins and rubber bands to hold the panel in position until set and let each panel dry thoroughly before going on to the next. Before cutting the balsa sheet make stiff paper templates to obtain the correct shape, several may have to be made for each panel, but it is cheaper than wasting balsa and the fitting of the balsa panel is then much easier if the shape is correct. Considering one side of the fuselage only, the sheet panels are as follows and should be fitted in this order. Above the crutch, from F5A to T1 — one panel (do not cut out the aft side windows at this stage). From F5A forward to F2 and from crutch to centre spine — one panel. Below crutch from F5 to F9 and down to centre spine — two panels. The joint line of these panels runs from the sharp corner of F6 to about halfway round the curve of F9 and should start as a sharp line at F6 becoming a continuous curve at F7 and on to F9. From F5 forward to F3 and from crutch to wing centre section — one panel.

The rear cabin windows may now be marked and cut out, the pieces of sheet cut away are then fixed in position so as to conform to the concave curve in former F5A, there should be a 1.5mm deep ridge around all of the window edge. The blocks and thicker sheeting around the nose are

now added. Fit the lower block between F2 and F3 first then make up and fit the exhaust duct and finally add the side panels. The forward top block can also be fitted and the cowling assembly built up and carved to shape.

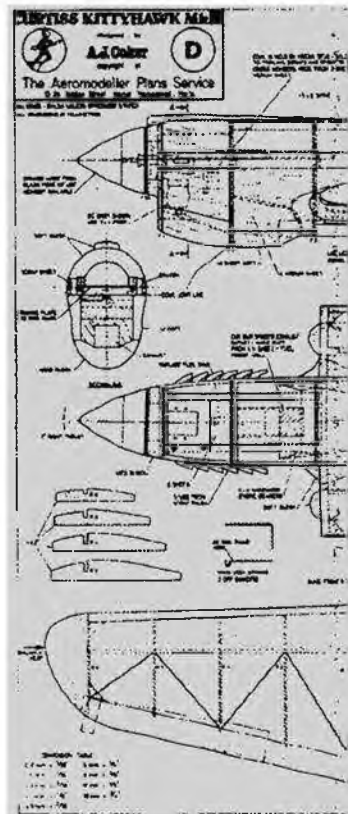
WINGS

The wing construction is quite straightforward apart from the 0.8mm diagonal ribs which should be fitted as oversize blanks and then carved and sanded to shape so as to conform to the section of the main ribs. The wing panels should be built complete with their boxes taking care to build in the 2.5mm (3/32in) washout on both tips.

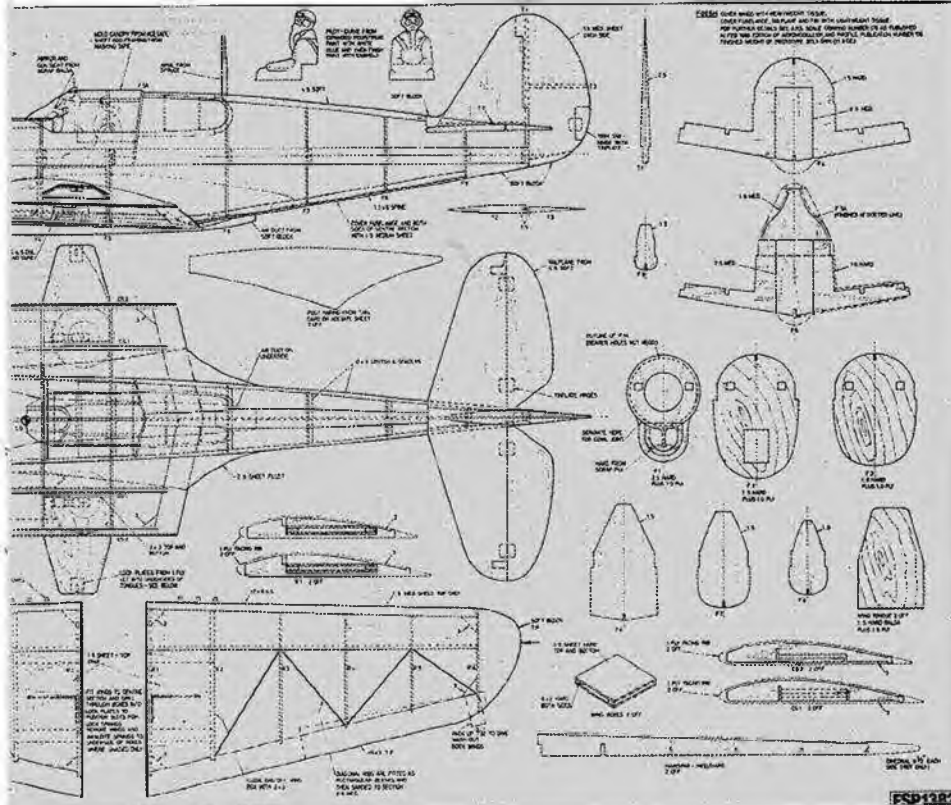
Make the wing tongues and assemble to the centre section dry, fit the wings and check alignment/dihedral etc. When satisfied add the 3 x 3 mm strips against the CS1's and securely glue the tongues in place and leave to dry thoroughly.

Mark the position of the slot for the wing retaining springs on the undersides of the boxes and then drill through the boxes into the wing lockplates, remove the wings and finish the location slots in the lockplates.

The underside of the centre section can now be sheeted and the air duct made from block and fitted. Fine surface polyfilla is useful for getting a really smooth blend between the blocks and sheeting, but only use the minimum as it is very heavy. Fit



CURTISS KIT



Full size copies of the plan, reproduced here to 1/16th scale, are available as Plan FSP1382 price £1.35 plus 20p postage and packing. Export orders obtainable from appointed agents or direct from Plans Service, PO Box 35, Bridge Street, Hemel Hempstead, Herts HP1 1EE.

looks very plain, the lines and rivets can be drawn on with black ink and a draughtsman's pen or with a soft grade pencil. Weathering is a mixture of painted-on chips and highlights, together with "dry brush" scuffing and pencil shadows on rudder/aileron leading edges etc— a few oil stains about the cowling and wheel bays using brown gloss enamel wiped on finishes the job. Don't be afraid to experiment, the golden rule is a little at a time, although if you decide that you have overdone it a wipe with a turps-dampened rag will take off the excess paint if you catch it before it dries.

There are many colour schemes for the Kittyhawk, but I chose not to use the more common "shark's mouth" and went instead for a RNZAF scheme as on the aircraft flown by Flg Off G. B. Fiskin at Quadalcanal — now I am forever being asked if it is a Hurricane!

FLYING

Do pick a calm day, try to find a long slope and having checked the CG, test glide the model noting its behaviour. The prototype needed about 2mm of up elevator measured at the widest point of the elevator T.E. and also needed an increase of washout plus some tip ballast on the starboard wing to correct a consistent tendency to drop its port wing. Do not try to get a floating near the stall type glide, a fairly fast, straight and stable glide suits the model better.

Only when the glide is satisfactory should power flights be attempted. Correct any further trim problems with thrust line adjustments aiming for a wide left hand circle under power. Having achieved a successful flight pattern you're now ready to go in search of the opposition, good hunting!

TY HAWK Mk III

the 1.5mm trailing edge root fillets and then the acetate root fairings, these incidentally are only single curvature and so not as difficult as might be imagined — use very thin acetate or draughting mylar film, as when glued down all round they become very stiff, but are easier to fit if thin and flexible. Mark the fairing edge positions on both the fuselage sides and upper centre section sheeting and then having sanded the back to roughen them, glue in place using five minute epoxy. Finally make the forward part of the fairing from balsa block.

TAIL UNIT

Check that the negative incidence angle is correct and fit the tailplane. Fit T2 to the top of the tailplane ensuring that it is central and then add the two 1.5mm sheet fin/rudder sides, cement them to the fin post T1 and T2 also glueing the leading edges together. When dry slip in T3 and the soft block piece, with the aid of clothes pegs glue the trailing edges together. When dry round off the edges. Cut out trim tab and fit hinge, finally adding tailplane fairing blocks and sand to shape.

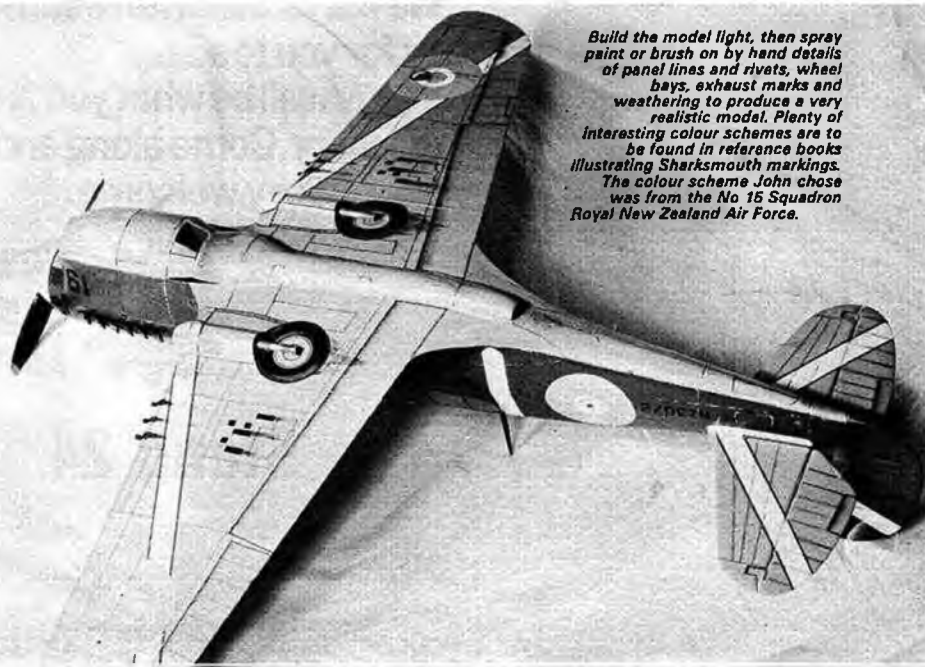
FINISHING

Give the entire airframe one coat of sanding sealer, sand with flour paper and cover using heavyweight tissue for the outer wing panels and lightweight on all remainder. After dopping give the entire

model one more coat of sanding sealer and again lightly sand with flour paper.

Paint with matt enamels and then seal with matt polyurethane varnish — seal the engine bay and exhaust duct well with a hard fuel proofer before installing engine. The canopy back to the front frame was moulded on the prototype and the remainder was made from flat panels with external framing from masking tape.

Panel lines and weathering are a must with this type of model which otherwise



Build the model light, then spray paint or brush on by hand details of panel lines and rivets, wheel bays, exhaust marks and weathering to produce a very realistic model. Plenty of interesting colour schemes are to be found in reference books illustrating Sharkmouth markings. The colour scheme John chose was from the No 15 Squadron Royal New Zealand Air Force.

**49th Model Engineer
Exhibition, Wembley.**

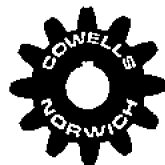
AN IMPORTANT MESSAGE FOR VISITORS.

If you are thinking about buying a machine tool, don't, until you have visited Cowells Machine Shop at Wembley.

You'll find high quality precision-engineered machines and accessories on show.

We will as usual have something new for you to see.

It may well be what you are looking for. Come along and see, you'll be very welcome.



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Stand 24

CO₂

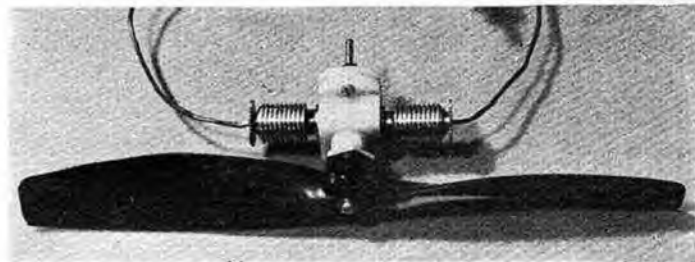
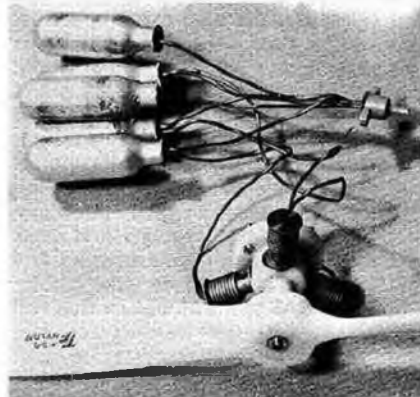
it's a GAS!

THIS MONTH: REVIEW OF LATEST MOTORS AND CO₂ PRODUCTS

Part 8 – IAN PEACOCK

I STARTED RESEARCHING the field of CO₂ some 18 months ago, during which time many items and ideas have come to hand from manufacturers and importers – not to mention those emanating from readers themselves. Some of these occurred in time to be fitted into the series as it progressed, others didn't. Therefore, we are taking the opportunity of bringing readers up to date by giving you a chance to catch up on these new products and ideas.

Several additional motors, both old and new have come to hand and been tested. Many readers who are also engine collectors have mentioned the **OK** CO₂ motors of yesteryear and I have been able to borrow one and found it quite fascinating. Also of interest, although we know that sadly they are unlikely to ever be produced, are experimental motors from **TELCO**. The two and three cylinder *Telco* motors were the result of research into greater power and were "home made" prototypes in the truest sense. Practical manufacturing problems would have made them very expensive to produce and it is likely that they will remain a curiosity in someone's private collection. There were however a couple of the *Telco*



CO₂ motors are not a new invention as illustrated by these two early units manufactured by OK. Three cylinder motors for powering model aircraft were being advertised as long ago as 1914 at a time when even full size aviation was in its infancy.

twins made – at least one of which was donated to the RAF for a prize and was won by that stalwart of CO₂, Butch Hadland. Several readers have also made *Telco* twins themselves utilising model engineering skills to produce a new crankcase to fit two cylinders.

Many readers have expressed concern over the apparent difficulties of obtaining *Telco* motors during the last 12 months or so. Some of this rests with *Telco* themselves, although it may well be argued that distributors could have done a better job. Briefly the major part of *Telco*'s business was in manufacturing ticket issuing machines and in January of 1979 the business was sold to the EMI group. A separate holding company however, retained the manufacturing rights to the CO₂ motor. During the summer of 1979 the decision was taken to pull out of the CO₂ market as the *Telco* motor was not really compatible with the other products associated with this company.

It can now be revealed that **MICROMOLD** are the principal shareholders in a new company trading as **TELCO SYSTEMS**, who have bought out all parts, equipment, patents and manufacturing rights for the *Telco* motor. Production of the standard *Telco* motor will be back in full swing before Christmas 1979, and a

new simplified and improved charger will be added by the spring of 1980.

Roy has been active in other CO₂ spheres throughout the autumn and has also negotiated a distributorship for the Czechoslovakian **MODELA** CO₂ engine which to date was largely handled by Anne & Norman Keat of the **Modellers Den** in Bristol, and Peter Fisher of **Performance Kits**. The *Modela* is larger displacement than other current CO₂ motors and is well worth investigation for those wishing to build larger or heavier models.

There may be those amongst you who have seen *Telco* motors with strange looking tanks attached when flying at the major meetings during 1979. It has been a reasonably well-kept secret that **British Oxygen** had been experimenting with LATENT HEAT TRANSFER systems where oil filled jackets enclosed the gas tank. The theory is that the jacket formed a heat reservoir, accepting the cold from the slowly cooling gas (remember – CO₂ cools as it is used!) into the oil. The oil freezes, giving up its heat as it does so, effectively keeping the gas "warm". The argument is that greater power could be had from the engine and that successful flights could be achieved in colder temperatures where the standard motors would freeze up!

Translating this theory into practice was not an easy task and although a limited number were built and tested (mine has been flying for more than a year) the prototypes were not altogether a pinnacle of success. Basically the original proposed size and weight of the unit, almost twice that of a "standard" *Telco*, negated the extra power that was available. Furthermore, in the technical handout provided with the motors, model sizes and types suggested and flight durations hinted at

These two prototype motors produced by Telco are unlikely to reach production but similar versions are being built by model engineers grafting two or three cylinders onto home made crank cases.



which indicated that someone, somewhere, simply hadn't done their homework!

However, lengthy experimenting and proving by the designers, Micro-Mold's Roy and Tony Scott during the late spring and summer, have resulted in the design consultants producing a simplified but much improved version of the BOC system which has been patented and will be manufactured under licence, available spring 1980.

Initially there will be three tank sizes, 3cc to fit on a *Telco*, 6cc to fit on either the *Telco* or the *Modela* and a 10cc size for the *Modela* only, with an even larger tank rumoured to be in the pipeline for later. The super-charging technique has led to the nickname "*Turbotank*" which may well remain the title for production models. Incidentally the 3cc *Turbotank* now adds only a gram or two to the weight of the standard *Telco* motor!

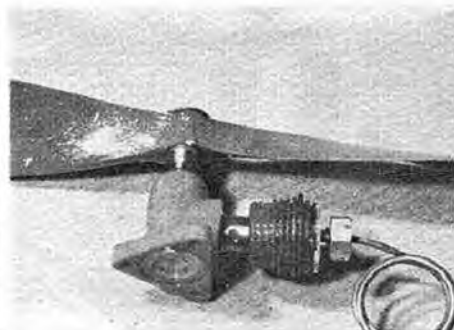
MicroMold certainly believe in the future of CO₂ as a model propulsion source for among the plethora of frantic activity down on the south coast is an experimental motor of around 1cc displacement!

From the other end of the country comes news of two new **POWERMAX** motors. Firstly, a revised version of Roy Lever's horizontally opposed twin, a marked improvement over the earlier version, which now features a new style fitting where the gas pipe connects into the cylinder head. The motor runs very well, and provides serious food for thought because it runs for longer on two standard gas tanks, than the single cylinder motor does on one standard tank. Maybe we still don't understand fully, the ramifications

The original British Oxygen latent heat transfer tank which utilises heat from oil filled jacket to supercharge cooling gas tank. The same principle will be used by MicroMold for their Turbo Tank adapters.

of the laws of physics that govern volumetric expansion of gases!

Powermax's second surprising release is a 'contest' version of their standard motor. This, like the twin, features the revised pipe attachment at the cylinder head, and also like the twin, has blue plastic cylinder fins. Basically the 'contest special' has been developed to meet the requirements of the duration orientated flyer and is hand assembled and 'tuned' for this very purpose. They are set up at the factory under controlled conditions at 18°C and 65% humidity to give the best possible run. The running characteristics are somewhat different to most other motors. A good hard flick is needed to start the motor which then builds up rpm for the first 20-25 secs, before going into cruise conditions for a further 20-25 seconds. There then follows a noticeable increase in revs to around the 1½ minute mark whereupon the revs and thrust die off in the manner to which we have become accustomed. The propeller is of the same diameter as the *Shark* but now has a greater pitch. It is recommended that a drop of medicinal castor oil is injected into the ports before each flight and that the crankcase is half filled with the same oil after every couple of hours of flying. Quite obviously, Roy Lever and his staff have put a lot of thought into these motors. Roy has also investigated that 3 cylinder approach and has prototypes running quite successfully although he was a little shy of forecasting when, if at all, they could be put into sensible produc-

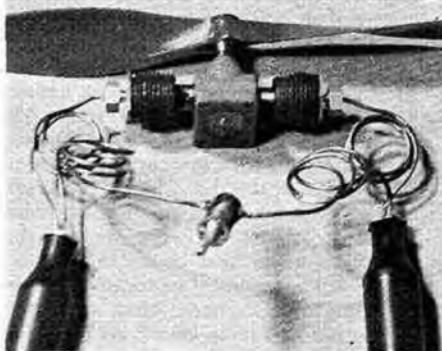


The Powermax Competition Special, a hand assembled motor specially set up to be suitable for duration events. Note the new improved feed pipe to head junction, a feature of all new Powermax motors.

tion. Rumour has it that this enterprising manufacturer is also running a large CO₂ motor of approx 1cc capacity – could this be a sign of the future trends?

From the **MODELLERS DEN** comes the good news that the much sought after – and up until now, hard to get – **BROWN** CO₂ engines are at last available here in the UK. *Brown* motors have been around for many years but they were so difficult to obtain that only the more persevering modellers ever managed to get one. Anne Keat generously provided a *Brown Twin* for me to review, and its performance lives up to its reputation of high quality. Both the single and twin cylinder units are currently in stock at Bristol as are *Brown's* range of CO₂ gas tanks from the smallest (a little smaller than *Telco's* at 1½cc) to the massive 20cc tank giving engine runs of at least 8-12 minutes, dependant upon settings and ambient conditions.

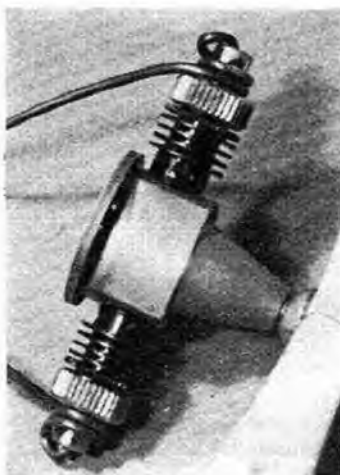
Also from the *Modellers Den* comes a host of associated goodies ideally suited to the CO₂ modeller. A vast range of kits and suitable plans plus many specialist accessories. Propellers of varying styles and sizes, lightweight wheels that would grace the finest model and which weigh hardly anything. *Fulton Hungerford* spoked wheels, are finished items weighing a mere 1 gram yet capable of supporting 3lb at the axle. *Hunt's* wheels are similar but are supplied in kit form from which it is quite simple to produce first class results. I built a pair in one evening and that included stopping to take photographs. An SAE to the *Modellers Den* will



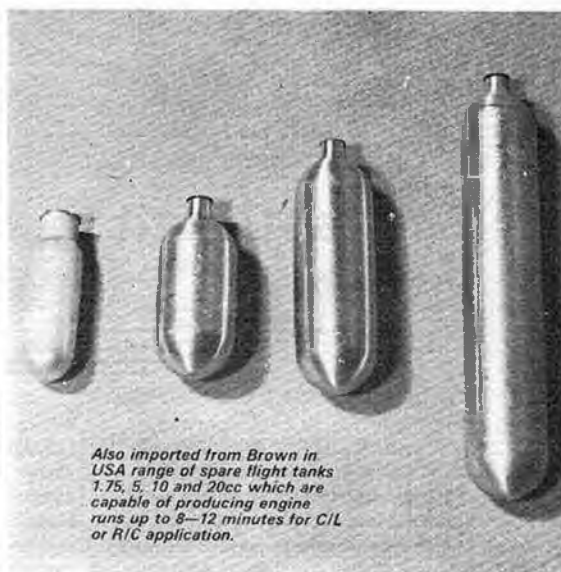
The current production twin cylinder motor from Powermax is an improved version of earlier horizontally opposed twin which runs more than twice as long as two singles!

Another interesting motor, the Czechoslovakian Modela, should soon be more widely available. It is the largest and most powerful motor currently available and is well suited to larger models.

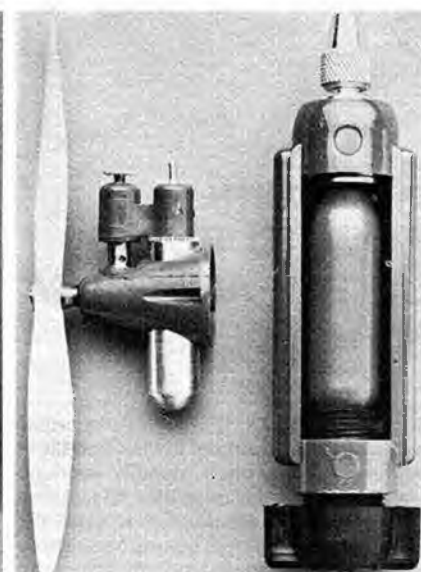




Until recently almost impossible to obtain the American Brown twin, and other Brown products are now available from their new English importers the Modellers' Den.



Also imported from Brown in USA range of spare flight tanks 1.75, 5, 10 and 20cc which are capable of producing engine runs up to 8-12 minutes for C/L or R/C application.



Still not released for sale since its appearance at last year's trade shows, the Humbrol All-in-One CO2 motor does away with fragile feed pipes.

bring an enormous pack of brochures and lists covering almost all aspects of CO₂ modelling. Of particular interest is a somewhat vintage looking kit specially designed for CO₂ by Andrew Moorhouse of "peanut" fame. Called the *Puffin* it flies extremely well and if current demand is anything to go by, must be one of the most popular CO₂ kits around. The lists include several ranges of imported American kits not previously available here which are well worthy of investigation.

On the kit front, it appears that the excellent range of *Hi-Flier* kits shown earlier is to soon be a thing of the past, for the current UK importer intends dropping them from his range. So! Buy now and put them into stock for future projects as they may become rare unless some specialist importer like the *Modellers' Den* can come to the rescue.

Surprisingly the **HUMBROL** "all-in-one" motor shown for the first time at the Toy Fair in January 1979 has still not yet materialised. I understand from the *Humbrol* team that considerable mass produc-

tion problems have been encountered and that much new (and expensive) manufacturing machinery has been purchased from abroad to overcome difficulties. When it does go into production though, it will considerably ease the use of CO₂ motors for the younger modeller as there will be no fragile pipes to get broken.

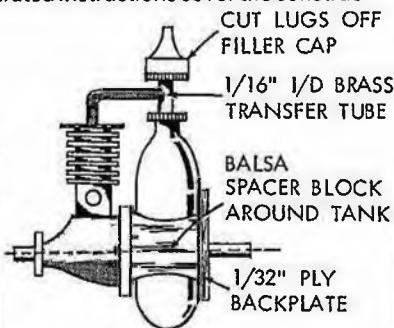
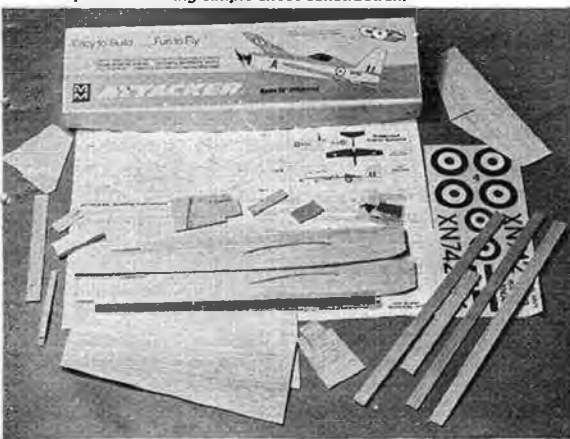
I don't know whether this new *Humbrol* motor was the source of inspiration for Jack Headley who wrote to us from sunny California to offer his thoughts on the subject. Jack's sketch is self-explanatory and the modifications make for a simple-to-handle unit.

Also hot off the press is the release of three, all-sheet models from *MicroMold* for the average younger flyer. All three are semi-scale in appearance yet simple in concept. The wing is of semi Jedelsky structure and the models may be assembled and painted in an evening. Pictorially illustrated instructions cover the construc-

tion down to the minutest detail and a set of fine transfers complete the model.

Finally this month I close with a safety reminder that **CO₂ UNDER PRESSURE CAN BE DANGEROUS**. I have received some mixed comments over the publishing of alternative gas sources in November issue - some complimentary and some voicing concern over the safety aspect. Each of the methods described has been tried and tested and work well. Many others were tried with mixed results and these we refrained from publishing. Whether you elect to follow our advice or to go your own route **DO IT CAREFULLY!** Pressures of 800psi at 20°C or twice this out in the sun, must not be underestimated. If at all possible get a qualified Hydraulic or Pneumatic engineer to make and test the adaptors for you. If in doubt - **DON'T DO IT YOURSELF**. If you are using an adaptor with a flexible hose, do not store with gas in the hose still under pressure.

New kit from *MicroMold*, the *Attacker*, one of a range of three produced exclusively for CO₂ power featuring simple sheet construction.

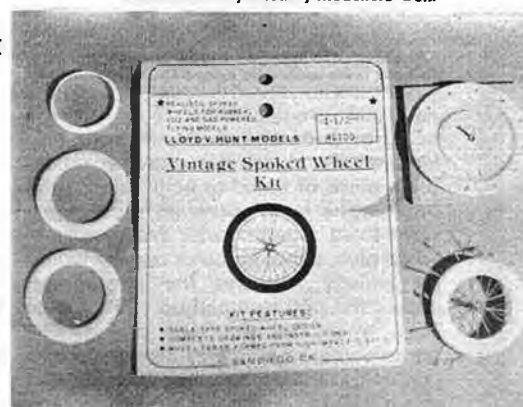


MODIFYING TELCO CO2 UNIT TO A MORE COMPACT VERSION

Instructions

- *Remove all screw caps and 'O' rings from unit.
- *Drill tank cap from inside to suite transfer tube.
- *Counterbore filler cap 3/32in deep for transfer tube.
- *Drill transfer tube for supply pipe to engine (.040in dia).
- *Solder all joints together.
- *Replace 'O' rings and reassemble unit.
- *Make balsa spacer block between motor and tank, and 1/32in ply disc for backplate. Balsa block is to prevent crushing the tank when mounting.

Ideal for lightweight CO₂ models, Lloyd Hunt's Spoked Wheel kit, one of the many useful accessories imported by Modellers' Den.



THIS MONTH: HOW TO BUILD SIMPLE ALL-BALSA KIT GLIDERS

SINCE LAST MONTH'S Aero Aces article was written, my gang of novice free-flight modellers have been steadily working away at their various glider kits. It has quickly become apparent that even the simplest designs pre-suppose some knowledge of model aeronautics, but presumably anyone tackling a model plane for the first time will have an interest in the subject anyway.

I don't propose to write detailed building instructions for each model; this has been done already by the kit manufacturers. Instead, general methods will be described, starting with the basics, and adding more information as we look at more advanced models.

Perhaps the simplest kit that we received was the Cambria *Hobo*, which had all the parts stamped out from sheet balsa, and had the flying surfaces (wings

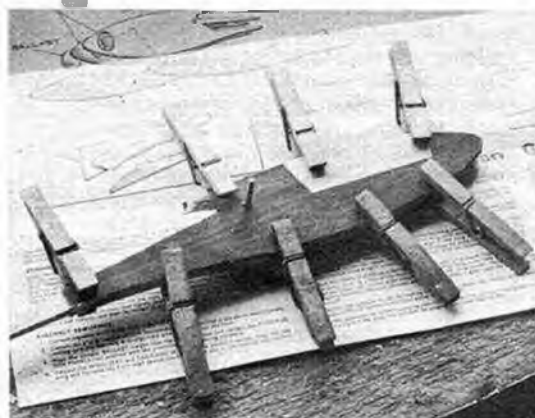


may cause the model to fly in tight circles, which can lead to a spiral dive. Any platforms on these type of models that support the flying surfaces must be set up as shown on the plan. Not only must they be square with the fuselage when viewed from the front or rear, they must also hold the wings or tailplane at the correct angle to the air as the model flies. The designers have determined these angles with the prototype models, so reproduce them accurately. The tailplane platform will generally be parallel with the fuselage centre-line, while the wing platform will lift slightly at the front, the angle to the horizontal being called the angle of incidence.

When sanding off the rough edges of the fuselage (and this applies to most model gliders) go cautiously at the nose, removing as little material as possible.

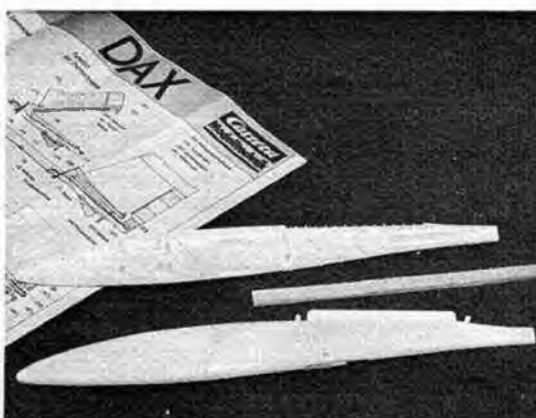
of the wings and the leading edge of the tailplane. Fuselage breakages usually occur at these points, so keep them as strong as possible by not reducing the section too much. The situation is often aggravated by dowels being mounted through the fuselage to hold retaining rubber bands just at these critical points, so they should be well glued into correct sized holes, to become part of the load bearing structure.

All the other kits we built which used sheet balsa wings featured "pod and boom" construction, some with hardwood booms and others with balsa booms of larger cross section. The 'pod' designs varied from a built-up structure covered with sheet balsa as on the Peerless Models *Yard Stick*, through the spindle-moulded solid balsa type as in the new Veron *Domino* kit, to plastic half



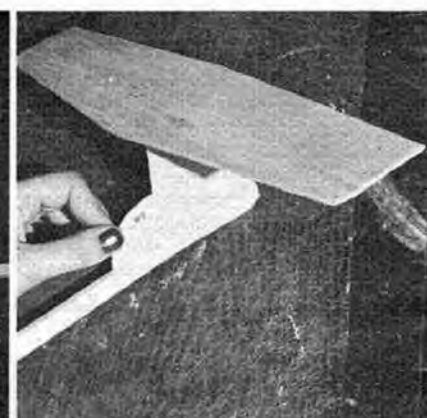
Sheet laminated nose pod and hardwood boom on Cambria *Hobo* assembled using PVA white glue, held together until dry using clothes pegs.

and tail) pre-decorated. The fuselage nose, or pod, was made up from four laminations of balsa, the centre two retaining a piece of metal to help balance the model. The laminations on our sample were fixed together with woodworkers' white glue, although balsa cement would be equally suitable; the photograph shows the pod clamped up with clothes pegs while the glue was drying. The hardwood tail boom was also glued into position, checking that the assembly was straight. Don't forget that a bent fuselage



Plastic nose shells as used, particularly by German kit manufacturers, which simplify construction by moulding fittings for tow hook and rudder.

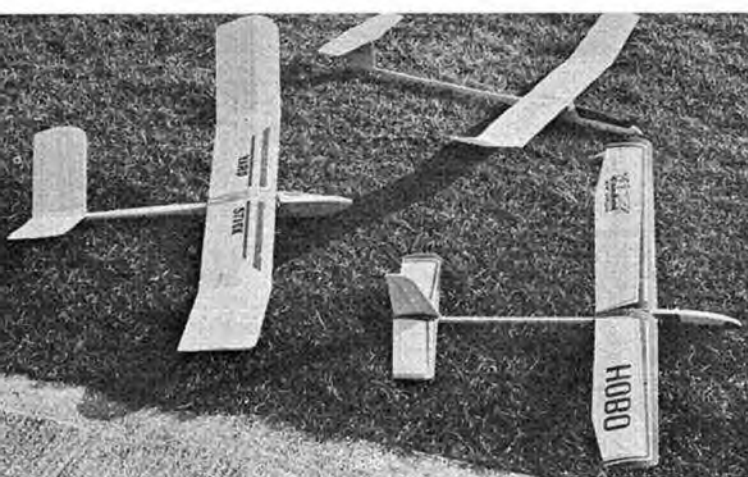
You will only have to add ballast later into the nose, so why remove weight unnecessarily? You can be more liberal with the sandpaper at the tail end, as weight saved there helps to reduce the overall model weight, but there are two regions on the fuselage which should not be reduced too much for reasons of strength. In those occasional unfortunate landings where the model likes to stick its nose hard into the ground, the arrow-like quivering that results creates high stresses in the fuselage at positions around the trailing edge



Angle templates supplied in kits, should be used to ensure accurate assembly. Here a T-tail fin is glued to the tail boom of the Graupner *Penny*.

shells as in the German kits Graupners' *Penny* and *UHU*, and Carrera's *Dax*. The hollow plastic noses of the two larger models contained fittings for a working automatic rudder, a device I will describe later in the series.

The pod and boom layout generally provides a satisfactory reference for the correct mounting of the flying surfaces, and as mentioned earlier, the tailplane usually mounted flat on the tail boom. Three models, however, were different in layout, incorporating T-tails, that is, with



Three of the simplest gliders built for the series each illustrating different construction. Cambria's Hobo uses thin sheet wings curved to aerofoil. Vee dihedrals with conventional tail and fin and sheet balsa pod and boom construction. The Peerless Yardstick uses angled sheet wings, with tip dihedral built up balsa nose and butterfly tail. Graupner's Penny uses preformed balsa Jedelsky wing also tip dihedral with plastic nose and T-tail.

the tailplane mounted on top of the fin. The Graupner *Penny* and Humbrol's *Mistral* and *Sirocco* used this arrangement. Care had to be exercised to ensure the fin was secured to the fuselage in the correct attitude, otherwise the tailplane could be at the wrong angle of incidence. The *Penny* kit contained a gauge to check the angle, while the Humbrol models could be checked easily over the plan.

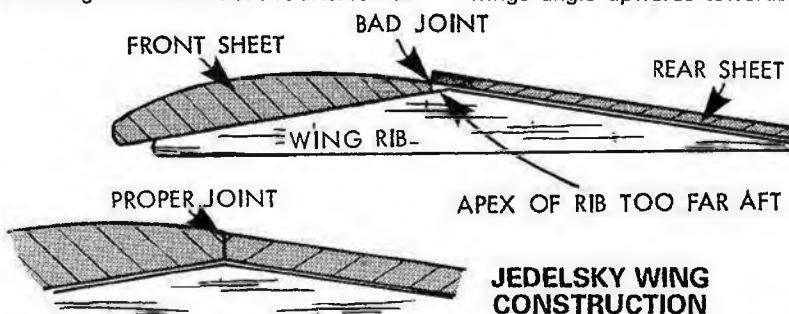
The fuselages, then, did not present any major problems to the youngsters, who then moved on to make the wings. Again, the simplest construction was found in the *Hobo*, which used a curved sheet of balsa for each wing, the curve, or camber, being held in by means of balsa ribs cemented underneath. A simple jig was provided to hold the curve while the glue was drying, but a useful way of pre-curing the wing is to slightly damp the top surface with water,

excellent bond.

If, after the sheet balsa has dried out, and the ribs are securely fastened, a twist is apparent in the wings, it can be simply removed by holding the wing in the steam from a kettle, and twisting it in the opposite direction. Hold the opposite twist in the wings for a minute or two after remov-

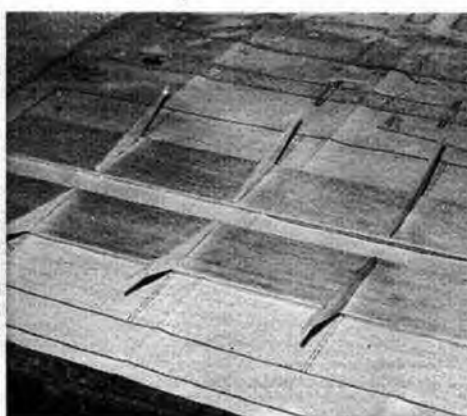
tant to fit the obtuse-angled apex just exactly at the joint line between the front and rear wing sheets. Work from this datum, otherwise, if you start at the trailing edge, and the pre-cut ribs are too long or too short, the apex may come out at the wrong position, making edge-to-edge joining of the wing sheets difficult. Excess rib length can be trimmed off after the wing has been constructed. With the ribs firmly set on the rear panel, the front, thicker piece of balsa can be glued in place, a butt joint being made between the front and rear pieces of balsa sheet held together top and bottom with Sellotape. Pins can be pushed through the sheets into the building board to keep them in position while the glue is drying.

With the wing panels completed, the next stage is perhaps the most tricky part of wing construction, whatever the form of structure being used. I refer to joining the wing panels together at the correct dihedral angle. Dihedral is the way the wings angle upwards towards the tips,



Predecorated wings on Cambria's Hobo wetted using sponge to achieve curved aerofoil. Slots in sheet locate ribs glued underneath to hold curvature.

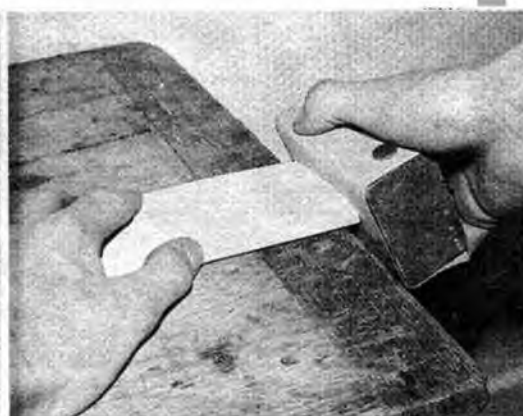
using a sponge. The dampened top layer of wood expands, and automatically puts the curve into the wing. Do not overdo the wetting, though, or the curve will become excessive. The same effect can also be observed when coating large balsa sheet areas with white PVA adhesive. As this glue has a water base, its wetting action also causes curvature, particularly if applied too generously. It should not be necessary, though, to apply more than a thin smear of white glue, and clamping up the parts to be joined will produce an



Triangular balsa ribs glued to underside of rear sheet as first part of construction of Jedelsky type wing as used on Humbrol's Mistral.

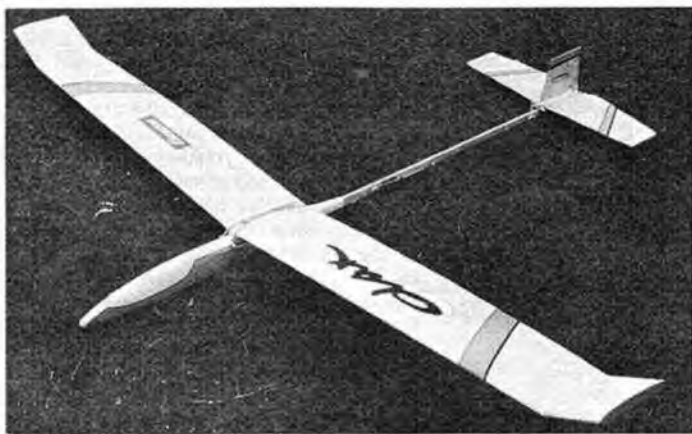
ing from the steam, then pin that wing panel to your flat building board to settle in its untwisted form.

The true Jedelsky wing construction is less likely to suffer from wing twist because of its much thicker, and therefore stiffer, front half. Good examples are found in the Veron *Domino* and Humbrol *Mistral* and *Sirocco* kits. The normal way of building is to start with the rear sheet of the wing upside down, and glue in position the transverse stiffeners or ribs. These are like very long triangles, and it is impor-



Ends of wing panels should each be sanded to half the dihedral angle by supporting over table edge and gently sanding using flat block.

which is necessary to provide stability in flight, keeping the model upright should it start to slide sideways and downwards through the air. Too little dihedral results in an unstable model, which is slow to recover from sideslipping, while too much dihedral gives a rocking motion from side to side, called Dutch rolling, and can be seen very often when pigeons are gliding in to land with their wings held up at a steep angle. The wing dihedral joint (or joints) carries high loads, and a well-made junction is essential. I confess to still hav-



One of the largest all sheet kits, the Carrera Dax, uses prefabricated plastic parts including nose shells and working parts for towhook, auto rudder and pop-up-tail dethermaliser.

ing trouble, particularly with all-sheet wings, and I suspect the kit designers do too, as they always gloss over this part of the construction. Phrases like "*Sand the wing ends to the correct angle shown*" do not really tell you how to sand a cambered surface so as to match its opposite half accurately, leaving no gaps. Patience is the secret, together with the use of a sanding block. Hold the block at the correct angle and rub across the full width, or chord, of the wing, slowly removing the balsa. Alternate between the two panels to be joined, testing them for fit occasionally, until the two ends fit up against each other closely from leading edge to trailing edge. The two halves can then be glued together, putting blocks under the wings

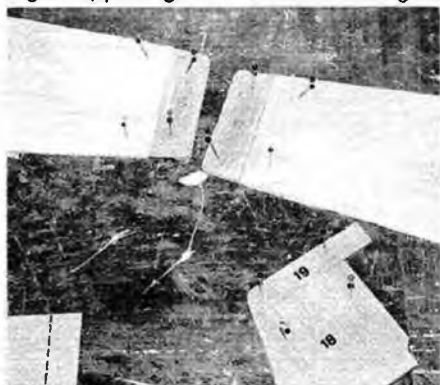
neat, is ordinary cotton bandage. Some kits do include tape for this purpose, so do use it – it is not superfluous.

When the completed Jedelsky wing has set firmly, sand off all the rough corners and edges, including both ends of the underside ribs. The wing will probably have some sort of platform at the centre, where it sits on the fuselage. Check that when in position, the wing does not hang drunkenly over to one side, and if it does, adjust the platform accordingly. Also check by balancing on the fingers to see if one wing is heavier than the other. This often happens because of different densities of wood. If your kit has any choice in which pieces of wood can be used in various parts of the wing, always

has no chance of flying properly! A point of balance more than 10mm in front or behind that indicated is too much, as the tow hook position is located according to the position, among other factors, of the centre of gravity. Therefore, if your balance point is wrong, then the tow hook position as shown on the plan will also be in the wrong position, and the model will not tow up correctly. I shall look more closely at these matters when we come to the trimming and flying of your models.

Adjusting the balance point, should, of course, only be done after all the finishing touches are complete; the addition of the paint to the structure can move the centre of gravity significantly. Model finishes and their application will be the subject of a later article, but suffice it to say here that for the models just described, the all-sheet surfaces will only need two coats of cellulose sanding sealer, rubbed down with fine abrasive paper after each application. Any colour painting should be restricted in the main to the front half of the model. Colour pigment is relatively heavy, and you will be adding nose weight anyway to balance the model.

If your kit does not include some sort of material for ballasting the nose, such as lead or plasticine, then lead shot can be bought from any fishing tackle shop. The lead balls should be about 2mm diameter, and can be poured through a paper funnel into the ballast compartment of the glider nose. When sufficient weight has been added to achieve the correct balance, a



Thin sheet balsa tails or fins can twist and warp unless cross grain stiffeners are used. Parts are pinned flat until glue dries, then edges are sanded smooth.

to hold them at the correct angle until set. For good adhesion if using balsa cement, a technique known as pre-cementing can be used for this and other highly stressed joints. Balsa cement is smeared onto both faces to be joined, and allowed to soak into the wood and dry. A second application of cement is then made, and the two parts brought together. The joint should be allowed to set firmly overnight. Pre-cementing is not necessary with PVA glue, but a really accurate joint is required, with plenty of drying time. To stiffen up the joint, a piece of linen tape, about 10mm wide, can be glued over the joint, top and bottom. An alternative to tape, but not as



Sheet balsa surfaces only require a minimum of water proofing using cellulose dope, sanding sealer or preferably non-shrinking banana oil.

pick the heaviest pieces for the middle part of the wing (the centre section), using the lighter pieces for the wing tips. The lightest balsa is very often lighter in colour and much easier to cut across the grain.

Your model is by now nearly complete, just requiring the addition of dowels to hold the rubber bands for retaining the flying surfaces, and the addition of the tow hook and nose weight. Again, accuracy is required for these last two items. The amount of nose weight controls where the model balances (its centre of gravity) and the optimum position will be indicated either on the plan or in the building instructions. Get it right, or your model



It is vital that the completed model should balance exactly as indicated on the plan. Lead shot should be added to the nose compartment until this is achieved.

generous squirt of glue into the compartment will stop the shot rattling about. Seal the filling hole, and the model is then all set for its next stage – preparing for flight.

Before leaving the construction of gliders, we have yet to describe the more traditional type of construction, where a lightweight balsa framework is assembled, and the whole covered with a skin of tissue paper to give it a clean, streamlined shape. As this type of model building warrants a more detailed description, I shall leave until next month the building of such models as the Graupner UHU, Veron Dominette, Cambria's Mistral, Petrel and Merlin, and the KeilKraft Caprice.

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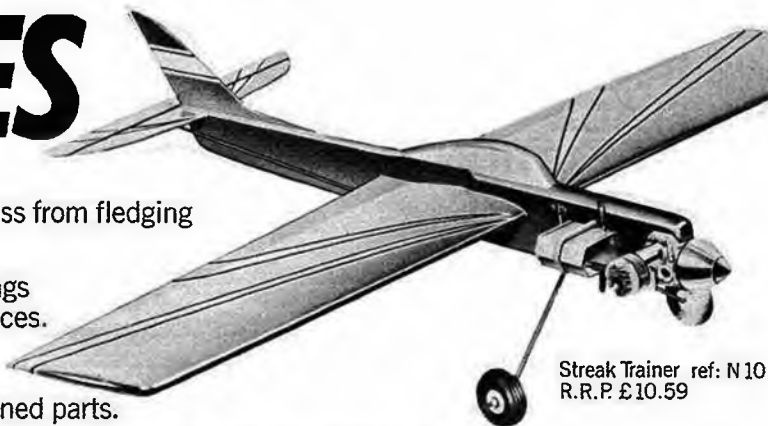
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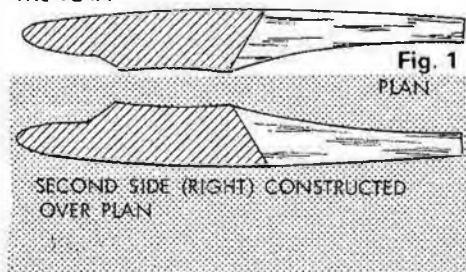
Corsair ref: RC21
R.R.P. £71.88

THIS MONTH: WE REVIEW BASIC FUSELAGE CONSTRUCTION OF SIMPLE R/C TRAINER KITS

IF YOU HAVE been following our series and acting upon information given it may be that you are now the proud owner of a stout cardboard box containing an assorted selection of shapes and sizes of balsa wood and ply. You would also have various other items of hardware with which to complete your model, together with the necessary building board and tools.

It is a matter of personal choice whether wings or fuselage are built first but we normally suggest the latter course, if only to clear the box somewhat! The fuselage for both power or glider trainer models are normally built in the same way and follow similar techniques and sequences. Our purpose this month then is to take the novice step by step through the method.

FIRST SIDE (LEFT) MADE AND PLACED IN THIS POSITION TO GIVE A MIRROR IMAGE OVER THE PLAN

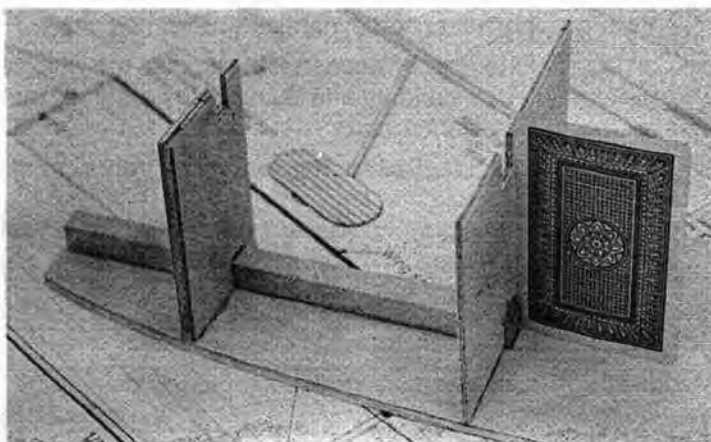


building a sheet sided fuselage. This article by necessity is generalised and if it diverges from any building instructions contained in the kit the latter should be followed.

The very first job is to pin the plan onto the building board to show the side elevation of the model. This should then be covered with a transparent material to prevent the plan being defaced with blobs of glue. Polyethylene film is ideal for this. Next read through the building instructions carefully and making reference to the plan. When you thoroughly understand the instructions and general building sequence read through them again but this time referring actual parts to the plan, building the fuselage in your minds eye as you proceed. Whilst referring the parts, you should take the opportunity of checking the suitability of wood quality and consistency against the function for which it is intended. A broad sweeping statement indeed, since any kit manufacturer



Front fuselage formers must be epoxied to sheet sides at right angles, check with set square or even a playing card!



ASSEMBLING FUSELAGE SIDES

USING BALSA CEMENT
PRE-GLUE BOTH EDGES
SEPARATE AND LEAVE TO DRY

Fig. 2



THEN PIN FUSELAGE SIDES OVER PLAN AND PLACE SELLOTAPE OVER JOIN

although controlling the quality of incoming balsa stock cannot always precisely control the quality within individual kits. However, the fuselage sides must be of similar quality for if one side bends easier than the other a banana shape will result when pulling the sides together at the tail post. The other important facet of wood choice is within the tail group where light wood should be used. If the tail group is too heavy with the long moment arm from the centre of gravity a considerable quantity of lead may well be needed in the nose.

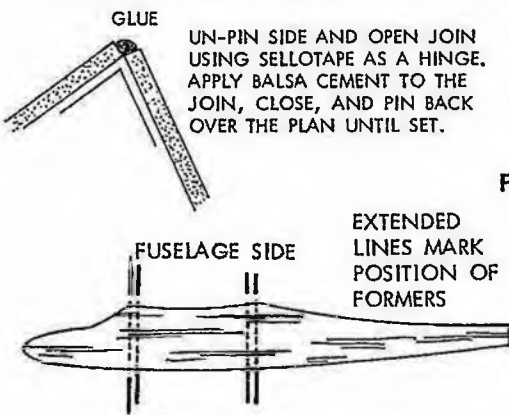
As a rough guide, soft wood is light and hard balsa is more dense and therefore heavier. In a later article we will be discussing the whys, hows, and wherefores of building from plans. At this time we will cover choice of wood in rather more detail.

Having checked everything carefully you can at long last pick up your balsa

which should be cleaned down with fine glasspaper and carefully checked for size against the plan. Make up the balsa wood sheet sides and ply doublers over the plan ensuring that a right and left hand side is made. A simple way of doing this is shown in Figure 1. Some fuselages need more than one piece of sheet to be joined to make the full side. Figure 2 shows a method of joining sheet which ensures a good bond with a minimum gap. The doublers can be attached using contact adhesive. Complete the sides by fitting any longerons or braces required. Sometimes hardwood engine mounting beams are also fitted at this stage using either white PVA glue or preferably epoxy. When both sides are complete pin them together, face to face, using the wing and tailplane seating as reference points and trim the silhouette edges with glass paper so that both sides are identical in shape. Do not alter either wing or tailplane seatings or the incidences will change which will alter the flying characteristics of the model.

The formers can now be cut out using a sharp knife for balsa wood or a fret saw, if necessary, for the ply ones. Once again trim the edges and check for size and shape over the plan. If formers have to be drilled for either engine mount, nose leg or undercarriage fixings it should be done at this stage. Positioning of the holes may be achieved by marking the former placed over the plan, using the method shown in

knife and start cutting out, starting with the sheet sides and plywood doublers, Fig. 3. A similar method could be used to transfer the positions of other formers onto the fuselage sides. Glue the formers from nose to the rear of the wing seat if sides are parallel onto one side checking that they are upright by using a square or even a playing card. When dry the other fuselage side may be fitted to form a box structure. This sub-assembly should be left to dry, preferably overnight. Transfer the assembly to the plan view of the fuselage and fix over the plan using pins or



weights (cans of soup are ideal) then gently pull the tail together and glue, holding in position with sellotape or a bulldog clip. It may be necessary to chamfer the inside of the fuselage at the tail to get a good bonding surface. When thoroughly dry the rest of the formers can be fitted holding them in position with pins or sellotape.

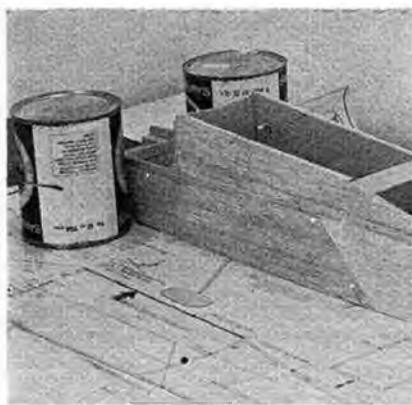
The next stage is to fit any plywood reinforcement required to support the main undercarriage, and to bolt on engine mount and nose leg to the front former.

This is carried out at this stage in order that bolts and nuts can be fitted before they become too inaccessible. Before the engine mount is permanently fitted it must be drilled to accept the engine. This is best done by fixing masking tape over the mounting beam, holding the engine in place, then 'spotting' through the holes in the engine mounting lugs with a pencil. The resultant marks when trued up will give the drilling positions (Fig. 4). If a metal mount is being used and you are lucky enough to have access to a set of BA size taps the holes may be threaded to take the hold down bolts. Whichever mount is used make sure that the nuts have a flat bearing surface on the underside of the mounting beams (Fig. 4a).

Drill sizes for clearance or tapping holes are given below:

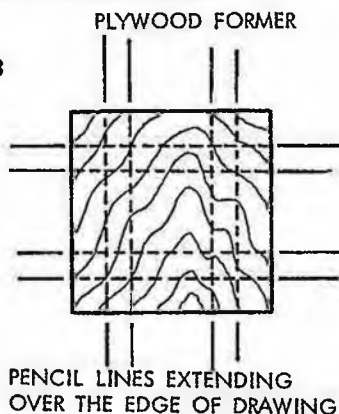
	Clearance	Tapping
4 BA	9/64"	No. 34.
6 BA	7/64"	No. 44

Control rods have been discussed in an earlier article and can generally be divided



Fuselage box is assembled over plan to check equal taper about centre line, held in place by heavy tins, pins and strips of masking tape.

Fig. 3

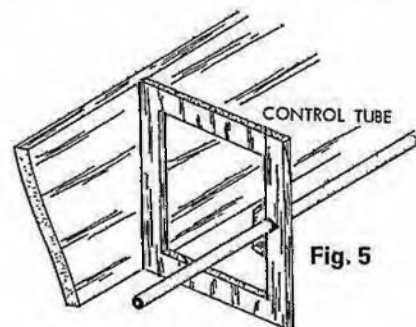
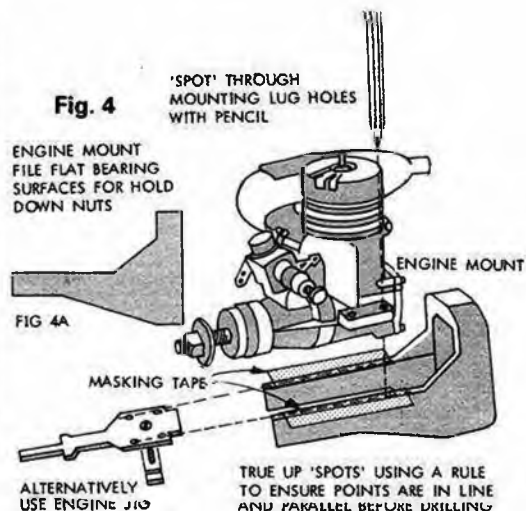


into solid balsa rods with metal ends; tube, cable, or rod in tube; and closed loop. It is recommended that the newcomer limits himself to one of the former methods. Closed loop linkages are very positive but can be more difficult to set up properly for the newcomer. Balsa push rods with threaded metal ends carrying either metal or plastic clevises are very positive and can be fitted after completion of the fuselage. However 'snakes' should be installed prior to fitting the top decking and are best supported each time they pass through or by a former. Since the outer tube is often polyethylene, and this particular plastic is not easy to glue, one of the following methods should be used to ensure a good fixing.

1. Roughen area required to bond with coarse glass paper before fixing with epoxy.
2. Wrap several layers of masking tape tightly around the tube before applying glue.
3. Use saddle clamps screwed to fuselage side or cross members. Take great care that the tube is not flattened thereby creating a resistance to the free movement of the inner.

Figure 5 shows a suitable way of fixing outer tubes to formers.

Servo to engine throttle linkages are almost always tube in cable and provision for installation of this linkage should be



FORMER NOTCHED TO TAKE TUBE HELD IN POSITION WITH SCRAP BALSA.

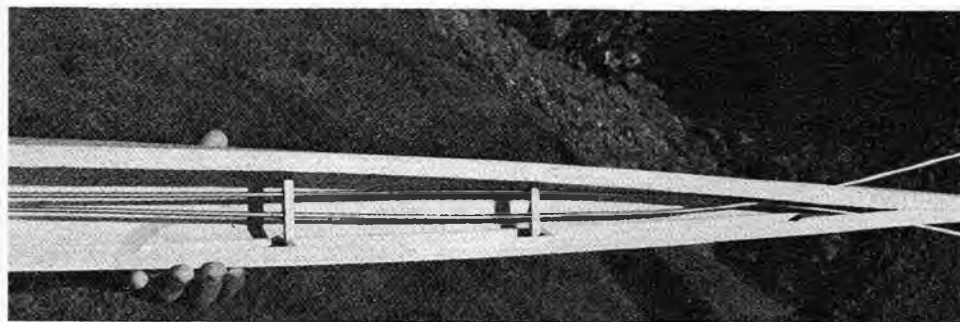
made at an early stage of construction.

When using 'snakes' ensure that the metal threaded end of whichever type does not foul the outer tube at extreme servo travel. On the other hand if the length of inner is left too long, the total linkage will become sloppy, because of the tendency of these inner tubes to bend if unsupported for a distance of more than about 1-1½ ins.

The bottom fuselage sheeting is fitted next followed by the top sheeting. Ensure that this sheeting is fitted with the grain running across the fuselage. It is always a temptation to simply fit a sheet along the length of the fuselage but by using the crossgrain method a much stronger structure results and the sheet will more readily follow the curve of the top and bottom.

Nose blocks, check blocks and top blocks, or any variation, are now fitted to the front of the fuselage and when thoroughly dry the whole fuselage should be shaped and rounded with progressively finer glass paper to obtain a smooth even surface all over.

Holes should now be drilled for wing and undercarriage dowels. These should not be glued in position until after the model is covered simplifying the application of film or tissue. Experience has shown that some dowelling provided in kits is not quite long enough and in operation when unburnt fuel is sprayed onto the



Above: Plastic tube control runs have to be fitted and secured to structure before top decking is added. Solid pushrods can be fitted later.

dowel ends it is sometimes difficult to get the wing bands to stay on. Ideally the ends should project at least 1/2in, if they do not it is suggested that a trip to your local model shop will secure a length of the appropriate diameter dowel sufficient for several models.

Fit the engine to its mount and trim the nose blocks where necessary to clear throttle linkage, mixture and slow running adjustment controls, and crankcase. If any untreated balsa is left inside the engine compartment this should be fuel proofed.

Balsa wood will soak up fuel like a sponge and although the outside of the fuselage is to be covered, the inside of the fuel tank and engine compartments should be treated with two or three coats of fuel proofer, two part polyurethane is best.

The main undercarriage can now be fitted to the underside of the fuselage. Saddle clamps are normally used and are bolted to the ply strengthening plate clamping the undercarriage wire firmly in position. A few models use a torque system of clamping separated main undercarriage legs between plywood plates inside the fuselage.

The fin is usually the last component to be made and fitted. The majority of trainer models carry solid sheet fins. These often need to be made from two or more pieces of sheet which should be joined using the method described in Fig. 2. Finishing is completed by sanding down and rounding off the leading edge. Some fins are built up from pieces of shaped sheet and balsa strip over the plan. Remember to use the polyethylene sheet!

Whichever type is required, fitting is normally achieved by slotting the fin into the fuselage top using a form of tongue and groove system then gluing. If your model requires that the fin is simply glued to the top of the fuselage, a worthwhile modification is to glue two strips of 1/4in right angle balsa each side to provide a larger 'glued area'.

It is essential that the fin is exactly along the centre line of the fuselage, exact verticality is a secondary luxury. The easiest method is to temporarily fix (pin, sellotape or spot glue) a length of stiff stripwood (e.g. 18in of 1/2 sq. balsa, to one side of the

fin, which then acts as a pointer to help align the fin correctly during glueing operations. If the fuselage is placed on a flat surface and a set square used to ensure that the sides are true to the vertical plane, the square can then be used to check that the fin is upright. Alternatively the fuselage/fin assembly can be sighted against the crosspieces of a window (which is normally a true right angle).

A final overall sanding and filling as described in an early article completes the first stage of construction.

Almost ready to fly (ARTF) kits usually include either a GRP or ABS fuselage. In either case the join line should be trimmed with a file or sharp knife then blended into the fuselage line using progressively finer wet and dry paper (down to 600 grade). Before attempting to glue any bulkheads or ply strengtheners in position the outside of the fuselage should be wax polished so that if any excess glue spills over it may be removed without affecting the surface finish.

Before glueing the internal components in position the area of the fuselage must be roughened to assist with a good bond. So much for the general now for the more particular.

G.R.P.

Having treated the outside and roughened the inside, where necessary, any dowel holes should be drilled. GRP tends to be brittle so that it is extremely important to drill pilot holes first then use increasingly large bits until the correct size is achieved.

The best adhesive to use is polyester resin with odd scraps (rovings) of glass mat as reinforcement. The easiest way of achieving this is to tack glue the component into position using small blobs of rapid cure epoxy. The join may then be completed using resin and rovings.

It is also advisable to reinforce engine bulkheads and any main undercarriage areas with resin and glass cloth or mat.

Normally slow setting epoxy resin twin pack adhesives are acceptable but are not quite as good as polyester resin.

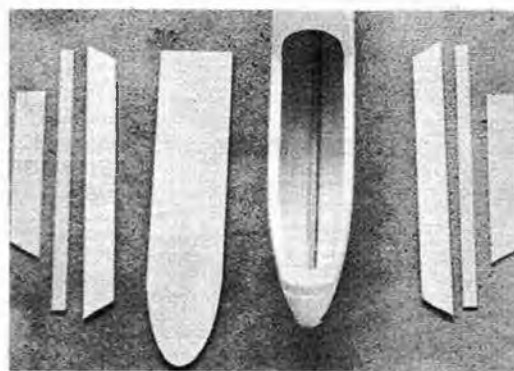
ABS

Normally these fuselages are ready joined and the line hidden beneath a cheat line. If the halves need to be joined and no adhesive is supplied, then the best course is to



Above: Prefabricated cowling has to be modified to fit round engine, needle valve silencer and throttle control.

Below: ABS plastic glider fuselage showing plywood servo floor and stiffening rails which need to be fitted internally using epoxy glue.



visit your local builders merchant and purchase some ABS pipe joining cement. The area to be joined must be thoroughly cleaned and roughened before applying the cement since this is a solvent type, care must be taken that the application is not too excessive.

Under no circumstances should polyester resin be used in conjunction with ABS, otherwise an instant 'goosey' mass will result!

Holes may be drilled quite readily but since the surface is very shiny and slippery, a pilot hole should be used to avoid damage from a runaway drill bit. Often areas of the cockpit have to be cut out (especially in gliders). This is best achieved by drilling holes at the corner points then taking a heavy knife with a sharp but substantial blade e.g. Stanley knife, and heating this to a cherry red glow. The hot blade can then be drawn along the line to be cut. This avoids the problems of a sharp knife slipping across the surface leaving a blemish which cannot easily be repaired. An alternative is to use either scissors or tin snips, but it is worth noting the colder the plastic the more brittle it becomes.

The above method can also be used for cutting or trimming ABS formed parts such as engine cowls and wheel spats. As with GRP fuselages twin pack epoxy adhesives are suitable and again the slow setting types are better than fast cure.

Next month – wings and tailplane.

L.E REINFORCEMENT 1/6 x 1/8 SPRUCE

WING 1/4 SH.T. (SOFT)

SISTER AVIATOR



FINISH ~
WING & FUSELAGE ~
3 COATS TALC & DOP
(50/50 + A FEW DROPS
CASTER OIL)
TAIL & FIN ~ 1 COAT.
SAND WITH WORN
'600' WET N DRY.

TAIL 1/6 SH.T.
SAND TO THIN
SYM. SECTION.

FINGER REST
2 LAMS 1mm PLY

INSET LEAD INTO
NOSE

EPOXY
FAIRING

THROW: RIGHT
GLIDE: LEFT

0° H/L-POINT 1/8 BACK FROM L.E. ~ FLAT?

SKewed-IN DIHED. JOINT
RIGHT WING ONLY!



BEND SLIGHT
WASH-IN INTO
LEFT WING TIP

BEND REAR
OF FIN FOR
GLIDE TRIM

FUSELAGE 1/4 x 3/4
C.G. MED ~ COVER WITH
(60%) LIGHT GLASS CLOTH.

SANDPAPER GRIPS BOTH SIDES

FUSELAGE TAPERS IN PLAN FROM 1/4 AT WING TE. TO 5/32 AT TAIL L.E.

L.O.A. 20 1/4°

TYPICAL SECTIONS

0°

FIN 1/6 SH.T.
SAND TO THIN
SYM. SECTION

THE RECENT HISTORY of the World Free Flight Championships has been in doubt over the past few years, with the CIAM threatening a change to a three-year cycle and the Danes stepping in at short notice as hosts to salvage the 77 event. The 79 event went through a similar period of uncertainty with Yugoslavia, the original hosts, dropping out at a late stage.

Fortunately, much to the gratitude of Free Flight modellers the world over, the United States, having been through a similar planning proposal in 77, were ready to step forward and take over the job.

The venue was the legendary Taft, a flat desert area on the floor of a valley near Bakersfield, 200 miles north east of Los Angeles. With the resources and enthusiasm of a large group of dedicated modellers in California, the backing of the mighty American Model Academy (membership 80,000 – the world's largest) and the likelihood of calm, sunny conditions the event promised to be a classic World Champs.

Long before the competitors from literally all over the globe started arriving for the Champs it was clear, despite holding their own trials and nominating team members, that participation from the Eastern Bloc countries was unlikely. Whether this was for political reasons, as had been the case with the 1978 C/L Championships, or for financial problems of international exchange will perhaps never be made clear. Certainly steps were taken to reassure Eastern European Aero Clubs that there were no grounds for political boycotting, but the outcome was the same. No Russian glider flyers, no North Korean Wake flyers (individual and team champions), no Czechs, no Bulgarians, Rumanians, Hungarians, Poles, East Germans, Yugoslavians or Cubans – even the South Africans weren't there.

Despite the slight reduction in numbers from the missing socialist countries there were nevertheless, 187 of the World's top competitors present from 24 countries each of whom had spent the previous 12 months building, trimming, preparing models and 'California dreaming' of the Taft thermals.

Biggest surprise of the meeting was the attendance of a team of modellers from the Peoples Republic of China. Little has been heard of aeromodelling in China since their last participation in International events back in the 1950s. A group of seven flyers plus Team Manager and Interpreter had arrived one week before, and it was already apparent from watching their very competent practice sessions and inspecting their models that they were quite familiar with modern FAI free flight and their performance at these World Champs was eagerly awaited by all present.

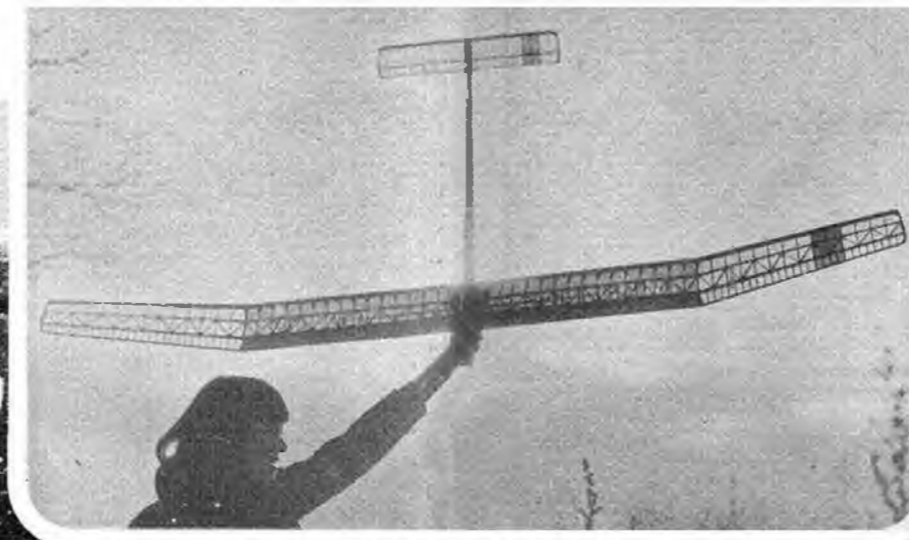
Most teams started arriving just a few days before the Champs, leaving themselves with a tight schedule for practice flying, processing and getting their models and themselves acclimatised to the hot, dry desert weather. Surprisingly few competitors had taken advantage of the opportunity to participate in an Open International held at the same site the weekend previously, but as it was to turn out, not surprisingly these handful of early birds produced several of the new World Champions. Among these early arrivals was the local US glider team who were living on site in camper vans flying literally from dawn to dusk and were looking very suntanned, very fit and very potent.

Some of the hard luck stories, before the championships had even started, included US glider team member Bob Isaacson, a football coach by profession, who had competed in their trials against doctor's orders to make the team, since when the damaged knee he was suffering failed to heal in time for the event – so he stood down in favour of reserve man Jim Walters. Our own British team also had a last minute change of personnel, as Wakefield flyer Dave Hipperson found himself unable to attend due to complications moving house, and Ron Pollard (on the team in 73, 75 and 77) eagerly stepped into Dave's place. Another absentee Urs Schaller 4th in F1C in 77 was unable to attend having recently opened a model shop in Firenze, Italy. Per Grunnet one of Denmark's top glider flyers was also unable to attend as his wife was expecting a child. Surprisingly Per elected to have his models proxy flown by an "unknown" Danish glider flyer by the name of Thomas Köster – quite a risk at such an important meeting.

During the preceding week competitors and supporters had filled the Bakersfield Inn Motel and surrounding accommodation to capacity, processing and practice flying had passed relatively uneventfully for most and after the hour long drive in cars or official coaches to the flying site at Taft, the day finally dawned for the first of the three FAI events.



F1A
Per
Grunnet



Thomas Köster

1979 FREE FLIGHT WORLD CHAMPIONSHIPS

October 3-9, Taft, California U.S.A.



"Stop joking. Who won Glider?" was Per Grunnet's reply when Thomas Köster phoned from Taft trying to tell him he was the new F1A Champion of the World. Per is now reunited with Cirkeline, top left, in native Denmark. Below: Anxious moments for Israel's Itzhak Ben Itzhak before the final deciding F1B Fly Off. Minutes later America's Walt Ghio is first to congratulate him on winning the coveted Wakefield Trophy. Right: Immaculate launch from Italy's Mario Rocca, the new F1C World Champion who won the event using the AD 15 motor. Mario received hearty congratulations from exuberant team mates and shared the accolades with engine designer and 1965 Champion Alberto Dall'Oglio.

F1B

Itzhak Ben-Itzhak



F1C
Mario
Rocca

6TH OCT – F1A GLIDER

A green Very light marked the start of the 1st round, the time 0800 hours and almost immediately several models started circle towing. The sun had been up for about half an hour, burning off mist shrouding distant mountains, overhead the sky was blue and above all there was virtually no drift. Up wind a dozen or more red silk flags hung limp on short poles. This indicated an area marked out by the Chinese where they intended to tow and launch and where the flags would show any change in wind direction immediately prior to release. A little after five minutes into the contest, the first flights were being timed, including the first Chinese who returned one of the early maxes with a flight of a little over four minutes. They were using a new type of latched towhook with pendulum over ride to control the rudder at release.

However it soon became apparent that the lift, which had been abundant an hour earlier during pre contest practice, was now not available. Many competitors were surely tricked into a false sense of security by their early practice flights and were now finding themselves being dumped with less than max flights. The best a competitor could expect was for a reduced rate of descent, as virtually no rising thermals were contacted during this early round.

Tony Young, the first British competitor to fly, had waited patiently watching for signs of rising models for the first 20 minutes, before deciding to tow for his own air. A further ten minutes sampling the conditions towing his model, and he released in the same air chosen by American Jim Walters. Both looked to be in trouble, sinking quickly and the buoyant layer of air nearer the ground that might earlier have saved them was no longer to be found. Tony landed at 2.24 and Jim Walters soon after scoring 2.49.

Time was running out for flyers still waiting for conditions to warm up. Soon after a large group of models was released, more through mutual hope than any positive signs, and soon a multi-national stampede of flapping team members and supporters were raising the dust under the descending models, but that's all they raised. One flyer who had failed to be panicked by this was the American Jim Wilson who continued circle towing throughout with his distinctive Vee Dihedral model.

John Cooper was the next English flyer and after a less than perfect catapult release was down for a flight of 2.30. This difficult opening round was indeed claiming some competent victims; Pete Allnutt, 2nd in 1975, was already 'out' with a 2.30 and team-mate Tam Thompson scored 2.25; Holland's Arno Hacken, out continuously practising the previous week, started badly with a 2.52; New Zealand's hard working Paul Lagan made 2.37; France's best performance was Lionel Braud's 2.38; and Australian Ace Dave Simons was 9 seconds short.

With some 10 minutes remaining in the 1st round, news came along the line that all three Chinese team members had maxed comfortably. Minutes to go to the close, and young Swede Per Quarntstrom made a terrific catapult launch to ensure his first max. But away down wind, watching him and still circle towing, was the amazing Jim Wilson. The US team effort was overwhelming. Surrounded by supporters running alongside clearing a path, calling the position of other models, avoiding line tangles, the workers surrounded their Queen Bee Jim Wilson, as he towed like a marathon runner backwards and forwards across the site until eventually, after almost half-an-hour's towing he chose his air. At 2.50 his glider No. 6 was diving with disaster dancing above the sagebrush; seconds later it was clocked off. The model had just maxed – a brilliant flight.

Meanwhile our third man, Phil Owens, was away towing with little time left. Suddenly his model was released, the circle towhook latch had opened prematurely and the model fell off the line at half line height; however the air was good and the model was holding height. Agonisingly the model got lower until finally it was apparent it wouldn't make it – 2.21 and it landed.

Better fortune for Austrian Werner Kraus, 3rd at the last Champs in Denmark. His model was set for a poor score when 90 secs in to the flight a towline to model collision brought him out of the sky for a refly. With five minutes of the round left he was once again towing, this time for a more successful result, a well earned max. As the red Very signalled the close of round one, just one flyer was left still towing, Requena's model from Venezuela, on its second attempt after a line cross.

Spirits in the British team were understandably low. After months of training, the whole team were wiped out in the first hour, but conditions had been tough and a look at the scoreboard revealed only 18 maxes from the sixty four competitors. Only the Chinese had a full team



Sunrise at Taft on glider day. Far Left: Holland's Arno Hacken completes his practice flights and Leo Sweepette Hines finishes his cornflakes. Left: Welcome participants at the Champs was a team from Peoples Republic of China. Guo Haozhou walks out to flight line assisted by Gao Quinfai. Top: Remarkable flight by Andres Gornides glider from Brazil. Both models involved in mid-air collision lost port wingtips yet continued to glide! Above: Gordie MacKenzie with a fourth round zero score following a line cross and a tow-in amongst his other six max flight.

score – were they about to walk away with their first World Champs victory? They certainly made it look easy. Close behind were Denmark 2nd, USA 3rd and Austria, the only teams with two double maxes, then Holland 4th and Germany 5th with other countries who considered themselves lucky to have even a single max. Among the 1st round maxes was Gottfried Zach who had used a very high aspect ratio still air model, A2 veterans Herbert Schmidt and Heikki Tahkapaa, and one of the four proxy flyers – a certain Mr Koster!

As the 2nd round got under way someone switched on the Taft thermals for the day, and so began the regular weather cycle of 90–180° wind shifts as air was sucked into monster thermals which took models almost out of sight overhead after 3 minutes or dumped them like a sack of spanners in dead patches of becalmed air. Early into the round there was a standing thermal overhead which presented successive flyers the opportunity to show off their catapult launch as they joined the 15–20 earlier models already gaining height in leaps and bounds overhead. One of the freak accidents which can happen at such times occurred when Brazilian Andre Gornide's model had a mid-air collision with another which cleanly removed the outer wing tip from each model. The remarkable fact was that both models now each with 3 panel asymmetric wings continued to glide uninterrupted, if a little steeper than before. Worse luck came on the refly when Andre failed to make second attempt and scored a zero.

More excitement as Spanish competitor Santiago Garrido's model glided down right over the heads of competitors still on the pole waiting to launch, an indication of the truly flat calm conditions. Amid cries of "stand clear" and "mind your heads" one foolish competitor reached out and caught the model! Although not the intention, a clear case of a flyer interfering with the flight of a fellow competitor, thereby allowing a refly to what would have been a non max performance. As it turned out Santiago was running short of round time and only just managed a refly before round end, returning an even lower score of 1.25.

The British fared better in this round with their first two maxes, except for poor Phil Owens who was still suffering towing problems to return a 1.57. Problems too for the Chinese who were unfamiliar with the dramatic changes in conditions compared to steadier weather back home. Premature unlatching and releases at half line height were responsible for dropped flights for Chuahyi and Haozhou but Yaodong was still there with 2 maxes.

For models with the mobility of the modern circle tow glider the 3rd round proved that maxes were no problem. Sixty competitors maxed – in other words, only six flyers dropped the round, and flyers were asking themselves what they were proving by flying at such a ther-

mally period of the day. Certainly by halfway through the round nearly all the flights had been made, and the flight line took on a deserted appearance with competitors hiding their models under the shade of the tents provided for each team, out of the sun until required next round. Among that handful of flyers with the distinction of dropping was our own John Cooper whose model was bouncing around at towline height asking to be let into the thermal overhead, but the thermal gods said no, and returned John's model to earth 5 seconds short. Japan's Hiroshi Yoshikawa and Belgium's Leo Reynders each being proxy flown scored 2.23 and 2.24 respectively. Andre Gornide kept his tips on this round for a 2.31 and Australia's Peter Lloyd scored 1.54.

Lowest score of the round went to sixteen year old Luis Colmenares Jrn with 96 secs to add to his first two round maxes, an expensive flight that was to prove his only mistake. For the rest of the field, although there were the odd anxious moments as models made up their minds to centre into the thermals, the score cards at least proved it to be the easiest round.

The 4th round started with 15 full houses from the 18 who had started with a first round max, but from here on the pressures got tougher as downdraughts and line tangles started to claim unsuspecting victims. Heart-break came to Canada's only remaining max man Gordon McKenzie, who with 3 maxes under his belt towed in with a line tangle. Choosing to refly again quickly for his second attempt, the model veered over immediately on launch for a zero score. Ironically his remaining three flights were all to be maxes. Haozhov with the Chinese team met similar fate and also returned a zero score, and another to fall by the wayside this round was Werner Kraus, well out of the running with a 1.45.

A bad round in the British camp, as Phil Owens and Tony Young were among the fifteen flyers who failed to max with scores of 2.28 and 63 seconds. A crucial flight this round came for the Danish team, sitting in number one team position since they took over the lead after the 1st round. Peter Buchwald scored a disappointing 2.03 to let the USA into top spot chased by the equally skilled Dutch team of Peter de Boer who was still maxing, with Arno Hacken and Tony van Dijk, with the Germans 3rd, and the unfortunate Brits way out of it in 18th place, with much to think about during the following 1 hour lunch break.

Refreshed and rested after lunch, the competitors returned from the shelter of sunshade city to the 5th round and the heat of the mid-day sun and another relatively easy round for most, 54 maxes from the 66 flights. One contestant to suffer from his siesta was Italian flyer Brussole (on the team to replace Claudio Contaldo) who made his only bad flight of the day, a disastrous 1.55.

A further set back for Tony Young dropping just 8secs

short of his max, and another slip for Pete Allnutt with a 2.45, with fellow Canadian Tam Thompson losing more time in the 6th round with 2.35. Bad news also, for the Germans in round six, with Gunter Mussig's flight of 70 seconds putting an end to the two seconds lead they had enjoyed over the Finnish team in 4th place, and reducing the Germans to 10th place.

So to the final 7th round of the contest and still twelve remained on full scores. Emotions were running high for the American home team with a huge gallery of supporters to cheer them on. The round started, once more to the sound of pounding feet as a posse of outriders accompanied first man away Jim Walters. "Tower coming through, clear the way" went the shouts as they blazed a trail for the circling Walters. "Models in lift to the side" he was directed and manoeuvred into position. A great cheer, with hats thrown nearly as high as his catapult launch, as he shot away into the thermal for his sixth consecutive max. Similar treatment for next man Lee Hines. The US led the team scores by six seconds and with last men Hines and Wilson both on full scores, they can accept no mistakes. Hines maxes, Wilson maxes – result uproar, the hard-working Americans are very worthy team champions.

Not such good news in the Danish camp, Jorn Rasmussen spoils his perfect score with a 1.49 as does the Argentinian Antonio Tarzibachi with a very close 2.52 and also the remaining Chinese Yaodong scoring 2.03. So only nine remain for the deciding fly-off. Gottfried Zach Austria, Per Grunnet (proxy Thomas Koster) Denmark, Heikki Tahkapaa Finland, Herbert Schmidt Germany, Peter De Boer Holland, Per Quarstrom Sweden, Walter Haller Switzerland and the two Americans Lee (Sweepette) Hines and Jim Wilson.

With virtually no twilight period after sunset at around 6.30 the fly-offs had to be held immediately in the still thermally afternoon air, and by 4.30 all was set for the first fly-off period for the 4 minute max round. Right from the start signal models were launched and began circle towing, testing the air and soon after were being launched into buoyant looking air, certainly the majority were gaining altitude. Only two models away to the side low down seemed to have missed the best conditions and proved to be Peter de Boer down at 2.42 and Herbert Schmidt with 3.20. Also in trouble, Gottfried Zach was at half line height with a team of frantic flappers furiously running around underneath. Surprisingly this was having the desired effect as the model tightened its glide circle and centred into the rising air to join the other models. Already in the distance the first of the bunch were spiralling down on D.T. ready for the next round. Walter Haller was unlucky to have his model DT onto, and get tangled in, some downwind telephone wires, but when finally retrieved the only damage was the fin broken off, which was quickly 5-minute-epoxied back in



Left: Brilliant young Swede Per Quarnstrom checks model during fly off preparation, his catapult launch was highest on the field, helping secure 2nd place. Above: Finland's Heikki Tahkapaa, veteran competitor in World Championships, was a strong challenger in fly offs. Top Right: The Maestro of Brinkmanship - King Koster, calmly reassembles smashed tow hook minutes before final Fly Off. Right: Let's hear it for the good guys Jim Wilson, Lee Hines and Jim Walters deservedly Numero Uno Glider Team.



place while his reserve was test flown ready for the next round.

5.15pm once again the flare goes off for the 5 minute max round followed immediately by Lee Hines, Jim Wilson and Thomas Koster each beginning to tow. Wilson quickly moved into a downwind position to wait for the others to make a move. Almost immediately Koster launched and looked good. Tahkapaa followed, so does Wilson. Per Quarnstrom was towing and racing down wind trying to catch the bunch which now included Haller. Hines still towed unsure if he can join the four rising models as Quarnstrom whipped his model round a final circuit and made the most brilliant of catapult launches. Only Lee Hines remained still down wind making another circuit - was he too late? All the other models were away and looking safe and finally Lee joined them. As they glide away into the evening air gaining height Zach's model suddenly glided low over the heads of the timekeepers. But Zach's luck stayed with him, because as he was about to start towing Haller's towline had fallen across his for a technical line cross, and by choosing to launch within the next minute he could then nominate a second attempt, which he took and maxed to join all the other six remaining flyers with a five minute max and a place in the six minute Fly Off.

But for one flyer, the chance of a further Fly Off brings many problems. Diving down from the 5 minute max Per Grunnet's Cirkeline glider hit a rock which had smashed all the adjuster screws off the circle tow unit. He could be in no safer hands now than his proxy flyer, the legendary Thomas King Koster, veteran of so many Fly Off crises over the years, that such drama has become an expected part of his contest performance. When others would give up in despair, Lee Kool Koster with his attendant

slaves set to work rebuilding the tow hook and installing a new timer system - the previous one being incapable of running for the six minute max. With just minutes to go, Koster is out there test flying! "The glide is too tight" - "quick, another test flight" - "who set the timer?" - "It's in lift - will it DT?" - "yes, it's OK". Motor cycles eagerly retrieve in a blur of activity as the other Fly Off contestants can only stand by in disbelief waiting their turn to perform.

The 6 minute Fly Off round starts. Immediately Jim Wilson takes to the air and heads purposefully off down wind. Jim travelled to the '77 Champs in Denmark exclusively to watch the Russian team perform (read report *Model Aviation* July 78, Glider Flying Russian Style). He learnt well from his observations and all day his tactics have been immaculate, now he was waiting downwind poised for any advantage he could gain. Quick off the mark Lee Hines follows suit. Then Quarnstrom starts to tow. Tahkapaa has already launched, the flight does not look good, Zach waits on the line. But it's Quarnstrom who makes the first move with another massive catapult launch to the cheers of the crowd. Downwind Wilson lines up on the approaching model, Hines hangs just to one side of him. Wilson fires his model up under Quarnstrom but already the air doesn't look so good. Hines continues towing to the side but finally decides the air is good enough and also launches. Wilson and Quarnstrom are still up, with Per looking best as Wilson's model starts losing height, he won't make it now, but Quarnstrom is still there. Upwind two models still circle, it's Haller and Koster.

Koster tows well to the right hand side accompanied by Peter Rasmussen running alongside to tell him that not much longer remains. The air is really much cooler

now, on the horizon the sun sets through distant clouds. Hines' model still flirts with the mountain tops along the horizon. Only Zach remains still on the ground watching Koster and Haller towing, all the other flights have now landed. Then Koster decides to go, a good launch, the model appears on trim, the air looks buoyant and he's too far to the side for the others to reach him. Zach takes to the air and dashes over trying to catch him, Haller launches but misses the lift. Zach realising he too can't make it, turns back upwind towing on his own; only a few minutes remain. Koster looks very good. Once again Zach's in trouble, he's fallen off the towline at perhaps only 50ft; for the reigning European F1A Champion this has proved a disastrous string of Fly Off flights.

But in the air downwind Per Grunnet's model still holds height - Koster could well make it. With all eyes still transfixed on the disappearing silhouette on the sky line, competitors and supporters alike edge towards the timekeepers, as the seconds are read off the running watch. As the hands pass 3.33 he's made it! The model flies on to 4.11 Thomas Koster proxy flying fellow countryman Per Grunnet's Cirkeline glider has won the World Championships! A triple victory for King Koster Wakefield Champion in 1965, Power Champion in 1977 and now Glider winner with Per in 1979! The only Triple F1A Champion ever to win all three events.

Runner up was 23 year old Swede Per Quarnstrom with a flight of 3.33, just beating American Lee Hines' score of 3.22 with winning team mate Jim Wilson in 4th with 2.10, at least having the consolation of flying the highest placed Vee Dihedral glider.

The only remaining question is who gets to defend the title at the next World Championships, Per Grunnet the winner, Thomas Koster the proxy, or will they both be allowed to fly?

FIA Glider-Individual Scores

Contestant	Team	RD1-7	RD8	RD9	RD10	Total
1. Grunnet/Kestor	Denmark	1260	240	300	251	2051
2. P. Quarnstrom	Sweden	1260	240	300	213	2013
3. L. Hines	United States	1260	240	300	202	2002
4. J. Wilson	United States	1260	240	300	130	1930
5. H. Tahkapaa	Finland	1260	240	300	102	1902
5. W. Haller	Switzerland	1260	240	300	102	1902
7. G. Zach	Austria	1260	240	300	51	1851
8. H. Schmidt	W. Germany	1260	200	—	—	1460
9. P. Deboer	Holland	1260	162	—	—	1422
10. K. Kulmikko	Finland	1254	—	—	—	1254
11. A. Tarzibachi (RA) 1252; 12. A. Hacken (NL) 1252; 13. I. Weiss (IL) 1251; 14. J. Walters (USA) 1249; 15. T. Vandijk (NL) 1247; 16. M. Rosling (S) 1245; 17. P. Lagan (NZ) 1237; 18. H. Schoder (CH) 1235; 19. V. Lensl (I) 1233; 20. L. Braud (F) 1228; 21. P. Nash (AUS) 1228; 22. J. Cooper (GB) 1225; 23. S. Larson (IN) 1224; 24. A. Riedlinger (D) 1222; 25. K. Henriksson (FI) 1221; 26. S. Chorev (IL) 1217; 27. P. Allnutt (CDN) 1215; 28. P. Buchwald						

(DK) 1214; 29. P. Jomarién (F) 1213; 30. J. Leleux (F) 1212; 31. T. Thompson (CDN) 1210; 32. P. Soave (I) 1209; 33. R. Erismann (CH) 1209; 34. Z. Yaddong (PRC) 1203; 35. V. Brussolo (I) 1195; 36. W. Palmieri (RA) 1195; 37. C. Minoli (RA) 1195; 38. J. Rasmussen (DK) 1189; 39. W. Kraus (A) 1185; 40. L. Colmenares, Jr. (MEX) 1176; 41. A. Baruch (IL) 1173; 42. I. Weston (NZ) 1170; 43. A. Abaunza (MEX) 1156; 44. G. Mussig (D) 1145; 45. F. Nuttini (BR) 1145; 46. J. Melis (B) 1139; 47. J. Matsuno (J) 1138; 48. V. Sancruzado (E) 1136; 49. P. Owens (GB) 1126; 50. M. Sexton (NZ) 1122; 51. W. Kamp (A) 1110; 52. Reynolds/Herzog (B) 1101; 53. M. Ledocq (B) 1100; 54. Yoshika/Shibach (J) 1099; 55. T. Young (GB) 1099; 56. P. Sjolund (S) 1087; 57. G. Mackenzie (CDN) 1080; 58. P. Lloyd (AUS) 1079; 59. L. Colmenares (MEX) 1063; 60. D. Simons (AUS) 1059; 61. A. Gomide (BR) 1042; 62. S. Rodriguez (E) 1017; 63. Requena/Dona (YV) 987; 64. D. Chuahyi (PRC) 972; 65. G. Rodriguez (E) 951; 66. G. Haozhou (PRC) 796.

FIA TEAM SCORES

1. United States 3769; 2. Holland 3759; 3. Finland 3735; 4. Switzerland 3704; 5. Denmark 3663; 6. France 3653; 7. Argentina 3642; 8. Israel 3641; 9. Italy 3637; 10. W. Germany 3627; 11. Sweden 3592; 12. Austria 3555; 13. New Zealand 3529; 14. Canada 3505; 15. Great Britain 3450; 16. Mexico 3395; 17. Australia 3366; 18. Belgium 3340; 19. Spain 3104; 20. China 2971; 21. Japan 2237; 22. Brazil 2187; 23. Norway 1224; 24. Venezuela 987.



Left: Kevlar cloth fuselage tube cross wrapped with carbon fibre used by Finland's Pentti Aalto, note wing tweak prior to launch. Above: Scores of flappers raised the dust under down draughted models, a technique which usually failed at Taft. Right: Gilbert Toni winds his rubber in shade created by Brazilian team mates. Below Right: Top Chinese F1B flyer Yi Xiangming checks torque operated VIT mechanism. Note cloth sleeve over props and hub. Below: Dick Myers points out approaching Taft Trashmover as Walt Ghio prepared to launch in the terrible third round.



7TH OCT – F1B WAKEFIELD

With the surplus of performance that the top Wakefields have over the 180 sec max, many flyers were keen to make an early start in **Round 1** with first flights quickly following up the starting signal. A few minutes later a big cheer from the French camp signalled their first max as they raced on confidently, trying to be the first team with three maxes, a feat they achieved with apparent ease. Another early maxer was Bob White with his familiar twin fin design gliding comfortably in the early morning breeze. First flight from the British camp was Ron Pollard who scraped through anxiously with some 15 secs to spare.

Next GB flyer John Cooper had a harder task, now some 20 minutes into the round, conditions were quickly turning flat calm. Mylar streamers ceased to billow and came to rest hanging vertically down the dozens of glass fibre fishing rod poles on which the tell-tale lengths were hung. Bubbles fell to the ground and formed a carpet of transparent mushrooms. Thermistors remained constant and there followed a period lasting almost half an hour with no perceptible air movement at all. Some elected to fly but wisely most chose to wait. German high aspect ratio protagonist Reiner Hofsass chose to fly and 2.32 later wished he hadn't. Canadian Paul Roberts had similar problems losing just 5 seconds in his flight. John had the misfortune of losing his high performance still air model just prior to the Championships and now waited a long while for conditions to improve flying his next best model, and when the air finally started to warm he launched. Alas too early, insufficient air movement and a tired motor left him becalmed and set for a sub max flight, when, just at shoulder height another competitor caught the model! A real stroke of luck for John with a re-fly and a second chance to make the max.

There now remained 10 minutes left for Bob Wells and John's re-fly. With time at a premium and conditions improving by the minute Bob launched to a successful max. Three minutes remaining and John wound up again and launched into an almost identical flight pat-

tern which touched down just three seconds longer than his first flight at 2.28. Amongst the others to fall this first round were Denmark's Paul Kristensen, father of Jens, also on the team, with a 2.53, Austria's veteran Herbert Chmelik with a 2.31, Holland's Piet van Merkestijn with 2.18 despite the help of Glider flyer Peter de Boer on Thermistor, and three of the lads from down under Australians Dave Tongway and Alan Edwards scoring 1.45 and 2.24 each, joined by Kiwi Ron Magill with 2.09.

Generally speaking though most countries had experienced few problems in this opening round with 43 maxes being scored from sixty four competitors which included full team scores for seven countries – Argentina, China, Finland, France, Italy, Sweden and USA with Israel's two-man team also keeping a perfect score.

Round 2 again heralded the start of the big thermal weather and with the reduced mobility of the Wakefield flyer having to launch from his pole position and not having the facility of testing the air afforded to the preceding days circle tow glider flyers, downdraughts were to play a larger part in thinning the field down. Also, as the day wore on and hotted up, problems with rubber motors was to increase. Dutchman Pym Ruyter needed eleven motors to make his first two contest flights! Pym attributed much of this problem to the very low humidity which accompanied the high temperatures at Taft, which seemed to affect his Silicon lubricated rubber more than most. He tried watering his motors with some success before changing to soft soap and glycerine on another batch of freshly processed rubber later in the day.

This second round wiped out the entire Chinese team who had again started in great shape with all maxes and who now all dropped with flights around 2 minutes each. They were using models powered by multistrands of 1/16in sq rubber home produced in Shanghai. More trouble for Cooper with a 2.08 flight which never rose above 80ft on the climb, and a bad flight of 1.58 for this year's Pierre Trebod International winner and German National Champion, Bernard Silz. Balzarini was first to spoil the Italian's score with a 2.01 his only mistake of the

day, and Archangel Armesto broke the Argentinian's luck with a 1.51 as did Swede Lennart Hansonn with his 2.04. So, by the end of round 2, only American and French teams remained with a full score along with 32 individuals who included Britain's Ron Pollard and Bob Wells.

Round 3 and as the day hotted up, this was to prove the toughest round of the contest. Early attention was focussed on the very potent looking USA team, flying on their home ground they looked formidable opponents. Walter Ghio was wound and ready to fly amid the barrage of information he was being fed from fellow team mates. Runners were launching great clouds of fluffy cat-tail seeds into the air with others on bubble machines and thermistors, or general model spotting. All the Americans were really getting involved in the contest. The air was improving, a great thermal was building, all the signs looked right as a whirling, twisting dust devil started to form towards the far end of the line, slowly approaching and gathering momentum. As other competitors raced to hold down models, Walt was preparing to fly – team-mates confirmed all was good – the dust devil now close at hand, Walt launched into a magnificent fast vertical climb – whoops and cheers from the team sped it on its way rocketing upwards until they changed to cries of horror as the model flicked onto its back and plunged vertically earthbound, prop still running, wings fluttering *No No No No!* All the cries of the Americans couldn't prevent the inevitable but long before the model hit the ground the lump in Walt's throat told him it wasn't the twister that had caused the dive, he recognised the pattern as resulting from an incorrectly set *Seelig* timer changing from cruise to glide rudder settling too early. All who witnessed the flight were saddened by poor Walter's misfortune knowing him to have been in real contention for the title. Truly, this emotional flight was part of the agony and the ecstasy of model flying, which continues to bring so many nations together for Free Flight Championships.

But for the unfortunate Americans there was to be yet more drama in the terrible third round, this time for Bob



Top Left: Fateful flight for French Team as all-rounder Alain Landeau launches into 98sec downdraught in the 6th round. Left: Excellent results for Argentinian Team ultimately placing 4th. Archangel Armesto flew sheet covered wing model utilising carbon fibre fuselage tubes.

Above: Danish hopes rested with Jens Kristensen, a top flyer in Europe this year, who dropped final flight. Top Right: Hardworking Kiwi Paul Lagan with stuffed mascot flew both F1A & F1B to drop only a single flight. Right: Gottfried Zach assists Austrian Team mate Hans Zachhmel who became a victim of processing drama.



White. The most experienced flyer on their team Bob placed 3rd in '71, 5th in '73 and 2nd in '75 at previous World Champs; somehow everyone present quietly expected this to be Bob White's year, being on home soil. Even the graphic logo for the Champs was recognisably old twin fin Bob launching for another max. Under the circumstances the pressures on his flying were enormous. Probably still in a state of shock from the preceding flight Bob fell victim to another Taft downdraught which produced a mere 2.13 flight.

Heartbreaks too for Giovanni Cassi who landed just one brief second from his max to eventually leave him that close to the fly off by the end of the day. Italian team-mate Roberto Artoili also made his only mistake of 1.55. Lefthanded Dane Peter Rasmussen dropped his only flight with 2.29 as did Osca Viggiano with a 2.06 and Super Swede Jan Zetterdahl who despite having probably the fastest climbing model of the meeting on 25-30 sec runs scored only 1.56. Mitsuo Kibori, top Japanese flyer, 2nd in '73 in Austria, dropped his only flight with a 1.46, as did Canada's Jack McGillivray, Israel's Giora Herzberg and Norway's solo flyer Ole Torgersen. Frenchmen Albert Koppitz and Jacques Petitot dropped time for their team with 2.44 and 2.47 yet the French team stayed on top just ahead of Holland and New Zealand.

Round 4 started with only 15 of the sixty four competitors remaining including two British flyers, Bob Wells and Ron Pollard. Most of the problems experienced had come from misjudged air or simply treacherous thermals that petered out and dumped models, but problems with rubber were also to blame, many contestants were finding their Pirelli motors especially the newer translucent batches were simply not standing the extreme heat. Those motors that survived the rigours of being wound appeared to turn exceedingly spongy and devoid of torque for the flight after being held even for brief periods. The secret, and one familiar to the local American flyers, was to only use Pirelli for the cooler opening rounds if at all, and then change to the more robust Ed Dolby FAI Supplies rubber as the heat built up

during the day. This tactic was employed by most of the competitors who had such a choice, and it worked wonders for John Cooper who scored his first max of the meeting with a scorching climb.

But it was very much a case of swings and roundabouts for the British, with a poor flight of just 1.25 for Bob Wells spoiling his perfect score. Bert Kroon of the Netherlands was the only other top flyer to have survived this far to come unstuck with 2.17 but the Dutch held on to 2nd team place, behind the French and ahead of New Zealand, with Great Britain hanging on in 10th place – and so to lunch.

Conditions at the start of Round 5, an hour later were still at their hottest, with the thermals taking models to an enormous height, many taking longer to descend under D.T. than they had taken to gain their altitude. It was whilst watching such a spectacle of a cloud of diminutive models spiralling down from making their maxes overhead, that a larger shape floated over the heads of the timekeepers, that of the familiar *Vol Libre* twin fin, had Bob missed another max? The sad news was *No!* The near identical model in fact belonged to his flying partner and team mate Bob Piserchio who up until then had kept his score together before recording a 2.09 to join the growing ranks of also rans. Trouble too, for Swiss flier Fritz Gaensli who after a successful year flying in European contests scored only 2.14 with his immaculately built model. The sole remaining Japanese flyer Masumichi Shihachi made his exit with 0.57sec and John Cooper slipped further back with a 2.03 and bad flights by Piet van Merkestijn with 70 secs and Ron Magill with 59 took their countries out of contention in the team placings.

Round 6 and further dramatic changes for the team scores resulted from a bad mistake by Frenchman Alain Landeau. All day the French team under the experienced guidance of Pierre Chaussebourg had led the field. Now at the penultimate hurdle, despite the extreme care they were taking, they got it all wrong and Landeau's model was becalmed by the freakish Taft air, the model did a couple of circuits overhead, as nothing stirred and

landed back near its launch point for a scant 1.38. A moment of glory now for the Argentinians who found themselves in third place behind Italy and Denmark. All the British team maxed which raised their sights to sixth place, and with just ten individuals remaining all now rested on the final round.

Round 7 and a tough time for European competitors, Sweden's Bror Elmar 2.20, Holland's Pym Ruyter 1.53 and the young Dane Jens Kristensen 2.29 who all spoiled perfect scores to miss the Fly Off as did Argentinian Rudecindo Marquez with his flight of 1.27. The result of such flights on the team scores was that the Italian team of Artoili, Balzarini and Cassi who all maxed took top honours, Denmark with father and son team of Paul and Jens Kristensen plus Peter Rasmussen slipped back to 2nd, and a pleasant surprise for the British who had all maxed guaranteeing a Fly Off place for Ron Pollard, and elevating themselves from sixth to third spot, the best team position in Wakefield since our 3rd in 1959. So it was that just six Wake flyers had survived the arduous thermal conditions of the day, Paul van Leuven Australia, Hans Zachhmel Austria, Dan O'Grady Canada, Ron Pollard Great Britain, Itzhak Ben-Itzhak Israel and Paul Lagan, New Zealand.

The 4 minute max round Wakefield fly-off began. First away was all-rounder Paul Lagan and after an impressive looking climb in good air, he was followed by Ron Pollard with Ben Itzhak and Zachhmel soon after. Paul van Leuven blew a motor and started rewinding while Canadian Dan O'Grady waited already wound. Of the earlier flights all looked good except for Ron Pollard who had run out of dark 1971 Pirelli and now had to rely on some 1973 rubber producing a short run which didn't coincide with the timer operated Auto Rudder, and was struggling for airtime, landing at 2.35. Then the shock news that Lagan had missed his four minute max by just 3 seconds lost out of sight behind the Kitty Litter factory! Van Leuven eventually launches with wings fluttering all the way upon the power burst and with Dan O'Grady also in the air, both looked set for good flights.



Ron Pollard sets Seelig timer watched over by Steve Marriott. Ron was highest placed Briton for over 20 years, placing 5th in Fly Offs.

F1B Wakefield ~Individual Scores

Contestant	Team	RD1-7	RD8	RD9	RD10	Total	
1. I. Ben-Itzhak	Israel	1260	240	300	360	2160	
H. Zachhalmel	Austria	1260	240	300	144	Disq.	
2. P. Vanleuven	Australia	1260	240	300	124	1924	
3. D. O'Grady	Canada	1260	240	284	—	1784	
4. P. Lagan	New Zealand	1260	237	—	—	1497	
5. R. Pollard	Great Britain	1260	155	—	—	1415	
6. G. Cassi	Italy	1259	—	—	—	1259	
7. J. Petiot	France	1234	—	—	—	1234	
8. H. Chmellik	Austria	1231	—	—	—	1231	
9. J. Kristensen	Denmark	1229	—	—	—	1229	
10. P. Rasmussen	Denmark	1229	—	—	—	1229	
11. B. Eimar (S)	1220	12. R. White (USA)	1213	13. R. Piserchio (USA)	1209	14. O. Viggiano (RA)	1206
15. E. Balzarini (I)	1201	16. J. Zetterdahl (S)	1196	17. R. Artioli (I)	1195	18. P. Ruyter (NL)	1193
19. W. Eggimann (CH)	1189	20. A. Barnes (NZ)	1187	21. M. Kobori (J)	1186	22. A. Landeau (F)	1178
23. G. Toni (BR)	1176	24. B. Silz (D)	1171	25. R. Marquex (RA)	1167	26. P. Kristensen (DK)	1167
27. A. Wells (GB)	1165	28. O. Kilpelainen (SF)	1160	29. Y. Xianyming (PRC)	1142	30. O. Torgersen (N)	1133
31. L. Chengming (PRC)	1133	32. A. Armesto (RA)	1125	33. F. Gaensli (CH)	1121	34. M. Shibachi (J)	1105
35. T. Soakawa (J)	1102	36. P. Vanmerkestin (NL)	1089	37. Gonzalez/Sandroni (VY)	1084	38. J. Waser (CH)	1084
39. A. Koppitz (F)	1082	40. P. Roberts (CND)	1079	41. J. Cooper (GB)	1077	42. P. Solonribeiro (BR)	1073
43. B. Kroon (NL)	1058	44. R. Hofsass (D)	1053	45. R. Schlesinger (D)	1053	46. W. Ghio (USA)	1043
47. J. McGillivray (CDN)	1037	48. G. Hertzberg (IL)	1020	49. D. Tongway (AUS)	1013	50. R. Alvarez (MEX)	995
51. S. Mutad (E)	994	52. L. Hansson (S)	986	53. X. Kai (PRC)	977	54. R. Magill (NZ)	968
55. M. Kosonen (SF)	960	56. P. Aalto (SF)	930	57. E. Reitterer (A)	914	58. A. Edwards (AUS)	899
59. J. Navarro (E)	876	60. G. Albrecht (BR)	867	61. F. Vera (MEX)	783	62. O. Vazquez (VY)	541
63. J. Arjona (MEX)	489						

F1B TEAM SCORES

1. Italy 3655; 2. Denmark 3625; 3. Great Britain 3502; 4. Argentina 3498; 5. France 3494; 6. United States 3465; 7. New Zealand 3415; 8. Sweden 3402; 9. Switzerland 3394; 10. Japan 3393; 11. Canada 3376; 12. Holland 3340; 13. W. Germany 3277; 14. China 3252; 15. Australia 3172; 16. Brazil 3116; 17. Finland 3050; 18. Israel 2280; 19. Mexico 2267; 20. Austria 2145; 21. Spain 1870; 22. Venezuela 1625; 23. Norway 1133.

The 5 minute max round, and four remained, first to wind was the Israeli, alongside Paul van Leuven broke another motor as did Itzhak Ben-Itzhak soon after. It was Australia's Paul Van Leuven away first following his rewind into great air followed by Hans Zachhalmel. But as Dan O'Grady the Canadian released, *disaster strikes!* In a fumbled launch one prop blade breaks off and the remaining unbalanced blade lifts the shuddering model into the air chasing the earlier models. Confusion reigns. "It's a no flight — a part fell off!" "No the blade must have come off before release!" "Is it a second attempt?" Nobody knows, but as Dan O'Grady hastily prepares his reserve model before the round ends, his first single bladed attempt is already gaining height in the thermal gliding away to a certain 5 minute max. Itzhak Ben Itzhak is next away and despite the impressive looking climb a fleet of motorcycles zoom off downwind circling noisily underneath the model to raise the dust and hopefully also a thermal.

Less than five minutes remain and the Canadians wait as yet unwound, listening to the advice on their handheld radio sets from team mates spread out upwind with thermal detectors sending back temperature readings. Back comes confirmation that the first models away had maxed, including O'Grady's 1st attempt. His 2nd attempt looks equally good and is accompanied right from the start with another group of flappers running on under the circling model, trying to make the most of the good climb height. But their enthusiasm was not matched by the score, being 16 secs short of the magic five minute max. So O'Grady drops out. *Or does he?* — what if the model without the prop blade was still up to Wakefield weight? Wouldn't it merely be a case of a competitor choosing to fly a single blade model — and the 1st attempt max would stand! Certainly the blade left behind felt light enough, just a few grammes, to raise

hope. *But what if the model was underweight?* If he had knowingly flown an underweight model that means total disqualification! And yet the rule book says "if a part is detached during flight or launch". Does that mean the instant of release or all the period of body English that precedes the click of the timekeeper's watch. *Who knows?* Certainly at that moment the contest organisers and FAI jury couldn't decide, and in any case, the model sans blade would need to be returned and processed.

So with confusion all round, with proposals and counter proposals still being made, the flare signalled the start of yet another Fly Off, the 6th minute max round. Zachhalmel launched first closely followed by Van Leuven but it was immediately apparent that neither was set for a good flight. The Australian had now completely run out of the FAI Supplies rubber he had used all day and for this crucial flight had been forced to swap back to his Pirelli, and with a poor climb it looked like being an expensive flight. Meanwhile the Israeli's, now on their second wind, were taking their time. Flying extensively on thermometer knowledge they had two meters, one 50 yards upwind and one at the pole. Both heads fed a double chart recorder and they watched for the upwind temperature to start falling to indicate the passing of a warm patch of air before launching. Unhurried, they waited knowing already that Zachhalmel 2.24 and Van Leuven 2.04 had failed. Finally Itzhak chose his moment and launched. Soon the crowd was buzzing — *can he make it?* — the climb looked so good — the glide even better, it was gaining height. *He must win.* Soon the speculation turned to cheers, he had already beaten the other two scores and still the model flew. It was a great flight comfortably achieving the full six minutes in the gentle evening air. *Itzhak Ben Itzhak had won the Wakefield Cup!*

And yet, what was happening now, a flurry of activity



Tragedy strikes for Canadian Dan O'Grady as one propeller blade breaks off during launch, model still managed five minute max but attempt was disqualified.

on the flight line and another model takes to the air, launched badly to the left in the haste it nevertheless flicked round into a steady climb followed by the red Very signalling the close of the round. It was Dan O'Grady — had his five minute single blade flight counted? *Was he also about to max?* Were we about to witness another traumatic fly off drama, like the all time classic Matveev versus Koster drama of 1965? All eyes were transfixed, half willing the model up, half willing it down. But the evening air had cooled, and the flight petered out after three minutes without challenging Ben Itzhak's winning max.

Even as the crowd gathered eagerly for the final prize-giving, the story was not yet over. There was some delay. Speculation ran through the assembled crowd as rumours spread, was it O'Grady's flights? Then a shock wave hit the crowd — it was Zachhalmel's model — *it was underweight!* The extreme desert heat and low humidity was known to dry models out 8–10 grams, surely he had not flown a model too close to the limit? The sad news confirmed that this was the case, but the model was to be taken back to Bakersfield that night for more accurate measurements.

An interesting precedent was created here, for a legally processed model that has subsequently dried out during a day's contest flying, could easily gain a few grams during its journey in the damper night air. For poor Hans Zachhalmel this was not to be the case and he lost his second place and *all his scores for the day!* The final judgement credited him with a model 0.4 gram under the limit — the weight of an extra wing band! This now placed Paul van Leuven 2nd and Dan O'Grady 3rd by virtue of his 2nd attempt 5 minute round flight, with Paul Lagan 4th and our own Ron Pollard a most creditable 5th, the best British performance since John O'Donnell's 3rd place in 1956!



Left: Australia's Paul van Leuven loads fresh rubber motor into model but he had run out of decent rubber before deciding Fly Off. Right: Resplendent in British Airways patriotic track suits, the victorious British Wakefield team Ron Pollard 5th, Mike Farnham Team Manager, Bob Wells 27th and John Cooper 41st took 3rd Team prize.



8TH OCT — F1C POWER

The morning of the event dawned uncharacteristically overcast and cool and from first light those motors were running, as last minute check flights were made. Amongst the early practice flyers was sole Chinese entrant Gao Quinfel with rather dated-looking models, D-box leading edge with tissue covered wings, powered by rear induction Rossi's due to a current nonavailability of the front induction motor. But the models were spot on trim with an immaculate vertical climb, would this be a better day for the Chinese?

Soon the contestants were gathered on their starting positions and at 8.00am the 1st round began. Conditions were quite still and competitors were naturally eager to fly in the neutral air. A Championship is never the time to make mistakes but without the possibilities of thermals to rectify off trim models any mistakes at this stage would mean elimination.

Attention was naturally focussed on reigning World F1C Champion Thomas Koster who had arrived equipped with yet another immaculate flapper, one of a pair built for the event, but one which sadly didn't survive the rigours of trimming. So Thomas relied upon his '77 World and European winning *Speed Cream* which was now looking well worn, especially around the motor and the pylon area. The same inconsistent motor problems which had plagued him at the Euro Champs were still giving him trouble and he shut down the motor on his first attempt electing to delay his flight. Minutes later he started up again and launched but the motor still ran intermittently all the way up for a short run and a very tight looking under elevated glide. Thomas was in trouble and this time it was just him versus gravity, a battle he lost by a scant 7 seconds.

An even closer flight came from Thomas Heideman, one of Germany's power flying brothers, just 4 seconds short. Argentina's Maurice Zito scored 2.55, Australia's Peter Nash a disappointing 2.52, Switzerland's Andres Bartsch just 2.51, and Sweden's Anders Enstrom 2.51. In fact some twenty of the World's best power flyers, that's almost half the field, fell before the contest had hardly started. It was not as easy as it looked, but the blame usually rested with bad launches, short runs, indifferent pull-outs or just a case of getting up too early! In the British camp things were going better, the thermometer was registering little or no temperature changes, yet there were some anxious moments as each of the three Brits made their opening maxes — nevertheless a good start. At the round close four countries had kept a perfect score Canada, France, Great Britain and United States. Only New Zealand's John Ensall returned a zero following a double over run.

2nd round and it was back to Californian sunshine as the early overcast burned off and with it came the first of the dead flat periods with no wind and definitely no lift. Amongst those caught out was past Champ from 1965 Franz Bauman scoring just 1.57. Another veteran our own Ray Monks suffered a left climb which put the model well to the side of the group of models thermalling directly overhead resulting in a 2.37. Anxious moments for America's top man at their trials Carl Bogart with his model coming down in the sink, only the encouraging shouts from his team mates could have helped it seek out the good stuff and go away for a max. Sole Brazilian, Walter Nutini, made his only mistake of the day with 1.42 as did Finland's Roul Saukkanen with 2.48. The round ended with just 21 doubles left from the 46 entries and only Canada, France and USA tied with full team scores.

The 3rd round was to see some far more remarkable flights both good and bad. Peter Harris had a bad left launch with the model on its back looping into the glide but the big Taft thermals saved him. Stafford Screen flying soon after made a characteristically consistent flight, groovy climb and clean pull out into a well marked patch of lift joining other models already up there. But Stafford was to be let down by one of those treacherous thermals, soon at less than half height, with no hope of a reprieve, the model landed at 2.02.

With the reigning World Champ out of the running, another Scandinavian was drawing attention. Past winner of the Pierre Trebod Sweden's Jan Olle Akerson, flying a really potent model, consistency was his only problem with a critical tendency to tuck nose under and roll left as the impressive acceleration built up flying speed. But he was let down with an identical score to Koster's 2.53.

For the French Team, problems for that great all rounder Alain Landeau. Practice flights and now early contest rounds left him with damaged models. An awkward D.T.



Left: Traditional rib and tissue structure model flown by China's Gao Quinfel was spot on trim every flight to reach Fly Offs. Above: Waiting for signs of lift, Anders Enstrom member of Swedish Team which did not include 1975 champion Lars G. Olofsson. Below: Australia's Bill East really put some muscle behind his javelin launches, seen here test running engine.



Above: Norway's only Power entrant Tor Bortne flew model with underfin, claimed to improve climb but was vulnerable to damage. Below: Mexico's Al Vela equipped with magnificent models again suffered series of bad flights. Right: Very impressive power patterns from Sweden's Jan Olle Akersons last climbing model.





Left: Start of an unforgettable flight for America's Roger Simpson. Almost a minute later the timekeepers spotted the engine was still running! Above: Japan's Keiichi Kibiki flew models using wings braced at centre with external piano wire. Trimmed out best model between rounds for Fly Off. Top Right: Busy Frank Schlacta must have clocked up most trimming flights – all Canadian models used white spot tip markings to aid downwind recovery crew. Frank – it still looks a little left. Right: Distinctive dihedral of Dennis Ferrero's model, unlucky splashdown in Kittyflitter lake may have cost him top placing.



broke his wooden fuselage under the tail mount and now he is repairing, way off to one side on his own retrimming. When he eventually has to make his third flight he's not ready and scores only 2.38.

With just seventeen minutes of the round remaining, two Americans Simpson and Galbreath wait anxiously for signs of improvement. Roger fires up his motor and launches, the run seemed long, "Was it an over-run?" the team ask. "No, the engine run was good", the timekeepers reassure them. The model circles overhead and looks safe, two glide circuits and someone is shouting for quiet. "What's that noise?" Everyone listens – it's a motor running. Surely it can't be – yes, Simpson's motor is still ticking over, the propeller is still turning. The pullout was unaffected, the glide seems unaffected yet the motor continues to burble on for almost a minute. Embarrassed timekeepers call an over-run – highlighting the practical problems of engine timing. Had the model not remained gliding overhead no one would have ever known! With time running out for the Americans, Doug Galbreath starts up as clouds of bubbles are carried aloft and soon his model joins them for a safe max. Now it is Roger's turn again, with his second attempt, and time running out, three minutes left, then just two, then only one. He has to fly. Reluctantly the motor starts, the climb and pullout are superb but the air isn't, the result just 2.11. The American team has dropped, to third team spot, but so too have all the others with France now leading Canada following Landeau's flight and Sugden's who also dropped with a 2.22.

The 4th round, competitors are now much more respectful of conditions and wait for each other to mark the thermals. When such standing thermals are marked overhead, the air is suddenly full of screaming motors as flyers race to get their models airborne. On occasion a dozen or more models are launched almost consecutively in the space of perhaps a minute. But for those who miss, the price is high, Ray Monks gets only 1.44 for his flight but Birmingham clubmate Pete Harris continues to max, now Britain's only hope.

More spectacular flying just before the round ends comes from Denmark's Neils Hammer when a few seconds after launch the prop comes loose and the motor shaft runs with consequent loss of climb and poor transition, the glide is good but the model will surely fall to max. Then as the model slowly glides still high above the heads of the timekeepers, eagle-eyed Koster spots that one prop blade has been shed by the shaft run. "A part has fallen off, refly quickly!" – only one minute remains. While the first attempt continues to glide overhead, Neils is already fumbling with his reserve in the panic to

get it airborne, the motor's not running perfectly, the launch is left, the pattern and pullout poor, but it beats the red Very light into the air by a couple of seconds. The flight is on, and as the model glides in wide circles the wings rock and the thermal gods take over the piloting – it will be a max! Now only the Danes remain on the flight line, the lunch break has begun.

Contestants return to an even more dried out and dusty starting line for the 5th round. Every time a motor starts up, the slipstream throws up clouds of fine sandy dust which now coats everything and everybody nearby. The sensible flyers have engines and timers safely wrapped up in polythene bags or cloth covers to prevent mechanical damage or malfunctions. Earlier the spectator area had been wetted down by a water lorry, a similar treatment would not have gone amiss at the flight line before the contest got underway.

Flying was uneventful with only seven flights dropped including the first mistake for Japan's Keiichi Iwamura with just 48 secs and for poor John Ensoli, his only max of the contest. Worst flight went to Mexico's unlucky Al Vela, builder of immaculate World Class models, who had written one off in practice, and now having dropped time in the previous two rounds, he went out of the contest with one of the few crashes at 9 secs. With most teams maxing the scoreboard changed little and still it was France, Canada and USA at the top.

6th round and thirteen flyers remain perfect, and Carl Bogart must have been the thirteenth. Inconsistencies during the previous week had made him keep his latest half-thou. aluminum skinned thin section models hopefully for use later in the contest. Reverting to his safe lower aspect ratio models he put in another great flight, only to be told the timekeepers had given an over-run amid the background noise of engines being run on adjacent poles. Naturally the flight maxed miles up in lift. With only 10 minutes left, Roger Simpson who had already dropped, elected to drop back to give Carl his second attempt; all looked good but this time the thermal was missing, and Carl went out with a leaden 1.36. Minutes later, models overhead marked another big one to take Roger to a comfortable max. Few other flyers failed to max and now Germany found themselves elevated to third team place ahead of Sweden and America.

The final 7th round and 12 flyers are left with all the British team willing Pete Harris onto a full house score which to everyone's relief he managed. No happy ending though, for past Bronze Medallist in '75 Mike Burns from Canada who had been plagued with faltering motor runs all afternoon, now attributed to an air leak in his fuel line. Duly replumbed and running great, he

dropped his perfect score with a 2.22. Tragedy also for Hans Seelig, Champion in '67, and world famous for his excellent German made multifunction clockwork timers, used by virtually every other competitor on the field. The score which broke his perfect run was only 2.06 and team mate Bauman, Champion in '69, did worse scoring a zero after a double over-run.

France emerged clear winners of the team prize a minute ahead of Canada with Sweden third, and ten individuals left for the deciding fly off rounds. Reine Truppe Austria; Frank Schlacta Canada; Gao Quinfei China; Pete Harris Great Britain; Martti Keinanen Finland; Dennis Ferrero and Michael Iribarne both French; Keiichi Kibiki Japan; Mario Rocca Italy and Doug Galbreath USA.

Even before the fly offs there was plenty of activity and none more than from the busy Frank Schlacta determined to squeeze in five trimming flights to practice his launches. Just before 5 o'clock the last ten competitors gathered at the start line for the 4 minute max Fly Off. Frank Schlacta starts up first – the others watch him as he tunes the motor, then launches. Four, five, six – cut, the run is good – the transition poor, but soon the model is gliding away well in lift. Mario Rocca starts up quickly with Michael Iribarne and power flyers panic sets in as motors fire into life. Iribarne launches, chased by Rocca; all round motors are singing, dust is thrown up from slipstreams, timekeepers tense their trigger fingers on stop watches, Kibiki launches – now the Fin, Keinanen – now Galbreath, away well "Go it Doug – Do it!" shout the Americans. The Finn spins down to lose some height but Galbreath's got a good one. Harris starts, yes, he's away into a good pattern, Austrian Reine Truppe starts up and goes well, so too does Ferrero. Then the Chinese launches, brilliant pattern, great pullout, really superb climb; a cheer goes up "Hey – All Right!" call American voices amid the applause. All the models are circling away towards the sun in a wide bump.

But in the British camp a reserve model is being prepared – over-run. There is no way any timekeeper could possibly hear a motor cut 500ft away with other engines being tuned 20ft away on adjacent poles but the timekeeper's watch is law. With his first model still gliding towards its max, Peter launches his back-up plane but this time there is trouble with the timer the motor falls to flood off properly and the rudder doesn't come in, massive stalls result but it's already too late – it's a double over-run – a zero score. The other contestants all max.

The time now 5.30 and the 5 minute max Fly Off. Again it's Mario Rocca to make an early start, the model



Left: Highest recorded climb with 180 metres, Doug Galbreath's model used Wing Wiggler gadget to produce differential incidence for climb and glide. Above: Emergency repairs for Frank Schlacta after best model landed on downwind oil tank. Top Right: Kiichi Kibiki with Japanese Team Manager watches anxiously as his final flight approaches 6 minute max. Right: Top Power Team Frenchmen, Alain Landeau 15th, Michel Iribarne 3rd, Alain Roux Manager and Dennis Ferrero 7th collecting their trophies at final banquet.



tucked a bit flat at the top but the transition is good, the run 6.2 secs and the model holds height well. Back on the ground all is not well as models returned from their last flight are checked. Frank Schlacta's model landed on an oil tank and the retrievers had to be lifted in a hydraulic tractor bucket to bring it down. Now the tail is found cracked and repairs are under way with *Hot Stuff* and 5 minute epoxy, but he has an Anderson Cox Rossi equipped spare prepared as a back-up while repairs set. Austrian Truppe DT'ed awkwardly to damage the wing sheeting – repairs won't help him, he will need to use his spare model. Frenchman Ferrero splashed down in one of the Kitty-litter factory lakes and can't start the water-logged engine, the timer too must be soaked.

Overhead Rocca gains altitude, now twice the climb height, he's going to max. Then the others decide to go. First it's Finn Keinanen; motor faltering, it goes away flat; Iribarne starts, checks wind direction and launches to gain tremendous height; Schlacta and Kibiki have motors running, gusts of wind blow through raising dust as they tune their engines, the Japanese is away well, the Canadian goes left but holds the climb; Galbreath goes, another fantastic pattern, this must be the best model on the climb, to join the four models directly overhead in lift; now the Chinese releases rolling horribly left, his worst flight of the day, upside down, short run, it loops back down towards the ground, and peels right into the glide at less than half height upwind of the thermalling models – he may well have missed it. But there is no shortage of lift overhead as the Chinese model starts to improve and still Ferrero can't start his motor. As the French team race about with wings and tail to assemble a reserve, the first cheers confirm early

maxes for Rocca and Keinanen. The other models are swallowed by the golden sun, still the watches run. Now Ferrero goes with his distinctive curved wing and last is the Austrian with his reserve model, but it is only a five second run. Ferrero and Truppe dropped the flight but still seven remain.

All competitors are back now for the 6 minute max Fly Off; Schlacta actually chose his repaired number one model for the last flight, but dissatisfied with the left climb now adds some right trim. It's six o'clock and the relative silence is shattered first by the Chinese motor but again the model uncharacteristically misbehaves, climbing over onto its back, cutting early at five seconds, looping round into a low glide circle, but this time the air won't be good enough. Keinanen launches – Kibiki launches – both good but the Japanese model is far, far higher. Now Schlacta and Rocca launch simultaneously but their paths diverge. Rocca overhead, poor Frank way out to the right as the model tucks under with speed. Meanwhile Galbreath and Iribarne wait – have they left it too late? Only three minutes remain, downwind Rocca is holding height, but attention is focussed to one side where the Japanese model still flies on. The air feels much cooler now, as Galbreath decides to go, that climb is so fast, it's a lovely flight, fantastic height but *has he got the air for a max?* Iribarne follows with motor faltering, a steady flight, but nothing like the American's height and it doesn't look good enough to max.

It looks as though Kibiki is out in front on this flight, finally being clocked off 15 secs under six minutes. Can anyone match that? Then a cheer goes up – it's Rocca – he's made six minutes. Those last two models are still in the air but they can't catch the Italian, the new Champion

of the World, Mario Rocca. But it's Mario who's doing the congratulating as he hugs a past Champion from 1965, fellow Italian Alberto Dall'Oglio the creator of the superb AD15, the winning motor which Mario used throughout the contest.

Sadly however the story does not end here for once again as the sun sets the prizegiving is delayed – and delayed. There will be no prizegiving tonight – Galbreath's standard Rossi is oversized. What a catastrophe to lose a World Championship medal because a manufacturer has not made the motor to the correct size! What is more concerning is that Doug's motor is not an isolated case, other World Champions in the past have been denied their moment of glory by the oversized Rossi, and at processing other motors spot checked were found to be borderline or oversized. What a terrible reputation, for what is generally considered the World's finest production motor, that the manufacturer is incapable of producing engines to the correct size for contest use. Sadly for Doug, the records will never credit his score of 4.18, but fellow competitors will always remember his final flight, a score worthy of that bronze medal.

So it was with the bitter sweet mixed feelings of sadness and joy that this classic Championships was brought to an end. It will be an event remembered not only for its winners, but for the quality of competitors many of whom never reached those Fly Offs, and for the two Champions who never received their medals. Modellers now spread all over the globe will remember those hard-working Americans who made the event happen and those unforgettable meals at Bakersfield – has anyone ever eaten worse food?

F1C Power-Individual Scores

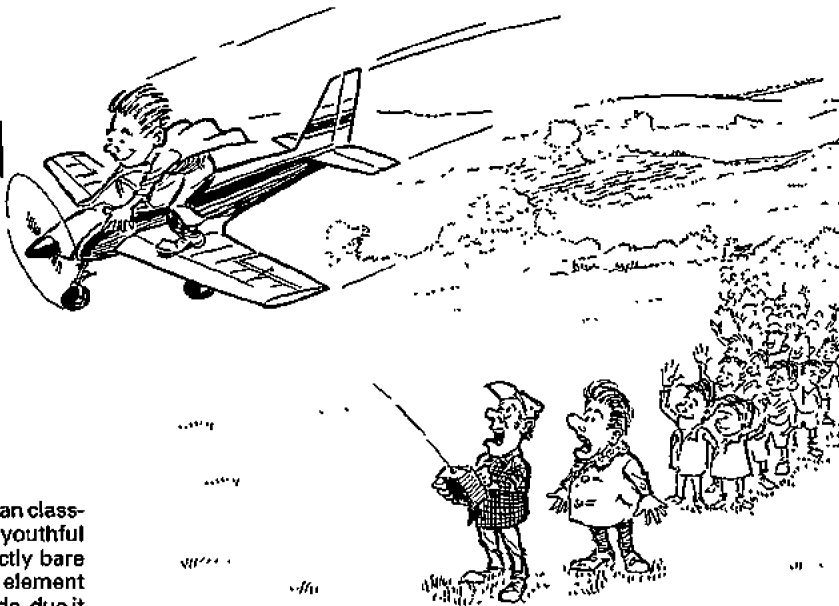
Contestant	Team	RD1-7	RD8	RD9	RD10	Total
1. M. Rocca	Italy	1260	240	300	360	2160
2. K. Kibiki	Japan	1260	240	300	345	2145
D. Galbreath	United States	1260	240	300	258	2058
3. M. Iribarne	France	1260	240	300	234	2034
4. M. Keinanen	Finland	1260	240	300	222	2022
5. F. Schlacta	Canada	1260	240	300	198	1998
6. G. Quinzel	China	1260	240	300	154	1954
7. D. Ferrero	France	1260	240	217	—	1717
8. R. Truppe	Austria	1260	240	175	—	1675
9. P. Harris	Great Britain	1260	—	—	—	1260
10. J. Akesson	Sweden	1253	—	—	—	1253
10. T. Koster	Denmark	1253	—	—	—	1253

12. A. Bartschi (CHI) 1251; 13. M. Zito (RA) 1248; 14. R. Saukkonen (SF) 1248; 15. A. Landeau (F) 1248; 16. U. Carlsson (S) 1238; 17. N. Hammer (DK) 1228; 18. M. Burns (CDN) 1222; 19. P. Nash (AUS) 216; 20. D. Sugden (CDN) 1213; 21. T. Heldemann (DJ) 1213; 22. R. Simpson (USA) 1211; 23. H. Seelig (D) 1206; 24. S. Screen (GB) 1202; 25. B. Flegl (I) 1200; 26. O. Cohen (IL) 1195; 27. T. Bortone (NI) 1190; 28. W. Nutini (BR) 1182; 29. C. Bogart (USA) 1176; 30. A. Enstrom (S) 1164; 31. R. Monks (GB) 1161; 32. E. Bain (NZ) 1148; 33. S. Hinds (AUS) 1133; 34. T. Oxager (DK) 1132; 35. R. Schenker (I) 1132; 36. W. East (AUS) 1081; 37. G. Barbabella (I) 1066; 38. J. Bonetto (RA) 1051; 39. F. Baumann (D) 1017; 40. K. Iwamura (J) 1016; 41. L. Rodway (NZ) 916; 42. D. Intriери (RA) 898; 43. T. Masuda (J) 828; 44. J. Ensoll (NZ) 707; 45. A. Vela (MEX) 646.

F1C TEAM SCORES

1. France 3758; 2. Canada 3695; 3. Sweden 3654; 4. Great Britain 3623; 5. Denmark 3613; 6. Italy 3526; 7. W. Germany 3436; 8. Australia 3430; 9. Argentina 3197; 10. Japan 3104; 11. New Zealand 2769; 12. Finland 2508; 13. United States 2387; 14. Switzerland 2383; 15. China 1280; 16. Austria 1260; 17. Israel 1195; 18. Norway 1190; 19. Brazil 1182; 20. Mexico 646.

TOPICAL TWISTS



by Pylonius

illustrated by Sherry

THE QUICK AND THE DAD —

EVER SINCE THE first paper dart sailed across an Edwardian classroom model flying has been considered one of the more youthful pursuits, slightly superior to marbles or conkers, but strictly bare knees and pimple cap stuff. In spite of this the actual youth element in our hobby has always been somewhat on the meagre side, due it would seem, to the curious inability of most youngsters under sixteen years of age to produce a flyable model plane. The few that do come very much in the gifted child category; capable of doing horrible things to flying field reputations.

The hard fact is, that for most of us, these whizz kids are just too gifted, performing feats of model aircraftmanship that make us oldies look all too ridiculous, both by reason of our comparative ineptitude and the re-inforcement of the popular notion that model flying is just child's play. And it seems that they have been doing just that at the Nationals, snatching valuable trophies from under the whiskery noses of the ageing legions of contest flyers. The competition put up by the young flyers makes it tough going for the over forties who valiantly battle on in order to keep the Free Flight ranks from thinning as rapidly as their hair, for that extra bit of youthful sinew comes in useful for piling on those last few rubber motor turns, putting in that extra backward spurt to a high glider launch, or just getting over those first anxious seconds of flight without a heart attack.

Whether more of these whizz kids would be welcome is another matter, but there is not the influx of youth into our hobby that those concerned for its future would like to see. When you do see a youthful radio flyer it is likely that he is just filling in time between the football field and the disco by seeing what Dad gets up to at the weekend. By way of relieving the boredom he takes over the transmitter to add a few extra grey hairs to the paternal cranium by performing some equally hairy manoeuvres.

The baffling thing about this lack of young blood on our flying fields is that the hobby today, with all its gadgets and goodies, would seem to be irresistible to the scientific minded youngster. Back in our day when we saved up our pennies for a few strips of the new fangled balsa wood, the prospect of an engine powered, fully controlled model would have been just too good to be true.

From experience it would seem that the promising youngster is always whisked away to do exams. No doubt this will enable him to earn enough money in later years to actually take up Radio.

LUMBERED

We live in an age of clutter. Most people have more money than they need to cover the simple requirements of life, and they spend what is legally known as the disposable income on cluttering up the home with all the bulky luxuries and gadgets that scream out of the adverts at them on all sides. And our model aircraft hobby is not without guilt in this regard, for when you see someone frantically adding on a home extension, or moving to a larger abode, it may well be that he is doing so to house the clutter he has acquired from the mail order firms and model shops, particularly now that the larger types of model in vogue seem to be all of a piece.

In view of all this, and the way the rising tide of modern goodies is oozing through the loft conversion, it seems like piling on the

"THAT'S THE LAST OVER 5KG MODEL I'M GOING TO BUILD"

agony for people to add to the clutter by salvaging more from the past. Almost everything nowadays is collectable; at least half of what the dustman gathers in, goes not to the dump but to the nearest antique shop. In saner times it was just foreign stamps and the odd piece of china that was collected, but now its things like Victorian mantelpieces and early stuffed ferrets. On the model side of the acquisition business we have the well established engine collecting and vintage departments, but now we read of someone collecting early wooden control line propellers. They may not be an aesthetically overwhelming choice, but the size factor is to be commended. Fortunately, the models of the past were on a relatively small scale — apart from the 1930's Gassies — and the collecting of A Frame Pusher Struts or pre 1940 cup washers would not greatly add to the household clutter, but what of the future when the four engine giants of today become the collectors items of tomorrow?

TARNISHED GLORY

There was a time when the acme of achievement in model flying was the domiciling of a large annual trophy on the sideboard, setting off the whatnot with its fine, silvery gloss. It was the accolade, the high point of an illustrious flying career, with such trophies keenly competed for at club level and above. Usually silver plated, and shaped in the style of a medieval goblet, the trophies were handed out at plush prizegiving ceremonies, where a spirited ovation would be followed by a few flowery words on the contribution of model flying to aviation etc.

In its pride of place on the family sideboard the gleaming chalice would be there for family, friends and neighbours to admire. Auntie Mable would say she didn't know that Johnny was so clever with his hands, and Granny observe how lucky he was to get such a fine cup just for flying his toy plane. But what has happened to these choice pieces of hardware? Many, tarnished and forgotten, are locked away in cupboards, safes, and even bank vaults, while the few that do survive to get the occasional polish do not seem to be all that eagerly competed for. That one inscribed for the Club Control Line Mouse Race is not likely to be greatly coveted, and if awarded is stuck so far out of sight by the recipient that he cannot find it when the year of tenure is up. This has a lot to do with the nature of the modern, streamlined home, where the only sideboards to be seen are on the trendily whiskered face of the owner. Even the silver cup substitute of today — the plastic plaque, is scarcely given house room: "Not another of those little dust collectors . . .". And the good lady of the house isn't having anything hiding her capo di monte pieces.

If, however, the silver cup could be passed off as a trendy piece of bygonery it could well take pride of place once more on top of the bookshelf, or more likely the TV set.

COMBAT

by Paul Smith

1980 US FAI COMBAT TEAM

We completed our combat team selection programme in St Louis. The team is Phil Granderson of Washington, Sherwood Buckstaff of Texas, and George Cleveland from Louisiana. Alternates are Paul Curtis of Indiana, and Ron Colombo of Detroit, Michigan, from the 27 entries in the triple elimination contest.

Ron Colombo of the Detroit Combat Team was fifth (second alternate) with five wins. Ron was highest points winner for the contest with 2892 points total in eight matches. In his final match, Ron was leading four outs to one and was unfortunately disqualified for leaving the handle in the centre circle. (It's those silly FAI rules again — ED.)

MACA President Paul Curtis placed fourth with a series of narrow victories over tough competitors, resulting in a 6 win — 3 loss record. He averaged only 12 points per match better than the opposition in his nine bouts and his schedule included the entire future US team, plus Rush, Stubblefield and Frost.

George Cleveland made the team for the second time with six wins and only one loss (to Granderson). George scored the highest single match with a 688 points over a former national champion!

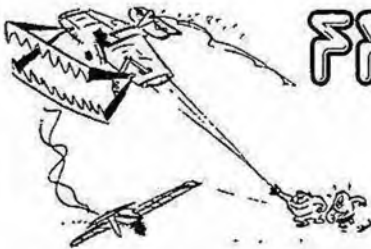
Sherwood Buckstaff took a team spot with a 6 win — 1 loss record. His only loss (to Curtis) came when his spot was already in the bag. In seven matches, Buckstaff allowed only 420 points to be scored against him.

The Number One team member is Phil Granderson, with an undefeated 7 — 0 all win record. Phil also won 1st place in fast combat at the 1978 US Nationals.

All three team members used relatively small, all-wood models. Buckstaff and Cleveland used the Fox motor with pacifier tanks.

This looks like being a stronger US combat team, thanks mainly to the improvement brought about by the better flyers entering the event and a general increase in FAI interest over here.

Last word goes to the top man Granderson from a back issue of Model Airplane News "I'll betcha six pacifiers, four glowplugs, and a broken Super Tigre crankshaft, that the Sports flyers from Texas alone could whip the whole lot of Englishmen! The time is upon us — fellow Combat flyers and sympathisers, we must all rise,



FROM THE HANDLE

lift up our stabilisers, and say to the World: No more will we stand for your failure to recognise us!" This UIC outburst (Un/Controlled) came in response to the previously published statement in Aeromodeller November 73 issue page 611, which simply stated "England is still top of the Control Line Combat Class" — seven years later nothing has changed. Keep practising Phil — we'll see you in Poland!

1980 CANADIAN TEAMS

The Canadian C/L Team Trials was held at Huron Park in Ontario, an abandoned Canadian Armed Forces Base now being used for a civilian airport and industrial park, which would certainly be a suitable site for a future C/L World Championship.

The organisers had established minimum performance levels of 200kph in Speed and 4:30 in TR. If three flyers did not qualify at these levels they said they would send less than a full team to the WC.

Best times were in F2A — 236.8 by Sam Burke and 227.8 by Alan Feil with still two meets available for new qualifiers and for these flyers to improve their times. F2B Team members are Geoff Higgs, Fred Tellier and Andy Fakia. Alternate is Bill Logan.

In F2C Kelly/Parent 4:07.4, Fairay/Fairey 4:25, Baker/Burke 4:42 lead with still two meets for improvement and additional entries. Kelly/Parent used a "Ram" engine of his own manufacture. Fairay used the BHF engine which he builds in conjunction with his Swedish partners, Bentsar and Bohlin. The bottom of the crankcase is cast in the shape of a pan and crutch and is bolted directly into the model. The crankshaft is counter-balanced with two gold inserts valued at \$50. Fairay says that the engine is a bit of a hedge against inflation in that the gold has appreciated about \$10 since the engine was built!

The F2D team is Ross Melhuish, Cliff Gibson and Pierre Sigoun, with Danny Sigoun as the alternate. Melhuish and Gibson are repeats from the 1978 team. Gibson was 8th that year, with only pitting problems keeping him out of the top four. Melhuish went out early that year for the same reason. All three team members

live in the same area, so they should be using more organised this year. Pierre Sigoun is an experienced combat flyer who has been active since the early 60s. He physically resembles Paul Bunyon, the legendary lumberjack who lived in this part of the country, and can outreach any opponent! Combat is definitely Canada's best chance for a good showing in Poland.

AMA NATS by Rich von Lopez

In the US Fast Combat (35 and 36 cu in motors) is considered the main event, all other forms not being considered real combat. However, Slow Combat has a real good following and has been gaining in popularity every year with FAI still not being taken as seriously as it should be. One could hear pilots saying "Why don't we just fly AMA Combat with .15s instead of using those FAI rules"; the consensus of opinion of many pilots was "I don't like these FAI rules".

I always go to the Nats with the thought of picking up new ideas from modellers who are innovative but this year there was nothing really unique. More kit models were flown in competition than in the past, the trend also seems to be going back to more and more all-balsa models — they won every event. Yes, there were some good foamies but not very many of them. In FAI combat there were basically three different motor brands being used, Fox, Super Tigre and Rossi. Fox motors came 1st and 3rd with Rossi placing 2nd. The Texans have some Fox .15s that just scream and go as fast as any other motor but the only problem with the Fox is that you have to feed them expensive fuel such as 50 and 60% nitro blends. The Rossi and Super Tigre motors give about the same horsepower on a lot less nitro. G-15s and X-15s were in use, most of them propped with 7-4s either the Top Flite wooden, Rev-Up wooden or the Taipan glass filled nylon. As far as glow plugs go (call that Blow-plugs) the most popular brand is the K&B standard long reach. Some of the pilots use the Glow Devil plugs, or the new glow buttons instead of standard plugs.

In Fast combat it was 80 to 90% Fox Combat Special motors, the rest were Super Tigre with two TWA motors. Duke Fox has set out to capture the Fast Combat market



Left, Howard Rush clowning around at the Open Slow Combat event at US NATS, pit crew is Kit Gerhardt and Mike Guthenson. Centre, Pierre Sigoun on the 1980 Canadian Team uses Rossi 15 piped through wing. Right, Cliff Gibson with one of 20 Zingers he built to also reach Canadian team.

and has finally done so. The once dominant Super Tigre has not kept pace.

Everyone kept asking about unofficial 1/2A Combat (in US that means 049 class) during the week, and it was not until Friday that Charlie Johnson and I decided to run an event. There seems to be a growing interest in 1/2A Combat as a good fun event. Brian O'Gorman of the Irish World Championship Combat Team has been in San Francisco this summer. I have taken him out flying a couple of times and let him try his hand with some of the 1/2A models. You might ask him his opinions when you next see him at your contests.

CATS. MAC. 1/2A COMBAT RALLY 7th Oct. Report by John Benzling

A new venue at Horsenden Hill, West London, was opened for the first time with a 1/2A Combat event organised by CATS MAC. Six magnificent trophies and prizes, kindly donated by St John's Engraving Ltd, encouraged 35 entries.

Opening bout of the day saw an upset for the Peterborough club when their captain, Neil Gill, was put into the losers round by T. Maynell of Cosmo, after a mildair collision destroyed his model. One of the best of the early bouts was between a new name on the combat scene, T. Bartram, flying against S. Taylor. With both engines screaming at peak revs, the two pilots followed each other in a series of complex manoeuvres at speeds reminiscent of FAI combat. The cuts came thick and fast, but the final outcome was a win for S. Taylor by three cuts to one.

Neil Gill managed to struggle back into the second round after having to work hard beating B. Jones of Elliot MAC in the losers' reply round, and also D. Willis in an eliminating bout. An interesting tussle in the second round saw D. Harrison of Cosmo take all the streamer in one cut from John Benzling of CATS and then proceed to adopt the now popular upside down style of evasive combat flying. This play proved successful until in the closing seconds, with both models still flying inverted, Benzling managed to 'home' in and take two quick cuts, thus winning the bout. Another CATS member, and local combat star, M. Harrison, lost to A. Mansfield in the second round, after spending most of the bout trying to start his engine - try a smear of epoxy on that loose backplate next time!

Onto the quarter finals, and Pete Tribe of Cosmo flying against Robert Roy of Northampton MAC gave a demonstration of how many cuts can be taken from a 10ft streamer with a crushing five nil defeat.

Almost unnoticed, Marc Humphries also of Northampton MAC had been working his way quietly but efficiently through the rounds and in the semi-final found himself flying against Pete Tribe. This bout proved close but with Pete suffering from the effects of a lunch time visit to the local tavern the outcome was a win for Marc. The second semi-final saw last remaining Elliot club member T. Medhurst flying against Neil Gill and producing a good win for the Peterborough club captain.

The final therefore was a Midlands benefit matching Marc Humphries, Northampton, against Neil Gill, Peterborough. Both pilots were obviously very keyed up after such a hard day's flying, but once the models were in the air Gill quickly managed to take a cut, which was soon equalised by Humphries. Halfway through the bout Gill took a further cut, but try as he may, Humphries found it impossible to get close enough to Gill's highly manoeuvrable model to take any further cuts. A superb final and great win for Neil Gill.

The Junior event attracted nine entries including 1979 NATS winner, ten year old Adam Willis and runner-up Chris Tribe. Young Willis sailed through the bouts all the way to the final, his only worry being in the first round with A. Cox when his father Dave, acting as pitman, took nearly two minutes just to start the engine! However, Adam retrieved the situation by taking two cuts to Cox's one, thus winning the bout.

The final resulted in a win for Willis, with second place to T. Jenner. Credit to T. Wolfram for taking third place, in this, his first ever, competition entry.

Thanks must be extended to C. Windows and other members of the Peterborough club for helping out by running a second circle when the time started to run short, allowing 55 bouts to be flown in seven hours.

Altogether a great opening meeting, and with the local Council favourably impressed, approval has been given for more rallies in the future, the first being planned for April 1980 - So watch the Contest Calendar for details.

RESULTS: Seniors - 1. N. Gill, 2. M. Humphries, 3. P. Tribe; **Juniors** - 1. A. Willis, 2. T. Jenner, 3. T. Wolfram.



Above, all the winners from the successful CATS MAC 1/2A Combat Rally. Seniors standing left, Neil Gill, Marc Humphries and Pete Tribe with Juniors Adam Willis, T. Jenner and T. Wolfram. Seems like 1/2A continues to rise in popularity.



'Light is Right' revisited - 2

Henry Nelson coined the headline, and now according to a phone call with Henry a little while ago, he is making available the ultimate 'goody'. Now you may not believe this but Henry is going to make later on this year a limited batch of FAI-T/R motors weighting just 100 gml AAC piston/liner, magnesium case and back-plate all help this amazing achievement plus (so rumour has it - and not from Henry's mouth) a Titanium shaft. Do I hear someone ask the price? Twice the price of a standard steel motor is the answer. Just imagine it: if 385 gm is achievable using a standard steel motor, then this 'super' motor should give a 305 gm model less than 11 oz - quite incredible! For those who cannot resist such a possibility, get your orders in now for there is bound to be quite an over-demand for this, the ultimate 'goody'.

SMAE Rule Changes for 1980

Subject to the approval of the SMAE Council, the SMAE C/L Sub-Committee have proposed the following rule changes to be effective 1st January 1980.

Goodyear - 'Le Mans' start now deleted.

Motors to be 2.5cc maximum, diesels only.

'B' Team Race - Line diameter to be 0.4mm dia. minimum.

Safety wrist straps to be compulsory.

Silencers to be compulsory (tuned pipes allowed).

Rat Race - To be re-introduced at the 3rd SMAE Centralised meeting. Rules as before with silencers compulsory (tuned pipes allowed) but maximum motor size, reduced to 3.5cc and no 'Le Mans' start.

The aims of these changes should be obvious to all, i.e. to return Goodyear to the 'beginners' event it was 10 years ago; to increase safety margins in B-TR; to provide an event for the OPS and K&B 3.5cc racing glows; to reduce noise emissions substantially.

In my opinion, these are all very sensible rule changes. Let us all hope that the objectives behind them are achieved for that will mean that our sport of C/L Racing will have become more healthy.

'Rat is Back' for motors up to 3.5cc with silencers compulsory (see SMAE rule changes for 1980). But will we see any as beautiful as this one, possibly America's best, by Tim Gillott.



3RD CRITERIUM DE L'ILE

Le Bourget — 23rd and 24th June

Strange to recall that this column has never reported on this contest, before, for it has been one International which has seen in its previous two runnings total domination by the British. This omission is now corrected for once again we British dominated the results and we don't do that very often.

The contest site is to the north of Paris at what used to be Le Bourget Airport and now houses the French air museum and hosts the Paris Airshow. A convenient location and lots of tarmac make Le Bourget a fine site. Unfortunately this year a strong wind whipped up a lot of sand into the air forcing the wise to use their second string equipment after the 1st round of heats.

The British also took the National Team Prize (couldn't avoid it with a 1-2-3 finish like that). Notable in the first round of heats was the use by Steve Smith and John Broadhead (here deputising for Steve's normal partner Colin Brown) of a 'Flugl' powered flying wing model which was doing near 20 sec/10 laps in traffic for 2 stop range. In case none of you know what a 'Flugl' is, it is the version of the Bugle MkII, much modified by Enrico Flores, recently pictured and described in this magazine (p224 April '79). To aid your recall, these modifications by Enrico include an all-steel front housing, a Nelson style induction system using a 'Tufnol' backplate, a chromed high expansion steel liner and a 2-part aluminium cylinder head. In other words a Bugle modified to have all of the material features of an FMV. Obviously the Flores/Metkemeljer theories recently revealed in this magazine work, for no other Mk. II Bugl has gone this fast before.

3RD SMAE CENTRALISED —

1st July 1979 RAF Fairford

After a gap of quite a few years, Fairford's fair acres of lovely tarmac was made available again — let us hope that Fairford becomes once again a regular venue, for its vast hard standing area makes it about the best site for CL racing contests in the UK. The weather was kind (as opposed to that for the 2nd SMAE Centralised which was so bad that it ruined the contest — thus no report in this column) and the two events run had ideal conditions, a pity that the size of entries did not match the conditions.

Goodyear (13 entries)

A low entry and an even lower number of recorded times in the heats — a mere 7 in the first round and a miserable 3 in the second round. This low number of recorded times was due in the organiser's own words to "novices using K&B 35s and OPS 3.5s and wiping each other out". Certainly from the distance of the FAI-TR circle much of the flying looked hairy indeed and the sound and sight of crashing models was far from infrequent. There can be little better in the way of a demonstration of what is wrong with our present Goodyear rules than this contest.

A really fast Open Final as the results show with 'old timers' Dave Rudd and Richard King winning in a new UK record time. Not the only Goodyear record set this day for in their first heat Jarvis/Needham established a new heat record of 3.51. Novices Shackleton/Schofield (from Manchester — good lads!) chased them hard in the heats with a 3:52 but their two retirements in the two finals they flow show just what frustrating beasts 3.5c racing glow motors are.



Brian Cunningham and John Green of Ipswich MAC with their winning Miss San Bernardino with piped K&B. For next year's Goodyear events it's NO-GO-FOR -GLOWS, diesel powered models will help return the class to the beginners' event originally envisaged.

FAI — TR (16 entries)

Because Derek Heaton and Malcolm Ross were organising this event, and Ron and Micky Tribe were organising Goodyear and because holidays had claimed Colin Brown, Bernie Langworth and John Broadhead, the low entry can be explained. Nevertheless the entry was deficient in some of the top teams and so the action was not as vivid as it should have been. Results are given here for all of the semi-finalists.

Quite the most unusual happening in the heats was Dave Fry's model suffering a split tube on the tank filler, leading to a great deal of fuel being pumped into the model on re-fuelling. The effect was a super rearward CG model especially at take-off where acceleration forces caused all of this fuel to slosh back to the tail of the model. Amazing that Dave Fry managed to complete a heat with the model in this stage for its flight characteristics were indescribable. Less amusing was an incident in the semis involving Wilson/Gardner's model. When Dick Wilson hit the shut-off for a pit-stop both FOX line connectors at the model end instantly failed and the model flew free, low and horizontal over some spectators, to crash some distance away.

Having dominated the heats and semis with their steel Nelson powered APS 'Nelson Sprint', Clarkson/Woodside made a big tactical error for the final. In the heats and semis they had been using a 3.1mm dia venturi on the motor resulting in near 21 sec/10 laps airspeed for about 36 laps. For the final a change was made to a 2.9 dia venturi so as to eliminate the requirement for one pit-stop. Range leapt to about 46 laps but the airspeed dropped too much giving an overall worse performance.

Meanwhile Dave Fry and Tony Harknett got their BG really moving at under 21 sec/10 laps in traffic so despite two slow stops towards the end of the final due to an overheating motor, they took the victory by just 1.5 seconds — a very close finish that saw a lot of stop-watch examination to decide the winner.

9TH GOODYEAR 'MARATHON'

15th July 1979, RAF Dishforth
Lovely weather saw just 15 teams have a go at this, one of the real 'he-man' events in the calendar. One hour and 20 compulsory pitstops is the formula and the team that does the most laps from a 3-up start is the winner. For the over 1000 lap finishers, the results go:

No record breaking this year despite the fine weather, so the record still stays with Mark Jarvis and Ed Needham at 1321 laps established at the 7th Marathon in 1977. In fact the big glows didn't even manage to better the best set a long time ago for a 2.5cc diesel of 1285 laps by Clarkson/Daly!

Hark luck stories this time include:
Shackleton/Stubbs — 12 slow stops
Jarvis/Needham — 7 blown plugs
Schofield/Fitzsimmons — broken engine mounting bolts
Cross/Cross — broken fuselage
Paxton/Smith — crashed
Stubbs/Stubbs — changed engine

Obviously a hard life is Marathon racing. Quite an exercise in concentration is the organising, so the accolades go to John Horton with help from Wharfedale, Kelghly and Norwest club members.

3RD CRITERIUM DE L'ILE — F2C

(18 entries)		Best Heat	Best Semi	Final	
1. Smith/Broadhead	GB	3:48.0	3:58.0	8:12.3	Nelson
2. Tribe Bros	GB	3:58.3	4:02.4	8:28.2	Nelson
3. Rudd/King	GB	3:51.5	4:07.0	Disq.	Nelson
4. Metkemeljer Bros.	NL	3:57.0	4:13.3		FMV
5. Saccavino/Christen	CH	4:04.1	4:34.3		Nelson
6. Geschwendtner/Suruque	DK/F	4:04.3	4:22.8		BG
7. Wakkerman/vd Weerd	GB	4:13.0	4:22.2		Nelson
8. Gray/Haycock	GB	4:13.0	Disq.		Bugl.
9. Flores/Buys	NL	4:17.9	Disq.		FMV
10. Fry/Harknett	GB	4:19.2			BG

3RD SMAE CENTRALISED — GOODYEAR

Open Final (*New UK Record)

1. Rudd/King	Feltham	7:54.6*	K&B 3.5	"Miss San Bernardino"
2. Jarvis/Needham	Norwest	8:09.6	OPS 3.5	"Lil' Quickie"
3. Shackleton/Schofield	Norwest	Rtd.	K&B 3.5	"Lil' Quickie"

Novice Final

1. Gibson/Launders		9:20.0		
2. Shackleton/Schofield	Norwest	Rtd.	K&B 3.5	"Lil' Quickie"
3. Berry/Stubbs	Norwest	DNF	STX-21	"Ol' Blue"

F2C

		Best Heat	Best Semi	Final	
1. Fry/Harknett	Feltham	4:00.4	3:59.3	8:06.2	BG
2. Clarkson/Woodside	Norwest	3:53.1	3:54.0	8:07.7	Nelson
3. Sykes/Crabtree	Feltham	3:59.1	4:08.4	9:12.8	Nelson
4. Smith/Yeldham	Elliott	4:03.9	4:09.0		Nelson
5. Wilson/Gardner	Tynemouth	4:06.6	4:09.2		Nelson
6. Smith/Summerfield	Feltham	4:09.6	4:21.0		Nelson
7. Allcock/Chambers	Wolves	4:09.9	4:11.6		Nelson
8. Horton/Haworth	Wharfedale	4:18.4	4:48.6		Haworth
9. Nixon/Campbell	Hunters	4:19.6	4:19.5		Nelson

9TH GOODYEAR MARATHON

		Laps	Stops	
1. Shackleton/Stubbs	Norwest	1270	20	ST X-21
2. Jarvis/Needham	Norwest	1255	26	OPS 3.5
3. Sykes/Crabtree	Wharfedale	1230	20	Rossi FI D
4. Goddard/Temporal	Wakefield	1164	20	Rossi RV D
5. Rosser/Snowdowns	Norwest	1164	23	Rossi FI D
6. Fitzgerald/Williamson	Wharfedale	1163	20	Rossi RV D
7. Fitzsimmons/Schofield	Norwest	1159	21	MVVS 2.5D
8. Temporal/Goddard	Wakefield	1126	20	Rossi RV D

SCALE MATTERS

by Alan Callaghan



"REFLECTIONS"

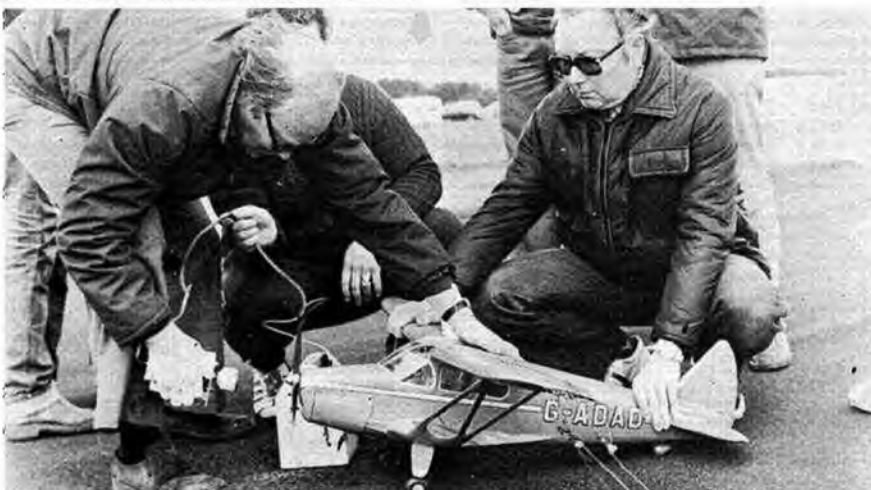
There has been something of a change in the general trend in non-RC scale contests during 1979. With the exception of the Woodvale Event, FF power scale interest has dwindled somewhat, whereas the traditionally poorly-supported CL scale and virtually extinct Rubber scale meetings have taken on a new lease of life. Indoor scale seems to chug along with reasonable support, but I have always been convinced that with more regular meetings in suitable surroundings the various aspects of this type of flying, ie CO₂, Open Rubber, and Peanut, would see much more response than at present. The annual meeting at Crawley, however, in very congenial surroundings, is always well attended, and a few more meetings like this would be welcome indeed.



The Three Kings Aeromodellers CL scale open day on September 9th drew nine entrants of which only one did not put in a qualifying flight, and a very large collection of models made an appearance. The resurgence of interest in CL scale was typified at this meeting by the variety of models entered and the competitiveness by the results sheet showing only 90 points separating the first five places—the lure of a very worthwhile prize (a new 40 RC motor) having the desired effect! Knowing what various people are now flying, and what others have on their building boards at the moment, I should think 1980 will be a healthy year for CL scale, especially if the World Championship event draws enough entries to be held in Canada.



The SMAE News rubber scale contest, organised by newsletter editor, David Parker, was not held at Odiham as scheduled due to poor and unsuitable weather. Certainly enough models turned up, but there is no fun in flying in constant drizzle. The event has now been held over until next year to be run probably at Old Warden in July, so there remains plenty of time to build a model specially for this. It is more than likely that another rubber scale event will again be included in the Nationals programme, so how much more incentive does one need? Now that the building season is firmly with us, re-discover the "off" switch on the telly, and think of all those models you regret not having built last year!



Left upper: Hugh Stevenson runs the motor in his SE5A but was unable to achieve a qualifying flight at Woodvale Scale International. Very neatly built model for a young newcomer to FIF Scale. Left, Wal Cordwell starts up his Heston Phoenix at the 1979 Nats, model has retracting undercarriage operated airdraulically.

Top, Mike Hetherington's F.W.Stosser is built largely of paper and thin card with a very light internal balsa framework. Superbly realistic, the model also features a gearbox and flies quite slowly and steadily. Left, group of entrants at Rubber Scale contest, Old Warden, July 15th, shows a very interesting selection of subjects that flew under quite perfect conditions at this attractive venue. Below, winner Andrew Moorhouse's Comper Swift capable of gentle but steady ROG

STUDIO ONE AIRBRUSH from Humbrol is a new single action airbrush for use with cans of compressed air or direct from compressors. The airbrush operates held pen fashion with index finger pulling back on a slide which operates paint and air-flow simultaneously. The air hose is fitted with an air volume control with six settings for adjusting working pressure when using cans of air, and a second hose for connecting to a compressor is also supplied, working pressure is normally between 15-35lbs/sq. in. Paint which should be thinned at least 50/50 with thinners, is contained in a miniscule cup mounted on top of the front of the airbrush and can pivot to allow painting at various angles without spillage. The volume of this paint cup being little over 1cc, makes the airbrush unsuitable for all but the smallest jobs, although we understand that a larger cup is on its way as a much needed accessory for Aeromodellers.

Trade Topics



Left: Studio 1 Airbrush from Humbrol. Below: 6mm carburettor for Super Tigre G15s and pacifier adaptor for Combat fans from Michaels Models. Bottom: Montreal stop Wakefield hub with panic button, from Free Flight News with T-bar and rear bobbin now available with turned ring and nose cone to fit Ronytube fibre glass motor tube. Bottom left: Davis diesel conversion head for OS40FSR. Far left: Rhombus display case.



RHOMBUS DISPLAY CASE distributed by Morris and Ingram Ltd. are ideal for modellers wishing to keep the dust off small models, engine collections or other display items. Offered as a DIY kit, the package consisting of a solid base with angular steel framing and plastic sheet sides and top which appear to be rather insubstantial. These parts assemble into a display case 17½ x 8 x 7½ in (435 x 205 x 190mm).

DIESEL CONVERSION HEAD from Davis Diesel Developments Inc. in America transforms a whole range of large glow plug engines to diesel useage following their success with smaller Cox 020, 049 and 09 conversions. New conversion kits include Fox 15BB Schnuerle, K&B 21, Super Tigre 35, OS 40 FSR and OS 60FSR! The largest of these, the OS60FSR for example converts into an extraordinary power plant producing 1½ BHP capable of swinging a 16 x 4 in propeller at 10,000 rpm idling down to 1,800 rpm. Aimed at the 1/4 scale and mammoth R/C flyers DDD claim extremely low vibration and smooth running with a fuel consumption of 90 sec per oz of fuel plus of course a quiet scale like sound.



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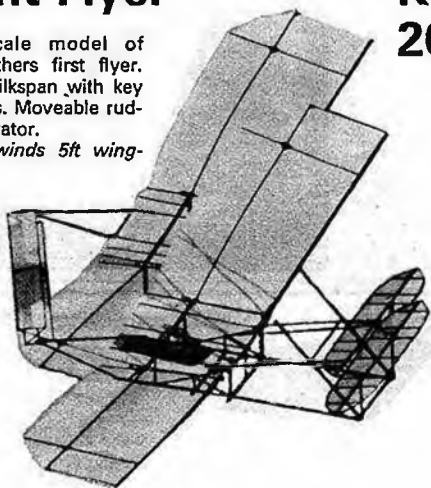
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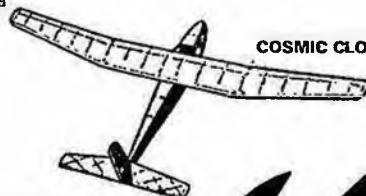
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CLUB NEWS

SOMETHING THAT ALWAYS intrigues me, is the way different aspects of our hobby find expression around the country. The emphasis can vary from club to club, and even from region to region. In some parts of the country the interest may be predominantly Radio, with other branches of the movement getting scant attention. Control Line may be as dead as the Dodo in one area, flourishing in another. Of course, the type of terrain, and the availability of flying fields, often determine the nature of the activity, but there is also the observable fact that enthusiasm breeds enthusiasm so that where you get a group of keen flyers involved in a particular aspect of the hobby something of a cult grows up. It may be centred on a club ground or just the people who meet up on a public open space. Whatever it is, it certainly pays to advertise, and the best way to do this is to let other people see you actively enjoying your model flying. In this vein we open with a group of enthusiasts who keep Free Flight very much alive in the **Western Area**, whence comes a report upon their latest activities from Toby Rogers, the Area Hon Sec, and PRO. Keeping the Free Flyers in good fettle has been the use of Colerne airfield for four rallies during the season, for which blessing thanks must go to Major Harbon. In the accompanying newsletter, largely devoted to F/F contest results, the outcome of the 5kg limit weight questionnaire around the Area clubs showed an overwhelming desire to push up the weight limit. Personally, I think the airfield situation is tough enough without pushing our luck with oversize models.

It may not be the Olympics, but the Essex Games gave opportunity for a get-together of the county's Radio flyers and for a mutual demonstration of their skills. Teams from eight of the sporting areas of Essex turned up at Two Tree Island (an offshore possession of Southend). But, we are informed by David Verlander, the Hon Sec of the **Southend Radio Flying Club**, that the Tendring sector, located at Clacton, was not represented. This is disconcerting since Tendring is the venue for the 1980 Essex Games, but they have been informed by the Tendring Sports Council that, notwithstanding an ideal R/C site in the locality, they have been unable to contact any aeromodellers in the Area to use it. **Wake up you Clacton flyers!**

A letter accompanying the *Wings and Fins* magazine of the **Coventry & DMAC** conveys the news that the club has acquired the use of a hangar at Bramcotes Barracks, which is situated just outside Nuneaton, for indoor flying meetings on the 1st and 3rd Wednesdays of each month throughout the winter. Other clubs may be interested in contacting Mr N. H. Goodman, the club PRO, who is himself a F/F enthusiast, but is looking forward to experimenting with a pennywise plane. Should he, though cover it with cling film? The air has a nasty way of slipping through the framework if you don't. The main item in the newsletter is of the setting up of a new Thermal Soaring record of 1 hour 39 minutes to eclipse the existing 55 minute effort. *Coventry DMAC Sec: N. M. Goodman, 23 Berwyn Way, Stockingford, Nuneaton, Warks CV10 8QW.*

Mr Stuart V. Tucker, Hon Sec & Treasurer of the **Leatherhead MFC**, sends in our next newsletter. The editorial raises the problem of securing some sort of overall radio flying discipline on a public open space; in the case of Leatherhead – Effingham Common. As pointed out, radio sites are sacred, albeit always under threat, although with a well organised club using the site with tact and restraint the main threat comes from loners who have little regard for such niceties as safety and silencers. One idea, mooted in the newsletter, is to try to rope in the loners or non-club flyers, or at least persuade them to adopt the club code of flying behaviour. From elsewhere in the newsletter comes reports of the two main local functions concerning the club. One was the British Aerospace Gala in June. Two members entered four flying models and a number of plastics, and were rewarded with a First in Flying Scale and in the Senior Plastics section. The other event was the Mole

FROM ALL RIPMAX STOCKISTS

Valley Show, which was quite a big affair, some 10,000 visitors getting the chance of a look at the club static array of models, including its first R/C helicopter. They were also treated to an outdoor C/L display which, though well received, could have been better, but the experience was worthwhile. *Leatherhead MFC Sec: S. V. Tucker, "Fairways", The Warren, Ashted, Surrey.*

Much of the October issue of *Northern Area News* is justifiably taken up with one of the big events of the year up there, the Northern Area Rally. Held at Church Fenton on September 2nd in weather not quite so bad as the meteorological pundits had threatened—at least the rain held off—there was a good attendance at all corners of this four cornered event: radio, thermal soaring, free flight and control line, all enjoying a fine day's flying. A successful model flying day all round. Remembering that all the events were held on a single airfield, it is rumoured that the Free Flight part of the 1980 Nationals will be rehabilitated on an airfield alongside other events, even if this means restricting maxes—sounds like good news.

The **Leicester MAC** is a large, prospering and very active club, but has a bit of uncertainty hanging over it in the matter of flying grounds, for we read in the October newsletter that the Wymeswold concession, though licensed up to the 31st December, is uncertain beyond that date. In the meantime the search goes on for a suitable alternative. Certainly a private field, enjoyed now by many clubs, would be the ideal solution. As one who flies on a private site, I have some misgivings about model flying being tucked away in remote places, but realise it solves many of the problems we associate with public areas. In the meantime a number of events are scheduled for the autumn, including Indoor RTP, C/L Scale, A/2 and Combined Mini, R/C Glider Pylon Race, R/C Spot Landing and the opening of the F/F Open Glider Winter League. Almost something for everyone! To give an idea of the sort of support given to these club contests, we notice there were ten entries in the Open Thermal Soaring event held at Birstall in September, and twelve in the Standard event. But honours are not just restricted to the home grounds. Out and about the contest venues, John Abbey and Gerry Ferer have followed up their successful assault on the Nationals with the lifting of more trophies at the Southern Gala. John Abbey put in a full house in A1 Glider, and thought his chances had gone when, in the dull fly off conditions, he made a poor launch, but an adventitious piece of lift came to his rescue to give him a winning time. Meanwhile, in Open Rubber, Gerry Ferer had maxed out comfortably with his new 320 sq in model, but was faced in the fly off with a high climbing model and a low cloud ceiling. Being, however, an old tactician, he put in an old sub-torque motor, wound on only 3/4 turns and sent the model on a long, low altitude flight of 4.40 to win by a handsome margin. Back to the club grounds—Wymeswold in this case—and to a 'they come ever younger' story. Third place in the Open Glider comp went to eight year old Damon Birch, flying his first tow line glider in

The Chairman of Banbridge Aeromodelling Club, Dennis McNeill presents club member Trevor Hutchinson with a cheque to help cover expenses on his trip to the World championships in South Africa.



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a club comp. It won't be long before some young genius is operating the winch from a perambulator — or would that be a dummy run? *Leicester MAC Sec: P. Toyne, 1 Sherrard Drive, Sileby, Loughborough, Leics LE12 7SG.*

Having not received any copies of the *Court Circular* lately I thought we had been taken off the 'By Appointment Only' list, but we have just received the September issue, pleasingly back in its old printed cover. I am referring, of course, to the newsletter of the **Three Kings Aeromodellers**, the habitués of the Old Croydon Airport. Latest news is of a good club Nationals. True, it blew a trifle hard during the C/L Scale event, but not enough to prevent Three Kings from taking the top two places. What added to the success was an entry larger than in recent years, a state of affairs that could be fairly attributed to the 'have-a-go' encouragement from the Three Kings. And 'have-a-go' is the name of the game when putting on displays in some of the restricted fete areas. Barriers may be made to be knocked down, but not by fragile models. However, at the latest display, the only casualty of the tight circle was a hook up by Allen Fritz's carrier model on a 1/2in thick rope. Which brings us to the saga of Allen Fritz's young daughter, Angela, who took first place in the Sleek Streak competition at the Nationals. She won not only a plaque but also a vast quantity of sweets. Sic transit gloria. Among other intrusive factors on the beleaguered Croydon Patch, the club is now faced or rather non-faced, with a faceless motor cycling spectre, or so it would seem from reports in the local paper. The ghost is reputed to be that of a Battle of Britain pilot, but the Three Kings members think it to be of more modern origin — someone who ran over a member's lines and was suitably despatched. But it was solid stuff at the Open Scale on September 9th. The turn out of C/L models was on a larger 'scale' than the Nationals, and the weather was really first class: sunny and windless. It was a day of fine flying and a feast for the eyes with craft such as a Hawker Tomtit, a Kawasaki Tony and a Mig 3, to name but a few. Mick Staples was the winner, flying his Fokker D VII — a repeat of his Nationals success. *Three Kings Aeromodellers Sec: D. G. Woods, 133 Ravensbury Rd, Southfields, London SW18 4RY.*

CAPTION CONTEST



The *Windsock* newsletter of the **Reading & DMAC**, looks back over a quiet season. Much water has flowed over models, including a helicopter, that have been unwisely dunked into a local river. But what can you expect when the name of the club flying field is Dreadnought? The club Winter programme covers a wide range of events, from Dead Engine Spot Landing to a Bring and Buy. *Reading & DMAC Sec: R. M. Tiller, 49 Albert Rd, Caversham, Reading, Berks.*

Whilst the 'T' in *Nitro*, the newsletter of the **Belfast MFC** stands for 'Thermaling' the whole of the October issue is taken up with Control Line. Seems that last season there was something of a turn down in Goodyear racing, but, happily the trend has gone into reverse; a number of Goodyears have put in an appearance of late, and in this area of Control Lining it looks like being indeed a good year. But Goodyear is not the only interest. At the Ulster Championships, held at Nutts Corner in September, there was also 1/2A and FAI Combat, although the Stunt event was held over for a fortnight. However, a week earlier, at the Irish Nationals, saw five entrants going through the schedule. J. Hamilton was the winner, with Maurice Doyle second.

Also from Northern Ireland we have the newsletter of the **Banbridge Aeromodelling Club**. The big news is still of Trevor Hutchinson's recent trip to South Africa for the World R/C Champs where he placed 42nd. Trevor was the only Ulsterman in the three-man Irish team, and by way of a practical send off, the Chairman of the club, Dennis McNeil, presented Trevor with a cheque to cover his expenses. Other news is of a couple of R/C Spitfires doing a spot of formation flying. Alas, though, one came to grief, not at the hands of a Messerschmidt ace but by a spot of anonymous interference. *Banbridge MAC Sec: B. Rooney, 4 Bridge St, Banbridge, County Down, Northern Ireland.*

One of the most appealing newsletters for the Free Flight enthusiast is the New Zealand *South Island News*. Reminiscent of old plan filled news-sheets of the fifties and sixties, it is edited by top N.Z. flyer, Paul Lagan. The plans are beautifully reproduced.

Looking forward to your reports and newsletters. **Clubman**



NOVEMBER WINNER – NIGEL PAPIWORTH, NOTTS.

Runners up to our November Caption Challenge were Gilbert Lawrence from Canterbury with "GET IT DOWN QUICK, THE TRAFFIC'S MOVING AGAIN". Rupert Harris from Loughton "NOW WATCH ME REALLY ANNOY MY NEIGHBOUR!" Harry Foster from Ilkeston "ARE YOU SURE IT SAID THAT THE NATS WAS A FLY-IN?" G. Green from High Wycombe "THAT'S NOTHING, WAIT TILL YOU SEE MY GROUND TO AIR REFUELLING DEVICE". Bob Brown from Newbury "IF ONLY YOU'D BUILT A TWO PIECE WING, WE COULD HAVE TAKEN IT IN THE CAR WITH THE REST OF THE LUGGAGE", and Dick McDonald from Upminster "NO-NO 'BREAKER ONE FOUR' IS LEFT RUDDER NOT 'COME BACK WITH YOUR HANDLE GOOD BUDDY' ". Our November Caption Challenge actually depicted back seat pilots Charles Dance and Wally Skells practicing their successful attempt on the World Distance record in 1960 comfortably seated in an open top Morgan. The route chosen for the 453 mile Record flight made on May 8th was from Lympne Airport near Folkestone to Sidsup along the A201 The flight took 82 minutes and included driving through the centre of Maidstone while the model continued on overhead. But the last laugh comes from Vic Dubery, captioning such a practice with Driver "THE STARTER'S JAMMED!" Pilot "I'VE LOST CONTROL!"

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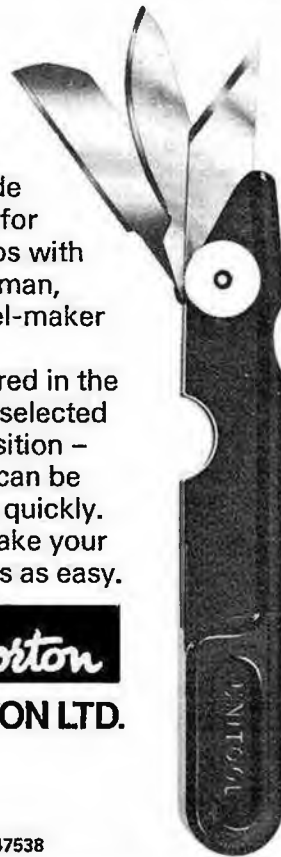
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