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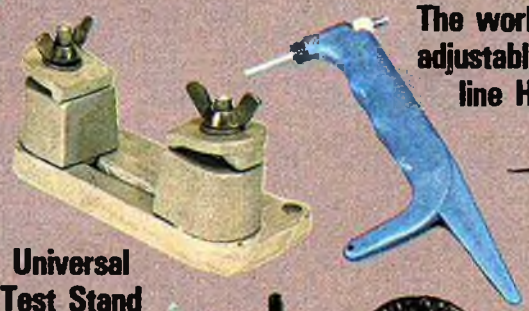

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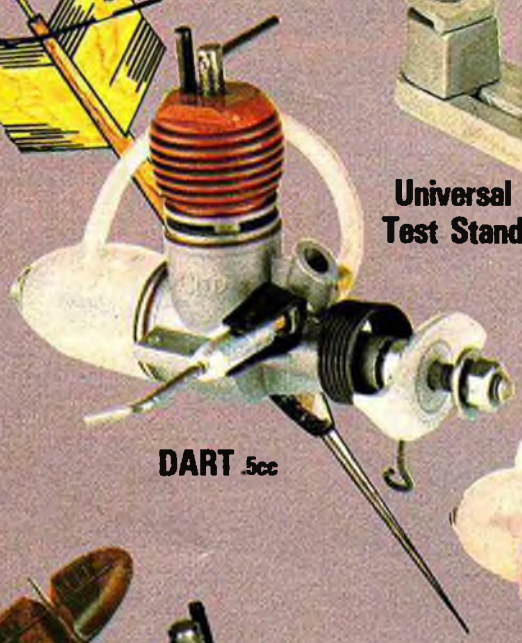

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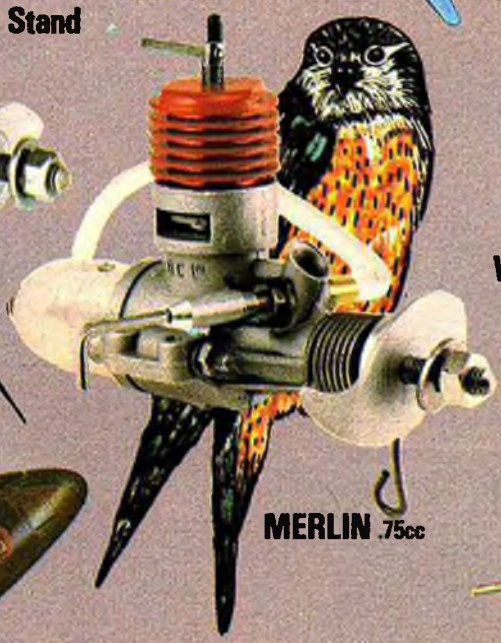

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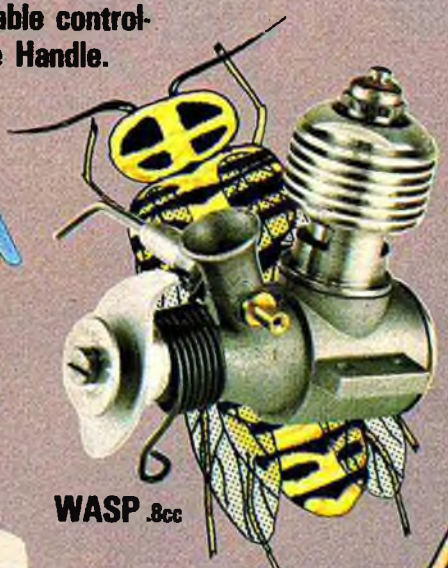

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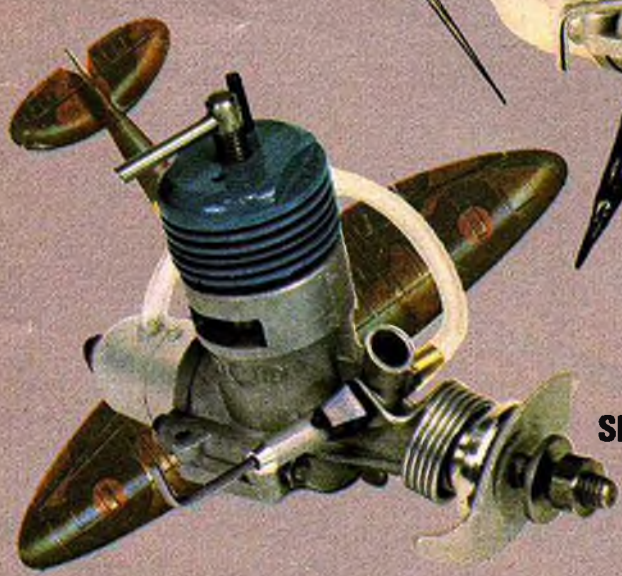

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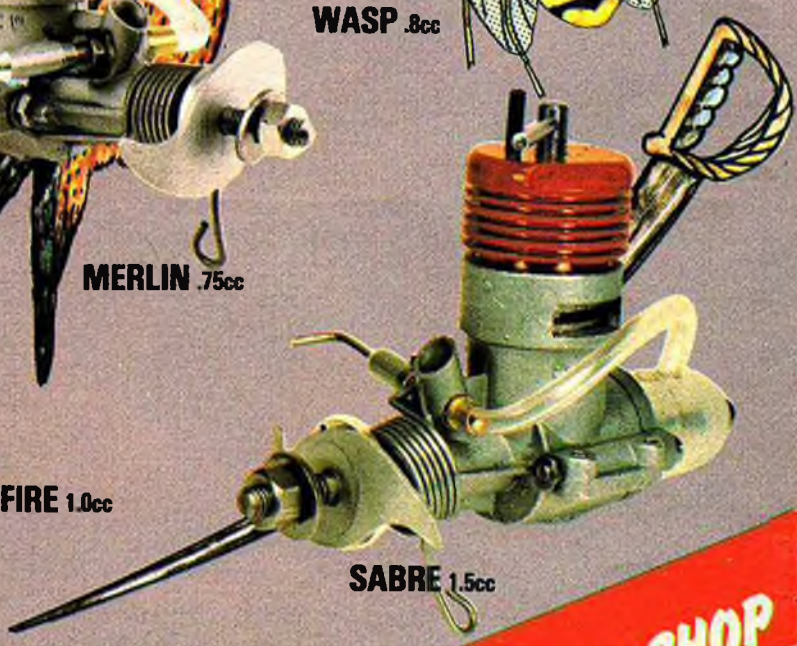

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MAY 1980

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Group Advertisement Manager **M. GRAY**

MAP **HOBBY MAGAZINE**

Comment

HAVE YOUR CAKE – and eat it too, is the message from SMAE, who have published details of their annual "expenditure cake" to show exactly where their membership fees are spent. Benefits from about a quarter of the annual fee are immediately received in the form of Member's Handbook, regular copies of the Society's magazine *Model Flyer,* and as Full Members immediate access to fly on SMAE negotiated MoD airfields. A further half of the fees go towards administering model flying interests throughout Britain; via the SMAE's full time office in Leicester; technical committees, and Local area meetings. Of the remaining budget only 5% goes towards organising SMAE competitions which are largely self funded through entry fees and therefore not subsidised by the non-competitive flyer. Even the Nationals is financially self-supporting.

The icing on the cake, is the vast amount of experienced voluntary effort which goes into the running of the Society and which benefits all model flyers. Elected officers of the Society are unpaid. Some 95% of annual fees are spent for the benefit of non-competitive modellers, protecting the rights of flyers and providing facilities and benefits. Yet there remains many thousands of active model flyers who by not joining their Society, are only holding back the progress of their chosen hobby. If you think it is now time you found out more about SMAE, contact the Membership Secretary, SMAE Office, Kimberley House, Vaughan Way, Leicester Tel: 0533 58500.

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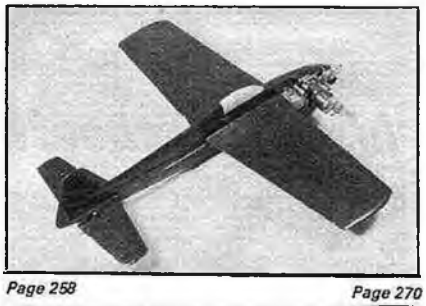

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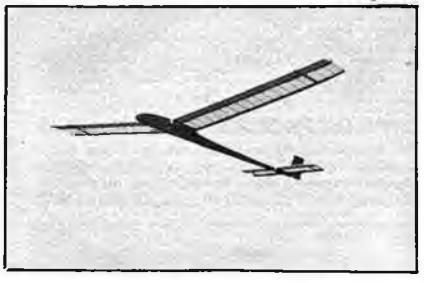

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On the Cover

Excelsus, this month's free full size pull-out plan design, about to make another flight from the slopes of Yorkshire in the able hands of designer Bryan Miller. This simple, lightweight design is quick to build and a joy to fly and inexpensive R/C gear makes this a model within the budget of most modellers. Turn to P270 for a full story.

Next Month

Scale special – Aircraft Described drawings of *B.A.M. Swallow* together with APS flying scale plans for 1250mm span F/F or C/L version. Mini Goodyear full size plans for *Owl Racer,* 410mm span for 1.5cc motors. R/C Sport Flyer continues flying hints for flat field thermal soaring. Plus lots more news on F/F, C/L, R/C and Scale model flying – On sale May 16th.

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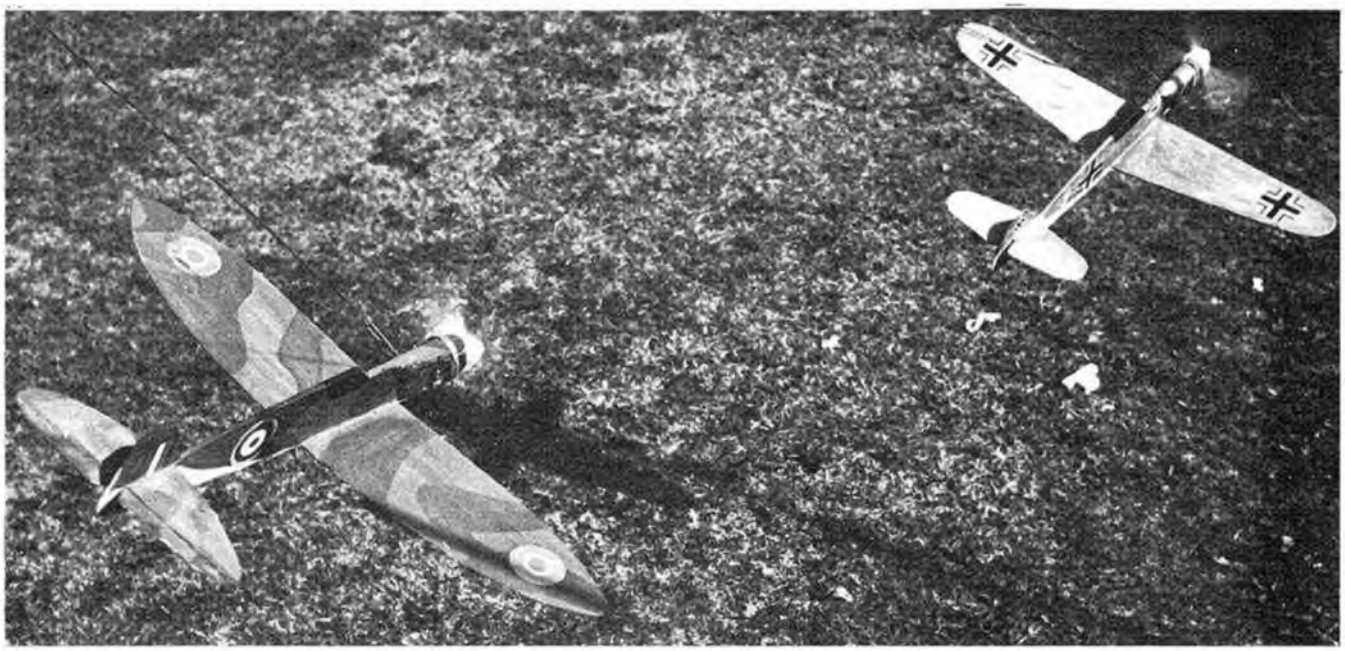

A Spit on the tail of an FW 190 at low level. Both electric R.T.P. models. Quick – and inexpensive – to build. And with all-balsa construction (simple to repair after a crash), airframe life is usually hundreds of hours. (Motors, and even wire undercarriages become unserviceable long before the airframe!).

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Models illustrated are the Harry Butler Spitfire (17in. span) and Harry Butler FW 190 (15in. span), produced in kit form by Keilkraft. Prefabricated wood parts in Solarbo Balsa.

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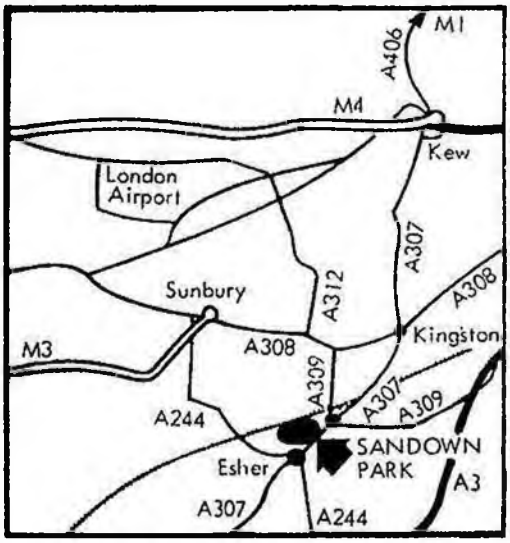

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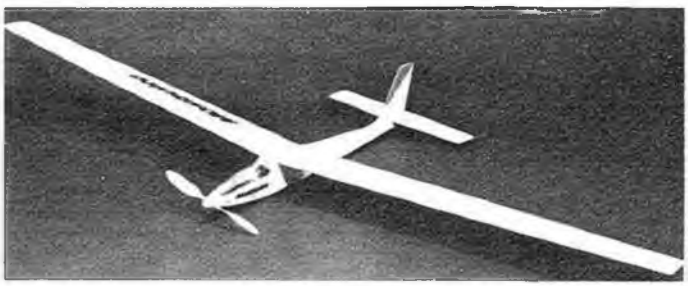

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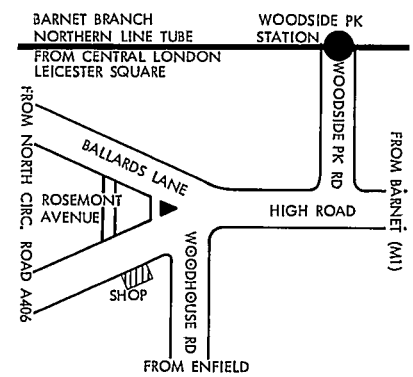

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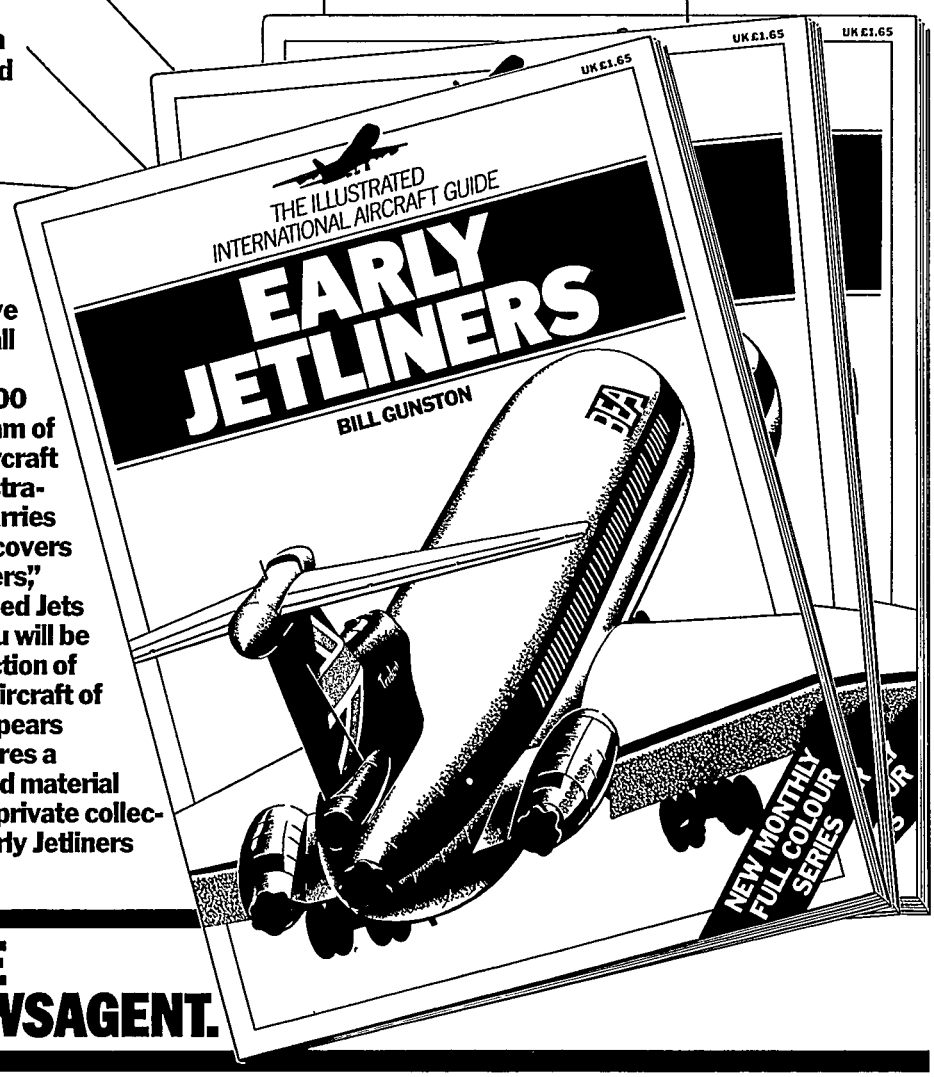
4. Which jet airliner had a nose and flight deck based on that of the Comet?
The answer's in "Early Jetliners."

5. What was the only jet airliner in use in 1957?
The answer's in "Early Jetliners."



On March 27th a massive new series will be launched on all the world's aircraft. Published monthly, it will contain over 2,000 entries and illustrations by a team of twenty of the world's leading aircraft writers, photographers and illustrators. Each monthly magazine carries no advertising – just fact – and covers a specific theme – "Early Jetliners," "Modern Jetliners," "Wide-Bodied Jets and Jumbos" etc. Eventually you will be able to build up a detailed collection of all significant civil and military aircraft of the last 80 years. Full colour appears throughout and the series features a wealth of previously unpublished material from major manufacturers and private collections from around the world. Early Jetliners is just published, price £1.65.

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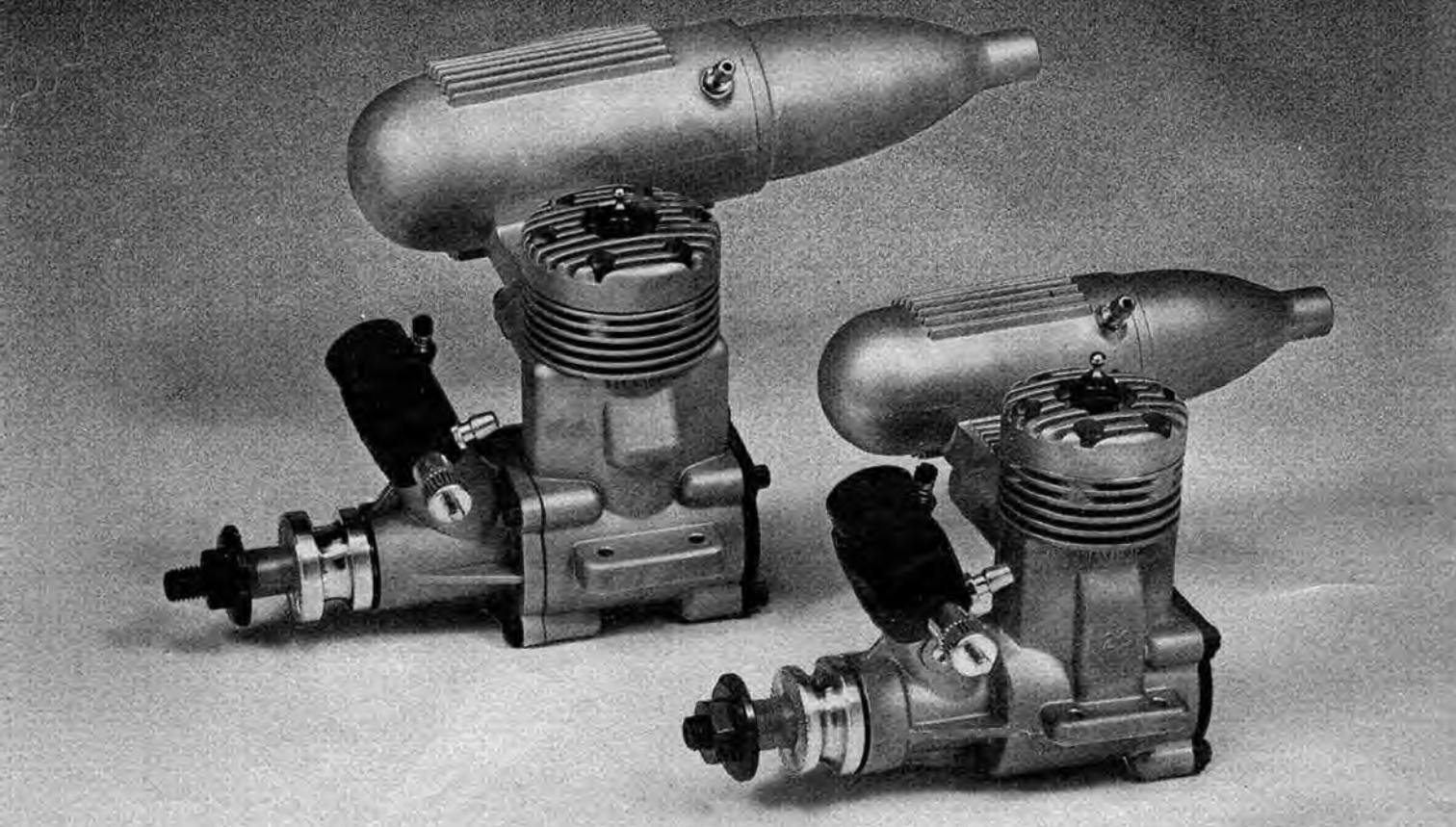

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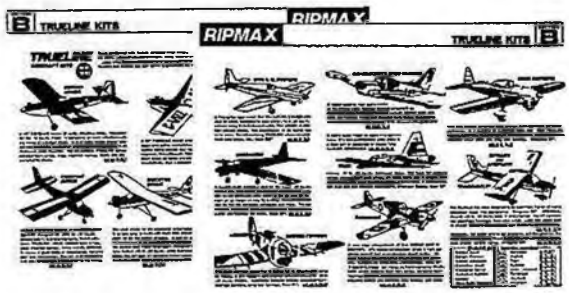

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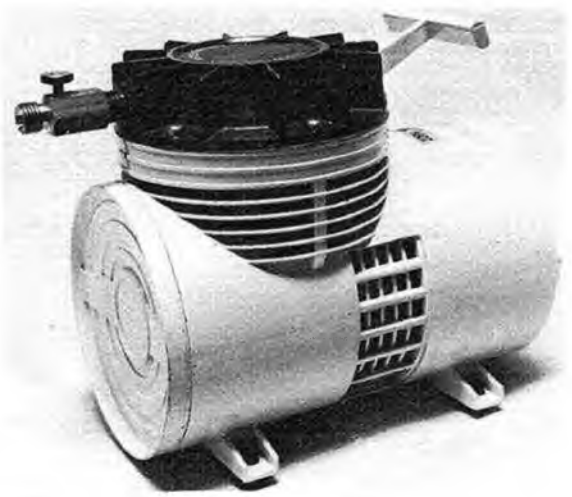

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SMAE SOARING SCHEMES

Following the success of achievement schemes for R/C power flyers, additional awards are now offered for achieving set levels of competence flying R/C gliders from flat field sites. The scheme is free to all SMAE members who may make qualifying flights at their own club field without the need to take part in official competitions. Five achievement levels have been set, ranging from two 5 minute flights and five spot landings for the bronze awards, with increasing duration and cross country tasks for higher awards. Special decals and badges will be available to confirm attainment of each level by flyers. The SMAE must be applauded for this imaginative project aimed specifically at the non contest club flyer, which is certain to increase the levels of competence and interest in R/C glider flying. The R/C Soaring Achievement Scheme is being administered through the SMAE office in Leicester, for details Tel: 0533 58500.

F3B SOARING LEAGUE

A similar series to the Free Flight Plugge Cup is to be run for F3B R/C soarers, but the emphasis will be on the individual and annual results may well form the basis for Team Trials selections. Participants in the six SMAE contests plus one other, may nominate their best four results scored on a percentage basis. A number of divisions are planned, similar to the football league, whereby newcomers to competitive soaring will participate in an introductory league with flyers of similar ability. Each year awards will be made to the top flyers in each league and the best flyers will go forward into a league of higher ability and ultimately join the experts in the premier division. All league members will be placed on a register of F3B enthusiasts used for mailing specific information and decal sheets are available to participants. The R/C Soaring F3B League is to be administered through the SMAE office in Leicester, for details Tel: 0533 58500.

MANY HAPPY RETURNS

Does your boomerang come back? If so, you may well be interested in an event promoted by the GLC Inner London Education Authority. A Boomerang Making Workshop is to be held on Saturday April 26th at the Horniman Museum from 11am, and throwing demonstrations and contests will take place the following day, Sunday April 27th in Dulwich Park. Four contests are planned for "Throwing Accuracy" requiring spot landings from the returning missiles; "Catching the Boomerang" highest number without dropping it; "Shortest time for 3 throws" for quickest relaunching of boomerang; "Best made Boomerang" – decoration an important feature. Further details from Dr E. Goodhew, Horniman Museum, London Road, Forest Hill, London. Longstanding readers might like to refer to our fullsize Boomerang Plans p.82–83 February 1963 *Aeromodeller,* photocopy available from *Aeromodeller* price 50p.

NEW PLANS HANDBOOKS

Completely revised 1980 editions of all MAP Plans Service Handbooks are now available, detailing and illustrating our complete plans range showing latest additions and revised prices.

Aeromodelling Plans Handbook No. 1 covers all types of Free Flight and Control Line model aircraft while Radio Control Aircraft appear fully illustrated and described in *Handbook No. 4,* and "how-to" editorial features make them a handy information source.

For Scale enthusiasts the brand new *Handbook No. 5* illustrates and describes nearly 400 scale drawings from the MAP range which makes an excellent pictorial reference for selecting your next scale model project.

Handbooks cost 75p each (plus 25p post and packing inland) and are available from your local model shops or direct from MAP Plans Service, P.O. Box 35, Bridge Street, Hemel Hempstead, Herts.

New Plans Handbooks from MAP listing literally thousands of subjects plus useful "how-to" articles makes them a must for all modellers.

CARDINGTON

The indoor flying meetings originally scheduled in the 1980 Contest Calendar to take place at Cardington Airship Hangar may not now take place due to insurance negotiations. It is hoped that some events may take place or alternatives be organised and it is therefore essential to contact Bob Bailey Tel: Stevenage 723642 or Laurie Barr Tel: 0628 25595 to check arrangements. However an Indoor Nationals May 3rd–5th will take place, thanks to the co-operation of RAFMAA, where a party of Rumanians is expected.

FREE FLIGHT IN HOLLAND

Two competitions of interest to Free Fliighters are the Dutch Nationals on Thursday May 15th for F1A and F1B at the usual venue of Roosendaal Heath, and the Holland International on Saturday and Sunday 17–18th for F1A, F1B and F1C, this year at a large new site at Flevoland, 40km north of Utrecht. These events traditionally attract British competitors who combine the three contest days in an extended weekend overseas. Further details are available from H. Van Rij, Molengaarde 34, 6983 BG, Doesburg, Holland. Tel: 010-31-83344718.

BELGIAN COMBAT INTERNATIONAL

The local model aircraft club in Genk is organising their first F2D International on 17th–18th May at Limburgse Vleugels, their local airfield. Camping or accommodation in local hotels is available and the entrance fee is a modest £4. For entry details, or further information contact: Fons Beckers, Paalsesteenweg 10, B3950 Beringen, Belgium, Tel: 011/436622.

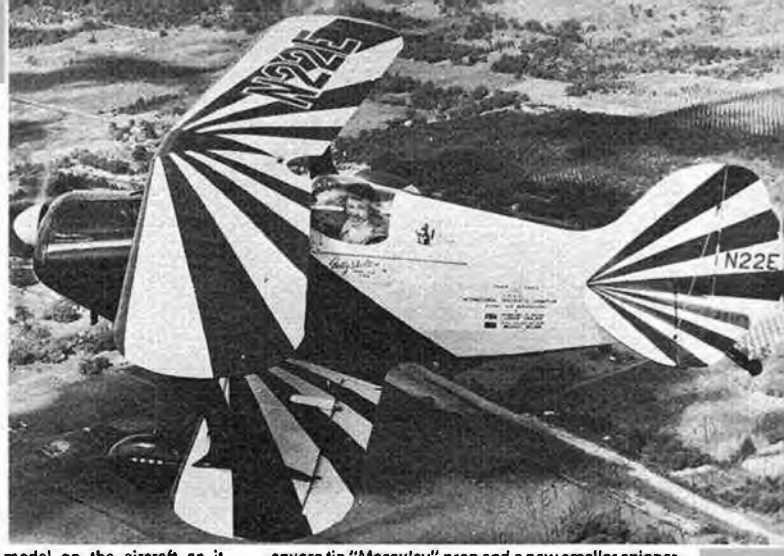
BELGIAN INDOOR

The 4th International contest for indoor models will again be held in Flemalle, Belgium on August 30th–31st. Classes of model include F1D, EZB, Peanut and "Saintes Formula", entry fees are 100FB and further information is available from F. L. Van Hauwaert, Grand Place 1/52, B-4110 Flemalle-Haute, Belgium. Tel: 041/33 3078.

BILL HORTON

A prominent free flighter from the heyday of the Crawley Club, Bill Horton died as a result of a heart attack in early March. Bill was a regular member of the British Coupe d'Hiver team which went to France for the annual challenge and will be remembered for his design "Tyra" which we published in July '67 as a dual purpose Open/"CdH" model. It is ironical that Bill was only just returning to Aeromodelling after a few years of involvement in the oil rig industry and had been looking forward to renewing old friendships on the model fields when he should have been taken at such an early age of 43. We are sure that all readers join us in offering sympathy to his wife Shirley and son James in their great loss.

Letters



Miss Betty Skelton at the controls of her Pitts S-1 Special *N22E "The Little Stinker Too" flying over Florida USA in 1950. This is the same aircraft which had the Reg. No. NX86401 and which Betty flew at Gatwick in 1949. See P76-81* Aeromodeller *for full story and Aircraft Described feature.*

THAT *LITTLE STINKER*

Dear Sir,

I was surprised and delighted to see the spread on the Betty Skelton *Little Stinker* in the February *Aeromodeller* and Pat Lloyd's excellent drawings and gen on the Pitts S1 after so many years.

However, there appears to be some errors creeping into the *Stinker*'s history, which I would like to put right for the record! *The Little Stinker Too* to give it its full title means *"Too" as well as, and not Betty's second aircraft as implied in the text.*

The Stinker in the first place, was Betty Skelton's Little Dog! When Betty acquired her Pitts in 1947, the aircraft having some peculiar habits, was dubbed *The Little Stinker Too* and a Walt Disney skunk, which appeared in the Walt Disney film "Bambi", adopted as her mascot!

With regard to the aircraft, it was at the Old Gatwick airport prior to the *Daily Express* Air Pageant in 1949, Betty was 22 years old then, having started flying when she was 12!

1949 was her first visit to England. *Stinker* then had the Reg. No. NX86401, a wing span of 16ft 9in, length 14ft 8in, weight 568lb empty, with a 90HP *Continental* engine with a Variable Pitch Prop. Colour was mostly red with white flashes top of upper wing and tail surfaces only, Betty's Pitts had fairings on everything including all bracing wire ends and bracing wing lugs. Another super scale detail is the double tail wheel flash which Ian Peacock has correctly on the plan; later Pitts have only one side on the flash. Also on *Stinker* the carburettor air intake is in the nose fairing just below the spinner, and the exhaust pipes (two) protrude through the engine cowling. The *Continental* engine being smaller than the *Lycomings* in use on later Pitts.

I based my first C/L model on the aircraft as it appeared at Gatwick, depicted in the 1949 *Flight* photo, reprinted at the head of my article. The *Stinker* was shipped to Gatwick in a crate on the old liner *Queen Mary*. We had the aircraft at Gatwick over a period of months as Betty was taking part in several air shows in the UK and N. Ireland.

There being no drawing in the UK at the time, I drew up my original set of plans from the actual aircraft, with Betty's help! When Betty Skelton returned to the States, she wrote to me in 1950 giving me details of changes made to the *Little Stinker* for its 1950 certificate of airworthiness. The aircraft had been completely overhauled and a number of changes made. The new Reg. No. N22E given and the new colour scheme as described correctly in the February 1980 *Aeromodeller* text for the N22E version. I would add that the red and white checkerboard on underside of bottom wing were 12in squares and 8in squares on underside of the tail surfaces, on the full size aircraft.

The only other alterations that affected the outward appearance were a change to a one piece solid metal square tip "Macauley" prop and a new smaller spinner.

Harlow, Essex Peter Donavour-Hickie

3-view drawings of N22E to 1/48th scale, detailing the original colour scheme, appeared on P64 1950 Aeromodeller Annual – Ed.

BRITISH DIESELS

Dear Sir,

Looking through the pages of *Aeromodeller* I wonder what has happened to the 'British' high performance 2.5cc engine? It seems that since the heyday of the *Oliver* and *ETA*, British model engine manufacturers have forgotten that there is a market for 'High Performance' 2,5cc glowplug or diesel motors, or are they prepared to leave this market to the Japanese, Italian and Stateside manufacturers.

If the commercial manufacturers do not wish to produce this type of motor, surely we have sufficient enthusiasts to design and produce small numbers of reasonably competitive engines – I for one, would be prepared to help on this type of venture.

Chelmsford, Essex D. Stapleton

What's Happening?

EVENTS

May 4th
BKFA KITE DAY. See hundreds of kites airborne simultaneously all day and bring yours along too. Venue: Old Warden, Beds.

May 10th–11th
ELMBRIDGE SYMPOSIUM. Two full days of C/L and R/C model flying demonstrations with grandstand viewing and extensive model trade stands. Venue: Sandown Racecourse.

CONTESTS

April 20th
CATS 1/2A COMBAT RALLY. Limited entry. Pre entry only. Seniors £1. Juniors 50p. **Venue A:** Horsenden Hill, Perivale. Contact: Mark Harrison Tel: 01-997 1794.

April 20th
FF 2nd AREA CENTRALISED. *F1C (HALIFAX+PLUGGE) O/R (GAMAGE), O/G.* Venue: local area. Contact: Mike Fantham Tel: 01-736 7163.

April 20th
CL 1st CENTRALISED. *SPEED, F2B+NOVICE F2C, 1/2A TR, 1/2A COMBAT, CARRIER.* **Venue B:** Cosford. Contact: Bob Horwood Tel: 0272 48869.

April 27th
WITHAM CL STUNT COMP. *F2B & NOVICE.* **Venue C:** Essex Showground, Braintree. Contact: Peter Burgess Tel: Witham 516881.

April 27th
INDOOR FLYING MEETING. *PEANUT, OPEN RUBBER SCALE, CO₂ SCALE* (INCORPORATING INDOOR SCALE NATIONALS). Soft shoes essential. 12.00–1800 hrs. £1.50 entry plus SMAE entry. **Venue D:** Derby Municipal Sport Hall, Moor Lane, Derby. Contact: John Blagg Tel: 0707 52779.

April 27th
ST ALBANS SPRING GALA. *F1A, F1B, F1C, O/G, O/R, O/P.* Venue: Bassingbourn. Contact: John Fletcher Tel: Stevenage 68731.

April 27th
SPRING SCALE. *C/L SUPER SCALE.* **Venue F:** Upwood. Contact: Vic Willson Tel: 073-522 3743.

May 3rd/4th/5th
INDOOR NATIONALS. *HLG, CO₂ & MANHATTAN* – Saturday. *EZB & 35cm* – Sunday, *FAI & OPEN MICRO-FILM* – Monday. **Venue G:** Cardington. Contact Bob Bailey Tel: Stevenage 723642. Programme may vary.

May 4th
ELLIOTT SPRING RALLY. *F2B, F2C, GOODYEAR, SPEED, 1/2A TR, 1/2A COMBAT.* 1st–3rd Trophies all events. **Venue H:** Marconi Avionics, Rochester. Contact: Pete O'Neill Tel: 0732 57899.

May 4th
ODIHAM SPRING GALA. *F1A, F1B, F1C (first round 10–12am), A1, CDH, 1/2A, HLG, FF SCALE POWER AND RUBBER, F2B+NOVICE.* **Venue I:** RAF Odiham. Contact: F/F Tel: Copthorne 713115; C/L Tel: Crawley 517387; Scale Tel: Reading 669219.

May 11th
FF 3rd AREA CENTRALISED. *F1B (WESTON+PLUGGE), O/P (WHITE), O/G.* Venue: local area. Contact: Mike Fantham Tel: 01-736 7163.

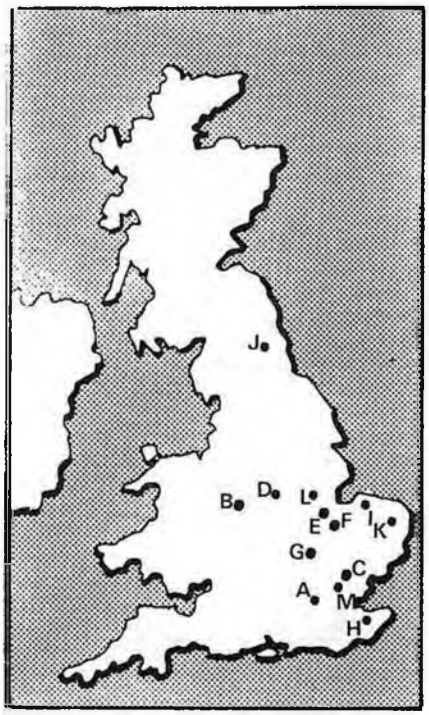
May 11th (originally April 27th)
BRITISH COMBAT CHAMPIONSHIPS 1st ROUND. *CLASS A DIESEL.* 10am start. **Venue E:** Peterborough River Embankment. Contact: Neil Gill Tel: 0733 252645.

May 18th
NE AREA RALLY. *F1A (No rounds), O/R, O/P COMBINED MINI HLG.* (substantial cash prizes). **Venue J:** Albemarle. Contact: Phil Moate Tel: 0642 557048.

May 18th
BROADLANDS CL COMP. *F2B+NOVICE AND JUNIOR STUNT, PROFILE 40 CARRIER, 1/2A COMBAT.* 10am start. **Venue K:** Earlham Park, Norwich. Contact: John Bailey Tel: 0603 868135.

May 18th
CL 2nd CENTRALISED. *BTR, F2B+NOVICE, F2C, F2D, SPEED, RAT RACE.* **Venue L:** Barkston Heath. Contact: Bob Horwood Tel: 0272 48869.

May 18th
CROYDON GALA. *F1A, F1B, F1C, A1, CD'H, 1/2A.* 10am start. Venue: Bassingbourn. Contact: Ray Elliott Tel: 01-997 1563.



On MoD property, model aircraft may *ONLY* be flown by *FULL* SMAE members or contest entrants. All SMAE members (Associates and Juniors) and their families are welcome as spectators, and non members *may* be admitted by prior arrangement with contest director. For SMAE membership details Tel: 0533-58500.

MINI-GOODYEAR RACING

by Bob Walker

THE FIRST Mini Goodyear race that I saw was the Final at the '77 Nats. I had taken a party from the school club that I run and they at once recognised that this was something that they could 'have-a-go' at. Back for the new term in September models were quickly built to existing *Aeromodeller* designs (*Mini Stinger* and *Swee' Pea* C/L 1297 price £1.20; *Deerfly* and *Shoestring* C/L 1232 price £1.50 inc p&p) and also I prepared plans for two other Goodyear racers, *Owl* and *Cassutt*.

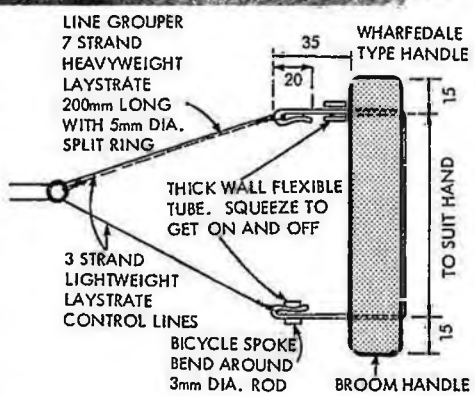
Our first practice 'races', three up, could best be described as fiascos. Pilots, pitmen and models demonstrating similar lack of ability. Regardless of where the pitman moved to, landings were usually at the other side of the circle but the ensuing dash to the model was useful for picking up bits that had fallen off; these being ready for fastening back on with string, rubber bands, nails etc. With the engine then cold, awkward and coughing the model would rejoin the race often to the detriment of at least one of the other pilots when their down lines caught on another's head! Any stop watches still running after a hundred laps of this, registered around 10 minutes. The Northern Area Meeting at Elvington in October was our first competition. As expected we were slower than everyone else but we all enjoyed ourselves and scores were down to around 7 minutes.

We are very fortunate to be in the Wharfedale Club area. They are very keen to encourage new recruits to racing and invited us to fly in their club events. This was a decisive factor in improving our times from many points of view. We saw people using similar models and engines to ours but going much faster; showing us that practice was what we needed. Our sights were then set on the Nationals where we had teams in 3rd, 6th and 16th places and a fastest time of 4:37.

If you fancy a go at racing, these Mini Goodyear models provide a very enjoyable introduction to the sport. They also make good first time 'trainers' and several of our clubs have in fact learnt to fly and take part in their first races using the same model.

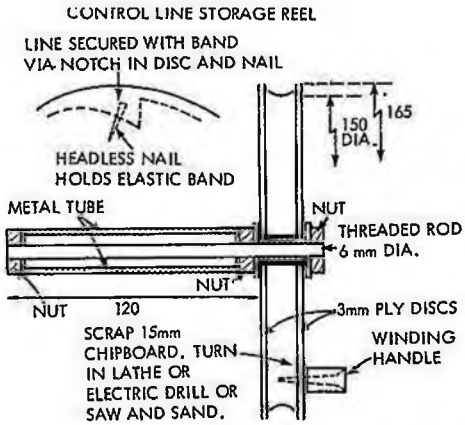
The rules which we use have evolved themselves over three years' racing at school and are as follows:

Two 1/12th scale profile Mini Goodyear racers flown by members of Allerton Grange High School Model Aircraft Club, left The Owl *and* right L'il Quickie, *full size plans for which will appear in future Aeromodellers.*



MINI GOODYEAR RULES

1. Models are two-thirds the size of SMAE Goodyears, i.e. 1/12 full size scale ± 5%. Tail area may be enlarged by 25%. (Several *Aeromodeller* Plans are available; *Mini Stinger* and *Swee' Pea* CL/1297 Price £1.20 inc p&p, *Deerfly* and *Shoestring* CL/1232 price £1.50 inc p&p).
2. Power up to 1.5cc engines costing less than £14 (as Jan 1st 1980).
3. 10cc commercial tanks to be used, vents and feed may be altered to suit model or engine if desired.
4. Line length of 12.75m ± 20mm measured from centre line of handle to centre line of model. 100 laps = 8km. (3 strand lightweight laystrate).
5. 100 lap heats. 200 lap final.
6. Models flown over grass. No undercarriage required.
7. One member of the team must be under 19 years old (Jan 1st).



lotape type container and glue about 6in diameter cardboard discs on each side. (b) make loops on both ends of the wire (we bind with fine copper wire and solder). (c) open the container, slip the wire coil on to it and replace the lid. (d) secure one loop and roll out the wire. When it is all out, the best place for it is on a reel of the type sketched. If the wire goes slack it tends to twang into coils. Do not pull to straighten it or you will pull one of the loops tight and put a kink in the wire, which will break if you try and use the lines again to fly your model!

When all your gear is ready make sure you can start the engine in the plane (not in the house). Hold it firmly with thumb over cylinder head and fingers around the model's nose. Position the prop in the five minutes past seven position, so that you can comfortably flick it hard over compression. Be careful how you tilt the model, bearing in mind where the fuel feeds from. It is easy to flick away with no fuel reaching the motor!

The next item is practice, to improve your team performance. During starting, the pilot must keep his handle on the ground and the pitman should keep the lines down so that other models cannot fly under them. The pilot can help the starting by not doing a pull test or shouting abuse. The pitman can help the flying by giving a good launch; plenty of speed tangential to the circle is what is needed. Our method is the 'Highland Fling' where the model is held by the outboard wingtip with the right hand and swung from left to right. Care is needed not to rip out the bellcrank. During racing, the pilot should keep the handle back on his chest and walk forward in small circles with the other pilots. Flying height should be about 2 metre unless overtaking. If you fly high needlessly, 'the action' gets packed into too little space with more chances of things going wrong. Pivoting – standing in one spot and rotating – is a good way to get everybody elses' lines wrapped round you. Another thing to avoid is taking your handle over other pilots' heads long before your model overtakes them because if your model cuts its engine prematurely, you all have a problem!

In a correct landing you move nearer to the edge of the flight circle when your engine cuts and keep opposite the model. Do not pivot so that your lines end up across the flight circle where they will be trampled on or become tangled up with the other pilots. Also, by moving out, you make life safer for your pitman who must make sure that the model is out of 'the line of fire' of models flying overhead before refueling it.

Left: *Line storage reel and Sellotape tin reel.* Below: *A Mini Goodyear Racer is launched using the "Highland Fling".* Below left: *Holding the model ready for restarting.* Below right: *Pilots circulating in the centre during a race.*

There are a number of suitable engines available, such as PAW, M.E. Snipe, Kingcat, D.C. Sabre and Spitfire etc plus 'golden oldies' such as Frog 150 and A.M.15 and no doubt many others. Our most popular motor is the PAW 149. They are very well made, robust, excellent value and have service to match. All motors require particularly careful use when new if they are to reach their potential. You must not expect an engine to perform well if you overcompress and starve it of fuel so that it overheats and seizes when running in. If you have not handled an engine before, try to get someone experienced to help you but be careful who you choose. The person who operates his own engine without fuss and bother is the one you want; not the 'armchair ' expert.

In addition to model and engine you also need a suitable handle and steel lines. The sketch shows an efficient suitable control handle that is cheap and easy to make. Your line could be Lightweight 3-stranded or 33 swg single strand. The stranded line is easier to handle but it has more drag which slows the model. In wet or damp conditions, however, single strand lines will bind solid so take your choice! Single strand wire is sold in a coil, getting it off easily, requires the correct technique. Pulling on either end invariably produces a tangled mess, bad temper, and another visit to the model shop. A cheaper sequence is (a) obtain a 5in diameter Sel-

Now for something completely different – Insurance and Safety. If you are going to fly near other people, you should be insured against third party risks. This is certainly not so that you can behave irresponsibly but it is to guard against accidents. There are several schemes available, one of which is advertised in the *Aeromodeller* – the MAP scheme, see P298. Pitmen **must wear a safety helmet** so that the helmet gets bashed in rather than their skull if there is a collision.

NEXT MONTH: Full size Plans for *The Owl.*

FLYING HIGH

with Ian Barrett

THIS MONTH:

FIRST GLIDER FLIGHTS: TEST GLIDING, ADJUSTING TRIM, TOW LINE LAUNCHING

AT LAST WE have reached the stage in this series of articles where we have a completed model glider, ready for its first trial flight. This is the time that all new modellers have been looking forward to, and it is difficult to control one's natural impatience, which demands that the model be taken outdoors immediately and launched into the air. Patience! After all the hard work in constructing the model, do not ruin it all by rashly trusting an untried machine to the elements. The model, however much a faithful copy of the original design, will require some adjustment, called trimming, before its full potential can be achieved.

Above: *test gliding the Graupner* **UHU**, *an ideal first model. Choose a calm day and face into wind, gently launch from shoulder height and follow through – like throwing a dart in slow motion. A long slow glide should result, but look for any signs of diving, stalling or excessive turning.*

Trimming the model does not begin on the flying field, but at home. The plan or the building instructions will indicate where the balance point of the completed model must lie, and it is most important that your model has its centre of gravity at this point. Without exception, all the glider models that we have built for this series of articles have required the addition of ballast to the nose of the fuselage.

With the assembled model correctly balanced, examine it carefully for alignment. The wings must sit squarely on the fuselage, and the tail assembly must also be square with the wing/fuselage combination. Hold the model level, and look at it critically from the tail end; is the tailplane parallel with the wing? If it leans over a little to one side, it may produce an unwanted turning effect when the model is flying. Does the fin point fore and aft, and is it securely located? Slight knocks on landing might cause misalignment, and subsequent adverse effects on the performance.

Whilst looking at the model, especially from the rear, examine the trailing edges of the flying surfaces, and check that no warps have returned into the structure. If they have, remove them as described last month by warming the offending part and twisting in the opposite direction.

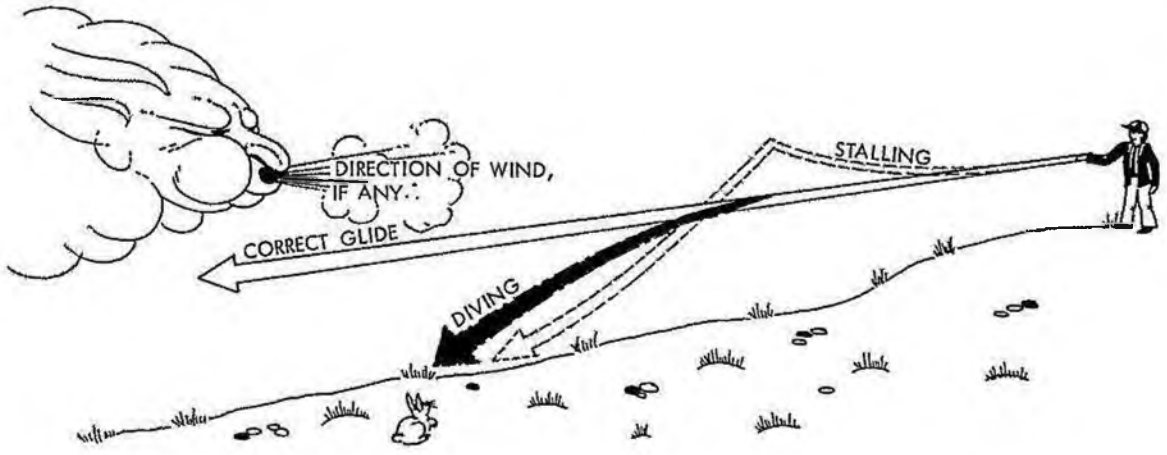
You should now have the model ready for taking outdoors, and this is where patience is required. Wait until the wind has dropped to no more than a gentle drift; it is surprising how these conditions exist up until the time the model construction is finished, and then, as soon as the model is ready for flight, the wind picks up!

The calmest times are usually early morning or late evening, but whatever time of day you choose, there must be no turbulence in the air. The small gusts of air will make it difficult to decide whether the model is correctly trimmed or not.

Instructions on trimming nearly always tell you to carry out the first flights over long grass, which is fine if you can find it. What is required is an area free from obstructions, and with a surface soft enough to protect the model on landing. Note the direction of any air movement by throwing a few tufts of grass into the air, and watching the drift. You should position yourself so that you can launch the model into the drift, and allow plenty of room for the glide. There should be no large buildings or trees upwind, as these cause eddies which can upset the model.

Any spectators should be requested to stand behind you, and dogs discouraged from performing retrieving duties. Pick up your model, and check that all the flying surfaces are in their correct attitudes. There should be sufficient rubber bands holding the wings and tail to prevent them rocking, but not too many that might

Above: *The deliberate mistake – definitely* **NOT** *the way to test glide a model. A glider cannot possibly continue this upward path and will inevitably stall and dive into the ground — therefore choose long grass to fly over and launch more slowly, slightly nose down.*



cause damage to the structure. The idea in using this form of attachment is that in a hard landing, the bands will fail, and release the component parts.

Hold the model in one hand, supporting it at the centre of gravity, and position it about head height. Keep the wings level, and try to point the fuselage along the expected line of flight – the glide angle. Face the breeze, and gently push the model forward. The speed required is something that comes with practice, but generally a speed equivalent to a fast trot will not be far out. This will, of course, be proportionally less with increase in wind speed. Do not, under any circumstances, hurl the model upwards.

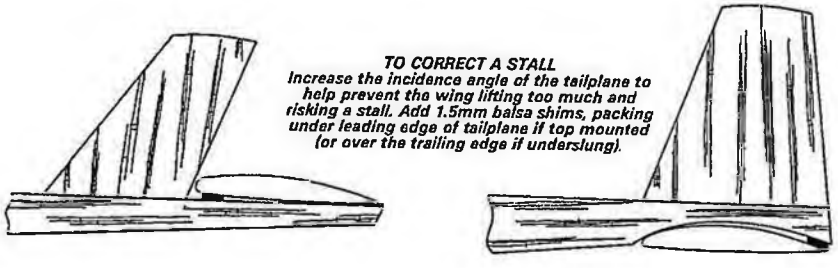
Watch the model carefully, and note its reactions. If you are remarkably lucky, it will continue forwards in a straight line, gently losing height to land lightly on the ground. Unfortunately, things are not likely to be so perfect. Several things can happen, the most probable being a stall. This takes place when the model slows down to a point where the wings cannot support it, and it begins to drop rapidly. If there is sufficient height, the model will pick up speed as it drops, and begin to lift the nose. Depending on the trim, the stalls will continue, or damp out. However, from a hand launch, there will only be enough height for the beginning of any unwanted manoeuvre, and hopefully no damage will result. Do not be misled into thinking that the model has stalled due to bad trim, if you have not launched it with enough speed. If launched too slowly, the model will flop down immediately.

Now, assuming a definite stall has taken place, and the balance of the model is correct, there is only one real solution, and that is to adjust the relative angle between the wing and tailplane. Moving the balance point of the model forward does have a correcting effect, but the danger is that too much nose weight will be required, making the model too heavy and inefficient. The angle between the wings and tail is called longitudinal dihedral, and to reduce the stall, this angle must be decreased. Imagine the stall being caused by air loads on the tailplane pressing down too much at the rear; to reduce this effect, the leading edge of the tailplane must be raised slightly relative to the trailing edge, thus making the tailplane generate a little more 'lift'. The angle adjustment can be achieved by placing thin pieces of balsa sheet between the tailplane and fuselage. If the tailplane is mounted on top of the fuselage, then the packing will be placed under the leading edge, and if it is mounted under the fuselage, then the packing will be above the trailing edge. The packing should be inserted in 1mm increments until the stall disappears.

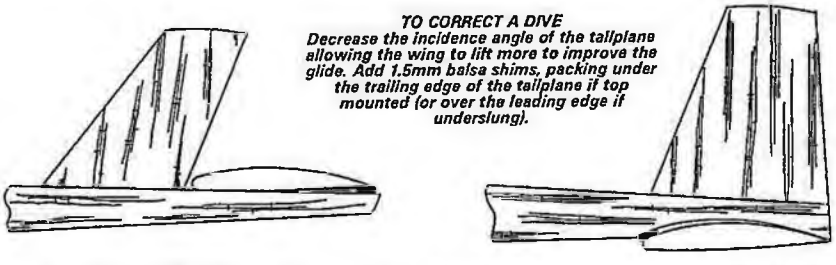
If, on launch, the converse occurs, that is, a dive, again check that the balance point is not too far forward, and then pack the tailplane in the opposite fashion to that described above. When a long glide without undulations can be obtained at each test launch, cement all the packing pieces into positions, otherwise they will fall out on a heavy landing, and you will have to start all over again.

Rudder trim is difficult to assess from a hand launch, as the model has usually landed before a turn has developed. If an obvious turn is apparent, then it is probably too tight for high flights, and is likely to develop into a spiral dive.

It is now time to try the model on the tow line. Nylon fishing line or carpet thread is suitable, and should be wound onto a reel. A 50 metre length will be the maximum you will require, and a fast winding reel is very useful for recovering the line after



TO CORRECT A STALL
Increase the incidence angle of the tailplane to help prevent the wing lifting too much and risking a stall. Add 1.5mm balsa shims, packing under leading edge of tailplane if top mounted (or over the trailing edge if underslung).



TO CORRECT A DIVE
Decrease the incidence angle of the tailplane allowing the wing to lift more to improve the glide. Add 1.5mm balsa shims, packing under the trailing edge of the tailplane if top mounted (or over the leading edge if underslung).

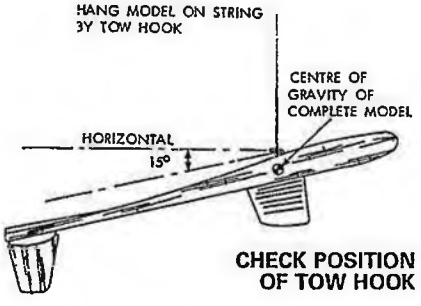
Commercial glider winch with tow ring and polythene penant.

For towline launches, get a helper to release the glider. Hold the model with wings horizontal, nose up 30°, run with model and allow to lift out of grasp.

launching the model. A small curtain ring of about 20mm diameter is tied onto one end, with a piece of lightweight coloured nylon cloth tied as a banner about 300mm from the end. This material will help to pull the ring off the tow hook on the model, and aid visibility.

Reel out about 20 metres of line for the first launch, and ask your assistant to hold the model facing the wind, wings level and nose very slightly raised. The ring is slipped onto the hook, which will also pull the rudder into the 'straight ahead' position if an auto-rudder device is fitted. When you are both ready, start to run into the wind. Your assistant should follow, letting the model lift of its own accord out of his hand. He should not let the tow line stretch, or catapult take-off will result, and the model will drop the tow line. Continue running into the wind, and the model should begin to rise quickly. Slacken off your run gradually as the model rises higher, and do not allow it to rocket up. A nice easy climb is the most controllable, and a steady climb in an arc to the overhead position should be aimed for. Slow down to a stop when the model is overhead, and let it float off the line; the pennant will help to drag the tow ring off. Reel in your line while keeping an eye on the model. It should start to fly in lazy circles of about 50 metres diameter. A more accurate impression of the trim will be obtained on this longer flight, and adjustments, as described above, carried out accordingly. If a spiral dive develops, reduce the rudder offset. If this has no

When towing a glider, always look back at the model as you run, if it pulls too hard or veers to one side, slow down or release model early.



CHECK POSITION OF TOW HOOK

effect, check the wings carefully for warps, as these might be rolling the model into the turn.

A word about tow launching. I have mentioned the necessity of obtaining the correct position for the centre of gravity, and this is also related to the tow hook position. If the tow hook is too far in front of the balance point, the full height on the tow will not be achieved, and the model will tend to weave on the climb. Alternatively, if the tow hook is too far back near the balance point, the model will rear up and then veer off to one side, without recovery. In these circumstances, the safest course of action is to slacken the tow line and release the model to sort itself out!

An easy check on tow hook position is to invert the model, and hang it by its tow hook on the line. It should hang with its tail pointing towards the ground at an angle of about 15° to the horizontal. If the balance point of the model is correct, then move the tow hook to the optimum position. Some designs incorporate two tow hooks for this reason.

When satisfactory flight from the short line can be made, the full length can be used. If a dethermaliser device is fitted to the model, light the fuse immediately prior to launch. The length of the fuse required will depend on the accessible retrieving distance downwind from the launch point, and the wind speed. For the first trials, try a short length of fuse, say half a minute, which should allow the dethermaliser to operate at a reasonable height. A parachute type of descent should then develop fully after the model flips into a 'super stall'.

With practice, the model can be kited up on the line, and the variations of lift in the air felt through the pull on the line. By releasing into rising air, the model can climb in circles to a surprising height, and it is then that the dethermaliser becomes necessary for recovery. Without such a device, then you might have to rely on the name and address label on the model, for its subsequent return.

As the model circles downwind, note the direction of the centre of the circles, and follow that line. Watch carefully where the model lands, and take note of any relevant landmarks. If the model lands in long grass, a high view point will help to locate it. Brightly coloured panels help enormously. A successful retrieval after a long flight is one of aeromodelling's most satisfying moments.

Next month: We shall be looking at more intricate models such as rubber and engine driven types.

See you at the FF Nationals (see P264).

Returning from another successful flight. Always make sure you fly well away from downwind obstacles – you'll be surprised how far your model can fly on a good flight.

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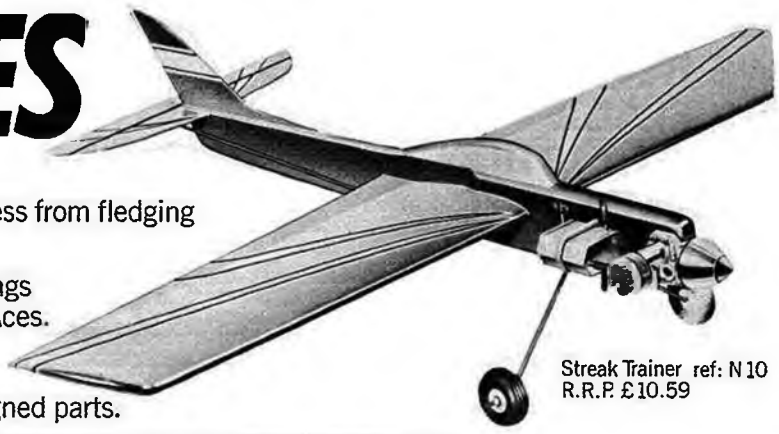

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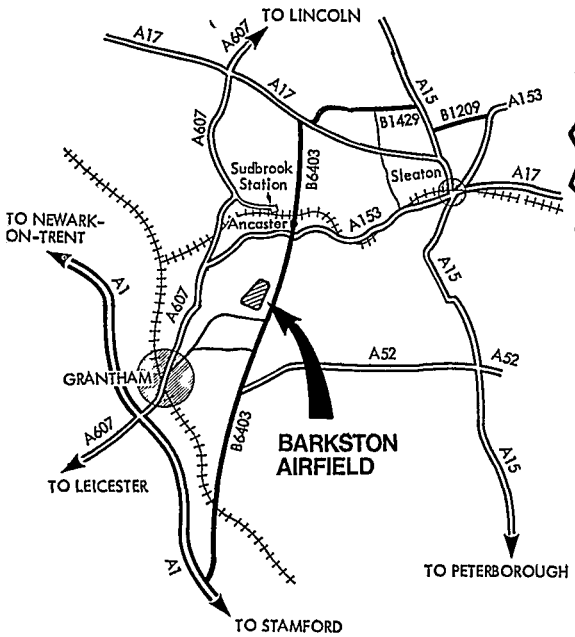
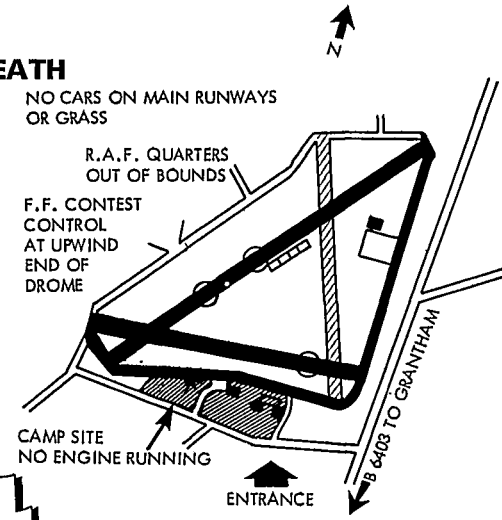


BARKSTON HEATH
24–26th MAY



FREE FLIGHT NATIONAL CHAMPIONSHIPS 1980

THE NATIONAL CHAMPIONSHIPS for model flying have grown so large and model performance improved so much over the years, that Free Flight contests now need a whole airfield to themselves instead of sharing a site with other C/L and R/C activities. Once again the British Nationals will be a 'split' event with more than twenty Free Flight classes being contended over the weekend from Saturday 24th May to Monday 26th May at RAF Barkston Heath, near Grantham.

A welcome return to this year's Nats will be the facility to camp on site which should help restore the atmosphere found lacking over the past few years. Admission to the airfield is allowed from 1800hrs Friday 23rd and you can bet the modellers will take advantage of this for literally dawn until dusk model flying activated throughout the weekend. Another welcome feature this year is the proposal to hold daily prizegiving and social events at the conclusion of each day's flying provided hangar facilities are available. It is also hoped to run a juniors Free Flight Workshop in the hangars, with experienced modellers on hand to lend assistance to newcomers building their first flying models, and trade support is expected. In addition to the competition events, members of the Society of Antique Modellers of England (model aircraft variety) will be present throughout the weekend flying their Vintage models to add to the spectacle.

Admission at the gate will be £1 per car where a programme of events will be on sale. Advance camping permits are available price £3.50 per head or £4.50 on the day. Under 14 year olds free. Competitors Registration is: 50p Full Members; 25p Juniors; £1.60 Associates. Closing date for entries 3rd May. Junior Kit contest and other events for daily visitors are free and may be entered during the event.

This year's Nationals promises to be a really memorable occasion and is highly recommended to both dedicated modellers and casual spectators alike. All SMAE Members will be circulated with entry details or send to SMAE NATS ENTRY, 39 Bowhill Grove, Leicester with SAE or telephone SMAE Secretary 0533 58500 for information.

JUNIOR KIT – RUBBER AND GLIDER

This competition is open to all juniors under 16 years old (1st January 1980) flying a model built from any standard commercial kit, Rubber or Glider, under 1250mm (50in) wingspan. The event is simply for model duration and gliders are allowed up to 50m of towline and each competitor can make three flights timed to a maximum of 2 minutes. Entry to the contest is free. Substantial prizes are awarded of model kits and accessories thanks to generous support from the Model Hobby Trade, and the winners are each awarded one of the Norman Foster Trophies.

WIGAN 70 EVENTS

Impromptu evening events are planned for any model under 70cm span and length to the "Wigan 70 Rules" as outlined on P164 March 1980 *Aeromodeller.* Many existing plan or kit designs fit these rules and the class is gaining popularity in the North so let's hope for a good turnout. More details and entry on the day.

PROGRAMME OF EVENTS

SATURDAY 24th MAY

Contests start 10am; Close 7pm; Fly Offs from 7.15pm.

A1 Glider – 5 flights x 2 minute max – 50m towline;
Coupe d'Hiver – 5 flights x 2 minutes max – 10 grams rubber;
1/2A Power – 5 flight x 2 minutes max – 7sec engine run;
Hand Launch Glider – 9 flights x 1 minute max – best 5 count;
CO_2 Duration – 6 flights x 2 minutes max – best 5 count;
CO_2 Scramble 5pm approx – highest accumulative score in 1 hour.

SUNDAY 25th MAY

Contests start 10am; Close 6.30pm; Fly Offs from 6.45pm.

Open Glider – 3 flights x 3 minutes max – 50m towline;
Open Rubber – 3 flights x 3 minutes max – unrestricted rules;
Open Power – 3 flights x 3 minutes max – 10sec engine run;
Tailless – 3 flights x 3 minutes max – Combined G/R/P;
Vintage – 3 flights x 3 minutes max – Pre 1951 designs;
Women's Cup – 3 flights x 3 minutes max – Combined G/R/P;
Frog Junior – 3 flights x 3 minutes max – Combined G/R/P;
Junior Kit Glider – 3 flights x 2 minutes max – 50m towline;
Junior Kit Rubber – 3 flights x 2 minutes max – unrestricted rubber;
HLG Scramble 5pm approx – highest accumulative score in 1 hour.

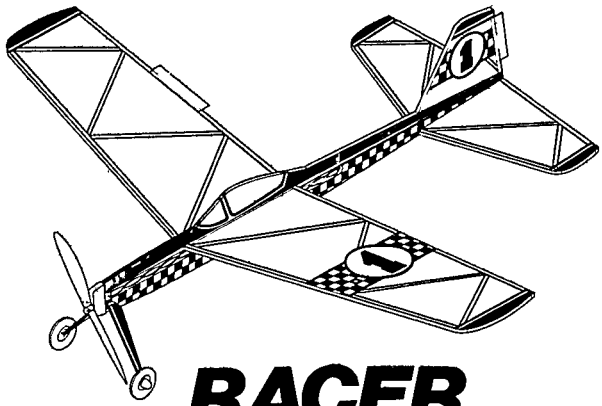
MONDAY 26th MAY

Contests start 9.00am; Close 4.30; Fly Offs 4.45pm.

F1A Glider – Round 1 9.00am – 5 flights x 3 minutes max;
F1B Rubber – Round 1 9.45am – 5 flights x 3 minutes max;
F1C Power – Round 1 9.45am – 5 flights x 3 minutes max.

Airfield to be cleared by 6.00pm.

NEW RUBBER POWERED MODELS



RACER

WINGSPAN 450mm (18")

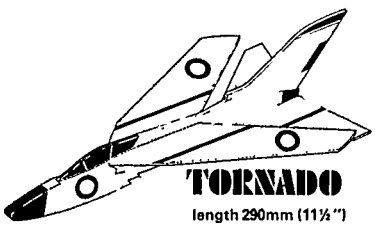
£1.99

RUBBER DURATION SERIES

Cessna 180

WINGSPAN 450mm (18")

£1.99

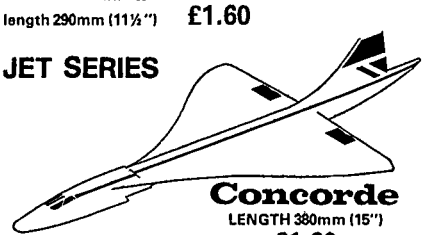


TORNADO

length 290mm (11½")

£1.60

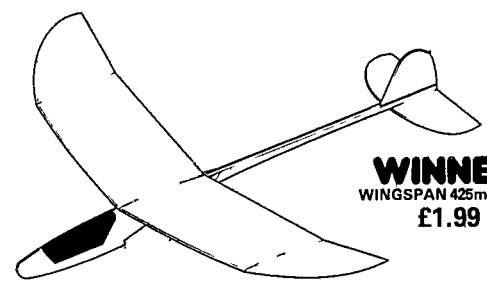
SUPER JET SERIES



Concorde

LENGTH 380mm (15")

£1.60



WINNER

WINGSPAN 425mm (17")

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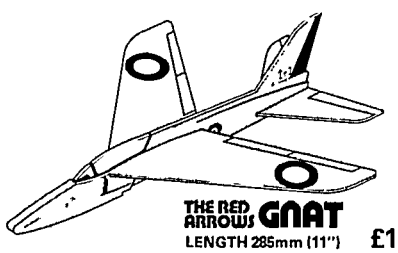
CATAPULT GLIDERS



THE RED ARROWS **GNAT**

LENGTH 285mm (11")

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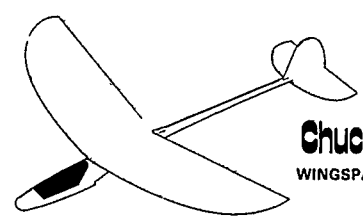

Chuckie £1.25

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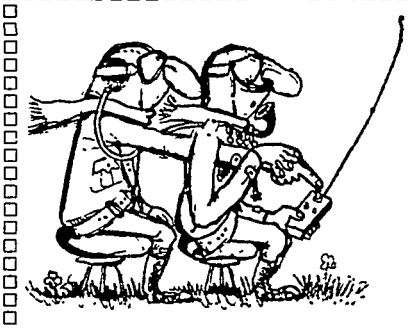
THIS MONTH:

R/C GLIDING SLOPE SOARING



R/C Sport Flyer

by Chris Pinchbeck

THIS MONTH is an R/C gliders only edition and we will first of all look at slope soaring, leaving flat field thermal soaring and power assisted gliding until next month.

It is comparatively easy to understand why a power model flies. It has a great noisy fan up front pulling it through the air at a great rate of knots, thereby ensuring sufficient air flow over the flying surfaces to produce lift. The model is literally pulled through the air, given a powerful enough engine, and it can be made to climb simply by using up elevator.

Let us now consider a glider, by contrast as it flies forwards it will always be flying downwards relative to the surrounding air, thanks to the pull this time from gravity. This may be called its 'rate of descent'. However, if the surrounding air is itself going upwards quicker than the model's 'rate of descent' then the model will gain altitude. Of course the converse is true, and downwards moving air produces 'sink', adding to the model's descent rate. Air may move upwards for several reasons but this month we are really only concerned with slope lift.

SLOPE LIFT

When air (wind) approaches a hill it must either go up over the top or round it. Our first requirement then is for a hill or slope which is long enough to ensure that the air is forced up and over the top. A smooth area in front of the slope ensures a smooth air flow and a flat area behind the top ensures both a good landing area and a smooth air flow with little or no turbulence. Fig. 1 illustrates air flow over different slope sections. There are, of course, innumerable variations on the themes but try for a smooth slope at least 100m high with flat ground, or sea, in front and smooth obstruction-free landing area behind.

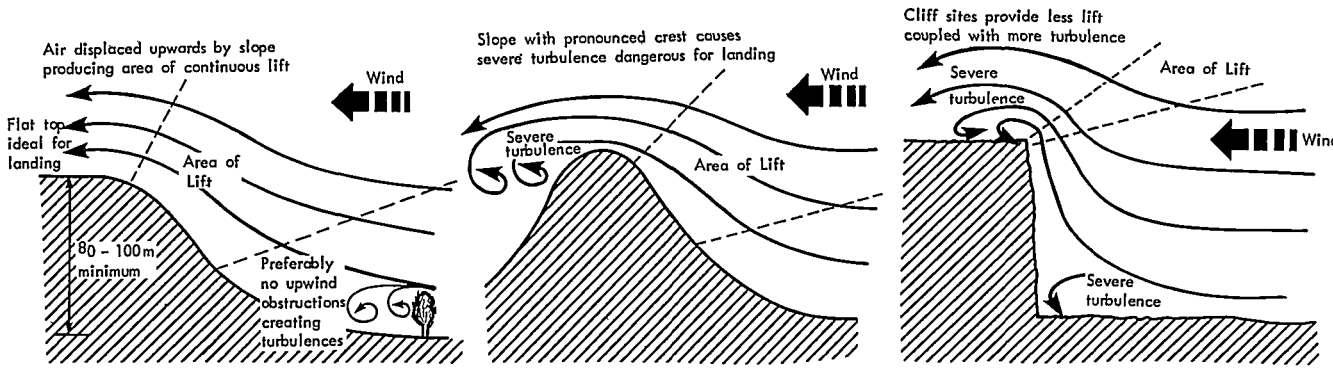
Now if the speed of the wind is faster than the natural forward speed of your glider in its normal 'rate of descent' mode, the model will of course appear to fly backwards! Remember it is being kept aloft by the lift from the flying surfaces which in turn is dependant upon the differential speed of air over and under the lifting surfaces. The ability of a glider to fly forwards in a strong wind is known as penetration. Penetration can be improved (up to a limit) by putting ballast into the glider. This normally takes the form of sheet lead *secured* at the centre of gravity so that the balance of the model is not displaced by the increase in weight. This has the effect of making the model fly through the air faster relative to the surrounding air and it therefore penetrates wind better.

But how do we actually make the model gain altitude? First and foremost, not simply by feeding in up elevator. All this will do is to put the tail down, destroy the essential air flow and create a stall. Try and think in terms of the elevator affecting the position of the tail rather than the nose and you will be a long way towards understanding what to do and what not to do in various situations. The elevator then makes the model pivot near the centre of gravity (I know it's not strictly true, but this is not meant to be a treatise on aerodynamics) which has the effect of altering the angle of wings to the air flow. So elevator is used to ensure that the lifting surfaces are always kept at the optimum 'angle of attack' to the surrounding air. If this is done, then the upwards moving air will take the model with it, provided of course that the 'rate of descent' is less than the upward 'slope lift' created by the air flowing up and over your hill.

PRE-FLIGHT CHECKS

Having completed your R/C glider, the comments made in last month's article concerning the importance of achieving the correct centre of gravity and checking radio installation for freedom of movement and correct response, must again be stressed. The essential difference is that whereas it is virtually impossible to test glide a power model, this check may be carried out with a glider. Choose a flat area, with longish grass if possible. Switch on, TX then RX, and facing into the wind, launch the model with a slightly nose down attitude from shoulder height. It

Fig. 1: Three types of slope soaring sites showing how the topography affects the airflow over the ridge.



Above: *judging the right wind strength for those first slope soaring flights can mean the difference between success and splintered balsa wood. For those without assistance or experience a wind meter can be used. This anemometer is available from Auto Temp Meter Co. Ltd., 140 Kings Cross Road, London.*

should have a gentle flat glide and land some 30 feet ahead of you. If the glider stalls, then pack up the leading edge of the tailplane using 1.5mm balsa sheet, or adjust the control cable clevis to give slight down elevator while the transmitter stick is still at neutral. Repeat the performance until a satisfactory glide angle is achieved. If the model dives on release then pack up the trailing edge, or adjust to give slight up elevator with transmitter set at neutral.

If the model tends to turn or bank, then check that the rudder is centralised. If all is well, carry out a careful examination of the flying surfaces to check for warps or twists. If any are found then they should be corrected by heating the part and twisting it an equivalent amount in the opposite direction. Heat can be applied either by steam or from exposure to a radiant electric fire. A slight turn in flight can be removed by adjusting the control cable clevis to give some opposite rudder to the turn until corrected.

Along with beginners to power flying, the tyro glider enthusiast will also benefit from the armchair flying described in last month's article. The main difference being that in turns rather less up elevator is required to hold the nose up and upon completion of a turn into the wind, there may be a tendency for a glider to rise up and stall due to an increase in flying speed from the turn, so be ready to feed in a touch of down. The main objective at this stage is to recognise, control and correct flying attitudes.

Before dashing out to the slope check equipment and model using as a guide the following list: MODEL 1. Radio fully charged, 2. Radio operates correctly, 3. Range check (25m with aerial down), 4. Visual check of airframe for damage. FIELD BOX 1. Transmitter, 2. Wing retaining bands and spares, 3. Tools – screwdriver(s), pliers etc., 4. Lead weights for ballasting, 5. Wind meter for slope soaring.

Above: *something definitely to avoid, those yawning gaps between fixed and movable surfaces can reduce control response to a dangerously low level. Any gaps should be reduced to a minimum by close fitting surfaces or sealed with flexible iron-on covering.*

Below: *two compact slope soarers for beginners, constructed for this series;* Left, *the Cambria* Capstan *and* below right, *the Edmonds Model Products* Apogee. *Both are stable aircraft for trainee pilots and are sufficiently rugged to absorb inevitable rough and tumble.*

The wind meter is not essential, but can be desirable for the beginner who is perhaps inexperienced in judging wind strengths and thereby the suitability for even attempting to fly. There are several commercially available types which only cost a few pounds.

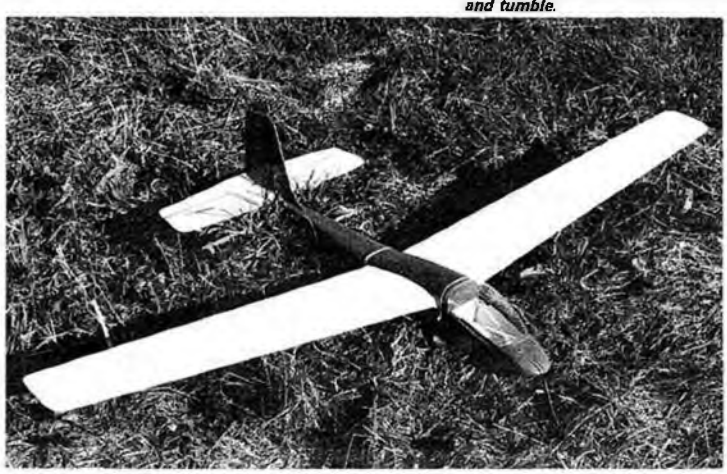
SLOPE SOARING

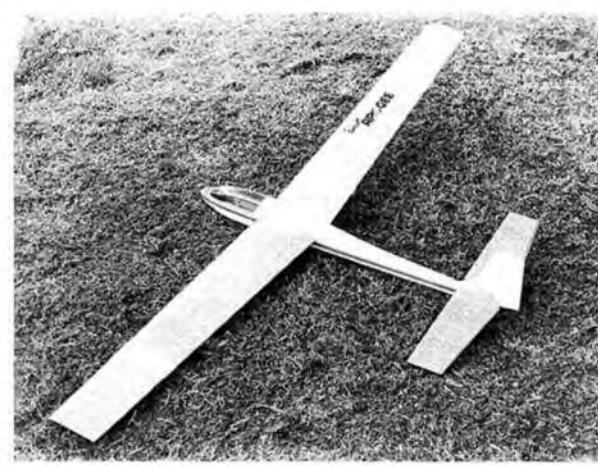
Apart from the model, the main requirement is obviously a good slope! Your local model shop should be able to put you in touch with a club or an individual who knows the local soaring sites and who will, with a bit of luck, be prepared to test fly your model and teach you to fly. Once again we stress that this is the best and safest entry to the hobby. For those who do not have this facility let us first of all consider how the model keeps up and secondly what type of slope to look for.

Choose the weather carefully for your first flights, a clear day with a 15–25kmph wind at right angles to the slope is ideal. Incidentally, remember your sun glasses. Not only will they prevent your eyes watering when facing the wind, but many good slopes face S.W or W into the prevailing wind and sun!

Arriving at the site you should check the proposed landing area for obstructions, and carefully plan a secondary or emergency landing area in case you get into difficulties. Always remember that as a last resort you can fly out and land in the fields (?) below. Too bad if it is a seaside slope – just hope the tide is coming in!

Assemble the model, check the radio then hold the model and face to wind. If the wind is strong enough to fly, you should feel the wings just trying to lift when you point the nose slightly up. Ideally you should have a helper to launch for you. If he is right handed, stand to his right so that you have an uninterrupted view of the model. He should position himself just below the brow of the slope and after checking the controls are working well tell





him clearly to launch. He should 'push' the model firmly out from the slope with the nose pointing slightly downwards. Be ready to immediately feed in down elevator to keep the nose down or the wind will get under the wing and blow the model back over the brow with disastrous results for the model. The model should continue to penetrate the wind flying straight out away from the slope and given sufficeint wind strength the model will ascend, but still with a slightly nose down attitude. Keep the glider pointing out from the slope until an altitude of perhaps 50m is achieved. Now comes the crunch; there is your pride and joy actually flying, but away from you. The first turn should be made about 50m out from the slope, in fact just a touch of rudder and the model should drift, rather than turn, parallel to the slope. Keep the nose pointing just away from the slope so that the model is 'crabbing' sideways. When the glider has gone far enough, perhaps 50m, make a proper 180° turn back parallel to the slope. Remember, ALWAYS TURN AWAY FROM THE SLOPE into wind. Until you become competent the only turn you should ever make towards the slope is on the landing approach, and even then there are ways of landing without doing this. Initiate the turn by feeding in some down elevator, to increase speed, neutralise elevator then put in rudder. As the model banks round, neutralise rudder and a touch of down elevator may be required to prevent the model climbing into a stall after the turn. Opposite rudder may be needed to bring the wings back horizontal, Fig. 2 shows a typical flight pattern. Repeat these turns back and forth across the face of the slope until you have completely mastered them and the control movements become automatic.

Practice landing approaches should be made at a safe height about 25m initially, by turning in towards the slope then making a second cross wind turn some 25m behind the brow before a final turn into wind. Watch the model closely, if the glider loses airspeed and looks unstable,

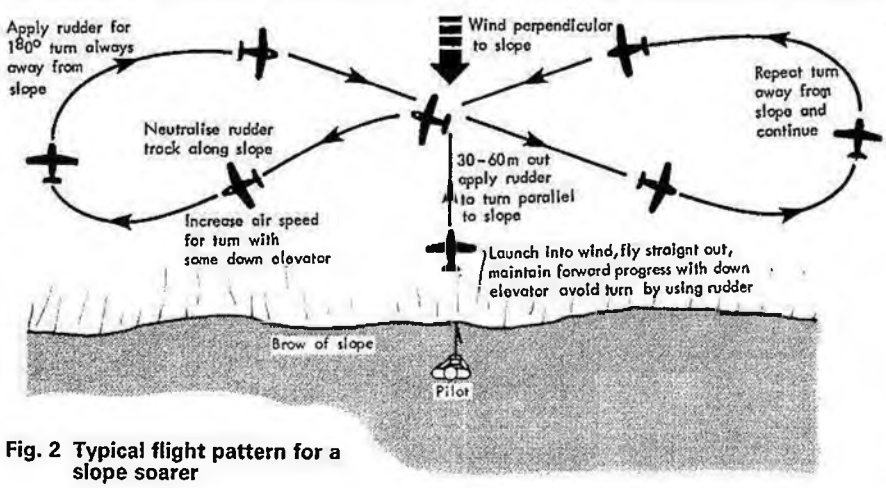
Pre-flight checks. Although RIC power models are generally too heavily loaded for useful test gliding, a pre-flight test glide over flat grass is a useful insurance before initial flights with a radio controlled glider. Keep the nose down at launch and make trim adjustments to overcome stalls, dives or turns so that ultimately the model flies itself straight and true.

feed in a little down to maintain speed or a stall will result. Also watch for any signs of turbulence which may cause a wing to drop suddenly. Practice these approaches, if the model is too high to land simply continue flying it back out off the slope and make another circuit until you are satisfied about the amount of lift and turbulence over the landing area. To actually land, simply repeat the approach, progressively a little lower each time. Just before the final touchdown feed in a little up elevator to reduce speed and lift until the glider is just about to stall, then feed in down elevator and hold it until the model comes to rest. This last precaution should prevent the model from lifting nose high into a stall or at best, back into flight. During the critical final approach to landing, ensure that the wings are kept horizontal to prevent the possibility of a cartwheel should one tip catch the ground.

The alternative method of landing needs more practice and can be more critical. You will note that dependant upon wind speed, when the model faces directly into wind it can be slowed right down, almost to a hover, by feeding in small amounts of up elevator. If the wind speed exceeds the model's stalling speed then the model will appear to have no relative ground speed, and still facing into wind the model can be allowed to be blown backwards over the brow of the slope. A touch more up elevator and the glider will tend to float backwards reducing height as she goes. To regain forward speed and lift, simply feed in more down elevator. With practice the glider can be landed using this technique but it would only be used when turbulence behind the slope edge is minimal.

So much for the first flight of your slope soarer. Landings inevitably are the most difficult part but provided the wings are kept level by use of rudder control, the risk of damage will be kept to a minimum.

NEXT MONTH: If you can't stand the draught at the top of those wind swept slopes, fear not – next month we venture down into the low lands and cover flat field Thermal Soaring, from towline and bungee launches or power assist.



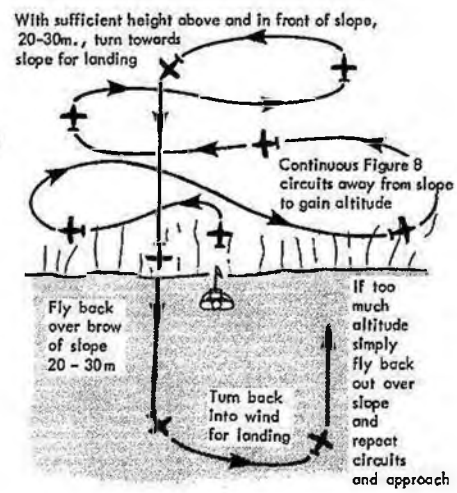


Fig. 2 Typical flight pattern for a slope soarer

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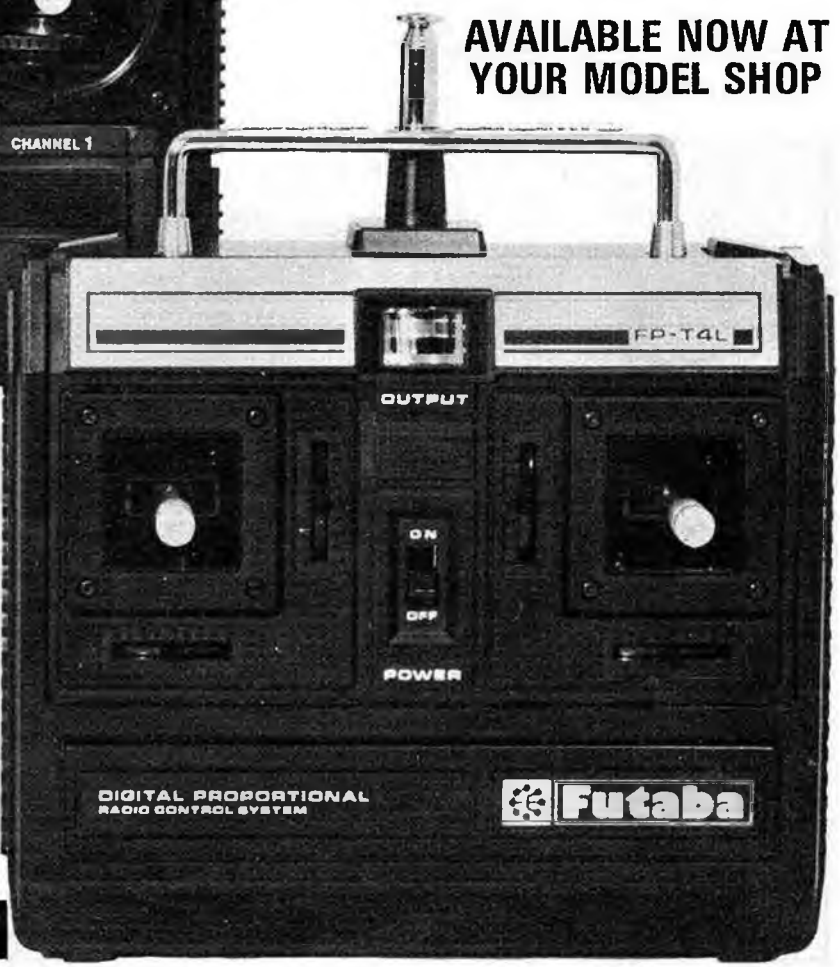

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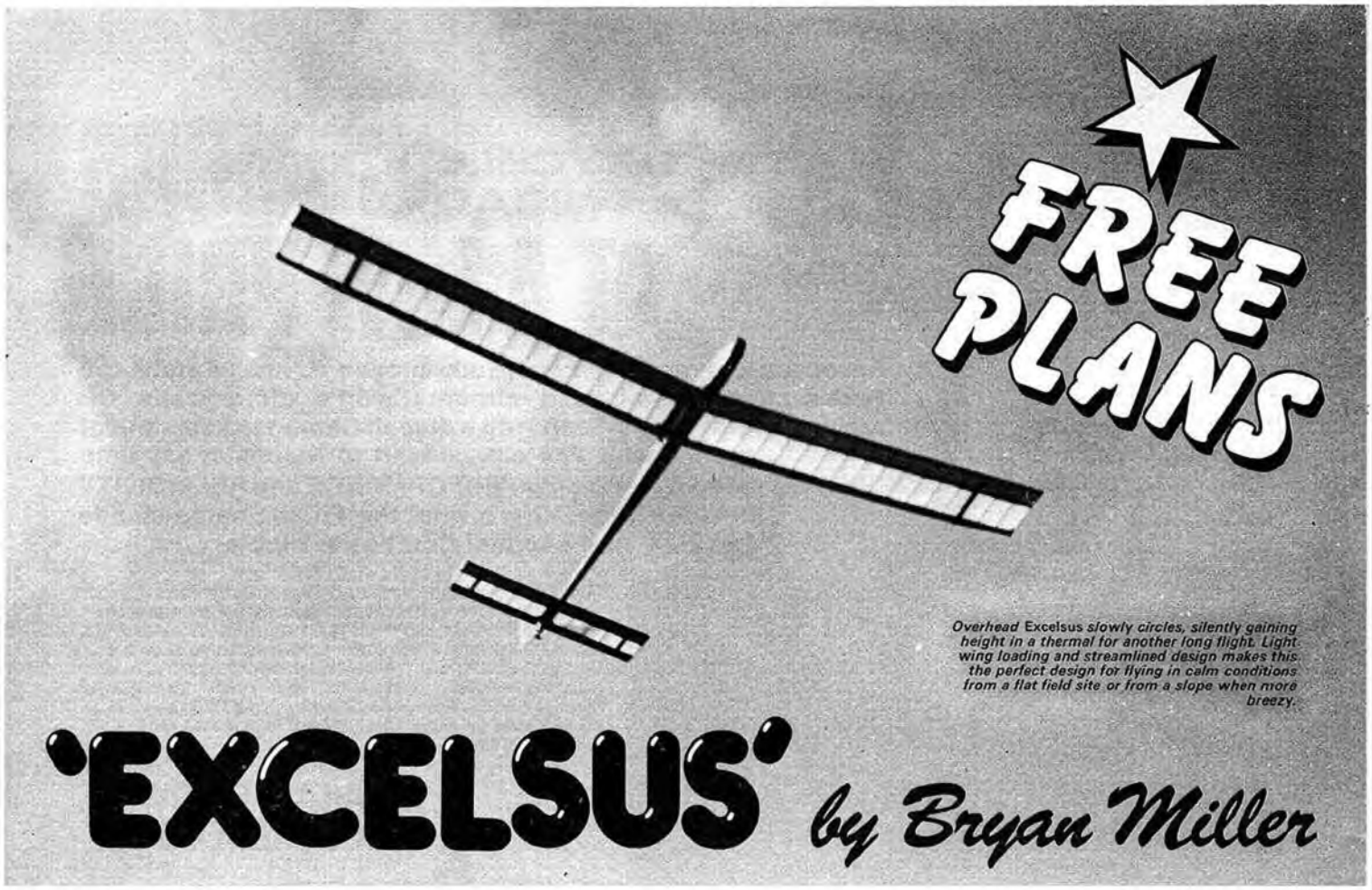
**Nicad Conversion is recommended when using these Servos. (The FD30M, 32M and 33M are low current drain types, suitable for Drycell Combos).*

FROM ALL RIPMAX STOCKISTS



Overhead Excelsus *slowly circles, silently gaining height in a thermal for another long flight. Light wing loading and streamlined design makes this the perfect design for flying in calm conditions from a flat field site or from a slope when more breezy.*

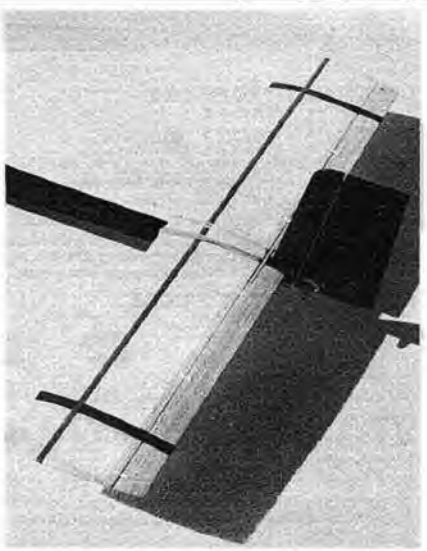
'EXCELSUS' by Bryan Miller

RADIO CONTROL GLIDER — 17

INEXPENSIVE R/C EQUIPMENT, which is now becoming readily available at amazingly low prices from retailers here in UK, now means that thousands of aeromodellers are discovering for the first time that they too can now afford to join in the fun of Radio Controlled flying. There can be no easier way of getting started, nor a safer type of model to learn the basics of control, than the rudder and elevator, 2 channel controlled R/C glider. *Excelsus* is such a model, and the average free flighter or control line enthusiast amongst our readership will have no problem either with the straightforward construction or the simplicity of trimming out the model. Sensible design which is economic on building materials means that you can literally start from scratch, purchase brand new R/C equipment and all the wood required to build our Free Plan — all for under £40! Need we say more?

Excelsus is a two channel soarer capable of superb performance in a light breeze or on a moderately windy day. It is economical and easy to build from standard 900mm length sheets of balsa. The low wing loading, approximately 15gm per dm sq, enables the model to keep flying when most others are grounded through lack of lift and yet it can still battle its way around in 25 kmph plus winds, penetrating thanks to its relatively thin, fast flying wing aerofoil section. Lightly loaded soarers can be flown from shallow and otherwise less suitable slopes and the small flight pattern obtainable with this 1700mm wing span model enables landings to be made on the tiniest of grass patches. The model embodies the most desirable features of a series of similar designs built and flown over the past two years.

The construction of the airframe, whilst employing traditional strip, rib and glue methods, should offer few difficulties even for the tyro to the art. Only sheet balsa need be purchased as all the strip wood required can be cut from such stock using a very sharp, stiff blade and a 900mm straight edge. Formers 1–4 may simply be widened as necessary to

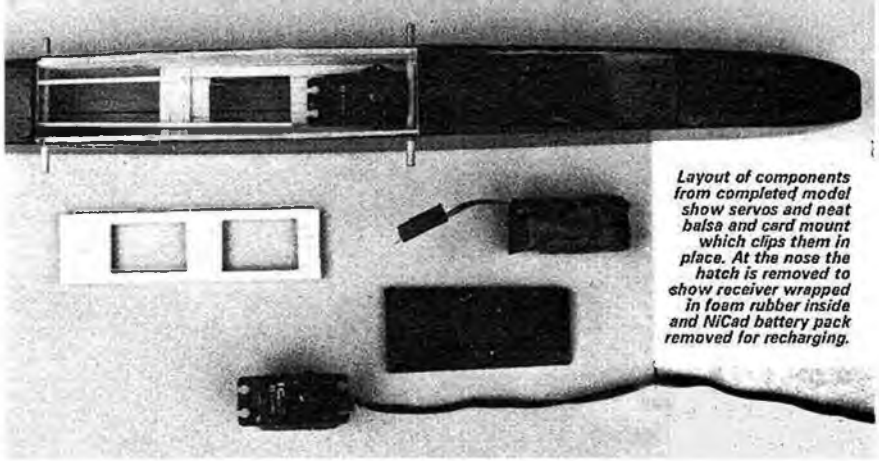


Close up of tail surfaces show tailplane strapped on with elastic bands passing through slot just in front of elevator. Generous rudder area makes the model easy to control at low speeds when making final landing approach.

accommodate more bulky radio equipment than illustrated on the plan. To facilitate curving the 1.5mm sheet fuselage bottom at the nose section, shallow cuts should be made across the grain; these cuts being filled with glue when the bottom sheet has been fixed in position. Alternatively, this front section can be sheeted cross grain. PVA glue is used throughout with the exception of the few plywood parts that are secured with impact adhesive.

The wing panels are built over the plan in the usual manner, do not add the lower main spars until the wings have been removed from the building board and the wing rod aluminium tubes have been installed and aligned. The tailplane is straightforward in construction and being a built up structure is more rigid and much lighter than a solid sheet of balsa.

The completed airframe is sanded and given one sealing coat of 50–50 dope and thinners before covering. No problems should be encountered if thinned PVA glue is used to attach heavyweight modelspan tissue to the undercamber of the ribs, decorators' cellulose paste can be used elsewhere. The tail plane and wings are covered with heavyweight modelspan tissue, the fuselage, fin post, rudder and elevator only need lightweight modelspan. The wings, tailplane and elevator then require three coats of 50–50 dope and thinners plus a few drops of castor oil used as a plasticizer. The covered fuselage, fin post and rudder are given one coat of thinned dope followed by two coats of colour finish or further coats of clear dope as required. The radio installation shown is perhaps a little unorthodox and merits an explanation. The servos are mounted without screws or rubber grommets, these two items are considered to be unnecessary in a lighweight glider of such size. As illustrated in the photographs and plan, the servos are carried in cut-outs in a 1.5mm sheet tray with thin card glued underneath to stiffen, this assembly then being glued to the fuselage sides. The servos are held in place by a further sheet plus card, and are secured with adhesive tape at the rear. Beefing up the servo installation is not recommended, this easy, light, speedy installation method provides adequate support in normal flying use, plus the advantage that it will spring apart during heavy landings or crashes thereby reducing the possibility of damage to the servos.



Layout of components from completed model show servos and neat balsa and card mount which clips them in place. At the nose the hatch is removed to show receiver wrapped in foam rubber inside and NiCad battery pack removed for recharging.

To avoid the possibility of having to add an unreasonable amount of weight to the nose to achieve the correct balance, the tailplane, fin and rear of the fuselage should be as light in weight as possible, coupled with adequate strength. To further this aim, the servos are shown connected to the rudder and elevator by lengths of 24swg music wire within fine bore plastic tubing. The wires should be an easy sliding fit. If necessary, a simple kink in the wire will facilitate adjustment to the control surfaces. Commercial flexible plastic control cables fitted with screw adjusting devices may be used, but should be the lightest available.

The original *Excelsus* had 225mAH *Deac* cells for the receiver and servos which provide 1½ hours flying time. A back up set of batteries taken flying will extend flying if so required.

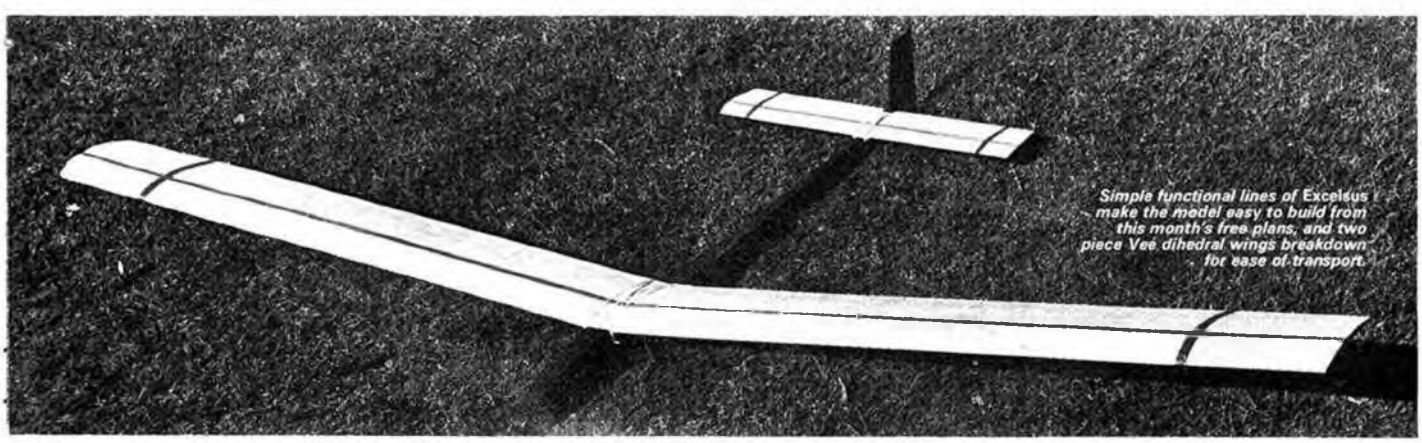
The receiver aerial is carried within the fuselage and no problems have been encountered. The aerial may be pulled through with the use of a needle and thread inserted into a 1.5mm dia hole made near to the rear end of the fuselage. When the aerial is drawn through it is held in place by a short piece of self adhesive tape wrapped over the protruding end of the wire.

Balance the model carefully where indicated on the plan, it is better to add further weight in the form of glass fibre reinforcement to the battery/receiver compartment rather than resorting to lead weights. The original aircraft weighs 400 grams, but there is obviously lee way here for heavier equipment or 'heavy' builders. A large throw on the rudder is useful, 45° each way, but the elevator movement need only be small, say 15° each way, but neither is critical.

00mm SPAN FOR 2 CHANNELS

Excelsus is not intended to be an aerobatic model and although loops, stall turns and spins are possible, the model is at its best thermaling in a gentle breeze, floating gracefully upwards in lift.

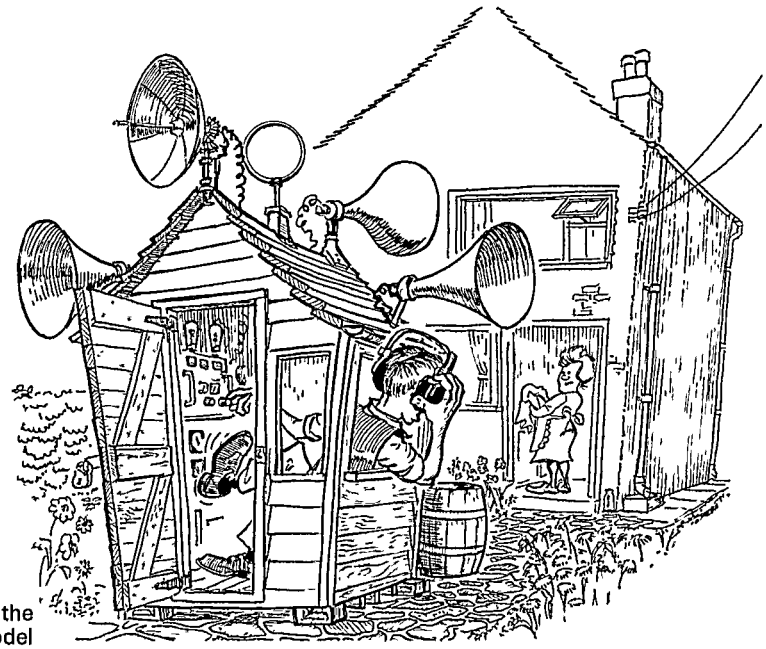
For readers who do not live within easy reach of a suitable slope soaring site, *Excelsus* can be fitted with a tow hook and used with a light bungee or tow line for flat field flying where once again its light wing loading and superb glide make it an ideal choice.



Simple functional lines of Excelsus make the model easy to build from this month's free plans, and two piece Vee dihedral wings breakdown for ease of transport.

TOPICAL TWISTS

by Pylonius
illustrated by Sherry



"RING THE COUNCIL, EMMA, THEY'RE FLYING THOSE MODEL PLANES AGAIN"

SILENT WITNESS

You would have thought that with the general adoption of the legally prescribed noise limits and the clearance of the model engine from the urban open spaces that the apoplectic colonel and the angry resident would be resting on their laurels, soothed no doubt by the cooing of the jet overhead and the friendly rumble of the juggernaut outside the front door. But, far from it, the boosted up hearing aids and sound detector equipment still scans the environment for any hint of an alien noise – and its not UFOs they're after.

Such thoughts occurred to me, upon reading of 'silent day' fixtures on a highly countrified flying venue. I always considered how lucky the local radio club was to have a no noise problem at this site, for their engines could be only faintly heard on the far side of the drome, but I must have underestimated the sensitivity of the human ear. It may well be that the sound goes beyond the upper limits of my audial receptors, and that the complainants against model noise are, like our canine friends, attuned to a higher accoustic range.

It could be, though, that it is not noise in general that people object to, but to unfamiliar sounds, even silence. It's like the neighbours who can't get to sleep because the do-it-yourself fanatic next door has taken the night off. No doubt if you were to fly a power model plane anywhere near London Airport the residents would come out of their jet-noise shattered houses to furiously complain, although a non-resident wouldn't be able to hear anything above the noise of the jets.

In the area of complaints about noise it is the will of the minority which prevails, for the majority of people just can't distinguish between the sound of a model plane and other extraneous noises – and wouldn't much worry if they could.

A LONG STRETCH

If anyone could have foreseen the way the model plane was to develop from a more or less stringless kite to the compact piece of machinery and electronics that it is today, one thing he would be undoubtedly sure of and that is that the primitive means of propulsion, the twisting of rubber strip, would be just a nostalgic memory, as outdated as a horse and cart at the Silverstone Grand Prix.

What then is the peculiar attraction of this archaic form of propulsion? Well, its not the simplicity of it: the techniques and intricacies of rubber power flying are just as advanced as anything else; just look at the mechanics of a top level Wakefield (enough to make us ordinary duffers take up stamp collecting). Nor is it a question of economy: rubber strip, if not on the gold standard, is certainly giving the old fool's dross some pretty stiff competition, weight for weight, particularly if you take into account the wastage factor, sometimes as high as one motor per flight.

I put the continuing popularity of the rubber motor down to sheer human perversity. As a means of propulsion nothing is more inefficient and inconsistent, CO_2 excepted. Its all one big burst at the start and a slow fizzle out, like a bottle of dud champagne. And if that hank of imported stuff does have a bit more life in it than a pair of old bootlaces, you might be sure it snaps quicker than a starving crocodile, and these days, might be much the same colour. Moreover, it has a way of twisting up the integrity of any airframe it powers, making it a near certainty that you will finish with a heap of matchwood unless you are lucky enough to get the flying surfaces warps in the right places.

And what gives rise to these profound thoughts? Only reading a published letter about the gearing down of a rubber motor, or it might be gearing up. Anyway, it must be a dead loss, for the hopes of linking up a reasonable sized, normal looking propeller to a rubber motor died a miserable death way back in the thirties. The only thing that works with a rubber motor is a dirty big paddle prop which looks so highly ridiculous on the rubber scale models some masochists still insist on tackling.

Still, its a great tenser upp-er and test of nerve to pile on those turns – just one short of breaking point. It separates the men from the boys – call me 'sonny'.

SHEER GRIT

"As soon as anyone had made his flight he was cooled down, watered and got into the shade . . ."

Had it not been for the 'anyone' we could have taken this extract to refer to the care and preservation of a rare species of bird life, inevitably threatened with extinction. But, would we be so mistaken? For the reference is to that rara avis, the free flight competitor, operating in his new found habitat, the desert. After all, he has been under threat longer than most species, and is now eking out a tenuous existance in the scorching desert, surviving only by special life supporting systems.

But what else does the desert have to offer to make survival worthwhile except miles and miles of open, unhindered, unobstacled stretches of fine grit. Had it been of use to anyone but rats, rattlesnakes and scorpions it would have been closed off to model flying years ago. Even so, it has one big drawback, or you could say, draw-up, from a model contesting point of view. I refer to the colossal thermals cooked on the frying pan surface by the solar heating device up above. Well, you would think it a drawback considering the trouble they used to go to years ago to escape the dreaded comp clobbering thermal, like holding the Wakefield on a frozen lake at dawn, or colder still, on an English airfield at 6am.

Considering that success or otherwise hinges like Judge Jefferies on a big hang up, you would think that the hyper-thermal and its equally hyper downdraught would be avoided like the plague instead of being hunted down in the remoter regions of the earth.

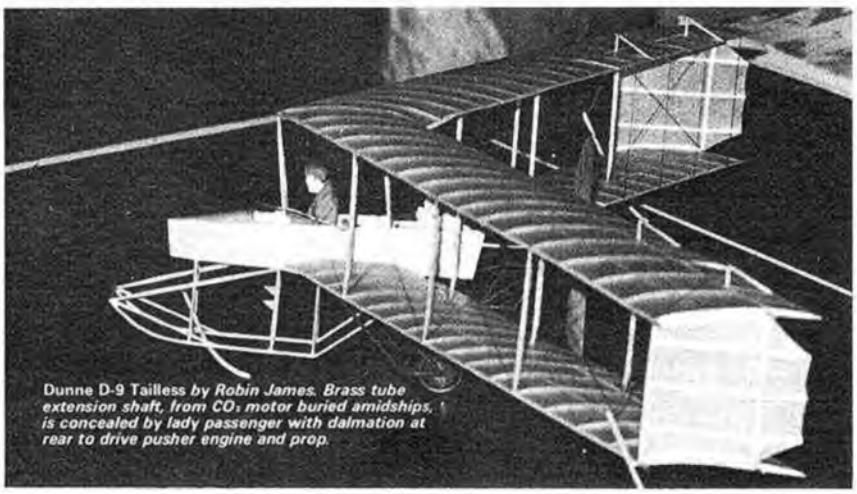
SCALE MATTERS

by Alan Callaghan

CRAWLEY INDOOR SCALE
February 10th, 1980

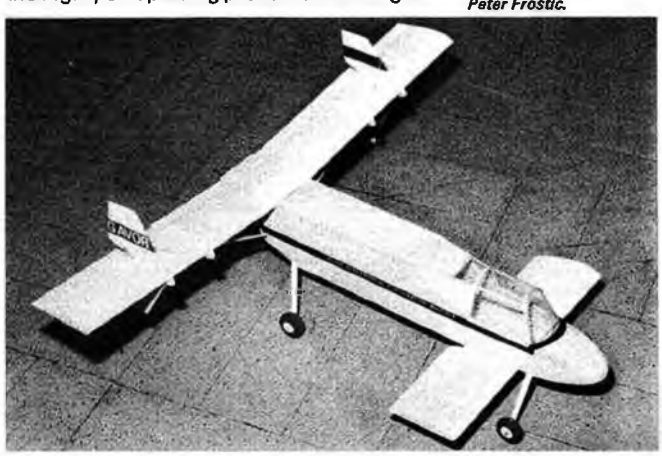
The annual indoor meeting held at Crawley Sports Centre once again turned out to be a very enjoyable day's flying, with the usual mixture of CO_2, Peanut, and Open Rubber Scale blending quite happily with the other duration classes. I came away with the impression that attendance was down compared with previous years but I could be wrong, and it may have been due to good flying discipline and not too many free-for-all sessions. Each class flown had its own time slot of one hour or so, and during the flying of CO_2 models the floor was kept clear for only one or two models to be flown at any given time. This is a very good arrangement in a hall of this size (app. 120ft x 120ft x 35ft). I did not fly any scale models myself, preferring to try and do some photography during the scale sessions. Anyone familiar with the Crawley Hall will appreciate the completely smooth, fully glazed illuminated ceiling which gives a thoroughly consistent light level that is ideal for photographing indoor model flying activities. Even movie filming with 160 ASA colour film is quite successful without any additional lighting.

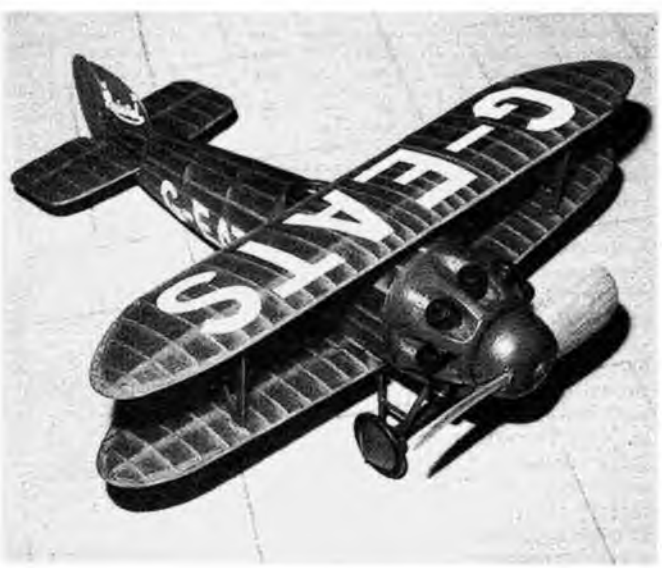
To return to the scale models, once again I am spoilt for choice in making a selection to report on, and standards seem to improve all the time. The most ambitious new model to be seen was a *Dunne D-9 Tailless* biplane by Robin James, entered in CO_2 Scale. The model was very highly detailed with spoked wheels, working suspension and was fully rigged. The CO_2 motor was fitted about halfway along the length of the fuselage, with an extension shaft running back to the pusher prop, and the tank mounted in the nose for ballast. Whether it was due to the shaft arrangement or a poor motor was not clear but Robin was unable to make the thing run well enough to put in a good sustained flight. A very powerful motor is needed on this type of model to overcome the great amount of drag from all the rigging wires alone. As the model tried to rotate on lift-off, the tip skids on the highly swept wing prevented the angle of attack from increasing further and the model was bobbed back onto its nose skids. A hand launch attempt damaged the complex front skid arrangement – again seemingly due to lack of power, and the model was retired for repair. Hopefully the bugs will be sorted out for a future occasion; the model certainly looked superb in its natural linen colour and the lady passenger with the dalmation poised upon her knee seemed quite unperturbed by it all.



Dunne D-9 Tailless by Robin James. Brass tube extension shaft, from CO_2 motor buried amidships, is concealed by lady passenger with dalmation at rear to drive pusher engine and prop.

Almost as unusual but in Peanut Scale was a new *Lockspeiser LDA. 1 Canard* by Peter Frostick. To test the feasibility of this subject Peter had made a very quick model from foam before building the accurate scale version. The foam model turned out to be an excellent performer, indoors or out, returning flight times of





Right: Bristol Bullet Racer by Roy Ashby from Rochester has extremely attractive finish in red Japanese tissue.

Below: Unusual Lockspeiser Canard by Peter Frostic.

around 50 seconds or so. Unfortunately the fully detailed one is proving to be more of a handful even though they are roughly the same weight. Peter is treading on completely new ground as far as trimming techniques go with this one, since normal method and tricks don't work. The foam model did not have an undercarriage so perhaps the four legs and wheels are having an extreme effect on stability on the built-up version. Undaunted, a new lighter model is to be made, since the potential does seem to be there.

Another unusual Peanut subject was a *Bristol Bullet Racer* by Roy Ashby from Rochester. This extremely attractive bright red/white model is modelled on the version featured on the back cover of *The Speed Seekers* book by Thomas Foxworth which deals in great depth with early Racing aircraft that took part in the Schneider Trophy, Gordon Bennett, Pulitzer, and Curtiss Marine Flying Trophy races, amongst others. Roy's model was new and untrimmed but nicely made and a very original subject.

Winner of CO_2 and Peanut Scale, Butch Hadland, was showing but not flying another *Bristol*, this time the *1911 Racing Biplane* for CO_2. Having already produced a Peanut Scale model of this type with its quite enormous tailplane, Butch scaled the *Racer* up for a Brown Junior motor and Fulton Hungerford wheels. This superb model was built in just over a fortnight and weighs only 30gms for its 450mm span.

Although the top contest placings in all three events went to well-known and tried models, it is encouraging to see new models of such interesting types still making appearances. Make a date for January 1981 to attend this meeting!

Results

		Static	Flying	Total
CO_2 SCALE (6 entries)				
1. C. Hadland	*Mr. Mulligan*	90	80	170
2. P. Cameron	*Piper Cruiser*	55	45	100
3. R. James	*Dunne Tailless*	96	–	96
Best Junior				
C. Parkinson	*Little Dipper*	35	25	60
PEANUT (21 entries)				
1. C. Hadland	*Lacey*	131	117	248
2. L. Barr	*Fike*	117	114	231
3. R. Oldridge	*Isaacs Fury*	119	101	220
RUBBER (5 entries)				
1. N. Pepplatt	*Mustang*	50	40	90
2. P. Cameron	*Baby Ace*	55	10	65
3. A. Sweetland	*Tiger Moth*	40	10	50

NE AREA INDOOR MEETING – Spennymore, 2.3.80

byJeff Anderson

A number of new models appeared at the meeting, notably Walt Mooney's *Upton Baby Ace* (see p. 349 June '79 *Aeromodeller*) which was being proxy flown by Bill Colling. Two Whitfield fliers, John O'Donnell and Steve Philpott, flew their well-known models the *Antoinette* and *Fike*; both flew very well but fared rather badly in Static. The winner of Static judging was Jeff Anderson with his *Wittman Tailwind* which still resisted all efforts to make it take off, but it does taxi beautifully! But as so often happens, a model with consistent all-round performance was to come out

Below: *Second place in Peanut at the Debdenaires Indoor meeting went to 1950 Gold Trophy winner Brian Hewitt flying this neat* Farman Moustique.

Above: 1911 Bristol Racer *450mm span by Butch Hadland powered by Brown Junior CO_2 motor uses Fulton Hungerford wheels, weighs 30 grams.*

on top and Paul Street eventually won with a *Supermarine Sparrow* closely followed by the *Fike* and *Tailwind*. We were pleased to see a number of new models being flown for the first time in the contest by beginners and juniors; most of these showed considerable potential.

Results – Peanut Scale

1. P. Street	(Sunderland)	*Supermarine Sparrow*	7½ pts.
2. J. O'Donnell	(Whitefield)	*Fike E.*	10⅝ pts.
3. J. Anderson	(Tynemouth)	*Wittman Tailwind*	12½ pts.
4. Walt Mooney	(USA (Proxy Colling))	*Upton Baby Ace*	13 pts.
5. S. Philpott	(Whitefield)	*Antoinette*	13 pts.

PEANUT GRAND PRIX

Big news for indoor fans in 1980 is the staging of the World Indoor Champs at West Baden, Indiana, and the programme of events now being organised includes a day set aside for Peanut Scale Models. A fantastic combination of events lasting from June 20th-28th, starts with practice and contest days for the F1D Championships, followed by all five classes of Peanut Scale flying on June 25th with the NIMAS Annual Record Trials for every single type of indoor model from June 26th-28th.

Contest director for the Peanut Grand Prix is Britain's Butch Hadland, entry is $5 plus $1 for each additional model entered, and proxy entries are encouraged. For additional information regarding the meeting write to Doc Martin, MAIMA Club, 3227 Darwin St., Miami, Florida 33133, USA and to arrange proxy entry write to Mike Arak, Proxy Chairman, 10900, SW 61st Ct., Miami, Florida 33156.

A supporter or competitor package deal is available which provides accommodation on campus adjacent to the flying site with full meals, at $100 up to the F1D Banquet on June 24th and less than $100 for the remaining days up to June 28th to cover the other events. So far, at least 12 countries are expected to attend the Champs and you can bet most will stay on for the Peanut and VNART days, so why not make the trip and join in the World's greatest indoor gathering.

Lorraine Patchette displays John O'Donnell's peanut scale Fike *flown at Spennymore, model has won three second places so far – a good flyer but beaten "on the ground" each time!*

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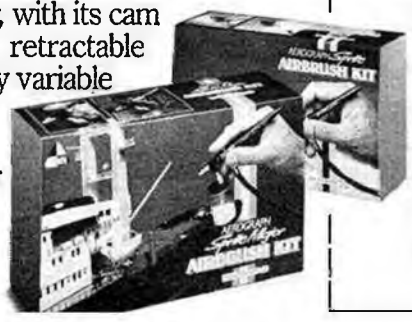

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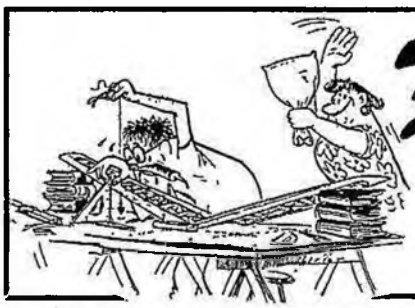
Dave Hipperson reports....



Free Flight Scene

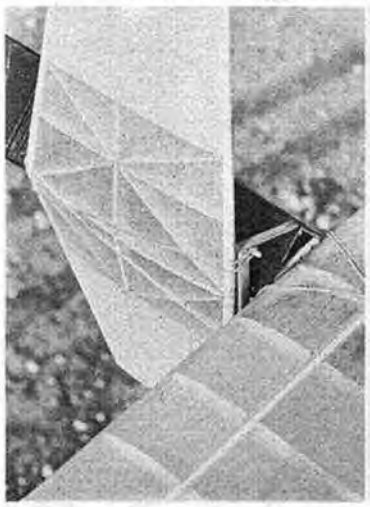
PHIL BALL'S 1979 OPEN RUBBER MODEL

Towards the end of the '79 season – certainly from the Nationals onwards – Open Rubber was dominated by one man, even if the rest of us didn't want to admit it at the time! Looking at the results now with hindsight, this becomes even more apparent.

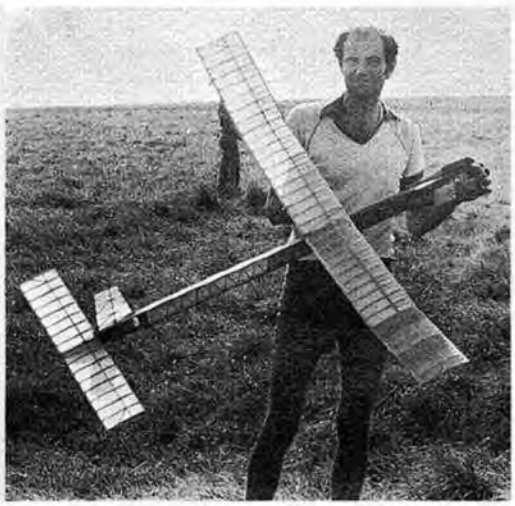
It is interesting to learn that Phil designed this larger than usual model from the same premise that prompted my suggestions in *Aeromodeller* April 79 and incidentally three months beforehand! My theory was, that surely a light model with conventional power but bigger wing and cleaner lines would be capable of 10 minutes, from what we already knew was possible from the larger Coupes. Phil came to the same conclusions, but ultimate size was restricted by his existing model box dimensions!

The model's first airing was the Feb '79 Crookham Gala where it was trimmed on the competition flights. Phil admits that his casual attitude to the contest necessitated his re-entering twice but a final 6.50 in the fly-off looked promising. After damage at the Easter Two Day Meeting, when it struck the side of a van, a smaller reserve was used in the fly-off. The repaired model was only partially retrimmed minutes before the Nats fly-off and then 'risked' on full turns. At Odiham it climbed into fog and disappeared along with most of the other models, and therefore the recorded time bears no relation to what it actually did. I saw it land, and as far as distance was concerned it would probably have only been 5 minutes plus, but I believe he ran turns off the motor before launching.

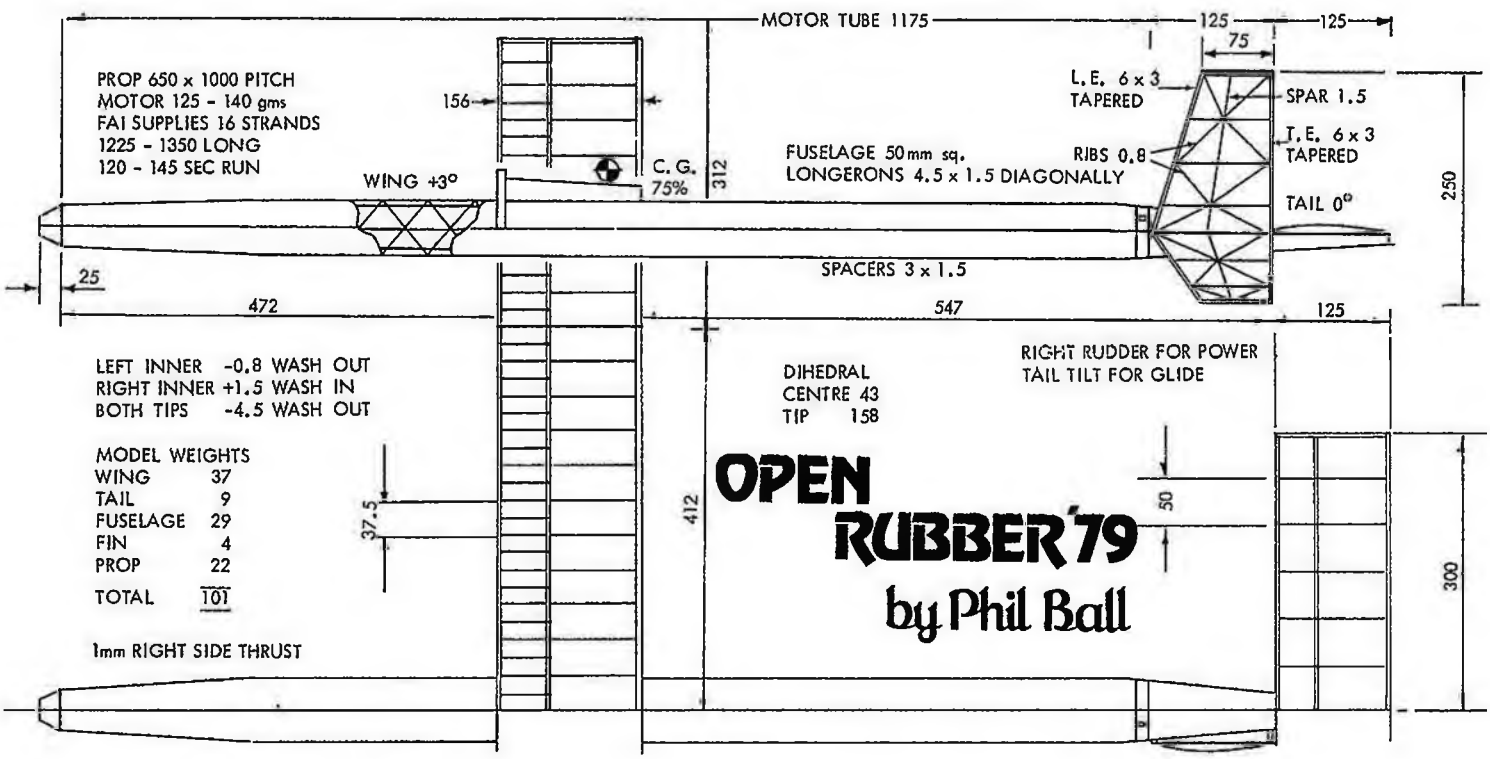
The model stalled towards the end of the climb in the fly-off at the Autumn Two Day Meeting where it was beaten by Peers although both models were reckoned to be in lift. It was at the Farrow fly-off that things got interesting again as a slight increase in rubber was tried and the model did 8.20 in what the organisation that day described as liftless conditions! As a fitting finale to the



Detail of unusual fin mounting, which is elastic banded onto mounts like a vertical tailplane, to ease transport.



Phil with his highly successful Open Rubber model which helped him win eight 1sts, three 2nds and three 3rds, more F1F events than any other flyer in 1979.



Right: *Stephen Philpott* (Whitefield) *launching CO_2 powered Very High Thrust Line model, which uses Humbrol motor on this pusher version.*

Replica of Norman Blacklock's 1940 Gutteridge Trophy winner launched by John Blagg of St Albans at '79 Jubillee Wake event (built from APS Plans No. D/138X price £2.05 inc P&P).

Peter Michelle launches model of Bob Copland's multi-stringered fuselage Wakefield, also at Bob Wells' Watton Wakefield Jubilee contest. Plans for this design, first published in December 1946, are still available, No. D/121X price £2.05 inc P&P.

year the model was used on the important last two flights of the six-flight Open Rubber Trophy in October which attracted a larger 'active' entry than any Open Rubber event of the year. His total was made up from 20 minutes of increasing maxes plus a superb 6.53 at the end of the day just before the light went completely.

The wing is 23.25dm sq and sensible aspect ratio allows a very light 37 grammes for this component. Otherwise the model is conventional apart from prop and fin. The fin is completely detachable and straps onto the side of the fuselage á la *Predator* – very neat. The prop is 650 dia by a staggering 1000 pitch. This allows a 2.00–2.30 run to be extracted from a thick but none too long motor and hence retains a sensible length fuselage. This is of the established light diagonal longeron construction and is only 50mm square from presumably drag rather than visability considerations.

Usual motor is 125 grams (4½oz) arranged to about 1500mm long which makes up to 16 strands when FAI Supplies rubber is used and 18 strands when the thinner Dowsett Pirelli is used. However in the Farrow fly-off 140grams (5oz) of 'used' Dowsett Pirelli was made up into 120 strands 1600mm long!

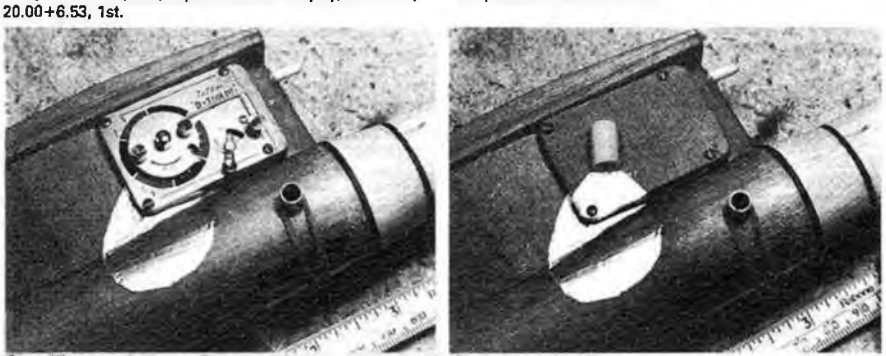
Phil points out that to reduce airframe weight any further would make the model difficult to handle. Already paper and dope are responsible for 40% of its weight so where do you start? An all up weight without rubber of 100 grams would appear a very reasonable compromise and mine, which are admittedly not such a large wing area, are similar.

I have watched the model on a number of occasions now – it climbs quite slowly – no apparent burst. However it continues to climb steadily for at least 2 minutes and at a constant speed. Its glide is extraordinary and for this reason capable of using lift most models fly through – this is where it really gains. Its only limitation seems to be that with such a high pitch prop the static thrust is low and power stall recovery is hesitant but as yet not disastrous. If you want an advantage in the calm Open Rubber fly-offs of 1980 build a model like this!

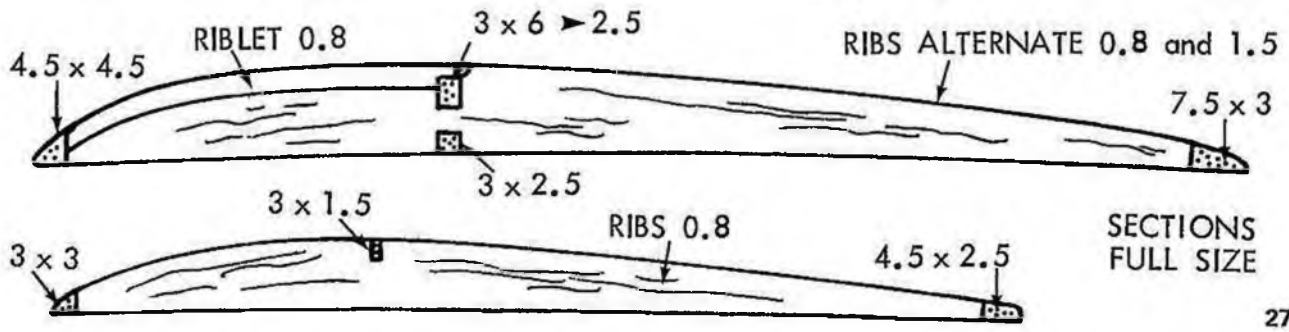
Phil Ball's Open Rubber Contest Record 1979:
Crookham Gala, Feb 25th, 9.00+6.50, 3rd: 1st Area, March 18th, 9.00+5.03, 9th (one blade off!); SMAE 2 Day, April 15th 9.00+6.21, 2nd (small model); Nationals, Aug 26th, 9.00+7.07, 1st; Odiham, Sept 23rd, 9.00+1.37, 7th; SMAE 2 Day, Sept 29th, 9.00+7.22, 2nd; Northern Gala, 9.00+4.53, 4th (small model); Farrow Shield, Oct 14th, 9.00+8.20, 1st; Open Rubber Trophy, Oct 21st, 20.00+6.53, 1st.

100/80 gram Coupe

The photos show a dual purpose 100/80 gram Coupe d'Hiver arrangement. It is no joke building my APS of 200 sq inch Artoo down to 75 grams odd so that a DT timer can be used to bring it up to 100 grams but it can be done. However it seemed a waste to build a model for only one contest a year so the timer was sited under the CG and a 1/16 ply plate made up to replace it. The plate is complete with snuffer tube and small ballast weight on the rear so when it replaces the timer the model conforms to the 80 gram rule. The burn through band is looped into the wire ring which normally hooks onto the timer and then attached at the other end to the front wing dowels as per usual for an Artoo.



Dave Hipperson's Coupe timer installation – Now you see it, now you don't!



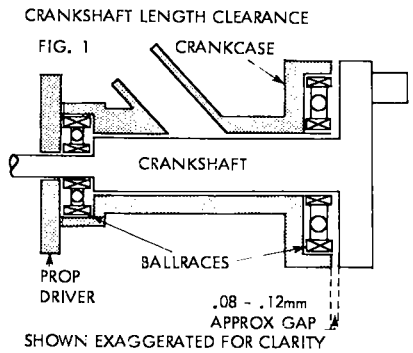
Bob Bailey reports....

ENGINE PREPARATION

The performance of high speed model engines varies considerably (by anything up to 30%) from one specimen to the next even for the same make and type. This statement is not news to regular contest power flyers but may possibly surprise a few others. What, they may ask, are they paying fifty quid or more for? The answer is the research and development over a large number of years for the basic product. Why do individual motors vary? The reason is, that individual fits between, for example, the piston and cylinder vary from one motor to another. This article sets out to give some guidelines on how to improve the life and performance of your motor. You will notice that the work is devoted almost entirely on how to improve the basic fits.

Much of the following information is by courtesy of Don Jehlik's article in January 78 *Model Aviation.* Don, with his team partner, Herb Stockton, won the Team Race World Championships in 1966 and 1968, so should know what he is talking about with regard to engines.

Undoubtedly the best time to prepare an engine is whilst it is brand new and has not been run. It is not uncommon to find bits of dirt and metal inside which will do your motor a power of no good!



If there are any instructions on how to disassemble your motor, read them first. Secondly make sure that you have screwdrivers and spanners which fit everything properly. In addition, needle-nose pliers, tweezers and Swiss files are very handy. Other items needed are (1) Solvent – Don recommends a 50–50 mixture of paint thinner e.g. turps and lacquer thinner, (2) wet and dry emery of 320 and 600 grit, (3) an old toothbrush and a soft small brush, (4) car rubbing compound – I think *T Cut* should suit. Don't use grinding paste – its far too coarse and rouge is rather too fine, (5) 3-in-1 oil.

Don recommends the following procedure in disassembly:

Prepare a clean white surface and work under a strong light. First remove the glow plug and turn the engine over slowly to feel for internal resistance. If it occurs, note where in terms of the piston in the cylinder stroke cycle.

Next remove the rear backplate cover, repeat, noting any drag, put on a prop and tighten up normally. Note any drag on turning over. Now if appropriate, remove the cylinder head by loosening opposite screws a little all the way round, then unscrew completely. On Rossi 15s the cylinder head has to come off to remove the plug.

What has been done so far will indicate whether distortion of any part, particularly the crankcase, is taking place when the head and backplate are put on. Putting on a propeller will indicate whether the ballraces for the crankshaft are properly lined up.

The usual next step is to remove the cylinder from the crankcase and slide the con-rod off the crankpin, thereby allowing the piston to be withdrawn from the top of the crankcase. Before final disassembly, rotate the crankshaft again for signs of drag and note.

CLEANING

Clean all parts thoroughly in the 50–50 cleaner. The old toothbrush should reach all corners and cracks. Ball bearings require special care. Try soaking the housing without removing the bearings. The object is to remove all dried oil residue from every part of the bearings – many engines have worn flats on the balls because they could not rotate freely in the races. If the bearings cannot be completely freed, remove from the housings by heating in an oven to 325°F. This should allow the bearings to be tapped out – very gently – using a wood dowel. Complete cleaning until each bearing spins freely. Be meticulous and clean each part perfectly – this is where the strong light comes in.

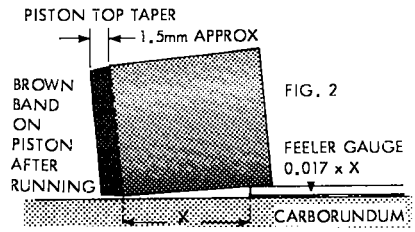
INSPECTION AND PREPARATION

Do not oil the parts; the residue from the paint thinner is a light oil which protects them from rusting.

CRANKSHAFT

Re-install the crankshaft in front housing, tighten the prop and turn carefully. If the shaft is not perfectly free there are several possible problems.

a. Crankshaft plain bearing (between the ballraces) is tight. Remove ballraces, put some rubbing compound on the shaft, insert in the bearing and rotate by hand or with an electric drill. Thoroughly clean and examine the bearing to see where the high spots are polished. Continue with compound until the housing has a uniform matt finish.
b. Ballraces may not be correctly seated. Make sure the ballraces are a free fit on the crankshaft. If not, spin the crankshaft in an electric drill and use 600 grit emery paper to achieve a proper fit. Tighten the prop then spin it. There should be a small amount of clearance at the rear of the crankshaft. This should be about 0.075mm (see Figure 1). If you don't get this play, heat the housing to 375°F and ensure that (1) the rear ballrace is fully forward in the housing (use the crankshaft to push the ballrace forward) and (2) with shaft in rear bearing, slide front bearing back to rearmost position in front housing. Spin prop while housing is still hot and when it is cooled to be sure it spins freely both ways.
c. Could be a bad bearing. Make sure the bearings are perfectly clean before deciding to replace them with new ones.



CON ROD

Make sure that the bottom end bearing is chamfered on both ends. This will ensure that the rod doesn't bind on the radius between crankpin and crank disc.

PISTON AND CYLINDER

The basic aim is a cylinder with little or no taper above the exhaust ports, matched to a round piston (or ring) that has adequate clearance before running. Engines that run 'tight' when new place extra stress on con rods, bearings, piston and gudgeon pin fits and means reduced performance when run in.

Smear a light coat of rubbing compound on the piston and lap the piston using the con rod to move the piston in the bore. When the piston laps smoothly without drag in the bore, clean thoroughly and examine the cylinder for shiny spots. They usually occur around the ports where the cylinder may have warped. Continue lapping, cleaning and examining until the cylinder has a uniformly matt finish. Clean all parts very carefully with solvent and toothbrush until you can wipe each surface with a clean tissue which stays clean.

If the engine is an ABC (Aluminium piston, Brass Chrome plated cylinder) the precise clearance is more difficult to determine. Lap free and run the engine rich and briefly. Remove head and examine the chrome surface. If it has shiny areas, the fit is still tight and extra lapping or honing is necessary.

If the piston is ringed, you cannot use the piston to lap the cylinder because it is too small. Instead you will need an aluminium bar which is a slip fit in the cylinder. Lap as above.

2. Piston. Racing engines have an enormous amount of transfer port and exhaust port area in the cylinder. This is sufficiently large to allow the piston to rotate sideways in the bore so that the piston can actually catch on the edge of the port as the piston comes up to top dead centre. The way to prevent this from happening is to taper the top of the piston slightly (see Figure 2). The top 1.5mm of the piston is given a taper of about 1°. This is best done by machine grinding but can be done with care by hand. This will look pretty crude to the purists but the actual finished shape is not that critical.

The way to check the result of the tapering is when the engine has been run for a while – there should be a brown band of coke at the top of the piston where the taper is. Insufficient taper will show as shiny spots on the piston.

PISTON RING

Place the ring between two snug fitting piston skirts or similar and lap the ring in the cylinder. Lap until even. This is far more important than a small ring gap. Check by pushing the ring into the cylinder, hold it up to a light and check for light between the ring and cylinder. If none, all is OK.

CYLINDER AND CRANKCASE

This may sound totally irrelevant but isn't. Lap the cylinder into the crankcase until the fit is nice and easy like piston/cylinder. Tight fits mean distortion and that's bad news. Make sure the cylinder seats nicely in the crankcase. A dab of rubbing compound and lapping will ensure this.

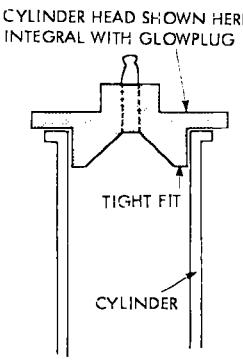


FIG. 3 CYLINDER HEAD FIT

CYLINDER HEAD

It is vital that the head fits the cylinder as well as the piston does (see Figure 3). If the head is a loose fit, it must be machined down and a band shrunk on. The band can then be machined down to give the precise fit required.

BACKPLATE

Lap the backplate onto the crankcase using rubbing compound.

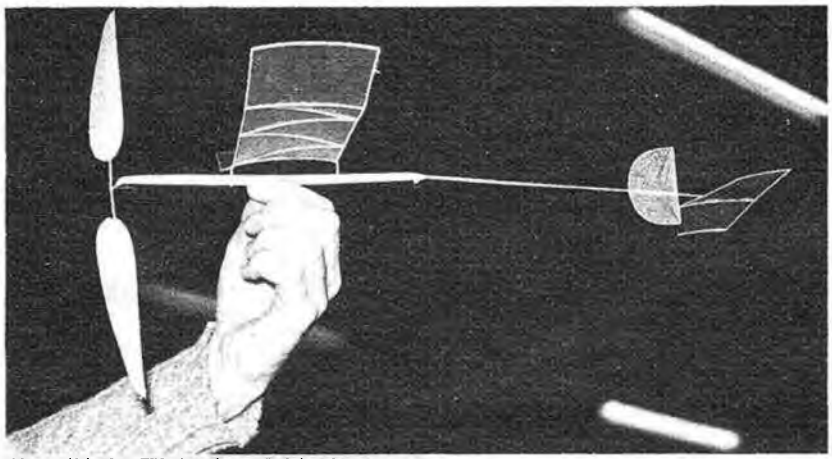
REASSEMBLY

Make sure all parts are scrupulously clean before reassembly. Again, use the old toothbrush and solvent. Check with a clean tissue which should stay clean.

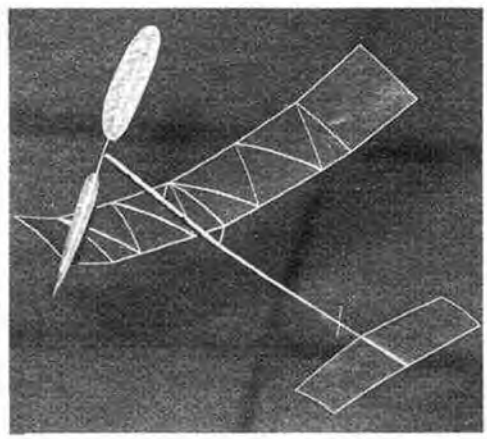
Oil all parts lightly with *3 in 1 oil*; this will ensure that no corrosion takes place before running. If you have done the job properly, the engine will *feel* different on turning over and the compression seal will surprise you.

INDOOR MEETING AT LOUGHTON

Held in a Sports Centre at Loughton, the Dnbden Indoor Meeting was organised by the Debdenaires club and brought a reasonable turnout of East Anglian indoor flyers to a site with about a 25 foot ceiling, with occasional obstructions. As is becoming usual in low ceiling contests, Coot-type HLGs were predominant, and, surprise, surprise, Butch Hadland won Peanut with a *Lacey M-10.* Ron Green's minimal structure EZB flopped around to total 13:48 and win its event. Local Sports Council representatives were present and the wider range of free-flight, both indoor and outdoor, was well covered by a pair of photo layouts by Mike Fantham. Certainly the use of this sort of presentation at exhibitions and public activities gets across the drama and action of model flying far more effectively than the usual



Above: *Winning EZB duration at Debdenaires contest was put up by Ron Green, using a low pylon wing mount and a droopy tailboom to give an effective high thrustline layout. Note lack of ribs in tailplane and wingtips, and external propeller spar.*
Right: *Minimal EZB by Ron Green uses a flexible tailboom to give automatic dive recovery, and has an external prop spar rather than a cricket bat jointed one. Fin has no outline structure, tailplane and wingtips have no ribs, resulting in 0.65gm airframe weight.*
Below: *Mike Fantham flew the 300mm tissue-covered model he designed for Vic Smeed's recently published* Encyclopedia of Model Aircraft *(see Review P287) at the Crawley indoor contest.*



group of Sunday-flying models some clubs seem to display. Hopefully Debdenaires will run a similar event again.

RESULTS: HLG 1. R. Green *St Albans* 49.6, 2. C. Hadland *RAFMAA* 49.2, 3. P. Davies *Richmond* 39.0. **Peanut** 1. C. Hadland *RAFMAA* (Lacey M-10) 87, 2. B. Hewitt (Farman Moustique) 81, 3. Frostick (Farman Moustique) 60. **EZB** 1. R. Green *St Albans* 13:48, 2. R. Bailey *St Albans* 10:42, 3. M. Fantham *Richmond* 8:57.

SOUTH EAST AREA INDOOR MEETING, Crawley, 10.3.80

The Crawley Sports Centre is one of the best indoor sites in Britain with a dead smooth ceiling about 30 feet high and little but a rolled net up one wall to snag models. The hire cost is around £50 for the six hour session so a largeish entry is needed to defray costs and the reputation of the site certainly attracted sufficient flyers. The results were something of a Hadland benefit with wins for the ubiquitous Butch in Hand Launched Glider, Peanut and CO_2.

HLG was flown with contestants in two groups at opposite ends of the hall to even out any possible differences in the air; each nine-man group changed ends after making five of the ten flights, the best two scoring. No other flying was allowed during the HLG slot, not even trimming flights by the competitors, and this put Ron Green at a disadvantage, with a variable-camber Coot-type aircraft (see full size plans P201 April 1978 *Aeromodeller*) that had suffered from a half hour wait during which the trim changed to produce a spirally half bunt, instead of the usual floating glide. The one permitted warm-up launch was insufficient to cure the problem and Ron didn't figure in the places.

Brief TV publicity had provided quite a sizeable crowd in the viewing galleries, in spite of the date being announced as the Saturday instead of the Sunday, and I heard amazed comments on the slowness of Ron Green's EZB and some of the other duration models. With no outline to its fin, and no ribs in wingtips or tailplane, its 0.65 gram weight is hardly surprising, but its auto-stabilising tailboom seems to work well and at present it is definitely one of the EZBs to beat.

RESULTS: HLG 19 flew 1. C. Hadland *RAFMAA* 61, 2. R. Jones *Crawley* 57, 3. M. Dilly *Croydon* 54. **EZB** 9 flew 1. R. Green *St Albans* 21:40, 2. R. Bailey *St Albans* 20:21, 3. L. Barr *St Albans* 10:16.

CROOKHAM GALA, Bassingbourn, 24-2-80.

Traditionally the first event of the season, this year's Gala attracted a surprisingly high attendance, over 150 cars were present! However the foggy conditions that persisted throughtout the day saw most modellers preferring to trim out their latest creations fresh from those winter building sessions in the hope that conditions would improve. By midday a mere handful of scores had been recorded, and the organisers should really have reduced the maximum, even at this late stage, to salvage the competition. Eventually the max was reduced only in Open Power because most models were through the cloudbase halfway up the climb. John Cooper, always the tactician, decided he could take advantage of these conditions by towing almost out of sight upwind of his timekeeper before releasing, allowing maximum visibility before the model disappeared out of sight down wind. This approach adopted by surprisingly few others, coupled with his ability to also find weak lift, gave him 1st in Combined FAI and 2nd in Open Glider, when many others were making equally good flights but losing scores in the fog. The other two events required Fly Offs where once again the atmospherics rather than necessarily the actual duration, was often the deciding factor. Julian Hopper fared best in this respect in Power, flying his 40 powered *Super Jacker* (P317 June 1978 *Aeromodeller*) while Croydon's Dave Hipperson won Rubber with a flight kept in sight through binoculars down to tree top level. A nice selection of Trophies awarded at the close of the competition included top Junior award to Lawrence Gray. Once again many new faces and models confirmed that, if anything, Free Flight is again attracting wider participation with, despite the weather, 115 entries from 27 clubs.

RESULTS: COMBINED FAI (33 entries) 1. J. Cooper F1A *(Biggles)* 14:20, 2. C. P. Williams F1A *(Richmond)* 14:15, 3. M. Fantham F1A *(Richmond)* 14:14, 4. R. Miller F1B *(Northwood)* 14:05, 5. B. Rowe F1B *(St Albans)* 13:58. **Open Glider** (47 entries) 1. A. Cordes *(Whitefield)* 9:00, 2. J. Cooper *(Biggles)* 8:53, 3. C. Edge *(Welland Valley)* 8:43, 4. A. Crisp *(Biggles)* 8:21, 5. J. Ashmole *(Grantham)* 7:53. **Open Rubber** (20 entries) 1. D. Hipperson *(Croydon)* 9:00+5:20, 2. R. Peers *(Falcons)* 9:00+5:00, 3. D. Neil *(Anglia)* 9:00+4:41, 4. P. Ball *(Grantham)* 9:00+4:38, 5. A. Jack *(Tynemouth)* 9:00+4:32. **Open Power** (15 entries) 1. J. Hopper *(Stanstead)* 7:30+5:04, 2. R. Monks *(Birmingham)* 7:30+4:55, 3. D. Reader *(Birmingham)* 7:30+4:30, 4. J. Bailey *(Biggles)* 7:30+4:15, 5. T. Payne *(Biggles)* 7:30+4:09.

NE AREA INDOOR MEETING, Spennymoor, 2.3.80

Hand Launched Glider opened the proceedings and the principal contenders were quick to show their mettle in the opening rounds. Alan Jack put in some excellent flight times and had a very close struggle throughout with Steve Philpott, both of them achieveing times very close to the existing hall record. As on previous occasions however, 16 year old Graham Davitt was putting in some excellent times and he eventually came out the winner setting a new hall record of 33.2 seconds (35ft ceiling) in the process.

The quality of the competition in EZB was extremely high as may be seen from the results. A number of more experienced competitors were using propellers of a new design which appears to give a vastly improved performance for low ceiling work. Dave Pymm was a clear winner with an aggregate time of 25 minutes 12 seconds including an outstanding single flight of 14 minutes 19 seconds which broke the previous hall record by almost 2 minutes while Graham Davitt completed an outstanding day by taking third place overall and not unnaturally was also Top Junior, followed by Graham Brown from Wharfedale. The Area Championship was won for the third year in succession by Jeff Anderson, with his 9 year old son taking second place the easy way – using the option of flying a number of classes.

RESULTS: IHLG (10 entries) 1. G. Davitt (J) *(Leeds)* 66.2 (Hall Record 33.2), 2. S. Philpott *(Whitefield)* 64.2, 3. A. G. Jack *(Tynemouth)* 64.0, 4. R. C. Pollard *(Tynemouth)* 52.0, 5. D. Yates *(Wigan)* 45.0. **EZB** (14 entries) 1. D. Pymm *(Birmingham)* 25.12 (Hall Record 14.19), 2. B. Hunt *(Huddersfield)* 20.55, 3. G. Davitt (J) *(Leeds)* 17.54, 4. B. Bibby *(FRCLS)* 17.06, 5. D. Davitt *(Leeds)* 17.01. **Junior** 1. G. Davitt *(Leeds)* 27 points, 2. G. Brown *(Wharfedale)* 8 pts, 3. R. Anderson *(Tynemouth)* 6 pts, 4. T. Auckland *(Whitby)* 3 pts, 5. N. Turnbull *(Darlington)* 2 pts.

SMAE 1st Area Centralised 16.3.80
F1A Glider – KMAA Trophy: 1. S. Philpott *(Whitefield)* 15:00+7:02; 2. C. Batty *(Bristol and West)* 15:00+6:13; 3. C. P. Williams *(Richmond)* 15:00+6:03; 4. D. Bartle *(NYFFG)* 15:00+5:01; 5. P. Ball *(Grantham)* 15:00+4:32. **Open Power – Frog Senior Trophy:** 1. T. W. Smith *(BAC)* 9:00+6:58; 2. S. Screen *(Birmingham)* 9:00+6:40; 3. R. Monks *(Birmingham)* 9:00+6:30; 4. R. Baggot *(Birmingham)* 9:00+5:48; 5. J. Hopper *(Stanstead)* 9:00+5.44. **Open Rubber:** 1. J. Fletcher *(St Albans)* 9:00+12:27; 2. J. Bailey *(Biggles)* 9:00+11:45; 3. R. Peers *(Falcons)* 9:00+7:47; 3. A. Jack *(Tynemouth)* 9:00+7:47; 5. T. Grantham *(East Grinstead)* 9:00+7:45. **Plugge Totals:** 1. Grantham 265; 2. Bristol and West 256; 3. Croydon 251; 4. Biggles 250; 5. Crookham 240.

COMBAT
by Paul Smith

CONSTRUCTION TECHNIQUES

Since my first contact with foam wing models, at the 1976 Rotterdam Pre World Championships, I have used such construction methods exclusively. At first I was impressed with the speed of foam construction (as opposed to balsa) but as time went by even these foam methods seemed slow and I tried to develop some short cuts and improvements.

AEROFOIL TEMPLATES

When making Aerofoil Templates, do not include projections at the leading and trailing edge normally required to lead-in the hot wire for cutting. These projections are necessary to assure accurate cutting of the wing, but they needlessly complicate the process of making templates at this stage. Decide what size "nails" you plan to use to hold the templates to each end of the foam blank and obtain a drill and some piano wire of matching size eg 16swg wire and 1.5mm dia drill. Cut four 100mm lengths of wire and bend a sharp 90° angle at the midpoint of each piece, then epoxy the wires into the "nail" holes of the aerofoil templates so as to function both as hot wire lead-in projections and also template locaters as in Fig. 1. Advantages of the procedure are: templates are easier to make; projections do not burn through or get damaged after repeated use; templates can be installed on the foam blanks quicker during mass production cutting.

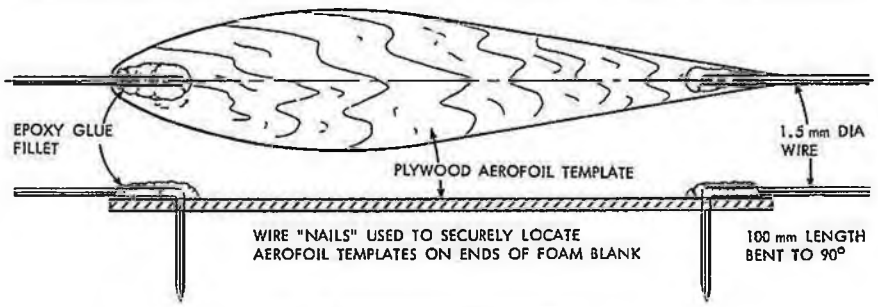
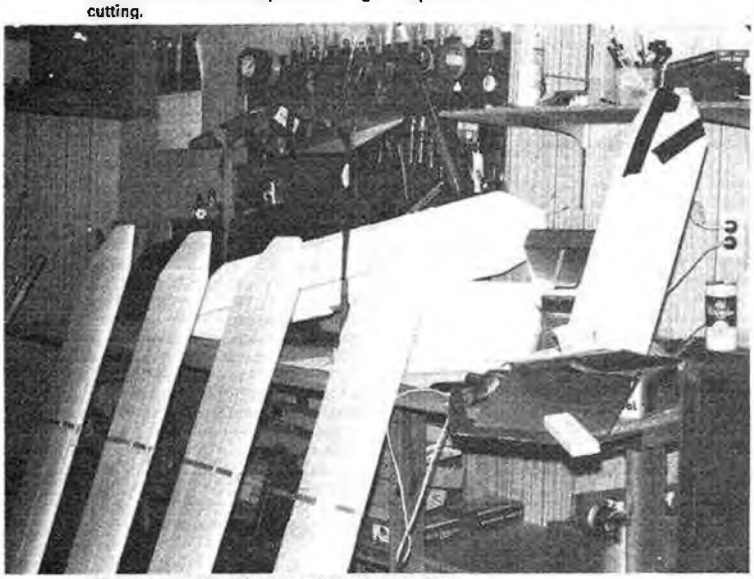


Fig. 1 AEROFOIL TEMPLATES



Above: *Production line assembly of foam wing combat models in Paul's workshop.*

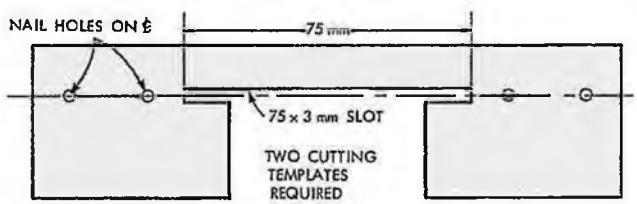
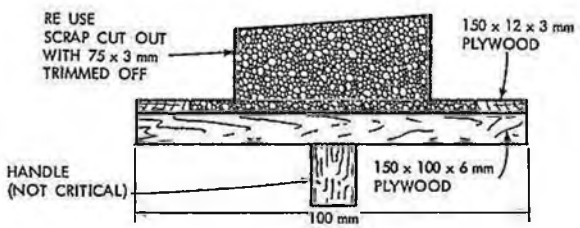


Fig. 2 LEADOUT SLOT TEMPLATES



SCRAP TRIMMING TEMPLATE

Fig.3
BALSA INSERT
LEADOUT SUPPORT

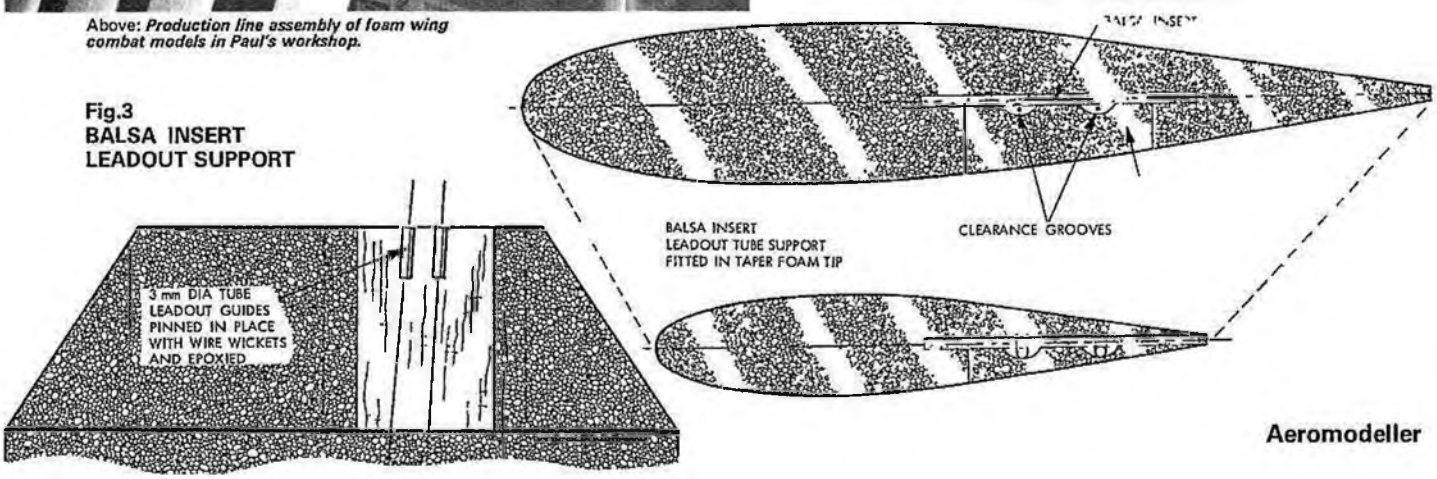
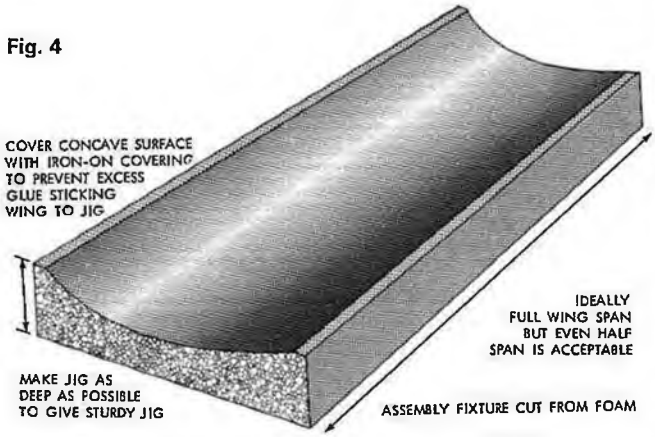
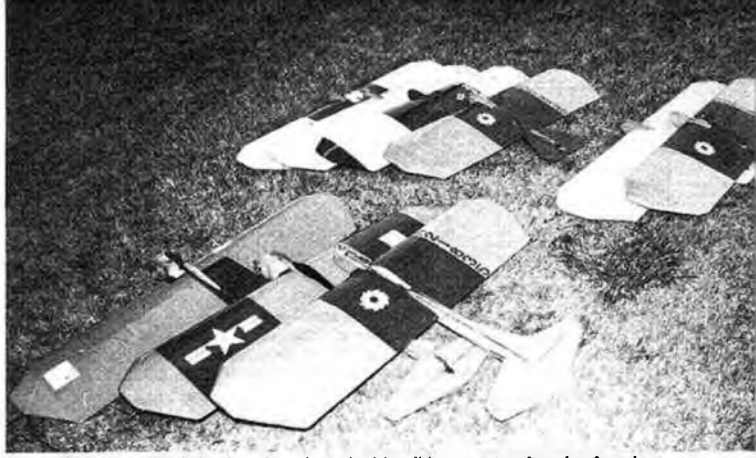


Fig. 4





Above: *Selection of FAI size foamies adapted with tail boom extensions for American Slow, Fast and FAI events.*

LEADOUT INSTALLATION

The only major shortcoming in most foamies is the method of installing the leadout guides. The idea is usually to simply drill or punch two holes in the foam wingtip and epoxy glue in the tubes. The disadvantages are that tubes frequently rip out; leadout wires are not reusable from one model to another; once located, it is almost impossible to move the leadouts without having to repair the wing tip.

I have devised a procedure for installing a balsa wood insert in the foam tip that make the leadout guides far more secure, allowing the entire control system to be reused in future models, and permitting the guides to be repositioned to trim the flying performance of the model with only minor surgery. The required templates are universal and can later be used on any model with foam block wingtips.

Firstly, make two templates as shown in Fig. 2. It is critical that the nail holes, centrelines, and 75 x 3mm slots be layed out and cut accurately on the two slotcutting templates. All other dimensions are unimportant. The scrap trimming template should be made in the cross-section shown, but can be any length necessary for the tips on your design. After cutting the tapered foam wingtips in the normal manner, draw centrelines on both ends of what will be the inboard wingtip with a marker pen. Then align the slot cutting templates to the centrelines, assuring that the templates are parallel to each other and "nail" in place. With your hot wire foam cutter, follow the template to cut a slot in the tip. Save the scrap block of foam to be used later to fill the gap. Cut a 75x75x3mm balsa insert, blind and epoxy short lengths of 3mm diameter tube lead-out guides in place, and then glue it into the tip. Hold the scrap foam upside down on the trimming template and slice 75 x 3mm off it with the foam cutter. After cutting two clearance grooves in this scrap block of foam, glue it back in place in the wingtip, Fig. 3.

I have been using this method for the last two years and have had no trouble of any kind. The savings in time and lead-out wires has been substantial.

ASSEMBLY FIXTURE

This fixture provides an accurate way of assembling the two halves of a foam wing. The first step is simply to cut a wing from a foam blank using the standard aerofoil templates. This time it is the two concave offcuts that we are interested in as well, of course, as the wing itself. The length of these concave offcuts need not equal the wingspan, but it helps to have them at least half the span. If the normal 50mm thick foam is used, try to place the templates as high on the foam as possible to produce a sturdy offcut and repeat to obtain the other. Then cover the inside surface of these offcuts with normal iron-on wing covering, which prevents any excess glue sticking the model to these assembly jigs, Fig. 4. You may find it necessary to cut some clearance slots in these jigs to accommodate pushrods, motor mounts, tails and other projecting parts of your model. When assembling your wing with white glue or epoxy, use bits of tape to hold wing halves and spars etc in place until you can get the model into the jig. Lay the wing on the bottom half of one jig then place the other jig on the top of the wing followed by a flat wooden plank, and finally whatever weights you have available. With one wingtip against a wall or column, press against the other as hard as you dare, to close the gap between the wing halves. Leave overnight or as long as required for your glue to set and the weighted jig will ensure a flat wing, with no dihedral!

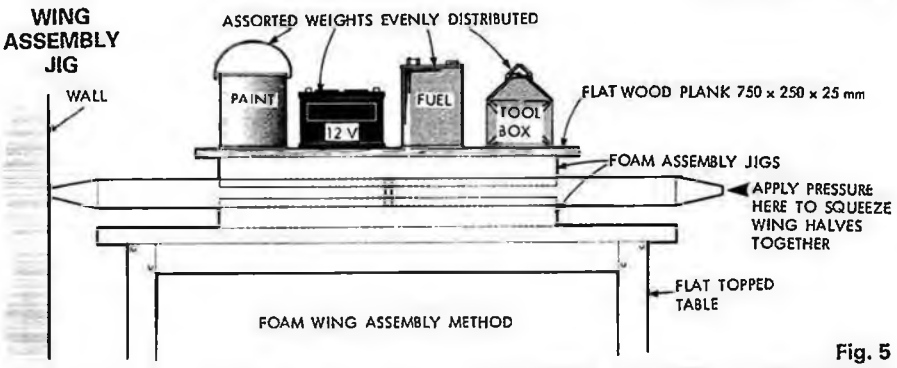


Fig. 5

Incidentally, I set this up with the leadout tip towards the outside and upwards so I can then install the leadouts with the model still in the jig while drying, Fig. 5.

In addition to providing true alignment during assembly, these fixtures are handy cradles to use while covering the model, repairing or doing other details.

A WARNING FOR COMBAT

Of all the branches of model flying, FAI Combat probably has the distinction of having the worst set of competition rules. Most of the rules are undesirable from the point of view of producing good combat flying or they are unrealistic and virtually impossible to enforce by the organisers. It would appear that combat flyers around the World are unanimous in their condemnation and now finally the FAI at the CIAM meeting in Paris last December have conceded the point, and have appointed a working committee to revise the rules.

The question is, how should this be done? Let us first look at what the objectives of the contest should be; why we need rules; and what form they should take.

First let's define what Combat is not! Combat flying has nothing to do with pitting – we have team race events for modellers who like to restart engines. It has nothing to do with the pilot keeping his feet inside a small circle on the ground – we have ballroom dancing for people interested in footwork. Combat has nothing to do with unfair attacks on other models, nor is it a put-up job between pilots; there is no such thing – deception is the province of wrestlers not model flyers. Combat has nothing to do with one hundred and one other trivial interpretations in the FAI rules which are impossible to administer, and which have ruined the art of combat flying. Once numerically the most popular event for both competitors and spectators ten years ago, FAI Combat is now a "dead" event which only attracts a handful of "Old Timers" who persevere in the hope of again enjoying the flying they still remember. Combat is pilot skill pure and simple – and that is all it is, to find the best pilot at chasing and cutting an opponent's streamer.

We do however, need some rules – sensible ones. The intentions of the current rules are generally considered laudable, it is usually their heavy handed application that is ruining Combat. Basically we need the two pilots in the middle and the pit crew on the outside, all agreed. Obviously we do not want pilots to evade cuts by literally running away from their opponent, so we need a rule designed to keep both pilots in the centre of the circle without penalising their flight score. After all they are supposed to be concentrating on their models and streamers and not on the relative position of their feet! We need some rule to prevent pilots circulating at ground level, after all we want to see some combat, and we need rules to discourage wild activity by the pitcrew, but please lets not penalise the pilot score unnecessarily. But if they do break these simple principles by intent or accident, don't lets start giving massive penalties out of all proportion to the offence which often negate the advantages of a cut, skilfully won.

Let's take a look at other model flying events with more developed rules and learn from them how to administer the principles. If a team race pilot allows his handle to come off his chest or perhaps is suspected of assisting his model with a little whipping, do we add a minute to his race time? If a Speed flyer fails to get his model into the pylon, do we disqualify him from the whole competition? Of course not, and yet many of the Combat rules have the same effect with 50 point penalties handed out for minor pilot or pitcrew infringements which even if intentional, may have little outcome on the result of the bout compared to the penalties incurred.

Let the punishment fit the crime; what is needed is a system of warnings, like team racing, which do not directly affect the scoring unless a quota is exceeded.

Consider a pilot who steps out of his centre circle while engaged in combat. Was it accidental, was it deliberate – maybe One warning, score unaffected. If he flies too low for a couple of laps – deliberate? One warning, score unaffected. Perhaps a pit man enters the circle not at right angles, is that an advantage to the pilot – perhaps – One warning, score unaffected. After a pilot has collected five warnings, either we have a sloppy competitor or he is flying to some tactical advantage. Let five warnings equal 100 points penalty perhaps. But his next infringement will be the first of another set of five warnings.

Too often in the past, expert pilots who have scored three or four cuts have ended up losing the bout due to an accumulation of ill conceived penalties from the trivial FAI rules. No wonder so many pilots are dropping FAI Combat completely and taking what at first sight appears a retrograde step to British Class A diesel or 1/2A Combat. In fact these older classes had better rules ten years ago than the supposedly International Class has today.

FAI Combat rules need bringing in line with the intended spirit of the event – to find the best pilot. A system of rule infringement warnings might help towards that aim.

RACING by Dave Clarkson

RACING ROUND-UP FOR 1979

For many years now it has been my great pleasure at about this time of year to summarise the end of the year racing situation as shown on John Horton's justly famous 'Racing League' lists. As in all previous years, John has used the following points system for crediting contest successes:

	Open Final	*Novice Final*
1st	6 points	3 points
2nd	5 points	2 points
3rd	4 points	1 point

In addition for certain non-conventional events eg. Goodyear 'Marathon', Wharfedale '1000', SMAE 'Team Trials', points are awarded down to 6th place in reverse order.

Enough of an introduction, so now to the 1979 season League summaries.

1/2A TEAM RACE

This last year has seen more 1/2A-TR contests than for many a year, to be precise 8 contests – not that many but enough to keep interest alive.

		1sts	*2nds*	*3rds*	*Points*
1. Langworth/ Broadhead	Wharfedale	2	1	2	25
2. Horton/ Haworth	Wharfedale	1	1	0	14
3. Heaton/ Ross	Norwest	1	1	0	13
4. Wilson/ Gardner	Tynemouth	0	1	2	11
5. O'Neill/ Bollen	Elliott	1	1	0	9

Wharfedale rules the tiddlers – or so it seems.

B TEAM RACE

Just 5 contests in 1979 are a sign of the decline of interest in this class. The low entries at most of these few contests give further reason for concern.

		1sts	*2nds*	*3rds*	*Points*
1. Wilson/ Gardner	Tynemouth	3	1	1	27
2. Nixon/ Campbell	Hunters	1	3	0	24
3. Heaton/ Ross	Norwest	1	0	1	10
4. Smith/ Hudson	Tynemouth	0	0	1	5
5. Fitzgerald/ Williamson	Wharfedale	0	0	1	4

B-TR remains a Northern speciality and one for specialists for the top three did *all* of the winning.

GOODYEAR

The big one with 60 teams listed and 12 contests covered. Despite these apparently healthy numbers, actual contest entries have not been high. Let us hope that the major rule changes adopted for 1980 will return Goodyear back to the top of the CL Racing popularity ratings.

		1sts	*2nds*	*3rds*	*Points*
1. Jarvis/ Needham	Norwest	2	5	0	37
2. Green/ Cunningham	Ipswich	3	1	1	27
3. Shackleton/ Scofield	Whitefield	2	0	0	15
4. Sykes/ Crabtree	Wharfedale	0	1	2	13
5. Smith/ Brown	Feltham	2	0	0	12

For the first time ever, the highest placed novice team came from north of the border, 'Scots Awa" for Crozier/Burns of the Hamilton club. Come to that, the top novices at the Nationals were 'foreign' too – Doyle/Kane from Belfast.

FAI TEAM RACE

It would seem that FAI-TR is now the most popular CL Racing class here in England for more contests (15) were run in 1979 for this class than any other. With so many point scoring opportunities, 'entry-holics' like Wilson/Gardner who entered 13 contests and Langworth/Broadhead who entered 12 contests were in a good position to make their efforts pay; and they did pay as the summary shows.

		1sts	*2nds*	*3rds*	*Points*
1. Smith/ Brown	Feltham	5	1	1	39
2. Wilson/ Gardner	Tynemouth	2	4	1	37
3. Langworth/ Broadhead	Wharfedale	0	5	1	35
4. Clarkson/ Woodside	Norwest	2	1	1	24
5. Heaton/ Ross	Norwest	2	1	1	23

However it was the real 'class' team of 1979 who topped the League – Steve Smith and Colin Brown of Feltham who were probably the winningest team in the World this year if their European victories are included into the reckoning.

ALL TIME GREATS

This time I thought that I would put the "All Time Greats" in the various classes together in one section to illustrate just who were the most successful CL Racing teams of the decade.

1/2A TEAM RACE		*Points Total 1975-9*
1. Langworth/Broadhead	Wharfedale	68
2. (Wilson/Gardner	Tynemouth	44
3. (Heaton/Ross	Norwest	44
B TEAM RACE		*Points Total 1972-9*
1. Wilson/Gardner	Tynemouth	94
2. Nixon/Campbell	Hunters	77
3. Heaton/Ross	Norwest	75
GOODYEAR		*Points Total 1970-9*
1. Horton/Haworth	Wharfedale	216
2. Jarvis/Needham	Norwest	134½
3. Daly/Howard	Norwest	122
FAI TEAM RACE		*Points Total 1975-9*
1. Heaton/Ross	Norwest	165½
2. Clarkson/Woodside	Norwest	118½
3. Langworth/Broadhead	Wharfedale	94½

These summaries show Norwest to have been the club of the 70s and Heaton/Ross the team of the 70s. I hope that these conclusions are not too controversial for Derek Heaton and Malcom Ross have been *the* example to follow for success and their club mates have followed their fine example.

OVERALL SEASON SUMMARY

Combining points achieved in all of the CL Racing classes by individual teams results in the following: the 'Top Ten Teams' for 1979:

		Total Points
1. Wilson/Gardner	Tynemouth	77
2. Langworth/Broadhead	Wharfedale	60
3. Smith/Brown	Feltham	51
4. Heaton/Ross	Norwest	46
5. Jarvis/Needham	Norwest	39
6. Clarkson/Woodside	Norwest	30
Nixon/Campbell	Hunters	30
8. Green/Cunningham	Ipswich	27
9. Horton/Haworth	Wharfedale	24
O'Neill/Bollen	Elliott	24

As you can see, to Dick Wilson and Ian Gardner from Tynemouth goes the honour of 'Top Team for 1979'. Congratulations are well earned for Dick and Ian are some of the hardest workers in CL Racing.

Those Norwest club placings towards the top again make the 'Top Club' contest almost a one-horse race. 'Norwest is Best' is a good motto.

	Total Points
1. Norwest	148
2. Feltham	114½
3. Wharfedale	114
4. Tynemouth	98
5. Elliott	30½

Sadly (from the Norwest point-of-view) we cannot claim to be the 'creme de la creme' of CL Racing for that title is surely possessed by the most successful club in FAI Team Racing – in 1979 it was Feltham. Their motto is quite a good one too 'Feltham Rules OK'.

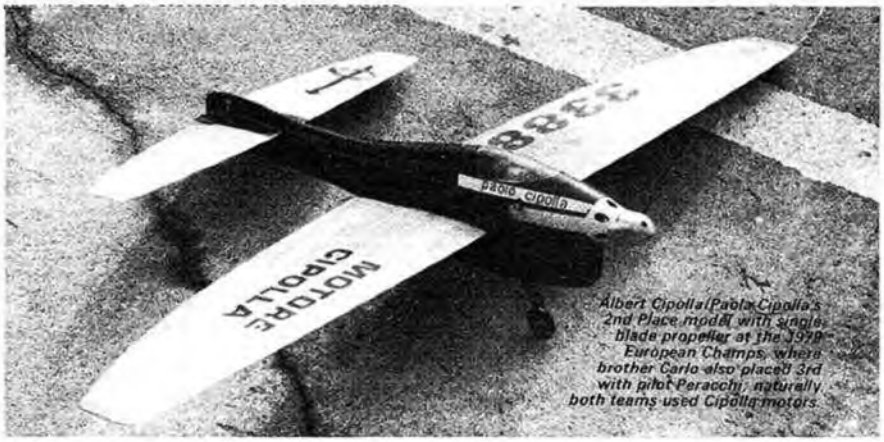
The final congratulations and I am sure, all of our thanks go to the compiler of all of these League lists, John Horton. Remember the vital address: J. C. Horton, 10 Lawn Avenue, Burley in Wharfedale, Ilkley, W. Yorks LS29 7ET, for if you don't post your results to John, no compilation will result.

CIPOLLA TEAM RACE MOTOR

Ever since the 1978 World Championships, we have known that the Cipolla brothers in Italy were making exceptionally fast motors. In my second semi-final at that event, Perrachi/Cipolla took me twice in the first tank before they thought they had been disqualified and retired. Now my toy was a 21.5 sec/10 laps in traffic machine which meant that the CIPOLLA in Perrachi/Cipolla's beauty was pulling it along at somewhere around 20.1 sec/10 laps and pilot Perrachi is only a little fella.

No-one really noticed the exceptional airspeed of the CIPOLLA then, but eyes started to open early in 1979 at Breitenback where its near 20 sec/10 laps speed was confirmed. So at Marville for the 1979 European Championships, the Italians having the fastest models (and all CIPOLLA powered) should have been no surprise – only the human factor stopped Marville from being a CIPOLLA benefit. Finally the Coppa d'Or in September 1979 saw Cipolla/Cipolla get near the potential of their motor when in the heats, a world best of 3:37 was their

Components of Cipolla Master 2.5cc Diesel FAI Team Race motor. See also photo P285.



Albert Cipolla (Paolo Cipolla's 2nd Place model with single blade propeller at the 1979 European Champs, where brother Carlo also placed 3rd with pilot Peracchi; naturally both teams used Cipolla motors.

achievement. Who can say now that the CIPOLLA is not the fastest motor around for no other motor has given a sub 3:40 time in actual competition anywhere to date.

Having tempted you all with this bit of history, I guess that many piggy-banks will be raided as a result of this temptation and the timely news that the Cipolla brothers are putting their CIPOLLA motor into regular production. The necessary address is: A.U.M di Cipolla, Via Gobetti 2,20090 Trezzano S/N (Milano), Italy, and the prices seem reasonable:

	Lira
TR motor incl. venturi, chromed liner/cast-iron piston	180,000
TR motor incl. venturi, chromed brass liner/aluminium piston	180,000
Multi function valve incl. exhaust primer motor mounted	40,000
Fully machined cast aluminium pan incl. crutch insert nuts and bolts	25,000

At £1 = 1,700 lira, the bare motor cost quoted above is about £106 – between the NELSON AAC and BG in price – pretty reasonable I would say bearing in mind its track records and obvious potential. Also available at extra cost are numerous special tools for the motor and necessary accessories such as spare venturis.

According to the manufacturer, the ABC version is faster and trickier to operate than the SCI version – both are sub 21 sec/10 lap machines but the ABC goes further and faster if everything works OK. Nice figures: the pictures look nice too!

The crankcase is gravity cast aluminium alloy with steel bearing housings for 6 x 13 x 5mm front and 8 x 22 7mm rear ball-races, and a 64HRC steel crankshaft, with oxydized magnesium spinner and prop driver. Connecting rod is high strength aluminium alloy with plain bearings on both ends. Liner and piston assembly is available in two different alternatives; Tetraboro treated steel liner with cast iron piston; or Tetraboro treated brass liner with Si-Aluminium cast piston. Tetraboro is a special treatment used only at AUM di Cipolla which offers advantages over normal chrome plating. Surface hardness is HV 1400 compared to HV 1000–1100 for best chrome plating and the reduced thickness of this treatment improves thermal conductivity while better lubricant adhesion to this surface produces higher performance. An aluminium liner version is planned to be available shortly following further tests. The contra piston is a double head unit for fine compression setting. A plain bearing rear rotary valve is moulded in bakelite with a central induction system and two piece air venturi. Spare venturis range from 3.1–3.6 dia in .1mm increments. A multi function valve is available with needle valve, cut-off and exhaust prime which is adjustable using a key.

TAILSKIDS FOR WINDY WEATHER

The amazing take-off stability exhibited by Steve Smith's flying wing model in the extreme wind of the first Team Trials last year, set me wondering why? On that day the wind was so bad, that my models were virtually unflyable! Nothwithstanding that Steve is a much more skilled pilot than I, I just could not believe that his brick-like *Flying Fing* could be so much better in such difficult conditions.

The problems of flying in wind are really confined primarily to the take-off. Agreed, heavy wind buffets the model badly when airbourne and can also make for very heavy landings, but these do not stop you flying unless your model just cannot take it and cracks-up under the strain. It is the take-off problems that actually stop the racing. I am sure most of us recognise these wind-created take-off problems for; either immediately after launch the model nose dips sharply and uncontrollably and *DRAT – there goes another prop*; or the model turns in, looks at you disconcertingly and *DRAT – there goes another model!* The prop-smashing syndrome usually occurs when the model's tail is into the wind and the model-at-you syndrome when its nose is into the wind.

My conclusion about windy weather take-off performance was that it all depended on the 'static ground angle' vs the 'running ground angle'. I hope the sketches show what I mean. The angle of attack of the model in these two cases is quite different. With my models angle 'x' might be 2–4° and angle 'y' 13–15° – quite a difference. With Steve's *Flying Fing* the difference is much, much smaller. But why should this be so important?

First, a high 'Static Ground Angle' must be a bad thing when one considers just what must be happening to the prop-blast when the motor is started and the model is released. Quite obviously the prop blast is squeezed between the tail and the ground and the angle of the tail to the blast gives a similar effect to having a massive amount of *down* elevator. Even worse, when the wind is blowing hard and the tail is pointing into it, the prop blast tends to be trapped under the tail creating a high pressure zone under the tail. The result when the model is released is that its tail pops up as if powered by a big spring – a characteristic that will get worse the harder the wind blows. Little wonder then that the nose dips and another prop burns a hole in your pocket.

Secondly, a big difference between the 'Static' and 'Running' ground angles must be a bad thing when one considers precession forces due to the rotation of the prop. On model release, even if you manage to control the nose dip explained above, inevitably the tail comes up quite sharply – especially with modern lightweight TR models that accelerate so quickly. With the prop rotating in its usual direction (anti clockwise when viewed from the front) and the tail rising, precession turns the model left. The more the tail rises, the more the left turn. Obviously a natural left turn coupled with a forward take-off point relative to the wind is a sure recipe for the pilot to get a good view of the wrong profile of his model.

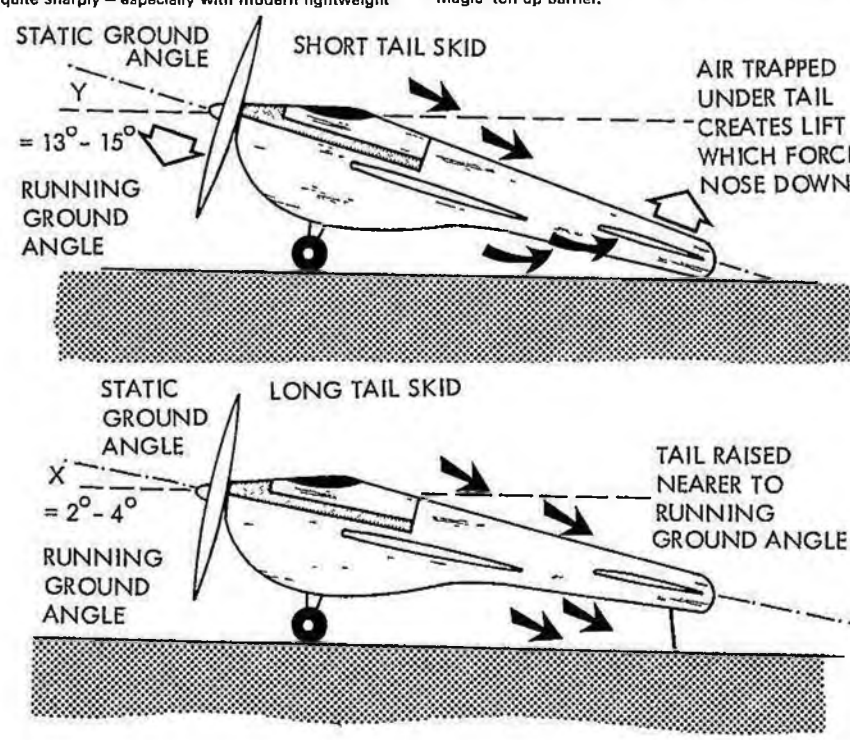
If the above is true, then a long, long tailskid giving a shallow 'Static Ground Angle' should reduce the take-off upset forces to manageable proportions. Now Steve's amazing *Flying Fing* has a very small difference between 'Static' and 'Running' ground angles and that may well, on its own, be responsible for its excellent windy weather take-off characteristics. But Steve's model is so 'different' that there may be another reason. To prove the case, one way or another, I went and modified my *Nelson Sprint* to have a long, long tail-skid (projecting almost 1½in). The results were all I had hoped for – vastly reduced nose-dip and left turn on model release. In fact in the wind of the Northern Gala it performed very sweetly. Incidentally, at that contest I noticed that Langworth/Broadhead's models had sprouted equally long tail-skids and chatting to Bernie Langworth revealed that he had done it for similar reasons to those I had concluded, and that he had found similar improvements.

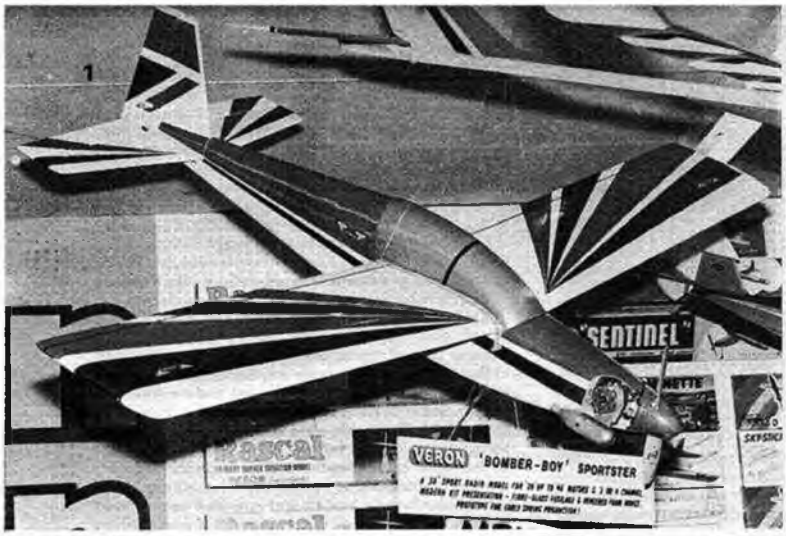
Mind you, if your model has no tip-weight, has an inward pointing wheel and has flexible flying surfaces, it is going to be horrible in the wind no matter what you do. But if your wheel is pointing in the right direction and if you have at least 10gm tip weight plus rigid flying surfaces, and you have trouble at take-off in wind, try a long tail-skid; it may well solve your problems.

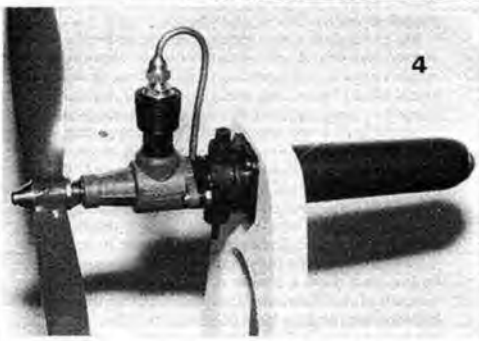
BAD YEAR SWAN SONG

My last column queried whether Goodyear at the Northern Gala 1979 had been the last contest to the old 'hairy' rules. Not so, for almost certainly the last airing for probably the most outrageous class we have flown – 3.5cc glow Goodyear (thus my title 'Bad Year' pinched from Dirty Dan Rutherford of *Model Builder* magazine in the USA) – was at the Elliott Autumn Rally in Rochester on 21st October 1979.

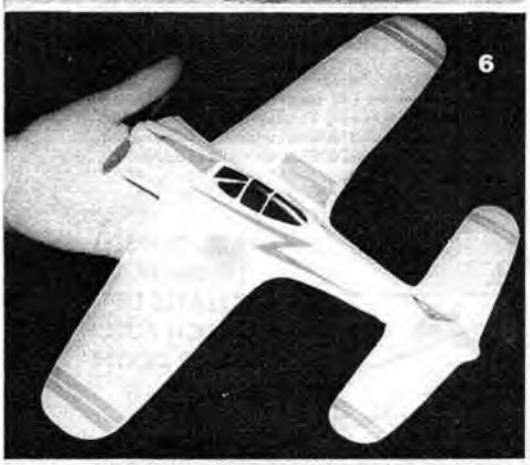
Not an earth shattering event you may say, but at the Elliott Autumn Rally, Badyear departed in style with the winners, Green/Cunningham of Ipswich, completing the admittedly 2-up final in an amazing time of 7:31.5. To my knowledge this time (well inside the existing SMAE record) is the first one recorded by a Goodyear model at any contest in the UK, beating the relevant existing SMAE record for FAI-TR. To show just how frustrating Badyear was, that 7:31.5 time for the 20km final represents an average speed of 99.3mph – just a touch off the 'magic' ton-up barrier.



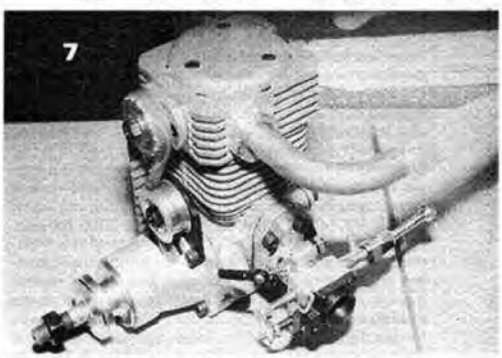


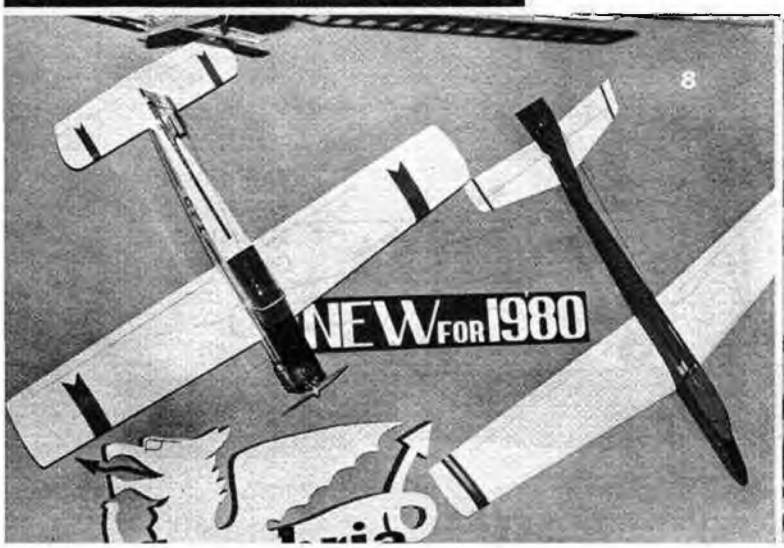


TRADE



New products announced at the British Toy and Hobby Fair at Earls Court included: **1.** Verons 1250mm span *Bomber (Bovver?) Boy* Sport R/C model for 20–40 size motors with glass fibre fuselage and veneered wings. **2.** *Nimbus 4,* 1200mm span Ready-to-Fly Free Flight tow-line glider, latest from North Pacific, long famous for clip together rubber powered Sleek Streeks etc. **3–4.** *TurboTanks* from MicroMold, supercharge CO_2 motors to give more power and duration, seen here fitted to Telco motor left and Czechoslovakian Modela motor right. **5.** Cox *Sky Ranger* Free Flight Helicopter powered by the Babe Bee 049 engine which can be removed and used on other models. **6.** Completely Ready-to-Fly Electric RTP model from Harry Butler Models, now KeilKraft, in vac formed plastic, one of their FLY-ELECTRIC range. **7.** *Webra 91,* 15cc 4 stroke has rotary Aspin valve in head, uses crankshaft induction for lubrication, distributed in UK by MRC. **8.** Two new kits from Cambria, *CFI (Chief Flying Instructor)* a 1450mm span 3–4 channel more advanced R/C aerobatic trainer for 20–35 motors and *Scimitar* 1750mm span aerobatic Slope Soarer with foam veneer wing and balsa fuselage with foam decking. **9.** A welcome back to Trade Fair exhibitions for KeilKraft with their huge range of products, supplemented by many new releases.





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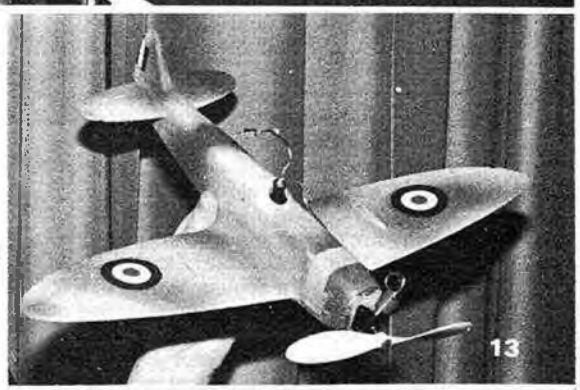

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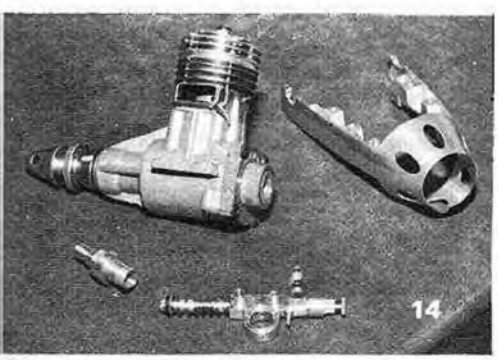
FAIRS



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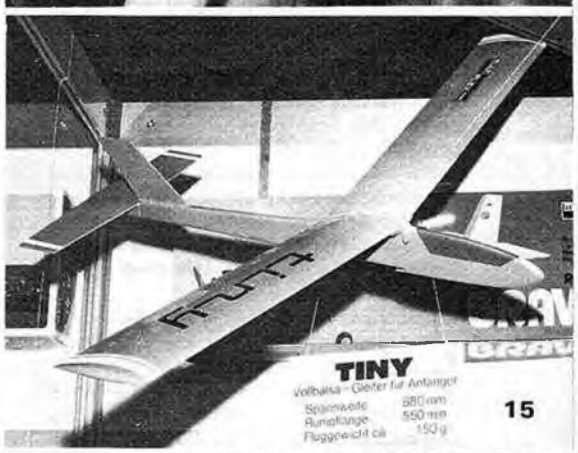
The message from the 1980 Nurnberg Trade Fair was that Ready-to-Fly model flying and electric powered flight are enjoying a dramatic leap in popularity. Many of the models utilised foam plastics or prefabricated glass fibre construction to offer modellers instant airframes and should help make model flying a more popular leisure activity for the future. **10.** Graupner Ready-to-Fly *Cessna 177 Cardinal,* 1150mm wingspan with OS MAX 10 throttle and silencer for 3 or 4 channel R/C with aileron conversion. **11.** Twin engine Electric Powered Semi Scale *Rockwell Commander* from Remco for the Ready-to-Fly market. **12.** Electric Power assisted glider *YS Plane* from Nitto in Japan, 1280mm wingspan for 2 channel R/C, with rapid charger for battery pack using cigar lighter socket to car battery. Kit includes polystyrene fuselage, wing and tail for "same day flying". **13.** Harden Associates Ready-to-Fly polystyrene *Spitfire* powered by Harden CO_2 Motor. **14.** Cipolla, *2.5cc Team Race Motor,* many accessories available include half pan, multi function valve, venturi insets etc. **15.** *Tiny* Free Flight glider from Multi Plex 880mm span, all balsa construction. **16.** *DH-88 Comet Racer* from Nitto powered by twin Mabuchi electric motors with rapid charge batteries for 2 channel R/C, Almost Ready-to-Fly kit includes preformed polystyrene fuselage wings and tail for same day flying. **17.** Interesting small rubber power Free Flight models from Nitto utilised injection moulded plastic components with clear film covering.



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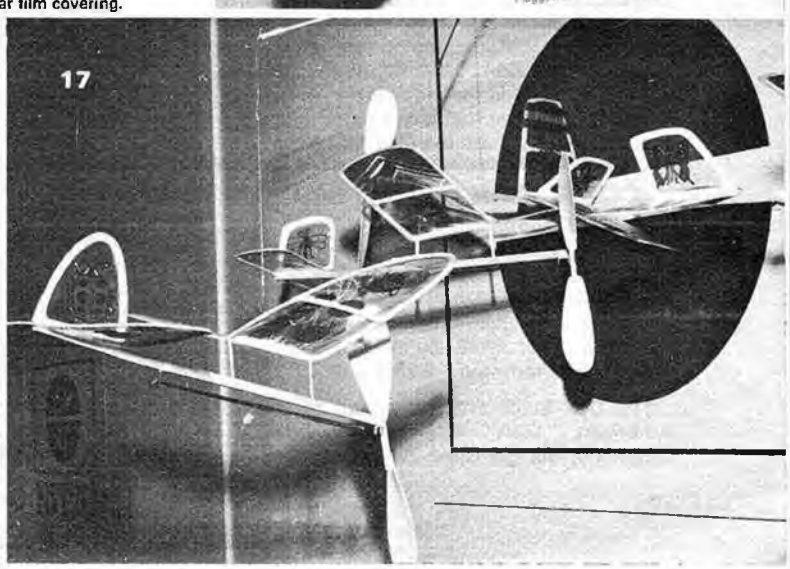


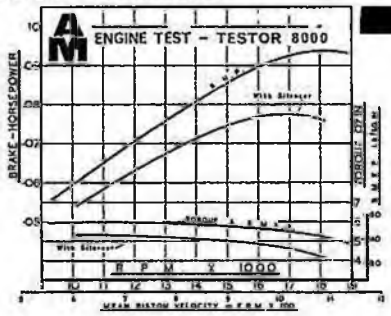
17

Engine Test Review

with Peter Chinn

TESTOR 8000

Country of Origin: USA
Type: Glowplug ignition, reed-valve with plain bearing. Integral fuel tank.
Bore: 0.4202in (10.67mm).
Stroke: 0.360in (9.14mm).
Swept Volume: .04992 cu in (0.8181cc).
Weight: 62 grammes – 2.19oz; 67 grammes – 2.37oz (with silencer ring).



The origin of this unusual 1/2A class engine goes back to the Wen-Mac Thunderbolt 049 motor, the production of which was taken over in 1968 by the Testor Corporation, manufacturers of McCoy engines. Modified and renamed McCoy 049, this motor continued in production for about seven years, during which time its working parts were also used as a basis for several special power units for Testor's ready-to-operate plastic models. These special motors had a number of unorthodox features, including the use of moulded reinforced plastic, instead of aluminium, for the engine crankcase and, when the time came to find a successor to the McCoy 049 for regular model use, it was decided to continue along this line of development.

The outcome, the Testor 8000, was introduced two years ago. It employs a glassfibre reinforced black nylon crankcase with moulded-in zinc alloy bush for the crankshaft and brass thread insert for the screw-in cylinder. Also of moulded plastic, this time in white translucent Celcon C90, is the large rectangular section radial-mount/fuel tank that incorporates the crankcase backplate, reed-valve housing and air intake, ultrasonically welded into a single unit. The valve reed itself, is also of plastic material: this time 5 thou Mylar film.

No screws are used to attach the tank to the engine. Instead the projecting boss, that houses the reed valve, is simply pressed into the back of the crankcase where it snaps into position. There is a projecting peg on the bottom of the fuel tank which engages a slot on the side of the crankcase to prevent rotational movement of the engine on the tank. This means that the engine is intended for 'sidewinder' installation, ie, with the fuel tank bolted to the model correctly (with the filler at the top), the cylinder lies horizontally to the right and the needle-valve control projects from the left side of the tank.

The rest of the engine follows conventional American 1/2A engine practice. The cylinder, machined in one piece with integral cooling fins from leaded steel, has twin opposed exhaust ports and twin opposed internal flute transfer passages. It is topped by a screw-in head with integral glow element. The flat crown piston is of case-hardened steel and is ball-jointed to a hardened steel connecting-rod. The crankshaft is also case-hardened. It is counterbalanced and is relieved at the centre to form two journals.

The 8000 continues to feature the totally enclosed 'Rotomatic' integral spring starter unit first seen on Wen-Mac engines twenty years ago. This incorporates a clutch device so that it is automatically engaged and disengaged. One simply turns the prop backwards approximately 1½ turns and then, on release, the engine will be spun rapidly over several compressions to ensure a quick start in the right direction of rotation.

The 8000 is packaged complete with an optional "silencer" (in the form of a simple slotted sintered steel ring around the cylinder) two plastic knobs (one with an extension) for the needle-valve and a 5½ x 3½ Testor polypropylene propeller.

On test, the 8000 was found to be considerably more peppy than the Testor McCoy 049 engine that it replaced and our particular example (which came direct from the factory in the U.S.) reached a peak output of approximately .094 bhp at 18,000 rpm when running on 15 percent nitromethane fuel and with the silencer removed. This is outstandingly good. Typical propeller speeds recorded included 14,600rpm on the 5½ x 3½ polypropylene prop supplied, 13,400 on a 6 x 4 Top Flite nylon, 14,800 on a 6 x 3 Tornado nylon, 15,700 on a 6 x 3 Top Flite nylon and 16,300 on a 5½ x 4 Top Flite nylon.

Adding the muffler ring reduced these figures by up to 1100 rpm and dropped the peak output to .077 bhp at 17,000 rpm.

The Testor 8000 is an oddly shaped engine (the prospective purchaser is advised to check that it will fit his model) but performs well and is easy to handle.

COX BLACK WIDOW 049

Country of Origin: USA.
Type: Glowplug ignition, reed-valve with plain bearing. Integral fuel tank.
Bore: 0.406in (10.31mm).
Stroke: 0.386in (9.80mm).
Swept Volume: .04997 cu in (0.8189cc).
Weight: 64 grammes – 2.26oz.

The Cox Black Widow is built to the American "1/2A" displacement limit. Originally, the US Class A capacity was limited to a maximum of 0.10 cu in, so, naturally, the new baby engines that began to appear in the early 1950s became known as "half-A" when their maximum piston displacement was set at 0.05 cu in. Hence the abundance of ".049" engines that appeared at that time.

In 1952-53, the Cox company introduced the "Space Bug" and "Thermal Hopper" .049 engines which immediately set new standards of design and performance in the 1/2A class. They employed some unusual (at the time) features, including a screw-in replaceable cylinder head with integral glow filament, reed-valve induction and a ball-and-socket piston/connecting rod joint. Later, these features were incorporated in the "Babe-Bee" .049 engines which Cox has since produced in millions as power plants for their ready-made plastic control-line aircraft, boat and car models.

The Black Widow, introduced nearly six years ago, is based on the Bee but with

BOOK REVIEW

THE ENCYCLOPEDIA OF MODEL AIRCRAFT

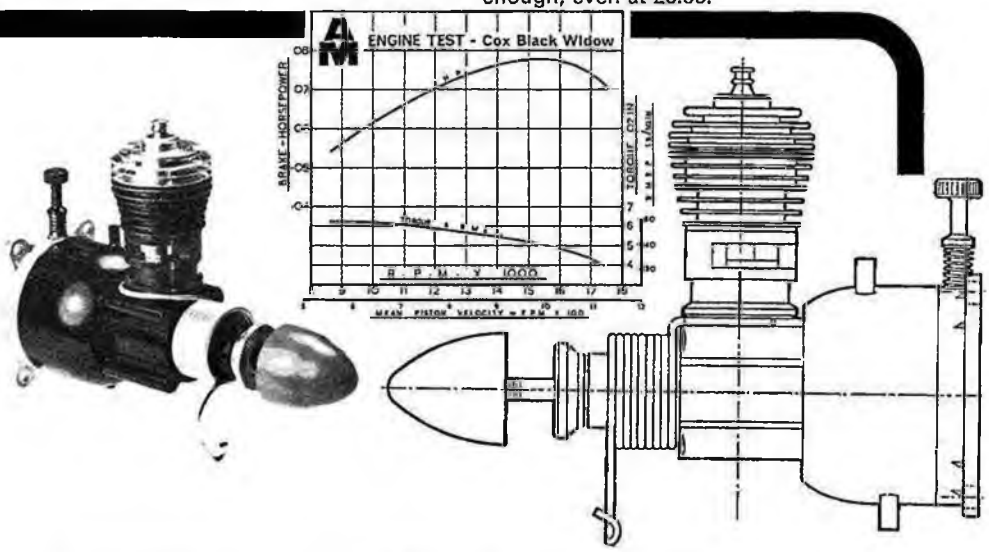
Edited by Vic Smeed, published by Octopus Books Ltd., London, 226 pages 305 x 225 mm hardbound, lavishly illustrated exclusively with colour photographs, and colour and black and white illustrations and eight model aircraft plans.

Beginners' books on model aircraft are rarely of interest to the enthusiast, and likewise expert books are invariably unintelligible to the newcomer – until now! The **Encyclopedia of Model Aircraft** covers literally every aspect of aeromodelling from non flying scale and simple stick rubber models through to up-to-the-minute contest models, in such a compelling publication that it cannot fail to appeal to all tastes. There has never been such a comprehensive and professionally produced book on every aspect of model flying. General Editor Vic Smeed has assembled a team of the finest writers, each experts in their field, and has captured both the spirit and techniques of Aeromodelling in this splendidly illustrated volume. Full double page colour photos abound and colour cutaway drawings will astound; this simply has to be the finest model aircraft book ever produced and we cannot recommend it highly enough, even at £6.95.

improvements aimed at making it more suitable for "proper" aeromodelling applications, with particular emphasis on small control-line models. The engine has been given a larger fuel tank and a different cylinder with deeper exhaust ports and twin transfer ports.

Externally, the Black Widow is identified by its black anodised crankcase and fuel tank. Basically, its design, like the Bee, is similar to that of the smaller Pee-Wee .020 engines described in the October issue. Its crankcase is machined from extruded aluminium bar, complete with unbushed crankshaft bearing, and the case-hardened counterbalanced crankshaft is relieved in the centre to form two journals. The full-length steel cylinder is machined in one piece, complete with cooling fins, and screws into the crankcase. The steel piston is hardened on its skirt surface and is free to rotate on its ball-ended hardened steel connecting-rod.

The engine is mounted by means of four radial lugs on the fuel tank backplate which also contains the needle-valve. The rest of the fuel tank is machined in one piece from aluminium alloy and is integral with the crankcase-backplate, induction-pipe and reed-valve housing containing a .001in X-shaped copper-beryllium reed-valve. Four long screws tie the complete tank and induction unit to the crankcase, which can be relocated at 90 or 180 degrees for side mounted or inverted.



The Black Widow is easy to start. Like other small Cox engines it is equipped with a starter spring and this not only simplifies starting for the beginner but also ensures that the engine runs in the right direction.

The Black Widow is intended for operation on fuels of medium rating – ie about 15 percent nitromethane or equivalent. Using such a fuel, the test motor recorded a peak power output of approximately .078bhp at between 15,000 and 15,500 rpm, which is quite good. Equally good, for a "sport" type 0.8cc glow engine, was the maximum torque of over 6 oz in at 9,000rpm. These figures result in useful speeds on a variety of props.

For example, although the most widely used prop is likely to be a 6 x 4, the Black Widow proved capable of turning larger diameter props while still producing a good power output. Figures recorded on test included 12,000rpm on an old type 7 x 3 Top Flite wood, 12,600 on a 6 x 4 Tornado nylon, 13,000 on a 6 x 4 Top Flite nylon and 13,800 on a 6 x 4 McCoy nylon.

CLUB NEWS

IN THESE FAST CHANGING TIMES model techniques can change rather rapidly, too. It is all too easy to get into a rut and fail to make full use of the technology available. Certainly the new range of adhesives, the epoxies and instant glues, have been a great boon to model builders, and plastics and fibre glass have had their impact on structural design. Even the old building board is not quite what it was. More and more models are being built on an 'assembly' basis rather than on the 'flat', with jigs and self aligning methods to bring things right up to date. For my part, I found a plastic faced board most useful in tackling the featherweight indoor structures. Here a smooth, non-snagging surface makes for ease of handling the delicate pieces. You can even draw the plan on the white board; an ideal arrangement as the slightest bump or crease can otherwise cause distortion.

We start off this month right bang in London with Martin Dilly, PRO of the SMAE, **London Area,** reporting on what has been going on in the Area. Committee appointments for 1980 sees it chaired by *Model Flyer* editor, David Parker, an R/C and F/F man. Vice Chairman is Fred Jones of North Kents Nomads, and holding the vital job of Council delegate is Trevor Oughton. First job to be tackled by the Committee is the all important one of flying venues, and they are working on the possibility of the large North Weald airfield lying on the north east fringes of London. A sub committee, headed by radio flyer, Mike Beaumont, has been set up for this purpose. Other items on the agenda are a F3B soaring teach-in at RAF, Halton, and a 2-day London Gala, tentatively booked for the Everleigh Dropping Zone, with R/C Soaring on the Saturday, 12th July and F/F on Sunday 13th. Area meetings are held at the John Snow, Broadwick Street, London W1 on the second Monday of every month at 8pm. All model flyers are welcome, and Martin says that any affiliated club worth its salt sends along at least one member. Whatever your model flying interest why not come along to meet and talk to the people who do the work? *Martin's address is 20 Links Road, West Wickham, Kent BR4 0QW. Emergency phone number 01-777 5533.*

Long associated with the London Area is **Croydon DMAC,** from whence comes our next report. Obviously happy with its 1979 committee for all its members were returned unopposed at the mid January AGM. A hopeful start to the season for this all F/F club is a 15% increase in membership with Newham Beaumont, John Lorrimer and Norman Marcus. The latter was well known as a designer and competition flyer in the 40s and 50s; older flyers will remember his *Jaded Maid* and *Supa Dupa,* which, too, have made a comeback via vintage flying. The club ambition is, as stated earlier in these columns, to retake possession of the much coveted Plugge Trophy. They almost made it last year, and a strengthening of the FIC factor could well do the trick. *Secretary, Don Thomson, 18 St Peters Way, London W5, phone 01-998 9472.*

We now have news of a new club which has been founded in South Devon. The Secretary, who has supplied this information, is Mr N. H. Evely. The name of the club is the **Teignmouth & District Aero Club.** The meeting place is the Winterbourne Centre, Winterbourne Road, Teignmouth, and the get togethers are on Wednesday evenings at 7.30pm. To get the club away to a firmly based start there is full SMAE affiliation. More details to come, including we hope, news of flying sites, particular interests, etc. *Mr Evely's address is 3 Kimberley Cottages, Bickford Lane, Teignmouth, Devon.*

Yet another new club, or at least the attempt to form one in **Sutton-in-Ashfield,** Nottingham. Anyone interested should apply to *Mr P. Klitofsky, 49 Clare Road. Telephone Mansfield 58157 or 514993.* No provision for R/C flying at present.

And now to the **Leeds & DMAC,** for a report from Ian Davitt, the PRO. At the club AGM, the list of elected officers includes many a noted aeromodelling name such as veteran Henry Tubbs, the Club President and Jim Mosely, Chairman. The latter, incidentally, deservedly holding the Arthur Mullet Trophy for services to the Northern Area. During 1979 members kept the club flag flying in such events as the Indoor Nationals, winning both Manhattan and EZB, and in the *Aeromodeller* Coupe D'Hiver, which yielded 1st, 3rd and the two top junior placings in the 80 gram event. *PRO: Ian Davitt, 54 Tredgold Avenue, Bramhope, Leeds LS16 9BV*

Still in Yorkshire, we come to a report from Secretary, D. Busling of the **Thirsk Model Club.** Weekly flying meetings are still being held at the club site at Newton Grange, but no indication given of type of models flown. The club also held a comp during the year which was won by J. Kettlewell. Again no details given. Big event of the year was an Open Night held in the Town Hall, Northallerton, in December. Apart from the club models on display there were two Trade stands. Well received by public. *Sec: D. H. Bowling, 105 Chawtry Road, Romanby, North Allerton, N. Yorks.*

The first AGM of the **Chelmsford Model Flying Assoc,** gave cause for some gratification. Seems the club has grown out of a small group who for some years have been flying on a local sports field. In building up the club other sites have been acquired, but some too small for R/C comfort! Meetings are held in a small hall, the space of which is certainly not wasted, for both C/L and RTP have been experimented with. The C/L effort was a three up Gnat Race using 8 foot lines and Telco CO_2 motors. Like many go-ahead clubs these days they are represented on the local Sports Council, and have been invited to take part in the June sports festival. Unattached modellers in the area, including juniors, are invited to contact the *Secretary, Mr D. Clark, 14 Campbell Close, Chelmsford.*

The membership tally at the AGM of the **Peterborough MFC** was 14 seniors and 10 juniors, according to the PRO, Charlie Windows. The junior section is very much involved in the sport of the quick reflex and keen eye, Combat and chuck glider having its due following. The river embankment site is suitable for C/L though, and there is always RTP in the large clubroom at the Lincoln Road Youth Centre where the members meet on Friday and Saturday evenings. Just now the club is looking forward to putting on a good show at an all model exhibition at the Cressel Centre, Bretton on March 22nd. *Sec: M. Page, 27 Aster Drive, Warrington, Peterborough.*

We have more news of the only model club we know to be named after an individual, albeit a most worthy one. The club is the **R. J. Mitchell MAC.** Mr A. Edwards, the Chairman, writes to tell us that the Spitfire designer is further celebrated by the raising of a very stylish club standard in blue and gold with a picture of a

Croydon DMAC members participating in last year's Model Engineer Cup, SMAE decentral event at Bassingbourn, where their "A Team" all reached the fly-off to take the trophy. From the right: Pete Jellis, Martin Dilly and Ken Smith (A Team). Ray Elliot, Tony Young and Brian Spooner kneeling (B Team).

Spitfire and the name R. J. Mitchell emblazoned across it. The flag to be flown on his birthday and on Battle of Britain days. Still more news involving the famous fighter: the club participated in a display-cum-contest with a local club, the Spitfires, in a school hall. The RTP event was quite a success with a cup and other prizes to the top men. Last year, the club gave over 50 displays, and flew for the first time a four engined Liberator. And to round off the Spitfire associations the club hopes to have a flying site in the place where R. J. Mitchell was born. *Sec: David Leigh, 20 Darnley Street, Shelton, Stoke on Trent, Staffs ST4 2BH.*

Our first newsletter to hand, **Northern Area News** continues to give excellent coverage of the **Northern Area** activities. At the Area AGM, the retiring Secretary, N. Walton, reported a register of no less than 24 affiliated clubs, an increase of five over the previous year. This amount of interest obviously puts pressure on the flying field situation which, over the past few years has been far from good. Even so, in 1979 all the Area events were duly run, although club rallies were more seriously affected. This is to be regretted because only at the club rally can you win a prize without taking on the whole country, the big galas excepted. This year applications have gone out for Dishforth (granted for C/L) and Elvington, Church Fenton and Driffield (replies awaited).

Enterprise on behalf of the **South Bristol MAC** has yielded two extra halls to meet the demands of the growing Indoor interest within the club. Both are of medium size, with one having a 35ft ceiling, giving the possibility of high duration times. Both are reasonably priced: one at £5 and the other £10 rental; price being an importtant consideration as there are obvious limits to which you can stretch the club funds for this purpose. An incentive to Indoor participation comes in the form of an award, the Dave Martin Trophy for Free Flight. *Sec: Gordon May, 4 Burchells Avenue, Kingswood, Bristol.*

Still uncertainty about the future of Bovingdon; the **Hemel Hempstead MFC** maintaining a tenuous hold on the site. The newsletter goes on to say the flying situation depends on the local council giving the landlord permission to reside on his own pro-

CAPTION CONTEST

Why not try winning yourself a year's subscription to Aeromodeller *by entering this month's Caption Challenge – just send your entries to* Aeromodeller, *P. O. Box 35, Bridge Street, Hemel Hempstead, Herts HP1 1EE – Results July issue.*

perty. *Sec: T. Angell, 20 Lyme Avenue, Northchurch, Berkhamstead, Herts.*

A new cover, highly stylised, graces the **Three Kings Aeromodellers'** *Court Circular* newsletter. Bolstering up that scale interest is a series of lectures that I, as a WW2 buff, would like to attend. They are on the subject of air battles, given as a course by Peter Cooksley at the Sutton College of Liberal Arts. *Sec: D. G. Woods, 133 Ravensbury Road, Southfields, London SW18 4RY.*

What seemed an ill wind blew very advantageously for one particular model club according to a newspaper cutting appearing in the *Wings and Fins* newsletter of the **Coventry & DMAC.** The club was banned from a particular flying site following complaints of noise even though **a petition against model flying was signed by only two people!** But a look around for another site came up with one of 130 acres, with not a complaint in sight, or rather, earshot. *Sec: N. H. Goodman, 23 Berwyn Way, Stockingford, Nuneaton, Warks CV10 8QW.*

In the **Leicester MAC** bulletin Mike Pitchers weighs up the pros and cons of electric power flying. He duly appreciated some of its advantages, since the type of model most suitable is a powered glider he considered bungee launching the better proposition. Obviously electric power is admirably suited to open spaces where internal combustion power flying is banned and glider lines are vulnerable. *Sec: I. McKeggie, 12 Pochin Drive, Burnmill Park, Market Harborough.*

One of the nicest little magazines to come to our notice is *Flight Lines,* the journal of the **Model Aeronautics Council of Ireland.** Let me say at once though that the advert for Bass on the inner cover page has no connection with the modellers' wood of the same name. Much news of Radio and even C/L, but what of Free Flight in the South? *Sec: P. Deane, 1 Blackheath Grove, Clantarf, Dublin 3.* Up North, though, the emphasis is very much on Control Line, and the **Belfast MFC**'s *Nitro* gives all the news and views straight from the handle. *Sec: R. Johnston, 11 Ailsbury Crescent, Belfast.*

That's all for this month. **Clubman**

MARCH WINNER – GEOFF GREEN, HIGH WYCOMBE

Our March Caption Challenge inspired the largest entry so far since we started the contest. Runners up were: Tony Brooks, Nottingham IT'S A MARVELLOUS SILENCER, BUT IT DOES NOT GIVE YOU MUCH WARNING". Pete Malinson, Southport "IS THIS ONE O' THEM BUMSTORMERS, 'ERBERT?" Jackie Atkinson, Maidstone "HE'S PRACTICING LIMBO, A GOOD BLOKE COULD GET IT LOWER THAN THAT!" Michael Griffiths, Bristol "FORGET THE MODEL, RUN FROM THE BULL CHASING IT!" and finally, Harry Foster, Derby "PERSONALLY I NEVER HAVE A PROBLEM FINDING SPACE TO FLY!"

The photo depicts moments of excitement from the halcyon days of Northern Heights Galas at RAF Halton and was originally published in September 1956 *Aeromodeller,* since when this particular manoeuvre has been faithfully re-enacted at flying fields throughout the country.

However the last word in captions comes from Fernando Zabaleta, Sevilla, Spain "TAKES-OFF IT WITH THIS BAD TEMPER EVER?" reply "NO, ONLY AT THE FIRST FLIGHTS IT HATE GET UP EARLY!"

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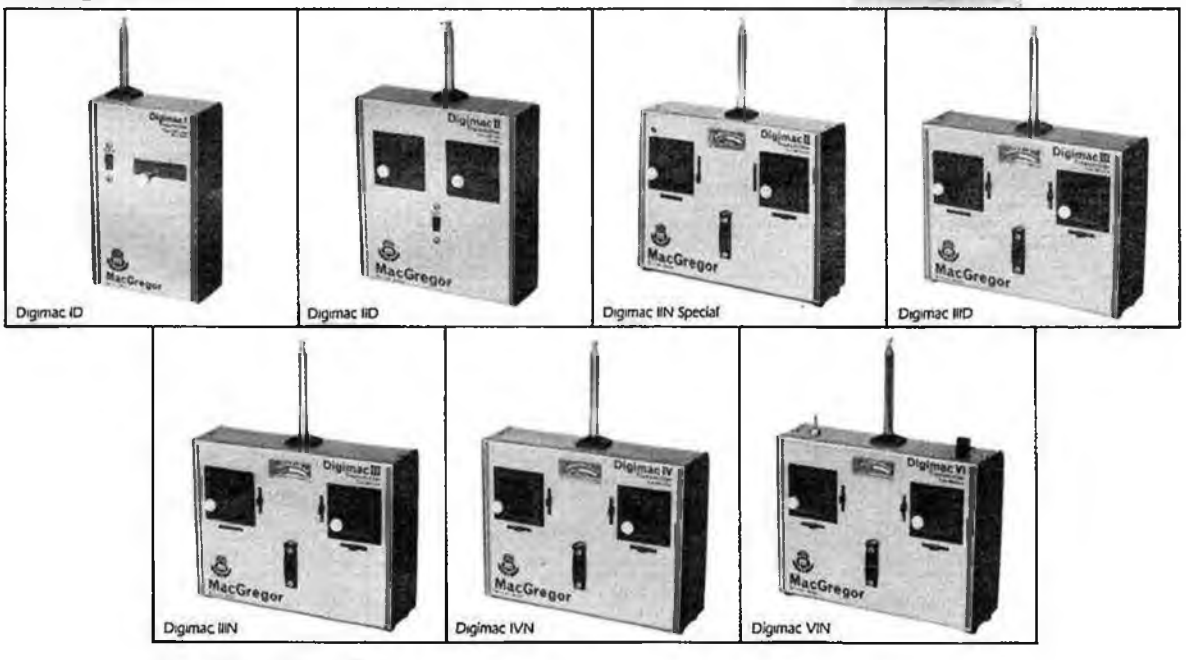

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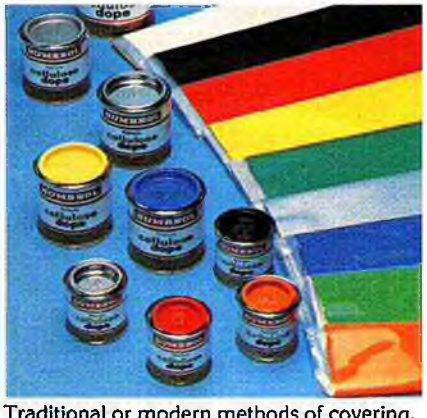

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