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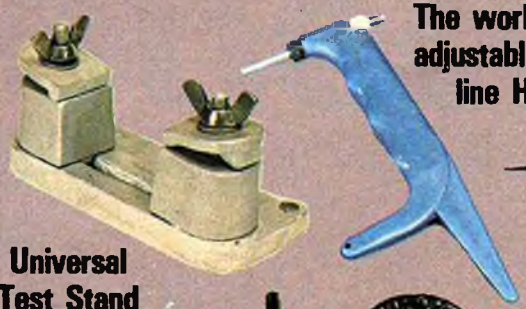

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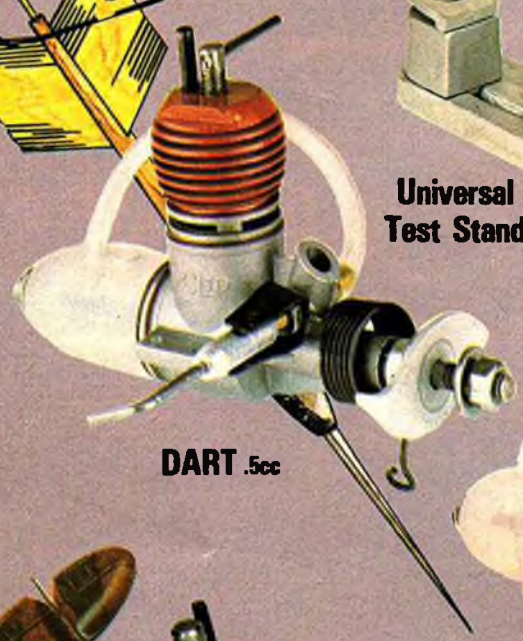

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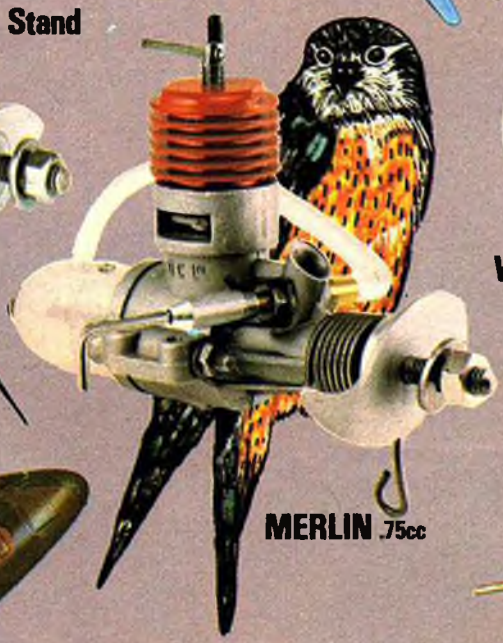

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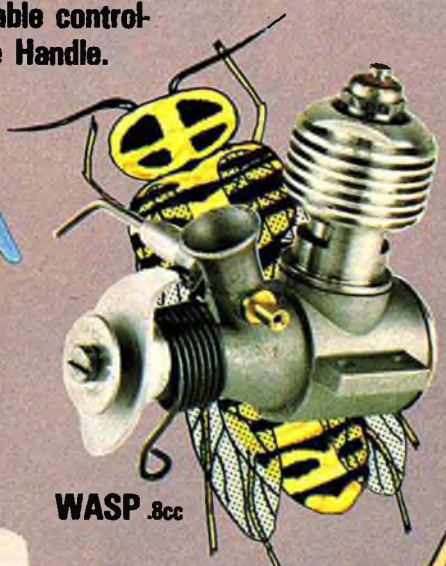

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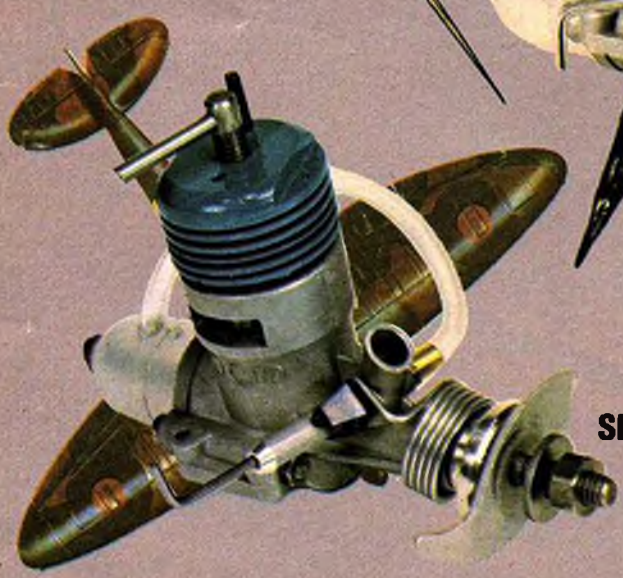

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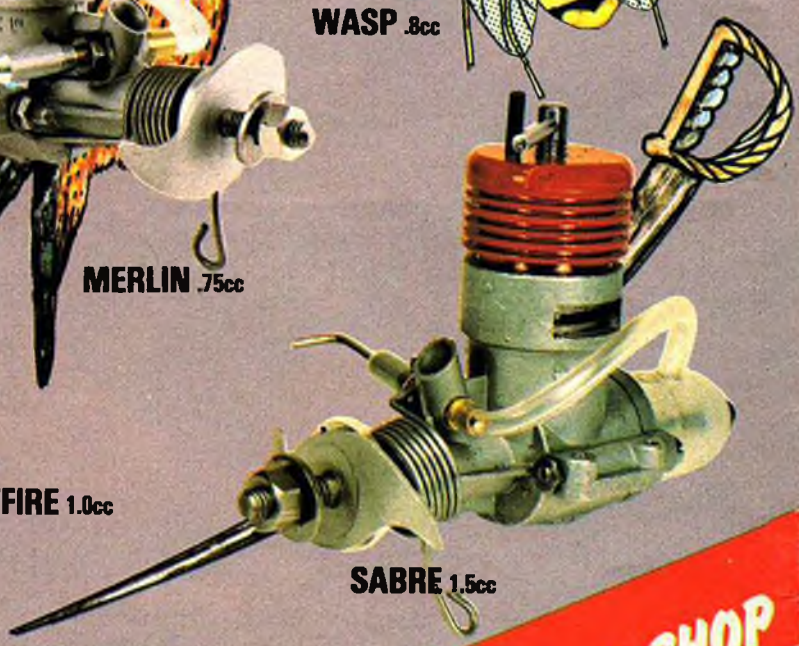

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Aeromodeller

JULY 1980

EDITOR **MARTYN COWLEY**

Editorial director **TONY DOWDESWELL**

Managing Director **R. G. MOULTON**

Group Advertisement Manager **M. GRAY**

MAP **HOBBY MAGAZINE**

Comment

CB OR NOT TO BE, that is the question – to which as yet there is *still* no clear answer. The Home Office have announced that they propose to *eventually* lift the current ban on Citizen Band transmissions, allowing what will be called "Open Channel Radio" – but have not stated what frequency will be allocated! They estimate that 100,000 illegal operators are currently risking £400 fines or 3 months imprisonment for being in possession or transmitting on CB equipment. The World Standard frequency for CB (legal in other countries) is 27MHz, the *same* as used for R/C model flying – yet the Government have said they will *NOT* allocated 27MHz for CB in England! The SMAE have been resisting the illegal use of CB radio on behalf of model flyers for many years and have suggested 35MHz now be allocated for R/C flyers. 100,000 model flyers have paid £¼ million in licence fees for the privilege of being legally licenced for fly R/C models on their government allocated frequency of 27MHz. What is now required is an immediate statement from the Home Office specifying which frequencies are to be allocated in future for CB and R/C model flying, in order to prevent a further stampede for the still illegal 27MHz CB equipment. Otherwise, with so many CB sets in circulation, 27MHz will continue to be interference ridden, even after another frequency has been allocated for "Open Channel Radio".

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On the Cover

William Brooks' unique 3.6m wingspan 2 channel Radio Controlled Flexi-Wing Canard powered by a Veco 61, his latest model in a design series leading to a full size man carrying micro-light aircraft. A detailed account of these fascinating flying machines appears on P374.

Next Month

Bumper issue: Full Nationals report and results of Britain's biggest annual event; Conclusion to Flexi-Wing feature includes APS plans of three machines, CO_2 Free Flight and .8cc and 10cc R/C versions; Full size plans for Bob Walker's C/L Mini Goodyear racer *L'il Quickie*; Aircraft Described Scale Drawings of the famous Stampe Biplane. A great issue, make sure of your copy – on sale July 18th.

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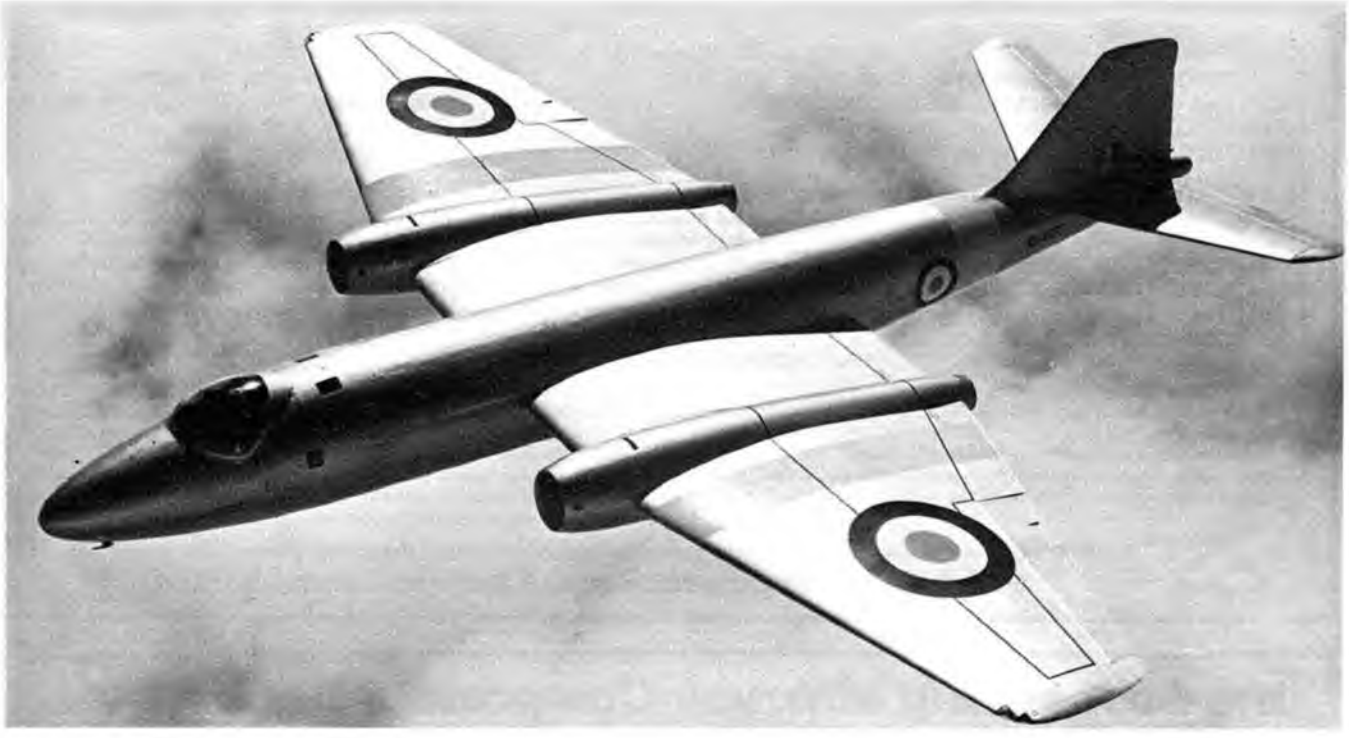

Some aircraft are 'right'. From the start. Like the English Electric Canberra – Britain's (and NATO's) first jet bomber. A simple, clean design with a low wing loading. First flown on 13th May 1949. Still in service in parts of the world. Obviously the designer (it was actually a private venture project to start with) had a good look at a Meteor first. And improved on it. Nothing really outstanding about its performance. No special aerodynamic features. It just got accepted as one of those aircraft that defied much criticism at its inception by working out right and ended up taken for granted.

It's surprising that designs, even materials, that are 'right' *are* taken for granted. Like balsa, for example. It's a first-choice material for a lightweight, fully-engineered airframe. But balsawood supplies can vary a lot in density, quality – and in the way the material is treated during manufacture into sheet, strip,block, etc. Only Grade A balsa is 'right' for models. Followed by *real* know-how in selecting, grading and cutting it.

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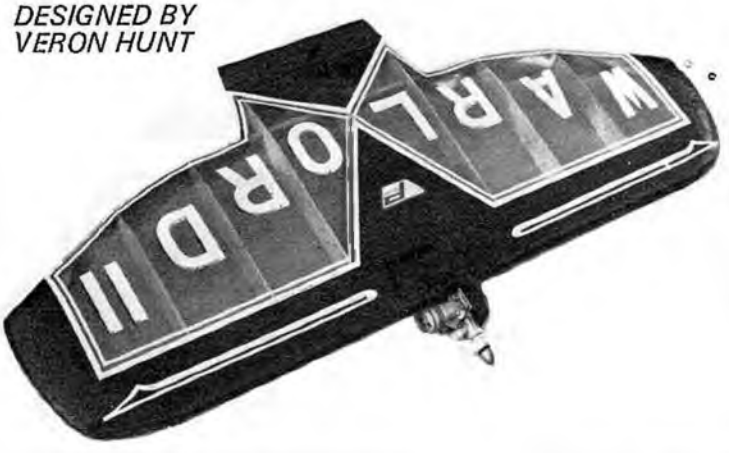

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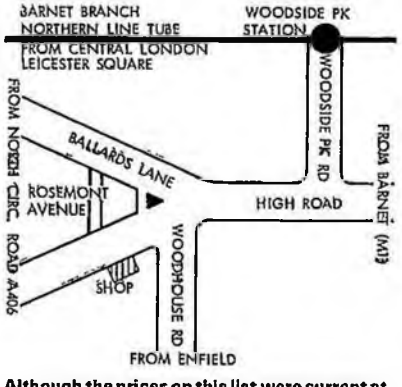

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Hangar Doors

BRITISH MINIMUM AIRCRAFT ASSOCIATION

A new organisation has grown out of the British Powered Hang Gliding Club which aims to represent people interested in the new breed of powered flying machines up to 100kg empty weight. A regular magazine circulates members providing a forum for exchange of information and ideas, and the BMAA committee is to seek authority from the CAA to control the flying activities of its membership. Pilots, constructors and other interested parties are invited to contact BMAA Secretary, David Kirke, 31 Park Town, Oxford.

WORLD CHAMPS ART

Polish model flyer Stanislaw Zurad proposes to organise an exhibition of his paintings concerning the theme of aeromodelling after the World C/L Champs held in his home country later this year in mid-July. A graduate of the Academy of Fine Arts in Cracow, Stanislaw hopes this could be the beginning of a series of such exhibitions at Championship events, featuring the work of artists worldwide depicting their favourite topic of aeromodelling, leading to greater appreciation and recognition of the sport. Stanislaw now lives in USA, where he recently completed a charcoal sketch of Gossamer Albatross pilot Bryan Allen. Artists who would like further details of his proposals can write to: Stanislaw Zurad, 4193 Ridge Road East, Novi, Michigan 48050, USA.

Another new shape in the skies; powered micro-light aircraft which use hang glider technology fabric wings, combined with spartan accommodation for pilot. Above: *John Chotia's* Weedhopper *from Utah, USA.* Right: *Steve Hunt, Chairman of newly formed BMAA at the controls of his Hiway* Skytrike *which uses add-on hang glider power unit.*

MODELS ON SHOW

At this year's *Daily Mail* Manchester Ideal Home Exhibition, the organisers invited the SMAE North West Area to present a static display of model aircraft. The NW Area were provided with a large carpeted stand free of charge, which they duly filled with an array of Free Flight, Control Line, Radio Controlled and Scale models. Aeromodelling literature, plans, photographs and information panels supplemented the models and flyers were present to help answer questions from the public. An added bonus came with visits by fashion models from the adjacent Empire Stores stand who added glamour to the occasion. The Exhibition attracted over 60,000 visitors and the models were featured in a pictorial spread across the centre pages of the *Daily Mail*. Congratulations go to all the Northern modellers of the SMAE for attracting such good publicity to the sport of model flying.

ANNUAL NEWS

Many readers have contacted us to express their disappointment on hearing that the legendary *Aeromodeller Annual,* published continuously since 1948, has now ceased production. Rising costs of producing such small format, low circulation books is responsible for the decision but the story does not end there. A new annual synopsis of aeromodelling's finest achievements will continue to be published under the new title *Model Planes Review* on sale from June 20th. Contents will include all categories of Radio Control, Free Flight and Control Line with model designs and technical details including aerofoils, rubber motors, survey of engines, latest solar power experiments, all written by world leaders in the model flying world. Whether beginner or expert Model Planes Review will have a big appeal and follows in the tradition of being a fact packed reference source.

Two views of Daily Mail *Manchester Ideal Home Exhibition in May,* far left: *Derek Brunt's Miles Sparrowhawk and Macchi 202 airframe,* left: *fashion model Lorraine amongst the C/L exhibits.*

Right: *Look out for the 1980 Model Planes Review which replaces Aeromodeller Annual – on sale 20th June.*

Letters

MONTREAL STOP

Dear Sir,

I don't know where you dug up that old photo of me and my Open rubber *Iroquois* in the December issue's Caption Contest, but as I no longer have the picture myself, I must thank you for featuring it.

A small group of us from the old Montreal MFC used to drive the 60 miles west from Montreal to Hawkesbury Airport, often leaving at 3.00am in summer to fly at first light in what we hoped to be dead air. We even made the occasional winter visit as the picture shows, and had concluded an afternoon's flying in bright sunlight, light drift and a temperature of about 20° Fahrenheit – retrieving in a foot of dry snow kept us warm enough.I might mention that I then played around with feathering props for a while, with satisfactory results, before going into folders, and with Don Mackenzie simplified an American idea into what is now, I gather, known as the "Montréal" auto-stop. It never failed us, hence my difficulty in understanding one of your free flight writer's recently-expressed reservations about it. Perhaps the old *Montréal Bulletin* I used to send out (to eight countries other than Canada) was guilty of spreading the idea.

Malvern, Worcs — *Barry V. Haisman*

THE MISSING LINK

Dear Sir,

Having read your item on p.134 March *Aeromodeller*, I had better identify myself as the 'missing link' who pointed Kunrat von Hammerstein in your direction. In fact, tracing Her von Hammerstein turned out to be easier than it seemed.

I bought the *Aeromodeller Annual* in January 1979, and having been living here in Germany a few months was interested in Frank's article. However, it seemed that the only readily available way of tracing his friend was to go right through the telephone directory and contact all the Hammersteins. That seemed a long and expensive undertaking and at the same time there would be no certainty of success, so at that point, I gave up the idea of searching.

However in July, I saw a television documentary – one of the interviews was with one Ludwig von Hammerstein and I therefore, found out the TV company and programme producer involved, and sent him a copy of the *Aeromodeller Annual* article with a request to forward it to Ludwig von Hammerstein 'for his interest'.

After several weeks I received a letter from Kurt himself, who it turned out, was Ludwig's brother, together with an autographed copy of his second book and a request for help in contacting Frank. I sent him your editorial address and telephone number, and you know the rest.

West Germany — A. P. W. Martin

BECOME AN UNCLE!

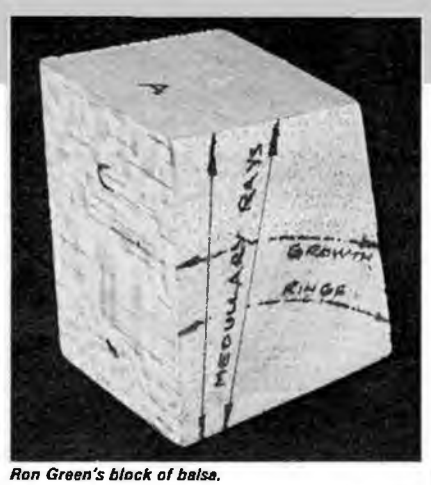
Dear Sir,

With reference to your request for ideas for recruiting youngsters into the sport, I wonder if my club's 'FLYING SCHOLARSHIP' scheme is of any interest.

Very simply we invite two local schools each year to nominate one pupil each for the award of a Wimborne Model Aero Club Flying Scholarship. These candidates are then taught to fly using the club's own R/C training aircraft dual control radio gear.

We also run an 'UNCLE' scheme. Under this, junior members who need assistance can if they wish be assigned a 'senior' member who acts as their 'DUTY UNCLE' and gives them all the help they want. Both schemes have proved popular and successful.

The club has always been very strong on the R/C front, but lack of a suitable site has restricted F/F to indoors only. 1980 however, sees a dramatic change in this situation with the opening of a new exclusive 18 acre site, with hundreds of acres of overflyable adjoining 'scrub' land belonging to the same owner, just outside Ringwood in Hampshire.



Ron Green's block of balsa.

We very much look forward to a boom in F/F and C/L activity, and new members are very welcome and should contact membership secretary: Frank Robinson, 11 Paddock Close, Stapehill, Wimborne, Dorset.

Wimborne, Dorset — Kevin Allison

QUARTER GRAIN – CORRECT

Dear Sir,

Enclosed is a block of balsa which I have cut to show the three main cuts of sheet. I have also marked in the growth rings medullary rays. This shows quite clearly that Bob Meuser is absolutely correct. 'C' grain is the equivalent of quarter grain. Note also that the medullary rays are not straight but curved. It is for this reason that true 'C' grain can only be cut in narrow sheets up to approximately 30mm in width. I hope this finally solves the question as to what quarter grain really is. Tangent cut sheet is 'A' grain, radial cut is 'C'. The colour which Vic Smeed refers to has nothing to do with the cut. I have all cuts in both dark and light colour.

Watford, Herts. — Ron Green

What's Happening?

EVENTS

June 21st
GREENWICH FESTIVAL including displays by Greenwich Electric Flying Circle. Venue: Greenwich House Community Centre, 141 Greenwich High Road.

June 21st/22nd
AEROMODELLER ALL-SCALE TWO-DAY. The Biggest and best event of its kind held anywhere, with hundreds of flying scale models to be seen. R/C, F/F and C/L. Venue: Old Warden, Beds.

June 29th
VINTAGE MODEL AIRCRAFT SOCIETY 3RD FLY IN. Bring your Vintage models along for informal flying or just come to spectate. Venue: Chobham Common. Contact: Don Read Tel: Farnham 723400.

July 20th
SHUTTLEWORTH MODEL GROUP OPEN DAY – *FREE FLIGHT, CONTROL LINE, AND STAND-OFF SCALE.* Venue: Old Warden, Shuttleworth, Beds. Contact: M. Staples, 11 Whitehill Road, Cambridge CB5 8LT.

July 19th–20th
BOURNEMOUTH AIR PAGEANT, displays of Military and Civil aircraft. Venue: Hurn Airport.

CONTESTS

June 22nd
ST ALBANS SUMMER GALA. *A1, CDH, 1/2A, HLG, CO₂.* **Venue A:** Bassingbourn. Contact: John Fletcher Tel: Stevenage 68731.

June 27th
NORWEST NIGHT. *F2C* Friday Evening Racing. Pre-entry essential. **Venue B:** Burton Wood. Contact: Jim Woodside Tel: 051 734 2130.

June 29th
CL 3rd CENTRALISED. *GOODYEAR F2B+NOVICE, F2C, F2D SPEED INC. JET.* **Venue:** Could be anywhere. Contact: Bob Horwood Tel: 0272 48869.

July 6th
PETERBOROUGH COMBAT RALLY. *1/2A COMBAT.* **Venue C:** Peterborough River Embankment. Contact: Neil Gill Tel: 0733 252645.

July 6th
TYNEMOUTH RACING RALLY. *F2C, 1/2A.* Limited access SMAE or SAA only. **Venue D:** Albemarle Barracks. Contact: R. Wilson Tel: 0632 881127.

July 6th
WMAC VINTAGE DAY. *R/C ASSIST PRE '51 DURATION & PRECISION.* **Venue E:** Walsall Airport. Contact: M. Taylor Tel: 0922 415316.

July 6th
SCALE FLY IN. *F/F, C/L, R/C.* **Venue F:** Barkston Heath. Contact: F/F Bill Dennis Tel: 0734 669219; C/L Vic Willson Tel: 073-522 3743.

July 12-13th
LONDON AREA GALA. Sat: *F1A, F1B, F1C,* Sun: *O/G, O/R, O/P, VINTAGE.* **Venue G:** Everleigh. Contact: Martin Dilly, 20 Links Road, West Wickham, Kent. Enclose SAE.

July 12-13th
CLAPA CHAMPIONSHIPS. *F2B, OPEN SCALE, CARRIER & NOVICE.* **Venue H:** Essex Show Ground, Braintree. Contact: Peter Burgess Tel: Witham 516881.

July 20th
WESTERN AREA GALA. **Venue I:** Woodbury Common. Contact: Brian Silcocks Tel: Bristol 641101.

July 20th
ELLIOTT SUMMER RALLY. *F2C, GOODYEAR, CARRIER, 1/2A TR, 1/2A COMBAT.* 1st–3rd Trophies all events. **Venue J:** Marconi Avionics, Rochester. Contact: Pete O'Neill Tel: 0732 57899.

July 27th
FF MINI CENTRALISED. *A1, C.D'H, 1/2A, HLG, CO₂ DURATION.* **Venue A:** Bassingbourn. Contact: Mike Fantham Tel: 01 7367163.

NEW ANNOUNCEMENTS

August 2nd–3rd
WOODVALE RALLY. *CLASS I, CLASS II R/C SCALE, LARGE R/C SCALE (1/4 PLUS), F/F SCALE; RUBBER, POWER AND CO₂.* International R/C Aerobatics. Public Displays. Venue: RAF Woodvale, Nr Southport. Contact: R/C – A. N. Searle Tel: Parbold 2000; F/F – B. Sinclair Tel: 051-207 0111.

August 24th
WOODBURY RALLY. *O/G, O/R, O/P, COMBINED MINI, HLG, VINTAGE.* Sponsored by Free Flight Model Components. Venue: Woodbury Common, near Exmouth. Contact: Chris Chapman Tel: Plymouth 881 460.

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.

FLEXI-WING CANARDS

The fascinating account of the development of these unusual flying machines.

– by William Brooks

Below: *Flown at Aeromodeller All-Scale Day last June, this small electric powered Free Flight version similar to the CO₂ prototype uses a butterfly canard foreplane to aid flight stability.*

THE "CATALYST" in the story comes from when I started hang gliding in the late summer of 1978. I became very impressed with the simplicity, lightweight, ease of transportation and surprisingly high performance of the modern Rogallo derivative hang gliders. These have now progressed from governable parachutes to real thermal soarers with a glide angle of around 10:1. Immediately I began to experiment with high aspect ratio powered flexwing models, with a view to one day building a full size powered machine. The first ones were of pure flying wing planform but I soon found the stability very marginal especially in pitch!

The idea behind the proposed full size design is to produce a very safe, quiet and efficient foot-launched aeroplane having:

1. Large diameter propeller for high efficiency at low speeds,
2. simple, foolproof controls, effective at all speeds,
3. high degree of stability (especially fore and aft when under power),
4. simplicity to allow de-rigging and portability,
5. impact absorbing structure with the pilot strapped in by harness,
6. good flight angle by using a (relatively) high aspect ratio flexible wing,
7. lightweight – I hope to get the full size weighing under 36kg.

As a hang glider pilot, I can see the shortcomings of simply bolting a power unit onto the very good but totally unsuitable second-generation hang gliders: non-recovery when the sail luffs in a power dive, to quote one highly dangerous feature, and incompatibility with many of the goals I have laid down.

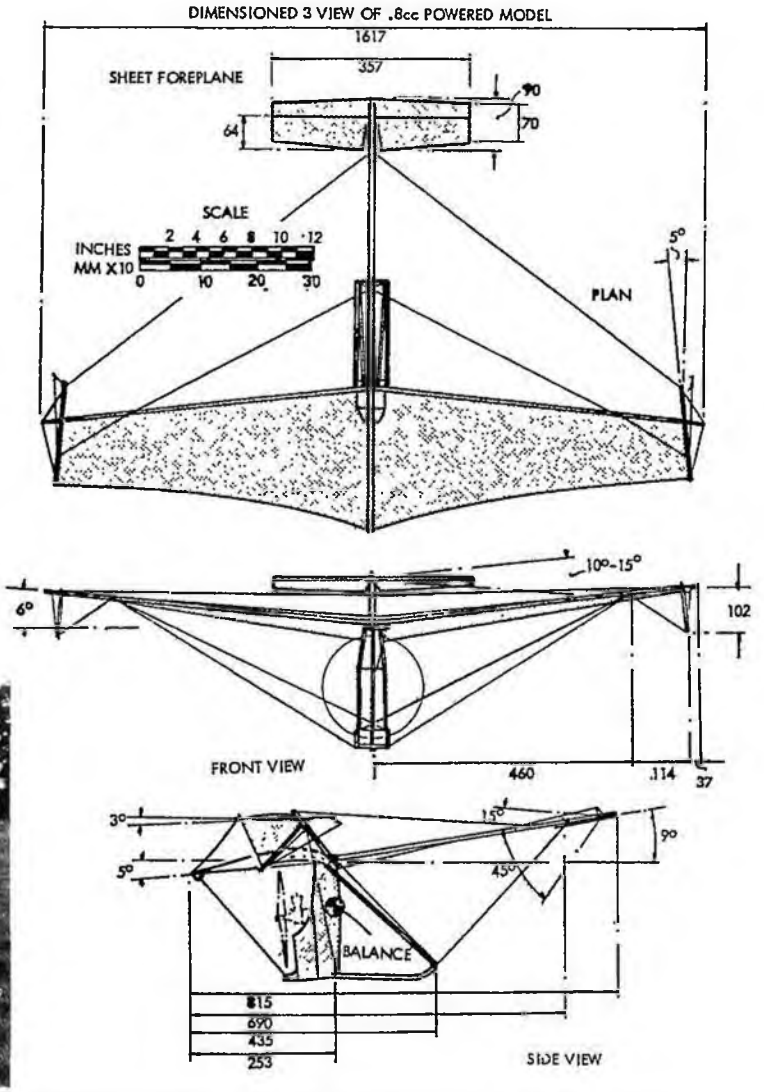
Some time previously one of my friends had built one of Jim McCann's Free Flight Cox .010 powered canards, published P130–136 March 1963 *Aeromodeller,* the performance and stability of which so impressed me that I have also experimented with canards of my own design, some rubber powered and one R/C glider version. I found that they were particularly sensitive to lateral rocking of the foreplane for producing smooth, banked turns, and this stuck in my mind as a means of control.

Suddenly in the bath or somewhere similar – Eureka! the canard layout jumped out as the perfect arrangement – no stall, good pitch stability, a control position in the machine for a pilot (where he could be protected), ability to flare out for landings without hitting a conventional rearward tailplane on the ground. Combined with an ultra simple yet very rigid bracing system which could enable the aspect ratio, and thereby the performance, of the sailwing to be increased.

My first efforts either had the propeller at the rear of the machine or on top driven directly on a power pod but I knew it wasn't right somehow. Then I realised that

Left: *Surprisingly compact, the 1200mm span .8cc powered machine packs down to little more than a handful, for easy transportation.*

Below: *Original 1200mm span 2 channel R/C model powered by .8cc Cox* Baby Bee. *Note plastic covering film pulled taut over centre keel rib, and 'Cyclone' type droop tip fins.*



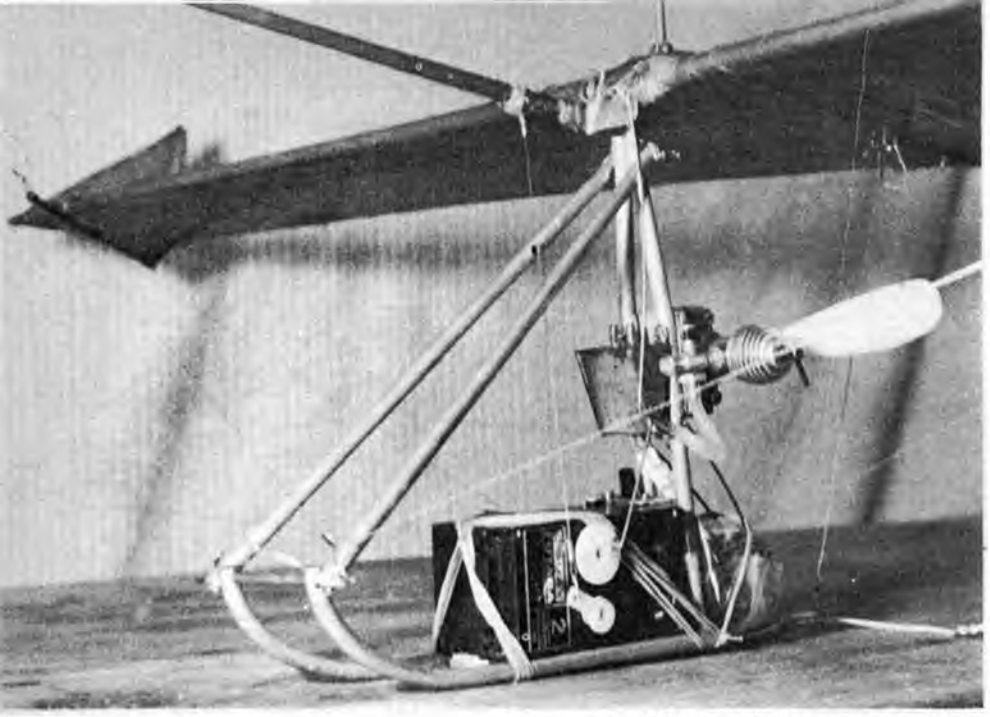
because of the stall-resisting properties of the canard layout, I could put the engine and propeller in a low slung pod underneath the wing where I also proposed to have the pilot and attachments for the bracing wires.

After my initial CO_2 powered prototype had amazed me on its first flight by spiralling upwards straight out of my hands with no trimming, this culminated in the first Radio Control version. I was apprehensive about a .8cc Cox powered R/C model but it just got airborne and staggered round the field straight away, resembling a backward daddy long-legs! Control response was good, using a tilting foreplane for bank and turn, it was ultra-stable and could be flown continuously with full-up elevator – I just couldn't believe it! It seemed I was on to something special.

At this time I began hearing of an unusual man-powered machine from America. The rumours came in one by one – it was almost as if someone had spied on me, so similar was the concept of *Gossamer Condor* to my machine, which I had originated independently for an entirely different purpose! Now whenever I take along one of my models to a meeting at least 80% of the people I speak to think its a scale model of – guess what. Nowadays it doesn't really bother me, it just serves to show the validity of the design concept, and no aeromodeller worth his salt can belittle the stupendous achievements of the *Condor,* the *Albatross* and no doubt those to come from Dr Paul MacCready and his talented team.

The Cox .8cc Silver Bee was used because it can happily run backwards as a pusher driving a 175 x 100 prop in reverse. This can fly the 1200mm span model weighing just over ½ kilogram, on straight fuel – but you need to have a clean run! One interesting point is that although the engine makes more noise and gives more power on a 150 x 100, the model flies less well than on a 175 x 100, probably because of the low flying speed and the unclean air near to the prop hub. Control to the left and right is achieved by tilting the canard foreplane and the entire canard boom, which is fixed by a bearing at the heart of the machine. When tilted over to the left, the assymetric lift causes the machine to yaw and roll into a nice left bank, and vice versa for the other way. Pitch control is achieved by altering the angle of incidence on the canard. Full down with a powerful all-flying canard induces a divergent condition with the sail luffing in a vertical dive, but up elevator pulls it out very quickly indeed and normal flying resumes – this can only happen when the canard incidence goes negative to the main wing – but the angle would be restricted in any case on the full size.

On the 1/3rd scale model, 4 meter span powered by a Veco 61, I did quite a lot of flying but was bothered with a handling problem where the control would be acceptable under power but when the power cut out the machine would start a yawing oscillation. This I traced to the slipstream effect over the built-up fin behind the propeller, which I was using at the time. If I made it larger the glide handling would be alright but there was spiral instability under power. Because of this I returned to the small model to sort the problem out and to this end I have now adopted "Cyclone" type droop tip fins which also reduce tip vortices, thereby



reducing induced drag, as well as acting as auxiliary landing skids. These fins have cut the weight down and are also completely collapsible for transportation. Because they are now not prone to propeller slip stream effect, control is now identical on power and glide. An important point is to ensure that the fins are "toed in", so that if one fin should lag behind the other in an incipient stall, the fin on that side is aligned to the flow whereas that on the leading tip creates more drag, automatically straightening up the craft.

While I was about it, I dispensed with dihedral on the foreplane with no ill effects, simplifying the construction and allowing long strip elevators with just a cut-out for the bowsprit. However for Free Flight I would still recommend dihedral, along with a higher raised bowsprit. My present .8cc R/C model as drawn at the time of writing, has progressed from something that would climb to 15 metres with luck followed by a parachute glide, to a model that goes up like a lift and has soared in thermals for several minutes. It is also very manouevrable, winding into tight spirals very quickly but coming out within half a turn with neutral controls. With the elevator area as drawn, it is possible to flare out (by giving full-up about one foot off the deck) to produce vertical landings in all but dead flat calm.

The 1/3 full size model weighs 3.6kg for airframe and radio weight and carries 1.4kg payload in the pilot position to get the CG in the right place, giving a total of 5kg – it climbs steadily on about half throttle and has quite a flat glide. The wing is the highest aspect ratio yet at 12:1, with the 15mm O.D.HT30TF 18swg leading edge tube curved to eliminate twist along the planform. On the latest type wing, tip fins are used and work well.

I cannot really recommend building this size of model for ordinary modelling as it is difficult for the following reasons:

1. Large room required to set up the rigging properly;
2. Large amounts of dead weight need to be carried;
3. Special high power servos are required.

Up to about 2 metre span with around 2–5cc would be much more practical.

The model in this form was quite responsive but the servo was right on the limit of what it can manage, so I reduced the amount of rocking put onto the foreplane. A simple wing-warping system was developed to get the model rolled into a bank much quicker, or compensate for gusts.

A wire was connected from the top of the kingpost to the trailing edge of two battens, each at about midspan. When the foreplane was rocked over, the inboard wing lifted at the trailing edge by the tension put into the wire, whilst the outboard wing assumed greater incidence. Only a slight movement was necessary to give spectacular response without compromising on stability in the central position.

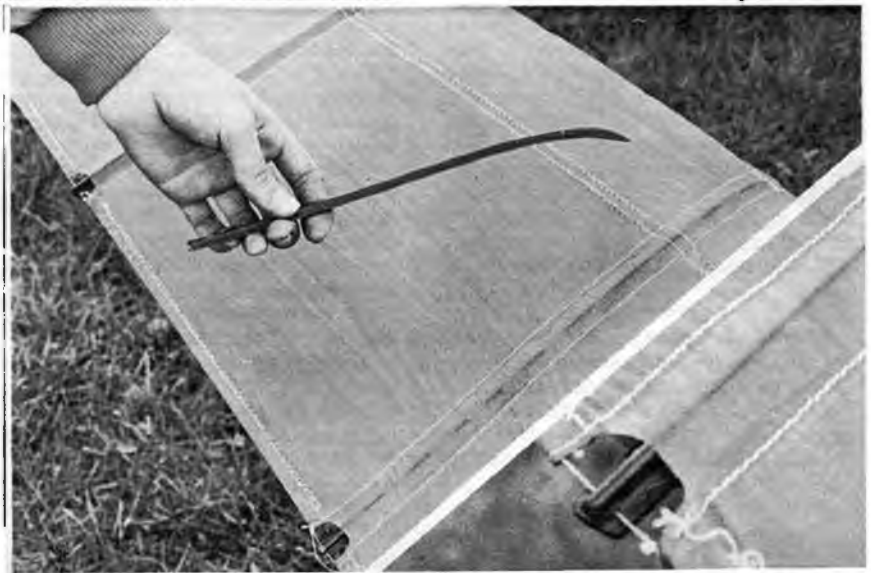
The kingpost on top of the wing has an over centre mechanism built into it to tension the wires when rigging up – tightening all the wires at once.

The foreplane boom had a ball race mounted in the end to give ease of swivelling, and the foreplane was mounted by two fibreglass plates above and below.

Over Christmas 1979 I did a lot of experimenting with different sorts of wingtips to get equivalent dihedral effect using tip fins. The .8cc 2 Channel model was rebuilt in order to give better control response, increased strength (all aluminium pod) and improved glide performance. It is now powered just nicely by

Above: *Simplified underslung pod made from alloy tube for R/C equipment and Mills .75 motor.* Below: *Kingpost incorporating 'over-centre' hinging break to release tension in wires for adjustment or derigging on 10cc version.*

Below: *Chordwise sewn pockets for preformed plastic strip aerofoil battens, which fit against leading edge tube at the front and are clipped in place by trailing edge wire at rear.*



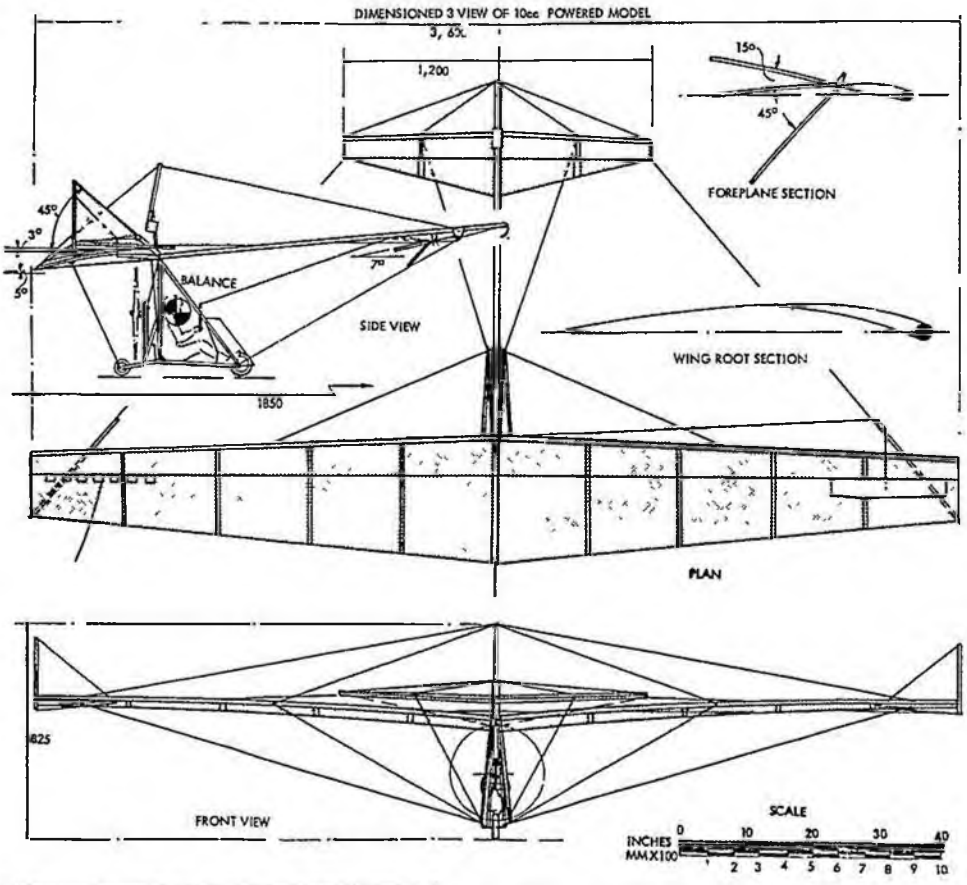
an Indian Mills .75 which is far quieter and more civilised than the Cox, gives longer and more even runs, and can be throttled back to a fast misfire for silly flights!

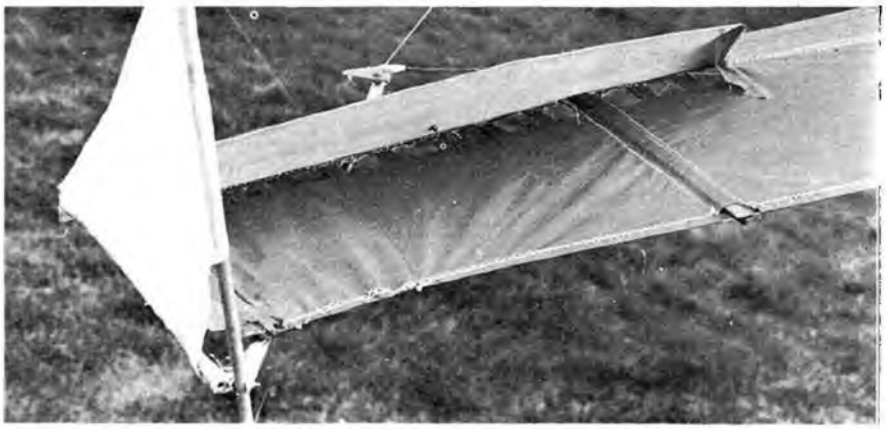
The dihedral angle of the original .8cc R/C model was necessarily steep in order to give structural stability without the use of a kingpost. This meant that droop tips could be used safely but beware of using them on a straight wing!

Because this machine was controlled in turns by yaw induced roll, dihedral effect is necessary to pick the outboard wingtip up as the machine sideslips and so puts it into a co-ordinated bank. For this reason, when I rebuilt the model I used an almost straight wing which necessitated a kingpost, with turned up, toed-in wingtips (remember, toeing-in increases yaw stability). This produces a stable structure, able to fly through much worse turbulence and able to take some negative 'g' force.

The small model has no tip stalling tendencies, especially since I have adopted Chargus' Vortex Generators, as used on their hang gliders at the moment. These are small holes in the covering at the tips just behind the leading edge pocket designed to energise the boundary layer flow on the top suface, thus delaying the stall.

All my bracing is now secured with 20g brass tube swages crimped onto the wire, which works a treat! With a little tin of swages and some spare wire one can change the rigging or repair it easily on the field.





Above: *Slot tip ailerons, as tried on Toucan MPA, proved the solution to lateral control. Holes in surface allow some air through even with flap down, thereby reducing unwanted tip stalling.*

The .8cc model now has excellent control characteristics: I have flown it in a turbulent 22mph wind (when it would sail backwards with full up elevator!), the odd nudge on the foreplane being enough to straighten it out of the gusts, and have taught two complete novices to fly it in the space of 3–4 five minute flights. Because the fin has been pared down, this means that when the foreplane is level the machine is stable in yaw, but when rocked over a lot, the side area presented at the front makes it unstable, allowing ultra tight turns for corrections to be made.

On a final note, a straight wing planform is necessary on these machines to prevent the CG moving back too far – swept back a bit is OK but *not* forwards. When cutting out the sail from ripstop nylon, cut it as though expecting 5–10° more sweepback at the leading edges than required – it will be taken up in stretch. If you have made a mistake and need more sweepback, just cut darts out at the root, overlap and glue up.

The other thing I cannot stress too strongly is to get the *vertical* position of the CG correct. In the small R/C model the radio gear brings the CG down slightly below the thrustline, but much larger than this and *payload must be carried* to prevent nose-up and loss of control under power along with excessive power/glide trim change. My 12 foot span model car-

Right: *Huge fabric elevator on fixed canard foreplane used for pitch control.*

ried 1.4kg in payload (including the glow accumulator!) in the pilot position and could take more. To check, simply pick the model up by the propeller; if it rights itself or balances, you are alright but if it inverts, *add payload.* This however makes the larger model great for aerial photography, and I have since carried a Super 8mm Movie Camera payload with great success.

Excessive down elevator will cause the model to tuck as the sail deflates, so on the large model and full size I have got wires from the kingpost to the trailing edge of the wing at mid-span, which incidentally can pass over a bellcrank to give more manouevrability and gust-relieving. The down elevator movement is limited to a safe angle as shown on the plans.Too much down elevator also results in loss of lateral control as the canard stops lifting, so get that CG in the right place.

My latest developments involve using slot-lip ailerons for lateral control, which have enabled the use of a flex-wing foreplane and elevator which now also fold up into the transport package. The main advantage though is that now the model is flown with lateral and pitch control completely separate from each other. With the rocking foreplane system, where lateral control was achieved through a component of the foreplane lift, a nasty situation could occur in that if a gust came along upwards and from one side, you put down elevator on to keep up airspeed, and since that stopped the foreplane from lifting you found there was then no lateral control! This situation was especially bad if the thrustline was not high enough in relation to CG – a problem I had initially on the large model through carrying insufficient ballast – in this condition it was almost uncontrollable except in a flat calm.

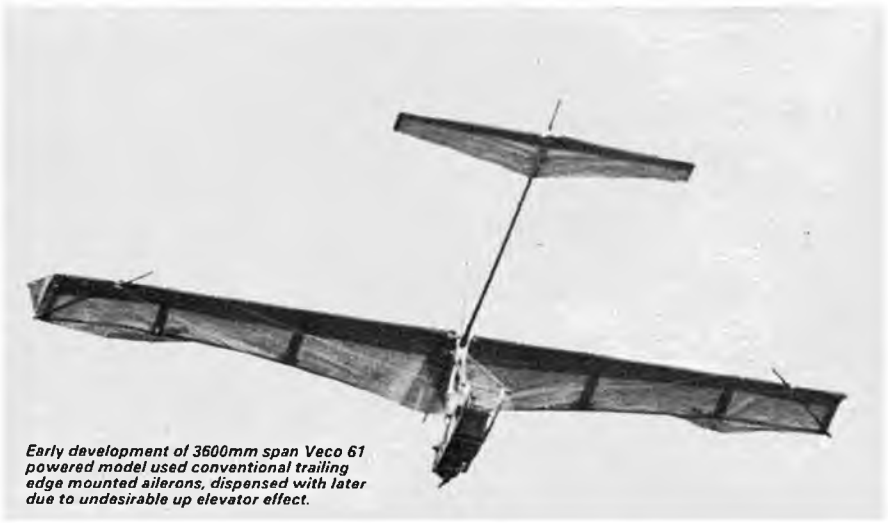
Several types of ailerons were tried – inset, trailing edge, opening panel – until I remembered the Toucan MPA with its slot lip ailerons. This device is perfect for a high aspect flex wing, as when closed a bleed of air comes through the slot, preventing tip stalls. At low speed, at small angles they work as ailerons – good for battling through turbulence (drag rudders are very poor at this). At large angles they work as spoilers to really get the aircraft quickly round a turn and also can be used both together as straightforward spoilers to give a steeper approach path, or complement the landing flare-out. Not bad for something that weighs so little, is simple and cheap! Only the inboard one is operated for turns by bellcrank or pulley, in this case from the tip strut. Problems were experienced in using "normal" T.E. ailerons in that the performance suffered a lot, especially on the glide, and being on the trailing edge gave an up elevator effect (only the inboard one was operated to stop tip stalling) which meant that when flying slowly, and aileron applied to the outboard tip, the machine would stall, dive, pick up speed and then go into the turn!

With the slot lips, full aileron can be put on at the slowest speed and a smooth turn results, since they are much closer to the CG and don't give pitch-up. Without elevator, a steady spiral dive builds up and if lots of up is applied in the bank, continuous turns can be made on the small model of about twenty feet radius!

The flex-foreplane is arranged so that it cannot produce negative lift, since the elevator can only be pulled down against aerodynamic force, not up. This means that divergence (tucking) in dives is no longer possible, as the foreplane always goes into luff before the mainplane, which is held up at the T.E. by anti-luff wires. This gets round another bogey of the old built-up foreplane and adds considerably to the safety of the design.

I realise that all this is getting rather specialised as one would expect, given that I should have a full size machine flying by next Spring, but the purpose of this article is to open aeromodellers' eyes to what is happening in hang gliding and the embryo microlight aircraft movement and to take advantage of the technology of lightweight, high strength, low cost structures that are capable of being repeatedly and simply folded for transport/storage without changing the trim or compromising safety too much.

Next month: Plans and construction details for three versions.



Early development of 3600mm span Veco 61 powered model used conventional trailing edge mounted ailerons, dispensed with later due to undesirable up elevator effect.

Below: *Large model is launched while running behind, with model held suspended from above to avoid danger of rear facing propeller. Unorthodox – but surprisingly easy.*

RIPMAX recommended kits for JULY

ELECTRIC FLIGHT

GRAUPNER ELEKTRO-MAX £37.60
Wingspan 57in. Designed for the JUMBO 755 electric motor – and 2-ch radio. Rudder and elevator gives semi-aerobatic performance. An ideal R/C Trainer! (You can also fly it on a small glow motor). Needless to say, being a Graupner kit it is super-prefabricated and super-complete, down to wheels, adhesives. (Motor and spinner extra).

GRAUPNER ELEKTRO-FLY £36.85
Large 70in span and lightweight construction gives low wing loading for super soaring performance. Ample 'payload' capacity for installing 3-ch radio. Our personal choice for a first R/C model! Building is simple and straightforward from precut balsa and ply parts, milled stripwood, and everything else needed to complete the airframe – including adhesive.

TELCO CESSNA 185 £14.93
18½in span model COMPLETE with CO_2 motor. Assembles in 5-10 minutes ready to fly. The TELCO CO_2 motor is also available separately (**£9.75**) and is ideal for the STERLING PEANUTS and 6-WAY models.

GRAUPNER UHU Mark III £9.85
48in span beginner's model with a contest performance (it's an official class in Germany). An ultra-modern easy-to-assemble kit with moulded plastic pod shells, wing mount, etc; die-cut ribs, milled boom and spars, precut tail parts, etc. Even an auto-rudder and dethermaliser.

STERLING PEANUT SCALE

CURTISS JENNY & SPIRIT OF ST. LOUIS
TWO models in each kit – like all the Sterling 'Peanuts'. Each model is approx 13in span – designed with REAL flying performance in mind!

STEARMAN and TAYLORCRAFT

CORSAIR and JAP ZERO

Built-up tissue covered construction with die-cut balsa parts in SELECTED precision-sanded balsa; formed wire and plastic mouldings, props, wheels, decals, all included. Each kit is the same price (**£3.10**) and makes two models.

RUBBER MOTOR WINDER £2.45
Ideal for all small rubber models. Nylon casting. 5:1 gearing. Takes motors up to 6 strands of ¼.

STERLING 6-WAY KITS

37½" span BLACK WIDOW P-61 £18.25
Built-up construction ensures light weight for best flying performance. All balsa parts die-cut, plus highly detailed plastic parts to simplify assembly. Formed wire parts, wheels, props, decals, etc., all included. Rubber power, or easily convert to CO_2 or glow. Check the listing on right for further models available in the 6-Way range.

37½" span PIPER CHEROKEE £17.50

Here are some superb models – rubber powered free flight scale and a whole range of control-liners.

STERLING RUBBER-POWERED
Flying scale models built-up tissue-covered construction with die-cut and plastic parts. In-flight action features, too. Plus full-size plans.

24" FOKKER D-7	£9.10
22" STEARMAN PT 17	£8.35
22" BEECH BONANZA	£6.10
20" THUNDERBOLT P-47	£6.10
24" NIEUPORT 17	£9.10
20" STUKA	£6.10
17" ME-109G	£4.20
18" AT-6 TEXAN	£5.30
16" CURTISS HAWK	£5.30
17" CESSNA 180	£4.85
17" L-19 BIRD DOG	£4.85
24" P-51D MUSTANG	£9.10
24" F4U-5 CORSAIR	£9.10
24" ZERO	£9.10
21" FOKKER D-8	£6.10
22" SE5A BIPLANE	£9.10
19" ANSALDO SVA5	£6.10
24" SPITFIRE MK 1	£8.35
24" FOCKE-WULF 190	£8.35
24" SPAD 13C	£10.65
30" PIPER CUB J-3	£8.35
25" FOKKER E-3	£6.85
24" GT. LAKES SPECIAL	£9.10
36" AERONCA C-3	£9.10
24" SOPWITH CAMEL	£9.10

2-IN-1 PEANUT SCALE
Each kit contains parts to make TWO models. Prefabricated balsa and plastic parts including wheels and decals.

SE5A/FOKKER D8	£3.10
MONOCOUPE/CITABRIA	£3.10
WACO SRE/CADET	£3.10
CORSAIR/ZERO	£3.10
STEARMAN/TAYLORCRAFT	£3.10
JENNY/SPIRIT OF ST. LOUIS	£3.10

STERLING 6-WAY KITS

33" CURTISS JENNY JN4	£12.95
33" span TIGER MOTH	£14.45
39" FLYING FORTRESS	£17.50
34" FORD TRI-MOTOR	£13.70
28" ALBATROSS D111-A	£13.70
28" BOEING P26-A	£13.70
31" STINSON RELIANT	£11.40
35½" span PIPER CUB	£12.95
33½" span CITABRIA	£11.40
27" P-40 WARHAWK	£11.40
23½" FOKKER TRIPLANE	£11.40

ALL-BALSA 'BEGINNERS' KITS
Another super range from Sterling to take any 049 glow motor. Pre-cut parts with nylon mount ready fitted, complete control system, etc.

21" span RINGMASTER	£5.30
21" span MUSTANG	£5.30
21" span BIPLANE	£5.05
20½" span SPITFIRE	£5.30
20½" span PIPER CUB	£5.30
20½" span SHOESTRING	£5.30
20½" span CHEROKEE	£5.30
20½" span THUNDERJET	£5.30
20½" span EINDECKER	£5.30
20½" span THUNDERBOLT	£5.30
20½" span FOKKER D-7	£5.05
20½" span HELLCAT	£5.30
20½" span FW190	£5.30
20½" span ZERO	£5.30
20½" span ME109	£5.30

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42" RINGMASTER (19-35)	£13.70
38" P-51 MUSTANG (19-35)	£14.45
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30" RINGMASTER (09-19)	£9.90
21" RINGMASTER (02-049)	£7.60
24" LIGHTNING (049)	£3.20
36" LIGHTNING (09-19)	£13.25
52" SPITFIRE (29-35)	£30.45
34" FLYING FOOL (19-35)	£15.20
42" span WINDER (35)	£10.90

STERLING CONTROL LINE SCALE

32" span STEARMAN PT 17	£19.75
36" GT LAKES TRAINER	£22.10
32" span SE5A	£19.75
32½" span FOKKER D-7	£19.00
35" span CORSAIR F4U-1	£20.55
33" span NIEUPORT 28	£19.75

GRAUPNER *JOLLY* 45" span **£10.75**
A1 class contest sailplane with dethermaliser. Converts to pylon power (Pylon mount price **£2.35**).

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

GRAUPNER *JUNIOR* 53" span **£13.80**
Very complete and fully prefabricated kit for A1 class model. Profiled wing.

GRAUPNER *KATY* 67" span **£24.60**
A2 contest model with auto-rudder & dethermaliser. Die-cut sheet parts, milled stripwood, plus plastic parts, tissue, adhesives, decals, etc.

GRAUPNER *DANDY* 63" span **£22.25**
F/F or R/C glider kit includes die-cut sheet, preshaped fuselage parts, milled & slotted stripwood & canopy. Pylon mount available (**£2.35**).

GRAUPNER *AMIGO II* 79" **£25.95**
Super-performance contest glider also adapts to pylon power (pylon mount **£6.95**). Extensively prefabricated kit includes die-cut and shaped parts, shaped towhooks, etc., etc.

GRAUPNER *BETA* 77½" span **£38.75**
Specially designed for 2-channel (rudder & elevator) radio control. Preshaped balsa parts plus plastic root ribs, spar braces and canopy frame.

THE BEST COMES FROM RIPMAX AT YOUR MODEL SHOP

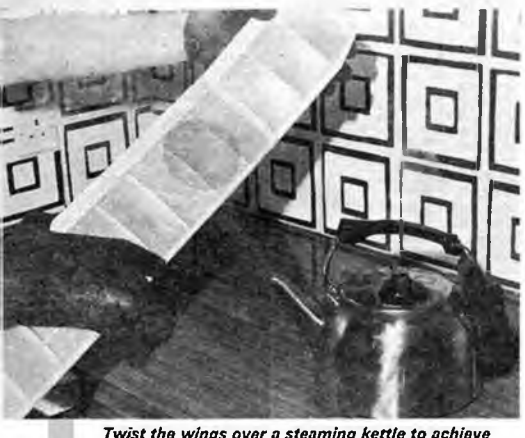
FLYING HIGH

with Ian Barrett

THIS MONTH:

MODELS: PRE-FLIGHT PREPARATIONS FIRST TEST FLIGHTS

Assemble the wings and tail to the fuselage, and check that the model balances as indicated on the plan. The balance point is generally about 50–75% between the leading and trailing edges of the wing. Any variation should be corrected by adding lead to the nose or tail. Look carefully at the flying surfaces (wings and tail unit) to see if any twists are present. Slight wash-out (trailing edge high) is acceptable on both tips, but most important, the inside right panel, or the whole right wing if Vee Dihedral should have some wash-in (trailing edge low). About 1–3mm is sufficient, just enough to be visible, and this is vital to ensure the model keeps nose up during the powered climb and does not enter a spiral dive. Steam the required warps over a boiling kettle.



Twist the wings over a steaming kettle to achieve the correct warps.

Before setting out for the flying field, some means of winding up the motor should be obtained. To put several hundred turns onto the motor by hand is tiring and time consuming. The popular method is to use a drill hand brace, which gears up the turns applied by about four times. A higher ratio is inadvisable, as it then becomes very difficult to turn as the rubber reaches maximum torque. The winding hook can be bent from 12 or 14 swg wire, and must be held very securely in the chuck, My own wire hook has a small turned-over portion at the rear end of the straight length which rests behind one of the chuck jaws, and prevents the wire from sliding out of the chuck when tension is applied.

Hand drill fitted with wire hook for winding rubber motor.

Test gliding the model is carried out in the same way as was described in the last article on trimming gliders. The propeller should be allowed to free-wheel, or in the case of a single blade unit, be in the folded position. If the model tries to lift its nose, then drop it suddenly, then either you are launching it too fast or slightly upwards, or it is stalling. Check your launch, and if a stall persists, pack up the leading edge of the tailplane to increase its lift slightly. On the other hand, should the model be inclined to dive into the ground, more 'longitudinal dihedral' is required. This time, however, lift the leading edge of the wing by packing it up with balsa. On a rubber driven model, the propeller axis should point down relative to the wing, and it is safer to increase this "downthrust" angle rather than decrease it.

When a satisfactory glide has been obtained, take a note of which way the model is turning. Adjust the rudder tab so that the glide is always in a right hand turn. This is especially important in rubber powered propeller driven models, a left hand turn during the power phase can be disastrous.

The twisting power, or torque, required to turn the relatively large propeller in one direction is equally applied to the motor peg in the tail, and tries to roll the model in the other direction. The model rolls into a bank to the left, and a left turn then can develop into a left spiral dive. The rudder tab has the slipstream from the propeller washing over it, and is powerful enough to keep the tail low and nose high if the model is adjusted for a right hand climb under power. The model consequently climbs in a right hand spiral with the wash-in keeping the right hand wing up until the torque from the rubber motor dies away, and then reverts to its normal right hand glide.

Folding propellers, as on this Mercury Mentor reduce drag improving glide.

Now for the big moment where the motor is wound up. Initially just wind the propeller by hand clockwise, and put on twenty to thirty turns. This small amount should not let the model get into serious difficulties, and might indicate where some adjustment is necessary to the trim, as an extended glide will result. If everything is satisfactory, try putting on about 25% turns.

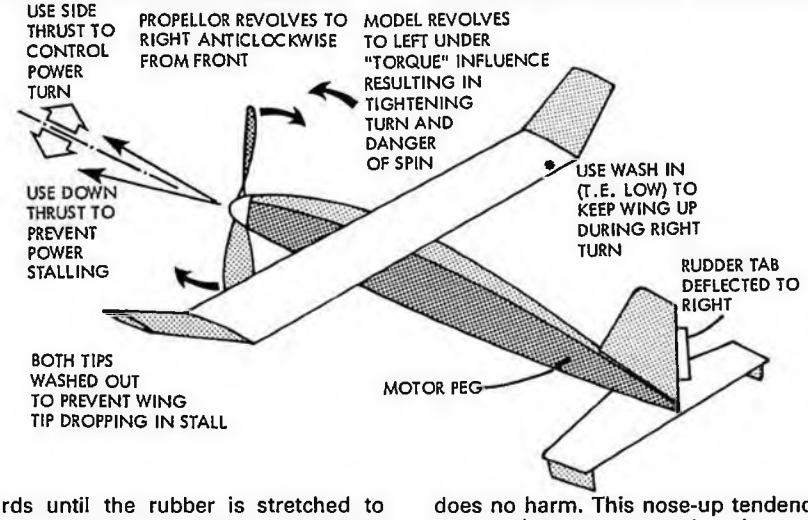
This is where you will need to use your winding aid, a hand brace with hook. Hook it into the propeller shaft loop, and ask your helper to hold the model securely. He should stand, feet apart, sideways-on to you, taking the pull of the motor only on

Rubber motors should be stretch wound, with assistant taking all the load only on the rear motor peg.

the motor peg with one hand, and just steadying the fuselage nose with the other. He will find it more comfortable if he holds the fuselage close to his body, with the wings vertical. The hand steadying the nose should be placed so as to prevent the rubber chafing on the balsa nose former.

Warn your helper that you are going to pull the motor fairly hard, and walk backwards until the rubber is stretched to about three times its normal length. Start to wind on the turns, make sure that the propeller is turning clockwise, in the opposite direction to that required on release, and progressively move in towards the model as you approach the number required, slowly shortening the motor, until the nose block assembly meets the fuselage just at the time the required turns are reached. Fit the noseblock to the fuselage the right way up, and carefully unhook the winder. We have had some trouble engaging the simple ratchets on the plastic propellers, and mis-use can soon wear them away.

Hold the fuselage under the wings with one hand, and the propeller tip with the other. Face into wind, and launch the model slightly upwards, releasing the propeller in the same movement. Should the nose of the model rear upwards into a loop, then a little "downthrust" is probably required. The noseblock is packed so that the thrust line is pointing downwards slightly, and has the effect of holding the nose down. Again, many designs already incorporate this feature, but a little more does no harm. This nose-up tendency is due to the excess speed under power, which produces the stalling motion seen after launching the model too fast when test gliding.



Sometimes the rudder tab, even though correctly set for glide turn, is not quite powerful enough to keep the nose of the model rising and turning right under power, and another little trick is used. A little bit of balsa packing (about 1mm) is inserted at the left hand side of the nose block so that the propeller shaft points slightly to the right. Thrust from the propeller is then helping to pull the nose to the right. If, however, too much right turn under power is present you may need to remove some right thrust, or check you have sufficient right hand wash-in. Some model kits show the sidethrust already built into the nose; it is generally about 3° to the right.

Up and away, the Mercury Mentor *above and Peck Polymer* Prairie Bird *below, launched nose up directly into wind.*

Gradually increase the number of turns applied, but don't approach the maximum (see table) until the motor has become well run-in, say after a dozen flights or more. The rubber must also be kept well lubricated and abrasive grit kept away from it. One of the most distressing sights is a broken rubber motor rapidly unwinding in a bunched-up knot inside a fuselage, demolishing the covering and much of the structure. Examine the rubber regularly, and knot any broken or damaged strands.

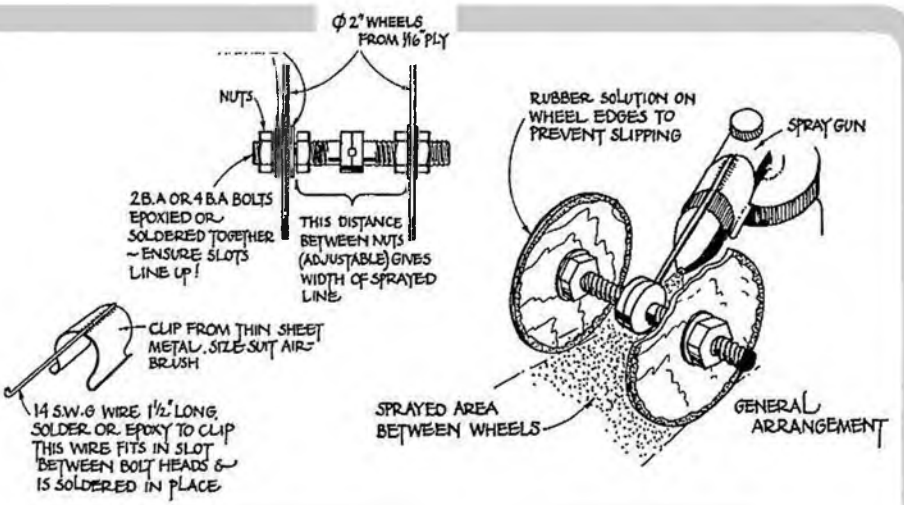
Store your rubber motors unwound in a tin, and keep them in a cool place, away from the light.

ACE LETTERS

Dear Aero Aces,

I have written to tell you about a handy device to fit to your airbrush. It enables you to spray straight lines or curves of adjustable width without the use of masking tape. I got the idea from a road line marker and redesigned it to fit an airbrush. I have enclosed plans and instructions; it should be simple enough for the average modeller to make, and will not cost more than 50p to make, I am not a member of Aero Aces yet but I hope to join in the near future.

Liverpool 8. *D. Tsang*



Dear Aero Aces,

My name is Eric Booth and I have just started aeromodelling. I am a bit confused about control line flying and I was wondering whether or not you could explain it for me. I am only 13 and have only heard of RTP and Radio Control flying. I would be most grateful if you could explain it for me.

Bushey, Herts. *Eric Booth*

Two factors confront the newcomer to aeromodelling, cost and difficulty. As you are still at school your limited budget will restrict your activity. Radio Control equipment plus model will cost £60—£100, obviously too expensive and also probably too difficult to attempt yet for a few years. R/C models are controlled by radio signals which move the flying surfaces, and training by an experienced pilot is recommended. Models tend to be much larger, to carry all the radio equipment, and can be difficult to build.

Electric Round the pole can also be expensive to start, £30—£50 for equipment, although the models themselves are cheap and easy to construct. Usually a school club sharing the initial investment in equipment is best. RTP models are fed with current along 2—6m flying wires, speeding or slowing the electric motor varies the flight path, and flying is usually carried out indoors.

Control Line flying would seem more appropriate for you costing £12—£15 for model and engine. Models are very easy to make but you will need to learn to start and operate your motor which takes a little time. Models fly round the pilot on two wires, 8—16m long, pulling on either operates the elevator thus controlling flight and allowing manouevres. Due to the motors you must fly away from houses.

The last category, Free Flight, offers alternatives to motor power with towline gliders and rubber powered models where you can certainly get started for under £5. Some of the tissue covered models may seem a little tricky but if you start with all sheet designs you will find they are no harder than plastic kits. Models fly freely and are adjusted for maximum duration usually between 1—3 minutes, so you will need plenty of space.

Dear Aero Aces,

I have been aeromodelling for three years and although I have read many books on the subject, there are still a few things which baffle me:

1. How is a rolled balsa fuselage formed?
2. If rolled balsa fuselages are difficult to construct, why is the APS 'Lube-Tube' a one star plan?
3. What are the "80 and 100g" referring to in Coupe d'Hiver?
4. If I built a Coupe d'Hiver or similar for sport flying, would higher weight materials affect the flight performance very much?

I would greatly appreciate answers as I think that they will help me to choose a plan from the APS handbook better.

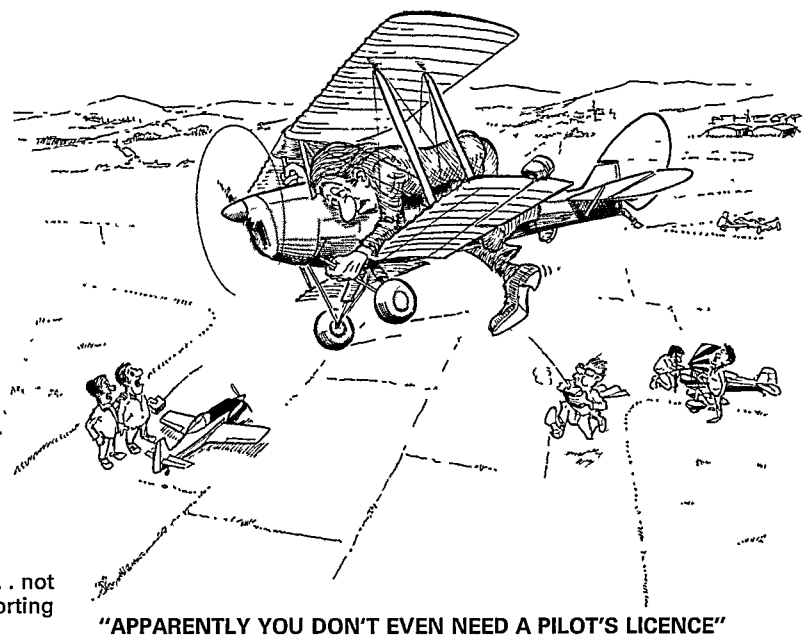
Norwich, Norfolk. *Andrew Ellis*

1. *See Rolled balsa fuselage article in April 1979 issue.*
2. *Rolled fuselages are not too difficult to construct, and although perhaps not ideal for a first model should present no problem to anyone who has built one or two designs already.*
3. *80 and 100 grams refers to the minimum all up weight of the models. Two classes exist, the current FAI rule 70 gram min model plus 10 gram max of rubber and the old FAI rules (still flown in France) 90 grams min model plus 10 grams max of rubber.*
4. *With all models, the heavier they are the worse they fly; lighter models fly better but can also be weaker. Always try to build as light and strong as possible, grading your balsa carefully before building.*

Don't get left out of the flying fun this summer, join the Aero Aces by sending for your Membership card, badge and transfers. Members can benefit from our question and answer service to help them overcome familiar problems facing Aeromodellers, and the chance to win APS plans vouchers for the most interesting letters published.

TOPICAL TWISTS

by Pylonius
illustrated by Sherry



"APPARENTLY YOU DON'T EVEN NEED A PILOT'S LICENCE"

MOVE OVER, OLD SPORT

Seems that, officially, the definition of a model aircraft is '. . . not capable of carrying a human being . . . and purely for sporting purposes'.

Well, if not capable of carrying a human being it should be able to transport him! But, at the way the scale enthusiasts are narrowing the scale gap to the real thing, it shouldn't be long before the first enthusiast gets airborne, voluntary or otherwise. But its the sporting aspect of the definition that is most suspect, though, particularly when you think of all the various business and other non-sporting uses to which the model aircraft is put nowadays. There is crop spraying, aerial photography, including low level runs over a certain Brighton beach, and target practice, to name but a few. Now we read of model aircraft being used by smugglers:

"Okay, I've got the model plane, but where's the dope?"

"Two coats on the fuselage and one on the wings."

Flying a model aircraft just for the sport, or fun of it is something of an antiquated notion anyway. The first priority in life today is your leisure activity; something to fill out your otherwise idle hours whilst the silicon chip gets on with what was once your job. In future you will not be known as a doctor, lawyer, bricklayer or dustman, but as a go-cart driver, model builder, morris dancer, etc. Or, if you have a strong-willed wife, a general handyman. Already the serious modeller only allows his activity to carry the tag of 'sport' just in case the Ministry of same is forthcoming with a cash hand out. In fact, his personal commitment is such that model building is not necessarily something he finds pleasure in; it is more of a stern duty. Many of our top flight modellers regard the actual construction of models as an extremely onerous chore, doing everything possible to preserve the models that they have, rather than build a new one. The same sort of people seem to suffer a great deal on the flying field, too; the time spent in contest flying an ordeal of anguish and frayed nerves, and even worse if they happen to lose. Only some strong inner compulsion keeps them going.

Generally, people who are successful in model flying are just as competent in their particular calling or profession. They are usually of a kind known as ergomanics or workaholics. You know the kind: a perfect model; a marvellous set of equipment; and genned up to the eyebrows in all the latest techniques. They make you feel ashamed of owning a telly, and full of wonder how they get away with all that time spent on the hobby.

And the money they spend, too! All that up-to-date equipment, plus a lot you never thought was even marketed. It is all too evident that such people are already geared to the leisurely way of life – if you like to call it leisure. But they are in no danger of dying of boredom when the chips are down. It might well be that when the robots take over the workaday world the sort of social security you will get will depend on the measure of leisure success that you achieve. Thus, when you see a clutch of Rolls Royces at the contest site, turn your bike around and pedal – you wouldn't stand a chance.

RULE OF THUMB

No longer does the small boy ask 'Did you build it yourself, mister?', for, young as he is, he can tell a bit of plastic when he sees it, and will assume, quite rightly, that you purchased the gleaming craft with yet another piece of plastic – a cheque card! In any case, the wonder of it all, in the past, was that a miniature flying machine was a possibility at all. Back in those days the model plane had something of a mystique, and it was this that intrigued the small, inquisitive boy. A high percentage of human beings are born with ten thumbs, and, in the pre-affluent, pre-plastic days the chap who could conjure a flying machine out of a few bits of wood, wire and paper was highly admired. But you can write out just as good a cheque with ten thumbs as you can with the most gifted set of hands. And no manipulative skills are needed to bring a model to the flying field.

The question is, though: can you effectively control and operate a model plane with ten thumbs, considering the general lack of technical ability that seems to go with that digital peculiarity? Now, since the model plane, whether of plastic or cast iron, is a highly vulnerable piece of apparatus with a fairly high failure rate even in the most capable hands, you might be wiser to give any flying field peopled by the plastic brigade a very wide berth. Not that the plastic brigade is all that forthcoming on the flying fields. I, for one, have yet to see a plastic model in full flight, remarkable though their performance may be in the adverts.

MAKING A COMEBACK

The first model aircraft was not the Stringfellow Monoplane, a Sir George Cayley glider, or even some medieval toy. No, it was that curious, get-your-own-back instrument, the boomerang. This spinning aerofoiled wing was no toy, but used very much in the sporting sense for the clobbering of the kangaroo, walloping the wallaby, or for the very original purpose of bopping the bloke who called you an aboriginal.

Anyway, the aerodynamic missiles are staging, dare I say it, a come back with, of course, the inevitable competition element. A return match? No doubt it should have a special appeal to the chuck glider enthusiast, whose Popeye developed forearm could give the right sort of impetus. Also, the boomerang is ideally suited to the small flying field, where retrieving is likely to be of a very minimal order. A clear loser would be the chap who got a fly away.

One encouraging aspect of the boomerang is that it is a rule of thumb rather than a drawing board effort, having been developed without so much as a mathematical symbol or a sniff at a wind tunnel. Had the old aboriginals got involved in plotting the ordinates and arguing over drag factors they would still be waiting for a taste of wallaby stew.

THIS MONTH:

HOW TO FLY SIMPLE AEROBATICS AND SAFETY CODE

R/C Sport Flyer

by Chris Pinchbeck

PRESUMING that by now, you the reader (are there any left out there?) have built, covered and trimmed your model and that you are able to take off, fly around, and land it, this month is something of a pot pourri.

I recently heard the official definition of a landing, would you believe 'a controlled crisis', think about it! Much of the worst damage to any model occurs during the landing phase. More often than not a wing tip 'arrives' first and this produces a cartwheel with pieces breaking off left, right and centre. Whilst it is very nice, and most impressive, for your model to land at your feet, undoubtedly the most important aspect is that it should get down in one piece. During the landing approach, concentrate mainly on keeping the wings level. If you start your approach directly into wind, and the wings are kept level right through to touch down, nine times out of ten you will bring her down in one piece. A tip I found very useful, when the plane is coming towards you and one wing drops, is to push the stick towards the low wing. This automatically gives the right corrective control. If you can, practice slow, low level passes over the landing area. It is not necessary to go to the lengths of touch and goes, a fly past will train you for landing approaches. Apart from this you will have the opportunity of seeing your model in its element, and at close quarters – not too close though, and keep an eye out for wayward spectators during such occasions.

Built especially for this R/C beginners series, the Cambria Instructor sits awaiting take off. Tarmac or short grass is a luxury for Rise Off Ground take-offs, but by no means essential.

During the landing approach remember that the elevator should not be used, unless a real crisis develops. The descent should be controlled by use of the throttle. A slow setting will obviously reduce power and the model will lose height slowly but steadily. If the descent is too quick, a short burst of throttle will make the model climb, or at very least maintain height. If the elevator is used at this critical time, up elevator will simply lead to a nose up attitude at this slow speed leading to a stall with no reserve altitude for recovery.

Just a short note about take offs. Little or

Whether flying power or glider, if the ground is rough, get an assistant to hand launch the model – but make sure you are switched on, and have checked all control surface movements before he chucks it!

Below: *A handy gadget for any R/C power flyer with sore fingers, this Sullivan Pylon Brand* Hi-Tork *electric starter is powered by a 6 volt accumulator.*

no logical sequence this month! The most critical time is just after lift off. However if the model is at full throttle and the rudder is used throughout the actual take off run to ensure that it is kept heading into wind, the chances are that a smooth lift off can be accomplished. Make sure that the model has achieved flying speed before feeding in a touch of up elevator. This is usually signified by the model 'bouncing' or making short hops. Do not be confused by natural bounces caused by overlarge tufts of grass! Immediately after take off keep the model heading straight into wind in a gentle climbing attitude, say 20°, before climbing out into your flight pattern. The danger is that at the comparatively slow take off speed, a gust of wind may get under a wing and throw the model off balance, so be ready with rudder correction to prevent this from happening. You control the model, do not let it control you!

Flying around aimlessly can very soon become quite boring, so first of all fly a specific, pre-determined pattern; rectangular figure eight circuits flying level are best. Use land marks to set your pattern and try both left and right hand circuits. A figure of eight pattern is good training with the cross-over point directly above

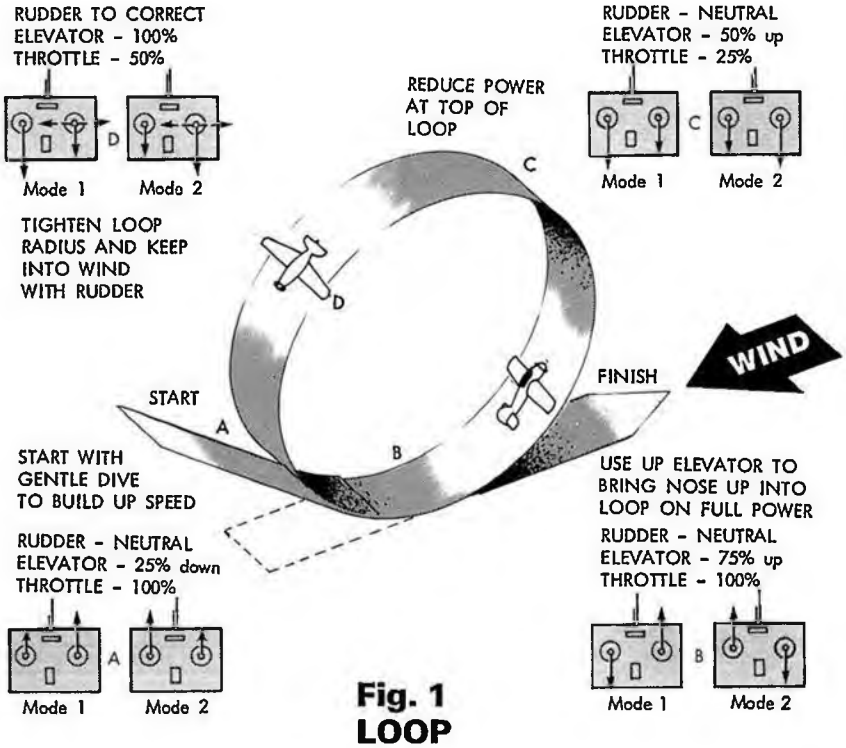


Fig. 1 LOOP

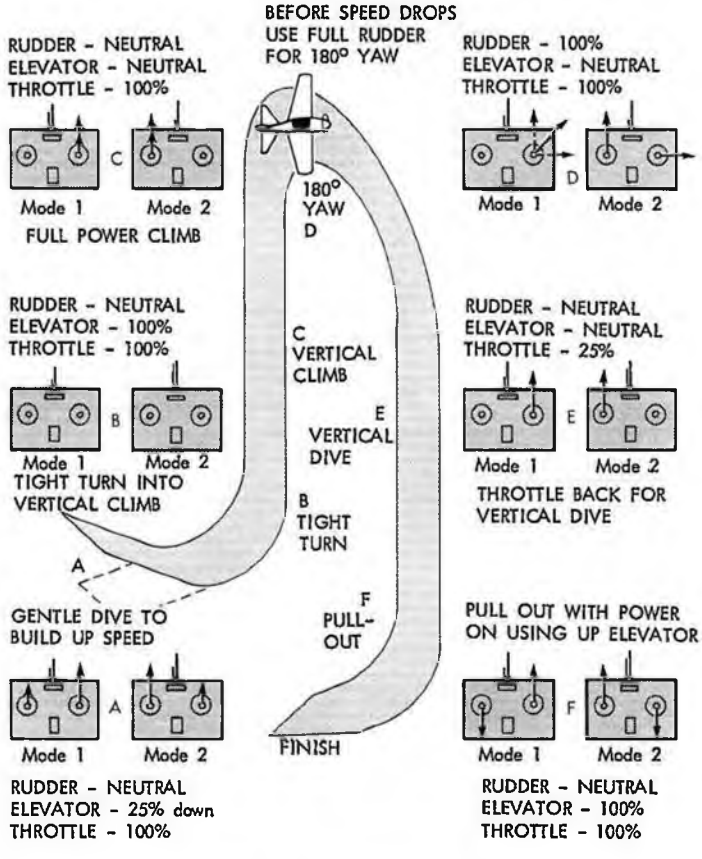


Fig. 2 STALL TURN

you so that you can check the accuracy of your flying. At some stage however, you will almost certainly want to try some simple aerobatics.

LOOP

In common with most manoeuvres it is advisable to build up a little excess speed by putting the model into a gentle dive before gently pulling back on the stick to bring the model up into the loop. As the model goes into the inverted position at the top of the loop, reduce throttle to about a quarter setting. When she comes over the top and starts down, more up elevator should be used to tighten the radius of the loop. Fly the loop directly into wind and use rudder control to keep the model 'on track' through the manoeuvre. Try and complete the loop at the point of entry. See Fig. 1.

STALL TURN

A very attractive pattern if flown precisely, the stall turn should be entered from a gentle dive directly into wind. Full throttle and up elevator make the model climb steeply. As the speed drops off, but before an uncontrolled stall, neutralise elevator and apply full rudder. As the nose goes over and down, throttle back and correct the turn so that the model returns along its original path. When the required altitude is achieved, a touch of up elevator and throttle and the model will return to its original but new heading course back in the opposite direction. The timing of the rudder movement is critical and comes with practice. See Fig. 2.

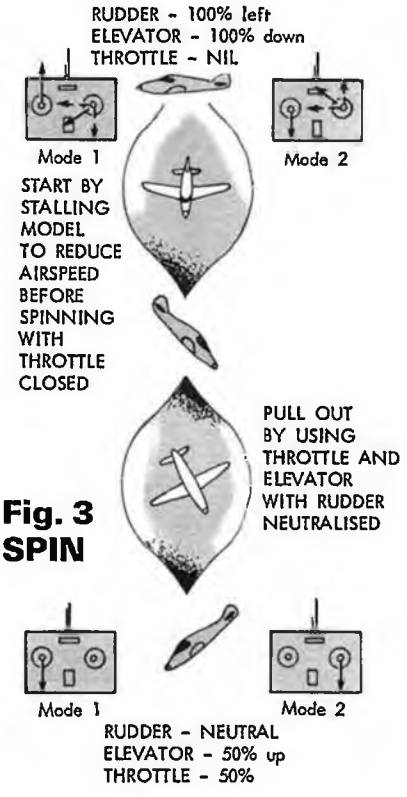


Fig. 3 SPIN

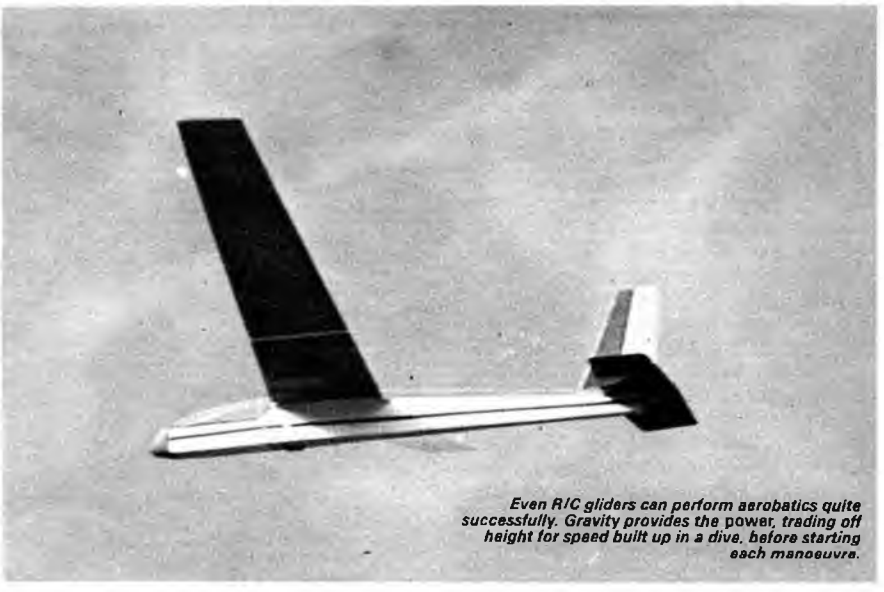
SPIN

Since your R/C trainer model has (or should have) a high degree of inherent stability, and is specifically designed not to go into an uncontrollable stall or spin, it is virtually impossible to put it into a true flat spin. Usually, the closest you will get is in fact a spiral dive. One of the advantages of practising this manoeuvre is so that you will be able to extricate the model from 'unplanned' positions.

The manoeuvre itself is started at a good altitude. Throttle right back and hold in up elevator, just before the stall feed in full rudder. The model should fall into a spiral dive. Recovery will probably happen when controls are released to centre, but if not, a touch of opposite rudder and *down* elevator will bring the model out and into a dive. Once flying speed is regained, up elevator and throttle can be used to regain normal level flight. See Fig. 3.

Apart from the satisfaction of completing aerobatics successfully they do help to increase your confidence, and for this reason if no other, they should be part of your *planned* flight pattern.

Glider enthusiasts can follow the above instructions but will obviously need to ignore the throttle. Instead a longer and perhaps steeper initial dive for the loop and stall turn can be used, exchanging height for speed. The spin can be performed in the normal way, but do not delay recovery too long!



Even R/C gliders can perform aerobatics quite successfully. Gravity provides the power, trading off height for speed built up in a dive, before starting each manoeuvre.

ACHIEVEMENT SCHEME

To promote an improvement in the general standard of model flying the SMAE (Society of Model Aeronautical Engineers) has introduced a system of awards. Initially this was aimed at power fliers but recently awards for glider pilots have also been introduced. Your local club or model shop should be able to give the name and address of an approved examiner but in case of difficulties, contact The Secretary, SMAE, Kimberley House, Vaughan Way, Leicester LE1 4SE.

The achievement scheme consists of two certificates.

'A' (Silver Wings)

1. Start engine and carry out pre-flight checks.
2. Take off, complete circuit, and overfly take-off area.
3. Fly right hand circuit.
4. Fly left hand circuit.
5. Rectangular landing approach.
6. Land within 30 metre area.
7. Remove model and equipment from landing area.
8. Correctly answer two questions from the SMAE Safety Code.

'B' (Gold Wings)

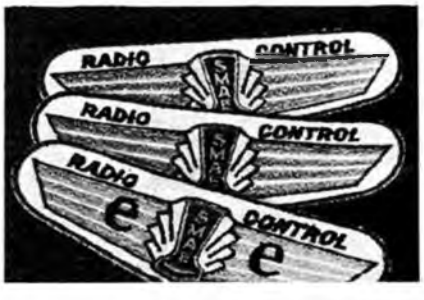
1. Start engine and carry out pre-flight checks.
2. Take off, complete circuit, and overfly take-off area.
3. Fly a figure of eight circuit.
4. Fly into wind and loop the model.
5. Fly downwind and complete outside loop.
6. Two consecutive rolls into wind.
7. Two consecutive rolls down wind.
8. Stall turn.
9. After gaining height complete 3 full spin turns.
10. Left hand rectangular landing approach and overshoot.
11. Right hand rectangular landing approach.
12. Land within a 30 metre area.
13. Remove model and equipment from landing area.
14. Correctly answer five questions from the SMAE Safety Code.

Details of requirements for the SMAE soaring scheme were published P256 May 80 *Aeromodeller* or Telephone SMAE Secretary 0533–58500 for further information.

This list of requirements can form the basis of your own flight programme or you can arrange to take the test at your local field. Once you have passed, you will have the satisfaction of an official seal of approval on your ability to safely fly an R/C sport model. Next month we shall be looking at simple fun competitions to help improve your skills.

A final request to all our budding R/C Sport Flying readers. We'd like to see what models you are building and flying, and hear from you the problems you are facing or the advice you may have for others. Send us a black and white print of man and machine and we'll publish them in future issues. Good flying, and remember – SAFE FLYING IS NO ACCIDENT!

Below: *SMAE R/C Achievement Scheme embroidered cloth badges, for Silver and Gold awards and examiner qualification.*



TAKING UP RADIO *SERIOUSLY?*

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CHECK THESE POINTS:

☑ **THE NAME** Ripmax-Futaba GUARANTEES you HIGH PERFORMANCE, SUPERB QUALITY as well as being world-famous for the RELIABILITY of its products.

☑ **ALL-NEW** means radio which will not become out-moded. ALL the features you need, with the very latest in voltage-stabilised, interference-rejecting 27 MHz AM circuitry. Plus up-to-the-minute Tx styling to match!

☑ **DRYCELL OR NICAD** operation means that you can buy a Drycell Combo for initial economy. That means you can start operating at once with HIGH PERFORMANCE EQUIPMENT AT A LOW PRICE. It's easy to convert to all-Nicad working later, if you wish.

☑ **2-, 4- or 5-CHANNEL COMBOS.** The 2-channel Combo is for gliders (rudder and elevator) – and the price is REALLY LOW. The 4-ch Combo gives you 'full house' on powered aircraft. The 5-ch Combo that extra control (e.g. for retracts or flaps). Plus DUAL RATE servo switching on the two main functions. Frankly, if you are REALLY serious about radio, we would advise the '4' or '5'!

☑ **COMBOS OR COMPLETE OUTFITS.** Combo prices are quoted separately for a very good reason. All 'L' Series Combos work with ANY 'M' series SERVOS – AND you need only buy the number of Servos you actually need. So your model shop can make up COMPLETE OUTFITS that exactly fit your requirements.

☑ **DRYCELL COMBOS PRICES: 2-ch COMBO* £22.00; 4-ch COMBO* £44.50; 5-ch COMBO* £55.50.** Examples of COMPLETE OUTFIT prices: 2-ch+2 Servos **£44.00;** 4-ch+4 Servos **£88.50;** 5-ch+4 Servos **£99.50.** (These prices are based on Drycell Combos and FD32M or FD33M Servos.)

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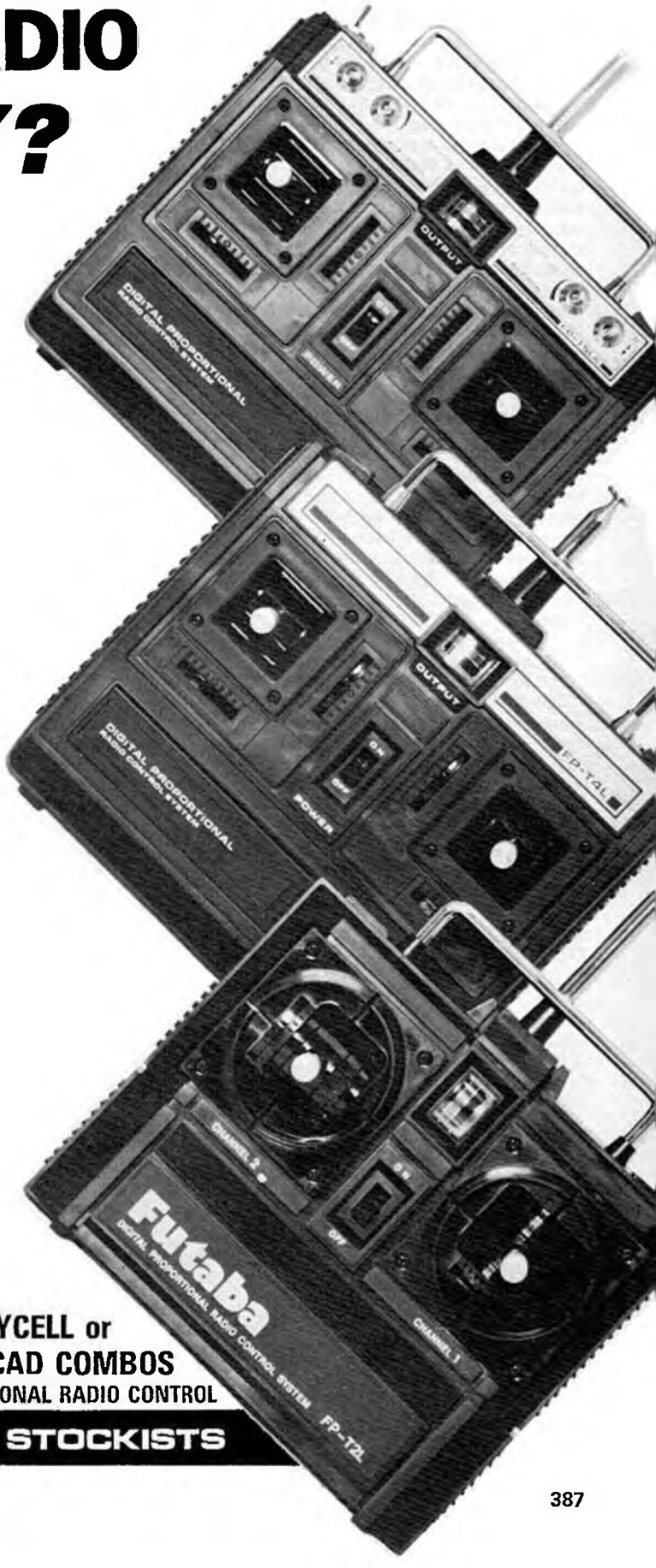
**DRYCELL COMBO prices include Transmitter, Receiver, wiring harness with switch, 1 pr crystals, frequency pennant. Batteries and Servos are extra.*



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TOUGH NUT

Symmetrical wing section and plenty of wing area makes Tough Nut *an ideal second model with which to learn basic aerobatics.*

THOSE OF OUR READERS who followed the progress of my 'likely lads' in the Aero Aces *Flying Start* series may be wondering what has happened to them. Well, I am pleased to say, that with four of them the aeromodelling bug has bitten. They received almost exclusively aero modelling presents at Xmas, and now model building and sorting out new engines is even going on when they rush home from school at mid-day! To keep the funds flowing paper rounds and cleaning out cowsheds have been undertaken. So of course it is difficult not to be carried along by such enthusiasm and they still provide a proving ground for some of my own ideas.

Surprisingly all the trainers built are still in one piece, although they have now completed hundreds of flights. Before Xmas blessed our group with some new motors I started to design and build a trainer for the next stage in the programme around 1-1.5cc motors, choosing the Davies Charlton *Sabre* and *Spitfire*. Although not suitable for fully aerobatic models these engines have enough power to achieve the next step forward. You may remember that I drew up three objectives to the training programme for control line flyers.

1. Learn to build models.
2. Learn to start and tune engines.
3. Learn to fly.

Tough Nut is intended to provide progress on all three fronts. Providing you have made a reasonable job of at least one solid balsa trainer, I consider you are ready to have a crack at a built-up structure. (If yours keeps falling apart into 'kit form' perhaps you should try your hand at another solid job first.)

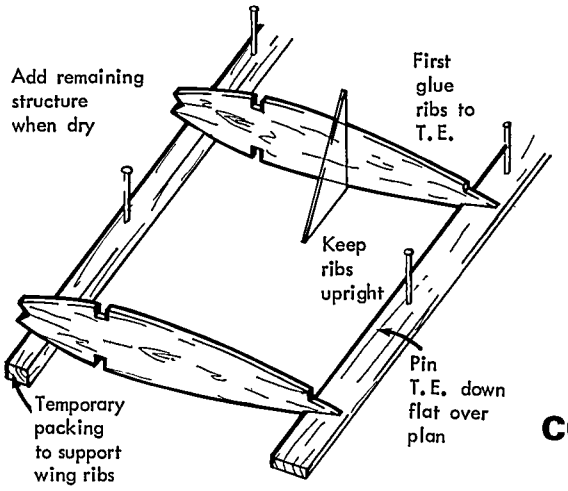
The criteria for *Tough Nut's* design were – minimum cost, simple construction, mildly aerobatic and crash resistant. In order to get models of this type to perform aerobatics they must be light – the lighter the better. The trouble is that light aircraft can suffer from crash damage. I therefore decided to attach the wings with rubber bands as I did on my stunters some 30 years ago! Although *Tough Nut* might be voted '1980 Model of Yesteryear' this construction has two very positive advantages. Firstly the 'give' in the basic structure considerably reduces the likelihood of damage. Secondly one can easily rebuild whichever bit gets damaged without building a whole new model. In my experience box fuselages are remarkably strong and the tissue covered wings rarely suffer much damage and are easy and cheap to repair. Sellotape is handy for field repairs.

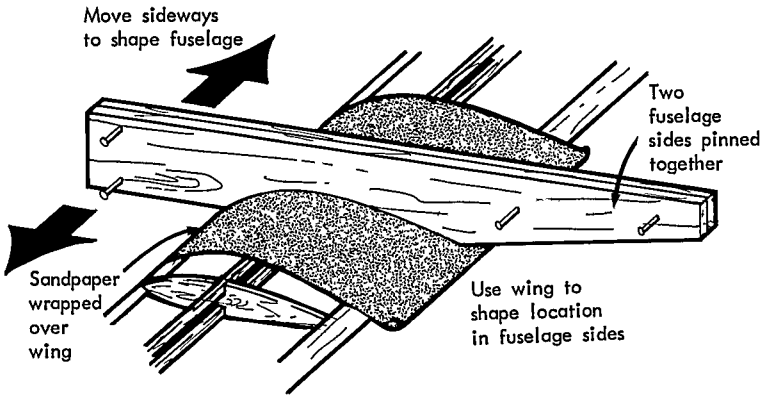
Two young aeromodellers Alan left, and Ian, who have developed their Control Line flying skills with John Stroud's design.

All the basic instructions are included on the plan but a few extra tips might be useful. Both Ian and Allan built Tough Nuts by copying mine, in its uncovered state, without a plan. Allan's is the 23in span version and is powered by a DC *Spitfire.* However, during test flying the tank has worked loose so glue yours in place firmly. The position of F3 should be adjusted to make the tank a tight fit between F2 and F3. It might be necessary to trim the bottom of F3 to allow the wing to fit in properly. This type of construction needs a snug accurate wing fit. Ian made the mistake of thinking this could be achieved after putting the fuselage together. It took him a long time to do it this way. The wing must rest exactly parallel to the top of the fuselage. Mark the exact centre of the leading edge and trailing edge and check after fitting. Pack it out if necessary and glue the packing in place.

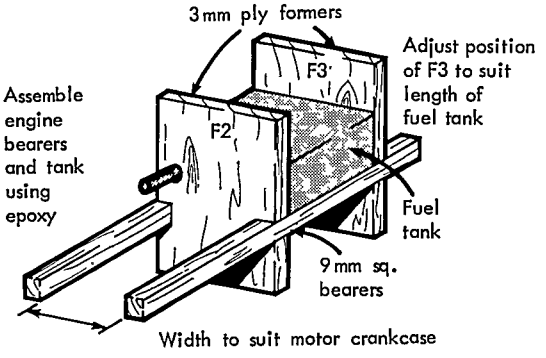
The first two prototypes used our DC engines and the boys are getting quite expert at handling them. One problem we have found with the most used ones is that the compression screw tends to slacken off due to vibration. Mr Gilbert, a local model engineer, kindly made us up some locking levers. Cotton wound into the thread provides a temporary solution but one really needs a proper locking lever made, perhaps, in metalwork classes.

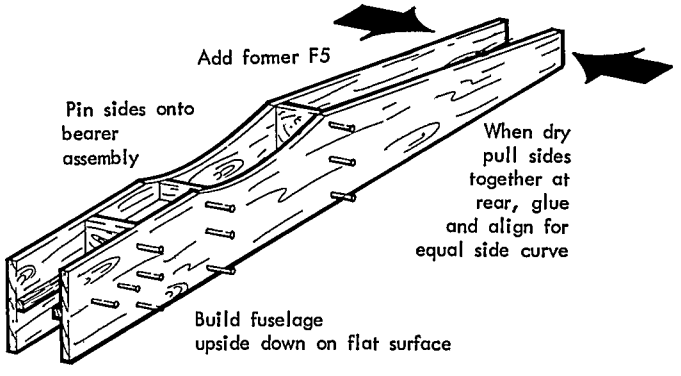
Flying. If you can fly a solid balsa trainer then Tough Nut will prove just as easy, if not easier, to fly. It is more responsive and maintains line tension when flown high. Good line tension can be obtained in any part of the flight path providing this type of model does not lose airspeed. Do not attempt any manoeuvre unless you have a good fast engine run and a good propeller.





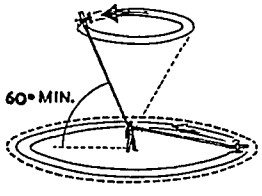
CONSTRUCTION DETAILS



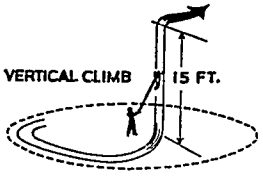


Fibre filled ones seem to give an extra 5 mph but they do break rather easily. If all seems OK then check out the model by flying a little higher each lap to find out if it will keep line tension. The model might get a bit slow and dodgy at about 70° elevation if you keep it up there but that should prove OK for normal purposes. If it won't stay up even on a good engine run, check the thrust line of the engine, tip weight, fin offset and wing position. The rubber bands holding on the wings need to be pretty strong and tight. If it still won't stay up with the lines at 70° it may be overweight – in any case you'll have to fly it as an ordinary trainer. My model weighs 11oz complete and a 1cc powerd version needs to be less than 10oz. Make progress slowly and remember – TIGHT MANOEUVRES KILL AIRSPEED. For those you will need a more powerful engine and a combat design. All the stunts I describe here should be flown downwind i.e. with the pilots back to the wind. *Tough Nut* powered by a 1.5cc DC *Sabre* has been tested on the following stunts.

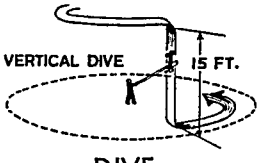
LEARN TO FLY THESE BASIC STUNTS



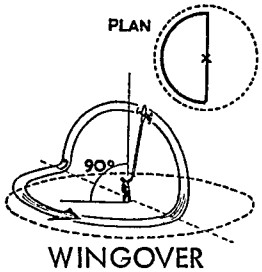
HIGH CIRCUITS



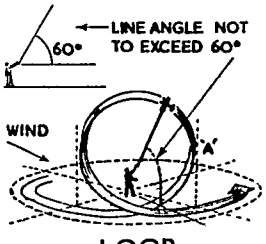
CLIMB



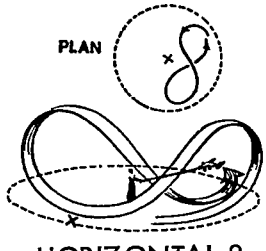
DIVE



WINGOVER



LOOP

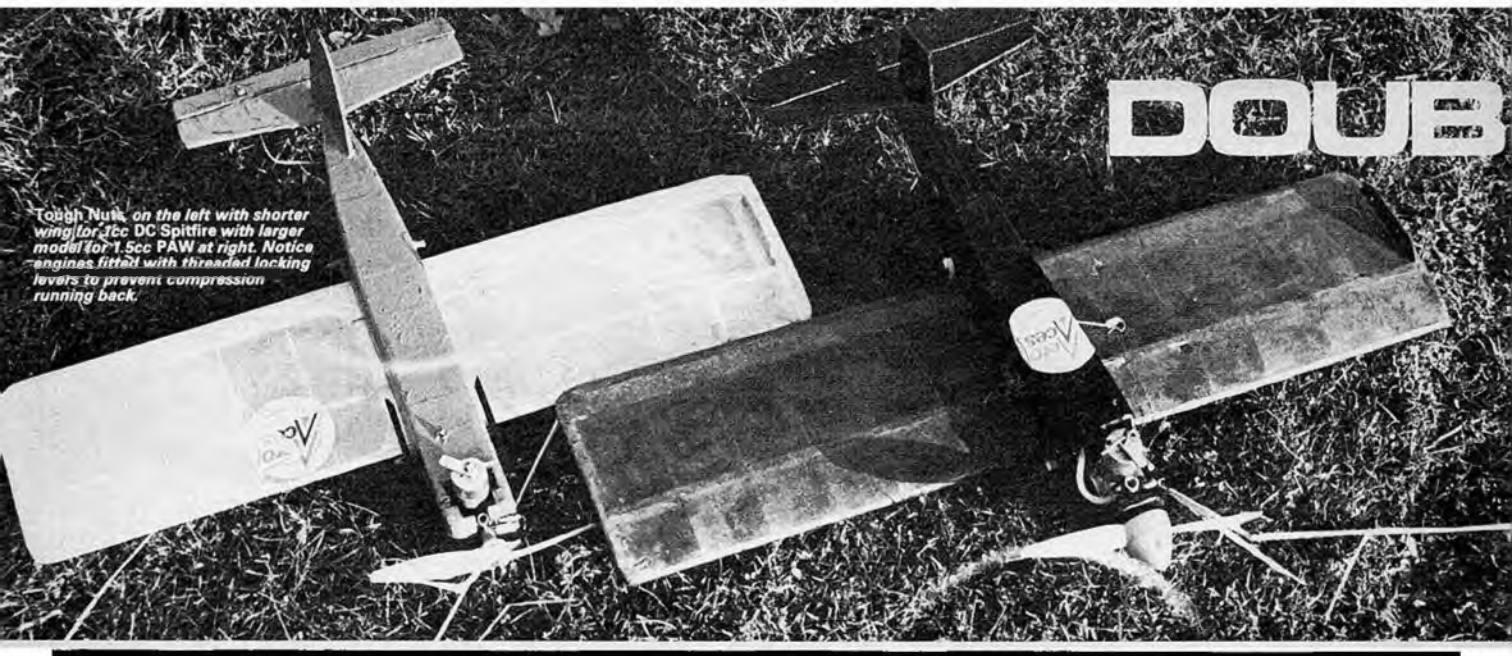


HORIZONTAL 8

Climb and Dive. These are the first manoeuvres you should try. Start with shallow climbs from about 3ft off the ground to 20ft high. Slowly make each climb a little steeper until you can achieve a vertical climb. The corners should be as square as possible without losing too much airspeed. Dives should start as high as possible. Keep them shallow and pull out early to begin with. Practice these until you can fly a good, controlled, vertical climb or dive every time.

Wingover. A perfect wingover is achieved when the model goes into a vertical climb, continues exactly overhead and finishes with a vertical dive the other side of the circle and levels out. Try a few times without making the climb vertical and look out for loss of line tension when the model is overhead. Do not try to start with too sharp a corner or you will lose too much airspeed.

Loops. This is the natural progression from the wingover for a C/L model. By keeping on the 'up' in the vertical climb the model will turn over on its back and start to dive. Full up is then needed to pull out of the dive. Beginners tend to jam on full up at the start of a loop and just keep it on.



Tough Nuts on the left with shorter wing for 1cc DC Spitfire with larger model for 1.5cc PAW at right. Notice engines fitted with threaded locking levers to prevent compression running back.

TOUGH NUT
750mm span STUNTER
by John Stroud

The result is that the model is on its back with very little height and greatly reduced airspeed. It then needs a lot of luck to miss the ground as the model staggers round.

Bunt or outside Loop. Although this stunt takes more courage than a loop I have always found it easier to perform. Fly the model as high as you can and then give full down. The model should pick up speed in the dive and go under on its back. In most cases one can use the extra speed and leave on full down to complete the bunt and level out.

Horizontal eight. This stunt is only possible after you have learned to fly good big fast smooth loops and bunts. It is a severe test for a model of modest power because one loses speed in the first half and cannot get round the second half. If this happens when you are more skilled then you just fly round inverted until the speed picks up again and finish the eight after an extra lap.

Inverted flight. Tough Nut can fly inverted very well and when you can do this you are ready for a more advanced stunter. Remember that when you are inverted the controls will be reversed. 'Up' will be 'down' and visa versa. Enter inverted flight by doing the first part of a horizontal eight and then flatten out the inverted dive by giving a little 'down'. Hold it inverted as long as you can and remember when you get too near the ground you must give *down elevator* to get out of trouble.

If you can do all these stunts with Tough Nut then you are doing very well. If you feel like an extra challenge try these:

Loop from inverted
Bunt from inverted
Horizontal eight from inverted
Pull out from a wingover to inverted.
Start inverted flight with a half bunt.
Recover from inverted with a half loop.

You have now learned all Tough Nut can teach you!

When starting the engine it is advisable to get your assistant to hold the model steady and grip the fuselage around the engine for extra support.

LE FREE PLANS

The two prototype Night Owls have proved that the design is not only strong and easy to build, but that the flight performance is beyond expectations.

Night Owl

1500mm span GLIDER

by Jim Moseley

DURING THE SPRING of 1978 I assisted my elder son Kevin, then 8 years of age, to build his first glider from a kit, which subsequently demonstrated the fact that the flying ability of a small cabin design is not necessarily as attractive as its illustration upon the box! In this instance, even I had great difficulty in towing the model to any appreciable altitude, and Kevin found it impossible to handle at all with his very limited skills.

After putting aside the pieces, I reasoned that the prime requirement was; for a glider of moderate size, and thus possessing greater inherent stability; which would be simple enough to build to be within the "attention span" of a youngster, yet strong enough to stand up to some considerable abuse; and still fly well enough to be satisfying.

So *Night Owl* took shape on paper, prime importance being given to stability and strength with the structure kept simple, and performance a secondary consideration. A flat bottomed wing section was chosen for ease of building for rib cutting, assembly and eventual covering. The 12½% thickness aerofoil was selected to give a thick wing that would be resistant to both warps and towing stresses.

All parts for the initial model were totally prefabricated by myself as a kit of parts, and Kevin then assembled them with a minimum of supervision, a procedure which surprised me with regard to the speed of construction compared to the equivalent time input required for an F1A glider. Given this preparation an experienced modeller can then have the entire airframe ready for sanding and detail work in less than five hours; compare that to an A2!

The second, and most pleasing surprise came on the occasion of the models' first outing in October 1978 when, after a little hook adjustment, it proved viceless to fly in all respects with a slow, bouncy glide which was in excess of all expectations. Kevin promptly set out to learn the art of towing, initially in light breeze conditions and eventually in quite strong, gusty winds, during which time the model has stood up to a great deal of abuse, demonstrating a reserve of stability sufficient to enable it to recover from the most horrifying manoeuvres without impact or damage, even though this 250gm lightweight has been known to break a 15kg B.S. line on at least two occasions.

Still air performance of both of our models is consistent at approx 2:20 in flat calm, freezing conditions from a 50 metre line, but they show an ability to ride very weak lift that an A2 might pass through almost un-noticed.

Kevin Moseley, now 10 years old, with the original model with which he learned to fly.

A pointer to its potential is that Kevin, in his first-ever SMAE contest, won the Top Junior plaque with the highest Northern Area glider score of the day in an Area

Centralised event during 1979, following this up with a 3rd place and Top Junior in a subsequent N. Area contest, during which he produced one of the only two maxes recorded that day in pouring rain, and eventually – at a windy Northern Area Rally – 5th place, and once again, Top Junior. Admittedly luck played a major part in his successes as his skills are still being developed but nevertheless, *Night Owl* has proven to be a most satisfactory model and morale booster for a young flyer.

FUSELAGE

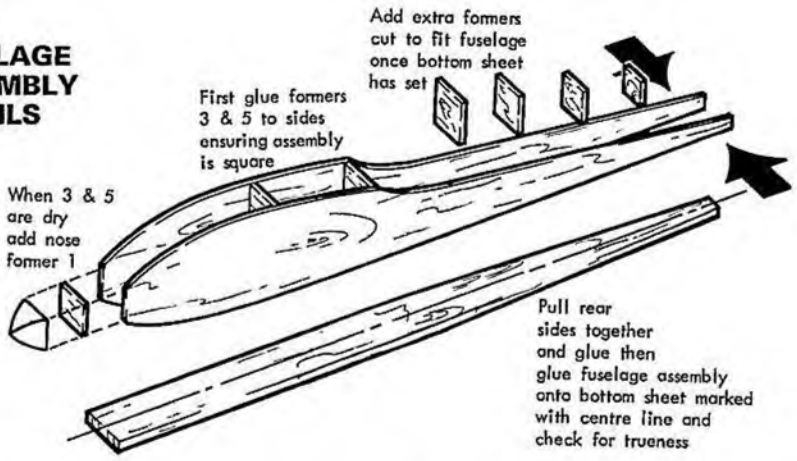
Mark out one fuselage side onto a piece of firm 2.5mm straight grained balsa, cut out the side and use it as a template to cut a second from the same sheet of balsa, and mark up both with former positions.

Cement formers 3 and 5 to one side ensuring that they are square and vertical and when thoroughly dry, glue the other side into its position. Once dry, pull in the nose and install former 1 and carefully mark the centre point of the lower edge of formers 3 and 5 in pencil or ballpoint.

Now take a piece of firm 2.5mm sheet, slightly wider than the maximum fuselage width, and lightly rule a centre line down its length; pull in and cement the rear ends of the fuselage sides together, positioning assembly over the marked sheet to line up with centre line and ensure that the fuselage is true and straight. Apply white PVA glue to the lower edge of the sides from former 3 to the rear, including bottom edges of 3 and 5, and place onto the bottom sheet, again ensuring that the fuselage is true, and pin the whole superstructure flat to the board until dry, after which the front portion of the fuselage bottom can be glued up to the curve of the sides.

Now cut former 2 to fit and also the 1.5mm formers rear of the wing position; these are not shown on the plan as the degree of bow in the fuselage sides is dependent upon the flexibility of the wood used and width dimensions could well vary slightly from model to model. Simply measure the fuselage depth and breadth at each former position and cut each former accordingly using a 90° triangle for accuracy; former positions are not critical,

FUSELAGE ASSEMBLY DETAILS



a former fractionally over or undersize will fit quite happily about 3mm from its specified position, though effort should be made to get the final one in its correct place as it supports the fuselage in the region of the tail mount. Do not, at this time, install former 4.

Add hard 3mm sheet gussets at the wing dowel positions noting direction of grain in each case, and when thoroughly dry drill through at the appropriate places for the wing dowels, for ease of covering these may be glued in place later. The rear top surface of the fuselage can now be sheeted with medium 1.5mm sheet and the nose covered in with 2.5mm cross grained, with a small hatch subsequently cut to allow ballast to be inserted; add a rough-carved balsa block nose and when dry, sandpaper smooth the entire fuselage, which in itself should have taken little more than about 1½ hours to bring to this stage.

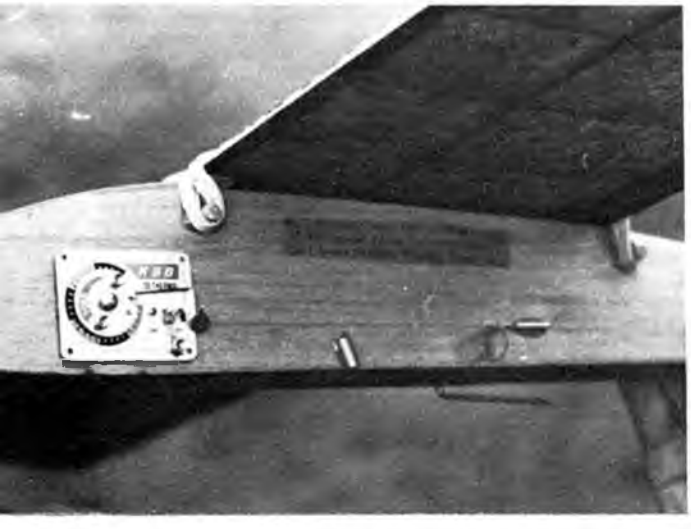
The towhook is bent from 16swg wire and sandwiched between two pieces of 1.5mm ply with a balsa spacer between into which the hook is recessed, the entire unit being epoxied thoroughly together and fitted in the fuselage. Former 4 can now be added and give the fuselage a final sanding with fine grade paper, but fin, underfin and fittings can be left until the fuselage is covered and finished.

WING

Build the wing tips first – the 18 x 6mm trailing edge can be cut from 6mm sheet or cut down from 25 x 6mm pre-formed TE stock if the thought of carving the whole T.E. from rectangular strip does not appeal. Choose fairly light but firm wood for the tips, each of which will slot together in less than ten minutes if you have already precut all the parts. Pin down the L.E., T.E., and lower spar and add ribs, the 3mm rib at the dihedral joint is cemented into place using the angled template shown on the plan as a guide; 6 x 3mm balsa upper spars are then added to the structure and all gussets installed before the panel is lifted from the plan. L.E. and T.E. are chamfered to match the rib slope, all spars trimmed flush, leading edge carved to shape and the soft end caps added to extreme tips and finally rounded off and the whole panel fully sanded.

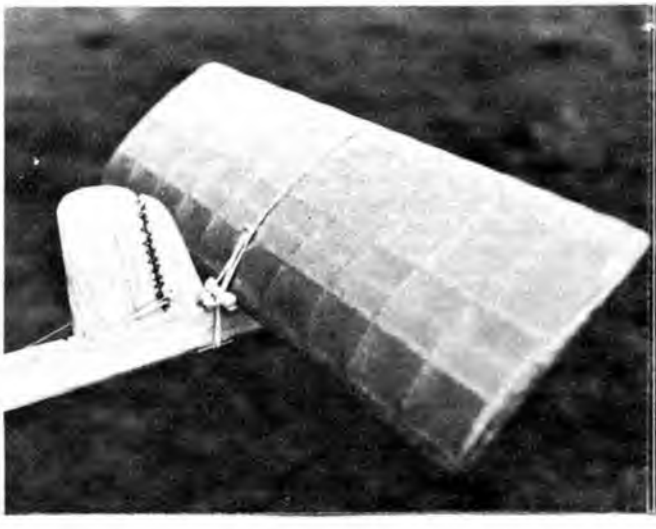
The centre panel is built in the same manner though the wood should ideally be harder stock and all three spars are of straight grained 6 x 3mm spruce – use white PVA for all balsa/spruce joints. Once the L.E., T.E. and bottom spar and the 1.5mm ribs are in place, offer up each tip in turn to its position and trim the ends of the main panel to fit; each tip is then pinned into place, propped up to the correct dihedral measurement, and the end rib of the centre panel is then glued into place tight up to that of the tip, but not glued to the tip itself at this stage.

Once the top 6 x 3mm spruce spars are



Left: *Optional clockwork Dethermaliser timer installed in nose. Note aluminium tube line guide and DT tailstop; also angled tube for auto rudder pin; and that all important name and address label under wing.*

Right: *Tailend shows tailplane tipped up 45° in DT position which causes the model to parachute back to earth in a safe manner. Note aluminium tube line guide protecting DT line from tail bands; also sewn hinge auto rudder with activating rubber*



Left: *8 year old Paul Moseley with older brother Kevin and their two Night Owls which have provided them with many hours of enjoyable flying.*

Below: *Designer Jim Moseley admitted that even with all his years of modelling experience, he was greatly surprised by the exceptionally good glide from this simple design which he sketched out for his lads.*

in place all gussets should be added and the panel left to dry, following which the L.E. can be carved to section and the centre section sanded. The tip panels are now glued securely to the centre panel using PVA or epoxy; it is important that these joints be perfect and the use of spring clothes pegs as well as pins is advised, to hold all parts firmly in contact until the adhesive is dry. The beauty of this type of structure lies in the fact that each panel is complete and 'solid' to handle on being lifted from the board and convenient to sandpaper, warping is reduced and the butt joints obviate the time and frustration often incurred in matching up spar ends, installing dihedral keepers, etc, and the resulting joint is sufficiently strong for such a glider.

TAILPLANE

The T.E. is 12 x 3mm pre-shaped stock, pin down L.E., T.E. and lower spar followed by tailribs. All gussets and details can be added whilst the tail is pinned to the board, including the wire hook which is epoxied to the centre rib before the 1/16th gussets are added around it. Carve the L.E., sand the tailplane and take time out to admire a virtually complete airframe.

FINISHING

The centre panel of the wing should be covered with heavyweight tissue, the tips and tailplane with lightweight and all surfaces doped with a 50/50 dope/thinners mixture – about 3 coats on the centre panel and 2 coats to fill the tissue pores elsewhere.

Dope lightweight tissue onto the fuselage and fins and finish off with a further couple of coats. Type a name and address label and glue to fuselage. Install the plywood rudder horn and hinge the rudder to the fin. I prefer to use a sewn hinge though tape hinges could be substituted. In the latter case a neater job would be obtained if the tapes were added before fin and rudder were covered and doped.

Epoxy the 14swg aluminium tubing line guides to the fuselage as shown; do not omit the one immediately below the tail mount as this prevents the tailplane rubber bands from binding the D/T line and so preventing the tail from tipping. D/T and Auto-rudder lines are of 4–5kg B.S. nylon, loops being secured by small pieces of 14swg aluminium tubing crimped on with pliers.

A small piece of 14swg aluminium tubing is epoxied to the fuselage side to accept the towline pin which releases the autorudder upon launch; scratch away a small area of tissue from the fuselage at this point to allow a stronger bond.

Install a clockwork D/T timer between formers 2 and 3 and adjust the line to allow the tail to tip to approximately 45° on release; alternatively a fuse D/T system may be used with a snuffer tube epoxied through the fuselage at the timer position and the forward end of the D/T line adapted with a hook instead of a washer, to accommodate a rubber band.

FLYING

Adjust the CG with lead ballast added to the nose compartment until model balances at points shown; look to see that no undesirable warps have developed. Tailplane and wing centre panel should be flat and the wing tips slightly washed out i.e. on studying a tip panel from the rear, the trailing edge at the tip should be perhaps 3mm higher than the L.E., with both tips having an equal amount of warp. Remove any unwanted warps by holding the offending panel in the steam of a kettle and applying opposite pressure for a short period before removing and allowing to cool whilst holding in the adjustment, repeating as necessary. Really persistent warps can be removed by submerging the panel in almost boiling water for a period before pinning it out to cool and dry, but this should not prove necessary as the *Night Owl* wing is very stiff and warp resistant and if built correctly, should need little further attention.

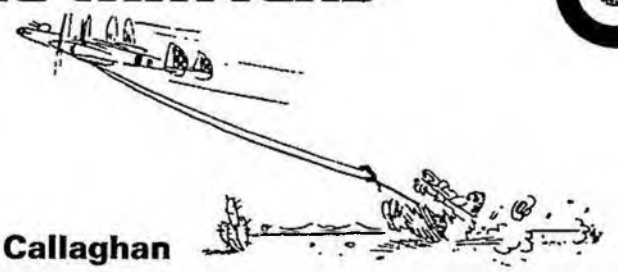
Hand glide the model over long grass on a calm day, adding tail packing under the L.E. if it stalls or the T.E. if it dives, until a smooth glide is obtained. Once you are happy with the hand glides it is time to try towing your *Night Owl*: use a full 50 metre line and tow up the model fairly cautiously directly into the wind, watching its behaviour carefully.

If it flies straight and smooth to the top of the line, offer thanks to the thermal god. However it is more likely that the model will either weave from side to side or otherwise pull sharply to one direction. In the former instance move CG forward 3mm at a time, and re-trim glide until the weave disappears; in the latter if the veer cannot be adjusted with rudder offset, move the CG backwards. The hook position shown on the plan is the average of three models, all of which fell within a 9mm range relative to CG position.

Once a straight tow is obtained, watch the glide closely and add or subtract tail packing to bring the model close to the stall in a smooth, slow circle. When you are happy with your final trim, fly and fly again until you are completely familiar with your model in all conditions – that thick wing with the spruce spars will most likely be stronger than your courage in the wind! The article by John Cooper on the trimming of gliders, both on the tow and in free flight, P346 June 79 *Aeromodeller,* is well worth consulting as a comprehensive guide to the art.

I try to keep systems as simple as possible on all models; my timer release is simply a 300mm piece of thick nylon line attached to the towline, the end of which is thrust into the works of a running timer until it fouls the gears and stops the action. The timer restarts once the line pulls free on launch. Simple, reliable, no springs or bands to bother with – but do use a D/T on *every* flight from a tow line no matter how modest your intention. *Night Owl* has proved itself capable on several occasions of riding weak thermals from as low as 10 metres, and will fly away given the slightest opportunity, even in windy or wet conditions; maybe you *can* build another before next weekend but what are you going to fly for the rest of the day?

SCALE MATTERS



by Alan Callaghan

INDOOR SCALE NATIONALS

Derby, 27th April

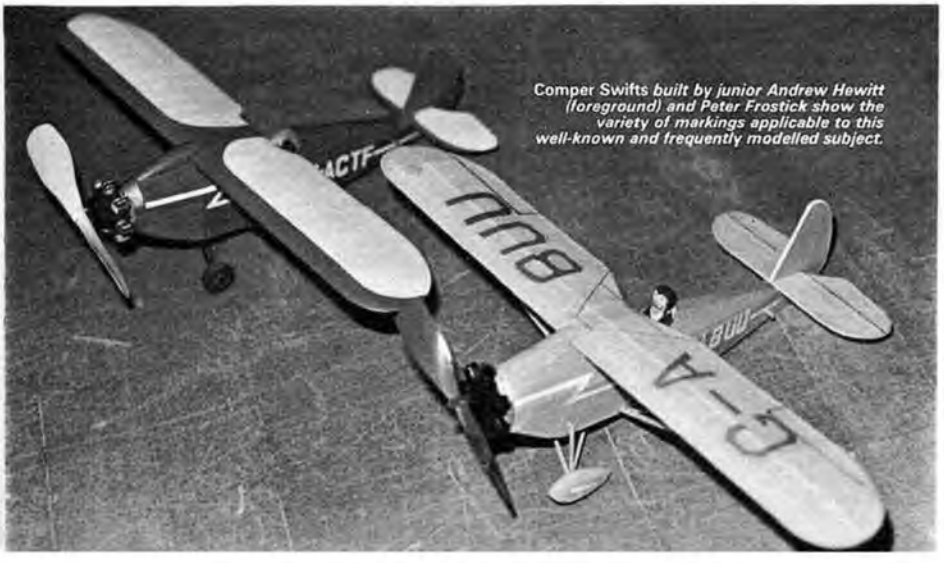
Derby's Municipal Sports Centre was the location, for the second time, for this particular meeting, and the slightly larger than usual hall proved to be an excellent flying site with relatively clean walls (structurally – that is!) and with the roof girders being problematical to only a few ultralight models. Arrangements for the use of the hall were by courtesy of Nottingham MAC through Alan Kidby, and for the SMAE, John Blagg organised the large team of judges and timekeepers who handled the three contests. No particular time slots were set aside separately for each of the events, and as a consequence the meeting had a very relaxed atmosphere without the need to be constantly checking one's watch in order to fit flights in. Only when the CO_2 models were putting in their contest flights was it expedient to keep other models out of the way, and this arrangement works very well allowing as it does the models to fly in clear floorspace while everyone is able to get a good view.

Interest in Indoor Flying Scale models seems to go from strength to strength as more people begin to realise the great attraction of flying in perfectly calm air, and a well-trimmed scale subject cruising around unaided for a minute or so from a smooth take-off to a gentle landing is a sight that only the most stony-hearted of model fliers would resist.

The pattern of entries changed slightly this year. Peanut Scale, with nineteen fliers, was the most popular, as it probably always will be. There were, of course, many other Peanut models not entered. Open Rubber Scale drew no less than thirteen models, although three did not have their flight scores returned. I cannot recall a higher number than this at any Indoor Scale meeting. Unusually, CO_2 Scale was not well-supported, their being only three entrants. The limits of the size of the hall may be a factor here since it needs a very well-trimmed model to fly safely in such a space. The volunteer "wall-guards" were kept busy during the flying sessions and more than one model was caught just in time to prevent it doing mischief to itself. Total disasters were noticeable by their absence.

Above left to right: *Butch Hadland,* Lacey M10, *Nick Peppiatt,* Bristol 138a, *and Jeff Anderson,* Wittman Tailwind, *topped the entry in Open Rubber Scale.*

As usual at this kind of meeting someone is bound to turn up with something out of the ordinary, and two more greatly opposed extremes could not be found than the rubber-powered pink balloon airship (!) flown by Rick Granger, and the all-foam pusher *MIG Foxbat* that went extremely well in the hands of an owner whose name I missed. Sporting what seemed to be a Sleek Streak prop, the model amazed many by its slow and very stable flight. Another foam model was a half-Peanut sized *Lacey* by Peter Frostick which was built from the foam packing from a new radio outfit (they have their uses!). This may seem too much of a novelty except that in Peter's hands the thing was doing around 75 seconds duration – and that from a model built in roughly two hours.



Comper Swifts *built by junior Andrew Hewitt (foreground) and Peter Frostick show the variety of markings applicable to this well-known and frequently modelled subject.*

Trying out a new "fullsize" Peanut model for the first time I was not having such a successful time. The model, a *Westland Woodpigeon,* is a good subject for rubber with its long nose, good ground clearance (a 140mm dia prop can be used) and reasonable tail surfaces. Having, however, greatly underestimated the pitch needed on the prop to overcome the inherent drag from a biplane with a full set of rigging wires the model could manage little more than a powered glide. The model consequently recorded the lowest flight score, but in compensation made the highest static score in Peanut. In trying to show the difference in materials to better effect on this model the engine cowlings were vac-formed from the thinnest grades of Plasticard and painted with

enamels. The end result turned out quite well and I hope to give some fuller details at a later date.

The Peanut event did not draw too many completely new and original models – most being built from readily available kits and plans. No less than four *Wittman Tailwinds* took part and outnumbered the *Laceys* by two to one. Mike Hetherington's *Fokker DVIII* and Ken Bates' *Westland Widgeon III* were completely original designs placing seventh and tenth respectively. John O'Donnell's condenser paper covered *Fike* flew into a 37-second lead over its nearest rival, and although it came only thirteenth in static, John still managed fourth place in the final results.

It infrequently happens that the most unorthodox model wins any scale contest but on this occasion Mark Hinton's superb *Santos-Dumont 14bis* had a very large lead coming second in static and second in flying to emerge the overall winner by a healthy margin. Mark was also flying a new condenser paper covered *Farman* monoplane built from some French references, and it was flying well up to his usual standard.

As already mentioned, the CO_2 event only had three entries, and a slightly sour taste was left when it was learned that as a result of this low number it was not possible to provide plaques for each placing due to a SMAE ruling. A more parsimonious way of treating enthusiastic fliers requires some imagining. Ron Green won the event for the second time with his meticulously detailed *Bleriot* in Swiss markings that picked up a very healthy lead in both static and flying. In second place, Geoff Spencer's *Sopwith Tabloid* was able to turn and circle quite well in the confines of the hall without an excessive amount of banking. Butch Hadland's *Mr. Mulligan* in third place is a very trusty veteran now and though second in flying its relative simplicity did not measure up to the others in static.

The Open Rubber event saw a very interesting new model of a *Bristol 138a* high altitude monoplane by Nick Peppiatt from an American Pres Bruning plan. Very neatly made in black and silver finish the model actually achieved the highest flight score with some excellent take-offs to finish in third place. Jeff Anderson's very large 1:12 scale *Wittman Tailwind* and Butch's *Lacey* to a similar scale finished second and first respectively, proving as they did so that for smooth, steady, and realistic flight patterns it could be argued very strongly that the indoor model is the supreme FF Scale type.

Group of CL Scale models before static judging at last year's Nationals

At the time of closing this column it seems that another meeting at this venue in late autumn may be possible. Indoor Scale enthusiasts would be well advised not to miss it, so do keep an eye on the contest calendar.

CL SCALE MEETING

RAF Upwood, 27th April

Being run in conjunction with an RC Scale event, this meeting resulted in a very pleasant day's flying in a friendly and informal atmosphere. The somewhat doubtful weather elsewhere in the country gave no indication of the ideal flying conditions at this location where flat calm near the shelter of large hangars kept the entrants well satisfied. Even the sun popped out for a short while to see what was going on!


Mike Hetherington launches his Peanut Fokker DVIII.

Five entries made up the field in CL, and with only eight in RC, one can continue to wonder why CL Scale always seems to be regarded as a 'Cinderella' event. With three new models joining Mick Staples' *Avro 504K* and Wal Cordwell's *Heston Phoenix,* a unique mixture of subjects took to the air. Geoff Spriggs' *Savoia Marchetti SM73* (featured in April Scale Matters) was being contest flown for the first time, and although the unthrottled motors rather limit the flight options, the models' flying score was quite well up to standard for the day. Gerry Gibbons was flying a new *Grumman Hellcat* that incorportes a full 90° rotating and retracting undercarriage to his own design, but which was locked in the down position on this occasion. Hopefuly this will be fully functional for the Nats. Mick experienced throttle trouble on the *Avro* and his good lead in static judging was brought down as a result. The *Phoenix* returned the best flight score being ably flown by Wal as usual but he could not quite catch the new *Scottish Aviation Bulldog* converted from an RC design, by Derek Bird. Although this model only featured working flaps and throttle compared to the *Phoenix*'s retract gear, the better ground handling on the trike undercarriage and the slower flight achieved by using a very large prop was sufficient to give the *Bulldog* a clear and decisive lead. Another one to watch out for at Barkston Heath in August!

RESULTS

		Static	Flying	Total
CO_2 SCALE (3 entries)				
1. Ron Green	*Bleriot XI*	1033	975	2008
2. Geoff Spencer	*Sopwith Tabloid*	921	690	1611
3. C. Hadland	*Mr. Mulligan*	687	767.5	1454.5

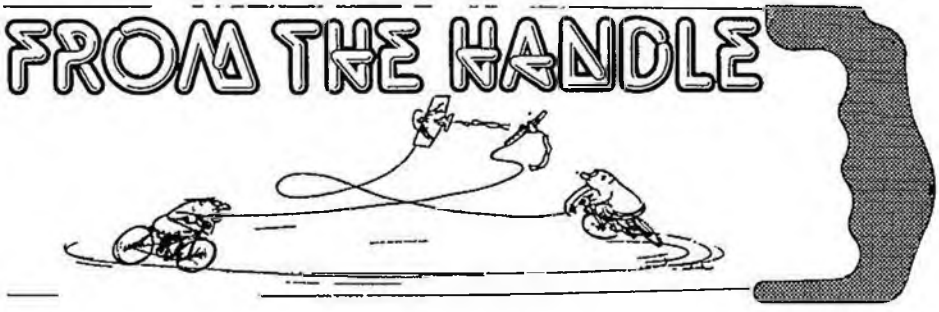
		Static	Flying	Placings
PEANUT SCALE (19 entries)				
1. Mark Hinton	*Santos-Dumont*	41.5	140	2nd+2nd=4
2. Chris Chapman	*Westland Wigeon*	37.5	110.5	6th+4th=10
3. Butch Hadland	*Lacey M10*	36.5	117	8th+3rd=11

		Static	Flying	Total
OPEN RUBBER SCALE (10 entries)				
1. Butch Hadland	*Lacey M10*	157.5	160	317.5
2. Jeff Anderson	*Wittman Tailwind*	153.5	146	299.5
3. Nick Peppiatt	*Bristol 138A*	117.5	173	290.5

RESULTS

		Static	Best Flight	Total
1. Derek Bird	*S.A. Bulldog*	505	792	1297
2. Wal Cordwell	*Heston Phoenix*	393	832	1225
3. Mick Staples	*Avro 594K*	585	524	1109
4. Gerry Gibbons	*Grumman Hellcat*	345	670	1015
5. Geoff Spriggs	*Savoia-Marchetti SM73*	150	652	802

COMBAT
by Paul Smith



UPDATING FIA COMBAT RULES

The FAI combat rules have remained essentially unchanged over the past ten years or more. During that time the equipment has gone through several generations of change. Diesels have been replaced by glows, which have in turn been replaced by Schneurle-ported glows. Wing area has increased from 200 to over 400 square inches. The net result has been a model that is 50% faster and far tighter-turning than its predecessor of ten years ago. Although these models are far more spectacular to watch and more fun to fly, they are also more frail. Serious contestants must now bring twelve or more models to an important contest, compared to about four in the olden days. This has restricted the growth of the event, caused several good flyers to drop out, and limited the number of contests.

The problem is how to cut the expense without making all existing equipment obsolete or creating a complex set of additional restrictions. I submitted a list of rule proposals to the FAI, via AMA, which are now under consideration for future adoption. The overall objective of these changes is to limit the contestant to six models for the entire contest and one model per match. Also, the pilot is to be assisted by only one mechanic and there are several other clarifying proposals that do not significantly change the event.

I hope that all combat flyers will contact their representatives and help to pass these proposals.

SUGGESTED FAI RULES CHANGES

FAI RULES, GENERAL

NUMBER OF MODELS: Delete the following – "Combat, two per heat." Add the following – "Combat, six (6)".
Reasons – All other events, with the exception of indoor, limit the competitor to a certain finite number of models, either 1, 2, or 3 for the entire contest. The unlimited supply of models in F2D encourages destructive flying tactics. The present rules give an advantage to the few nations that are located within driving (surface travel) range of a championship site in that they can more easily transport vast quantitites of models to the contest. All other nations are put at a disadvantage in that they are limited to what they can transport by airlines. The building of large numbers of models creates an unnecessary financial hardship on all competitors. With a limited number of models, each competitor could bring a certain number of models and be assured that he had an equal amount of models with all other competitors. This rule will encourage higher quality models and safer flying tactics.

FAI CL COMBAT (F2D)

3. COMBAT SITE: Delete – c.A 22 meter (72ft 2in) pitting circle.
Reasons – This 22 metre circle serves no useful purpose in the event. The 3 metre piloting circle and the 19 metre flight circle are perfectly adequate. The 22 metre circle creates unnecessary work for the organisers and needlessly confuses the management of the event.

4. COMPETITOR: Change from "two mechanics" to "one mechanic". Also make this change in any other reference to mechanics.
Reasons – If the proposal to limit each competitor to one model per match is passed, two mechanics will not be needed. Most nations cannot bring the full nine-man combat team to the world championship. Limiting to one pit man per pilot would lower the total combat team from nine to six people. This would allow more nations to bring a complete team to the world championships.

7. NUMBER OF MODELS: Delete entire paragraph.
Substitute – Each contestant will be permitted to use a total of six (6) models for the entire contest. Only one model will be used for each flight period.

Reasons – The cost of using two complete sets of equipment, including the model, engine, glow plug, lines, propeller, fuel, and fuel bladders, per match has become prohibitive. Several countries are now running various combat events that allow only one model per match. In most cases these events are more popular than FAI combat in its present form. The lower cost resulting from using only one model per match will help the event become more popular and spread to additional countries.

Current FAI rules encourage lightweight disposable models. Flyers frequently require 6-10 models per contest! Pictured here are Swedish combateers Per Stjarnesund, Johan Norelius and Johan Sandstrom with the armfulls of models they used at Verviers, predominantly mass produced foam polystyrene construction powered by Rossi 15 motors.

8. STREAMER: Length; Change from 3 metres (9ft 10⅛in) to 2.25 metres (7ft 4in).
Reason: The length of 3 metres (about 10ft) was originally chosen because at the time the rule was written the Industry standard for crepe paper was 10 feet. The industry standard is now 7ft 6in. The streamer should be changed to reflect the reality of the materials now available. The length is adjusted to allow 2in to make the knot, thus the 7ft 4in length is proposed.

WIDTH; Change from 3cm to 6cm.
Reason: The narrow width was originally used because earlier engines did not have the power to tow a wider streamer. Now the engines are so powerful and the airplanes so fast that they can shred off the streamer in level flight. The narrow streamers are frequently snagged off all in one piece at the first cut. Wider streamers would resist shredding due to high speed and snagging off in big pieces. They would also be easier for the judges to see and thus result in more accurate scoring.

CARDS: Delete the "thin card of reinforced tape".
Reason: The cards serve no useful purpose, but they do sometimes spin and roll up the string thus shortening the effective length of the streamer.

11. METHOD OF SCORING: c. Change the value of a cut to 50 points. e. Change the penalty for a streamer falling off to 50 points. g. Delete in its entirety.
Reasons: The above changes will have no effect on the outcome of any match. They will maintain the same relationship between cuts and air time that now exists. These changes will greatly simplify the mathematics of running a contest. In the event that electrical scoreboards are developed this will eliminate the need to deal with negative numbers.

14. CLASSIFICATION: Change a. to "The contest shall be run as a double elimination tournament." Revise the remainder of the section to agree with this concept.
Reason: Contestants who lose for the first time in the second, third, or fourth round should have as much right to a second chance as those who lose in the first. Other events, such as speed, TR, and aerobatics allow contestants to "throw out" a bad flight at any stage of the contest, except the final. This will result in slightly more matches being flown, which is fair considering the time and effort that the contestants expend to attend the world championship.

15. INTERNATIONAL TEAM CLASSIFICATION: Delete the entire section. Replace with this section: a. Each nation will receive one point for each match one of its pilots wins. b. Nations will be ranked with the most number of points first and on downward in order of decreasing points.
Reasons: The present system is very complicated and difficult to administer. Nations that do not enter a full three-man team cannot participate in the present system. At Woodvale, the first time the present system was used officially, most spectators and many contestants could not figure out the scoring system. In order to start scoring with the present system, it is first necessary to estimate the total number of rounds to be flown. If this estimate is wrong, the running scores will be incorrect.
16. CANCELLATION OF FLIGHT: Delete the following paragraph entirely, f. "He deliberately . . . co-operates . . . passive action. Both eliminated . . . from the heat."
Reason: There is no conceivable way this situation could occur. This rule must be a remnant of a past set of rules that no longer apply. At this time it only servos to clutter

and confuse the rules.
h. Delete the line: "He intentionally leaves the 3 meter circle while the model is airborne,"
Reason: If the pilot leaves "unintentionally" he is penalized 50 points. If he leaves "intentionally" he is eliminated. This is a judgement call with tremendous consequences. How does the jury know the pilot's intentions? Knowing that he will be penalized or eliminated, would a pilot ever intentionally leave the circle? All incidents of leaving the circle should be treated as unintentional and penalized 50 points. This will make judging easier and more consistent.
I. His model is launched before the signal to launch is given.
Remove this line from section 16 (Cancellation of flight) and insert in section 12 (Conduct), with the following addition: The competitor will be penalized 50 points.
Reasons: The result of this change is that the penalty for launching early is changed from cancellation of flight to 50 points. Launching early is a harmless accident and it does not result in any competitive advantage. Cancellation of flight is far too harsh a penalty for such an accident. Officials would be much better able to enforce this rule if the penalty were more reasonable.

CATS. MAC. 1/2A COMBAT RALLY

20.4.80 by John Benzing

CATS. MAC. Spring 1/2A Combat rally at Horsenden Hill, West London, saw an almost Nationals proportion entry of 45 pilots, all competing for prizes kindly donated by Gig Eifflaender of PAW, and trophies by St Johns Engraving Ltd.

Opening Senior bout of the day had Marc Humphries of Northampton MAC, runner-up at last year's Autumn CATS rally, flying against Tim Bartram of Cosmo. Right from the first launch both pilots were soon struggling to remain airborne in the strong Horsenden Hill wind, but a quick appraisal of the conditions saw a change of tactics with both models flying continuously downwind to produce some good high speed combat. With no cuts scored by either pilot the outcome was a win for Tim Bartram on air time alone.

Tony Eifflaender, who with his father Gig, make the famous PAW range of engines, had made the long journey from Macclesfield to compete in this, his first 1/2A combat event for several years. He was drawn against veteran CATS flyer Robert Rendell, who was using his new all-foam *Wildfire* design model for the first time. Both pilots were equally matched in ability and gave a fine display of good, well co-ordinated combat flying with Rendell just having the edge and winning the bout on air time alone. Tony was using a new 'hot' 1.5cc engine, at present in the field trial stage, but which he hoped will be generally available later in the year. Engine 'tweekers' Messrs Harrison and Willis, driving force behind the South London Cosmo club, were lent a sample engine and spent much of the day screaming their models round the sky at terrific speeds. Seems like 90mph 1/2A combat is clearly visible on the horizon.

Meanwhile the combat bouts were continuing apace and in the second round Neil Gill, Peterborough MAC captain, and winner of last Autumn's CATS rally, found himself flying against Dave Harrison of Cosmo. The usually slick pitwork of Peterborough club members Andy Mansfield and Marc Jarret seemed a little rusty after their winter layoff and must have given Neil a few anxious moments, but he quickly had the bout under control and managed a convincing two nil win. No doubt a few more competitions and the pitwork will be back on form.

Disaster for Paul Vallins of Cosmo when in the second round, flying against Robert Rendell of CATS, a midair collision late in the bout totally destroyed his engine, a very rare occurence despite the apparent risks of combat flying. Commiserations to Paul – that engine was brand new, having only been purchased the day before. Small consolation was the fact that he won the bout by two cuts to nil.

The quarter finals saw jubilation for Dave Stenhouse and the Elliott club when he managed to beat the notorious Pete Tribe of Cosmo. Although Pete had two cuts to Stenhouse's one, he lost because of considerably more ground time.

A potentially good quarter final bout between Neil Gill and Mark Harrison of CATS proved a big let down when Mark failed to start his engine for the whole duration of the bout. Mark seems jinxed with engine problems, last year's Autumn rally saw a non-start caused by a loose backplate, this year's problem was loose head screws and revolving liner.

So on to the semi-finals and two Cosmo pilots, Richard Edwards and Dave Fincham, who had been working

By contrast, top three in FAI Combat at last year's US National Championships. George Cleveland 3rd, Richard Stubblefield 1st and Gary Fentress 2nd. All used labour intensive balsa airframes too complex for painless mass building.

their way through the bouts virtually unnoticed, were soon duelling for a place in the final. With both pilots equally matched in ability it was a close bout, but Dave finally emerged the winner by one cut to nil.

The other semi-final saw the Elliott club's hopes of a crack at the final dashed, when the fine run of Dave Stenhouse was halted by Neil Gill, who managed a convincing two nil win.

The final therefore was between Neil Gill of Peterborough and Dave Fincham of Cosmo. Right from the word go, the combat was hair raising, with everybody transfixed by the precision of the manoeuvres and low pull-outs. Suddenly Fincham managed a cut which was quickly equalled by Gill. All square so far and the tension was mounting. A mistake by Gill and Fincham managed to take another cut, but in so doing lost control and crashed. Furious pitwork however failed to get the model airborne for the remainder of the bout and with so much groundtime the final result looked close. Examination of the score sheets showed that although Dave Fincham had two cuts to Neil Gill's one, he had only 90 seconds air time against Neil's 235.

Thus Neil Gill became the CATS combat rally winner for the second time running – and it was no fluke. Neil goes about the business of winning without argument, fuss or furor, and sets a fine example for all other combat flyers to follow. It will be interesting to see if he can make it three in a row by winning the Autumn CATS rally next October.

The Junior event was run entirely by Charlie Windows and members of the Peterborough club, for which CATS. MAC extend thanks. The standard of flying continues to show a steady improvement, with many juniors breaking out of the straight and level routine and attempting manoeuvres during a combat bout. In a fast-changing modelling world however they still need assistance, and Seniors should make all efforts to help and encourage keen youngsters at every opportunity. Even with our help many will fall, but just one success story makes it all worth while. The event was won by T. Jenner with A. Willis second, both members of the Cosmo club, and third place went to A. Cox of Peterborough MAC.

Altogether a great action packed meeting, with the added bonus of having one of the sport's top engine manufacturers, not only competing, but freely joining in the general modelling chat and seeing what makes a modern combat rally tick.

RESULTS: Seniors 1st N. Gill *(Peterborough)*, 2nd D. Fincham *(Cosmo)*, 3rd R. Edwards *(Cosmo)*, 4th D. Stenhouse *(Elliott)*. **Juniors** 1st T. Jenner *(Cosmo)*, 2nd A. Willis *(Cosmo)*, 3rd A. Cox *(Peterborough)*.

Winners at CATS MAC ½A Combat Rally with their prizes. Seniors Neil Gill, Dave Fincham and Richard Edwards with Juniors T. Jenner, Adam Willis and A. Cox kneeling.

RACING by Dave Clarkson

1980 RULE CHANGES

Some new rules will be in force during the coming contest season as follows:

1/2A COMBAT AND MINI GOODYEAR

1. Only commercially produced engines of recommended retail price £14 maximum may be used in the two classes.
2. Engine modifications. Only metal removal is permissable except in order to vary the choke diameter. The original intake type must be retained.
3. In Mini Goodyear the pilot must be under 19 years of age on the 31st December of the year of contest.

CLASS B

1. Lines, 0.4mm diameter minimum.
2. Pull test of 30G on controls.
3. Model weight to be written on the wing tip.
4. Teams are asked to consider, fitting a strong engine retaining strap and use of a wrist to handle strap.

GOODYEAR

1. Retaining strap of 7 strands to be fitted between the engine and bellcrank mounting (recommended to use the pivot bolt).
2. The model weight to be written on the wing tip.

THE CASSUTT *PLUM CRAZY*

In the search for a likely Goodyear to be modelled, I came across this one in the *Circle Torque* newsletter from Australia. Basically *Plum Crazy* is a *Cassutt* except for the increased span, tapered wing. The wing should make all of the difference to we racing types, for it promises a good glide as opposed to the brick-like performance exhibited by the standard barn-door *Cassutt* wing eg. the APS *BooRay*. Allowing for the 5% tolerances on dimensions permitted under the current SMAE Rules, I make the key model dimensions to be Span 712mm(max), Length 588mm(min), Depth at cockpit 118mm(min). Very suitable dimensions for a good flying model.

Have a try with *Plum Crazy*; Ron James did for the 1977 British Nats – and he won! In case anyone fancies painting their model using the original colour scheme, the wing, tail and motor side cheeks were in white, and fuselage, fin and rudder in purple. The wing stripe and numbers were in purple and fuselage numbers in white. Yuk – White and purple! Where do you get purple numbers from?

MORE GOODYEARS

For other sources of Goodyear 3-views, a comprehensive listing was given in this column P529 September 1977 *Aeromodeller*. Those who are new readers may not have access to such old editions so below are summarised the best sources.

1. R. S. Hirsch, 8439 Dala St., Buena Park, Calif, 90620, USA – 90 different 3-views available; send for catalogue;
2. 'Racing Planes' volumes I to XII by Reed Kinert – From Argus Books at £3.50 each;
3. The Modern Air Racers in 3 views' by Charles A. Mendenhall – From Argus Books at £3.35. (details of 24 Goodyears).

Plus of course the APS Plans Service, full details of which are available in the New Plans Handbook No 1 available price £1 inc P&P, where full size model plans are available for:

APS PLANS	*Plan No.*	*Price*
Grey Ghost & Shoestring	CL/1034	£2.05p
Boo Ray	CL/1138X	£1.20p
Rivetts	CL/1084	£1.20p
Ol' Blue	CI/1265	£1.50p
Miss San Bernardino	CL/1246	£2.05p
Argander Special	CL/1194	£2.05p
Lil' Quickie	CL/1343	£2.35p
Long Midget	CL/1085	£1.20p
Little Gem	CL/1139	£1.50p

Also available are the Aircraft Described Scale Drawing plans which have appeared in past issues of *Aeromodeller* and are available as dyeline prints of original drawings, plus reprints of the article, further details of which are available in the New Plans Handbook No. 5 price £1 including post and packing from *Aeromodeller*.

SCALE DRAWINGS	*Plan No.*	*Price*
Airmark Cassutt 111M		
1/12th & 1/36th	2905	£2.05p
Rollason Beta Type B1, B2 & B3		
1/16th & 1/48th	2925	£2.35p
Cosmic Wind & Long Midget		
1/48th & 1/72nd	2762	£1.20p
Loving Wayne Love		
1/36th & 1/48th	2707	£1.20p
Mace R-2 Shark		
1/12th & 1/36th	2931	£2.05p
Owl Model OR-65-2		
1/12th & 1/48th	2932	£2.35p

Those of us raring to get back into Goodyear and those contemplating their first venture, now that the fearsome big glows are gone and 2.5cc diesel only Goodyear has been introduced, will surely find 'the' model amongst this vast variety of literature.

POETIC JUSTICE

"Yon Goodyear hath a lean and hungry look." Not exactly what Shakespear had in mind perhaps but these sentiments will be to the forefront of contest directors' minds when administering Goodyear events this season. This lyrical reference is to the interpretation of the rules, which require 1/8th scale profile models of Goodyear, Continental Trophy or other NPRPA formula 1 full size racing planes (1/12th scale for Mini Goodyear). Models may be built to an accuracy of 5% for linear dimensions with an allowance for tails to be 25% over area in the interests of improved model controllability. It seems that some competitors have been over enthusiastic in their scaling down. However, as the original full size machines were built to a minimum allowable wing area (not counting tail area) of 66sq ft then even allowing for the 5% tolerance, the minimum possible model wing area is 148.5sq in (9.6sq dm). With this in mind there will be spot-checks at contests and the top three models at all events will be processed. So next time you are scaling down a future Goodyear racer, resist the temptation to become *a mortal barred.*

YEAR OF THE RAM

The pedigree of the *Nelson, Cipolla* and *BG* team race motors should be known to us all by now. They are after all well proven in competition and feature in the world's fastest times viz.

Cipolla – Cipolla/Cipolla 3:37;
Nelson – Langworth/Broadhead 3:40;
BG – Metkemeijer Bros 3:42.

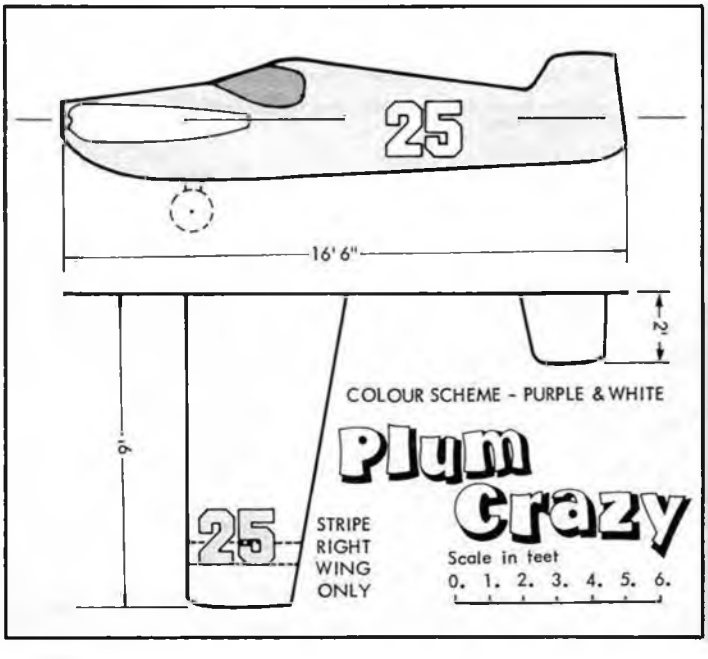
Performances like these are going to be par for the course at the 1980 World Championships in Poland.

But, besides these commercially more-or-less available TR motors, home-made specials will also figure in Poland. The better known of these will be those of the Russians (variously known in the past as the TMA and the OMB) and that of the current World Champions, the FMV from Holland. One other home of the 'special' is Canada where two home-made specials are known to exist – the RAM and the BBF. The RAM has been around for a few years and its best known users have been the Canadian team of Dave Kelly and Ken Parent – the motor looks pretty good and maybe this time it will go pretty good as well.

The BBF is really a Swedish/Canadian affair for the initials represent the names of the Swedish and Canadian collaborators in this project – Matts Bohlin, Gosta Bengtsar and Brian Fairey. At last a truly different looking motor! Hopefully we will see this one in Poland too, and hopefully it will prove to be a real goer.

TYNEMOUTH RALLY – Albemarle Barracks, 6th April

This first contest of the year organised by the Tynemouth club saw 3 events – FAI, 1/2A and Goodyear – run in perfect weather. My thanks to Dick Wilson of Tynemouth for this report (I was in South Africa avoiding the expected Albemarle weather – wrong again Clarkson!)



Left: ***Dave Kelly with F2C racer used for place in Canadian C/L Team. Motor used is home made RAM, seen near right.***

Far right: ***Another new F2C motor the Swedish/Canadian BBF (Bengtsar, Bohlin & Fairey) uses integral pan/crutch crankcase allowing motor to be bolted directly into model. Crankweb is counterbalanced with Gold!***

F2C Team Race

The outstanding performance here in their first heat was by Langworth/Broadhead who produced a 3:40 record breaker in a strictly controlled 3-up race with 2 watches to certify their time. A back-up time of 3:43 in their second heat showed it was no fluke. The only other sub-4 minute heat time was by Wilson/Gardner using a "New Wing Thing" model and by Jarvis/Woodside using "old rubbish". Not surprisingly these 3 teams featured in the final as the results show.

			Best Heat	Best Semi	Final
1.	Wilson/ Gardner	*Tynemouth*	4:02	3:57	8:16
2.	Langworth/ Broadhead	*Wharfedale*	3:40	4:00	8:26
3.	Jarvis/ Woodside	*Norwest*	3:55	4:05	9:04
4.	Etherington/ Lorimer	*(Scotland)*	4:05	4:17	
5.	Sladdin/ Archer	*Tynemouth*	4:15	4:43	
6.	Laurie/ Wallace	*Tynemouth*	4:16	4:27	

In the final, Jarvis/Woodside got their settings wrong and Langworth/Broadhead had their prop fall off at a pit-stop so locals Wilson/Gardner won by default.

1/2A TEAM RACE

A little affair for the tiddlers with just 6 entries from only two clubs. Only Horton/Haworth showed real pace with both heats inside the current UK record. In the end an all Wharfedale final resulted as follows:

		Best Heat	Final
1. Horton/Haworth	*Wharfedale*	3:56	8:27
2. Langworth/Broadhead	*Wharfedale*	4:29	9:16
3. Fitzgerald/Williamson	*Wharfedale*	4:55	10:40

GOODYEAR

Another little event and one that showed that quite a bit is still to be learnt about 2.5cc diesel-only Goodyear. So far it would appear that 24 sec/10 laps or better airspeed plus instant re-starts are the recipe for winning. Some may believe that a *Nelson* motor is essential to win but it was a *Rossi* that won this one.

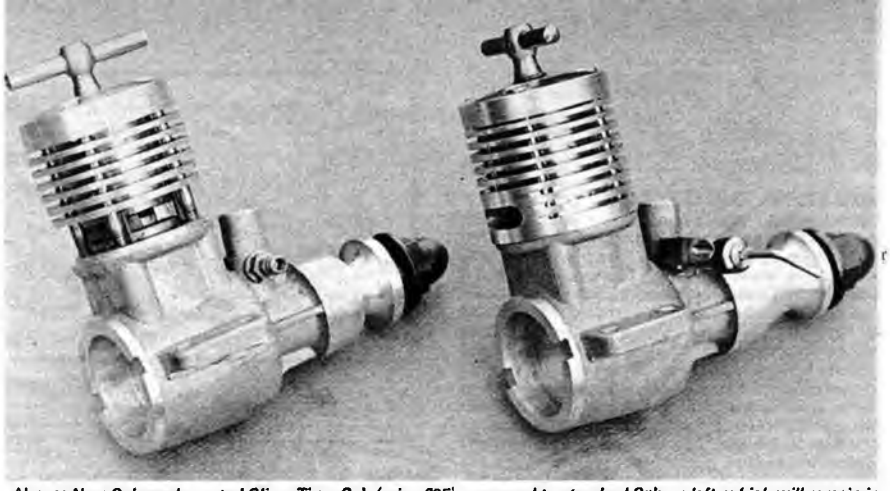
Open Final	*Best Heat*	*Final*
1. Fitzsimons/Millar	5:04	9:21
2. Jarvis/Needham	4:31	9:25
3. Stubbs/Schofield	5:10	11:15

Novice Final	*Final*
Fitzgerald/Williamson	10:16
2. Cross/Cross	11:52
3. Houlton/Paxton	12:25

1st SMAE CENTRALISED — RAF Cosford

20th April 1980

Last year I said nice things about the facilities and weather at this meeting. This year the facilities were as good, after all we were back at RAF Cosford near Wolverhampton, but the weather was not as kind for a very cold wind blew all day, strongly until late afternoon. Two racing events were flown and both attracted reasonable entries and saw new UK records established.



Above: ***New Schnuerle ported Oliver* Tiger Cub *(price £35) compared to standard* Cub *on left, which will remain in production. Schnuerle version offers slight superiority at low RPM, increasing to considerably more BHP at much higher peak revs, 17,500-18,000 on 130-135 x 155 x 180 pitch props. In competition this motor is returning 21 sec. for 10 laps airspeed for up to 45 laps range. A similar side exhaust prototype has won both ½A events so far this year.***

F2C TEAM RACE

22 entries is really quite good for the UK these days and is enough to make for a good competition. Just as important for a good competition are good, experienced organisers and Steve Smith and Colin Brown of Feltham (our Numero Uno FAI team) were most definitely sufficient in that respect. The final requirement is that of a fair number of really fast models; there were enough of those as the results show for the semi-finalists.

*New UK Record

			Best Heat	Best Semi	Final
1.	Langworth/ Broadhead	*Wharfedale*	3:57.8	3:43.5	7:33.5*
2.	Nixon/ Campbell	*Hunters*	3:57.5	3:54.9	8:09.9
3.	Wilson/ Gardner	*Tynemouth*	3:57.2	3:57.0	8:16.0
4.	Clarkson/ Woodside	*Norwest*	3:46.2	3:57.4	
5.	Rudd/ King	*Feltham*	4:13.4	4:15.0	
6.	Horton/ Haworth	*Wharfedale*	4:16.8	4:20.8	
7.	Coote/ Horwood	*S. Bristol*	4:27.1	4:50.9	
8.	Lodge/ Norman	*S. Bristol*	4:30.7	4:31.8	
9.	Fitzgerald/ Williamson	*Wharfedale*	4:30.8	4:50.0	

Strangely neither of the 2 teams in the current UK team for the 1980 World Champs able to fly here (the 3rd team doing the organising) figured — Heaton/Ross because of absence and Gray/Haycock because of rustiness. They were not the only ones for despite a really fast heat, Clarkson/Woodside paid for mistakes in the semis with yet another 4th placing. The 'class' team of this contest were the eventual winners who showed real confidence by running-in a Nelson ABC in the heats, reserving their Nelson AAC for the semis. How it went too! A new UK final record being the result, in one of the best finals we have seen for some time. Congratulations to Bernie Langworth and John Broadhead for showing us all how it should be done.

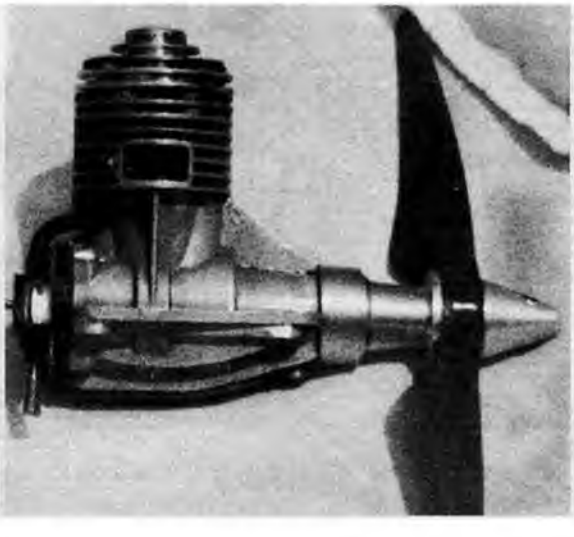
1/2A TEAM RACE

This 'little brother' event seems to be continuing in its resurgence for not only did we see 16 entries, we also saw new motors. The winners used a special made by John Oliver for Bernie Langworth — a side exhaust Schnuerle ported motor. Almost as fast in terms of airspeed were O'Neill/Bollen of Elliott and Hutchinson/Daly of Norwest using converted Webra 1.8 Schnuerle ported motors but mistakes in the races put them out of the running. Also in the semis were the Feeney 1.5 run by Graham Howard and Don Haworth's home-made special. This last motor a very quick one as the results show with a new UK record.

*New UK record

			Best Heat	Semi	Final
1.	Langworth/ Broadhead	*Wharfedale*	4:21.3	4:32.0	8:17.1
2.	Horton/ Haworth	*Wharfedale*	3:56.4*	4:07.4	8:31.3
3.	Nixon/ Campbell	*Hunters*	4:41.7	4:35.2	9:40.5

I am told by Bernie Langworth that John Oliver is producing a Schnuerle-ported version of the trusty Oliver 'Cub' — good news for those who want to be competitive in this, the nicest of the SMAE C/L racing classes.



Martin Dilly reports....

A/2 FROM THE G.D.R.

Florian Georgi is not a name we know yet in the West, but he was runner-up to Hans-Jurgen Wolf in the 1979 F1A Championships in the German Democratic Republic, so will no doubt be active before long on the international contest scene. His aircraft uses one or two rather different structural techniques from those usual on A/2s. The D-box uses a large section spruce leading edge with a light balsa filler strip on top, and tapers steadily from root to tip (presumably the balsa filler gets thicker to compensate); as well as the mainspar web, the D-box sheeting itself is also webbed midway between the spar and the leading edge, and secondary riblets link this web to the spar. The box sheeting uses several pieces, to provide a gradual decrease in stiffness and weight away from the highly-stressed root areas; top skinning uses a 1mm ply insert adjacent to the spar, tapering from 15mm to zero over its 170mm length. The remainder of the skins are of medium balsa in the front, with hard at the rear; the latter tapers from 20mm wide at the root to 5mm at the dihedral breaks, which are secured to the tips with bandage.

Since the model needed 30gms of lead to bring it up to F1A weight, the structure is obviously light. The fuselage uses the same thinking as the wing, with the top and bottom of the box being composite balsa and spruce; twin spruce strips forming the outer part of the top and bottom, and tapering towards the tail end of the fuselage. This ensures that side to side stiffness is maximised, with the harder wood on the outside, at the same time keeping the overall weight down.

Florian's tailplane uses a sheeted upper leading edge, butting against a spruce spar which tapers to zero at the tips.

F/F SHOP WINDOW

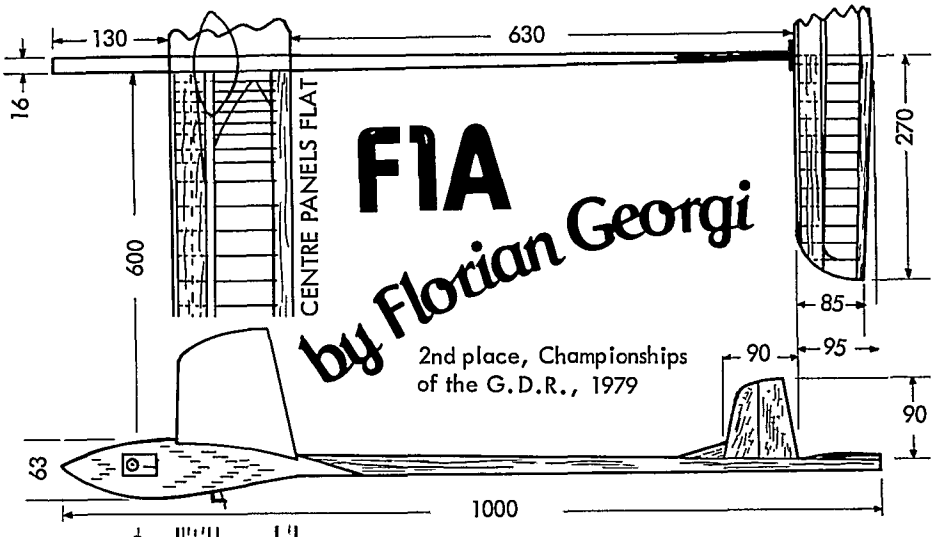
Ron Pollard now has Ronytubes in carbon fibre. The Tchop-pattern A/2 one weighs 31gm as against 25 for the glass version, tapers from 18.5mm to 10mm over 1050mm, and costs £8, compared to £4 for the earlier material, which is still available. The A/1 tube weighs 13.5gm, tapers from 10mm to about zero and costs £4. Ronytube's address is 23 Ivy Road, Walkerville, Newcastle–on-Tyne.

Further to our item in the April 1980 F/F Scene, Tom Hutchinson tells me that shipping costs for the kits we mentioned (*Zingo* – F1C, 1/2A *Maverick* and *Ultimate Dragmaster A/2*) are as follows. Add $3 to the kit price for overseas surface shipment and $8 for air mail; for 2 kits in one box add $4 for surface and $12 for air mail. Tom asks that payments are made in US dollars via an international bank draft, which can be enclosed with the order and speeds matters up compared with an international money order. Tom's address again is 3255 NW Crocker Lane, Albany, OR 97321, USA.

MIDLAND AREA RALLY – 30.3.80

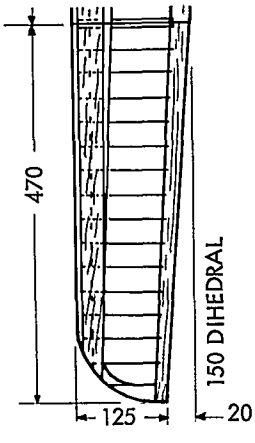
Reasonable weather and a good entry at the heavily-used Barkston Heath airfield led to fly-offs in all except CO_2 and HLG. Most noteworthy models present were those of visiting German Lothar Döring, and his twin pen chart temperature recorder used for lift-spotting. The model has a sheet balsa wing with 3-D turbulation, and the tips are detachable from the one piece centre panels; a 2mm dural knitting needle set 15mm back from the leading edge forms the joiner for each tip, and a brass wire clip both locates the trailing edge and can be bent to adjust the wash-out of the tip. One of Lothar's Wakes uses carbon fibre strips laid over the wing surface chordwise every 100mm or so to stiffen the structure. The prop used a thread turbulator, the tailplane was covered with aluminised Mylar, and an all-flying fin was fitted. This fin was basically a flat plate 2.5mm thick, with

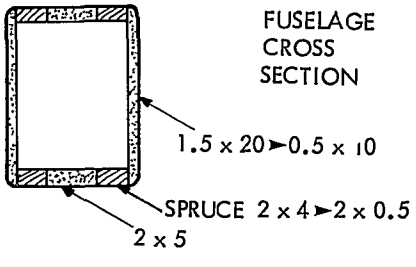
Free Flight Scene

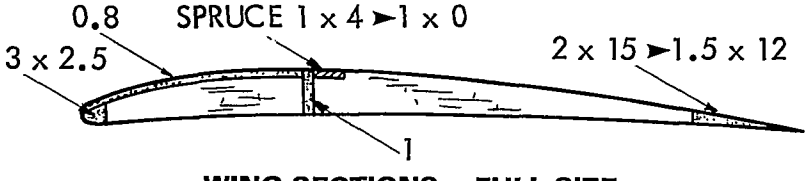


F1A by Florian Georgi

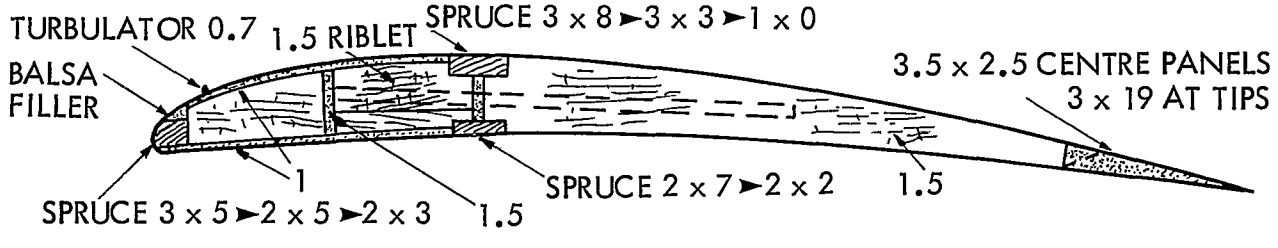
2nd place, Championships of the G.D.R., 1979







WING SECTIONS – FULL SIZE



the leading edge radiussed, but the trailing edge was left square and full thickness, with one side being chamfered for about half the fin height to give a turning effect, possibly with lower drag than with a more orthodox unit.

Lothar, who maxed out in Open Rubber, used a thermistor and also an anemometer on a pole about 3 metres high to sample both temperature and wind speed. DC amplifiers fed the changes measured by the two sensors to a couple of ex R/C car servos which drove fibre-tip pens on a moving strip of chart paper. The twin traces could thus be monitored and the rise in temperature and simultaneous drop in wind speed that marked the passage of a thermal was quite clear (see photo).

The timer start on these models was neat too. A multi-function Seelig timer, with the start button spring-biassed to the 'on' postition operates D/T, auto rudder and VIT, but has some sensible modifications. The timer is held stopped by a 20swg wire latch, which engages with a wire stirrup on the fuselage. Flicking this latch free on launch sets the timer running; the photo shows the details. Lothar had replaced the blued steel trigger arm hinges on the Seelig with a single piece of 1.5mm dural, which had three grooves filed into its lower face in which the arms pivotted; the dural was then rivetted to the original faceplate, thus preventing both the rust problem found with steel hinges, and also the troublesome slackness that occurs with the original hinge rivets.

Dr Döring was living at Stamford for a few weeks gaining experience in the workings of the National Health Service, and has now returned to West Germany.

Glider winner Tony Cordes used a sheet bottom on his model, which has a Benedek 6356 airfoil; Tony has sanded the original 1.5mm down to maybe a thick millimetre and there are no lower spars in the wing, so this balsa takes all the tension loads during tow. It is, however, webbed to the upper spruce spars, which have sensible tapered doublers to reinforce them. Tony uses a thickish undercambered tailplane in windy weather and a flat one in the calm; the model has a straight tow system.

RESULTS: Open Glider (33 flew) 1. S. Phillpott *(Whitefield)* 9:00+3:30, 2. M. Gregorie *(Freebirds)* 9:00+3:05, 3. J. Cooper *(Biggles)* 9:00+2:54. Top Junior C. Parry *(Biggles)* 7:23. **Open Rubber** (16 flew): 1. B. Kenny *(Falcons)* 9:00+6:50, 2. M. Sanderson *(Cleemac)* 9:00+6:47, 3. J. O'Donnell *(Whitefield)* 9:00+5:59. **Open Power** (7 flew): 1. R. Monks *(Birmingham)* 9:00+5:32, 2. P. Harris *(Birmingham)* 9:00+5:24, 3. D. Reader *(Birmingham)* 9:00+4:52. **Combined Mini** (30 flew): 1. J. Fletcher *(St Albans)* (1/2A) 10:00+3:49, 2. P. Harris *(Birmingham)* (1/2A) 10:00+3:11, 3. P. Carter *(Croydon)* (C d'H) 10:00+2:53. Top Junior J. Walker *(Birmingham)* (A/1) 8:25. **HLG** (8 flew): 1. P. Ball *(Grantham)* 5:00, 2. M. Page *(Peterborough)* 4:53, 3. P. Davis *(Richmond)* 4:47. **CO_2** (6 flew): 1. A. Gibbs *(Wolves)* 9:26, 2. S. Phillpott *(Whitefield)* 9:09, 3. P. Sidall *(Grantham)* 9:05.

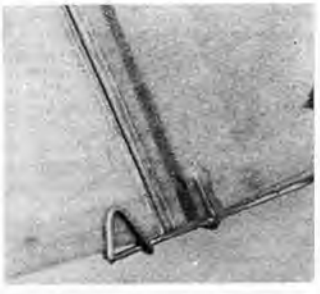
SMAE CLUB CHAMPIONSHIPS
– Barkston Heath, 5.4.80

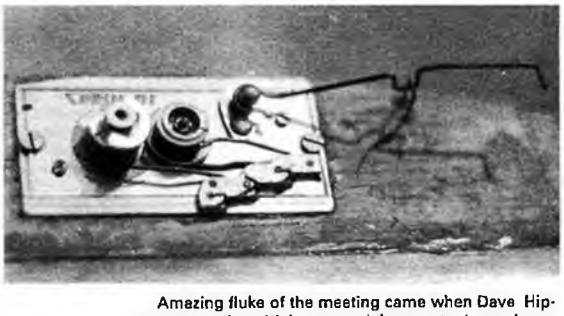
Most of the day's flying for the Club Championships on the Saturday took place in the downwind turbulence from a couple of hangars and this probably led to the number of power model write-offs, which included contributions from Messrs; Monks, Harris and Screen of Birmingham. The day's moderate drift dropped off for the fly-off and Mick Coomes' 9:24 glider time gave Grantham a scant one point victory over Biggles, who had won the Championships for the preceeding five consecutive years! The Plugge scoring system meant that if I had filled my timer space up with Plasticene like Mike did, instead of D/T-ing early out of the same lift, Grantham might have been deprived of the point; as it was, John Bailey formed the entire Biggles team, flying in all three classes and coming out top Biggle in each, but could only get his club to second place.

Two out of the three Smiths in Open Power made it to the fly-off, with Jeff beating father Tom into second place by eight seconds; both flew .40-powered *Super Nogs*, Tom's using 6 thou card strip turbulators on the tips to delay tip stalling. The card was about 4mm wide and cut with pinking shears to form a zig-zag at the front, and certainly the model had a very slow, rather nose-high glide when it drifted over me downwind.

Croydon member, Norman Marcus, newly-returned after a 25 year rest from model flying, used one of his original 1955 Open Rubber models to reach the fly-off and managed 6:38 with it! Rumour has it that he even still has a stock of the khaki Japanese tissue with which it is covered.

Visitor at Midland Area Gala from Germany was Lothar Döring with this all sheet F1B Wakefield. Black chord wise stripes on wing are carbon fibre reinforcement stiffeners. Top left: *Wind and air temperature pen chart recorder, used to help detect passing thermals.* Below right: *Modified* Seelig *timer uses wire latch to control timer start, arms are hinged in dural plate.* Below left: *Plug on tips are accurately located at trailing edge with neat brass wire clips allowing wash-out adjustment.*





EUROPEAN TEAM TRIALS
Barkston Heath, 6/7.4.80

Sunny weather for the first day led to a big crop of maxes, with 21 people ending day one with five threes in F1A. The surrounding fields were not yet showing green so recovery was no problem, but for the same reason, Barkston Heath will be avoided for free-flight during the sensitive crop period from June till September. The Trials were run smoothly by Jeff Anderson of Tynemouth. His only problems arose when a wind swing led him to change the launch line *during* a Wakefield round on the Monday!

Among the various incidents, was Alan Jack's F1C flight in round 4, when his model climbed only about as fast as a Wakefield with the Rossi screaming and Alan staring dumbfounded at it till the motor cut and the model went away in low lift for a max; all was caused by the prop being put on backwards. Phil Uden managed to score three consecutive 2:53s.

The second day's cooler weather and rather stiffer wind weeded out the maxers, and produced the usual crop of "six threes and a hole" stories, among them Tony Le Vey in F1A and Dave Digby of Croydon, whose Wakefield had a VIT fault and looped on power for a 44 second score. Ron Pollard did 40sec flight consisting of three loops before landing – after the wing cracked at launch. For George Foster, top man in Wakefield, there were no hard luck stories – just good steady flying; George used the model and thermistor combination in a similar manner to his victory at last year's RAF Champs. During the Fly-Off round, Ian Kaynes, who was seen constantly mending and trimming after unlucky landings on rock strewn ploughed fields, flew and was down for 1:56. As the skies darkened dramatically upwind, George still waited for the lift to score an impressive 4:00 max. His model uses a one-piece wing with location pegs to maintain adjustments and a Koster airfoil with a thread turbulator 3mm back from the leading edge. A Seelig timer operates the VIT, while the auto-rudder is prop-stop triggered; the propeller is a 610 x 660 helical pitch one carved from lime and mounted on a Free-Flight News hub assembly.

Amazing fluke of the meeting came when Dave Hipperson got lost driving around the country lanes downwind with no map, only to discover an F1A glider by the roadside! It was Brian Nicholson's model lost since the first round, and Dave stumbled upon it 6 miles off the drome! Brian was very pleased to get it back, but just missed having to use a third model on the last flight and drop from a full score! Pete Bayram, equally lucky, had his glider flight land alongside a chuck glider he had lost the previous week!

RAFMAA flyer George Foster topped the European Team Trials – F1B in a convincing fashion.

At the end of the final glider round only Gerry Le Vey of North Yorks F/F Group still had a perfect score, and his was certainly a popular win. Using a straightforward model that had flown poorly until he added a thread turbulator 9mm back on the original airfoil, Gerry shunned new-fangled circle towing and flew more or less with the mob. His wing has a single I-beam mainspar and the airfoil looks a bit like a thin Shoaf, with a sharp leading edge, and seems a bit thicker than one would expect aft of the 60% point. Brian Baines in second place, used a circle towing model but was rarely, if ever, seen circling; instead kiting his model downwind of the pack in, to my mind, the logical manner unless you relish the maypole results of massed glider launches. John Bailey, despite feeling tired after flying all three classes in the Club Championships, flew F1C as well as F1A; his model in the latter class used an Isaenko circle hook installed as in the original drawing, with no rake between pivot and tow-ring. (Results last month.)

Right: *FAI Power Team for the European Championships in Yugoslavia in August, from the left Ken Faux, very much on form so far this year, Stafford Screen and a first time place for Alan Jack.*

Below: *A popular win for Gerry Le Vey of the North Yorks F/F Group, who topped F1A in the European Team Trials.*

Dave Hipperson reports....

THE OPEN RUBBER TROPHY, 1980

By special arrangement with the C.O., Bassingbourn is being made available for the Open Rubber Trophy on 19th Oct. However, no I.C. engines whatever will be allowed to be run on the drome on this day. The event will be as last year – Trophies, goods and cash to top seniors and juniors. Increasing max throughout the day and prize giving at 7pm at the Waggon & Horses Pub.

Pre-entry advised as it will be double on the day. Entries to Open Rubber Trophy, 35 Anthony Road, Boreham Wood, Herts. Enclose two SAEs for confirmation and last minute details and results service after the event. Senior £1, Junior 50p. Closing date for entries 5th October.

CO_2 REV COUNTER by J. H. Maxwell

The original of this rev counter was made 32 years ago, during the first wave of popularity for CO_2 power. It is described now because of the interest shown in it by a number of today's CO_2 enthusiasts following publication of my letter P197 April 1980 *Aeromodeller.*

Usually, rev counters of the vibrating reed variety have a single wire which is adjusted in length until it starts to vibrate in harmony with the engine. This is fine for an engine running at a steady speed, but is simply not practical for a CO_2 engine where the speed is continually changing throughout the engine run.

The solution was to make an instrument with a series of non-adjustable wires, the lengths of which were obtained from the formula

Imperial $L = 1227.6 \sqrt{\frac{D}{F}}$ or **Metric** $L = 6188 \sqrt{\frac{D}{F}}$

where L = length; D = diameter; F = frequency per minute i.e. rpm

Thirteen reeds of 20swg (.914mm) piano wire were used giving a range from 7,500rpm to 1,500rpm in steps of 500rpm. It is possible that, for the modern smaller CO_2 engines, wires of a thinner gauge would be more suitable.

To construct the instrument, two discs 60mm dia were first of all cut from 1.5mm plywood. On one of these the wire positions were marked, radiating from the centre at 15° intervals. This disc was then coated with gap-filling glue (epoxy resin) and the wires, which were about 50mm overlength at this stage, laid on it with their root ends near the centre. Next, the other disc, also coated with glue, was placed on top, and the whole sandwich was cramped up tightly until the glue had set. The handle was made from a piece of 10mm dowel, slotted at one end so that the disc assembly could be glued into it.

An engineer's steel rule was used for accurate measurement when cutting the wires to length. Initially they were cut slightly over-size, and then reduced to the final lengths by grinding the tips with a powered grinding wheel.

Finally the rpm figures were marked on the disc, and the completed instrument appeared as shown in the photograph. In use it is held in firm contact with the engine mount, and, as each wire vibrates, it indicates the rpm of the engine at that instant.

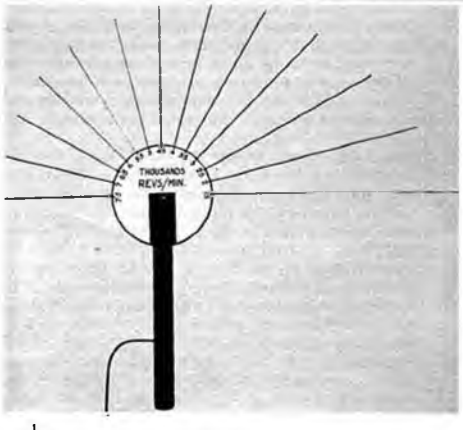
To arrive at the actual Energy ouput of a CO_2 engine run, it is necessary to combine the rev counter with a torque measuring device. However, even without the latter, some useful figures can be obtained for comparative purposes, by adopting the following procedure.

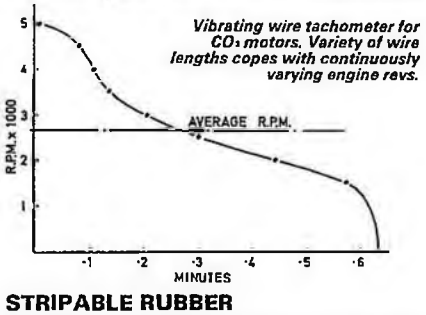
The same propeller must be used throughout the tests, and two people are required. One operates the rev counter, while the other is armed with a stopwatch. The engine is started and as each wire vibrates the number is called out while the assistant writes down the corresponding elapsed time.

If these figures are plotted as a graph similar to the one shown here, the Average rpm can be calculated. The Energy output is then proportional to

N^2T

where N = Average rpm
T = Engine run, minutes.





Vibrating wire tachometer for CO_2 motors. Variety of wire lengths copes with continuously varying engine revs.

STRIPABLE RUBBER

The editor has sent me more rubber to test. This batch is particularly interesting as although it comes with the same general surface finish as FAI Supplies, it is almost completely perforated down in its length into six strips approximately 1mm square. This is useful if the rubber is intended for indoor but perhaps even more so for outdoor use, as being able to control the width allows motors to be made up to the required length/cross section without resorting to odd numbers of strands. I took advantage of the facility immediately to arrange a 10 gram sample in six strands as close as possible to 10½" long. To do this I simply stripped off one 1mm piece from the edge – leaving a strip nominally 5mm x 1mm.

The complete six strips made up into a 10 gram 6 strands motor of only 9.5" (too short) and four strips came out somewhere around 12.5" (too long).

Anyway the 10.5" motor was tested on the usual rig and was really rather disappointing. To save you rummaging in back copies of the *Aeromodeller* I have included along with a table for the results on this piece.

Turns	Strippable Sample	HJN 1979	Dowsett 1979
410	16.50		
400	10.00	20.00	
390	7.50	15.50	20.00
380	6.50	12.50	15.00
370	5.50	10.50	13.00
360	4.75	9.00	11.00
350	4.25	7.75	9.75
340	3.75	6.50	8.25
330	3.50	6.00	7.75
320	3.25	5.50	7.25
310	3.00	5.00	6.50
300	3.00	4.50	6.00
290	3.00	4.00	5.50
280	2.75	4.00	5.50
270	2.75	4.00	5.25
260	2.75	4.00	5.00
250	2.50	4.00	4.75
240	2.50	3.75	4.75
230	2.50	3.75	4.50
220	2.50	3.50	4.50
210	2.50	3.25	4.25
200	2.50	3.25	4.24
180	2.25	3.25	4.00
160	2.25	3.00	4.00
140	2.00	3.25	4.00
120	2.00	3.00	3.75
100	2.00	2.75	3.50
80	2.00	2.25	3.25
60	1.75	1.50	2.75
40	1.25	1.25	2.00
20	0.75	0.5	1.25
0	0	0	0

the readings from a piece of HJN Pirelli of last year and the best piece of Dowsett Pirelli also tested last year and which has yet to be surpassed. Perhaps it was a little unfair to make a direct comparison with such good rubber but I would still put it in the useable category as it compares quite favourably with stock HJN Pirelli of two or three years ago – much of which I still use. The pity of it is that its limitations would show up most in indoor for which it was undoubtedly designed!

On inspection the 'perforation' seems nearly complete and stripping it is a very simple matter of just pulling. It was surprising to find therefore that the test sample didn't break up into multi-strands when wound repeatedly to full turns as had been expected. It did, however, stretch considerably – never a good sign. The 10½" motor was 12" after break-in and a fraction over that after 400 turns had been applied a number of times. See Classified Ad. P357 June for supplies.

ST ALBANS' GALA

Bassingbourn 27.4.80

With mild and calm weather from the start it was a foregone conclusion that the 1980 St Albans' Gala would be a 'Fly-Off' event. The re-entry facility made doubly sure, and because of the unpredictable lift or sink in the first few hours, quite a number made use of it including surprisingly over half of the eventual ten in the Open Rubber flyoff!

Roy Miller had a full score in Wakefield quite early on in the afternoon. F1B turned out to be the only event that would be decided without a flyoff when Pete Williams dropped his last flight after choosing to fly in the same lift that gave Chris Edge his last glider max. Somehow Pete's Wakefield fell out after an impressive climb to score 2.50 for 2nd place, having already put together 5 maxes in F1A and went on to win the flyoff in this event when Tony Cordes towed in for 39secs. A good day for Pete – 9 maxes from 11 flights! In the 5mph drift and virtually liftless conditions, the power flyoffs – open and FAI – were run together. This made it possible to compare climb heights and glides of the two classes. Highest model of all was Stafford Screen's FAI job but a slight left lean had it off pattern at the top and the rudder was unable to pull it around and it lost much height in the transition. This left Ken Faux to win F1C with an excellent 4.56 which was seen to out glide a number of larger and lighter loaded Open models in the same air. Hopper and Peers made useful climbs in Open Power but Julian was also unlucky with the pull out. At a tremendous height the auto-rudder seemed either insufficient or timed too late to bring the model into its glide circle from a perfect vertical attitude. The ensuing stall lost him a hundred or so feet and probably the contest. Monks and Johnson made spectacularly good pattern climbs but found no help in the air. Trevor Payne – flying last – seemed the only one to contact anything when after a slowish but on pattern climb, the model twitched on the glide soon after its smooth pull-out suggesting lift, with a score of 6.47.

Above: *Frank Rushby of Grimsby club flew this ¼A model with 9% thick wing sheeted top and bottom; TD .049 swings Tornado 5½ x 3 prop. Model now weighs 8½oz.*

Right: *Russel Peers, would you believe reigning Scottish F1B National Champion, continues to fly this restricted rubber class to good effect.*

Left: *Brothers Chris and Dave Edwards from Darlington took 2nd and 3rd places at Northern Area FAI meeting.*

Open Rubber was last, and most of the pack were away quickly soon after the hooter. The air and the visibility was still improving so Croydon Club members Marcus and Hipperson chose to fly last – nearly the end of the period. Marcus flew first and had the better air all the way and Hipperson's model never seemed to quite catch it up. Both models were up for over six minutes, however the tiny Marcus model did the trick and took 1st by just 12 seconds. This proved a very popular win from a well-known man making his return to aeromodelling this year after such a long layoff.

John Fletcher who had run the event all day with little trouble assembled all for a prize-giving to conclude the proceedings. Winners received very handy balsa weight balances and to the top three in each class re-distributed entry fees plus plaques.

RESULTS: F1A 1. C. P. Williams *(Richmond)* 15.00+2.37, 2. A. Cordes *(Whitefield)* 15.00+0.39, 3. P. Hawkins *(Biggles)* 14.41. **F1B** 1. R. Miller *(Northwood)* 15.00, 2. C. P. Williams *(Richmond)* 14.50, 3. D. Hipperson *(Croydon)* 14.25. **F1C** K. Faux *(Freebirds)* 15.00+4.56, 2. S. Screen *(Birmingham)* 15.00+4.02, 3. R. Monks *(Birmingham)* 15.00+2.46. **Open Glider** 1. C. Edge *(Welland Valley)* 9.00+4.36, 2. M. Gregory *(Freebirds)* 9.00+4.13, 3. R. Bailey *(St Albans)* 9.00+. **Open Rubber** 1. N. Marcus *(Croydon)* 9.00+6.13, 2. D. Hipperson *(Croydon)* 9.00+6.01, 3. R. Peers *(Falcons)* 9.00+5.53. **Open Power** 1. T. Payne *(Biggles)* 9.00+6.47, 2. R. Peers *(Falcons)* 9.00+6.01, 3. R. Monks *(Birmingham)* 9.00+5.20

SMAE 2nd Area Centralised 20.4.80

F1C Power – Halfax Trophy: 1. M. Cowley *(Biggles)* 14:25, 2. R. Moore *(Biggles)* 13:22, 3. M. Wood proxy M. Dilly *(Croydon)* 12:03, 4. R. Cummins *(Bristol & West)* 11:32, 5. J. Bailey *(Biggles)* 8:17. **Open Rubber – Gamage Cup:** 1. J. Cooper *(Biggles)* 9:00+6:51, 2. D. Wain *(Bristol & West)* 9:00+3:29, 3. R. Peers *(Falcons)* 9:00+04, 4. P. F. Davies *(Bristol & West)* 6:10, 6. D. Hipperson *(Croydon)* 6:00. **Open Glider:** 1. R. Audley *(Bristol & West)* 9:00+2:45, 2. A. Moorhouse *(Bath MAC)* 9:00+2:24, 3. L. Rogers *(Swindon)* 7:19, 4. M. Duce *(Liverpool)* 7:05, 5. B. Lavis *(Biggles)* 5:54. **Plugge Totals:** 1. Biggles 500, 2. Bristol & West 356, 3. Croydon 344, 4. Crookham 280, 5. St Albans 276.

SMAE 3rd Area Centralised 11.5.80

F1B Wakefield – Weston Trophy: 1. J. Bailey *(Biggles)* 12:27; 2. J. Cooper *(Biggles)* 11:34; 3. M. Evatt *(Biggles)* 11:23; 4. A. Wharrie *(NYFFG)* 11:04; 5. C. Plant *(Darlington)*. **Open Power – White Cup:** 1. P. Harris *(Birmingham)* 9:00+3:34; 2. A. T. Smith *(BAC)* 8:38; 3. J. K. Smith *(BAC)* 8:22; 4. R. Moore *(Biggles)* 8:18; 5. R. Monks *(Birmingham)* 6:00. **Open Glider:** 1. M. Gilmore *(Grantham)* 8:53; 2. P. Moate *(Tynemouth)* 7:12; 3. J. Godden *(Leeds)* 7:04; 4. C. Rogers *(Swindon)* 6:00; 5. Ball *(Grantham)* 6:00. **Plugge Totals:** 1. Biggles 791; 2. Grantham 487; 3. Crookham 432; 4= Bristol & West and Croydon 428.

Engine Test Review

with Peter Chinn

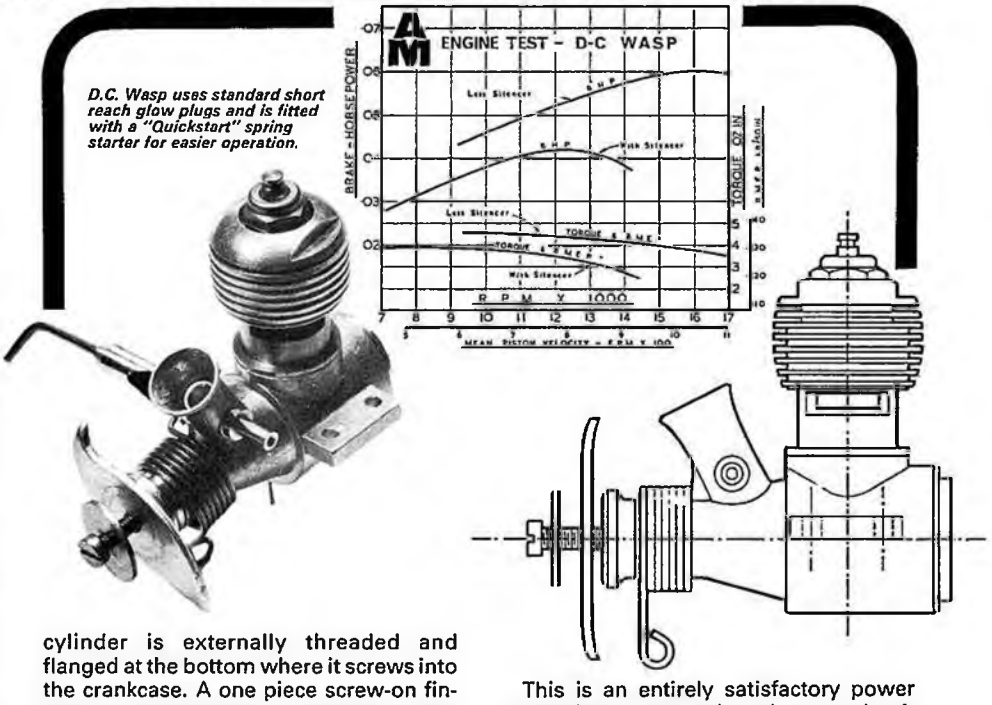
DAVIES-CHARLTON 'QUICKSTART' WASP

Country of Origin: Isle of Man, UK.
Type: Glowplug ignition, shaft rotary-valve with plain bearing. No fuel tank.
Bore: 0.407in (10.34mm).
Stroke: 0.389in (9.88mm).
Swept Volume: 0.0506 cu. in. – 0.8293cc.
Weight: 46 grammes – 1.62oz. 67 grammes – 2.36oz (with silencer).

Davies-Charlton are one of the oldest British model engine manufacturers and, for many years, have specialised in producing small inexpensive motors for the younger modeller. Known as the 'Quickstart' range, these are all compression-ignition ('diesel') motors with the sole exception, at the present time, of the 'Wasp' 0.8cc glowplug unit which is the subject of this report.

The original *Aeromodeller* report on the Wasp appeared in the June 1971 issue and was timed to coincide with the engine's release to the retail market. Our report (of which the following is a résumé) was based on tests of a pre-production model loaned by the manufacturer. It is possible that current production models differ in minor detail and performance. Early models could be obtained with a choice of two types of fuel tank but the current version appears to be sold less tank. At a recommended retail price of £6.92 including VAT, it is one of the cheapest model engines currently obtainable.

The Wasp is suitable for models intended to take the popular American ½A class 'sport' motors having a capacity of approximately 0.05 cu in. or 0.8cc. It is of the crankshaft rotary-valve type and features a pressure diecast crankcase and main bearing housing with hardened, counterbalanced crankshaft running directly in the case alloy like the Cox engines. Also like the Cox motors, the Wasp uses a steel piston, hardened on the skirt surface only, attached to a hardened steel connecting-rod by means of a ball and socket joint. The piston runs in an unhardened cylinder having dual opposed exhaust ports with internal flute type transfer ports between them. The cylinder is externally threaded and flanged at the bottom where it screws into the crankcase. A one piece screw-on finned cylinder jacket and head with a separate glowplug is used.



D.C. Wasp uses standard short reach glow plugs and is fitted with a "Quickstart" spring starter for easier operation.

The Wasp is equipped with a spring starting device and, compared with normal 'flick' starting, this gave more positive results and is certainly a help to the beginner. The device consists of a coil spring (fitted around the crankcase nose) the free end of which is hooked over a sheet aluminium pawl installed behind the prop.

Tested on Keilkraft Nitrex-15 fuel (at that time containing 13 per cent 2-nitropropane and roughly equivalent to a 10% nitromethane mixture) the Wasp recorded 13,000 rpm on a 6 x 3 Tornado nylon prop, 13,100 on a 6 x 3 Keilkraft nylon, 14,800 on a 5 x 4 Tornado nylon, 16,700 on a 5 x 3 Keilkraft nylon and 17,100 on a Tornado 5 x 3 nylon. The engine was obviously at its best when allowed to have its head and this was confirmed by the torque and power curves which indicated a peak output of 0.06 bhp at just over 16,000 rpm.

This is an entirely satisfactory power output for a 0.8cc beginner's motor, but it is only fair to remark that the original engine loaned for test may have been slightly below average in performance, since the manufacturer subsequently stated that production motors would turn a 6 x 3 prop at substantially higher rpm.

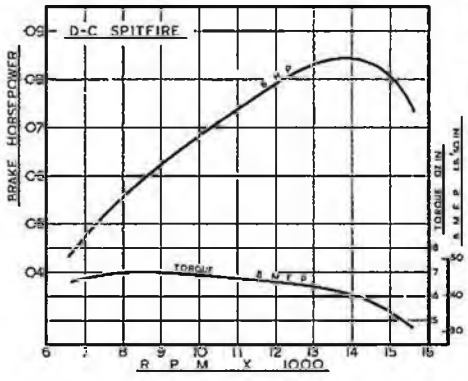
Incidentally, the 'with silencer' curves shown on the performance graph were obtained with the engine fitted with a D-C 'U-tube' silencer and exhaust collector ring supplied at the time. The rather severe power loss caused was due, not merely to the back pressure caused by the steel wool packed silencer pipes, but to the fact that the piston skirt uncovered the exhaust ports at the top of the stroke, allowing exhaust gas, rather than fresh air, to be drawn into the crankcase and thereby diluting the fresh charge. We understand that this fault has now been corrected which should mean a substantial improvement to the with-silencer power output.

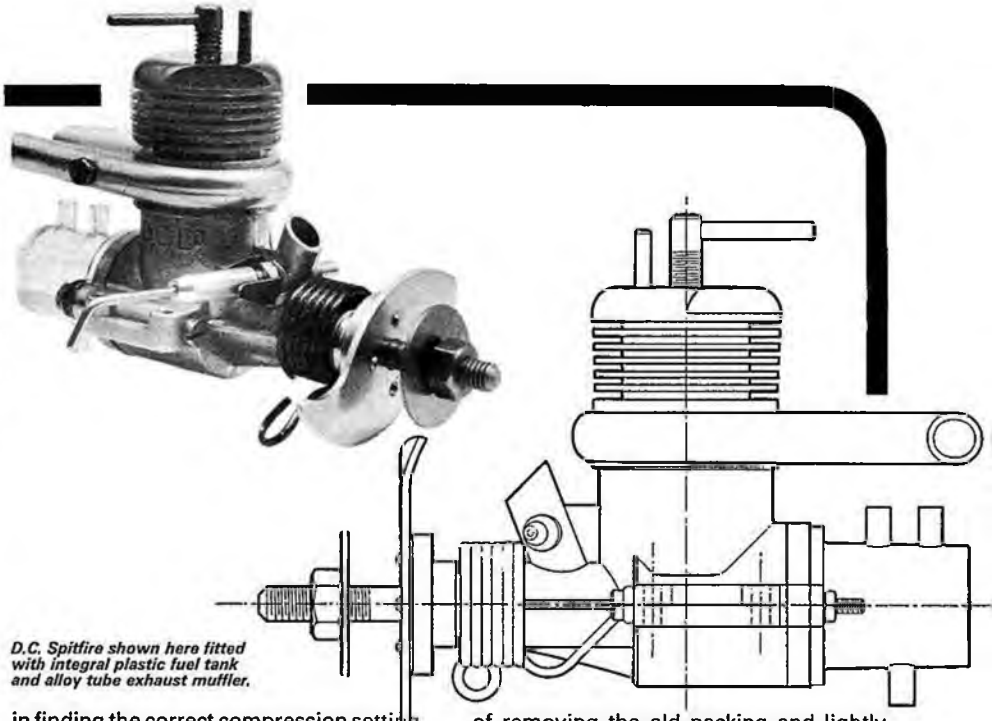
DAVIES-CHARLTON 'QUICKSTART' SPITFIRE

Country of Origin: Isle of Man, UK.
Type: Compression ignition, shaft rotary-valve, with plain bearing. Optional fuel tank.
Bore: 0.425in (10.79mm).
Stroke: 0.420in (10.67mm).
Swept Volume: 0.0596 cu. in. – 0.9764cc.
Weight: 3.4oz (less silencer); 3.6oz (with silencer).

The very first Spitfire 1cc diesel made by Davies-Charlton appeared in 1953. Actually, it was then called the Allbon Spitfire, being one of a number of engines designed by Alan Allbon, who had previously manufactured engines at his own workshops at Sunbury-on-Thames. In 1957, an entirely new model – at that time known as the Spitfire Mk. II – was introduced and it is this model, basically, that has been made ever since. The engine was re-tested for the *Aeromodeller* Engine Test series in July 1966 and it is on that report that these notes are based, although one or two minor changes have since been made to the Spitfire, including a slightly different fuel tank.

The Spitfire is of simple construction. It





D.C. Spitfire shown here fitted with integral plastic fuel tank and alloy tube exhaust muffler.

is, of course, of the ringless lapped piston type like most model compression ignition engines. The piston is of cast-iron and runs in a hardened steel radially-ported cylinder-liner. This latter has a flange at exhaust port level by which it is located in the pressure diecast aluminium alloy crankcase and is held in position by the machined cylinder jacket that drops over the upper part of the liner and screws into the top of the crankcase. The piston has a conical crown and is coupled to a forged high-duty aluminium connecting-rod by a pressed-in 1/8in dia. solid gudgeon-pin. The hardened crankshaft has a plain disc web and a 5/16in dia. main journal that runs directly in the crankcase material.

The crankcase has two substantial beam mounting lugs (the mounting faces of which are *below* the engine's centre-line) and two long screws pass through these to secure the deep crankcase back-plate. Removal of the fuel tank will enable the user to mount the engine directly to the model's front bulkhead, should this be more convenient.

A stop pin is fitted to the cylinder head to limit compression lever movement to one complete turn. This is a useful addition to a beginner's engine, as it reduces the extent to which he can become muddled in finding the correct compression setting, especially if he, or someone else, has, as often happens, previously fiddled with the compression-screw and disturbed the factory setting.

Our tests on the Spitfire were carried out with the engine fitted with the appropriate D-C silencer. This consists of a U-shaped aluminium tube, suitably cut away at the centre where it is wrapped around the upper part of the crankcase to cover the two exhaust outlets and it is secured with a 6BA screw and nut. The two tailpipes so formed are packed with steel wool to form simple absorption type silencers.

All our tests were carried out with the silencer installed. There is a tendency for the steel wool to become clogged with exhaust oil residue after a while, which will reduce power and, after running in the engine, we therefore took the precaution of removing the old packing and lightly repacking the tailpipes with fresh steel wool.

As the performance curves show, a peak output of 0.085 bhp at a surprisingly high 13,800 rpm was recorded on test. Prop rpm figures obtained included 8,100 on an 8 x 3½ Top Flite wood, 8,100 on a 7 x 5 PAW wood, 9,300 on a 7 x 4 Top-Flite nylon, 11,000 on a 7 x 3 PAW, 12,600 on a 6 x 4 Power Prop wood and 13,400 on a 6 x 4 Top Flite wood.

Starting was good. The Spitfire is equipped with a coil spring starting device. The spring, consisting of six turns of 17 swg spring steel wire, has its free end formed in a loop to engage a dural plate behind the prop. The spring is quite strong and needs to be wound back only about half a turn to spin the prop vigorously on release.

RAPIER 1cc

The 'mystery' engine of which a photograph was published in the March issue, has been correctly identified by three readers. Mike Clanford of Sutton, Surrey, drew our attention to an advertisement that appeared in the December 1948 issue of *Model Aircraft* magazine which, despite one or two external differences, left little doubt that the motor was a 1cc 'Rapier' diesel made by Warwick Street Engineering Company (Manchester) Ltd., of Lyon Street Works, Ardwick, Manchester.

This appears to have been the only time that the engine was advertised and it would seem that it went off the market shortly afterwards, along with the Rapier 3cc diesel from the same company.

Tom Crompton of Breightmet, Lancs, also identified the engine as a Rapier and added: *"I used to own one of these many years ago and recall that it was a very well made and pleasant to handle motor. The example shown in the photo differs from mine (from memory) in that the venturi tube on mine extended well beyond the tank and there was a 'tennis-racquet' shaped choke lever thereon. (Quite correct, P.G.F.C.). It may not be obvious from the photo, but the head is all-moving (à la E.D. Mk. II) to adjust the compression setting.*

J. Shaw of Oldham is also a former Rapier owner and mentions that he bought his particular example in the Manchester area in 1948.

One for the books! Yes, it really is a glowplug version of the beloved Mills 75. One of a handful of special glowplug versions of the Doonside-Mills replica made in Australia.

BOOK REVIEW

RADIO CONTROLLED MODEL AIRCRAFT

Written by Adrian Vale with cartoons by RAF, published by Gresham Books, Surrey, England, 181 pages 210 x 144mm softbound, illustrated with photos, sketches and cartoons.

Written as a complete guide for beginners to our hobby, it covers all the information that a beginner should require and offers sound advice. The chapter on aerodynamics is well written but it is perhaps a mistake to try and over simplify this very complex subject. In a book of this size and scope it would be better to concentrate on the 'effect', leaving the beginner to extend his reading if he wishes to learn more about the 'cause'. The fact that errors occur show the author is also confused! However, a good introduction to the subject as a prelude to further reading, as recommended by the author.

THE WORLD OF MODEL AIRCRAFT

Written by Martin Hedges, published by Bison Books, Hamlyn Publishing Group Ltd., London. 192 pages 312 x 242 mm hardbound, lavishly illustrated with colour and black and white photographs and some sketches.

It is very rarely that books on model aircraft are published to the high standard of graphic illustration to be found in Martin Hedges book **The World of Model Aircraft.** Every type of aeromodelling is covered, right from the birth of aviation with model flying machines in a historical survey in the opening chapter through Free Flight, Control Line, Scale and Radio Control Power and Glider Flying, with lots of coverage on details construction of plastic kits. Altogether the book forms an ideal and comprehensive introduction to the fascinating hobby of flying Model Aircraft.

KEILKRAFT HANDBOOK

Published by KeilKraft Ltd., Wickford, Essex. 98 pages 228 x168mm, softbound, illustrated with photos and sketches.

Not just a catalogue of their extensive range of model flying kits and accessories, **KeilKraft Handbook** contains many useful articles on building models, installing equipment and learning to fly and includes a complete plan with full size parts of *KK Katie,* a 750mm wingspan all-sheet towline glider which the modeller can construct – preferably using *KeilKraft* balsa wood, of course. Every type of model is included in their plans range, FF, CL and RC, as well as the *Harry Butler* range of Electric RTP models and accessories. All the kits are code numbered and cost of each item can be found on a loose leaf price list which can then be updated by requesting a replacement and sending an SAE to *KeilKraft Ltd.,* Wickford, Essex SS11 8BU

Trade Topics

AUTHENTIC AIRCRAFT COLOURS

Following intensive research into official records, specifications and historical sources, Gloy have announced a new range of truly authentic colours specifically for the benefit of scale modelling enthusiasts. Information was obtained from official Air Ministry files, the United States Air Force and United States Navy as well as Luftwaffe historical sources. Now modellers, whether of plastic kits or flying scale aircraft, have no excuses for not reproducing the exact colour scheme of the full size counterpart. All the enamel paints in the Gloy range are of a modern synthetic oil-based composition, designed to spray or brush and a slightly extended drying time helps eliminate "brush marks" and other imperfections. The colours include matt, semi-gloss, gloss and metallic finishes as appropriate, and the complete range is sure to prove an asset to the serious modeller. A "Hints for Modellers" leaflet is supplied free of charge on receipt of an SAE to: Gloy, Eighth Avenue, Manor Park, London E12 5JW.

Above: ***Authentic Aircraft colours from Gloy.*** Below: ***Tiger Squadron profile chuck gliders.***

TIGER SQUADRON AIR SERIES

An updated version of the once popular profile chuck gliders, this new series of models from America is now imported by *KeilKraft Ltd.* The novelty with the **Tiger Squadron Air Series** is in the choice of materials, the profile balsa fuselage is laminated with expanded styrofoam, which is also used for flying surfaces and is attractively overprinted with colour schemes of the original full-size counterparts – the result is colourful, durable and lightweight. Each of the different subjects comes with a fileable data sheet, giving details and 3 view drawings of the original aircraft together with flying instructions for the model.

What a pity, however, that a simple notch is not incorporated in the fuselage to allow rubber band catapult launches, as the flight performance from a mere chuck is disappointing to say the least. No doubt the innovative youngster will modify their own models accordingly.

CO_2 PRODUCTS

Although interest in CO_2 model flying is rapidly catching on, few kits as yet, are specifically designed for this convenient power source. Helping to correct this shortcoming, Modela of Czechoslovakia have announced their latest kit *Tourist* designed to suit the Modela CO_2 motor, both of which are currently being imported and distributed by MicroMold. The 675mm span kit is quite unusual in construction, with fuselage, tail and fin assembled from very lightweight pre-moulded expanded polystyrene sheet, the wings being of quick build construction using injection moulded plastic ribs. Plenty of wing area and attractive semi scale high wing monoplane styling is sure to make this a popular model for the sport flyer.

Below: ***Modela Tourist CO_2 kit designed to suit the Modela CO_2 motor.***

CLUB NEWS

WHEN YOU THINK ABOUT IT, the new materials used in model aircraft are more the concern of the manufacturer than the model builder. The materials, such as fibreglass, polystyrene and moulded plastic, can require special techniques and apparatus that are not familiar to the average modeller who continues to use that staple material, balsawood, for his basic constructional needs. Where we do see the new materials extensively used, is on the complete, ready-to-fly models and in prepared components like moulded fuselages or polystyrene cored wings. Components which are not without appeal to the model builder looking for a light, tough structure, but not easily produced by conventional means. Generally, there is little danger of the ready-made model taking over our hobby, at least for the present. But we can expect a greater utilisation of prepared components, however much some of us may deplore such a trend.

Our first report this month is an encouraging one from Alan Davies, the PRO of the **Nottingham MAC.** He writes of an increase in membership, outdoor competitions well under way, and a successful Annual Dinner/Dance to look back upon. And here is an idea for other clubs to follow: a photographic competition. Not of nubile dollies but aeromodelling scenes. The Nottingham competition was judged by Mr Eric Tomlinson, Chairman of the Eastwood Photographic Society, who brought along a number of slides of full size aircraft. Winning members were Reg Lowe (slides) and Cyril Green (prints). One of the first club events of the season was run on March 30th. It is styled as a C/L Stunt Race, and was won by Alan Davis himself, flying an Oliver Tiger powered own design. Other Stunt events are to be held throughout the season, ably organised by Comp Secretary, Mick Ward, who is also at work on an Open Stunt event to be held at Basford Hall on June 15th. The club is again running a bus trip to Old Warden for the Scale day on June 22nd, encouraged by last year's successful outing. Cost to members, including families etc, is only £2.50. *Sec: V. R. Ward, 15 Main Street, Newthorpe, Nottingham.*

Not such good news to be read in the report sent in by Jeff Smith of the **Wharfedale MAC**. Membership figures presented at the AGM in April showed a drop in membership, due to the loss of Radio flyers since the closing of Rufforth airfield. However, this Leeds based club still maintains a buoyant interest in C/L flying, for which it is well known, and even Free Flight has its stalwart supporters. Team racing is the true metier of the club though, and results in this sphere have been encouraging, auguring well for the future. It is hoped that a monthly Mini Goodyear League will stimulate interest in racing among the juniors. Anyone wishing to join the club just turn up on club nights at the Salem schoolroom in Burley in Wharfedale on the first Friday in each month, or telephone the *PRO, Jeff Smith on 0532 (Leeds) 663432.*

We are all aware of the excellent showing the Israeli model flyers made in the World F/F Champs, but we have little idea of the nature and extent of the model movement in that country. Now comes a letter from the **Haifa Aeromodellers Club** to give us some idea of what goes on at club level. Oddly enough, though, the Haifa club is the first in the country of an independent kind, all other 'clubs' being but local branches of the National Aero Club. The club, which has been in existence for just 16 months, not only brings together local modellers, but sets out to promote the as yet undeveloped FAI classes throughout the country, such as; Speed, Combat, Team Racing and Radio Scale. Michael Raviv, who has sent the letter, asks us to forward the club's best wishes to its British colleagues and would like to hear from British modellers, too, for the exchange of ideas, and perhaps club decals. The address is *Haifa Aeromodellers Club, Haifa P.O.B. 3367.*

Mr N. H. Goodman, PRO of the **Coventry & DMAC,** sends along the April edition of the *Wings & Fins* newsletter. The main editorial

Canterbury Pilgrims MFC Chairman Gerry Lyons reflects ruefully on receiving the Club's "Prang of the Year" award. The Pilgrims are having a successful season with a gradual increase in membership and 100% SMAE membership.

concern is the keeping open the Indoor option they have at Bramcote. This being the use of a hangar. Just at the close of the Winter season an EZB model broke the 5 minute barrier. Not all that easy to do – it requires a carefully adjusted model. Microfilm models have also made their debut – well, at least one, and there has been chuck gliding and Round The Pole. An appeal has gone out to members not to let this aspect of club flying subside. Meantime the outdoor season got under way with an F/F evening competition at Warwick on April 18th. A P.30 event among others. Actually the season was launches somewhat earlier that that, for there was a 'Pre Thermal' Glider Comp at Wolston in March – Radio Controlled, of course. The heavy winter ground made it hard going for the towers, not yet fit after the winter's hibernation. Winner of the event was Roy Garner. *Sec: N. H. Goodman, 23 Berwyn Way, Stockingford, Nuneaton, Warks CV10 8QW.*

More Indoor news. This time from the **South Bristol MAC** newsletter. Indoor interest is such in the club that they even have their own Indoor Secretary, Keith Penny. He reports on the first meeting at the Hope Centre back in March. On the R/C side it is a matter of gearing up for the warmer days to come, particularly for Thermal flying in which the clubs expertise is rapidly increasing. Free Flight saw the first comp of the year on a cold windy day at Whitchurch. There were four events: P.30 Rubber, Kit Glider, CO_2 and HLG. In spite of the turbulent conditions a total of 66 flights were made during the day. Kit Glider and HLG got the best support, and only 3 maxes were made. At the Area Meeting at Everleigh, J. Down maxed out in both Open Glider and Open Power. C/L has had its share of activity, too – but a windy day for a 1/2A Combat and Mini Goodyear event. There was spirited jousting in the strong wind and some tight racing in the Mini Goodyear. *MAC Sec: Gordon May, 4 Burchells Ave, Kingswood, Bristol.*

According to the *Bourne Flyer,* the newsletter of the **Sittingbourne & DMAC,** the Club Annual Dinner was a great success. Good food and a zinging disco. It was also an evening of Prizegiving, with the Golden Ball Trophy going to Gary Brenchley. This award is given to the person who is voted to have done most for the club during the year. There were thirteen awards for various flying and other achievements including the Dave Smith Memorial Thermos Flask, not for a heat winner, as you might think, but to the Secretary (Dave Smith), for his coffee fortifying commitments. Always a good insight into various club trends is the Competition Calendar. In the case of SADMAC it covers a fair cross section of interests. There is Open Pylon in Power-on Radio and F3B Thermal Soaring in Power-off. There is also Combat and Mini Goodyear on lines. Free Flight unspecified, and a One-Kit Event for *KK Invaders,* not to mention Spot Landing and HLG. Certain of the events carry points towards the Best All Rounder Trophy. And what do members do in the clubroom as a diversion from all this hectic

aeromodelling? Why, Scalextric, of course. Super hill climb events, too, over boxes, rolled carpets, chairs and tables. But there, I'm going off the track. *Sec: D. J. Chamberlain, 100 North Street, Milton Regis, Sittingbourne, Kent.*

A rather sparse newsletter from the **Hemel Hempstead MFC** welcomes contributions from its members, and subs, too. The latter not all that onerous though: £18 for Radio Seniors and £4 for Free Flight and Control Line. There is also a notice to members telling them that a noise test is mandatory at Bovingdon. Trouble is, you might get people complaining about the noise tests! *Sec: Russelll Attwood, 63 Crouchfield, Boxmoor, Hemel Hempstead.*

Oddly enough, the next newsletter to hand, that of the **Aylesbury & DFC** also mentions noise tests and electric car racing, too. This goes on – the car racing, that is – at Quarrendon School every Friday evening, and is taken seriously enough for a league to be introduced. Makes a change from the usual Beetle Drive, I suppose. As for that secondary interest, model flying, the club field, seemingly on farmland, appears to provide ample flying facilities for the members with power flying allowed on four days of the week, including the weekend, and any time for rubber and electric power and gliders. Much of the newsletter is taken up with a most useful article on plywood construction, contributed by Mike Smart. It is the sort of thing that the newsletter editor looks for from club members, but so seldom gets. Unfortunate, since, as this particular article testifies, there is a lot of knowhow around the clubs that could do with an airing. *Sec: G. Gray, 9 Barnet Way, Bierton, Bucks.*

The **Leicester MAC** Bulletin covers the usual wide range of activities that we have come to expect from this very buoyant club. At the R/C Natter Night the thorny subject of Wymeswold inevitably presented itself. The future of the venue is still uncertain, apparently, with members making the most of it whilst still available, being a very useful place for contests. Also discussed were the safety rules and the observance of same. Most of the rules are just commonsense and no doubt duly observed by the reasonable flyer – but there is always the maverick who does all the wrong

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 September issue.*

things. By now the covered stage of the Winter Building Competition will have been held, and also the flying stages come to that. We look forward to news of these events. *Sec: I. McKeggie, 12 Pochin Drive, Burnmlll Park, Market Harborough.*

The editorial in the **Belfast MFC** *Nitro* mulls over the lack of prestige aeromodelling carries compared with Olympic style events, and thinks may be that we are better off for being out of the limelight, as bigger means costlier and comes the time when you have to rely on sponsorship. Generally, aeromodelling is still very much an amateur involvement, In spite of the high degree of expertise we have at top levels – and long may it remain so! What we must acknowledge though, is that the movement to an ever increasing degree, relies upon a highly geared, highly supportive model Trade, and it might not be a bad idea, on occasion, to expect some sponsorship from that source. The issue is given over mainly to the why's and wherefore's of C/L Stunt flying, even to a short biography on how a member became a stunt pilot in '2475 Easy Lessons'. *Sec: R. Johnson, 11 Ailesbury Crescent, Belfast, N.I.*

Still from Northern Ireland comes *Flight Lines,* the official journal of the **Model Aeronautics Council of Ireland.** Professionally produced, complete with glossy adverts and clear photographs. The message is mostly Radio, both glider and power, with plenty of information on what is going on in the Emerald Isle. The editorial by Denis O'Hara, gives point to an aspect of insurance too often overlooked by model flyers, and that is the 'reasonable' factor in insurance claim considerations. If the accident occurs under circumstances and in conditions which the 'reasonable' model flyer would regard as dangerous, the insurance company might well take the same view and try to invalidate the claim. People who fly on public open spaces, or give public displays, should give special consideration to this 'reasonable' factor.

That about winds it up for this month. Your reports and newsletters and photos welcome.

Clubman

MAY WINNER – JOHN WOOD, West Mersea, Essex

A bumper bundle of captions this month certainly brought the house down, so on with the runners up. "... AND IT HAS FULL HOUSE RADIO" from T. Stanley, West Bromwich. "DO YOU REALISE THAT LEGO IS ACTUALLY CHEAPER THAN BALSA?" Phil Siddall, Lincoln. "DO HAVE A GO, IT'S AS SAFE AS HOUSES TO FLY" Chris Bradford, Marlborough. "ALL IT NEEDS NOW IS SOME WASH-OUT IN THE WEST WING" from Tony Brookes, Nottingham, and his son suggested "IT LOOKS GOOD, BUT IT FLYS LIKE A BRICK!" but the last laugh goes to Harry Foster, Ilkeston "I'M KNITTING A HANGAR FOR IT".

The photo first appeared in our April 1952 issue, depicting an unknown entrant to an Unorthodox Model event which had a popular following at that time at model flying rallies.

SHOP GUIDE

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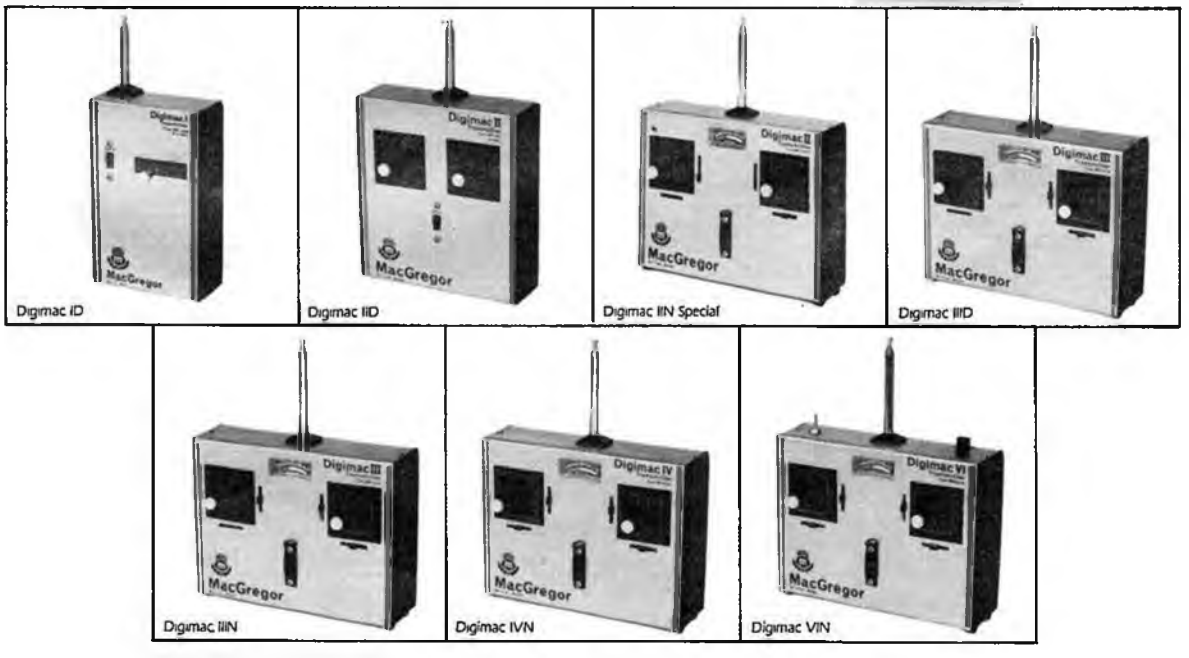

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