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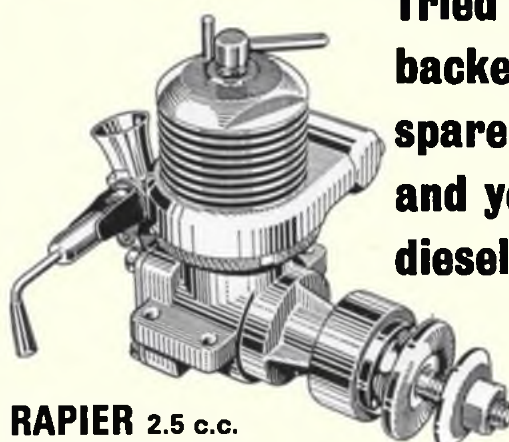

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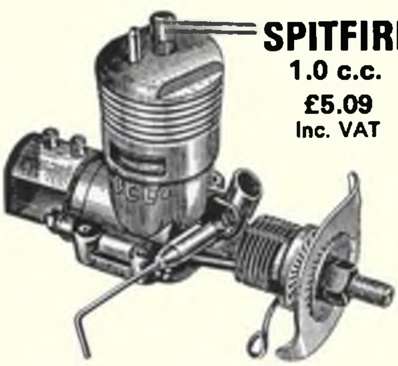

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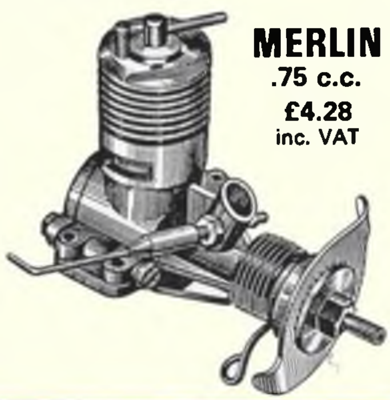

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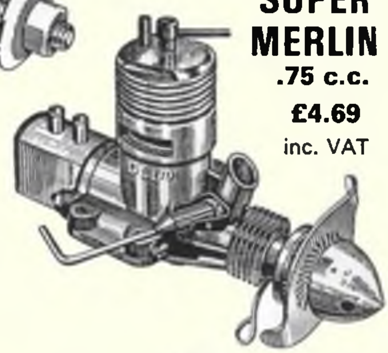

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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

July 1975

Volume XL No. 474

CONTENTS

MAP HOBBY MAGAZINE

ABC

ALSO MODEL BOATS . RADIO CONTROL MODELS & ELECTRONICS . MODEL ENGINEER MODEL RAILWAYS . SCALE MODELS . WOODWORKER . MILITARY MODELLING . GEMCRAFT and BATTLE

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Comment

Aeromodellers are incredibly lucky people. They set up a National Championships on a long narrow airfield with its Northern extremity blocked off by prohibited areas with a village beyond, and the wind obliged by rotating to north-easterly to almost align with the runway in the only favourable direction! Admittedly it was the coldest weekend on record, but who cared for that little inconvenience? What mattered was that about 40 official contests occupied a mile-long stretch of concrete and all the available dispersal areas, perimeter tracks and runway extensions over $2\frac{1}{2}$ days of continuous buzzing activity. It was also an Internats. French friends won the Class B team race; Dutch collected FAI team race and the Swedes and Germans came near to success in Pylon, while Italy made its 'impact' in speed. One could rub shoulders with competitors from Spain, Eire, Australia, Canada and the USA plus visiting spectators from Thailand, India and South America. Without doubt it was the biggest-ever aeromodelling event in Europe and one to be well remembered by all who attended. Our immediate recollections were of the four dozen eager juniors in Sue Miller's events for the under 16's; of the vast number of caravans in the camp site; of radio and freeflighters cheering the dramatic Combat and Team Race finals, and of the many old timers who watched open-jawed at the speed and tempo of modern aeromodelling. What a magnificent start to the crammed calendar of 1975 rallies!

next month

The large and the small! Eric Herbert displays a brace of Fournier RF5s – the smaller one being rubber powered and forming this month's full-size plan feature, while the larger varient is for radio control. An attractive subject, and as you will see by turning to the centre pages, the indoor version uses a novel form of construction for this class of model – it is made entirely from expanded polystyrene foam.

on the cover

Detailed reports from the 1975 British National Championships – which, incidentally, produced several 'unexpected' results. Plans for an attractive medium-sized control line stunter named 'Thrift', which reflects its low costs construction. More details of circle tow techniques for the 'serious' glider flyers, plus a kit review and other welcome features, all in the August issue of *AeroModeller*, on sale 18th July. Don't miss it!

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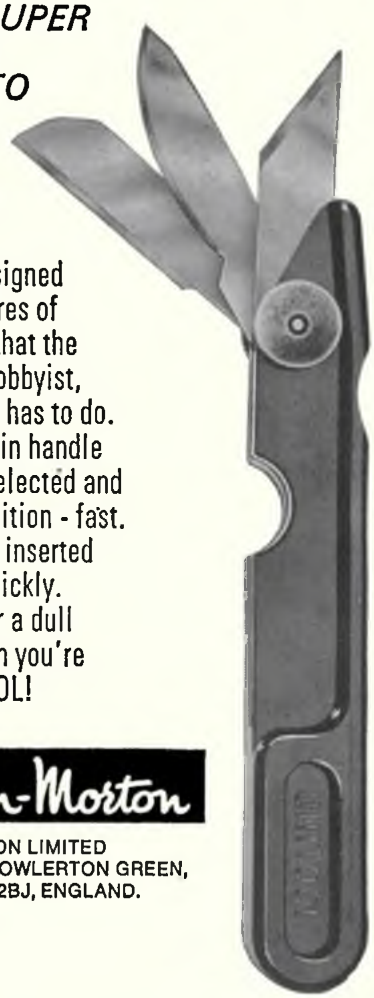

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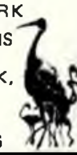

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Heard at the
HANGAR DOORS

ATTENTION! Our ever-popular AeroModeller All-Scale Rally will be held at Old Warden, Biggleswade, Bedfordshire, on Sunday 22nd June, from 10am to 6pm. Admission costs just 50p per adult (25p for children) and car parking is free. All are welcome, as are all *scale* model aircraft, whether free-flight, control-line or radio controlled.

COMBAT CONTESTS. Firstly, a reminder that Alfreton and District MAC are organising an International event at the Derby Municipal Sports Centre on 5-6th July. The £5 entry fee includes full camping facilities, a meal on the Saturday night, plus, of course, a chance to win some of the £200 worth of prizes. Full details from Dennis Degg at 31 Stretia Lane, Higham, Derbyshire.

Next, we have details of the ever popular Dutch International – the fourth to be held. Venue has been changed to Rotterdam, which should prove as good, if not better, than the previous site of Spaarndam – hopefully the weather will be better too! The organising club Daedalus hope for an even better foreign entry this year at what promises to be the biggest International event yet for combat fliers, and which will be held on 9-10th August. Information and entry forms may be obtained from Ed Meijer at Aalbersestraat 10, Amsterdam, Holland.

CHEEKY! A model group in the Northwest solicited a well-known manufacturer for the supply of a radio controlled trainer kit at full trade discount, stating that they thought it would be very useful to train their members (35). The manufacturer responded that he wished every success to the Club and thought they had made a wise choice in the type of model they wanted to buy, but he was unable to help with goods at trade price, as he had appointed stockists in the area. He recommended that the Club encourage a good relationship with the local Model Shop to enjoy the services and support which would not be forthcoming if the manufacturer dealt with the Club direct.

Far from appreciating the sincerity of the manufacturer's reply, said model group then issued a reply to the effect that the feeling of their members (now grown to 40) was that the response was shabby and that they will now cancel all of the orders that their members were due to place for the said manufacturer's products, and that they would no longer publicise any of the manufacturer's items at the Flying meeting they announced would take place in June.

In the same letter, they stated that a 'very popular manufacturer' had already presented, without asking, two kits free of charge to the Club, and that they thought one good turn deserved another.

The moral of the story is, that any Club which tries to by-pass the well-established chain of distribution through to the friendly Model Shop is in itself behaving in a 'shabby manner'. Manufacturers are generous in providing prizes for presentation at rallies and open contests, which are genuinely organised for the continued expansion and enjoyment of the hobby, but they do not take kindly to threats, whether well-founded or otherwise, from those using Club Letterheads who become abusive when their requests for special terms are rejected, however kindly.

MANY OLDER modellers will be saddened to hear of the death of veteran, Alec Wilson, at the age of 80 years, on 12th April. Alec was probably best remembered in the Fairlop era with his impressive petrol flying wing *Manx Queen;* a winner of the Eaton Bray *Pterodactyle Trophy*, with its sensational climb, rock-like stability, and using the new laminar flow wing section LDC3. One of the first in the field with radio control, his reliable radio and electric motor servos, all home built, were installed in large unconventional flying-wings.

A.W. joined the Hayes Club at Faireys in 1937 with an earlier background of pre-1914 competition flying, and quickly established himself among the contest experts with Wakefield and Petrol. A member of the first British SMAE post-war team (1947) to Switzerland. Alec was also an all-rounder, winning the Governor's Cup at the first Isle of Man Rallies in '48and '49.

His passing severs yet another link between the peaceful scene at pre-war Heathrow and the din and bustle there today. Alec leaves behind a devoted wife, Majorie, his only son, Roy having been lost over Germany in the war, from a Halifax.

WITH VERY GREAT regret we have to announce the death of Doug Blake (41) who was killed in a tragic boating accident whilst on holiday on the Thames. Control-line flyers in particular will feel his absence, as it was Doug who stepped into the

Doug Blake - as he will be remembered - keen C/L stunt flier and backbone of the Three Kings club, where he earned the title of 'The General'.

breach in 1973, taking over the hard-to-fill post of C/L sub-committee chairman and organising that side of the '73 Nationals at very short notice. It is no exaggeration to say that without Doug, there would have been no C/L Nats that year. He had a great capacity for organisation, and his forthright manner endeared others to him – how well the nick-name of 'the General' suited him! A backbone of the *Three Kings Club*, his cheerful nature and strong personality will be sorely missed at the Croydon flying site. Our deepest sympathies go to his young daughter, Heather and wife, Cynthia, who adds the following note:

"*I find it hard to express my proper feeling and thanks to all Doug's friends in the aeromodelling world for the kindness and concern shown towards myself and our small daughter Heather. It will prove impossible for me to thank personally all those fliers who have either been in touch with me or who sent floral tributes. All the flowers were beautiful.*

I feel so proud that Doug attracted this kind of interest. As you know aeromodelling was his passion, and it will be strange for me not to have balsa, glue, etc., all over the place at home.

Would you, through your magazine express my thanks to his friends throughout the country."

CORRECTION Since publication of the FAI Contest Calendar in the June issue, we learn of three changes: (a) the C/L meet at Hradec Kralove in Czechoslovakia will now take place on 19-20th April (not 29-31st March as stated) (b) the 11th International Kolibri Cup for FIA and FIE gliders will be held on 28-31st of August and (c) the Bochum C/L meet has been moved back a week to September 20-21st.

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DOUBLOON

winner of the ½A Power class at the 1974 Nationals, this 38 in span, straightforward design is ideal for high performance 0.049 cu. in. glow motors.

By EWAN JONES

AT THE 1974 NATIONALS, the engine run for the ½A power event was to be restricted to seven seconds' duration, instead of the normal ten permitted, while the flight maximum was reduced to two minutes, and so this model was designed with these factors in mind.

The restrictions seemed to dictate a fairly small model, but my findings with previous small-area ½A class models suggested experimentation in other directions, as the result had been inconsistent glide performance. Using a variable incidence tailplane plus auto-rudder would probably be the ideal, but a simple, easy-to-build model was required, so an attempt was made to build VIT characteristics into a straightforward design. The idea was to have a reasonably sized model, climbing fairly straight, with a good pull-out at the cut-off stage. The thin, flat section, low pylon and large fin appeared to give the required climb characteristics, while the auto-rudder meets the good pull-out requirements. American experts have decided that moderate areas, combined with low aspect ratio wings with thin sections, give a good glide, coupled with a reasonably quick, viceless climb. Also, the three-piece wing system is quick to build, light and fairly rigid – considering the section.

It is possible to fly this design with a forward centre of gravity, which improves stability and glide, and practise has shown that a 70 per cent position seems to be about right.

Fortunately, the prototype seemed to have all the right characteristics, and with the usual adjustments to auto-rudder and tailplane packing it consistently turned in over two minutes on a 6½-second engine run, increasing to 3:30–3:50 minutes with 9·5 seconds of power.

Construction is best commenced with the wing and tailplane, as it gives these components time to 'age' somewhat while the fuselage is being assembled, which all helps prevent the bogey of warps appearing. Also, the fuel proofer has a chance to fully harden – important if high nitro content fuels are to be used.

Tailplane

This features very straightforward construction which hardly needs elaboration. The original was covered with lightweight Modelspan tissue and given two coats of 50/50 dope and thinners, followed by a couple of coats of Ripmax *Tufkote* fuel proofer. Do not skimp the finish, as 50 per cent nitro exhaust spray will rapidly rot the wood and tissue, and add a lot of weight.

Wings

Again, these are very straightforward to build, and the three-piece system cuts down building time quite a lot. Construct the centre section first, using PVA glue, and keep it pinned down flat on the board until it is nearly dry, then remove pins from the leading edge (apart from one at the extreme left hand of the LE) and packing-up the right-hand corner $\frac{1}{16}$in. to provide the necessary wash-in. Allow to dry for about a day.

Build the outer panels completely except for the spars, then sand LE and TE to the correct dihedral angle and epoxy to the centre panel; then add the spars. The ribs are made by chopping off the rear of a standard rib, and

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Ewan displays his contest winning design which features simple construction for rapid assembly. Only 'gadget' employed is the use of an auto rudder to provide good glide recovery after the power run. Moderately large wing area employed for consistent glide performance.

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then trimming the underside so that the rear ends correspond with the trailing edge. The original wing was covered with lightweight Modelspan, and given four coats of 50/50 dope and thinners plus one coat of *Tufkote* fuel proofer all over, with a second coat on the underside of the wing just above the engine's exhaust. Do not forget the dowels to locate the wing on the pylon.

Fuselage

Cut bearers to length, bolt to the engine and angle to give approximately 2–3° of downthrust. Add former F1. When dry, remove the engine and glue this assembly to the remainder of the fuselage. Add dowels and dethermalizer snuffer tube, as well as the D/T line guides. Cut out the auto-rudder, sew in place to provide a free-moving hinge and add all wire components.

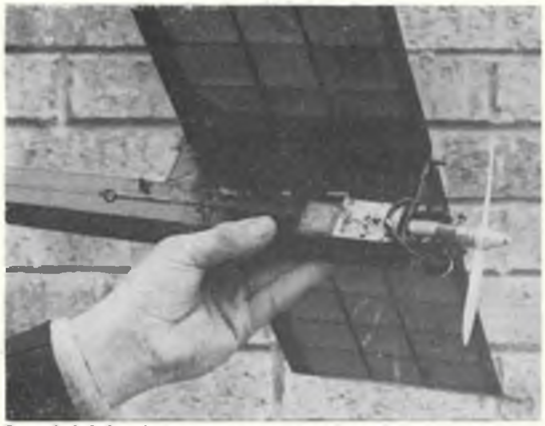
At the front of the model, cut out slots and add both tank and timer. Cut out the pylon slot slightly elongated.

Construct the pylon completely, finishing as per fuselage. Bolt engine and prop. to model, attach tailplane, attach wings to pylon, then insert pylon into slot and slide backwards or forwards until the correct centre of gravity position, and angle of attack is ascertained. In this way, the correct C.G. position can be arrived at with the model almost in flying condition.

After the pylon has been glued in place, finish the whole fuselage with two coats of *Tufkote*, then add the auto-rudder and D/T lines.

Trimming

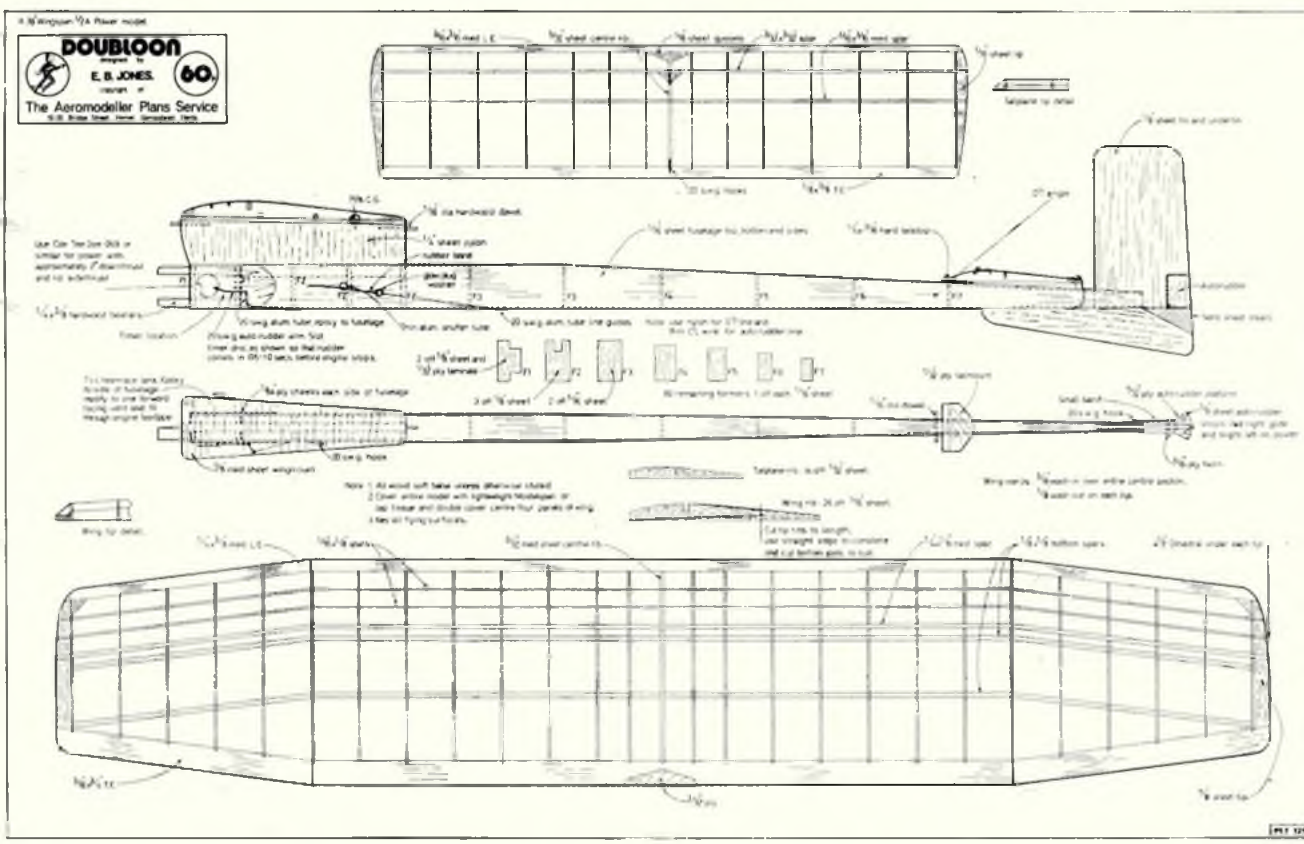
Pack up the LE or TE of tailplane until a reasonable glide is obtained from a gentle hand launch. The auto-rudder on the original was set at about $\frac{1}{16}$in. left for power, and about $\frac{1}{8}$in. right for glide, and comes in approximately half a second before the engine actually cuts.



Ewan is left-handed, hence the engine timer is mounted on the starboard side for ease of operation at launch, and engine is mounted to keep exhaust gases away from it – plan however shows these items reversed for 'normal' operation.

On the lowest power possible, launch the model with about a seven-second engine run; if in doubt, shorten the run and fly over nice long grass! The ideal is a slow right turn under power; if it tends to go straight or left, reduce left rudder. Too quick a swerve to the right, then add more left rudder. At the same time, watch the glide and aim for a wide right-hand circle. Do not cure a stall by tightening the turn: instead, add packing under the tailplane's leading edge.

On full power the model should climb steeply, turning slightly right, with about a quarter of a turn on 6·5 seconds of power and about half a turn on 9·5 seconds engine run.



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The Free Flight Scene

This month:
Martin Dilly
(as seen on T.V. 1)

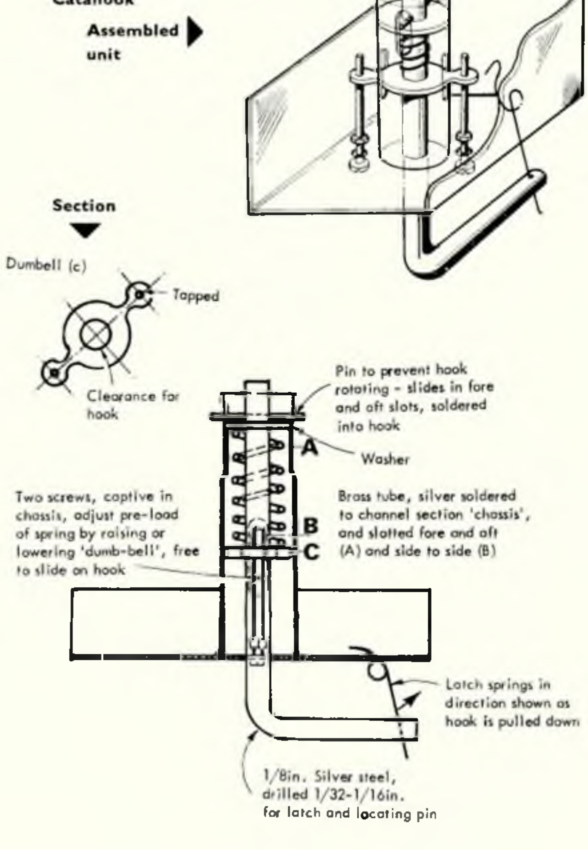
HAVE YOU NOTICED how there are national differences in free-flight design? Some, of course, are factors determined by the weather conditions in which contests are locally flown. Thus, in Britain, where few contests take place in the early morning or late evening, and daytime conditions are often quite turbulent, aspect ratios of more than about 15:1 are quite rare. For A/2s a wing structure that will give reliable tow characteristics (and withstand being blown over a few times after landing) is probably more important than the actual glide performance of the aircraft in still air. When trimming a model, this does, however, tend to lead to an attitude of *'That'll do – nothing wrong that a good thermal won't cure'*.

Is the windy weather and shortage of good-sized flying fields the only reason we do not see many outrigger turbulators humming away on gliders here in Britain? Perhaps the thought of models dangling from downwind trees, firmly caught by their shirring elastic, deters us.

During the past few years there has been quite a crop of solid balsa wings on A/2s in Europe and the United States. Apart from Bryan Spooner's SPL, brought with him on his return from Germany, few have been seen in Britain. Are the racks full of warped, heavy, weirdly grained balsa so often found in British model shops the only reason? Three-D triangular turbulators are as scarce as hen's teeth (now there's an idea!) at British contests, but then they are hardly necessary if you launch into a strong enough patch of lift, are they?

Circle tow-hook users in Britain at present probably number under twenty. Certainly, in a stiffish breeze there's no real need for them, but the catapult facility that most of them include can be useful in any conditions. Paul Masterman and I cooked up a catapult hook last year that was intended to be used with a two-part rudder, giving more turn for the zoom than the glide. *Figure 1* shows the hook itself; the unlatching load can be varied by adjusting the pair of 8BA screws, thus altering the preload on the spring. Parts for this hook may soon be available in Britain: a variant can be produced with the adjusting screws arranged fore and aft, instead of at either side of the tube, which reduces the overall width of the assembly so it can be used with a glassfibre rod blank fuselage.

Figure 1 – Catahook



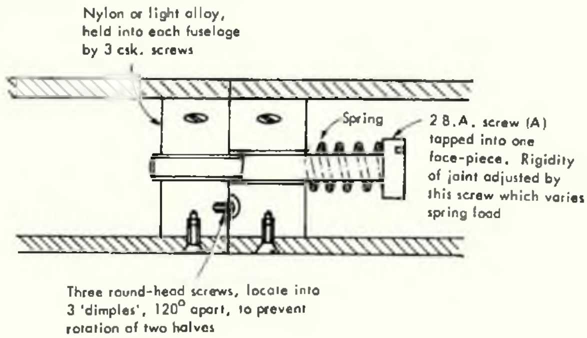


Figure 2

After expending some time and effort in producing the double-hinged rudders, drilling and tapping a variety of rudder horns, and setting up assorted torsion bars to deflect the rudders, flight testing showed that the right result was achieved merely by letting the rudders deflect to the glide position when the hook was unlatched immediately prior to release of the model. We also used a spring balance to determine towline tension during a launch. A reading of the maximum tension was achieved by laying a strip of Plasticene over the balance's scale, so the pointer left a scraped trace after returning to zero. I am told I tow pretty hard and fast, and the unlatch tension was usually around 7lb.; figures quoted in Czechoslovak and Soviet magazines suggest 2–3kg.

* * *

Another thought on the subject of glider towing may hopefully provoke some reaction. A few people are using towhooks that allow them to release the 'ground end' of their towline at the moment of launch, so the model climbs somewhat higher than 50m before the line separates from the model. Rule 2.8b of Section 4 of the FAI's *Sporting Code* states: *'Immediately after a competitor has launched his model, he must leave the starting area, remove his equipment and,* **in the case of gliders, wind up his launching cable'.** The bold face type is mine, but the point is (I think) explicit. In the case of a towline which is deliberately detached from the winch, its end has to be found before it can be re-spooled. Meanwhile, the 50m of loose towline may have draped over several other competitors' towlines, effectively grounding them until our hero decides to recover his towline. Maybe a sharp pair of scissors will be part of the A/2 flyers' equipment next, but do *you* think this rule needs tightening up? Let your F/F sub-committee know *now*.

* * *

One continental feature strangely neglected in Britain is the separately attached fuselage rear end. Italian A/2s, East German FAI power models and numerous foreign Wakefields have used the system for years, and it has two big advantages – transportability and lightness. Anyone who remembers the North Korean Wakefields at Wiener Neustadt, packed three in a box about 2ft. by 9in. square, will be convinced of the first point, but the second is the important one.

A one-piece fuselage must be strong enough to withstand landing loads, as well as merely being a means of keeping the wing and the tail assembly in the correct relative position. Even a gentle landing can impose considerable deceleration, albeit for a short time: D/Ting vertically, if the towhook or mid-portion of the

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fuselage strikes something unyielding first, means that the back and front ends tend to keep on moving – and then recoil back again. The structure of a one-piece fuselage must survive this treatment repeatedly. In the case of A/2s, the hollow glassfibre fishing-rod blank, being resilient, takes this abuse happily and the British have taken to it *en masse*. But, assuming a typical tail moment arm of 28in., the amount of rod blank aft of the wing weighs about 0·65oz. and has far more strength than necessary. With a separate rear end or a flexi-joint, like that used by Paul Crowley of the USA on his *Happy Hooker* (the NFFS 'A/2 of the Year' for 1974, and one that also features a solid balsa wing with outrigger turbulators, incidentally), a very light rolled balsa cone can be used, which keeps the moment of inertia low for the rear of the aircraft. Using 5–6lb. balsa sheet $\frac{1}{16}$in. thick, total boom weight should be about 0·2oz. bare and, say, 0·3oz. covered, and doped (with clear, of course, to avoid the extra weight of unnecessary pigment). The compliance provided by the flexible attachment allows the whole cone with the tail at the rear of it to 'wag' under shock loads.

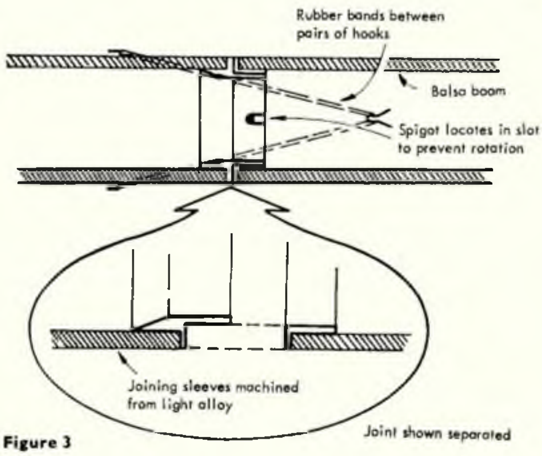


Figure 3

In practice, there are two methods of providing this 'give'. The flexi-joint uses a spring-loaded nylon screw arranged axially along the joint between boom and front end. With this type, shown in *Figure 2*, the fuselage normally remains as a single unit, although the two light alloy facings are attached to their respective fuselage halves by three radial screws, so the joint can be dismantled without major surgery. The exact degree of flexibility can be adjusted by the nut, which alters the the preload compression of the spring on which the system depends.

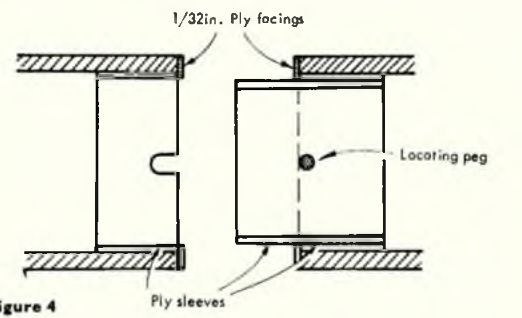
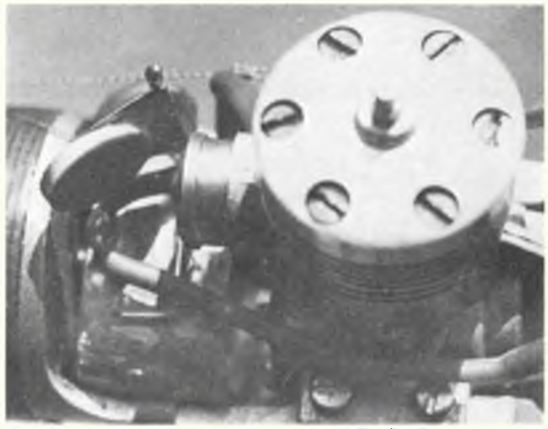


Figure 4

The simpler type, which allows the front and rear fuselage halves to be easily separated for transport – or, in the case of Wakefields, for motor insertion – uses external rubber bands to keep the halves together, as shown in *Figure 3*. While some people use simple ply facings with a shallow locating spigot to prevent the units twisting, the suaver types sport machined light alloy sleeves that fit into each other, and include a shoulder for one half to butt up against. *Figure 4* shows a typical system; weight for a pair suitable for Wakefields is around 2 grammes.



Ken Faux uses an exhaust clapper to kill the 'burble' as the Rossi 15 cuts out at the cessation of the power run.

Nylon screws
In case you have difficulty finding nylon screws and nuts – for flexi-joints or as trim adjusters, for example – have you tried *Allscrews Ltd.*, of 270/274 King Street, London W6 0ST? They have a vast range of screwed fastenings and operate a mail order service. As an idea of prices, one hundred $\frac{3}{8}$in. long nylon 8BA cheeseheads cost £1·28. As well as being lighter than metal ones, nylon screws have a self-locking effect, and if you need to alter their length you can do so with a balsa knife or a razor blade, instead of a hacksaw and a file.

SMAE Two-day FAI Meeting
The weekend of 26/27th April saw the first centralised FAI F/F event on the SMAE's calendar, held at the vast USAF base at Sculthorpe, Norfolk; with the longest runway of any military airfield in Europe, Sculthorpe is possibly the best free-flight venue this side of Wiener Neustadt. Day One had very low drift and plenty of sun and lift; at times the bubbles were rising vertically from generators, hanging overhead for a minute or two and then settling down to ground level as runway generated thermals decayed (luring several models up for sub-max flights in the process). Sunday saw dull overcast sky, early rain and windier conditions, with much lower temperatures – as one wag commented, it is not often you can get sunstroke and double pneumonia at the same contest.

Undoubtedly, the contest will be remembered as the one when glider flying in Britain was dragged kicking and screaming into the circle-towing seventies. Eventual A/2 winner, Pete Stewart of Crookham, was, together with Dave Barnes, one of the first people to use the system in Britain, and his experience paid off at Sculthorpe. Both he and Brian Baines of RAFMAA, also using a circle tow-hook, scored seven maximums plus the four-minute eighth-round flight. Some dozen other glider flyers also used circle tow models for some of their rounds, so it looks as if the knitting bee will soon be transposed to somewhere downwind of the launch line at future contests.

The event started with a Wakefield round, which saw a rather

Close-up of the VIT and D/T triggers on Ken Faux's latest all-sheet Rossi powered FAI model which is full of neat innovation such as this.

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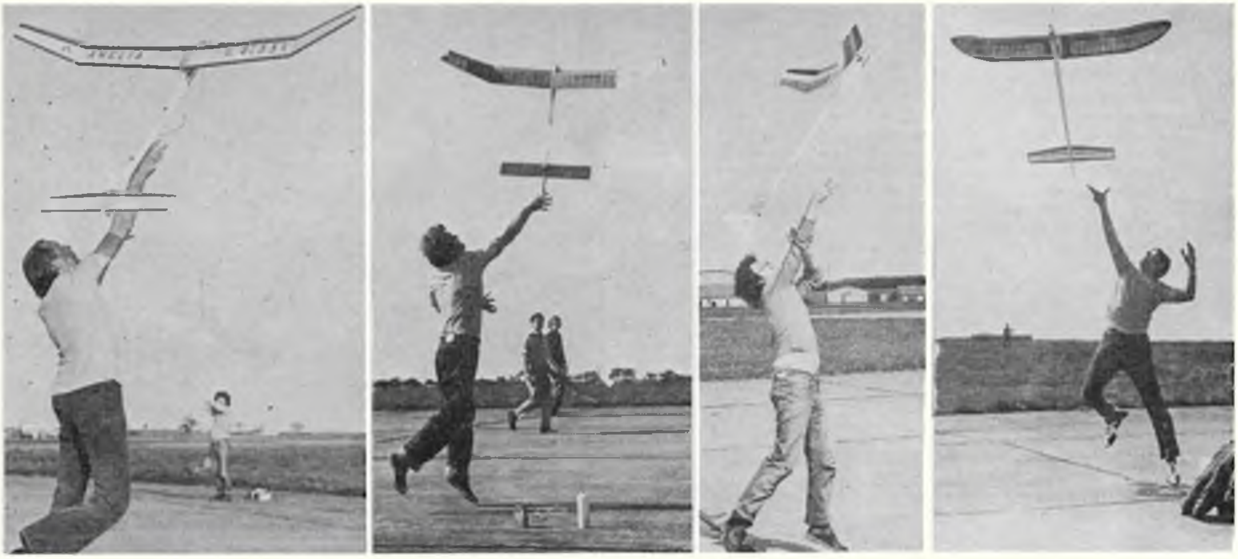

A contrast in FAI power launching styles seen at the SMAE two-day meeting held at Sculthorpe. From left to right are seen 1975 team member Roy Collins from the Anglia club with his all-sheet Rossi model. Peter Harris looks as if he is trying to recapture his trendy-tipped model (panic over Pete, the timer *was* set!) while next picture shows another '75 team member Ken Faux who had motor trouble due to over compression. At far right is the very stylish Roy Collins sending his Rossi model into the wide blue yonder (well, we're always hopeful of good weather!)

shabby buzzard thermalling upwind as the hooter went to mark the start; those flyers ready wound and waiting thus had a useful lift marker, and five of the six models launched were soon up there with the buzzard. Paul Masterman glided straight out of the thermal for 2:24; a check showed that a ¼in. 'tail' of excess nylon monofilament, projecting from the aluminium crimping tube that limits the travel of the auto-rudder release line, had slid into the guide tube carrying the line itself, restricting rudder movement to the straight ahead position.

As expected, the first rounds on the Sunday morning were crucial. Poor visibility and a wind swing caused the start to be delayed from the planned 5.40am, and this eventually absorbed the programmed lunch break. These breaks caused some adverse comment from the usual stalwart band of critics, but at least provided compliance in the schedule in case of weather problems, as well as giving people the chance to talk and actually look at other aircraft, instead of just competing against them. The delayed first A/2 round eventually began at 6.20am and featured a heavy dose of Norfolk rain; nevertheless, nine gliders maxed (against 35 in the mid-afternoon round on the sunny previous day), and the circle towers who could wait downwind of the pack both avoided line tangles and could use other models as thermal markers.

The glider fly-off saw both Brian Baines and Pete Stewart make the four-minute max., after using most of their allotted four-minute round feeling for lift on the line; in round nine Brian dropped out after 1:32, while Pete returned a convincing five-minute max. to win the event. One interesting feature of his timer set-up was the use of a small blob of silicone rubber bath sealer over the starting trigger slot, to keep out some of the dirt and moisture; it was flexible enough to allow the trigger to operate as usual.

The Saturday thermals produced some long flights after D/T failures. John O'Donnell was seen looking straight upwards through binoculars as his model disappeared overhead, only to spot it descending again some time later, and yo-yo-ing up again to eventually land four miles away in Fakenham. Mike Coombes' model was picked up, 19 miles away, by a traffic warden in King's Lynn.

While Wakefield required no fly-off, the lead changed several times. After five rounds, Jim Baguley, John O'Donnell and Ray Paveley were all in contention, but the sixth round saw a 2:50 time from Jim, after power stalling in good air. In the final round, Baguley flew early for only 2:04 and was overtaken by O'Donnell and British team member, Bob Wells. Geoff Lefever flew a twin pylon aircraft; on one flight the wing-retaining bands departed from one side, allowing the fuselage to dangle at 45° from the remaining bands along the top of one pylon, but the model still managed to max.

In the second Wakefield round, almost flat calm, the bubbles could be seen spreading outwards and upwards from the machine in the lift off the runway, and then sinking again in the often described 'doughnut' shape that some thermals take.

Fred Chilton, Ray Monks and 1975 team member Bob Bailey all maxed out in F1C, and the first fly-off round with eight seconds' run saw Ray D/T straight off the top of the climb. This heartbreak was due to the terylene D/T line slipping in its crimped aluminium tube, allowing the tailplane to pop up from the climb mode straight to D/T, without engaging the glide trigger *en route*. Both survivors overran on the six-second round; round ten saw a bit of nervous checking of engine run times to get the four seconds as close as seemed safe. Bob Bailey had a mediocre climb pattern off a 3·9 second run, but Fred, drawn to fly second, had his spinner spun off by the electric starter; by the time he had replaced the prop. nut and the rubber starter insert, his two minutes were up and he finished second.

Jim Baguley (left) now a Norwich member took third in Wakefield at Sculthorpe with family 'team' for recovery. Below, Dick Johnson and Roger Melville eye the FAI power opposition at the same meeting.

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During the power fly-offs a large number of flyers were asked to time the engine runs and to note their results, so that a statistical check could be made by the F/F sub-committee on the 'scatter' over a sample of timekeepers. Since the FAI Sporting Code states that the engine run is considered ended when the propeller stops (and you can only *see* a propeller stop, not hear it), the only way to time this is visually. I tracked some climbs with 7 × 50 binoculars (quite possible, on the longer runs anyhow) and even then it was impossible to see if the propeller was rotating or not. Even using unsilenced Rossis (since exhaust extensions are banned for FAI power models), the engine sound decreases so rapidly during the climb that the changeover from exhaust noise to aerodynamic propeller noise is almost impossible to accurately detect aurally, so even if we reverted to timing the 'power-on' phase there would be problems. At present, the actual means of timing is a trifle ambiguous. . . .

Bob Bailey used two aircraft to win F1C; for the first three rounds he flew a standard *Night Train*, with a Roy Collins engine pan, KSB D/T timer and a modified Autoknips timer to trigger flood-off, auto-rudder and variable incidence tailplane systems (as detailed in the June issue). For rounds four through ten, he flew a modified *Night Train* with a Laurie Burrows epoxy/glass fuselage tube giving a tail moment arm 2in. longer than the original design. The wing has the same outline, but uses an airfoil similar to NACA 4409, and extra diagonal bracing to improve the torsional rigidity of the structure. A Ray Monks' timer controls the transition and D/T; the propeller is a Bailey original, approximately 7 × 3·5in., made of carbon fibre, glass roving and *Bondaglass* polyester resin. The accompanying three-view shows this modified *Night Train;* original plans appeared in *Model Airplane News*, and the aircraft was included in the *1971 National Free Flight Society Symposium* report as F1C Model of the Year.

The winning O'Donnell Wakefield used a 3/32in. sheet balsa diamond fuselage, built in 1961, and 1966 vintage wings using the Mike Burroughs A/2 airfoil. Using 14 strands of rubber to power a non-helical pitch propeller (with wash-in at the tips), first carved for a 50-gramme Wakefield, the model is gadgetless and employs a fuse D/T.

Ron Green (St. Albans) flew this Schwartzbach propped Wakefield at Sculthorpe, with all-flying fin, Burrows motor tube, modified Murray Stringer hub and Gard airfoiled wing with sheet bottom and cap strips.

RESULTS:

F1A (40 flew) – 1. P. Stewart (Crookham) M + 4:00 + 5:00; 2. B. Baines (RAFMAA) M + 4:00 + 1:32; 3. P. Owen (Liverpool) 20:48.

F1B (20 flew) – 1. J. O'Donnell (Whitefield) 20:29; 2. A. Wells (Anglia) 20:16; 3. J. Baguley (Norwich) 19:52.

F1C (15 flew) – 1. R. Bailey (St. Albans) M + 3:00 + 0 + 1:21; 2. F. Chilton (Crookham) M + 3:00 + 0 + 0; 3. R. Monks (Birmingham) M + 0:48.

AMSTERDAM CUP

continued from page 749

timed at 3·3 seconds, climbed virtually straight, as he had been doing most of the weekend, hit better air and maxed to end up a popular winner.

Instead of flying his usual 'flapper', Tom used a very well-thought-out *Cream 2*, with a shoulder-mounted two-piece, fully sheeted wing using a flat-bottomed airfoil; the Rossi was tightly cowled *à la* speed model, with its head exposed and a megaphone exhaust duct through the low pylon fuselage. A timer operated spring-and-drum system braked the prop. after the engine was flooded-off, which certainly convinced the timekeepers that the engine was stopped well within the four seconds allowed in the tenth round.

Thermal detection techniques were mostly normal; the only automatic bubble machine was the Masterman-Dilly one, now featuring glass-roving stiffening to its PVC piping and a battery-operated 6rpm display turntable motor to dip the bubble loop into the solution. One team used a thermistor thermal sensor 50 yards upwind from the launch point, and watched the meter through a tripod-mounted telescope to get advance warning of approaching temperature changes. There are still sufficient normally-towing gliders to provide an upwind indication of lift for those not convinced by bubbles or thermistors. However, even in the deceptive conditions at the Amsterdam Cup, a properly set-up circle-towing model is at an advantage; to be able to wait downwind of the turbulence as well as in a position to aim for other aircraft in lift paid off for several people.

Tom Køster's Soviet influenced A/2 with dihedralled tailplane, flexi-joint, dural spine/pylon and circle hook.

RESULTS:

F1A (*75 flew*) – 1. B. Baines (Great Britain) 1,242; 2. D. Deubel (West Germany) 1,226; 3. P. Allnutt (Canada) 1,202; 15. M. Warren, 1,110; 28. J. Baguley, 1,039; 33. M. Dilly, 1,003; 40. M. Gregorie, 935; 49. J. Masterman, 835; 68. D. Digby, 409; 75. P. Masterman, 58.

F1B (*22 flew*) – 1. H. Haacken (West Germany) 1,236; 2. M. Giallenella (Italy) 1,184; 3. K. Kongsberg (Denmark) 1,172; 4. J. Barnes, 1,170; 13. J. Baguley, 985; 16. D. Digby, 869; 20. P. Masterman, 300.

F1C (*20 flew*) – 1. T. Køster (Denmark) 1,260 + 180 + 180 + 180; 2. T. Schwend (West Germany) 1,260 + 180 + 180 + 86; 3. J. Brodarac (West Germany) 1,260 + 180 + 166; 10. K. Faux, 1,065.

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Control line
TEAM TRIALS
for the 1975 European Championships

★ ★ ★

The combat team will consist of those well-known names (left to right) Vernon Hunt, Richard Evans and Mick Tiernan – and just look at the variety in model designs! One thing they all have in common is light weight and plenty of square inches!

TRADITIONALLY held at the end of the previous season, this year's Trials differed in several major ways. Due to unfortunate circumstances, beyond the control of the organisers, the meeting was held at the very start of the season, which naturally meant that competitors had been unable to prepare their models to proper 'contest tune' – especially after the miserable weather experienced in the early part of the year. These comments do not, of course, apply to the aerobatics team, which was decided last November when Messrs Blake, Mannall and Newnham qualified. However, the most important (and controversial) new features were the adaption of different procedures to select the teams concerned.

Combat

For the first time, a combat team was to be selected – and this highly competitive event naturally caused the SMAE's control-line sub-committee much head scratching to produce a representative team. Their solution was neat – and worked very well. Twenty people were invited to attend, being chosen from their performances over the previous year. These 20 individuals then each flew five opponents – those who scored the most victories being the chosen team.

Eventually, two names remained 'unscathed' with five victories each – Richard Evans flying a *Vertigo* (a much enlarged version of his *Ironmonger* design, now spanning 38in. with a 12in. root chord and weighing 15oz.) and Mick Tiernan with his recently kitted *Anduril* design. Close behind, however, were Vernon Hunt and Steve Bingham with four wins apiece – the deciding fly-off being in Vernon's favour. He flew a huge (390sq.in.) low-aspect ratio design which weighs in the region of 13–14oz., and has a *very* good Oliver Tiger for power.

What was, perhaps, a little surprising was the absence of glow motors – these very big models need a really well-tuned diesel to be competitive, and a glow motor would appear to be the easy way out. No doubt, time will prove their superiority, especially when pit-crews get used to their intricacies. Main glow motor propagandist John Hammersly was in attendance, but in an organising capacity only.

It is interesting to note the result of the current trend of large area, minimum weight models – they are very fragile. Vernon Hunt 'totalled' six machines, while Mick Tiernan damaged a similar number; Richard Evans, however, escaped unscathed. Will this carnage discourage would-be combateers? Let's hope not . . . perhaps a minimum wing loading, or even minimum weight ruling, will have to be introduced some day?

In all, a well-planned and organised Trials, with plenty of keen competition – and with a very strong team emerging.

Speed

Under the firm control of John Penton, this event saw a much-needed innovation – use of a height marker, which caught many fliers unawares.

The selection method used was to allow five rounds – the competitor's average of his *best three* flights being used to decide team positions, whereas in previous years the single best flights have been the deciding feature. In essence, the organisers were striving for reliability – a worthwhile aim – but is this what is needed for an International meeting, which will be decided by a *single* best speed? By examining the results, it can be seen that a rather different team would have been chosen under the 'old' method. Speed models by their very nature are tricky to operate, and to record three good times in a single day is quite an achievement.

Pete Halman set the pace with his first-round flight of 15·95 seconds (140·25 mph), breaking the British record – a real achievement considering the cool, cloudy and breezy conditions. He further established his position, using his ex-late Alan Woodrow

Three strongly contrasting model configurations were used by our newly found speed team of (l to r) Mike Nash de Villiers, Dave Smith and Pete Halman. Note how Mike's assymetric design has an upright motor, while Peter's is sidewinder mounted. All used Rossi 15's – what else?

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Team racing was hotly contested, the top teams using three different makes of engine. Representing the UK will be (l to r) Dave Fry and Steve Smith, Malcolm Ross and Derek Heaton plus John (tongue in cheek!) Daly and Dave Clarkson. Engines used were Rossi, Bugl and Daly K & B respectively.

Rossi 15 Mk 3 in his side-winder asymmetric model. The propeller was his own carbon-fibre moulding based on an MVVS blade shape, measuring 5¾ × 7¼in. In second place lay Mike Nash de Villiers, who failed to record a time in the first two rounds with his Miebach Rossi 15, but achieved 127mph in the third. With the next two flights being all important, and with his record holding (now ex-record holding!) motor obviously below par, he changed models to record a couple of 16·5-second flights, resulting in an overall average 3·2mph slower than Pete Halman's.

Finishing third place was Dave Smith with a very consistent series of flights, albeit rather slower, from his Mk 3 and Mk 4 Rossi's in his usual conventional model – the only competitor to use a conventional model!

Unluckiest flier of all was Gordon Isles, now in his eighth season of striving to claim a team placing. Failing to record a flight in the first two rounds (he had to change a failed bearing), he then recorded three very respectable times, but was disqualified in the third round for flying high, thus ruining his chances. In fact, his best flight was the second highest speed of the day. Next time, Gordon . . . *definitely!*

The only other competitor was Mick Tribe, in his first year of speed flying; but although he made two good times he failed to achieve three recorded speeds, thus ending his chances with his *Kingfisher*-styled model.

Team race

As far as ground administration was concerned, the heats were perfectly arranged – John Horton and Don Haworth performing a magnificent job with a good clear system of awarding warnings, plus the provision of a flight-height marker. The affair was well organised, competitors being hurried through four rounds of flying which were run strictly to the rule book. However, a big black mark concerned the team selection itself – neither the organisers nor the competitors knew how the team was to be chosen! The purpose of the Trials was, it appears, to merely record a series of times from which the C/L sub-committee would choose three suitable teams.

Not knowing how these results would be utilised was, we believe, grossly unfair to the competitors – and could have led to all kinds of arguments, especially as the competition was so close. For example, in the end the best three times recorded by each team were used for the selection; but very different results would have been achieved if selection was based on (a) the best *two* times, (b) discard best time and average remainder, (c) discard worst time and average remainder, (d) discard best *and* worst time, averaging remainder, or (e) averaging all flights.

As it was, first place was never in doubt: Heaton/Ross were head and shoulders above the rest, with three consistent times from their new model powered by a Bugl 15. Their 'poor' time was the result of using their old camouflage model – and by this time their position was totally secure, in any case. The table below shows how each team fared, but it is interesting to note that a total of 65 warnings were issued – some 26 of these for high flying, which underlines the value of a height marker and of diligent contest directors. Also, the performance of Steve Smith's (now flying with Dave Fry) Rossi 15 is worthy of note: the motor was converted to a diesel during the previous week, run-in on the morning of the contest, then bolted into the model to provide a string of times sufficient for second place! The variety of motors employed reveals how little there is to choose in performance from a well-set-up motor, no matter what its origin.

'Just a squeeze is all you need.' Barry Campbell, now teamed with Dave Nixon, builds up pressure in his refuelling system prior to the start of his heat.

SPEED

	Round 1	Round 2	Round 3	Round 4	Round 5	Average speed of best three flights
1. P. Halman	15·9	17·1	16·3	16·5	17·9	136·2mph
2. M. Nash de Villiers	—	—	17·3	16·5	16·5	133·0mph
3. D. Smith	17·6	17·4	17·3	17·2	17·5	128·8mph
4. G. Isles	—	—	—	16·7	16·2	—
5. M. Tribe	16·6	—	16·9	—	—	—

TEAM RACE

		1	2	3	4	Average of best three heats
1. Heaton/Ross	*Bugl*	4:23·6	4:23·6	4:24·3	4:34·1	4:23·8
2. Smith/Fry	*Rossi FI*	4:51·6	4:31·6	4:30·1	4:36·5	4:32·7
3. Clarkson/Daly	*K&B*	5:12·6	4:28·2	4:36·8	4:35·1	4:33·4
4. Langworth/Williamson	*Bugl*	4:37·0	4:34·6	4:42·2	4:37·3	4:34·6
5. Bryant/Haycock	*G15RV*	4:31·4	4:36·0	rtd.	4:41·0	4:36·1
6. Rudd/King	*G15RV*	4:40·2	4:36·5	4:39·2	4:38·8	4:38·2
7. Tribe/Broad	*Bugl*	4:48·6	4:40·0	4:42·3	4:32·9	4:38·4
8. Gray/Devenish	*HP15*	4:48·2	disq	4:23·8	4:49·3	4:40·4
9. Hammond/Williams	*G20D*	4:41·0	5:15·0	4:58·0	4:52·2	4:50·4
10. Sutherland/Woodside	*K&B*	rtd.	4:47·6	5:12·8	4:47·8	4:56·1
11. Neville/Graham	*Bugl*	5:17·6	5:20·6	4:56·3	4:51·8	5:01·9
12. Giles/Harknett	*G15RV*	5:11·0	rtd.	5:01·6	4:57 0	5:05·2
13. Nixon/Campbell	*G15FI*	rtd.	4:49·4	4:41·8	rtd.	—
14. Daly/Howard	*K&B*	disq.	4:47·5	4:42·5	rtd.	—
15. Green/Cooper	*G15RV*	5:17·8	5:25·0	rtd.	scr.	—
16. Coote/Horwood	*K&B*	6:09·8	6:07·2	rtd.	scr.	—

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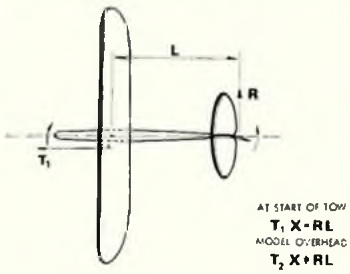
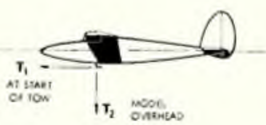
CIRCULAR TOW — Part 1

an outline of the developments, and an explanation of the various systems used by the leading A/2 glider fliers detailed by

Elton Drew





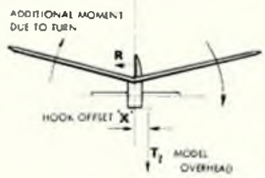


FIGURE 1
Offset tow hook-originally intended as a means of obtaining a straight tow.

WHAT IS circular tow? Simply the capacity to allow a glider to cover a controlled circular flight path at will with towline attached, as opposed to conventional straight line tow.

Why circular tow, when in the early days of glider flying the greatest problem encountered was the achievement of a straight tow to full towline height followed by a circular glide path? The answer, or rather answers, become more readily apparent if consideration is given to the problems encountered when flying in calm conditions.

First, as anyone who has towed a sagging model in a flat calm well knows, the boundary fence and/or exhaustion tend to arrive much more rapidly than a thermal and the flyer is often confronted with the choice of attempting to bring the model down on the line, itself a chancy operation, or releasing the model in desperation, with the resulting flight time very much in the lap of the gods. Circular tow can obviously overcome this problem.

Secondly, circular tow can be a decided aid to thermal detection in these conditions, in that one can get two or more 'bites at the cherry', because if in doubt as to whether or not a thermal has been encountered, one can simply 'go round again' and recheck that particular patch of air.

Thirdly, circular tow may be employed as a tactical flying aid in that, assuming a definite wind direction, one can drift the model downwind and take up a favourable position to assess which of the opposition's models is hopefully going to mark lift; a favourite ploy of the Russian exponents. This tactic obviously is particularly useful in competitions having starting lines from which other competitors are naturally reluctant to tow upwind. It has obvious limitations if all the contestants employ circular tow and adopt the tactic!

A further bonus is provided by the capacity that circular tow can offer, of a significant catapult height boost on release; invaluable in gaining precious seconds in very dead air.

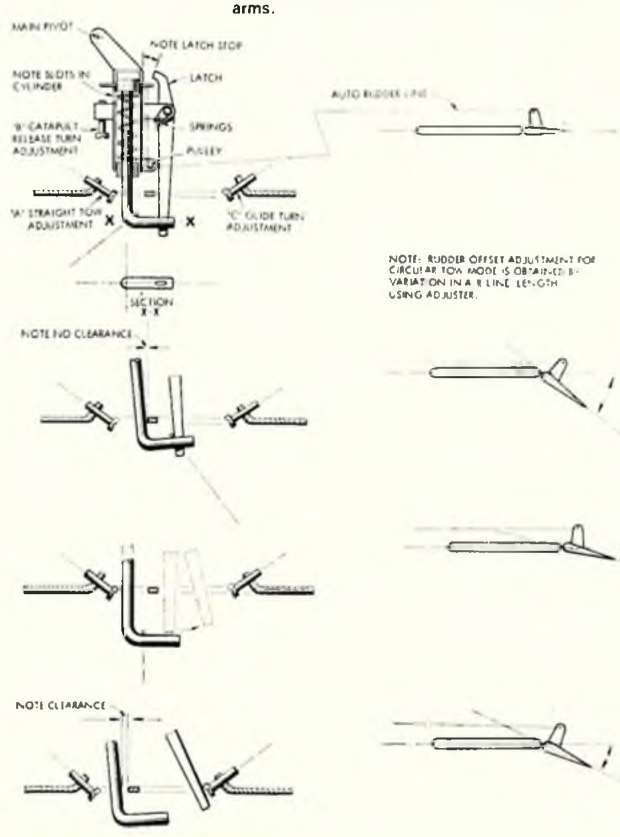
Circular tow systems

1. *The 'French System'*

The intentional use of circular tow flight path for gliders is by no means new. The French had a system in widespread useage around 1967, perhaps earlier. Their very simple system, resurrected a device used many years earlier (and rejected as virtually useless) – the offset towhook. Originally this was intended as a means of obtaining a straight tow followed by a circling glide; this being before the universal adoption of the Auto Rudder.

The offset hook's original demise is easy to understand: in theory the moment imposed by the line tension acting on the offset towhook balanced the moment due to the fixed rudder deflection. This is true at the start of the tow and for a particular airspeed, but the situation rapidly changes! As the model approaches the top of the line the set up changes as shown in *Figure* 1. Now the line tension will be seen to produce a rolling moment rather than the previous yawing moment. Hence the counteraction to the rudder turning moment has disappeared; indeed the rolling moment tends to roll the model in the same direction as the rudder is turning the model, and the peeling off effect is thus aggravated. Combine this with the variable effect of changing windspeed and it is readily apparent why the advent of the Auto Rudder had been welcomed with open arms.

FIGURE 2
Russian-type hook and operation (diagrammatic)



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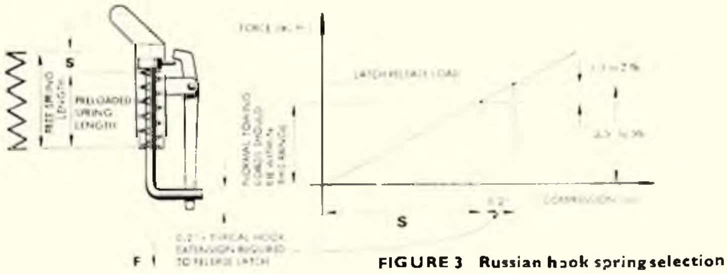


FIGURE 3 Russian hook spring selection

From the graph a typical spring would require a 2lb. load to produce 0·2in. compression i.e. Rate — 10lb./inch.

Spring rate is given by the formula $R = \frac{Gd^4}{8ND^3}$

Where G = Modulus of rigidity, typically 11·5×10⁶lb./in.² for carbon steel spring wire.
d = Wire diameter.
D = Mean diameter of spring.
N = Number of active coils (take as 2 less than total).

As a guide a suitable starting point for experiment would be provided by a spring ⅜in. long, nominal diameter $\frac{3}{16}$in. (mean diameter 0·16in.) having 8 coils (i.e. 6 active) in 25swg (0·020in. diameter wire). $R = \frac{11 \cdot 5 \times 10^6 \times 0 \cdot 020^4}{8 \times 6 \times 0 \cdot 16^3} = 9 \cdot 35$**lb./in.**

For a given spring variations can be made to the preload and/or the length of latch engagement, on a "trial and error" basis, to obtain a suitable latch release load; otherwise substitute a stronger, or weaker spring.

The French resurrection of the idea was to simply set up for tow with offset rudder, but often with more offset than necessary for the normal glide turn, i.e. using an Auto Rudder acting in the reverse direction to conventional practice, and counteract this with the offset hook. Thus with the exception of the extra rudder offset to induce a tight 'on the line' turn (not always considered necessary) the set up was identical to that used previously. The application was, however, vastly different.

Following launch, usually accompanied by a rather vicious yaw, the initial part of the tow was reasonably straight, continuing until the model approached the top of the line. Whereas the original offset hook users at this point directed their efforts to combating any 'peel' off, the French now deliberately introduced the model into a turn. Continuing this through 180° with line attached and repeating the process as necessary, the model remained substantially overhead. If all went to plan, the flyer remained on much the same spot, though smart footwork was required on occasion!

Peter Van de Ouden gave a useful description of the system in the March, 1970 *AeroModeller* from the Dutch point of view. It is interesting that he advocated the use of slack line on at least the initial part of the turn. My observations of the French in action indicated that they maintained a fairly high line tension throughout, with their models rotating quite tightly at a considerable rate of knots, and with the towline really 'singing'. Indeed Braire had a spring device on his hook apparently intended to push the tow ring off; thus high line tension at all times would be a necessity in his case. This leads one to speculate that such a technique would have adverse effects on the ability to detect thermals by 'feel', although, this did not appear to affect the French fliers.

Another apparent difference between the French and other continental exponents is that the latter tended to equip their models with both offset and conventionally positioned hooks, changing techniques to suit changing conditions as described by De Ouden, whilst the French appeared to commit themselves to the offset hook.

The hooks themselves ranged from the ultra simple to those of some complexity. Jean Marie Berthe, perhaps the most widely known advocate, had his famous *Super Flamingo* equipped with a folding offset hook providing a neat means of triggering off the timer rather than for any drag reduction benefit. See *AeroModeller*, February, 1969 for details.

Whilst the use of the French system was widely adopted on the continent and indeed Canadians, Peter Allnut, Andy de Mellow, Tam Thompson and others experimented extensively and, I believe, successfully with the system, it is perhaps strange that it made little impact in Britain. Mike Woodhouse was the only person I saw competitively fly such a model, the offset hook being additional to the normal position in this case. Even allowing for the admitted scarcity of suitable conditions, one would have assumed that more modellers would have at least tried the system.

2. *The Russian Hook*

While the French were developing their offset hook technique, the Russians were experimenting with a rather sophisticated hook. In fact the basic design, attributed to A. Semekyj, had been drawn and described in the September, 1962 *AeroModeller*, having been spotted in a Russian magazine. However the true significance of the device seems to have been lost in the translation and indeed it's possibilities appear to have been completely missed by readers at the time. I certainly did, and my first contact with the system was at the World Championships at Weiner Neustadt in 1969.

The Hungarians, Russians and, of course, the French were employing circular tow. Most British observers naturaly assumed that they were all employing the offset hook system. Indeed second place man, Geza Pataki, used this system, though his model was also equipped with a conventional hook. Even John O'Donnell in his excellent, comprehensive technical report of that Championship, described only the French system, and John rarely fails to ferret out any innovation of significance on these occasions; perhaps it should be remembered that he was also competing in Wakefield.

However, following my success in the first day's A/2 event, some rather hectic celebrating naturally ensued in a local hostelry; one of the chief recollections of which, for me, was the jovial Austrian landlord's assurance that the copious supply of local wine he was providing was of a good vintage – that morning's! Consequently, next day I made a somewhat belated and bleary appearance on the airfield just in time for the start of the fifth Wakefield round! It was here that the Russian A/2 flier, Grigorasch attempted to explain the intricacies of the 'new' Russian system that permitted both circular and straight tow, at will, and locked the towline on. In the circumstances, his English being somewhat limited and my brain being somewhat befuddled, I failed to grasp the significance of his explanation, and thus a golden opportunity to get some early first hand knowledge of the Russian Hook was lost.

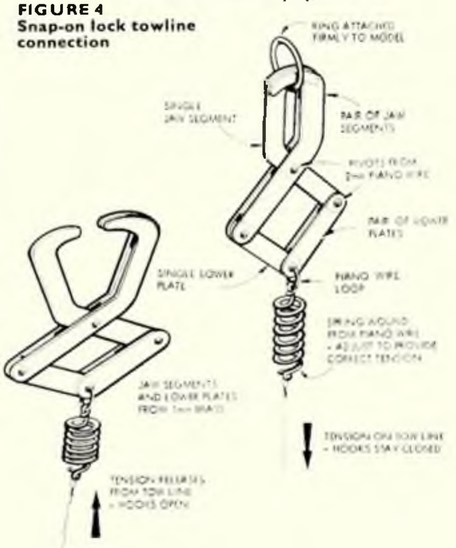
Fortunately, at the same Championships I had made the acquaintance of the Czechoslovakian A/2 flier, Ivan Horéjsi' and later he sent me a lot of information on the system. Apparently it was catching on fast in the East European countries at that time, the Russians having given an impressive demonstration of its capabilities at the earlier Communist bloc Championships.

I was tempted to try out the idea, but with the 1970 Trials coming up and the subsequent necessity to prepare for the World Championships in Sweden, I decided to delay any experiments with this 'new fangled' and somewhat complex system. However at the 1971 World Championships the 'Russian Hook' had arrived in a big way! The entire Russian Team and many others were equipped with the system. Lepp, Ekhtenkov and Markov readily demonstrated their models and tow-hook 'hardware', and indeed supplied the 'West' with a complete hook. From this hook of Andres Lepp, the excellent drawings which appeared in May, 1971 *Free Flight News* were prepared – it was undoubtedly the publication of these drawings, to be followed by Markov's hook in the next issue, that spurred development throughout the rest of the free flight world though, perhaps strangely, not to any great extent in Britain.

The principal of these hooks is now widely understood but to recap briefly the operation is as follows. Referring to a typical hook drawn in *Figure* 2, moving the body of the hook forward against its stop 'A', as at launch from the helper, brings the rudder to the straight tow position. Slackening line tension, as at the top of the line, the hook body moves aft to stop 'D', the rudder moves over to a position in excess of that required for the normal glide circle, and the model can go into a circular path with line attached. The straight tow position is

continued on page 734

FIGURE 4
Snap-on lock towline connection



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Back to . . .

SQUARE ONE

completing our feature on building and flying the Mercury 'Mentor'

COVERING THIS MODEL is perfectly straightforward, and you should follow the procedure described in detail in earlier parts to this series (see *AeroModeller*, April, 1973.) The only point needing special attention is the wing, which has an undercambered section. This means that when covering the underside of the wing, tissue paste must be applied to each rib over the undercambered portion and the tissue must be made to stick to each rib. It is not as hard it sounds, but do not expect to end up with the tissue looking very tight *between* the ribs before the water-shrinking stage. However, take special care to smooth the tissue gently against the paste on each undercamber, to remove any wrinkles along the line of the rib – because they will not be removed once the paste has dried.

The lack of any spars in the wing means that continual care to prevent warps is needed right up until the final doping has been completed (and then perhaps after, see later). Once covered and water-shrunk, it is vital that you proceed slowly and carefully with your doping, so as to enable the wing to be pinned down at all dope drying stages. With a polyhedral wing such as the *Mentor* this is a slow task unless you just happen to have a matching polyhedral board to pin it to! Don't forget to support the unpinned part also.

As the tip panels are short you can probably risk leaving them unpinned while drying so the suggested procedure is to treat the wing in just two bites. Firstly get six small pieces of scrap balsa of at least ⅛in. thickness and six pins. Then, using dope thinned to about 50:50 with thinners, dope top and bottom of one half of the wing, including the tip panels.

Pin the inner part of this wing-half down to your worktop using the six pieces of scrap as spacers to hold the wet underside clear of the worktop (one piece under each corner and one piece about half-way along TE and also LE). The tip panel will naturally be unsupported but this is OK – but support the other wing half to prevent unnecessary strain. *When absolutely dry* remove carefully from the worktop and repeat for the other half. If more than one coat is needed then the same procedure must be carried out again. The fin is covered and doped before it is cemented to the fuselage – again pin flat while the dope dries.

The propeller blade does not need covering – you will find that three or four coats of dope, sanding with fine glasspaper between coats, will give a glossy and weatherproof surface.

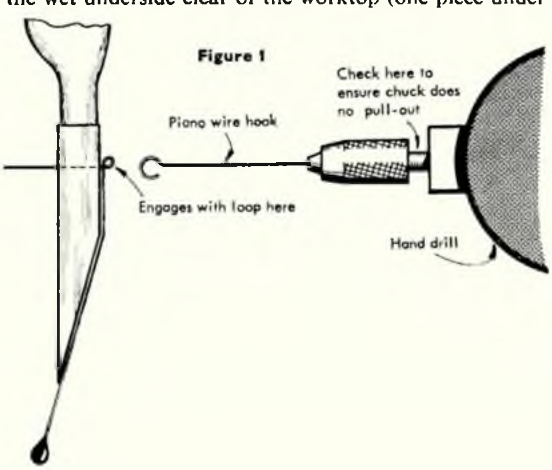

Figure 1

Finishing

When everything is covered and doped, there remains just a couple of items to carry out before the flying can start. The first is the propeller balancing and adjusting, and the second is the rubber motor.

The single-bladed propeller has to be counter-balanced by a lead weight added to the wire arm opposite the blade. This requires care *and should not be attempted without adult guidance*. First the free end of the wire arm must be cleaned and 'tinned' (as for soldering) for about ¾in. back from the end. Next, about an ounce of lead needs to be melted in a suitable container and whilst still molten, the tinned wire end should be heated and pushed into the molten lead. The whole lot must then be held steady until the lead solidifies and cools. The resulting lead lump at the end of the wire is then shaped with a file and cutters – at the same time removing the lead little by little until the propeller assembly shows no tendency to settle always in one position when the main shaft is held horizontally. This is a most important step, so take some time over it. The whole model will vibrate terribly if the propeller is unbalanced and performance will be affected seriously.

Next comes the rubber motor, and before we go further you will wish to know that a recent series in *AeroModeller* ('Rubber Techniques' by Ron Coleman) covered rubber motors in great detail and should be referred to – see particularly Parts 1–3 in the July-September 1974 issues.

The *Mentor* instructions give several choices for the rubber motor – 16 strands of ⅛in. rubber, 10 strands of 3/16in. or 8 strands of ¼in. Whichever size you choose the procedure is the same. First join the two ends of the rubber together with a firm knot to form one large loop and then successively double the loop until you have *half* the final number of strands in a multiple loop which is twice as long as *final* motor length (30in. is the stated final length in the case of the *Mentor*) – better read that

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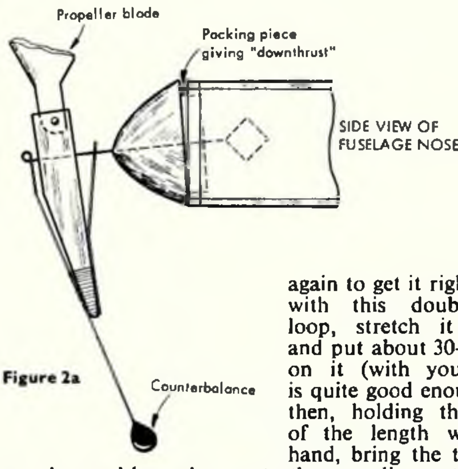

Figure 2a

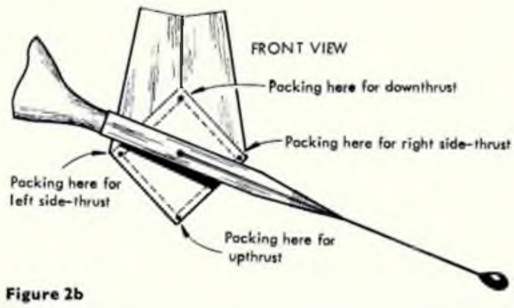

Figure 2b

again to get it right! Now, with this double-length loop, stretch it slightly and put about 30–50 turns on it (with your finger is quite good enough) and then, holding the centre of the length with one hand, bring the two ends together and loop them onto the propeller motor hook. When you then let everything go the motor will twist itself into a 'knotted rope' just over 30in. long.

You will probably have to 'pick and pull' the motor to get an even 'rope'. The result is a 'pre-tensioned' motor which avoids slack rubber in the fuselage which would affect performance.

At this stage lubrication of the motor is worthwhile. The Ron Coleman articles go into this, but a simple method is to mix glycerine and soft soap in your hands and rubbing it thoroughly into the motor. It's messy (but kind to hands too!).

The rubber motor is now inserted into the fuselage and the rear motor peg inserted in the end loop to retain the motor. A cut out is left in one panel of the fuselage tissue behind the peg to help do this. It should be easy at this stage because the motor will be about an inch too long. By the way, a hollow aluminium tube is better than the provided wooden dowel for the rear motor peg. It is stronger and helps during winding – see later.

The final step is to put about 20–30 turns on the motor (turning the propeller clockwise when looking at it from the front) and adjust the tension wire between the propeller and nose block, until it just prevents the motor from unwinding in this condition. These turns should take up the slight excess length of the motor. Now make a pencil mark on the nose plug and fuselage nose so as to be able to quickly locate the correct way round for the nose plug. If you do not seat the nose plug correctly the folding propeller cannot fold in the correct place and your thrust adjustments will be wrong.

Flying

Wait for a fairly calm day (which could be the most difficult part of the the whole exercise!) and meanwhile assemble the model and check that everything is square and without warps. If you have to wait several days before the weather co-operates, keep those wings out of the sun when storing – otherwise warps will occur. Take with you several rubber bands, pieces of $\frac{1}{16}$in. balsa, balsa cement, a hand brace with a simple wire hook (see *Figure* 1) held in its chuck – and a friend. The flying field must be fairly large and without trees over a wide area – the windier the day then the longer the field must be. First, try a few hand launches into the wind. Keep the nose slightly down and throw the model gently forward, using the same procedure as with the *Mercury Swan* (see May, 1973 *AeroModeller*) to get a long flat, straight glide. Use the $\frac{1}{16}$in. balsa pieces to pack up the LE or TE of the tailplane to get the glide right. When this is achieved, gently bend the rear part of the fin towards the left to give the model a slight left-hand turn.

Now give the motor about 200 turns. This is done by hooking the loop at the front of the propeller shaft with the drill-brace wire hook and stretching out the rubber motor with your friend holding the model sideways (see photo). A piece of piano wire through the hollow tube rear motor peg makes the strain easier to support. With the rubber motor stretched out to some $2\frac{1}{2}$–3 times its normal length, start adding turns by winding the drill (check the direction of rotation!) and counting the turns. Most hand braces have about a $3\frac{1}{2}$:1 gearing, so 60 turns of the handle will be about right. As the turns are being made, gradually walk towards the model, so that the motor is reduced back to its normal length by the time you have finished winding. Locate the nose block correctly and keep holding the propeller!

Now face the wind, and hold the model up in one hand with the propeller tip held with the other hand. Release the propeller and push the model into the air at about 20°–30°, upwards. If the model does not climb very well, then you need to give the motor some upthrust (see *Figure* 2) assuming that you trimmed the glide correctly when hand launching earlier. Conversely, if it stalls under power some downthrust is necessary. Trial and error is the only way at this stage – but after about six or so flights you should be getting better performance. The aim is to get a tight, left-hand turning steep climb, followed by a wider, left-handed turning glide. As adjustments are made, the number of turns on the motor can be increased gradually. The recommended maximum number of turns is 800 – but do not try this with an unlubricated motor. As the power is increased, the adjustments may vary and right or left side thrust, as well as up or down thrust, may be necessary to get the desired flight characteristics. Patience is the main thing to use. When you have got the settings right, cement the packing pieces in place to avoid losing them.

On our model we achieved well over one minute

When applying the 'turns' to the rubber motor, engage the wire loop held in the drill chuck with the propeller shaft, and stretch out the motor. The motor peg in the model must be held securely. Wind the handle of the drill chuck, counting the number of turns carefully while walking slowly toward the model as the tension increases.

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flights from the fifth or sixth flights onwards – so it will fly well if you follow the instructions! One word of safety: check your hand-brace before using it to wind the motor. Check that the wire hook will not pull out and also check that the drill is not the type which allows the whole chuck and shank to pull out. Some makes do pull out, and a stretched rubber motor carries a very dangerous punch behind it.

We would recommend a dethermaliser with this model, even if it does require some changes to effect it – the model is quite capable of disappearing in a thermal. A suggested method is shown in *Figure* 3, but in any case, do clearly write your name and address on the model.

Conclusion

There is a lot to be learned from a basic rubber model which will stand you in good stead in your later modelling life. The first point to note is that power adds complications: the model really needs one set of adjustments for a steep power climb, and another for the subsequent floating glide. A compromise is the only solution with this simple model.

You will also have noticed that the model had a tighter left turn under power than in the glide. The reason for this was 'torque'. As the propeller rotates in one direction a turning force in the opposite direction is induced in the model (the same effect causes helicopters to have small tail rotors to counteract the torque of the main rotor).

So, get to know your model and study the why's and wherefore's! Good flying!

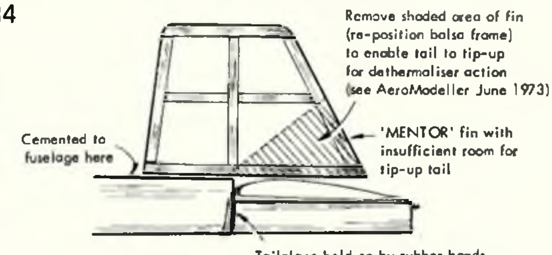


Figure 3

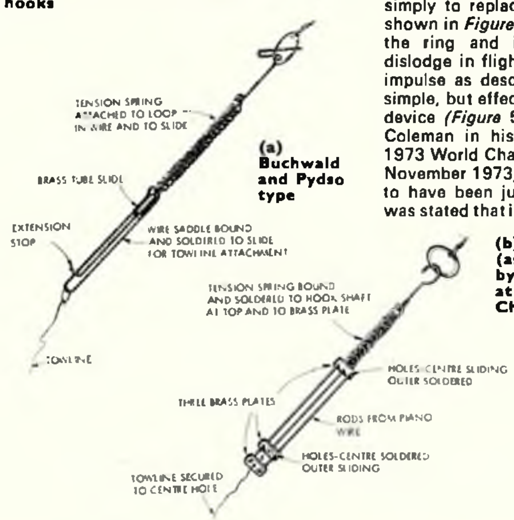
CIRCULAR TOW *continued from page 731*

restored by applying light tension to the line. Release of the model is accomplished by a further increase in line tension. This compresses the spring to stop 'B', thereby introducing a slight amount of rudder offset just prior to the release of the latch, and hence release of the tow line from the model. This offset, combined with increased air speed due to the high line tension, results in a catapulted climbing turn with a useful gain in altitude.

Lepp at the 1971 Championships, and again in 1973 demonstrated a variation employing an aileron on the port wing tip activated in conjunction with the tow rudder offset (left-hand turn). This, I gather, enhanced the model's behaviour in the circular tow mode, permitting tighter 'on the line' turns to be attained and eliminating any spiral diving tendencies.

The main deterrents to the more widespread adoption of these hooks in Britain are undoubtedly our capricious climate, coupled with the complexity of the hooks – machining facilities were widely employed on the originals. The vagaries of our climate result in very few occasions ideally suited for use of the hook and the anticipated low useage would appear to lead most British fliers to the conclusion that the effort needed to produce these hooks would be hardly warranted.

Figure 5 — Scandinavian 'ring and spring' hooks



(a) Buchwald and Pydso type

(b) Danish device (as sketched by Ron Coleman at 1973 World Championships)

3. *The Scandinavian 'Spring and Ring' variation*

Until recently, the French system appeared to have been largely superseded by variations on the 'Russian Hook' theme. A revival of interest has been triggered off by the adoption of a new line release system originating from Scandinavians Buchwald and Pydsø, apparently derived from the rather complicated and cumbersome Scandinavian spring-loaded claw device described in the 1973/74 *AeroModeller Annual*. Briefly, this involved replacing the conventional towhook with a ring to which the claw is clipped, see *Figure* 4. The release of the claw is activated by an impulse from the spring provided by the sudden release of a small amount of slack in the loaded towline. It cannot release whilst the line is slack, and thus provides an absolutely positive line lock on.

Buchwald and Pydsø's development was simply to replace this claw by a hook as shown in *Figure* 5a. The hook just hangs in the ring and is virtually impossible to dislodge in flight, other than by a sudden impulse as described above – a brilliantly simple, but effective, idea. A similar Danish device *(Figure 5b)* was illustrated by Ron Coleman in his Technical Report on the 1973 World Championships *(AeroModeller, November 1973)* and stated, in that report, to have been judged illegal. Since then it was stated that its use was allowed in those Championships. It is difficult to see on what grounds it could have been disallowed since the spring extension is limited by a stop and cannot provide any more in-flight line extension than permitted by the 2kg line test pull. Admittedly the device has a rather 'suspicious' appearance, but remember that the spring merely provides the impulse to dislodge the hook, and does not impart any energy to the model.

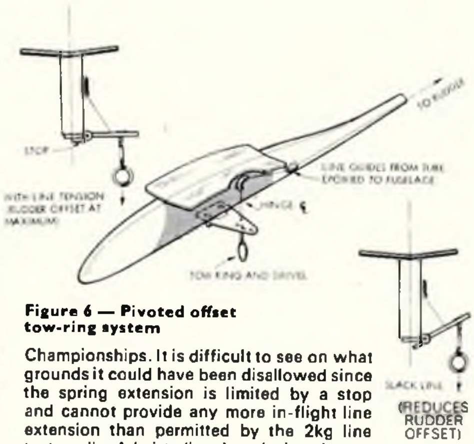


Figure 6 — Pivoted offset tow-ring system

This 'Ring and Spring' device was enthusiastically introduced to me by Peter Allnutt at the 1974 British Nationals, he having picked up the idea on one of his frequent excursions to continental contests. He had adapted it to the French offset hook system and thereby introduced a new dimension to its use in that it was no longer essential to maintain line tension; the model now being free to circle with slack line, as with the Russian system.

This system has been used with some success by Steve Marriott who has added a refinement, as shown in *Figure* 6. This provides the facility to reduce rudder offset as towline tension increases, and provides, it is claimed, greater control over the release operation whilst retaining the ability to circle tightly with slack line.

Interestingly both Peter's and Steve's hooks utilise springs having much greater extension than those shown in the *AeroModeller Annual* drawings, and in a sketch of Buchwald's and Pydsø's hook which appeared in *Free Flight News*, March, 1974 accompanying a drawing of an A/2 design, 'Styk' by Prydsø and Konsgard.

to be continued

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FOURNIER RF 5

full size plans overleaf

Eric Herbert describes the novel form of construction employed on his contest winning indoor scale model

INDOOR FLYING SCALE models *must* be very light, and this means that usually only a minimal balsa structure with tissue covering can be employed. Except for certain very early aircraft prototypes, scale appearance usually suffers if a reasonable performance is required, as few modern aircraft have translucent coverings, and metal and plywood covered prototypes are really impossible to simulate.

Because of local competition rules (scale placing plus flight duration placing; lowest mark wins) I needed a model that whilst placing high in the scale section would also have a good duration and which could easily be documented for SMAE event. The *Fournier RF5* powered glider having been featured in *AeroModeller* (see Plan Pack 2950, price 55p) and also being a 'current' type easily photographed, seemed to hold out promise; and this has been borne out in practice, winning the February, 1974 Liverpool DMAS, SMAE Scale event, and finishing second in the 'Keyhole' scale event; both on its first time out.

All major components are made from foam styrene cut to shape with a hot wire and finished with glass paper. A suitable cutting bow for the styrene is shown in *Figure 1*, this can be powered by a transformer or variac direct from the mains, or probably more easily by a 12 volt car battery. Resistance wire from a 'replacement fire element' is used – 28swg (·0148in.) in my case. An 18in. long bow takes approximately 2 amps at 8 volts. Different wire sizes will require different voltages; the thinner or longer the wire, the higher the voltage needed.

A variety of bow designs are possible but the most important point is to keep a good spring tension on the wire since it stretches on heating. A few practice cuts will soon show the best speed.

Balsa leading and trailing edges are used on the wings to preserve the outline, and balsa mainspars are used in the tailplane and as a stern post and rudder leading edge. Such thin foam sections are virtually impossible to cut by the normal method and after several unsuccessful attempts, the following methods were adopted. All templates are cut from 1/32in. card and held in place with ordinary straight pins.

It's a different technique alright, but quite simple. No balsa formers or ribs to cut out, just these card templates. With a little practice a model can be built extremely quickly.

Wings

Airfoil top sections are carefully positioned on an exact-length block and straight edges are pinned over these to provide a smooth 'run' on and off. The wire is brought down to the approximate centre of the wing and taken forward, moving slower at the tip than the root. This is repeated at the trailing edge, attempting to leave a small ridge down the centre of the wing which can be sanded off later. The straight edges are then removed and the wire cut in and up past the TE and LE. Finally, the rib templates are removed and replaced by straight edges to cut the undersurface.

Several attempts may be necessary to get a useable pair of wings, but with practice the system becomes reasonably simple and material costs are negligible. If the templates are positioned close to the top of the block the wire can be seen through the top whilst cutting and this helps considerably. Balsa leading and trailing edges are cut oversize and stuck on with PVA. The whole thing is then sanded with first a medium, then fine glass-paper on a block, taking care to preserve the section.

Tail surfaces

These are so thin and sharply tapered that it was obvious that the above method would not work; instead straight edges were pinned to an oversize block and tapered sheet cut. A template of the plan was then moved around, until it seemed to coincide with a position that would give a reasonable blank, and was then cut round with the wire and inspected, changing the position or cutting another tapered sheet until correct. This is easier to do than it sounds, and once found its opposite number is cut alongside. The sections are all glued on either side of a 1/32in. spar and finally sanded to shape.

Fuselage

Using straight edges, two blocks are cut to size slightly larger than the fuselage, and side templates pinned on; the blocks must meet each other exactly since this will form the fuselage join. Cut out and then do the same with top and bottom templates centred, then over the join. The fuselage must now be spot glued together and sanded to shape using progressively finer glass paper. Check cowls are cut, sanded to fit and glued on (PVA).

Figure 1 Suggested foam cutter

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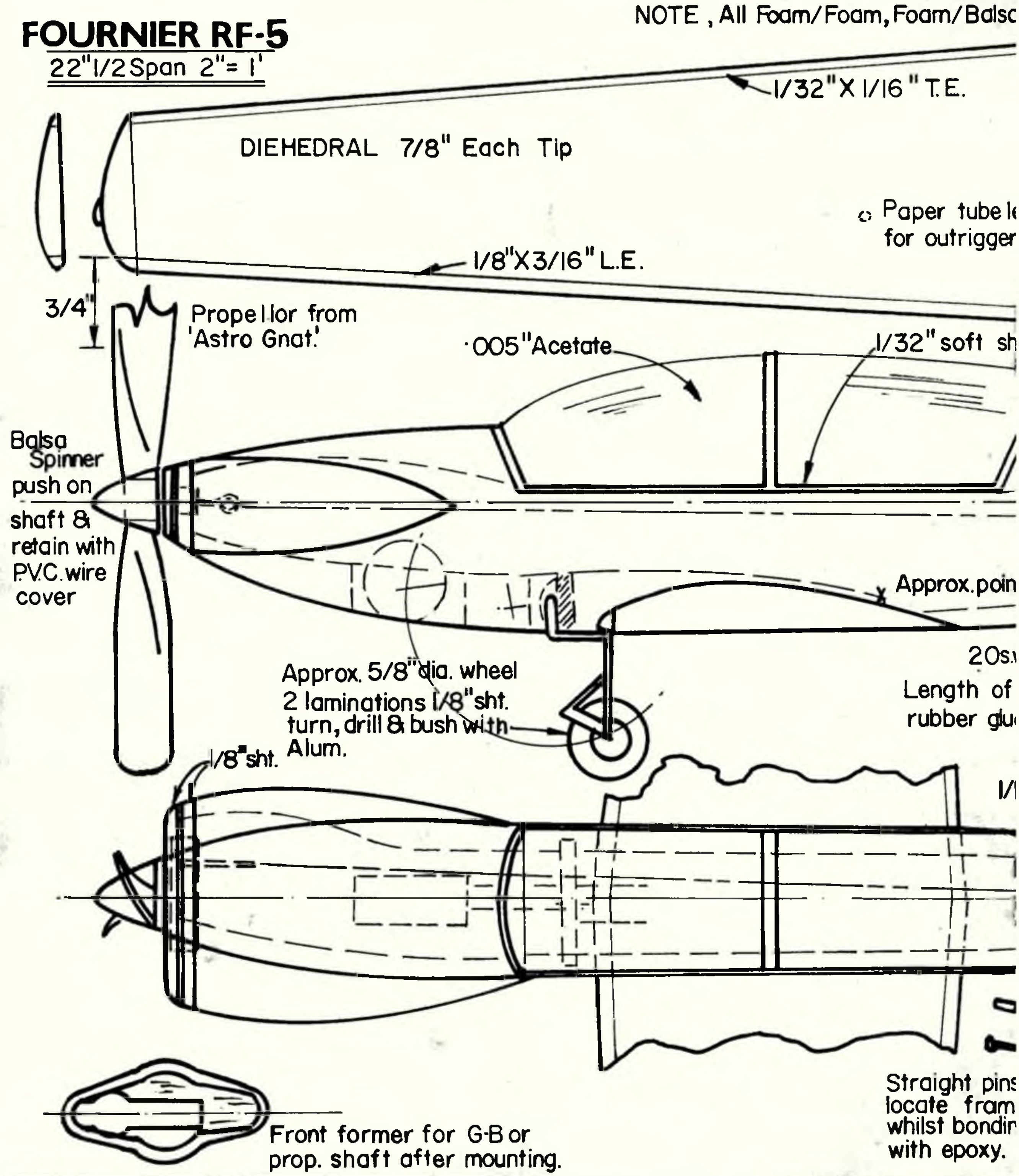
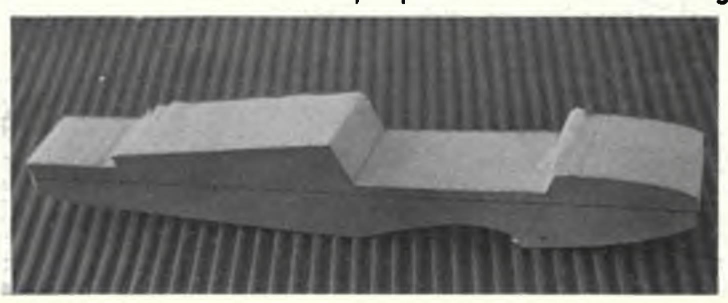
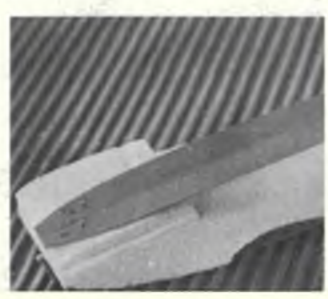
FOURNIER RF-5

22" 1/2 Span 2" = 1'





The first stages in producing the fuselage. At left, two pieces of foam of approximately the right size were pinned together and the cardboard side templates also pinned in place. The hot wire cutter was then used to leave this form. Next step is to pin the top and bottom template in place (see photo at right) before repeating this operation.



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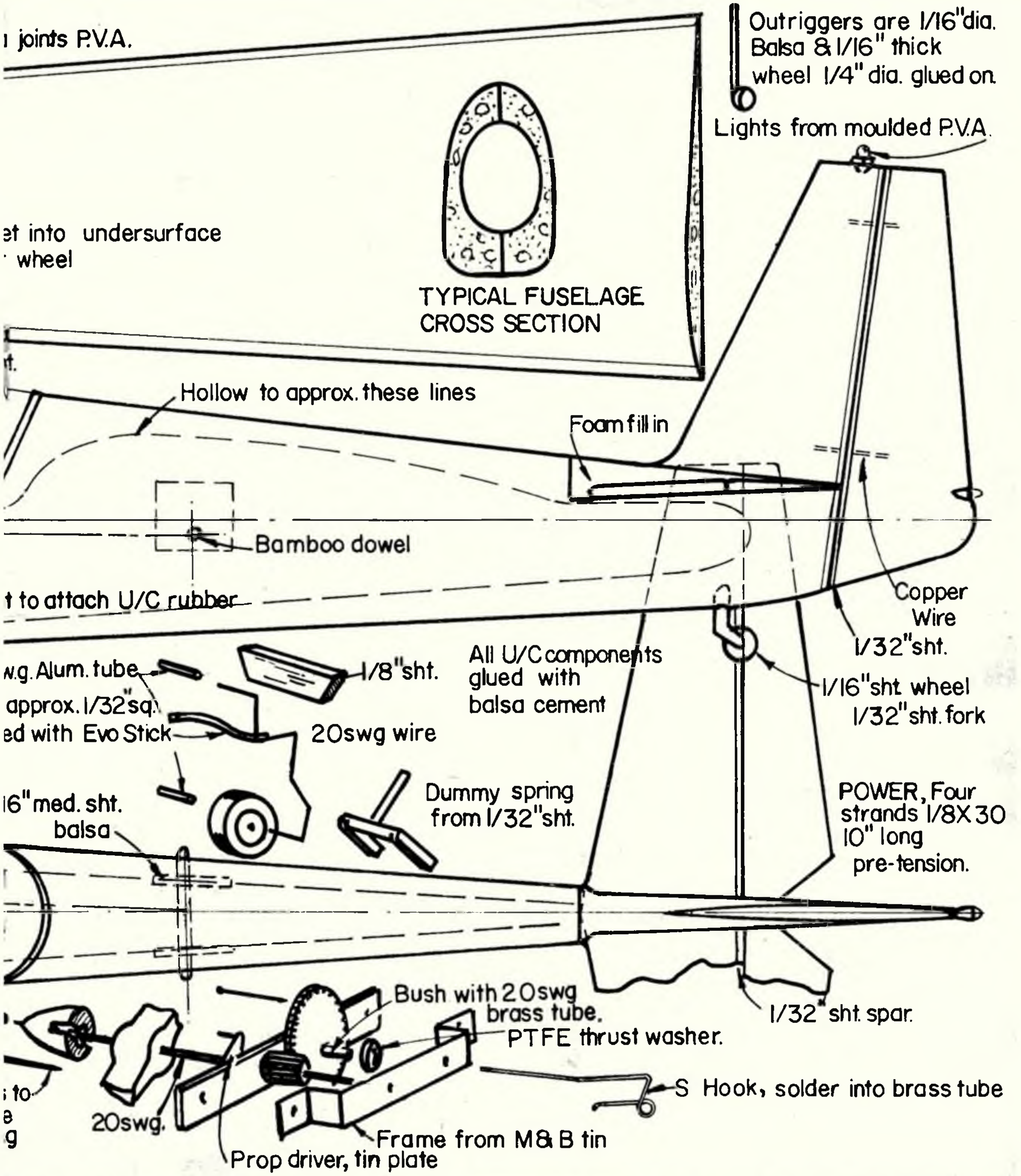
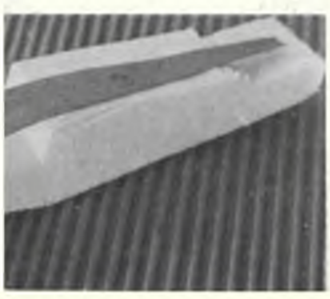
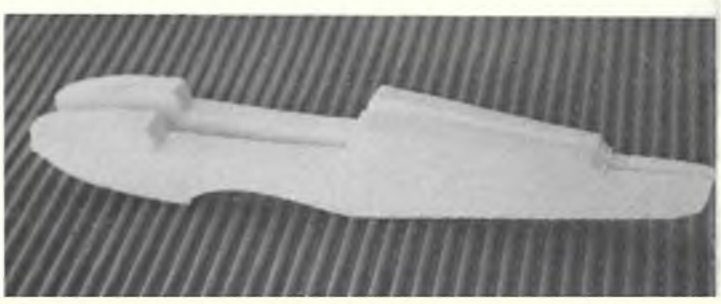




At right, the fuselage halves having now been shaped with the hot wire must be lightly spot cemented together to enable them to be finally shaped with glasspaper. Use progressively finer grades, taking care not to tear the foam.



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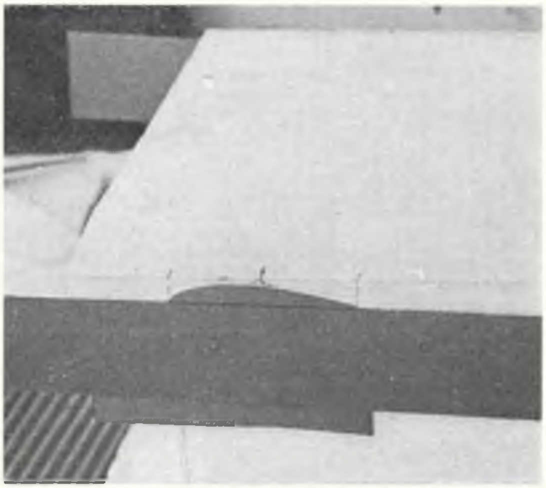

Cutting the upper surfaces of the wing, using the card templates as described. Note the straight edges to provide a smooth 'run-on' and 'run-off' for the hot wire cutter. Make sure that the cutter is moved slower at the tip than at the root to allow for the tapered plan-form.

When happy with the outside shape, split again and hollow out to save weight and provide clearance for the motor. If a gearbox is used the motor will be off centre and run into one cheek. Use a fairly coarse sandpaper to hollow and note that the wing saddle and cockpit area are taken right through, the cockpit area opening will be covered with $\frac{1}{32}$in. sheet since the motor runs immediately below this; the wing opening is needed when setting up the spring tension for the retracting undercarriage. Do not forget to fit the $\frac{1}{16}$in. balsa motor peg blocks before glueing the fuselage sides together.

Undercarriage
This operates on the over-centre principle, at one time used for duration models; the wheel retracts under the action of a thin piece of rubber with just enough strength to ensure it does so. Complete retraction is not possible (as on the full size) since the correct wheel size would interfere with the motor. The leg is stopped with the edge of the tyre just showing and no doors are fitted. The weight of the model holds the wheel down until it takes off.

Motor/gearbox
When designing the *Fournier* it was envisaged that for 'duration' events a much larger propeller would be fitted and the model hand launched; this has not yet been tried and all flying has been done using a 2·5:1 gearbox and plastic propellers from an *Astro Gnat* or cut down *Sleek Streak*. A direct drive propeller which clears the floor is unlikely to give enough thrust for take off, or a long enough run. The gearbox is not difficult to make and well worth those take-off marks. However, 2·5:1 is a little low and I think about 4:1 would be better, remembering that the cross-section of the motor must go up with the ratio. Gears for the present box were stripped from an old travelling alarm clock and only simple tools are necessary. Incidentally, I first made a 12:1 compound gearbox which brought the motor hook back to the centre line. This needed a loop of $\frac{1}{8}\times$30in. to drive it . . . with no propeller! The foam nose is carefully cut straight and a $\frac{1}{8}$in. medium balsa front added. This is then carefully cut out with a new knife blade until it just clears the gearbox and locates the nose piece exactly; a round file is used to clear a path for the motor. Epoxy is then smoothed over the outside of the nose to provide impact resistance.

The gearbox, motor and nose block should be fitted and tested before finally glueing on the wings; also, test the undercarriage retraction with the motor installed – four strands of $\frac{1}{8}$in.$\times$30in. pre-tensioned rubber were used in the original.

Assembly
Glue all components together with PVA. **NOTE:** the tailplane is set at a large negative angle. This is to maintain a good wing/fuselage angle at the high angle of attack necessary with a model. The canopy is pressed from ·005in. acetate in the usual way and is not fitted until the decoration is complete.

Finishing
Lightly spray with well watered white emulsion until individual beads of the foam 'disappear'. Trim colour and registration numbers were sprayed with *Pactra* enamel, through *Fiske* non-tack masking material; ordinary masking tape will lift off the emulsion. Spray one or two off-cuts to practise on before working on the actual airframe. Navigation and beacon lights were moulded from PVA glue as follows:

Carefully drip on a bead of the right size and after a skin has formed, mould the end and squeeze to shape. The canopy is finally glued to the cockpit floor only with balsa cement (sand emulsion off first) and a strip of lightweight tissue is stuck with PVA across the front and rear.

Flying
With the gearbox, torque is very low and the model seems to turn equally well in either direction. I suggest the following method of trimming, preferably performed outside over long grass *on a flat calm day*. With the centre of gravity as shown, first hand glide with a few turns on. Foam does not warp, so the glide should be straight, and there will probably be a stall. If so, kill the stall with a turn to the right by setting the rudder. If there is a natural turn, kill the stall by turning in the same direction; the rudder is very powerful by the way. If the model dives, then open up any turn or add weight to the tail – this should not really be necessary. If the centre of gravity is approaching 50 per cent, then the tail will have to be repositioned. The model will turn very tightly in steeply banked turns but this tends to spoil the landing; about 15 to 20ft. diameter seems best. Progressively wind on more turns and add downthrust as necessary. Initial flights must be hand launched, as a good initial power thrust is needed to get the model off the floor before the wheel retracts. The outriggers should not be used for take off as they tend to spin the model round. The model by the way is exact $\frac{1}{2}$in.–1ft. scale, except that the wing section is altered to a flat under-surface and the tailplane negative incidence is increased. Tailplane area and scale dihedral are more than adequate. Total weight is less than 1oz., but since my scales are meant for weighing 11lb. R/C scale models, I don't know how much less, or how accurate this is!

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Czechoslovakian junior, Oswald Janisch, has had great success with his 21½in. span rubber powered Farman. A really good flier, this is an ideal subject for a 'first' scale model. Plastic prop is a Czech product.

FLYING SCALE COLUMN

by Eric Coates

IN THIS COUNTRY, the rubber-scale revival at the moment seems to be centred around the 'Peanut'; but in the USA, although 'Peanut' has a huge following, other classes of rubber-scale models appear also to be gaining in popularity. It will be interesting to see if we follow suit this side of the Atlantic. The unofficial classes of rubber-powered machines in the USA are as follows:

Peanut – 13in. maximum span.
Walnut – 13in. to 18in. span.
Flying Ace – Up to 47in. span monoplane, 35in. span biplane.
Jumbo Scale – Over 47in. span monoplane and 35in. span biplane.

(I just hate to think of the number of writhing strands required to power the latter machines!)

The latest amongst these classes is 'Walnut', which is being promoted by Vito Garofalo of *Tern Aero* and Bob Reschke of *Euclid Trading Post*. I personally can see a great future for this class internationally – an 18in. span model can be made more easily than a 'Peanut' by less skilled modellers, as 1/16in. square balsa is much easier to handle than the 1/20in. and 1/32in. required for 'Peanuts' if they are to perform at all. The larger models will also fly better outdoors. Paradoxically, of course, they are a bit big for indoor flying, except in sheds like Cardington. It is also a class for which most models from the popular ranges of kits from our leading British manufacturers would be eligible, although I must say that I doubt whether many of them, designed up to 20 years ago, would be competitive with the latest products from America; but there again, they don't cost $3.50, which is the price now ruling in the States for *Tern* scale kits.

Tern have recently released two new 18in. span 'Walnut' models, both ideal scale subjects: the *Curtis OX-5 Robin* and *Aeronca C.3*. Both these kits are well up to the highest standards set by this manufacturer, and it goes without saying that the printed sheet has a superb clarity of line and all the wood is first-rate. Three colours of Jap tissue are provided, as well as the usual 6in. paddle propeller. A slight variation is that a pair of 1in. diameter rubber 'O' rings are included in the *Robin* kit to be used over balsa hubs to represent 'Palmer Cord' type wheels (I think it may be necessary to use cyanoacrolate adhesive to hold the tyres to these hubs). The instruction to use dope given on the plan looks a bit optimistic! The *Robin* is a natural for CO_2 power – one of the Brown Jnr. units will fit perfectly into the upright cowl. I, in fact, hope to build up this kit, using this form of propulsion later this year.

Also this month, a review of a rather luxurious kit for a ¾in.=1ft. *FW 190A* by **Guillows** of Wakefield, Mass., USA (yes, another American one, I am afraid). I suppose at 25½in. span, it will come under the '*Flying Ace*' category. Guillows kits have been around for some time and are now distributed in the United Kingdom by *J.N.T. Model Products Ltd.*, of Easingwold, Yorks.

Presented principally as a rubber model, the very detailed plans also show a power installation for a Cox ·020cu.in. motor and all the hardware for a control-line version is supplied – a lightweight single-channel R/C version is also featured (parts not provided). In my opinion, the *FW 190A* is best suited to F/F power: the long-nosed 'D' version makes a better rubber model. With an engine up front (a Cox or, better still, a vintage British 0·5cc diesel), the C.G. should be ideal as the '190' with a bit of tweaked-up dihedral is a remarkably stable model. When I have a little more time, I hope to build up the kit in this fashion, using an old ED ·46 from my collection.

Two new kits from Tern Aero – both to 'Walnut' scale. The sheet wood is very well selected and has all parts clearly, and finely, die-printed. Jap tissue is provided (coloured) as is a 6in. 'paddle' propeller. Will fly outdoors or indoors where room permits.

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Another of 14-year-old Oswald Janisch's models – this time a Sopwith Triplane with 'working' bungee-cord suspension. Again this delightful aircraft is rubber-powered and a realistic performer.

The structure contains plenty of wood, the wings featuring multi-spars and many ribs which makes it rather heavy for rubber power. The kit contains a ready-made-up plastic prop. – nose button assembly, woefully too small, I am afraid. Many moulded plastic parts are featured plus a nice cockpit transparency. All sheet parts are cleanly diecut on good quality balsa or ply, while the stripwood is also of good quality. Silkspan tissue is provided, together with a nice sheet of transfers. Altogether, a very nice kit which should give hours of constructional pleasure, but I suspect that as a rubber model (unless built and modified by an expert) the performance would be rather disappointing. Price at £5·81 seems a bit steep at first, but compares well with other American imports.

Fuel Proofers

For many years, people have asked me what I would recommend as the 'ideal' matt fuel proofer for scale models. Until recently, I am afraid, I have had to give rather a qualified answer as I did not know of a suitable product which could be used in *all* circumstances. In the past, for F/F models I have personally skirted round the problem by using non-glow motive power – i.e. diesel, CO_2, or good old-fashioned rubber for small models. As regular readers will know, I have a predilection towards cellulose for finishing models – this, I suppose, stems from my earliest modelling days when no other suitable paints were available. Notwithstanding the introduction over the intervening years of plastic enamel, one and two-part polyurethanes, acrylics, etc., I have not found a paint which personally suits me better. It is light, relatively cheap (especially if bought from automobile suppliers in large quantities), easily thinned and a wide range of intermixable colours are available, making any shade required easily producible. Above all, the stuff dries quickly, enabling the painting job to proceed apace. I think it is this latter feature which has kept me faithful to cellulose above all else: there is nothing so frustrating as waiting a couple of hours between coats or changing colours or, worse still, picking the model up before the paint has quite set, so imprinting one's police credentials on the machine for all time!

In recent years, matt dopes – so essential for aircraft of both war periods – have been rather difficult to obtain, but I have found that since I have gone over almost exclusively to airbrush painting in the last couple of years a matt finish is attained quite easily with *gloss* dopes. You adjust for a fine spray and hold the brush sufficiently far away from the work so that it is half-dry when it contacts. A matt finish is automatic in these circumstances. Incidentally, I hope to devote more space to airbrushing flying-scale models later on this year; but back to fuel proofing for now. I have mentioned before that some diesel fuels, usually those using a castor-based lubricant (this includes most of the proprietary diesel fuels) will in time attack cellulose finishes, but this can be avoided by using a *mineral*-based lubricant. For R/C machines, however, I have had to find a more direct solution, as above 2·5cc the diesel engine is virtually unusable for scale, with the possible exception of the Taplin Twin – alas, no longer in production! Even in the smaller sizes, the diesel engine does not throttle well, it rapidly cools off when run at small throttle openings and misses badly when opened up again. To carry full house radio, an engine of at least 3·5cc, and more usually 5cc, is a minimum for anything other than models of ultra lightweights. A glow motor is, therefore, almost mandatory and the lubricant is of minor significance as regards the cellulose: the 75 per cent or so methanol base ingredient of all glow-fuels will wash off the cellulose almost as effectively as thinners unless fuel proofer is used.

Some five or six years ago, I converted my 1/7th-scale SE5a from F/F to R/C by fitting three-channel radio (rudder, elevator and throttle) and substituting the elderly Eta 15 for a brand new OS30. Now this was the first glow motor I had used for 18 years (!), and whilst running it in I thought at least these things have improved since the Frog 500, in both starting and handleability! I wish I could say the same about the modern diesel successors to the Mills 1·3. . . . Of course, the old SE was finished in my customary matt khaki cellulose and would require some protection from the 'lethal' muck which poured from the OS exhaust. Asking round my contemporaries, more in the know of the ways of these reciprocating wonders of Japanese technology, as to what I should use as a matt proofer, the consensus of opinion indicated I should try one of the proprietary brands of one part eggshell-finish polyurethane varnish. This was duly applied by brush – one coat overall plus a second round the engine bay region. The effect was not bad; a bit more sheen than before, but I have seen photos of SE's which indicate finishes varied from the best of Jaguar showrooms to the proverbial zookeeper's instep. In service the finish appeared to be 'splashproof', but in areas of the fuselage where exhaust collected I was not impressed with its impermeability, and the proofer tended to soften. I must add that I am *not* one of those meticulous types of modeller who gives his model a bath in washing-up liquid immediately upon cessation of flying activities. When a model has proceeded as far down the road of

Our Czechoslovakian correspondent Lubomir Koutny also sent a picture of his own model – this Avia BH7a which has met with several wins in rubber scale contests. Finished in the original three-colour WWI camouflage scheme, the model spans 20in. and needs the transparent rudder seen under the tail.

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A 'de-luxe' kit from Guillow for the Focke Wulfe 190A. Model is basically intended for rubber-powered free flight, although details are also given for a power conversion plus a control-line and lightweight single channel R/C variations. Free flight power is probably the best solution for this relatively stable subject.

depreciation as my SE had by then (Sunday afternoon sports hack), then it is lucky to have a wipe from a rag a couple of nights later – to prevent it dripping on the bedroom carpet! Over the years, during maintenance periods, I tried various brands of matt polyurethane – *Kingston Diamond, Blackfriar, Paripan*, etc. None seemed better, or worse, than each other. Towards the end of its days, when all pretence of a matt finish was long forgotten, I used a two-part polyurethane – *Ripmax Tufkote*, in fact. I had also used this on a sport radio model and found it to be definitely superior to any of the single-part mixtures. It is also much thinner, and brushes out well, drying to a hard mirror gloss. As a fuel proofer it appears quite good, but for wartime scale models it hardly fits the bill. The suggestion in the instructions that the high gloss can be removed with wire wool after it has dried is hardly practical for a fabric-covered biplane.

There is one other snag with these polyurethane varnishes, both one or two part; that is, they react violently to cellulose dope being applied over the top of them. If one, therefore, has to make a repair, even a minor one which involves doping on a patch, the whole surrounding area in contact with the dope boils up in an awful mess, which has to be scraped away before reproofing.

I have recently finished my *Martinsyde Elephant:* a 1/7th scale five-channel R/C model. As usual, all the paintwork was done in cellulose – practically entirely with the airbrush. Fuel proofing has been carried out with *K & B Super Poxy* clear lacquer. This American product, available at good model shops in the UK (distributed by Irvine Engines), I consider to be as near to the perfect fuel proofer as one is likely to encounter. It comes in two parts – *Part A* clear lacquer and *Part B* satin finish catalyst (a gloss finish catalyst is also available for 'shiny' models). One also requires a can of special thinners to thin the mixture down – up to 100 per cent for spraying. It is not cheap; nothing good ever is! Each part costs £1·49 per ½ US pint, plus the same for a pint of thinners. One has, therefore, to outlay a fiver before one can start; but then, you do have enough for several large models. It would appear to be rather a toxic solution – in fact, I was rather horrified to read the instructions, and hardly dared use the stuff! I will quote verbatim the warning on the back of the tin.

'*Contains: Aliphatic amine – adduct, Xylol, and Toluol. Do not get in the eyes, on skin or clothing. In case of skin or eye contact, flood immediately with plenty of water. For eyes, call physician. Remove contaminated clothing, including shoes. Wash clothing before re-use. Discard contaminated shoes. Keep away from heat and open flames. Close container after each use. Use only with adequate ventilation. Keep out of reach of children.*'

Having read that lot, I thought it might be safer to brush it on – so I tried a sample on an old model. This was useless: it just smeared the cellulose beneath it. Further reading of the instructions said it was *not* suitable for brush application. Ah, well, I thought, I haven't spent umpteen hundred hours on the *Elephant* for nothing! *I will proof thee even if it kills me* – which seemed very likely at that time – and got out the airbrush. The instructions also stated that one should spray at a temperature of at least 70°F, in a well-ventilated room. Hardly practical in England in March! Anyway, to cut a long story short, I turned the central heating up to the maximum in my workshop, opened the window wide, wrapped a wet handkerchief around my nose and mouth, and sprayed.

Apart from a slight tingling sensation on the cheeks, I suffered nothing – my clothes did not rot off my back, my shoes did not disintegrate, nor the flesh fall from my bones. Although the model was sprayed at a temperature well below 70°F, it turned out perfectly. The proofer is surface dry in about 10 minutes and fully cured in about three hours. The finish is virtually matt – much more so than the eggshell polyurethanes and absolutely fuelproof. All the test flying has been done with a fuel mixture of 75% methanol, 5% nitromethane and 20% castor, and there is not the slightest hint of tackiness to date.

Apart from clear, *Super Poxy* (horrible name, especially with those warnings on the tin) is available in a full range of primary colours, which, mixed with the appropriate catalyst, will dry satin or glossy. I'll still stick to my cellulose for painting (see, I really am a traditionalist!), but thanks K & B for the best proofer of them all.

One further point, cellulose dope and *Super Poxy* appear to be completely compatible. One can dope patches over a proofed model and reproof again without any apparent interaction.

Our columnist's completed (and safely fuel-proofed!) Martinsyde Elephant in all its pristine glory, just finished in time for this years' R/C Nationals event. We can confirm that Eric is *still* alive and well despite his original misgivings on the use of modern fuel-proof finishes.

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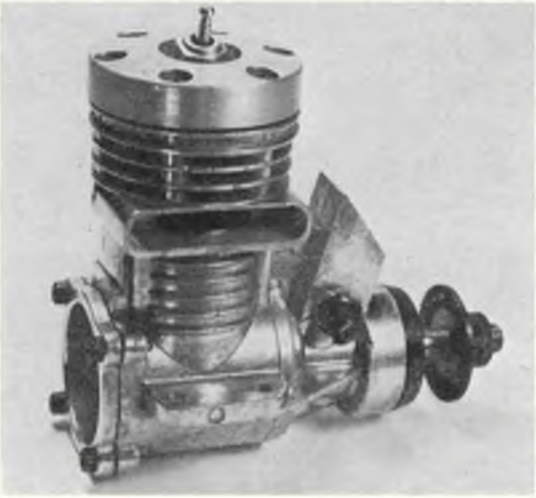
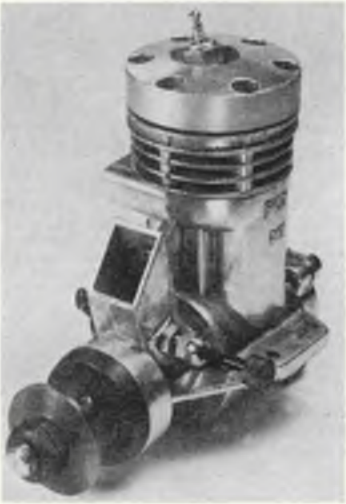


Left, the latest of a long line of Fox Combat Specials; the new 1975 version features Schnuerle type porting.

Right, the new Fox Combat Special has a very distinctive appearance with its canted glow-plug, non-finned head and large bore, square sectioned venturi.



LATEST ENGINE NEWS by Peter Chinn

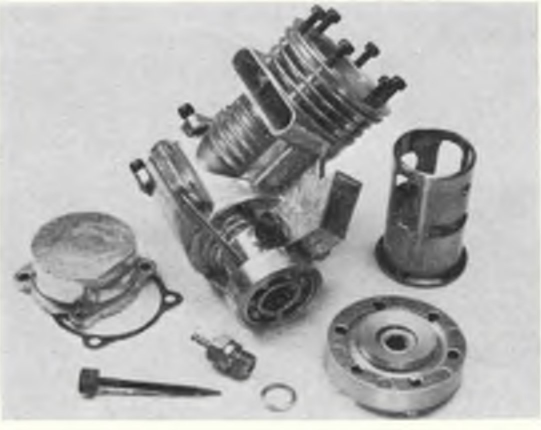
IN CONTRAST to some engine manufacturers who have become so involved with radio-control motors that they seem to have forgotten the existence of the ordinary control-line and free-flight enthusiast, the Fox Manufacturing Company continues to offer a choice of glowplug engines for widely different applications.

The Fox engine range for 1975 includes no less than 15 models and, according to the latest Fox catalogue, these can be expanded to something like 39 versions in all if one takes into account all the different intakes and carburettor assemblies currently available.

Fox divides the range into two groups: those using plain bronze-bushed main bearings and those having the crankshaft carried in ball bearings. The first group begins with the Fox 15, an engine that has been in production, with minor changes, since 1962, and progresses through the more recent Fox 19 and 25, each of which is offered with either a standard intake assembly or throttle type carburettor, to the current Fox 29 obtainable with the choice of a standard intake, a special large intake for competition use or an R/C carburettor. Next up in size is the current version of the Fox Stunt 35, now in its 27th year of production and indisputably the most successful control-line aerobatics motor of all time; followed by the Fox 36, a bored and stroked version of the 29 and obtainable with standard suction feed intake or oversized pressure-fed type, plus two types of throttles. Finally, there are the entirely new Fox 40 and 45 models. These are Schnuerle-scavenged engines based on a common crankcase and shaft assembly with different cylinder bores. The 40 is sold in two standard versions and two R/C versions. The 45 is listed in one standard and one R/C version. All these bushed bearing motors are of the lapped piston type.

Although the demand for large capacity non-throttling engines must be very small nowadays, all the big Fox motors – the 10cc Eagle and Hawk and the 12·87cc Fox 78 – can

Parts of the 1975 Fox Combat Special. Features include very large ports in cylinder-liner, unusual combustion chamber shape and very short frontal overhang.



More Fox Combat Special parts. Note massive con-rod with oil retaining groove at big end, and massive size of crankshaft, necessary to withstand the rigours of American style combat.

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now be purchased with standard intakes and needle-valves, in place of R/C carburettors. These, of course, are ball-bearing motors with ringed aluminium pistons. Also scheduled for production shortly is a ball-bearing, ringed aluminium piston version of the new 40, to be known as the 40BB, and it is planned to offer this in four variants and to also make an ABC-type piston/cylinder assembly available, which is a new move for Fox.

Listed, but not yet on the market, is a new 2·5cc ball-bearing engine, the 15BB. This is quite different from the standard 15 and is aimed further 'up market'. It has Schnuerle porting, a single rear ball-bearing plus an outer bronze bush and is listed in four versions for both sports flying and contest work.

Lastly, there is a new ·36cu.in. combat motor, a class in which Fox has been pre-eminent in US control-line circles since the late 1950s, and we have just been taking a close look at one.

1975 Fox Combat Special

The body casting of this new motor is marked 'Fox 36X'. It is, in fact, pressure cast in the same die as was used for the 36X, but with some small modifications. These consist mainly of the addition of metal, front and rear, enabling two extra flutes to be milled internally for the new three-channel transfer system.

The porting arrangement is a further Fox variation on the Schnuerle scavenge system. Instead of the 36X's single rectangular transfer port diametrically opposite the exhaust, the new Combat Special has three very large port windows extending almost to the bottom of the liner skirt. Two of these flank the exhaust port and are angled, in the approved Schnuerle manner, to direct gas to the opposite side of the cylinder, where it is joined by the upward flow from the third port which has suitably chamfered port edges. The piston is flat-crowned and, of course, without a deflector. There is little or no delay before the third port opens. Timing, measured from the engine submitted for examination, indicated a 140° exhaust period, a 126° period for the front and rear transfer ports and a 125° period for the third port.

The engine has the square section intake that has been common to this group of Fox engines since the original and highly successful 35X of 1963 and, in conjunction with a rectangular port in the crankshaft journal, this gives a quick-opening, quick-closing, rotary-valve timing of 30° ABDC to 50° ATDC. The crankshaft has a ½in. (12·7mm) o.d. main journal and a ⅜in. (9·5mm) gas passage. It is supported in a ½ × 1⅛in. ball-bearing at the rear and a ⅜ × ⅞in. ball-bearing at the front.

A feature of this new Combat Special is its short frontal overhang. This puts the needle-valve uncomfortably close to the prop., but has been adopted quite deliberately in order to bring the prop. closer to the model's centre of gravity for improved manoeuvrability.

The 1975 Combat Special, like all previous Fox engines of this type, is a lapped piston motor, the piston being machined from Meehanite and running in a steel cylinder liner. The connecting-rod is machined from aluminium alloy bar stock and has a bronze-bushed big end. The solid gudgeon-pin is retained in the piston by wire circlips. The plain unfinned cylinder head has a shallow cone-shaped combustion chamber with a shallow depression surrounding the inclined glowplug.

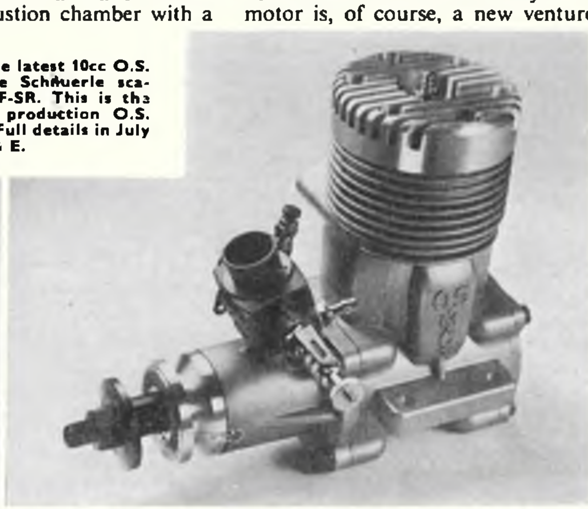
The checked nominal geometric compression ratio of the sample examined was approximately 11·5:1 and Duke Fox tells us that it will run satisfactorily on any fuel from straight methanol/castor-oil up to a 50 per cent nitro mix. Recommended fuel for normal combat work is Fox 'Missile Mist', or a similar castor-base mixture of around 25 per cent nitromethane content. The engine apparently performs best when propped for a speed approaching 16,000 rpm on the ground. Incidentally, there is no choke restrictor in the rectangular intake and the effective choke area, after allowing for the needle-valve, is approximately 75 sq.mm. Naturally, such a large choke calls for a pressurised fuel system, and the type of tank favoured in the United States, these days, for combat competition work with these engines is a bladder type.

Like all previous Fox engines in the ·35–·40cu.in. group, the 1975 Combat Special has a ·800in. bore. Stroke is 0·715in., giving a swept volume of 0·3594cu.in. or 5·89cc. Checked weight of our sample was 236 grammes, or just over 8·3oz.

We hope to have some test figures for the new Combat Special in due course.

Kraft 61

We have just received a new Kraft 61 from the first production batch. Although illustrations of the Kraft 61 have been appearing in Kraft advertisements in the US model journals for several months, the engine did not, in fact, go into production until very recently and its actual release date was 1st May. This motor is, of course, a new venture



Two views of the latest 10cc O.S. R/C engine, the Schnuerle scavenged Max 60F-SR. This is the most powerful production O.S. engine to date. Full details in July issue of R.C.M. & E.

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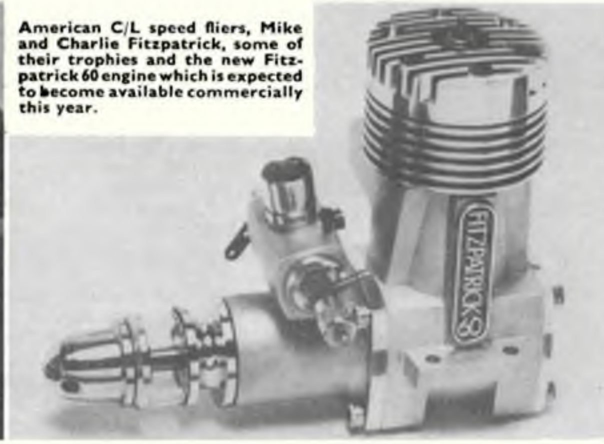

American C/L speed fliers, Mike and Charlie Fitzpatrick, some of their trophies and the new Fitzpatrick 60 engine which is expected to become available commercially this year.

for Kraft Systems Inc., who, hitherto, have been concerned mainly with the manufacture of radio control equipment. Incidentally, free-flight enthusiasts may be interested to know that manufacturer Phil Kraft, despite the fact that he is widely known only as a highly successful R/C flyer and former World R/C Aerobatics Champion, is, himself, a former free-flighter.

Responsibility for the design of the Kraft 61 rested mainly with Roger Theobald, who joined Kraft a while back from K&B, where he had been associated with Bill Wisniewski in K&B engine development and, of course, in the building of the 2·5cc TWA (Theobald-Wisniewski Association) racing engine with which they finished second and first respectively in the FAI World C/L Championships at RAF Swinderby in 1966.

Not unexpectedly, the Kraft 61 is aimed squarely at the R/C market, and the aerobatics class in particular. The engine is of modern design with Schnuerle scavenging and has one or two novel features. A fully illustrated description of it will be found in next month's issue of *Radio Control Models & Electronics*. The engine has a bore and stroke of 0·940 × 0·875in., giving a displacement of 0·6072cu.in. or 9·951cc. Checked weight of our sample was 481 grammes (17oz) or 556 grammes (19·6oz) with Kraft expansion-chamber type silencer supplied.

Taipan Props.
Model Aircraft (Bournemouth) Ltd., well known as wholesalers to the retail trade and as manufacturers of the *Veron* range of kits, are UK distributors of the Australian Burford Taipan engines and related products. Currently obtainable through Veron dealers is the excellent little Taipan 2·5cc high-performance rear-exhaust glow engine, and we shall be dealing with this in the *AeroModeller Engine Test* series very shortly.

Another recent Burford product to reach the UK is the new Taipan propeller range. These props., of glassfibre-reinforced high-viscosity nylon, were under development for some two years, during which time we had various pre-production samples on test and were well impressed with their strength, rigidity and balance. Presumably to bring them in line with the advance towards metrication in Australia, the props. were actually designed to millimetre dimensions (e.g. 175, 200, 225, 250mm diameters), but are marked in the nearest centimetre and inch sizes, the imperial equivalents currently available being 7 × 4, 7 × 6, 8 × 4, 8 × 6, 9 × 4, 9 × 6, 10 × 4 and 10 × 6. As the photo shows, these props. have a distinctive blade shape, with plenty of meat around the root to reduce the risk of blade shedding. The tips are fairly severely washed out, and this, plus the taper towards the tip, tends to reduce power absorption, with the result that these Taipan props. turn a little faster, for any given power output, than equivalent sizes in other makes.

One more point. We understand that Veron's prices (inclusive of VAT at 8 per cent) for these props. range from 23p for the 7in. diameter to 37p for the 10in. sizes, which appears to be considerably cheaper than most other makes.

New K&B 40
Prototypes of K&B's new rear exhaust racing 40 are alleged to be putting out more than 2·4bhp. This, of course, on nitro and with a short tuned pipe as now widely used in US Formula I pylon racing with K&B 40S and Super Tigre X40 engines. The new K&B is an ABC type (K&B's first) and porting is much the same as on the existing side-exhaust 40S, except for a modification to the third port.

Australian Taipan props as distributed in UK by Veron. Finely moulded in glass fibre-reinforced nylon, very rigid and competitively priced.

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BETWEEN THE LINES

with Dave Clarkson

Very neat transport boxes for combat models as used by the Italians at the Munich International. Helper is seen servicing one of Tomelleri's models, which have a very 'British' appearance. MVVS engines were the most popular at this event, and several teams used glow motors.

WHICH WAY RAT-RACE?

'Rat' is almost dead here, and has been ever since the silencer requirement was introduced; last year there was only one event, and this year probably the same – hardly worth bothering with. Are we going to let Rat die, or do we revitalise it? It would be a pity if Rat were to die, because these are the biggest and fastest racing models around – magnificent beasties to watch and fly; real 'men's machines'.

In America, where it all started, Rat is still going strong, with performance levels rising all the time mainly because such excellent 'Pylon' motors are available. With no silencer requirement, competitive motors available, together with a lot of goodies and nitro still cheap, speeds have crept up now over 160mph. John Kilsdonk was hitting 168mph at the last King Orange meeting, even in two-up heats, and he is reported as saying that all he could do was hang on and hope for the best! TOO MUCH. As Charlie Johnson says, *'I almost hate taking the Rats out because they are so hairy; goof up, and you destroy a plane and engine, plus the engines wear out so fast you hate to run them except at meets'.* If we took off our silencers, we would soon arrive in this position and Rat would certainly die – *hara-kari*, perhaps! But with the silencers on, we are in the same position. So which way Rat?

Maybe 'Slow Rat' is a way out. In its homeland, 'Slow Rat' is a very popular event; in the south-west of USA there are an estimated 60 'Slow Rat' teams, just showing how popular this class is. Quite a few rule variations exist in the USA, both based on the 10-mile distance using 2×18 thou. lines, 60ft. long for 140 laps. The West Coast variation allows ballrace '40's, but only 1oz. tanks, whilst on the East Coast it is plain bearing '36' size motors and compulsory pit stops. Both variations call for profile fuselages and 300sq.in. wing areas. Either way, speeds are down around 100mph and the models handle so well that racing over grass is quite usual. Sounds like a simple, fun-type event and still requiring big, powerful hard-pulling machines. Maybe we should give it a try, so I suggest the following rules as a basis, having tried to combine the simplest features of the various USA rules.

Races: 140 laps (10 miles), 'Le Mans' start, two compulsory pit stops.

Lines: Two lines 60ft long, of heavyweight Laystrate.

Motors: Maximum capacity 0·40cu.in., no other limitation. Motor must be uncowled and fitted with an expansion chamber-type silencer.

Tanks: No limitation in size. Maximum filler ID is $\frac{1}{8}$in. (i.e. Quick-fills not allowed), pressure refuellers not allowed.

Models: Profile fuselage maximum width $1\frac{1}{4}$in. including any side cheeks, but excluding the tank. Motors must be side-mounted. Mono wheel U/C allowed. Minimum wheel diameter $1\frac{3}{4}$in., 300sq.in. minimum wing area. Fuel shut-off essential.

Plus all the normal safety and conduct rules, this set of proposed 'Slow Rat' rules could fit the bill. Any other ideas? Since these rules will definitely give 'slow' models, maybe there is a case for a 'Middlin' Rat' – i.e. as above, but with 150sq.in. wings, $1\frac{1}{2}$in. diameter wheels and allowing 'Quick-fills', which should hold speeds to around 120mph at the most.

Now why are silencers OK here, but not with our present side-winder models – very easy models to install a silencer on? The present rules allow fully-cowled models, and these are usually with upright or inverted motors for constructional reasons. On such models, installing a silencer is very difficult indeed; but since these 'speed models' are much more efficient than side-winder profiles, either you struggle mightily with installing the silencer or you build a slow model. An undesirable choice and, I suspect, a major reason for the death of new Rats about – and when no one builds the models, what is the point of scheduling contests?

It has not escaped my notice that the real American 'Slow Rat' would make a fine 'sports' model. After all, 300sq.in. is a fair amount of wing area and should provide quite reasonable 'stuntability'. The silencers, 'grass' undercarts and shut-offs bring them up to A1 demo machines. Worth thinking about?

One of the most exciting bouts of the Munich combat meeting were between Nagy of the home club and Kaptijn of Holland.

VIEWPOINT

The FAI Combat Rules

I see from the FAI Combat Rules, given official status by the CIAM for 1975 onwards (rules strangely not yet disseminated by the SMAE to its membership), that the 'String Cut' rule has been re-emphasized by the insertion of an extra rule:

4.4.11 (d) – *No points shall be awarded for cuts of the string line whether the crepe paper is attached or not.*

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Andy Kerr (left) and Allen Shing used a Super Tigre 29 RV ABC engine to win the Australian 1000 lap class B team race event – the first time this particular event has been held over tarmac in Australia.

Placed second at the same marathon event were Peter Tilley (left) and Warren Shurmer. Peter holds the model used, while Warren displays their reserve. Super Tigre engines dominated the event.

This rule is in direct opposition to the UK view as approved by the SMAE (and reported in this Column) that a cut be defined as *'any cut of an opponent's streamer that includes a piece of the crepe paper'*. This SMAE view is the way in which cuts have been counted in most contests here since we adopted the FAI rules (and, incidentally, was used for the 1973 Dutch International at Spaarndam) for the excellent reason that it is much easier and, more important, less controversial to score cuts in this way.

The purpose of rules is to enable the carrying out of intentions in the fairest and least contentious manner possible. The intention behind the FAI 'String Cut' rule is obvious to all – i.e. that attacks should be made on the streamer and *not* the model, and no one would argue with that. However, since 'going for the model' is already an instant disqualification offence (and no one argues with that, either), is the FAI rule as now defined the fairest and least contentious way of scoring cuts? I think not, and suspect that the vast majority of FAI combat fliers in the UK agree – certainly, their delegates to the SMAE voted that way.

I would estimate that as much as 50 per cent of the FAI combat bouts flown world-wide in any one year are flown here in the UK; certainly, we have a high proportion of the world's best FAI combat fliers here (as International results for years have shown). Should not, therefore, the CIAM consider most seriously UK experience as to the rules? It seems quite obvious to me that they do not, and I am left wondering how long this rather unsatisfactory situation will last.

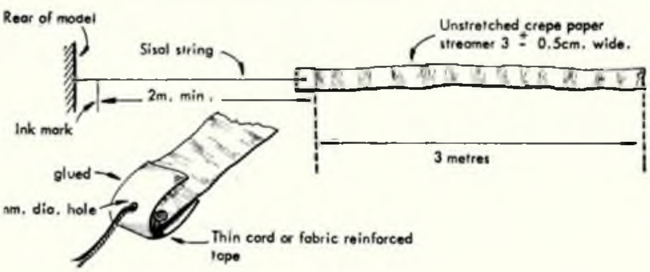
Whilst on the subject of the FAI combat rules, it should be noted that the streamer construction is now strictly defined thus:

4.4.8 – *Streamer*

> *A crepe or similar toughened paper streamer conforming to the dimensions and specifications shown in the figure below shall be attached to the rear of the longitudinal centre-line of the model.*
>
> *The colour of the streamer must be different for each model in the heat. The point of attachment on the model must be sufficiently strong so that the string cannot detach under normal flying conditions.*

Just how is it proposed that the 'thin card' be 'glued' on to the 200–300 streamers required for a big-entry contest? Alright, I know nice, light fabric-reinforced adhesive tape is freely available (expensive, though) in the USA, but I have never seen any here. Unless I have missed something, this 'streamer construction' rule looks like yet another rule that is so impractical that it just will not be used in our domestic contests.

Who's a silly boy, then? HOLD YOUR HANDS UP, CIAM MEN! Only three out of ten for those rules!



INTERNATIONAL NEWS

Munich Combat Contest

Our German friend, Claus Maikis, reports that this event received 42 entries from Belgium, Holland, Italy and the host country, with the results as follows:

1. Mohimot (Belgium)
2. Darsonval (France)
3. Perret (France)
4. Benincasa (Italy)

Points of interest were that MVVS motors dominated – only the Dutch using Olivers, and some of the Italian and French entrants flew glows (including one Italian who used Rossi's!). The most popular design was Konrad Kaul's *Blitzkrieg* design, recently published in Germany. Bad weather marred the finish of the contest and was responsible for the lack of Claus's usually excellent photos (ice formation on the lens of his camera, would you believe!).

Australian 'B' Team Race – 1,000-lap contest

Held on tarmac for the first time in Australia, this event produced some really fast times as the results show:

1. Kerr/Shing (ST 29 RV ABC) 49:16·5
2. Tilley/Shurmer (ST 29 RV ABC) 49:25·2
3. Wearne/Jenkins (ST 29 Fl Steel) 49:27·9

Just to make things difficult, all practice had to be done over grass except for a five-minute 'bash' just before each actual race to allow the pilots to get used to the tarmac. Super Tigres dominated the event (just one non-ST, an ETA 29), even though it has been reportedly years since the last importation of ST 29's into Australia. This event seems to have caused a stir locally, not only because of the excellent finishing times (all inside our 'Rufforth 1,000' record) but because second place men Tilley/Shurmer did their first 140 laps in 5:46, proving their claimed performance of 120–124mph for 45–48 laps. Nevertheless, the winners' 125–127 mph for around 37 laps came out on top. Thanks to Chris Noakes, Hutton Oddy and David Baird for results, data and photos.

The Dutch Team Trials for the *1975* European Championships

The team selected following Trials held at the Dutch permanent C/L site at Utrecht is:

Stunt: Bert Metkemeijer, Peter van Doesburg, Paul Tupker.
Speed: Bas Buser.
Combat: Buys, di Ridden, Fred Meijer.
Team Race: Metkemeyer/Metkemeyer, Visser/Buys, Helmich/van der Kroon.

The only details received from our correspondent (Hans Visser) concern the team race selection, where six rounds were flown with the *fastest* and two *slowest* times disregarded. The Metkemeyer brothers averaged 4:18 (their best of 4:11·8 was not counted!), using both a Bugl and their front-exhaust Rossi. This latter motor was achieving 52 laps per tank, and gave a fastest heat of 4:20·5. Visser/Buys used a Bugl for all six flights, averaging 4:33·1 with a best time of 4:25, while Helmich/van der Kroon also used Bugls to average 4:40·1 with a best time of 4:22·5.

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COMPRESSION RATIOS FOR GLOWS

This month's educational piece, like most of its predecessors, is intended to lead to an understanding of what is going on, rather than just laying down (questionable) solutions. It concerns compression ratios for glows and is, to some extent, a follow-on to the article about glow heads published two months ago.

The first thing to understand is that, as with diesels, compression ratio is important in glows. With a diesel the compression ratio is adjustable, so it never presents a real problem; it is simply a matter of 'nudging' the comp screw right – no matter what weather, prop. or fuel the right compression ratio can be selected (typical of we ordinary humans, we get it wrong at times!). Of course, it is less critical with glows, otherwise these would have to have adjustable heads also, but it remains critical. Too much compression means a 'stuffed-up' run, and too little gives missing; it takes quite a lot of variation (at least 50 per cent) to go from missing to a cook-up, but it can happen. Somewhere in between lies the optimum and, just as with diesels, it depends on what you want as to what the optimum is – like with diesels, the maximum power setting is a 'midges' higher than the maximum reliability one! Experienced T/R men know what I mean – Heaton/Ross set a 'clack' and never cook, the Austrians set 'hard' and push the Jury for a fast time. Heaton/Ross may go slower, but do not need help. In glow terms, a speed man will find he can use a bit more compression than a racing man.

Back to basics. Why does compression ratio matter at all? Combustion (which is what our motors are about) is a chemical reaction, and like most such the more concentrated the mixture the faster it goes. When we compress our fresh gas in the motor head, we speed up the combustion and, when the compression is right, burning is accomplished in just the right time. Too little compression slows things up; if it gets too slow, it just does not happen, either occasionally (a 'clack') or never. Too much compression and its all over before the piston starts coming down (the ultimate condition), and all that happens is a highly bent con-rod. Of course, this is an over-simplified picture; other factors influence the picture, like mixture strength (the richer the mixture, the slower the combustion – T/R experience again, screw in the needle and it 'cooks', remember!) and, not really known in diesels, the fuel composition. This last factor is the one over which you have control, but not on the flying field, so more basic data – basic combustion data like:

Methanol, $CH_3OH + 1\frac{1}{2}O_2 \rightarrow CO_2 + 2H_2O$

since the liquid volume is negligible (check your Perry) this means that one volume of inlet gas is converted into three volumes of exit gas – a 3:1 ratio. Now we look at the other common glow fuel ingredient:

Nitromethane, $CH_3.NO_2 + \frac{3}{4}O_2 \rightarrow CO_2 + 1\frac{1}{2}H_2O = \frac{1}{2}N_2$

This time the exhaust/inlet ratio is 4:1. Nitro in the grog means more gas – i.e. a higher effective compression ratio. Just to keep 'B' men happy, I throw in cumene (John Gray take note):

Iso-propyl benzene, $C_6H_5.CH.(CH_3)_2 + 12O_2 \rightarrow 9CO_2 + 6H_2O$

this time a volume ratio of 1·23:1 – i.e. a lower effective compression ratio. If you keep on reading your Perry (a tell-tale, I am a chemical engineer – Perry is a most useful 'Bible'), you will find that all power boosters increase the effective compression ratio, and all range ingredients lower it. So here we go on compression ratio physical against fuel composition. Nitro means a lower physical ratio (its chemical ratio is up – have to keep the balance) and vice versa, range ingredient means more physical compression. So we can fiddle the compression ratio with the fuel composition.

The lazy way out on compression is to vary the fuel to make the motor run at its happiest, and it is a cunning manufacturer who makes his motor for the fuel most users use – i.e. the Rossi 15 (and the ST G15 FI) is designed for straight fuel; nitro blows 'em out and a Fox is made for *Missile Mist* (25 per cent nitro). But if you want your Rossi to go on 60 per cent nitro, or your Fox to go on straight, without a change in compression ratio, *there is no way* (you poor Goodyear Rossi men!). Most glow users, knowing their motors, know the fuel that is right – e.g. a little less nitro then blows the insulation out of Fireball 'blues'. Yup! Actual compression comes back! And the Fireball plug is a fine measure; too much compression and a 'blue' just falls apart.

Coming back to reheading motors, you can rehead a motor to make it work best on the fuel *you* want to use. If you vary the compression ratio, *any* glow can work on *any* fuel. Unfortunately, no absolute relation between fuel composition and compression ratio exists, to my knowledge, so you always have to experiment with the head to fit the fuel (or vice versa). However, a basic guide goes:

0 per cent Nitro – Use 11:1 compression ratio
15 per cent Nitro – Use $10\frac{1}{2}$:1 compression ratio
30 per cent Nitro – Use 10:1 compression ratio
50 per cent Nitro – Use $9\frac{1}{2}$:1 compression ratio

and for 'B' range brew users, scratch your heads! This is based on my 'T/R diesel' mentally; a motor running *just* off a 'clack' (or even giving one every now and then) is a very, very nice feeling. Maybe others with greater confidence in glow plugs will reckon a bit more compression. OK, I like to finish, not flash!

THE AEROBATIC SCENE (by Glen Aison)

There have been two noticeable trends lately in the competition sphere. Firstly is the interest being shown in foam (expanded polystyrene) wings. Nowadays, with better foam and $\frac{1}{32}$in. Obechi veneer covering, there is little to choose, weight for weight, for the *average* builder between conventional construction and foam. With the price of balsa so high, and the fact that foam wings are quicker and easier to build, together with improved warp resistance, their popularity is bound to spread.

One has to install bellcrank and leadouts before joining the two halves together with epoxy resin and glassfibre tape. A suggested method for the leadout holes is to form a wire to the shape shown in *Figure 1* and heat in a flame. When hot (but not red hot) lower the cutter into the foam, having previously marked the entry and exit positions. The bellcrank may be mounted as in *Figure 2.*

The undercarriage may be mounted in a grooved block *(a la* radio style). This has an advantage in that the u/c may be removed easily for transport or adjustment to rake, etc., merely by undoing a couple of screws.

The second item is the sudden popularity of the Super Tigre G21/46 motor – its power to weight ratio being very good, because it is based on the original '29' size crankcase. It is expensive and not often available in a stunt (non-R/C) version. Ringed and ballrace equipped, it has the power to fly a model up to 750sq.in. wing area and 4lb. in weight, while only weighing about 9oz. A standard Merco silencer fits very well and gives an acceptable noise level, whilst the ST unit is much larger . . . and more expensive.

I have fitted one in my *Baga 32*, running with a 12 x 6in. wood prop. and the most immediate effect is a noticeable increase in line tension and power when flying high in the circle for overhead eights and the cloverleaf. Of course, big engines are thirsty, and it needs 140cc of fuel for a schedule run of six minutes.

An unusual feature of the engine is that the needle-valve assembly is remote from the venturi. After the fuel passes the needle, it enters a circular gallery around the choke tube and emerges into the airstream through six small peripheral jets. This is fine most of the time, but occasionally the jets get partially blocked and the engine leans out.

A modification which eliminates this problem is to make a standard venturi with a $\frac{1}{4}$in. bore and reposition the needle valve in the centre in the conventional manner *(Figure 3)*. I have found this to be more reliable with no noticeable alteration in running qualities.

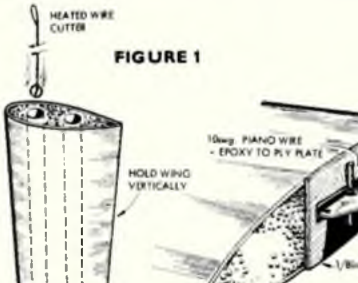


FIGURE 1

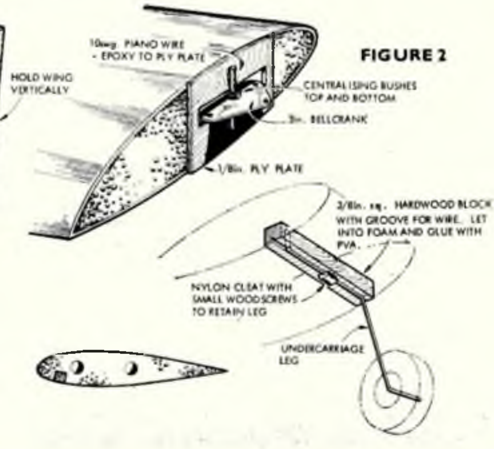
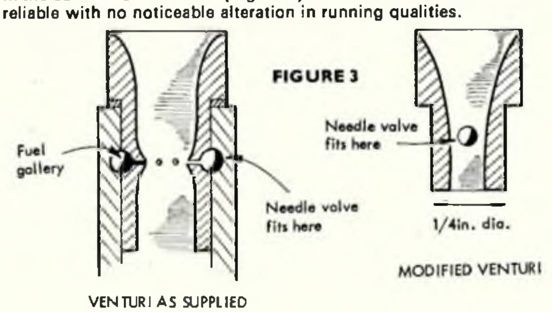


FIGURE 2

FIGURE 3



VENTURI AS SUPPLIED

MODIFIED VENTURI

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Michael Warren and Martin Dilly report on the 'Dutch Treat' — held on May 10-11th 1975

TENTH ANNIVERSARY AMSTERDAM CUP

THE BRITISH contingent, barely half that of the previous year, who made the trip to the vast heath outside Arnhem found that the 1974 organisational problems (when the event was run by an amalgam of non-specialists) had been overcome since the F/F sub-committee of the Royal Netherlands Aero Club took charge. Paid timekeepers were provided and, while it was fortunate that visibility proved reasonable, there were few complaints.

The scheduled starting time of 1pm on the Saturday saw one of the day's several squally showers; luckily, nobody had flown at the start of the round and the contest director sensibly used this fact to delay the actual start of the A/2 round by an hour.

Starting posts, hammered into the sandy ground of the Rozendaalse heath, resembled the setting for a mass execution; they were a hundred yards downwind of a steepish escarpment, which gave some problems with thermal detection, although the mown heather in this area made glider-towing easier than on the rest of the heath. The slope lift sometimes fooled people into launching into air that dumped aircraft after a couple of minutes; the downwind recovery areas consisted of scattered small pines and birches, and accurate orienteering skills with the compass were essential to locate models. Shin-high heather made straight-down-the-bearing recoveries tiring. Most people used the sandy moped paths and animal tracks that criss-cross Rozendaal. Half a dozen competitors used FM radio beacons with some 150 yards range to aid model location; in the downwind, wooded conditions, where models could be invisible 10 yards away, a device like this was invaluable.

The British 'tradition' of leaving at least one model behind in the Netherlands was upheld by Jim Baguley, whose Wakefield had an apparent D/T failure and headed for the woods in the sixth round. The contest was preceded by a bad morning for the British: Paul Masterman suffering a premature unlatch on his cata-hook A/2, which resulted in it trying to fly through an open car boot lid, Jim Baguley damaging a Wakefield when he launched with the auto-rudder disconnected, and 13-year-old Julian Masterman shedding a wingtip on his *St. Leonards* 'Nova' after D/T-ing into the scrub.

Two of the nine British flyers who attended – Joe Barnes and Brian Baines – arrived well in advance of the main contingent and made good use of their time by flying two days before the Amsterdam Cup in the Dutch Spring F/F Competition – taking second places in Wakefield and A/2 respectively.

Saturday morning lift was spasmodic, but, when present, covered quite wide areas; and, surprisingly, there were a large number of sub-maximum scores, so that after the three Saturday rounds there were only five trebles – including on-form Brian Baines. At the end of Sunday's

Heading picture shows Van Oostrum of the Dutch Hengelo club who used a wire-braced sheet wing on his A/2 – note radio beacon antenna projecting vertically in front of wing. At left is Brian Baines of RAFMAA who won the Amsterdam Cup with circle-towing A/2 that took two second places in the previous fortnight. Below, Jean Errard of France took fifth in A/2 with this Brinks airfoiled model with outrigger turbulators and radio location beacon.

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round five, only Brian and Reiner Weiland of West Germany had full houses. Then, after losing one model and damaging his only spare, Weiland tried to fly someone else's! This extraordinary attempt to win by fair means or foul was discovered, and he took no further part in the contest. So, by round seven, Baines was in an extremely strong position; then, after a near faultless weekend, he misjudged a thermal and was down in only 2:42. However, this was still enough to ensure victory, and so he completed an extraordinary treble of two second places (in the British two-day FAI meeting and the Dutch F/F Championships) plus a first place in a major Open International – all in just a fortnight!

Brian had obviously done a great deal of work, both on the circular tow ironmongery and in its practical use. He flew carefully and thoughtfully throughout the weekend, but was lucky in Round 2 when, after an unpromising start, his Shoaf-airfoiled model picked up a thermal a minute into the flight.

Third place in A/2 was taken by Pete (Mr Jet-lag) Allnutt, over from Toronto for the weekend; he planned to compete at the French *Criterium du Nord* the next weekend, followed by the British Nationals, returning home to his work with Air Canada (surprise, surprise!) on the intervening weekdays. He flew a model with a sheet-topped wing, Hacklinger airfoiled, long tip panels and outrigger turbulators. Unlike the Dutch A/2s, which sang like Aeolian harps, Peter's turbulators maintained a respectful silence. His hook gave a circling tow facility, but no zoom, feeling that if launched into lift the height gain made no difference. The hook on the model actually terminated in a ring, enabling a recoil release 'zig-zag hook' to be used on the towline to prevent accidental drop-off.

Josef Brodarac used heat-retaining head wrapper on his Rossi - here about to be inserted into tripod mounted Graupner hand-pulled starter.

Perhaps the most interesting A/2 of the meeting was that of Denmark's Thomas Køster. It is now ten years since his dramatic Wakefield win at the Kauhava World Champs, when he was only 18. More recently, Tom has become better known for his well-engineered power models and his work with variable airfoil wings; he is, on the strength of this contest, an equally competent A/2 flyer. His aircraft shows strong Soviet influence – dural spine (with moulded glass-fibre front end, enclosing both timer and circular tow-hook systems), dihedralled, tapered tailplane, and great emphasis on reduction of weight towards wingtips and tail end. Also featured are a flexi-jointed fuselage, resin-impregnated rolled balsa tailboom, and straight tapered wingtip panels. Køster was one of several to tow without using a winch, claiming that the increased sensitivity improved his ability to detect thermals. This system is, of course, potentially dangerous in that, once the line is free of the aircraft, it will tend to fall across other lines on the ground. In fact, this did not happen, since, without exception, Tom was downwind of 'the pack' when he released.

In spite of a Sunday forecast for a continuation of Saturday's squally showers, these held off until the final A/2 round; the morning started calm and warm and the number of maxes per round increased. Joe Barnes, flying in Wakefield, had dropped 90 seconds after launching into bad air on his first round flight, but thereafter steady flying and a string of six maxes brought into fourth place, squeezed out of the prize list by Kjell Kongsberg only two seconds ahead.

Top place in Wakefield was taken by Haacken of West Germany, 24 seconds short of a full house; his model employed the Køster wing airfoil with 5° washout on the left tip and 2½° on the right one, small tapered tips and riblets. Tailplane airfoil was John Gard's, and the model used extensive side and down thrust to climb against rudder; the same aircraft was used for all flights, and it used a Montreal prop. stop with auto-rudder release. Even the propeller blades were turbulated.

In the power event there were three 'full houses' – Køster, Tassilo Schwend of West Germany and Josef Brodarac, originally from Jugoslavia but now also living in Germany. All maxed on the 8-second run round, but Brodarac dropped out after a flight of 166 seconds in Round 9, leaving Schwend and Køster. Schwend was away first, with a conventional-looking model (all sheet, of course), but the rather rolling climb was relatively shallow, the air was poor and he was down in 1:26. Køster finally, and after a run

continued on page 727

Left, Brian Baines holds for Joe Barnes who placed 4th in Wakefield with Pollard -influenced design.
Right, Ken Faux (St. Albans) with Gerhard Heidemann of West Germany and T-tailed Rossi model.

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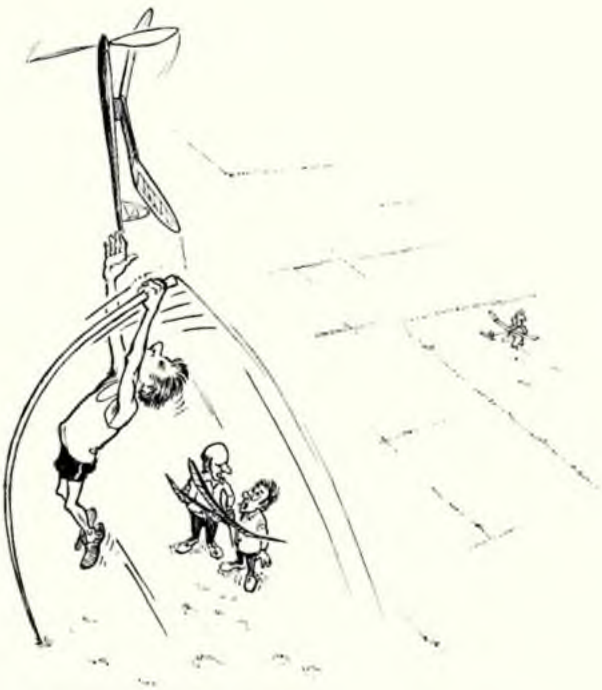
topical twists

by 'Pylonius'
illustrated by Sherry


"There's nothing against it in the rules"

With strings attached
THIS, WE ARE TOLD, is to be the year of the kite – a return to favour of our fine tethered friends from the mists of antiquity. Ever since that early open space operator removed the string from his kite to give us the first model aeroplane, the kite, which was the 'radio model' of the Victorian age, went the way of the horse-drawn carriage and the crinoline, although a powered, short-hauled version was to become popular under the name of control line.

Like all things overtaken by 'progress', the kite was immediately considered as dead as the dodo as soon as the free-wheeling version, either glider or rubber powered, became all the rage. Even so, the good old kite still had a lot to recommend it. It evoked a minimal degree of noise complaint and was never known to feature largely on the 'don't' side of the park notice-boards. It also unwaveringly held that nice into wind position for which the thermal soaring enthusiast so desperately strives, and just look how happy it kept the Chinese throughout countless centuries. Overtaken, as we ourselves are, by progress, they don't build their dragony kites any longer, but glumly watch the pandas eating the bamboo canes and the paper going into little red books.

Perhaps I am unduly suspicious, but it could be that all this kite publicity is a way of conditioning us to the rigours of the spaceless, energyless world of the future. Our only Sunday recreation might well be standing shoulder to shoulder on top of a tower block, waiting for our turn to hold the kite string.

Angels one-five
That rosy promise of man-powered flight development getting us all happily sky pedalling, or ornithopting, around the tower blocks and pylons of the future does not seem to have all that hope of being realised. Unlike the birds and the bees, from which he is reputed to get many of his ideas, the *homo sap* does not seem to have a particularly good power-to-weight ratio. Had that big prize been put up, say, for monkey-powered flight, or even poodle-powered flight, the cyclonauts would not now be trying to achieve the impossible by whacking extra feet on an already Jumbo plus wingspan. What complicates the whole man-powering process is the dual operation of pedalling and piloting. Such a maddening business that the pilot could well finish up in the care of a trick cyclist.

The ultimate answer may lie in genetic engineering. From out of some future test tube may well come the hollow-boned man with four super-muscled legs, or even one equipped with a pair of wings. Meantime, it's either back to a larger drawing-board or a spot of hang gliding.

Knowhow nohow
I am not sure that the expert is the right sort of person to instruct us ordinary duffers in the finer arts of modelcraft. He may perhaps be suited to the running of a seminar for those destined, like himself, to achieve the élite status of experthood; but his demands of utter dedication, fine judgement and sheer virtuosity are a bit excessive for those born with two quivery left hands and a chronic condition known as the television flops. To the expert, all things come easy – one good reason why he is an expert – whether it's an involved Wakefield nose assembly or a complex radio installation. A couple of seemingly magical passes, and *voila*! there it is. In fact, trying to follow the instructions of the expert is like watching a magician pulling rabbits out of a hat – you see him doing it, but you don't know how he does it.

Being an expert means doing everything the hard way. Whereas the ordinary modeller, operating on the short route to the flying field, will just slap a couple of plain spars into a wing, and feel flushed with success if the result is not too hopelessly switchbacked, the expert will slot in a fiendishly complicated box spar made up from the sort of wood you couldn't get hold of, anyway (*'Six-millimetre Bass, sir? I should try the pub next door'*), and which would take you longer just to work out than the time you expected to spend on the whole model.

Then there are the tortuous gadgets, so beloved of the expert. Many a common or garden patch flyer has gone through life happily oblivious of such diabolical devices as VIT, AR or even D/T. *Chuck it and hope* is the wholesome philosophy of the bloke who hasn't the time or motivation to make that painful grab for the stars – he loses quite enough models close to terra firma, as it is. But what really separates the boys with toys from the men with gen is the expert's prodigious output. While you are just tinkering about in your model den, he is setting up the next production line. One expert is reputed to have a contest stock of no less than nine A/2's, all gadgeted up and rarin' to go. Now, how to build that chuck glider . . .

Beginner's luck
We shouldn't knock the expert too much, though. He can come in quite useful to the beginner if the beginner's model will only fly in the hands of an expert. A recent review of a kit described how the emergent model didn't have a hope of flying until breathed upon very hard. Rough luck, therefore, on the poor old beginner who hasn't a tame expert at his elbow.

That's the bad news. The good news is that the kit is not available in this country.

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It is now 40 years since the Chicago Aeronuts launched themselves on the aeromodelling world, and they celebrated this fact with a reunion of some of the hobby's 'greats'. Seen here are Wally Fromm (kneeling) and, left to right, Joe Ott, Billy Erlich, Chuck Feulner, Otto Kurth, Pete Vacco, Ed Mate, Dushan Desich, Ed Lidgard, Al Davis, Dick Charski and Carl Goldberg.

CLUB NEWS · CLUB NEWS · CLUB NEWS

THIS BEING THE YEAR of the kite, we might reflect that the kite – and its later development, the model plane – had one thing in common which made for popularity: they could be flown on any open space, and not require any special operating conditions. Things may have changed quite a bit since the kite and model plane flew harmoniously together in the local parks, but you can still more readily fly a model plane than float a boat or run a model car. Much, of course, depends upon where you happen to live and where your specific interests lie; but, generally, where you see a kite aloft you can fly a model plane, be it only rubber-powered scale.

Our first report comes from Alan Davies, Chairman and PRO of the **Woodthorpe & District MAC.** He informs us that the outlook for this Nottingham club is a bright one. Mainly control line, it has two fields at its disposal (though subject to certain limitations, such as silencing rules) and a cheap line in diesel fuel – 76p per pint. Also on tap, as it were, is the pride and joy of the club: glow fuel at £2 per gallon. This comes from a local model shop, which, alas, is soon to close. We seem to have put out the suggestion at some time for clubs to put on small field F/F events. For our pains, we are called to task for a more than pathetic entry in a rubber power and chuck glider contest, but the promotion of a 'mouse' event got no less than four teams in the field – or, more specifically, school yard. A number of other events are lined up for the season, and there is the hope of entering at least three members in the Junior Stunt at the Nationals.

We have a letter from the **Fulbourn Modellers' Society.** We are informed by its correspondent, Mr. G. M. Cordner, that the Society aims to further modelling in general, but we are not given any specific instances of how this is being effected. However, if you are interested in the group, which appears to cover the whole spectrum of modelling in its objectives, Mr. Cordner's address is 18 Grandridge Close, Fulbourn, Cambs.

Next we have a report of **Lees Bees MAC** activity, sent to us by PRO E. G. Boddie. Mainly an R/C club, the rocketing membership, now around the seventy mark, includes a hard core of free flight rubber enthusiasts, and there appears to be a growing interest in control line. All this adds up to a lot of activity of a varied kind, which happily can be safely accommodated in one of the finest flying fields in the south, the Royal Naval Station of HMS *Daedalus*. Members have very good relationships with the naval people, and with the Helicopter Search and Rescue Units. Sounds hopeful for anyone losing a model. To add point to the general proceedings, Competition Officer Harry Vear has organised a programme which, it is hoped, will involve the new R/C flyers to a greater extent than in the past.

Talking of flyaways, we have news of a real marathon one in the **Watford Wayfarer's** newsletter. A Kamco *Kadet*, belonging to junior Pete Huntley, got unhooked from its radio beam in a strong wind and soon left Croxley Moor far behind. It turned up, quite undamaged, in a field in Stevenage, some 21 miles away. He seems to have the makings of a good free flighter! Danger, though, is that the moor itself may fly away – at least, for Sundays. Seems the District Council intends to introduce a bye-law to restrict Sunday flying, but nothing definite has yet been announced. Meantime, all fingers are kept firmly crossed. With councils and other powers-that-be so touchy, it behoves the radio flyer to operate quietly and safely. However, members visiting the Sywell R/C Expo over Easter were most unimpressed by a mid-air smashing exhibition put on by two of the exhibiting firms. A dangerous thing in itself, they thought, and something that can damage the hobby in the eyes of the public. Finally, a variation on the R/C Novelty Power/Glider event. The original idea was to just allow a 60-second engine run, but since this so patently gave advantage to high-powered, lightweight models, a formula was devised to make things more equitable: engine run in seconds = 60 × model weight (lb) over engine capacity (ccs).

With the arrival of its sound level meter, the **Sussex Radio Flying Club** reminds its members of a change in provisions of the *Noise Abatement Act*, which means that a local authority can now act on the complaint of only one local resident, and not three as heretofore. Each complaint must be investigated, and if the noise is above the accepted level the perpetrator must seek to reduce it. Noise tests carried out by the club seem to suggest it is exceedingly difficult to muffle a powerful engine down to the requisite level. It is not just a straightforward procedure of bolting on a baffle; there are complications. For one thing, the size and pitch of the propeller can make a telling difference, with the coarser pitches showing to advantage. Then there are the engines with an irrepressible rattle, and others which just won't

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go if any appendages are attached. It's a tough life. The bulletin lists quite a number of novel radio comps. A double function is claimed for these: getting the flyer to familiarise himself with his model, and to give the beginner an equal chance with the expert. My own view is that the novelty event is alright for the occasional gala day, but tends to throw doubt on the competitive viability of the radio model in any serious sense if such events dominate the club flying programme. It can all too easily give the impression of the radio model as a mere plaything, rather than a mature interest.

The story of Croydon Airport is continued in the **Three Kings Aeromodellers'** *Court Circular*. The current instalment deals with the romantic beginnings of air transport, when, like model flying today, every flight was an adventure. But whatever the glories of the past, members are reminded that the old airport site is now the best C/L field in the south of England. Advice given in the newsletter to budding pitmen – not how to hold your shovel, but what to wear, etc. Seems you need a crash helmet, a knee pad and a finger guard, and reliable refuelling equipment (haven't I seen pressure pumps on the helmet or arm?). Communications betwixt you and the pilot should not be on a shout-and-hope basis, but through a set of prearranged hand signals. And then it's a question of doing everything fast and systematically – something that can only come with plenty of practice. Norman Chapman makes the point in his column that anyone who has any query concerning flying on a public open space would be well advised to acquire a copy of the appropriate bye-laws before asking direct questions. A direct enquiry might prompt the authorities to introduce a ban, whereas you may have a perfect right to use the site. Norman thinks something like this may have happened with the club' enquiry on the use of part of Putney Common.

Very impressively called the **Rockwell International Flightmasters,** this Californian-based club issues a newsletter, giving all the news and views of interest to the Scale buff. What gave me a stab of nostalgia was the reprint of a 1934 plan of a *Waco Model 'D'* Two Place Pursuit. It took me right back to all that delicious browsing through the pre-war American model mags.

More nostalgia in *WMC Patter*, newsletter of the **Willamette Model Club** of Oregon, from yet another reprint. This time of a Carl Goldberg article on the trimming of gas models. Much of it is still applicable today, particularly the systematic checking-out procedures.

Tarmac Torque, newsletter of the South African **Rand MAC,** gives an idea what modelling life is like in that sunny clime: '*. . . a quiet leisurely Sunday afternoon drive with the family, a couple of flights followed by a sundowner, a bite to eat and a stay over for an evening film. . .*'

Your reports and newsletters welcome.

Clubman

CONTEST CALENDAR

21st June	**NEW MILLS COMBAT RALLY.** Details I. Hutchinson, 579 Rooleymoor Road, Rochdale, Lancs. Venue 10 miles SE of Stockport.
22nd June	**AEROMODELLER ALL SCALE RALLY.** Fly for fun scale meeting for R/C, F/F and C/L models. All welcome at Old Warden, Nr. Biggleswade, Beds.
22nd June	**YORK RALLY.** Open R/G/P combined mini HLG, R/C fly for fun. Venue: Elvington, Nr. York.
28th June	**BURNS BROWN COMBAT MEETING.** For Burns Brown Trophy plus good cash prizes! Pre-entry (35p) essential to P. Rabjohn, 47 Hillyfields, Dunstable, Beds. Venue: RAF Halton, Nr. Aylesbury, Bucks.
28-29th June	**ASHFORD RADIO AEROMODELLERS 2-DAY EVENT** Class 2 scale, open and biplane pylon race, plus many novelty events. Thermal soaring. No entry fees, free camping. Details: D. Hopkins, Broad Downs, The Street, Brook, Ashford, Kent. Tel: Wye 812 443.
29th June	**ELLIOT MEC C/L RALLY.** Combat, Goodyear and FAI T/R, stunt, scale. Further details: R. James, 21 Rochester Crescent, Hoo, Rochester, Kent. ME3 9JH. Venue: Elliot Bros. Airport Works, Rochester, Kent
5-6th July	**COMBAT INTERNATIONAL,** organised by Alfreton and District MAC. £5 entry fee includes camping facilities, every meal and a chance to win £200 worth of prizes. Full details: Dennis Degg, 31 Strettin Lane, Higham, Derby.
6th July	**LONDON AREA C/L CHAMPS.** Combat, FAI and Goodyear team race at Charville Lane, Hayes, Middx.
5-6th July	**SMAE INDOOR DURATION NATIONALS.** EZB, Penny Plane, FAI Microfilm, Indoor HLG. Any event may be flown either day at Cardington, Beds.
13th July	**SMAE SCALE MEETING.** F/F, C/L, R/C Class 2. Venue: RAF Little Rissington, Glos.
13th July	**FINCHLEY C/L RALLY.** Class A and B combat, stunt. Venue: Glebelands, Summer Lane, Finchley N12. 25p pre-entry to J. Goodwin, 77 Gallants Farm Road, East Barnet, Herts.
13th July	**SOUTH MIDLANDS AREA THERMAL SOARING.** Venue: RAF Weston-on-the-Green, pre-entry 40p to J. Shaw, 'Alvere', Witney Road Freeland, Oxon.
13th July	**SOUTHAMPTON F/F GALA.** FAI glider R/G/P, combined mini, HLG, 10am start at Beaulieu Airfield.
20th July	**SMAE 4th AREA CENTRALISED MEET.** Team glider (open), FAI power, C d'H. Area venues.
20th July	**SVAS OPEN DAY.** Fly for fun – mainly F/F and C/L but all welcome at Old Warden, nr. Biggleswade, Beds.
20th July	**STOCKPORT COMBAT RALLY** at Manchester Road, Cheadle, Cheshire (new venue). Mainstream Trophy and £50 (min) of prizes. Pre-entry only (80p) – send with large sae to D. Woods, 18 Royon Drive, Cheadle Heath, Stockport, Cheshire.
27th July	**R/C HELICOPTER FLY-IN.** Venue: RAF Odiham, Hants. Details: N. F. Couling, 7 The Green Walk, Willingden, Eastbourne, Sussex BN22 0RB (sae please).
27th July	**LONDON GALA C/L:** Scale, stunt, speed, combat, Goodyear, FAI and class B T/R. R/C: Scale Class 2, Novelty. Venue: RAF Wyton, nr. Huntingdon. SMAE and RAFMAA members only.
2-3rd August	**WOODVALE RALLY.** R/C FAI aerobatics, Class 1 and Class 2 scale plus demos, etc. C/L: Saturday – carrier, speed; Sunday – FAI, Goodyear T/R, combat, scale. Camping facilities available. Further details (and entry) from M. Duce, 16 Windy Harbour Road, Southport, Merseyside.
3rd August	**DEVON RALLY.** Open R/G/P. All-in FAI (Torbay Trophy) chuck glider. Venue: Woodbury Common, nr. Exmouth.
3rd August	**LEEDS RALLY.** Open R/G/P, HLG, Vintage duration, 0.5cc Vintage replica combined mini comp. Combat. R/C Thermal. SMAE members only at Elvington, Nr. York.

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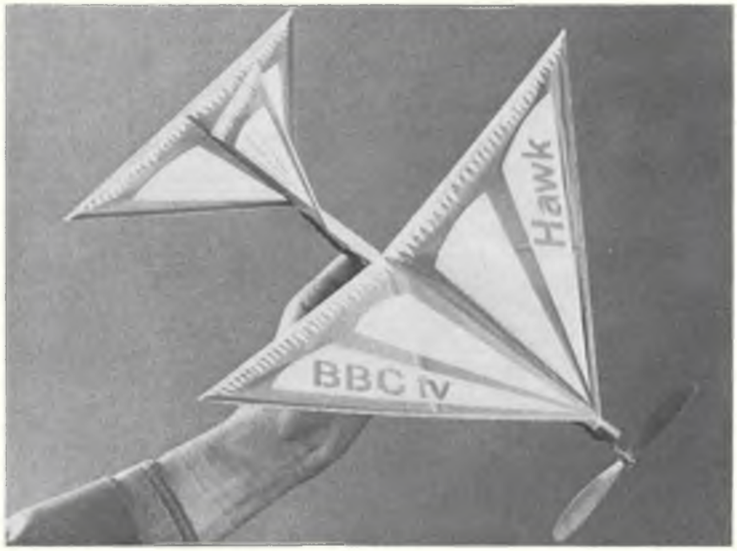

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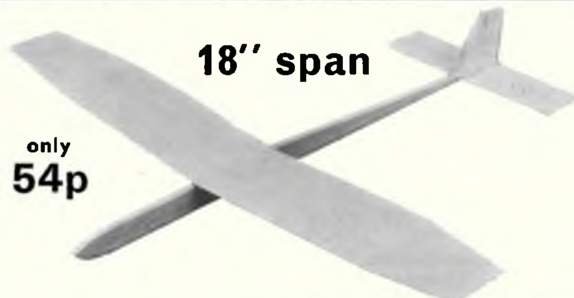

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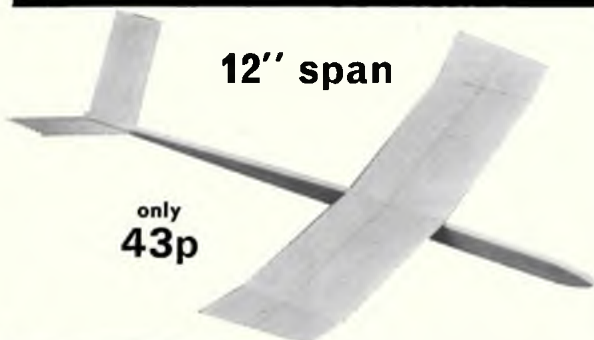

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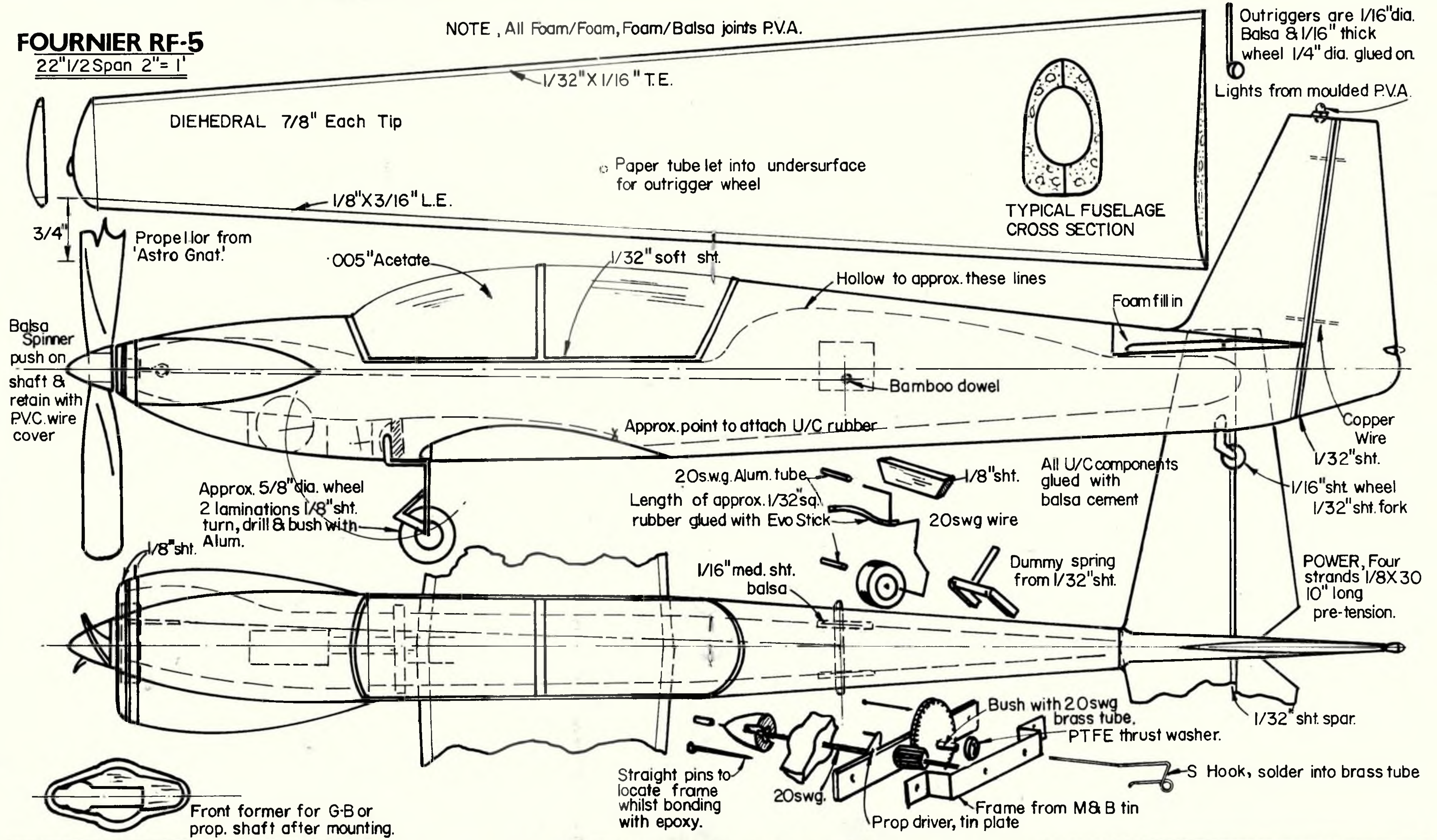
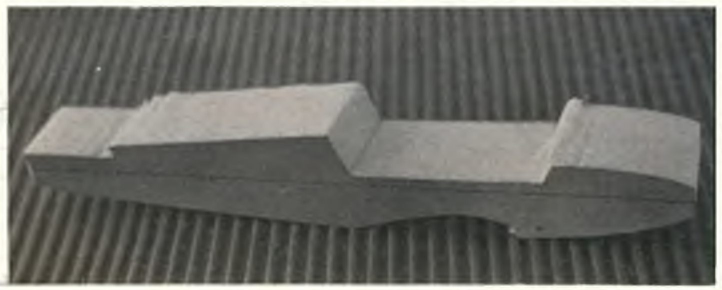
22"1/2 Span 2"= 1'





The first stages in producing the fuselage. At left, two pieces of foam of approximately the right size were pinned together and the cardboard side templates also pinned in place. The hot wire cutter was then used to leave this form. Next step is to pin the top and bottom template in place (see photo at right) before repeating this operation.

At right, the fuselage halves having now been shaped with the hot wire must be lightly spot cemented together to enable them to be finally shaped with glasspaper. Use progressively finer grades, taking care not to tear the foam.

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