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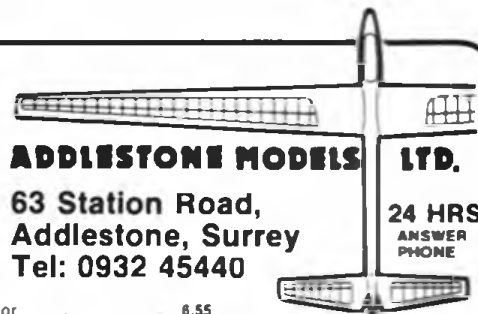
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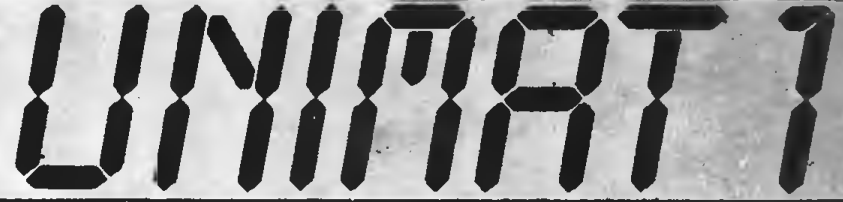
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January 1986

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AERO MODELLER



p.8



p.28

Editor *Pete Freebrey*
Graphic Design *Jenny Hine*
Advertisement Manager *Jim Carrigan*
Group Editor *Alec Gee*

Cover:
Main photo is the Embraer 'Tucano' now to be made in the UK by Short Brothers, Northern Ireland. Inset, the four electric round-the-pole models featured in this month's full-size plans (page 28). Colourful subjects for this winter's indoor programme.
(*Tucano' photograph courtesy of Short Brothers PLC)

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HANGAR DOORS



Above, this Vickers Armstrong 'Walrus' as yet unfinished and to be powered by a D.C. 'Spittfire' has been built by P.A. Scorey and will be on show amongst the hundreds of other exhibits at the Model Engineer Exhibition in January.

Model Engineer Exhibition

3 - 11th January, 1986

In last month's Hangar Doors we gave you what we think are some good reasons for visiting the Model Engineer Exhibition. We also mentioned the "SMAE Experts Forum" that is due to take place on Saturday 4th January. We now know that there will be two "Forums" - one starting at 12.00hrs. and another at 14.00hrs. These will include the topics shown below... there will be others as well!

There are other lectures and

demonstrations that could well be of interest to the aeromodeller. These range from soldering and brazing - always a useful accomplishment - to airbrushing and indoor flying to a film of "Concorde's 24 Hour World". As always there will be something for everyone - try and make it... you'll enjoy yourselves.

The Model Engineer Exhibition is held at Wembley Conference Centre, 3rd - 11th January, 1986 and cost of entry is £3.25 for Adults and £2.00 for Children and Senior Citizens.

SMAE Experts Forum on January 4th - Model Engineer Exhibition: two sessions 12.00 - 1.00 and 2.00 - 5.30. There will be an opportunity for people to talk to the speakers afterwards.

Bernard Hunt	Design and 'Flying' of Indoor Duration Models using a home computer
Chris Edge	Uses of Composites and Plastics in Free Flight Aircraft
Robert Dulake	Etherless Diesel Fuels
Mike Fantham	Structural Design
Steve Philpott	CO ₂ Duration Aircraft
Martyn Presnell	Invisors and Turbulators at Low Reynolds Numbers (question and answer session)

Where and when to find the lectures, films, demos etc

Savern Suite 1

Friday 3rd January	14.30-15.30	Indoor Flying	Reg Parham
Saturday 4th January	12.00-13.00	Ultimate Fuel Economy	Mike Billinton
Sunday 5th January	13.15-14.15	Ultimate Fuel Economy	Reg Parham
Tuesday 7th January	13.15-14.15	Ultimate Fuel Economy	Dr. Graham Paul
Saturday 11th January	16.30-17.30	Model Airbrushing	Ian Peacock
Tuesday 7th January	13.15-14.15	Tools for the Aeromodeller	Ian Peacock
Saturday 11th January	12.00-13.00	Model Airbrushing	Ian Peacock

Savern Suite 2

Friday 3rd January	13.15-13.45	Concorde The 24 Hour World	Film
Saturday 4th January	12.00-13.00	SMAE Forum	
Sunday 5th January	14.00-17.30	SMAE Forum	
Tuesday 7th January	15.15-15.45	Concorde The 24 Hour World	Film
Wednesday 8th January	12.45-13.15	Concorde The 24 Hour World	Film
Thursday 9th January	12.00-12.30	Concorde The 24 Hour World	Film
Friday 10th January	16.00-16.30	Concorde The 24 Hour World	Film
Friday 10th January	14.00-15.00	World War Two Aircraft on Film	John Huntley
Friday 10th January	15.15-16.30	Soldering and Brazing	Tom Walshaw
Friday 10th January	12.45-13.15	Concorde the 24 Hour World	Film

Please note that there are many other lectures, films etc - these are just a few we thought may interest the aeromodeller.

French Coupe comp...

The "Coupe d'Hiver du Modele Reduit d'Avion" was a classic event from 1939 until the late seventies, when the magazine lost interest in free flight. This competition had a very special character of its own and in its latter years attracted quite a regular and growing following of British entrants.

This interest prompted *Aeromodeller* to run its own "International Coupe d'Hiver" in December each year and for a time many continental flyers made the reverse pilgrimage to attend our version over here.

1985 saw the birth in France of the *Association des Amateurs L'Aeromodelles Anciens - 4A* as it has become known - which pursues the same goals as *SAM* in the USA and *SAM 35* in the United Kingdom. Now *4A* has decided to revive the French Coupe d'Hiver event on the traditional date (last Sunday in February).

The originator of the class and founder of the *MRA* magazine, Maurice Bayet, agreed to give his name to the revised competition just before he died in October, and this will be known as the

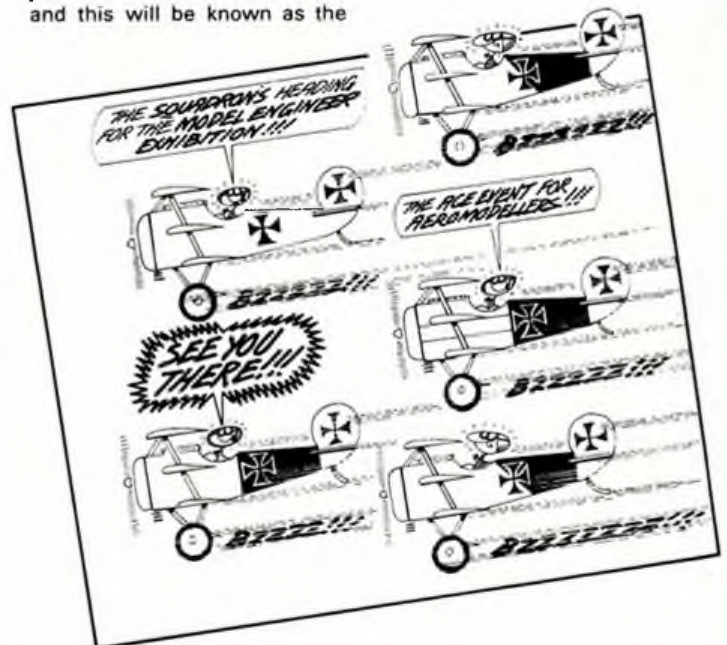
"Coupe Maurice Bayet"

The first "Coupe Maurice Bayet" will be held on the 23rd February 1986, with the help of the Club Modeliste Beaumontois at the Persan-Beaumont Airfield, some 40km north-west of Paris and will be run to the following rules.

1. 80gm minimum weight.
2. 10gm maximum rubber weight.
3. 20sq cm minimum fuselage cross section.
4. Take off from ground.
5. Three flights.
6. Unlimited number of models per contestant.
7. Separate Junior results list and prizes.

The Club Modeliste Beaumontois will be delighted to register as many foreign entries (including proxies) as the former "Coupe d'Hiver du M.R.A." used to attract...

Entries of Vintage (1956 and before) Coupe d'Hiver models will be particularly welcome. Special prizes will be awarded to the best placed vintage models. Vintage models of all types are also welcome to put in demonstration flights...



Details of the competition and entry can be obtained from 4As secretary: J.M. Piednoir, 23 Allee Herold, 93340 Le Raincy, France.

Jean-Marie can reply in French or English and even reads German and Italian... after a couple of beers!



Above, the long awaited binders for Aeromodeller - once again available - to store your precious mags. Order now from Reader Services...

Are you being served...

Here is something new for our readers to look out for - the ASP Readers Services Department - based at Wolsey House, the present home of Aeromodeller. "Readers Services" will undoubtedly be worth keeping an eye on in the future. Its aim is to supply the readers of our magazines with some of the goodies that come under the umbrella of the modelling mags. It is in many ways an extension of the Plans Service, which at present already supplies cowlings, canopies, fuselages, and boat hulls for selected models within the Plans Handbook range.

The first offering is something that many readers have enquired about - binders for their precious Aeromodellers. As with most things we remember from a few years back, the cost has had to rise with the years and the new price will be £5.20 inclusive of postage and packing. Binders are, of course, an ideal way of keeping your Aeromodellers: 1) neat and tidy, 2) in order - for reference purposes and 3) removable for when you wish to build from one of our many full size plans.

A.S.P. Readers Services, P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts HP2 4SS. Allow 21 days for delivery and please make cheques or postal orders payable to A.S.P. Ltd.

SMAE Snippets

Letters

We get letters aplenty, and one of them recently was from a model flying solicitor, taking the SMAE to task about a comment in an item on member-to-member insurance cover, in which it was stated that claims may take a long time to settle "thanks to the solicitors involved". He makes the point that the long times sometimes taken to settle personal injury claims were usually due to the reluctance of doctors and lawyers to discuss compensation until they are reasonably certain about medical after-effects in the long term.

In fact the item was abridged by the SMAE PRO, Martin Dilly, from a piece by a member of the insurance profession, who possibly has a different outlook from a solicitor, but the point is taken. In any case, keep flying safely, and you should avoid first-hand knowledge of how long it takes, in fact, to settle a claim.

25% Increase

In 1986 the SMAE has had an increase of around 25% in the number of clubs affiliated to it. There are now 328, all of them with 100% SMAE membership, and all enjoying the full support of the Society's expertise in every aspect of model flying, no matter where they fly in Britain.

To those of us who heard the sharp intakes of breath and mutters of "compulsion" and "clubs will leave in droves" when the sensible suggestion was made that an SMAE-affiliated club should consist entirely of members of the Society, the news of this continuing swing to the SMAE is further proof that their stick-in-the-muds have had their day.

Hidden Benefits

One of the many things that the SMAE membership cost never pays for is the time and sheer expertise of the model flyers who work with the Society. If the true cost of this was included in the budget we would be paying three or four times the fee that the Annual General Meetings approve each year.

An example of this arose recently when it became clear that the big increase in membership meant that the sheer time that is taken to put each member's details onto the computer prevents it from being used for other SMAE work. It was decided to move up to a multi-terminal system that would let several people use the equipment simultaneously for different jobs, like account-keeping, up-dating club lists or event calendars and so on. But this needs new software to be written, which is expensive.

At no cost to the members this is being done by Bob Horwood, who is a Fellow of the SMAE and was heavily involved earlier in 1985 in the organisation of the European Control-Line Championships at Three Sisters. The fact that Bob has also been personally involved in several other SMAE Council posts in the past means that he can tailor the software programs to avoid some of the problems that he has discovered can arise with them. It is the in-depth background stretching right across model flying that makes the people who work for the SMAE so vital for your own future flying.

Looking Ahead - World Championships

Unlike all the rest of the SMAE's undertakings, competition flying must be self-supporting financially. Before any proposals can be accepted for Britain to host one of the World Championships for the FAI, the budget must be accompanied by a guarantee to meet any loss without calling on the Society's funds. You may feel that this is not a very enterprising way for a sport's governing body like the SMAE to operate, but that is nonetheless what was decided in the late 70s.

One result is that before the long-term planning for such an event can start, a sponsor or a fairy godfather must be found. In 1985 it was Greater Manchester Council who enabled the highly-successful European Control-Line Championships to take place at Three Sisters, near Wigan, for instance. Next year, assuming the offer is approved by the FAI's large and highly-active Commission Internationale d'Aeromodellisme at its

December meeting in Paris, Britain will be running the World Indoor Championships at Cardington in the airship hangars there in late August.

These Championships will be underwritten by Laurie Barr, the driving force behind British indoor flying for many years, and managing director of Aeronautical & General Models Ltd., the industrial and display model company. The likely dates will unfortunately clash with the R/C and C/L Nationals traditional August Bank Holiday weekend, but any offers of help will be welcomed by Laurie; what better way to get a ringside seat at one of model flying's most fascinating sights, at one of Britain's most famous aviation sites?

Soaring League Postals

Entry cards are now ready for the SMAE's new soaring programme for 1986. Briefly this consists of flat-field and cross-country league events, plus four separate postal contests. The latter are the Mayfly (second weekend in May), the Midsummer Evening event (second weekend in June and following five weekdays), the Highsummer Evening (second weekend in July and following five weekdays) and finally the Autumn Leaves on the second weekend in September. For full details send a large s.a.e. to Soaring, SMAE, Kimberley House, Vaughan Way, Leicester LE1 4SE.

For the Leagues to run it does require you to make sure that your SMAE Area committee decide which clubs will run the events, and to co-ordinate these offers with the other Areas in the League region. Six contests need running in each region, so now is the time to start organising.

What's On

14 December
DERBY LOW CEILING INDOOR MEETING
Comps: EZB, HLG, PND, Scale, Sweepets
Trophy for Open HLG. Venue: Rolle Royce
Sports Hall off A5111 Ring Road. Contact:
Phil Ball 0332 665361.

1986
12 January
SLAITHWAITE LOW CEILING INDOOR MEETING
Comps: EZB, HLG, PND, Scale. Venue:
Colne Valley Leisure Centre, Slaihtwaite.
Contact: Dennis Davitt. Tel: 0532 675433.

26 January
SOUTHERN AREA INDOOR MEETING.
Comps: Peanut, Open Rubber, CO₂, HLG,
EZB All Balaa Machin SAM 35, Earl Stahl.
Venue: H.M.S. Daedalus, Lee-on-Solent.
Contact: Malcolm Leach. Tel: Emsworth
(Hants) 5364. Also Fly-For-Fun. Entry £1.25
(per comp of F-F-F), under 16 free. Anyone
going must inform Malcolm Leach at least
one week before. Flying from 1pm to 6pm.

29 January - 5 February
MODEL EXTRAVAGANZA EXHIBITION AND COMPETITION
Venue: Bury Art Gallery, Moss St., Bury,
Lancs. Contact: Colin Billingham. Tel: 061-
761 4021. All sorts of models - Entry:
Adults 80p. Children and Senior Citizens
40p. On Saturday 8th February there will be
a modellers swap meet and auction at the
same venue. Phone/write for full details.

9 February
SLAITHWAITE LOW CEILING INDOOR MEETING
Comps: EZB, HLG, PND, Scale. Venue:
Colne Valley Leisure Centre, Slaihtwaite
Contact: Bernard Hunt. Tel: 0484 882353

30 March
SOUTHERN AREA INDOOR ALL SCALE DAY.
Comps: Peanut, Open Rubber, Open CO₂,
SAM 35 Earl Stahl. Venue: H.M.S.
Daedalus, Lee-on-Solent. Contact:
Malcolm Leach. Tel: Emsworth (Hants)
5364. Also Fly-for-Fun. Entry £1.25 (per
comp of F-F-F), under 16 free. Anyone
going must inform Malcolm Leach at
least one week before. Flying 1pm to 8pm.

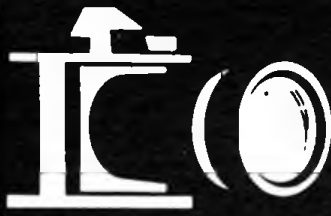


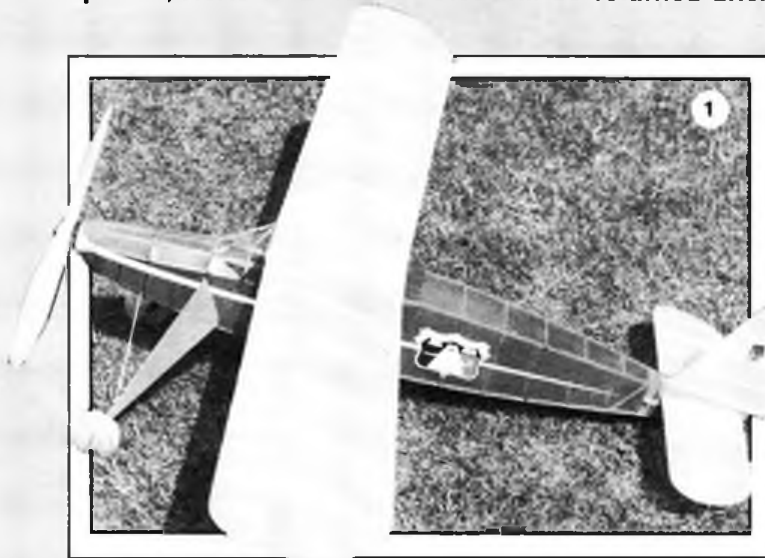
PHOTO PRIZE

Model News With Fliar Phil

Wood for the Winner

100 Sheets of balsa, nearly 200 lengths of strip wood — some prize!

All you have to do is send Fliar Phil your photograph — good quality black and white or colour prints will do, with your name and address plus details of the model, its construction, etc., on the back. Post your entries to Aeromodeller Photo-Prize Feature, P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts HP2 4SS. Photos will be returned after publication.



'Per ardua ad Astra — through difficulties to the stars'. We all know the motto of the RAF. It suddenly occurred to Fliar Phil that whenever we aerobods draw up a new design or pin that first longeron in place on a plan, we are truly associating ourselves with the R.A.F.'s noble motto! Even if after all the building 'ardua' our model does not fly quite 'ad astra'! However, now for this month's model stars!

Photo 1

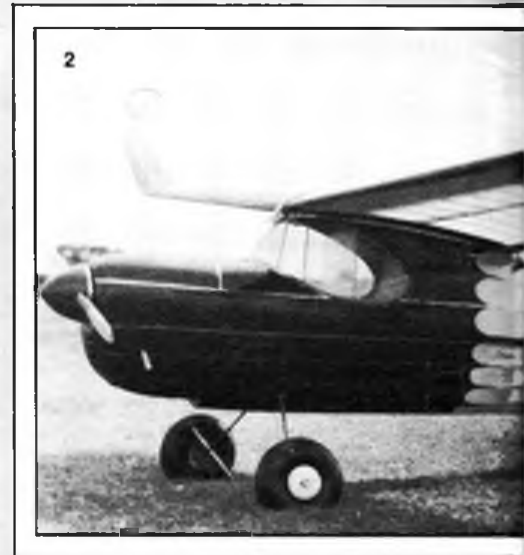
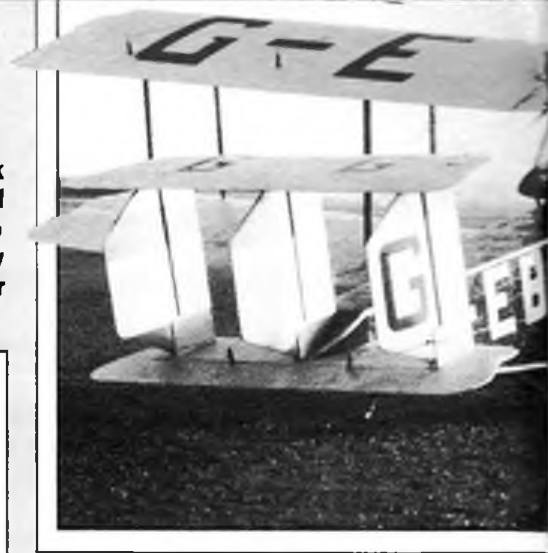
From those halcyon days of rubber models comes this 1938 'Fairy Facula' by master designer S.R. Crow. Elegant it certainly is and no midget: spanning 52in. Superbly built by Sqdn/Ldr Bob Jones (RAF ret'd) of Carterton, Oxford. Weight is 5½oz (without rubber). Your remarks on 'Pin-ups' made F.P. chuckle Bob — he's also got several 'must build one day' model pix on his wall...Happy landings.

Photo 2

The original 'Southerner' was without doubt, an elegant model. This fine 'portrait' of an enlarged 'Southerner' (called, so FP is informed, a 'Southerner Major'), emphasises the dignity and efficiency of the design. Sent to F.P. by Tony Froggatt of Gt. Wyrley, Staffs. Tony built it from a Ben Buckle plan, and at 7½lbs its flight performance more than matches its looks. F.P.'s congratulations Tony!

Photo 3

That well worn saying "there is a first time for everything" happens to be true of this fine photo of a 'Tiger Moth'. No! NOT because it is a 'Tiggy' (F.P. has published a number of 'Tiger Moth' pix!) but because it is, for Bill Richards of Great Barr, Birmingham, a FIRST attempt at a multi-channel Radio Control model! Bill writes "Not bad eh Phil"! F.P. replies: "very good Bill — Phil"!



Winner

Photo 4 Winner

Those A.W. 'Argosy' airliners of *Imperial Airways* certainly had a fascination uniquely their own. That fascination comes over in this study of free flight model 'Argosy' G-EBLF, seen at sunrise at the August Nationals. It is the work of that master of the scale model, Bill Dennis of Okehampton, Devon. Power is two *Mills .75's* in the nacelles and a free wheeling prop up front. Beautifully photographed it has to be this month's winner!



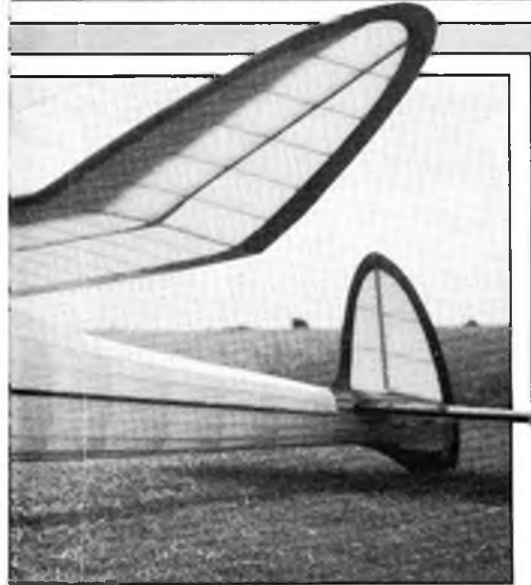
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Photo 5

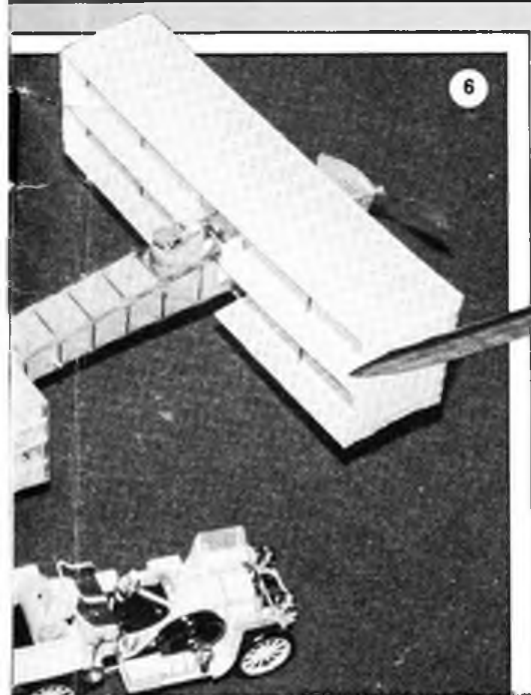
A really impressive 'Gladiator' built from a *Bryan Taylor* plan. Sent to Fliar Phil by Mr W Davies of Balby, Doncaster. Although Mr Davies is probably *not* contemplating night operations(!)...the model has working navigation lights (L.E.Ds) with switches in the cockpit for the lights and radio. Span: 58in, power: *Webra 61'Champion'*, weight: 9 3/4lb. Fifteen 'Gladiators' were sent to Portugal in 1939 so the model wears Portugese markings...

Photo 6

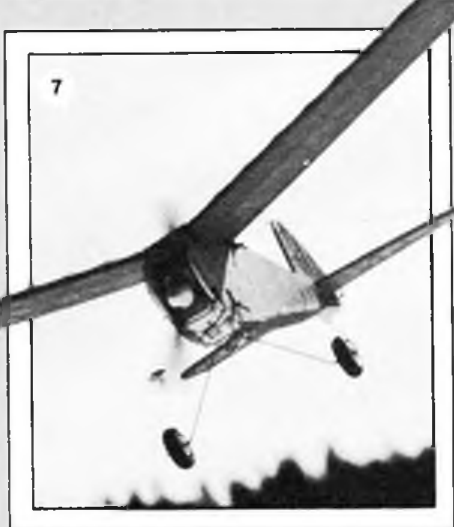
Back in 1908 folks, if you please - to have the work of French aircraft pioneer Ambroise Goupy recalled for us by this superbly detailed peanut of his Goupy No 1.



5



6



7

Built by Benno Sabel of Frankfurt, West Germany from a plan in *Model Builder* magazine. Adding interest to Benno's excellent photo, is that 1908 'Thomas Flyer' automobile. Thanks Benno - Goupy No. 1, must look great in flight.

Photo 7

"DUCK everyone"! The model in this pic looks too close for comfort! From Tapio Linkosalo of Kuopio, Finland, it is of his 'Simplex' (a 1984 *Aeromodeller* plan). Power is an *Acoms* electric motor, with *Futuba* R/C. Incidentally, the photo was taken in a temperature of -10°C! Great credit to Jukka Kananen, the courageous man behind the camera. Thanks for your greetings from Finland Tapio, F.P. sends greetings from Britain to you all.

Happy Christmas everyone! New Year 'pick of the pix' next month.



CONTROL LINE STUNTERS have always held a fascination for me and so it seems only natural that my interest should lean towards this aspect of the hobby (sport?). I started aeromodelling, like so many, when I was young and with pocket money that did not run to me having a large stunter. As I grew older and started to work, other things became more important, such as motor bikes and girls, and so still I had no stunter! Like everyone else I suppose, I progressed on to marriage, buying a house and generally settling down, during which time aeromodelling faded away completely...

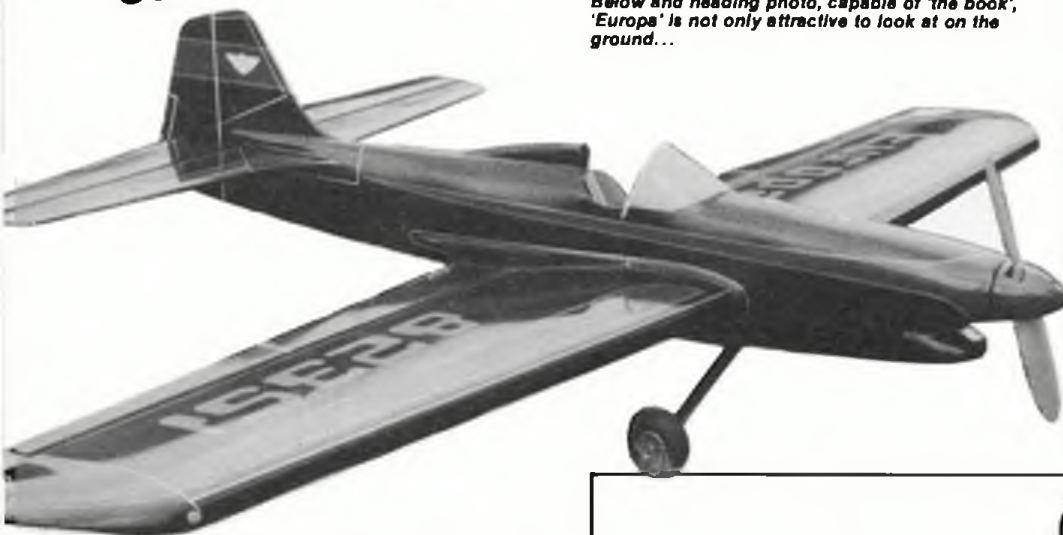
Having settled down to a regular routine more time becomes available and the aeromodelling comes back into being, in the form of a stunter, an OS35 powered Mercury 'Crusader'. I learnt quite a bit - crashing and repairing it - though I never felt completely at home with it. I soon added an old type OS 40 powered SIG 'Akrobat' which I liked but unfortunately did not last too long. This I replaced with an A P S Focke Wulf 190 during the building of which I completely wrote off the 'Crusader'.



EUROPA

Build this smart stunter, winner of Novice Stunt at the Nationals by R. Sanderson

Below and heading photo, capable of 'the book', 'Europa' is not only attractive to look at on the ground...



afterwards. I have seen the same situation arise with other flyers ending with the same result.

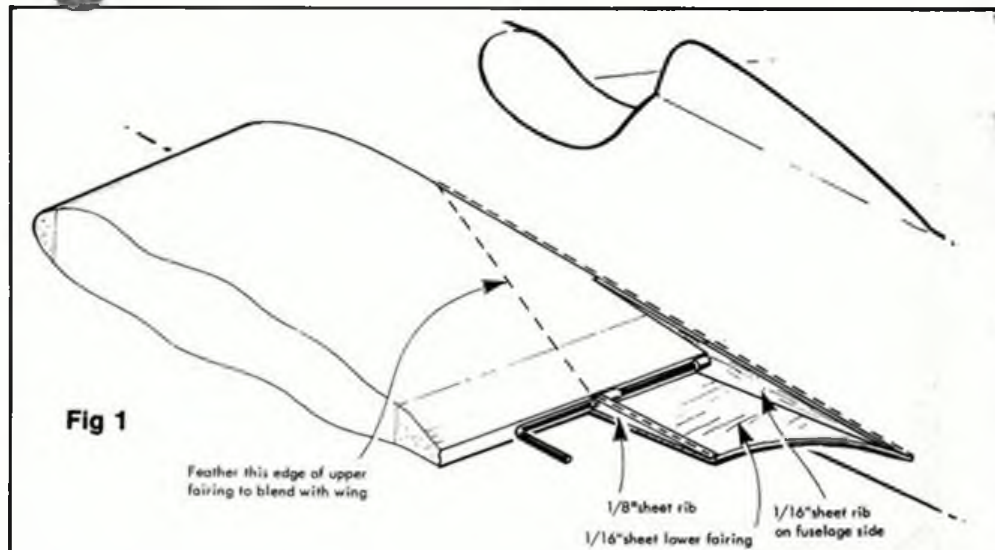
I started to fly the schedule with a knowledgeable club member in the middle of the circle with me, to tell me the sequence of the manoeuvres. Now I was flying with the goal of doing the schedule completely and, although the shapes and sizes of the manoeuvres left a lot to be desired, I was flying aerobatics and taking my models home in one piece. I soon became familiar with the schedule and was then able to concentrate on flying accurately and smoothly.

I built a 1½ times full size 'Peacemaker' around some Obechi veneered foam wings that I bought in a club auction. This I flew for quite some time increasing my confidence and skill to the extent that I entered a couple of open competitions. It flew very well and was a very practical model being quite resistant to the knocks and bumps that models inevitably receive.

It did, however, lack the glamour of a fully flapped full fuselage model so I sold it and built an A P S 'Spacehound' powered by an Irvine 40 Rear Exhaust. This looked terrific but did not fly too well and I had to mess about with it, altering tip weight, tail weight, and even tail span and chord to get

At about this time I moved house to a different area and joined a club where the members flew the Novice Stunt Schedule. Here I was able to learn very much more than I had done on my own and it was brought home to me very strongly that in order to fly an aerobatic model and not crash it needlessly, you have to have the discipline of the schedule.

Prior to this I had known the shape of the manoeuvres and had flown most of them, though in a very haphazard manner with no particular goal to aim at. As a result, I was flying manoeuvres and half way through... wondering what I could do next. This indecision led to situations where the model was flying *me* and caused panic, with the inevitable crash taking place shortly



it to fly as nicely as the 'Peacemaker' had. It took about a year of fiddling to achieve this and just as I was becoming happy with it, I wrote it off due to a lapse in concentration.

So...there I was, in need of a new stunter and the '83 Nationals only a few weeks away and I did want to enter the Novice Stunt Event. Something had to be done quickly, the result was 'Europa I'.

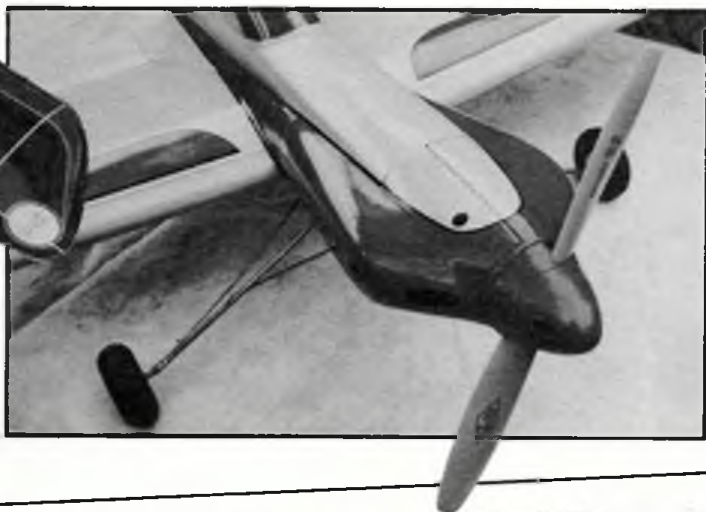
I chose a fairly thin wing section because I had read somewhere that they were better in the wind, and it is *always* windy when I fly. I chose to make it from Obechi veneered foam for speed and ease of production and...durability. It had areas of wing and tail similar to my modified 'Spacehound' but I

increased the tail moment a little to make the elevator more effective.

I mounted the Irvine 40 R/E sidewinder because I had experienced some starting difficulties with it inverted in the 'Spacehound'. I had some doubts as to the durability of an undercarriage mounted in a hollow foam wing so this meant it had to be mounted in the fuselage. Finally, I wanted it to look something like a real aerobatic plane and added the styling in the form of cheek fairings, cockpit canopy, wing tips, and so on.

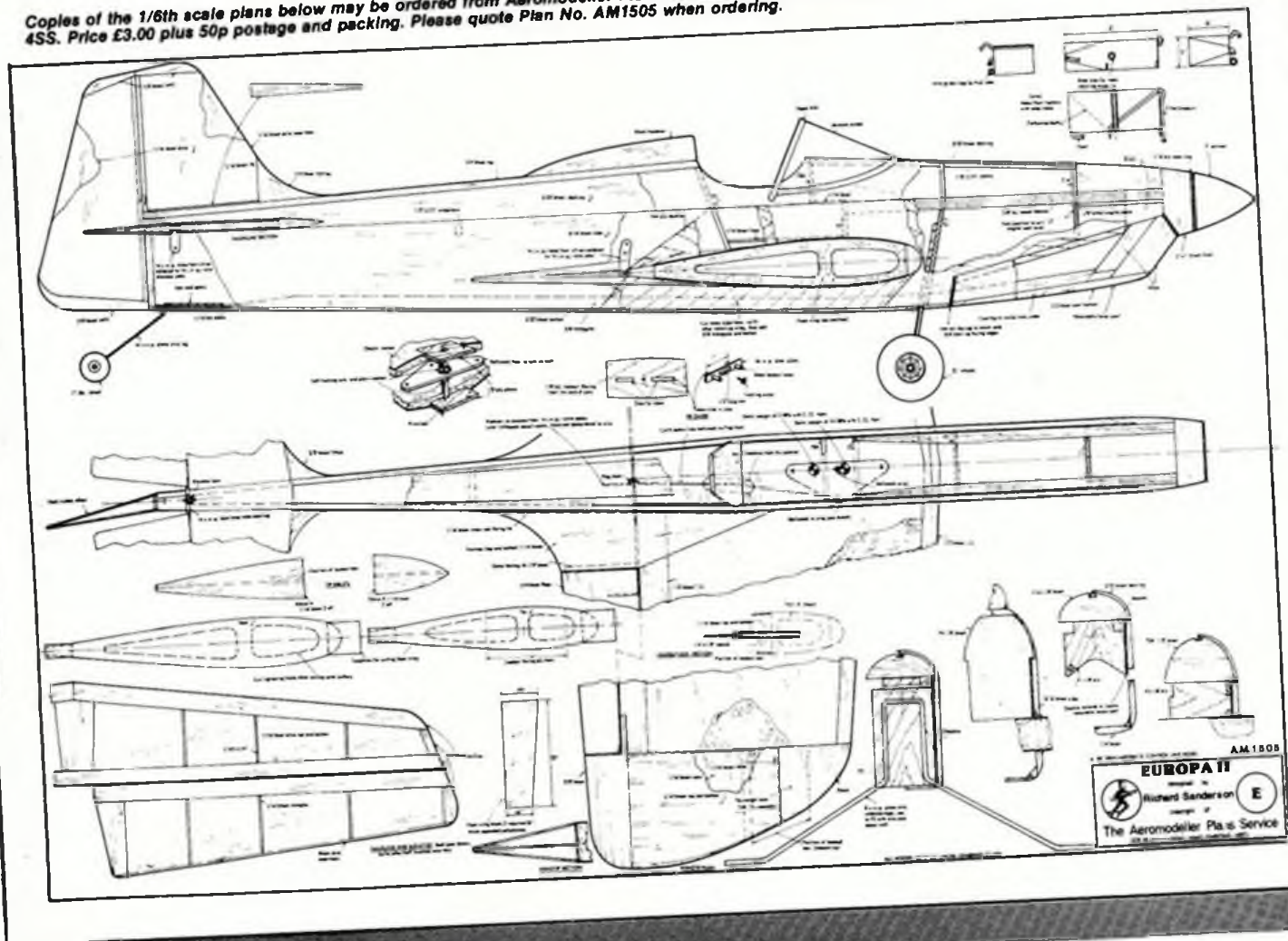
Building the 'Europa' is very straightforward though obviously care taken during building will be rewarded with an airframe which will last and look better for longer. One such example is the wing flap to fuselage fairings. These are usually made from a bit of 1/4 in. sheet stuck to the fuselage sides and the trailing edge of the wing. After a little time, a stress crack appears along the trailing edge/fairing joint line.

To eliminate this weakness the 'Europa' has these fairings made from 1/16 in. sheet top and bottom with small ribs at each side

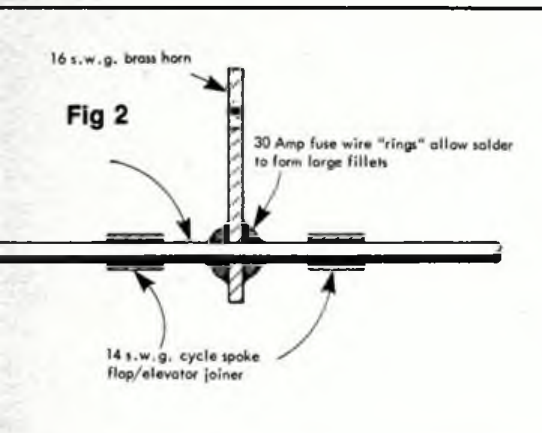


Left and above, an earlier version of 'Europa' that had a side mounted engine and featured the rather eye-catching cheek fairings seen here.

Copies of the 1/6th scale plans below may be ordered from Aeromodeller Plans Service, P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, HP2 4SS. Price £3.00 plus 50p postage and packing. Please quote Plan No. AM1505 when ordering.



AM1505
EUROPA II
 designed by Richard Sanderson
 The Aeromodeller Plans Service



and the sheeting is extended right up to the high point of the wing at the wing/fuselage interface. It may sound complex but is not really and after two years there is no sign of a stress crack. (See fig. 1).

Another detail well worth taking a bit of care over is the bushing of the control horns. These bushes are glued firmly to the trailing edge of wing and stabiliser and reinforced with cloth tape and are essential if smooth controls with no sloppiness are to be made. If you have the facility to silver solder the brass horn to the wire then that is just fine. If you do not have this facility then I would recommend the use of the method shown in figure 2. I cover the wing flaps with glass cloth to make them nice and stiff.

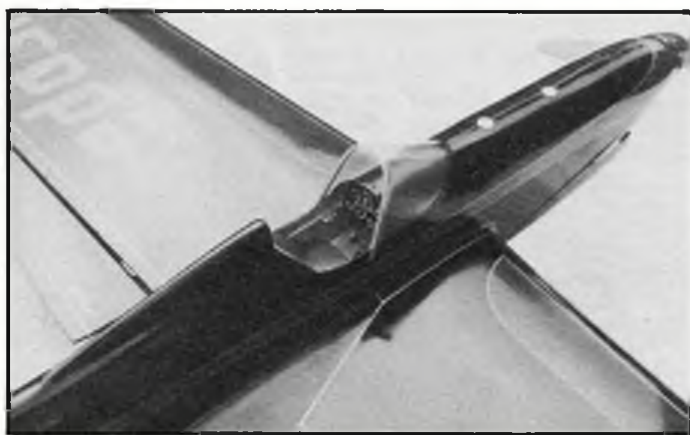
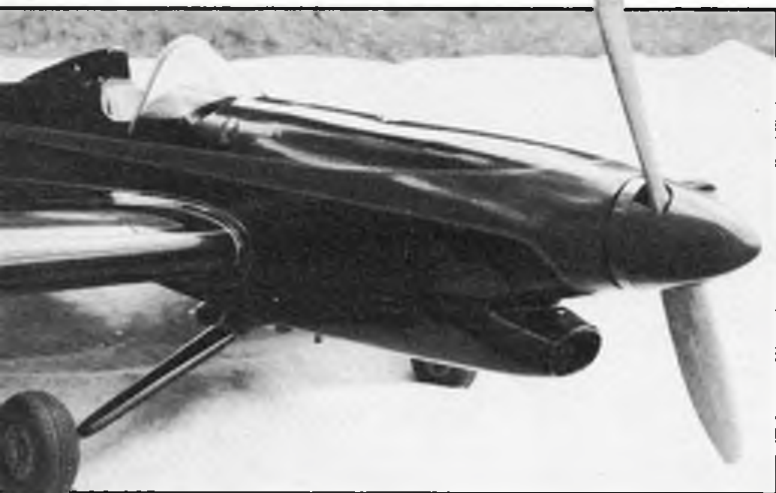
I originally covered the model with Solartex thinking that it would be quick and

afford the model considerable strength and durability (that word again!). However I was sadly disappointed and have stripped it off and refinished with tissue, dope etc. in the old fashioned way.

The Irvine 40 Rear Exhaust may not be the most popular stunt motor in the world but being English and a trained engineer I appreciate the fact that this motor is very well engineered in this country. Also, the rear exhaust means there is no bulky muffler hanging outside in the breeze upsetting the airflow over the wing or spoiling the clean lines of the model.

The fuel tank may look a little bit odd but it does work. It is filled by tipping the model on its nose with the inboard wing pointing towards the floor. When the fuel vents out of the motor venturi the tank is full. However,

Below, the latest version has an inverted engine and makes a feature of the air intake, note undercarriage attached to fuselage and not wings. Middle below, cockpit detail, lettering and lining create a very finished appearance...



Left, tail feathers of 'Europa' continue to emphasise the overall 'finish' that the designer has put into the model.

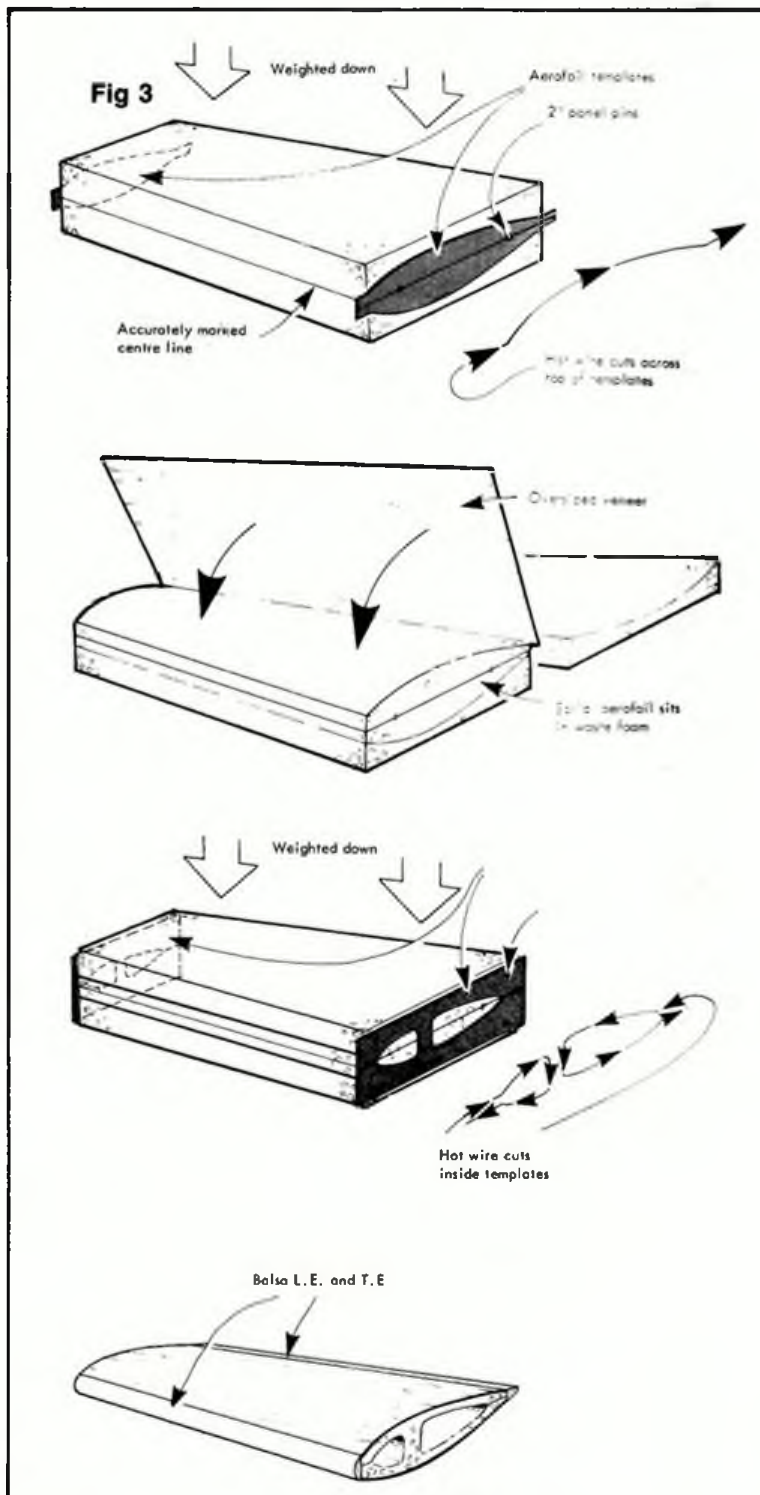
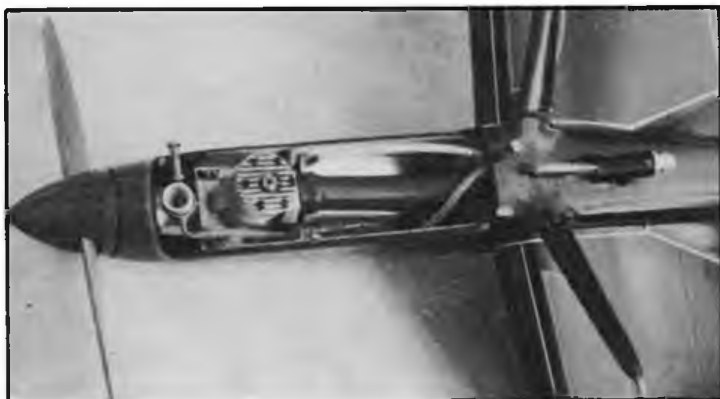
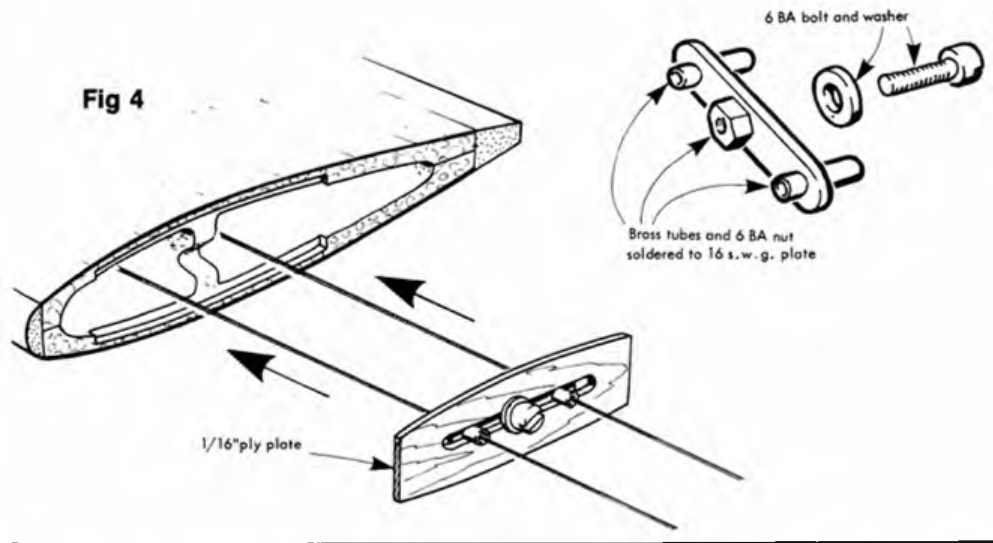


Fig 4



Left, worm's eye view of the front and, note relative positions of tank and exhaust extension tube and pressure take off from inboard section of aileron.

by tipping the outboard wing towards the floor the amount of fuel put into the tank may be varied to alter the length of the motor run required. The prop must be turned backwards to compression to ensure that the intake port is closed and thus prevent the venting fuel from flooding the motor.

When the tank has been filled, the filler tube is connected to the pressure nipple on the silencer to provide a pressurised fuel system. This arrangement has given me very reliable and consistent runs. The method of mounting the tank in the model allows for easy adjustment of its position should this be found necessary.

The centre of gravity range shown on the plan may seem rather wide but is the result of using the Cranfield College Design Programme on a B.B.C. computer. This program was published in the Feb. '84 edition of CLAPTRAP, the newsletter of the Control Line Aerobatic Pilots Association. I thought it would be interesting to feed in all the data from the 'Europa', which I think flies well...to see if the computer would agree with me.

Happily we do agree. It also tells us that the target weight should be 48oz. Originally when Solartex covered the model weighed 53oz and after re-covering, adding quite a bit of scale-like detail and tip-weight and a more ambitious paint scheme, it still weighed 53oz. At that time I had a 'thing' about light weight and exhaust 'goo', and since the model was apparently overweight and got a fair covering of 'goo' the mark II came into being.

For this, the motor was turned inverted so that the exhaust would exit through the bottom of the fuselage and thereby restrict the 'gooiness' to the underside. The cockpit styling was also altered to adopt the appearance of the 'Spectre', a model I have always liked the looks of.

Also, in an effort to meet the target weight, I selected very light wood stock and omitted some wood from the construction in the form of the fuselage top longerons, the ribs from the fin and rudder and reduced the number of ribs in the stabiliser and elevators.

Amazingly the completed model weighed - yes! 48oz exactly...and it is the best flying model I have ever had. Having said that though, there are other members in the club who have built 'Europas' whose weights vary from 55oz up to 60oz and all comments have been favourable, particularly the models' ability to turn nice and tight. This I would put down to the equal movement of the flaps and elevators - 45° each way.

As mentioned earlier the construction of the model will present no problems to anyone who has made a couple of control liners before. However, taking the plunge into foam wings may appear a little daunting to those with no experience of them. Have no fear, it really is easy. The white foam can be obtained from model shops though I prefer to buy mine from specialist insulation material suppliers who usually cut to your exact specification. A block 25in x 15 1/16in x 2 1/2in will make two wing halves, i.e. one wing.

To make the wing, start by cutting the block in two to produce the blank shapes as shown on the plan. A centre line is then,

drawn accurately down the long edges and the airfoil templates pinned carefully to the ends with 2in panel pins. With the blank weighted down evenly the hot wire cutter can be used to cut the top section. Keeping the 'waste' foam in place the blank is turned upsidedown, weighted, and the bottom section is cut. This is repeated on the other blank.

I prefer to veneer the wing blanks whilst in this 'solid state and use water thinned Copydex with some coloured ink in it as the adhesive. The colouring makes identification of where you have put the stuff on the white foam very much easier. Coat the slightly oversized veneer and the foam and leave to dry thoroughly before pressing firmly together. Having the airfoil blank resting in the appropriate 'waste' piece on a flat surface should ensure a warp free wing half.

The excess veneer is then trimmed off. Now place the other 'waste' piece on top and align and square up everything and weight down again, fit the hollowing templates and cut the hollows entering and exiting through the leading edge for the front one and the trailing edge for the back one. The balsa leading edge and trailing edge sections may now be fitted using PVA, again using the 'waste' pieces and a flat surface to ensure that no warps creep in. When all is dry the balsa may be blended in to the section of the wing. (See fig. 3 for sequence).

The method of mounting the bellcrank is shown quite clearly on the plan (I use a 6mm threaded rod) and must be done when joining the wing halves together. For this I use a quick set epoxy and again use the 'waste' foam and flat surface to ensure accurate alignment. When the epoxy has set cover the joint with a 1 1/2in strip of bandage impregnated with PVA. The hole for the flap pushrod must be cut and the pushrod fitted to the bellcrank before joining the wing halves together of course.

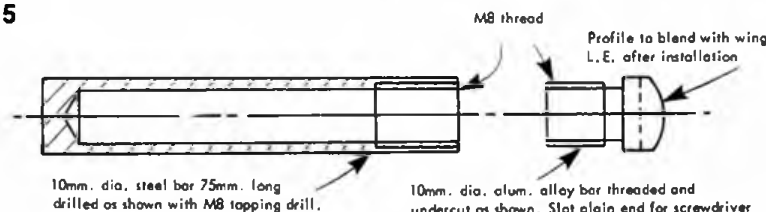
The adjustable line guide is made up and fitted to a 1/16in ply plate which is recessed into the inboard wing edge (fig. 4).

About 1 1/2oz of tipweight must be added to the outboard wing tip, making sure it is very securely attached. Alternatively, a tip weight box can be made and installed (fig. 5), this giving a useful adjustment feature.

I mentioned earlier that the fast approaching '83 Nationals had a lot to do with the coming together of the 'Europa', and in fact the Novice Stunt Event, was the first proper outing of the model, and it placed 8th. In the same event of the '84 Nats. It placed 4th, and in '85 the 'Europa II' won the event outright. A nice way to leave for the greater challenge of FAI F2B.

If you have a motor in the 40 to 46 size and like the lines of the 'Europa', build one, I'm sure you will like it. If, however, the foam wing puts you off, you might persuade me to supply you with a pair of ready veneered wing halves. You can reach me on 0535 661066. Go on, have a go at it!

Fig 5

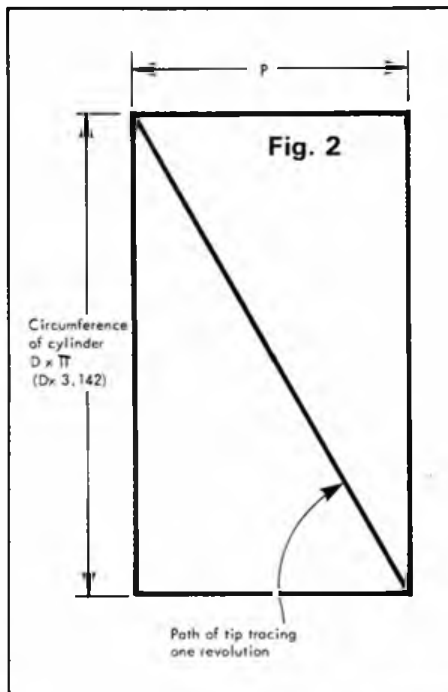


If you are intending to construct propellers for your rubber models - or power models for that matter, it is important that you have a clear understanding of what prop pitch is and how it is arrived at. Nowadays it is too common to start by copying someone else's 1/2in sheet blank, setting it up at the angle they say and hoping for the best.

It may well be, that if you have followed the designer's instructions to the letter - and knowing most of you, you will not have done - it will work fine but if it doesn't what do you change? Unless you understand the geometry covering prop pitch then you cannot modify a prop scientifically, neither can you try a different configuration.

Propeller pitch is dependent on the angle or angles of the propeller's blades relative to its direction of travel. It can be expressed as the theoretical distance that the prop travels forward during one revolution. A prop which has the same pitch all along its blade is known to have a *helical* pitch distribution.

All this might sound mighty complex but if we limit ourselves to helical pitch for a moment then there is a very simple way of expressing the blade angles - graphically.



the end of this 'X' blank and if the blank is of constant thickness and tapers to nothing at the centre line axis, the diagonal along its length will represent the necessary angle of the blade to maintain the pitch established at the tip (fig 4).

To produce a blade therefore, one has simply to carve off the corner of the block - rear surface first - to produce a perfectly helical surface. If you don't believe this and are reluctant to commit large volumes of balsa, experiment with a little wedge from 1/4in thick wood, and see how it works out.

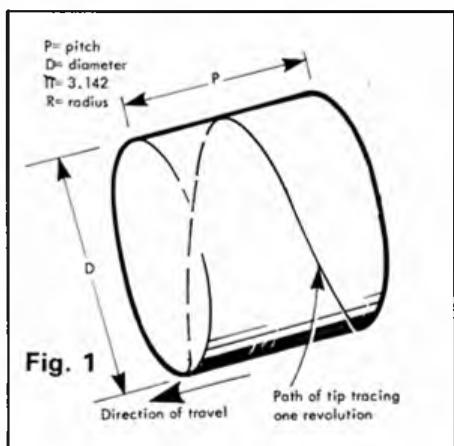
Let us work through some figures just to prove it. Figure 5, starts with our flattened out cylinder diagram again. If we require a 22in diameter and 30in pitch the dimensions of the rectangle become 30in x (20in x π) or 30in x 69in. That can then be reduced to more sensible dimensions by dividing both dimensions by any convenient figure (in this case 20). We are left with a block of end dimensions: 1.5in x 3.45in. Thus the remainder of the 'X' blank falls into shape and we can carve out our prop from the unit so produced (fig 6).

Its not a bad idea to finalise hub details at this stage so that the block still sitting square on the building board allows

PROPELLER PITCH

What it is and how you get it...

Some practical advice from Dave Hipperson



Once this principle is understood, calculating your own shape and size or variations away from pure helical pitch distribution is simple. What is more this way it is never necessary to so much as measure an angle nor refer to Tangent tables

Let us consider the helical form first (fig 1). Imagine a prop of diameter 'D' making one revolution and hence moving forward the pitch distance 'P'. The prop tip inscribes a helix around the cylinder thus formed. If that cylinder is slit open and laid flat (fig 2), the horizontal dimension - the smaller one

of the resultant rectangle - is pitch 'P' and the vertical dimension is diameter 'D' x π or D x 3.142. (The circumference of a circle being πD).

The interesting discovery then, is that the *diagonal* of this rectangle *still* represents the path of the tip of the blade. Hence we have established graphically the *actual* angle of the tip of the blade for *any* given values of 'P' and 'D'. There is no need to actually measure this angle as you will appreciate later.

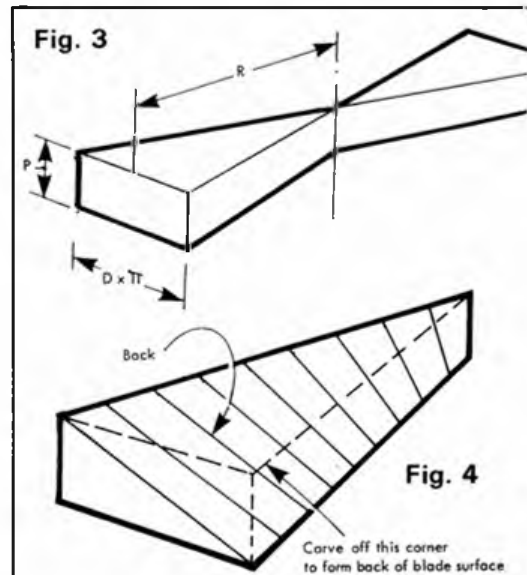
Of course this is *only* the angle of the blade at the *tip* - what of the rest of the blade? If we maintained that same angle all the way down to the hub the blade would be flat - that is it would have no twist. In effect it would just be a wing set at an angle. It would work but not very efficiently.

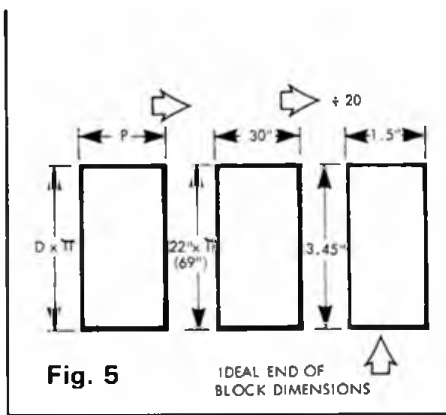
To maintain a *true* pitch all along the prop blade the angle has to *increase* as we approach the hub, as further down the blade the diameter decreases and the distance 'flown' in one rev is less...so, to keep up with other parts of the blade, the angle has to be more. To calculate the angles the blade has to change through would be a laborious task. To this end American rubber flier Joe Bilgri invented the 'X' blank. 'X' being the shape of the blank (fig 3) as viewed from in front.

The dimensions we obtained from the cylinder diagram can be used to proportion

accurate alignment rather than having to rely on fiddly templates and angle measuring later on, once the prop is carved. I do not intend to cover hub construction here...

The back of the blade is carved flat and any profile can then be drawn on this finished surface and the block trimmed to that shape before the front surface is started. Prop shape and section is to your own taste. Certainly I have found no detriment in flat bottom sections - in fact I *think* it is marginally preferable but many

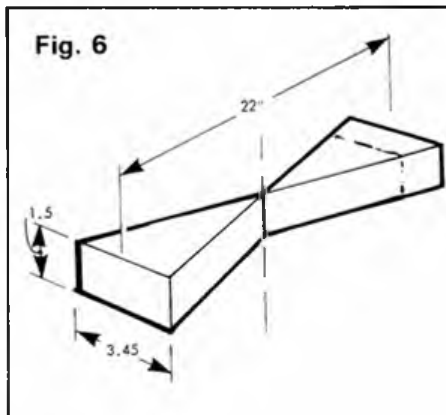




have success with high camber sections. I also prefer comparatively thick sections when carving from balsa but thinner ones can be accommodated if glass cloth covering or hardwood is envisaged. I am not sure of their 'aerodynamic' advantages however...

That is the purest form - the helical pitch prop from a full 'X' blank. We can, however, take some short cuts to save both time and wood - particularly where large units are planned.

I would however, recommend retention of the full 'X' blank where small props are concerned such as Cd'H, as accuracy is greater this way. For large props, savings can be made by trimming the 'X' blank format at the edges as in figure 7. However this needs a corresponding tapering of the

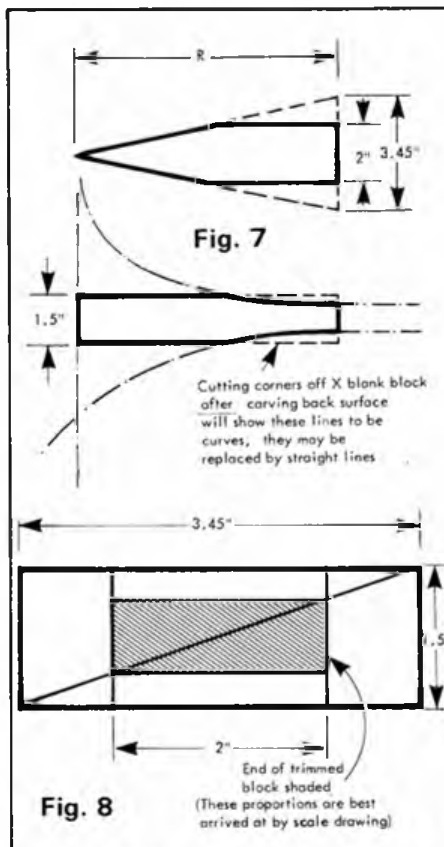


top and bottom too. Once again using the full size drawing of the tip blade angle it is quite easy to see the dimensions that the tip of the block has to follow (fig 8).

The taper lines incidentally in figure 7 should be *curves* to maintain the pure helical form. You can see that, by again cutting off the corners of that little 'model' you made out of 1/4in sheet...when you did not believe me earlier! However it is really splitting hairs to worry too much about these curves - hyperbolic from the axis of the blade and axis of hub incidentally. Replacing them with straight lines is quite satisfactory but you are increasing the pitch at 2/3 radius slightly by so doing. This may be worth remembering when drawing up the original design...

Of course this reduced block volume need not be a single piece of wood either. In fact I would recommend that it were *not*. First, such large sections in light enough stock (5-6lbs) are not freely available and secondly a 'constructed' block from say three layers of 1/2in sheet will inevitably be stiffer because of the inevitable cross graining.

I would recommend construction of all prop 'blocks' from 1/2in sheet - with the stiffest wood on the bottom to accommodate the hub and glued together with copious quantities of balsa cement, a glue that can be carved and sanded easily but is not so hard as to create problems and high spots. Such an assembly requires a *week* to dry



properly, so you must plan ahead but it would take you longer than that to locate regular block! *The Balsa Cabin* Unit 5, Mill Lane Fullbridge, Maldon, Essex. CM9 7LD. Tel: 0621 59711 will supply perfectly suitable 1/2in stock if you ask them.

If you produce the purely helical form as above and finish it carefully you will have a unit better than most people on the field. What is more, you will now exactly how to reproduce another should it perform successfully or alter it a controlled amount if it doesn't.

Non helical pitch layouts

No one is really sure whether the purely helical layout is actually the most efficient. In fact a number of notable theorists insist that it is not. However you will see that there is nothing new in non-helical prop pitch configurations.

The non helical theories suggest that a propeller works better if the blade is washed-out (reduced in pitch) slightly at the tip *below* the helical value and also reduced (sometimes even more) towards the root. Such configurations are becoming increasingly popular on modern FIBs.

Such props can be more fiddly to set-up but once again we should start with the helical form and work away from that...reducing pitch where we think most beneficial - there certainly seems to be no agreement on this. As a good example the very successful Lothar Doring using the Theordorsen system comes up with a pitch distribution pattern giving maximum pitch at 0.8 blade radius and then 92% of that pitch at the tip and a mere 80% at 0.2 blade radius!

Others are somewhat different - what they *all are* is flatter and less twisted than the full helical form. Clearly tapering the end of the block more than in figure 8 will reduce the pitch proportionally towards the tip and the exact tip proportions can be found by drawing another tip diagram.

In other words if you require a 30in pitch prop to fade to 27.5in at the tip, then remodel the tip dimensions to suit a prop of *that* pitch. The hub end of the blade can be reduced in pitch even more easily simply by tapering the top of the 'V' of the 'X' blank as in figure 9c.

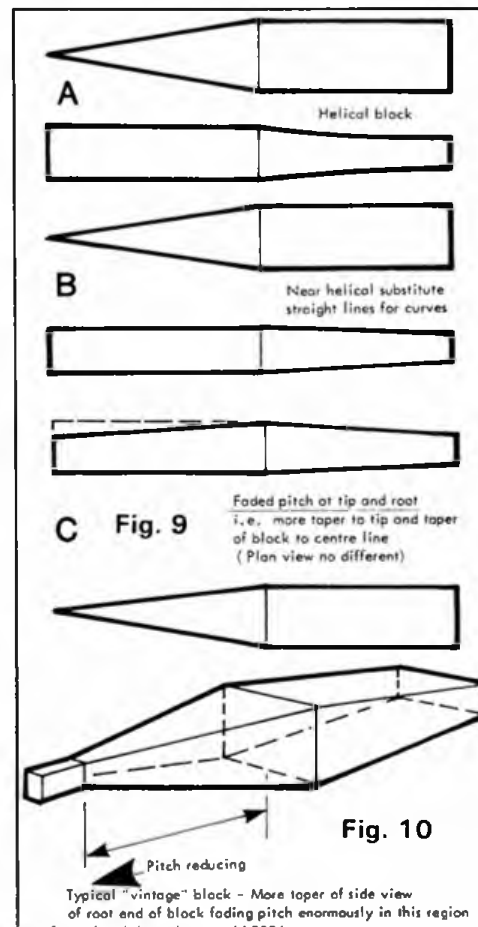
Once again diagrams can be drawn to calculate this exactly. What is important is that whatever measurements and alterations away from the helical you decide upon...keep a sketch of the final block shape you use, so that repeat blades can be produced or the design altered.

Much of the hub washout theory seems to stem from a belief that the propeller at these small diameters is not very effective anyway and huge prop angles which come with helical arrangements just exaggerate the inefficiencies. Washout makes the best of a bad job. I am still not completely convinced of the gains of all this myself but Doring's performances do speak volumes.

However, if the hub ends of the blade are so ineffective I would have thought well outriggered blades such as the French seem to favour might be the answer - of course Doring does this a little too - no blade inside 0.2 radius. Hub washout certainly is the order of the day in Control Line speed circles and to very precise values indeed so its worth remembering.

Going back to my point that the Schwartzbach, Theordorsen pitch arrangement is not new - take a look at a typical vintage rubber model prop block (fig 10). Although usually rather lower aspect ratio than we use now the pitch variations from the helical - particularly at the root are very similar to modern state of the art thinking.

Perhaps this goes somewhat to explain why my Vintage 'Lanzo Wakefields' complete with undercarriages and large fuselages outclimb my similar sized modern Open Rubber jobs using similar sections, areas and run with identical motors. Something to think about isn't it?



HOW CAN we outwit drift on rounded hilltops - the curse of the magnet glider flyer? To find an answer to this question we travelled the equivalent of several times around the World...on journeys to the slopes.

The big problem is that rounded hilltops are real windsplitters, as illustrated in figure 1. The models drift either left or right of the hill instead of keeping straight. Some readers might ask 'Why not choose bowl-shaped hills?' However, even the best slope terrain, with flying sites facing the pre-

Right, the classical launch of a classic magnet glider. All photos come from the teams' European travels...



MAGNET GLIDERS and adverse drift

Hans Gremmer and Trevor Faulkner point the way for better flight times

vailing wind direction, may include rounded features and even the most careful direction setting of a magnet glider often seems to be ineffective.

Over the years we had been observing the behaviour of models on rounded slopes, mainly at competitions. Observations showed that high flying models usually kept their course excellently, whereas models

near to the ground were soon displaced to the flanks of the hill.

One might argue the reverse to be true: If models keep 'straight on' they utilize lift better and as a result they climb higher. Conversely, if they veer to the side they soon leave the lift band and sink.

The problem could only be solved by watching several models flying simult-

aneously in competitions. It is common tactics to launch immediately after a high climbing model, and successive models usually climb as well as the pilot model does... without being pushed sideways. On the other hand, if a 'pilot model' drifts sideways and obviously encounters poor lift, other models often blindly follow suit, also veering sideways.

Below, patience is the watchword, studying the flight patterns of other models is of paramount importance for tactical flying.

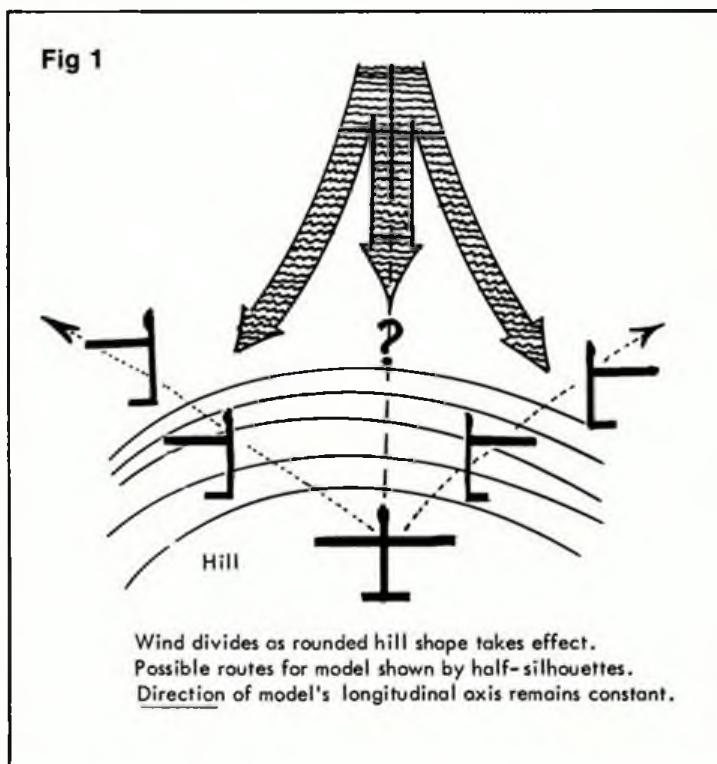


Fig 2



Section through thermal shell.
The rotary system maintains model's position.

Below, good air, verified by several models out of this picture, has caused a flurry of launches to hopefully follow for a max...



The answer...

Now our clever readers without having travelled round the globe may have just guessed what sort of phenomenon is involved here...of course thermals!

Obviously mainly big thermals near to the ground play a part in these changing air currents. *How can thermals convert divergent currents into convergent ones?* Today we know that in a thermal bubble, warm air rotates on itself so that the air rises in the centre of the bubble and descends at the periphery, returning at the base to the centre and there rising again (fig 2).

This rotary system also causes the 'entrainment', i.e. influx of ambient air mainly at the base of a thermal and towards its centre. As is known, this keeps a circling, well dihedralled glider *in* the bubble. It also *centres* a straight flying model through the middle of the upcurrent for a while, depending on the extension of the thermal (see bottom of fig 2). In addition, it increases the slope-lift considerably.

On progressing further, the models may encounter a downdraught which *follows* the up current of a thermal. In the forefield it cannot do much harm, on the contrary, the model tends to veer sideways to the next thermal shell (fig 3).

However, if one launches a model directly into a 'downer', even on straight edged hills, the model is prone to drift to the flanks of the hill and on rounded hilltops the sidedrift is intensified by the diverging thermic downdraught...but how can we predict thermic currents?

Early warning...

Obviously the safest sign of good lift is always a high flying model. Accordingly,

January 1986

Down-draught
approaching
Divergent flight
paths likely.

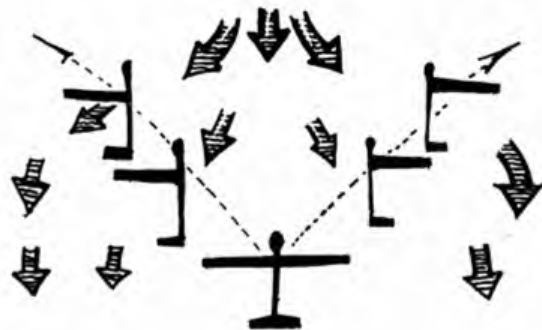
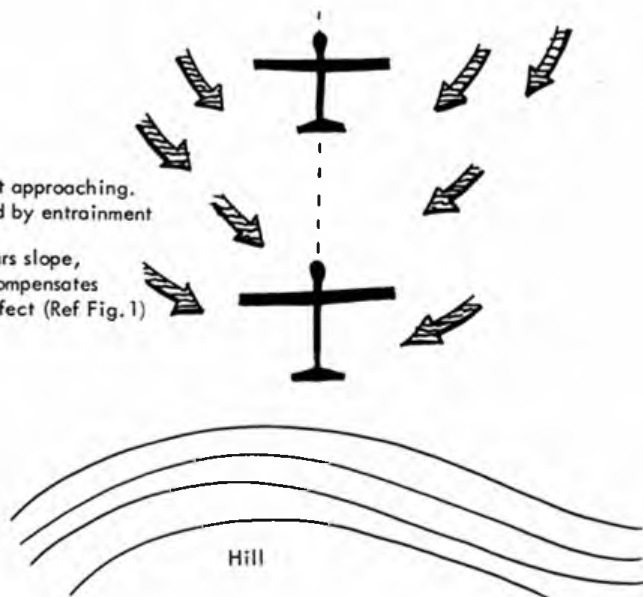


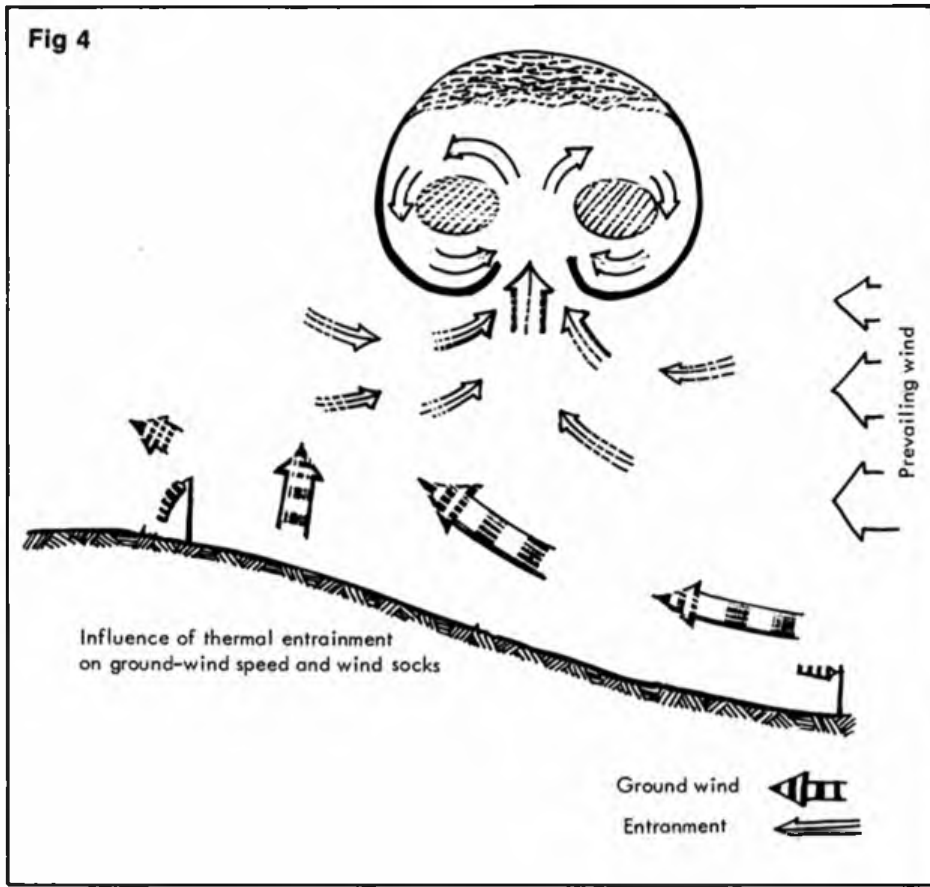
Fig 3

Thermal current approaching.
Model retained by entrainment

As current nears slope,
entrainment compensates
for splitting effect (Ref Fig. 1)



Right, Dr. Bodmer, launching at Cansiglio (Italy), both the flag and another model airborne and 100 metres out, indicating that the moment is right...



good competition fliers watch other models patiently and if they become aware of good and consistent conditions then the air will be full of models.

For starters...

But one competitor has always to be the first - the 'Vanguard', so being in the same situation as the lone flyer. He has to look for other indications of impending lift. It is often indicated by rising temperature and also by lessening wind speed.

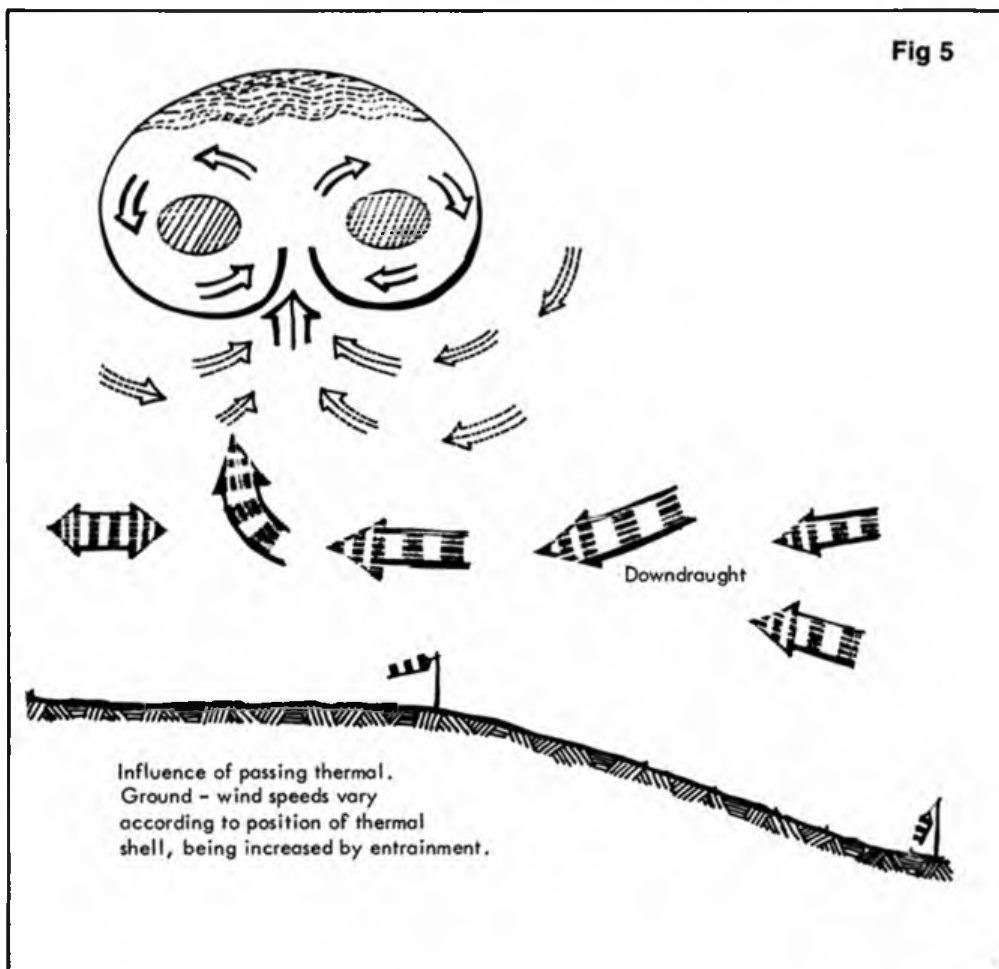
In addition, a good indication of an approaching thermal can be given by a flag or windsock in the foreground at a convenient distance - say 300 to 400m. If this starts to 'fly' and if it moves in a more lively manner than that at the launching site, it may mean that a mass of warm air is being pushed aloft between the two flag-indicators lift! This phenomena can also be explained from the 'entrainment' of the thermal bubble (fig 4).

Contra indication is that when the wind again freshens and the air becomes cooler, then a down-draught is approaching. In this case, the flag at the launching site often flies in a more lively manner than that on the foreground. Then the thermal bubble has just passed and is followed by a 'downer' (fig 5).

Different windspeeds... different flying speeds

This 'rotary system' and the entrainment cause different wind speeds at the base of a thermal and as a result also different model speeds relative to the ground.

When entering a thermal in the upwind direction the entrainment reduces wind speed and consequently the model



Left, a fine example of a classic magnet glider, providing an excellent subject for the photographer - almost stationary as it rides the gently lifting air. Below, plenty of pennants/flags in evidence at this F1E competition!

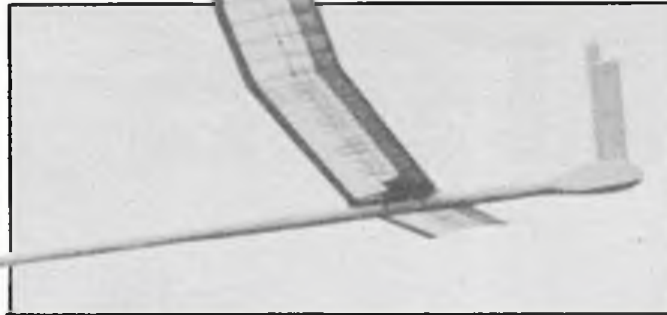
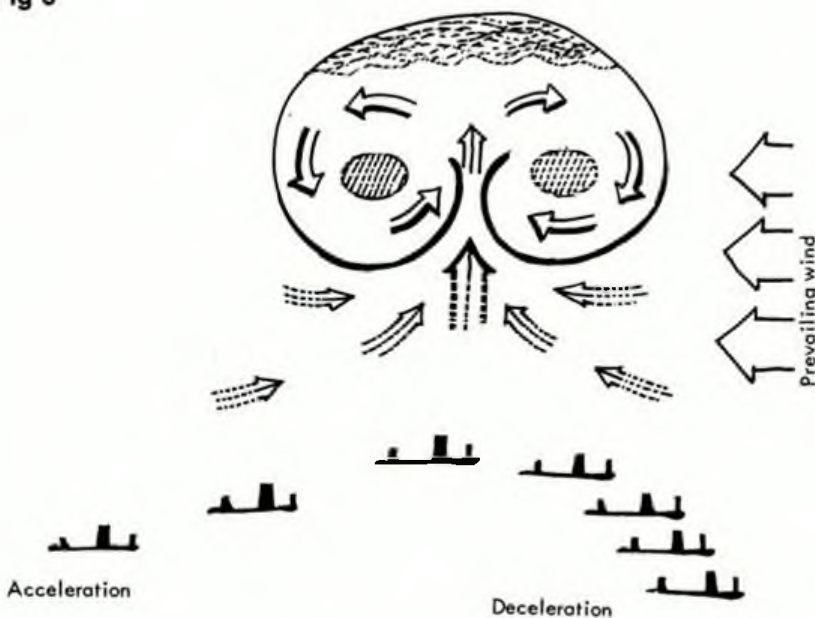


Fig 6



Progress of magnet steered glider flying directly towards the base of an up-wind thermal. Entrainment increases apparent speed on approach, decreasing as it leaves the thermal base.

accelerates as if attracted by a giant magnet, steadily rising. Later the model encounters the counter-rotation, where the oncoming upwind is intensified and the model can even be pushed back - often seen in slope competitions (fig 6).

In this way after a lull there nearly always follows gusting with a down-draught. Being aware of this fact, one may avoid so many mis-launches and poor flights with erratic flight patterns. The flag method certainly helps avoid such mishaps. The Czech F1E team capitalised on this method at the EC and E-Cup 1985 in Melchsee-Frutt/Switzerland, winning both the individual and the team classification. They had tested this method in a training week at home beforehand (*SMAE please note*).

If the wind is too strong so that the difference in windspeed cannot be spotted by flags or windsocks, they at least show the exact wind direction for a longer leg of the slope and give an early warning of sudden changes of wind-direction as is often caused by big thermals.

In addition, on rounded hills a clever contest director will reduce maximum times according to the new regulations which allow maximum times between 120 and 300 secs to be set. With this system the best score (or maximum time) in each round, earns 100% and so allows maximum times to be changed for every round if required without any unfairness resulting. This new rule encourages the creative direction of contests and avoids setting impossible targets in adverse conditions on difficult terrain!



SCALE MATTERS

Free Flight with Bill Dennis

Indoor

The Indoor Scale Nationals will again be held at the Alumwell Sports Centre, Walsall on Sunday 26th April. The classes to be flown are Rubber, CO₂ and Peanut. Those of you who have attended recent Indoor Nationals will know that they are very well organised by Doug Sheppard, and that an enjoyable time is guaranteed.

This year there will also be a static exhibition of free flight scale models, with an emphasis on Indoor. This will take place in an area outside the main hall so that those members of the general public who usually observe us with interest (bewilderment?) from the balcony will also get a chance to see what it is all about.

In addition there will be a series of talks by some leading lights in the Indoor movement, including one by Mike Hetherington on his paper models. So, even if you are not flying, this is definitely a date not to be missed.

Entry forms and details are available from Doug, at 13 Luckington Road, Monks Park, Bristol. BS7 0UT. At the time of writing, the SMAE Competition Licence situation has not been resolved, so it has not yet been decided at what level the entry fees will be fixed.

In the past, it seems the big problem at the Nats - was lack of practice, but with the proliferation of indoor meetings throughout the country, this is *no longer* an excuse! By all accounts, one of the best sites is that at Nottingham University, and the Nottingham club is organising several meetings this winter. The remaining dates when these appear will be 12th January, 9th February, 9th March and 6th April; all those are *Sunday evenings*, 5.30 - 9.30pm. Entry cost will depend on the numbers attending but will be between £2.50 and £3.50. Please give Doug Hunt a ring on Derby 672362 just before, in case of any change.



Rule Changes

There are one or two minor changes to the F/F and C/L scale rules for 1986. These will no doubt appear in due course in the SMAE newsletter, but if you are in a hurry, a copy may be obtained from the Leicester office. In the meantime, here are the salient points...

1 The maximum weight for *outdoor* CO₂/electric models is raised to 5kg(!), in line with the other classes. This was requested by some of the CO₂ fraternity in order to make possible the multi-engine type. The electric model should also now be more feasible.

2 In Peanut, workmanship will be marked from 0-10 points, while complexity of colour and markings is reduced to 0-6 points. The single point awarded for an exposed radial engine is now to be given for any type of engine.

3 The flying schedule for Indoor Rubber has been altered; namely 'take-off' has been subdivided into 'take-off' and 'initial climb'. This brings it into line with outdoor and

means that the penalty for hand launch is less severe. It will also make it easier to judge, since there is often a large change on the realism of flight following the first power burst.

4 For Control line, the optional demonstrations may not commence until the model has completed at least five consecutive airborne laps.

Electric Power

At the Nationals, Michael Smith produced a rubber powered model of the 'Currie Jet Wot'. At around 36in and weighing 10oz, its performance was stable, if not sparkling with its geared propeller. For next year, Mike is planning to build an 'Aerospeed Ferry', with three electric motors, and has in fact collected all the necessary hardware. It seemed a good idea



Heading photo, Charlie Newman has now sorted out the Avro and is very pleased with its performance. Above, one of Gary Sunderland's large 2.5cc powered free flight models, a Rumpier finished in typical mauve and green scheme. Left, another of Gary's models, a BE 2c with realistic clear-doped fabric finish.

to use the 'Wot' as a flying test bed and Mike brought the model along to the Southern Gala at Odiham where conditions were, for once, idyllic.

The motor is a Mabuchi 380, fitted with a 6 x 4in Top-Flite prop. The heaviest part of the system is the battery pack and Mike decided to increase power during trimming by progressively soldering in additional 1.2 volt, 225mAH nicad cells. It took six cells before the model would climb and by this time the motor was really going! Flying weight at this stage was approximately 16oz and the performance was very encouraging indeed.

One problem with electric power is that of the motor becoming stalled on landing or possibly suffering damage. Mike has



incorporated a micro-switch in the circuitry, operated by a weighty pendulum. When the model lands, the momentum of the pendulum overcomes the light pressure of the 'click' on the switch and breaks the circuit.

This system is also advantageous when launching; if the motor is running and a gust of wind blows up, all you have to do to stop the motor is jerk the model forward and downwards. An opposite action instantly restarts the motor. All this is very impressive to see and the advantage over oily diesels is obvious.

Unfortunately, nothing is perfect and there is no doubt that the power pack is rather heavy. Choice of the correct subject will be very important in order to keep the weight down without sacrificing strength and for this motor I would suggest an airframe weight of between 7 and 8oz would be suitable, giving a flying weight of around 11oz.

Perhaps the most encouraging thing about Mike's success is that he has done it

Below, a close-up of Doug McMard's absolutely immaculate CO₂ powered 'Gulphawk'. The U/C leg fairings are self-made plastic tube extrusions and the dummy engine is vac-formed...



using entirely standard parts and no prior knowledge. He got a lot of useful information from the *Argus* book 'Electric Flight' by Dave Day.

Electric power is very popular in the USA and several systems are available. According to the advertisements, they are lighter than Mike's set up and will power larger models. The disadvantage would be in the cost of importing one of these items!

Another Failure

I've just found a photo of my *Sopwith '1 1/2' Strutter* which was supposed to have been my new rubber model last year. It was adapted from the APS plan and was 33in span. Everything went well until the doping stage - I did this in the conservatory on a warm day and got sidetracked. When I got back to it, the entire structure was mega-warped - even the fuselage spacers buckled in half! Another bonfire...

If you're wondering why I'm wasting all this space on a failure its because I'm not getting much input from out there. So, if you get fed up with seeing pictures of models from the same group of people, you'll know why!

Documentation

In the March 1985 issue I referred to a catalogue I had received from a company in the USA called *Scale Model Research*, run by Bob Banka. The catalogue lists over 600 'photo packs', containing up to 65 colour photographs; some 3-views are also available.

Since then Bob has sent me a sample pack for a DH 60 'Gypsy Moth', G-ABEV. There are 34 superb shots of the aircraft, covering every area in detail, and they yield sufficient information to build a world class model. The only criticism I have, is that there are not three or four shots taken at a greater distance so that the shape of the aircraft can be seen as a whole...very necessary for documentation.

However, as I said in the previous article, most of the pre-WWII types are either replicas or in museums; and so the detail shots will be invaluable to supplement whole aircraft photos of historically more interesting specimens.

This particular pack cost a very reasonable \$21. The catalogue is available from Bob Banka: *Scale Model Research*, 418E Oceanfront 'B', Newport Beach, California 92661, USA.

Control Line with Vic Wilson

At the closing date for the Team Trials arranged to select a UK team for the 1986 Scale World Championships to be held in Norway there were just two control line competitors, Chris Bradford with his 1985 Nationals winning 'Dakota' and Ron Truelove with the 1984 Nationals winning *Heinkel 219 'Uhu'* (both of whom represented the UK at the last Championships in Paris). Eric Coates, in his capacity of SMAE Scale Technical Committee Chairman wrote to both entrants, returning their entry fees and explaining that the SMAE would be unwilling to enter a UK team unless a full team of three was available...

Perhaps at this stage I should explain a few facts about the procedure in these matters; a) The role of the Scale Technical Committee is to recommend a proposed



Above, 1974 and the Control Line World Championships at Lakehurst, America. 'Vic' Venables and his Fokker EV - greatly admired for his throttle control and line camouflage finish.

team to the SMAE council who have the responsibility to authorise an entry to be made via the *Royal Aero Club*, b) there are no individual entries in an FAI World Championship c) even after a team trials has been held, if the standard of the models finishing 1st, 2nd & 3rd is considered by the committee not to be suitable to represent the UK, then it has either the option of choosing alternative models or recommending to the Council that no entry is made.

However to return to the present situation, a third (verbal) entry was received, but too late for the already postponed team trials which were held at RAF Elvington 12/13th October for radio control models only. These trials attracted the largest ever entry (10 models) and resulted in a very close finish. The final flight of the day resulting



Left, Vic Wilson with D.H. Chipmunk at the Lakehurst World Champs. Model was 53in. span, powered by an OS-40 and used four line control (elevator, throttle and flaps).

Right, the British Team at the first Scale World Championships, held at Cranfield. Those at the back are the R/C Team - M. Charles, R. Yates and T. Mellaney, those kneeling at front are the C/L Team - A. Briggs, M. Reeves and D. Goddard. Standing at the back is Team Manager Norman Butcher.



in a win for Brian Taylor with his 'Spitfire' IIa, second was Pete McDermott with the Sopwith 'Snipe' and Chris Foss just pipped Mick Reeves for third place, flying his 'Dalotel'. A team which I am sure will acquit itself well in any company.

Mick Reeves, who has represented the UK in every Scale World Championships since the first was held at Cranfield in 1970, missed the team by about 10 points. Not wanting to miss the event in 1986 he then decided that if he was unable to fly in the RC event he would enter the Control Line class.

For those who have come into the hobby in recent years it may be a surprise to learn that Mick Reeves has an extensive control line background, having flown combat in the 50s and following on from that, CL aerobatics, representing the UK on several occasions.

In 1969 with the first Scale World Championships scheduled for this country the following year, he decided, after an analytical look at the (then existing) rules, to build a 1/6th scale model of the Zlin 526 'Akrobat', resulting in a model wing span of 72 inches and a ready to fly weight of 5 3/4 pounds. The model had an aerobatic performance on a 40 size engine, with the added embellishments of retractable undercarriage, flaps and throttle control (using a clever variation of the conventional three line control system).

History shows that Mick won the World Championships and also helped the UK to second place in the team event, ably supported by Derek Goddard and Albert Briggs.

Soon after this, Mick took to radio flying, but still found time to fly in control line at the 1972 World Championships held in Toulouse, France. However, here he crashed the 'Zlin' quite heavily, breaking off the nose and splitting the wing in two. Nevertheless he still finished in 8th place.

In 1974 he once again entered both control line and radio control, this time finishing in 4th place with the 'Zlin' (still showing the scars of its crash in '72). After this event the model was stored away in its travelling box and has remained there for the past eleven years. Now it looks as though we may have the opportunity of seeing it perform once again.

The result of this is that we now have four potential entrants for a CL team trials and in view of this the scale committee has decided to arrange a trials to be held in

March 1986 (possibly at RAF Wyton) and entries should be sent to Eric Coates, Arosa, Liberty Road, Newtown, Fareham, Hants together with a cheque for £8 to cover the entry fee.

So to all the people who may have considered entering the trials previously but never quite got round to it, there is now another four months in which to enter...

Looking back over the records of the Scale World Championships prompted me to draw up the tables below which show that out of eight championships held so far, six have included a control line event. Out of these six the UK has been represented in five, although in 1976 only one entry was made and therefore we were at an extreme disadvantage in the team placings!

Our best results have been 1st & 3rd individual, 1970 & 1974 respectively and 2nd & 3rd Team in 1970 & 1984 respectively.

Ten nations have competed over the years, but only two, USA and Poland have been represented at all eight competitions.

Only eight modellers have represented the UK in these events although only about half of them are still active today.

Ven Venables, Derek Goddard, Albert Briggs where are you now?

It would be nice to see a bumper entry for the trials next year, resulting in the selection of the strongest team possible - so how about it...

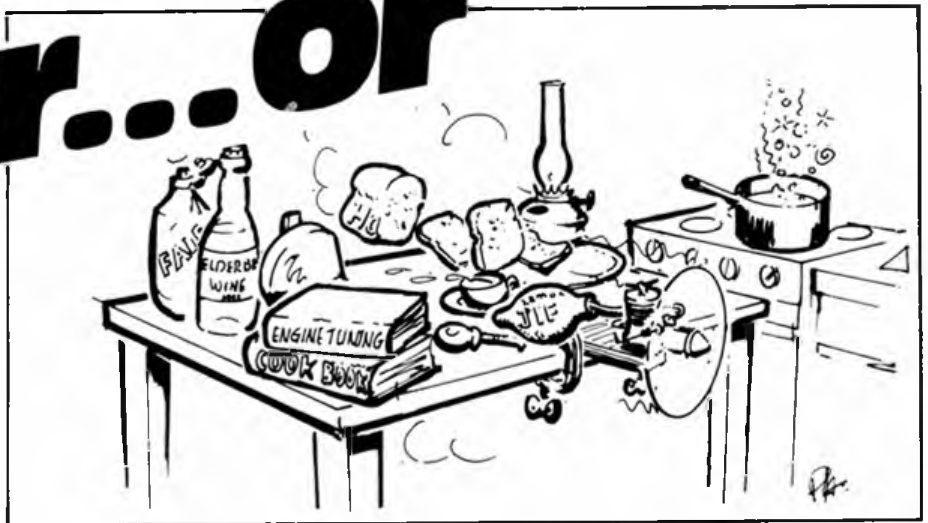


Above, bringing us up to date, is this shot of Ron Truelove with his Heinkel 219 'UHU', flown at the 1984 World Champs at La Bourget and a probable contender for 1986 as well...

	Cranfield UK	Toulouse France	Lakehurst USA	Dalarna Sweden	Woodvale UK	Ottawa Canada	Kiev USSR	La Bourget France
UK TEAM MEMBERS	1970	1972	1974	1976	1978	1980	1982	1984
Mick Reeves	1st	8th	3rd					
Derek Goddard	7th	10th						
Albert Briggs	11th							
Mick Staples		15th						
Ven Venables			8th					
Vic Willson			12th	11th				8th
Chris Bradford								6th
Ron Truelove								12th
Total Entry	15	15	12	14	0	0	15	18
NATION	POSITION IN TEAM EVENT			1976	1978	1980	1982	1984
Great Britain	2nd	5th	4th	(5th)				3rd
USA	1st	4th	2nd	3rd				2nd
France	4th	3rd	5th	4th				6th
USSR		2nd	1st	1st			1st	1st
Poland	3rd	1st	3rd	2nd				4th
Bulgaria								5th
Italy	5th							
Czechoslovakia								
Romania								
Canada								7th

Ether... or

Robert Dulake poses some very interesting questions on what should go in our fuel tanks...



NCESSITY can be the mother of invention. So can bad planning, to wit the evening when I was caught ready to fly with *no* fuel, save only a few drops left from the previous Sunday. My ether ration, on order from the model shop, so far hadn't arrived, so I tried the local chemist.

He had a sense of humour, ether at £8.00 per litre...no chance, I'm afraid, of making a sale. So what to do? Thinking back I recalled some bench-bound experiments of the previous winter when, priming with ordinary fuel, I had managed to make a variety of diesels pick up and run from cold on a paraffin/oil blend. No startlingly new idea, this, but one implanted in my memory long ago while reading 'Petrol Engined Model Aircraft' (Bowden) under the desk in school, and now was the time to see how such a fuel would behave in the air.

Garage, kitchen and brain were ransacked until a blend of cooking oil, Castrol 545, paraffin and isopropyl nitrate emerged which didn't distress the PAW 19 too much, so off I went to the park with my last remaining drops of respectable fuel for priming. Four flights, one rich cut and three recognisable stunt schedules were enough to prove the point. Ether is *not* necessary to fly a diesel.

At this stage, however the PAW wasn't entirely happy and would labour if over leaned as only an unhappy PAW can. Cheering it up was the next task and it soon became clear that the lubricant held the key. Logical, this, as paraffin evaporates very slowly and stays around to dilute the oil at the bearings giving an effect not unlike a metallic equivalent of arthritis.

After discarding several mineral oils, and then finding mediocre results with Shell

2TX, I returned to *cooking oil* which is a beautiful natural vegetable oil, a fair lubricant and above all, cheap. This time I boiled in small amounts of washing up liquid and glycerine, giving a fine, fairly stable suspension of dehydrated and non-paraffin-soluble lubricant to coat the bearings. This seemed to have the desired effect so I ran some rpm checks comparing fuel to the following formulation with *Model Technics D2000*:

I.P.N.....	1%
Paraffin	66%
Modified cooking oil.....	33%

I tested three engines, a very down at heel ME 'Snipe', a well run-in but still excellent PAW 19 R/C and a newish E.D. 'Viking'. They gave similar figures, prop for prop, on both fuels and similar throttle performance too - where appropriate. Handling was different, of course. The ether free fuel needed a very open needle to pick up from cold and a little compression chasing to nurse it through the first few seconds of running. It was also more sensitive to adjustment when hot and needed a little more compression advancement. Accepting this, once fuel was at the spraybar, a prime of ether containing fuel was all that was needed for a cold start. Hot restarting only needed a heavish prime or choke.

As a basis of experimentation the fuel formulation given earlier is as good as any. Nitrate level might be varied to suit

individual motor/prop combinations and can be increased to improve cold pick up. While the 'Heath Robinson' lubricant works for me it should not be considered the ultimate. Castrol 545 and STP or Redex to cut down on carbon build-up is still worth trying as an additive at 1-2% on total fuel, especially with thinner cooking oil brands. More speculatively the new fluorocarbon additives 'Slik' and 'Tri-Lon' seem, on paper at least to be the complete antidote to diesel rheumatism. Who will be the first to test these scientifically in model engines?

The overwhelming advantage gained in omitting ether is economy. The price of fuel works out at less than £1.00 per litre and on a cost/weight/performance basis this must make the diesel a formidable rival for the four stroke glow motor. Against this is a little extra time in establishing settings while the motor warms up and an extra tin of fuel for priming. Power and throttling appear unaffected.

Ether free fuels seem well worth considering for sports C/L and R/C work where long engine runs are called for and they offer a challenge to anyone who just likes experimenting with diesels.

As for the diesels themselves, I have never heard them express an opinion on diet or anything else for that matter but it is quite possible that replacing all that anaesthetic with calorific value might make them livelier than usual.

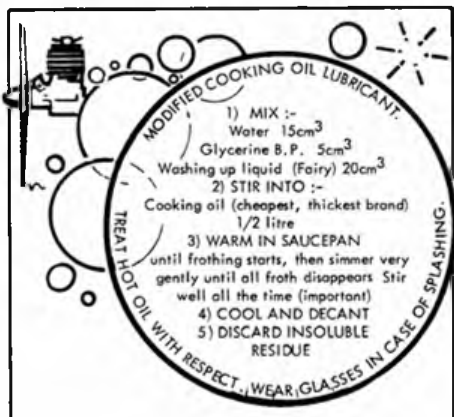
Why Cooking Oil?

Vegetable oils come from many sources. Chemically they are very similar, i.e. they are triglycerides of C18 fatty acids. Differences, except for one very special case, are confined to the degree of unsaturation. Those with higher saturation, e.g. sunflower and linseed are in demand for their drying properties by the paint industry and are relatively expensive. Some less expensive types e.g. soya, rape, groundnut etc., tend to be less unsaturated and find their way on to the supermarket shelves under the guise of branded cooking oils.

The special case mentioned earlier is that of castor which has little unsaturation and does not dry but it is hydroxylated which makes it thicker than the other oils, unsoluble in paraffin and important for glowmotors - soluble in lower alcohols. The other oils dissolve readily in paraffin but not in alcohols.

In diesel fuel, castor is undoubtedly superior to the other vegetable oils, but needs ether to keep it in solution. Without ether, one is left with a choice of mineral oil, some synthetic oils, or ordinary vegetable oil. The mineral and synthetic oils are not at their best in high paraffin fuels where dilution effects come into play and here they have little, if anything to offer over the cheapest vegetable oil.

However, when it comes to modifying an oil as in the accompanying article, and it is probable some chemical change specific to vegetable oil take place as well as physical dispersion, a simple chemical substance of known non-toxic properties is much safer to play with than a commercial 2-stroke oil which may contain unknown hazardous ingredients. Add to this the consideration of cost (some more expensive cooking oil contains thinning additives and should be avoided) and the question becomes *not why* cooking oil but *why not* cooking oil.



FROM THE HANDLE

CONTROL LINE NEWS

Racing with Jim Woodside

Some months back I mentioned Behram Driver of Dubai and his collection of 2.5cc team-race diesels. Behram has just sent me pictures of one of Boris Kraznorutsky's 1973 engines. Note at this stage two important details: the turned steel front bearing housing and the very compact integral backplate-filler assembly held in place with a lock ring. These two items show a definite parentage to the engines used in 1985 by Kutnetsov.

By the 1975 Euro Champs in Verviers the motor had an upswept carb - presumably using a short rotary drum. By 1977 the final details had been settled. The steel front housing now screwed into the case and the exhaust ports had been rotated through 90° to a front exhaust configuration. The model this engine flew was converted to suit a single blade prop and hence looked rather odd (see October 1977 *Aeromodeller*).

Nothing odd about the performance, however - a blistering 3:54. This set the pattern which continued to a Championship win of 7:58. The 1983 version of the motor as constructed by Kutnetsov holds the present F2C record in 3:19 - *some engine* you might well say!

A favourite reminiscence of mine is that of watching Kraznorutsky setting his engine in preparation for the 1977 final. Having tweaked on a bit of compression the Soviet team manager, Yuri Sirotkin, pocketed the adjustment key! I have always thought this to be impressive behaviour. A real team-manager...

Contest Report

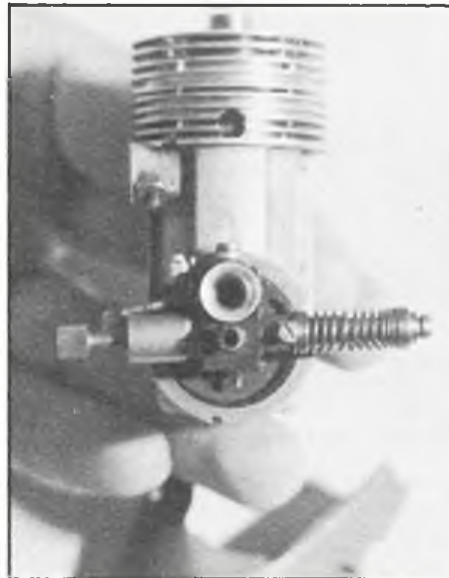
Records Tumble at the 1985 Northern Gala, 13th October at RAF Dishforth: One unofficial and two official records were established at this meeting: the only one of the year to have warm and calm conditions. If nothing else pitmen and pilots were more able to move with some freedom released from the encumbrance of layered pullovers and anoraks.

The first heat of FAI saw Heaton-Woodside return 3:28 against the second place 3:33 of Sladdin-Gardiner. The record run was established using a *Nelson R.E.* which was fitted with a liner made by Don Haworth. The ports in the liner are very small by comparison with the standard item and in consequence, the transfer passages in the case have been reduced in volume pro rata. Further packing of the lower crankcase to remove any unused volume means that the primary compression is quite a bit higher. Certainly it works, as in the race it gave 18.9/10 airspeed with 35/36 laps.

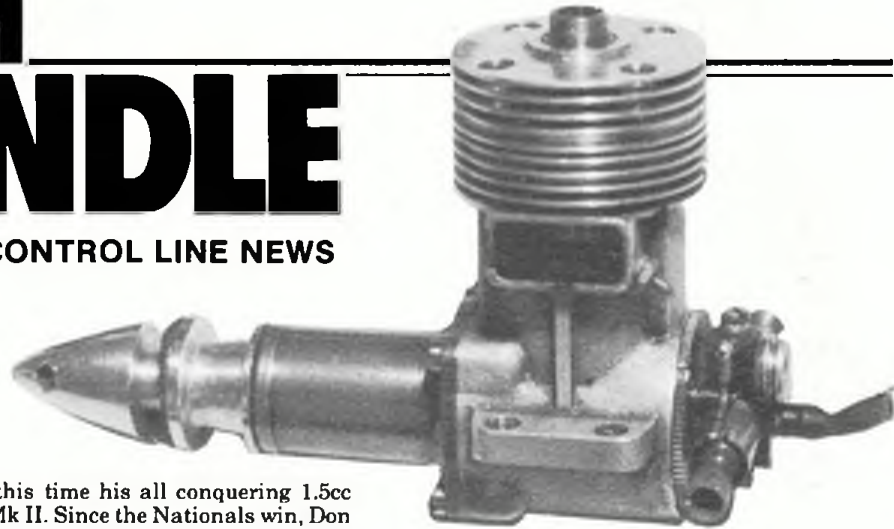
Later Don Haworth had the pleasure of seeing another record fall to one of his

motors; this time his all conquering 1.5cc Special Mk II. Since the Nationals win, Don had noticed a crack in the intake disc and so reverted to his reed valve backplate. This is just as quick but can allow the engine to run backwards unless properly primed. No mistakes today though, with a 3:27 heat and a blistering 7:04 final. Clarkson-Needham performed very well with 3:34 and 7:24 and so must be wondering what they can do against Horton-Haworth!

Dave Clarkson and Ed Needham did have some consolation in that they did put away a 3:31 heat in Goodyear using their familiar 'click and flick' method. I have heard, unofficially, that proposals to outlaw the big tank - no refuel - have been rejected by the



Above, rear view. Note compact intake system machined from tufool like material. Right, the square drive compression key as pocketed by Soviet Team Manager. Tools are for the assembly of the motor.



Above, Boris Kraznorutsky's 1973 T.R. motor. Clear father of the Kutnetsov motor, 3rd in the '85 Euro Champs.

SMAE Council and so will be in force for the 1986 season.

In Class B Dave Campbell's piped OPS29 model ran very close to the final record held by Wilson-Gardner in 6:56. If he loses a stop, he should be able to take the record...

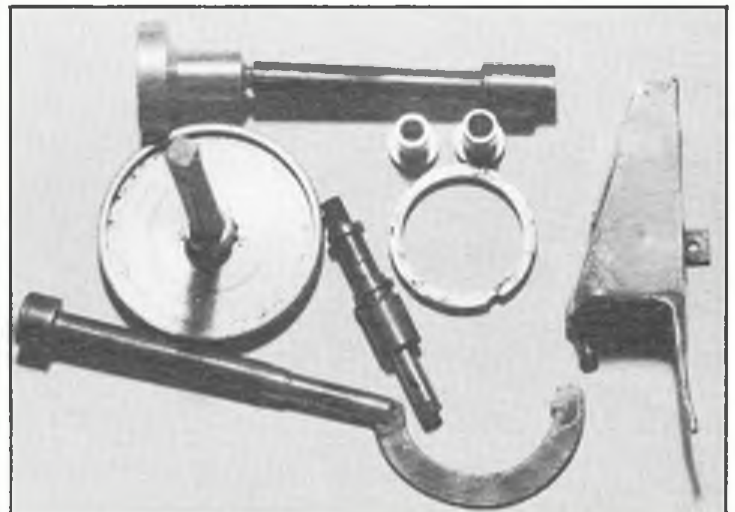
So, a very pleasant day was had by all who attended. The only blot (and one I have moaned about recently) was the day started late and the final of FAI could not be held because of lack of light. A great shame and avoidable!

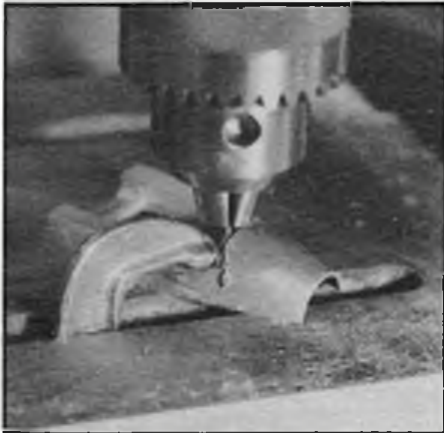
Constructional Techniques

Preparing an engine mounting pan:

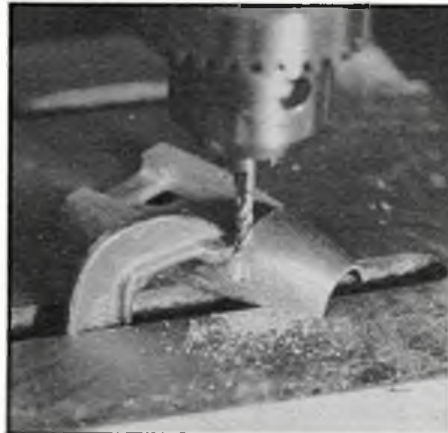
I had a letter from a young novice modeller, asking how to make an engine mount as seen on many racing models. I must say, that despite the growing popularity of integrally mounted engines like the later *Cipollas*, I do like a pan, as it can act as a heat sink for the motor.

The first problem is obtaining a pan in a size suitable for your purpose. *Michael's Models* who regularly advertise in these pages often keeps a selection of pans. *Henry Nelson* in the U.S.A. sells a magnesium pan which will suit most normal 2.5's. He will even machine the item as well as drilling and tapping all holes. In New Zealand *Des McAnelly* sells a large range of pans at very reasonable prices. I have had a couple of these over the years and can personally attest to their good quality.





Above, positioning the pan on the drill table using the clearance drill as a guide and a 'G' clamp to hold the pan in position.



Above, using a suitable end mill to counterbore for the hold down bolt. Genuine counterbores are best but can be expensive in small sizes.



Above, removing surplus metal by moving the pan freehand against a rotating end mill with the table set at a suitable height to leave about 1/8 inch of metal in the base of the L-section.

Assuming then that you have the castings to hand, make a clean flat lower surface. A convenient method for this process is to tape a sheet of 120 grade wet'n'dry paper to a sheet of ground glass (old mirror) and with light strokes in varying directions work up a clean face. Small voids, providing they are not in key areas do not matter. Now make sure the engine will sit between the sides. File a clearance if not. At this stage it may be necessary to remove metal from the bridged area to allow the prop driver a running clearance.

For the next stage, find a pointed piece of metal which will just pass through the engine lug bolt holes. Nails or suitably ground centre punches will do this. Using small 'G-clamps' hold your motor in place in the pan. If all seems square mark the centre with the punch. Check again O.K.? Then remove the engine and emphasise the marks with a sharp centre punch. Holding the pan inverted on a block of wood, drill the tapping size hole for your engine bolts (6BA, 2.5mm, 4-40 etc). Form threads with a sharp tap, well flooded with kerosene.

Now mark out the position of the hold down bolts. Providing socket head cap screws are used 8BA or 2mm sizes are quite adequate. If the pan is bridged it will be necessary to counterbore on the curved surface to give a flat seating for the bolts. If you can obtain a suitable size counterbore, then clamp the pan on the drill table and perform the task. A harder but cheaper method is to leave the clearance drill in the chuck and clamp the pan in such a position that the drill passes into the hole easily.

Remove the drill and replace with an end mill and counterbore. This is easy to get wrong so check several times - carefully - at every stage.

It is a good practice to remove as much unwanted metal as possible in order to save weight. In one of the photographs an end mill of about 8mm diameter has been used to remove surplus metal leaving behind an 'L' section. This can be dangerous to fingers as the process has been done freehand. Unless you are competent you are advised to leave this alone.

The inside of the bridge can be lightened very easily using a rotary file held in a high speed drive such as a *Dremel* tool. The same process can be achieved at a slower pace by using a selection of files.

Lastly, file and polish the exterior of the casting to a pleasant bright finish, then stand back and admire your handiwork...

entries, the standard of flying all season was very high, which made each competition worth attending and quite an achievement to win.

The *SMAE* made a major change in the team selection procedure in an attempt to make the system a bit fairer. Basically, the idea was to reward consistency by awarding points for placing in an *SMAE* competition and then taking each flier's best three results to decide their team position, with the top three being asked to fly in the British team.

This meant that every competition was worth something rather than under the old system whereby people would fly purely to qualify for the team trials and having qualified, did not bother to turn up again. However, the expected higher entries, as already mentioned, did not occur. This seems rather surprising since at the time of

Right, a rotary burr may be used to lighten the inside of the bridge. Below right, from rough casting (left) to finished product is only a matter of confidence and a little practise!



Construction techniques

Tools needed

1. Access to a pillar drill.
2. Drills and taps.
3. Sheet of glass and 120 grit paper.
4. Rotary file or selection of small files.
5. End mills and/or piloted counterbores.

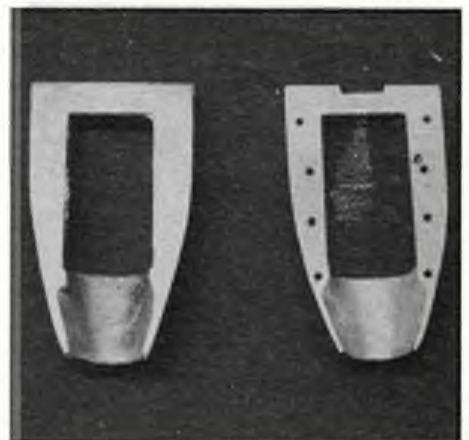
Sources of pans

1. Large selection in alloy from: Des McAnelly, 47 Norwood St., Invercargill, New Zealand.
2. Magnesium F2C, prepared if required from: Henry Nelson, RD2 Box 233, Ramsey Rd., Zelienople, PA 16063, U.S.A.
3. Specialist shops like Michaels Models of Henry J. Nichols.

Combat with John Jones

FAI Combat... 1985

The season was a rather unusual one for the flier in a couple of different ways. although quite a few people actually flew FAI Combat last year, they didn't all turn up at the same competitions so the entries per event were quite low. However, it was marvellous to see a few new faces. Let's hope this is the start of an upswing in the number of people flying combat. Despite the low



writing a venue for next year's World Championships has not been agreed upon and the SMAE are holding back on the team announcement until it has been confirmed even if there will be a World Championships.

Another surprising factor of the 1985 season was the variety of motors used. After the total domination of the 1984 Nationals by fast motors one would have expected far more to be in use this year. However, they were in a minority with only a couple of fliers using the *Nelson*, a couple more with the *USE* and most others with the *Super Tigre G20/15* and *Rossi 15s*. In fact John James won the Three Sisters Gala, Richard Scully won the second SMAE centralised and Mervyn Jones reached the Nationals final, all with *Super Tigres* showing that you don't need expensive equipment to be successful.

The 1985 FAI league (based on 1st place - 6 points, 2nd place - 4 points, 3rd place - 2 points, 4th place - 1 point), taken from all the contests flown during the season produced the following:-

1. John James	Sheffield C.L.A.M.S.	18 points
2. Mervyn Jones	Wharfedale M.A.C.	15 points
3. Neil Gill	Peterborough M.A.C.	12 points
4. Mike Whillance	Urmstone M.A.C.	9 points
5. Richard Scully	Wharfedale M.A.C.	7 points
Ten fliers actually scored points in six competitions.		

Stunt with Claus Maikis

Forked Forces...

Most stunt flyers seem to have a special pleasure in playing with other pilot's aeroplanes. A favourite occupation is pulling the leadouts to see how free the control system feels. If you happen to do this with the aircraft of Henning Forbech (Denmark) you'll be surprised. Watching the movable surfaces of this model is a new experience. Beyond a certain point of deflection the flaps remain fixed in position - yet the elevators still move on.

Maximum flap deflection depends on airfoil thickness and location of the point of maximum thickness. To my knowledge, NACA wind tunnel tests have shown that flaps shouldn't be deflected more than 20 degrees. Beyond this point there's no additional lift, but drag is increased considerably.

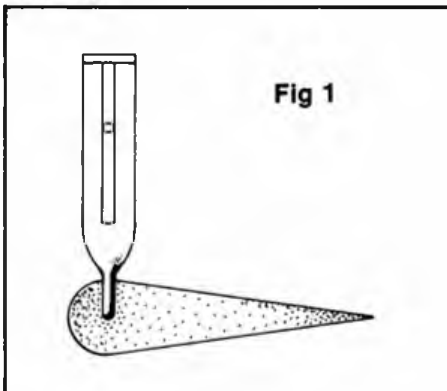


Fig 1

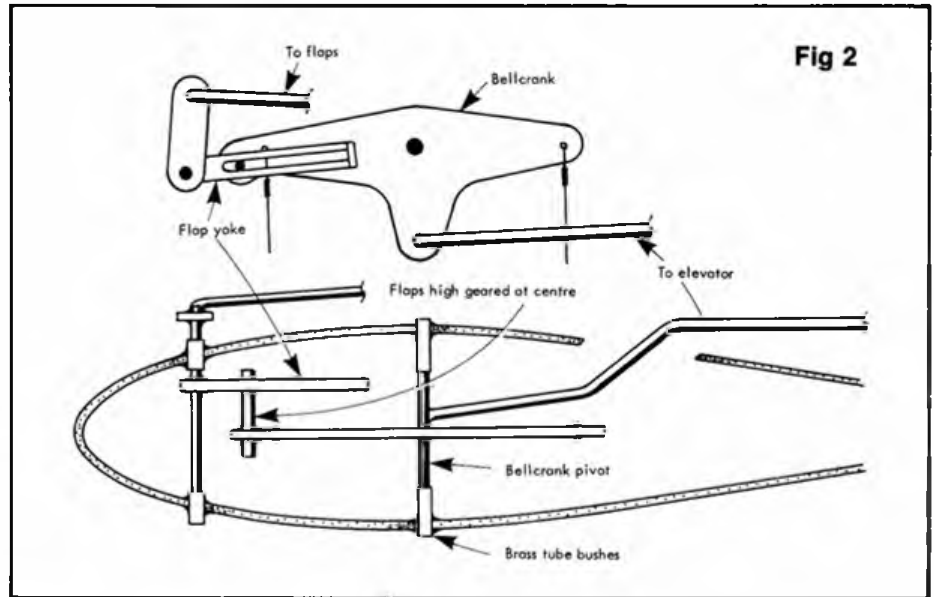


Fig 2

I don't know the maximum flap deflection on Henning Forbech's stunter but obviously Henning has looked for a solution to not exceed a certain flap deflection. A discussion with Henning was one of those occasions when you realise that learning never stops. He was kind enough to offer detailed drawings of his control system to me. The heart of his system is a fork...

If you have fixed hook up points - as we usually have in our bellcrank or horn designs - input or output movements follow a circular line - that means, the linear displacement (= pushrod travel) per rotational degree is the largest around neutral and constantly decreases until zero, but you *cannot stop it before zero*. To stop flap deflection while still retaining elevator movement, you need a fork!

As Henning points out, this can easily be achieved by replacing the usual flap horn with a fork shaped item. Unfortunately, while this (fig 1) would work fine, it would require undesirably large dimensions. Henning has produced a mechanism that combines the best of two worlds and fits into the limited space our usual stunter has to offer. His system looks somewhat sophisticated. But I like this way of doing things, I just *have* to admire Henning's solution (fig 2).

The flap horn is not driven by the bellcrank *directly*. Instead, the front arm of the bellcrank carries an additional pin. This pin controls what is basically a secondary, 80 degree bellcrank - 80° because of the angular conditions in this installation. This bellcrank looks a little bit complicated because one arm runs *within*, the other arm *outside* the wing...

It's actually an axle with two arms mounted at a certain distance to each other, angled at 80° - and one arm is a fork! The pin of the main bellcrank controls this fork. The

arm outside the wing is connected to the flap horn, respectively horns in Henning's design (he has a swept forward wing trailing edge, thus uses two horns).

Now, if the bellcrank is moved, the pin will move the secondary bellcrank. This works until a certain degree of rotation. Beyond this point, the pin will merely slide in the fork, but will not deflect it any further. The flaps will stay in this position, whereas the elevator can be deflected still more.

There are some more innovative features to be found in Henning's aeroplane. An aspect ratio of 1:7.7 - which means a wing span of 187cm! - and a Wortmann airfoil are only part of this thoroughly worked out design which is full of clever ideas. I was

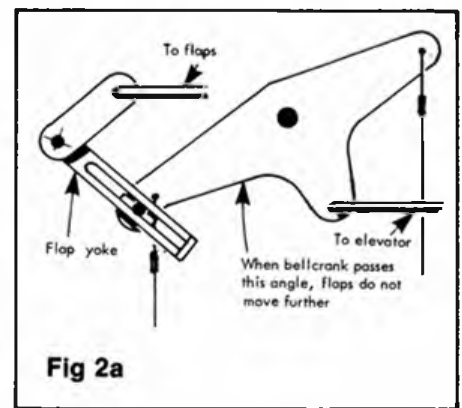


Fig 2a

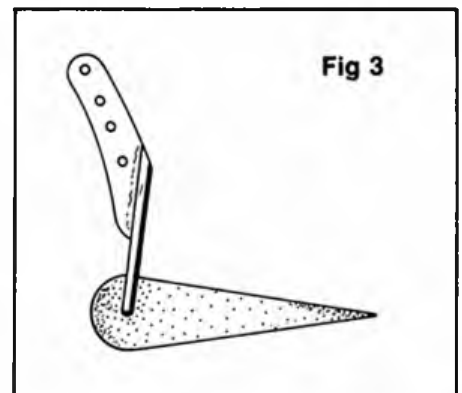


Fig 3



Left, Claus could not resist taking this shot... Harold Ruff's girl friend got carried away when she had the opportunity to decorate Harold's new stunter!

much impressed with his horn design. The angled shape of the horn obviously was chosen by the same thoughts I mentioned in the July *Aeromodeller* (fig 3). Let me add that the sketches shown here just explain Henning's control system. They are not exactly to scale and they are simplified a lot to show the basic principles of his system. Many details (such as the bellcrank or the pushrods) are not shown for clarity.

While I like to discuss the pros and cons of this type of technical stuff with a twinkling eye when viewed from a scientific viewpoint... I must admit that I'm glad to meet people such as Henning Forbech. As I see it, his control system is not only advanced technology but also a work of love and art. After all, this is what makes our event so colourful and enjoyable.

If you want to have complete, detailed drawings, contact Henning at Arbøgevej 4, 8220 Brabrand, Denmark.

Snow Shoes

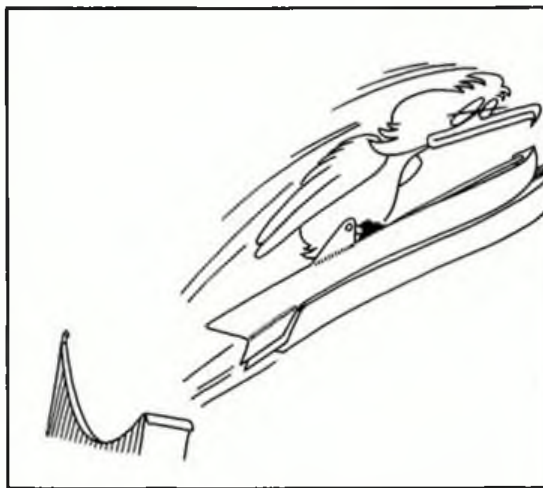
Ever tried to fly with skis? No? You've probably missed one of the most pleasant experiences in control line flying. You'll never realise what beautiful takeoffs and landings you *can* perform unless you've tried it on skis!

Apart from that super smooth take off and touch down - not at all comparable with grass fields, let alone asphalt - that

intriguing 'Shhhhhhhh' on each landing is enough to turn your mind. Since a big part of our Central European flying season is in snowy conditions this way of flying is worth serious consideration.

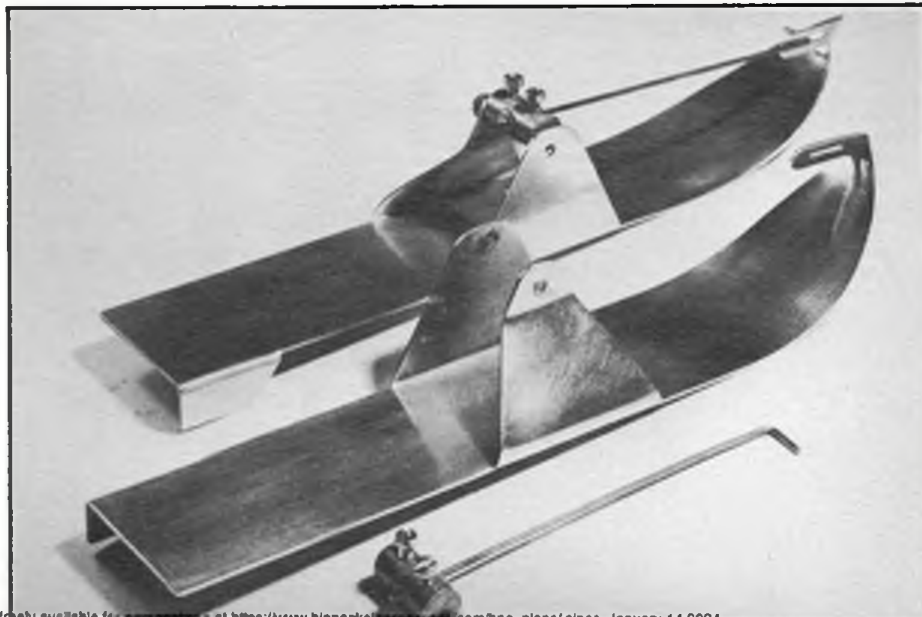
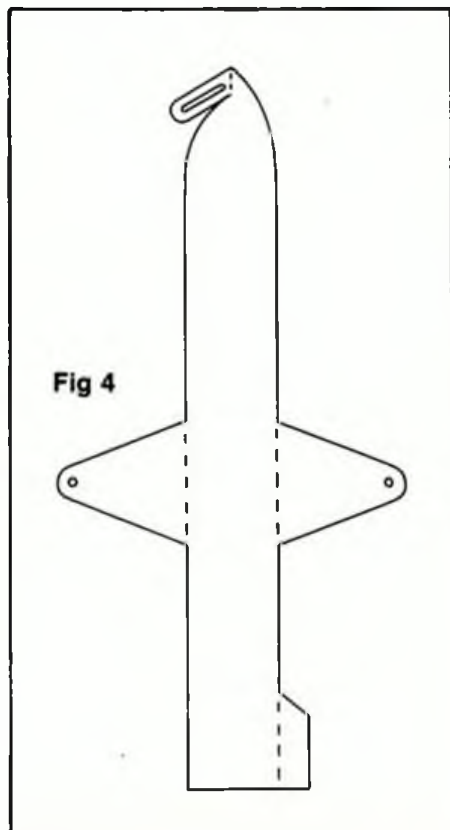
I tried these skis on a 1200 gram model. An area of about 9in. x 1½in. proved sufficient. The skis are made of 1,5mm Dural, sawn with a jig saw (fig 4), then cleanly filed and sanded. The struts are carefully bent in a vice, using balsa sheet between the vice jaws and the Dural whilst bending. Dural is prone to cracking when bent through a small radius and the balsa prevents this.

Two brass blocks (with the width of the normally used wheels) keep the whole unit in place. Drill the hole for the undercarriage



leg eccentric, so you have enough material to cut two threaded holes to fix the block. The hole for the torsion bar is drilled in such a way that the bar (1,5mm piano wire) is squeezed tight to the undercarriage leg when tightening the two bolts. The torsion bar holds the ski at the correct angle - I used 0 degrees to the longitudinal axis of the airplane. Of course, an undisturbed snow surface is necessary for these small skis. While they do not hamper flight performance, they don't like anything but the smoothest surface. When flying, step back a little so you do not land into your own foot prints. This might lead you to some kind of ski-jumping!

Below, if your regular flying field is covered with snow, remove your wheels and replace them with these skis. They are designed to be mounted without additional struts, cables or springs... Left, skis are made from dural cut to a pattern similar to that shown here. Scale is approximately 1:3.



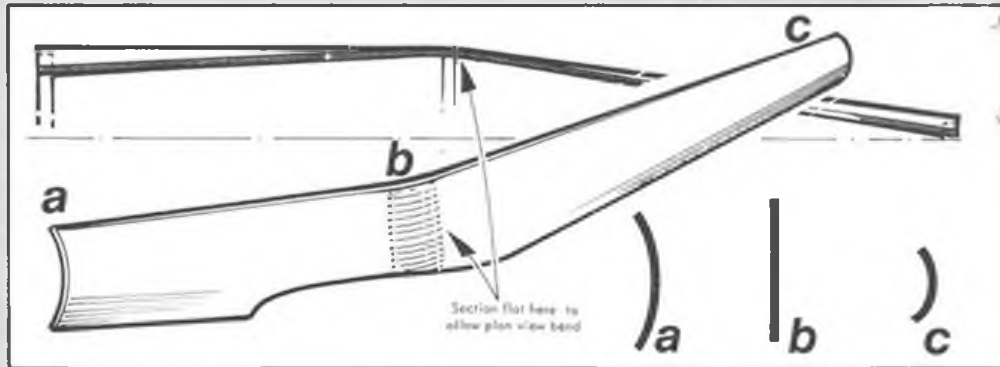
HOLLAND'S HINTS

There are many ways of building...this series offers groups of sketches from Peter Holland's construction notebook. Each of the series deals with related details in the enthralling business of making various types of aircraft...

by Peter Holland

HERE ARE just a few tips concerning the making and notching of formers for those curvations fuselages that lift your model out of the o'le square box category...

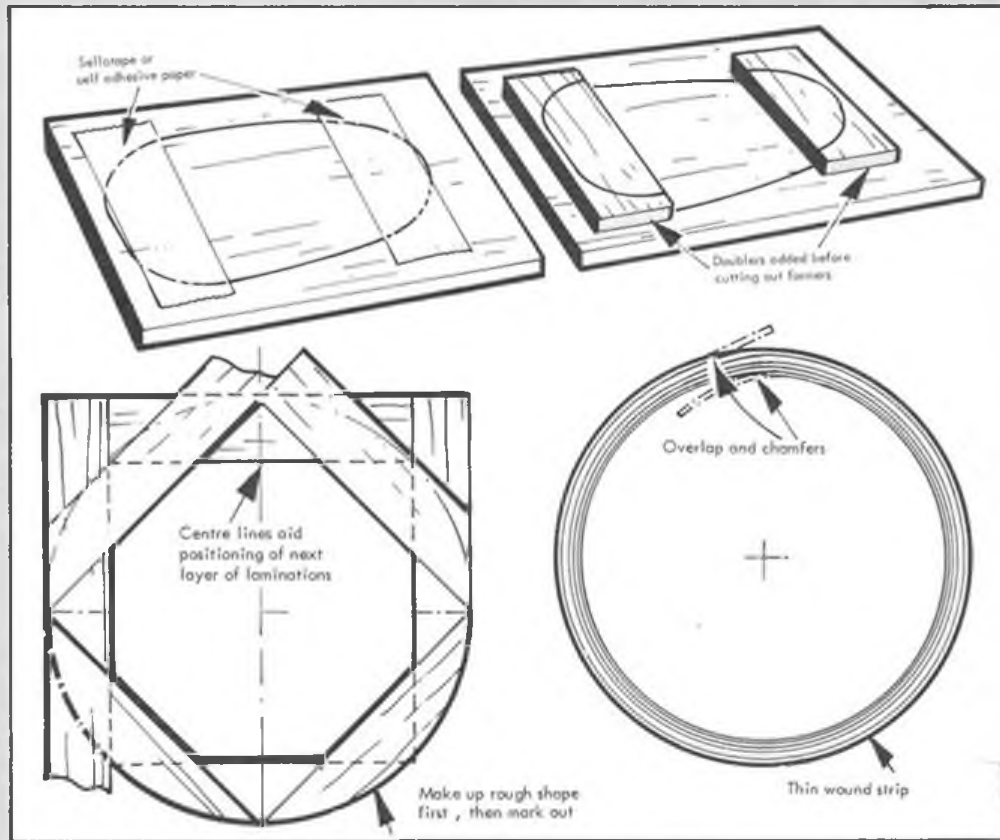
If you are still stuck with sheet box fuselages, try a spot of sectional curve - Quite thin sheet can be used, because curving it in section gives it rigidity. Try this out with a piece of paper, if you need to be convinced. This system has drawbacks however, a fuselage must have a straight taper. This may not be convenient - who wants a front bulkhead wider than that at the wing leading edge for example? The sketch, right, shows that if a small flat area is incorporated where the transition between taper and parallel sides occur, both front and rear parts can gradually adopt a sectional curve towards the ends. This leaves a convincing wider part, where it might be presumed the cockpit would need to be sited.



Making formers

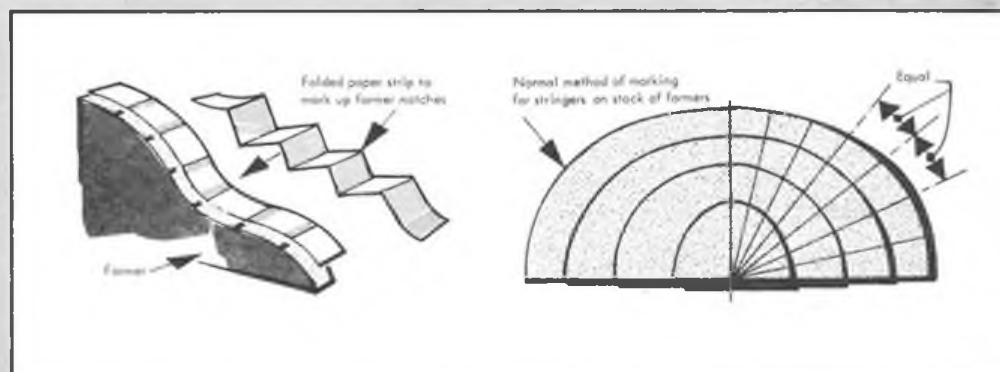
When cutting sheet for formers, it is a good idea to put *Sellotape* across the grain to prevent splitting during the tricky curved knife cuts that have to be made. Provided the tape does not cover areas which are to be glued, it may be left on as a reinforcement. Self adhesive paper may also be used. Where the design requires doublers to be used at top and bottom of formers, try gluing these in place first, then they will support that cross grain when cutting. There is no need to make formers flat and in one piece; in fact, overlapping strips of wood not only enable the grain to run around the edge, where it will offer the best support, but the joints are double for strength, gluing area, and for where notches have to be cut for longerons, stringers and whatnot...For really light formers, the rather laborious old fashioned wound method can be used (far right).

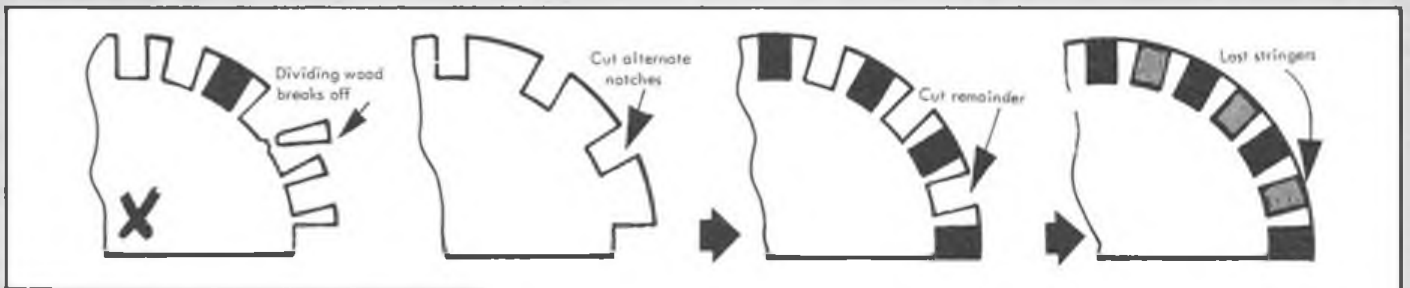
In this case, a cardboard forme is made; smaller all round by the thickness of the laminations - Small formers and those with contorted edges are better made from plain or overlapped sheet.



Stringering

Suppose the formers have to be divided up into equal sectors for the accurate spacing of stringers? Really "Humpty-bumpty" sections can be divided up in a trice, by folding a strip of paper trimmed to the circumference of the former into an equal concertina form, according to the number of stringers to be used. It will take a few tries to get the folds equal without running out of paper, but it is quicker than using dividers on the former and running out of patience!



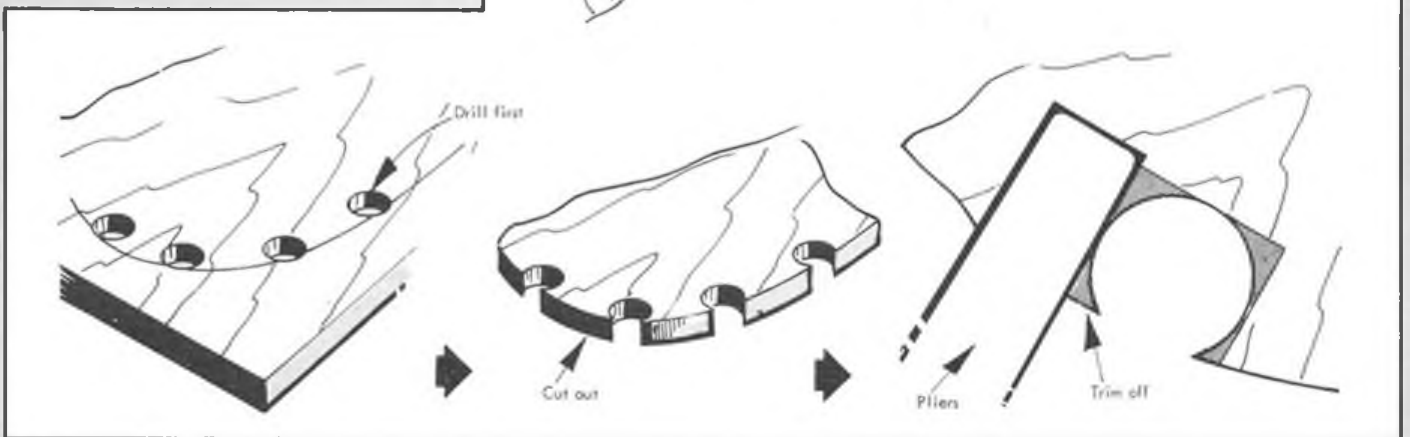
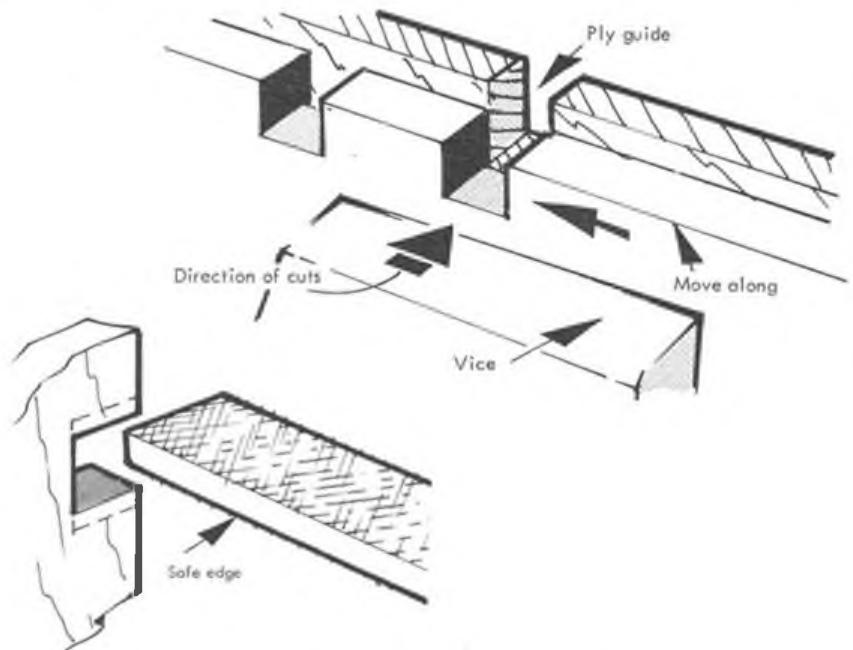


Notching

Where the stringers are close spaced at the tail end, there is a sure bet that the wood between them will fall out. To avoid this, cut alternate notches first, fit alternate stringers, then when dry cut the remaining notches in the small formers for the rest of the stringers.

Notches in ply formers can be a bit of a chore, but once they have been started, a safe edge file can be used to clean them up. Now you've made a good job of one notch in a piece of ply - former or trial piece, use it to guide a file in the cutting of more notches in balsa formers clamped to it in a vice or on a fretsaw bracket.

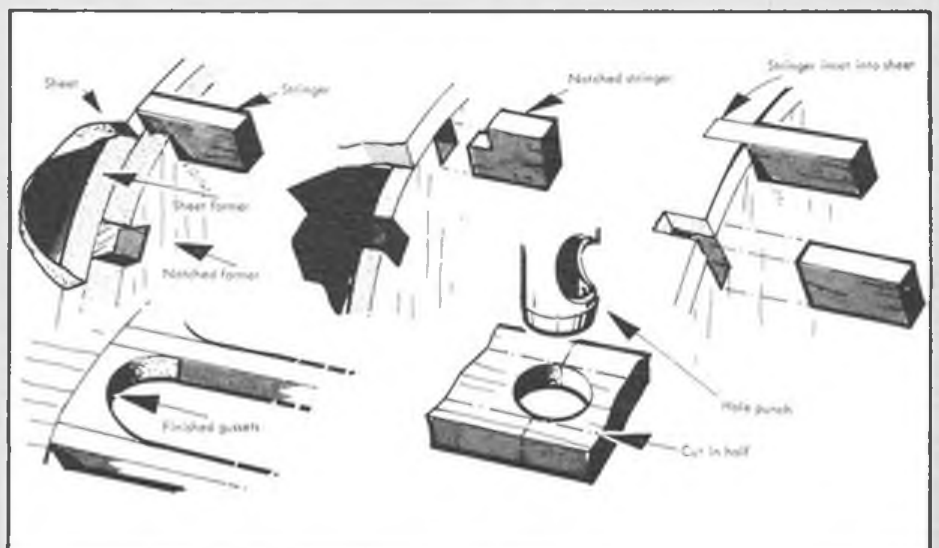
How about planning for notches when cutting out ply formers - Don't wiggle the old fretsaw, *drill* at each notch position *before* cutting out. The result should look like the centre sketch below. Grip the edge of the former next to each hole with old pliers and use these as a guide for filing to a neat shape.



Tailoring stringers to sheet

Finally, remember that stringers need to be notched into a *double* former adjacent to sheet, or, to have sheet depth notches in their ends to accept them. An alternative method is to add the sheet first, *then* file notches in it over the former notches to take the stringers, as seen far right in the lower sketch.

Those little fiddly curved gussets at the ends of the stringers look good, but only if made neatly. Choose a hole punch (one of the *X-Acto* range) which will fit between the stringers and punch pieces of scrap sheet. Trim the scraps down to fit between the stringers and slice each in half, yielding two sets of gusset scallops per hole. You can use the waste bits retrieved from the centre of the punch as wedges while the glue dries. Waste not - want not. Then you may grow as old as me...well if not as old - as mean!



The final choice for the RAF basic trainer was the Brazilian Embraer 'Tucano', to be manufactured in the UK by Short Brothers. This rtp version very neatly airbrushed by Bob Petrie of Daventry.

separately from the fuselage and assemble when each part is completed.

The plan shows basic shapes on some models and surface detail and colour schemes on others but all four have the same approach to building. Fuselage outline is doubled up on each side with a left and right hand doubler. Note that the doublers are angled at the rear to avoid a sudden stress change (fig 1).

These doublers also chamfer off to nothing over the last inch of their length. This is best done before they are attached to the fuselage. Any of the modern glues will do - cyano, PVA, epoxy or even balsa cement.

When dry, smooth off all corners and set aside. Wings require only sanding to section - watch out though for the dihedral - two models have a centre line join and two have flat centre sections with dihedral joints outboard (fig 2) - make sure that these joints are good and if using balsa cement - double glue these joints.

RTP Foursome

Electric round the pole versions of the aircraft from which the new RAF trainer was chosen — by Ian Peacock

THERE CAN be little doubt that electric round-the-pole flying must rate as the world's oldest example of controlled, powered, model flight, stemming, (at any rate in this country,) from the early Model Engineer Exhibitions at Dorland Hall in the 1930s.

In the ensuing years, its popularity has, like most aspects of our hobby, risen and fallen in cycles, yet it has never totally lost its appeal. In particular, to many a youngster, it has been the introduction to greater things, for its low cost, ease of operation and simple construction, has made it a 'natural' choice of the school model club.

Many variations have been seen since those early days, one was the carrier landing event at the very first M.E. Exhibition to be held at Wembley. A group of Northampton school children constructed a sectional aircraft carrier, 16 feet long and 4 feet wide, fully fitted with superstructure, arrestor wires, and (before its time even) a ski-ramp for take off. Multi-headed poles allowing formation flying or even - another highspot - aerial dog fighting.

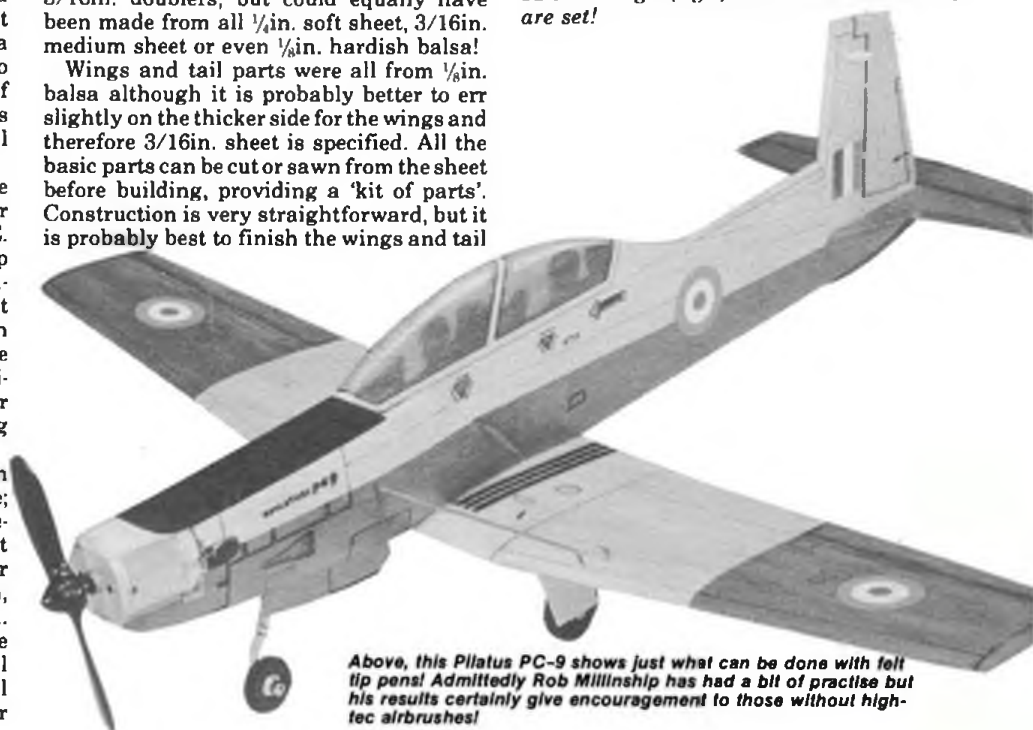
The four simple profile models shown here, have been around for a little while; before, in fact the decision was taken to re-equip the RAF with its new basic trainer. At the time of their conception there were four contenders for this contract. One British, one Commonwealth and two foreign. History is, littered with questionable decisions taken for a variety of political reasons, and often having no technical relevance, that have left our fighting air

arm with doubtful equipment (or sometimes with no equipment at all vis-a-vis the T.S.R.2.). Certainly the decision to buy the Brazilian 'Tucano' will give the RAF a superb trainer but whether it was what the RAF wanted is another matter!

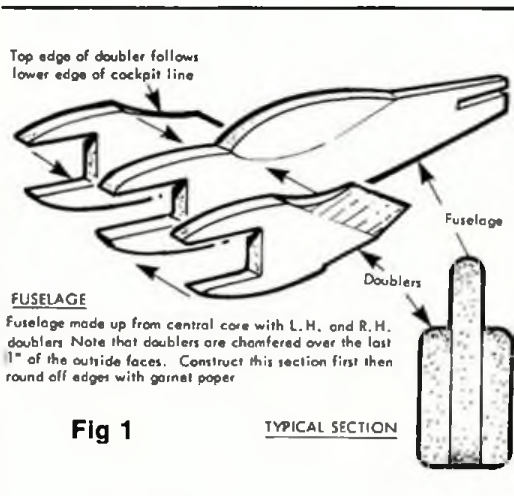
The models depicted here are of all sheet profile construction and can be made from a variety of wood thicknesses. Basically the fuselages were from medium 1/4in. sheet with 3/16in. doublers, but could equally have been made from all 1/4in. soft sheet, 3/16in. medium sheet or even 1/4in. hardish balsa!

Wings and tail parts were all from 1/8in. balsa although it is probably better to err slightly on the thicker side for the wings and therefore 3/16in. sheet is specified. All the basic parts can be cut or sawn from the sheet before building, providing a 'kit of parts'. Construction is very straightforward, but it is probably best to finish the wings and tail

Fin and rudder are made separately from each other, sanded to section and the rudder stuck to the fin, offset by 20° - 30° to the right to assist in keeping the model out on the end of the lines. Similarly tailplane and elevator are made and sanded separately. They are joined using heavy gauge fuse wire, thin aluminium strips cut from soft drink cans or one can use the plastic and wire 'ties' around cut bread wrappings. Either way it is essential that a stiff hinge is provided allowing for the elevators to be adjusted to a suitable angle (fig 3) and remain where they are set!



Above, this Pilatus PC-9 shows just what can be done with felt tip pens! Admittedly Rob Millinship has had a bit of practise but his results certainly give encouragement to those without high-tec airbrushes!



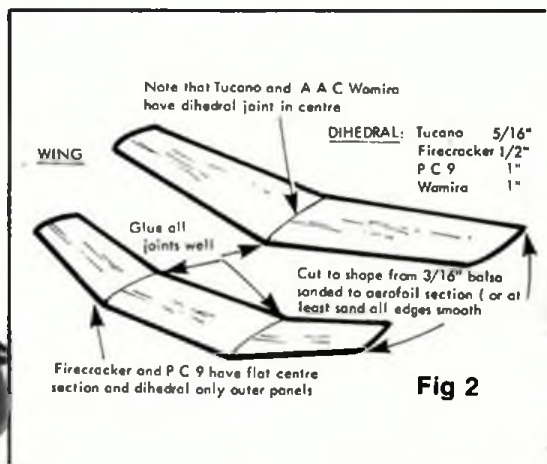
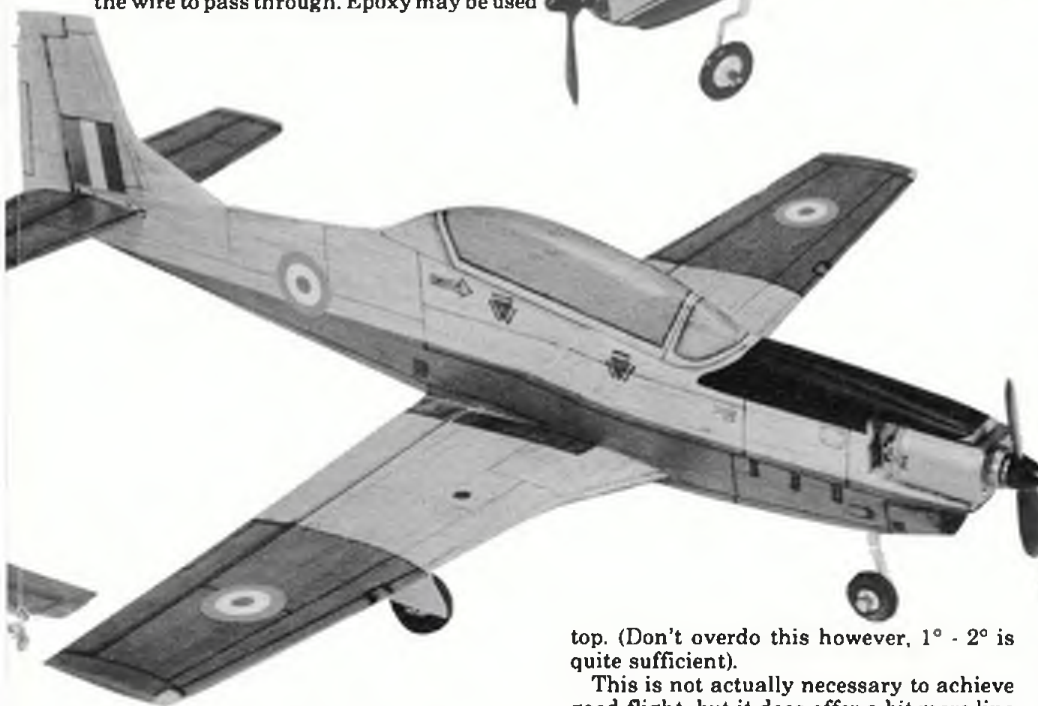
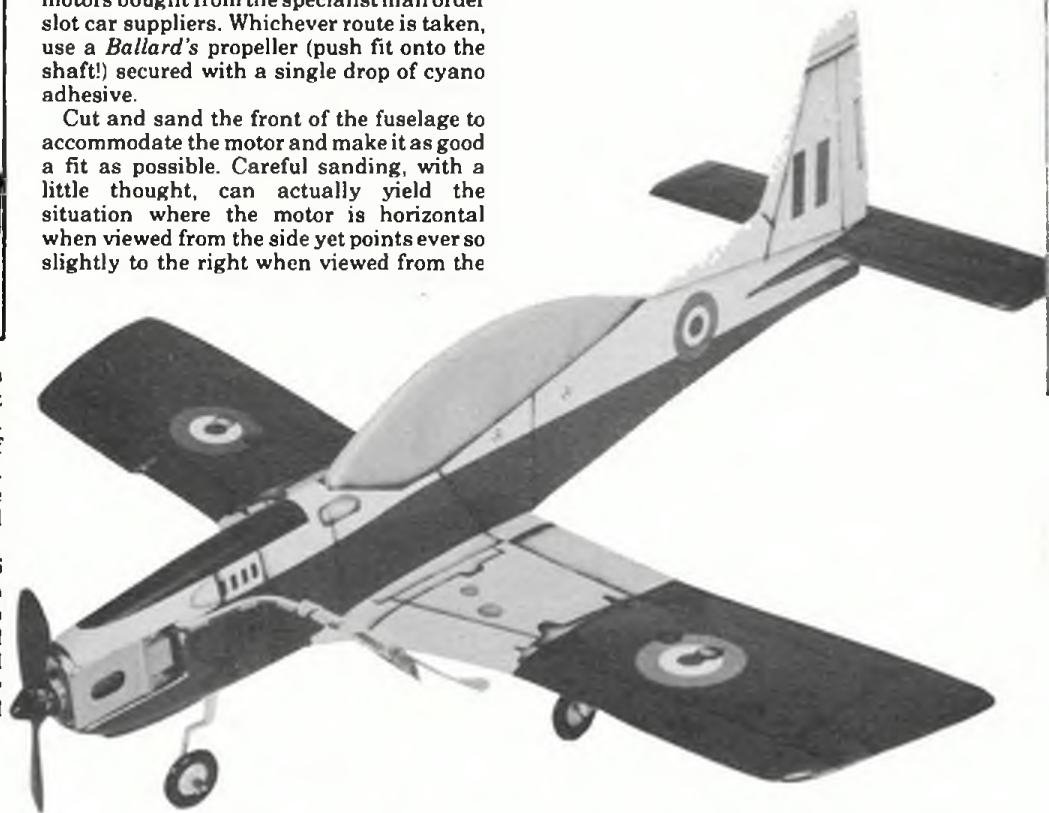
The side view of the fuselage shows clearly that the motor and tail plane are set at zero degrees - i.e. parallel with the floor. The wing however has a small amount of positive incidence (it tips up at the front!). Don't omit this or overdo it, 1/16in. is quite sufficient, or the flying performance will suffer.

Undercarriage legs can be made from 16 swg or 18 swg piano wire dependent upon what is to hand. It is a simple bending job and the main, one piece leg, is simply glued to the underside of the wing (fig 4). A small notch may be needed in the fuselage to allow the wire to pass through. Epoxy may be used

Finally the motor:- Well there are various thoughts about the current crop of motors available for R.T.P. and at least one model featured the current *Ballard's* motor. Others used motors robbed from defunct *Scalextric* cars and yet others had new '16D' size motors bought from the specialist mail order slot car suppliers. Whichever route is taken, use a *Ballard's* propeller (push fit onto the shaft!) secured with a single drop of cyano adhesive.

Cut and sand the front of the fuselage to accommodate the motor and make it as good a fit as possible. Careful sanding, with a little thought, can actually yield the situation where the motor is horizontal when viewed from the side yet points ever so slightly to the right when viewed from the

Below, the NDN Turbo 'Firecracker' was a hot favourite - beaten to the post by the 'Tucano'. Below left, the AAC 'Wamira', more felt tip pen magic worked on this smooth rtp flyer...



for sticking this but a patch of silk or nylon soaked in balsa cement will do just as well.

The nose leg is a similar piano wire job pushed and glued into a hole drilled into the fuselage underside. Wheels were scavenged from the kid's toybox, old slot cars, dinky toys etc. or lin. *Micromold* tail wheels can be used, even if they are a shade oversize. For simplicity, the undercarriage doors can be left bare, but the enthusiastic modeller may care to add thickness with rolled sticky paper and undercarriage doors from thin ply, card or plastic sheet. The tether hook is from 18 swg piano wire, pushed through the fuselage at the point shown, bent back and glued to the fuselage side.

top. (Don't overdo this however, 1° - 2° is quite sufficient).

This is not actually necessary to achieve good flight, but it does offer a bit more line tension, and every little helps. If the motor is a good fit, it needs only a single drop of cyano top and bottom to hold it in place, failing which, a thin fillet of epoxy may be used.

Finishing is a matter of choice, careful attention with felt tip and ball point pens will produce a colourful result. Colours are based on what we thought the RAF machines would look like and therefore are inspired guesswork. It might be possible to find suitable size transfers in the model shop but frankly, we just didn't look.

Ball point pens in compasses produced the right answer quite quickly, with a rule and set square giving the straight edges for

panel lines etc. This method is quick and simple and with a little patience - within everyone's grasp. Once more, it might be prudent to consider colour and detail on wings, tail and fuselage prior to final assembly if it is thought easier to work with the component flat on the table.

Needless to say, the other route to finishing is to paint the model (surprise, surprise!) and to this end, a quick blast with an airbrush can produce startling results. Pre-finish can be done with sanding sealer, tissue and dope or, for the more modern approach, *Hobbypoxy* finishing resin. Either way, however, keep an eye on the weight and on the time. These models were designed to be simple and there is little point in spending hours and hours on a basic profile model. Far better in that case to start with a real scale model.

Drill small holes in front of elevator and rear of tailplane to take wire 'hinges'

Fig 3

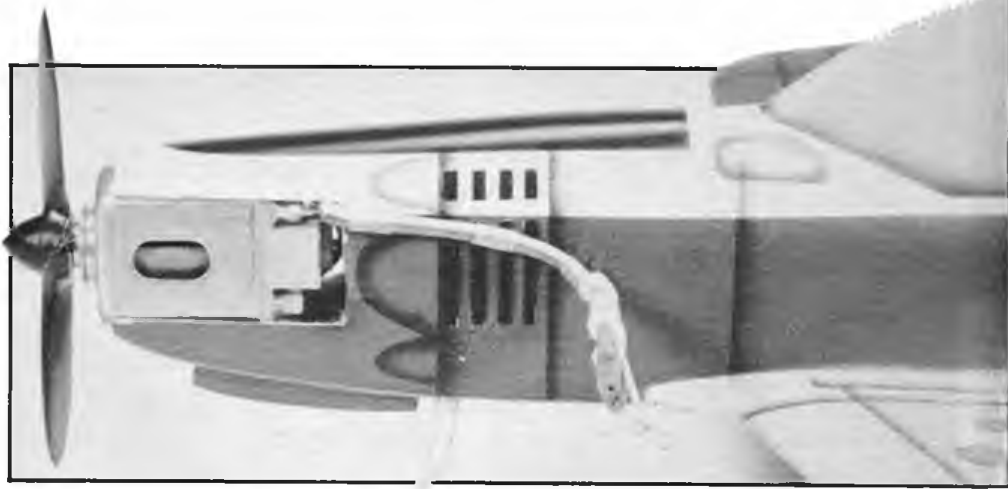
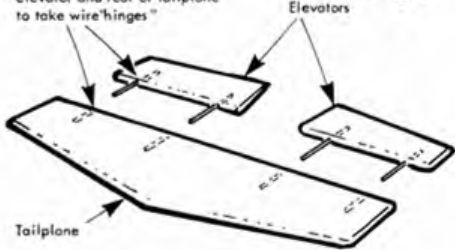
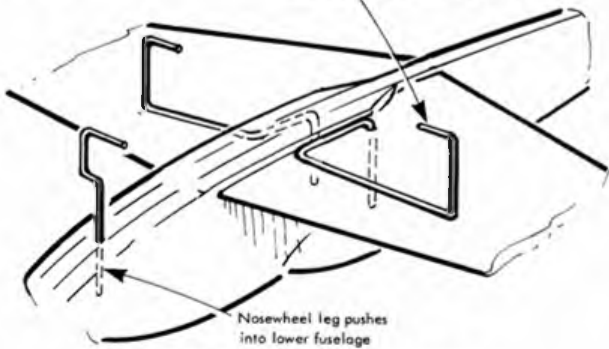
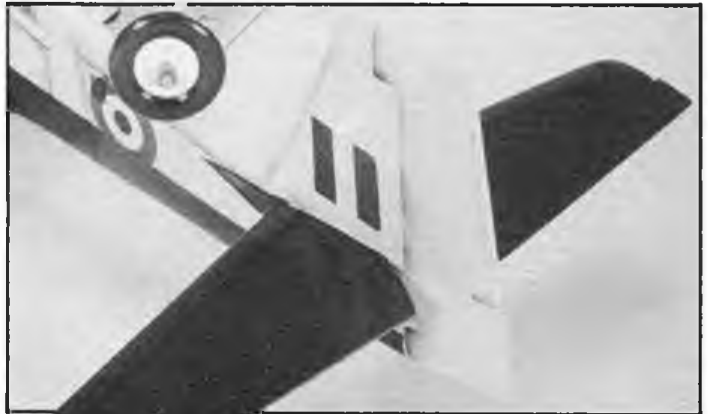


Fig 4

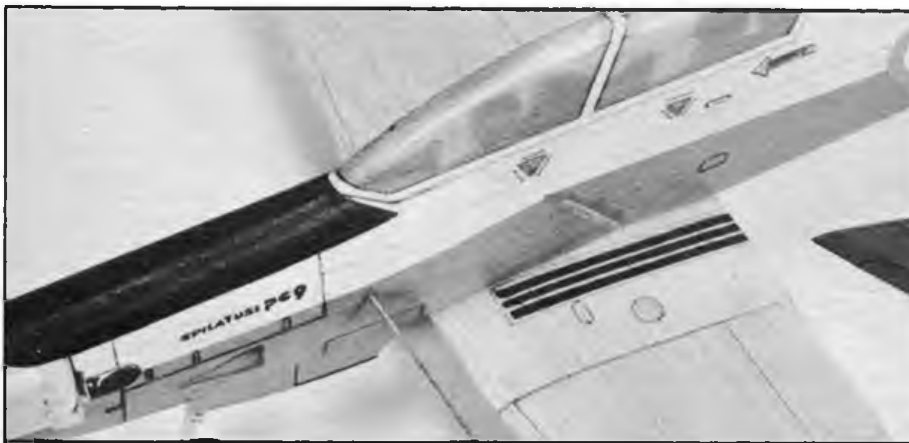
Main U/C legs are "Z" shaped inner end sits along fuselage side, make legs to suit each model per drawing



Secure all legs with thick cyano glue or epoxy U/C doors can be made from thin card, wheels from discarded "Dinky toy" type cars.



Far above, ALL side views are true scale - so take care that there is enough room for YOUR choice of motor. Above and below, detail shots to give you some idea of simple paint/felt-tip colouring schemes.



R.T.P. flying is simple but it never does to assume that everyone knows how to do it. Connections to the motor must be made by some suitable plug and socket. If in doubt, it is better to use the Ballard's type of plug that is in common use throughout the U.K. Most clubs feature this type of plug on the end of the flying wire.

This flying wire will have a loop or ring on the end that fixes over the tether hook (fig 5), the plug connecting to the socket on the motor lead. Check that the motor rotates the correct way round and if not, reverse the connections to the motor or to the pole head. If the rest of the club all connect up in a common manner then it will pay you to find out which way round this is and for ease of use, adopt the same system.

When set, gently increase the power to the motor (never exceeding 12 volts at the motor

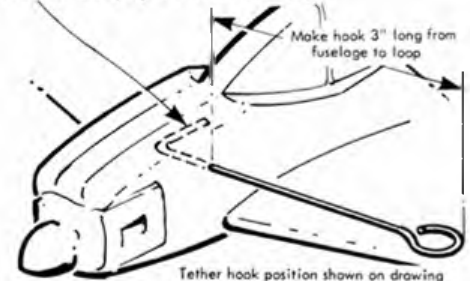
itself) and the models will taxi and take off. Flight trimming is done by a combination of elevator and tether hook. *Nose up* attitude is corrected by moving the elevators *down* and vice versa. *Nose out* or *nose in* attitude is cured by bending the tether hook forward (to reduce nose out) or backward, (to increase nose out). Similarly bending the tether hook up or down will correct any tendency for the model to fly 'one-wing-down'.

Gently reducing the power will slow the model and cause it to fly lower and lower until it touches the ground, all three wheels at once. So there you have it. Simple, cheap, but above all FUN. Multi headed poles and separate power controllers will allow several models to fly at the same time. Who, I wonder, will be the first to precede the Royal Air Force by flying with a formation team of Tucanos?

TETHER HOOK

- 1) form hook
- 2) Push through hole in fuselage
- 3) Bend over and epoxy to R.H. side of fuselage

Fig 5



Tether hook position shown on drawing

MIND THE LINES

with
Andy Brough

Rubery Fun Day

There's a song about 'Mad dogs and Englishmen' and if you apply this to wind and rain, then on October 6th at Rubery Hill Hospital there were, no dogs to be seen only several very wet Englishmen. True to form for 1985, October 6th was sandwiched between two very reasonable days but on *that* day one would not normally have ventured out, let alone driven 120 miles to fly a 'Midge'!

Still, twenty or so stalwart circle-burners turned out prepared to fly but in the event only 'Midges' took to the air, with one exception; that of Tom Hughes and his 'Kandoo'...

'Midge' racing is a very relaxing activity with everybody assisting each other and congratulating the flyer after a good run. First away was Eddie Snow with an *Elfin* powered version sounding a little off song and only 62.5 mph was the result. Tom Hughes was next but did not complete six



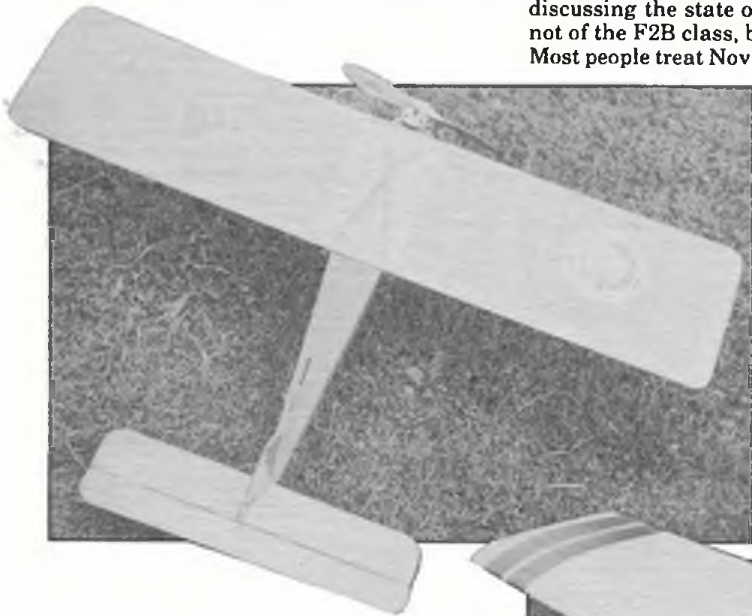
Above, Ron Prentice with one of his first finished kits of the old Mercury 'Monitor', this one is powered by an AM35...

the 'Monitor' and 'Small Fry'. (see review in this issue). Don Burgess showed us his many photos of the 1985 AMA Nationals which included several of .049 stunters, a seemingly popular class in the States. Don in fact has the rights to sell plans of the .049 George Aldridge 'Nobler' within the U.K. and also has plans of the De Bolt 'Stuntwagon' miniature. Both these plans would be eligible for SAM 35 stunt comps. Talking of competitions, several of us were discussing the state of the UK stunt scene, not of the F2B class, but that of the Novice. Most people treat Novice as a stepping stone

to F2B, not as a casual event in its own right. Consequently by the time people enter Novice they are usually fairly proficient and enter a 35 or 46 sized model, very off-putting to the *real* novice or impromptu entrant. The feeling at Rubery was that the Vintage class should replace the Novice at SMAE meetings; the advantages are:-
a) The schedule is fairly simple.
b) is easy to judge i.e. marks for good, bad or poor.
c) models are simpler to build than an F2B *proper* stunter.

Also regarding the last point many designs are available, some kits are coming on the market and Vintage engines are *not* essential. Your views please on this one...

Back to the rain at Rubery just as we were about to depart, Jo Myszka and John Allcock arrived having been lost for several hours but determined to have a go at the first 100mph for a 'Midge'. The *Frog 150* sounded very sweet and they were rewarded with two 95.7 runs but still somewhat short of that magic 100 (that's 9.0 sec *dead* on the stopwatches folks!). Jo said the engine was made out of standard parts culled from four *Frog 150*s and if anyone knows how to put a good 1.5cc together it should be Jo and John as they are the current 1.5cc speed record holders at 130mph.

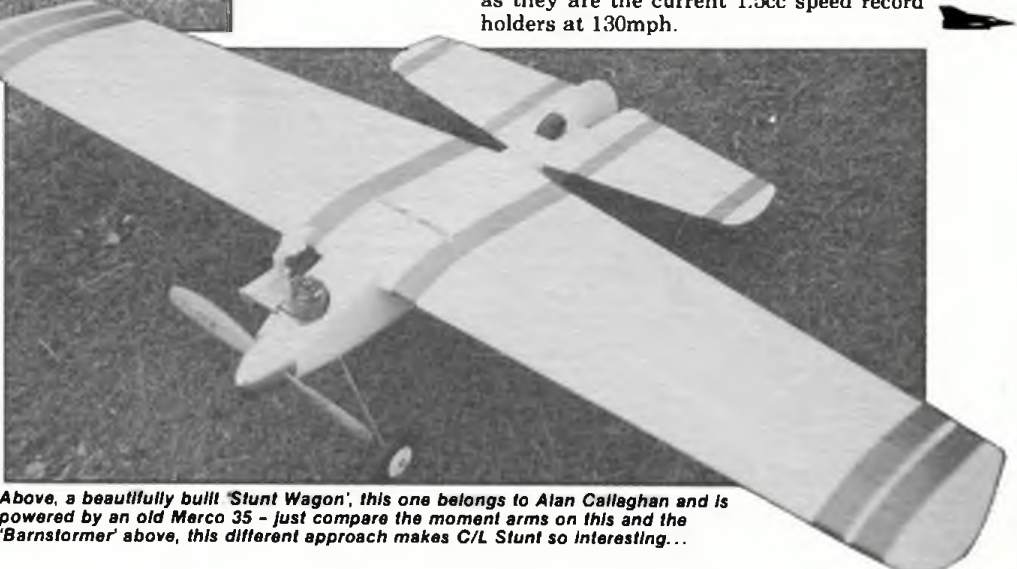


Left, this view of Jym Leddy's 'Barnstormer' tends to emphasise the very short nose moment - a definite indication to build the back end as light as possible!

laps 'Mind the Lines' then put in two flights in succession, one at 67.7 and the second at 81.8. The feeling of confidence was soon shattered as Ray Gordon's *PAW* 'Midge' ran on song to an 87.4 followed by Don Burgess' *Frog 150* turning in an 84.1.

Meanwhile Tom Hughes was in all sorts of bother flying for less than six laps and continually rebuilding his model. The cause was traced to a split tank and Super Glue was not going to be the answer, so - nothing lost nothing gained - out came the *Elfin 1.8* 'Kandoo' and away it went doing what only a 'Kandoo' can't. Well done Tom.

Much standing under trees and sitting in other's cars was undertaken, much to the delight of Ron Prentice, all the way from Somerset, who sold many of his new kits of



Above, a beautifully built 'Stunt Wagon', this one belongs to Alan Callaghan and is powered by an old Merco 35 - just compare the moment arms on this and the 'Barnstormer' above, this different approach makes C/L Stunt so interesting...

Again all thanks to Peter Martin for organising yet another control line do.

Model of the Month Barnstormer

Of the many hundreds of control line models at Old Warden on Vintage Day there was bound to be one or two which caught the eye either for their rarity, finish or performance. It was for the first reason that the 'Barnstormer' intrigued me and hence the owner was sought for further information. This turned out to be Jym

which are in the starboard wing, clockwise flying being popular until the early fifties when it completely died out in the U.K. Apart from three spars and the low aspect ratio wing, the construction is very conventional and of course simple. The wing section is typically thin, only 7/8in deep but quite adequate if flown fast and with small elevator movements.

The recommended engines ranged from the 5cc *Micron* to a *Vivell 49* and prop sizes in the 12 x 10 and 11 x 10in region. A modern day version would be amply powered by that ever popular *PAW 2.5* or *3.2cc*.



Jym offered me a flight, which would have been my first with a clockwise flying model, but by the time I was able to have a go... the plane had lost an argument with the ground. Further details can be obtained from yours truly but please enclose an SAE.



Above, Vintage team racer 'Tantivvy' designed by Chas Taylor, this one was built by Jim Gough and is powered by a PAW 2.9.

Leddy, a prolific Vintage control line enthusiast, who furnished me with all the details.

The 33½in span model was designed by Ted Buxton as a stunt trainer back in 1948, and published in an *Ian Allan* magazine. According to Ted the model was "built rugged to take the knocks it was bound to get. This ruggedness with simplicity (our favourite design feature) and ability to stunt were the requirements when working out this design".

Considering the age of the design it wouldn't look out of place had it been recently published except for the leadouts

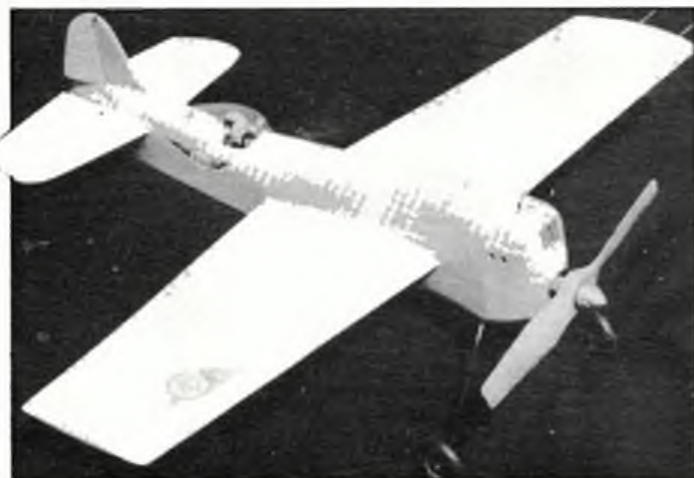


That famous West Essex Gala of 1950: Above right 'Skipper' Rowe holds winning Amco powered T/R. Above, Norman Butler with long distance 'Lil Lulu'.

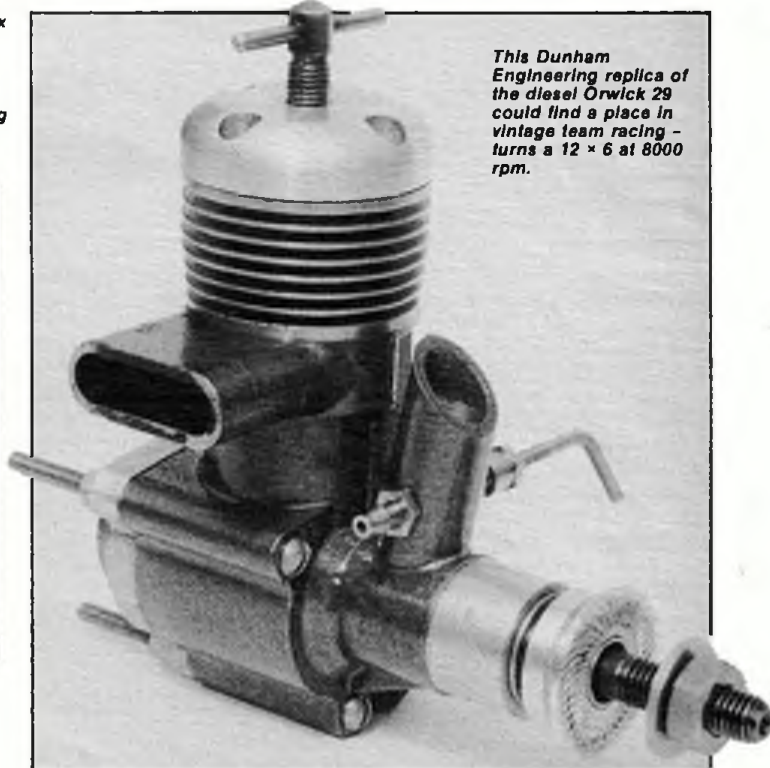
Vintage Team Racing

Vintage control line activity is now very strongly supported in areas of stunt, speed (via 'Midge' and several 'Arkansas Travellers') and trainers. Vintage Scale we have recently mentioned... now what about team racers? Fellow columnist (and Vintage F/F enthusiast) Jim Woodside has tried to get something moving in team race circles (pun) and some results of this were seen in November's 'From The Handle'!

Knowing very little about team racing and even less about its beginnings, I had a chat with fellow Whitefield Club member Tom Miller, who said it all started in 1950, so out came the 1950 *Aeromodellers*. A real treat was in store in the September issue for here was a report that captured the whole essence of team race in 1950. The event was



Above, another Vintage team racer, this time from the hand of our own Ron Moulton - 'Man O' War' was published in *Aeromodeller* July 1950 and in those days the plan cost all of 10p post free!



This Dunham Engineering replica of the diesel Orwick 29 could find a place in vintage team racing - turns a 12 x 6 at 8000 rpm.

Small Fry

Andy Brough gets his hands on one of the first...

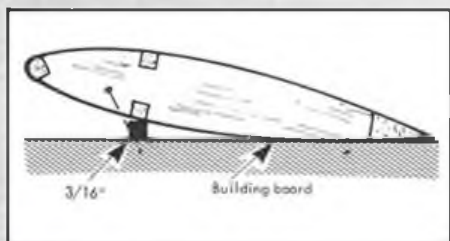
Whilst on holiday in Somerset, back in 1984, I called in to see Ron Prentice and before long we were out flying his control line models...whereupon Ron said, "its your turn now" and thrust a handle in my hand. The little model I flew fairly buzzed round on 40ft lines pulled by a then new prototype AM 15. The model was of course Ron's rebuild of his 1948 All Herts Rally winning model; the 'Small Fry'.

I was delighted when Ron told me it was to be kitted and snapped up the first kit, in order to review a rare item, that of a vintage control line model. The first few kits were sold in plastic bags in order to meet the Old Warden Vintage Day deadline, but are now boxed in stout cardboard.

The kit is very complete, rolled up plan and white tissue, bellcrank, push rod, tape for the hinges, formers cut to shape and all the timber was of suitable quality for the job it had to do (the downfall of many a kit). The instructions are in fact a re-print of a magazine article of the period and whilst brief, are more than adequate, especially as one could build it from the plan without any additional data. In fact the design is more like a free flight model than a stunt job and for anyone having built a model before presents no real problems but one or two points are worth noting.

The wing having a symmetrical section cannot be built flat on the board so the following method was adopted:

- 1 Pin a piece of 3/16in sq over the spar position,
- 2 On top this, place the bottom spar (you did pin either side of the 3/16 in didn't you?)



3 Pin the trailing edge to the board, after notching for the ribs (I had to thin my trailing edge section slightly).

4 Stick ribs to bottom spar and trailing edge, add the top spar and leading edge (see fig 1). When dry you will have a true wing.

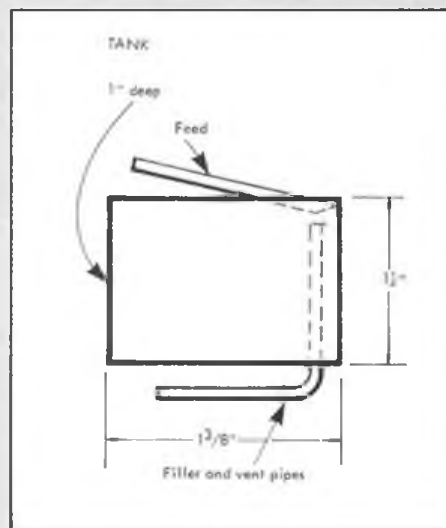
No tank was included in my kit (but I believe new kits have pre-bent and punched tin plate pieces and brass tubing which only needs soldering) so I made up a 1in. deep by 1 1/4in wide by 1 1/8in long tin plate box (fig 2).

As the original had a Mills 1.3 fitted and the bearer spacing is for that engine, that's what I used. Any 1.0 to 1.5cc diesel will do but the two formers will need modifying to suit your particular engine. The Mills is in fact slightly more difficult to fit than other engines as the venturi only just clears the fuselage side; the engine drawn on the plan is actually taller than mine by 1/4in.! I put some spacers under the engine to give more clearance but Ron says all you need to do is turn the venturi round by 90° you then have plenty of space.

Covering...well, Ron used lightweight Modelspan and his came out at 7 1/2 oz. I used heavyweight and got 9 ounces - Gordon Counsell's was covered in Vintage Solartex also giving 9oz...so take your pick.

The poor weather has prevented much flying of mine but on 40ft lines the performance with the Mills was quite crisp so with a PAW, AM or Frog it should be quite exciting.

A very worthwhile effort and Ron Prentice is to be congratulated for a well produced kit. The price is about £11.50 available from some shops or from Ron at The Mill, Ash Priors, Taunton, Somerset Tel 0823 432734. Also available is the 'Monitor' and a twice sized 'Small Fry' for PAW 2.5's and in the future the 'Marlin' and 'Marlin Mite'.



the West Essex Gala and to quote:-

"Perhaps incited by the stirring display at Brighton over Easter, eleven teams entered this second big match, and the four finalists provided such a thrilling finale that Fairlop air has been buzzing with team race chatter ever since. Working on the 'long-range' theory, Norman Butcher surprised all by finishing his five mile eliminator non-stop, using an ED IV; yet he was beaten by Johnny Nunn whose fastest ever team, completed two refuellings in approximately 30 seconds each. Butcher was a close enough second place to warrant fourth place in the final, where he repeated his long range flight; but was obviously handicapped by his lower speed.

With four in the circle, anything can

happen... T Wilson (ED IV) was very unfortunate in getting his lines wrapped around Nunn and Butcher each of whom flew left handed while trying to get untangled and perhaps Johnny Nunn (Frog 500) was more unfortunate in losing 0.05 of his 125sq. inches on 'Skipper' Rowe's forehead as the latter refuelled his Amco 3.5 winner".

All exciting stuff 'Skipper' Capt D Rowe refuelled and restarted his Amco five times during the ten mile race (pilot was D West), using an 8 x 10in. prop the model averaged 30-35 laps per tankful which could be 30cc according to the rules (max engine size 5cc).

I hope I've whet your appetite a little but what are we going to do about it? To succeed, modellers from outside the usual team race

circles need to be encouraged and for them to stand a chance of winning. The 'Midge' speed formula seems to have worked with a great cross section of modellers having a go and enjoying themselves! If you like the idea of vintage team race please tell us what you think so we may recapture the thrills of four up racing back there in the 50s.

As a footnote a certain Cyril Shaw was at the West Essex Gala and set a new record in the 1.5cc speed class of 75.4 mph with his 'Javelin' powered 'Midge'. Geoff Clarke's winning speed of 75 mph at the 1984 Vintage Day, with his 'Javelin' 'Midge' was a very creditable performance especially considering the extra drag of the 0.015in diameter Laystrate, compared with the original's 0.008in solid wires.



EXPERTS FORUM

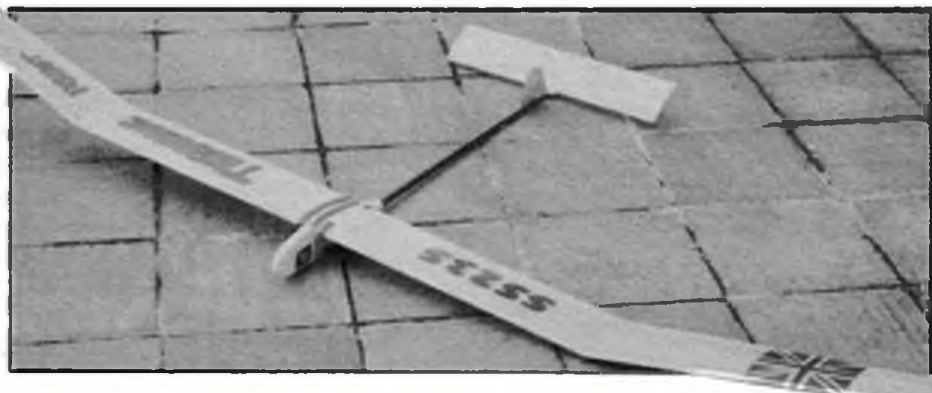
Phil Owen's way with A/2 gliders

MY INVOLVEMENT with aeromodelling dates back to 1953 when as a schoolboy I joined Wavertree MFC after having first completed the statutory apprenticeship on simple kits. The club had a strong following in Free Flight and Control Line (no R/C in those days) and over the next five years I had a go at most types of modelling. I enjoyed them all, particularly F/F power and C/L team racing; an event I still find fascinating.

A decline in aeromodelling activity in the Merseyside area in the late 50s resulted in the remaining stalwarts from the several local clubs amalgamating to form Liverpool & District MAS. This has grown into a very large and successful club and has been responsible for organising the annual Woodvale R/C Extravaganza plus the 1978 R/C and C/L World Championships at that venue.

By the end of the 1950s my interest in aeromodelling had declined to the armchair variety due to a developing interest in

Right, "Turning Point" Mk IV made its first major appearance at the 1982 Nats where Phil placed third in Open Glider. Below, different tips are the most noticeable difference in this shot of the Mk II (1979).



cycling (it was all the cycling to distant flying fields that started it) plus pressures of University studies.

A move of job to the London area some ten years later, resulted in me living in the vicinity of Epsom Downs. The availability of such a suitable flying field plus some chance meetings with glider flyers from the Croydon club rekindled my interest. My re-introduction was via Dave White's 'Rolling Stone' design. This design proved an excellent introduction to glider flying and has probably introduced more people to competitive glider flying than any other single design in the last twenty years. It is still to be recommended together with its modern derivatives ('Pink Elephant' by John Cooper and 'Sunset' by Brian Baines).

I quickly realised that whilst the 'Stone' was a very good model in lift it did not have a very good dead air performance - 2 minutes ± 10 seconds being typical. Over the period '69-'72 I attempted to develop a glider with higher intrinsic performance, my approach loosely followed the designs of Elton Drew. The series of models flew well in light conditions but with variable reliability in strong wind. They did ultimately produce useful competition success in winning the Nats in '74 and the KMAA trophy in '75.

The general preoccupation with tactical

flying in the early 70s was responsible for another change in glider development. The emphasis moved back to the more rugged, lower performance, straight tow models. In my own case I built a number of 'Stone' derivatives which utilised a very simple multispar wing structure but changed to the Shoaf 4738 wing section. This commonly adopted approach was, on reflection, an incorrect one, which I now believe hindered A2 development in the U.K. and inhibited the widespread use of circle towing.

After a virtual layoff from flying in '77 due to a house move I was fortunate in winning the '78 Team trials for the '79 World Championships at Taft (USA). I used my original ten year old 'Rolling Stone' and was undoubtedly helped by the very windy conditions at the first trials which suited this model well.

The prospect of competing in the '79 World Championships was a daunting one, especially as I realised that my own outdated models were hardly suitable for the envisaged conditions at Taft. The solution necessitated building at least two new more suitable models. The problem was whether to develop one's own design or adopt a proven one. I opted for the former which was probably a mistake. It did, however, force me into a line of development which I other-

wise would not have made and has since paid dividends in that I did not have this problem for the '85 World Championships in Yugoslavia.

Development of 'Turning Point'

The design philosophy of the first model in the series was based on the results of an experiment which involved flying two models together. Comparisons can only be made in flat calm conditions and ensuring that both models are circling in identical air. One such series of experiments was made with the help of my then flying companion Bert King. Both of our models were using the identical Shoaf wing sections; indeed the ribs for both models were cut using the same metal template. His model, which featured long tapered tips, consistently outperformed my 'Rolling Stone' type derivations by about 30 seconds...

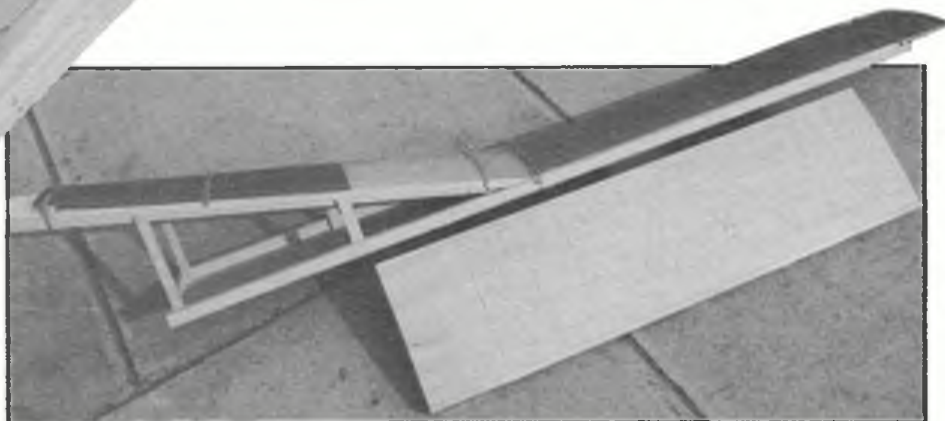
During these tests the models were launched together and it was so calm that they flew within a few yards of one another for the entire flight.

The first 'Turning Point' adopted the tapered wing layout and this feature has been common to all subsequent versions. The Mk I design was published in the 1979 NFFS plans book and utilised Shoaf wing section and multispar wing structure. Its performance matched expectations and it proved very easy to trim and forgiving to fly. Originally it was fitted with a straight tow hook which was replaced by the then newly available Hatschek circle-tow hook - once a satisfactory hook position had been found. These excellent hooks have been fitted to five subsequent models.

Recently I have been experimenting with other hook designs and have settled for the hook shown in the photographs shown here. This is superbly made and would not be out of place at the M.E. Exhibition. I hasten to add that the ex-modeller who made these for me is not prepared to make any for resale!



Left, one of Phil's cambered building jigs together with Mylar plan (see text). Below, an early wing jig - note the packing under the tip for washout, below this is the custom-built jig from Joe Maxwell.



In an attempt to extract even more performance from the basic layout I was mistakenly tempted to build a Mk II version with a thinner wing section (6%) designed by Hirschell. This proved to be my undoing and confirmed a suspicion that thin sections do not necessarily glide best. I wasted vital time prior to the '79 World Champs trying to persuade the model to fly. In desperation another set of wings (Mk III) were hurriedly built before departure for Taft. The change back to the *Shoaf* section cured the problem immediately. Both Mks II and III used the wing structure shown in the Mk IV three view. The change in structure was an attempt to produce a more rigid wing, which was quick to build. It succeeded in the first respect but not in the latter.

After an undistinguished performance at the '79 Championships, Mks I and II were used successfully for a couple of seasons of domestic competition until both were lost following DT failures. Their loss necessitated using the then newly completed Mk IV and forced me to salvage something from the Mk II debacle. This model would tow well and had a superb slow glide. Unfortunately, after 1-1/2 minutes of stable flight it would develop a stall which defied eradication.

I sought advice from many well known figures but none could offer an explanation or solution. One fact had emerged - namely the exceptionally slow glide. In desperation I took a razor-plane to the leading edge and sharpened the front of the wing section. This, coupled with a dramatic increase in tip washout cured the problem and produced what I still rate as my best ever model.

Subsequent loss of some of the tip washout brought the stalling problem back and with the advantage of hindsight I feel that more than usual washout (6 - 9mm) is necessary with these long tapered tip

models. This has been confirmed with the development of the Mk IV and V versions of the design which use the *Quarnstrom* wing section.

The change to this section was prompted by the performance of Per Quarnstrom's models at the '79 Championships. The section is derived from *Benedek 6356* and it is interesting to note that it appears to be identical to the *Koster '66 Wakefield* section.

'Turning point' Mk IV has certainly been a good model and during the '82-'84 period has resulted in my best ever run of contest success. Mk V is a shorter tipped version of Mk IV and has a moulded glass fibre fuselage front end. Mks VI and VII are virtual copies, apart from minor structural changes, of Mks II and IV respectively.

Constructional Aspects

My scientific background has taught me the importance of keeping *very* detailed records during model construction and flying. I try to weigh all timber at the point of purchase using a 0-100g spring balance and make such purchases as and when I see suitable timber rather than when needed. I cut stripwood from sheet; apart from the saving in cost it gives matched strips. I only recommend this if you have a small circular saw available, as I have found that stripping wood using a knife and straight edge can produce bowing of the strip.

All parts for any given components are

cut out and accurately weighed (laboratory scales!) prior to glueing. This enables me to predict the final weight of any component in advance of building it. It also affords an opportunity to make any weight adjustments *prior* to construction. An interesting observation is that the contribution of the ribs to the *overall* weight of a wing or tail is relatively small and thus one should perhaps err on the heavy side in the choice of rib material.

For the general construction I favour white PVA dispensed from a 10cc plastic syringe fitted with a coarse needle that has had the point ground off. This ensures that you use the minimum of glue (its quite heavy) in the desired spot. PVA can be left in the syringe for quite a long period without going solid.

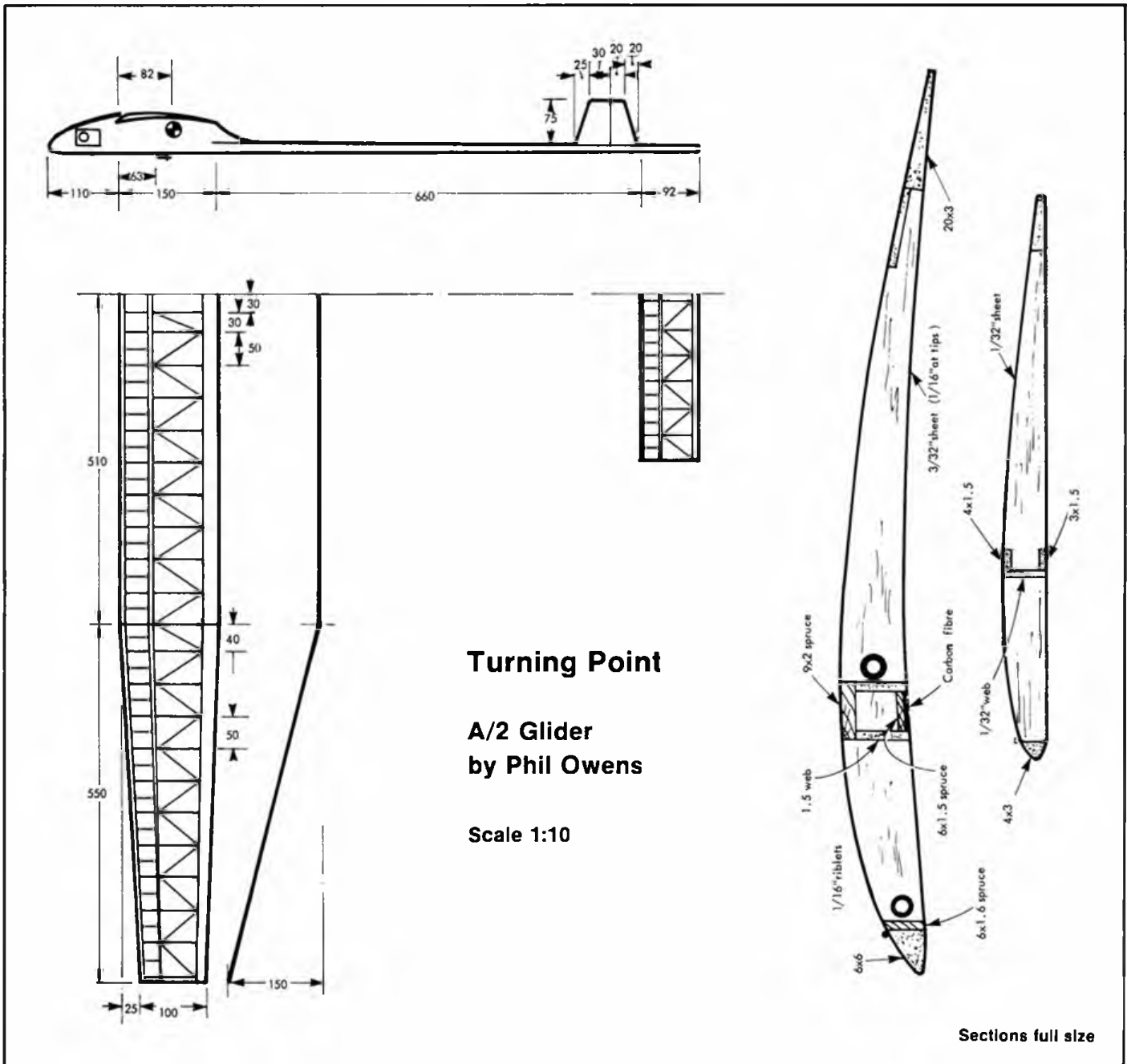
If it should sieze up, overnight immersion in a bowl of water enables re-use of the syringe. For highly stressed joints I use regular *Araldite*, never 5 minute epoxy, as I have found that the latter has a tendency to lose its strength and become rubbery after several years. I suspect that this may be due to long term water absorption.

More recently I have made greater use of cyano for basic construction and for aligning components prior to using epoxy. Cyano offers many advantages by virtue of its capillary penetration of joints but this also has its disadvantages, in that it sticks the component to the plan or jig! I tried covering the jigs with various materials but the only one that really worked was clear 0.002in. *Mylar/Melinex* film. This is fairly cheap, about 50p per square metre and is obtainable from suppliers of glass fibre laminating materials, who sell it as a mould release agent. One significant advantage of this material is that you can easily draw your plan directly onto the film using an overhead projector marker pen. What is more, by turning the sheet over you obtain an exact mirror image of the plan - very useful for wing construction...

The first six models in the series were built on the jigs shown. These were constructed from rock hard 1/2in square balsa and covered with 1/16in thick cardboard. Such jigs can accommodate a variety of wing section by changes in the undercamber packing strips. My most recent model has been built on a cambered jig which is commercially available from *Joe Maxwell* and has the top surface machined to suit any undercamber which the customer requires. An additional feature is that the ends of the boards can be cut to any angle, thereby enabling accurate sanding and



Left, two "Turning Point" front ends, note battery in the Mk IV (top) to power retrieval aid beeper, bottom - latest version with pivoted hatch revealing latest two hook - the skid protects the hook from damage on landing.



Turning Point

A/2 Glider by Phil Owens

Scale 1:10

Sections full size

fitting of dihedral joints. These jigs plus the previously described non-stick plans do ensure accurately built wing panels.

I still use the older non cambered jigs for aligning tip and centre panels. Wings built in this manner turn out to have perfectly flat centre panels and tips which are slight (2-3mm) washed out. The washout is increased by steaming and banding the wings back onto the jigs with suitable packing.

Great care should be taken in selecting the wing spar materials as they carry most of the wing loads. I cut the spars from close grained spruce. The bottom spar is intentionally made smaller than the top spar since timber is much stronger in tension than in compression and the difference in spar width allows easy and accurate fitting of the webbing.

The bottom spar is reinforced by sticking a tow of carbon fibre along its length. This is done *after* the wing panel is completed. The carbon fibre tow is smoothed out so that its width is approximately equal to the spar

width and tacked to the spar just past the dihedral joint with cyano. The fibres are smoothed out across and along the spar and tacked with cyano at 10cm intervals. It helps to apply slight tension to the tow whilst doing this...

The carbon is finally stuck to the spar with thin epoxy resin (*SP113*) or alternatively and equally satisfactory, several coats of *Tufkote* fuel proofer. It helps to hold everything in place if a length of sellotape is pressed on top of the wet epoxy whilst it cures. On my latest model, I have added four or five strands of boron fibre before sticking the carbon fibre to the spar.

Alternatively, the carbon can be directly attached to the spar prior to building the wing panel. This requires the use of a mould and I use an adaption of the method described by T/R columnist Jim Woodside. Being a neighbour of Jim's I was able to use this mould and simply added a length of spruce to the mould before clamping up...

This produces a very professional product

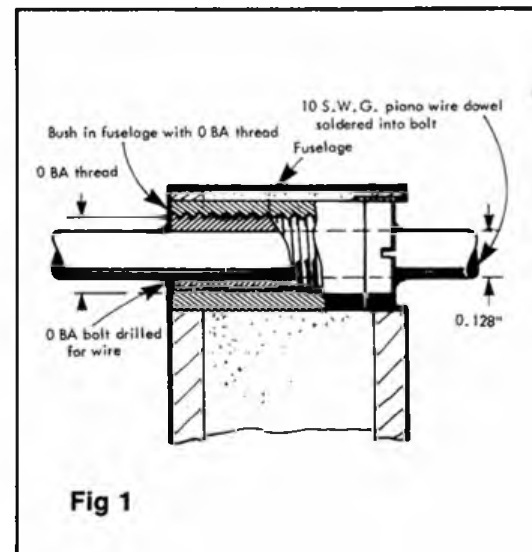


Fig 1

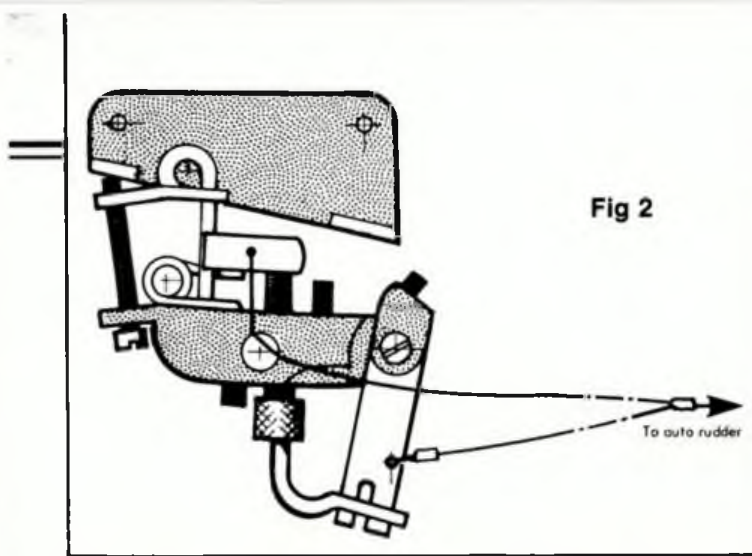
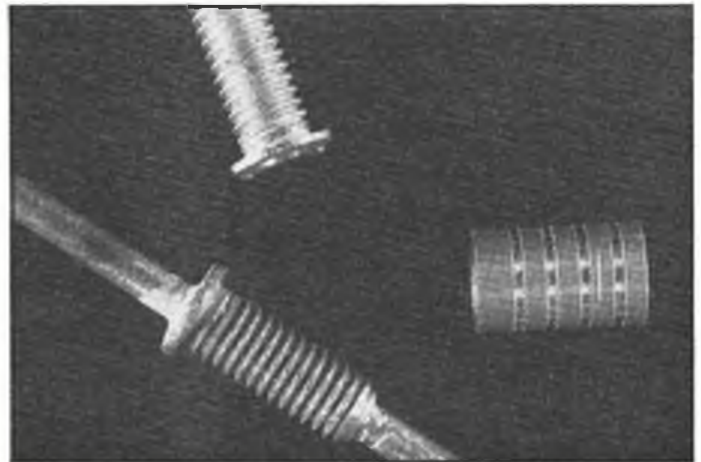


Fig 2



Right, details of Phil's wing joiner system, an OBA brass bolt is drilled to suit joiner and soldered on. Fuselage bush has OBA thread to accept this arrangement.

but the technique does limit the choice of spar widths. Also the clamping operation, which is necessary to exclude air and excess resin, produced a slight bow in the completed spar. This disappeared when it was built into a wing panel but worries me as potentially a source of future warps.

With the present series of models I abandoned using the thin *Ronytubes* because I suspected that their flexibility might cause problems during circle towing. Instead, I use either a balsa/spruce fuselage boom or the large diameter 'Tchopp' *Ronytube*. In using the latter, it is essential to take care with the routing of DT or auto-rudder lines through the thin wall of the tube. I've seen a number of fuselage failures emanating from small holes which have been drilled through the fuselage. Such holes *must* be re-inforced if a strong fuselage is to be obtained.

Most versions of this design have used wing dowels which screw directly into the fuselage (fig 1). The system has proved entirely reliable and greatly facilitates assembly and dismantling of the model (useful when returning upwind on a windy day too). The threaded sleeves are easily made from OBA screws with the aid of a lathe and give the added advantage of greatly stiffening the wing joiners when soldered to them.

Flying/Trimming

Of the various aspects of aeromodelling it is the development and flying of the models that motivates me most. Building, I find the tedious side of the sport although care in construction undoubtedly pays dividends with regards to the reliability and longevity of a model.

Since the flying of free flight models is so weather dependant, it is important to make maximum use of any suitable flying opportunity.

If accurate and detailed records have been kept of previous models in a series, it is possible to predict approximate trim settings e.g. decalage and rudder settings without leaving the workshop. With the present design the important points are CG, hook position (both shown on 3-views) and wing warps. The centre panels should be flat and the tips washed out equally (6-8mm). This washout is *very* important in preventing tip stalling of the long tip panels.

One of the commonest difficulties with circle tow models is getting the so called 'zoom launch' correct. In many cases a zoom dive would be a more apt description. This can be caused by a number of factors. The design of most circle hooks is such that the auto-rudder line is slackened as line tension is applied prior to unlatch...

The rudder deflection so produced causes the model to veer progressively up to the point of launch. At this stage the model, which is already veering in the glide direction, is subjected to a further increase in rudder deflection corresponding to the glide turn setting. These two factors, coupled with the high launch speed, cause the model to spin until speed is lost and it hopefully returns to its normal glide pattern. In extreme cases the spin causes the model to speed up and it never recovers!

Several solutions to this problem are possible depending on the design of the hook. Ideally, the spring in the hook should be subjected to a preload (5lb) which is only slightly less than the release tension (6lb). This ensures that virtually no rudder

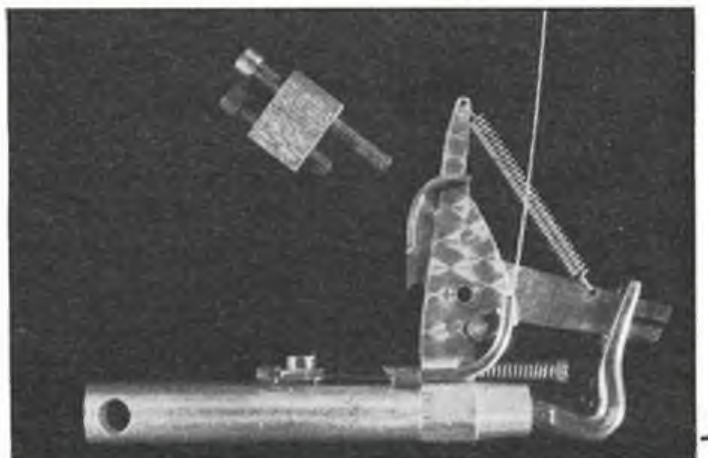
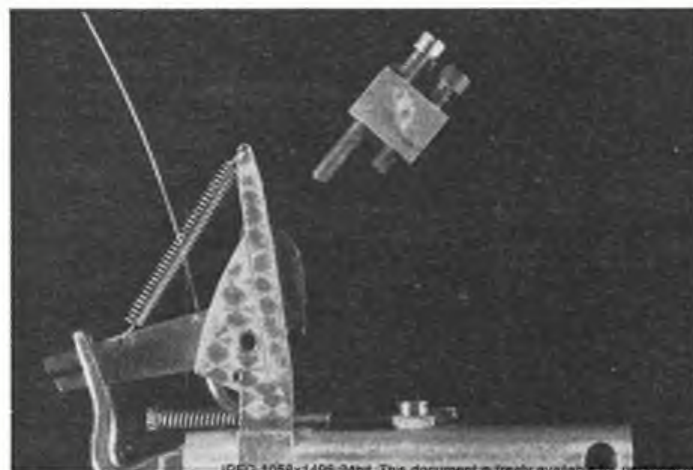
deflection is applied until the model is launched. Frequently the hook design prevents this and a simple and neat alternative is that shown in figure 2. The additional line from the latch to the auto-rudder line effectively overrides the zoom.

This method is applicable to just about all the commonly used circle tow-hook designs. I have found that even after overriding the zoom setting, some models exhibit a flat rather than climbing launch. This is due to the increased effectiveness of the glide rudder setting at the high launch speed. Most people overcome this by the use of a little wash-in (1-2mm) on the inner wing panel in the turn direction. A simpler and I feel preferable method is to decrease the amount of rudder deflection for the glide and compensate by adding tail tilt, the effect of which is virtually independent of speed.

Finally, I should point out that I do not believe that there is any magic formula for success in glider flying. Its a function of the effort expended in developing and flying a model. Building a well established design is a good starting point but don't expect instant results with somebody else's design - which may have taken years to perfect. I find that each model has a character of its own despite my attempts to make them identical. It is only after constant test flying that these idiosyncrasies can be evaluated and exploited. Constant test flying also serves to maintain a degree of physical fitness which is an important aspect, as fatigue during a long tow will certainly affect one's ability to judge the conditions correctly.

Most importantly *enjoy your flying* - if winning is your *raison d'être* it is time you tried another hobby...

Below and left, left and right views of Phil's tow hook - just shows what can be done in the average workshop...with ablt of care and a lot of skill!



VINTAGE CORNER WITH ALEX IMRIE

Howlers

When recently speaking to Doug McHard he mentioned what he thought was an error in the October Vintage Corner, in that the Earl Stahl 'Hurricane' may not have been described in the July 1940 *Flying Aces* as I had stated. I checked, and was just preening myself on being right again, when I saw with horror that in the same issue, I had, on two occasions, called Derek Ridley, for some obscure reason, Clive! Wish I could have blamed it on the typesetters, but I can't!

upon us, and the days of the quality rubber model kit were numbered. Not that I have anything against the post war 'Super', it is undeniably a much more workmanlike version of the original design. However, *nostalgia* being the name of the game, I wanted to build the original as I knew it - warts and all!

Of course, as with other models, in my youthful folly I had neglected to preserve the original plans and spent quite a while trying to locate a set. Indeed I had pretty much

Right, Mike Kemp, SAM 35 Rubber Columnist with his 'Raff V' a Norman Marcus design, described in Aeromodeller January 1947. Although fitted with a D/T, was lost at last year's Oxford Rally. Plans are still available as D/253 from APS price £2.30 plus 50p postage.



Above, 'Club Super Durallon' built by Ron Randall from Coventry (see text) this 40 inch span design won many awards in the competitions held in 1938 and 1939.

This is the column too, where I am apologising to Brian Welch for similiar ill treatment in a previous issue! Must be old age or too much 'Mountain Dew', whatever the reason, my apologies to Derek. Even H B McGillicuddy would have uttered more than his customary 'Tuts' at my behaviour

During the past few months space has been at a premium due to reporting on the various vintage meetings held throughout the year, and as a result a number of letters from readers have been unavoidably held over. In an attempt to catch up, a selection of these are given this month.

Club Super Duration

Ron Randall of Coventry writes: "Latest model in the 'second time around' series of Randall's Reminiscences is the 'Club Super' duration model. I am aware that you have featured this model in the column before, but this was not the machine that I knew in the early 1940s. The model shown in the photo you published (Vintage Corner January 1983) was probably built from plans which are currently commercially available and is the post-war version of the 'Super'. (It was actually the 'Club Duration' a 36in version by Bill Archer of Inverness).

A few manufacturers, including *Veron* and *Premier* as well as *Drome* tried to modernize their somewhat dated designs in the immediate post-war years, but none were successful. The era of the diesel was

given up hope of obtaining them and considered, in my ignorance, simply altering the shape of the tail assembly on the post-war version to that of the 1938 original.

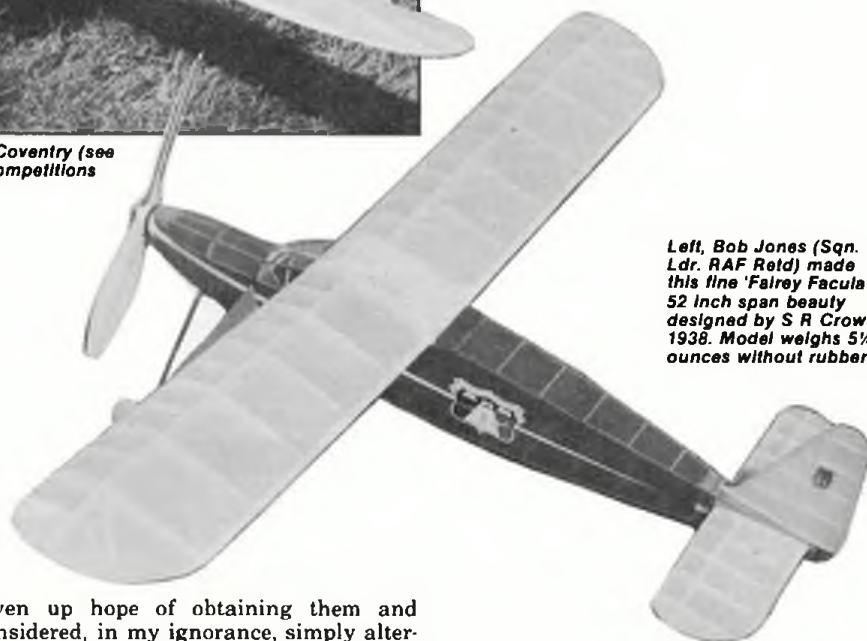
Having now obtained the original plans I am certainly glad that I did not take this drastic action. Although it *looks* basically the same outline as the original, the post war version has a longer fuselage, different tail and rudder shape, different wing section and construction, different undercarriage, and in fact about the only feature the two versions have in common is the nose block and airscrew assembly!

How I came to get the plans is in itself one of those odd quirks of fate. After searching high and low for the things for years, it turns out that a chap I know who lives just a

couple of miles away down the road had them all the time - Thanks Ray!

My 'Super' is finished in natural wood and white tissue which is how I always remember the ones that were built in this area. A second vote of thanks now to Phil Smith for making genuine Jap white tissue available to me and others of the vintage fraternity. This has enabled me to re-create as near as I can make it a 100% authentic replica - which to me is what, this game is all about.

On the subject of tissue, as a sort of post-script to my comments on *dead* Jap tissue in



Left, Bob Jones (Sqn. Ldr. RAF Retd) made this fine 'Falrey Facula', a 52 inch span beauty designed by S R Crow in 1938. Model weighs 5 1/4 ounces without rubber.

my last letter, (Vintage Corner March 1985) I received a very nice reply from a gentleman in Yorkshire. After writing at some length on various covering techniques, he made a most intriguing reference to the fact that he had covered some of his models with tissue which he obtained wrapped around bottles of wine!

Now I am all for old time models having the correct *vintage flavour* - but is this not taking things a little to extremes? Conjures up a mental picture of a vintage modeller slumped on the floor, dead to the world, with a serene smile on his face, and surrounded



Left, John Meaney, a Flight Engineer on Lockheed TriStars with 'Merlu' which has featured in this column before as an uncovered airframe (April 1984). Taken at rain-soaked Barkston Heath on 4th August last, John presented the model to a surprised and delighted American visitor a few minutes later.

by dozens of empty wine bottles. Enter wife, who looks at the half covered model on the workbench then, raising her eyes to the heavens exits, muttering 'There he goes, at it again, trying to cover a 'Thermalist' at one sitting'..."

Wakefield Or Not?

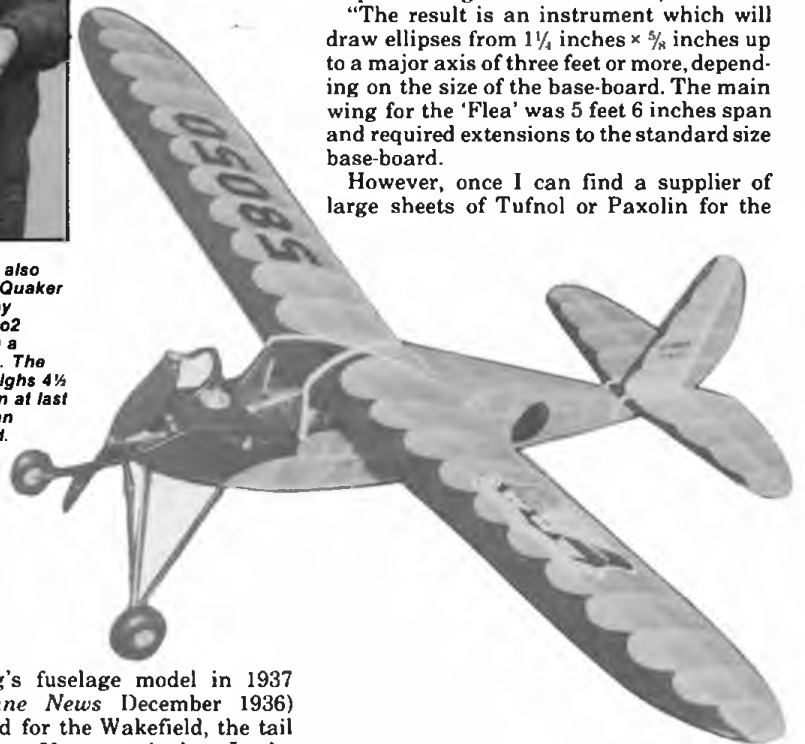
Arthur Butler, free flight competition flyer of West Pennant Hills, Australia, takes us to task on our generalisation of Wakefield models, he writes:

"I don't recall 'Lanzo' ever flying a Wakefield or designing one. The 1936 'Lanzo' in the photos at Warwick (Vintage Corner October 1984) is a cabin fuselage model to American rules ie weight one ounce per 50 square inches of wing area.

Wakefield specifications included that the tail area be a maximum of one third of the wing area. The plan of the 1936 'Lanzo' (*Air Trails* September 1937) gives the tailplane as having a span of 23 inches and a chord of four inches, producing an area of about 77 square inches. Wakefield wings were 200 square inches area plus or minus 10 square inches, thus if the wing was 210 square inches area the maximum area of the tail would have to be 70 square inches.

The 'Lanzo' wing is nearer to 190 square inches area so the above mentioned tail is very much over area, and this makes the model ineligible for Wakefield contests.

Right Bob Jones also built this 1/4 size 'Quaker Flash' powered by Davis/Cox 020 Co2 conversion using a Modela propeller. The model, which weighs 4 1/2 ounces was flown at last year's Old Warden Vintage Weekend.



I built Ying's fuselage model in 1937 (*Model Airplane News* December 1936) which qualified for the Wakefield, the tail area being about 60 square inches. In the June 1985 *Aeromodeller* in Free Flight Scene photos of Dave Hipperson's 'Lanzo' described as a Wakefield, give a good view of the elevator and 'Blind Freddie' could see that it is much over area according to the Wakefield specification for that period.

I have just about retired from free flight competitions and have started building the pre-war models that I was not able to make as a lad. Presently I am on Cahill's

'Clodhopper' and Goldberg's 'Zipper'. I look forward to reading Vintage Corner, keep up the good work."

Thanks, Arthur, for bringing these facts to our attention, we stand corrected. How about it SAM - should these 'Lanzos' have been in the competition at all?

Easy Ellipses

John Derbyshire of Sheepcote, The Green, Tuddenham St Mary, Bury St Edmunds, Suffolk made a quarter scale 'Flying Flea' some time ago and has developed an idea which he used in rough form to draw the elliptical wings of that machine, he writes:

"The result is an instrument which will draw ellipses from 1 1/4 inches x 5/8 inches up to a major axis of three feet or more, depending on the size of the base-board. The main wing for the 'Flea' was 5 feet 6 inches span and required extensions to the standard size base-board.

However, once I can find a supplier of large sheets of Tufnol or Paxolin for the

base-board, I can go up to wing spans of 6 feet (half span of 3 feet) or more from the smallest ellipse of the size given above using just two different size base-boards but using the same bits and pieces. In examples of the smaller size ellipses the major and minor axes are infinitely variable.

For the modeller about to sit down and draw a model with several elliptical cross-section fuselage formers and elliptical wings and tail, I should think that such an instrument would be more than useful and a great time-saver. I am looking at the possibilities of obtaining a provisional patent; however, I would much appreciate any views of modellers who would be interested in this instrument if I go into production. It would only, I hope, cost a few pounds.

Meanwhile, time permitting and to get the idea circulated (ellipticated?) I could produce some ellipses to order if anyone is interested. These would be on folded foolscap or kitchen shelf paper unless other paper (and cardboard tubes) were supplied and would be in pencil or ballpoint pen as required. A postage stamp and a small contribution towards my R & D costs would be much appreciated."

Help wanted

J Price of 49 Willard Street, Bootle, Merseyside wonders if it is still possible to buy the replica transfer of the old



Left, yet another model from Bob Jones' hangar is this 1/4 size 'Privateer' powered with a Brown Co2 engine. Weighing only 1 1/4 ounces the model is in excellent condition and a super flyer.

NGA/NGM 'Volas Cum Cura' type as described in Vintage Corner August 1983 and January 1984. I understand that the original supplier went out of business but there must be some model shop somewhere with these still in stock, has SAM 35 perhaps a source of supply?

Tony Murphy of 66 Wansbem Road, Ashington, Northumberland would like to build Rupert Moore's rubber driven 'Tiger Moth' (FSR/197 from APS price £3.60 plus 50p postage) but does not feel capable of tackling the Moore Diaphragm and has thoughts of fitting a twin geared motor if he could find suitable gears. This seems an on-going requirement and does any reader



Above, Marlo Rolando made this 'Snowflake' for a Dooling 61 and tells of very successful flights. The 'Snowflake' dates from 1948, while the Circulator, above right, is a 1950 design.

know of a source of cheap suitable gear-wheels of around 3/4 inch diameter?

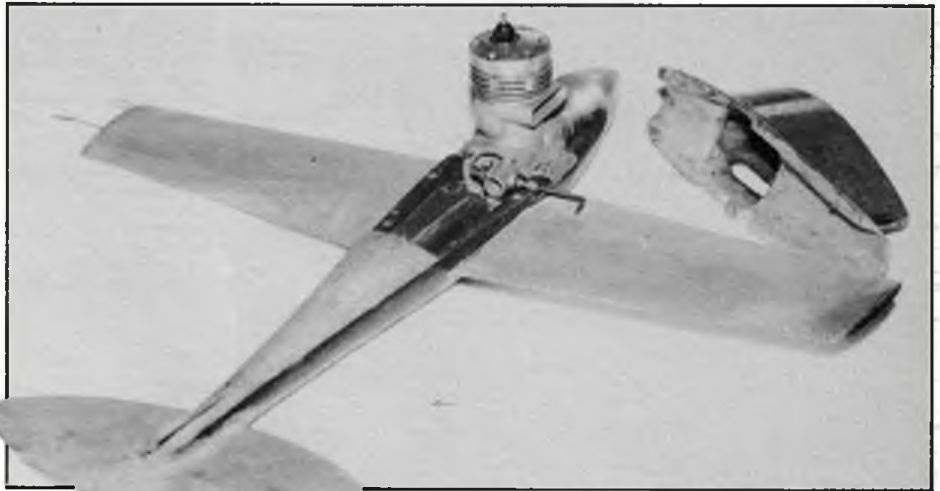
Norman Wells previously of the Northern Heights MAC, the name of his house being most appropriate for that of a vintage modeller at 'Jackdaws', 25 Highridge Close, Purton, Near Swindon, Wilts, desires to have more information on The Club Favourite 'Miss Blue Bird', especially the date of the original model. The earliest mention that I can find is in a half page advert in *The Model Aeroplane Constructor* for April 1937, but possibly some reader can provide more exact gen.

The model is a good case in point regarding the up-dating of plans mentioned by Ron Randall earlier. While I can't give a detailed list of differences between the blue print (my original being on loan) and the 1940 plan, the latter was a complete re-design with thicker ribs, different motor anchorage and changed fuselage shape.

Simon G Blake from 10940 71 Avenue, Edmonton, Alberta, Canada is trying to unearth plans of the model that Bob Copland flew in the 1939 Wakefield Contest at Bendix, New Jersey. He writes:

"The only picture I have of it appears in an article called 'Looking Back' in the 1944 *Air Trails Annual*. . . I have a set of plans for Copland's Wakefield as described in *Aeromodeller* December 1946 (APS plan D/121X price £3.60 plus 50p postage) is this the same aeroplane? I need to know because we fly to American SAM rules with a cut-off date of 31 December 1942. . ."

It appears that the 1940 Wakefield described by Bob in *Aero Modeller* April



Above, Ing Marlo Rolando from Northern Italy has read *Aeromodeller* since 1946, always a speed merchant, when he found two brand new Doolings he naturally made suitable models for them. Here is his Circulator fitted with the Dooling 29.

slight resemblance, is completely different in construction and shape."

But was that 1940 model really all that different from the 1939 one despite Bob's statement? Especially since he writes in *SAM 35 Yearbook No 2*: "During the war no further development took place, but when it was possible to start up again, the next model was of similar shape and build, except that the wing section was changed from the popular RAF 32 to a Davis, which is quite a bit thinner."

The 1940 plan gives a span of 43 1/2 inches and shows a single blade propeller, whereas the 1946 plan uses a two bladed propeller and gives a span of 47 inches. Can any reader help with plans or details of the 1939 model, or will Bob tell us more? Maybe he has drawings of this machine, which I think still exists in USA, possibly in the AMA Model Museum?

Competitions

Simeon Bull of 4 Castle Street, Canterbury sends a thought provoking letter on this subject which includes, inter alia: "It is well known that mankind is by nature competitive. However, motivation in this area will range from 0 - 100% with most people being 'almost average' (40-60%)."

Below, Performance Kits 'Aspls' models on Jurby aerodrome IOM during development flying of this Vintage Style machine which will soon appear as a plan in this journal. Left to right, John Kemp, Peter Fisher and Charlie Staples (see text).



What this means in practice is that most people like to compete with their 'mates' and are quite content to be big fish in small ponds. Only a few (60% +) will wish to compete outside that group, ie Nationally or (80% +) Internationally. These last named are a race apart and will develop anything, to a level that is way beyond the capabilities of the average (40 - 60% group)...

I can remember Clubs going to Open Meetings by coach and I am sure that if we could somehow organise a return to this we would see a considerable revival in the

to 'pinch' the SAM 35 idea and promise local/Regional/National events for 'one-designs' (or for models of a largely similar but simple concept) and, for the most part, for free flight models. Some at sub-Regional level could be one/two day get-togethers: others could be monthly/seasonal competitions that would allow the competitor any number of officially observed attempts by independent Third Parties...given a real push we could, perhaps, look forward to seeing hundreds of 'Ajaxes', 'Orliks' or whatever floating round

the first three models which virtually flew off the board. Recently Charlie Staples and myself indulged in some formation free flight, using this design, and it was very pleasing to see them performing with almost identical flight patterns.

Completion of the sale of our old works buildings, and my abode, at Thorncote Green was recently effected, and the final residue of *Performance Kits* parts etc were packed into six large cartons and shipped over here. Lists have been prepared at nominal prices, in the hope that this large supply of original items, many dating back to 1957 can pass to vintage enthusiasts."

Interested readers should write direct to Peter for the lists which comprise almost a brief history of *Performance Kits*, and list plans for 'Sun Duster', 'Cloud Elf', 'Ziz' and many others.

Below, Bob Copland winner of the Queen's Cup on June 24th 1951 at Langley aerodrome during the Northern Heights Gala with a time of 10 minutes 8 seconds.



Above, happiness is two 'Midgets' John Kemp holds the two models mentioned in Tony Penhall's letter (see text). This design was researched by Ernst Schiachter from Switzerland a keen CEB enthusiast. The prototype machine is illustrated on page 134 of CEB's book *Diesel Model Engines* (1st Edition) and is fitted there with a Majesco Mite .7cc diesel and fitted with full span slots.

number of competitors, mind you I am not sure that this is what organisations like the SMAE want in a National event, nevertheless perhaps at Area level it would be something to aim for.

Coming now to SAM 35 and Old Warden. As an aeromodeller I am definitely only 40% motivated, I am not even a member of my local club. I am quite happy to lob my creations into the air in a field close to my house and my pleasure is in achieving a satisfactory flight pattern, in other words the model more or less does what I want it to do.

However, according to all reports, Old Warden Vintage Weekend is *Fun*, so I determined to go this year (actually I determined to go in '82, '83 and '84 but somehow it didn't happen - lack of real motivation!) Anyway I built 'Spar-Es' for the purpose - to give my pilgrimage a focus. In the event, whilst I was gratified to come away with the 'Spar-Es' plaque, I was rather saddened that none of the SAM 35 'experts' were competing - I had hoped to learn quite a lot so as to have some sort of *benchmark* for my future (solitary) endeavours...

To my way of thinking SAM 35 has the right approach. Think up something simple and invite the 'faithful' to 'have a go'. Nothing elaborate, high tech or expensive - something that most people may well have around anyway or can build quite quickly and cheaply. In this, SAM 35 seems to have injected a further factor - a leaning towards 'one-design' or something close to it and changing the specification just often enough to prevent *total expertise* creeping in...

Perhaps the SMAE should be encouraged

small fields on balmy evenings.

Trade support would be a great help - those splendid people (who's name escapes me for the moment) who started off with 'Chukkiess' show what can be done. (David and Janine Rawlins of *DPR Models*...Ed).

Hopefully we have not altered the meaning of Simeon's narrative by rather drastic cutting, I am sure that the meaning is clear, but then there is surely a difference between the serious competitor for out and out performance and the SAM 35 'fun-flyer' - even though both may be 100% motivated...

Simeon's missive ends with: "...perhaps the word could somehow be spread that it is the *in thing* to go to open meetings by coach (I nearly said 'Charabanc!') - or at least minibus."

I.O.M. Doings

Peter Fisher (*Performance Kits*) of Woodland Towers, Onchan, Isle of Man writes: "John Kemp visited us again this summer, and we had a couple of Vintage Sports flying sessions on the aerodrome at Jurby. The enclosed photo, taken on the edge of the runway, with the mountains in the background, shows him on the left of me with Charlie Staples on the right.

The models are of course, my latest Vintage Style design, the 'Aspis'. All three machines were built from my original plan and are 'Dart' .5cc diesel powered. Wingspan is 36.4 inches and the all up weight 6½ ounces. All models are finished in orange and yellow heavyweight *Modelspan*.

The design has been taken over by *Aeromodeller* (Feb '86), so I thought that the readers might be interested in this picture of



Keen Junior

Richard Hunter also has a most appropriately named home for an aeromodeller: he lives at "Lysander", Houghton-le-Spring, Tyne and Wear and writes as follows: "In regard to your article on 'us youngsters' getting involved with aeromedelling. (I try and give the juniors a plug when I can and Richard probably means my recent mention of Mark Leivesley and Stephan Edkins from *Mike's Models* who have been regular attenders at our meetings this year) I have only been building models since about March, and certainly I am 'hooked' but am

somewhat alone in my obsession (although I have introduced at least two friends to the hobby who have built models since).

The problem as far as our area goes, is awareness of the hobby. I have shown some of my models (none of which are very good really, only being simple owing to my lack of experience) to my schoolfriends, and they say that they have never seen anything like them, and are amazed at the most moderate of performances. So why not bring the hobby more to the notice of our generation? I am really sure that this would work."

Although Richard does not tell us his age, or detail the kind of models he has made, his remarks hit right on the button - are we all doing as much as possible to bring the hobby to the attention of juniors? If not, take a leaf from Richard's book.

We look forward to hearing more from this young enthusiast, perhaps with photos of his models, and in the meantime let's see whether every reader can recruit at least one youngster to our ranks.

Bowden Midgets

Tony Penhall of 'Brigadoon', 62 Gordon Road, Little Paxton, Cambs., tells of adventures with this smallest of CEB designs. He says: "John Kemp and I have recently completed a 23 inch span 'Bowden Midget' each, both have had their trials and are really delightful little models, but at eight ounces all up weight with but one square foot of wing area, they tend to be a little swift. All the same we are very pleased with both of them.

Right, to encourage our juniors, here is a fine example that breathes the very spirit of aeromodelling. Master G Pendlebury aged 12 with his well made 'Flying Minutes' at the Northern Area Daily Dispatch Rally on Woodford aerodrome in 1947.




I was fortunate in obtaining an Ace. 5cc diesel for mine and since this is the right engine, it tends to make my model the more authentic. John has an ED 'Baby' .46cc diesel in his model and it flies, if anything better than mine. Should any reader be interested I can supply plans for the 'Bowden Midget' at £3.00p per set."

The Late Peter Mason

Any readers having unfinished business with the above named are asked to write with full details to either Mike Wilson, 126 Birkbeck Road, Enfield, Middx., EN2 0EP or the writer at 66 Tuffnells Way, Harpenden, Herts., AL5 3HG, enclosing an SAE.



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FREE FLIGHT SCENE

with Dave Hipperson

Stretch winding rubber motors

Amongst the many clever ideas and techniques I spotted at the World Champs, the one that stood out most obviously was the distance that most F1B flyers were stretching their motors before winding. I estimated that some people, Chinese and Russians in particular were stretching up to five or six times the natural length of the motor. With this came an appreciable increase in possible maximum turns. If my counting on the day was correct many fliers were getting 20-25% more turns than I was... on similar motors!

Since my return both Ivan Taylor and I have tried this technique of winding. There are problems. First experiments ended with a wire hook in the winding equipment straightening out because of the vastly greater load. Ivan has had this happen too.

For this reason I would advise all those contemplating experiments of this kind to try them outside the model first and never with a person holding the model - always use a stooge even when you are confident everything is going to hold together. An accident under these conditions could cut a finger off if metal parts let fly!

However on the plus side it is indeed possible with this technique to substantially increase the maximum number of turns. What is more, the maximum torque at the end, is rarely more than you would normally have expected and therefore should not upset the power trim.

Just as useful is the side effect that apparently less wear and tear is experienced by the motor. That is, repeated tests suggested that motors subjected to this use, lasted appreciably longer and blew less often... even if the experience is more nerve racking for the flyer. I must have known all this once but have been slipping into lazy habits...

Now there are side effects. Obviously

The Team Trials for the 1986 European Free Flight Championships are over and our teams chosen: Right, the F1B Wakefield trio (l to r) Dave Hipperson, Brian Spooner and Ron Pollard. Below, the F1C Power Team (l to r) Stafford Screen, Roger Baggott and Alan Jack.



more turns will mean more knots and bunches and they will be spread more evenly along the motor. In short there may well be more towards the back than you may have been used to. Beware a stalling glide on closely rigged Vintage and Open models - you may have to make small adjustments to the glide trim. On F1Bs and Coupe d'Hiver models, particularly the latter you should have nothing but advantage although I have come up against another snag with Wakefields. I have actually had bunches stick inside the fuselage tube; but this is

probably due to my using too short a distance between pegs for the motor length. I am now faced with a model modification or shorter motors!

All the above may seem more trouble than it is worth to those of you that fly on 75% turns anyway but this way you are going to conserve that precious *Pirelli*,... However just what constitutes a sufficient stretch for your particular application?

Theoretically it would seem the ideal is to stretch whatever motor you use to seven or eight times its natural length and start winding at that position whilst slowly returning to the nose of the model on completion of the turns. This way the energy in the rubber is converted from the linear pull to prop turning torque in the gentlest way possible even if it does feel frightening!

It also involves the minimum of friction for the strands of the motor. Now that may be well and good in theory but believe you me that much stretch will pull out any stooge and straighten out any 'S' hook and probably pull apart the winder too. There has to be a compromise and of course the actual end load in pounds will be directly proportional to the cross section of the motor.

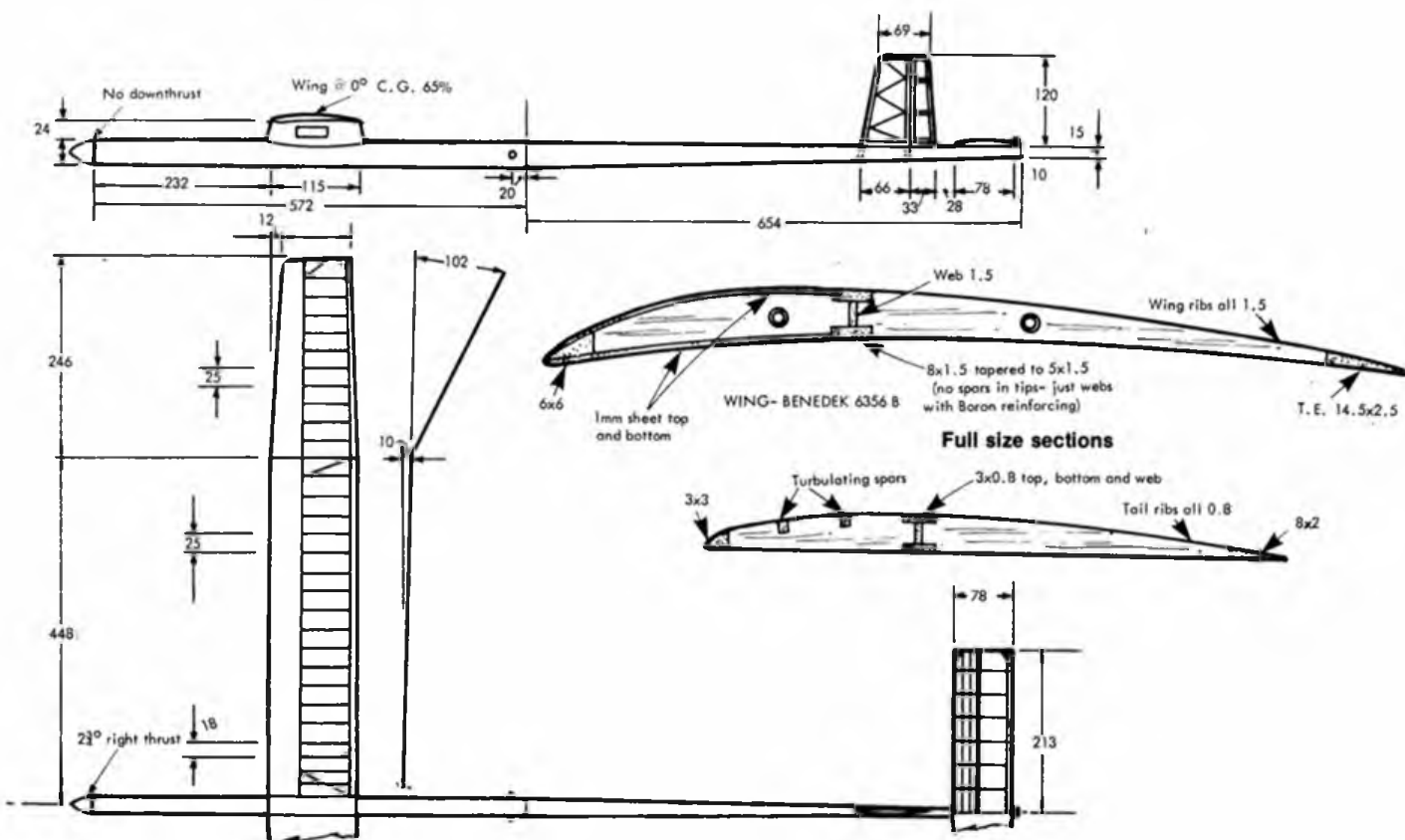
So while you may feel happy at six times stretch on an already long and thin Open motor, a short fat Wakefield skein will resist this energetically. Find out what pull you feel safe at and stick to it. This is the important point and where you can gain in



Left, Euro Champs team for F1A, Glider (l to r), Steve Philpott, Gary Madalin and Phil Owens. It seems that A/2 flyers are going to have to work hard in the future to dislodge Phil from what is becoming almost a permanent place on our glider teams!

Megatramp F1B

by Pete Fauser (Australia)



Megatramp. DATA

Weights

Fuselage	92.0g
Wing	54.0g
Tail	6.0g
Prop	47.0g
Bobbin	2.0g

Prop 600mm dia. x 630 — 755 — 680p
(Max pitch 50% radius)

Hub Mod. Woodhouse/Montreal stop

Timer Three function Seelig

Rubber 28 strands 1/8in. FAI supplies
Length 470 - 480mm
Turns 400-420
Run 35 - 40 secs.

Motor Tube Carbon Fibre

Rear Boom 1.5mm balsa — Glass cloth skinned

Wing

Two piece wing. Main spar/web construction reinforced with 'internal' boron fibres

Warps

Tips — 1.5mm wash-out
(Port) L.H. inner - flat
(Stb) R.H. inner - 1mm wash-in
Prop blade shape similar to Doring/Samokish style.

consistency. *Always* do it the same way.

For instance just before I left for the World Champs I was talking to Bernard Aslett at Cardington about his indoor winding technique. I had noticed he has a distance gauge laid out in front of the model. This tells him exactly where to stretch to and also how many turns should be applied at various stations as he comes back in. It is extraordinary how variations in the speed of return can alter final torque and knot distribution even for the same number of turns.

Now, applying all this information allows better control of *outdoor* bunching and knotting. My suggestion for a practical and consistent arrangement would be to note at what extension you feel safe on the various

types of motors *you* use. (As much stretch as possible remember). Then measure and mark on the ground the point over which the prop end of the motor has to come *before* winding.

If you have beefed up your winding system so that you feel safe stretching to six times or so, wind in slowly and steadily from there. If on the other hand, and what is more likely, you have set a safe maximum stretch of perhaps four times then stretch out to that, wind on half the turns at *that* position and come in slowly and steadily for the rest. Whatever you decide - always do it *the same way* and you will be surprised how much more consistent the glide will become, not to mention the extra turns and less wear on the rubber...

Megatramp Pete Fauser's F1B

This Australian Wakefield was one of the most impressive models at the Livno World Champs finishing 8th after maxing out in the 4, 5 and 6 minute flyoff rounds. At Poitou against slightly less opposition a week later Pete Fauser placed 2nd where Lepage, who he just beat at the World Champs, managed to beat him.

The model has been developed over seven prototypes since 1979 - starting with an APS 'Sniffler' and then Van Leuven's twin finned layout, after its success at the Taft World Champs. The model here is the eighth development and rigged very much along Russian lines.

Peter must have been pleased and maybe

surprised to see how close he got to their pattern, as before Livno he had never seen a Russian Wakefield and neither had many others as of course they had not been in attendance at the last four Champs.

The wing is set at zero and the VIT holds the tail at $+1/2$ degree for the first four seconds of the climb and then goes straight into -3 degrees for the remainder of the cruise and glide phases (fig 1).

During this, the rudder plays a vital part. It has no less than three positions. Held a little left during the burst for $3/4 - 3/2$ seconds then moving virtually dead straight for the remainder of the power run. It triggers to the right glide setting at prop fold.

This three position cycle is achieved as in figure 2. The timer - a Seelig - activates the first release from burst position to cruise and allows the rudder to rest against a lever poking out of the fuselage. This is spring loaded backwards and is in turn released by the prop stop at the end of the power run allowing the rudder to go further over into the glide position.

It is interesting to note that despite all this, Peter still uses nearly three degrees of right thrust! Warps are conventional although quite slight and the 65% CG on a Benedek 6356b would appear to be a popular arrangement...

The prop is obviously very effective. Carved from Western Red Cedar the blades are thin with no more than 1.5mm of undercamber. Pitch distribution is along the same lines as the Russian Andryukov. That is: 630mm at the root, 755mm at 50%, fading again to 680mm at the tip.

Pete uses FAI Supplies rubber and due to certain inconsistencies with this that can adversely effect a model so dependant on timer operated auto functions, he is very careful to torque test when he breaks in the rubber and to note figures whilst winding. After break-in all motors are washed and stored dry with their appropriate torque figures at various turns.

Below, Pete Fauser prepares his 'Megatramp' F1B Wakefield for the first fly-off round in the scorching heat at Livno during 1985's World Champs.

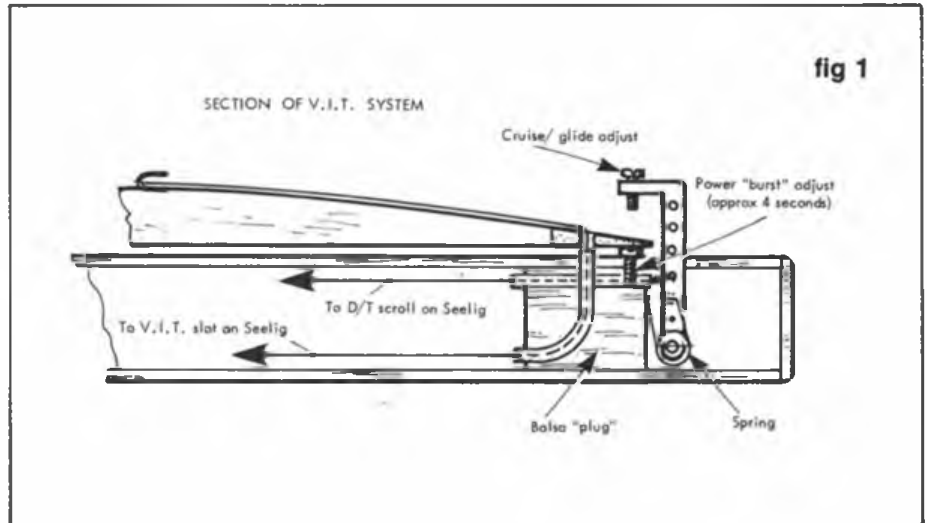


fig 1

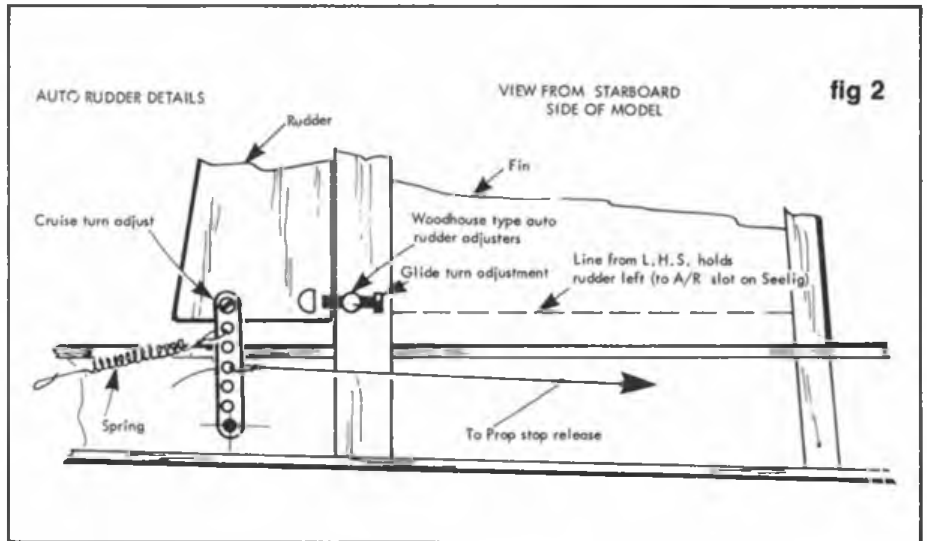


fig 2

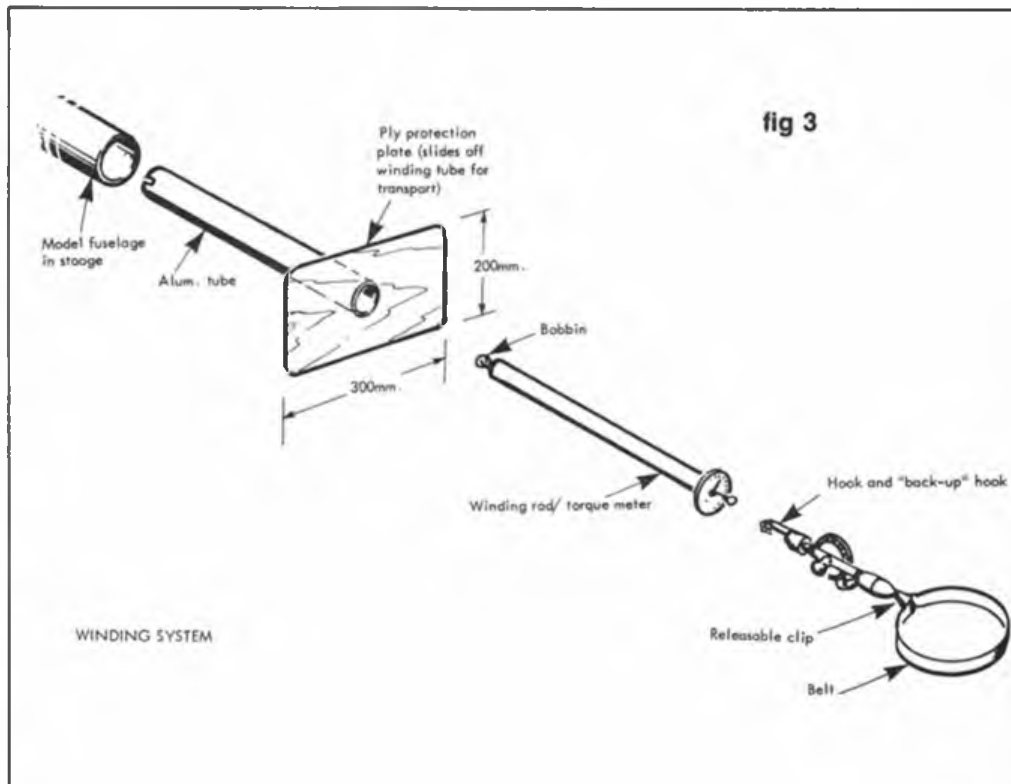


fig 3

They are then only re-lubed when needed and when required...do they get bashed! It was partly Pete's winding technique that led me to the experiments above. The reasons I have no pictures of him at full stretch is because when he did this...sensible people with delicate equipment like cameras usually took cover!

Peter stretches the rubber out a very long way before any turns are applied. He doesn't measure the exact distance but reckons to stretch it until it feels like it might actually break if it were stretched any further. From observations at the contest and my experiments since, this would suggest 5-6 times its natural length.

Turns are then applied slowly and at the same time the stretching is reduced until all the motor is back inside the fuselage as full turns are completed. I measured a motor of his at a little over 18in long at Livno and witnessed him applying over 420 turns to it. The torque from that sort of configuration would have to exceed 120oz inches - nearly double what I fly on with 20in motors.

Only one blade is held at launch and almost the tip of that - remember hardwood blades and a very strong hub assembly. The other is held out by a dacron line joining both. It is relatively simple to work out how he does this. The model is launched very steeply, at least in the calm - Peter admits that it requires a slightly flatter launch in wind. He does not throw it all that hard but just enough to attain its flying speed.

Much of his climb rate would have to be attributed to that prop and the considerable energy he puts into the rubber. The model is 'stooge' wound and the winding tube has a large thick ply shield clipped to the end to protect both model and his wife who steadies same when necessary.

Pete's wife appeared to be a vital part of the operation, with a complete working knowledge of the model and procedure. I know how invaluable this is myself - such assistants certainly deserve protecting...

The torque meter is integral with the winding rod (fig 3) - quite the most compact way to do this and the winder itself if belted around his waist...the winding rod actually clipping to the motor bobbin so that in the event of breakage *nothing* flies off.

In good weather - up to 10 mph wind - the model climbs nearly vertically and in 3-4 seconds makes 50 metres. This has been verified against A2s on tow at the top of the line. The transition to cruise occurs at this point with a slight turn to the right but with positive climb throughout the 35-40 second run.

Any problems in achieving this

Right, Dave Hipperson's massive 555 sq. in. 'SST 1' flown to first place in the Flight Cup at the Southern Gala.



consistently are usually attributed to fluctuations in rubber output and the necessity of having to estimate auto-rudder and VIT times from torque figures taken during and after winding. Too early a transition is disastrous - too late looks untidy but isn't so wasteful. Pete reckons there is a window of about half a second in which to get this right and even that exact moment varies as ambient temperature effects the power output of the rubber! Still want to try this sort of trim?

Now for the real surprise. As I said earlier 'Megatramp 8' is the culmination of intensive development since 1979. What did Pete fly before that? Nothing! That is when he started aeromodelling. Heaven knows what he will have by the next World Champs.

New Year's resolutions

These are for *you* - you should have plenty of time during the winter months.

First: try and organise your *Aeromodeller* collection into date order and preferably file those index sheets somewhere where they can be referred to. So much useful stuff has been published in the last few years - its far easier and quicker if I just refer you back to it rather than go through it all again!

Second: stock up with a few rolls of good old fashioned black and white film for your camera and run a few through at contests...or even when you go trimming. We can always use pictures of models particularly if there is something a bit unusual or interesting about them.

You do not have to become a press photographer - pictures of your own models are fine - then we can dig them out when you appear in the results...

I am prompted into this plea because I see fewer and fewer people taking photos at

contests. The Wells, Wakefield day was a classic example. I only saw my camera in use all day and I was trying to fly in three events as well! There were hundreds of you there *and* it was sunny!

Third: if you think you have a winner or just a novel design or idea jot it down on paper and let either me have it, or send it to the office at Hemel Hempstead. Detailed information on model designs is always welcome.

If you think there might have been more rubber and power model designs in Free Flight Scene during the last year...that is because the numerous glider fliers I have asked - do not give me their drawings! Have you got a good glider design you would not mind sharing with other readers?

Fourth: have a jolly good season in '86 and the very best of luck.

SMAE 6th Area Meeting... 22nd September

It was only a matter of time before the weather coincided with an Area Open event flown to the reduced 2:30 max. Hence the most pleasant weather for any '85 Area do filled the flyoff for the main event - the Farrow Shield - to the ludicrous figure of 46 participants!

Individual high scores came from Merryfield - Derek Wain recording his second individual win in two meetings with Bill Dennis best known for his free flight scale models managing a minute less presumably flying a duration model, although I know the lift down there was strong as Dave Greaves bettered six minutes with an F1B.

None of this was enough to lift the Farrow Shield however, as Anglia and Grantham along with four other teams elsewhere in the Country had full scores and made respectable flyoff flights. The Grantham members at Barkston had a very flat unhelpful patch, although there was lift a little later as Tony Cordes winning glider flyoff will illustrate.

It was not much better at Sculthorpe either but there was just enough help around to lift Derek Neil into the top three and clinch the win for Anglia by the smallest of possible margins - 1 second! What was more, this took them well out in front of Plugge rivals Biggles and Bristol and West to win that hard fought trophy into the bargain.

Places in 1/2A were spread around the country too. Screen uncomfortable after dropping a second at Barkston had nothing to fear as both Bailey and Buskell had also done a few seconds short on one flight each.



Left, Derek Cash preparing his super gliding, Open 40 model for the Short Cup fly-off at the Southern Gala, placed second just over a minute behind Julian Hopper.

Results

F1A - A1 for SMAE Cup - 41 flew			
1 A Cordes	Birmingham	12:30	5:58
2 J Cooper	Biggles	12:30	3:07
3 D Barille	North Yorks	12:30	2:14
4 A Gibbs	Birmingham	12:30	1:07
5 R Audley	Bristol & West	12:15	

Open Rubber - 72 flew - 46 flew off			
1 D Wain	Bristol & West	7:30	10:30
2 W Dennis	C/M	7:30	8:30
3 D Neil	Anglia	7:30	7:55
4 M Pressnell	Vikings	7:30	7:46
5 M Richardson	East Grinstead	7:30	7:32

1/2A Power - 21 flew			
1 S Screen	Birmingham	9:59	
2 R Bailey	Vikings	9:53	
3 J Buskell	Crookham	9:42	

Team Rubber for Farrow Shield			
1 Anglia	Neil, Pavely, Wells	22:30	21:24
2 Grantham	Croome, Ball, Hipperson	22:30	21:23
3 Vikings B	Pressnell, Barr, Willis	22:30	20:08

Plugga Cup (Final result)

1 Anglia	
2 Bristol & West	1259
3 Biggles	1181

prop, long run and sensitive thermistor only. The Chilton system must have had the edge on this occasion as he survived the day with an unblemished score and helped his Dad slip into 3rd place too.

Very similar stories and scores surrounded A1 for the Ripmax Trophy. Here only Chris Sharman maxed out over Gary Madelin two seconds behind. Mr Power, Stafford Screen fell victim to the 'hump' on one 1/2A flight leaving the way clear for Andy Crisp and Roger Baggott.

Andy's model using no gadgets apart from a small auto-rudder came up against Roger's model - almost a miniature F1C - even boasting a 'bunt' facility when I examined it the previous week. On the decider for the Quickstart Trophy Andy flew first and picked the best air - but both models were high on the climb.

Phil Ball had put his chuck gliders away and was busy preparing for the Open Rubber flyoff when he was told that two more had maxed out and there would be a

White Cup winning flyoff flight landed in earlier in the year. This time the model found an isolated haystack against which to snap its fuselage!

Open Rubber was last and had a large percentage of the original entry still involved.

Peers who had stacked a 40 power model comprehensively earlier in the day, had turned to Open rubber, in which, since the advent of his 500 sq inch model, he has become a big threat. He launched first with a couple of others who had been winding before the hooter. The bulk of the 16 qualifiers including Hipperson and Cliff (Jnr) launched a minute or so later and Ball flew last in the cooling air.

On this occasion Hipperson had the biggest model, the longest run - just 3 minutes - and probably the best of the air. None of those that flew with him exceeded 6 minutes - most much less. He cleared 9 1/2 in sight flying the 'SST 1' as per *Aeromodeller* issue May '85. A fitting celebration of that extraordinary day at the same event exactly 20 years before when he had been one of the three qualifiers to exceed 27 minutes only to place 3rd! This flight also clinching him the '85 Senior Champion title for the first time.

With the very slight drift most winners were able to return in time for the prizegiving and to thank Mike Howick for a well run day.

Results

Open Glider - 29 flew - 8 flew off for Pitcher Cup			
1 J. Bailey	Biggles	9:00	6:30
2 M. Fantham	Richmond	9:00	6:07
3 B. Lavis	Biggles	9:00	6:56

Open Rubber - 24 flew - 18 flew off for Flight Cup			
1 D. Hipperson	Grantham	9:00	9:31
2 R. Peers	Falcons	9:00	6:43
3 P. Ball	Grantham	9:00	8:29
4 A. Cliff (Jnr)	Biggles	9:00	6:54

Open Power - 8 flew - 5 flew off for Short Cup			
1 J. Hopper	Freebird	9:00	5:48
2 D. Cash	East Grinstead	9:00	4:32
3 S. Screen	Birmingham	9:00	4:24

A1 Glider - 20 flew - for Ripmax Trophy			
1 C. Sharman	Bristol & West	10:00	
2 G. Madelin	Crookham	9:58	
3 P. Bayram	Richmond	9:29	

Coupe d'Hiver - 12 flew			
1 M. Chilton	Birmingham	10:00	
2 G. Sharp	Croydon	9:56	
3 R. Chilton	Birmingham	9:34	

1/2A Power - 10 flew - for Quickstart Trophy			
1 A. Crisp	Biggles	10:00	4:58
2 R. Baggott	Birmingham	10:00	4:05
3 S. Screen	Birmingham	9:56	

HLG - 10 flew			
1 P. Ball	Grantham	5:00	1:01
2 J. Buskell	Crookham	5:00	0:52
3 J. Tipper	Crookham	5:00	0:49

Senior Free Flight Championship positions after 14 events			
1 D. Hipperson	Grantham	31	
2 S. Screen	Birmingham	20	
3 R. Peers	Falcons	17	
4 P. Ball	Grantham	16	
5 P. Harris	Birmingham	13	

Wells Wakefield Day

R.A.F. Barkston Heath... 20th Oct Results

Ted Evans Trophy - 8oz Pre '51 Wakefield rules - 24 flew			
1 D. Hipperson	Grantham	9:00	6:08 (O.D.)
2 P. Ball	Grantham	9:00	4:34 (O.D.)
3 J. O'Donnell	C/M	9:00	2:38 (O.D.)

Pre '37 designs 4oz - 7 flew			
1 D. Hipperson	Grantham	9:00	6:00 (Lanzo)
2 P. Michel	Croydon	9:00	4:55 (Coptend)

F1B - Current rule Wakefield (18 flew)			
1 R. Pollard	Tynemouth	12:00	4:16
2 D. Hipperson	Croydon	12:00	3:20
3 B. Martin	Tynemouth	12:00	3:08
4 R. Peers	Falcons	12:00	3:04
5 P. Gaunt	Leeds	12:00	2:09



Left, the much heralded new Ron Pollard Wakes, seen here at the Wells' Wakefield meeting where they won the F1B event and followed this by placing second at the Trials...



Right, one of the numerous Copland Wakefields seen at the Wells' Wakefield meeting. This is Peter Michel's second placer in the 4oz. class.

Southern Gala... Odhiam 29th September

The warm spell held long enough to bring us a Southern Gala much more reminiscent of those of the late 60s. Early morning fog delayed the start but once cleared by 11.30am gave no more trouble. Immediately, lift was treacherous and those that wanted to be sure of a max picked their launching moments very carefully even in the high performance Open events.

A rather unusual southerly, although giving few retrieval problems, did involve flying over a slight grass hump which seemed to do more harm to the low level lift than might have been expected in the 5-10 mph drift.

The outstanding Coupes of Chilton and Sharpe were a match for it however. The former relying on thermistor and mylar streamer detection and the later a very large

flyoff. What a close one it turned out to be. These three can usually be relied upon to produce high times in HLG when the weather is favourable. These early flyoffs had been held soon after the close of the event at 5pm and now the breeze was dying and swinging slightly away from the buildings and out over those so familiar open fields to the north east of the drome.

John Bailey - second in Open Glider last year - made sure this time by topping the eight way flyoff in the last of the real lift. Julian Hopper flew last in Open Power after Screen had recorded a mere 4 mins plus, with what looked like an F1C model and Derek Cash could push his big 40 job to do no more than a few seconds better.

Julian's flight seemed away for a big time and must have found slight sink once off the aerodrome but it was enough to win the Short Cup comfortably. It does not come easily for Julian - remember the lone tree his



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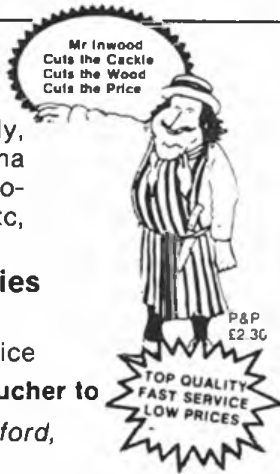
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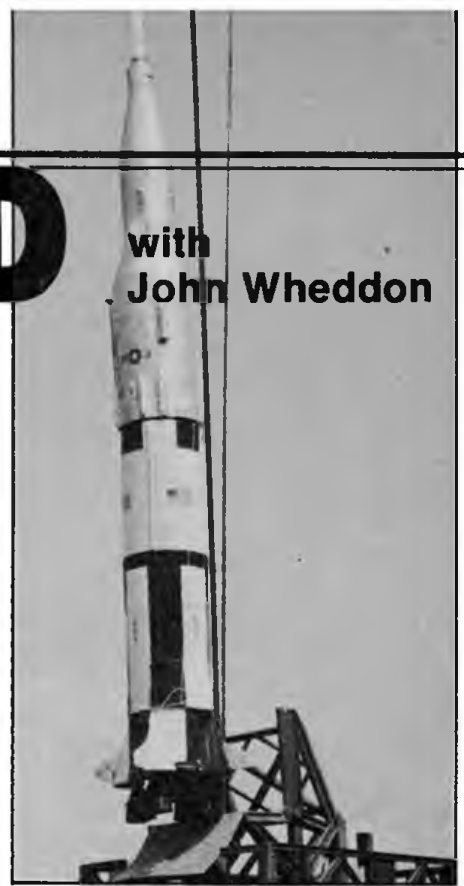
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AT THE LAUNCH PAD

with John Wheddon



Scale models are the top line in Space for modelling complexity and the spectator, they gain all round by a multiple canopy recovery system (see below).

Instant Engine Adaptors

The American manufacturers *Estes* and *Centuri* both produce 13mm diameter engines for the '1/2A' and 'A' classes. These are known as 'mini' engines and a variety of kits have been specially developed to accept them. However, the range of kit models which are designed around the 18mm diameter engine is much greater and of course these rockets will fly equally well when powered by an equivalent 'mini'. The problem is just that the mini is smaller in diameter and length.

However, by luck or careful judgement it just so happens that the inside diameter of the standard 18mm engine is just the right size to accept a 'mini'. So after, cleaning out the burnt remnants of propellant and removing the nozzle from a spent 18mm engine casing a perfectly sized adaptor is the result. 'Mini' engines are usually quite a tight fit inside the 18mm casing but if any sloppiness is present a spot of instant glue is sufficient to secure the smaller engine.

The weight of the combined mini and the 18mm casing is usually less than that of the equivalent 18mm engine but it is wise precaution to check that the CG position of the prepared model has not shifted aft towards the fins. Also the nozzle end of the 'mini' should be flush with the end of the 18mm casing; the efficiency of the nozzle could be reduced if the 'mini' is placed too far inside.

Shock Cords

Kit manufacturers supply lengths of flat, white rubber strip for use as shock cord in many kits, particularly for some of the larger models. I have learned to my cost that this material is not really suitable for this demanding job. Model aircraft fliers recognised many years ago that 'white' rubber strip contains filler additives which can only detract from the natural rubber's useful properties of strength and elasticity and serious modellers would have nothing to do with the stuff.

I should have known better when building a 'Maxi Alpha 3' but I used the strip supplied in the kit. The shock cord lived up to its name by breaking on the 'Maxis' first flight, allowing the precious nose cone (it is a huge moulded plastic one) to drift away under a large parachute! If I had been building a model from scratch I would have used standard 'sewing-box' elastic, fabric covered and about 1/4 inch wide. This is more than adequately strong and the fabric covering provides some additional protection against particularly hot injection gases.

Multiple Canopy Recovery Systems

Stuart Lodge has kindly provided details of his most impressive recovery system for larger models. Parachute packing is definitely not given enough attention by most of us and I can confirm that here is a method that definitely works. So in Stuart's own words this is what you do...

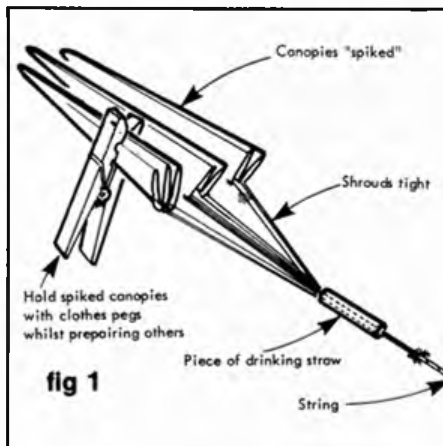
One of the most satisfying aspects of Space Modelling is the operation of larger

than normal rockets with their slower and more realistic lift-off and climb. Frequently however, the recovery phase is anything but majestic with a single and often inadequate parachute planting the model unceremoniously into the turf. By far the best way of recovering models the size of the *Estes* 'Phoenix', 'Honest John', 'Pershing' et al is to use two or even three 18in diameter polythene canopies in a cluster.

On the face of it there is a major risk of all the rigging lines of the system tangling and causing the demise of a prize model, but using the 'Slider System' we take a leaf from the book of full size parachuting, line restraint is employed to assist an ordered canopy opening sequence on aerobatic square parachutes.

Materials and method

- 1 Two/three 18in parachutes with identical rigging
- 2 Plastic drinking straw; 1/8in diameter, 1in long
- 3 Clothes peg (for holding canopies whilst packing)
- 4 Thin string and recovery wadding

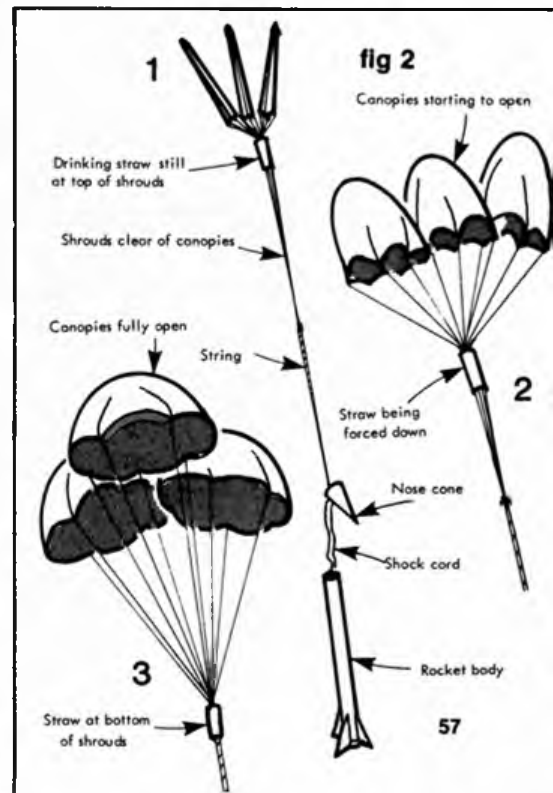


Select the parachutes required and connect all rigging together at the base using the thin string leaving an 18in leader for attachment to the rocket. Cut the 1in length of drinking straw (the 'Slider'), and thread this onto the string leader to the base of the rigging; attach the leader to the rocket's shock cord or nose cone.

The folding/packing sequence of the canopies may now begin: Just prior to flying, the canopies in turn should be 'spiked' and rigging pulled taut and held in place with the clothes peg, this is repeated with the other parachutes until all are clipped together with tight, *untangled* rigging. The slider should then be moved to a point 1in from the parachute's peripheries (say that on a packet of wine gums!) and a wrapping of recovery wadding given to the collected canopies after folding in half. Carefully encircle the canopy pack with the rigging up to the interface with the string leader, and at this point roll on another layer of wadding encircling with the string loosely. This unit may be inserted into the model body atop the usual amount of recovery tissue.

Following the launch and (we hope) majestic climb, the motor will fire the expulsion charge, blowing off the nose cone and ejecting the recovery pack. The rocket will turn 180° in the air, moving tail first towards the ground, the string leader will unwind followed by the rigging...this is *lines first* deployment much favoured in full-size parachuting...leaving the restrained canopies to deploy last of all, at this point the slider will move down the lines and the parachutes will open; and in my experience it works every time!

Continued on page 59

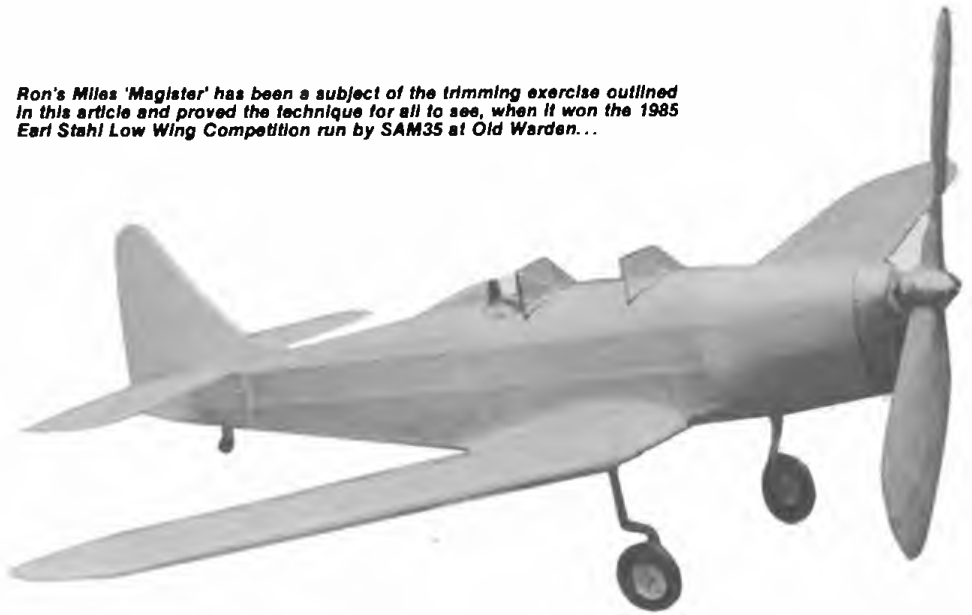


A COUPLE of years ago I built a low-wing rubber driven model (a 'Cruiser Pup') and thereby re-kindled an interest in low-wing scale or semi-scale aeroplanes that had started with my interest in all model aeroplanes in the heady days of the late '30s. Then, weekends seemed to be blessed with fine calm weather. Megows 12in. wingspan scale kits cost 6d. (half my weekly pocket money).

This was of course B.D. or before I'd heard about the application of dope to tighten the covering and keep the rain out! With the lapse of time one thing has *not* changed, the problem of making the thing *fly*. In particular, overcoming the lack of spiral stability associated with low-wing aeroplanes.

Free-flight model aeroplanes need to fly in circles or at least a curve, in order to eliminate stalling and thereby obtain a stable flight and also so that they will not land in the next county when they fly down

Ron's Miles 'Magister' has been a subject of the trimming exercise outlined in this article and proved the technique for all to see, when it won the 1985 Earl Stahl Low Wing Competition run by SAM35 at Old Warden...



Scale Flight Trim

-one man's approach

Do you have problems trimming small rubber powered scale models? If so try Ron Brownson's improver course...

wind. This latter feature becomes more important with the passing years...

But...the trouble with low-wing models is that they are very sensitive to the use of rudder to obtain the desired turn. They spiral down to earth at the least provocation, especially by any injudicious over-application. So, taking a leaf from the pilots of full size aircraft I asked myself how I might induce the thing to turn *and* retain stability without the usual rudder/dihedral combination. As aileron control was out, I decided to try to use the next best thing, a combination of varied wing incidences and side-thrust...

I started by ensuring the point of balance (C.G.) was where it should be (by adding plasticine to the nose of the model) which of course is of paramount importance. I then checked that I had a 'positive set-up', that is, that the wing had a greater angle of incidence than the tailplane. Adjusting the tailplane until a reasonably flat glide was obtained.

I then decided to apply power. Experience has taught me that providing it is not over-powered a light model will not damage itself unduly if flown over grass - corn stalks definitely to be avoided. So, approximately 100 turns were applied and the model released in level flight into wind... It was soon apparent that low-wing models in particular, have a greater susceptibility to go left on power due to the torque effect.

In order to counteract this, right side-thrust was applied to the propshaft. At this stage I must confess I was tempted and applied a touch of right rudder but this resulted in a right-hand spiral at the end of the power run, which confirmed my expectations - so the rudder was returned to neutral.

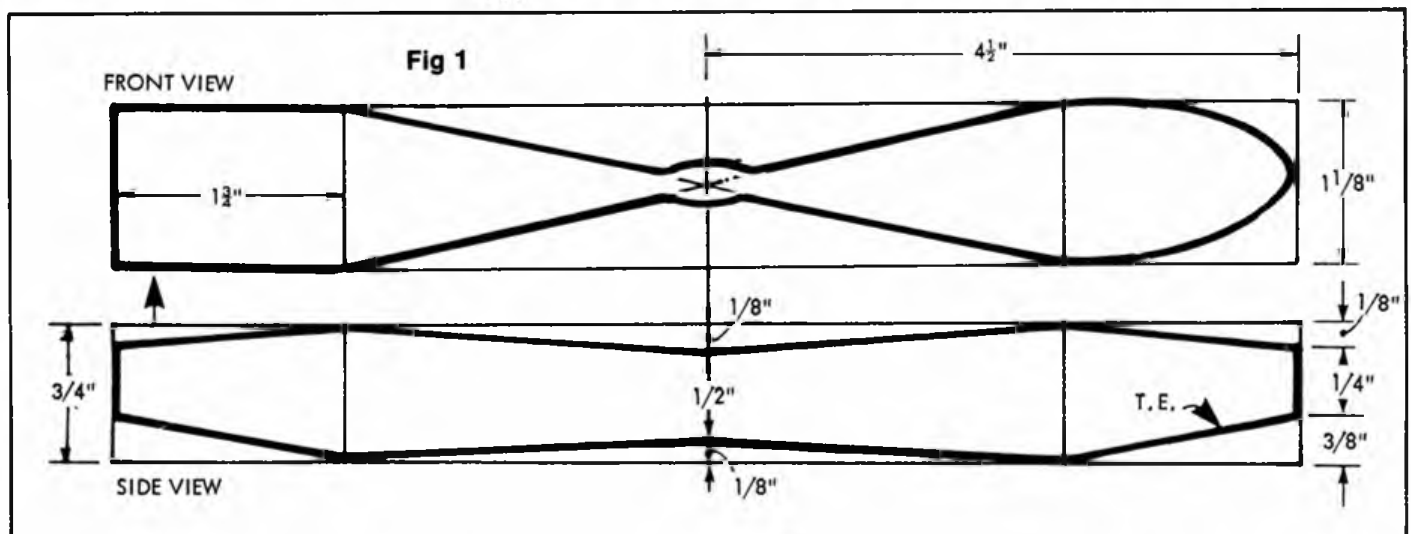
I have always favoured the 'right power right glide' pattern for open rubber models, using increased incidence or 'wash-in' on the *right* wing to give a safe climbing set-up, that produces a right glide because of the drag/aileron effect when the power runs out.

In theory a similar effect should be obtained by 'washing-out' the left wing to a greater extent than the right. This was therefore tried, this produced a further tendency for the model to fly too much to the left on power, but when this ran out, the glide was a gentle turn to the right...

At last I seemed to be getting somewhere! Once more additional right side-thrust was applied and the number of turns on the motor drastically increased, by a few stages, to 600 turns! By a careful balance of power/airscrew pitch and sidethrust an 'S' power pattern was obtained which gave a steady 'scale appearance' climb without *any* hint of a stall, starting left and gradually turning right.

As the effect of the initial torque dropped off, the sidethrust took over and a safe right shallow spiral climb resulted. The glide was a gentle right turn to a safe landing, almost three point!

The amount of sidethrust used, is at first sight, somewhat alarming at seven degrees



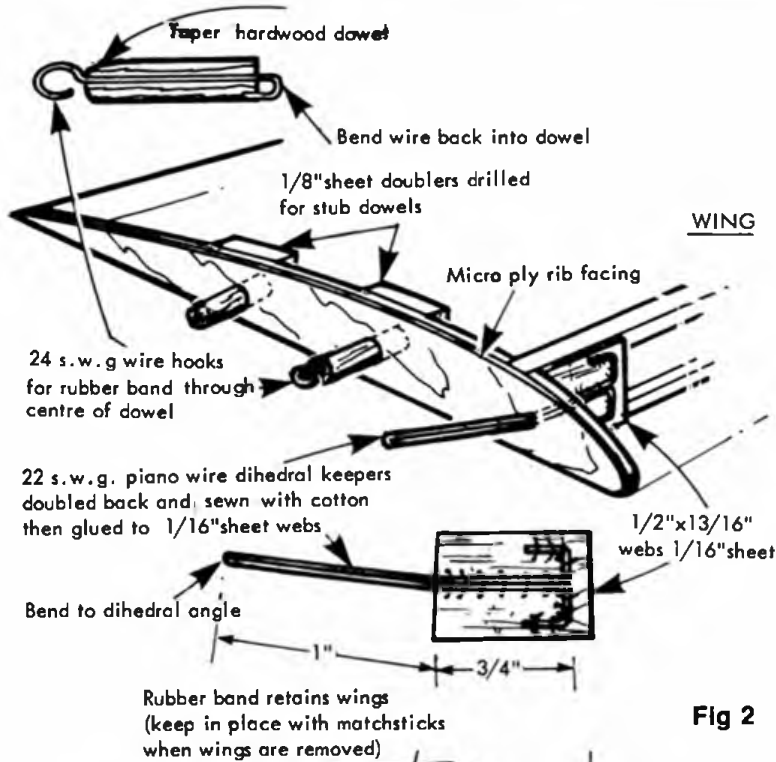


Fig 2

motor run was of a reasonable length considering the fine pitch used.

This year (1985) I built an aeroplane of similar size and weight, an Earl Stahl *Miles 'Magister'* and used the same rigging. It was gratifying to see that the resulting flight pattern and stability was almost identical. Both models were not built particularly light. Being built to last and weighing over two ounces without the rubber. However the tail structure was built as light as possible.

In each case a P30 size motor of four strands of 3/16in. *FAI Supplies* rubber weighing slightly under 10 grams was used and this with the 9in. x 8in. prop, stretch-wound to 800 turns gave consistent scale appearance flights of about 40 seconds without thermal assistance.

The wings (around 30in. span) are washed out by 1/16in. for right and 1/8in. for the left at the trailing edge of the tip rib. The centre of gravity is at 42% of the wing. The propeller, whilst not true helical at all stations on the blade, is gradually washed out to the tips and is carved from a medium balsa block of 9in. x 1 1/8in. marked out as shown in figure 1.

In order to test the set-up further, the rigging and prop/power combination was tried out on a friend's model. A low wing scale job which was proving difficult to trim out using conventional settings. The results were very encouraging as with the improved stability the duration of flights was approximately doubled. The wing of this model was made in one piece and the respective wash-outs steamed in. This suggested that whilst flexing wings (fig. 2) are an advantage both for stability and in heavy landings they are not essential.

To summarise: the set-up is seven degrees right side-thrust, 0 to 1 degree downthrust, 9in. x 8in. propeller, 10 grams lubricated rubber - four strands 3/16in. *FAI Supplies* 20in. long (40 pre-tensioning turns put on each half of the motor). Right wing washout 1/16in. left 1/8in; the trailing edge of the wing tip rib is packed up by these amounts during construction to obtain the correct wash-out. These settings are for a two ounce model of 28 to 30 inch wingspan (area 100 - 120 sq. in.) and could be varied proportionally according to the size of the model.

The importance of getting the CG in the right place cannot be over-emphasized. Experience suggests that this is best placed about 40% of the wing chord for low-wing models using flat bottomed airfoil sections and symmetrical (streamlined) or non-lifting tailplanes.

but in reasonably calm air the flight pattern was constant and perfectly stable. It was noted that in windy and gusty conditions, the type of wing fixing which allowed the wings to flex, thereby absorbing the effects of sudden gusts, greatly assisted stability.

The fixing used consisted of wire dihedral keepers pushed into a central tube with the wings held in place by rubber bands stretched between hooks on each wing half.

The 'S' power pattern was elongated in proportion to the wind strength until in strong winds it resulted in a crabbed slide to the left prior to the right circle. The set-up was still stable even in those quite strong wind conditions.

In order to obtain a scale appearance to the flight, a relatively fine pitch propeller was used, the diameter was 9in. with a pitch of about 8in. Contrary to expectations, the

At the Launch Pad continued from page 57

"At the Launch Pad" BSMA Competition Meeting

The very first BSMA model rocketry competition was held in Wiltshire over the weekend of 7th and 8th September. The competition, for Streamer Duration models powered by *RPS 'C'* engines was held on the Sunday afternoon and attracted seven entries. BSMA members, including a contingent from Scotland occupied the remainder of the time with over one hundred launches!

September often provides relatively mild weather and so it did this year, although the cloud base on Sunday was low enough to cause problems for the high performance

models. Recovery did not pose any serious difficulties because the launch site was on open farmland kindly made available following the corn harvest.

The general flying sessions saw a wide variety of models ranging from basic kits to quite complex scale models. Nigel Parry-Jones demonstrated his growing stable of scale types including the 'Mercury-Redstone' featured in this column's Scale Special. Nigel also flew a very impressive 'Little Joe 1' and a nicely made model of the German World War II 'Rheintochter'. More drawings please Nigel!

Competition entries included kit models and a group of designs specially built for the event. Stuart Lodge actually designed two of the models used - 'Flavour of the Month' built by Chris Sturgess from the drawings published previously in this column and his

own 'Stretched Flavour' aptly named 'C - Stream'. John Stewart from Scotland, produced a fascinating model in which the huge polythene streamer, rolled up, formed the body tube. A good example of fresh thinking producing a completely new idea.

In the competition itself a lot of recovery/deployment difficulties kept scores low and only Stuart Lodge succeeded in making the required two official flights. This consistency paid off and Stuart duly won the event and received the Paul Clark Trophy which will be awarded annually for this event.

Results

Streamer Duration - BSMA Paul Clark Trophy	
1 Stuart Lodge	27 secs + 12 secs
2 John Wheddon	0 secs + 34 secs
3 John Stewart	0 secs + 18 secs

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APPENDIX - Links to the plans

The original issue comes with four free plans of RTP models (Pilatus, Firecracker, Wamira, Tucano) printed front/back on a pull out banner of four sheets. The banner is not included in this document.

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