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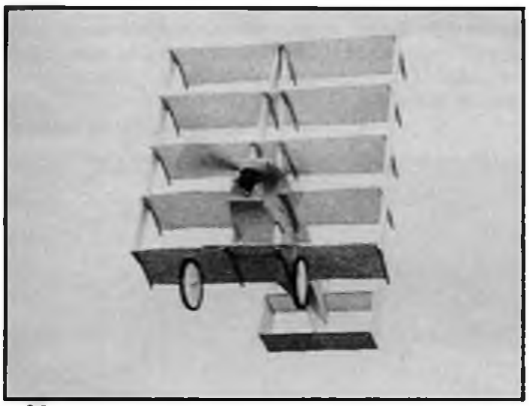

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Cover:
Chunky, purposeful lines of the colourful 1930s Hall Racer have always attracted the aeromodeller. Here's Bernard Sexton's splendid C/L version, snapped at Croydon by Phil Bolderson. Inset is Arthur Searl's large R/C Desoutter, created with much reference to the full-size restoration at Old Warden. More to inspire the Scale buff on p.66.

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HANGAR DOORS

THE Shuttleworth COLLECTION

Junior involvement

In the wake of the first Junior F/F Champs (*Aeromodeller*, January issue) it's useful to look at individual efforts at junior encouragement. Newham Beaumont has sent a photo of a merry bunch of juniors at Jean-Luc Drapeau's Azay-le-Brule club, which flourishes just south of Poitou. No doubt the proximity of one of Europe's finest and most enthusiastically attended flying sites is a great boost to young enthusiasm but one must simply admire the drive to instruct and capture such numbers of youthful disciples. Maybe a future World Champion is somewhere in the picture, even if not, we're sure that all involved are having a great time, besides practising some of the skill and enterprise of thought and action which good old *homo sapiens* is sometimes surprised to find it can manage.

New Zealand Rod Lewis is another enthusiast not prepared to bemoan apparently low junior interest in aeromodelling. Instead he set about instructing by example. Net result is the FFOXY one-model competition, actually based on the French CLAP programme (but with universal use of the FFOXY A/1 glider rather than the special French model whose specification lies between A/1 and F1A). The first competition, to be held at the next NZ Nationals, will consist of three one-hour rounds and a two-minute maximum. Three-person teams (either from clubs or simply a group of friends) will be managed and coached by an experienced senior glider flier. Winner receives the FFONZ Junior Trophy. A key paragraph from the event publicity states

Mills Speed will be a new SAM 35 event in '89. Bert Streigler's Flounder managed 43mph at Old Warden...

'All other seniors will be encouraged and expected to act as timekeepers, scoreboard operators, contest directors, launchers, help with trimming, quick repairers, retrieval assistance, etc...'

More news on this to follow. And shouldn't we be asking ourselves whether we ought to try something like this? More power to the FFONZ!

Shuttleworth Shindigs

Looking forward to long, calm, warm Sundays in the year ahead? Of course you are, for with just a handful of notable exceptions – the story of '88 was of unremittingly poor weekend flying weather.

Milestones during the season? We'd like to think that our Old Warden gatherings are viewed as such. Certainly, attendance continues to grow, and our revised airfield layout has met with approval thanks to the increased space afforded to all disciplines. And we have even more ideas for improvement this season.

Here are the 1989 model flying dates at Old Warden:
26th March: DB Models Fly-in
7th May: ASP Large Model Day
17/18 June: ASP Scale Weekend
16th July: ASP Golden Era Day
19/20th August: ASP Vintage Weekend
16/17th September: ASP Four-Stroke Weekend
(yes – now a weekend!)
1st October: BKFA Autumn Festival

Note also the Shuttleworth Veteran Aeroplane Society's Model Group Open Day on 30th July, and the same club's Silent Flight Open Day (no i/c engines allowed) on 3rd September.

More news of specific menus in coming weeks. And how pleasing it was to learn that ASP and The Shuttleworth Collection had been jointly awarded the BMFA Ray Malmstrom Trophy for services to model flying outside the BMFA itself. But, of course, that's largely because you, the modellers, enjoy our meetings as informal, low-key get-togethers with just a scattering of competition every now and again. Look forward to seeing you all in 1989!

Coming up

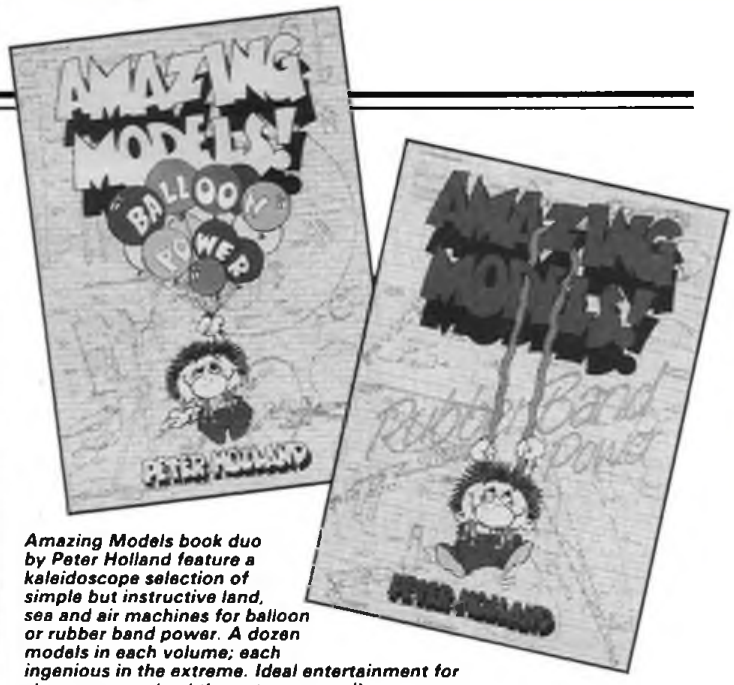
Just in time for this issue, we are happy to confirm that the thirteenth Crawley Indoor Meeting will be held on 29th January at the Crawley Leisure Centre, starting at 11 am. As usual, competition slots are for HLG, Peanut, Open Scale and EZB, but there will be room for some fun-flying and it is hoped that at least one Indoor R/C demonstration will take place. Going? Contact organiser John Dolding at 22, Loxwood Walk, Ifield, Crawley, Sussex. Also from the BMFA South Eastern Area comes news of an Open Invitation F/F event at Ashdown Forest on 16th July. Details from Mick Howick at Harriers, Hare Lane, Blindley Heath, Lingfield, Surrey RH7 6JB.

And for those who fly 'up north', John Pool sends advance details of the 1989 Knavesmire Free-Flighters Ancient and Modern Mini-events at York Racecourse on the same date, 16th July. Addition to the existing format is a Mini-Tailless event for craft of up to 180 sq.ins area, including elevons – with gliders up to A/1 size.

John also tells us that the Tailless Power Fund Jackpot has now reached over £165. Well worth fighting for at the next Nats – get building and trimming those planks and swept-wing wonders!

Junior involvement. Above: The Junior chapter of Jean-Luc Drapeau's club at Azay-le-Brule, near Poitou. Left: Hi-tech problems for Gennadi Dobrovolski at the Junior F/F Champs – dural-skin of F1C wing signs of bubbling. Holes allow ingress of cyano.

Above: Typical club scene with juniors - young hands from South Birmingham help Chris Chapman with his Flite Streak. Note concentration as the prop is flicked! Below: The junior theme down-under. Youthful New Zealanders David Chambers and Mark Halliday admire their FFOXY gliders at a wonderful flying site...



Amazing Models book duo by Peter Holland feature a kaleidoscope selection of simple but instructive land, sea and air machines for balloon or rubber band power. A dozen models in each volume; each ingenious in the extreme. Ideal entertainment for the youngster (and the not-so-young!). £4.95 each from Argus Books.....

Take it easy...

Derek Ridley relates the unexpected results of a trip to a specialist to investigate shoulder pains, cause unknown. Not to go into the 'orrible details, calcium dust at the shoulder joint was diagnosed, and treated with cortisone injections. Said ailment, it turns out, was precipitated by Derek's hefty 'diesel flick' creating unnatural stress. Final shot must go to Derek's specialist - himself once an aeromodeller - who recommended a switch to glow motors with their lower compression!

Indoor Scale Nats update

Booming interest in the Indoor Scale Nationals will mean more to see at the Alumwell Centre, Walsall on 23rd April. The local Club is to present trophies for noteworthy entries in the static exhibition of F/F scale models. Doug Sheppard tells us that the aim is to attract a powerful showcase of models, so submissions by 9.30 am on the day are being actively sought., All kinds of F/F Scale models are welcome, not just Indoor, so sharpen up your latest masterpiece and take it along to add to the occasion. No extra entry for the exhibition; just the usual at-the-door admission. And who knows - you might just go home with a trophy....

Stunt and Scale in Switzerland

Going to Switzerland in the summer? If so, why not take in the Open International at Nafels on 8-9th July. Chris Bradford passes on news of this event for Aerobatics, Novice Aerobatics and (new for '89) Scale control line. Scale judging, we're told, will be relatively informal, flying quality being equally important. Interested? We can forward more details.

The final count

Thought you'd like to know. Our vintage engine auction actually netted just over £1500 - a splendid amount to be able to forward to the lucky beneficiary. Thanks, all who took part.

Airspeed Fleet Shadower possesses good proportions for free flight and is occasionally tackled. This is Anthony Druce's quadruple-prop interpretation for Moore-type rubber drive. Below left: Accurate colour information can be hard to find; cigarette cards are a fine period source.

We examine background research for flying scale models

WHAT TO choose for your next project? A favourite aeroplane – perhaps one which arouses much personal nostalgia, or a glamorous subject; or something perhaps a bit more quirky – even oddball? At *Aeromodeller* we have also encouraged personal research to unearth the unusual – so to fuel enthusiasm for the coming season (with Scale Weekend at Old Warden now on the calendar; book 17-18th June in those diaries!) here are a few thoughts on selecting something special.

Read all about it

First stopping point just has to be our own scale drawings Plans Handbook No. 3, available for just £1.50 (which is refunded with your first order). Less well-known is a number of unlisted drawings of very modellable subjects, some published in *Aeromodeller* in the 1940s: other didn't see light of day. A selection is tabulated here for your interest. Monospar ST4, Avro Commodore and Gloster AS31 Survey lurk on file awaiting rediscovery. We've always hankered after the Waco-like Commodore, particularly the green, white and silver G-ACUA. All reprints, usually accompanied by the original article, are available as photocopies for £1.50 each.

Flash, bang, wallop

Once you have the drawing of your dream craft, do check with photographs of the real thing. Make the effort to get fresh prints if you can – always so much better than fuzzy magazine reproductions (however inspirational these may be in the first place). Even better is to photograph the full-size machine if one can be found; these days a variety of museum and vintage aircraft guides will ease the task of location. For a true competition model access to the real thing is well-nigh essential, but for general 'sport scale' free-flight and control-line ignorance can sometimes be bliss!

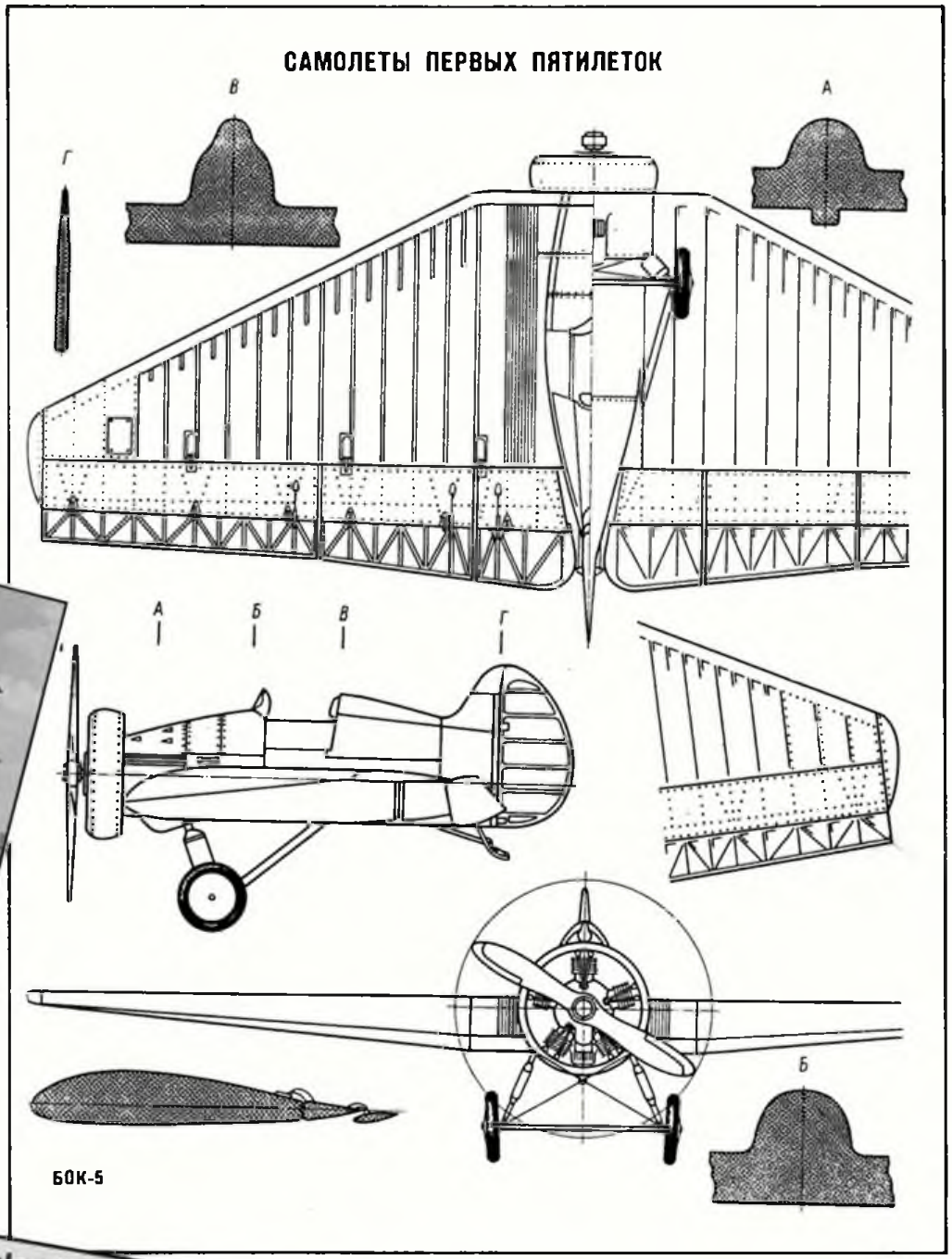
Just occasionally we learn of a story of which aeromodelling's spirit is made. Arthur Searl, when researching his fine Desoutter – see our cover this month – happened to turn up at Old Warden at a critical point in the restoration of Shuttleworth's G-AAPZ. Upon querying wing rib profiles he was told 'we've just finished with these – any use to you?' and was astounded to be presented with an armful of original ribs from the original structure...

Collect and collate

But for the really unusual, the message is simple. Read and collect as much as you can – and that means everything that might contain the slightest reference to full-size aviation. Your editor once found a surprisingly accurate three-view of the Cierva C.24 autogiro – the one that looks a bit like a rotor equipped, truncated Leopard Moth – in a children's Biggles comic. Perhaps not quite so unexpected as one might imagine, for the illustrator of this adventure was none other than Bjorn Karlstrom; Swedish researcher, archivist and creator of many a full-size reference.

Foreign publications are a rich source, as our selection here proves. Even if first reference is sketchy (it's amazing how many two-views will appear, making it impossible to derive essential sections) you must persevere. Sooner than you realise the information will beging to cross-match.

scale SPECTRU



Where else to go? Specialist bookshops will be pleased to help with specific requests. The Aviation Bookshop in Holloway Road even maintains a reference library of its own. Other libraries abound. Books may be reserved, or sections copies. Beware, though, of the browsing syndrome when entrancing alleyways of research beckon. Some clarity of purpose will help you to steer a straight course, but, having said that, it's quite delightful to be overwhelmed by that magic subject that leaps at you from nowhere.

And there's more

So you've become something of an aerophile. Now you can help others. Chat with like-minded enthusiasts. Find out what they're hoping to build. Swop information. Before you know what's happening you'll find you've developed a specialist area of knowledge all your own...

To be continued...

A selection of Aeromodeller Scale Drawings from the 40s

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Hillson Praga	3/44
Miles M 14A Hawk Trainer	10/48
Miles M28	4/43
Miles Messenger	8/46
Miles Gemini	10/46
Newbury Eon	11/48
Pander EG 100	3/44
Percival Prentice	11/47
Reid & Sigrist Snargasher	4/42
Ryan FR 2 Fireball	11/46
Short Sturgeon	1/47
Spartan Arrow	6/45
Tipsy B	12/46
Vickers Viking	3/47
Vickers Vulcan	3/45
Westland Wizard	6/44

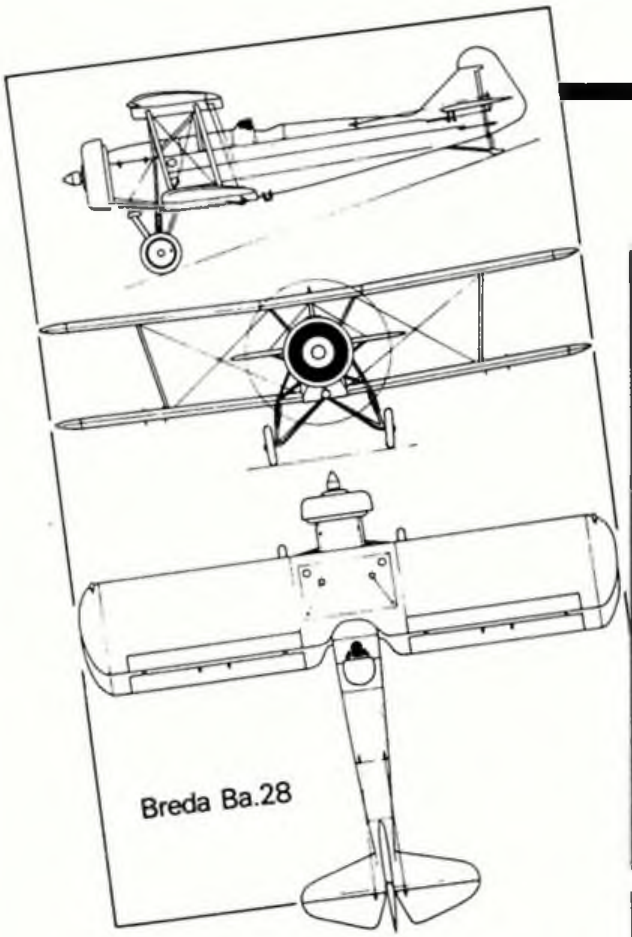
Unpublished drawings

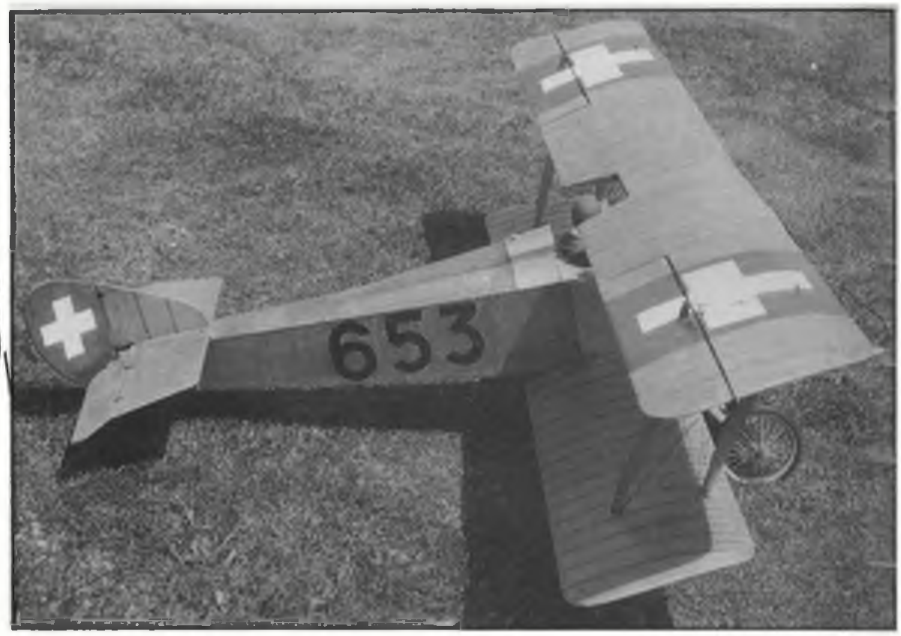
Gloster AS 31 Survey
Robinson Redwing
GAL Monospar ST4

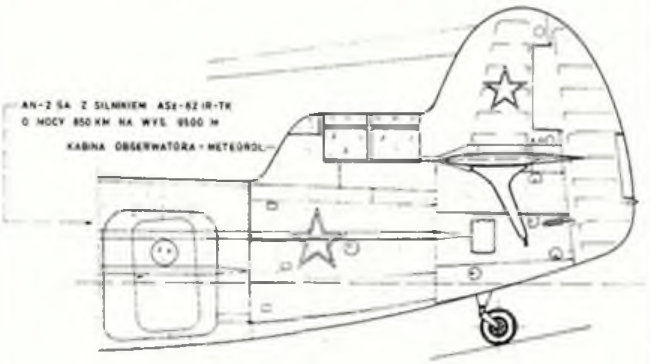
Inset photo, right of heading: Or photograph the real thing. Gawky glider-towing Wilga was snapped by Martin Dilly in Poland. Careful at foreign airports, though...

Above: Now try this! Browsing through the bookshops will yield all sorts of unfamiliar shapes, like this Russian BOK-5 from 1937.

scale SPECTRUM







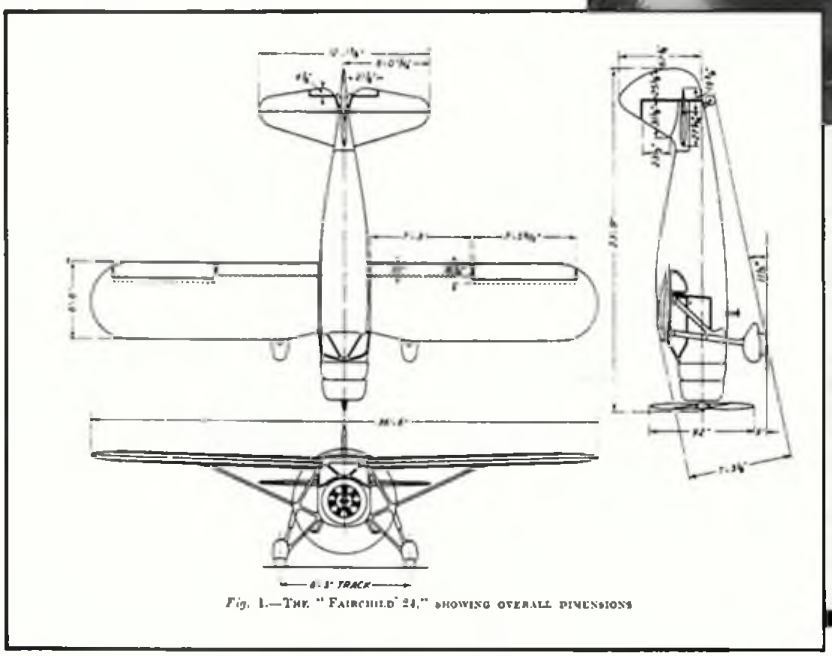
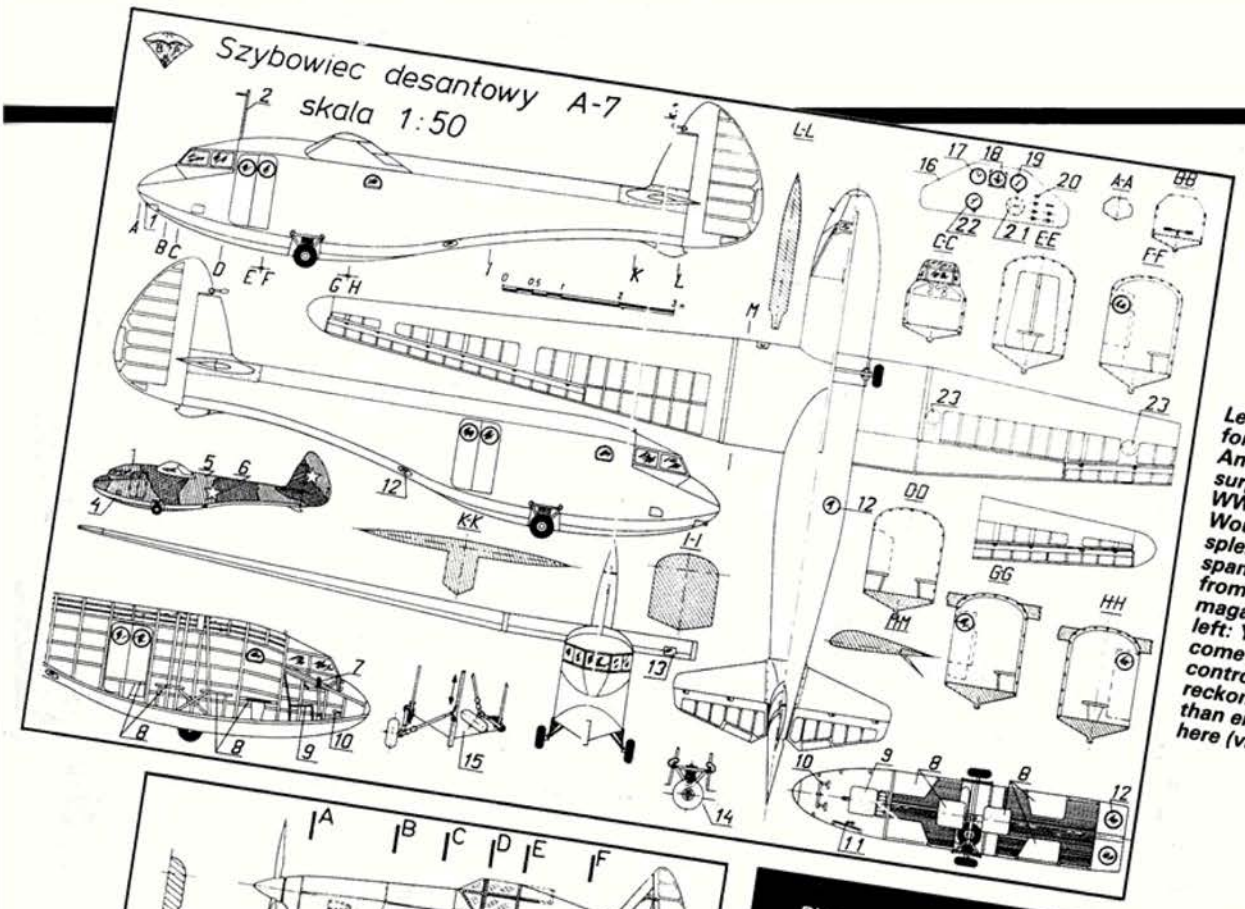
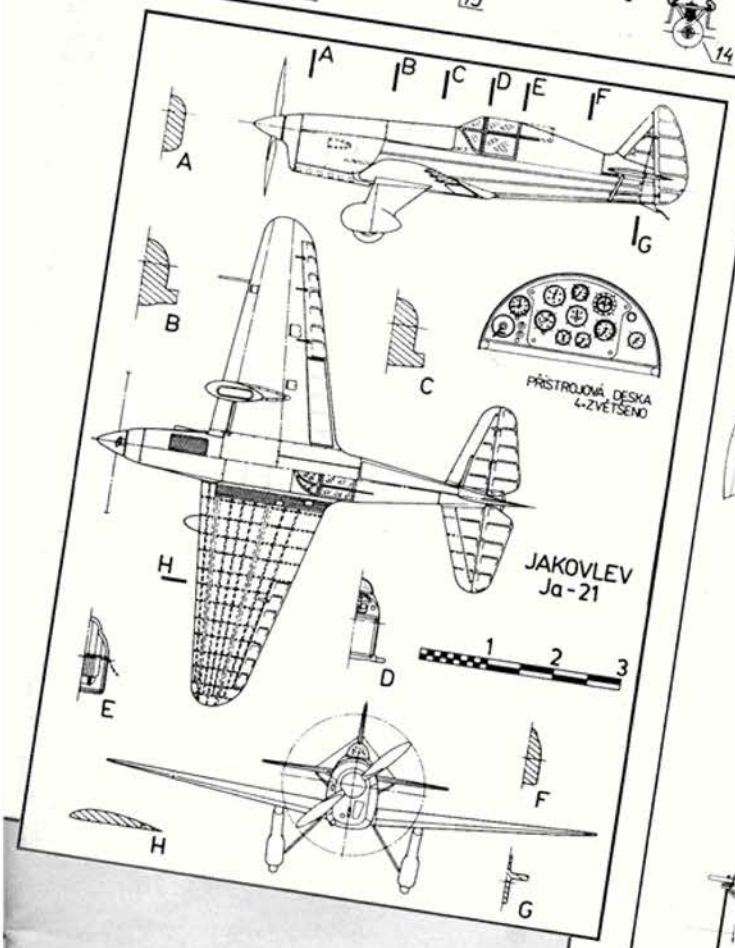


Fig. 1.—The "Fairchild 24," showing overall dimensions

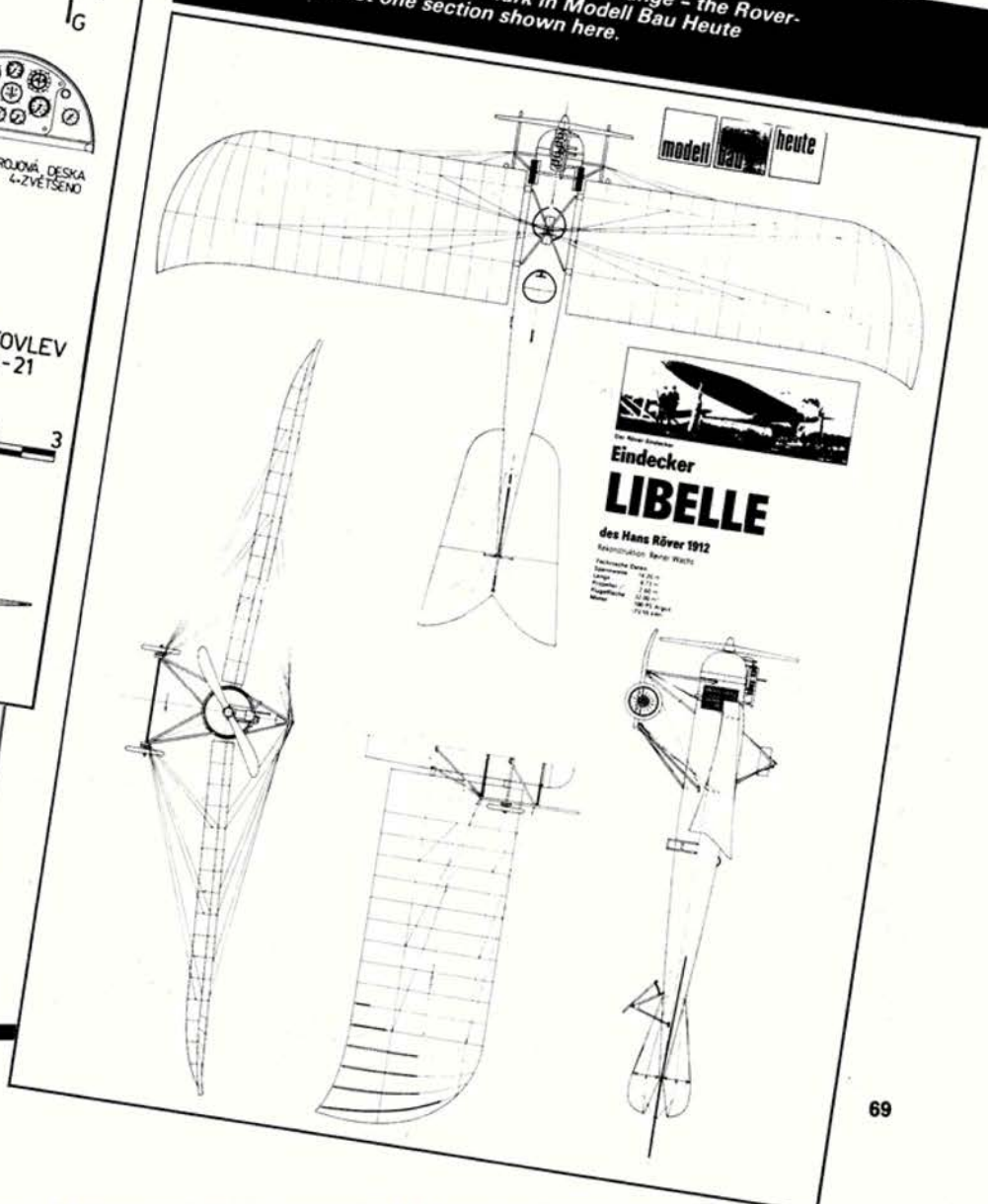
Top left: Breda Ba 28 three-view is a typical find – no fuselage sections and unknown rib positions. Snippet from Plany Modelarskie An-2 package indicates wealth of data that may be unearthed. Gee-Bee-like cockpit is for meteorological observation. Left: Fairchild 24 details are from pre-war Aeroplane Operation and Maintenance series. A useful cross-reference. Photos show (top) Peter Neate's superb R/C Hanriot in Swiss markings, (centre) Mike Hall and colourful Phonix D-1 from Profile gen, and (right) Derek Bird – cheer up, Derek! – with his crisp Pitts Special.

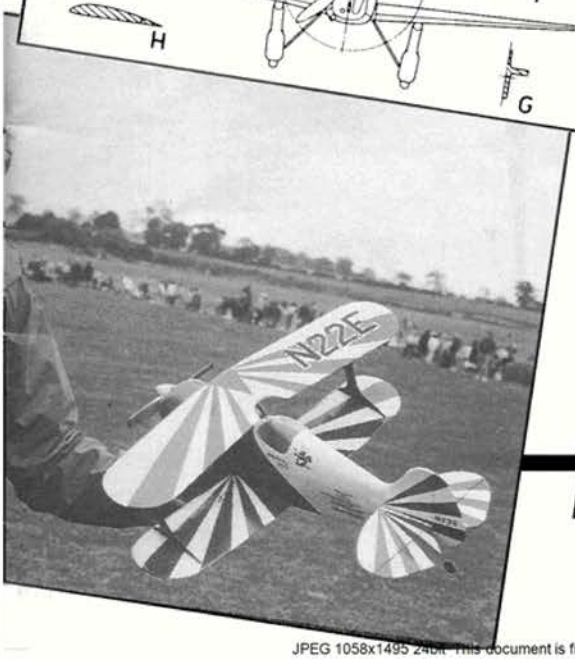


Left: And don't forget gliders! Antonov A-7 is a surprisingly sleek WW II craft. Would look splendid at 60in span... Drawings from Modelarz magazine. Below left: Yak-21 must come into the control-line reckoning. More than enough data here (via Modelar).



Pioneer craft always attract. Here's a change – the Rover-Eindecker, plans for which lurk in Modell Bau Heute magazine. Just one section shown here.





A Belgian beauty... Henri Stouffs' 1954 World Championship Stunt winner is revisited by Jim Woodside - with performance in mind

FIRST I must reveal a dark secret; a skeleton from the cupboard of the past. I must have been in my third or fourth year of senior school; a small knot of budding aeromodellers were discussing the merits of Blue Pants' thick wing configuration versus that of the recently-published Peacemaker. I don't suppose any of us had the slightest idea what we were talking about. In any event, a Peacemaker was built for my shiny new Frog 249BB. It lasted less than one lap – just time to perform a perfect three-quarter loop to destruction! The ill-fated Peacemaker actually marked my adolescent exit from modelling until my middle twenties, since when three or four very successful versions have been built and reacquaintance made with one of that knot of schoolboy experts – Mike Howard. One of Mike's sons, Andrew has now built a Peacemaker...

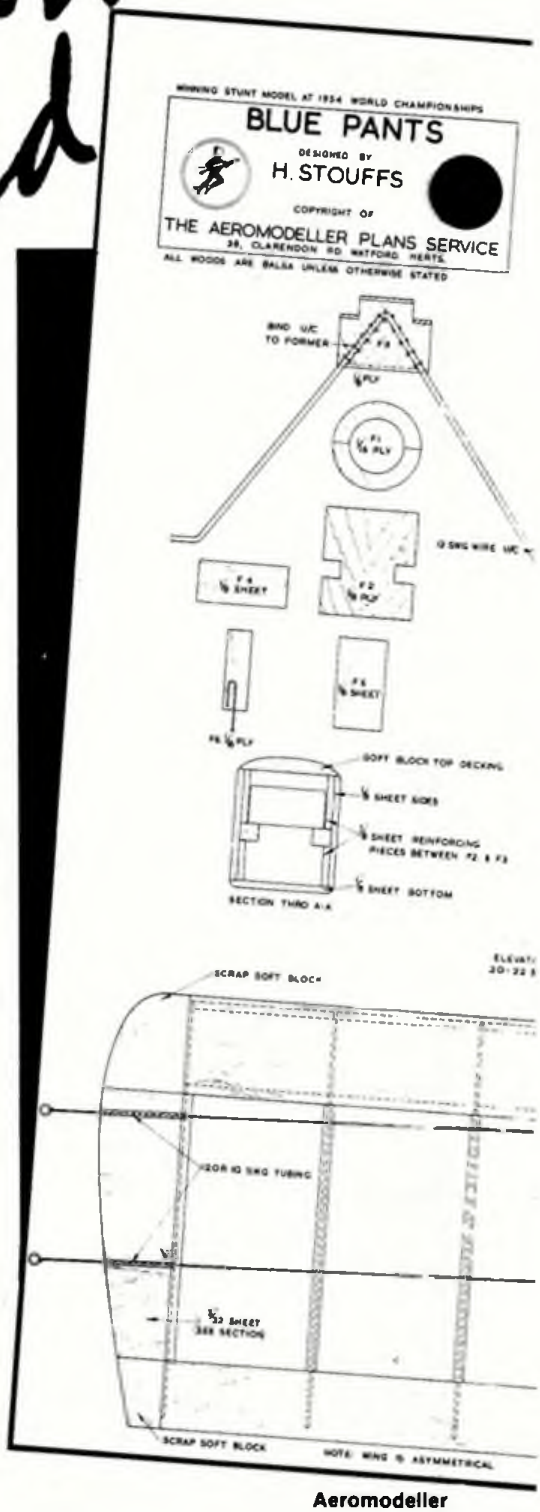
Nevertheless, a hankering to build the thick-winged Blue Pants remained. About a year ago I found a good example of the ED 246 Racer and this proved to be the catalyst. The plan was ordered.

Apply the technology

Since the time of Blue Pants' appearance in the January 1955 *Aeromodeller*, modern technology has made building from plans a simple matter. No more tiresome tracing, pin-pricking or carbon-paper to transfer the shapes to the timber. Instead, obtain photo copies of all the parts needed and trim out the section required. A faint but adequate copy can be transferred by pressing on the reverse side of the copy with a fairly hot iron. A darker image can be achieved by lightly moistening the surface of the timber with cellulose thinners and pressing the photo-copy firmly down with a tissue barely dampened with thinners. In both cases the image is reversed but this is of no importance.

34 years on... Build

Consolidating his Vintage interests these days — and taking a break from F2C Team Race — Jim has nothing but praise for Blue Pants...

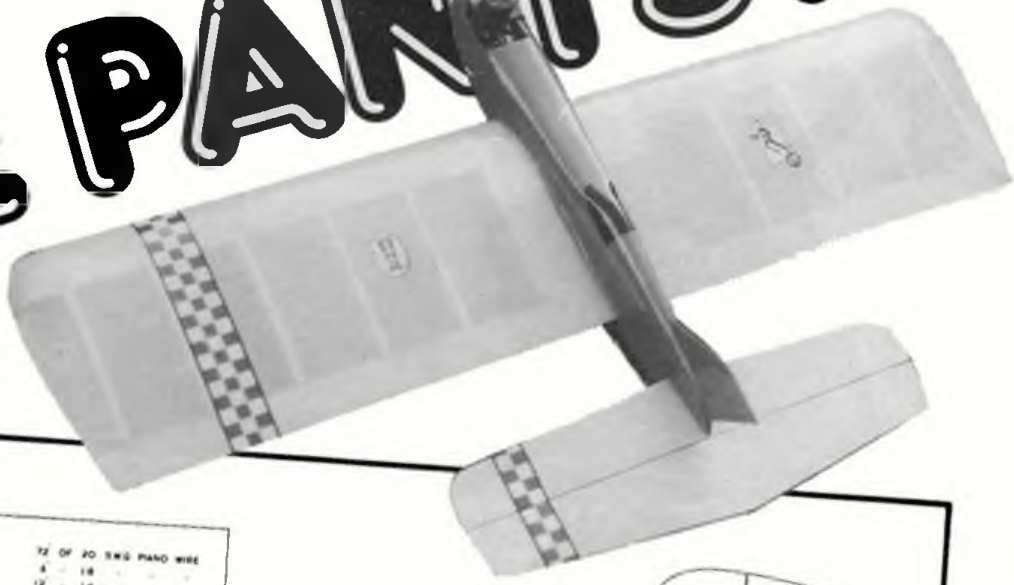


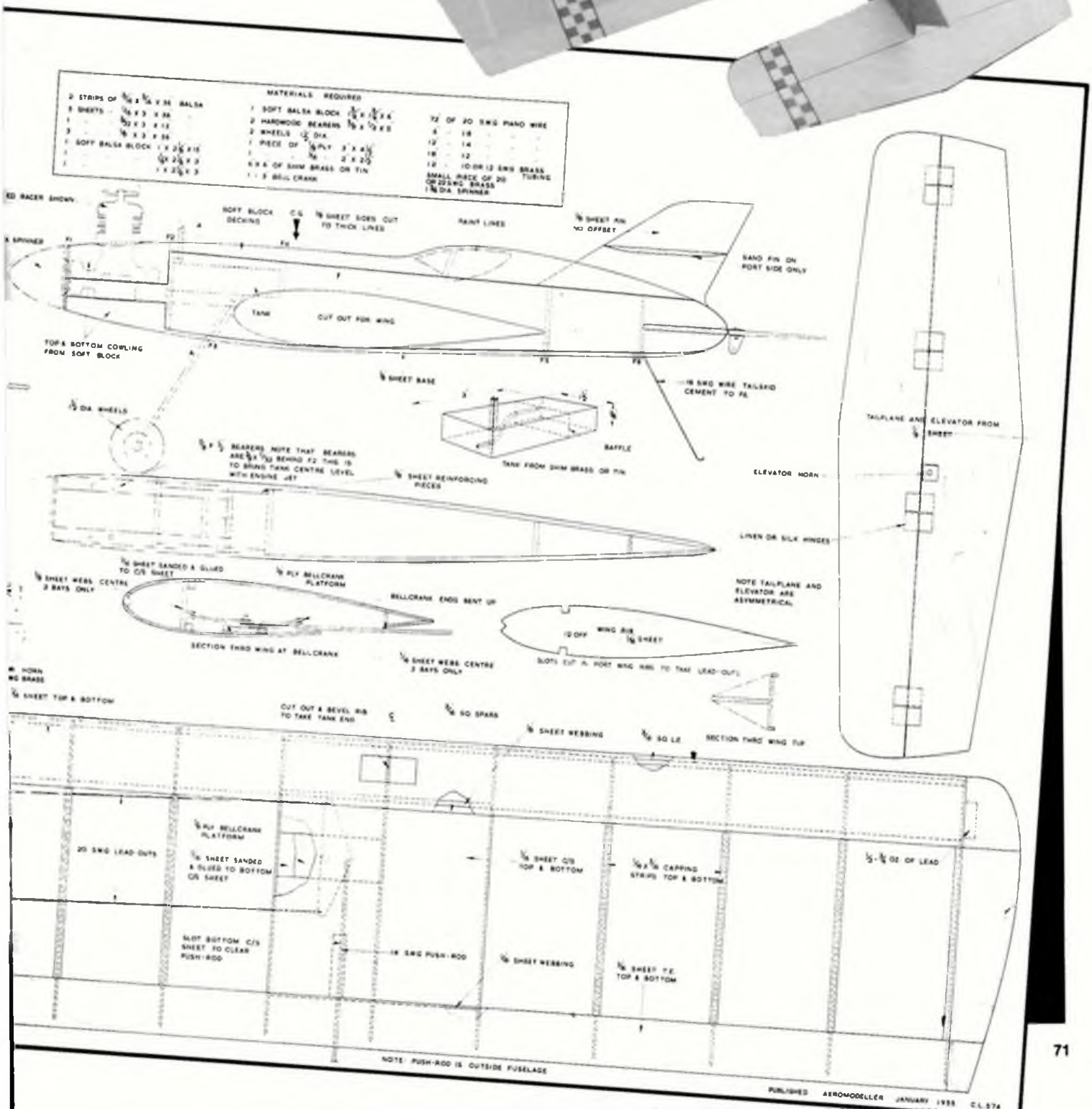
Full-size plans of Blue Pants, originally published in January 1955, are available from ASP Plans Service, 9 Hall Road, Maylands Wood Industrial Estate, Hemel Hempstead, Herts HP2 7DH. Price £4.10 including postage. Quote plan CL 574 when ordering..

The wing ribs were cut out using a plywood template, again generated by a photocopy. Making a complete kit of parts in this way is the work of only a couple of hours.

Building is a really straightforward affair, especially as Henri Stouffs arranged the push rod outside the fuselage. Not only can the completed wing be slid through the finished fuselage but a perfect neutral on bellcrank and elevator is achieved either by tweaking the pushrod or sliding the tailplane back or forth before the glue sets. Neat.

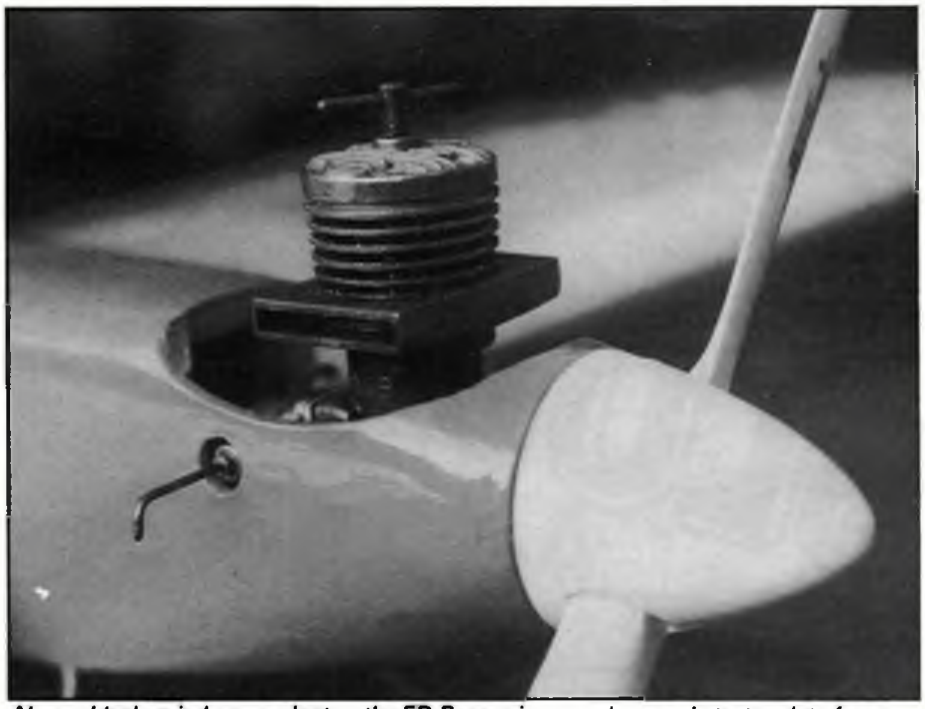
BLUE PANTS!



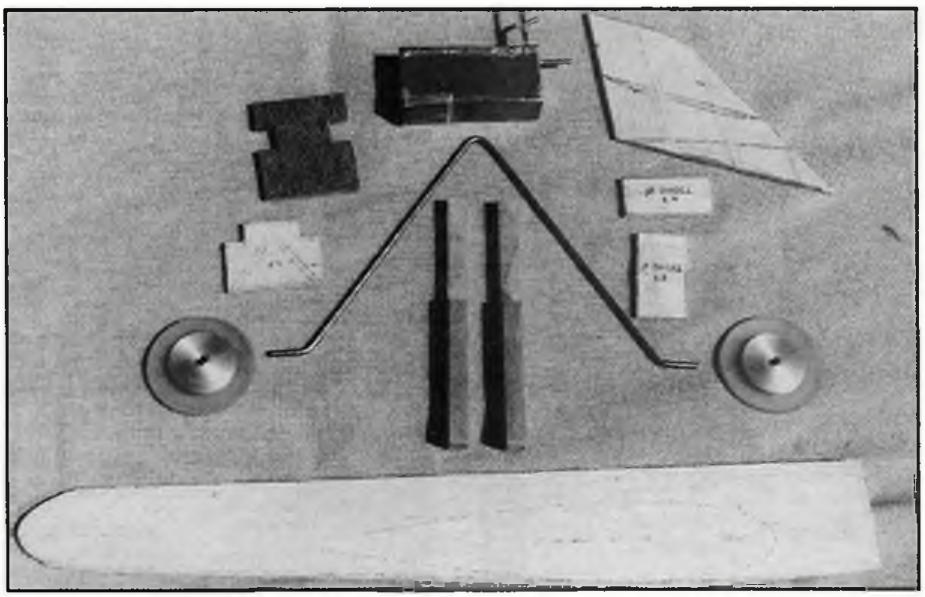


BLUE PANTS!

Famous APS Pageboy, faithfully copied onto tissue and doped onto wing. Here's your chance to do the same!



Above: Ideal period powerplant — the ED Racer gives ample urge. Latest update from Jim is that increased familiarity with the model is paying dividends — this really is a championship design.



Sample components spread. Two-inch slimline wheels are available from Ed Needham, 100 Lowfield Road, Stockport 3, Cheshire for £5.00 including postage.

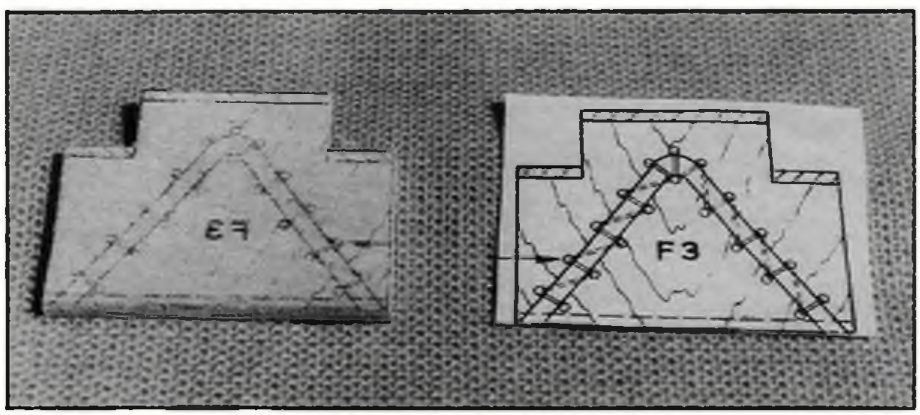
The structure!

Take the trouble to find some medium quarter grain 1/16in. wood for the wing ribs and light straight-grain for the leading edge sheeting. The original instructions suggest building the wing 'in the air', eyeballing it straight. I preferred to trust my building board better. The trailing edge was pinned down and the upper spar and leading edge cyanoed in place, once alignment was satisfactory. Isn't cyano wonderful stuff! The only changes made were to use a bellcrank platform threaded through the centre section ribs and to use flexible leadouts from a Sullivan kit.

The fuselage was built as per plan. Only two points need to be highlighted. Bearers are shown as 'stepped' but this is only necessary to bring the tank onto the centre line of the carb of the original ED 246. Check that the tank in your model lines up to the chosen engine's spraybar. Secondly, glue on the bottom sheeting before cutting out the holes for the wing – this helps to keep the fuselage curvature accurate. Take a deep breath when buying the block for the fuselage top – ouch! Expensive...

I assembled the wing and fuselage components using cyano, and then 'filleted' around the joints using five-minute epoxy smoothed with a wet little finger. Covering was genuine yellow Heavyweight Modelspan on the wings and matching Lightweight on the tail, while the fuselage was finished with Humbrol matt pale blue. A couple of coats of Tufkote gave Blue Pants a gleaming fuel proof exterior.

Xerox technique for transferring patterns to wood explained in text. Copy at right, crisp results at left.



Flight trials

The first available Sunday dawned calm and clear – something had to go wrong. It did. At the end of the first cautious flight a not ungentle landing saw the undercarriage fold back. Closer inspection revealed that I had forgotten to gusset the ply undercarriage former – one of the penalties, I suppose, of building a model over many months. A repair during the next week had Blue Pants ready for the following Saturday. The design is a pleasure to fly – especially in the round manoeuvres. Of course, being unflapped the response can be coarse; but then it is not designed for present-day F2C. It has only taken thirty-three years to get round to building my Blue Pants, but I am glad to have made the effort; it's well worth it. Try one!

INDOORS IN OCTOBER

John O'Donnell looks at autumnal undercover activity

AUTUMN IS normally a very busy time on the outdoor contest scene – and my absence has certainly been noticed by the opposition! Most of the 'contest regulars' already know that my disappearance was anything but voluntary. In short, I had a bad fall, whilst towing an A/1 glider, and dislocated a shoulder. My recovery seems to be straightforward, but it is a long slow process. Flying Open Rubber demands a lot of arm movement – look at any launch photo – and this is exactly what I lack! Bicycle retrieval is a further problem...

The first weekend in October was particularly busy with two major outdoor events scheduled at opposite ends of the country. Moreover, my son got married in London on the Saturday. As my arm was still in a sling, June had to do all the driving. However, Cardington was only a short distance off the direct route home – and my powers of persuasion must be better than I thought! Indoor flying was about the limit of my capabilities – but, at least, it helped curtail the withdrawal symptoms.

On site

Conditions inside the 'shed' are very susceptible to the weather outside – and the best flying conditions occur when it is too nice to be inside. This particular weekend was exceptional, with calm sunny weather outside giving warm, bouyant air indoors – and with no drift.

The Loughner one-design contest had been well (dare I say over) publicised, yet attracted only a handful of entrants. They included none of the true Indoor fliers – and I can only wonder whom this type of contest is really intended to attract.

Several models were eliminated because their builders had been misled by the covering advice offered in print by the organisers. Those who used tissue preshrunk and doped (on a frame) found their wings twisted like propellers – and with nothing that could be done to rectify the situation. Dave Wolstenholme was only able to fly when he was lent a wing by the Contest Director himself. Rules are obviously as flexible as the models!

Most of the other entrants eventually worked their way up to around four minutes, producing a set of rather close scores. I upset this picture with a couple of five-minute flights that received a rather mixed reception! There were even threats of a protest because I had solved CG problems (the model was at first tail heavy) by the expedient of moving the rear motor anchorage well forward. I would add that this had been seen and approved by the CD prior to my official flights.

The purists may have been offended – but would they have liked other 'solutions' any better? Alternatives include a thin wire spacer between the rubber and the rear hook, or a a gram of noseweight. A propeller of three-times the weight of mine would serve, but is difficult to arrange 'on-site'.

But are any of the replicas really representative? Cyano, pre-shrunk tissue, Teflon washers, and dural bearings are hardly authentic, not to mention the motive power itself. I was using Pirelli (and a good batch at that) whilst at least one of the runners-up was right up-to-date with 1988 Chinese rubber. Add modern ideas of trimming, and it is all a different world.

There were also comments that my model was much lighter than the opposition. True enough – but why should it be so? In any case, you can be sure that those competing in America sixty years ago would use the very best materials that they could get – and that the winning models would be light. At least I feel that we have learned something over the years. My models (yes, I had two) were flying nowhere near their limit. I had better not prophesy in case I have to use them again!

Index endeavours

The Index event also received indifferent support. It was dominated well and truly by Mark Croome who exceeded his own CO_2 record several times, and eventually managed a 15-minute-plus flight for a 113% score. He indicated at the end of the day that 'enough is enough', and that his efforts are likely to be directed elsewhere in future. His model, described in December's *Aeromodeller*, is a deceptively simple square-tipped design with a stick fuselage and Mylar-covered flying surfaces. The secret is in the motors, and the use of a large-diameter single-blade folding propeller.

The next two places were taken by Novice Pennyplanes with Stan Sawyer and Brian Kenny both achieving over 90% of the target score. Clearly the choice of category is all-important if winning is the intent. Mind you, few fliers in Cardington are really

Top trio (actually the only three!) in the Sweepette Trophy event at Wigan on 15th October: winner Reg Boor, Roy Roberts (third and last), and second-placer Dave Yates.

'Team Wolstenholme' with standard P15 craft at Cardington on 2nd October. Left to right are Damian Austin and Dave, Melissa and Matthew Wolstenholme.

Cardington 2nd October

Loughner One-Design Event 7 scores; Best 2 from 6

					Total
1	John O'Donnell	5:00	5:20		10:20
2	Stan Sawyer	4:05	4:03		8:08
3	Reg Parham	3:54	3:53		7:58
4	Peter Lee	3:51	3:13		7:44
5	S. Taylor	3:53	1:52		7:06
6	John Barker	3:30			5:22
7	Dave Wolstenholme	3:39			3:39

Index Event 6 scores; Best 1 from 6

1	Mark Croome		113%	Target	13:28	Flight	15:18
2	Stan Sawyer	Novice PP	92%	Target	12:00	Flight	11:02
3	Brian Kenny	Novice PP	91%	Target	12:00	Flight	10:58
4	Peter Williams	EZB	87%	Target	24:43	Flight	21:27
5	Bernard Hunt	EZB	85%	Target	24:43	Flight	20:55
6	A. Wheddon	Novice Flyrod	45%	Target	14:56	Flight	8:40

Wigan: Saturday 15th October 1988

P15 Standard One-Design Event 13 entries, 11 scores. Best two count

					Total
1	Damian Austin	1:31	1:36		3:07
2	Peter Broady	1:15	1:33		2:48
3	Peter Dean	1:24	1:23		2:47
	Roy Roberts	1:23	1:24		2:47
5	Matthew Wolstenholme	1:18	1:25		2:43
6	Dave Wolstenholme	1:13	1:25		2:38
7	Brian Faulkner	1:13	1:22		2:35
8	John Pope	1:15	1:16		2:31
9	Jack Bray	1:06	1:05		2:10
10	Melissa Wolstenholme	59	1:02		2:01
11	Ray Jenyon	57	52		1:52

P15 Modified 4 entries and scores. Best two count

				Total
1	John O'Donnell	3:00	3:00	6:00
2	Dave Yates	2:42	2:43	5:25
3	Reg Boor	2:30	2:33	5:03
4	Mike Colling	1:47	1:48	3:35

HLG Sweepette Trophy 3 entries and scores. Best 2 from 12

				Total
1	Reg Boor	27:4	26:1	53:5
2	Dave Yates	25:4	26:0	51:4
3	Roy Roberts	19:7	17:3	37:0

competitive – and regard the contests very lightly indeed. To be fair, twenty minutes with an EZB is an achievement (and Peter Williams was delighted to manage it twice) even if it is no use in the Index event.

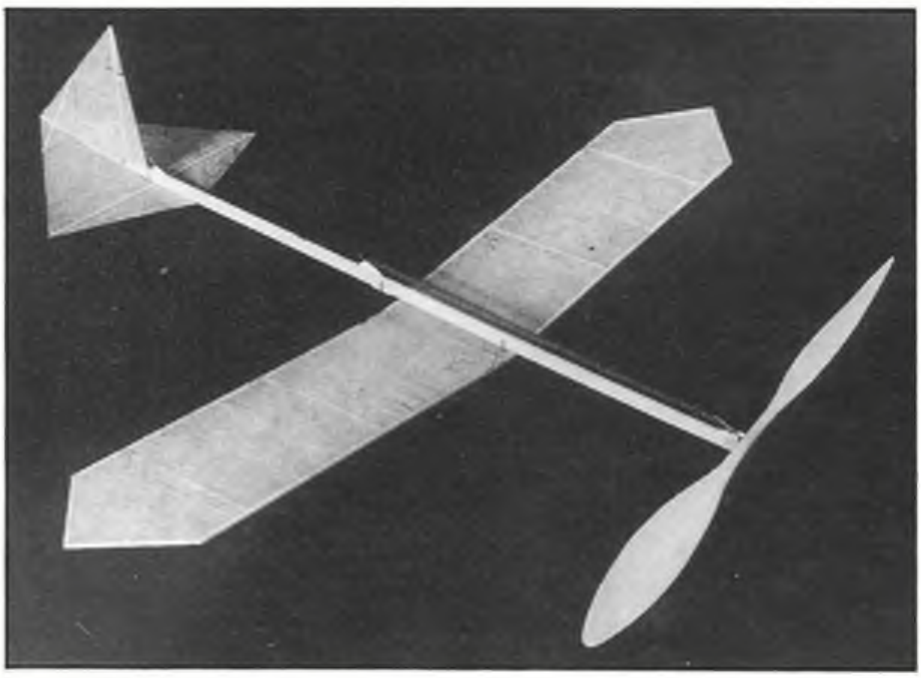
I suppose I must accept that most of the 'Cardington Club' are happy just to fly there – and regard the making of long (but safe) flights as sufficient reward in itself. Perhaps this is why I never feel that it is quite my scene!

Oop North...

The Wigan meeting a fortnight later was a very different affair. Following the declining interest in the usual competitions during 1986 and '87, the more recent North West Indoor Meetings have been fly-for-fun get-togethers. Although enjoyable enough, and providing some opportunity to trim, these meetings lack purpose.

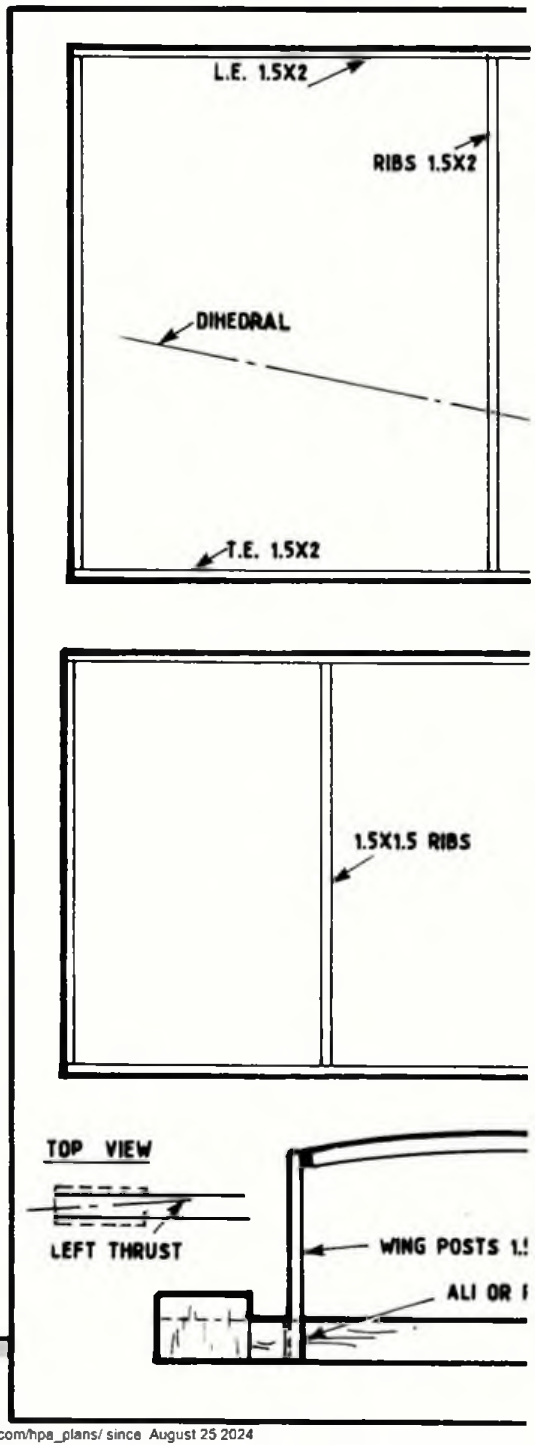
One idea that looked worth a try was the P15 Specification that had been featured in Jorgen Korsgaard's Indoor News. Essentially, this is a duration event using a Sleek Streak style propeller assembly, and having a fifteen-inch wing span limitation. The plan published by Korsgaard seemed simple enough for anyone, and a one-design event was proposed by Mike Colling.

Our reporter's Loughner, winner of the Cardington one-model event for this design.



Such events pose some obvious problems with interpretation, never mind the more tempting improvements. Intelligent anticipation of this situation, and a certain amount of discussion, led to the introduction of an additional and alternative 'modified' category – which covered own-designs as well. Entrants were restricted to one class or the other – not both. This worked out well in practice – as it effectively separated out the 'contest fliers' from the rest, and made for two competitive events and a lot of determined flying.

The one-design class attracted 13 entrants, with all but two submitting scores. This response was helped by Dave Wolstenholme having mass-produced no less than five models – one for each of his entourage, and all in different colours. There was, of course, no builder-of-the-model requirement at this 'fun contest'! For reasons that were not apparent the example allocated to Damian Austin was far superior to the others – and eventually proved a convincing winner with two flights of ninety-odd seconds. Runner-up was scale flier Peter Broady whose final

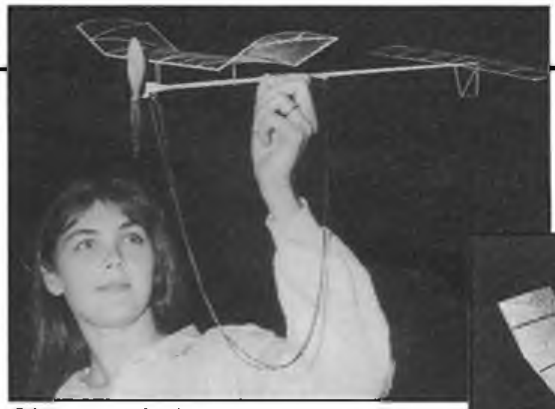


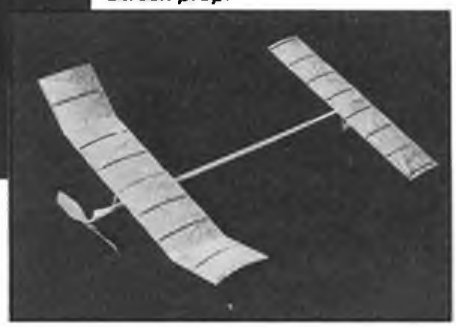
flight was enough to squeeze in front of Peter Dean and Roy Roberts by just a single second.

All the various own-designs proved to have considerably more performance – and certainly needed their separate contest. Models by Dave Yates and the writer showed much EZB influence, whilst Reg Boor tried a different approach with two stages of taper and a swept-back LE. Surprisingly, I was the only one to try the obvious (and legal) experiment of increasing the propeller pitch – and the results showed that this was indeed the way to go.

The Sweepette Trophy for Open IHLG had been allocated to this meeting by the Indoor Tech. Committee. Following the decline of interest in this category at Cardington, the trophy had been lent to meetings at Crawley and Derby. Now it was the North West's turn.

To be candid, the idea was a disaster. There were only three entrants – all local Wigan club members. Nevertheless, the contest was run properly with all other flying stopped and the floor cleared so as to give the models every chance to perform. It was soon apparent that the contest was between Reg Boor and Dave Yates, with the former having the better glide – but less height on launch!



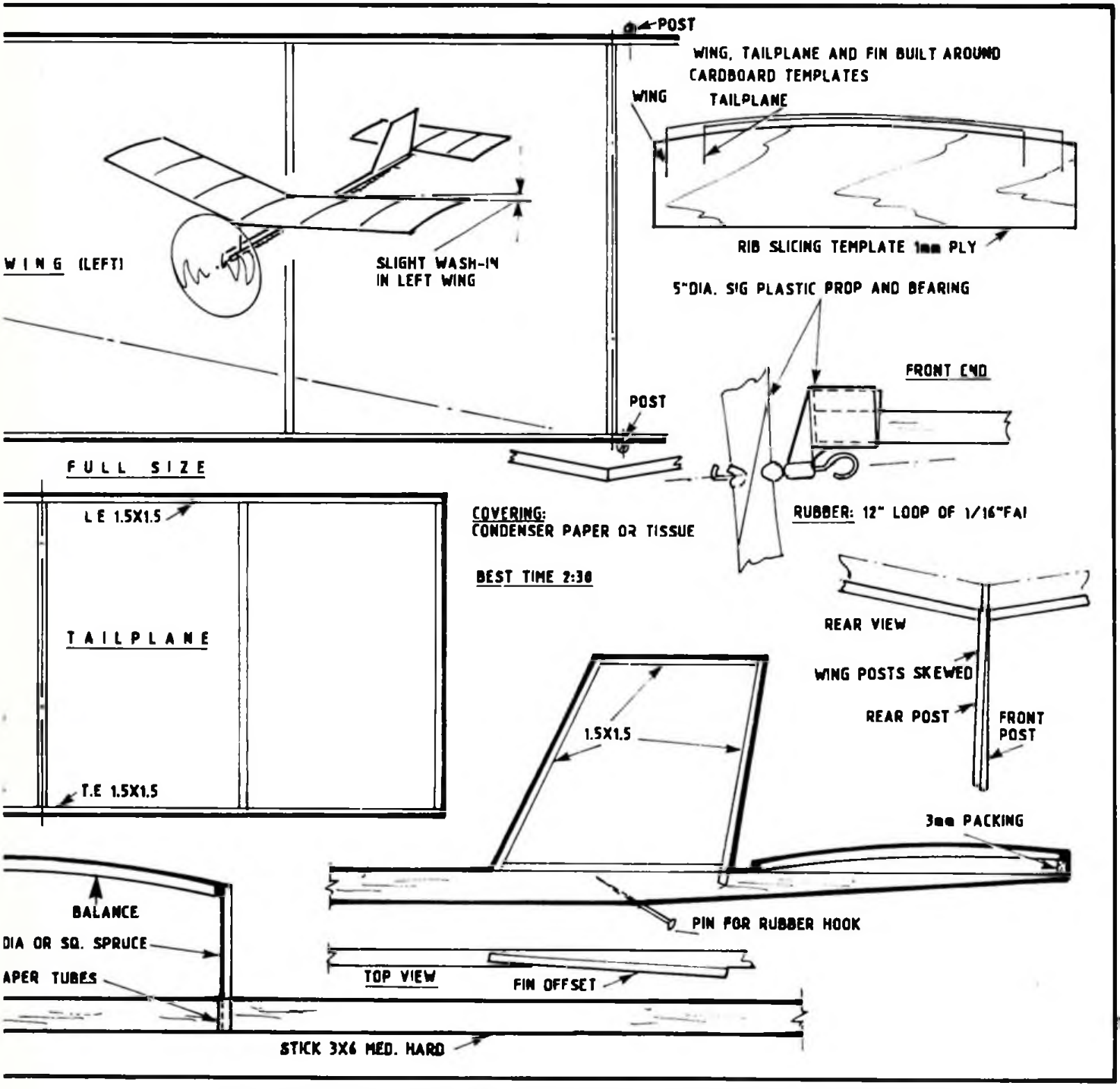


Left: Melissa Wolstenholme admires John O'Donnell's 'modified', or own-design P15. Long motor, is it not? Below: Another of John's P15s. This one has 3in chord and standard Sleek Streek prop.

P15 class is for Indoor designs of 15in span. 'Standard' category at Wigan was for Erik Knudsen's version (drawing below) with tissue, condenser paper or clingfilm covering.

Eventually Reg got it all together with a best flight of 27.4 seconds – a score that was to prove decisive. His model was a standard (if slightly heavy) Coot – just as featured in print on several occasions. *Aeromodeller* published the plan in April 1978.

By now it has become pretty obvious that this trophy has become an embarrassment, with rock-bottom interest in competition IHLG. Surely the time has come to admit the situation, and return the trophy to its donor. It ought to do more good elsewhere...



The Aeromodeller guide to...

Rubber Model Trimming

New to competition modelling? Fancy beating the opposition? Dave Hipperson explains how...

IT IS PLANNED to bring you trimming techniques for Power Models and Gliders in due course but these will be written by those more qualified than I. Nevertheless, some of the basics I apply to Rubber trimming are common to the other disciplines. It should be understood that there can't be two fliers with exactly the same trimming technique. The ideas here have worked for me - they are not necessarily better than anyone else's, but if you are having trouble then they might help.

I can dispel a few myths about that fine contest trim people talk about. It doesn't exist. These models we fly are much less critical than we give them credit for. When I have deliberately flown models grossly under-elevated it has always been remarkable how little difference there was in the duration! You don't trim for contest performance. The model is *designed* for contest performance and then trimmed to fly.

Trimming at home

As with all classes, most trimming can be done by careful and intelligent observation at home long before you ever venture to the field itself. However, that pre-supposes that the model you are about to trim is built straight and 'square'. I know it's boring to say so but there is no substitute for neat building. I don't mean fancy building, I mean practical, straight, accurate building. Take a look at the winning models at a contest - all classes. Look at Russell Peers' power models. They aren't pretty but they are straight, accurate, sturdy and built for the job. Look at Mike Fantham's gliders. Very little fancy stuff but neat, solid, straight building that you can rely upon when it matters.

With enough time, calculation and patience we could eradicate the trimming stage altogether. After all, full-size aircraft come off the production line ready to fly. Why shouldn't ours? My rubber models aren't particularly pretty either but they are built for the job and can be relied upon not to move between flights and not to fail during them. There is no substitute for good building - without it trimming is well nigh impossible. Develop an attitude of mind that actually enjoys building well - it will stand you in good stead and save you masses of time in the long run.

Alignment

Make sure the wings and tail are on 'square', preferably keyed in place. Ensure the fin is secure and the nose block is a snug fit in the front of the fuselage. A long spigot down inside the front of the fuselage is invaluable here even if the block is a tight fit (Fig. 1). It will allow for thrustline adjustments which may bring a shallow key piece almost out of the fuselage nose. Make sure the prop blades fold as neatly as possible (if the model is a freewheeler), ensure that the prop doesn't stick and that it will rotate freely when required to.

The forces at work

Here we are considering trimming simple rubber models which possess no moving surfaces or any other fancy stuff. Not so much as an autorudder. To incorporate automatic surfaces is simply an admission that we have given up trying to trim the model with its own inherent forces and that we are bending the rules. If you are *really* good, autosurfaces are not necessary as Bob White's win in the Wakefield World Champs proved last summer.

If you are new enough to trimming models to be reading this then probably you have either designed yourself a simple Open or CDH model, or you have built someone else's design; or maybe you have built a vintage model. Trimming that last category is by far the most telling so I will concentrate particularly on the problems that are likely to arise with vintage models - almost everything else is simpler.

The power forces at work on a typical

high wing rubber model are simply forward thrust and torque from the prop (see Fig. 2). At high-speed there can also be gyrosopic reaction, rather like a power model but we will try to avoid that stage as it is usually only evident in a dive! Incidentally I am talking about conventional prop rotation in all cases - that is clockwise when viewed in the same direction as the model flies. If you are totally left-handed and have to wind the 'other way round' then it follows that your props, warps and trim will also have to be reversed.

Let us presume that you intend to fly your model with a right-hand power turn (against the torque of the motor). This allows torque further to add to the left-rolling tendency and hence further to force the model away from a tight-turning dive. As a rule of thumb the power turn should be in the same direction as prop rotation.

Thrustline alterations can induce turns, loops and dives on power. This is a quite separate matter from the basic glide trim which is set up first by adjustment to CG position and wing and tail incidence. The two interact so it is very important to trim them in the right order. Start with the glide.

Warps

If you study published designs you will probably find that most rubber duration models use some differential warp to roll the model in the opposite direction to the power turn. Often there is some negative incidence on the tips (wash-out) to delay tip-stalling. Personally I have dispensed with wash-out on the tips of my models although I have noticed that over some years the trailing edge of a square wing tip will lift and induce a little of its own accord. My normal policy is for all panels to be flat apart from the 'starboard inner' which has a little positive warp - that is, 'wash-in' or 'increased incidence'. This wash-in is designed to roll the model against the turn in the high-speed phase of the initial power pattern. It then goes on maintaining a little more incidence on the inner panel throughout the cruise and glide. Unlike the theorists I find wash-in in any rubber model will open out the glide turn as well. In other words it will lift rather than drag the model around as some people suggest. The only wash-in I have come across that did 'drag' rather than 'lift' was when applied to super-light and slow-flying CO_2 indoor models. My suggestion is to wash-in the inner panel on the 'inside of the turn'. Everything else, including the tailplane should be flat.

Just how much wash-in? I have found this is best decided by how quickly the model *decelerates* during the climb phase. In other words, by how quickly the power reduces. It is, after all, this constantly-altering power output that makes rubber trimming such a difficult trick. I have found 1/8in. wash-in at the dihedral break ample for medium size Open Rubber models and Wakefields. Use a little more (say 3/16in.) on shorter-running vintage designs of the same size.

Once again 1/8in. should suffice for vintage lightweights. Invariably no warps are suggested on the plan; that's probably why such models fly better now than they used to! On CDH I have often found a great deal more can be beneficial. You can go to 1/4in. depending on the design; but on large, long-running Open Rubber models 1/8 to 3/16in. is probably enough despite their size as they move so slowly thanks to their large props.

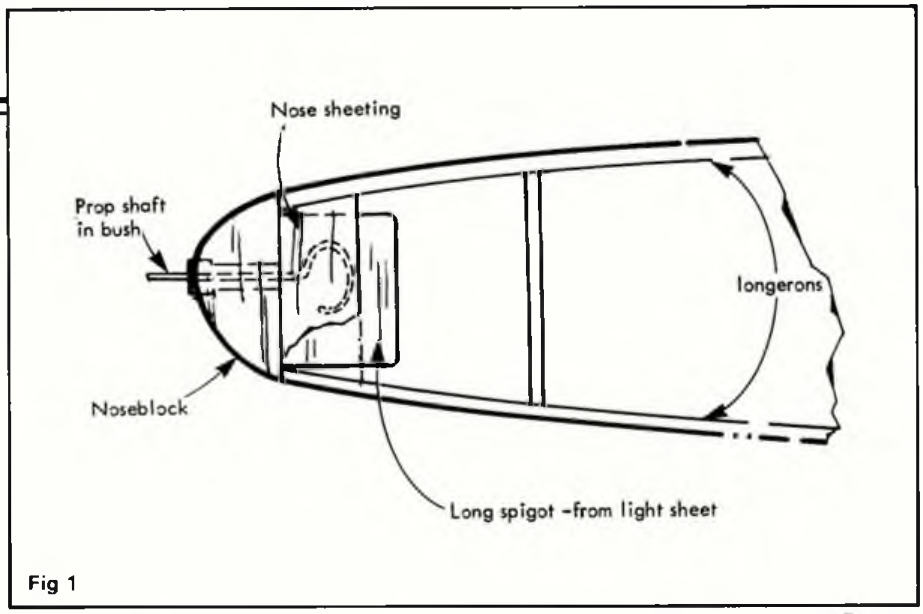
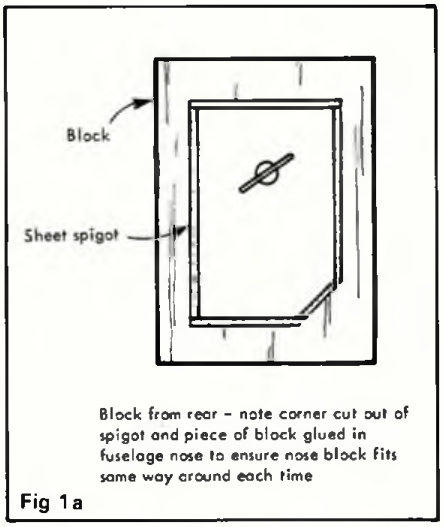


Fig 1



Block from rear - note corner cut out of spigot and piece of block glued in fuselage nose to ensure nose block fits same way around each time

Fig 1a

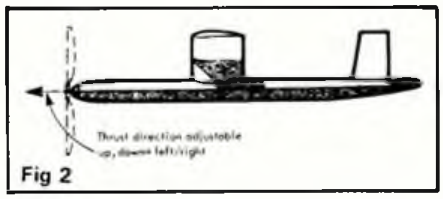


Fig 2

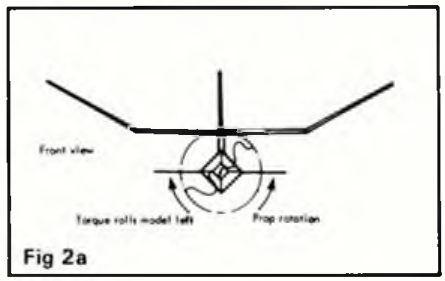


Fig 2a

Trimming the glide

The greatest dread with all models is of having the CG too far back. There is an ideal position for every set-up but a touch further forward is safer. It will produce a super-stable flight, admittedly of perhaps indifferent performance. Too far back produces an unstable condition at best - no flight at worst. If building from a plan, or an established design (particularly if it's a vintage model) concentrate on getting the CG where it says. If none is marked, about 70% wing chord is as far back as is permissible to go in the early stages. Remember it is very easy to ballast the tail to move the CG back but the nose is much shorter and to ballast the CG forward will need much more weight.

When the CG is in the correct place incidence should be adjusted until a straight, level glide is achieved. A very slight stall is acceptable but only from a firm launch. Turn can be adjusted in a number of ways. My favourite goes against all the theorists. I add a little right rudder to achieve the right glide turn - as simple as that. Others use tail tilt. This is fine but looks untidy in flight and behaves oddly in dives. However, if tail tilt appeals then one lifts the end of the tail, on the side of the model you wish it to turn towards (Fig. 4). But be careful - if the tail is mounted on its leading edge, the tilt may also reduce incidence slightly and should thus be compensated for. Otherwise it should not effect the power trim very much although it might start to take over towards the end of the run. You will notice that the further back the CG the more sensitive is the effect of tail tilt. I would therefore recommend it only on models where it will be most effective like the modern Open Rubber craft. Wakefields and such tend to need too much tilt before it takes any effect.

One may trim the glide either in the direction of the power or against it. There is a school of thought that favours 'right climb' and 'left glide' (the glide being trimmed with rudder) - the argument being that it is safer. Nothing wrong with this apart from the fact that it is an untidy pattern involving a great deal of side thrust when trimming 'power'; it can also throw the model out of a thermal into which it might have centred during the climb. Enough to condemn it you might think but although I don't used it many do in F1B; Bob Bailey used it with success in Open Rubber some years ago and Chris Chapman still does.

For simplicity I would still recommend my system. Adjust the glide with right rudder using either a tab or strips of wood stuck on the side of the fin. Don't turn the model too tight or make the common error

of trying to kill a stall with a tight glide. The wings shouldn't bank in a glide turn; to do so is wasteful of wing lift.

When absolutely satisfied that a flat, slightly right-turning glide is established start thinking about the power set-up.

Power trimming

Apply a few turns and let the prop run whilst holding the fuselage, observing carefully from the side and above how the prop is revolving. This is the most accurate way I know of checking the thrust line and it also double-checks that the blades are balanced and tracking truly. You start with a fair amount of side thrust for early flights - say three degrees. It can always be reduced later. Make absolutely sure there is no up-thrust; it is unlikely that you will require down. When happy with the thrustline try a test hop on half turns but allow the motor to unwind half way before launching. This eliminates the power burst on release of the prop no matter how many turns have been applied. If you are not sure then time the 'static' run-down on half turns and hold the model for half this time before releasing. Remember we are trying to do this without any annoying trimming accidents. This is the most dangerous time for your model. Be patient.

On these low turns the model should fly away positively in a gentle climb to the right. For more power turn add right thrust; for less, decrease it. If up/down thrust is neutral and if the glide has been trimmed correctly it is unlikely that at these turns the model will stall. Height achieved on the climb should be enough to be able to ascertain if there is anything wrong with the glide. If so, fix it now before going on with the power. Once again the glide should be trimmed with wing incidence and rudder and if it does need some fine adjustment remember that any alterations will effect the power trim so you will have to start again with that. Increase turns until you are releasing on a full three-quarter wind-up. As winds and thrust increase, so does torque and model speed. A little downthrust is beneficial on vintage models but rarely necessary on anything else. I have found it is usually wise to keep a vintage model's power turn fairly wide for safety so a little down thrust is often required to control the looping tendency. Probably you will be able to reduce that right thrust a bit as the speed builds up but don't be too eager. As you reach full turns, particularly on modern FAI Rubber, those final few winds can make a world of difference to the pattern. You may find that you get a tight, almost flat turn; then the model's nose will rise, the turn widens and as the speed drops and the torque takes over the model comes close to the stall. Actually this is very near to trim but it looks untidy. Sometimes a little less 'right' thrust and a little downthrust will cure it; if not, the answer is more wash-in (or even a bigger prop to handle the power if one is allowed). Playing around with the fin area of the model can also be of use here but I am limiting myself to trimming what you have rather than redesigning the model!

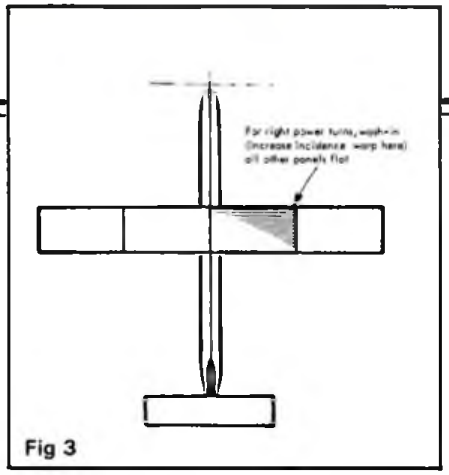


Fig 3

Otherwise you can always fall back on VIT systems but this is not recommended for one's first few models.

The effect of different props

Remember, if you are using a freewheeler, that sidethrust adjustments will affect the glide very slightly as the windmilling prop will pull more to the side which it is turned; but it's a fine point. Many vintage flyers are still worried about the CG shift from the blades of a folding prop. Well - if you have trimmed the glide properly in the first place then the glide itself can never be affected, unlike the transition period. It's not the CG that is the problem but rather the drag from the blades just before they fold. I have sometimes experienced a mush or stall just before the prop fold on my own design '54-rule Wakefield. (Incidentally, Dick Korda's '39 model doesn't do this - only my modern copy; says much for development, doesn't it!). I have put this down to drag rather than CG shift. The blades I use are of very large area and they probably offer more drag than thrust just before they fold as the model settles into glide speed. A similar effect can be induced if you have an over-elevated model trimmed with too much downthrust - that is, a stall at prop fold. These are rare problems, however. I have no experience of feathering blades but would expect them to act a little like free-wheelers. Certainly, featherers and free-wheelers are both good stall dampers.

Small models with large propellers are notorious for power-stalling - sometimes right through the climb, particularly if they carry a large load of rubber. I have seen John O'Donnell's model do this, and so do a number of my vintage Wakefields. Notably, the Lanzos with the duplex tractor fuselage often power-stall if disturbed by turbulence and never seem to get back into their stable climb. The wing rotates about the prop. Then there is nothing for it but to add a little wasteful down and right thrust to maintain climb speed; sometimes it is even necessary to reduce incidence if the glide looks near the stall.

Prop geometry

Of course the geometry of the prop itself can effect the behaviour of the model. The more pitch the greater will be the effects of torque and, in general, the motor run will be longer and the model will become easier to trim. However, it will have less thrust at any given moment and will thus be more susceptible to displacement in turbulence. On the other hand the smaller, finer pitch set-up can achieve a very snappy get-away; but you are then more likely to have that 'over-and-around' trim problem - almost a half loop - on full turns. It's a matter of compromise.

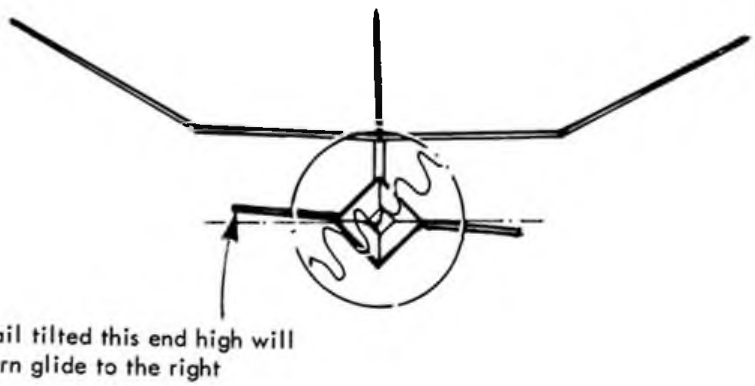
Personally, when choosing a vintage design I would always tend towards the model with the biggest possible prop for trimming ease and ultimate performance, even if it's more tricky to wind...

Some common problems

As you near full turns gyroscopic reaction of the turning prop can overcome the effects of torque, particularly if the model is slightly underelevated or if you launch it very flat or off to the right of the wind. In this case the nose will be forced down and the increasing speed will induce a tight turn (Fig. 5). Then, even if the torque reduces, the speed of the model may not and it will tend to bank even more steeply, flying a series of flat turns before climbing again - or worse, winding all the way in.

My Korda will do this if launched flat and to the right of wind. If launched steeply the speed never seems to build up enough to create the problem. When launched steeply in a wind it loops - so I don't fly it in such conditions! I saw a CDH model in perfect trim execute just such a flat-climbing manoeuvre at a Southern Gala. Next flight, without adjustment, the model was launched at a greater angle - and it flew perfectly. Of course, the steep launch can always induce a loop, so once again it's compromise. However, if the problem persists and you haven't written off the model (and if the glide is how you want it)

Fig 4



open out the power turn a little with less right thrust - but keep the nose down on launch.

Glide stalling

Here is a common one. Even a tight pre-tensioned motor can leave uneven knots along its length, particularly after full contest turns. This is why you see so many Open Rubber models stalling out of flyoffs. It's those last few turns that do the damage. On the other hand, you may be struggling with one of those vintage creations with a slim rear fuselage which actually catches complete knots and holds them in bunches bulging through the tissue. If this is the case, you are in real trouble and no amount of trimming will get around the problem. However, the risk of both can be reduced in the same way. You must wind more carefully. A routinely stretched length of rubber and a routine number of turns at full stretch followed by one's usual approach with the winder towards the nose of the model for the final turns will at least give a similarly-knotted motor each time; or at least a situation close to it and - hopefully - a regular CG position.

I know it's fiddly, but I put out a marker at a set distance from the nose of the model so that at least I know I am stretching the motor the same distance every time. Coming in too quickly will allow the motor to bunch up, probably at the front; but these bunches unwind quickly and do little harm as long as the nose is large enough to accommodate their whirling around. However, mysteriously, a motor like this will usually deploy its final knots at the rear and this is what will stall the model. Putting on more winds with the motor back inside the fuselage will increase the initial torque (bad); reduce the number of possible turns (bad); but will avoid nose bunches. Conversely, this winding technique will usually deploy its knots, when unwinding, at the front of the fuselage. Because of this, I have actually had more diving glides in Open Rubber flyoffs than stalling ones. If you can follow the same winding technique everytime then you can trim the glide to compensate for the knots in the unwound motor - and you are on your way to consistent glide performance.

Interaction and fine trimming

Having said all this, you will have noticed that despite all our efforts to trim the glide right at the start we are already talking about making adjustments to it after we have trimmed the model under the power. Sadly it is not a perfect world; and there is no way of knowing how the motor in your particular model and with your particular prop-stop system is going to deploy after full winds until you have tried it.

I usually fly initial test flyoffs with the glide slightly underelevated so that towards the end of the flight the motor itself re-establishes the correct trim. It is not always possible to find a big enough field nor a calm enough day to achieve this last 'fine' trim so my trick is to wind the motor fully and then allow the model to

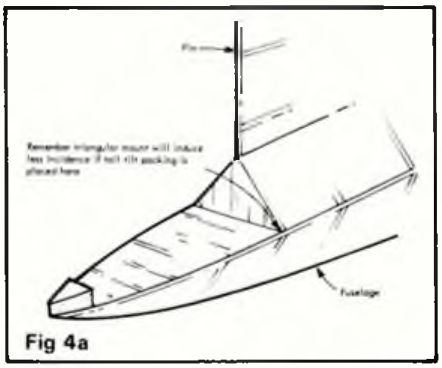


Fig 4a

unwind on the ground (preferably at the climbing angle) and launch when three-quarters of the turns are gone. Just a long enough hop to check the glide after full turns.

As I mentioned at the beginning, glide trim is a relationship between CG and incidence. All wing sections and all set-ups have their ideal operating angles and hence ideal CG positions. My 'cover all' estimate of 70% for everything is a bit general for what is commonly referred to as 'contest' trim. Some improvements in glide can be achieved by experimenting with moving the CG and then rearranging incidences. This will, of course, necessitate retrimming the power phase too but if your glide is very bad it may be worth the effort. What is more likely is that the section is suffering air flow breakaway on transition from power to glide.

Lastly, turbulators

There has been a great deal of theoretical mumbo-jumbo expounded on this subject. My practical experience has shown that thread turbulators very rarely harm the climb speed or height, very rarely increase 'still air' times but almost always improve stability in turbulence and hence increase duration in real conditions. If the glide on your model is actually impossible to trim - that is, it's a stone-like plummet no matter what incidence you have chosen then it probably has a smooth wing top surface with inset spars or no spars at all.

A 15 thou. diameter thread glued or doped on 3-5% back from the LE will probably transform it. If it doesn't, stick on another one at 25-30% chord.

Nevertheless, it is best that the model is brought out with them on in the first place. My experience has shown that a 15-18thou. thread at 30% chord is most useful, particularly on small chords of 5in. and less, and on very light models such as CDH and vintage lightweights. Invigorators are just the next step - that is, they turbulate further behind the 30% point. Really they are acting like re-attachment points for the air flow. Once again I have no evidence to suggest these do anything but good. I have a sneaking suspicion that if we really knew what was going on over our wings in flight we would stick a turbulator on every 10-15% of the chord right back to the TE on every model.

The absolutely smooth top surface is a dead loss in anything but a wind tunnel!

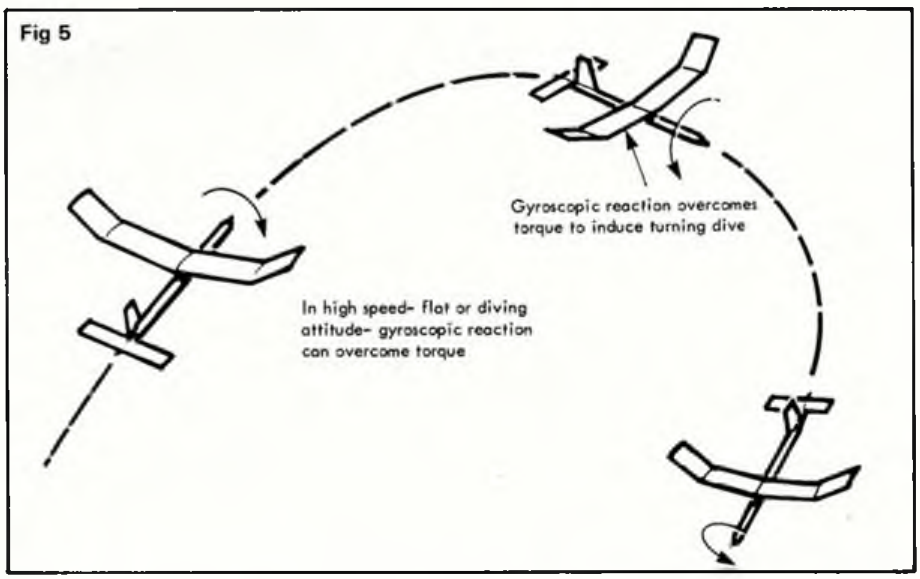


Fig 5

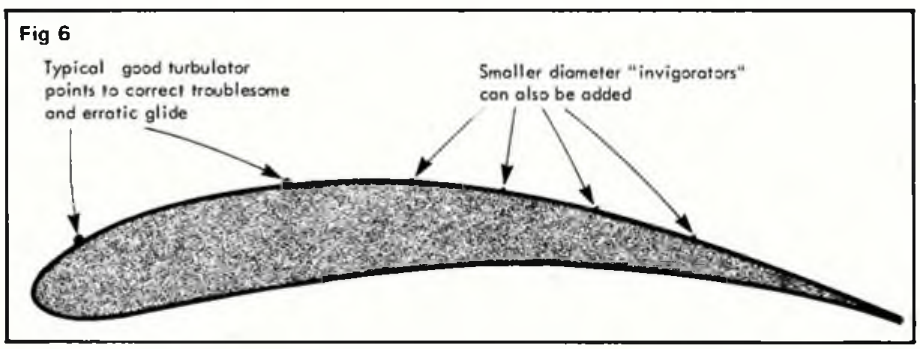


Fig 6

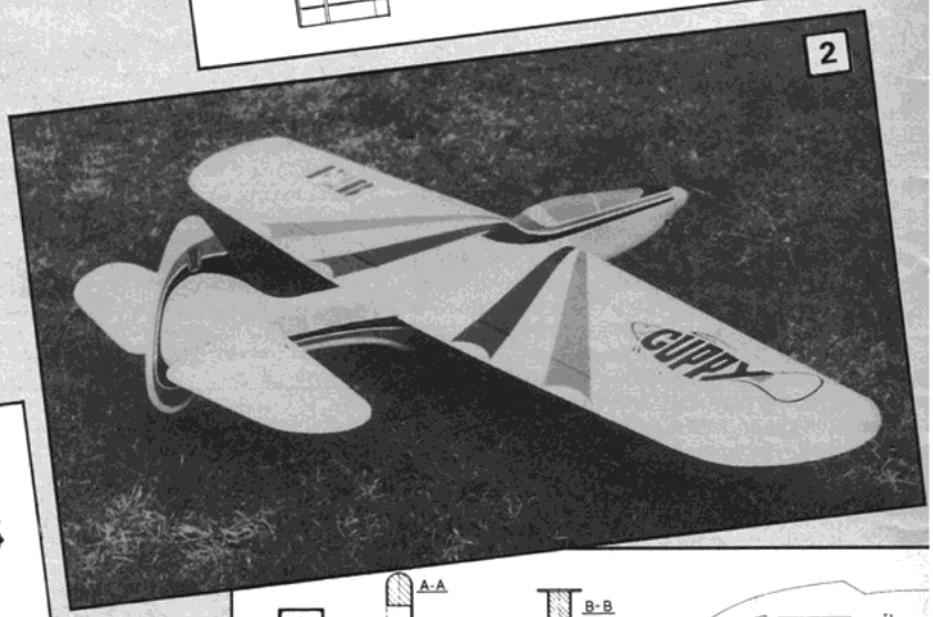
WORLD

SKETCH PAGE

Fragments from overseas captured for your interest

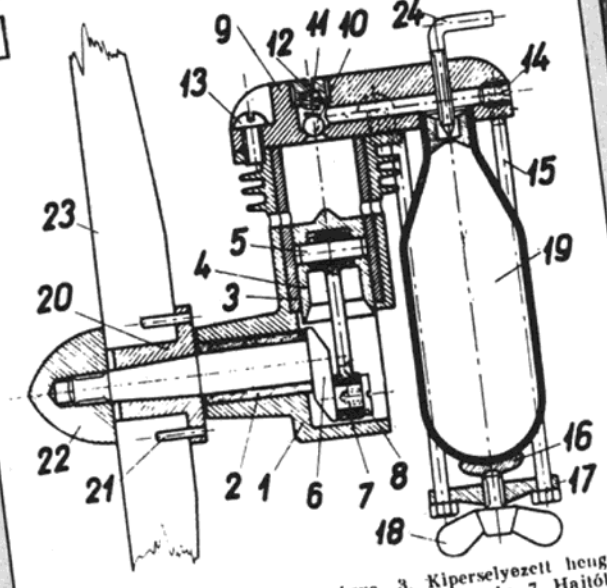
1

2



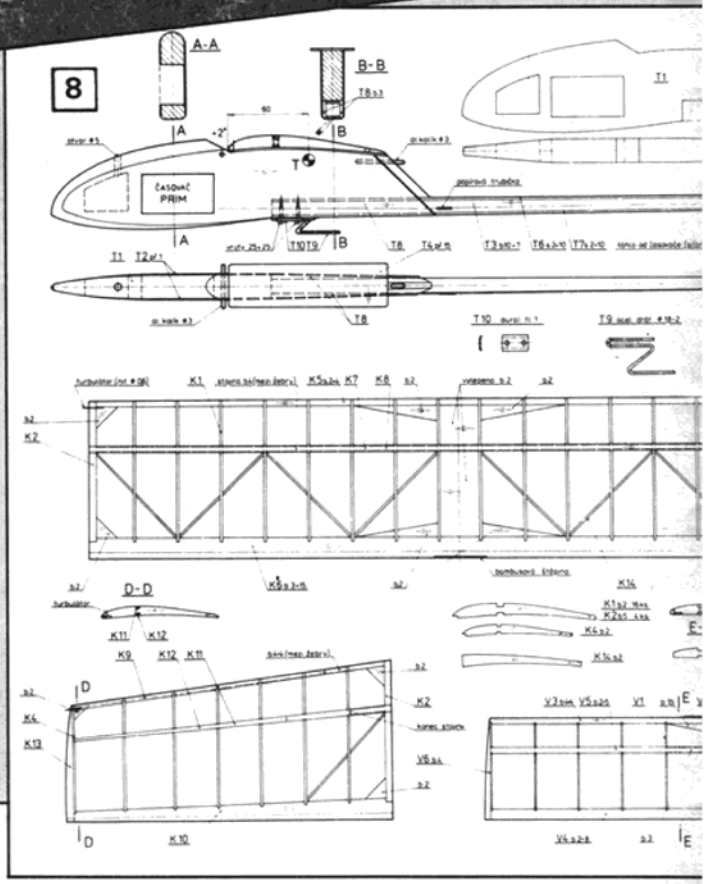
1: Albatross, an R/C record contender, hails from Sweden. 'Traditional' layout throughout – 9.1/2ft span model could almost be Vintage! Note centre-section tank. 2: Stunt winner at the '87 Egyptian Nationals. OS40 powered Guppy by Nersess Siragen is one we'll feature in more detail soon. 3: Early CO_2 motors carried the cartridge too, as witness this 1948 Hungarian design recently featured in Modellezes magazine.

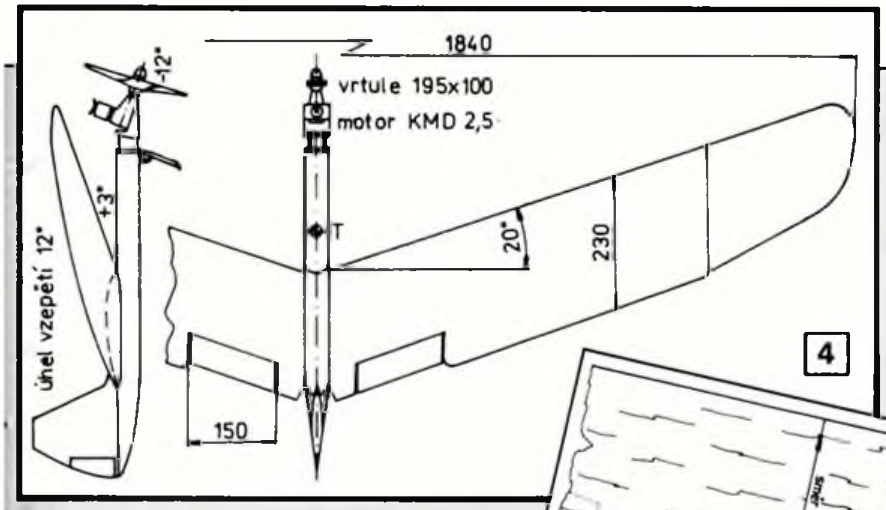
3



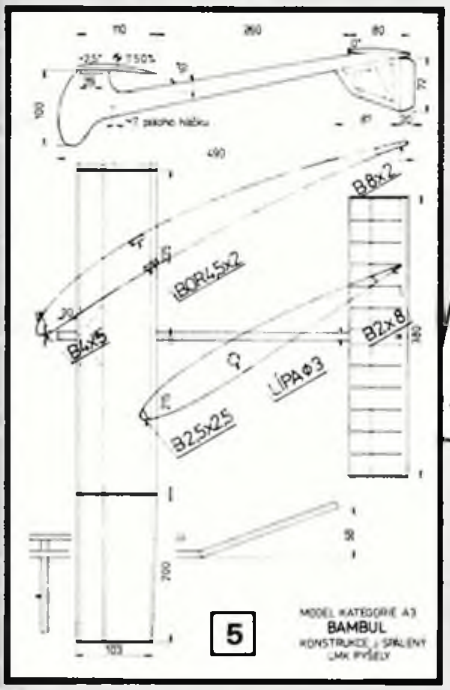
1. Motorház. 2. Főtengely csapágya. 3. Kiperselyezett henger. 4. Dugattyú. 5. Dugattyúcsap. 6. Könyökös tengely. 7. Hajtókar bronzperselyekkel. 8. Biztosítócsavar. 9. Hengerfej. 10. Golyós szelep. 11. Golyós szelep rúgója. 12. Leszorító csavar. 13. Hengerfej leszorító csavarok. 14. Dugócsavar. 15. Patrontartó csavarok. 16. Alátét. 17. Támaszlemez. 18. Szoktó szárnyascsavar. 19. Szénsavas patron. 20. Légcsavar alátéttárcsa. 21. Légcsavarbiztosító csapszeg. 22. Kupak. 23. Légcsavar. 24. Patronyitótű (menetes).

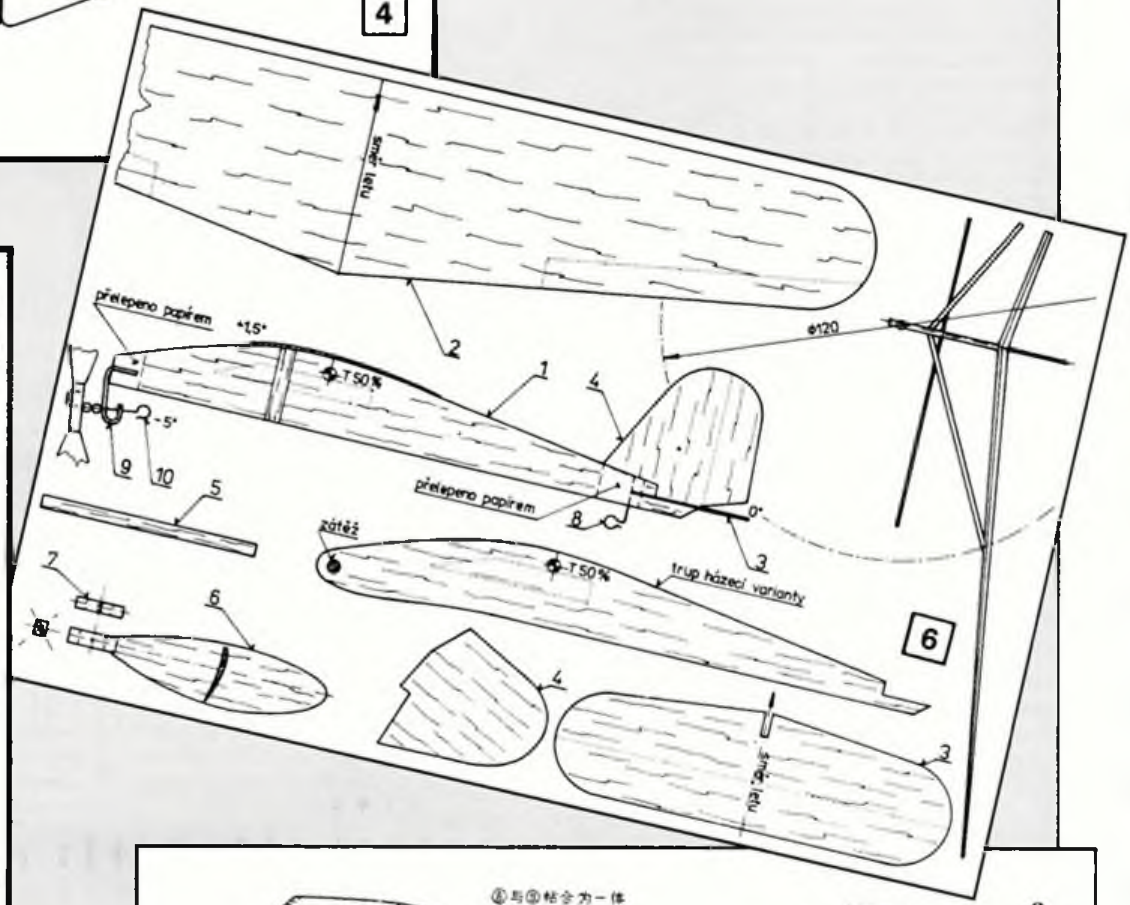
8

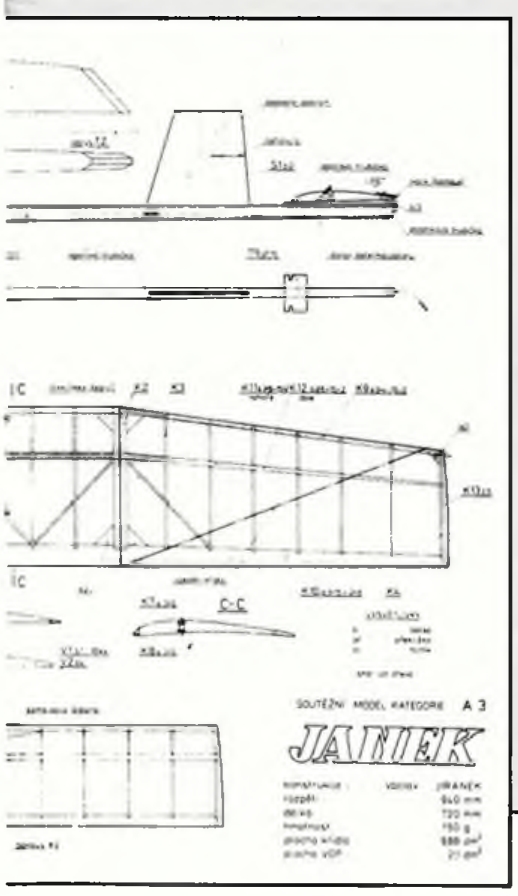


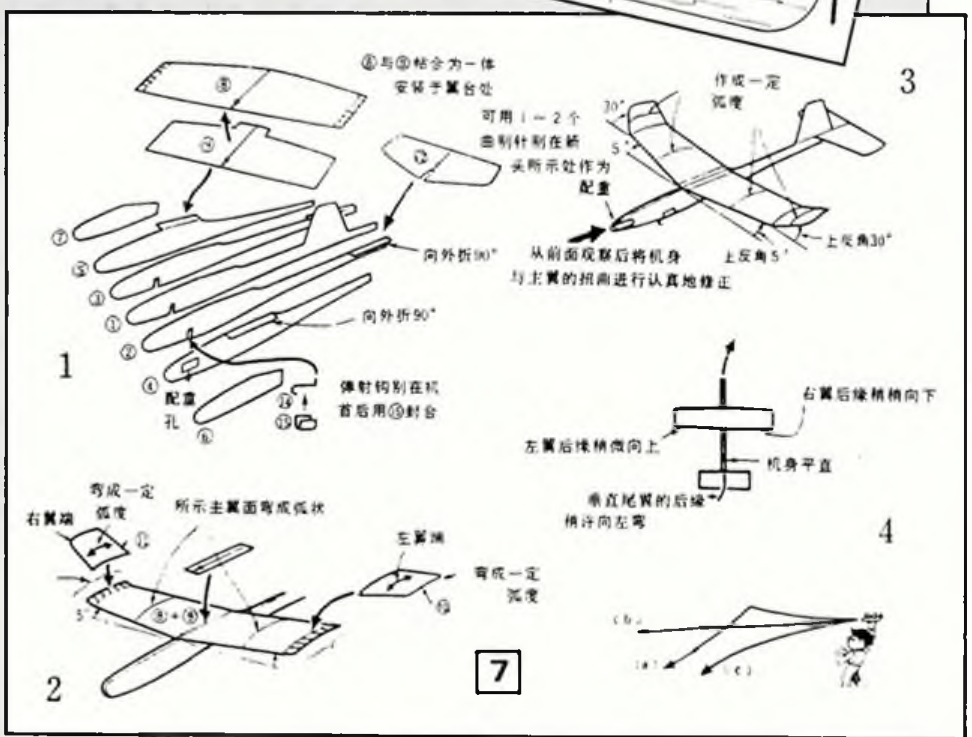


4: Forward-swept wings involve substantial wash-in to create necessary longitudinal dihedral. Rather more unexpected – in the case of this Czechoslovakian craft – is the massive twelve degrees of downthrust!
5: Even more startling is this 'hammerhead' styled A/1 glider from the same country. Wing section is RAF 31; tail is symmetrical. 6: Shown half-size, Czechoslovakian Lu-2 is ideal for indoor fun-flying. Alternative 'glider' fuselage shown.









7: From Hongkong Moxing magazine comes this paper flyer for the youngster. Typical of the genre, wingspan and length are about eight inches. Inboard wing panels have top and bottom surfaces. Trimming guide at bottom left is the same the world over! 8: Vaclav Jiranek's Janek is a state-of-the-art A/1. Benedek 7406 wing section is turbulated just aft of the L.E. with a single length of 0.6mm monofilament.

High potential

Chris Coote's series on electric power for free flight. Part Four: Gearboxes

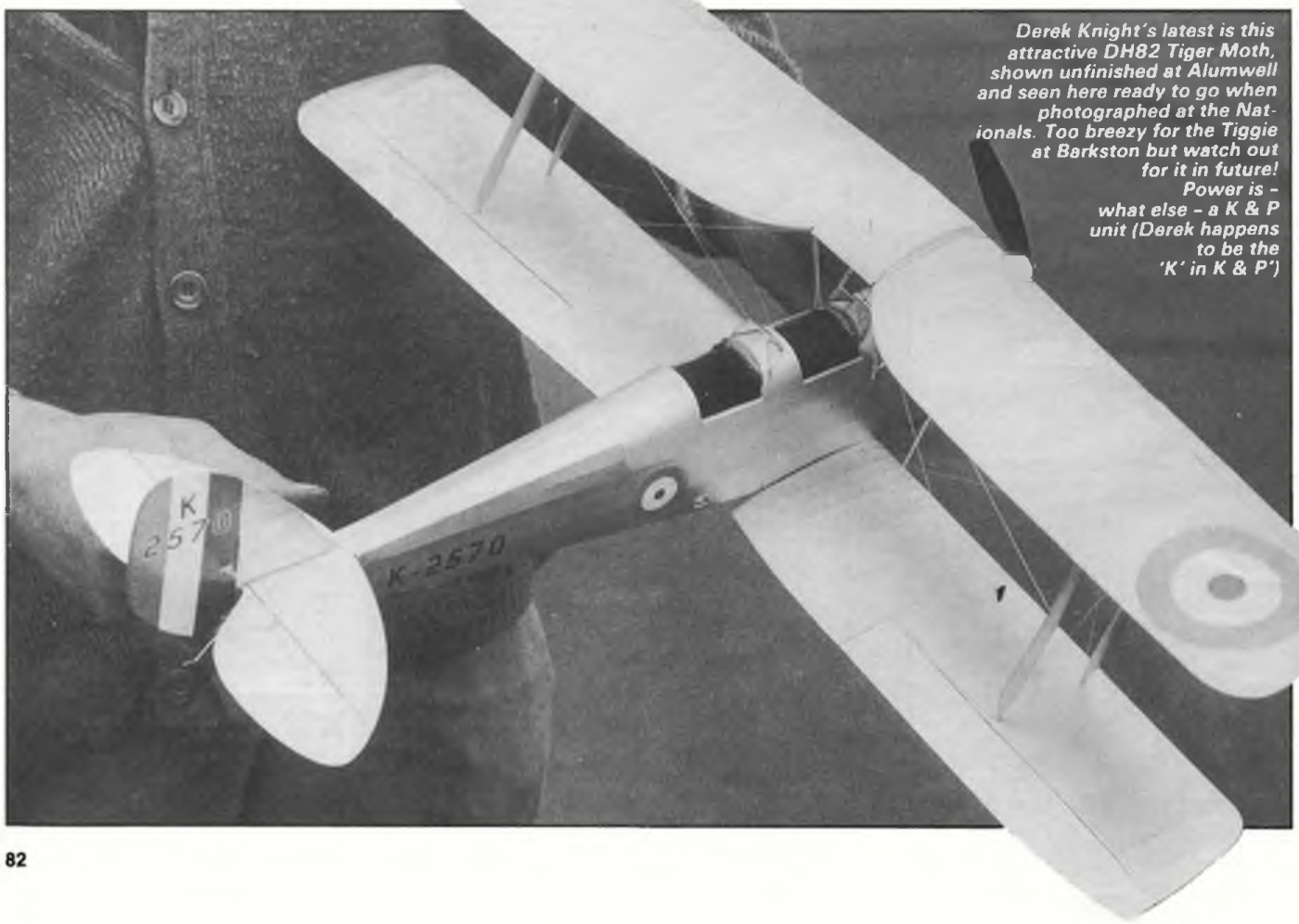
THE WHOLE essence of electric flight is to use the limited power available for given weight in the most effective manner. Thus a marginal choice of system for power-to-weight ratio (which is what electrics are, when compared to conventional power systems) can be made into an entirely practical method – with care. In the case of free-flight models operating at relatively low airspeeds and with low wing loadings, what we need for propulsive efficiency are large, slow-turning props. You only have to look at the similar problems of marginal power/weight ratio in man-powered flight to see the truth of this. Most of the motors we use are of very high-speed type – a layout which allows them to produce the required high power in a lightweight and small package. Thus we need to gear down the propshaft drive to lower more suitable rpm for optimum results.

Current thinking

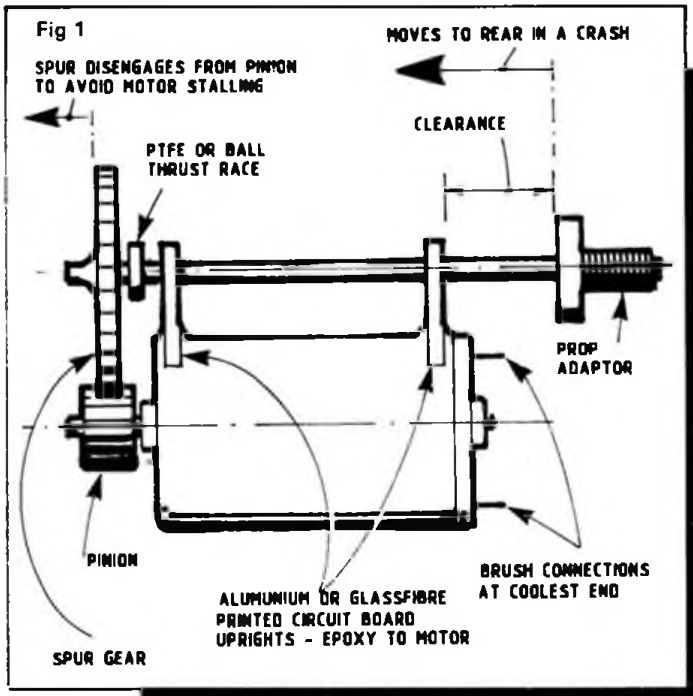
Some of the earliest work on practical electric flight was undertaken in Germany by the Graupner company using what was then a state-of-the-art, high-efficiency DC servo motor. This little Micromax motor free-ran at some 40-50,000rpm and needed a gear ratio of 15:1 to give a reasonable on-load prop rpm of 1500-2000 using a rubber-model-type prop. The motors commonly available to us now are not of quite such an extreme design; and the science of power prop design has advanced. Thus, for optimum efficiency using commonly-available power propellors, current thinking is towards the aim of 4-5,000rpm at the prop. This usually implies a single gear reduction of between 3 and 5:1. How is this best achieved? Several systems are in common use, and some of them can be usefully modified to provide a degree of protection to the motor in the event of a crash.

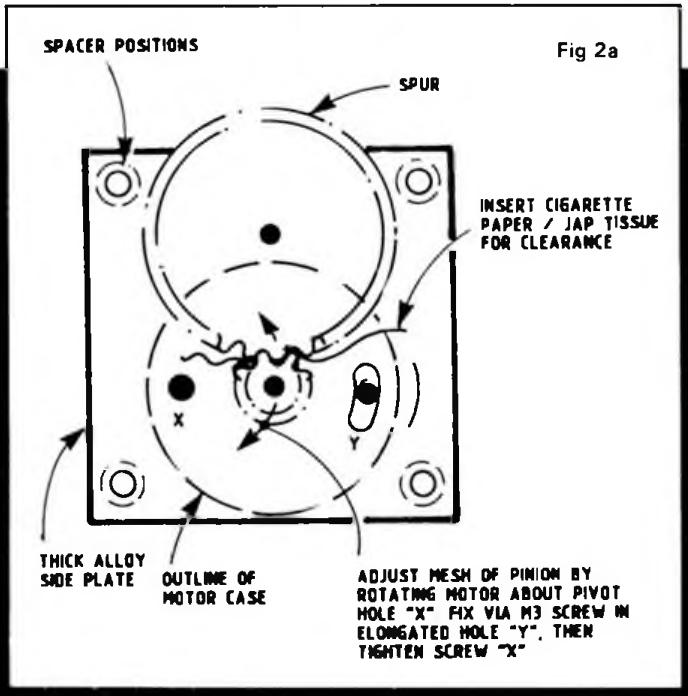
All the gear

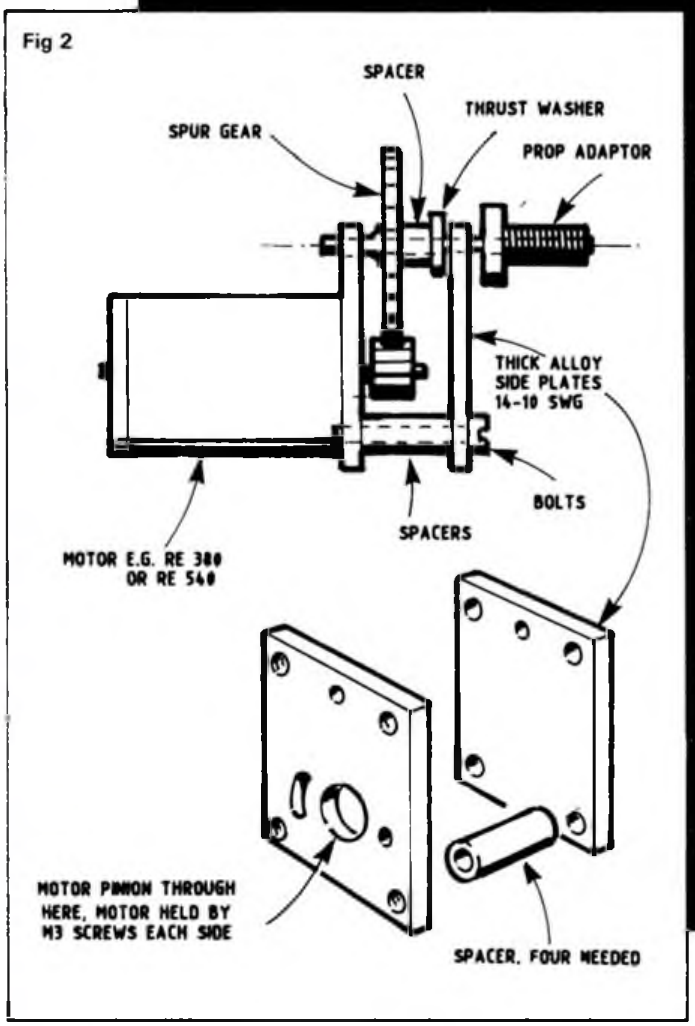
All the systems described and shown here make use of a simple pair of spur gears. The gears themselves should be chosen with a tooth size sufficiently large to transmit happily the not inconsiderable torque generated by even small motors. Sources of gears are shown in the list of useful addresses, but the two most fruitful sources are probably the Ripmax range of nylon gears in the small sizes, and Tamiya electric R/C car gears for the larger 380 and 540 motors. It is a good idea to try to incorporate some form of thrust washer or bearing in the system (whatever its size). This can range from a simple PTFE or teflon washer to a rubber-model-type thrust race or small ball bearing (as sold for use in electric cars). Main journal bearings can range from the ultimately crude hole drilled in a piece of

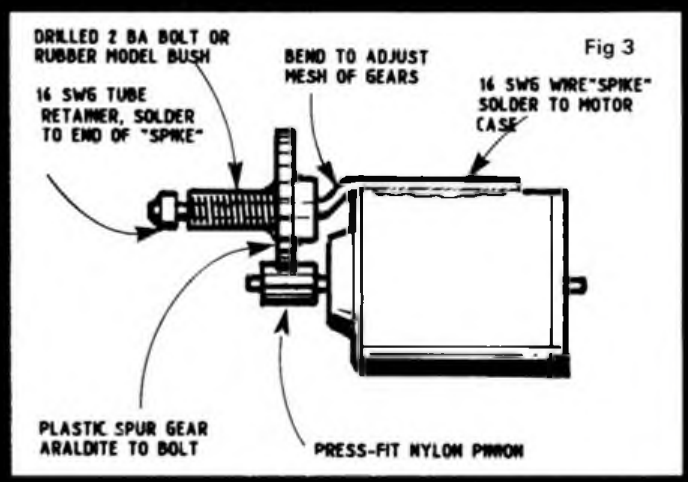


Derek Knight's latest is this attractive DH82 Tiger Moth, shown unfinished at Alumwell and seen here ready to go when photographed at the Nationals. Too breezy for the Tiggie at Barkston but watch out for it in future! Power is – what else – a K & P unit (Derek happens to be the 'K' in K & P')

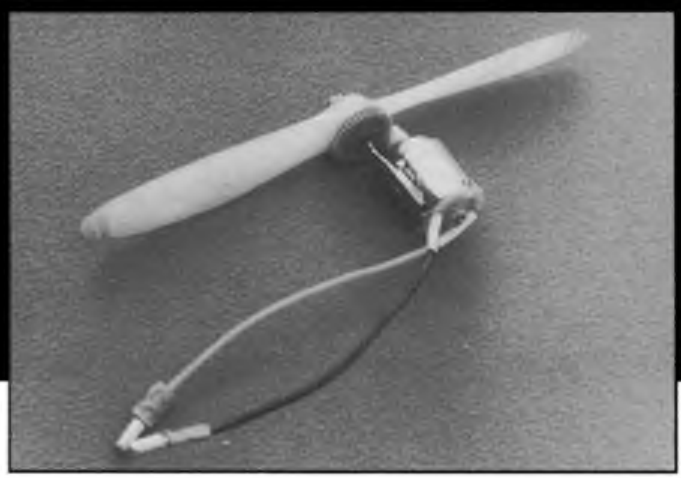








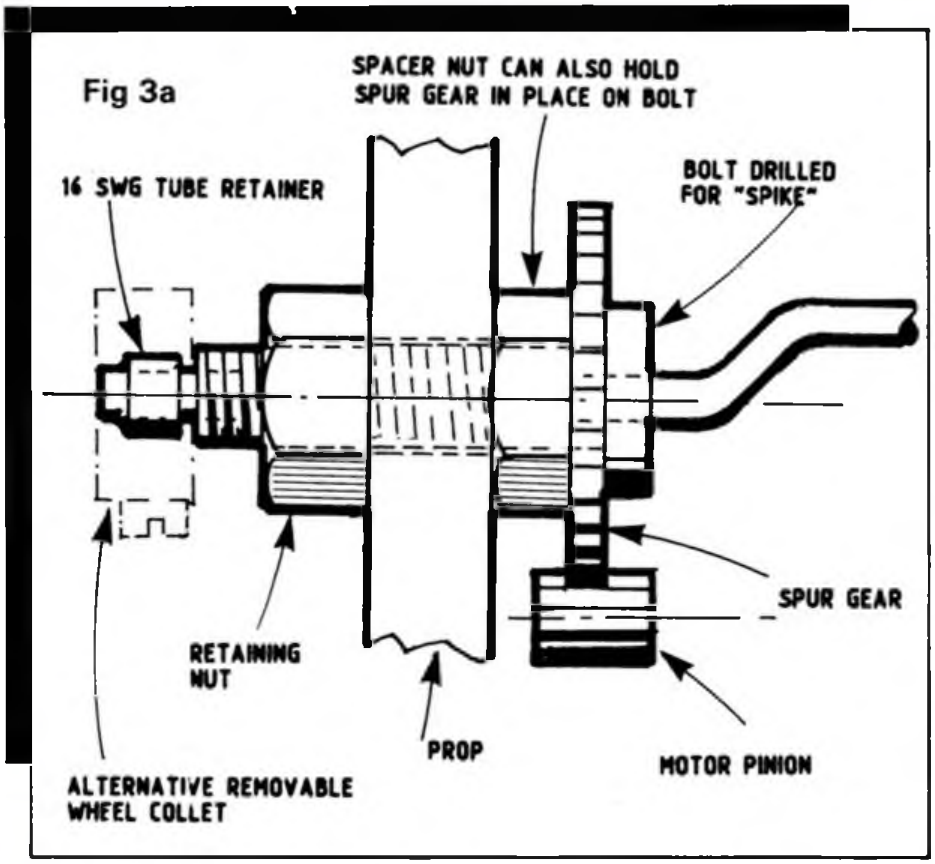
Below: Mabuchi 140 motor, geared 4:1, drives 7 x 4 Topflite nylon prop thanks to three or four 50 to 100 mah cells. Ideal for lightweight F/F!



fibreglass printed circuit board to proper Oilite or miniature ball-bearings – sold once again for R/C cars.

What a mesh

Fig. 1 shows my favourite method of gearing small motors using Ripmax nylon gears. (These are also available from Hobbies of Dereham). The basic method consists of two pieces of fibreglass printed circuit board drilled to take the propshaft which is made of 3/32in. or 14swg wire. These two plates are carefully filed on their undersides to give an optimum gear mesh when they are held tightly to the top of the motor case. The mesh can be checked by that old rubber modellers' trick of jamming a piece of cigarette or thin jap tissue paper between the gears and ensuring that one can just rotate the shafts. When satisfied with the mesh, the plates can be secured to the top of the motor case with 24-hour epoxy. The pinion on the motor shaft is usually retained with a small grub screw, or simply as a tight push fit in the case of a pure nylon pinion with no brass centre. The larger spur gear is held to the propshaft with a grub screw and an MFA prop adaptor for a RE380 motor similarly screwed onto the front of the shaft. A simple teflon thrust washer can be cut or sliced from an aerosol spray tube; or, better, a 14swg rubber model ball thrust race may be used. If enough lateral clearance is given to the propshaft, the rearward movement of the shaft in a crash will disengage the gears. The motor can then free run until the batteries run flat and no



damage will result. Certainly this situation is preferable to to the motor stalling and taking the full shorting current from the batteries. In some cases the length of motor shaft sticking out at the other end to the brushes is long enough to take the drive pinion. If this is so, then advantage can be taken by mounting the motor as shown with the hot (and thus vulnerable) brush end positioned in the direct cooling blast of the prop.

A matter of a pinion

Consideration should also be given to the sizes of the gears used in this method. It should be obvious that the distance between centres of the pair of gears chosen must be greater than half the overall diameter of the motor. Otherwise, even if the geared shaft is mounted directly on top of the motor case, it will not be possible to get the spur gear to reach the pinion and mesh with it properly. In practice this means choosing a pinion for the motor shaft with more teeth than the minimum, and a spur with more teeth, again to maintain the reduction ratio. For instance, it may be required to use a pinion of 125 teeth meshing with a spur of 45 teeth to give an overall reduction of 3:1; whereas, if spacing distance was not critical, a more efficient smaller pinion of, say, eight teeth could be used with a pinion of 24 teeth to give the same reduction. It should be noted that from the point of view of ease of construction the larger gears are easier to use because they normally have a brass hub with grub screw for ease of securing to the shaft, and meshing clearance is less critical with larger gears.

Fig.2 shows a preferred methods for the higher power (and larger) motors. It is based on the classical open-frame gearbox often used in model boats and locomotives. In its simplest form it consists of two parallel rectangular side plates held apart by tubular spacers at each corner. Running through the centre of each spacer is a bolt by which the plates may be clamped tight up to the spacers. This bolt may be tapped into one plate, or retained by a nut or nuts at each end. The plates themselves are drilled to form the bearings for the geared shaft (or to take proprietry Oilite or ball bearings to support the shaft). One side plate is then drilled with a hole large enough to clear the diameter of the motor pinion. On each side of this hole are drilled diametrically-opposite holes to take the retaining screws for the motor. One of these holes can be usefully opened up to a kidney shape to allow some adjustment of the mesh of the gears by twisting the whole motor pinion assembly in and out of mesh about the fixed hole. If you look at an RE380 or 540 motor you will see two tapped holes either side of the drive shaft, just to allow such a mounting. They are normally threaded metric, 3mm or 2.5mm, so you will have to find two small short screws to suit. If the screws are too long they will penetrate the motor case too far and foul the armature! A useful source of such small items is (once again) the Tamiya R/C buggy spares list.

One advantage of this type of gearbox is that the spacing of the gears is not critical. Advantage can thus be taken of using the smallest and lightest practicable pinions meshed with just the right spur to give optimum reduction ratio. Drilling holes at accurate centres for good gear mesh is not needed if advantage is taken of the mesh adjustment described above. If the side plates are made of thickish, 14 to 10swg alloy, then you do not even need to think about bearings, for plain drilled holes will do. A good technique for getting a good fit on the bearing holes is to drill them slightly undersize (say 1/64in. or 0.2mm) and then ream them to fit using a bit made from a piece of piano wire shafting. This is simply of a piece of wire with a flat filed at an angle on the end. The angle should be about 30 degrees to the axis of the shaft. Another trick to help accuracy is to stick the two plates together with five-minute epoxy before doing any drilling. This ensures that all the holes are in matching spots after separation so the shaft should run square in the final assembly.

A good shaft

Shafts can be made from piano wire with the usual MFA prop adaptor screwed to the front. Once again it is a good idea to use some form of thrust bearing, and this can be incorporated easily as a teflon washer or rubber model ball thrust race as shown. If you cannot face the thought of all this mechanical work, well-made gearboxes of this type are available from Mole Technology at around £17.95. They suit 380 and 540 type motors.

My favourite method for small motors is what I call the 'spike'. This is a system first seen on the geared motors produced for RTP work by Harry Butler. It consists of a piano wire spike made from 16swg, fixed to the top of the motor case by soldering or gluing and binding. A suitable brass bolt is then drilled down its axis so it is a nice running fit on the spike. A large spur gear is fixed to the bolt; it meshes with a smaller pinion press-fitted to the motor shaft. The clearance or mesh fit between the two gears can be easily adjusted simply by bending the spike up and down. The prop is fixed to the bolt in the normal way with a nut and washer, and the whole assembly is prevented from sliding off the spike either by a removeable wheel collet or a thin sliver of 16swg brass tube spot soldered to the end of the spike. A photograph of a Mabuchi 140 fitted with a 4:1 reduction is shown; see also Fig. 3. If the prospect of drilling the bearing hole through the bolt is beyond you, then a standard rubber model brass bush can be used, but be careful with the central alignment of the large gear. This is about the simplest and crudest gear system I know, but it has the great advantage of being light. The gear kits obtainable from Electromail (stock number 337-677, costing £2.50 or thereabouts) contain many small pinions suitable for direct press fitting to small motor shafts. Some even contain larger spur gears already mounted on small rods suitable for through-drilling or incorporating in frame-type gearboxes. Another useful source of small plastic gears is the geared motor kits sold under the Como label by MFA.

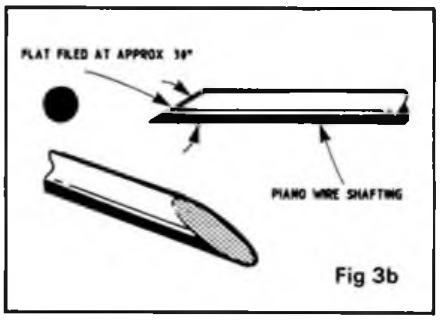


Fig 3b

Precaution

One point worth noting when working on permanent-magnet motors is that the strength of the magnets can be reduced by excessive heat, such as that generated by soldering-on spikes! A good precaution is to take the motor apart and remove the magnets before doing such work. On removing the endcap you will normally see the curved magnets jammed against crimps in the case by a U-shaped spring on one side. This is easily withdrawn using long-nose pliers, thus freeing the magnets. Strong magnets may take some effort to drag out from the case! Work on the bare can is then easily managed; the opportunity may be taken to incorporate of better bearings (ball races from model car sources) as well as gearing supports.

MAKING Whoopee!

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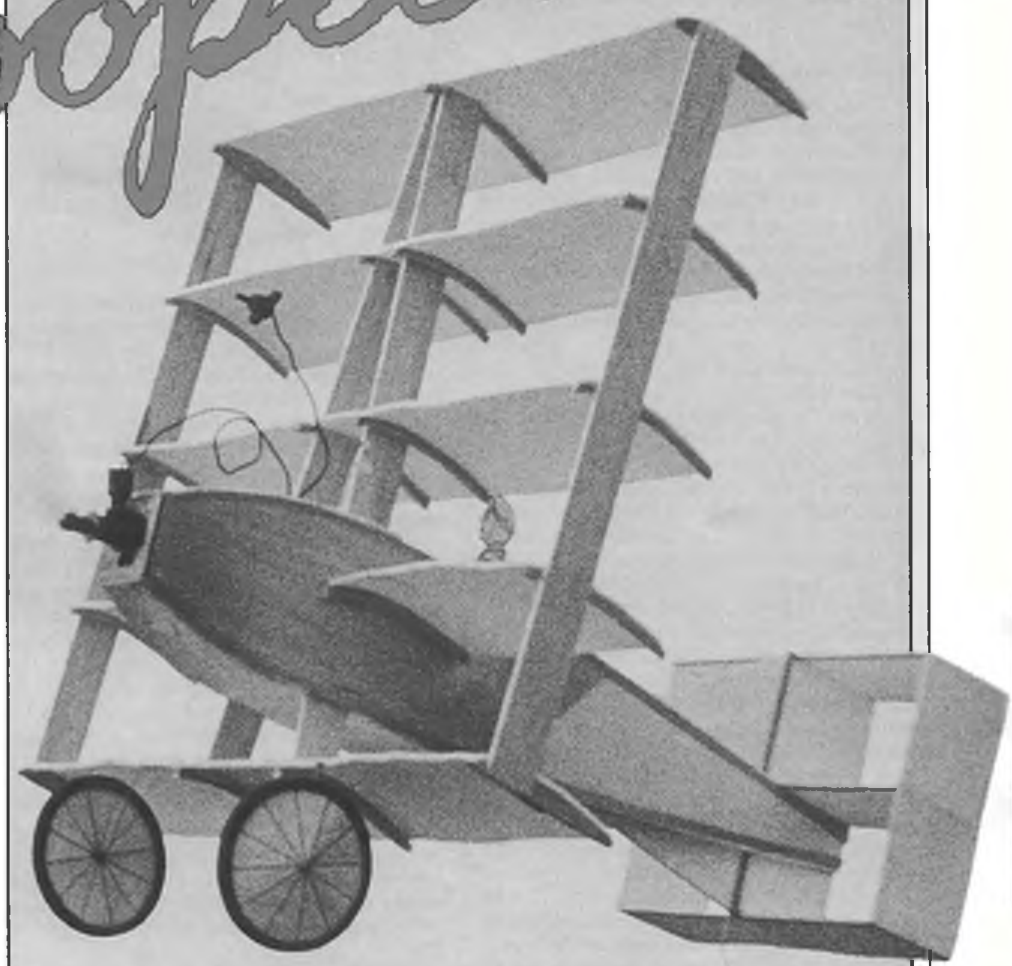


At last – full-size plans for Robin James' delightful quintuplane for CO_2 or electric power!

Whoopee's unmistakable lines and incredibly slow flight have captivated scores of enthusiasts since it first appeared a couple of years ago. Now build yours!

WHOOPEE was designed as an indoor model to fly in a small hall. Many CO_2 models fly too fast for this, so I needed plenty of wing area to give a low flying speed, and a small wingspan to permit tight turns. A typical CO_2 powered indoor model weighs around 35 grams. Reducing the weight will give slower flying speeds but as the motor weighs 15 grams not much speed reduction can be obtained without resulting in a model which is too easily damaged. I decided therefore to build a compact model with more wing area, and to make it reasonably robust by not building it too light.

Question: how do you design a model with a very large wing area and a small wingspan? Answer: use plenty of wings! So Whoopee was born. It flies better than appearance might suggest! Why not build one? The good news is that there is no covering or finishing to be done...

At first sight it might seem as if this model might be laterally unstable as there is no dihedral, but in fact the combination of side area and low centre of gravity gives very adequate pendulum stability.

Choice of motors

This model has been flown with both electric and CO_2 power. The plan shows both - the electric version has a shorter nose to maintain balance. As the Telco CO_2 motor weighs less than the Knight and Pridham electric motor it should, technically, be better for flying in a small hall. The weight is about 40 grams with CO_2 and 55 grams with electric. In practice there does not seem to be much difference. The electric unit is more reliable, and both the power level and length of motor run can be set accurately and repeatably.

What do you need?

Much of this model is made of 2mm polystyrene foam wall veneer. This is an excellent material for indoor models as it does not break on impact (unlike balsa); it is very light (being only half the weight of 0.8mm sheet balsa for the same area) and it is also very cheap! No sanding, covering or finishing is needed. Available from decorating shops (like Fads, for example) a roll of 30 feet costs a little over one pound.

Balsa cement and cyanoacrylate (super glue) cannot be used as they dissolve the foam. Copydex can be used but it possesses the disadvantage that eventually it disintegrates, particularly when exposed to sunlight. White glue (PVA) is better, but, best of all, is so-called 'R/C Modeler's Glue' which is available from Deluxe Materials. Both glues are slow drying and require pins or thin strips of masking tape to hold the components in position until set.

What do you do?

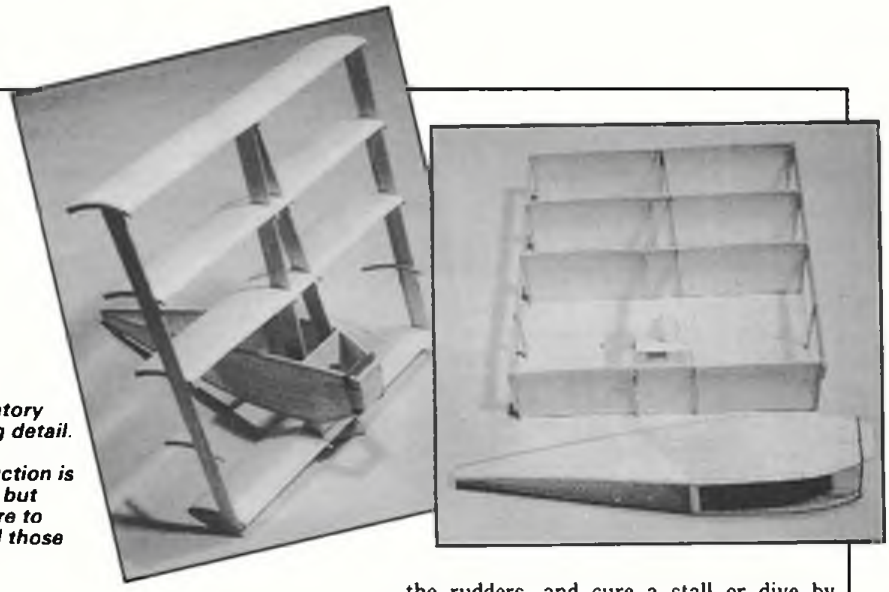
Begin by cutting out the four struts and nineteen ribs. Glue five ribs onto each outer strut over the plan, remembering to make one right-hand and one left-hand. While this is drying cut out the fuselage sides, longerons and formers, and five rectangles of foam for the wings. If you are using CO_2 power put in ventilation holes in F1 (below the engine) and F2 (behind the bottom of the tank). If you are using electric power cut out the hole in F1 for the motor using the template supplied, and cut a hole in F2 to clear the battery holder.

Steam the longerons to shape and cut out the slots for the centre struts in wings 2, 3 and 5. These slots are 6 mm back from the leading edge, and the spacings are shown on the plan. Assemble the fuselage sides over the plan, remembering that the sides should be flush with the longerons on the outside. While these are drying cut out the components for the tail surfaces and glue the leading edges onto the tailplanes.

Cut out the components for the wheels and draw the spokes onto the flat discs. Assemble the wheels over a small hole drilled in the building board. Yellow-tube Uhu is the best glue I have found for this. Lay the flat disc over the hole in the building board and glue in the tube. The hole in the board allows the tube to protrude downwards by about 1.5mm. Next glue the balsa triangles in position. Lay the second disc (the one with the slit to allow it to be formed into a cone) in position and mark the positions of the spokes from the first disc. This disc can now be laid on a flat surface and the spokes drawn in. Apply glue to the spokes, hub and rim and then press the cone into position. Start by putting one end onto the spoke, then work round the rim, finally applying more glue and overlapping the second end. When this has dried sufficiently lift it from the board and add the rim, from a stip of card or stout paper 4mm wide, and glue the tyre on, again with Uhu.

Slide wings 2,3 and 5 onto the centre struts in approximate position, then assemble these onto the outer struts and top wing, gluing the wings onto the outer ribs. You may find it helpful to pin two or three strips of wood across the outer struts to hold them in position during this operation. The inner ribs on these wings can now be glued in position onto the centre struts and wings. Use a rule laid along the leading and trailing edges to ensure that the wings are straight.

Assemble the rear fuselage, joining the sides at the rear and gluing F3 in position. Steam a curve into the fuselage sides at the front, being careful not to damage the foam. This makes the assembly of the fuselage onto the wing easier. Place former F2 over the plan and mark the positions of the centre wing struts. Glue F2 onto the centre struts. When these parts are dry the fuselage can be assembled onto the wing. Pull in the fuselage sides at the nose to hold F1 and F2 in position. Retain in position with small rubber bands.



Self-explanatory building detail. Basic construction is simple, but take care to align all those wings!

Note that F1b goes between the fuselage sides but F1a is wider, extending to the outside of the fuselage sides. Add the 2mm foam fuselage top and bottom. The fuselage top finishes at the tailplane leading edge.

Glue the two remaining wing ribs onto the fuselage sides, measuring with a ruler from the wings above and below to ensure alignment. The tail surfaces can now be added starting with the tailplane support wedges and the centre tailplane. Then build the centre fin. First cut holes in the fuselage top and bottom decks for the fin spar, and then add the four sections of 2mm foam that make up the centre fin. Lastly add the outer fins and top and bottom tailplanes. The remaining wing can now be trimmed to fit each side and glued in position.

The one-piece undercarriage wire is bent to shape then bound (with cotton) and glued lightly to a piece of 2mm square hard balsa 100 mm long before being glued to the leading edge of the lower wing. The undercarriage wire runs along the inside edges of the centre ribs on the lower wing for a distance of 20mm or so, and is tacked in place with PVA. The wheels are retained by bending the end of the wire as shown on the plan.

Install the engine. I use tapped holes in the plywood former (strengthened with cyanoacrylate) rather than messing around with those fiddly little nuts which always get lost on the bench or, worse still, in the grass on the flying field. Finally add the rigging wires from invisible sewing thread or very thin nylon line, and reinforce the leading edges of the upper and lower wings by gluing a piece of cotton in place.

Finishing and flying: CO_2 version

This model requires no covering or finishing! When you have finished assembling it, it is ready to go! If you really want to add some colour I suggest a thin coat of Tamiya paint sprayed on. This paint is water-based and so does not attack the foam. It gives a good colour even with a very thin coat and adds hardly any weight.

The centre of gravity should be about 8 to 10 mm behind the leading edge. It does not seem to be very critical. Whoopee should be trimmed to turn left, and can be made to turn very tightly, which means it can be flown in a very small hall. It does very nice take offs and landings.

With the CO_2 version, test glides are best done with the engine running very slowly. The model should descend and land gently on its wheels. Adjust the turn by bending the rudders, and cure a stall or dive by bending the elevators or adding weight to the nose or tail as appropriate. Gradually increase the power until the model starts to climb. Trim adjustments at high power are made by altering the thrustline up or down or to the side as required. Any excessive bank can be controlled by bending in 'aileron' to the trailing edges of the wings. Flight duration is about 30 seconds on a liquid charge.

At very high power the torque causes the model to fly in a very tight circle at a very steep angle of bank, almost looping in the horizontal plane, and without climbing much. I have found that changing to a Knight and Pridham propeller cut down to 120 mm diameter results in a higher climb and a longer flight. This is because the torque is reduced: the engine produces the same power at higher RPM and lower torque. When cutting down propellers, remove the propeller from the model and mark each blade with a pair of compasses, inserting the point of the compasses in the centre hole. cut each blade accurately with a pair of scissors. This way the propeller stays balanced.

Electric version

On the electric version I elected to reduce the power by reducing the propeller diameter. This gives very consistent results and gives a longer flight time. Initial trimming was done outdoors and I found that cutting down the propeller to 120 mm diameter gave an increased rate of climb, owing to the reduced torque already mentioned. I would recommend the use of a Knight and Pridham propeller trimmed to 120 mm diameter for flying outdoors. The rate of climb is much too high for flight indoors: I would suggest a propeller diameter of 110 mm for initial trimming indoors, with a very short motor run (ten seconds charge).

Make trimming adjustments to the model as described above. If the rate of climb is too high, gradually cut down the propeller by about 1.5mm at each step. Increase the charge time once you know that the model will not climb too high. Under a ten or twelve foot ceiling I ended up with a propeller diameter of 100 mm, which with a 50% charge (one-and-a-half minutes) gave a flight time of 30 seconds, including a stately rise-off-ground. Under a high ceiling, with a 110 mm diameter propeller and on a full charge, the flight time was 60 seconds.

The slow flight and generous side area result in a model that has no vicious tendencies, and if upset it quickly returns to equilibrium: any oscillations are well damped. Try one - or two!

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Lee-Richards

ANNULAR MONOPLANE

Richard Halfpenny's scale, circular-wing pioneer

THE LEE - RICHARDS Annular Monoplane was no aerodynamic freak. It was a carefully researched project to create a wing with good characteristics for high and low speed flight. Had not one of the partners in the enterprise died in the Great War, it might well have been developed further.

Three prototypes were built at Shoreham in Sussex during 1913-14. As they were intended as military aircraft, great secrecy shrouded the undertaking, and not very much was known about them at the time. All three were wrecked in accidents, but none were due to any fault in the unusual design. In one case the crash was caused by a bolt coming loose in a control linkage. Nobody was seriously hurt in any of these misfortunes.

Chief designer was the famous Gordon England, himself also a noted pilot. The aircraft were surprisingly advanced for their time, having such features as good streamline form; enclosed 80hp Gnome rotary engines buried in the fuselage; telescopic undercarriages, and even wind-driven generators. Winston Churchill formed a high opinion of them, and asked, on one occasion, to travel as passenger in one; but unfortunately could not because the aircraft concerned had just suffered slight damage on landing.

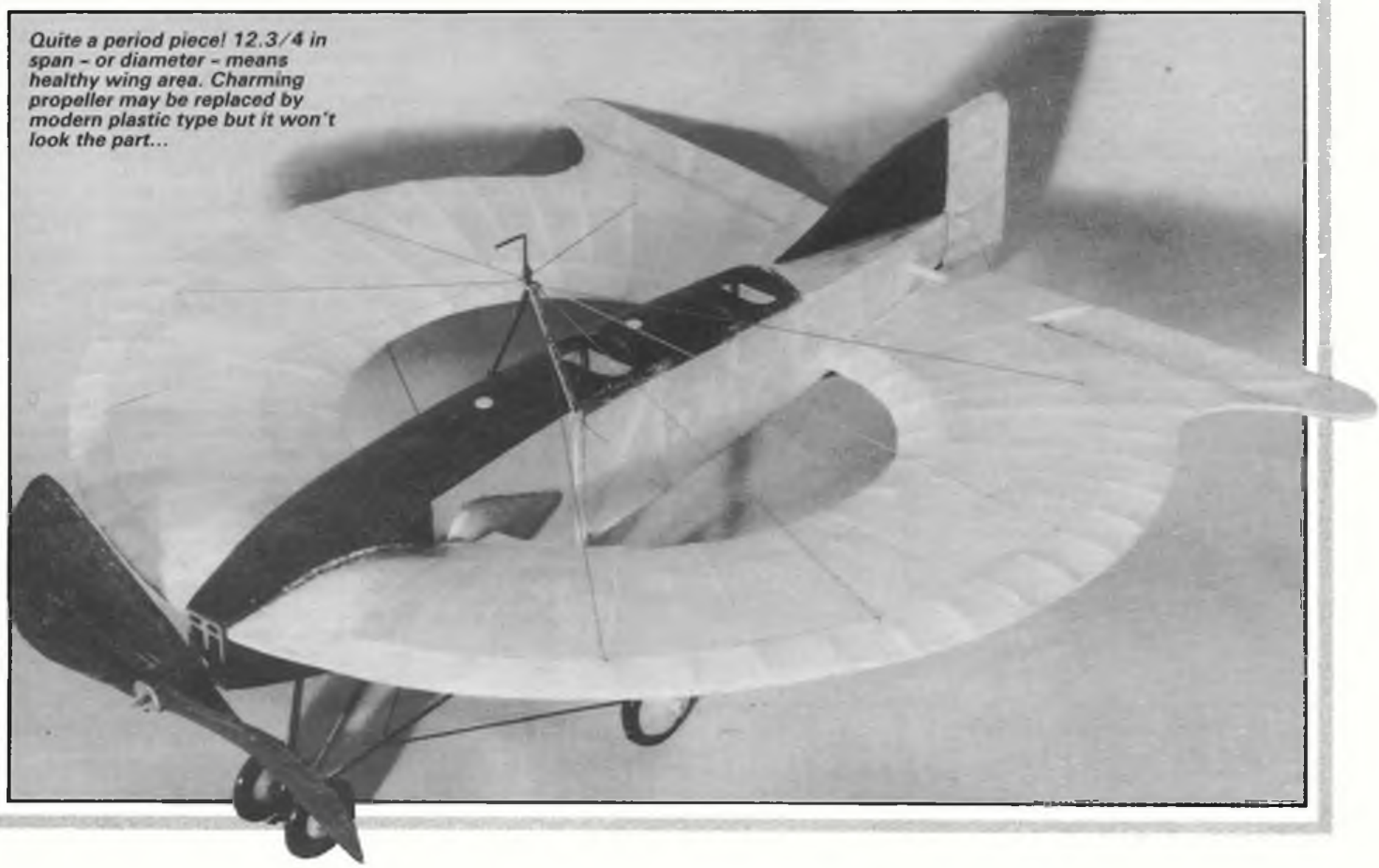
A one-tenth scale model of the No.3 Monoplane can be seen at The Science Museum in London. This was partly the inspiration for my smaller, flying model. Richards himself worked there, as a lecturer, for many years after the Great War, and they have very comprehensive drawings of his aeroplane available to anyone who wishes to research it still further.

When a flying model Lee-Richards was contemplated, it was decided it should be rubber powered because of the long motor that can be accomodated, and because of the unusally rearward centre of gravity. Also, it ought to be a Peanut, because of the large wing area within a short span. In fact, the scale works out at approximately 1/20.7th of full size, only fractionally under the 1/20th scale usually favoured by the writer.

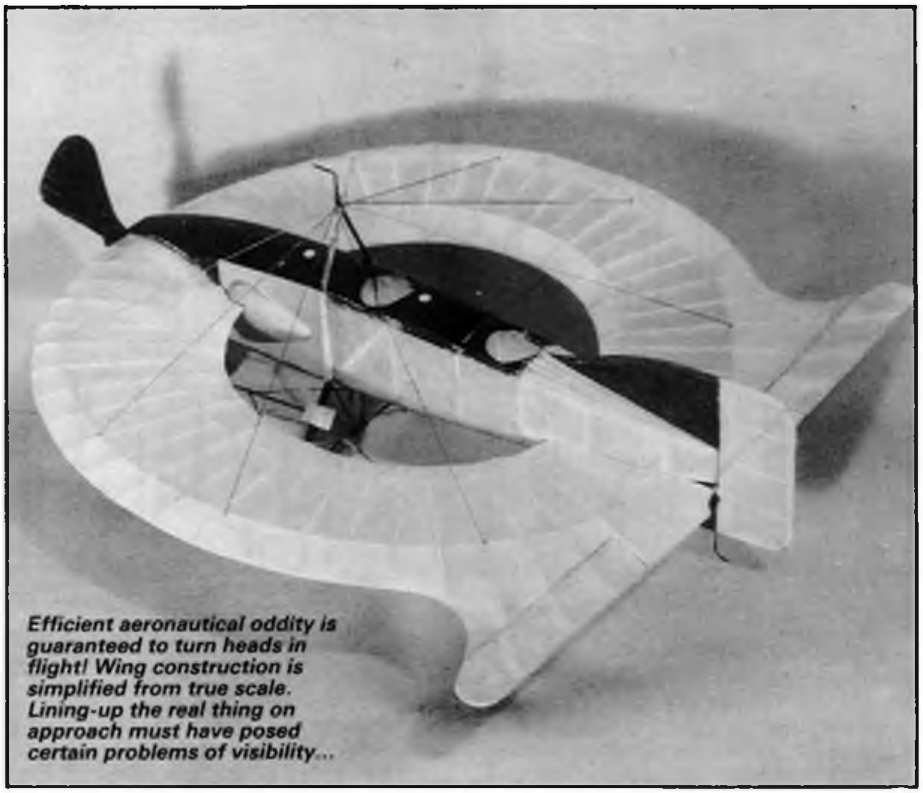
Circulate!

The Lee-Richards wing structure was very complex indeed, the section being thick and undercambered at the front, and tapering gradually to the rear, changing in shape all the way. Every rib on each side must have been different. This is hardly necessary - and too complicated - for a small flying model, so the structure has been simplified. As the thin obechi main spars have been placed eccentrically forward, the aerofoil section starts the right way round, and gradually changes to come the right way round again at the tail.

Cut the sheet sections to form the 'leading' and 'trailing' edges for each wing and pin them out on the plan, joining with cement. The obechi spars, which bend easily to shape, should be joined to the sheet with PVA glue,



Quite a period piece! 12.3/4 in span - or diameter - means healthy wing area. Charming propeller may be replaced by modern plastic type but it won't look the part...



Efficient aeronautical oddity is guaranteed to turn heads in flight! Wing construction is simplified from true scale. Lining-up the real thing on approach must have posed certain problems of visibility...

pinning while drying. Cement in the ribs, riblets and dummy ribs, and when dry, lift from the plan and trim and sand all to aerofoil shape.

Tissue need only be doped to the flat undersides and pulled reasonably tight, then given two coats of thinned clear dope. No watershrinking is needed. The more complex upper surfaces should be treated differently. Paste the tissue in place, using small pieces over the humped leading edge ribs. Watershrink, and when dry, dope, pinning the wings down while drying.

Build the sides of the fuselage first. Before joining them, crimp the longerons near the nose with the thumbnail to make them curve in where they are reinforced by transverse sheeting. Remember to cement or epoxy the tubes for the forward undercarriage attachment in place before the last of the sheeting is applied. Top decking is best achieved with panels of soft balsa wrapped over the formers, and lightly pinned while drying, but use planking if you prefer. Whichever your choice, sand it down very well when dry for lightness. Cut out the cockpits, and apply the stringers behind them, and holding with rubber bands while drying.

Cut cabane slots with a fine saw blade where the frame is recessed. Make the wire framework and superglue in place. The streamline cowlings for each side can be carved from soft balsa, but may be omitted altogether for lightness if one is not unduly scale-minded. Panels of aluminium foil, dull side outward, may be fixed with epoxy or thick PVA to the sides of the fuselage where shown, and the cowlings painted to match. The rest of the sheeting can be stained mahogany with wood dye, and finished with sanding sealer or banana oil. The full-size Lee-Richards, with its military intention, was painted battleship grey. However, this seems too drab for a veteran aircraft model, so the writer chose otherwise. Cover the framework with tissue, doping on with no watershrinking where the surface is flat. This is to prevent excessive shrinkage and distortion.

Make up the remainder of the undercarriage framework as shown, binding all joints with fine fuse wire, and superglueing. The detail of the dummy wind-driven generator is optional, like the engine cowlings (its purpose on the full size machine seems obscure, as the rotary motor was fired by magneto, and there is no evidence of navigation or landing lights). Upper and lower fins are cut from sheet, and stained to match the fuselage. Build the rudder frame on a piece of glass over the plan, and prize up when dry. Cover, and fix in place with thick PVA, which gives a tough joint that may nevertheless be adjusted by moistening.

Because of the exceptional - and actually excessive - lateral stability of the full-size aircraft, only approximately scale dihedral is needed on the model. With the model standing on its wheels, the central wing rib on each side should be just 3.1/2 inches above a level surface. Make sure all joints fit, and use PVA where the obechi spars enter the front of the fuselage, with cement for the balsa tongues at the rear. When dry, fit the four lengths of grey button thread rigging. Each is looped to a miniature rubber band hooked to the undercarriage pylon, passes once round the outer wing spar, up through the wire loop on the cabane, and so back; around the spar again, in a different place, to below the wing. Do not glue where the thread passes through the wings, as slight adjustments to incidence and dihedral can be made there. Now add the elevons, which are simple sheet structures with false ribs on top, tissue covered. Fix to the wings with PVA, as with the rudder, but also tack the inner, back corners. With luck, no adjustment of the elevons will be needed anyway. Check that the span here is no more than thirteen inches; this is the Peanut rule.

The 5.1/2in. airscrew is laminated from balsa strips. Eleven 3/8 x 1/16in. strips were shaped to a broad-bladed profile of period shape. Thrust washers are made from ordinary tinplate, pierced to fit the 20 swg propeller shaft. The front one may have dummy studs punched in from behind. The freewheel is arranged by making a nick in the side of it, and bending up a small tab, as shown, to form a ratchet. Fix the washers with epoxy or superglue. Make sure the airscrew is well balanced and turning freely on its shaft. It may be wood dyed, and must be covered with lightweight Modelspan, doped on, with several subsequent coats of dope. When dry, pitch may be slightly adjusted over a low heat, holding until cold. This airscrew works well: in fact the model tried to escape from the large open space where it was being tested, but was fielded, undamaged, by a high hedge. However, there is plenty of room for experiment with airscrews. The noseblock is quite simple. Note that the shaft bush is set with two or three degrees downthrust.

In or out of doors

Although officially a Peanut, this is a strong, outdoor flying model. A single loop of 1/4in. rubber sixteen inches long provides the power. Wind this a little by hand to stretch it evenly in the fuselage, and stop the airscrew with a rubber band. Then, if the model sits back on its undercarriage, or stays tail down when placed so, add just enough sheet lead, glued inside the nose, to tip it forward.

Test over grass if possible. The model should glide steadily; it usually lands upright. The only trim adjustments needed to the writer's model were to an elevon which had warped slightly downward (cured by low heat and dope) and re-setting the rudder slightly to the left. Like the full size Lee-Richards, it seems remarkably stable, and this may be partly because the annular flying surface acts like a slotted wing when approaching a stall. Despite the considerable aerodynamic knowledge available at the time, this probably was not properly understood in 1914.

Read all about it: Sources of Reference

The model is based almost entirely on the feature 'Circles in the Sky' by Philip Jarrett, published in Aeroplane Monthly during September and October 1976. This not only gives a detailed history of all three Lee-Richards monoplanes, but also describes the many interesting experiments leading up to them.

Also of interest are The Biology of the flying Saucer - 1 by A.R. Weyl AFRAeS in The Aeroplane, 13th February 1948, and the feature on Bill Warner's larger electric powered model of the same aircraft in Model Aviation, January 1983.

The writer wishes to thank Aeroplane Monthly; the Science Museum, South Kensington, and Richard Almond of Shoreham Airport for their help.

Lee-Richards

ANNULAR MONOPLANE

BALSA CUTTINGS

Cyano de Bergerac's nose around aeronautical affairs...

The Peace of Cake which passeth all understanding

Ordinary people from all walks of life passed knowledgeable comment of historical inaccuracies observed in the television series *Piece of Cake*, and we aeroplane people have patiently explained why Spitfires (and the wrong marks into the bargain) had to be used instead of Hurricanes. But what of the film itself? Did not Rossini say 'There are some great moments in Wagner – and some very bad quarters of an hour.' Well, like the off-taking Spitfires in the last instalment, let us pass over the rather un-August-1940 bright red civil kite parked by the hangar, and remember Piece of Cake's great moments. Like the one where the Bf 109 (all right, Hispano HA-1112 Buchón) suffered a surprisingly pyrotechnical explosion in the port wing just outboard of the cannon, then turned over to display what looked very like balsa sheet and flapping shrinkfilm. Even better was the Transformation Scene, where the magic bullets from the Brownings ripped into a Bf 109 and it blew up – becoming a Ju 87 as it did so. Okay, so it was only pretend, but you had to feel a bit sorry for the poor old Stuka. Earlier in the same episode it had upset everybody by suddenly appearing out of a wave of 109s and 111s, where quite plainly it had no business to be. As a punishment, it got blasted then as well, and there is five quid here which says we saw exactly the same shot.

Couling towers over all

How does he do it? Nobody knows. But when it comes to organising something, Norman Couling is a giant. Actually, he organises quite a lot of things but let's look at the Eastbourne Vintage Fly-In, in which he had a hand. How is it that mortal man is permitted to interfere with the calendar to the extent that on 2nd October there blossomed a beautiful shirtsleeves June afternoon, with thermals elbowing each other for precedence over the lovely Sussex airstrip nestling at the foot of the South Downs? Makes you come over all lyrical. But not only a nice day. Nice place, nice people, with tea and coffee from the nosh tent where hot-dogs and beefburgers done over silver-birch embers were available from chaps who were not out to rob you rotten. Best scale effect was achieved by our host, the farmer himself, with a most realistic Piper Cub of some 35 feet span, powered by a Lycoming four-stroke. Thanks to him, to Norman and to Eastbourne MFC for perfect, relaxed enjoyment.

We've a slot to be thankful for

Whilst it is not the intention that B. Cttngs should become a latter-day Gadget Review,

Couldn't resist these two photos — both taken within a week of each other, but aeromodelling worlds apart. Above is an ex-P.E. Norman miniature from 1947, complete with home-made 0.5cc sideport detail; while, below, Jeremy Shaw prepares the 53cc five-cylinder Saito radial in his Beech Staggerwing. Truly, ours is a varied hobby...

that fine body of men, the CO_2 brigade, deserve a bit of space for the Bent Propshaft Trick. You can't apply it to motors wot the back plate of which doesn't come off, but for, say, a Telco it is ideal. Although plastic props tend to bend and absorb a lot of the oof in a nose-over or downward-pointing arrival, and bent propshafts are not all that common in the Sunday-flying variety of model, they are a nuisance when they do happen because if the 10 BA screw breaks off flush when you try to withdraw it, you have an adventure getting it out. And of course, it happens much more often with the higher-performance jobs, or if in the search for more efficiency you use a hardwood airscrew. Zo! Take your propshaft screw and run four nuts on to it which you lock together in pairs so that you can hold the shaft head downwards in the vice without damaging it. Then, screwing up your eyes and using an old Winfield Handicraft Single-Edge Multi-Purpose Blade For Home And Industry, or preferably something with a shorter name, start a slot in the end. Now take a clapped-out junior hacksaw blade and where the teeth are still okay at one end or the other reduce its thickness over just an inch or so of length by grinding off the 'set' of the teeth. Don't worry, it still works. This enables you to open out and deepen the slot to accept the blade of one of those little 'precision' screwdrivers, or whilst you've got the grinder out you could shape a blade on to the end of a bit of 18g. piano wire in ten seconds flat. Do this for all your propshafts and the spares you carry, then next time one breaks off, simply chase out the stub by removing the back-plate and poking your little screwdriver into the hollow crankshaft from the rear. With benefit of clergy and a following wind you won't even have to slip the con-rod off the crank-pin.

Never hesitate to ask...

It is the devout hope of this column that every single one of its readers would be kind and brotherly to anybody seeking guidance when first venturing to take up our hobby. Well, *almost* anybody.

Far out in the wilds of the country a friendly aeromodeller was approached by a newcomer who sought help. It was gladly given; indeed, it took on material form by the gift of goodies and the loan of two perfectly good engines suitable for installation in the much-repaired and now overweight, sadly modified, clapped-out, crummy old third-hand radio job the aforesaid newcomer had bought with more enthusiasm than judgement. There followed a silence of six months. Then, on the borrow himself this time, friendly aeromod visits the farm next door to the dwelling of the newcomer, who rushes out as he is leaving and proffers a plastic carrier bag containing two mud-encrusted gritty objects with silvery metal gleaming through the greasy crud. 'Thanks for the loan of the motors, old boy,' sez he, 'They did the trick. I was going to drop them in to you before but perhaps you'd like to take them now?' Exit newcomer, briskly, with big smile. Exit aeromod, awkwardly, with knobbly plastic bag swinging and bumping against his knees and the seventeen-rung ladder he is carrying.

When ya gotta go, ya gotta go

...When he started talking about the Bardic electronics genuis Dai Ode and his lovely Irish sweetheart, Kath, the clubroom emptied as though by magic.

LET'S GET TOUGH IN COMBAT!

Frank Smart – 1988 National Diesel 'A' Champion – takes a two-part look at construction techniques

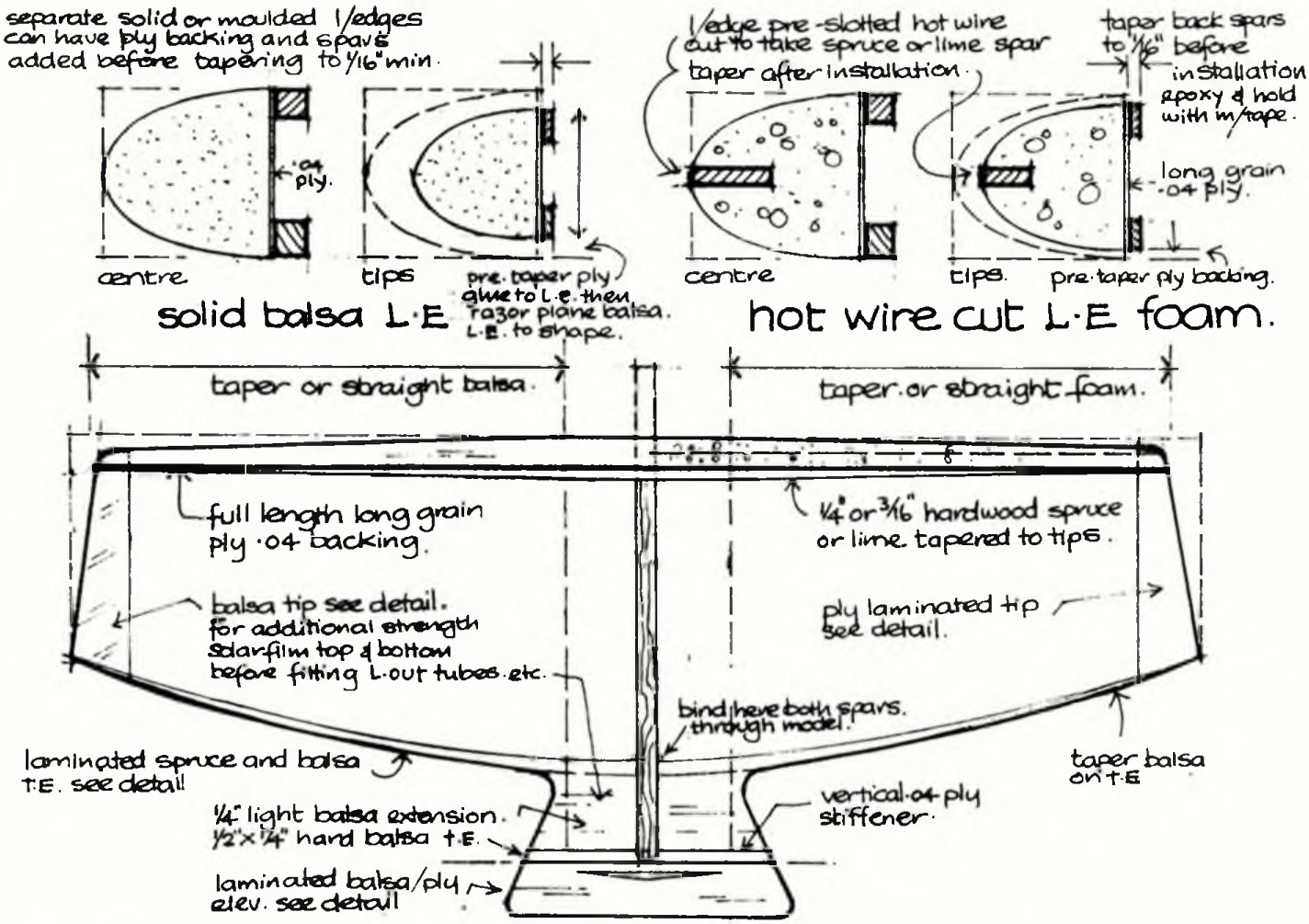
THE CLOUD NINE feature in the September issue of *Aeromodeller* dealt with unconventional methods of Combat model construction. This time I will deal with more straightforward layouts which have been well-proven in bouts over the years, including recent victories at Genk, Peterborough and the British Nationals.

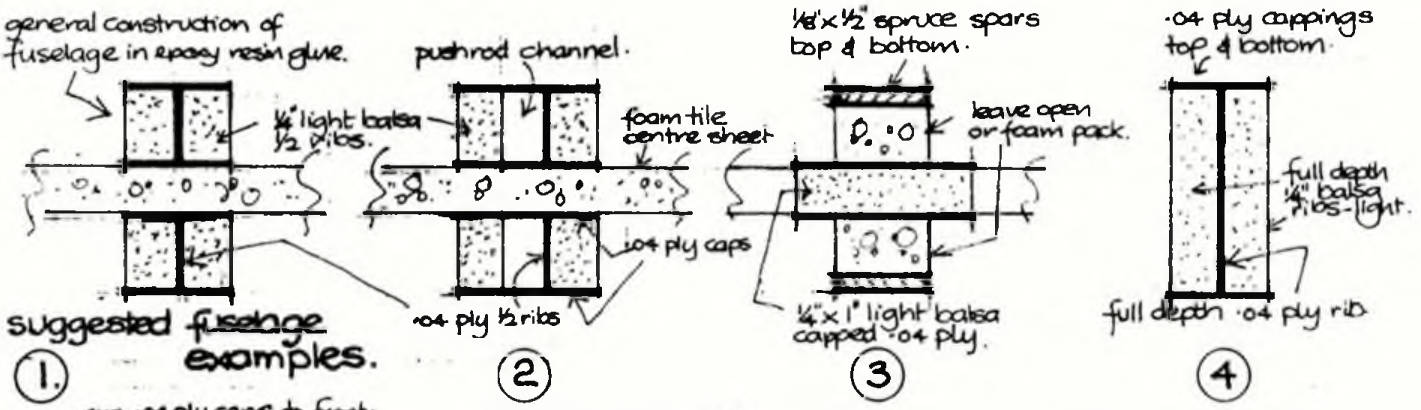
Ideally we would choose unbreakable – but competitive – models for Combat. This makes an interesting comparison with other branches of control-line where models often last a considerable time, especially when they are flown only in fine weather; absolute strength then is very much a secondary consideration.

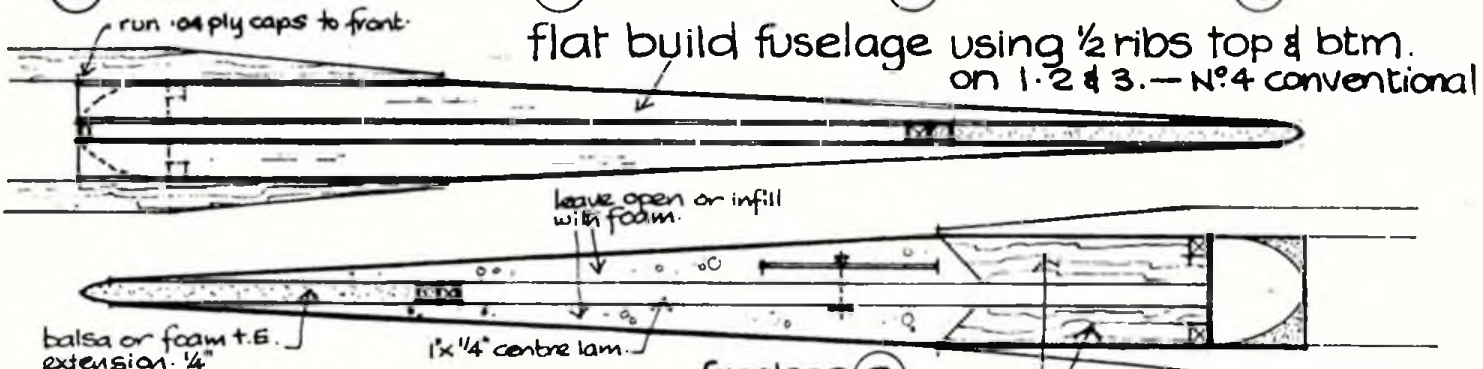
Background to unbreakable

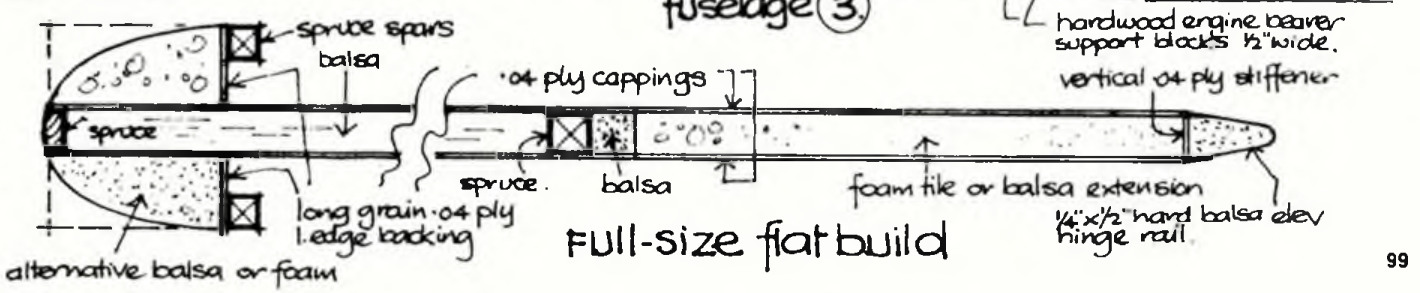
My own aeromodelling began with free flight and scale – a good foundation because well-designed and built models are light and strong. My present approach to control line would not be the same without this background. Of course, patience and stronger models will help you speed through proficiency at Combat. Trying to achieve the 'unbreakable' target has kept my interest focussed on this branch of aeromodelling. I get immense satisfaction from building and repairing models (sometimes as a member of a field repair team!) especially when rebuilds

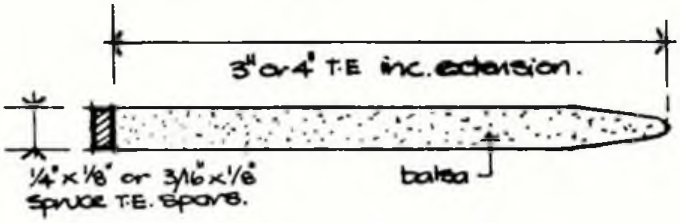
Top: Frank's Nats-winning model is 40in span and of largely polystyrene construction. 2.5cc Nelson 'side-exhaust' diesel gives the urge. Left: Action from the 1988 Genk meeting as Ron Kaptijn gets to grips with Paul Stanley in Diesel A. Sketches at right and over page are in Frank Smart's own distinctive style.



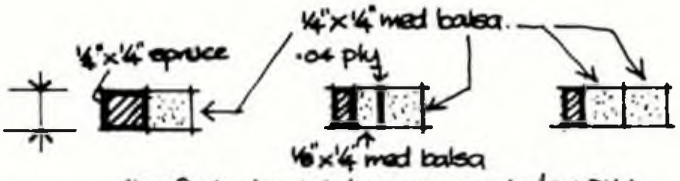






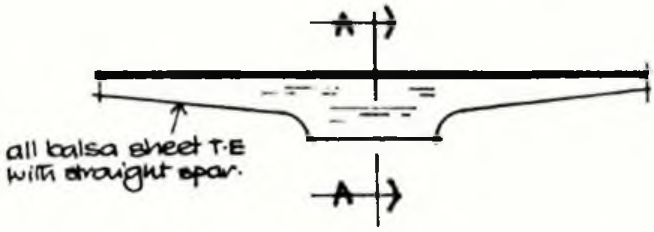


full size section A-A

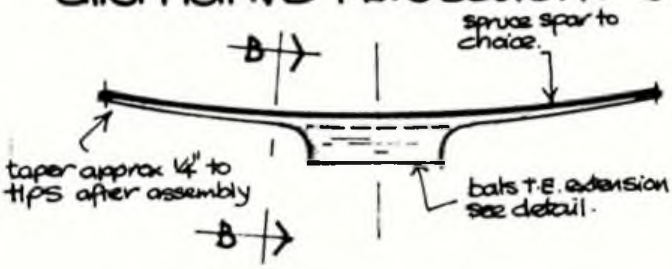


the first glue joint epoxy - remainder P.V.A. for mass production make a ply jig to curve.

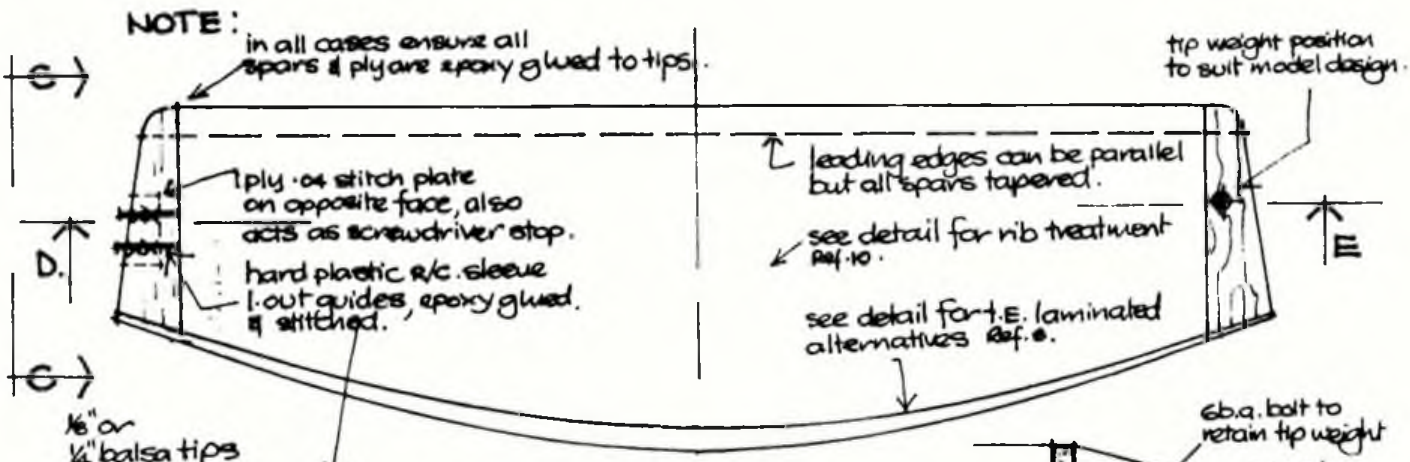
alternative T.E. sections B-B

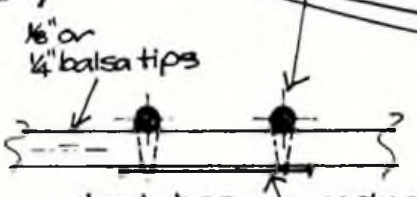


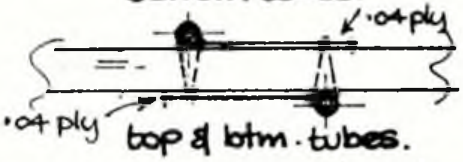
conventional T.E



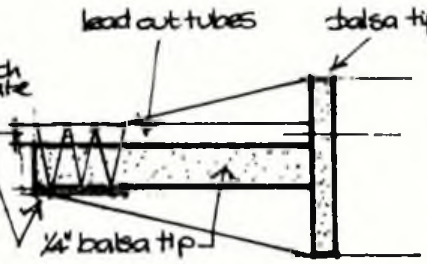
laminated curve T.E



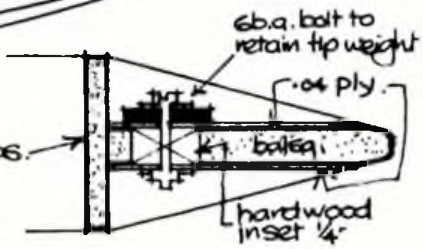




end elev. of lead-out tubes · CC

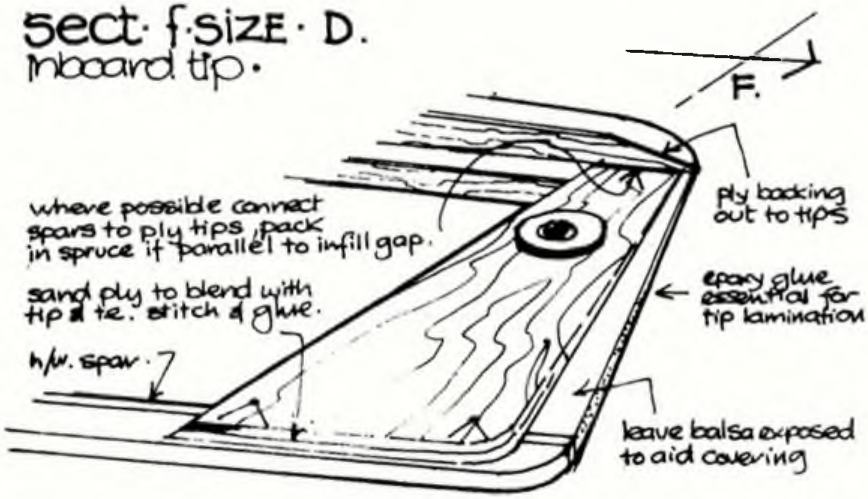


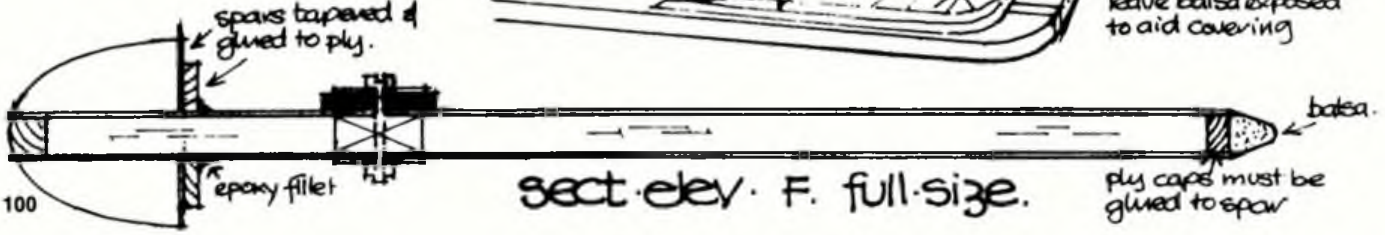
sect. f. SIZE · D. inboard tip.



sect. f. SIZE · E outboard tip.

WING TIPS.





sect. elev. F. full size.

win in the finals. When glow 'foamies' arrived – churned out by the dozen for each event – their higher speeds and minimal pilot reaction time available meant not only was extra equipment needed (thus incurring higher costs) but the carnage rate was higher. The result was a lessening of interest in FAI Combat.

On the other hand, A and 1/2A Combat have blossomed forth and now there is every reason to expect the imminent arrival of Vintage Combat as a competition class. This will be welcomed by enthusiasts like myself who enjoy building – and participating in a relatively relaxing day's flying, with the chance to watch other events and to meet socially.

To make the most of the Nationals weekend I flew in FAI and A Combat to accumulate flying time with the new side-exhaust Nelson diesel, which is now beginning to show its mettle. Lack of practice – and age, I guess – meant that 90 per cent of my own battle damage was caused in FAI, whereas I reached the A final without repairs. My selection of models are of different designs but they all incorporate new ideas for strength without excessive weight – ideally suited for blustery conditions too, having less wing area than usual.

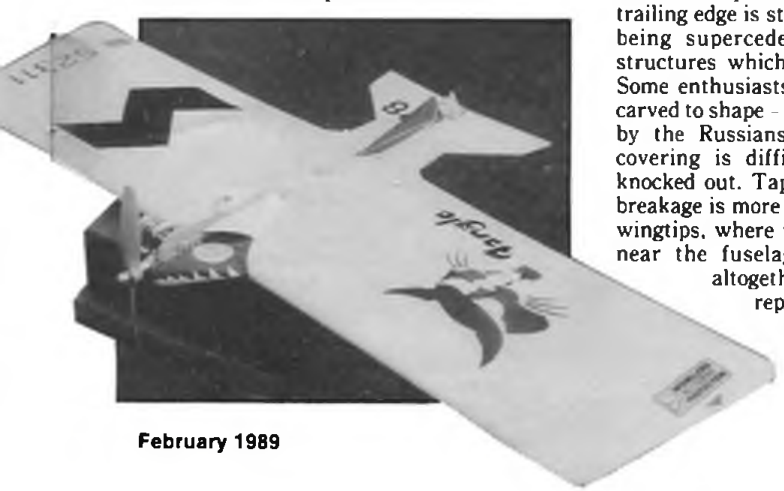
As some testimony to the strength in my combat designs I should mention that two models I flew in the '86 Nats are still airworthy. Indeed, one was used this year. It was perfectly competitive, surviving several collisions and 'ground bounces' (as witnessed by spectators at the Genk meeting reported in the November *Aeromodeller*) Russian Combat models are also very tough, but are clearly designed to extract most performance from their lightweight motors.

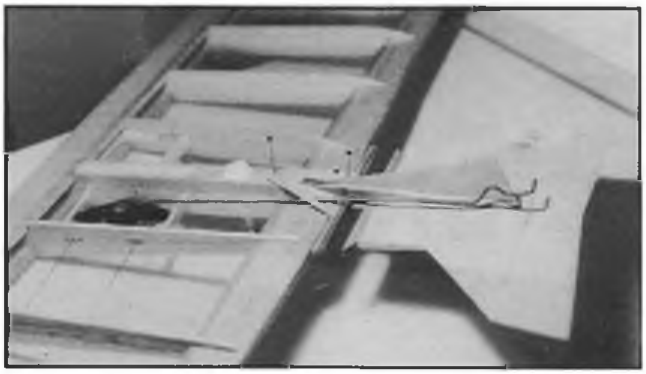
Let's get tough in Combat? Let's get down to business!

Survival techniques

Current engines are capable of pulling models weighing up to twenty ounces with no loss of speed in manoeuvres. However, sixteen ounces seems the ideal compromise between performance and strength for Class A. Lighter models are necessary for FAI.

A well-tested model – and equipment – means a better chance of survival if you fly within its limitations. Keeping to one design also helps in the same way, as the British Team showed in the last World Championships. The two main Combat model components are the leading edge and the fuselage. If this 'T' configuration is sound you are halfway to staying airborne. Nevertheless, the other components can be treated so as to help lengthen model life at the cost of little more workshop time, minimal weight increase – and less time needed in future repairs on the field.





Detail of bolt-on tail experiment used on Fangle design (shown at foot of page). Note different wing sections of inboard and outboard panels. Swept-forward layout tried too!

The leading edge

Tapered hardwood spars not only reduce weight by up to 50 per cent, but they ensure that maximum stress isn't concentrated at the centre of the model, thus increasing survival rate.

If you choose a balsa leading edge make sure that the heavier end goes outboard to reduce the amount of tip weight required. A full-depth backing piece of 0.4mm ply over the whole span, and the whole lot tapered once the spars have been added, will give a really strong, flexible set-up. The balsa need only be light.

Foam leading edges require a full-length hardwood or ply insert at the front. This not only adds strength but acts as a line deflector. Resistance to ground impact at the tips is also improved.

Fuselage facts

There are many possible permutations of fuselage design. It is essential to consider the forces that may cause breakage. If the model is 'planted' vertically the rear end will try to meet the nose. At anything other than a ninety-degree impact a whiplash effect will tend to break away the tail. Of course, the fuselage is responsible for housing the control system, tank, engine and accurate elevator location. Ensuring a good platform for these eliminates many potential problems, particularly after a knock in the air. Most successful models incorporate thin ply or hardwood spars fore and aft, and top and bottom. These link with the leading edge and elevator hinge point at the wing trailing edge. Avoid anything that might encourage breakage – that means holes, sawcuts, or pushrod exits. Binding or strapping at the tail is essential.

Various types of engine mount are satisfactory, but for the balsa-and-foam model I have yet to improve on the layout chosen for Cloud Nine. Although I prefer to use wood, there are a number of excellent machined-alloy mounts on the market which enthusiasts with metal-working skills could easily adapt.

Trailing-edge technology

The old system of a single 1/8 x 1/4in hardwood spar 'on edge' glued to a 1/4in trailing edge is still acceptable, but is slowly being superceded by curved, laminated structures which are lighter and stronger. Some enthusiasts use 1/4in square spruce, carved to shape – this is the method favoured by the Russians, but you will find that covering is difficult and ribs are easily knocked out. Tapered trailing edges means breakage is more likely to occur towards the wingtips, where repairs are easier. A break near the fuselage is a different matter altogether, and often hit-or-miss to repair accurately without jigs.

Foam models present more of a problem, for the only practical reinforcement is to add a hardwood spar to the trailing edge, afterwards shaping it to suit. Balsa is a faster material with which to work but it is subject to frequent failures – usually at the fuselage, when the model hits the ground. Many enthusiasts prefer not to add anything to the foam, but a model with no trailing edge reinforcement is often difficult to trim. If warps occur they are almost impossible to straighten out, and the only solution is to use trim tabs. Failing that, give the model away to the opposition!

Take a tip...

Balsa is still the best material for wing tips, which should be narrow to keep weight down and to reduce cantilever effect on ground impact. The widest part should be at the rear to obtain maximum glued area at the TE. Good fits are important. Lightness has to be coupled with strength because both tips have a job to do. The inboard one carries the leadout tubes and takes the strain when the model is subject to pull checks. Tip weight is carried outboard; if it becomes detached in flight the results can be awful to witness...

Don't drill holes to perforate the tips. Glue leadout tubes top or bottom. Stitching right at the tip is acceptable but only in conjunction with a backing of 0.04mm ply. The same material should be used top and bottom to strengthen the outboard tip. Weight increase here is beneficial.

Toughen those ribs

Models with a foam leading edge and balsa ribs are widely used. Cover both sides of ribs with Solarfilm for strength and fuel-proofing. I first tried this in 1976. Many modellers thought I was just trying to create a pretty model (clear wing covering was used) but the advantages are amazing. During a bout I have suffered the ripping-out of an entire set of leadouts; all the ribs stayed intact apart from internal cutting. After mid-air collisions the ribs are undamaged and the traditional 'bag of bits' is no longer an automatic result.

Transparent Solarfilm (or, even better, Fascal) is ironed onto a balsa sheet at 'tack', not 'shrink' heat; the film is folded by turning over the sheet and the process repeated for the other side. Choose light balsa with a 'streaky' grain. When cutting out the ribs you will find that those difficult bits that break at the TE are a cinch to cut out. Once the ribs are cut increase the heat setting of the iron and run over individual ribs to ensure maximum adhesion. Strength is doubled. Tips, trailing edge and gussets may also be Solarfilmed with advantage.

Punch out leadout holes after installation with a 'rotating-wheel' leather punch. The Solarfilm will meet at the perimeter, further increasing strength.

Next month: Control systems, covering and conclusions!

VINTAGE CORNER

Alex Imrie focusses the old-time microscope on a paper plane from the 'twenties. Build one!

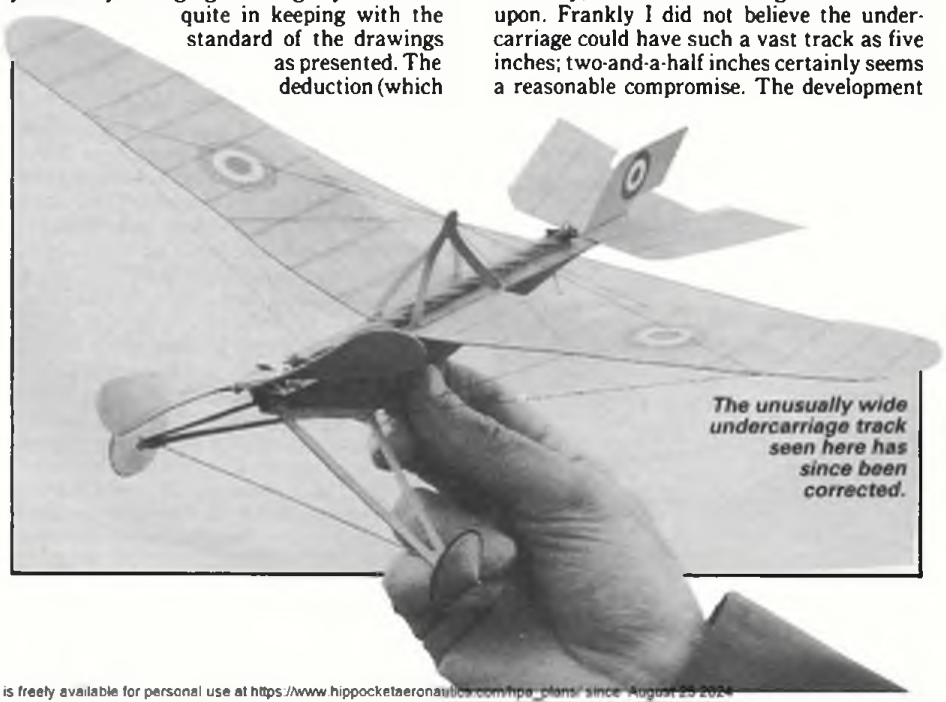
REGULAR readers of this column will doubtless have followed the items in June, August and November 1988 relating to a thread-braced card model from 1929. However, to put the thing into the proper perspective, here is a short resume. The model was first brought to our attention by Joe Maxwell from Stirling who sent in a sketch made from memory after reading our coverage on Wallis Rigby, the noted card modeller in the March 1988 Vintage Corner. Features of the model were confirmed by Josh Marshall of Hayes and Jim Fullarton of Victoria, Australia, but it was only when George Blair from Edinburgh found a copy of the actual issue of The Modern Boy, (number 55 dated 23 February 1929) which contained Part One of the model's description, that it was learned that this was, in fact, an F J Camm design – not of Rigby origin as had at first been thought. Our request in Vintage Corner for a chance to look at the next issue containing Part Two was kindly answered by Julian Snook of Dorset. However, even before that was to hand, copies of the first part, with xerox scaled views, were sent to our card model expert, Norman Peacock of Merseyside, who rapidly built the model and brought it to Old Warden Vintage Weekend, but the weather was unsuitable properly to evaluate the model by test flying, Norman commented '...Looking at the design I thought it would be nose-heavy but it proved to be quite tail-heavy. It is the sort of model which needs a flat calm, and we certainly have not had that recently; but such attempts to fly it as I have made, suggest that the fin area is inadequate, as it readily rolled over either left or right..."

It might very well be that the fin area is insufficient. The three different views in the article were of varying sizes; and using an enlarging copier I brought them all up to what I considered the correct size by using the five-inch propeller as a key.

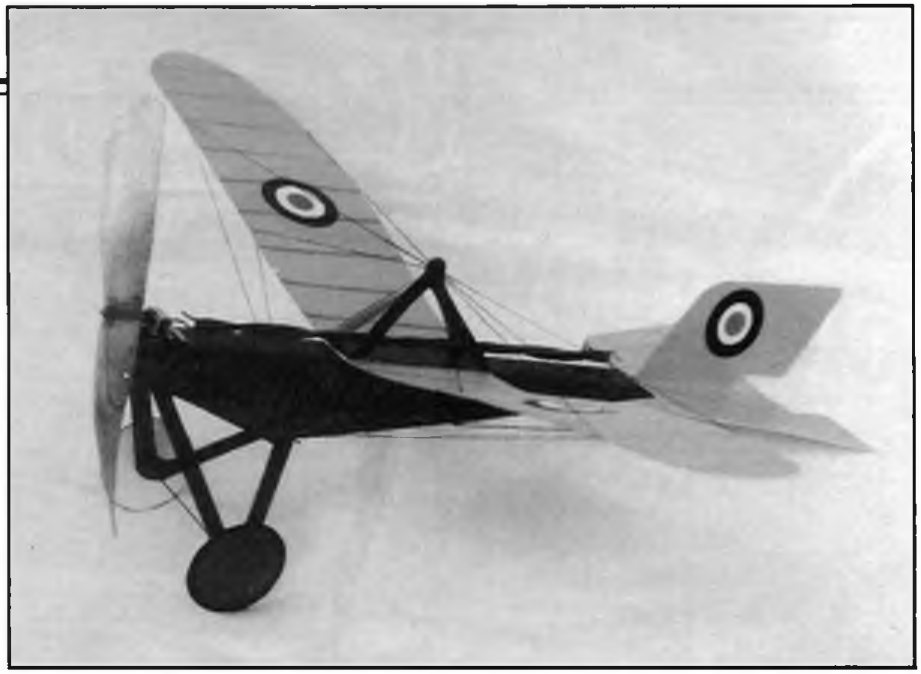
This was deduced from the illustration of the contents of the 'Fittings' envelope, it being felt that the eyelets looked full-size – and if this was so, the fibre propeller blades were most probably shown in their correct size. That the drawings are not to scale is confirmed by the wheel track in the plan and front views, this being five inches and two-and-a-half inches respectively when the propeller diameter was enlarged to five inches in both views! Not having an original model (which was colour printed on thin card as an insert in the paper) there is no way to confirm the exact size of the fin, and judiciously enlarging this slightly would be quite in keeping with the standard of the drawings as presented. The deduction (which gave a wingspan of 14. 1/2in) was confirmed with the arrival of the second Modern Boy article which contained details of the landing gear axle. Measurements for bending the wire were actually shown full-size, and this gives a wheel track of almost two-and-a half inches. Thus the front view is approximately correct in this respect, so builders should ignore the exaggerated wheel track given in the plan view. No attempt has been made to alter any of the drawings. Here they are as originally published. Norman had built his model with the wide undercarriage track, but on receipt of the additional information he reduced this to the correct size and made a fin of increased area. He also produced a drawing of the individual component parts incorporating the above changes. This shows the development drawing of the fuselage as well as a necessary reinforcement for the rear undercarriage legs. This latter item is in the interest of longevity as is the use of epoxy glue at various points; intending builders are advised to do likewise and to adopt the techniques that Norman describes below.

Over to Norman:

'Really, none of the drawings can be relied upon. Frankly I did not believe the undercarriage could have such a vast track as five inches; two-and-a-half inches certainly seems a reasonable compromise. The development



The unusually wide undercarriage track seen here has since been corrected.



Man and his model. Norman Peacock with his 1929 card Modern Boy presentation model at Old Warden during last year's Vintage Weekend meeting. Note the small fin and wide undercarriage then fitted.

drawing to produce the triangular section fuselage caused some head-scratching. The side view drawing shows the fuselage coming to a chisel edge fore and aft. Clearly this cannot be if the fuselage is triangular in section so my model has a shallow triangle at nose and tail. In fact, I made two fuselage developments before settling on the final one. I also ignored the simple nose bearing in favour of a double bearing to give some down and right thrust. The nose has a small balsa block inside to take the bearing and nose ballast found necessary. My model is made from 90 lb Watman Watercolour paper. The fuselage is coloured Sky Blue 529 and wings and tail Marigold Yellow 517 – references for Winsor and Newton Gouache, a fine poster paint. Bostik clear adhesive straight from the tube is used for assembly. All folds are scored (a used fine ball-point pen is suitable) to give a clean bend or fold. Assembly is simple except for the bracing threads to the wings. I found it best to run these through the top cabane strut to the top of the wing and through pin-holes at the relevant points. The dihedral (1 1/2 inches at each wingtip) is then set with some tip washout. A dab of cement secures the threads at each of the eight points on the wing. When set, the threads are taken under the bottom of the fuselage, drawn taut, then again secured with a dab of cement, the excess thread being cut off. The propeller is made from two pieces of plywood to the shape given, epoxied together, then bent with steam in the approved fashion. Undercarriage legs are reinforced with microply; otherwise, they buckle easily. The revised undercarriage and enlarged fin have been fitted; and the model weighs 3/4oz. with rubber. I cannot say that the model has flown properly so far, but it does glide tolerably well now that the larger fin has been fitted. The trouble is the fixed thrust adjustment and the difficulty of getting the right amount of rubber to power it'.

Norman's model with enlarged fin and reduced track undercarriage. The 1.1/2in diameter wheels fitted here have since been replaced with a pair one-quarter-of-an-inch smaller.

We would be pleased to hear from modellers who tackle this model. Those of you who have succumbed to my 'authenticity' pleadings over the last eight years might choose to avoid the use of modern glues; and if anyone finds a source of thin red vulcanised fibre they can use the eyelet method of joining the propeller blades! The models that resulted from the activities of little hands and Seccotine at the time must have been sights to behold. Joe Maxwell's fuselage buckled under the strain of the wound rubber, as did Jim Fullarton's model; while Josh Marshall found great difficulty with that red fibre, eyeletted propeller; so if you wish to fly your creation,

When the Rigby Swallow was given away with The Modern Boy on 13th February 1932, the Editor could not resist making this comparison. (see March 1988 Vintage Corner). The real reason why the 1929 'Peak of Perfection' looked so ancient is mentioned in the text.

IN placing these two pictures together, I am enabling you to draw comparisons between present-day model aeroplane design, as encouraged by MODERN BOY, and the "peak of perfection" in 1929. Several striking points of contrast leap to your eye, notably the absence of bracing wires in this week's GIFT AEROPLANE. The propeller in the present model shows an astonishing advance on the best designs of three years ago. The present undercarriage is a distinct improvement, and as for the relative performances this week's Gift Plane speaks for itself!

In the light of present knowledge, simplicity of design and excellence of performance can go no further. This week's gift plane demonstrates unmistakably the great part that MODERN BOY has played in model aircraft development! •

THIS WEEK'S FREE GIFT MODEL PLANE

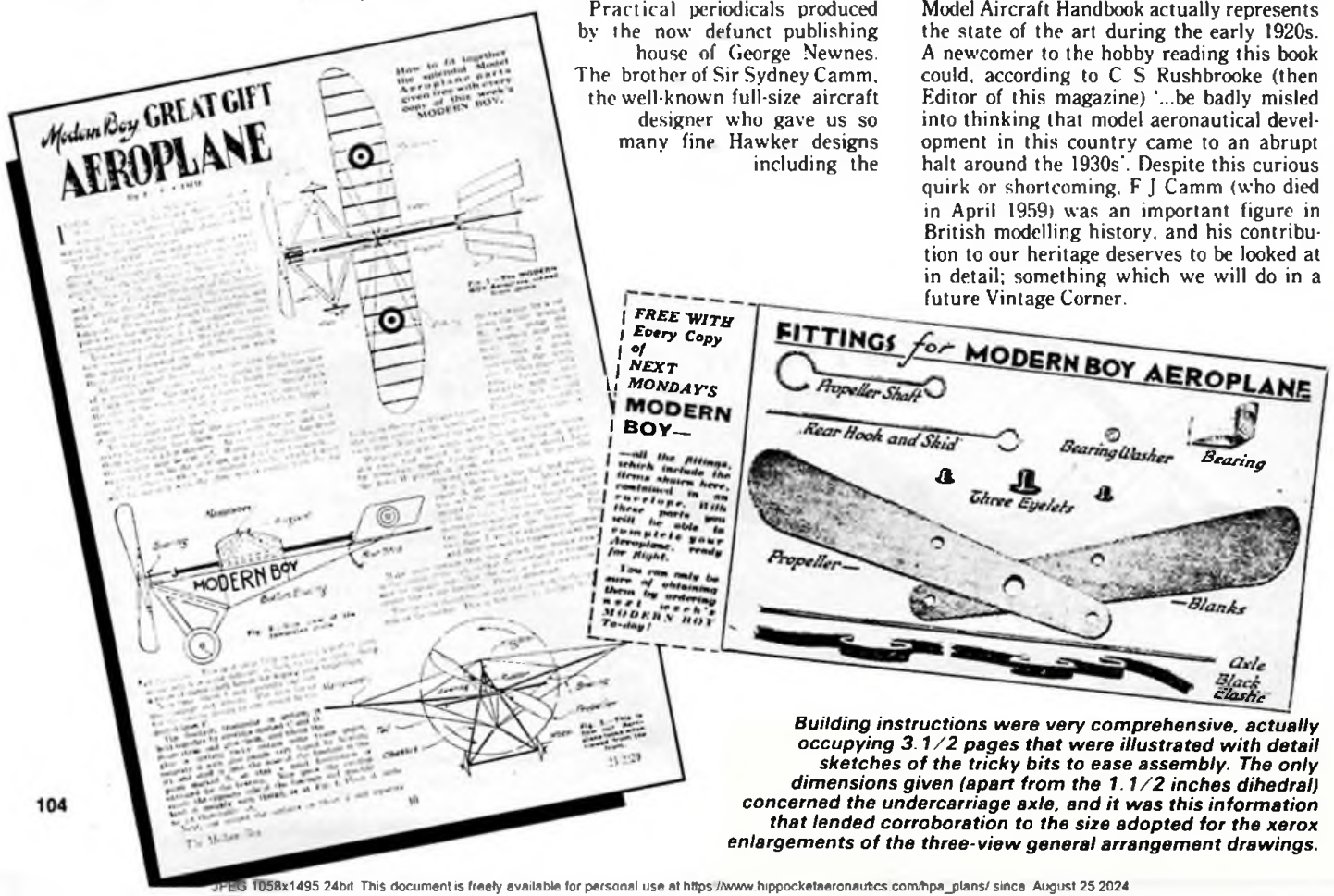
OUR GIFT PLANE IN 1929

The two front covers of Modern Boy that must have caused many young pulses to quicken in 1929! The first issue contained the component parts, colour-printed on three sheets of thin card, all ready for an assault by scissors and a two-penny tube of Croid or Seccotine. How slowly the next seven days must have passed before that second issue came out with the parts needed to finish the model...

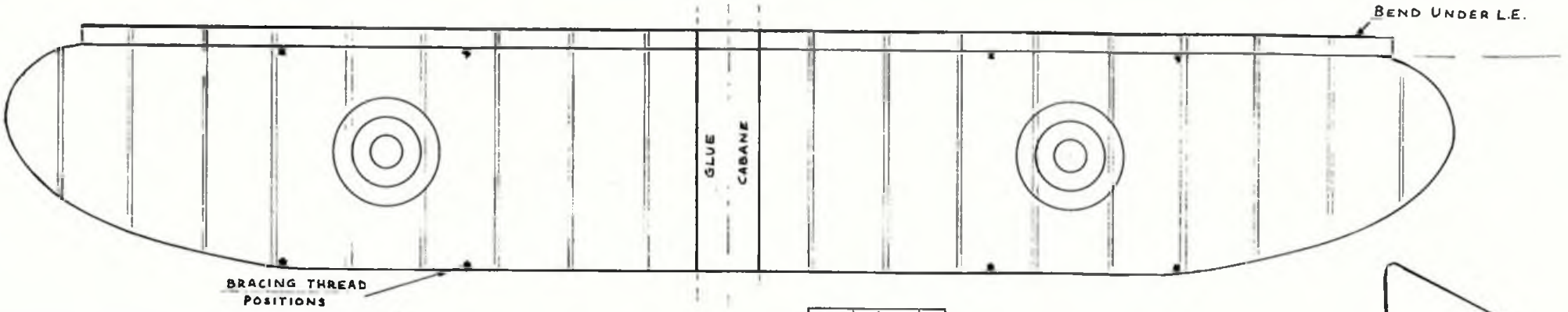
our best advice is to follow Norman Peacock's techniques and so benefit from his many years of experience with models of this type!

A look back at F.J. Camm

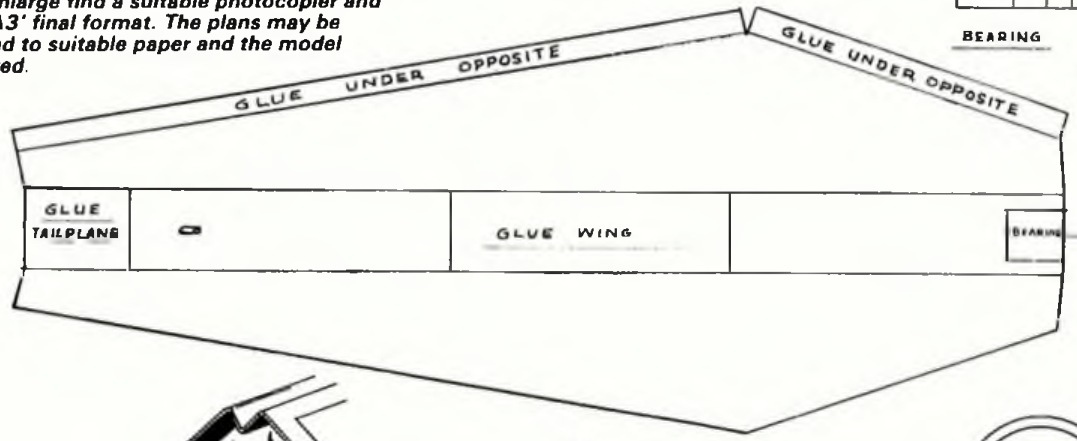
Being brought up on the modelling literature of the 1930s, the name of F J Camm was known to me from an early age. He was then the Editor of Practical Mechanics, a publication which always carried model aeroplane news and information in its Model Aero Topics column. He had a reputation of being a jack-of-all-trades, and he was also the Editor of many of the other Practical periodicals produced by the now defunct publishing house of George Newnes. The brother of Sir Sydney Camm, the well-known full-size aircraft designer who gave us so many fine Hawker designs including the Hurricane, he had been involved with model aeroplanes since before the First World War. The Camm brothers were co-founders of the Windsor Model Flying Club – a very industrious group of modellers who '...were building three models each per week, and since crashes were frequent were unable to send detailed descriptions of them for inclusion in the pages of Flight'. If this gives the impression that their piano wire and hardwood silk-covered models were not great performers, don't be misled. As an example only, at an August 1914 meeting F J Camm's model flew out of sight and was lost, while Sydney won the competition with a time of 85 seconds! F J Camm wrote convincingly on every technical and scientific subject imaginable. Countless books and articles appeared under his name, and he was the model aircraft Editor of Aeronautics, Flight and Everyday Science at different times. He it was who persuaded the London Aero Models Association to adopt the title of Society of Model Aeronautical Engineers (SMAE) '...a title more national in character...' when the LAMA took over the records of the old Kite and Model Aeroplane Association in May 1922 and thus became recognised as the governing body of the sport in this country. His name was therefore well known when he designed the Modern Boy presentation model, and if its appearance looks ancient even for 1929, that is in keeping with his style, because although he engaged in model aeronautics for a further thirty years, F J Camm continued rather to live in the past; and his writings do not really reflect the progress being made in the hobby. Indeed, they were not only dated but, in many cases, extremely antiquated. The compressed air engine and flash steam plant that he described in his 1949 publication Model Aircraft Handbook actually represents the state of the art during the early 1920s. A newcomer to the hobby reading this book could, according to C S Rushbrooke (then Editor of this magazine) '...be badly misled into thinking that model aeronautical development in this country came to an abrupt halt around the 1930s'. Despite this curious quirk or shortcoming, F J Camm (who died in April 1959) was an important figure in British modelling history, and his contribution to our heritage deserves to be looked at in detail; something which we will do in a future Vintage Corner.

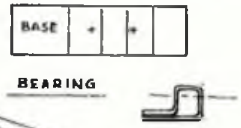


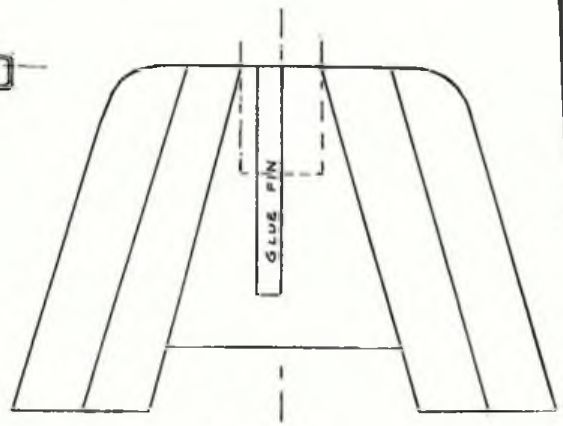
Building instructions were very comprehensive, actually occupying 3.1/2 pages that were illustrated with detail sketches of the tricky bits to ease assembly. The only dimensions given (apart from the 1.1/2 inches dihedral) concerned the undercarriage axle, and it was this information that lended corroboration to the size adopted for the xerox enlargements of the three-view general arrangement drawings.

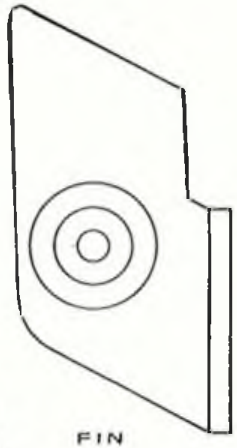


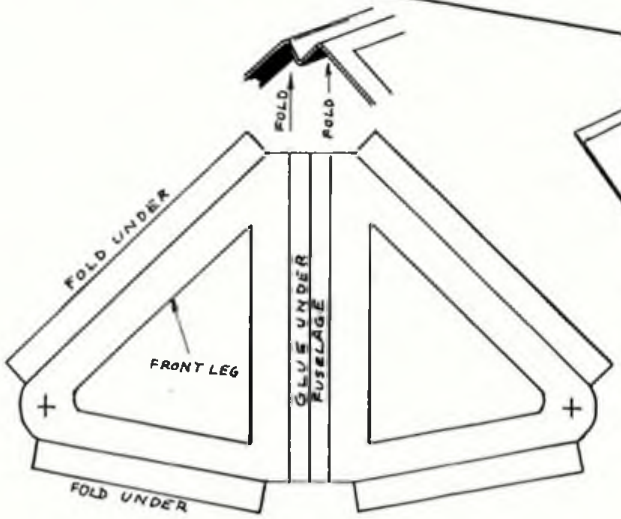
Norman Peacock's drawings are shown here in 'A4' size. To enlarge find a suitable photocopier and choose 'A3' final format. The plans may be transferred to suitable paper and the model constructed.



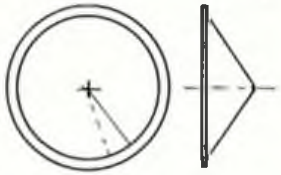


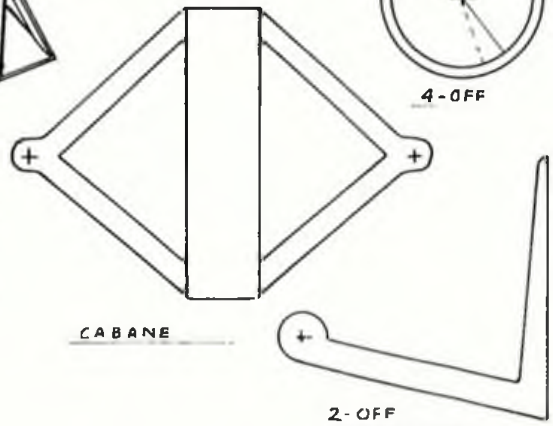






UNDERCARRIAGE





2-OFF
MICROPLY REAR
UNDERCARRIAGE
REINFORCEMENT

2-OFF $\frac{1}{32}$" ply PROPELLOR BLADES
ARALDITE TOGETHER

PROPELLOR SHAFT ARALDITE BLADES IN CLIP.

1929 MODERN BOY AEROPLANE.

BY F. J. CAMM.

N. D. PEACOCK. 1988

Bruce Kopasz looks at the Chart-Micro Mold Volksplane R/C kit - with control line in view

THERE ARE relatively few control-line kits around these days, let alone scale ones, so if the C/L modeller wants to build a scale model he must either build from a plan or convert a radio-control kit. Now most people can build from a plan, yet few would think of trying to convert a radio model. Nevertheless it is very easy, as I found out when I had a go myself with the chart Micro Mold Volksplane kit.

The full-size Volksplane is a small single-seat homebuilt machine, powered by a converted Volkswagen car engine. It features very straightforward construction and is claimed to be easy to fly. The Volksplane is strictly non-aerobatic, being only stressed to about ± 1/2G. As it is very stable with good slow speed handling, and is easy to build, having only straight edges, it makes an ideal scale model, so when Micro Mold brought out a semi-scale kit of the Volksplane I decided to convert one.

The Kit itself

The Micro Mold kit is described as a 58in. span sport/scale model for .29 - .40 cu in engines and four channel R/C. Almost everything is provided except engine, radio and finishing materials. Taking up most room in the box is a large pair of obechi veneered foam wings with the balsa leading and false trailing edges already glued in place. There is also an ABS cowling, dashboard and headrest, a dural undercarriage, a pair of wheels and a clear moulded windscreen. Delving further into the box one finds a big bundle of rather hard balsa wood, some plywood formers and numerous goody bags containing all the pushrods, clevis, nuts and bolts, tailwheel, and so on. Last comes a well printed plan and a set of vinyl stickers for the registration letters, instrument panel and fin badge.

Let's build!

The model goes together very easily, so provided you can read the instructions and have already built a model or two, you should have no difficulty. Just one or two alterations are advised.

I rotated the engine around 20 degrees from inverted which means that both the engine and the silencer are now enclosed by the cowling. For realism, the cockpit floor also needs lowering by about 1/2in. so as not to foul the bellcranks. Naturally, the C/L conversion will demand a line 4.1/2in. back from the leading edge, and about 1.1/2ozs. of tip weight in the outboard wing. The strip ailerons may be glued to the false trailing edge, and there is no need to cut out the servo box. One could cut ailerons to the scale size and hinge these with thin brass strip for trimming and scale effect but painting them on looks good enough.

Wheel, wheel, wheel

The main wheels are mounted on a dural unit which is held with self-tapping screws to the fuselage. These screws should be replaced by 4 BA steel bolts, and the U/C also needs bracing with seven-strand control line wire. As kitted, the tail wheel is mounted on a bit of piano wire, held to the fuselage by a saddle clamp. This system is too flimsy so I replaced it with a fully-castoring aluminium unit held on with bolts.

Control system

This is the most important alteration to the kit. It must be installed correctly. All the measurements are shown in the diagrams. The system goes together easily if care is taken during construction.

First make up the parallel bellcranks and rudder crank, mounting these on 1/4in. plywood plates. These cranks may be made from dural, brass, paxolin or 1/8in. plywood. Bush all holes with thin brass tube (unless you have used brass as the crank material, of course). The leadouts are double loops of heavyweight control line wire, bound and soldered.

Once the bellcranks are in position make up a balsa pushrod for the elevator and a closed loop linkage for the rudder. The closed-loop cables can be from nylon covered fishing trace or heavyweight Laystrate. Solder the ends at the crank and fit a clevis at the rudder horns. Next make up the throttle snake from bowden cable running in plastic tubing, again fitting a metal clevis at both ends.

When you are satisfied that the controls work smoothly make up a short wire pushrod (adjustable via yet another clevis) from the throttle crank to the rudder crank. The rudder must now be adjusted for required throw on full and low throttle. Remember to allow most offset on low throttle! One final point: use plastic pin-type hinges, not nylon; they are much smoother.

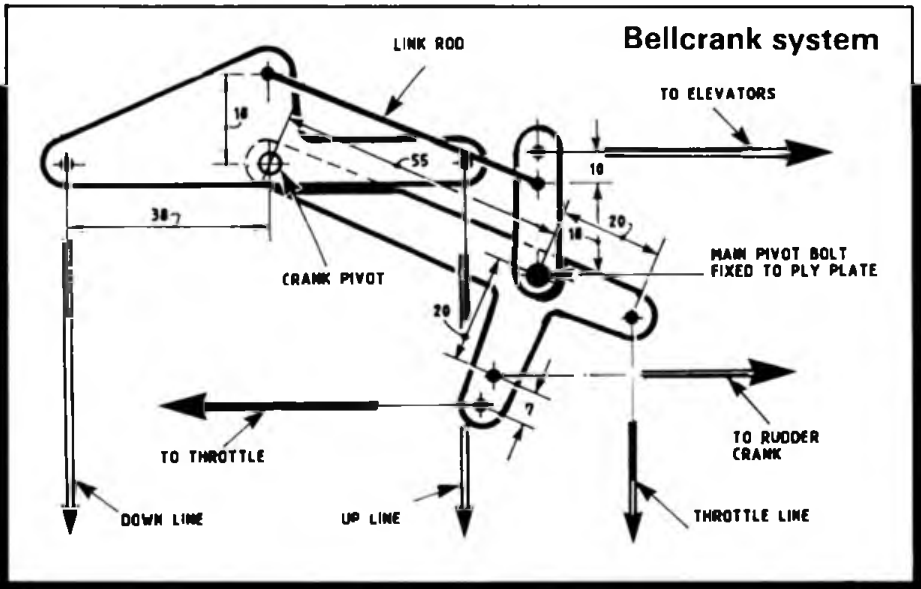
The tailplane/elevators and the fin/rudder are sheet centres with strip added on top to simulate a built up structure. It is well worth building-up the tail or cutting large lightening holes. The model may otherwise be tail heavy.

Finishing

I used Solartex followed by Solarlac but choose your favourite method; tissue and dope, Solarfilm, nylon, Polytex, glasscloth, or whatever. The box shows an attractive colour scheme. These vinyl stickers are of a very high standard.

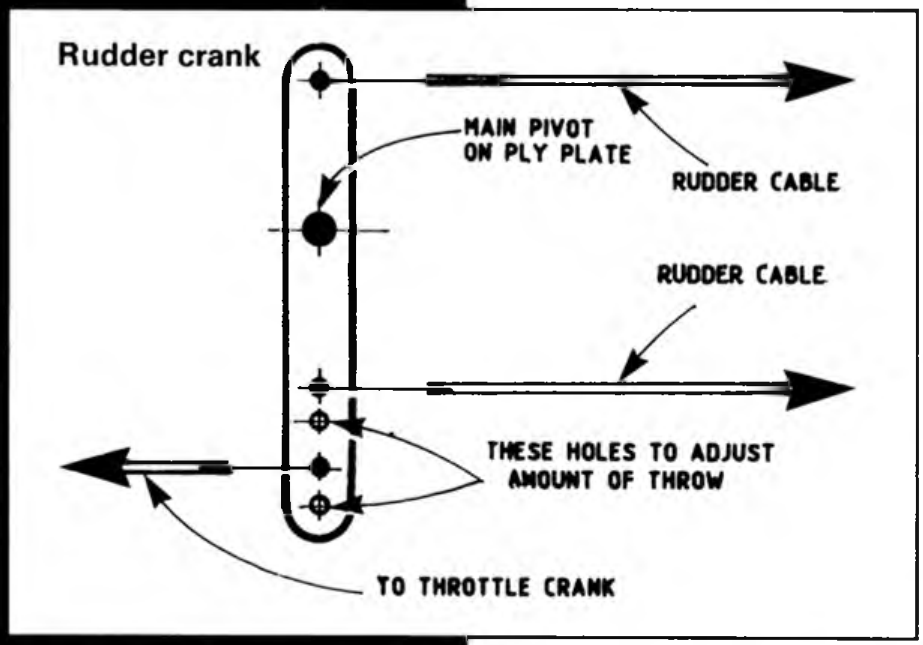
A quick spray of Tufkote finishes things

Volksplane



Main picture: Bruce's Volksplane conversion looks good and handles well in the C/L circuit.

Control system is fully dimensioned in millimetres - so build your own and adapt to other craft as desired.



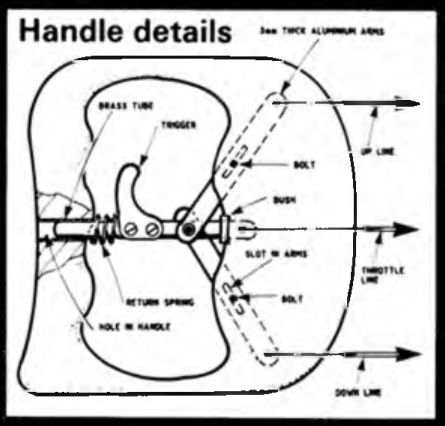


Photo at right shows Merco 61 canted to fit almost entirely within cowling. Wide range of powerplants acceptable - but remember, it's better to have too much oomph than too little!

Conversion

off nicely. Glue the windscreen with R/C Modeler's Glue - it works wonders.

A pilot is a must for this type of aircraft, so a 1/5th scale head was bought and a pair of arms and shoulders were carved from balsa to fit. These were then glued together and covered with nylon. A dummy fuel filler was fitted (see sketch). Because no radio was fitted the model was tail heavy so I fitted a Merco .61 in place of the intended OS 40 FSR which then brought the balance to within a sensible range.

Flying!

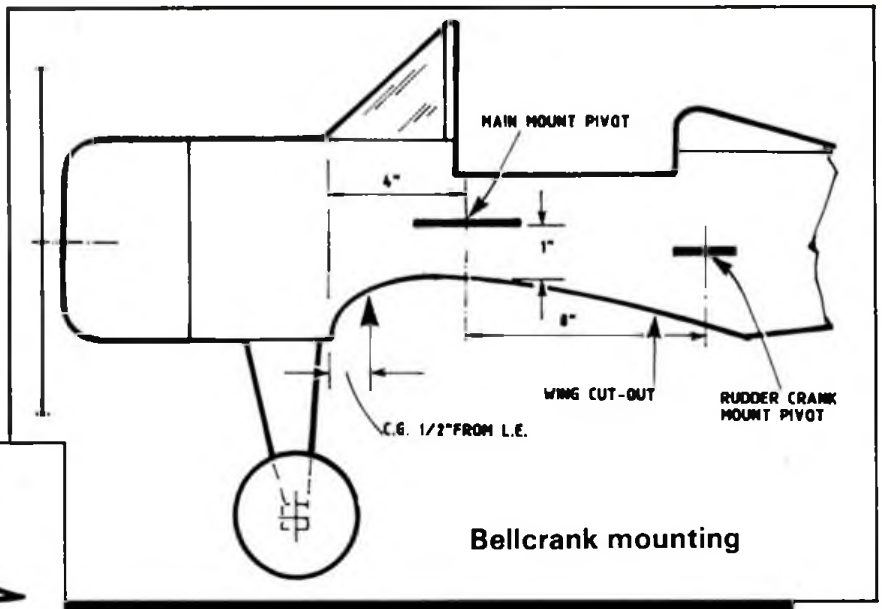
Once the throttle was sorted out there was nothing left but to connect up and go. The model was fastened via 65 ft lines to my own design 3-line balanced handle (see diagram). With a touch of up elevator and at about half throttle the Volksplane took off without any problems at all.

The model will float around slowly on a calm day and it will also hold the 45-degree laps easily. Landings present no problems whatsoever. At tickover it glides in slowly, with a light nose-up attitude. The stall is very predictable. Gentle wing rocking gives plenty of warning.

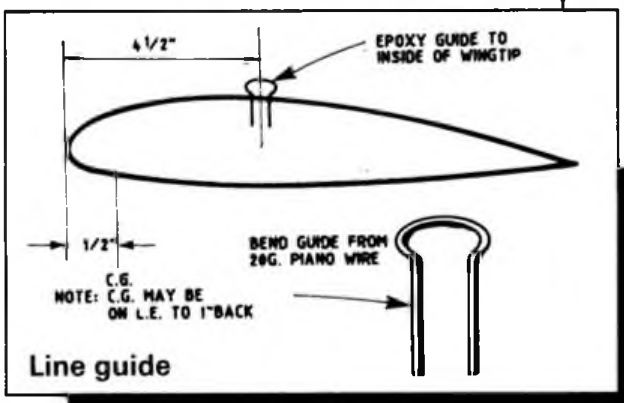
Conclusions

The kit goes together very well indeed. The only thing to watch is the tail-heaviness. The

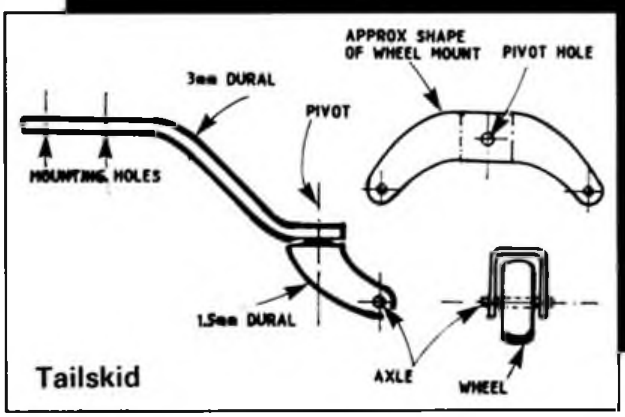
Volksplane Conversion



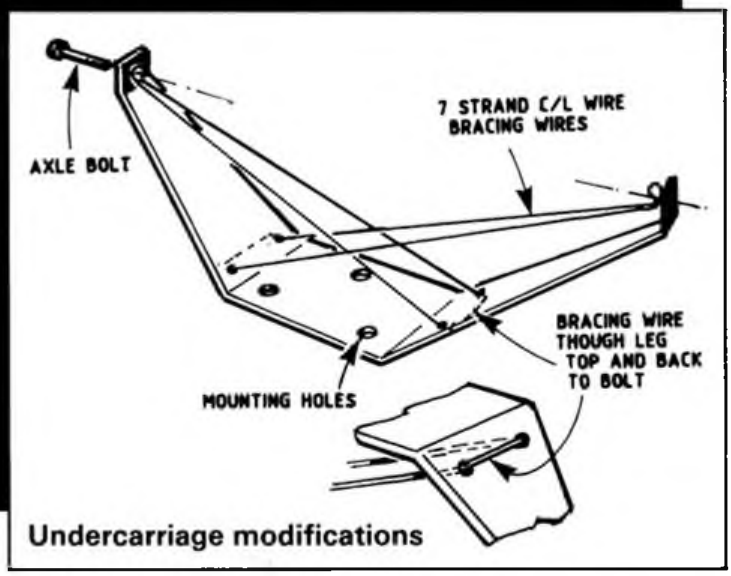
Bellcrank mounting



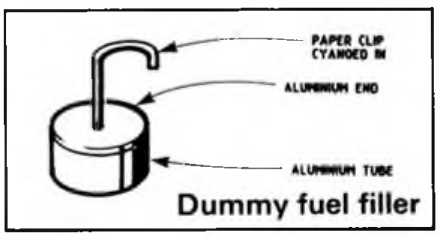
Line guide



Tailskid



Undercarriage modifications



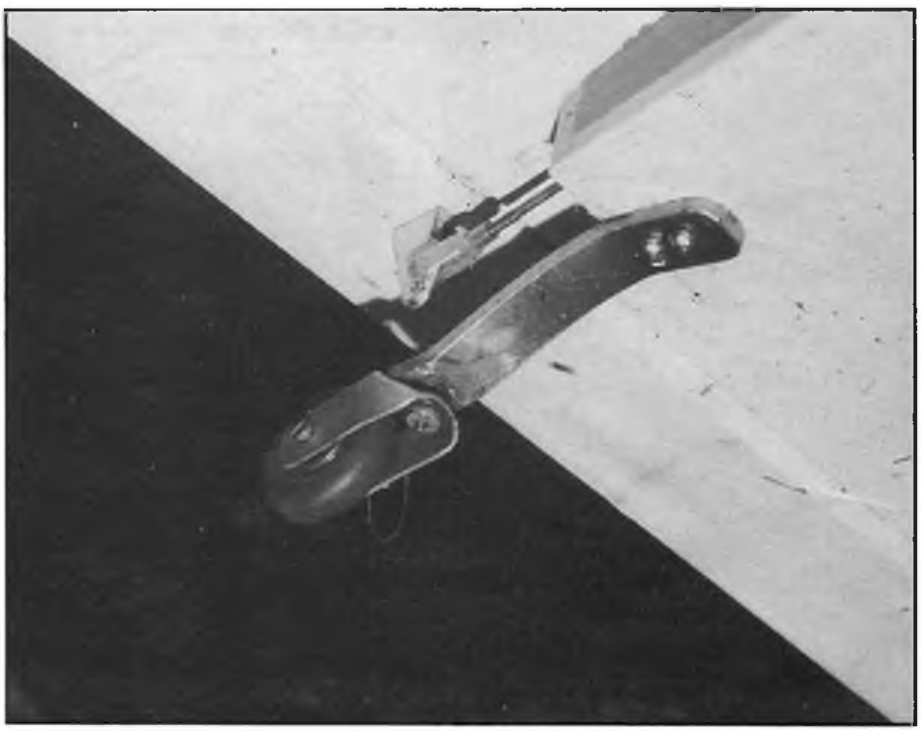
Dummy fuel filler

same principle of conversion could be applied to any kit or plan. There is an enormous number of radio-control scale kits and plans about, and many of them would make easy fun-to-fly C/L models.

And if you don't fancy making the handle or bellcranks, then I can supply you with both Telephone Bradford (0274) 583876. Well done, Micro Mold. It's a great kit. What's next? next?

Volksplane data

Span: 58in.
Engine: Merco .61 (any from .29-.61)
Lines: 65ft Heavyweight superline
Tank: 8oz Clunk tank
Fuel: 5% Nitro Model Technics
Weight: 5lbs
Propeller: 13 x 6 Zinger
Distributor: Micro Mold
Price: £49



Replacement tailwheel assembly is more robust and scale-like than simple piano-wire unit supplied in kit.

MOTOR MART SPECIAL

We examine a new vintage-style diesel all the way from down-under

WHEN Gordon Burford produces a new engine the vintage world sits up and takes notice. His 2cc Deezil replica maintained his reputation with its fine workmanship and impeccable manners. Now comes the follow-up from his workshop Down Under – a 3.5cc gem. It isn't vintage because Gordon has designed it himself – but judging by its looks it jolly well ought to be (even despite an F2C-style cylinder head!) and it will, of course, be acceptable in vintage contests. Here are Gordon's thoughts on how it all came about:

'I have always flown Old Time with diesels. I love them! I mainly used the Deezil replica and later my Skateboard Special – a high-performance engine – but that is another story. However, my long-distance sight failed and I started to fly other people's models in the sky, so the need for a larger aircraft arose which, of course, meant larger capacity engines. Before I started making such an engine the capacity of my production machinery had to be taken into account. The physical measurements of material for a 3.5cc engine was as much as could be handled. So 3.5 it was!

'It had to be long-stroke (17mm) to handle big props and the bore had to be 15mm because piston manufacturing tooling already being used was a combat 2.5cc engine. And it had to be user friendly. Therefore the needle valve had to be at the rear. That way there was no getting bitten by that spinning piece of wood and no dunking the two-speed throttle into the dirt and snapping the needle valve. Another plus: compression adjustment had to be easy and painless. And it is. You can twiddle to your heart's content with the knurled disc. If you lose this, a hex key will do the trick, but not so easily.

'That's the operational thoughts. Now to the actual manufacturing. First of all, it had to look old-fashioned – tall and spindly, with lots of bumps and screws; not the slick looks of today. Now to materials. Why not try high-tensile aluminium for the crankshaft, with special high radial clearance bearings and a press-in needle roller pin (3/16 dia. INA). Works like a charm and no problems have been experienced in six months' use.

'This particular engine has the traditional hardened-steel cylinder and cast-iron piston. However, the next in the series will have a high silicon content, cast-in-ports cylinder, boron nickel plated, and a 22 per cent. silicon piston. Or alternatively, a cast cylinder with a plated piston. I shall try both set-ups.

'The cylinder head is press fitted with a close clearance squish band, and the compression is adjusted by a 5/16in. diameter high silicon plug fitted with a high-temperature resistant O-ring. This is of the push-pull style, being jointed to the 5/16in. diameter grub screw by a small socket head screw.

'I use a Rev Up 12 x 6, 4-cycle series 100 prop. The fuel is 40 per cent kero (paraffin), 30 per cent ether, 30 per cent castor and a smidgeon of IPN. The motor has been powering a 70 per cent version of Carrol Krupp's 8ft. span Bowden International Trophy Winner.'

Of course, we couldn't wait to give it a go! First impression – it runs as well as it looks, which is saying a lot. It starts second or third flick from cold after port priming. Warm starting is instant after one choke turn.

With a heavy 12 x 6 plastic prop the motor achieved 6,500 revs. It sounds beautiful and kicks back a lot of air for 3.5cc. It throttled back to 4,000 and a lower idling speed could probably have been obtained with a bit of fiddling. On the lower speed settings the compression adjustment slackened off, eventually stopping the run. Obviously a small production adjustment is required here. Pick-up from idling, as with most diesels, was slow compared with spark or glow motors. This, of course, will not bother free-flighters who will be more than charmed with the low-revs facility for that stately, constant-height circling so beloved of the F/F vintage fraternity on days of flat calm. On a much lighter 10 x 6 prop, revs shot up to 9,000, which isn't hanging about for an engine of this nature.

But that knurled disc compression adjuster just has to be an acquired taste... During our short test it was found to be awkward in use. You have to keep it in hand to be sure of instant availability, and it is bound to be lost on the flying field. In any case, a good old tommy bar would look so much more vintage. Please have second thoughts on this one, Gordon!

Price: to be announced. Further info from Gordon at 86, Tierney Drive, Currumbin, Queensland 4223, Australia.

New Burford 3.5, meant particularly for Vintage models, is a mixture of new and old. Cylinder assembly, with push-pull contra-piston, is distinctly state-of-the-art C/L style. Separate compression adjuster is an acquired taste!

The 3.5 maintains the Burford tradition of departing yet again from previous design types. Such a variety has come from this manufacturer — Sabre, Glo-Chief, Taipan, Doonside Mills, Deezil and Elfin replicas, to name the most famous. A sort of Aussie wanderlust through model engine types? All of uniformly excellent quality, though.

FREE FLIGHT SCENE

Dave Hipperson rounds up the rallies and we look back at earlier action from Oxford and Timperley

Ted Evans Wakefield Day: Barkston Heath, 30th October

It says much for this particular formula of contest that the concept has lasted almost uninterrupted since Bob Wells invented it back in the mid-seventies. True, there have been some adjustments to the original idea and main theme (with which, incidentally, Bob does not totally agree) but only to maximise entries. Central to the event is the Ted Evans Trophy itself which is still awarded for the highest performance by any model designed to fit the pre-51 Wakefield rules. However, this year's hosts, the Croydon club (in the form of David Beales) had added some notable extras. Realising that the main trophy would most likely go to an own-design model they presented the Fairlop Cup for the best Vintage model performance. More than that - they awarded beautiful perspex trophies to the top three in each class as well as the Croydon Thurston Trophy for F1B!

On the day the reins were handed over to the very competent team of Martin Dilly and Brian Spooner, who actually ran the contest. It may have been my imagination but these two dedicated FAI flyers seemed slightly ill-at-ease with what was ostensibly a Vintage event. Nevertheless, they managed excellently.

The weather co-operated too although the Barkston authorities could hardly have been said to do so. Officials from the compound insisted that the ideal siting of control was too near their perimeter fence and insisted that we fly elsewhere. (This is the fifth time we have had such difficulties at Barkston this year). With the drift light from the north-west, options were rather limited, and eventually the event took place over the south-west corner of the drome with a downwind line straight towards the control tower, a hangar and the line of trees that skirt the southern edge of the drome. This became a crucial factor for almost everyone as three-minute-flights would just reach these trees. It needed quite a bit more to clear them or a dropped flight to fall short. Hardly encouraging, and annoying as here we were on the main central venue in the country, easily big enough to retain the contest; and we weren't being allowed to use the site properly. Very silly.

With the calm - and clear blue skies - entries were massive. Flying was arranged in the usual three rounds for Vintage and four (to slightly different times) for F1B. With temperature hardly reaching the 50s those with Pirelli of reasonable quality were at an advantage. Certainly the F1Bs of Russell Peers, powered not only by Pirelli itself but the best there has ever been, showed a distinct advantage on the climb over everyone else. Flyers in the original eight-ounce Wakefield formula (the next-best-supported event after the modern class) were certainly having trouble scraping the maxes. Even Dennis Davitt's eventual winning total from his Yankee IV only included one max, and he too was on Pirelli. This would appear the most challenging of all the classes. It's quite amazing how many people fly eight-ounce when they could be flying in the older but much more agreeable four-ounce class. Here Bernard Aslett - the man that showed us all the potential of the wonderful 1936 Lanzo Duplex many years ago - was out again with his faithful, but now somewhat faded model. Both he, Michel and Hipperson made full scores - Hipperson also flying a Lanzo. He had a busy day, being the only person to compete in three events. A day very much a matter of 'wind it and chuck' for him; this was his undoing in F1B when he caught sink and dropped the third round. In the main the air was steady - less 'up and down' than last year as it was a good deal colder. However, many complained of a sort of inversion, or ceiling, at a hundred or so feet which restricted climbs. I am afraid it was more likely the effect of cold rubber...

By the end of the day only two had qualified for a flyoff in the Own Design class; Hipperson again, and O'Donnell. For John - the current holder of the trophy - this was his return to flying after dislocating his shoulder some weeks before when flying glider. Healing had been slow and he was only just able to manage the ROGs. His day didn't go without incident, for one of his flights hit the trees. John Pool's beautiful, geared model also finished up in an unclimbable tree after the second flight; so that was the end of his challenge. Phil Ball dropped his second flight and stopped and Stan Fairless retired after two maxes - presumably there was a disaster on the third.

In F1B Roy Miller dropped away, just one unlucky second short, on the very last flight after Gerry Pink had had a similar experience when he was robbed of two seconds by the downwind line of trees. This left only Greaves, Pollard and Peers with full scores.

Flyoffs started at 4pm with F1B and four-ounce Wakefield combined in the first fifteen-minute period. Greaves was away early in F1B and gliding in good air before Peers launched. His flight outclimbed anything I had seen in the class all day. This obviously good air tempted Hipperson to fly in Vintage; and soon after that Pollard launched. Incredibly, Peers' model came down from its tremendous height and could not beat Greaves' four-minute-plus. Pollard had left it too late and only just cleared 3:30. Hipperson's Vintage model was well away into its climb when he realised he had flown the wrong model! After a day of intense activity when there had been little time for anything but winding, flying and retrieving (with many of his flights right at the end of rounds) Hipperson had become confused as to the order of the flyoffs. He should have been flying his 4oz Lanzo - he had actually flown his own-design 8oz model! The problem now was that he had no reserve for the class, unless he flew his Korda which would be hardly competitive against O'Donnell's own-design model. Phil Ball immediately volunteered his express retrieving service and set off after the model, now well up without D/T fuse. Hipperson wound his 4oz Lanzo with a few minutes to spare, and it was away in another patch of good air. Between these efforts Bernard Aslett had also made a good flight.

By the next round Hipperson's OD model was hardly down, let alone back. To compound the problem it landed in the trees - his only flight from a dozen or so made during the day that did so. Ball therefore had to climb as well as run. He dropped the model down to Dave Greaves who was passing after his winning F1B flight. Ball's sprint had the model back with ten minutes to spare but

Ted Evans Wakefield Day 30th October

Own Design Box Wakefields to Pre-51 Rules (5 flew) for Ted Evans Trophy.

1	D. Hipperson	9:00 + 4:58
2	J. O'Donnell	9:00 + 4:49
3	S. Fairless	6:00
4	J. Pool	5:58
5	P. Ball	5:18

Box Wakefields: Pre-51 original designs (23 flew)

1	D. Davitt	8:30	Yankee IV
2	A. Wells	8:19	
3	S. Fairless	8:16	
4	C. Strachan	7:50	
5	M. Kemp (J)	7:02	
6	B. Platt	6:38	

4oz Wakefields – Vintage designs (14 flew)
Winner received Fairlop Cup for best Vintage Model

1	D. Hipperson	9:00 + 4:54	(Lanzo 35)
2	B. Aslett	9:00 + 3:52	(Lanzo 36)
3	P. Michel	9:00 + 3:16	
4	P. Ball	8:45	(Ying)
5	R. Alban	7:59	
6	A. Wells	7:20	

Modern Wakefield Formula: F1B for Croydon Thurston Trophy (31 flew)

1	D. Greaves	12:00 + 4:11
2	R. Peers	12:00 + 3:58
3	R. Pollard	12:00 + 3:36
4	R. Miller	11:59
5	G. Pink	11:58
6	M. Woodhouse	11:48

it was badly torn and the motor had shed strands. Phil insisted on repairing whilst Dave replaced the motor and wound. More strands went; so Phil was working on a moving target. Bob Wells, attracted by the clamour, offered to mend the motor; so it became a production line of winding, patching and tying. When the model eventually got away it was not wound well; neither were all the strands together, but the flying surfaces were intact. It didn't climb as well as before but whereas O'Donnell's model (which had probably flown for longer) was clocked off high over trees, Hipperson's found a gap through which it was timed virtually down to the ground. Not only that – the earlier flight wth the Lanzo had done five minutes and had won that class too. It was most sporting of Aslett to make no complaint when he could have protested that Hipperson had flown a model outside the specification and should not have been allowed to correct the error with another flight.

1988 SMAE Free Flight Forum

Last year's Model Engineer lectures are now available in printed form. The information gathered by Messrs. Woodhouse, Evatt, Pymm, Warren and Crisp last year

Left: Brian Lavis casts a critical eye over his Oxford Rally winning F1A. Above: Doug Tennant launches his Condor Clipper at the Timperley Vintage meeting on 25th September. Port leading edge appears cracked – but it's an optical illusion! Top right: Back at Oxford as Derek Wain lets the Bazooka go and, right: William Beales dispatches his winning Mick Farthing Lightweight. John O'Donnell photos.

is not only reproduced but expanded greatly. Mike Woodhouse explains the uses and application of such new materials as carbon fibre and Kevlar; Mike Evatt investigates electronic thermal detecting; Dave Pymm examines indoor prop design via computer experimentation; Mike Warren casts an eye at the World's Team selection techniques and Andy Crisp explains the history of the Chuck Glider. Altogether a very varied assortment, all put together most professionally by last year's Chairman and contributor, Mike Warren. Mike also adds some insight into what goes into the preparation of a paper, as an amusing introduction to the publication! The whole package is available for £5.00 in UK, £5.60 in Europe and £6.25 the rest of the world from Mike at 30 Cole Park Road, Twickenham, Middx TW1 1HS, England.

SMAE Results service extended

At this time of the year that I can remind you that I supply a results service covering all Area events. However, in future I shall be extending this facility to include complete results lists of all free flight SMAE events apart from the Nationals. Those interested should send me six SAEs, preferably 9x4in size.

Results will be despatched free of charge about a week or ten days after each Area event. Those Centralised events which have occured in the meantime will be automatically included in the envelope. In this way I hope also to run a constant check on exactly who has won what, and hopefully will be able to chase the distribution of plaques and trophies that may not have been given out on the day. In this regard will anyone who has not received a plaque for any SMAE event in '88 (and to which he is entitled) please contact me with details and I will chase it up!

Send SAEs and queries to D. Hipperson, 35 Anthony Road, Borehamwood, Herts WD6 4NF.

The Falcons Rally: Bottesford, 6th November

There is one thing worse than a howling gale at a free-flight contest. Thick fog! We don't have it often these days, but it came in earnest for the Falcons Rally – the day after Bonfire Night. Of course, the dry, settled weather had meant increased celebrations the night before, and huge bonfires across the country, burning late into the night, exacerbated the visibility problems the following morning when it dawned flat calm.

In the circumstances it was surprising that so many arrived on time for what should have been a 10am start. Obviously they were inspired by the forecast of calm. Visibility upwards was less than the length of a towline; horizontally, it was often worse. The large gathering had plenty of time to talk to one another for a change.

Because much of the field is recently-seeded farm land, John Carter, the CD, could hardly waive the timekeeper 'ten-metre' rule for fear of damaging the new crops – so timekeepers were unable to follow models. This made contestants even more reluctant to start. It began to clear just after 1pm when some trim flights were made; they all disappeared very quickly, even if their owners could keep them in sight. It was no longer flat calm. Drift was about 5mph; occasionally more. It looked pretty hopeless; then just before 2pm it cleared enough to allow cautious contest flights. As the event was to shut at 3pm this was the last opportunity to get the flights in so there was something of a scramble with the entire contest taking place in little over an hour. Mercifully the drift reduced so those models that did disappear could easily be found a few yards further on. It also allowed some competitors to fly in two events despite the shortage of time.

So flying was possible – maxing was more difficult. Anthony Ball had two maxes in Open Rubber, both of which came perilously close to vanishing. Then, to make sure on his third flight, he underwound substantially – and dropped the flight! His total was still enough to win. Gerry Ferer flew his original black and white Lanzo – the very model that impressed us all so much back in '79 and which changed Vintage contests overnight. The model still flies well – and well enough to take the contest with the only full score.

Terry Dilks flew his Challenger and Chris Strachan his red and white striped Lanzo. Everyone lost time in the fog. It really was rather hit-and-miss. The glider contest was vastly better supported. At its clearest the fog allowed a good zoom launch with safety. If that was executed well upwind of the timekeeper then the model was just about guaranteed to stay in sight. However, once again, only one person – Steve Philpott – managed a full score. At the close of the contest the air was probably clearer than it had been all day. Drift was so slight that approaching darkness would not hamper further flights too much so the organisers arranged an impromptu Champagne flyoff for all classes. Everyone could fly again! This was very popular. More than thirty entered and approached the unlimited flights with a variety of tactics. Pete Harris was first away in Power and judged it about right, staying in sight for a little over four minutes from the four-second engine run. Watson had a run of similar length but the model disappeared on the glide. Trevor Payne, with a second longer, achieved a perfect pattern to see the model vanish with the motor still running! He used his new super-light model as a reserve and got away to a shorter climb, stayed in sight but stalled slightly on the glide. Once again the most entries were in Glider. Steve Philpott won this too after recording the only treble max of the event. It really was his day. He flew from well upwind of most of the contestants to score well over four minutes. John Carter stranded-down his Open Rubber motor and flew on a gentle four-minute-plus run. Although the model certainly kept low enough to stay in sight it didn't get high enough to win; instead it wandered off and found a tree to land in, still only a hundred yards or so from the launch point. John O'Donnell's model stayed in view very clearly – he too was on a thin motor, not fully wound, but didn't do quite enough to beat Ball who was very lucky with his air. Three-quarters turns, a little buoyant patch and clear enough air all added up to a flight in sight for nearly seven minutes. Ferer and Strachan flew again in Vintage. Chris's model climbed beautifully and promptly vanished at little over 90 seconds. Gerry Ferer just kept his under the visibility ceiling to win for the second time with the same model. All this frenzied activity at the end of the day kept plenty of people interested (and warm). Therefore it was an ideal opportunity for a rather special prizegiving as everyone was back from their flights before anyone had thought of going home. The organisers built a makeshift rostrum on which the top three in each event stood in the time-honoured tradition whilst trophies and bottles were presented. Very neat and extremely popular. The rostrum had been built from John Carter's model boxes – still full of models. What devotion to duty!

Left: Ewan Jones prepares his .40 power model at the Falcons Rally. Cloudbase too low this time but craft has flown well at Northern Gala and Team Power events. Right: Steve Philpott's Dad prepares to launch Steve's experimental flat-bottomed-wing model on test.

The last existing example of a Phil Ball designed tapered-wing Open Rubber job – Brian Horsley flew this in the Champagne flyoff.

Falcons Rally
Bottesford
6th November

Open Glider (23 flew)

1	S. Philpott	9:00
2	J. Cooper	8:44
3	P. Stewart	8:37

Open Rubber (10 flew)

1	A. Ball	8:52
2	W. Beales	8:37
3	J. O'Donnell	8:35

Open Power (10 flew)

1	M. Lester	9:00
2	R. Monks	8:27
3	R. Peers	8:15

Vintage (9 flew)

1	G. Ferer	9:00
2	T. Dilks	8:59
3	C. Strachan	8:31

Champagne Flyoffs
Open Glider (16 flew)

1	S. Philpott	4:18

Open Rubber (5 flew)

1	P. Ball	6:46

Open Power (6 flew)

1	P. Harris	4:18

Vintage (5 flew)

1	G. Ferer	3:44

FROM THE HANDLE

Marvellous Magaluf!

Dick McGladdery reports an up-and-coming International...

Top: F2C Team Race finalists at Magaluf - Richard Salisbury, Andy Whorton, Steve Smith, Colin Brown, Bruno Delor, Roland Surugue. Above left: Guess what - it was warm! Andy Whorton prepares his familiar F2C contender. Finished third. Above right: Steve Smith, with rather more body covering, gets ready for final victory.

AFTER A contest season of frequently dismal weather, the prospect of a meeting in Mallorca (Majorca to you, John) was too good to miss. Ex-pat Scot, Ian Mackintosh of the Mallorca club, arranged accomodation for the Brit task force at Sole Hotel Don Manolo, positioned less than one kilometre from the flying site, and it was excellent value at about £11 per night including a very enjoyable buffet breakfast and dinner; very comfortable too with friendly staff, a nice bar and good swimming pool. The flying site itself was in the car park of Magaluf's Aquapark, a sort of adventure swimming pool, and Ian Mackintosh and other members of the Mallorca club had put in a prodigous effort to rope off pit areas, put up a safety net around the flying circle, erect a jury tower, and so on. The Aquapark company not only made the space available but also gave each entrant a free pass into the Aquapark itself. These were much appreciated and we all had a lot of fun on the water slides - the Super Kamikaze really gets the adrenalin going - and we also availed ourselves of one of the several bars dispensing fast food snacks, coffee and very palatable beer (Team Guzzle approved) and other beverages at very attractive prices.

Brits rule!

The contest itself was sadly only lightly supported; in fact, the British rather swamped the opposition with three teams in F2C and no less than five in F2A. France helped to swell the entry list with superfrogs Surugue/Delor in F2C and Jean Magne in F2A. Two days were allotted for the contest, allowing things to progress at a relaxed pace, which was just as well because old man weather was unseasonably nasty on the first day, laying on a very strong wind and a good deal of the wet stuff as well. However, it cheered up in the afternoon, so we got down to business with the first round of Speed. First to fly was Peter Halman, recording 279.72 kph with his Irvine 15R model. Using an old Irvinised (liner/piston/crank/rod) Rossi 15 borrowed from myself in a model hurriedly cobbled up from bits scrounged from various sources, Steve Smith was second fastest this round with 256.41; my Irvine 15 was rather lean and only managed 247.59 to move into third place; new boy Ian Mander was fourth with 236.22. Jean Magne suffered a broken crankshaft on his Moki, as did Juan Sancho with his OPS. Dave Brewin's Irvine 15R just seemed disinterested and poor Pujalte had been sidelined after his model collided with his own dolly after a practice flight. Jean Magne dug into his kitbag, came up with an ancient Rossi 15 and set about bolting it in for a spot of test flying in readiness for the next round.

Onto Team Race

The first round of F2C then followed. Suruge/Delor led with 3:36.5 from their modified Nelson powered wing, followed by Smith/Brown (3:38.4), Salisbury/Whorton (4:09,0), Fry/Brewin - Dave Brewin, standing in for AWOL superboozer Nigel Thorpe, managing a very creditable 4:23.30 with zero recent pitting experience and a rather obstinate Cippola - and Ebanas/Feiran on 4:51.2.

The next day, Sunday, was what we expect of Mallorca; hot, sunny and with minimal wind. We kicked off with the second round of F2A, Peter Halman consolidating his first place with 285.94 kph and Jean Magne clocking second fastest with 265.49. My Irvine 15R began to show something like its proper form with 258.44. Dave Brewin got his up to 256.23, and Ian Mander improved to 242.10.

The second round of F2C was then flown off, Smith/Brown getting a near-perfect run to record the fastest heat time of 3:29.2. Surugue/Delor more or less equalled their first round time with 3:36.0, and Salisbury/Whorton pulled their socks up to 3:39.6. The third and fourth rounds left these three all qualifying for the final without improving on their previous times.

Superior speed

The last round of F2A saw Peter Halman drive home his superiority with a new British record of 288.92kph. Jean Magne was slightly slower than in the second round, but by now Dave Brewin had found the reason for his motor's rather sleepy performance - it had

F2A

			1st Flight	2nd Flight	3rd Flight	Best
1	P. Halman	GB	279.72	206.94	288.92	288.92
2	J. Magne	France	-	265.49	255.49	265.49
3	D. Brewin	GB	256.41	256.23	265.29	265.29
4	S. Smith	GB	247.59	-	258.99	258.99
5	D. McGladdery	GB	236.22	258.44	254.78	258.44
6	I. Mander	Spain	Rtd.	242.10	240.96	242.10
7	J. Sancho	Spain	-	-	-	-
8	A. Pujelte			-	-	-

F2C

			1st Heat	2nd Heat	3rd Heat	4th Heat	Final
1	Smith/Brown	GB	3:38.4	3:29.2	3:40.5	-	7:18.7
2	Delor/Surugue	France	3:35.6	3:36.0	4:6.5	3:44.6	169 laps
3	Salisbury/Whorton	GB	4:9.0	3:39.6	Disq	-	165 laps
4	Florit/Crespi	Spain	Rtd	Rtd	Rtd	4:01.0	-
5	Fry/Brewin	GB	4:23.3	Rtd	5:24.1	-	-
6	Elanas/Ferran	Spain	4:51.2	Rtd	Rtd	4:44.0	-
7	Fits/Bellot	Spain	-	-	-	-	-

Part of the prizegiving. Ian Mackintosh, left, UK contact man in Spain, looks happy with the proceedings.

lunched on a gudgeon pin circlip. Fortunately replacement parts were obtainable from Peter Halman's box, and after field repairs Dave recorded 265.49 kph, third fastest at only 1/100 sec. slower than Jean Magne. Steve Smith also improved to take fourth spot with 258.99.

The F2C final, as usual, provided the climax for the meeting. All got away quickly, but Salisbury/Whorton's Cippola was too cool and spent the first twenty or so laps 'burping' itself to a sensible temperature. Meanwhile Smith/Brown seemed to have a slight edge over Surugue/Delor and began to build a small lead. Around three-quarters distance, however, Salisbury/Whorton appeared to be pulling up with the other two teams, and a close finish was in prospect. Then, suddenly it was all over; Delor/Surugue suffered an unexpected engine cut as Salisbury/Whorton were coming fast, low and just behind; Salisbury shot under Delor, and both models bit the tarmac in the ensuing line tangle. This left Smith/Brown to romp home unpursued. A great shame, this, but it was one of those split-second situations requiring luck as well as skill in order to escape from it; and this was luck's day off.

Most entrants had one or more days to spare after the competition; useful to get down to some good solid loafing around in the sun, and this was when the free passes into the Aquadrome were most appreciated. Some are still there even as I write this report, touring and availing themselves of the balmy weather and other delights that Mallorca offers. Same again next year? I hope so - and also that this super event attracts much more international support, which it richly deserves. I would love to see this event become an annual alternative Euro or World Champs, so c'mon you Europeans; let's see more of you in '89!

...and Ian Horne examines plug-in undercarriages for racers

Many control-line models which are operated from hard surfaces are fitted with a wire tailskid which is just glued to the fuselage. This method, whilst undoubtedly simple, makes a mess of the model finish when replacement is needed because of wear or breakage.

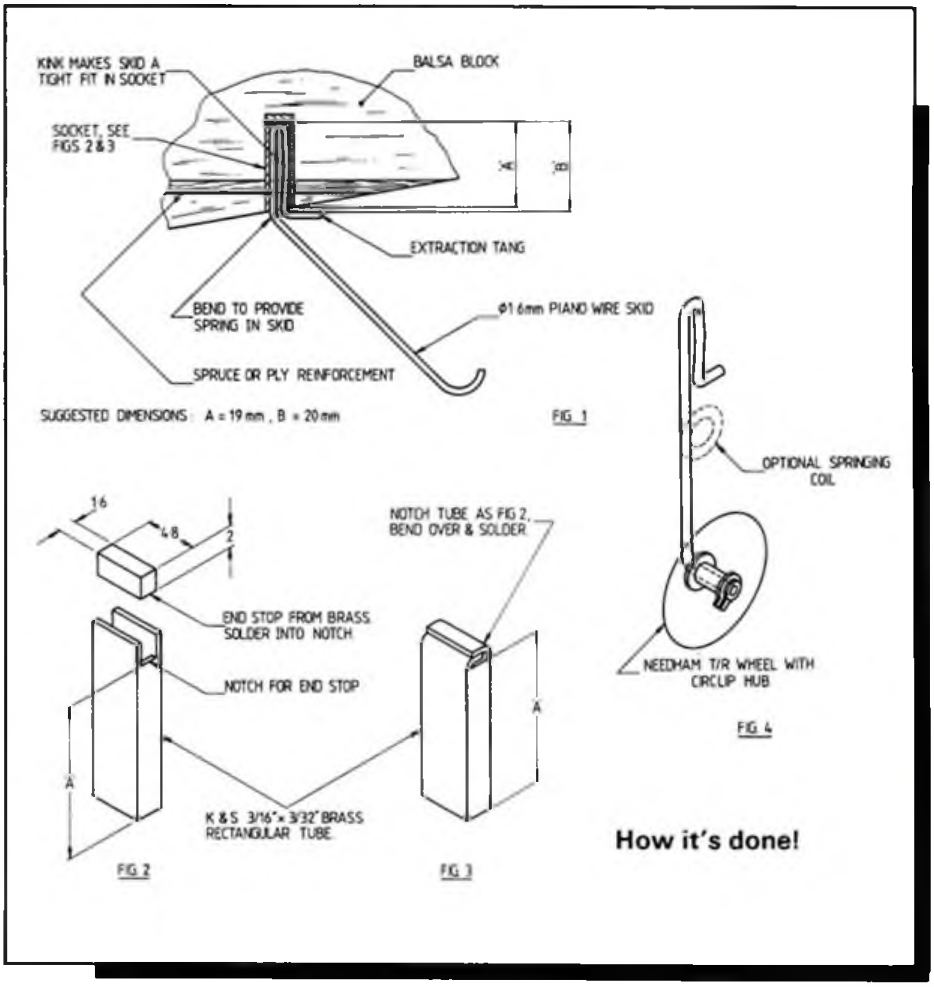
A better arrangement is to make the wire skid into a plug-in replacement as shown in Fig 1. A short length of K&S 3/32 x 3/16in rectangular brass tube is provided with a closed end as shown in Fig 2 and Fig 3 to make a socket with an internal length of 'A'. The socket is externally abraded, degreased and epoxied into block balsa at the rear of the fuselage. The balsa should be reinforced with a strip of spruce or ply to prevent it splitting in the event of a hard landing.

The skid is bent from 1.6 mm. (16 swg) piano wire, commencing with the tang. It is important that the plug-in length of the skid 'B' is longer than the socket length 'A' in order that landing loads are taken by the closed end of the tube. The tang is necessary to extract the plug-in part from the socket should the skid fatigue at the spring bend.

Undercarriage legs

Fig 4 shows an arrangment which is currently used on some FAI team racers. For such lightweight models, a leg of 2.6 mm. (12 swg) piano wire can be used but heavier models, such as Open Goodyear, should use 3.2 mm. (10 swg) wire. There is no conveniently sized brass tube for these wire sizes so it will be necessary to form something from brass sheet, tin-plate or by deforming a suitable size of round tube.

For very heavy models, such as those used in aerobatics, a springing coil should be wound near the point where the leg exits the airframe. A further benefit of this idea is that the undercarriage is easily removed so that the model is more compact for storage and transportation.



WHAT'S ON

28th January
WIGAN INDOOR MEETING FF
Venue: Wigan Technical College Sports Hall, New Market Street, Wigan. 10am - 4pm. Fun-fly and P15 Duration. Contact: Peter Dean Tel: 0772 731127. **This is a Saturday meeting.**

25th March
WIGAN INDOOR MEETING FF
Venue: Wigan Technical College Sports Hall, New Market Street, Wigan 10am - 4pm. Fun-fly and P15 Duration. Contact: Peter Dean Tel: 0772 731127. **This is a Saturday meeting.**

19th February
BMFA WINTER OPEN EVENT FF
Venue: Bottesford. O/G, O/R, O/P, SOP, Vintage.
Contact: BMFA.

19th March
BMFA AREA CENTRALISED EVENT FF
Venue: Areas. F1A for KMAA and Plugge points;
O/R and O/P for Frog Senior. Contact: BMFA.

19th March
BMFA FIRST CENTRALISED EVENT C/L
Venue: 3 Sisters. F2B, F2C, Open GY and British GY.
Diesel A and 1/2A Combat. Contact: BMFA.

25-26th March
BMFA EASTER MEETING FF
Venue: Salisbury Plain Training Area 10.
Saturday: F1A, F1B, F1C (F1B for Duce Trophy) - first four rounds. Sunday F1A, F1B, F1C - final three rounds; O/G, O/R, O/P.
Contact: BMFA.

2nd April
BMFA SECOND CENTRALISED MEETING CL
Venue: 3 Sisters. F2B, F2D, F2C Team Trials for 1989
Eurochamps (invitation only). Contact: BMFA.

8th April
WIGAN INDOOR MEETING FF
Venue: Wigan Technical College Sports Hall, New Market Street, Wigan. 10am - 4pm. Fun-fly, EZB and HLG. Contact Peter Dean Tel: 0772 731127. **This is a Saturday meeting.**

9th April
PETERBOROUGH MFC SPORT AND VINTAGE DAY FF, CL
Venue: The Embankment, Peterborough. 10am start. C/L: Old Time Stunt, Midge Speed, Yoicks Comp, Vintage A and B T/R, Vintage Concours, Fly for fun (mown grass circle). F/F: Jetex, KK/Veron/Stahl flying scale rubber, concours, small-field fly-for-fun. C/L Contact: Mick Taylor 0733 204484. F/F Pete Gibbons. Tel: 0733 314741.

9th April
BMFA SECOND AREA CENTRALISED EVENT FF
Venue: Areas. F1C for Halfax Trophy and Plugge points.
O/G and O/R for Gamage Cup.

23rd April
SPRING MINI AND VINTAGE MEETING FF
Power, HLG,
Vintage, SOP. Contact: BMFA.

23rd April
BMFA INDOOR SCALE NATIONALS FF
Venue: Alumwell Centre, Walsall. M6, junction 10. 8.30 to 5.30. Peanut, Open Rubber, CO_2/Electric, Air Racing. Pre-entry only by 31st March.
Fun events for Kit Scale and Jet subjects - entry on the day. Talks and demonstrations; large static display. SAE to Doug Sheppard, 13, Luckington Road, Monks Park, Bristol, Avon BS7 0UT. Tel: 0272 697505.

30th April
WITHAM CUP C/L AEROBATICS EVENT CL
Venue: Slip End recreation ground, near Luton. F2B, Class 2 Aerobatics. Contact P. Burgess via Glen Alison on 0923 772675.

29-30th April, 1st May
BRISTOL AND WEST WOODBURY WEEKEND FF
Venue: Woodbury Common. Saturday: Champagne Flyoffs in O/G, O/R, O/P; also Vintage. Sunday: O/G, O/R, O/P, Vintage to SMAE rules. Monday: Five-round combined FA1; Vintage to South Bristol rules. Contact: Elton Drew.
Tel: 0454 415092.

7th May
THIRD AREA CENTRALISED MEETINGS FF
Venue: Areas. F1B for Weston Cup and Plugge points; O/P for White Cup; O/G.
Contact: BMFA.

7th May
THIRD BMFA CENTRALISED MEETING CL
Venue: Hullavington. F2B, F2C, Open GY, British GY, B T/R, F2D, Handicap Speed.
Contact: BMFA.

27-29th May
BMFA BRITISH NATIONALS FF
Saturday: A/1 for British Airways Trophy. CDH for 308 Trophy, 1/2A Power for Hales Trophy, HLG for HLG Trophy CO_2 for Sparklets Trophy.
Sunday: O/G for Thurston Trophy, O/R for Model Aircraft Trophy, O/P for Sir John Shelley Trophy, Vintage for Jubilee Trophy, Women's Cup, Junior Open for Frog Junior Trophy.
Monday: F1A for Ronytube Trophy, F1B for Boxall Trophy, F1C for Eddie Cosh Trophy) FA1 events start at 6am), SOP for Falcons Trophy, Tailless for Lady Shelley Trophy.

3-4th June
3 SISTERS GALA CL
Venue: 3 Sisters. Open Speed, F2B and Class 2 Aerobatics, F2C, Open GY, British GY, A Combat, F2D Vintage A and B T/R, OTS, Midge Speed. Contact: John Noble. Tel: 061-790-4056.

11th June
FOURTH AREA CENTRALISED MEETING FF
Venue: Areas. SOP for Astral Trophy, O/G for Plugge points and Model Engineer Trophy for teams. CDH. Contact: BMFA.

18th June
CHILTERN CUP C/L AEROBATICS EVENT CL
Venue: Slip End recreation ground, near Luton. F2B, Class 2 Aerobatics, Vintage Aerobatics. Contact Rex Landon via Glen Alison on 0923 772675.

18th June
F1E TRIALS
Venue: Sheffield. Contact: BMFA.

2nd July
FOURTH BMFA CENTRALISED (PROVISIONAL) CL
Venue: TBA. F1B, F2C, Open GY, British GY, F2D, Handicap Speed. Contact: BMFA.

9th July
BMFA SUMMER MINI MEETING FF
Venue: Barkston Heath. A/1, CDH, HLG, 1/2A Power, Experiment Mini Vintage (small cash prizes) not plaques; does not count towards Senior Champs points.
Contact: BMFA.

22-23rd July
BMFA SHOW (PROVISIONAL)
Venue: Middle Wallop. Contact: BMFA.

26-30th July
1989 CONTROL LINE EUROCHAMPS CL
Venue: 3 Sisters. Contact: BMFA.

30th July
BMFA CLUB CHAMPS FF
Venue: Driffield. O/G, O/R, O/P for Club Champs. Contact: BMFA.

30th July
SHUTTLEWORTH MODEL GROUP OPEN DAY FF,CL
Venue: Old Warden Airfield, Biggleswade, Beds. 9am - 6pm. General model flying of all types. Contact: Mick Staples. Tel: 0223 241978.

27-29th August
BMFA RADIO CONTROL, CONTROL LINE AND SCALE NATIONALS (PROVISIONAL)
Venue: Barkston Heath. Details to follow.
Contact: BMFA.

1st September (Friday)
BMFA SOUTHERN GALA FF
Venue: Little Rissington. O/G for Pilcher Trophy, O/R for Flight Cup, O/P for Short Cup, 1/2A for Quickstart Trophy, CDH, HLG.
Contact: BMFA.

3rd September
SHUTTLEWORTH MODEL GROUP SILENT DAY FF
Venue: Old Warden Airfield, Biggleswade, Beds. 9am - 6pm. All types of model flying but no i/c engines. This includes ground running! Contact Mick Staples. Tel: 0223 241978.

10th September
BMFA FIFTH AREA CENTRALISED EVENT FF
Venue: Areas. O/P for Plugge points and Keil Trophy for Teams, F1B for Gutteridge Trophy. A/1. Contact: BMFA.

17th September
BMFA NORTHERN GALA FF
Venue: Driffield. O/G for CMA Trophy, O/R for Caton Trophy, O/P for Hamley Trophy. Contact: BMFA.

17th September
BMFA FIFTH CENTRALISED EVENT CL
Venue: Hullavington. F2B, F2C, Open GY, British GY, 1/2A, T/R, F2D. Contact: BMFA.

24th September
DOUG BLAKE TROPHY C/L AEROBATICS EVENT CL
Venue: Slip End recreation ground, near Luton F2B, Class 2 Aerobatics, Vintage Aerobatics. Contact: Glen Alison. Tel: 0923 772675.

24th September
BMFA SIXTH AREA CENTRALISED EVENT FF
Venue: Areas. O/R for Plugge points and Farrow Shield for Teams, F1A for SMAE Cup, 1/2A Power. Contact: BMFA.

7-8th October
BMFA FIRST EUROCHAMPS TRIALS CL
Venue: TBA. F1A, F1B, F1C. No trophies. Possible 8am start. Contact: BMFA.

15th October
F1E EVENT SHEFFIELD FF
Venue: Sheffield. F1E for CMC Trophy.
Contact: BMFA.

15th October
BMFA SIXTH CENTRALISED EVENT CL
Venue: 3 Sisters. F2B, F2C, Open GY, A and 1/2A Combat, Handicap Speed. Contact: BMFA.

21-22nd Octonbr
BMFA SECOND EUROCHAMPS TRIALS
Venue: TBA. F1A, F1B, F1C. Contact: BMFA.

FF suffix to event title indicates a free-flight contest; CL indicates control line. BMFA contacts are: Ian Bracken on 01-263 9849 (FF) and Richard King on 01-890-4504 (CL). For more details check with Free Flight Scene and From the Handle columns where frequently updated information will appear.

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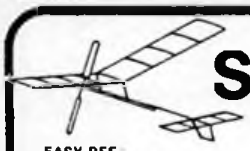

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The original issue comes with two free plans (Whoopee, Annular Monoplane) printed front/back on a pull out banner of four sheets. The banner is not included in the document.

Blue Pants (revisited) by Henry Stouff
CL Stunt model
https://outerzone.co.uk/plan_details.asp?ID=3491 ...
Document Page: 10

Whoopee by Robin James
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Modern Boy - Aeroplane 1929 by F.J. Camm
Card model from 1929 Modern Boy Magazine. Presented in VINTAGE MODEL. Plan in A4 size to be enlarged in A3 Size. Drawing by Norman D. Peacock dated 1988
https://outerzone.co.uk/plan_details.asp?ID=2179 ...
Document Page: 37