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MODELLER



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Cover: What better time than now - with the C/L Eurochamps just around the corner - to feature Ken Morrissey's magnificent 10cc speed model on our cover? This World record holder has hit 216 mph with every prospect of more to come. Fancy speed? Our special feature on fast flying starts on p.366.

ASP

Argus Specialist Publications

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ISSN 0001-9232

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HANGAR DOORS

Go to the Eurochamps!

Put 26-30th July in the diary now, if you haven't already done so, for the 1989 European Control Line Championships take place between those dates at the Three Sisters site at Wigan. Team Manager Dave Rudd will be leading the British contingent hopefully to victory against the best of European opposition. Good reason to anticipate, too – remember the splendid Kiev World Champs achievements of Neil Gill, splitting an expected Russian 1-2-3 in Combat; and Pete Halman's fastest-of-the-Westerners in speed. Remember, too, the Eurosuccess of Steve Smith and Colin Brown in Team Race back in '85. Don't miss the Eurochamps – check out the map, go along and shout for the Brits! U.K. Team details as follows:

F2A Speed:
Pete Halman, Paul Eisner, Dick McGladdery.

F2B Stunt:
Tony Eifflaender, Bill Draper, Barry Robinson.

FOIL FOCUS

Heading: Stylish logo for the '89 C/L Eurochamps. Be at Three Sisters from 26-30th July and cheer on the Brits! Above: Apt title for F1C topics – see text.

F2C Speed:
Smith/Brown, Sladdin/Gardner, Langworth/Campbell.

F2D Combat:
John James, Mervyn Jones, Tony Frost.

Making youngsters into local heroes?

Virtually everyone with a long term interest in model flying is concerned about recruiting newcomers. With the wide variety of interests put before today's young people, it's not easy to promote the activity of flying model aircraft, even though it has plenty of glamour and excitement.

With the aim of 'catching them

young', the organisers of the Model & Craft Show have come up with a novel idea: young people coming to Shepton Mallet on 24/25th June will be given what will be for many their first chance of flying a control line model – and in the main show ring!

During the weekend, a wide variety of C/L models normally flown over grass, including combat and vintage combat, as well as the young flyers' training aircraft, will be occupying three flight circles in the ring, which has its own covered seating accommodation for spectators. Regardless of the success (or otherwise) of the neophyte flyers, it's hoped that it will encourage anyone with an interest in model aeronautics to persevere and take up some branch of the activity, even if not control line – though a better starting point would be hard to find.

Among the other prospective events on display, it is hoped that there will be a chance for some youngsters to build and fly simple

models on site. Again, the intention is to help people 'catch the bug' of model flying.

As well as an organised competitive indoor duration event on the Sunday, other indoor activities planned include Round the Pole flying by members of the South Bristol club.

For further details of these and other events due to take place at the Model & Craft Show '89, please contact: Glenda Bracken, 1 Didbin House, Mingard Walk, London N7 7RT; or telephone 01-263 9849.

Foil publicity

The March 1989 issue of Foil Focus, British Alcan's house magazine, gave some useful publicity to foil-wing F1C craft – in particular, Stafford Screen's efforts in this field.

In order to avoid having to import wing-covering foil from Russia, approaches were made to British Alcan, and after investigation, this company's 5052 foil

Left: Fullsize flavour at Fairford – the '89 International Air Tattoo promises noise and blast on the weekend of 22-23rd July.

1989 EUROPEAN CONTROL·LINE MODEL FLYING CHAMPIONSHIPS



THREE SISTERS
WIGAN
GREATER
MANCHESTER

– developed for full size airframe work in honeycomb structures – was actually superior. Stafford's achievements, and hopes for the 89 World Champs, actually taking place as these words are written, are stressed. And as so often happens, the models are described as 'engine-assisted gliders'...

Free Flight views!

Twenty years of Free Flight News has been marked by the publication of a twelve-page photo supplement. Sent out with the May edition of this monthly newsletter, the supplement contains more than two dozen photos of key men and models from the British and World free flight scene since 1969. And on the front cover – coincidentally – is an action shot of *Aeromodeller* ex-editor Martyn Cowley.

A few spare copies of the supplement are available to non FFN-subscribers and can be obtained by UK readers by sending £1.00 to Michael Warren at 30 Cole Park Road, Twickenham, Middlesex TW1 1HS.

Twenty years! Ian Kaynes has been the driving force since the first edition – wonder how many hours he's spent at the typewriter and the word processor?

Changes at Alumwell

23rd October is the date of the next Indoor Scale Meeting at the Alumwell Centre, Walsall. Full details next month in What's On. Competitions for Peanut, Open Rubber, CO₂/Electric and Air Racing will be augmented by fun flyoffs for Jet subjects and Kit Scale. There are a couple of experimental rule changes. Open

Rubber and CO₂/Electric will be for a minimum of three flights and no attempts. The Air Racing final will be run for ten minutes, placings to be decided on laps completed in that time. Heat times will be taken into consideration in the event of ties. More gen from Doug Sheppard on 0272 697595.

Rocketry update

Mike Pay, from C.P. Associates (UK importers of Estes Model Rockets) tells us that Free-wheeler/CPA will be sponsoring the BSMA team at the International Model Rocket Festival in West Germany on 16-18th June. We also learn that the Health & Safety Executive Committee are currently reviewing the position

How to get to Three Sisters for the C/L Eurochamps...



on D-class motors. It is hoped that these high-power units will be in the country by the end of the year.

Aerostar result

Remember our appeal for Aerostar C/L aerobatic model drawings in the May issue? Michael Gagg came up trumps with a full set which we are happy to pass on, as desired. Well done! Michael still flies his own Aerostar, fast with OS Max-S 35.

RGM throttles back...

After more than thirty-nine years, spanning Eaton Bray to Argus House and Editorial Assistant to Editorial Director, Ron Moulton retired from ASP service on 15th May. Actually, we'll believe 'retirement' when we see it, for we expect simply a change of focus to RGM's contribution to the world of modelling. But let's hand over the Hangar Doors controls to Ron himself for a moment, taking the opportunity to add *Aeromodeller's* own, personal good wishes for the future...

Not D/T'd - just floating down Like shedding winter clothing, or a business suit for summer wear, the prospect of no longer having a direct responsibility, coupled with the freedom to decline a request will bring welcome change in lifestyle. But after 39+ years the reminiscences are so numerous that complete severance is impossible.

Retirement is all the more acceptable when spirits are high and the cogs grind smoothly. Eaton Bray seems a distant memory, after several moves at Watford and Hemel Hempstead addresses though fortunately not so strange since the same original spirit still pervades with identical enthusiasm for aeromodelling.



Spoo! Aeromodeller cover presented to Ron Moulton on his retirement from full-time active service with ASP was also used as the menu cover at his celebration dinner. And for the gourmets amongst you, here's a look at the delights a table. Fillet of Salmon Fairlop, indeed...

Forty years back the office walls were whitewashed breeze-blocks; ceilings corrugated asbestos roofing and heating came from salvaged Army coke stoves. A far cry from the suspended tiles, flush lighting and central heating of brand new Argus House.

Printing methods too have changed, more for economics than quality and the age of industrial specialisation has imposed staffing changes. More people, different functions, extra departments; the age of the universal person exists no longer.

What else should one expect from close to four decades of progress? The emergence of a thirty-title publishing group out of the three from our first stable at Eaton Bray "Sportsdrome" is

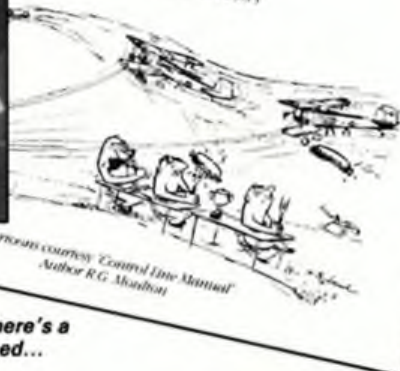
typical of everything that ought to happen in any progressive company over that period. The real point is that each of the 30 titles represents a treasury of enthusiastic readers all totally involved in their favourite subject, demanding the best of information. Provide for them in publishing and you succeed. If you don't, then circulation is strangled and the title simply dies.

In the midst of change Aeromodeller maintains a unique position which survives the electronic age. The bonds of free flight and control-line are too tough to sever and have been strengthened by returnees to the fold seeking old favourites now classified as 'Vintage'. For myself this is the most appealing aspect of freedom from the office desk.

Our French friends have a most appropriate expression for the feeling which is encapsulated in the one word 'Retro'. It'll be great to get back to free flight scale, to toy with those designs which offer many fondly remembered highlights using R/C assist of course to bring 'em back alive. Recollections of chasing four-minute maxes in the 50s recalls that feeling of dry chested breathless frustration - a state of exhaustion which I'd rather leave to the young!

So many readers have already discovered the delights of Retro. It refreshes parts that sophisticated latter day creations simply cannot reach and I look forward to the opportunity of my own relaxed mid-week flights with anticipated pleasure. See you on the flying fields! **RGM**

MENU	
SANDOWN SOUP	Cream of spinach and bacon garnished with nutmeg
CRANFIELD	CHAMPAGNE SORBET
FILLET OF SALMON	FAIRLOP
Served with dill sauce and seasonal vegetables	
OLD WARDEN BOMBE	Hazelnut faced with Grand Marnier
EATON BRAY BREW	Coffee with mints
TOLEDO TIPPLE	Liquors
FUEL	Seave Classico 1987
	Rioja Don Jacoba 1985



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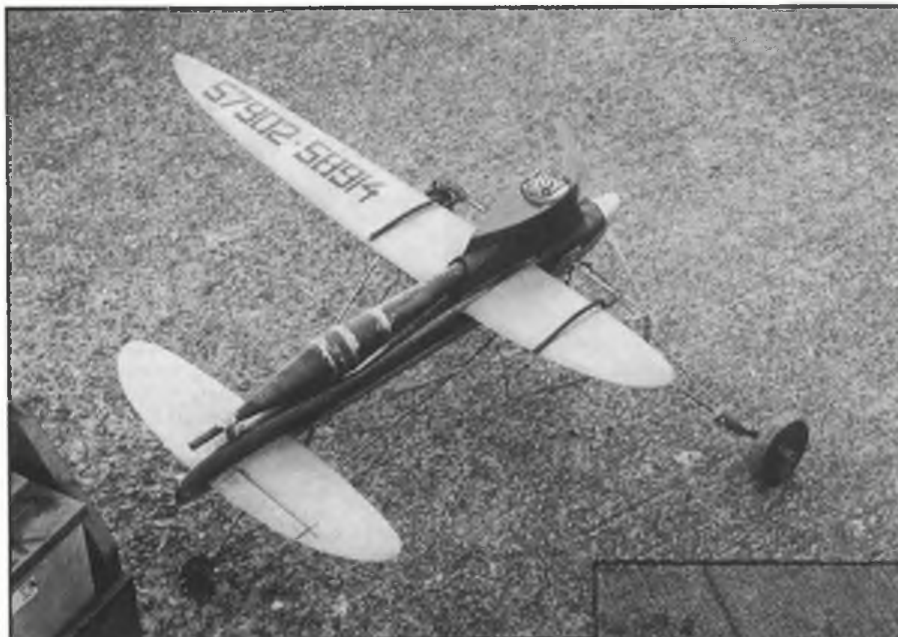
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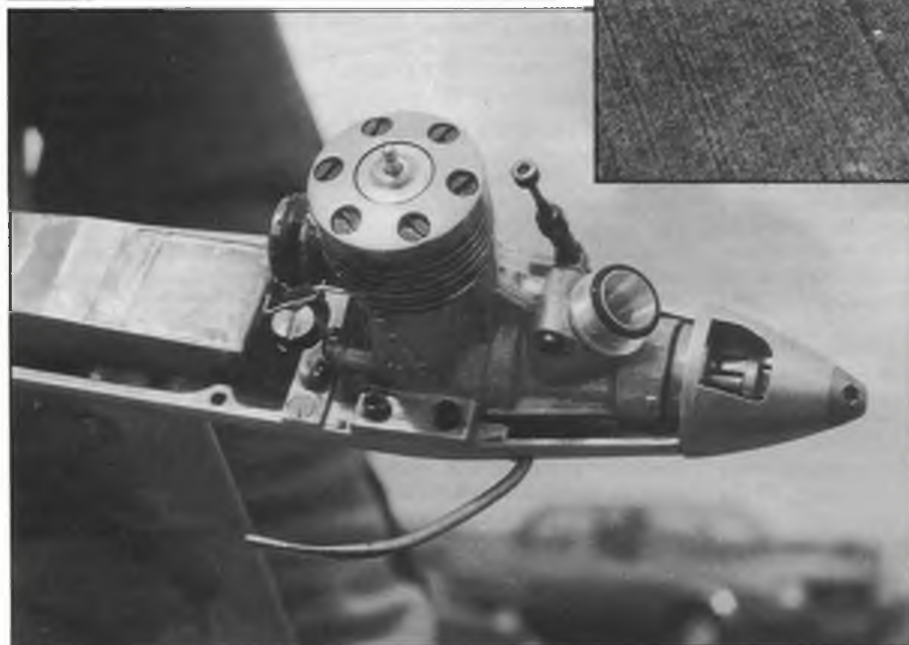
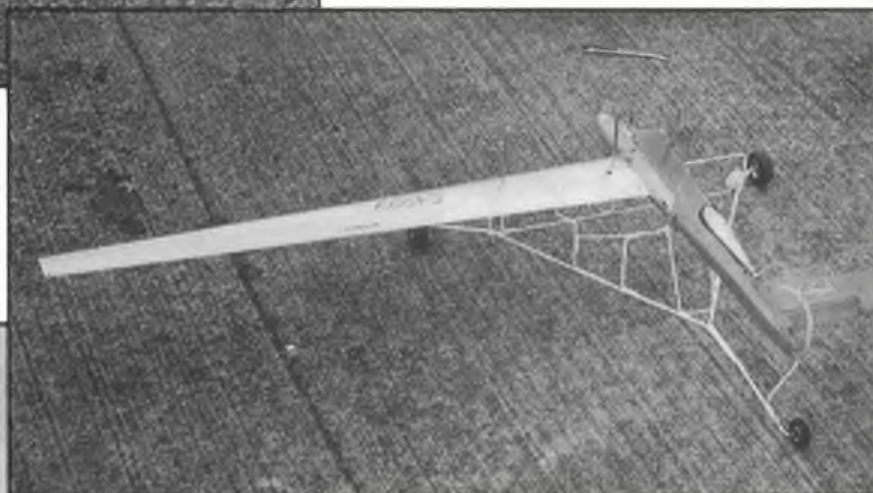
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Above: Attractive 'semi-asymmetrical' Class 6 model by Joe Myszka and John Allcock is Super Tigre X40 powered. Steel pipe home-built by John. Best official flight: 170mph approx. Right: Formula 21 craft by Frank Chambers of the Dalston Club has clocked 160 mph.

Below: Rossi .15 is a long-favoured FAI class motor; British Irvine 15RE now holds supremacy.



Dick McGladdery

summarises 'state of
play' speed
achievement...

What's allowed?

'Open' classes can use two-line or monoline control line systems. Groupers are allowed on two-liners and fuel is unrestricted, apart from the fact that nasties like dioxan and nitrobenzene are positively prohibited. The FAI-F2A class is restricted to two ungrouped 0.4mm lines and straight methanol/oil fuel. 'Formula' classes are also restricted in the lines department (class 8, F40 wires have to be 0.45mm diameter) but fuel is unrestricted in the same way as the 'open' classes. In competitions, an individual can enter as many classes as he likes for one entry fee, and in each class he gets three 'official' flights, for which he can have a maximum of two attempts each; that is, if a time is recorded on the first attempt, an 'official' flight is recorded and the second attempt is discarded. If no time results from the first attempt, then the second attempt can be used; if this also results in no recorded time, the flight is lost altogether.

What's what?

The 0.9cc and 1.5cc classes (commonly tagged .049 and .09 in conversation) have been dominated for many years by the formidable duo of John Allcock (pilot) and Joe Myszka

CONTROL-LINE speed in the UK is comprised of a multiplicity of classes, with engine capacities from .049 up to .60, different line lengths (though all are timed over a one-kilometre course) and, until the end of this year at least, a complex system for sizing the diameter of control lines according to model weight. As if all this is not enough, some classes are limited to an ungrouped two-line control system using wires of a specified minimum diameter. Furthermore, the entry at speed contests has hovered around 15 for years, giving only about 1.5 entries per class, so for a long time now, all contests have been organised on an index basis, each entry's speed being expressed as a percentage of the appropriate class record, and placings decided according to the percentage scored.

The index system is a bit of a nonsense in some ways - for instance, the extraordi-

nary performance of F2A (SMAE class 4) models is entirely negated when converted to a percentage of the (very daunting) Class record. However, the index system makes some kind of national contest possible, and no-one has managed to come up with a better idea. Having set the scene, here's a compressed resume of the speed classes as of April 1989. Some class records may have been raised by the time of publication.

UK Speed categories

Class	Capacity	Line Length	Laps/Km	Record mph	Notes
1	0-0.9cc	13.26 metres	12	102.15	Open
2	0.95-1.5	14.47	11	139.99	Open
3	1.51-2.5	15.92	10	192.52	Open
4	0-2.5	15.92	10	179.56	FAI-F2A Class
5	2.51-5.0	19.90	8	185.03	Open
6	5.01-7.0	19.90	8	187.20	Open
7	7.01-10.0	19.90	8	215.93	Open
8	0-7.0	19.90	8	172.74	Formula
9	0-3.5	15.92	10	164.00	Novice
10	0-3.5	15.92	10	176.45	Formula
11	Jet	19.90	8	159.67	Open

FROM THE HANDLE

Speed scene Special



Maurice Roberts with sensible first speed model, a Kingfisher with Irvine 21R on mini-pipe.

(spanners). Their records of 102 and 140 mph were achieved by dint of much work on the motors by Joe, and John had exceptional ability to fly their monoline, symmetrical models in all but the roughest UK weather. The 049 record was set with a Tee Dee 049 fitted with sundry goodies from the USA; however, this motor is fragile when pushed hard, and considerable carnage was wrought on crankshafts and ball/socket little-end bearings, which are marginal on the stock engine, let alone a tuned one burning lots of nitromethane supplied under pressure from a bladder tank.

On the other hand, the 09 (1.5cc) power plant was a Webra Speedy sleeved down from its normal 1.8cc to 1.5, with steel liner/piston sets made by Joe and developed steadily over a period of five years or so. This progressively

John Allcock with all-conquering .09 winner at the '88 Nats. 140 mph achieved!



nudged the record up from around 120 to the present 140 mph, winning many Index contests in the process, not to mention several Nationals – just reward for a lot of diligent work. Sadly, John and Joe seem to have deserted us for the pleasures of blasting clay tweeters, so these classes are deserted for the moment.

The way ahead must be that demonstrated in the USA last year by Charlie Legg. His 049 model and motor are virtually scaled-down F2A units, eschewing the venerable Tee Dee for a twin ballrace barstock case, Schneurle ported and piped engine. This had been done before, with unimpressive results; and, indeed, Charlie's machinery took a year or so to sort out, but when he got it right, he lifted the US record out of sight – from about 130 up to 144 mph in one bite! The model is of typical asymmetric F2A layout, with generous flying surface area. It uses monoline for control, which under US rules

has to be flown on much heavier wire than the UK rules require. The motor revs around 40,000 on its 2.625 x 5 prop, running on a fuel mixture of 70% nitromethane/15% propyleneoxide/15% oil (this only works in very dry atmospheric conditions) drawn from a suction/uniflow tank.

The prop actually starts life as a 6x4 Rev-Up with one blade chopped off and a counterweight to replace it. Anyone wanting further gen should join the North American Speed Society, Box 82294, North Burnaby B.C. Canada V5C 5P7 (24 hour telephone hotline number 604 299-4500) if you're eager) and get the October-December 1988 issue of *Speed Times*. Apart from a fuller report on Charlie Legg's machine, it has lots of other news and useful gen – if you're serious about speed, join up!

And watch out for the next issue of *Aeromodeller* which will continue our look at the speed scene here in the UK.

... and continues with a look at the First

Centralised meeting at Bicester on 16th April

IN SPITE of dull, windy and bitterly cold weather, over fifteen stalwarts converged on the Piddington parade-ground for their first foray of the year, hoping the forecast was wrong – but it wasn't. Whilst half opted to preserve their equipment for more favourable conditions, the rest defied the grinding cold and put up some remarkable performances.

First up, and ultimate handicap winner was Peter Halman, using last year's Irvine 15RE model in preference to his new lightweight Russian-influenced job which had been flown for the first time only a couple of weeks before. The old nail was quite sufficient for the job, though, clocking 174.92 mph on its best official run.

Next came Des Ratcliffe with his OPS powered Formula 21 model, but he fell victim to the wind, coming off the dolly too steeply, getting far too high and returning to earth close to his take-off point. The model was badly damaged, but looked repairable; however, it was a workshop job rather than a field one. Ian Mander fared hardly any better with his very smart Irvine 15RE powered F2A model, Russian influenced and featuring a home-turned alloy pan with integral, rolled plywood tailboom. He got into the air without trouble but F2As are sometimes a bit dozey

until they are travelling fast enough for sufficient fuel to be pushed to the motor by centrifugal force, and Ian fell into the trap of trying to whip up to speed by trotting backwards – a quick glance around to locate the pylon entailed a momentary relaxation of whipping, and the wing got under the model's tail and planted it on the ground in a trice.

Ian was less lucky in the damage department, the lightweight model being fairly comprehensively wrecked. Nothing daunted, though not without some fatalistic bravado, he switched to his Irvine 21R powered F21 model; and although he made several flights without damage, a fuel starvation problem prevented any official flights and defied several efforts to effect a cure – final diagnosis was a very boggy small-end.

The Formula 21 record holder, Dave Smith, had an all-new NovaRossi model to try, a neat, no-gimmicks design. Running a light prop load in deference to the conditions and the newness/unfamiliarity factor, Dave made one test flight around the middle 160s and then went for an 'official' clocking 160.96 mph, a performance Dave considered quite satisfactory for a shakedown canter. The only monoline effort came from Ian Skinner flying his venerable Super Tigre X29 powered semi-

symmetrical model. Ian is a remarkable monoline pilot; he handled the breezy conditions with contemptuous ease and as much to his own surprise as anyone else's, managed two cracking flights, the best of 178.31 mph, gaining him second place in the handicap. Ian says his setup had always been obstinate in cold weather, and he hadn't expected it to work - however, on both occasions, it took off in half a lap, chimed up immediately and ran clean and strong all the way through.

Late in the day, just before the weather



Above: Dave Smith and Johnny Hall prepare Dave's Nova Rossi F21. Left: Ian Skinner's 5cc monoline model made second place. ST X-29 power; suction fuel system.



Pics from Bicester. Top: Ray Cox's classic OS .60 monoline. Above: Paul Eisner's third-place Irvine 15RE F2A, with Dick Miles' K&B powered F40 in background.

turned terminally miserable by adding rain to the cold, Paul Eisner and Dick Miles of Elmbridge concluded their customary on-the-field tinkering on their table in the lee of the car boot lid, and got down to some flying. Paul, after one attempt to sort out a setting on his new Irvine 15RE powered F2A model, clocked a promising 166.21 mph. Dick Miles, who gets very little time to prepare his equipment due to business and family commitments, was flying his piped K&B powered Formula 40 model, an asymmetric sidewinder with a pressure-feed fuel system. Instead of a CFS, Dick uses a pressure bleed activated by full 'up' elevator which leaves the fuel mixture to coax the engine onto the pipe - when the engine does 'come on', the model is brought down to regulation height, thereby closing the bleed and restoring full pressure once more. Dick knew the engine was well down on power, and so was fairly pleased to get a single clean run at 152.90 mph.

The contest was run by Jo Halman, swathed as for an arctic trek, and all entrants were grateful to her for carrying out all processing and timekeeping throughout the day in the teeth of gruesome weather.

Classified Results

1	P. Halman	F2A	97.40%	(174.92 Vs 179.56 mph)
2	I. Skinner	5cc	96.37%	(178.31 Vs 185.03 mph)
3	P. Eisner	F2A	92.57%	(166.21 Vs 179.56 mph)
4	D. Smith	F21	91.20%	(160.96 Vs 176.45 mph)
5	R. Miles	F40	88.51%	(152.90 Vs 172.74 mph)

Turn it up!



Ian Mander explains how painlessly to machine your own speed pans – useful for free-flight, too

AS ENGINES for speed control-line have become increasingly more powerful they have also increased in size and bulk. They have consequently outstripped the available speed pans, the majority of designs being twenty or more years old. Often the only recourse is to make your own.

Some enthusiasts have gone to the lengths of making patterns to produce castings, but this is not always practical. Foundries are seldom interested in small quantities and so the price becomes prohibitive. There is a simple alternative available to anyone with access to a lathe – turn one! Good examples of this technique are to be seen on Peter Halman's superb FAI class speed models, but the same principles apply to any size and shape of engine and model. It is possible to turn team race and free flight pans by similar methods, but above all, the system is cheap and available to all with access to a lathe.

Draw it up!

The first job is to draw out the required item (Fig 1). This must be done carefully because the angles to be machined must be measured or calculated from the drawing. Because the pan is to be turned only half the plan view need be drawn. For ease of turning it is usual to make the pan with a constant taper from the spinner to the engine mount area and from there a constant taper to the back. The outside shape can be 'prettied up' after the pan is made with a file and some 1000-grade wet and dry paper, and subsequently polished as required.

The example of the pan we will use for the article is for an Irvine 15 or MkIII Rossi 15, but is applicable to motors of any capacity.

It may be noticed that the wall thicknesses of the pan shown are much thinner than on most commercial pans. This is because it is possible to use a much higher grade of material, and hence better control of machining thus producing a more accurate, stronger and lighter finished product. A most suitable material is HE30 bar stock, which is available at most non-ferrous metal dealers. But before you buy your lump of metal, ask if you can inspect their scrap bin – you may just find the right piece in there at just a fraction of the cost.

Now to production

Having obtained your piece of material, which, to produce a Rossi or Irvine pan, will be 1.7/8in diameter and approx. 5mm over the finished length, face it to length using a fixed steady, unless your lathe is big enough for the bar to pass into the throat of the machine. Face both ends as these are to

become the finished ends of the pan.

Next find the nearest size drill to correspond with the smallest bore in the pan, in our case 26mm, and drill all the way through the pan. In most cases this means drilling in from each end. It is always wise to put a pilot drill (say 6mm) through first to aid accuracy. My largest drill for this operation is about 20mm, so I drill from both ends and bore with a boring bar to finished size.

Operation Three is to bore the inside front taper of pan to the correct diameter and depth. Follow this by the parallel section where the engine crankcase sits. In most cases this is larger than the pan front diameter, so when withdrawing the boring bar care must be taken not to spoil the front diameter. The clearance for the crankcase can be checked using internal calipers.

Now remove the bar from the lathe and chuck on the front of the pan again using a fixed steady. This is usually a long slow taper and it may be necessary on a small machine to take two bites at this. In my example there is a taper at the back followed

Close-cowled Irvine .15 on Ian Mander's latest F2A craft. That's it, and him, at top of page.

by a parallel section. This is done by setting the taper on the topslide and boring the taper following up the parallel on the saddle to the required depth.

You can now remove the bar and inspect the internal contours of your pan.

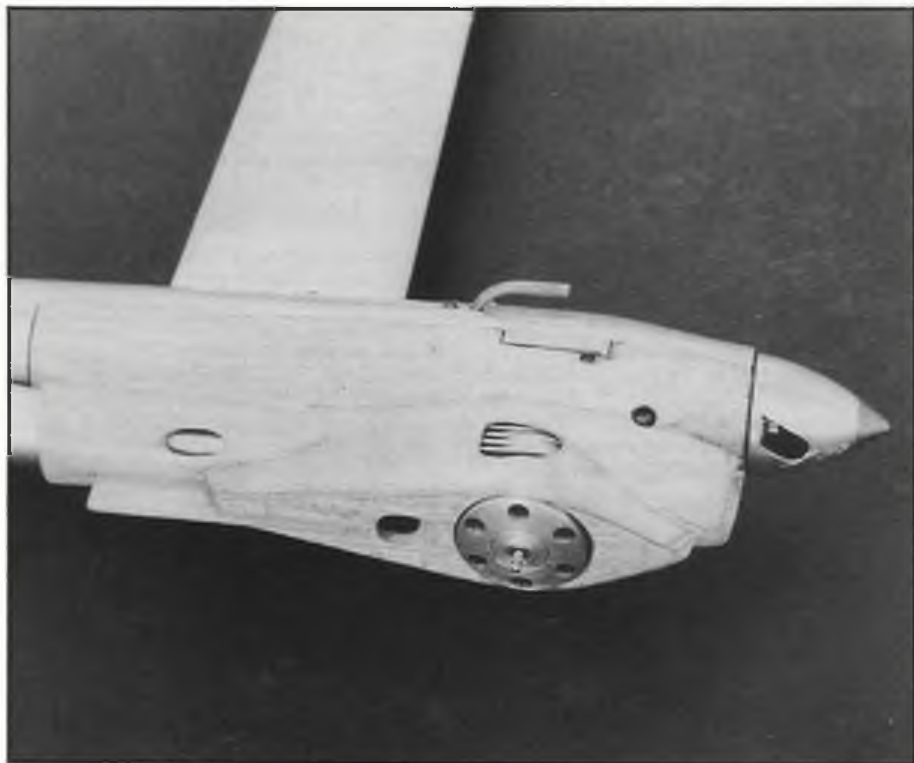
Outside machining jig

Turn a plug with a centre hole to fit in the back of the pan as shown in Fig 2.

Rechuck the bar as before but do not use the steady; fit the plug you have just made to the back of the pan using the tailstock fitted, preferably with a live centre to the plug. You can then turn the outside taper to the rear of the pan.

A word of caution at this point. Bitter experience has proven that, on some lathes, the protractor markings on the topslide are not as accurate as they could be, and it pays to start with a degree or so larger angle than desired, gradually reducing to produce the outside diameter and length of taper you require – after one or two near misses in this area I have produced a correction table for my own lathe – well worth the bother for doing many odd jobs!

The next bit sounds a bit Heath Robinson, but it's the only way I could work out how



to do it on a small lathe.

Using the angle set for the rear taper, usually two or three degrees, turn a plug that the front internal diameter will lock onto and leave it in the lathe (Fig 3). Put the front ID on this then, with the other plug in the back, again insert the centre into the plug and tighten the tailstock just enough to drive the pan. Now turn the outside front taper, again checking the lengths and diameter as for the back taper, but this time reduce the angle for initial cuts. You should now have a tube which will make two pans and a heap of aluminium swarf; all this will have taken about two hours. It's also a good time to polish out any marks (bad turning!) using wet or dry paper or scotchbrite with a drop of paraffin or cutting oil.

Next set up a pointed tool at centre height and scribe a series of marks along one side of the tube; then rotate the lathe by hand through exactly 180 degrees. Repeat the operation to give a guide for slitting the pan...

Slitting the pan

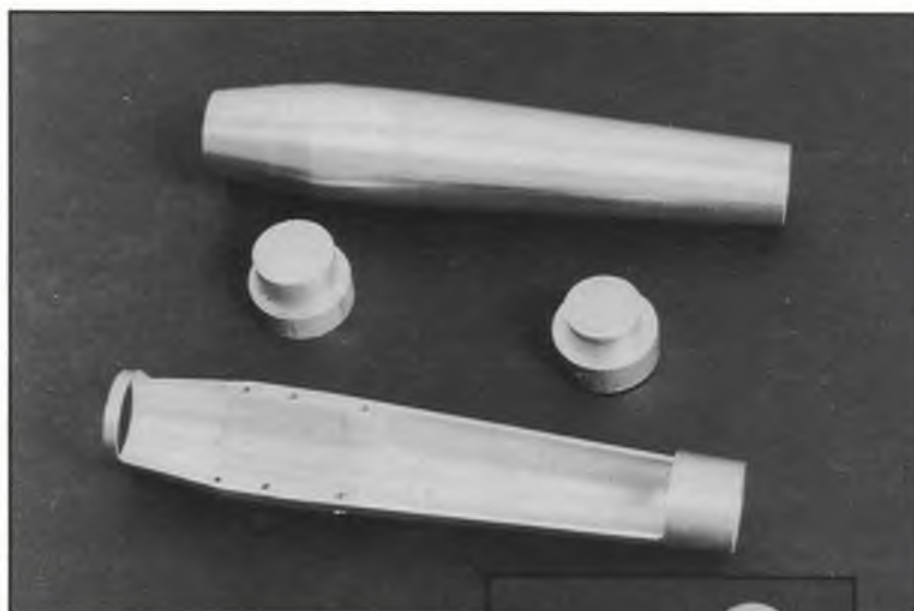
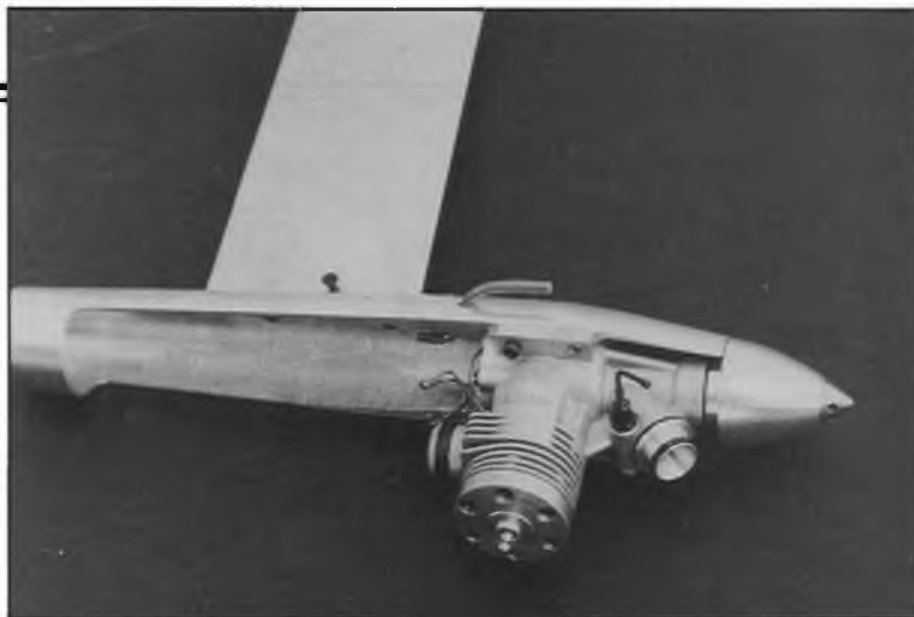
In the absence of slitting facilities, I use a hacksaw, offsetting the hacksaw to one side of the scribed lines, with the tube held in the vice. The sawgap in the tube will tend to close up due to the pressure of the vice, causing the saw to bind. This can be overcome by packing the slot with a piece of old hacksaw blade. Repeat this operation on the other side and - lo and behold - something that resembles a pair of pans!

The engine mounting face can then be cleaned with emery paper stuck to a flat surface in time-honoured fashion, and excess metal under the engine removed by milling (for the lucky ones) or by rotary file. Drill and tap to suit your own requirements. This should produce a pan of a weight that compares very favourably to a cast one, of superior strength and exactly to your own requirements, and all for around £8.00.

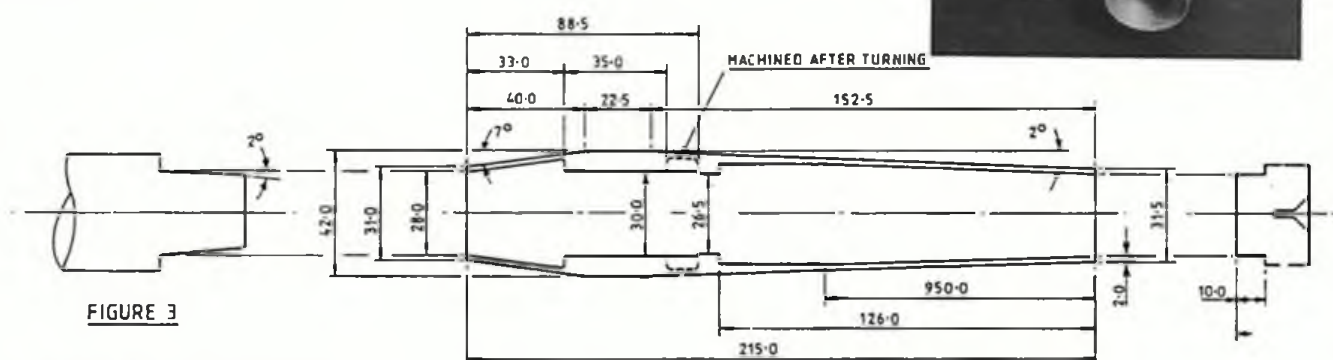
Lastly...

It is possible to make the two pans from one tube if machine slitting is available, but experience has shown that you must add about 1mm to the spinner diameter at the front of the pan to allow for 'lost' metal.

Don't worry about taking the job out of the machine. Accuracy of about 0.010in (ten thou) is good enough. Take your time - and good flying!



*Top: Finished pan, constructed as per Ian's instructions. Irvine .15R is the country's top FAI speed motor.
Above: Turned tube, plugs and completed pan. Right: Another view of tube and plugs. Below: Dimensions and angles. All you need to know!*



READERS' LETTERS

LSARA lines

Dear Sir,
I started aeromodelling, in a particularly crude way(!) in about the early 1930s. As did so many in those days, I began with 1/72nd solids. When pocket money stretched to it I bought Skybird kits but usually hacked away at whatever old bits of wood I could lay my hands on; even scooping out cockpits and cabins. We dodderly old pioneers look down on the modern plastic kit bashers!

But to the point of this letter which arises from that of Martin Simons in your May issue. When I was working in the Aerodynamics Department of R.A.E. towards the end of the war I contacted Norman Walker as our families lived in adjacent flats. As a result I helped him in his work in running the LSARA, for a time as its Acting Treasurer. He put a quite amazing amount of work into this Association but eventually it folded up for two reasons. First, Norman was posted to Washington, USA, and then resided in that country for the rest of his life. Second, when taking on the duties of Acting Treasurer I produced a Balance Sheet which showed that the Association was no longer financially viable.

My wife and I always kept in close touch with Norman and his wife and visited them in Washington on a couple of occasions. So we were very saddened when Norman died on 18th July 1985: I was disappointed that the obituary that I then wrote could not be fitted into the Aeromodeller columns at that time.

Peter Payne still goes strong in the aeronautical world in the USA. I am afraid that I lost contact with Bob Annenberg and other colleagues in the Association.

Heswall, Merseyside Dr J. C. Gibbings
FRAeS

Don't panic

Dear Sir,
The Builder of the Model Rule! Free flight competition flying is going down the wrong road. As Dave Hipperson has said in his column, the abandonment of the requirement to build one's own model is going to give problems.

It is indeed - or was - a difficult line to draw between one's own efforts and what can be purchased. I personally would have preferred the rule to have stayed as it was. So, I believe, would most modellers. Perhaps we can change it back?

However, at the end of the day, who will be selling and who will be purchasing models? The way to win through is having a good model and flying it well. Buying contest success will not work. One cannot buy the skill to 'use' a model properly. Those trying to buy this success will want quick returns on their outlay and I don't think they will get it. Models get damaged and need repair and maintenance. If one cannot build a good model it's a sure bet the repairing will be of a low standard as well!

I don't like the change of rules but I am not going to panic. I am not going either to buy or sell models. Part of the struggle to do well in contests is at home in the workshop.
Eaton, Norwich Mike Woodhouse

Terezka is a neat P-30 from Czechoslovakia - more rubber and a change of prop is all that's needed to fit the Swedish B1 class.

New for old?

Dear Sir,
Here in Sweden we have now set up a revised set of free flight rules in an attempt to reverse the trend towards shrinking numbers of ageing competitors.

There are no changes for international contests run in Sweden or for the team trials. For the national events, however, several changes have been made.

To start with, we have the 'mini-FAI' classes, of which the A/1 glider class is well established all over Europe.

Then there is the now revised B1 rubber class, with a maximum lifting area of 12 sq. decimetres, a minimum loading of 12 grams per sq.dm and a maximum of 20 grams of rubber. We now have the choice of building a small, super-hot model or a large docile one. A P-30 model is easily modified by changing the prop to a larger one, maybe folding; and doubling the rubber quantity, with the option to change it back to a P-30 without structural changes.

The also revised C1 power class now requires 12 grams/sq. dm, 300 grams per cc of engine displacement, engines allowed being diesels of 1cc or less or the 0.8cc Babe Bee, the only glow plug engine allowed so far. Engine run is 15 seconds to start with, to be reduced next year if necessary.

These three classes all have a two-minute max flying time, which gives us more suitable flying fields than we have for the FAI classes.

Then to the F1C class and the addendum for national contests only. Something had to be done in Sweden, where even the National Championships fail to attract more than a couple of flyers. We also believe that this is a trend all over the world.

Now we shall try to separate formulae in parallel, models to both specifications being permitted for 1989 contests.

Flodstrom formula: 0.00-1.00cc 250 grams/cc: 12 gram/sq.dm.
1.01-1.80 250 18
1.81-2.50 300 20

Holm formula: Minimum weight: 320 gram/cc less 50 grams maximum lifting surface: 12

sq.dm per cc of engine capacity plus 7.5 sq.dm.

The Holm formula is of course more favourable for small engine models. Made up to a table it looks like this.

Engine cc	Flodstrom		Holm	
	min weight	max surface	min weight	max surface
2.5	750g	37.5sq dm	750g	37.5sq dm
2.0	600	30	590	31.5
1.5	450	22.5	430	25.5
1.0	300	15	270	19.5
0.8	240	12	216	17.1

Personally, I do not care very much which formula we use, but I think it essential that we get a choice of engine sizes with a fair chance for 1.0 or 1.5cc model to compete against 2.5s. I have even at a time considered 3.25cc in order to widen the engine supply, with 23-24 grams/sq. dm.

Finally, a change of rules which will make it easier for beginners to reach the rank and file of experts.

When a national contest is announced for the FAI classes only, the use of A1, B1 and C1 models are allowed for the F1A, F1B and F1C classes respectively. This will give the young and inexperienced ones more contest opportunities.

They will have a very slight chance of winning, but the idea is to give them experience and ideas as well as a kick to move to FAI models. At the same time entry fields will grow which will be most beneficial for small contests.

Summing up, we get a more varied scope of model types, sizes and engines, more flying fields, more contests (less travel for some), fiercer competition and a smooth transition from beginner to expert, all for very small penalties, if any.

The only opposition to the new rules was from somebody who said: it will not help.

Well, it will not hurt either. But we must try to find new ways to replenish the supply of old modellers.

Stenungsund, Sweden

Lennart
Flodstrom

DESPITE arriving relatively early, or so I thought, at 9.30 I had difficulty in finding a piece of wall to set up against; indeed, by the time the contests began, modellers were double parked in some places! This, combined with a dustbin collecting water from the leaky roof, caused a reduction in space more psychological than real. The hall was rather chilly in the morning and this caused some problems for the CO₂ models.

There were more new and adventurous models than ever before, and standards of construction are ever higher. The real star of the meeting was Pete Smart's Felixstowe flying boat; at about 33in span for twin Telcos, this is quite the most impressive indoor model I have seen. Despite being a very short-coupled aeroplane it flew happily in right and left circles. As is often the case,

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WALSALL

it performed at its best after the contest flights, and I look forward to seeing it outdoors on a calm day where the radius of turn can be opened out.

Rubber

In the Rubber event, the ante-post favourite was surely Butch Hadland's immaculate Widgeon III, resplendent in its green and silver scheme and with an exquisite dummy engine. Weighing a scant forty grams it flew well from hand launches, but didn't want to know when it came to ROGs, thus failing to qualify in the contest.

At recent meetings, four official flights have been allowed, with no attempts, but this time the rule was altered to two flights only, with two attempts at each, which I think is insufficient considering the amount of time spent building these aircraft. Even a well-prepared model needs some tweaking between flights to get the best performance. The new weight rule in the Rubber and CO₂/Electric classes made no real difference, just as I expected. When Indoor flying there is nothing to be gained from going past a certain weight or size, since the model then either flies too quickly or has to turn too tightly for realism. As an example I had built a new large red Avian monoplane, which looks pretty and flies well outdoors, but it weighs 110 grams, flies fast and hit the wall once too often at Walsall. The lesson I have learned is that I must drastically rethink my building techniques to reduce weight while maintaining a reasonable minimum degree of realism, (below which I lose interest in any case). The other lesson is the importance of getting plenty of practice in with the model, and that means starting to build it now, not in February. It is no coincidence that so often

**Bill Dennis reports
on the 1989 Indoor
Scale Nationals.
Date: 23rd April**

it is the well-trying model, which has been around for years (and years), that comes through to win on flying performance. Sometimes you get a lucky break with a new model, but the odds are against it.

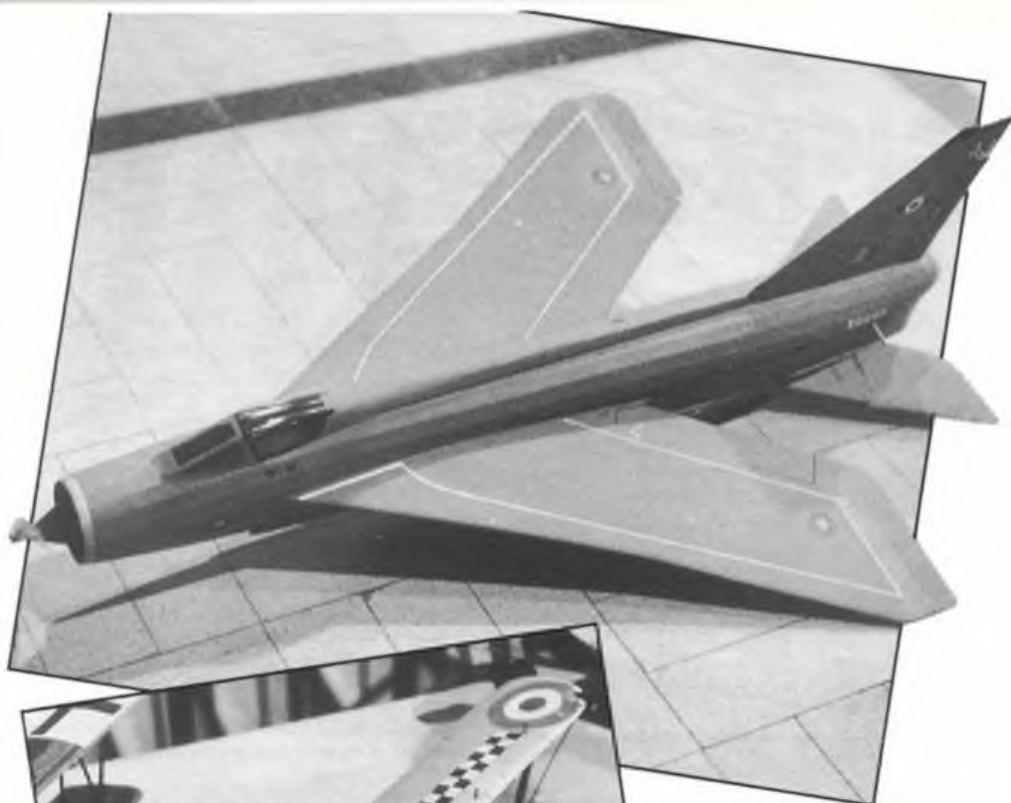
Peanut

This event produced the usual nail-biting finish. Chris Hutchinson was victorious with his Farman Carte Postale – an ideal candidate for restricted-span competitions which put up the best flight too. I found myself wondering whether some of the models were realising their true potential. Once the aircraft has been built reasonably lightly and trimmed out, it all comes down to a lot of work experimenting with motors and propellers, and yet most people seemed to be using standard plastic props. Mike Hetherington told me some time ago about the dramatic changes in duration he achieved with his Fokker DVIII simply by altering the pitch of his props. I would have thought it would be easier to arrange adjustable pitch than to endlessly change motor lengths and cross-sections.

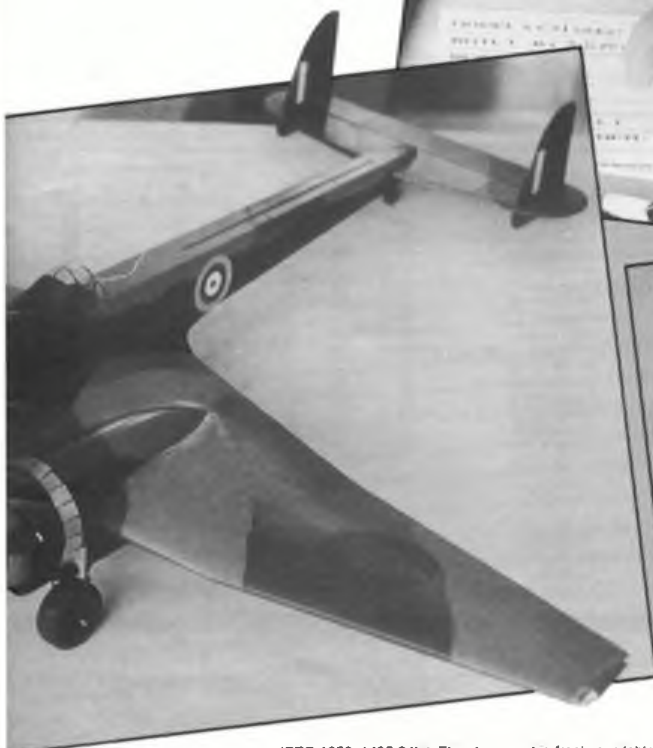
Air racing

This is now an official class, attracting more entries each time. I still have doubts about the way in which finalists are chosen from two-lap qualifying flights since it has yet to produce an exciting final with four reliable models. Speed is very much of secondary importance to the ability to string together four or five successful laps. I suggest that this would be a better criterion by which to whittle the entry down, and then send them on to the static judges to choose the best four. I also think that a proper, painted

Heading: Bob Horwood took a break from C/L racing to enter this attractive Jeep in the Air Race. **Left:** Race winner was Chris Strachan's Keith Rider Suzy. **Below left:** Peter Smart's amazing Felixstowe flying boat for twin Telco power. **Below:** First public sighting of Charlier Newman's latest twin, this HP Hampden – another for two Telcos.



Above: Jet scale Lightning, also by Peter Smart, awaits further trimming. Left: On static display, Neville Coldrick's Gloster Gamecock for rubber has inherited some of the full-size craft's quirky flying characteristics, says builder.



Above: part of Doug McHard's airforce on show – this 1/24 scale Reid and Sigrist Desford for twin rubber via flexi-drive. Left: A challenge by any standards – Chris Strachan's Peanut Gee Bee R1.

1989 Indoor Scale Nationals Open Rubber

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
No flight
No flight

CO₂/Electric

1.
2.
3.
4.
5.
6.
7.
8.
9.

C Hutchinson
P Frostick
M Allen
R Johnson
G Ball
P Briggs
C Strachan
P Lee
A Sephton
M Green
R Boor
B Hetherington
K Bates
W Dennis
P Robinson

Chelmsford Farman Carte Postale
Buhl Pup
Chester Jeep
Svenska SK8
Puss Moth
Bleriot Parasol
Nottingham Baby Ace
Impington Lacey M10
RAFMAA ABC Robin
Croydon Fiat CR32
Wigan P-51D
Nottingham Stinson
Cleemac Piper Cub
Nottingham Avro 625
Cleemac Loving Love

S Bristol Eastbourne Mono
Petersfield DH R2
RAFMAA ABC Robin
Impington Bristol Prier
Nottingham Felixstowe F2A
Walsall Bellanca
Wigan Nieuport II
Impington Bristol Brownie
Sopwith Scooter

Complexity percentage	Static	Best flight	Total
0	991	1042	2033
0	1070.5	928	1998.5
0	942.5	1000	1942.5
0	915	1014	1929
0	885.5	998	1883.5
0	1110	768	1878
0	805	1030	1835
0	759.5	984	1743.5
0	1042.5	620	1662.5
0	782	748	1530
0	846	632	1478
0	828	546	1374
0	771	406	1177
0	1093		1093
0	817		817
0	892	1060	1952
0	1028	854	1882
0	950	883	1833
0	702	1086	1788
0	968	785.4	1753.4
0	830	910	1640
0	746	536	1282
0	580	280	860
0	520		

Peter Smart. All the models were realistically finished, and they look good in the air too; winner was Chris Strachan's Supermarine Attacker prototype. Give it a go next time! During the meeting I met Cyril Edwards, who designed the APS Fokker EIV featured in this column recently, and he showed me his Lee Richards Annular monoplane. There is a model of this aircraft (and many others) in the Science Museum, but I didn't know that drawings of all these models are available from the museum library. In the case of the Lee Richards these are very detailed indeed, running to ten sheets, with full information on the complex wing section changes.

Last thoughts

Once again I can say this was the best Indoor meeting yet, with just so much to do and see. The static exhibition was superb, but I didn't get the chance to attend any of the lectures (perhaps the speakers could be persuaded to do articles on their talks for *Aeromodeller*?).

These meetings at Walsall have changed beyond recognition from the early days, and the credit for this goes to Doug Sheppard. SMAE Chairman Kath Watson was there all day, and she was able to present Doug with his very well-deserved Fellowship certificate.

launches at the next two Walsall Indoor meetings will be for biplanes and triplanes only. To build them down to the minimum weight of twenty-five grams structural mods will be allowed.

Jets

The new fun event this year was Jet duration which produced seven entries, including a very frightening Lightning from



Left: Third in Peanut was Bob Horwood with this SE5a. This pic: Mike Hall's Open Rubber Vought Corsair was another on static exhibition.

finish should be mandatory.

Having said all that, Chris Strachan won in style with his well-finished Keith Rider racer, taking just two 'rewinds' to complete the course very smoothly indeed. It was also nice to see C/L racing expert Bob Horwood in the final, although he ruined his chances by breaking his prop in the one-minute warm-up period! Incidentally, Bob also placed a very creditable third in Peanut with an SE5a - quite an achievement with a 'non-freak' model.

Mass launch

The kit scale mass launch has survived far longer than I expected it to, and it certainly produces a spectacle, but is it time for a change? I personally get tired of seeing the same models winning, so unless I receive sackfuls of protests in the interim, mass

Peanut

	C. Hutchinson	Chelmsford	Farman Carte Postale	42	6	155	1	7	Fly off
1	A. Sephton	RAFMAA	Lacey M 10	46	3	121	4	7	Fly off
2	R. Horwood	S. Bristol	SE 5a	53	1	81	10	11	
3	P. Briggs	Nottingham	Bleriot Parasol	46.5	2	55	13	15	
4	M. Green	Croydon	Leningradec	27	12	123	3	15	
4	D. Knight	Hunter	Hunter	33.5	8	92	7	15	
7	C. Strachan	Impington	Piper Cub	22.5	15	133	2	17	
8	A. Balding	Cleemac	Renard R17	28	10	87	8	18	
8	N. Peppiatt	SAM 35	Ponnier	39	7	72	11	18	
10	G. Dimes	S. Bristol	Avro Avian	42.5	4	21	16	20	
10	R. Pressnell		Pietenpol	25.5	14	99.5	6	20	
10	P. Lee		SE 5a	43.5	5	39	15	20	
13	J. Granger		Gordon Leseurre	27	12	85	9	21	
14	M. Golding	RAFMAA	Piper Cub	21	17	101	5	22	
15	M. Bates	Cleemac	Widgeon	27.5	11	62	12	23	
15	P. Craske	Impington	Andreasson	30	9	48.5	14	23	
17	P. Robinson	Cleemac	Citabria	25	16	19.5	17	33	

Air Race

	C. Strachan	Impington	Keith Rider	Heat 1	Heat 2	Static
1	N. Peppiatt	SAM 35	Mr. Smoothie	10.3	10.72	15
2	R. Johnson	S. Bristol	Cassutt	10.94	10.81	14
3	R. Horwood	S. Bristol	Chester Jeep	12.03	—	13
4				8.72	—	13

THE GREAT ESCAPE

An intriguing tale of prison-camp gliding -

Martin Dilly explains

WHILE GOING through the letters my father wrote home from prison camp during the war it became clear that it took more than barbed wire, alsatians and sentries in watch-towers to keep model flyers out of action. He was captured in 1941 in Crete, where he was a codes and cipher officer in the RAF, and spent most of his captivity in Stalag Luft 3 at Sagan in Poland about sixty miles from Leszno, where the first Junior World Championships took place in August 1988. He died in 1987 and, while not a model flyer himself, his reports of the activities of captured modellers probably got his seven-year-old son hooked at long range.

He was a commercial artist by profession, and his letters home during imprisonment were all pencil written in minute capital letters about 1/16in. high; soon my mother discovered that he was sending coded military information in the letters that were, of course, first read by German censors. Some of the capitals were very slightly higher than others, and they carried the messages amongst news of harmless prison camp life, including model flying.

From what I saw of Leszno and Sagan (or Zagan, as it now is, since that part of the world is now Polish, rather than German) the weather is pretty tempting for free-flight, with warm, still summers, and strong thermals, sometimes marked by buzzards, eagles and storks. Extracts from his letters tell some of the story.

April 5th, 1942

'...Better weather has brought on a nasty epidemic of glider-itis among the RAF. Some very strange and comic productions. Curiously the worst made seem to do best, while a perfect beauty, marvellously made (taking over a month of hard work) did so badly it's now being re-built. It had over three foot span.'

April 18th, 1943

'...It's a lovely calm evening and there's a din coming from the sergeants' RAF compound like the noises at a Cup Final. They're holding a glider meeting. Martin would be thrilled. Some flights very good indeed and most spectacular.'

Undated

'...We've three gliders in camp now. The largest has six foot span (far too big for this camp - it'll take all our main sports ground to take off and if it comes down again inside camp I shall consider it's disgraced itself). It should have its trial flight tomorrow evening. Small aircraft are best for this place. They fly just as well in proportion to size and give great pleasure to the onlookers who enjoy a spectacular crash as much as a good flight.'

May 20th, 1943

'...Squiz' Taylor's aeroplane tested two nights ago. Grand performer. Lands beautifully, its last flight skimmed in huge semicircle round parade ground about a foot above ground, with amazed laughing mob frantically scattering before it.'

Below: At just over full-size - a fragment of an original letter...

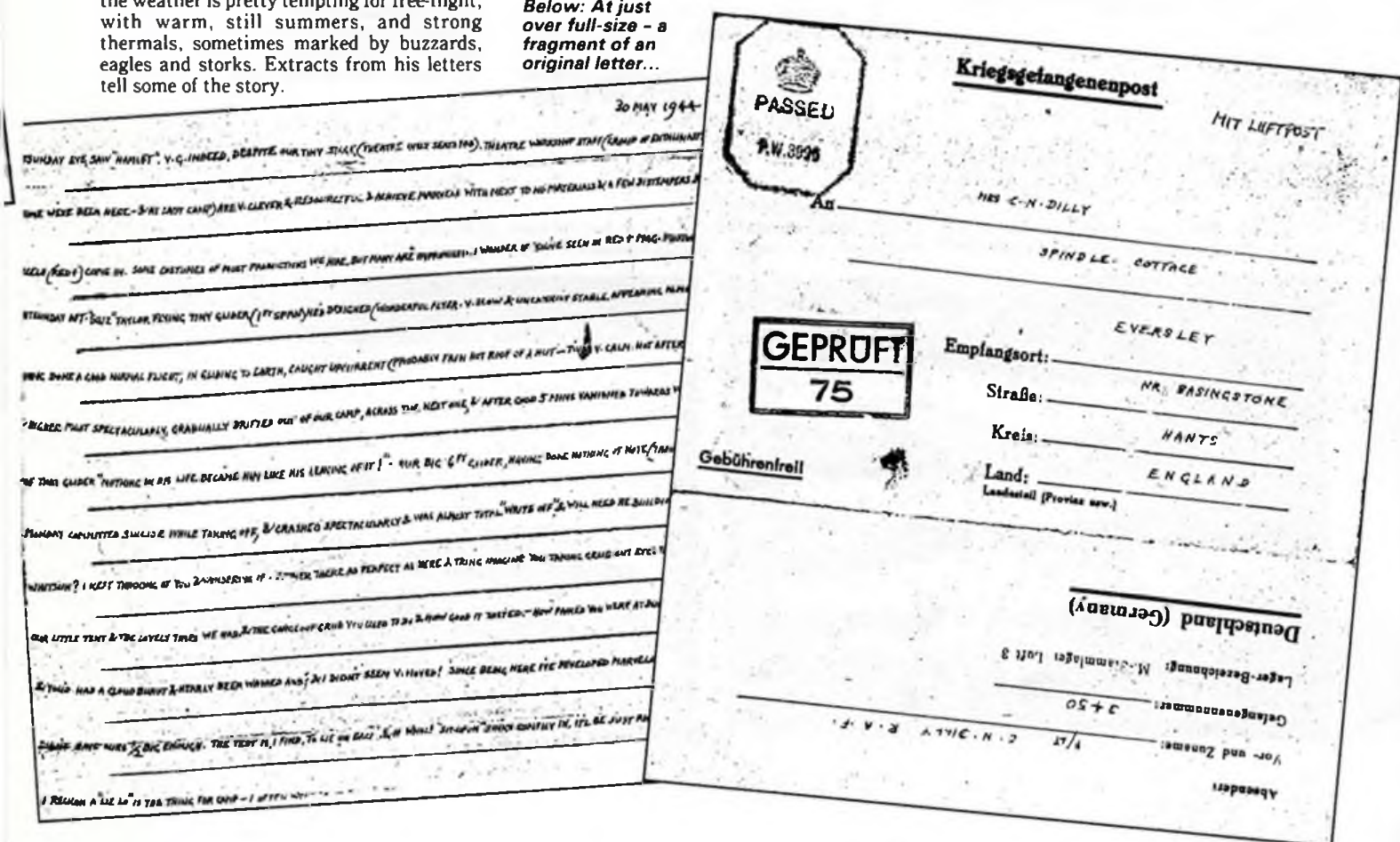
May 30th, 1944

'...Squiz' Taylor flying tiny glider one-foot-span he designed. Wonderful flyer, very slow and uncannily stable, often appearing almost stationary. Having done a good normal flight, in gliding to earth it caught up-current (probably from hot roof of hut, as it was very hot, calm afternoon) and soaring higher and higher most spectacularly it gradually drifted out of our camp, across the next one and after a good five minutes vanished towards West Camp. Truly we may say of that glider "Nothing in his life became him like his leaving of it." Our big six foot glider, having done nothing of note, though it flew nicely enough, on Monday committed suicide while taking off and crashed spectacularly. It was almost total write-off and will need re-building.'

What news?

It would be fascinating to know more of model flying by prisoners of war; maybe 'Squiz' Taylor is still flying models. He would probably be in his late sixties now, and was probably an artist professionally, as he did several portraits while a PoW. It was possible to send some modelling materials to prisoners, via Red Cross 'games parcels', packed under Swiss supervision in Britain, and sent via neutral countries to Germany, but stripped-up ply from packing cases was sometimes used for structures, since balsa was in very short supply in Britain, too, during the War. Covering was sometimes dozens of leaves of cigarette paper. Glue was usually Seccotine or Croid.

More news of similar activity would be welcomed. What do you remember?



Material change!

Stephen Midson

encourages

experimenters

to try polystyrene

foam models.

Ideal for youngsters, too...



YOU REALLY must make a model aircraft out of polystyrene foam - there is an Indoor meeting at Crawley in a couple of weeks.' Thus spake a regular Easy B flier and work colleague. Not long to design, build, and have a new and original model complete and ready for public viewing, but I made it; and one kind gentleman was heard to say as the prototype fell out of the air, 'Those models have potential - if only he gets the weight in the right place.'

Encouraged, I returned to the drawing board and at the Watford meeting I got the ultimate compliment of being asked by the Editor to write a description of the design for the magazine. The models were now more than satisfying my expectations of a plane that costs less than one pound and can be made in one evening!

It would appear that they were also pleasing the onlookers.

The other push that caused me to design the construction system is a Summer School that I have volunteered to take, when I will have a group of eager youths all wanting to make 'Things That Fly'.

Take your foam

The construction system, which, I am told, has not been seen before, produces a stand-off, semi-scale model by glueing together pieces cut from 2mm thick expanded polys-

tyrene foam as sold in DIY shops under the impressive title of 'wall and ceiling veneer.'

All airframe parts are from this foam, doubled where shown to give efficient sections.

To take the tension of the rubber motor, a built up balsa motor stick, or box, is used. This is pushed in between the two halves of the fuselage.

As it is sold in a roll, the foam has a natural curvature and this is sufficient to give

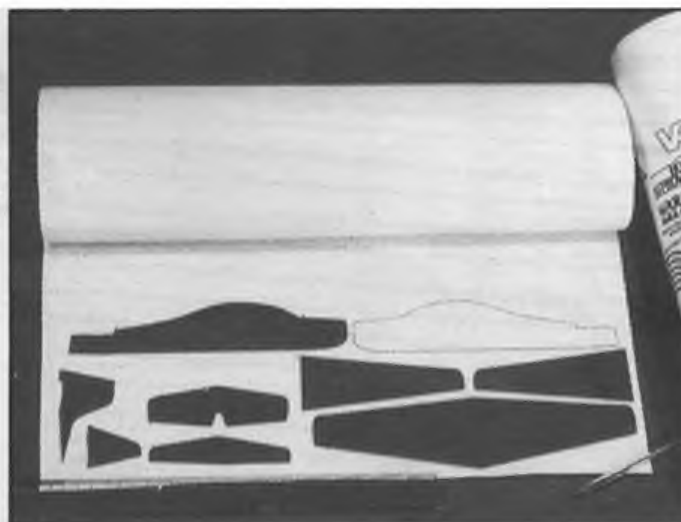
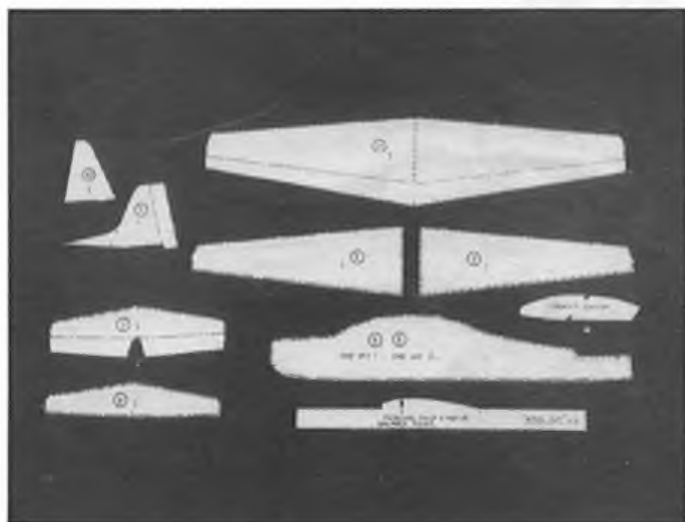
thickness to the fin and tailplane.

The wing section is held by glueing the top surface to a preformed shape cut in the fuselage. Bending the top surface up also forces the bottom surface *down*, since they are glued only at the leading and trailing edges.

After experimenting with high, middle, and low wing prototypes I decided on a low wing model, and chose the Shorts Tucano as a design base - firstly, because it is a modern,

FOAM flier

Below left: Draw the templates. Patterns should be slightly undersize; ball-pen outline runs round the outer edge. **Below right:** Mark out the components. 160mm of foam needed for the 13in Tucano - or mass-produce fifty from one roll!



Incidentally, I gave him copies of my design, but he decided to try and improve it. After a frustrating evening or two he threw the fuselage into the waste bin, and turned up at Watford with the foam wings mounted on a balsa stick fuselage! But even then, it did fly pretty well.

More on materials

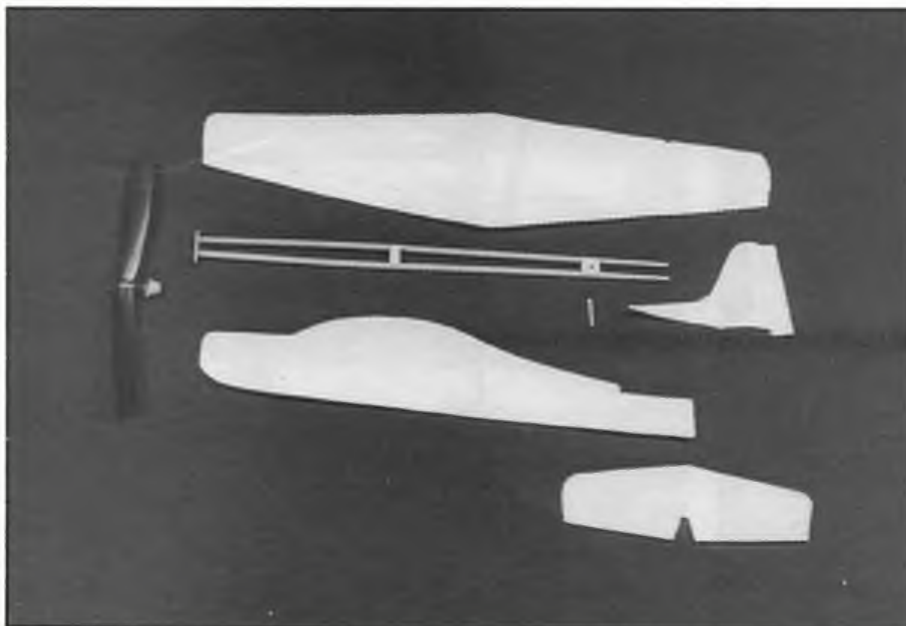
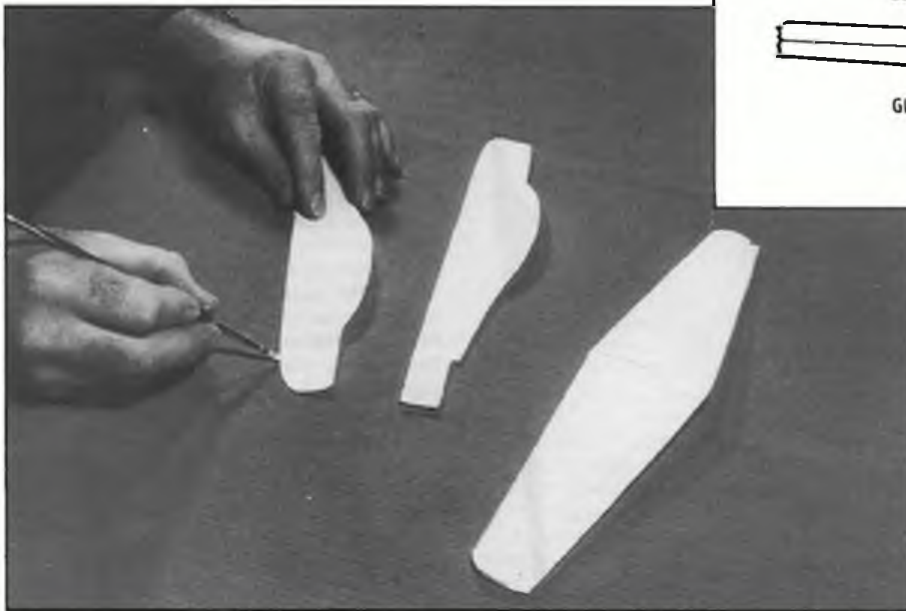
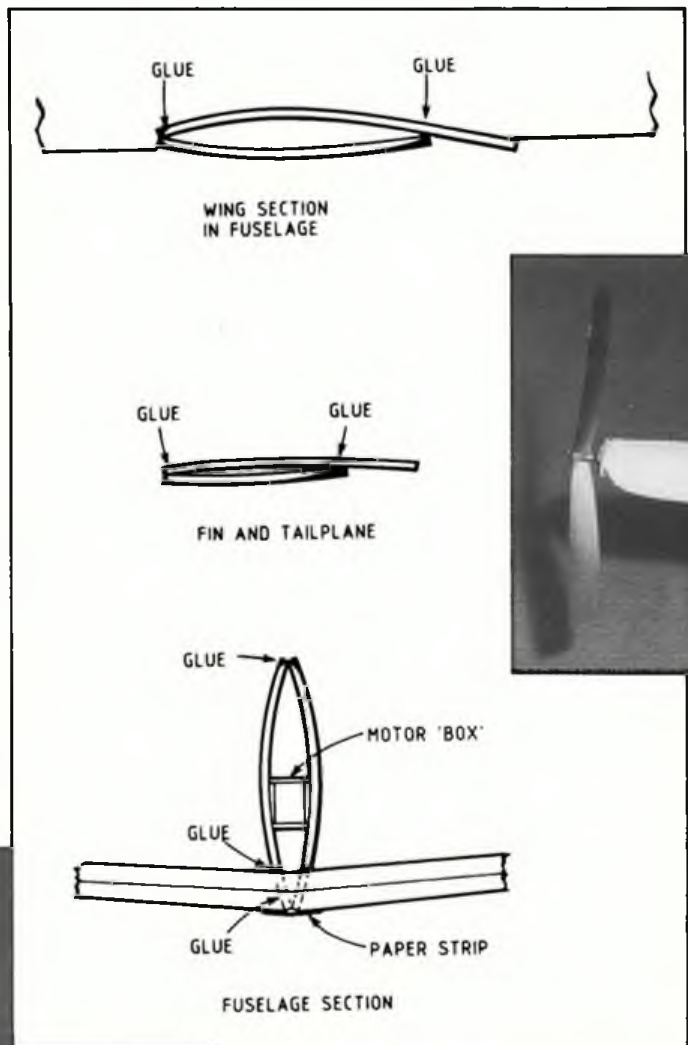
A small amount of 1/32in (0.8mm) balsa will be needed, and a propeller - which can be made from balsa as shown; or a 5.1/2in diameter plastic equivalent is available from SAMS; see their advertisement elsewhere in this issue. Also required are a bearing bush, and wire for the shaft. White PVA, or water-based latex glue is essential for assembly. Anything else will melt the foam.

Building details

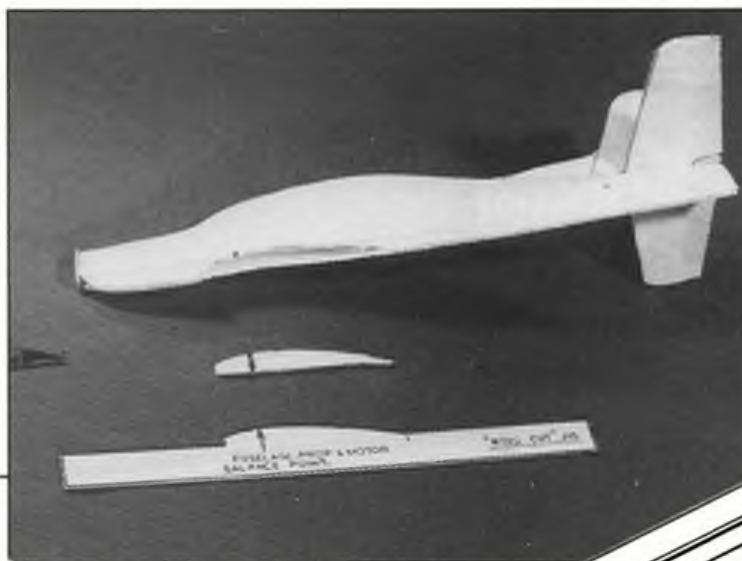
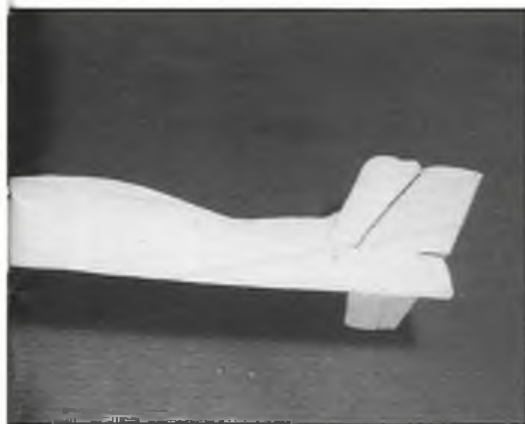
Make the motor stick first, so it can dry while you set about the rest of the fuselage. This is the most time-consuming assembly, but as you can make two or three in little more time than just one, why not set about producing a fleet of models right now?

Roughly cut the paper patterns and paste onto cardboard. When dry, cut out carefully along the outside edges. You now have a set of patterns that will allow you to make the fuselage parts very quickly. Just lay them on

Wing and tail sections, plus fuselage/wing junction, shown at right. Below left: Glue is applied to edges of fuselage sides by brush. Note areas where glue is not applied! Bottom left: Components ready for final assembly. Top centre: Motor box is inserted into fuselage. Below centre: Marking out the wing cut-out.



Below: Find the balance point with motor in place, but without wing (see text). Right: wing position is cut.

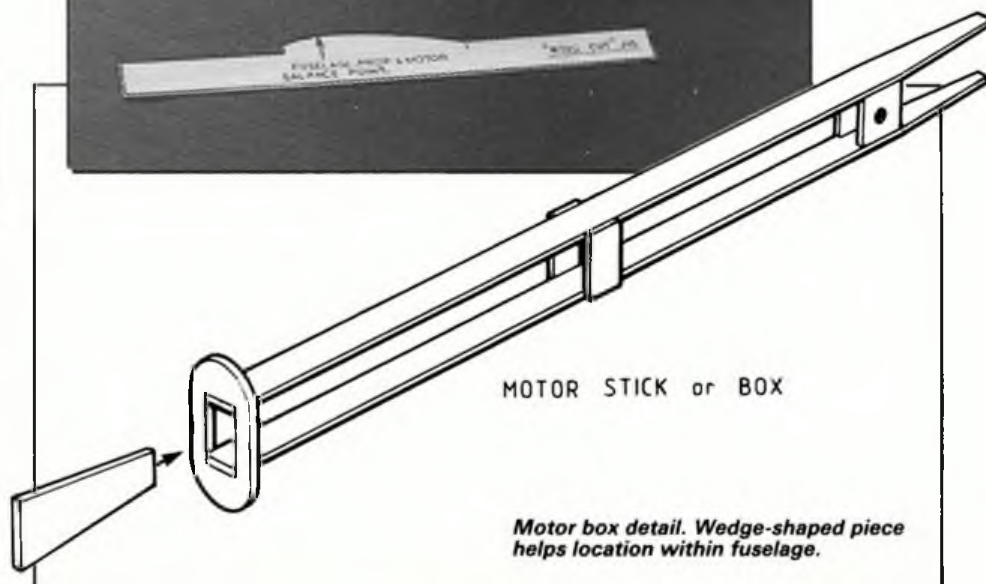


the foam, mark round and cut. Note the areas where you must not put glue, and on pieces 2 and 7 carefully mark the folded edge so the glue line is known. A trial assembly ensures that you get everything right. A thin line of glue is sufficient; bring edges together and leave to dry with light clamping or weighting. Round the edges of the foam with very fine glasspaper. Make up the prop assembly as shown and balance the model without the wings. Using the 'wing cut' jig, mark the wing position, remove motor assembly and cut the shape. Replace motor stick and glue wings in position. Note that persuading the top of the wing into its curve will force out the bottom surface, creating a full section. At this stage there is still a gap between the two bottom pieces of the wing.

Glue a strip of paper over the wing gap and support the tips, as shown, to the dihedral angle. This will reduce slightly when the blocks are removed.

Assembly and flight

Choose some stripped rubber about 1.5-1.8mm wide. Make into a loop to fit between the motor hooks, assemble the model and you are ready for flight! Wind on a few turns. Slight bending of the elevator and rudder may be needed to achieve the correct flight pattern. If the model stalls under power add a strip of paper packing under the top edge of the propeller block to create downthrust. Mark the block and make sure it always goes



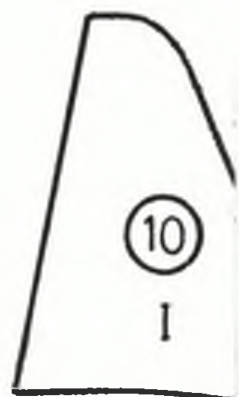
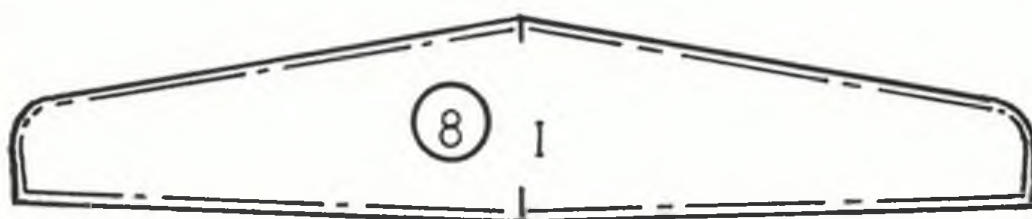
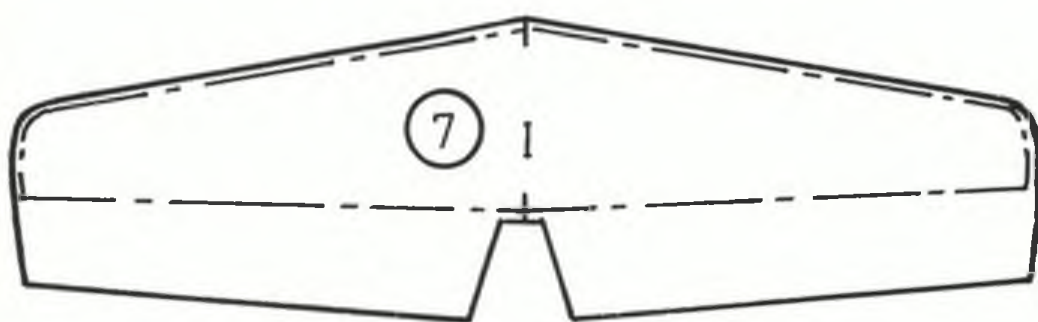
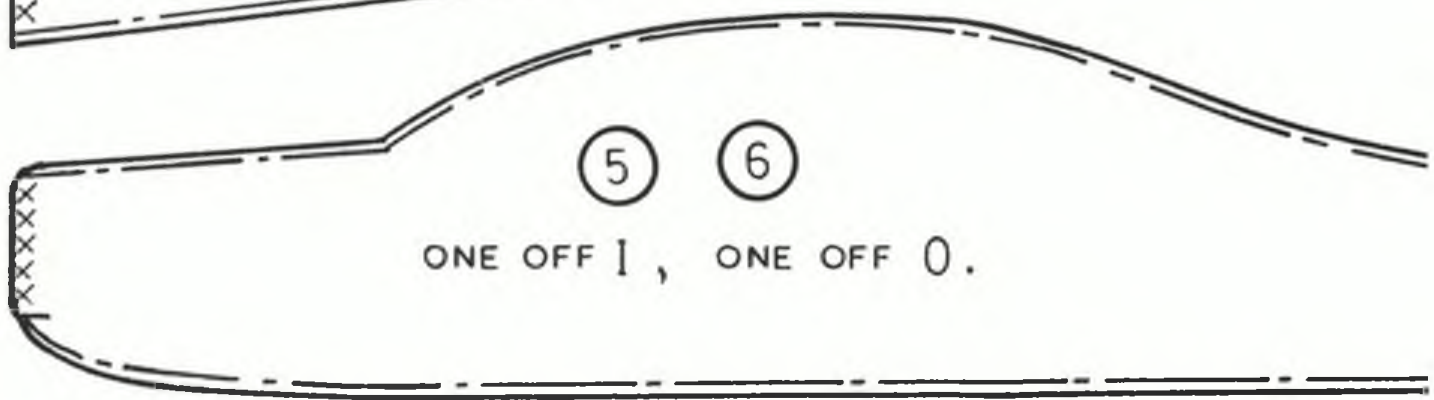
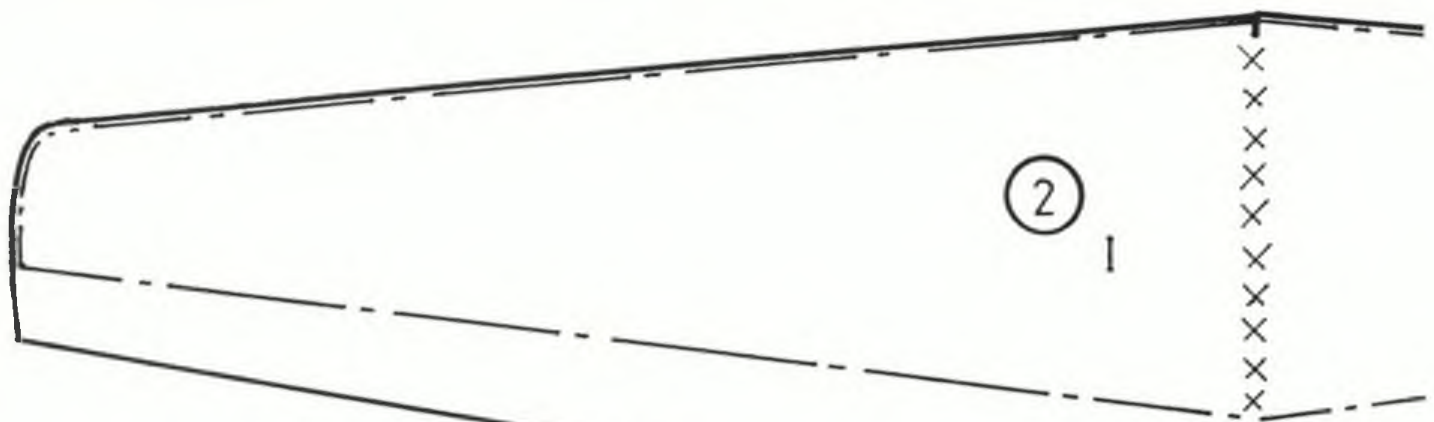
back in the same position. Maximum turns will be in the region 200-400.

This very light model is exceptionally crash-resistant. Specifically meant for indoor flight, it will perform just as well in calm conditions outdoors. Your Tucano will fly

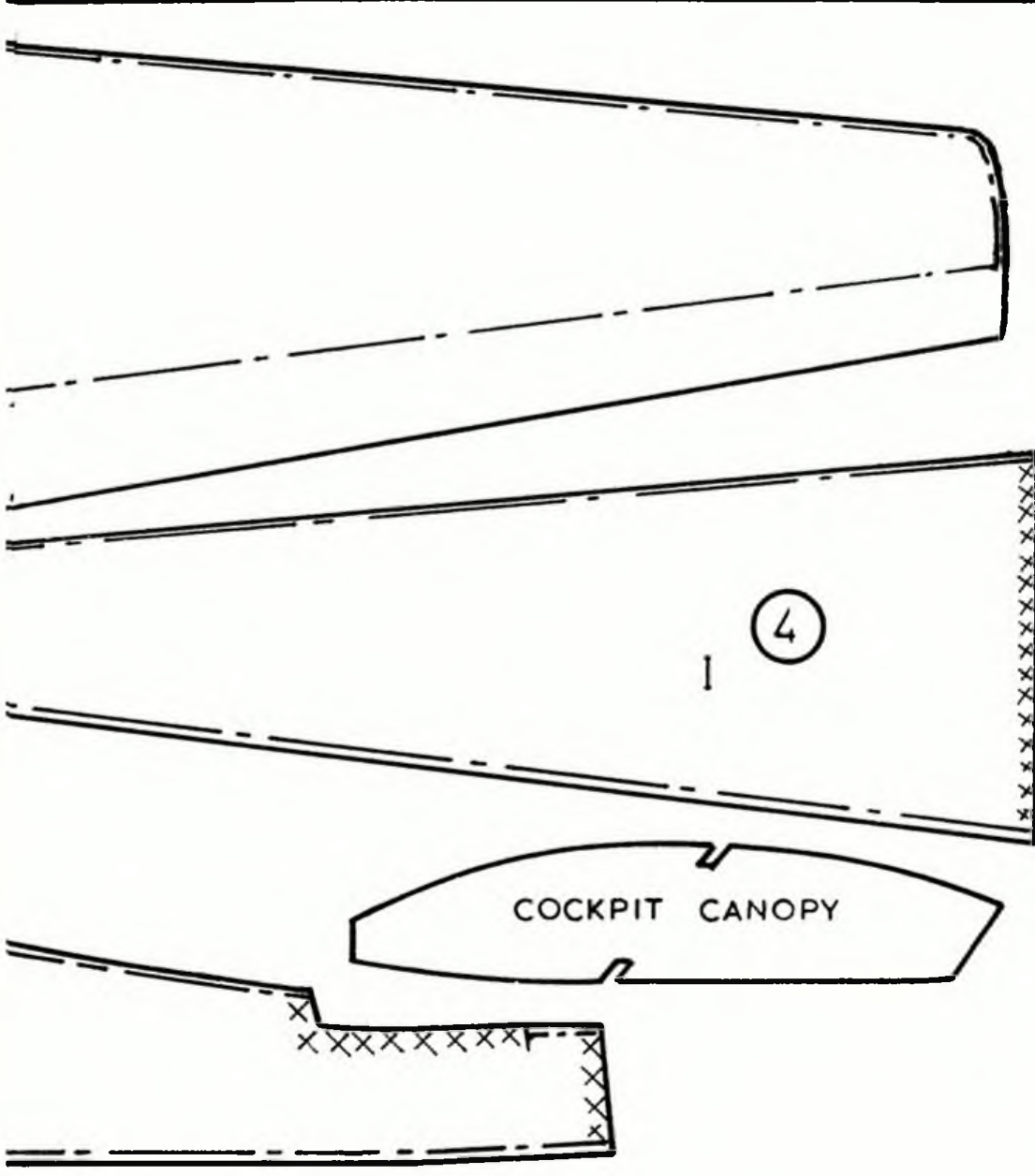
best without the burden of unnecessary decoration, but you can colour your model with anything that will not dissolve the foam! Try your choice on a piece of scrap first... Thinned plastic enamels are ideal.

This principle of construction can apply to all sorts of aircraft. Try some for yourself!

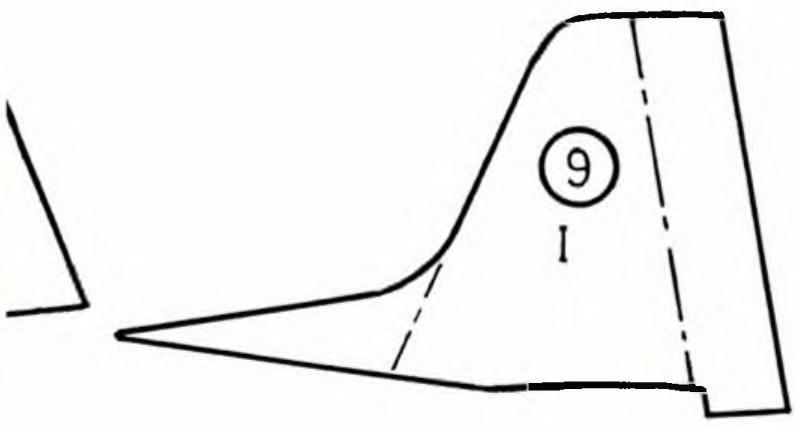
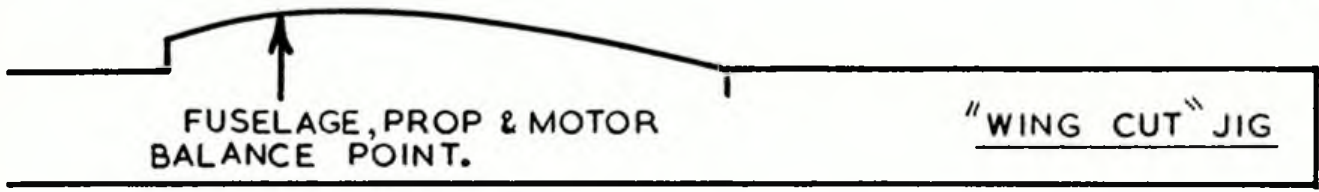
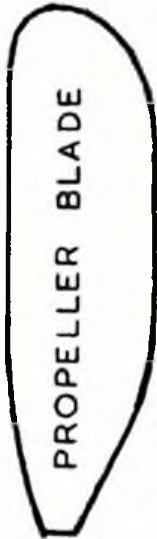




— — — — — = GLUE LINE, XXXXX = DO NOT GLUE
I = INSIDE OF CURVE, O = OUTSIDE OF CURVE.



PROPELLER
BLADE BLANK
FOUR OFF



Shorts Tucano

Full-size templates

Aerobatic Design

Part 2

Claus Maikis concludes his
exposition of F2B design
factors



ALL KINDS of wing tip shape have been tried, probably more for aesthetic reasons than any other. Theoretically a swept-back tip is best because it should reduce induced drag. I prefer this shape because it allows a long span flap without having to extend the flap to the tip itself. The real effects are too small to devote much thought on the subject, but some rules apply. Straight-cut tips will increase drag. End-plates? I doubt if they confer any advantage. And those small, vertical winglets (as seen a few years ago on a Chinese model) may very well cause more problems than solutions.

Line rake

Many aircraft are built with a fixed line guide, so line is an important consideration. To put it simply, our aircraft hangs on the lines rather like a pendulum. Now a pendulum hangs with its CG always vertically below the attachment point. In our case,

centrifugal force takes the place of gravity. Control handle, line guide and the model's CG position are roughly in one straight line. However, drag causes the lines to bow, so the line guide has to compensate for the slight rearward angle generated at point of entry to the wing. About three degrees is the generally accepted figure.

Tailplane topics

The tailplane is surely the second most important part of the model. A typical structure is from 3/8in sheet - or stringers - which gives a thickness of about eight per cent. The Nobler is a classic example. The section can hardly be called an aerofoil; flat plate is nearer the truth. Nevertheless, it works. Some enthusiasts, including Les McDonald, have increased the thickness to about one inch, creating a true aerofoil. It is claimed that the model flies more smoothly. Others, like Keith Trostle and Henk de Jong,

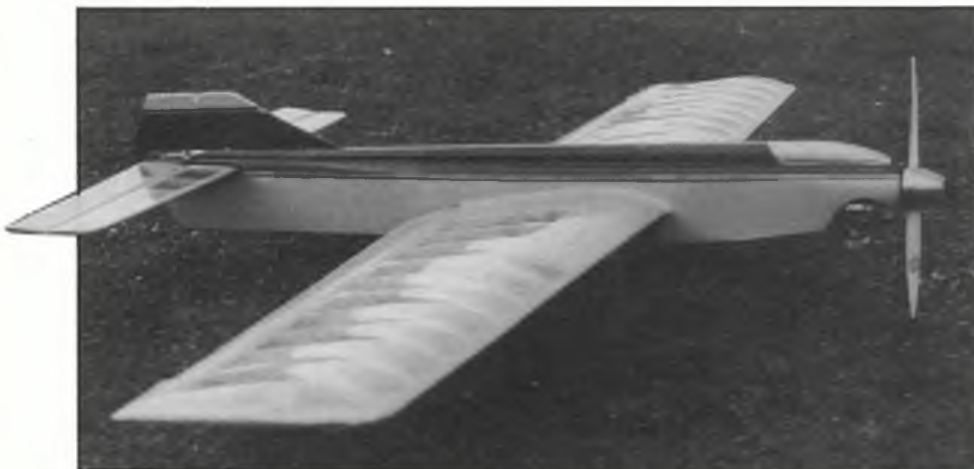
use tailplanes with a carefully-built, gutter-like slot to close the hinge gap, again to improve efficiency. This may well be true in theory, but I think it is too complicated. What about a thick-sectioned tail, but thin elevator? The aim here is to create less sensitivity around neutral because the thin elevator moves within the vortices of the thick stabiliser, needing deflection before it works efficiently. I have no experience of this, but I don't like the sharp angle needed before the elevator bites. This might cause flow separation and drag increase, even if the aeroplane is controllable.

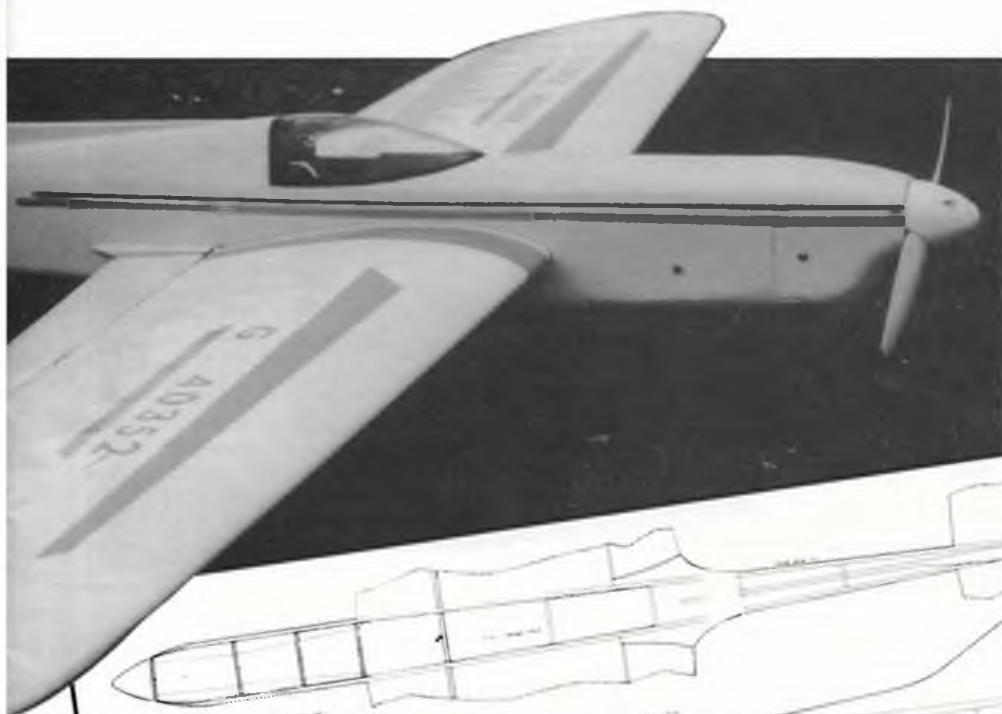
As a guide, minimum tailplane size is about twenty per cent of wing area. A little more is OK, but a smaller tail may cause problems. I've flown quite a few aeroplanes with small tails and they just don't behave well. Not only are they unstable in level flight but they show reluctance to fly tight corners. Such models will 'hunt' - a constant oscillation in level flight - at various frequencies.

Another positive effect of greater control surface area is the increased 'feel' at the handle, which helps us to control the model, caused by the higher surface loads. It's like driving a car; in a sharp corner we feel increased force at the wheel. In our case, the added load (actually shown as extra pull) helps us judge corner radius and to develop the right feel, and precise reaction.

Contrary to popular belief, a longer fuselage doesn't allow a smaller tail. We need a certain amount of stability and manoeuvrability, whatever improves the former will

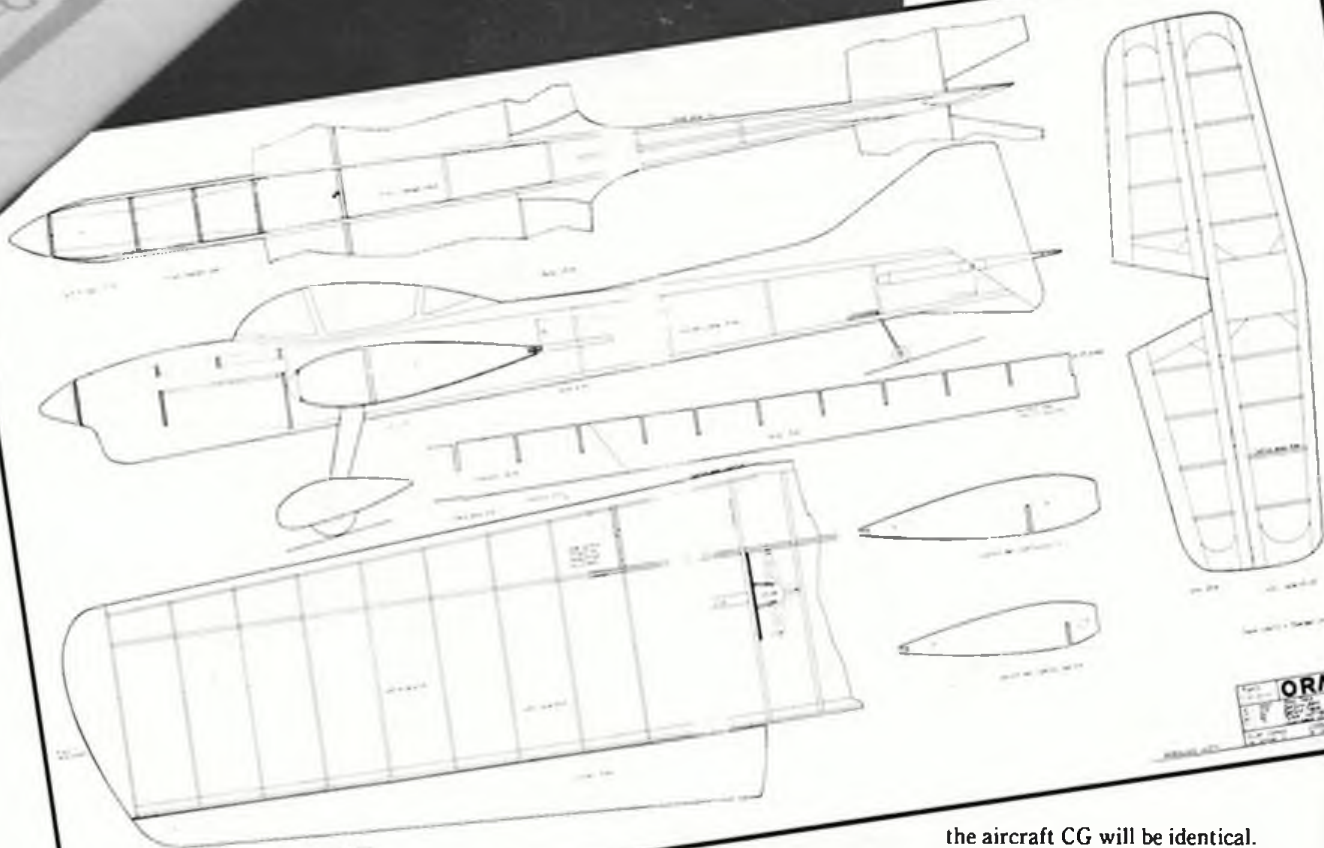
Contrast in style: Kenny Arbuckle's jet-styled lightweight looks sharp. Claus recommends using fuselage design to create your own impact.





Bill Draper's familiar Superhawk. This is number 31 in the series. Flaps end inboard of tips; integrated design looks good. Successful, too!

Semi-scale Orma-5 by Dionisio Furlan is designed for Super Tigre .46 power. Flaps extending to tips might not meet with Claus' approval, but model has been a consistent performer in Italian domestic competition. From Modellistica magazine.



also aid the latter. Practical considerations, such as the correct CG location, will prevent extremes being reached. And although the tailplane's efficiency depends upon the same factors that we discussed for the wing, beware - there is more to it than that. For example, Ted Fancher recommends a low aspect ratio. The increased drag - once the elevator has been deflected - seems to create a stabilising effect which helps the pilot in corners. Overshooting is reduced. A tailplane/elevator area distribution in the proportions 50/50 is recommended. If anything, the tailplane may be slightly larger.

Fuselage facts

The fuselage is only a means of holding together the engine, wing and tail. Fuselage dimensions, and thus moment arms, have been developed empirically to the best compromise to give comfort in handling, stability, and agility in corners. The nose moment arm is generally quoted as the distance from spinner backplate to wing leading edge at the root; tail moment arm

from hinge point. This is poor, because it takes no account of the wing and tail geometry. For example, imagine a swept-wing design where the wing root leading edge is proportionally further forward than usual. These definitions just don't work here. A correct system can only use the centres of lift of wing and tail as reference points. For practical purposes, we may also use the distance 'engine CG to aeroplane CG' as the nose moment, and 'aeroplane CG to elevator hinge as the tail moment. Not very scientific perhaps, but very practical when it comes to transferring data from one design to another. This way you can easily figure out nose moments with engines of varying weights - just multiply 'distance' by 'weight'. The same applies to the tail moment.

Nose moment arm

This distance should be as short as possible. A moment is the product of force, or weight, and distance; so the model may have the same moment if it is fitted with a light motor on a long nose or a heavy motor on a short nose. As long as the product: engine weight multiplied by nose length is the same,

the aircraft CG will be identical.

Provided that the CG is located correctly, this static balance is sufficient for level, straight flight. However, when the direction of moment is changed we enter the area of dynamic flight. Now we have to take other laws into account. The inertia of the nose mass - mainly engine weight - creates a force that still wants to move in a straight line. To change direction we have to apply a large force. Then to return to straight flight, the same force is needed again; and it's very difficult to do this quickly and accurately. The inertia is the product 'weight times movement arm squared'. This means that with twice the moment arm and half the weight, our model would balance at the same CG location, but turning ability would be much worse because the inertia would be so much higher.

Tail moment arm

The same goes for the tail moment arm, too. To keep inertia low we'd like to have a short rear fuselage. However, for stability reasons we need a long moment arm. CG location defines a clear limit here! The only solution is to build the tailplane as tight as possible. A low aspect ratio tail (as mentioned before) helps here. It will always be lighter to build... Stunt models are notoriously tail-

heavy. It is valuable to use a heavy engine! We have to decide what is more important; a low wing loading and a long nose, or more weight (caused by heavier engine or nose ballast) with a short nose - and better flying characteristics. My experience shows that a shorter nose is much more helpful on the exit from a corner; there's less danger of overshooting, and those occasional wobbles are all but eliminated. The fin could be placed anywhere. In order to create a reasonably symmetrical layout there should be some fin area below the tailplane. This brings the rudder beyond the tail.

Symmetry

Again we have mentioned symmetry. Because our aeroplane should perform equally well in upright and inverted flight, a fully symmetrical layout would be the best solution. This would require the engine thrust line, wing centre line and tailplane centre line all to lie along the same path. Nevertheless, there are some factors which

stifle creation of a totally symmetrical model; namely, engine weight, and landing gear weight and drag. A slightly lower wing position will compensate; and most stunt models are designed that way. It works quite well. The wing centre line is drawn about an inch below the engine thrust line, and the tailplane is set along the thrustline. Happily this also makes for easy pushrod installation.

Quite obviously, a low-wing configuration should be avoided, because the vertical position of the CG is actually higher than the line guide. This can cause the model to swing badly, and in extreme cases it can be impossible to fly accurately. So if we insist on a low-winger we must compensate with dihedral. The wing tips must be raised to the level of the CG.

Fuselage flings

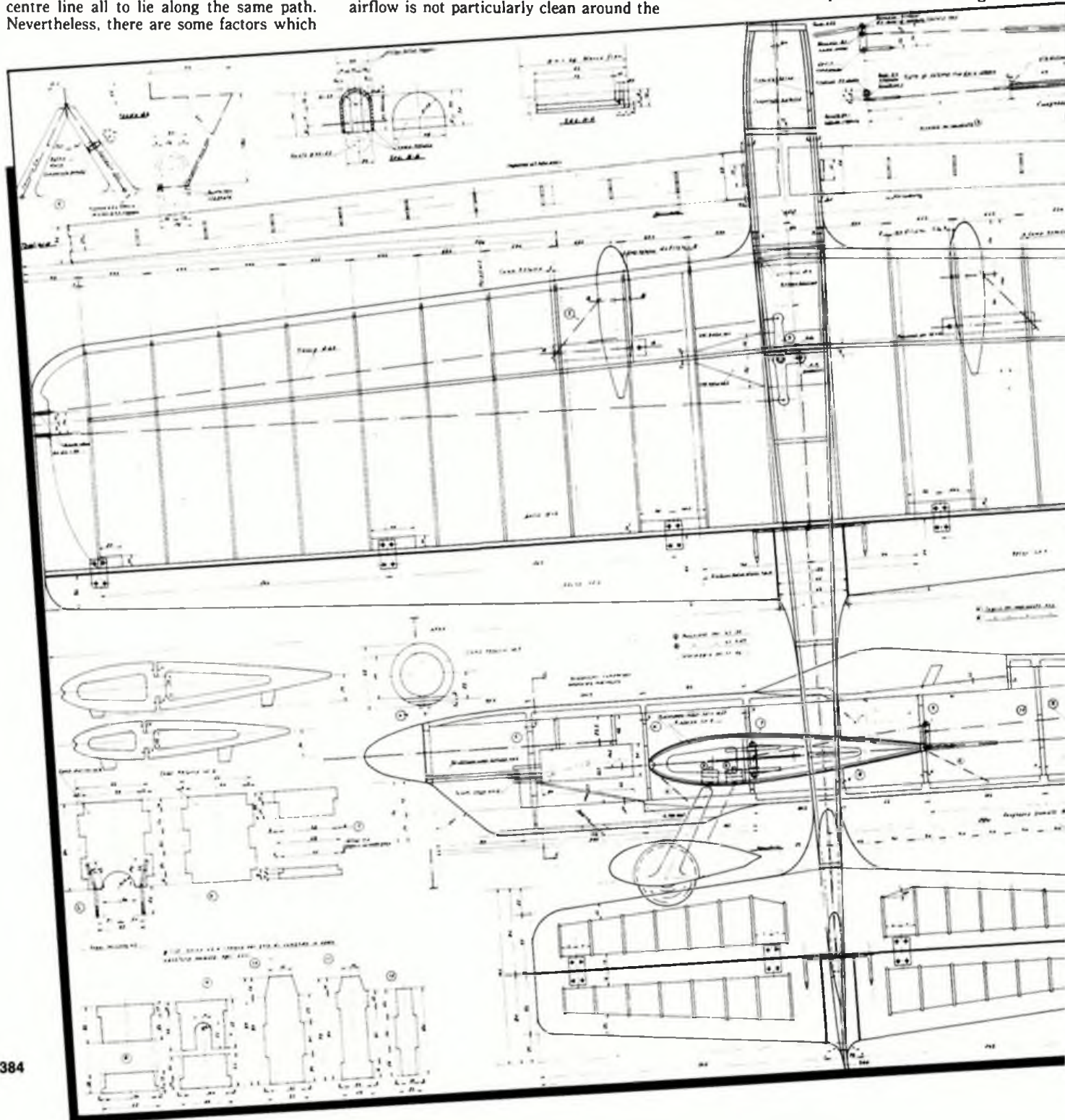
Designers can have their fling when it comes to the fuselage. We can assume that airflow is not particularly clean around the

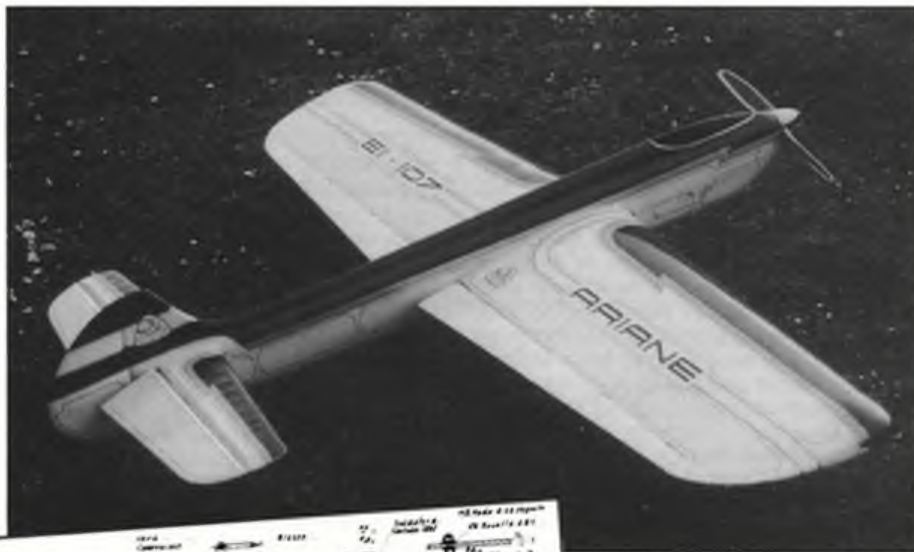
fuselage - so why not try some fancy shape? It has been argued that thick fuselages with large cross-section create too much drag, but I don't think this is a disadvantage.

Perhaps a 'draggy' fuselage might prevent our model from over-accelerating in the dive. But probably the drag increase may be neglected. Al Rabe has figured out that the very roomy fuselage of his Sea Fury increased overall drag by just three per cent. So nobody should feel handicapped by trying an unusual fuselage shape, so long as the propeller's efficiency is not impeded.

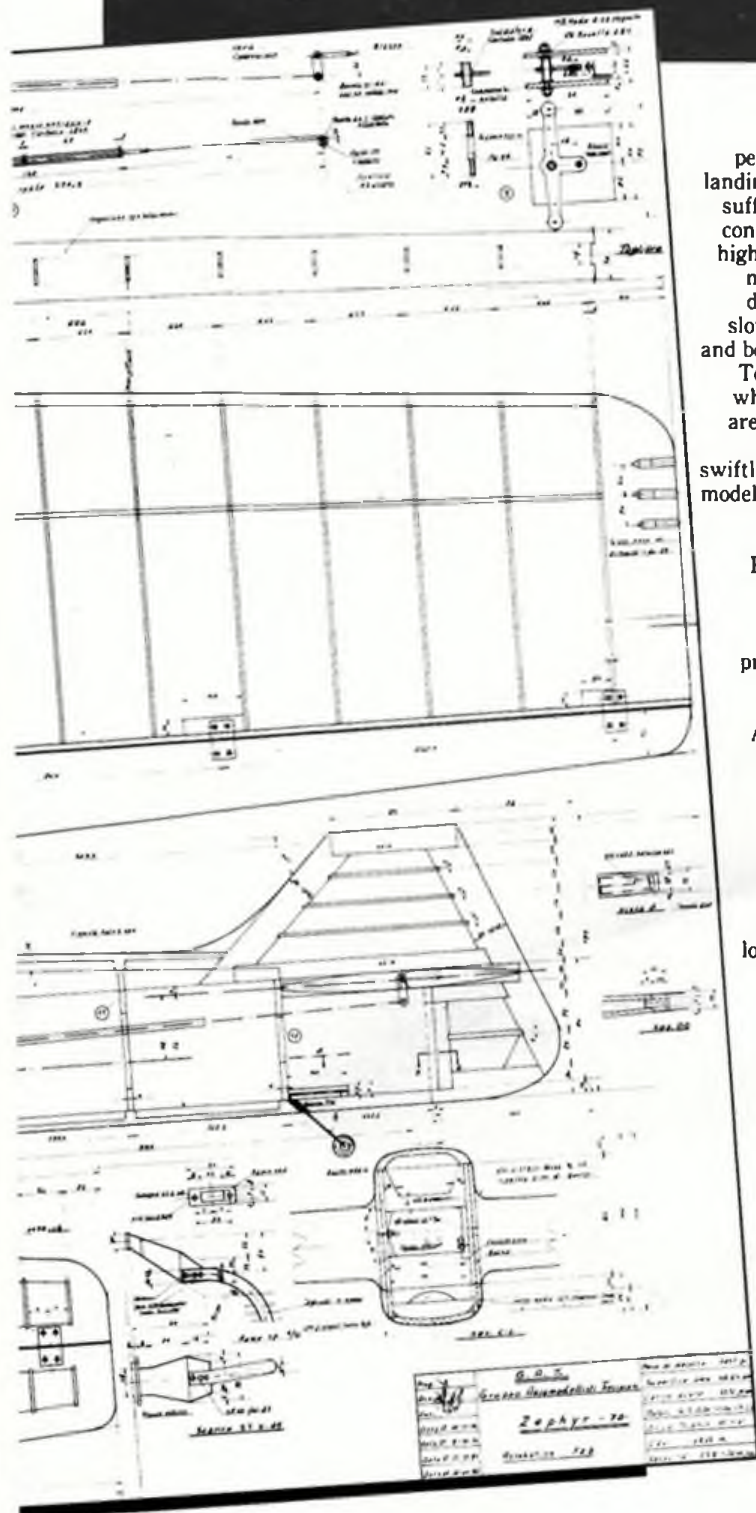
Undercarriage considerations

Most aerobatic models have a 'tail dragger' undercarriage. Despite widespread use in radio control craft, tricycle undercarriages have never really caught on in C/L. The Shark is a notable exception. While it may be easy to bang a model onto the ground on three wheels it's quite a different thing to





Left: Maurice Doyle always combines elegant design with classic F2B paint schemes. Latest in the line is Stiletto-inspired Airane. **Below:** More Italian secrets. Andrea de Marchin's Zephyr, Super Tigre X45 equipped. Lifting-surfaced fin used, rather than offset rudder.



perform a perfect, 'ten-point' landing. We normally land with sufficient speed to retain good control. At this point, speed is high, so we touch down on the main wheels only. As speed decreases, the tail descends slowly, giving a very realistic and beautiful landing (we hope).

Touching down on the main wheels of a trike gear, which are behind the CG causes the nosewheel to pivot down swiftly onto the ground, and the model may bounce. A two-wheel undercarriage is thus no disadvantage.

Position of the mainwheels is critical. Models for the beginner usually have a forward wheel location to prevent nose-overs and prop damage, but this usually causes bumpy landings. Actually, slightly aft of the optimum location is better than too far in front.

In most cases, taking an angle of twenty to thirty degrees, forward of the vertical, through the CG proves quite practical. Aeroplanes which sit very low and flat (that is, thanks to a tall tail leg) need

the lower figure. The larger angle is preferred for aircraft with long main legs, which are often necessary to cater for large props.

Tailwheel location may depend upon functional demands, or looks alone. A nose-high 'sit' will suit a scale, or 'nostalgic' looking craft - especially if you can manage that gentle landing described earlier. However, the take-off, especially on windy days, may be difficult. Particularly if a low pitch prop is fitted, the tail comes up rapidly and the prop may touch the ground. With a long tail leg, such as on the Gieseke Nobler, we can keep the model on the ground easily, for as long as we want. It cannot jump into the air because the fuselage is prevented from rotating. Take off occurs only when the wing is producing sufficient lift (at a low angle of attack).

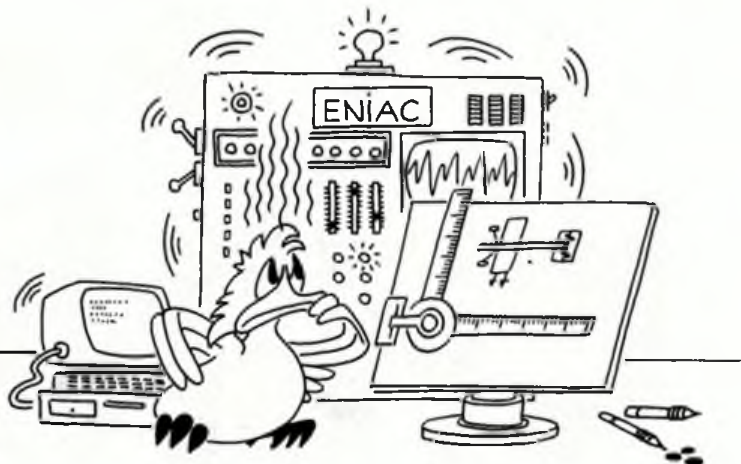
More, more, more...

Of course, there are many other features which must be considered when designing a stunt model, but in this two-part feature I wished only to discuss aerodynamic matters. You may think I have given little concrete advice. In which case - you're right! I cannot; no-one can. Remember - the Nobler, Stiletto and Genesis have all been World Champion aircraft - yet how different they are! It's not easy to improve on these designs. We may alter their flight characteristics to meet our desires, preferences or skills or the lack of them.

Craft which are destined to give high performance, and which have been developed over a long period, are refined to a very high level. Freedom is then very small. Errors and extremes have been ironed out. And it is my conviction that extremes are an indication of bad design. Just as in trimming, any measure must be used as sparingly as possible.

One extreme may gain an advantage in one direction, but it will certainly create disadvantages elsewhere - maybe in all other areas!

A highly developed design is a well-balanced one; but I wouldn't discourage anyone from trying his own ideas, based on sound knowledge. This is where I hope this feature has helped a little. Let us know the results!





A. Healey's 38in slot-winged sportster is just right for 0.8cc motors

I DECIDED that I wanted to build a model which would look attractive and would fly very stably. With this in mind I started looking at my stock of magazine back issues to get the old brain-box working. A parasol-winged design was one criterion – and then the notion of a slatted wing began to emerge. But there might be problems with covering the wing... Then I came up with the idea of slats that could be fitted permanently – or left off at will.

Next thing was to simplify the parasol wing mount – I hate having to mess about, bending and soldering fiddly bits of wire. A simpler strut fitting is a definite bonus. The results bear out the theory and motivation perfectly. Now – why not try Chindit yourself?

Fabricate your fuselage

Select medium-grade balsa and carefully mark and cut out the sides. Mark the positions of the formers and doublers, and fix doublers and 1/8in strips in place. I still prefer balsa cement for all but highly-stressed joints. Don't forget to make a left and a right side!

Cut out the formers. Note that F3 and F5 are slotted to take the cabane struts, so they must be accurate. Bend the undercarriage to shape, and bind and epoxy to the front of F3.

Fix the bearers next. Note the taper to allow the correct incidence angles. Cement F2, F3 and F4 to one side ensuring they are at right angles. The easiest way to do this is with the side on a flat surface; of course, the undercarriage, fixed to F3, must be allowed

to hang over the edge of the work surface.

Cut the cabane struts from 1/8in ply. The rails, upon which the wing sits, are from spruce. Epoxy the components together over the plan – again, make one 'left' and one 'right'. When this assembly is dry, slot the front lugs into F3; the rear lugs fit into F5 which is now glued into place in company with the other formers on their fuselage side. Follow this by carefully fixing the other side sheet. Pin or clamp together while everything dries. Taper a piece of scrap balsa to form a sternpost and glue this in place when the fuselage sides are drawn together at the rear. Do this over the fuselage top view to ensure equal taper. Add formers F9 and F10, the 1/8in strip, and the top formers F5A, F6, F7 and F8. Bevel the top edges of the 3/32in decking, glue in place and add the 1/16in top sheet, which must be carefully shaped and tested for fit. Add the piece of scrap balsa at the rear of the fuselage; then turn your attention to the nose and build up your cowl from soft balsa. Balsa cement is again the best adhesive because it sands so crisply, but allow plenty of time for large glued areas to dry before carving.

Smooth the cowl, rounding to a pleasant shape between F1 and F2. Drill bearers (allowing for a couple of degrees of sidethrust) and check fit motor. Cut cowl to suit access to the engine controls. Lastly, add undercarriage fairings and wheels. Cover fuselage with heavyweight tissue. Lightweight modelspan, slightly dampened, can negotiate amazing curvature if treated carefully so you may prefer to use this to cover the cowl.

The flying surfaces

Wings are built in halves, joined with a dihedral brace. A little extra work is needed to build the false ribs, top sheet and slat mounts. The slats themselves are cut from 1/4in balsa; you may laminate from thinner sheet.

Shape the rear curve first, then the front before carefully cutting the slots for the 1/16in ply mounting lugs. These must be a tight push fit in the false rib slots. Position the mounting lugs, then glue the slats in place, carefully ensuring equal alignment on both wings. When dry, ease out of the wings before covering with heavyweight tissue. The tissue over the false rib slots is carefully cut away with a sharp knife. A little easing with a fine file may be needed, but don't overdo it. Make sure there are no warps.

Empennage

Tail surfaces are simple to build. The tailplane centre piece is from soft balsa sheet, sanded to section and notched for the spar. Cut a 3/16in slot (over the plan for accuracy) to take the fin.

Thin aluminium hinges (cigar tubes or Steradent containers are a good source!) allow trimming adjustments to the rudder. Don't forget the tail locating piece which fits into a matching cutout in the fuselage. Cover with heavyweight tissue.

Finishing-and flight

Dope and colour to taste. You can go to town a bit as weight is not crucial. This could be your chance to try sunburst patterns, stars, stripes – or what you like. A dummy pilot also looks good.

A few test glides should reveal if anything is wildly wrong – but if you have built your Chindit accurately, and it balances where shown, there will be no problem. Try powered flight on half revs if you wish, but I always go mad and use normal power. Such is the stability of this model... Chindit will happily fly right on the stall, thanks to the flaps. It is most enjoyable, trimming to achieve this. In fact, you will find here a model which can be flown all day long, or as relaxation from your latest brainchild, so get ready to put a can or two of fuel through your favourite small diesel or glow this summer!

Plenty of wing area, plus slats, make Chindit a forgiving, stable flier.



CHINDIT

BALSA CUTTINGS

Cyano de Bergerac sniffs out a selection of aviation 'appenings

Correct for drift?

Knocking people who work hard doing their best for you is always bad business. In the first place it is ungracious, and in the second, they get fed up and leave off to see if you can do the job any better yourself. The last eighteen months or so have seen sad examples, reflecting little credit upon those whose readiness to complain has led to aeromodeling becoming the poorer by the understandable conclusion of two irreplaceable stalwarts that enough is enough. Many value and are grateful for the service they have given us, but fine words butter no parsnips, and we have treated these chaps badly.

So let us be a mite restrained when having a bit of a bind about the SMAE, and refrain from any stupid jokes about Some Mothers (do) 'Ave 'Em when we open the first issue of New Model Flyer. Therein, editor Peter Freebrey observes that the use of a new working title for the SMAE has caused some confusion. Surprise, surprise. This confusion was such that even his able pen was heavily overstressed by the laborious additional explanation he then most valiantly embarked upon. Although BMFA may, as claimed, say 'very clearly what we are about' one is left wondering whether, if the search for clarity had begun nearer home, the whole clumsily-operated idea would have been dumped as futile in the first place. It takes a lot longer to explain it than to use the old formula - 'The SMAE is the body appointed by the FAI to govern aeromodeling in this country.' Full stop. Fifteen words. The CAA and other outfits we deal with have never betrayed difficulty in grasping what we are about - can it have been the idea that if we adopted 'an additional working title' the Government, Sports Council and local authorities would exclaim 'Oh! That's what you are about! In that case, here for you are grants, flying sites and better understanding.'

Now the job done by the SMAE places aeromodeling under a debt of gratitude which can never be acknowledged by the mere payment of subs. It is probably better now than it ever has been in its long history. Don't let it slip back to those days when the ordinary modeller felt that Londonderry House was a thousand light years away instead of at the bottom of Park Lane, W.1. Let the SMAE reflect upon its own way of thinking, and orientate it more upon the practical realities of our hobby, without recourse to complicated, dead-end expedients like this one, which has to be bolstered up with over-bright meaninglessnesses like 'BMFA is the way ahead for the future' - lest BMFA should become the way *sideways* for the future. And this proliferation of emblems is not a good symptom. For years

and years we had only the classic SMAE cinema organ; suddenly we have in addition the BMFA Union Jack Football and the highly-aerobically depicted motto UWA - United We Achieve. Three logos seem rather excessive and a temptation for the uncharitable to suggest a fourth - the (hopelessly) entwined letters SFA floating in a vacuum. Nothing to do with Sweet Fanny Adams, although that is all symbolism will get for us. The call would just be - Stop Fooling Around.

It never Claude Rains but it powers

A vintage control-line model at Old Warden was making its circuits, and it seems that the ululation (good word, that) of the rather obtrusive motor was getting on the wick of a visitor standing at the nearby beer dispensary. A brightly chatty enthusiast at his elbow nodded and nudged and remarked on how the little Keil Kraft favourite took him back in memory to the Forties. 'Yeah,' said the first bloke wearily, 'I saw the film. Phantom of the Uproar.'

Watch it on CV

If the 'brutally frank' play about Air Chief Marshall Sir Arthur T Harris, GCB, OBE, AFC the BBC is planning for September is not so brutal and frank that it goes the same way as Channel 4's effort, which they reckoned to screen last year but didn't, it might be worth keeping an eye open. At the material times, Dowding did fighters and his oppo, Harris, saw to the bombers. By the cringe, Neddy, one way and another those two have taken some stick! Send for your copy of the (revised) Harris job description - today! 'Leading a successful and fully-motivated team will sometimes involve working a totally-dedicated 168-hour week. Above all, applicants must possess a flair (flare?) for dropping an unprecedented tonnage of bombs without causing resent-

ment amongst the recipients, or offending, fifty years later, the comfortably-removed and finely-tuned susceptibilities of those for the security of whose future the bombs are to be dropped in the first place.'

The ghostest with the mostest

From a suggestion on how an old Galloping Ghost actuator might be used in conjunction with modern 35MHz FM radio gear - 'Most will recognise the function of T1 as a 1/2F oscillator and T2 as a frequency doubler and RF amplifier.' Yeah, well, of course, *most* of us did. (Wossa 1/2F oscillator?)

Once apun a Times it was even worse

That aeromodeling writer who complains about punning paragraph headings should be grateful that he missed those really bad old days when The Times was going through a painful phase of addiction to this terrible habit. As the police investigation proceeded into the case of a lady who had been rather cruelly used in a churchyard, a bit appeared under the announcement 'Tombstone Murder - Grave Implications.'

Vote for Cyano

What this country really needs is someone to sort out the soft drinks industry once and for all. Always on the plan you're being told that it's just the thing to use, but have you ever *tried* to make a cockpit canopy out of a plastic lemonade bottle?

Fun for future fetchermite

Mary had a little duck,
She also had a model,
And always knew the difference for
The model didn't wodel.
She covered it with tissue
But it always came unstuck.
Perhaps that's why it doesn't fly.
The model? No - the duck!

Mighty R/C Short Skyvan at the 1988 Large Model Day tempted one stalwart of the CAA to comment that a small child could be given joyrides quite comfortably..!



High

potential

I HAVE had several interesting letters in the past couple of months, most of which have been asking for information on sources of nicads, or queries on charging these. It is worth repeating that overcharging at a fast rate can damage your cells, but if you restrict the charge rate to 1/10th of the nominal cell capacity, then you can put the pack on charge overnight and forget it quite safely, just like your normal R/C receiver packs. As an example - if you have some 100mAh cells, 1/10th of this is 10mA, and this is a suitable rate to charge them for an overnight session. You can use a standard R/C charger with a variable resistor in the line to cut the current down to the required value. A 100 ohm variable resistor, or thereabouts, should do the trick with three or four-cell packs. Standard R/C type chargers will run out of steam if you try and charge more than four cells since they have their output voltage limited to suit the standard four cell or 4.8volt packs used almost universally in modern R/C gear. An alternative to all this is to completely flatten your pack by leaving it switched on (overnight if it is a receiver pack) and then calculate how long you can afford to leave it connected at the standard commercial charger rate of 50mA. Thus a 100mAh pack will only need two hours; leave it connected for longer at your peril. In fact, most modern cells will stand a fair bit of overcharge at hourly rates, but you will reduce their life. One thing that definitely has to be avoided is overcharging at rapid rates (where the charging period is measured in minutes rather than hours). The little holes in the top of so-called vented cells are there to relieve internal cell pressure as gas builds up in an overcharge situation. If you hear a cell 'pop' then this is a bit of gas escaping; for every 'pop' you lose some cell capacity!

Meter it out

All this talk of charging and measuring voltages and currents leads me to the subject of meters. I have been asked what is a suitable instrument to buy and use. Personally I have an ancient and rather cumbersome AVO meter which is still accurate, but it is not obtainable now at any sensible price (they always were fiendishly expensive!). One of the problems is that we need to measure quite substantial currents (up to 10 amps, but low voltages.) This tends to preclude the use of cheap meters. However, the situation has, fortunately for us, changed with the introduction of low-priced multimeters from China and Taiwan. A meter specially selected for model electric flight applications has been recently introduced by MFA (Chart Micro-mold) and this should be obtainable from your local model shop at about £30. This is a digital display meter of high accuracy, especially on the critical voltage ranges. It seems to be good value and should complement well the existing MFA range of electrical goodies. As a cheaper alternative you could consider an analogue meter (one with

Meter matters and other electrifying affairs

wired up by Chris

Coote

a needle or pointer). One company which provides a good range is: Circuit Distributors, 53 Burrfields Road, Portsmouth, Hants PO3 5EB. Their telephone number is 0705 669021.

The cheapest meter, at only £4.60, is type HM101; stock number 56-01010. This measures voltage and 0-100mA current range (it is OK to monitor overnight charges). Accuracy is limited but what do you expect for the price!

The next in the range, which can measure current up to 10 amps, is model HM102BZ, stock number 56-01020, at £10.60; but note that it is only accurate to five per cent and drops 0.5volt when measuring ten amps, so it will slow the motor a bit.

The best compromise is probably model HC2020S at £14.05. This measures to 10amps with three per cent accuracy and only 0.25volt drop. Its stock number is 56-02020. All these prices are subject to a postage and packing charge of £2.75, plus 15 per cent VAT on the total. Still excellent value for money!

VFM

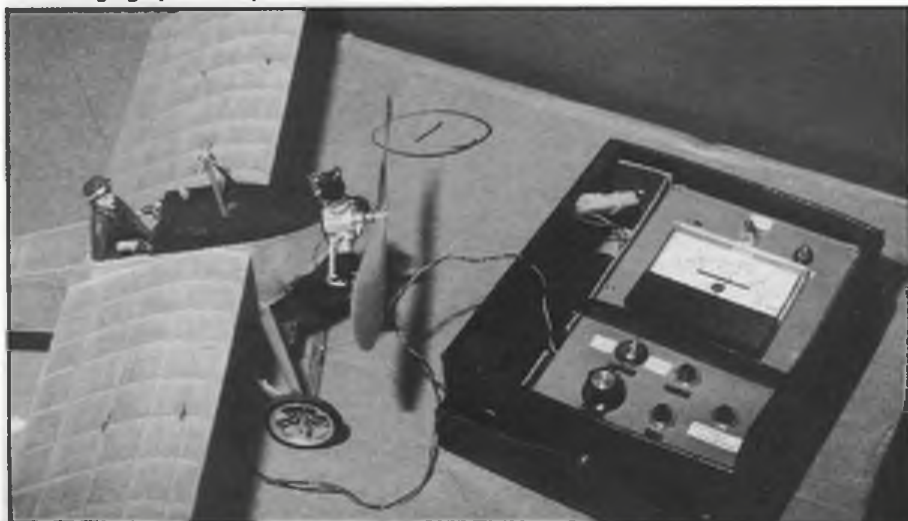
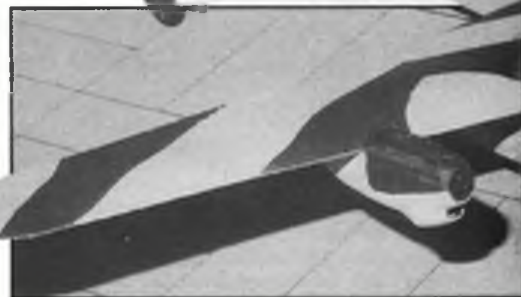
On the subject of value for money, it continues to surprise me that there is such a wide variation in the prices of basic electric motors. My favourite size for outdoor, general knockabout F/F models is the so-called 380 size. A standard winding 380, as sold for model boats, is currently offered in my local shops for £5.99. This is quite a good performer if you use enough cells (my standard setup is six 225mAh and a 6 x 4 prop) but I recently picked up a nominally identical MFA '02' motor for £3.95 in the same shop. On closer inspection this had a heavier winding (fewer turns of thicker wire) and running it in soon

Dave Hanks' winning Eastbourne Monoplane - see March issue for details - plugged in and charging up. A compact unit.

showed a significantly better performance on fewer cells. The same motor is also sold in a flight pack with a five cell battery pack and switch harness for £19.95. I used a made up pack of five new type 600mAh Sanyo pencils for initial trials. As usual, I ran it on the bench with various props using my optical tacho to record a few typical prop rpm figures, before flying it in my C/L testbed. On a 7 x 4 Topflight nylon it produced 8,250 rpm compared to the standard '380' figure of only 7,000 rpm. This means a power increase to the propshaft of no less than 63 per cent! Of course, this is only obtained at the expense of increased current consumption. Both these figures were recorded using the five cell Sanyo pack. On a more typical 5.25 x 4 Topflight nylon, initial rpm of 13,500 (dropping to 12,500 cruise at nine amps) was recorded. After two minutes 11,500rpm was still available, dropping to 10,000 at three minutes. A quick check on fusing showed that there was no real drop in rpm using a 20mm long, 6.3amp type, and this blew straight away when the motor was stalled by the crude expedient of chucking a cloth into the prop! Performance in the C/L testbed was really quite sparkling despite the increased battery pack weight, with the added bonus of a reasonable flight duration of three minutes-plus at good power.

Nats natters

I recently attended the Indoor Scale Nats at Alumwell and am very pleased to be able to report that electric models once again took



Below: Twin-engined Lancaster by Dave Hanks now reduced in weight to 118gm. Shows promise despite trimming damage. Centre: KP motor in Nick Peppiatt's Sopwith Tabloid replaces Brown CO₂ unit.



Standard Sanyo Cells					
Type No.	Capacity (mAh)	Internal Resistance (ohm)	Dia (mm)	Height (mm)	Weight (gm)
N-50 AAA*	50	55	10.5	16.0	3.5
N-110AA	110	30	14.5	17.0	8
N-120TA	120	34	7.8	42.5	7
N-150N	160	27	12	29.5	9
N-200AAA	200	21	10.5	44.5	10
N-200A	200	20	17	30	11
N-270AA*	270	15	14.5	28	14
N-500A	500	9	17	50	22
N-600AA	600	12	14.2	28	26
Specialised Cells					
High capacity					
N-225AE	225-245	20	17	17	12
N-600AE	580-630	8.5	17	28	22
Fast charge					
N-450AR	450-500	9.0	17	28	19
N-600SLR	600-660	5.5	23	26	29
*Recommended					

scale version of the Heath Baby Bullet. This pre-war racing monoplane with its pointed spinner and minute tail area has always attracted me but I have never had the courage to try it! In this case the tail area has been enlarged for safety and a two-cell (50mah capacity) setup used with a remote battery pack for a KP01 power unit. At 62gm and only 18in wingspan I reckoned that it would be marginal on power due to the relatively high wing loading, but certainly on three cells it will go like a real racer should.

One of the attractions of indoor flying is the wide attraction of the events to modellers of different persuasions. At indoor meetings you can find modellers more well known for fast and large R/C jobs having lots of fun with models that could fit inside the fuselage of some of their other efforts. Two such gentlemen, in the form of Brian Harvey and Squire Kay, were seen with electrics. Brian's Fairy Long Range monoplane was a worthy and unusual entry in the CO₂/Electric event. This 100gm model needed a bit more trimming to give of its best but certainly did not suffer from lack of power with its three-cell standard KP01 unit. Squire Kay had come along with a very neat version of the Interstate 6 American high-wing monoplane. This 28in (3in chord) model weighed in at 62gm with 2 x 50mah cells to power its converted Matchbox toy motor. It flew very easily, illustrating the advantages of low-wing loading for realistic flight on low power.

A really nice first time electric was Brian Roberts' neat conversion of an old Aeromodeler free plan for an electric RTP Fokker E.III. This was designed by John Simmance, and appeared in the Jan 1964 issue. Brian's fully painted version with KP01 and two 50 mAh cells flew well at 50pm - although he is a noted builder of this weight - his KK Super Cruiser won Kit Scale for the third time this year.

Finally this month I have some details of the latest range of nicads available from Sanyo. The enclosed table shows the most useful small sizes. My favourites are marked with an asterisk. You may care to calculate the energy density by seeing how much capacity you get for a given weight, and look to see which cells have a low internal resistance and thus good capacity for supplying large currents with minimal internal voltage drop. The new high capacity cells in small sizes do not seem to give much advantage, but certainly from personal experience the more expensive rapid charge cells in the red cases, do give better output at high current levels. See last month's issue for retail sources or persuade your local shop to open an account with Technicad (the UK distributors in Blandford Forum).



Derek Hardman's fine-flying all-foam Spitfire weighs 70gm for KP power. See text.

top honours in the CO₂/Electric event. First place went to Dave Hanks, who flew his lightweight Eastbourne Monoplane. This scored well in static and had the best flying score of all after a superbly realistic second flight. Close behind was the man of Indoor electrics, Derek Knight, with his familiar silver Tiger Moth, powered - of course - by one of his own standard KP01 units. In an all too short conversation with Derek he told me that he hopes to be able to put together a few of his double motor KP02 units in the near future, but only to order. Also, he pointed out that the photograph of his Fairchild Argus in the last issue was wrongly captioned, since it does in fact fly on a standard

4:1 geared KP01 and not the special low geared unit as stated. It does need four cells to guarantee sufficient excess of power for reliable ROG's in the often windy outdoors at Gosport!

Because of my involvement in organising talks and demonstrations at this meeting I did not have much time to look around at the numerous non-competition models at this meeting. However, I was able to catch up on a few - and one group of models which caught my eye were those of Derek Hardman. To those of you who do not recognise the name, he is the man who makes Solarfilm products. These were not much in evidence on his indoor electric models, but I am sure that Litespan is well suited to larger outdoor electrics. The most appealing model to me was a largish all-foam Spitfire for KP01 power, which tipped the scales at just 2.5oz or 70gm on my scales; light for a 25in model with full fuselage. Needless to say this flew very well, and once in the air the lack of finish on the foam was not apparent. Derek had sprayed the whole model in sky blue acrylic to represent the photo-reconnaissance version of this most attractive subject. His other model was a standard version of the miniaturised Scram vintage free flight job kitted by Andrew Moorhouse. This was fitted with a Matchbox toy motor and gear system from the toy car illustrated in the High Potential article in May. The Scram flew quite fast on two cells and would be equally at home outdoors despite its low weight of only 52gm. The latest of Derek's models was a very neat

VINTAGE CORNER

More on old-time compressed air affairs.

Latest update from Alex Imrie



THIS COLUMN'S compressed-air article in the May issue was well received; the response from some of our top modellers is most gratifying and is bound to lead to the hoped-for renaissance of the compressed-air model in this country. Tony Turner has briefly recounted how he was first attracted to this form of power and informs us that he is presently making the lightweight horizontally-opposed 1929 engine designed by Major Landis. He plans to install it in a 60in model; it will drive a 15 in propeller. We look forward to a progress report.

Tony used to fly his scale SE 5 on Epsom Downs in 1947/48 and in conversation with P E Norman, who was another frequenter of that famous flying ground, he learned that PE had tried compressed air and still had his engine. He loaned it to Tony who was greatly impressed with '... this simple kitchen table made brass engine which ran with a beautiful whistling sound'. So Tony got the bug and after reading D A Pavely's 1947 *Aeromodeller* articles he made a point of visiting him to ask about compressed air. Pavely showed Tony some of his engines. These were mainly experimental motors that had been built to order. He told of his early days when, with his brother, he made air containers and tested them to destruction wrapped up in a roll of carpet. When the half copper ball valve ends blew off at around 200 psi there was just a dull thud! Tony made his Camm engine some 30 years ago and it has run for many hours in the interim. The best flights that he has been able to get from his models using this motor are in the region of 30 to 40 seconds; however, says Tony, 'the thrill of seeing your home made engine run and fly for the first time are the high points that make this activity worth while.'

This typical 1930 American compressed air model was powered by the three-cylinder Dobe-Ott engine with enclosed crankcase. Can anyone identify these two Chicago enthusiasts? Below the rarely-modelled 63in Bowden Moth. This version with non-standard vertical tail surface was built by Tony Penhall. An all-balsa lightweight version could easily fly with compressed air...



Doug McHard advises that Bert Pond can supply Whirlwind engines at a cost of \$39.95 plus delivery, and can also make the three-inch diameter, 24 inches long brass foil containers to order, but Bert points out that because of moisture, and the corrosive action of the soldering fluxes, the containers are really only good for some twelve months – the best bet would appear to be the use of plastic soft drinks containers and as mentioned in an earlier article, Jack Humphreys has submitted details of various methods of using these and joining them to increase the capacity of such a container. Obviously, a simpler approach would be to use a single plastic bottle as on Bert Pond's models; this might produce a regular crop of Bottle Babies!

Jack tells us how...

'Although Bert Pond uses steel or other solderable metal screw caps on his bottle tanks, I have searched high and low in this country, tried every bottle and can, but cannot locate anything for this purpose other than plastic. This is the reason that I was compelled to use a flanged plug and had to select bottles whose flanges have parallel faces and are of large enough diameter to allow bolting together with three or four bolts (8 to 10 BA) with the use of epoxy or similar adhesive to improve the air seal. Some bottles have a smaller diameter flange and do not have parallel faces, but it is still possible to use this type of bottle although the bolts tend to bend on tightening-up due to the flange face not being at 90 degrees to the bolt hole. The plugs used to fit into the necks of the bottles incorporate a tyre valve for charging the bottle and a means of supplying air to the engine. These were turned up from either aluminium or nylon; both could be drilled and tapped successfully but brass screwed adaptors had to be used to solder the small diameter brass supply pipes to the motor connections since these small tubes were too

thin-walled to allow them to be threaded.

(Obviously, the plugs could be made of brass, thus allowing the motor supply pipe and charging valve to be soldered to the plug, so there is plenty of room for experiment here...GC). See Fig. 1 for a diagrammatic explanation.

In order to increase the capacity of the plastic air container it was necessary to connect tanks to each other and I did this at first with 3/32 in internal diameter brass or copper tubing connected to plugs in the necks of bottles, but later this was changed by using a 1/2in diameter aluminium nut and bolt with a hole drilled through it. A half-inch hole was then cut in the base of each bottle and using two thick aluminium penny washers under the nut and bolt heads with a thick washer cut from half-inch internal diameter nylon tubing on the bolt between the bottle bases gave a satisfactory air seal when tightened-up.

When two bottles are connected in this way, if the holes and washers are not dead central the bottles will not lie in the same plane when pressurised; also each bottle has to be supported individually and the misalignment was a nuisance. However, there is no reason why two bottles cannot be connected via their necks and a suitable fitting used on one of the bases to take the motor and the charging valve. Fig 2 shows this method diagrammatically. The plug connects the two bottle necks and is bolted between the two neck flanges; this lines up the bottles accurately and results in a rigid container that only requires to be anchored at one place; also, if the joining flange is made thick enough it can incorporate the tyre valve for air charging. The motor attachment bolt which is drilled out for air supply to the motor can be made up to incorporate a large head curved to suit the internal curvature of the container base, or if an ordinary bolt is utilised a dished washer has to be used under the bolt head. Epoxy is used on one side and a thin rubber washer (cut from an old cycle inner tube) on the other, underneath dished washers in both cases. If this bolt is of brass or steel connections to it can be soldered, but if plastic or aluminium is used it is, of course, necessary to screw and tap a brass insert. The motor can be easily mounted on the protruding end of the bolt. The dished washers can be from aluminium, brass or copper and are easily made using a large nut or metal ring and the end of a ball pein hammer and squeezing-up to the desired curvature in the vice.

It is essential to have an on/off valve that allows full pressure to be delivered to the engine with the least possible delay. I used a model steam engine cock which is ideal, expensive to buy and quite difficult to make; it is, however, heavy, although it can be lightened by careful filing away of unwanted metal. I have tried a needle valve but it needed a coarse thread for quick, full-bore supply; and air leaked at the threads. A finer thread reduced the leakage but was, of course, slow to turn fully on. A great deal of the first burst of air power can be lost if the motor and model cannot be started and launched immediately, in fact these actions must be almost simultaneous. A simple push/pull air valve using very small O-rings might be the answer and Fig 3 shows the modus operandi. Note that when shut the tank pressure tends to hold the valve closed so no additional locking device is required. I lost my machine

Fig 1

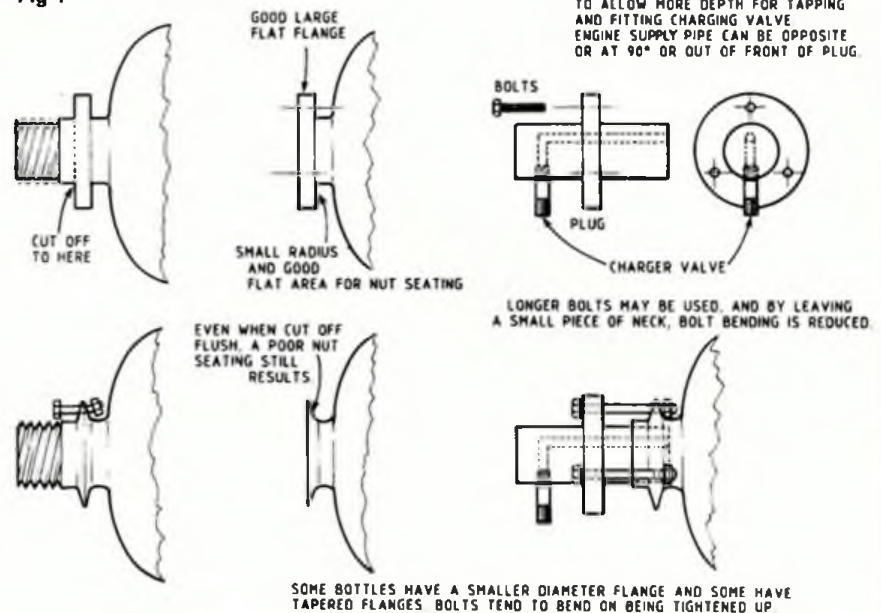


Fig 2

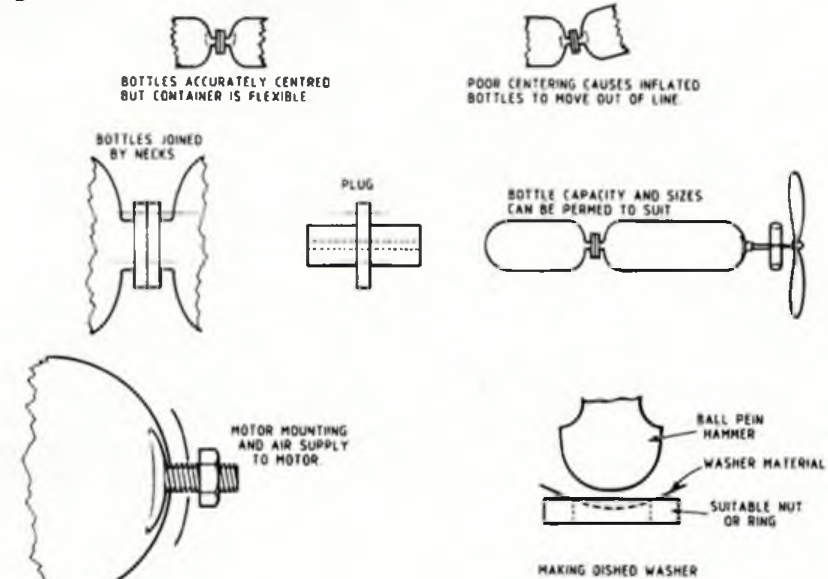
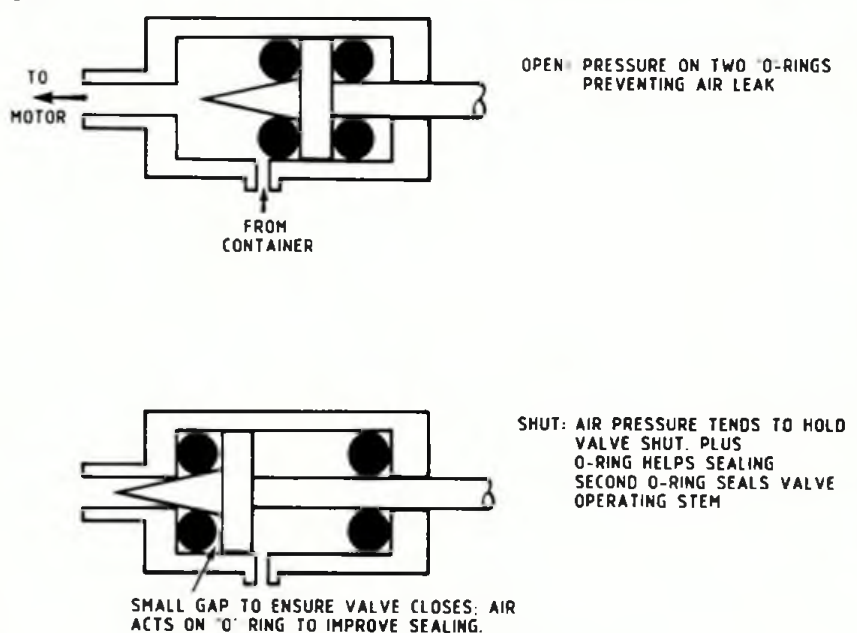
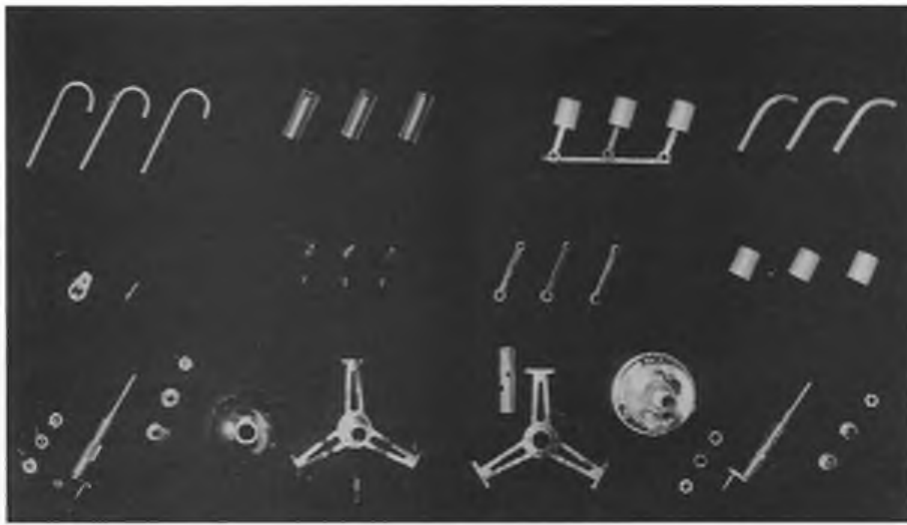


Fig 3





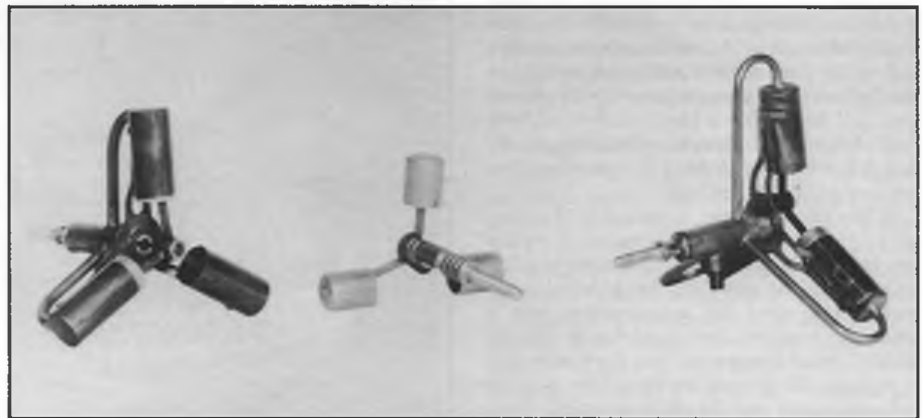
Left: Component parts for Joe Ott open and enclosed three-cylinder air engines.

Below: Variations of Joe Ott's Sky Flyer 3C engine with piston/crankshaft assembly. Lightweight pistons are essential; those shown are made from aluminium. Piston/cylinder clearances should ideally be under .0005 inch. Foot of page; dimensioned working drawings for making the Joe Ott three-cylinder compressed air engine mentioned in the text. This engine is similar to Bert Pond's currently-available Whirlwind of 3/8in bore and stroke.

shop facilities before I could make this on/off valve so it is offered here merely as a suggestion and doubtless can be improved upon.'

Joe Ott three-cylinder engine

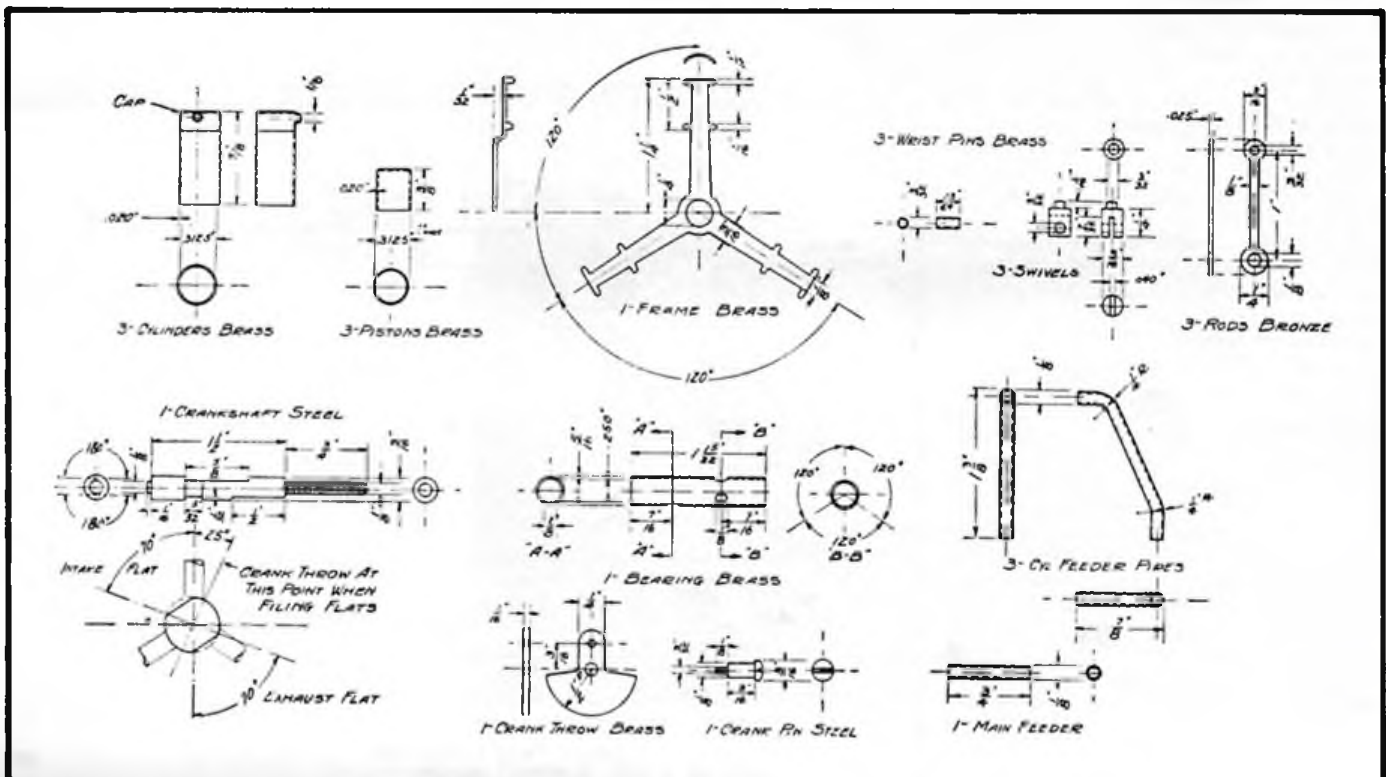
The building instructions for this engine appeared in Joe Ott's book *Model Airplanes: Building and Flying* published in 1931 and Peter Martin, 16 Ashfield Court, Middleton Hall Road, King Norton, Birmingham, B30 1AF can supply xerox copies for 90p plus postage. Jack Humphreys has made several of this type of engine and considers it to be entirely satisfactory. It is quite common to find that dimensioned parts on a model engineering drawing do not always match up, and it is wrong to assume that one can make all the parts individually and expect them to fit one hundred per cent. One must work carefully continually checking and modifying slightly to ensure a perfect fit. Bert Pond has already commented that Joe Ott's drawing was not checked carefully enough for accuracy and completeness before publication. He brings our attention to the fact that the 3/16in crankshaft in the 1/4in internal diameter bearing will leak air! Also the hole size in the centre of the piston and the actual size of the swivel rivet that goes through the piston crown are not given. Obviously the crankshaft must be a good fit in its bearing and confirmation that the



discrepancy mentioned is entirely a slip on the drawing is shown by the 'materials required' list in Joe's building instructions which calls for brass tube of 3/16in internal diameter, for the bearing. Also, he explains some of the other drawing shortcomings, when under the heading 'piston swivels' he says '... Dimensions on the drawing have been eliminated on purpose, because it is not necessary to maintain any particular size, except that the parts are not too heavy and have sufficient room to operate within each other.'

The engine is stated to be of 5/16in bore and stroke, but I see that Peter Martin quotes

the stroke as 3/8in. In fact, depending on the size of the tube used for the cylinders, the bore could vary as well - without any detrimental effect. I have in front of me as I write two lengths of K & S 1/64in-walled brass telescopic tubing that would be ideal for the fabrication of pistons and cylinders, the largest tube being 3/8in outside diameter, giving 11/32in inside diameter. All model shops stock this material, and they also have brass sheet suitable for the other parts, like frame and connecting rods. You will require a four-inch length of 3/16in diameter mild steel for the crankshaft - and make sure that your two-inch length of brass tube for the



bearing is a close fit on the shaft material. This is the easy way to compressed-air engineering - making sure that the basic materials are perfect fits to start with before you set about them with hacksaw and file!

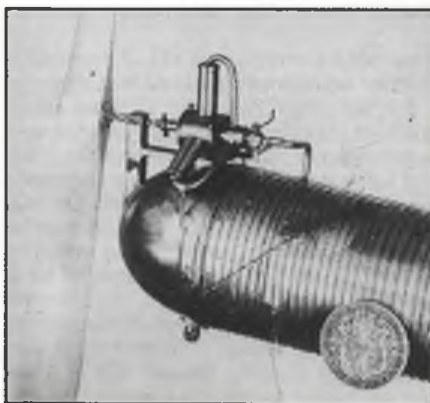
Bert Pond Postscript

In my review of Bert's book in the May issue I did not mention Bert's enthusiasm for what he calls the 'Gun-Bus' type of compressed air model ('Gun-Bus' was a name used to describe the Vickers FB5 pusher two-seater of 1915 that carried a machine-gun on the front of the nacelle whence it had uninterrupted forward fire) and in a recent letter he writes: *'.... if people had never been injured or killed by the engines crushing them, I am sure that there would be many more such "Gun-Bus" types of larger planes today. So, our modellers build the big ships with the model engines out in front where they get banged every time that it hits something. Since air engines are more subject to injury in this fashion, I naturally believe that for models the safest place for the engines to be located is behind the wing. Easier on the pocketbook too!'*

It was the vulnerability of the compressed air engine that perpetuated the 'toothpick' skids used by D A Pavely (amongst others) and also the reason why R J Trevithick used the easily-straightened crankshaft extensions shown in some of this month's photographs - so aspiring compressed air model designers would do well to take heed of Bert's suggestion and make a pusher.

Bert joins the hemi-spherical ends of his plastic bottles in a similar way to that described by Jack Humphreys but cuts threads in the bottle holes and tightens-up the hollow threaded bushing and nut (sealed by epoxy) with long socket extensions and then uses a string fillet of at least one inch diameter to stiffen the joint between the bottles, the string having been previously coated with contact cement. His use of metal screw caps on the bottle necks enables engine air supply pipes and charging valves to be attached by solder - a far simpler and lighter job than the fabrication of special plugs. Joining bottles by the necks is also simplified by the metal screw caps since they can be soldered together and the join can incorporate the necessary connections also by soldering. Another aid that Bert uses is a tubular 'tee-piece', the end of the vertical arm being soldered into the metal cap, and any number of bottles can be connected by plastic hose wired onto the horizontal tubes. This is a good idea as long as your model is designed to house the different bottles! I expect Bert will be deluged by requests from British modellers for metal screw caps to fit the threads on a Tizer bottle and for the tubular metal 'tees', and if he can find a source of supply for both of these items he could include them to his compressed air accessories listing with advantage.

We have heard again from Bert Pond, who advises us that to avoid problems with currency exchange, UK readers should send \$23.15 to ensure surface delivery of his splendid book. Payment should be by banker's draft or IMO. Please do not send personal, sterling cheques.



Top and above: Enclosed two and three-cylinder motors mounted on brass foil wire-wrapped containers by R J Trevithick. Note simple on/off air valves, detachable crankshaft extensions and front bearings on both installations.

Lesser evil

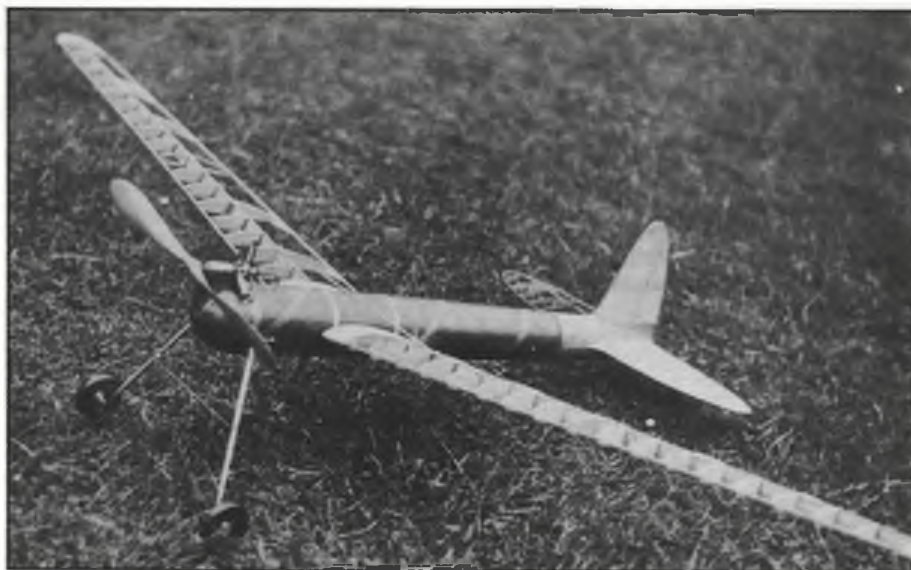
Mike Patience of Wellington, New Zealand, who made the replica Elf engine that powered my model of Joe Weathers' Miss San Diego as described in this column in the March 1989 issue, has now completed a second replica Elf and intends to make a few more! He recently wrote to me about his experiences and despite the vastness of the flying sites which is apparent from photographs, it seems the New Zealand modellers suffer the usual hazards of free flight when their models collide with unwanted obstructions. Mike enjoyed flying his Elf powered Bantom, a 56 in Ted Foti design from the 1938 Frank Zaic Yearbook, but rapidly became fed-up with the model running into poles and fences at the end of its flights. So he installed lightweight



Above: Mike Patience of Wellington, New Zealand with his Elf powered Bantom, now fitted with rudder only R/C (see text).

R/C using a servo to operate rudder-only - he recalls that fitting this equipment on the centre of gravity position meant that no change of trim resulted. This, of course, is what R/C assist really means - a device to ensure that the flight of the model can be controlled to remain in the manoeuvring area. Had he striven for elevator and throttle control as well not only would the flight characteristics of the model have changed, but he would have taken his delightful combination out of the Old Timer class and the increased wing loading would have given him a modern performance, the zip of which does not belong to the ancient model era that he is trying to emulate. So far I have refrained from fitting any form of R/C to my models, but am currently having serious thoughts about fitting a rudder-only control to my eight-foot Miss Philadelphia, since due to the small confines of my flying field coupled with a gliding ratio of about 20 to 1 means that it must only be a matter of time before I collect one of the nearby trees in a breeze. Using radio must surely be a lesser evil than that!

A successful mid-wing Trevithick compressed air model. High engine mounting and long undercarriage legs (as well as propeller shaft features already mentioned) reduce risk of engine damage on landing.



FREE FLIGHT SCENE

Accent on F1C – Pete Watson's Halifax Trophy

winner comes under Dave Hipperson's scrutiny

LIKE many others, Pete Watson's first FAI Power models, built some six or more years ago, were Veteranos – the Ray Monks design. These original layouts were stretched, and the model here represents the fourth generation. Prototypes used conventional VIT transition systems but Pete has since found that the 'bunting' arrangement – that is, many degrees of positive applied to the tail for a second or so at engine cut-off before the glide VIT comes in – is both more forgiving and efficient on the transition, to such an extent that he doesn't expect ever to build another non-bunter.

Certain practicalities were kept in mind when designing the overall size and shape. Namely, straight lines wherever possible, one-piece wings, no cowls on the engine (most unfashionable) and wings of a maximum span that can be just accommodated from two 36in sheets of wood. Similarly, the fuselage can be built from a four-foot sheet of balsa.

It is interesting that Stafford Screen also developed his first F1C models from the Veterano design. Hence it is not surprising to see distinct similarities with Screen's designs of a few years ago, in particular the Series 3-21 model published in the February '85 Free Flight Scene. In fact, it is from the 3-21 that Pete has taken many of the structural ideas – and certainly the wing sections. He has, however, dispensed with carbon fibre and has introduced a small, solid trailing edge wing member. The root chord and covering materials are identical and the very minimal warps are also similar.

Pete points out that by far the most difficult and important part of the trimming of a modern F1C model is the pull-out phase. He believes that this is much easier with a 'bunt' transition, but the launch is still critical, and a poorly running engine or premature cut just as disastrous. When the model is launched dead straight, very steep and perfectly into wind the pattern, when on trim, is a vertical climb with a half-turn, bunting off the top downwind at engine cut. As anyone who has flown Power will know, perfection in launch is not always achieved. A touch left isn't too bad. The model will still roll the half turn, but will be slightly upside down at engine cut. Here the bunt is really useful as it will – more often than not – haul the model right back around the outside of the loop, losing very little height. The least favourite option is to launch leaning right of the wind. In this situation the model executes a somewhat less-than-vertical spiral climb with the 'bunt' activation forcing the nose down further on transition before the glide VIT kicks it up again. It is probably for this reason that you will see Pete tend to launch left, rather than right of the wind, if he is going to make a mistake either way. The mechanics that activate the bunt system are really quite simple and require few more special parts

than might a conventional VIT. It is probably ideal for rear finned models such as this.

For the future Pete admits, rather reluctantly, that longer, thinner wings are the way to go for higher climbs and better glides. This will inevitably mean foil covering the wood, not using glass cloth as at present. But foil-covered models are easy to dent and hard to repair, so such designs will most probably be kept for sites with few hazards, or vital flights in important contests. His current development is a compromise. His latest and as yet untried models still have wood and glass wings but the thinner NACA 4409 section, higher aspect ratio, longer moment arm, smaller lightweight tailplanes with D-box construction, a cowed engine on a round fuselage, and a forward fin.

Starting in F1C

It would appear, from the numbers of flyers talking of new Nelsons and C15s they have bought, that we may be about to see a

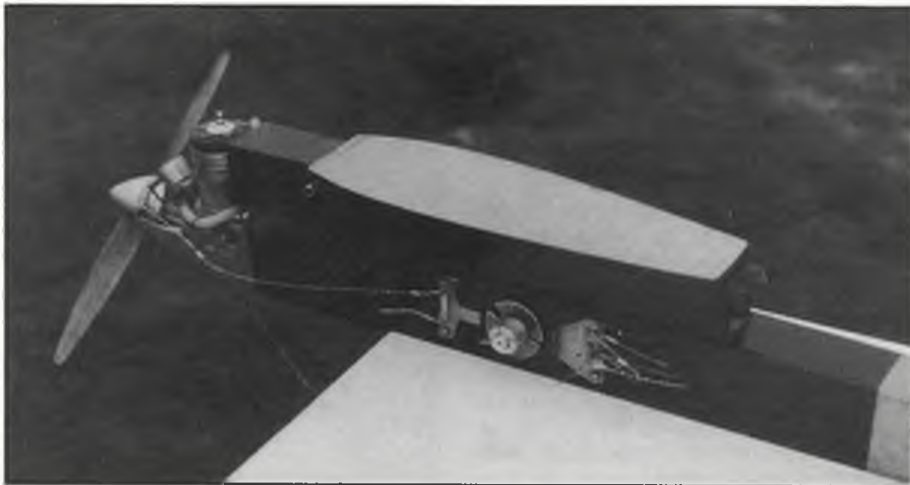
measurable increase in F1C activity – at least by next season, when models are finished and trimmed. Certainly a conservatively-proportioned model and a little determination could easily reap rewards, especially if the model is built to withstand the rough and tumble that some with International-standard airframes shy away from. Looking again at the construction of Pete Watson's model here (and, for that matter, Screen's published in '85) they appear to be quite straightforward to build. With no amount of imagination-stretching could one call them structurally complex, particularly in regard to the flying surfaces. A/2 would be far more so. Flying neither that class nor serious Power myself, I could certainly be more tempted by F1C than F1A, even though trimming sites would be far harder to find.

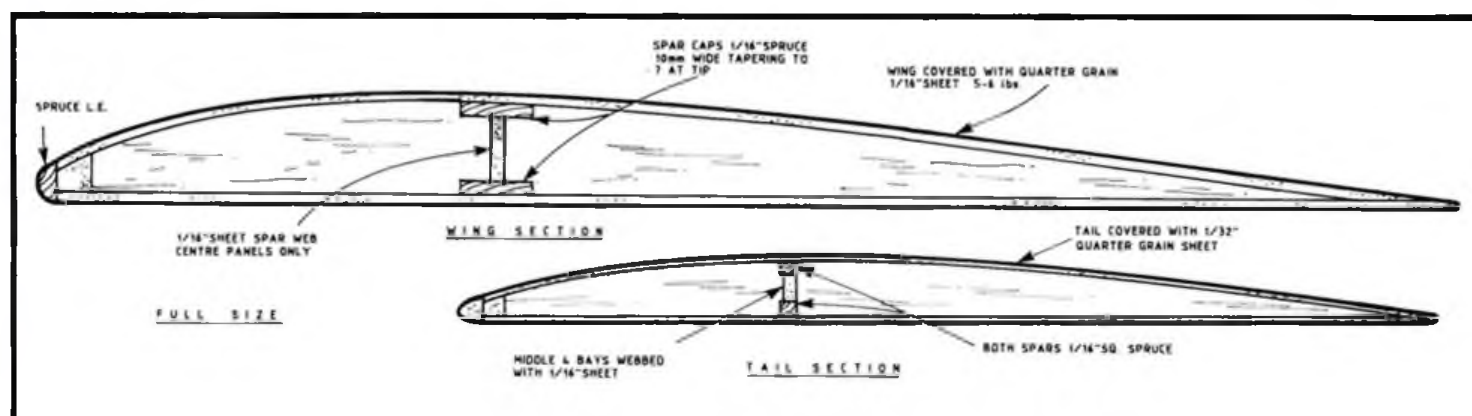
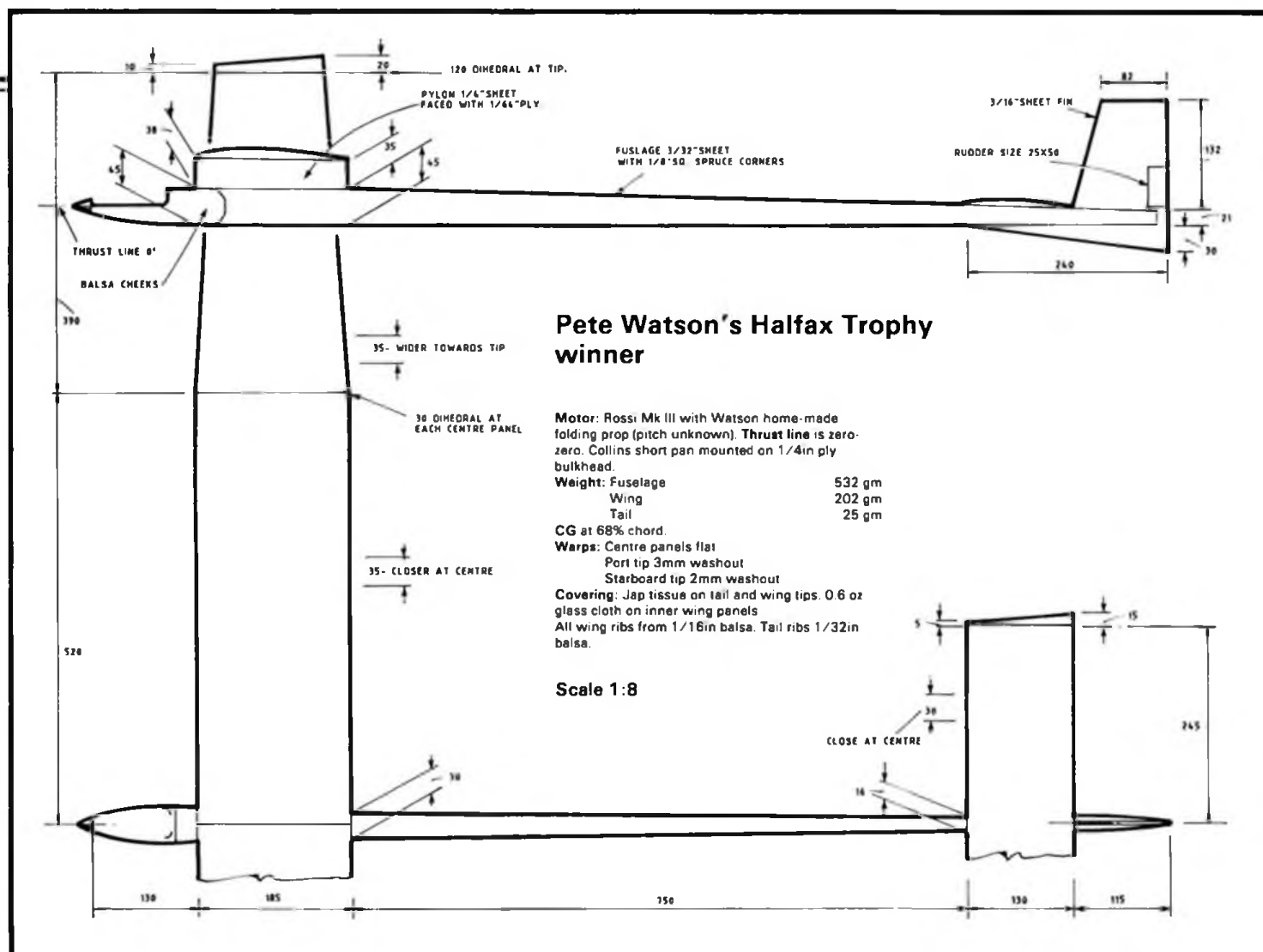
Sheet-covered flat-bottomed surfaces can be simply and accurately assembled on flat building boards, with no need for the complicated undersurface jigs that many prefer for F1A and F1B wings. Wood quantities are large and quality crucial so it would be unwise to embark upon anything until those magic 6lb sheets (or better) are in stock.

The basic fuselage for an F1C can still, it seems, be a balsa box. They are actually advantageous over a round section, being easier to hold and aim in a breeze. A long, narrow box of 3/32 sheet isn't a tall order,



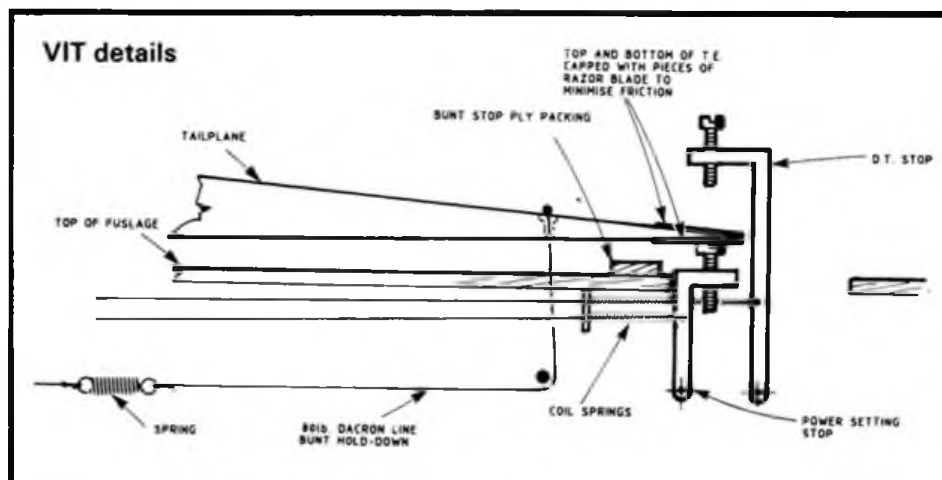
Above: Straightforward and sensible F1C layout – this is Andrew Cordes' model. No cowl; accessible tank (in case of problems) and a Monks timer. Below: Dad Tony Cordes' version incorporates a fairing behind the motor to duct exhaust, and cover tank.





although corner reinforcing with spruce seems popular – and sensible if the corners are to be radiused. A Collins pan bolted to a thick ply former built into the front of the fuselage with balsa cheeks reinforcing the sides means that all that remains is the motor, timer, props, plumbing and gadgetry. Now this is where the time starts disappearing.

Pete Watson's systems appear very practical for conventional rear finned models, and I can't see any reason why the bunt system shouldn't be incorporated from the outset. A Seeling timer can provide the precision although I would opt for a Ray Monks timer. A beginner would do well to bench-run his motor and experiment carefully with tank/flood-off systems on a lash-up before installing anything in a model. A look at a few leading designs will give much of the gen if



you can persuade their owners to remove the cowl (which your first models won't need). The tank and entire fuel system must be perfectly sealed if the pressure-feed and flood-off is to work reliably. There is nothing more demoralising than having a pin-hole-size leak in the system after you have neatly encased it all in the fuselage. Tanks have a habit of splitting open after repeated hard landings. Make sure yours are tough and well soldered together. Getting a fast, steady, reliable run is absolutely vital; but the modern F1C motor is a smooth unit and if well mounted, vibration is rarely such a problem as it is in the larger, and proportionally lighter, .40 powered Open models.

As far as design is concerned the F1C universe begins with the Veterano, and no way would this be a bad place to start. But with respect to Ray Monks, the designer, I think everyone but an absolute tyro could save at least one development stage by starting with something nearer in proportions to Pete's design.

Although, thankfully, F1Cs no longer employ nitro in their fuel, the exhaust is still hot and oily, and it will quickly penetrate a dope finish; therefore the fuselage – at least the front end, preferably all of it and the fin – is best painted carefully with an epoxy paint. The resin in the wing finish will probably be enough proofer although more around the root and some proofer on the tail (if mylar covering is felt to be rather too hi-tech) would be useful.

We will try to give some more details on this class in future issues, but for now here are some addresses useful for picking up the materials and parts you will need if starting from scratch. Most of these people are aeromodellers themselves and they will be quite happy to advise you if you have any problems.

Motors C15: via Peter Carter
27 Alexandra Road
South Woodford,
London E18 1PZ

Irvine 15: Irvine Engines. 01-361 1123.

Timers: Ray Monks
232 Westwood Road,
Sutton Coldfield
West Midlands.

(Ray Monks would probably be able to supply you with the original Veterano plan too)

Engine pans and assorted hardware: Roy Collins
19 Highfield Road
Hornchurch
Essex.

Carbon Fibre parts – made to order, including props etc

Paul Rowledge
31 Portreeve Close
Llantrisant
Pontyclun
Mid. Glamorgan.
Tel: 0443 228217



Above: Typical Power accessory box. Neat, simple, relatively light. Starter motor at top left, power sources beneath. Note also fuel, starter accumulator. Tools and spares may also be carried. Left: Jack Allen, flying F1C again at Woodbury Common. Model still being sorted.



Balsawood:

Balsa Cabin
Mill Lane
Fullbridge
Maldon, Essex
CM9 7ID

Balsa Cabin operates a fine mail order system. They will get you whatever quality of wood you require and of whatever lightness, even if it takes time. You can sometimes speed up the procedure by paying them a visit and selecting your own. Best to talk to them first on 0621 59711.

Glass cloth, epoxy, mylar, Carbon fibre material, wire, silicone fuel tube, neoprene type tube Mike Woodhouse
12 Marston Lane
Eaton, Norwich. Norfolk
NR4 6LZ
(send for catalogue)

SMAE Second Area event: 9th April

Despite there being invariably more entries at the central location of Barkston Heath, it is very rare indeed for that venue to produce all the winners at an Area event. I believe it has happened only once in the past ten years. On Gamage Day, however, the Birmingham club set something of a record when by themselves they produced all three National winners and inevitably pushed themselves up into the lead in the Plugge Cup. This success reflects a steady expansion of

the club over the past years with a considerable widening of the classes and events in which its members are competitive. Long gone are the days of them being solely a Power club.

No surprise, therefore, to see Pete Watson and Stafford Screen at the top in F1C. Despite the breeze increasing it remained in a fairly co-operative direction, apart from a brief flirtation with the edges of the missile compound. Watson and Screen were the only flyers to max out in power at Barkston – Monks dropping a little time on two of his flights. Watson, after a day of impressive climbs, was higher and in better air than his adversary in the flyoff and thus won the Halfax Trophy. Fourth place behind Ray King's good effort at Drifffield was Ken Faux, flying at Beaulieu, who made his flyoff in light rain and poor visibility.

The Gamage Cup itself attracted even more support than Glider at Barkston where all but one of the top six flew. The exception was Gordon Bunney who used a Skywalker 60 to good effect at Merryfield where the weather was less pleasant. Sensible times reflect helpful air rather than lift, and distances travelled were not much problem. Derl Morley, the winner by the finest of margins, had his luck run out after his flyoff flight had landed. When Russell Peers eventually found it, returning from collecting his model from even farther downwind, it appeared to have been all but consumed by hungry sheep! That's the story Russell is sticking to!

Bill Colledge contacted positive help in the ten-man glider flyoff but elected to risk D/T'ing at the timers' limit. He probably had enough height for many more minutes but it was enough. It ousted Mike Woodhouse, flying Glider for a change, at Sculthorpe. He too D/T'd but much lower. Of the others in the top six only Chris Edge flew elsewhere than Barkston. His flight was made, like Faux's, in the wind and increasing rain at Beaulieu and proved a very good effort given the conditions. Rain only spoiled the flyoffs at the most Southern venues. Elsewhere it was dry and in places, although quite breezy, sunny as well.

Current Plugge holders Bristol & West were not on form in F1C. John Buskell tells me that it was very blustery, giving club-mates all manner of problems and considerable damage. He escaped with nothing more than a broken prop and one slightly dropped flight, whereas George Fuller had two models broken in trees and Bernard Aslett wrecked his pretty Veterano when he flew it with the tail in the wrong position. All this did not add up to a very useful points tally and the club has slipped to fourth place - over 100 points off the lead now held by Birmingham. Crookham are hanging on well. They fielded half a dozen or so F1C flyers at Beaulieu, resulting in Chiltern, Hook and Pete Buskell placing around the bottom of the top ten. The former two flyers managed a perfect tie, scoring 1:56 each on their first flights!

SMAE 2nd Area Event

Open Glider No trophy (50 flew)

1 W. Colledge	Barkston	7:30 • 6:34
2 M. Woodhouse	Sculthorpe	7:30 • 5:34
3 J. Cooper	Barkston	7:30 • 4:27
4 A. Gibbs	Barkston	7:30 • 3:24
5 C. Edge	Beaulieu	7:30 • 3:15
6 J. Culthbert	Barkston	7:30 • 2:07

Open Rubber Gamage Cup (46 flew)

1 D. Morley	Barkston	7:30 • 7:16
2 G. Bunney	Merryfield	7:30 • 7:15
3 R. Peers	Barkston	7:30 • 6:37
4 A. Ball	Barkston	7:30 • 5:58
5 A. Cliff	Barkston	7:30 • 5:57
6 B. Horsley	Barkston	7:30 • 5:36

F1C Halifax Trophy and Plugge points (31 flew)

1 P. Watson	Barkston	12:30 • 6:26
2 S. Screen	Barkston	12:30 • 5:42
3 R. King	Driffield	12:30 • 4:52
4 K. Faux	Beaulieu	12:30 • 3:10
5 J. Buskell	Merryfield	12:25
6 R. Monks	Barkston	12:11

Plugge Positions after two events

Birmingham	518
Crookham	487
Anglia	462
B&W	409
Vikings	366
Morley	317

Spring Meeting: Barkston Heath, 23rd April

Days when it rains ceaselessly are rare, even in this country. However, the 23rd April was such an occasion - at least in the East Midlands. Low pressure systems and a gentle but very cold north-easterly breeze brought to Barkston Heath precipitation that varied between a light drizzle to - more often - the weight of rain that normal, 'sensible' people would not stand around in!

The promise of light winds - they were never more than 10 mph and often less than half that - must have been the bait that brought out so many. After an hour or so hanging around the choice resolved itself into either sitting in your car all day with the engine and the heater going full blast, or donning the wet-weather gear and giving it a bash. Most opted for the latter although entries may well have been increased by at least 50 per cent had there



Phil Uden holds for his father at Beaulieu in the rain. Skywalker 60 didn't get away in the Gamage fly off but was hardly damaged.

been a real break in the rain. Appropriately, in such inclement conditions, it was the Falcons club members Peers and Hipperson who began scoring first; together they quickly put together a string of maxes in Vintage that may have had demoralising effects on the remainder of contestants with models in that class. They were later to produce a spectacular finish to the day but at this stage nothing like it could have been foreseen. All models were getting too wet to fly again immediately after just a few minutes of exposure. Together with the rain, the thick, buoyant air - at low level at least - produced very much less in the way of piggy-backing tactics than would normally have been employed on such a calm day. Drying-out airframes carefully between flights accounted for much of the time and scores took longer to complete as a consequence. Patience was tried more than a little; it was easy but fatal to dry out a model too fast.

John Cooper flew well all day in A/1 despite a close shave when a CDH model became entangled with his line. Culthbert also joined him for a flyoff. Rather surprisingly, CDH didn't need a decider. Gerry Ferer's big model - perfect for the conditions - dropped less than half a minute on one flight and was pipped by Ian Davitt with the only full score. Ian's approach was very determined. With his basic layout and distinctive left/left pattern he simply knocked off the maxes one by one. Sometimes he opted to read the

conditions for himself; sometimes he flew under other models. His fourth flight may well have been his worst - but still well above the max - in a patch of air that had others in much more trouble. His model has a formidable climb and an excellent glide but, of course, the very low temperatures, less than fifty degrees all day, would have given him considerable advantage using, as he was, Pirelli rubber.

Both power classes were well supported - Slow Open particularly so. In this class Steve Philpott produced the only treble with his 350 square inch TD 15 powered model. This creation weighs sixteen ounces and is even rigged in the almost mythical style of the '60s with the CG behind the wing and a big tail to compensate. More details of this interesting model in a future issue. Pete Harris and Ray Pavely had full scores in 1/2 A. Pete's bad luck came in the form of a broken con-rod half-way through his flights - fortunately just before he released rather than a second after which would have put him straight out. Hand Launch Glider started early more as a way of keeping at bay the cold and wet than for any tactical reason. In fact, later flights seemed to fare the best. Quite a few ninety-second plus efforts were seen. Anthony Ball, the eventual winner, claims this was his first HLG event. He certainly had a very promising model. I noticed that on his final, crucial flight very late in the day he had another observer as well as his Dad timekeeping - by this point his Dad was leading! The max was exceeded by a large margin so Anthony won at his first try.

The early, five o'clock finish was not universally popular, suggesting that people actually wanted another hour in perpetual

rain. However, the rules allow a SMAE CD to do this and he had made the decision quite clear at the start.

The flyoffs were soon after the close and the two Vintage combatants moved to the top end of the north/south runway for their finale. Both were flying Lanzo Sticks, both on about the same weight of Pirelli, namely, between 3.1/3 and 3.1/2oz. Most sportingly, Peers suggested that they should launch together – this after he had been wound for a little while and Hipperson's motor was fresh. It was sensible in the circumstances, with models so evenly matched, but what occurred could hardly have been anticipated. The models were released seconds apart and probably too close for comfort. In good air and climbing high almost overhead, they miraculously never touched despite tracing out a perfect double helix exactly in synchronisation. They were still too close at the top of the climbs; both folding props at 1:35, neither model stalled – so easy with these layouts when wound to their maximum – and they sailed off downwind, very much slower than anything had all day. As they approached the five-minute mark – both well up with Peers' model fractionally higher – they began to drift somewhat apart. Peers' model continued to descend with quite a safe, but tight glide trim, whereas Hipperson's model, with a more open turn, stopped descending and drifting. Peers was down at the far edge of the drome in a little over eight minutes. Hipperson's was still at the same height when at nine minutes it suddenly vanished into a rogue patch of cloud that seemed to reach down and swallow it. The end of the work for the timekeepers and the beginning of an extraordinary retrieval story for Hipperson, which maybe we will tell in a future issue.

SMAE Spring Meeting, 23rd April

A/1 (15 flew)

1 J. Cooper	10:00 • 2:18
2 J. Cuthbert	10:00 • 1:57
3 J. O'Donnell	9:41

CDH (10 flew)

1 I. Davitt	10:00
2 G. Ferer	9:35
3 R. Chilton	8:49

1/2A Power (9 flew)

1 P. Harris	10:00 • 0:34
2 R. Pavely	10:00
3 A. Hall	9:21

HLG (10 flew: 9 x 1 min max)

1 A. Ball	7:24
2 P. Ball	7:05
3 A. Crisp	6:42

Vintage (5 flew)

1 D. Hipperson	9:00 • 9:03
2 R. Peers	9:00 • 8:12
3 J. Leitch	8:45

Slow Open Power (11 flew)

1 S. Philpott	9:00
2 S. Fielding	8:50
3 P. Ball	8:41

Woodbury Weekend

It is now almost tradition for contestants attending Bristol & West's annual Woodbury jamboree to expect poor weather. Equally



Nigel Dilks' first contest outing was at Woodbury. Model is a John Cuthbert design. Performed well, dropping only one flight in FAI; unlucky, with poor visibility in Open.

traditionally, no one seems to care, as the social side based at the adjacent Castle Brake Caravan Park offers its own attractions come rain or shine. Therefore all who attended this year's event could feel privileged to encounter very much above average flying conditions. It was never windy, often flat calm with only the middle day spoiled by rain – and even that had an amusing, if none too decisive, ending.

The first evening, set aside for the Champagne flyoffs, was as calm as it had ever been for this event. Far more than usual were attracted to participate, particularly in the Rubber classes. The drift was a little more than 5mph for the Vintage event and the air was generally helpful. Strachan's early flight with his distinctive, striped Lanzo held height on the glide to comfortably exceed seven minutes; and later towards the end of the period Hipperson produced almost that much from his Lanzo four-ounce Wakefield to take the highest vintage Wakefield award. Both models were found quickly – no-one else went half as far.

In A/1 John Cooper released first. Rumour was that he had been having some warp trouble with the wet model. It seemed to crab slightly left and eventually flew in a very large circle, clearly in good air. John Cuthbert circled under it on the line, felt nothing and declined to launch. By the time he did release, Cooper's model was safely downwind and still in good air. Cuthbert's was a good effort but not enough.

Despite the early finish Ray Pavely thought the 1/2A Power Flyoff still too late. After all the effort of five maxes in the rain he gave up and went home at this crucial stage! This left Pete Harris needing only a token flight to win with which he obliged. A short run and early DT – so the score on the board bears no relation to the model's performance but was simply a tie-break. Rather an anticlimax, too.

The drift edged around for the remaining flights, giving more Common over which to fly – and safer recovery. Nevertheless, the top two Rubber flights travelled a mile or so off the Common. Ball's held good air low down while John O'Donnell's flyoff model climbed well for a flight of nearly eleven minutes. Both flights were taken together and close on the end of the period.

Tony Hall was most unlucky in the Power flyoff with an over-run into beautiful lift to probably make double figures but to no avail. This left Peers' good flight, chased closely by two F1C's both of which were DT'd down – and at least one of which could have won.

The next day – set aside for the three Open events as well as combined Vintage – was quite wet with threatening low cloud. Surprisingly, everyone waited it out despite the drift being a little over 10mph. Vertical visibility was certainly a worry. With hindsight they should have flown, as conditions worsened.

Nigel Dilks – participating in his first full Glider comp (his first ever contest flight having been the night before) flew first, around lunchtime as the wind picked up. Two flights were both sub-maxes, but nothing to be ashamed of considering the horrible weather. This prompted a few others to try but no sooner had they done so than the clag came right down to reduce visibility to a few hundred yards! Despite a further great reduction in the wind, flights of over a minute were all but impossible. The scores in all four of the classes reflected what became essentially a token event with contestants trying all manner of dodges to keep their models in sight. Phil Ball actually managed to make two officials on one wind-up in Rubber and Trevor Grey, the eventual winner in the class, used motors with numerous strands already broken!

Glider flyers fared best as they could draw their models upwind from the timekeeper before releasing, and also – if skilful – adjust the height of release to just stay within the visibility envelope. In this regard Glider once again was the most sensible event. Nigel Dilks was well in contention already thanks to his two flights of the early afternoon. However, on the second one of these his model was horribly broken at the wing root, and very water-sodden. It was here that the Castle Brake facilities came into their own. He was able to return to the dry warmth of a caravan and in just over two hours had the model fully repaired. His final flight, just before the close of the contest, was rather too good, disappearing in less than a minute for second place.

As always at this event, no amount of wind rain or fog could dampen the enthusiasm with which the host club ran the whole affair. The lavish prize giving in the bar that night – although missing its usual host – was very well handled by George Fuller, with worthwhile prizes going to third place in everything including the Champagne flyoffs!

The morning of the FAI day dawned flat calm with thick fog in the valleys of the Common. Once again control was located in the mown area in the south-west corner, anticipating a southerly breeze. It didn't come, remaining flat calm with the fog lifting enough to make Glider and Rubber flights comparatively safe, but power somewhat



tricky. A combined event such as this would normally give F1C a huge advantage. As usual for this venue, such was not the case. Power contestants had difficulty with trim, motor runs and low cloud, and by the end of the second round only F1A and F1B classes had full scores. Some flights were landing within yards of their launch point. Nigel Lee had a lucky one in F1B when a timer jammed and the model failed to DT. What could have been a catastrophe resulted in only an extended flight of five minutes or so, most of which was above the launch area.

A little breeze had picked up for the third round but before control was re-sited one and all were treated to the spectacle of Nigel Dilks, now in his second full Glider contest, scoring his third consecutive max. The flight itself was fine, steadily gaining height off a good tow. The spectacular part was the shouted encouragement he received from what sounded like the entire entry as he towed. One wonders how he could possibly concentrate under such a barrage!

With the drift now established from the north west it was possible to move control to the top of the Common and the final flights were made from there. The move unsettled a few people and glider scores tumbled. Only Carter was able to nurse a full house to the finish. Lee had kept going in the F1B to total of five maxes, as had Russell Peers. It must be said that Russell's combination of model and excellent rubber was producing a performance in F1B measurably better than anything else on the field.

The flyoff, therefore, involved two Wakefields and a Glider. There was no max and by now the drift was a mere five miles an

We had to ask Trevor Gray to stop winding so we could capture all the broken strands! Low power chosen here to stay beneath low cloud base at Woodbury.

hour, allowing perhaps eight or nine minutes safely across the site. As well as his model, Peers' tactics were excellent. While Carter went off downwind to find a suitable towing area Peers prepared himself to fly adjacent to Lee confident he had the performance to beat the other Wakefield. This was illustrated perfectly when the two launched close together. Peers' climb was exactly double that of Nigel Lees with perhaps two seconds less prop run! The appearance of these two together, from downwind, was that of an F1B flying against a short-running Open model! To compound the differential Peers' model sailed away into gentle lift whereas Lees wasn't quite high enough to contact it and sank for a 2.1/2 minute flight. Try as he might, John Carter could not find helpful air for his glider and he had to watch the Wakefield drift past hundreds of feet up – the clear winner.

As I predicted they might, the imminent World Champs are already having their effect on Russell as he DT'd the model down at a little over eight minutes – still in sight. And this with only his seventh best model!

The final prize ceremony of the event was held on the field with awards for the top three in the combined event plus prizes for the top in each of the disciplines. The best day, and probably the best weekend's weather this contest has ever seen.



Dave Greaves' F1B box seen at Woodbury. Half-a-dozen models very neatly packed.

Woodbury Weekend, 29/30th April, 1st May

Saturday Evening Champagne Flyoffs

Open Glider (5 flew)	
1 J. Carter	4.08
2 P. Tribe	2.31
3 J. Flynn	1.55

Open Rubber (13 flew)	
1 J. O'Donnell	10.54
2 P. Ball	10.22
3 C. Chapman	7.47

Open Power (8 flew)	
1 R. Peers	6.32
2 T. Cordes	5.43
3 A. Cordes	5.13

Vintage (16 flew)	
1 C. Strachan	7.21
2 D. Hipperson	7.05
3 P. Michel	2.40

Sunday: Open Events (3 flights, 2.30 max)

Open Glider (6 flew)	
1 P. Tribe	3.52
2 N. Dilks	3.43
3 J. Flynn	3.08

Open Rubber (10 flew)	
1 T. Gray	3.21
2 C. Chapman	2.48
3 P. Michel	2.38

Open Power (3 flew)	
1 S. Willis	3.18
2 R. Peers	2.09

Vintage (10 flew)	
1 A. Hall	3.10
2 C. Strachan	2.42
3 P. Michel	2.33

Monday: Combined FAI and Vintage precision

Combined FAI (25 flew)			
1 R. Peers	F1B	15.00 + 8.17	
2 N. Lee	F1B	15.00 + 2.23	
3 J. Carter	F1A	15.00 + 1.12	
4 A. Moorehouse	F1B	14.49	
5 C. Tribe	F1A	14.39	
6 G. Fuller	F1C	14.36	

Vintage Precision

1 J. Martin
2 S. Willis
3 P. Ball

What's Happening: BMFA contests

11th June 4th BMFA Area Centralised Event

Area Venues. Slow Open Power for Astral Trophy, Open Glider for Plugge points and Model Engineer Trophy for Teams.

Coupe d'Hiver.

Contact Area Comps Secs or SMAE Comps Sec Richard King: 01-890 4504.

9th July BMFA Summer Mini
North Luffenham A1, CDH, HLG, 1/2A Power. CD: Dave Hipperson.
Contact: Gerry le Vey. Tel: 0904 705647

(Please note the CD is also running an experimental Mini Vintage event on this day – rules as per May *Aeromodeller*. This will not be a BMFA/SMAE event in any sense of the word but will have proper prizes and will form the basis of further discussion as to the possibility of adopting similar rules for future SMAE events).

MIND THE LINES

Ron Prentice

investigates Aussie

affairs and updates old

time control line news

IHAD HARDLY put the envelope containing the copy for April's Mind the Lines into the postbox, when through my own letterbox came a large envelope from Australia. I don't know if you're like me, but when a letter comes from foreign parts I get quite excited and always open that one first. This contained two plans, a magazine and a letter, all from Bob Allan. Bob must live in the wilds because he mentions that he has no problem with noise where he lives and even runs motors of .40 size and upwards without mufflers...

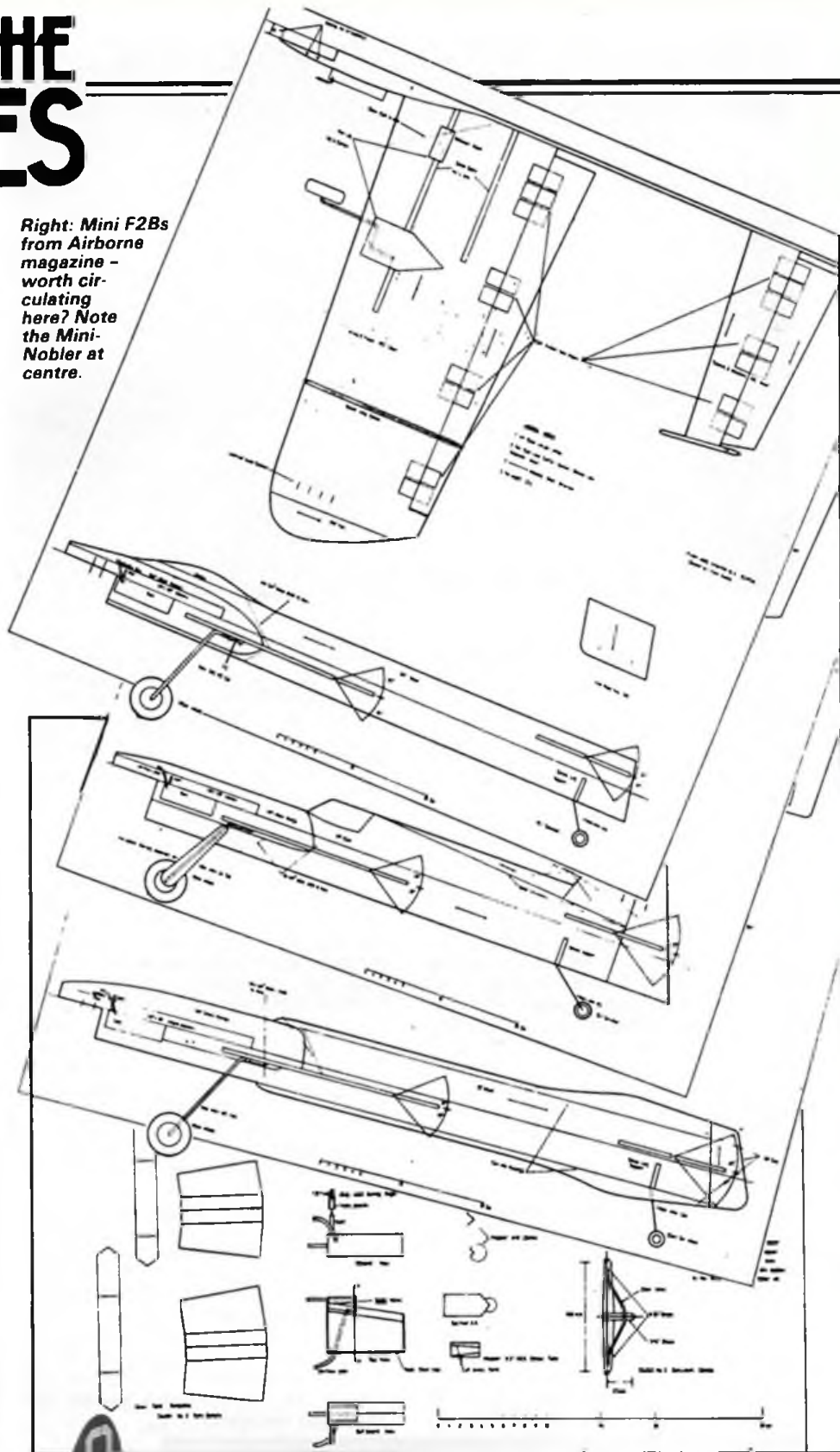
What prompted his letters was my advice on fuel tanks in December '88. It seems that scaled-down Noblers and F2B stunters, using 2.5cc motors, with profile fuselage and sheet wings are all the rage Down Under. The most popular fuel tank is, yes you've guessed it, the front feed hopper tank as recommended by Tom Dixon in the April's Mind the Lines. I wonder who came up with it first, the Americans or the Aussies?

Mini-F2B stunters are a great idea; they are very quick and cheap to build and could even be a new competition class. Perhaps they could be restricted to one type of motor, such as PAW 2.49, to give everyone an equal chance. I would welcome comments. Apart from the tank information, Bob mentions that he started his modelling career with a Mills Mite trainer powered by a Frog 50, but could never get the Frog to start! I seem to remember being offered a Frog 50 a few years ago, and that wouldn't go either! (If you do find a good Frog 50, you'll discover a great little diesel ideal for under-36in F/F models, and tiny C/L. Less 'torquey' than a Mills!GC)

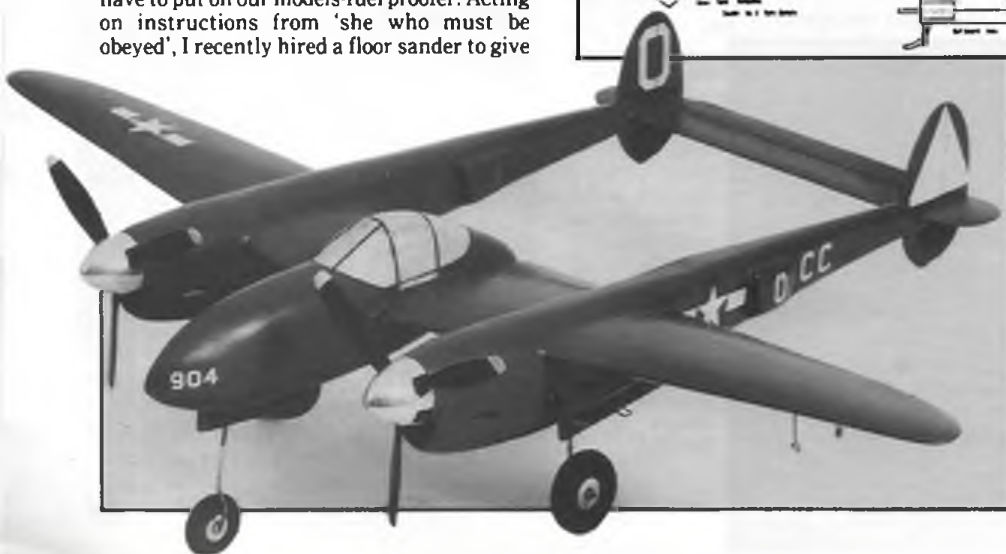
All the proof you need

Next I have a couple of tips. The first concerns that evil-smelling brew that we all have to put on our models-fuel proofer. Acting on instructions from 'she who must be obeyed', I recently hired a floor sander to give

Right: Mini F2Bs from Airborne magazine - worth circulating here? Note the Mini-Nobler at centre.



Left: A design familiar to Mercury kit enthusiasts - that manufacturer's actual P38J Lightning prototype from the late 1950s.



the dining room floor a good going-over. On the advice of the hire firm, I bought a litre tin of Clarke's Permanent Floor Finish (nothing to do with our Editor, I hasten to add). When I opened the box I found a two-part pack, which when mixed together had the very familiar smell of urea-amino resin, plasticised with Alkyd and reinforced with

Aeromodeller

melamine. In other words, Tufkote fuel proofer. I have now used this product on several models with perfect results. The one-litre tin and 30ccs of hardener, costing £8.20 including VAT, is obtainable from hire centres and DIY shops or direct from Messrs. Clarke, Hire Technicians Group Ltd, Chalk Hill House, Chalk Hill, Watford, Herts. If ordering direct you would obviously have to include sufficient for postage. Check because it's quite heavy.

The second tip is for those vintage enthusiasts who would like to use a Frog 500 motor but don't live in Wattamondara like Bob Allan, and are thus looking for a muffler to fit.

All your troubles are over. An OS 702 muffler fits perfectly over the exhaust stack. All you need to do is make a new strap from thin brass or steel sheet. This tip comes from John Bortnak, 740 Lake Ontario Drive S.E., Calgary, Alberta, Canada, T2J3J8. Your local model shop should be able to supply them at £7.25 retail. Mike Callaghan from OS Products tells us they have plenty in stock.

I am certain that you all know of the range of old timer plans offered by John Pond, but I wonder if you know that he also offers a very large list of U-Control models? All these designs are eligible for the old-time events which take place at Old Warden, the Nationals and other venues. The address to write to for these plans is John Pond, Old Time Plan Service, PO Box 3215, San Jose, California 95156. USA.



Above: from the days of the USAFE contests in Germany - the 1956 event at Weisbaden and a potent Invader. Note the pretty Pitts in the background. Below: Chosen by the SAM 35 Comp Sec - this is John Perry's interpretation of the popular APS Calamity Jane.

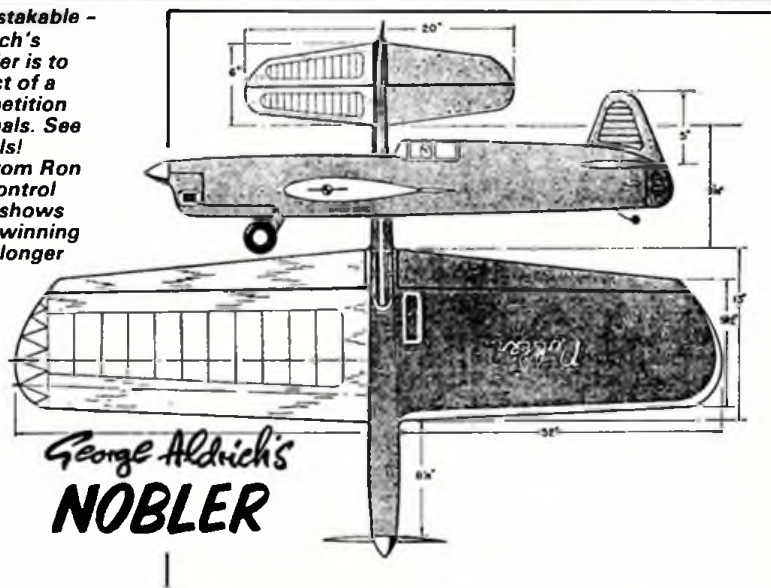
Super Zilch tales

Regular readers of this column will no doubt recall that the Old Time Stunt event at the 1988 Nationals was won by John Hamilton of Belfast, flying a Fox powered Barnstormer, with Glen Alison in second place with his Fox 59 powered Super Zilch. Glen is a well known F2B enthusiast and sometime correspondent for *Aeromodeller*. Last year's OTS event was his first foray into the world of vintage models and from what I hear, it will not be his last. His Super Zilch suffered stress damage a few weeks before the Nats, when the outboard wing almost departed from the fuselage. A hasty repair resulted in a useable model again, but I noticed an alarming amount of movement in the wing during his competition flights. He has recently re-engined the model and is now using the much smaller Fox 35, which surprisingly enough, produces more than enough power to take the plane through the schedule and makes it a much more pleasant aircraft to fly. Glen tells me that he is building a new scale stunter to replace his much-used Pace Spirit in F2B contests. It is a replica of the Russian radial engined Sukhoi Su26M aircraft which performed so well at the International Aerobatic Championships. The model, which features an A1 Rabe style all-sheeted wing and fuselage, will be powered by a ST 60. I look forward very much to seeing it at Barkston Heath.

Another event to anticipate at Barkston is the all-Nobler competition, the brainchild of Don Burgess of Birmingham. Don is a long time friend of Nobler designer George Aldrich and he has persuaded George and his wife to come over to the UK for a holiday this summer. Don contacted the BMFA, who agreed to this unique occasion, which will be attended by George Aldrich himself. It is scheduled to take place on the Sunday and is bound to create a great deal of interest. Event organiser is Iain Ward. Details via this magazine.



Right: Unmistakable - George Aldrich's famous Nobler is to be the subject of a special competition at the Nationals. See text for details! Illustration from Ron Moulton's Control Line Manual shows the US Nats winning version with longer tail moment.



WHAT'S ON



17-18th June

ASP SCALE WEEKEND RC, CL, FF
Venue: Old Warden Airfield. Not to be missed for the most delightful weekend of scale fun flying ever! Awards for best models, informally judged - but just come along and enjoy. Contact: Aeromodeller. Telephone 0442 66551.

17-18th June

OXFORD MFC F/F RALLY
Venue: Port Meadow, Wolvercote, Oxford. Saturday events at 7pm: Champagne fly-off for A/I and CDH. Chuck glider comp. Sunday from 10am A/I and CDH in five rounds. HLG, five flights, no rounds. Vintage Rubber (up to 34in), three flights, no rounds. Vintage Glider (up to 72in or A/2), three flights, no rounds. 50m towline. Tailless Rubber or Glider (50m towline), three flights, no rounds. Trophies for top junior and rally champion. No bubble machines, Thermistors or Streamer Poles. Contact: Andrew Crisp. Telephone: 0865 53800

18th June

CHILTERN CUP C/L AEROBATICS EVENT
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 RESERVE DATE
Venue: Sheffield. Contact: BMFA.

24-25th June

MODEL & CRAFT SHOW 1989
Venue: West of England Exhibition Centre, Shepton Mallet, Somerset (A371 between Castle Cary and Shepton Mallet). Indoor and outdoor traders' exhibition and display, demonstration flying, R/C, C/L, F/F outdoor and indoor, plus model boats, cars, railways, collectables, military modelling, crafts, how-to-do-it, lectures, weekend campsite and disco on Saturday evening. Contact: 1 Dribin House, Mingard Walk, London N7 7RT. Tel: 01-263-9849.

1-2nd July

NORTHERN MODEL SHOW
Venue: Ripon Racecourse. Aircraft displays of all types including helicopters and seaplanes, yachts, submarines, buggies, model engineering, etc. Traders' stands, refreshments, amusements etc. Admittance £2.50 adults £1.50 children. Open from 10am-5pm. Contact: Organisers Office, 75 West End Avenue, Harrogate, N. Yorks. HG2 9BX.

2nd July

WHARFEDALE CLASS A DIESEL COMBAT CL
Venue: Ripon Racecourse. Contact: Bob Walker. Telephone: 0423 884505.

2nd July

FOURTH BMFA CENTRALISED (PRO-VISIONAL) CL
Venue: TBA. F1B, F2C, Open GY, British GY, F2D, Handicap Speed. Contact: BMFA.

1-2nd July

RAFMAA/BMFA F/F MEETING
Venue: RAF Barkston Heath
Saturday: (a) F1A/B/C in rounds, concluded on Sunday
(b) Champagne flyoff for F1A/B/C.
Sunday: 1/2A, A/I, CDH.
Contact: Flt. Lt. Julian McCormick. Tel: 0526 42581 x 249.

2nd July

BMFA C/L SCALE EVENT CL
Venue: RAF Abingdon. Contact: Vic Wilson. Tel: 0734 471964.

2nd July

MORLEY INTERNATIONAL F/F DAY FF
Venue: Heath Common, Near Wakefield. Mini-Vintage, Dart Duration for 0.5cc diesels, A/I, CHD, P-30. Contact: Stan Horne. Tel: 0532 610429.

9th July

BMFA SUMMER MINI MEETING FF
Venue: Barkston Heath. A/I, CDH, HLG, 1/2A Power, Experiment Mini Vintage (small cash prizes) no plaques; does not count towards Senior Champs points. Contact: BMFA.

9th July

MORLEY INTERNATIONAL SILENT DAY FF
Venue: Heath Common, Wakefield. Events: P30, Mini Vintage up to Wakefield size, CDH, Dart Power. Contact: Stan Horne. Tel: 0532 610429.

18th July

ROLLS-ROYCE MAC VINTAGE C/L MEETING
Venue: RR Airfield, Hucknall, Notts. Events: Oil Time Stunt, Classic and Open Midge, Vintage A and B Team Race. Contact: Terry McDonald. Telephone: 0332 511273.

16th July

ASP GOLDEN ERA DAY RC, CL, FF
Venue: Old Warden Airfield. All the fun of the twenties and thirties! Scale and vintage models all welcome. Lympha Scale 89 competition. Period costume desirable. Do come! Contact: Aeromodeller. Telephone: 0442 66551.

16th July

KNAVESMIRE FREE FLIGHT ANCIENT AND MODERN MINI EVENT FF
Venue: York Racecourse. Contact: John Pool. Tel: 0757 703060.

16th July

BMFA S.E. AREA OPEN FREE FLIGHT EVENT FF
Venue: Ashdown Forest. Contact: Mick Howick. Harriers, Hare Lane, Blindley Heath, Lingfield, Surrey RH7 6JB.

16th July

CARDINGTON INDOOR MEETING FF
Venue: Cardington Airship Shed. All-in Index and fun-flying. Contact: Bob Bailey. Tel: 0438 723642.

23rd July

3RD NORTHWEST VINTAGE SWAP-MEET
Venue: Memorial Hall, Chester Road, Northwich, Cheshire. New venue with bar and restaurant. Bring anything to do with model aircraft. £1.00 entry. 10.30 to 4.30. Signposted from M6. Free car park. Contact: David Lloyd-Jones. Tel: 056589 3170.

23rd July

BRUMFLY 89
Venue: RAF North Luffenham. Contact: Stafford Screen. Tel: 0384 396535.

25-30th 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

OXFORD MFC DREAMING SPIRES GALA FF
Venue: Port Meadow, Silent Vintage, Vintage HLG, Open Tailless (not power), Scale (motors under 1.5cc). Contact: Charlie Newman. Tel: 086 77 3020.

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.

5-8th August

WOODVALE INTERNATIONAL RALLY
Venue: RAF Woodvale. International R/C events. Trade stands. Vintage Car Rally. Competition and Camping. Contact: John Armstrong. Tel: 051 5266857.

6th August

CARDINGTON INDOOR MEETING FF
Venue: Cardington Airship Shed. All-in Index and fun-flying. Contact: Bob Bailey. Tel: 0438 723642.

19-20th August

ASP VINTAGE WEEKEND RC, CL, FF
Venue: Old Warden Airfield. The annual pilgrimage. Two days packed vintage fun. Informal awards, ASP and SAM 35 competitions. More news to come. Don't miss it! Contact: Aeromodeller. Telephone: 0442 66551.

19-20 August

PLUMPTON MODEL SHOW
Venue: Plumpton Racecourse. 10am - 6pm both days. Everything from Chuck Gliders to jet R/C models. Many more attractions including full-size Ciri-Cri demonstration. Cars, boats and planes, trade stands, bar and fair ground. Live band of Saturday evening. Return coach trips to Brighton. £20 family ticket (after 6pm, Friday until Monday morning) or £2.50 per day (adults); £1.50 per day for children and senior citizens. Contact: Dave Bishop. Tel: 095 977550.

27-29th August

BMFA RADIO CONTROL, CONTROL LINE AND SCALE NATIONALS
Venue: Barkston Heath. Details to follow. Contact: BMFA.

26-27th August

BMFA INDOOR NATIONALS
Venue: Cardington Airship Shed. Saturday: (a) EZB for Houlberg Silver Trophy - best 2 from 6 flights
(b) Index for Manhattan Cabin, Flyrod (Novice only), HLG, Pennyplane, Novice Pennyplane, CO₂ Duration and PND. Best

single score from 6 flights.
(c) CO₂ Duration for Sparklets Trophy. Best 2 from 6.
(d) CO₂ Duration for Sparklets Longest Flight. Best flight from 6.
(e) Fun flying.
(f) Sweepstake Trophy for Indoor HLG - now an Index event for (i) Special rules models: 18in min spar, 22in max span, 10gm max weight; and (ii) 12in max HLG.
(iii) Open HLG.

Sunday: (a) F1D for Aeromodeller Trophy. Best 2 from 6.
(b) 1990 F1D W/Champs Trials - first three flights; best 3 from nine to count.
(c) Fun flying.
Contact: Bob Bailey. Tel: 0438 723642.

17th September

WALSALL MAC F/F SCALE DAY
Venue: Essington. Contact: Geoff Spencer. Tel: 021 556 3376.

17th September

INDOORS AT CARDINGTON FF
Venue: Cardington Airship Shed. F1D W/Champs Trials - second three flights, best 3 from 9. Fun flying too. Contact: Bob Bailey. Tel: 0438 723642.

17th September

BMFA C/L SCALE WORLD CHAMPS TEAM TRIALS
Venue: RAF Hullavington. Entry fee: £10. Contact: Eric Costes, Arosa, Liberty Road, Newtown, Fareham, Hants.

1st October

EAST COAST MODEL AND LEISURE EXHIBITION
Venue: Richmond Hotel, Richmond Drive, Skegness. All types of modelling on display. Contact: C. Firrh, 7 Laythorpe Avenue, Skegness, Lincs.

1st October

THREE KINGS C/L SCALE DAY
Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. FAI Scale and Profile classes: Best WWII. Silencers and proof of insurance essential. Contact: Wel Cordwell. Tel: 01-764 1661.

22nd October

MORLEY & DMAC ANNIVERSARY MEETING FF
Venue: Driffield Vintage Power Duration. Vintage Plus 10 Duration for 1950s power models. Other events too. Free entry. Prizes. BMFA members only. Contact: Stan Horne. Tel: 0532 610429.

23rd October

BMFA INDOOR SCALE MEETING
Venue: Alumwell Centre, Walsall. 8.30 to 5.00 Peanut, Open Rubber, CO₂/Electric and Air Racing. Experimental rules revision see Hangar Doors. Contact: Doug Sheppard. Tel: 0272 697595.

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Ian Peacock

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Discovery Starter Set	1	£32.95	Mini Mean Machine	1	£7.95
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Space Shuttle Starter Set	2	£29.95	Mini Scale Combo		
			(2 Rockets)	2	£6.95
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June



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B 6-4	(x3) £3.25	Porta-Pad Launch Pad	£11.95
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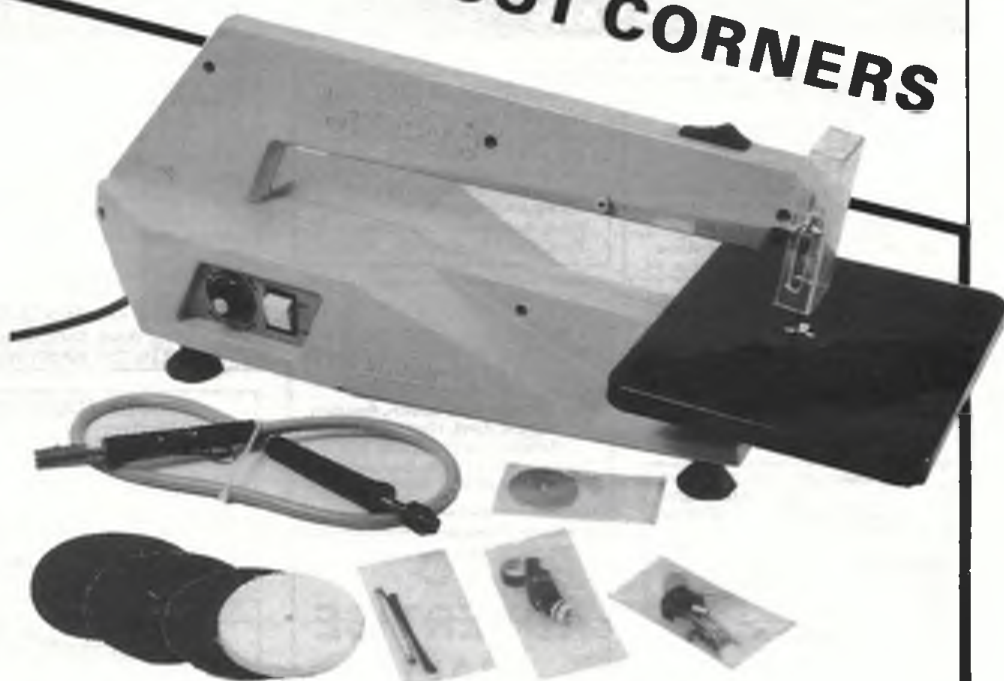


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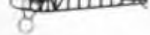
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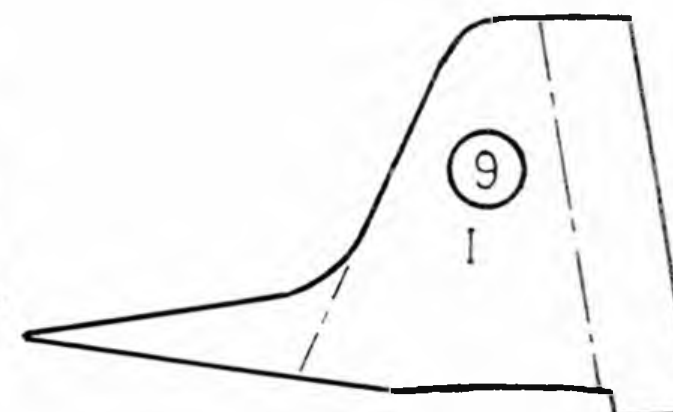
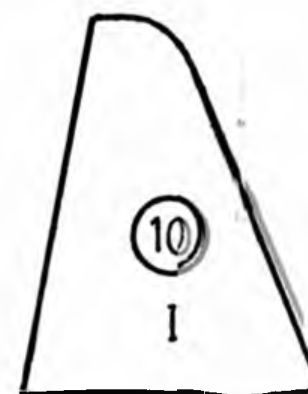
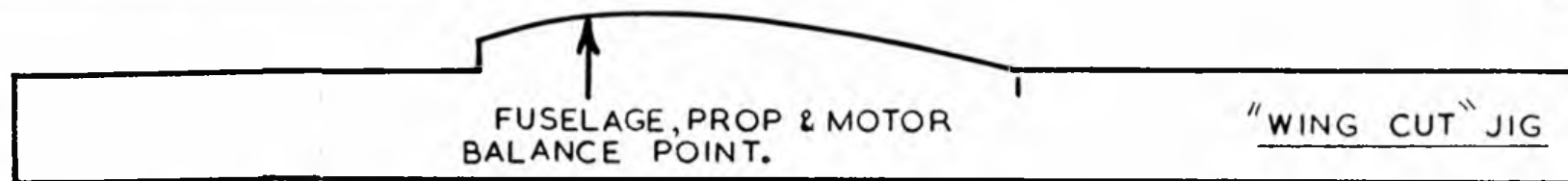
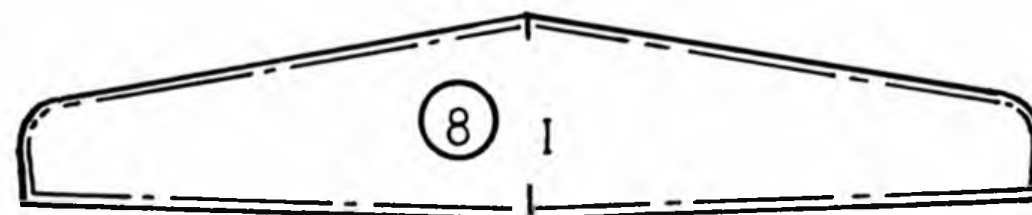
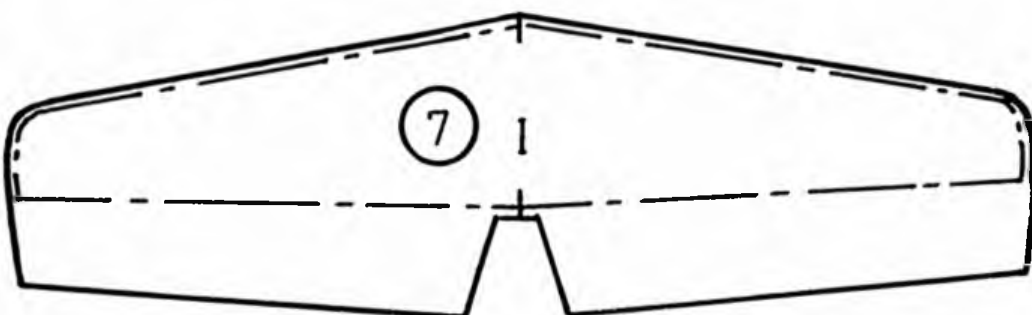
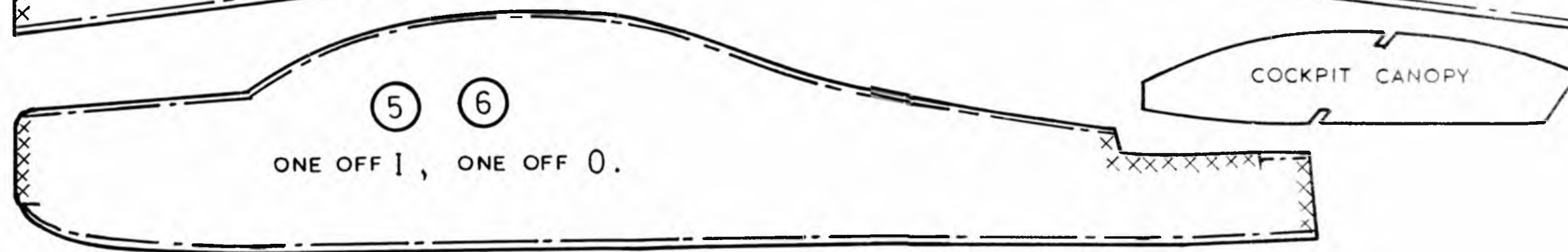
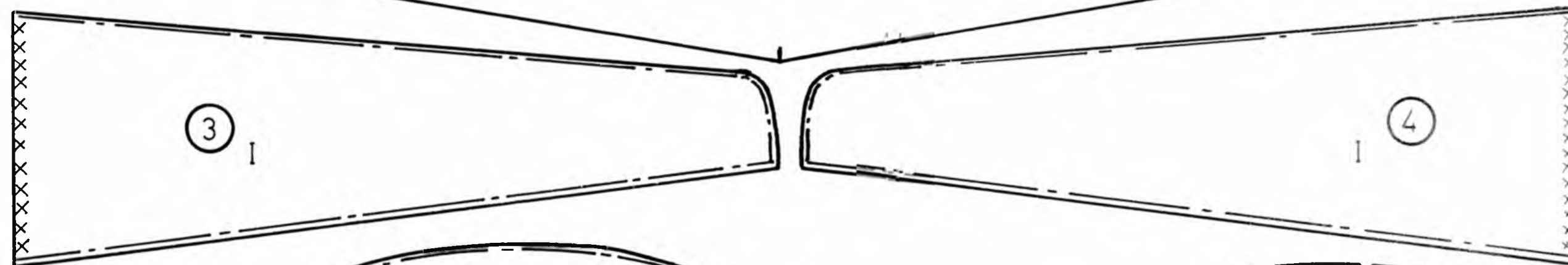
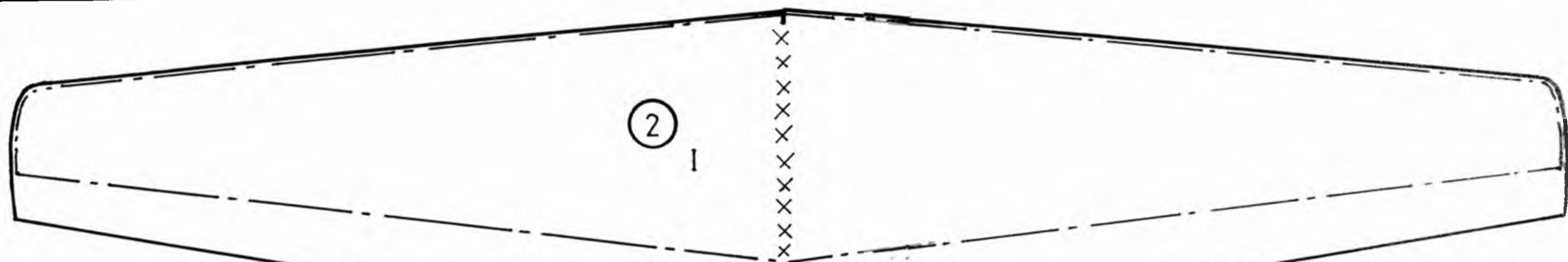
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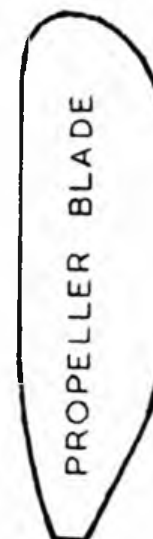
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Links to the plans

The issue comes with a free plan (Chindit) printed front back on a pull out banner of four sheets. The banner is not included in this document.

Tucano by Stephen Midson

In FOAM FLYERS: Polystyrene Foam Models Techniques

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ORMA 5 by Dionisio Furlan

CL Semi Scale Stunt Model presented in AEROBATIC DESIGN

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Zephyr by Andrea De Marchi

CL Stunt Model presented in AEROBATIC DESIGN

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Chindit by A.Healey

Full Size Plan Sportster -

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Halfax Trophy Winner by Pete Watson

FF F1C Model presented in FREE FLIGHT SCENE

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Some Mini F2Bs

CL Stunt Models from Australia presented in MIND THE LINES

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Just a Sketch of the famous Nobler by George Aldrich

CL Stunt Model presented in MIND THE LINES

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Tucano Union Page

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