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AERO MODELLER



p.72



p.80

Editor	Geoff Clarke
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Design	Peter Kirby
Advertisement Manager	Alan Cole
Advertisement Copy Control	Marie Quilter

Cover: Quick and simple to build - loads of character too!
That's the Flying Aces Navy Pursuit, tested by Alex Imrie
on p.80.
Fancy flying scale? Full data in this issue on the characterful
Fiat CR 32 - turn to p.85.

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HANGAR DOORS



Arthur Fox's replica of J W Bishop's Endeavour putters by slowly at Old Warden, where it was awarded the 4A Trophy for most unusual craft. Giant bipe, a masterpiece of intricacy, dates from 1933.

Tech News

We learn that the BMFA Free Flight Technical Committee have co-opted three new officers, as follows: Bill Colledge is Flying site Liaison Officer, Phil Roughton is Publicity Officer, and Glenda Bracken is F/F Nationals Co-ordinator. Already serving are Ian Bracken (Chairman), Chris Edge (Secretary) and John White (Safety Officer).

An advertiser writes...

You'll have seen the Eastwood Model Aircraft advert in the back of Aeromodeller; they're selling Silver Swallow 1.5 and 2.5cc diesels. Eric Rawlings, the chap

in charge, tells us how successful the campaign has been. Nice to know we're doing something right, so over to Eric...

I was going to write to you a few weeks ago to let you know the results of my first advertisement in Aeromodeller. To my surprise, as late as last Friday, I was still getting a response from people overseas. The total number of written replies I have now received from one advertisement is one hundred and four. They include orders from France (9), South Africa (4), Italy (2), Holland (2), and a club in Scotland who so far have purchased 17 engines!

The letters from customers have been arriving at a very consistent rate, six days of the week and every one refers to the magazine in which they saw the advertisement. I have also received a considerable number of telephone enquiries which has resulted in my making some very interesting and useful contacts. The age of the people I have spoken to is also interesting - it varies between 40 plus and one gentleman of 79 who is still an active modeller!

Perhaps you should start a club for Aeromodeller readers? I think you would get an excellent response and you would certainly have some interesting members.

Finally I would like to say how delighted I am with the results



A recent behind-the-scenes look at Old Warden revealed the remains of the Collection's ANEC II (top), among other treasures; aeroplane is not yet on public view, unlike the Desoutter (above) which was having its undercarriage jiggled at the time of our visit.

of my advertisements in your magazine and should you wish to quote them to any potential advertiser please do so.

Our own club? Now there's a thought...

Attention Young Artists

Martin Dilly sends news of the FAI's Young Artist Competition. If you are under 16, you may submit as many original pieces of artwork as you wish, in any medium, on the theme of Silent

Flight. There is no fee; just these rules:

- (a) Entries must be on A3 size paper (297 x 420mm).
- (b) The title of the work must appear on the front.
- (c) Your full name, age, date of birth, address and nationality must go on the back.
- (d) Entries should be sent to: The Chairman of UK Jury International Art Competition 118 Lutterworth Road Aylestone Leicester LE2 8PG

Left: Latest Argus Handbook is Flying Radio Control Gliders by George Stringwell. Packed with gen, like the others in the series, this volume retails at £4.95. Below: UK F/F Team Manager Martin Dilly caught in a rare off-duty moment at the World Champs...



Closing date is 18th April. Entries will be judged in three age groups: 5-8 year olds, 9-12 and 13-16.

International winners in each class will receive gold, silver and bronze medals at the FAI's annual awards ceremony in Budapest in October. AERO, the Air Education and Recreation Organisation, will be offering certificates and prizes of VIP airport visits and flights to the British winners in each age group, whose entries will be sent on to Paris for judging alongside entries from young artists all over the world.

Model flying subjects? How about R/C slope and thermal soaring; Wakefields and other rubber models; gliders, indoor microfilm flying - and the whole spectrum of electric flight.

Go on - it's up to you!

Junior National Team for Britain?

The British Model Flying Association will be selecting and funding a team to represent the United Kingdom at the second



World Junior Free-Flight Championships at Mostar, Yugoslavia. The provisional dates for the championships are 20-26th August; the full entry fee of \$310 per member includes accommodation and food and will be met by your national organisation. The team selection trials for FIA gliders, F1B Wakefields and F1C Power will probably be in April; contact BMFA competition secre-

tary Richard King, 55 Longford Avenue, Bedford, Feltham, Middx., with a stamped addressed envelope for details.

To be eligible to meet the best of the rest of the world's young model flyers you must be under 18 on Jan 1st, 1990. Now is the time to get building and trimming models if you fit that description, and now's the time to think about sponsoring the team's travel

costs if you are in the model trade, for keen young flyers are likely to stay in the sport for life, especially if they start their flying career by representing their country at such a prestigious event as the World Champs. If you are a parent, Mostar is in a highly attractive part of a fascinating country, so why not combine the Champs with a holiday, or else come as a supporter?

WHAT'S ON

28th January

CRAWLEY INDOOR MEETING
Venue: Crawley Leisure Centre, Haslett Avenue, Crawley. Contests for HLG, E2B, Peanut Scale, CO₂, and Open Rudder. Contact: John Doiding. Tel. 0293 510272

4th March

SAMS INDOOR FUN FLY
Venue: Watford Leisure Centre, 10am start. Fly for fun all day - but come early! Contact: George Wallbridge of SAMS on 076 388 384

29th April

ASP DESIGNS MODEL FLYING DAY
Venue: Old Warden Airfield. Bring and fly any model from an Aeromodeller plan. Lots

and lots of choice. You must have a suitable model already! Come and enjoy this new event in our Shuttleworth season. Contact: Aeromodeller. Tel. 0442 66551

20th May

ASP LARGE MODELS FLY-IN
Bring and fly the biggest and the best! No free-flight models at this event; CAA rules demand that we use all the field for the R/C craft. Contact: RCM&E. Tel. 0442 66551

26-28th May

BMFA FREE FLIGHT NATIONALS

Venue: RAF Barkston Heath. Top competition at this central airfield, three full days of activity for Mini, Open and FAI. More details to follow. Contact: BMFA

23-24th June

ASP SCALE WEEKEND
Venue: Old Warden Airfield. The world's best fun-fly scale meeting for R/C, C/L and F/F! Don't miss it! But Scale Models only, please. Contact: Aeromodeller. Tel. 0442 66551

15th July

ASP GOLDEN ERA, MODEL FUN FLY
Venue: Old Warden Airfield. Plenty of room for craft from those glorious twenties, thirties and forties. Scale and Vintage equally welcome! Contact: Aeromodeller. Tel. 0442 66551

18-19th August

ASP VINTAGE WEEKEND

Venue: Old Warden Airfield. The annual pilgrimage! Meet friends old and new - see and fly those super designs from yesteryear! Collectors corner is a new feature for 1990. Model flying at its informal best! Contact: Aeromodeller. Tel. 0442 66551

25-27th August
BMFA R/C, C/L AND SCALE NATIONALS

Venue: RAF Barkston Heath. Three days of top competition. 1989 had more entries than the previous year - '90 promises to beat that! Come and add to the control-line revival - and watch top Scale and R/C in action. Contact: BMFA

15-16th September

ASP FOUR STROKE WEEKEND
Venue: Old Warden Airfield. Information action for four-stroke enthusiasts! Great fun for all! Contact: Aeromodeller. Tel. 0442 66551



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You could build something like this! a Wittman Tailwind.



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There are a number of designs (80 to date) approved by the P.F.A. for building at home. These range from the vintage to the ultramodern, using materials from traditional wood to metal or modern foam and fibreglass. P.F.A. inspectors supervise the construction of members aeroplanes on a voluntary basis.

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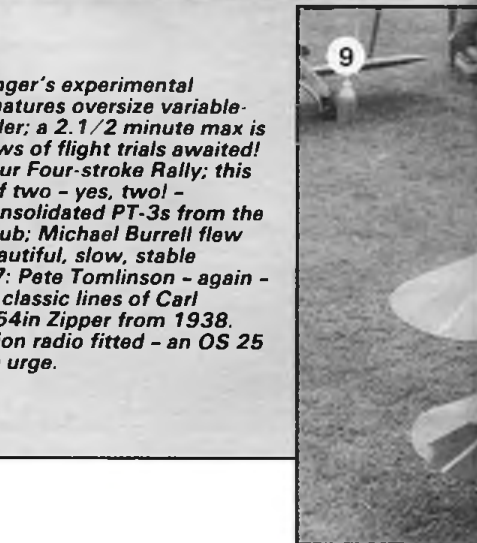
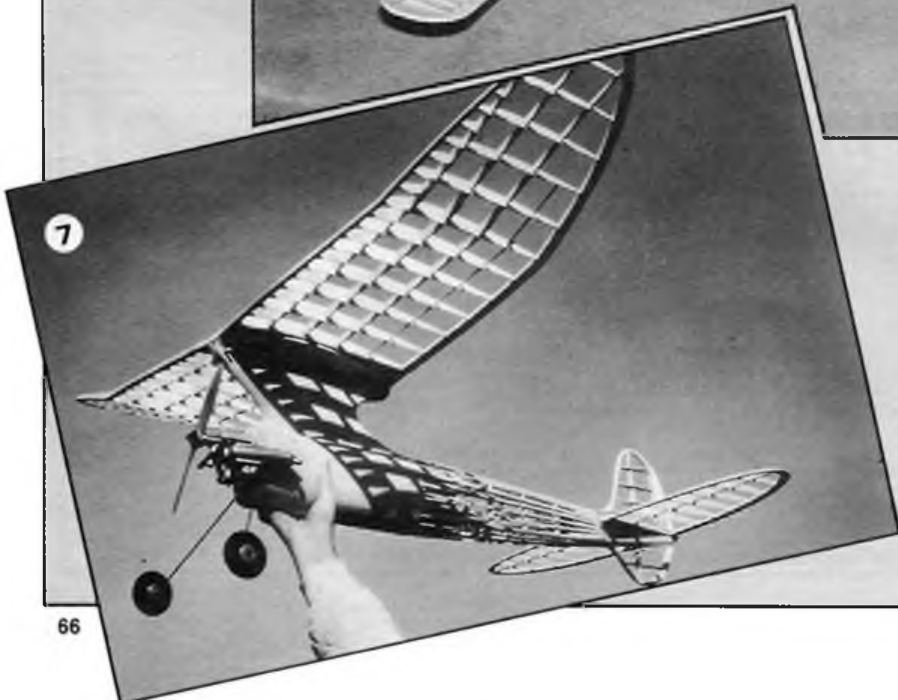
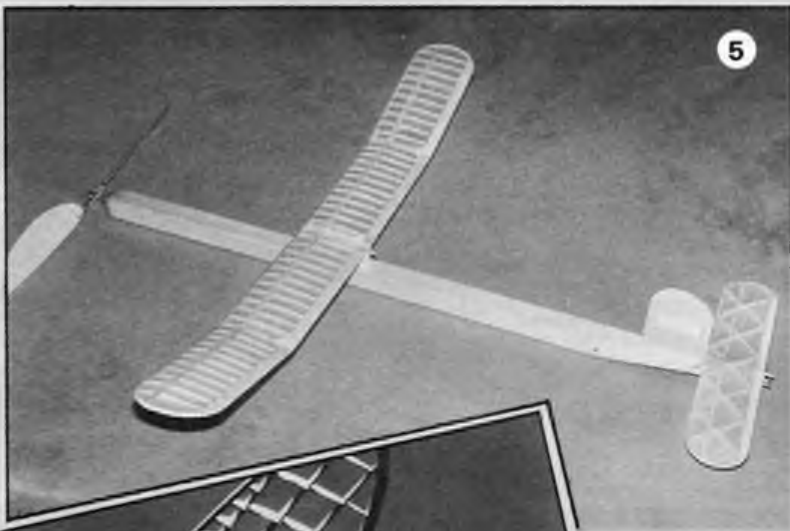
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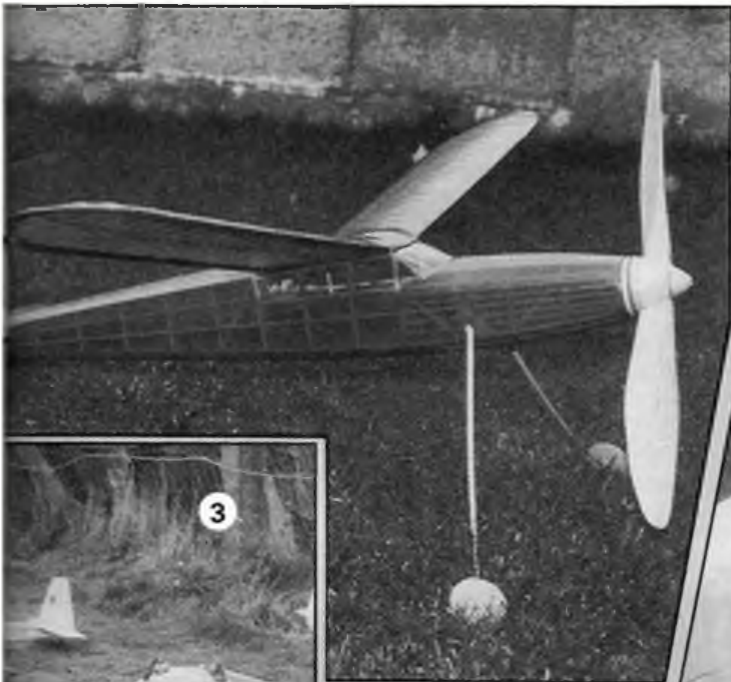
MODEL NEWS



Another hatful of photos showing aeromodelling at its most interesting - now send in yours!



5: B E Pettinger's experimental Wakefield features oversize variable-pitch propeller; a 2.1/2 minute max is the aim. News of flight trials awaited! 6: Back to our Four-stroke Rally; this one is one of two - yes, two - identical Consolidated PT-3s from the Southend club; Michael Burrell flew this one! Beautiful, slow, stable performer. 7: Pete Tomlinson - again - displays the classic lines of Carl Goldberg's 54in Zipper from 1938. Three-function radio fitted - an OS 25 provides the urge.



1: The judges do their worst! Barrie Hotham and Dennis Thumpston check out Dave Causer's CO₂ Hawker Woodcock at the autumn Alumwell indoor meeting. 2: Neat Stoffel Aristocrat wins a year's Aeromodeller subscription for John Wilkinson. 3: At our Old Warden Four-stroke Rally, Charlie Essex prepares his Lanzo for flight. Performed beautifully. 4: Pete Tomlinson's Vintage Weekend shot captures the delight of Rubber Scale as Butch Hadland hooks on the prop of Doc Martin's Waco bipe; Reg Parham looks on.



3



4



6



8



8: Homebuilt, five-cylinder radial engines aren't exactly common! Lovely to see Richard Green's quarter-scale Sopwith Pup puttering merrily around the Old Warden skies at our Four-stroke Rally. Well worth a prize at that event. 9: The Bipblast lads put everything into their displays too. Shapely performer here being prepared for another session of sky-carving!



HAMPDEN HAPPENINGS

CHARLIE Newman's new Handley Page Hampden for twin Telco motors, first seen at the '89 Indoor Scale Nationals, incorporates several unusual features. Indeed, the model was born out of a collection of ideas that had been whirling around in the designer's head for some considerable time. Not all were meant to end up in the same model but that's how it worked out. During the lengthy gestation period (it itself the result of pressure of work) the BMFA introduced a much lower wing-loading limit for Indoor scale models, which made things even more interesting!

What's new

The following features were tried, all in a twin-CO₂ model:

- (a) Stressed-skin wings, with radiused leading edges and tips
- (b) Stressed-skin nacelles and cowlings
- (c) Through-flow ventilation for motors in radial cowlings
- (d) Retracting - and retracting - undercarriage.

The Hampden's shape seemed best suited to these features, and it possesses a good layout for a flying model: adequate dihedral, good tail moment and twin fins. Time to get out the rule and drawing film...

Five weeks later, with the builder suffering from a moderate lack of sleep, the model was statically exhibited at the Indoor Scale Nats. The target weight of 110 grams had been exceeded by twenty-five grams, but all the intended features were there - and the undercarriage worked! Subsequent flight trials have been very successful to date. The model proved rather nose-heavy, so the extra-large Brown CO₂ tank has been replaced by a smaller one, reducing the overall weight by five grams in the process. Very stable, the Hampden shows very little trim change when the undercarriage cycles, merely losing a few inches of altitude. So far, it is still at the trimming stage but as a proof-of-concept machine it has been a great success.

Charlie Newman's latest scale twin

incorporates some nifty ideas...



Much use of moulded plastic in this fine twin. Wheels, nacelles, cowlings, exhausts, spinners and transparencies so formed. Easily duplicated for damage replacement...

Neat 'Flying Suitcase' has passed initial flight trials; target competition is the '90 Indoor Scale Nationals...

What's going down?

A prototype undercarriage rig, built to exactly the size needed in the model, did not work well at first. It came as some surprise to find just how much force was required to raise and hold the legs, despite their light weight. Also, very light legs do not lock readily, for they lack inertia. The slipstream from the props, only a couple of inches away from the wheels, was another consideration. After several evenings of brainstorming and tweaking, the ultimate executive toy had been devised - working happily at a high level of reliability. Anyone thinking of trying a retract undercart is strongly advised to dry-run the system before building it into a model. It would have been impossible to develop the Hampden's system correctly had it been installed in original form.

Functions

Centre of the system is a Fletcher Arrow two-function timer, mounted upside-down with release arms to the rear. A servo arm, approximately 2.3/4in long and pivoted at the top (actually inside the upper gun turret) hangs two or three inches behind the timer. Beyond this is a substantial bulkhead on which are mounted three pulleys via thin, piano wire shackles. To save weight, these pulleys are made from thin-wall aluminium tube of 3/16in diameter with birch dowel cores and flanges punched from five-thou

styrene sheet. They do not need to spin freely. The servo arm is from 1/4 x 1/8in spruce, with an angled 18swg pin at the bottom and two small wire loops immediately above, facing aft. The lower loop is for the release stop, which is from 6lb fishing line. The upper loop is the anchor point for the four undercarriage lines, all of which are from Woolies Nylon Invisible Mending thread. All nylon line attachments are made by crimping a short piece of aluminium tube over the doubled line. The only tied connection is that between the second U/C line and the U/C legs.



Retract-undercarriage linkage appears complex but is straightforward in action. Refer to diagrams overleaf.



What of the main legs themselves? They are bent from 18swg piano wire into an inverted 'U', the top half-inch of which is bent through ninety degrees. A 16swg bar is soldered inside this, and a small 1/32in diameter brass staple is soldered to the rear cross piece, facing forward. The radius leg is made in two, pieces, hinged at either end and in the middle. Down lock is achieved by the 'over centre' principle, the slight bend - in respect. Mainwheel and axle are omitted until the rigging of the leg is complete. The axle is 1/8in diameter aluminium tube with two holes at each side to accept the legs. As it epoxied in place it may be removed for servicing.

The set-up

To set the system, the release stop is made to length so as to hold the servo arm a minimum of twenty degrees from the vertical when it is attached to 'function one' of the timer, and with the rubber band linking the servo arm and 'function two'. To provide the required tension a band stretched to about three times its normal length is needed. Lines one and two are now attached to the legs, noting that line one passes through, but is not attached to, the staple at the top of the leg. Both lines run forward to the large staple fixed to the rear of the firewall and then

diagonally back through the inner wing panel (as described below), through holes in the wing roots and round the upper pair of pulleys in the fuselage. With the servo arm held at twenty degrees, and with the U/C manually set 'down', lines 'one' are attached tightly to the servo arm without slack. Lines 'two' are fixed with a little slack. This is easily achieved if the lines are crimped, but almost impossible if tying is attempted. The reason for the difference in tension between the lines is simply that line 'one' breaks the over-centre lock, thus allowing line two to pull up the legs. It cannot do this unless it moves first; hence the difference.

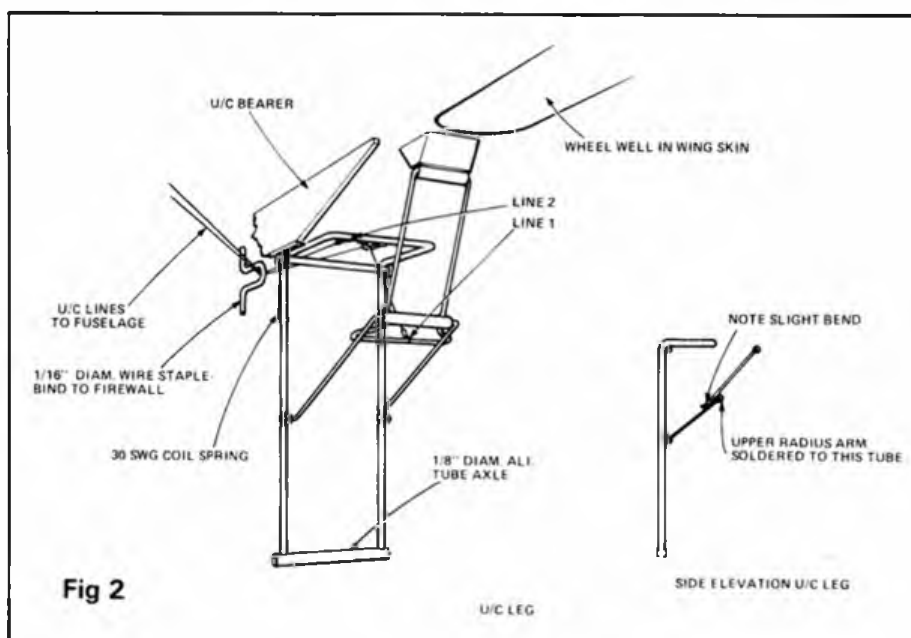
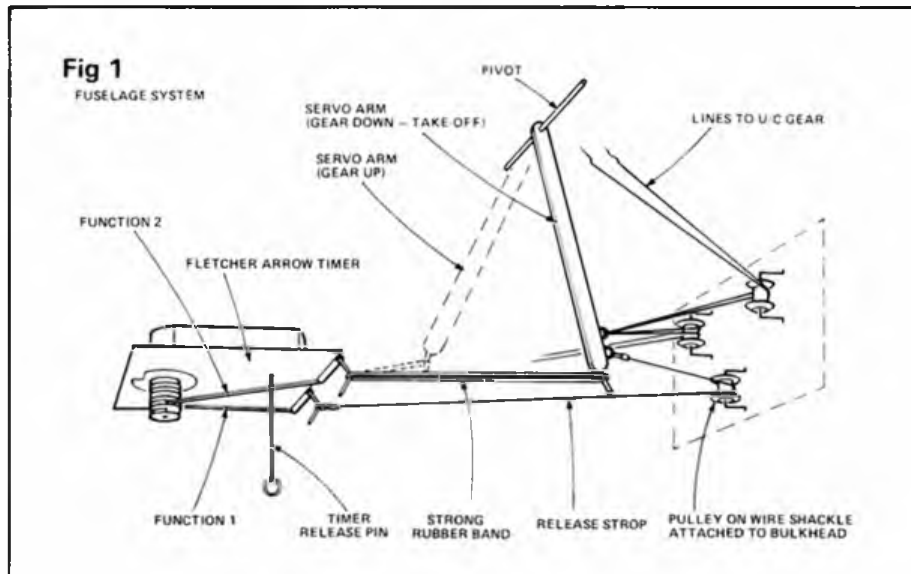
The system is now ready to go. To operate, the timer is wound with the release pin in situ. The legs are manually locked 'down' and the stop attached to function 'one' of the timer. The band is now stretched between servo arm and the bomb bay doors on the Hampden. It will be necessary to perform numerous take-offs with the gear fixed 'down', timing on each occasion the unstick time so function one, or 'gear up' time may be calibrated. At least a foot of altitude is needed for safety, for - as we have said - the model sinks slightly when the wheels slam up. To calibrate 'gear down' in relation to 'gear up' it will be necessary to slacken the nut retaining the scroll and cam, then moving their relative positions slightly before re-tightening. This has given me the biggest headache so far...

Just when the model is set free to take-off the release pin is removed. 'Function one' releases the stop, allowing the band to pull the servo arm forward, pulling up the legs and holding them there; that is, 'up lock'. As the timer continues to revolve, 'function two' will ultimately release the band. The combination of that release, coupled with the weight of the legs and the assistance of the small coil springs on the U/C legs swings the gear down and back slightly to lock for landing. The system can be set to give one function only. For example, if flying outdoors, when it may be undesirable to expose the legs to a fast downwind landing, all that is needed is to place the function two arm at the bottom of the scroll when it will not release before the model lands - unless it is airborne for more than four minutes!

What of the wings?

So much for the wheels. Onto the wings! Span is 31in; outer panels are plug-in and consist of only eight ribs tip-to-tip. Paper covering is used - basically the method devised by Mike Hetherington, but taken a stage further in relation to scale models. 800gm cartridge paper was used for all the skins, although a lighter grade might be a better choice for the outer panels. All finish and markings were applied to the flat shapes. The framework, such as it is, amounts to four sections, two outer and two inner. Each consists of a root and a tip rib with a full-

Fletcher two-function DT Timer is light and reliable, and easily reached through removable bomb bay door assembly.



depth spar between them. All spars are from very light 3/32in sheet. The wing is fitted with a leading-edge of substantial section - a departure from the true Hetherington system. Local reinforcing of 1/16in spruce maintains strength where holes have to be cut for the U/C lines, and the inner panels also had a light, secondary spar of 1/32in sheet. To prevent an unsightly panel joint at the leading edge, the skin for each panel is in one piece, not two. This requires a good deal of setting out, pre-cambering and colour demarcation. Inner panels are flat, but the outers incorporate considerable washout to control tip stalling. This was achieved by building them over a shaped surface. 3M Scotch Display Mount spray adhesive was used, with careful masking to keep it where required. An even coat is achieved in about fifteen seconds. The method worked well, although more experience would bring improvement. Lastly, wingtips were pressed from five-thou acetate sheet. The lenses can be masked out, and if mylar reflectors are fitted inside, the result is very pleasing. Weight of the finished wing is 27 grams.

Mould away

Moulded plastic sheet was the final area of experimentation - clear and opaque,

pressed and vac-formed. In addition to the transparencies and wingtips, the wheels, nacelles, cowlings, exhausts and spinners are formed from this material; twenty-five mouldings from thirteen patterns. The nacelles (apart from U/C bearers and motor mounts) are simply two pressings of seventh-thou styrene. They are incredibly strong and very light, although difficult to mate to the wing camber. Wheels are vac-formed from plastic of the same thickness, while 60 thou is used for the cowlings. The cowling pattern has a flared rear part, allowing individual gills to be slit. Four narrow struts attach the cowling to nacelle, allowing a substantial air current to flow around the Telcos. Not only does this look good, but it helps in the battle against icing. Similarly, the cockpit canopy is moulded in one piece; cutting the 'sliding' section away allows the 12cc Brown tank to be thoroughly ventilated, air entering by the bomb bay and leaving via the canopy and lower turret.

In addition to all the bright ideas above, the Hampden was fitted with a pair of 'new' Telcos, so it had untried motors as well as untried airframe and systems. In the full-size industry they say it is a mistake to create such a marriage; but it seems to work sometimes - the Telcos were great too!

FOAM

Steven Midson
presents a pair of
simple designs

HERE are two designs which are very simple and quick to make, to give you the opportunity of trying out for yourself the construction techniques described in previous articles in this series. If you have not got the copies - find a friend who has, or phone Hemel Hempstead (0442) 66551 with your credit card number at the ready!

Both are intended as 'starter models' and, being almost guaranteed to fly straight off the building board, are intended to whet your appetite to build more, and more complex, models from sheet foam.

Once you have grasped the principles described, you can use them to build almost any prototype shape - do you fancy building a Boeing 747?

Indeed, I sent one drawing to a modeller who took to the principle and turned up at Watford with eleven successful models, all of different prototypes - and he got a photo of them in Aeromodeller!

First foamies

For the first model, acknowledgements have to be given to Erik Knudsen and those who have encouraged the new P15 class. This I choose to call an FP15 - F for foam; I am not suggesting yet another subsection of P15 competition classes. The FP15 is heavier than a covered, balsa-framed standard P15 and thus flies somewhat faster.

Both designs are very simple, yet make satisfying models that can be built quickly and cheaply by Schools, Clubs and Families, and will give very creditable flight times in school gymnasiums or halls. They can even be trimmed to fly in tight circles in your living room - but take the best china off the sideboard first!

It is hoped that they will satisfy the often-requested need for something that will encourage the young into our hobby.

How about it Chigwell, and other schools!

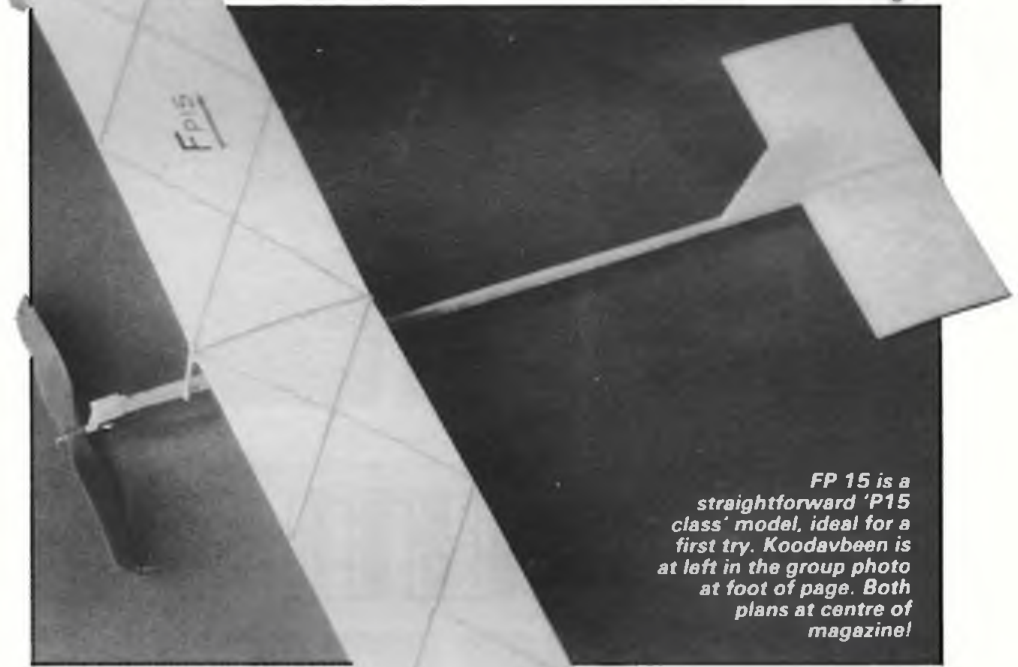
The second model, a high wing cabin monoplane, is typical of many light aircraft, although it is not a copy of any particular one - it is a 'could have been'. By following this approach a very simple design can be produced, which it frees the builder from the need to produce the detail of a scaled down actual aircraft. Indeed, you can change the shape of the fin, invent and apply your own colour scheme and add details as you wish.

In addition to the general arrangement drawing of the complete models, all the parts required are shown. These have been numbered in the sequence of assembly, but you can start in the middle with, say, the wings, if you prefer.

Except where stated to be in inches, all dimensions are millimetres - they are far easier to use than fractions of an inch!

The foam parts for Koodavbeen are shown with the outside of the lines the finished size. It is intended that you transfer the shapes to paper or card; when cut out, use them as templates to mark the foam.

fun follow-up



FP 15 is a straightforward 'P15 class' model, ideal for a first try. Koodavbeen is at left in the group photo at foot of page. Both plans at centre of magazine!

You should then cut with the blade on the inside of your marked line to give a clean piece of the correct shape.

Remember - use PVA glue and strips of masking tape to hold the pieces together whilst the glue sets.

The Koodavbeen design can be scaled up to as much as 500mm span, but balsa edging to the wing leading and trailing edges should be added.

As an alternative to scratch-building the designs given, a kit of a Starter Model very similar to the Koodavbeen and containing all parts and full instructions can be obtained from Fly Me Models of Colchester or from

their stall at various aeromodelling meets.

I hope that as a result of these articles and plans we will see a great upsurge in the use of foam sheet for model aircraft - believe me, it makes some jolly good fliers!



Koodavbeen

Balsa reinforcing strips data.
Use table when referring to plans.

Part no.	Number off	Length, mm
2	2	235
3	2	12
5	2	210
7	1	22
8	1	17
9	1	10
10	1	19
11	1	16
13	1	22
14	1	17
15	1	19
16	1	16
17	1	22
22	1	17
23	1	22
30	2	22
31	2	65
	2	65

Cut to fit

All parts from 1mm or 1.5mm sq. balsa

Right: Ray Johnson prepares his winning Veron Tiger Moth. Below: New to Indoor, but not scale - David Vaughan with neat Sopwith Pup. Below right: Splendid flights from Barry Hetherington's familiar Bellanca were still not enough for higher than third place. Opposite page: Stan Giles waits to go in the Air Race as that man Hetherington watches the opposition.



Walsall was the venue
 for splendid Indoor fun
 - as Bill Dennis reports



Autumn at Alton



Far left: Derek Knight took Electric again with reliable Avro 560. Left: Hard-working Doug Sheppard prepares his new Farman Monstique. Below left: Top in Peanut was Chris Hutchinson and Farman Carte



Postale. Above: Chris Strachan's sleek Suzy.

Aeromodeller



Alumwell

THIS meeting was held rather earlier in the year than usual – a fact that, combined with some initial confusion over the dates, may have been the reason for the smaller turnout. Having said that, entries were good, with a high proportion achieving qualifying flights. In a way I prefer this autumn meeting to the Indoor Nationals which can get a little frenetic with so much going on.

Open Rubber and CO₂/Electric

I was judging flying for these classes with Andy Sephton, and it was interesting to hear his observations from the viewpoint of a 'full-size' pilot. I am not sure what phugoids are, but a lot of models had them! The flying rounds for each class were split into two sessions. This may be advantageous when major repairs, or a trimming re-think is necessary, but there was a definite loss of momentum in the morning of the contest and as judge it was not easy to compare flights with those performed a few hours before.

There were very few new models, but it was a pleasant surprise to see David Vaughan entering his first indoor event with an electric Sopwith Pup. David is, of course, much better known for his R/C scale activities, his Mustang and Wirraway being particularly fine examples. He seemed enthused and vowed to return, but do cut down on the fast under-arm launch David!

The usual criticism of fast flying, tight

February 1990

Peanut		Appearance	Static Place	Best Flight	Flight Score	Flight Place	Score
1	C Hutchinson	Postcard	44.6	4	91	170	1
2	P Briggs	Bleriot	51.5	3	51	102	6
3	B Horwood	SE 5	52.5	2	49	101.4	7
4	L Smith	Macchi M18	56	1	31	53	12
5	C Strachan	Hollandair	33	13	61	125	2
6	D Vaughan	Lacey	36.5	12	55	104	5
7	P Robinson	Tailwind	39	7	37	84	11
8	A G Balding	Reynard	38	9	36	75	9
9	R Johnson	Widgeon	43	5	25	50	13

Note: 2nd and 3rd places were the result of a flyoff.

Open Rubber		Complexity	Static	Best Flight	Total
1	B Hetherington	Stinson	0	881	915
2	R Johnson	Svenska	0	528	926
3	P Briggs	Bleriot	0	813	718.5
4	B Pursglove	Bellanca	0	610	818
5	P Lee	Lacey	0	869	738
6	J Bail	Puss Moth	0	538	768.5
7	M Goldby	Cub	0	516	858
8	M Green	Fiat CR32	0	542	652
9	C Strachan	Baby Ace	0	566	700

turning models still applies. Other problems included oscillating flight patterns, rapid, curving take offs and bouncy landings. The most realistic flight speeds were from Barry Hetherington Stinson and Bellanca, and the Avro, Eastbourne and Svenska of Messrs Knight, Hanks and Johnson. It is no coincidence that these models filled the top places. The general standard of documentation and presentation was described by one judge as 'rubbish'.

The most interesting new model was Doug Sheppard's Farman Moustique but it proved too big, heavy and reluctant to turn. In fact, it seemed to be being forced to turn left when it wanted to go right...

Peanut

I have in the past been a little scathing about Peanut. The rules are still a nonsense with loopholes – plenty to be exploited by anyone so minded. However, this year I took a little more interest, mainly because of the vast amount of flying time devoted to the class in the middle of the day. I was helping Paul Briggs wind his Bleriot as he tried to squeeze the best performance out of it, and it was interesting to see the large differences that only slightly thicker or larger motors made. Like any Indoor duration model the trick is to have it land just as the turns run out. Easy, isn't it?

Air Racing

Only six entries this year. This time the final was run over ten minutes, with the number of laps completed in that time being counted. The runaway winner, with a total 25 laps, was Chris Strachan's Keith Rider racer, flown in a most relaxed style. In contrast, Andy Sephton had to work very hard to get second place with his all-yellow

Canary from Bob Horwood in third, whose model had been reduced to kit form in the morning, but was skilfully repaired.

Mass Launch!

For a change, this time the popular mass launch was for biplanes (and Sopwith Triplane), and it proved successful with seven entries. As was expected models were Furies, SE5s and one Tiger Moth from Ray Johnson, which proved to be the ultimate winner. In particular, the Furies of Chris Strachan and Charlie Newman showed what can be made of these kits, given skill and a decent propeller. Bill Dennis' Fury showed what can be done with two hours and two left hands, but it still flew well!

The biplane rule will be kept, certainly for the next two meetings. Have a go, but note it is for KK and Veron kits only, with a minimum weight of 25 grams. Anyone for the Nieuport 17?

Jet Duration

These models look really good in the air, where the prop is almost invisible, flying fast and smoothly. The rules, unfortunately, are incomprehensible – most people mistakenly thinking it is a mass-launch contest. Why not make it such?

Thanks yet again to Doug Sheppard for organising the meeting. Apparently it now involves a team of 24 people on the day!

CO ₂ Electric		725	973	1698
1	D Knight	0	844	810
2	D Hanks	0	592	972
3	B Hetherington	0	840	901.5
4	C Strachan	0	833	578
5	C Newman	0	578	560
6	M Allen	0	828	483
7	H Perrens	0	795	268
8	D Vaughan	0	975	-
9	D Causey	0	869	-
10	P Briggs	0	862	-
11	G Spence	0	-	852

Air Race		First Heat	Static	Final Laps
1	C Strachan	9 sec	16.5	23
2	A Sephton	10.06	14.5	13
3	B Horwood	9.02	12.5	8
4	B Harvey	7	12.5	-
5	L Smith	10.22	-	-
6	S Giles	14.25	-	-
7	A Beecher	-	-	-

John Roberts looks at motor control matters for
the C/L Scale enthusiast

In the scale circuit

GIVEN the standard of flying demanded in modern control-line scale flying, it is impossible to achieve reasonable results without motor control. The best-known system is the Roberts three-line arrangement which is used in conjunction with R/C (that

is, throttled) motors. The bellcrank and handle combination is no longer available, but - luckily - an improved version is available from GS Products in the USA. This is more substantial than the earlier type, but components are not interchangeable between the two. A third choice

is the bellcrank produced by Enterprise Model Services which may be used with either handle - most useful if you already possess one of the other systems and simply wish to build another model!

Obviously, such an installation opens up a new dimension of controllability. Manoeuvres such as the touch-and-go are now easily achieved, and landing at the end of your flying sequence is no longer a dead-stick affair. The aircraft can also be taxied just like the full-sized original. Once all this has been achieved, the next step is to add such functions as operating flaps, retractable undercarriage, bomb dropping, and so on.

If there are to be more than two mechanical options it is best to adopt the method chosen by experts such as Ron Truelove - that is, to return to two-line control via insulated lines. Pulses from a digital encoder in the handle are sent down the lines to a proportional decoder in the aircraft; this transforms the signal to operate servos and, thus, the appropriate option. Unfortunately it is not possible to buy this type of equipment in the UK, although occasional promises of production on a commercial basis are heard from the other side of the Atlantic.

But don't get disheartened. A simple, two-function system can be made very simply. Indeed, a small electric motor and gearbox can be hooked up with homemade cam rings and contacts; sufficient torque can be generated and though the hardware may be a bit bulky it should still fit within the space afforded by a medium to large model. To drive the system, a three-volt battery pack is carried in the model to feed current up the lines to the switchgear at the handle and thence back to the aircraft and an on-board transistor for each electric motor. Voltage drop along the lines would otherwise dictate the need for at least 45 volts at the handle! Wal Cordwell is one notable exponent of this system.

A third method entails the conversion of an R/C transmitter to feed the signal down the lines, rather than through the air, to the model. Chris Bradford uses this method to control the mechanical options on his well-known (and successful) Dakota. Perhaps the only drawback is that there is no miniaturisation so the transmitter, which is externally unaltered, must be strapped to the flier's body. But onto the details!

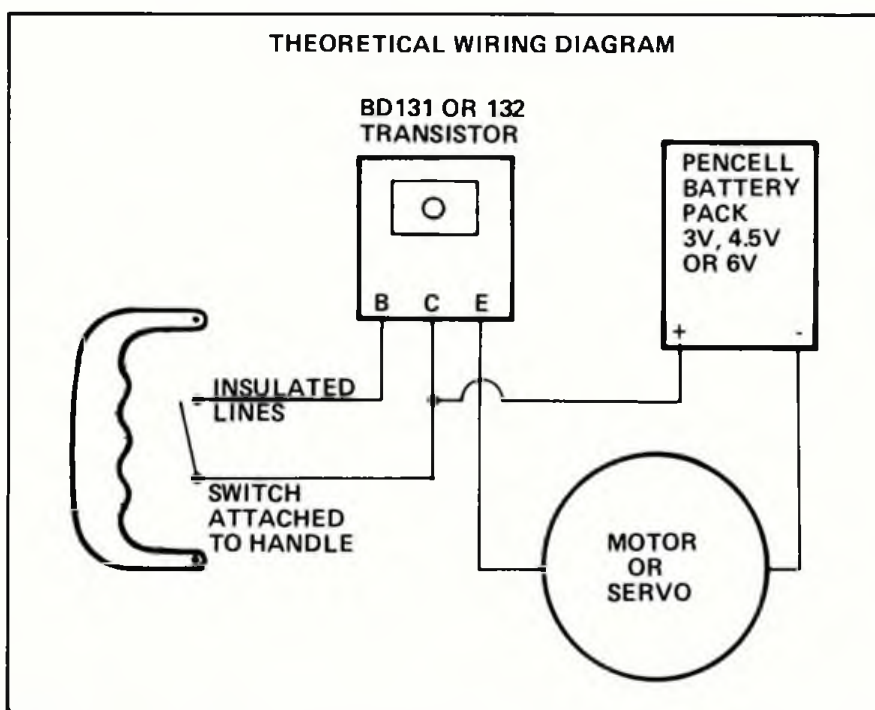
How it's done

We have described that the impossibly large voltage drop down the lines means that transistors are used to act as relays in the

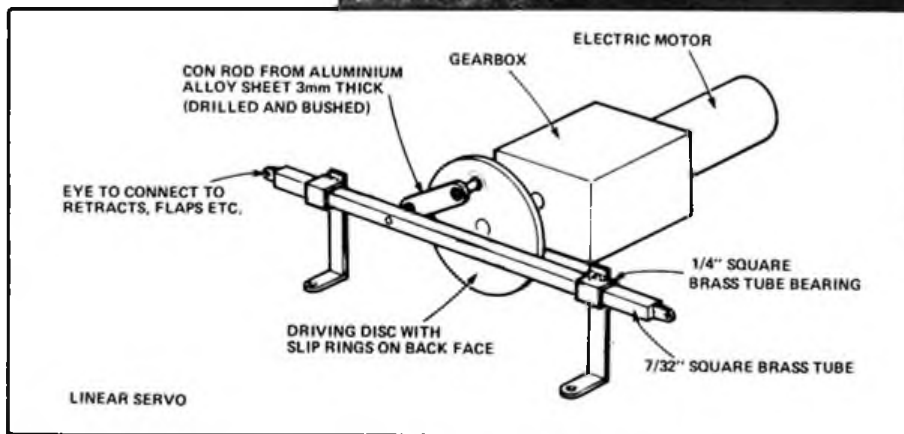
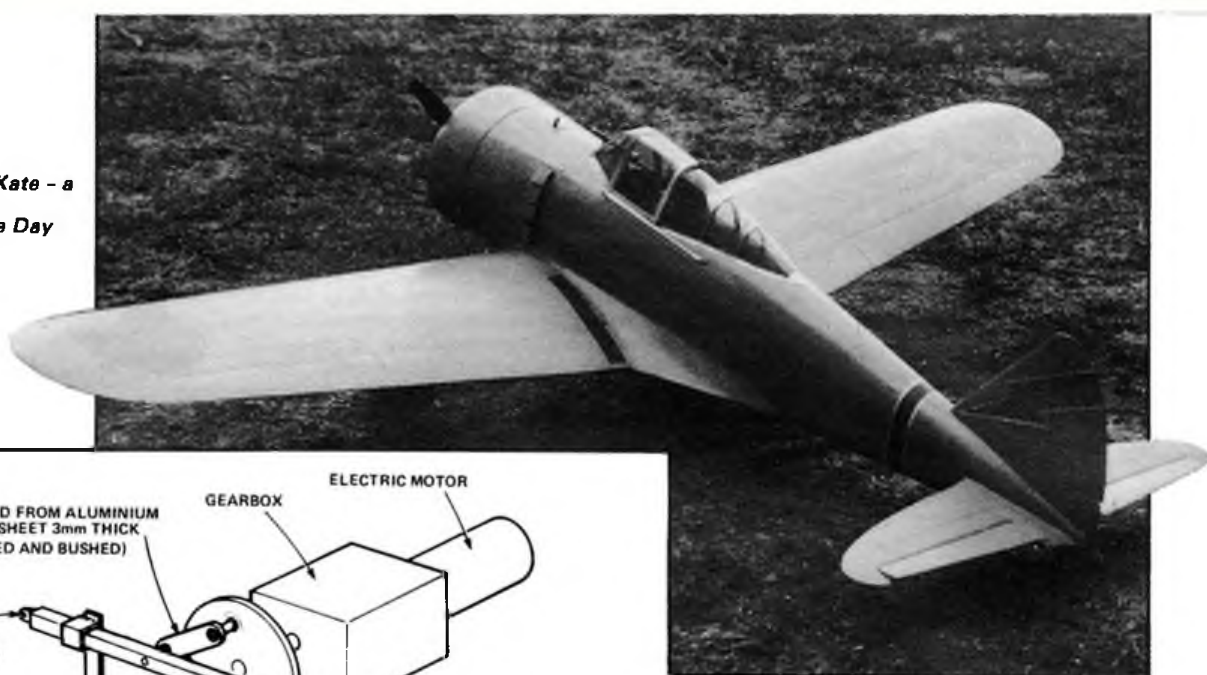


Above: Bernard Seale captured this shot of a healthy Scale trio at the Three Kings Scale Day on 1st October. Chris Bradford's Dakota heads Wal Cordwell's DH Dragonfly and Granger Archaeopteryx. Eight entries in FAI Scale; yet another win for the well-known John Roberts Dakota. Good flying reported in excellent conditions.

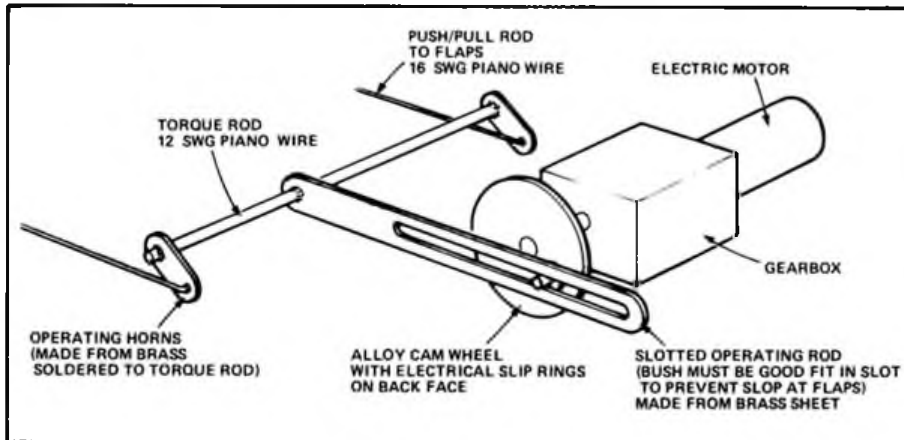
THEORETICAL WIRING DIAGRAM



Pete Styles' Nakajima Kate - a crisp contender at the Marlborough C/L Scale Day on 15th October.



Another Pete Styles creation at Marlborough - Handley Page Heyford is a characterful choice, slow and stable in flight.



system. They are polarised (as shown in the diagram) and thus allow the current to flow in one direction only. Suitable components are BD 131 (positive) and BD 132 (negative). Three tags project from each transistor; these are known as the Base, Collector and Emitter, or B, C, and E.

This is what happens.

By closing the circuit between C and B a current will flow from the battery. This operates the transistor as a relay and allows current to flow between C and E.

What motor do we use? Wal Cordwell prefers an R/C servo with the PCB removed, but this is not only expensive but produces marginal torque. Also, the gear bearings are generally so poor that the nylon gears do not mesh properly and eventually they may shear.

The cheaper, and more powerful motor/gearbox sets sold by MFA for approximately £3-4 are much more effective, particularly if a bush is turned to fit the two endplates of the gearbox. This prevents excessive clearance and aids correct gear meshing. It will also accommodate side loads produced by the operation of (for example) a retracting undercarriage. To adapt the motor and gearbox it will be necessary to make a simple cam ring assembly from brass shim.

Much has been written (and even more spoken) about increased line drag because of the larger-diameter lines used in these systems. Of course, with the accent on safety these days it is imperative that the C/L Scale discipline maintains an unspotted record with no flyaways. Thus I use three lines of insulated fishing trace which, though very expensive, is highly resistant to kinking and possesses high tensile strength. As this is stainless steel, nominal diameter is greater than that of normal C/L wire. Stainless steel is difficult to solder by normal means so crimping has to be used to retain the connectors, but I have never experienced any problems with this method.

Several advocates of this system use only one insulated line (the feed line from the BD 131/132 transistor), but if you are using a three-line bellcrank assembly it will be necessary to have equal tension on all wires; if a weaker line is used for the throttle control - and model pull might exceed the limit of the remaining two lines. And bear in mind that if you enter an FAI event your handle, lines and model will be subjected to a pull test of ten times the model's weight.

The quoted transistors may be used with a variety of motors and linkages without problems. They will cope with a six-volt,

three-amp drain before failure occurs. These transistors are available overseas under other designations, as follows:

UK	Europe	USA
BD 131	BD 237	2N 4923
BD 132	BD 238	2N 4920

Back to the linear conversion diagram, and a few words of explanation.

The slider is made from brass tube and mounted on brass brackets which must be at exactly the same level as the gearbox output shaft. The square brass tube is 1/4in square to match the outer guides, and the linear rod is from 7/32in sq with brass ends to take quick-links. Of course, dimensions will depend on the chosen model. On the subject of retracts, I have found the systems produced by Uniretracts International to be very reliable. They may be contacted at 87-89 Farleigh Road, Warlingham, Surrey CR3 9EJ; or phone 08832 7240. Top quality materials are used with high tolerances in manufacture. Other items produced are a set of telescopic, damped oleo legs. Sensible prices, too...

Now - how about sending in details of your own electrical and mechanical systems?

SPRING TO IT!

Goodyear detail as Ian

Horne checks out

'wobbly wheels'

wheel but to replace the rubber with a torsion spring (like the end of a safety pin) which plugged vertically into the rear uppermost section of the leg. Initially the idea was closely copied and installed in an old Open Goodyear model with great success. Later the idea was developed further by making the box into a trapezoidal shape laminated from three pieces of epoxy/glass printed circuit board (PCB). The outer laminations were made from 1.6mm. thick material which may be obtained from electronic supply shops with a single copper-coated side. The copper foil may be removed by careful peeling from one corner or immersion in ferric chloride solution (also obtained from electronic suppliers). The centre lamination was from 3.2mm. thick material which most good model shops stock for electric car chassis.

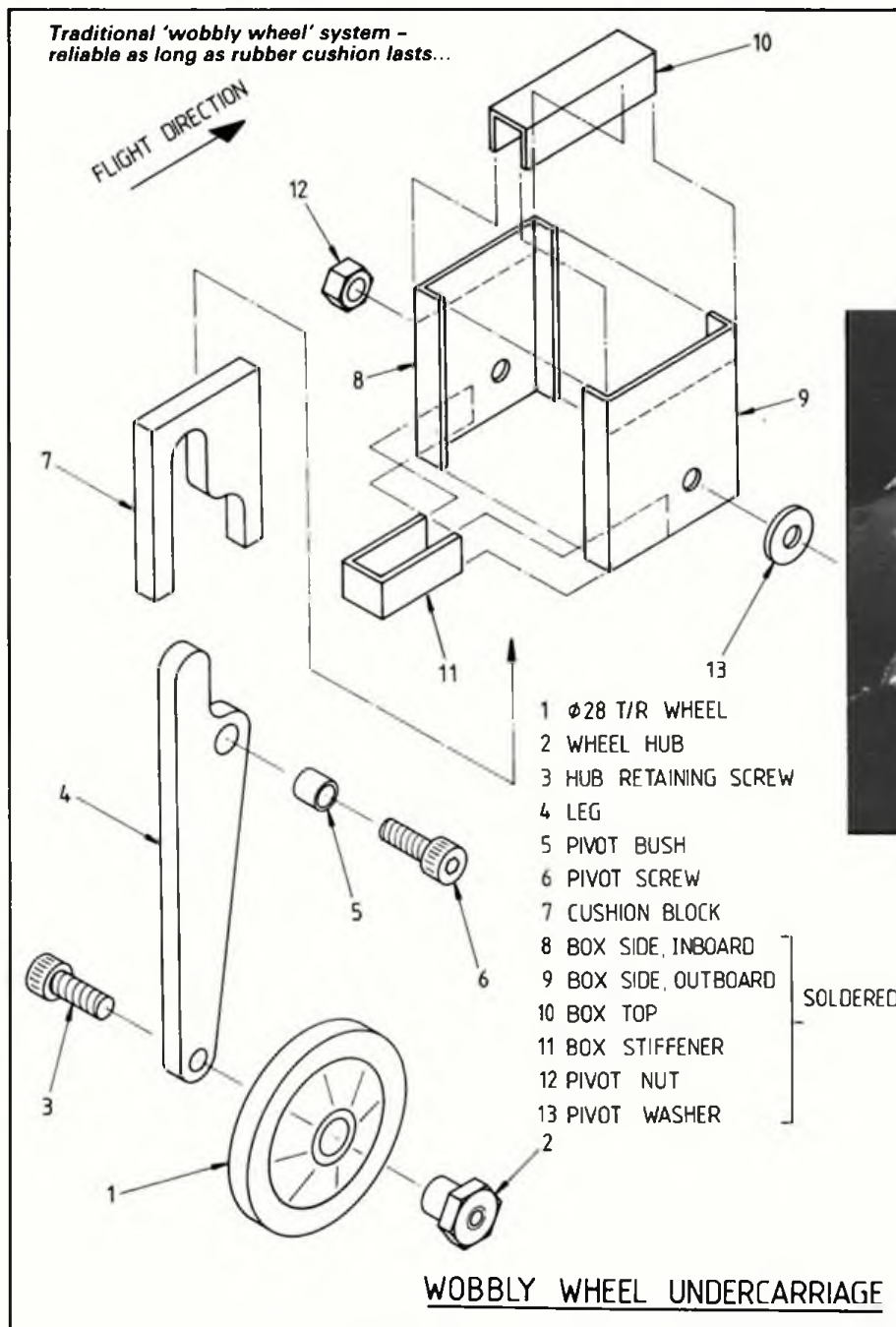
MANY teams use the 'wobbly wheel' design which was originally described by Dave Clarkson in October 1976 (p586/7). Here's a summary for those of you without access to this back issue. The assembly comprises a wheel mounted on a metal leg which can freely pivot on a bush between two sides of a metal box but is restrained fore-and-aft by a rubber cushion block. The metal box is built into the model directly below the lower engine bearer and between the plywood nose doublers. Rearward movement of the leg during landing impact causes the vertical extension above the leg pivot to swing forward and compress the rubber cushion block, thus damping any bounce. Note also that a vertical shock load is translated into a rearward movement by the disposition of the wheel axis behind the leg pivot axis. A large distance will improve the vertical, shock-absorbing properties of the undercarriage but if taken to extremes will tend to make the model nose dip at landing with consequent propeller damage. It also means that the model will 'kneel' if the

pitman leans on it at a stop. Experience has shown that between 3 and 6mm. is the optimum range of movement. Rubber choice is critical for reliable operation. Hard rubber virtually removes any shock absorbing qualities, whereas soft rubber is quickly damaged by tearing or permanent set. The leg will then move freely fore-and-aft, usually at take-off when it may be accompanied by an unintentional reduction in propeller diameter! Another problem is that 'hard' rubber is quickly converted to 'soft' by soakage from diesel fuel. It seems that regular replacement of the cushion block is a necessity for reliable operation.

The wire sprung leg system

The author disliked the problems associated with the rubber but was attracted by the simplicity of the design. A solution was found after examining a partly constructed F2C model which belonged to Mark Thomason, although he does not claim originality for the idea. His method was to construct a similar box, leg and bush to the wobbly

Traditional 'wobbly wheel' system - reliable as long as rubber cushion lasts...



Neat Goodyear racer seen at the Nats - undercarriage leg pivot reveals use of wobbly wheel

Epoxy/glass box construction

A 3.2mm. trapezoid is cut by sawing and the space for the leg and spring fretted out. The two plain, outer trapezoids are glued into place with a slow-setting epoxy adhesive. Mark and drill for the leg pivot, clamping screws and corners of the lightening holes after the adhesive has cured. Complete the lightening process by joining up the holes with a fretsaw. Add the two M2.0 (8BA) clamping screws and nuts to prevent delamination after repeated landings. Apply low-viscosity cyano to the threads and file away the excess thread when cured.

The captive nut can no longer be soldered in position so its place is taken by a tapped steel strip which is epoxied to the inboard

side whilst a large series washer is similarly affixed to the outboard side to act as a load spreader for the pivot screw head. The box is now ready for installation within the fuselage and although heavier than the wobbly wheel box, its design significantly reduces the probability of destruction during a hard landing or crash and adds stiffness to the lower engine mounting.

Spring manufacture

This is best accomplished with a simple jig comprising of any convenient piece of flat steel around 6mm. thick with two drilled holes of 3mm. and 1.3mm. diameter approximately 30mm. apart. A 3mm. diameter steel roll pin or dowel is pressed into the largest hole to act as a mandrel for the spring coil. To produce the spring, simply bend through 90 degrees the last 6mm. of a length of 1.2mm. (18swg.) piano wire, insert it into the 1.3mm. diameter hole and wind the free end around the mandrel about one and a half turns trying to keep constant tension on the wire. When the correct angle of 20 to 30 degrees between

the legs (in the 'free' condition) is achieved the coil is removed from the jig and the legs cut to length.

Leg materials

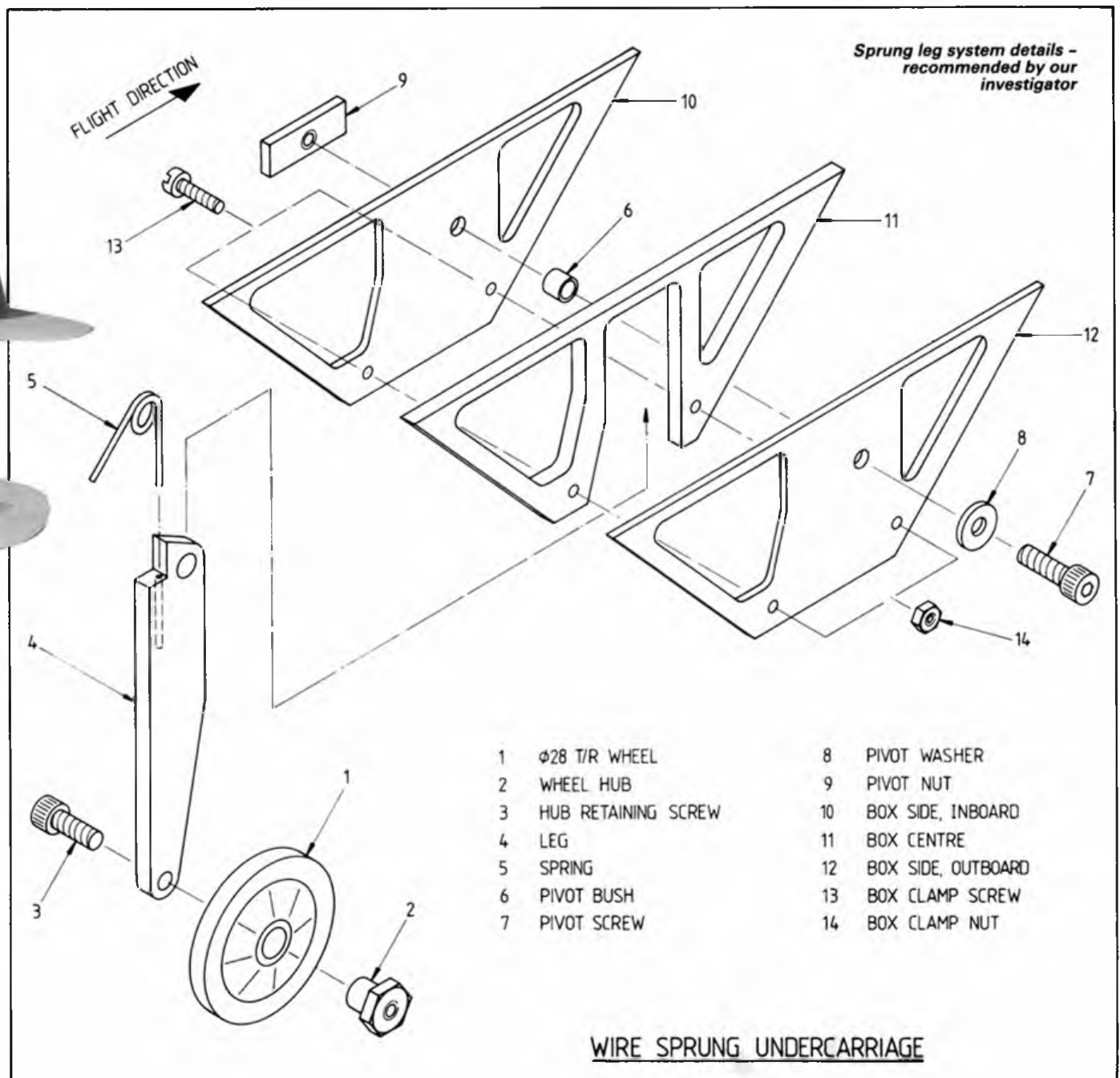
With both undercarriage systems the leg can be made from high-tensile aluminium alloy, titanium alloy or steel, in ascending order of weight and stiffness. If aluminium is your choice try to use material to BS.1470-2014A (formerly HE15), condition TF or something even better. This material has a tensile strength of 435N/sq.mm. TF means that the alloy has been solution heat treated and precipitation hardened to improve its strength: ie. heated to 490-505 degrees Centigrade, quenched in cold water and tempered for eighteen hours at 155-165 degrees. Such treatment will be a problem to the majority so to avoid it only use material of known specification. Note that in the UK the most common commercial high tensile aluminium alloy is BS.1470-6082TF (formerly HE30) which has a tensile strength of 295N/sq.mm. which is significantly weaker

than 2014A. If anybody knows of a commercial source of 0.5 to 3.0mm. titanium alloy in small quantities let's see it published for the benefit of all.

Wheel attachment

The ideal wheel assembly for either design is the Ed Needham type with the 6BA sleeve nut type of hub. Fasten the assembly to the outboard side of the leg to ensure that the hub always tightens onto the retaining screw when the wheel is jarred on landing. Make sure that vibration will not cause the screw to loosen by treating it with an anaerobic locking compound such as Loctite 222 or 241. The latter is preferable as it is the stronger; but its use makes removal difficult unless the screw is heated with a soldering iron.

One final tip: check the wheel for free rotation before every flight as part of the pit procedure. Accumulated dirt and fuel residue soon forms a sticky mixture to provide an excellent wheel brake. This will give impressive landings but awful take-offs and damaged propellers.



BUILD FROM OUR
FULL SIZE
PLANS!

MY acquaintance with this aircraft resulted from reading the Spanish aviation magazine *Avion Revue* a couple of years ago whilst on holiday. Surprisingly, the subject has not often been modelled, although - quite apart from its character, which is considerable, it was produced in large numbers and served in several air forces. Indeed, there are so many variations in CR 32 colour schemes and national markings that one could spend a modelling lifetime on little else.

The first version was Peanut-sized. At the time I didn't realise just how ambitious a project this was - the small size is deceptive - so, many useful lessons were learned. The



CR 32 proportions are just right for F/F scale. Build this one - then double up for 0.8cc..!

Try a fine Fiat fighter - the CR32

To accompany our scale drawings here's Mike Green's 17.1/2in 'Chirri' for Indoor rubber. Get building ready for this season!

model turned out a shade too heavy, so duration was limited, but it looked pretty in flight and I was encouraged to build a larger one.

The model described here was produced for this year's Indoor Scale Nationals, but presented a few teething troubles - however, proper attention to the CG position these have been eliminated, although there is no doubt that expert trimming would improve performance even more...

Building the CR 32 should present no difficulty to the modeller already experienced in small aircraft, but some aspects are demanding and patience is of the essence. Weight must be kept to a minimum, especially behind the wing. The greatest risk is overdoing the finish. Use only the best materials for the job. Cost factor on such a small aircraft as this is insignificant.

Fuselage construction

The basic, entirely conventional fuselage structure is mostly from 3/32in sq. Longerons and spacers can be carefully trimmed to a triangular section. Use white glue; cyano is OK for certain tasks but it is a bit fierce for small aircraft and mistakes cannot easily be undone. Add the front formers and tack sheeting. Carefully study photographs of the prototype and carve and sand the nose to shape. This must look right, so take your time. Likewise, tack glue the rear foam section and carve paper. When satisfied with your efforts, these three components can be hollowed out as thin as possible with a small rotary tool. Leave the rear turtledeck about 3/32in thick. A face mask is essential, or you will risk asphyxiation - and foam plastic is a horrid substance when reduced to dust.

When all this is satisfactory add the

stringers at sides and bottom, cut away where shown and sheet the spaces between. Reinforce the interior of the fuselage at the motor peg position, taking care because this needs to be an exact fit. Tidy up with fine emery paper. The headrest fairing can be left until later, as can the cockpit cut-out. Carefully prepare and glue the nose disc.

Check the undercarriage angles and lengths against photographs as this is a particularly distinctive feature of the aeroplane. If you choose the spatted version, a useful tip is to line the insides of the spats with aluminium foil - or cleaned yoghurt tops - shiny side in; this avoids unnecessary friction and improves take-offs. For the same reason, wheels are slightly thinner than scale. Make sure they are a free fit or the model simply will not take off, but ground loop, making ROGs a source of frustration.

Noseplug and prop assembly must fit accurately - with no wobble. There is scope for experimentation with propellers but the one shown works quite well enough. Do not overlook the small key.

Wing surfaces

These are reasonably conventional. Sliced ribs give a little extra rigidity and are lighter than all-sheet equivalents. Note that top and bottom slices are fixed next to, rather than directly on top of, each other. This gives a stronger trailing edge (TE) attachment. Sand the TE to section before assembly to avoid distorting the wing. The leading edge (LE) needs to be raised from the building board. Carve and sand carefully to section. Trim the lower rib carefully to matching section. It is only too easy to exaggerate the scalloped effect at the TE so be restrained! The lower wing is made in one piece thanks to its lack of dihedral. Root ribs are trimmed to mate up with the curve of the fuselage. TE and spar fit under the front longerons as shown to give the correct incidence.

Avoid unintentional warps, but as the model must fly 'left' the lower, port wing may be allowed a little positive incidence - say, 3/64in - which may be built-in or introduced

during assembly.

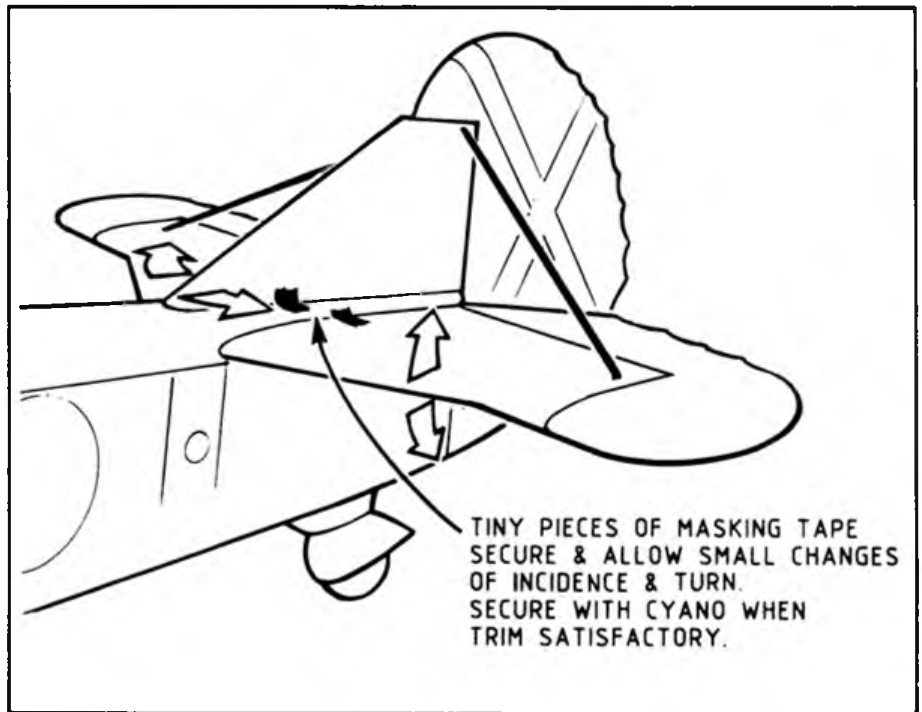
The fairing for the fuel tank on the top wing is carved from plastic foam and cut to fit the wing. One or two attempts may be needed to get it right. When satisfied, cover wings with tissue; my preference is for thinned white glue as adhesive.

Tail and fin affairs

These are simple - but only light wood must be used. The separate elevator is hinged with soft wire. Refuse bag wire ties or heavy-duty fusewire are fine. Build tail and elevator together, carefully parting afterwards. Trimming is greatly helped by a working elevator, so be careful with the covering. If the whole lot gets gunged up some other means of adjustment will be necessary. When fitting the tail to the fuselage you may find that judicious trimming of the LE is necessary. The fin is even easier. You may hinge the rudder if you like, but I did not, preferring to offset the whole affair slightly to port on assembly.

Covering the bones

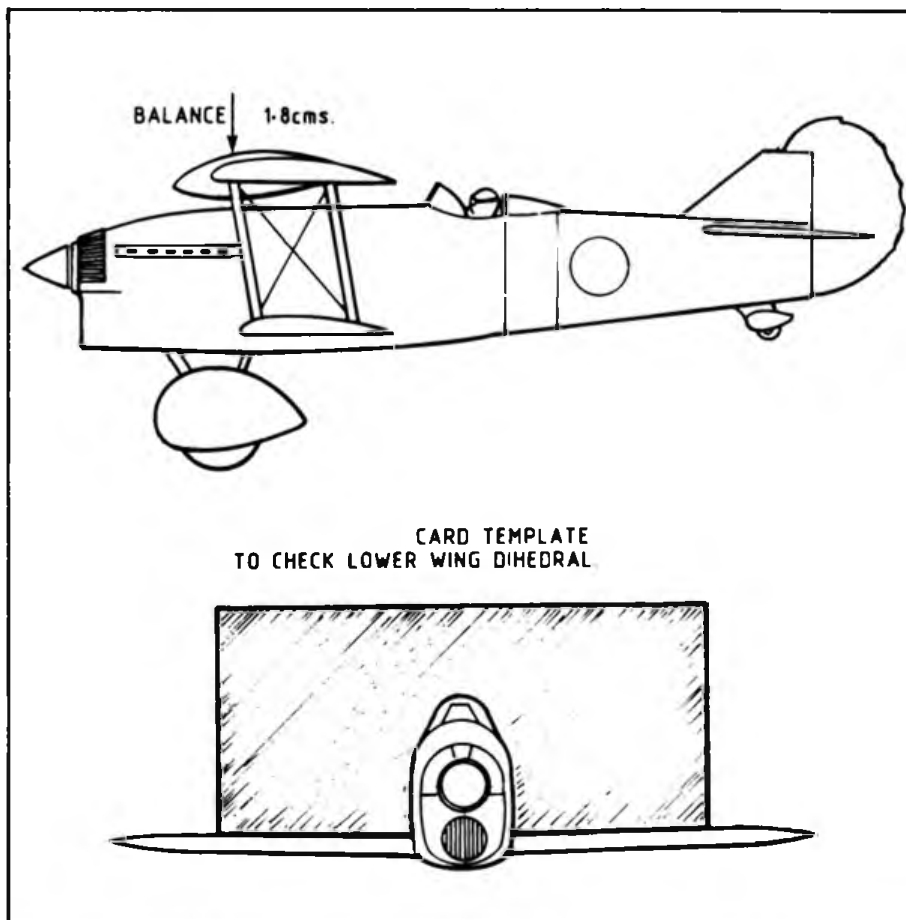
I used genuine Jap tissue, fixed with diluted PVA which is also used to apply the tissue to the turtledeck as it allows the slight double curvature to be accommodated. Use sufficient thinned dope just to fill the pores. Take it very easy because warps will be extremely difficult to remove. If you get dope on the foam parts they will dissolve and you will have to make them again. Lightly sand the covering with very fine emery paper to remove the hairy bits and you are ready to apply the colour scheme. I chose Humbrol enamels, well thinned. A good airbrush is a great asset. Generally speaking, it is best to get as much painting done before final



assembly. Actually, final assembly is the hardest part of the whole business...

Cut the slots for lower wing LE, TE and spar, and check for fit. You may have to trim root rib, spar and LE to suit. I used small amounts of Devcon because this adhesive gives plenty of time to make adjustments. Card jigs will ensure correct positioning. Pins may be needed to secure the top wing temporarily in position. Double check all angles. This is fiddly so make sure you have

everything just right. Trim outer wing struts to fit and fix (use Devcon again - cyano may well be tempting but you have no chance if you make a mistake). If you have made a rigid tail, fix it with just a spot of glue at the spar and a temporary fastening of masking tape at the LE - this permits incidence adjustment for trimming. Tail struts and bracing are omitted until the model is flying as desired. The undercarriage is secured to the fuselage with Devcon. Chamfer oleo legs to shape and fix. Add the tailwheel and windshield and you are ready to try the air...



Trimming and flying

The model must balance 18mm behind the top wing LE. Ballast if necessary with small pieces of lead and plasticene located in the space behind the radiator shutters.

The original model flies quite happily with a loop of 3/16in rubber of twice the length of the 'between-hooks' distance. This is perhaps a trifle long; 'one-and-a-half-times' should be enough to begin with. Start with short, low hops just off the decks, for which 250 turns will suffice. All this assumes Indoor flight - otherwise you will have to find the traditional 'flat calm and long grass'. Long grass, certainly! Indoors, the biggest risk is banging the walls. A touch more noseweight may be needed to prevent a 'floundering' pattern, and sidethrust can be added in small increments to generate the left turn under power. Gradually increase turns. If all is OK try a ROG. If the model fails to unstick, or chases around its wingtip, try a small amount of ballast on the outer wingtip. This is a handy trimming tip which is just as applicable to larger power models, for its effect does not increase with airspeed, and thus it is a relatively docile means of adjustment.

When all is satisfactory, the time has arrived to experiment with various rubber motors. You will shortly become very aware of the difference between various batches of apparently identical rubber! All that finally remains is to add fine detail, including, of course, the pilot.

Enjoy flying this characterful Italian job!

VINTAGE CORNER

Motivation - and the Flying Aces

Navy Pursuit - tried and tested by

Alex Imrie

Right: Characterful cover of the January 1934 issue of Flying Aces wherein appeared the neat Navy Pursuit. WWI dogfight painted by Paul Bissell. This photo: Tissue decoration of red chevron and fuselage band, period stars and rudder stripes plus aluminium coloured nose, undercarriage and propeller give this 'pursuit ship' a snappy look.

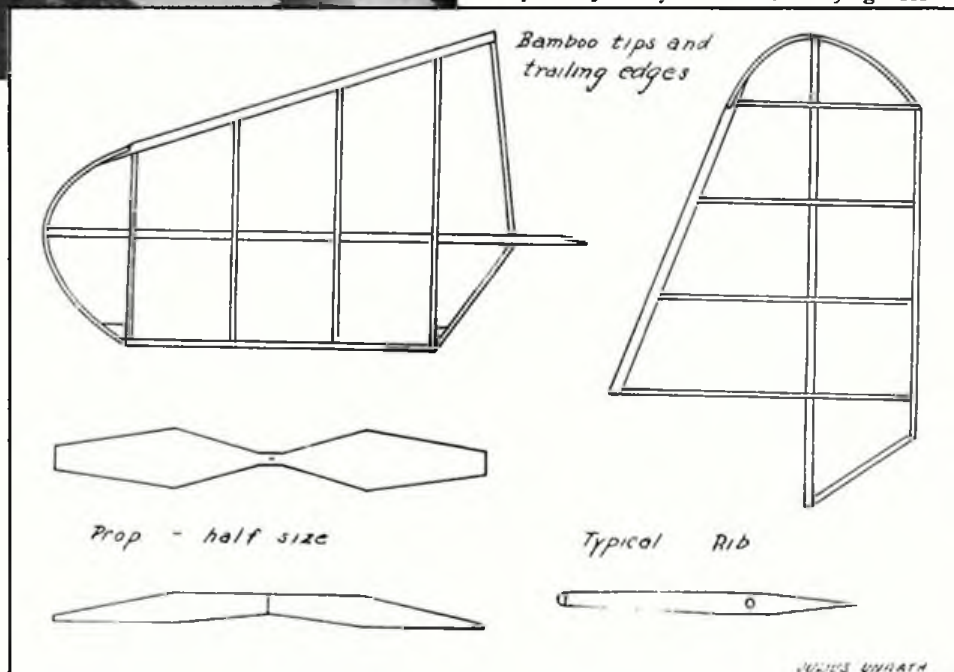


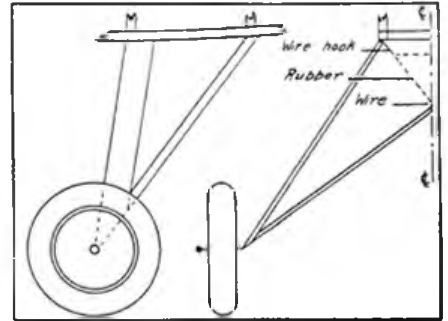
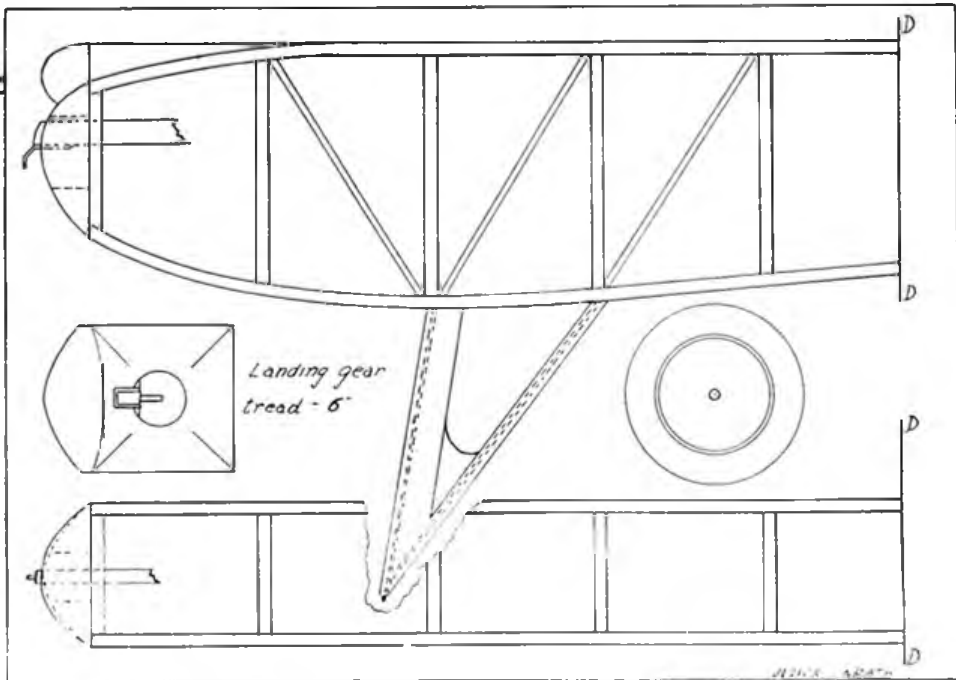
I am certainly pleased that I did because it has just given me a most pleasurable 'scrapbox' experience.

Flying Aces Navy Pursuit

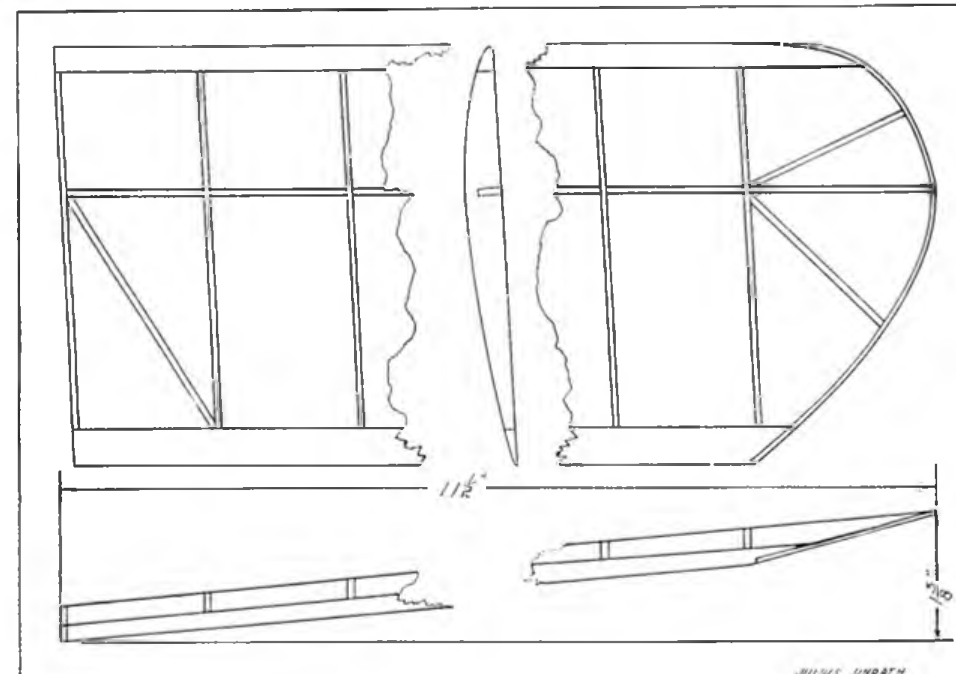
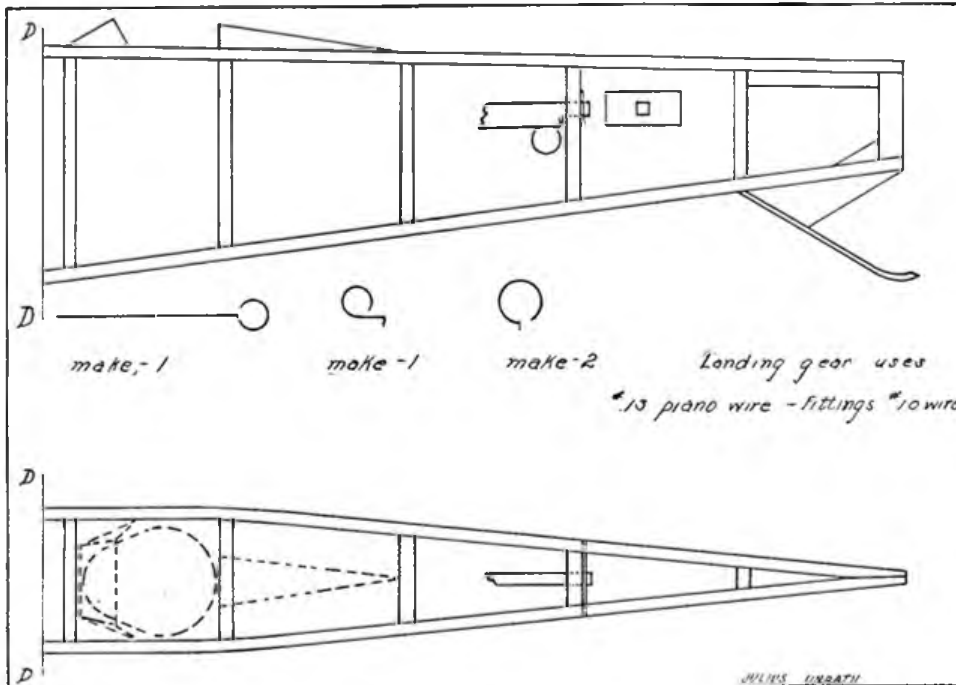
In the early 1930s any aviation magazines finding their way into our household were immediately pilfered and kept under my bed in a large Palethorpe Sausages cardboard box. They were regularly devoured from cover to cover and were more-or-less memorised, much to the detriment of my school work. It was doubtless paternal correction of their erring son's ways that caused this rather tattered collection (a hazard to health it was said) to mysteriously 'disappear' one day! The January 1934 issue of Flying Aces

HOW do you decide on what model to make next? Do you review all available designs, study their structures; then, having made your choice, collect all the materials carefully together and work away at the construction as your spare time allows? Or do you find yourself starting to build on the spur of the moment, and as you get more involved with your project, organise your resources (which includes 'finding' the time) accordingly? Or do you merely threaten to build various models, actually putting off starting on any of them because the essential urge is not present? I personally have a list of models that I would like to build; they occupy strict priority positions, but sometimes, due to a curious quirk of human nature, some designs appear to jump the queue like my Flying Aces Navy Pursuit... or was it always at the 'number one' position anyway? If so, why did I not build it years ago? And why did I, with a million other things to do, suddenly make time for it now?





Plans are reproduced exactly as in *Flying Aces*, but at half-size. Span is 23in, length 18in. Landing gear arrangement shown above. Axle is in one piece; extends upwards in an inverted vee sprung with rubber band to simulate radius rods.



was one of my favourites. As an eight-year-old I longingly studied the plans in the model section wishing that I could build the designs shown. Time passed... some forty years in all, occupied by other aeroplanes, both full-size and model; then one day I borrowed some magazines from Ron Raddon that included that January 1934 issue and could immediately recognise many of the illustrations and the model articles that had made such an impact on me all those years before. I copied the drawings of Julius Unrath's little model on a piece of transparent paper, obviously intending to build it; but never did. More years slipped by and eventually I obtained my own copy of this magazine, but apart from reading it with interest, made no attempt to build the Navy Pursuit. The time was obviously not yet ripe. Then, only a few days ago while looking amongst my plans for something else, the pencilled drawing on greaseproof paper resurfaced - suddenly I was eight years old again and the *Flying Aces* magic that I had known took over.

Before I consciously realised it, the building board was out and I was reaching for the balsa cement and the 1/8in square strips and went right on to finish the model, completely ignoring all other, more important demands on my time. There was no rational explanation for this behaviour other than the sheer enjoyment of every minute taken to build that simple little model that had attached itself to me fifty-five years ago. The *Flying Aces* Navy Pursuit is really a 23in high wing fuselage sportster-type model, and the addition of an open cockpit, windscreen and headrest, plus a dummy engine cowling makes it more appealing than a straight duration model. The structure is not only simple, there is not much of it, and it can be built from the offcuts that one usually throws away. The bent-bamboo tips of the flying surfaces make it 'different' in this day and age, this material also being used for the trailing edges of the tail unit. The pre-war Arite wheels that I used were products of The Model Shop that had seen service on a friend's Keil Kraft Rover in 1948. The axle holes were elongated and the tyres split and broken. I re-bushed them, glued them together and repainted them and despite their half-ounce weight their profile really suits the model, so they were a worthwhile restoration. How about a propeller? I had a plastic one of the right size (scorn the thought) but used balsa and fitted a Garami simple spring-aside,

latch-type freewheel. Of course, I cheated and built in some right thrust and downthrust when I drilled the noseblock for the screwed brass bush, and I used a peg rear motor anchorage instead of the motor stick, so common on American models of the time. Then there was the fun of decorating it as per the pictures of the original model, with coloured tissue stripes on the rudder, fuselage and wing, correct period US National star markings and that silver cowling and propeller marked with its red, yellow and black tips. Too soon, it seemed, the model was finished. It weighed 3.1/2 ounces with six strands of 1/8th rubber for I had not attempted to keep it light - would it fly?

On low winds the model was surprisingly stable in the air and made some delightful low-level circuits. Various adjustments were tried but these did not seem to alter the flight pattern very much, so eventually all were removed and four strands of 1/4in rubber chosen. Now, as the number of turns were increased, she really lived up to her name. Due the coarse-pitch propeller and the built-in nose block thrust settings, the model flies away in level flight straight ahead for some thirty feet or so; then, just as if a pilot is at the controls and has pulled the stick back, the model zooms in a steep climb to orbit at over 100 feet. What a thrill for an eight year old this would have been... This take-off manner is surprisingly like that of my Elf-powered Miss San Diego. Model aerodynamicists will be able to explain the forces at work; to me it seems that in both cases acceleration to a suitable flying speed is necessary before the models 'do their stuff'.

At the end of the first flying session, which went on until it was almost too dark to see the model, its flying was most consistent, the model achieving forty seconds on about 400 turns in the dead, damp evening air. With some lift in the air there is no telling what adventures and feats of endurance will befall this dream ship of mine! Build one and share my fun. Drawings are presented here no building instructions are necessary. If you don't wish to go as far into the past as I did, use laminated bass or balsa instead of bamboo for those outlines and fit a plastic propeller.

F.A. Navy Pursuit Material info...

Fuselage from 1/8in square balsa. All diagonals 1/16 x 1/8in balsa. All ribs from 1/16in sheet. Fuselage top covered 1/32in balsa; 1/16in balsa inserted in sides and bottom of front fuselage bay. Wing tips and tailskid 1/16in bamboo. Undercarriage: wire faired with balsa. Wheels 2in diameter. Tailskid fairing 1/16in sheet balsa. Tail unit spars 1/8in square, sanded round.

Leaving well alone

An early rubber flying scale model of the 1930s kit type (like Burd or Megows) has a special attraction all of its own. Generally, it is not a model of an aeroplane at all, but rather, it is only a model aeroplane and cannot be confused with anything else. Despite (or more correctly, because of) its inaccuracies, it is a different breed altogether from the splendid, exact-scale models that are so much a part of the present-day scene. To keep

Right: No embellishment here! Doug McHard's red and green Megow's Fokker D VII of 24in span is typical of the simple balsa and tissue flying scale model of the 1930s. Below: Aeromodeller cartoonist Terry Rose with his 30in parasol Studiette Master seen at Old Warden on Golden Era Day. Terry's model was eventually lost OOS vertically overhead after a flight of over eleven minutes on Silent Day... and he did not have his name and address on it!



it this way does not require any embellishment, but refraining from altering it can be difficult.

It is true to say that most modellers change vintage designs slightly during construction. They 'add more lightness', fit undercarriages that 'give', usually replace the rear hooks with the more practical wooden peg or aluminium tube rear anchorages, and invariably use modern practice in their motor make-up and propeller design, often incorporating some means of freewheel. Should you pursue this avenue, don't use the above as an excuse to change too much and get carried away with modifications if you wish to retain that certain aura that only these oldies possess. Don't alter the decoration, finish and markings either; use the old (even though incorrect) colour schemes and insignia and you will have something special that present day designs do not have. One often hears of modellers who 'improve' old plans, and having built from them, really believe they are dealing with vintage designs. Many so-called vintage enthusiasts will not even tackle such models. An example of this thinking was brought to my attention at the

sale of old plans from Vic Dubery's estate after the recent SAM 35 AGM. I watched some modellers looking through early plans which they did not purchase because they were too 'far out', these fellows obviously have still to discover the magic of true Vintage.

Mind you, many old models hardly fit into what we call flying scale. Their outlines are so poor that modellers who desire to make a scale model cannot be blamed for not selecting them, so it needs a particular dedication to complete them with the sort of abandon that I speak of.

One great difference between then and now concerns the builder himself. We are no longer boys learning the art. Usually we have considerable experience in model building, have been well educated on the subject via books and magazine articles showing us the best way to tackle various jobs and we benefit greatly as a result of seeing other modellers' work. A far cry from the lone-hand youngster of the 1930s who could only follow sometimes scant instructions, hampered by the limited materials of his mail order kit. It is a wonder that so many persisted with the hobby, but with the passage of time, their wings became less warped and their tissue less wrinkled. Nevertheless, they were usually so lacking



Below: Both photos show more of Doug McHard's handiwork. Basic fuselage structure of the 22in Hawker Fury shows to advantage the deep bottom keel of 1/16in balsa - a hallmark of the excellent Keelbild models. Plans for this fine-flying, 3/4in: 1ft model still available from The Model Shop for £3.50.

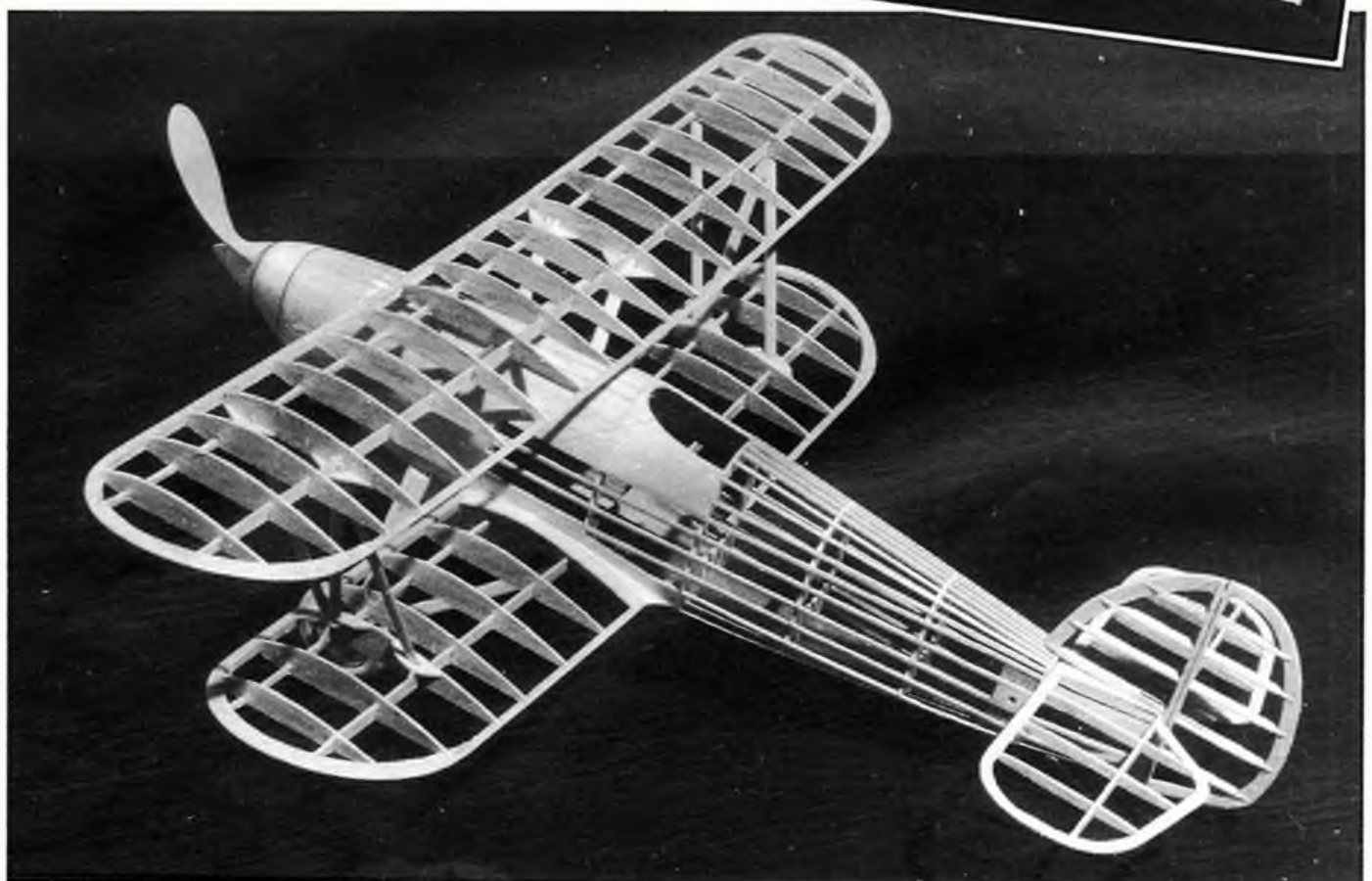
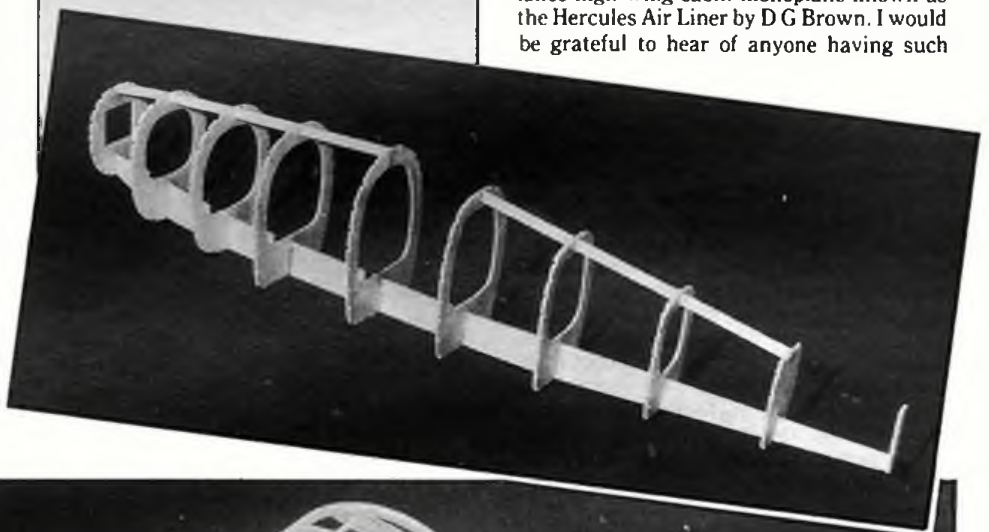
vesteryear. They can still supply plans for many of their old designs. Tommy Kennedy tells me of the revival of world-wide interest in their Hawker Demon. Requests for plans of this model that Tommy designed over fifty years ago came from Australia, New Zealand and the USA, as well as the UK, following the publication of photographs of Doug McHard's excellent example in this column a few months ago (September 1989 issue).

Readers responded unselfishly to my request for the loan of Keelbild plans in my story of The Model Shop in the June 1986 Aeromodeller, and as a result, drawings for the Lockheed Vega, Flying Flea, Arrow Active, Magister and Hurricane (all of the pre-1939 period) were added to the list of this supplier and are now available to all. Unfortunately some gaps remain. These include the Gloster Gladiator (16in span) and Leopard Moth (22in span) designed by Tommy Kennedy, plus the 22in Pfalz D XII by C H Lutman and the large (48 in) free-lance high wing cabin monoplane known as the Hercules Air Liner by D G Brown. I would be grateful to hear of anyone having such

in the know-how to make their model fly on its single loop of dry 1/8th rubber and roughly-fashioned, saw cut propeller, that flights were seldom encouraging. However, today, the models on which some of us cut our teeth are flying strongly and well with just a little knowledge garnered over the past fifty years; but don't overdo it. Allow these old stagers to retain the dignity that is truly theirs and remember if the flying scale efforts of our forebears look out of date - that's vintage - modernise them and it no longer is!

Keelbild plans

I frequently mention The Model Shop of Newcastle-upon-Tyne in my writings since this business (which is still going strong) was one of the original model supply houses of





Above: The elusive Gloster Gladiator designed by Tommy Kennedy in 1937, which is one of several plans sought by The Model Shop of Newcastle-upon-Tyne.

plans who might be willing to loan them for copying. In doing this they would be performing a service that would benefit the whole vintage movement. If any individual can help, but wants to 'wheel and deal', I am prepared to offer a variety of vintage items to secure any of the above to help The Model Shop complete their original range.

More plans thoughts

Aeromodellers, especially vintage aeromodellers, collect and harbour far more plans than they can ever possibly build, and someone, somewhere is bound to have copies of plans longingly sought by others. How much better to see these designs in the flesh - something that our enthusiasts can only do if they have access to authentic working drawings. We all get pleasure out of other people's industry and the large plan services that are an essential part of the vintage game only came about by devoted searching and considerate contribution. Other plans that have been requested but so far remain missing are the Frog Pterodactyl and the Brixton Terror tailless models mentioned in this column in December 1988. Apart from these two designs being naturals for our own Howard Boys Trophy, Al Backstrom from Texas (who first brought our attention to these two models) would rapidly change inert drawings into balsa and tissue.

There may be other ways of tackling the hunt for elusive plans, and people with large holdings might like to send in lists - who knows what rare models might yet surface as a result? Imagine how dull our large vintage meetings would be if only half a dozen types were present - it is the boundless variety of designs that make these occasions so enjoyable - can you help by keeping them that way?

Departed friends

It is with regret that we learn of the passing of two American modellers that we had the pleasure of meeting when they attended vintage functions in this country. Walter Getsla, who died on 7th August 1989, aged 77 years, was a successful Indoor flyer in the early 1930s. A member of the Illinois MAC (the oldest club in USA, which was formed in 1911), he was a Wakefield team member in 1934 but was unable to attend the venue on Warwick Racecourse personally, so his model was proxy flown by ROG Booth. How a replica of this model was built by Mike Hetherington from information gathered by Denis Fairlie and flown in the 50th Wakefield Anniversary meeting at Warwick has already been covered in Vintage Corner (March and October 1984). It was a touching occasion for Walter who remarked that '...it has taken me

fifty years to get here!' Mike presented Walter with the replica model at Taft in 1986.

Only six days later, on 13th August 1989, Chester Lanzo passed away, aged 75 years. A keen competition modeller who left his mark on the hobby with his many splendid designs, he was a pioneer R/C flyer and experiments with his seven-foot span RC1 high wing cabin monoplane of 1934 led to his better known R/C Stick Model with which

he won the first US R/C Nationals Contest in 1937 at Detroit. He was not only a keen follower of all SAM activities, but also an active participant who placed in three R/C Assist events at the 1988 SAM Champs. A member of the Cleveland Balsa Butchers, Chet was inducted into the AMA Hall of Fame in 1976 in recognition of his significant contribution to the science of model aeronautics.



Left: Chester Lanzo listens to Tim McCoy of Detroit relating his experiences with his Lanzo D at Old Warden on 15th August 1987. Below: Walter Getsla, wearing the T-shirt of the Oakland Cloud Busters of which he was Secretary, with Mike Hetherington and the replica 1934 Wakefield on Warwick Racecourse on 24th June 1984.



National colours in the tail surfaces of this CR 32 from 85 Squadriglia XVIII Gruppo in 1938. Although the fuselage is in aluminium dope, and all markings are brightly coloured, the upper wing and spats are camouflaged. (R. Gentili).



AIRCRAFT DESCRIBED

FIAT CR32

No. 269: Ron Moulton describes a belligerent biplane; drawings by Ian R Stair

ASK which biplane saw more action in the 30/40s or which carried 0.5in machine guns when most others, including monoplanes were equipped with 0.303s and the unexpected answer is the CR 32. This grey-hound of a fighter, bearing the hallmark of designer Celestino Rosatelli's much earlier Ansaldo SVA with its warren truss rigid wing struts was one of the best examples of the new fighter concepts of the 30s.

A sesquiplane, with its large ailerons in the upper wing, each carrying a balance tab not unlike the 'spades' on modern aerobatic types, the CR 32 was to gain instant recognition for outstanding manoeuvrability. This quality was verified in 1934 when four units became involved in the Spanish Civil War on the Nationalist side, the more famous of which was the XVIth Cucaracha (Cockroach) group.

Formidable!

Against the Polikarpov I-15 Chato and subsequent I-16 Rata, the '32 was a formidable opponent. Leading pilot, Captain Garcia Morato who led the Blue Patrol had 40 confirmed victories, using the advantageous fire power, diving speed and strength of the 32. Less well known were the confrontations between Hungary and Czechoslovakia where similar superiority was demonstrated over the Avia and Letov fighters.

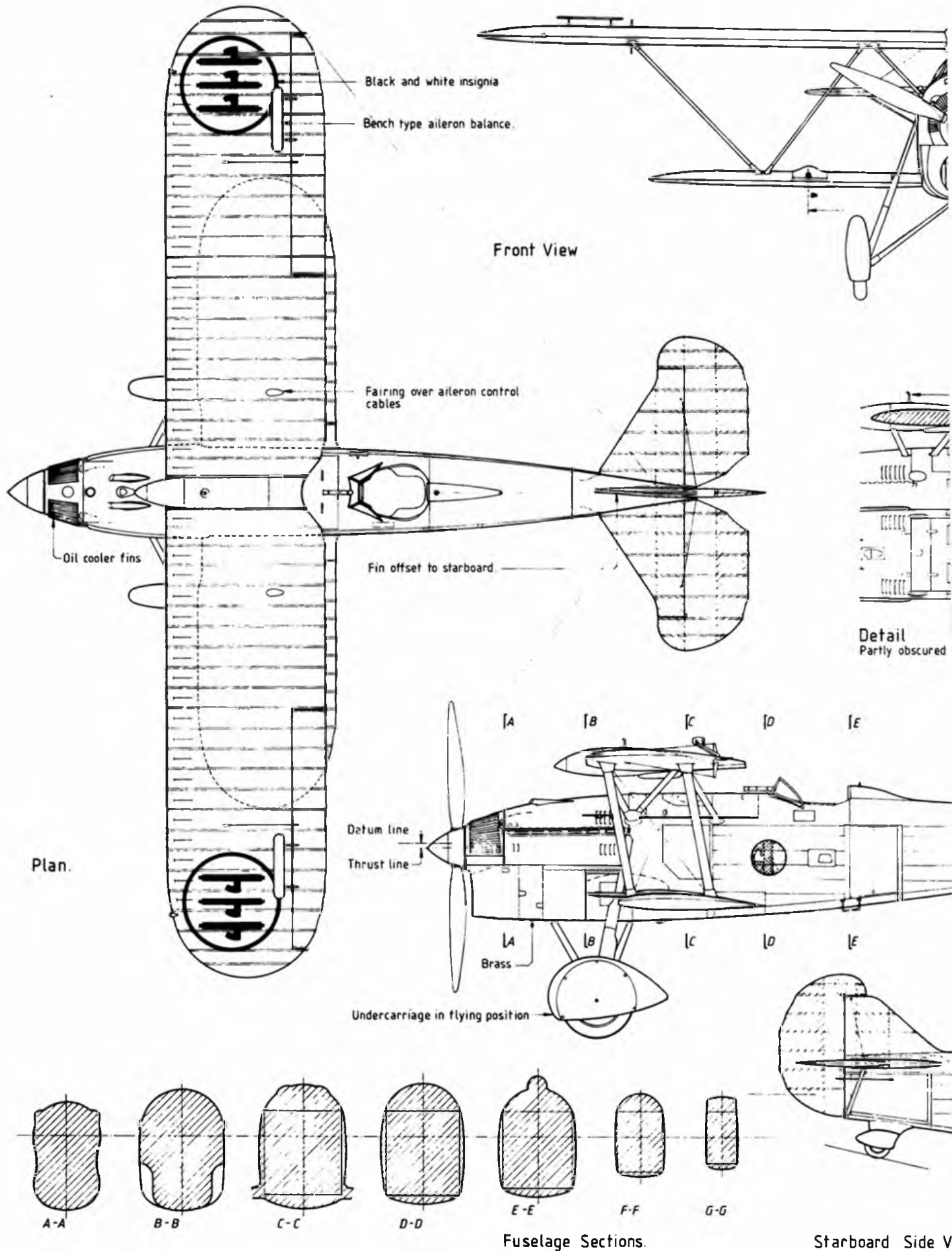
Arrival of the Bf109 and development of the I-16 diminished the advantage and by 1939, although still frontline equipment of Regia Aeronautica, the CR 32 was being replaced by the CR 42 derivative and the emerging low-wing fighters. But it had made its mark in five years of service, and affectionately

known as the 'Chirri' from Spanish days, it remains legendary among Italian aviators, mainly for its superiority over all contemporaries, including the Gloster Gauntlet.

Powered by the Fiat A 30 RA *bis*, twelve-cylinder liquid cooled engine developing 600hp, it appeared in four versions. The original production type became the CR 32 *bis* with an improved engine and addition of two 7.7m (.303in) guns in the lower wings.

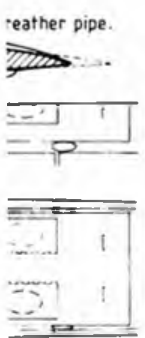
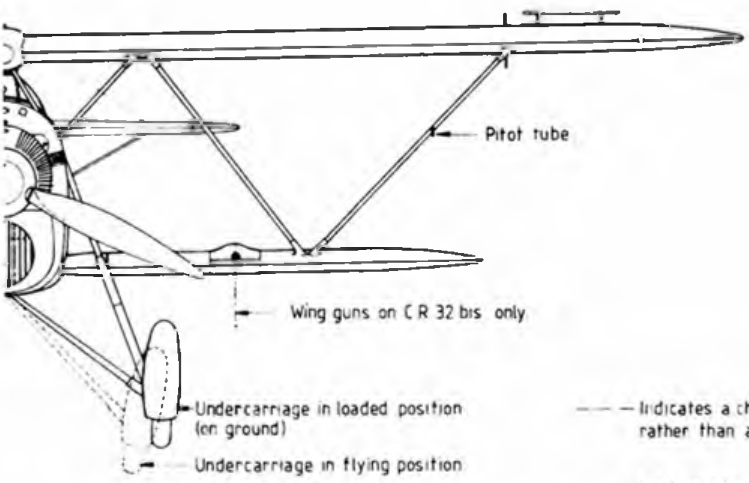
First production aircraft, MM 2589 in March 1934. Well over 1000 were made, and the type was in service until 1945. (C Milani).



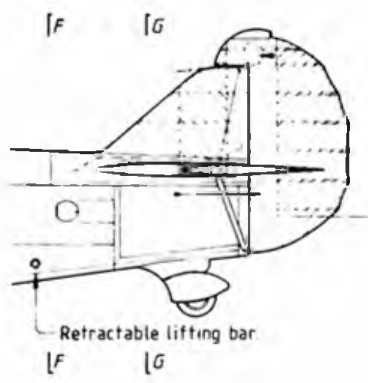


FIAT C.R.32

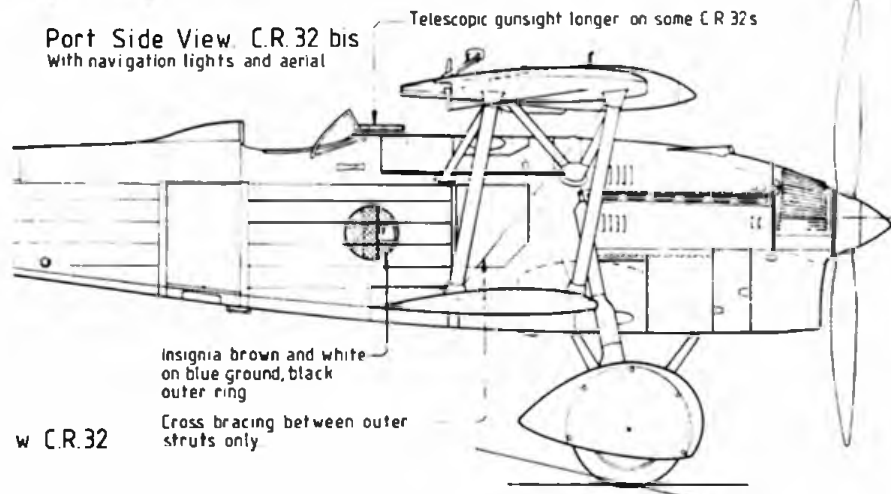
Drawn and traced



other views



Port Side View CR 32 bis with navigation lights and aerial



Underside

by IAN R. STAIR.

--- Indicates a change of curvature rather than a hard line or edge

Position of wing gun fairing on CR 32 bis

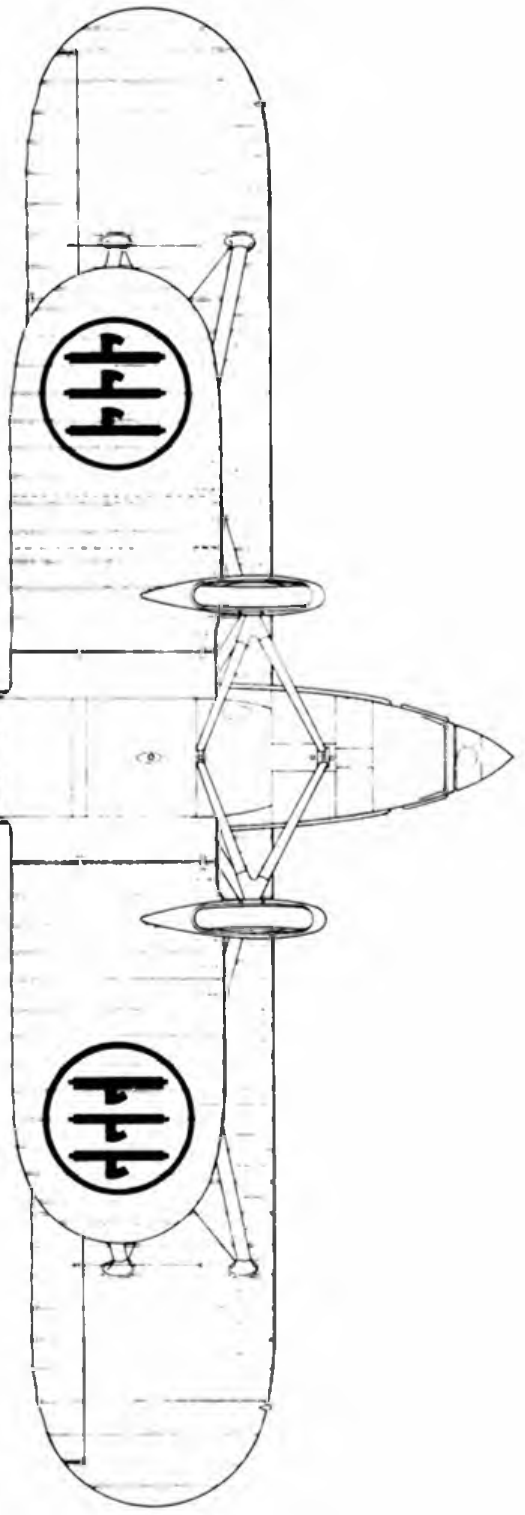
Red
White
Green



Crown red and gold
Shield, white cross on red
Axes white
Scroll blue
Remainder gold

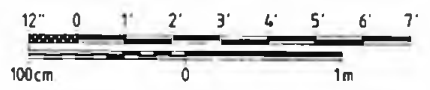
Arms of the House of Savoy

Colours shown are for a typical FIAT CR 32 of the Regia Aeronautica in the mid 1930s with an all over silver finish

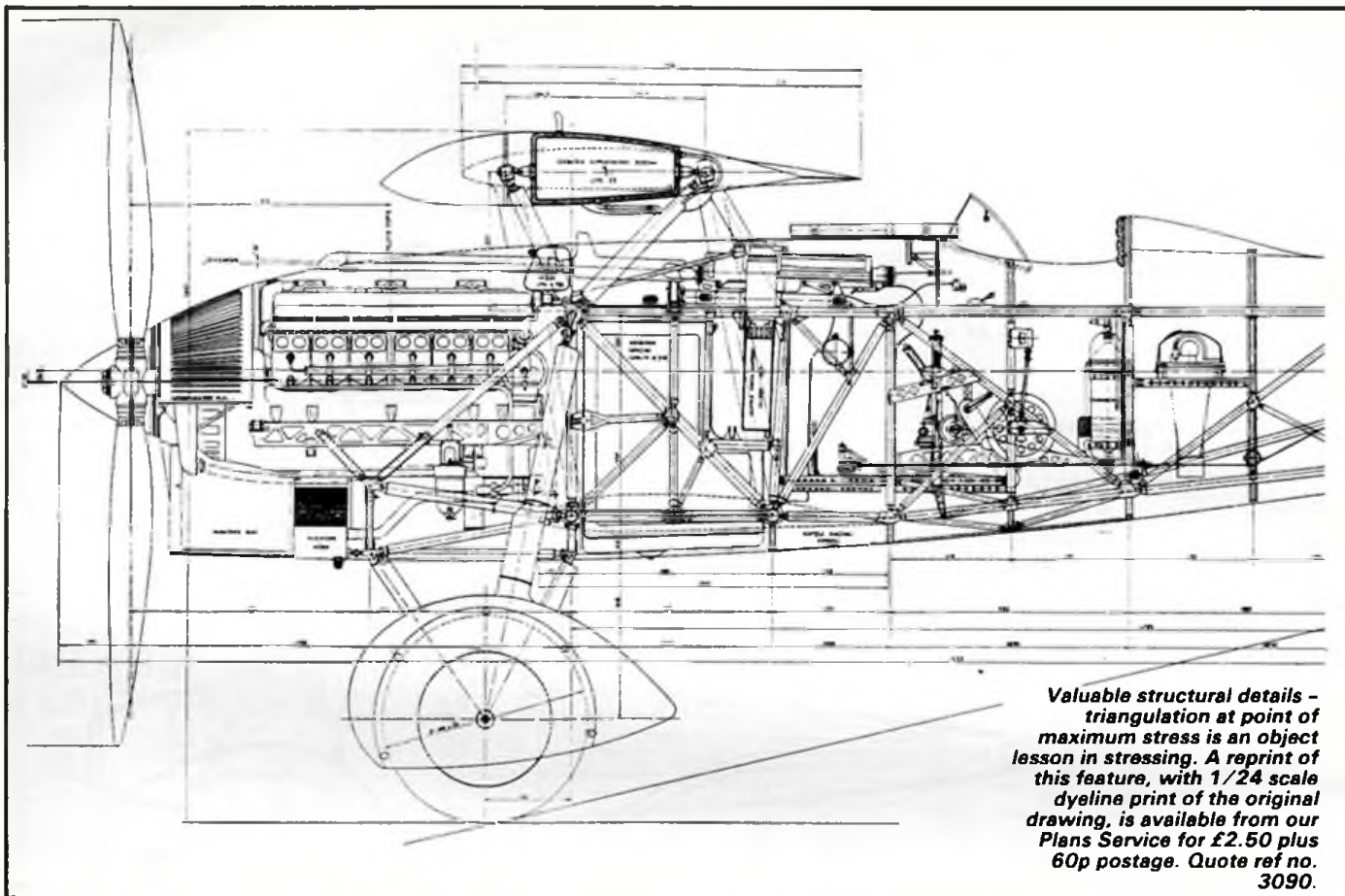


Wing Sections

Datum line Taken from FIAT drawings, not related to thrust line Parallel to top longeron of fuselage frame
Thrust line Note down thrust Also slight offset to port



Scale



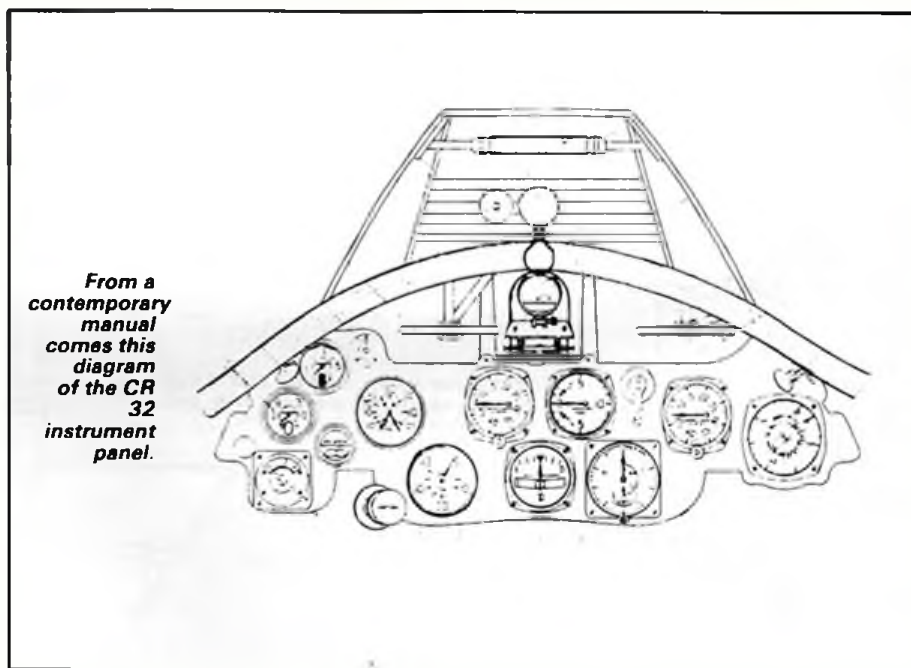
Above: Formerly with the Austrian forces, the CR 32 was impressed into the German Luftwaffe as a trainer. They also served in Hungary, China, Spain, Venezuela and Paraguay. (H Nowarra).



Above: 150 and 152 Squadriglia '32s, the nearest carrying a Gruppo Commander pennant. Note different sizes of squadron numerals (R Gentilli).



Above: CR 32 of 357 Squadriglia reflected in the wet area of Chedi, 1938 (R Gentilli).



These were removed, following unreliability and effect on performance due to extra weight; and the CR 32 *ter* with a new gunsight and the original 12.7m (0.5in) guns replaced the *bis* version. Last production run, and the largest, of about 350 machines was the radio-equipped CR 32 *quater*.

All were characterised by the painted nose and external oil cooling radiator on the upper cowling. Significantly, the emergence of more powerful, aircooled radial engines was to change the appearance of the fighter biplane in its last days but the romance of Rosatelli's sleek 32 with its large spats, rearward cockpit

and heavy armament makes it extremely attractive as a scale model subject.

Fiat CR 32 Data

Wingspan : 9.50m
 Length : 7.453m
 Height : 2.632m
 Area : 22.1m²
 Weight tare : 1390kg
 Weight loaded : 1915kg
 Max speed : 315kmh at 3000 metres
 Armament : 2 x 12.7mm Safat machine guns
 Useful reference : Wingspan, June '89.

BALSA CUTTINGS

Everyone should read Cyano de Bergerac's first item

We might just survive

As aeromodelling continues to count its grey hairs and mutter that it is getting old, there comes news of fresh attempts to draw in young people, and someone asks the question 'Does the emergence of the non-authentic vintage-type model mean the vintage bubble has burst?' Totally different items, to be talked about in the same breath.

Once, full-size aircraft intrigued the nation. Their technology was graspable by the average boy, and flying them was his attainable ambition. The answer to the inane and oft-put enquiry 'And what are you going to be when you grow up, sonny?' (or worse, 'my little man?') changed from 'An engine-driver, Sir,' to 'A pilot!' Aeromodelling was a natural and satisfying substitute until he could get his hands on the real thing (or realised that it was too damn dangerous). Two things happened. The first is irreversible - interest in aeroplanes waned as they became commonplace and flying them moved towards the present stage where you need a degree to comprehend them and a computer to handle them. Now, far fewer kids reckon to go where our pathway was once believed to lead; it doesn't go there anyway, and other attractions beckon. The second thing - which somehow we don't talk about much - was that there came a time when rather many of us found that long, thin stereotypes were more competitive than fun, fat prototypes; specialisation eroded variety, appeal narrowed, and some say the atmosphere altered too. Happily, this state of affairs has mended. Some years ago, our local model shop just dried up and blew away. Today, we have three. Aeromodelling supports a substantial, highly-specialised, vigorously-growing industry which every month thinks it worthwhile to pay for around four hundred adverts to flog stuff to us. Our national body is nearly 25,000 strong.

It is nobody's fault that the stream of incoming youngsters has become a trickle, and it is beyond anyone's power to restore it, because so much is different. It is a fact of life that people come into aeromodelling later than they did, but they do come. Let us remember that when we are fishing for recruits, and not spend all our time working the lower pools when the shoal has moved up river. And if chaps are now building vintage-type designs, it is no indication of a move for the worse. What better sign could you have of a determination to expand, consolidate and continue a very agreeable philosophy? Quite the healthiest thermal since Dorland Hall. Like it or loathe it, in pointing the way back to traditional aeromodelling, the vintage movement has acted like a tonic which will invigorate this hobby for years to come.

Twenty-seven mega hurts

'Sarcasm,' a famous guy said once (or possibly twice, so that folk could take some

of it in) 'is the ebullition of an unhealthy mind hankering after a spurious and epigrammatic terseness of expression.' Probably meant: don't do it. Quite right. Certainly you never encounter sarcasm in *this* column; people can be touchy. You know how ladies will admire a sunset or a pillar-box, then urge the purchase of an invariably expensive outfit to match it? One of our bods rolled up on Sunday with an obviously un-ironed shirt, no sandwiches and a stern injunction to be sharp for lunch if he didn't want his eye in a sling. 'She was trying on this new dress and all I said was I wished I had a frequency pennant that colour.'

Amongst the Whizz-kids

In this age where computers are reckoned to be needful for the running of any big comp, and raw beginners fly models on equipment your aged columnist doesn't even pretend to understand, it made a welcome change to receive, towards the end of October, a newsletter dated for the previous September, advising readers that applications for a junket should be in the end of the previous August. Though it is a proper letter-press job catering for the interest of maybe six hundred air-minded people and emanates from the offices of what is arguably the most technically sophisticated outfit in the land, this delightfully laid-back communication also contained a prophecy that the newsletter for the previous April would be posted in the next week. That this didn't happen was presumably because the prophet concerned subsequently discovered that the said newsletter for the previous April had been duly posted during the previous May...

Yep! Can see that

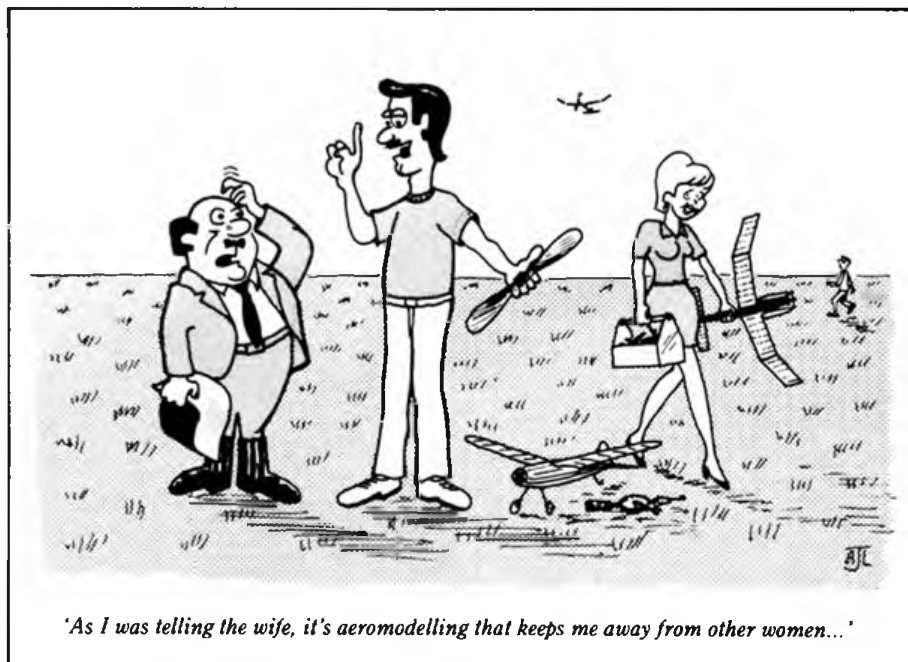
BMFA reports that there are still problems in getting the British Space Modelling Association aligned with the Free Flight Technical Committee.

BMFA again

On safe flying, Accident Investigation Subcommittee member Des Farthing produced the quotation *Quidquid agas, prudenter agas, et respice finem* - Whatever you do, do cautiously, and look to the end. The excellence of this advice led Des to bet that its author never had an accident, whoever he might have been. A learned friend thinks it was Pliny the Elder, and if this is right, we have even further incentive to conduct ourselves carefully. Anxious to view the eruption of Vesuvius, poor old Pliny the Elder got himself in the right place at the wrong time, and had a very nasty accident indeed.

Aviary at Cardington?

To draw a parallel with their own quest for above-average performance, Kleinwort Benson Unit Trusts have been running a advert featuring the Schleicher ASK 25 full-size sailplane. They tell you it is pretty super, holds many world records and has a glide ratio of 60:1 - four times more efficient than that of the golden eagle! Which is around *one-tenth* of the size. Okay, Alexander Schleicher, enjoy your triumph whilst you can. The Scaling-Up Division of B.Cttngs' Genetic Engineering Department has been doing a lot of work on these birds, and as soon as we develop one which doesn't insist on carrying the pilot internally - ASK 25s?: you won't be able to *give* them away!



Granite monolith on Flers aerodrome pays tribute to René Amiard, founder of the Cedars squadron, on the 50th anniversary of the club. Right: Amiard's model club workshop in the school grounds shows evidence of its stages of expansion, fastly to accommodate the Jodel 112 project.

L'ESCADRILLE DES CÈDRES
SOUVENIR DU CINQUANTENAIRE
1934 - 1984

EN HOMMAGE A SON FONDATEUR
MONSIEUR L'ABBÉ AMIARD



Ron Moulton visits Normandy to research
a true Father of aviation



Amiard's links were not wasted, and when eventually Flers was directly in the path of the invasion from Arranches, his years behind the scenes were confirmed as he undertook liaison with British Forces. No sooner had the dust settled, and the rebuilding started from the rubble which was Flers, than Father Amiard renewed his invitations in '46. He came to Eaton Bray, and to the Bowden Trophy events at Fairlop, bringing with him a young Fillon among other French prominents. Those reunions with his pre-war friends after the carnage of the Caen-Falaise battlefields must always have held a special place in his heart.

Came the restorations, and soon another annex added to the workshop, now in corrugated iron, to make space for a venture in full size. His Jodel 112 became a perfect extension of all he had aimed for. Proof of the immense regard for Amiard which pervades Flers and the Aeroclub de Basse Normandie is that the

REVENIR A FLERS

THERE IS one place in Normandy which for those survivors of the 1936-50 period has a very special association of fond memory, and also a great personality. The man was Father René Amiard, and the town, Flers. Readers of *The Model Aeroplane Constructor*, *Aeromodeller*, and the postwar *Model Aircraft* will recall the tales of rushed sleepless weekend sorties by rattling coach via Dieppe for an aeromodelling and gastronomic exercise which became a legend, although in fact the annual visit could only be enjoyed by no more than two dozen participants from Britain. And it wasn't only one-way. Father Amiard brought his pupils to Blackheath, and being a firm friend of the Thurstons, Houlbergs, Keils, Russells, Rushbrookes, Cashes and Yorks of the day, ensured that his own proteges had a true taste both of English modelling, and our food.

Father Amiard was the tutor of English at the Ecole de l'Immaculee-Conception. He had been a pupil there himself, returning after higher education to become a Master. As an aviation enthusiast, he encouraged his flock to build models and in 1934 founded the 'Cedars Squadron' (l'Escadrille des Cedres) based in a brick workshop he built himself among the Cedars which surround the school.

Year by year, he would send group photographs of his clubsters, usually with one-design, uncovered frames, and these often headed the Club News Features of Aero Modeller.

The workshop extended, the number of pupils who improved their English through modelling expanded - and then came War in Europe.

Although modelling contact was severed,

same Jodel is perfectly maintained today at the Club, having been bought back after it was sold on his death in '83. And that isn't all.

As Alex Imrie and Alwyn Greenhalgh reported in Nov '84 *Vintage Corner*, the square opposite his house, and the entrance to the school was renamed after him in June '84. But during my recent pilgrimage, even more impressive was the granite memorial erected on the aerodrome, where incidentally the street sign on the highway reads 'Aerodrome - Aero Modelism!' The Club is still active as local posters and the model shop prove; but its parameters are extended and it no longer uses the workshop or is part of the school and its 500 pupils.

It now represents the whole town, but still carries the original name. Professor Martin, himself a pupil of Father Amiard, who recalls visits to Harry York's shop in New Kent Road, London, is now the English Master and it was through his kindness and respect for the maestro that I was able to locate these cherished mementoes of a great aeromodeller.

One wonders, if there exists in any other place, as many symbols of homage to a single individual as there are to Abbe René Amiard?



Far left: Most majestic of all the cedars at Flers. Left: Professor Martin, now English master but once Father Amiard's pupil, stands by one of the place names dedicated in June 1984.



Above: The Jodel 112 built by Amiard and his pupils at l'Ecole de l'Immaculée Conception, is still maintained in top condition at the Aero Club of Basse Normandie. Right: The original mill-owners mansion has seen two great wars in its double century among the cedars and often appeared in the background of photos published in our much earlier columns.



1989 Free Flight Cha

At last we have a fair scoring system for the Senior Championships award. This year our table is based entirely on their system. Points are awarded down to sixth place in the proportion 9, 6, 4, 3, 2 and one. Any ties share the available points, hence some fractions. Points are only reduced in the event of there being less than six participants in a contest. In that instance they shrink from the top down so 1st place in an event with five participants scores only six points; second place scores four points, and so on. In practice only three events fell into this category, all early in the year before the summer got into top gear. Two events at the February meeting attracted only four entries, and one class at the cold and wet Spring event attracted only five. Otherwise, entries were very high. Even Tailless at the Nationals attracted eleven, and CO₂, despite attempts on the part of the SMAE to confuse the life out of potential competitors with 'on-off' rumours for months before, attracted fifteen thereby (presumably)

top place in this table cannot be affected.

Before examining the top dozen a mention for a few just outside. John Cuthbert shouldn't be there. A/1 at the Southern Gala once again became a controversial issue this year. John was, coincidentally, the winner again - last year the event received no points because of insufficient entries. This time it had more than twice as many but it still doesn't count! The reason for this is simply that it wasn't an official, SMAE-listed event at the start of the year. A clerical error thus robbed John of nine points and a place in the top twelve - and, of course, the other five placers of points as well. A timely reminder that it is worth writing for the official list of contributing events available from the SMAE Comp Sec at the start of each season, if only to double-check that your classes are on, and if not, to get things put right quick.

Another man just outside the top dozen who certainly rates a mention is William Beales. William is David Beales' son; David will be remembered for

the excellent perspex awards he created for all the classes at last year's Nationals, as well as his activities in Vintage. William, who is twenty-one years old, started contest flying in a small way with Indoor scale in the early 80s. This blossomed into more classes, especially Vintage rubber duration by the mid-80s - remember his win in the Oxford Rally flyoff a couple of years ago? Since then he has channelled more effort into the modern classes, culminating this year in good results at the Winter meeting and 5th Area events in Open Rubber, placing in CDH at the 4th Area event and taking second in Vintage at the Nats. He finished the season by winning the Flight Cup for Open Rubber, beating a very on-form John O'Donnell in the process; and he holds fourth place at close of play in the F1B Trials. This latter success is all the more remarkable for his having only finished the model the night before the contest, trimming it on the way to Beaulieu. It then survived the rigours of the venue itself.

It's that time again! Dave Hipperson examines the season's activities and sorts out who's top

redeeming it for the future.

So the points we award here are coincident with the SMAEs and a double column is no longer required. This return to a more fair, sliding scale system was my suggestion, but it took six years to get it through - illustrating how with ideas, however useful, one still has to be patient! A fact worth the consideration of those who enthusiastically thought they could change all manner of rules this year and became rather disillusioned when they discovered they could not.

We have included the top 55 flyers this year - more than ever before. If you won an SMAE event then you are on it. The first column details the actual event won the remaining columns simply list numbers of placings down to sixth. In the more detailed analysis of the top dozen we also examine the numbers of events flown and hence gain some idea of effort versus return. It is in this department too that history has been created, but more of that later...

Of course, the largest slice of history of all effected everyone the weather. A summer just like the ones you thought you could always remember but actually never happened. Not for the last 30 years anyway.

Few blow-outs, numerous very calm days and of course hours more warm sunshine than usual. The only real disaster came at the end of the season when the Trials couldn't be finished because of gales and poor visibility. Hence the Trials results here.

are based on the flights made so far; that is, about half. The SMAE itself will have taken no regard of them at all, quite rightly because the contest is not over. However, to tidy up the books we have used the provisional positions. We apologise to those who are presently not in the top six and who are convinced they will have risen to a team place when all the flights are concluded; in the same way we hope not to bring bad luck to those presently in contention. Thankfully, whatever the outcome, the



Left: Cheery Ken Faux, top in F1C at the trials and the Easter meeting, made 14th place overall. Right: Steve Philpott's Open Glider and F1A Nats wins helped boost him to fourth place for the year.

Championships League

Perfect performance

Ken Faux is back in the action again at fourteenth spot after a very productive season. As well as the perfect performance thus far in the Trials he tied for top place at the Easter Meeting in F1C when the top three all did colossal times; and he was second in F1C at the Nats and fourth with the same models in Open! He was also fourth at the 2nd Area event in F1C and fourth (again!) at the next Area do, once again using his F1Cs in Open Power. Ken can feel justly proud of having placed in the top four every time he flew. He didn't drop a flight.

Mike Chilton had a better year than last finding form in his usually strong classes of CDH and F1B and using Open Rubber as an occasional second-string event. He was fourth in CDH at both the Spring and Southern Galas. He dropped a flight at the Nats but made amends in F1B with a steady, high-scoring performance for third place on the windy FAI day. He was successful twice at Area

level in Wakefield with third in the 5th Area event and an out-right win after a good flyoff for the Weston Cup earlier in the season. He currently holds second position in the Trials.

At eleventh place is Ray King who has been improving steadily over the past few years of F1C development. Apart from his Slow Open power entry at the 4th Area Event Ray used his F1C models exclusively throughout the year, and even lifted the coveted Hamley Trophy for Open Power at the Northern Gala as well as coming close to doing the same thing at the Nats! Actually he didn't do quite that well in F1C itself. A 'fifth' at Easter, fourth at the Nats and third in the 2nd Area event. However he is currently sharing the lead in the Trials with Stafford Screen and Ken Faux. It is a positive by-product of an otherwise unimaginative rule change - the reduction of Open runs from ten to seven seconds - that the keener F1C flyers can now compete on more even terms in Open. Hopefully we will continue to see more of them, like Ken and Ray, out flying in all weathers.

Next up - another top Power flyer. Pete Harris flew a lot more than the last two as he was also active in 1/2A, winning both the Spring Meeting and the Nationals. His F1C slipped a bit - he is currently fifth in the Trials but he won Open Power at the Winter Meeting, and was in the points at both the Southern and Northern Galas. His other placings were fourth in Open at Easter and fifth in Slow Open at the Nationals. The seven-second run rule in Open Power cost Pete an over-run in the Nationals flyoff. The idea had been largely Pete's!

John Carter flew as much as anybody - actually in more than twenty events. He achieved a steady though unspectacular return on the effort but with no outright wins. He had a good Nationals - coming very close in the F1A flyoff against Philpott when what looked to be the winning flight was dumped out of the lift. He was also fifth in CDH and sixth in Vintage - all flyoff flights. John had also been third in that latter class at the February Winter meeting. He was fourth in Open Glider at Easter,

fifth at the 3rd Area event and third again at the Southern Gala. He came second in A/1 at the 5th Area meeting. Although his Open Rubber performances were not up to the usual standard with only a fifth place at the Northern Gala he was part of his club Falcons effort in winning team rubber at the last Area meeting with his third place behind his clubmates' top two places. John's efforts show just how, when the breaks go against you, it is really very difficult to win consistently. This throws the achievements of the top contestants this year into even sharper focus as truly great performances.

As always, John Cooper flew mainly Glider - but less than usual, limiting his choice by missing the Nationals, the Southern Gala and the Trials! He was, however, very successful at Area events placing in all but one. His Open Glider positions came with a second place in February, a 'third' in the 2nd Area event and second place in the 4th Area event. He won A/1 at the wet Spring Meeting and again placed in the class at the 5th Area event. He flew-off in F1B to place fourth at the 3rd Area event and rounded off the season with a fine flyoff win in the SMAE Cup for F1A at the last Area meeting. John placed in seven out of the ten events flown.

Considerable jump

On the same score as John and sharing seventh place this year is Anthony Ball. This is a considerable jump up the lists for Anthony. He flew an enormous amount, though in quite a wide range of events (in which he is now competitive). He started the year with a fifth place in Open Rubber, then won the Easter Meeting flyoff in the same class with a good flight in poor conditions. He won HLG at the Spring meeting and had a good Mini Day at the Nationals taking fourth in HLG and third in the CDH flyoff. He got to grips with Open Glider quite well towards the end of the season with a 'third' in the 4th Area event and a second in the flyoff at the last Area do. Anthony also placed in Open Rubber at the Northern Gala. Perhaps for someone so competitive in the Senior Table it was appropriate that he dropped a flight in Frog Junior at the Nats and hence didn't place in that event. He was, however, clearly Junior Champion by the end of the three days - and for the last time, as next year he will move completely into the Senior list.

His Dad Phil gets in above him - but only just. Phil seems to have flown much less this year but placed in almost everything he turned his hand to. Quite a few outings were responsible for more than one placing. For instance, at the Winter event in February he took sixth in Rubber and fourth in Slow Open Power. He placed again in that class, third this time, at the Spring Meeting where he also took second in HLG behind Anthony. He was third in Open Rubber at the 3rd Area event, then fourth again in the same class at Easter. Once again Easter was an event where he managed another placing - fifth in Open Power. He had a disappointing Nationals with only a fifth place in HLG, but took third in Slow Open for the Astral in a close flyoff at the 4th Area event and got busy again at the end of the season with places of fifth and first at the Southern Gala in Open Rubber and HLG. One gets the impression that Phil is, if anything, half-way between classes, having reduced his efforts in Rubber but not yet become a consistent threat in power. It would be exciting to see him back on the FAI circuit with power models - he is one person who would keep flying when the weather got nasty.

Up a place this year for John O'Donnell. Last year it was John's Vintage Challenger that was the mainstay of his effort; this year he is back on terms in Open Rubber with a larger model than usual for John - and proving to be very competitive. Having said that John actually only won the Winter

Left: Ball pere et fils, apprehensive at the Nats HLG box. Phil finished sixth in our Champs table, two points ahead of Anthony at seventh.



meeting in Open Rubber but came close second at the three major events of the year - so close to winning the Nationals, Southern Gala and Northern Galas! He also placed with it at Easter and at the 1st Area event. His other successes were a third place in A/1 at the Spring Meeting and a useful sixth in the reprieved CO₂ event at the Nationals. An important win also came at the Nats in the A/1 flyoff. His fly-away cost him a very competitive model and hence curtailed further activity in this class. Like Phil, John placed in nearly everything in which he flew - getting the very most from a limited number of models. As everyone will know, John was one of the first aeromodellers in the world to bring a real competitive attitude to free-flight. It is extraordinary that after some forty years he is still firmly amongst the top few, having managed to adapt and move along with the times. He has the happy knack of being able quickly to recognise useful new ideas and discard the purely cosmetic ones which he often refers to as 'fashion'. He has never found it necessary to use any sort of thermal detection equipment apart from his own senses and he still picks lift better than most of us. He did

wait about fifteen years too long before building this larger style of rubber model, however!

Steve Philpott is fourth in our list, having improved on his performance last year whilst still flying about the same number of events. His mixture of classes was novel. He came very close to dominating Slow Open Power with a 'third' at the Winter Meeting, then clear wins in the Spring event and for the Astral Trophy at the 4th Area meeting. He must be the first Glider flyer to win the Astral for some time! He was unable to fly the class at the Nats as he had his hands full that day winning F1A. A close flyoff against John Carter after a blustery and difficult day for FAI. The day before, in calmer conditions, he had towed for nearly the entire flyoff period eventually to release in the best air and win Open Glider. That was the Thurston and Ronytube Trophies in two days! Like John Cuthbert's incredible achievement the year before, Steve also came very close to taking all three Glider events. He was in the A/1 flyoff but a rare, duff flight placed him just out of the points. His diversion into Slope Soaring (F1E) gave him a second place at the Trials and then the SMC Cup in the same



Ian Davitt was victorious in CDH at the SMAE Spring Meeting but out of luck at the Nats. Down the list this year.

class in October. Between these Steve attended the F1E World Champs in Poland and placed eighth against the World's best. It is interesting to note that three out of the top four in this list have all attained considerable success at International meetings this year. He came home to fly steadily in the F1A Trials and finished holding fifth place. His eight placings out of fourteen events flown represents a fine performance, as (apart from the unfinished Trials) they were all 'top threes'.

Just above Steve is Stafford Screen. He flew a little less than last year mainly due to being away flying in the Argentinian World Champs when we had the Nationals, but (like Ken Faux) Stafford placed in everything in which he flew. Not only that, but he placed in the top three every time too! He won the Frog Senior for Open Power at the first Area meeting, the Quickstart Trophy for 1/2A Power at the Southern Gala and 1/2A again at the last Area event - and that one with a scorching flyoff. His main effort, of course, went into F1C: he was second in this at the 2nd Area event and tied for top place at Easter, as well as sharing the lead at the end of season Trials - hence the fractions of points. His Open power placings were third at the Northern Gala and second in the 5th Area event. There were at least three power classes that he could have flown at the Nationals had he not been otherwise engaged abroad. His performance at the World Champs themselves was marred by only one very unlucky flight which kept him out of the flyoff. A few years ago Stafford was regularly a threat at the top of this list. The fact that he is now more commonly found down a few places does not suggest that he is not as good as he was. The fact is, that to compete at the highest international level every year in the most difficult class means some sacrifices have to be made to the effort in the domestic events. Personally, I am really pleased he doesn't fly rubber...

Close to winning

Pete Watson has come very close to winning this league before. This year his challenge lasted right up to the end of the season and was much closer than the final points tally would suggest. He is, of course, a Power flyer almost exclusively, being very competitive in all three disciplines - four if you count Slow Open. In fact, Pete really has the touch when it comes to Power models. Unlike Stafford Screen he was able to fly in the Nationals where he did rather well. He won the Eddie Cosh Trophy for F1C as well as taking a 'third' in 1/2A Power, but dropped his first flight in Open. He had other successes in F1C, winning the Halifax Trophy at the 2nd Area and tied for first place at Easter. He won no Open events this year but made useful placings throughout the season. In February he was second, then fifth at the 1st Area event; second at the Southern Gala and fourth at the Northern - all these placings being decided at the flyoff stage. Towards the end of the season, because of this steady flying, he was very close to the lead and piled on the pressure with a second in 1/2A at the Southern Gala and a trump card at the Northern Gala. He reached the Glider flyoff; then proceeded to win it - and the CMA Trophy into the bargain! However, the leader was also flying well so it still left him needing, miraculous flying over the last two events of the season if he was to close the gap. He could only take fifth in 1/2A

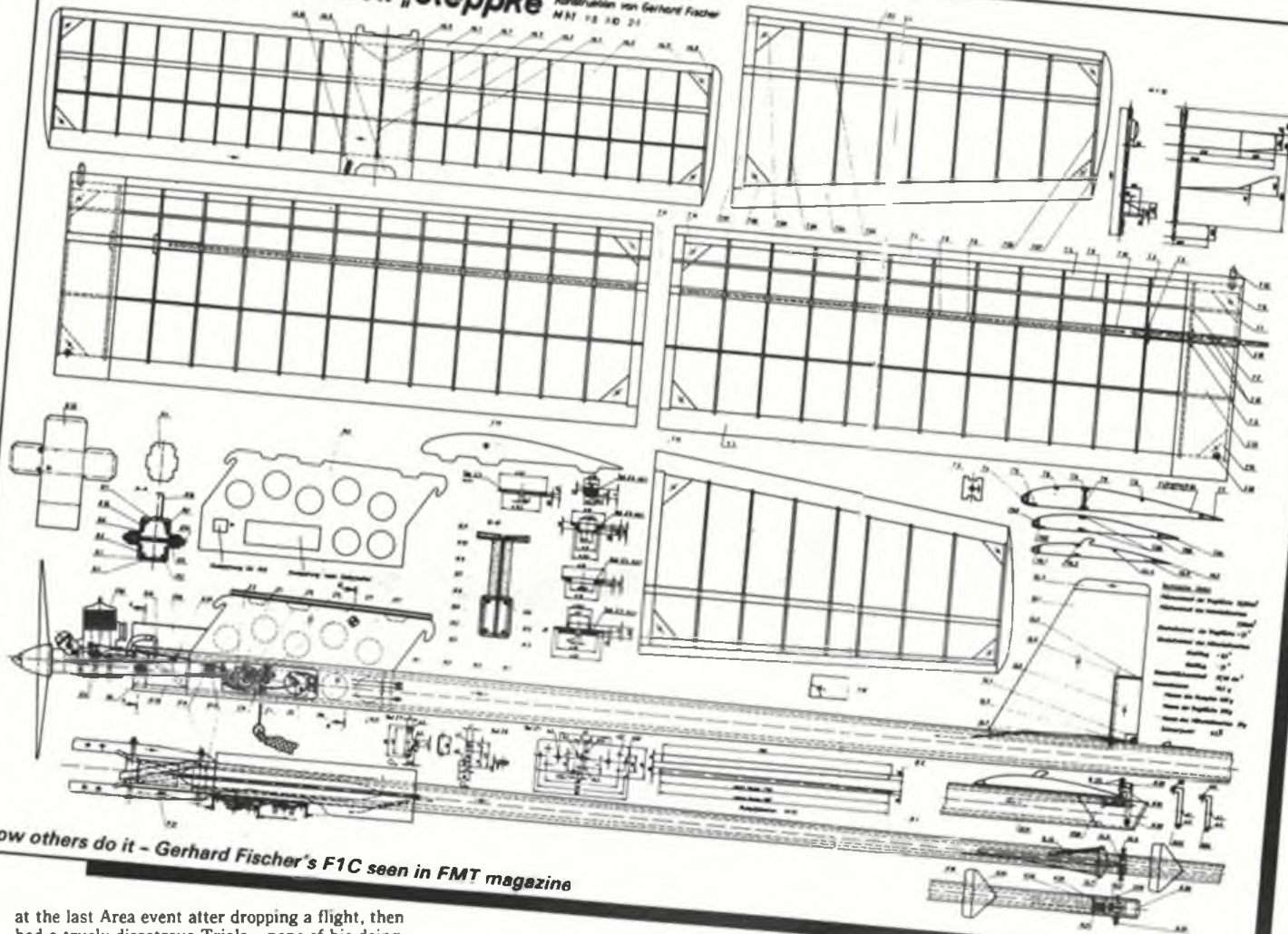
Aeromodeller

1989 SMAE Championship League table

	events flown	1st place	2nd	3rd	4th	5th	6th	Points
1 R. Peers	20	Vintage Winter O/P - Easter O/R - 8th Area	2	8	2	1	4	74
2 P. Watson	15	F1C - Easter F1C - 2nd Area F1C - Nats O/G - Northern	3	1	1	2	-	69.33
3 S. Screen	8	O/P - 1st Area F1C - Easter 1/2A - Southern 1/2A - 6th Area F1C - Trials	2	1	-	-	-	55.66
4 S. Philpott	14	Slow O/P - Spring O/G - Nationals F1A - Nationals Slow O/P - 4th Area	2	1	-	1	-	64
5 J. O'Donnell	10	O/R - Winter A/1 - Nationals	3	1	1	-	2	46
6 P. Ball	12	HLG - Southern	1	3	2	3	1	40
7 A. Ball	21	HLG - Spring O/R - Easter	1	2	1	1	1	38
= J. Cooper	10	A/1 - Spring F1A - 6th Area	2	1	1	-	1	38
9 J. Carter	21	O/P - Winter	2	3	1	3	1	32
10 P. Harris	14	1/2A - Spring 1/2A - Nationals	-	-1	2	2	-	31
11 R. King	8	O/P - Northern F1C - Trials	1	1	1	1	-	30.33
12 M. Chilton	9	F1B - 3rd Area	1	2	2	-	-	29
13 G. Ferer	11	-	4	1	-	-	-	28
14 K. Faux	6	F1C - Easter F1C - Trials	1	-	3	-	-	27.66
15 J. Bailey	-	-	1	2	3	1	1	26
16 W. Beales	-	O/R - Southern	1	1	1	1	1	25
= D. Hipperson	-	Vintage - Spring CDH- Nats	1	1	-	-	-	25
18 D. Oldfield	-	F1A - Trials	1	2	-	-	-	23
= J. Cuthbert	-	O/G - Winter	2	-	-	-	2	23
20 D. Greaves	-	F1B - 6th Area F1B - Trials	-	-	1	-	-	21
21 G. Sharp	-	CDH - 4th Area	1	-	1	1	-	20
22 T. Payne	-	O/P - Southern	1	1	-	1	-	19
23 M. Croomie	-	O/R - 1st Area O/R - Nationals SMC Trophy (F1E) F1E - Trials	-	-	-	-	-	18
= J. Baguley	-	-	-	1	6	-	-	18
24 G. Beal	-	O/G - Southern	-	2	-	-	-	17
= D. Davitt	-	O/R - Northern	-	1	1	-	1	17
28 E. Redfern	-	Slow O/P - Winter	-	1	-	1	-	16
= W. Colledge	-	O/G - 2nd Area	-	1	-	1	-	15
= M. Woodhouse	-	-	2	-	1	-	-	15
31 G. Bryant	-	-	2	-	-	1	-	14
= R. Steines	-	O/G - 4th Area	-	1	-	-	-	13
= J. Walker	-	HLG - Nationals	-	1	-	-	-	13
= A. Gibbs	-	-	1	1	1	-	-	13
35 M. Walker	-	A/1 - 5th Area	-	-	1	-	-	12
= R. Monke	-	O/P - 3rd Area	-	-	-	1	1	12
= D. Cash	-	-	1	-	-	-	-	12
= A. Jack	-	-	-	1	2	1	-	12
39 S. Fielding	-	-	1	1	-	-	1	11.6
40 J. Foster	-	Slow O/P - Nationals	-	-	-	1	-	11
= G. Pink	-	F1B - Easter CDH - Spring	-	-	-	1	-	11
42 I. Davitt	-	O/G - 3rd Area	-	-	-	-	1	10
= P. Stewart	-	O/G - Easter	-	-	-	-	1	10
= M. Gregorie	-	F1B - Nationals	-	-	-	-	1	10
= P. King	-	Vintage - Nationals	-	-	-	-	1	10
= E. Jones	-	F1A - Easter	-	-	-	-	1	10
= M. Fantham	-	-	1	1	-	-	-	10
= J. Pool	-	-	-	-	-	-	-	10
49 P. Dickson	-	F1A - 1st Area	-	-	-	-	-	9
= D. Morley	-	O/R - 2nd Area	-	-	-	-	-	9
= T. Smith	-	O/P - Nationals	-	-	-	-	-	9
= K. Attwell	-	Tailless - Nationals	-	-	-	-	-	9
= T. Gray	-	CDH - Southern	-	-	-	-	-	9
= A. Cordes	-	O/P - 5th Area	-	-	-	-	-	9
= R. Richards	-	CO ₂ - Nationals	-	-	-	-	-	9

F1C Anfängermodell „Steppe“ Konstruktion von Gerhard Fischer

MM 13 10 21



How others do it - Gerhard Fischer's F1C seen in FMT magazine

at the last Area event after dropping a flight, then had a truly disastrous Trials - none of his doing. A disappointing finish after an excellent year. He may not have known it but he actually had the eventual winner very worried in those last three comps, particularly after his Glider win. Russell Peers even went as far as to calculate that Pete only needed to win the F1C Trials and place second in the F1A Trials at the same time to beat him! That's *all* he had to do!

So Russell Peers has won it again, and has never

The impossible achieved

deserved it more. This year he went the long way round. The route that took in a 12,000 mile round trip to Argentina and his first ever World Champs and only his third-ever trip out of the country with his models. Because of this he would have to miss the Nationals for the first time ever. This would not have been so had the Champs themselves not changed date after Russell had qualified; however, he stuck with it and placed a tremendous twelfth in the World and collected the Bill Riocall trophy for the highest placed UK flyer in F1B for his troubles. In fact he was the highest placed amongst the entire team of nine which included many flyers far more experienced at International contests of this level than he. This was a man on the very top form and it shows even before we examine exactly what he won because this year he has again set a record. I would have considered it absolutely impossible to fly in twenty SMAE events throughout one season of such good weather and place in everything. It would just be a crazy dream. But Russell has done just that. He never placed outside the top six in any of the events he flew! Right from the start he knew he would be missing the Nats so he really laid into the flying. That alone would have been expected to bring in a few duff events; but it didn't. Russell even placed in a number of events on a single day; indeed, many times. On seven occasions, in fact; and at the Spring meeting he placed in three classes including CDH which he admits is his weakest. This can never be repeated - not even by him. Let us look at how it went and

ask yourself if you could keep this up.

The Winter meeting produced a win in Vintage and a fourth place in Open Power. The 1st Area event brought a third in Open Power; and another third place, this time in Open Rubber, awaited him at the 2nd Area do. The Easter meeting gave him third in F1B and another win, this time in Open Power - once again on the same day. At the Spring meeting he started the flying early and went right through a day when it never stopped raining to place fifth in CDH, fourth in 1/2A and second in Vintage. He threw everything he had at the 3rd Area event and made third place in Open Power and scraped sixth in F1B, both from competent flyoffs. It's never easy to make two flyoffs in one evening - one class or another inevitably suffers. He then missed the Nationals, leaving Pete Watson to make up some ground. Russell's return at the 4th Area event was startling. Completely un-phased by his exposure to the International elite he flew in Team Glider, topped the Falcons effort and placed sixth nationally. This meeting, usually considered his bogey day as the only other class available to him is CDH, was passed and he was still clean with a perfect record! At the Southern Gala he qualified for the Open Power flyoff then dropped a little time in 1/2A. The flyoff for this filled up too but his good score was still enough for sixth place. He went on to take third in the Open Power finale; hence another two scoring events in one day. He was third again in the Open Power flyoff at the chilly 5th Area event and then had an excellent Northern Gala to take third in Open Rubber (after a long flyoff flight) and second in Power - also after a flyoff. Determined to hold off the Watson challenge he flew all he could at the last Area event knowing it could wreck his unbroken record; but he got away with it again. Moreover it was one of his best days! A very fine third in 1/2A after a flyoff and then the tremendous win in Open Rubber to lead his Falcons club team to their first Farrows victory and the first ever first, second and third clean sweep in history!

He had it in the bag and needed nothing startling

at the Trials. Subsequent to their postponement the actual points for his current sixth place would not have counted towards the SMAE total but it still maintained his perfect record for the year.

Despite time lost in preparation for, and attendance at, the distant World Championships he has become the first ever flier to win the SMAE Senior Championship three times, consecutively or otherwise, since the current scoring system began some twelve years ago. He placed in every SMAE event in which he flew and topped his club team efforts in all three team events taking individual victory in the very one his club actually won. Through it all he never even lost a model!

There have, in the past, been many flyers of Russell's standard and there certainly still are now. The difference is that Russell is, effectively, three flyers of Russell's standard - he covers so many classes! There have also been, from time to time, individuals who outshine him in one or more event. People who quite simply 'get lucky' for a couple of seasons, then fade away again. When Russell flies he knows he isn't going to get lucky. He doesn't get away with anything. On the contrary, luck tends to go against him. Neither is he one of these annoying people who seem to have a magic touch when it comes to picking air or his timekeepers! He hits the occasional hole like the rest of us and drops flights. The reason his results are anything but normal is because he immerses himself in it and works at it. If the flying side of free flight competition is a sport then Russell is our version of Daley Thompson. He thrives on competition but shuns over-fancy models, never falling into the trap that so many do of allowing the airframe to become an end in itself and not a means to an end. He never gives up and believes whole heartedly in himself. Complete rules have been re-written with the sole aim of making it more difficult for Russell to win and he just keeps coming.

So now you know how it feels to place everytime you fly. It feels like being Russell Peers!

MIND THE LINES

Ron Prentice finds himself flying F2B and thinking Nostalgically

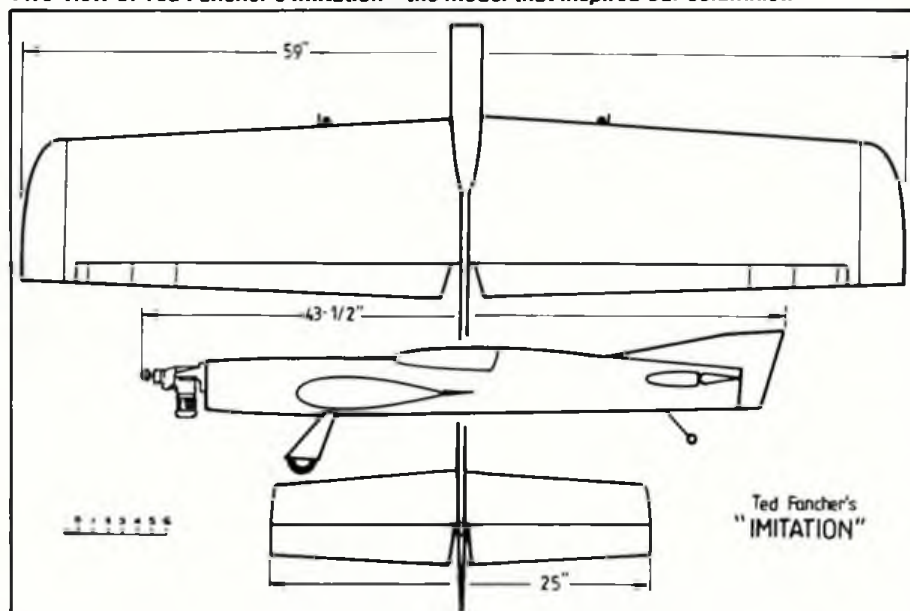
HAVING recently repaired the wings and elevator of my ill-fated Excitation, I had a sudden urge to build them on to a profile fuselage similar to that used by Ted Fancher on his Imitation. This model, which predated the Excitation, was published in the October 1979 issue of Model Aviation. It was a flying testbed for exploring various ideas formulated over a period of several years. Aerodynamically the model featured a 59 inch wing of 631 sq. inches. The large horizontal stabiliser and elevator was 140 sq. inches or 22.2 per cent of the wing area. The all-up weight of the model was approximately 50 to 53 ounces, according to the weight of the engine. I decided to try my new Super Tigre Bullring 46 in the model instead of the Merco 61 which had been in the Excitation. Because of the extra weight of the blue foam in the wings, the model was somewhat heavy at 62 ounces. However, it flew very well — square corners in particular, were a joy to perform.

Idyllic

With the SMAE Centralised control line meeting at Hullavington due in a few days, I took the Imitation to my local flying field for a practice at the Class 2 (Novice) schedule, because as a strictly Old Time Stunt flyer, I'm not yet adept at the 'modern' way of performing manoeuvres.

Sunday, 7th May turned out to be one of those days that all modellers dream about, or think they can remember from their days of youth. Blue skies were accompanied by just the lightest of breezes. The scene at Hullavington when I arrived was wonderful, with Aerobatics, Team Race, Speed and Scale control line models all being tried out at one end of the drome and scale R/C flyers practising at the far end. In addition to this

Two-view of Ted Fancher's Imitation - the model that inspired our columnist.



Looking back to the Peterborough Rally - this is Mick Taylor's Demon King, Amco 3.5 powered. Attractive craft is available as plan CL347X, price £3.60 including postage, from our Plans Service.

modelling activity we were treated to a spell of full-size gliding, and a Fournier RF-01 was doing circuits at the same time.

This idyllic scene was slightly marred when I learned that the Novice event would not take place, thanks to lack of entries. However, in spite of being unable to fly some parts of the schedule properly, I duly entered the F2B event with no hope of placing, but with great expectations of gaining experience.

The competition was flown in three rounds, with most competitors performing smooth, well-positioned pattern shapes. My

second and third flights were considerably improved when that virtuoso of the handle, Bill Draper, offered to come in the circle and call the schedule for me.

At the end of the day the event was won by Bill Draper flying his usual Superhawk powered by an Enya 40. Second place went to Nev Dickinson and his Merco 61 powered Northstar; third was Barry Robinson flying his ST60 Northwind (in two rounds) and his new Boreas (I'm told it means God of the Northwind in Greek!) in Round Three.

The final results were as follows:

		Points	
1	C.W. Draper	Superhawk, Enya SS40	3987
2	N. Dickinson	Northstar, Merco 61	3964
3	B. Robinson	Northwind, ST60/Boreas, Merco 61	3885
4	P. Coates	Maxi 48, ST46	3877
5	N. Evans	Sig Magnum, ST46	3597
6	J. Kergon	Superhawk, ST46	3537
7	R. Handscombe	Freebird, PAW35	3476
8	T. Taylor	Own Design, Enya 40	3356
9	J. Handscombe	Samba, Enya 46	2977
10	R. Prentice	Imitation, ST46 Bullring	2792

Just Nostalgia

While at Hullavington I was chatting to Richard King — Chairman of the SMAE C/L technical Committee, about the Old Time Stunt event I shall be organising at the Nationals, and the All-Nobler competition which is taking place in the presence of George Aldrich. Richard was telling me that if the Nobler event is successful, it is possible that it will be retained on a permanent basis and the format slightly altered to encompass what in America is called Nostalgia era or the period 1953 to 1964.

A recent copy of the PAMPA Stunt News, sent to me from the United States, contained the following provisional set of rules for the Nostalgia class which had been formulated

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Authentically-finished All-American Senior by Mike Castell with Fox .35 up front - just like the advert at left.

Below: Not a bad deal in those days of yore (1951, actually!)

by Gerry Phelps, Ted Fancher and Windy Urtnowski. I find the idea of the '25 years or older' guideline an interesting one and I propose to send a copy of the rules to Richard King for the Control Line Technical Committee to chew over. I think that many of the vintage flyers would welcome such a move, because the 1952 cut-off date does severely limit the number of good models available for competition flying. As I understand the proposal, it would not eliminate the Vintage Old Time Stunt event in its present form, but would be an additional competition in line with the current American thinking. For instance, it would enable models such as Henri Stouff's 1955 Blue Pants, a model I am continually receiving enquiries about, to be flown. Other well known models would be Bill Morley's 1955 Thunderbolt (a flapped design for a Frog 500) his Mercury Crusader, Gordon Cornell's 1959 Princess, and Ray Brown's well-known 1959 Coy Lady. There are many American designs of the period, but perhaps the best known, in addition to the Nobler, would be Bob Palmer's Thunderbird, both Veco and Dumas kit versions, his Veco Hurricane and Skyscraper, the Bill Werwage Aries, Don Still's Stuka, Roland McDonald's Detroit, T. Hoffman's Conquistador and many others.

An altogether exciting prospects, don't you agree?

Not so Easy

If you were asked to turn out twenty-four control line stunt models to be used as Christmas presents, what would you come up with? In 1950, well known American modeller Frank Ehling had just this problem. Another well-known present-day aeromodeller, Peter Michel, is shown in the accompanying photograph with the replica of the model that Frank Ehling designed on that occasion. It is, of course, the Easy, published in the 1951 Air Trails Annual. In that period it was very often the practice to make a particular design in various sizes, the scaling up or down usually being done by the builder. However, in this particular instance the plan



Above: Tom Dixon's sleek, enlarged Thunderbird MkII is 62in span, has 744sq in area and weighs 64oz for its Merco 49.

Right: Peter Michel with his Fox .35-powered Easy, reportedly a fine, precise stunter. See 'Not so Easy'.

was published with numbers and letters given instead of measurements and these were shown in a separate chart, to enable the aeroplane to be made in sizes from a CO₂ version up to a large '60' powered model. I remember having a spark ignition Atwood Champion powered Easy in 1951, which flew very well in contests at that time. Somewhere I have an old snapshot of my old mate Laurie Glover in his garden, holding both the Easy and his Mercury Monitor, but I don't think it would be sharp enough to publish. Peter Michel tells me that his model is a fine flyer and he will be using it during the present competition season. I shall look forward to seeing it rotate!



THIS meeting, although unfamiliar to us in the United Kingdom, is one of the major Indoor events in Europe. A most pleasant and relaxed affair, it was held in the André Cools Sports Hall at Flémalle, near Liège, Belgium. This year, apart from the Belgian hosts, there were representatives from France, Germany, Holland, Poland and Czechoslovakia. In addition models were sent from USA, Japan and Sweden to be flown by proxy. I was the only Brit to travel from the United Kingdom, but also in attendance were Jack Bartier who resides locally and Mark Newbury who works in Brussels. Unfortunately, M. Fernard Hauwaert, the prime mover of the event, had been seriously ill and was unable to attend in person. Happily, he is on the mend; and his place was taken by his charming wife.

The André Cools Hall seems perhaps larger than, say, Alumwell, but more importantly the roof is somewhat cleaner, being supported by arches and relatively free from gymnastic impedimenta. The useable ceiling is thus reasonably high at some eight metres. A bar is conveniently to hand for refreshments.

Accommodation was excellent at the Residence du Blanc Gravier, a student hostel, part of the Sports Complex of Liege University. In fact, this is some twelve kilometres from the flying site and as navigation skill was required, the routine was to follow a more confident or experienced driver. Some of the harder competitors camped close by the Sports Hall at Flémalle but the long dry spell broke, raining stair rods at night, so I was glad to have a roof over my head.

Duration day

The first day, Friday, was given over to the pure duration events. Indoor cognoscenti will be able to judge for themselves, but overall the standard seemed pretty good. The F1D and F1D Beginners contests, as expected, were inhibited by the ceiling height but nevertheless put up some creditable times. The external conditions caused some drifting due to convection and necessitated some skilful steering by extensible fishing rods. One or two balloons were stationed in readiness but were not used.

Nimpsch and Alfred Klink of West Germany cleaned up F1D; Thomas Merket and (again) Werner Nimpsch in F1D Beginner. Christophe Hanriot had a field day, or rather week-end, scooping most of the Junior Events. At 17, Christophe should have a great future!

I flew in EZB with a new model, my first attempt at this class. This fact showed in the placing, but there is nothing like the real thing to sort out the bugs!

The Micro 35 event is roughly similar to EZB, having originated in Germany and been adopted by the French. The rules are less

'Tonda' Alfery's adventurous Chance Vought V-17 for Peanut Scale. Flexi-drive to props...



FLYING DOWN TO

FLEM

Mike Green goes

**Continental and
samples Indoor activity**

rigid, permitting wing shapes which seem less liable to 'stick' on the ceiling. The model bounces and turns. Consequently the durations are somewhat higher than EZB. By the way, the name may suggest microfilm, but this is not so. The maximum span is 35cms.

Sainte Formula (the René Jossien Trophy) was flown on Saturday and finished on Sunday, again to a very high standard; with airframe down to two grams you need four-minute flights to be in contention. In my opinion there is scope for experimentation - whereas most people favoured a 'left' trim, one or two were flown to the right. Pros and cons; the 'left turners' seemed to find the ROG requirement difficult, the model being unwilling to unstick, but the one ROG flight needed was perhaps less onerous than it appeared. The score was best three out of five regardless of ROG.

I managed fourth place which does not appear too disgraceful but indicates the need for more work. Jack Bartier came sixth.

At this point I will mention one or two items of interest. One was that the competitor signed his score after each flight, having agreed to it - a good way to avoid dispute later, although I did not notice any problems! The other thing novel to us is that one can enter all one's models - some fliers did just this, making multiple entries, particularly in Peanut.

Over to scale...

Whilst the flying action was taking place on Saturday, the Peanuts and Pistachios were lined up for static judging. I was struck by the generally high standard of the entries, those of Antonin Alfery being particularly noteworthy. Microflight prototypes were in favour in addition to pioneer aircraft, together with some 'solar' powered entries. I must mention here that the Peanuts were divided into two categories - Duration (not to be confused with our class Peanut Duration) and scale.

Duration is just that - duration and static points, mathematically more complex than our system, but with much the same result. The scale is, in principle, not unlike our scale event at the Nats, with static score plus qualifying flights only. The two classes had different Propeller stipulations but model-wise the rules were much the same as here, except no 'static props' for judging.

I thought I espied a single-surface model,

not a microflight, so in that sense things were a little more lenient. To be fair though, the static Judges put in a lot of hard work. In conjunction with the Peanut contest there were two other awards - Jacques Delcroix Pottier Challenge and Renard Cup (for designs by the Belgian Fernand Renard). In the scale class Antonin Alfery won with a truly superlative Chance Vought VI featuring contra props, powered separately but synchronised by an ingenious flexible drive/gear system. This model, unlike most of his other models, was of conventional wood and tissue construction.

Thomas Merket won duration. In this class flights of 60-seconds-plus were commonplace and some frames were down to four or five grams weight. The Pistachio event was won by Rainer Lotz with a Windham Tandem. This pioneer aircraft fortuitously combines lots of area and length, yet spans only eight inches. Even so, the more conventional aircraft astonished one by their performance. Surely in time they will catch up with the Peanuts! Georges Beaujean demonstrated a collection of three exquisite sub-pistachios - 15cm span in an attache case.

There were fittings for two more!

I had expected to see more multi-engined types, but apart from Alfery's winner I noticed only a Twin Mustang Pistachio. These tiny models seem to offer the ultimate in ease of transportation; hence the proxy flown examples from USA, Italy, Japan and Sweden. Never an easy task, for proxy fliers put in a lot of effort. Klaus Nottelmann for one, with a Solar Challenger...

There were two prize giving ceremonies, the first on Saturday evening prior to the 'banquet' honoured by the presence of The Mayor of Flemalle, M. Jean Buelers and M. Marcel Strang, Municipal magistrate and with Mrs Van Hauwert as hostess. On Sunday we were privileged when M Alfred Renard, the son of the famous aircraft designer, presented the Renard Cup. (M. Renard was sadly killed a few weeks before in a car accident in his 94th year.) There were prizes awarded to sixth place, and as a nice gesture, everybody received an individual certificate. I found this a most enjoyable function, and was made most welcome. The organisers would certainly like to see more of us from the United Kingdom on future occasions.

Aeromodeller

Right: Neat Renard 17 Peanut by M. Orsini (France).

ALLE

Flemalle International

F1D Microfilm (Best two out of five)

1 Werner Nimpseh	D	3222 secs
2 Alfred Klink	D	2961
3 Sylvester Kujawa	PL	2826

F1D Beginner (Best two out of five)

1 Thomas Merkt	D	1289
2 Werner Nimpseh	D	1236
3 Jurgen Weil	D	1156

EZB (Best two out of five)

1 Ryzard Czechowski	PL	1454
2 Jurgen Weil	D	1396
3 Jan Dihm	PL	1317

EZB Junior (Best two out of five)

1 Christophe Harriot	F	802
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Micro 35 (Best two out of five)

1 Werner Nimpseh	D	1865
2 A Klink	D	1291
3 Jacques Delcroix	F	1053

Micro 35 Junior

1 Christophe Harriot	F	
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Sainte Formule Senior (Best three out of five) Jossien Trophy

1 Henri Fraikin	B	761
2 Jacques Delcroix	F	612
3 Heinz Neumann	D	576

Sainte Formule (Junior)

1 Christophe Harriot	F	635
2 Christophe Harriot	F	596
3 Thibaut Nihoul	B	402

Peanut Duration: Junior

1 Thomas Merkt	D	Solar Challenger	959.9 points
2 Christophe Harriot	F	Pottier 100	824.0
3 Joachim Lotz	D	Blackburn Mono	713.1

Peanut Duration: Senior

1 Thomas Merkt	D	Solar Challenger	1248.3
2 Jurgen Weil	D	Cloudbuster	1081.2
3 Jacques Delcroix		Lacey M10	1064.4

Pistachio

1 Rainer Lotz	D	Windham Tandem	1238
2 Rainer Lotz	D	Cloudbuster	944
3 Antonin Alfery	CZ	Fike Model E M10	878

Pistachio: Junior

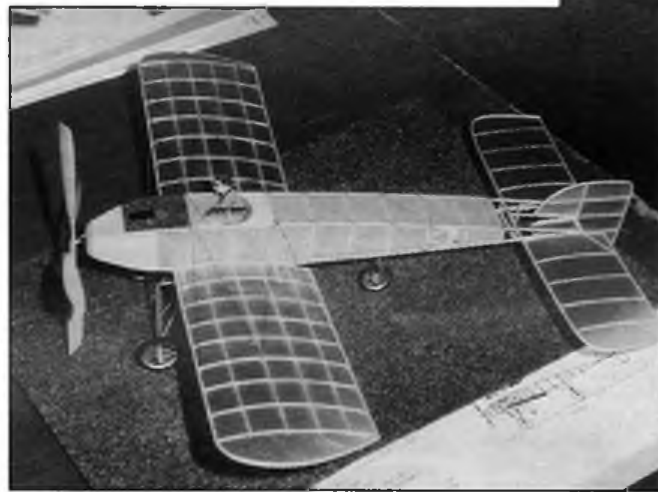
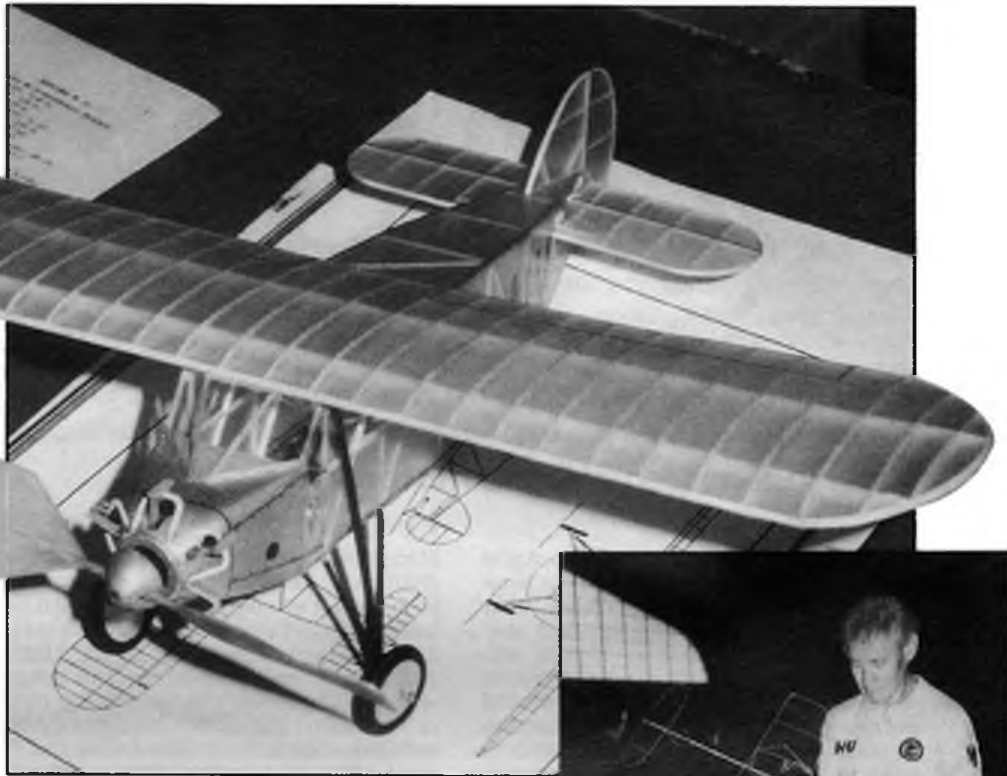
1 Joachim Lotz	D	Farman Moustique	642.9
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Peanut Scale

1 Antonin Alfery	CZ	Chance Vought V-1	575.0
2 Antonin Alfery	CZ	Spitfire LF MK IX	494.8
3 Antonin Alfery		Messerschmitt BF 109	494.8

Right: 1909 Clerget by Sylvester Kujawa (Poland) is an unfamiliar shape. Far right: Charming Saint Formula craft, second in the class by Jacques Delcroix.

February 1990



Above: This Bleriot VII, another Peanut, was entered by J. Weil from Germany. Above right: Alfred Klink (Germany) prepares his Micro 35 entry. Right: Dave Linstrum's Dornier Komet Pistachio; a proxy entry from the US.



High

potential

Chris Coote comments on commercially - available geared electric motors

I HAVE already mentioned the benefits of gearing and have shown how the home experimenter can produce simple, spur reduction mechanisms for the usual 'can' type electric motors that we normally use. However, many builders are put off by the thought of getting to grips with file and soldering iron, so I thought it was about time to review what is commercially available in the sort of sizes most useful to free-flyers.

From the smallest...

In the smallest category, for indoor and small outdoor models, there is the well known KP01 with its integral 4:1 gear reduction made entirely from engineering plastics. In this tiny, low-load size there is no need for sophisticated bearings and the prop shaft runs happily in the plastic end cheeks of the motor mountings. Moving up the scale, the Union company from Japan produce a range of ARTF R/C electric kits which contain a very neat, geared Mabuchi 280s motor. It is one of these units that has been so successfully used in clubmate Doug Sheppard's Vintage sports model pictured in the December issue. This unit is really a scaled-up version of that found in the small Union foam free-flight kits (which use the same motor as the KP01). The motor is encased in a red plastic moulding with the gearing mounted at the rear. This leaves the hot brush gear in the coolest spot at the front of the unit, but necessitates a long layshaft running over the top of the motor to carry the prop. In this case nylon material type bearings are press-fitted into each end of the mouldings for the prop shaft. Unfortunately the main gear is made from a similar material to the bearings, and I found that under pressure from the thrust of the prop, these two similar materials were tending to melt under the strain! This was cured quite easily by the simple expedient of inserting a small brass washer between the rear bearing and the main gear and lubricating the whole lot with a spot of grease; just like a rubber model nose block really! This motor/gear unit weighs in at about 65gm and seems to need four or five cells of between 100 and 200mAh for a good free-flight performance in models weighing up to twelve ounces, ready to fly with batteries.

The Union Stickplane also features this unit.

...to medium

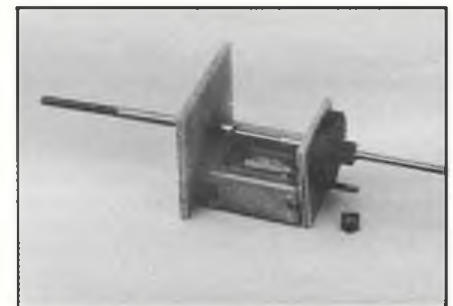
Going up in size, we come to the Acoms unit used in their R/C kits (also ARTF, and mostly foam). This unit is available as a spare part. My last one came complete with a switch harness and special, flexible, wide-

bladed prop. The motor is a Mabuchi of the 380 can size - and with a pretty hefty winding. In R/C guise it is intended to be powered by a five or six cell pack of up to 800mAh cells. I have good service out of it on anything from four to six 225 and 270mAh cells. This motor, with its 3:1 gearing, can swing a big prop of 9in diameter and can be regarded as a good replacement for a 1-1.5cc diesel. I have used ordinary nylon power type props ranging in size from 8 x 4, 8 x 6, and 9 x 4. The prop supplied is a thin-blade, large-area type of, nominally, 9in diameter and 4in pitch. Of course, the installed weight of the power system is going to be a lot more than the diesel or glow due to battery pack weight and the inherently heavier electric motor. In this case the bare motor weighs about 70gm; the gearbox is commendably light at 15gm, and the small battery packs that I use come out at about 60-70gm. So for a total power system weight of around 160gm (say 6-6.5oz) you can fly a model of between 40 and 60in span with an all-up weight of about 24oz. The secret is to try and keep the wing loading down. Certainly this motor/gear combination will lift a substantially bigger motor glider of up to 72in span. Remember that with this size of motor you are taking considerable currents from the battery pack (in excess of 10amps initially) and therefore your wiring and fusing has to be of a size to adequately cope with all this! See your local car accessory shop for advice on 15amp multi-strand cable.

The largest geared unit that I have used is the Graupner 600. This is about the same size and weight as the usual 540 'buggy' type motors (actually, more like the slightly higher power 550 motors: same can diameter,

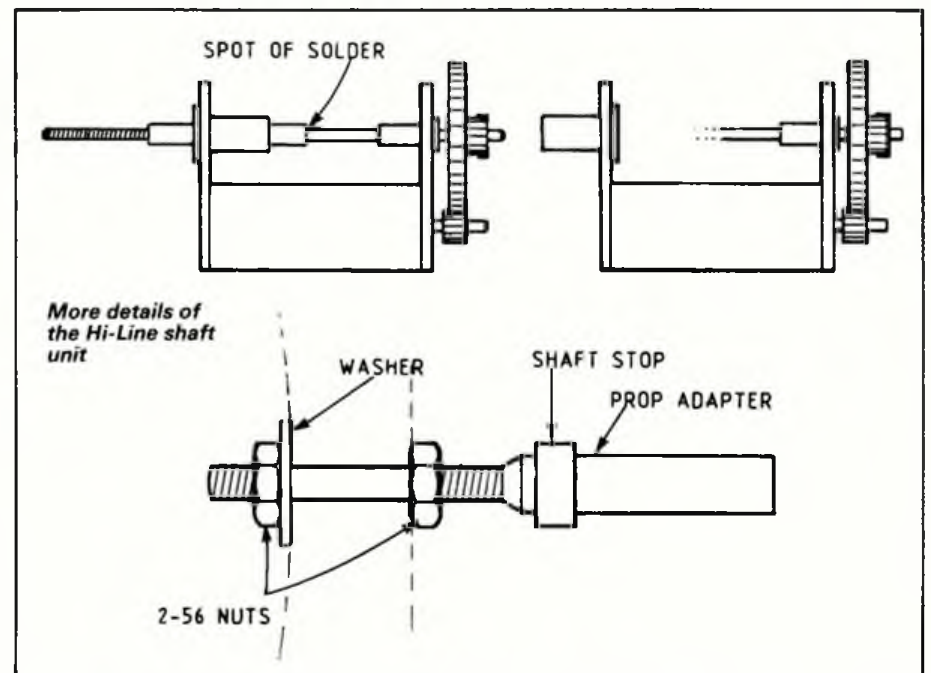


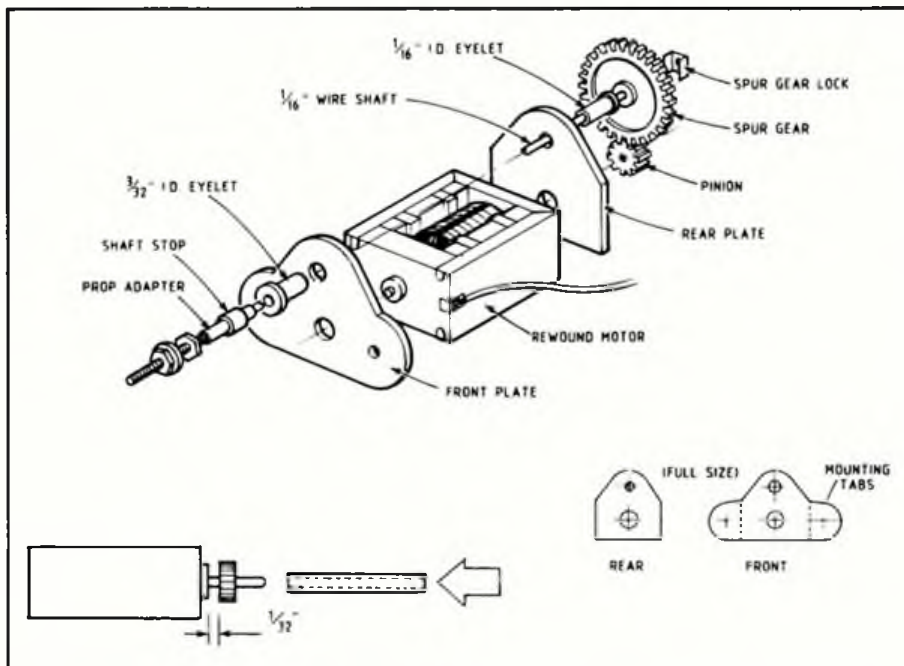
Above: Geared Acoms 380 unit rubber-banded to test block



Hi-Line mini motor - see also diagram, opposite page, top.

slightly longer length) although it features a higher quality can and metal end cap for the brush gear. The gearbox is a very neat and small plastic case fixed to the motor can with two M3 screws. Releasing these reveals a totally enclosed spur gear system with brass pinion and plastic output gear mounted on a plain 4mm shaft. The propshaft bearings are bronze to the rear and ball race at the front. This is a good arrangement since it means that the thrust from the prop is taken by the ball bearings rather than by a plastic-to-plastic interface as in the smaller units. The motor specifications are written on the





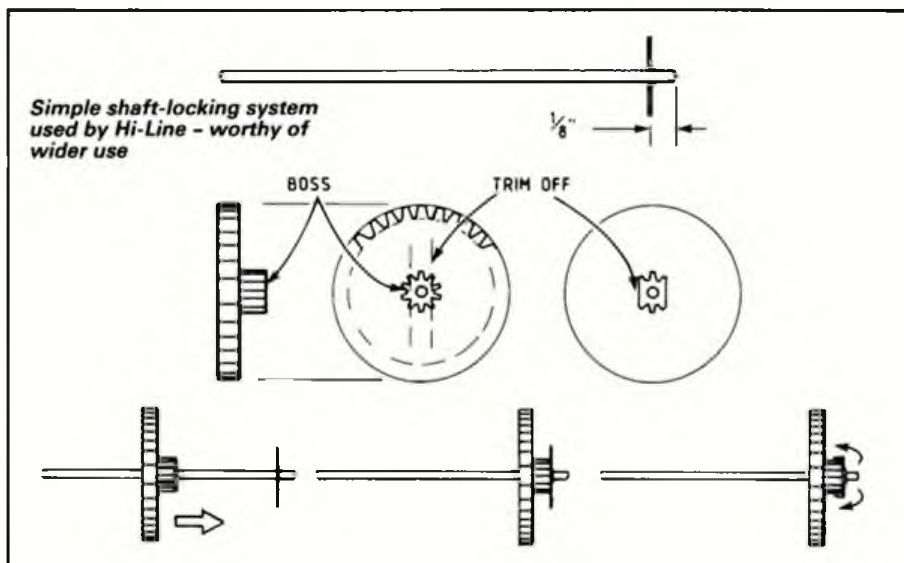
box lid and make interesting reading, especially if you refer to our previous article on performance prediction. The quoted free running speed is 18,000rpm at two amps, and the stall current is quoted at no less than 85amps! The gears give a healthy reduction of 3:1, so taking my rule of thumb for half free-running speed for best power, that means 9,000rpm on the motor; just 3000 at the prop. The current at max efficiency is quoted as 12 amps, so I would expect to load up the motor with a suitable sized prop to give a current draw of twice this figure; giving a 24 amp estimate. This figure is quite OK with decent 1.2Ah cells and should be alright on the latest high output 600mAh pencils. Tests so far have shown a more than adequate amount of go on six 600mah Sanyo pencils driving a home-made 12in prop. This sort of performance almost exactly mimics that of medium-size vintage spark ignition motors, and the installed power system weight of some 15oz is not far away from the spark layout of old with its ignition batteries, timer and circuitry. So there you have it; a clean, reliable, low-revving power unit ideally suited to large vintage jobs. Who will be the first to cast one into the blue? I would be interested in any comments from vintage fliers on the prop/rpm performance of their motors and the sort of installed weight they suffer when not using modern nicads for the ignition source.

More on the Spartan

Just to prove the point, I have a Halfax Spartan vintage job, which is a 60in high-wing sports free-fighter. It was originally flown with spark ignition motors in the 19-40 cu in size range at all up weights up to 3lb. Mine, fitted with aforesaid (excellent) Graupner unit, tips the scales at 2lb 4oz ready to go with a pack of six pencils. Power on duration with the 12in prop is about 60 seconds at rapid climb, which is more than enough for a very sprightly flight around the field. There is bags of room and payload capability for 1.2Ah cells, and R/C assist gear, so this is the next obvious step towards small local-field flying.

In fact, in the free-flight mode a 10 x 6 nylon prop works well; this turned at just over 5,000rpm. Obviously in this case the motor is under loaded and is having an easy life, current consumption being only 8-9 amps which gives a good power on duration of well over 90 seconds, so partial charges are the order of the day to keep it within the confines of the field.

The famous Fred Hemsall design Black Magic, another 60in span petrol model also weighed just 36oz. The comment was made in the relevant Aeromodeller that this gave a wing loading of around 12oz/sq ft, which made it ideal for contest work! Thus my electrified Spartan is flying free at just about



exactly the identical weight, wing loading and power performance of the original, and oh what a joy it is to be able to switch on and fly with no nasty oily mess or noise to contend with!

Bits and pieces

The last month pictures showed the basic layout and motor mounting details which make use of all commercial bits and pieces. The prop adaptor with its neat safety spinner nut is one from SLEC bought at one of their trade stands at the recent Shepton Mallet show. This had to be drilled out to 4mm rather than the 1/8in hole supplied but there is more than enough thickness in the threaded alloy part to allow for this. The adaptor is clamped to the shaft with an allen key type grub screw (which comes with a suitable tiny hexagon key in the adaptor kit) onto the preformed flat on the prop shaft. The motor mounting itself is a pair of preformed curved plates with tags to screw to engine bearers, sold by the model boat trade for engine mounting. These could have been equally easily made up of thin aluminium at home (a good tip for this is to visit local scrap metal merchants and see if you can get a bit of old caravan cladding material. This is usually half-hard aluminium sheet of around 22swg and extremely useful for all sorts of modelling items. What is more, you get a huge bit for your not much money). The original Spartan engine mounting consisted of a removable or knock-off cowl with short engine bearers forming the upper edges of this unit. The spark motor was then attached to an aluminium adaptor plate which was held to these bearers by bolts passing horizontally through the wood. This seemed over-complex for the vibration free electric unit, so I simply glued some short lengths of bearer material to the inside faces of the originals. The Graupner motor with its mounting plates then fitted neatly between the new wood and was attached with four self tapping screws into predrilled holes in the timber. The upper cowl piece needed just a small amount of material removing to give clearance for the top of the gearbox, and I cut some cooling air slots in the back of this top cowl opposite the motor brushes.

The battery pack is tucked away in the bottom of the fuselage right behind the ply undercarriage bulkhead. Any forward motion of the battery pack is absorbed by some white foam packing up against the strong point of this bulkhead. The switch and charging jack are located just beneath the cabin window as normal, and the chassis mounting fuse holder for the 20mm long 10 amp fuse is simply glued to the top of the ply U/C bulkhead inside the cabin. The latest development is a simple transistorised speed control longer flight duration if you do reduce power output. In other words the battery energy is not simply wasted by dissipation in a resistive type arrangement to reduce speed, but is conserved by switching the motor on and off rapidly, just like the old WW1 pilots did with their rotary engines in Avro 504's and Sopwith Camels using the 'blip' switch. This unit will be the subject of a constructional article.

That is all for this month. Do not forget to write in to the Editor, or contact me direct on 0272-877149, with news of your exploits with electrics; or, indeed, if you have any queries - which I will do my best to answer. Let's see more Vintage-style electric flight!

FROM THE HANDLE

Claus Maikis considers venturi design, and

recommends making your own

TO write this account I have used all the material available to me - my own thoughts and the ideas of others. Scott Bair of America has written some very interesting comments about this topic. Special credit must go to Eric Janssen of Netherlands who gave me some most valuable information about his practical experience on stunt engine carburettors. One of the questions most asked by beginners concerns the venturi diameter. Usually I have a problem with this, because it cannot be answered with just a simple dimension. To handle this topic you also have to mention systems and shapes in order to give useful advice.

Theory

Let's look on the theory first to see how a venturi works. Bernoulli discovered the physical law which explains the behaviour of fluids. He found out that a fluid changes its flow velocity depending on the cross-section area of the passageway; and the pressure of the fluid depends on the velocity. The smaller the area (say, a venturi hole) the higher the velocity - and the lower the pressure (which, in our case, means suction). The way our fluid - the air - flows through the venturi is also influenced by the shape of the inner venturi walls and, of course, the venturi system itself.

A simple straight drilled hole just isn't an acceptable form for a venturi. While for reasons of economical production many venturis have a simple, tapered opening, the ideal shape should be a parabola. Smallest radius is at the entry, gradually enlarging towards the point of smallest diameter. The fuel jets should be located here because this is the point of highest velocity, and thus lowest pressure. Downstream, the diameter should increase gradually again. This shape provides smooth airflow without flow separation, vortices, and, thus, loss of suction. Ideally the diverging part should exactly mate with the shape of the crankshaft opening.

Categories

We all know that in reality things look somewhat different. There are many kinds of venturis, broadly categorised into two main systems; the true venturi, and the venturi equipped with a spraybar. The true venturi has a fuel jet at the point of smallest diameter, controlled by a needle valve outside the venturi. A more popular version is the 'sprinkler' type with peripheral jets. Fuel is delivered into a feed groove running around the venturi, from which the fuel is sucked through one or multiple holes. Best known is the Super Tigre type where the venturi is fixed with the spraybar. This spraybar replaces the clamp screw which holds the carburettor of the RC engine version. This installation dictates the location of the spraybar.

The 'spraybar type' venturi comes in several versions. The spraybar can be put right through the crankcase boss and the venturi at the same time, thus fixing the venturi. This is usually done on small engines, and puts the spraybar very near to the crankshaft. The other method is to hold the venturi with bolts at the boss, and have a separate hole for the spraybar above the edge of the boss. The spraybar can run right through the venturi.

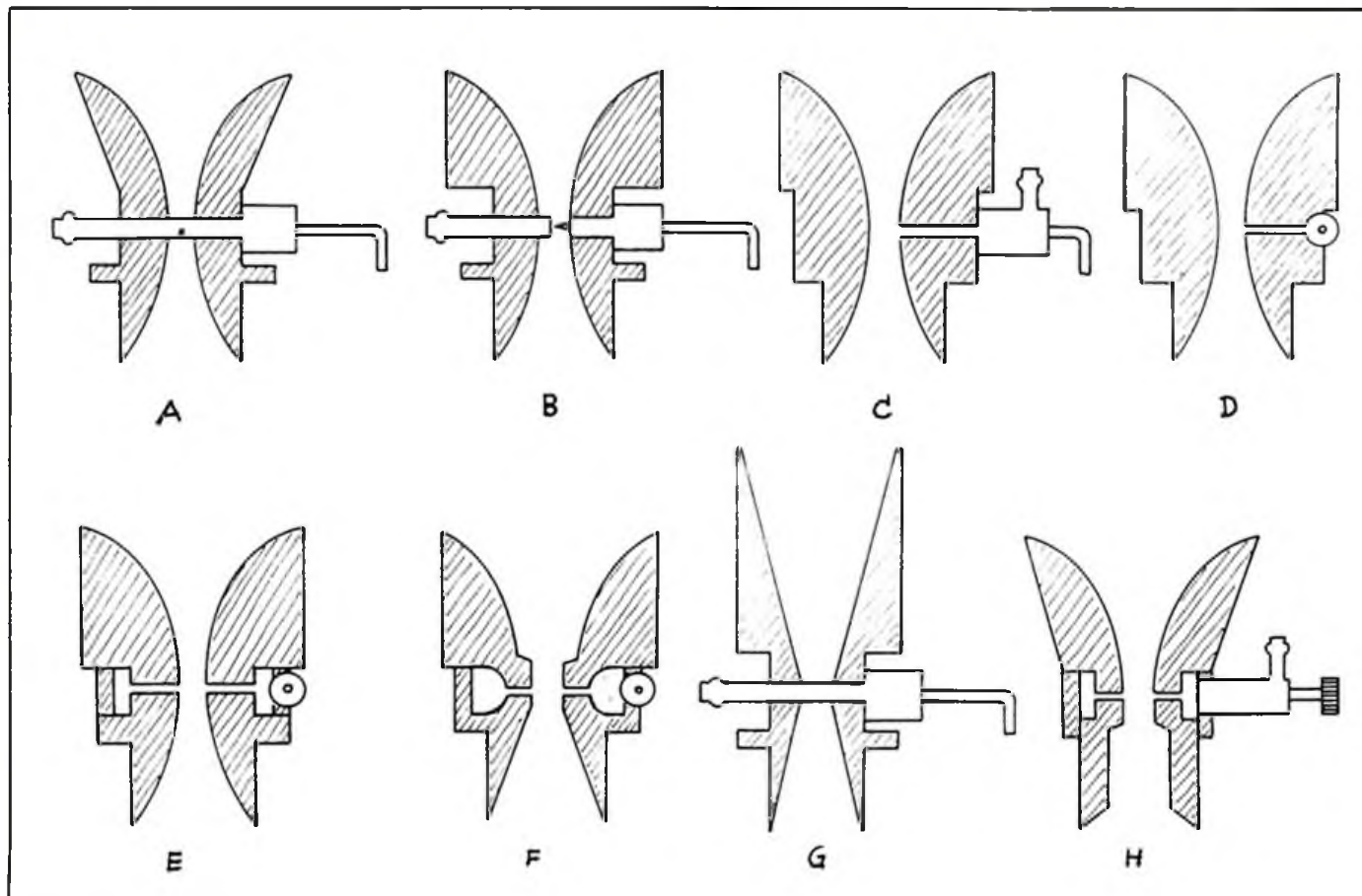
Other types employ, effectively, can have 'half a spraybar', ending in the centre of the venturi, with the needle screwing in from the other side. This type is sometimes seen on racing engines. Another version has needle and fuel inlet on the same side, and the spraybar ends in centre of the venturi. RC carburettors sometimes have this type of spraybar, and - if no other item is found - can easily be used for our purpose. This way, the 'disturbing' area of the spraybar is reduced.

Examination

Since there's a wide variety of venturi shapes and spraybar versions, there's quite a number of venturi systems. Now let's examine the peculiarities of the different types. For clarity and easy comparison the drawings show only such venturis which are held in a crankcase boss in one way or another. Mounting methods are not considered, with the exception of those mentioned.

Couldn't resist this cheerful Nationals shot of Ireland's Maurice Doyle and latest Ariane. Relatively light construction evident; model is covered in tissue.





Perhaps the most popular type of venturi is that shown in figure A, which shows the ideal parabola shape of the venturi opening. The spraybar is mounted 'straight through'. This brings the fuel jet to the centre of the venturi bore where the pressure is supposed to be the highest. However, the spraybar is a bluff body, destroying the clean air flow. Behind the spraybar strong vortices are almost certainly produced, which means low pressure. Now we can expect that the airflow doesn't return to normal pressure, thus entering the engine at low pressure and resulting in less than optimum cylinder charge. Scott Bair has made torque tests which reveal considerable difference in torque output on engines equipped with different type of venturis. With the same cross-section area in both types, the unobstructed venturi produced a torque increase of at least eight per cent over the spraybar type. Scott recommends that the fuel jet should point downwards to the crankshaft. I know that somebody has made experiments with the hole location, and has found that the best location is a little downward off the horizontal. I suppose that the optimum location depends on shape and dimensions of the venturi, and has to be found by trial and error.

Figure B shows the 'half spraybar' which ends in the middle of the airstream, with the needle entering from the opposite side. This reduces somewhat the area of the 'disturbing' spraybar. One step further is the method shown in figure C. Here we already have a true venturi, which is again shown in figure D, only with a different way of mounting the needle valve. In figure E the 'sprinkler' type venturi is shown. Usually a groove is cut around the venturi with multiple holes providing the fuel supply. This type is usually found on Cox engines and has proven quite satisfactorily. Figure F shows the typical Super Tigre version with that sharp edged step at the inlet. Nobody knows what it is for! Scott has had problems with this type, and Eric Janssen reports a reduced tendency

of the engine to return to four-stroke. Super Tigre also built a version with a step downstream from the smallest diameter.

Cones

The American Bob Baron builds his venturis with a simple conical inlet and outlet. He says the cone shouldn't be wider than ten degrees angle. Scott recommends the angle of the downstream cone to be not larger than fourteen degrees. Now, this makes for a relatively long venturi. However, that's no mistake. It's generally accepted that the long inlet - as shown in figure G - improves suction. It's quite obvious that on a very short intake opening the air is still quite turbulent when hitting the spraybar. With a long inlet the air has more time to form a smooth flow, thus allowing for easy setting of the needle, and producing better suction. The same goes for the downstream part of the venturi. Here Eric gives another reason to make that part long.

You'll probably have noticed that sometimes the engine likes to spit fuel out of the venturi. Because of the extreme port timing in modern Schnuerle engines a high pressure wave can reach the spraybar when the intake port is opened. Of course this is exactly what we don't want. With a long distance between spraybar and crankshaft we can reduce this effect. Eric recommends a minimum of 20mm.

Finally, in figure H you see the venturi design by Jaco de Ridder which Eric Janssen and Henk de Jong have used so successfully for the past couple of years. I am told that the parabola shape was computer calculated. The step downstream of the multiple jets is supposed to create a very good mixture of the fuel with the air because of the induced vortices. Only a thoroughly mixed gas provides a uniform combustion, hence smooth and reliable running, and a long engine live.

Not shown in the drawings is the venturi type with a simple hole of equal diameter from top to bottom, as it can be found in

some older engines. Eric has had problems for about three years until he found out it was this type of venturi. It can still be found in the RC carburetors of a certain brand where a simple hole is drilled into a metal block, with no attempt at a smooth entry. I wonder how it works...

The spraybar location has still another effect. Since our tank usually has a height of 25mm or more, the centreline lies 12,5mm off the engine bearers. Now we wish to vary the vertical tank location according to the requirements of a symmetrical engine run (upright and inverted). With a spraybar location too close to the engine bearers we might run into problems when it comes to shifting the tank level. The engine bearers might be in the way.

More than meets the eye

It's quite obvious that there's more to venturi design than meets the eye. Most of us still prefer that typical four-stroke/two-stroke break. For this characteristic it's presupposed that we have a smooth and reliable engine run at a rich mixture setting. The venturi is responsible for that. Additionally it controls power, fuel consumption, and the tendency of modern Schnuerle engines to 'run away' (that means the reduced ability to return to four-stroke after the break into two-stroke).

When making venturis some consideration should be given to the material. We can make it from metal (aluminium) or plastic. Metal may get hotter and may heat up the incoming fuel, but I don't know whether the effect is big enough to be worth caring about. Plastic is easy to work with, but it shouldn't be too soft to take threads (if you wish to do so). Also, the fixing method with a clamp screw *a la* Super Tigre doesn't work well with plastic. Important point: it doesn't gleam as pleasantly as polished metal!

So - choosing the venturi diameter depends, of course, on the venturi type, respectively spraybar thickness. Since it's not so easy to find a suitable spraybar for



us these days, it's recommended to look for the spraybar first, then decide on the venturi type and diameter. To make it easier for you, I've included a chart which contains the cross section area for several diameters, plus the actual choke area for a number of combinations with four popular spraybar thicknesses. For the raw beginner I've added a rough subdivision of intake areas according to several engine capacities. The correct venturi dimensions are always a balance between the requirements for power and suction, a compromise that can only be found by trial and error. That means: flying!

I hope your venturi will vent well...

The de Ridder system

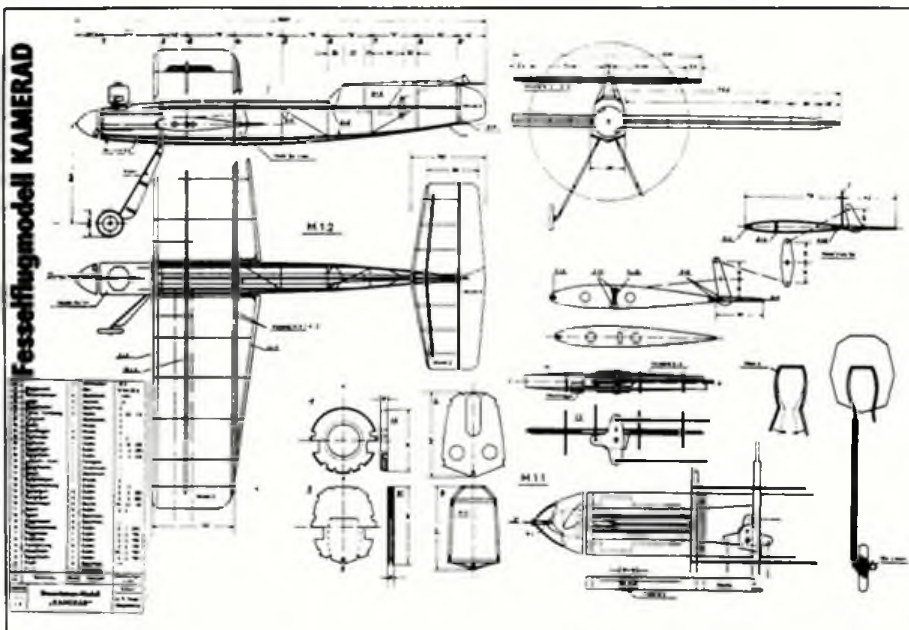
In my venturi story I've mentioned a venturi system manufactured by De Ridder, from the Netherlands. The Dutch flyers Eric Janssen and Henk de Jong have used this system for several years, and they swear by this product. When top class flyers like these two recommend an item, you're well advised to take a look. I bought a set.

I can confirm that this is a well-thought-through item of excellent workmanship. The set consists of four venturis one spraybar/

Above: The de Ridder venturi system; worth trying, advises Claus.

collector ring assembly, one sleeve, and one O-ring. The air inlet has a trumpet like shape. The curve of the section is a computer calculated parabola, so I was told. The diameters range from 4.5, 4.6, 4.7 to 4.8mm.

High-tail stunter from Modell bau Heute is a bit unusual. Double-bellcrank system converts control movement. Don't see many polygonal fuselages, either...



Actual choke area (mm²) with spraybar thickness of

Venturi diameter mm	venturi area mm ²	3	3.2	3.5	4
7.2	40.7	19.1	17.7	15.5	11.9
7	38.5	17.5	16.1	14	10.5
6.8	36.2	15.8	14.5	12.4	9
6.7	35.2	15.1	13.8	11.8	8.4
6.6	34.2	14.4	13.1	11.1	7.8
6.5	33	13.5	12.2	10.3	7
6.3	31.2	12.3	11.1	9.2	6
6.2	30	11.4	10.2	8.3	5.2
6	28	10	8.8	7	4
5.8	26.4	9	7.9	6.7	
5.7	25.5	8.4	8.3	5.6	
5.6	24.6	7.8	6.7	5	
5.5	23.7	7.2	6.1		
5.4	22.8	6.6	5.5		
5.3	22				
5.2	21.2				
5.1	20.4				
5	19.6				
4.5	15.8				
4	12.5				
3.5	9.6				

Recommended choke areas for given engine capacities

engine capacity	choke area in mm ²
60	12-16
45	12-15
40	11-13
35	10-12
25	9-11
15	8-10
09	5

Fuel delivery is through three peripheral jets in the fuel groove. Downstream from the smallest diameter there's a sharp edged step which is supposed to improve the turbulence of the airstream, providing a thorough fuel/air mixture which is so essential for power and smooth running. The needle valve assembly contains a fuel nipple which can be rotated and fixed in any desired position. The whole assembly mounts to a collector ring which covers the fuel groove.

As delivered the lower venturi outer diameter is made to suit the Super Tigre .46 (12mm). With the included sleeve slipped on, the outer diameter is 14mm and will fit the ST 60 and Como 51.

For these engines, you'll have to enlarge the diameter, of course.

In these times when control line engines are hardly produced any more, and venturis and spraybars hard to find, this is a high quality product many of us have waited for. All parts are available separately, but for a starter the whole set is a sensible investment. Prices are really acceptable, so this shouldn't keep you from acquiring this outfit. You cannot make it yourself at this price.

For information write to:
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THE SKY'S THE LIMIT!

AN INTENSIVE model rocketry competition was a key part of Britain's first ever Space School.

The students at the school had four days to learn rocketry from scratch and then build two or three rockets to competition standard during the scant free time available. On the fifth day they assembled on a large playing field, converted for the day into a launch site. With reporters and camera crews joining the staff as spectators, the students handed over their rockets one by one to be launched.

Space School was held in the last week of July at Sevenoaks School in Kent. This innovative summer school was attended by around 100 pupils, mainly sixth formers, from throughout the length and breadth of the UK. It was directed by Rodney Buckland, an engineer who is also involved in insuring space leaders and steer them toward careers with a space orientation.

This is to be the first of an annual event. Next year the school is to take place over two weeks. Students from across Europe are to be invited, swelling the roll to 200.

What's on

During the five days of this year's school, the students' lives were organised from breakfast at 8am in the morning until 9:30

Britain's first Space

School - Mark

Patterson examines the rocketry syllabus



in the evening when the last lecture finished.

Experts from both the academic and commercial spheres came to lecture on the science and enterprise of space. The students made field trips to local centres of space research.

Recreational activities included a Space Masterminds quiz, held over five days, and 'Newton the Musical' by Principia Players, a company of volunteers from Sevenoaks School staff who take their name from Isaac Newton's seminal work, 'Principia Mathematica'.

The hour before and after the organised activities of each day was allocated to free time options — work in the computer lab, watching videos, investigating possible courses and careers, and working on the rockets for the big competition on the closing day.

For rocketry, the space cadets were divided into teams of five and worked under the guidance of three members of the British Space Modelling Association (BSMA). Each team entered one of the three events staged — streamer duration, spot landing or egg loft — and was expected to have two or three rockets ready for launch by the end of the week.

These events are standard in BSMA competitions. In the streamer duration event, the



Main picture: This team painted their egg-lofting rocket in the livery of British Aerospace, one of the event's main sponsors. **Top:** Stuart Lodge of the BMFA launches yet another rocket with Charlie Braham at the control desk.



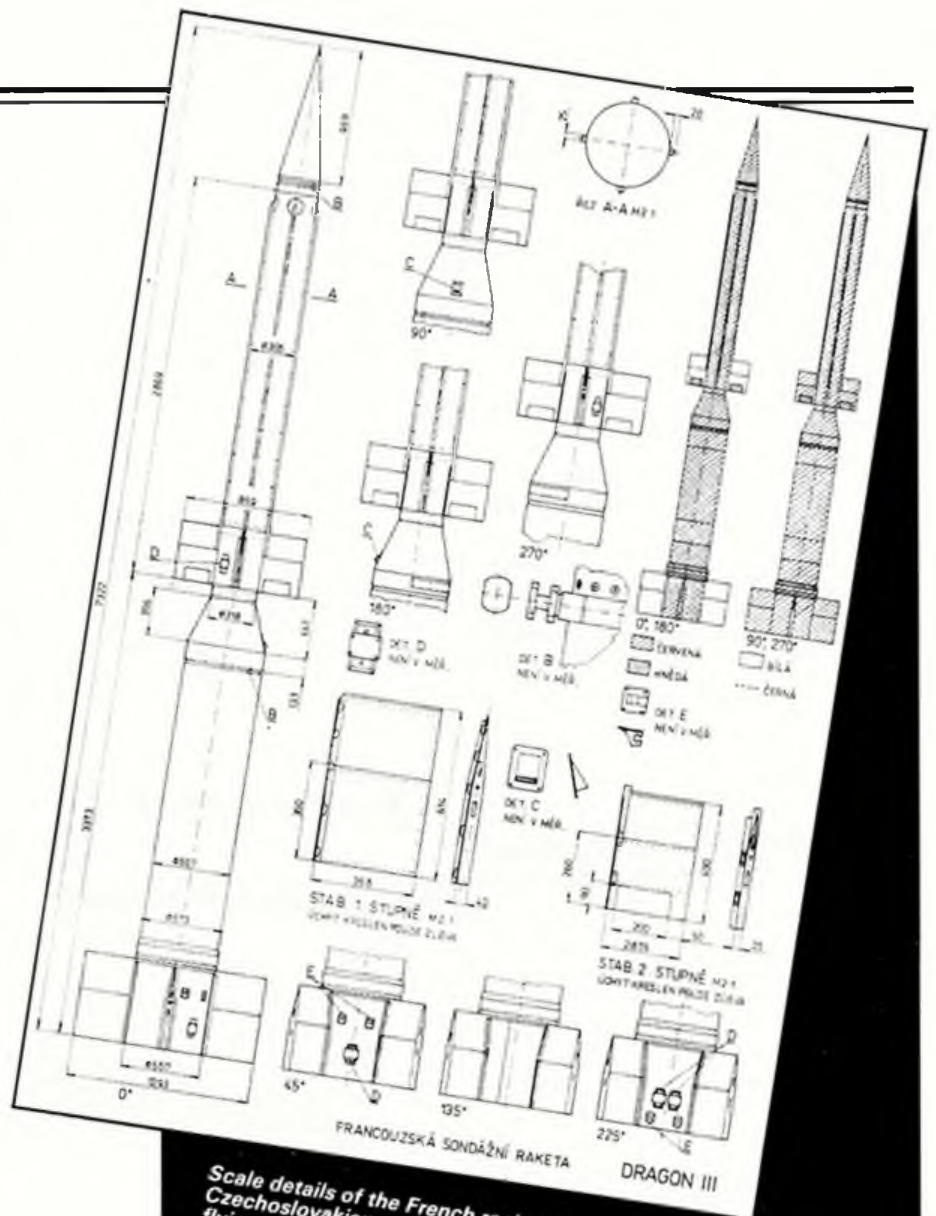
object is to achieve the most time on the stopwatch timing the flight. The rate of descent is reduced by streamers thrown out by a charge in the rocket motor, set off when the propellant is exhausted.

In spot landing, the rocketeer marks a spot on the ground and scores points for how accurately this spot predicts the place where the rocket falls.

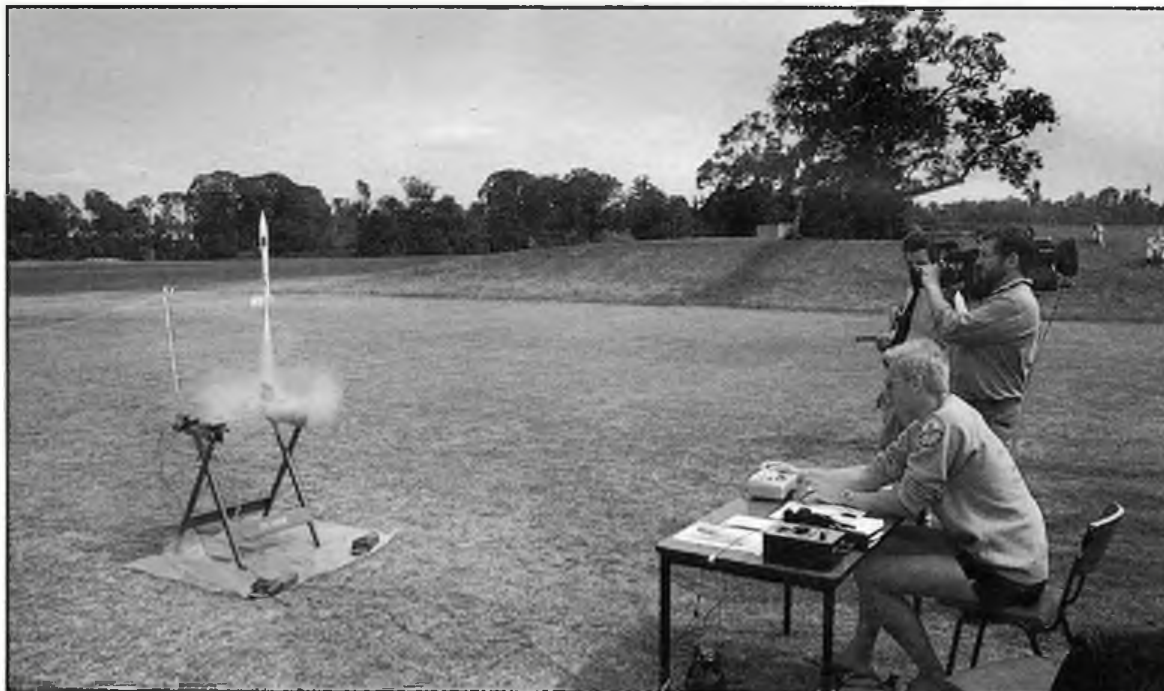
In egg-lifting, the top of the cylinder is loaded with an unbroken raw egg and a parachute is packed in. The object is to land the spent rocket gently enough for the egg to remain intact.

Mixed cries of pity and jeering greeted one of the unsuccessful egg-loft builders when his rocket was opened by one of the BSMA members for inspection after a dubious WD2/landing. Out flowed a clearly visible stream of egg goo onto the ground. Others, however, were cheered as the inspector announced a good egg.

This is the first time model rocketry has been used in Britain as an educational tool, although it is used in high school physics courses in the US. The BSMA members that I spoke to are keen to see more schools capitalise on young people's natural enthusiasm for this technically demanding and exciting activity. Quite right, too.



Scale details of the French rocket Dragon III come from the Czechoslovakian magazine Modelar. Who'll be first with a flying model?



Top left: Trevor Sproston fits a young competitor's rocket onto the pad. Left: The event was featured on TVS - here's filming in progress. Above: Vostok on the egg-lifting pad.

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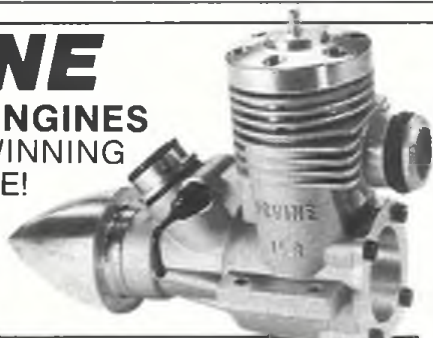
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It is over 50 years since tissue and dope was first used in place of oiled silk as a lightweight covering material for model aircraft. Since then model aircraft design has changed and developed to make the best use of the properties of tissue & dope. In fact, *doped tissue is a very poor, shoddy material* - it is weak, brittle and punctures easily, dope shrinkage often pulls airframes out of shape or gives that 'starved horse' look, and it is badly affected by fuels, especially glowfuel. Colours fade quite quickly. About its best point is that it is cheap! But after spending hours building a model we have often felt that it deserved more than a 'cheap' finish.

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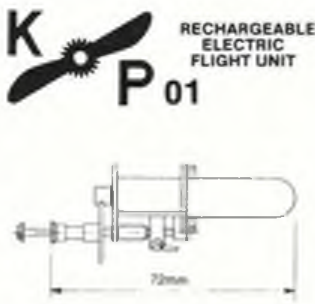
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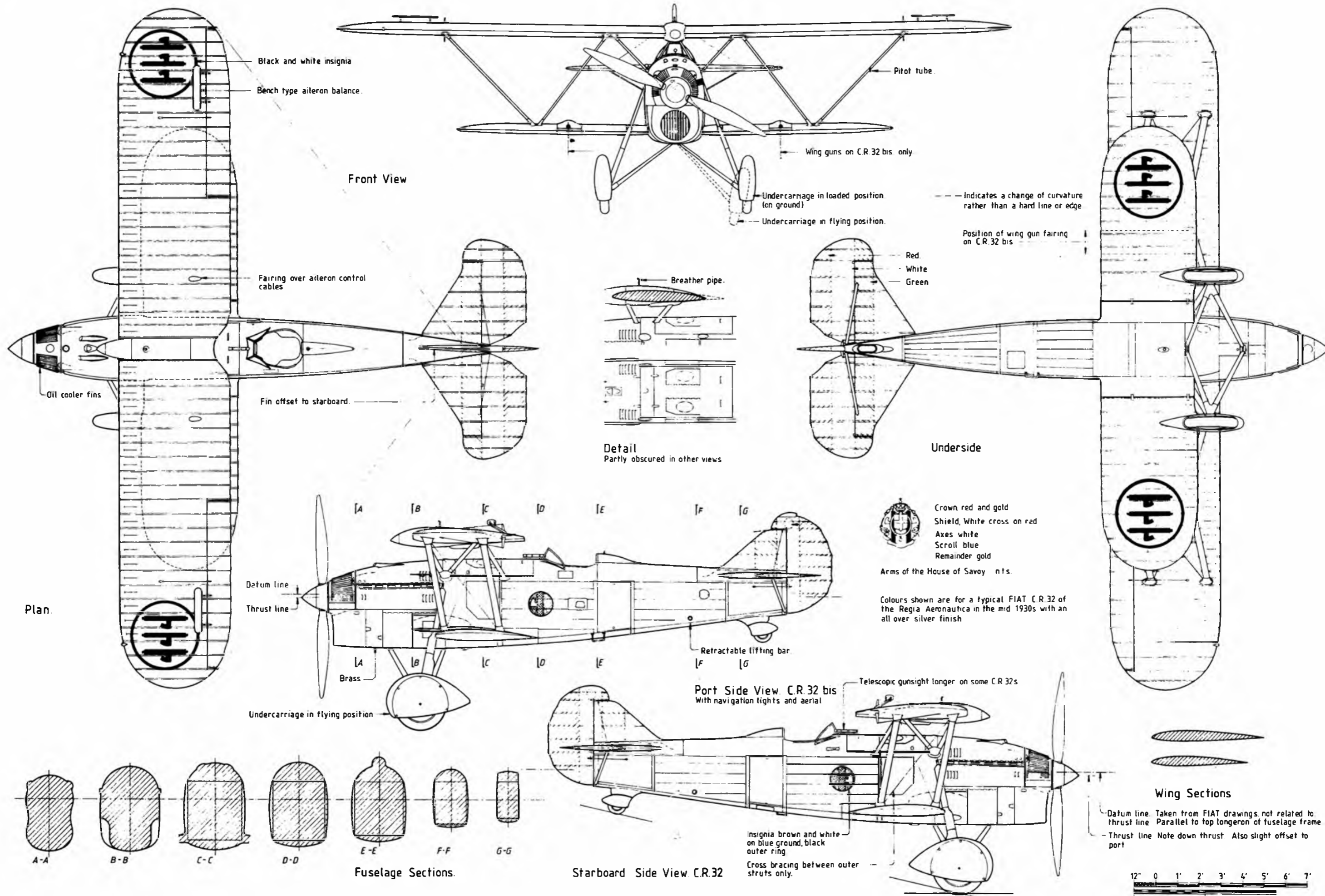
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FIAT FIGHTER CR32 by Mike Green

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FIAT CR32 Aircraft Described by Ron Moulton

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