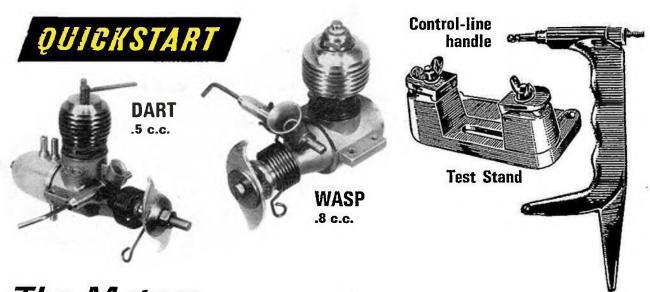
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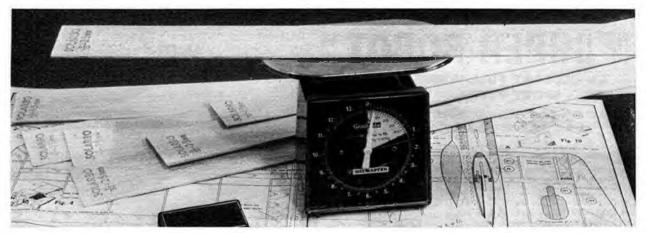
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SOLARBO

DATA SHEET

SHEET BALSA



Probably your local model shop does not stock all our standard sizes of Balsa (after all, there are more than 100!). So we have been asked to publish a full list in our advertisements. But we thought we could do something more useful than that by listing standard sizes and weights in a series of Data Sheets. This is the first, covering standard 36in. long sheet sizes.

Since most of you will probably use a letter balance for check-weighing sheet and the Post Office has gone 'metric' we have calculated weights in grams for soft, medium and hard Balsa conforming to our own grading.

Because the weight of sheet Balsa can be very important at times, we have also included weights in ounces for extra-light Balsa (6lb density); and also for the top end (12lb density) where 'hard' grade starts. It so happens that these two densities give simple ounce-fraction weights.

We hope aeromodellers will find these Data Sheets useful. Next month we will be covering Solarbo Rib Stock and 42in. and 48in. long sheet.

36" She	eet	(6 lb)	soft			medium	(12 lb)	hard	ı	
1/32" x	2"	(1/8)	5	or	under	6	(1/4)	7.5	or	over
×	: 3"	(3/16)	7.5	11	- 11	9	(3/8)	11	11	11
×	4"	(1/4)	10	41	"	12	(1/2)	15	11	11
1/16" x	2"	(1/4)	10	11		12	(1/2)	15	11	41
×	3"	(3/8)	15	11	u	18	(3/4)	22.5	ŧI	12
×	4"	(1/2)	20	11	11	24	(1)	30	11	11
3/32" ×	2"	(3/16)	15	11	11	18	(3/4)	22.5	п	11
×	3"	(9/16)	22.5	н	11	27	(1 1/8)	33	t1	11
×	4"	(3/4)	30	11	11	36	(1 1/2)	45	ti	11
1/8" ×	2"	(1/2)	20	н		24	(1)	30	11	16
×	3"	(3/4)	30	11	**	36	(1 1/2)	45	17	11
×	4"	(1)	40	н	11	48	(2)	60	11	п
3/16" ×	2"	(3/4)	30	11	16	36	(1 1/2)	45	11	82
×	: 3"	(11/8)	45	11	11	54	(21/4)	66	11	11
×	4"	(11/2)	60	Ħ	11	72	(3)	90	11	41
1/4" ×	2"	(1)	40	н	11	48	(2)	60	11	11
×	3"	(11/2)	60	11	11	72	(3)	90	11	11
×	4"	(2)	80	11	11	96	(4)	120	11	11
3/8" x	2"	(11/2)	60	Ħ	11	72	(3)	90	Ħ	H
	3"	(21/4)	90	#	п	108	(41/2)	135	11	11
×	411	(3)	120	11	11	144	(6)	180	11	11
1/2" x	2"	(2)	80	11	11	96	(4)	120	11	11
	3"	(3)	120	H	11	144	(6)	180	11	41
×	4"	(4)	160	II	11	192	(8)	240	11	11
	2"	(3)	120	н	11	144	(6)	180	11	ti .

Weights in grams
Weights in brackets () are in <u>ounces</u> for
6 lb (soft) density and 12 lb (hard) density.

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Comment

Since its inaugural meeting at Cranfield in 1970 Control Line Scale at World Championship level has always struggled to attract entries. This year insufficient entries have come forward to make the minimum of 5 required for an official World event so the Woodvale meeting was reduced, demoted or whatever one cares to call it, to mere International level. A sad blow to control line scale modelling. The reasons for lack of support have been practical, financial and political. Countries short of funds and what they judge to be minimum modelling standards prefer to concentrate on other more competitive and better supported classes of model flying. Politically, some Nations dictate that they cannot support events in which South Africa is competing. Yet it is a FAI requirement that all member countries be invited, thereby including South Africa. Politics aside, we are not aware of any aeromodelling apartheid existing in South Africa. In fact we have seen the opposite. It is a pity that such philosophies should affect the sport of model flying.

on the cover

AI Rabe holds his US NATS winning Mustang VI and the Jim Walker Trophy that he won. Turn to the centre spread for the full story of the amazing development of these fabulous scale-like aerobatic models.

next month

World Championships Report on Scale and Control Line models, held here in England at Woodvale. News on the NEW World Champions, their models and the contests. How do models fly, more help on basic aeronautics. Trade reports on latest modelling goods, accessories and kits. Plus up to the minute news on all types of model flying activity. On sale September 16th 1978.

Getting the best from

Two of MAP's leading monthlies combine talents to produce this invaluable publication aimed to appeal to all types of plastic kit modellers of all ages. With the accent very much on 'how to', this one-off is designed especially for beginners and newcomers to the world of plastic kits, it does not therefore, assume the reader necessarily has any previous knowledge or experience and in this way it provides a really firm foundation of modelling experience for the hitherto uninitiated.

There are chapters on 'Getting the best from PLASTIC KITS' to cater for most tastes, including notes on the tools required, general techniques and more extensive features on getting the best from AFVs, aircraft, ships, figures, cars and trucks, not forgetting of course, notes on vac-form modelling. A series of 'Conversion Courses' explain converting and customising a wide cross-section of standard kits, and with numerous full colour illustrations, scores of black and white photos, plus many diagrams and sketches, the Special's emphasis falls fairly and squarely upon visual easy-to-follow reference. Destined to become a best seller this Special issue is published on 11th August 1978. Make sure you reserve a copy now!



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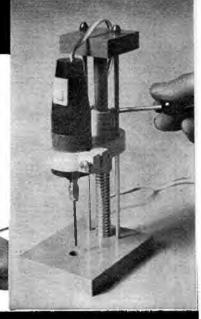
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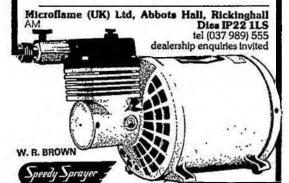
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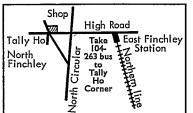
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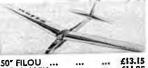
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SEE THEM ALL AT YOUR MODEL

Heard at the HANGAR DOORS

HELLO SPORT. British model flying took a great leap forward at the end of June and caught up with most other countries, when the Sports Council announced that the sport was to be recognised for grant aid.

This follows some eight years of patient effort by SMAE negotiators; it will give a big boost to the prestige of all model flying in the United Kingdom. Early indications are that the Sports Council will give financial assistance for travel costs for all British teams representing us in World and European model flying championships, as well as helping with the essential organisational expenses of World Championships held in Great Britain. This of course, emphasises the importance attached to the competitive spearhead of any sport as far as public acceptance is concerned, a point of which the Sports Council is obviously aware.

The benefit that this encouraging move will have for the 'average flyer' is immense. Now officially a 'sport' aeromodelling has at last taken its rightful place alongside football, gliding, fishing etc. This will be of great help whenever local and regional Sports Councils are concerned with flying fields. It is now even more important to ensure that all branches



Part of a collection of over 100 scale models reference books and other modeling material being offered by Mrs. Pat Albright of Horton, Northants. to any museum club or society, in memory of her late husband. Finance so generated, will help fund research on Lukaemia. Offers to AeroModeller.



David Cyster with his wife Cherry admiring a model replica of the Tiger Moth in which he flew solo halfway round the world to Australia. The aircraft has since returned to British shores and will appear at numerous airshows throughout the year.

of model flying are represented by capable delegates on local Sports Council or Regional Conference of Sport.

For recognition and grant aid to be given it is an essential Sports Council requirement that a team is selected by the national governing body for the sport

body for the sport.

This, as well as the administration of all model flying in the United Kingdom, is one of the responsibilities that the Society of Model Aeronautical Engineers has always undertaken for all British model flyers.

If you have hesitated in the past, then now is clearly the time to join your Society and take full part in Britain's newly-recognised sport — model flying. For details of membership send to: Mrs Mary Horwood, 21 Burghley Road, St Andrews, Bristol 6.

CHANGE OF EXHIBITION TITLE It has been decided to change the title of the forthcoming major new model engineering exhibition sponsored by Traction Engine Enterprises & M.E. Specialist Publication Supplies, and hosted by the Leicester Society of Model Engineers Ltd. The exhibition, which will be held at the Granby Halls, Leicester, from 20th to 28th October 1978, is presently titled "1st National Model Engineering Exhibition" and the title is to be changed to the "1st Midlands Model Engineering Exhibition". The reason for the change of title is to avoid any possible confusion with the "Model Engineer Exhibition" to be held at the Wembley Conference Centre from 4th to 13th January 1979.

The organisers state that the change

in title is not expected to have any adverse effect on the contents or scope of the exhibition and the anticipated 1,000 exhibits will still be drawn from all parts of England, as will be the numerous trade exhibitors.

The exhibition is to be devoted exclusively to the hobby of Model Engineering and it is intended that both the exhibits and trade exhibitors will reflect this aim. It is hoped that this exhibition will become an annual event in the model engineering calendar.

MODEL FOUND. A very neatly built model of a Piper fitted with R/C equipment has landed safely in a back garden in Debden. No doubt the owner must be anxious to claim his model back which he can do by phoning us at Aeromodeller.

WINSTON-SALEM HOBBY PARK was the venue for the recent USA Control Line Championships. The Hobby Park is a city owned facility for flying model aeroplanes including two 160ft diameter asphalt Control Line flying circles, paved runways for Radio Controlled Models and grassed flying areas for Free Flight and general purpose flying. The site includes rest room amenities and concession trade stands. The facility is open to the public but users are naturally encouraged to join the AMA's 60,000 strong membership. The local Golden Triad Model Masters club give demonstrations and flying lessons to interested newcomers. Winston-Salem a famous name for tabocco, proudly boasts of having the finest model airplane flying facilities in the Southeast States.



Clarkson/Woodside, Britain's World Championship hopes.
Top at the Trials plus New British record with a 10km heat in 3:50 secs.

Dave and Jim with a Nelson Sprint, a development of their earlier APS Simple Sprint, designed around the powerful Nelson ISD engine. Kit box contains spare models.

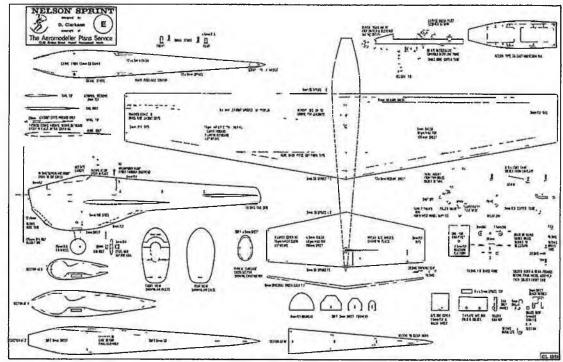


Introduction:
Judging by the FAI Team Race scene in this country over
the last few seasons, it would appear that my original
Simple Sprint published in October 1974 Aeromodeller
has proved to be one of the more popular APS FAI Team
Race plans. The plan shown here – the Nelson Sprint – is
the latest in the Sprint design series and represents my
current 'state of the art' incorporating all of the developments made to the original design. Primarily, Nelson
Sprint, as the name implies, is intended for the Nelson
15D Team Race motor. However, I am sure that other
rear-exhaust TR motors such as the Rossi 15D FI or RV
would prove equally suitable if not quite as potent as the
Nelson 15D has proved. As an indication of the potential
of this model, one of its predecessors at Cranfield in
September 1976 using Rossi 15D FI power took the UK
Heat Record with a 4:03 heat followed on the same day
with a near record 8-18 final and there is no doubt in my
mind that an out-of-the-box Nelson 15D gives significantly
greater potential – would you believe, a heat time
potential of around 4:00? In fact, since its conception it
has produced Top Team Place at the Trials and a new
British record time of 3:50 at the NATS . . . !

Infinitely preferring flying to building, as I do, the design has developed to incorporate a high degree of commercially available parts and has not, when compared with the original Simple Sprint become significantly more difficult to build despite the considerable degree of aerodynamic improvement that has taken place over the years. So, down to the nitty-gritty with the building followed by

a few words on motors, props and fuels. Wing and Tail

Do the easy bits first so as to get in the 'mood' for the job. The wing is based on one piece of 4in. x \(\frac{3}{8}\) in. balsa sheet; to give an acceptably light wing, this sheet must not weigh more than 2.50z (70gm) and must have a long, uniform grain. You should be prepared to do a lot of searching for such a sheet! Wing assembly is entirely conventional including, I hope by now, the 'make it easy' lead-out groove method last published in the 1977 Control-Line Aeromodeller. Once all is together, (you didn't forget to fuel-proof the leadout groove), shape with a razor-plane and sanding block to the aerofoils shown—note that the ply wing tips should be pre-sanded to the tip aerofoil and then glued to the wing blank prior to shaping the wing (carefully align these tips), the tips act as perfect tip aerofoil guides in shaping the wing. Once shaped, fine-sand smooth and carefully de-dust using a tack-rag or similar. Now you can write onto the bare balsa using a fibre-tip pen your SMAE number and any other 'endearments' you may want, and then the wing can be glass.



Full size copies of this 1/7th scale reproduction are available as Plan CL1351 price £1.35p +20p postage. Export orders may be obtained through appointed agents price £3.00+40p postage (§5.25 US) or directly by post (add 50% to order value for Airmail) from Plans Service, PO Box 35, Bridge Street, Hemel Hempstead, Herts HPI IEE.

cloth covered. Lay the cloth over the bare balsa with the cloth weave at 45° to the grain of the wood and then carefully brush on one coat of Ripmax 'Tufkote'. When dry, sand off the excess cloth and rub down just a little (a bit of a rub only – just enough to remove dust etc.). Recover the outboard wing only and rub this down. Now apply 2 additional coats of 'Tufkote', rubbing down between coats and you have your finished wing. Nice and stiff isn't it! – that struggling to keep the glass cloth weave at 45° to the wood grain is really worth it. (See this months From the Handle.)

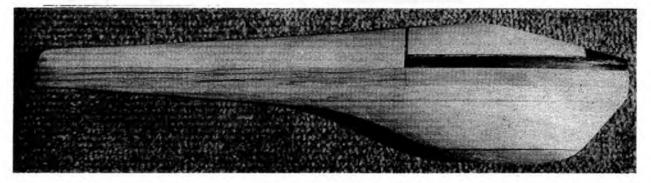
Tail construction is as for the wing. The only 'trick' comes in the hinging of the elevator. I have found R/C plastic hinge tape perfect for the job — just make a knife slot for the hinge tape, insert the hinge and apply a couple of drops of cyanoacrylate type 'instant' glue and zap! job done. Do the elevator removal and hinging after cutting and glueing in the 'V' dihedral and then covering the complete tail with one layer of glass cloth, it is easier this way. After hinging the elevator back to the tail, the

finishing coats of 'Tufkote' can be applied and you will get a super-neat tail.

The Fuselage and Model Assembly

The difficult part, for me anyway. The fuselage is designed around the best pan currently available – the Nelson Magnesium pan. The pan should be drilled and tapped as shown on the plan if you are using the recommended Nelson 15D motor – for just US \$2.00 Henry Nelson will do this for you when you order your pan. The model crutch is made up from ½in. sq. Ramin (African Hardwood) or Obeche strip and ½in. x ¾in. spruce strip plus balsa cross-braces as shown on the plan. I shape the Ramin strips to their outside profile using a hack saw and razor-plane before assembling the crutch. Then I offer up the pan to the crutch and drill the crutch through the pan for the pan hold-down bolts. With the hold-downs centred, these holes can then be enlarged by drilling to accept the tapped dural hold-down studs. Now 'Araldite' the hold-down studs into the crutch using the pan and hold-down bolts to pull and centre the studs accurately in

Fuselage assembly carved and sanded to shape before fitting to wings. Central spruce and ramin crutch fitted with Nelson 2A cast magnesium pan with upper and lower blocks of hollowed out soft balsa just tack glued in place.

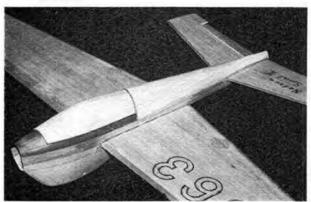


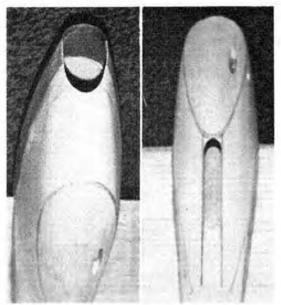


Ramin and Spruce crutch fitted to wing and tail and controls installed. Dural studs are for pan hold down bolts. Temporary balsa spacer at front used during construction.

place (do wax the hold-down bolts most carefully if you want to get them out again!). Whilst the Araldite is curing, assemble the front and rear fuselage top covers and the lower fuselage including the pod and pod floor as three complete units except for external shaping. Note that the pod internal walls should be finish shaped and covered with glass cloth using 'Tufkote' after installing the 'wobbly-wheel' undercart box in the inboard pod side but before final assembly of the pod. With the crutch completed including shaping to the front inside profile, bolt the pan back in place and tack-glue (little blobs of glue every 40mm or so) in place the remaining parts of the fuselage. Well on with the job now, so take courage and shape the fuselage to its final profiles. Now grit your teeth and carefully, using a knife-blade, split off from the crutch and pan the fuselage tops and bottom. Next step is to 'Araldite' in position the wing and tail - be very careful in aligning these 3 items together before the 'Araldite' has cured; it will be too late afterwards and mis-aligned flying surfaces fly badly never mind the looks. Once the wing/tail/ crutch unit is completed, install the push-rod and shut-off trip wire clip and 'Araldite' into the front bulk-head of the

Assembled Nelson Sprint, name and SMAE number written with felt pen prior to covering with glass cloth. Cockpit yet to be added.





Left front of engine bay opening for shaft and air inlet, wobbly wheel box lower right. Right, rear view of air exit, outlet faced with .8mm ply.

rear top cover the nylon 'Oddy blob' (see March 1978 Aeromodeller). You can glue the fuselage together now for the last time after removing the excess wood from the rear of the bottom and fuel-proofing all inside and then do the final wood removal and shaping inside the nose to enable your motor to fit neatly — whilst at this, get the tank and shut-off installed too.

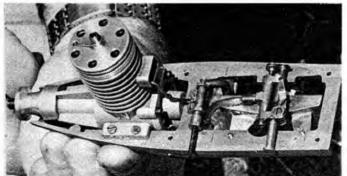
Up to the covering stage at last. Cut two rectangular pieces of glass cloth large enough to cover each side from the top of the fuselage to the bottom plus a bit and then slit these pieces so that they will slide neatly over the wing and tail. Apply these pieces one at a time to each side of the fuselage after sanding super-smooth and de-dusting the fuselage. To apply the cloth, smooth it onto the fuselage and carefully brush through with either 'Tufkote' if you want a clear finish or Humbrol 'Epoxycote' if you want a coloured finish. With 'Tufkote' it takes one coat to apply plus two to finish (gently rubbing down between coats) but with 'Epoxycote' only two coats in total are required.

The final finishing operations are quite conventional—like installing your carved and painted balsa 'pilot', the top cover windscreen and hold downs, undercart etc. Do make sure that everything — controls, shut-off, motor controls etc. — works; now is the last time to do any corrections. The finished model should weigh no more than 450gm and preferably 430gm; the CG should be on or no more than 5mm behind the wing leading edge. Heavier and/or more rearward CG models will prove less than satisfactory.

A really slick looking plane – ugly? maybe, but slick! This is a contest model after all.

Motors, Fuels and Props

A short paragraph on what is perhaps 80% of the content of team racing. The Nelson Sprint is specifically for rear-exhaust motors i.e. it features full Larsson-Rylin cooling. I very much doubt whether side exhaust motors like the BUGL will be suitable without major revision of the cooling arrangements on the model (the APS 'Klotz-norutski' is a BUGL model). Of the rear-exhaust Team Race motors currently available, the Nelson 15D is the best straight out-of-the-box. World class performance is



The heart of model assembled from commercial parts, Nelson 15D using Oliver prop driver. Note extra needle valve which controls exhaust prime. Shut off and filler valve from North West Model Supplies.

available without modification and that cannot be said for any other rear exhaust motor. With either a lot of luck or a lot of work (maybe both) Rossi diesels can be top class too but for the relatively small extra cost of a Nelson 15D over, say, a Rossi 15 RVD plus the Nelson's out-of-the-box usability, the Nelson is the wise choice. Thus all of the plan details are for the Nelson. Henry Nelson issues very comprehensive instructions with his motors and, despite his modest disclaimers, his advice on running-in, fuel and maintenance is extremely appropriate. I must say that I have bucked, at using only 5% castor fuel and have stuck with my Metkemeijer influenced formula of:

Ether		• •		38%
Paraffin				54%
Castrol 'M'		• •		8%*
Iso-propyl Nitrate +		• •		11/2%
(*any more than this is unnecessary)				

A word or two on exhaust primers. My experience is that, whilst an exhaust primer is not absolutely necessary

especially with a 'tight' motor, the installation of an exhaust primer definitely helps with the starts – using the primer is the only way to get reliable 1 to 2 flick starts and re-starts. The exhaust primer is easy enough to arrange off the tank overflow, so why not use one. Silver solder a side-branch onto the overflow pipe; the side-branch is the vent and the straight run goes to the primer. In my view it is essential to have a needle valve in the primer arrangement for the amount of prime required is small and finding the right amount of prime is tricky without having a needle valve in the system. You should find that the OS 10 R/C NVA is ideal for the job although a modified ST item is quite satisfactory as the photo shows.

ST item is quite satisfactory as the photo shows.

Props: Bartels, John Gray, Tribe and so on! Maybe the Bartels 'Metkemeijer' in Carbon Fibre is still the best but I tend to prefer the Tribe 'Petersen' epoxy/glass prop because it seems almost if not as good but is quite a bit cheaper. Thin blades, plenty of diameter, balance and consistent pitch are essentials. Get a good pitch gauge and a good prop balancer, for without them you will get absolutely nowhere. And be prepared to do a lot of work

in finding the best prop for you.

Flying
The Nelson Sprint flys as good as most other models and a lot better than many — neutral characteristics, grooves well etc. This is essential nowadays, for the rules and current levels of performance make Team Racing a tough game. My advice is to fly a lot. Yes, practice (purposeful practice, note) is essential but just as important for pilots anyway is contest flying. Flying is the only way to achieve complete sympathy with your model and team mate and you will only learn that by time, observation, taking criticism and a lot of thought. Sounds difficult doesn't it. But if Team Race wasn't difficult I, and I suspect many others, would not find FAI Team Race to be the intensely enjoyable and demanding event that it undoubtedly is.



Latest Engine News

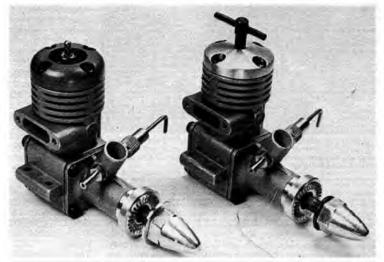
by Peter Chinn

Kingshire Glo-Cat

Last year, a new small British diesel appeared on the market in the shape of the 'Kingcat' 1.49 and a full description of this engine was later included in these columns. More recently, Kingshire Products have introduced a glowplug engine called the 'Glo-Cat'.

As the photos show, the Glo-Cat is basically a glowplug version of the diesel model. Outwardly, the only thing that distinguishes the newer engine is its red anodised cylinder head, with a glowplug, instead of the natural aluminium coloured head and black T-bar compression screw of the diesel. The cylinder length is unaltered, the space normally occupied by the contra-piston, on the diesel, being taken up by increasing the plug-in depth of the cylinder head.

When the Glo-Cat is dismantled, however, several more differences are



The "Glo-Cat" and its diesel predecessor, the "Kingcat". Although based on the same castings, the Glo-Cat has many internal differences.

revealed. For example, it uses a completely new crankshaft. This has a larger journal (0.345in. o.d. rather than 0.312in.) and, instead of having a plain crankdisc, it is counter-balanced by means of a crescent counterweight. It also has a longer crankpin and more generous porting. The valve port, much larger, and rectangular instead of round, considerably lengthens the induction period. while the gas passage through the shaft is enlarged from 0.180in. to one of the cylinder ports are wider and slightly deeper and the piston, despite the addition of a baffle, is appreciably lighter. The cylinder head is machined to clear the piston baffle at TDC and to form a wedge shaped combustion chamber.

A silencer has been introduced with the Glo-Cat in place of the attractive, plated, twin exhaust pipes of the Kingcat. The silencer is a cylindrical expansion chamber, attaches

to the engine's exhaust duct with two screws and accounts for just under an ounce of the all up weight.

The Glo-Cat continues the 0.501 x 0.460in. bore and stroke of the diesel, so the engine's swept volume of 0.0907 cu.in. (1.486cc) is unaltered. Checked weight of the Glo-Cat submitted for examination was 100.5 grammes or 3.540z (slightly lighter than the diesel) or 128.4 grammes (4.530z) with the silencer added.

Like the Kingcat, the Glo-Cat is a nicely made little engine of attractive appearance. One small point. The instruction leaflet recommends operating the engine on a standard commercial glow fuel, but for those who wish to mix their own, it quotes a blend of 80% methanol and 20% mineral or castor-oil, with the option of adding 5% nitromethane. Needless to say, mineral, i.e. petroleum base, lubricants are not suitable since they will not dissolve in methanol.



New addition to the ranks of British made sport engines, the Kingshire "Glo-Cat" 1.49, complete with silencer. Parts on left. Compared with diesel model, it has different piston, cylinder-liner, head, shaft and front housing.



Silhouettes

Several readers replied to our invitation in the July LEN to identify the silhouettes of two early post-war model aircraft engines. Everyone identified the Frog 100 diesel more or less accurately and all recognised the second engine as an Arden, but no one gave a 100% complete and accurate identification, although one

or two got very close. Among the first replies received was one from Peter N. Scott, secretary of the International Model Aero-Engine Collectors' Society, based in Switzerland, whose answer read 'Frog 100 Mk. I Series I' and 'Arden 099 or 199 with diesel conversion head'. Also quick off the mark was R. B. Palmer of Eaton Bray with '1948 Frog 100 Mk. I Series I' and '1946 Arden 099, fixed jet with throttle and diesel conversion head', followed by Mick Wilshere of World Engines with 'Frog 100 diesel, 1947' and 'Arden 199 spark-ignition version, about 1950'. Well known Stockport enthusiast Ron Wilson submitted 'Frog 100, 1948' and 'Arden 099 converted to diesel' and D. A. Tennant of Adlington, Cheshire suggested 'Frog 100 diesel' and 'Arden 199 diesel conversion'. Jim Moseley of Garforth, Leeds opted for 'Frog 100 Mk. I' and 'Ray Arden's diesel

conversion of the Arden 099'.

What we were really waiting for, however, was someone who would remember the name of the diesel version of the Arden and the only reader to do so was Dr R. L. Cottee of London SW14, who replied with 'Frog 0.99cc and D-E Arden 1.62cc conversion from glowplug, both circa

1947'. 'D-E'. This is the essential bit. The D-E conversion was not just some home-made gimmick. It was a professionally designed conversion that was produced by D-E Model Products of Rockville Center, New York and marketed through Berkeley Models Inc. of Brooklyn. It consisted of five parts. A short steel liner, containing a contra-piston, was screwed into the top of the cylinder in place of the regular cylinder head and was then secured by a new screw-on finned aluminium head containing the usual compression screw. Finally, there was a machined aluminium cover which enclosed the crankcase nose after removing the unwanted contact-breaker assembly.

The Arden '099 and '199 engines, designed by Thomas R. (Ray) Arden and produced by Micro-Bilt Inc., of Danbury, Connecticut, were first marketed in 1946. At that time, they had the fixed jet referred to by Mr Palmer. The 'throttle' was an air control. In 1947, this was dropped in

favour of the greater versatility of a conventional air intake and adjustable needle-valve. The .099 engine shown in the photograph is a 1947-8 model, was a gift from the late Ray Arden and is still in our possession. This is a twin ball bearing model. There was also a plain bearing version of the .099, but the .199 was made only as a ball bearing engine. The .099 had a bore and stroke of 0.495 x 0.516in., giving a swept volume of 0.0993 cu.in. or 1.627cc.

The Arden engines were, of course, designed as spark ignition motors and the purpose of the D-E conversion, first marketed in 1947, was to eliminate the weight and complication of the ignition system with its coil, condenser, battery, contact breaker and sparking plug. It worked very well but, in the same year, Ray Arden introduced the first model glowplugs and, within twelve months, practically every American manu-facturer had switched to glowplugs and interest in diesels, never very strong in the US, fell almost to zero. Incidentally, the D-E conversion shown in the photo came from Joe Dale (the 'D' part of D-E) who designed and manufactured it and with whom we have maintained contact ever since - mostly by mail but including a couple of personal meetings. Joe is an engine enthusiast from the very earliest days and has built numerous engines of all kinds, including four-strokes and multicylinder types.

Turning back to our other silhouette, this was, as stated by Peter Scott and R. B. Palmer, a 'Mk. I Series I' version of the Frog 100. In 1946, Lines Brothers introduced the Frog '175' petrol engine and early in 1947 followed it with the Frog '100'. Actually, at that time, it was not



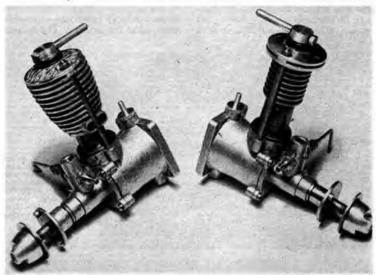
Answer to Silhouette No. 2. 1947-8 Arden 099 with D-E Diesel Conversion. Only one reader, Dr. R. L. Cottee, correctly identified engine as D-E Arden.

known as a 'Mk. I' or 'Series I' but merely as the 'Frog 100'. However, because, one year later, it was superseded by a revised model known as the '100 Series '11' and, also because in 1958, an entirely new Frog 100 called the Mk. II was introduced, the original model is now more readily identified as the 'Mk. I Series I'.

Incidentally, just in case anyone has any doubts about the authenticity of the silhouettes, we should, perhaps, mention that these were produced from actual photographs of the engines concerned.

Silhouette Postscript
Two more readers, Colin Sparrow
of Beith, Ayrshire and Maris Dislers
of Brooklyn Park, South Australia,
have correctly identified the engine
silhouettes in the July issue. Both of
them recognised the Arden as a
'D-E' diesel version and Mr. Dislers
did even better by remembering that
the D-E conversion was made by
Joe Dale, Well done!

Engines from 30 years ago. 1948 Frog 100 Series 11, on left, was successor to original Frog 100 of 1947, on right, which was the first subject of our "Silhouette" quiz in July issue.





Left: Brian Downham with his APS ABC Robin for rubber power. Colourful subject flown well brought Brian 1st prize. Right: Fairey Fox built by Derek Knight powered by Mills 1.3, has beautiful polished aluminium cowlings.

Scale Matters

Alan Callaghan relates all the latest news and views on scale modelling topics

AS THOUGH JUST for the benefit of those attending the All-Scale day at Old Warden Aerodrome, the weather gods made their annual offering very much in keeping with recent years. Clear skies, a very hot sun, and gusty uncertain wind conditions are what one must anticipate at this Bedfordshire venue if one wishes to come completely prepared to enjoy the day. Overall attendance at this particular meeting must have been very close to surpassing previous records, and whilst this demonstrates that scale modelling has an enormous following, it did pose one or two problems on such a relatively small flying field.

Over recent years, the upsurge of interest in small scale models, mostly peanut scale and CO₂ powered subjects, has become very apparent at this meeting, making up at least 50 per cent of the activity. The small scale model is ideally suited to this venue not only from the point of view of the limited space available, but also because they incur less damage to themselves when flown over grass rather than indoors over a

hard floor. In such very crowded conditions as existed at Old Warden the small model fares better again when it has to cope with more full-bore contacts with homo sapiens than with terra firma!

As the models I had with me were FF types I spent most of the day at this side of the field and did not see as much of the CL flying as I would have liked. During one visit to the CL circles I was made aware that the FF fliers were not the only ones having trouble finding enough space to fly. From a distance I had been watching a very large attractive biplane taking off only to see it suddenly cartwheel nose over tail before leaving the ground. Further investigation showed this to be a new model by Peter Miller who had deliberately turned the model over onto its nose when he realised that two small boys had run well into his circle in the line of flight, presumably to get a better view of the take-off!

Damage to the model was confined to the upper outboard wingtip but understandably Peter was somewhat annoyed at the incident. The subject was an American homebuilt aerobatic aircraft known as the 'Mong' Sport, and built to 2½ inches to the foot. Peter had been working very hard to prepare the model for this meeting following a year spent researching scale details. The vivid colour scheme had required almost two hundred feet of masking tape to complete, and the model was powered by a Fox 40 Schnuerle RC motor. Having been unable to locate a published three-view of the type good enough for his purposes, Peter had bought the construction book for the full-size aircraft costing roughly fifteen pounds and from this had prepared a scale drawing to a reasonable size as well as his own model plan.

Other CL models that impressed me included Vic Willson's enormous Hawker Hurricane from the Mick Reeves RC kit, that looked quite majestic taking off from the short grass. Vic mentioned that this model prefers to do three point take-offs, but on this occasion could only do a two-point landing since the inboard U/C leg would not lock down properly on detraction. This particular model can also be flown RC, and in this mode does not require some extra springs to help the U/C retract. The removable springs are used when the model is flown controlline in order to overcome additional centrifugal forces acting on the wheels. Vic had forgotten to replace these when preparing the model, but the resultant landing on the outboard wheel and the inboard wingtip was very gently done, the throttle was cut dead on touchdown and the large model simply swerved into the circle slightly. Right up to World Champs level, retracting undercarriages on CL scale models present many headaches due mainly to centrifugal effects, and it is



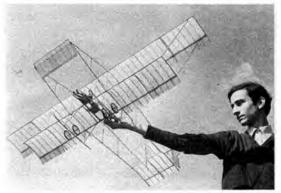
C/L Mong Sport by Peter Miller. 2½ inches to the foot and powered by a Fox 40 Schnuerle R/C motor. Very attractive vivid colour scheme.

a wise man who chooses a subject on which the wheels retract forwards or backwards rather than sideways.

A sight rarely seen was that of Ron Truelove and Wal Cordwell flying together with, respectively, a Boeing F4B4/OS 50 powered, and an Avro Tutor/Merco 61 powered, in the same circle. Combat streamers were not attached, but these were not needed for it still to be an impressive formation duet although rather an odd combination of types. Aircraft, that is!

Amongst other control-liners seen both on the ground and in the air included a 6ft. Britten-Norman Islander by E. V. Westmuckett of Stotfold that was flying very well, and a 60in. Lockheed Tri-star with two OS 35s by Richard Poll from Beccles, What is apparent from the control-line section on this particular day is that there is a thriving interest in scale models, but why is it that most SMAE CL Scale contests continue to be the most undersubscribed events imaginable? Of all scale events this is the most likely one in which it is possible to do well with a modestlybuilt model that is flown particularly impressively, since the general standard of flying even at Nationals level is not very high.

One of the most remarkable machines to be seen was that built by Jocelyn Levy of London. This was a 1:12 scale Bristol Boxkite of approximately 50in. span powered by a geared DC Dart driving a 8 x 6 propeller. The ailerons were pendulum controlled as was the foreplane, and the complete model weighed 15oz. Jocelyn mentioned that the 2:1 geared engine was difficult to start, and I would be rather concerned at how long the gearing assembly would have held together once it was going since only standard Meccano gears were used. The model captured superbly the atmosphere of the real aircraft complete with dummy pilot and the motor in fact in the correct location, and was very neatly made and accurately detailed. Whether the model can be made to fly Bristol Boxkite by Jocelyn Levy powered by a 2:1 geared D.C. Dart driving an 8 x 6 propelier. Model was much too fragile to attempt to fly in prevailing conditions.



properly remains to be seen since under these wind conditions even the fullsize Boxkite would also have been grounded. Scale performance! The problem with this type of subject is that it cannot make a decently banked turn due to a total lack of side area. For this reason many early Voisin types had the areas between the interplane struts covered in so that the effect of this side area prevented the craft from sideslipping into the ground and a correctly co-ordinated turn could be achieved without loss of height. I would think that, assuming the motor can be persuaded to work properly, this model may just be capable of a long, straight powered glide in perfectly calm conditions, but very little else. Nevertheless, it was an ambitious subject, tackled very well, and could hold its ground in any static display if it survives initial test flights and was in fact awarded 3rd place at the prizegiving.

One beautiful scale model that has been around for some time but which has been much too infrequently seen is the Fairey Fox built by Derek Knight from the Portsmouth Club. Made to the unusual scale of 1:9.6 (or $5 \times \frac{1}{40}$), the Fox is powered by a Mills 1.3 and weighs 32oz. Incorporated in the engine compartment is an ingeniously devised diaphragm which, working from exhaust pressure, is arranged via a pushrod linkage to give a very small amount of down elevator on full power, thus holding the model out of a power stall in the initial part of the flight. As the

motor throttles back and stops, the elevator automatically returns to glide trim. All of this is contained within some of the most superblymade cowlings from polished aluminium that I have ever seen. These were made from 20 thou, aluminium which was not panel beaten, but formed over a wooden male mould into a rubber female mould using a vice for pressure. After forming to shape the cowlings were etched down to 6 thou during which process hammer markings from the more normal beating process would have shown up rather badly, hence Derek's pressing technique. The method is shown to work superbly well on this model, and the perfectly detailed fasteners on the panels add even further to the overall effect.

The wing construction is also an unusual departure from normal in that the surfaces are entirely covered in 🚠 balsa sheet, to which is subsequently added all necessary rib-tapes before covering with tissue. As well as adding enormously to the strength of the flying surfaces, this method allows a very realistic and thin trailing edge to be formed without the standard trailing edge balsa stock showing through the covering as with more conventional happens methods. Yet another bonus is that the wings remain extremely straight and flat without any curved dihedral finding its way in as can easily happen with normal open framework and doped surfaces. With very accurately detailed wheels and a scale spinner turned from nylon, this handsome subject has been 'done proud' by Derek, and within the terms of a conventional subject its highly innovative features put it in a class apart.

Amongst a whole van full of subjects consisting of a fraction of the restored P. E. Norman models together with own models brought by Alan Jupp and Mike Holloway, I was intrigued by the two centrifugal ducted fan types by John Coatsworth shown in the accompanying photo by Mike. The larger eight-engined jet is a semi-scale version of the Convair YB-60, and features a removable tail-

Mike Holloway with two renovated FF centrifugal ducted fan models built by John Coatsworth. Convair YB-60 has Elfin 2.49 power and the Vickers Valiant an Allbon Dart.





Mick Oakey's 1/18 scale DH6 for twin cylinder Shark CO2 and rubber powered Curtiss Jenny are seen here held by his father. Very neatly made models.

plane and knock-off wing panels. Mike had built new aluminium impellers for both of these models and the Convair is powered by an Elfin 2.49. The jet efflux is through the rear of the wing roots and Mike mentioned that there was not exactly a great deal of power to spare using this system. This model is approximately 48in. wingspan and the smaller Valiant is about 24in., and powered by an Allbon Dart. On a really calm day they ought to be very impressive since naturally one does not see the impellers when the models are in the air. Incidentally, Alan and Mike are seeking Elfin diesels to keep the 'P. E. Norman' collection going.

Another excellent pair of models I came across during one 'walkabout' were those belonging to Mick Oakey

of Letchworth. His Curtiss Jenny was built to 1:20 scale for rubber power and was good enough to have taken a bronze medal at the Model Engineer Exhibition. At the time of the photo the model had not yet flown and at 21oz it nevertheless felt somewhat 'heavy'. A model of this size and complexity would to my mind be best suited to indoor flying in perfect conditions. I am not sure of the materials Mick used but I would think that had indoor quality wood been used perhaps half an ounce could have been saved which, representing 1 of the empty weight, could make all the difference between good, and only average, flight performance. Mick's workmanship is of a very high standard and the realism achieved particularly around the nose section

and engine cowlings was excellent. Mick's other model was a DH6 built to 1:18 scale and powered by a twin cylinder Shark CO₂ motor, and was yet to have its roundels, fin flashes, and cowlings added. This ideal choice of subject weighed 4½oz but was of a size best suited to outdoor flying. Having not yet tried one of the Shark twin motors I have no idea of its power output but it certainly looked very practical on this model.

Numerous rubber-powered models were to be seen during the day and I was particularly impressed by a Hawker Typhoon built probably from an American Guillow kit which performed several sorties over the road nearby but always to return and land back on the field! I did not manage to note the name of the builder but also nearby was John Coker flying his Me 109 superbly built from a Veron kit and with an extremely neatly applied splinter camouflage scheme applied by airbrush. These two would have made an ideal dogfighting pair had they got together. John's model was good enough to come second in the prizegiving and first prize was taken by Brian Downham's APS ABC Robin built from the Eddie Riding plan but with additional modifications made from information supplied by Richard Riding, who is editor of Aero-



plane Monthly. I believe Brian normally flies radio scale but at least with his rubber-powered Robin did not have to queue up to fly!

An hour or so after the RC flying had been brought to a close a small number of real enthusiasts were rewarded for their patience when the wind dropped to almost flat calm, the sun was still shining, and the field had emptied dramatically. Under these conditions the small scale models really came into their own element and some quite superb flights were to be seen mainly on CO₂ power. David Deadman's SIG 'Mr Mulligan', Flyline Velie Monocoupe, and Hawker Hurricane were putting in flight after flight until when trying to get some formation shots with the two cabin monoplanes, yours truly pushed the 'Mulligan' into the tail of the Velie. Black mark! David's 1:8 scale Sopwith Pup was also flying well but the similarly sized Nieuport was suffering from the gremlins. Another CO₂ model flying superbly was a Sopwith Triplane built but modified from the Veron kit by Peter Waller of Northampton. This was easily the best flying of any triplane I have seen and Peter's clear doped example looked terrific as it circled against the clear blue sky.

If you hope to attend next year's meeting to fly free flight I can

thoroughly recommend planning to stay a little longer. Indoor Scale

Barrie Hotham has made the major contribution to indoor scale flying in 1978 by initiating an Indoor Scale Nationals meeting to be held at Derby Municipal Sports Centre, Moor Lane, Derby, on 29th October, and running from 12 midday until 6pm. The hall is 116ft x 116ft x 30ft and contests will be held for Peanut Scale, Open Rubber Scale, and CO₂/ Electric Scale. Soft footwear is essential and a bar and cafeteria will be available. Further information is available from Barrie, telephone Mansfield 34127, who deserves many thanks for his efforts, without which no major SMAE event of this kind would have materialised this year.

Still on the subject of Indoor Scale I am grateful to Butch Hadland for an account of the Peanut Scale event held at Cardington on 18th June. This event, run by Butch on behalf of the Indoor Committee, was very poorly supported with only six entrants turning up to fly. This is in no way indicative of the general level of interest in this class but probably due to the extreme shortage of any other organised Indoor Scale activities to date. One has to read all the small print in the contest calendars to find one! Most remarkable achieve-



Peter Waller of Northampton with Sopwith Triplane much modified from a Veron kit to take CO₂ power.

ment of the meeting must surely have been Bernard Aslett's flight of 3 min. 03 sec. with his ultralight Nesmith Cougar which must stand as an unofficial record. Only four years ago most people were struggling to make 15 seconds!

Results

1. Ken Bates
2. Doug Hunt
3. Bernard Aslett

4. Reg Boor 5. P. Robinson Westland Widgeon Sorrell Hyperbipe Nesmith Cougar Desoutter 1 Loving Wayne Wittman Tailwind

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MANY NEW ITEMS came to hand during the seven months that this series was being written, some of them could not be added earlier due to space or time restrictions. We therefore offer a final chapter of assorted news items for the spray paint modeller to complete the story.



Compressors. Several new commercial compressors have also been announced. First from Morris & Ingram is a new low priced unit to supersede the Campbell-Hausfield compressor. Selling at £55 (regulator and gauge – similar to the B06 mentioned below is an extra £16).

New to the spraying scene from Thomas Industries (via Burgess power tools) is a range of compressors under the 'WOBL' label. They may be considered light industrial and would suit the really serious modeller as they are capable of driving larger spray gups as well as airbrushes.

capable of driving larger spray guns as well as airbrushes. The fundamentally new design of these compressors centres around the piston and con-rod being cast in one piece (no gudgeon pin). Therefore as the crank rotates, not only does the piston move up and down but rocks from side to side or wobbles – hence the name. A tough plastic skirt replaces the piston rings and forms the piston/cylinder seal. Lower production costs, reduced tolerances, increased volumetric efficiency and longer trouble-free life are all aspects claimed of the new design. Three sizes of this compressor are now available from most DIY stores and through mail order catalogues.

An updated version of DeVilbiss's Tuffy, called the Devco 'Beaver' is also designed for factory use, being somewhat larger and more rugged than compressors sold purely for airbrush use and it too is recommended to the more serious spray painter.

Finally a new name to me — Dawson, McDonald & Dawson of Ashbourne, Derbyshire, who produce a range of compressors eminently suited to airbrush work and quite inexpensive. Their model D/351/VM is available either mains driven (250v ac) or 12v dc for portable operation. Prices are similar to other small compressors and it can be supplied standard or with regulator and gauge etc. as required. However, this is where the story differs, as the D/351/VM is designed to be quickly reversed such that it 'sucks' rather than 'blows', and should be suitable for powering a simple vacuum forming press and runs very quietly in either mode. Because of its dual role, this compressor might well be a sound investment for one's hard earned cash.

Airbrushes and sprayguns. Paasche have now firmly established themselves in this country through the capable hands of Malcolm Woodward of Microflame. Many modelshops stock this range but failing this, virtually every major graphics dealer now carries stock. Watch out for special 'packaged' deals that might suit the complete beginner such as the 'Stripe and touch-up kit' comprising airbrush, spray gun, striping pencil, paint jars, hoses etc. which would launch the novice full tilt into the spraying scene. News also that Thayer & Chandler will have their entire range marketed in the UK by Burgess power tools.

Micro Mold offer a new product from the American

Below: Latest compressor from DeVilbiss the Devco Beaver. Right: Thomas Industries WOBL compressor features one piece piston/conrod.







Preval Company, an extremely cheap and simple device that combines the ease-of-use of the aerosol can with an interchangeable colour facility. A special aerosol cartridge is simply screwed to the top of a glass paint jar which may be bought separately and used to store various colours of ready-thinned paints. To the casual user, this approach offers much greater flexibility of use compared with the conventional aerosol cans of touch-up paint. Like most aerosols, however, the area of cover is somewhat

large, limiting its use to the larger model or to very careful masking.

Paints. Another aerosol product, this time from Frisk is a range of waterproof printers ink packaged largely for the graphics art market. Of special interest is the choice of colours – particularly the high visibility fluorescent shades – and the light weight when compared to paints. Yet another source of fluorescent colours is Rank-Strand, 250 Kennington Lane, London, whose range of scenery paints include several high-visibility colours in emulsion based format, which, suitably thinned with water, may be readily sprayed.

Another new paint available for the first time in Great Britain is 'Perfect Paint' from the USA, available from Mick Charles Models. Samples are only just to hand and have yet to be tested and analysed, but initial reaction is that they are likely to be urethane based enamel similar to many household paints. Mick was unable to tell us just exactly what Perfect Paints are, but if under test and analysis they live up to the extravagant claims made by the US advertising, then they really will live up to their

name and justify their equally high price.

I can now report that the results achieved with two-part acrylic lacquers is little less than staggering. They are remarkably easy to use (that is not to say that one can short-cut the maker's instructions!) and dry to a fabulous, glass-like finish, appear to be completely fuel-proof and are available in about 4,000 standard colours, including metallic shades and clear gloss; the clear being an excellent way to fuel proof other materials such as cellulose dopes. The brand that I have been using is Gipfast 60 made by Ault & Wiborg and is available from most good motor-refinishing agents.

One problem with all two-part paints and fuel

One problem with all two-part paints and fuel proofs is the requirement to mix the parts in accurate proportions. This is accentuated when only very small quantities are required such as when touching up or, say, just proofing the engine bay. 'Rocket of London' produce a range of glass or glass and metal syringes which extends from 1cc up to 100cc measures, available from all good

chemists at quite a reasonable fee (although one may have to explain at length just what one wants it for). The glass/metal type, despite being a little dearer, are more robust and capable of several years service. Syringes may be stored in a jar of thinners between use or if put away dry—MUST be thoroughly cleaned out. Plastic disposable syringes are also available, and are much cheaper al-

though one should check that the paints, hardeners and thinners to be used do not attack the plastic.

Fittings. Many items suited to the home compressor constructor at quite acceptable prices are available from C. A. Norgren. One new item in the catalogue is a 'snaptogether' pressure union to connect the nylon pipe to, say, the reservoir or what have you. This replaces the screw or solder style union previously used and is safe to many

hundreds of psi.

Other items worthy of mention are a pressure relief valve 61A2 or 61B2 (dependent on thread) which sells for less than £2 and is adjustable over the range of 70-150 psi and a Regulator B06 which will regulate up to 100 psi with a primary pressure of 150 psi. This mini-sized regulator (complete with oil/moisture trap and pressure gauge) does a man-size job and sells for just under £8, suitable for both home constructor or those with a commercial compressor. Do-it-yourselfers would benefit by obtaining this catalogue.

Dawson McDonald Dawson D/351/vm blows for spraying and sucks for vacuum forming.





Cleaners. From the Badger stable is a new aerosol cleaner called 'Spray Away'. Claimed to be an instant airbrush cleaner, it appears to be predominantly carbon tetrachloride based and does indeed clean out much of the deposited paint residue. However, CTC fumes are just as hazardous as those of some of the more exotic paints, and it is strongly recommended that aerosols of such cleaning agents only be used in well ventilated areas or even outdoors.

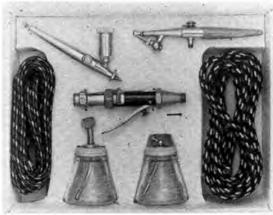
Airbrushes and spray guns should always be cleaned directly after use, following the particular manufacturers recommendations and paint should never be allowed to dry in the nozzle, jets or needle bearings. 'Spray Away' will often clear a blocked airbrush used with cellulose or enamel, but chemically hardened paints such as acrylic and epoxy can rarely be removed once hard, and will usually reduce the airbrush to a dustbin job necessitating

total replacement.

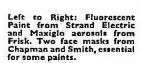
ALWAYS follow the makers' instructions and keep the unit scrupulously clean. Some manufacturers recommend dissembly for cleaning and others do not! Airbrush needles are extremely delicate and like the rest of the instrument are precision made to exacting standards; any damage will reduce spraying quality. Between use, always keep the airbrush in its proper box, and during use, rest it in a proper holder, to avoid knocking onto the floor. Most quality airbrushes come packed with such a retaining clip that is designed to screw to the side of the bench or spray booth. Otherwise, one may be fabricated from thin steel strip or from a 'Terry' tool clip. Whilst moving around the spraying area, take extra care to avoid pulling trailing air hose. A problem common to all brands when using fast drying paints such as Matt enamels and cellulose dopes, one may experience jet blocking when working at extremely fine settings. Open up the spray into some scrap paper to clear the jet every minute or so and return to the subject; additional care spent in thinning the paint will also help.

Safety. Much alarm can be generated reading all the safety precautions recommended by paint manufacturers but the simplest equipment is adequate for the casual user, and I

Spray package from Paasche, H Airbrush, FP Flawpencil and AUTF spray gun with paint bottles and air hoses.









would like to quote from one manufacturer: "Your correspondence raised an interesting point not always appreciated by modellers that, in fact, many modern techniques create hazards usually more associated with involved chemical processes. These hazards are often aggravated by the application of these techniques in poorly ventilated and confined spaces, for example, a garden shed in the depths of winter, with doors and windows shut, and an electric fire burning! The message is I feel obvious and the prices of industrial standard safety gear is quite reasonable, for example several suitable face masks sell for around the five pounds mark.

ALWAYS WEAR A MASK. Inhaling paint fumes and dust is hazardous to the health; a mask costs only a small

amount from your spray dealer.

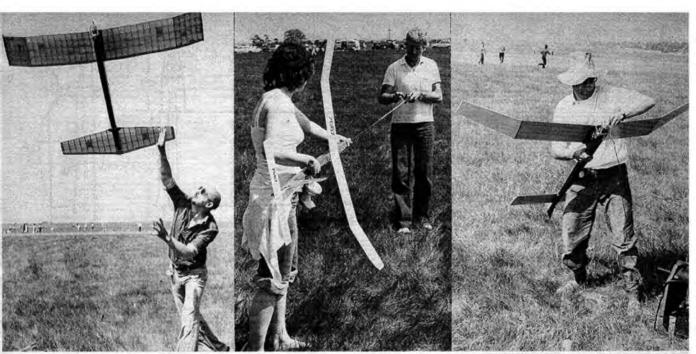
DON'T SPRAY NEAR A NAKED FLAME. Many paints are inflammable and many paint vapours are either inflammable or explosive. The 'Health and Safety at Work' Act shows how the government sees the risks in this hazardous area. However – do not be put off. With care and attention, the risks can be reduced to a satisfactory level, and without doubt, your standard of finishes

will definitely improve.

So, summarising the spraying scene, remember the horses-for-courses approach and be prepared to shop widely around before parting with your hard earned cash. Define, as closely as possible, the job requirements. FIRST pick a device to match these requirements. Stick rigidly to manufacturers' recommendations, particularyl in the realms of careful handling and scrupulous cleanliness. If my own experiences are any guide (and discussion with other modellers countrywide leads me to believe that they are!), then virtually 95 per cent of so-called faults and problems with airbrushes stem from either misuse (possible from ignorance) or mishandling. Hopefully as we progress further into the realms of techniques in using these high finesse products, much of this ignorance and uncertainty will be dispelled.

Whatever else – do not cut short on the practice. If you are certain that you have got together the right combination of equipment and yet still cannot get the results, then its odds on you are just light on practice. Keep at it and the expertise will come; slowly at first and then quicker as one's confidence increases. Personally I am no artist, yet constant practice has enabled me to get to grips with many of the techniques described with very satisfactory results.

Finally my diary is rapidly filling up for the winter months but if your club would like an illustrated talk or demonstration one evening, please drop me a line, care of the editor.



Scenes from this year's Nationals. Tony Child releases his Ramrod, centre, Bruce Rewe winding his Wakefield; winding tube inside fuselage slides out over rod extensions to hand drill. Russel Peers regular winner in open events, once again turned his hand to FAI Power.

Fæe Flight Scene

CARDINGTON - 14th May 1978 - report by B. Bailey

The events scheduled for this meeting were EZB and open microfilm. The latter, like Pennyplane, has never really caught on; invariably in the last few years the conditions have been so poor that attempts to fly lerge models have met with little success. However there is no doubt that the big models are most impressive and majestic to watch. Regrettably this meeting was no exception, it being damp as well as not being warm. Bernard Aslett was the only entrant who flew, flying an FAI model.

Most people concentrated on EZB and found it very difficult to get altitude during the morning. Bernard Hunt established an early lead with two excellent 14½ min. flights but was unable to improve on this despite the shed gradually warming and drying during the day. My own flights improved steadily with the conditions as did Dave Pymm's. I got the lead, then lost it to Dave when he produced a 16.11. That left me with one flight; a full wind, launch with as much torque as I dared and hope. The model centred perfectly, hit the girders at least 6 times and eventually landed at 16.24. That then left Dave one flight, but his model went flat at the start and never got high enough. A very exciting finish and somewhat nailbiting at times I Indoor is often like that; the agony of waiting lasts a lot longer than 'n free flight!

Dave afterwards upped the elevation on his 'B' and hung it up in the girders but got it back OK. Murphy's law struck again I Results.

EZB (7 entries) 1. R. Bailey 15:43+16:24=32:07, 2. D. Pymm 16:11+14:51=31:02, 3. L. Barr 15:13+14:14=29:27, 4. B. Hunt 14:34+14:40=29:14. Open Film (2 entries) 1. B. Aslett 26:23+29:11=55:34, 2. G. Lefever.

CARDINGTON - 4th June 1978 - report by B. Bailey

The recent weather boded extremely well and the shed was very hot and dry in the morning. Proceedings were held up by a barrage balloon being brought in due to thunderstorm warning. Then followed 2-2½ hours of super conditions during which several people flew EZBs to try them out in good weather. I had no luck with the new lightweight models, but Bernard Aslett managed a 20:01 — only the second 20 min. flight ever with an EZB to my knowledge – that flight used 2,300 turns an enormous number for a large 14in. prop I Bernard Hunt who was close to winning the last meeting showed continued improvement by doing 18½ mins. — a magnificent flight by any standard — he is now a strong contender. EZBs showing increasing strength in depth in this country with a fair diversity of

approach, particularly with propellers since Bernard Hunt was using a 12in. prop and around 2,700 turns on soft rubber. And then the thunderstorms came at about 2,30pm. Torrential rain ruined the conditions which rapidly became extremely damp for EZB. A plan to open the doors again at 5.30 caused the film jobs to be put away, the doors opened 3 feet and were promptly shut again at the renewed lightning risk.

This chopping and changing caused loss of impetus for the meeting. I never got as far as entering film. In the end there were 3 entries but never enough time to get things sorted out — hence the low scores although the conditions improved. A last minute rush to get flights in before 7pm made the results look more respectable. The other scheduled event — 35cm microfilm never got a look in with no entries. In many ways, a difficult and frustrating day. We haven't had much luck with the weather yet this year and time is running out before the World Championships for practice.

Results

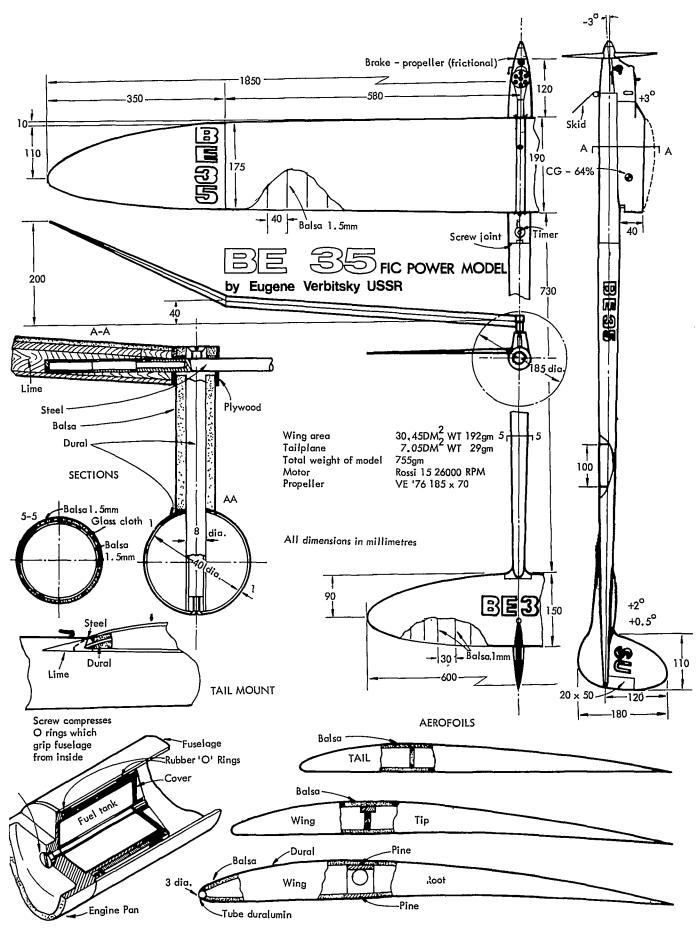
FAI Film (3 entries) 1. D. Morley 29:11+28:22=57:33, 2. R. Green 28:23+25:00=53:23, 3. G. Lefever 25:00+20:15=45:15.



SWEEPETTE TROPHY FIRST HEAT Sunday, 18th June Cardington

Indoor Hand Launch Glider

The first meeting proper of the Sweepatte Trophy series attracted 11 entries which was a fair turnout for this very specialised type of flying. It was hoped that the large prize list valued at almost £100



would attract more people, perhaps they are saving their efforts until the last two heats (30th July and 17th September) since one of their three results will be discounted for the overall prize.

The meeting almost didn't happen . . . We arrived at Cardington to find that one of the giant doors was stuck half open. Test flights showed that the disturbance inside, whilst too bad for rubber driven lightweight duration types, was not too much of a problem to the Hand Launch Gliders. The contest was held, but it was decided not to accept any record claims for flights made with the door open. Ironically there seemed to be less 'lift' about than previously experienced with the door shut!

Pete Bayram won the Heat with two flights of 60 seconds each from a newish model. This is a 20in span 26 gram aeroplane with a fibre-glass tube fuselage.

The only additional fuselage structure is under the wing to provide a grip, so the thin tube nose gives the model a distinctive appearance. Pete was getting as high as I have ever seen a model at Cardington but his glide was letting him down. (Unintentional pun, sorry!). In contrast, Phil Ball's model was gliding very well and took him to third place, perhaps they should collaborate. Mick Page came between them to take second spot and also won the 12in span limit event.

Kevin Brown had a bad day; he got it together enough to record a 67.5 flight early on but couldn't find a back up flight, breaking three models in the process. One model blew up on launch and when he had collected all the pieces the fin was missing. No amount of searching brought it to light. It was eventually found sometime later when Kevin brought his flight card to the organisers' table and I

when Kevin brought his flight card to the organisers' table and I noticed the missing fin buried in his mop of curly hair I Results (11 entries) – 1. P. Bayram (Richmond) 60+60=120; 2. M. Page (Peterborough) 63+54=117; 3. P. Ball (Grantham) 59+55=114. Top Junior – G. Dowsett (Northwood) 50+56=106. 12 inch limit (8 entries) – 1. M. Page (Peterborough) 45+58=103; 2. C. Edge (Welland Valley) 51.5+47=98.5; 3. M. Fantham (Richmond) 49.5+45.5=95. Top Junior – B. Malton (Peterborough) 40+32=72.

TEAM TRIALS FIRST WEEKEND 24th/25th June 1978

On no account should any object found lying on the ground be moved, it may explode! This was the message that greeted competitors to the first round of the Trials to select the Free Flight teams to represent Great Britain in Yugoslavia for the 1979 World Championship which were flown at Everleigh Dropping Zone, a military training area on Salisbury Plain. The site, which is a very large undulating area of grassland, was obtained mainly thanks to the efforts of Martin Dilly after the SMAE Free Flight Sub-Committee had searched in vain for a suitable airfield.

The weather was unkind. The rain held off for most of the time but the wind was strong and the only available launching point, downwind of some trees on a hilltop, made conditions very turbulent in the flying area. The presence of some clumps of medium sized trees downwind didn't cause as much trouble as the valley which tended to suck models down if they didn't have a good altitude when they started to cross it.

In spite of the problems, however, flights launched in good air did good times and the familiar names filtered through to the top or thereabouts.

John Cooper had a very successful weekend topping the Wakefield results and placing fourth in Glider.

Tony Young put in some hard towing to achieve his second spot in Glider and could even be seen practising between rounds!

John O'Donnell lost his only A/2 in the sixth round when a seventh round max would have put him into fifth place.

The second half of the trials takes place on 15th/16th July, again at Everleigh.

Results

F1A Gilder 57 entries, 50 flew – 1. P. Owens (*Liverpool*) 19:27; 2. A. Young (*Croydon*) 19:23; 3. P. Moate (*Tynemouth*) 18:38; 4. J. Cooper (*Biggles*) 18:23; 5. R. Woodruffe (*Swindon*) 16:49; 6. M. Gilmore (*York*) 16:46.

6. M. Gilmore (York) 16:46.

F1B Wakefield 42 entries, 40 flew — 1. J. Cooper (Biggles) 20:39; 2. R. Pollard (Tynemouth) 19:08; 3. A. Wells (Anglia) 18:54; 4. J. O'Donnell (Whitefield) 18:39; 5. D. Hipperson (Croydon) 18:14; 6. M. Evatt (Biggles) 18:02.

F1C Power 23 entries, 18 flew — 1. S. Screen (Birmingham) 20:50; 2. R. Johnson (St Albans) 20:48; 3. P. Harris (Birmingham) 20:23; 4. R. Monks (Birmingham) 19:43; 5. A. Jack (Tynemouth) 19:37; 6. R. Baggott (Birmingham) 19:21.

VE35 F1C POWER MODEL - By Eugeny Verbitsky

This is the model proxy flown into 3rd place in the 1977 World Championship in Denmark by Igor Ziljberg.

The details of this model have been obtained from the Russian magazine Wings of the Fatherland. The text has been translated by Dave Taylor of the Richmond Club and he points out that it is a fairly 'free' translation but I'm sure we have the essentials here in my edited version . . . thanks Dave.

"Model VE35 was built and first flown last year (1976). In many respects its components and assembly are the same as models VE33 and VE34, which were described in Wings of the Fatherland No. 76/3. Design changes have been brought about by fundamental changes in the competition rules, i.e. the reduction of the engine run to 7 seconds. Great attention has been paid to the layout of VE35. Wing area and span have been increased. Tail area has been correspondingly decreased, which in turn calls for an increase in tail arm and therefore fuselage length so that the coefficient of static longitudinal stability is not changed.

The coefficient is taken as A, where:

Tail area x tail arm

A= Wing area x mean wing chord

This may also be expressed as:

A=Tail area x tail arm x wingspan (Wing area)²

The ranges of values usually found for each World Championship class are:

F1A Glider 0.8 to 1.0 F1B Rubber 1.3 to 1.4 F1C Power 1 · 15 to 1 · 25

The wing section has undercamber, a root thickness of 7.8 per cent and tapers to a tip thickness of 6 per cent. The camber at the root is 4.2 per cent and the nose radius is 1.5mm. A considerable part of the undersurface is flat back as far as 47 per cent of the chord; this simplifies preparation of the wing jig.

The forward fuselage construction is the same as the previous model (i.e. dural tube). For more precise and reliable coupling of the nose section with the tail boom, the telescopic joint has been replaced with a threaded fitting (M40 x 0·75) of length 8mm. The joint is locked by screws (M2) uniformly disposed about the perimeter. The timer is situated on top of the fuselage behind the pylon. This position, it appears, is a consequence of the method of con-struction of the pylon area. This rearward position of the timer appreciably affects the centre of gravity of the model therefore the nose is unusually long.

The model is fitted with a propeller brake. The steel brake 'drum' is 18mm diameter and 4mm wide, it is a press fit on the propeller driver. The 'brake block' is one and one half turns of 1mm wire, which is expanded by rotation into a 21mm diameter by 2mm wide groove in the body when the brake is in the 'off' position and the motor running. The body is manufactured from dural and locked to the nose assembly of the motor by an M3 screw. When the timer signals the end of the power run the spring is released and reduces in internal diameter. By a combination of friction and the fact that the motor is trying to wind up the spring a fast and gentle stop is obtained. The relaxed inside diameter of the spring is 15 or 16mm. A tighter spring is too violent and liable to breakage, a looser spring does not give the necessary effect.

The wing tips and tailplane are manufactured by the same methods as used on VE34 (i.e. fully sheeted with glass covering on top and long grain paper underneath) but the centre panels use a new technique. The covering is dural foil of 0.03mm thickness. This idea was first used in 1975 by V. Klimenko, who has been Champion of the USSR in the duration class several times. The main advantage is that the structure is much stiffer and resists flutter and warping, problems which are accentuated by thin high aspect-ratio wings. A few words about the construction itself: The balsa wing sheeting of thickness 1.5mm is prepared first. The pine lower spar is assembled to the fore and aft lower panels on a sheet of glass 6-8mm thick. The prepared upper and lower wooden wing panels are attached to the dural foil (in the flat state) with Epoxy resin K153, a gap is left between the sheets of 6.4mm which will accept the 3mm diameter dural leading edge tube at a later stage. This thin walled tube accurately guarantees the necessary radius of curvature of the nose profile. The epoxy glue is applied at a rate of 0.15 to 0.2 grams per square decimeter. The assembled panel is pressed to a sheet of glass while the glue cures with a 3-5mm sheet of foam rubber and a pressure of 2-4 kilograms per square decimeter. The internal structure of the wing is assembled to the lower panel whilst the latter is supported on a jig which fits the lower surface. K-153 epoxy glue is used again. The final opera-tion is to wrap over and stick down the upper panel with rubber strips pressing it down to the wing ribs. The finished centre panel has the wing tip and markings added; it is then given a coat of lacquer for protection."





Evolution of a Thorough

Developed over 11 years and 8000 flights by Al Rabe, America's Aerobat

WORLD CLASS COMPETITION STUNT SHIPS are seldom the result of casual design efforts or luck. They usually evolve over a period of years. For a design to evolve, the designer must experiment with layout changes on a succession of airplanes. He must analyse the results of these changes and apply this experience to the improvement of the design. The proper evaluation of these changes depends somewhat on his ability as a flyer. The most competent designs are usually the result of thousands of

practice flights.

While evolution and practice are all that is usually required for competitive success with classical stunt ships, semi-scale designs require a third ingredient, revolution, to become successful. Departure from proven moments and areas creates new problems which require the practical application of new ideas. The Mustang presented here is evolutionary and revolutionary. It is the sixth of a series, the result of eleven years of experience and eight thousand practice flights. It all began in 1967 with the Mustang I. Mustang 1 The first Mustang turned out fairly well for a novice attempt at original design. It was underpowered, tail heavy, a little overweight and suffered from the use of a suggestivities of the centre. suffered from the use of a super airfoil shape in the centre of the wing. This 'super' airfoil had a fairly sharp leading edge and the high point was back around 50%. It had horrible stalling characteristics for a stunt model. If the last triangle corner happened to be pulled just a little too tight that centre section would stall suddenly and the model would drop three or four feet. This resulted in a number of surprise landings in the triangle bottoms. Adding four ounces of nose weight cured the tail heaviness and improved the overall handling charactieristics to the point where those heart pounding surprises occurred less frequently.

In defence of the Mustang I, it flew fairly well and was impressive in flight. In 1968, it was the first serious attempt to bring realism to semi-scale stunters. This new concept, while dismissed by some as semi-stunt scale, helped me to qualify at my first Nats.

In addition to semi-scale realism, that first Mustang was the third stunt ship anywhere to use a removable wing, it pioneered the use of significant wing dihedral and

the movable rudder.

Mustang II This is the airplane published in American Modeler June 1969. It incorporated changes to the Mustang I design to correct its obvious faults. The root rib template was changed to a more conventional section and the flaps were slightly enlarged. This improved lift somewhat and completely eliminated the Mustang I's nasty stall. The nose was lengthened ½in. to balance the airplane without noseweight. There were minor improvements in the structure to eliminate stress cracking and a built-up fin and rudder was shown.

While the Mustang II looked realistic for its day, its outlines actually left much to be desired. When I got around to building one myself, more changes were made. The landing gear was lengthened and larger wheels were used. The belly scoop was extended aft lin. and the tail-wheel doors relocated. This produced a much nicer looking airplane than the Mustang I or the Mustang II

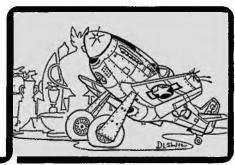
My Mustang II's structure was also improved by using all built-up tail surfaces and a fibreglass pushrod. This Mustang II was also the first airplane to utilize the now familiar sliding block type adjustable leadouts. I published that feature in the Bearcat article in the American Modeler March 1970.

By 1968 standards, the Mustang II was a good com-



bred.

tic Genius



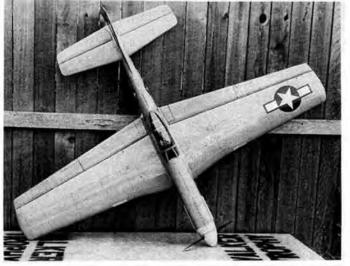
petitive airplane. It was so easy and fun to fly, and looked good enough on the end of the lines that neither flyer nor judges seemed to notice its subtly lacking performance. Bill Netzeband published a complimentary flight evaluation of the Mustang II in his R&R column in MAN February 1970.

Mustang III. In the winter of 1969-1970 I was busy building the first successful moulded fuselage competition stunt ship, the 1970 Nats 2nd place Bearcat III. Development of an improved Mustang II was taken up by Bill Rutherford. Bill used the fuselage and tail of the Mustang II and adapted the new Bearcat III wing to build his Mustang III. This new wing had a smaller wing tip chord and a larger flap tip chord. Trading wing area for flap area substantially increased lift. With improved lift and less weight the Mustang III/Bearcat III were probably the first realistic semi-scale stunt ships capable of flying as well as most classical designs. This development occurred just in time. After a couple of years of fairly realistic Mustangs, judges were noticeably less impressed by appearance and were demanding better flight performance for winning scores. Bill won a number of contests with that airplane. Because of Bill's success with the Mustang III and mine with the Bearcat III, I published a fifteen page supplement of drawings and instructions which many builders used to upgrade their Mustang II plans to Mustang III.

Mustang IV. In the winter of 1970-1971, I ran some airfoil tests to optimise the wing design of the 1972 and 1973 Nats winning Sea Fury. Bill wanted to use those test results to build an 'improved' Mustang III. We designed a new wing using a thicker rib of new contours and reduced area. The percentage of flap was increased again as was planform taper. The idea, this time, was to use improved

Man and Machine, above Mustangs VI and V, below AI Rabe with Sea Fury and Mustang, each has won the U.S. Nats.





"Easy Two Sugar" Mustang V shows its exceptional scale like layout for a competition aerobatic model.

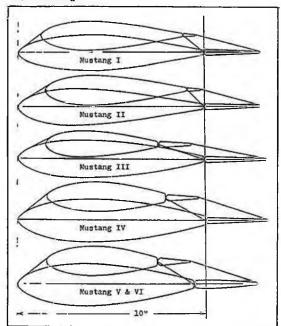
aerodynamics to reduce the wing size to stress appearance

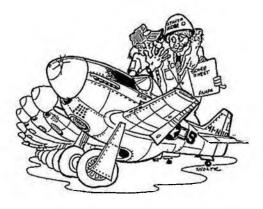
while just maintained performance.

Bill also enlarged the basic Mustang II fuselage by adding \$\frac{1}{2}\$in. to both the height and width of the fuselage and moved the tail surfaces 1in. aft to offset the weight of the ST .60 he used. The inch longer tail moment on the Mustang IV's drastically increased elevator sensitivity and required considerable adjustment of linkages and whittling on elevators to get them trimmed out. Bill used his Mustang IV to place 3rd at the 1972 Nats.

Mustang V. In the winter of 1973-1974, after three years of more or less constant engine problems with the Sea Furys, I decided to build a new, smaller airplane to use the better running ST 46. The ever popular Mustang seemed the most likely candidate for an all out effort. The design goals were to use Sea Fury aerodynamics and construction techniques to (1) retain the pleasant handling characteristics of Mustangs I & II, (2) substantially improve on the performance of Mustang III, (3) build a scale like airplane more realistic than Mustang IV. By combining the best characteristics of these airplanes with stunt aerodynamics developed from the experience gained from the Sea Furys. I hoped to design an evolutionary airplane with outstanding competitive performance. I also tried to make Mustang V revolutionary by using a number of altogether new ideas and sophisticated building techniques to lessen weight while increasing the fuselage size to more realistic proportions.

Progressive development of aerofoll, flap and dihedral on successive mustangs.





"PSST! Does Cloning violate the builder of the model[rule]"

The first design consideration was the power/weight ratio. From experience, I've found the ST .46 capable of hauling about 60oz. To ensure a strong pattern with outstanding vertical performance a design weight limit of

50oz was decided upon.

I wanted to use the smallest wing possible. A small wing would enhance realism and build lighter while reducing profile and parasitic drag. Based upon airfoil tests published in the Sea Fury article I expected an approximate 15% improvement in lift from the new concept airfoils and flaps. A 50oz Mustang, then should be capable of a corner radius equal to a typical 43oz stunt ship. Since 520 sq. in. total wing/flap area would be plenty for that 'typical' airplane, it should be sufficient for the Mustang V. Distributing this on a 55in. span gave a realistic plan

form and taper similar to a scale Mustang.

To keep the Mustang V on the end of the lines while manoeuvring, it would have to roll slightly away from the pilot on each control application. This roll could be caused by (1) increasing the length (area) of the inboard wing and flap (assymmetry), (2) deflecting the inboard flap more than the outboard flap with unequal flap horns (Palmer's differential flaps), (3) utilizing the wing swing-ing inertia of tip weight. Nearly all stunt ships combine at least two of these methods. Since beginning to fly stunt, I have developed an increasing respect for the third method above, tip weight. In the early 1970s my Sea Furys and Mustunts used tip weight, without any asymmetry or differential flaps, with great success. I was perhaps more successful with equal span panels than others because I happened also to be using a movable rudder which would remove the yaw component, if any, from the tip weight induced roll. It also helps to be able to stick 3½oz of weight into the tip without flinching and to have a fully trimmable airplane. I am convinced my airplanes fly better in the wind and are easier to trim without asymmetry or differential flaps. This information was published in the Mustunt and Sea Fury articles in 1973. Since then many top flyers have reduced or eliminated asymmetry in their airplanes.

The Mustang V was so very weight critical, however, that a slightly less desirable configuration was used. The Mustang's wing used a small amount of asymmetry (\frac{1}{2}\text{in.}). Asymmetry was eliminated from the flaps by adding \frac{1}{16}\text{in.} more tip chord to the outboard flap to balance the flap areas. This made the Mustang V a little less straightforward to trim but it reduced the required tip weight for a

small overall weight reduction.

A fairly large stabilizer/elevator total area, located on an inch longer moment arm than the Mustang IV was used because longitudinal stability (groove) is improved when the horizontal tail area is increased and/or the tail moment is lengthened. Elevator sensitivity is determined by the percentage of that horizontal tail used for elevators. Recalling the unusual elevator sensitivity of the Mustang IV, the hinge line was placed well back to limit elevator area. The stabilizer was mounted on the Mustang V with $\frac{1}{32}$ in. incidence (tilted up) at the leading edge because my

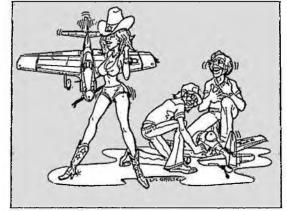
previous airplanes usually turned tighter 'inside' than outside'. My Mustunt article explained how this is caused by mounting the stab much higher above the wing than most other stunt ships. The unusual height is the result of using a true low wing and a scale stab location. The differential in down-wash experienced by the horizontal tail, in the high tail configuration, is greater between upright and inverted flight than the differential experienced by the horizontal tail of classical configurations. The Sea Furys and Mustunts, for example, required approximately in in. down elevator trim to balance their 'inside' and 'outside' turn rates. The Mustang V's positive incidence allows the elevators to approximately 'fair' with the stabilizer when it is trimmed to turn equally. This reduces or eliminates the misalignment between the elevators and the elevator root fairings when the Mustang is trimmed. Either configuration can be easily trimmed for fully normal, balanced turning characteristics.

To approach scale realism the fuselage had to be large. Accomplishing this within weight limits required moulded balsa construction. The fuselage was drafted by laying out the stunt wing and indicating the desired moment arms and thrust line. Onto this paper was projected Mustang outlines from an accurate North American 3-view. The critical locations of the canopy, scoop, tailwheel and stab height were determined. The slimmed, but photographically derived characteristic shapes were drawn in. The result was a fuselage stretched to stunt moments but pleasing to the eye and appearing more 'right' than many supposedly scale ships. The vertical fin and rudder were enlarged so that the stabilizer and elevators would not

appear too big by comparison.

To fly the Mustang in FAI events a muffler was required. Conventional muffler installations had to be avoided for several reasons. First, most mufflers were much too heavy. Second, most mufflers create too much back pressure causing the engine to run unnecessarily hot. Third, an external muffler would disturb the airflow over the inboard wing/flap root causing a loss of lift and requiring extra wing to compensate. Fourth, an external muffler would disturb the airflow over the inboard stab/elevator causing an unpredictable effect on handling characteristics and stability. Finally, an external muffler would be particularly unsightly on an otherwise 'realistic' airplane. Clearly, the Mustang's muffler had to be light, cause little or no back pressure, and go inside.

The only practical way to put the muffler inside was to 'cant' the engine and use an 'clbow' type adapter to duct exhaust gases to the muffler body located behind the engine. The adapter protrudes into the mouth of the muffler body without touching the body walls. Since the body does not touch either the engine or adapter, it could be made extremely light and attached semi-permanently to the airframe. The adapter could also be very light as it does not support the weight and vibrating mass of the body. The result was a flow-through muffler where cooling



"Al definitely did not invent the wiggly tail!"
air flows into the mufiler body around the centre rather
than through the centre. It weighed .9oz installed.

If care is taken to flare the muffler body inlet, the muffler becomes an augmented exhaust system as installed on a Cessna 310 or a Convair 440. The exhaust, blasting into the muffler body, induces a flow of engine compartment air into the annular body inlet. This pumping action draws air into the cowling and past the engine thereby 'augmenting' the engine's normal ram cooling. If the muffler body is removed from the airplane, the engine will run hotter and longer.

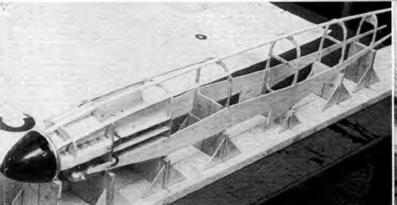
From this, I conclude that this particular muffler design is not only augmenting the engine's cooling, but is also increasing its power, probably through a reduction of back pressure in the exhaust system.

The muffler body was completed by adding two ½in. stacks which protrude through the fuselage bottom. While this was obviously not a very restrictive muffler, it was very effective due, in part, to being wholly enclosed. More noise energy was dissipated by the dilution, mixing and cooling of the exhaust gases in the muffler.

Canting the engine made it impractical to use conventional engine bearers extending through the tank compartment and radial mounts were too heavy. Combining the best characteristics of both beam and radial mounting resulted in the use of short wooden beam mounts installed in the engine compartment only. These extended from the spinner ring to the firewall and were cut off flush with the back of the firewall. This mount, including the plywood spinner ring and firewall weighed 40% less than an aluminium radial mount by itself.

It was also impractical to make the fuel tank removable or adjustable. Since it had to be glued in anyway, I tried to make it part of the load carrying structure by gluing it to the firewall, then used hin. balsa sheet egg-crating to transmit engine vibration to large areas of fuselage shell structure. The tank itself was a two vent, baffled stunt tank. In the top view this tank was not rectangular. With the front and back of the tank mounted flat on the forward and aft tank compartment bulkheads, the rear end of the tank was hin. closer to the right side of the airplane than the front end. Canting the rear of the tank outward makes the tank more nearly tangent to the flight circle

Left: Jig built fuselage assembly awaiting it's moulded balsa skin. Further "egg crating" at nose helps absorb vibration. Right: Moulded balsa skin added over internal structure, produces maximum strength for weight while jig ensures alignment.





while the airplane is in flight, reducing the volume of unburned fuel in the tank when the pickup uncovers. Airplanes using this tank configuration are capable of a very clean engine cut only a lap or two after completing the cloverleaf.

This entire nose design built unusually light. It was adequately strong but a little marginal as to its effectiveness in vibration dampening. It worked OK but an out of balance propeller can damage or destroy the nose. This happened once when a wiping cloth blew into the turning prop of Mustang VI. The prop broke and the entire nose vibrated off the airplane. An all new nose was built without changing the original structural design. It was grafted onto the Mustang and has survived an additional 1525 flights, crack free.

Another obvious feature of the Mustang V was its shock absorbing landing gear. This would seem unnecessary as all of the Mustangs were excellent wheel landing aircraft. However, experience with shock gears on two Sea Furys convinced me there is no other way to make a stunt ship take-off as smoothly or land as softly. These two outstanding manoeuvres are not only scored high but seem to add a definite 'quality' to the rest of the flight.

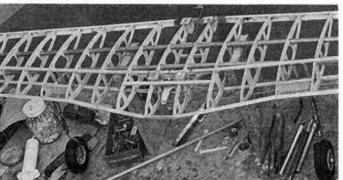
Unfortunately, I had a great deal of trouble with the dope sealer during the finishing of Mustang V. First, dope shrinkage buckled the wing sheeting. This necessitated removal of all wing skins, repairs to the ribs, and resheeting of the wing. To prevent a re-occurence, I plasticised the dope sealer. This time the dope failed to completely harden making it impossible to properly remove the surface sealer by sanding. The extra weight from repairs and incomplete removal of sealer drove the final weight to 560z. Now, I use Hobbypoxy from the bare wood up.

Regardless of the finishing problems, I thought Mustang V, 'Easy Two Sugar' looked beautiful. Its small wing, long moments and scale lines gave it an undeniably 'real' look.

In the air, E2-S turned out to be a little less than I had hoped for, but much better than I had expected, considering its overweight condition. Surprisingly, the new wing handles the excess weight well. The extra weight did, however, ruin the outstanding power/weight ratio I had planned. This loss of anticipated vertical performance, more than insufficient lift, characterized the Mustang V.

The Mustang V also had poor corners. I had over-compensated for Mustang IV's elevator sensitivity by making the elevators too small. Since E2-S had a removable wing and variable flap/elevator ratio, an effort was made to improve the turn by increasing elevator deflection. The extra elevator travel helped the turn but had an overall undesirable effect on handling characteristics. Numerous trimming flights indicated the original one-to-one ratio worked best. Next, the CG was moved

Wing incorporating dihedral, straight rods align each rib keeping wing true, even T.E. is scooped out hollow to save weight.





Installing the fuel tank in the jig mounted fuselage bulkheads. Note how plywood is hollowed and scooped away to save weight.

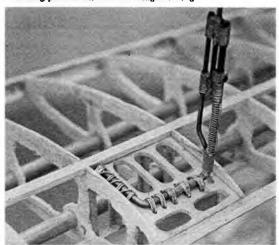
aft to improve the turn by machining weight from the engine and spinner and adding weight to the tail. The tail weight was removed when the 'groove' suffered. Finally, the central handle was modified to increase both elevator and flap deflection. These efforts improved the turn, but E2-S would always be a little 'soft' in the corners.

The appearance of the corners was also hurt by a tendency to roll or 'hinge' on hard corners. The hinging lessened as tip weight was removed. The last of the tip weight was removed at the 1974 Nats. By then E2-S was flying smoothly unless the controls were jerked. Fortunately, the weather was good, as the absence of tip weight had reduced the Mustang V's windy weather capability. After the Nats, I discovered the outboard flap was torsionally weaker (springier) than the inboard flap. It was working like Palmer's differential flaps, In hard manoeuvres the air load would reduce the outboard flap deflection allowing the inboard flap to roll the airplane. Adding extra area to the outboard flap balanced the asymmetrical roll force and allowed the use of normal tip weight for excellent line tension in the wind. It was a relief to discover that Mustang V's major trim problem was caused by a construction fault rather than a design fault. I had begun to suspect the Mustang V's semi-scale configuration was somehow spoiling the airflow over the model creating an untrimmable condition.

Excepting the slight softness of the corner, the Mustang V finally flew well. To put this in perspective, E2-S placed 3rd at the 1974 Nats, less than one point out of second place, before its problems were fully sorted out.

Mustang VI. This was a straightforward clean-up of the Mustang V design. The elevator hinge line was moved forward $\frac{1}{16}$ in. and $\frac{1}{2}$ in. was added to the stab/elevator span to make the Mustang turn and groove better. To save weight, the wing was glued on as the optimum flap/elevator ratio and stab incidence had already been determined. Mustang V's hinging tendency was eliminated by making the outboard flap tip cord $\frac{1}{2}$ in. wider than the inboard flap tip. Both flaps were covered with five layers of epoxy resin and glass cloth for much greater stiffness and aerodynamic effectiveness. The size of the vertical fin and rudder was increased again to provide more directional

Undercarriage close-up showing details of spring suspension and fixing prior to sheet balsa wing covering.



stability for further protection from hinging. You don't hear much about my airplane 'wobbling' in the corners any more. Comments are heard, however, about the accurate shapes of my manoeuvres which couldn't be accomplished without the extra line tension from a fairly mature movable rudder system.

Finally, two inches of wingspan was added to the Mustang VI because Mustang V's overweight worried me. My design/construction concepts were verified when Mustang VI finished at exactly 50oz. This made the extra wing not only unnecessary but unsightly as well, particularly when painted silver. For two years now, I have

threatened to cut that excess off.

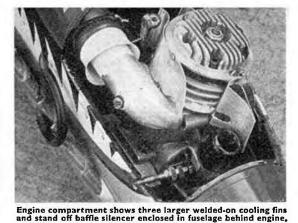
The Mustang VI's flight characteristics were excellent. In addition to being easy and pleasant to fly, it was very smooth and groovy. Increased elevator sensitivity gave more corner than I could use. The extra parasitic and profile drag from the oversize wing plus the induced drag build up in an extra tight corner, would slow the Mustang VI more than it could comfortably recover in a vertical climb. It was obvious that the excellent power/weight ratio of a 50oz airplane powered by a strong ST.46 could still be improved.

In 1976, the Mustang VI placed a very stisfactory 3rd at the Nats. While I am usually not all that pleased with 3rd, placing ahead of the World Champion, 2nd and 3rd places in the World Championships made it seem like a

good day's work.

In 1977 Mustang VI was brought to maturity by an increase in power in the form of a stroked ST.46 and a prop having more pitch. Finally, I could take full advantage of the Mustang VI's corner. With a .51 motor in a 51oz airplane the Mustang VI was then able to fly very slowly for an impressive presentation of its new sharpened corners while retaining its vertical performance and windy weather capability.

When I increased the lap time from 5.4 sec with the

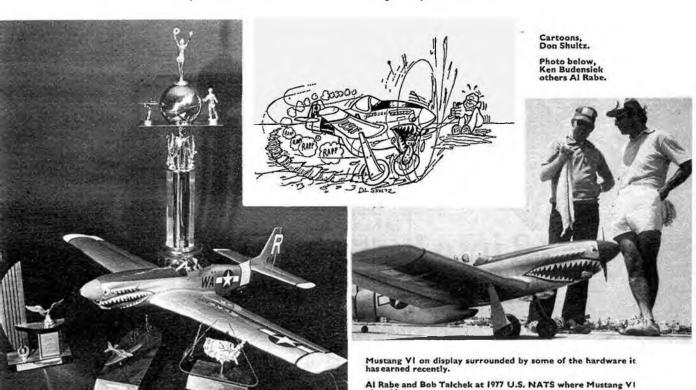


ST.46 to 5.7 secs with the .51, the slower speed and the increased prop load caused cooling to become a problem again. I needed two engines, overhauled and alternated frequently to get through the 1977 contest season. At times, to combat the effects of excessive heat, ring end gaps of as much as .014in. were used. After the Nats, I modified a ST46 case by welding on and machining three larger cooling fins. A cowling baffle and stand-off cylinder baffle were also added to improve cooling. With these modifications, it was possible to use a ring end gap of

.006in. for a better seal and more power but the cooling problems were not yet eliminated. Since then I have increased the custom case fins to five and installed a machined head with greatly enlarged fins and a new muffler of improved design. It runs great now but I'll have to wait for summer's heat to find out if the problem has

truly been licked.

On a memorable evening last August, I was awarded three trophies: 1st place Nats Open Stunt, the Walker Cup, and a PAMPA award for technical contributions to the sport of precision aerobatics. The PAMPA award mounts a figure control line flying a Mustang. I agree that if technical contributions have been made, then the Mustang best symbolizes those efforts.



1979 M.E. EXHIBITION

news Bulletin

During the last few months many changes and new developments have been planned for the 48th Model Engineer Exhibition and this bulletin aims to explain these and at the same time, give detailed information for all those who wish to enter models in the Exhibition.

Travel

British Rail have re-opened Wembley Hill Station, renaming it Wembley Complex, just a couple of minutes walk from the Wembley Conference Centre. The journey from Marylebone takes only ten minutes. Extra trains are being negotiated especially for visitors to the Exhibition and special all inclusive excursion fares will include the cost of Exhibition entrance and provide an advance ticket.

Extra space for the Model Engineer Exhibition to be contained within the two main Exhibition halls and the nearby Avon Suite, now that the Woodworker Show has become a separate Exhibition, allowing more and better lit space to be allocated to all the models.

There are some who feel that the models took second place to trade stands at the 1978 Exhibition. This criticism is understandable because the models seemed to dispersed. However the support of the model trade helps enormously to meet the rising costs of staging an Exhibition in a fine modern hall in London, and provides an invaluable shop window for visitors.

Transport of Models

The transportation of models to London from the provinces is becoming more expensive each year and in order to encourage modellers the organisers are planning a series of journeys to pick up points in the Midlands, North and West.

Models will be transported under insurance cover from these pick up points to the Exhibition and details of these arrangements will be sent to those who live well away from London as will the arrangements which will be made to return the models. Those entering models will be responsible for getting their models to these pick up points and collecting their models back from them. It is hoped that this new service will encourage more entrants from much further afield than usual.

Security

Owners of models will be reassured to know that the 24 hour a day security arrangements worked so well at this year's Exhibition that only one small wooden bowl was lost out of nearly 1,000 models on display. Stewarding and security arrangements are being further improved and better protective measures are being installed in 1979 to stop visitors touching models, These include in the case of the aeroplane models, the use of Perspex screens.

RTP Flying

A popular attraction for both participating flyers and spectators alike for many years, the RTP circle will not be a feature of the 1979 ME Exhibition. Last year's circle was very cramped by previous standards and understandably received many complaints. Absence of any alternative flying area due to the pressure of commercial demands on space precludes the RTP flying facility.

New Awards

The organisers are pleased to announce that there will be no less than 13 new Cups and Awards at the 1979 Exhibition. Furthermore, all the cash prizes are being increased in value and the Prize Pool system is being dispensed with in favour of straightforward prizes. Morris & Ingram Ltd. are giving a Cup and Cash Prizes for the best air brush painted model in the entire Exhibition. In the aero-modelling section new Cups are being presented by Aeromodeller, Radio Control Models and Scale Models In Classes AA, AB, AC respectively.

The organisers are anxious to see as many entries from modellers of all ranges of skill. The Model Engineer Exhibition is not, nor ever has been, intended only for modellers of exceptional experience and modesty should never prevent anyone from entering. An entry Form is included in this issue.

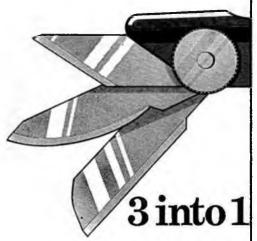
Championship Cups

In addition to challenge trophies a number of cups or other trophies are offered to become the permanent property of the winners.

Certificates

Certificates of entry are given to the owner of every model exhibited in the Competition sections. Where, in the Judges opinion, an exhibit is of sufficiently high standard but does not obtain a 1st, 2nd or 3rd place, it may be awarded one of the following certificates. Very Highly Commended, Highly Commended or Commended.

All correspondence and entry forms to:
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EXHIBIT No.

that I am entering the competition as an amateur model

Date Signature

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topical t_wi_sts

by 'Pylonius' Illustrated by Sherry



"There goes old Higgins, after the Crash of the Month Trophy again"

Crash Course

I would not go so far as to say that Radio flying is a crashing bore, but there is certainly much evidence to suggest that crashing is taking the boredom out of radio flying. At one time the club newsletter would be full of glowing and marvelling reports of the newest radio jobs making their dramatic and spectacular debuts on the flying field. You were asked to wonder at the super power unit, the number of radio channels, the perfection of the finish and the aerobatic excellence — each a miracle of modern aeronautical and electronic science. But the writers have long since run out of superlatives, and the radio wonder of the age now excites less attention than a stunt kite, which itself has become another of the unseeable, boring objects in the sky.

What now gets the newsletter writer going is the spectacular crash — it is not the finish that gets the headlines but the finish. There is page after page telling in glowing, even relishing, terms of crashes of the most succulent order, and he is never short of material, for the modern cult of crashery is sustained by the whole mass of disaster factors inbuilt into the radio model; the capricious nature of which adds zest to the developing crash industry.

Big kudos go to the chap who splatters his new, expensive model over the flying field. He is greeted in the clubroom like someone who has just got his Blue Max. The fact that he is light of a couple of hundred pounds and several hundred man hours is given no consideration in the euphoria of his fine sacrifice, nor the possibility of what his out of control model may have done.

Some clubs have become so kamikaze crazy that you could almost imagine the model pilots lining up for a final sip of Sake before sacrificing their models in the Relief of Boredom. It is not unusual to have a Crash of the Month trophy for the most spectacular prang — and no trophy is more grander or held in greater esteem. And some clubs are even exploring the possibility of a Crash Championship competition, worked out on a points system covering extent of damage, age of model, experience of modeller, number of people treated for shock etc. Running parallel to this would be a championship for the flyer with the greatest number of crashes of other people's models by his hairy flying and tricks at the transmitter — the type who would proudly record his kills on his model box.

I can't think why I am going on in this vein — I don't, personally, find crashes at all funny. If I crashed a model I wouldn't be a jolly good sport about it, even if it did make for fun on the flying field and a titter on the tarmac, I'd be flaming mad. I do, however, notice one peculiarity about the habitual crasher; whatever the type of model he may fly: he always launches or flies over the more crowded areas of the flying field.

Sam Missiles

With all this talk of vintage in the air I feel as time disorientated as Dr Who in a tailspin. I keep having to tell myself I am living in 1978 for good or for ill, and hope to continue to do so as long as I keep out of the way of the lumpy pre-war monsters besetting me on all sides. But it is all too easy to imagine you have taken a time machine trip into the past when you come face to face with the Bowden Mouse, a model so hideous as to be comical. It was about thirty years out of date design wise when it caused bibulous yokels to hurriedly sign the pledge back in 1935. Significantly it came out about the same time as Boris Karloff's Frankenstein monster, and constructed on much the same lines.

Then again, it seems, that the whole of the United States has slipped back into the Thirties, too, with the Sam in Uncle Sam now standing for the Society of Antique Modellers. Now, since the definition of the term Antique is something over a hundred years old our expectations are not quite fulfilled by the sight of middle aged men flying the sort of bulbous gassie models that were contemporary with the Tin Lizzie and Laurel and Hardy films. But who can blame them for going back in time even that far considering what a frightful mess the whole frightful business of venturing into a frightful future has made of their once beautiful country. Come to that it has not done any good to quaint old Britain, either. Little wonder we are all looking back with nostalgic regret when the only forward model development is a jet propelled helicopter or something even more horrible.

Unfortunately, though, no one can really retreat into the past, for he will always take what was then the future with him. So what happens at the Vintage meets? Apart from the odd time shift of keeping these big, shaggy Thirties models on short radio control leashes, you have the canny ones using that 'future' knowledge to sort out the most flyable designs, fit d/t's and other then unknown improvements, and then fly the supposedly archaic models tactically. It is like using the time machine on a shuttle service.

The only way to achieve any sort of authentic Vintage meeting would be by mass-hypnotism, with all memory of 19-whatnot onwards erased. The whole atmosphere would be historically realistic, with everyone grumbling about the silly rules, and some crank suggesting that the Wakefield event be hand launched, with no cross section area rule, but a reduced 40 gram rubber weight.



Winning smiles from Ken Faux 1st FIC, Per Grunnet (Denmark) 2nd FIA, Gary Madelin Ist Al and Mike Warren Ist Sunset Sunrise FIA.

Azelot, France, 14th/15th May 1978 Report by Michael Warren WITH NO Coupe d'Amsterdam for

WITH NO Coupe d'Amsterdam for the second successive year, half a dozen British flyers took themselves on a short Springtime long-weekend holiday to France instead. The small grass airfield at Azelot, 10kms south of Nancy, was the venue for the Combat des Chefs, nothing to do with control line (nor a cooking contest) but an internationally-advertised free flight meeting, with events for the three main FAI classes, plus A1, Coupe and a junior event.

Since it was advertised internationally, it must be acknowledged that the attendance was disappointingly low. Four countries were represented and there were experienced and respected flyers there like Hermann Motsch of West Germany and Per Grunnet of Denmark. On the other hand, only 17 people flew in A/2 and that was the best supported event. Only three flew in A/1, only one (Ken Faux) in FAI power and, most amazing of all since we were in France, there was only one entry in Coupe.

The main events were the ten round FAI Comps and a special Sunset/Sunrise contest, flown to experimental rules, with four rounds each of three

Mike Warren with his new FIA model used to win Sunrise Sunset contest flown with no maximum! the ten round contest, Motsch was pretty well in a class of his own, dropping only 28 secs out of a possible 30 minutes. He is a first-rate glider flyer, similar in style of flying and degree of professionalism to our own Brian Baines, and I doubt that there are many — or any — better A/2 flyers outside the Eastern bloc.

Per Grunnet had a dreadful start to the contest, his best model being virtually demolished by the cows in

minutes and no maximum time. In

Per Grunnet had a dreadful start to the contest, his best model being virtually demolished by the cows in a downwind field. They ate one wing panel, half the tip and part of the fin, and trampled on the bits they didn't eat. (Britain's John Williams lost half a tip to the same animals later in the day.) Per recovered from the shock of this and from a mistake in Round 2 and flew increasingly well as the weekend progressed. He and Steffen Jensen, another Dane, were the only two to max out on the second day of the event.

The Sunset/Sunrise contest was an interesting and worthwhile experiment but was poorly named. Not only did we not see the sun either on the Sunday night or the Monday morning, but the contest was flown partly in the rain and in a stiffish breeze.

As far as I know nobody flew without d/t, but most set them at

Paul Masterman looking a bit soggy after flying in the rain to eventually place 2nd in FIB.







A quick glance at the trophy table shows considerably more incentive to participate than the normal offerings back home.

between four and five minutes, to make the most of any lift that was about but without risking a model loss. And there was lift about. Despite the fact that it was past eight o'clock on a damp and cold evening, Michael Warren (in the first round) and Hermann Motsch (in the second) found good thermals. These two stayed well clear of the others. In the last round, flown in the drizzle shortly before 7 am the next morning. Motsch's model, after a promising start, was down in just over two min-utes, leaving Michael Warren the winner by 35 secs in a 12 minutes total. It was an exciting contest, with the three-minute rounds demanding some quick thinking and with the air full of circling models.

Other British performances gave Gary Madelin first place in A/1 (though he loathes flying with a 30 metre towline!) and Paul Masterman, after a weekend of struggles with his props and prop assemblies, took second place in Wake.

All in all, and despite the weather, it was a contest that deserves better support next year. The organisation was friendly and sensibly flexible in coping with the problems of running a contest in foul conditions.

Results

FIA (10 rounds, 17 entries): 1. H. Motsch (GDR) 1772 secs; 2. P. Grunnet (DK) 1725 secs; 3. G. Nocque (FR) 1669 secs; 4. M. C. Warren (GB) 1462 secs; 5. E. Maiworm (GDR) 1406 secs); 6. J-C. Hirlimann (FR) 1339 secs.

F1B (10 rounds, 6 entries): 1. A. Koppitz (FR) 1397 secs; 2. P. S. Masterman (GB) 1352 secs; 3. H. Prioux (FR) 1299 secs.

A/1 (10 rounds, 3 entries): G. Madelin (GB) 1028 secs. Sunset/Sunrise F1A (4 rounds, 13 entries): I. M. C. Warren (GB) 268+123+172+183=746 secs; 2. H. Motsch (GDR) 121+265+194+131

Harmonia C. Watter (GB) 208+ 123+172+183=746 secs; 2. H. Motsch (GDR) 121+265+194+131 =711 secs; 3. P. Grunnet (DK) 115+ 185+112+151=563; 4. A. Deubel (GDR) 92+196+91+121=500 secs; 5. S. Jensen (DK) 178+114+56+138 =486 secs; 6. H. Couvard (FR) 112+ 103+72+102=399 secs.

Sunset/Sunrise F1B (4 rounds, 4 entries): 1. J. Wantzenreither (FR) 200+154+134+147=635 secs; 2. L. Doring (DK) 125+174+172+123=594 secs; 3. A. Koppitz (FR) 185+106+144+156=591 secs.

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by Dave Clarkson BOOK DAGE TERREPORTERS AND ALLESS TO THE SOUTH THE PROPERTY OF THE PROPERTY OF

Obituary - Paul Bugl

During the night of Wednesday, 28th June, Paul Bugl died in his sleep, from a heart attack. I am sure that all of my readers will join

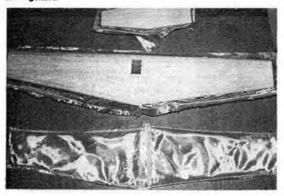
me in extending deepest sympathy to Paul's wife.

The death of Paul Bugl is one of the saddest occurrences in Team Racing for many, many years. Active in TR for over 20 years, Paul Bugl made and supplied TR motors of the very highest quality. Perhaps his most significant motor was the HP-15D which appeared in 1966 and gained a 2nd place for Hohenberg/Turk (Austria) in TR at the 1966 World Championships, and a 1st place for Stockton/Jehlik (USA) in TR at the 1968 World Championships. It was the first Schnuerle ported model aero-engine produced in significant numbers — a motor that has been the inspiration of many others since. Upon leaving HP, Paul commercialised his own Bugl 15D TR motor, a most worthy successor to the HP 15D. In its original prototype, Mkl and Mkll forms, the Bugl 15D, since the early 1970s, has played a major part in elevating standards of performance in TR to the present, amazing levels. I think that there is little doubt that had it not been for Paul producing his Bugi 15D TR motors, these last five years would have seen the Russians so far ahead that TR in the West might have disappeared. Instead we are coming to the 1978 World Championships here in England with the West able to mount its strongest challenge in ten years to the Russian dominance of Team Racing.

Sadly, Paul Bugl, one of the greatest TR 'Kings' will not be there to see what he of all people has worked for - possibly happening. to see what he of all people has worked for – possibly happening. Got the Meximum Stiffening from Glass-Cloth Covering Most of us are familiar now with the advantages and techniques of applying glass-cloth covering to the flying surfaces of racing models. Now that really excellent quality glass cloth of just 15gm/m² weight is freely available from advertised sources at reasonable prices. There is no sense in not using it to cover racing models, for the gains it offers directly in stiffness and strength and indirectly, by exploiting the strength gain, in reducing model weights. I guess that the most popular technique now used is that explained in this column – laying the cloth over the bare wood and brushing through 'Tufkote' or 'Epoxycote' paint to stick the cloth down. Recently I have learnt of the Improved stiffness that results from applying the cloth with the weave at 45 degs to the wood-grain, a technique pioneered by John O'Donnell in the Free Flight world. My own experiments have shown that the stiffening effect of the glass-cloth can be doubled by using it in this way, so what is the snag? Simply put, the snag is that once the cloth has been cut to shape with the weave at 45 degs, the cloth loses all 'shape' and becomes almost unhandleable.

There are two techniques for overcoming the 'shape' snag of There are two techniques for overcoming the shape sing or cutting the cloth at 45 degs. The first was discovered by the Free Flight boys and involves spraying the cloth with a 5/95 per cent dope/thinners mix to 'size' it before cutting. The small amount of dope put on the cloth sticks the strands together and so 'shape' is

Glass Cloth being applied to Dave's latest Nelson sprint, stiffness is increased by laying weave at 45°, Sellotape frame keeps cloth manageable.



retained on cutting at 45 degs. As you might guess, this is a messy technique and the 'sizing' removes most of the cloth's ability to go smoothly over compound curves — not a good idea.

The second technique has been inspired by Tim Gillott of Salinas,

California and is quite appropriate for the relatively small areas that we CL people have to cover. It is also quick and easy, and non-messy. What you do is to 'frame' the cloth with sticky tape (Sellotape will do but masking tape is best), leaving an approximately 25mm gap between the edge of the tope and the surface to be covered, before cutting the cloth at the magic 45 degs angle. The 'frame' of sticky tape holds the cloth most satisfactorily in shape whilst you are brushing though the paint to stick the cloth down. For the minimal amount of extra effort that this technique involves, you get really significant extra stiffness and warp resistance, both most desirable in CL racing models. Try the Gillott method described here — I can tell you that it works well and you will be most pleased with the results.

Criterium Midden Nederlands - 10th-11th June 1978, Utrecht Having a somewhat more important appointment at Church on this particular Saturday, I was not able to attend this year but, as you can see from the results, Utrecht as always turned out to be a very

ıası	contest.					
1.	Mau/		Heat	Semi	Final	
	Geschwendtner	Denmark	3-54.3	3-49.4	7-55.1	Nelson
2.	Petersen/					
	Geschwendtner	Denmark	3-54.4	5-57.8	8-04.0	Bugi
3.	Heaton/Ross	England	4-02.0	3-57.0	rtd	Neison
4.	vd Voort/Flores	Holland	3-50.7	disq		Bugl
5.	Visser/Buys	Holland	3-59.1	4-06.4		Nelson
TI	he winning model	was notah	le for its	very light	weight ((378 am)

The winning model was notable for its very light weight (378 gm) and its small diameter propeller (160mm) – the low weight gave rocket like take-offs and the small propeller very high revs. In the heats they used a large venturi to give just two stop range but venturied down for the final to give 40 laps range.

The final was very close with only a couple of laps in it until an incident occurred at lap 190 for Heaton/Ross.

To quote Luis Petersen: "At the time of the incident, we were leading with one lap on Mau/Geschwendiner and two or so on Heaton/Ross. We had already done our last stop as had the others. I was overtaking Heaton/Ross and had crossed lines. As I passed Derek, he got in behind me and tried to get it back. During this (as he told the jury) he lost sight of his model and my prop cut off his tail from the underside. Our motor stopped and Jens had to retrieve the model and run back almost one segment to restart with a splintered prop. So our final time was 8-04. After the final, we were disqualified for whipping on overtaking. But the rules clearly state that a warning for flying offences must be given visually during the race. We pro-tested, the final warning and won our protest."

Sounds as though the Jury of Jurgen Bobjerg (Denmark), Ed Meijer (Holland) and Colin Summerfield (England) had some very difficult decisions to take; I would not have liked to have been

For those interested, now that the World Champs is so close, the Team Prize situation - adding together the best heats from the three highest placed teams of each nation – was as follows: 1. Holland 11-53.0 2. Denmark 12-13.6 3. Englar 3. England 12-15.9

4. Austria 12-52.1

It looks as though we British are going to have to go very fast

indeed to get a team prize at Woodvale.

Norwest Evening TR Contest - 30th July, RAF Burtonwood Despite a 6pm Friday evening start, this contest attracted entries from all over the country - the most notable travellers being Wilson/ Gardner from Tynemouth and Smith/Brown from Feltham, both journeying over 200 miles to make it. Being a small entry FAI-TR only event, it proved possible to run four full rounds of heats followed by the Final before dusk came - allowing an hour or so in the pub before travelling home (and for a few a two-hour film show at organiser Jim Woodside's home where the Feltham films of the Trials, the Nationals and Utrecht were much appreciated).

The weather was kind enough I suppose for it didn't blow too much, but it wasn't warm and the wind was always a bit tricky. Almost two-thirds of the entry used Nelson 15D motors including very recent converts like Smith/Brown and Allcock/Chambers, both of whom made the final. With Ian Hutchinson presiding as Chief Judge, no one was going to have an easy time of it and no one did

The final was close between Heaton/Ross and Smith/Brown (both having reverted to Bugl powered models, Smith/Brown to their, by now famous, 'Slippery Sam'). The third qualifier, Allcock/ Chambers suffered from bad settings throughout except for, as pilot John Allcock commented to his mechanic Frank Chambers, 'a

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Dutch team for Woodvale, Metkemeijer/Metkemeijer, Visser/ Buys and Wakkerman/vd Weerd.

nice last tank, Frank'. Due to good pit-work and slightly superior airspeed, Steve Smith and Colin Brown won in a new UK record time just three seconds ahead of Heaton/Ross (who finished also inside the old record).

Results (14 entries)				
		Heat	Final	
1. Smith/Brown	Feltham	4-09.5	8-04.0	Nelson & Bugi
2. Heaton/Ross	Norwest	3-59.7	8-07.0	Nelson & Bugl
3. Allcock/				0
Chambers	Wolves	4-06.7	10-12.0	Nelson
4. Langworth/				
Broadhead	Wharfedale	4-10.0		Bugi
Nixon/Campbell	Hunters	4-12.2		Nelson
It is a real pity that	we cannot us	se Burton	wood at	the weekends
because of the activit				
tarmac are very good		•		
INTERNATIONAL	TR ROUND	-HP		

Kraiwiesen, Salzburg, 26th-28th May 1978

Bugl/Hohenberg Belogh/Dorant Nitsche/Fischer	Austria	3-58	3-56	8-11	Bugl
	Hungary	4-00	3-57	9-12	Bugl
	Austria	3-55	3-52	rtd	Bugl
(13 entries from six nat	ions)				_

The Salzburg newspapers reported Nitsche/Fischer's 3-52 as a 'World Record' but we all know better than that!

Swedish Team Trials, Sweden, 4th June 1978

		meat	Semi	rinai	
1.	Larson/Anderson	4-00.6	3-59.0	8-01.4	Rossi Fl
2.	Winkler/Pontan	4-22.0	4-00.3	8-55.0	Rossi FI
3.	Bengstar/Böhlin	4-06.0	4-02.0	rtd	K&B Spl
•	These heat times were	combined	with those	from pro	vious con

These heat times were combined with those from previous con tests for team selection purposes, the previous times being:

1. Bengstar/Böhlin 3-59 4-02 3-59 2. Larson/Anderson 4-01 4-01 3-59 3. Winkler/Pontan 4-04 4-09 4-02

As always, the Swedes are going to be a team to be reckoned with at Woodvale.

Whilst giving out foreign team selection information, for completeness, here are the results from the somewhat earlier Danish and Dutch selection procedures.

Danish Team Selection		
 Mau/Geschwendtner 	3-46	Nelson
Petersen/Geschwendtner	4-00	Bugi
Sejersen/Edsler	4-01	Nelson
Yes, a 3-461 The fastest time	anywhere	this year.
Dutch Team Selection	•	•

Metkemeijer/Metkemeijer Visser/Buys Wakkerman/vd Weerd	Fastest heat 4-02 4-02 4-09	Nelson Nelson Nelson
3. Wakkerman/vd Weerd	4-09	Nelson

The features of the Dutch team trials were Bert Metkemeijer flying against his doctor's advice since his broken leg was still mending and the new team of Wakkerman/vd Weerd who, before the trials, had never beaten 4-30. Their Nelson powered them through just pipping Helmich/vd Kroon in the process.

Le Bourget, Paris, 17th-18th June 1978

The second running of Roland Surugue's French International again saw a British 1-2-3-4 result. I have few details except that Smith/Brown won using a Bugl after having achieved a 3-58 in the heats using a brand new Nelson in an old Rossi model.

THE 1978 IRISH NATIONALS

The Irish Nats are held in succession at Cork, Dublin and Belfast. This year it was Belfast's turn so the C/L events took place at Nuts Corner Aerodrome near Belfast on 2nd June 1978. The site was of reasonable quality except for the total absence of practice facilities. Weather was reasonable being overcast with only a slight breeze. Normally an all-Irish affair, this year saw a small English invasion. The English did rather well as the results show.

Goodyear (12 entries) — 1. Doyle/Kane (Belfast) 4:34+9:56
Rossi RV G; 2. Morrall/Needham (Norwest) 4:34+10:01 STX-21;
3. Thomason Bros (Belfast) 4:51+rtd Rossi RV G. FAI-TR (6 entries) — 1. Jarvis/Needham (Norwest) 5:34+10:05 Nelson;
2. Hamilton/Wright (Belfast) 5:37+rtd Rossi; 3. Thomason Bros (Belfast) 7+rtd Nelson.

In Goodyear Ed Needham just could not get his OPS 3.5 powered 'Lil' Quickie' to run at all well so withdrew this to pit Len Morrall's ST X21 'Ol' Blue' to a close finish. The Thomason Brothers had similar lack of luck with their Nelson powered team racer. It was showing 21:0sec/10 laps airspeed for the first 16 laps of each tank and then seized ~ every time at 16 laps 1

Nevertheless the English Invaders really enjoyed themselves thanks to the great Irish hospitality – particular thanks go to the Thomason Brothers and Robin Kane for hosting the invaders.

TYNEMOUTH TR RALLY Albermarle Barracks, 9th July 1978 Amazingly for this particular venue in the North East of England, the weather was absolutely perfect with blue skies, lots of sun and hardly a breath of wind. Tynemouth club organised things smoothly once more, with height marker, warnings board etc. Events run were \(\frac{1}{2}\)A, Goodyear, FAI and B — quite an ambitious programme and if entries had been larger, organisational problems may have occurred for Dick Wilson and his club mates. The results were as follows: \(\frac{1}{2}\)A-TR 1. Clarkson/Woodside (Norwest) 4:11.0+8:08.5 Oliver Cub; 2. Fitzgerald/Berry (Wharfedale) 5:11.5+10:13.0 Oliver Cub; 3. Broadhead/Langworth (Wharfedale) 5:27.5+ntd Oliver Cub. On this occasion, Clarkson/Woodside's Oliver Cub behaved well in the linal giving easy 50 lap range and excellent airspeed with fast re-starts aided by the use of a fuel shut-off to give a new UK record performance.

Goodyear (Open Final) – 1. Cotterell/Perry (Wolves) 4:26.0+4:08.6+8:29.2 K&B 3.5; 2. Lorimer/Broadhead (Scotland) 4:30.0+4:38.0+9:37.0 Rossi RVD; 3. Fitzsimmons/Stubbs (Norwest) 6:01.0+4:37.8+rtd ST X-21 piped. (Novice Final) 1. Hollins/Gryszkowiak (Norwest) 5:11.0+11:55.0 ST X-21; 2. Ulrich/Hart (Wharfedale) 5:45.0+13:06.5 Rossi F1 D. The final was a hairy affair involving three (I hope they will forgive me) less than top class pilots – a perfect example of what is wrong with Goodyear at the moment. Nevertheless, two out of the three survived and the winning time was very close to the current UK Goodyear final record.

FAI-TR 1. Horton/Haworth (Wharfedale) 4:16.0+4:17.0+8:46.8 Haworth Spl; 2. Clerkson/Woodside (Norwest) 4:06.0+4:13.8+8:56.3 Bugl; 3. Langworth/Broadhead (Wharfedale) 4:08.0+4:09.5+9:51.0 Nelson. The heats were notable for a couple of quick times and less happily, Daly/Howard crashing badly and totally destroying a brand new Nelson motor (they eventually found the piston). At the start of the final John Broadhead was still removing dirt from the needle valve assembly on his Nelson, effectively guaranteeing them third place. Close it was between the first two with Clarkson/Woodside having slightly better airspeed but some mistakes and one comp adjustment for them vs the winners' faultless performance made the difference.

B-TR 1. McMahon/Myszka (Wolves) 3:39.0+7:16.5 OPS 29RV piped; 2. Fitzgerald/Berry (Wharfedale) 3:50.9-8:46.5 OPS 29RV; 3. Laurie/Clarke (Tynemouth) 3:45.0+9:37.0 OPS 29RV. Once more an all OPS final and as at the Nationals, it was the piped one of McMahon/Myszka that was the fastest and quietest: this time they won rather easily. Joe Myszka told me that their motor/pipe combination weighs all of 16ozs (now we know why current Bs are heavy!) and was running on a fuel of Castrol M 22 per cent, Iso-Propyl Alcohol 68 per cent and Nitro-methane 10 per cent.

HANDLE + FROM THE HANDLE + FROM THE HANDLE -

SPEED by lan Skinner

IT'S ALMOST FIVE years ago now, when after viewing the TV showing of 'The Blue Max', I tempted providence by visiting a local model shop, searching for a box containing a plastic Fokker Triplane. Long forgotten hobby shop smells returned to my nostrils and a chance flip through the current AaroModeller revealed a familiar face, sporting a moustache. Well, well, Martin Radcliffe, with whom some six years previously I had shared the same office, both as computer programmers. Martin at that time was quite an active aeromodeller, while my involvement had come to a halt around 1980 but as it now turns out, only interrupted by motor cycles, girl friends, marriage, etc.

However, armed with my box of plastic bits and copy of Aero-Modeller I arrived home. The small pile they made on the kitchen table hardly eroused any suspicion at all from my wife as to the future that lay in store. Being naturally a tidy person she had no notion at all that the innocuous bundle was to become a corner-stone in her life leading to, horrors of horrors, wood shavings in the bed and a prevailing homely atmosphere of dope and other 'beauti-

ful' odours.

Thus heralded my return to aeromodelling, anyway it would be an interest for the youngster! After reading Martin's article several times, I decided that Speed Flying was for me and I embarked upon the most absorbing and certainly sometimes, the most frustrating interest of my life. "Why fly speed?" I am often asked by my club mates. Well, speed is pure, always an ultimate goal and if you, as I, have feeling for mechanical power, then speed flying is for you. To experience being on the handle-end when the motor in your model really comes "on-song" is the essence, in fact fellow enthusiasts tell me that I smile the whole time when I'm in the pylon; could be though, I'm just gritting my teeth pending a hernia!

Let's get down to what this article is all about — entering the Speed Scene. Of course, you must appreciate that speed flying is relatively expensive, as George Aldrich says "No event takes more work and money per minute of flying time". This of course is true, but how much is at the discretion of the individual once he/she has started. The trick is 'softly softly catchee monkey' and not a big initial outlay on something exotic, promptly followed by an equally big wipe-out. Both Owen Warboys and myself fell into this trap leaving in our wake similar heaps of expensive junk which in turn led to 'very popular' delays in the replacement of worn-out household equipment. I've seen a fair number of speed newcomers put off in this

Owen and I, from the outset, decided that monoline was to be the mode of control and upon reflection we still believe we made the

After our initial self-induced setbacks, we decided to approach the problem in a more scientific and orderly manner and to suppress the optimistic enthusiasm somewhat. Eventually a robust and stable profile training model was designed and produced to satisfy the following criteria: (a) a natural flying altitude of around 8ft; (b) be able to rise from a take-off dolly; (c) be sufficiently strong to survive numerous premature landings; (d) be fitted with an H & R type torque control unit.



Ian certainly made an impression on the speed scene this season placing lst at this years Nationals with a new British 5cc record of 181.8mph.

To enable the model to perform in the 80-100mph region, motors of 5cc were chosen for power. Now we come to the bit engine collectors won't like. Through junk-shops and old contacts an assortment of Frog 500s and ETA29s were obtained; it's surprising how well the Frog responds to 60 per cent nitro; albeit not for long I Flying success was almost immediate with a minimum of heavy landings. However some very useful experience was gained, the main points being:

Keep the model on the ground sufficiently long to gain flying speed, if you don't, the most incredibly aerobatic stall results.

Pull the model toward you on the take off run about twice as hard as you think necessary.

Rat-trap type take-off dollies appear to offer some advantages over the drop-in variety, by naturally preventing premature lift-off.

Don't let the model climb too high on the first lap, that is, above 20lt, if it does don't even suggest anything that looks like down-elevator. Although it takes some stomach to do we found infact we had to give full-up control and hang on until the model had 'cleared' the hard surface on the other side of the circle before any attempt to level out was made.

Once flying, if any oscillation tends to occur, flatten it out on the climb and not on the dive, unless of course, it really is bad, when

anything is worth trying!

Using the points outlined, four competent monoline flyers have evolved, including my 12-year-old son, who needless to say found no problems at all right from the first lap, leaving Dad wondering what all the fuss had been about I

lan's Super Tigre X29 powered model sitting in its Rat-trap take off dolly, wires hinge over wing leading edge to prevent premature take off. Pipe running from tuned silencer pressurizes fuel tank.





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In point of fact he converted his KK Champ to monoline and has experienced less mishaps than when it was flown two-line. Taking monoline a stage further, we installed a torque unit in a KK Gazelle and this aircraft now performs all manoeuvres excluding squares, which I believe is one in the eye for the 'having never flown it' monoline knockers.

So far I have emphasised my commitment to monoline; there is, however, plenty of scope with two-line flying, particularly if one's leaning is toward the specialised FAI competition where it is mandatory. In open speed classes monoline currently dominates the records table with one very notable exception, Paul Eisner's 183mph Rossi 15 powered 2.5cc record. This was flown using two wires with groupers. The use of grouped lines is a science in itself and has its own flying characteristics and peculiarities which would be best expressed by someone with first hand (on the handle) experience. I think perhaps the writing is on the wall for us monoliners.

Currently, the main problem for the newcomer to monoline is the supply of the essential component parts, namely the control handle and the aircraft control surface actuator. The system itself was developed by an American, Victor Stanzel, one of control line's pioneers. Unhappily his company which manufactured all the necessary items ceased business some years ago. The first component to become extinct was the actuator which consisted of a worm driven bellcrank but Messrs Husted and Roy in the States launched their torque control unit as an alternative. These are obtainable, when available, through Irvine Engines. However the principle of operation and construction of them is such that most competent modellers should be able to manufacture their own. The Stanzel control handle consists of a hand grip and a pair of fairly large diameter wires wound to form an Archemedian screw, which is supported by bearings within the handle. The screw is made to rotate by means of a sliding bobbin.

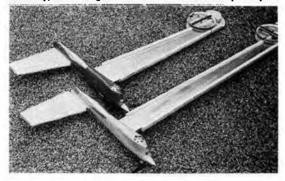
This type of device is somewhat difficult to reproduce, although a friend is actually doing so.

An alternative to this type does exist in the form of the Uni-line handle, again obtainable through Irvine Engines. This device consists of a hand grip similar to the normal two line handle, control being applied in the same manner, while the twist to the control wire is transmitted via a chain of gears. Whichever method is adopted by the user, obtaining the necessary items is generally the result of single-minded persistence.

Having mastered the principles of monoline one is faced with the next step in speed, competition. A fundamental, I believe, is to concentrate one's efforts on a single class. I chose 29s, while Owen, fancying something he-manish, wont for 60s. One can of course start with the smaller classes, 049 and 09s but the models, particularly the 049, do tend to be rather fiddly and have the most appalling take-off characteristics, like rolling In and winding the line all the way up to the man in the middle, an exaggeration agreed, but the point is there.

The first season of competition flying should consist mainly of developing technique, entering the pylon successfully, recording three official times and studying the style and performance of others more experienced, rather than going breakneck for instant success. This period should commence with the construction of a traditional style of speed model being powered by an easy-to-handle 29 or 40 motor of reasonable performance. Sporty 29s of the older generation, ie KB29R and ST G2/29RVs are rather rare these days but do occasionally crop up. Ex-Rat Racing motors such as the ST G40 and KB40 are perhaps easier to obtain, with the added advantage that they are usually cheap. The most expensive component of the model is likely to be the pan, an aluminium or magnesium alloy casting obtainable through the local model shop from a specialist such as Irvine Engines. Two excellent articles have already been recently published regarding these matters in Aero-

Jurgen Lenzen s new models for Woodvale, Ultra Kinglisher and smaller Piccidusi for wind. Needle is adjusted internally by Allen key, metal wings are available for interested speed flyers.







Two more National winners Owen Warboys left who took locc Class Speed with 174.7mph and newcomer Pete Williams who set a new 40N record with 153.2mph.

Modeller, the first by Martin Radcliffe in August 1973 and the second by Pete Halman in April 1977, so there seems little point in duplication here. Pete's article was associated with the publishing of his plan for a 40N newcomer's class speed model which contains copious tips on construction, etc.

Our first season of competition in terms of result-board placings was poor as expected but on the bonus side we invariably posted three official flights, which is most important.

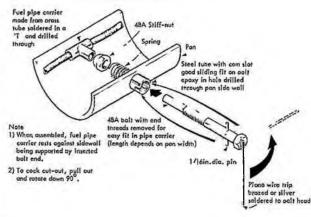
One of the undesirable aspects of speed flying which soon became apparent was the shaft-run, where for some reason or other, usually ground contact, the propeller blades are shed. The resulting dramatic rise in engine revs being generally followed by connecting-rod failure and severely damaged piston/liner assemblies. Not very nice, not only is it very expensive to replace these components, one is also faced with 're-learning' the re-built motor, just the sort of thing to happen at the contest immediately prior to the Nats.

There is, however, a simple method of avoiding almost all shaftruns, by the fitting of a fuel shut-off device, activated by ground contact.

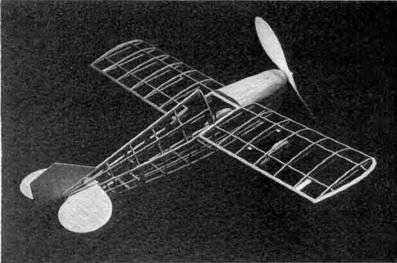
The shut-off does not have to be complicated, just something simple to crush the fuel-feed pipe to the motor is sufficient. The litting of such devices to our own aircraft must have saved Owen and myself a small fortune. When we first exposed the technique to the old hands, it attracted a fair degree of scepticism. However, it is starting to catch on; can't be doing the spares business much good though!

I hope the foregoing was of interest to some readers. I would like to wind up by saying that in Speed Flying the old adage 'He who hesitates is tost' is totally out of place and perhaps the Scouting 'Be prepared' is more in keeping. If you are not certain about the operating efficiency of any single component (including yourself) in the set-up, don't fly until you are. Remember, when you're in the middle with the control handle, you occupy the supreme position of trust. Those around you are relying on you flying safely, the pull-test is only part of it.

SIMPLE GROUND CONTACT FUEL CUT-OUT







Andrew Moorhouse caught at point of launch, the biplane in the background is a bonus. Above, model structure emphasised on dark background using single overhead light, additional light from right would illuminate cowling.

PHOTO TIPS

by Alan Callaghan

A STATIC SHOT of the uncovered framework of a model always has its attractions particularly with scale models since they tend to have a much more complex structure than other types. Photographed in this way any model is always shown off to best advantage when placed upon a totally plain and preferably very dark background. Such pictures rarely work well if the model is placed on grass, or against a background that is either confusing or very close in tone to the colour of the balsa. One should aim for as high a contrast between the model and the background as possible. I like to use a piece of very dark brown cheap imitation velvet bought as a remnant at a fabric shop and which is approximately 2 metres square. Lighting for this types of shot is best done with two lamps. They need not be very powerful, normal domestic 150w bulbs may be used instead of photofloods, since one is trying to lose any cast shadows against the dark background. One lamp can be placed above the model, and the other to the side from which one is viewing it. A minimum of exposure should be given and this is easily measured correctly by taking a reading from a sheet of 4in. wide balsa placed in the position of the model. By using this method only the light reflected from the balsa is taken into account and any shadows cast by the lighting should simply blend in with the background material.

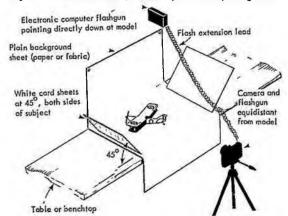
It is wise to 'bracket' the exposure by making three exposures altogether: one underexposed by one stop, one at the indicated exposure, and one overexposed by one stop. As an example, for an indicated reading of f8 at 1/125, this would give: f8 at 1/250, f8 at 1/125 and f8 at 1/60. By keeping the aperture constant one does not alter the depth of field, and if one is using a tripod any slow speeds used should not cause any difficulty. Another advantage of using a tripod is that the camera's self-timer or a cable release can be used, and using either of these will help to keep vibration to a minimum and produce sharper results. As very much a rule of thumb guide to the actual positioning of a model for such a shot, a rear three-quarter view makes a good starting point since, aircraft being the shape that they generally are, this angle most easily fills the normal rectangular picture frame.

A similar technique may be used to good effect in taking indoor photos of a finished model, but using a flashgun as the light source. An electronic unit with a computerised output makes it all relatively easy, but a standard unit may also be used if the distances of the flashgun to subject and subject to camera are carefully controlled. An extension lead is used from the camera to the flashgun, which is held directly over the model pointing downwards (see diagram). Once again a plain background should be used which is large enough to completely fill the viewfinder and still contain the model. A light colour is more suitable for this method. Used by itself, the flashgun would give extremely dark and unpleasant shadows beneath the model at such close range. This problem is overcome by placing at each side of the model a sheet of clean white card angled at approximately 45 degress to the vertical. The strong light reflected from both of these sheets will illuminate the sides of the

model very well, and will greatly lighten the main shadows created by the gun overhead. This technique is most suitable for small models such as Peanut scale size where a great deal of space is not needed and the setting can be quickly assembled on a table top with a minimum of 'props'. Excellent studio type record shots of a model can be made in this way using either black and white, slide, or colour print film. Although they sound like very expensive items a computer flashgun can be bought for as little as £12 if one is prepared to shop around.

Static shots of a scale model taken outdoors in a suitable location can be very satisfying if they are carefully composed. It is best to try and position the camera at a scale eye level to give the most convincing perspective, and as most tripods will only go down to 15in. or so above ground level it is better to use some books or suitable blocks of wood on which to stand the camera to achieve the correct height. Some tripods have means of attaching the camera to the bottom of the central column, but one then has the problem of getting at the viewfinder since the legs tend to get in the way! A wide-angle lens is useful for this type of picture, because these tend naturally to have a greater depth of field than a standard or telephoto lens on the same setting, and depth of field (or the lack of it) is the main give-away with any picture of a model that is purportedly of a fullsize subject. The background should be very carefully chosen, and naturally the best ones are found at airfields, with the model standing on tarmac. If you make an attempt at this type of shot at a model flying meeting, also try to ensure that there are no people or rows of shiny motor cars encroaching into the frame to spoil the scale effect.

The lens should be stopped down as far as it will go after focussing on a point on the model that is halfway between the nearest and furthest extremes of its distance from the camera. It is here that many of the older folding bellows type roll-film cameras have the edge over the modern SLR, since they are usually designed to



stand on a flat surface, and many have viewfinders usable from above together with lenses that will stop down to 132 and frequently beyond, thus giving terrific depth of fleld even with a standard lens. Since the camera is very firmly located when used in this way there is no problem in using very slow shutter speeds.

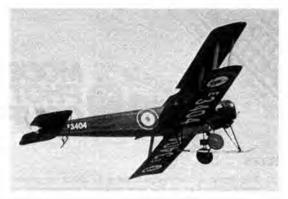
In photographing models being flown there are a number of things worth bearing in mind, and one golden rule is to never get in the way of the person flying the model. There are two ways of doing this in the main, the first being to ask the flyer if he minds being photographed, so that he knows exactly where you will be as he launches his model, and the second is to use a short to medium telephoto lens on your camera so that you can stay well back and even shoot without the flyer knowing. Close-up shots of models being launched often hold much interest due to the many and varied facial expressions that are occasionally and unwittingly adopted when the launcher is concentrating particularly hard! If the model is small, a wide-angle lens can be useful since the subject is capable of flying out of the frame very quickly indeed. Because of its wider coverage, a 35mm or 28mm lens will keep both the model and the flyer in view just that little bit longer to enable you to keep both subjects together. With handlaunched models one should try to keep the aircraft as close to the hand as possible, and being able to anticipate exactly the right moment is a knack only acquired through much practice. A good method of ensuring that such a naturally sudden movement is captured sharply is obviously to use a high shutter speed, say 1/500 or 1/1000 second, and position oneself so that the model is being launched directly across the picture plane with the action being confined to within a limited depth of field. On a dull day with 400 ASA film a typical setting of f2 at 1/1000 could be quite adequate for a sharp result. Having a model launched directly towards the camera can also give very good results, except that one needs to stop the lens down to give greater depth of field enough to keep the flyer and the model in sharp focus and subsequently use a lower shutter speed, which increases the chances of a blurred image. There is no reason why this may not be acceptable, of course, so long as this was the predetermined intention before the shutter release was pressed, and the photograph does have some other genuinely commendable quality.

In the air, control line models and radio models are the easiest to photograph, whereas free flight models, particularly small ones, are the most difficult. Radio models can be ideally placed to suit the camera by a good pilot, and with a CL model one can usually gauge almost to the nearest foot where the model will be on each lap. Speed and racing models are almost impossible to catch in the air since a subject even doing only a modest 90mph will still have moved 1.584 Inches in the space of 1/1000 second. With any moving subject it is essential to 'pan' or follow the movement with the camera and press the shutter as smoothly as possible, but with this degree of movement at relatively close range one has enough difficulty keeping the subject within the viewfinder let alone anything else. Having read hundreds of modelling magazines over the years I have yet to see a good photo of a speed model in flight, perhaps someone can show us how to do it?

An easy technique to adopt with a slow flying CL model such as a scale type is to use say a 135mm lens, and choose a spot on which to stand where you can fill the viewfinder and focus carefully on the model as it is being made ready for flight. If you do not move from this position the model ought to be fairly accurately in focus as it comes over the same take-off point on each successive lap. All one has to do then is to pan carefully and make sure that the image

Brian Dykos C/L Stunt Stuka. Careful focussing and panning with the model keeps image sharp: 135mm lens at 1/1000 sec. in bright sunshine.





Mick Staples, immaculate AVRO 504K. With control line models shots can be planned and framed up on previous laps.

is centrally located in the viewfinder for each exposure, Again, the highest shutter speed on the camera should be used.

In taking photos for the Scale Matters column I mainly use a 35mm single lens reflex camera with a 50mm and a 135mm lens, together with a computer electronic flash for indoor flying shots. I previously used an 85mm lens which I found perfect for general purpose and close-range flying shots, but since changing my camera the cost of replacing this has become prohibitive at today's prices I As I prefer to try to include people with their models when possible and therefore work at close range, I do not find much need for either a long-range telephoto or zoom lens, both of which are better suited to in-flight shots of fairly large models. One article published some time ago was entirely illustrated by photos taken on a Super Ikonta folding 120 rollfilm camera dating from approximately 1936 which will quite happily slip into any normal jacket pocket and give results equal to many a modern expensive SLR although it obviously is slightly more difficult and slower to use. The SLR I use has a through the lens (TTL) metering system which I always use for black and white photos, but when taking colour slides I find it more reliable to take a reading with a separate light meter using an incident light attachment. This measures the general light falling on the subject and not the light reflected from the subiect's surfaces as does the TTL system. When shooting against the sky in black and white I like to use a yellow/green filter on the lens. This has the effect of making any clouds stand out in contrast to a blue sky, but not over-dramatically so. If there are people in the picture the yellow/green combination makes skin tones appear much less pallid than would a straight yellow filter. In colour work a polarising filter will improve the appearance of the sky without affecting any natural colouring of the subject. If you are photographing fast moving subjects you cannot always be sure which way the lens may be pointing in relation to the sun, so it is a good plan to always use a lens hood in order to minimise flare. The majority of black and white pictures that I take are on 400 ASA film so that the higher shutter speeds may be used under most normal conditions. As I rarely have very big enlargements made, the problem of graininess normally associated with the faster speed films compared to slow speed film does not usually arise. I also find it better when preparing for a day at the flying field to decide beforehand whether to concentrate either on flying my models or on taking some photographs. To try to do the two separate things really well is a compromise that for me produces either poor pictures or broken models, or occasionally both I

Author's 14 inch span Isaacs Fury outdoors at Cardington, Beware of rough foreground. Camera rested on ground using 25mm lens.







RULES

- The theme of the competition is to select the photograph judged to be the best pictorial presentation of Aeromodelling. All submissions must be certified as the work of the entrant, by signature on the rear face or mount.
- 2. There are two competition classes:
 - (a) Colour slides which should preferably be vertical format 35mm, or larger.
 - (b) Black and white prints of any size up to 10×8ins., negatives need not be provided.
- The following information must accompany each entry:
 (a) Sender's name and address,
 - (b) full details of the model, location, builder, event,
 - (c) title or caption.
- 4. Entry is free. Each entry (however many pictures it contains) must be accompanied by a contest coupon taken from an issue of AcroModeller magazine. There is no limit to the number of entries that may be made but remember that quality will count, not quantity.

- 5. Clearly mark the entry "Model Photo Competition" and send to AeroModeller, 13-15 Bridge St., Hemel Hempstead, Herts.
- Proof of postage cannot be held as proof of receipt by AeroModeller. While every care is taken of material received, this journal cannot take responsibility for any loss or damage to entries whatever the cause.
- 7. Entries can only be returned after the judging if suitable postage and packing is provided.
- 8. The Judges' decision is final in all matters and no correspondence can be undertaken in connection with the contest.
- 9. Entry to the contest implies full acceptance of all rules.
- AeroModeller reserves the right to publish any photo during or after the contest. Copyright of all entries rests with the entrant.
- Closing date for entries 29th September, 1978.
 Winners will be announced in December AeroModeller on sale 17th November, 1978.

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club News

"IS OUR HOBBY too commercialised?" is the question bandied around the clubrooms, and there seems to be no satisfactory or definitive answer. We have always had to rely upon the Trade for our prepared materials, but now that whole components such as wings and fuselages, and even completed models, are becoming available there seems to be the danger of the aeromodelling hobby being less a hobby than just another affluent indulgence.

But there is another term we often hear these days, too, and that is 'job satisfaction'. There is a certain pride and sense of achievement in handling and flying a model that you have constructed yourself, particularly one in which there has been some tricky building problems to over-come. It matters not how much you spend on expensive components, the hobby will remain basically a building, as well as a flying one.

Plenty of building activity, still, in the Timperley & DMFC, the subject of our first report. I say this, as it would appear that this South West Manchester based club appears to be mainly free flight, which, in these days of radio domination, is certainly something, and, of course, it is the free flighter who still pins down the \frac{1}{2}in. strip in the time honoured way. Very much in the forefront of free flight thinking is the recent, highly successful Nationals. Timperley club honours came in junior Stephen Wingate putting the seniors in their place by reaching the Open Rubber fly-off with his APS, design,

Late Night Final. It is now rumoured that the designer of the model is about to build a replica of his old design. The other Nationals success was a partial one, for Steve Philpot who won Vintage shares his time between the Timperley and Whitefield clubs. On the home front the very active committee has arranged a number of free flight comps, not least of which is the P-30 rubber powered event, flown every Friday evening at the Salisbury Road site, where John O'Donnell's *Teacher's Pet* design, flies very effectively. The Salisbury Friday evening meets also feature R/C Thermal Soaring, which has a strong club following. Power R/C however, is banned on this club field. The Thermal Soaring enthusiasts go out each Sunday in a large motorised convoy to follow the Northern Thermal Soaring circuit. Coming down somewhat in wingspan to yet another club interest there was an Indoor Rally in April, attended by a number of clubs, including Bolton and Sheffield, with Peanut Scale the focus of club interest. Colin Tissiman's well performing models came in for admiration. Anyone, then, interested in any of the pursuits mentioned are welcome at the Friday meetings (St Alban's Hall in the Winter). And look out for the club at the South Trafford Technical College Model Exhibition from 26th to 28th October.

When we get it we too readily dismiss it as a lot of hot air, but general chat, the plaintive complaint and the interflux of ideas however heatedly expressed is what we modellers thrive upon - man cannot live by balsa wood alone; so pity the poor old newsletter editor, in this case Bertie Wright of the Belfast MFC's Nitro, when the material forthcoming, vocal and otherwise, is thinner than the thin air into which it all vanishes. To the rescue of the May issue, however, comes that redoubtable bastion of Northern Ireland model flying, Maurice Doyle, with what went on in the Summer Silver C/Levent at Nutts Corner. Goodyear may describe the event but not







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An unexplained mystery in the latest issue of *The Bourne Flyer*, the newsletter of the Sittingbourne & DMC, centres on a Red Pig seen in the bar where the club meets. It could have been mistaken for a pink elephant except for the suspicion that it was radio controlled. Still on sport rather than scrious flying the club held a F/F Scramble in May. Good times were recorded with an energetically wielded Chuck Glider and a model with a deliberately installed stall to save on the legging distance. We wonder how this compared with the CO₂ Scramble also mentioned in the newsletter, and which provided an amusing diversion from the more serious exertions at the Nationals. You would not have imagined how many and various were the approaches to CO₂ power, from lively little scale models to up and away duration jobs. Part of the fun was the ability to duck swiftly from the models anxious to save the legs but not so sympathetic towards the other extremity.

The good news in the Leicester MAC, Bulletin is the acquisition of a new flying site; a field adjoining the Wreake Valley College, Syston, to which the club is affiliated. At present it is only available for silent flight. Primarily suitable for R/C gliders it is large enough for F/F trimming and sports flying, non-powered of course, if the wind is in the right direction. The college facilities appear to give opportunity for the revival of the once popular indoor meetings. On the wider F/F front talk is still of the Nationals. Described by Martin Scott as "straight out of a 50's Aeromodeller' the weather, all blue skies and light winds was a truly remarkable piece of leniency on the part of our usually ill intentioned climate. Four Leicester members tested out the thermals in various events - in the case of Gerry Ferer, too thoroughly, for his Coupe D'Hiver entry still went up after the d/t had come in. Model found later but not in time to complete his flights. Gerry was also active in Open Rubber, being the defending champion, but sadly dropped a flight to keep him out of the fly off. He was out of luck in Vintage, too. His new and radical Vintage 'Open' model was not quite on form, but his faithful 'Northern Star' performed in lively fashion but not up to the standard it enjoyed in its prime. No honours, then, for Ferer & Co., but, nevertheless, a wonderful weekend's flying.

Andrew Tomlinson draws the attention of all modellers of all aspects of modelling to the existence of the Linscale Scale Model Club. Not just a model aircraft club, though, for it covers ships, cars, railways, military vehicles and even war games. Meetings are held on the last Friday of each month at Deighton Close School, Lincoln Road, Louth at 7.30pm, admission 20p. For further information contact the Secretary, Andrew Tomlinson, 'Omega', Albert St., Horncastle, Phone Horncastle 6071 (day).

Over the years we have come to associate the name of Wharfedale with control line, particularly team racing, but wider interests are discussed in the report we have received from Peter Valentine, PRO, of the Wharfedale & DMAC. He tells us that membership has suffered a violent drop, from 160 to 110, due mainly to the loss of Rufforth as an R/C site, but, he adds, activity in C/L is as hectic as ever. The lesson here is obvious, and not overlooked at the club AGM, where it was decided to restrict membership renewal to those attending at a club meeting. It is a notable fact that the whole nature of model flying has undergone radical change, with large numbers of model flyers, particularly radio, not interested in club life or the movement in general, but only in access to a suitable flying site. Perhaps they would be happier, and everyone else,

too, if they just paid a field admission fee, on a day or seasonal basis. But enthusiasts all at the Nationals, where Wharfedale achieved some good results. Chairman, John Horton was first in Goodyear and Bernie Langworth and Mike Cross first and second in Mini Goodyear. And a fillip on the free flight side, too, with 15 year old Graham Brown first in Glider and 3rd in Rubber in the Junior Kit contest. Another notable Junior success was that of Roger Price winning Junior Stunt. Back at home there are meetings or competitions three Sundays out of four at Ilkley Grammar School or Bramphope, and if there is now no site for R/C power, there is a step up of interest in Slope Soaring. The annual Scale Day for R/C and C/L, a popular event over the past few years, is again being held this year in spite of the loss of Rufforth; the Northern Area kindly making available a suitable site. Club meetings are held on the first Friday of each month at the Salem School Room, Burley, in Wharfedale. New members welcome, or contact Secretary John Broadhead at Flat 5, 8, The Avenue, Roundhay, Leeds 8.

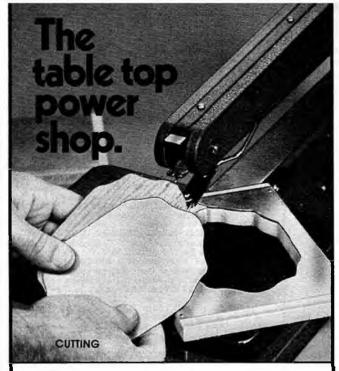
Not too easy to escape the afterglow of the Nationals even if we were so disposed, and in Seadog, the newsletter of the South Eastern Area, where the free flight organisa-tion comes in for a spot of appreciation, a gesture which we readily endorse. The splitting of the event into the two groups is also favourably commented upon, even though camping at one place and flying at another can be tiring to those committed to a hectic contest schedule. But you have to take what is available these days, and considering the restrictions and provisions surrounding any airfield negotiation all credit must go to the people in our move-ment who undertake this frustrating and often fruitless ground work. Mentioned in the newsletter are some of the new swathings of red tape around the very desirable site of Odiham. The airfield is required on two occasions during the year, and although seemingly obtainable, modern noise sensitivity has produced a number of power taboo areas. Things get tougher every day! A brighter prospect is the number of new clubs now joining the area, with the Sussex Radio Flying Club, with 145 members, the largest to affiliate. Nice to see that Folkestone has a club once again, and that the Canterbury Pilgrims have returned to the fold. Much of the newsletter is devoted to contest results, saying much for the activity that goes on in the area. Free flight shows some good placings in Area Centralised events, and there is always plenty of Thermal Soaring competition at Ashdown. And on the thorny (literally) subject of Ashdown model flyers were intrigued by the appearance of a derrick on the old gorse patch. Could it be they were drilling for oil, or even gold? No, just water. But why prospect for this, it is asked, there are unlimited sources - where the models land.

Members of the Watford Wayfarers' Club have been tentatively trying out the newly acquired flying site at the Queen's School Flying Field. Looked upon with little favour at first the field is not so obstructive to the meanderings of radio models as was at first feared. There is just one isolated tree that menaces, albeit with that magnetic attraction that such isolated objects seem to have. But it is not on the playing fields that the battle is being fought; but on Croxley Green where noise sensitive residents are on the attack. Like the old lady who could see monstrous things if she stood on a stool to peep out of the top of the window, so the over reacting noise complainants find nuisance where none is too apparent. Meantime the club is improving its public image with a series of public displays. Seems there is a call for a static display as well as the flying one, thus giving a public view to that super Concours model or something unusual or unorthodox. Revenue from the displays goes towards cash prizes for

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Contest Calendar August SMAE 2 DAY FAI MEETING. F1A, F1B, F1C. Sent LEE BEE'S AEROBATICS DAY. F2B. Start 10am. Vonue: 2 miles from Beaulieu on A3054. Contact: Dick Craik. Tel: Locksheath 5726. M. AREA GALA. FIB Jubilee Trophy plus cash & O/R both in rounds O/G, O/P, A1, ‡A, Cd'H & H.G, Start 10am. Venue: Barkston Heath. Contact: G. Ferer. Tel: 053-388 6519. INDOOR MEETING. EZB, CO₂, Duration, HIG (Swagnatta) Venue: Cardinaton, Contact: 19/20th Venue: Barkston Heath (provisional). Contact: Mike Fantham. Tel: 01-736 7163. August INDOOR MEETING. F1D, 35cm Microfilm. 10th Sent 20th Venue: Cardington. Contact: Laurie Barr. Tel: 17th 0828 25595 O628 25595. August ST ALBANS SUMMER MINI GALA. A1, Cd'H, \(\frac{1}{2}\)A, HLG, Venue: Bassingbourne, Contact: Poto Putnam. Tel: Wel. Gd. 28926. August ALL VINTAGE DAY. Fly for fun. Rubber Glider Power R/C assist and Old Timers Fireball Trophy Control Line, Venue: Old Warden. Contact: Aero Modeller, Hemel Hempstead 42501. August MAGNET MEETING for magnet steered gliders, 26/27th entry 40p. Venue: Castleton near Derbyshire. Sept INDOOR MEETING. E2B, CO₂, Duration, HLG (Sweepette). Venue: Cardington. Contact: Laurie Barr. Tel: 062 825595, HUDDERSFIELD FAI COMBAT. Top Eight+Junior prizes. Venue: Crossland Moor Airfield, Huddersfield. Contact: Doug Shore. Tel: Hudds. 17th Sept 17th WIDNES STUNT COMP. SMAE Schodule plus Novice event. Stert 10am. Contact: G. Pile, 16 Ganton Close, Widnes. Tel: 051-424 3901. SM AREA VINTAGE RALLY. F/F, C/L & R/C 26/27th entry 40p. Venue: Castleton near Derbyshire. Contact: B. Faulkner, Tel: Lymm 5558. Sept 17th WORLD CHAMPIONSHIPS INDOOR. F1D. August 26/28th No spectators. Venue: Cardington. Contact: Laurie Barr. Tel: 0628 25595. August SMAE CENTRALISED SPEED. All classes. Sept Assist. Also C/L Novice/Junior Stunt. Venue: RAF Halton, nr. Aylesbury, Bucks. Contact: W. Burkinshaw. Tel: Ayles. 21676. ELLIOTT GOODYEAR ENDURO. Half hour racing periods. Venue: Elliott Marconi, Rochester Works off A229 from M2. Contact: Peter O'Neill, 24th August 27th Venue: Widnell Lane, Piddington, near Bicester, Contact: Mike Billinton 01-699 5354. Sent 3 KINGS OPEN DAY. Stunt+Novice Class II Scale Carrier. Venue: Old Croydon Aerodrome, August 24th 28th Puriey Way, Croydon. Silencers essential. Contact: A. Fritz 01-767 4128. 1 Hillingdon Rise, Sevenoaks, Kent. LONDON AREA GALA. O/R. O/G, O/P. Venue: Sept 5TH F/F AREA CENTRALISED. Team Power 24th Bassingbourne. Sept (Keil & Plugge) F1B (Gutteridge) A1 glider. Area Sept SOUTHERN GALA. O/R, O/G, O/P, A1, Cd'H, 1A, HLG, Scale. Venue: Odiham. Contact: N. Couling. Tel: Eastbourne 53116. 3rd 24th venues. venues. EUROPEAN C/L TEAM TRIALS, F2A, F2B, F2C, F2D, Venue: Burton Wood, Contact: Bob Horwood, Tel: 0272 48869. NUMERICAL 2 FSA SCALE GET TO-GETHER. Informal Flying from 2pm. Venue: Chobham Common. Contact: W. Dennis, 67 Shepherds Close, Hurley, Maidenhead, Berks. N. AREA RALLY. R/C, C/L & F/F & Scale & Taillass. Venue: Elvington. Contact: Clive Westerman. Pudsay 550812 Sept WOLVES F/F GALA. O/R, O/G, O/P, Combined Mini HLG. Class II F/F Scale. Venue: Chetwynd. Contact: Mick Brown 021-329 2751. 3rd October 1st Sept October INDOOR MEETING. F1D Manhattan. Venue: 3rd Cardington. Contact: Laurie Barr. Tel: 0628 25595. ELLIOTT AUTUWIN SPEED. All Classos+Best 1st October Sept 1st Newcomer. Venue: Elliott Marconi, Rochester Works, off A229 from M2, Contact: Ivor Roffey,

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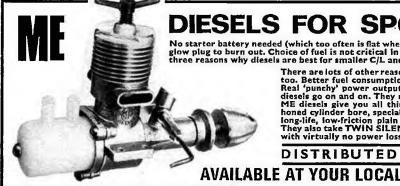
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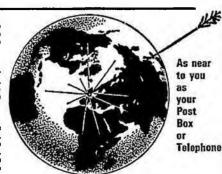
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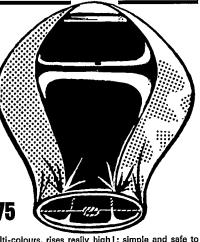
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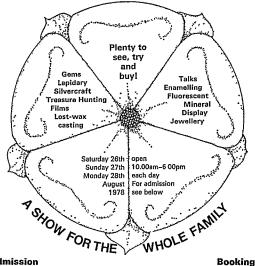
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