Aero Modeller

February 1977
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MODEL AIRCRAFT

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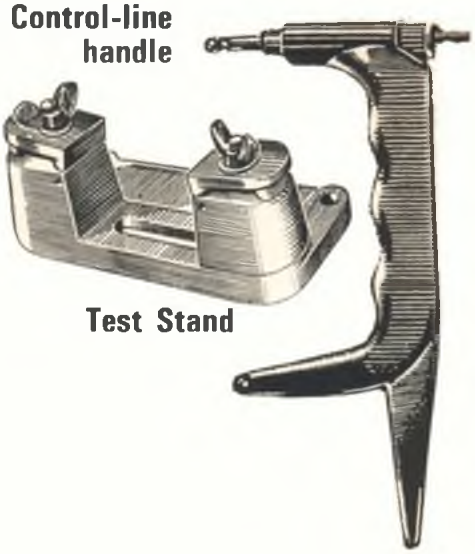

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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

February 1977 Volume XLII No. 493

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Comment

Production lead-time and the advanced publication date of this 'February' issue inevitably presents us with a situation where we are writing this on the last day of 1976. One wonders what the next twelve months will bring. The crystal ball is cloudy in parts!

In the World Championships sphere we open with the pre-Easter R/C Thermal Soaring event near Pretoria, RSA. This will be the first W/Ch for the class and we wish it all the success it will undoubtedly need. Next, the R/C Aerobatic World Champs will take place at Springfield, Ohio, USA, June 29th-July 4th (instead of at Klagenfurt, Austria), and then the Free Flight Champs at Copenhagen Airport, Roskilde, Denmark, July 6th-12th.

Ardent followers of FAI matters will realise from the above news that the December meeting of the Models Commission (C.I.A.M.) resolved the difficulties which threatened all Championships. The two year cycle is preserved though subject to re-arrangements still being considered.

On the domestic scene, it is with some regret that we cannot announce the venue or date for the British Nationals which appear to be subject to splintering of divided (should we say blinkered?) interests. However, the Indoor Nats are announced for Spring Bank Holiday, June 4th-6th at RAE Cardington, and Little Rissington is listed in the FAI calendar as the location for the International Sopwith Trophy event for Pylon Racers over the Summer Bank Holiday, August 27th-29th.

on the cover *photo by Joel Rieman*

Surfing over the vast desert flats of El Mirage dry lake, Taras Kicenuik's Icarus MPA on a test flight, just after cable release from its car tow. Covered with Solarfilm it is the first colour decorated MPA, and lays claim to being first to fly in the USA. See page 102 for more details

next month

Plans for a simple semi-scale free flight version of the unconventional Fairchild A10 prototype—for electric power too! Sig's semi-scale Mustang stunter kit is reviewed, and drawings provided for a very different form of aircraft—certain to appeal to sports fliers. Other features include full size drawings of the retracting undercarriage leg used on the Heaton/Ross team-racer—all in the March issue, on sale February 18th. Don't miss it!

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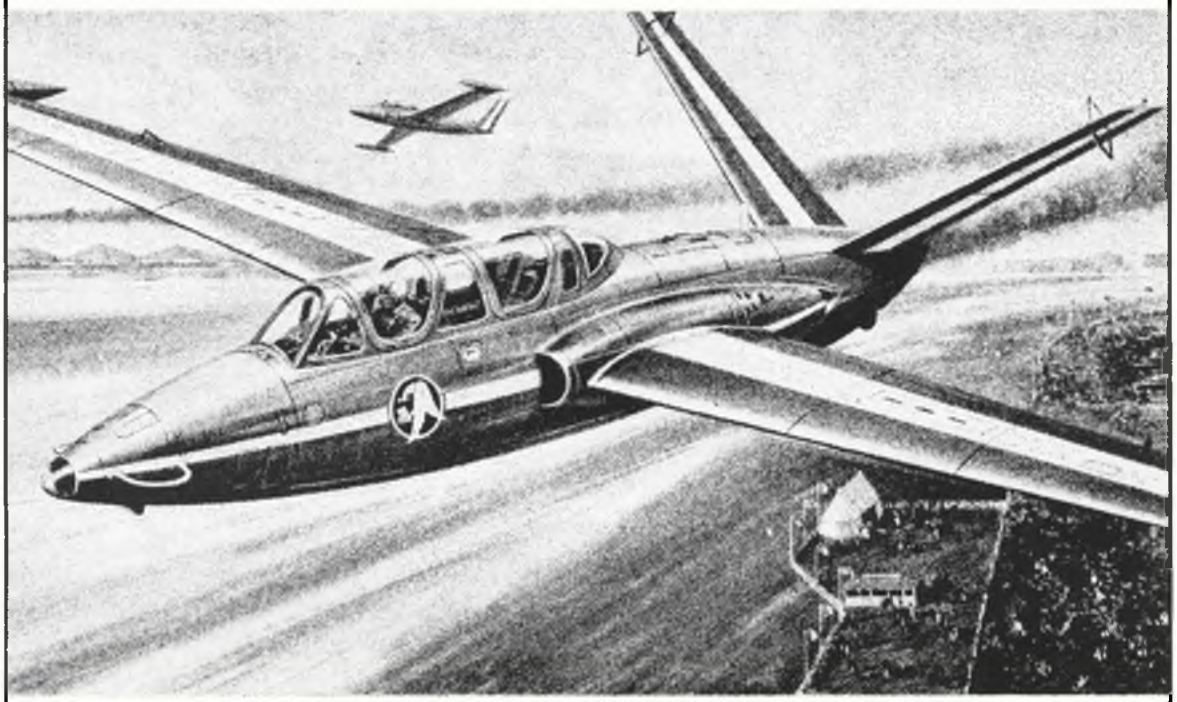
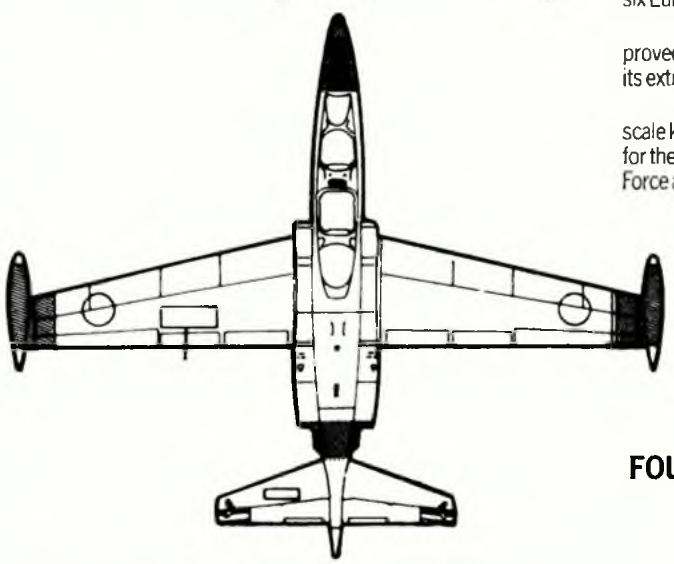


FLEW LIKE A BUTTERFLY. STUNG LIKE A BEE.



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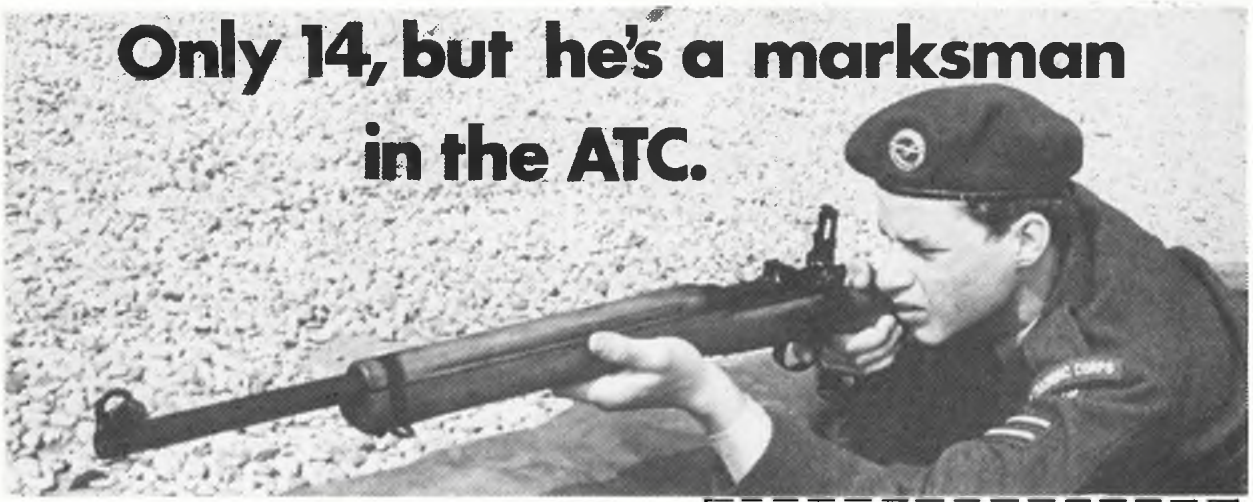

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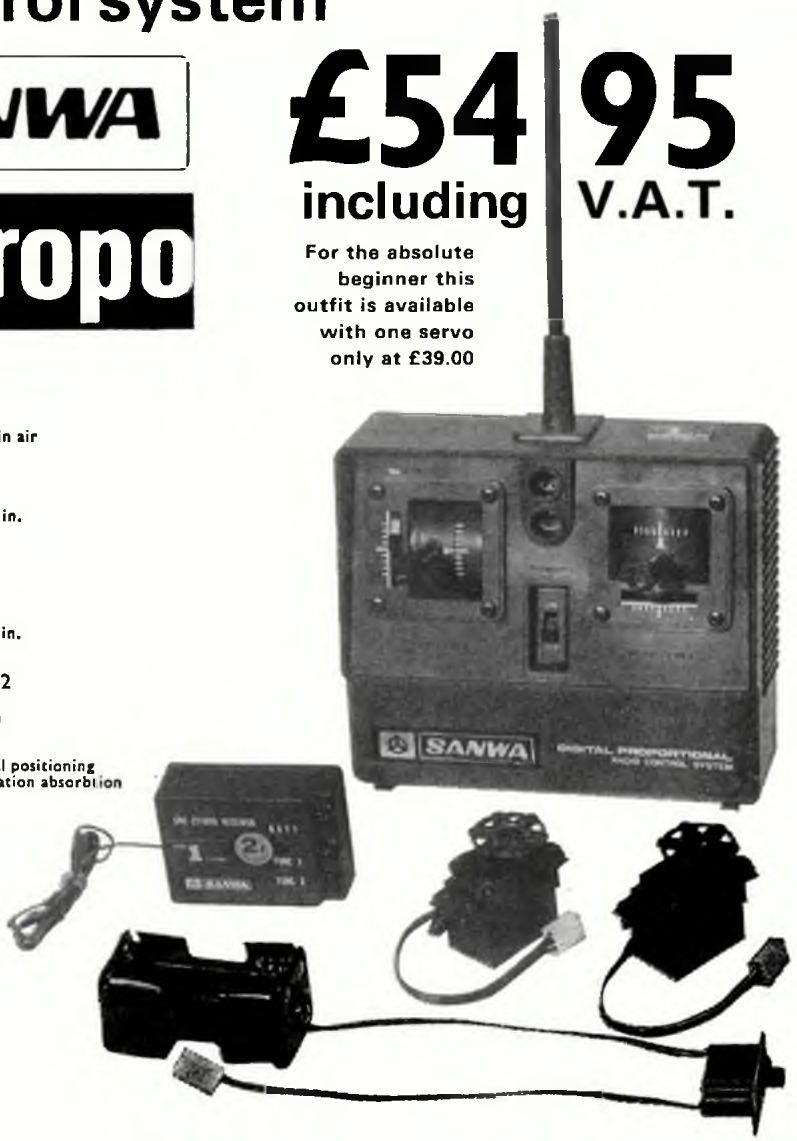

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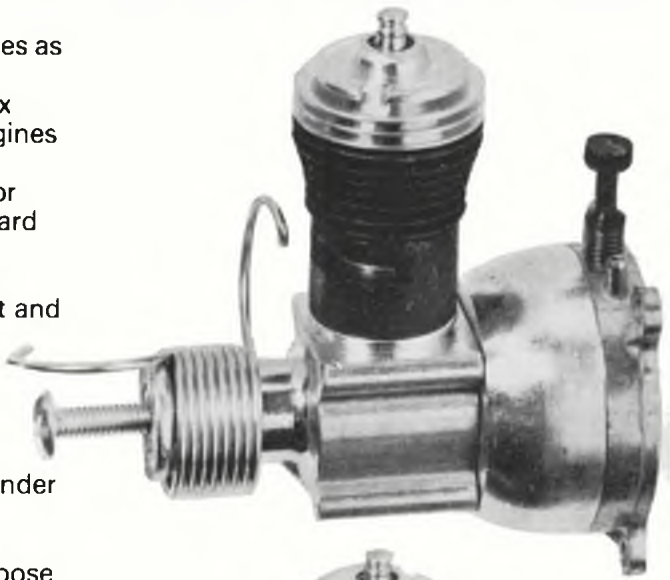

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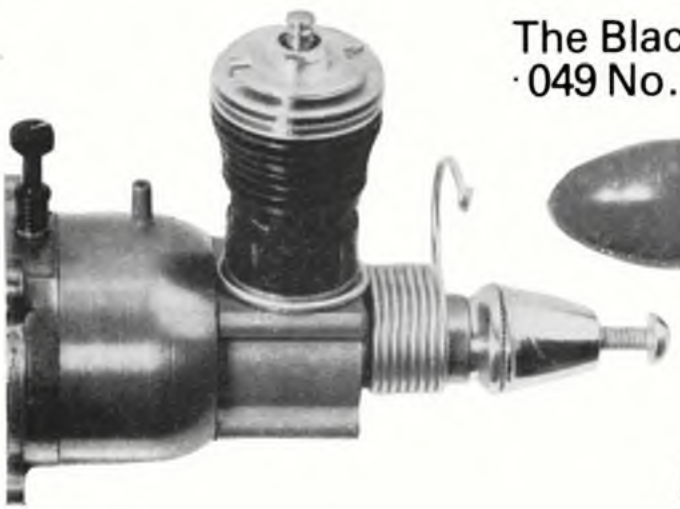

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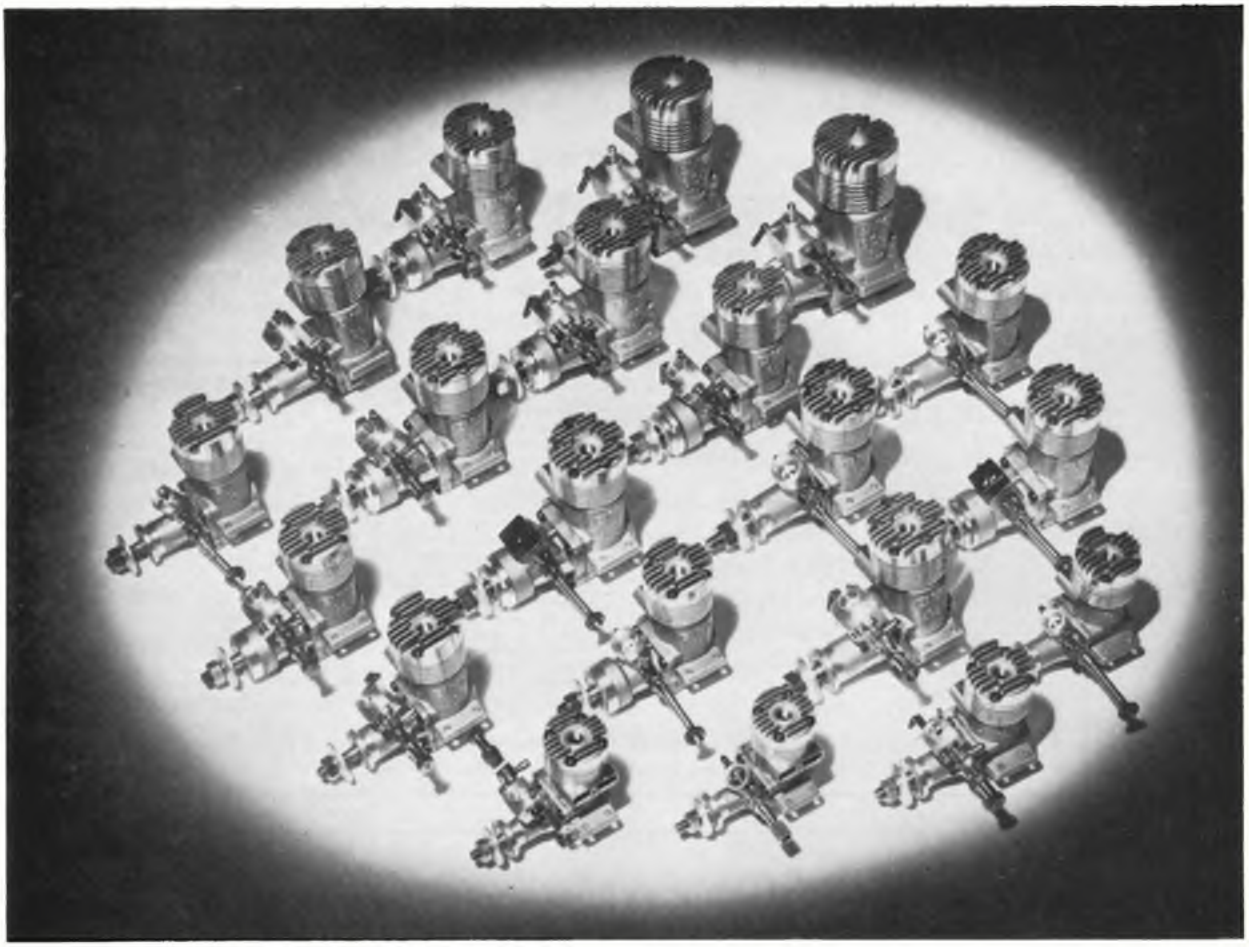

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Model	c.c.	BHP	Max rpm	Weight (oz)	F/F prop(s)	C/L prop(s)
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ENYA 15	2.47	0.33	16000	4.8/5.2	8 x 4	8 x 5 - 6
ENYA 19	3.25	0.42	16000	5.3/5.7	9 x 4	9 x 5 - 6
ENYA 19BB	3.25	0.46	18000	5.7/6.1	9 x 4	9 x 5 - 6
ENYA 29	4.91	0.80	17000	7.7/8.6	10 x 4, 11 x 3	9 - 10 x 6
ENYA 29BB	4.91	0.95	18000	8.6/9.1	10 x 5, 11 x 4	9 - 10 x 6
ENYA 35	5.85	0.80	15000	7.7/8.6	11 x 3 - 4	10 x 6
ENYA 35BB	5.85	0.85	17000	8.6/9.1	11 x 3 - 4	10 x 6
ENYA 40	6.52	1.10	16000	10.5	10 x 6, 11 x 5	10 x 6 - 7
ENYA 45II	7.41	1.15	15000	10.5	11 x 5, 12 x 4	11 x 6
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SEE THEM ALL AT YOUR MODEL SHOP

Heard at the HANGAR DOORS

CYRIL WEST, so long associated with Godalming & D.MFC, and organiser of many of the early control line rallies, died on October 12th. Cyril was 56. He had been seriously ill for 2 years though he continued to build and fly models as well as carry on his duties as Club Secretary right to the end. He often told us of his early days with a 'Kinglet' and this influenced the novices 'Tutor' and 'Mini Tutor', which was one of many designs he produced for *Aero-Modeller*. Renowned for his team race activities with 'Bluebottle' he also produced the 'Plover' A/1 glider and 'Manx Arrow' tailless to illustrate his diversity. Among his large collection of engines were several of his own design including a 5cc. flat twin. In recent months his eyesight was failing, but he could still be amused by making an 8¦ minute flight to win the 1976 Godalming Club annual rubber model contest, though he had to rely on others to tell him of its progress. Cyril will be greatly missed, but by none more so than his wife Brenda, their 3 daughters and grandchildren. To them we extend our sympathy and condolences.

FREE FLIGHT WORLD CHAMPS. As can be seen from the FAI Calendar below, Denmark is to host the 1977 event – but what the Calendar does not reveal is the tentative programme. Namely, that for the three contest days (Friday 8th through Sunday 10th) there will be five rounds flown before 9am (sunrise is 3.30 am!) and a further two rounds will be flown from 5 pm with fly-offs from 7.30 pm (sunset is 8.45 pm). No model flying will be permitted between 9 am and 4 pm as the airfield is open to general (full size) aviation.

COMMERCIAL! The 1976-77 *Aero-Modeller Annual* is in your model shops now – easily recognisable by its superb 'vintage style' cover painting by Rupert Moore, while plans of the A-frame pusher depicted thereon are inside. The vintage theme is continued by those outstanding modellers Bob Gosling and Juste van Hattum, while the more modern-minded will appreciate methods of vac-forming small plastic parts and details of variable geometry free-flight power models by the creator Bill Gieskeing. In short, the Annual not only lives up to its previous high standards – it surpasses it (we claim modestly!) with technical and not-so-technical features and 30 drawings of Champion, novelty and thought-provoking designs.

Price: £2.25

FAI CALENDAR for control-line and free-flight contests

	WORLD CHAMPIONSHIPS	
6–12th July	**Denmark** Roskilde	*Free Flight:* F1A, F1B, F1C
	CONTINENTAL CHAMPIONSHIPS	
6–11th July	**Belgium** Wegnez-Verviers	*Criterium of Aces:* F2A, F2B, F2C, F2D
August	**Switzerland** Arosa	*Europaneistarschaft:* F1E
	OPEN INTERNATIONAL EVENTS	
9–11th April	**Czechoslovakia** Hradec Kralove	*Control Line:* F2A, F2B, F2C, F2D, F4B plus R/C: F3D
23–24th April	**German Fed. Rep.** Oberhausen	*Third International Combat Contest:* F2D
1st May	**Belgium** Namur	*Control Line:* F2D
20–22nd May	**Switzerland** Breitenbach	*Control Line:* F2A, F2B, F2C
21–22nd May	**Netherlands** Arnhem	*Holland International:* F1A, F1B, F1C
25–29th May	**Poland** Torun	*Model Rockets:* S3A, S4B, S5F
9–12th June	**Austria** Wiener Neustadt	*Kratky Cup:* F1A (on 11th); F1B, F1C (on 10th)
11–12th July	**German Fed. Rep.** Drover Heide	*9th Int. Eifel Pokal Contest:* F1A, F1B, F1C
22–24th July	**Hungary** Pecs	*Mecsek Cup:* F2A, F2B, F2C and R/C: F3A
6–7th August	**Netherlands** Amerongen	*Dutch Combat International:* F2D
6–7th August	**France** Assais par 79200 – Parthenay	*Free Flight:* F1A, F1B, F1C
18–20th August	**Hungary** Debrecen	*Hajdu Cup:* F1D
19–21st August	**Czechoslovakia** Sezimovo Usti	*Free Flight:* F1A, F1B, F1C
25–28th August	**Austria** Herzogenburg, Wr. Neustadt	*12th Kolibri Cup* 1977: F1A F1E
25th Aug–3rd Sept	**Bulgaria** Plovdiv	*Balkan Games of Rocket Modellers:* S3A, S4D, S7
25th Aug–3rd Sept	**Bulgaria** Plovdiv	*Balkan Games of Aero-modellers:* F1A, F1B, F1C, F2A, F2B, F2C, F3A, F3B
27–28th Aug or 3–4th Sept	**Belgium** Genk	*Control Line:* F2A, F2B, F2C, F2D
10–11th September	**Belgium** Rixensort	*Control Line:* F2D
11th September	**Italy** Lugo	*Coppa d'Oro:* F2C
15–18th September	**Romania**	*Control Line:* F2A, F2C, F2D, F4B
23–26th September	**Bulgaria** Yambol	*'Europa' International Cup:* S3A, S4C, S4D, S6A, S7
25th September	**Italy** Treviso	*Trofeo Super Tigre:* F2A
29th Sept–to 2nd Oct	**Bulgaria** Sofia	*International Cup Sofia:* F2A, F2B, F2C, F2D
1–2nd October	**Netherlands** Utrecht	*Criterium Midden Nederland* IX: F2A, F2B, F2C
7–9th October	**Hungary** Nyiregyhaza	*Nyirseg Cup:* F2A, F2C, F3A, F3B, F3D
7–9th October	**Romania**	*Indoor:* F1D
17–18th October	**German Fed. Rep.** Bochum	*Control Line:* F2A, F2B, F2C

KLOTZNORUTSKI

Top FAI team racer by Denmark's Luis Petersen and Jens Geschwendtner

EVOLVED OVER A two year period of intensive flying, this is the seventh such design that we have flown – each one being better than its predecessor. By 'better' we mean that it is faster, lighter, easier to construct and has better flying characteristics to cope with the frequent strong winds that are encountered – and of course 'hard' races. All the models have been tested in a wind tunnel in order to compare drag characteristics etc, and so all the improvements have been tried and tested in a controlled, reliable, environment.

In the sport of FAI class team racing, the model building really starts with selection of an engine. We have tried most makes – even made them ourselves – but in order to have time to make *and* fly models, we have found that the Bugl engine, in its standard form, is the best choice. It can outperform most other engines, but they are not easy to obtain.

Our engines, when fitted with a 3·1mm internal diameter carburettor all do 16,200–16,300 rpm when fitted with a 8×8in blue Kavan prop in weather conditions of 15°C, 760mm Hg, humidity 45 per cent. However, we have seen some Kavan *props* that are 600 rpm faster, so be careful when the talk is about rpm figures. The only changes we make to the engines are to fit aluminium bolts, a compression lock and modify the filler valve as specified on the drawing.

Until now we have seen no effective way to improve a Bugl, except by reducing its weight. The only weak point seems to be the cut off spring, which can be pulled out of shape if the bellcrank gives too much down movement. The pan is made from dural and not aluminium, because of its greater strength/weight ratio, and because the threads are less likely to strip. The tank is made from 0·4mm steelplate to avoid blowing out during filling

under pressure. It is made to the correct capacity by filling the tank and tubes with 6·76cc of paraffin before the end plate is fitted. The level is then marked and the end plate tapped in to this point and then soldered. We do not like to 'squeeze' the tanks down to capacity as it just might blow out again when pressurised. The tank is mounted on the pan with two 2mm screws, using a piece of nylon in between to insulate it.

The filler valve and cut-off are Bugl original parts, and we have not yet found it necessary to insulate it, although it is possible that it might improve the handling if the engine is worn.

The reasons for our sprung undercarriage are that on take-off you need a wheel well forward to avoid nosing over and clipping the propeller, but on landing you need it around the centre of gravity, so as to be able to make fast landings without bouncing, even if the ground is rough. This type of undercarriage provides just this compromise, and is easy to make and install. The pivot screw is a 3mm Allen head screw, secured with epoxy and faired in with silicone rubber – be careful not to fill the hole for the Allen key with epoxy, as this will make replacement difficult . . .

The wing is made as specified on the plan – the alternative leading edge can be used to make it stronger (more 'crush resistant') at the cost of spanwise strength. Grooves for the aluminium lead-out tubes are made by cutting out the whole section, making the grooves into the sides

Weight list

Crutch with nuts	15g
Wing uncovered	48g
Wing complete with tipskid etc	75g
Tail covered	12g
Undercarriage	15g
Fuselage with wing, undercarriage, tail etc	137g
Tank	12g
Pan	24g
Propeller	10g
Cowl	12g
Bellcrank with pushrod	8g
Screws	6g
Engine (lightened)	185g
Finish	30g
Model ready to fly	**424g**

of piece removed, and then glueing in the tubes and replace the section of wood. Do this before carving the wing to the section shown. The seat for the bellcrank is from 1mm ply covered on the underside with heavy (0·2mm) glasscloth. After carefully sanding down the wing, give it one coat of dope, sand again and cover the whole wing with one layer of ·03mm glass fibre cloth and epoxy. The epoxy (we use *Araldite* – but any slow curing epoxy should be satisfactory) is thinned down 200 per cent with methanol and coloured with pigment. When nearly dry, cover over the leading edge again back for 40mm, sand the edges smooth and cover the outer wing once more. Be careful not to use too much epoxy filling out the pores of the glass cloth as it is only extra weight, and you do not gain any speed by having a glossy surface finish. The only thing that *really* affects the speed is a correct aerodynamic shape. The tailplane is made in a similar way, but is only covered once.

The main crutch is made of 10mm plywood. Start by drilling the holes for the nuts, glue them in and saw out the shape with the pan screwed on. Glue on the balsa sides and check that it is straight and true.

The fuselage blocks are now tack-glued onto the crutch and shaped. Hollow out the fuselage to approximately 3mm wall thickness, but keeping the space around the engine quite narrow. Glue the undercarriage unit, wing and tail to the crutch ensuring that all are aligned correctly at 0° incidence. Check this very carefully.

Cover the interior of the fuselage with one layer of 0·03mm glass cloth and epoxy, using a double layer around the stressed points such as the undercarriage and pan nuts. Glue the fuselage together and cover with glass cloth. Now sand down the various overlapped joints, but be careful to avoid sanding through the glasscloth, as this weakens the model considerably. Give the entire model one more coat of pigmented thinned epoxy to fuelproof the sanded areas – and the model is finished.

The accompanying table of weights is for a Bugl-powered model; if another, lighter engine is used, then make a slightly longer nose to keep the centre of gravity in the correct place.

As for the flying, the model can be flown 'on instruments' – which is nice if you are the victim of blocking! The fuel cut-off is set at 5°-10° down elevator, and is

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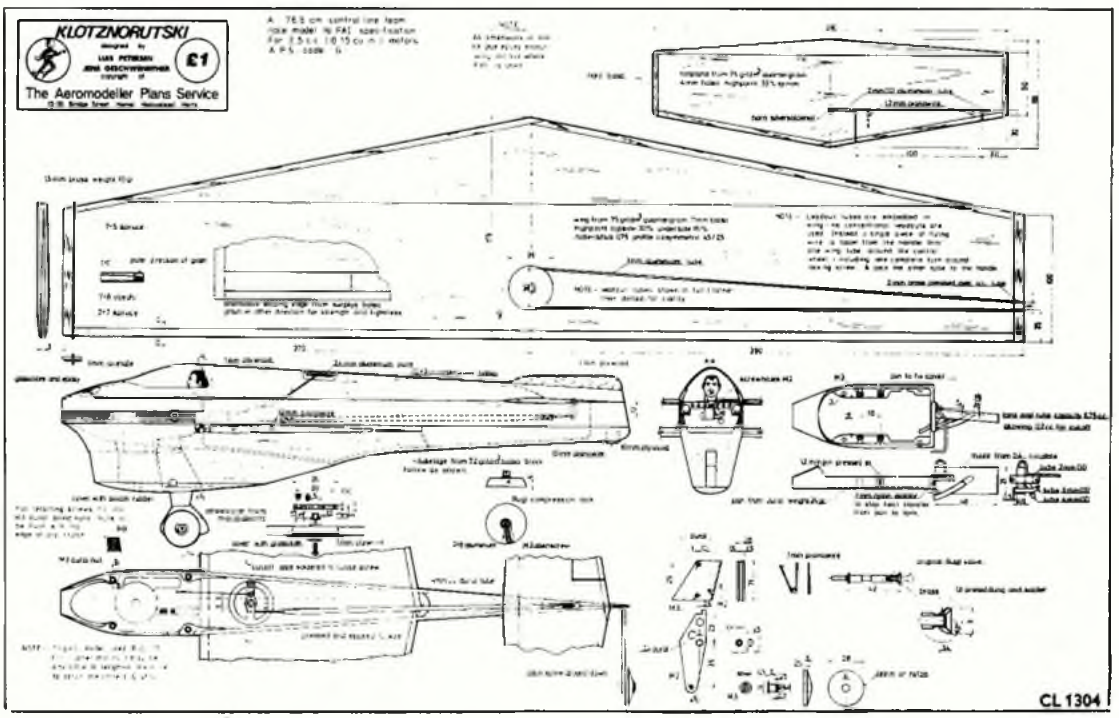


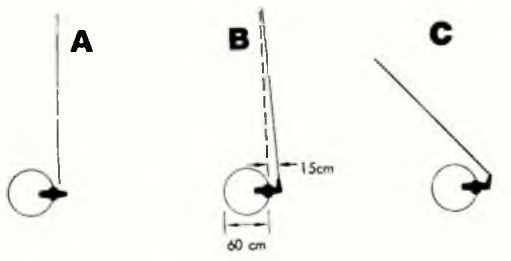


Figure 1
Different flying styles

operated at around ¾ lap before the mechanic. If the model is heavier, then use a longer distance! The propeller we have used for the last year is a John Gray product (marketed by *Jago Competition Products*) – which has 172mm diameter, with a pitch distribution from the hub of 5·1, 6·2, 6·8, 7·2, 7·4, 7·5, 7·2 measured on a Rumpel pitch gauge. But as can be seen from the tall undercarriage, we have also played with a 200mm diameter one-bladed prop with a similar pitch distribution. This gives better performance, but is a bit 'hard' on the engine!

The fuel used at present consists of 15 per cent Castrol M, 32 per cent ether and 53 per cent paraffin plus 2·5 per cent amyl nitrate. We believe that one could use less oil, but then the pilot would need quick reactions if the engine 'loads up', as the fuel would not be as forgiving as the one we use.

One of the main reasons why so many teams have such a varying performance is their flying styles in practice. It is no use flying at 21 sec/10 laps and 40 laps range solo, and then in the race fly 5 laps fast and then have to adjust the compression and fly the rest of the race with 23/10 and 30 laps. The way we do it (see *Figure* 1) the setting can cope with all types of opponents.

Flying style 'B' is the one used for setting the engine, and styles 'A' and 'C' are just used to check it. If you cannot obtain these *differences* in airspeed then either your prop or your flying style is wrong, and you will have trouble in a 'hard' race. The airspeed in a race will only differ by a maximum of 3 seconds over 10 laps from flying style 'B' in a race with a normal, strict, jury.

Some hot competition! Luis Petersen, the pilot for this team (centre) in the process of recording a superb heat time of 3:56.7 at the '76 World Championships. Fellow pilots on this occasion are Kramerenko (left) and Onufrienko – both of the USSR. This team has averaged 4:05 over some 18 races!

Another important point are the pitstops: this is where most fast races are won, because you just cannot overtake unless you have a *very* superior airspeed. The fastest pit stop we can do is 6 seconds (time including deceleration, refuelling and acceleration to normal speed) but the average ones take 8 seconds, so this is where training pays the most rewards.

As for heat times, the only way to improve upon them are hard work – there are no super secrets. On average we have both spent some 20 hours a week during the last year flying, training, talking team race and making new items.

When you have flown the model we would be very interested in comments and criticism on our model and viewpoints – as this seems to be the only real way in which to improve. Write to us c/o the Editor who will be pleased to forward all letters.

READER'S LETTER . . .

Dear Sir,

I have for the last few years sat on the *Federation of the North West Sports Associations,* where I have actively pursued increasing our water and flying areas, with at present a few limited successes. This body of people who meet under the Sports Council have done a tremendous amount of ground work in establishing contacts with all planning authorities etc that they are now approached *before* any work is carried out on any recreational development. This allows the Federation to draw upon all its expertise to formulate a detailed plan for the development to proceed. This sounds a bit far fetched, but I can assure you it works. Recently, under a directive from the Minister of Sport the Regional Sports Councils have been reformed and re-organised. I have been elected to serve on this new Council as one of the nine representatives of outdoor recreation (approx. 120 organisations), where, I hope, I can further modelling in the North West.

I chose the word 'modelling' so as to cover all models; although I sit on the Federation through being the Vice-Chairman of the North West Area of the SMAE, I consider it my duty to protect and improve the interests of *all* modellers MPBA, BARCS, NMPRA, MYA, etc. My own interests are varied as fellow members of the Warrington Model Club can testify.

Now, the tricky part – I need information on where all the modelling activities take place in the North West. This is not an excuse to pry into private arrangements, the local farmer's pond or field, the local park etc, but an honest attempt to find out where the activities take place and the numbers involved. The information gained will be treated confidentially if you so desire, but it will allow me to contact the local modellers as areas and ideas are formulated. I don't promise anyone a flying site or boating pond tomorrow, but five, ten, fifteen years hence, it could be quite different.

I am *not* interested if you are members of the SMAE, MPBA, MYA etc or members of a club or not, only if you are operating models in the North West. To the club members – do not rely on your overworked secretary to send the information, do it yourself for a change.

The North West region is a large area, so the information I would like, should contain the following:

1. Nearest town or village.
2. The map reference of the site or sites.
3. The approximate area.
4. Public or private – leased or free.
5. The approximate numbers using the site.
6. The modelling activity – cars, yachts, aircraft.
7. Whether it is confidential.
8. The best person to contact in your area for further information.

Please invest in a 6½p stamp and send the information to this address:

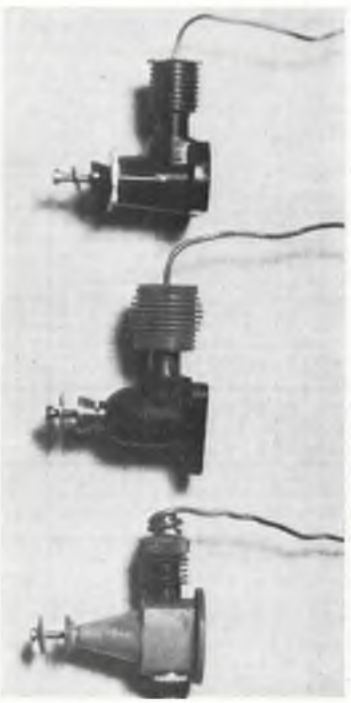
Mike Jackson
2 Cambridge Close
Stockton Heath
Warrington WA4 6SF

SCALE MATTERS

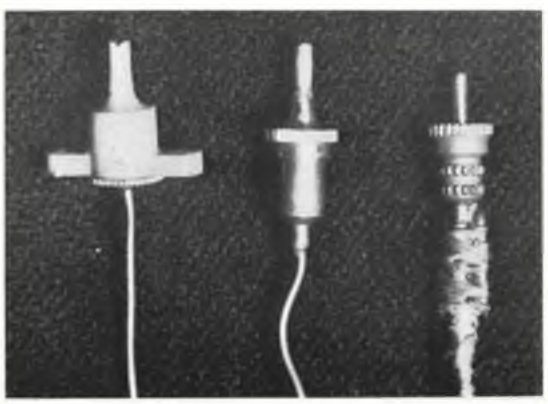
by Alan Callaghan

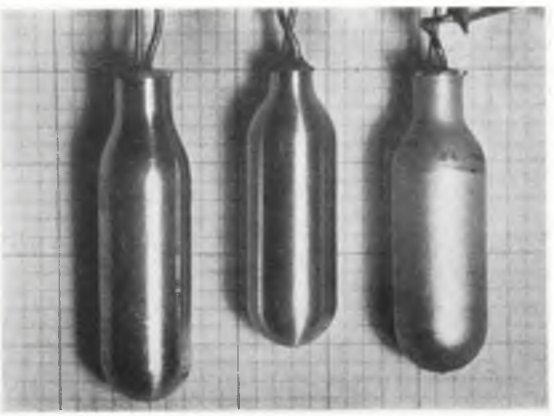
BRITISH MODELLERS interested in small-scale free-flight models, either for indoor or outdoor flying, and who counted themselves lucky in 1976 with the introduction of the excellent little Telco CO_2 motor, and may now claim that with the eventual appearance of the Humbrol CO_2 motor, things are twice as good! As many of you will already have discovered, the new PMS-1 motor is being sold as part of a kit for an easy to build F/F sports model. With this approach the manufacturers are obviously aiming at a much wider market than is created by our purely scale interests, but I would suspect that many of these motors will eventually find their way into scale models. In certain respects, CO_2 motors are absolutely ideal for the beginner to aeromodelling, e.g. foolproof starting, no mess, practically no noise, and it does not hurt very much if your finger gets caught in the prop once too often! On the other hand these motors are nothing like as robust as the average small diesel or glow motor and I think that most of us have seen the type of treatment that the latter can receive in inexperienced hands.

Turning to the new motor, I was most impressed with the duration of run on the PMS-1 unit sent for review. At one stage I achieved five 30-second and five 20-second runs on low throttle from only one Sparklet bulb, and with a different power setting, no less than four consistent 80-second runs. I would quickly point out, however, that I do think that comparing this directly with the performance of the other two motors (the Telco and the Brown Junior) is only of academic interest, and does not really have much bearing on how well a particular engine will perform in every different kind of model. The factors which affect the overall performance of a complete model are of more interest, such as inbuilt drag and natural stability, and therefore other aspects of the motors should really be given more consideration



Heading picture shows David Deadman's Curtiss-Wright Junior under construction. This 24in span model features a very accurate scale structure, while the Telco CO_2 motor is nicely disguised. Noseblock is hollow and neatly covers the filler valve. At right are the three CO_2 motors currently available – being from the top the Telco, Humbrol PMS-1 and the Brown Junior. Below left are the tank charging nozzles in the same order (left to right). The Brown's became very stiff to use, hence the reinforcement. The Telco's mounting lugs are a good idea. Below right are gas tanks which reading from the right are courtesy of Telco, Brown and Humbrol.





A Peck Polymer Peanut Scale Kit (what a mouthful! Geddit?) of a Gipsy Moth being held by Hank Wheeler, owner of the full size 'Gipsy' on which it was based

when trying to decide which one to use in which particular model.

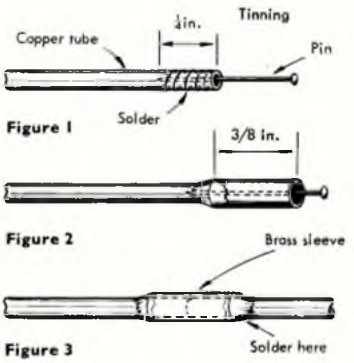
The PMS-1 is throttled in the same way as is the Brown Junior, i.e. by rotating the cylinder, and a wide range of adjustment is easily achieved. It will be interesting to see if the problem of broken feed pipes due to this rotating action, as encountered on the early Brown motors, will occur on this one. It is slightly larger externally than the other two; it has a larger tank, and uses an additional mounting screw giving a very firm three-point instead of a two-point mounting. I am afraid that scale modellers will not like the bright red cylinder fins, which together with the large hexagonal brass nut on top will prove to be very difficult to disguise in a model without painting unless a scale prototype is found where the motor can be completely hidden within the cowling. One then has the problem of getting at the throttle in order to adjust it! In such a case as this it would therefore be better to use the Telco motor for this same prototype, in that it is unnecessary to have access to the cylinder for throttle adjustment. The unique rotating main bearing on the Telco by means of its front adjustment solves the problem entirely.

It is this kind of consideration that is more important to the scale enthusiast than whether one particular motor will fly a model which is four inches greater in wingspan than another. In fact I would particularly advise against trying to fly too large a model with these CO_2 motors. As with most other types of scale models it is always useful to be able to fly well on only about 80 per cent power, so that there is always something in reserve for that slightly more windy day. It is certain that with CO_2 power this approach is a sure way of increasing flight duration, regardless of which motor you use. As a general guide to sizes, I would recommend anything up to about 24 inches for a monoplane weighing a maximum of approximately 2oz, and at this same weight, a biplane up to about 16 inches. Smaller models will have a much more sprightly performance, but consequently scale effect will prevent them from looking very realistic in the air. For the very best scale appearance in flight, build them as light as you possibly can, and either fly them indoors or force yourself to keep them for only the calmest days; it is worth it!

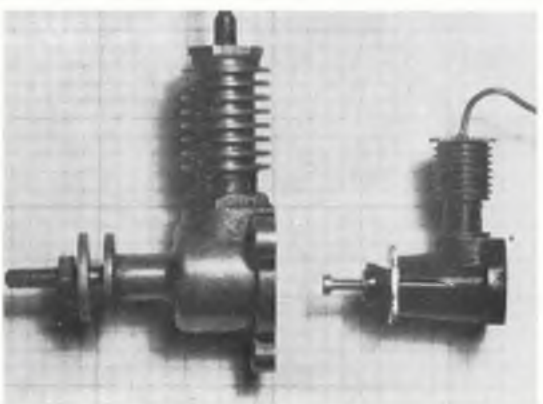
The most vulnerable parts of CO_2 motors are the prop shaft screw and the fine-bore copper feed pipes. Both of these parts are very much more fragile than anything to be found on the average small diesel or glow motor, and having used CO_2 motors frequently over the last two or three years I think it is worth emphasising a few points about them.

One should always use a screwdriver that fits the prop-shaft screw properly without 'churning' it up. It may be necessary to file down the smallest one in your present tool kit to fit, but better still is to buy one specifically for this job alone, since they are not expensive. The feed pipes ideally should not be flexed any more than is absolutely necessary. Once you have arrived at the right shape for whatever model installation you have in mind, try not to change it. If you intend to change the motor from one model to another, try to devise a layout in both models which involves a minimum of re-bending of the tubes when the motor is moved. If disaster strikes and the tube breaks, it can easily be mended by sleeving with approximately $\frac{3}{8}$in of 18swg brass tubing in the following way.

First of all obtain some dressmakers' pins which are made from an alloy, *not* steel – a way to check this is to try to bend one. If it proves difficult, the pin seems brittle, and simply breaks, it is *not* suitable for the job since it will probably be the type that will take solder, and this is exactly what we do not want. If it can easily be bent in your fingers (be careful!) it should be the right kind but check that it cannot be soldered



before going any further. Gently push a pin into each of the ends of the broken tubes to make the bores properly round again – they will have been flattened out at the very point of the breakage. Without removing the pins, and with a medium-sized soldering iron, tin the ends of the tubes back from the break to a length of about ¼in (*see Figure* 1), making sure that the solder runs fully around the outside, leaving no gaps. Put these aside and tin the brass sleeve over its entire length. Taking one of the tubes, remove the pin, put the sleeve in place, and then put the pin back as it was before (*Figure* 2). The idea is that the non-solderable pin will prevent the solder from flowing into the bore which would then be impossible to clear out. With a very hot iron quickly solder the sleeve in place using as little extra solder as possible. Now remove the



How things change! A Telco CO_2 motor (at right) is compared with an American OK motor – also CO_2 – of around 1950

Second new Peanut Scale kit from Peck is for the Ganagobie – just like a sports rubber model. Should be a really good flier.

pin and push the other piece of tube into the sleeve as far as it will go. Apply the iron to the other end of the sleeve (*Figure* 3) – again making sure that the solder flows completely around, and if all has gone well a very strong joint has been formed. Examine your work very carefully before putting a charge into the tank, and if you are at all in doubt, switch the soldering iron back on again!

One very substantial CO_2 model to make its appearance recently is a 24in span *Curtiss-Wright Junior*, built by David Deadman, which I have been able to see 'grow' over the last few months. By 'substantial', I do not mean excessively heavy or bulky, but a properly thought out design where great care has been taken over accurately simulating what amounts to some rather difficult construction details. At the same time none of the character of the aircraft is lost and now that the aircraft is finished it just looks right, and the effect is further enhanced by the carved balsa pilot and his lady passenger. An ingenious feature is the completely removable hollow noseblock which covers the tank filling nozzle which is mounted facing forward on the front bulkhead. There are not many other aircraft on which this can be done – the British *Dart Pup* and *Luton Buzzard* spring to mind – and it is a perfect way of keeping the filler valve out of sight.

* * *

Recently received for review were the two new kits from Peck Polymer of the United States. Bob Peck is the Californian producer of what must now be the largest range of Peanut Scale kits and accessories and so any new items from him will always be of interest. The first of these, the DH *Gipsy Moth*, is not a subject that immediately springs to mind as being the ideal Peanut model, mainly because of its relatively small tail surfaces and the low thrust line of the motor which limits the size of propeller one can use. Bob has obviously decided, however, that these restrictions are to be considered secondary to the general appeal of the aircraft and I feel sure that to the majority of builders in this country, he is right. The model is based upon a *Moth* belonging to Hank Wheeler of San Diego, and is finished in silver and red. Prospective builders would have a wide choice of colour schemes since this is a very well documented subject and there are still about 36 examples preserved throughout the world.

The kit is very attractively packaged and it includes a very clear comprehensive plan, an instruction/information sheet with a three-view drawing, excellent printed wood, and a packet of goodies including a brown plastic prop, nosebearing and propshaft, etc. The items of special interest are the strips of basswood used for the more highly-stressed parts in the model such as the cabane and undercarriage struts, and the motor cowling and front fuselage decking which comes as a vacuum-formed moulding in one piece. This will make life a lot easier for someone building a biplane for the first time. Basswood is not generally available in this country but is much used by model railway enthusiasts in the United States where it can be bought in a very wide range of sizes including tiny I-beam and L-shaped sections. It is a type of Lime (*Tilia glabra* to be exact!) native to North America, but it is both lighter and stiffer than the Lime which can be bought over here. Incidentally the latter is relatively easy to obtain from a good hardwood timber specialist supplier and is probably the best material available for carving scale wooden props for almost any size of model. To the really discerning modeller the wood-grain pattern on, for example, a 1/12th scale prop made from real mahogany can never look anything other than twelve times its natural size. By using Lime instead and carefully staining it the correct colour this problem is overcome since the very close grain pattern actually maintains the scale effect. The wood itself is also much easier to work if you are limited to using standard modelmaking tools.

Meanwhile, back at the *Gipsy Moth*, one feature shown on the plan which I would not be too happy about is the use of an ordinary pin as the rear motor peg. A piece of $\frac{1}{16}$in dowel or a cocktail stick is much better, and not only creates less of a sharp tension point in a fully-wound motor, but would make the model much easier to handle for your helper if you do not use a 'stooge'.

The second kit is of a very unusual little French aircraft called the *Ganagobie*, designed by William and James Lobet. One only has to glance at the documentation three-view provided to understand why it was chosen since there is nothing, not even the *Lacey M-10* which more closely resembles a rubber sports model. Despite some rather odd shapes around the cockpit, it ought to make up into a very attractive little model exactly in the spirit of Peanut Scale as it was originally formulated, i.e. as a fun event.

Available from **The Modellers Den** these kits may at first seem rather expensive at £2.50 each, which as I am sure you all know is due mainly to our foreign currency exchange problems, but one must not forget that these, too, are rather specialised items in these days when it is possible to pay almost four pounds for one single propeller for a large glow engine.

CO_2 is not the only form of silent power – remember the electric motor! A small quantity of these Mattel electric motor units, complete with fast-charge batteries are available – see Classifieds for details.

THE FREE FLIGHT SCENE

This month : **Bob Bailey**

Mike Evatt (left) with Wakefield and Martyn Cowley with chuck glider, wait for signs of a thermal at the Richmond Gala. Both are members of the strong Biggles Free Flight Group.

1976 HAS, in the opinion of one or two seasoned members of the SMAE's Free Flight Technical Committee, been the most difficult year for organisational problems that they can remember. Some difficulty has been caused by 'too little too late' due to lack of appreciation of *What* action is needed *When*, and due to problems from unexpected quarters. Attempts are being made to get the 1977 Calendar on a firm footing by booking venues at the moment.

Unhappily this has already run into trouble from an unexpected quarter – again – with the news that we are unable to get confirmation for use of Sculthorpe for next year beyond April. Confirmation of the rest of the dates will have to wait until next Spring, which is already very late in terms of publicity, particularly for the International next June. Alternative venues will have to be sought for these contests and this is going to be very difficult, assuming the same constraints such as hay contracts apply this year.

THIRD TRIALS FOR 1977 WORLD CHAMPIONSHIPS

As is no doubt well known, an unfortunate double booking of Sculthorpe occurred on the Sunday of the 2nd Trials, when a car rally prevented us from finishing the contest. This error was due to changes in personnel at Sculthorpe and was not the SMAE's fault. Attempts are being made to secure another venue for the last three flights to be completed. We were informed that a booking at Rissington could be made in a week, but four weeks have elapsed and no news yet from the authorities in charge.

LOW WING MODELS

Quite recently I built a Micro X rubber powered indoor/outdoor kit of the Glenny & Henderson low wing monoplane for some relaxation flying indoors (in Cardington, for instance, when the conditions are two wet or too turbulent for EZB or microfilm).

Firstly some brief comments on the kit. The instructions were not very explicit on one or two details such as the manner of fixing the wings to the fuselage, although most of the construction is straightforward. Unfortunately most of the wood was the wrong size although the quality was good ; there was a severe shortage of 1/64in. sheet required for some formers and I used some indoor scrap bits to supplement the shortage.

No CG position is marked on the plan and despite using light stock for the tail unit the CG came out *much* too far back. This problem is caused by the short nose and long tail moment for the rubber – a change in rubber weight has a drastic effect on CG position.

Early tests at Cardington were disconcerting with the model stalling all over the place. High torque with a right hand turn produced a comical pattern with the model trying to fly right but banked over 20 degrees to the left !

I was informed *'heard somewhere that low wing models are supposed to fly left'* – and this seemed to figure. The next flight with left turn caused the model to spin in ! It was soon clear that spiral stability of this model seemed somewhat less than that for high wing models, and that it is more sensitive to turn ; in fact it was necessary to add a flap to the inner wing to hold it up against high torque !

The main problems outstanding at present are :

(a) The model turns viciously to start with, and then tends to straighten out ; hopefully this can be sorted by a judicious combination of sidethrust and rudder.

(b) The model needs a larger prop (the kit version has too small a diameter and far too much pitch).

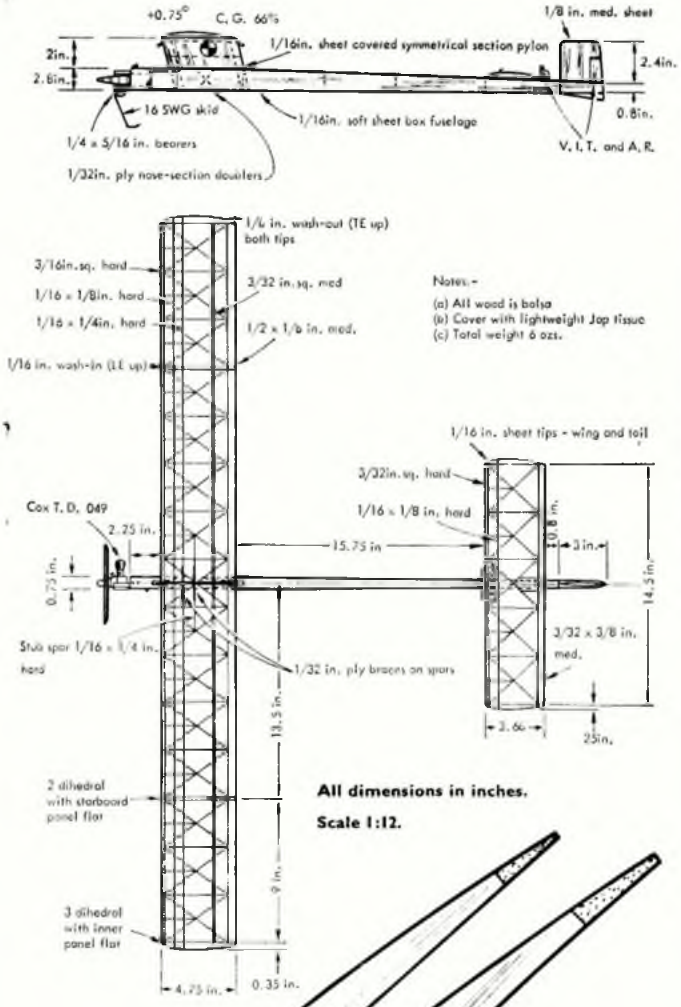
I hope this bit of discussion will help those about to build, or having trouble with, trimming low wing models. One point needs to be emphasised – the CG must be *well* forward (not further back than about 40% of wing chord).

PAA LOAD MODELS

A class that will be remembered by older members of the F/F fraternity, but which faded from the scene 12 or more years ago. It is hoped to hold events for this class during 1977 – here, therefore, are the rules :

(1) Engine size .049 or .051cu.in.
(2) Minimum airframe weight 5oz – no area restrictions.
(3) The model must carry a "man" weighing 4oz and sized ¾in.

Wakefield winner at the Richmond Gala was John Billam. As he waits for lift, the motor is fully wound and has the propeller locked.



1/2A Mk III

by Jon Fletcher

deep with a ⅜in. sq. head and a body of 2in. x 1¼in. In addition removable ballast of 1oz. must be carried.

(4) The "man" must be able to "see" forwards and sideways (both sides).

(5) An engine run of 15 seconds is permitted. Flights to be flown to a 3 minute maximum. All flights must rise-off-ground.

½A POWER MODEL

This model maxed-out to win the recent Richmond Gala and its previous successes include second place at the Centralised Mini event last December. Jon, who lives in Stevenage, is a member of the Royston Club and provides the following information:

All the aids of modern living – or rather flying! Graham Walker (with Wakefield), consults Birmingham club mate Stafford Screen's thermistor before launching.

"The MKIII is the derivation of a design started in 1963/64. The basic concept of the MKIII was to produce a fast climbing model without sacrificing too much glide performance. To this end an under-cambered wing and variable incidence tail and auto rudder were used. The tail is 25% of the wing area. Geodetics were used for the flying surfaces for torsional rigidity. The model is trimmed for a right/right pattern with, ideally, a quarter turn on the climb. Climb consistency in wind is a problem, as with any fast power model, and launch angles are critical. It is much easier to obtain a consistent pattern in calm weather."

HELPFUL HINTS ON D/T TIMERS

The following are tips that I have found to be very helpful on an item which, despite its importance, does not always receive as much attention as it should – the clockwork dethermaliser timer.

My comments apply to KSB Timers, the most readily available timer in the UK, although many of my comments are applicable to other brands.

As supplied, the timers have two principal defects which are very easily remedied, namely the on-off switch is very tight, and as such far too stiff for glider application and secondly, the release levers are carefully shaped to give the maximum chance of non-operation! Hence the following modifications.

(a) Timer Switch

(1) Undo the domed hexagonal nut holding the slotted disc, and remove the disc.

(2) Remove the three small screws holding on the faceplate and remove the faceplate.

(3) Support the faceplate upside down on small blocks on either side of the switch pivot (a rivet). Tap the underside of the rivet with a centre punch (see *Figure 1a*). This will loosen the switch which should drop under its own weight when the faceplate is held on its side (*Figure 1b*). A little persuasion (e.g. tapping on the othe side of the faceplate) may be necessary to achieve the desired result, but generally there is little difficulty.

(b) Release Lever

If the lever is not modified, when the D/T line is hooked up, it slips to the bottom so that there is little or no leverage to rotate the lever and release the D/T line (*Figure 2a*). Result – one D/T failure, possible loss of model and what is worse, not knowing what caused the failure. The remedy is very simple – bend the lever arm holding the D/T line as shown by the dotted line. No stops or washers needed, and ample leverage to ensure operation.

Still on the release lever; many will have noted how, over a period of time the lever arm released by the disc creeps round as shown in *Figure 2b*. This can mean quite simply that the slot in the disc will not reach the lever and release it. Remedy again is simple; bend the release arm back again so that the slot will uncover it with about the width of the slot to spare.

(c) The Timer

Last, but by no means least, the timer itself needs some attention from time to time to ensure 100% reliability. I have found that hold-

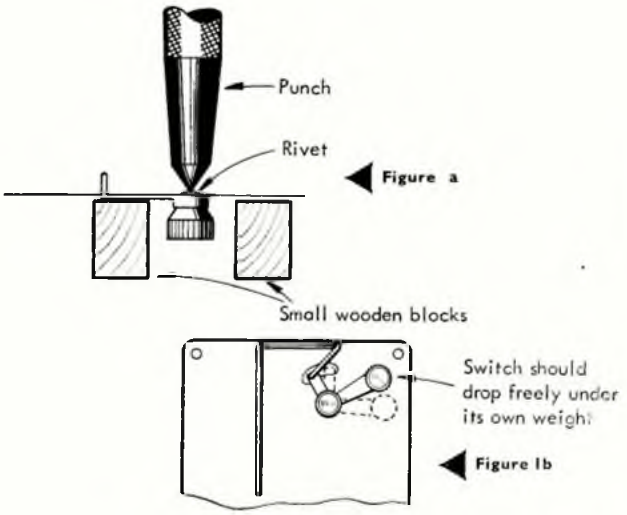


Figure a

Figure 1b

ing a KSB timer upside down is the most severe static test of smooth running of the works – if it is going to stop, holding it upside down will tell.

If this test indicates trouble, the timer probably needs cleaning. Remove the backplate using the two screws (take care not to lose them, they are pretty small!) Wash the timer in a cleaning fluid – carbon tetrachloride or dope thinners works well – you will be amazed sometimes how much dust, sand, filings, etc. will come out, these being almost invisible on visual inspection. Shake to dry off the fluid, and when dry, spray with a water repellant penetrating oil like WD40, which is available in aerosol cans from garages.

Result – usually one very smooth running timer; repeat the test above to try to detect any slowing down of the timer and, in addition, try holding the timer at all conceivable attitudes. There should be scarcely any detectable slowing down of the timer at any time.

All this sounds very long winded and tedious, but the above modification can be done in well under an hour – worth it to save that valuable model?

One last tip. When setting the required D/T time for the model, let the timer run down to the mark before stopping it; the gears are then always in mesh, thereby avoiding the other fault which occurs – the timer not starting. I have had only 3 or 4 timer failures with KSB's in the last 10 years or more, and was lucky enough to find out the problem each time – missed the lift! Who said KSB's are not reliable? They are if a little trouble is taken – and it is cheaper than using two!

NORWIND INDOOR MEET – *28th Nov. 1976, by Laurie Barr*
Once again the North West Area (SMAE) began their winter indoor programme with a very successful meeting held at Wigan Technical College.

The hall is comparatively small but has a fairly flat roof with the fluorescent lighting recessed behind some wooden planks, thus enabling Easy-B's, for instance, to successfully "ceiling scrub" for approximately half the total duration of their flights. As the hall is built on stilts above a car park (with a fairly cold wind whistling through it!) the hall temperature was only about 50°F and the only warm air, relatively speaking, was up on the ceiling, thus ceiling scrubbing was essential in order to win.

With all the competitors situated at one end of the hall, there was naturally a thermal drift where this hot air rose at one end, hit the ceiling and then travelled along the length of the hall, and in order to do flights of the order of 9-10 minutes, it was necessary to continually steer the model to prevent it from touching the walls of the hall, but more importantly on the latter stages of the flight when it reached the far end of the hall, so that the models had to be steered gently back towards the centre.

This is a fairly difficult exercise since most of the lightweight glass fibre fishing poles used for this purpose are only just long enough to reach the ceiling, and many models were damaged during steering, due to over reaching.

I knew from previous experience that an ultra lightweight Easy-B model (i.e. weighing 1 gram or less) is no good in such a site under cold conditions. For long flights under low ceilings one has to fly on relatively thick, short pieces of rubber in order for the model to land just as the last few turns come off the motor. Very light models under these cold, damp conditions tend to suffer from motor stick breakages, excess wing warping etc. and quite a few people run into trouble on this account.

The actual winner of Easy-B was Bernard Aslett (from the Swindon area), who struggled most of the day trying to get his ultra light-

Tony Cordes, holding his "Little Hinney Mk2" A/1 glider design (now an AeroModeller Plan – order No. G1293, price 70p) confers with Barry Kershaw

weight models to fly successfully, and only late in the day changed over to much heavier models and during this final session produced the two winning flights of 9 minutes 1 second, and 9 minutes 2 seconds, showing commendable consistency!

The writer had been leading in Easy-B up until this final round but was happy to take second place as Bernard definitely deserved to win. John O'Donnell came third in Easy-B with a *new* model, whereby the wing posts were split in the form of a 'Y', and using a flat centre section with dihedral tips, was thus able to have a more rigidly braced wing than is possible under the no-bracing rule, with the model built in the traditional manner.

There then followed a session of indoor Chuck Glider, some of the times being quite remarkable and once again the winner was Mike Duce from the local area, his two best flights being 25.9 seconds and 27.7 seconds – the latter being a new hall record. Butch Hadland came second with two highly commendable flights considering he had not had the hall experience of Mike Duce.

In scale which was flown to the "key-hole" rules, whereby the models were lined up in order of scale merit according to the local judge (there was some discussion as to why Butch Hadland's *Wittman Tailwind* did not take pride of place in the static judging and likewise some concern at the relatively high placing of Bernard Aslett's *Ryan N.1*, which is a Micro-X semi-scale kit, built extremely light and with horrendous potentiality!)

The writer flew his, by now well worn, *Fike E* into first place with flights of 56 and 57 seconds to place second in flying, and with his third place in static judging won by a clear margin over Butch Hadland's *Tailwind*. However, had Butch's *Tailwind* placed first in the static judging, we would have in fact tied.

The meeting closed with a prize giving which was very well received – it makes a pleasant change for the prize giving and the prizes to be presented on the days of the actual competition, and the meeting closed with hearty applause for the principal organisers who I understand to be Pete Farrimond, Dave Yates and John O'Donnell.

EZB (*Total of best 2 flights, 16 entries*): 1. B. Aslett 18:03, 2. L. Barr 17:19, 3. J. O'Donnell 17:02. **HLG** (*Total of best 2 from 9, 14 entries*): 1. M. Duce 52.9, 2. C. Hadland 51.8, 3. S. Carr 50.7. **Keyhole Scale** (*19 entries*): 1. L. Barr (Fike E), 2. C. Hadland (Whittman Tailwind), 3. M. Reeves (Bristol Monoplane).

Figure 2a

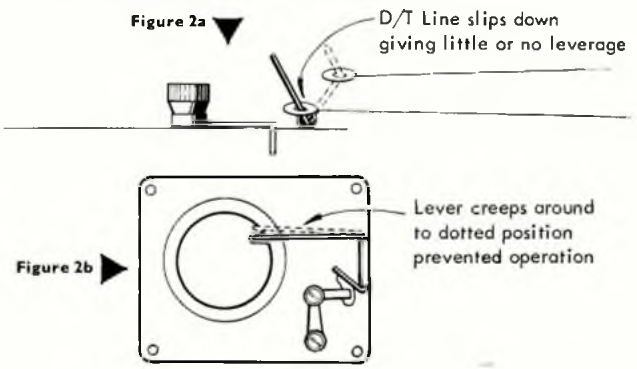
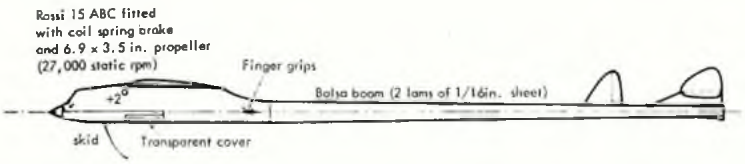
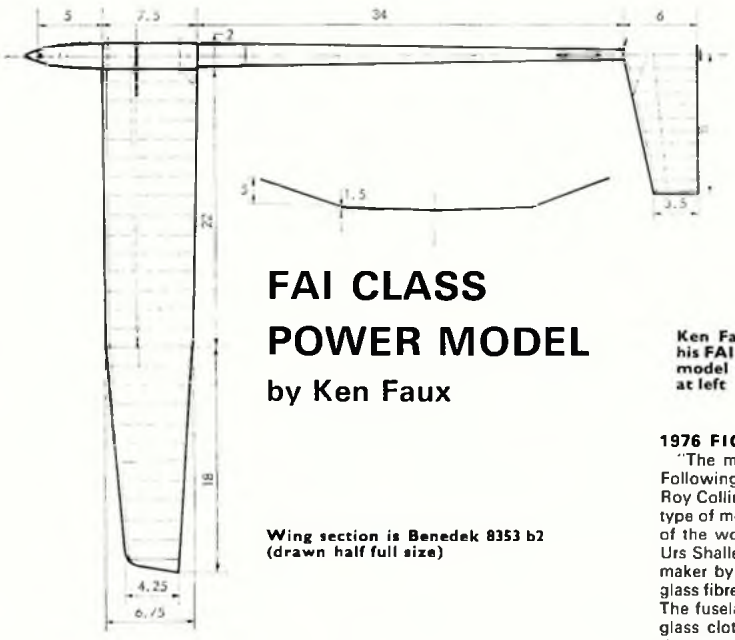


Figure 2b



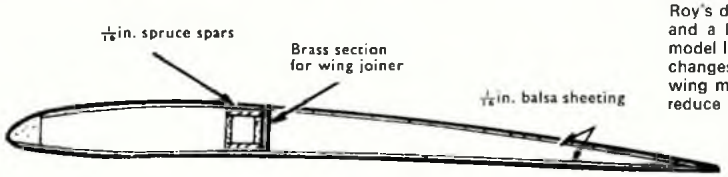
ALL DIMENSIONS IN INCHES



FAI CLASS POWER MODEL

by Ken Faux

Wing section is Benedek 8353 b2 (drawn half full size)



Ken Faux displays his FAI class power model – as drawn at left

1976 FIC *by K. Faux*

"The model shown in the drawing was designed late in 1975. Following the World Championships at Plovdiv it was decided by Roy Collins and I that we would like to build a far more sophisticated type of model than we had been flying up until that time. Inspection of the wonderful models of Eugene Verbitsky, Thomas Koster and Urs Shaller gave us much help and inspiration. Roy being a pattern maker by trade made a very fine job of producing moulds for the glass fibre fuselage front end, and also for a new type of engine pan. The fuselage front is made from five layers of 1oz. per square yard glass cloth, carbon fibre reinforcement and polyester resin. Using these components, Roy and I set about designing our own models. Roy's differs from mine in having a forward fin, lower aspect ratio and a larger area tailplane. My model was designed around the model I was flying for the last couple of seasons with the following changes. Wing span increased from 72in. to 83in. (flat). Plug-in wing mounting was employed to make a positive mount and also reduce drag. A longer tail moment arm was used and a balsa tail boom (instead of glass fibre) was used to keep the rear end light. The wing and fuselage booms are both covered in glass cloth and epoxy. The front end of the fuselage was a completely new design to use the glass fibre front end. The pan is held in place by a single 1BA and two 6BA bolts. The motor exhausts through the starboard side of the fuselage and has no cooling except for the exposed head, for this reason an ABC Rossi is fitted to suit the higher running temperature. The Seelig timer is positioned in the bottom of the fuselage and is completely enclosed; a see-through cover is easily removed for access."

RICHMOND GALA – *Bassingbourn, 7th November 1976, by Mike Fantham*

The weather for the 1976 Richmond Gala was fine and sunny all day with a 10mph breeze. The wind direction was awkward and retrieving considerations led to a decision to reduce the FAI max to 2:30. Entries were fairly low in all classes except FAI Power, which had eleven flying, two more than Wakefield. Is the availability of reliable, if expensive, power plants attracting people away from the rubber driven classes where the power source is so variable? No, not really there are still the same number flying power they are just very keen.

Prizes consisted of the three annually awarded 'STAG' trophies in the FAI classes plus modelling goods purchased from the entry fees, plus a small amount from club funds, and distributed on a take-your-pick basis.

The organisers would like to thank those who support the event each year especially those who tell us they enjoy it – see you next year?

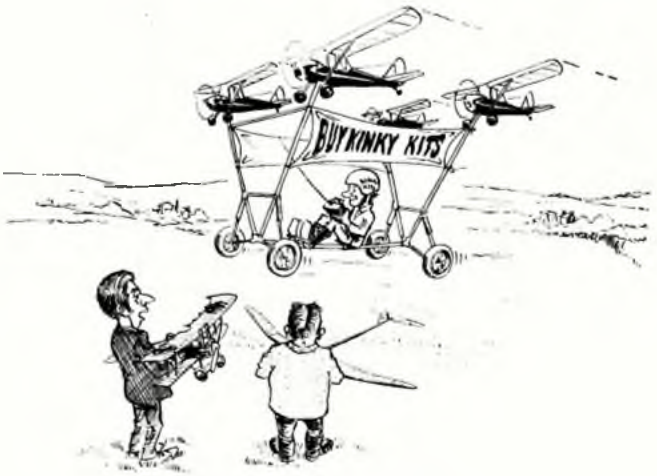
A/2 Glider (F1A) (*14 entries*): 1. J. Cooper (Biggles) 12:30, 2. D. T. Hambley (York) 12:05, 3. G. Madelin (Crookham) 11:55. **Wakefield (F1B)** (*9 entries*): 1. J. E. Billam (Grantham) 12:13; 2. J. Baguley (Norwich) 11:34; 3. D Digby (Croydon) 10:41. **Power (F1C)** (*11 entries*): 1. S. Screen (Birmingham) 12:30; 2. D. Cash (East Grinstead) 11:59. **A/1 Glider** (*5 entries*): 1. C. James (Crookham) 9:32; 2. M. Cowley (Biggles) 9:25; 3. J. Williams (Stansted) 8:43. **Coupe D'Hiver** (*10 entries*): 1. D. Roche (Anglia) 9:53; 2. G. Ferer (Leicester) 7:45; 3. A. Wells (Anglia) 6:52. **½A Power** (*10 entries*): 1. J. Fletcher (Royston) 10:00; 2. D. Pymm (Walsall) 9:52; 3. P. Harris (Birmingham) 9:18. **Chuck Glider** (*4 entries*): 1. P. Bayram (Richmond) 4:32; 2. M. Cowley (Biggles) 4:19; 3. M. Bull (Stansted) 3:02.

Three Hambleys retrieve a Humplehound! Dave placed second in A/2 at the Bassingbourn-hosted Richmond Gala.

topical twists

by 'Pylonius'

illustrated by Sherry



"I just can't stand these professionals".

Round the Bend

WE READ a lot these days about *Circular Tow Hooks*. And, just in case you do not know, these devices are not overbent bits of wire but potent pieces of weaponry in the tactical flying war. In practice it is not so much a matter of bending the hook to one's requirements as bending the tame timekeeper to your will. To make the gadget work it is necessary to have the timekeeper trotting obediently at the heels of the master tactician as he circularly stalks his thermal prey around the airfield.

Not that I have anything against free flight gliders. It is only that, as a chuck-it-and-hope innocent I have never come to terms with the sophistries of tactical flying. For one thing you need a colossal amount of cheek, all of which comes in very useful if using the 'thermal blush' method of detection. And for another, you must have the kind of dominating personality that makes timekeepers sit up and beg – some of the more dominating personalities even get their wives to hold the watches. Anyway, I was put off glider flying many years ago because of the markedly low incidence in *homo sapiens* of 180 degree swivel heads as opposed to swivel hooks, making, for the generality, a high measure of hazard in moving rapidly backwards, even for Christmas. Anyway, to cut a long tow line short, I fell into a not too salubrious hole, but, unlike the happy thermal catcher, I did not emerge smelling of violets.

Yet even the advantages of circular towing are of little avail if the timekeeper of your choice has not that type of 'circular vision' I have seen demonstrated on so many occasions – a bionic ability to readily see round obstacles such as woods, hills and the distant horizon.

What I most object to about the circular tow hook is the way gadgets are not only getting too profuse, they are becoming a darn sight too complicated. I do not mind trying to do moderately clever things with bits of wire, and only one function at a time, but a seven function hook would be about six too many for my limited memory bank. I am only capable of dealing with one gadget on one model at one time, and often the only reminder I get of having fitted a Montreal Stop is the vicious whirr of an unengaged, unwinding rubber motor.

Ah for the days when competitors were called out and given two minutes to launch, and the only function to worry about was the annual club dinner.

Pros and Cons

Whether it is through tradition, or some quirk in human nature, we do not know, but the spectatorial display of human skills is mainly confined to people bullying balls in various ways and with a variety of clubs, sticks and upholstered footwear. There is also great interest taken in the way human beings run, jump and generally indulge in the kind of leapings about that animals do so much faster and better. For all such skills, where the greatest asset of man, his brain, is but mildly engaged, big money is paid at the higher levels. Unlucky, therefore, if your talents run to an intelligent preoccupation as model flying rather than to smiting some inoffensive ball – there ain't no money in it.

Just supposing, though, that the public at large, was not so deeply indoctrinated with the 'toys for boys' philosophy. We might have our top flyers involved in an aerobatic final or a free flight fly-off for very large purses, something like £3,000 for a third placing instead of the usual tube of solidifying cement. But there could be nasty complications. Imagine some errant tactical flyer being shown the yellow card or some luckless Wakefield flyer getting sent off for using 1968 Pirelli stock instead of Standard Gumstrip U.G.H. We might even have our own partisan supporters, fanatically attached to the various clubs or even to a frequency allocation (*Red Rules OK*). Tactical heroes could well be regaled with that stirring song of the North, *I'm Forever Blowing Bubbles*, and you might even have hordes of supporters breaking through the police cordons to trample on the opposing club's winning models.

Then there would be the commercial side of things, with track suited competitors having 'Kinky Kits' emblazoned across their backs, and everyone, simply everyone, buying *Biggles Peanuts*.

Vin or Bust

Now that industries are controlled by cost-conscious accountants rather than ordinary businessmen there is very little room for the marginal profit or the sentimental gesture. For this reason Pirelli, and other brands (if any), of rubber powering strip, are no longer on the market. Even Pirelli only came our way as a bonus. Its basic purpose was to tie up the grape vines on the sticks, poles or whatever they use, but when a couple of years ago they changed the rubber formula we failed to get the right sort of information along the grapevine, for we bought the stuff in all innocence, quite unaware that it was nearer to green garden string than rubber strip. Since that time rubber has been in extremely short supply, so much so that the vintage model is all too often powered by rubber of much the same vintage.

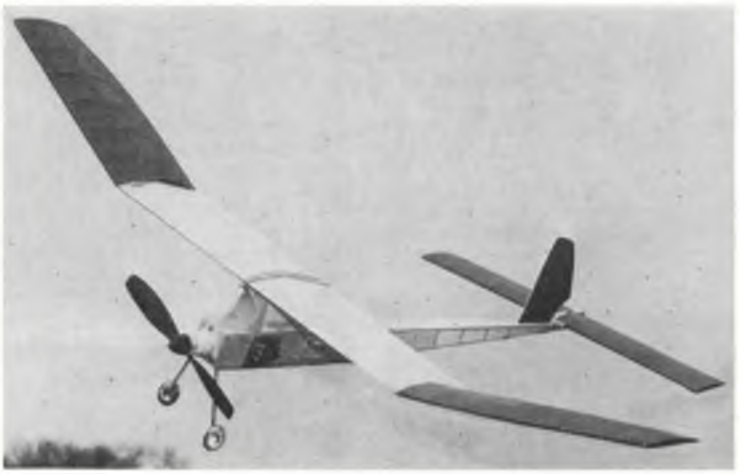
This, very aptly, is where we get a tie up with the grapevine, for the rubber strip has its vintage years just like the wine on who's behalf it perishes in the vineyards. It is unlikely that a Pirelli connoisseur can tell a particular batch by its bouquet, but he has that delicate touch with the torque meter to guide him. You may be sure that when the year was a poor one the snapping of motors on the flying field found an echo in the vineyards as the vine stalks came pingingly adrift.

Personally, I never attained to that standard of flying performance when the finer nuances of rubber vintage or condition become critical. Quality wise, all rubber stock is the same to me; the only vital difference being in the way it suspires, whether with a bang or a whimper. I'm all for the stuff that goes whimperingly one strand at a time – much gentler on fuselages and nerves than that which goes with a loud whang on half turns.

Ray Favre takes a critical look at an American product —and obtains a very favourable reaction

VL PRODUCTS

ELECTRIC FLIGHT SYSTEM



Before publication this article was sent to the supplier for comment, and on seeing the motor performance results he immediately diagnosed a faulty cell in the review battery. I was so impressed with the performance (even with the faulty cell) that I decided to let the report stand unaltered apart from showing the corrected graphs in Figure 1. This information only emphasises the high performance of the VL Products system – **Ray Favre.**

LOOKING FOR SOMETHING a little different in the free-flight line? Then how about this? The **VL Products Electric Flight System** is a purpose-built electric motor system for small free-flight models – the manufacturers say from 25in. to 50in. span.

The motor unit itself is called a *Hytork* 48 and consists of a 3 pole motor coupled directly into planetary reduction gearing, contained within a neat plastic shroud. The main body of the motor and moulding is just 1in. in diameter,, and only 1⅜in. long. The moulding includes a flange with three mounting holes on a 1½in. diameter circle, so the motor is specifically designed to fit into the nose of a converted small free-flight model. In principle, conversion of an existing model would simply be a matter of squaring up the nose, cementing on a piece of plywood with a 1in dia. hole in it, and screwing the motor on.

The reduction gear reduces the motor speed by a factor of 4.8, and with the 7½ x 4in. propeller supplied, a speed of about 4,200 rpm is typical.

The in-flight system is completed by a rechargeable battery and an on-off switch with built-in charging socket. The total weight of the in-flight system is only 2½ozs. and the manufacturers claim that it will cope with models up to 10ozs. all-up-weight. Indeed with a real lightweight, vertical take-offs are possible.

It is important to stress that the manufacturers offer a *system* rather than just an electric motor (albeit a good one!) – so the following comments deal with each part of the system in turn.

The flight battery

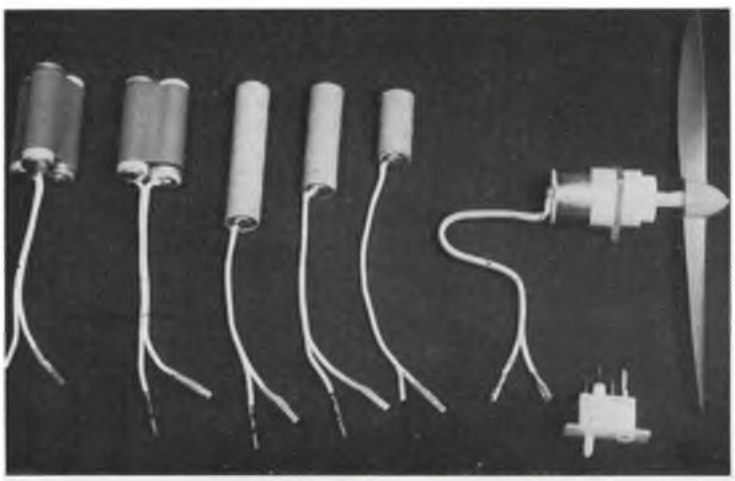
Five different flight batteries are offered, and they are all made up from special, rechargeable, nickel-cadmium cells. They are special because they can be charged and discharged rapidly over a long useful life, and they incorporate a self-sealing safety vent to prevent leaking or explosion. The difference between the five types available is simply voltage output and milliamphours capacity i.e. motor speed and motor duration varies with each type of battery.

The three basic types of battery, the B32L, B33L & B34L (the suffix 'L' merely donating the type of lead-out wires) are all rated at 100mAH and can be fast-charged at 2 Amps for up to 3 minutes. With the B33L this charge gives a 45 second power run, the first 7 seconds of which are at peak revs and then a noticeable drop in rpm occurs for the final 40 seconds. (*Due to bad cell – see corrected curve in Figure* 1). However, all but the very last couple of seconds produce *useful* thrust. The B34L is merely a B33L battery with an extra cell, and so produces higher revs but a shorter run. The power run is about 35 seconds with the first 15 seconds at higher revs than with the B33L (see Figure 1).

Although the B32L was not reviewed it is assumed to be of lower voltage than the B33L and might therefore be expected to give, say, 60 seconds motor run at reduced rpm.

Finally, the B303L battery is rated at 450 mAH and is fast charged at 2 amps for about 12-14 minutes. This was not reviewed, but we would suggest a power run of about 3 minutes at the same sort of speed as the B33L.

All of these flight batteries can be left discharged indefinitely, and be repeatedly fully charged, without harm. Unlike most nicads however they are harmed by overcharging (which is not surprising at 2 amps!)



Heading picture shows the 36in span Electro-Lite II built by the reviewer from plans supplied by VL Products. At left are the five different Ni-cad battery packs, Hytork 48 planetary geared electric motor and the switch gear/re-charge socket. All leads are supplied with connectors fitted – no soldering is necessary. The two battery packs at far left (the B303L and B302L) will power one Hytork 48 for up to five minutes. Their weights are 69 and 41 grams respectively. Also available are props, charger components, test meters, plans and kits.

Two other points are interesting: firstly it is recommended that at the start of each flying session the battery is charged for 30 seconds or so and then used to run the motor until it is completely discharged – apparently this 'conditions' the cells for a full charge. Secondly, complete discharge is recommended before every fast re-charge. In practice this is easy because the flight continues until the motor stops turning – as a bare minimum. Usually it is a lot longer.

A few measurements showed that the motor runs as long as the battery voltage exceeds about 0.5 volts, so the motor run duration is simply determined by this factor – and the speed roughly by the voltage itself. Naturally the batteries run fairly hot, but a few minutes cooling between flights is all that is necessary.

A disconcerting but useful characteristic of these vented cells is that they 'pop' when overcharging occurs. This gives you a firm warning and you should take notice of it because each 'pop' can lower the capacity, and thus reduce the maximum charge held. In short, reduce your next charge a little or it will 'pop' sooner!

Charging

It should be evident by now that fast charging requires a fairly substantial source, and without doubt a car battery has a lot going for it. The source must be at least 6 volts (d c. of course) and needs sufficient AmpHour capacity to supply 2 amps for at least 15 minutes (i.e. to get half a dozen or so flights).

VL Products supply a field charger which plugs into the cigarette lighter (USA fitting) of a car using a 12V negative earth battery, and simple modifications allow this to be used on any 12V car battery.

A further VL Products charger carries a 6 volt battery which is trickle charged at home and then taken to the field for use – and this is fine for up to about 50 flights between re-charging.

The main attraction of these VL Products chargers are their built-in clockwork timers and an adjustable resistor plus meter for setting the charge rate. These features allow you simply to plug in the charger to the special charging point on the model, turn the charger timer to the required charging time (2½ minutes, say) and adjust the resistor until the meter reads the required charging current (2 amps, for example).

Cheaper methods of charging are possible of course, but they are haphazard and will cost more in the long run.

The Models

The first model tried was an old Coupe d'Hiver model of your Editor's. The tissue covering was brittle and split in many places (it was nearly 10 years' old!) so a re-covering job was necessary. The nose was sawn off square at about an inch in front if the wings and the *Hytork* 48 motor was held in place with tape. The flight battery and switch were then taped in place in different positions until a reasonable balance point was obtained (55-60% of wing chord).

If this balance point persists in being too far forward, then chop a bit more of the nose and start again! When a suitable layout has been achieved, the conversion can be carried out properly. A piece of plywood about $\frac{3}{16}$in. thick was prepared with a nominal 1in. diameter hole in it for the motor, and with overall dimensions equal to the fuselage cross-section. Thin ply was then added to the fuselage to support the switch/charging socket and some means of supporting the flight battery was found in the form of a loose box plus foam rubber.

Any small free-flight model of about, 30-42in. wingspan would seem ideal for conversion but keep the *total* weight as far under 10ozs. as you can (5ozs. is easily achieved at about 36in. span).

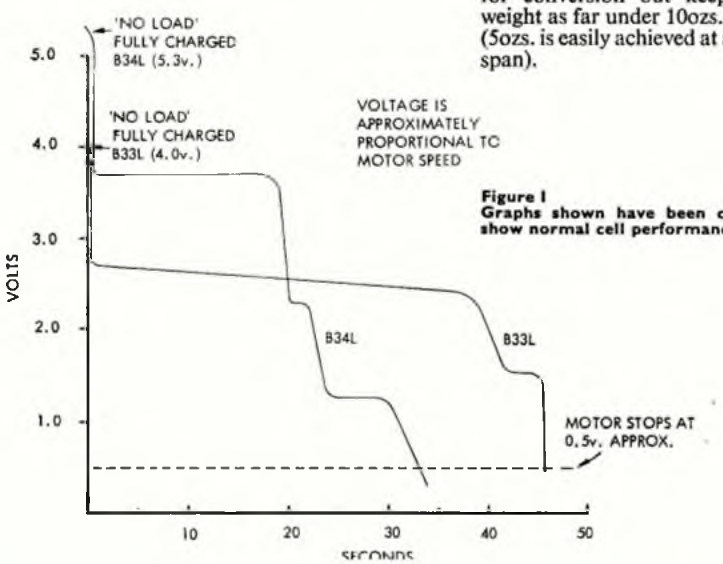
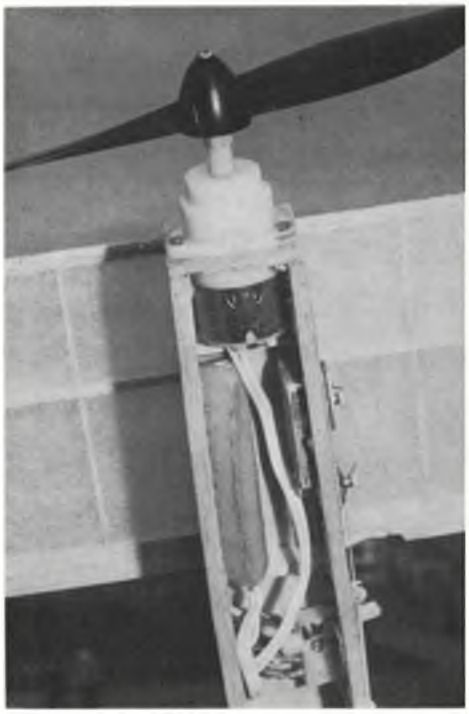


Figure 1
Graphs shown have been corrected to show normal cell performance.



Trimming for flight is very straightforward: first get the hand glide just above the stall, and then start power flights. If the total flying weight is anywhere under 6ozs then the model should climb steeply at first – so if it does not, adjust the motor thrust line *upwards* by slackening the mounting screws and packing the mount accordingly. Slight rudder offset will probably be necessary to achieve a tight climbing circle under power with a wider turn under glide.

Do not under estimate the model's potential performance. The first session saw a fly-away and a local "fetcher-mite" takes the credit for permitting this particular review to continue!

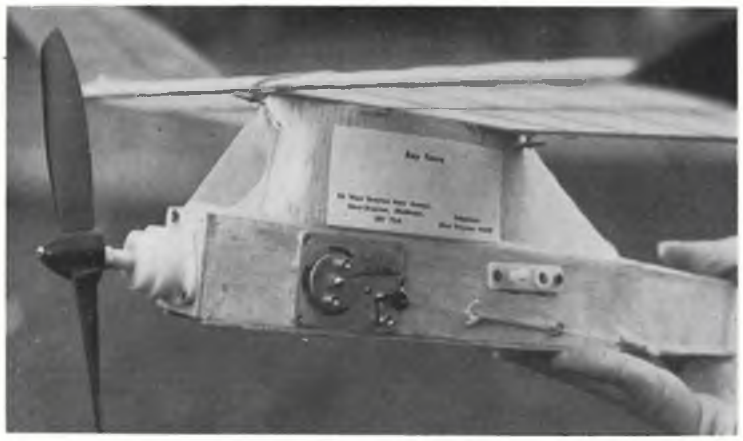
Fired with enthusiasm by the success of the crude conversion, the second model attempted was a purpose-built design called *Electro Lite* the plan of which is available from VL Products, and again the performance was very satisfying – particularly with the higher voltage B34L battery. When trimmed correctly the model would normally climb to around 60 or 70 feet before the motor stopped and from then on, it depended on your luck in finding thermals.

With both models it was found that upthrust was necessary in order to obtain a good climb – and it is suspected that this will be mainly affected by the weight of the model, as most small F/F models tend to have the same layout (wing mounted on a pylon).

A dethermaliser is a 'must' – the second model used a timer rather than a fuse, but still the total weight only came to 5½ozs.

General Comments

The motor run is very consistent and therefore, poor flights rarely occur –



Two views of the VL101 system installed in the Electro-Lite. Note the very simple mounting method used – the motor is simply screwed to a ply former which has a circular hole cut in it to accept the rear of the motor case. Fitting of the clockwork dethermaliser proved to be a very worthwhile precaution.

with the two models used in the review no flight so far has ended before the motor run finished – which is not always the case with some small sports rubber or even diesel/glow engine-powered models.

Due to flying field restrictions and the wind strength, a one-minute dethermaliser setting was used on nearly all the flights. In many cases the D/T has been a great saver – so do not forget to put your name and address on the model just in case!

The other advantages of quietness and absence of smell and oily fuel etc. are obvious – but the consistency of flight performance is undoubtedly the biggest advantage.

On the other side of the coin the need for a car or motorcycle battery for charging must be noted. If your local field has a convenient car park then you have no problems – but otherwise the motorcycle type battery is recommended and should be entirely adequate.

When building or converting a model one important factor has to be noted: it is not wise to complete the forward end of the fuselage until the motor, battery, and switch positions are known fairly accurately. The only way this can be achieved is to assemble the model *with wings, tailplane, fin and rear fuselage finished completely* (i.e. covered and doped). Then fix the motor and switch and finally juggle with the battery position until balance occurs at the due point. When the battery retaining box or equivalent is completed, then the front of the fuselage can be finished. It would be handy, but not essential, if the battery can be removed without having to cut the fuselage open.

The weakest point of the motor is the propeller mounting screw which bends fairly easily on impact with the ground. As the screw is of dural (or similar metal) it is suspected that this 'weak link' is deliberate, to prevent more serious damage to the motor. Spare screws are therefore, essential and it is also necessary to check the propeller rotation for trueness before each flight. A lightweight undercarriage fixed to the engine mount gives very useful protection to the propeller, and is worth trying.

The VL Products field charger (left) incorporates a clockwork timer and can vary the charge rate, so overcoming problems of accidental overcharging. Other chargers are also available. A catalogue of all available items costs 50c plus postage. At right – a vertical take-off gives proof of the power available.

Conclusions

The VL *Products Electric Flight System* is a very worthwhile addition to the market. It will *not* out-perform a top-class rubber-driven or glow motor powered contest model, but it *will* consistently out-perform most rubber-driven kit models and will equal many small diesel or glow powered kit models.

It's biggest advantage is consistency – and on that score alone can be recommended to the hundreds of youngsters wanting to learn something useful from their early models.

For adults the system offers a no-fuss 'relaxation' model which can be thrown in the car boot along with the more exotic, and expensive, types of models.

Mention must also be made of the excellent instruction/information booklet available for the system. It gives circuit diagrams for various chargers, link-ups for multiple-engined arrangements etc., all with clear diagrams.

Finally it is easy to be sceptical with seeing such motors for the first time, so just one word of warning – if you succumb to the temptation of holding the motor in your hand and seeing how it runs, then *hold tight*! It really does 'motor' and will easily pull out of a casual grip, perhaps causing damage to something or someone.

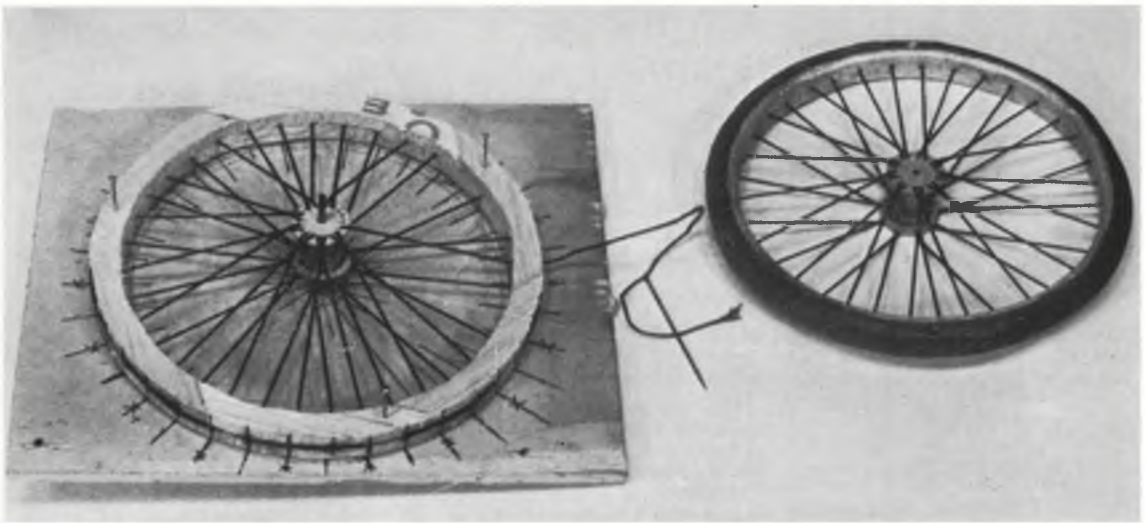
The Cost

Although it can be misleading to quote costs when the review system was obtained directly from the USA, some indication of the likely order of costs is considered to be essential to this type of review. The current price list from VL Products shows a price of $24 (US) for the VL101 system (Hytork 48 motor/gear unit, propeller, B33L battery, switch/charger socket, completed wiring, mounting screws, instruction book, charging plug and leads, i.e. only a charging battery plus model required).

For those who would prefer more information before investing, then we can strongly recommend purchasing the instruction book, which contains a wealth of information/advice, and cost just $1. Prices quoted do not include postage. All these items are available from VL Products, Division of Vista Labs, 7023-D Canoga Avenue, Canoga Park, California 91303, USA.

For countries outside the U.S.A., there is a $3 handling charge (any size order) plus postage – any excess postage sent will be refunded. Payment may be via international draft or international money order, payable in U.S. Dollars to VL Products.

Incidentally, the next innovation from VL Products is an ultra-miniature 2-channel R/C system for electric models. It is claimed to weigh less than five ounces complete – including the Hytork 48 motor, propeller and flight battery!



SPOKE - IT - YOURSELF

DENNIS BINNIE provides the answer to those tricky scale wheels

WHEN VISITING various scale meetings with my free-flight *Bleriot*, I have often been met with questions such as "*where did you get those pram wheels from?*", or more simply "*what sort of machinery did you need to make the wheels?*". Actually they are much easier to make than one would imagine – and only very basic hand-tools are required for their assembly. Before looking too horrified at the size of the model (it is powered by a Rivers 3·5cc diesel, and weighs 3½lbs) combined with the fact that the wheels consist merely of balsa and thread, I should perhaps point out that they have withstood a great deal of abuse in the form of 'heavy landings' – not to mention crashes! On every occasion the wheels have survived with only minor scuffing of the 'tyres', whereas most other parts of the venerable machine have been extensively repaired. Different forms of construction are used for the main wheels and the tail-wheel – and naturally the former are designed for greater strength.

Using the following methods, you will find it quite easy to make spoked wheels to suit your own model – and remember that the finished product is very light indeed.

Main Wheels

First, draw onto a piece of ¼in plywood the inner and outer circles of the wheel (*Figure* 1), then mark off six equally spaced points around the inner circle. Use these marks as the joint lines for strips of balsa used to form the wheel itself – the width of the strips will depend on the width required for the finished wheel, while the thickness should be half that of the total thickness of the finished wheel.

Place grease proof paper or polythene over the jig (or wax with a candle) to prevent parts from adhering to it, then take six of these balsa strips and glue together – also as shown in *Figure* 1. When set, repeat with a further six segments, then glue these two laminations together, with the joints staggered, to form a ply. This form of construction minimises the effect of end grain and adds to the strength considerably.

When all is set, mark out circles of the correct size with a compass – you will find it easier to hold the compass centre point on a piece of scrap wood the same thickness as the tyre. Using a fretsaw, the surplus material can now be removed leaving a ring ready for the next stage, which is the sanding plus drilling of the spoke holes.

With a protractor, mark the ply jig with 36 points outside the outer circle as shown in *Figure* 1, then carefully pin the balsa ring in position, ensuring that it is exactly central. Using a rule, mark the lines on each side of the ring and continue over onto the unfinished tread by joining the centre and outer points. The next stage really needs some form of turning device i.e. a lathe. I realise that not everyone possesses one, but a small hand grinder or hand drill, suitably mounted, or electric drill, will do. Cut out a separate ¼in ply disc slightly larger than the inside circle, and drill centrally to take a bolt which

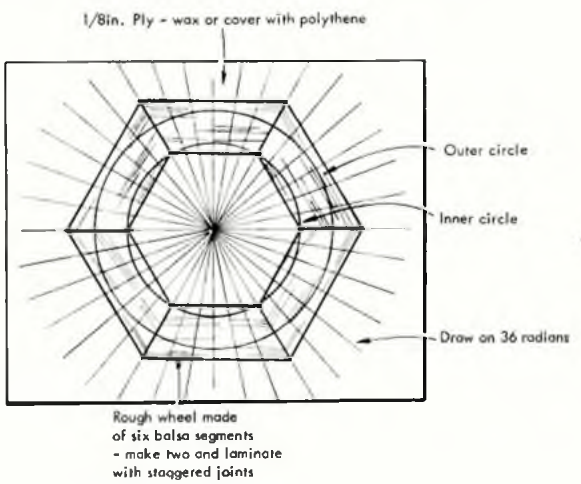


Figure 1
First stages, with jig marked with radians and rough wheel in place.

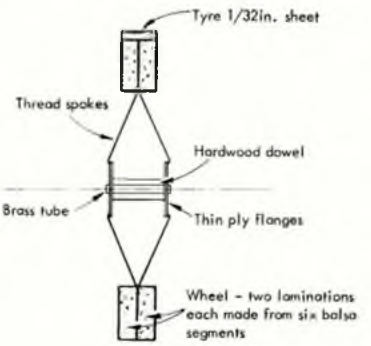


Figure 2
Typical cross section through wheel.

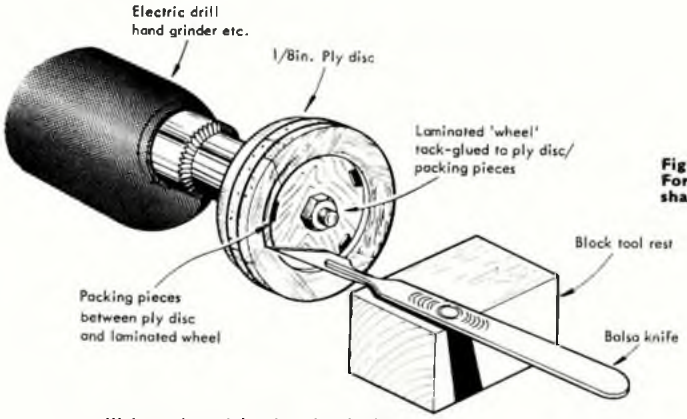


Figure 3
Forming wheel shape.

will be gripped in the chuck. Mount the ring on the disc with packing pieces between them – spot glue or pin together so as to run as true as possible when being 'turned'. See *Figure* 3. With the wheel now being revolved, sand the inside of the rim until smooth, using the glass paper wrapped around, or glued to, a piece of hardwood. Next, with a balsa knife mounted on a block set nearly to centre height, lightly score the rim

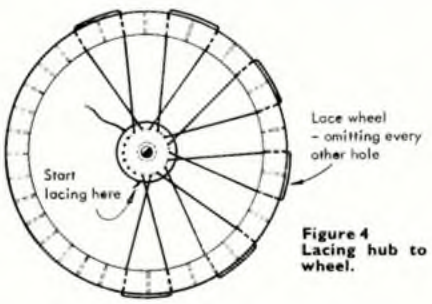


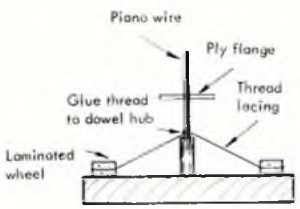
Figure 4
Lacing hub to wheel.

line and finish it with a piece of folded glasspaper. Remove ring, reverse and carefully true up again on the disc and score the other side as before. Apply sanding sealer to the rim only when dry, and then paint the rim colour (usually silver). With a small drill or thin wire made to a spear point, carefully drill spoke holes in the centre of the tyre. The hub is a piece of hard dowel drilled centrally to take a brass tube bearing, while the flanges are pieces of thin ply each drilled with 18 holes equi-spaced. The jig is now fitted with a pin in its centre, the same size as the wheel axe. This must fit tightly, so drill a little undersize and press the pin firmly in place. All is now ready for assembly. For the *Bleriot* front wheels I threaded a needle with heavy shoe thread, knotted at one end. Referring to *Figure* 4, start lacing with the knot inside the hub flange, then through the rim missing every other hole. When you have 18 spokes threaded (leave plenty of surplus thread on the needle) place brass tube bearing over the jig pin, followed by rim with spokes and flange. Glue the latter to the hub dowel. Depending on whether the tyre is central to the hub or offset coned (as some 1914-18 aircraft were) pack up the rim to suit – the shortest spokes are on this side. Secure the rim to the jig centrally and pull each 'spoke' taut – then glue the ends to the outside of the rim. Repeat the threading for the other flange whilst holding in your hand – it is easier to manoeuvre the needle this way. Once again, pull the spokes taut and apply glue to the outside rim.

Now take some $\frac{1}{32}$in balsa strip, the width of tyre, well soaked in water. Glue around the rim and feather the edges where they overlap. About two layers will do. When dry, place the wheel back on the 'lathe' and sand tyre to shape. The complete wheel can now be dipped in a shallow tin filled with thinned dope, removed and the surplus spun off. When dry repeat again if required – this process helps to stiffen and tauten the spokes. The last stage is painting the tyre. If the wheel is running true it can be mounted on a spindle and slowly rotated with the tyre dipping into a shallow trough of thin grey-black paint up to the edge of the rim; adjust the trough with packing. Alternatively, mask the rim and spokes with a paper disc and either brush or spray paint.

Tail Wheel

This method for much smaller wheels is similar, but because of the small size of flanges the drilling of these is dispensed with – the spokes being wound round the jig pin and glued to the ends of the wooden hub centre. The other half of the spokes are then added, and once again glued to the hub. Finally, the blank flanges are added – these can be dimpled with a needle to give a spoke head effect. See *Figure* 5. Building is a little tricky but the result is a very light and really tough wheel.



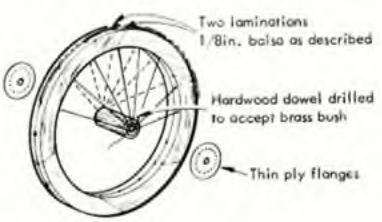


Figure 5
Alternative method for small wheels.

SMAE FINANCE FOR BROMLEY FIGHT

FAST CO-ORDINATION between Martin Dilly (SMAE London Area official) and the SMAE Council enabled the latter to rapidly approve use of the SMAE's Legal Fund for the forthcoming Public Enquiry into bye-laws in the Bromley area.

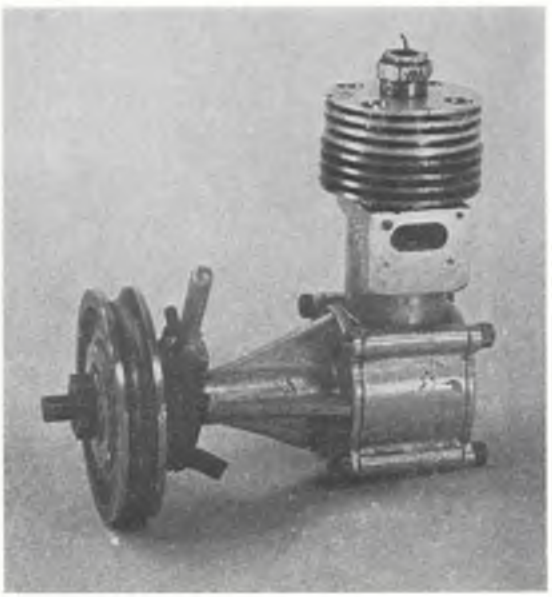
Martin Dilly has been involved in the difficult Bromley case for six years and, despite SMAE and Regional Sports Council advice, the Bromley local authority has continued to propose bye-laws which would restrict model flying to a totally unreasonable level. Inevitably a Public Enquiry has been ordered by the Home Office.

The SMAE's legal fund was set up some years ago precisely for this sort of possibility, and contributions have been received from several sources, including the Trade.

If ever there was a time to add your numbers to the SMAE's membership strength, this is it! It may be your patch next time. Should you wish to assist the Legal Fund, then contributions are always welcome.

Details of membership of the Society of Model Aeronautical Engineers Ltd, may be obtained from the Secretary, Mrs J. Halman, 36 Tyne Road, Oakham, Leics, LE15 6SJ.

LATEST ENGINE NEWS by Peter Chinn



Anyone recognise this spark ignition engine, *sans* carburettor and with busted plug? Reader J. McDougall would like to know.

New British CO_2 Motors

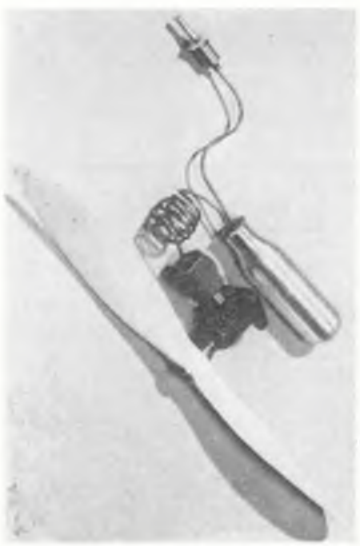
We have been asked to say a few words about the Telco and Shark CO_2 motors now being made in the UK. Frankly, CO_2 motors are not really this writer's scene. Eric Coates is better qualified to comment on the practical operating qualities of CO_2 motors and has already done so, so far as the Telco is concerned in his *Flying Scale Column* in the August and October issues. However, a few words about the design and construction of these engines may be of interest.

Model reciprocating engines operating on carbon-dioxide gas are not new. The first commercially manufactured unit of this type was the American *OK* CO_2 motor which first appeared in 1947 made by the Herkimer Tool & Model Works Inc of Herkimer, New York. This motor had a bore and stroke of ·275 × ·300in giving a swept volume of ·0178cu.in or 0·2920cc and operated directly from a standard CO_2 bulb. Keil Kraft marketed a British made equivalent in the UK soon afterwards. Later, Bill Brown (of Brown Junior fame) began manufacturing a very much smaller CO_2 motor in the United States, the *Campus* 100 which, instead of having to carry the actual CO_2 bulb, was equipped with its own smaller and lighter tank which could be recharged to give several flights (instead of only one) from a standard bulb. From this stemmed the current *Brown MJ*-70 single-cylinder and *MJ*-140 twin-cylinder motors.

The *Telco*, which was the first of the new British CO_2 engines, reaching the market late last summer, is of a similar size to the *Brown MJ*-70. The *Shark*, about the same size and weight as the *Telco* but of larger displacement, derived from a longer stroke, was released more recently. We are dealing first with the *Telco* and its various parts are illustrated here. The *Shark* (export name as used by Harden Associates, otherwise known as the Humbrol PMS-1) will be photographed for similar treatment in an early issue.

Basically, a CO_2 motor works on the same principle as the compressed-air engines used half a century ago for some larger type model aircraft before the advent of small petrol engines made such power units obsolete. The main difference was that the compressed air motor needed a very large air tank (30in long × 3in dia was not unusual) made from copper shim and wrapped with piano wire to contain a pressure of about 100lb/sq.in, whereas the CO_2 engine operates on the very much higher gas pressure (around 800 lb/sq.in) available from an ordinary *Sparklets* bulb containing liquified carbon dioxide. This container (or, in the case of the current CO_2 engines under discussion, the separate tank charged from it) is installed vertically in the model with the delivery pipe at the top so that CO_2 gas (not liquid) is fed to the motor.

The motor itself consists of the essential parts of a simple reciprocating engine: crankcase, crankshaft, cylinder, piston and conrod and cylinder-head. Gas enters the engine through a ball valve in the cylinder-head. This is opened as the piston reaches the top of the stroke by a small spigot on the piston crown



Right: close up of the Telco CO_2 motor complete with tank and filler valve. Total weight is less than ½ oz

At left is Britain's "other new CO_2 motor", the Humbrol PMS-1 ("Shark" when exported by Harden Associates). Illustrated detailed description will follow in next L.E.N. column.

which pushes the ball up and allows gas to enter the cylinder. The piston is forced downwards, the gas supply shuts off again as the spigot is withdrawn from the valve and, as the piston reaches the bottom of its stroke, it uncovers exhaust ports in the lower part of the cylinder, allowing the spent gas to escape.

The speed of the motor can be varied by increasing or decreasing the amount of gas admitted through the ball valve in the head and this is usually achieved by rotating the entire cylinder (this being screwed into the crankcase) so that the ball valve is raised or lowered relative to the piston spigot.

The *Telco*, however, uses a different method of varying the valve timing. Here the cylinder assembly is fixed and the crankshaft is mounted in an eccentric bush so that rotation of the bush raises or lowers the piston relative to the ball valve.

These little motors are smaller than any production model ic engine. The *Telco* has a nominal bore and stroke of 4·5mm × 3·8mm, giving a swept volume of ·060cc or ·0037cu.in. This is a little over one-third of the displacement of the Cox TD ·010, the current 'World's Smallest'. The engine, complete with tank (empty) filler nozzle and piping, weighs a checked 13·4 grammes (0·47oz). The Telco plastic prop adds another 3·1 grammes bringing the total weight up to 0·58oz.

The *Telco* is manufactured by Ticket Equipment Ltd of Cirencester, a sizeable company specialising in the production of modern ticket vending machines and electronically controlled turnstile equipment. The engine was designed from the outset for volume production and most of the tooling for it was made 'in-house'. Many moulded plastic parts are used in the motor's construction, including the crankcase and its snap-in backplate, the piston, valve seat and filler nozzle.

The tiny crankshaft has a 2·5mm dia journal and a 1·5mm dia crankpin on a 5·4mm dia crankdisc. The eccentric main bearing bush has an o.d. of just over 4·5mm and is a tight fit in the crankcase nose – a little too tight on our engine, making speed adjustment rather difficult. At the front the shaft is fitted with a blued steel prop driver and a 10BA prop retaining screw. A ball joint is used to unite the connecting rod and piston. The latter runs in a steel cylinder that screws into the crankcase and is located by a flange. The top of the cylinder contains a nylon sleeve forming the valve seat on which a $\frac{3}{32}$in dia steel ball valve rests. The top of the cylinder is internally threaded for the screw-in knurled brass head cap into which the gas delivery pipe is soldered. An O-ring seal is used to maintain a gas tight joint. A similar type of cap, valve and seal assembly is employed for the filler valve.

Telco outfit includes 5½in prop, speed-control key (left) charging gun (top) and one Sparklets CO_2 bulb (right).

The *Telco* is supplied complete and ready to go. The outfit not only contains the motor ready plumbed to tank and filler valve but also the recommended 5½in diameter prop, charging gun, a key for the eccentric bush speed control, a set of mounting screws and one *Sparklet* CO_2 bulb.

According to the manufacturers' claims, the *Telco* produces a torque of 19·2g.cm (1·72oz.in) stalled at 700lb/sq.in gas pressure and a power output on the same pressure at 2500 rpm of 2·4 watts – equivalent to ·0032 horsepower. Nominal initial rpm on the *Telco* prop is given as 3500 rpm.

Webra and O.S. 1·8's

Webra and O.S. both have powerful new Schnuerle scavenged engines in the 1·8cc group. The O.S. product is the Max 10-FSR of 1·75cc for which O.S. are claiming an output of 0·35 bhp at 19,000 rpm for the standard free-flight/control-line version. The Webra is the rear-exhaust 'Speedy', heavier and of slightly larger displacement (1·79cc) and, for this, Webra are claiming 0·38 bhp at 19,000, rising to 0·52 bhp at 22,000 when a tuned pipe is used. Although both these engines were announced in their countries of origin several weeks ago, it may be a while yet before they reach the UK, so don't start worrying your dealer about them just yet.

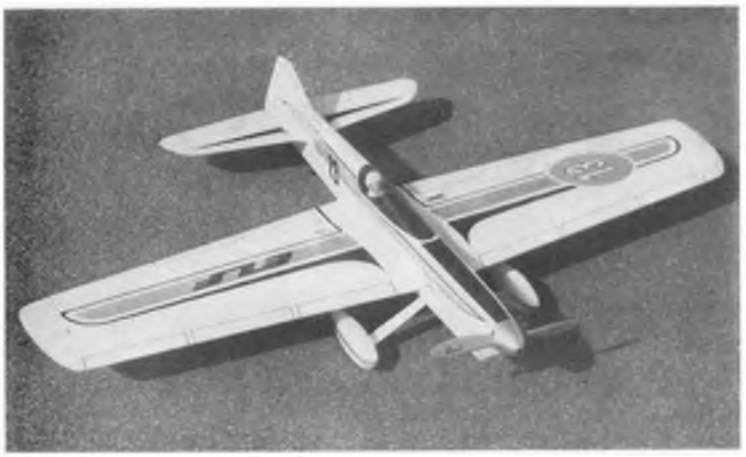
COLLECTORS' CORNER

Mr C. L. Joyce of Bournemouth recently sent us some photographs of a rare 10cc petrol engine, a Taylor Typhoon made some 30 years ago. He writes that he has acquired this engine from a friend who was modelling before and after the war. As the photos show, the engine was of the 3-port or side-ported type – i.e. the induction port, as well as the transfer and exhaust ports, was located in the cylinder and, on this engine, the induction port was under the exhaust with the idea of cooling the exhaust side. (Actually quite a number of pre-war production engines had this exhaust-over-inlet arrangement although it was then more common to have the inlet and exhaust at the rear (*a la* Brown Junior) rather than the side.

Mr Joyce quotes from the specification sheet dated July 1946 that was sent out at the time the Typhoon was on sale: *Cylinder: steel liner, ports milled out, ground inside and out . . .*

Continued on page 101

Parts of the Telco motor. Note spigot on top of piston which protrudes into white plastic valve seat at TDC lifting ball valve for gas entry. Top right of picture is eccentric main bearing bush.



CLAUS MAIKIS,

Purveyor of Perfect Paintwork, claims that his handiwork is far from perfect and that it is all "in the mind"!

THE BRIGHT SIDE

VERY OFTEN I am asked how I finish my airplanes, but I am always anxious to keep my secrets just in case someone turns up with a better finish than my own. But if you promise not to tell others, I *will* give you a hint or two . . . . . but first of all I would like to point out that if you put one of my aircraft next to one of the top Americans' models, then you would notice a big difference. Therefore I never do! The finish I achieve is really not that extraordinary, it just *looks* as if it is. To achieve this impression and to overcome my laziness, I have found some technical and tactical secrets.

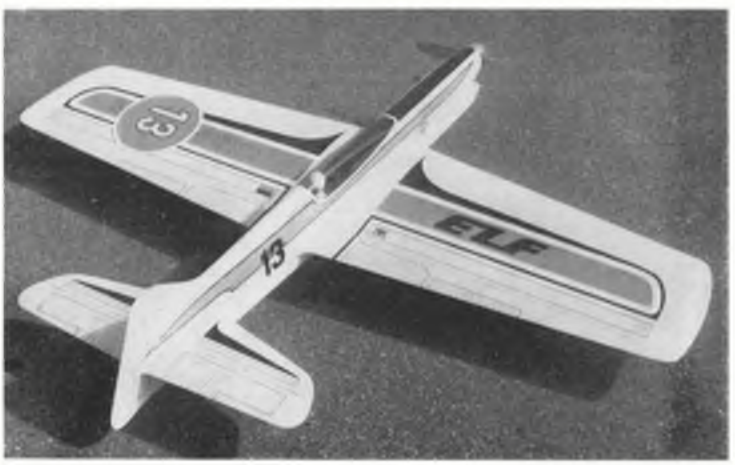
The most important secret is – there is **NO SECRET**! I do just what you do, but I do every part just a little bit more and of course, this adds up to quite an amount of time. But think; that model you started building yesterday – do you really *have* to fly it tomorrow? You KNOW you have built a super new "orchid", you KNOW you will have a breathtaking finish, you KNOW you will fly it excellently, so it really does not matter WHEN you do it. I think that it is very important to gain this attitude; your whole workmanship will profit from this.

So, here we have the framework which has been sanded with differing grades of glass paper until it feels very "pleasant "in the hands. The first coat of lacquer is now applied mixed 1:2 with thinner. Any type of filler can be used, but I prefer to use a dope which is also available as colour dope, because of compatibility with later coats. The thinned dope penetrates the wood grain and slightly hardens the surface. After sanding with 320 grade wet/dry paper (used dry) three or four coats are added, mixed 1:1. Apply just enough coats to make the surface waterproof, sanding each coat with 400 grade paper. Waterproofing is necessary because I dampen the tissue covering when applying it. I prefer tissue for two reasons: it does not stretch as does silk (thus making for a stiffer wing or tailplane) and tissue is easily filled with dope, and this means less weight. Sheets of tissue are precisely cut, slightly dampened with a wet rag, and applied with unthinned dope. The "open" areas on the wing and tailplane are covered first using heavyweight tissue. Lightweight tissue is used for the entire framework with the pieces overlapping a little bit. Compound shapes (such as top of the fuselage or wing tips) are helped with the wet rag – so these areas must be sealed well – previously.

Now for the hardest part. Two or three 1:1 coats are applied each being sanded thoroughly. As with the next two coats, a little white dope is added to the clear dope and sanded carefully with 400 grade paper, used dry (always).

At this stage the canopy can be installed by filing a groove, with the depth of the groove equal to the thickness of the canopy material. Any necessary "transition" fairings are made with micro balloons (as marketed by the American company K & B).

Now there are two more coats, mixed with just a little more white and with talcum powder to be applied to the *wood surfaces only*. These coats must be sanded extremely carefully, I usually need about an hour for sanding one coat; the work cannot be done quickly. By now you must avoid any scratches or dents, as this would



The superb paintwork on Claus' control-line stunters is well known – in fact they are his trademark. This is typical of his approach: a basic all-white aircraft with attractively placed trim and careful work with the ink ruling pen.

cost a considerable amount of time to repair. If necessary, wing fillets are coated once more.

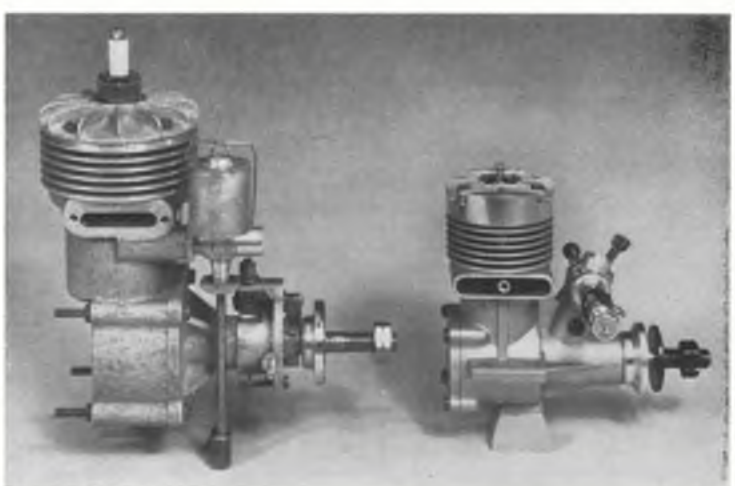
For the base colour, I use touch-up spray cans. *Dupli-Color* is available almost everywhere, has an endless range of colours, is the lightest spray lacquer of which I know, and dries very fast (almost too fast, but if you spray in the backyard as I do, then you will like it). Wait for a warm day, so that the lacquer can flow. For a '46' size stunt airplane I need about three big – 12oz. — cans (white! with a better covering colour you might get by with two cans). As the lacquer dries almost instantly, you can cover the model until the colour is "saturated" and you are satisfied. On the underside, I tend to stop *before* I am satisfied, remembering the weight. I usually add about 4 ounces in total to a C/L stunter.

Now is the time for an exciting colour scheme! Masking tape is mandatory. There are several makes of plastic or PVC adhesive tape which can be used to form curves. If you cut the tape into quite narrow strips (do this after sticking temporarily onto glass or metal sheet) you can form it around very tight bends. A really tiny radius or difficult shape can be masked with shapes cut from self adhesive plastic films (like *Contact* or *Fablon*). After the last of the colour trim has been added, decals should be applied. A transfer sheet is very useful for fancy letters, recess imitations, narrow stripes etc. Ink lines – if you like – are applied last, because they are easily destroyed by water (from the transfers) or by touching them. Before drawing the lines, the paint surface must be roughened with a household scouring powder such as *Vim*. Now all you have to do is to apply a coat of clear fuel proofer – a two part resin type preferred. I use a type which is normally used for covering wooden floors; it is light, hard, and does not yellow – qualities shared by Ripmax *Tufkote*. This *must* be sprayed, as the ink lines do not allow brushing, and you would not like to ruin your wonderful surface with brush marks anyway! Although I always mix up about 6 fluid ounces, I have never added more than $1\frac{1}{2}$ ounces final weight of fuel proof. My complete finish – all that is added to the framework – usually weighs 6 to 7 ounces. I neither sand nor polish the last coat.

Now the tactics! My last 5 or 6 aircraft have been coloured white. White has an image of cleanliness, proficiency, self-confidence – you do not wear white trousers when you expect to run into troubles of any kind do you? Moreover, white has an invaluable advantage: *it hides the failures of my finish*! If the sun shines brightly on my aircraft, nobody is able to see the 'waves' on my wing and the dents on my fuselage! With colour areas and trim lines it is quite easy to 'lose' any glue seams, spars, edges (for example the edges of the paper and wood on the wing, edge of the heavy-tissue on wing planking, canopy edge etc.) Areas which might be exposed to the danger of handling, "grab" marks at front and rear fuselage – can be protected by a "camouflage" of letters and numbers. When applying the high gloss fuel proofer, apply some extra at areas where most spectators will look first: canopy, fuselage nose, wing areas left and right of canopy and wheel pants. As their glances rarely extend to the extremes, your whole model will appear brilliant, even if only the centre is! Finally the colour, and colour scheme, make your model more visible – to spectators, judges, and helpers. Ever tried to find "green machines" in the beans?!

Please do not get me wrong. It is not my opinion that stunt aircraft MUST have an incredible finish – probably it is just my very own neurosis to finish airplanes as I do, but at least I don't have to have an excuse every time a spectator comes closer than ten feet of my airplane, and with my number of models, I would soon run out of excuses!

LATEST ENGINE NEWS *continued from page 99*



British made Taylor Typhoon 10cc engine of 1946 Seen with an O.S. Max 25 for comparison

Piston: ground cast-iron shell with aluminium gudgeon-pin boss and deflector head. Conrod: H-section Hiduminium RR.50, with $\frac{1}{4}$in.dia small end $\frac{5}{16}$in.dia big end with Oilite bronze bush. Crankshaft: cast steel. Main bearings: 2 Oilite bronze $\frac{5}{16}$in.dia, $\frac{1}{2}$in long. Carburettor: venturi choke tube, variable jet as in normal practice but with float chamber. Contact breaker of non-oiling design, points situated at top and separated from cam by large flange.

Our correspondent concludes by saying that he knows the engine not to have been used (it was merely test run only when purchased by its original owner) and has been advised by fellow club members not to use it as it would spoil it as a collector's item. Mr Joyce is not a collector and we gather that he might be tempted to part with the Typhoon to a genuine collector. If anyone is interested, we would suggest writing to Mr Joyce at 28 Ensbury Avenue, Bournemouth, Hants.

Mr J. McDougall of Elstree, Herts writes: "*Please can you give any relevant information regarding the engine illustrated in the enclosed photographs. As far as we know, it is hand made. There are no casting marks. We would like to know the approximate year of manufacture and any commercial retail value.*"

Sorry Mr McDougall, we do not recognise your engine but we are reproducing one of the photos in the hope that someone else may be able to identify it. We suspect, however, that it is a homemade effort and, judging by its design and appearance, would guess it to be at least 25 years old. It is impossible to put any sort of value on it without knowing something of its origins.

Progress with

Up-to-date survey by

Icarus on tow with Dave Saks at the controls as the machine skims along at 33km/hr. Note the novel aerofoil which only has an inch ground clearance when at rest

Unusual side elevation of Icarus emphasises the strange aerofoil contour and concentric propeller boss on the upper fuselage boom. Covering is of Solarfilm There are no ailerons

IT SEEMS incredible but true that for the umpteenth year we can say that the prize of £50,000 so generously donated by Henry Kremer to the Royal Aeronautical Society remains unclaimed. Equally that the additional prizes totalling £5,000 for a "Slalom" flight, or the more recently announced £1,000 for the first to fly for 3 minutes are still apparently beyond reach.

Though there is little to report in the way of British flight progress since the reviews in March '76 or May '75 issues and in Keith Sherwin's book *Man Powered Aircraft* (Argus Books £2.95) the picture in Japan and the USA is much more progressive. A golden summer was wasted here, but the Belgian team of the Maascheleim brothers and Eric Verstraete have been flying their *fifth* machine at Calais. Sponsored and named after 'Superia' it is distinguished by a pod and boom fuselage with tall power pylon for a pusher prop over a high wing. While the rudder is huge, the elevator which is all-moving, is tiny. It has certainly flown well. One photo shows it at shoulder height ground clearance but no statistics have been released. Strangely, the very similar concept 'Dragonfly' by R. J. Hardy (May '75 for 3 view) failed to take off due to high thrust-line and small tail volume.

In the USA Joe Zinno's ZB-1 was officially observed to fly for 5 seconds at between 12 and 14 inches for a distance between 50 and 60 feet on 21st April 1976 at Quonset Pt, Rhode Island. The event was widely reported as the first man powered flight in the USA, and became the subject of an entertaining account in the *New Yorker*. Subsequently called 'Olympian', Zinno's machine flew once more on tow in September and was damaged beyond repair when the right wing failed – a fate common to others! The design had many interesting features, notably a 'dual' aerofoil wing with MS 150-B high lift on the inboard panels and the popular Wortmann FX 63-137 on the outer 25ft of the 78ft span. This gave a peculiar 'step' in the wing – which also had rotating tip ailerons over the last 5ft of span. Power was by levers rather than rotary pedals (as a Kiddy car or some invalid carriages) and the fuselage was of very thin wall alloy tubing. Zinno's 'first to fly in USA' claim has been contested from California where Taras Kiceniuk of hang glider fame has had his 'Icarus' flown by two pilots, Dave Saks and Bill Watson. Dave made an unassisted flight of a few seconds on 19th September at El Mirage Dry Lake (see cover) which the Californians maintain was the first official unassisted flight in the United States. Icarus is also unconventional with its ground hugging low wing using a thick Liebeck type aerofoil, worked out on a computor by Taras Kiceniuk. It has an alloy tube fuselage, plus a boom mounted pusher prop. The wing is constructed from hot wire shaped styrofoam blocks on a single spar of Douglas Fir, 1in x ¼in tapered to ⅛in at the tip! Covering is Solarfilm which provides colour, unlike the usual transparent Melinex which has been universal since the Puffin.

Like a microfilm indoor model on its stand, Icarus being assembled in El Mirage dry lake, California Propstands are needed for wing assembly, with one person at each tip All fairings are from foam sheet. Photos by Joel Rieman.

Roger Hardy at work on Dragonfly at Prestwick. This machine is now taken over by Ron Frost and has required modification to overcome its reluctance to rotate nose-up for take-off

Meanwhile, seemingly unknown to both parties, Wayne Bliesner flew his huge 12ft chord, 74ft span flying wing at Bellingham Airfield, Washington on 18th August 1976. Wayne uses a 12ft diameter prop which is on a tall pylon over the centre pod. He flew to 12ft height for a 'hundred yards'. Progress had been set back by having a hangar collapse on the machine and the ultimate weight of 220lbs which is obviously at least 80lbs too heavy. Still he's keen, as a second 100ft span 8ft chord wing is on his design board!

Elsewhere, Gerry Ritz, once the world champion in A2 gliders, is working on a project at his farm in Northern Wisconsin, and the MIT Canard biplane is nearing tests. These are two well considered projects which will be watched with interest.

Other prospects in the UK range from M. N. Collis's propeller attached 'powered' Tweetie hang glider which is about the nearest one can get to a man-carrying AMA Cub or BBC Hawk model. It uses a treadle drive, from stirrups, and has been flown many times from hillsides. Peter Lock who lives in Belgium, has a fascinating tandem wing idea, where the airflow is sucked through to provide thrust and Admiral Goodhart is constructing his two man 138ft (42m) span machine at Newbury with the aid of the local model club. To all practical purposes, a flying wing with separated power nacelles, it calls for co-ordination of the two pilots and use of a twisting wing to obtain lateral control. At Edmonton, N. London, M. R. Knight, namesake of a modelling pioneer, is working on a 76ft, 320 sq.ft machine with FX 63-137 section and a 10ft prop. The RAeS register is full of such concepts, plus ornithopters, deltas and pneumatic blow-up airframes to add variety. But it is to the long programme of Linnet, Egret and Stork designs in Japan that we must look for real progress.

The idea of developing man-powered aircraft by students at Nihon University originated in 1961 soon after the news of

Man Power

RON MOULTON

successful flights of Britain's "Sumpac" and "Puffin" was received. April 1963 marked the beginning of their first year of research, when a device was made to measure the power generated by man. The second year was devoted to operations research to determine the optimum airframe dimensions, weight, aerodynamic characteristics and other factors to make man-powered flight possible. The basic form of the airframe was defined on the basis of the research. The third year marked a transition to detail design and manufacturing. The long-awaited first 'Linnet' was rolled out in February 1966. Airframe assembly and test flights were carried out at Chofu Airfield with first flight on 25th February 1966, with Munetaka Okamiya at the controls. The 'Linnet' thus achieved the distinction of the world's fourth man-powered aircraft, following the 'Sumpac', 'Puffin I' and 'Puffin II'.

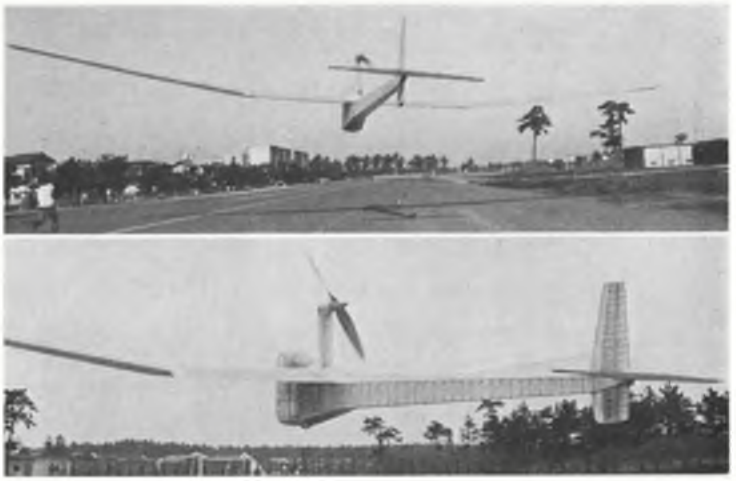
Subsequently, machines continued at a pace of one design almost every year, except for the period during which the university was embroiled in student disputes. The 'Linnet' series was built up to the fifth model, using more or less the same basic form, the longest flight being 91 metres by the 'Linnet II'. The last model, 'Linnet V', however, remained unfinished.

The key to success of every flight of the 'Linnet' series was in the weight reduction. Styrene-paper was used as covering and this proved to be a particularly effective contributing factor. Made by rolling styrol-resins to a thickness of about 0.5mm, the material is light, and effective in enhancing the airframe rigidity. It is also smooth in outer surface finish.

What was wrong with the 'Linnet' series was that a torque shaft measuring about 12ft long was needed to transmit power to the tail end propeller. Vibration of the shaft was resolved by increasing its diameter. The shaft, however, could not be elongated beyond reasonable limits and this made it impossible to lengthen the tail moment arm. Such structural deficiency brought on insufficient longitudinal stability. This demanded too much attention by the pilot, while pedalling at full power. There were many cases in which the Linnets prematurely hit the ground.

In 1972, a well-equipped runway, 620m long and 30m wide, was completed along with a hangar in the precincts of the Narashina School of Nihon University's Science and Engineering Department. This provided ideal local facilities and a new series named the 'Egret' was developed. Major improvements featured introduction of belt drive to shorten the power transmission system in a pylon for the propeller behind the cockpit (as in the 'Sumpac' and 'Jupiter'.) The rear fuselage was elongated and the moment arm increased for greater longitudinal stability.

Unfortunately, the 'Linnet I' was destroyed by wind gusts but the II and III models of the 'Egret' series demonstrated much more stabilized flight characteristics and came out with far better records than the 'Linnet' series, the best flight being for 203 metres.



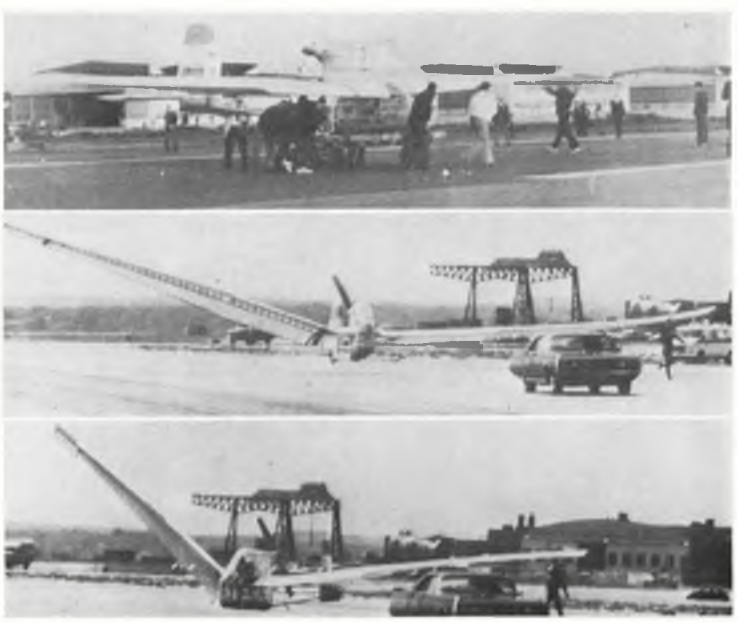
Stork in flight at Narashina, drifting with yaw but at steady altitude over the narrow single runway with hazards either side

The 1975 student team was composed wholly of enthusiasts who had been helping their seniors with the manufacture of man-powered aircraft since their freshman days. The team had an expert designer as its leader named Junji Ishii, and he was entrusted by Professor Hidemasa Kimura, the guiding light of Japanese Man Powered Flight research, with a new design to be called the 'Stork'.

Compared with 'Egret', the main object of the 'Stork' was directed at further weight reduction and greater airframe engineering precision. Wing panels were made detachable to facilitate transport which resulted in a weight penalty of about 2kg as compared with the conventional one-piece wing, but an overall weight reduction was successfully achieved in terms of an empty weight of only 36.0kg (79.3lbs) – an incredible figure. It is worth noting that in addition to the hitherto used foam plastic covering "gan hishi" (a sort of Japanese paper) was used for the outer covering of the various parts of the airframe. Most important of all this truly outstanding achievement is entirely due to Mr Ishii's design policy. Every inch of the airframe was controlled *not to allow a single gram of excess weight.* Modelling experience was influential. The 'Stork' featured a longer moment arm than the 'Egret' series, use of the chain drive for power transmission and for the first time, remarkably, a system for driving the wheel.

Kazuhiko Churei made the first long flight on 14th March 1976 over 446m (1,462.8ft) for a duration of 57secs. Over the previous two days he had made 5 tests of up to 450ft and over the four day period, 12-15th March, he made eleven flights, and the only

Disastrous sequence shows the end of Joe Zinno's Olympian when being towed in September '76. Previous flight attempts ended in heavy landing on spar mounted outrigger, which weakened the spar with the resultant fracture at right root. Photos by David Gustafson



limiting factor appeared to be the length of the University runway.

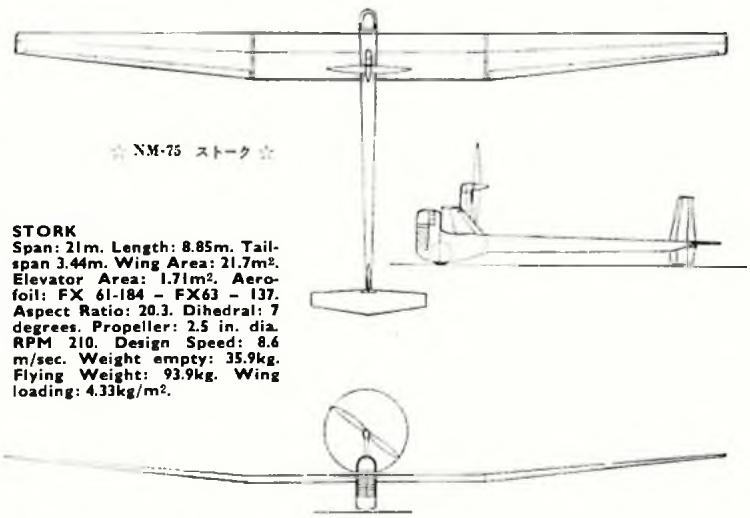
A new student team took over the 'Stork' and a move was made to the Maritime Air base at Shimofusa where the runway length is 2,450m. Two flight trial sessions in May and June included the encouraging flight of 650m (2,132ft) on 18th May, but this was not officially observed as no one predicted so long a flight and in consequence, there was no person at the landing point.

Churei made a deliberate 180 degree turn on the 4th June and this was to be followed by a complete 360 degree circle. Unfortunately, at the 90 degree point, while turning right, the left wing broke. Damage was not serious, and further tests were started in October/November. A second pilot, Takashi Kato, who had made just two flights in June, 577m and 595m respectively, has since made flights of 816m (December 26th), 855m (December 28th) and the momentous 2,139·9m record on January 2nd.

Man-powered flight remains the most demanding challenge for designers.

Sadly, the architect of the prize awards, and guiding light of the RAeS Man Powered Committee, Bob Graham, died on 14th December. A man of staunch character, with a long background of aero-engineering which included test flights of the first British helicopter in the '20's, Bob's influence will be greatly missed in the Man Powered scene.

One of his last tasks was to set up the 2nd MPA Symposium which will be at the Royal Aeronautical Society on 7th February, starting with registration at 09.30, through to 1800hrs. Speakers include Professors Lilley of University of Southampton, Covert of MIT (USA), Wortmann of University of Stuttgart, and Wilkie of University College, as well as Frank Irving of Imperial College, Martyn Pressnell of Hatfield Polytechnic, Rear Admiral Goodhart and a film miscellany. Registration details are available from RAeS, 4 Hamilton Place, London W1V 0BQ.

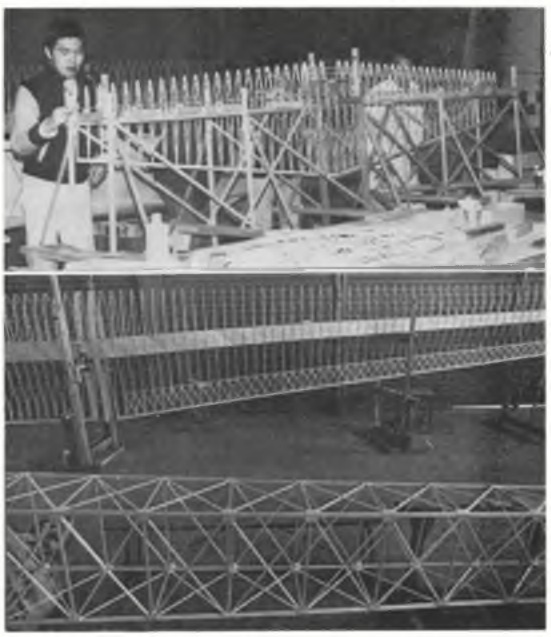


STORK
Span: 21m. Length: 8.85m. Tail-span 3.44m. Wing Area: 21.7m². Elevator Area: 1.71m². Aerofoil: FX 61-184 – FX63 – 137. Aspect Ratio: 20.3. Dihedral: 7 degrees. Propeller: 2.5 in. dia. RPM 210. Design Speed: 8.6 m/sec. Weight empty: 35.9kg. Flying Weight: 93.9kg. Wing loading: 4.33kg/m².

Typical of the many ribs for Stork, the Wortmann aerofoil is jig assembled using magnetic stops on a metal baseplate. Radian lines permit re-arrangement for wing taper.

Kazuhiko Churei (23) pilot of the Stork for the majority of flights to date. His weight is 58kg. Propulsion set up is similar to Puffin and Jupiter

Two views of the Stork under construction, tell a story without words for all aero-modellers. It incorporates every desirable modelling feature for maximum strength and rigidity at minimum weight and is a great credit to the team of Junji Ishii, Susumu Ohara, Yasuhiko Katsuki and Noboru Ozeki who first saw British Man Powered aircraft during their Farnborough '74 visit, plus their other colleagues at Narashina College of Science and Technology under the guidance of Prof. Hidemasa Kimura.



Best yet

Takashi Kata flew 'Stork' over a distance of 213.9 metres for 4 minutes 27 seconds on January 2nd, 1977.

2nd Coupe d'Hiver International

RAF HALTON DEC. 5th

DECEMBER could not have been more kind to aeromodellers than on its 5th day when this International took place at RAF Halton. An azure sky over the hard frosted grass airfield and only the slightest breath of wind provided a meteorological miracle. In such ideal conditions, 55 individuals made a total of 274 flights in the 80 gramme class, and a further 136 flights were recorded by the 39 modellers who entered the 100gr section. No wonder there were times when up to eight Coupe d'Hiver models could be seen airborne simultaneously! In the short winter day, the pace was fast, and as pleasant as most could remember, for Coupe d'H is an event where it's no disgrace to land in less than a minute. That tiny ten gramme motor is a great leveller, and also a tremendous taskmaster for the ingenious. Once more the French group showed the way with huge 100g models – seemingly larger than a Wakefield yet flying on only six strands for a 1:1 power/glide ratio with large props, said to slow up when in thermals give almost a minute of power run. Georges Matherat did not use his 'special' which squeezes a two minute run off four strands . . . it has been known to land with the prop turning!

This fate actually happened to Martin Dilly much to the amusement of his Croydon thermal seeking clubmates. His new model showing French influence, flip-flopped through 100g flights then came on trim for a terrific finale in 80g. Martin rushed his five flights in the last hour, collected three max's and two near misses for a well deserved 2nd place.

In a shoot-out duel with Dave Hipperson *after* the contest results were known, Martin had the edge of 25 seconds better glide time over Dave's tactically flown winner. Third was John O'Donnell with his Javelin launched delayed action prop release – a fascinating contrast in styles.

Many of the perennials were being aired for their once-a-year outing. At least one has now served through 12 such Internationals! But if the 1976 event indicated anything special it was that a lot of new thought is being applied to Coupe d'Hiver model design. The French sweep of '75 had clearly left its mark in the 80g class – where France no longer has so much keen interest. In the perfect air, tainted only by the aroma of the barbeque, numerous new models were having ideal trimming sessions. It was possible to study flight charateristics closely as the drift was barely

Top: Sue Hipperson holds for husband Dave, closely watched by Matherat and Boutillier. Dave won the 80 gr. class. Left: Georges Matherat daintily R.O.G.'s his huge 100 gr. winner, which wafted aloft on a long motor run from the course pitch prop. Below: Gallic Conference – Pierre Rousselot (centre) talking with Paris resident, Brian Cox, as Matherat and Boutillier look on. Note size of Brian's new model – bigger than a Wakefield!

Left: Pierre Chaussebourg with Bob White's model which he flew by proxy into 18th place in 80 gr. Above: Martyn Cowley piles on the turns in the winter sunshine. Right: Obvious French influence in Martin Dilly's new model which showed a remarkable glide.

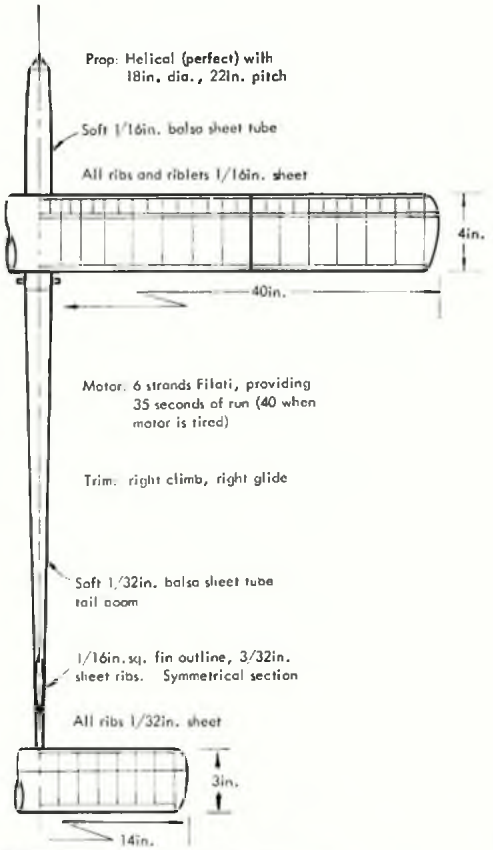
walking pace at times. Propellers need to be matched to airframes. A fast revving 20 seconds power run is little use on a big model and similarly there is no point in chasing the 50 secs run with a two-foot 300 rpm shovel of a propeller if the airframe is heavily loaded with small surface areas. Finding the formula is the challenge, and the barrier comes around 90 secs. The majority of modellers find their first Coupe d'Hiver will manage 80 seconds with comparative ease, rubber quality permitting. Getting the extra 10 secs. or so demands a good combination. If the model is capable of this duration unaided, it is set for tactical success, and if the reader thinks that sounds easy then he is invited to try it. He will discover that Coupe d'Hiver has many hidden facets. How else could this year's French team chatter incessantly through several hours of Aeromodeller mini-bus travelling, talking of nothing but Coupe d'Hiver designs.

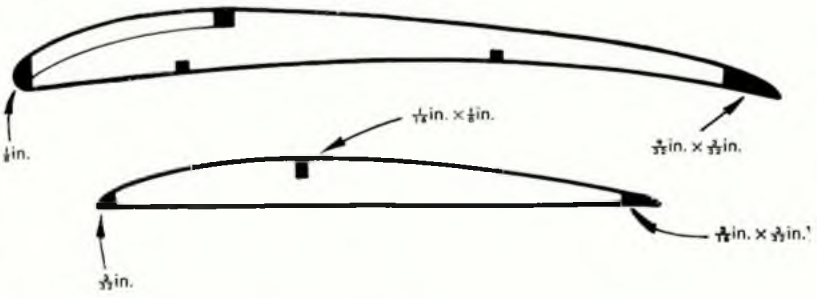
Pierre Rousselot the new publisher of *Modele Reduit d'Avion* came in person to promise a new Perpetual Trophy for 100gr in 1977, and with first five places filled by cross-channel visitors this year, he appears to be on safe ground. Apart from the main trophies the awards list was again long and extensive thanks to excellent model trade support. Part of the tradition established by Maurice Bayet when he created Coupe d'Hiver was to gather everyone in a warm clubroom afterwards for distribution of the loot. We never could understand why it took the officials so long to produce the results. Perhaps they were in league with the bartender! Anyway Halton came through with flying colours as befits No. 1 School of Technical Training, by allowing use of its community centre.

Thanks to the liaison of Chief Tech: Les Atkinson of Halton Model Club, the warm hall and its welcoming bar were a popular refuge from the increasing cold outside. The Gallic cheer for Dave Hipperson when he received the Aeromodeller Trophy set the seal on a fine experience for all who participated in this exceptional contest. Here's hoping our luck holds out for another calm date next winter!

Left: three at once! Launches at the average rate of over one a minute led to several close situations like this one. Below: Ian Dowsett sights fin alignment on his "Swallow" (plan last month) making its first contest outing. Right: The Croydon Thermal indicator read-out illustrates a regular pattern of passing lift.

Left: Dave Hipperson collects the unique Aeromodeller Trophy for his leading place in 80 gr. Plan of his model and actual size ribs (right).





OFFICIAL RESULTS

100gr (MRA Challenge)

1.	G. Matherat (F)	120	113	120	353
2.	B. Boutillier (F)	120	120	105	345
3.	B. Boutillier (F)	115	105	120	340
4.	A. Roux (F)	103	120	108	331
5.	B. Cox	120	120	87	327
6.	S. Marriott	85	99	112	296
7.	I. Kaynes	79	109	105	293
8.	G. Matharat (F)	120	91	80	291
9.	A. Wells	88	120	76	284
10.	G. Ferer	80	98	104	282
11.	F. Monts (USA) (Proxy J. O'Donnell)	112	108	61	281
11.	J. Quinn (USA) (Proxy B. Boutillier)	107	103	71	281
13.	D. Greaves	100	99	80	279
14.	L. Ranson	89	81	97	267
15.	M. Dilly	93	105	67	265
16.	I. Dowsett	70	77	115	262
17.	J. Cooper	81	82	88	251
18.	D. Goodwin	83	81	85	249
19.	P. Chaussebourg (F)	78	72	98	248
20.	D. Greaves	81	83	78	242

21. R. White, 229; 21. A. Crisp, 229; 23. H. Tubbs, 226; 24. A. Crisp, 220; 25. R. Godden, 217; 26. S. Millet (F) (Proxy A. Roux), 215; 27. M. Cowley, 211; 28. L. Taylor, 206; 29. R. Moore, 198; 30. J. M. Chabot (F), 197; 31. M. Evatt, 196; 32. C. Sotich (USA) (Proxy D. Goodwin), 195; 33. P. Bixby, 183; 34. I. Dowsett, 177; 35. D. Roche, 175; 36. K. Moore, 169; 37. S. Savage (Canada) (Proxy S. Dowsett Jr), 168; 38. J. Bailey, 166; 39. M. Evatt, 161; 40. M. Cowley, 160; 41. R. Pavell, 154; 42. P. Cameron, 132; 43. T. Grey, 131; 44. M. Bull, 130; 45. R. Marden, 103; 46. J. O'Donnell, 67.

80gr (Aeromodeller Trophy)

1.	D. Hipperson	109	120	120	120	120	589
2.	M. Dilly	120	120	104	120	119	583
3.	J. O'Donnell	118	111	120	120	108	577
4.	S. Marriott	116	120	120	86	120	562
5.	G. Matherat (F)	120	100	120	120	93	553
6.	B. Boutillier (F)	105	120	116	106	99	546
7.	R. Godden	110	119	104	120	100	543
8.	R. Fleetwood	120	97	120	93	105	535
8.	A. Roux (F)	120	103	120	88	104	535
10.	T. Grey	101	107	85	120	120	533
11.	D. Greaves	120	107	115	112	60	514
12.	C. Shepherd	115	97	106	83	107	508
12.	I. Kaynes	77	120	99	120	92	508
14.	J. Cooper	102	90	120	94	97	501
15.	B. Rowe	101	120	72	80	120	493
16.	F. Monts (USA) (Proxy P. Chaussebourg)	105	97	111	85	89	487
17.	H. Tubbs	58	114	92	120	100	480
18.	R. White (USA) (Proxy P. Chaussebourg)	118	105	71	120	62	476
19.	P. Cameron	100	89	85	84	110	468
20.	A. Crisp	102	75	97	101	89	464

21. B. Cox, 440; 22. M. Cowley, 432; 23. A. Wells, 429; 24. M. Evatt, 426; 25. J. Bailey, 424; 26. P. Chaussebourg (F), 423; 27. J. Billam, 420; 28. D. Goodwin, 414; 29. R. Paveley, 404; 30. S. Millet (F) (Proxy A. Roux), 403; 31. G. Ferer, 399; 32. G. Hart, 396; 33. D. Roche, 394; 34. K. Proctor, 384; 35. I. Dowsett, 369; 36. D. Taylor, 367; 36. P. Taylor, 367; 38. S. Johnson, 366; 39. D. Linstrum (USA) (Proxy P. Cameron), 364; 40. F. F. Takagi (USA) (Proxy R. Johnson), 363; 41. D. Digby, 362; 42. S. Savage (Canada) (Proxy G. Dowsett Jr), 361; 43. L. Ranson, 360; 44. P. Bixby, 353; 45. R. Moore, 351; 46. J. M. Chabot (F), 336; 47. R. Elliott, 333; 48. R. Johnson, 324; 49. M. Riggs, 322; 50. F. Chilton, 318; 51. S. Taylor, 316; 52. S. Marden, 276; 53. S. Billam Jr, 233; 54. M. Bull, 225; 55. J. Nash, 223.

CLUB NEWS

'COST EFFECTIVENESS' being the watchword in the business world today, minority interests are apt to suffer from limitation of demand. This means that it may no longer be profitable to produce many of those everyday items that, in the past, have always been readily available in our model shops. Even worse, we have had not a few (unfounded) scares about the continued supply of our staple food, balsa, and currently there is the chronic rubber strip shortage that is plaguein the free flight contest flyers. But even with all that we can strike a note of optimism by saying that we still seem able to obtain most of our modelling requirements at failry reasonable prices, from one source or another, to effectively maintain model flying as an attractively cheap hobby/sport.

Our first report this month comes from Mr B. T. Dew, of the **North Norfolk Aeromodellers.** He is the new Club Secretary. He feels that the club has done a good public relations job on behalf of the hobby over the past year through the displays given at a number of village fetes. He points out that, all too often, the fete organisers have little idea of the potential hazards involved in radio and C/L flying in limited and crowded areas, but patient negotiation, plus good planning and team work, secured the conditions which allowed for safe and enjoyable shows. These displays, incidentally, lasted for as long as an hour and were complemented by a static show for general viewing. Notably all motors used were silenced to an acceptable level. Further publicity came in ensuing press reports.

According to the face sheet of the **Watford Wayfarers** newsletter that anthromorphic little doggie *Snoopy*, has taken to radio flying. We can only hope that he doesn't find a *No Dogs Allowed* notice on the new flying patch. Anyway it is the snoopers rather than the snoopies that you have to worry about on flying fields, and with the grass now in trim, and hopefully all the models, full use is being made of the new site. But it is one thing to acquire a new site, and quite another to hold on to it in face of the sensitively attuned opposition that abounds in these noise-conscious days. Sensibly, then, the Wayfarers are imposing a strict noise output limit on all engines of 83 dB, measured at a point 10 metres from the model. Fitting the correct silencer is of prime importance, but it is here pointed out that the prop radiates its own musical performance, too, and this should be given some attention. Size and pitch of prop have an effect, and so, apparently, has the material of which it is made.

From *Scimitar*, the newsletter of the **Buckaneers Model Club,** we have stories of two club excursions. The first, a visit to the Bochum '76 C/L stunt competition in Germany by members Jim Mannall (British team member) and Dave Chalk, plus respective wives. The venue was about the largest kind of tarmac area you can find around these days: the car park of a hypermarket. Drawback is that you cannot get the flying under way until the last reluctant shopper has left. Thus it was late afternoon when the decks were finally cleared for action, and Jim was able to put his *Nimrod Mk* 7 through its usual consistent schedule. It flew just as brilliantly in the second round on Sunday morning to put it into second position and give him a place in the final round. In this he hung on to that second place with an even better flight to earn him a well merited silver medallion and certificate. Nearer home Pete Smoothy and Mike Parrott went along to the *Peacock Models Fly-In* at the Harpole MFC. This was a radio do, with the usual fly-for-fun fare: spot landing and the purgatorial limbo. Mike Parrott had a few geometrical problems slotting his 8ft *Vulcan* through the 12ft gap, but Pete's *Senator* was made to measure, for he won the event after a fly-off. Notable feature of the Fly-In was the strict control exercised over all transmitters. There was but one crash to mar an otherwise incidentless day, upon which all flying was stopped.

A somewhat flimsy issue of *SEADOG* this month, due to reasons beyond the control of the editor, Mr T. J. Grey. But at least we have the results of the successful series of thermal soaring meetings that have been held throughout the season at Ashdown Forest. The wonderful thing about thermal soaring is that it is so noiseless – just what is needed in an ecological sensitive spot like Ashdown. Thirty-nine flyers took part in the events, testifying to a rapid growth interest in this form of flying. Chris Foss of Sussex was the winner, with Ricky Shaw of the same club second. Indeed, the Sussex flyers took the first five placings. An even bigger entry is forecast next year, and new rules are being formulated to meet the demand. Results of Area F/F events show a sustained involvement in the Brighton and East Grinstead clubs, with Crawley

YOUR CLUB ?

IN THIS, and following issues, we will be publishing the addresses of model club secretaries for which we have records. Within the past twelve months all the clubs detailed have been written to and the details checked or amended. Clubs which did not reply have been deleted from our records, but newly formed clubs have been noted as the information was made available.

If your club is not listed – or if the secretary has changed recently – then please let us know and enable an accurate listing to be achieved. Amendments will be printed at the soonest opportunity.

BUCKINGHAMSHIRE
Aylesbury & District MFC
F. C. Hale, Cottage Farm, Dudswell, Nr. Berkhamstead, Herts.
Buckaneers Model Club
D. Giles, 64a Station Road, Bow Brickhill, Milton Keynes, MK17 9JT
High Wycombe
R. J. Edmonds, 16 Telford Way, High Wycombe, Bucks. HP13 5EE
North Bucks C/L Club
J. J. Ridley, 2 Back Drive, Coit, Lillingstone Dayrell, Bucks MK18 5AL
Northwood MAC
P. D. Freebrey, 6 Fair Lees, Chesham, Bucks.

CAMBRIDGESHIRE
Cambridge MAC
R. Baker, 15 New Road, Melbourn, Cambs.
Fenland Model Aircraft Club
B. T. Knott, 363 High Barns, Ely, Cambs. CB7 4RW
Impington Village College MAC
C. J. Hinson, 111 Fallowfields, Cambs. CB4 1PG
Oundle & District MAC
G. H. Stubbs, 74 West Street, Oundle, Peterborough, Cambs. PE8 4EF
Peterborough MFC
M. Page, 8 St. Andrews Road, Northborough, Nr. Peterborough Cambs.

CHESHIRE
Chester MFC
C. R. Filtness, 26 Raymond Street, Chester, Cheshire
Darley Moor RCS
D. J. Findlow, 10 Beech Grove, Wilmslow, Cheshire SK9 5EU
North Cheshire Radio Model Club
R. Wilson, 92 Mottram Old Road, Gee Cross, Hyde, Cheshire

CLEVELAND
Teesside Model Flying Club
L. N. Nicholson, 188 Wynard Road, Hartlepool, Cleveland TS25 3LJ

CUMBRIA
Kendal Model Aero Club
P. Talbot, 16 Castle Green Close, Kendal, Cumbria

and Sittingbourne also making a showing.

Our next report comes from the West Midlands, and is sent in by Geoff Spencer, the Secretary of the **Sandwell MAC.** Since he last wrote to us the club has developed considerably. New meeting premises have been found in the shape of a large church hall – this being quite large enough for Indoor flying, and already the EZB, Peanut scale and indoor chuck models are spreading their nacreous wings on Monday evenings. Membership is on the high side, with 40 to 50 turning up at the club meetings. Most classes of modelling are represented within the new club, including Radio and free flight. Members are by no means parochial in spite of the church connections, venturing out to the Nationals, Cranfield and Cardington in search of contest experience. No club honours achieved yet, but valuable knowhow has been gained and enthusiasm fired. To add a bit of dash to the flying field scene the club has its own printed T shirts which, it is hoped, will prove a familiar sight on the national airfields during the coming year. No fulsome news given of the flying amenities, but at least the Radio boys have a friendly bit of pasture to operate on, thanks to the farming connections of the local model shop proprietor who is also a club member. Club meetings are held at St Bernards Church, Broom Avenue, Hampstead (off the Newton Road, West Bromwich) every Monday night at 7.30pm. Central heating, bar and refreshments. Prospective members and visitors welcome.

The *Northern Area News* reports a somewhat dismal ending to all the postponements and cancellations that have beset the holding of the Northern Area Rally. It finally held at Rufforth on a very wet October Sunday indeed, with wind speeds approaching 20mph. Yet such is the spirit prevailing in the Area that the meeting got under way with an entry list up on the 1975 turnout. J. O'Donnell, a practised bad weather man, put his experience to good advantage to win both Open Rubber and combined Mini. But where are the O'Donnells of the future? Well, one up and coming young prospect is Graham Davitt, who won the Vintage event with his *Scram.* His brother Ian, too, shows promise, having taken third place in the Junior Kit event. Not so promising for the future, at least for timekeepers, is the promise of time (the good old tick tock stuff) going metric in 1979. It looks to be a very mean time that Greenwich has in store for us. There will be so many hours to a Lacaday, and by my new calculator, a present 3 minute max will be ·3472222 of a Centiday. Now for the good news. A new flying field appears on the Area scene: RAF Church Fenton. The use of this field is a breakthrough for the Area. Already the Winter Rally is scheduled there for 16th January, and it is hoped to stage another event at the field later in the year.

Why, in a mad, bad world do people take such delight in persecuting a few model flyers for making a bit of a noise on Sunday morning? This question is asked by Wal Cordwell in the *Three Kings' Court Circular.* The answer would seem to be that they can do something about it, whereas gypsies, squatters, football hooligans and other real disturbers of the peace are held sacrosanct as social problems. Come to think of it, though, we might do better if we could get onto the social problem list. Perhaps instead of being threatened with eviction we would have social workers bringing us cups of tea, and us older ones might even qualify for meals on wheels. Seems the gypsy curse has been on the Croydon patch again and the mess and rubbish they have left behind is a minor ecological disaster. They don't sell wooden clothes pegs or tell fortunes any more, it seems, but deal in lucrative scrap

Contest Calendar . . . .

January 16th	**NORTHERN AREA (SMAE) WINTER RALLY.** F/F: Open R/G/P, Combined mini (K-factor), Vintage duration and HLG. C/L: FAI team race, Goodyear, Combat and Junior/Novice stunt. R/C: Novelty events. 9am to 3.30pm at RAF Church Fenton, Yorks. SMAE members only.
February 13th	**N.E. AREA (SMAE) INDOOR MEET.** EZB, HLG, Scale (N.E. Area Class 11 rules), Novice Duration. Hall size 226 x 122 x 35ft. Venue – Sporting Club of Washington (by arrangement with Sunderland Assoc. Football Club). For further information contact Jeff Anderson, 16 Chevely Walk, Belmont, Durham DH1 2AU. Tel. Durham 68493.
February 13th	**CROOKHAM GALA.** Open R/P/G. All-in FAI (5 flights, no rounds). 10am start. Venue: Bassingbourn Old Airfield, Royston, Herts. SMAE members only.
February 20th	**SMAE CENTRALISED MINI EVENT.** A/1, C d'H, ½A, HLG. Venue: RAF Barkston Heath (Confirmed).
March 6th	**N.E. AREA (SMAE) INDOOR MEET.** Details as per February 13th meeting.
March 6th	**S.E. AREA (SMAE) INDOOR MEET.** Peanut scale, EZB, HLG, CO_2 Scale. Venue: Crawley Sports Centre, Haslett Avenue, Crawley, W. Sussex. Hall dimension 120 x 105 x 30ft high. Pre-entry (SMAE members only) Seniors 60p, Juniors 30p. Associates 90p. Spectators 20p. Details/entry forms: D. Cash, 22 Crossways Avenue, East Grinstead, Sussex RH19 15F. Tel. E. Grinstead 23242 or A. Boyle on Horley 3664. Soft shoes only to be worn in hall.
March 20th	**SMAE 1st AREA CENTRALISED.** Open rubber, Open Power, A/2 (Plugge Trophy). Area Venues.
April 16th & 17th	**SPRING FAI MEET.** KMAA Cup FIA, Weston Cup F1B, Halifax Trophy F1C. Venue: Sculthorpe – confirmed. Pre-entry essential. (SC) (JC).
April 24th	**SMAE INDOOR MEET.** EZB Beginners/Expert. Venue: RAE Cardington, Beds.
May 8th	**SMAE INDOOR NATIONALS.** Plus general fly-in. Venue: RAE Cardington, Beds.
May 8th	**SECOND AREA CENTRALISED** F1C (Plugge Trophy), Open Rubber & Glider. Area Venues.

metal. But gyppoes are not the only unwelcome visitors on the club sites, there are things in the walls of their meeting centre (more heavily bugged than a Moscow ambassadorial suite) and, as a result, the place will have to close down for a few fumigatory weeks. To add to the club's problems there have been complaints of noise on the alternative playing fields site. Not all C/L noise, though, as the site is shared with Radio. Perhaps it is a good omen for the future that kite flying has become popular in the club, but even that's got strings attached.

The **Wolves MAC** newsletter contains some disturbing news of flying field difficulties in the North Western area. Chetwynd, it seems, looks to be on the way out, thanks to noise complaints about R/C models (why not just ban the R/C models?). The rally held there in October was not properly authorised, and the club's own scheduled gala has been cancelled. To add to the Wolves' problems a levy of £2.25 per day has been imposed on the Marsh Lane C/L field, but fortunately, the Lucas Sports Field is still available for C/L, albeit on a limited basis. This generally parlous flying field situation has had an attenuating effect on the club contest programme, with many trophies not competed for. But what has been lacking on the shrinking home grounds has been made up for, and more, by some spanking wins and placings in the wider contest field. There is Colin Shepherd's 1st in Open glider at the Nationals and another glider first at Cranfield by John Watkins. The C/L boys have also had their share of glory, with the Brian Perry/Chas Cotterell first in Goodyear at Woodvale and many other successes. The flying field gloom has been further lightened by the very full programme of displays put on by the club in 1976. It was the year of the Cracker, with a full fireworks realism adding pyrotechnic glamour to the many displays given by members. How realistically do those dummy castles go up in fire and smoke, lock, Brock and barrel! And the club makes a bob or two out of the demos, too. What you might call flying-for-fund, going possibly to offset those frightful flying field costs.

Following a successful season, with goodly entries and high standards of flying, the **Scottish Aeromodellers Association** reminds members, in its newsletter, that competitions do not just happen, they have to be organised. Bearing this in mind, members are further asked to sit down and consider how they can make their particular contribution to the organising side of things. There is certainly a moral obligation on the part of any regular contest participant to serve a term of office in some capacity. It also helps the modeller himself to know what goes on at the heart of things. The newsletter reports that, in spite of the super summer, albeit not quite so brilliant in the extreme north, many of the year's contests suffered from poor weather. Let us hope the coming season will be kinder.

A photograph in New Zealand's *Free Flight Down Under* shows a couple of Wakefields hoist upon winding racks. These waist level rigs are fast becoming popular throughout the world, and may be either a sign of a universal helper famine or the use of refined winding techniques. Certainly the casual helper may have a peculiar notion of holding a model or that he should keep it straight and steady.

Two newsletters which perform an invaluable service for NZ modellers in addition to the above are the *NZAAA's Newsletter* and the Christchurch MAC's *Torque*. It is encouraging to know that F/F is so much alive in the antipodes.

Clubman

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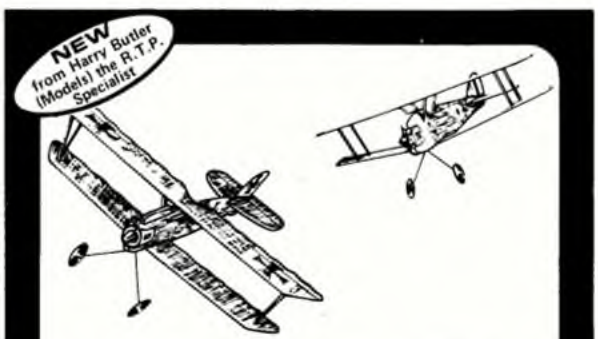

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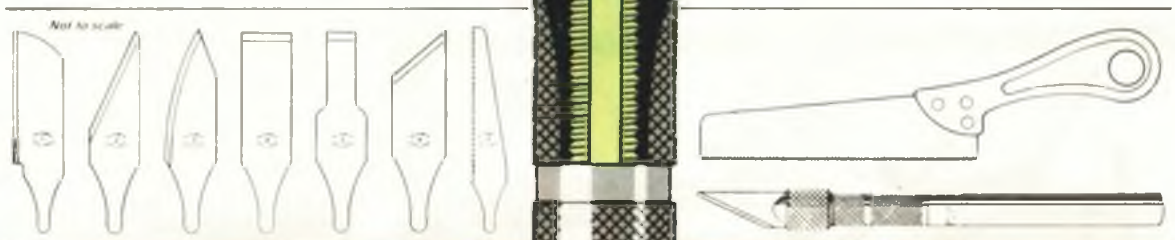
For ease of identification this diagram is colour-coded

Blade. Blue: Collet, Green: Bush, Dark Blue.



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1 PIXIE

2 GIPSY

3 SENATOR

4 COMPETITOR

5 ACE

6 ROBIN

7 PLAYBOY

8 EAGLET

9 ACHILLES

10 AJAX

11 ELF

12 GEMINI

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Two other points are interesting: firstly it is recommended that at the start of each flying session the battery is charged for 30 seconds or so and then used to run the motor until it is completely discharged – apparently this 'conditions' the cells for a full charge. Secondly, complete discharge is recommended before every fast re-charge. In practice this is easy because the flight continues until the motor stops turning – as a bare minimum. Usually it is a lot longer.

A few measurements showed that the motor runs as long as the battery voltage exceeds about 0.5 volts, so the motor run duration is simply determined by this factor – and the speed roughly by the voltage itself. Naturally the batteries run fairly hot, but a few minutes cooling between flights is all that is necessary.

A disconcerting but useful characteristic of these vented cells is that they 'pop' when overcharging occurs. This gives you a firm warning and you should take notice of it because each 'pop' can lower the capacity, and thus reduce the maximum charge held. In short, reduce your next charge a little or it will 'pop' sooner!

Charging

It should be evident by now that fast charging requires a fairly substantial source, and without doubt a car battery has a lot going for it. The source must be at least 6 volts (d c. of course) and needs sufficient AmpHour capacity to supply 2 amps for at least 15 minutes (i.e. to get half a dozen or so flights).

VL Products supply a field charger which plugs into the cigarette lighter (USA fitting) of a car using a 12V negative earth battery, and simple modifications allow this to be used on any 12V car battery.

A further VL Products charger carries a 6 volt battery which is trickle charged at home and then taken to the field for use – and this is fine for up to about 50 flights between re-charging.

The main attraction of these VL Products chargers are their built-in clockwork timers and an adjustable resistor plus meter for setting the charge rate. These features allow you simply to plug in the charger to the special charging point on the model, turn the charger timer to the required charging time (2½ minutes, say) and adjust the resistor until the meter reads the required charging current (2 amps, for example).

Cheaper methods of charging are possible of course, but they are haphazard and will cost more in the long run.

The Models

The first model tried was an old Coupe d'Hiver model of your Editor's. The tissue covering was brittle and split in many places (it was nearly 10 years' old!) so a re-covering job was necessary. The nose was sawn off square at about an inch in front if the wings and the *Hytork* 48 motor was held in place with tape. The flight battery and switch were then taped in place in different positions until a reasonable balance point was obtained (55-60% of wing chord).

If this balance point persists in being too far forward, then chop a bit more of the nose and start again! When a suitable layout has been achieved, the conversion can be carried out properly. A piece of plywood about ⅛in. thick was prepared with a nominal 1in. diameter hole in it for the motor, and with overall dimensions equal to the fuselage cross-section. Thin ply was then added to the fuselage to support the switch/charging socket and some means of supporting the flight battery was found in the form of a loose box plus foam rubber.

Any small free-flight model of about, 30-42in. wingspan would seem ideal for conversion but keep the *total* weight as far under 10ozs. as you can (5ozs. is easily achieved at about 36in. span).

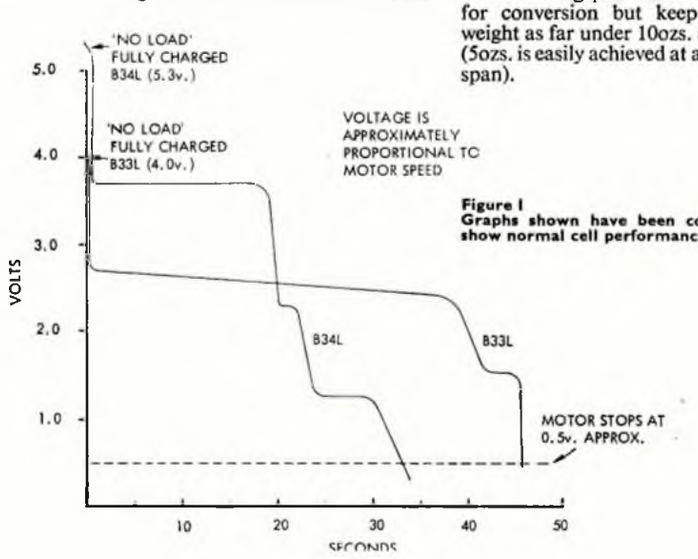
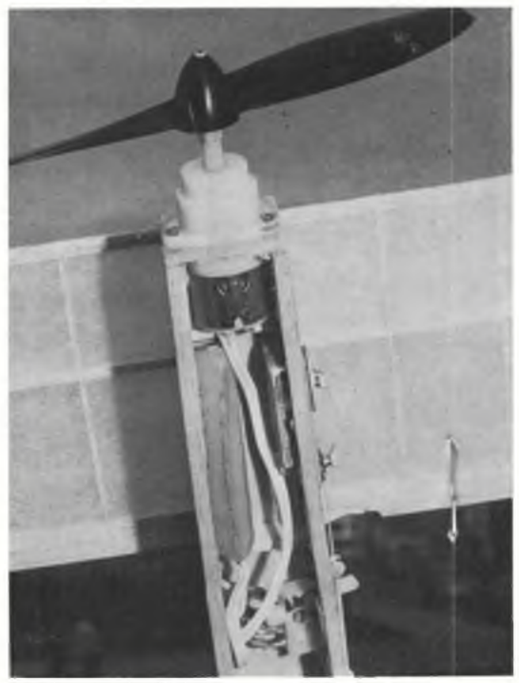


Figure I
Graphs shown have been corrected to show normal cell performance.



Trimming for flight is very straightforward: first get the hand glide just above the stall, and then start power flights. If the total flying weight is anywhere under 6ozs then the model should climb steeply at first – so if it does not, adjust the motor thrust line *upwards* by slackening the mounting screws and packing the mount accordingly. Slight rudder offset will probably be necessary to achieve a tight climbing circle under power with a wider turn under glide.

Do not under estimate the model's potential performance. The first session saw a fly-away and a local "fetcher-mite" takes the credit for permitting this particular review to continue!

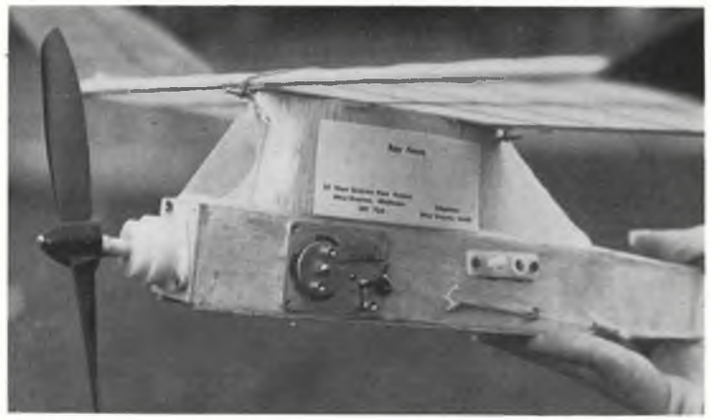
Fired with enthusiasm by the success of the crude conversion, the second model attempted was a purpose-built design called *Electro Lite* the plan of which is available from VL Products, and again the performance was very satisfying – particularly with the higher voltage B34L battery. When trimmed correctly the model would normally climb to around 60 or 70 feet before the motor stopped and from then on, it depended on your luck in finding thermals.

With both models it was found that upthrust was necessary in order to obtain a good climb – and it is suspected that this will be mainly affected by the weight of the model, as most small F/F models tend to have the same layout (wing mounted on a pylon).

A dethermaliser is a 'must' – the second model used a timer rather than a fuse, but still the total weight only came to 5¼ozs.

General Comments

The motor run is very consistent and therefore, poor flights rarely occur –



Two views of the VL101 system installed in the Electro-Lite. Note the very simple mounting method used – the motor is simply screwed to a ply former which has a circular hole cut in it to accept the rear of the motor case. Fitting of the clockwork dethermaliser proved to be a very worthwhile precaution.

with the two models used in the review no flight so far has ended before the motor run finished – which is not always the case with some small sports rubber or even diesel/glow engine-powered models.

Due to flying field restrictions and the wind strength, a one-minute dethermaliser setting was used on nearly all the flights. In many cases the D/T has been a great saver – so do not forget to put your name and address on the model just in case!

The other advantages of quietness and absence of smell and oily fuel etc. are obvious – but the consistency of flight performance is undoubtedly the biggest advantage.

On the other side of the coin the need for a car or motorcycle battery for charging must be noted. If your local field has a convenient car park then you have no problems – but otherwise the motorcycle type battery is recommended and should be entirely adequate.

When building or converting a model one important factor has to be noted: it is not wise to complete the forward end of the fuselage until the motor, battery, and switch positions are known fairly accurately. The only way this can be achieved is to assemble the model *with wings, tailplane, fin and rear fuselage finished completely* (i.e. covered and doped). Then fix the motor and switch and finally juggle with the battery position until balance occurs at the due point. When the battery retaining box or equivalent is completed, then the front of the fuselage can be finished. It would be handy, but not essential, if the battery can be removed without having to cut the fuselage open.

The weakest point of the motor is the propeller mounting screw which bends fairly easily on impact with the ground. As the screw is of dural (or similar metal) it is suspected that this 'weak link' is deliberate, to prevent more serious damage to the motor.

The VL Products field charger (left) incorporates a clockwork timer and can vary the charge rate, so overcoming problems of accidental overcharging. Other chargers are also available. A catalogue of all available items costs 50c plus postage. At right – a vertical take-off gives proof of the power available.

Spare screws are therefore, essential and it is also necessary to check the propeller rotation for trueness before each flight. A lightweight undercarriage fixed to the engine mount gives very useful protection to the propeller, and is worth trying.

Conclusions

The VL *Products Electric Flight System* is a very worthwhile addition to the market. It will *not* out-perform a top-class rubber-driven or glow motor powered contest model, but it *will* consistently out-perform most rubber-driven kit models and will equal many small diesel or glow powered kit models.

It's biggest advantage is consistency – and on that score alone can be recommended to the hundreds of youngsters wanting to learn something useful from their early models.

For adults the system offers a no-fuss 'relaxation' model which can be thrown in the car boot along with the more exotic, and expensive, types of models.

Mention must also be made of the excellent instruction/information booklet available for the system. It gives circuit diagrams for various chargers, link-ups for multiple-engined arrangements etc., all with clear diagrams.

Finally it is easy to be sceptical with seeing such motors for the first time, so just one word of warning – if you succumb to the temptation of holding the motor in your hand and seeing how it runs, then *hold tight*! It really does 'motor' and will easily pull out of a casual grip, perhaps causing damage to something or someone.

The Cost

Although it can be misleading to quote costs when the review system was obtained directly from the USA, some indication of the likely order of costs is considered to be essential to this type of review. The current price list from VL Products shows a price of $24 (US) for the VL101 system (Hytork 48 motor/gear unit, propeller, B33L battery, switch/charger socket, completed wiring, mounting screws, instruction book, charging plug and leads, i.e. only a charging battery plus model required).

For those who would prefer more information before investing, then we can strongly recommend purchasing the instruction book, which contains a wealth of information/advice, and cost just $1. Prices quoted do not include postage. All these items are available from VL Products, Division of Vista Labs, 7023-D Canoga Avenue, Canoga Park, California 91303, USA.

For countries outside the U.S.A., there is a $3 handling charge (any size order) plus postage – any excess postage sent will be refunded. Payment may be via international draft or international money order, payable in U.S. Dollars to VL Products.

Incidentally, the next innovation from VL Products is an ultra-miniature 2-channel R/C system for electric models. It is claimed to weigh less than five ounces complete – including the Hytork 48 motor, propeller and flight battery!