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AERO

MODELLER



p.276



p. 264

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Cover: One of the most encouraging aspects of the 1989 Free Flight Nationals was the attraction of Slow Open Power, which brought hardened control-liners like Dave Clarkson (dressed in true Nats attire) into the fray. Advance news of the '90 Nationals in Hangar Doors on P.244. See you at Barkston Heath!

ASP

Argus Specialist Publications

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HANGAR DOORS

Away! Dave Hipperson puts everything into launching his F1B at the 1989 Nationals. Details of this year's events appear below... and note - CO₂ Duration is back!



F/F Futures

With the 1990 F/F Nationals knocking on the door, it's time to appraise the season's model flying here in the UK. Optimistic signs, we think, for a healthy future. F/F competition is well established at selected centres of activity, and variety of classes appear to be attracting gradually-increasing numbers again. Recent correspondence has gratifyingly highlighted the 'Junior situation' again. We deliberately refrain for using the word 'problem'. Perhaps most relevantly, we should quote from fifteen-year-old Tom Phillips' letter.

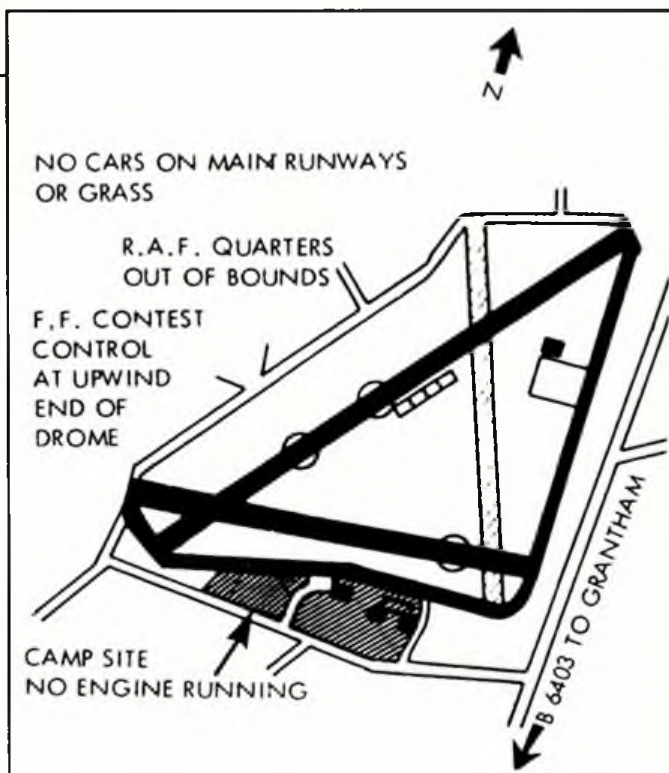
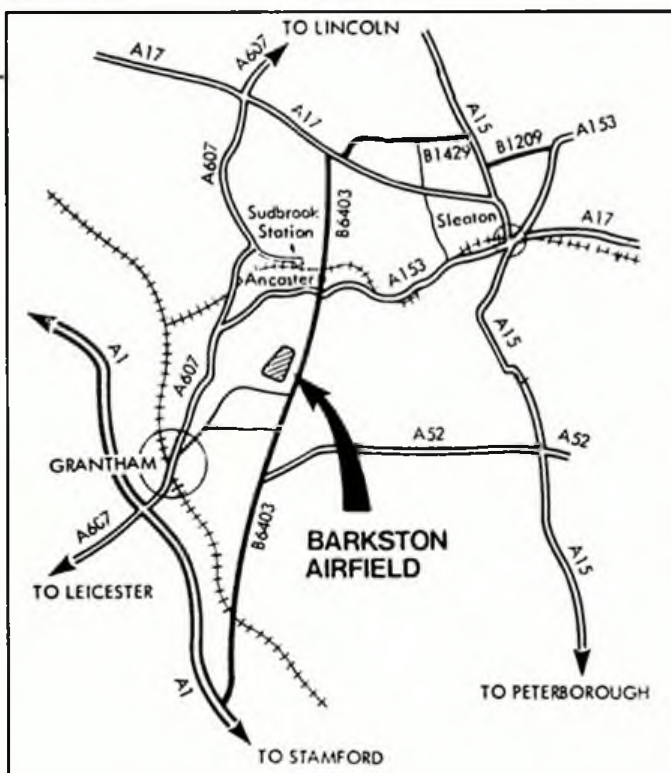
'We have heard the comment that "youngsters are not interested in aircraft, least of all model aircraft, any more". I find this an over-simplistic generation. I am a member of a model aircraft club in which there is a strong youth contingent, and believe that the lack of young people entering the hobby is due to cost. Aeromodelling is expensive and there is little hope of a young person pursuing the hobby without very generous or similarly interested parents. Nevertheless, I am interested in aircraft and aeromodel-

ling, and I do know several other youngsters similarly interested...'

Growth aeromodelling in schools - usually as a result of the introduction of CDT activities - is another healthy sign. On page 254 Tony Trevail describes his own efforts to promote model building and flying amongst the pupils. A good, simple approach, we'd say. Could you apply similar effort? For a start, why not build one or two CFC Gull gliders from our feature on p.278, and take them along to the flying field next time - just in case any interested youngsters turn up...

The O Zone

One of the things we liked about the aforementioned Gull was that its designer specifies CFC-free foam as the raw material. Not 'Green-fashionable', just aware. Which leads us to thinking about natural resources - and inevitably, to the cheapest source of motive power, air itself. For years, ever since the days of wire-bound brass reservoirs in fact, individuals have battled with compressed-air power. Now we see new, commercially-available products, notably the Powermax unit shown



What's what at the Nats

Saturday 26th May: Mini Day

A/1	: British Airways Trophy
Coupe d'Hiver	: 308 Trophy
1/2A Power	: Hales trophy
HLG	: HLG Trophy
CO2	: Sparklets Trophy

Sunday 27th May: Open Day

Open Glider	: Thurston Trophy
Open Rubber	: Model Aircraft trophy
Open Power	: Sir John Shelley Trophy
Vintage	: Jubilee Trophy
Open Junior	: Frog Junior trophy
Women's Cup	

Monday 28th May: D1A Day

F1A (Glider)	: Ronytube Trophy
F1B (Rubber)	: Boxall Trophy
ie, Wakefield	
F1C (Power)	: Eddie Cosh trophy
Slow Open	: Falcons Trophy
Power	
Tailless	: Lady Shelley Trophy



here; and as Doug McHard explained so forcefully last month, they really work. In this issue Doug recounts his latest experiences with this motor, finding it even better than he first thought. We've tried the all-sheet Jonathan model advertised in our pages, and can report not only great fun but incredible interest on the part of flying-field youngsters who have seen it in action. Food for thought – and more next month; but think about it. Let's cheer louder for global-friendly models of all types!

All the fun of the air!

Sunday, 4th March saw another highly successful and enjoyable SAMS Indoor Fun Fly at Watford Leisure Centre. This twice yearly event is fast becoming an institution and, for anybody interested in flying all day in excellent surroundings with a host of fellow enthusiasts, it is an event not to be missed.

Some famous faces were there, notably Ron Moulton, Butch Hadland, Robin James, Derek Knight and Bob Bailey, and it is good to see Ron Green again after a long absence (can it be five years?) from the scene. Although he said he'd just dropped in to see what was going on and say hello to some old friends, when he left (two hours later) he said he really couldn't resist getting back into it and would be taking up modelling again immediately! Welcome back, Ron.

Throughout the day there wasn't a moment without something in the air and all round the hall were clutches of aeromodellers deep in earnest conversation or examining the finer points of some model. One great advantage this time was the copious supply of large tables which made excellent workbenches. A tremendous addition.

SAMS tells me the next event is booked for Sunday, 14th October, but note that in the meantime there will be a similar, two-day indoor fun fly at Shepton Mallet, Somerset

across the weekend of 16th and 17th June on the site of the West of England Showground where there will also be a craft and model fair going on.

Camping on site can be arranged and SAMS have a list of useful B&B's in the area. For further information on both of these events contact George Wallbridge at SAMS: The Chapel, Roe Green, Sandon, Buntingford, Herts SG9 0QJ (Tel: 076 388 384,) or look for details nearer the time in this magazine.

Morely meetings

Updated news is that the Morley DMAC are holding their Cabin Duration and Open Cabin Duration events at Barkston Heath on 13th May. Note also that the same club's International Silent Day will be held at Heath Common, near Wakefield on 8th July, not the 15th as previously printed. Rules from E Whitehouse, 29 Church Street, Royston, Barnsley, S Yorks S71 4QU; or phone 0226 726335.

Wharfedale clash

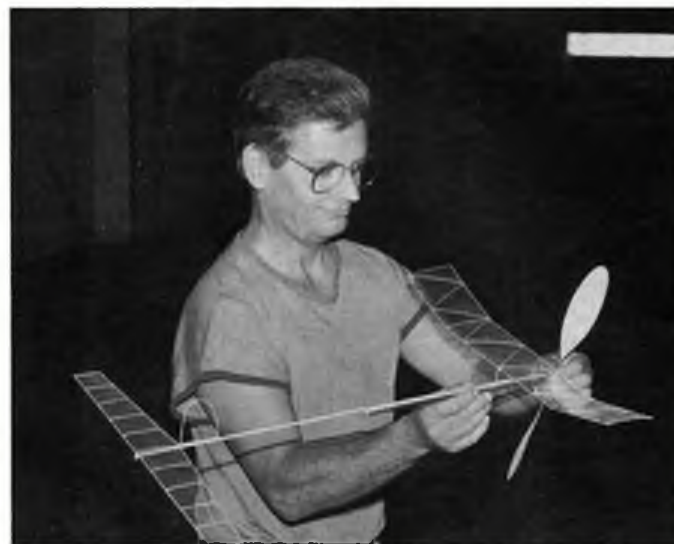
Stop press this. Disregard Wharfedale Combat dates shown in What's On. Both will now be held, simultaneously if you see what we mean, on 24th June. Check with Jeff at 45 Denton Avenue, Leeds LS8 1LE.

Not, not now

Here's a correction. Martin Dilly's letter 'BMFA Affairs', published in the March issue, contained a line that should have read, apropos of the SMAE/BMFA titles 'we are not an engineering society...' instead of 'we are now...' Does change the sense, rather... sorry, Martin.

Tomy – to you

Ian Dowsett, purveyor of Tomy Motors to one and all, reports a fur-



Above: Calm and concentration as Bob Bailey, UK member of that select 'forty-minute-club' in F1D, reads his EZB at Cardington. **More coverage of indoor activity scheduled this year in Aeromodeller...** **Below:** Is this the image of a revolution in model power? Might compressed-air rule again? Interesting signs...

ther supply in stock, available at £1.30 each, including postage, from 2 Warren Drive, Eastcote, Ruislip, Middx HA4 9RD. Ideal for lightweight timers, as described in past issues, they just have to be value for money. Recommended.

Walt Mooney

On March 1st, 1990, Walter E



Mooney, aged 64, passed away at work in his offices. Bill Hannan, longtime friend, fellow modeller and colleague writes:

'Walt was an artist, author, engineer, historian, test pilot, lecturer, TV performer and possibly one of the most productive designers of model airplanes in the United States, if not the world.'

'Truly a 'total aviation person', he was equally at home in the spheres of model aircraft, sailplanes, lightplanes and aerospace vehicles, although one suspects that the smallest ones were his favourites.'

'Walt's enthusiasm for life was contagious – he delighted in sharing his pleasures with others – and gave freely of his encyclopaedic knowledge. His energy seemed boundless, and he packed more living into a day than anyone else I've ever met. His curiosity was unlimited, extending far be-

yond aviation, encompassing animals, especially birds, all types of machinery, languages and philosophy.'

'He had friends throughout the world, and a large portion of his spare (?) time was devoted to answering mail. He also had strong feelings for political injustice and used his powerful pen to make his opinions known. Counterbalancing this was his remarkable ability to deliver jokes and

puns in apparently endless variety.'

'To Walt, each day was a new adventure, and he made the most of it, finding "silver linings" even in situations which would have discouraged most people. For example, when confined to a hospital bed some years ago with a serious heart condition, Walt didn't feel sorry for himself at all. Rather, he seized the opportunity to design and draw half a dozen new Peanut Scale models! And, his positive outlook made such an impact on the nurses that they told him he was one of the very few patients they didn't want to leave...'

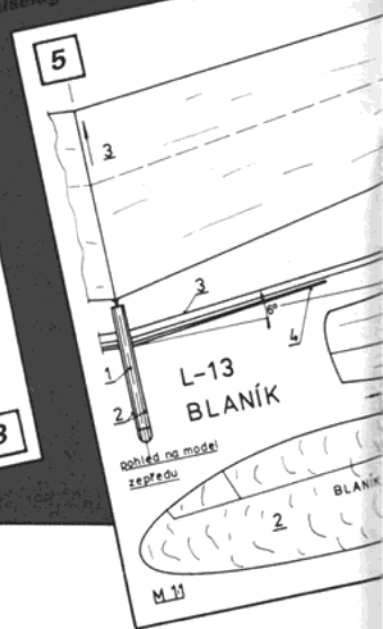
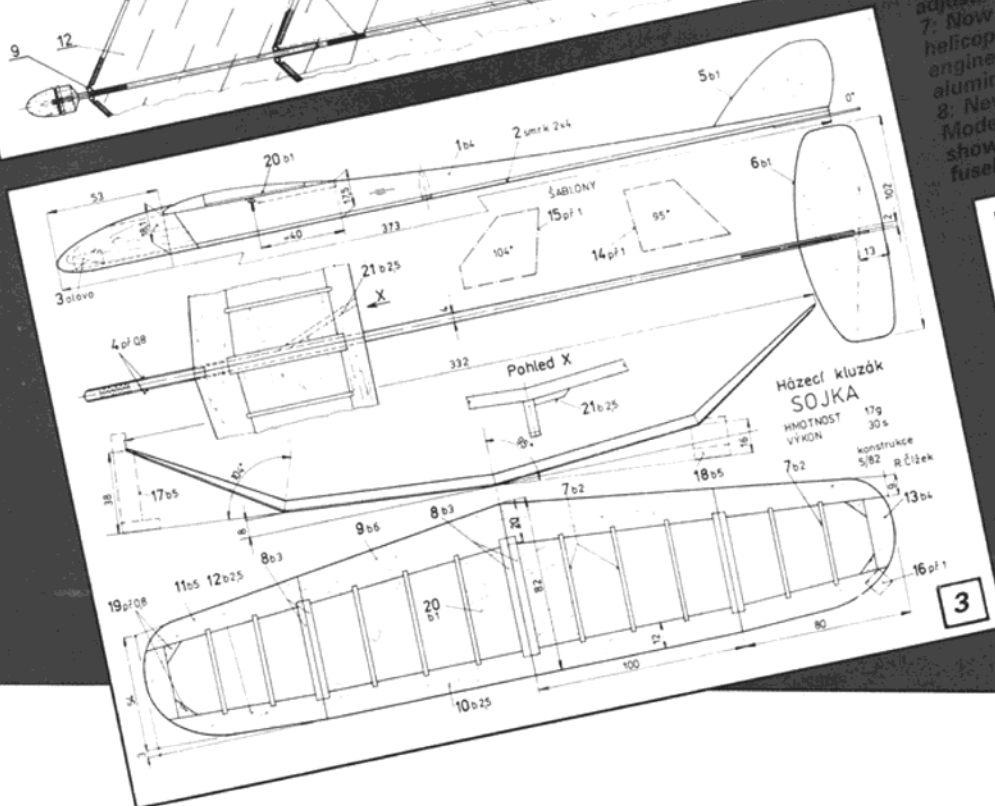
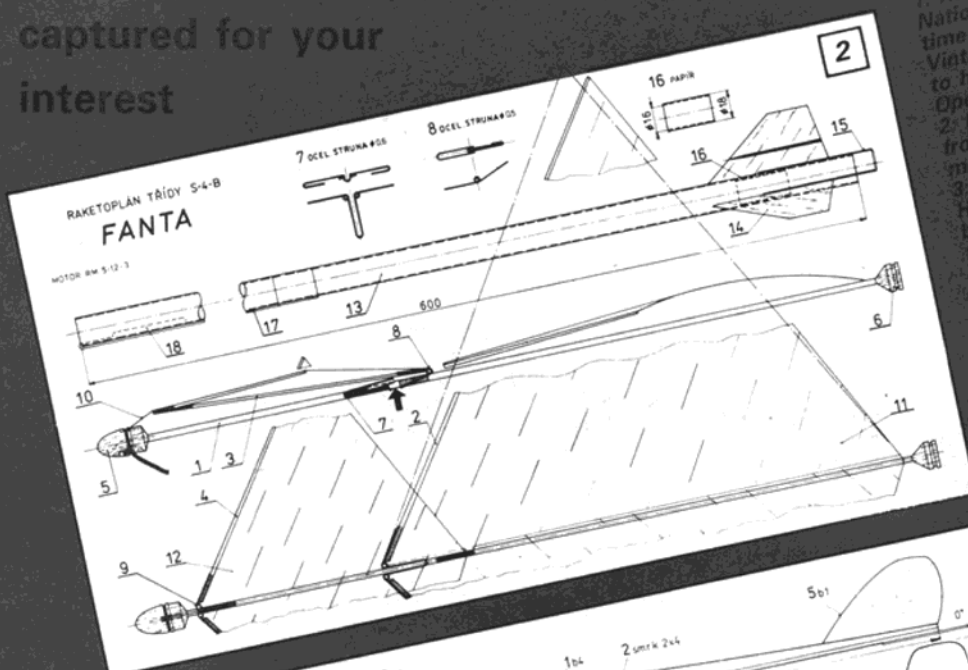
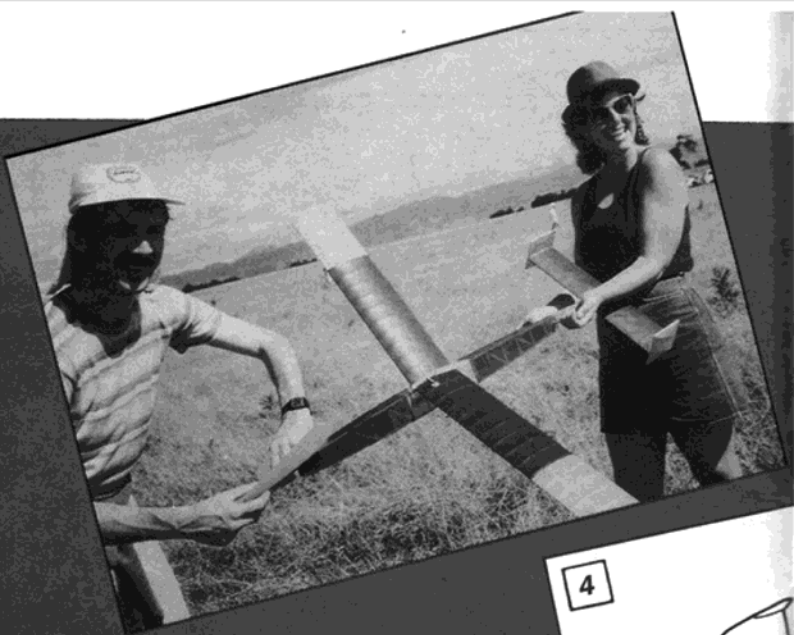
'Walt left us with a rich legacy – his family – all of whom are endowed with sizeable portions of his philosophy, his legion of friends who will help to keep his memory alive, and, of course, his designs which are now such an integral part of both full-size and miniature aviation.'

WORLD



SKETCH PAGE

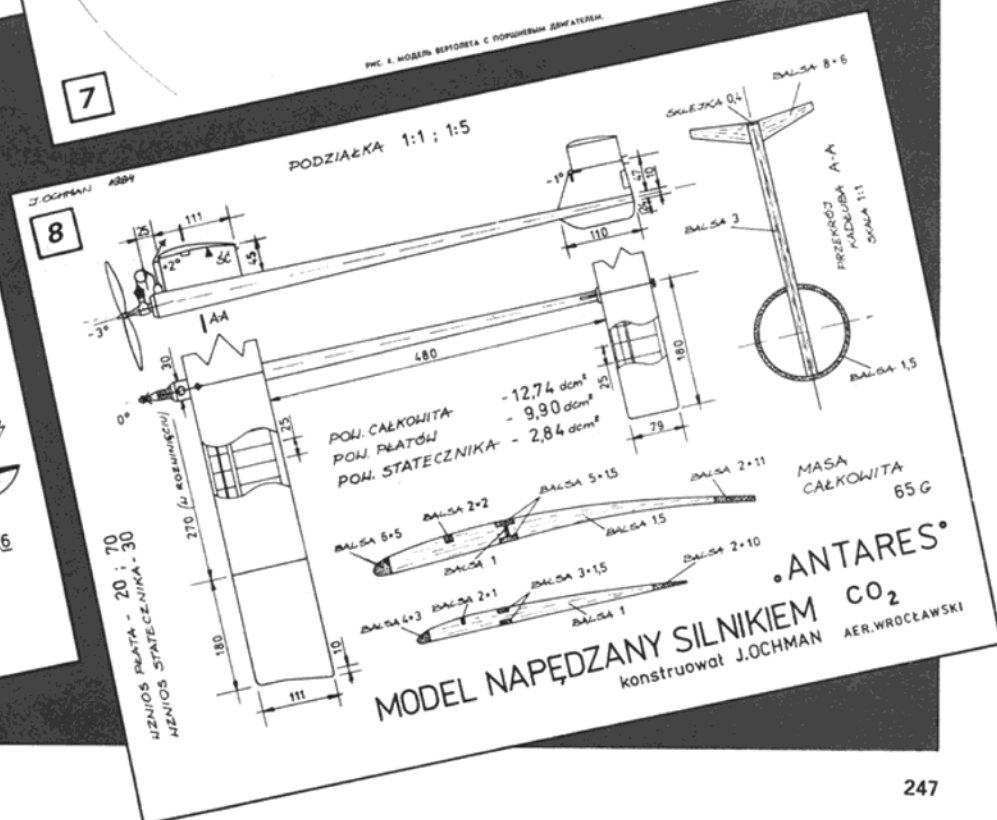
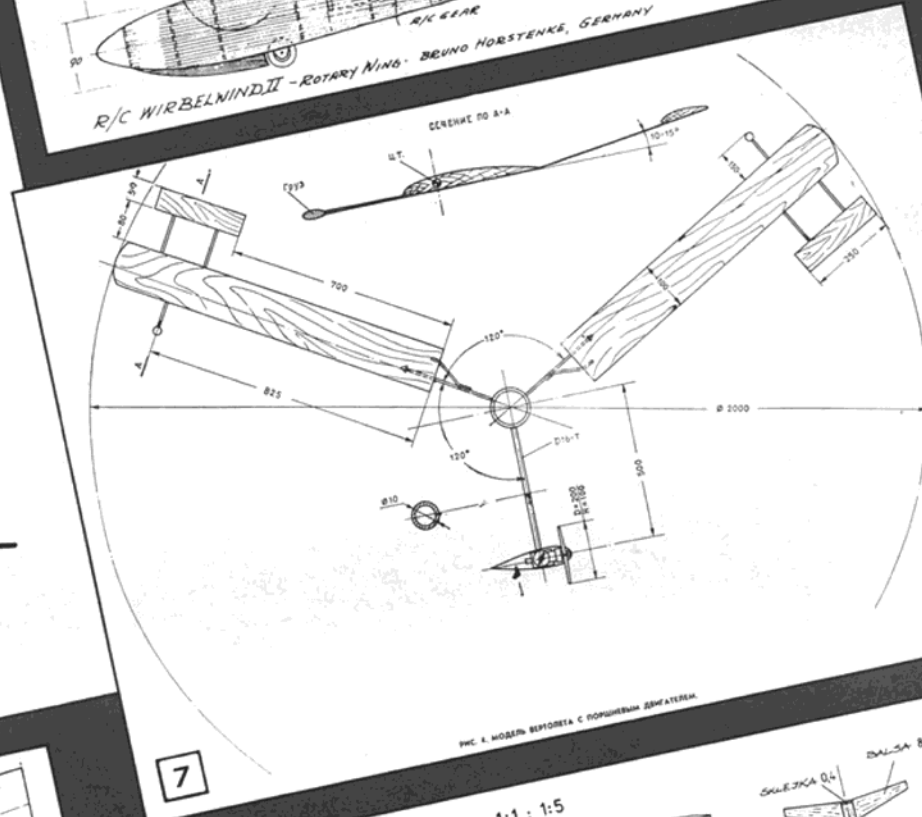
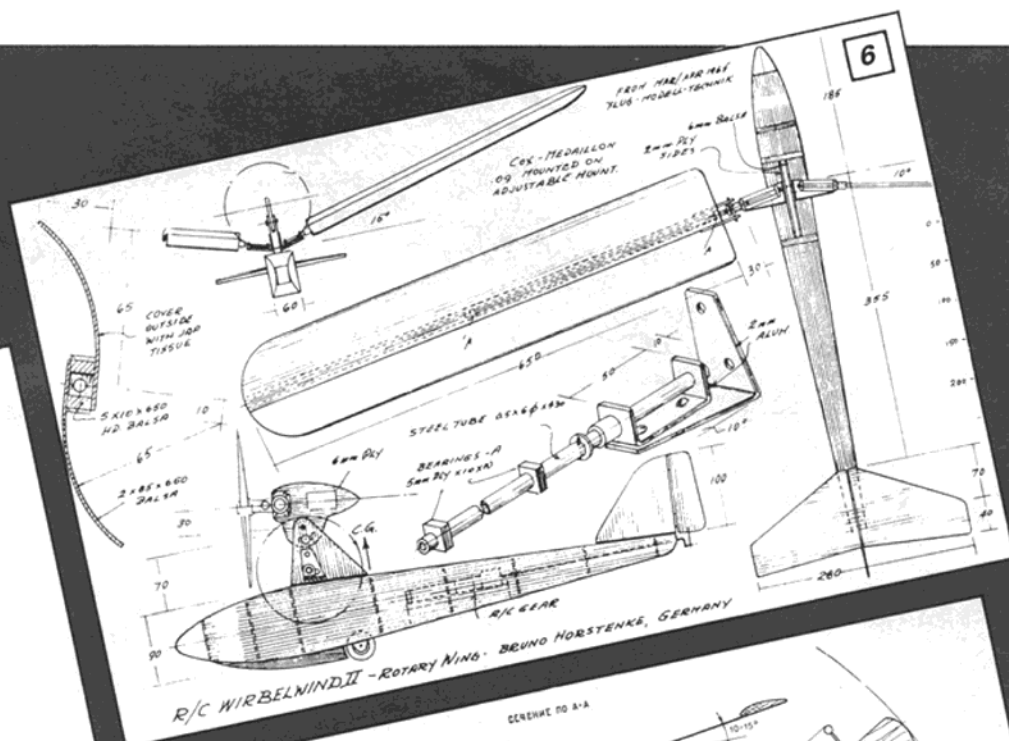
Fragments from
overseas
captured for your
interest



7: Heading photo: At the NZ Nationals, Jennifer Royce took time out from running the Vintage event, with her father, to help Chris Murphy wind his Open Rubber APS Expendable.
2: Flex-wing Fanta S4B hails from Czechoslovakia's Modelar magazine.
3: Rudi Cizek's built-up wing HLG is layout which could well be adopted by sheet-surface traditionalists.
4: Compact Polish F3E record breaker shows modern thought note winglets and inverted V-tail.
5: Scale couldn't be simpler! Czech Blanik glider, just right for youngsters to model, even incorporates tailwheel!
6: Rotating-wing subjects crop up now and again. This German R/C interpretation allows plenty of latitude for thrustline adjustment.
7: Now try this! Russian bi-rotor helicopter features separate engine pod on (presumably) aluminium tube boom.
8: New availability of the Modela CO motor prompts us to show this Hungarian tube-fuselage design.



F3E
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konstr. **AEROKLUB PODKARPACI**



VINTAGE CORNER

Alex Imrie begins a two-part tribute to the late Dr J F P Forster.

WITH the death on 14th February 1990 of Doctor J F P Forster, in his 83rd year after a long illness, the movement has lost a much-respected power model figurehead – who never considered himself to have been a pioneer since the hobby was already in existence when he took it up. He said '... my own beginning was unorthodox, as I came to the game practically unhampered by any preconceived notions of rubber-powered models, and I am not ashamed to admit that I had never built or wished to fly a duration model before making my first petrol model.' We are fortunate to have such fine records of early power model flying in this country as those provided by Doctor Forster's writings in this magazine, and those of his friend and fellow 'Petroleer', Lt. Col C E Bowden. (It was Doctor Forster who invented the name 'Petroleer' for those of our kind afflicted with a love of model aeroplanes powered by petrol engines.) C E Bowden was, of course, earlier on the scene, and was an established writer on the subject, but his contributions became, of necessity, infrequent during the war due to other demands on his time. In *Petrol Topics*, from April 1940 until November 1946, John Forster kept interest alive in petrol models – no easy task when engines were unobtainable, and when, flying such models was prohibited for four years from August 1940, both factors being deprivations occasioned by wartime restrictions. He liked to incorporate practical scale, or semi-scale features into his models, and the almost scale positions of landing gears plus cowlings for his engines (always installed inverted, of course!) and good knock-off ability to reduce crash damage, were items that he took special care with; and he promoted their adoption in his writings. He relied on the input of information from readers, and when on occasion this dried-up, he recounted some of his own doings – but, never the one to blow

his own trumpet, the accounts of his own experiences were fragmental, but they kindled a keen desire in the writer to find out more about the modelling doctor. Some twenty years ago I had the pleasure of meeting with him and seeing his models, but obtaining details of his modelling life was difficult since he felt that nobody 'could be really interested in that' – he took a lot of convincing that he occupied a special place in the hearts of aeromodellers, who, in the dark days of the war, so eagerly awaited each copy of *Aero Modeller* to avidly read his well-written column. It did not appear in every number, and I can remember the disappointment that I personally felt when the latest issue arrived and he was not 'present on parade.'

Affair of the Hart

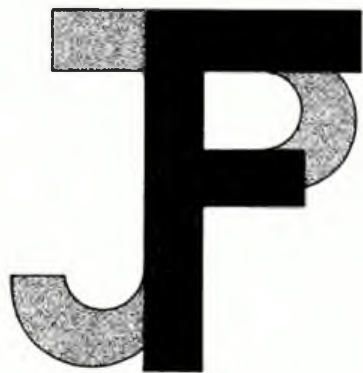
John Ferdinand Pullin Forster was born in Burton-on-Trent on 13th August 1907, and af-

ter prep school at Malvern, Worcs, was educated at Felsted in Essex before deciding on a medical career, which study was undertaken at Birmingham University Medical School where he qualified in 1932. After varied hospital work and GP locums, he settled in Porlock where he maintained his Practice for forty-five years.

The increase in airmindedness during the early 1930s obviously made an impression on the young doctor, and he bought the FROG ready-to-fly model of the Hawker Hart early in 1936. Despite following the carefully prepared flying instructions printed in the facsimile Air Ministry pamphlet that came with this beautiful model, he could not get any decent flights. Due to the high speed of the Hart, propelled by the three geared rubber motors, it was touchy to trim and good flights under power became dives or stalls when the rubber ran out; its control surface settings gave a good gliding performance. It was preceded by violent aerobatic manoeuvres under power. It was John Forster's dissatisfaction with this model's flying characteristics that caused him to embark on the construction of a rubber-powered flying scale model of the low-wing Miles Hawk Major during the late summer. This model was built from a kit costing 10/6 made by International Model Aircraft Ltd, the manufacturers of the FROG range of ready-to-fly models. Highly prefabricated, complete with liquids, the kit for this sixteen-inch design was of *de luxe* quality. It employed a ready-made-up gearbox having a step-up gear ratio of 1:4 (the same unit fitted to the FROG Mk IV Interceptor); when fully wound, it was claimed that the model would fly 300 feet using a scale-sized propeller. By dint of careful adjustment and experiment, Doctor Forster at long last – amazingly – obtained such flights, but he was equally stunned to find that the duration was a mere fifteen to twenty seconds. In attempts to increase the length of the rubber motor run, he devised various mechanisms, and described his 'lightest, simplest and



Dr Forster's famous book 'Petrol Engines for Model Aircraft' is still regarded as the best of its type by many.



Doctor Forster's personal insignia consisted of a black 'F' superimposed on a combined red 'JP'. It was usually carried at the top of the vertical tail surfaces, or on the rudder. The example shown is tidied-up from that carried on his monocoque low-wing monoplane P-10 of 1942.

most reliable means' in the June 1937 Model Aeroplane Constructor magazine. Comments that he made in that article indicate just how much of a beginner and lone-hand he was at that time, living in the isolation of the village of Porlock in Somerset: *'It may sound incredible to the town-dwelling readers of this magazine, but I must ask them to believe me when I say I have never to this day seen a model in flight (except my own), and what is more I have never yet met a single enthusiast or exponent of the gentle art of model building, still less model flying. I mention this in support of my contention that not only am I amongst the "loneliest" of "Lone-workers", but also at that time I was unquestionably the "greenest" (a point which readers will no doubt find less incredible).'*

By this time he had completed the 36in flying scale model of the Miles Falcon VI that was described in October 1936 Model Aeroplane Constructor, and it was on this model that he installed the mechanism that he described, which, he hoped, would provide the longest duration from a given weight of rubber consistent with a sufficiently powerful torque to keep the model in level flight. Despite this optimistic view, he continued to experience frustrations with rubber power, and the 'death agonies of stripping gears' led him to look at the small petrol engine as an alternate form of propulsion.

Petrol power

The Model Aircraft Stores of Bournemouth were then selling their 'baby' Spitfire engine of 2.3cc that sold for four guineas (4.20p) complete with propeller, coil, condenser and tank, and he purchased one of these. In selecting a suitable model for this power unit, he decided to build a 5/6th scale version of Harry E Moyer's Cloud Cruiser which was described in July 1937 Model Airplane News. The 60in open cockpit, parasol model that resulted from this decision was named P-3 (his third model, the P denoting petrol). Attempts to fly P-3 with the Spitfire were disappointing. Doctor Forster remarked 'It never spat anything much and it barely succeeded in maintaining P-3's height from a hand launch.' A Model C fixed-ignition Baby Cyclone was next purchased with this fine American motor the model was really overpowered, but the combination was one of his most successful models that carried out well over 1000 flights during the next two-and-a-half years.

He had, in the meantime, met C E Bowden, then a Captain serving in the Royal Army Service Corps. The manner of their first meeting is interesting. A previous account, given in my tribute to C E Bowden in the January 1985 Aeromodeller, is incorrect. Mrs Grace Bowden's father had been Rector of Porlock; Grace had a sister who still lived there; thus, as army leaves allowed, they visited Porlock. On such an occasion, they came across the local doctor trying to get P-3 to fly on the recalcitrant Spitfire. Doctor Forster knew, through his readings in the model aeroplane journals, that CEB was a well-known figure, an SMAE personality and official record holder. Needless to say, having the same interests, their friendship blossomed unusually quickly and lasted for the remainder of their lives.

P-3 had from inception, a backwards shock-absorbing undercarriage, but had used the Cloud Cruiser type of wing fixing. Doctor Forster soon found the aluminium tubing cane struts altogether too flimsy and substi-



Left: CEB secured this photograph of Doctor Forster holding his first petrol model P-3 on Boxing Day 1937 just before the model flew out into the nearby Bristol Channel, an ever-present risk. Below: Doctor Forster's fleet in March 1938 showing all his models up to that time. The monocoque nearest the camera is P-4.



Right: Prototype Porlock Puffin on its home field. Powered by the 2.3cc Spitfire engine it was the result of a combined effort by CEB and Doctor Forster to produce a powered glider that would actually climb on the very low amount of power available.



tuted double 1/16in aluminium sheet centre-section struts, the two halves bolted together forming a saddle on the fuselage, while the upper ends of the two struts terminated in a rib which was sandwiched between the wing-halves. The vee wing struts were also not very crash-proof and other modifications became necessary. Very soon the inverted Baby Cyclone was installed on a Bowden-type detachable elektron mounting. This latter, was the result of witnessing a crash into a stone wall by CEB's Kanga Kite, which, by pure bad luck, did not save the engine on that occasion. It served as an unforgettable lesson and Doctor Forster

henceforth always used some form of knock-off engine mounting or airscrew shaft and later continually brought the attention of his readers to this very practical feature.

Whenever possible the two enthusiasts spent time together talking or flying models, but the close proximity of the sea to Long Back Field, where most of the flying took place, always presented a hazard for their free-flight landplanes; and it was only a matter of time before the inevitable happened. On Boxing Day 1937 P-3 decided to fly out to sea for the first time: she was retrieved by boat in a waterlogged but otherwise undamaged state, many more

flying hours being ahead of her. In September of that year CEB had established the official record for power-driven flying boats of 30.4 seconds, and the subject of waterplanes was frequently discussed. Doctor Forster did not conceal his dislike for the flat-bottomed hull and other exaggerated features of the record breaking model and reservedly described it as '...a very curious looking flying boat.' He benefited greatly from his contact with CEB, but this initial association was, however, of short duration, since early in 1938, the newly promoted Major Bowden was posted to Gibraltar.

Doctor Forster now undertook the design and construction of a low-wing, monocoque-fuselage model with a centre-section mounted undercarriage. The stability of P-4 suffered from having a too short fuselage, but this was improved in a re-design called P-5. These models had rigid centre-sections, and although the outer wing panels were detachable, they did not possess good knock-off-ability for protection in the event of a crash or collision with any of the many obstructions around his only available flying field. Experiments to improve this, which he saw as an essential feature of a power model, occupied much of his time, but the vastness of the Bristol Channel continually reminded him of its suitability for flying and the requirements of a model that could be operated from the water caused Doctor Forster 'furiously to think'.

CEB was back from Gibraltar on leave at the end of 1938 and this meant a resumption of more communal work. The Spitfire and other small engines were installed in a number of lightweight designs, but merely 'hedge-hopped' thanks to the carriage of the same, heavy, ignition components as the larger, more powerful engines. This brought about a combined assault on the design of a special model to reduce this handicap. The Porlock Puffin was the result. Speaking of the first version of the Spitfire engine Doctor Forster related that the only model that this 'gutless wonder' ever made climb was the Porlock Puffin '...which we 'designed in a night - 'twas a wizard for flight'. It had practically no undercarriage, just a pair of very light wheels from a low belly, and an ultra-light high aspect ratio wing with a low drag, high lift section...' One can imagine the



Left: Newly completed Brown Junior powered flying-boat in the air at Gibraltar, May 1939. Named P-6, this initial venture into water-plane design and construction was subject to various modifications, after which it became a reliable performer. **Below:** Doctor Forster, in the stern of his boat Blue Bell with P-6, obviously sees something that he does not approve of! August 1939. (A reversed print but a pleasing study of the flying doctor). Foot of page: Also taken in August 1939, this action photo by J Burgoyne shows Dr. Forster closely watching P-6 ROW.



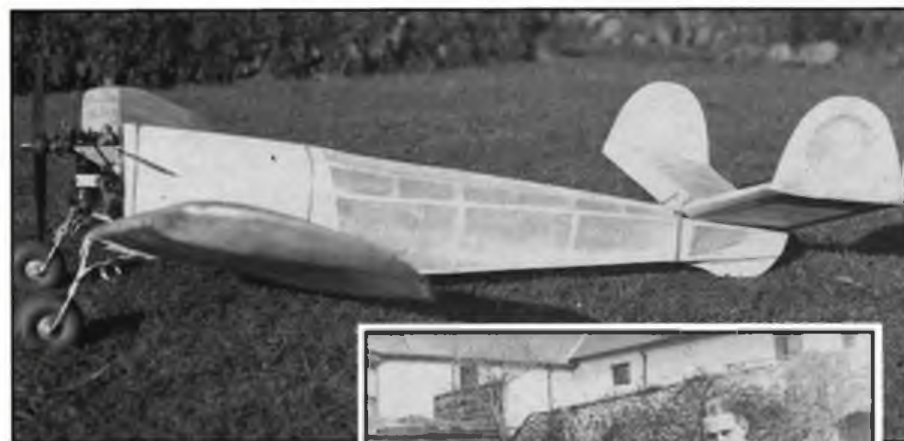
two Petroleers, who each possessed an example of this engine, scheming up the suitable flat gliding design to utilise this engine's low power. The Puffin was also flown with the 2.4cc Elf with which it gave a great deal of trouble-free flying, being later described in the May 1939 Aero Modeller.

Flying boats

During this leave CEB related his experiences with a float seaplane that he had been flying in Gibraltar, and this caused the ideas that John Forster had harboured for over twelve months to crystallise. In January 1939 he began the design and construction of a flying boat. His main aim in the creation of P-6 was '...to try and show CEB the "errors of his ways" by producing a machine bearing some sort of resemblance to a scale model which was capable of getting off water unassisted, and possibly breaking that ridiculously low record of his...' Pow-



Above: Cabin version of P-3 made in November 1939 reverted to the original size of the Moyer Cloud Cruiser. Baby Cyclone fitted to a Bowden detachable elektron mount sports an early attempt to cowl the engine using a Grip-Fix tin. **Left:** Never attracted to control-line when it later came to this country, Doctor Forster did try some tethered flying. He is seen here playing the cabin P-3 on his trout fly rod and line around Christmas 1939.



Above: The lightweight P-7 was considered to be a freak, but it flew well on the 2.3cc Spitfire engine, using the same airframe weights and areas that produced the Porlock Puffin. **Right:** P-8 was an improved version of the cabin P-3 built in 1940 following the loss of the earlier machine in the Bristol Channel.



ered by a newly acquired Brown Junior, P-6 was 6ft 9in span, sponson equipped for stability on the water and weighed 4.3/4 lbs. It was completed just in time for Doctor Forster to take it with him to Gibraltar in May, when he visited the Bowdens. Carried as cabin luggage, there was apparently much speculation amongst the ship's passengers as to the content of the coffin-shaped box accompanying the holidaying doctor! During his stay, there was, unfortunately, only one opportunity to try P-6, but Doctor Forster was enthused to see CEB's water planes, which now included two flying-boats; and one can imagine the 'hangar flying' that must have ensued! Later, home in Porlock, test-flying showed that the model needed larger-span sponsons and a horizontal tail located rather higher – so modified, P-6 became a reliable performer, surviving water landings well; and by the outbreak of war it had made a number of flights of over two minutes' duration, rising from the sea completely unassisted. The enjoyment of water flying made Doctor Forster heartily endorse CEB's enthusiasm for this sport: '...the flurry and spray as she gradually climbs on to the main step with the surprising acceleration which occurs once this is attained; then the gradual diminution in wash, culminating in the final "unsticking", as the model becomes airborne with the last traces of water dripping from her hull.' He knew that he had caught a fever that would not let go!

P-7 was a venture into lightweight construction; a twin-ruddered low-wing model with wing mounted undercarriage, Spitfire-powered with the knowledge gained from the evaluation of such models already mentioned, however, he considered it to be a freak and it was the only slab-sider that he ever made. This machine, however, marked a further step in his attempts to fair the low-wing into the fuselage while retaining full knock-off-ability, which feature was fully vindicated by a crash following a 100ft dive when powered by CEB's 3.8cc Cloud Hurricane. He engaged in much flying of his old faithful P-3, and when this was written-off in November 1939 he made a cabin fuselage for the remnants of wing and tail. Since P-3 had been overpowered with the Baby Cyclone, he extended the length of the fuselage and increased the span to six feet by inserting a centre-section. Thus the model reverted to the size of the original Cloud Cruiser. But, in this form its tenure was short, and in May 1940 – Petrol Topics he reported: 'P-3 has disgraced herself by flying away out to sea with a perfectly good Baby Cyclone aboard...' The model was actually last seen at about 1000 feet, halfway to Wales, obviously due to a malfunction of its clockwork timer – the reliability of which he had just previously enthused over in his column! However, such had been his pleasure with this cabin version of the Moyer Cloud Cruiser, that he immediately set about making a replacement which incorporated additional improvements that he considered necessary, and so was born P-8, a model that would be repaired and modified over a period of some 35 years and end its days being fitted with radio control.

To be concluded.

NEWENT School is a large rural, well-respected, 11-18 comprehensive, situated some ten miles from Gloucester. Recently, part of the headmaster's strategy for broadening what was formerly a narrow, traditional curriculum, was to initiate an 'Activities' programme as part of the regular school timetable. For one hour each week all pupils can participate in a wide range of esoteric sports,

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**Top teacher Tony Trevail reports on
healthy school activity from
down Gloucester way**

unusual interests, hobbies and subjects not normally found in schools. They have to commit themselves to their chosen activities for a term at a time; thereafter they are free to either continue with their original selections or to go on and try something new instead. The normal teaching staff, perhaps aided here and there by volunteers from the outside community, were expected to be in charge of their particular activity.

As the head of the very successful mathematics department I could have been responsible for activities concerning chess, computers or even mathematical investigations. As a keen motorcyclist perhaps I ought to have offered moped training, road safety or elementary motorcycle mechanics.

I chose aeromodelling instead! At first sight, not an altogether rational choice. My personal experience is somewhat limited, to say the least. Thirty years ago I made a Keil Kraft rubber-powered scale Hurricane which steadfastly refused to fly. A medium-sized glider was next; this one certainly did fly rather well – straight out to sea on its maiden flight, never to be seen again. This ended all teenage aeromodelling activities for good, as well as unfairly prejudicing me against model gliders ever since.

Creations

The intervening years saw me develop into a reasonably competent DIY-er, tackling anything from complete house renovations to restoring vintage and classic motorcycles. I derive a great deal of satisfaction from creating something really useful and aesthetically pleasing from other people's cast-offs and discarded junk. I reasoned that simple aeromodelling must be a bit like that – from a few simple bits of balsa, some tissue, a plan, and nothing more high-tech in the way of tools other than a glorified razor blade, some pins and pegs yet the end result could undoubtedly generate a great deal of satisfaction to its creator, perhaps doubly so should it actually fly acceptably well. If nothing else a few acorns might be sown in the process, and interest in something other than computer arcade-type games, pop records and the soap 'Neighbours' on the box might be aroused instead.

For various internal reasons the 'Activities' programme was launched at rather short notice. Instead of the twenty or so pupils expected I ended up with thirty-plus. The Cotswold Model Centre in Gloucester is probably the best source for the embryonic aeromodeller locally. In no time at all I had cleared their shelves of the small Keil Kraft and Veron flying scale rubber model kits, along with most of their cheap modelling knives, tubes of balsa cement, packs of pins, etc. As well as a sub-



EMATICAL ODELLING!

stantial discount copious amounts of advice were freely offered – and gratefully received.

A free source of building boards was found on the school site itself; various internal classroom partitions had recently been taken down and the redundant display boards were up for grabs. A craft teacher soon reduced them to a pile of two-foot by one-foot building boards for me. Pairs of vertical battens were affixed to suitable walls; half-inch dowelling was glued into drillings

every foot or so. Result – instant shelving and storage for 36 building boards. Only one slight snag though – all these creative storage activities are located in the first – floor male staff toilets!

Shaking stuff

The kids' enthusiasm really shook me; instead of the projected one hour timetabled each week, most of them are to be found in two of my mathematics classrooms virtually every lunchtime as well. Bits of aeroplane abounded everywhere. With hindsight the small flying scale models were a mistake. For many pupils cutting out the intricate fuselage formers and wing ribs proved to be too fiddly, and the tiny stringers often snapped or buckled. Flimsy wings warped badly after doping. Many pupils would steadfastly refuse to follow the written instructions, and I am still constantly amazed at how quickly some can blunt a brand new blade, let alone get through a tube of balsa cement. I had to spend quite a few of my 'free' periods and many

hours after school surreptitiously doing remedial work to certain half-built models unknown to their young owners.

The wide variety of the models that were in use meant that I was more or less forced to make a few myself, just to see firsthand what problems might exist, and to provide some 'visual aids' for those that refused to read the instructions. A Fokker D8, Lysander and Sopwith Camel were sampled from the KK stable, along with an SE 5A and a Hurricane from Veron. Only the first two flew acceptably well which surprised me somewhat, as neither model has much in the way of wing area. All

Newent School pupils were also responsible for producing these photographs. Note preponderance of traditional, favourite Keil Kraft designs!





Bigger stuff! 52in Veron Deacons take shape...

look rather nice suspended from the classroom ceiling, however.

Ajaxes and activities

As might be expected many of the resulting models built by the kids were excellent; just as many were rubbish, sadly. Not too many flew that well, and the sheer number of unidentified bits and pieces that I kept finding all over the place meant that I obviously had to standardise, if only to keep sane. A letter to Keil Kraft revealed the existence of a 'rubber duration free flight' series of larger models, all of which were quite straightforward to build and fairly cheap. Furthermore, KK offer their products at special school prices too. An Ajax was hurriedly bought and built; this was much better. Twice the size and well under half the building time – and it flew like a bird straight off the board, despite having a bit of a twist in the wingtips due to me being a bit heavy handed with the cellulose dope.

A bulk order of Ajax models resulted in far more pupils achieving success first time out, both on the building board and in the air. I keep a small number of other rubber duration models in stock too, and several pupils have gone on to Pixies, Robins, Eaglets, Senators and Competitors. The helpfulness of Peter Montgomery at Keil Kraft and the firm's virtually instantaneous delivery times mean that I will continue with KK/Veron kits for some time yet awhile. Logistically I could not really cope with carrying a wide stock of raw materials and getting the kids to build from plans alone. I am expected to do a bit of organising on the mathematics front too, and not just aeroplanes!

The 'Activities' programme is now in its second academic year and I have since standardised further. All beginners now start with the Achilles, a smaller version of the Ajax. This particular kit has all its component parts die-cut, is extremely quick to build, and even the most horrific banana-shaped fuselaged ones will still stagger convincingly enough into the air to encourage their slapdash builders to try again with another model, and perhaps this time to listen to 'Sir'. From the Achilles the plan is to graduate to one more rubber job, say a Pixie, Competitor, Senator or similar. Alternatively, a glider perhaps, such as the 36-

inch wingspan Soarer Baby with its open structure and diecut parts. Then, if they so wish, to simple powered free-flyers. The Veron Cardinal just has to be the obvious choice here, easy to build, sturdy and a cheerful good looking. For some time the Cardinal was unavailable; a KK Ladybird and a couple of Veron Deacons were the choice of three lads instead. Progress on the Ladybird is slow, whereas the Deacons are now virtually ready for covering. They look a bit big for unattended flight and as I have been promised the loan of some radio gear then modifying them to two-channel radio control is currently being mused over.

Maths and motors

Teaching mathematics in a couple of rooms heavily redolent with the smell of cellulose dope is not too pleasant and so the current crop of models will all be covered in Litespan or similar. Despite careful thinning and application we still get too many warped wings and fuselages, and a rubber break is usually enough to write off many weeks of some unfortunate lad's hard work. No more tissue and dope from now on! Derek Hardman of Solarfilm has proved very helpful recently and has provided me with lots of off-cuts and 'seconds' but I haven't mastered this new technology yet. I intend to, though, at half term.

Cheap small engines for the projected Cardinals and Deacons are another problem area. I can start an Indian Mills diesel easily – but they seem to be unavailable. I have a couple of small PAW diesels, but so far we have yet to acquire the precise knack of starting them. Perseverance will be an asset here. I have high hopes of some cheapish Silver Swallow Chinese diesels that Eric Rawlings of Eastwood Model Aircraft in Penryn has promised to let me evaluate.

All this lies in the future though, and depends upon sufficient school funds being made available during the next financial year. In the long run a small stock of engines and possibly radio gear will hopefully be held to lend out as the occasions arise. Obviously the pupils themselves contribute their share but even so I purposely run the club at a loss, and subsidise their kits. With but one adult to so many youngsters the amount of individual help that any one person can receive must, by definition, be

somewhat limited. Accidents will happen and disasters do occur; many a new kit has had to be robbed to make good the damage. Never mind; the kids are enjoying themselves and are creating things which just a few months earlier they would have not thought possible. That is the main thing.

Pupils are encouraged to try a new activity after each term; many do. Quite a few return a term or two later, which must indicate something. Just as many prefer to stay with their plane-making permanently and of course they are allowed to. A growing trend is for certain youngsters to do a somewhat esoteric activity during school time but to spend all their lunchtimes aero-modelling. These developments are all very encouraging.

One thing does rather annoy me though; despite my best efforts I have not yet succeeded in attracting any girls to the club. Nowadays boys do cookery and textile work in schools as a matter of course, and girls happily follow wood, metal and related craft lessons. Making aeroplanes is still apparently seen as a boys-only activity. I wonder why.

Postscript

Finally, as a postscript, what about Sir himself? After a thirty-year gap you may recall that the second rubber-powered Hurricane did no better than the first. The Ajax, Pixie and Achilles 'demonstrators' go well enough though, and my own Senator floats along beautifully. A Deacon and a KK Mercury Tiger Moth lie patiently in their boxes up on the shelf. A Cardinal awaits my first attempt with Litespan, whilst a heavily-hinted Christmas present, a 1938-design Junior Scram, lies half built. If my beloved wife and three daughters play ball and we all learn to do without food for a few months, simple two or three channel radio and hopefully a small four-stroke motor might just eventually find themselves inside, just in time for the summer. I expect that I am destined to make a better builder than flier though; weather perfect for a bit of flying is equally perfect for a spot of motorcycling too!

Another merry shot. Now – will we see these lads at Vintage or Scale Weekends?

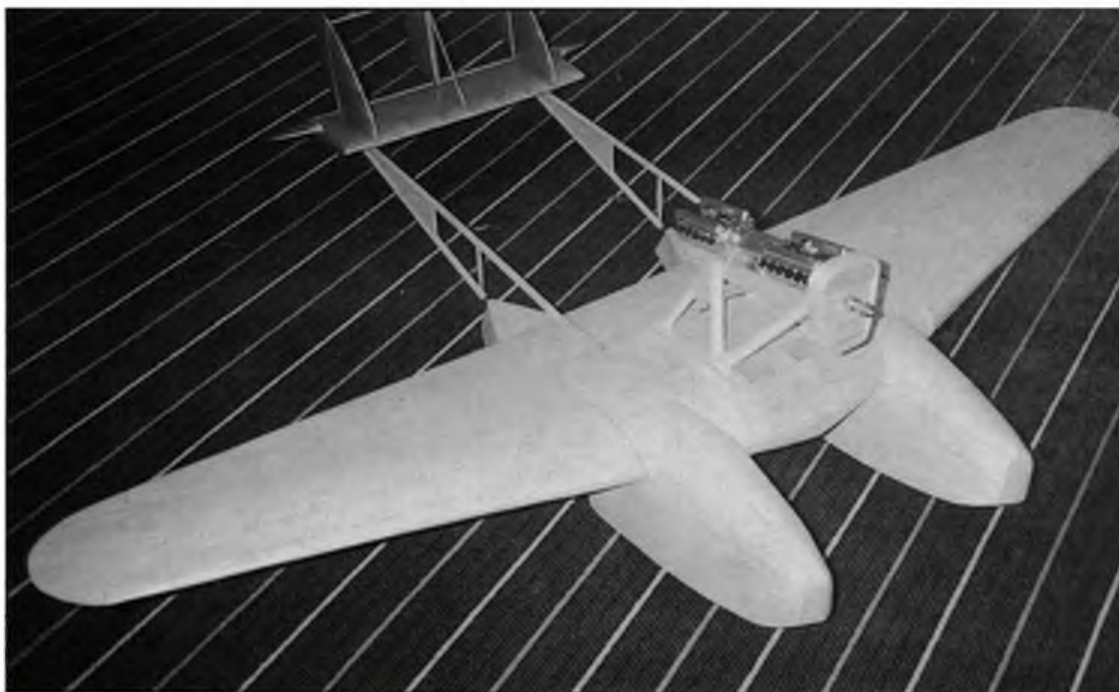
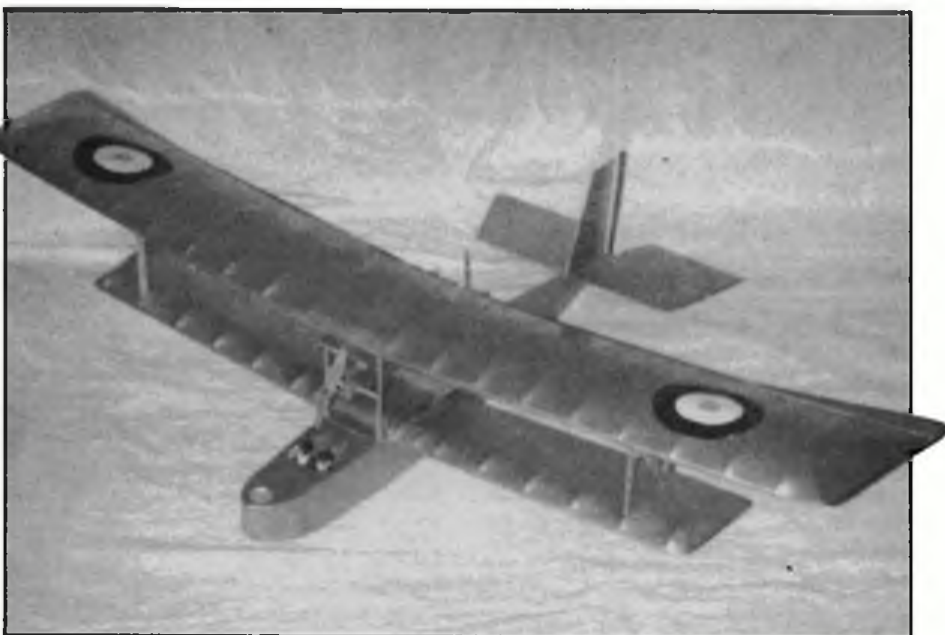


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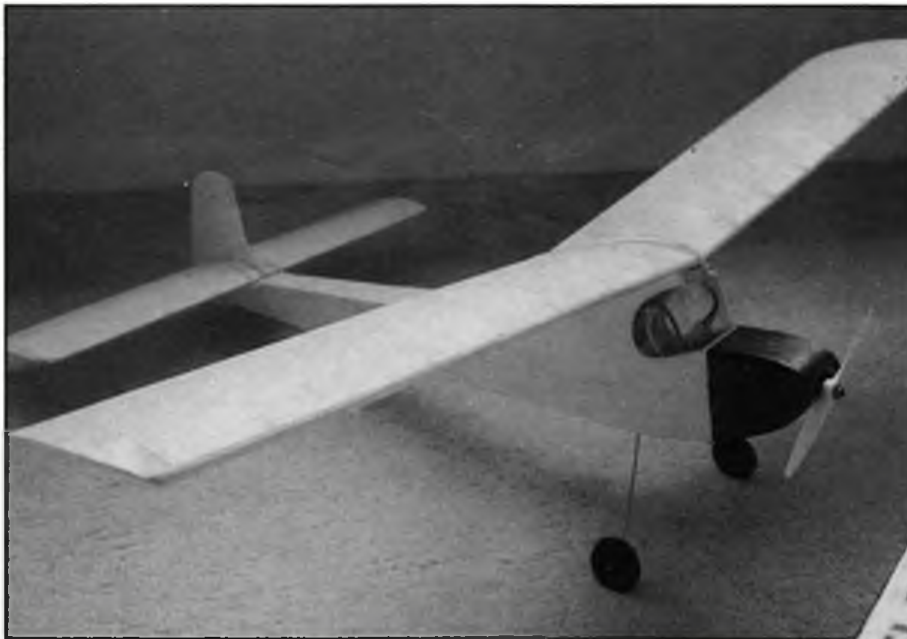
potential

Charge! Chris Coote packs power into pencells and investigates more motor matters

THIS month's offering starts with another look at charging and chargers. Several enthusiasts have asked for further advice on charging, especially on the small 50 and 100mAh cells used in F/F models. One such was Ian Ward, who apologised for flying his electric Union Cessna at Watford so much that he was afraid he had rather monopolised the air time there! His question concerned the advice given in the Union kit; that is, not to use four big nicad cells in the hand-held charger provided, but rather to use ordinary primary cells, such as Duracells. This advice is quite sound, since the nicads with their very much lower internal resistance do not drop much voltage when asked to supply the 1 to 1.5 amps or so for charging, and consequently would pump in a much higher current than recommended if no extra resistance were inserted in the charging lead. Ian wisely put in a fairly dud primary cell together with three nicads to charge the two cells in his model-about night; you need about one more charging cell than the number of cells in your flight pack for a crude and simple field charger. In fact, on the three-cell packs commonly used in the KP01 units, a field charger consisting of four 1.2Ah nicads gives just about exactly the right charging current of 1.5amps initially, tailing off slightly as the flight pack comes up to full charge. My own experiments with four big Duracells showed that despite the potentially larger voltage (6.0v compared to 4.8 from the nicads), the higher internal resistance of these cells caused the actual applied voltage to the



Top: Colin Sparrow's Brigidier at 35oz for R/C Spirit power 9 x 6 prop via Astro 035 gearbox. Fourth in Open Electroslot at the Nationals! Above: Own-design flying-boat by Tony Searle is 45in span. Twin motors - one Astro 02 and one MFA 02, both running on one pack of six AA cells. Left Ambitious SM-55 flying-boat, is another Tony Searle craft. Two Kyosho AP29s (380 size motors; £12 each). Built from an H J Towner plan.



Sheppard some time ago (Fig. 1). Things to notice are the simple ammeter wired in series with a fuse and variable resistor. In this case the source battery is a sealed lead acid type of about sixty amp-hour capacity and six volts output. The resistance is adjusted to give 1 or 1.5amps initial charging current and this is timed into the flight pack for two minutes or so

More of Tony Searle's work. Left: this Veron Cardinal flies on Astro 02 power; five 100mA cells and 5 1/2 x 3 prop. Below: Best flier in the fleet - APS Little Vagabond with geared Acoms 380. six pence cells provide power.



flight pack to drop such that the maximum charging current was limited to only about 1amp. This just means that you have to charge a bit longer to get in the same amount of juice. However, the only way to find out exactly for how long it is safe to charge without exceeding the flight battery's capacity and thus perhaps damaging it, is to measure the current going in and time the length of charge.

Meter matters

This measurement of current is not difficult. Most model shops will sell you, or order for you, a cheap ammeter (such as the MFA one) intended to show the current flowing through the glowplug on an i.c. motor. These meters only cost a couple of pounds or so, and are pretty robust. Their accuracy at the bottom end of the scale (where we are going to use it, on small models) is not too wonderful, but is adequate for our purposes. All you have to do is connect it into one of the two charging wires; it does not matter which one, or which way round you connect the meter at first. If you have got it wrong, the first time you try to use it the needle will go below the zero mark, and you can rectify the situation by merely reversing the connections on the back of the meter. Now you know how much current is going into the battery, and you can easily time duration with your wrist watch. Those of you who remember the first High Potential articles can skip the next bit, but if you want a bit of revision - read on! You can calculate the capacity of the battery in more convenient terms than the often-quoted amp-hours or milliamp-hours by multiplying the quoted figure by 60 to give amp-minutes of capacity. Thus the battery in Ian Ward's Union model is known to be of 50 milliamp-hour capacity. This is $50 \times 60 = 3000$ milliamp minutes, or, if we divide by 1000, 3 amp-minutes. So when we charge at a given current, the figure of current (in amps) times time (in minutes) must not exceed 3, or we may damage the battery. One amp for three minutes is OK; or 1.5 amps for two minutes and so on. What if we measure the initial charge current at say an odd figure of 1.3amps? How long should we charge for to get maximum flight duration? All we have to do is divide the nominal capacity in amp minutes by the charging amp to get time in minutes. So the answer is simply: $3 \div 1.3 = 2.3$ minutes = 2 minutes and 18 seconds.

Right: all those who skipped the last bit now read on and examine the circuit of a very simple but fairly safe field charger built by me for Doug

FIG 2: Simple Field Charger for up to 3 amps

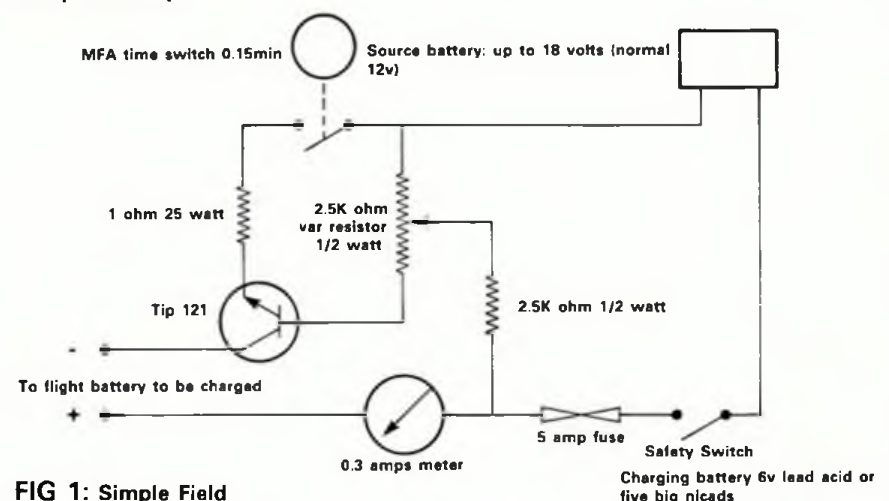
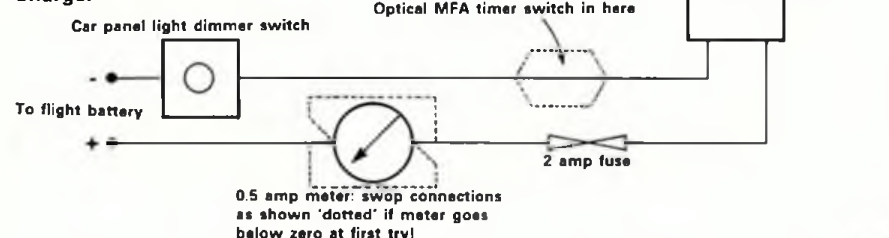
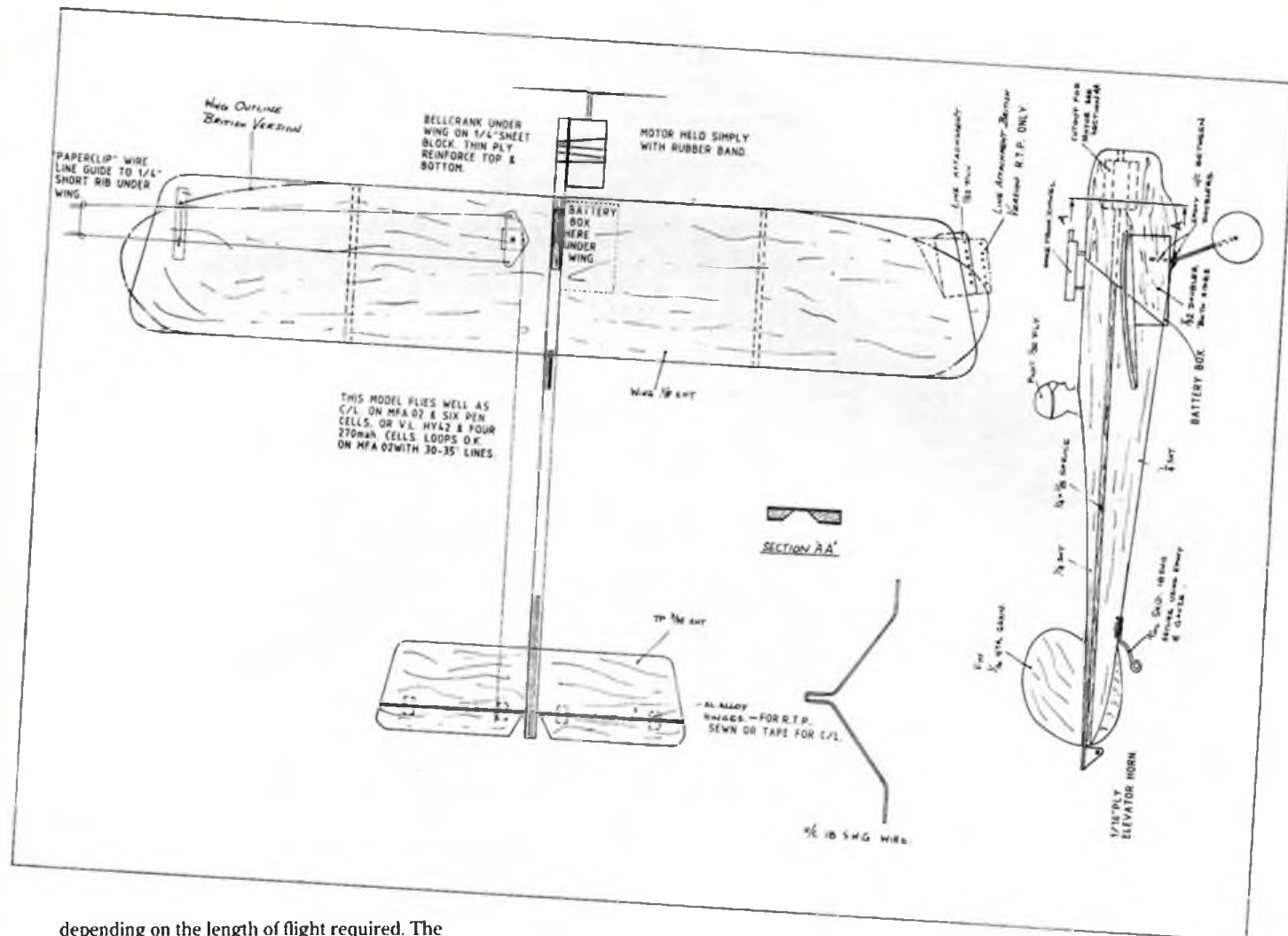


FIG 1: Simple Field Charger





depending on the length of flight required. The variable resistance came from a WWII bomber panel lights dimmer control; it can easily handle the charging current flow of up to 1.5amp without getting too hot. Such resistances are now hard to find in surplus shops but luckily most modern cars come with panel light dimmers, so a trip to the local car breakers or second-hand spares shop can be fruitful. I have used a couple of these now with no problems at all other than getting them out of the cars in the first place! For those who want to go one step further then I recommend the purchase of a timer from MFA. These clockwork mechanisms cost about £8 but are surprisingly accurate, even over periods as short as one minute. They contain a pair of contacts which open to interrupt the charge current after a specified length of time. You set the time by how far you wind the control knob around in the first place. The charging current is set in this case by adjusting a silver knob at the top which is connected to a low power variable resistance which controls the output of a simple transistor network. A circuit diagram in Fig. 2 is shown for those keen enough to want to replicate this unit, which is designed to be able to accept input voltages up to 14 volts, say from a car battery, give sufficient resistance to drop the charging current to only one amp; when charging two or three small 50mAh cells. It is also OK for 600mAh pencil packs up to 7.2v for larger motors.

Still on the subject of charging, I have had lots of letters asking about charging smaller than normal R/C receiver battery packs. These are often sold as four-cell packs of 270 or 200mAh, and are very useful in saving weight in our type of models, such as vintage R/C assist). If the actual current requirement is low, as in gentle flying models, then these sort of packs can still give you a whole afternoon's

flying. However if you leave them on charge overnight connected to a standard R/C system type mains charger, which is giving out some 50mA or so, then this charge rate will exceed that regarded as safe for continuous charge. Thus if you leave it on overnight (as is the usual instruction) you will eventually damage the cells by overcharging. The smaller the cell capacity, the more rapidly you will do damage. There is a simple solution however, which is to note that nicads can be charged at high rates if you do two things. First is to make sure it is completely flat before recharging. The second is to calculate the length of safe charge based on time and current. So, in the case of a 270mAh pack charged from flat that the usual 50mAh, the time in hours is simply 270 divided by 50 which equals 5.4, or 5 hours and about 24

minutes. If it was me, I would err on the safe side and give a straight five hours' charge and no more. Excess charging causes the cells to get hot and give off some gas. This is an irreversible process which will reduce the capacity of the battery. Every bit of gas released is a bit more capacity gone. Eventually all the capacity will go and the cells will be dead and useless. The moral is: be careful with your cells and they will repay you with a long and consistent life. If you treat them in a careless fashion, early failure will occur and this could cost you a model or two. The oft-quoted, but totally erroneous, nicad 'memory' feature is usually a result of consistent overcharge from a partially charged condition!

New fuses



Above: 'ME Exhibition' control-liner referred to overleaf. **Left:** Own-design gull-winger by Dick Kwalowski from the USA. Two 50 mAh cells power HY70 (a KP 01 equivalent).

I will now move on to the subject of useful bits and pieces, always a subject close to my heart! The first one is on fuses. As you will have appreciated from previous articles I am very keen on using suitable fuses to prevent the considerable damage that can occur with a stalled motor connected to a set of lively nicads. As the product owner of a newish French car I noted that the thing was fitted with a large number of fuses of a type I had not used before. These are in fact the increasingly common 'blade' fuses, and are widely sold in car accessory shops in sizes ranging from 2.5 to 35 amps. The most useful sizes for us are the 5, 7.5, and 10amp versions, all identified by both colour and numeric marking. The really useful point about these fuses is that you do not need a fuse holder! This makes for a really neat and light installation. Each blade of the fuse is a standard 1/4in wide flat strip, to which a standard car type Lucas-style crimp connector will fit directly. In fact, the spacing is a bit tight, so if you are not using insulated connectors it is a good idea to wrap a bit of tape around one of them. This sort of fuse can be seen in the under-model shot of one of my electric C/L jobs.

A separate picture of the components is also shown minus the insulating tape. Just for interest the model is a conversion of my design for a semi scale profile RTP model that was originally built for flying demos at an ME Exhibition some years ago, hence the odd scar in the fuselage! In fact, this design was built in several different versions to represent Fokker Eindekker, Bristol Monoplane and Morane Parasol, depending on the shape of wing and fin outlines. It still makes an excellent simple model for quiet school playground type flying. Currently the model shown is fitted with a geared HY42 unit from VL products in America, but it has also flown with an MFA02 direct drive unit, and my favourite rewound Mabuchi 360s on direct drive. The performance is excellent on the latter, with all the normal looping and wing-over manoeuvres easily achieved, despite the simple, curved-plate wing section.

Just to finish off this section on fusing, it is as well to note that fuses of this type blow only when their current rating is well exceeded. Usually it takes a current of up to three times the rating to make the fuse go quickly. If you want good protection it pays to have the fuse rating close to the normal running limit. Sometimes a bit of experimentation is required. To give an example, my MFA02 on direct drive to a 5 x 4 prop and on five cells, initially takes nearly 9 amps. However, to guarantee a quick fuse blow if the motor is stalled, a fuse of only 7.5 amps has to be used. This holds up well in normal flight since as the model accelerates, the load comes off the prop and current reduces (which explains why actual flight runs are longer than static bench ones). The only problem with this approach is at initial switch-on. What happens is that before the motor can start to rotate and generate some back volts (remember the previous article?) to limit what is called the 'inrush' current, the instantaneous current drawn is very high and can blow the fuse. The bigger the prop, and hence larger inertia, the worse is the problem. I overcome this by simply flick starting the motor to get it rotating and overcome inertia, before switching on. I have had quite a few ribald comments on this, such as 'didn't know you had to have a starter for those things'. However, such a technique does allow close fuse sizing and better protection by faster fuse blowing under fault conditions. Try it and you will see what I mean, particularly on the bigger motors.

Alternatives

Final tip of the month is an alternative source for small motors. Several of you have written to say that the Stomper toys, with that very nice small flat motor with carbon block brushes, no longer seem to be available. I too scoured the shops over the Christmas period, but to no avail. Ian Ward even went as far as tracking down the original importers, and got them to give him some broken toys. However, do not despair, because the wonderful Tomy

people (who have given us the clockwork means for IDT timers) are now in the business of selling a small slot car set under the AMX brand. The motors are available as separate items as one of the 'tune up' kits available. My local toy shop sells these at just £2.50, and a further pack consisting of brush spares is also available. So now there is no excuse for you tinkers out there. Who will be the first to produce a multi engined model? Just to encourage you in the search towards experiment, we have published a few pictures showing unusual craft from the States, notably Dick Kwalowski's gull-winger. And a shot from Phil Stanson's camera shows some interesting, lightweight Demoiselle-style models powered by a variety of geared and direct drive units. The best flyer is the top version powered by an HY70 geared unit (equivalent to our KP01). I have recently completed my own version of this with a lightweight, built-up wing. Performance is in the duration model class on three cells, so the speed controller really has to be used as well as a fall-off-wing DT. More details and a plan in another article; the editor won't allow me to ramble on any more here!!

Of great interest now that I have a sort of suitable model is my local BMFA Area's decision to boost flagging entries and interest in CO₂ duration, by allowing electric models to compete on equal terms. The idea is to allow the standard KP01 type units with a maximum of 50mAh cells to be used alongside the 3cc gas tanks and hand chargers. As I stated in an earlier article, my own club allows this and all the indications are that the electric models with their consistent high power will be more than a match for the CO₂'s. Perhaps other Areas will follow suit if this proves a winner. I hope so; I may even be persuaded to go to the F/F Nats for the first time in years! Seriously I would be most interested in a report of the performance of a CO₂ duration job simply re-engined with one of the latest welded battery pack KP01's. Someone out there must have a suitable model; please tell us about it!

Beaulieu welcome

Finally, I have included some pictures from Tony Secarle in Poole. He extends a welcome to all electric flyers at the new, R/C end of Beaulieu airfield on the first Sunday in every month, where you will also probably find Norman Markham as well - another electric fan. Tony's recommendation for a first vintage electric is the APS free plan of the 40in Simplex with a Kyosho, or AP 29 or MFA 02 motor running via direct drive on 8 x 4 or 7 x 4 prop and or five or six 100mAh cells. His flew great until it clouted a Beaulieu tree too hard.

The other lovely shot of a Brigadier in 'Swiss' markings is the work of Scotsman Colin Sparrow. It has flown with a variety of direct drive 540 buggy type motors but now, like my own Halfax Spartan, it goes best on a geared 600 type motor drawing less than 10amps. Performance is so good it placed fourth out of 28 at the UK Nats Electrosport Soaring Championships last year. Regular 30min flights are the order of the day. Very light at only 36oz (22oz of which is motor and battery!), it uses the excellent Astro 035 gearbox, which fits direct to most S40 or buggy type motors - a little known but very useful fact!



Left: Here's a bootful!
Stateside selection by Dick Kwalowski shows a variety of approach. Below: Trio of Demoiselle-style craft by Phil Stanson. Top one features HY 70 driving Williams Bros CO₂ prop; smaller ones less successful.



JPEG 1058x1495 24bit This document is freely available for personal use at https://www.hippocketaeronautics.com/hpa_plans/ since May 13 2024

brigade before their production also ceased. However, I am pleased to be able to report that not all is lost, because the world – renowned Australian engine designer and maker Gordon Burford has produced a batch of 600 superb replica Elfin 2.49s. I obtained one from him at Vintage Weekend last August and can confirm that the workmanship and performance are truly superlative. I understand from Gordon that he is likely to make a batch of Elfin 1.8 reproductions in the near future. For details of price and availability drop a line to Gordon Burford at 86 Tierney Drive, Currumbin, Queensland 4223, Australia.

Mashed T-Bird

In the February issue I included a photo of Tom Dixon's Thunderbird Mk11, a really lovely design by the old maestro, Bob Palmer. Alas, I hear from Tom that the model is no more. Did the motor cut at the wrong moment? I wondered, or perhaps one of the lines broke, or even locked up? No, unfortunately it was nothing so mundane as that. In Tom's den a large fan is fixed to the ceiling, which when it is rotating provides his fevered brow with a cooling breeze. One day he forgot that it was switch on, lifted the model to carry out some minor adjustment and Bingo! – one mashed up Thunderbird which wasn't worth repairing.

In his latest letter, Tom tells me that he is now marketing some reproduction vintage control line kits. At the time of writing those available are the Black Tiger, a 45in span semi-scale stunter for a Fox 35, originally described



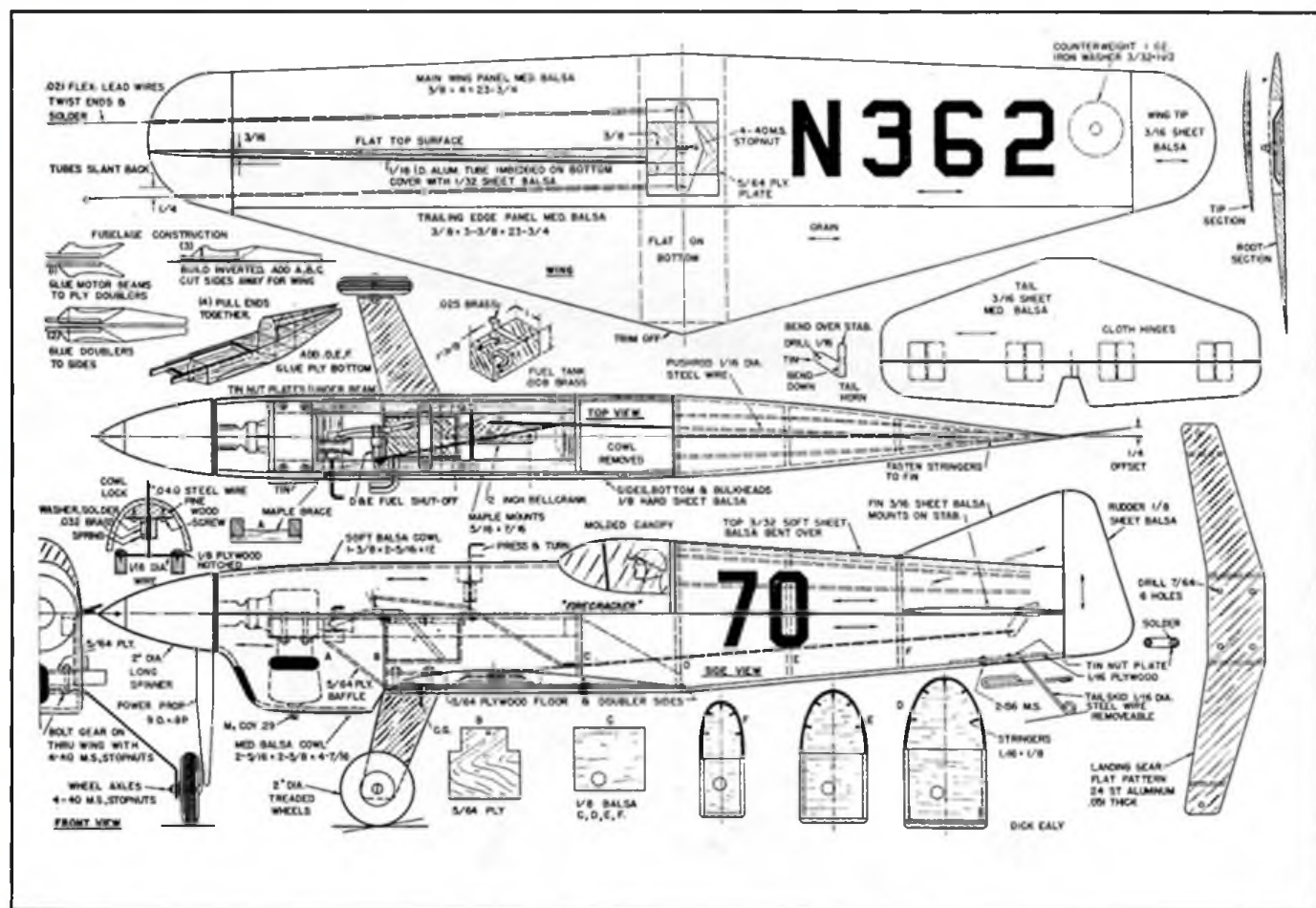
Bigger brother of the 1.8 was the Elfin 2.49. This is Gordon Burford's replica, soon to be followed by the 1.8 we hope. Foot of page: Knight Rider Firecracker for McCoy .29 power – much admired by our columnist.

in Air Trials February 1953, and the 1952 version Nobler. OKd by George Aldrich to include some structural changes to eliminate 'block' construction. Other kits to be available shortly are the 1959 Bob Palmer Thunderbird, the Southwick Skylark, the 38 Special (a profile sport biplane) and a modern design yet to be chosen. In addition to his kits, Tom has commissioned some custom needle valve assemblies which feature a specially fine

thread and taper to enable very delicate needle adjustments. They will fit a variety of .46-.06 motors including Super Tigres. Tom Dixon can be contacted at Suite 401, 1938 Peachtree Road, Atlanta, Georgia, 30309, U.S.A.

Skylarks

In the previous paragraph I mentioned Ed. Southwick's Skylark, a well-known American design from the early 50s. Winging its way



from Australia is another Skylark, this time the Super Skylark, a much smaller (39in span) and more unusual model. It was designed on 1950 by Jack Hearn of Hearn's Hobbies for a Frog 500 and published in Australian Model Hobbies Magazine in December of that year. The prototype model was built by Johnny Lamont who within a few years, had become the Australian Junior Stunt Champion flying the Super Skylark. The model is obviously a good flyer; and if you are looking for something different from the usual British and American stunts it might well be just what you are looking for!

Undiscovered

With vintage team racing gaining popularity every season, I am sure that enthusiasts are always on the look-out for that 'undiscovered' racer that might put them up there with the winners. The other day I was going through scrap book which formerly belonged to Bob Hawkins, the American modeller who lived in Somerset and who died a couple of years ago. Among the torn-out pages from long-ago magazines I discovered the plans for a Class B team racer which had been published in Model Airplane News December 1951. This model, powered by a McCoy .29, is called the Firecracker design was by Dick Ealy. It is a semi-scale team racer adapted from the 1938 Greve Trophy Winner, one of the hottest speed aircraft of that era. The Keith Rider Firecracker flown by Tony Le Vier, chief test pilot at Lockheed, averaged 250.886 mph.

The Burford 2.49 Elfin again, below; and Tom Dixon's Kustom Kraft needle valve assembly - ideal for 46-60 motors - which provides very fine adjustment.

beating such greats as Art Chester in the Goon, Joe Jacobson in Eightball and Earl Ortman in Jack-Rabbit. The beautiful but rather simple lines of the full size aircraft make for simple slab side construction and the wing and tail assembly are of typical American sheet balsa construction. Full size plans were available in 1951, so the magazine-size plans I have do not have a scale on them for enlarging up. However, after a few minutes with the calculator, I discovered that scaling up the drawing by 3.1 results in the correct size. If anyone is interested in a photo copy of the plan, I would be happy to send one if you send a stamped, addressed, envelope to me at The Mill, Ash Priors, Taunton, Somerset, TA4 3NQ.

Whilst on the subject of team racers, I wonder which Class B team racer was the longest serving of all time? Perhaps you know of one which lasted longer than from 1955 until 1988? If so I would like to hear about it. One model which certainly has, is the Double Dice designed by Pete Drewell, Chas Taylor and John McNess of the West Essex Club. It was built and developed during 1955 with subsequent modifications to tank and controls, from this period on the model was used continuously, placing in numerous competitions. In the early 70s the model was converted into monowheel configuration and flown by the Taylor/Yeldham/Oates team to place first in Class B British Nats 1972, 3rd at the 1973 Nats and top at the 1974 Nats. In 1985 it was returned to two-wheel u/c and used by Taylor/Yeldham/Banks to place first in the Rufforth 1000 (Vintage Class B) and, finally, top in Vintage Class B at the 1988 Nats flown by Taylor/Yeldham/Muscutt.

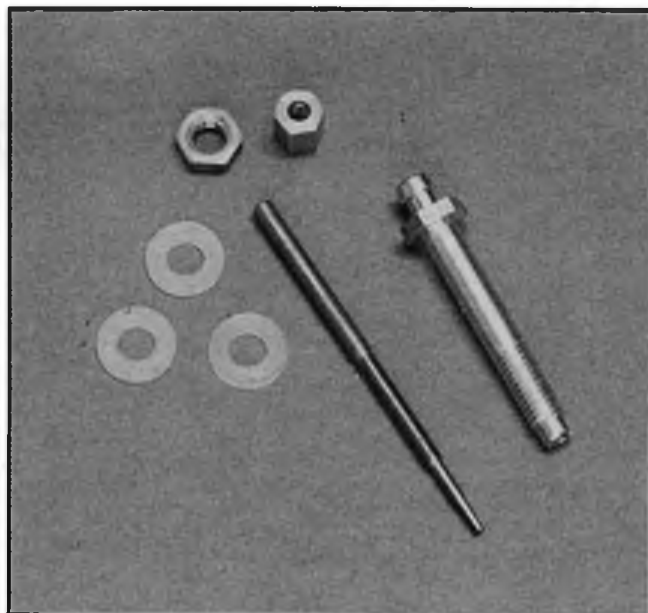
The Double Dice is powered by a Carter-McCoy 29. Approximate speed is 110-115 mph over 55 laps. The colour scheme is cream all over with front of fuselage trimmed with crimson. Black and white dice motif. The unpublished plans have been drawn up from the original model by Dave Banks from whom the copies are obtainable at a cost £1.50 plus postage. Dave's address is 46 Queensbury Road, Kingsbury, London, NW9. Telephone: 01-205 8809.

Stars from the past

Can you imagine attending a competition/fun fly at which the majority of those flying were the former control line stunt starts of yesteryear? You wouldn't think it could happen, because most of these luminaries are now somewhat elderly and gave up C/L flying years ago, in favour of radio control.

However in Whittier Narrows, California, this is precisely what did occur last February. It was the brainchild of Mike Keville of the Precision Aerobatics Model Pilots Association (PAMPA), who almost single-handedly contacted as many of the old timers as he could locate, as well as all the present day experts all over the USA. After eleven months of planning all was ready for the Inaugural Vintage Stunt Championships to take place on 18-19th February. Some 200 people attended and a galaxy of Stunt filled the skies. Models such as the Zilch, Madman, Fireball, Barnstormer, Super Clown, Ares, Thunderbird, All American, El Conquistador, Warrior, Fierce Arrow, Sportwing, Nobler, Go-Devil and so on, were flown and admired by all. The two days of high spirited, low key fun, was enjoyed by all and the Inaugural Vintage Stunt Championships were pronounced a 'blast' and a 'gas' by all concerned. Due to the success of this first championships, Mike Keville has now organised the second one to take place on 24/25th March and I will let you know the results, just as soon as Mike sends them to me.

Finally this month, I have news of another event at which it is proposed to run as control line competition. Mark Bees has written with news of the Newbury & District Model Aircraft Society's Vintage Day which is being held from 9.30 to 4.30 on Sunday, 29th July at Newbury Racecourse. He tells me that in the past this event has been mostly supported by R/C modellers, but that this year they would like to run some C/L events as well, if there is sufficient interest. Mark's address is 4 Newbold Road, Speen, Newbury, Berks (phone 0635 46426), so give him a call and let's hope they have a great day. It would be that opportunity to get some more practice before the competitions at Old Warden and the Nationals.



MOTOR MART

Accent on diesels this month with a look at some new releases -and a new glow

AM 10 and 15: produced by Premier Engines and Plastics Ltd, 12 Queensborough Road, Southminster, Essex, CM0 7AB			
AM 1.5cc Glow -		£27.95	
1.5cc Diesel -		£29.95	
AM 1.0cc Glow -		£26.95	
1.0cc Diesel -		£28.95	

ALL change! Shortly after our report on Merco and AM engines in the August 1989 Aeromodeller, we learned that production of these 'traditional' style British motors had changed from Forest Engineering to Premier Engines and Plastics Ltd. This company was keen to consolidate its plans before widespread announcement, but the first motor produced under new management has just appeared; a fresh version of the AM 15 1.5cc diesel. By the time you read this the '10' 1.0cc version will also be on sale. Of great interest is the news that both engines are to be marketed in diesel and glow version. We have yet to examine the latter type.

At first glance the new AM 15 resembles closely the original version, which first appeared in 1958 as a bored-out version of the potent AM 10 of 1956, but close examination shows a number of changes. The crankcase now

'fully open' position.

The cylinder jacket of this revised AM 15 is not colour anodised, as was its predecessors, but the traditional 'blue' identity is maintained by the plastic components; the throttle barrel already described plus crankcase backplate and fuel tank. A spinner nut is standard on all versions, and crankshaft bearing diameter has been increased. A twelve-month, no-quibble guarantee is offered with each engine; prices as shown from all good model shops!

We look forward to examining the other motors. Further good news is that production of the Merco series is imminent.

AE 0.2cc diesel

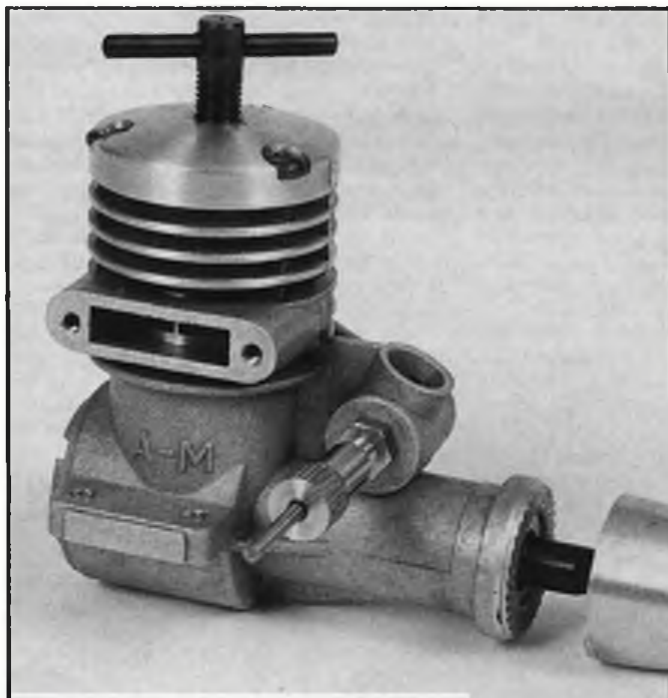
Coincidentally, we have also just received the latest of the AE series of diesel engines. The coincidence is of course that Dennis Allen is

the designer of this range, just as he was the original AM series. Already in existence are the AE 15, 10 and 5 of 1.5, 1.0 and 0.5cc respectively, but the motor discussed here has the honour to be amongst the smallest - in capacity produced in this country, being 0.2cc.

Diesels of this size, or slightly larger, are not unusual. A number were made in the early, vintage days including the Kemp Hank (0.2cc) and the Kalper 0.32cc diesels from the UK. Perhaps most famous of British miniatures was the DC Bambi of 0.15cc, which appeared in quantity from 1954 to 1958, and is now a prized collectors' item. Other, tiny miniatures were produced as the Dragonfly 0.1 and 0.2 diesels available at intervals during the 1950s and 60s; and other, even smaller motors have appeared as one-off or limited production items, not only from the UK but overseas.

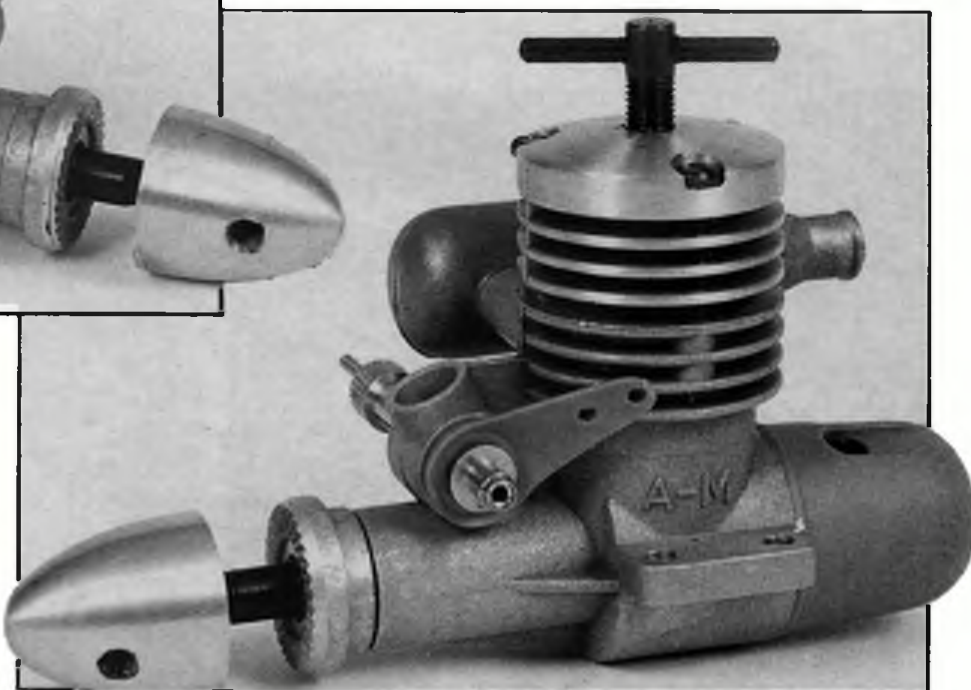
Model engine collectors will be well aware of many current examples. However, this latest AE is available, like its larger brothers, from Irvine Engines Ltd so continuity of supply, and spares availability, should be excellent.

The AE 0.2cc is actually the first of the range that we have been sent for appraisal, but sufficient of the others are in existence for us to be able to say that it inherits the characteristics of the other family members. A square-section main crankcase is bolted to a machined front housing with separate carburettor insert. A neatly-finned aluminium alloy cylinder jacket clamps the radially-finned liner via three screws. The fuel tank is turned from aluminium and a starter spring is

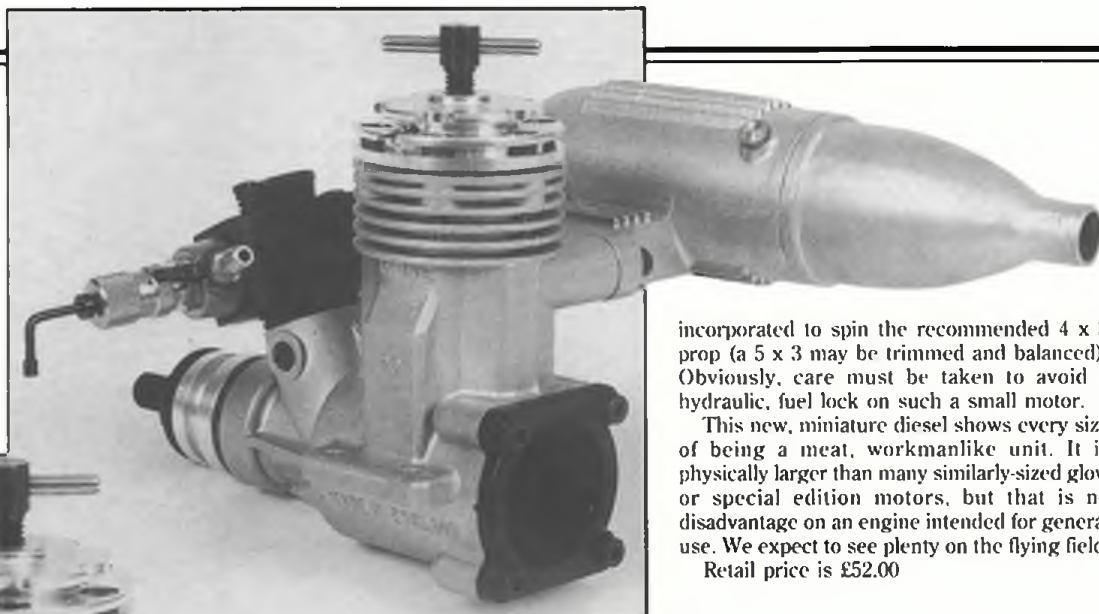


Left and below: Latest version of the AM 15 features simple, barrel-type R/C throttle as standard.

incorporates a cast-in exhaust stack to allow fitting of a simple, two-part silencer via two screws. Diametrically opposite to the stack are cast fins. The cylinder is now Schneurle, instead of radially ported, and it is claimed that between 15 and 20 per cent more power is liberated as a result. A simple R/C throttle is standard on all versions. This consists of a moulded plastic barrel which rotates under friction provided by adequate tightening of the spraybar. As might be expected from such a system, there is a degree of stiffness at the limits of throttle arm travel, but freedom over the useful range of movement is reasonable. There is scant clearance to arrange the linkage to servo in the



Right and below: Currently available in R/C form, although a standard-venturi-version will be on sale soon, is the long-awaited Irvine 20 diesel. Plenty of low-end diesel 'stomp'! Full assessment soon.



incorporated to spin the recommended 4 x 3 prop (a 5 x 3 may be trimmed and balanced). Obviously, care must be taken to avoid a hydraulic, fuel lock on such a small motor.

This new, miniature diesel shows every size of being a meat, workmanlike unit. It is physically larger than many similarly-sized glow or special edition motors, but that is no disadvantage on an engine intended for general use. We expect to see plenty on the flying field.

Retail price is £52.00

Cox topics

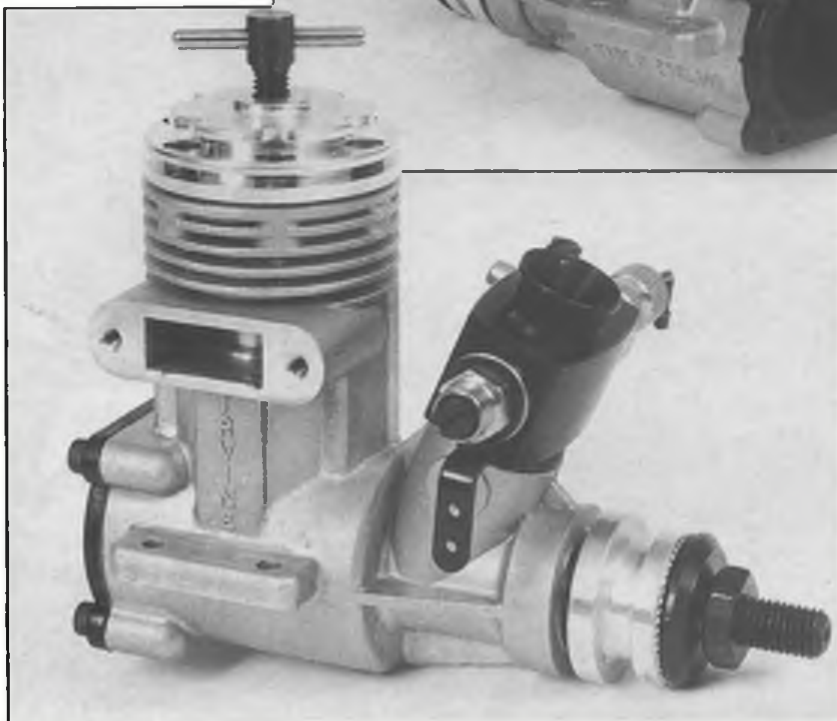
The most famous of all small glow engines just has to be the Cox Tee Dee .010, a jewel-like miniature which first appeared in 1962. Although it has been on the market for several years, fresh prototypes have appeared at trade shows recently, and at Nuremburg we were assured that this smallest Cox would be reintroduced by the middle of the year. We'll let you know as soon as we have confirmation.

We are pleased to present details of another Cox glow, not generally available in this country, but produced especially for .049 size Texaco competition, a very popular R/C class which depends on high duration versus tank capacity for success. The Texaco .049 features extra cylinder head fins for extra cooling, an 8cc tank (mandatory in the class) and a backplate of plastic manufacture for lightness.

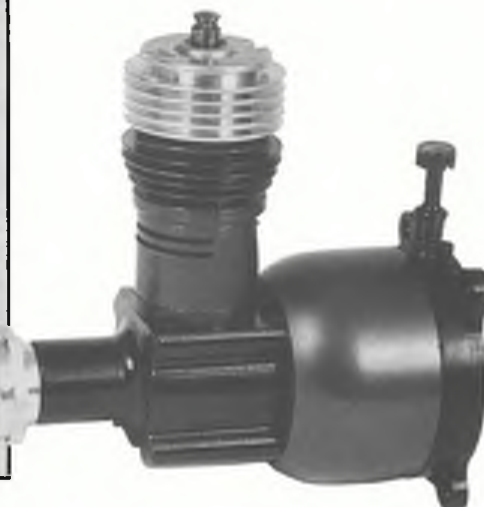
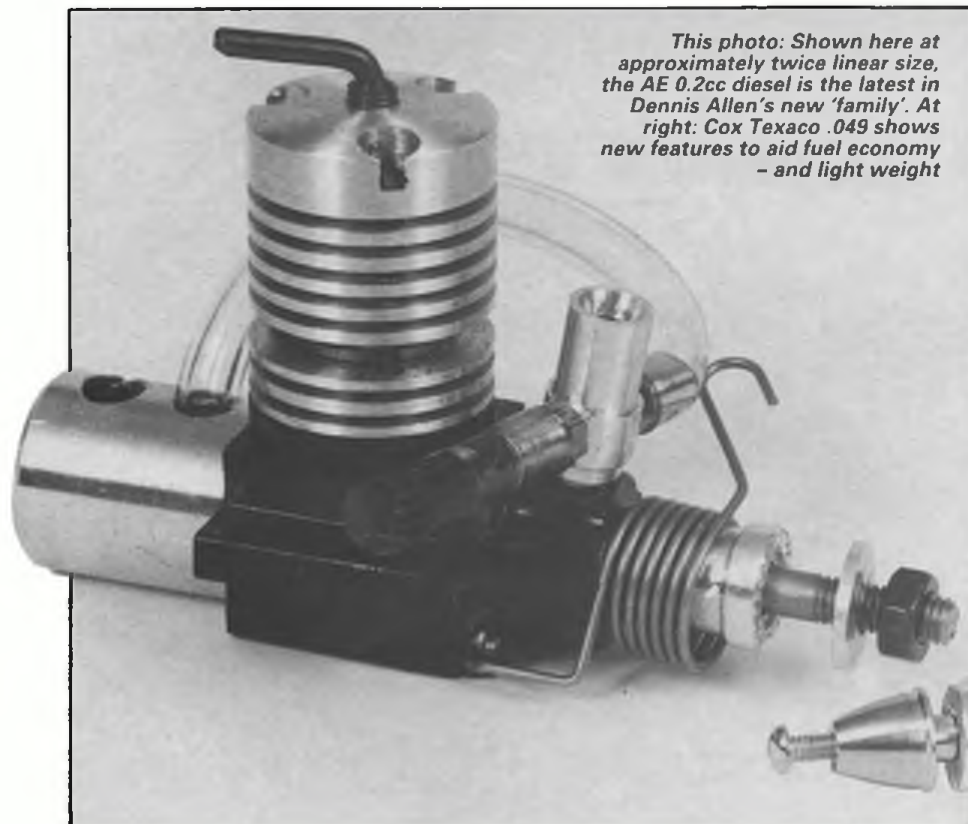
Other specific modifications are a high velocity intake venturi of 0.062mm diameter, a new design of reed valve holder, and a larger diameter prop driver boss to enable the recommended 7 x 3 1/2 prop to seat correctly. Up to six minutes duration is claimed.

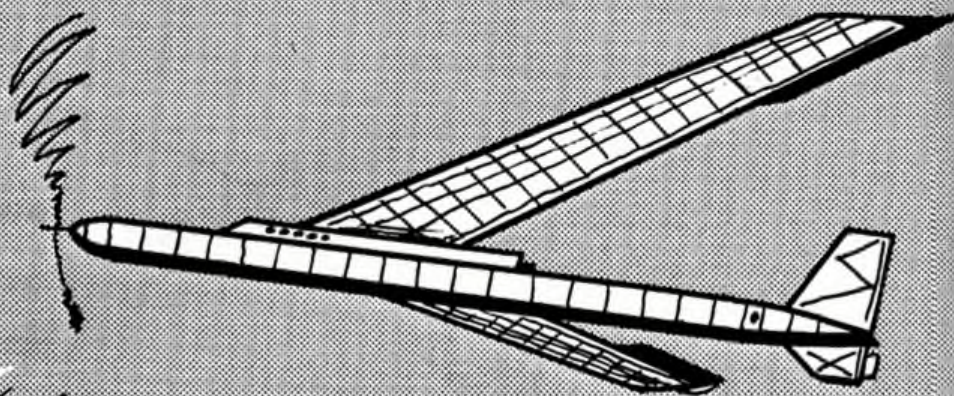
DC demise

After a fairly chequered career in the past ten years, it appears as though the famous DC, or Quickstart, motors has finally ceased production. Ewdec Technology have no further plans, so unless a new buyer is found, we have seen the last of this Isle of Man-based range of diesels and glows. Should there be a renaissance we'll keep you informed!



This photo: Shown here at approximately twice linear size, the AE 0.2cc diesel is the latest in Dennis Allen's new 'family'. At right: Cox Texaco .049 shows new features to aid fuel economy - and light weight





Try tailless-build PIPISTRELLE

IF you recall my article about the Terry Tailless Vintage model (October 1987) you will be surprised to learn that this funny old model with its meandering climb and terminal glide did not put me off tailless models for life.

In fact, my obsession with these freaky but inspiring models continued apace. Many were the flying wings that came and flew away. I learned that tailless models are very like their vintage brethren. That is, they can be divided into those that want to fly and those that don't.

Any amount of trimming applied to the latter group is a waste of time. Even tailless supremo John Pool has failed to persuade one American design to fly in spite of thirty years experience in this field.

Cheer up!

But believe it or not there are flying wings that love to fly and are no more difficult to trim than a decent conventional model. Pipistrelle is one of them (plans are available from APS as MA 145, or from Terry Rose at 35 Old Orchard, Harlow, CM18 6YG). When I first built this classic George Woolls beauty I could not believe its stability. It just put all the other tailless models I had built in the shade and was as easy to trim and fly as your run-of-the-mill vintage lightweight.

Flights averaged ninety seconds. Even with this modest performance I was able to place second and third in a couple of competitions during 1989. The question therefore arose as to how the performance could be extended to two-minutes-plus. The answer obviously lay in the glide slope.

Whereas the Pipistrelle would hop on a passing riser with alacrity, it wouldn't glide into the next county unless you launched it whilst standing on the border. There was obviously a slight inefficiency somewhere because as one moved the CG back so it would cease scurrying about the sky in its usual purposeful fashion and would descend in or semi stalled state rather like a gently D/Td, conventional model.

I concluded that the wing was not working very efficiently – and that the cause was excessive washout (specified at 10 degrees). I also felt that the fuselage length (28 inches) really needed a bigger wing. But the thing I liked least was the nature of the washout.

What happens?

A swept wing has the problem that the outer bits are subjected to an airflow slightly bent inwards by the pressure gradient. The tips are therefore operating a greater thickness and camber than the bit in the middle. The result is a tip-dropping, tail sliding, non-recovering stall – unless one reverts to one of a number of dodges, of which washout is the most popular.

The trouble is that in covering a conventionally twisted wing with tissue, one involves oneself in a two dimensional curve and the result is a warp that varies with humidity. To eliminate this, the Pipistrelle GTI featured here incorporates a construction technique pioneered by C A Rippon with his George (a 1941 Flight Cup Model) whereby one manufactures a complete set of identical ribs and then trims them away at the rear to fit each station on a trailing edge which is packed up in stages above the building board.

Because the wing is tapered, the result is five degrees of washout but no twist in the tissue, and hence no locked-in stress. There is another advantage in that the section changes from undercambered at the centre to flat-undersurface at the tip. This has an effect very like the flaps of a control line stunt model whereby the drooped TE of the Bene 7406F at the centre has an elevating effect and reduces the degree of negative elevon required for a given CG position.



This, together with a 33 per cent increase in span and a slight reduction in taper yields the extra glide performance we are looking for.

But don't expect it to be as good as, say, a modern Coupe because swept wings can never be as efficient as straight ones.

Fuselage affairs

Turning to the fuselage, the original Pipistrelle unit works very well, but I have taken the opportunity of providing a slightly simpler structure incorporating an underfin which may help in the transition from power to glide, which is a well known trouble spot for tailless flyers.

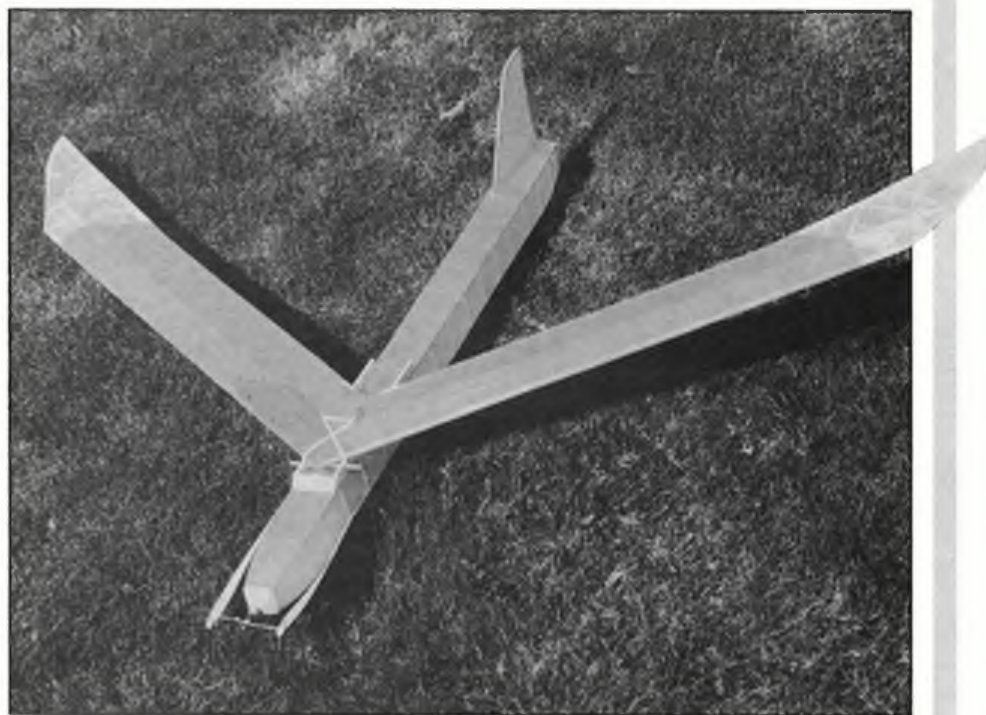
On the prop front: you can raid your box of vintage lightweight props provided they have got plenty of pitch to accommodate the faster flying speed. If you want to go to a modern style, narrow-chord, double-blade folder of larger diameter you may have to arrange a

'freewheel fold' mechanism, otherwise you will beat seven bells out of the wing at folding time. But don't let me put you off, because this is a rich hunting ground for further improvements. I have also tried a 430mm diameter Coupe prop with positive results, but as it takes more than twice as long to build and so far is no more effective than a low aspect single blader, I have

shown the latter. The single blader does possess the advantage of a smaller CG shift when folded.

What to do?

I have put all the construction information on the plan so I won't bore you with it here. One word, though, about D/Ts. The wing is



arranged to hinge upwards pivoting about the leading edge. The front band comes from the fuselage dowel across the wing to the opposite side wing top dowel and then round the other wing top dowel and back to the fuselage to form a crossover.

The trailing edge is restrained by a 400mm length of 10lb mono filament nylon line which is attached to each trailing edge. When assembling the model open out the wing then pass the fuselage through the resulting loop. On the loop is a free-running plastic ring cut from a felt tip pen top to which is attached a rubber band.

The nylon line passes under and in front of the most convenient of the two lower fuselage dowels, and then is stretched back to the Tomy timer or snuffler tube at the rear. The resulting pop-up-wing D/T is extremely effective, and very necessary. However, there is (as in all things) a snag. If you wish the D/T to operate very early in the power phase it may fail to open because of the thrust, so there is provision for a 'helper' band at the extreme front end.

Spiffing

I first came upon this problem with my original Pipistrelle as follows. There I was in my usual, ridiculously small field at Horsenden Hill with a light breeze from the east. This means towards the highly secure and sinister IBM factory which is all set about with barbed wire fences and TV cameras on poles and from which there is no escape for wayward toy planes.

Trimming was proceeding spiffingly well so I decided to see the effect of full torque and screwed on maximum turns. Being cautious I set the D/T for first twenty seconds the Tomy slipped the band spot on time but there then followed a moderately efficient, ornithopter-like

Andrew Longhurst takes advantage of renewed interest in manx-style models to revitalise an old favourite



This new version of George Woolls' original design features a few simplified features - but retains every bit of character. Tomy Timer D/T system fully detailed on plan. Andrew Longhurst refers to this 'update' as the Pipistrelle GTII

progress in which the wing popped up but was then immediately jerked down again as the fuselage thrust forward.

This continued with the model flapping and lurching its way in drunken spasms over the canal and into uncharted IBM territory. It eventually sank, apparently exhausted, onto a large oblong mound, within the barbed wire, which, I am convinced, hides the IBM nuclear bunker.

With sinking heart I collected my trappings and made my way back to the car determined to at least attempt a retrieve of this excellent plane via a frontal assault upon the gatehouse. This despite the lack of success I had in reclaiming both a Parham Dizzy Lizzy and a Mick Farthing in the recent past.

However, as luck would have it, when I arrived at the frontier pole I found myself behind a builders' lorry. I recalled having seen a factory extension going up at the back of the site. In perfect Steve McQueen style, when the barrier went up I drove through with what I hoped was a gesture associating myself with the lorry in front. I immediately headed for the bunker as fast as was inconspicuous and without looking in the mirror, but all the while imagining a fist waving band at Keystone Cops in hot pursuit.

Arriving at the mound I raced up the slope and collected my plane guilty conchs of cameras swivelling to watch my every move. I drove back to the gatehouse hoping I was not to be frogmarched before the Vice President or whoever is in charge. But no, a brief explanation to a bemused security guard and I escaped with my model intact. I wished then I had stayed to look for my other two lost toys but no doubt exposure to the elements would have killed them anyway.

The moral of the story is, if you wish to D/T early in the power phase you may need a helper band form the front hook to the wing dowels.

Fly the GTI

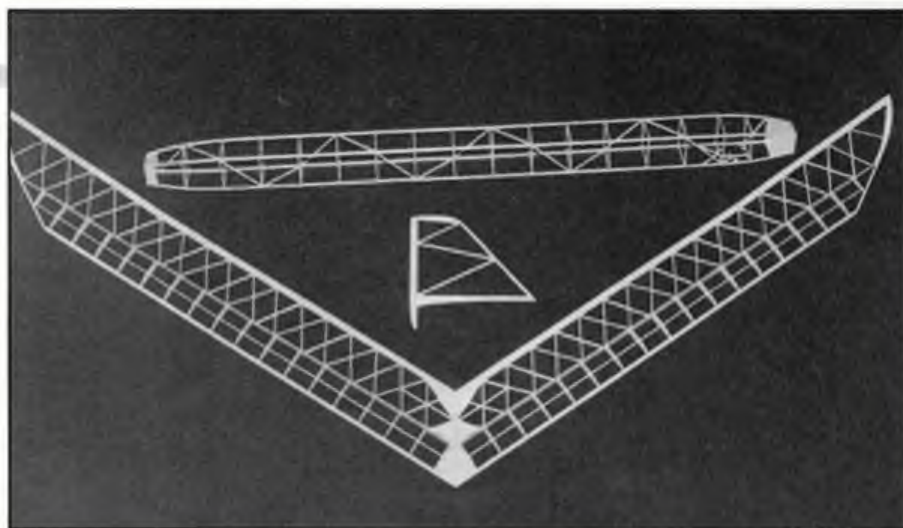
Don't worry – it will fly splendidly, but 'rule number one', as with any other model, is to get the CG right. Assemble the model at home and adjust the wing position to get the CG where marked on the plan. Mark both the CG position on the wing and the wing position on the fuselage with indelible felt pen. On the flying field do everything else you can think of before you move the wing from your marks. Beware of changing the weight of rubber as this will shift the CG slightly.

When you get to the flying site try a few test glides. Remember swept models fly faster so heave it about ten per cent harder than you would a conventional model of similar weight. Get a glide well below the stall, turning imperceptibly left. The catch is you have to do this with the fin and rudder tab dead straight. In other words shim up the elevons 1mm at a time but keep the left elevon about 1 to 2mm higher than the right.

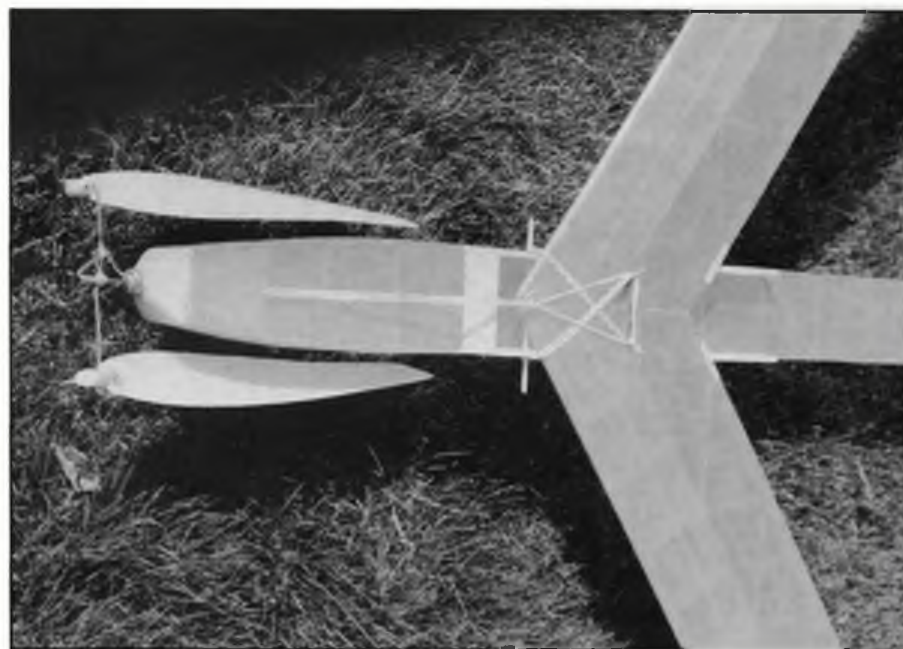
If there is a differential warp then you will have to make due allowance for this factor. Now press on with a flight on modest power and from this greater height check the glide again. Adjust the elevons to bring the glide up to the stall still maintaining a huge left glide circle. When you are satisfied, tighten the glide circle with up to ten degrees left rudder tab.

Meanwhile the power run should have shown a firm right turn gradually opening out as the power dies to just sneak left at prop fold. If it is not doing this, here are some clues:

Problem – Stalls badly under most power conditions but spirals with additional right



Above: Construction is straightforward, even if the wing is a bit unusual by modern standards. **Left:** Pipistrelle's lines are austere but attractive. Long fuselage means plenty of room for rubber. **Below:** Plenty of scope for longitudinal wing adjustment.



thrust. **Answer** – Check CG position then check washout progressive.

Problem – Spirals under high power only. **Answer** – Less right thrust, less strands of rubber, more prop pitch, more differential elevon.

Problem – Climbing well but nose down at end of motor run. **Answer** – Increase prop pitch, adjust prop stop to come in slightly earlier.

Problem – Climbs in right circling steps and stalls gently before prop fold. **Answer** – You are nearly there, more downthrust required.

Problem – Loops obliquely on full power

before climbing away nicely. **Answer** – You have got it launched with slight right bank.

So there you are; you can't call yourself a proper free-flyer without a good tailless model in your fleet and this one is so simple to build and fly you just can't resist it. Tell you what, if it won't fly you can break it over my head at Andy Crisp's Oxford Comp in June. And if it will fly you can enter it, can't you. It's only a two minute max after all.

Lastly, my thanks to John Pool for all his advice and encouragement – and for being such a very nice person.

BALSA CUTTINGS

Cyano de Bergerac sticks to the facts

Charming

For ingenuity and attractiveness, not to mention performance, the models of Robin James take some beating. For mastery of the microscopic flying machine, Peter Frostick is the man. Both these pillars of indoor flying turned up at Crawley for the January SE Area Champs, each with an electric-powered indoor R/C job. Along with the sadly-missed Roy Ashby, they have been pioneers in this demanding but intriguing adventure. Very early in the day, Robin got in a flight, and complaints were made. So he and Peter waited until 5pm, when the air was cleared for them and they flew, one after the other, keeping within the *total* time of five minutes allowed, to show us loops, a touch-and-go, and how to fly up a curtain. It was good. To the announcement that this demonstration would take place the following (actual) words were added:-

'For the last time at Crawley. If anyone thinks he is going to fly a large radio model in here next year, he needn't bother.'

We can dispense with this

Have you ever reflected that if you slung in aeromodelling and went in for athletics, atrocities, needlework or whippet-fancying, you could do without glue altogether? No, you replay, we don't have stupid thoughts like that and anyway, we like glue. Too right. Glue is great. Scotch glue, which comes in shiny beads you melt in special little nestling gluepots. Fish glue, that stinks the place out. Beetle glue, for assembling Celestial Horsemen – each joint takes fourteen days to dry. Bit different from yer five-minute epoxy (Devcon, glorious Devcon, as the old song goes). Did you ever try sticking tissue on with Croid? Have you ever made up a bucket of wallpaper paste, only to have the dog scoff the lot whilst your back was turned? Why is balsa cement thinner these days? It no longer forms that second skin, bits of which you could nibble off in moments of deep concentration or acute embarrassment, and blow out with a little *pphhhtting* sound. But the question today is, do you know how to apply cyanoacrylate glue? That is, do you go dab, dab, job done? Or do you go splurge, splurge, and incontinently flood the joint, soaking the local carpentry for an inch all round, adding weight, wasting expensive sticky stuff and creating a big hard spot at the borders whereof structural failure will be wont to occur? Harken, splurgers – once it was thought that there was only one John O'Donnell. Recent research has established that he does so many things and gets to so many places that there must be at least half-a-dozen of him, but – they all live at 36 Marina Drive, Marple, Stockport, Cheshire SK6 6JL. And what you want to do is to get from one or other of them a coil of their very very thin PTFE tubing. About a pound. (Costs, not weighs, that is.) Cut off maybe a couple of inches and poke one end remorselessly into your cyano bottle. By the cringe, Neddie, you'll never regret it! If it falls

out, waves around or leaks, bandage it up with a strip of tissue or loo roll, which will soak up the spilt and go solid. *The* precision applicator. As they used to tell us apprentices, when we were working sixteen hours a day for a packet of five Player's Weights and a canteen voucher – 'There's only one way to do a job, lad; and that's the *right* way.' They really knew how to get on your wick in those days.

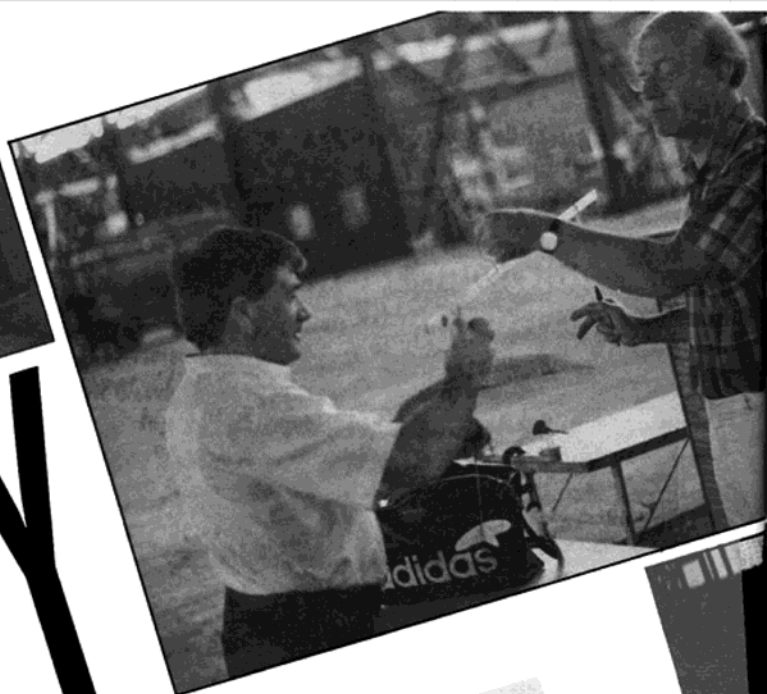
A home of your own

You know, the first thing this column ever said was: go and buy your own flying field. It will still only cost a pint of beer a week. Some clubs have done it. Northampton got their own place recently, and the Skylarks Model Flying Group have set up Cottismore Modeldrome in Berkshire which, albeit on land which is only leased, is going in the right direction. In our little world, Old Warden has long been an institution; there's Brooklands, you've got the Model Aviation Museum at Bestwood, the annual Primrose Valley hobby holiday week, etc. – It is, however, odd that since the splendidly-conceived but ill-fated Eaton Bray Model Sportsdrome, our thinking has never lingered long over the idea of establishing one or more permanent national sites. Places, that is, really suitable for model flying of all types, places where you could fly when you damn well pleased, places where there would be no prob-

lems over holding nationals and internationals, area meets, comps, bun-fights and fun fly-ins. Places, moreover, dedicated and secured to aeromodelling for all time, with ownership safely vested in trust through the governing body. Which, by the way, seems to be breaking out all over! Although the poor old Gen Sec doesn't get around much just now because the Council flogged his van last October and at the time of writing hadn't replaced it, the BMFA has really lashed out, spent all its dough, and bought itself a freehold office. Could one thing lead to another, we ask ourselves? And 'ere, as Max Miller used to say, is a funny thing, lady, 'ere's a very funny thing indeed. The BMFA has just put up senior membership by a pound. Do you miss it? Miss It? You'd forgotten already, hadn't you? Now this increase represents around twenty thousand quid! Do you realise the kind of step towards a national site twenty grand on deposit would be? And if that increase had been two pounds instead of one, so that this year we could be putting by £20,000 for a really field-sized field, and you coughed up another of your miserable quids every year after that for just a wee while, would the burden of .2739 of a penny a day sink you? It would? Okay, better forget it then. Pity, because we might have caught the BMFA whilst it was in the mood. Who knows? Today, an office. Tomorrow, a field. Maybe next week – a van!



'Er, Frank – are you sure we have the landowner's permission to fly here?'



INDOOR ACTIVITY

Top: Closed! Forbidding sight at Cardington shed for the Indoors Nats caused a touch of confusion at first. Top right: Mick Page and Bernard Aslett at the scales. Right: Bernard Hunt takes time out from EZB for Pennyplane activity.



Sunday, 27th August

This day was marred by strong winds and intermittent rain squalls – it would seem, rather unluckily, considering the excellent summer virtually throughout, and the class of model most affected by adverse weather conditions. The first leg of the Trials was also held on this day and dominated the thoughts of most flyers, since seven entered the trials at this stage.

Because of the wind outside, ground turbulence was extreme, which made trimming very difficult indeed. For this reason, several entrants did not record a score in the first round. Brian Kenny was the only person to record over 30 minutes and achieved reasonable scores (as per three rounds. His big, 'square' models (as per Bernard Hunt) showed excellent cruise and let-down.

Laurie Barr and Bob Bailey both had models 'donged' out of the sky by turbulence at low altitude. Bob also provided some of the main afternoon's entertainment by waiting for the wind to drop (yes!); then putting the model into girders, which it hit seventeen times!

Miraculously the model survived, but the rain squall which occurred during the girder-bashing exercise did nothing to improve the maelstrom at the far end of the shed into which the model was sucked. The attempted steer missed the wing but broke the tail. Almost 24 minutes at maximum altitude and another potential 40-minute flight that got away; just like the proverbial fish! Dave Wolstenholme, meanwhile, was able to put in some very useful scores in the difficult conditions, finishing off with 28:03, which was bettered only by Brian Kenny's flights.

At the end of the first leg the scores were:

- 1 Brian Kenny
- 2 Dave Wolstenholme
- 3 R Parham

All very much wide open, depending on the weather for the remaining two days of Trials...

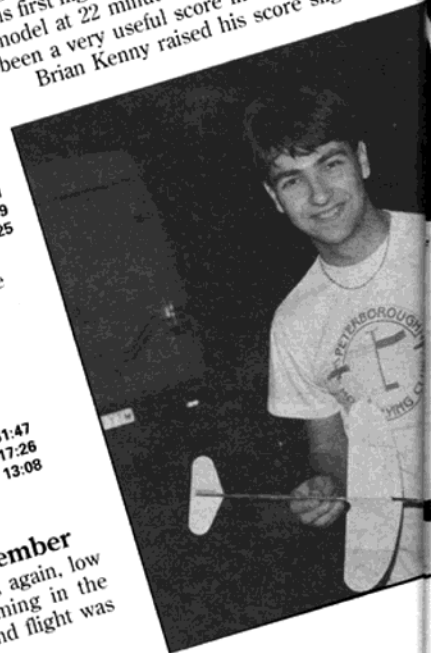
Aeromodeller Trophy: 3 entries		
1 B. Kenny	31:51 + 30:56	= 61:47
2 J. Kilpatrick	17:26 + 0	= 17:26
3 L. Barr	2:59 + 10:09	= 13:08

Second Trials: 17th September

Very cold and wet on this day; again, low level turbulence wiped out trimming in the morning and scarcely a first round flight was

A look back to the F1D Trials – with a mix of pix from Cardington. Bob Bailey reports

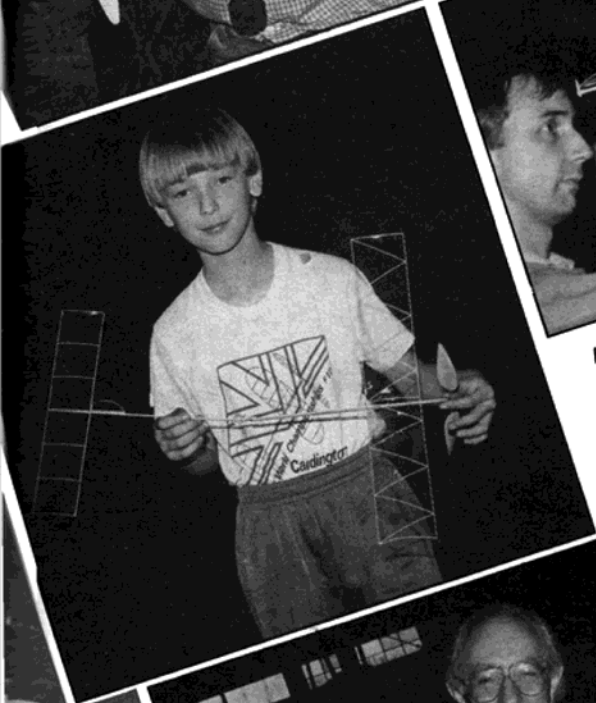
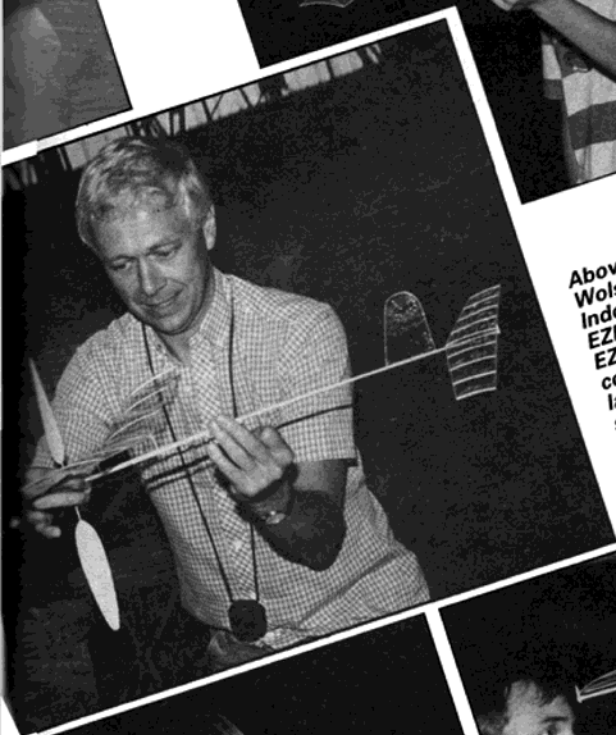
recorded. Brown paper envelopes used for rubber motor storage were going soft in the damp; all very difficult conditions for F1D. However, it was a pleasure to welcome Robert Champion and Andre Trachez from France who had come over for the weekend. Derl Morley tried his luck this time, but it was right out, since after recording 25 minutes for his first flight, a mid-air collision with a French model at 22 minutes ruined what would have been a very useful score indeed. Brian Kenny raised his score slightly with



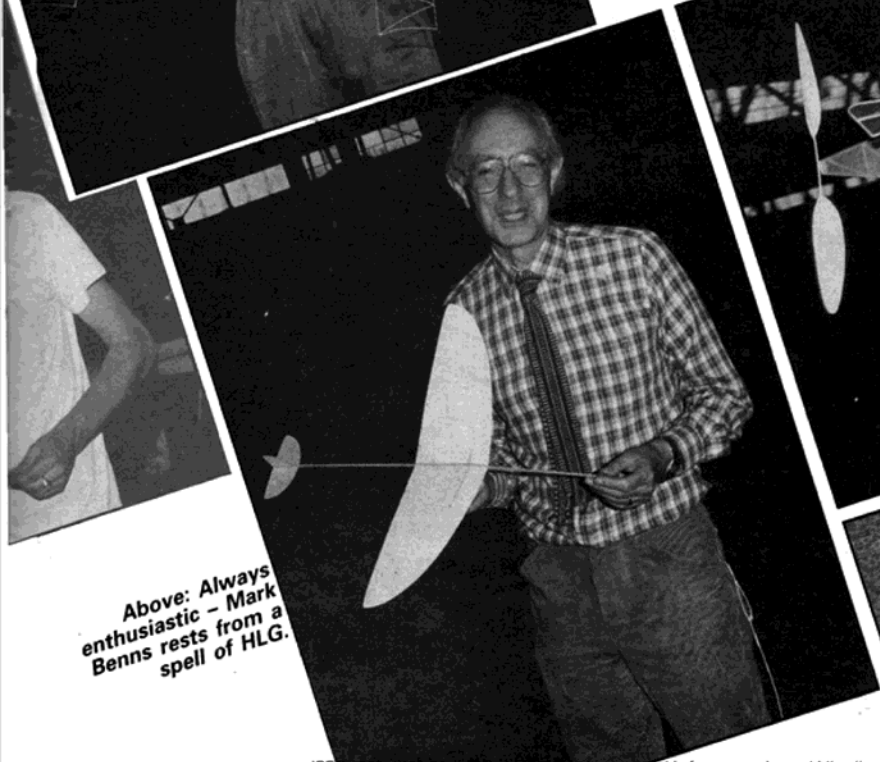
Aero Modeller



Above: Melissa Wolstenholme enjoys Indoor - here with neat EZB. Left: And another EZB, subject of intense concentration prior to launch. Right: Compact scale favoured by Mark Croome.



Left: Junior member of the Wolstenholme family, Matthew of that ilk, proudly displays his EZB - and Indoor Champs tee shirt! Above: Taking a break from Scale, here's Chris Hutchinson with microfilm F1D.



Above: Always enthusiastic - Mark Bennis rests from a spell of HLG.

a 28:37 to retain first place. Bob Bailey moved up to second spot thanks to improved scores; the better (29:32) was achieved after the motor stick had collapsed three times on attempted hook-up. Further collapse was prevented by the installation (via cyano) of the equivalent of an RSJ on the starboard side of the stick. Dave Wolstenholme also improved slightly to hold third place.

However, Robert Champion made the best flight of the day (31:33) which earned suitable mention at a small presentation ceremony when our French visitors were given some suitable English liquid refreshment. This was a small token of gratitude to our French hosts for the GB party which made the much enjoyed and worthwhile trip to Tours in July.

Results after Day Two

- 1 Brian Kenny
- 2 Bob Bailey
- 3 Dave Wolstenholme

31:51 + 30:56 + 28:37	= 91:24
23:47 + 26:34 + 29:32	= 79:53
26:02 + 28:03 + 22:24	= 76:29

Third Trials: 15th October

Again, very cold (12 degrees C) and somewhat damp conditions meant that difficult to gain. As on the first two days, the scores generally remained low, reflecting the different conditions. The three leaders managed to improve their times by greater of lesser amounts, then Laurie Barr (hanging back for all the turns made to get full altitude, running off second place. Alistair Robertson, who didn't fly in the first trials made two very useful flights on this day and narrowly missed fourth place. He missed what turned out to be the best day - a very creditable performance.

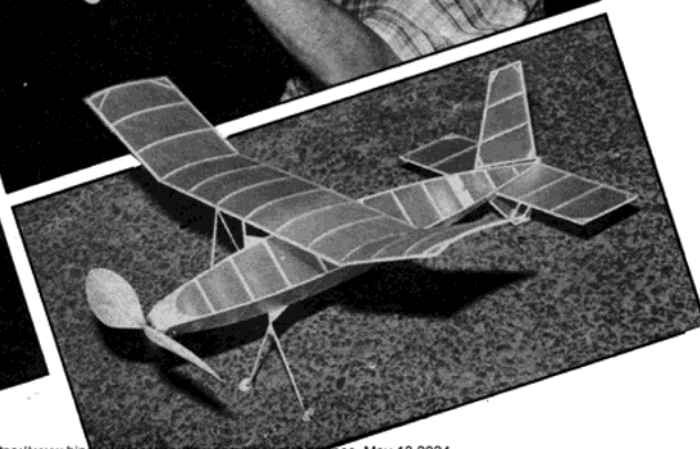
To summarise, the trials were just that, with much patience and determination needed to avoid defeat by the elements and secure a place for the team for the 1990 World Championships. As you read this, a venue may be secured; until then, like Mr Micawber, we have to wait for something to turn up!

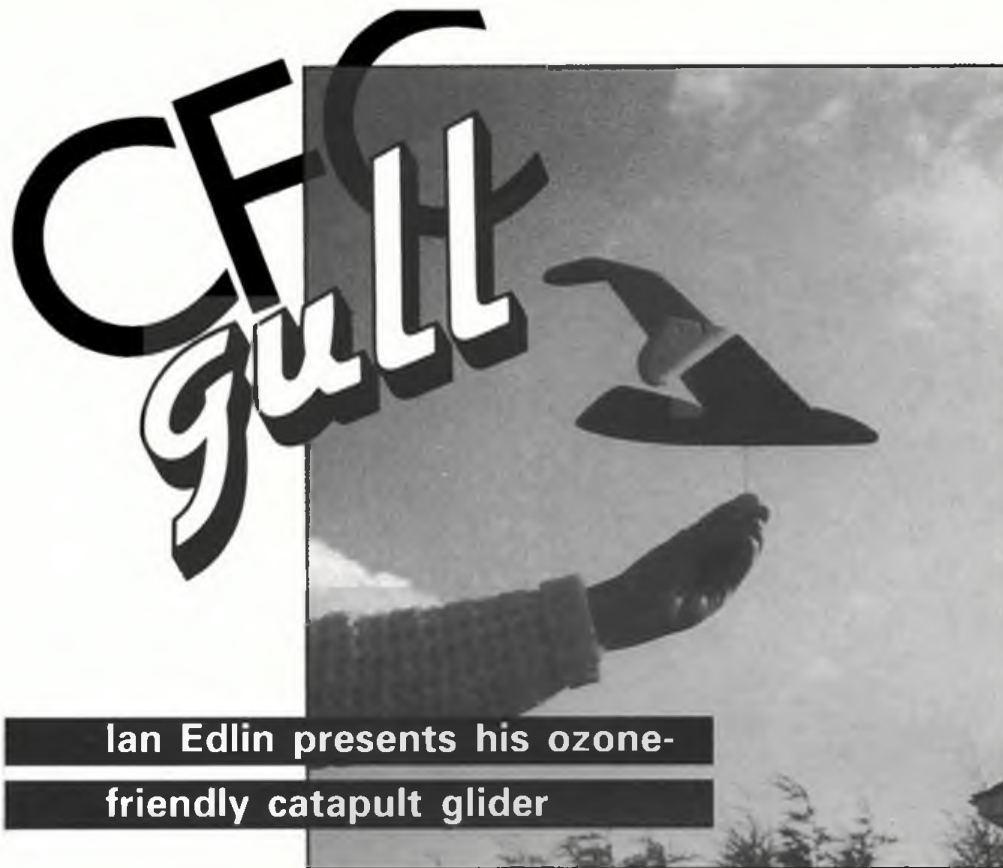
Final Results

- 1 Brian Kenny
- 2 Laurie Barr
- 3 Bob Bailey
- 4 Dave Wolstenholme
- 5 Alistair Robertson

31:51 + 30:56 + 29:16	= 92:03
26:35 + 24:57 + 31:58	= 83:30
26:34 + 29:32 + 27:13	= 83:19
26:02 + 28:03 + 24:57	= 79:02
27:52 + 24:51 + 25:40	= 78:23

Far left: Cheery Reg Boor with long fuselage HLG. Left: Don't see many Manhattans these days. Reg Parkham indulges. Below: Peanut Duration Cagebird from Aermodeller Plans - always a pretty performer.





Ian Edlin presents his ozone-friendly catapault glider

THE CFC GULL is a small catapault or chuck glider which can be easily built for next to nothing if you can save the plastic foam food packaging trays of the kind used for chicken pieces or chops. They are now CFC-free (marked) and are usually light blue foam measuring approx. 10 1/2 x 7 1/2 in. If you can also save a small white one the cockpit cover can be made to contrast with the rest of the model, which gives a better effect – see plan.

Begin!

Having washed-up the trays, trim away the sides and ends which form the trays to leave the flat floor portion measuring about 8 1/2 x 5 1/2 in. One tray floor will provide enough material for one main wing panel and a wing tip, so two floor portions will make all the flying surfaces. The shape of the fuselage is arranged diagonally within the panel of material and cut out from the third tray. Keep the scraps for making the braces 'X' (two off) and 'Y' (one off). These braces are not so much for strength as for helping to assemble the units together.

Smooth it out!

Before constructing the two wings, sandpaper the surfaces smooth and shape the leading and trailing edges to resemble the section as shown cross-hatched in the drawing of the main wing panel. Next sand the inner and outer edges to chamfers, at the angles shown on the drawing for the join of the two main panels at the root and at the join of the main wing to the wing tips.

White resin woodworking glue may be used for assembly if faster-drying adhesives are not to hand. With both main wing panels placed top surface 'down' on the building board, glue and assemble a brace greaseproof or waxed paper underneath to stop the join from sticking to the building board! Apply glue to the appropriate edge of each wing tip and slot 'X' therein, then press lightly into position where the wing tip follows the upward angle of the brace 'X'. Support in this position with suitable blocks and leave to set overnight.

With the contrasting colour cockpit portion glued in the correct location in the fuselage (and dry) sandpaper the fuselage smooth and round-off the edges except where the wing root is to fit. Glue two pieces of matchstick together and glue them into a slot cut to receive them adjacent the step in the bottom edge of the fuselage.

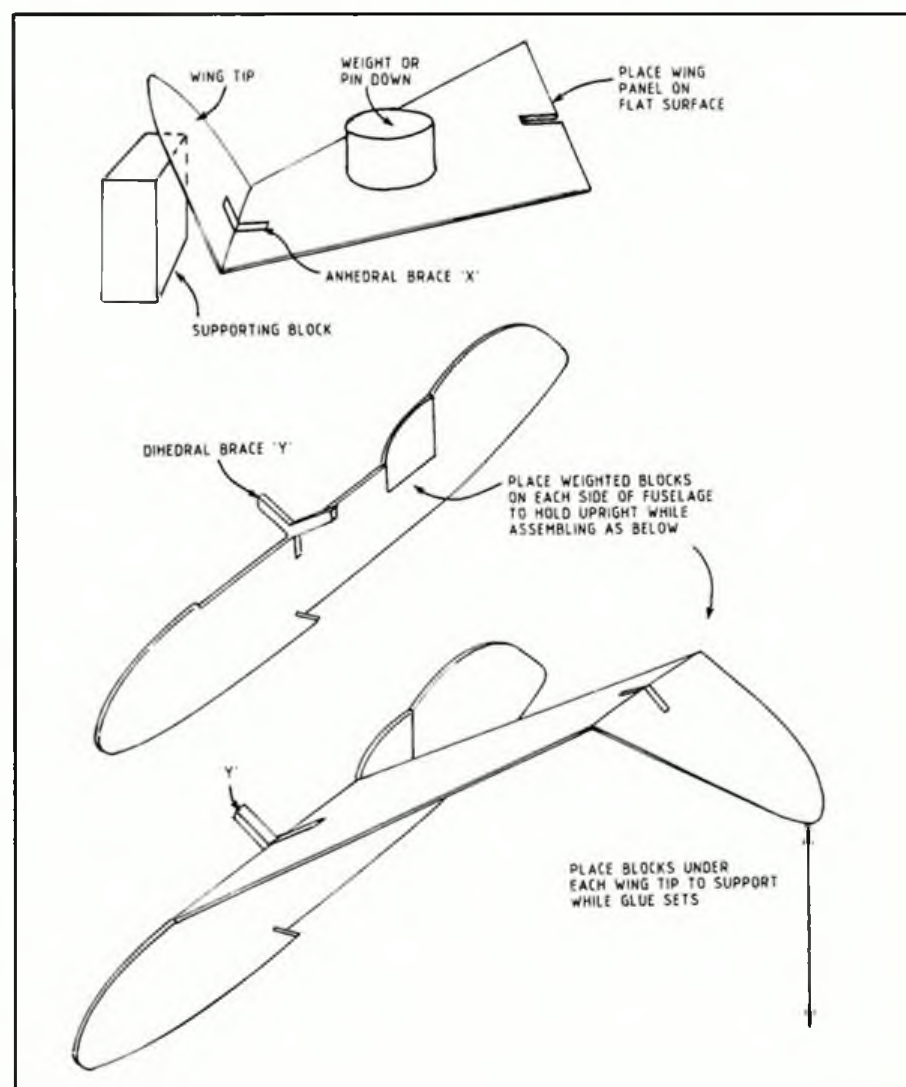
This forms the hook for catapault launching.

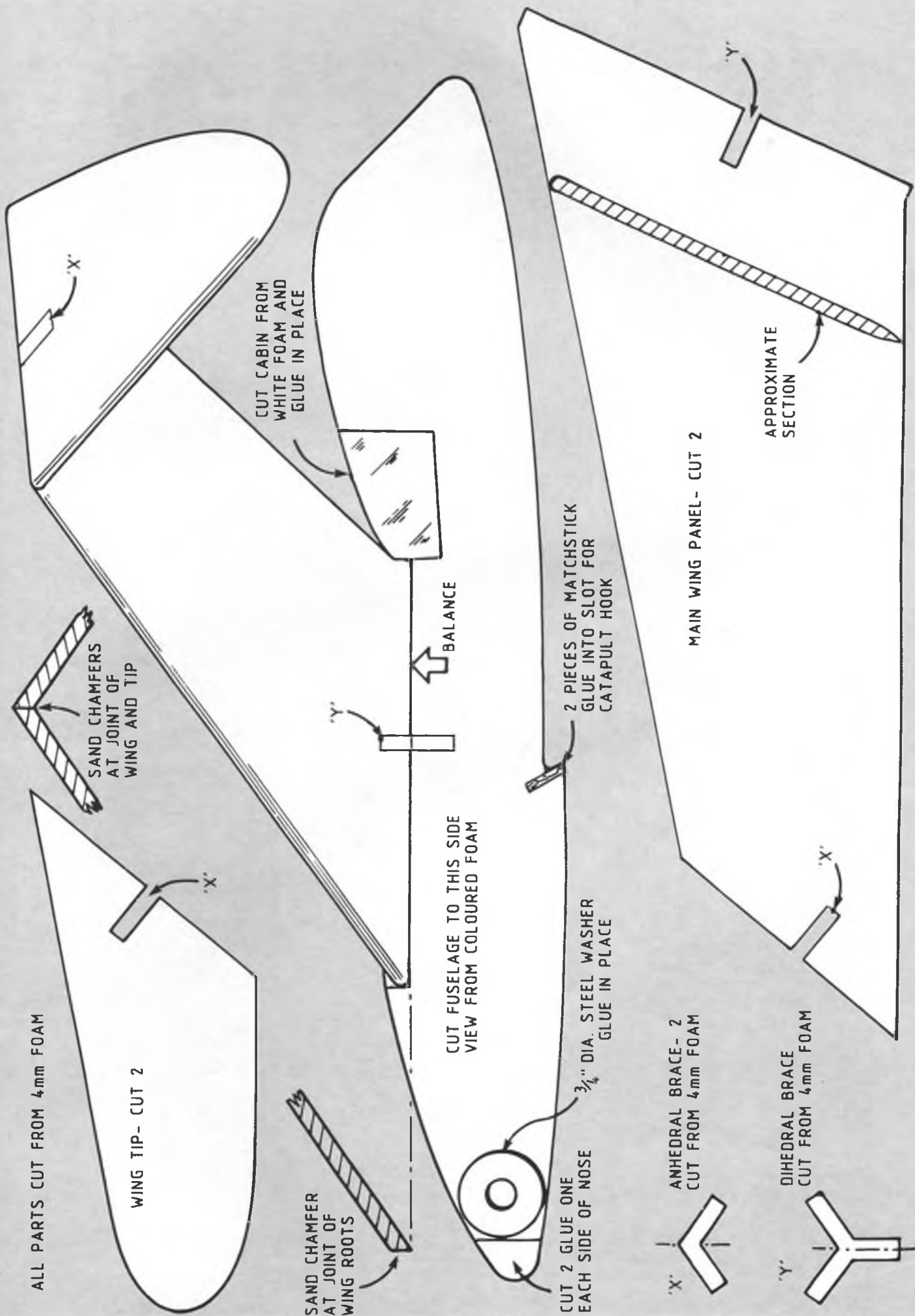
Place the fuselage on the building board with a weighted block against each side to hold it firmly upright, then glue the brace 'Y' into place where shown and leave to set thoroughly. When dry, try the fit of the wings – before glueing – by carefully fitting the appropriate slot on to the brace 'Y' and checking that when both wing roots meet they are also sitting correctly on top of the fuselage. At this point find two suitable blocks to support the wings under their tips so as to hold them at the correct angle dictated by the brace 'Y'. If all appears to be symmetrical and correct – apply the glue sparingly to the wing roots, the slots for 'Y' and the top edge of the fuselage where the wing 'sits'. Leave to dry thoroughly. An alternative to this assembly which some may prefer is to join the two wing halves at the root first, in which case do not apply glue to the slots for 'Y' but leave the wing correctly supported under each wing tip until absolutely dry. When ready, apply glue to the slots for 'Y' and along the top of the fuselage, then carefully lower the wing into place and support until quite dry.

Ready to go!

When the model is completely set, experiment with the size of washer required to balance where shown on the drawing. Fix with a small piece of sticky tape until the ideal washer for a noseweight is found. Check by test gliding on a fairly calm day initially. When a satisfactory level glide is achieved the washer can then be glued to the fuselage as shown.

A suitable catapault may be produced by using about six feet of elastic or quarter inch strip rubber joined to about twelve foot of thread with a small ring tied to the end. Tie the elastic end to the top of a cricket stump banged a little further than usual into the ground. Go fly!





THE SKY'S THE LIMIT!

Mark Patterson visits the BMFA National Rocket Weekend



A chill north-easterly breeze did little to cool the enthusiasm of the record number of forty or so rocketeers and spectators who came to the British Space Modelling Association's National Rocket Weekend held on 9-10th September.

Upwards of 100 model rockets of all shapes and sizes were launched from the site, a farm near the village of Yatesbury in Wiltshire. 'It's been like Clapham Junction', enthused the event organiser Stuart Lodge. 'We couldn't anticipate this size of response'.

Rockets were being shot off in quick succession. For each launch the rocketeer would enter the model in the log, mount the rocket onto one of the four pads then attach the small electric igniter to the motor and wire it to the launch control unit. After calling out a warning count-down he would then punch the fire button.

Once the missile was in the air the rocketeer would track it visually – not always easy to do with a small, fast-moving object at some distance against a grey sky.

With luck the rocket would successfully release its recovery parachute and land softly a short distance away. All that was left then is the walk over a rough ploughed field to retrieve the landed craft.

Ballistic mastery

The egg-lofting contest, held on Sunday, was one way of demonstrating mastery of the basic skills. Several contestants fired off rockets with an egg packed into the nose-cone. The object is to keep the rocket in the air for as long as possible but if the egg is damaged the launch is disqualified.

Members took advantage of the wide open spaces offered by the site to try out a range of adventurous launch vehicles and configurations. There were multi-engined vehicles, one of which had attached to the side of the main tube two external booster motors, which were jettisoned when spent. A number of two-stage vehicles were also launched.

At least one Astracam was lofted. This is a kit rocket that carries a camera along with the recovery parachute in the nose-cone. When the parachute is released at the top of the flight the sharp deceleration pulls a cord which releases the shutter.

Other rocket-powered curiosities to be seen were a balsa glider, a helicopter, a tube ten feet high and various scale models – a Saturn V, an X-15, various rocket planes from science fiction, a flying saucer and a V-2.

But perhaps the weirdest was Hot Dog. This smiling cartoon-style sausage-in-a-bun had the distinction of winning the Odd-Roc prize for its maker, Paul Hollis. He was duly awarded a certificate and an asteroid-shaped trophy.

A BBC camera crew, with Mat Irvine in charge, were among the onlookers on the Sunday, getting footage for the education series *Techno* aimed at 11 to 14-year-olds, screened in January. Each episode has a hobby section. Model rocketry was their choice for the episode on energy.

The weekend marked a successful end to the summer season of monthly rocketry events organized by the British Space Modelling Association. More to come this year!





Left: This BBC camera crew, led by Mat Irvine at right, prepare to film the launch procedure of an Astracam rocket-launched camera. Below: Stuart Lodge, organiser of the event, checks the condition of an egg after it has been launched in the egg-loft contest.



Opposite page, far left: Lee Stringer sporting 'Rocket in Head' cap, prepares a 10ft rocket for launch. Main pic, below: Various rockets, including multi-engined and two-staged. Above that: Paul Hollis with Hot Dog, a working rocket that won the 'Odd-Roc' contest. Left: Charles Braham of BSMA launches an egg-loft. Below right: A BSMA member mounts a two-stage rocket.



FROM THE HANDLE

Armed forces! Claus Maikis investigates dynamics of Stunt control-line systems

CONTROL LINE flying must have been well known to Socrates. He said 'it's the simple things which are the difficult ones.' Probably few people have stressed their minds to think about our control system. It's so simple that it doesn't seem worth to spend any thoughts about it. The result is those aeroplanes which don't live up to the expectations of their builder and are the reason for many a disappointed and frustrated pilot. A sad situation when you consider the considerable work necessary to build one of our pieces of jewellery.

Practicalities

Some time ago (Aeromodeller, July 1985) I tried to explain the basic principles of the control system. That article dealt with practical geometry only. Loads on the control components were not considered. During that time I happened to fly the aeroplanes of two fellow stunt flyers. I was quite disappointed with their flight characteristics. Since both of them had removable wings it was possible to inspect the control system. After discussion with the builders I had a slight inkling of control problems. Also, two articles in the model press again caused me to take a close look at that assem-

blly of wires and levers within our aeroplanes.

One article was written by American Paul Walker who explained the forces occurring in our control system. Recently an article by M. Hepperle in the German model press dealt with the loads produced on control surfaces, especially with the resulting torque. He published a nomograph which allows the calculation of moments which occur at control horns. This nomograph was drawn by calculations with a complicated computer programme (which is far beyond my capabilities!). It is based on typical R/C dimensions, but with some modifications, I think the obtained figures are not very far from control line aerobatic reality. Peter Germann of Switzerland did a lot of calculations with this nomograph and came up with the results, which all appear quite realistic. Wolfram Reuter helped me with the formulae. So, much tribute goes to these gentlemen for completion of this story. Of course, physical laws apply to all control line events and aeroplanes.

The right moment

However, here let's talk about the typical control set up in an aerobatic aeroplane only

(what else!). Before we dig too deeply into details, let's make clear what we're talking about. First, what is a moment? A moment is a force necessary to turn an axis. This force doesn't work on the axis directly, but instead on a certain distance via lever, crank or arm (See fig. 1). The figure is usually given in Nm = Newton/metre, where N is approximately 0.1 kilogram. We can see that the product M depends on the force F and the distance D . This means: if we know F and D we can calculate M . On the other hand, if we know M and D , we can figure out F .

$$F = \frac{M}{D}$$

or if we know M and F we can find out D .

$$D = \frac{M}{F}$$

The distance at which the force attacks is called the moment arm. F and D are reciprocally proportional: if one figure increases, the other has to decrease. For example: if the dimension of the lever is only half, the force has to be doubled, and vice versa.

In Fig. 2 the principle is shown with four different moment arms (horn lengths) and the requisite forces. The length of the different rods indicates the required amount of force relative to each given moment arm. The dotted line was added to show clearly that the increase of force isn't linear but square.

Now, when our control surfaces are deflected a load is put on them. Remember that the load increases with the square of speed. This load tries to turn the surface back to neutral. We

P-51 styled stunter is the latest from Dr. Geza Egervary's stable. Superb silver finish. ST 60 power. Looks great!



have to overcome this force by pushing or pulling the pushrod(s) which transmits a certain force on a control horn of a certain length.

In our formula the horn length is D and the pushing or pulling force is F. We all know that with a longer horn the pushrod travel is increased, but the required force is less. Besides, the smaller force puts less load on the horn holes which results in less wear and slop.

For utilization of M. Hepperle's nomograph some figures have to be given; surface dimensions and flight speed. Let's fix flight speed first. For safety reasons we want to know the highest possible loads, which occur at high velocity and quick and large control surface deflections. let's say we have a 5sec lap time at 20.7 metre flight radius. That's a flight speed of 26m/sec. Then let's say we have a slightly lean needle setting; we are in the diving part of the wing over, and have a light breeze from 'behind'. All this may result in an assumed speed of 35m/sec. Now we need the dimensions of the control surfaces to enter the nomograph. I've assumed 700mm (millimetre) span and 65mm average chord for the elevator; then 1400mm span and 60mm chord for the flaps. With these given figures, the nomograph shows a torque of 1,35Nm for the elevator and 2,4 Nm for the flaps at 35m/sec velocity. These loads may occur seldom only, but – as I said – let's use this safety margin to be prepared for any critical situation we may ever encounter.

Now the actual pushrod load can be found. For example: 1,35Nm means that we'd have to apply a force of 0,135kg if our elevator horn was 1m long. Since (we suppose) it's 25mm long we calculate.

$$F = \frac{M}{D}$$

$$= \frac{0.135}{0.025}$$

$$= 5.4\text{kg}$$

The same calculation applied at the flap horn with an assumed flap horn of again 25mm results in:

$$F = \frac{0.24}{0.025}$$

$$= 9.6\text{kg}$$

These loads may seem high. But remember that they depend mainly on speed – squared, that is! Imagine that with a supposed airspeed of 25m/sec the calculated moments are 0,75Nm and 1,33Nm; that is, 3kg plus 5.3kg only. With both (high) loads added, our pushrod has to stand and transmit a force of 15kg. To say it in other words: to fly a sharp corner (say a pull-out from a wingover) with an aeroplane with the quoted control surfaces (with a slightly fast setting a light wind) we have to produce a force of 15kg at the bellcrank output arm.

Now – the bellcrank

Can we reach that figure? Let's look at the bellcrank side of things. We can apply the same laws here. F is the force which is applied by the flying lines, and thus the pushrod. D is the dimension of the input or output arm of the bellcrank (depending on which way we enter the calculation). It's quite obvious that the highest possible force we can reach is the existing centrifugal force. That's where we finally depend on. We have to know this force in order to find out whether we can produce enough force to move the pushrod. The formula for the centrifugal force is:

Fig 1

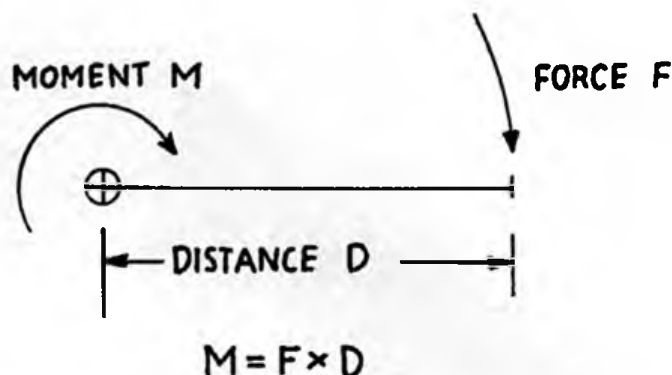


Fig 2

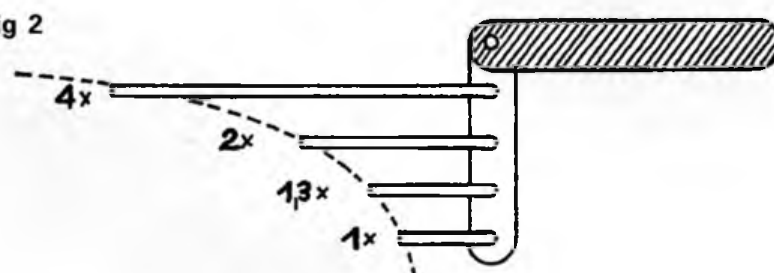


Fig 3

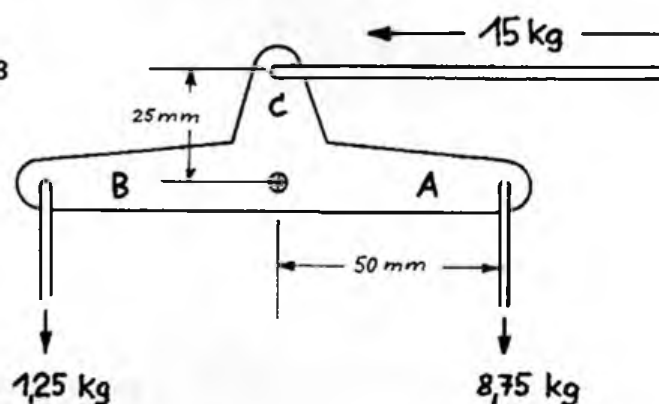


Fig 4

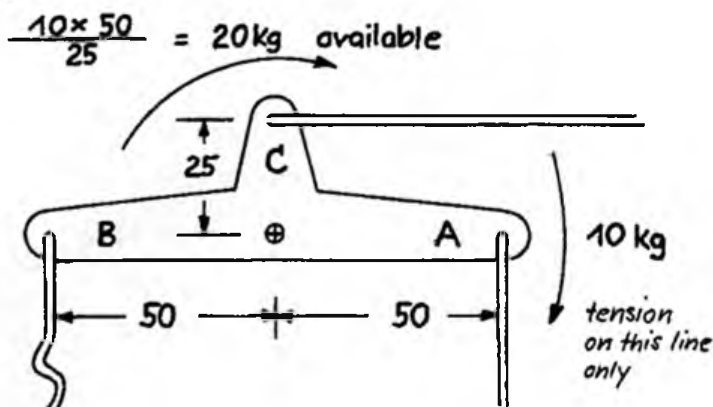
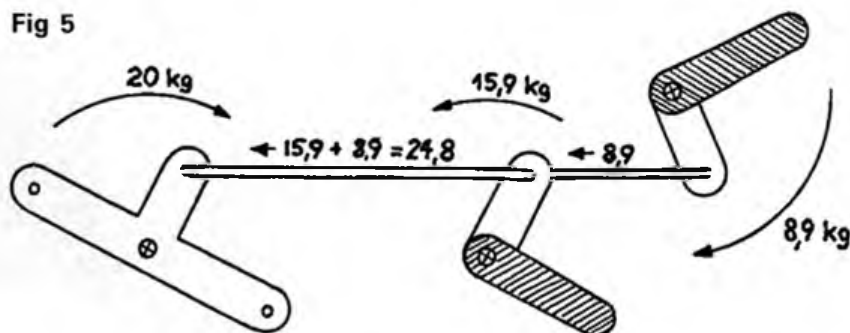
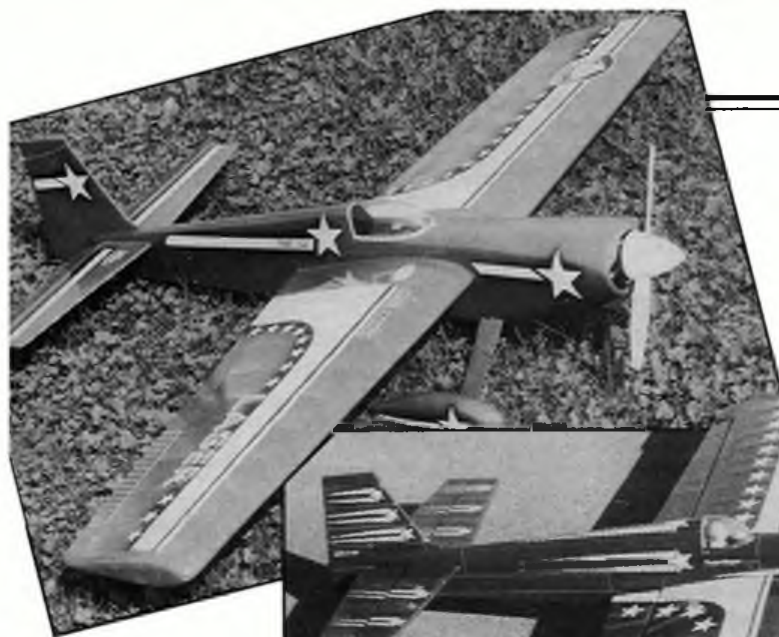
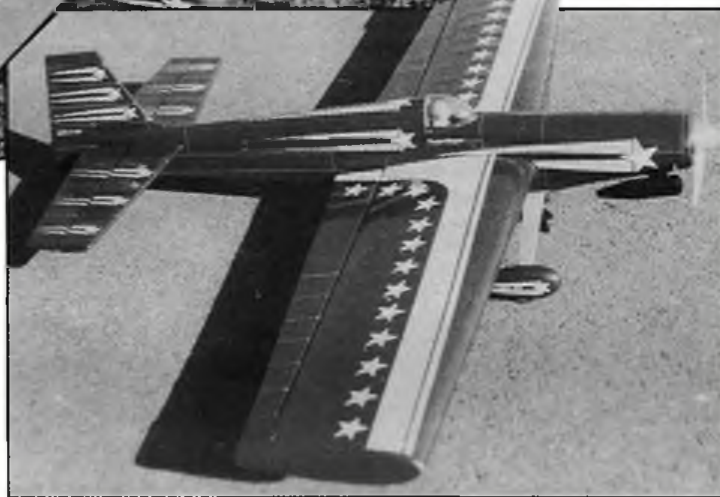


Fig 5





Left: Our columnist's new, small-size Laser for fun-flying and simple stunts. Likes loops and 'round' manoeuvres, but not squares. OS .25 on board.



Right: ST .46 powered Laser by Gunter Wagner from East Germany features detachable wing.

$$F = \frac{\text{Weight (Kg)} \times \text{speed}^2 \text{ (m/sec)}}{\text{radius (m)}}$$

Suppose our .45 size creation has a weight of 1.850Kg (= 65oz) and – again with a 5 sec lap time at 20.7m radius – it travels at 35 m/sec. Then:

$$F = \frac{1.85 \times 35 \times 35}{20.7} = 109\text{Nm.}$$

For ease of calculation let me continue with 100Nm = 10Kg. This is the centrifugal force, and at the same time it's all the force which is available for controlling our aeroplane – and for bringing it out of trouble! This line tension is distributed on both lines. If we apply a sudden surface deflection – quick and strong enough that the aeroplane hangs on one line only – we have a 10Kg force on this line. Assumed the bellcrank dimensions are as given in Fig. 3 we have the force arrangement:

$$\frac{10 \times 50}{25} = 20\text{Kg}$$

Now we see that with a strong jerk at the handle and the aeroplane hanging on one line only, we can transmit a force of 20Kg to the pushrod. Since we've figured out a required force of 15Kg, we see that control is possible (boy, am I glad to know that now!).

Now we usually don't give full rudder deflection. I don't know the maximum possible deflection on your aeroplanes, but on my own creations I don't have much more than 45 degrees. By the way, this figure was one of the parameters used for setting up the above mentioned nomograph results. Since the necessary deflection is probably considerably less, we hardly ever reach the figures I've arrived at, here.

Anyway, it might be interesting to know exactly how much tension we have on our lines. The idea is that the combined tension on both

lines is 10Kg. However, with 'up' elevator the pushrod is 'pushing' (hence it's name!) with a force of 15Kg. We must overcome this force by 'pulling' the up line, provided we use that conventional control arrangement as shown in Fig. 4.

We have to pull 'against' the 15Kg force. Since the force transmission is 2:1 (50:25mm), we need 15:2 = 7.5Kg more tension on line A than on line B. Wolfram Reuter told me the necessary formula. With this it's quite easy to figure out (even I can understand it now!)

$$\begin{aligned} A + B &= 10\text{Kg} \\ A - B &= \frac{15\text{Kg}}{2} \\ &= 7.5\text{Kg (difference)} \end{aligned}$$

$$\begin{aligned} A &= 7.5 + B \\ A + B &= (7.5 + B) + B = 10\text{Kg} \\ 7.5 + 2B &= 10\text{Kg} \\ 2B &= 10\text{Kg} - 7.5 \\ 2B &= 2.5 \\ B &= 1.25\text{Kg} \end{aligned}$$

$$\begin{aligned} A + 1.25 &= 10 \\ A &= 10 - 1.25 \\ A &= 8.75\text{Kg} \end{aligned}$$

It's quite clear now that we don't need the full tension on one line to get the necessary control deflection. However, this shouldn't lead

us to neglect accuracy of control system design. Satisfying function is only guaranteed with correctly dimensioned control components. An example: let's just try a bellcrank layout with a C arm dimension of 30mm. We find

$$\begin{aligned} F &= \frac{10(\text{Kg}) \times 50}{30} \\ &= 16\text{Kg} \end{aligned}$$

Since we have to produce a 15Kg force for the pushrod to fulfil its duty, 16Kg just isn't enough to have a safety margin. On the other side, with a 20mm bellcrank C arm we've already got 25Kg force, which seems fine. However, whether or not the resulting short pushrod load is practical, seem open to question.

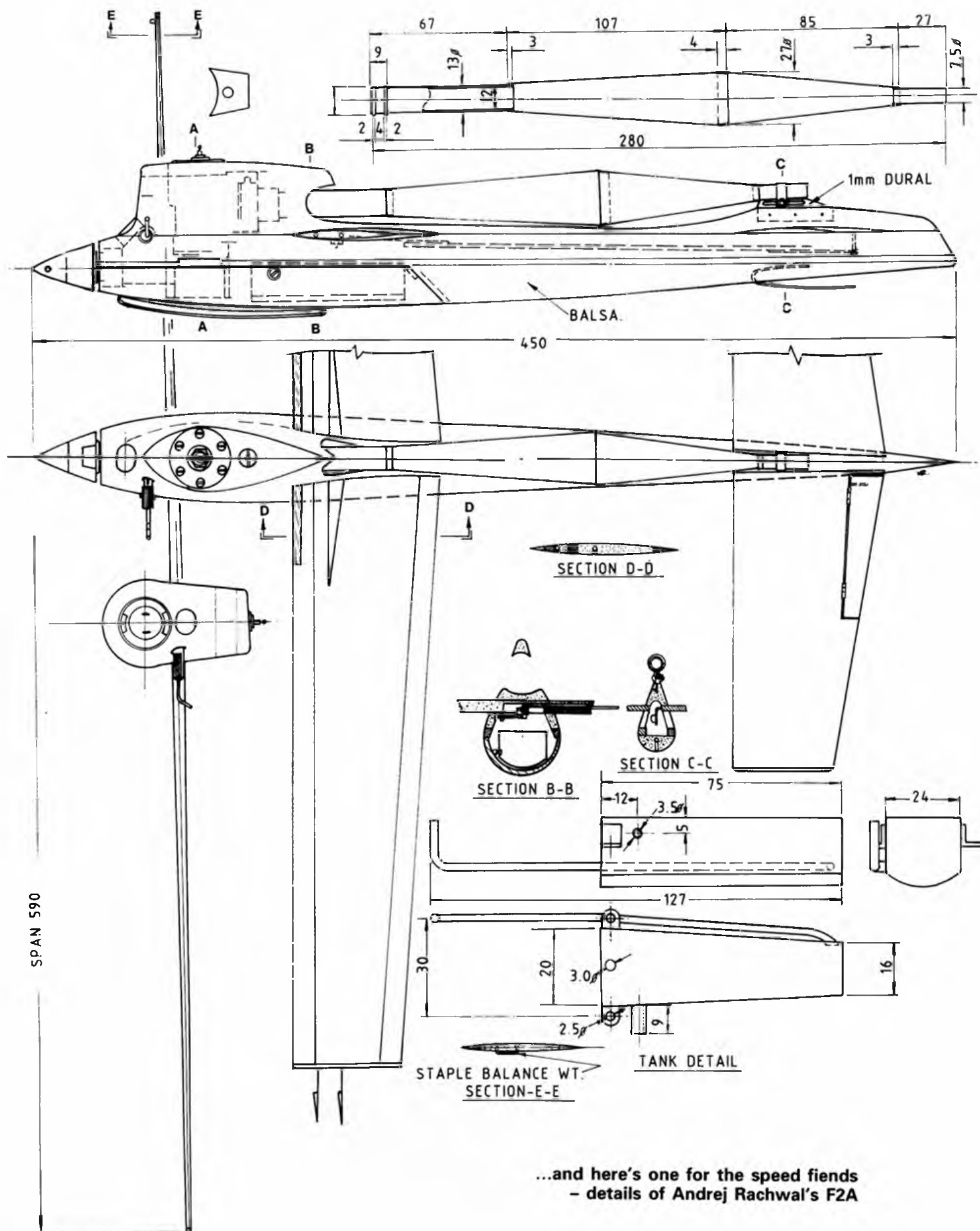
Also, we shouldn't forget the control horn side of the topic. The required force in the pushrod depends on the horn length, of course. Just imagine a reduction in horn length to 20mm. The loads will instantly increase to 6.7 = 12 = 18.7Kg. At a horn length of 15mm the required force will be 8.9 + 15.9 = 24.8Kg on the pushrod (see Fig. 5).

With the available amount of 20Kg on the bellcrank output it's easy to see what happens. The control surfaces will be deflected to that degree when the surface loads will equal the pushrod force. No further deflection is possible. Even if the aeroplane in itself may be capable of still a tighter bend (because there's still more deflection available, and there's enough lift), control surfaces are blocked, and the ground will come closer with a frightening quickness. That exactly was my experience with those two aeroplanes I had the pleasure(?) to fly. The elevator horn was too short. Although the aeroplanes were quite manoeuvrable, they felt very stiff and performed corners reluctantly.

As mentioned above, I cannot claim the data given in this story to be tried and proven figures. It was tried to determine the highest possible loads so the construction of control components can cope with these. If they do, they will handle smaller loads with ease. For those who are interested to obtain data for the lower end of aeroplane sizes I've calculated the data for a Nobler-size aeroplane. They are shown for comparison in Table 6.

It goes without saying that a correct control system alone doesn't produce a world champion. It's just one problem we're faced with. I'm glad our even is so versatile as to provide satisfaction and success on different roads. However, it would be a disaster if a pilot had to abandon his aeroplane to its fate, hanging on the wall (the aeroplane, that is!) for the rest of its life. It might be worth considering the task of designing and building the control system with the same seriousness and effort which we usually apply in waxing and polishing our aeroplanes.

Table 6 Aeroplane					
	Speed m/sec	Nm Elevator	Nm Flaps	Total Kg	Pushrod Load
.45	25				
.45	35	0.75			
.35	25	1.35	1.33	8.3	
.35	30	0.4	2.4	15	
		0.6	0.6	4	
			0.8	7.2	



SCALE MATTERS

SPECIAL

Doug McHard updates us on his adventures with the Powermax Z compressed-air motor



MODELLERS in the British Isles will require no reminding of the atrocious weather that we have endured for the first two months of 1990. I have been able only to sneak in two very short flying sessions in five weeks, but these have, despite their brevity, been very educational in terms of an operating knowledge of Compressed Air Powered models.

I now can confirm that the six-ounce, 40in span Piper Super Cruiser is an ideal size for

the MM3 motor. It provides more than enough power to give exceptionally good flights, averaging about 1.1/2 minutes.

Since my article in the April issue, I have acquired a Track Pump. This is a stirrup-type air pump with two little fold down flaps on which one stands to stabilise the pump. It has a very good built-in pressure gauge to monitor this important matter, and twenty effortless strokes provide over 7-bar pressure.



Left: 3-2-1-Bang! Actually, Doug's investment in this Track Pump has proved most worthwhile - Piper Super Cruiser flies beautifully for at least 90 seconds. Above: Pump is robust, with sensibly-sized supports. Opposite page, top: This Pentel Marker body was used to reinforce the motor's head attachment. Below that: 14g aluminium tube insert prevents ejection under pressure. See text. Below that: Pump attachment is easily fixed. Note also easy-to-read pressure gauge.

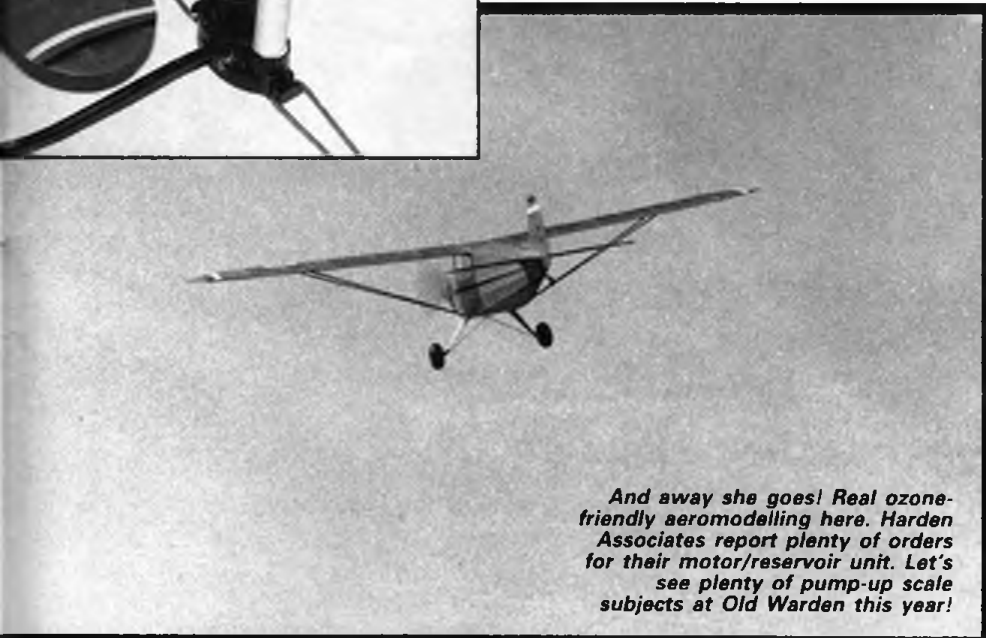
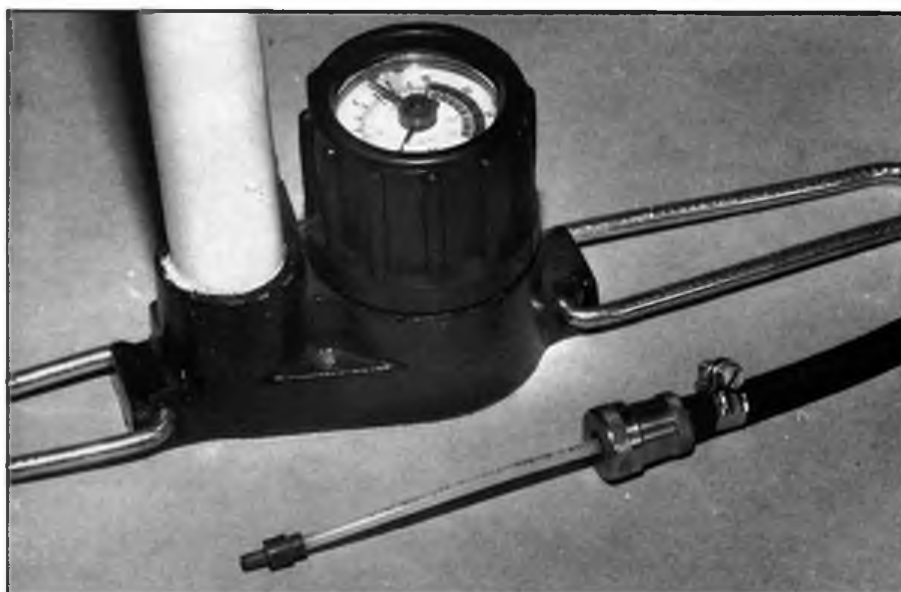
Aero Modeller

My pump is sold under the brand name Witborg, and originates in Ostend, Belgium. It cost about £25 from my local hardware shop, and is a very high quality product which looks as though it will last the proverbial modelling lifetime. It will actually produce up to 15 bar (250lb sqin), but don't try this on your plastic MM3 engine.

Speedy!

Such a pump is highly recommended to anyone who is thinking seriously about using these interesting new engines. It takes all the hard work out of their operation and speeds things up no end! The Italian manufacturers of the MM engine state that their product is rated up to 12-bar. However, this statement must be treated with some reserve as I have blown two cylinder heads off at just 8-bar. The plastic head is easily reattached with a little cyano, but the gluing area is very small and the assembly certainly requires some reinforcement.

Ideally one would turn up an aluminium,



And away she goes! Real ozone-friendly aeromodelling here. Harden Associates report plenty of orders for their motor/reservoir unit. Let's see plenty of pump-up scale subjects at Old Warden this year!

channel section, annular collar to hold the head together, but for a kitchen table modeller, a Pentel aluminium market pen body forms a good base to start from. I cut off the end, removed the centre to allow the centre raised head to protrude, then slit the side to allow the diameter to be adjusted and the finished collar to be positioned. The bottom edge was peened over to wrap under the head flange, and a little cyano applied to secure everything. The plastic softens a bit with the first application so it's wise to leave it to re-harden for a few hours before running the engine.

Be careful not to cover the three head exhaust ports under the head flange, and do be careful not to get cyano on the rubber diaphragm in the head. My two repaired engines have withstood 9-bar, so there now seems to be a good safety margin.

Using the Track Pump to fill the reservoir, builds up the pressure very quickly. This, in turn, heats the plastic pipe connecting the bottle, filler point and engine. Combined with the internal bottle pressure, the heated, and therefore softened, tube tends at higher pressures to be ejected from the hole in the bottle neck. This can be prevented by

unscrewing the plastic cap, pulling the tube through and inserting a short length of 14swg aluminium tube. This effectively wedges the tube from inside and the bottle and entirely prevents its release.

The adaption of the Witborg pump is simplicity itself. The nylon tube that comes attached to the MM3 cycle pump is removed complete with its red plastic collar and rubber grommet. This complete assembly is inserted behind the brass Witborg pump connector which is then screwed up tight – and that's all there is to it!

Try it!

Although the flying characteristics of the MM3 powered model Piper is similar to a rubber model, there are some differences. You only get the really good long flights when operating at the higher pressures. Perhaps that isn't so surprising, but the progression from mediocre performances to startling performances is quite sudden. At about 5 to 6-bar pressure, all I get is little more than an extended glide, but at 6 to 7-bar, the model climbs quite steeply for a good thirty seconds, then just goes on and on! Very little power is needed to keep it flying, but you do need that high pressure to give height initially. The same characteristics were noted with the Jonathan on most occasions. The steady cruise and descent phases are far more extended than you would expect from a rubber motor.

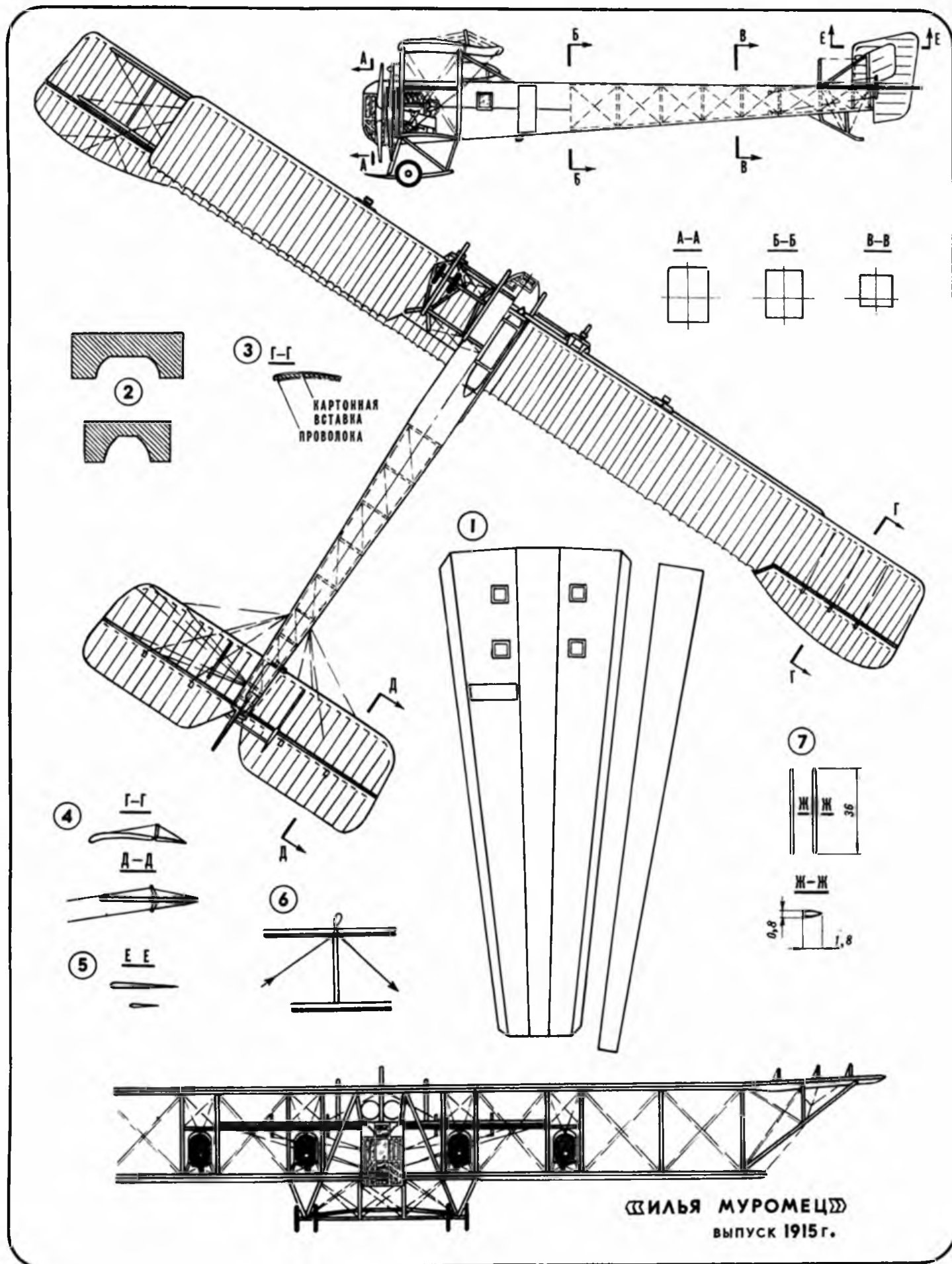
I look forward to seeing lots of imaginative, CA-powered models at the 1990 meetings; the potential for the forward-thinking modeller is very exciting!

Opposite page: Fancy a challenge? Try this Ilya Muromets for quadruple electrics! Drawing to 1/72 scale...



And here's an absolute gem for CO₂! Butch Hadland's latest is this jewel-like Cessna AW to 1/16 scale. Glossy red charmer has bags of character and flies as well as it looks on Brown power.





WHAT'S ON

22 April
INDOOR SCALE NATIONALS
Venue: Alunwell Centre Walsall, CO/Electric, Open Rubber, Air Racing, Aeroplane Monthly Trophy for Best Ultralight Talks and demos. Contact: Doug Sheppard. Tel: 0272 697595.

29 April
WHARFEDALE & DMAC OPEN MINI GOODYEAR EVENT
Venue: Dewsbury. Contact: Jeff Smith. Tel: 0532 663432.

29th April
ASP DESIGNS MODEL FLYING DAY
Venue: Old Warden Airfield. Bring and fly any model from an Aeromodeller plan. Lots and lots of choice. You must have a suitable model already! Come and enjoy this new event in our Shuttleworth season. Contact: Aeromodeller. Tel: 0442 66551.

29th April
WITHAM CUP EVENT CL
Venue: Clip End, Luton. Open Stunt, Vintage Stunt, Novice Stunt. Contact: Glen Alison. Tel: 0923 772675.

2nd May (Wednesday)
WEST LONDON MAC GRAND BRING AND BUY AUCTION
Venue: Large Hall, Rattle of Britain Club, RAF Station, Hillingdon Road, Uxbridge, Middx. Doors open 7.30pm. Auction starts 8.30. Sell off your surplus gear, or purchase some more! Loads of film, low-priced drinks too! Super raffle of three, four-stroke motors. Contact: Peter Niclsen, 176 Cherry Tree Road, Beaconsfield, Bucks.

5-7 May
BRISTOL AND WEST WOODBURY WEEK-END
Venue: Woodbury Common, Nr. Exmouth, Devon.

5 May
Champagne fly-offs for OR, OG, combined OP/SOP, Vintage Rubber. 5-8pm.

6 May
Open Rubber, Combined Open Power/Slow Open Power, Open Glider, Vintage to SMAE rules.

7 May
Combined FA15 rounds - Ray Inker Memorial Trophy plus prizes for to fly in each class. Vintage to SE rules. 8am-3.30pm. Caravan accommodation at special rates. Sunday evening supper. Contest details and accommodation booking forms from: Elton Drew, 2 Downfield Close, Alveston, Bristol, BS12 2JN.

6 May
CONTROL LINE SCALE MEETING
Venue: RAF Hullavington. Contact: Martin Fardell. Tel: 0454 412486.

6th May
FIRST RAYNES PARK MAC VERON CARDINAL MEETING
Venue: Epsom Downs. All Veron Cardinals eligible. 1cc max power. Ratio competition. Club transfer must be displayed. Best of 3 meetings to count. Contact: Alan Jupp. Tel: 01 669 9497.

13th May
MORELY 7 DMAC VINTAGE CABIN DURATION AND OPEN CABIN DURATION EVENT
Venue: RAF Barkston Heath. Contact: E Whitehouse. Tel: 0226 726335.

13th May
SMAE F/F SCALE MEETING
Venue: RAF Barkston Heath. CO/Electric, Rubber and Power. Additional Jelix Scale comp. Contact: Charlie Newman. Tel: 086 77 3020.

13th May
BLACKPOOL AND FLYER RCMS NORTH WESTERN HELICOPTER FLY FOR FUN
Venue: The Blackpool 200 Flying site, 5 minutes from M55. Classes: Beginners Hovering, Drag Racing, Auto Sport Landing, Bottle Knocking, Scale etc. Refreshments, Model Shop, Entry Fee £3.00. BMFA insurance required (insurance available on day £2.50). Contact: John Prothero Tel: 0253 855928 (Evening).

19th May OXFORD MFC 21ST ANNIVERSARY SHOW
Venue: Exeter Hall, Kidlington, Nr Oxford. All model aircraft types, RTP flying, adults £1.00. Children OPAs 50p. Contact: C Newman. Tel: 086 77 3020. Raffle: One-hour flight in hot air balloon! On-board champagne.

20th May
SECOND RAYNES PARK MAC VERON CARDINAL F/F MEETING
Venue: Chobham Common. All Veron Cardinals eligible. 1xx max power. Ratio competition. Club transfer must be displayed. Best of 3 meetings to count. Contact: Alan Jupp. Tel: 01 669 9497.

20th May
WHARFEDALE & DMAC OPEN AEROBATICS EVENT
Venue: Dewsbury F2B and Class 2. Contact: Jeff Smith. Tel: 0532 664432.

20th May
ASP LARGE MODELS FLY-IN
Bring and fly the biggest and the best! No free flight models at this event; CAA rules demand that we use all the field for the R/C craft. Contact: RCM&E. Tel: 0442 66551.

20th May
THREE KINGS C/L SCALE FLY IN
Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. Stand Off and Profile Scale classes. Silencers and proof of insurance essential. Contact: Wal Cordwell. Tel: 081 764 1661.

26-28th May
BMFA FREE FLIGHT NATIONALS
Venue: RAF Barkston Heath. Top competition at this central airfield; three full days of activity for Mini, Open and FAI. More details to follow. Contact: BMFA.

26/27/28 May
WEST MALLING 1990 INTERNATIONAL AIRSHOW FOR RADIO CONTROLLED MODEL AIRCRAFT
Venue: West Malling Airfield, Kent. 10.00am-6.00pm each day. Admission charges £3.50 Adults, £2.00 Children/OAP's advance tickets £3.00 & £1.50. All in camping passes (including barbecue) £8.00 Adults, £4.50 children/OAP's. Contact: WMMAS, 58 Salisbury Road, Tonbridge, Kent, TN10 4PE. Tel: 0732 350691.

3rd June
NORTH LONDON RADIO CONTROL MFC SCALE DAY
No venue given. Prizes. Entry £1.00 on the day. Proof of insurance needed. Contact: Richard Barley, 44 Orchard Avenue, Berkhamsted, Herts. HP4 3LG.

3rd June
BLACKPOOL & FYLDE RCMS SCALE DAY
All welcome. Venue: Not supplied, but contact: A Dawson. Tel: 0253 506513.

10th June
THREE KINGS C/L SPORT AND VINTAGE DAY
Venue: Old Croydon Aerodrome, Purley Way, Croydon, Surrey. Vintage Stunt, Midge Speed, Vintage 'A' T/R, Concours, Weatherman. Silencers and proof of insurance essential.

tial. Contact: Wal Cordwell. Tel: 081 764 1661.

10th June
WHARFEDALE & DMAC 1/2A COMBAT EVENT
Venue: Dewsbury. Contact: Jeff Smith.

17th June
CHILTERN CUP EVENT CL
Venue: Slip End, Luton. Open Stunt, Vintage Stunt, Novice Stunt. Contact: Glen Alison. Tel: 0923 772675.

16/17 June
THE OXFORD MFC FREE FLIGHT RALLY
Venue: Port Meadow, Wolvercots, Oxford. Saturday from 7.00pm progressive champagne fly-offs for A1 & CDH also HLG Comp, Sunday from 10.00am A1, CDH both in 5 rounds. HLG, Vintage HLG, Tail-less, Canards Combined, Vintage Rubber (34in Max span) Vintage Glider (A2 or 72in max span). No thermistors, Bubble Machines, Streamers on poles, or power models to be flown. Contact: Andrew J. Crisp, 30 Portland Road, Summertown, Oxford, OX2 7EY, tel: 0866 53800.

23-24th June
ASP SCALE WEEKEND
Venue: Old Warden Airfield. The world's best fun-fly scale meeting for R/C, C/L and F/F! Don't miss it! But Scale Models only, please. Contact: Aeromodeller, Tel: 0442 66551.

24th June
THIRD RAYNES PARK MAC VERON CARDINAL F/F MEETING
Venue: Chobham Common. All Veron Cardinals eligible. 1cc max power. Ratio Competition. Club transfer must be displayed. Best of 3 meetings to count. Contact: Alan Jupp. Tel: 01 669 9497.

1st July
FOURTH RAYNES PARK MAC VERON CARDINAL F/F MEETING
Venue: Epsom Downs. All Veron Cardinals eligible. 100 max power. Ratio competition. Club transfer must be displayed. Best of 3 meetings to count. Contact: Alan Jupp. Tel: 01 669 9497.

1st July
FM&E F/F SCALE MEETING
Venue: RAF Abingdon. CO/Electric, Rubber, Power. Contact: Charlie Newman. Tel: 086 77 3020.

1st July
WHARFEDALE 7 DMAC CLASS A DIESEL COMBAT EVENT
Venue: Dewsbury. Contact: Jeff Smith.

1st July
CONTROL LINE SCALE MEETING
Venue: RAF Abingdon. Contact: Martin Fardell. Tel: 0454 412486.

8th July
NORTH LONDON RADIO CONTROL MFC VINTAGE DAY
No venue given. Vintage character models. No F/F. Proof of insurance needed. Contact: Richard Barley, 44 Orchard Avenue, Berkhamsted, Herts. HP4 3LG.

15th July
ROLLS ROYCE MAC VINTAGE C/L MEETING
Venue: RR Airfield, Hucknall, vintage T/R A and B, Old Tyne stunt, Vintage Speed, Fun Flying over grass and tarmac. Contact: Terry McDonald. Tel: 0332 511273.

15th July
ASP GOLDEN ERA, MODEL FUN FLY
Venue: Old Warden Airfield. Plenty of room for craft from those glorious twenties, thirties and forties. Scale and Vintage equally welcome! Contact: Aeromodeller. Tel: 0442 66551.

15th July
MORLEY INTERNATIONAL SILENT DAY FF
Venue: Heath Common, near Wakefield.

Classes: P-30, Mint-vintage (up to Wakefield size), CDH, Dart Power, Maybe Chuckie. Contact: E Whitehouse, SAE to 29 Church Street, Royston, Berneley, S. Yorks, S71 4QU. Tel: 0226 726335.

15th July
KNAVESMIRE FREE-FLYERS ANCIENT AND MODERN SILENT MINI EVENT
Venue: York Racecourse. 10.00am start. Classes: A/1, CDH, CO Duration, Mini-Vintage Rubber, Mini-Vintage Glider, HLG, Handicap Flying Scale, Mini tail-less, P-30, Achilles kit Contest, Best Junior, Possibly more. Contact: John Pool, 8, Sycamore Road, Barby, Selby, North Yorkshire, YO8 7XB. Tel: 0757 703060.

22nd July
BRISTOL 7 WEST MAC DEVON RALLY
Venue: Woodbury Common, Nr Exmouth. O/R, O/P and SOP combined. O/G, All-in FAI 5 rounds 9am start. Contact: Alan Parker. Tel: 0404 B22681.

22nd July
BRUMFLY 90
Venue: RAF North Luffenham. 10am start. Competitions will be flown in rounds from a line. Classes: Open Power, Open Glider, Open Rubber, 1/2A, CDH, A/1. Send SAE, and submit name, telephone number, BMFA number and car registration before 15 July to Stafford Screen, 66 Stevens Close, Wollescote, Stourbridge, West Midlands. Tel: 0304 396535. Identification will be needed on the day.

29 July
NEWBURY & DMAS ANNUAL VINTAGE DAY
Venue: Newbury Racecourse, Newbury, Berks. Control line and R/C Vintage ONLY. A full day's flying in a relaxed atmosphere. All welcome! Proof of insurance essential. Contact: Mark Bees. Tel: 0635 46426.

18-19th August
ASP VINTAGE WEEKEND
Venue: Old Warden Airfield. The annual pilgrimage! Meet friend and new - see and fly those super designs from yesteryear! Collectors corner is a new feature for 1990. Model flying at its informal best! Contact: Aeromodeller. Tel: 0442 66551.

25-27th August
BMFA R/C, C/L AND SCALE NATIONALS
Venue: RAF Barkston Heath. Three days of top competition. 1989 had more entries than the previous year - '90 promises to beat that! Come and add to the control-line revival - and watch top Scale and R/C in action. Contact: BMFA. Tel: 0533 440028.

9th September
NORTH LONDON RADIO CONTROL MFC ELECTRIC FLY IN
No venue given. Electric models only. No F/F. Proof of insurance needed. Contact: Richard Barley, 44 Orchard Avenue, Berkhamsted, Herts. HP4 3LG.

15-16th September
ASP FOUR STROKE WEEKEND
Venue: Old Warden Airfield. Informal action for four-stroke enthusiasts! Great fun for all! Contact: Aeromodeller. Tel: 0442 66551.

16 September
SMAE F/F SCALE MEETING
Venue: RAF Hullavington. CO/Electric, Rubber and Power. Contact: Charlie Newman. Tel: 086 77 3020.

16 September
CONTROL LINE SCALE MEETING
Venue: RAF Hullavington. Contact: Martin Fardell. Tel: 0454 412486.

23rd September
DOUG BLAKE TROPHY EVENT CL
Venue: Slip End, Luton. F2A Stunt. Contact: Glen Alison. Tel: 0923 772675.



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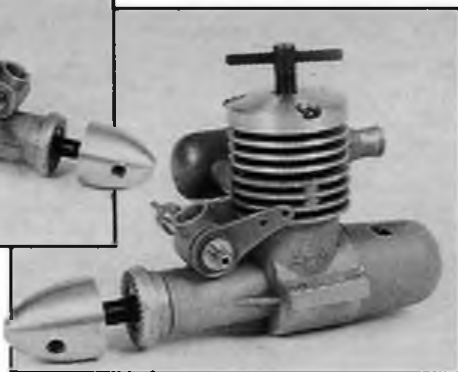
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Appendix - Links to the plans

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

Super Skylark by Jack Hearn

Vintage Control Line. Presented in "Mind the Lines" with credits to Australian Model Hobbies.

https://outerzone.co.uk/plan_details.asp?ID=3330 ...

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Firecracker Class B CL Team Racer by Dick Ealy

Presented in "Mind the Lines". More information overleaf. (See Undiscovered paragraph).

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PIPISTRELLE GTI by Andrew Longhurst

FF Rubber Tailless

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CFC GULL by Ian Edlin

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[Document Page: 30](#)

F2A Speed Model by Andrej Rachwal

Presented in "From the Handle": the sketch of a Control Line F2A Speed

[Document Page: 37](#)

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