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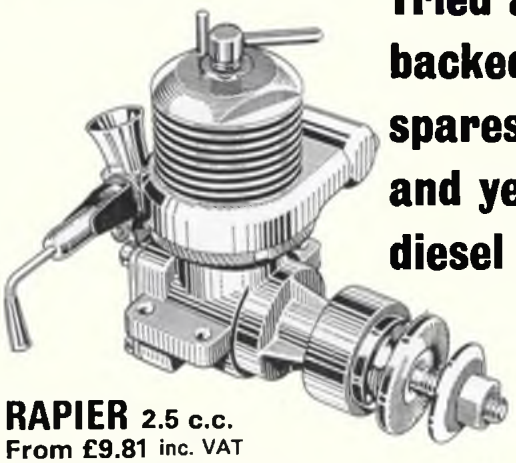

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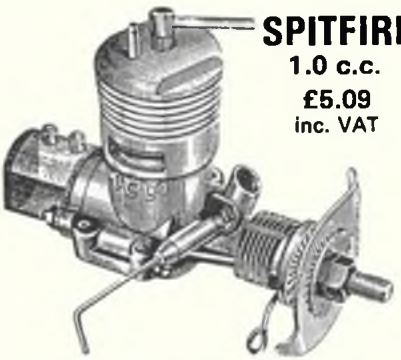

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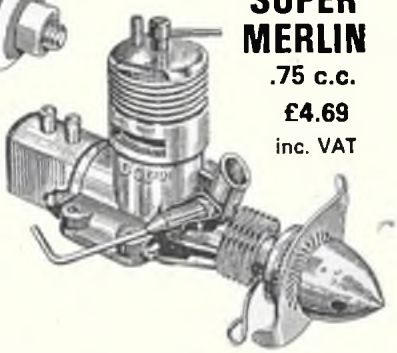

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Todays Wakefields may use GRP, carbon fibre RP, aluminium tube – plus balsa, of course. A considerable advance in technology, with as much care as ever put into the airframe construction – although they all tend to end up looking very much the same. Simply because the design formula has been developed to about the limit, under restricted rubber rules. And saving that little extra weight is not all that critical. Otherwise airframes would still be all-balsa.

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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

April 1975 Volume XL No. 471

CONTENTS

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Comment

The first ever all-day Symposium on Man Powered Flight which was organised by the Royal Aeronautical Society on 10th February was an event which must surely be repeated regularly in future. Eight impressive lecturettes, coupled with film and slide projection ranged in subject matter from the historical to the projected future aspects of the continuously challenging targets of man powered flight. In the large audience we noted many prominent aeromodellers, and this is not surprising for the flight envelope of the MP aircraft is so similar to that of a free flight model. And of the several successful pilots present, who had actually flown themselves under their own power, most were, and still are, practising aeromodellers.

It was the last of the lectures which created most interest, if the subsequent Q and A session is to be a yardstick, and this concerned flapping wing flight – or ornithopters. Film and statistics shown by D. V. Curry of Bristol Polytechnic illustrated how methodical approaches are being made towards simulated bird flight. Erudite comments from others engaged in serious research confirmed that the ornithopter is far from being a joke. It is known that Radio Controlled models up to 96in. span have been flown for some time in the USA. Why not here? Just as the generous prize offered by Henry Kremer for completion of the famous figure-of-eight course has captured the attention of Man Powered enthusiasts – why shouldn't the offer of £200 for a successful ornithopter model be received with similar enthusiasm? The donor now offers £4 per metre to induce interest. Come on flappers! Like the once elusive helicopter model, the R/C ornithopter is an inspiring challenge which cries out for serious attention in Britain.

on the cover

Just where do you get conditions like these around the end of December? And that scenery – it's not the foothills of the Cotswolds either you know! In fact the answer is New Zealand – Omaka, South Island to be precise, where A. Fagg prepares to launch the control-line Vought-Sikorsky 'Kingfisher' in the Nationals Scale event. Photograph by David Hope Cross.

next month

Is British best when it comes to combat? Perhaps not . . . take a look at Richard Lopez's *Firefly* design, a true American FAI combat ship that could turn a few heads! Our popular 'Back to Square One' series returns to help beginners on their way, while more experienced modellers will appreciate Ron Pollard's feature on the intricacies of a modern Wakefield. With regular features on control line and free flight matters, Kit Review and other favourites, there is something for everyone in the May issue – on sale 18th April.

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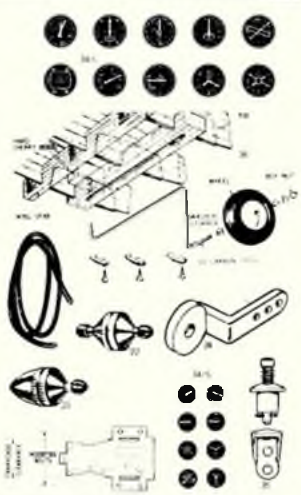

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J.R. MORGAN *(left)*

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J.R. LONG JOHN SILVER

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J.R. SIMPLE SIMON *(right)*

Perfect as an introduction to aeromodelling, this simple 18in. span chuck glider has all parts pre-shaped to aid its rapid assembly – even the glasspaper is supplied. A tube of glue and a few minutes' work will result in a model that flies – for just 55p.

J.R. EL BANDITO *(below)*

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J.R. PIRATE *(above)*

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J.R. BUCCANEER *(above)*

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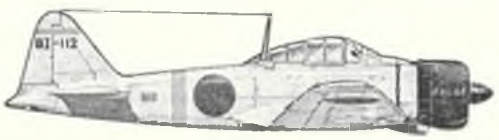

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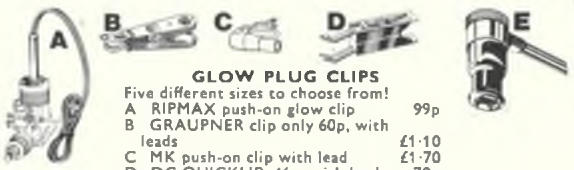

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Heard at the

HANGAR DOORS

The year, 1938. The donor, Luton and DMAS competition secretary Edgar Clark, the recipient Rex Brown treasurer of the same club, and a position which he has only just vacated!

COMBAT INTERNATIONALS. Two more events have just been announced for control-line combat enthusiasts. The first is to be held on 5-6th April at Munich, West Germany, and will be run strictly to the current FAI rules. Participants must hold an FAI licence. Pre-entry should be made immediately to Johann Dubell at 8 Munchen 50, Karlingerstrasse 43, Germany – entry fees being 10DM (juniors 5DM). Prizes will be given to the first three places, while the entry fee includes a free meal and beer (!) on the Saturday evening. Overnight accommodation is available at the clubroom, but bring your own sleeping bag!

The second event, named "*Le Grand Prix International de la Ville Namur*", will be held on 7-8th June at Namur, Belgium. Host club is *Le Condor* of that town, who will be providing three medals and cash prizes totalling 15 000 Belgian francs – first prize being 5000FB (£55). Entrance fee is 50FB, and free accommodation will be provided to those who give at least one month's notice. Further details are available from W. Gossiaux, 10 Rue de la Colline, 5000 Namur, Belgique.

HELP, PLEASE! British exile and internationally known scale enthusiast Dave Platt, currently living in the US where he is marketing a range of R/C scale kits, sent us this plea for help: '*During WW2, as a young beginner in modelling, I often borrowed a certain book from the library. It was one of a great number in a "How to Draw . . ." series. This particular one was called "How to Draw Aircraft" and was authored by the greatest aviation artist ever, Frank Wooton. I want to get a copy of this book so bad I can taste it. If any of your readers has one, I'd be happy to trade him any one of our R/C scale kits (Spitfire, T-28B or the new FW 190-D-9) for this book*'.

We will be glad to forward any letter, so please search through your bookshelves.

GOING TO THE WORLD CHAMPS? Those interested in travelling to Plovdiv, Bulgaria, for the Free Flight Championships – now to be held over 15-20th August, 1975 – will be glad to know that Paul Masterman is attempting to arrange a 'package tour' at greatly reduced prices. Details and costs cannot be finalised until the size of the party is known, but at present brief details are: cost of accommodation/food, etc., for contest period, £30 approximately; transportation via air and hire car/mini bus, approximately £70. In addition, there will be three nights' additional accommodation to be paid for, as it is intended to depart from Heathrow on Wednesday, 13th August, and return on Thursday, 21st August. Those who prefer to stay longer in Bulgaria will be able to do so; but if the return groups are less than ten individuals, there may be a small surcharge on their fare. In the meantime, contact Paul at 92 Marylebone High Street, London W1M 3DE – telephone number 01-486 1593.

CLEVELAND FREE FLIGHT SOCIETY is sponsoring a postal event for 'small-field models', to be held on any day one chooses during May and June 1975. The event is open to any and everyone – just fly, then make out your own entry form. Classes to be flown are:

Hand-launched Glider – six flights, 60 seconds max. If you score three maxs, continue to fly to a 60-second max until you miss.

Jetex, 80-gramme Coupe d'Hiver, Embryo Endurance, ¼A Gas, and *A/1 Glider* will be flown to a 120-second max. plus a single unlimited fly-off flight. ¼A Gas is restricted to an 8-second engine run.

Entries must be received by 31st July, and these should be forwarded to Gordon Roberts of 3710 Strandhill, Shaker Heights, Ohio 44122, USA – the same person can also supply detailed information on the contests.

AFTER THE SUDDEN DEATH of Ralph Gould, many of his friends wish to see his memory perpetuated in the form of a trophy. Ken Morrissey of 95 Crantock Drive, Heald Green, Cheadle, Cheshire, has offered to receive donations towards the trophy to be presented for the outstanding 40 or 60 Speed Flight at the Nationals which will be given to the SMAE for presentation.

THE LUTON & DISTRICT MAS has recently achieved what must be an almost unique record for long servitude by two of its officials. At the recent Annual General Meeting of that Society, Rex Brown retired from the post of Hon. Treasurer, having held that title for some 41 years! At the same time, Edgar Clark also retired from the position of Hon. Secretary, the office he first occupied a mere 30 years previously, although it should be added that he was previously Competition Secretary! Rex, in fact, was a founder member of the club, which prior to 1935 was known as the South Beds. Model Aeroplane Club, and this was when he first volunteered for the position of Treasurer! Edgar not only served his club well for all those years, he was also Chairman of the South Midland Area of the SMAE for 30 years and indeed, when we were recently thumbing through the minutes of the SM Area, whose name should we see written on the list of those attending the inaugural meeting of the Area than a certain E. C. W. Clark! Congratulations to you both – the sport needs more workers like you two!

There! It was worth all that trouble, wasn't it? Despite long experience in flying duration-type free-flight models, our author ran into several 'snags' when he attempted his first scale model . . . nonetheless, these were all overcome, and the result is a most pleasing model to fly. Trevor's description of himself as 'the bald bloke with beard' perhaps indicates that he is really trying to improve his scale modelling by having a 'Doug McHard cut'!

TREVOR FAULKNER reports on an exercise in scale modelling, which resulted in his rubber powered

S-4 KANIA 3

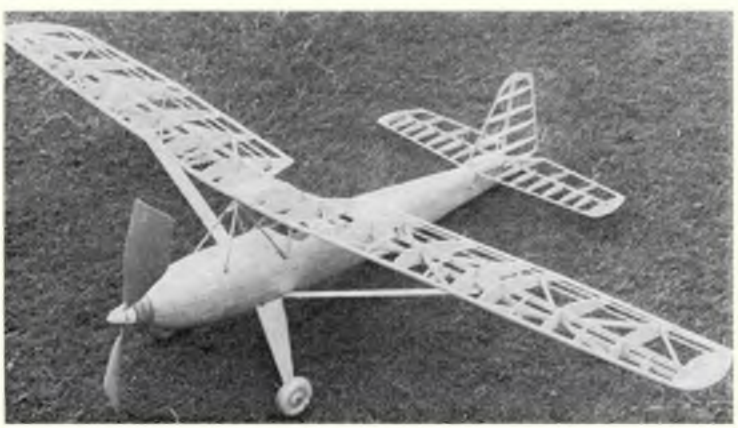
A LONG TIME AGO, the writer in the guise of a very small boy was taken to see a local Hobbies Exhibition. He remembers the first-prize winning model, a beautiful high-wing monoplane in dazzling white, made by a chap who did a bit of decorating 'on the side'. This was the introduction to our hobby for another addict, who attempted the realization of dreams through a succession of entirely unsuitable designs: small, scale, difficult to build and – for the writer – impossible to fly (we never reached the 'trimming' stages, as each maiden flight was coincident with a test to destruction).

Having since 1971 read Eric Coates' column, and managed to grasp a few rudiments of the art, the question of making a flying replica *really* work began to niggle away at my self-esteem. As I usually reckon that it's been a rough session if we have to replace a wing-band on the 13-footer, it did appear that the thrills of youth had vanished into the mists of time, so what could be more appropriate than a spot of self-mortification (sorry, rubber-powered free-flight scale)?

Well, I started chicken, looking for high-wing, swept-back prototypes with reasonable tail areas and moment arms. The Polish Kania didn't seem to have caught anyone's eye, and so the *AeroModeller* scale drawing No. 2927, price 27p, was purchased.

After a bit of debate between ambition and common sense, it was decided that:

1. The scale would be a multiple of the $\frac{1}{18}$th scale drawing.
2. A reasonably tough construction would be used.
3. Motor run would have a fair amount of 'punch' to avoid the prolonged glide type of flight to which Mr. Coates refers.
4. A step-up gear would be used to carry the rubber without tensioning turns, and allow a smaller blade prop. to be fitted.
5. Wings to be detachable.
6. Undercarriage to be sprung.
7. Model would be made to fly (if at all possible) before detail finishing.
8. Tailplane and rudder would be variable for trim, then secured.
9. The entire project was aimed at the production of a FLYING MODEL.

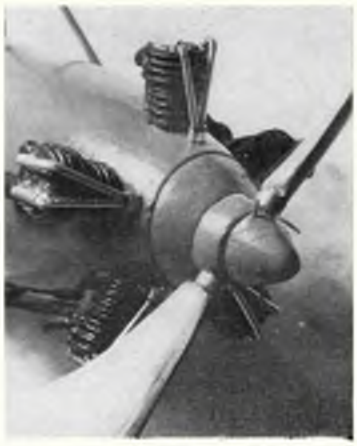


Model in 'naked' form reveals straightforward yet warp-resistant wing construction plus 'beefy' all-planked balsa fuselage – well able to withstand a broken motor. Model uses no 'exotic' materials, and was designed with flying ability as the foremost objective.

10. The model would not use exotic materials (i.e. Jap. tissue, $\frac{1}{16}$in. square rubber or expensive bought-in parts), nor would finishes other than those applied by brush be used.

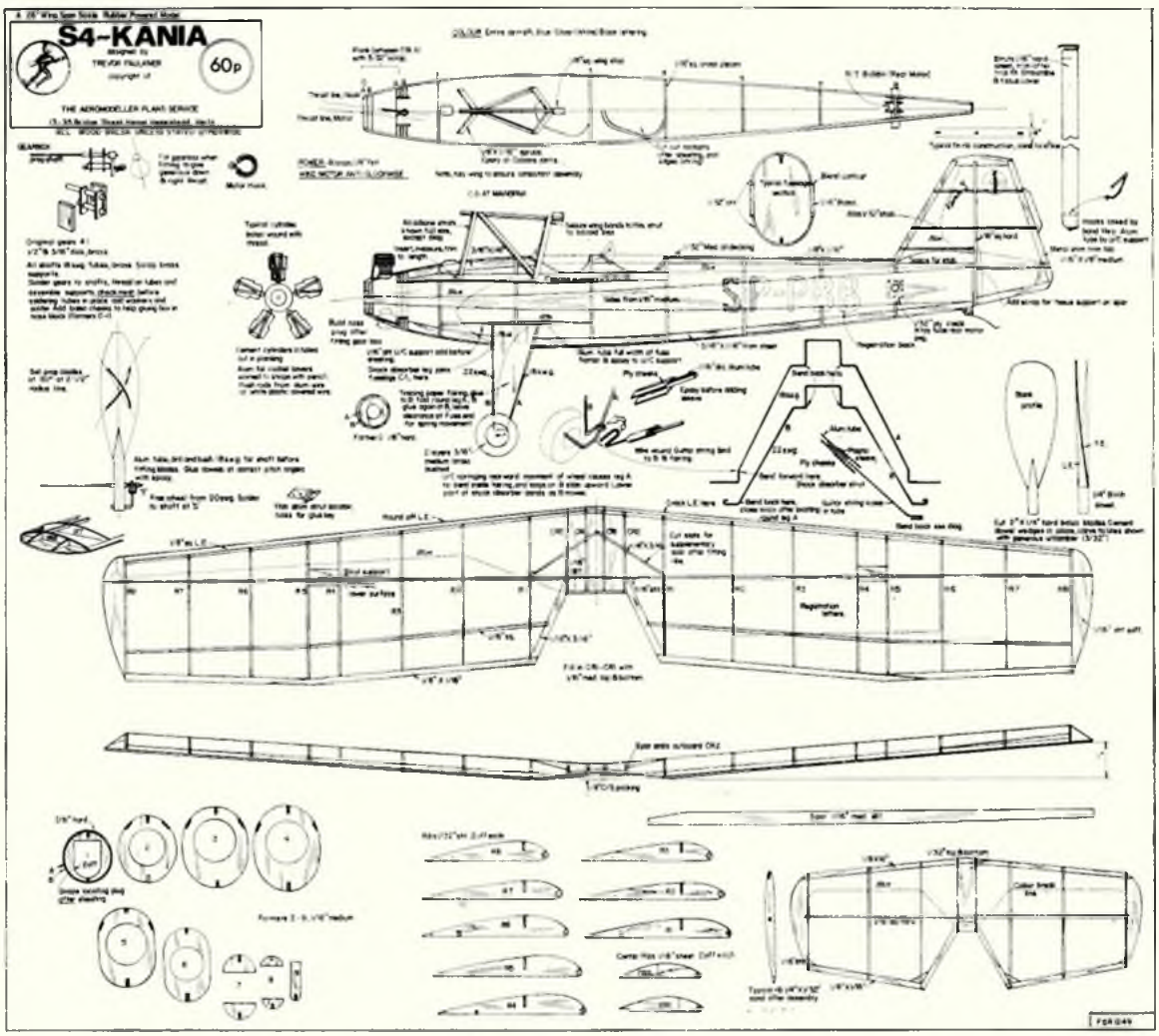
Eventually, the drawing was redrawn twice full size, giving a span of just over 2ft. Consideration of the fuselage sections showed a close approximation to circular sections, or semi-circular linked by straight parallel sides. The draughting of the fuselage was in fact very easy, as the width in plan of the *AeroModeller* drawing became the finished profile section *radius* (×2, remember) at the corresponding point.

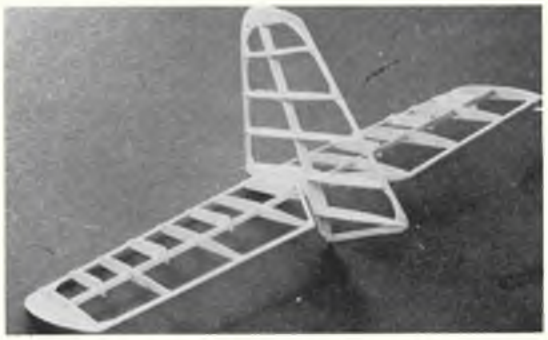
Bulkheads were drawn directly onto balsa by measurement, allowing for $\frac{1}{16}$in. sheeting all round. Stringer slots were filed for accuracy on the top and bottom, and the rubber clearance spaces were cut and sanded by eye. The gearbox dictated that the nose-block should be rather more than the bushed-button type, and the radial engine is, in fact, the nose block.



Dummy engine is quite easily made from balsa cylinders with thread representing the fins, plus scrap balsa valve-gear. Prop. is of the free-wheel variety.

FULL-SIZE COPIES OF THIS 1/5th SCALE REPRODUCTION ARE AVAILABLE AS PLAN No. FSR 1249, PRICE 60p (INCLUSIVE OF POSTAGE AND VAT). FROM AEROMODELLER PLANS SERVICE, PO BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE.





As is the case with all F/F models, keep the tailplane light! Tail and fin are constructed with rectangular-sectioned ribs, which are subsequently sanded to section.

As to the gearbox, a pair of old clock gears was found to give a 4 : 1 ratio, although plastic gears were considered. A clockwork toy would probably yield a suitable pair, and provided the smaller gear is about $\frac{1}{8}$in. thick and a good tooth profile match is made, the larger pinion may be quite thin. Gears may have to be removed from their shafts, and as most are press fits the job can be done by supporting the gear on a partially open vice, and gently tapping the shaft. The resulting hole is then bushed to size with sections of brass tubes, soldered in place.

The propeller was designed to be replaced easily for development work. Two simple laminated props. were first made, only the larger being used, this in turn being modified quite atrociously before being replaced by a slicker-looking job!

It can be stated that the prop. and gearbox are the only parts to be made with any amount of painstaking work; the rest of the model was put together rapidly, and could be bettered by a very average modeller with no trouble.

Construction

Gearbox: Ensure bearing tubes are parallel and that pinions mesh easily before soldering or gluing solid. Dope any wood in vicinity of the box to avoid oil-seepage.

Propeller: Carve two blades from hard quarter grain, insert hardwood dowels into roots, glue with epoxy. Drill alloy tube to take prop. bearing tube, gluing blades in position.

Fuselage: Cut sides from medium balsa, formers from similar stock. Mark formers with position of sides, and sides with position of formers. Assemble sides and formers, then when dry, fit top and bottom stringers – everything must be square. Make paper patterns of rear sheeting, upper and lower, aft of the cockpits. Cut wood slightly oversize from soft stock, damp it and curve to shape over the formers, holding it in place with tape or bandage until dry; then glue the sheets in place. Complete the remaining sheeting jobs in the same way. The basic shell formed, mark out positions for cabane struts, wing strut and landing gear pick-up points, adding reinforcement where required by cutting through the shell and inserting the members shown. The nose-block is planked with $\frac{3}{32}$in. hard, tack-cemented to the front former and sanded to shape.

Give the fuselage a coat of 70/30 dope/thinners, sand smooth, then cover with sections of white lightweight Modelspan tissue, laying the paper on wet and doping with a 50/50 mix immediately. When dry, sand lightly and cover areas to be blue with suitable pieces of Modelspan in the same way (wet doped). Cut out cockpits when dry, adding string padding for finish. A coat of very thin dope removes 'blush' when all is dry.

Wing: Entirely conventional, but note that the spar depth tapers to tip, and does not sweep back. Original was covered in damp tissue which, when dry, was doped, and the blue trim added as for the fuselage.

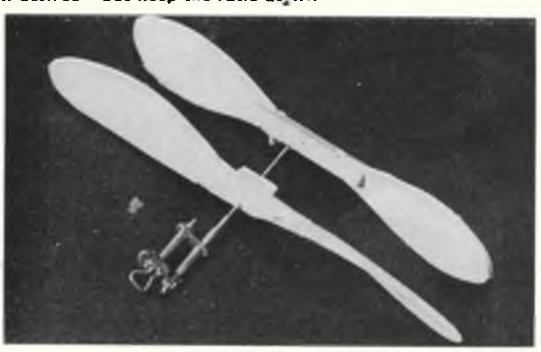
Tailplane and Rudder/Fin: Rectangular ribs are pierced for central spars, slotted for L.E. and T.E., assembled and sanded to profile when dry. Cover (white tissue), dope, then decorate as for wing.

Landing Gear: Both main struts have a central loop which helps in holding them at the correct angle to the fuselage. The bend at the point of emergence from the fuselage side is made fully in one leg only; the other is just kinked to assist bending when the wire is passed through. The loop at the lower section of the front strut allows good backward movement, also compensating for slight inaccuracies in bending! Manipulate the rear struts into these loops before gluing legs in place. The oleo legs use wire-wound guitar strings, cable insulation, alloy tube and 0·8mm ply packing.

The wheels are from two cross-grained balsa discs, glued together, with a 2in. section of brass tube epoxied in place as a hub. A matching piece of wire passed into the tube allows it to be gripped firmly in the chuck of an electric drill without kinking. Drill is vice-held, and the 'turning' done with sandpaper scraps folded around suitable supports. The tube is useful during painting processes, and is trimmed to length when wheels are completed, forming the bush specified.

The propeller has been designed for easy replacement – both in case of damage as well as for development work. Blades are carved from sheet. Wheels were turned down using an electric drill and glasspaper, while prop-gearing is from old brass clock gears.

Er, no . . . it is not a four-bladed prop. – just a couple of earlier props. that Trevor tried, and discarded in favour of that shown on the plan. Gearbox is really very simple – it just needs a little patience with the soldering iron. Nylon gears can be substituted if desired – but keep the ratio at 4:1.



Away she goes! The little Kania does what she likes best . . . flying. This is an ideal prototype for a 'first' scale model – nice high wing layout with ample tail surfaces makes for a stable machine.

Flying

This began with the dreaded 'extended glides' until I realised that the 4 : 1 gearing really would get used only if I forgot straight-drive thinking. I also lost count of turns – silly, isn't it – and broke all strands at once (Dunlop has this habit) which removed a few formers.

Regrouping the rubber into six loops of ¼in. flat (instead of the previous four) seemed better, with a little more height, but still descent was powered, and half-turns remained . . . and then the real goof. The anti-clockwise winding direction loosened the hook in the drill chuck, and on three-quarters turns (stretch wound) this vicious lump of steel really had fun going half-way down the fuselage! This was the point where I felt it was time to quit, but fortunately persevered. Repairs were quick and rough, confined entirely to the sheeted shell, and the following very windy day I was able to work towards a better pattern.

By now, it was obvious that launching was much more critical than on a higher-powered job; a straight launch often led to a couple of power stalls with a cruise at about 10ft., whereas a banked launch (to the right) kept the nose down to avoid this, and let the spiral climb 'come in' after the first circle.

The pattern I chose to fly was the conventional right/right normally used by rubber fliers – this was not because the model could not be trimmed for a left-hand circle but in response to my built-in assumption that right/right is best for rubber (the nose block had been skewed from the outset 'down and right').

The pattern was not satisfactory, though, and 18-second flights were nowhere near passable, so the prop. was lengthened by splicing in tip sections to the T.E. The next session was infinitely better with eight loops to cope with the bigger prop., the model turned in steady 23–25 second flights without really trying on 60 per cent power, and getting to about 25ft.

Even a take-off from a pebbled tarmac surface was 100 per cent successful, and so it was decided to carve the prop. shown, reducing hub depth by half and trying to get the prop/power combination correct. The dihedral was increased ¼in. to improve on the launching problem.

At the same time, a little more detail was added, the radial engine being mocked up, the undercarriage struts faired in with tracing paper, windscreens fitted and a spot of blue enamel added to 'beef-up' the rather washed-out tissue trim on the fuselage. Registration letters were applied (not quite authentic, but I was plumb out of 'P's' and 'B's'!).

The cylinder heads were modded to have alloy rocker-box covers formed with a soft pencil point, worked inside a cream carton foil cap to stretch the foil to shape. The fuel tank cover was made in the same way (a version of the 'repoussé' technique, really). Exhausts and silencers were omitted, as it was felt that the effects of the new prop. and radial engine would be enough to assess in the next series of flights. The temptation to go on adding detail to a model once it begins to shape up must be quite addictive, and only a firm resolve to honour intentions No. 9 prevented the Christmas tree look.

The next series of flights began to repay the effort and thought expended. By this time, I was getting used to the steep glide with the prop. freewheeling . . . very different from the Open Rubber or Wakefield glides one begins to regard as a norm. Careful adjustments of thrust-line settings (never mentioned in the articles I'd read as a boy!) produced a reliable right-hand circle; launch technique became easier as the angle of bank to get 'into' the turn could be forgotten. A slight enlargement of the tail areas improved longitudinal control, and the rudder trim tab was adjusted to give just enough right turn at the stage in the power when the right thrust was becoming less effective. (Previously, the model had a fitful transition; if a stall began, it would sometimes lurch into a left-hand spiral down to ground level; never vicious enough to cause damage, as I flew over long rough grass for all trimming flights.)

The tailplane angle having been set, it was then cemented in position; the thrust-settings were ply-faced for permanence, and some solid flying was put in. This text, in fact, is being completed on the cessation of a splendid afternoon's flying. Having gone out basically for some slope-soaring, I thought it might be good insurance to take the *Kania* along. Hardly a breath of wind, a brilliant sky, and lots of tame R/C types all waiting to be taught to hold a rubber model for stretch-winding! A whole succession of 35–40 second flights, a demonstration take-off from the highway, and that smug feeling we all have when our model's airborne, and the 'opposition's' grounded . . . believe me, *that's* real therapy: and we'd laid the old spectre of the small non-flying scale model at last!

I hope this account may encourage some readers to try this most intriguing sport of designing and flying – you don't need much more than an *AeroModeller* scale drawing as a start. The scope for experiment remains; for instance, I cannot believe the prop/power combination is the ultimate, nor that it would be impossible to fly with exact scale surfaces on calm days. Nor has the idea of a feathering free-wheeler been abandoned . . . nor the possible use of the Go.532 wing section! The robust aspects of the model (happily flying with only 30 per cent formers remaining) encourage me to experiment, and the quick-building features of small models makes this a possibility in terms of time.

Top: A view of the R/C pit area, showing J. Pavitt's 'Spitfire' plus the eventual winner of the Class I event, P. Scowan's 'Corsair'. Below this is seen G. Glover's second-placed (Class II R/C) 'Chipmunk', B. Borland's 'Turbulent' (second in Class I) and M. Paton's Class I 'SE5a'.

SCALE at the NEW ZEALAND NATIONALS

David Hope-Cross reports from Omaka, South Island

THE 27th NZMAA National Championships will go down in New Zealand modelling history not only for the temperature (no day was below 30°C) but for the impact that Scale made on the whole championships. For the first time, all scale events were run entirely by the *Scale Modellers Association* with the blessing and co-operation of the Executive Council of the NZMAA. The *Scale Modellers Association* is a group (80 members) of dedicated modellers who have been active over the past three years, promoting scale events, reorganising rules and getting scale modelling accepted.

Another 'first' for the Nats was that Class 2 events were held simultaneously with the Class 1 events: this together with the pre-contest publicity resulted in the highest ever number of scale entries – 60 in all classes. Classes 1 and 2 were flown together, each entrant having nominated his class beforehand: this kept the judges on their toes, but it worked well and the pattern will be repeated next year.

Entries included three Schneider Trophy models, and these were flown off water at the nearby pool of the Marlborough Association Modellers. At the close of the event, the judges took to the water to try their hand at flying a C/L Schneider Trophy racer – after many attempts each judge learnt the knack and logged a flight with this exciting class of model.

Free flight was held as a morning event so that more time would be available. The standard of flying was high and few models failed to qualify – some contestants were quick to qualify first with a hand launch and then return later in the day to better their score by attempting a take off. Noteworthy was the twin of Dr Rees Jones – a *Curtiss Condor* which had a very spritely performance indeed. Rees apparently likes challenges since he flew in control line Class 2 with a push-pull Maachi twin! An analysis of the F/F results shows that Class 1 was won by the models with the top static marks and which were also flown well. In Class 2 the event was decided on flying points which says a lot for the rules.

Control line events were both flown in turbulent conditions and this had an effect on the flight scores. However the stars of the control line were the Schneider Trophy racers of Bill Morgan who is the father of this type of model in New Zealand, and Rees Jones. The performance of both models was spectacular – there are few modelling thrills to compare with flying off water. Class 2 control line scale provided the most variety with seaplanes, top-dressers, ultra lights, WW!I fighters and racers.

The high standard of flying in R/C Class 1 by the Wellington

continued on next page

Our reporter, David Hope Cross, placed second in the Class I free-flight event with this nicely detailed DH83. De Havilland aircraft are popular subjects for free-flight scale the world over!

Dr Rees Jones flew this unusual choice of prototype – a push-pull 'Maachi Schneider Trophy racer' in the C/L Class II event. Spectacular model when flown over water.

Readers' Letters . . . . . .

Dear Sir,

With regards to the controversy concerning standards in team racing, basically, I feel the problem lies not with the competitors, but with the organisation. If you take an ideal situation (i.e. a World Championship under strict but fair supervision) you are allowed to break the rules twice – *legally*. Most people would agree that *all* pilots indulge in a bit of 'arm', and most pilots expect to be caught out. But when one can whip for 100 laps – as I admit I've done – and not get even one warning, well, who is to blame?

I think that this state of affairs extends deeper. We in this country have never really been 'competitive' – not just in aeromodelling either. In recent years, this situation has slowly changed: athletics are a good example. When a contest is organised, people expected to go along for a bit of fun, and if one wins, that's merely an added attraction. Now with FAI team race *really* competitive, this situation must change – fast. If a contest is organised, I feel that the organisation *must* be 100 per cent strict, and that means a set of heat-times must be drawn-up and adhered to. Some degree of strictness must be agreed upon – i.e. if a team doesn't turn up within (say) five minutes of being called *on a PA system*, their entry is cancelled from that round. If the weather is bad, as at Cranfield, then the organisation should announce that a certain waiting-period will be applied. If after that time the weather hasn't improved, then a list of people still willing to fly should be made, a new draw taken, and *adhered to 100 per cent*. If people are willing to travel 100–200 miles to fly, then they should either fly as required, or not waste the organiser's time. And I'm as guilty as any in this respect.

Really, all this means is that the rule-book should be applied, and well-applied. If you want a strict contest-director, here I am! Football referees will quite readily send-off a player who has travelled half-way round the world, let alone 100 miles, and an FAI 'referee' should do the same.

The Editor is not bound to be in agreement with any views expressed on this page

Anyway, those are my feelings – I have had a lot of correspondence with Dave Clarkson on this subject, and it seems that most FAI team race fliers are agreed that a general tightening-up is essential. 1975 could be a vintage year for UK FAI, and bad organisation won't help us any.

Graham Bryant

Birmingham

Dear Sir,

In his *Flying Scale Column* in the January *AeroModeller*, Eric Coates says of small rubber-drawn kits that 'the sales potential to young modellers is vast'.

While admitting that I built both an Airyda Blackburn Skua and a Megow Gulfhawk (original plan available for copying) around the end of the War – neither of which, of course, flew – such models are the most efficient way to *discourage* inexperienced people. Kits like these are rather like a smallpox vaccination – a small dose of cutting $\frac{1}{16}$in. square notches in poorly selected wood ensures that most people are made immune against the model flying bug for life.

Enormous harm must have been done to the model flying movement by kit manufacturers who market kits on the premise that they should be replicas of manned aircraft. During the mid-50's, one such manufacturer, now extinct, claimed to have sold sufficient half-crown 'scale' kits to provide two-and-a-half for every man, woman, and child in Britain. I wonder how many of the purchasers ended up as model flyers?

What beginners need, even if most kit manufacturers go for the quick, once-and-never-again sale instead of producing it for them, is a simply built aircraft that will fly, and respond to trimming in a logical way. Graupner had the idea with their *Uhu* glider, and the junior contests they run for it so successfully; the St Leonards kits are starting to fill the gap in Britain, while the *Delta Dart* has introduced model flying to beginners in the United States. After all, model *flying* is what we are concerned with, isn't it?

Would readers be in favour of the SMAE undertaking some kind of consumer report on kits? It might be possible for some rating system to be worked out to grade kits, or at least to allow those suitable for beginners to carry a seal of approval. There is one more reason for you out there to join the Society and say what you want from model flying.

Martin Dilly

West Wickham, Kent.

continued from opposite

Radio Flyers enabled them to run away from the rest of the field who in some cases were slightly higher on static points. As a result the superb display put on by Pete Scowan and his *Corsair* and the effortless aerobatic display by G. Glover's DHC 1 turned both Classes upside down. The standard of flying in both classes was high and the overall standard was higher than in previous years.

Free Flight: *Class 1* – 1. B. Borland *(DH4)* 755pt., 2. D. Hope-Cross *(DH83)* 745pt., 3. W. Rouse *(Gladiator)* 653pt

Class 2 – 1. M. Kingsbury *(Super Cruiser)* 205pt., 2. W. Rouse *(Beaver)* 200pt., 3. W. Morse *(Luton Minor)* 171pt.

Control Line: *Class 1* – 1. L. Willis *(Shoestring)* 632pt., 2. B. Borland *(Kittyhawk)* 594pt., 3. N. Maurice *(Black Widow)* 575pt.

Class 2 – 1. N. Maurice *(Tempest)* 239pt., 2. O. Bryant 229pt., 3. W. Morgan *(Gloster)* 224pt.

Radio Control: *Class 1* – 1. P. Scowan *(Corsair)* 756pt. 2. B. Borland *(Turbulent)* 749pt., 3. D. Richardson *(Nieuport)* 622pt.

Class 2 – 1. E. Galloway *(FU24)* 231pt., 2. G. Glover *(DHC1)* 229pt., 3. P. O'Connel *(J3c)* 187pt.

Another waterborne-enthusiast is W. Morgan, seen here preparing his 'Gloster Schneider Trophy racer' for the Class II C/L event. Developed as a racing class, this form of model could have some interesting possibilities!

David Hope-Cross was certainly a busy man – he also flew this 'DH Rapide' in C/L Class I event, where he placed fourth. The Scale Modellers' Association deserves much credit for developing such a renewed interest in scale.

GOLDEN WINGS AEROMODELLER MODEL CLUB

Are you between 10 and 16 years of age? Then don't delay, join today

JUNIOR KIT EVENT, NATIONALS' 75

HOW ARE ALL those rubber models and *Satellite* gliders getting on? By now you should be out and trimming whenever a calm weekend comes along, but don't make too good a job of it and lose the model before the contest!

A good many juniors have already written to me for further details of the Nationals Junior event, and I will give the answers to most of their questions here for the sake of those who have not yet written in to me (Mrs S. Miller, 1 Whitewell Way, Coton, Cambridge).

Where and when will the contest be held?
As most of you will know by now, the Nationals is to be held at RAF Finningley, Yorkshire (on the A614 about five miles north of Bawtry), on 24th/25th/26th May. The Junior contest will be held on Sunday, 25th from 10.30am until 4.30pm. 'Control' will be in a red Toyota van on the upwind side of the airfield; look at the map on the mobile information van if in doubt.

How do I enter?
At the control van, on the day, and its all free!

Do I have to be a SMAE member?
No! The contest is open to all modellers under the age of 16 on the day of the contest.

How many flights must I make?
Three flights of two minutes maximum duration each. You must tow and release your glider yourself, or wind and launch your rubber model. (Don't forget to bring a 164ft. towline or a hand drill with winder hook.)

Prizes?
Provided there are at least six entrants actually flying in each class (glider and rubber), 1st, 2nd, and 3rd prizes will be awarded. There will be kits and other modelling goods. In addition, a Challenge Trophy is being prepared for each class along the lines of the *Boxall Memorial Trophy*. These trophies should be really attractive, and something you could be really proud to have won.

On the day each entrant will be given a sheet of simple contest rules so that he knows exactly what to do to complete his flights. I am keeping my fingers crossed for perfect weather on the 25th, and hope to see scores of you at Finningley.

Sue Miller

Queries . . .

Dear John,

I have a Cox Golden Bee ·049cu.in. engine which normally goes very well, but at present it is hard to start and even then will not run evenly. I am using Cox glow fuel, a fresh battery, and the glow head is new. Any suggestions as to the trouble would be appreciated.

J. Wilson

Newbury, Berks.

Firstly, make sure that the needle valve is not bent and that it is not clogged – clear by unscrewing the needle and blowing through the tank vents. Most likely cause of trouble is that the washer under the glow head is missing, causing an air leak. Check by pouring some fuel over the glow head: flick the propeller over hard and see if any bubbles show a leak between the glow head and the cylinder. Obvious remedy is to replace the washer, but if a leak is evident despite the fact that the washer is in place, then check that the seating is clear of grit or dirt preventing the head from fitting properly.

● ● ●

NOW THAT YOU have mastered the elements of contol-line flying, i.e. you have learnt how to build a model, operate the engine and can fly round-and-round without hitting the ground, then it is time to try something a little more advanced.

Naturally, your model must be suitable for aerobatics. Sheet balsa or plastic wings are not intended for flying stunts – so choose a model with a built-up wing and a symmetrical section. The plan or kit of the model will also state whether your model is aerobatic.

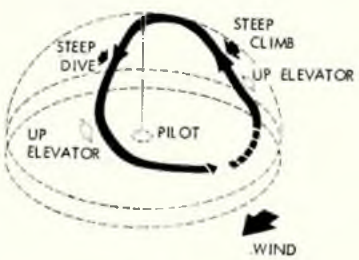
Next time you fly your model, try a few deliberate climbs and dives. Fly round at the normal 'comfortable' altitude – probably around 10ft. above the ground, then apply a little 'up' elevator. As the model climbs, level off and fly a few 'high' laps. Reverse this procedure by trying some dives (still at the downwind side of the circle to maintain line tension during changes in altitude). Carry on repeating these exercises until you are confident that you have full control – and that you are climbing when you mean to! Now for your first 'proper' manoeuvre.

Wingover

At all times, remember the golden rule: do not panic! Use your whole arm when controlling the model, and avoid using jerky wrist actions. A wingover is simply 'cutting the circle in half' – the model flies half a lap at normal height, then climbs vertically, passes over the head of the pilot, and dives vertically towards the ground before it is pulled out at a safe altitude. Refer to the sketches below and note the wind direction carefully as this helps the model climb. Although for a true wingover, the climb and dive sections should be vertical, do not worry about this at first, just aim for a fairly steep climb and gentle recovery.

As the model flies into wind, start giving full up control – but as the model climbs vertically, 'slacken-off' control so that the handle is at neutral. (Do not worry overmuch about this – it will happen almost naturally.) When the model has passed overhead, gently apply 'up' elevator again. Do this gently so that the model recovers to 'normal' flight without pitching up and down. Practice over and over again until the manoeuvre starts to resemble that shown in the second sketch, and so that the model recovers at the same height as it started the manoeuvre.

All set? Right, one down . . . and several more to go!



Dear John Bridge,

I am between 10 and 16 years of age and would like to become a member of the 'Golden Wings Club'. With this application I enclose postal order (International Money Order) for 25p to cover cost of the enamel club badge, two coloured transfers and membership card.

NAME IN FULL.....
ADDRESS.....
.....
YEAR OF BIRTH..... **SCHOOL**.....
NAME OF ANY OTHER CLUB OR CLUBS TO WHICH I BELONG (if any).....
Send to: **GOLDEN WINGS CLUB, AEROMODELLER, P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE.**

5/75 15p in the £1 Rebate plan purchase coupon for Golden Wing Members ? W. No.....

The Free Flight Scene

this month:
Martin Dilly

THIS IS THE FIRST of a new series of monthly features on free flight, written by a triumvirate of active flyers – Bob Bailey, Michael Warren and myself. Producing 5,000 words plus illustrations to a deadline every month may explain why John O'Donnell has built only one A/2 since the early 1960s; attending almost every domestic free-flight contest, reporting them, competing in several classes, and often winning as well, is an achievement I certainly have no intention of trying to match. To reduce the workload, each of us will produce a complete feature every third month. As well as the three of us doing the writing, we hope to receive plenty of letters on free-flight topics – systems, building and flying techniques, questions, information on specialised items for free flight, both domestic and foreign and, of course, reports of major National and International contests. By all means send us reports of smaller contests, too, for competitive flying is the life blood of the whole sport of model flying, but usually complete details of the local events will appear in the SMAE newsletter *Model Flying*, and the specialist free-flight newsletters.

You may feel that free flight is already covered well by these specialists; this is true, but there is still a need here in a widely read magazine for details of F/F developments and basics too, so that general readers, who may not yet know of the subscription-publications like *Free Flight News, Scatter, Free Flight, News of the North* and the rest, can have access to information that will get them successfully started in free flight.

Recently, a number of people are coming back to free flight after 15 or 20 years' interruption caused by work, marriage, or dabbling with R/C. Talking to people like these, on the SMAE stand at the *Model Engineer Exhibition*, for instance, shows that there is a lack of information on things such as up-to-date folding propeller mechanisms, circle-towhooks, VIT systems, thermal location, and the like. Maybe someone should write a book on free-flight techniques, but meanwhile this column will try to fill the gap between the *'How to Build Your First Glider Kit'* magazine articles and the *'Quasi-Static Analysis of Model Glider Longitudinal Towing Characteristics'* type of report from the National Free Flight Society Symposium.

Enough of the promises! At the December plenary meeting of the CIAM in strike-ridden Paris, the various proposals to turn F/F aircraft into 'lead sleds' were decisively voted out. In the case of F.I.C. (the FAI power class), the Danish proposal to limit engine runs to 7 seconds for all flights, including fly-offs, was accepted. This will, of course, allow people to continue to fly existing aircraft, and avoids the problem of re-setting critical timers for a number of different engine runs during the fly-off rounds. In the past this has also led to some pretty odd power patterns, as well as the perpetual problem of timing the run. Even though the 'four-second run' will be a thing of the past after the end of this year, the timing anomaly remains with us; paragraph 3.3.9.1 of the FAI's *Sporting Code* states that *'The time of the motor run is considered ended when the motor stops'*. Later, the notes on the use of binoculars mention that they should not be used while the model is being launched, although it is next to impossible to track a fast-climbing model with the narrow field of view of glasses having magnifications between 4 and 8. In practice, of course, it seems that the majority of timekeepers try to spot the exact moment the *engine* stops by listening for the end of the power run, as opposed to the 'free-wheeling' run-on of the propeller after the powered strokes end. This run-on can last a couple of seconds. If we assume that a model reaches 500ft. in 10 seconds (a rate of climb roughly equivalent to that of a Supermarine Spitfire at full throttle, incidentally) there is a delay of approximately half a second before the sound from the aircraft reaches the ground. Any drift downwind will, of course, increase the slant distance from the launch point, and the time lag. Both the CIAM technical committee for free flight and the SMAE F/F sub-committee will be looking into ways of timing engine runs accurately, but meanwhile let's hear from you on the subject.

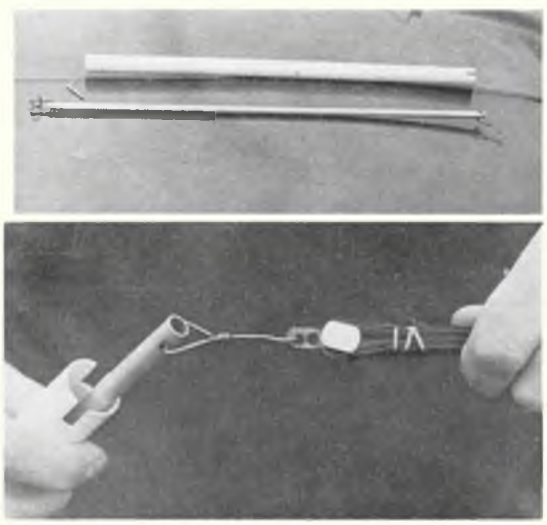
Bob Bailey will soon be testing one of the Hardy Brodersen 'brakes', which stops engines by allowing a spring to expand against a brake drum mounted on the rear of the propeller. Some of the Soviet team used a similar device at recent World Championships, and the resulting nasty-sounding 'clunk', as all the whizzing bits stopped dead from 26,000 rpm or so, certainly helped psychologically to convince timekeepers that all life had ceased up there!

CARTRIDGE LOADING FOR RUBBER MOTORS

A number of today's Wakefield flyers use the cartridge-loading system for motors, which both protects the model from motor breakage during winding and also allows motors to be rapidly inserted into the fuselage. A complete description of the system first appeared in *Free Flight News* in November 1970; it was suggested by John Boxall who, in fact, had never flown a rubber model, and developed by John Mabey of the Croydon club.

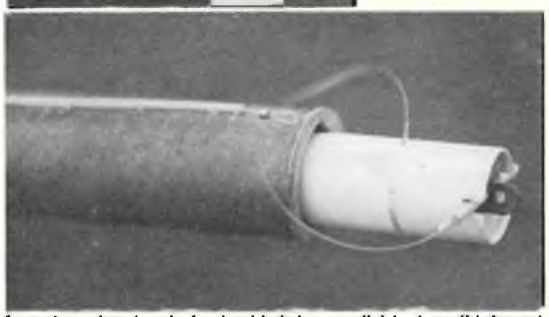
Essentially suitable for models with motors that are tight between hooks – i.e. the majority of today's Wakefields – it consists of a length of tubing, often hard PVC electrical conduit, of a diameter that will slip through the nose former of the fuselage, and 2 or 3in. longer than the distance from the nose to the rear motor peg. Normal practice is to load several of these cartridges with motors, each secured into a slot at the rear of the tube by means of a hollow dural bobbin, on which shoulders are machined to prevent its slipping out sideways. The motor is stretched in the tube and a suitable pin passed through the T-bar to which it is attached at the front to hold the motor in place. In operation, the cartridge is slid into the fuselage until the hollow rear bobbin lines up with the motor peg holes in the fuselage sides; the rear motor peg (a length

Below is the hard PVC electrical conduit, used for the 'cartridge' loading system described, together with the dural tube winding extension – note retaining pin tied to left end of cartridge to prevent loss, also wire fittings at each end of extension tube for winder and T-bar. At bottom, the cartridge is being loaded. The motor has been attached to a modified form of T-bar (it has end flanges), then the extension is hooked to T-bar. This is necessary as the cartridge is longer than the unstretched rubber. Note, too, the slots to retain the rear bobbin when cartridge is loaded.



Left: Rear bobbin is slipped through the rear end of the motor once it is in the cartridge, and located in the slots.

Below: loaded cartridge is slipped into fuselage. Note retaining pin holding T-bar in place.



from the pointed end of a dural knitting needle) is then slid through the bobbin, holding it and the motor in place in the fuselage.

A normal tube winding extension to the drill is used, a few inches longer than the cartridge, to allow the latter to be slipped out completely clear of the fuselage and T-bar once the rubber is wound. To wind, the T-bar is connected to the extension and the front retaining pin removed from the cartridge, allowing the motor to be stretched out and wound. After winding, the cartridge, which has been protecting the fuselage from a burst motor, is slipped out and over the winding extension; a suitable steel pin is slid into the T-bar and rests against the nose former, held against motor torque by the helper, while the extension is unhooked and the prop. fitted. Once the Montreal stop is set, the helper's pin is removed and the noseblock fitted in place.

An advantage of the system was found by Ian Kaynes last year. With the motor fully wound, but still in its cartridge, he had a problem with his propeller two minutes before the end of a round. The answer was to transfer the fully-wound cartridge-enclosed motor to his spare model, attach the correct prop. and fly it.

With the model's motor peg passing through the rear bobbin of the loaded cartridge, use the cartridge itself as a winding tube when applying the turns – the helper takes the pull on the exposed front end of the cartridge as the motor is fully extended. Our columnist demonstrates the hold—Paul Masterman winds.

Winding completed, slide the cartridge out over the winding extension, then slide knitting needle through the T-bar (hold against nose former) while extension is removed. While helper still holds the torque of the motor via the knitting needle, replace the propeller hook on the second hole of the T-bar.

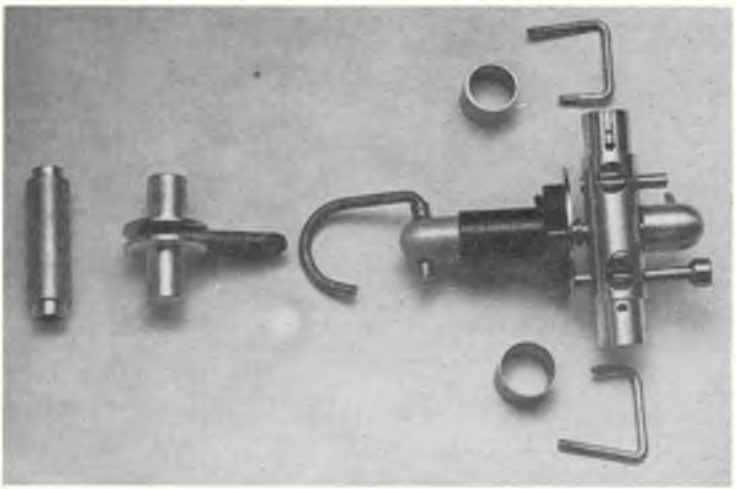
1975 NATIONALS

It looks, depressingly, as if the 'Nats' this year are to be held at a single venue, RAF Finningley. I say 'depressingly' for two reasons. First, the airfield is a long, narrow one and has several areas out of bounds, as well as a quarry just outside it; secondly, it seems to a number of people (both F/F competitors and others) that to hold F/F, R/C and C/L events all at the same site is folly and invariably harms all the contest flying. The fixed site events (R/C and C/L) are always situated on the airfield, and their associated ropes, stakes, loudspeaker equipment, marked circles, car parks and tents are all hammered well into place before anyone is sure how the wind will be blowing during the three days of flying. Short of holding the Nats on a huge turntable a mile and a half across, so that the whole mess can be swung to avoid free-flight overflying other events, the only solution with a one-site Nationals is to hold free flight at separate times from the rest – i.e. early in the morning and late in the evening for the high-performance classes. Because of organisational problems and the fact that many people want to fly in several classes in one day, the 'Mini' events will be held during the middle of the day, in the hope that their two-minute maxes will limit interference with other classes.

But the plot thickens still more. Some of the R/C thermal-soaring people apparently resented flying at a separate site last year, and now want to be in with the 'mob' at Finningley; to a mere free-flighter this seems like cutting off their noses to spite their faces – adding to the already jammed allocation of R/C frequencies, crowded with Pattern, Scale and Pylon racing. What is the objection in future to thermal-soaring and free-flight sharing the same venue, away from the fixed site activities? The one time this was tried, at Strubby in 1972, it blew a gale all weekend, but I am sure this is not an automatic result of being away from the C/L and powered R/C flying! What do you free-flight competitors feel about this? Would you prefer to share the Nats site, even if it means a drastic reduction in the space available for the contest? Would you like the free-flight Nats to be held away from the general public? Do you think free flight would benefit from some sort of commentary, so non-modellers could find out what was going on? Your letters please.

RETRIEVING AND THE PUBLIC

On the subject of public relations for F/F, one area in which some people who should know better have a blind spot, is model retrieving. If I were a farmer and looked out of my window to see someone walking straight across the middle of one of my fields, as if out for a stroll, then I should be very cross indeed. If the person gave the *appearance* of being at least aware that he was perhaps treading on somebody's livelihood, perhaps by walking slowly and carefully, lifting his feet high and trying to step between rows of greenery, then I might well think, *'Ah, here we have someone*



Some of the accessories available from 'Free Flight News' which make the free-flighter's life a little easier. From left to right are the rear bobbin, the T-bar plus the superb Wakefield propeller hub assembly, which is extremely good value at £5·00. This latter item uses a nylon moulding to house twin ballraces and incorporates a square spigot to prevent the unit spinning in the nose-block. It features both Montreal stop and 'panic pin', so that model may be held with a fully wound motor. The photograph shows the pre-bent pivot arms and locking collars of stainless steel. If you are serious about free flight, then take out a subscription to 'Free Flight News' when enquiring about these items.

making an obvious effort not to cause damage'. This would put me in a co-operative frame of mind, and I would very probably feel he was capable of taking reasonable care of my property without supervision; if he asked me if I'd mind if he looked for a model aircraft whose approximate position he knew, then I'd raise no objection. Call it public relations, call it amateur theatricals if you like, but for heaven's sake *do it;* meeting model flyers in fields is often a farmer's first clue that our sport even exists, and their first impressions are likely to be the ones they remember. Flying sites are rare today, and we probably want to come back again, so get it right.

If you have a perfect compass line on your lost model, when you come to the edge of a field of anything even remotely crop-like (i.e. greenish), note what landmark there is on the downwind side of the field, taking a back-bearing too, if necessary, and walk round the field till you are spot on the line again. Gates shut as well as open. If you meet a padlocked one, climb over it on the *hinge side*, to reduce the leverage of your weight straining the gate and hinges. Do not force your way through hedges. If you have narrowed the search down to one area, try to climb a tree and get a wider view; it will be quicker than a ground search. The same attitude applies to models lost in residential areas; even if you are dealing with a large stately home type of place with no gate, do try and find someone to ask *before* you wander about the grounds like a visitor from the CIA. An Englishman's home is his castle; do not be an unwelcome intruder or you may find yourself outside in the moat. If this seems an unnecessary tirade, then I will finish with a gentle reminder that this year the F/F sub-committee, and others, will be checking the situation downwind during contests. Contest flying is much more fun when you are taking part than when you are an enforced spectator.

F/F GOODIES

Even if wood standards are falling, the number of specialist free-flight items continues to increase. Some of these would have little appeal to the general model shop proprietor, and are produced in limited quantities; the Micro-X indoor materials and equipment marketed here by Laurie Barr are examples of this, and for the outdoor flyer *Free Flight News* have a mouth-watering list of items. These include an extender disc for Tatone or KSB timers to allow them to run for 12 minutes for fly-offs; price is £1·00 each. Remember to remove the internal stop on the output shaft of the KSB timer before the fly-off, though; this normally prevents the mechanism running down beyond its usual release position.

For the glider flyer *FFN* have 50m lengths of 30lb. breaking strain towline, woven from a Terylene type of material; cost per length is £1·00.

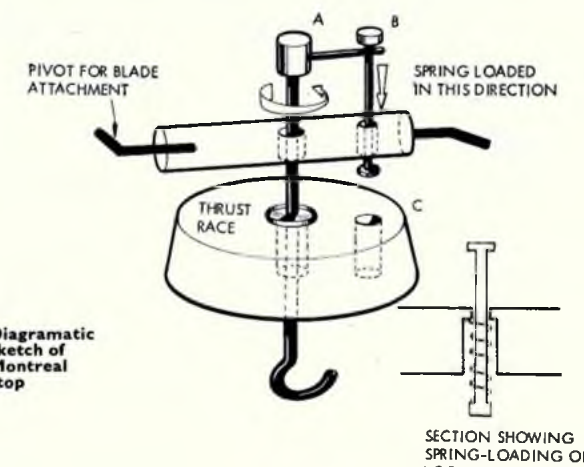
The Wakefield enthusiast is also well catered for by them. The improved version of the Murray Stringer propeller hub assembly uses a black nylon moulding to house the twin ballraces in which the ·125in. diameter shaft runs. This moulding incorporates a square spigot to which the chromed steel faceplate is attached by four countersunk machine screws. The spigot prevents the unit from rotating in the noseblock in use, a fault which occurred with the original Stringer-made assemblies after the shock loads from the Montreal stop pin had loosened the epoxy securing the unit in place. As well as a stop pin ·095in. in diameter with a 'grippable' head to it, a 'panic pin' is fitted to the opposite side of the hub, so the model can be held with the propeller locked while waiting for lift. Backing off the hub in the opposite direction to the torque allows this pin to pop clear of the faceplate so the propeller can rotate normally. High-rate safety-pin type springs are used for both these pins. Blade fixing is by means of pre-bent wire stubs, which are an interference fit into holes drilled through the hub, rotation being prevented by milled slots to hold the radial part of the stubs. Stubs are secured by stainless steel collars which slip over each side of the hub; the dural hub is drilled axially for lightness, and total weight is approximately 18 grammes. Price is £5·00, including postage (airmail for overseas).

The other *FFN* Wakefield items are a T-bar front 'hook' for 16-strand motors, fabricated from dural with a steel arm for attachment to the propeller shaft, and a dural rear bobbin for use with the cartridge motor loading system. Bobbin dimensions are 1·015in. long, 0·280in. diameter, with the ends machined down to 0·215in., giving a 0·075in. locating piece at each end. Prices are 25p (30p overseas airmail) for the T-bar and 7p (10p overseas airmail) for the bobbin. A stamped-addressed envelope or an international reply coupon to *Free Flight News*, 92 Marylebone High Street, London W1M 3DE, will bring a complete list of the timers, rubber and other items currently available.

MONTREAL STOPS

This might be a good time to describe the Montreal stop system; experienced Wakefield flyers, please bear with us, but not everyone knows basic details like this immediately they hear of the sport.

The common type of prop. stop mechanism uses a spring which tends to force the propeller shaft forwards against the tension of the wound rubber motor. As the tension drops while the motor unwinds, the shaft moves forward until a stop on it engages with



Diagramatic sketch of Montreal stop

a pin on the rear of the noseblock; this prevents further rotation, apart from a few skips as the stop grazes the pin, which sometimes disturbs the model's flight path noticeably. Until the Wakefield rules limited the rubber weight to 40 grammes, most people used a slack motor, longer when unwound than the distance between the propeller hook and the rear peg. Sometimes, this caused bunching and resultant changes in the model's centre of gravity because the tension of a motor is not dependant on the number of turns on it.

Since it is the *torque* of rubber and not the tension that provides the power to fly a model aircraft, it seemed sensible to relate the folding of the propeller to a particular point on the torque curve of the unwinding rubber, so that it occurred when the power available had declined to a value too low to let the model climb. This would allow the use of a motor tight between hooks, and prevent random shifts in CG position from flight to flight.

This torque dependent system was probably first developed by people flying in the Montreal area, and relies upon the friction between a pin **A** perpendicular to the driven propeller shaft and a spring-loaded pin **B** in the prop. hub. This hub is free to rotate on the shaft, but as long as its pin engages the driving shaft pin it will be driven by the rubber motor. As the torque drops the spring-loaded pin will eventually overcome the friction and drop out of engagement, its rear end locating in a hole **C** in the faceplate on the noseblock. This ensures that the propeller folds in exactly the same place, and that the motor unwinds fully immediately this occurs. Substituting a different motor, even with a different number of strands, will not affect the drop-out torque at which the propeller locks and folds; this value may be adjusted by using a spring with a different rate to load the pin **B**. The sketch shows the principle involved.

AIRFOILS

It is hoped to give brief details in this column of interesting F/F airfoils. Since I believe the John Malkin book *Airfoil Sections* is at the moment unobtainable, there are few sources (at least, in the English language) where data from which airfoils can be plotted can be found. Would you like to see more information here on aerodynamic characteristics of airfoils, polar diagrams, lift coefficients, turbulator experiments, and so on? Articles of this sort appear regularly in the East European magazines, and translations might be arranged. Are any readers fluent in Czech, for instance?

The Jedelsky type of construction is perhaps more useful for gliders flown in calm air, and not subject to high towing speeds. With parallel chord wings, flutter can easily be set up at quite moderate airspeeds, and this may explain why a number of the more successful wings of this type have elliptical tips. I have a feeling that the thin, unsupported 50 per cent at the outer trailing edge can start to buzz, and this quickly spreads to the rest of the structure with alarming results to the lift of the whole wing. Chopping the offending portion off and smoothing the result into a nice curve can reduce the problem. An alternative would perhaps be to add mass 'unbalancers' to the trailing edges at the tips but who needs more weight here from the stability point of view?

One of the best gliding Jedelsky models I have seen was one built by New Zealand's Angus MacDonald, which I had the good fortune to proxy fly at the 1965 World Championships at Kauhava. After the Championships, I made female templates from the wing and the resulting ordinates were as shown below.

The original MacDonald wing was 6in. chord, straight dihedralled and had a 78in. span. The whole wing weighed 4·8oz. complete with joiners, which were thin dural and ply 'feathers' about ½in. deep, fitting into a rolled paper box in the thickest part of the wing. The rear 50 per cent of the wing was $\frac{1}{16}$in. very light quarter-grain balsa, supported by 1mm ply ribs every 6½in.; the $\frac{1}{16}$in. sheet gave a section depth over the rear 50 per cent of the chord of 1·04 per cent.

The ordinates from this wing make an interesting comparison with a very similar Benedek airfoil, the B-6407-e. Both have their high points at 30 per cent, but the Benedek is 9 per cent thick compared with an actual 8·83 for the MacDonald; the Benedek maximum undercamber is about 6 per cent at 55 per cent, while the New Zealand airfoil has 7·3 per cent at the 50 per cent point, where the $\frac{1}{16}$in. rear portion starts. This appears from the Benedek ordinates to be of infinite thinness, since the upper and lower values are identical!

Incidentally, György Benedek, who has been responsible for so much of the research carried out on low-speed aerodynamics at the Hungarian State Model Institute, is alive and well. After the 1973 Championships, Bob Bailey and I were sailing on Lake Balaton with ex-Hungarian Wakefield team member Karoly Fischer, when we ran into Benedek, almost literally, flat on his back, sunning himself and floating across the lake on an air-bed!

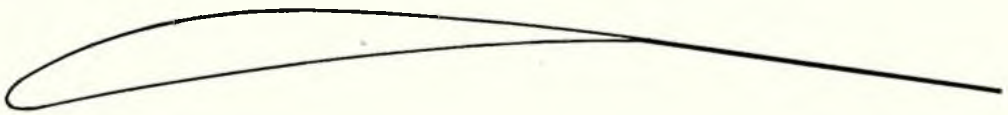
The big problem with a wing using airfoils like this is torsional stiffness; the balsa on the MacDonald wing seemed about 5lb. density and it was covered with Jap tissue, the grain of which may have helped to reduce twisting tendencies a little. Certainly, wings like this are rare, except in Central Europe, where they probably have little to contend with in the way of gusts. The quality of balsa in the shops at present is such that there is almost nothing one could reasonably start to use for a wing where lightness and stiffness are as important as they are with a Jedelsky structure. Perhaps there are fewer people today who know what to look for in the balsa racks, or maybe the majority of customers now have an R/C ·60 in their pockets, and the plan for their first model in front of them when they select wood. But even if you *want* 12 or 16lb. density balsa with no particular grain to it, surely not many people want it S-shaped along its length, or covered with stress-raising saw cuts, or hairy, or tapered across its width, or 6lb. density along one edge and 16lb. along the other, do they? It does seem that cutting standards are declining at present.

MACDONALD AIRFOIL

% Chord	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	100
Upper	0.84	2.17	3.1	4.51	5.42	6.25	7.4	8.0	8.60	8.83	8.58	8.34	7.54	6.74	5.04	3.3	1.04
Lower	0.84	0.18	0.37	0.73	1.09	1.46	2.19	2.92	3.65	4.37	5.82	7.3	6.5	5.7	4.0	2.25	0

Nose Radius 0.78%

BENEDEK B-6407-e



% Chord	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	100
Upper	0.8	2.5	3.5	4.9	5.9	6.7	7.95	8.6	8.95	9	8.65	7.7	6.3	4.8	3.2	1.6	0
Lower	0.8	0	0.2	0.45	0.8	1.1	1 9	2.7	3.45	4.1	5.2	5.9	5.9	4.8	3.2	1.6	0

Concluding Ron Coleman's series

RUBBER TECHNIQUES

with advice on how to bring 'em back alive!

AS CONSERVATIONISTS, I suppose we should try to do our bit to save the tree. It gives us oxygen, shade, material (like balsa) to work with, and it clothes the landscape to make what the Americans and Australians call our 'English Garden' . . . and it is always there on hand to trap our free-flight model aircraft!

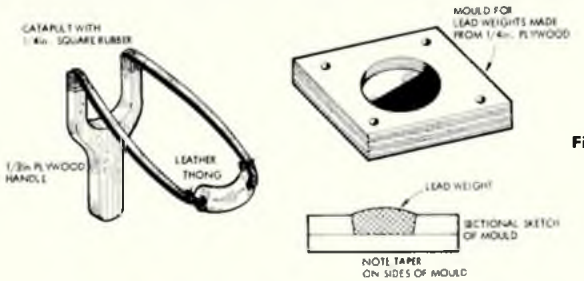
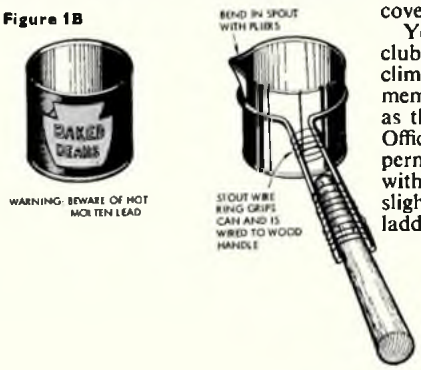


Figure 1A

I recall, nearly forty years ago, a certain tall 'enemy' elm at the end of the school cricket pitch which almost always trapped our *Baby Gnome* 2¼oz. lightweight duration model. My brother became an expert at climbing this tree, but when the 'plane lodged in the outermost top branches he was equal to the occasion with a powerful catapult to shoot lead weights (*Figure 1*). These weights were especially cast from scrap lead melted down in a tin-can on the gas stove. They would be drilled to tie on the end of a 30yd. length of string. He would shoot the weight over the bough to carry the line over – it would then either spin around and tie itself securely, or continue on down to the ground. It was then possible to violently shake the branch to loosen the model, which nearly always fell safely to earth. Unfortunately, weight and line would sometimes pass right through the model, causing much extra repair work later on! However, we only lost one model completely through its secure fixing in the branches, during a period of some three years of regular model flying on that far-too-small field.

Figure 1B



Incidentally, on the other side of the cricket field was the wide and deep river. If the model missed the elm tree it might land midstream. We never thought of trying floats instead of wheels, but we rapidly discovered the value of banana oil in waterproofing the covering to keep the model afloat. We would have to tramp downstream to recover the model at the bank, but sometimes the few remaining turns on the motor would revolve the prop. in the water and help to carry the model to the far bank. Sometimes, we could find a boat to take us across; but most times it was a three-mile walk via the nearest bridge. . . .

Another useful de-treeing tool is a long sectional fishing rod. Use this to push the model out of the branches. Stiffen the top section with a dowel rod and rubber bands and fix a wad of sponge plastic on the sharp end to minimise holing of the model's covering.

Yet again, it is suggested that a club investment would be a pair of climbing irons (and a strong active member to learn to use them) such as those used by foresters and Post Office telephone linesmen. Do get permission before climbing a tree with irons, as they do cause some slight damage to the bark. A rope ladder could also come in handy.

Occasionally, it is possible to drive a vehicle close up to a tree, and then climb on top and stand on the luggage rack. If you have a motor caravan, so much the better; but whatever method you use to combat a tree, take care not to damage it.

Nowadays, free-flight models are taken to Ministry of Defence airfields quite often. With luck and a favourable wind, the model will dethermalise and touch down within the perimeter. When the wind is stronger, away goes the model into the distance, and even with powerful binoculars it is often difficult to see where it touches down. The exact position in relation to the surrounding topography – trees, buildings, etc. – must be noted, if one is to have any chance of rapid retrieval. Then off one goes down the runway on a bicycle which has been brought on top of the car especially for the purpose . . . or one gallops off on foot, trying to make a straight line to where the model was last seen dropping over the skyline.

Now sometimes – nay, quite often, in fact – the truth begins to dawn that one has missed the line of retrieval, and has veered off to the left or right of the point of descent. Rather than waste valuable time searching (very important if one is flying to rounds in a contest), it might be better to return to the launching point to try and re-establish the exact point in the distance where the model was seen to descend, and set out again to retrieve it.

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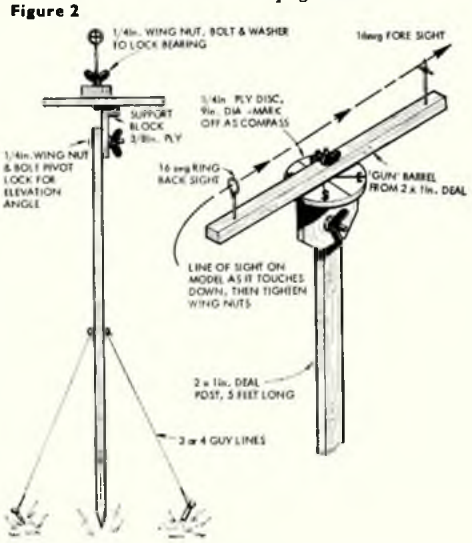
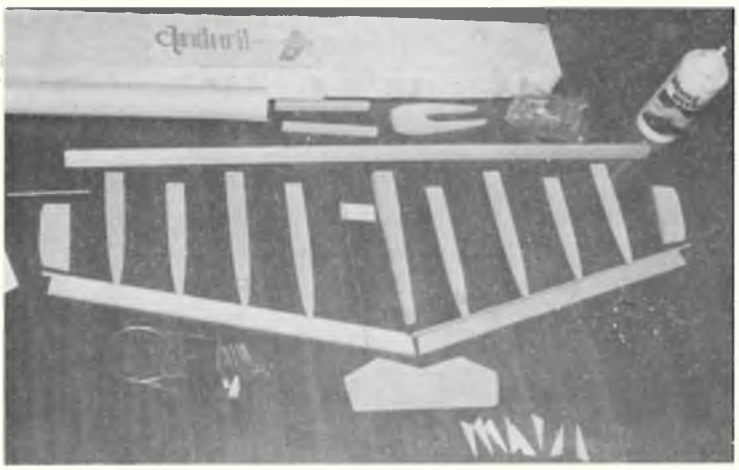
Figure 2





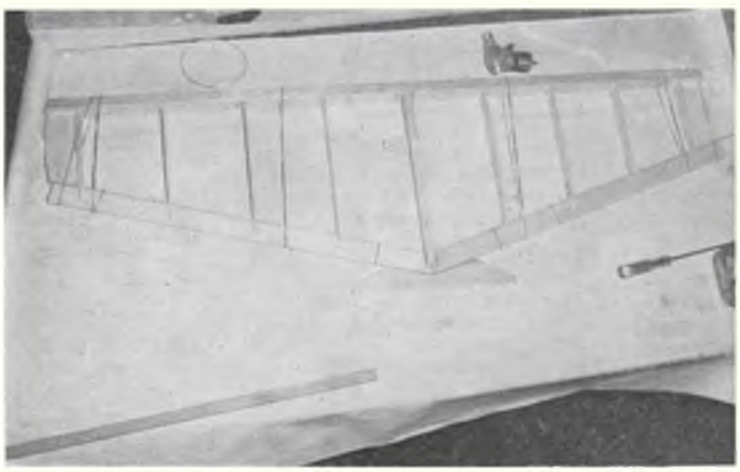
KIT REVIEW by Jim Carolan who appraises the latest design for C/L fans

MICK TIERNAN'S ANDURIL

FOR A KIT of this nature to sell well, it is necessary for it to appeal to both sport fliers and the competition-minded alike. An obvious example which springs to mind is the **Pegasus Models** *Warlord* kit, which has sold very well to all sections of the modelling world. A new challenger for this sector of the market was announced recently by Mick Tiernan, who has produced a kit of his very successful *Anduril FAI* combat model. This design has been developed over a period of five years, and in its current form represents a good compromise between strength and manoeuvrability, combined in a model which is very easy to fly and yet is competitive at any level.

Contents

On opening the box, most people would be surprised by seeing just how little there is in a modern combat model. All parts, however, are pre-shaped, ribs pre-cut, gussets supplied and all the necessary hardware enclosed, and there is no 'surplus' wood enclosed to confuse the novice. The fits of items such as wing tips and gussets were found to be good, as one would expect in any modern kit, but which is so rarely the case. No covering material was supplied, although mention of two alternative methods of covering was made in the comprehensive building instructions. A 'mustard-tin' tank kit with its own instructions is provided, and a point worth making here is that the bearers were beech and not the soft rubbish which I have grown to expect from recent kits. A half-size plan is included with rib spacings marked in full size.



Construction

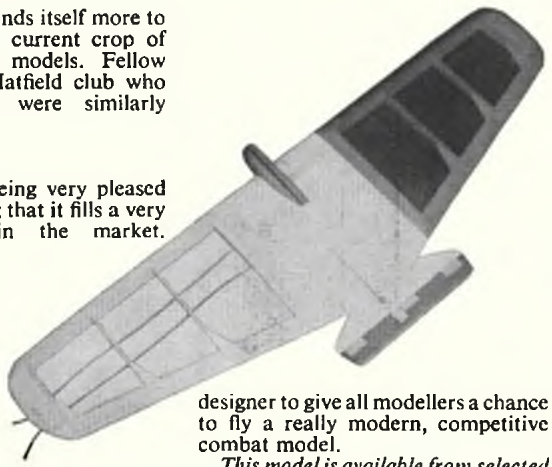
I am not going to bore the reader with details of how each part was glued together, but I had the model complete and ready to cover after only three nights' work – i.e. a total of nine hours – although I have no doubt that most people would build it even quicker. Instructions are clear and explicit, written in 'everyday English', suggesting which types of adhesives to use at each stage, and generally taking care of all eventualities. The most difficult part I found was the construction of the pod; I prefer to fit the bearers direct to the centre rib, although the method suggested in the instructions is that used by most currently successful fliers. Tank assembly is the area which will give inexperienced modellers the most problems, but as long as the constructor remembers the basic golden rules of soldering – namely, the right size soldering iron (large!), the correct flux, cleanliness and patience – a good light tank will

be produced. However, if the beginner finds tank construction as much of a chore as I once did, I assume that he will be able to find a reasonable stunt tank in his local model shop instead.

Covering
I elected to cover my model using nylon at the centre section and with Solarfilmed wings, as I think this gives the correct compromise between strength and performance. I would suggest that those who do not regularly fly competition combat should cover the model entirely in nylon. I used the recommended amount of dope and fuelproofed with two coats of PU15 polyurethene.

Flying
I flew Mick Tiernan's 1974 Nationals winning model just after the final and frankly was not impressed, finding that it lacked line tension and 'feel'. I therefore expected this to fly similarly, and was pleasantly surprised to find that subsequent development has produced a model which pulls evenly through all manoeuvres, and lends itself more to whipping than the current crop of large competition models. Fellow members of the Hatfield club who tried my model were similarly impressed.

Conclusion
I must admit to being very pleased with the kit, feeling that it fills a very important gap in the market.



Two thirds covered, just the inboard panel to do. Jim follows current combat practice by covering centre panel with nylon, tips with Solarfilm. Minimum structure airframe results in minimum weight.

Obviously, there were faults: a full-size plan would be nice, but cost considerations preclude this; the grain direction in the gussets was wrong; and the leading edge was a little heavy. However, the kit represents a brave (and successful) attempt by a leading combat model designer to give all modellers a chance to fly a really modern, competitive combat model.

This model is available from selected model shops or direct from Mick Tiernan at 41 Myrtle Avenue, Birstall, Leicester. Price is £3.49 (supplied post free if ordered direct). Please note that the kit supplied for review was a pre-production item, and thus the box, etc. may be slightly different to that now available.

RUBBER TECHNIQUES

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It is here that the apparatus shown in *Figure 2* comes in useful. When you see the model descending, sight the 'barrel' of the 'gun' on to it, and tighten the wing nut on top. Since the top disc has been orientated with a compass, you now have a locked-on bearing to the model's touch-down. A quick, easy substitute is to lay the fishing rod out along the ground pointing in the direction you must go. But this could be moved accidentally by others. Yet again, two tent pegs and a length of string set out to line up with the model's bearing point.

Whenever I have failed to come upon a model in a straight-line walk, it has usually been because the walk stopped short. I believe there is an optical illusion and we tend to think the model has come down much nearer than it actually has. So keep on going in a straight line – the model is probably behind the next gorse bush or hedge. On our local common the ground is very undulating, with many gorse bushes. Sometimes, a model is lost because a straight-line walk across hillock and valley has been lost. In such a case, it is handy to have three or four section flags (*Figure 3*) to stick in the ground at the tops of the hillocks and sight a straight line through them. Again, the flags are very useful to section off the ground in squares or strips when a concentrated detailed search is required on a subsequent day when the whole family may be recruited to search among the gorse bushes. This method saves going over the same ground needlessly. Mrs Coleman has found more than one lost model by this method because, she said, 'I could just see the little bit of RED (or ORANGE) peeping up among the bushes'.

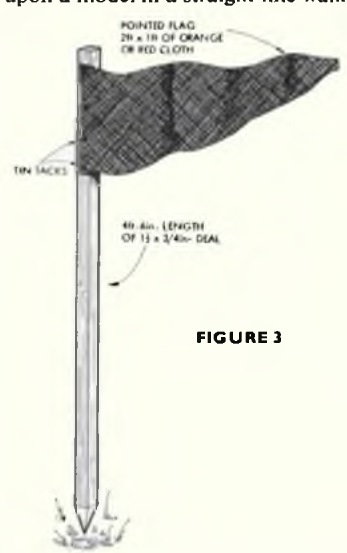


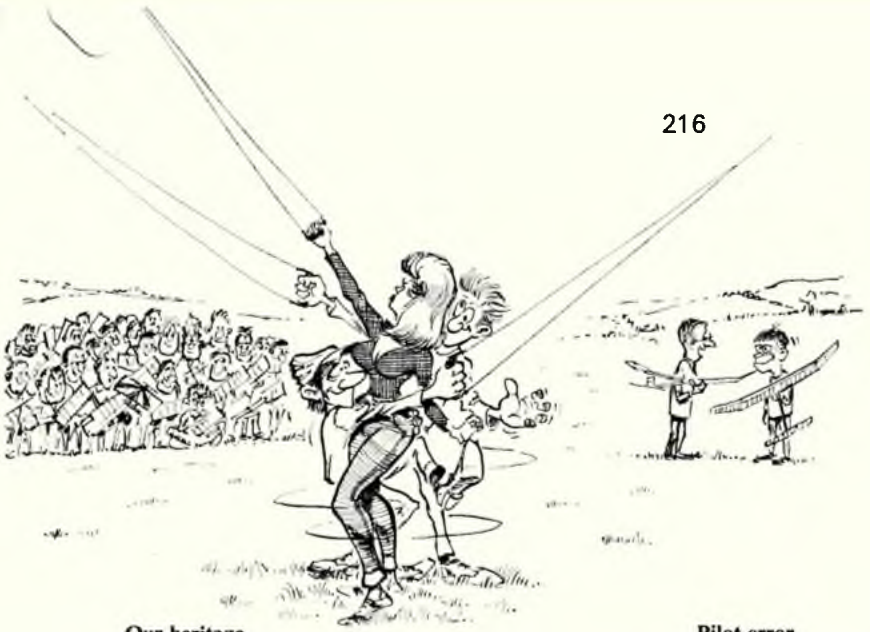
FIGURE 3

So we always cover all our models entirely in red or orange tissue, as it shows up best on the ground.

Another handy bit of equipment is a large cardboard arrow (to fit in the lid of the model box) covered with red fluorescent plastic. An assistant can hold it vertically to tell one to keep going straight on, or at 45° to instruct 'Go left' (or right). By holding it at 90° (horizontal) he can tell you to go hard left (or right). Thus, by glancing back regularly to the launch point, it is possible to regain a correct direction when a straight-line walk has gone astray. One's helper has the locked-on bearing to work from, even if he did not witness the model's flight.

In this series, I have dealt with a number of points about the operation of rubber-driven model aircraft about which I am often asked. Readers will have gathered that I am interested mainly in the Coupe d'Hiver class of model, as it affords so much sport and participation for a moderate outlay. It is not absolutely a simple model to develop and fly, yet it is not too difficult for beginners to tackle, either. There are plenty of competitions available, and it is the logical preliminary to Wakefield for any more ambitious young people with an eye to an aeromodelling 'free-flight career'!

I shall be pleased to try and answer any queries, especially from young readers, sent via the Editor. Do, please, enclose a stamped-addressed envelope for your reply. Good luck to all free-flight competitors, and don't forget to light the D/T fuse!



topical twists

by 'Pylonius'
illustrated by Sherry

"The combat section's swelling since they had that new member."

Our heritage

'It is hoped to hold the 1976 Nationals Championships at RAF Farflung, which is situated in the Outer Hebrides. The Society is very fortunate in obtaining the use of this airfield, which was only acquired after much hard negotiation. However, due to restrictions placed on the use of the actual airfield – it could be required for a possible emergency landing of a holiday charter aircraft – all flying activity will take place outside the aerodrome; that is, if permission can be obtained in time from the Crofter-in-Charge, or the Chief Engineer of Oil Installations, whoever happens to be in occupation of the Lower Bog Area at the time. No accommodation is available on the aerodrome or in the district, but a limited amount of camping will be allowed in the car park, which is situated about two miles south of the proposed flying site.

'There will be a restriction on the running of internal combustion engines during daylight hours, or from 0500 to 2200, whichever is the longer. This is in order not to disturb the pair of Oil-Spotted Rigger birds who have begun nesting in the area for the first time since 1896. The Ministry of the Environment is also anxious to ensure that any tenting erected is of a suitable colour and shape to blend in with the general tone of the landscape, but be bright enough to show up at night to the lorries from the oil rig platform which pass through the camping area.

'In addition to the special entry permit and Society membership card, visitors will be required to carry British passports, unless they are *bona fide* trespassers. Wives and girl friends can be brought along, but only at the competitors' own risk, due to the large oil rig encampment in the vicinity'.

Cool customers

All this great indoor flying craze strikes me as a bit of a 'con'. In my opinion, it has all been fostered by ageing free flight modellers who can no longer stand up to the rigours of flying outdoors in the British winters. Come to think of it, they cannot stand British summers either, but spend their time in the calm air of the continental contest circuit.

And still on the subject of chilliness, that ice-cream paper aeroplane contest was a bit of a letdown, or should I say float down. Instead of the entries being good, robust school playground craft, which could be heaved into the headmaster's study, or given a few swooshing circuits round the ice-cream van, they were wafery, delicate things that were glided gently down from various disputed heights.

Pilot error

Nothing frustrates our manly attempts to get the image of aeromodelling off the toy counter and on to a more mature plane than the installation of those truncated mannikins known as dummy pilots. The sight of one of these goggling non-action men encapsulated in perspex brings the whole hobby down to nursery floor level, alongside Noddy's car and Tiny Tim's annual.

Even the doyens of the FAI, who themselves so slavishly foster the subservience of model aircraft to the big daddy full-size stuff, are at last growing out of the dummy stage. They have ruled that, in future Scale events, a set of bristling moustachios or a vintage back-to-front cap will score less marks than a well-realised roundel or set of authentic hatch markings. But just to prove that the old imitation spirit is not quite dead, they insist on pylon racers carrying a quite extraneous, non-functioning dummy cockpit.

Coupe blimey!

I wish the gentlemen of the FAI would not fidget so much with the rules. It seemed only the other day they raised the Coupe D'Hiver weight to 100 grammes with, no doubt, the object of bringing down the soaring rate of performance to small field proportions. Unabashed at the increase in the French-style avoirdupois, the experts were still notching up flight times that many of us would like to achieve with open models. But whether they did actually ballast up their machines or build new ones of heavy-duty balsa, no one will ever know, for the models were never weighed or processed.

Quite suddenly, and for no good reason, the all-up weight has been dropped back to 80 grammes; and although everyone will be flying much the same models, I did go out on a limb by actually building a new model up to the 100-gramme limit – which just shows what a sillybilly I am. No hardship, though, for chunky bits of balsa are easier to stick together than skinny bits, and the performance remained at the same sub-thermal level.

Again on the subject of rule changes, I see they have reduced the power run to a mere 7 seconds, whilst still relying on old-fashioned manual timing techniques. Now, in ten years' time, given that their short but exultant noise output allows them to be flown anywhere, the estimated engine run will be 1·5 seconds. We can only hope by that time some electronic timing device will have been introduced – but, no doubt, by then flyers will be timing their own models. Come to think of it, some seem to do that already.

TAILPIECE . . .

Jim Mannall describes how he made his Nimrod stunter more easily portable. Use his methods to make your control-liner fit 'economy sized' cars

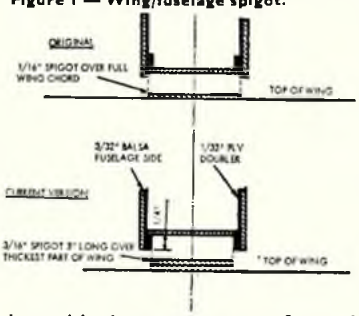
The author demonstrates the detachable tail unit on his Nimrod 5A, flown at the 1974 World Championships. It really is amazing just how much space is saved when the tail components in addition to the wing can be detached for transport — and there is less risk of damage too.

TWO-PIECE stunt models are now accepted as part of the British scene, and while they have not become very numerous at International championship meetings, I cannot think of anybody who has reverted to one-piece models after trying the 'two piece' variety. Those who have used detachable wings are now convinced of their reliability and the convenience of transport they offer.

The various designs used (by Steve Blake, Pete Tindal, John Lynch and John Newnham) vary in detail, but all now use four bolts to secure the wing. The 'fit' between the wing and fuselage appears to be less critical than was at first thought. The most significant departure from the *Nimrod*-type system is Pete Tindal's *Chipmunk* which has no spigot on top of the wing, lateral location being provided only at the bolt fixings. Personally, I would not recommend this, as the fuselage is likely to twist about the fixing lugs; however, the location on the top of my *Nimrod* wing has been changed to simplify construction. As shown in *Figure 1*, the $\frac{3}{32}$in. supports inside the fuselage sides are now flush with the fuselage sides – this gives wider seatings for the wing. The $\frac{1}{16}$in. spigot running the full chord of the wing centre has been replaced by a 3in.-long spigot consisting of two laminations of $\frac{3}{32}$in. balsa, positioned about the point of maximum wing thickness. The spigot is added after covering the wing, so that the tissue covering can be taken right across the centre, giving extra strength.

With a two-piece model, the wing accounts for about 40 per cent of the total weight, and when protected by cardboard covers is easily handled and not prone to damage. On the other hand, the fusclage is relatively heavy for its size, and with the tailplane attached is an awkward shape; the wing dictates the length of box required for transporting the model, but the fuselage/tailplane assembly dictates the width and depth required. Why not, then, remove the tailplane? Having already built a box to carry two models on a roof-rack, is such a gimmick really necessary? Maybe not two years ago,

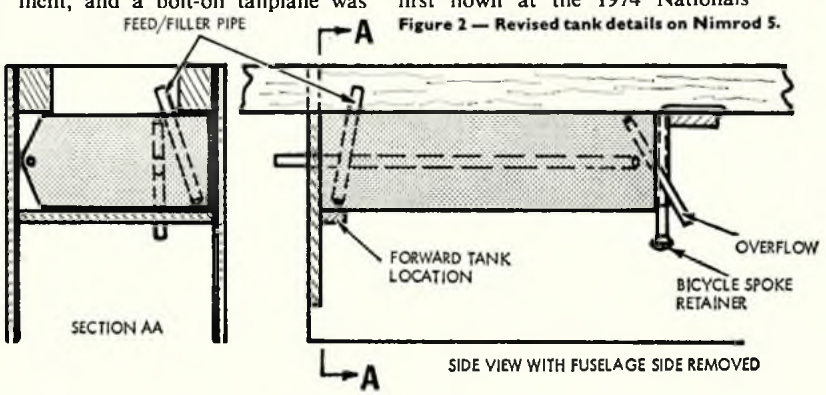
Figure 1 — Wing/fuselage spigot.



but with the present cost of petrol the possibility of carrying two models (and a family) without using a roof-rack is very attractive – the increase in fuel consumption caused by the extra drag of a roof-mounted box is quite dramatic. Anyway, early in 1972 a crashed model (*Nimrod 4*) provided the opportunity to experiment, and a bolt-on tailplane was devised. The fin was moved back 2in. to allow the tailplane to be lifted out The long rear fuselage rather spoilt the appearance and the performance was not too good (the fault of the wing section, not the tail arrangement). However, the model, although normally too 'snappy', proved to be an asset in very windy conditions, and won the *Gold Trophy* at the gale-force Nats of 1972. I now knew that a bolt-on tail was feasible, but with no real incentive to use it the idea was shelved, and *Nimrods 5* and *6* were built with fixed tailplanes.

Disaster struck at the 1973 Southern Gala; a loose feed pipe in *Nimrod 5*'s tank caused the engine to cut during an overhead eight. The resulting crash wrote off the fuselage and broke the wing in two at the centre. Remarkably, the wing proved to be repairable and a new fuselage was built using the old tailplane. To avoid further failures, the feed pipe no longer acts as the forward location for the tank. A $\frac{1}{4}$in. wide piece of $\frac{1}{16}$in. ply is fixed across the fuselage as shown in *Figure 3*. The hole through the front bulkhead was enlarged to clear the fuel tank feed. *Figure 3* also shows the latest tank vent positions. The rebuilt model was first flown at the 1974 Nationals

Figure 2 — Revised tank details on Nimrod 5.



where, on the Saturday morning, during what was intended to be my last practice flight, the tailplane folded at the top of a square loop. A partial recovery was possible and the model 'pancaked' inverted on to the runway, breaking the engine bearers, but leaving the wing unscathed except for minor scratches at the tips. *Nimrod 3* had been refinished and thus became my first string, being used in the *Gold Trophy* the day after *Nimrod 5*'s second demise!

The World Championships in Czechoslovakia were rapidly approaching and it was essential to have two good models. Before attempting to repair *Nimrod 5*, I decided to cover and finish number 6's structure which had been sitting in the loft for almost a year. This would be a 'non-active' reserve in case *Nimrod 5* should prove impossible to repair. For the first time, I was going to a World Championship without a car and it would be necessary to take four of the team's stunters by air. Space was at a premium, and it was decided to rebuild *Nimrod 5* with a detachable tailplane. But how was the fin shape and position to be retained? The fin must be removed with the tailplane, and further, since a tailplane/fin assembly would still be unwieldy, the fin must be separate. Several stages later the final design was evolved: the fuselage was lengthened by ¼in. and the fin strake much reduced in length, but the basic side view remained unchanged. The details are shown in the accompanying ½-scale drawings, but it is worthwhile explaining the purpose of the various parts.

The tailplane mounting is similar to that used on *Nimrod 4A*. Since the longerons and top block are no longer continuous above the tailplane, the rear fuselage is weakened with respect to the vertical forces from the tailplane. The triangular frames of $\frac{1}{32}$in. ply carry the tailplane loads on to the fuselage forward of the tailplane leading edge. The tailplane is secured by two 6BA bolts, the rear one of which is hidden, while the forward one also secures the fin. The $\frac{1}{16}$in. ply plate **A** attached to the tailplane sits on the top faces of bulkhead **B** and part **C**. Tightening the bolts imposes no load on the tailplane structure. The thrust piece **D** carries the bolt load on plate **E** through to plate **A**. Side location of the tailplane is provided at the front by plate **A** between the frames and at the rear by the frames protruding into the hollow centre of the tailplane. Two $\frac{3}{32}$in. balsa spigots **F** underneath the tailplane also locate inside the fuselage and help to prevent tilting of the tailplane. Stop **G** prevents rearward movement of the tailplane; forward movement is not possible, because of the shape of the fuselage cut-out. The fin is held vertical by the ¼in. square piece **J** which fits between the fuselage sides. The top of piece **J** is also a close fit under the $\frac{3}{8}$in. block at the fuselage rear to provide vertical restraint. The fin location piece **H** provides sideways location, and being behind the thrust piece **D** prevents rearward movement once the securing screw is fastened. The fin is removed by easing up the front to clear location **H** and then sliding the assembly backwards.

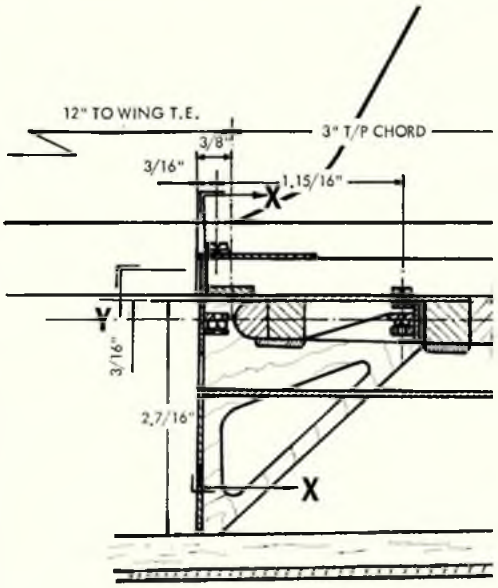
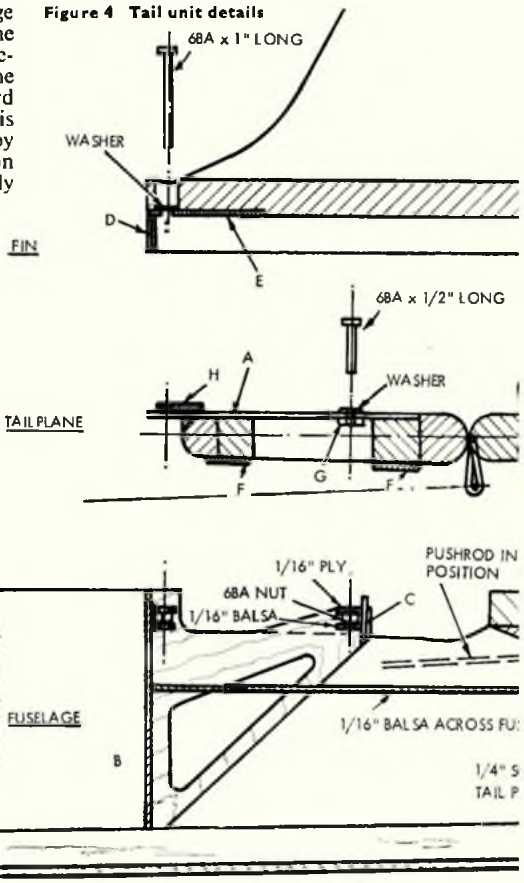


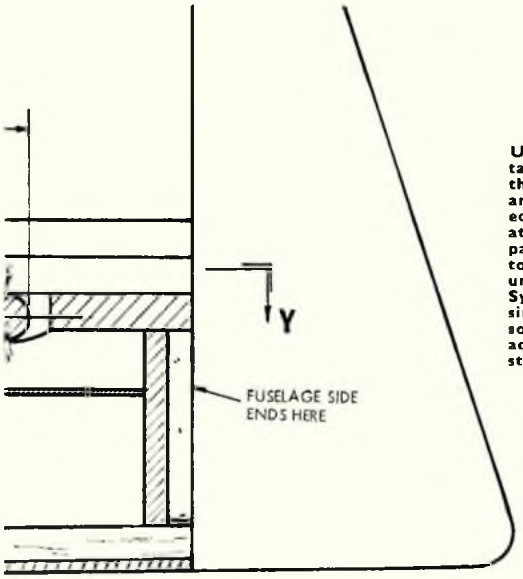
Figure 3 Nimrod 5A's tail unit

The pushrod is guided adequately by the slot in bulkhead **B** and no other means of securing the end in the elevator horn is necessary. With the model dismantled, the pushrod is loose – it cannot be withdrawn from the fuselage because of the guide halfway along its length and could move about in transit, perhaps damaging the fuselage. By coincidence, when the pushrod is turned so that its ends are vertical (pointing

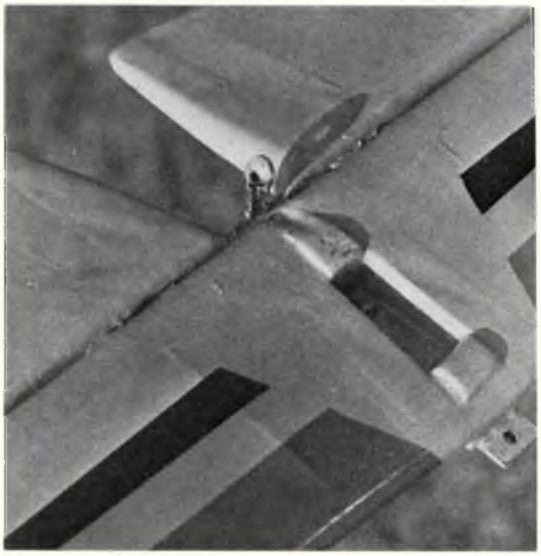
Figure 4 Tail unit details



Rear end of the fuselage clearly reveals the heying-system which Jim employs to ensure accurate alignment of the tailplane. The various component parts are drawn out in Figure 5.



Underside of the tailplane shows the recess, kegs and tonge employed for rigid, accurate location - compare with opposite to see how the units fit together System is actually simpler than it sounds and easily adaptable to most stunt designs



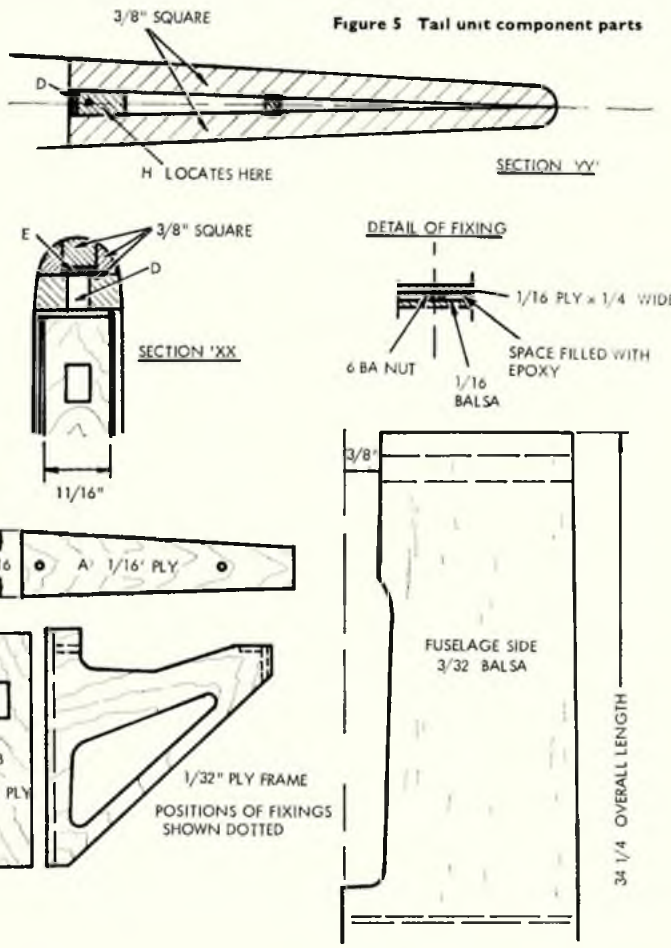
upwards) and the pushrod is as far back as possible, its front end lies in the slot in the $\frac{1}{8}$in ply bulkhead immediately behind the wing The position of the pushrod guide and the slot in bulkhead **B** are such that the rear end of the pushrod is held against the underside of the $\frac{3}{8}$in rear block A piece of scrap balsa, as shown on the drawing, retains the pushrod in its travelling position

When assembling the model, it is better to fit the tailplane first, since when the wing and fuselage are bolted together it is difficult to engage the pushrod in the elevator horn Some settling of the joints occurs during early flights, and it is as well to check all bolts for tightness before every flight while the model is new

A model bolted together in this way opens up many possibilities for experiment Different fin and tail areas may be tried simply by making new components and the elevator horn is now accessible This enables elevator trim to be adjusted without disturbing any 'aileron' trim that the flaps may have The most significant result, though, is the ease of transport (coupled with the reduced risk of tailplane damage during transit) Make a box to fit the wing, say, $60 \times 15 \times 6$in , and the other parts will fit as well! The air trip to the 1974 World Championships showed how much space was saved by removing *Nimrod 5A*'s tailplane The largest box available (courtesy of Ted Fowler) had to carry John Newnham's models and mine – that is, *Nimrod 5A*, a one-piece model and two with detachable wings Packing the box proved all but impossible and indeed so cramped that one tailplane/fuselage assembly was damaged in transit Without the removable tailplane, *Nimrod 5A*'s fuselage assembly could not have gone in

After almost a season's use, the tail assembly has proved to be perfectly satisfactory, and future versions will incorporate the same feature The next model will also see changes in wing and tail areas, but in the meantime I hope to use *Nimrod 6* as my main competition model this year It is also likely that an existing model will reappear in a new guise later in the season – watch this space!

Figure 5 Tail unit component parts



1975 Wakefield WC Team Member RON POLLARD discusses the heritage of his VITAR II design

Built in late '53 - early '54 for the then-new 80 gramme rule, the author's model displays a design trend which became popular some ten years later. Model featured a 60 in. wing span, 30 in. diameter prop and tiny (36 sq. in.) tailplane.

DEVELOPMENT OF A WAKEFIELD

AT THE 1967 Czechoslovakian World Free Flight Championships, the British Power team placed first with George French, Ray Monks and 'Joe' Savini placing 2nd, 10th and 17th respectively. Our Wakefield team was not so lucky, finishing 20th out of 28 teams, with individual placings of 56th, 57th and 67th. This rather disappointing performance prompted me to write to the then Editor of this magazine, Ron Moulton, on the subject of our lack of success in the Wakefield event – it should be remembered that our only post-war individual winner was Roy Chesterton (1948), although Ted Evans and Henry Tubbs had both managed second in 1950 and 1951. I can do no better than to quote from Ron's replying letter '*. . . on the problems of our poor efforts in International Wakefield Class Competition. The real reason why Wakefields from other nations are better than ours is that they are produced by specialists who think of nothing else and who apply a far higher standard of workmanship and patience to their product. The contrast was never more evident than at Sazena.*

'*We need far more efficiency in propeller design and use of power. Only Laurie Burrows in this country has bothered with any form of gadgets such as changing angles or positions of the flying surfaces. . . . I would certainly like to see a few individuals following his line and adding the latest techniques to give us a chance in 1969*'.

In retrospect, that letter showed considerable insight into the way in which British Wakefields would have to be developed if we were to compete with the world's best. It is interesting to note that in 1969 the British Wakefield Team finished 10th, with individual placings of 20th, 34th and 44th, and without a gadget amongst them!

Early history

To fully understand my dissatisfaction with my own Wakefield performances, as well as that of the British Team, it is necessary to trace the early development of my own Wakefields.

In common with many modellers, I felt that the 1957/58 rule changes reducing the maximum rubber weight to 50 grammes was a disaster. I tried a model to the new formula, and was very disappointed – having made the mistake of using a modified 80-gramme model with 12 instead of 14 strands of rubber with the same wing, tailplane and prop., i.e. 45in. span, 218sq.in. wing, 75sq.in. tailplane and a 22×22in. propeller. I also used this model for Open Rubber events with the ballast removed and 3oz. of rubber, with good results. However, to modify a multi-purpose model to obtain the best results from a new formula was doomed. In retrospect, I think that this is when the Continental Wakefield flyers made one of their biggest steps forward in the development of their models. Unhampered by an Open Rubber class, all their efforts and development were channelled into getting the best out of the new formula. This they did with a completely new approach; the basic layout of which forms the basis of the modern Wakefield.

I use the term 'new approach' in its loosest sense because in late 1953–early 1954, I designed and built two models which were to make the best use of the *then* newly introduced rules, permitting 80 grammes of rubber. The first model spanned 50in. with a 6in. root chord tapering to 4in. at the tip, a 244sq.in. wing, 50sq.in. tailplane, 14 strands of rubber 34in. long contained between a hook distance of 25in. and driving a 24×24in. propeller. The wing section was Benedek B8356 with the CG at 60 per cent chord. This performed well with a reasonable climb, bouncing up each time it turned into the wind, and had a superb glide. Thus encouraged, the second model was even more extreme with a 60×4½in., 258sq.in. wing, 36sq.in. tailplane, 16 strands of rubber driving a 30×20in. propeller. Yes, that's right, a 30in. diameter propeller with 20in. pitch! To minimise the centre of gravity shift when those huge 14in. blades folded, the central hub, with the blades attached, moved forward some 3in. to compensate. This model had an outstanding performance in calm conditions, but proved very vulnerable in wind due to its high climbing angle. Unfortunately, two years of National Service prevented a more detailed evaluation, and further development of this model. Looking back, I feel the root of the problem was in the pitch/diameter ratio of the propeller being only 0·66:1, whereas the most successful propellers are between 1 and 1·5. Upon release from

National Service, however, I did not pursue my line of design development (which has since been proved to be in advance of its time) and instead decided to use John O'Donnell model with its all-weather reliability, as the basis of my design and used this for the next two or three years. Discovering that this design was a very poor performer with 50 grammes of rubber, I abandoned Wakefield flying for a number of years.

With development of 50-gramme models going on in the rest of the world, improved performance resulted, and so I examined the formula again in 1962. The approach that I had previously followed was much in evidence, so I designed a new model following the popular trend. This model featured a 48 × 4 8in., 224sq in. wing, a 70sq.in. tailplane and 12 strands of rubber powering a 22 × 22in. propeller. This model was hopeless, recording flight times of around 1:45. Increasing the power to 14 strands improved the climb, and the flight times, but unfortunately the model was lost on a D/T failure before any further development could be done. Thus encouraged, another model to the same design was built, but this time with an all-sheet wing. Until this time, all wings had been of geodetic construction; some with sheeted leading edges and some without. The new wing improved the glide, and when a new propeller was carved (being 22 × 28in., powered by 16 strands) a further improvement in performance resulted. A change in trim from right/right to right/left gave a big increase in height on the climb, probably worth an extra 30 or 40ft. This is the model which won the 1963 *Weston Cup* with a full house of 15 minutes. Two more models to this design were built, but with limited success. These models were inconsistent and the trouble was traced to the all-sheet wings. After six months or so, when all the solvents had dried out; the wings would become uneven and one or more panels would warp.

In 1966, there was a decision to further reduce the maximum rubber allowed, this time down to 40 grammes, and I felt that there must be more accent on the glide. Three models were built in the next two years, but proved inconsistent performers.

Recent development

In 1968, I decided to use the sharp leading-edged wing section which had been used successfully on Thomas Koster's 1965 winner. This wing was used on an existing model and it transformed the performance, the model winning the *Weston Cup* again. Once more, I decided to build a new model using the successful wing, based on that of Thomas Koster's design. The new model had an aluminium front fuselage and turned aluminium prop.

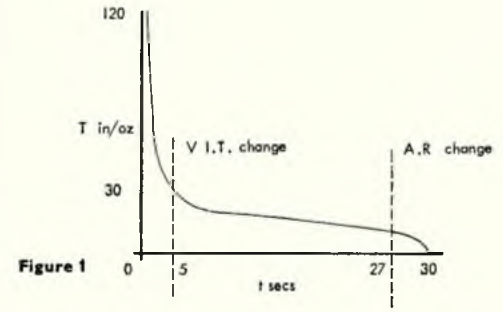


Figure 1

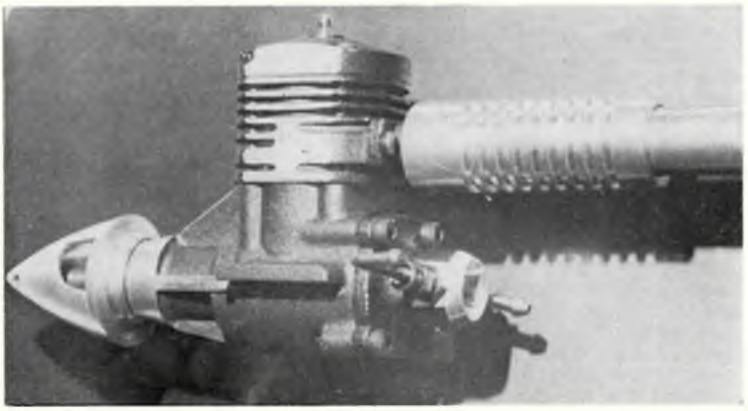
assembly as shown in the accompanying photo, 1968 was also the year that Christian Schwartzbach presented his now famous propeller theory: a suitable propeller was carved and the increased thrust made the initial burst uncontrollable. It needed a CG shift back to 75 per cent and a further 2in. on the moment arm to bring it under reasonable control Unfortunately, development was slowed down when this model was lost on a D/T failure.

In 1970, I decided to try a variable incidence tailplane to control the high initial torque, and an auto-rudder to allow the model to climb against left rudder and still have a right-hand glide. *Figure 1* shows a typical torque/time curve for 16-strand motor powering a modern Wakefield model. It can be seen that the initial high torque of approximately 120in./oz. falls to approximately 30in./oz in the first 4 or 5 seconds. During this period, the looping tendency can be eliminated by holding the tailplane at a more positive incidence and then releasing into the normal glide setting for the remainder of the climb and flight. The auto-rudder is held straight, or left, until a few seconds *before* the propeller folds. These were the important new features on the 1970 model, but whilst valuable experience in the use of VIT and AR was gained the model performed poorly because of other features – namely, low aspect ratio and the poor-gliding wing section.

For 1971, I combined the best features of the '68 and the '70 models, building a straight copy of the '69 model and incorporating VIT and AR! Only minor modifications were made for the 1972 model which is to be featured next month. These were that the model was built in metric measurements with a later Koster '66 wing section, and a much stronger wing construction. Looking back to Ron Moulton's letter in 1967, I think that *Vitar II* just about fits the bill!

To be continued.

Below: fore-runner of the present design, this 1968 model had V.I.T. and A.R. added in 1971. Spans 52 inches, uses sharp leading edge wing section and aluminium front fuselage. At right are the models used to win the 1973 FFn International. Model on right is the original Vitar II, flown to 19th place at 1973 World Championships.



The OPS factory had this '15' speed motor on show at the Nurnberg Toy Fair — but don't expect to see them for sale yet. Obviously it has to be as good, if not better, than its rival before serious production could begin. Interesting, nonetheless!

Dave Clarkson provides news, information and gossip for the control-line fanatic!

BETWEEN THE LINES

'MONOLITH' – A FASCINATING RUSSIAN TR MOTOR

I first saw a sketch of this motor in the Czech *Modelar* magazine a year ago, but since then I have been fortunate enough to obtain a copy of the original description and sketches in Russian, and have had the text translated. The sketches, and an edited version of the text, are presented here and serve to illustrate the great efforts our Russian friends put into their modelling. My first reaction was *'very interesting – but stupid'*, however, after studying the details and thinking about the theory behind the design, I am inclined to regard this motor as making a most significant contribution to our sport. Think about it, fellow T/R nuts, there is an awful lot of sense in what the designers – the Samoilenko bros. from Kiev – say.

'One of the basic requirements for any contest motor is to ensure efficient cooling. Our engine has a good aerodynamic shape that fits the natural model line; from the appearance and aerodynamic points of view, no motor cowls are required. In order to improve heat transfer, the exposed surfaces of the motor have been anodised black. It is bolted directly to the model fire-wall.

'The motor has three transfer passages and a front exhaust. The front exhaust position means that the *hottest* part of the motor receives the *coolest* air supply, ensuring very uniform cooling. This uniform cooling enables higher operating temperatures to be used, before thermal distortion causes seizure, and therefore the motor's thermodynamic efficiency is increased, and more power results. Comparative tests of two identical motors differing only in the orientation of the exhaust port have shown that a front exhaust position is distinctly superior. There are some other advantages: in particular, the transfer passages fit very well into the motor design.

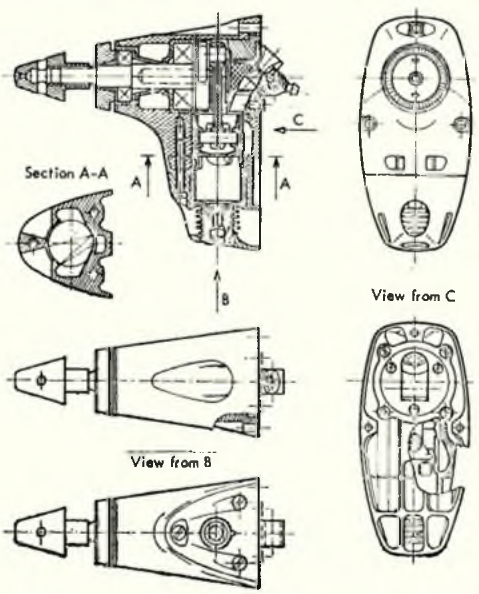
'The transfer passages are of minimum length, the main transfers being particularly short, necessitating the use of a full depth slot in the liner. Transfer passages designed in this way give little resistance to gas flow and ensure good cooling and lubrication of the little end, also the piston is more symmetrically cooled than is usual. Timings are 128–130° for the transfer and 144–146° for the exhaust, the actual port widths and directions follow normal Schnuerle design practise.

'An especially short and compact rear-induction system is employed, having been developed from the Natalenko *Start* motor design. The induction period starts at 45° after BDC and continues for 180°. The induction passage is short and only slightly bent and is so directed that the fuel/air mixture goes directly into the space underneath the piston. This is achieved by using a relatively large drum diameter of 12mm, and the passage continuity is given by a 'Tufnol' insert inside and drum held stationary by bolting it to the back-plate. The design was developed after studying and testing numerous designs – for example, the HP-style drum, the K&B-style drum, the Super Tigre disc and the ETA-style disc.

'The cylinder head is designed to give proper cooling and also provide very fine compression adjustment. It consists of a finned fixed portion into which fits the movable contra-piston of 7mm diameter, and its positioning screw which allows a total movement of 2·5mm. These parts are constructed in bronze, chrome-plated in places and are retained by a cast cylinder head which is bolted to the motor. The contra-piston stroke is sufficient for any fine compression variation dictated by weather changes. Coarse variation, required by fuel or prop. changes, is achieved by shimming the whole unit. The outer part of the head has three cooling ducts cast-in to direct cooling air right on to the fixed part of the contra-piston.

'The motor has a cast, heat-resisting aluminium alloy case, a forged aluminium alloy con-rod, a pearlitic grey cast iron piston, a through hardened liner (Rockwell 'C' 60–62) and a case hardened shaft (0·5–0·6mm thick case at Rockwell 'C' 58–60). The shaft is carried on two ballraces, 7×17mm front and 8×22mm rear, behind the rear race is a removable seal bush with a 0·010–0·015mm clearance around the shaft to prevent gas leakage through the front housing. The all-up weight of the motor, minus prop. and tank, is 200 grammes.

'MONOLITH' T/R MOTOR



'Two examples of the *Monolith* have been built and have been thoroughly tested both in practise and in official competitions on the Departmental Republic and Union levels'.

A. & V. Samoilenko, Masters of Sport, Kiev.

I, personally, would be inclined to 'protest' at such a motor under our rule 10.4 (1), which states: *'The motor(s) must be entirely enclosed, including the cylinder head and the carburettor. . . .'*. However, a motor with all of the characteristics described but designed for installation in a normal model should have even better uniformity of cooling and therefore further improvements in thermodynamic efficiency should be possible. According to my sources, the Metkemeyer brothers have just finished doing the necessary mods. to a Rossi; maybe at the Nationals we will see just how well the Samoilenko design theories work.

HEADS FOR GLOW MOTORS

For those of us who like to get the most out of any motor, whether it be a Rossi or a Fuji, glow motors seem to present more problems than they should. This is perhaps because the range of commercial fuels available here in the UK is restricted to the low to medium nitro content range (5–15 per cent nitro). Many deflector-piston motors will not run properly on these low nitro contents, but equally many deflectorless piston motors regularly 'crunch' plugs on anything but zero-nitro fuel. The key seems to lie in the motor compression ratio, so using a 1ml hypodermic syringe, a random selection of motor heads were measured with the following results:

Deflector piston motors . . 7–9 :1 Comp ratio
Deflectorless piston motors . . 11–13:1 Comp ratio

Yet for 5–15 per cent nitro fuel a compression ratio of 10·5:1 gives best results. Besides the compression ratio, a fairly narrow squishband with a piston-at-TDC to squishband clearance of approximately 1·2 thou., and a biggish plug element to piston-at-TDC clearance both help with providing good combustion and good plug life. The vast majority of standard glow motors available fail in one or more of these requirements, and therefore quite startling improvements in motor performance can be obtained simply by installing a new head on the motor. This operation is really only practical on a deflectorless piston type motor – i.e. one with Super Tigre-style open-loop porting, or with Schneurle porting – but since many manufacturers are changing to these porting systems, head substitution is becoming more and more possible.

Figure 1 shows a simplified trumpet-type head design that can be easily and, more important, accurately reproduced by any competent model engineer using a lathe. The accompanying table of dimensions gives the appropriate heads for a wide range of motors. So far, I have tried out these heads on a MVVS 2·5 RL, a Taipan 2·5 TBR, a Super Tigre G15 FI, a Fuji 35 and a Fox Combat Special, all with varying degrees of improvement in motor performance, but a significant improvement in all cases. The Taipan and G15 heads were intended for use on higher than normal nitro content fuels, so lower than standard compression ratios were employed.

Whilst turning such heads on a lathe from aluminium is a simple operation, there are a couple of points to watch out for. The first,

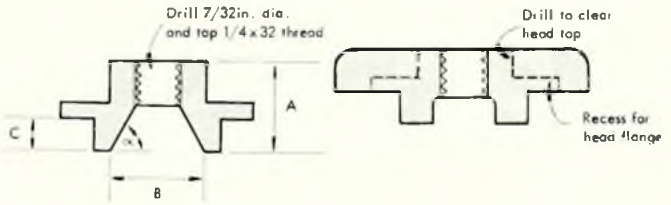


Figure 1 Simple trumpet head and clamp

Motor Size	0.15 cu.in.	0.19 cu.in.	0.29 cu.in.	0.35 cu.in.
Nominal Dimensions	15 x 14 mm	16 x 16 mm	19 x 17 mm	0.8 x 0.7 in.
Head Height (A)	8.30 mm	9.00 mm	10.00 mm	0.410 in.
Cone Base Dia. (B)	11.50 mm.	12.50 mm	14.50 mm	0.600 in.
Cone Base (exc.) Angle	50°	51°	50°	50°
Plug-in Depth (C)	Varied to give 0.3 mm squish clearance			

Suggested dimensions for trumpet heads - note dimension 'A' is calculated assuming that normal, long-reach glow plugs are used.

and obvious one, is that the stated dimensions have to be very accurately reproduced; for example, an error of only 1° in the cone base angle will give a compression ratio change of around 0·3:1, the squishband width is equally critical. The second point is that the head should be a good fit into the motor liner, a light-to-medium push fit should be aimed for. Finally, a really good finish should be given to the surfaces exposed within the motor. Having made the head, it is a simple matter to turn the rejected motor cylinder head into a clamping ring for the new head; using a lathe, a typical such modification is also shown.

Head-work is really the basic *starting* point for glow-motor tuning. Many people do a lot more, but without a good head it is frequently not worth the effort.

FAI POSTAL INTERNATIONAL TEAM RACE – 1974

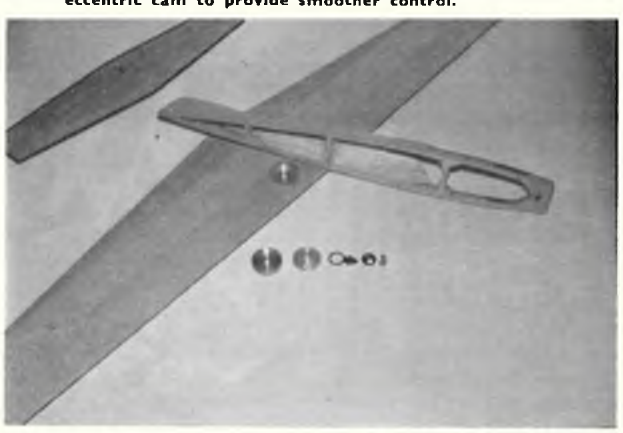
The second running of this event has again been won by Heaton/Ross, well supported by their *Norwest* clubmates. The organiser, John Wellman, received a total of 29 entries from no less than seven countries split up as follows:

Australia 10, New Zealand 7, South Africa 6, England 3, Canada 1, West Germany 1, Rhodesia 1.

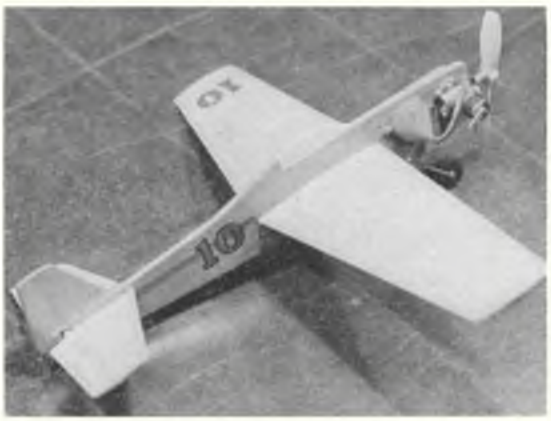
The top ten places were filled as follows:

1.	Heaton/Ross	(G.B.)	Bugl	4:12
2.	Clarkson/Daly	(G.B.)	K&B	4:19
3.	Bader/Kaul	(BRD)	Bugl & Rossi	4:23
4.	Oddy/Reichardt	(Aust.)	Bugl	4:32
5.	Sutherland/Woodside	(G.B.)	K&B	4:36
6.	Van Breda/Sutherland	(Rhod.)	Bugl & ARM	4:37
7.	Kerr/Shing	(Aust.)	Bugl	4:50
8.	Wellman/Newton	(RSA)	Bugl	4:56

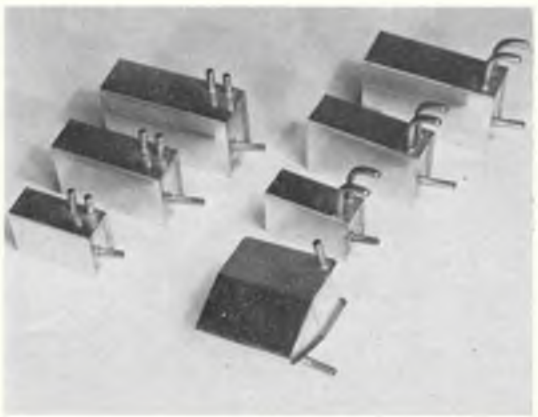
Emil Rumpel of West Germany's Bochum Club is renowned for his expertise at tuning team race motors, but he extends the same craftsmanship to his models, too. Note how even the humble bellcrank can become complicated! Emil uses an eccentric cam to provide smoother control.



Not only a superb builder but a quick one, too! Emil retains the same design of model for a very good reason – he has prepared special jigs for their assembly, and in fact can complete the basic model in a weekend. The three models seen here under construction were finished in a very few days!



¼A or Mini Goodyear racing is catching on fast amongst Junior fliers, who find that even old plain-bearing diesels are very competitive and that there is no special/expensive engine that is suitable! Helping to make the class even more popular will be this newly released kit – the Jolly Roger 'El Bandito'.



Frightened by the prospect of having to build your own fuel tank? Saturn Accessories now offer a range of 'team-race' tanks from 7½–30cc in both 'normal' and 'pressure' styles, plus a popular 'wedge' tank. Distributed by Ripmax, they should be in your model shop now.

9. Shumer/Noakes	(Aust.)	?	5:04
10. Koch/Duncan	(RSA)	Bugl	5:05

John compiles the results by taking the best four heat times recorded in separate open-entry contests during the period of July to December. To enter for the 1975 Postal, simply send in your results during the season to:

J. Wellman, PO Box 11131, Johannesburg, Transvaal 2000, Republic of South Africa.

No entry fee money is involved for we foreigners, and yet the winners receive really smart souvenir prizes.

John wrote with the results congratulating Derek and Malcolm on their repeat victory and also thanking the Australian and New Zealand entries for their support. However, he was a little disappointed with the lack of support from England (only one club bothered) and more particularly from Europe. If the Italians or Austrians had entered, then the prizes would, without doubt, have been going there. Nevertheless, Heaton/Ross deserve this at least for their fantastic performances in 1974

TO WIN OR NOT TO WIN (FAI COMBAT, OF COURSE)
(Reprinted from the Southern California Control-Line Association Newsletter) – **by Charlie Johnson**

'Some of you might know that I went to Europe last May and attended the British Nationals plus a meet at Wolverhampton and some miscellaneous flying sessions. Now that I am an expert at FAI Combat, having won my first round at the Nats (and sadly losing the second), I will proceed to tell one and all how to win.

'The British are very set in their ways of winning, using the Copeman-tuned Oliver Tiger diesel. Those stinky diesels are better than you think, too; the faster planes run in the high 80mph bracket and turn quite well. Almost all bouts are fought on the downwind quarter of the circle and consist of continuous loops, bunts (outsides) and line tangling. Their lines resemble soldered bundles of Rat Race lines – you bend them and they stay that way. Our 0·012's are slippery, but may get sawn right away.

'The ground is the AMA combat plane's worst enemy, but you'll find that hitting the ground with your FAI plane can be lots of fun and often a good way of avoiding being cut. The British rarely break a prop. because the diesels love to run on 8×6 *Tornado* nylon props. with the tips clipped and also depitched by a few healthy crashes; the prop. has a strong centre section and the diesels do not rev high enough to throw a blade. What are we going to use for props. on glow motors? Wood props are unthinkable; nylon props. are either not very efficient or not safe for high-revving Tiger and Rossi mills.

'Forget it, if you plan to fly the British style of flying – that is, close-in continuous manoeuvring never breaking-off the engagement until one or the other has one. The British almost consider it unsportsmanlike to fly away to the other side of the circle. There are several good glow motor fliers over in England, but they fly the same style as the diesel guys and have thus lost the advantage of the glow. *Hit and run* – superior speed is easy to come by with glows, and with your added speed you'll be able to go upwind (don't say that near a stinky diesel especially when the wind is blowing) and wait your chance to pounce in and get a quick cut. Take my word for it, if you get in tight with those guys they're gonna make your howling Rossi look like a Turkey. A couple good wraps of their lines around yours and your nimble mini-*Bosta* or *Nemesis* will handle like a lame camel!

'Cutting the streamer. If we make fire-breathing bombs, we take a chance of shocking the entire streamer off even though our plane/lines or even prop. might have hit toward the end. One of their favourite tricks is to 'feed' you the whole streamer in one gulp, then you play dodge 'me for the remainder of the match. The British are masters of taking little nibbles off the streamer, often matches will end 8 cuts to 10, etc. Real experts like Mick Tiernan, Richard

Two more control-line models from the 'Jolly Roger' production line. In the foreground is Vernon Hunt's Buccaneer FAI-combat design, which should prove a real winner in more ways than one, while the smaller fellow, the Jolly Roger 'Pirate', is a scaled-down version for 1·5cc engines. With three top-line combat models actually available in kit form, things are really looking up for the C/L flyer. Both models should be in your model shops now.

Evans or Vernon Hunt can follow another plane through any manoeuvre all the time taking little bits off the end. It's hard to forget the AMA style of getting in there and killing 'em, it happened to me in my second match at the Nats. Talk about sportsmanship; if you cut the entire string off your opponent where you wouldn't have a prayer of winning, you are expected to concede the match. Once a match has ended, you are expected to land your plane so that the next round can begin. They give their planes a couple of tight loops to kill the speed, and then belly in! Try that with your AMA plane sometime.

'Here's briefly what I intend to do to prepare for a possible FAI Combat World Championship. I'm going back to England for another try at their Nationals next May. This is the BIG meet, anyway, since the British are by far the best combat pilots; only Dubel of Germany at the Nats was in a class with the English lads. I'm also going to use glow engines with tanks, a couple kamakazie ships to fly against other glows and heavier planes for use against the diesels. I also purchased an Oliver Tiger and will construct a couple of British-style models for practise flying. It would be a good idea for the American Team to import a good British pilot to practise against; not only would he give Americans fits at FAI Combat, but would do very well at AMA, too. Don't think the superior American power-house can do it all for us; 'superior German technology' gets trounced every year!'

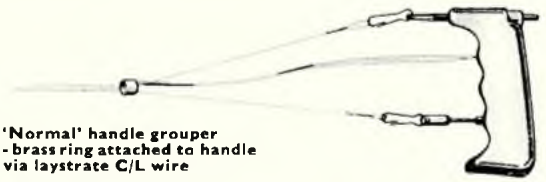
* * *

Oh! *Mein Gott* – they actually use Rossi's in 'confetti' models on wooden props.! A very perceptive article, Charlie, especially that bit in the last paragraph about the best pilots. You're welcome at our Nats any time, let's hope you don't draw a German opponent or someone who insists on flying up-wind of you with a 'stinky diesel!'

MAKE IT EASY – The 'Dutch' Handle Grouper

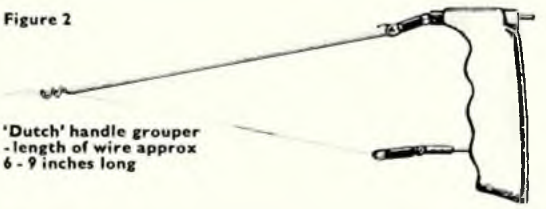
I flew most of the later half of last season with a handle grouper. I found no speed advantage. However, I did find the safety increase hoped for. With a handle grouper it is possible to counter obstruction-tactics by allowing people to back into my lines and not fear the (adverse) control effects of this. The point is that with the lines held close together near the handle, if someone (or something) snags the lines, both lines are equally effected as opposed to ungrouped lines where it is invariably the down line which is effected. When both lines are snagged, the model does not move in the air; when only the down line is snagged, a crash follows fast.

Figure 2 shows two forms of handle grouper – one a permanent attachment which requires handle modification; the other is the 'Dutch' handle grouper which is quickly and easily made, is quickly detachable and requires no handle modifications. It is simply a length of 20swg wire bent at the handle end so that it clips on to a convenient line connector and has the grouper end bent round a few times into a sort of corkscrew. To fit the grouper, simply hold



'Normal' handle grouper - brass ring attached to handle via laystrate C/L wire

Figure 2



'Dutch' handle grouper - length of wire approx 6 - 9 inches long

the lines together and wind the corkscrew end of the grouper onto the lines, when the corkscrew surrounds the lines all that remains is to clip the handle end of the wire to one of the line connectors. A simple operation taking about 20 seconds to perform.

Why the name – the 'Dutch' handle grouper? Well, it was invented by our old friend Hans Visser of Rijswjk in Holland.

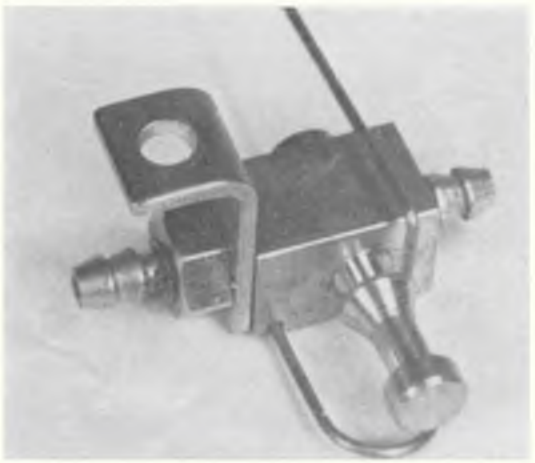
STUNT NEWS by Glen Alison

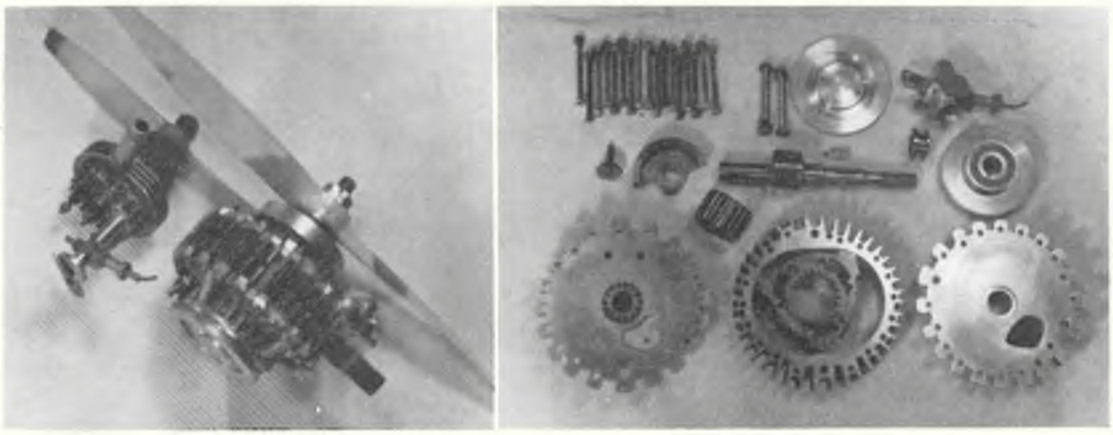
Some discussion has arisen over the new arrangements for C/L World Champs team selection. In this scheme, the three Area Centralised competitions, as well as the actual Team Trials, count. This is in order to obtain a fairer selection based on consistency of performances, etc., and I think that for T/R and Speed it is a good idea because these events are judged against the stopwatch and all results are absolute. However, with stunt, conditions are never constant as the result depends on a judge's opinion, different judges have different ideas and standards, and are you going to get the required five judges at all of these comps? What is perhaps more to the point is that a potential team member may be beaten and thus lose points at one of the events by a flier who does not wish to be considered. The advantages of a one-event Trial are therefore that only those who wish to commit themselves to the expense, should they be successful, will enter. The weather is the same for everybody, problems of getting five judges and a contest director together are eased, and fliers will not be penalised if they cannot attend some of the other meets.

Perhaps a compromise would be possible whereby, as a condition of entry to the Trials, a competitor must have flown in the Nationals and say one or two Centralised events, although these would not count towards a team placing. The object of this is to prevent the possibility of a person gaining a team place just by flying in the Trials only, and not seeing him for the rest of the year when he might help others by his presence and experience. How about some comments?

New name in the field of glassfibre props. is Nash-de-Villiers, who is making this deep cuff team race prop., ideal for Bugl or Rossi motors, etc. Also available is a 7×3½in. Cox-type prop. for F/F power. Prop. in the foreground has just had flashing removed and is not yet thinned for use. These props. are marketed by DES (Model Components) who also look after contest flyers by stocking Bartels GF props. and Punctilio Super Speed props. The N-d-V prop illustrated costs £1.10, the Cox 85p — very reasonable indeed. See Classifieds for details.

The Tatone fuel shut-off valve is a simple, spring-loaded plunger device fitting between engine and fuel tank – a pull on the trip wire releases the plunger to cut the fuel supply, while a quick push on the plunger resets the unit. Weight is ⅜oz. including the adjustable bracket – photo is approximately 2½ times life size. Ideal for C/L racing models or for use in conjunction with Tatone engine timer for F/F. Price is £1·95 from H. J. Nicholls & Son Ltd., of 308 Holloway Road, London, N.7.





Although these photographs are rather poor, they do at least give some idea of the effort that went into J. Howard's 10cc Wankel motor, based on the Falecki and O.S. Graupner designs. The smaller motor is an earlier Howard achievement, and has a displacement of only 1·27cc – certainly the smallest Wankel engine that we have ever seen.

Peter Chinn's
LATEST ENGINE NEWS

Remarkable home-built Wankel

Mr J. Howard of Eastbourne has sent some details and photographs of his 10cc Wankel motor. The photos are not really up to reproduction standard, but we are hoping that the blockmaker can do something with them as this motor does appear to be a most praiseworthy effort.

The design is loosely based on the Polish SW-992 motor by Julian Falecki (of which drawings were reproduced in the 1970-71 *Aero-Modeller Annual*) but modified to incorporate features of the OS-Graupner 5cc Wankel motor, including side-port induction instead of a peripheral intake. The rotor has also been lightened along the lines of the OS. The Falecki rotor, when made to the drawing, weighed 8oz. and the total for the complete engine would have been around 35oz., rather than the published 18oz. Mr Howard has managed to pare this down to 25oz., just twice that of the OS and thus maintain the same displacement/weight ratio.

Contrasting with both the OS and Falecki motors, the Howard Wankel originally had two glow plugs fitted in the rear side-plate instead of in the epitroochidal 'cylinder' itself. This arrangement was later modified to a single plug with another plug facing it in the front plate and this was found to increase performance by about 500rpm. The side-plates themselves were cast from old car-piston alloy.

Mr Howard tells us that his motor turns 11×8 and 11×7 props at 10,500rpm, an 11×6 at 11,000 and a 10×6 at 13,000 and, at the time of his writing to the Editor, the engine had had about ten gallons of fuel through it in the course of tests. Incidentally, this is not his first rotary-combustion engine. Several years ago he made a much smaller Wankel motor, which apparently has

Latest Russian model motor to be imported by The Modellers' Den is the little 8cc 'Kolibri' diesel. It weighs just over 1¼oz.

The OTM 'Kolibri' follows conventional practice for a 'baby' diesel, with screw-in liner and backplate, while the finned cooling jacket itself screws on to the liner.

a displacement of only 1·27cc. This is by far the smallest size Wankel motor we have heard about to date. Stout efforts.

OTM 'Kolibri' diesel

Already well-established as the only British model company importing and distributing Soviet made model engines (Sokol 2·5cc and MK-16 1·5cc diesels) The Modellers' Den Ltd., of Bath, Bristol and Cheltenham, are now offering a new and smaller model, the 0·8cc OTM 'Kolibri' diesel.

Modestly priced at £4·50, this little motor follows a familiar small diesel layout: to wit, shaft-valve induction and a radially ported steel cylinder that screws into a diecast aluminium crankcase and is topped by a machined screw-on finned cooling jacket. The crankshaft has a 6mm o.d. journal, a 3·5mm i.d. gas passage, a 3·5mm o.d. crankpin and a plain crankdisc. It has a pressed-on aluminium prop driver and is drilled and tapped for a 3mm prop retaining screw.

The cylinder features three equally spaced radial exhaust ports and, emerging between them, three internal flute type transfer ports. The short-skirted flat-crowned lapped cast-iron piston is fitted with a 2·5mm solid gudgeon-pin and a diecast aluminium conrod. The contra-piston is also of cast-iron and the cylinder jacket has a black anodised finish.

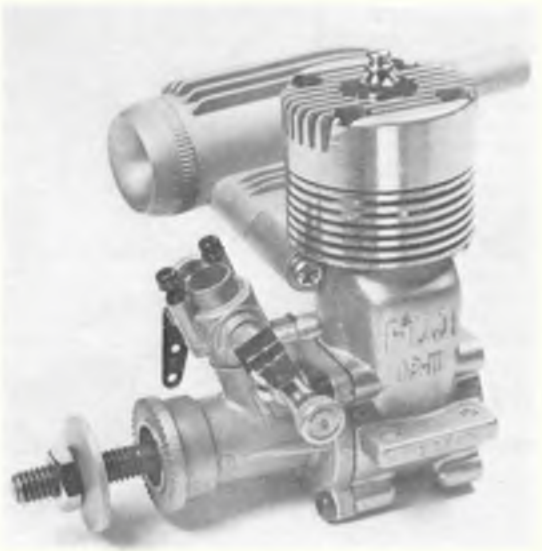
The Kolibri has a bore and stroke of 10·5×9·0mm, giving a swept volume of 0·779cc or 0·0476cu.in. It is a very compact little motor and, by any standards, is light for a ·8 diesel. Checked weight of the example examined was 44·3 grammes (1·56oz.). The motor comes complete with four mounting screws and nuts, a combination spanner (for cylinder jacket, backplate and cylinder) and an instruction sheet printed in English, French and German as well as Russian.

One final point. Norman Keat of The Modellers' Den makes the observation that they do not recommend the Kolibri as being entirely suitable for the raw beginner. Anyone who is familiar with the many baby diesels produced over the past 25 years will know that these very small displacement sizes are apt to be a trifle touchy as regards starting and respond best to a slightly more experienced approach.

Fuji 19-III

The Series III version of the 3·2cc Fuji 19 is one of two new Fuji models recently submitted for examination, the other being the 2·5cc 15-IV dealt with in the February issue.

Outwardly, the 15 and 19 share an obvious family likeness but are separated (in the same way as the current Enya 15 and 19 models are separated) by a different cylinder design. Whereas the 15 has a very thick walled axially-clamped liner with twin internal flute type transfer channels, the 19 has a conventional liner with a rectangular port window fed from an external transfer passage and located in the normal manner by a flange at the top.



Latest version of the Fuji 19 is the 19-III model. R/C version shown, but engine is obtainable in standard model.

Fuji 19's cylinder head is of the semi-wedge pattern, while con-rod features bronze-bushed big end, plain little end.

Like its predecessors, the Fuji 19-III is of quite conventional design and construction. Carburettor shown is Fuji's own with adjustable automatic mixture control.

In general, the 19-III is of orthodox design and construction. It is a shaft-rotary valve crossflow-scavenged motor with lapped piston and bronze main bearing. The body of the engine comprises a unified cylinder block and crankcase with detachable front housing. The crankshaft has an 11mm journal, a 4·5mm solid crank-pin and is counter-balanced. The gas passage through the shaft is 7·5mm i.d. and is fed from a large rectangular valve port that is uncovered by a parallel-sided main bearing aperture. The bronze bushed main bearing is cast-in and includes an annular oil channel at the front.

The drop-in steel cylinder sleeve has a wall thickness of 1·5mm and the cast-iron piston has a straight baffle and a fully-floating 4mm gudgeon-pin with brass pads. The connecting-rod is of pressure diecast aluminium with a bronze bushed big-end and plain unbushed small-end. The cylinder head is machine finished from an aluminium pressure casting and is of a semi-wedge pattern. A 0·2mm soft aluminium gasket makes the joint between the head and the top edge of the liner. Four Phillips screws tie the head to the cylinder casting.

The engine sent for our examination was fitted with a Fuji throttle-type carburettor incorporating adjustable automatic mixture control, but the 19 is also manufactured with a standard needle-valve and venturi insert for free-flight and control-line use.

The vented type silencer shown is specially made for these latest model Fuji 19 (and 15) motors and attaches with two screws through the ends of the exhaust duct.

Although the Fuji is one of the lower-priced Japanese engines and lacks a little of the finesse of its higher-priced compatriots, it is a reasonably well made motor. It has a bore and stroke of 16×16mm (and thus a higher S/B ratio than most other current 19s) giving a swept volume of 3·217cc or ·1963cu. in. Checked weight of the throttle equipped version examined was 174 grammes (6·1oz.), or 213 grammes (7·5oz.) with silencer.

Readers' Questions

Question. *I wonder if you can help me. Returning to aeromodelling after being grounded for about 20 years, I've dug out some of my old O/D power F/F designs, which were of a contesty nature, and discover that they were all built round the Allbon Javelin 1·49. This, judging by* Model Aircraft, *oops, sorry,* AeroModeller incorporating Model Aircraft – *is no longer made.*

I'm keen to get a diesel of similar weight, power output, etc., and wonder if you can suggest one. I see that there are one or two 1·5 diesels knocking around these days, but the adverts don't say what they weigh and what they give out.

My designs will take a fair bit o' oomph but I don't want to carry more weight than the Javelin if I can help it.

D.W., Somerset

Answer. Welcome back! Slight problem here, though. The Allbon Javelin (of fond memory) was one of the lightest 1·5cc diesels ever made, scaling less than 2½oz. No modern 1·5 diesel is as light as this. Most of them weigh between 3 and 4oz. So far as performance is concerned, the PAW 1·49 would be our first choice among stock diesels. When tested many, many years ago, it put out 0·17bhp at 16,000rpm, or upwards of 40 per cent more power than the Javelin. More recent ones might be even better. But it weighs 3·5oz. Couldn't you hack a bit off the model's nose-moment?

The only other suggestion we can offer is that you go the whole hog and opt for a glow plug engine instead and the Cox Tee-Dee ·09 in particular. This checks out at under 2·8oz. It is expensive but phenomenally powerful: ours topped 0·28bhp at just on 20,000rpm on test, using 30 per cent pure nitromethane fuel. This would be a real test of your design's ability to handle oomph! Good luck.

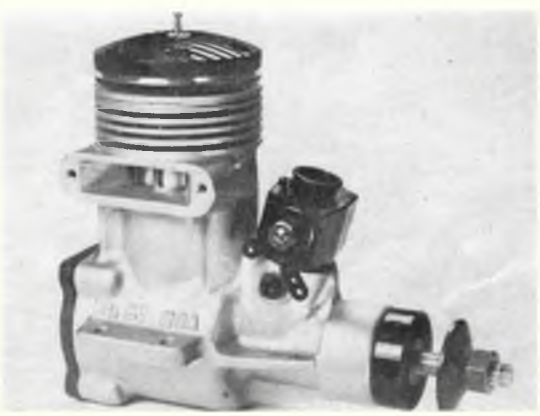
Question. *A question which must have arisen in the minds of many aero-modellers yet one which I have never seen explained in print concerns the advisability of operating model engines in pusher applications. Is engine wear or power output likely to be degraded? Where are the propeller thrust loads taken – by the prop driver against the front of the bearing housing or by the crankpin against the backplate? Is there any advantage in using a ball-race motor as opposed to one with plain bearing?*

I would be most grateful if you could answer these queries as I am about to start the construction of a control-line model (Merco 35 power) with pusher installation.

P.C., Voorschofen, Holland

Answer. Generally speaking there is nothing against using a pusher prop. There is, as you have suggested, an advantage in using a ball bearing motor – always assuming that the shaft is axially located in some way so that one of the ball races can act as a thrust race as well. In the majority of modern twin ball bearing motors, irrespective of whether the engine is used as a pusher or a tractor, thrust loads will be taken by the front (i.e. outer) ball-bearing.

However, if the engine has only one (inner) ball-bearing and the shaft is an easy fit, thrust, when the engine is used as a pusher, is likely to be taken by the rear face of the prop driver against the front end of the crankcase nose, as in a plain or bushed bearing motor, such as your Merco 35. If, as is usually the case, these two surfaces are of aluminium, they should be trued and polished so as to reduce frictional losses and, preferably, a steel shim washer should be inserted between them so as to provide a hard surface against which the aluminium can run. This shim will also help to take up any excess clearance caused by truing the two faces and thereby prevent the crankpin from coming into contact with the backplate. Incidentally, all the bushed bearing engines in the current OS range are now fitted with a thin hardened steel washer between machined faces for this purpose. Perhaps with the increased use of electric starters, other manufacturers may be persuaded to follow suit.



The American Ross RC-61, based on a Wisniewski design and available in the UK through Henry J. Nicholls & Son Ltd. A full description of this powerful motor will appear in the May issue of RCM&E.

Our scale columnist ERIC COATES provides news and views of interest to all who build flying replicas of full-sized machines

SEVERAL CORRESPONDENTS have recently suggested to me that, following the revival of interest in small rubber scale models for indoor flying competitions, the SMAE should turn the clock back 40 years or so and organise outdoor scale competitions for larger versions. Most of these correspondents also continue along the lines of how much a 'purer' form of model the rubber scale job is than the modern multi-channel scale machine, which costs umpteen hundred of pounds to produce. Unfortunately, I *cannot* agree with this viewpoint; to me, the best scale model is the one that is the most realistic both in the air and on the ground. On neither count can the rubber scale job even approach the multi-channel R/C model! In purest scale terms, i.e. that closest to the full-sized prototype, the multi R/C model wins hands down – its only real 'fault' being that it often flies too fast. Now, the rubber scale model has great *charm*, but as an outdoor competition class in the UK it just does not figure. On a calm day, it is a very pretty sight flitting through the air like a giant butterfly with transparent wings – but, really, is it *scale* flying or nostalgia for yesteryear? When one thinks about it, such models are more akin to Dick Korda's Wakefield than with a modern diesel-powered free-flight scale model. As I have stated in these columns before, when pitted against only *average standard* powered scale models, on a good day they have little chance of competition success. On a rough day, none!

One part of the world where rubber powered scale outdoor contests are still held with fair support, however, is in Czechoslovakia. Annually, I receive a report on the year's events in that country from my correspondent, Lubomir Koutny, and this is always accompanied by a selection of the most nostalgia-provoking pictures one can imagine! Whilst we suffered endless gales throughout the greater part of our '74 season, it appears, as usual, that the Czechs were blessed with fine calm weather for all their competitions! This, I think, is the major reason for the popularity still of the rubber scale model in that part of the world, although I also feel that there may be other factors, peculiar to East European countries, that influence the continued support of this class.

Contests were held at several sites, including Brno, Frenstat and Trnava. At the latter site, separate competitions were held for First and Second World War classes – riches, indeed!

Two more Czech rubber-powered models. Above is the 24in. open Kawasaki Ki 64 'Tony' by Ant Alfieri which took second place at the Frenstat competition. Normally achieves 50 seconds plus duration. At right is correspondent Lubomir Koutny's model which won the WWI class at Tranava – a Macchi MC 202, spanning just 22in. Another fine performer, it is capable of achieving over a minute's duration.

Still more rubber-powered beauties from Czechoslovakia. Above is George Merta with ambitious version of a Lloyd CI – note the two figures in the cockpit plus dummy engine. Above right is Peter Koutny, young son of Lubomir, with the latter's Fokker D VIII. This 16in. span model is capable of over a minute's duration in good weather; placed first in the season-long championships. At right is Ivo Ceresnak's P51 Mustang – again capable of achieving up to a minute's flight, and typical of the wide variety of prototypes flown in .ha country.

Probably, the country where rubber powered scale has, and always has had, the greatest following, both indoors and outdoors, is the USA. Recently published by *Model Builder* magazine is the finest book of full-sized plans I have ever seen. Entitled *Flying Scale Models of W.W.II*, this contains full-sized drawings all to a common 1/24th scale, of the most famous fighters of that war. The book is marketed in the UK by Argus Press Ltd. of PO Box 35, Bridge Street, Hemel Hempstead, Herts. HP1 1EE, for the very reasonable sum of £3·00.

The machines featured are, by their very nature (i.e. low-wing fighters), not the easiest subjects, but are designed by leading experts on this class of model on both sides of the Atlantic. Well, shall we say eight of them are designed by Americans and four by Doug McHard! I hope I am not being pro-British when I say that Doug's contributions (and I have seen the actual models) are in a class of their own for realism. I do not know a better modelling artist with an airbrush than Doug and his four offerings: *Spitfire Mk 1*, *Hurricane Mk 1*, *ME109E* and *Curtiss P-40C* could very well be 'plastics' when viewed at six feet! The other models presented are of varying standard; some are extremely detailed, others less so. They are as follows:

Grumman F4F-3 by Harry Bagley, *Grumman F6F-6* by Bill Hannan, *Vought F4U-1* by Frank Scott, *Mitsubishi A6M2* by Bob Peck, *Focke Wolf TA-152H* by Hal Cover, *Bell P39* by Clarence Mather, *Republic P-47D* by E. I. Coleman, *North American P-51B* by Clarence Mather.

All the plans are, of course, presented full size, with all parts laid out full size ready to transfer directly to 3in. wide balsa sheet, plus detailed construction and flying notes by their creators. In addition, there are three articles of immense value to builders of these miniatures:

Covering and trimming by Bill Hannan
Making it fly by Bill Warner
Building and finishing by Doug McHard.

It is interesting reading the articles to see the different approaches to the art each modeller takes to his subject. Bill Hannan frankly admits that if you want performance from these tissue-covered, stringered machines, then elaborate paint schemes are out and one has to settle for coloured tissue. But Bill regards the translucent scale model as an 'art form' in itself and likens his technique to a 'stained glass window'. As an example of this art

Two books which receive the 'Coates Seal of Approval'! At left is the book of enormous value to rubber-power fans, while at right is the ideal beginner's book for scale modellers – whether the interest is in free-flight or control-line flying.

Eric met just one lady F/F scale modeller in 1974 – Mrs Brenda Baldwin, of Crosshills, near Skipton, who found that the only way in which to converse with her aeromodelling husband and son was to join them! Her model, an FE 8, was far from being an easy subject, the model being based on an AeroModeller drawing, but modified to incorporate many 'Coates-style' modifications. Although not finished at this stage, the model is a very commendable effort and now trimmed out successfully.

form, his *Bearcat* is a superb masterpiece and probably one of the best flyers in the book. Bob Peck's *Zero* is of great interest. Structurally, it is just an enlargement of his recently kitted Peanut model, and also should prove a good flyer. Doug's Hurricane is a well-known excellent flyer, and I think just about the best model he has produced. The *Spitfire* is a lousy rubber scale subject to make fly well, and watching Doug's attempts with this one at Cardington a couple of years ago proved to be no exception! The trouble is that it always turns out so tail heavy, and the nose is so short that one needs a lead propellor to get the balance right! The wing loading by this time is then beyond a joke, especially over the concrete floor of Cardington shed. Doug, in fact, took the easy way out and fitted a Brown CO_2 engine and reduced the overall weight of the model by $\frac{1}{4}$oz. (20 per cent) to produce a delightful flying machine.

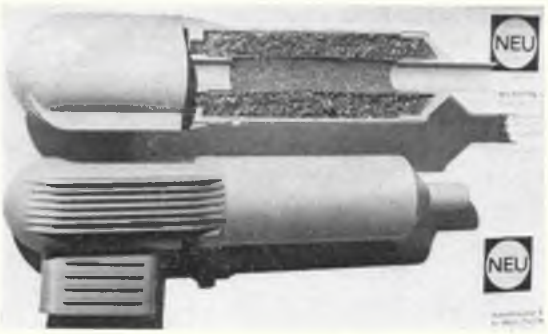
Probably the best layout for duration amongst the models presented is Hal Cover's *FW Tal52h*. With its long nose and high aspect ratio wing for high altitude work, it is halfway already to being a rubber duration model. I cannot say I am very impressed with Mr Cover's version of it, though. . . . Another well-known good flyer is the *Airacobra*, and Clarence Mather's model is a reasonable interpretation of what was a very much overrated fighter. I much preferred Clarence's other presentation, of America's finest fighter of World War II, the *P51 Mustang*. With its long nose, this machine makes a fine flyer.

I could go on writing for ever about this magnificent book. My advice to all readers of this column is buy it and build 'em!

Another book, which has been with us for many years now, has just been reprinted by Argus Books: Ron Moulton's *Flying Scale Models*. This offers excellent value at £1·00 for the beginner to scale modelling. A little dated now, perhaps, but much of the basic information is still sound for the construction of larger scale models for both F/F and C/L.

Don't show your prejudices, scale men – for absolute authenticity in the air, we cannot better full proportional radio control. True, rubber models may have more charm – to the builder – but for accuracy in representing the full-size machinery, then there is no comparison. Live with it – and enjoy both! Model at right is Terry Mellaney's Miles Hawk II: radio controlled, need we add!

Superbly realistic C/L Hercules by Arthur Dickenson, of Sudbury MAC. As a pilot in the RAF, he had plenty of opportunity to measure the full size! Spans 56in., and is powered by two PAW 2·49's in the inboard nacelles, the other props. being free-wheelers. This provides plenty of power for the 4lb. model, once it is airborne! Model also drops parachutes in flight – very spectacular.



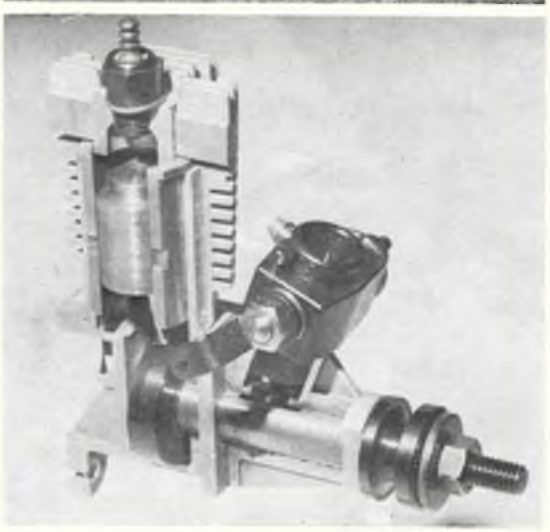
Above, and above left, are seen the complete Helmut Bernhart silencer system for the HB 61. The conventional silencer has been extended and is packed with sound-absorbent material while a separate expansion chamber of similar construction is connected to the silencer tail-pipe via silicone tubing. This second chamber bolts to the fuselage side. At left is probably the cleverest exhibit at the Fair – Graupner's Bell 47G helicopter fitted with new HB25 motor. Forget your complicated, bolt-together mechanism – this chopper uses snap-together plastic frames, pre-balanced blades, and can be built by anyone in a few hours. Very competitive on price, too.

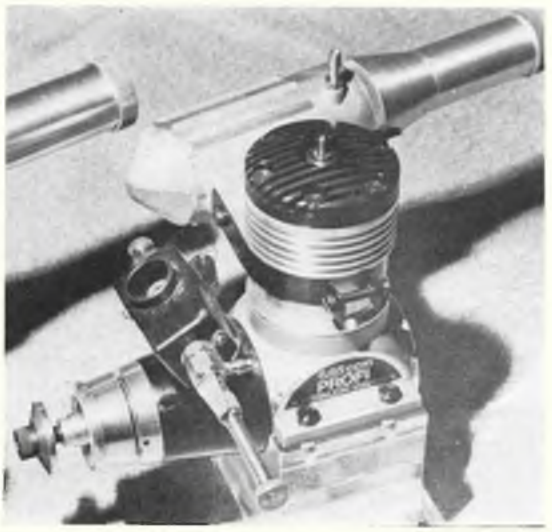
NÜRNBERG TOY FAIR

WHEN MODEL TRADE MANUFACTURERS get themselves mixed up with a *Toy* Fair, one might be forgiven for thinking that they deserve all that's coming to them by way of a 'toy' image. Nevertheless, the annual *International Toy (and Hobby) Fair* at Nürnberg, West Germany, is the biggest expression of world-wide model trade activity to be found anywhere. Most manufacturers concentrate their marketing on the R/C side but there is still sufficient to hold the interest of those we call (let's take a chance!) 'genuine aero modellers', who form the backbone of the hobby.

The main themes this year were electric power (primarily for R/C), engines, and more effective silencers. In fact, surprisingly, there was almost a glut of new engines. At the *Graupner* stand, we examined new introductions to the HB motor range, now expanded

Left: Latest Cox ready-to-fly stunter is semi-scale version of Art Scholl's Super Chipmunk. Wings are of tough, lightweight foam, and span 31in. Said to be fully aerobatic – including square manoeuvres. Cox also exhibited several other new 'ready-to-flys'. Below left: The new HB range of engines all feature Perry-type carburettors and sport this unusual stepped-piston. Below is another new engine – this time from the Profi range, somewhat resembling the Cox in appearance. Silencer incorporates perforated baffle tube leading to the tailpipe.





Marx Luder, leader in the electric motor (model) market in Germany, have now entered the electric power field with this neat-looking unit, ideal for power conversions of gliders.

Graupner's latest electric motor is typically well thought out. Seen mounted in the nose of the new Moskito glider, note the clutch mechanism which folds the large diameter propeller alongside the nose for improved glide when the motor is switched off. Although the motor run is restricted to approximately ten minutes, flight duration is frequently double this.

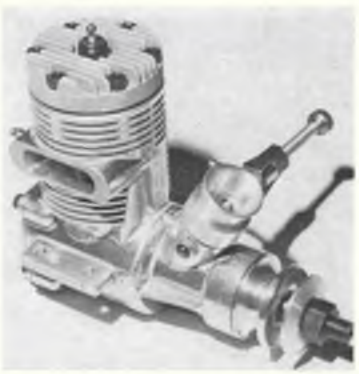
to include HB12 (2·0cc), HB15 (2·5cc), HB40 (6·5cc) and HB50 (8cc) units. All are R/C motors with Pery-type carburettors. The Austrian *HP* company have a new R/C ·61 motor with a brand new carburettor incorporating an in-flight mixture adjustment facility, while at the *Webra* stand we examined the long anticipated Webra-Austria ·40. This comes in two versions: a throttle equipped model and a pylon race/rat race type, both with front induction – the first front induction ·40 size racing to appear for a long time.

An entirely new name in the model aero engine business is *Profi*, who displayed a range of six glow motors including ·10 (1·75cc), ·15 (2·5cc), ·20 (3·5cc) ·40 (6 5cc), ·61 (10cc) and ·76 (12·5cc). All are R/C types and although the name 'Profi' is new, the manufacturer, Hörnlein is not, having produced the Taifun range of diesels for many years.

Such of course is of interest only to a very few of us, but a development in the model motor field which could have far reaching general effect was the beginning of a trend towards *real* silencers At Graupner we examined a very effective system for the HB61, comprising of an entirely new cast muffler which bolts on to the motor in the normal way. The expansion chamber is partially stuffed with noise absorbent material, and if this does not quite produce the desired effect, then there's another add-on expansion chamber. OPS also showed a redesigned muffler for their ·61 motor as did HP for their ·40. It can only be regarded as a good beginning in the search for really quiet silencers, because where one or two manufacturers lead, the rest will surely be forced to follow – the sooner the better!

New developments in electric power include an entirely new system from Graupner This involves an all-new, purpose-developed motor, complete with gearing, plus a lighter battery pack. This combination produces sufficient power to supersede the previous two-motor Graupner electric power system, and is complemented with a new 98in. span powered-glider type model to take the latest electric system which, as previously is the development initiative of Graupner's Fred Militky. Greater power for less all-up weight can't be a bad direction to go in as far as model electric power is concerned, and the new model, the *Mosquito* can also be used as a 'straight' glider or as a power assisted sailplane.

The Germans obviously take R/C electric power seriously, for in addition to the Graupner system, we were able to study the American *Astro-Flite* units an electric system by *Multiplex*, plus a new purpose made motor by the *Marx-Luder* electric motor manufacturers, logically entering the field.



New Webra-Speed 40 pylon is a lone champion of the front induction layout amongst a highly competitive field of rear-induction motors. Its larger brother, the 61, made quite a name for itself in the past year, so this motor should be an interesting one to watch for in '75.

At right is OPS's answer to the noise problem, although they have not taken the opportunity of using steel wool behind the perforated baffle tube. Below is HP's solution – a huge expansion chamber being bolted to their '40' instead of the previous large-bore venturi style 'legaliser'. Below right is, of course, the ultimate answer to noise pollution – another electric motor, this time from Multiplex and designed primarily to be used in pairs on the trailing edges of glider-type aircraft. This accounts for the fact that the prop. folds in the way it does!

CLUB NEWS

A TERRIFIC POSTBAG this month, which I hopefully take to be a sign of a great resurgence in club life. Certainly, in these days of restricted flying space, organised flying is a necessary way of life, albeit an enjoyable one. A model club provides not only flying and social amenities; it invariably ensures that the flying, particularly of radio models, is safe and unobtrusive.

A large influx of reports and newsletters means a bit of paring down to fit them all in; so apologies for any omissions as we go into our first report, which comes from Tim Stanley of the **Godalming & District MAC.** Quite a good year for the club, 1974, showing a membership increase to some 15 on the active list, plus not a few paper flyers. Main activities are radio glider and free flight, with a spot of indoor and r.t.p., during the winter months. A touch of drama was provided during the year by the Army suddenly clamping down on model flying on the club's favourite soaring site. However, after protracted negotiations the Army has allowed special flying licences to club members. For those operating at lower levels, a large field has been made available near Godalming, thanks to the good offices of a local landowner. Would seem that only Rubber and Glider can use this particular site. A number of club competitions are on the cards this year; two for restricted size free flight models. May I suggest that they make these for Coupe d'Hiver and A/1 glider? New members welcome. The club meets every Friday at 8pm at the Wilfred Noyce Centre, Godalming.

The next report, for the **Bristol & West MAC,** comes from Peter Hollis, who promises us more in the future. Since making those ill-fated remarks about the dearth of wholly free flight clubs in Britain, I keep getting news of just this sort of club abounding, and Bristol & West is yet another. The club, ever active on the contest field, is now in its 32nd year and is composed predominantly of dedicated free flighters, of whom the leading light is Elton Drew, the 1959 A/2 World Champion. Elton was re-elected as Chairman at the recent AGM, and presides over a select membership of ten. A drive is now on to improve this membership figure in order to spread the contest load. Juniors are being encouraged to join, and anyone in the North and West Bristol areas interested in the purity of free flight can contact Dick Cummins at 14 Beech Leaze, Alveston.

Martin Dance, PRO of the **Reading & District MAC,** sends us a copy of the new club magazine, which really is a magazine and not just a stencil effort. He also provides us with quite a long report. A large club this, with a membership of no less than 150. This means a big model output, and some of the club wealth was on display at the Reading Show – £2,000 worth of it. Flying was limited to C/L and helicopters. This showed up a demonstrable need for more C/L flyers, from which we gather the club is mainly R/C, although interests range over all types of modelling, including boats and cars. A fund has been set up for a flying field, as the existing club site is far from ideal, suffering from partial flooding and noise complaints. By way of placating the all-too-easily-ruffled public, a silent evening was held with rubber, gliders, etc., but no engines. Even so, one doughty lady took exception to the bungee lines obstructing her bike. However, at a council hearing on the club use of the site, the leisure committee came out in favour of the club – all three political parties united.

Mr R. A. Smith is the PRO for the **North-Eastern Area** and also the **Tynemouth MAC.** He has not written to us before in these capacities, but promises to try to rectify this omission. The North Eastern Area hope to run a number of competitions of various types at RAF Ouston during the year, details of which he will be submitting to us from time to time. His own club, the Tynemouth MAC, is hoping to raise the number of members this year. Club interests appear to be F/F and C/L – no mention of radio. Details from Mr Smith at 74 Whitley Road, Whitley Bay, Northumberland NE26 2NE. To give an idea of what goes on in the club, Mr Smith sends along a report of a Combat event put on during the winter by the Tynemouth and Sunderland clubs. The usual wet and windy weather prevailed during the morning, but the wind dropped and the rain ceased in the afternoon to round off the day in pleasant style. One advantage of the rain was nice soft landing for erring pilots. A really good bout was an intercenine battle between the two parts of the Gardener/Wilson team race team. Ian Gardener then went on to win the event.

Yet another all free flight group calling in to confound those remarks I made about the lack of free flight clubs. A year ago, a half-dozen contest-minded free flighters in the Market Harborough area got together to form the **Welland Valley Flyers.** Membership quickly rose to the dozen mark, which is not to be wondered at since the club has the use of a 150-acre site on the outskirts of the town. Needless to say, the members are anxious to retain this splendid facility, so it's strict observation of the country code all round. The club comes within the Midland Area boundary, which means regular visits to the Area meetings at Barkston Heath. A/2 gliders are the most popular weapons at present, but in the hope of the air being in less exuberant mood during the season now upon us, more interest will be taken in mini events (Coupe, A/1, etc.). And just to show the way, Chris Peters won A/1 Glider and Eric Vye ½A Power at Syerston back in December.

Mick Lewis, the Secretary of the **Glevum MAC,** sends us news of what is going on in the closed-circuit world of C/L. Big story line, he tells us, is Frank Smart's departure to join *Outlaws* go-glow Combat team (topless only if they forget to duck). Presumably, the Glevum boys stick to good old deezil. At present, the team comprises three full-time members – Derek Dowdeswell, Dave Cox and Mick Lewis himself – but another formation is on the cards. Mick, in his spare time, teaches at the Rednock School, Dursley, Glos., the pride of which is its large aeromodelling club – 20 to 30 regular members. Main inspiration is the dedication of Mick's mathematics colleague, Martin Fardell, who is a radio modeller of some note. Sensibly, he started the lads from 'O' level on chuckies and simple rubber models, whilst Mick lent his know-how on r.t.p. and control line. One group of boys have already produced a C/L trainer and learned the guiding principles, whilst others, with quieter intents, are turning out rubber models. Altogether, plenty of industry and enthusiasm. Thinks Mick: If only you could infuse such keenness into some of the older club members. . . .

Officials of the **Leicester MAC** are pondering on the implications of a questionnaire sent out to members. Ironically, they calculated a response figure of about six, but even club members can be just as unpredictable as humanity at large, and no less than 37 completed forms were returned, representing one-third of the

membership. Analysis of particular interests reveal a clear lead for radio glider with general sport and power radio not far behind. Free flight and control line featured as strong minority interests. Understandably, the club's contest calendar – a competition a month at least – registered these interests in fair proportion. Excel in these events and you get no rubbish on your sideboard, for a revaluation of the club trophies comes out at a staggering £595! But always the cry: where to fly? Well, a bit of a setback at Wymeswold. Seems the tenant farmer objects to the radio accoustics, and actively recorded his protest by spreading a particular farm ingredient over the take-off strip. The answer, perhaps, is to go to the hills for the sound of nothing more aggravating than the swish of a radio glider wing. And where better than the club site at Burrough Hill, where a licence to fly has just been issued by Leicester County Council? This was the outcome of the club approaching the council to ensure that use of the site came within the provision of the bye-laws, that permission was properly authorised, and the conditions of use known. A very sensible approach.

The **Wolves MAC** demo team is going in for *Duchess* biplanes, according to the club newsletter. A formal team has been set up, consisting of Stan Perry, Brian Perry, Glen Sibley and Bill Hatfield. This will provide a sort of elite nucleus, to which it will be considered an honour to belong. Membership will include a firm commitment to build a *Duchess* biplane, equipped with a throttled 35 motor, and the ability to fly it to the necessary standard. The club is not only noted for its model flying, but also for its organizational zest. Members comprise the major part of the Area Committee, and they are also custodians of the famous *HMS Flycatcher* carrier deck. Indoor stowage of this land-based dreadnought at Cosford is undertaken for two demonstrations there per year.

The topics of radio noise and safety are so time-consuming at meetings of the **Waveney MFC** that the editorial of *Wave Rings* apologises to the C/L members for radio hogging the floor, but these weighty matters, upon which hinge the whole future of model flying, just need to be talked about at length.

There is a nice action photograph in *Seadog*, the newsletter of the **South-Eastern Area.** In fact, two. One is of a Power Duration floatplane unsticking from the water; and another, even more spectacular, of a twin motor, rubber-powered flying-boat taking off in convincing style. Another picture of expert modelling, but in a different sphere, is Ricky Shaw's beautiful scale soarer, *Pirat*. It is complete with spoilers and retractable landing wheel. Stacks of contest reports and results in this issue, but one which caught my eye was the rubber event in the Sittingbourne F/F comp. It was run in three rounds of 15 minutes, each with 1½ hours between rounds. The max figure was variable and stated before each round – thus, given calm conditions you could have a six-minute max, but come down to a mere two minutes if extra windy. This idea is now taking on around the country.

I wish I could reprint in full the 'History of Croydon Aerodrome' that is being serialised in the **Three Kings'** *Court Circular*. Readers may, or may not, know that Croydon – the London Airport of the pre-war years – was originally a Royal Flying Corps' 'drome, built in 1915/16 to defend London against the dreaded Zeppelin. It seems a long way from those dramatic days to the relative peace of a flying ground for control line models, but the Three Kings' members are ever mindful of the exciting history of their ground, which adds an extra dimension of pride to their club.

Clubman

CONTEST CALENDAR

26th March (Wed.)	**PETERBOROUGH INDOOR MEET.** EZB, Chuck, Peanut at Winina Stadium. Details P. McMahon, 8 Bedford St., Peterborough.
30th March	**ELLIOTS SPEED MEET.** All classes C/L speed. *Note:* Line groupers *permitted* in open classes. Venue: Elliot Aero Works. Rochester Airport, Rochester, Kent.
6th April	**SMAE C/L MEET** FAI. Class 'B' and rat race, FAI speed, stunt, combat. Venue: RAF Little Rissington, Glos.
6th April	**ST ALBANS SPRING GALA.** FAI R/G/P (5 flights in rounds). Open R/G/P/. 10am start at Bassingbourn, nr. Royston, Herts.
13th April	**ST ALBANS C/L STUNT COMP.** Silencers and proof of insurance essential. Full details and map of venue from Ted Fowler, 38 Groveside, Henlow, Beds. Phone Hitchin 811017.
13th April	**ST ALBANS R/C THERMAL SOARING.** 40p pre-entry to B. Rapier, 5 Aldwick Road, Harpenden, Herts. State colour. Venue: Nomansland Common.
20th April	**SMAE INDOOR MEET EZB** combined novices/ experts. Venue: Cardington.*
20th April	**GLEVUM COMBAT RALLY.** 50p pre-entry to M. Lewis. 16 Tilner Crescent, Norman Hill Dursley, Glos. Venue: Overham, Glos.
26-27th April	**SMAE FAI MEET FAI** R/G/P at RAF Sculthorpe, Norfolk.
27th April	**C/L TRIALS FOR 1975 CRITERIUM.** FAI T/R, speed, combat (combat by invitation only). Venue: Little Rissington, Glos. Entries (£2.00) to R. Horwood, 145 Downend Rd., Horfield, Bristol BS7 9PY.
27th April	**ST ALBANS C/L STUNT COMP.** Contact Glen Alison at 62 Berry Lane, Rickmansworth.

* **Note** for Cardington meetings it is **essential** to apply to L. Barr at 4 Hastings Close, Bray, Berks, three weeks prior to attendance.

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where, on the Saturday morning, during what was intended to be my last practice flight, the tailplane folded at the top of a square loop. A partial recovery was possible and the model 'pancaked' inverted on to the runway, breaking the engine bearers, but leaving the wing unscathed except for minor scratches at the tips. *Nimrod 3* had been refinished and thus became my first string, being used in the *Gold Trophy* the day after *Nimrod 5*'s second demise!

The World Championships in Czechoslovakia were rapidly approaching and it was essential to have two good models. Before attempting to repair *Nimrod 5*, I decided to cover and finish number 6's structure which had been sitting in the loft for almost a year. This would be a 'non-active' reserve in case *Nimrod 5* should prove impossible to repair. For the first time, I was going to a World Championship without a car and it would be necessary to take four of the team's stunters by air. Space was at a premium, and it was decided to rebuild *Nimrod 5* with a detachable tailplane. But how was the fin shape and position to be retained? The fin must be removed with the tailplane, and further, since a tailplane/fin assembly would still be unwieldy, the fin must be separate. Several stages later the final design was evolved: the fuselage was lengthened by ¼in. and the fin strake much reduced in length, but the basic side view remained unchanged. The details are shown in the accompanying ½-scale drawings, but it is worthwhile explaining the purpose of the various parts.

The tailplane mounting is similar to that used on *Nimrod 4A*. Since the longerons and top block are no longer continuous above the tailplane, the rear fuselage is weakened with respect to the vertical forces from the tailplane. The triangular frames of 1/32in. ply carry the tailplane loads on to the fuselage forward of the tailplane leading edge. The tailplane is secured by two 6BA bolts, the rear one of which is hidden, while the forward one also secures the fin. The 1/16in. ply plate **A** attached to the tailplane sits on the top faces of bulkhead **B** and part **C**. Tightening the bolts imposes no load on the tailplane structure. The thrust piece **D** carries the bolt load on plate **E** through to plate **A**. Side location of the tailplane is provided at the front by plate **A** between the frames and at the rear by the frames protruding into the hollow centre of the tailplane. Two 3/32in. balsa spigots **F** underneath the tailplane also locate inside the fuselage and help to prevent tilting of the tailplane. Stop **G** prevents rearward movement of the tailplane; forward movement is not possible, because of the shape of the fuselage cut-out. The fin is held vertical by the ¼in. square piece **J** which fits between the fuselage sides. The top of piece **J** is also a close fit under the ⅜in. block at the fuselage rear to provide vertical restraint. The fin location piece **H** provides sideways location, and being behind the thrust piece **D** prevents rearward movement once the securing screw is fastened. The fin is removed by easing up the front to clear location **H** and then sliding the assembly backwards.

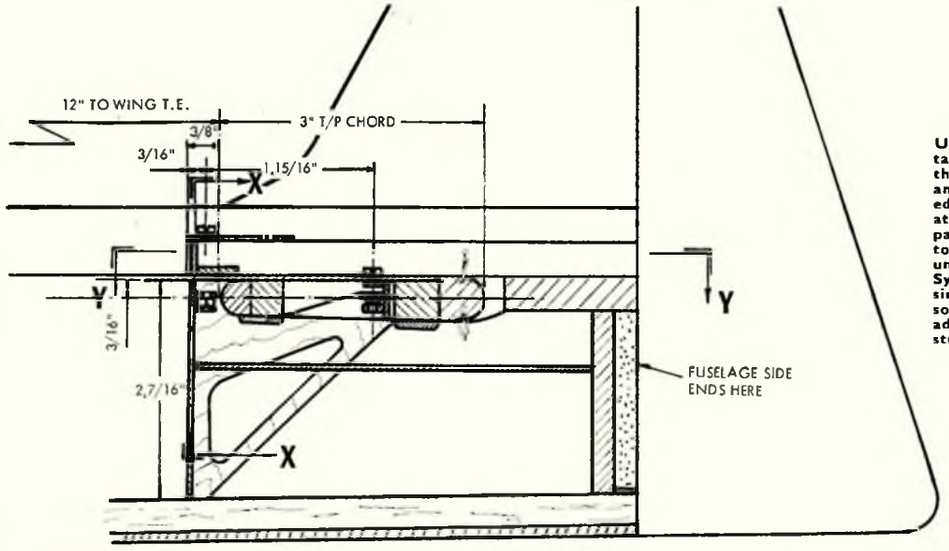


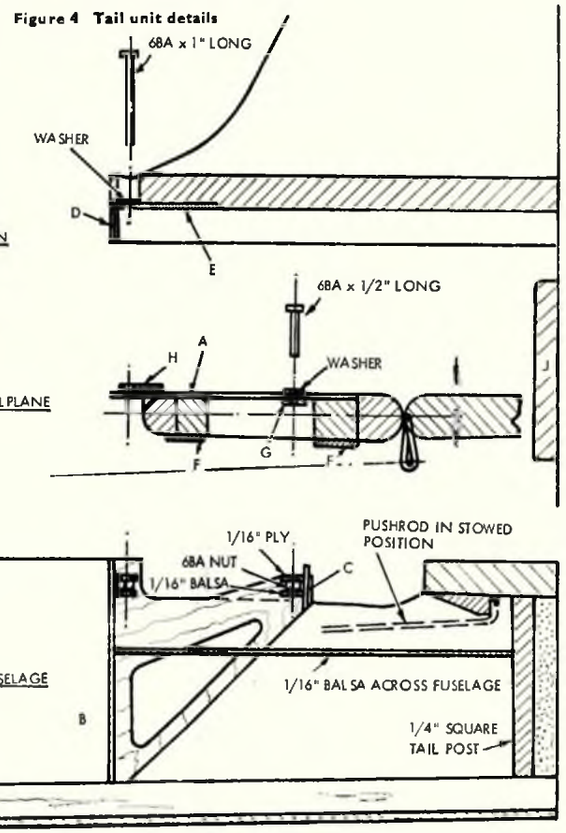
Figure 3 Nimrod 5A's tail unit

The pushrod is guided adequately by the slot in bulkhead **B** and no other means of securing the end in the elevator horn is necessary. With the model dismantled, the pushrod is loose – it cannot be withdrawn from the fuselage because of the guide halfway along its length and could move about in transit, perhaps damaging the fuselage. By coincidence, when the pushrod is turned so that its ends are vertical (pointing upwards) and the pushrod is as far back as possible, its front end lies in the slot in the ¼in. ply bulkhead immediately behind the wing. The position of the pushrod guide and the slot in bulkhead **B** are such that the rear end of the pushrod is held against the underside of the ⅜in. rear block. A piece of scrap balsa, as shown on the drawing, retains the pushrod in its travelling position.

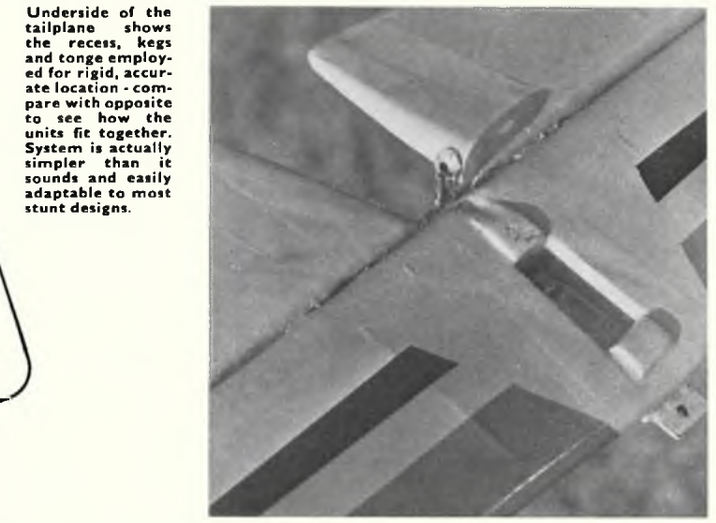
When assembling the model, it is better to fit the tailplane first, since when the wing and fuselage are bolted together it is difficult to engage the pushrod in the elevator horn. Some settling of the joints occurs during early flights, and it is as well to check all bolts for tightness before every flight while the model is new.

A model bolted together in this way opens up many possibilities for experiment. Different fin and tail areas may be tried simply by making new components and the elevator horn is now accessible. This enables elevator trim to be adjusted without disturbing any 'aileron' trim that the flaps may have. The most significant result, though, is the ease of transport (coupled with the reduced risk of tailplane damage during transit). Make a box to fit the wing, say, 60×15×6in., and the other parts will fit as well! The air trip to the 1974 World Championships showed how much space was saved by removing *Nimrod 5A*'s tailplane. The largest box available (courtesy of Ted Fowler) had to carry John Newnham's models and mine – that is, *Nimrod 5A*, a one-piece model and two with detachable wings. Packing the box proved all but impossible and indeed so cramped that one tailplane/fuselage assembly was damaged in transit. Without the removable tailplane, *Nimrod 5A*'s fuselage assembly could not have gone in.

Figure 4 Tail unit details



Rear end of the fuselage clearly reveals the heying-system which Jim employs to ensure accurate alignment of the tailplane. The various component parts are drawn out in Figure 5.



Underside of the tailplane shows the recess, kegs and tonge employed for rigid, accurate location - compare with opposite to see how the units fit together. System is actually simpler than it sounds and easily adaptable to most stunt designs.

After almost a season's use, the tail assembly has proved to be perfectly satisfactory, and future versions will incorporate the same feature. The next model will also see changes in wing and tail areas, but in the meantime I hope to use *Nimrod 6* as my main competition model this year. It is also likely that an existing model will reappear in a new guise later in the season – watch this space!

Figure 5 Tail unit component parts