Aero Modeller

OCTOBER 1969

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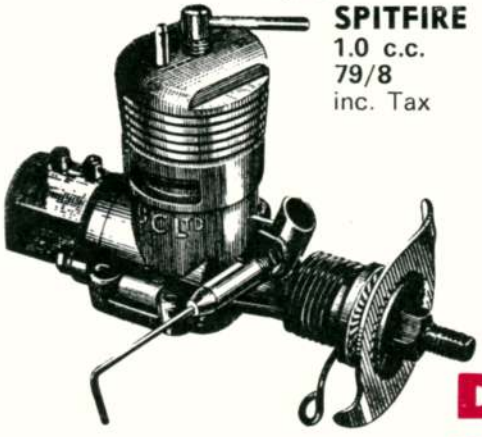

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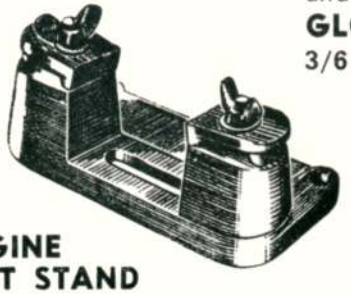

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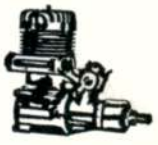

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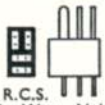

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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

October 1969 VOLUME XXXIV No. 405

CONTENTS

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COMMENT

ELTON DREW – WORLD CHAMPION IN A/2 GLIDER CLASS

Congratulations to Elton Drew of Bristol from every aeromodeller in the U.K.! To win the World Championships from a field of 84 entrants representing 30 Nations is a magnificent feat – and to do so with the only perfect score of 1,260 seconds is even more worthy of our acclaim. This modest flier, whose series of articles we published at the beginning of the year revealed his design philosophy and approach to contests, adds further glory to a successful year.

Congrats, too, for those stalwarts Ray Monks and George Fuller for attaining equal first place in the Power Champs along with Joe Savini flying for his native Italy. Their eventual position in the fly-off does not diminish a meritorious performance. Though not featured in the 'Top Ten' the other six team-mates and manager Stephen Bowles deserve credit for their staunch efforts which resulted in good team placings.

on the cover

Chris Soenksen, who runs a fine model shop at Mundelein, Illinois, U.S.A., with his ultra-light indoor Radio controlled electric powered biplane. Chris is exploring the prospects of small R/C models and this is one of his special interests. Photo by Dick Stouffer.

next month

Full story of both the **World free flight Championships** and the **Criterium of Aces** for Control Line. Full-size plan for a near scale Andreason BA-4 biplane, the **United States Nationals** highlights and all regular features, out on October 17th.

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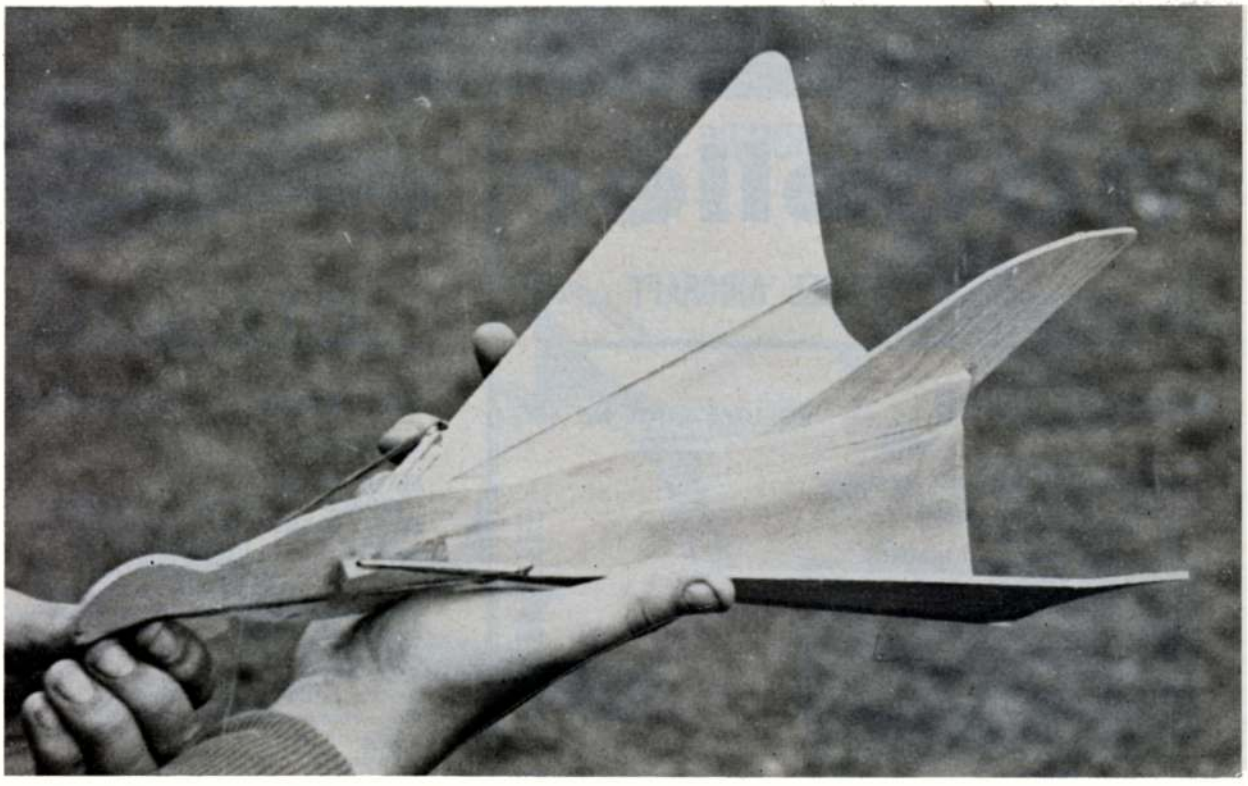
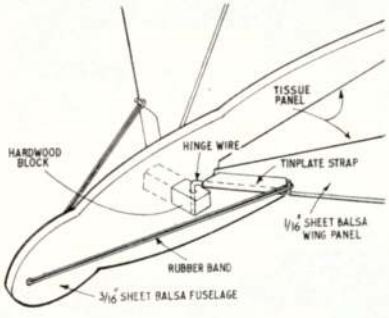


Over thirty years ago Jim Walker produced an all-balsa folding-wing catapult glider which really worked well – and it is still something of a best-seller in the American 'junior aeromodelling' market. It was – and still is – a masterpiece of model design-engineering (and some thousands of hours went into perfecting the hinge mechanism). The photo of our 'birdman' model shows how the same thing can be done more simply, and cheaply, using a delta wing with a foldable (heavy tissue) inner panel. It's a fun model for the kids! The secret lies in the hinge unit, shown in the sketch below. The rest of the model you can design yourself.



Once again it is Balsa that not only makes it easy to develop models that are different through several 'cut and try' designs, but also ensures the best possible flying performance. Other materials have their place for specialised models, but the undeniable fact remains that balsa models fly better. However, that's not quite the end of the story, for Balsa being a fast-growing natural wood can vary considerably in properties (density can vary from about 4 to over 18 pounds per cubic foot, for instance). For the best results you need **aeromodelling quality** Balsa. That's where Solarbo Balsa scores – every single piece of Solarbo Balsa that reaches the model shop being carefully selected and graded **for** aeromodelling use. Be **sure** to get the best – always ask for Solarbo Balsa by name!

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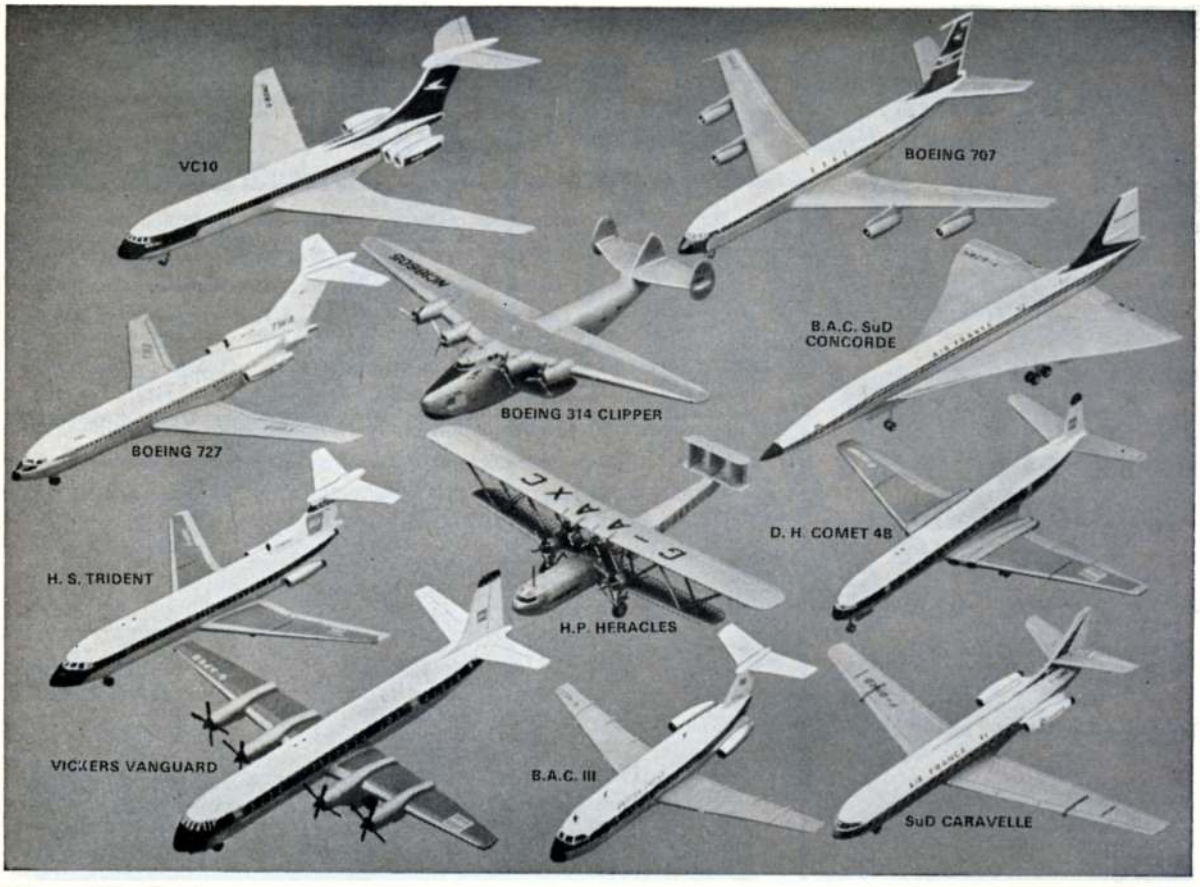

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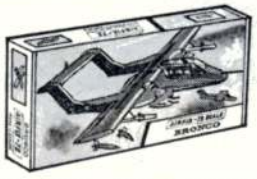

NORTH AMERICAN 'BRONCO'

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AIRFIX MAGAZINE 2/6d MONTHLY
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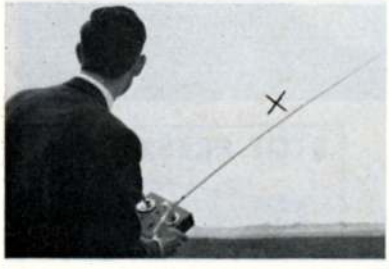


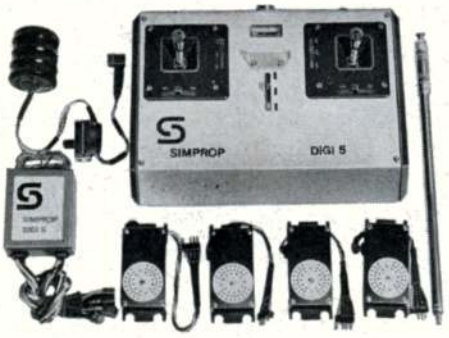
The winner of 'Find the Model' No. 2—R. D. Peet, of 84 Linksview Crescent, Newtown, Worcester, who receives a Kraft 4 Proportional Unit.

Near miss prizes of Navigator II Single Channel units were won by:

R. Grimes, 31 Hillcrest Road, Acton, London, W.3.

A. Pearce, 33 Blackwood Road, Milngavie, Glasgow.

R. Singleton, 16 Broughton Road, Sheffield 6.



(THE ONE IN THE AIR)

The new Mainstream Simprop radio control equipment embodies the latest development in electronic design and has been proved in exacting field and laboratory conditions over the last two years. It offers you superb value and quality in radio control.

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Precision engineering stick assemblies. 12v. 500 Deac with interchangeable plug in crystals.

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Size: 2 5/16" x 1⅞" x ⅞"
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RULES

Match your skill with the experts. A panel of experts will study and place, in their opinion where the centre of the model should be. Use your skill and judgment by marking crosses in ink, or ballpoint pen, where in your opinion the centre of the model should be.

The entrant with the centre of a cross nearest the spot selected by the experts will be adjudged the winner.

Minimum of five crosses and a maximum of 60 crosses per coupon. You may enter as many coupons as you wish. Members of the family may send their coupons in one envelope with one Postal Order to cover all the entries.

Payment must be made by Postal Order payable to Roland Scott Ltd. and crossed. Stamps are not acceptable.

No responsibility is accepted for late, mislaid or lost entries.

No competitor may win more than one share of the prize money in any one contest.

THE COMPETITION EDITOR'S DECISION IS FINAL. NO CORRESPONDENCE MAY BE ENTERED INTO.

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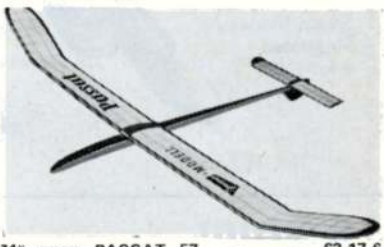

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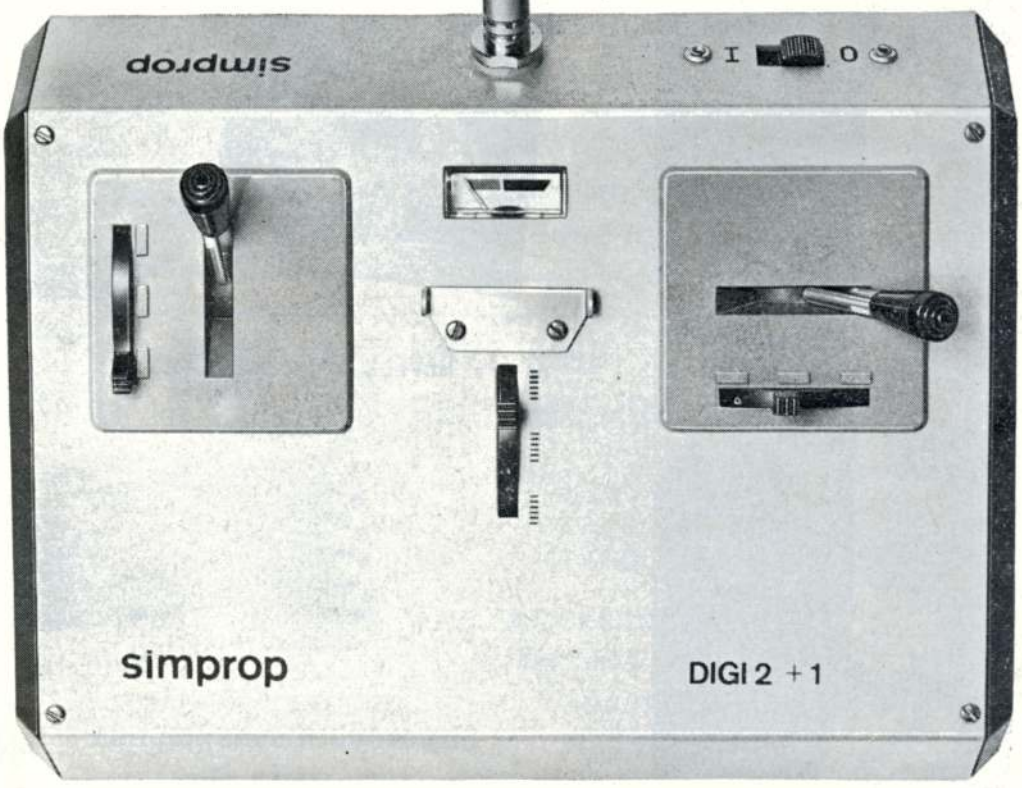

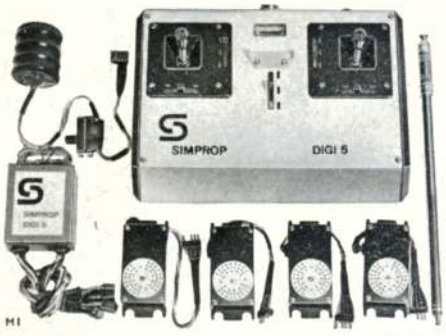

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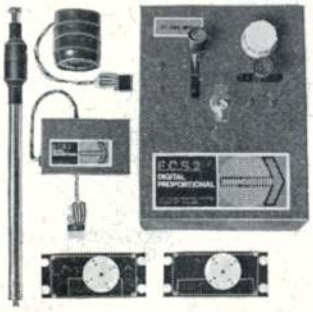

M1

RADIO CONTROL MANUAL 3

Our Bi-Annual Radio Control Manual series, which started in 1965 has proved so popular as a reference work on the R/C hobby, that this Autumn we will be introducing the third number, the cover of which will illustrate some unique R/C models of 'lifting body re-entry vehicles' used by the American National Aeronautics and Space Administration as an inexpensive method of obtaining data on the likely aerodynamic characteristics of the full-size vehicles.

Just how the project came into being and how it was undertaken is described inside this edition as one of the lead features.

Other features include Single Channel Contests; How to Run an R/C Rally, a review of Instant Covering Materials; An Approach to the Multi Aerobatic Schedule by Doug Spreng; Scale R/C by Dennis Thumpston; and a pictorial report on the 1969 World R/C Championships and Scale Internationals.

Besides all this, there will be no less than 38 scale drawings, all fully dimensioned, of the best of the World's R/C model designs of all categories.

8½ x 5½ ins., 128 pages. Hard board cover with full colour illustrations. (Reference No. 134).

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First issue of this entirely new modelling magazine, specially created to meet the demands of everyone interested in Scale Models will be on sale from September 12th, price 3/-. Never before has any hobby magazine received so enthusiastic a welcome. Response to a sample issue and questionnaire has provided the perfect blend of features to satisfy the most ardent enthusiasts. A small taste of what we have to offer is seen above. What we cannot show are the superbly detailed scale drawings, each a specific request, executed to the highest standards with full colouring data, interior information and photo details.

Highlights of issue number 1 include a special review of the Battle of Britain Spitfire Mk I and Mk II, also for aircraft fans, the 'Twin Lizzy', a kit conversion plus other Lysander data, and a radio controlled model. The famous Matra-Ford MS 80 racer to 1/24th scale with copious line and tone detail illustrations will aid car fans while for nautically minded readers, plans for a Coaster, and a historic 'Cog' offering tempting modelling subjects. Remarkable figure mouldings, World War I and II from Napoleonic, Soviet tank markings, a 1/5th scale *working* air-cooled V-8 Argus engine, Plastic Kit news, Book reviews and Tech Topics are but part of a pot-pourri to whet the scale appetite.

On sale at your newsagent, model shop or in case of difficulty direct from:—
Model and Allied Publications Ltd., 13/35 Bridge Street, Hemel Hempstead, Herts.

HEARD AT THE HANGAR DOORS

Ole Blomberg of Sweden took to skis when flying in the Chuck Glider International (see text) while others sweltered in equatorial heat!

CLANG! There it was, plain as a pikestaff, with the maker's name, cubic capacity standing out clear and legible, and its unique pressure-point silencer hovering by like an expectant sausage. How could one mistake this handsome power unit for anything other than the World Championship winning Webra 61 Blackhead? *We did!* So did our printers! Sackcloth and ashes all round for printing a Webra 61 illustration in Peter Chinn's test on the popular O.S.19 last month. It was a simple story of two similar printing blocks identical in size and each with rear three-quarter view of a front induction engine and silencer. Honest, we promise, never to do *that* again!

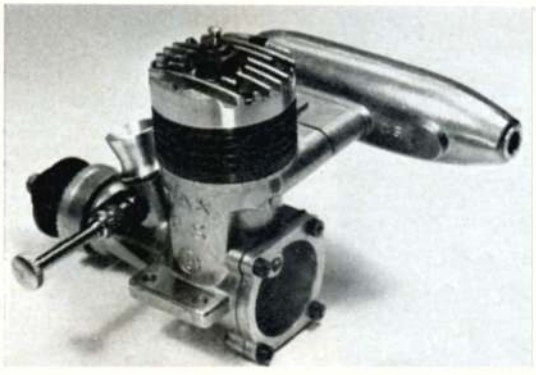
POSTAL Chuck Glider International Contest we announced in January issue drew no less than 130 entrants from all over the world. Organised by the *Termikschnuffler* Club in Germany the eventual winner was J. Walters of Boeing Hawks, U.S.A., who scored a maximum 360 and went on with a 143 second fly-off time. Of the eight who scored maximums (all went on to make a decisive fly off), Tony Slater entering from Croydon M.A.C. placed 6th with an additional 55 seconds. Flying conditions varied from snow-covered frozen lakes to parched Africa, where expatriate John Bailey, now in Zambia, placed 50th with 229. If the Contest increases in popularity the organisers will face a heavy mailing problem, we understand they had to fight off raids by stamp collectors when the results began to pour in!

POSTAL – 2 is announced by East Anglian Area S.M.A.E. Contest is for F.A.I. Power, Wakefield and A/2 Glider classes with competitors allowed to make one separate entry in each class at 2/6d. Half the entry fees will go to the Area International Contest Fund. Flights to be made October 5th or October 12th and results sent to B. C. Halford, 28 Chapel Lane, Wymondham, Norfolk by October 20th. The contest is National (i.e. for Great Britain only) and all entries must be made to Harry Halford by October 4th. Full details can be supplied by him on request.

POSTAL – 3 is the annual International A/1 and A/2 glider contest which can be flown on October 5th, 12th, 19th or 26th over 7 rounds. Max. time for A/1 s is two minutes, for A/2 s three minutes. Fly-offs increase with one-minute increments. Teams of three qualify for the incorporated team event. A booklet, with instructions in English, French, German, Spanish, Italian, Czech can be obtained from the organisers LMK Prostejov, Zdenek Flieger J Kohlera 7, Prostejov-Vrahovice, Czechoslovakia. Those for whom this info is too late can submit times direct but to arrive by November 15th.

DOUBLE Value – for extra premium is the theme for our revised Modellers' Accident Protection Scheme from this month, the increase of limited liability to £100,000 is to bring our insurance scheme into line with the requirements of many local authorities. Thus the M.A.P. insurance can be quoted in negotiation for use of public open spaces, airfields or communal land. With the increase of protection, and claims experience, the premium is now 5/- per annum for all regular readers of M.A.P. magazines – a small fee indeed for peace of mind while operating one's models.

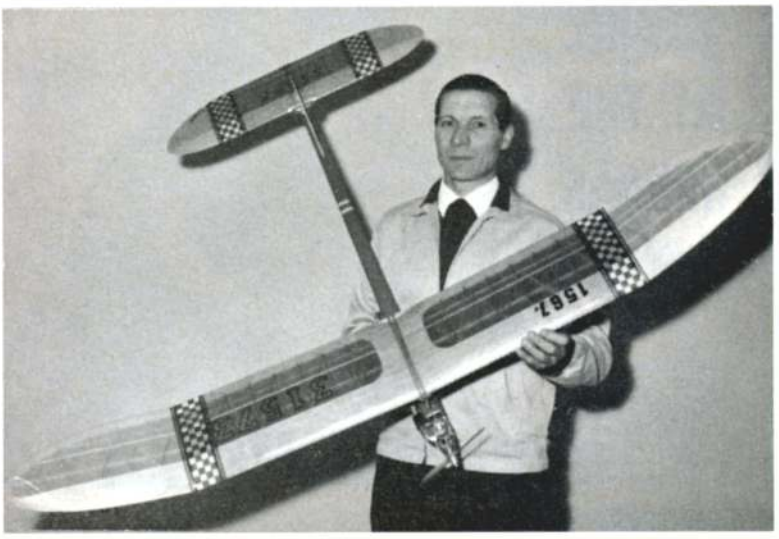
LAST MONTH'S cover of K. Brown and his P-5ID Mustang was incorrectly identified as a Jetco model. It was from the *TOPFLITE* Kit – apologies all round! And to stem the flow of comments on its colours – *yes,* we know the 'Millie G' series were **green,** not red; but Mr. Brown made his model to earlier, erroneous info. A fine summary of the four P-51 'Millie G' Mustangs (and comment on the earlier four P-38 'Millies') appears in the current Quarterly Magazine of I.P.M.S., Vol. 4, No. 2.



Here's the real – oops, nearly did it again!! This IS the OS 19 R/C reviewed by Peter Chinn in last month's edition. Doesn't look a bit like a Webra 61 does it – or does it?

WINKLEIGH Visitors to Harry Stilling's Model Flying Holidays in Devon automatically become temporary associate members of the 'Winkleigh Flyers'. Club members use the ideal venue adjoining the caravan park with good tarmac runways and ample grass area.

Many beginners have been initiated painlessly into the art of proportional flying during their holiday by taking advantage of dual-control tuition facilities, and at least five are now flying their own propo models on their home ground with the confidence that comes from sound basic training.



CHAMPION OF

10th in 1969 World
twice in World Champs
winner of countless

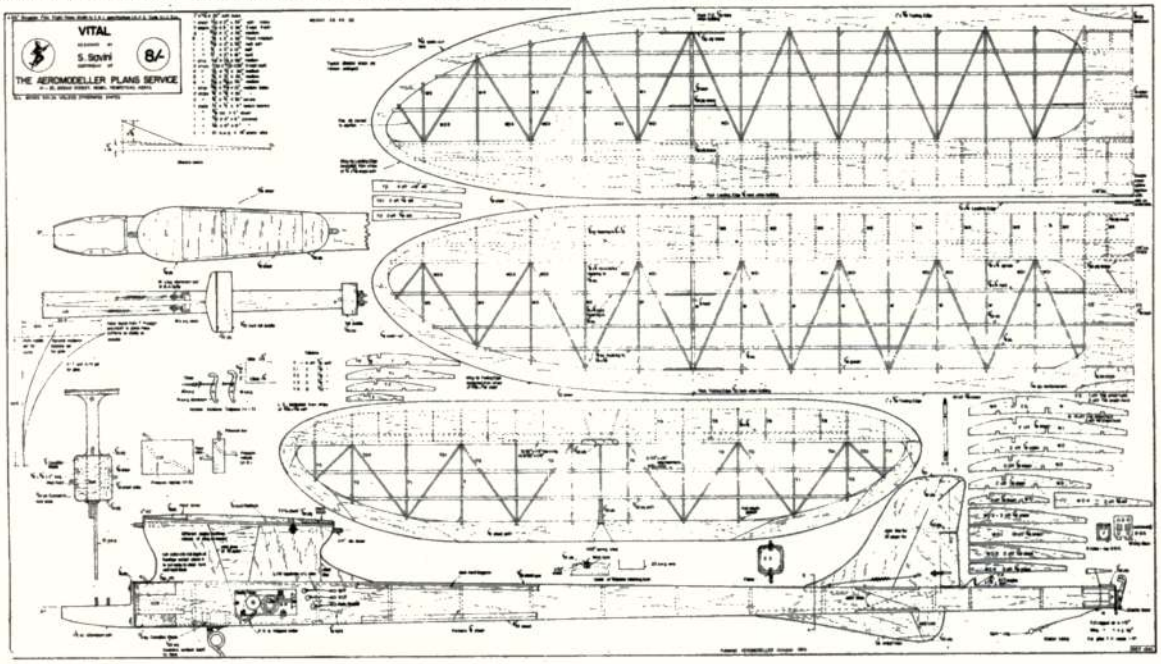
VITAL

THE FIRST of Joe Savini's forward fin V.I.T. (Variable Incidence Tailplane) models was built in 1966. On this, a Fryges section, short moment arm and straight taper wing was used, but this model did not come up to expectations. Power pattern was not consistent as it varied from a good, straight up climb one day, to a flat, half-circle take-off, followed by a vertical climb and poor pull-out a few days later. It was eventually lost at Woodvale (anybody for a search? – it had a brand new MVVS up front).

The design was subsequently modified and now features a slightly thinned down 'FAITAL' section, longer moment arm, more underfin, lower pylon and less centre dihedral on the wings.

As seen by the timer sequence it needs very little delay for the pull-out, between auto-rudder operation and motor-stop, the V.I.T. operates only when the plane is in a horizontal position ready for gliding; in fact, if the plane is banked when the tailplane rises, the latter has the effect of an additional rudder, banking the plane even more and causing a steep stall.

FULL SIZE COPIES OF THIS 1/8th SCALE REPRODUCTION ARE AVAILABLE FROM AEROMODELLER PLANS SERVICE AS PLAN PET1041 PRICE 8/- PLUS 6d. POSTAGE.



ITALY

Championships Fly-off top team (U.K. 1967 - Italy 1969) National events

by Sergio ('Joe') Savini

An F.A.I formula contest Power design with auto-rudder and variable incidence tailplane

This model will climb equally well on 7½ in. and 7¼ in. props, in fact, both sizes are used according to the 'pipe' requirement under different weather conditions.

It should be launched at an angle of 40–50 degrees, stretching the arm above the head rather than forward, and a few degrees to the right of the wind direction. This combination gives a good steep take-off – it must *not* be launched level!

Due to little longitudinal dihedral it requires less trimming to change the loop into a spiral, therefore drag is reduced and sensitivity to variations is increased, as opposed to the FAITAL.

The author prefers using 3½ in. pitch props, as with coarser pitches the initial acceleration is not as good and the climb becomes too straight towards the end of the power run.

There is no means of adjusting climb and glide incidence after building, it being preferable to build the fuselage accurately to give exactly what is specified on the plan. These angles of incidence have proved capable of coping with different weather conditions. Joe Savini's opinion is that once you start fiddling with rigging angles you never know where or when to stop – there is no packing whatsoever on any of his planes.

Should any difficulty be experienced in getting a good, steep take-off, one degree of left thrust can be applied. This was tried and found useful but not indispensable.

The warps in the wing should be built-in as they give a strong, safe spiral capable of coping with winds and small launching or trimming errors.

The original used a restrictor, with a 5–6 thou. hole in the pressure line from the crankcase and a 3/8 in carburettor extension. Length of the pipe supplied by Rolf Miebach is 280 mm. from cylinder centre line to the end of the rear cone. The MZ G15 has proved very reliable and powerful, 'come-in' is quick and positive and it starts within a few seconds unless the motor is too hot. The wings and tailplane should be built first; these are then left for 3–4 weeks before covering. Give the wings 7–8 coats of dope allowing 3–4 days in between, and 6 on the tailplane. Apply silk on the wings dry and well ironed, using dope as an adhesive. The tailplane is covered with lightweight Modelspan.

Cut fuselage sides 1/8 in. oversize, leave for a week, then carefully trim to size applying correct tailplane incidence, and glue bottom longerons in place. Glue the 1/16 in. front fuselage doublers and bearers in place, add 3/16 in. formers (level with the inside face of the bearers) on which the pylon will be glued.

The tank is Epoxied on the 1/32 in. ply and the hardwood block right behind.

Before inserting pylon check its height front and back to give correct angle of incidence.

The front end of the fuselage is then pinned to a flat and true building board and the formers added, starting from the front end, then the light Laystrate wires, fin, top longerons and top sheeting. The fuselage is then removed from the board, the V.I.T. aluminium mount, underfin and bottom sheeting added. The pylon and fin are tissue-covered, and the fuselage is covered with modelspan or a very light grade of nylon if the back end appears very light (double nylon covering at the front around the bearers.)

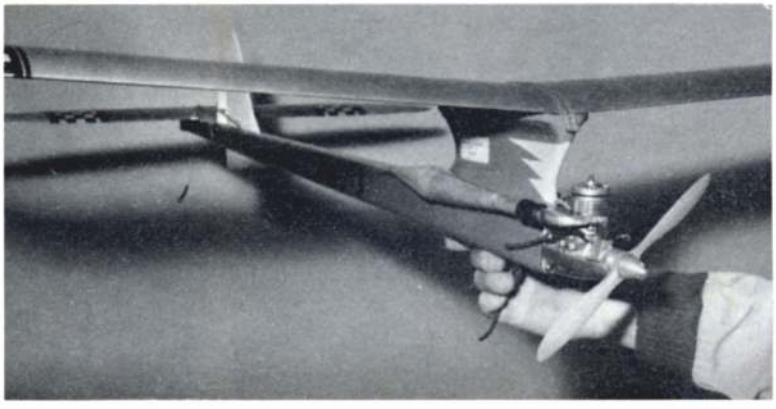
Trimming

Try and obtain the pattern shown on the plan, then fly with a 6–7 seconds motor run on full power. Flying with motor off-peak does not prove anything, as with modern motors the difference between off-peak and 'full song' power is so great as to cause a vastly different engine torque and airstream, hence power pattern could change (*KAPAU!*) drastically.

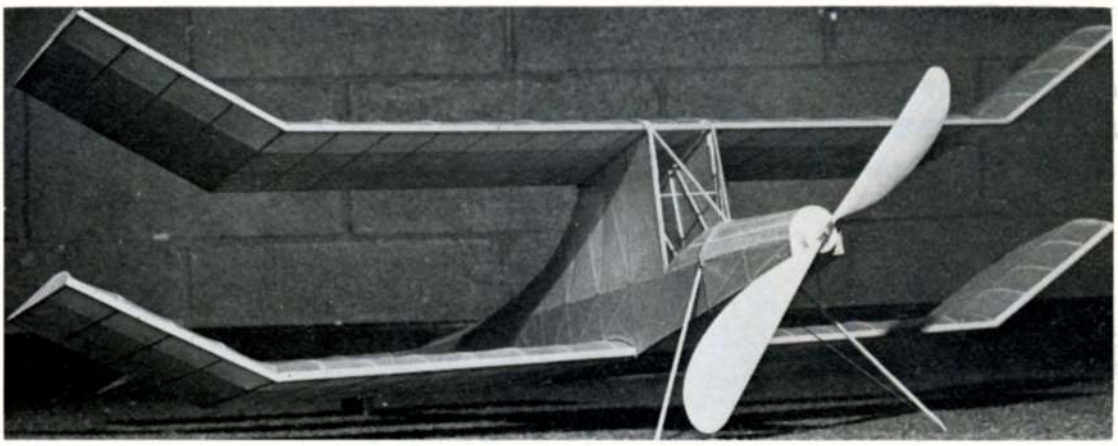
Building the VITAL might seem a little complicated but this will pay off in the ease of trimming and consistency afterwards.

All of the author's trim adjustments (very small actually) at the comps have been done with the rudder only – build the model as specified and it will not require any other attention.

Viva la Vital!

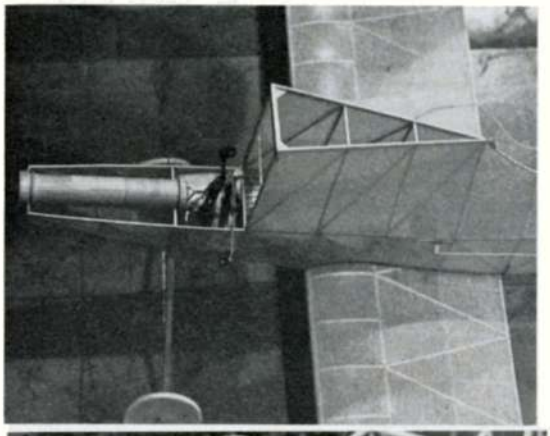


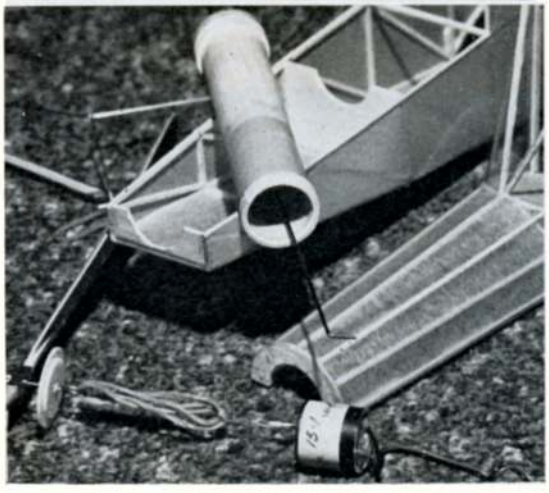
It was unfashionable to be without a tuned length exhaust pipe at the recent World Championships in Austria. Joe Savini uses the Rolf Miebach pipe on a Miebach-Zilliken modified Super-Tigre G15 engine. Joe's equal-first placing with a perfect score at the end of seven rounds is a great credit to him and is no way diminished by eventual 10th place in the fly-off.



ELECTRIC POWERED RADIO CONTROL

Photographs speak for themselves! Note the motor tube seen in detail below, and the light structure with two types of tail, flat or lifting; all photos, including our colour cover, by Dick Stouffer.





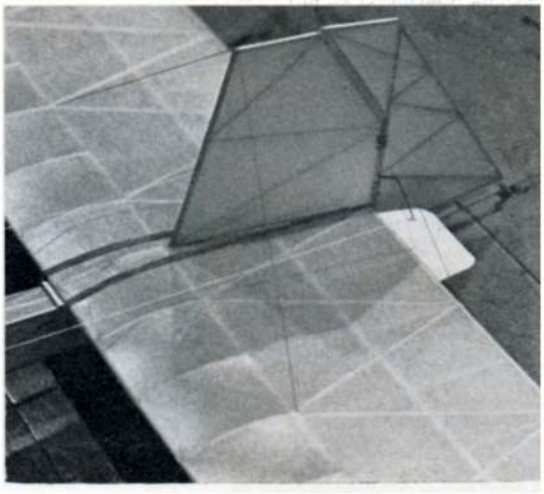
ONE OF THE most fascinating, but as yet not fully conquered aspects of aeromodelling is that involving electric power. The subject has always attracted interest and has been tackled in many different ways. Electric round-the-pole models are relatively commonplace. Last winter we produced a means by which models could be flown on lines of up to 20 ft. radius. This we demonstrated throughout the whole period of the *Model Engineer* Exhibition and thanks to the booklet on Electric R.T.P. which we subsequently issued, many clubs have been able to undertake less ambitious projects.

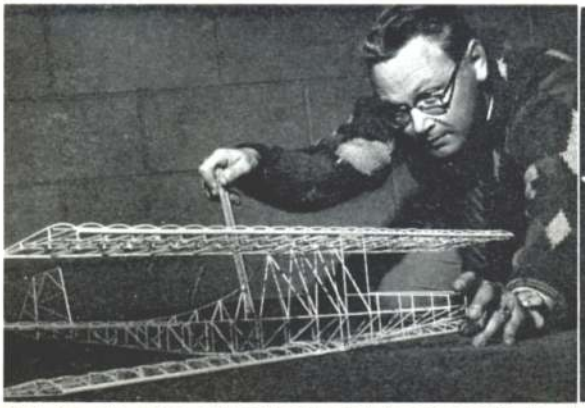
Free Flight Electric Power became possible with the arrival of the Graupner Mikromax Electric motor with its gold plated commutator, high efficiency, and the arrival of the salt water activated cell. Articles on this subject were produced by us in the *AEROMODELLER ANNUALS* of 1960–1 and 1962–3.

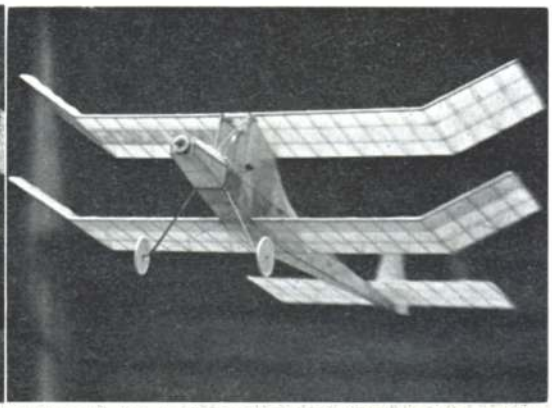
Thanks to the efforts of Fred Militky of the Graupner Company, the first commercial kit was produced for Electric Free Flight, the *Silentius*, and the popularity of this has probably outweighed the availability of the salt water batteries; hence the apparent lack of interest.

Much earlier, the late Col. H. J. Taplin, successfully demonstrated that Radio Controlled Electric powered flight was a possibility when he proved at R.A.F. Benson that a heavy model carrying Nife cells was feasible, if expensive.

Chris Soenkson, who features on our cover this month, and who runs a model shop in the U.S.A. has taken up the challenge and produced this biplane for indoor radio controlled operation. The power unit is the same as is used for *Silentius* – a Mikromax with 15:1 gear ratio. Power is sup-

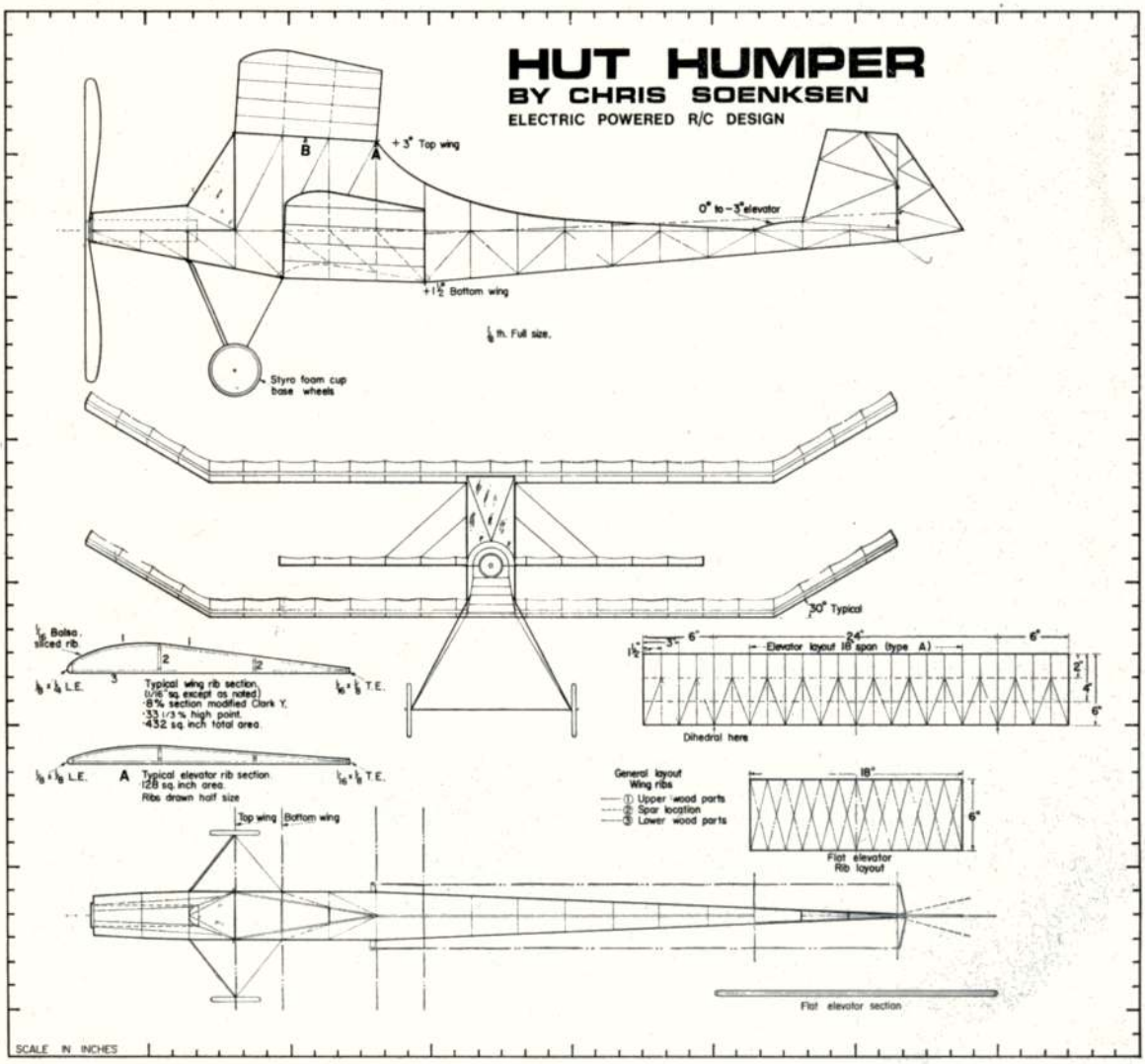






plied by salt water activated cells and the motor unit is retained in a tube with rubber shock absorbing link between the motor and the large diameter propeller.

The radio control equipment is an Albin receiver, Adams Baby Pulse proportional actuator and a Testor transmitter. The magnetic actuator is linked to a large bellcrank projecting through the fuselage sides and linked to the rudder. Total weight is 5½oz. Flights to date have been very much in the 'experimental' category but certainly provide food for thought which we trust will be picked up by our more inventive readers. It will be interesting to hear of experiments elsewhere.



Above, seen restarting his 5 c.c. team racer in the 'safety-zone' is Piasente, third placeman at French Nats. Pilot is Favre of Fabre/Favre fame. At left are a few of the French A.M.A. club, who specialise in T/R – and yes, that's right, Regine Curt's 'Griffon' does have an anhedral wing!

POTENTIALLY one of the most interesting **Carrier Deck** models to be seen at the moment must be L. Scerri's (R.A.F. Benson) *Fairey Gannet*. The model was built from A.P.S. plans (CL/631) but has been modified to accept a retracting under-carriage based on Olaf Sundell's centrifugal-force operated retract system, which was featured in the July '65 issue of *Aeromodeller*. This system was, of course, designed as a light weight unit to retract a monowheel for a team-racer, and it is evident that much skill and thought has gone into its adaption by Scerri.

The Gannet was flown at the recent Old Warden scale rally but the gear only partially retracted, probably due to either insufficient centrifugal force to operate the system, or else to an over-strong return spring. Once this model has the 'bugs' sorted out – and they are only minor – it should be quite a performer, and should certainly look the part, being very well built and finished.

Surely, this is the sort of model that the Carrier event should attract, not those profile 'thingies'? At last here is an event for *practical* scale models which fly *and* demand pilot skill. Unfortunately, several contest organisers appear to have misunderstood the rules regarding scale models and the bonus points to be awarded. The rules state that provided the 'major components' of any scale model of a Royal Navy carrier aircraft (whether operational or experimental) are within a tolerance of ± 5%, then a bonus of 100 points will be given. Note that 100 points *will be given* – the model is not to be judged out of a maximum of 100, as has been the case on several occasions this year.

French Nationals

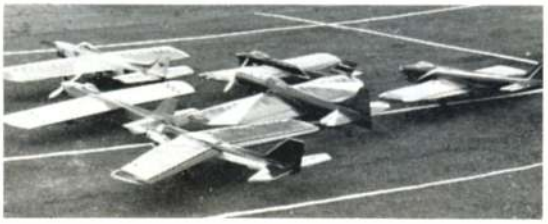
The French National Championships were this year held during excellent weather at Auxerre – which, incidentally is the twin-town of Watford, though sorry to say it is easily distinguished from Watford by its fine asphalt flying surfaces, safety barriers, etc., etc.!

The stunt event was largely dominated by relatively large models powered by '45s and '49s, which were favoured by the calm conditions. It is interesting to note that third placeman, Lauron, flew a Spinaflo equipped Merco .49 powered *Crusader*, fitted with a *retracting tricycle undercarriage* – just at the same time as Bruno Giezendanner won the World R/C aerobatic champs with a similar feature. Perhaps this will be the beginning of a trend?

The F.A.I. team race event attracted twelve entries–honour of establishing the fastest heat time of 4:52 going to the Magne/Triconnet team, who used an M.V.V.S. Final victors, however, were the young Topalian brothers, with a rear induction Super Tigre.

The 2.5 c.c. speed winner was Pecquet, who put in two runs of 225 k.p.h. on monoline – but this was overshadowed by Jarry-Desloges who, returning from semi-retirement, recorded 223 k.m.h. – on *two* lines! Jarry also won the 10 c.c. event with 262 k.m.h.

Below left. Scerri's Fairey Gannet, as described in text. Engine is an Enya 35, but this may shortly be replaced by a larger motor. Below, Boussin's 'Olympus' designed by Billen is a replica of Van Den Hout's 'Olympic'. In keeping with the trend towards large models it uses a Merco 49 with Mini-Vox silencer.



Left, is a line up of stunt models from the Rhodesian Nationals – the swept wing model in the foreground looks particularly interesting.

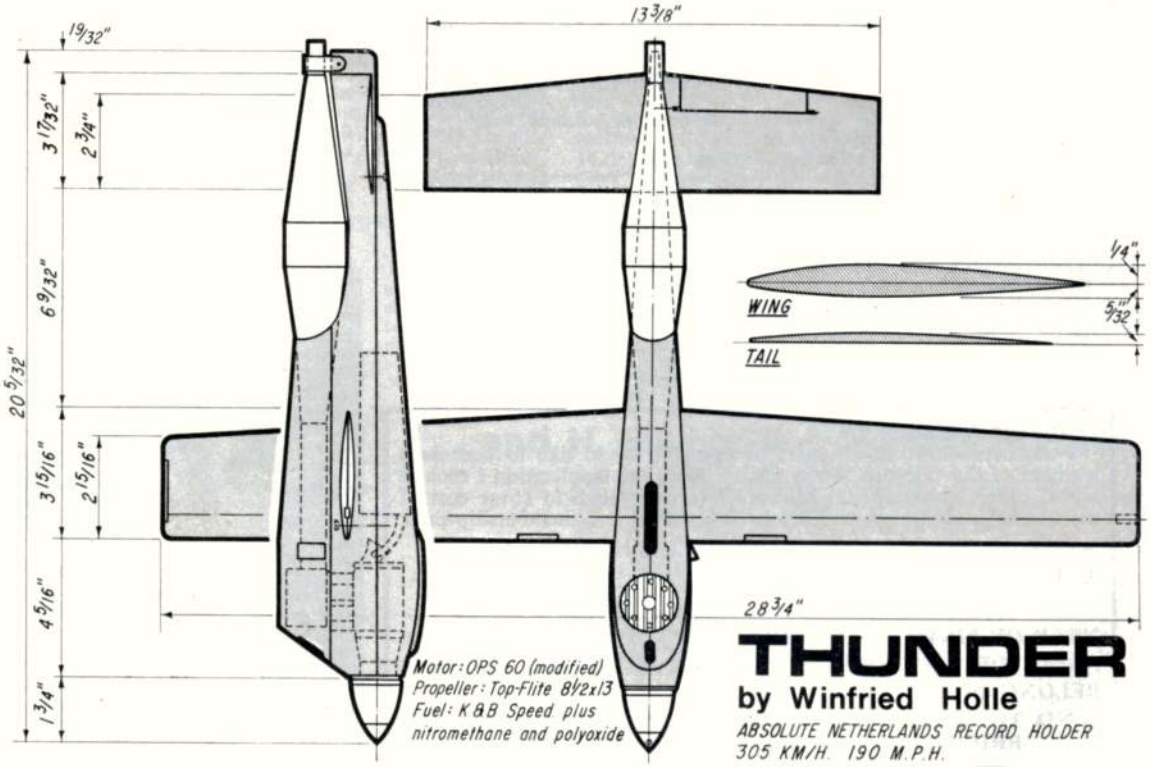
Sorry—it's all over!

Regrettably received too late for publication in time were the details for the *Coppa D'Oro* contest for F.A.I. team racers, held on the 14th September at Villa S. Martino airport, near Lugo, Italy. However, several features of this annually held contest are interesting, and may provide food for thought for other organisers. Firstly, it appears very well organised, and the rules and regulations are clearly printed on a card, with an English translation. Prizes range from a gold medal for the winners, to bronze medals for fourth place as well as assorted other plaques. The club for which the winner flies also receives a gold cup – a very nice touch and would, perhaps, encourage clubs to help 'sponsor' their best teams. Cash prizes are no longer awarded, in order to avoid 'excessive specialisation, and to free the competition from the aspect of a professional sport which it was acquiring'. The Italians must treat their winners rather more generously than ourselves, as it is doubtful whether many British fliers have been corrupted by a couple of grubby ten shilling notes!

The biggest innovation of all is the way in which the organising club (the F. Baracca Aircraft Model Group) has tried to encourage foreign countries to compete. Free board and lodging for the duration of the contest in Lugo's best hotels is given to all foreign teams, and also all Italian teams who have to travel over 300 km. A very commendable and ambitious gesture that deserves success, as there is nothing like stiff international competition to improve racing. Only hope we hear about 1970 event in better time to pass on the gen!

New Speed Record

Dutch speed enthusiast Winfried Holle has just established a new Dutch 10 c.c. record of 305.9 k.h.p. (189.52 m.p.h.) with an O.P.S.60, which is a considerable improvement on his previous record of 178 m.p.h., using a Rossi 60. Since changing from the F.A.I. class, and developing his O.P.S. for use on high nitro fuel, Winfried has had to develop an entirely new tuned – length resonant pipe. This took a long time, but the results were well worth while. especially as during the record flight, the engine was still running on the rich side – 315 km/h seems possible. Incidentally, he is also involved in engine development for the Australian Hirtenberger factory, particularly in respect of the speed version which should provide tough competition for the Super Tigre A.B.C. and the O.P.S. 60s. Already his *unpiped* H.P. 15G powered F.A.I. model has achieved 230 k.p.h.



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

Dear John,

I am thinking of building *'Arrowhead'* from the A.P.S. *quartet* plans set and wondered if it would be possible to fit an undercarriage of 18 s.w.g. wire and 1 in. dia. wheels to the front bulkhead? I would remove the bearers and radially mount a Cox Babe Bee ·049. Would it be satisfactory? I have been flying C/L for about a year now with a Keil Kraft Plastic *Hurricane* but after three of four flights the engine mount snapped. I obtained another and the same thing happened. I think this is due to the design of the part and I have decided to construct one out of $\frac{1}{4}$ in. aluminium and tin-plate but I cannot obtain any $\frac{1}{4}$ in. aluminium. Where can I get it and how much is it?

Ingatestone, Essex. *Paul Bennett*

You could certainly fit an undercarriage to the 'Arrowhead'. Either sew and glue the u/c to the bulkhead, or use J-bolts, as detailed in the July issue of Aeromodeller'. If you are flying over grass, the skid is quite unnecessary.

1/8 in. Dural would be quite sufficient for your modification to the Wen-Mac engine. Non-ferrous metals may be obtained from J. Woodhouse at Macwood Metals Ltd., of 30 Victoria Road, Surbiton, Surrey.

Dear John,

Next week I am planning to buy a Swedish Model of an *Auster* and I would like to put in a glow-plug engine. As this is the first of this type of engine I have had, I want to know if it starts 'inverted', because I have noticed some modellers turning their models upside down when they start them. Is this for convenience or is it because they start easier upright?

Please advise me – thank you.

Sutton Coldfield, Warks. *Nigel Bound Pearce*

Motors, glow motors in particular, do start easier upright – but this does not mean that they will not start inverted. It depends entirely on your individual motor/tank set-up.

The reason why glow engines do not always start inverted is that the motor 'floods', due to excess fuel running down the cylinder bore, and saturating the glow plug. Thus, the glow plug has to burn off this excess fuel before it can ignite a fresh charge.

The way to prevent this happening is to invert the model and start the engine in its normal attitude.

Dear John,

I am thinking of building a proportional system transmitter and receiver, and wonder if you could help me, through the club, in obtaining circuit diagrams and parts for building same.

Thanking you.

Ely, Cambs. *M. Murfitt*

The only information that we have on building your own proportional system, is that series of articles currently being run in our sister magazine, **Radio Control Models & Electronics.** *When this series is finished, it will be reprinted in the form of a booklet, which will contain full details of circuits, components, and instructions etc.' necessary to build a complete digital outfit.*

There are several firms selling components for this outfit, and I suggest you study the advertisements in **R.C.M. & E.**

Dear John,

I have a 6 foot wing on my hands, that belonged to a large sailplane, *'The Empress'* by Contest Kits Ltd. I want to use the wings for an R/C single-channel slope soarer. I still have the fuselage, which when new, flew from the 'Long Man' at Wilmington, Sussex. Maybe this shows that with the original design it *can* slope-soar, but this happened only once; now the fuselage and tail is a bit smashed up, not to mention too small for R/C. Please would you tell me what sort of shape, length and sort of max. size/weight ratio I would need. The wings are undercambered and have two dihedral breaks near the tips: the chord is 5 in.

Also, could you tell me whether the throttle-flap idea for control-line in last month's club page would be any good for R/C, or whether an ordinary A.M.15 could be converted easily into an R/C throttled version.

Heathfield, Sussex. *S. Bowles*

I suggest that you make a new box-like fuselage for your 'Empress' using the original dimensions for nose length, movement arm, angles of incidence etc.

Make the fuselage just large enough to accept your R/C equipment, and keep the tail light. It would be as well to make a **strong** *nose . . . those slopes can be hard.*

Although you could use the choke flapper type of throttle, for R/C use you would be better advised to fit the throttle made by A. M. (D. J. Allen Engineering Ltd.) for this engine.

Dear John,

Please could you inform me if it would be at all possible to install a Cox Babe-Bee ·049 engine in the plane *'Sawdust'* described in December 1968 *Aero Modeller* and whether this aircraft would be suitable as a trainer for single-channel R/C.

Grange-over-Sands, Lancs. *C. W. Thompson*

The 'Sawdust' was designed for the single-channel flyer, who having learnt to fly, wanted an aerobatic model. An A.M.15 was used in the original in order to give it the speed necessary for single-channel aerobatics. A Cox ·049 however, would not have sufficient power to permit this.

I would suggest that 'Pal Joey' plan no. RC.852, price 5/0d., would be a much more suitable model for your purpose – that is, learning to fly.

Dear John,

I have got the plans of the A.P.S. *'Super Master'* by J. Gabris and although I have no intention of building it for some time to come, I would like to know whether it would be possible to convert it to a tricycle undercarriage as the present one does not favour good engine protection.

Eastleigh, Hants. *Steven N. Pitt*

The 'Super Master' is a very advanced stunt model, and although of relatively straightforward construction, it must be built accurately for top performance.

If you have sufficient experience to build and fly this model, then lack of engine protection should not worry you.

You could modify this model to a tricycle undercarriage but you would have to reposition the main u/c further back, and mount a nose-leg on the front former. Personally I do not think it worth the trouble, as you will gain nothing from this mod.

Dear John Bridge,

I am between 10 & 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 2/6d. 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, 13-35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS

10/69 — 2d. in the 1/- Rebate — plan purchase coupon for Golden Wing Members — G.W. No.....

YOUR FULL SIZE PLANS!

René Stamm's FLYING FLEA

Rene Stamm, well known in France for his F/F scale models, designed this 'Flea' as a very stable semi-scale model. The main divergence from full-size is that the model is rather more conventional – the full size has no elevator, but changes altitude by varying the incidence on the front wing. The wing on this model however, should be well and truly fastened down with elastic bands!

The fuselage is constructed by first cutting out the two 1/16 in. sheet sides, and glueing on the four 1/8 in. sq. longerons. Next, cut out all the formers, noting that the top parts of formers F1–3 are cut off horizontally as indicated by the dotted line. This is to enable the fuselage to be built inverted.

Mark the positions of the formers onto the fuselage sides, and cement formers F3 and F4 in position – making sure that they are square and true. When dry, invert the fuselage so that a flat edge is presented to the building board, and insert the remaining formers – being careful to avoid a warp. Add the 1/8 in. sheet doublers for the landing gear, and epoxy the 16 s.w.g. tubes in position for the undercarriage and cabinet attachment.

Glue the lower longeron to the formers, and sheet the underside of the fuselage with 1/16 in. balsa. Also, sheet the top of the fuselage aft of F4 – ensuring that the grain runs from side to side to increase rigidity.

Mark the position of the engine on former F1 and drill the holes for mounting it. This is best done by inserting 8 B.A. bolts from behind the former, and preventing them from turning by soldering 22 s.w.g. wire across the heads. The top halves of formers F1–3 are then glued in position, the 1/8 in. sq. stringers added, and finally plank with 1/16 in. sheet.

Carve the nose block to shape from *soft* balsa, and hollow to clear the engine.

The fin is made by cutting three rectangular blanks, approximately ½ in. wide and to the lengths shown for the ribs, notched for the spar and L.E. The T.E. is then constructed from 1/8 in. sheet, as is the fin spar. Next, slide the ribs onto the spar, set into notches in the T.E., and add the L.E., when dry, sand the ribs to section.

Bend the cabane struts accurately over the plan, bind with fuse wire and solder. Epoxy 1/16 in. sheet fairings and bind and epoxy dowel wing runners to struts.

The wings may now be built. First construct the centre (flat) panel by cutting out five W1 ribs and two W2. Cut the L.E., spar and T.E. to length – sanding T.E. to section shown. Cut out four 1/16in. ply dihedral braces. Pin T.E. and spar to plan, and add the ribs. When dry, add the leading edge, dihedral braces and 1/32 in. centre section sheeting. Next, build the tips, noting the taper on the spars as well as the angle of the tip plate. Join the tips to the centre section, packing them up to achieve the 14 degrees dihedral angle. Chamfer and trim the ends of the L.E., spar and T.E. to fit accurately.

Lightly sand the entire model. Cover the wings, fin and fuselage with lightweight tissue. Dope wings using a 50% mixture of thinners, until all the pores are filled (approximately three coats). Apply two thin coats of sanding sealer to the fuselage to fill the grain, and apply two thin coats of colour. Hinge the fin with two pieces of soft aluminium (thick foil is ideal) epoxied into the balsa. This will permit movement for trimming, but will not move accidentally. Finally, fuel proof all over, and apply a second coat around the nose block.

. . . and H. Elwood's SPINNER

THIS plane is called 'The Spinner' because the propeller carving includes a spinner, and is no reflection on its flying characteristics! In fact, it is *very* stable and was designed for flying in windy conditions from small fields. Although the large propeller will not permit take-offs, 'Spinner' still lands safely on its short undercarriage with the propeller free-wheeling.

Total weight of this little ship, complete with motor, is under 2¼ oz., and the designer finds that on windy days, a four stranded motor of ¼ in. rubber is ideal, while calmer weather permits use of six strands of 3/16 in. which gives an impressively steep climb.

Complete building instructions are to be found on the full size plan.

FOR MANY YEARS, the American K&B factory had no official wholesale distribution channel in the U.K. In 1968, however, speed flier Ron Irvine was granted the U.K. sole distributorship for K&B engines and when K&B took over the manufacture of certain Veco products, this concession was extended to include Veco motors as well.

Irvine Engines now hold stocks of all the current K&B built engines – in fact, they can supply more K&B variants than the factory in America! This is because Ron Irvine has adapted some motors to other applications (e.g. the now discontinued 29F to R/C use) and has also produced watercooled marine conversions of most of them for the benefit of model boat enthusiasts.

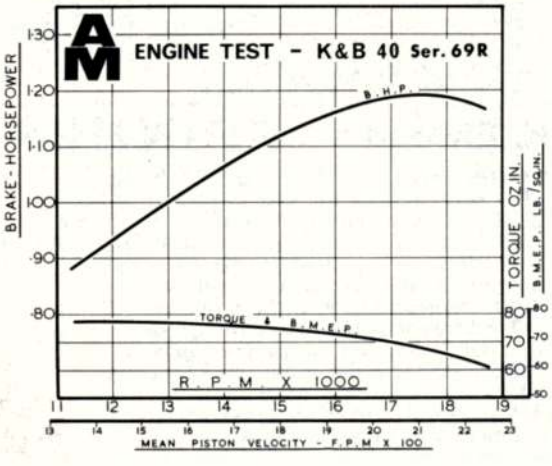
With the acquisition of the Veco R/C engine range, the K&B factory discontinued production of their ten-year-old Torpedo 45 model and the largest K&B Torpedo engines now made are the various '40' models.

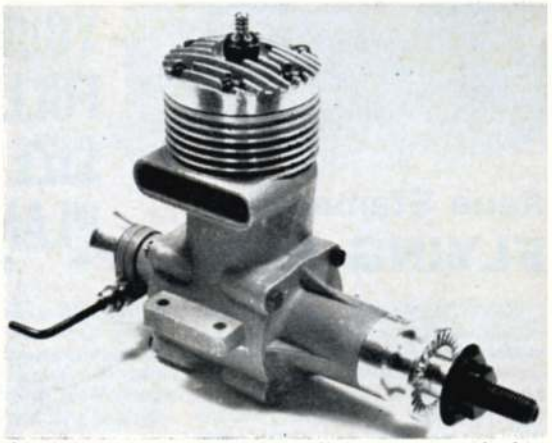
The Torpedo 40's are essentially high performance contest or racing type motors. In standard form, they are intended primarily for control-line rat-racing and for the larger types of free-flight power duration models. In 'R/C' form, they are strictly for the pylon-racing enthusiast, the standard K&B 40 R/C carburettor giving only a limited throttling effect and virtually no idle, as such.

The original type Torpedo 40, the 'Series 66' shaft-valve model, was dealt with in the 'Engine Test' series nearly two years ago. Our present report covers the rear-induction Torpedo 40 'Series 69R' introduced a few months ago to supersede the previous 'Series 67' model which also had rear rotary-valve induction.

The main difference between the Series 69R and the previous Series 67 unit is in the shape of the transfer passage. When the original Series 66 model 40 was introduced, it was basically similar to the Series 64 Torpedo 35 but had a revised main casting with the transfer passage shaped much the same internally but considerably widened externally. The extra metal thus provided has now allowed the internal dimensions of the passage to be correspondingly increased in the Series 69F and 69R models. Enlargement is effected by milling the casting at the sides and top.

Technical details on the Torpedo 40 Series 69R were given in last month's 'Latest Engine News' column and some further data is included in a table in this month's L.E.N. We will not, therefore, repeat





this information. It will be sufficient to remark that its design follows a classical racing model two-stroke layout. It uses an integral cylinder casing and barrel type crankcase, with inserted cylinder liner, twin ball-bearing crankshaft in a flange fitting front housing, separate backplate with rotary-disc type induction valve and a ringed aluminium piston. The latter has a single Dykes pattern piston ring (the K&B was the first commercial model engine to have this feature) and now has a gudgeon-pin with pads made of PTFE instead of the aluminium and (earlier) brass pads previously used.

Owners of Series 67 engines who wish to have them modified to Series 69R specification can have this done by Irvine Engines at moderate cost. Either model can also be converted to the Series 69R R/C specification.

Performance

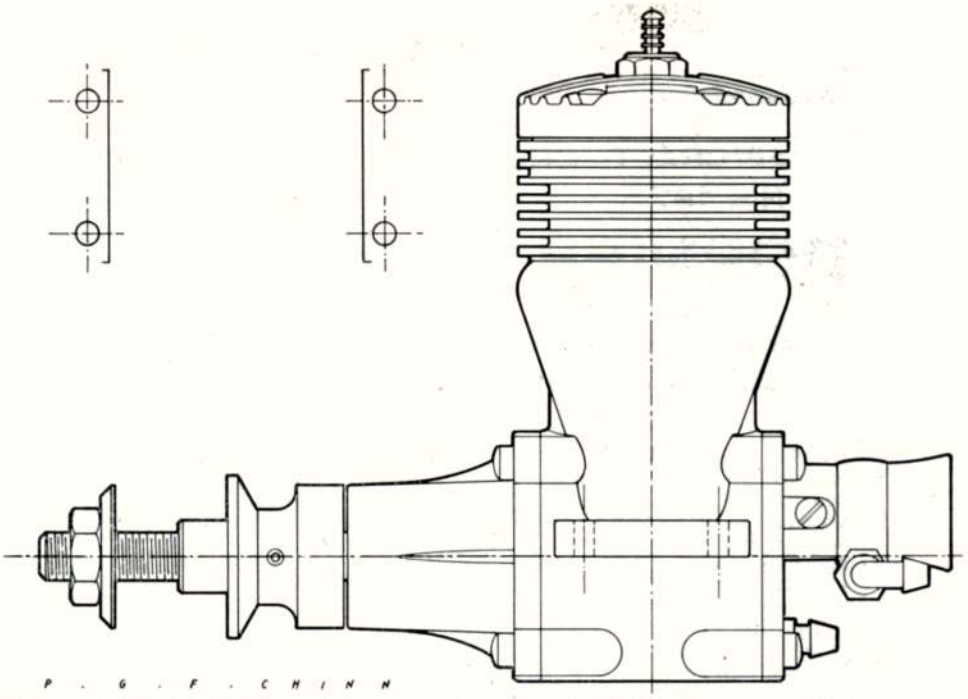
For most of our performance tests of the Torpedo 40 Series 69, a fuel mixture containing 30 per cent. pure nitromethane was used. This is the equivalent of a commercial mixture containing 43 per cent. of blended nitro.

As the graph shows, the power available on such a mix was pretty shattering, the engine indicating an output close to 1.2 b.h.p. at around the 17,500 r.p.m. mark. The rate at which the Series 69 gobbles such relatively expensive fuel is also rather shattering. We did not make an accurate check of the engine's rate of

ENGINE TEST

by Peter Chinn

K&B 40 Series 69R



fuel consumption but became aware that it was consuming fuel faster than most of the many R/C 60's we have tested over the past few years.

Checks on mild fuels resulted in a very sharp drop in power (about 22 per cent. at 11,000 r.p.m.) when the engine was loaded down with a big prop. Interestingly enough, however, there was a less severe loss (only about 12 per cent.) on mild fuels if the engine was allowed to really unwind, as maximum torque was realised at substantially higher revs than was the case on high nitro fuels. In other words, provided that one is interested only in running the engine at revolutions near its b.h.p. peaking speed (and this will usually be the case, anyway, since no one buys a K&B 40 for C/L stunt or 'cabin sportster' use) it is quite feasible to use a more economical mixture for practice flights, reserving high nitro mixes for competition use.

Taking this a stage further, we raised the nitro content to 50 per cent pure. This only added 300-400 r.p.m. on typical props but would be worth trying for out-and-out contest use.

All the K&B 40's we have tested previously (three of them) have been pleasant to handle and the Series 69R was no exception. Pressure feed was, of course, employed for our tests. Using the standard rotary-valve timed crankcase outlet tended, we found, to make the needle setting a trifle tricky and we suspect that a low pressure tapping (e.g. via a fitting to replace the upper backplate screw on the transfer side) would be better here. Actually, the engine will run on suction feed on the bench but would probably be too sensitive to variation in fuel head for this to be used in a model.

Starting was very easy. Hand starting on a small prop would occasionally result in reverse rotation initially, but nipping the fuel line and another flick would usually set the engine running immediately in the right direction. Running qualities were generally excellent with smooth, steady firing, especially on light loads but also on heavier loads when medium to high nitro content fuels were used.

The Torpedo 40 is obviously of particular interest to 'rat-racing' enthusiasts. Previous versions have proved popular in this particular control-line class, weight of less than 8½ oz., it offers truly phenomenal performance – for example: 14,500 r.p.m. on a 10x6 Top-Flite Maple or 16,300 r.p.m. on a 9x6 Top-Flite Maple.

Power/Weight Ratio (as tested): 2.26 b.h.p./lb.
Specific Output (as tested): 182 b.h.p./litre.

SPECIFICATION

Type: Single cylinder,air-cooled, glowplug ignition two-stroke with disc rotary-valve induction and twin ball-bearings.
Bore: 0.840 in. **Stroke:** 0.720 in.
Swept Volume: 0.3990 cu. in – 6.539 c.c.
Stroke/Bore Ratio: 0.857 : 1
Weight: 283 grammes – 8.41 oz.
General Structural Data
Pressure diecast aluminium alloy *crankcase/cylinder-block* unit with unhardened drop-in cylinder liner. Pressure diecast aluminium alloy *main bearing housing* secured with four screws and containing one ¼ x ⅜ in. front and one ⅜ x ⅜ in. rear ball journal bearings. Internally counterbalanced disc-web *crankshaft* with pressed-in hardened 7/32 in. dia. crankpin. Machined aluminium alloy *piston* with baffle and single Dykes piston ring. Forged aluminium alloy *connecting-rod*, unbushed, with lubrication slit at lower end. Fully floating 0.180 in. dia. hardened tubular *gudgeon-pin* with PTFE end pads. Pressure diecast aluminium alloy *cylinder-head* secured to cylinder casting with six screws. No head gasket. Pressure diecast aluminium alloy *crankcase backplate* secured with four screws. Ultra lightweight non metallic *valve rotor*, bronze bushed and rotating on hardened steel pin pressed into backplate. Provision for high-pressure type crankcase pressurised fuel system via rotary-valve timed bleed hole in backplate. Machined aluminium alloy *drive hub* fixed to crankshaft with rolled pin. Removable ¼ in. dia. mild steel prop stud with hexagon nut and steel washer. Machined aluminium alloy *carburettor venturi* with six peripheral surface jets fed from external collar containing needle-valve assembly. Beam mounting lugs.
(a) R/C type carburettor, K&B Part No. 4049 (Converts standard engine to R/C Pylon Racing type).
(b) British made marine conversion parts (flywheel and watercooled cylinder casing) from U.K. distributor.

TEST CONDITIONS
Running time prior to test: Approx. 2½ hours.
Fuel used: 30 per cent pure Nitromethane, 25 per cent Duckham's Racing Castor-oil, 45 per cent ICI Methanol.
Glowplugs used: K&B KB-1L platinum filament, long reach, as supplied.
Air Temperature: 70 deg. F. (21 deg.C.).
Barometer: 29.80 in.Hg. **Silencer:** Not fitted.

AIRCRAFT DESCRIBED No. 187

DORNIER Do 17

drawn by Bjorn Karlström
described by Bo Widfeldt

IN 1933 DORNIER was asked to develop a civil twin engined aircraft based on the Heinkel He 70. The new aircraft was to be capable of carrying six passengers and two engines were required in order to achieve higher flight security. The new aircraft, designated Dornier Do 17, was primarily designed for Deutsche Lufthansa (DLH) as a high-speed mailplane and suitable for use on European express services.

The first prototype Do 17 VI flew for the first time in the autumn of 1934 and before the end of the year the Do 17 V2 and V3 also joined the flight test programme. Early in 1935 DLH took over the three aircraft for evaluation. The slim fuselage contained two tiny cabins for the six passengers and the seats were rather inaccessible. Although the three aircraft fully met the DLH demands they were returned to Dornier.

After having flown one of the prototypes, Flugkapitän Untucht suggested the Technische Amt of the RLM study the Do 17 construction closer. A test pilot of RLM also flight-tested the Do 17 and the Dornier company received instructions to produce a fourth prototype suitable for military trials!

The Do 17 V4 was first flown during the late summer of 1935. It differed externally from its predecessor in having the cabin portholes eliminated and a twin fin-and-rudder assembly in place of the original single fin arrangement. Like the former prototypes, the Do 17 V4 had two BMW VI 12-cylinder liquid-cooled engines, rated at 660 h.p. maximum each.

The Do 17E-1 and F-1 were the first versions to be built in series for the Luftwaffe. They had uprated BMW VI 7.3 engines and deliveries started in 1936. The first units to get the E-1 bomber in early 1937 were I/KG 153 at Merseburg and I/KG 155 at Giebestadt. The Aufkl.Gr. (F)/122 simultaneously received the F-1 reconnaissance aircraft. During the spring of 1937 one Staffel (15 aircraft) from (F)/122 joined the Condor Legion as 1.A/88 in Spain. Later also twenty Do 17E-1 bombers were sent to Spain to supplant the Heinkel He 111B in 1. and 2.K/88.

In 1938 the Do 17M and P-versions began to supplant the E and F-versions in the Kampf- and Aufklärungsgruppen of the Luftwaffe. Ten P-1s were also sent to Spain and the 1.A/88. On September 19, 1938, 580 Do 17E, F, M and P had been delivered by Dornier and 479 were on that day serviceable by the Luftwaffe.

The Swedish Air Force experts had an opportunity to study the Do 17 in 1940. On July 6 that year a Do 17P made a forced landing in northern Sweden (Sangis). The aircraft belonged to the I.(F)/120 based in Norway and was coded A6+JH. Almost exactly one year after this first landing, a second Do 17P landed at Myckle on July 13, 1941. This aircraft was flown by Leutnant Karl Hasslach, Oberfeldwebel Künz and an unknown private. The Dornier Do 17P

Above: Early production Dornier Do 17Z-1 with Bramo Fafnir 323A-1 engines. The Luftwaffe started to convert to the type early in 1939. Note the two-tone green splinter camouflage – and the highly polished natural metal propeller blades. Below, top: A Dornier Do 17P with the rounded shape nose, bearing number 73 on the rudder and 73 superimposed over a 25 marked centrally on the fuselage cross. This version has BMW 132 N engines. Below centre and bottom, two views of a Yugoslavian Air Force Do 17Ka surrendered in Egypt. This version was made under licence by the Yugoslavian State Aircraft factory; the badge of which is seen on the fin. Note very small insignia above wing, near tip, and larger insignia on the underside. (I.W.M. Photos HU 2703, CM 697 and CM 698).

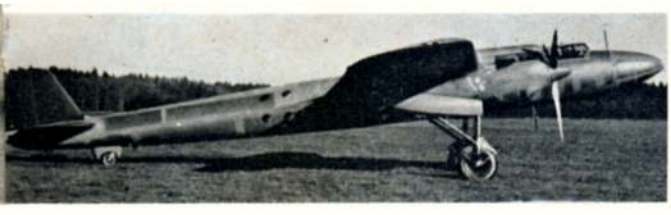
Crew member poses in uniform of the day beside Dornier Do 17P which crashed in July 1941 in Sweden (see text). Below: The first prototype Do 17VI first flown during the autumn of 1934. The aircraft was built for the Deutsche Lufthansa (DLH) intended for six passengers and as a high-speed mailplane.

was flying from Oslo to Rovaniemi in Finland when it had engine trouble and had to force-land. On the nose it carried an emblem with the word 'Eismeer'. The code was IR+BH and it seemed to have belonged to a Luftwaffe (F)-unit, probably (F)/100. According to the crew, the aircraft had earlier fought over Crete and the wings also carried marks from several hits. After being dismantled, the aircraft was ferried to Germany five days after the landing in Sweden.

The Dornier Do 17Z was the last aircraft in the series to retain the original type number. It was essentially similar to the S- and U-models (only 16 aircraft built) except for the power plants. The Z-series used the Bramo Fafnir 323 engines and production started in 1938. The Do 17Z-2 normally carried four crew members but an additional crew member could be accommodated for certain missions, and defensive armament first comprised six MG 15 guns.

On September 2, 1939, the Luftwaffe Kampfgruppen possessed 212 Do 17Z-1 and Z-2 bombers, of which 188 were serviceable. Less than one hour after the outbreak of World War II a Staffel of Do 17Z-2 from III/KG 3 started from its base to attack the approaches to an important bridge at Dirschau, in Poland.

Later, Do 17Z also were engaged during the 'Battle of Britain'. However, the poor armament proved too weak and the total defensive armament soon increased to eight 7.9 mm MG 15s. From 1941 many Luftwaffe units started to convert from Do 17Z to the Junkers Ju 88A and Do 217E. Apart from III/KG 3 the Do 17Z disappeared from Luftwaffe first line bomber strength. In 1942 15 Do 17Z-2 were donated to the Finnish Air Force, supplanting the Blenheims of PLeLv 46. The Do 17 continued to serve as a glider-tug for DFS 230, and one of the last operations was the aerial supply of Budapest early in 1945.

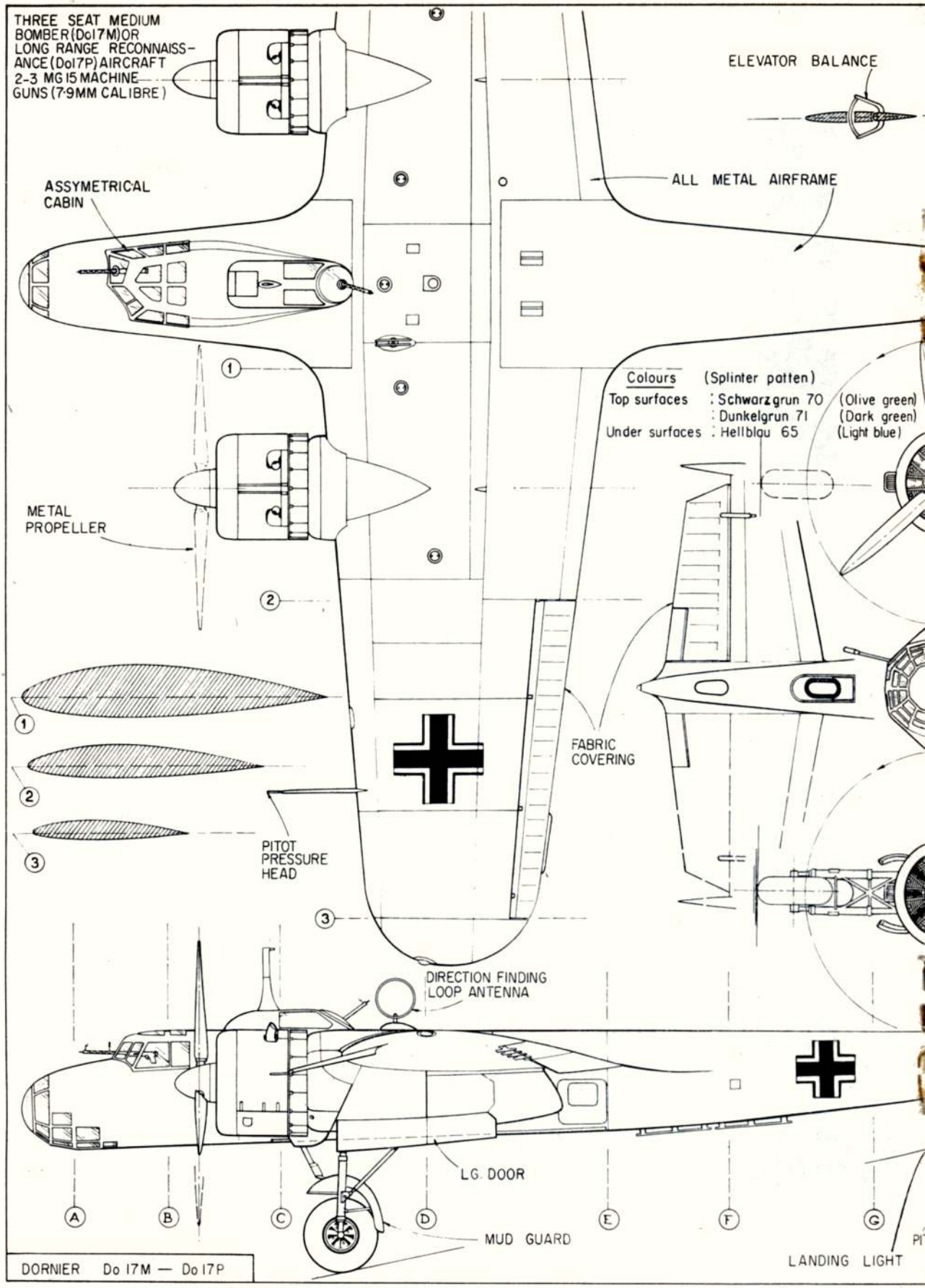


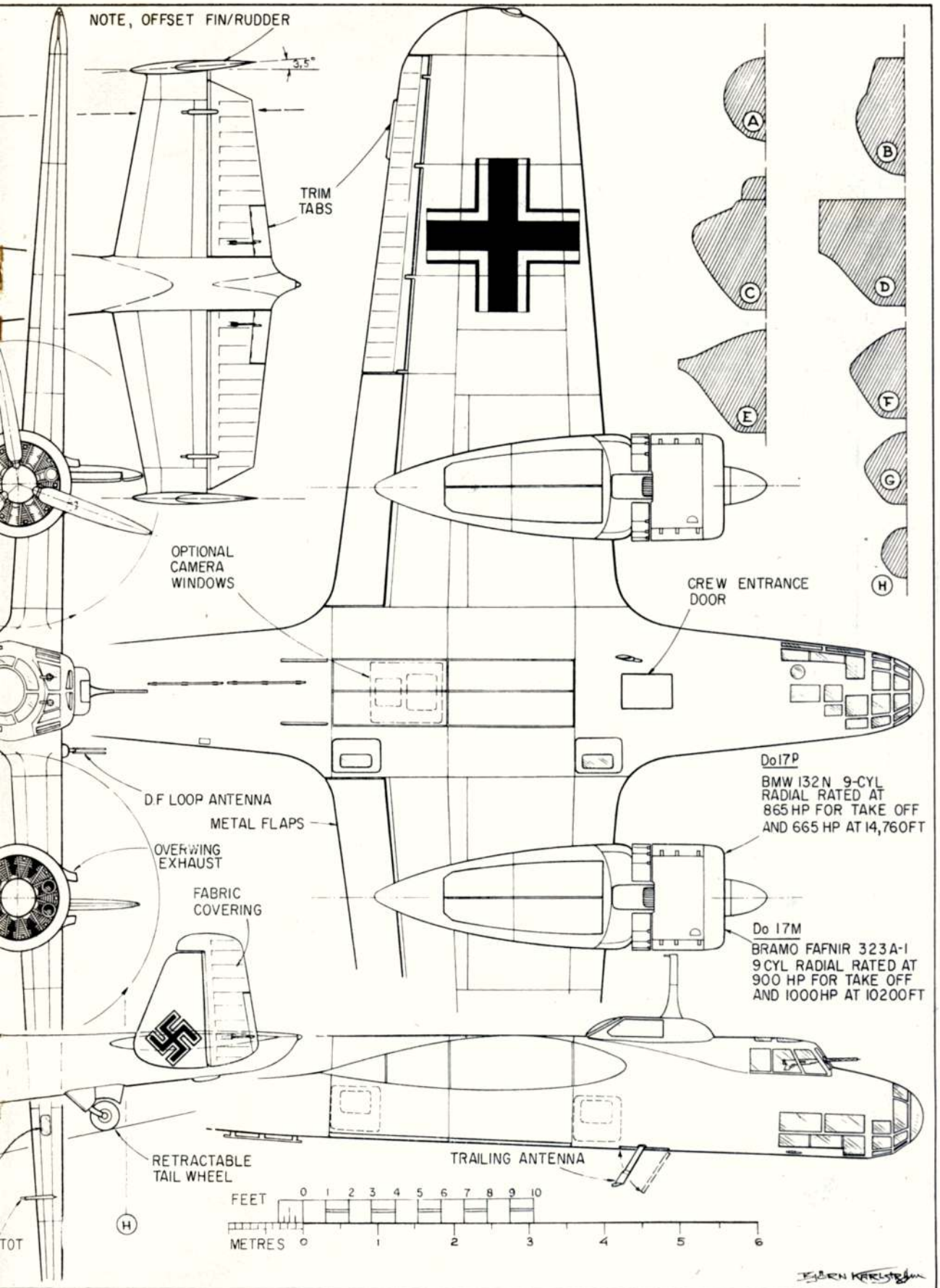
The Dornier Do 17Z was very popular both with flying and ground personnel. It was also a most reliable aircraft but lacking the load-carrying capability of the He 111 and the speed of the Ju 88, production terminated during early summer 1940. By that time some 500 Do 17Z-1 and -2 bombers and 22 Do 17Z-3 reconnaissance-bombers had been delivered. The total Do 17 production can be estimated to about 1,200 aircraft.

THE DORNIER DO 17 SERIES

Dornier Do 17 versions:

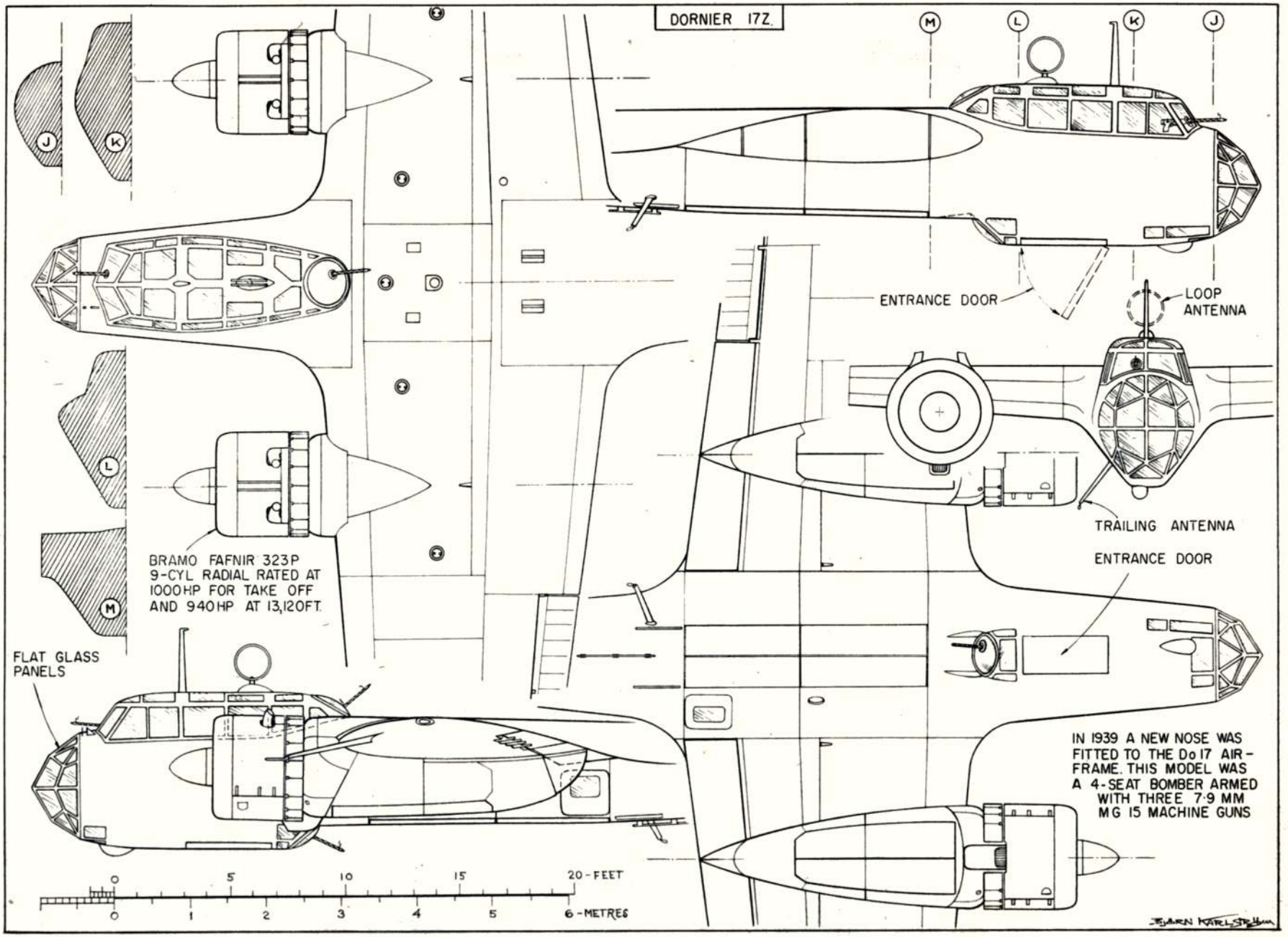
V 1 BMW V 1 engines, first flown autumn 1934.
V 2 Like the V 1.
V 3 Like the V 1.
V 4 BMW V 1 engines, twin fin-and-rudder, used for military evaluation.
V 5 Hispano-Suiza 12Ybrs engines (2 x 775 h.p.). Maximum speed 243 m.p.h.
V 6 Like the V 4.
V 7 Glazed nosecap, one 7·9 m.m. MG 15 operated by the radio operator.
V 8 Development aircraft kept by Dornier. Also designated Do 17M V 1 with DB 600A (2 x 1 000 h.p.), maximum speed 264 m.p.h.
V 9 D-AHAK first flown during the spring of 1936. Prototype for the E-1 bomber. Later in service as high speed communication aircraft until 1944.
V 10 D-AKUZ with uprated BMW V1 7·3 engines (2 x 750 h.p.) used for engine tests.
V 11 Alias Do 17L V 1 with Bramo Fafnir 323A–1 engines.
V 12 Alias Do 17L V 2 same as V 11.
V 13 Alias Do 17M V 2, D-AYZE with Bramo Fafnir 323A-1 engines (2 x 900 h.p.).
V 14 Alias Do 17M V 3 like the V 13.
V 15 Alias Do 17P V 1 with BMW 132N engines (2 x 865 h.p.).
E-1 Bomber with BMW V 1 7·3 engines built in series from 1936 for the Luftwaffe with two MG 15 and 1,100-lb bombload.
F-1 Long-range reconnaissance bomber like the E-1 and delivered parallel to the Luftwaffe.
M-1 Built in series from 1937 with Bramo 323A-1 engines. Three MG 15 as defensive armament.
P-1 Like the M-1 but photo-reconnaissance aircraft with a pair of RB 50/30 or 75/30 cameras.
Kb-1 Export bomber for Yugoslavia delivered from October 1937. Two Gnome-Rhone 14N (2 x 980 h.p.).
Ka-2 — Reconnaissance aircraft with secondary bombing and
Ka-3 — attack capability. Twenty Do 17K (all three versions) were delivered to Yugoslavia.
L Evolved parallel with the Do 17M as a pathfinder with four crew-members. No series aircraft built just V 11 and V 12.
R V 1 D-AEEE BMW V 1 and later DB 600G. Development aircraft not built in series.
R V 2 D-ATJU with DB 601A engines (2 x 1,100 h.p.). Like the R V 1.
S-O D-AFFY first aircraft flown in 1938. Not built in series. DB 600G engines, crew of four.
U-O Pathfinder with crew of five. Three aircraft built with DB 600A engines.
U-1 Twelve aircraft built and delivered to the Luftwaffe Kampfgruppen.
Z-O Similar to the S- and U-versions with Bramo Fafnir 323A-1 engines. Built in 1938 as a four-seat bomber.
Z-1 Introduced in 1938. Same airframe as M-1 except the forward fuselage.
Z-2 Bramo Fafnir 323P engines (2 x 1,000 h.p.), like the Z-1.
Z-3 Reconnaissance-bomber with RB 20/30 cameras in the nose-entry hatch and a 1,100-lb. bombload.
Z-4 Dual-control trainer modified by Luftwaffe maintenance units.
Z-5 Long-range reconnaissance-version with extra life-saving equipment.
Z-6 Kauz 1 fighter with three MG 17 and one MG FF (20 m.m.) mounted in the nose. Only one aircraft built.
Z-10 Kauz II had redesigned nose with radar and four MG 17 and two MG FF in the nose. Nine nightfighters built 1940.





AVAILABLE AS PLAN PACK AJ2895, PRICE 2/6d. PLUS 6d. POST FROM AEROMODELLER PLANS SERVICE

DORNIER 17Z.


J
K
L
M
BRAMO FAFNIR 323P
9-CYL RADIAL RATED AT
1000HP FOR TAKE OFF
AND 940HP AT 13,120FT.
FLAT GLASS
PANELS
ENTRANCE DOOR
LOOP
ANTENNA
TRAILING ANTENNA
ENTRANCE DOOR
IN 1939 A NEW NOSE WAS
FITTED TO THE Do 17 AIR-
FRAME. THIS MODEL WAS
A 4-SEAT BOMBER ARMED
WITH THREE 7·9 MM
MG 15 MACHINE GUNS
0 5 10 15 20-FEET
0 1 2 3 4 5 6-METRES

TOPICAL TWISTS

by "Pylonius", illustrated by "Sherry"

"Of course it's my own design"

Putting it Bluntly

THERE IS in Architecture an excessively blunt looking style known as Brutism: a sort of amalgam of oversize cigar boxes and super dimensioned cocoa tins. It has that sort of appeal that makes you take the long way round rather than be put off your lunch. Trouble is, these trendy modes are often highly contagious, and you get home to find the bloke next door is doing something diabolical to the front of his house on these very cigar box and cocoa tin lines.

Needless to say Brutism is all the rage on our with-it flying fields, but is to be found at its most aggressively ugly where there is a radio switch to be pressed. The other week I was up at a well known model and full size gliding centre, and felt utterly ashamed of our degraded hobby as the beautiful sailplanes, all grace, gloss and streamlining, flew disdainfully over the clumsy, squared off boxes that purported to be model planes. They weren't exactly made from cigar boxes and cocoa tins. Had they been so they might have looked a trifle more elegant. Mostly the covering looked as if it had been used to wrap up fish and chips, whilst the general squared up look was obviously based upon the principal that the shortest distance between the model shop and the flying field is a straight line.

At one time a model plane was a model plane. And if asked what he did after knocking off time, the modeller would reply that he built model planes. Ask the modern modeller and he would answer that he flew Radio. That which used to be a thing of beauty and a joy to behold is now a sort of rough encasing for the radio gear. I continue to be shocked by the cool elegance of the propo radio gear and the rough old outer workings it gets shacked up in.

This new Brutist approach to model design, if you'll pardon the term, is well known in Trade and Journalistic circles; which interests try to put a brave face on things by filling the adverts and front pages with pictures of all those highly appetising looking models you rarely see on the flying field. If you do you might be sure that the flyer is either Trade (they are the only people who ever seem to build the kits they produce), or model journalists (the only people who ever actually build the published designs.)

The mystery is: where do all these Brutist designs come from? They are neither published or kitted, whilst the radio flyers are only too happy to pride themselves on their complete aeronautic ignorance. It may well be that those excessively blunt looking models start off with a pleasant curve or two but get that way by the time the flyer learns that sticking a lump of deal in the tail is not the best way to cure a stall.

Early Risers

Recently we have been taken back in time to the days when contest flying was at its most elemental. What you did, in fact, was to grab yourself the biggest thermal in sight and bash everyone round the ears with it. The principle – if you could call it that – worked, in that it gave everyone a crude sporting chance. Success did not depend, as in later years, on flair and finesse, but on the outcome of a rugged, have-a-go lottery.

Some may doubt the ethics of this contest approach but, unlike dubious tactical flying, which is now the rage, it did at least pull in the competitors, rather in the same way as today Glider events, in which the outcome is largely the luck of the upward draw, provides the main gala attraction.

High-Brows

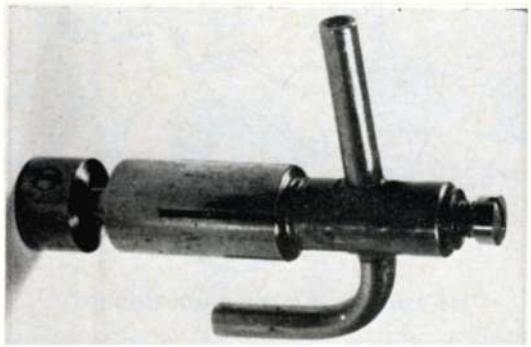
In spite of all the technological advances into a press button age, when we stand on the threshold of the fully electronic airfield, with operational radio models available from vending machines at the entrance, the old primitive cult of free flight still survives. Possibly the reason is a reaction against the automated pressures of modern living, with escapist man seeking the delights of the simple ancestral life. Instead of wallowing in the sedentary comforts of propo spot-to-spot control, he messes about with obsolete rubber strip powered contraptions and antiquated kite-up gliders; reverting to an even dimmer phase of ancestral life when climbing the model clutching tree.

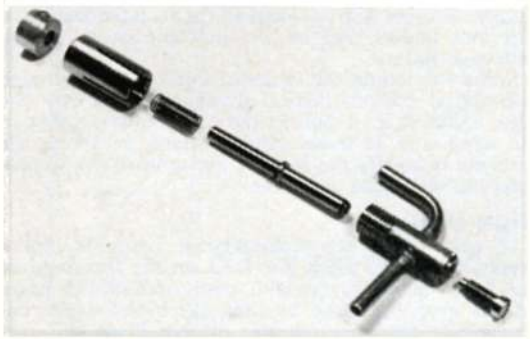
It isn't that the free flighter is too poor to afford the odd hundred quid or so to go electronic; nor too incompetent to set up the radio gear – you can get a multi kit on the flying field in much shorter time than it takes to produce a Wakefield nose block, and with only half the effort. As a matter of fact a recent survey of well known free flighters reveals them to be scientists, engineers, university lecturers and captains of industry. Come to think of it, our representation to the World Champs could always make out it was a Trade Mission if they don't do so well in the model flying. Could be quite a face saver.

Lone range

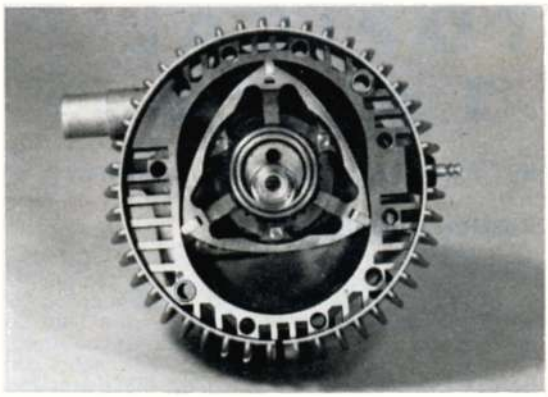
Whenever I am engaged on a lone vigil on the flying field, with nothing but a few frowsy horses and a couple of discreetly parked cars for company, I begin to wonder what all this 'shortage of airfield' fuss is all about. If anything is in short supply these days, it is the energy required to unglue oneself from the telly and glue up that first strip of balsa.

There are, admittedly, many other distractions these days, but, even so, you can't blame the miniskirt for everything. One offputting factor in these technical times is the way even the simplest project has become fraught with complication. What at one time was the simplest of all mechanical contrivances, the rubber model, is now a device of rare technological artifice, full of complex and dubious devices. The variable pitch prop might knock a minute or two off the performance, but think of the prestige value.





The MZ Centrifugal Fuel Switch. This device is intended to overcome excessively rich take-off settings with piped speed models.



LATEST ENGINE NEWS by Peter Chinn

Statistical comparison of .40s

	K & B 40 Series 69R	Super-Tigre G.21/29RV
Swept Volume	6·539 c.c. – 0·3990 cu.in	6·535 c.c. – 0·3988 cu.in.
Bore	22·34 mm. – 0·840 in.	20·5 mm. – 0·8071 in.
Stroke	18·29 mm. – 0·720 in.	19·8 mm. – 0·7795 in.
Stroke/Bore Ratio	0·857:1	0·966:1
Weight	238·3 gr. – 8·41 oz.	271·5 gr. – 9·58 oz.
External Dimensions		
Overall Length	120·2 mm.	121·5 mm.
Length – prop driver face to carb. intake	95·5 mm.	92·8 mm.
Overall Height (less plug)	81·0 mm.	85·5 mm.
Crankcase Width	33·3 mm.	32·0 mm.
Width across mounting lugs	47·5 mm.	48·0 mm.
Bearings		
Main (ball journals)	One $\frac{3}{8}$ x $\frac{7}{16}$ in.	One 12 x 27 mm.
	One $\frac{1}{4}$ x $\frac{3}{8}$ in.	One 7 x 19 mm.
Big end	Plain, aluminium	Bronze bushed
Small end	Plain, aluminium	Plain, aluminium
Piston bosses	Unbushed	Unbushed
Disc-valve	Bronze bushed	Hardened steel
Crankshaft		
Main journal dia.	9·5 mm.	12·0 mm.
Crankpin dia.	5·5 mm.	6·0 mm.
Pistol/Conrod Assembly		
Total Weight	12·3 grammes	12·9 grammes
Piston and ring only	7·0 grammes	7·2 grammes
Gudgeon-pin only	1·9 grammes	2·3 grammes
Connecting-rod only	3·4 grammes	3·4 grammes
Gudgeon-pin dia.	4·5 mm.	5·0 mm.
Port Areas		
Exhaust ports	110 sq.mm.	89 sq.mm.
Transfer ports	88 sq.mm.	86 sq.mm.
Carburettor choke dia.	8·8 mm.	9·0 mm.
Carburettor effective choke area	61 sq.mm.	54 sq.mm.
Port Timing		
Exhaust opens	70 deg. BBDC	69 deg. BBDC
Exhaust closes	70 deg. ABDC	69 deg. ABDC
Transfer opens	60 deg. BBDC	60 deg. BBDC
Transfer closes	60 deg. ABDC	60 deg. ABDC
Rotary-valve opens	33 deg. ABDC	35 deg. ABDC
Rotary-valve closes	50 deg. ATDC	55 deg. ATDC
Sub-piston period	negligible	65 deg.

K & B 40 Series 69R v. S.T. G.21/40RV

THE table of comparative data is coupled with the review of these interesting two motors in the September issue and also this month's Engine Test. It outlines the salient differences of these two powerful 'forties'.

Revised Cox Production

Several changes are apparent in the latest Cox engine programme. A total of 21 types are listed for 1969–70 although not all are yet in production. As previously noted in these columns, the Cox Special 15 contest engine is no longer manufactured, but several new or revised models are included.

Among established Cox products, the popular Pee-Wee ·020, Babe-Bee ·049, Golden-Bee ·049 and QZ ·049 reed-valve engines are continued, also the Tee-Dee series ·010, ·020, ·049, ·051 and ·09 contest shaft-valve engines. The Medallion 'sport' motor series continues in the ·049, ·09 and ·15 sizes, but the Cox Throttle-Control conversion kits for these have been superseded by complete R/C type engines in the Medallion series, plus an R/C version of the Pee-Wee 020 and Golden Bee 049. In all these R/C models, exhaust throttling via an outer cylinder sleeve is used. The semi-rotary spraybar throttle (formerly linked to a slider-bar type exhaust throttle) as used in the Cox Throttle-Control unit, is no longer in production.

The Cox 'Concept-II' engines will, according to the latest information we have from the Cox Manufacturing Company, be in production shortly and should be available from retailers towards the end of the year. Four models are planned. These comprise shaft-valve, twin ballbearing R/C engines in both ·35 cu. in. and ·40 cu. in. displacements, a ·40 cu. in. disc-valve twin ball-bearing R/C engine and a ·35 cu. in. shaft-valve plain bearing 'sport' (non-throttle) engine.

The 'Concept-II' title, one supposes, is derived from the fact that these motors break completely with earlier Cox design concepts (dating back to 1951) from which all subsequent Cox engines were developed.

Twenty-one years ago, pioneer American model aircraft engine designer and manu-

Rotary piston and combustion chamber of the new O.S.-Graupner 5 c.c. Wankel engine. A batch of fifty of these engines has now been built. A detailed description of the design and construction of the engine will follow in this column shortly.

facturer Bill Atwood introduced a very good 8 c.c. engine called the Atwood Triumph. Obtainable as a normal spark-ignition motor or with the then-new glowplug ignition, it was made in two sizes (to suit the American 'C' and 'D' classes): a ·49 with 0·890 in. bore and a ·51 with 0·900 in. bore, both engines using a 0·790 in. stroke.

One of the unusual design features of the Triumph was its crankcase construction. Both the front housing and backplate were detachable but, instead of using an orthodox barrel-type crankcase with this arrangement, Atwood chose a split crankcase, the bottom half being bolted to the main casting beneath the beam mounting lugs. Radial lugs, spaced at 120 degree intervals, were used as attachment points for the front and back units, the latter also serving for optional radial-type mounting of the engine.

The interesting part about all this is that just such a layout is used for the new Cox Concept-II engines, which is not so very surprising since Bill Atwood has, for some years, been responsible for the development of Cox motors. The similarity of appearance between the Concept-II engine (particularly the front induction models) and the Triumph is unlikely to escape the notice of anyone who remembers the Atwood Triumph motors. Even the cooling fins, extending below the exhaust duct (located on the left side in both cases) and also along the bottom of the crankcase, are much the same.

Another unusual feature of the Concept-II design is its integral cylinder-head. As far as we can recollect, this is something that has not been seen since the demise of the Ohlsson and Rice model engines in the mid-fifties. In the O&R engines it was possible to insert the entire piston and conrod through the front crankcase opening. On the Concept-II, fitting the piston and conrod assembly is facilitated by the removable crankcase lower shell. The piston, incidentally, has no baffle and is equipped with a single Dykes ring. In contrast to all previous Cox engines, a separate glowplug has, of course, had to be used with the new integral head.

All four Concept-II motors have the same stroke which has enabled the 35 and 40 front rotary-valve R/C engines to employ the same crankshaft. This uses an internally-balanced crank disc and a full ½ in. dia. journal, ball-bearing supported. At the front, the shaft steps down to ¼ in. dia. where it is carried in another ball-bearing. As on certain K&B engines, the shaft terminates just ahead of the front bearing and is fitted with a pinned prop drive hub into which a separate prop retaining stud is screwed. The rear induction 40 uses a smaller diameter shaft, supported in a ⅜ in. i.d. bearing at the rear, while the 35 Sport engine has a simpler shaft design with orthodox balancing cutaways each side of the crankpin. It has a taper fitted driver and the prop stud screws into the shaft end.

The throttles used on the R/C engines appear to be similar to the K&B pattern and there is provision on all models for fuel pressurisation via a backplate tapping.

MZ Centrifugal Switch

The problem of getting a piped speed model to unstick when set rich enough to cope with on-pipe fuel consumption in flight is one not unknown to speed modellers who have flown tuned-piped equipped models.

To cope with this difficutly, the West German speed experts Rolf Miebach and Franz Zilliken (who, of course, are also noted for their 'MZ' G.15 Specials), have devised a fuel valve which, while allowing full fuel flow at peak performance, meters an appropriately reduced amount when the model is stationary, or taxying, so as to give the best available take-off power.

The device is called the *Centrifugal Fuel Switch* and is just that. It is installed in the fuel line between tank and carburettor and in such a position that the centrifugal force that is generated in C/L flight causes the valve to open and admit more fuel.

The manner in which the CFS works can be fairly easily understood from a study of the photographs. During flight, centrifugal force, acting upon the weight of the spring-loaded plunger and its brass collar, holds the valve open and the normal engine needle-valve is used to adjust the mixture. The point at which the valve opens can be changed by turning the threaded outer barrel to increase or decrease spring compression. In the opposite end of the CFS there is an adjusting screw. This is slackened off, allowing the plunger to close sufficiently to obtain maximum ground revs.

Combat with the MVVS 2.5 TRS

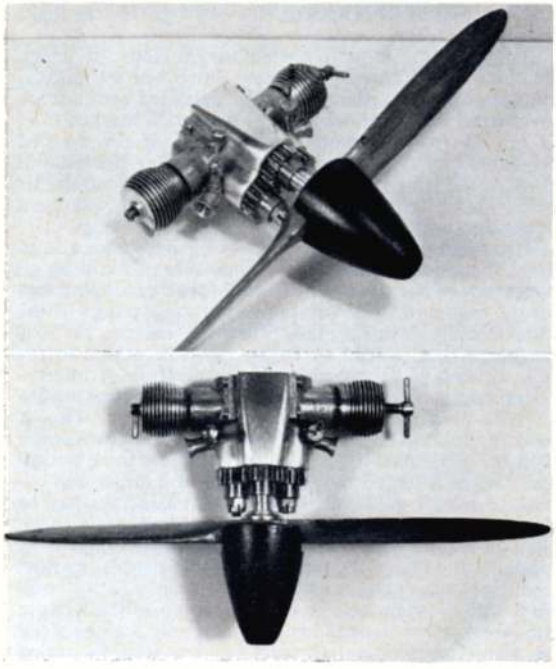
The 2·5 c.c. MVVS 2·5 TRS is best known as a team-race and free-flight diesel used by top Czechoslovakian modellers but, in a letter to the Editor, D. C. Clarkson of the Stockport & District M.A.C. puts in a claim for the TRS as a combat motor. He writes:

'I think you might be interested in publishing a few notes on the MVVS 2·5 TRS diesel. Having purchased one last November in Prague, I have worked it up over the winter in a "Liquidator" type combat model and have come to the conclusion that it is the most powerful diesel available. This conclusion is based on "rat-races" with tuned Oliver-Tiger and tuned PAW 2·49 Mk. IV powered combat wings, which showed a speed differential of 5–10 m.p.h. over any other model in the club.'

In answer to a criticism voiced in other quarters that the MVVS does not run evenly enough for combat, our correspondent says that the answer is to operate it on pressure using the standard choke (not the large one), with a special tank. An 8x6 KeilKraft or Tornado nylon prop, cut down to 7½ in. dia., is said to give the best results.

Loyal adherents to other makes may not be willing to accept that the MVVS has the edge on all the opposition. The fact that, despite the difficulty of obtaining them, there are now five MVVS motors in the Stockport club, would, however, seem to lend some weight to Mr. Clarkson's claims for it.

Of particular interest to Super-Tigre G.15, G.21/29RV and G.60R owners who wish to use tuned pipes, are these new S.T. exhaust elbows now available in the U.K. from World Engines.



Two views of a very neat flat twin engine made from two 1951 vintage Elfin 1.49's by Swedish modeller Torsten Nilsson. See October issue of RCM&E for further details.

One more stage in . . .

Basic Aeromodelling

HOWEVER carefully a model is built, and however good a craftsman you are, a finished model should always be regarded as suspect until it has been checked out – and that means checking *balance* and *alignment before* the first test flights. This applies to every type of free flight model.

Balance is the most important single factor, so check this first. In the case of published designs or kit models, the design balance point is usually indicated with a thick arrowhead under the wing, or by a symbol, marked C of G or CG (meaning centre of gravity). If the marked centre of gravity is not directly on the wing the balance point at the wing position is taken as vertically above, or below the CG symbol. This is often given on the plan as a dimension back from the leading edge of the wing.

The traditional method of checking the balance is to mark the balance point on the underside of the wing on either side of the fuselage (e.g. with a ball point pen) and lift the model on fingertips applied at these points. If the model balances horizontally, then the balance point is correct. If not, weight or ballast must be added to the nose or tail, as appropriate (or the position of internal components, such as batteries on a radio control model, shifted) until horizontal balance is achieved. This is usually accurate enough for most purposes, particularly as *small* differences in balance are not likely to be critical and can be trimmed out. In the case of a larger and expensive model, however, more exact balancing may be desirable. This can be done by using a blunt 'knife-edge', such as a steel ruler, rather than fingers to support the model at the design balance point. This could be marked on the bottom of the fuselage as a convenient lifting point on a high wing model; or on the bottom of the wing in the case of a low wing model. Alternatively, weighing can be used, supporting the model on two accurate spring

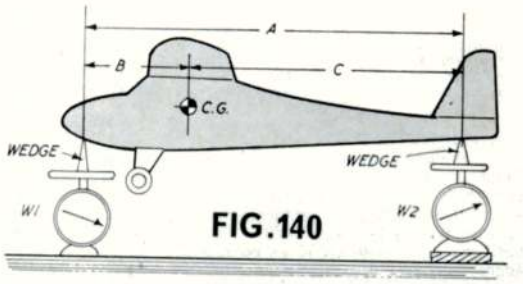


FIG.140

balances, as shown in *Fig.* 140. The position of the centre of gravity can then be calculated from the following:

$$\text{dimension B} = \frac{W2 \times A}{(W1 + W2)}$$

$$\text{or dimension C} = \frac{W1 \times A}{(W1 + W2)}$$

Note that a balance check must be carried out with the model completely assembled and in full flying rig, although the fuel tank should not be filled on a power model. This will give the least favourable (i.e. tail heavy) flight condition. Most models are, in fact, tail heavy as built. Accepting that it is possible to trim out differences in balance, it is still preferable to compensate for tail heaviness as this has a more critical effect on trim and reserve of stability than nose heaviness.

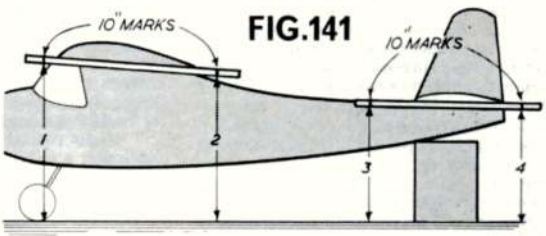


FIG.141

As regards alignment, rigging angles for the wing and tailplane are commonly accepted as correct when a model is built directly over a plan, leaving fine adjustment to be done by packing when flight testing. A rigging check is also usually considered unnecessary on a 'multi' or proportional radio control model since any discrepancies can be taken care of by the trim controls during test flying, and then eliminated by trial and error adjustment

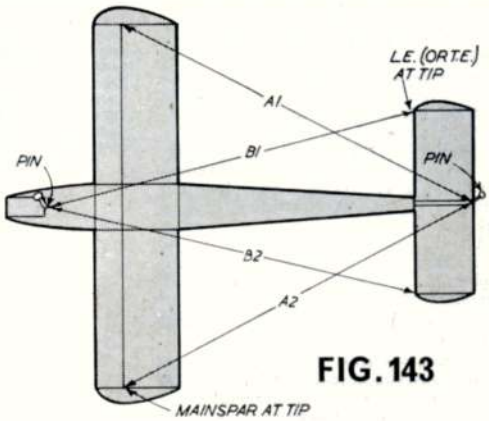


FIG.143

Also it does not follow that rigging angles shown on a plan are exact for each and every model built from that plan. They seldom are, for each individual model will almost certainly need some degree of fine adjustment, at least, which can only be established by flight testing.

However, if a rigging angle check is thought desirable, this can readily be done by standing the model on a flat surface and blocking it up until the datum line (plan datum or centre line) is horizontal. Cut a 12 in. or 14 in. length of straight strip balsa and mark on two points exactly 10 in. apart. Position this strip flat against the underside of the wing and tailplane, in turn, and measure the vertical heights shown, from the marks to the horizontal surface. The rigging angles of the wing and tailplane, relative to the datum, can then be read from *Table I.*

In the case of wings and/or tailplanes with a bi-convex section, the strip must be held against the underside of the wing so that it is an equal distance from the true leading edge and trailing edge, as shown in the detail sketch. Otherwise exactly the same technique applies.

The alignment of the model itself should *always* be checked. Most people are content to do this by eye to judge whether the wing and tail are 'square' with the fuselage, but actual measurement is best. Use a pin and a length of cotton to measure A1 and A2 to check that the wing is square to the fuselage; and measure B1 and B2 to check that the tailplane is square. (Obviously A1 should equal A2; and B1 should equal B2.)

Sighting by eye from the rear of the model is a very effective method of checking the rest of the alignment – see *Fig.* 144. By raising or lowering the eye level to line up the tail with the wing it will be readily apparent if the tail is tilted relative to the wing. Using a set square held in front of the eye will also show if the fin is square with the tailplane. Any tilt on either of these, relative to the wing, will give the model a turning tendency. To correct for mis-alignment you must first decide which is out of true – the wing or the tailplane – correct as necessary and then re-check the alignment. In practice, if the wing is out of line slightly with the fuselage it may be easiest to adjust the tail to match in many cases and ignore the fact that the fuselage is not exactly 'square' in the final set-up.

Sighting from the rear will also clearly show up any warps on the wing or tailplane since you have an edge-on view of the trailing edge(s) and can easily see if these twist up or down. Warps which give 'washout' or an upward twist to the wing or tailplane can generally be ignored, *provided they are equal on both sides.* Warps which are unequal should be corrected as they will produce a turn. The worst condition is where one wing (or tailplane half) is warped in the opposite direction to the other. This cannot be passed as 'fit for flight testing'.

There is no completely satisfactory method of taking out warps. Generally recommended treatment is to subject the offending wing or tailplane area to moderate heat – such as by holding it in front of an electric fire (or in the exhaust of a car on the flying field) – twist out the warp with 'over correction' and hold it twisted until it cools down again. This is only a temporary cure, at best. Warps which appear in a covered and doped wing or tailplane will always tend to re-appear after being corrected. The only real cure for warps is in the construction – using anti-warp structures, making the structure sufficiently rigid to eliminate warping, and avoiding building-in warps or warp-inducing stresses.

Flight testing and trimming, in which final adjustments are made to rigging, is a separate subject. The *first* object of trimming is to get the model flying smoothly and safely. Fine adjustments can then be made to get the best possible performance out of the model, particularly in the case of high performance designs. This requires specialised attention and considerable experience and know-how appropriate to the type of model involved. As far as basic aeromodelling requirements are concerned the following trimming chart should at least cover the requirements of the first stage for all free flight models.

Fault	Causes	Remedy
Model noses up, then dives.	Over-elevation	Add weight to the nose, which is usually the simplest cure. If this is not readily possible, insert packing under the *leading edge* of the tailplane or *trailing edge* of the wing. If the wing position is adjustable, move the wing back.
Model dives instead of gliding properly.	Under-elevated	Move the wing forward, if adjustable. Otherwise, add packing under the *trailing edge* of the tailplane or *leading edge* of the wing.
Model turns violently to one side.	(i) Too much rudder tab offset	(i) Reduce the amount of adjustment. If the model seems very sensitive, use tailplane tilt for turn trim.
	(ii) Warps	(ii) Check wing, tail, and fin for warps. Correct, if necessary, by heating in front of an electric fire and twisting straight.
	(iii) Incorrect alignment	(iii) Check that wing and tail are square with fuselage and each other; also that the fin is truly vertical and not angled to one side.
Model stalls under power.	Over-elevated	If glide trim is correct, add downthrust to cure power-on stall.
Model turns to one side and dives in, under power.	(i) Excessive turn trim	(i) Probably too much rudder tab offset, so reduce.
	(ii) Warps	(ii) Correct as above. Warps will show up more under power trim than on the glide.
	(iii) Too much sidethrust	(iii) Only a *little* sidethrust can be used on a model without danger of it pulling the model into a spiral dive.
	(iv) Too much downthrust used with sidethrust	(iv) If sidethrust is used, *less* downthrust is required.
Model does not climb properly.	(i) Lack of power	(i) If flight is slow, but steady, almost certainly more power is needed.
	(ii) Wrong propeller	(ii) Check that you are using the recommended propeller for the engine.
Model loops under power.	(i) Excessive power	(i) Engine is too powerful for the size of model. It may be controllable with downthrust and sidethrust.
	(ii) Incorrect power – on trim	(ii) Add downthrust for straigh climb; or downthrust and sidethrust for spiral climb.
Model will not take off properly.	(i) Lack of power	(i) Needs a smoother surface to take off from.
	(ii) Wheels binding	(ii) Check that wheels are free-running and true.
	(iii) Landing gear badly positioned	(iii) Try bending the landing gear back slightly.
Motor cuts too soon. (Power models only)	(i) Wrong adjustment	(i) Needle valve adjusted for too lean a mixture.
	(ii) Poor tank position	(ii) Move tank to a more favourable position which does not 'starve' the engine in climbing attitude.

Note: 1. *Downthrust* is adjusting the thrust line of a model to tilt downwards, either by inserting packing between the top of the noseblock and the front former in the case of a rubber model; or inserting washers under the lugs at the rear fixing bolts in the case of a power model. Only a few degrees of downthrust should be applied at a time. 2. *Sidethrust* is tilting the thrust line to the *right* to act

BASIC AEROMODELLING

(continued)

against engine torque, either by packing the noseblock (rubber models) or slewing the motor on its mounts (power models). Only a very limited amount of side-thrust should be used and *never more than* 3 *degrees*. *Never* apply sidethrust to the *left*.

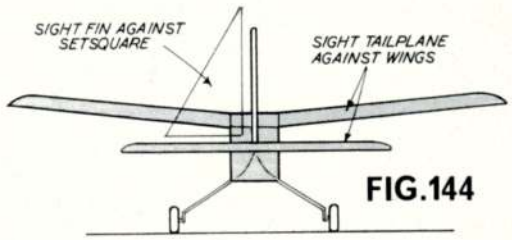


FIG.144

TABLE 1
RIGGING INCIDENCE (Ref. Fig. 141)
Wing Incidence = (1-2) inches* Tailplane Incidence = (3-4) inches*
*Find Equivalent Incidence in Degrees by comparing with this table

Incidence	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°
(1–2) in. or (3–4) in. in decimals	·175	·35	·52	·7	·87	1·05	1·22	1·4	1·56	1·74
(1–2) in. or (3–4) in. in fractions (approximate)	3/16	11/32	1/2	11/16	7/8	1	1.1/4	1.13/32	1.9/16	1.3/4

Example: suppose the measurement for wing incidences are 1 = 5.9 in. and 2 = 5.1 in., giving 1–2 = 0.8 in. Reference to the table will show that the wing incidence is approximately 4½ degrees.
Note: for a quick approximation, using the 10 in. marks on a 'tangent bar', every 3/16 in. difference in the two measurements is equivalent to an incidence of 1 degree. Thus all measurements are made to the nearest 1/16 in., incidence can be estimated quite accurately to the nearest one-third of a degree.

CHAMPIONSHIP RESULTS

World Free Flight Champs

Wiener-Neustadt, Austria. August 14th-16th
Advance results – full report next month

A/2 GLIDER (30 Nations 84 individuals)

1.	**E. Drew** (Great Britain)	1260 secs.
2.	H. Patacki (Hungary)	1257 secs.
3.	Prohaska (Czechoslovakia)	
4.	Cerney (Poland)	
5.	Grigorash (U.S.S.R.)	
6.	Horejsi (Czechoslovakia)	
7.	Munnukka (Finland)	
8.	Pugachenko (U.S.S.R.)	
9.	Tanyu (Finland)	
10.	Boscard (Italy)	
24.	**C. Batty** (Great Britain)	1143 secs.
33	**A. J. Young** (Great Britain)	1125 secs.

Winning Nation U.S.S.R. 3642. **5th G. Britain 3528.**

WAKEFIELD (25 Nations 72 individuals)

1.	A. Oschatz (E. Germany)	1260 secs.
2.	H. Martin (Austria)	1251 secs.
3.	Silberg (U.S.S.R.)	1250 secs.
4.	Loffler (E. Germany)	
5.	Gard (U.S.A.)	
6.	Kmoch (Yugoslavia)	
7.	Malenkiev (U.S.S.R.)	
8.	Sulkalla (Finland)	
9.	Yurov (U.S.S.R.)	
10.	Parmenter (U.S.A.)	
20.	**L. Barr** (Great Britain)	1168 secs.
34.	**J. O'Donnell** (Great Britain)	1111 secs.
44.	**R. Wells** (Great Britain)	1076 secs.

Winning Nation U.S.S.R. 3678, **10th G. Britain 3355.**

POWER (24 Nations 61 individuals)

1.	Baumann (W. Germany)	1260 + 240 + 300 + 240
2.	K. H. Rieke (W. Germany)	1260 + 240 + 300 + 186
3.	Spence (U.S.A.	1260 + 240 + 287
4.	Friis (Sweden)	1260 + 240 + 222
5.	Spring (Switzerland)	1260 + 240 + 202
6.	Koster (Denmark)	1260 + 240 + 150
7.	Fiegl (Italy)	1260 + 240 + 4
8.	Krycer (Czechoslovakia)	1260 + 233
9.	**G. Fuller** (Great Britain)	1260 + 209
10.	S. Savini (Italy)	1260 + 207
11.	**R. Monks** (Great Britain)	1260 + 204
39.	**D. Wiseman** (Great Britain)	1106

Winning Nation Italy 3691. **5th G. Britain 3626.**

15th Criterium Des As

Genk, Belgium. 22nd-24th August
Advance results – full report next month

TEAM RACING

1. Gurtler/Baumgartner (Austria)
2. Plotzinsh/Krasnorutsky (U.S.S.R.)
3. Zolotoverh/Kobetz (U.S.S.R.)
4. Hasling/Hasling (Denmark)
5. Molnar/Kuti (Hungary)
6. **Place/ Howarth** (Great Britain)
7. **Smith/Harknett** (Great Britain)

15. **Heaton/Ross** (Great Britain)

Team Prize – Great Britain

SPEED

1.	I. Toth (Hungary)	222.22 km/hr
2.	G. Krizsma (Hungary)	214.76 km/hr
3.	K. Bathge (Hungary)	213.01 km/hr
4.	H. Dusi (Italy)	210.52 km/hr
10.	**P. Halman** (Great Britain)	196.72 km/hr
11.	**B. Jackson** (Great Britain)	196.72 km/hr
16.	**A. Woodrow** (Great Britain)	190.48 km/hr

Team Prize – Hungary

AEROBATICS

1.	M. Vankerbeke (Belgium)	5,961
2.	J. Gabris (Czechoslovakia)	5,769
3.	L. Compostella (Italy)	5,744
4.	G. Billon (France)	5,730
25.	**J. Mannalll** (Great Britain)	5,066
26.	**M. Reeves** (Great Britain)	5,058
33.	**M. Harvey** (Great Britain)	4,396

Team Prize – Czechoslovakia

COMBAT

1. **S. Jones** (Great Britain)
2. **J. Dixon** (Great Britain)

Team Prize – Great Britain

SCALE

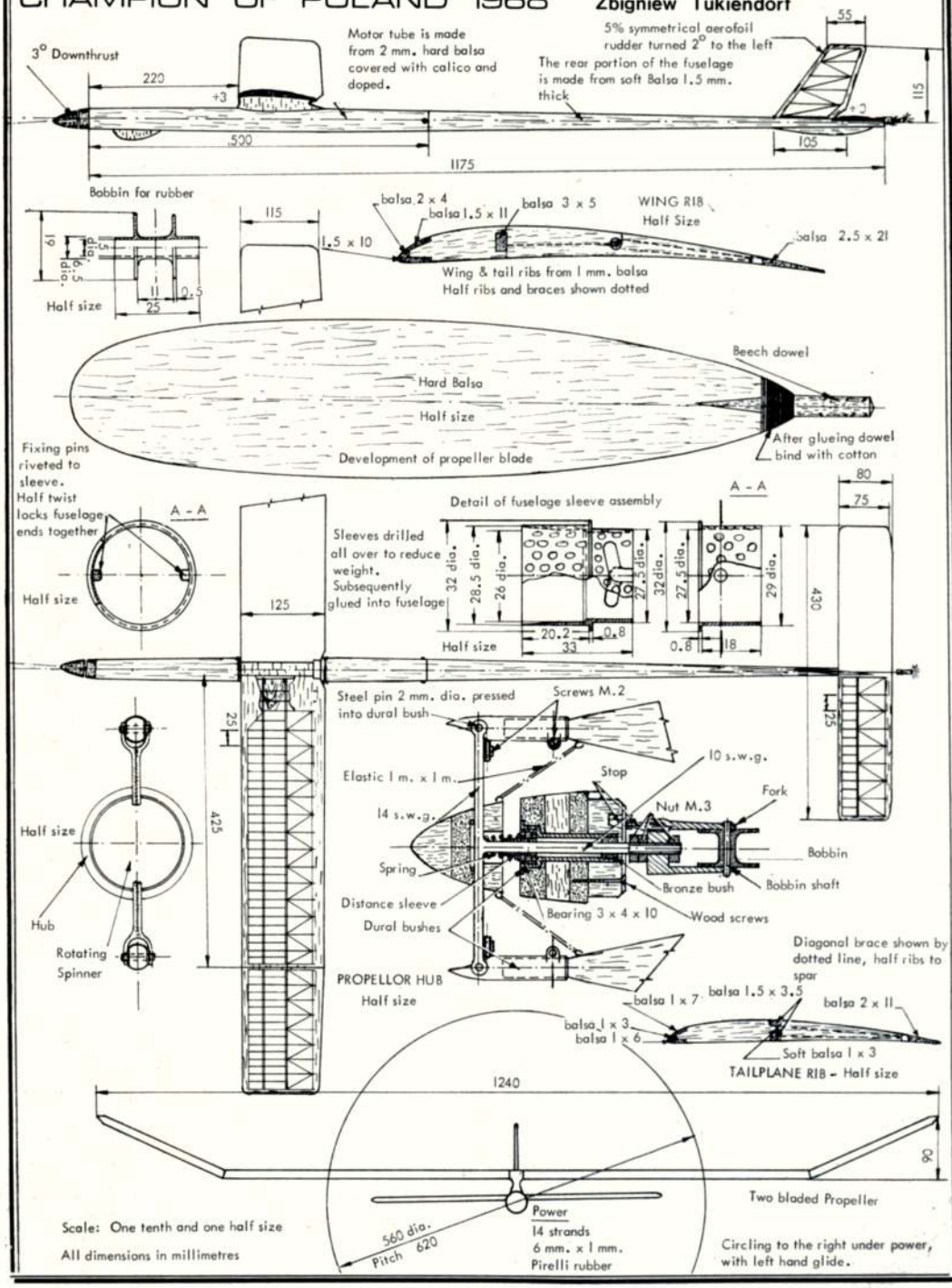
1.	**A. Day** (Great Britain)	1,401
2.	**A. Briggs** (Great Britain)	1,291
3.	O. Angelov (Bulgaria)	1,010
4.	E. Struik (Holland)	990

Team Prize – Great Britain

RUBBER DRIVEN MODEL Z-68C

CHAMPION OF POLAND 1968

Zbigniew Tukiendorf



SLOPE SOARING is a unique form of duration flying. Although almost completely dependent on lift for its execution, slope soaring has little in common with normal thermal flying. On a suitable slope and in suitable weather the locations of the lift provided by the deflection of the wind by the hillside is fairly predictable. In this situation the flying characteristics of a model become much more important than its 'performance' as measured by the criterion of sinking speed.

The problem, in fact, resolves itself into one of keeping the slope soaring glider more or less in the lift area. Anyone who has tried will acknowledge that there is a lot more to this type of flying than merely adjusting the model to glide straight, and perhaps adding ballast until the flying speed exceeds wind speed. Most gliders are reluctant to fly in straight lines, especially *into* wind, and rapidly circle back into (or over the top of) the hill. A few, very few, models have a natural weather cocking ability – and although I have possessed such models I would hesitate to analyse *why* they had such a characteristic.

FREE FLIGHT

COMMENT

By John O'Donnell

By far the best solution is some measure of control as has been fully appreciated by those clubs and individuals who have gone in for radio-controlled slope soaring. There is, of course, a free-flight alternative in magnet-steering. This has been exhaustively covered by Trevor Faulkner in his recent series of *'Aeromodeller'* articles, so there is no need for me to dwell on the mechanics of the technique.

Although small numbers of magnet models are now beginning to be seen at slope soaring meetings they seem to have caused some embarrassment to the organisers. So far there have not been enough to justify a special category on considerations of prizes versus entry fees – and yet they completely outclass free-flight soarers.

The latest contest with this dilemma was the annual **Clwyd Slope Soaring Rally** run by the Chester Club. Although initially (twenty odd years ago) solely a free-flight affair, the event is becoming more and more dominated by radio. This is not what Chester would like and they *specifically* asked me to solicite opinions via *'Aeromodeller'* as to what would improve any or all of the events.

Clwyd is not really an ideal site, its main virtue being that of easy access, and free-flight there has been regarded very much as a 'luck' contest. This was partly due to the inherent nature of the game, partly, to the vagaries of the site, and partly to a 'best flight' style of scoring. The absence of any max, and the waiving of the 'builder-of-the-model' concept, meant that many entrants flew expendable models produced from whatever remnants were available.

With this as a background it is not surprising that the appearance of serious magnet-steered slope-soarers has coincided with a severe drop in entries. Certainly if free-flight is to survive as a going concern at such meetings it *must* be held separately. This year it was not, and free-flight entries and interest were at a very low ebb. A 'best two of four flights' rule favoured the magnet models even further – even though the results might seem otherwise.

I managed to take first place – ahead of all the magnet models – by virtue of a 6:30 flight from a heavily ballasted and very old (circa 1953) bitsa A/2, followed by a couple of very nominal flights from a similarly weighted A/1. The latter were necessary as Paul Finn of St. Albans had made two flights of over 3 minutes, whilst Douglas Robinson had exactly matched my first flight. This required a fly-off to decide the award of the Gosling Trophy for best duration flight. As I nominated my second official whilst Doug. flew-off after the contest closed, the results gave me the contest and him the trophy!

My A/2 went over the top of the main ridge, and presumably into the pine woods beyond. They also claimed Ray Sutton's magnet model, whilst Paul Finn and Brian Faulkner left theirs in the downhill valley. Doug. was probably doubly pleased in comparison as he had both trophy and model – the latter, incidentally, was a Trevor Faulkner *'Hanger'* fuselage sporting *'Empress'* surfaces covered in Solarfilm.

A revival of interest in the **North East Area** was reflected in their holding an **Open Rally** on 29th June at R.A.F. Ouston – scene of the 1965 Nationals. Events staged included C/L and R/C as well as F/F. Attendance was not what I expected and must have been something of a disappointment to the organisers who said they were hoping to build up to this being a regular and worthwhile meeting.

Conditions were breezy, with an unusual wind direction that forced the launching site to be chosen to suit the airfield *contours*. Ouston is 'humped' and the usual peritrack positions would have given inadequate visibility. This meant that downwind woods seemed even closer.

Glider was a 'local benefit' with Tony Cordes managing two maxs in his winning score. His A/2 featured a sheet *lower* surface, whilst the upper surface was undisturbed by spars. The third flight terminated in one of the woods and was witnessed by two farm workers who subsequently spent *three hours* retrieving it! Billy Lee and Brian Martin were runners up, again with two good flights out of three.

The other two events saw my co-driver Russell Peers and I in the prize list – although Ron Pollard had us very worried in the rubber

Top. Tony Cordes of Tynemouth with winning A/2 at N.E. Area Rally has sheeted under surfaces. Left top, 'Empress' wing and tail covered in Solarfilm on 'Hanger' fuselage used by Doug Robinson at Clywd – see nose detail below left showing plug-on magnet steering unit.

event. He *started* flying when the wind dropped a little an hour. before the end, but a slight retrieving delay cost him his final flight Power was the worst supported and I was able to get by with two flights, both intentionally short D/T'd–using my HP15D F.A.I. model. Brian Martin had his Miebach F.A.I. model cross the combat circle – and suffer in the process.

Prizes were presented by Ouston's C/O, Flt.Lt. John Daniels and consisted of plaques to the top three places. The awards were distinguished by a rather nice centre piece depicting what June described as an R/C Slope Soarer! There were awards to the Top Junior (R. Nicholl of Glenrothes) and the highest unplaced score (R. Firth). Despite all this the rally was said to have been financially sound – although I gather this was helped by donations (a very healthy sign I might add).

Meanwhile the **St. Albans' Gala** was in progress at Chobham, Gordon Hannah sent a report and results. A fine and sunny day with a light breeze (onto the Tank Factory) produced more entries than the previous year – except in rubber.

Much thought and discussions had been expended on attempts to devise a satisfactory solution to the rubber contest problem – without destroying the *open* rubber concept, and without having merely a 'fly-off' contest. As most (I nearly said all) open rubber models can comfortably exceed three minutes, it had been decided to raise the max to four minutes as a compromise between practical and performance requirements. Extra flights to test consistency resulted in the announcing of a five-flight, four-minute max arrangement. In practice the prevailing wind direction led to this being amended to five threes – but produced little response from contestants. There were just *three* entries of whom Dave Miatt made all five flights.

This contrasted with 18 entries in power, 11 in vintage, and 30 in glider. Regular entrant, Fred Chilton, flew rather late to return the only treble and to destroy George Fuller's hopes of a hat trick. The third place tie between Ken Smith and John West required a fly-off. This was a one-horse race as Ken had lost his model – but the horse went lame when John's model 'went in' under power.

Glider saw many come a cropper attempting to fly tactically in patchy but strong lift. Croydon's thermister was credited with their providing both the fly-off participants. The fly-off was odd in that Martin Dilly released in apparently indifferent air that improved afterwards, whilst John Mabey's initially healthy lift suddenly died!

Martin had a good day as he also won Vintage with a *'Supa Dupa'* ultra lightweight, closely followed by Dave Tipper with a *'Pinocchio'* John Blagg provided contrast with a *'Hoverking'* but even this was outspanned by a 9 ft. *'Peres'* replica.

Having mentioned open rubber concepts it is probably relevant to mention the 'Open 40 grams' rules proposed to be used at the **Croydon Gala** on 22nd June. Although initially scheduled, this event was not mentioned in the contest report contained in *'Free Flight News'*.

I understand that Croydon's models built to this rule had so much performance – around 4½ to 5 minutes was rumoured – that all the usual 'open rubber' problems remained – plus that of reduced visibility. In consequence the event was quietly dropped – and presumably now the idea will be forgotten.

One other 'solution' tried elsewhere is the idea of continuing three min. maxs ad infinitum until a sub-max flight is recorded – or until darkness falls! The latter is not quite so fatuous as it may sound. In a recent postal event run by the N.F.F.S. of U.S.A. to these rules, George Perryman recorded a series of 24 consecutive maxs. The runners up *only* did 10 and eight respectively!

The rest of the recent contests have included *two* of the **S.M.A.E. Area centralised events.** These are probably best summarised by the official result sheets but a few comments may be interesting.

Events held on 15th June saw top places shared round the country – although the North seemed to have the best of it. The two sides of the Pennines were different. The N.W. having the better day at Chetwynd but the Northern Area better conditions at fly-off time! Hence my win in open glider, just ahead of two Norwich members.

Norwich also made their mark in the Weston Cup for Wakefields, even though Dave Hipperson edged out Dave Pymm for top position. This event counted for the Plugge Cup, and Norwich consequently moved into top position.

The White Cup was won by Roger Baggott, flying his ETA 29 F.A.I. *size* model, despite an early D/T and hence only a few seconds in front of Russell Peers. Trevor Payne, Ray Monks (with an F.A.I. model) and J. Steel were also in the fly-off.

July 6th should really have convinced some people how much weather can vary across the country. It rained almost all day in the South and at Chobham and Ashdown in particular. Many flights from these venues were made in the rain – and Brighton members said they could not have been wetter if they had tried.

Squire Kay with his Low wing multi R/C soarer seen at Clywd, now in A.P.S. as 'Mistral' plan RC 1037, 12/6d.

The Northern (at Elvington) and N.W. (at Cark) had good, if initially, breezy weather. The late afternoon improvement is reflected in the 'M.E. Cup' individual fly-off scores at Elvington. Two minutes spread in visibility saw Pete Oliver top with a model sporting *'Sans Egal'* wings and tail on a fishing rod fuselage. A double D/T timer system gave way to fuse for the fly-off! Coupe d'Hiver had a new name, D. Lansberry, in top position.

East Anglia, however, had what Barry Halford described to me as a very light, variable drift, high overcast, very warm with drift so light that one could not always predict the correct towing direction!

Large thermals were plentiful and could be accurately detected by flocks of swallows feeding on rising clouds of minute flies. Bill Parker had a D/T failure producing a 42:46 flight that landed 200 yards from launch!

All this will help explain Norwich's unprecedented success in the 'M.E.' in which *both* their A and B teams max'd out. The fly-offs saw Bob Wells find the only lift to give his B team victory! F.A.I. Power saw the 'Astral' Trophy won by G. Reed using a Cox ·09 model, launching into the thermals marked by the gliders and only dropping score through an early D/T.

CLWYD SLOPE SOARING MEETING, 22nd June, 69
R/C Single (9 entries, all flew) 1 P. Lang (Seven Oaks), 309 pts 2, S. Grove (Sheffield), 281 pts; 3, A. S. Bailey (Cheadle), 256 pts. **R/C Multi** (27 entries, 26 flew) 1, J. Marden (West Mendip), 231 pts; 2 B. Kerley (Isle of Wight), 203 pts; 3, P. Teakle (West Mendip), 199 pts. **F/F/ Senior** 1, J. O'Donnell (Whitefield), 7:19; 2, P. Finn (St. Albans), 6:56; 3, D. Robinson (Sheffield), 6:30. **Gosling Trophy** (Highest single flight) D. Robinson (Sheffield), 6:30 + 0:56. **Junior** 1. K. Goodby.

N.E. AREA RALLY, 29th June, 69
R.A.F. Ouston
Rubber 1, R. Peers (Congleton). 8:54; 2, J. O'Donnell (Whitefield) 7:50; 3, R. Pollard (Tynemouth), 6:00. **Power** 1, J. O'Donnell (Whitefield), 5:40; 2, A. Brown (Sunderland), 3:43; 3, B. Martin (Tynemouth), 3:11. **Glider** 1, A. Cordes (Tynemouth), 7:23; 2, W. Lee (Teeside), 6:48; 3, B. Martin (Tynemouth), 6:16. **Junior** R. Nicholl (Glenrothis), 4:48. **Top Unplaced** R. Firth (Sheffield), 5:30 (4th glider). **Rat Race** 1, A. Laurie (Novocastrian), 7:07; 2, Blair/Mackay, 7:51. **F.A.I. Team Race** 1, Turner/Hughes (Wharfedale), 9:32; 2, Blair/Mackay, 11:24; 3, Hill/Clarke, 163 laps. **Combat** 1, S. French (Scunthorpe); 2, J. Cuthbert (Scunthorpe); 3, G. Wood (Scunthorpe); 4, Brookes (Novocastrian). **Radio Multi** 1, (Tie) Pine (Chester-le-Street); Wood (Chester-le-Street).

ST. ALBANS' GALA, Chobham, 29th June, 69
Power (John Simeons Trophy) 18 entries: 1, F. Chilton (Crookham), 9:00; 2, G. Fuller (St. Albans), 8:19; 3, J. West (Brighton), 8:01 + 0:08; 4, K. Smith (Croydon), 8:01. **Glider** (30 entries) 1, M. Dilly. (Croydon), 9:00 + 3:05; 2, J. Mabey (Croydon), 9:00 + 2:25; 3, D. Thompson (Bristol Bulldogs), 7:47. **Rubber** (3 entries) 1, D. Miatt (Bristol & West), 12:31; 2, M. Shepherd (C/M), 4:21. **Vintage** (11 entries) 1, M. Dilly (Croydon), 7:34; 2, D. Tipper (St. Albans), 7:23; 3 J. Blagg (St. Albans), 6:31.

CLUB NEWS

Members of Bridlington and District Model Aero Club have varied interests as can be seen in this photo of a group in the local park.

LOOKING at the recently published pictures of those very fine pre-war Wakefield streamliners, we are taken back to a time when this country led the world in this aspect of model design. It is significant that these models were not developed merely for contest winning ability, but were pieces of aeromodelling art pleasing to look at and exciting to handle. Here, surely, is a lesson from the past which could well be taken to heart, particularly in these days when the sport of flying tends to overshadow the art of model building. Flying is fun, but how much more so with a finely built, attractive looking model.

Still, whatever you fly, and however you fly, you need the odd uncluttered acre or two to romp about on. And very active in a very essential space acquiring programme is the **Cheltenham M.A.C.,** where zealousness has paid off in the 25 acre shape of Cleeve Common. A very fine site, too, we are told – almost treeless and ideal both for free-flight and radio. Negotiations for this very desirable site had been going on for over a year, and the deal was finally clinched on the understanding that members stringently observed the few commonsense rules laid down by the Conservators. The key of the field, as it were, comes opportune, as this year the club is celebrating 21 years of existence. To mark the many-happy-model-returns occasion G. Lynn, who is, by the way, the S.M.A.E. Comp. Sec., has ordered a batch of inscribed memento pencils; the sale of which, it is hoped, will provide a welcome boost to club funds. A glance at the very fulsome programme of events suggests that the club has much to offer any potential member who might care to look in at the Northlands Youth Centre, Cheltenham, on any Tuesday.

Where is *'Snorlbons'?* Although you won't find it on any map, it lies close to Nomansland. According to *'The Thermal'*, appropriately indulging in a bit of rise taking, it is the way **St. Albans** is pronounced in the local tongue. Further knowledge from the same source is a definition of the Freudian term, masochism – the self-inflicted delights of a few model sorties over Chobham Common. There is, too, the suggestion that model flying provides an inexpensive (comparitively) substitute to the pursuit of the mini-bird, as in model flying also, the real enjoyment comes in the chase. And very much model chasing at the Nationals, where a grand contingent of twenty very much flying members notched up 31 entries in C/L and F/F. Needless to say, the Fullers, father and son, were very active in the Power events: C. Fuller taking first in Open Power and 3rd in Frog Junior, whilst maestro George came 2nd in F.A.I. Power. Another notable success was that of B. Rowe who came 3rd in F.A.I. Rubber. High placings too from a number of other Snorlbon entries. Cannot imagine many other clubs being so well and successfully represented. Incidentally, Dave Tipper flew a vintage Pinocchio in the Rubber event, and might well have got into the fly-off had he not D/T'd too early. (Odds next time: ten to one, Barr one). Just a quick reminder here that the Winter Gala is shiveringly scheduled for October 26th on Chobham Common. Events for All-In F.A.I., Coupe d'Hiver, A/1 Glider and ½A Power. Make it a date.

Russel Peers does a very exhausting but well worthwhile job in *The Message'*, the newslaetter of the **North Western Area,** in supplying fully detailed results sheets of Area Meetings, plus informative reports. The one covering the Chetwynd Centralised Meeting, featured in the current issue, reveals that Mr. Peers also puts in a useful stint on the flying field, for, not content with taking the Open Rubber event he was second in Open Power and 9th in Open Glider. Equally excellent performances, too, from noted pot-picker, Picken. Brian won Open Glider and was second in Open Rubber. In the pressure cooker weather that prevailed Chetwynd would have been better named cheatwind, as it not only blew in all lateral directions but had an up and down movement that played havoc with the form book. Yet a doughty flying day, forsooth, with all categories battling through to the fly-off stage. On the control line side of things the newsletter continues its extracts from Basil Menges' *'Tarmac Torque'*, a document full of inside gen on the techniques of team racing. For instance, one way to tune up to max revs is with a prop on the bench that will give the same revs static as the actually racing prop. Then there are all sorts of techniques to get the best engine performance over the distance, from whipping it up to top pitch to letting it work up steam itself, and holding the handle fully extended or close into the chest. All very complexicated for the non-expert.

By all that's controllable in the human situation the **Watford Wayfarers M.A.C.,** should not be living up to its somewhat vagrant name as the club is now 99% Radio Control. But what of the 1%? Seems out of those 26 seemingly solid radio types someone is doing a crafty bit of chuck gliding on the side. R. C. Hughes, who sends us this report, tell us that a fair variety of controlled aeronautica is to be seen around the club field, including *Senators, Lumpers, Super* and *Junior 60's,* and even some own designs. Fly for fun is the general order of play on the flying field – a term which euphemistically covers the heartbreak and anguish of fragile model in the grip of the elements – rather than the heat and temper of contest flying, although the lads are ready to stage a scratch contest at the wave of an aerial, even though the flying field surface is as bumpy as the Sea of Tranquility. Much smoother were the public relations enjoyed at a display given at the Rickmansworth Grammar School. A good comprehensive demo in which the Dads were invited to try a tentative finger on the radio button. At times their second boyhood eagerness outreached their immature skill, and a youthful correction or two was necessary to prevent too many 'O-level' failures. Anyway, if you fancy your piloting chances, contact R. C. Hughes, Hon. Sec., 109 School Lane, Bushey, Watford.

Do Trade interests still hand out 'merchandise' for contests in this country? I remember back in the old days writing begging letters to the merchants for any of their spare lumber, and very well we did out of it, although we never did find a use for half a crate of solidified cement tubes. I mention this because there is much talk of such contest merchandise in *'The Satellite'*, the voice of the **San Valeers** club of California. Reading through the precise and detailed contest arrangements set out by Lee Polansky, the club President, just makes you wonder if we, in this country, are too casual in our contest approach. Having attended one or two meetings of late run on the now fashionable do-it-yourself organising basis I cannot but feel that there is a positive relationship between poor organisation and dismal attendances. For instance, surely one Gala at least could be staged on Chobham Common that would attract more than the usual handful of inveterate contest flyers. Be that as it may, there was certainly no amateurism in the way the San Valeers club organised its 20th Annual Free-Flight event. Every provision was made for the accommodation and well being of the 141 contestants, and trophies awarded for all events.

We learn from the Newsletter of the **Heswall M.A.C.,** of a strong display team about to show the public what model flying is all about. Plenty of good stunters and a whole history of Scale models make up the very impressive circus. Naturally, with such a

high standard to maintain, a teach-in nursery is needed for the cultivating of future talent. And what better to introduce the junior element to the mysteries of C/L than by way of Mouse Racing? Towards this end Allen Jones is making up six kits for Wenmac or ·049 motors. Ready shaped balsa and plywood parts and similar refinements all for twenty-five bob a job, and part of that on the never never. News of the Nats. contains a mention of an unheard of hazard to high flying models – rugby posts! Seems a few were left in the vertical position at Hullavington, which made for a trying time for the Hon. Sec., when the wing of his glider was converted into two pieces. Suggested here that the two days we put aside for our Nats. is too much of a compression. Is it about time we followed the American example of a whole sabbatical week? But watch out, they're making divorce easier.

Newcomer to the world of club newsletters is the **Richmond & D.M.A.C.,** having just produced its very first, albeit very brief, bulletin on its very own 30/– duplicator. Mainly the issue is taken up with reports of Indoor flying in a large Church Hall at St. Osmunds Church, Castlenau. Cost per night, a mere 7/6d. Ceiling height a not inconsiderable 25 ft. – in fact a fair bit of elevation in these claustrophobic days. Initial times for chuck and tissue rubber power have been very modest, but the hall potential for microfilmies is now believed to be in the 14 minute region – look out for sticky bath nights! There is also provision in the hall for building and instruction sessions; a setting of a rather higher moral tone for junior meetings than the usual pub-club room. Anyway, these eventful indoor evenings are held on every second Thursday in the month. Why not come along and try your hand at this fascinating sport?

Club with a flying field problem is the **L.A.R.C.A.S.** The current newsletter finds no fault with the inherent enthusiasm nor with the financial position, but is concerned with a serious disintegrative situation resulting from the lack of a suitable centralised flying ground where all can indulge their pet radio obsessions in good clubbable style. At present the club is split into a number of separists groups, each with its own jealously guarded 'private' flying site, which hardly makes for a cohesive club life. This perhaps raises the whole question of the peculiar requirements of the ideal radio flying area. Radio flying has a way of 'taking over' any public open space, leading naturally to complaints from other users, and possibly to an eventual clamp down. Again, the noise factor demands that the site be sufficiently isolated not to cause undue nuisance to local residents. All in all, there can be few such ideal flying sites in the more populated areas of the country, but many treasured sites could be safeguarded by the choice of 'off-peak' flying times and the muffling of the larger engines. Not to despair, though, for the club has high hopes of the odd acre or two turning up within striking distance of Stockport. Jimmy Hutchinson has a comment or two on the gentle, noiseless, and so far, we hope, nuisanceless art of slope soaring, with particular reference to the Clwyd event (don't say it – fly it). Here a strategically-sited ridge and a magnificent scenic backdrop made for a perfect setting. Les Gwyn and Arthur Bailey formed the L.A.R.C.A.S contingent, acquitting themselves nobly with Les taking second place to the redoubtable J. Mardon of Mendip in the Mynd Multi event, and Arthur scoring third in Single with his high tail Own Design. Most impressive model flown was Squire Kay's '*Mistral*' 72" low wing; (plan in R.C.M. & E.) though it was thought he should have observed his own advice against low passes along the peopled slope. Point here for the newcomer to radio. What to do about broken contacts on the field! The classic answer, I suppose, is to carry a portable soldering iron. One piece of advice I can give from experience: key all those escapements, battery compartment and other bulkheads into the fuselage – mere butt cementing is not enough.

Arthur Gorrie of the **Newtown Model Aeronautical Association,** Brisbane, Australia, sends along a couple of small, neat transfers he has designed of the club of which he is Secretary, and which he founded back in 1950. He says he would be interested to receive transfers from clubs back in the old country. Newtown, which has around 50 active members, is an all-flying rather than all all-talking concern, but no information offered on the scope of activities, apart from telling us that all interests are covered, and no reference made to flying field facilities – pity. If you have any spare transfers the address is Arthur Gorrie, Hon. Sec., Newtown M.A.A., 604 Stanley St., Woolloongabba SZ, Brisbane, Australia.

Plenty going on at the **Whitefield Club.** A covering demonstration one evening, a cut-out and fly session on another (bring your own glue), and lots of novel events for all to participate in, novice and expert alike. After a lull following the Nats., members are now girding up their gliders in an effort to regain their Plugge Cup lead.

Spectators at the **Three Kings Aeromodellers** display at Redifon, Crawley, were thrilled to bits – or so we learn from the club bulletin. We trust, though, that the bits were not the result of the tangle between the demonstration and a six a side football match that got a bit too simultaneous for comfort. Not that the Three Kings boys can't hold their own in these sort of scrums as they have to fly between kick-off's on their Mitcham home ground. Talking of that hallowed flying site, there now emerges an obscure but sinister clause from the small print of the Council Byelaws, 'the noise of the model engine is to be reduced as far as is reasonably possible etc.'. Like the throttles that produce the decibels, this sort of regulation is wide open to interpretation. Incidentally, does it never occur to the earhole massaging brigade that they are also a nuisance to their fellow modellers – sorry, I mean other airfield users.

Propshaft, the Newsletter of the **Mashonaland Model Club** of Rhodesia, contains a highly detailed article on chuck gliding – something we rarely see. Ever see the chuck gliding experts breathing – yes, literally breathing – on their wings? Well, the reason is a very important one: to retain or increase that essential wash-in (leading edge up) on the left-hand wing. Idea is that at chuck velocity the warp gives a right turning bias against a left rudder trim; the effect minimising as the model slows to produce a smooth, height sustaining roll off at the top. Says here, too, that for an even snappier roll off you should try a gentle warp on the elevator: left side washed out and right side washed in. Of course, the worse type of 'wash out' is when those wings fold up on tow. I refer to A/2 gliders with which the Rhodesian lads are getting quite a run of such folds. A look around at the experts over here seems to indicate that 10 gauge rods in brass or ally tube gives a tough, anti-fold centre section, particularly if the tube is secured in a run of plywood ribs.

Universal warning culled from the **New Zealand M.A.A.** Newsletter. A contributor was proudly demonstrating the wonders of his retracting undercart multi when wham! it spread its secrets over the tarmac. Reason. Some slap-happy type arrived on the field and started bleeping away, oblivious to all but the wonders of his newly-acquired gadgetry. Only one answer to this sort of thing; all transmitters in one pound. Dispersal over the general flying area (very much the trend these days) can lead to thoughtless twiddling and disastrous overlappings. Let us take this opportunity to wish the New Zealand contingent the best of luck in the World F/F Champs., although the issue will be decided as this goes into print. A word of praise, too, to the group of top British flyers, under the managership of Jack North, who are mounting an all-out proxy effort in A/2 Glider, and Wakefield.

Something of the function of the old *N.A.N.*, has been taken over by the new *Free-Flight News;* an exceptionally well produced newsletter-style magazine. The number three issue to hand is full of good things for the free-flight enthusiast: plans, articles and reports, all angled towards the cognoscenti of the world of the freewheeling model machine. Some highly rarified specimens of the art are included, particularly a stick like Wakefield with the literary name of '*Finnegans Wake*'. Copies are obtainable from Ian Kaynes, 11 Parkside Road, Sunningdale, Ascot, Berks.

I see I have been taken to task by Flt. Lt. N. T. Carter, R.A.F., Hon. Sec., of the **R.A.F.M.A.A.,** for referring to the decision of the R.A.F.M.A.A., not to allow participation in the R.A.F. Championships as 'parochial'. This, of course, was not intended as a general criticism of the R.A.F.M.A.A., to whom we are indebted for the benefits they bestow on the movement as a whole in the provision of airfield space etc., but was confined to the particular decision in question. The term 'parochial' was not used in a pejorative sense, as it appears to have been interpreted, but in relation to the general 'open' nature of our movement, in which, from the earliest days, the only qualification needed to enter any event, at home and abroad, was the enthusiasm to participate. It is on the basis of this historic warrant that I made what I think was fair democratic comment on a particular policy decision which, I feel, comes within the scope of the aeromodelling movement. Incidentally the R.A.F.M.A.A. Champs. enjoyed magnificent weather at Watton, August 9th/10th and the field was happily shared by Service and Civvy alike. '*Flysheet*', the official newsletter of the **Cape Radio Flyers & S.A.A.R.F.,** (Cape Town) contains news of a rather unique form of contest: a R/C versus F/F Thermal Soaring event. Weather, with not a whisper of wind and air described as champagne, was a free-flighters dream, but had not the same uplifting effect on the Radio contingent. However, the champagne must have started flowing later for it was not long before Radio and Free-Flight were outsoaring each other in a closely contested match. Perhaps with a touch more wind Radio would have won the day quite handsomely instead of allowing F/F to get the edge, but even so Radio Soaring is not yet a widely practised art, and there is still a lot to learn in using

the control to full advantage. From my own experience Single Soaring is quite tricky, particularly in trying to cope with strong lift and wind drift at one and the same time. Still on the subject of Thermal Soaring, there is a suggestion that such an event should feature in the next South African Nats. At a recent try out of various launching methods, it was found that a converted, variable voltage generator was the ideal towing method.

The dream of many a C/L enthusiast is to have third line engine control. But why the seemingly simple addition remains a dream, rarely becoming reality, is discussed at length in the **Valkyries Model Club** Newsletter. Ron Truelove explains just why that third line cannot be operated without interfering with the tension of the two control wires. The solution is, of course, the J. Roberts' system where the main bellcrank moves to compensate for the load on the engine lead out. The newsletter also contains some well balanced criticism of the Nationals organisation. No fulmination, but a few useful pointers which, I feel, are deserving of attention, particularly with regard to parking and catering facilities.

News from Ireland, both North and South, is of lots of contest activity. Too much to cover, but nice to see all those well-stocked result sheets.

THE CLUBMAN.

FINCHLEY & D.M.A.C., C/L GALA HELD AT GLEBELANDS ON 29th JUNE

IDEAL weather, sunny and with a fair breeze, gave perfect conditions for this well-attended meeting. A total of thirteen entries in the Stunt Contest seems to have made this the event of the day. The Three Kings Club provided the judge and J. Mannall of Lincoln the winning number of points with his Crusador. Second place went to M. Reeves of Wanstead.

A Combat a fast and furious affair, was won by F. Dowling, with Steve Smith of Feltham as runner-up.

Thrills galore in the final of B Combat when J. Shaw of F.A.C.C.T. was left in solitary possession of the field after the other two finalists came into collision – one model leaving the lines and the other coming in on a dud engine.

No comment given on the Rat Race, but results were:
1st, F. Bradley (Feltham & Hayes), 7:15; 2nd, A. Dell (Feltham & Hayes), 8:42; 3rd, D. Coleman (Feltham & Hayes), 8:46.

RICHMOND D.M.A.C. SUMMER GALA—

CONSIDERING the fine weather there were less entries than might have been expected. In Power there were 7, A/2 (17) and Wakefield (9). The competition was run in 7 55-minute rounds starting on the hour at 10 a.m. A much appreciated scoreboard was displayed and kept up to date, although some competitors were not very efficient at returning their score cards on time. Spot checks were carried out on the weight of models.

The air improved as the day progressed, although the wind shifted continually, resulting in models lost to the tank factory. In the third round, B. Edwards lost his model (A/2) while in the lead, as did Jack Allan (Power).

In Wakefield, Spooner used a variable pitch prop but retired in the sixth round having got four max's. There seems to be a distinct lack of staying power in Power, only one entrant actually flying in the seventh round, and two in the fifth and sixth.

F. Chilton, who won the power event in fact rebuilt his model during the third round.

The great 'usefulness' of meteorology was demonstrated by J. Baguley, who, relying on the advice of a 'Neddybox' towed for 1.48, as compared with the five max's he made using nought but natural intuition.

POWER: 1, F. Chilton (Crookham), 14:11; 2, R. Johnson (St. Albans), 13:11; 3, P. Buskell (Surbiton), 8:28.

A/2: 1, J. Punter (Hayes), 20:12; 2, K. Smith (Croydon), 19:45; 3, J. Baguley (Hayes), 18:51.

Wakefield: 1, A. Crisp (FACCT), 19:06; 2, L. Burrows (Blackheath), 18:17; 3 L. Barr (Hayes), 17:29.

SOUTH BRISTOL MODEL AERO CLUB— SUMMER GALA – July 20th

THE familiar pattern of bright and breezy July weather greeted contestants at Hullavington on the 20th although, fortunately, the drift direction was away from the notorious Hullavington wood. However, a 90 degrees wind change during the afternoon took models over the buildings, and several were, unfortunately, lost.

Open Glider was very well supported, with the usual A/2 superiority. Three got through to the fly-off with Roger Baggot being the first away, but he was down quickly. Jim Baguley returned a lowish score leaving Junior Champion, Dave Plews, a chance with his Elton Drew design. He, however, spun down from release – a post mortem revealing an over-offset rudder due to a hurried repair.

Vintage Precision drew a very varied entry ranging from Noel Barker's huge *'K.G.'* to Ray Burgess' diminutive *'Stinger'*.

Thermal activity made averaging out of the five flights interesting to say the least. A pylon model, *'All American'* with Ohlsson ·23 glow, won the event for Mayes of South Bristol, whilst fellow club members filled the next two positions with a Keil Kraft *'Chief'* glider and a Frog *'Stratosphere'* respectively.

Rubber and Power were rather low entry events – John O'Donnell winning the former with a full house from *'Maxine'* and Martin Dilly with less than a max. won the latter.

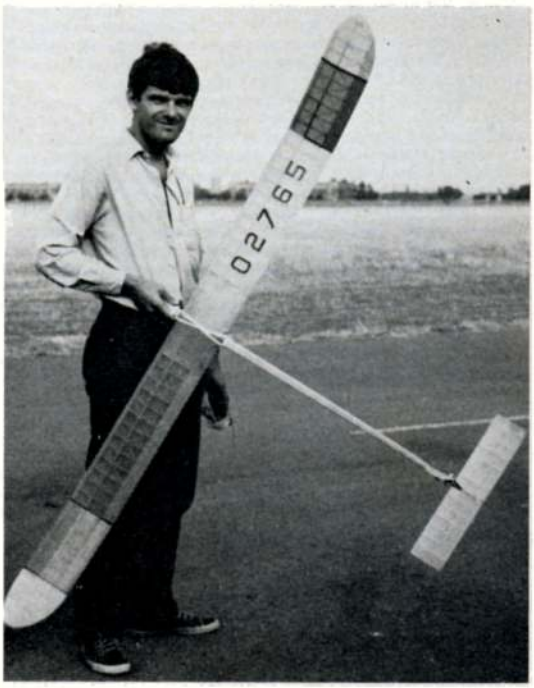
The control line Combat event proceeded smoothly throughout the day with a very varied entry. Finalists were both from Outlaws club and both used Oliver Tiger Mk. 3's in preference to later models.

Rat Race had some fast heat times, best being 2m 46 sec. by Frank Bradley. Coote of South Bristol provided light relief in one semi-final by becoming trussed up after a line tangle. He was just able to cut his motor on the 69th lap and glide in – wire cutters were then quickly applied! Once again it was an all-Feltham final with a good, fast time by the winner.

RESULTS:

Open Glider (46 entries) 1, J. Baguley (Hayes), 9:00 + 1:51; 2, R. Baggot (Birmingham), 9:00 + 1:13; 3, D. Plews (Cheltenham). 9:00 + 0:17.

Open Rubber (12 entries) 1, J. O'Donnell (Whitefield), 9:00; 2, R. Peers (Congleton), 8:30; 3, B. Bow (S. Bristol), 7:07. **Open Power** (13 entries) 1, M. Dilly (Croydon), 8:57; 2, D. Wain (S. Bristol), 8:16; 3, S. Chilton (Crookham), 7:14. **Vintage Precision** (22 entries) 1, J. Mayes (S. Bristol), 4·37% error; 2, G. Andriessen (S. Bristol), 7·45% error; 3, J. Down (S. Bristol), 14·60% error. **Rat Race** 1, J. Dixon (Feltham), 5:54; 2, F. Bradley (Feltham), 7:37; 3, D. King (Feltham), 8:30. **Combat** 1, Hammersley (Outlaws); 2, Strudwick (Outlaws).



Roger Baggott (Birmingham) placed second in the Open Glider at the South Bristol M.A.C. Summer Gala reported on this page.

radio control models

October R.C.M.& E. carries a full and detailed report on the 1969 World R/C Championships and Scale International held at Bremen, Germany. This fully illustrated report includes a round by round commentary, pictures of models from the competing Nations, technical data, and scale 3-views of the winning models.

Also featured in this issue will be a servo amplifier for the R.C.M.& E. Digital system designed for the Horison and Remcon servo mechanics, Test Report on the Staveley 4 proportional system, plus rules and model specification for pylon racing.

Regular features include Wave Lengths, Radio Motor Commentary, Sport & Single, plus Straight & Level.

Contest Calendar

September 21	**EDINBURGH RALLY** Team Pylon Race and Spot Landing, Donibristle.
September 21	**SOUTH MIDLAND GALA**, literally everything! Open R.G.P. ½A, Cd'H., Tailless Chuck, Helicopter, single and multi R/C, Vintage, Carrier, Combat, Stunt, ½A, F.A.I.T/R, Rat, Mouse racing. C/L. Entries to T. Heeley, 22 Upper High Street, Harpole, Northamptonshire. R/C to D. Giles, Derron, Station Road, Bow Brickhill, Buckinghamshire. F/F to T. Payne 92 Coppice Drive, Parklands, Northampton. 2/6 each event at Cranfield.
September 28	**SOUTH COAST GALA**. R/C events at Thorney Island, F/F at Chobham Common.
September 28	**S.M.A.E. CENTRALISED R/C & C/L MEETING**, ½A T/R, F.A.I. T/R, Stunt, Carrier. R.A.F. Upwood.
October 5	**SPORTS RALLY** (Performance Kits) Old Warden, Beds.
October 5	**EAST GRINSTEAD GALA** All-in F.A.I. (1st rd. 10.30–11.30) A/1, C.d'H. ½A Power, Chuck glider. 3/6 entry, re-entry 2/6. Chobham Common.
October 5, & 12	**EAST ANGLIAN AREA NATIONAL DECENTRALISED F.A.I. CONTEST**. F.A.I. Power, Wakefield, & A/2. Details from B. L. Halford, 28 Chapel Lane, Wymondham, Norfolk.
October 12	**NORTHAMPTON COMBAT RALLY**. Class 'A' only. Insurance & silencers required. 3/6 pre-entry to C. P. Champion, 12 Bedford Rd., Little Houghton, Northampton, NN71AB. Field entry, 5/-, at Midsummer Meadow, Northampton.
October 12	**GLENROTHES** Slope-Soaring, Falkland Hill.
October 12	**HARPOLE C/L STUNT COMPETITION**. Pre-entry 12/6 (includes lunch and beer). Lunch only (for wives, girl friends, etc.) 10/-. Full F.A.I. Standards. Details from I. Peacock, 41 Carrs way, Harpole, Northants.
October 12	**LONDON AREA GALA**. Open R/G/P, R/C Multi, Pylon Race, F.A.I. T/R, Stunt, Handicap Speed, Rat Race, C/L Scale. R.A.F. Greenham Common, Nr. Newbury, Berks. Trade supported prizes. Entry fees 5/- Seniors, 2/6 Juniors. Competition licence may be used for S.M.A.E. events only. Entry to airfield restricted to S.M.A.E. card per car. Further details, M. Blundell, 13 Forge Lane, Hanworth, Middx.
October 19	**YORK RALLY**. A/2, Open rubber, Open power. Prizes £10, £3, £3 (min.) respectively. No pre-entry, 5/- entry fee covers all events. Details from D. White, 24 Surtees St., Burton Stone Lane, York. Commences 9 a.m. at R.A.F. Elvington, Nr. York.
October 19	**LONDON AREA C/L CHAMPS** 3rd Round F.A.I. T/R, ½A T/R Combat, Charville Lane Circuit, Hayes, Middx.
October 26	**ST. ALBANS WINTER COMP.** All-in F.A.I. C.d'H., A/1, Chuck Glider, ½A Power, Chobham Common.
November 2	**WHARFEDALE 'RUFFORTH 1000'**. Class 'B' 200 lap heats, 1000 lap final. No entry fee, but all intending competitors please contact J. C. Horton, 10 Lawn Avenue, Burley-in-Wharfedale, Ilkley, Yorks.
November 9	**RICHMOND GALA**. Open R/G/P, ½A, C. d'H., Chuck at Chobham Common.
November 16	**ST. ALBANS THERMAL SOARING** event for R/C gliders, Nomansland, Wheathampstead.

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Taipan 1.5cc Glo	...	63/3
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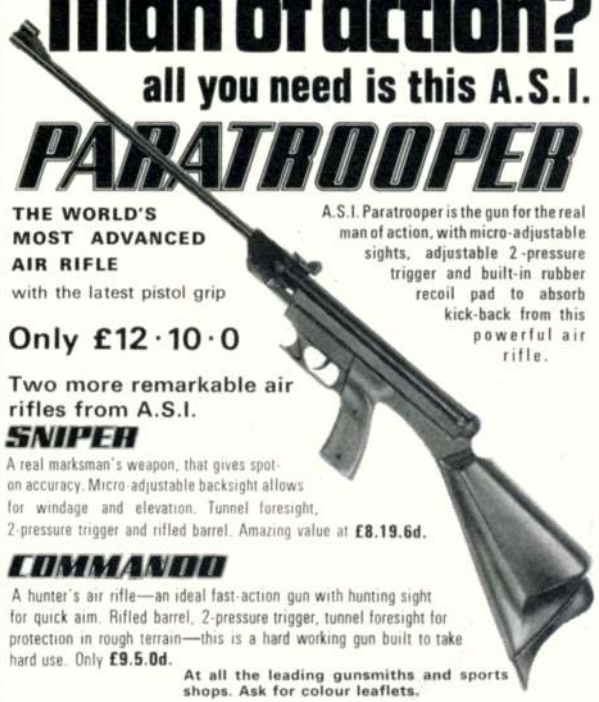

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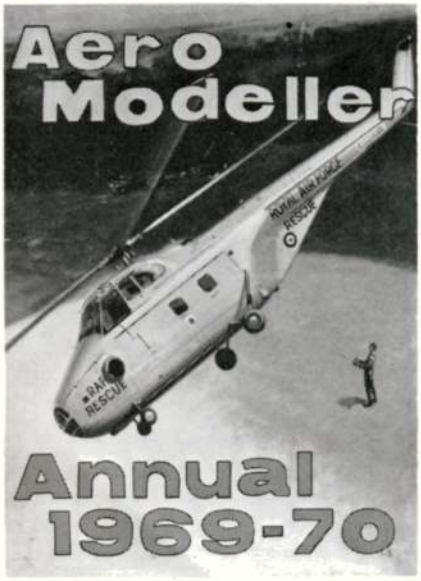

This is the 22nd year of continuous publication! Lucky the modeller with a full set! Laurie Bagley has provided a grand cover once again with his r/c scale model Whirlwind in bright yellow livery.
To tie in with this is Dieter Schlueter's fine article on Model Helicopter Technology. (Dieter was winner of 1st International R/C Helicopter Event – also reported in this Annual) John Burkham of U.S.A. (who won **their** first 'Copter event) adds comments. Other articles include Tubular Fuselages from Balsa; Contest Model Performance Prediction (not to be taken too seriously!) Beginners Only Please; Facts About Propellers; Glider Construction Suggestions; Navy Carrier Event and What It's All About; Fuel Control. Fifty model plans – all scaled and with main dimensions shown – from the year's best, most interesting, curious, screwball, intriguing, different designs that have appeared in the world's aeromodelling magazines.

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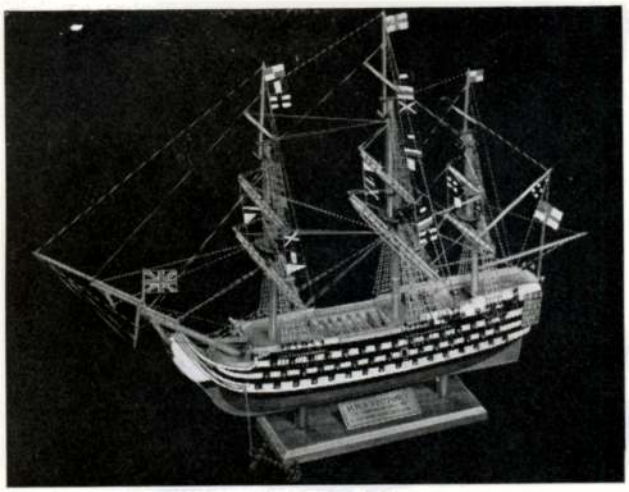

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