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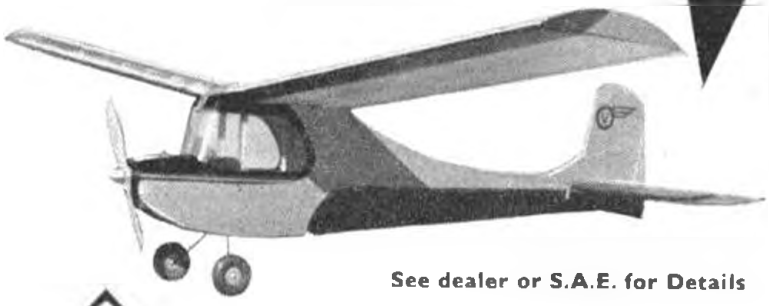

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Monarch Stunt 2.5-3.5 c.c.	34/10
Viper Stunt 1-1.5 c.c.	17/6
Cobra Stunt 5 c.c.	28/6
Crusader Stunt 5 c.c.	69/6
Fire Bird Stunt 2.5-3.5 c.c.	24/6
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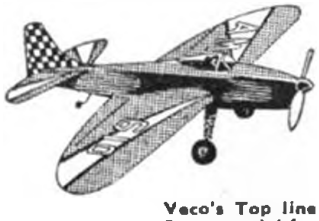

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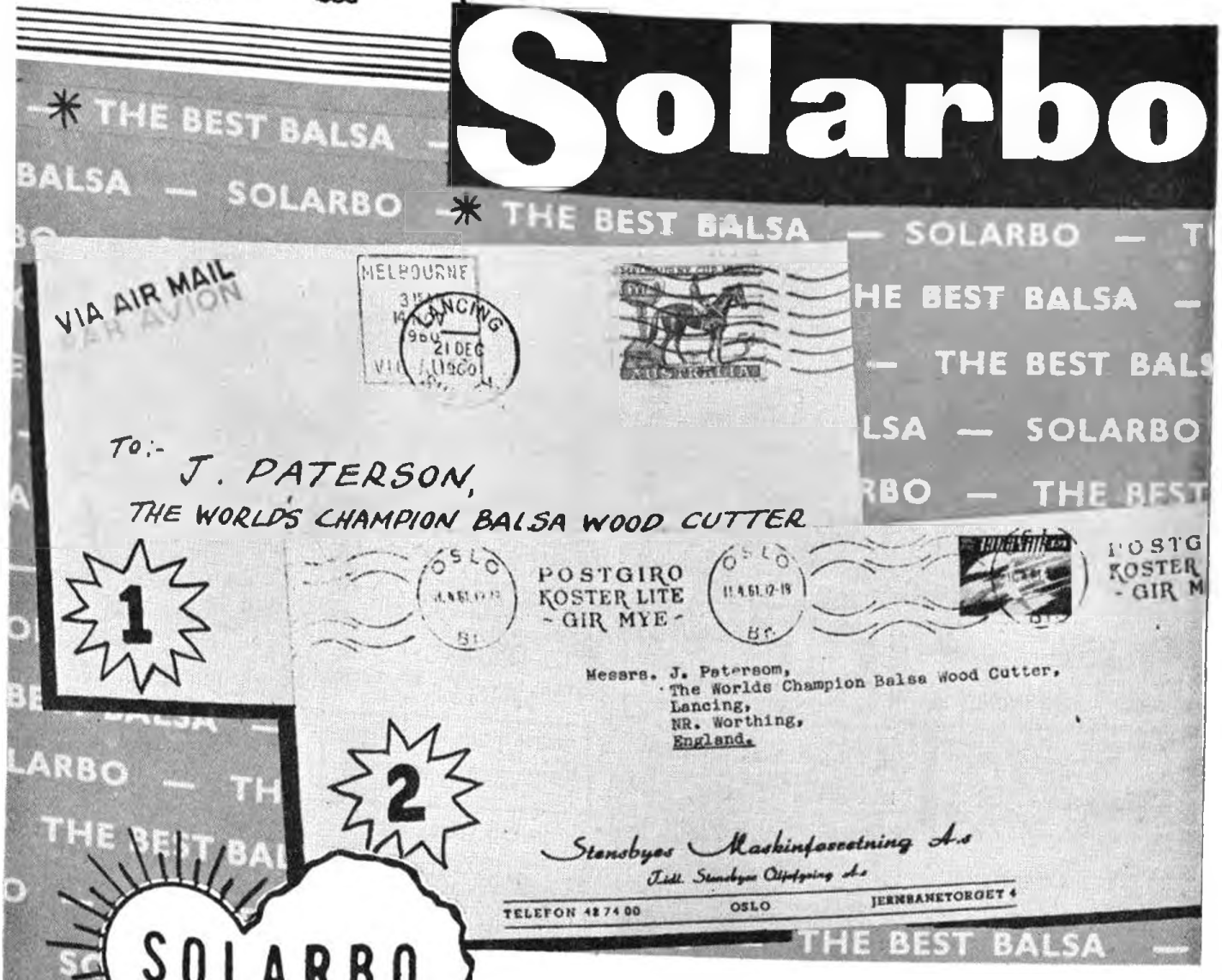
Solarbo



★ When we reproduced an envelope (1) addressed to the World's Champion Balsawood Cutter in a previous advertisement we hardly expected the response as in letter (2). On second thoughts, though, SOLARBO *is* the best Balsa you can buy, anywhere, and the description is thoroughly warranted—and note that the Post Office had no trouble in delivering to the right address. In fact, it is rather like preaching to the converted. *Everybody* knows that SOLARBO is the best Balsa—and the wise aeromodeller always asks for it by name.

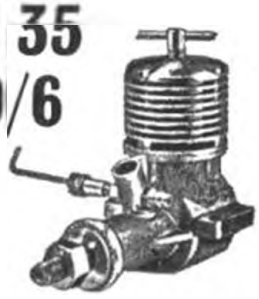
PERFECT PAIRS designed for each other

The following combinations of models and engines have been selected from the comprehensive range of kits now offered under the Mercury and Yeoman trade marks, and suitable engines from our catalogue.

YEOMAN DIXIELANDER 27/6

A formidable combination which has proved its contest-winning abilities in competition after competition since it was first introduced in 1959 is the Yeoman Dixielander together with the A.M.35. The perfect pair for unrestricted free-flight power contests.

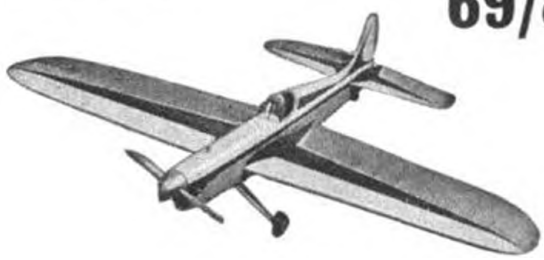
AM 35 69/6



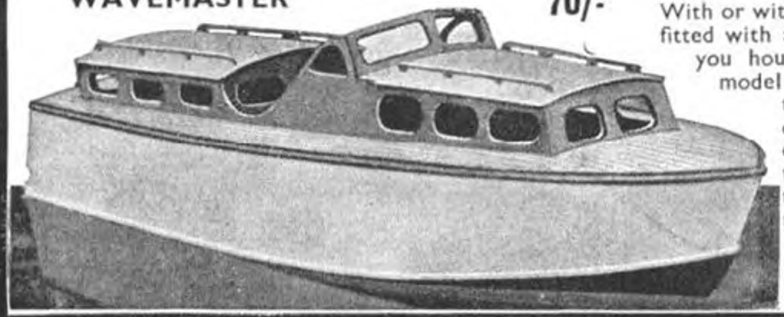
MERCO 35 £5.19.6

MERCURY CRUSADER 69/8

Within weeks of its introduction in kit form the Mercury Crusader has been selected by some of Britain's top stunt flyers for their contest flying in 1961. At the first control-line Rally this year at Dagenham on the 9th April, Crusaders fitted with Merco 35's were flown into first and second places, by Ray Brown and Dave Platt. What better proof could there be that this is indeed a contest-winning combination?

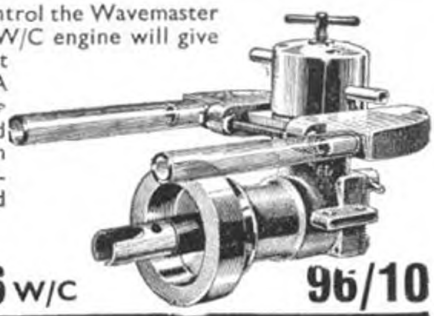


WAVEMASTER 70/-

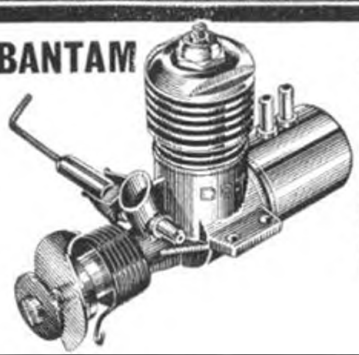


With or without radio-control the Wavemaster fitted with an E.D. 2.46 W/C engine will give you hours of pleasant model cruising. A tried favourite of solid, rugged construction the Wavemaster is designed to last.

ED 2.46 W/C 96/10

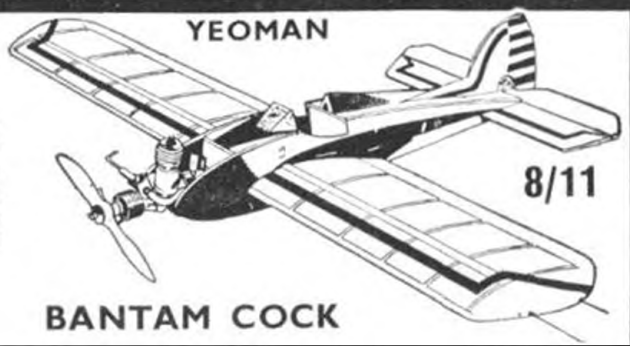


DC BANTAM 34/10



Here is the true economy combination for the beginner to control-line flying. The Bantam Cock with the D.C. Bantam is without doubt an ideal beginner's model.

YEOMAN 8/11



BANTAM COCK

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Dr. M. F. Hawkin's remarkable "new look" 580 sq. in. control-line stunter with Dayglo folding wing tips, United States Navy decor and a side mounted fully cowled Enya 35 is named the Super Satellite and seen here at the R.A.F. M.A.A. Championships.

AERO MODELLER

Editorial Director D. J. Laidlaw-Dickson

Advertisement Director C. S. Rushbrooke

Editor
R. G. MOULTON

Editorial and Advertisement offices:
38 CLARENDON ROAD, WATFORD, HERTS
TELEPHONE: WATFORD 32351 (Monday-Friday)

VOLUME XXVI
No. 306 JULY 1961

CONTENTS

ON THE COVER

Artist Ken McDonough portrays the Albatros DII in air battle over France in the first World War. Every effort has been made to ensure authenticity in colour reproduction as an aid to modellers using the drawings to be found on pages 380-382.

AEROMODELLER Incorporates the MODEL AEROPLANE CONSTRUCTOR and is published monthly on the 15th of the previous month by the MODEL AERONAUTICAL PRESS LIMITED.

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The Merry Month of May

THE BRITISH contest flying season runs to a set pattern each year. We start off in March with the traditional bad-weather events for the Gamage and Pilcher Cups (now joined by the White Cup to complete the Rubber, Glider and Power trio) which are flown at club grounds on a decentralised basis, then we have a series of Area organised eliminators in preparation for the later team trials. At Whitsun we have the National Championships — about ten weeks after the official season begins.

This alone is evidence of how our model flying programme develops so suddenly each year, and blossoms from events at club level, to the major meeting on the calendar with such rapidity that one cannot help but be smitten with a fever of excitement for this grand hobby of ours.

Yet 1961 seems to be doubling the intensity! In this issue we cover not only the "Nats" but also nine other meetings which have taken place since our last issue was produced. The month of May could not have been more merry, and the particular week-end of May 6th/7th more busy than on any other aeromodelling occasion. We leave it to Club News to relate the incidental tales from these events and apologise in advance to some organisers for having to ration out the illustrations in our Rally Round-up.

Perhaps the unusually good conditions for the year's opening contests should have given us an inkling of what to expect; but who could have forecast with any degree of accuracy that the Whitsun meeting would have created so many all-time records for attendance, enthusiasm, and high performance? It was one of those meetings that went with a swing. Voluntary effort from the S.M.A.E. Areas (including the R.A.F. M.A.A.) was really great, and the Society Officials are to be congratulated in the organisation of what was surely the most active model flying meeting ever held anywhere in the world. More than 1,500 individuals registered entries in the sixteen events at this two-day jamboree, and at a rough estimate we would guess that between 3,000 and 5,000 flights were officially recorded, some of them, as we report, being truly remarkable.

There would be a strong case for taking the leisurely line of approach adopted from the A.M.A. in the United States by so many other nations, of spreading the contests over a whole week, and there is certainly a new need for positioning control-line where safety precautions can be more securely taken. It was a meeting that confused with its enormity, a mile-long parade of events, all with large entries (296 in glider alone) and each enjoying a new standard in enthusiasm. Backed by the extraordinarily well-run camp site with 1,300 inhabitants, and owing everything to the co-operation of the Royal Air Force, the "Nats" rounded off a month of intense activity that does much to inspire confidence in the well-being of aeromodelling.

Spreading the word

Relationships of aeromodellers and the general public fall into one of three categories. (A) there is a degree of tolerance of the part of the great g.p. with the view taken if we are making a noise, at least the boys are off the streets and doing something creative, or (B) a considerable show of co-operation with provision of youth club facilities etc., in return for which a few displays are expected in the course of each year, or (C) where there is considerable intolerance on both sides and eventually the power of the great g.p. prevails.

Too often we have heard of the latter case, and every time it appears the club in question has no appointed P.R.O.—or if one has been appointed, he is of an aggressive and entirely unsuitable character.

Public Relations Officers are as important to our model movement as they are in industry. Far from sitting back content with their election, and awaiting the opportunity to deal tactfully with any problem that may arise, they should be capable of *promoting* good public relations, as for example in the case of "Bill" Bailey, P.R.O. of the Whitefield Model Aircraft Club. He was invited to deliver a talk to the Halifax Rotary Club lasting 25 minutes and listed in their talks programme as being on the subject of "Modern Aircraft."

Not only did Bill manage to over-run his time by 15 minutes, he also made the subject Aeromodelling, and dealt at length on the competitive and International aspects. Rotarians are important people. They represent leaders of all walks of life and they regard their luncheon speeches as a valuable opportunity to learn more of another's views. When they attended their function, no doubt they had no inkling of what was to come from Bill Bailey, yet an invitation was soon extended for a repeat talk next year. Thus was the word spread about our hobby, and perhaps one day the modellers in Halifax will see the benefit.

Television model

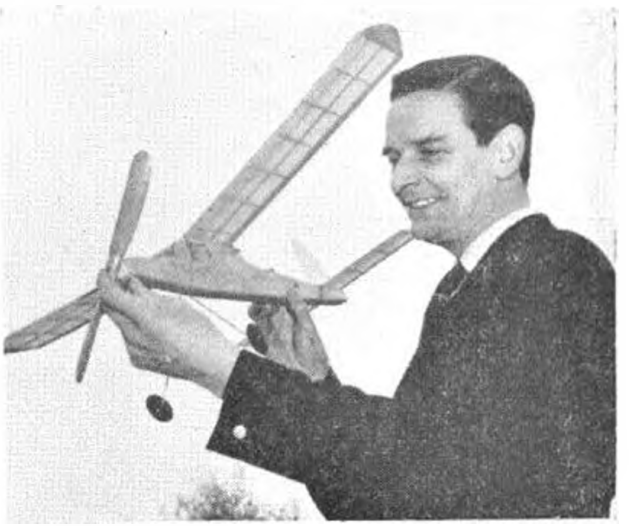
Most powerful of all the mediums for publicity of our hobby is of course that of Television. In recent weeks both B.B.C. and I.T.V. have featured programmes on radio control with George Honnest-Redlich, Stuart Uwins and Paul Rogers as "Stars", and these have been well presented programmes which we know have been received most favourably. One cannot help but think that though ten-channel radio control might be the epitome of many modellers interests, it is rather like jumping off at the deep end particularly when the showing is during peak hours of juvenile time.

Congratulations then, to Anglia T.V. and their series of weekly do-it-yourself features with John Seymour and the rubber driven "Anglianaut". Designed by David Greening of the Norwich M.F.C., the model was published in plan form in the Anglia edition of the TV Times for May 16th, tieing in with the series which began in "Anglia Afternoon Club" on May 9th and will be running each Tuesday at 4.40 p.m. until June 27th. We hope they will be rewarded with loads of Anglianautery!

Next month

Another full colour cover with a modelling subject will herald the midsummer issue out on July 15th, and for flying scale fans we have a real snorter from American expert Dave Garrett in the shape of plans for the *Dormer* 27 STOL for rubber power. This remarkable streamlined high wing aircraft is an ideal subject with its generous tail surfaces and cantilever wings, and the 27 in. span design is one which will be relished specially by those who take a pride in construction and attention to detail. For control-line stunt men, Frank Warburton's *U*-2, a semi-scale of the Lockheed recce plane for ·35 engines, features many entirely new ideas. Frank showed how he can lead the best in Britain on the F.A.I. schedule with his prototypes at the recent team trials. Keith Laumer, now stationed in this country with USAF, to our good fortune, continues his Beginner Course with a snappy simpleton of a rubber job called *Flutterbus* which introduces built up wings for the novice and for the scale fan whether he be "solid", "flying" or just "interested", a fully detailed spread on the fastest fighter in service today, the *McDonnell F4H-1 Phantom* II is a notable exclusive for our plans range. All these and Contest Designs (with Finland's top F.A.I. models), tests on the latest Oliver engines, Gadget Review and lots we'll keep up our sleeves will be out on July 15th. *Plus* ! ! ! a terrific *free* offer to every reader as announced on page 385 of this issue as our contribution to 1961 as a "MORE MODELLING" year.

This picture of Mr. & Mrs. C. S. Rushbrooke about to depart for the Royal Garden Party at Buckingham Palace on May 11th, should give aeromodellers special pride and pleasure since "Rushy" was invited in his capacity as Vice-Chairman of the Society of Model Aeronautical Engineers, and as such was representing all members. Other officials of the Society have been similarly honoured in the past, and H.R.H. The Duke of Edinburgh is, of course, Patron, whilst many younger members of the royal family have been active aeromodellers, so that we can pursue our hobby secure in the thought that it is, in its way, also "the sport of Kings"

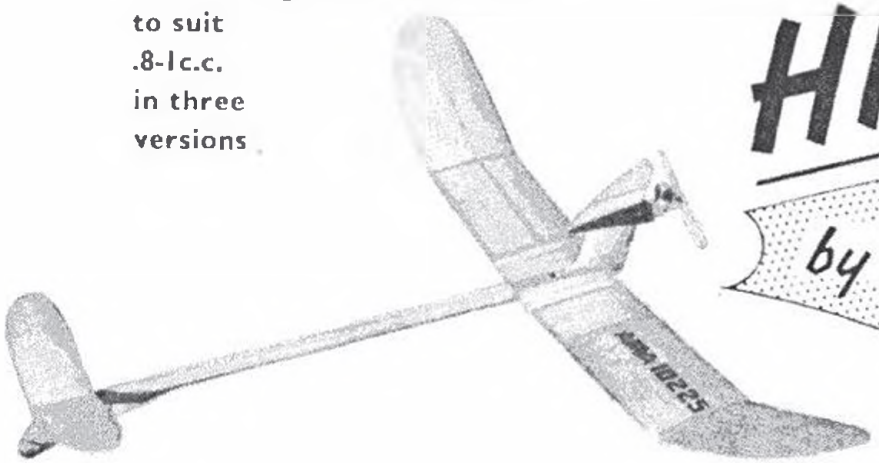


John Seymour of Anglia ITV with the Anglianaut rubber-driven model which is being featured on "Anglia Afternoon Club" in a do-it-yourself series

A top design from the States to suit .8-1c.c. in three versions

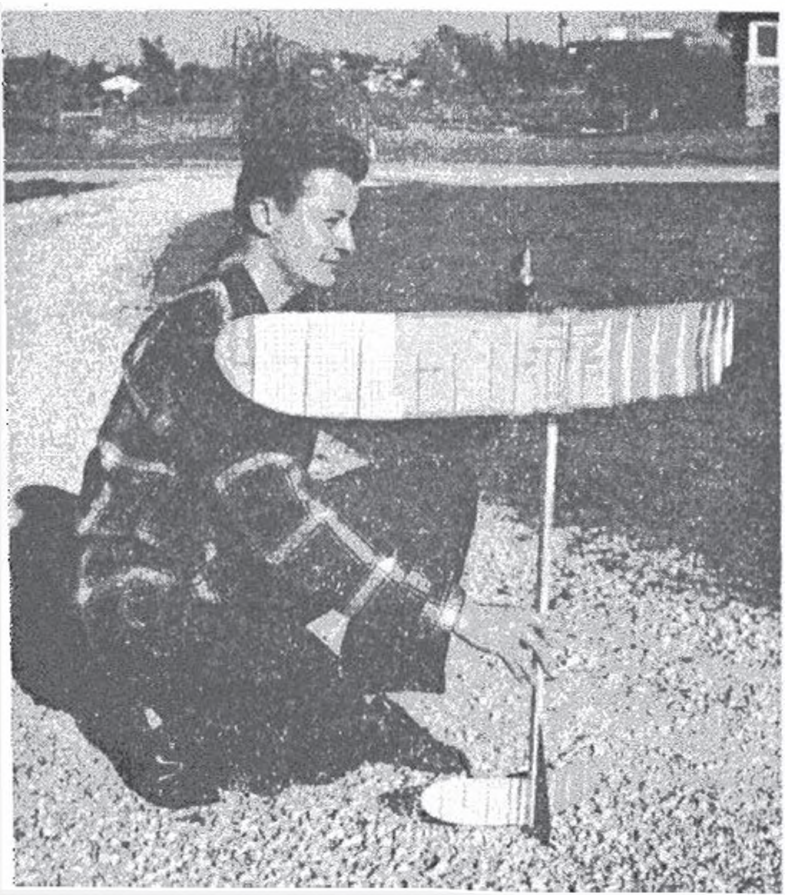
Hi-Liner

by Keith Hoover



THE HI-LINER is a radical departure from the conventional free flight power design. Each of the unique features has grounds in theory and the innovations pay off handsomely where it counts—in performance. Both in the U.S. and on the European Continents, its climb when powered by the Holland Hornet ·049 has been clearly superior to that of other models on the field.

The Very High Thrust Line (VHTL) model is now being tried by a few free flight exponents around the world. The Hi-Liner, on the other hand, is a proven veteran of three contest seasons which has always shown good flight characteristics. Its unusual force arrangement utilizes a high motor position on a forward fin for maximum longitudinal and spiral stability. A small tailplane (15 per cent. of wing area) is combined with the long fuselage, and as both tailplane and rudder are positioned low, the power pattern is not unduly affected by turn adjustments. As all incidence is in the tailplane (—3 deg.) with both the ultra-thin wing and motor at 0 deg., drag is quite low; in addition, these design features provide excellent transition from the "straight up" climb to glide without tricky mechanical means of changing incidence. The low wing is positioned for a good glide, as the tailplane is out of its downwash.



Construction of the Hi-Liner is no less unusual. It is sturdy, resisting warps and punctures. In theory, the all-balsa flying surfaces are quite superior, providing a high lift, low drag airfoil absolutely true for their entire length. The Jedelsky construction method represents a major advance in a wing which embodies the results of research by the "Vienna School" applicable now to power design because of improved VHTL force arrangement. Built up construction of such a thin, highly curved airfoil would be far too complex for most modellers; the Hi-Liner with its Jedelsky wing can be constructed by relatively new modellers who do careful work.

Some advantages of design development in this VHTL series combine in the Hi-Liner. Tip fins on higher aspect ratio (10:1), constant chord wings have been abandoned in favour of a moderate aspect ratio (8½:1) and more aesthetic elliptical tips. The natural "wash-out" in these tips reduces induced drag considerably without loss of strength. The butterfly tailplane and moderate sub-rudder add extra directional stability (look again at an arrow). The box fuselage of hard balsa is stronger than thinner types used earlier while being simpler to repair than a round one.

Construction should present few problems, as it is largely sheet balsa; hard for the fuselage, medium *quarter grain* for wing and tailplane, and medium hard straight grain for pylon, sub-rudder, ribs, and mounting platforms. The fuselage pylon is explained by figure 1 on the plan. A somewhat special technique is used to build the laminated wing; it should be made in four sections. The hardwood leading and trailing edges of each section are butt cemented respectively to the 3/16 in. sheet front of the wing and the 1/16 in. sheet back portion. With a small razor blade plane (or, lacking this, a sharp knife and sanding block) curve the upper surface of the 3/16 in. sheet, checking the end cross section against the plan. With model cement, glue the front and rear portions of each wing section together, over-lapping the rear portion on the front correctly (draw a line on the front part to make this easier). Now glue and pin ribs at right angles on the wing's underside; lines may be drawn before assembly or afterward with a right angle triangle as shown in Figure 2. Finally, add the wing leading edge planking

either with PVA white glue or a rubber base contact cement (this latter can be sanded and finished at once); either of these types of adhesives avoids warping. The simple, curved plate tailplane is pinned during drying as shown in Figure 3. Dihedral angles in wing and tailplane are sanded in with a block, Figure 4 and centre joints are covered with nylon for strength (don't add nylon to the wing tip joints). With the dihedral jigs shown on the plan, these joints are glued and can dry while wing and tailplane sit simply on a table on their leading edges. Only the tops of the flying surfaces are papered, with bright Jap tissue.

Test Flying

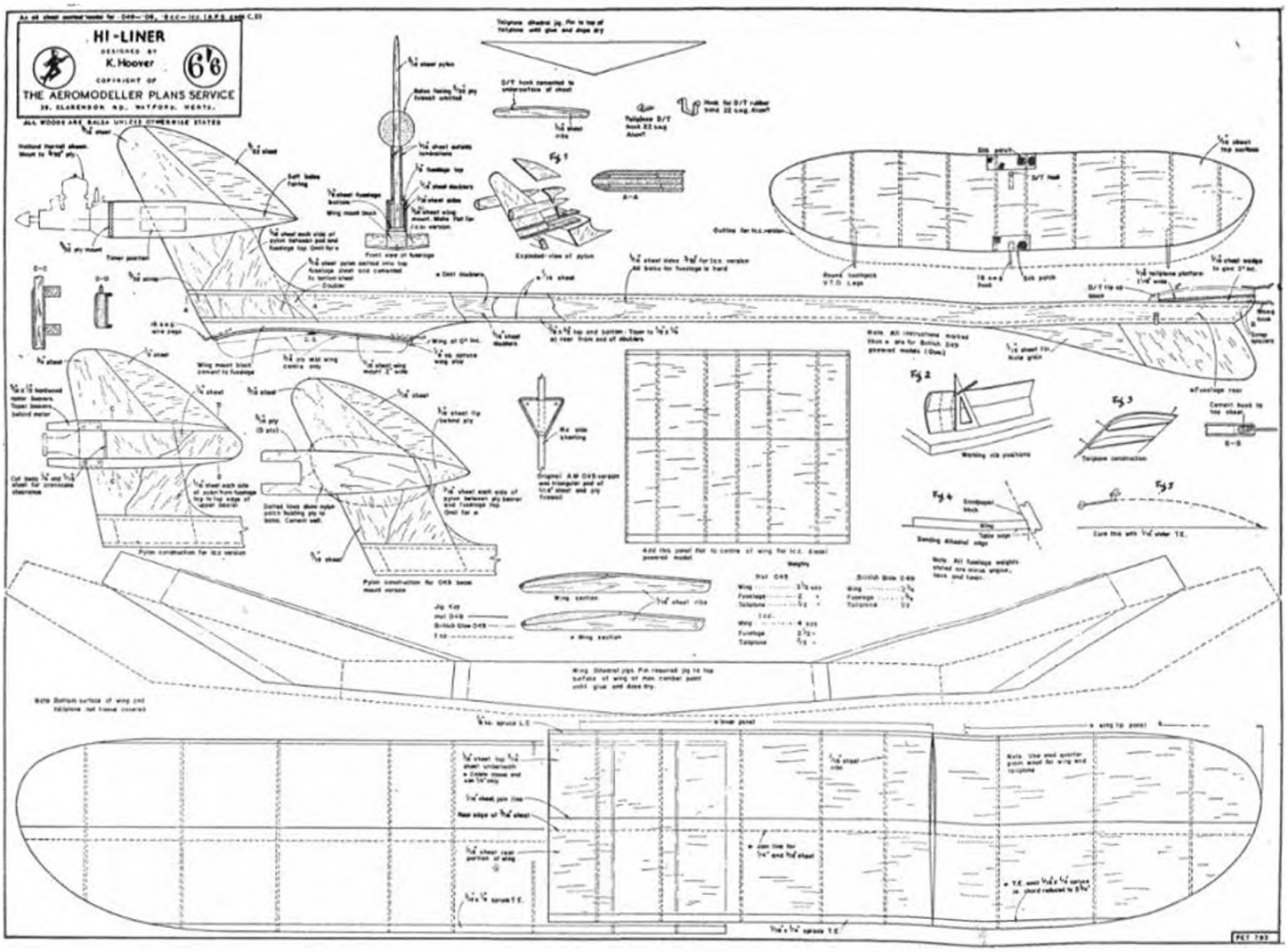
The real point to this design is safety of adjusting a *hot* aeroplane. With thrust, and fin and pylon set zero-zero and the indicated balance position, adjust the glide with a 1/16 extra shim under the rear of the tailplane. This should prevent the only problem which has ever occurred with this series of VHTL designs (Figure 5), a straight out flight, nosing down into the ground.

Gradually, after power tests, remove the negative in the tailplane and tighten the glide circle with tail tilt. Climb is dart-like, straight all the way, the angle increasing as greater engine power is used. For best climb-glide transition, a slight climb circle is advisable, perhaps one turn each five seconds of motor run, in the direction of the glide; the preference is right-right. Hope you enjoy your Hi-Liner as much as those of us who are flying them in the U.S.!

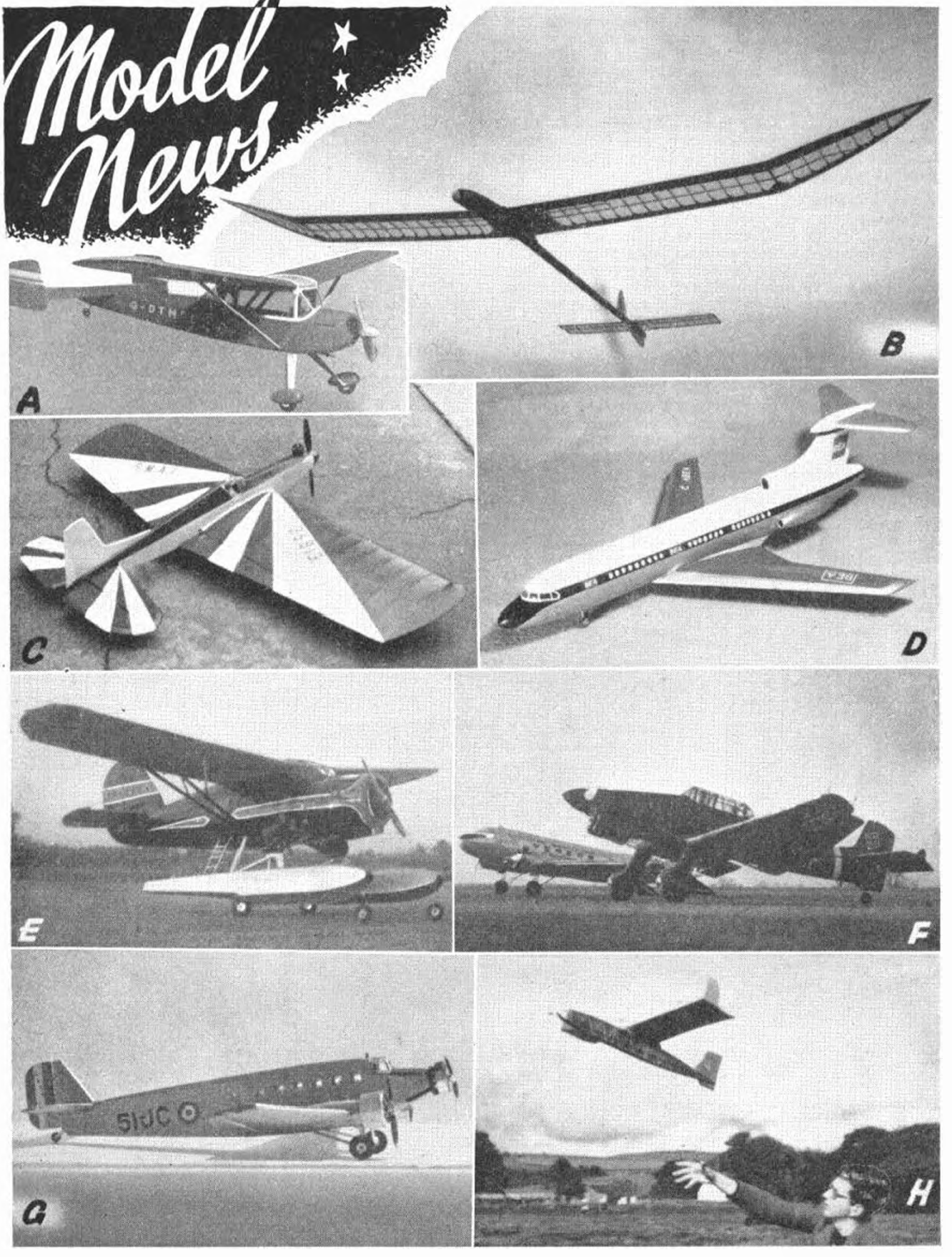
" It's not really new — just something half-way between control-line and free-flight "

Details are given both for the .049—.051 cu. ins. version with 250 sq. in. wing and 37 sq. in. tail and the 1 c.c. diesel type with 292 sq. in. wing and 45 sq. in. tail. For less powerful 049's, use the weight reducing modifications given on the plan.

FULL SIZE COPIES OF THIS 1/6th SCALE REPRODUCTION ARE AVAILABLE AS PLAN PET 793. PRICE 6/6 PLUS 6d. POST FROM PLANS SERVICE



Model News



MASS ARRIVAL of the diminutive Cox Tee Dee ·010 engine is imminent, and there's no doubt that the tiny powerhouse is going to inspire enthusiasts into making models of models — if you get what we mean. Unfortunately, as happened with the earlier influx and popularity of the Pee Wee engine, a lot of modellers chose to produce some real monstrosities, usually an insult to the magnificently engineered jewel of an engine. So this is an appeal. Take a look at picture **A** and there you'll see what a little extra effort affords in the way of neat appearance on these tiny mites. Dennis Thumpston made "Jimpy" for the D-C Bambi when it first appeared, five years ago. It has needed no repairs in many hundreds of flights. The moral is that one should spend time in thought when creating a model for sub-miniature engines.

Enough of sermonizing, and now to **B** which readers will recognise as an A/2 on the wing. It's Ernest Walter's *Sans Egal* from AEROMODELLER plans, and photographed by the builder as it was coming in to land. This is a clever against-the-sun shot which demands fast shutter speed (1/500th) and small aperture (f.22). If you can't get your model on the negative when airborne, then put it on a reasonably plain background as in M. Johnston's view of the stunt controliner in **C**. Following the new trend of large wings, this one has 600 square inches, plus an experimental long tail moment. The wing flaps are differential *a la* Bob Palmer system detailed in our July '59 issue, and the power unit for the red, white and gold model is an Australian Glo-Chief 35.

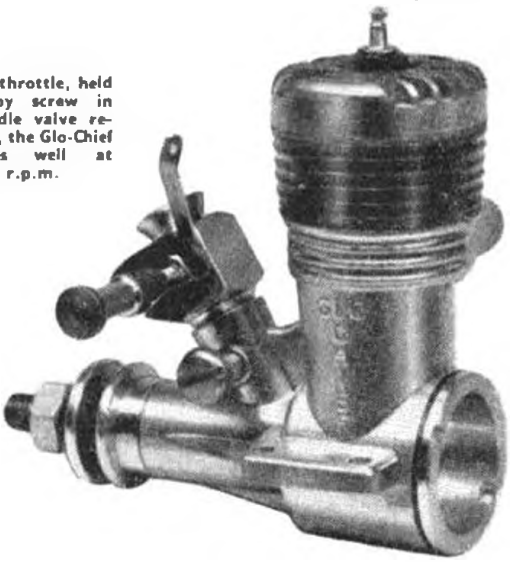
What appears to be a nice product of the professional model-making industry in pic **D** is most misleading, and it's not the latest Jap plastic kit either! B. Bownham took the view of R. E. Moore's *Round the Pole* 24 inch span, 7 ounce scale De Havilland 121 Trident. How does it fly? Ask the Enfield Club, for Hon. Sec. Mr. Moore has used the Trident for club displays to great effect. Answer is *compressed air*! All credit to the effort, and we hope it will be followed by a V.C.10.

Across the Atlantic for pics **E** and **F** which are only part of a large and most impressive collection by M. Fortney of Hamilton, Ontario in Canada. The 84 in. *Norseman* has removable wheels for water operation, weighs 14 lb., and uses a throttled Enya 60. Floats are 40 in. long, and flaps come down for slow flight. The *Ju* 87 *Stuka* is by comparison small stuff at 50 in. span for a K & B 35 but the *C*-47 *Dakota* behind is up to size at 60 in. for two Madewell 49's. A *Hampden*, *Spitfire* and *Fleet Finch* are others in Mr. Fortney's large stable; but not the Ju52/3m in photo **G** which *is* a Faller 1/100th scale plastic and comes from French reader Bernard Masuy. Fully modified from a basic kit, and painted realistically in French Air Force markings, the old corrugated monster still carries an air of fascination about it and might yet be seen in a famous British range.

D. Burt of Cardross, Dumbartonshire, submitted picture **H** which shows his Wakefield size flying wing. Appropriately named *Plonk*, this is the third in the series, with 42 x 7 in. wing and 22 x 20 in. single blade folding prop. Mr. Burt finds the plank wing amusing to fly. A 24 inch predecessor was known to make as many as a dozen consecutive outside loops, and the one illustrated has made three consecutive *backward* loops. This happened when the prop folded and the nose went up, but instead of a stall, the Plonk chose to reverse direction! Used as a reserve at the '60 Scots Gala, it made 2 : 16 with thermal aid and as the power run is 65 seconds, it is hoped to develop it into a 3-minute model.

Another modeller who favours the unusual, and whose plans for the Dunne tailless bipe and Coccinelle twin-engined free-flighter are so popular in AEROMODELLER Plans Service, is H. E. Males of Letchworth. In **J** we see him with the latest, a radio controlled Blohm und Voss BV 141b of 66 inch span, weighing 68 ounces for the AM35 diesel. This might sound a trifle heavy, but the AM35 gave too fast a climb and was replaced by an AM25. An R.E.P. Tritone is installed in the nacelle with Mini-Uniac servo in the boom, but whilst flight characteristics were good with power on, the small tail was not enough for the glide. In consequence the BV 141 was modified to an "a" type with conventional tail, but alas a broken wire caused a premature end to so gallant a design effort. Wonder what Mr. Males is thinking of now? The Dornier 28 offers a stimulating challenge.

More planks in picture **K**, this time a glider, and one which has been showing the conventional types the way. John Kay's *Blackboard* put up best times for his Hayes Club in the Pilcher Trophy this year at Chobham, and for the benefit of uninformed readers who might get the wrong idea, the background is not typical of the Common, it happens to be the car park. The flying area is quite unlike the lush green pastures of Bedfordshire seen behind Mr. Males in the previous picture!



Fitted with throttle, held in place by screw in normal needle valve retaining hole, the Glo-Chief 19R C idles well at 3,500 r.p.m.

ENGINE ANALYSIS No. 84 & 85 by R. H. Warring

THE GLO CHIEF "19" follows the traditional American layout for glow motor design, into which Gordon Burford has worked a considerable amount of personal "know-how" and experience gleaned over the years of highly successful engine production in a country (Australia) where potential sales are necessarily limited. What it may lack in appearance through the necessity of minimising expensive tooling, it more than makes up for in good engineering workmanship and general attention to the parts that really matter in making a good engine.

The Glo Chief "19" may be classified as a general purpose motor with a good performance in its class, and adaptable to throttle control. The throttle unit simply plugs straight into the normal intake tube (after first removing the spraybar) and is a complete unit incorporating the now more or less standard barrel throttle. A different feature—which, incidentally, makes for much easier production—is that the spraybar rotates with the barrel. This is purely a simplification of design for production purposes. It works just as well as the more complicated unit where the spraybar remains stationary and the barrel rotates around it, but it means that the fuel tube is rotated with the throttle movement and there is also rather more possibility of air leaks affecting the mixture setting. The fact that the throttle unit is a right push fit in place, is also all right from the functional point of view, but it makes the unit very difficult to remove again, should this be necessary, since aluminium fitted to aluminium always tends to seize. The large screw supplied is quite unnecessary for holding the unit in place. However, these are relatively minor points mentioned as a matter of interest rather than criticism.

The barrel throttle itself is quite effective so that no exhaust flap is required, nor is one intended to be fitted. Running at 10,000 to 13,000 r.p.m., the engine throttled back to a consistent 3,500 to 4,000 r.p.m. A slightly lower idle speed could be reached by completely closing the throttle, but this was not regarded as entirely safe since a large part of the mixture control then appears to be the air drawn in around the "loose" fitting of the assembly. Also, throttling down to 3,000 r.p.m. pick-up was more hesitant.

Very little performance penalty was found with the throttle fitted. Figures obtained were 10,500 r.p.m. with a Frog nylon 9 x 6 propeller and 13,000 r.p.m. with a Frog nylon 8 x 4. Corresponding figures were 13,000 and 10,500 with the throttle removed and conventional spraybar fitted so that any loss is only apparent at the higher speeds. Fitting of the throttle in fact, produced less drop in r.p.m. than fitting the venturi insert supplied in the conventional intake tube. This dropped the r.p.m. figure to 9,800 on the Frog 9 x 6 propeller and about 12,600 on the 8 x 4.

For straightforward operation the venturi insert gives easier starting and renders the needle valve setting more or less non-critical. It would obviously be an advantage to employ it for control line stunt work, for instance. Without the insert the Glo Chief was much more touchy on the needle setting. In all instances the engine definitely did not like running lean. As soon as the needle valve was closed too much it stopped firing and was difficult, to catch even if opened up immediately.

Without throttle and as tested for the propeller/r.p.m. figures in table at right

GLO-CHIEF 19

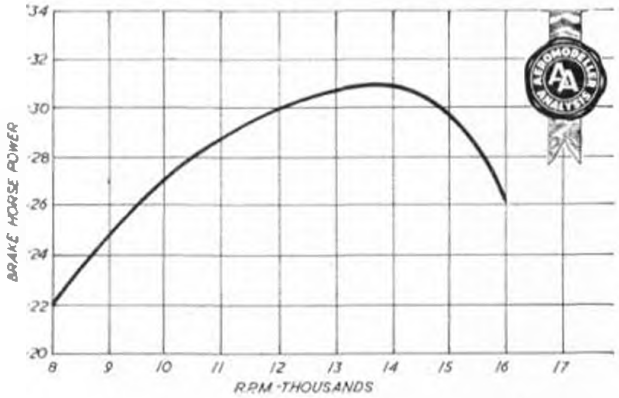
PROPELLER—R.P.M. FIGURES

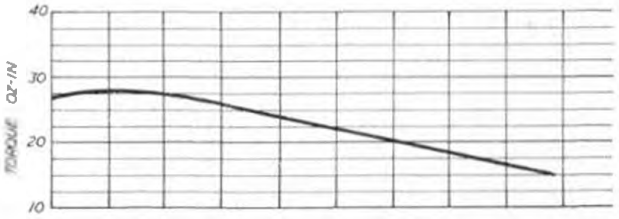
dia. x pitch		*r.p.m.*
8 x 4	Frog nylon	13,800
9 x 6	Frog nylon	10,500
8 x 4	Top Flite nylon	14,800
9 x 4	Top Flite nylon	12,200
10 x 3½	Top Flite nylon	10,200
8 x 4	K-K nylon	13,900
8 x 6	K-K nylon	11,800
9 x 4	K-K nylon	12,500
9 x 6	K-K nylon	9,500
9 x 6	Semo nylon	10,000
9 x 4	Semo nylon	11,200
8 x 6	Semo nylon	10,100

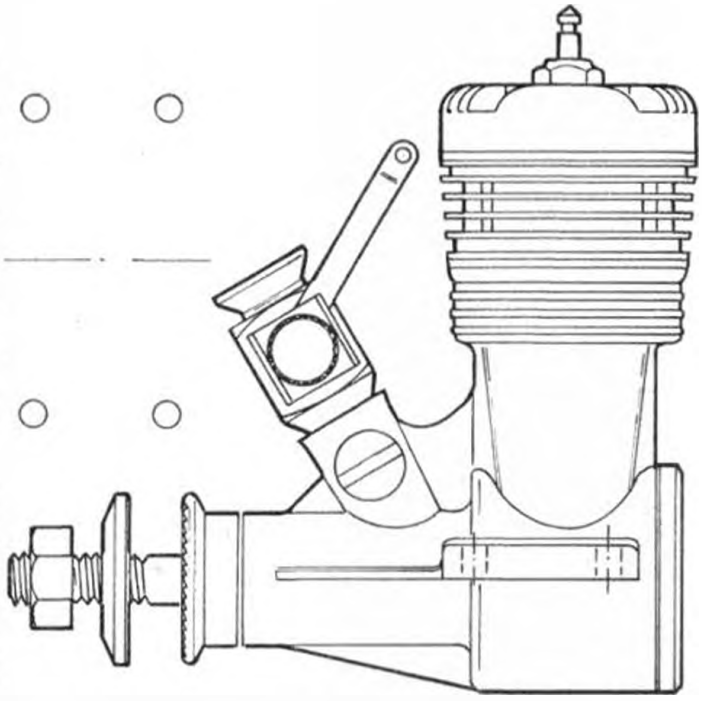
Fuel used: standard glow fuel mixture with 7 per cent. added nitromethane.
Note: all performance figures related to engine run with standard intake and spraybar.

SPECIFICATION

Displacement: 3·30 c.c. (·1994 cu.m.)
Bore: ·640 in.
Stroke: ·620 in.
Bore/stroke ratio: 1·03
Bore weight: 6¼ ounces.
Max. power: ·31 B.H.P. at 13,800 r.p.m.
Max. torque: 28 ounce-inches at 9,000 r.p.m.
Power rating: ·094 B.H.P. per c.c.
Power/weight ratio: ·0505 B.H.P. per ounce
Material Specification:
Crankcase: L.33 light alloy gravity die casting
Cylinder: leaded steel (integral finning)
Cylinder head: turned alloy, anodised gold
Piston: Meehanite
Connecting rod: dural
Crankshaft: hardened 3% nickel-steel
Gudgeon pin: silver steel
Propeller driver: turned dural
Backplate: turned dural
Spraybar: Brass
Main bearing: cast iron bush
Manufacturers: Gordon Burford and Co. Ltd., 91 Beach St., Grange, Australia.
Retail Price in Australia:
Standard £A5 9s. 6d.
2 Speed £A5 19s. 6d.







Starting characteristics were found to be good, without being outstanding. It is certainly not a difficult engine to start, although if the dry battery is a bit flat (specified for the 1½ volt glow plug) the engine will flood rather than start. We found it quite all right to use a 2-volt accumulator with long leads with the glow plug supplied and materially improved starting characteristics as a result. The Glo Chief will start on either a finger choke or prime through the exhaust, although the latter is probably the best and more positive method.

Running was good at all load-speeds tested. At high-speeds the addition of nitromethane to the fuel was definitely beneficial, although the Glo Chief runs quite well over the whole range over which it would normally be used on straight fuel. Nitromethane also tended to improve the starting characteristics from hot.

Maximum power as measured on test was .31 B.H.P. at 14,000 r.p.m. As received, the engine was very stiff and reluctant to run fast and quite a considerable amount of running-in time was necessary to free it up. The makers do not specify any particular running-in time, which will vary with individual engines, but a minimum of one hour would appear to a good general recommendation.

Propeller sizes recommended by the manufacturers are 9 x 4 for free flight; 9 x 5 for control line stunt; and 10 x 4 for radio control. Much depends, of course, on the make of propeller used as there may be a difference of as much as 1,000 r.p.m. with two different propellers of the same nominal size. It is probably best, therefore, to base selection on static r.p.m. achieved with given propellers, with a preference for larger diameters and smaller pitches for free flight and reduced diameter and higher pitch for control line. On this basis, propellers giving about 11,500 to 12,000 static r.p.m. should be best for free flight, such as a typical 9 x 4 or 10 x 3. A 9 x 5 or 9 x 6 should give about the right static r.p.m. figure for control line where the increase in r.p.m. in flight is somewhat higher due to the higher model speeds; and one inch added to the free flight diameter size, retaining the same pitch is about right for radio control with an engine of this size.

Constructionally the Glo Chief "19" features a gravity die-cast light alloy crankcase, which is extremely well formed for this type of casting. Lower cylinder housing and integral exhaust stack on the right are incorporated in the crankcase casting, also the venturi intake. A conventional transfer passage is formed with a core and machining on the casting is reduced to a minimum.

The soft cylinder is quite thin walled at the lower end, the upper part incorporating integral finning. Exhaust and transfer ports are directly through the walls, the transfer port being very deep and overlapping the exhaust approximately 85 per cent. The cylinder is ground inside and cut to finish and the bore is honed with a coarse stone. The cylinder seats on a thick metal-reinforced fibre gasket. The head is machined from solid and again seats on a similar thick gasket. Four short Phillips head screws hold the head onto the cylinder and two long screws pass down into the crankcase unit. The glow plug is centrally mounted in the contoured combustion chamber.

The piston is of cast iron, plain in shape with a flat top and thin rectangular deflector. Walls are thickened to take the .156 inch diameter fully floating silver steel gudgeon pin. The skirt of the piston on the test engine was not straight, but whether this slight lowering on the transfer side was intended or not is not known. It would not appear to serve any useful purpose.

The connection rod is machined from solid with a minimum attempt to finish smooth. Big and little end bearings are reamed to size and a good fit.

The ⅜ in. diameter crankshaft steps down to a ¼ in. diameter threaded length at the propeller end and is hardened and ground over the bearing and crankpin. The ⅜ in. thick web is cut away for counterbalance and the .217 in. diameter crankpin is drilled through. The shaft is ground between centres. The dural propeller driver forces over a splined section of shaft immediately in front of the full diameter length. The rectangular port is milled in the shaft opening into a ¼ in. diameter hole which finishes immediately in front of the port.

The main bearing comprises a cast iron bush fitted in the crankcase casting, with an extremely good finish. Shaft fit is quite close with complete absence of "rock". After prolonged running, too, the shaft showed no signs of pick-up or local overheating. The performance of a plain bearing engine is usually directly related to the fit and friction in the main bearing and in this respect, the Glo Chief scores top marks.

In fact, the Glo Chief "19" is a thoroughly good, workmanlike engine throughout with a performance to satisfy all but the most exacting "racing" enthusiasts. It is also a rugged engine which should be capable of taking a lot of hard knocks—particularly suited to control line and with plenty of punch for those radio models which are a little "marginal" on performance with anything but a good 3.5. cc. engine.

SUPER TIGRE G.20 Diesel

Loop scavenged unit from Italy

PROPELLER—R.P.M. FIGURES

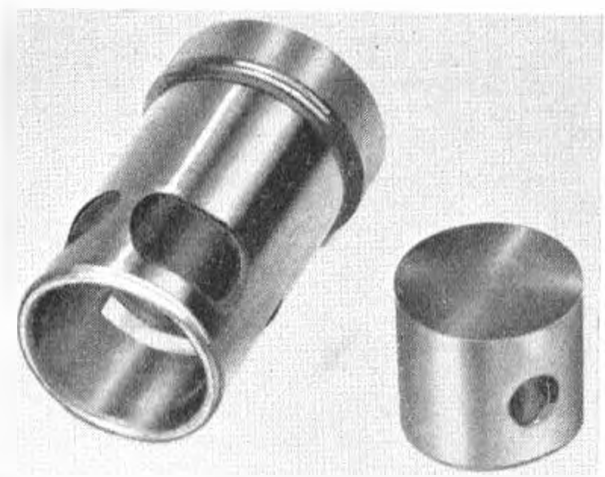
dia. x pitch	*r.p.m.*
9 x 6 Frog nylon	11,000
8 x 4 Frog nylon	13,800
10 x 3½ Top Flite nylon	10,300
11 x 4 Top Flite nylon	8,400
9 x 4 Top Flite nylon	12,000
8 x 6 Top Flite nylon	12,000
8 x 4 K-K nylon	14,000
8 x 6 K-K nylon	11,700
9 x 4 Trucut	11,500
8 x 4 Trucut	14,800
7 x 9 Trucut	11,400
7 x 6 Trucut	14,000
9 x 4 Semo nylon	11,300
9 x 6 Semo nylon	10,200

SPECIFICATION

Displacement: 2.982 c.c. (.1514 cu. m.)
Bore: .591 in. (15 mm.)
Stroke: .552 in.
Bore/stroke ratio: 1.07
Bore weight: 6 ounces
Power output: .322 B.H.P. at 15,000 r.p.m.
Max. torque: 27.7 ounce-inches at 8,500 r.p.m.
Power rating: .13 B.H.P. per c.c.
Power/weight ratio: .059 B.H.P. per ounce
Material specification:
Crankcase: light alloy pressure die casting
Cylinder liner: hardened steel
Contra piston: cast iron
Piston: cast iron
Connecting rod: machined from dural
Crankshaft: hardened steel, 5 m.m. metric propeller shaft thread
Propeller driver: turned dural mounted on collet
Main bearings: one 10 m.m. ball race (rear) one 5 m.m. ball race (front)
Cylinder head: turned dural
Back cover: light alloy die casting
Spraybar: brass—threaded steel needle screwing this internally tapped tube with external friction lock.
Manufacturers:
Micromeccanics Saturno, Bologna.
Retail Price: (in Italy) L.8,900. Test engine purchased ex-stock H. J. Nicholls, Ltd. £5 18s. 1d. including Purchase Tax.

THE ITALIAN Super Tigre G.20 is another of those rare types of diesel in employing loop scavenging which, provided all the difficulties in gas flow can be sorted out, produces a high speed unit peaking happily at r.p.m. figures normally associated with glow motors. The Italians, being very clever engineers, have found the answers as our test figures show—a peak figure of .322 B.H.P. achieved at 15,000 r.p.m., which would possibly show even higher with further running time. Furthermore they have got a satisfactory gas flow from the transfer into the head without resort to deflectors or stepped pistons by merely relying on clever shaping of the transfer parts—although what this involves in the way of production costs we hesitate to think.

The G.20 is a neat, compact and relatively light 2.5 c.c. motor—and really beautifully made throughout. Its handling characteristics are generally good, without being exceptionally easy, although some familiarity with technique is needed for quick starting when hot, particularly on the smaller diameters of propellers. It is also less easy to start on light propellers than plastic ones.



Starting is most readily initiated by a prime through the exhaust, although cold starting can be accomplished after finger choking. When hot, a prime is virtually essential to ensure first flick restarting. This should fit in with normal team race practice, utilising pressure filling of the tank when a suitable charge should be forced into the crankcase ready for restarting. If the first flip fails, however, we could see the mechanic having a little difficulty and reaching for the priming bottle.

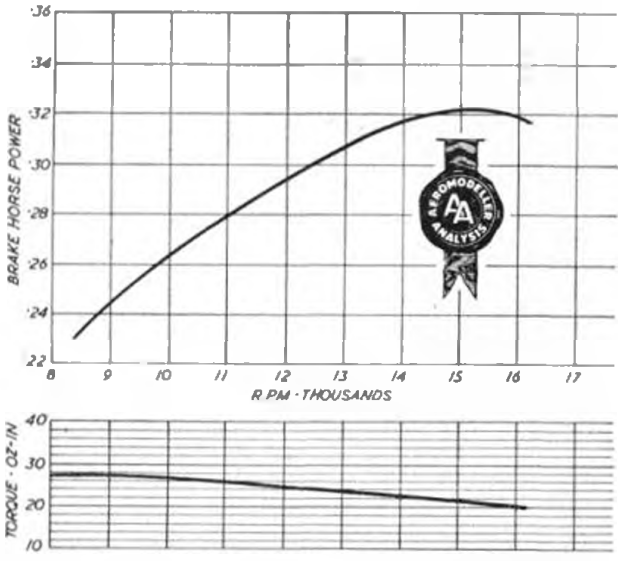
As supplied, the G.20 was fitted with a wide mouth venture, presumably corresponding to the "speed" venturi. A venturi with more restricted throat area would undoubtedly improve starting characteristics, at some expense in performance at the upper end. The main "venturi effect" however, is probably produced by the relatively large diameter spray bar which blocks off roughly one half of the intake area.

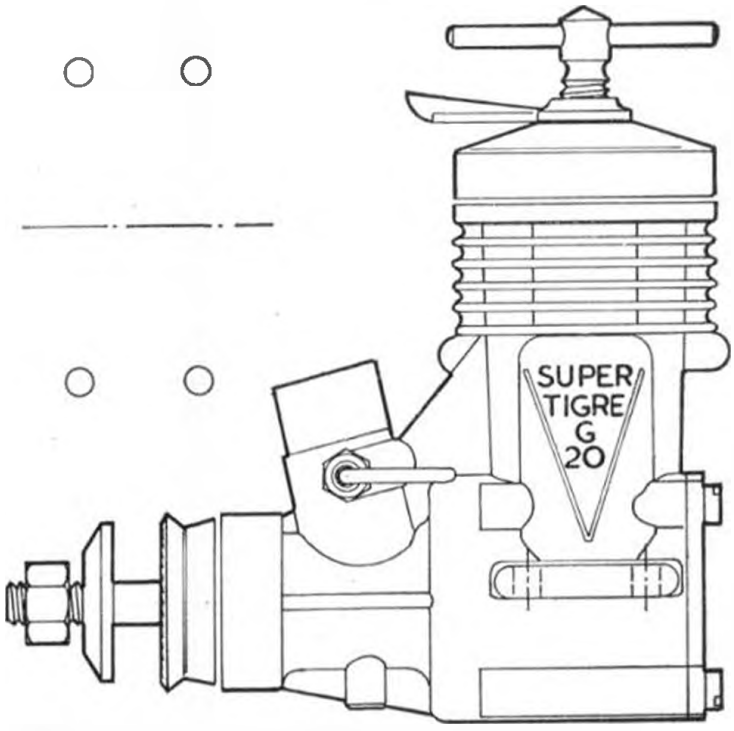
For pressure feed, which would seem a logical choice with this engine used for racing purposes, two tapping points are provided on the crankcase casting. A small slug shaped cast in under the centre of the main bearing provides a point for drilling a port to open up a source of pumping pressure; and a large central core in the backplate casting provides an alternative point to drill and tap for a continuous pressure line.

The intricate crankcase unit is a first class pressure die casting incorporating a cast-in transfer passage, finned lower cylinder housing, stub exhaust, large diameter intake tube and ball race housings. Quite an amount of machining is done on the casting. The tops of the transfer passage are enlarged in area by deepening and widening in a lobe shape: the bore for the liner and the interior of the crankcase are machined, bearing housings machined; and back and top faces machined, as well as the underside of the mounting lugs.

The cylinder liner is a substantial unit .709 in. overall diameter with a bore of .591 in., giving a wall thickness of nearly 1/16 in. The flange at the top of the liner is even

The novel transfer ports are shown in this view of the G.20 cylinder and flat top piston. Ports are cut at an angle and serve to direct the flow so that a piston baffle is not required. In some ways this follows motor-cycle engine practice





thicker—.786 in. overall diameter and just over 3/16 in. deep. This seats on top of the crankcase unit when assembled. The liner is hardened and finished by grinding inside and out.

The most interesting feature of the liner is undoubtedly the transfer porting. There are two ports of parallellogram shape cut through the thick wall at a sharply upward inclined angle. This shaping and angling has obviously been arrived at as giving the required deflection of the gases from the transfer passage into the cylinder head when the ports are opened by the flat topped piston. The point where the transfer actually starts to open is almost level with the top of the exhaust port, with the top edge of the piston providing a certain deflector action to ensure that the induced flow is primarily upwards rather than across the cylinder. It is one of those solutions which can only be worked out by trial and error—and quite obviously it works.

The piston is of cast iron of perfectly conventional pattern, except for some contouring on the skirt. Wall thickness is increased to approximately 1/16 in. just below the gudeon pin. The latter is hollow, .177 in. diameter and fitted with brass and pads (virtually small brass eyelets pressed in position). The connecting rod is elaborately machined from solid dural with plain big and little end bearings. Two small oil feed holes are drilled in the big end. This unit again is an example of the trouble taken with the manufacture of the G.20 involving a considerable number of different operations where the average manufacturer would be tempted to get by with one or two.

The crankshaft is of hardened steel, ground all over between centres. Main diameter is .3935 in. (10 mm.), spetting down abruptly just behind the front bearing to .196 in. diameter and tapped at the front end with a 5 mm. metric thread. The rectangular intake part is nearly ¼ in. long and 5/16 in. wide giving a substantial opening both in timing and area. The crank web is very nicely profiled for balance, which again seems to have called for the use of a special milling cutter. Although excellently made, we regard the shaft as weak due to the abrupt change of section immediately behind the front bearing and the small diameter propeller shaft end. This, in fact, is about the only criticism we could offer on the design.

The shaft is carried in two Imi (Italian) ball races—a 10 mm. race at the rear and a 5 mm. race at the front. The intervening length of bearing is filled with a bronze bush, slightly overside in bore so as to clear the shaft. The only purpose of this insert appears to be to present a rectangular port opening (cut in the wall of the bush) to match the shaft port shape. Actually, only the front of the port in the bush is squared. The shaft is a relatively loose fit in the races, needing only light finger pressure to remove, but the races themselves appear to have very little diametrical clearance so that there is no "slop" on the assembled shaft. The races might even be a little on the tight side when running at operational temperatures.

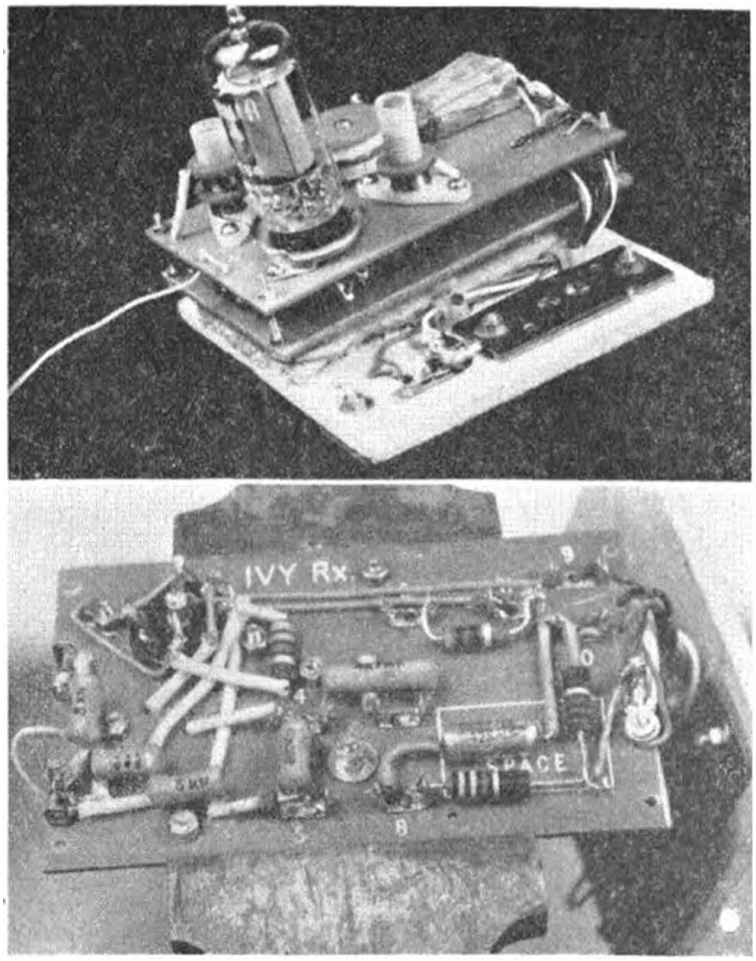
The remainder of the G.20 is quite conventional. The cylinder head is a dural turning, deeply recessed to fit over the liner flange, and secured with four screws passing down into the crankcase unit. A neat stamping is fitted as a tommy bar lock on the compression screw and proved much easier to grasp, or flick out of the way, than a plain lever. We found no evidence of the contra piston trying to work loose without the locking device, in fact it was on the right side to adjust although not so tight that it would not blow back when the screw was slackened.

The workmanship and general care given to the evolution of the design is impressive, but no more impressive than the performance which puts the G.20 right in the top class for 2.5 c.c. contest work. It should be a good choice for both free flight and control line and in the right hands could amass a considerable contest record.

"Once upon a button" —or Simple Single with *relayless* IVY-AM receiver

HOW CHEAP CAN I DO IT? This is the leading question raised by all intending radio modellers. Expense will in fact depend on whether the modeller intends to build his own equipment, or, go the easy way about it and buy ready made commercial equipment. If one is to choose the inexpensive way, then simplicity should be the first consideration and this review deals with a set which was specially designed so that anyone who can read and make a sound soldered joint can build it with complete success. We refer of course to the IVY-AM. Those who read last month's installment in this series, will remember that we mentioned a battery weight for this set of 13 oz Subsequently we decided that if we fitted a Mannings Type 31 Servistor (Current amplifier) instead of a relay, we would greatly improve the performance of the set, eliminate mechanical contacts and cut the battery weight down to a more manageable 8 ozs. Dealing with costs, this receiver (available in kit form from MacGregor Industries-the subject of our review) is as modestly priced as one could hope for with any chance of a successful end product. The kit itself including valve, but less relay is priced at 39s. 6d. However our version, instructions for which appear below is slightly different, requiring instead of a relay, a Mannings Type 31 Servistor which costs £1 19s. 6d. Total cost of receiver components £3 19s. 0d. Added to this is the cost of an escapement, in our case an Elmic *Conquest* £1 12s. 6d., and batteries—say 7s.

With the preliminary considerations now clear, let us deal with the sequence of building the receiver from the kit by MacGregor Industries, but with our modifications, the few slightly different components for which MacGregor will supply as an extra. It is convenient to hold the receiver panel in a vice during building operations. Remember to tin all components before soldering in position and use a heat shunt to take away the heat from components when soldering. This can be done by gripping the wire with a small pair of pliers, but a very useful little unit can be made for the job from a small Crocodile clip with a stout piece of copper wire soldered down the inside of each jaw.

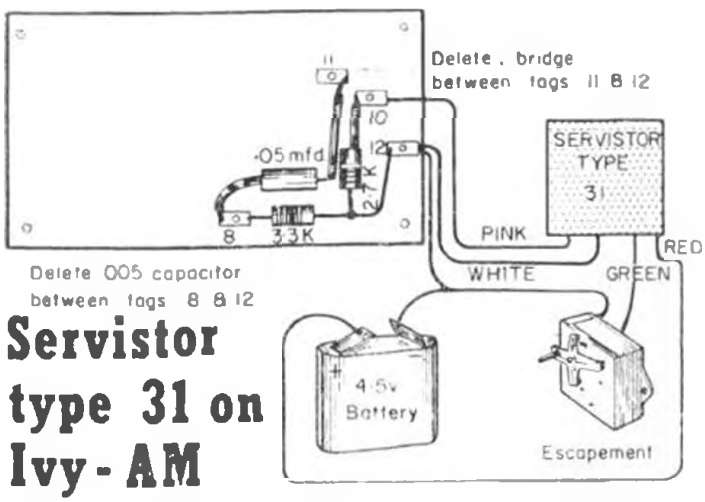


Top shows relayless IVY- M on shock-mounted bulkhead ready for vertical installation in Veron Viscount. Below it is panel underside showing simple wiring of MacGregor kit on printed panel, held in vice while soldering

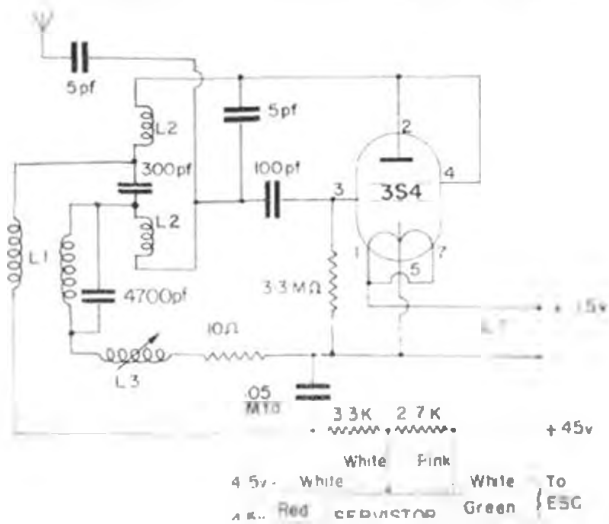
It is, like the vice, worth at least one extra hand. One last preliminary precaution, all bare wires to components should be sleeved with Systoflex. All tag references are related to the MacGregor Industries pre-cut panel.

Ivistor

Those wishing to build their own simple non-mechanical relay device designed to replace the orthodox relay, as we have done in this article, can do so by using the kit marketed by MacGregor Industries for their *Ivistor* which costs 29s. 6d. Kits for the *IVY-AM* receiver and *Ivistor* can be supplied together. Full detailed instructions together with circuits and wiring diagrams are supplied with the kit, and for those who would like to know all about it, a full instruction article on how to build and fit it to the *IVY-AM* receiver will be published in the current (July) issue of *Radio Control Models*.



Servistor type 31 on Ivy-AM



Building the Receiver

(1). Bolt 7 pin valve holder to the ready tagged base panel using the 8 B.A. bolts provided, securing also the tag washer under the bolt nearest tage 2.

(2). Bolt the two plastic coil formers to the panel.

(3). Tin all tags and valve pins.

(4). Note that of the two upright coil formers (L2 and L3) one has two washers on its stem (tuning coil L2) as opposed to the other (sensitivity coil L3) which has only one. NOTE THIS IDENTIFICATION.

(5). Wind the tuning coil L2. Take 10 in. of 28g enamelled copper wire bare one end removing all the enamel and solder to pin 4 on the valve holder (reading three pin numbers clockwise from the underside). Pass the wire through the hole nearby to the upper side of the panel and close wind nine turns on to the coil former in a clockwise direction. Although the turns are close together, they should not overlap.

(6). Slide one of the fibre washers provided down the former to the wound wire. Thread the upper end throughone of the holes in the washer and continue the wire remembering Systoflex, through panel and solder to tag 5.

(7). Take another 14 in. of wire as before and solder to tag 4. Thread through the blank hole remaining up through the other hole on the washer and wind on another nine clockwise turns. Cap with another washer and lead the wire down to the underside of the panel, soldering to tage 3. If the washers are not a tight fit on the formers they should be locked in place with Polystyrene cement.

(8). The second coil former (sensitivity coil L3) is now wound. Take a length of 28g. copper wire and solder to tag 7. Pass through the hole in the panel between tags 6 and 7 and wind 10 turns onto the former in an anti-clockwise direction. Cap the winding with a washer and take the wire through the washer hole, down through the rivet hole of tag 6 and solder to tag 6.

(9). The ready wound QUENCH COIL is now mounted on the panel by its centre bolt through the hole in the centre of the square formed by tags 4, 5 7 and 8. This coil is in two layers and the component should be mounted so that, of its four tags, the two which form the leads to the upper layer (examine the coil closely) face the outside of the panel.

(10). The two outside facing coil tags are now soldered one to tag 5 and one to tag 8 using short lengths of single strand plastic covered wire. Repeat this process for the back two coil tags, to panel tags 4 and 7.

(11). Solder a length of plastic covered non-flexible wire from tag 11 to pin 5 of the valve holder, via the centre spigot of the valve holder.

(12). A 5 pf capacitor is now soldered from pin 2 (valve-holder) to tag 3. This component was labelled 5KN in our kit.

(13). Solder another 5 pf capacitor from tag 2 to tag 3.

(14). Between pin 3 (valve holder) and tag 3 solder 100 pf capacitor. This can be identified by its five colour spots, heading from the green painted end orange, brown, black, brown, white.

(15). Solder the 3.3 meg. ohm resistor, recognised by colour bands orange, orange, green, silver to pin 3 (valve holder) and thence to pin 5 (valve holder).

(16). Solder a length of single strand plastic wire between pin 2 to pin 4, across the inside of the valve holder pins.

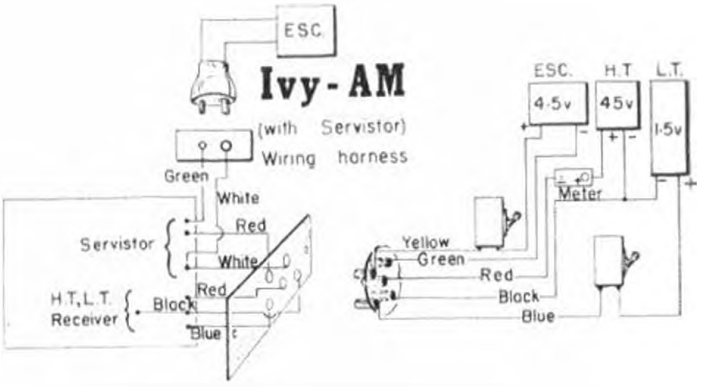
(17). Solder a length of single strand plastic covered wire from pin 7 to pin 1, and thence to tag 9.

(18). Take the 300 pf capacitor provided, labelled 300 KU in the kit and solder between tags 4 and 5.

(19). Solder a 10 ohm resistor between tags 6 and 11. Colour bands brown, black black, silver.

(20). Connect 005 Mfd. ceramic capacitor labelled 4 K 7 M Y from tag 4 to tag 7.

(21). Solder lengths of multi-strand plastic covered flex blue (L.T. +) to tag 9, red (H.T. +) to tag 10 and black (common H.T. and) L.T. negative) to tag 11 pass each flex through the hole in the middle of its tag to the top side of the panel and then pass through the holes provided at the edge.



Wiring harness as we are using in the Viscount

(22). Solder lengths of multi strand flex and solder to tag 2.

(23). Solder a length of single strand plastic covered wire from pin 5 to the tag washer under the valve holder bolt.

(24). Take a 05 Mfd capacitor (ours was actually 068 Mfd) and solder between tags 8 and 11.

(25). Take a 3·3K resistor (colour bands, orange, orange, red, silver) to tage 8. Solder a 2·7K resistor (colour bands, red, violet, red, silver) to tag 10. Make a junction of the two resistors with their free ends and link the junction to tag 12.

(26) Evo-Stick the Servistor to the top side of the panel, and leave to set..

(27) Solder the pink servistor lead to tag 10 and the white lead to tag 12 with two white 6 in. lengths of flex leading off from that tag. YOUR RECEIVER IS NOW COMPLETE. Layout of power supply and escapement harness is optional, but our method of mounting receiver and sockets on one sliding bulkhead is worth copying. A vertical Rx is ideal, with the valve horizontal to absorb landing and acceleration loads. Use two B122 22·5 volt batteries for H.T. and one D18 for 1·5 volt L.T.

Setting up and Testing

When all the wiring is checked to satisfaction, plug a 0-5 milliameter (noting correct polarity) into its sockets and switch on the receiver. With an insulated tuning tool (from a knitting needle or dowel). Rotate the tuning slug (L2) until the top is about ¼ in. above the coil winding. Now rotate the sensitivity slug (L3) until the current reaches a maximum (about 1·6)milliamps. If the current is already at a maximum, rotate slug until currect *just* falls, then turn back to *just* hold at maximum. This should be about ¼ in. above coil winding. Switch on transmitter. (The Ivy-AM will operate off any carrier wave transmitter, but a matching transmitter is available in kit form from McGregor Industries—detailed in R.C.M. & E. October 1960). With transmitter key depressed, rotate tuning slug (L2) until the meter shows a dip in current. Rotating the slug clockwise will cause a current rise while anti-clock rotation will give the opposite effect. Due to the interaction, however, it is necessary to adjust slug L3 in order to keep the current at approixmately the same figure until the transmitter signal is detected. The two adjustment slugs are now balanced to give a current drop of about one milliamp. If the escapement is plugged into the circuit, it should pull in on signal. If it does not:—

(A) Check polarity of escapement battery.

(B) Check wiring for dry solder joints.

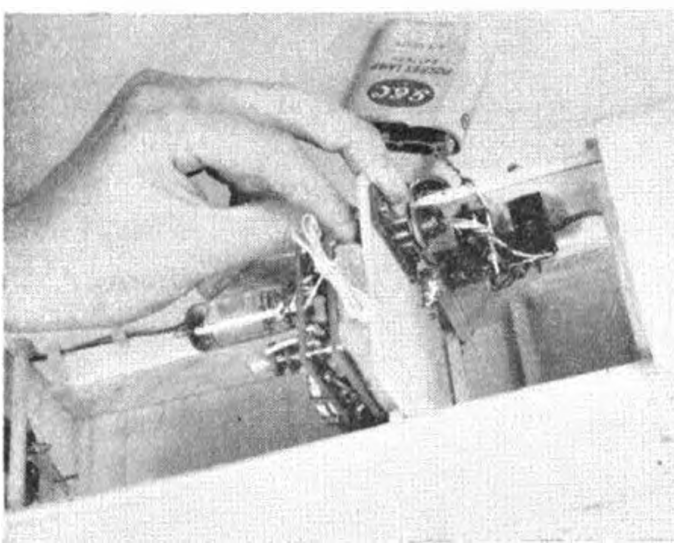
(C) Re-examine wiring for breaks.

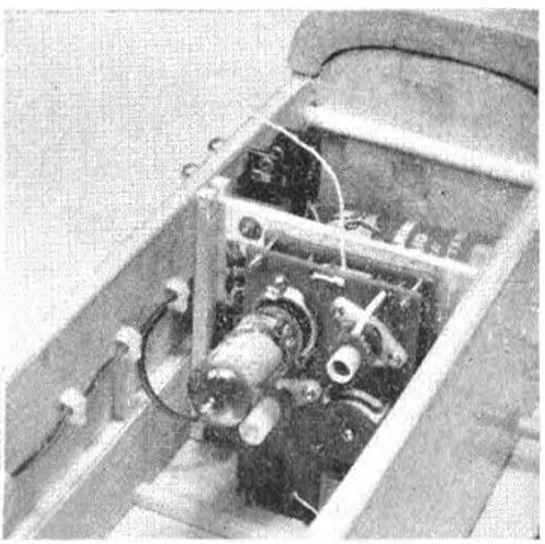
(D) Re-examine all wiring for correct hook up to receiver power supply and also check receiver circuit.

(E) Check polarity of meter if there is no apparent response whatsoever.

(F) Check all battery voltages. Note that the circuit is designed for a 4·5 volt escapement supply, 3 volts will not be satisfactory without modifications we do not advise at this stage.

Vertical bulkhead slides out, has horizontal valve to take shock and is complete with sockets for all wiring from batteries and switches in forward compartment





Contest GLIDERS

PART 4 OF THIS SERIES BY JIM BAGULEY

Introduction

MUCH PIONEERING WORK towards improving model aircraft and indeed the beginnings of logical scientific thought applied to model aircraft was done by the late F. W. Schmitz and published in his book "*Aerodynamik Des Flugmodels*". Since this, several sources of research works have appeared and many disappeared; organisations such as the L.S.A.R.A., M.A.R.P., and from people such as Max Hacklinger and Frank Zaic.

Many were branded as useless theorists during the theorist crazy time, 1946 to 1951, by purely empirical types. They have, however, stimulated thought about model aircraft, in particular designwise. One particularly successful ex-member of the now disbanded L.S.A.R.A. who comes to mind is Tom Smith.

Formulae derived from first principles are generally of no use practically and where the writer uses formulae they are either to illustrate a point or are empirical. There are too many variables to consider model aircraft design by calculation alone. We must mainly, therefore, draw upon our experience the experience of others, and the intelligent application of knowledge.

Stability in particular is a case which cannot even be calculated fully by empirical means and we can only give a cause and effect type of analysis. This does at least enable one to say why an undesirable effect occurs and how to cure it and may give an idea of what undesirable effects are likely to occur when looking at a design.

The inclusion of ideas of no direct practical value is excusable as even they will help towards an understanding of the overall picture. There have been many fantastic theories put forward, many of which are ridiculous. It is for each of us to form his own set of ideas from those of others and his own private ideas.

The following represents the writer's own set of ideas relating to gliders, set out fairly scantily but reasonably completely. Mostly, they are standard ideas, but some are controversial. Duration is dealt with first, and then stability.

Duration

Starting from basics:

The resultant force on a body of any shape acted upon by an airflow may be expressed as $R = C\frac{\rho}{2}AV^2$ where

R is the resultant;
C is coefficient;
ρ is air density;
V is air or body velocity;
A is the same factor dependent on length squared. (in the case of a wing or tailplane equal to area)

This idea may be extended to include a flat, say rectangular, surface

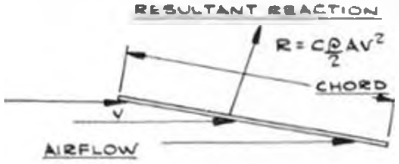


DIAGRAM 46

as shown in *Diagram* 46 where it is inclined at any fixed angle relative to the airflow.

$$R = C\frac{\rho}{2}AV^2 \quad \text{where}$$

A = Chord x Length;
length being perpendicular to the paper.

A datum line may be decided upon, from which the angle o incidence is measured. The resultant force R may be split vectorially into two forces: lift L and drag D relative to the datum line where L is perpendicular to the datum line and D is parallel to it as in *Diagram* 47.

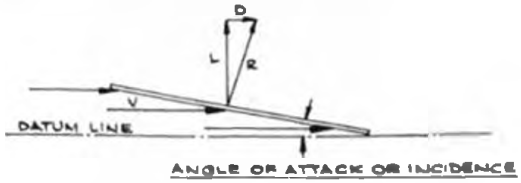


DIAGRAM 47

Lift and Drag now have separate coefficients, C_L and C_D, where

$$L = C_L\frac{\rho}{2}AV^2 \quad \text{and} \quad D = C_D\frac{\rho}{2}AV^2$$

This drag is the result of surface friction and turbulent wake drag. This idea may be further extended to an airfoil other than the flat plate so far considered as shown in *Diagram* 48. So far we have not varied the angle of incidence or attack. If we now do so, keeping A and V constant, with ρ obviously constant for our purposes, then both L and D will vary as ρ, A and V are constant then C_L and C_D must also vary where $C_L \propto L$ and $C_D \propto D$. The result shown in *Diagram* 49 will be obtained.

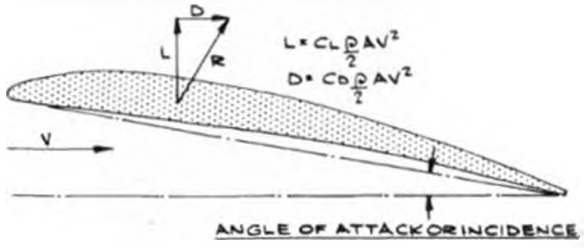


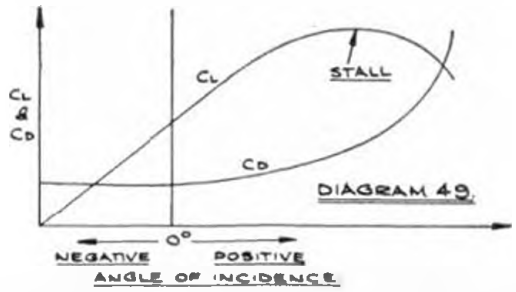
DIAGRAM 48

The stall will occur where C_L falls off as the angle of incidence is increased. It may be thought at this stage that *Diagram* 49 will hold true for all values of A and V and that all we have to do to find the lift and drag at any angle of incidence for a given A and V is to use the formulae and the graph. Even if we wanted to do this, we could not produce a truthful result this way. This is because the efficiency of the airfoil varies both with chord and velocity V.

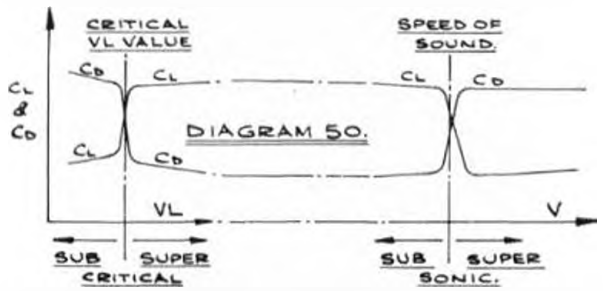
The criterion used in fullsize work is the Reynolds number which also includes ρ, but as ρ remains sensibly constant for our purposes we use the VL factor which equals chord times velocity. As long as the VL factor remains constant *Diagram* 49 will hold true.

Efficiency will vary for different VL factors and generally, for a given section and angle of attack, as VL increases C_L increases and C_D decreases. The result to be expected is shown in *Diagram* 50 in a slightly exaggerated form. The startling result shown is that at a certain VL factor, C_L will suddenly increase and C_D suddenly decrease, thus giving greater efficiency.

The reverse effect occurs at the speed of sound (note, not dependent



on VL factor), but as this is outside our range of operation we may dismiss it and concentrate on the first effect. The VL value at which this occurs is called the critical VL and we must obviously strive to work above this value. Below this value the airfoil is said to be operating sub critically and above is said to be operating super critically. This effect explains why a large model may have a slower sinking speed than a smaller one. Obviously, if the efficiencies of a smaller and a larger model were identical the gliding angles would be the same and the increased forward velocity of the larger model would give a sinking speed in the proportion of the linear dimensions of the models, *i.e.*, the velocities. This would mean that by doubling the linear scale of a model one would expect to double the sinking speed! In practise this is not true. The answer then is that the larger model is more efficient as it is working at a higher VL value. With a very large model no further gain can be expected and sinking speed will increase.



The approach to the smaller model is to use sections of low critical VL which will be exceeded in normal operation. To enable some of the methods of obtaining a low critical VL we must first understand what causes the critical VL effect.

When air flows past an airfoil section, there is a very thin layer next to the surface across which a velocity gradient exists.

At the airfoil surface itself the layer is stationary and its velocity increases until at its extreme the main air stream which is at the full velocity is met as in *Diagram* 51.

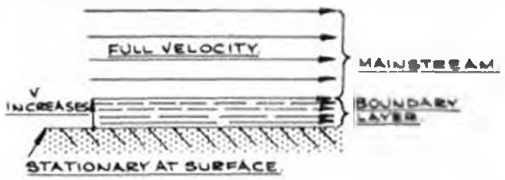


DIAGRAM 51.

This layer is called the Boundary Layer. Surface friction causes the innermost part of the Boundary Layer to be stationary while viscosity of the air causes the velocity gradient.

While air flows in smooth layers it is "Laminar" and when it breaks into eddies it is "Turbulent". Both mainstream and Boundary Layer may be either of laminar or turbulent nature. The Boundary Layer has fine grained turbulence while the mainstream may have either fine grained or the breakaway turbulence with considerable eddies or both.

At VL values below the critical VL value the Boundary Layer may initially be laminar but somewhere along the chord will become turbulent. *Diagram* 52

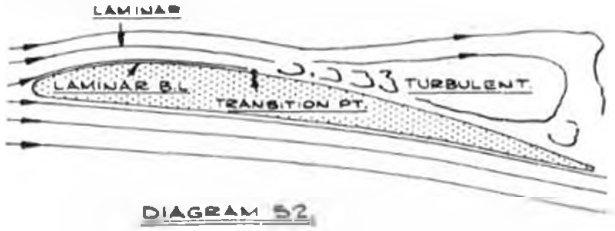


DIAGRAM 52.

A turbulent Boundary Layer is more able to absorb externa energy from the mainstream thus preventing early separation and turbulence. This will delay the separation point as in *Diagram* 53.

In actual fact the transition does not take place suddenly and may also be subject to hysteresis phenomena when the airfoil is taken from sub critical to super critical flow and back to sub critical as in *Diagram* 54. This is not, however, of great concern as we wish to operate completely free of this transitional region.

The effect of working above the critical VL is obvious, the wing upper surface is a more efficient lift producer and has a lower depth of turbulent wake giving less drag. This being caused by the delayed separation.

The curves of CL and CD against VL will be different for different angles of attack, the effect being more marked at greater angles of attack.

A by-product of the delayed separation is that the centre of pressure or point where the resultant lift and drag may be thought of as acting,

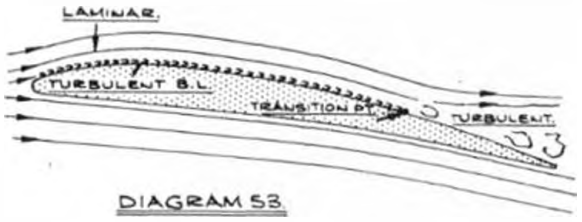


DIAGRAM 53.

moves back. There are several approaches to the problem of delaying separation, which will only occur on the upper airfoil surface. Some of these approaches are not based on turbulating the Boundary Layer but most are. A variety of these are given below.

Effect of Airfoil Nose Radius

Initially, it was suggested by the late F. W. Schmitz that a small nose radius would produce a turbulent Boundary Layer. This result, along with curves for the effect of camber and thickness was produced in a wind tunnel of doubtful freedom from turbulence and may not be taken as being reliable.

Hacklinger has written that the effect of a sharp leading edge is to act as a breakaway edge at low angles of attack and provides a large centre of pressure movement while not having the desired effect of turbulating the Boundary Layer. Cheesman's successful airfoils employ a very blunt leading edge.

Several others use leading edges of small nose radius successfully, Isaacson in particular.

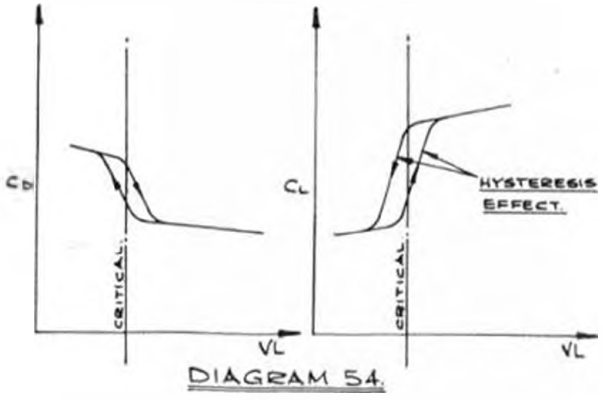


DIAGRAM 54.

Theory says that there is a certain ideal incidence at which the camber line of an airfoil would be followed smoothly by the airflow and there would be no "crossflow" at the leading edge at all. If the ideal incidence is exceeded crossflow will produce turbulence on the upper surface while if it is not reached, the lower surface will be turbulated as in *Diagram* 55.

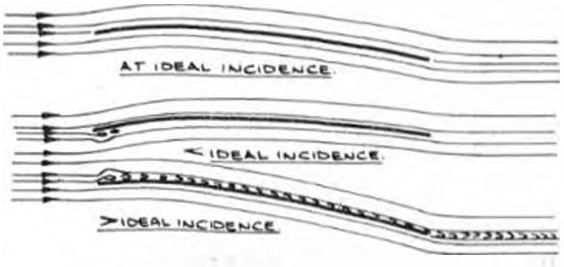


DIAGRAM 55.

If a sharp leading edge, or one of small nose radius is used on the fairing used to cloak the camber line, this effect should persist.

Generally, with the maximum camber situated well forward the entry will be at a large negative angle and the ideal angle of incidence will be positive and quite large but even so should be exceeded in normal operation and upper surface turbulation should be produced.

The M.A.R.P. found that even in this case the nose radius had no noticeable effect of VL critical.

One apparent user of the sharp leading edge and to good effect is Conover who uses it to "initiate turbulence" and also uses protruding spars to "propagate turbulence".

The writer, however, prefers to use a generous nose radius as he does not consider the beneficial effect of a sharp leading edge proved and prefers not to risk any detrimental effects.

Effect of a Thin Profile

The possible benefit resulting from such is fairly obvious, *i.e.*, a lower depth of turbulent wake resulting in less drag, also less possibility of breakaway again resulting in a lower depth of turbulent wake.

However, if parasitic drag is large the result may not be beneficial. This is because the lift and drag will decrease and the overall drag may be proportionally higher. We may then be faced with an enforced increase of camber to raise drag and lift followed by an undesirable increase of centre of pressure travel and consequent reduction of stability.

Effect of Upper Profile Shape

Since it is the upper profile shape which suffers breakaway and is, therefore, of the most interest it is legitimate to consider for a moment which shapes, for their turbulating effect or otherwise are least likely to encourage breakaway.

The first attempts along these lines were the so-called "Laminar flow" L.S.A.R.A. sections such as the L.D.C.2, which is shown in *Diagram* 56. The maximum camber of these sections was situated

DIAGRAM 56.

a long way back. The effect of this was to provide a long path of accelerated flow to the point of maximum upper camber. As separation can never occur in accelerating flow the point of separation was a long way back and lift was thus increased. While this held true for low angles of attack, the snag came at high angles of attack when a point was reached where the flow was no longer accelerated over the front portion of the airfoil and breakaway suddenly shifted to the front of the airfoil. The effect of this is to produce a sudden centre of pressure shift and stall which renders the airfoil useless.

Another approach is to consider shapes which encourage turbulence.

If the airflow is initially made to accelerate rapidly for the first part of the chord and then suffers a constant deceleration for the rest of the chord as in *Diagram* 57 turbulence will be encouraged.

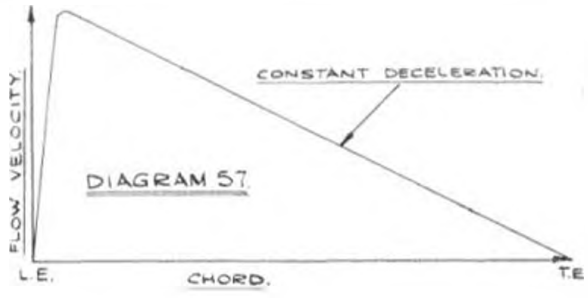


DIAGRAM 57.

According to Annenberg, from Goldstein fairing shapes which will do this are given by $y = C(1-kx)\sqrt{x}(1-x)$, some of which are shown in *Diagram* 58. This applies only at zero angle of attack. Presumably one could make one of these shapes part of one's upper airfoil surface. One would then have to ensure that the angle of attack of this part was zero otherwise turbulence would then be damped out. Obviously this is a little impractical.

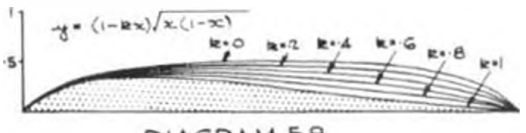


DIAGRAM 58.

Effect of Drooped Leading Edge Camber Line

The M.A.R.P. were responsible for this idea. Droop Snoot was the airfoil produced with this in mind.

The idea was to make the ideal angle of incidence large causing the pressure peak at angles of incidence less than the ideal angle of incidence to occur just behind the leading edge and thus to initiate turbulence. This gave a very low VL critical.

It is interesting to note the similarity between this section and Marcus's Eureka section shown in *Diagram* 59. Marcus's section

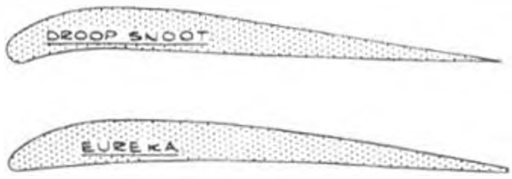


DIAGRAM 59

became famous for its peculiar phenomena of sometimes falling out of the sky, when no sheet leading edge was used, due to breakaway at the protruding spars when the model was pulling out at the top of the climb. This would coincide with the M.A.R.P.'s idea that the Droop Snoot was poor at VL sub critical.

The effect is akin to that of putting camber well forward.

Effect of Turbulence Holes

This, shown in *Diagram* 60 is another M.A.R.P. idea. Turbulence is initiated by spill through from bottom surface to top surface via small holes situated near the leading edge.

The spill will obviously give slight loss of efficiency but as VL critical was shown to be lowered in several cases, the idea may well be beneficial.

DIAGRAM 60

Effect of Protruding Spars

This well-known idea is shown in *Diagram* 61. Their effect in producing turbulence in the Boundary Layer is debatable as they may or may not do so but may cause breakaway. They will, however, increase friction drag. The probable effect is small, anyway.

DIAGRAM 61

Effect of Roughened Upper Surface and Turbulence Strip

These suggested methods of producing turbulence come under the same category as the protruding spars preceding and are subject to the same limitations. The latter is shown in *Diagram* 62.

Effect of Turbulators Suspended in Front of the Leading Edge

Schmitz first suggested and analysed various forms of this type of turbulator. Apparently this form of turbulator will produce a turbulent boundary layer.

The vertical positioning of the turbulator is alleged to be quite critical otherwise the turbulence will miss the Boundary layer.

Hacklinger further suggested that the turbulator should be elastic so that it would vibrate with high frequency.

The drag of a turbulator may well offset the benefit produced by it, but may have been essential with the wing chord used by Hacklinger.

The normal form of this type of turbulator is shown in *Diagram* 63.

It is interesting to note that the use of turbulators is dying and that several A.2's of aspect ratio up to 21 have recently appeared

DIAGRAM 62

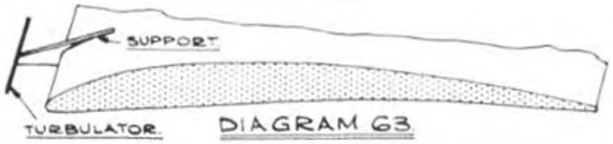


DIAGRAM 63.

without them; also Lindner in 1954 and 1955 used one of Hacklinger's sections without a turbulator and with no ill-effects.

Many results obtained in wind tunnels are fictitious as a low speed wind tunnel is quite likely to be turbulent.

A more satisfactory method of testing airfoils is that of Suzuki who put test wings at the end of a rotating arm, thus eliminating any possibility of artificial turbulence. The snag here is that testing with an infinite aspect ratio, which was done in a wind tunnel by making the test wing span the tunnel to eliminate tip interference at the expense of slight tunnel interference, becomes less easy.

The above is mainly educational, but may also give an idea of why a model sinks rapidly and paves the way for further discussion.

From the stability standpoint it should also be noted that low centre of pressure travel and low lift variation with variation of velocity is desirable.

Proceeding from here, we may roughly summarise the effect of variations of various airfoil parameters as shown in *Diagam* 64, assuming an orthodox fairing shape put on to the camber line.

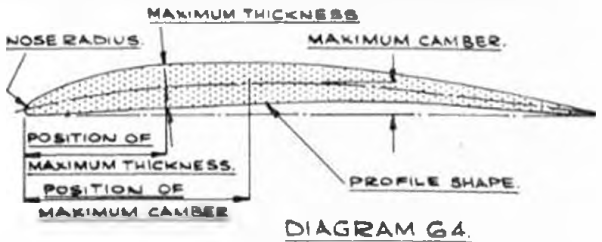


DIAGRAM 64.

Camber

Moving the position of maximum camber forward may raise or lower VL critical, make the angle of zero lift less negative, decrease the centre of pressure travel, encourage early breakaway as angle of attack is raised, and raise the angle of minimum drag. Moving the position of maximum camber rearward may raise or lower VL critical, make the angle of zero lift more negative, give a sudden centre of pressure shift as the angle of attack is increased, discourage early breakaway and lower the angle of minimum drag.

Increasing camber makes lift and drag higher at all angles of attack, increases the centre pressure travel, causes greater energy losses in gusts and raises the negative angles of minimum drag and of zero lift. Decreasing camber makes lift and drag lower at all angles of attack, causes less energy losses in gusts and lowers the negative angles of minimum drag and of zero lift.

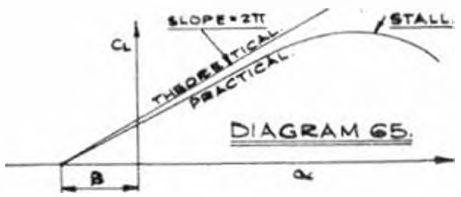


DIAGRAM 65.

Thickness

Increasing thickness raises VL critical, increases drag, may increase lift and causes greater energy losses in gusts. Decreasing thickness lowers VL critical, decreases drag, may decrease lift and causes smaller energy losses in gusts.

This is not the whole story as explained previously due to parasitic drag. The position of maximum thickness is dependent upon the fairing and is subject to similar comments to those associated with the position of maximum camber.

Nose Radius

Decreasing nose radius may decrease VL critical at the expense of increased centre of pressure travel.

An airfoil may well be defined by the five parameters, maximum camber, position of maximum camber, maximum thickness, fairing shape and nose radius, indeed many are, *e.g.*, Benedek 8356b, NACA 6409, Isaacson 73508.

Theory states that at any angle of attack α the C_L is given by $2\pi(\alpha + \beta)$ where β is the angle at zero lift.

The slope of the C_L against α curve being 2.

This falls down in practice especially when the stall is reached as in *Diagram* 65.

For any stability calculations the datum taken should be the angle of zero lift not the angle of zero incidence.

Before going on to describe a variety of sections it should be stated that the writer believes that the best sections are still the orthodox types, being thicker for larger models where structural considerations become significant and the VL value allows.

The preceding notes have served to illustrate that by deviating from the orthodox undesirable effects may result.

(*To be continued*)

The author replies to J. van Hattum

DEAR SIR,

I thank Mr. J. Van Hattum for his interest in and comments on the first parts of my series on gliders. I, too, have great appreciation of Bob Amor's excellent design. I feel it would be as well to briefly explain my reasoning behind the statement criticised. While this will essentially be a very brief picture of the topic to which it belongs, longitudinal stability, it will at least give a temporary reply.

If we move a model's C.G. either side of the optimum position for longitudinal stability, with consequent adjustment of tailplane incidence, we will adversely affect the longitudinal stability. Putting the C.G. forward will provide a condition I call overstable, and putting the C.G. backward will provide a condition I call understable. Assume that the C.G. is in the optimum position and that the model is an optimum design co-ordination for all longitudinal stability conditions.

It is a requirement that if airspeed is increased for any reason the tailplane lift should increase such that it will provide an under-elevating moment exactly cancelling the over-elevating moment created by the wing. The opposite effect for decrease of air speed. The increase or decrease of air speed may occur due to gusts or to the effect of circling flight in wind. In the former case there will be a time delay, due to the moment arm, of a fraction of a second and the model, depending upon its inertia, may "rock" as may be observed on many occasions. In the latter case the model will tend to lift bodily on an even keel.

If we can decrease the tailplane camber, what will the effect be? The angle of attack for zero lift and consequently the angle of attack for any lift will be increased and, therefore, the angle of incidence of the tailplane must be increased slightly. The lift *versus* speed graph slope of the tailplane with this airfoil of less camber will be reduced although at the nominal flying speed the lifts will be identical. This is mainly due to the airfoil whose camber is greater having a far greater increase of efficiency with speed with the low chord usually used on A/2 tailplanes. The compensation provided by the tailplane for increase and decrease of speed will now be insufficient, and a stall will tend to develop. A way of improving the situation is to damp the stall out by making the model slightly overstable, *i.e.*, by putting the C.G. forward. This, however, will necessitate decreasing the tailplane incidence with consequent slight decrease of tailplane lift *versus* speed graph slope which will aggravate the effect slightly, but will give an overall improvement. Therefore, the basic design co-ordination is now ruined.

Some of the writer's earlier models had very bad longitudinal stability caused by bad airfoil matching for the layout used.

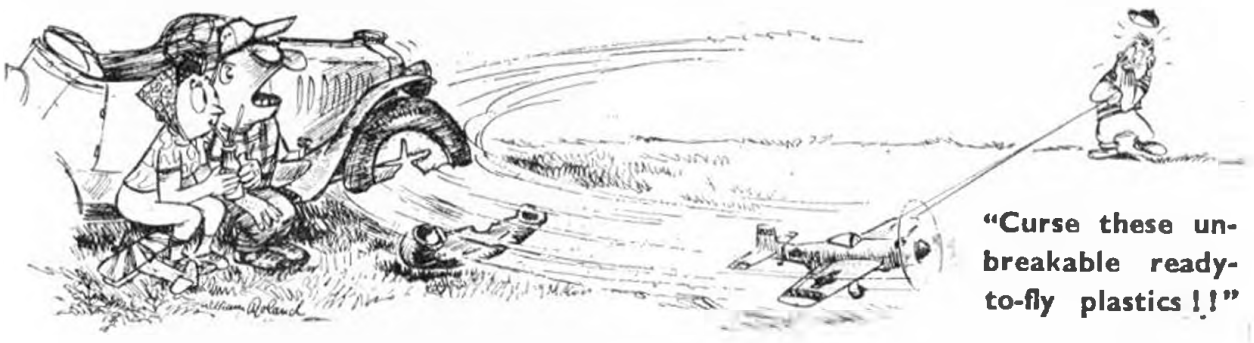
I was assuming that Lefever's "Altair" had an optimum design co-ordination for the effects of speed variation which may or may not be a fair assumption. Had we started with a design whose tailplane over-compensated for speed variation, decreasing the tailplane camber would probably have improved it. It is important to note that here, I have, as Mr. Van Hattum said, considered the overall geometrics of the designs to be identical. This is only so if one considers the well-known tailplane volume coefficient to be valid. However, here I must confess my own mistrust of this factor as I believe the moment arm to depend upon wing area as well as wing chord, in which case, the moment arm of Amor's design may be excessive as Mr. Van Hattum says. My discussion here is only related to the one effect connected with longitudinal stability and there are obviously many other considerations which will be discussed in later parts of my series.

It would be interesting to see Beuermann's results. I would have thought, however, that without knowing the characteristics of the airfoils used and other relevant data, in all conditions, and without the use of an analogue computer for simulation of the stability problem, as in some fullsize problems, it would have been rather difficult, to assure a design of perfect stability. Even after going to this trouble the accuracy of an analogue computer would probably be insufficient. I feel that the best method of obtaining perfect longitudinal stability is not by calculation, except possibly when first designing a model, but, by development of a series using observations when in flight, and one's knowledge of the effects of various faults to rectify them.

I have great respect for Mr. Van Hattum's opinion and I hope the rest of the series meets with his approval.

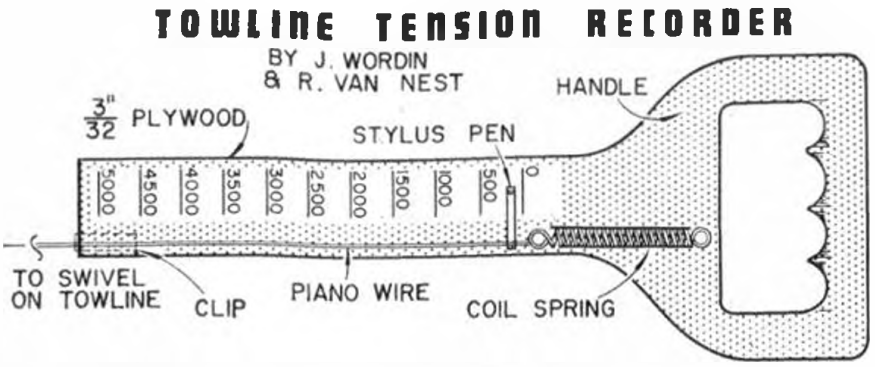
J. BAGULEY.

Hayes.



"Curse these unbreakable ready-to-fly plastics!!"

The following is reproduced from the Southern California Aero Team "SCATTER" Technical paper of April, 1961, and is of universal interest to all F.A.I. Glider flyers.



Towline tension tests . . . . . .

by John Wordin

AT THE 1960 CIAM meeting Sweden pointed out that A/2 nylon towlines can stretch 20 per cent. and an increase in performance was gained by the lengthened line rather than by more legitimate means. Whether the stretch occurred while the model was on tow, or by means of an intentional stretch before each flight was not pointed out. In any case, a pull test rule was enacted to prevent future re-occurrence of over-stretched lines. We investigated the effects the rule will have on lines and models. Several towlines were tested to see if they could withstand the five kilogramme pull and not stretch. The results are as follows:

10 *lb. nylon monofilament*	This line broke after a stretch of 10 ft. under a load of 2 kilogrammes.
25 *lb. nylon monofilament*	16 ft. stretch under 5 kilogrammes load.
30 *lb. nylon monofilament*	14 ft. stretch under 5 kilogrammes load.
Shoemaker's linen thread	13 in. stretch under 5 kilogrammes. (Broke on third test pull.)
·012 *dia. steel wire*	Neglible stretch under 5 kilogrammes load. (Disadvantages: snags, snarls, electrical conductor.)
·012 *dia. steel wire with nylon coating* (18 *lb. test*	Negligible stretch 5 in. under 5 kilogrammes load.

A recording spring scale was built to determine the load on the model while on tow. The spring was calibrated by hanging gramme weights on it in 500 gramme increments. Strips of paper were placed under a stylus to record the deflection of the spring. A clean strip was used for each test.

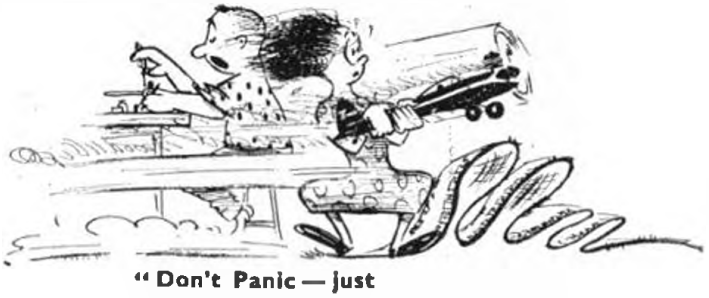
Seven flights were made under windy, thermal conditions. The maximum load sustained was 3,020 grammes, minimum load was 1,550 grammes, and the average was 2,217 grammes (4·95 lb.).

Test Number	*Load (Grammes)*
1	1,550
2	1,550
3	3,020
4	1,900
5	2,250
6	2,850
7	2,400
Average of seven	2,217 Grammes

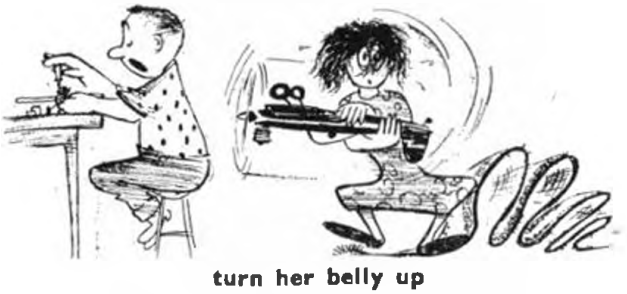
From these preliminary tests it can be seen that a non-stretch type of towline will be a necessity.

It is hoped that CIAM will use this data to modify the rule to make it more useful and without loopholes. These tests show that a five kilogramme load will stretch a nylon line approximately 10 per cent. Nylon has a permanent deformation when stretched, thus a nylon line can be stretched another 10 per cent. after the line is measured. Perhaps the line should be measured before *and after* each flight.

John made these field tests with a "past prime" A/2, in windy conditions. He made no attempt to "baby" the tests, but towed "fullout" to simulate, as near as possible, normal contest stress and strain.



"Don't Panic — just

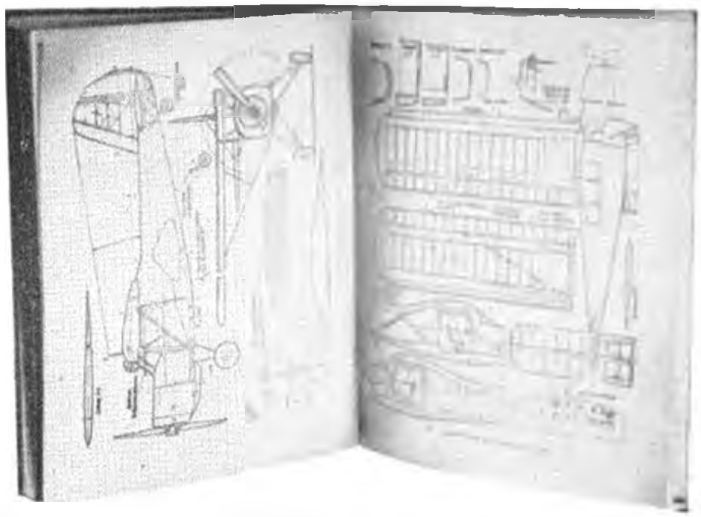


turn her belly up

that's it, girl!"

BOOK REVIEWS

of special interest to modellers



More Tech. Gen.

FIGHTERS VOLUME 2, by William Green, Macdonald and Co. Ltd., London. 192 pages 4¾ x 5¼ ins. Photos and three views 9s. 6d.

The industrious Bill Green has overflowed his quart in the pint pot to the extent of making this "Warplanes of the second World War" series run to four volumes instead of the original three as first announced. All to our benefit, for this 2nd volume is concerned with Great Britain and Italy alone and so offers descriptions of greater length for the more notable types. The Martin-Baker M.B.5 is given its due credit as an infinitely better fighter than any other similar type, the tale of the Firebrand (we heard last week that some are still flying) and its engines is fascinating and the failings of early Typhoons are accurately revealed. There are many such points of technical interest for the enthusiast and Dennis Punnett's 3-views aid the scale modeller. The Italian section is no less interesting with strange shapes in the twin boomed S.M.91 and 92 followed by the canard S.S.4. (below) and elegant S.A.1. 207 on consecutive pages. Our copy is on better paper with more clear reproduction than the first volume, so enhancing the value even more.

FIGHTERS VOLUME 3. Details as above Vol. 2.

Third in the series is that dealing with Japan, Netherlands, Poland, Rumania and the Soviet Union. With so many varied shapes emanating from this range of nations, this volume offers more for the experimenting scale modeller. Japan's Kawasaki KI.64 twin engined fighter with the pilot sandwiched between power units in the fuselage, the rather pretty A5M3 with elliptical surfaces, the Dutch De Schelde S.21 with twin booms and a pusher engine in the cockpit nacelle, the unique Rumanian I.A.R. 80 and Russia's "retractable" biplane Nikitin-Sevchenko IS-1 are all gems to study. Even the most ardent air enthusiast will find surprises, many of the illustrations appearing for the first time. Attractive dust jackets in distinctive colouring also add to the value of this fine series.

French Hero

SAINT-EXUPERY by Marcel Migeo, Macdonald and Co. Ltd., London. 335 pages 8¼ x 5¼, illustrated 30s.

The great legend which has always surrounded "Saint-Ex." in his native France and elsewhere through his exploits and beautifully written books is to some extent spoiled by this biography which comes from one who was his friend and co-pilot for many years.

It reads as it is, a translation from the French, with confusing changes of chronological order; and for that reason becomes more the book for one who has read Saint-Exupery's works or followed his career rather than for the casual reader.

One is apt to compare such a life story with that of other renowned aviators, and wonder at the end of this biography if earlier authors had not over reached themselves in adulation of the man as a writer, rather than as a great pilot.

Russian Hero

SOVIET MAN IN SPACE by Soviet Booklets, 3, Rosary Gardens, London S.W.7. 5¼ x 8¼ ins. 72 pages text 24 art photos 1s. 6d.

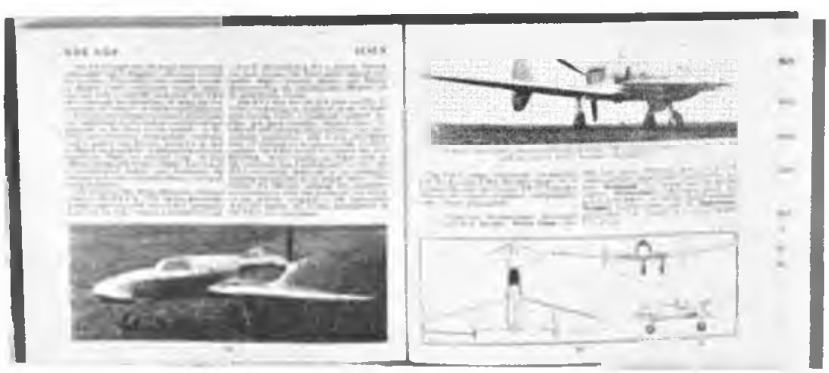
Produced with great speed after the orbit of *Vostok* with Juri Alekseyev Gagarin aboard, this soft covered book records history in factual repetition of the speeches, official Tass Press reports and interviews made in the few days immediately after the first space flight by man on April 12th, 1961. For the money the book is something no collector could afford to miss and like those equally cheap Ministry of Information books produced in Britain during the war years, will become something to treasure in future years.

Apart from the political expressions and vague answers to leading questions, the book confirms that *Vostok* had been flown before, that Gagarin had an ejector seat, could apply manual control, had three direct vision portholes and thoroughly enjoyed this realisation of an ambition. However, many mysteries remain on the technicalities of his voyage. His life history reveals him as an aeromodeller, parachutist and jet pilot, his physical condition was of the highest order and his reception as a hero unparalleled in Soviet history. Many questions will still remain for the reader, but to date, this Soviet booklet 78 combines all that has been said and a little more, plus many pictures of the first Cosmonaut.

Reference book

AEROMODELISM by Sbornek Statej, published in Moscow 1960, 144 pages 8¼ x 11¼ ins. 185 line illustrations, 6 Rubles, 70 kopeks.

Though not available outside the Soviet bloc countries, this manual on the hobby is of such interest that we feel sure it deserves mention, and could also be an ideal bartering piece for those who correspond across the "curtain". It opens with theory, proceeds to airfoils, props and wind tunnels then runs through a building programme which introduces models of all types including some which are highly original. Retracting undercarriages, gyroscopic stabilisers, cam control and complete circuitry for radio control are included along with full details of a home constructed diesel. Operation of all control-line models, starting with an appropriate and most accurate Yak-18 profile trainer and culminating in a "hotting-up" section for speed motors is well illustrated and to complete the book there are fine drawings of the Yak 12P *(as above)*



Transatlantic approach

R/C PRIMER by Howard G. McEntee, Kalmbach Publishing Co. Milwaukee. 64 pages 8¼ x 11¼ ins. fully illustrated. Price from Model Aeronautical Press Ltd. in England. 15s.

It is a significant fact that one must have particular gifts of expression to be able to introduce the somewhat complex subject of radio control to any novice. Many have tried their hand at authorship and wondered why their books have failed; but that will

certainly never be the case with the doyen of R/C writers, Howard McEntee.

This is a book worth its weight in transistors for any radio control aspirant. It contains no circuits, deals only with American gear, and uses American terminology: but these are no handicaps, for the multitude of hints and tips that fill these 64 pages are universal and could only have gleaned through the many years of experience in R/C operation possessed by the author. Many "experts" could learn much by study of the McEntee text, and the two colour diagrams are of the very highest standard of illustration.

Dealing with all forms of "single channel", from plain self-neutralising escapements to cascaded compounds, pulsing, and use of magnetic actuators, the Primer takes up the story where almost all the R/C gear manufacturers leave off in their instructions. It anticipates novice problems, covers the marine side as well as aircraft, and will, we hope avert many a disaster on the flying field this season. We have had particular satisfaction in reading the Primer and discovering how many points of advice are identical to those we have offered to enquiring readers, and to see how Mac has unravelled the "mysteries" of R/C in so easy-to-understand manner.

Records tumble at the new venue

1961 British National Champs

AFTER THE HIGH standards set by last year's meeting at R.A.F. Scampton, and the initial upsets of cancellation of arrangements for Waterbeach and the inevitably hurried change to an untried venue, we must confess that our first (and we are sure that there will be more) Nats at Barkston Heath was prefaced with misgivings. To our advantage was the use of a whole airfield, as distinct from a security de-restricted section, and one on which few buildings existed. Against it was a degree of inaccessibility for those dependant on public transport, and the completely unknown quantity as far as the all-important camping site was concerned.

We need have had no qualms, for by mid-day on the eve of the meeting, the mushroom village of tents, vans and caravans had been neatly arranged to an unprecedented standard of tidiness by the Spring Park M.A.C. organisers, the N.A.A.F.I. mobile shop was in business and all inhabitants had satisfied themselves that the one critical weakness of past years was adequately covered by a large battery of closets. Just across the road was the fine, newly surfaced hill-top airfield.

The situation was ideal, and every one of the 1,300 campers was issued with a directive concerning behaviour which was generally observed, though the reaction in our hearing to "No engines to be run after 8:00 p.m. was an immediate "But that only means in here!" Presumably he moved to the next field. There were strange booms in the hangars during the early hours and stranger sights and smells to be observed at the first breakfasts; but that's all part of the Nats and those who don't go and camp can never appreciate the full meaning of open air life.

Dull overcast and a cool wind heralded the first day, and some confusion over the location of main control and free-flight launch points provided the only points for criticism. What mattered was that the heavily subscribed control-line and radio control contests were all off to time. This was specially important in the case of the GOLD TROPHY for control-line stunt which became a solid ten hour stint for judges Eddie Cosh and Bill Morley, with 46 entrants trying hard over the sparkling new concrete. As a generalisation one could truly say that standards were not in the least improved over last year but the outstanding and more noticeable flyers were Dave Christopher from Weston-super-Mare and Australia's Brian Horrocks who were obviously better than expected. Christopher has a new version of the *Skua* with increased area for the Merco 35, and Horrocks flies *Larakin Mk* 3, a 3 lb. 12 oz. monster with 830 square inches in its 60 in. span and which would not have looked out of place among some of the smaller 10 channel R/C entries. Its Glo-Chief 49 keeps plugging away as Larakin almost stops to go around square corners, and there was no doubting the points advantage this gained for Brian to take top place. Only a single point separated Ray Brown and his *Crusader* and Frank Warburton with the *U-2*, each with Merco 35's, this despite a considerable discrepancy between their points for the first round. Frank had over-tried and lost marks for pulling out too low while Ray did very well, then in the second round they reversed positions to obtain the very close average. In fifth place, Tom Jolley was using his "reserve" *Veco Chief* with Fox 35, a model which has been used to good effect by Dennis "Tubby" Day in past years but this time he brought out a black and Dayglo O/D christened *Pedagogue* for the Merco 35 to fill 6th place. Of the forty "also-rans" we really must mention the terrific paint jobs on Dave Platt's and Alan Cardash's (Mill Hill) *Crusaders*. At long last it seems that appearance is a major consideration, and the overall impression is of far better finished models than seen before.

Across on the next runway, Hayes D.M.A.C. started the ball rolling in F.A.I. TEAM RACING with commendable promptitude and continued to run spot-on time throughout the long day. International rules were fully enforced, with everyone having two flights and the three fastest qualifying to fight it out in a final for the individual honours. Within the first hour, John Hall, Gordon Yeldham and Den Nixon had broken the 5 minutes with 4:43, 4:51 and 4:58 so there was great promise of a fast final. Races are won on pit stops, and Dick Edmonds is undoubtedly the grand master at the game, closely rivalled by Ken Long. Dick made the fastest heat time of 4:41 and decided not to take the option of having a second flight, then Ken Long made a 4:48 with his new *Tigress* variant resplendant in a bright scheme that will probably be as widely copied as was the original. Then Nixon reeled off another 4:48, Mike Bassett did 4:55, Les Davy 4:56 and John Hall, Ken Long also repeated under—5 times. It was sheer slick efficiency all the time. There were several models around with m.p.h. in hand over these named "experts" but oh! how they fluffed the stops or over-cowled to overheat, landed wrong side from the mechanic or bent their monolegs. For the final we now had Edmonds (4:41) Hall (4:43) and Long and Nixon tying at 4:48. Since the rules call for 3 in a circle, the latter pair had a fly-off with Long the better

An appreciation

Dear Sir,

I should like, through the medium of your magazine, to thank the Springpark M.A.C. for the fine work they did on the camp-site at the National Championships at Barkston Heath. I was personally involved in an incident which well proved their competence. Within two hours of my arrival at the camp-site I was unfortunate enough to lacerate my right hand rather badly. Hoping for the best, but fearing the worst, I mentioned the accident to the camp-site workers. Immediately two members took charge of me. Less than half an hour later I was in Grantham Hospital, having my right hand stitched, arriving back at the airfield in the early hours of Sunday morning.

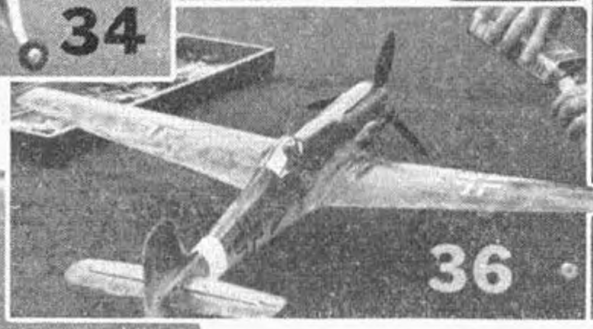
Throughout the whole weekend the great spirit which exists in aeromodelling became very apparent to me. To all those who offered me help with my models and help time-keeping, I should like to say a sincere, "Thank you."

M. C. WARREN.

Upminster.

MORE WINNERS

14. Major Gus Johnson, F.A.S.T.E., first in Class B Speed, with his ETA 29 and McCoy 60 speedsters. 15. West Essex proxy flyers Steward, Taylor and Oates with G. Yeldham's green "B" racer created 6 : 42 record for 10 miles. 16. Ernst Udet Fokker D VII was Knokke Trophy winner for Tony Day of West Bromwich.



Scale free flight and control-line, Multi-channel R/C

31. Part of F/F scale line-up after judging displays variety in choice. 32. Sopwith Camel with blue and white nose off for first-ever flight, by Roy Newton, Northwood. 33. A. W. Evans magnificent SM 55 weighs 23 oz. for T-Hopper. 34. Bridgewood's Stinson Vigilant takes-off. 35. Superb Spit VIII by B. Brown, finest scale seen for long time, tipped nose at each launch. 36. One of 5 Graupner Ta 152h's in scale C/L. 37. Ten channel Orbit in this Guillow Explorer by G. Franklin. 38. Udet's Fokker D VII by Tony Day of W. Bromwich won C/L scale, Taplin Twin fully enclosed. 39. Ken Marsh flew Octone deBolt Custom Bipe in multi, judges "Rushy" and HJN passing comment. 40. Chorlton's R. H. Jones produced this detailed PZL PIIc from his stable, F/F for Frog 150. 41. Brian Parkin aged 15 releases his Pee Wee Honey Bee. 42. Sharp Taper on Paul Rogers' latest multi for Dekatone. 43. Visitor "Windy" Kreulen and Den Allen study latter's deBolt Pursuit. 44. From Kenya, a nosewheeled Orion (Orbit 10) by C. Sweatman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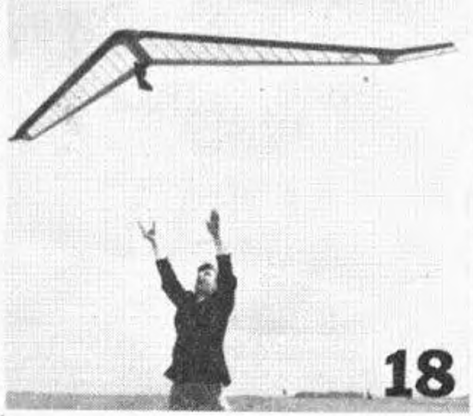
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Tailless, Power, Rubber and Glider


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17. Magnificent structure on Scot Urlan Wannop's red covered A/2 was much admired. 18. Co-operation as P. Hedgeman launches Grahame Gates' enormous max-area tailless. 19. Another max-area, "Checkmate", based on article in '54 AEROMODELLER is 12 ft. span by B. Bow, Bristol Aces. 20. Thermal Hopper ½A entry in power fly off by Croydon's Wisher was almost a giant killer. 21. N.W. Area's comp sec: Keith Mutch had A/2 launched by Anne Clanchy. 22. Hayesman F. Brench had an intricate F.A.I. Tailless. 23. Jack North helps Croydon clubmate Leppard in rubber fly-off. 24. J. Clampitt with one of several "Nig-Nogs" seen. 25. Ouch! Ron Swinden's payloader touches a wing on take-off. 26. Laurie Barr a close 2nd in rubber fly-off by a secs. in 9 mins. 27. Great work done by Civil Defence again with radio communication and first aid. Nats is a useful exercise for them. 28. Ramrod by W. Lee in fly-off, one of several around 29. Eric Barnacle finds 16 strands tough to wind. 30. McClave, 2nd in power used OS 15 like winner Monks. First 5 places went to glow engines.


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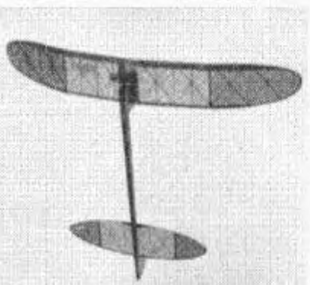
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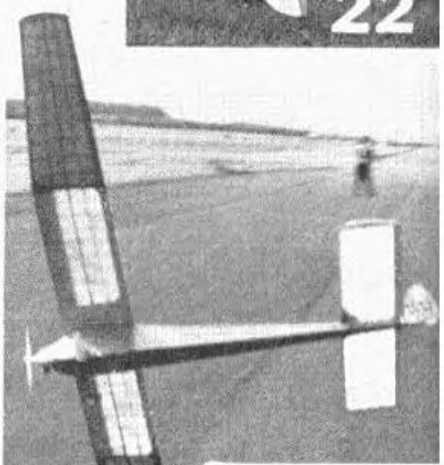
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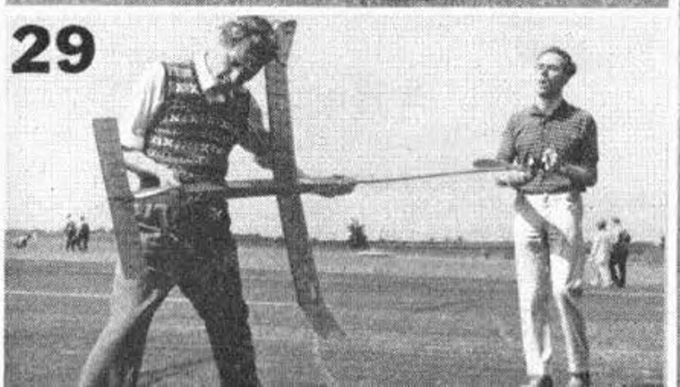
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British Nationals . . .

at 4:51 to illustrate his consistency. So it was now Long's ETA 15 against two home-modded Olivers in the slickest final seen for a long time. There was no doubting that with extra speed and range (38 laps) the Wharfedale team were leaders all the way but only by scant seconds for the times were 4:52: 5:02 for Edmonds and 5:03 for Hall. Air speeds were lower than earlier in the day and these fast times are entirely indicative of spot landing by good pilots and very fast pit work. The extended carbs; on Carter reworked Olivers of Hall and Bassett, and the predominance of the monowheel were interesting, but the heat that had no finishers as all three monowheelers rolled inside the circuit served to emphasise their weakness.

This year there was only one class for radio: MULTI-CHANNEL, which was, like Combat and speed a two day affair. The original Radio Control Sub-committee recommendation that all entrants should fly one round on the first day, after which the top 10 flyers would go forward to a second round of several flights on the second day, was met on the field with a protest from some competitors, after which it was decided that all competitors should fly one round each on both days as in the rule book.

Of the 42 subscribed entries, 23 reported to fly, the errant 19 thus blocking the chances of others who wanted to enter. Largest proportion of designs were, as might be expected, *Orion* types, though not all followed the monotonous fashion, adding a nosewheel to the unquestionable improvement of take off and especially landing performance. These included P. Walters of Port Talbot, John Singleton, C. Sweatman—back from Kenya and Chris Olsen with his latest *Uproar*.

First to display his piloting skill before judges H. J. Nicholls and C. S. Rushbrooke was Ed. Johnson who flew accurately to total 1358 points at the end of his first flight. First day high winds affected the consecutive manoeuvres of some pilots, the appearance of loops being more like a 45 degree corkscrew. Notable flight patterns were Frank Van Den Bergh's with beautifully smooth inverted flying with his now ageing model and John Singleton's with very precise entry into manoeuvres. Nearly all were the large type, though G. Franklin flew well with an Orbit 10, Merco 35 powered Guillow *Explorer* 56 ins. span high wing design. Two disheartening prangs were those by Dennis Allen who lost his de Bolt *Pursuit* while trying to throttle his motor and Harry Brooks who came in under full power after failing to recover from a loop. For the second days flying only 15 of the original 23 entrants reported to control. Much better weather conditions but the fact that few of the top men improved substantially on their previous scores shows that they were not really affected by the high winds. Flying ended fairly early in the afternoon, due to the depleted entry for the second round. By the end of the day Frank Van Den Bergh led Chris Olsen into first position by 440 points with Paul Rogers third: had he not had trouble in the second round it is probable that he would have placed even higher. His model has a pronounced tapered wing, 15 ins. root and 6 ins. tip chord, of 650 sq. ins. area. Paul confided that the object of the extreme taper was to achieve a fast roll, but at some expense to the lateral stability calling for two wing fences on each panel. Some radio interference was experienced during his second flight from a thoughtless single channel flyer who insisted on operating adjacent to take-off area, it took some persuasion to convince him that he had no right to be there!

In other years we have commented on lack of support for the tailless LADY SHELLEY Cup but such was not the case this time. They came in all shapes and sizes with the A.P.S. *Penumbra* leading the popularity poll by a long head. This was in fact the winning model, flown by Harry James of Maidenhead, and very neatly finished in red and yellow. Hayesmen, Hedgeman and Brench had neat international size jobs with varying approaches to obtaining tip washout and at the opposite end of the size scale, Grahame Gates was airing his taperwing 16 square footer yet once more and Brian Bow of Bristol another maximum area job that must have consumed many sheets of tissue in its time. This flying plank from Bristol Aces measured twelve foot span and was decorated like a chessboard. Using the Swiss S-1, airfoil (May '54 AEROMODELLER) it sailed majestically across the field to land on a hangar just half a second over a 3 minute maximum! Alas it was broken beyond repair on "landing" off the roof so the grand sight could not be repeated. One felt that brass bands should be playing as it circled, first left, then right down the runway.

1961 British Nats

Results

All provisional and subject to confirmation

Speed

F.A.I. Class (2.5 c.c. *Standard Fuel*)

	M.P.H.
1. P. Tribe/G. Copeman	108
2. P. Drewell (W.E.A.)	106.5
3. V. Jays (Surbiton)	99.9

Class 2 (5 c.c.)

1. G. Johnson (F.A.S.T.E.)... ...	144.3
2. J. Hall (Belfairs)	143.4
3. R. Taylor (Brixton)	140.7

Class 3 (10 c.c.)

1. R. Gibbs (Brixton)	162
2. G. Johnson (F.A.S.T.E.)... ...	160.9
3. P. Drewell (W.E.A.)	159.7

Combat

Semi-Finals:—

P. Healey (Weston)/M. Kendrick (W. Bromwich)

J. Benoy (Kenton)/J. John (Weston)

Finals:—

J. Benoy Beat P. Healey

KNOCKE TROPHY (C/L flying scale)

	pts.
1. A. C. Day (West Bromwich) ... *Fokker DVII*	86
2. P. Wheldon (Blackheath & Halesowen) *Aichi 99 "Val"*	84
3. D. D. Nelson (Derby C/L) ... *Ta 152H*	82
4. S. B. Perry (Glevum) ... ... *Hawker Fury*	78
5. A. Noble (Leicester) ... ... *Boeing F4B-4*	72
6. J. Hemmings (Blackheath & Halesowen) *D.H. 88 Comet*	72
6. Dr. M. F. Hawkins (C.M.) ... *Ta 152H*	72

THURSTON CUP (Open Glider)

1. R. Monks (Birmingham)	... 9:00+5:15
2. M. Carter (Chorlton) ...	... 9:00+2:52
3. G. Freeston (Sheffield) ...	... 9:00+1:20
4. D. Laxton (C.M.)	... 9:00+0:58
5. A. Wells (Hornchurch)...	... 8:57
6. P. Francis (Peterborough)	... 8:45

Super Scale Trophy (Free Flight Scale)

	Points
1. J. Simmance (Northwood) ... *Sopwith Snipe*	94
2. J. Bridgwood (Doncaster) ... *Stinson L-1 Vigilant*	93
3. A. W. Evans (Mill Hill) ... *Savoia Marchetti SS*	89

R.A.F.M.A.A. Trophy (½A Team Race)

	(10 miles Final)	(5 miles heat)
1. J. Atkinson (Debdenairs	9:00	4:27
2. A. Calvert (Feltham) ...	9:00	4:32
3. M. Ellis (Hinckley) ...	9:20	4:45
4. G. Cornell (Croydon) ...	9:45	4:35

DAVIES "A" TROPHY (F.A.I. Team Race)

	(Fastest Final	Heat)
1. K. Long (Wharfedale) ...	...4:52.5	4:48
2. R. Edmonds (High Wycombe)...	5:02	4:41
3. J. Hall (Belfairs) ...	... 5:03.1	4:43

DAVIES "B" TROPHY (5 c.c. Team Race)

1. G. Yaldham (Belfairs) ...	... 6:42
2. R. E. Lucas (West Essex)	... 7:17
3. . McNess (West Essex)	... 7:36

GOLD TROPHY (Control Line Aerobatics)

	Points
1. B. Horrocks (Wolves)	579
2. R. E. Brown (Lee Bees) ...	548
3. F. Warburton (Bolton) ...	547
4. D. Christopher (Weston) ...	541
5. T. Jolley (Whitfield)	524
6. D. Day (Wolves)	501

LADY SHELLEY CUP (Free Flight Tailless)

1. H. James (Maidenhead)	... 5:58
2. L. Moore (C.M.) ...	... 5:06
3. G. Mutch (Heswell) ...	... 4:52

S.M.A.E CUP (Multi R/C)

				Total
1.	F. Van den Bergh (Bromley)...	1872	1936·75	3808·75
2.	C. Olsen (A.R.C.C.)	1691·5	1676·5	3368·00
3.	P. Rogers (High Wycombe) ...	1627·5	1586·5	3214·00
4.	E. Johnson (A.R.C.C.)	1358·0	1706·0	3064·00
5.	P. Walters (Port Talbot)	1064·5	1375·0	2439·5
6.	J. Singleton (A.R.C.C.)	981·5	1430·0	2411·5

Short Cup (Payload)

1. G. Fuller (St. Albans)	8:00
2. J. O'Donnell (Whitefield) ...	7:26
3. D. Knight (St. Albans) ...	7:11
4. K. Glynn (Surbiton)	5:45
5. R. Swinden (Tees Side) ...	4:37
6. A. Mussell (Farnham) ...	3:18
7. P. W. Colling (Tees Side) ...	3:12
8. A. Bruce (Tees Side)	2:35
9. W. K. Harrison (Tees Side) ...	2:12
10. D. Turner (Cambridge) ...	2:09
11. D. Cornforth (Tees Side) ...	2:07
12. D. Jarvis (Tees Side) ...	0:55

Sir John Shelley (Open Power)

Following made 12 mins.	*Fly off times*
1. R. Monks (Birmingham) ...	11:58
2. K. McClave (East Lancs) ...	9:37
3. T. Smith (English Electric) ...	7:27
4. W. Lee (Novocastria) ...	6:07
5. A. Wisher (Croydon) ...	5:24
6. A. Spurr (Tees Side) ...	4:23
7. S. Morgan (Cardiff)	3:36.5
8. D. Cook (Canterbury Pilgrims)	3:17
9. M. Dilley (Croydon)	3:15
10. J. Bickerstaff (Rugby)	1:33
11. B. Picken (Wigan)	Overrun
12. R. B. Gray (Baildon)	Did not fly

Model Aircraft (Open Rubber)

Following made 12 mins.	*Fly off times*
1. J. Turner (Chorlton)	9:10
2. L. Barr (Hayes)	9:01
3. G. Roberts (Lincoln)	8:10
4. J. Harris (Blackheath) ...	7:55
5. R. Leppard (Croydon) ...	7:28
6. D. Morley (Lincoln)	6:28
7. F. Boxall (Brighton)	6:21
8. N. Elliot (Croydon)	4:30
9. D. Poole Birmingham	3:42
10. A. Anderton (R.A.F.M.A.A.) ...	3:37
11. J. Clampitt (Bristol Aces) ...	2:59
12. R. Brownson (Timperley) ...	1:46

British Nationals . . .

Concurrent with tailless was the open **GLIDER** event for the Thurston Trophy Cup, and with the time across the field to the nearside of some woods averaging about 3 minutes for an A/2 it was not surprising that even quite late in the day only one triple Max had been recorded and that by Ray Monks. Many were the tales of double max's and such bogey times as 1:11 or 1:18 (strange how consistant are those down-draughts!) and towline skills were an enormous asset. Of the 296 entries on the administrating North Western Area's lists, over half were discouraged enough not to proceed beyond the second flight either because they'd had enough long distance running, or the graveyard area of "down" had put paid to any hopes of success. Thus only four survived with a perfect score of nine minutes, and when they launched *en masse* for the decider it could have been either Carter of Sheffield or Monks to win, for each released in gentle lift whilst Freeston of Sheffield and Laxton were obviously on the wrong side of the thermal. A fifty foot gain over launch height was capably held all the way across the 'drome by Monks' highly developed A/2 and this made sure of his earned victory. Model features a flexible wing with broad trailing edge, small tail and triangular fuselage. Ray says it is the best he has ever had on a line, and we would not be in the least surprised to see it go to Leutkirch for the World Champs. in September.

CONTROL LINE SCALE for the Knokke No. 2 Trophy was most notable for the apparent popularity of Graupner's Kurt Tank *Ta 152h*, no less than five of them on our count! Doc Hawkins did at least add originality in a working undercarriage and throttle, others piled on the radar masts; but none could match B. F. Brown's magnificent *Spitfire VIII* to 1½ in. equals 1 ft. scale, complete with magnificent cockpit details, sliding hood etc. and a fuel proofed finish that would never disgrace a Museum. We could not fault it for anything. The spinner had been turned from fibre, the cannon and the superbly accurate cowl hid about eight ounces of nose ballast and its ETA VIc was completely enclosed and pressurised. Regrettably, each time it was launched for take off, the nose tipped about the rearward U/C position, and small prop clearance was not enough to save the blades and a whining shaft run. Though a maximum pointer for scale, the Spit was rivalled by Tony Day's Taplin Twin *Fokker DVII*, this year in Ernst Udet's markings which made a fine flight in the breeze to qualify for a win, and Peter Wheldon's *Aichi 99 Val* which was very steady and beautifully finished.

COMBAT was run over two days in a most effective manner by the Midland Area lads, from clubs including Derby, Bilston, Wolverhampton, Outlaws and Nuneaton, who managed the near 200 entries in heats held strictly to time. The first day was rather boring to watch, since many of the bouts were poorly contested with some of the less experienced contestants merely flying dangerously and in the process, eliminating some of the best combatants present at the meeting. However by midday on the Monday the competition had turned into a thrilling spectacle worthy of its name. The boys were really going for each other, so much so that in the heat of the moment the F.A.S.T.E. team found that a Fox .19 does not take too kindly to diesel fuel (enough said!). The standard competition of in this event has really improved, which a heartening thing, but the only innovation common to many models seems to be the all flying tail. The final brought together. J. Benoy of Kenton and P. Healey of Weston in a final that was something of a disappointment since Healey was grounded during the bout due to a crash, leaving Benoy the winner. Far better "combat" was seen around the score table during the quarter finals between Kendrick and Bumstead when it was argued that a cut streamer, recovered back by the wing of the opponent model after it had been cut off, and cut yet again by the other man, gave eligible cut points.

Do streamers "die" or do they stay "alive"? Anyway it gave Kendrick 3 chances to get in the semi finals through re-flights!

Second day

Whit Monday dawned calm but overcast; then as the sky cleared a little to allow patches of sun, thermals and downdraughts became abundant. Some idea of the enthusiasm of 270 **POWER** entrants for the Sir John Shelley Cup could be gained from any glance at the free flight area between 9 and 10 a.m. when last minute tests were being made, not all of them successfully. Geoff Dallimer's *Dixielander* wings scored a max as two separate panels while the fuselage made a rocket like trajectory back to the ground!

They were ideal conditions and the air was full of models. After events started, one could see at least a dozen jobs way up in the blue at any time of the morning and we can only marvel that, with the tremendous standard of rate of climb, only a dozen reached the fly-off with perfect scores in both power and rubber.

Wind was variable in direction too, and green corn embarrassed retrieving, while some models persisted in carrying on up although dethermalised!

More larger "open" models are making their appearance, ranging from *Ramrods* to own designs for 35 size glow engines. Brian Picken of Wigan produced his bulky OS 35 special which tends to look like a blown up rubber job and was designed to stay in sight longer than the others; but though he made a perfect 12 minutes, an over-run knocked him out of the fly-off. By contrast, A. Wisher of Croydon produced a Thermal Hopper .049 design which was in sight for 5:24 and gained him 5th place, moreover it appeared to be every bit as high as the better models when 11 of the twelve finalists released at 6 in the evening.

Ray Monks' great free-flight "double"

Highest of all by about 50 feet was Ray Monks' OS 15 all red O/D with Tom Smith's *Nig-Nog* not far below and a yellow *Dixielander* by D. Cook of Canterbury Pilgrims. The times were really phenomenal, for lift, if any was there, was weak, and yet Monk's models was in sight for 12 minutes all but 2 secs. We hope he got it back, for 90 minutes later he (and other fly-off competitors) were still looking a long way downwind. Most significant of all is that in such a decider where altitude is paramount, the engine used by the 5 leaders were all glowplug, the first two being OS 15's. And what a terrific "double" for the ubiquitous Ray to win both Glider and Power! Adjacent was the payload event for the **SHORT CUP**, producing the perennial crop of models, some now in their fifth and sixth years with maybe a new tail or engine. Despite a fractional over-run on his second flight which would have meant a max and a perfect 12:00 score, George Fuller's Cox Olympic winner of last year repeated its success on only two flights,—with two max's. This makes the class look ridiculously easy; and if you think so, we can only say,—try it! Carrying 16 ounces of detachable deadweight, these payloaders have to be very hot indeed to make four minutes from take-off—ask the Tees-side lads who produced five of the fifteen entries!

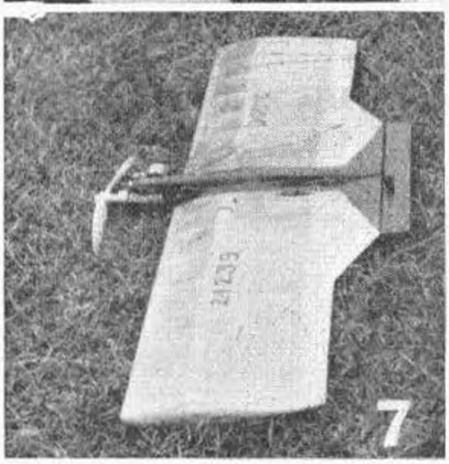
Massive motors was the order of the day at **RUBBER** for the Model Aircraft Trophy and sixteen strands of quarter made a mess of more than one fuselage in this "open" with around 150 entries. Urlan Wannop's model carried on upwards with the tail popped and when it finally decided to descend, took 4 minutes to do so, and this was typical of those who engaged lift as distinct from the many 2:15 or thereabouts scores of the downdraughted. In the final reckoning, as times came in each seemed to be the likely winner. At one stage 7:28 for R. Leppard of Croydon was top, then as more cards came in the figure rose to an eventual 9:10 for R. Turner of Chorlton, just 9 secs more than Laurie Barr of Hayes. The comparative stillness of early evening, with haze building up over the horizon made such durations seem incredible; yet true they were and those who made first five placings have every right to feel equal winners. Again we wonder if they managed to retrieve their models, for the unfortunate Dan Poole who was 9th at 3:42 lost his, and it went no farther than to the immediate outfield around the aerodrome!

A large crowd gathered to watch the **SUPER SCALE TROPHY** for free flight scale which was judged (as with C/L) by George Fletcher and Ken Brookes. Army Cadets performed a magnificent job of crowd control, for interest in the 24 models which came to the line to fly, was most intense. Conditions have never been better for what are usually considered the most risky of flying projects; yet more than half the entry were pitifully untested, underpowered or overtrimmed. We watched the release of three consecutive entries *which had never flown before* and which had little chance of making the brief 30 seconds qualifying flight. The Nats should never be used as a testing ground, and we hope that a system of "Fly-first, be judged later" will save loads of time in future. On scale points John Simmance's *Sopwith Snipe* was the leader, followed by Arthur Evans' ambitious Cox Space Hopper powered *Savoia Marchetti SM 55* "Santa Maria" as flown by Gen; Balbo, Dennis Thumpston's radio controlled *Sopwith 1½ Strutter* and J. Bridgewood's *Stinson L-1 Vigilant*, one of three brought down by the Doncaster Club. These three had to decide their place after the Snipe, which flew twice, beautifully, landing each time back on the take-off area, and by virtue of its excellent take-off and pattern, the Vigilant led. Thumpston's Sopwith went over the hill from a handlaunch on dead straight R/C trim (wish our single channel models were as well behaved) and was OOS for the landing, and the SM55 was miraculously repaired after a first adventure, skidded off its floats and flew well so earned 3rd place after the Vigilant. We must also note the miniature Fokker D VIII in full regalia by Doc Hawkins; 15 year old Brian Parkin's Pee Wee powered Honey Bee from Rotherham, and the enthusiastic group from Leicester who produced a variety of models with some very old Elfins aboard, perhaps to match their Aeronca C-3, D.H. 60 Gipsy Moth vintage selections.

A full mile away at the other end of this meeting was the control line area where more than 60 entries were continually using the **SPEED** pylons in what was the greatest revival of any single class at the Nats. Apart from the editor just missing a centre parting over his pate by Stephen's flying dolly, and the Ken Bedford family having their lunch interrupted by arms-length "landing" of a 10 c.c. model in full song, safety was more or less observed. However we feel that a wire mesh enclosure is a number one requisite in the early future, especially if speeds such as those established at Barkston are to be typical. In the F.A.I. class, the Kenton combateers Tribe and Copeman made good their lessons of the team trials and reeled off 108 with a Super Tigre G.20, and free flighter Vic Jays made 99.9 with an Oliver Tiger for 3rd place. We hope this really does show that standard fuel is encouraging more enthusiasm and look forward to more "new" names in future.

Speed specialists were not to be outdone in Classes II and III though, and once Ray Gibbs had made a fabulous 162 on his Carter/Dooling two-liner there was a succession of terrific flights such that 147 m.p.h. by Cpl. Pinkert of U.S.A.F. was only good enough for 7th place. Truly we have never known it so good as they say. It was a day

ALL THE WINNERS: (1) Ray Monks, top in Thurston with an A/2. (2) Frank Van Den Bergh again winner in Radio: Super Tigre .51, Orbit 10. (3) Monks won Power too: O.S. Max 15 O/D.—Hard worker! (4) John Simmance, second last year, took first place in Super Scale with same Sopwith Snipe. (5) Copeman and Tribe ready their F.A.I. Speed winner: Copeman-tuned Super Tigre Jubilee 2.5 c.c., Standard Fuel. (6) George Fuller, successful in Payload again, with Cox Olympic. (7) J. Benoy's (Kenton) winning combat model "Squig". (8) ½A T/R tie was between *(l. to r.)* A. Dell, A. Calvert of Feltham and J. Atkinson, D. Galpin from Debdenairs: Oliver Cub machines faster than old Tiger power "A" jobs! (8) J. Turner of Chorlton won Open Rubber with fly-off time of 9:10. (10) Ken Long from Wharfedale was rewarded after trying so long in Davies "A" ETA 15, Tigress V. (11) Jubilant Ray Gibbs did 162 m.p.h. to win Class 3 Speed. (12) A.P.S. Penumbra won Tailless for H. James of Maidenhead. (13) Hiding behind that 830 sq. ins. 60 ins. wing Glo-Chief .49 stunter i Brian Horrocks who regained the Gold Trophy.

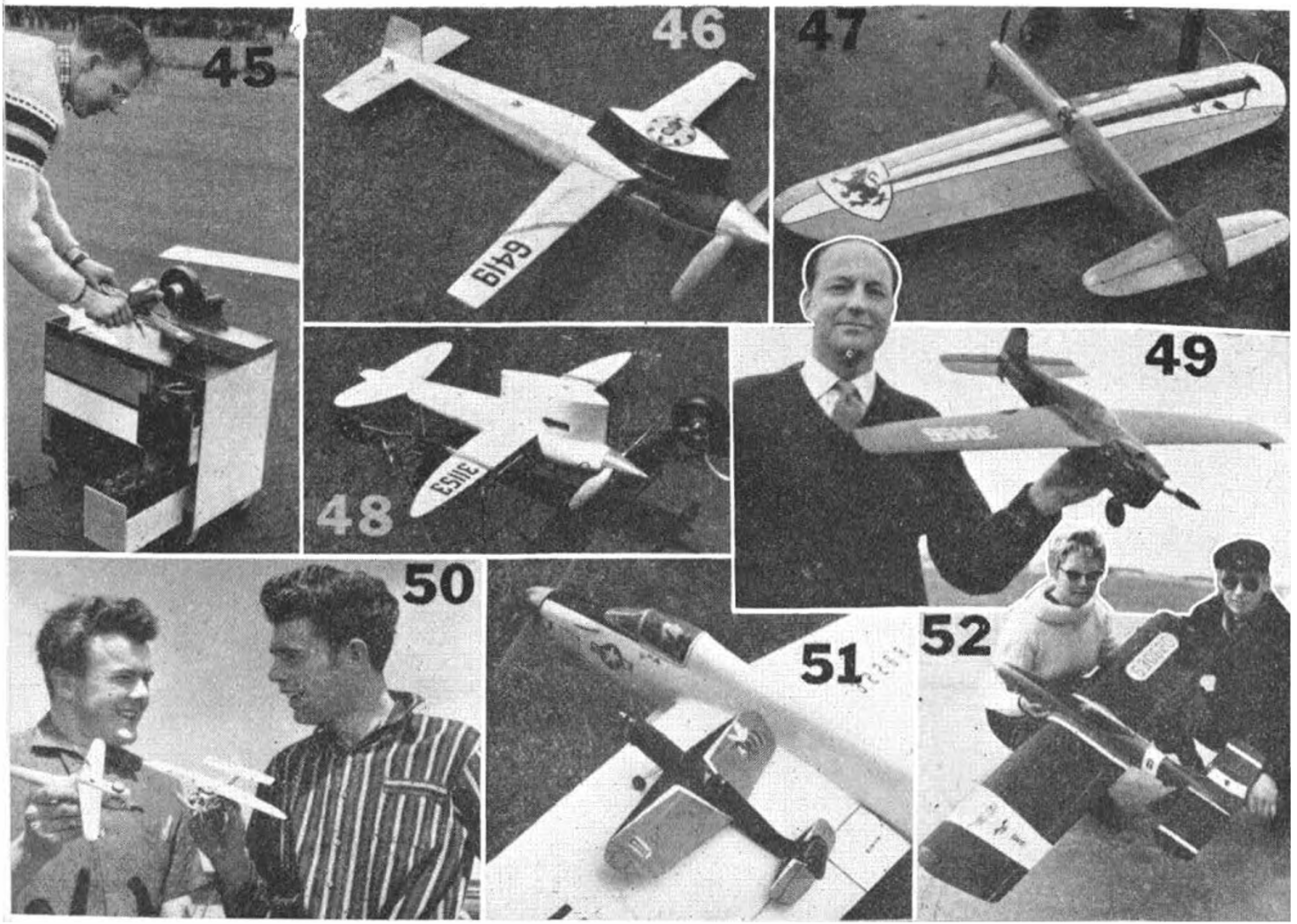


for big pitch props, (Gibbs using around 8+ by 14) and close split second times. Gus Johnson, who won Class II at 144 m.p.h. with an ETA VIc was chased at 143 by John Hall with Dooling 29 and in Class III he was only 1.1 m.p.h. slower than Gibbs and 1.2 m.p.h. faster than Drewell. The "sixties" were in full song but by no means dominated the circles for there were all types from Holland Hornet specials to Kevin Lindsay's Rossi Jet around in the biggest speed festival this country has yet seen. We liked the new line in servicing trollies, mobile starts and tool stores brought along by Brixton and Hayes members.

Adjoining speed on the second day was **Class B TEAM RACING** for the Davies Trophy where once more all records were absolutely shattered in the final. West Essex has always been renowned for its prowess in 5 c.c. racing and in particular for its teamwork. Thus in the final we had two W.E.A. teams, one from Dumbarton and the fourth from Belfairs. But Gordon Yeldham and Pete Stephens were so wrapped up in Class II speed they were not able to operate their racer so the West Essex team of Steward/Taylor/Oates took over the model and needless to say they won with a record time of 6:42 for the ten miles. It might have even been 6:25 but for the first stop coming the wrong side of the halfway mark. Thus the blend of long range and speed seems to have been found at last, and it will not be long before 50 laps at 115 m.p.h. is commonplace. Shattering though for the novice isn't it? We understand that the question of proxy-flown models is subject to scrutiny and the result subject to confirmation.

And so to the last of the "finals" and one which we rated highest for excitement, and tops for showing how the spirit of aeromodelling continues to infect new generations despite TV, Coffee Bars and other modern distractions we'll not enlarge upon. We refer to the **Half-A TEAM RACING** class for the RAFMAA Trophy, and most ably run by the Servicemen themselves. Incidentally we liked the new approach over the mike "If you don't clear the pad in two minutes, the next race is void". It worked! Modellers took off like rockets, and so did many of these astounding half-A racers. Of the 99 entries we would guess that half used the Oliver Tiger Cub and the balance a mixture of E.D. and PAW's. The rate of rotation on 42 ft. lines is like that of a 125 m.p.h. "B" racer and with four in the circle its rather like an eight legged cowboy twirling four lassoos with snarling buzzards attached. How some of them got around we shall never know; but they are all learning very quickly in a hard school and the joy of it is that 90 per cent of the entry are newcomers to team racing.

45. Dick Taylor of Brixton with smartest of several starter/tool trolley combinations seen around speed circuits. Has Fox 29R model here for Monoline. 46. Ray Gibbs, now of Brixton MAC set 162 m.p.h. record with his 2-line Class III model. Note big pitch prop. Carter innards in Dooling 61 crankcase. 47. Outstanding decor on Dave Platt's Merco 35 Crusader. 48. Lauderdale "Busy Boy" with McCoy 60 and Czech prop by West Essex entrant I. Roffey. 49. No final in "B" racing would ever be complete without J. MacNess here with all-red 3rd place model. 50. Teeny Holland Hornet speedsters with glass fibre fuselages by Hayesmen R. Beckett and J. Taylor have done 101 m.p.h. 21,000 r.p.m. on 4½ x 7 in. prop. 51. Frank Lee Warburton produced a "star" stunter in this 13 in. model of a Crusader for new Cox Tee Dee .010 here resting on his U-2 wing. Does everything on 20 ft lines. 52. Tom Jolley and his wife from Whitefield with Veco Chief using Fox 35, was specially good in horizontal eights



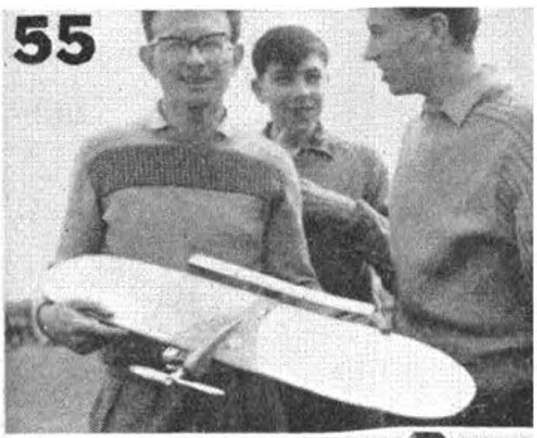
This panorama of the domestic site conveys a little of the enormity of this years National Championships. Airfield is beyond huts in left half. Ample water supply and other essential provisions were well organised by Springpark clubmen. Modellers came from all quarters of the British Isles, descending *en masse* from 7 a.m. onwards on Saturday before comps started. Truly a memorable meeting

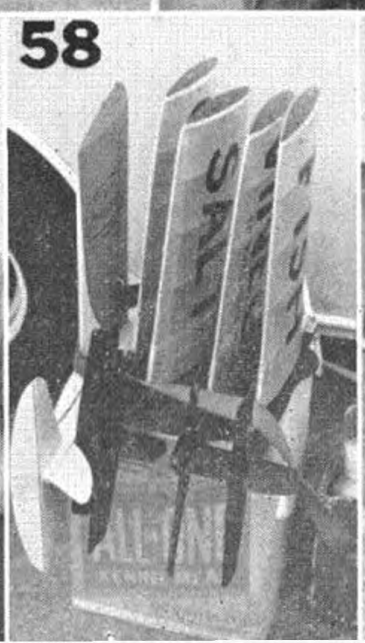
When one considers that these are the old 2.5 c.c. models fitted with 10 c.c. tanks and 1.5 c.c. engines, flying just as fast as ever and completing the ten mile final *a full minute quicker* than one used to expect of the best "old rule" model, the performance of the modern 1.5 c.c. diesel falls into true perspective. At this fine length of 42 ft. the pilot has to be a young and agile, ambidextrous, quick thinking person so no wonder we should be impressed (as also so many hardened modellers with ten years or more of racing behind them) with a final that had everyone on their toes from start to finish and ended in a dead heat! Full congratulations to the youthful Debdenaires, D. Galpin and J. Atkinson and the Feltham lads, A. Dell and Tony Calvert who completed the ten miles in nine minutes exactly. Much experienced racers Mick Ellis of Hinckley and Gordon Cornell of Croydon (with E.D. Super Fury against three Cubs) were stopping too often to rate a chance.

Full marks to the R.A.F. for its encouragement of smaller engined racers from the very beginning and more power to the young 'uns who we hope will also come into the F.A.I. class to strengthen our standards for international competition.

Many are the anecdotes one could recall of this Nats. Of the Orion that lost its K & B 45 complete with bearers so the engine was stuck back on the bulkhead with a fistfull of Araldite to fly again. Of the sub miniature Cox Tee Dee .010 *fully* stuntable 13 in. model of a Mercury Crusader flown by Frank Warburton on 20 ft. lines. Of the 6 mile walk back to Grantham made by many without transport. Of the 1 in 3 tractor track over the hill downwind where we went to help Ray Monks. Of the NAAFI tea, same as ever but welcome. Of the many young ladies, some not in the least abashed at displaying their affections on the flying field. Of the three leading Gold Trophy pilots impressing themselves with one another's models. Of the F.A.I. racer that ran in the circle and straight up the pilots back. Of the combat model that got away and cavorted at 500 ft. for five minutes. Of the ever helpful Civil Defence Service with first aid, telephone and radio intercom. Of the volunteers in the Camp site, at the gate in Control and running all sixteen events so well that no complaint (and we are usually the Aunt Sally for them) reached our ears. Here's to the next time!

53. Down from Dumbarton to place fourth in Class B team race final are D. Gordon, G. Marchbanks, and R. Ray. 54. Close pilot work is essential in the half-A Class, these finalist pilots averted several disasters. John Hall had a field day in this and F.A.I. final, also speed. Everyone voted half-A most exciting final yet with dead heat finish. 55. New look in combat design, with all flying tail as flown by Derby's R. Gibbard, K. Deville and B. Sadler. 56. Gordon Yeldham and John Hall after the F.A.I. race final. Oliver Tiger has a Carter intake extension. Many F.A.I. models did over 100 m.p.h. 57. Mick Ellis and Nixon of Hinkley with glass fibre half-A finalist for Tiger Cub, one of the best looking entries. 58. Salt, Pepper, Vinegar, Fish and another flying wing combat model that "had its Chips" from Leicester. 59. Gordon Cornell and half-A final model with E.D. Super Fury was worthy finalist but lacked range

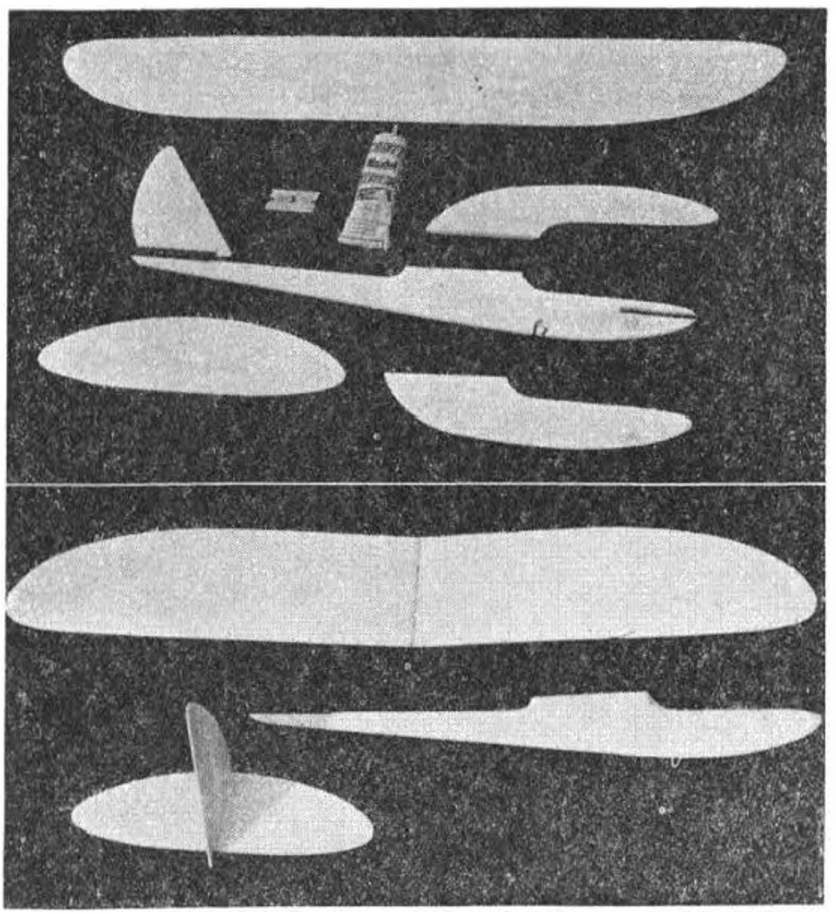




Starting this month we embark on a new series which has been specially written for the novice aeromodeller

BEGINNER COURSE 1

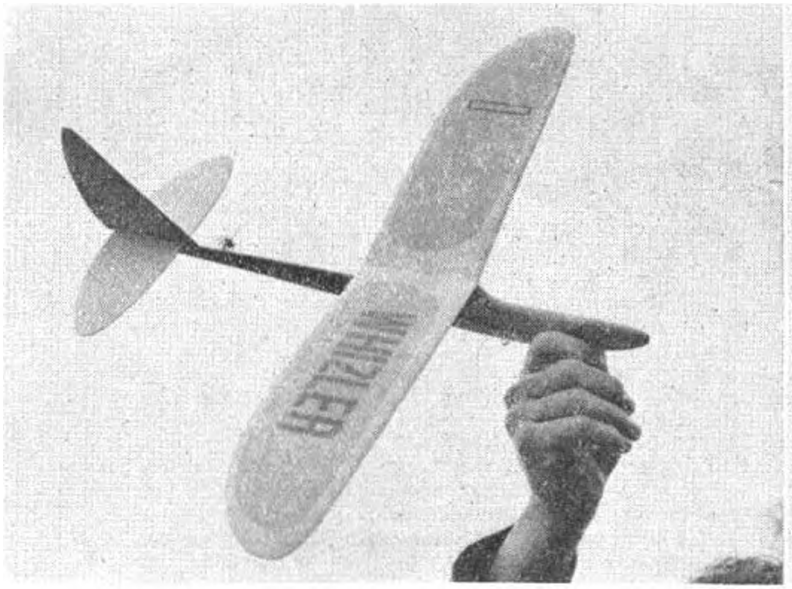
Launched with a simple all-balsa chuck or catapult glider **WHIZLER** designed by *KEITH LAUMER*



Component parts of WHIZLER at left emphasise the simplicity of Keith Laumer's specially-created design to launch this new series for the novice aeromodeller. Fuselage side doublers add considerable strength and leave an open slot in the nose for trimming weight to be enclosed, and finally blocked in with a piece of balsa. Razor blade, cement and sandpaper are the only accessories one needs to make this fine 24-inch span flyer

At left we see the basic components have been assembled, with the nose doublers sandwiching the catapult hook in place, the fin mounted squarely over the tailplane centre line and the wing panels cracked and reinforced with cement and a strip of gauze to hold the dihedral angle. Finally the wing and tailplane are added to the fuselage at their respective seating positions

At right is a quarter-scale reproduction of the Whizler plan which enables any modeller to scale up the full-size parts. All dimensions necessary to enlargement are quoted and squares represent ¼-inch at the curved tips. For the convenience of those who would rather work from actual size plans, we can supply Plan G 791 for Whizler, price 2/6 plus 6d. post and packing from AEROMODELLER PLANS SERVICE at the Editorial Offices



Keith Laumer's original was decorated with the name in transfers over colour-doped panels on the wings and the result is most pleasing as seen in these two views. If you're looking for something guaranteed to give flying satisfaction why not start now on Keith's Beginner Course and follow through next month with the rubber powered Flutterbus?

THE METHODS USED in building and flying contest model aircraft can best be learned by starting off with a basic flying machine like *Whizler*, a hand-launched glider of all-balsa construction and conventional layout. You'll find it simple to build (a couple of hours work will do the job) and it will turn in beautiful flights. *Whizler* can be hand- or catapult-launched, and with proper adjustment and a little luck you can lose it out of sight as easily as you can an expensive R/C job.

Selection of wood is important in model construction, so start by picking the correct grades as noted on the plan. Now cut a 24 in. length of soft $\frac{1}{8}$ in. by 3 in. balsa, add a half inch strip of hard $\frac{1}{8}$ in. balsa for the leading edge, then trace on it the outline of the wing. Draw the rudder and elevator on medium 1/16 in. balsa and cut out outside the line and complete the shaping with sandpaper. The full-length profile of the fuselage should next be traced on hard $\frac{1}{16}$ in. balsa. Cut this part with great care to establish the proper angle of wing and elevator mounting surfaces. Cut the slot at the front and the hole below it. Bend the launching hook and use it as a pattern to cut the slots in order to be sure of a fit. Shape a piece of lead $\frac{1}{8}$ in. thick to fit into the circular hole to establish approximate trim.

Now cut the side doublers and cement to the centre section. Use your razor-blade to whittle off the corners except for the surfaces where the wing and tailplane will fit), and use sandpaper to shape to the cross-sections shown on plan.

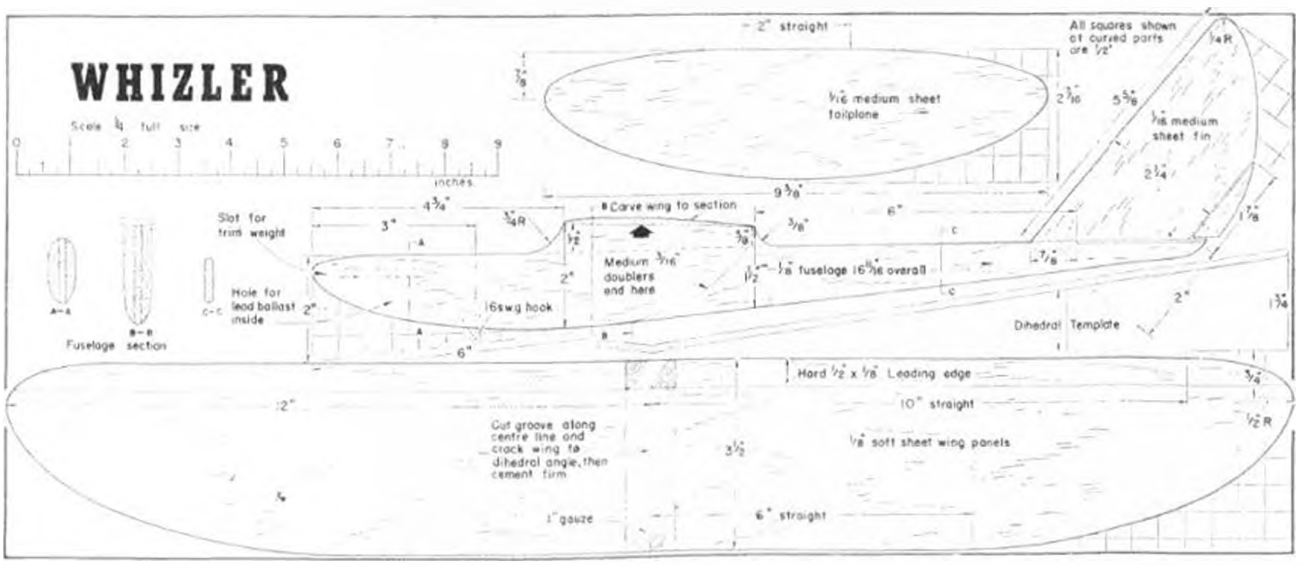
Sand the wing to the airfoil shape shown on the side view of the fuselage and round the tips, then finish—sand with fine sandpaper. Cut a groove on the centre-line, and crack the wing to the proper dihedral angle. Cement the joint and add a strip of gauze bandage reinforcement.

Round the edges of the rudder and elevator with fine sandpaper: cut the tab free from the rudder and reinstall with soft copper wire hinges.

Now give all the parts a coat of clear dope and another light sanding. Then cut a slight valley in the wing mount and cement the wing in position, holding it with straight pins until dry, then add the tailplane and rudder.

When the cement has dried thoroughly, give the entire model another check for rough spots and finish with a final coat of clear dope. If you wish, a coat of colour dope can be used to brighten things up. Add any transfers you happen to have lying around and you're ready for flight-testing.

Make your first test glides by tossing the model forward with a smooth motion as though throwing a light spear. Add weight as needed to trim. When you have achieved a long, flat, fast glide, set the rudder tab to establish a slight turn, and cement it. Now you can try a harder launch—or a catapult—and *Whizler* will show you what she can do.



South African 1961 Nationals

CAPE TOWN DID not live up to its usual reputation of a wind-free Easter week-end this year. The first day was almost a complete "blow away." Tents for processing and refreshments threatened to take off after the A/2's, Gliders, Jetex and Rubber jobs which were battling with a near gale.

Open Rubber was first on the programme and soon developed into a ding dong battle between Robbie Rowe and Pete Visser of Western Province and "Cookie" Watt and Brian Partridge of R.M.A.C. Pete Visser of W.P. flying a Hatchek *Mulvihill Winner* made top time with a total of 644.3 secs., Partridge and Watt of Rand also flying the same type of model, clocked up 519 and 502.4 secs. to take second and third places respectively. The only junior section entrant, R. Stamer of Rand M.A.C. won flying an A.P.S. *Urchin* with 362.4 secs.

A/2 was next up and 22 entries battled in the rising wind to get overhead releases to catch the thermals which were in evidence. Nicest towing of the day came from John Swallow of Rand M.A.C. flying a beautiful O/D job with a fully automatic rudder. No matter which way the plane veered from the straight the rudder controlled the tendency. Unfortunately Swallow did not place. The winner was A. Bonamour of Durban M.A.C. with 553.8 secs. flying a *Graupner Passat* followed by A. H. Rae of W.P. with an A.P.S. *Seraph*, R. Byrne of Rand M.A.C., flying an A.P.S. *Shortie* was third.

Jetex followed and only 8 entrants came to view. First two Senior places and the first Junior place were taken by *Sidewinders*. Third place went to J. Swallow flying an O/D and Brian Partridge of Rand M.A.C. using a Jetmaster 150 took top honours with an 8.68 ratio.

By late afternoon the wind had abated and the **open sailplane** entrants had a much better time of it than the A/2 boys. In the Senior section Ed Boys of R.M.A.C. flying an A.P.S. *Pelican* with 419 secs. (over 4 flights) was 1st followed by R. Rowe of W.P. with a *Mantis* and "Cookie" Watt of Rand M.A.C. with a *Sans Egal*. The Junior section was won by R. Stamer of Rand M.A.C. flying a *Shortie*.

Control-line events were flown on Saturday at the Bellville Sports Ground about 13 miles from Cape Town. The field proved ideal and even the **½A Team Racers** did not have much difficulty in getting off. This event was won by "Mossie" Clements of Salisbury, Southern Rhodesia flying an O/D powered by a Tiger Cub. Brian Patridge of Rand M.A.C. flew into second place with a reduced *Dalesman* also powered by a Tiger Cub. **Class A T/R** was won by *Miss* Sheilah Buck of the Topliners M.C. (Johannesburg, a new club) flying a *Voodoo* powered by an Oliver Tiger.

At lunch-time a bevy of Drum Majorettes from a National Afrikaans Newspaper delighted the men's eyes with a display of marching and high stepping. The wolf howls could be heard in Cape Town! Pencils and paper were hurriedly brought out to take down measurements for the next Miss F.A.I. T/Racer.

B T/R contestants reluctantly dragged themselves off to fly with many a backward glance at the lovelies. Brian Partridge of Rand M.A.C. flying his old *Rambler* with a Fox Moir Special won the event followed by M. Smith of Durban flying an ETA 29 O/D job. This was a great effort by the Rand team as they had to fit the u/c back in place with Pirelli after a false start.

Combat was won by M. Clements of Salisbury flying a "scaled up" *Peacemaker* powered by O.S. Max 35 and for the third year in succession R. Heydenrych of Johannesburg won the **Stunt** (flying the full A.M.A. pattern) with a *Thunderbird*.

C/L Scale attracted 6 entries. Roger Stern of Salisbury flew a beautiful A-26 Invader into 2nd class while "Benny" Boxall of Western Province won the event with a Vought Corsair. Vic. Smith of Durban entered a Tiger Moth (ignition engine) but did not qualify as his motor refused to lift the model. Without a doubt this model, together with Henry Rae's (Western Province B-26 Marauder, were the best on view. Rae tying for points with Smith, overcorrected on take off and 2½ years work met the turf with a resounding thump. Two McCoy 29's provided the power.

In much better conditions **A/1 Glider** was flown on Sunday and this event went to R. Byrne of Rand, 658.5 secs., flying an *Aiglet* followed by B. Partridge of Rand with an A.P.S. *Pluto* and R. Stern flying an A.P.S. *La Mouette*. **"B" Power** was won by B. Partridge of Rand flying a Torp 23 powered enlarged *Dixielander*. **P.A.A. Load** (2 entries only) was won by M. Clements 230.5 secs. of Salisbury flying an A.M.10 powered *Halo*.

¼A Power on Easter Monday went to Norman Leipzig 876.6 secs. of Rand flying a sensational O/D powered by a Space Hopper. The climb of this model has to be seen to be believed. Brian Partridge made a great effort of rebuilding his *Starduster* after a first flight prang (due to using "hot" fuel instead of the same as used for trimming) and made 2nd in 3 out of 4 flights.

F.A.I. Power went to M. Clements with 810 secs, flying a *Lightning Rod* powered by a Cox Olympic, again with Partridge 2nd (*Calypso*, Cub 1.5 c.c.) and **"A"** went to N. Kelly 729 secs. of Port Elizabeth flying a Torp 15 powered *Kiwi*, and Partridge 2nd yet again with the same *Calypso*.

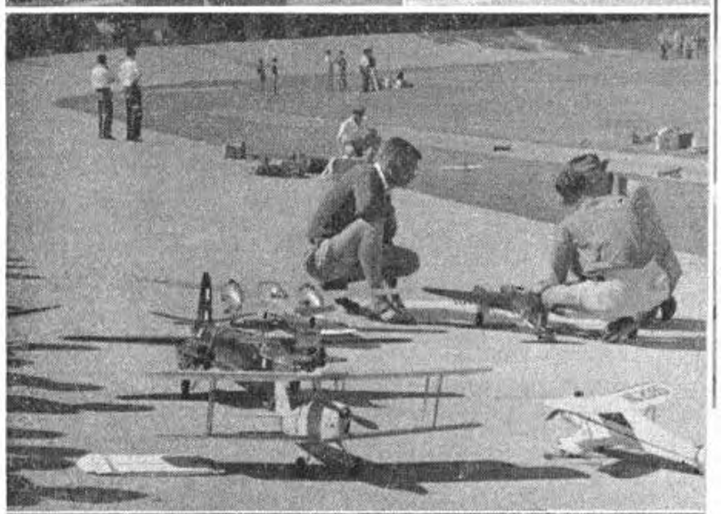
Robbie "the arm" Rowe chucked 157 secs. to lead in **Chuck Glider** with a *Spinner* and once again took the Wakefield (833 secs.) event flying an O/D based on *XL56*.

Two new Cups were presented this year. The B.P. Floating Trophy presented by B.P. Southern Africa (Pty.) Ltd. for the best finished model of the weekend went to John Swallow of Rand for his beautiful A/2.

The "Graupner" trophy for the high point man in all the Glider events, including chuck glider, went to R. Byrne of R.M.A.C.

A word of tribute must be paid to the ladies (3) who provided Hot-dogs, hamburgers, cheeseburgers, tea, coffee and cold drinks. They put in sterling work and the resulting profit from their efforts took the Western Province Model Aircraft Club out of the red and into a small profit. Tribute too must be paid to the overseas manufacturers (including AEROMODELLER) who so kindly assisted with prizes. Most sought after prize was a subscription to AEROMODELLER. Judging by the A.P.S. designs flown in the Championships there is very little doubt as to where one finds the best designs.

B.J. MOORE.



Far left: Norman Leipzig (1A power winner) launching Sans Egal A/2 for "Cookie" Watt who placed 7th in A/2 and 3rd in Open Glider. *Right*: Sidewinders were common in the Jetex class. *Extreme right* is Pretoria's A. Wedgemoed launching his reduced size Satellit with Graupner gear. Model subsequently went for a tour of the buildings, out of sight round corners several times, yet unscathed!

The South African Nationals for R/C was held at the Wonderboom Airport near Pretoria at the same time. The R/C types have formed one central association for all modellers called S.T.A.R.S. (*Southern Territories Amateur Radio Society*). Affiliated to the Aero Club of South Africa, it will therefore enjoy recognition by the F.A.I. for international contest participation. Mrs. Marie Lee of Bloemfontein was elected the first Secretary.

During the Championship event the wind gave the rudder-only and Intermediate boys some difficulty in keeping to the pattern. Dennis Hunt of Rhodesia had to give up eventually when the model became too small for visibility and a glider pilot who was in the same thermal reported later that he saw the model at 8,000 feet, above him, and still going up!

Multi events proved to be the most popular with the most contestants. Orions galore, all fitted with eight or ten channels. Cliff Culverwell won the event for the fourth time running, this occasion with an *Orion* and *O.S. Eight* outfit.

Most spectacular prang was by Jimmy Conacher with his *Orion*. During his power dive the radio went for a visit and the *Orion* came down under full power, gradually increased the angle of dive and hit nose first. The impact caused all the wing ribs to protrude through the leading edge — a complete write-off, radio and all.

Intermediate was won again by Don Parker with his O/D called "*Rock Ape*". He put up a splendid flight at the absolute last moment, pulling the same stunt as last year in Bloemfontein when he came to light with a brilliant last flight. As before, this flight had everybody foxed and the last minute rush and scramble to try for one more flight had the previous leaders in a flap, but Don took the cake.

Rudder-only went to Mr. Lee of Bloemfontein with a very deserving flight near the end of the meeting. Runner-up was Mr. Williams, Jr., a lad of 13.

Flying was of a very high standard and competition in the multi events severe. The judges had a hard time. Because of the mixing up of all classes, they had to judge Multi, Intermediate and Single all one after the other, and could not take a break; flying was around the clock from 8 a.m. to 5 p.m. Nevertheless, they did a splendid job and very few moans were heard.

The Rhodesian boys should get a special prize for the way they finished their models. They really proved their ability to build and their models looked much better than any of the others, the exception being Jimmy Conacher's Orion.

In all, the R/C Nats was most successful, and a tribute should be paid to our old friend Monte Malherbe, he did a first class job organising the event. Next year the R/C Nats will be held in Salisbury.

Trackside view is of R. Rowe, B. Moore and M. Carine judging control-line scale. *Below*: Contest Director Basil Moore explains the intricacies of a Marauder to some of the Drum Majorettes, model by A. H. Rae. *Bottom*: Brian Partridge, down 1,000 miles from the Rand, collects the Victor Ludorum Trophy at prizegiving. Almost all the hardware went North from the Cape, back with those who travelled many thousands of miles from Southern Rhodesia, Mashonaland and the Rand

1. Dan Bateman and Sid Miller of Luton in action controlling the former's R/C glider. 2. John Dumble launches Peter Thornton's Mini-Reptone modified A/2 (with under-belly ballast for penetration). 3. J. Fellows lets go J. A. Mountain's winning R/C model with manual pulsed rudder

S.M.A.E. RADIO CONTROL TRIALS
R.A.F. BENSON, April 22nd - 23rd, 1961

Competitor	1st Flight	2nd Flight	3rd Flight
F. Van den Bergh	1701·5	1753·5	1738
E. Johnson	1553	1658·5	1648
D. G. Walker	1445·5	1483	1671
P. Rogers	1381	1399·5	1562·5
H. Brooks	1458	1562	1037
C. Olsen	558	1744·5	1541·5
P. Brown	1206·5	1284·5	1131·5
P. T. Waters	331	1181·5	868
J. R. Wingate	346·5	422	1110·5

4. Rain belts down on Van den Bergh and judge S/Ldr. E. C. Cable under the umbrella at the radio team trials, R.A.F. Benson during May 6th.

SURBITON M.F.C. GALA
Chobham Common, May 7th

(3 flights, 3 min. max.)
(12 sec. run both power events)

Rubber (4 entries)
1. D. Latter (Brighton) 4:55
2. Hawkes (Blackheath) 1:40

Power (16 entries)
1. J. Simeons (St. Albans) 5:34
2. G. Fuller (St. Albans) 4:39
3. B. Mack (Stevenage) 4:04

Glider (17 entries)
1. M. Burrows (St. Albans) 6:13
2. J. Barker (Non-member) 5:30
3. A. Wisher (Croydon) 5:10
4. T. Challen (Northern Heights) 5:00

½A Power (4 entries)
1. D. Dyer (Stevenage) 3:08
2. M. Dilly (Croydon) 1:56
3. A. Wisher (Croydon) 1:56

Gala Champion
D. Latter (Brighton) 8:29 (1st in rubber, 5th in glider)

CAMBRIDGE Slope Soaring Rally
Ivinghoe Beacon, May 14th

Rudder Only (5 minute nomination)
1. J. Mountain (Kidderminster) 2 secs. error
2. J. Fellows (Kidderminster) 5 secs.error
3. C. A. Ward (Hatfield) 6 secs. error

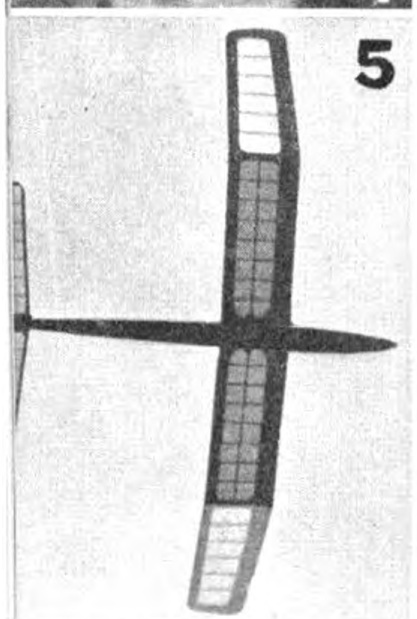
Multi Channel (5 minute nomination)
1. P. Thornton (A.R.C.C.) 11 secs. error
2. R. Copland (N. Heights) 13 secs. error

Free flight duration
1. D. Edwards (St. Albans) 7:26.
2. Miss S. Allsopp (Cambridge) 7:19.
3. W. Godden (Cambridge) 3:49.

Rally Round-up

Dismally wet conditions spoiled the radio team trials in the first round. Then in brighter air, Frank Van den Bergh emphasised his lead with the well-worn *Sky-duster*, Chris Olsen making 2nd best flight and Ed. Johnson showing greatest consistancy. At Chobham it was a job to find the Surbiton Gala, most sensible modellers were lurking in shelter from the gale. D. Latter was a worthy Champ, being bold enough to fly both rubber and glider. At Ivinghoe the following week, the wind did not matter for it improved the soaring and many superb radio flights were seen at the excellent Cambridge meeting.

5. The Northern Heights' team glider, holder of duration records and with a fascinating control system, soars at Ivinghoe. 6. Indoors at Cardington for practice flying, Phil Read and Ray Monks with the former's model which joined the "Over-30" club with an honourable 31:42. Ray made second best time of 26 minutes followed by Ron Draper with 24, Reg Parham with 23:05, Stan Wade 22:35 and John O'Donnell 21:24 the last two joining the "Over-20 club" for the first time. 7. Sue Allsopp, Secretary of Cambridge MAC, launches her free flight soarer. 8. At Surbiton Gala, Chobham, Bill Horton holds down Veco 19 Dixielander in strong wind. 9. KK Gaucho by R. A. Herben at same meeting

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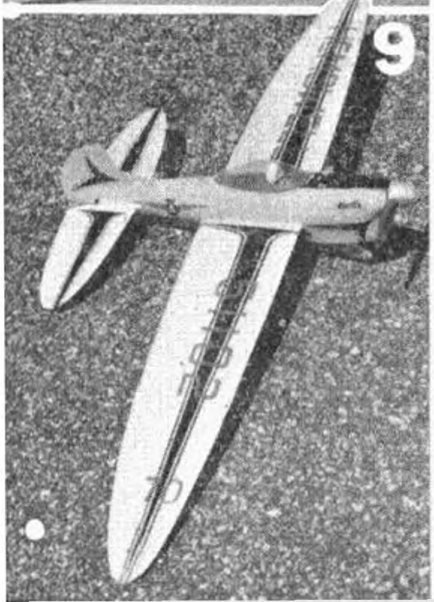
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R.A.F. M.A.A. CHAMPIONSHIPS

R.A.F. Debden, May 6th - 7th

Concours d'Elegance (AFROMODELLER Trophy) J/T Johnson (Fighter Command).
Radio Control (Malta Cup) Cpl. Parton (Fighter) 2,062 points.
F/F Power (*Model Aircraft* Trophy) S.A.C. Standing (Flying Training) 315 secs.
F.A.I. Power L.A.C. Lowman (Fighter) 111 secs.
Open Glider 1st, F/O Hiscock 295 secs.
A/1 Glider 1st, Cpl/App. Winterhalter (Halton) 237 secs.
A/2 Glider 1st, F/O Hiscock (Technical Training) 438 secs.
Thurston Trophy (Wakefield) 1st, S/Tech. Anderton (Maintenance) 336 secs.
Open Rubber 1st, S/Tech. Anderton 222 secs.
Scale Free Flight 1st, Flt/Lt. Hough, S.E.5 (A.P.S.).
Stunt 1st, Flt/Lt. Falconer (Coastal) 493 pts.
Combat 1st, Cpl. Pinkert (U.S.A.F.).
Speed Class I 1st, Flt/Lt. Gould (Flying Training) 105 m.p.h.
Speed Class II 1st, Maj. Johnson (U.S.A.F.) 112 m.p.h.
½A Power 1st, Flt/Lt. Jones (Signals) 164 secs.
Team Racing ½A 1st, A/A White (Locking).
"A" (International) 1st, S.A.C. Phinn.
B" (5 c.c.) 1st, Major Johnson (U.S.A.F.).
cramble 1st, F/O Byrd 310 secs.

1. Double event winner S/Tech. "Andy" Anderton prior to winning Thurston flight. 2. Blustery wind caught several like Cpl. Potter's A/2, snapping wing at launch. 3. ETA 15D "Texan" by S/Tech. Sheldon. 4. Concours winners, J/T Johnson with Ta 152h, Cpl. Pickford's O/D 'Assegai' stunter for Merco 35. 5. FAI Power winner LAC Lowman. 6. Cpl. Pinkert of USAF won "B" race with Major Johnson. 7. Last seen of Cpl. Dunn's R/C which disappeared downwind. 8. Brian McCarthy launches 'Aiglet' for SAC Stewart. 9. Hemswell FAI racer in yellow/black/red. 10. Scramble winner F/O Byrd. 11. Cpl. Parton had K & B 'Olympic' O/D with Min-X 10. 66 in. span.


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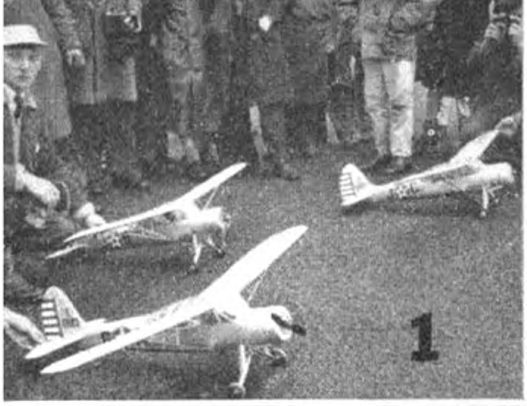
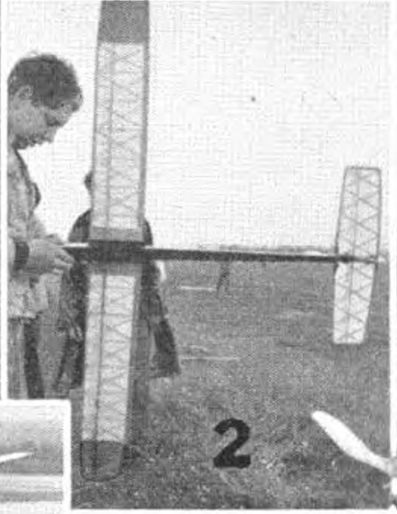
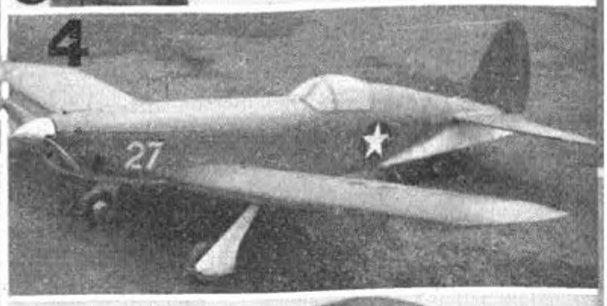
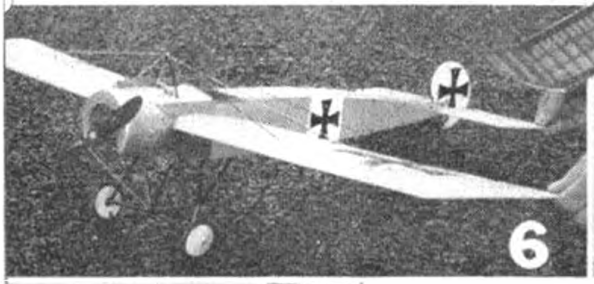
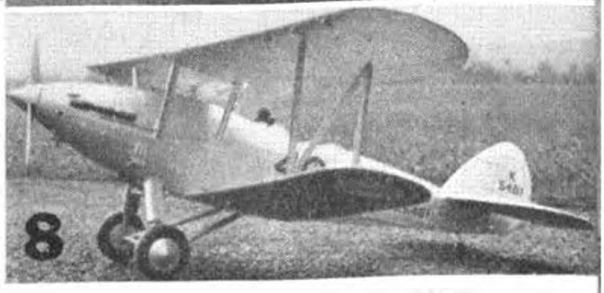










1. The Doncaster "Vigilantes" (G. Abell, J. Bridgewood and J. Clifton) with Stinson L-1 scale entries, Bridgewood won. 2. Complex structure on Brian Faulkner's (Cheadle) glider. 3. "Topscore" by C. J. Copple of Poulton-le-Fylde braced against wind by helper. 4. Eric Herbert's semi-scale Lagg fighter with D-C Manxman, Aerotone is Dk Blue above, Duck egg below. 5. "Gipsy Moth" with AM 25 in green and yellow by R. Gardner of Hoylake. 6. Ron Boid of Rotherham with Merco 35 F/F was 4th. 8. R. H. Jones of Chorlton produced this "Hind" with Marown Heron. 9. Rally Champ with 2nd in Rubber and Power, John O'Donnell with "Maxie". 10. Power winner Tom Stoker with black and orange AM 35 O/D. 11. Eliot Horwich's deBolt "Equaliser" has Enya 15, ED-1, Varicomp, nicknamed the BooBooBear. 12. Strong wind was not for lightweights as Wostenholmes here, needing two helpers to save wing.

Stockport Advertiser Rally

WOODFORD
MAY 7th

High winds, heavy showers and even hailstones could not dampen spirits at the A. V. Roe airfield (nor did they deter light fingered gentry who were removing engines from airframes, even when left in the "security" of tents). Aside from this, the N. Western Area once more showed their smooth and efficient organisation within the limited airfield allowed them for this major event. Large entry figures provide a measure of the popularity of this early meeting.

OPEN GLIDER *(119 entries)*

1. G. Illingworth (Baildon)	6:00
2. C. Copple (Poulton)	4:46
3. T. Ellison (Avro)	4:33
4. J. Hannay (Wallasey)	4:22
5. C. Rennie (Chorlton)	4:22
6. G. Beal (Mexborough)	4:11

OPEN POWER *(88 entries)*

1. T. Stoker (Baildon)	5:22
2. J. O'Donnell (Whitefield)	5:07
3. S. Savini (Liverpool)	4:56
4. R. Boid (Rotherham)	4:31
5. W. Hadfield (Ashton)	4:20
6. R. Lea (Congleton)	4:09

OPEN RUBBER *(85 entries)*

1. G. Tideswell (Baildon)	6:00+4:06
2. J. O'Donnell (Whitefield)	6:00+3:28
3. J. Barnes (Liverpool)	6:00+2:06
4. P. Dunkerley (Timperley)	6:00
5. C. Kimber (Eng. Elec.)	5:05
6. H. Tubbs (Baildon)	5:00

CHUCK GLIDER *(28 entries)*

1. T. Stoker (Baildon)	2:32
2. J. Birks (Chorlton)	2:09
3. T. Ellison (Avro)	2:00

JUNIOR GLIDER *(22 entries)*

1. P. Kazer (York)	4:41
2. M. Proctor (Baildon)	3:38
3. A. White (Chester)	2:28

JUNIOR RUBBER *(4 entries)*

1. J. Allen (Ashton)	3:40
2. B. Smith (Eng. Elec.)	1:57

JUNIOR POWER *(10 entries)*

M. Proctor (Baildon)	1:15

FLYING SCALE *(16 entries)*

1. J. Bridgewood (Doncaster) Vultee Vig.	100
2. E. Jones (Chorlton) Hawker Hind	94
3. J. Clifton (Doncaster) Vultee Vigilant	89
4. E. Coates (Blackb'n A/C) Leopard Mth.	81
5. H. Yates (Wharfedale) Fokker DR1	79
6. G. Jones (Cheadle) Tiger Moth	72

RADIO (Rudder Only) *(20 entries)*

1. B. Purslow (Chorlton)	76
2. M. Munday (Evesham)	52
3. R. Lever (Leigh)	49½

COMBAT *(60 entries)*

1. M. Everitt (Chester)	22 pts.
2. P. Tribe (Northwood)	-1 pts.

TEAM RACE *(F.A.I. only)*

Davy/Long (Wharfedale)	4:32
Horton/Baxter (Wharfedale)	

LADIES' TROPHY

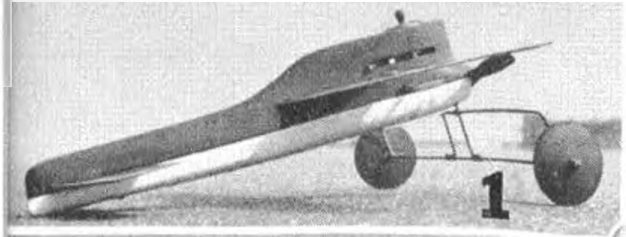
Mrs. N. D. Stott (Eng. Elec.)	3:00

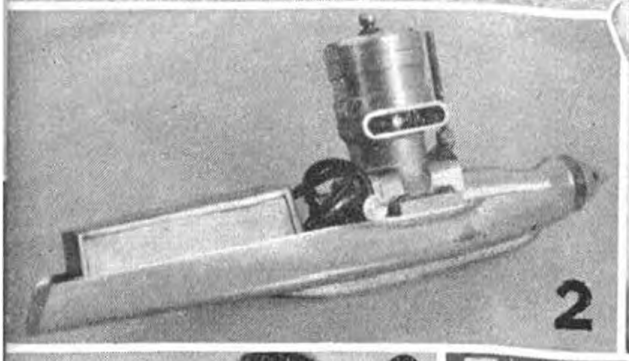
JUNIOR RALLY CHAMPION

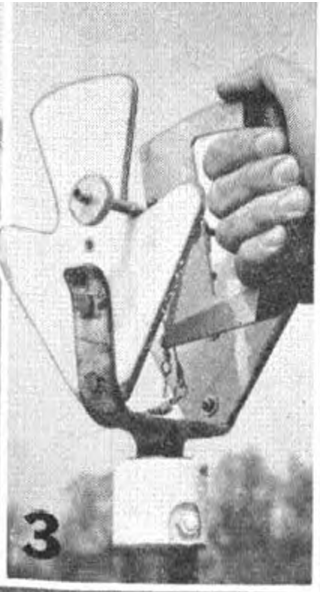
J. Allen (Ashton)	6:03

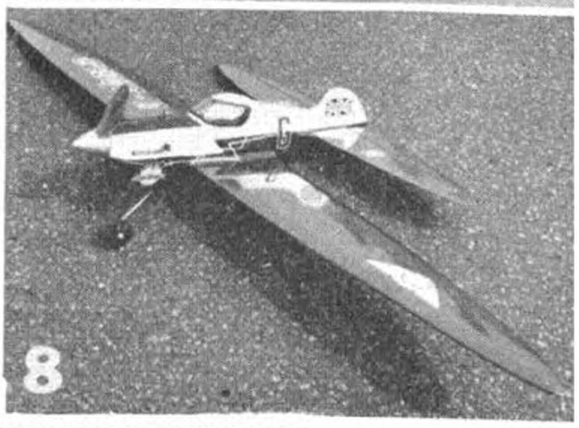
SENIOR RALLY CHAMPION

J. O'Donnell (Whitefield)	14:46









High Wycombe Control Line Rally

F.A.I. Team Race

1. Wallace (Novocastria)	5:06
2. Hall (Belfairs)	5:23
3. Bassett (Ecurie Endeavour)	*Retired*

Class "B" Team Race

1. Steward-Taylor (West Essex)	7:01
2. McNess (West Essex)	7:10
3. Wallace (Novocastria)	9:56

Stunt

1. R. Brown (Lee Bees)	619 pts.
2. D. Christopher (Western Clnrs.)	588 pts.
3. D. Day (Wolves)	578 pts.

Combat

1. P. Perry (Northwood)
2. De Ville (Derby)
3. { Fountain (Peterborough) / Pinkert (F.A.S.T.E.)

Sutton Coldfield Radio Control M.A.C. Rally

Rudder Only (Wilfred Jones Trophy)

1. S. E. Uwins	238½ pts.
2. L. Roberts	155½ pts.
3. B. Fellows	147 pts.

Multi Channel (Sanderson Masters Trophy)

1. E. Johnson	1067 pts.
2. P. Rogers	1015 pts.
3. D. G. Walker	792 pts.

(Best of two flights)

R/C Scale (Dennis Thumpston Trophy)

1. J. R. Morton D.H. Gipsy Moth; 2. D. S. Skelcher (Small Heath M.A.C.) Luton Minor; 3. D. J Bannister (Glevum M.A.C.) Fokker D VIII

1. Gibb's ETA 15 speedster. 2. Carter 2.5 spcl. is finless, pressure tank. 3. FAI pylon yoke for 2-line. 4. Day, Brown, Warburton, Platt, all with Merco 35/ Crusaders at trials. 5. Warburton flew his new U-2, had Fox 35 and Merco variants. 6. Dick Edmonds led FAI racing. 7. At Wycombe Christopher's new Skua (Merco 35) was outstanding. 8. Latest Tigress by Long/ Davy team, 2nd at Trials.

S.M.A.E. CONTROL LINE TRIALS
R.A.F. DEBDEN, 23rd April, 1961

F.A.I. Speed (14 competitors)

1. P. Wright (West Essex)	173 k.p.h. (108 m.p.h.)
2. R. Gibbs (Hornchurch)	163 k.p.h. (101·7 m.p.h.)
3. N. Butcher (Croydon)	162 k.p.h. (101·2 m.p.h.)

F.A.I. Team Race (27 competitors)

1. R. Edmonds (High Wycombe)	4:59 and 4:52
2. K. Long (Wharfedale)	5:10 and 4:54
3. M. Bassett (C.M.)	5:29 and 5:21

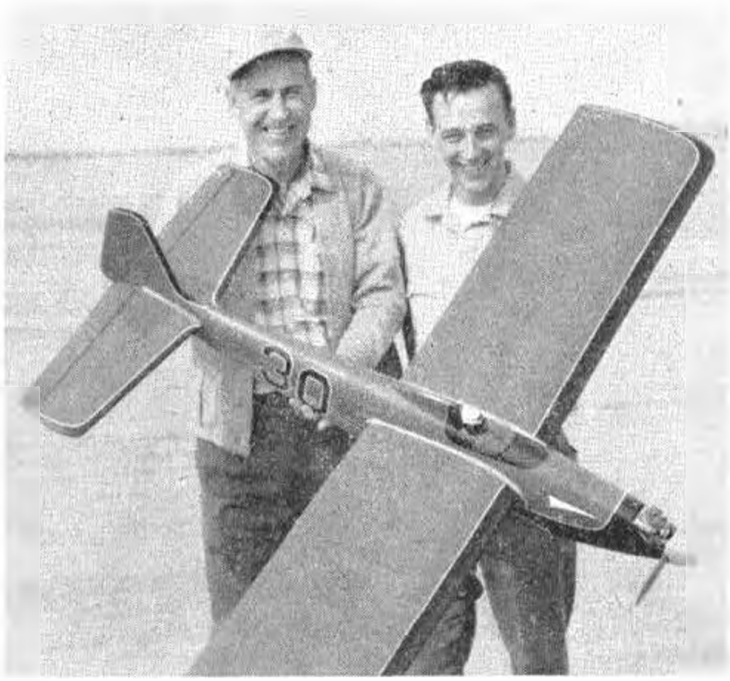
F.A.I. Aerobatics (5 competitors)

	F.A.I.	*A.M.A.*	*Total*
1. R. Brown (Lee Bees)	1026	1150	2176
2. F. Warburton (Bolton)	1072	1001	2073
3. D. Platt (Wanstead)	995	983	1978

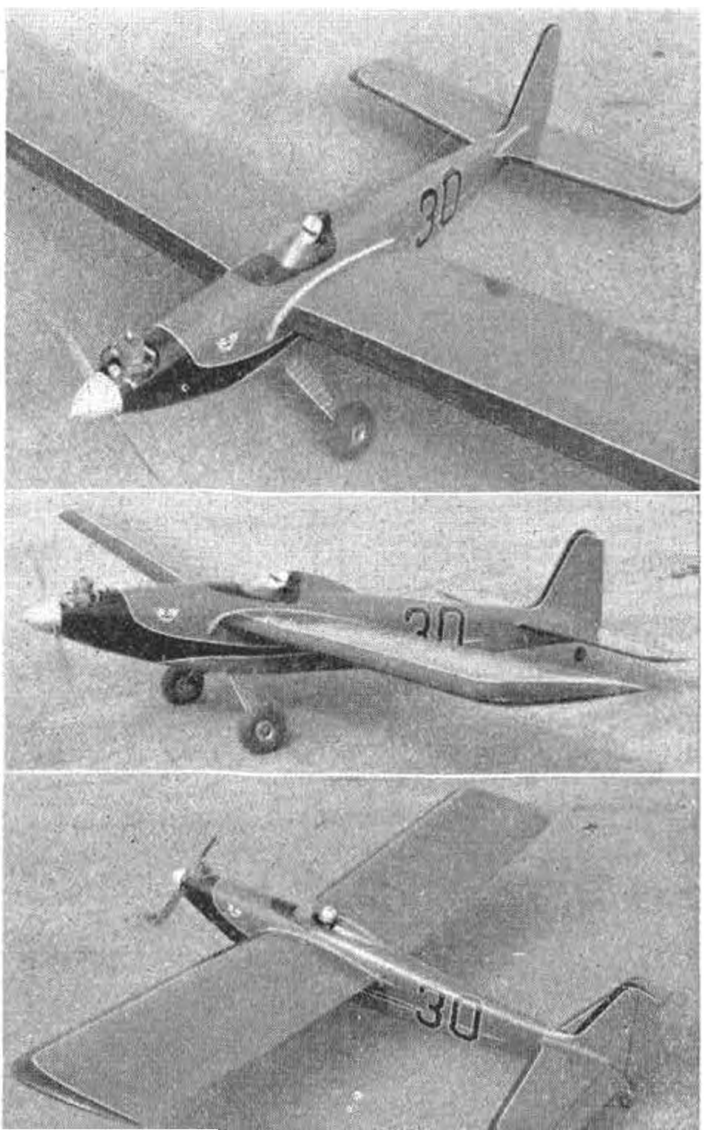
No one was "on orm" for the C/L Trials at Debden, Dick Edmonds being the only expert not to make a mistake. New F.A.I. pylon and fuel regulations proved workable, but whipping is still possible. Ray Gibbs went to diesel after glow misfortune and turned in second fastest speed. In stunt, Frank Warburton showed further improvement and individuality with his neat U-2 own design, to be featured next month. At High Wycombe, the C/Liners were in better form but had to cope with rain showers. Dave Christopher of Weston impressed in stunt and Wallace down from Newcastle in T/R. Was a grand rally, spoiled by litter-louts. High winds blew out scale and single at Sutton Coldfield rally. Wellesbourne though multi coped well. New Frog Jackdaw (Tritone) piloted by Sewart Uwins topped rudder only and Morton's multi Gipsy Moth showed that single-channel is eclipsed in tough conditions. Let's hope they get dead calm next time for R/C Scale!

SCALE AT WELLESBOURNE. 9. Den Thumsston's Sopwith 1½ Strutter, Wright radio, Silver Streak. 10. Scale winner with impressive flight, D. Morton's Gipsy Moth, Orbit 10, Enya 60. 11. Third in scale. D. Bannister's Merco 29 Fokker D VIII with O/D single Rx.

Gee-String



A 70 inch Radio Controlled model for multi-channels which harmonises all the best features of a fully aerobatic design with simple structure and attractive appearance.



by Bob Palmer & Dick Larsen

THIS IS A combined effort by two long experienced aeromodellers who wanted a multi-channel design that would be easy on the nerves when airborne, smooth in its flight pattern and yet sensitive enough to manage any manoeuvre in the book. The result in the words of maestro Bob Palmer is "Anyone who flies multi will have a good plane in the Gee-String. Mine flew right off the board first flight with the force set-up and balance exactly as on the plan. It's a relaxing plane to fly, just stable enough to be easy, the longer nose making the turns keep the nose up, yet it still rolls very well and will roll on rudder alone."

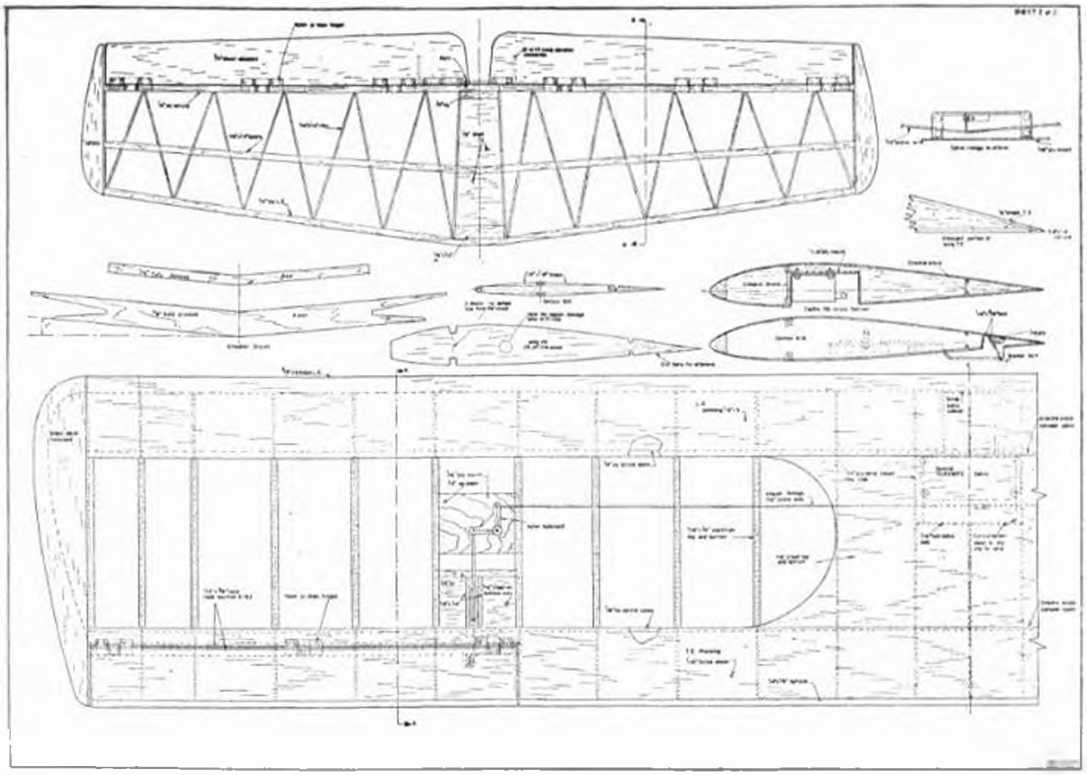
The design owes inspiration to Jerry Nelson's well known *Pegasus* but many design changes have been applied in the course of development over four prototypes.

Through his work as a modeller for Lockheed, Bob Palmer has to make many trips to the Moffett Field wind tunnels from his home near Los Angeles, and in the course of one of these trips, met Dick Larsen who was flying the original shoulder wing Gee-String. Bob flew it and was impressed. It did not drop a wing if speed was lost on a landing approach with too much up elevator applied, and in general it showed such promise that together, the two modellers devised further improvement changes, and the second and third prototypes soon built.

Among its virtues is the inverted flight characteristic of not needing much down trim for level flight; but a point that has to be watched by the novice is limitation of tail control surface movement, for the Gee-String will jump like a scalded cat or spin like a sycamore seed on full rudder/elevator motion. Application of restricted control movement makes the model ideal for the man who wants to feel his way into radio controlled aerobatics, and to progress to contest style performance all with the same model.

Moreover, by judicious use of graded wood and neat construction of the carefully thought out airframe, one

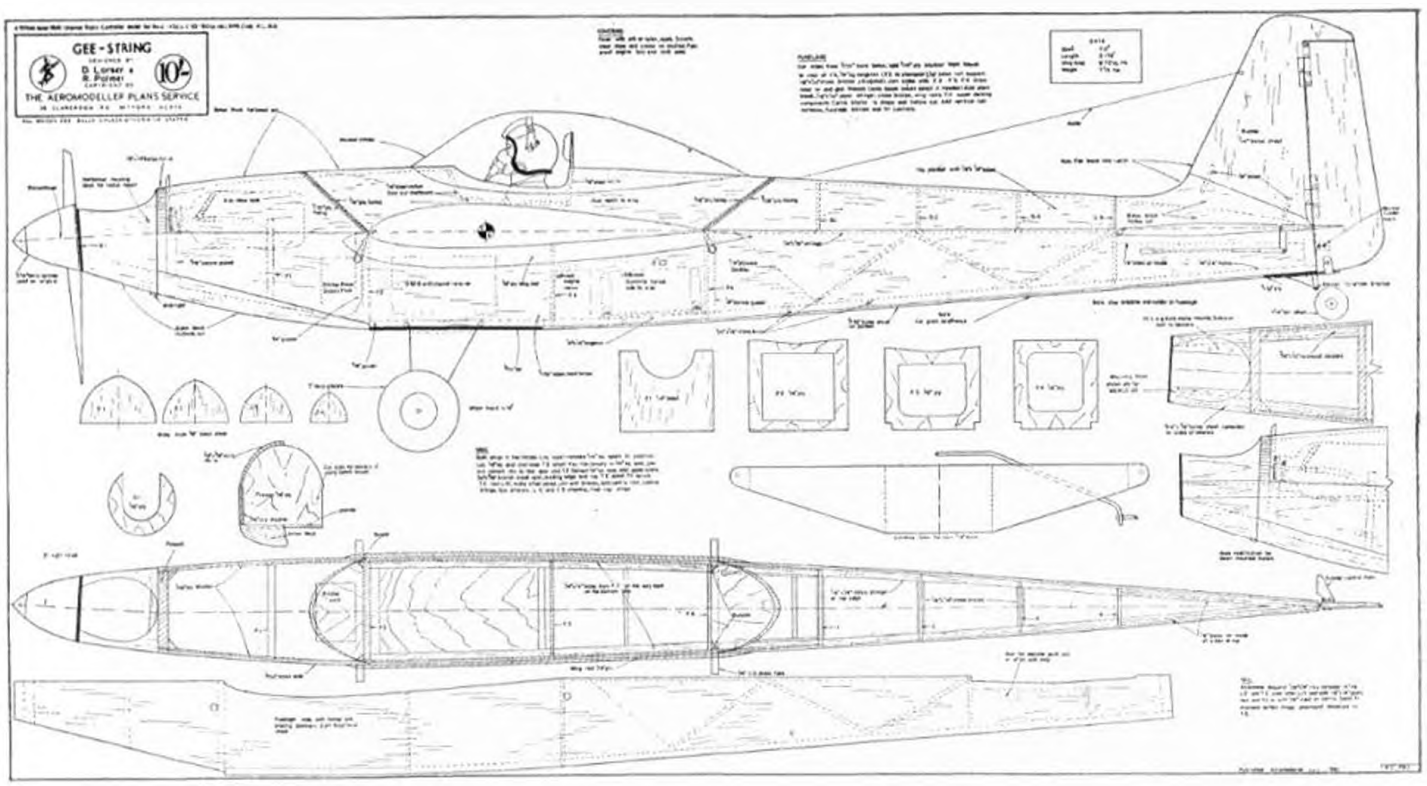
Heading picture shows Bob Palmer (Left) and Dick Larsen (Right) with one of the prototype Gee Strings. Far left, three views show racey and attractive lines well worthy of the fine finish so typical of top American designs. Open cockpit is an alternative for those who dislike moulding large canopies. Full size drawings of this ¼th scale reproduction are available in two sheets price 10s. as plan RC 792 from AEROMODELLER PLANS SERVICE.



can execute all the known manoeuvres with Gee-String on standard .35 cu. in. engine capacity, though that is not to say that a .45 would not provide an edge of advantage in power. In the pictures we see the third model, with a stock Veco 35. The only manoeuvre that gives any trouble with this power combination is the vertical eight, and any experienced flier will soon explain what that entails, for it calls for loads of power to keep that eight in proper shape if the wind is at all strong.

Nor is Gee-String restricted to U.S. equipment. Original specifications are indicated on the plan, and these items are readily obtainable through importers. Home producers of transistor power packs, servo boosters, moulded nylon bellcranks, horns and tailwheel brackets are about to announce their new wares on the British market for those who demand the very latest in equipment. Modellers who already have their gear will find the fuselage capacious enough and with ample accessibility for all the commercial radio outfits.

Many years of topline experience in control-line aerobatics is reflected in the general structure and appearance of the model. It is tough, yet involves no unnecessary weight producing structure. It is easy to build and when examined critically it boils down to being a very simple box fuselage with block fairings and supporting a parellel chord wing, yet the appearance disputes any charge of austerity. It is functional and practical, allows modification for tricycle undercarriage gear if the builder so desires (though Bob and Dick are quite happy with standard two-wheel gear) and we have no hesitation in offering it through AEROMODELLER Plans Service as a refreshing change from the monotony of low wings to be seen (not always successfully or safely) flying over British airfields this season.



AIR MODELLER

AIRCRAFT DESCRIBED No. 110
by P. L. GRAY

Albatros D III

ZAK 3 before serial on this D II signifies use by Officers of the Central Control Commission (ZAK)

IN THE AUTUMN of 1916, soon after the formation of the first newly inaugurated single scale fighter units (Jagdstaffeln) in the German air force, a waspish, bullet nosed fighter began to appear in the Jastas, as they were abbreviatedly termed. This sleek machine was the Albatros DI and was in marked contrast to the hotch-podge of Halberstadt DII's and DIII's and Fokker DII's, DIII's and DIV's with which they had formerly been equipped.

Powered with the excellent 160 h.p. Mercedes DIII and the standard twin Spandau machine-gun armament the Albatros could outfly and outshoot any of the contemporary allied types that it met. The main disadvantage of the type was that visibility was not exceptionally good from the cockpit, a serious shortcoming in any aeroplane, more so in a fighter. However, a slight re-design of the centre section strutting in which the former trestle type cabane was replaced by widely splayed "N" struts with consequent narrowing of the gap, resulted in the Albatros DII. The new arrangement brought the top wing down almost to eye level so that the forward and upward field of view was now almost completely unrestricted, inclination of head to either side gave good forward and downward view as the centre-section struts no longer converged to restrict this field.

Installation of the engine was particularly neat for the period and only the fore part of the cylinder block protruded from the fuselage shell. From the large spinner, the fuselage lines flowed harmoniously to slab-side, with a deeply curved top decking and a slightly shallower bottom decking; the whole tapering to a horizontal knife-edge at the rear. The fuselage was based on six spruce longerons with strong ply formers to which was pinned and screwed the thin plywood skin, resulting in an extremely strong structure. The panel immediately aft of the spinner and others adjacent to the cylinder block were of sheet aluminium, quickly removable to facilitate servicing.

Tail surfaces were of composite construction. The vertical fin was of wood built integral with the fuselage and also ply skinned. The tailplane, of almost semi-circular profile, was of wooden framing but fabric covered. To the small triangular underfin, also a ply skinned wooden component, was hinged a stout ash tail-skid. The horn-balanced rudder and one piece elevator were welded from light guage steel tube and fabric covered.

Of orthodox construction, the wings were based on two main spars with steel tube compression members. Ribs were of ply, extensively fretted for lightness, to which was tacked the soft wood capping strips. False ribs were no more than slats of spruce, spaced between the main ribs and extending as far back as the rear spar. The ailerons—which had a slight inverse taper and broke up the near complete rectangular profile of the wing structure—were, like the other control surfaces, of welded steel tube and fabric covered. They were actuated by a crank lever at approximately mid-span. All interplane struts were of streamline section steel tube; centre section struts were also of this medium and welded to their "N" format. All bracing was of stranded cable and no wires were duplicated.

The undercarriage was a conventional vee type chassis of welded streamline steel tube tied together with a single spreader bar and with the rear legs cable braced. The axle was bound to the apices of the vees with elastic cord which also served as a shock absorber.

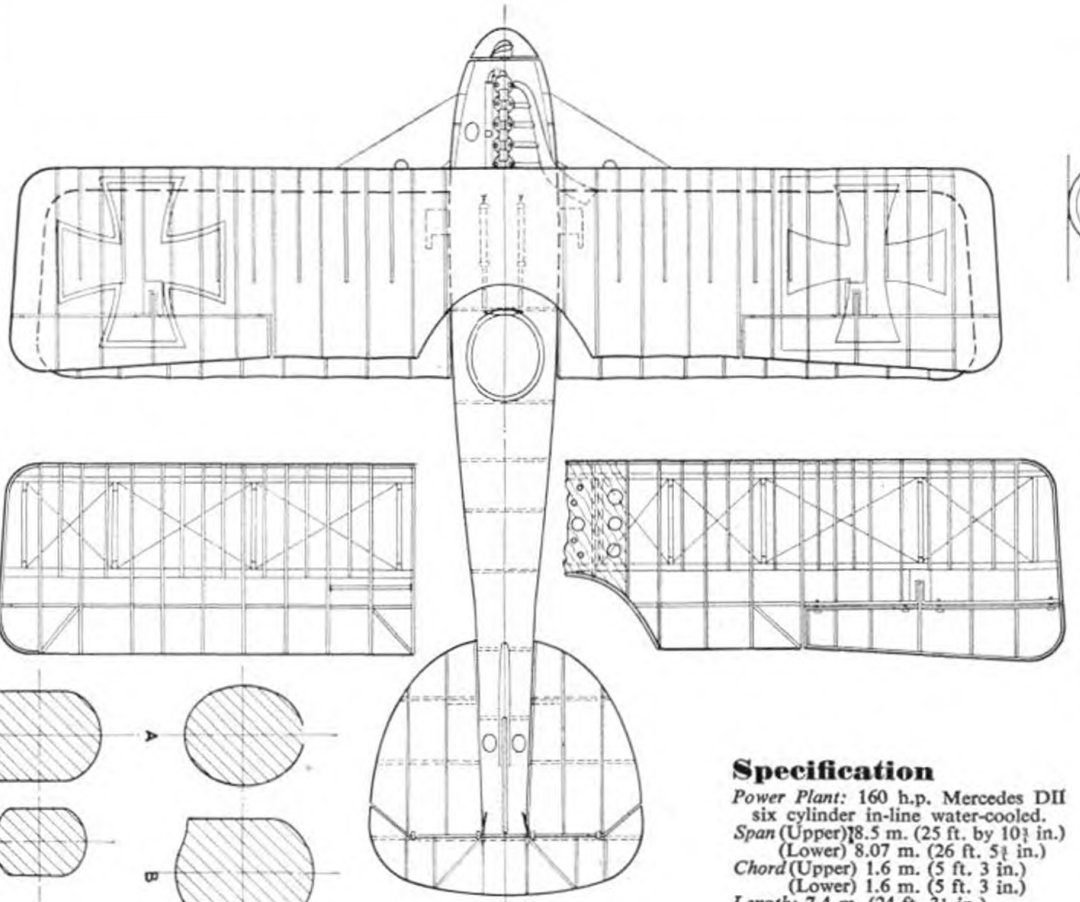
Clean lines of the Albatros DII were marred to an extent by the box-like Windhoff radiators on either side of the nose. An attempt was made to remedy this on the late production machines when a Teeves and Braun radiator was fitted in the upper wing centre-section in exactly the same manner as the Albatros DIII, by which it was soon to be succeeded.

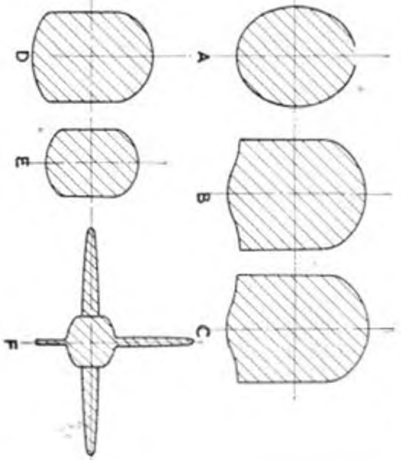
Probably the best-liked German airman to fly the Albatros DII was the chivalrous Oswald Boelcke who commanded Jasta 2 and achieved a final score of some 40 enemy aircraft. He unfortunately lost his life in a machine of this type too when on October 28th, 1916 he collided with Erwin Böhme while both were diving to attack some British D.H.2's; Boelcke's aircraft broke up, Bohme managed to effect a safe landing.

Manfred von Richthofen fought a long duel with Major Lanoe G. Hawker V.C. on Albatros DII and D.H.2. respectively, on November 23rd. Hawker eventually succumbed to the superior Albatros speed and fire power and became von Richthofen's 11th victory. Although the Albatros had not the manoeuvrability of its rotary engined adversaries, it possessed the speed to attack when it held the advantage; and, perhaps even more important, to break off when expedient. The fire power of its twin machine guns was also able to destroy much more quickly than the single-gun with which the majority of its opponents were equipped.

Left, Prinz Frederich Karl of Prussia's Alb D I shot down near Lagnicourt-Vaulx, 21/3/17. *Right:* 180 Austro-Daimler D II. Pics. by Heinz Nowarra and I.W.M.

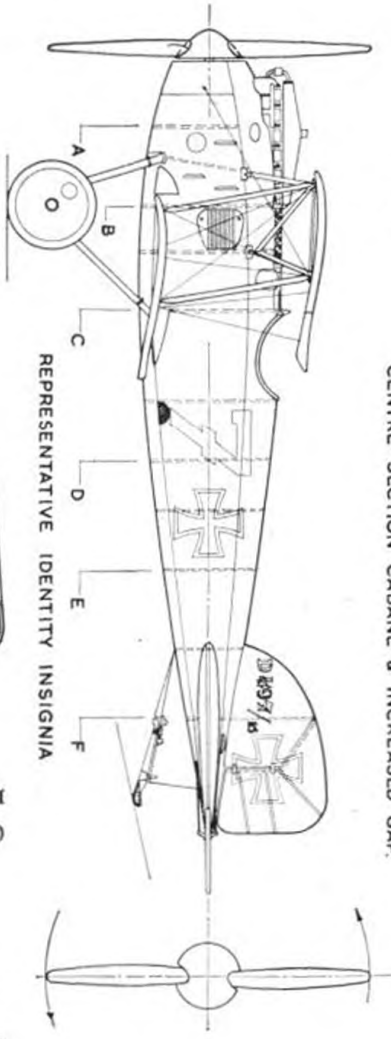
ALBATROS DII (DI DETAIL)





Specification

Power Plant: 160 h.p. Mercedes DII six cylinder in-line water-cooled.
Span (Upper) 8.5 m. (25 ft. by 10¾ in.)
(Lower) 8.07 m. (26 ft. 5¼ in.)
Chord (Upper) 1.6 m. (5 ft. 3 in.)
(Lower) 1.6 m. (5 ft. 3 in.)
Length: 7.4 m. (24 ft. 3½ in.)
Height: 2.64 in. (8 ft. 6⅜ in.)
Dihedral: Nil
Speed: 175 Km./hr. (109.4 m.p.h.)
Climb: 1000 m. (3,280 ft.) in 5 min.
Weight Empty: 637 kg. (1401 lbs.)
Weight Loaded: 888 kg. (1954 lbs.)
Duration: 1½ hours
Armament: Twin Spandau m/c guns synchronised to fire through airscrew



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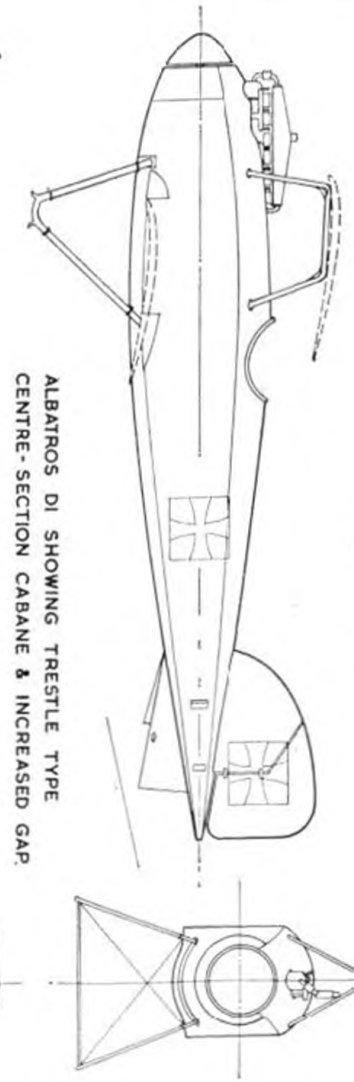


ALBATROS DI SHOWING TRESTLE TYPE CENTRE-SECTION CABANE & INCREASED GAP

Colour Detail

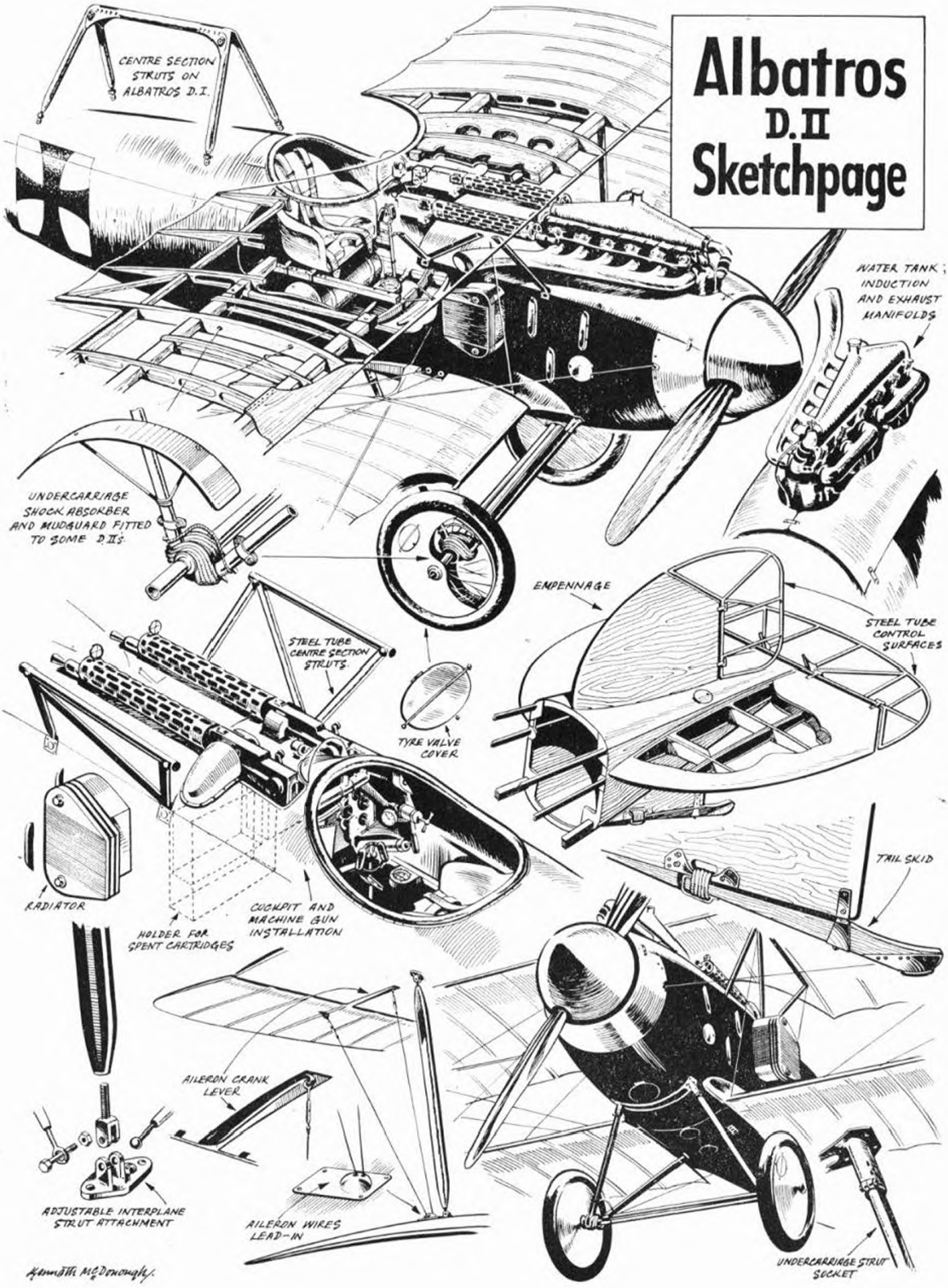
Fabric surfaces, i.e. wings, tailplane, control surfaces, were camouflaged in large irregular patches of dark olive green and deep mauve on the upper surfaces, the wing surface being divided into three or four patches as seen on background aircraft in cover painting. The under surfaces were usually doped a clear sky blue shade.

"Ex works" the fuselage was left in a natural finish with several coats of protective varnish which imparted a yellowish (straw) shade, varying obviously with the texture of the timber. However, some units often painted the fuselage dark olive. The steel struts and metal panels at the nose were painted for protection either grey or dark green.

Patee crosses were painted at first on a square white background but later they were painted with only a white outline. Both examples are shown on G.A. drawing as is also a specimen serial which was painted in black on the fin.

At the period DI and DII were operational (mainly Autumn 1916 to Spring 1919) the grey colour schemes of the Jagdstaffeln had not yet come into usage. It was usually found that a large numeral or personal device such as a monogram, swastika etc.—painted on the fuselage sides in a contrasting colour was sufficient to identify a comrade in the air. Later some Jastas also adopted coloured tails as a unit identity, Boelcke's Jasta 2 had black and white tailplanes, simply starboard half black, port half white.

FT.


Albatros
D.II
Sketchpage
CENTRE SECTION STRUTS ON ALBATROS D.I.
WATER TANK; INDUCTION AND EXHAUST MANIFOLDS
UNDERCARRIAGE SHOCK ABSORBER AND MUDGUARD FITTED TO SOME D.II's
EMPENNAGE
STEEL TUBE CONTROL SURFACES
STEEL TUBE CENTRE SECTION STRUTS
TYRE VALVE COVER
RADIATOR
HOLDER FOR SPENT CARTRIDGES
COCKPIT AND MACHINE GUN INSTALLATION
TAIL SKID
AILERON CRANK LEVER
ADJUSTABLE INTERPLANE STRUT ATTACHMENT
AILERON WIRES LEAD-IN
UNDERCARRIAGE STRUT SOCKET
Kenneth McDonough.

Regular followers of Club News will be aware of the "one off" contest for the A.P.S. La Mouette currently being held by Glevum M.A.C. The heading shows the proud contest participants with their models

London

ST. ALBANS M.A.C. had a good day at the Surbiton Gala, Carl Simeons gaining 1st place in power followed by G. Fuller in 2nd place. M. Burrows gained 1st place in the Glider comp. Les Binge did extremely well in the Halifax Trophy with a flight time of 14:40 out of a possible 15:00. They have unfortunately been experiencing radio interference at their local flying ground and are unable to account for it, making radio flying almost impossible. A theory has been put forward that it might be caused by electrified fencing in the area as this works on a pulse system. They would be pleased to hear from anyone with ideas on this subject.

April 6th, 7th and 8th HORNCHURCH M.A.C. took part in an exhibition of hobbies at a local school arranged by the Hornchurch Rotary Club. The exhibition, as far as the club was concerned, was arranged in 2 parts, a static display and a flying show. The static display featured models from all competition classes as well as one or two unorthodox—a Warren Young wing *Ace of diamonds* and a Mercury *Aggressor*. A construction stand was also set up and several members of the club helped to staff this over the 3 days. The flying display was restricted to exhibitions of stunt, combat, and ½A. The exhibition was a great success with nearly 6,000 people passing through.

At the Dagenham rally KENTON M.A.C's George Copeman and Bob Parnell came second equal in Class A Combat, and for the past two years Bob hasn't flown a combat model! (or any other type—exams!) New engines are appearing in the club now. As usual most are Olivers but both a Super Tigre G20 v Jubilee glow and diesel version have been acquired.

WANSTEAD A.C. has recently formed an insurance policy which for 3d a week can cover the cost of repairing motors damaged during the participation of an event in the name of the club. Although no claims have been made to date everyone is supporting the scheme and has encouraged more members to enter comps.

NORTHWOOD M.A.C's Pete Perry managed to break their bad start to the combat season by winning at High Wycombe in great style, and Peter Tribe followed this up by coming second at the Stockport Rally at Woodford after camping the night in a local swamp.

The C/L Trials were the most off-form period HAYES & D.M.A.C. have had for a long time. At the Trials and at the High Wycombe Rally, three F.A.I. team racers were written off! Dave Balch clocked 4:52 at Wycombe to get into the semi-final of class A, in which he crashed due to the rain binding up his lines. John Taylor is the owner of an engine, that sounds more like a turbine in the air, a works tuned *Holland Hornet* .051 turning a hand-carved 4½ x 7; it has so far reached 101 m.p.h. in a medium weight fibreglass job.

R/C is progressing well in MARS M.A.C. but funds are holding up their assault on the multi class. By the end of the year though they expect to have at least two full multi R/C planes flying, one O/D scale, the other an inevitable *Orlon*. Plans for the future include every member flying at least single channel, using O/D 6 volt Transistorised tone receivers the prototype of which is working well. Their services were offered to the S.M.A.E. for help in clearing up litter after the "Nats"., in next months club news they will mention a list of oddities (if any) left on the drome.

At their Prizegiving and Social on April 28th 1961 COSMO M.A.C. had the pleasure of the company of the Editor as their Guest of Honour and who presented the prizes, S.M.A.E. Secretary, Major S. D. Taylor, four representatives of Sidcup A.S., and a full complement of parents, friends and members. A most enjoyable evening was had by all with music provided by Ron James and his Merry Men, (a Club group). The large display of models was commented on by several visitors as being the best they had seen anywhere. Fred Andrews gave a short display of high speed RTW (round the wire) flying his "Pee Wee" *Spitfire*. P. Jefferies "*Coy Kat*" was well up to his usual standard and won him a 2 gn. model voucher, presented by Roland Rees Ltd. (Local Model Shop), for the best model.

Junior Brian Sulway of CROYDON D.M.A.C. placed third in the Area S.M.A.E. Cup results with eleven minutes odd with the Dennis Partridge *South Cone* design, which seems to be rapidly becoming a *Nebula* replacement. The Walpole-Fletcher-Uwins team put the new *Frog Jackdaw* into first place in single channel at the Sutton Coldfield "do", thanks to Stewart's competent button pushing in near gale conditions. The long awaited Paul Anderson six-channel "*sort of Orion*" has finally emerged, Merco 35 5-powered and rudderless.

North Western

In Liverpool D.M.A.S. junior members are taking a keen interest in stunt flying and getting away from the incessant combat models. Members have again been invited to put on a static display at English Electric's Flower Show, this has now become a regular feature on the club calendar. Woodford saw the free flight members take home a share in the prizes with 3rd in rubber and power for Barnes and Sarini respectively though not without loss of one "*Topflite*".

The C/L Section of CHARLTON M.F.C. spent most of the day organising the F.A.I. T/R at the Woodford Rally. Of the 44 pre-entries only 14 returned times but in spite of this the final was fast and furious, as reported by Wharfedale. During the day Barry Purslow took time out to win single-channel Radio with his Veco 19 R/C "*Rattler*" Dick Jones placed second in the scale event with his Hawker Hind and John Birks placed second in Chuck Glider.

Western

A controline competition held recently at R.A.F. Locking was run efficiently by the R.A.F. with five prizes. Dave Christopher of WESTON CONTROLINERS won the stunt event using his original *Skua*—still going strong. Roy Burgess led the F.A.I. racing event and Vic Needs the "½A", while Pete Heeley won combat with a very fast model. At High Wycombe, Roy Burgess placed fourth in combat and Dave Christopher finished second in stunt with his beautiful brand new large scale *Skua* with Merco 35.

Midland

Only thing OUTLAWS (CANNOCK) M.A.C. can boast about at the moment is the ownership of the first two *Fox* 40s in the country—make quite a difference to a normal "35" ship. F/F power has mysteriously appeared in their ranks with a "*Y-Bar*" and "*Eureka*" performing nicely at the moment and two *Dixielanders* on the way.

On Thursday April 13th, MARKET HARBOROUGH M.A.C. held a Concours d'Elegance. First juniors were John Shiers with his *Altair*, and Roger Vincent with his *Golden Wings* which he had just completed in a beginners class. E. Vye won the senior covered section with a Ritz *Continental* A/2.

LEICESTER M.A.C. entered their 25th year of existence on April 1st, and look like having the greatest ever membership, with 110 members just after "sub" collection. (The kitty must be fat!) The monthly Combat Cup competitions have proved popular, the last cup holder being Mr. J. Mushett but despite this combat practice, the PETERBOROUGH and WHITTLESEY clubs gave them sound beating during a return match on Leicester's ground at Braunstone Aerodrome on April 23rd; Messrs. M. Fountain and T. Fairchild being 1st and 2nd in the knock-out comp.

Southern

GODALMING D.M.A.C. were hoping to run a C/L Rally again this year, but are sorry to say that with arrangements well in hand, they have been refused the use of the proposed ground. This comes as a great blow as no indication of the possibility of this has ever been mentioned; particularly in view of the fact that they have never made themselves a nuisance in the town. In fact, they have always been most careful to keep noisy activities to an absolute minimum, always donating to a local charity from the proceeds of any events which they have organised. Someone complained about the noise it seems, but members are at a loss to understand why the complainers could not tolerate them for about 7 hours on one day per annum, particularly as a Fair uses the same ground 3 times a year for a week at a time, and keeps the whole district awake until midnight or later. The date was to have been June 18th. It is hoped that they can find a suitable venue away from the Borough for future efforts, which will be run purely for the "Boys"; they can well do without all the extra work involved in making money for charities.

Four members of WORTHING BALD EAGLES M.A.C. sharing a communal workshop are in the process of building themselves out of occupation. Contents to date include; 11 Combat models with more on the stocks, one R/C model, one monstrous *Hovercraft*, 7 team racers, 3 rubber models, 4 stunters, 3 scale C/L multi's and about 3 cwt. of balsa shavings. These, together with all the other accoutrements of aeromodelling and the models in varying stages of construction and decrepitude not mentioned, is quite something.

BEXHILL M.A.C. is another club with a flying field problem, but the only difference is that they have solved theirs with the help of the town council. They are now flying on three grounds working them in rotation once every three weeks. The club still continues to correspond with Australian and Canadian clubs.

Recently LEATHERHEAD M.A.C. member Colin Burbridge scored 7 mins. 50 secs. in the K.M.A.A. Cup, at R.A.F. Tangmere. A week later a small coach party went to R.A.F. West Malling, members enjoyed the day with some general sport flying. The clubs C/L flying ground at Fetcham Grove is proving popular with combat models appearing in large numbers, silencers are being developed to keep noise down to a minimum, as the area is in the middle of the town.

EAST GRINSTEAD M.F.C.'s R/C delta enthusiast, Roy Payne was flying at the club field recently when a *full-size* Tiger Moth startled him by flying across the field lower than his model, subsequently giving chase to the delta, round and round the field! The delta justified all their claims about its speed, for the Tiger Moth

couldn't catch it. Praise for one of the A.P.S. designs:— Colin Greig has built a "*Lucifer*" and claims it is his first A/2, he has had consistent max's with it, with about five in a row one afternoon.

At **BOURNEMOUTH M.A.S.**'s A.G.M. it was decided to replace the A. V. Roe Championship Trophy which was won outright two years ago. The new Trophy, a replica model of the 504.K Avro will be known as the A. V. Roe Memorial Trophy, in memory of the late Sir Alliott Verdon-Roe O.B.E. president of the B.M.A.S. from 1930 until his death in 1958. Another A.G.M. decision was the appointment of a Radio-Control competition secretary (Mr. S Taylor) to cope with the increased R/C activity within the Society, and the possible recruitment of a number of unattached R/C enthusiasts known to be operating in the district.

East Midland

Multi R/C plays a prominent part in **LINCOLN A.C.**, Eric Kent is doing well with an *Orbit* 4 channel "*Electra*". Mr. Foster's new *Orbit* 8-channel "*Astro Hog*" is performing well; M. Elmer's 10-channel "*Orion*" is nearing completion. P. Clarke with his single-channel "*Emeraude*" takes care of the scale side of the R/C field. The club has many up-and-coming C/L flyers who are now moving over to the ·35 Stunters: *Pinnacle* 1½rd size *Spectre Thunderbird* and an O.D. have already flown. The secretary is willing to swop a 15-minute colour film of the World Wakefield Competition 1959 in France for any other movie film on modelling especially on R/C. His address is 559 Newark Road, Lincoln.

South Eastern

ISLE OF THANET M.A.C. have fixed the date for the Ramsgate C/L Rally as Sunday, August 6th, at Jackie Baker's sports ground, commencing 11 a.m. Prize money will be subject to entries and pre-entry is required and must be sent (with 2/6 P.O.) to the Rally Organiser, J. Lakin, 115 Percy Avenue, Kingsgate, Broadstairs, Kent, not later than July 30th.

Several members of **TUNBRIDGE WELLS M.A.C.** attended the High Wycombe Rally and though no success was resultant all had a very enjoyable time. Several displays are lined up for the near future which, it is hoped, will win the club new members and maybe encourage the council to restore to the club its control-line field. A new silver cup has been purchased out of club funds and a f/f event is to be held to encourage the younger members who would win a cash prize as well as the cup should they prove victorious.

On April 30th in the Weston Cup at West Malling **BRIGHTON D.M.A.C.**'s Dennis Latter topped the Area result with a score of 15 minutes plus fly-off times of 3½ min. and 1 : 53 minutes and but for running out of rubber the model was performing so well it seemed that he could have achieved at least another two or three maximums. Fred Boxall came second with 12 : 28 minutes and his brother Reg. third with 8 : 27 minutes. In the Halfax, Ian Lucas topped the Area results with 11 : 25 and John West, who had trouble with the trimming of his model, was third with 8 : 39. Dennis also won the rubber event at the Surbiton Gala and was third in the Glider which made him Gala Champion. John West lost his veteran *Dixielander* with which he had been in so many fly-offs last year.

Northern

Highlights of the **NORTHERN AREA NEWS** (price 6d.) for April and May have been a Power Modeller's "special" with good gen from Brian Egglestone and T. Unsworth plus three-views of Alan Carter's Open Power job (second in Frog Sr. 1960) and Dave Gordon's ½A *Tenderfoot*. Also Team Race gen by Ken Long, with a three-view of the Wharfedale latest and Michael Turner's 58-second Indoor chuck glider.

Rat Race held in April was a great success, reports **HUDDERSFIELD D.M.A.C.** Arthur Bradley flew his *Unlimited* to victory in 6 min. 8 sec. Second was Allan Schofield flying a *Splatt*. Third was John Woodhouse with his Razor Blade. About 40 members had a good day at Woodford on May 7th, but one of their Chuck Gliders had to be left on a hangar roof due to the very high winds. One of their Juniors was so engrossed in the demonstration of Radio Control flying, that he failed to notice the water rising over his shoe tops, and in consequence all had the rather unwelcome odour of drying socks on the return journey.

The few lines in "Club News" last month pointing out that there are *two* Aeromodelling clubs in Huddersfield were read with interest by members of the **H.M.F.C.** (not H.M.F.C.I.) and they point out that their club is *also* affiliated to S.M.A.E., now rather more than a year old and proving to be a very sturdy infant. They claim that the H.M.F.C. not only meets but is the only club which regularly flies in Huddersfield. Sounds like war to me! This should be ripe ground for inter-club challenge contests!

Mr. Leonard Davies is giving up active aeromodelling for the most ambitious project ever conceived by a **HALIFAX M.A.C.** member: he is going to build a *full size Luton Minor*! At the Woodford Rally the club's only success was the third place in Combat, gained by David Piggin, flying in his first contest! Recently, a 14-year-old club-designed A/2 did a 2 : 58 flight, covering the length of the local flying field, from a 20-ft. towline.

For the second eliminators on April 30th **BAILDON M.F.C.** were blessed again with pouring rain. In F.A.I. Power, Frank McNulty, getting back into the swing of things after his National Service, was best at 8 : 43. Henry Tubbs managed 11 : 50 in the Wakefield. At the Woodford Rally, their members topped almost all free-flight events except radio — Gerry Tideswell won rubber, Tom Stoker power and chuck-glider, Geoff Illingworth won glider, with M. Proctor placing first in junior power and second in junior glider. Gerry Tideswell has developed 300 sq. in. rubber model that makes four-minute maximums appear ridiculously easy and he used this to good effect in the Woodford fly-off.

ROTHERHAM & D.M.A.C. contest flyers are beginning to get "on the ball" and models at present in use or under construction include *Pulteri's*, *Eurekas*, *Dixielanders* and *Y-Bars*, plus *Topscore*, *Empress*, *Roplano* and *Sans Egal* in the glider field. The power jobs sport engines ranging from *A.M.*15 to *Merco* 35. R. Boid, top northern area man in the "Astral", was unfortunate to lose his *Merco* 35 *Pulteri* at Woodford after attoning for a poor first flight with a second round max. However, he recovered it almost a week later. M. Bartholomew bent his *Sans Egal* when called upon to fly in a hailstorm at Woodford, and G. Stringwell had the mortification of scoring a max from a half-second over-run, then having his *Eta* 15 *Eureka* soaked in a rainstorm; this precluding further competition.

On April 23rd a small force of **WHARFEDALE M.A.C.** members made the long trek south to the C/L trials at R.A.F. Debden. The results of their efforts were not without merit. The Long Davy F.A.I. team flying the 1960 World Champ's *Tigress V* succeeded in establishing a couple of useful times (5 : 10 and 4 : 54) which qualified them for one of the top three places. It was the opinion of their members present that in future this event should be located at a more central venue (44 miles from London can hardly be called centrally located). Twenty-six members had an extremely successful day at the Stockport Advertiser Rally at Woodford on May 7th. Achievements were no longer confined to the T/R events and were of the best they have ever attained.

East Anglia

MARCH & D.M.C., formed last October and boasting some 35 members in its aero-section, collected two "feathers" for their cap recently. After a six months' trial "run", the club members, 50 in all, decided there was enough interest to continue and last week they added to their list of officers Mr. John W. R. Taylor, Editor of *Jane's All The World's Aircraft*, and a leading aviation journalist, as President, and Flying Officer Peter Perry, the first of the country's young A-bomber captains as Vice President

CAMBRIDGE M.A.C. recently held an auction. Members brought all their space wasting junk, the items were sold, and all proceeds went to club funds. It made an entertaining evening with some remarkable bargains: 4-in. airwheels for 5/- but some ancient airframes had to be given away, now presumably wasting someone else's space. Of the large models which have been on the way for some time first in the air is Eric Miller's *Merco* 35/*Nobler*, so pleasant to handle that he will not make any more small models. The brilliant yellow finish has drawn admiring comments, the secret being sprayed silver undercoat which also saves considerable amount of colour dope. The Editor attended a recent meeting with some models which he demonstrated in detail followed by a showing of films.

A new club has been formed as a branch of the **CURZON CLUB** at Barking. The club will be doing model making in a general way but at the moment the members are making mainly boats and aircraft. They have a total number of 35 juniors at the moment, who are all very keen modellers, and five adults. Meetings are held on Monday nights from 7 to 9 p.m. at Bastable Avenue, Barking.

South Midland

HIGH WYCOMBE M.A.C.'s Control Line Rally is increasing in popularity every year, the total of entries this year being 280 made up of 160 combat, 70 F.A.I T/R, 30 "B" T/R and 20 Stunt. There is now doubt that next year the club will have to restrict entries, particularly in Combat, though they were pleased to see not only an increase in numbers, but an improvement in the standard of flying. In F.A.I. there were six models that returned a time of 5 : 00 and under, the best of the day going to Mike Bassett, at 4 : 48 and in "B" Steward Taylor did a 3 : 20 for the fastest heat and 7 : 1 for the final. Stunt was to a very high standard in the perfection of the models as well as the flying. Combat was keenly fought out through endless rounds, although this event was somewhat marred by rain in the afternoon. *What they did not like* was the filthy mess left behind by some very thoughtless folks, such as *bean tins, banana skins, bread*, as well as *miles of C/L wire*. Also they took a poor view of the "*Gent*" who *stole* the tins of dope from the Combat Control. An event such as their's takes a great deal of time and effort to organise, they like doing it but when things like that crop up it takes a great deal of pleasure out of the proceedings, but this is all cancelled out when they receive letters ofappreciation

Scotland

GLASGOW HORNETS M.A.C. started off their second year of competition flying with a club combat competition, held at their present flying field at Braidbar Farm, Giffnock, on April 30th. Of the ten competitors, none failed either to beat the two-minute starting bogey or to give an interesting display of flying. The final brought together a *Silver Arrow-Gladiator* and a *Viper-Gazelle*. This somewhat unequal combination didn't give much opportunity for streamer cutting, the *Gazelle* winning by 1 less point lost on the ground.

For the first time in the **ANGUS AND DISTRICT** League's history, there was a fly-off to decide the winner, when three competitors got three maxs each in the first 1961 U/R rubber competition. David Petrie (Montrose) scored 3 min. 23 sec., David Wright (Bucksburn) 2 min. 33 sec., and Charles Christie piled in his newest rubber model

to return a modest fly-off time of 7 sec. In the glider event, run concurrently with the rubber, Charles Alexander (Bucksburn) came first with 7 min. 42 sec., flying his "Topscore" in its second season. Second was David Petrie with 7 : 02.

THE CLUBMAN.

S.M.A.E. Contest Programme

June 18th
•Model Engineer Cup (U/R Team Glider) *Area* Flight Cup (U/R Rubber)
June 24th - 25th *R.A.F. Barkston Heath*
FREE FLIGHT TRIALS (F.A.I. Rubber/Glider/Power)
July 9th *Centralised*
C/L Speed
July 15th - 16th *Centralised*
FREE FLIGHT TRIALS (F.A.I. Rubber/Glider/Power)

S.M.A.E. Contest Results

GUTTERIDGE TROPHY

1st Wakefield Eliminator 47 Entries Area Centralised 19th March,

1.	Robert, G.	Lincoln	14:04
2.	Monks, R.	Birmingham	12:47
3.	Nicholson	Canterbury	12:35
4.	Pool, D.	Birmingham	12:02
5.	Lefever, G.	C.M.	11:39
6.	Chambers, T.	Tees Side	11:33

K.M.A.A. CUP

1st A/2 Eliminator 206 Entries Area Centralised 19th March, 1961

1.	Dallimer, G.	Stevenage	13:08
2.	Hinds, S.	Wallasey	12:58
3.	Henshall, B.	Heswell	12:38
4.	Challen, T.	Northern Heights	12:26
5.	Burrows	St. Albans	12:05
6.	Wiggins, E.	Leamington	11:49

Contest Calendar

June 18th. Junior Leaders Regiment R.E. C/L Rally—Combat Stunt, Speed. *Old Park Barracks, Dover.*
June 18th. Scottish C/L Nats. *Beveridge Park, Kirkcaldy.*
July 2nd. Northern Heights Gala—All F/F classes, R/C Spot landing, Combat, Concours d'Elegance. R.A.F. *Halton.*
July 9th. West of Scotland F/F Gala—R.A.F. *Abbotsinch.*
July 23rd. Ashford C/L Rally—Combat, F.A.I. T/R. *Victoria Park, Ashford, Kent.*
August 6th. Ramsgate C/L Rally. *Jackie Baker's Sports Ground, Ramsgate.*

CLASSIFIED ADVERTISEMENTS

PRESS DATE for issue August 1961, June 19, 1961

ADVERTISEMENT RATES

Private	**Minimum 18 words 6s. and 4d. per word for each subsequent word.**
Trade	**Minimum 18 words 12s. and 8d. per word for each subsequent word.**

FOR SALE

Selling up; A.M.25, 30s.; AEROMODELLER transmitter, £1. E.D. Mk. III rubber escapement, 10s. Allbon Merlin, 30s. Hawkins, King Alfred's School, Wantage, Berks.

Aircraft of the Fighting Powers, Vols. 1-5 good condition, 75s. Willoughby, 26 Faversham Avenue, London, E.4. Sil. 6244.

Plans; 21 *Model Aircraft*, December 1958-1960; AEROMODELLER *Annuals* 1954, 1957, 1958; 15 AEROMODELLERS, between 1942-1946. Offers? Exchanges considered. P. Hancox, The Gables, High Street, Tewkesbury, Glos.

New Enya 15D, £2 10s. 0d. ETA 29V, £2 10s. 0d. 6 Topflight 8 x 3½, 10s. S.A.E. for odds and ends list. K. Croft, 147 Queen Street, Redcar, Yorks.

AEROMODELLER 1950 to 1955 complete; also other modelling books. What offers the lot? Fisher, 9 Lamorbey Close, Sidcup, Kent.

AEROMODELLERS, 1944, 1945, bound, 20s. per year. Fighters, 1914-1918, Harleyford, 20s. Aircraft, 1914-1918, Harborough, 20s. Hodgson, 22 Oaktree Gardens, Bristol 6.

Frog 80, 150; AM 10, 15; Fox 10; OS PET;—with aircraft. Also books, accessories, aircraft. 240 Norwich Road, New Costessey, Norwich.

New, unused Forster G29, 75s.; Arden 099 Spark, 60s.; O.K. Cubs: .074, 45s.; .099, 50s.; 2 149's, 50s. each. Atwood Wasp .049, 55s.; Very good: Atwood Champion 10 c.c., 80s.; Ohlson 23 Spark Glo, 45s.; E.D. 3·46, 40s.; Arden Glo, 42s. 6d. As new, Handee Grinder Engraving Tool, 25,000 r.p.m. 115 V. 25/60 cyc., with 32 bits, stones, etc., what offers, or exchange 1 ph. 240 V. 50 cyc. ½ h.p. motor or W.H.Y.? Wanted Vol. 7 A.F.P.'s, Book of Bristol Aircraft. Marsden, 176 Somersall Lane, Chesterfield, Derbys.

Ladybird, almost complete, Bench run Sabre. Two unused R.E.P. relays. Offers. Bowcott, 8 Bulmers Avenue, Garden City, Hereford.

O.S. Max II 35, unused, £4. Oliver Tiger II, rebored by Oliver, unused, £4. Both immaculate. D. McEwan, 31 Parkside Road, Alyth, Perthshire.

Taycol Asteroid motor £1. Ex-government 12V. electric motor, 10s. F. R. Clockwork escapement, £1. E.D. standard escapement, 10s. AEROMODELLERS 1953-58, *Afodel Aircraft* 1953-56, 7s. 6d. year. Wanted: Sigma SCR522 relay. C. Morrell, 15 Gallows Hill, Hunton Bridge, Herts.

Radio 'plane 5 ft. span, Fox 19 R/C Special, Varicomp escapements. Airwheels, wired for Ultraton Rx. Excellent flyer will demonstrate. £20. Also Galahad, £10. Taylor, 33 Cecil Avenue, Bournemouth.

Fox 19, hardly used, good motor, £3 10s. 0d. B. Wilson, The Old Parsonage, Swanland, N. Ferriby, E. Yorks.

E.D. Black Prince 1 tone transmitter, as new, £8. Good Elfin 2·49, 30s. G. Halley, 46 Poplar Road, Methil, Fife, Scotland.

K. & B. Torp 19, 90s. Frog 80 diesel, 20s. C. Ashworth, 24 South Royde Avenue, Halifax, Yorks.

Nine engines, plans, kits, many accessories. S.A.E. details. Hoare, 35 Gloucester Road, King's Lynn, Norfolk.

Rivers 2.5 c.c. New, unused. Bench run ½ hour. Perfect condition. Taylor, 58 Arcadia Avenue, Brooklands, Sale, Cheshire.

Merco 35, Fox 35, 70s. O.S. 35 III R/C, 120s. Bellaphon A, £10 10s. 0d. Octones, £30-£40. Reptone £10. Olsen servos, 55s. Tornado Twin, £8. Boomerang set, 70s. E.D. set, 90s. Unitone, £10. New R.E.P. and E.D. for sale or exchange. K. M. Greaves, Hutton Rudby, Yarm, Yorks.

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