JUNE 1948

AEROMODELLER

1/3

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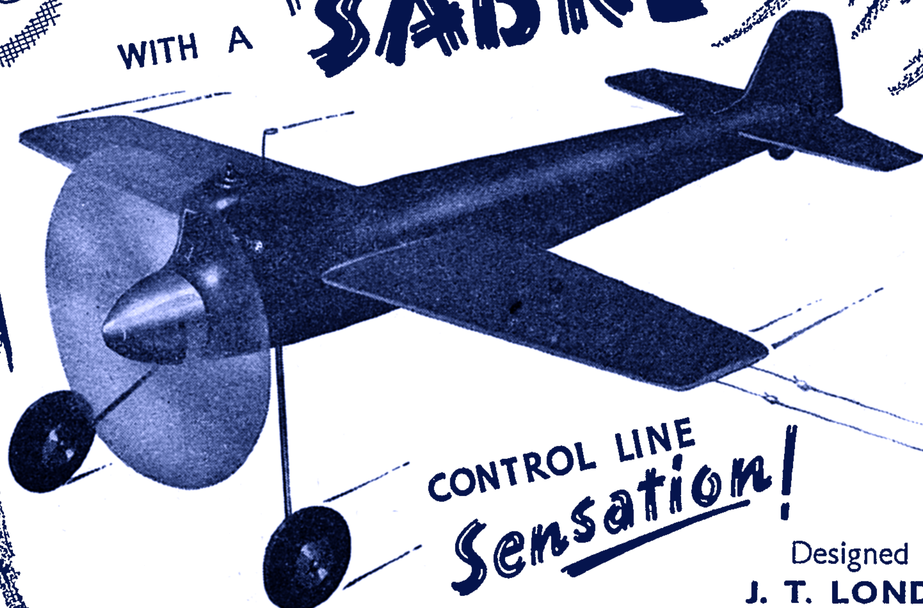

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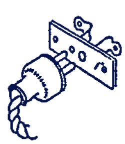

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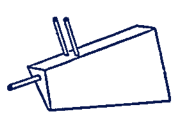

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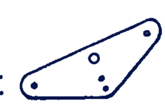

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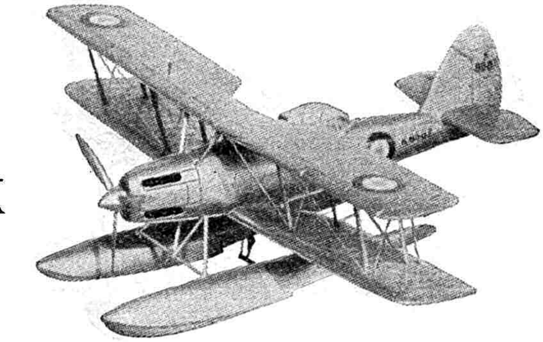

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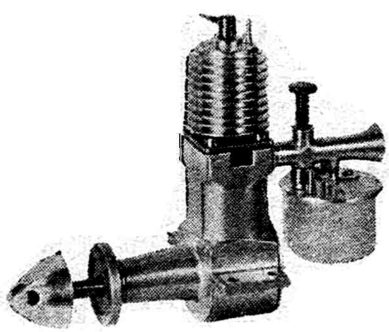

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STRENGTH. The new forged conrod and the crankshaft, strengthened in main shaft and web, increase the robustness of the engine 100%. The choke tube, guide and cut-out column are a one-piece forging in light alloy and the cut-out sleeve and arm is a one-piece unit in steel. In addition, the magnesium crankcase is stronger than any casting in conventional alloys.

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PLUSES. Due attention was given to modellers' requests. The engine speed is fairly variable by adjustment of compression. The flexible jet tube ensures steady fuel feed also during steep climbs. The cut-out spring has been carefully balanced to exercise just that advisable amount of bias without affecting the pull of a perhaps weak timer.

The filler opening is large and conveniently spaced. The compression lever screws into the adjusting screw which is tapped cross-ways to facilitate resetting to any conditions which may otherwise be outside the range of the usual full turn of lever. Extended fuel needles are available; however, for the convenience of those who wish to add an extension of non-standard length, the fuel needle is also drilled to take a 1 mm. wire which is easily sweated in.

APPEARANCE. In addition to the renowned Mills workmanship and the general streamlining of the engine, the Mark II is polished all over and the steel parts are blued. These finishing touches were added because the serious aeromodeller devotes such care to perfecting the appearance of his model that it is only fair to give him an engine of equal beauty.

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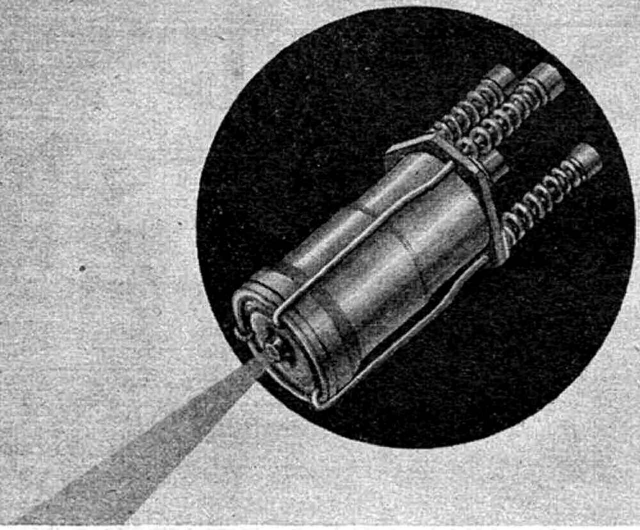

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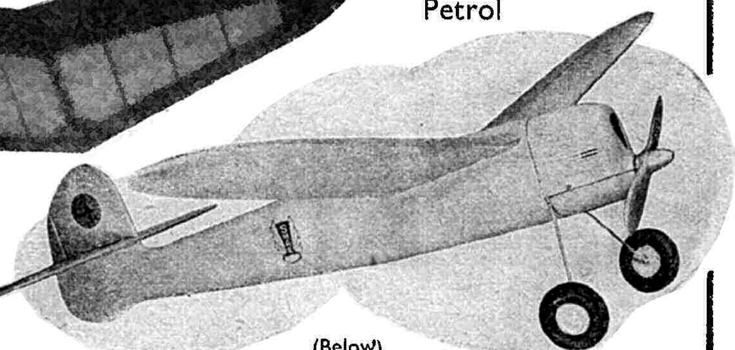

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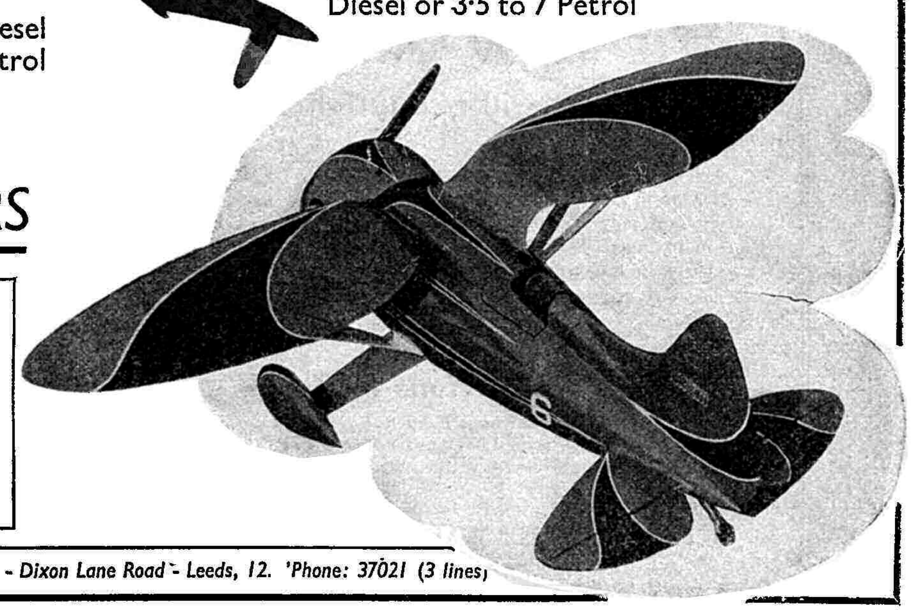

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ESTABLISHED 1935

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AEROMODELLER

INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

(CONTROL) LINE-SHOOT: "There I was, upside down, nothing on the clock. . . . !!! "Henry J." in characteristic attitude soliloquises for television with "Dicky" Dickson of the Aeromodeller supplying well earned local admiration. The occasion—a control line exhibition at Kensington Gardens.

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GLOSTER METEOR
Featured on page 355

EDITORIAL

WAKEFIELD CUP

THE Wakefield Trophy competition is being revived this year and will be held at Cleveland, Ohio on Thursday and Friday, August 26th and 27th under auspices of the American Academy of Model Aeronautics. Within the next month or so selection of the British Team—by competition—will have been completed and we hope that by then also the Council of the S.M.A.E. will have announced its arrangements for the British team to compete.

At the time of writing there is little or no news as to which of the other European countries will be sending teams but we trust that there will be a fair representation, so that the competition can be truly International.

Needless to say, we shall expect the British team to bring back the trophy—but above all we look forward to a really good competition with the best man winning. Both our Managing Editor and Editor will be flying to the States to attend the meeting and readers of the AEROMODELLER may look forward to a fully illustrated report of the meeting in the issue of the AEROMODELLER published towards the end of September.

In our previous Editorial we referred to a new development in the powering of model aircraft. In this issue we are able to reveal that this work has been pioneered by Messrs. Wilmot Mansour Ltd., and our advertisement pages carry the first announcement of the power units which are now available. Considerable research work has been carried out by the AEROMODELLER technical staff in conjunction with Wilmot Mansour Ltd., with a view to producing model aircraft suitable for use with these new units, and in this issue we publish plans of two models in which they may be used. The first—" Zephyr "—designed by Mr. H. E. (Tim) Hervey, will appeal to beginners and may be relied upon to give a first class performance. For those aeromodellers who prefer a more advanced type the " Meteor " should have a special appeal. As the thrust developed by the twin motors in this model approaches the all-up-weight, a " meteoric " performance may be expected—but care must be taken to see that *both* units are working properly before the model is released.

Tail-Less Island.

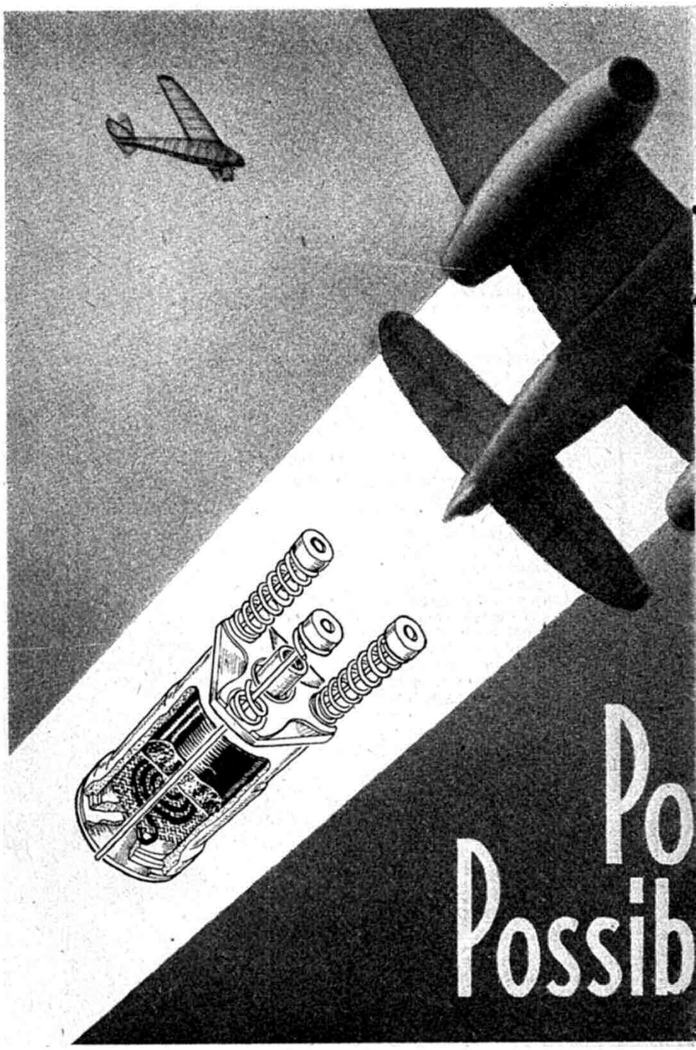
Last month we were the guests of the Manx Model Aero Club in the Island, during which time negotiations were concluded with the Manx authorities for the holding of an Aeromodelling Rally which will be an annual event on a par with the British and Irish Nationals.

The meeting, which is scheduled for the 6th, 8th and 10th of September will coincide with the motor cycle races for the Amateur Grand Prix which take place on the 7th and 9th. For those who have not yet fixed their holidays here is the ideal chance for a real week of sport.

A comprehensive range of contests will take place throughout the week, and a Championship class will be conducted on the usual lines. The main event will no doubt be for tail-less models (an obvious choice for the Isle of Man) and it is hoped to get official recognition of the Manx Trophy for this class of contest.

The Isle of Man is ideally situated for a central meeting between enthusiasts from England, Scotland, Wales and Eire, adequate transport being available from all points, and in our opinion this meeting should rapidly become a regular International event of prime importance. We understand that invitations are likely to be extended to the top men in the S.M.A.E. tail-less contest, also the Eaton Bray competition for similar type models.

Full details will follow at a later date, but we take this opportunity of giving readers advance information of this interesting project so that they have ample time for planning a trip to the Island.



THE past few years have produced such an advance in fullsize jet propulsion that already there are many who see the future of the airscrew as little more than an obsolete motive power analogous to the horse. Jet motors for model aircraft have rather lagged behind. The true impulse duct motor as developed in the States is heavy, noisy, dangerous and, even more important, virtually unobtainable in this country. Rocket motors have been tried to take the place of jets in scale models, but have proved uncertain in operation, irregular in thrust, and even dangerously explosive. We welcome therefore a new motor just released that, while by no means a true " jet " motor, is nevertheless jetlike in operation, and overcomes most of the defects of alternatives available.

The basic principle of the new motor is the employment of a solid fuel that is non-explosive in operation. Fuse-induced combustion causes it to generate a gas at the rate of something like 4,000 feet per second, and the discharge of this gas through a jet orifice gives forward motion. A similar fuel in cartridge form was used to operate starters on full size aircraft during the war.

The power pellet as made up for model use is particularly interesting, as the manufacturers are able to guarantee precise weight, constant thrust, and regular duration. Should the duration be overlong for test purposes the user can cut it in half and enjoy two power flights each of half the normal duration. In appearance they look somewhat like yellow candles without wicks. The fuses used to ignite them are separate and added before use.

Aluminium alloy motors to contain the power pellets can be obtained cheaply, and have one advantage over most motors, in that they are virtually indestructible. As will be seen from the cutaway drawing, the pellet is loaded by removing the jet nozzle, easing up the spring clips with the special loader provided. Incidentally a strong pair of fingers will do the job, but with the loader it is less like hard work. After inserting the pellet, the fuse is coiled up leaving just enough to project about 1/8 of an inch through the jet orifice. The coil should be pressed well down on the surface of the pellet to give maximum burning area using the circle of wire gauze provided. Take care not to strip the fuse material from the wire core when fitting or the charge may not ignite. In addition to holding on the nozzle the springs are designed to lift and allow excess gas to escape at the sides should the thrust for any reason exceed that intended.

Convenient brackets for attachment to models are available and render loading and recharging to be effected in a few moments. At present two sizes of motor are ready—the Jetex 100, weighing with charge $\frac{3}{4}$ oz. giving a thrust of up to $1\frac{1}{4}$ ozs. and power run of 15 seconds, and the Jetex 200, weight $1\frac{1}{4}$ ozs. thrust 2 ozs. duration 30 seconds. A larger model weighing 4 ozs. and having a 4 oz. thrust will be offered in a week or two.

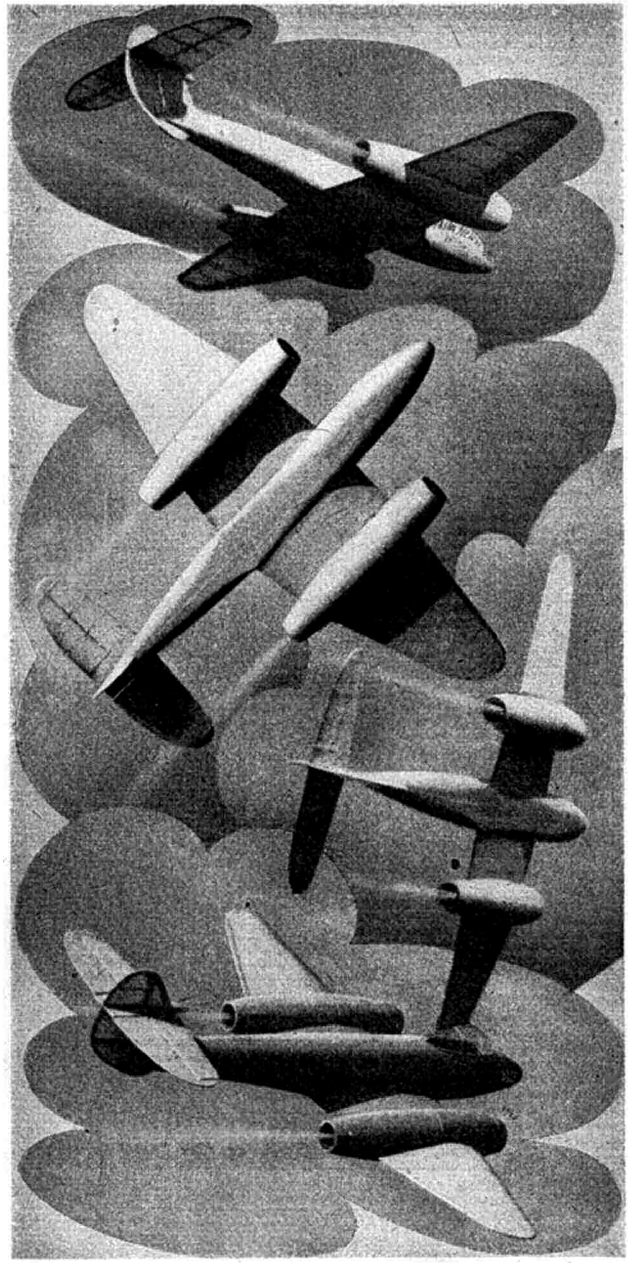
When used in scale models—for which they seem particularly suitable—it should be noted that the nozzle must not be blanked off, but a cone of at least 10° left for the gas to escape.

There is no doubt that these units offer unlimited scope to the model designer. Jet aircraft can now be faithfully modelled by the scale enthusiast, witness the Meteor developed by our staff experts and duration fans have a power unit at their disposal of amazing versatility. Plans of the Meteor and a duration model suitable for beginners are given on following pages and may well serve as test beds for our more inventive readers to develop still further.

A 1/24th SCALE METEOR

The Fuselage. This is carved from a block of hard balsa measuring $17\frac{7}{8}$ ins. $\times 2\frac{7}{8}$ ins. $\times 2\frac{1}{8}$ ins. This is cut vertically in half and temporarily rejoined with a layer of tissue in the joint, this to facilitate separation after the external carving has been completed. The inside is hollowed out, the thickness forward of the C.G. (which is on the main spar) should be $\frac{1}{8}$ inch. Aft of this position the fuselage should be taken down as thin as possible compatible with strength. The two halves may be joined together with Durofix pre-gluing for strength.

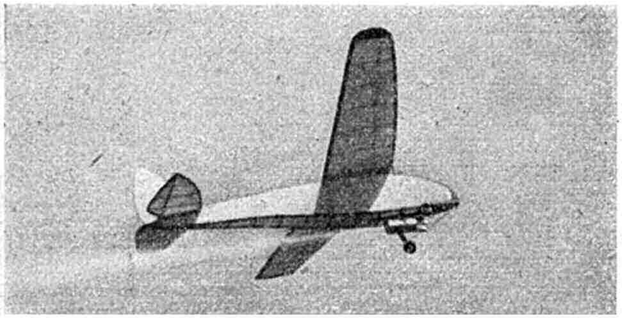
Ducts. A mould should be made to the inside dimensions of the duct shown on the drawing and the duct nose block tacked on with cement. The mould is well greased with petroleum jelly or vaseline and planking is commenced with medium soft $\frac{1}{8}$ square balsa. This may be carried out with a casein glue such as " Casco ", which should be left to set for 24 hours. When dry make a neat cut around the duct in the spar position, then carefully remove the two halves. Celluloid rings are cut to form a clean edge to the duct orifices also to strengthen these points. Finally attach the mica discs on the duct sides which carry the fuses.

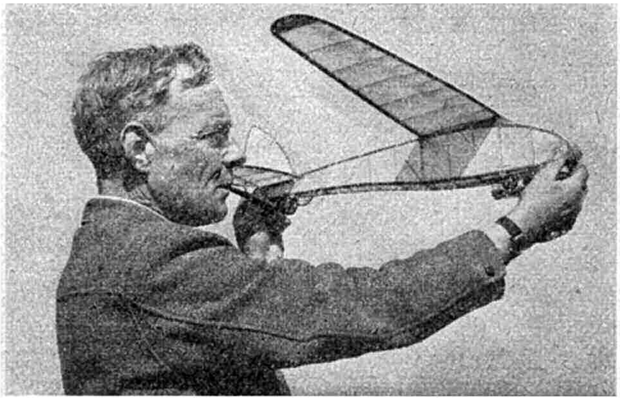


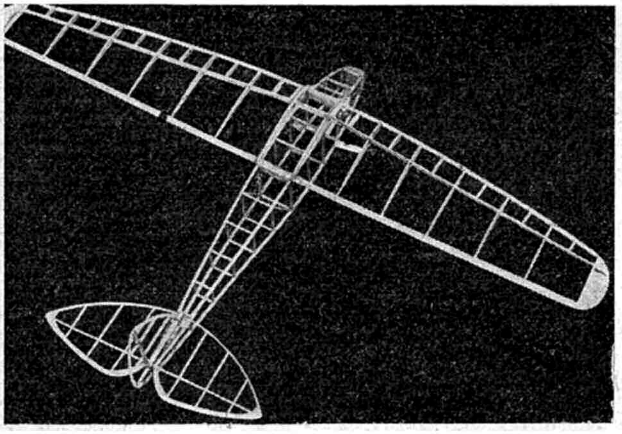
Our heading photo shows the Meteor and Zephyr models in flight with a sectional view of a typical unit inset. Above are various flying shots of the Meteor demonstrating its scale appearance.

Wing and Ducts. Cut all spars and ribs to the drawing. The main spar is threaded through the fuselage, lined up and glued securely with Durofix. The two root ribs on either side of the fuselage are glued securely and perfect alignment assured. It should be mentioned that extreme care in building is most essential as the slightest inaccuracy in the structure will prove quite disastrous in flight. The centre section should now be completed with the exception of the sheet covering. The ducts are then fitted, lined up and glued fore and aft of the ply former. The extension planes are built on the board and aligned and glued to the main spar, the main spar spliced joints being covered with tissue saturated in Durofix. The leading edge is then sheet covered with 1/64th sheet balsa.

Tailplane, Fin, Elevator and Rudder. These are of straightforward construction and require little explanation.







Tailplane ribs are of 1/16th sheet and trailing edges of rudder and elevators are of laminated balsa using a casein glue. All hinges are of very thin tinplate or aluminium.

Fitting the Jet clips. This job has to be done extremely accurately and to ensure perfect alignment two card templates are cut to fit in the front and rear duct orifices. In the centre of each is drilled a hole to take a piece of steel rod or straight dowelling. This is used as a jig for perfect alignment of the two metal clips.

Finishing. The model is covered in rag tissue with the exception of the fuselage. Water spray and apply two coats of 50-50 thinners, dope and colour trainer yellow.

Flying. Long grass is most essential for preliminary trimming. First see thatthe C.G. is over the main spar and with all controls set at neutral try a glide, trim until the glide is flat. A word of warning, the glide is very fast therefore good launching is essential. Flying is a two man job. One person lighting the fuses, which come through the mica disc on the duct sides, the other actually launching. Do not launch the model until your assistant reports that both jets are expelling satisfactorily.

ZEPHYR

Fuselage. This is a simple slab sider. Build the two sides on the drawing. Next, cut the temporary bulkheads of ⅛th sheet balsa and hold them in place between the fuselage sides with pins at No. 3 and No. 6 cross strut positions. Cement the rear ends of the fuselage sides together, then No. 1 top and bottom crosspieces. When this has been done the fuselage sides will take a natural curve from nose to tail and the remaining cross struts can be fitted. When all are in place and the cement has set, remove the temporary bulkheads and fit normal cross struts. Next, fit the crosspieces and celluloid tubing for the wing attachment pins and undercarriage struts. and finally the wing seating on which the centre section rests.

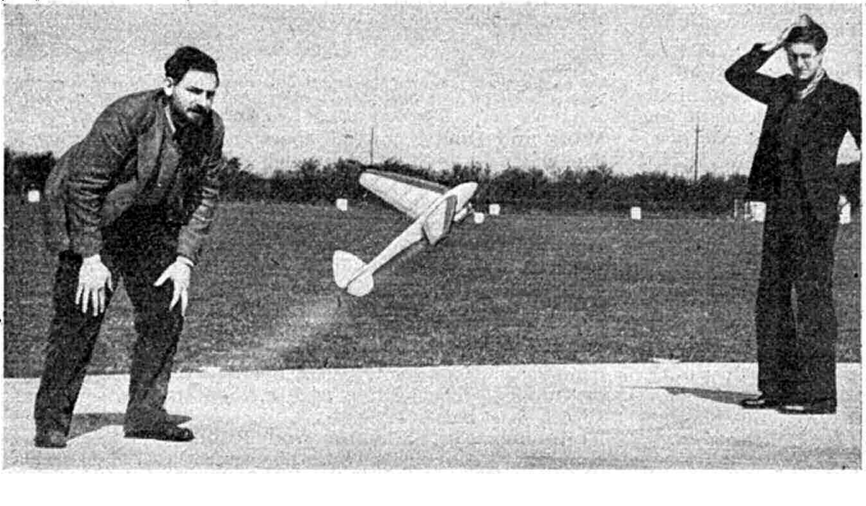
Mainplane. This is in three sections, right, left and centre section, cemented together and reinforced at the joints by a hard balsa bridge piece cemented to the rear face of the main spar, and a 20 gauge steel wire strip cemented and bound with tissue to the front face of the trailing edge.

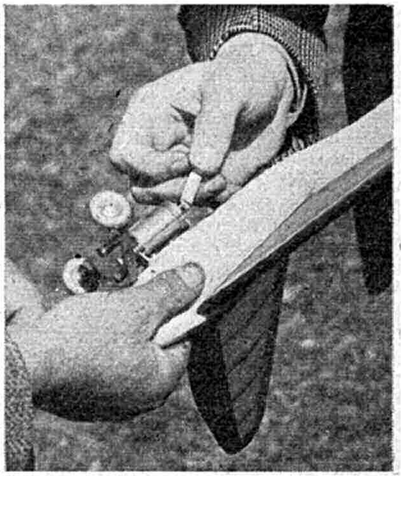
Tailplane. Build the tailplane on the drawing, as the leading edge if of ⅛th and the trailing edge of 1/16th balsa, place strips of 1/32 sheet balsa between the drawing and the underside of the trailing edge to raise it to the correct position.

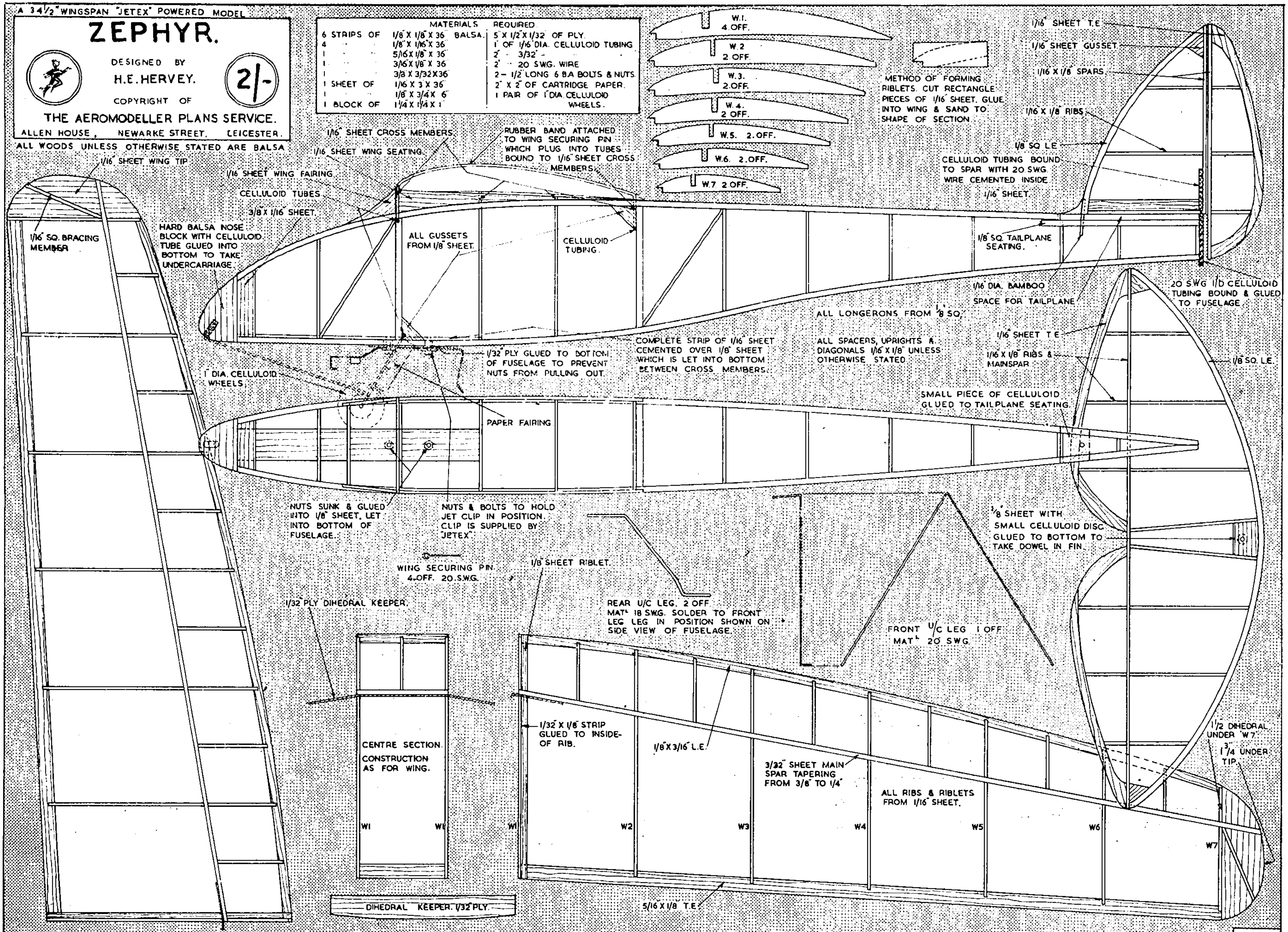
Fin and Rudder. The fin and rudder are joined by two small sheet brass strips. Build and cover the two units as one, cut through the tissue after doping between trailing edge of fin and leading edge of rudder to allow for rudder adjustment.

Flying. Trim the model for gliding with the Jetex unit *unloaded.* The extra weight of the loaded unit and slight down thrust counteracts the tendency to climb too steeply under power. Fine adjustment of downthrust can be obtained by placing thin washers between the Jetex base and the underside of the fuselage.

On the left are views of the Zephyr whilst below is an action shot of another experimental model together with a close up of a unit being ignited.



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ALLEN HOUSE, NEWARKE STREET. LEICESTER.
ALL WOODS UNLESS OTHERWISE STATED ARE BALSA
MATERIALS REQUIRED
6 STRIPS OF 1/8 X 1/8 X 36 BALSA.
4 1/8 X 1/16 X 36
1 5/16 X 1/8 X 36
1 3/16 X 1/8 X 36
1 3/8 X 3/32 X 36
1 SHEET OF 1/16 X 3 X 36
1 1/8 X 3/4 X 6
1 BLOCK OF 1 1/4 X 1 1/4 X 1
5 X 1/2 X 1/32 OF PLY.
1' OF 1/16 DIA. CELLULOID TUBING
2' 3/32
2' 20 SWG. WIRE
2 - 1/2 LONG 6 BA BOLTS & NUTS.
2' X 2' OF CARTRIDGE PAPER.
1 PAIR OF 1' DIA CELLULOID WHEELS.
W.1. 4 OFF.
W.2 2 OFF.
W.3. 2.OFF.
W.4. 2 OFF.
W.5. 2. OFF.
W.6. 2. OFF.
W.7 2 OFF.
METHOD OF FORMING RIBLETS. CUT RECTANGLE PIECES OF 1/16 SHEET. GLUE INTO WING & SAND TO SHAPE OF SECTION.
1/16 SHEET T.E.
1/16 SHEET GUSSET
1/16 X 1/8 SPARS.
1/16 X 1/8 RIBS
1/8 SQ. L.E.
CELLULOID TUBING BOUND TO SPAR WITH 20 SWG. WIRE CEMENTED INSIDE.
1/16 SHEET.
1/16 SHEET CROSS MEMBERS.
1/16 SHEET WING SEATING.
RUBBER BAND ATTACHED TO WING SECURING PIN WHICH PLUG INTO TUBES BOUND TO 1/16 SHEET CROSS MEMBERS.
1/16 SHEET WING TIP
1/16 SHEET WING FAIRING.
CELLULOID TUBES.
3/8 X 1/16 SHEET.
HARD BALSA NOSE BLOCK WITH CELLULOID TUBE GLUED INTO BOTTOM TO TAKE UNDERCARRIAGE.
1/16 SQ. BRACING MEMBER
ALL GUSSETS FROM 1/8 SHEET.
CELLULOID TUBING.
1/8 SQ. TAILPLANE SEATING.
1/16 DIA. BAMBOO
SPACE FOR TAILPLANE
20 SWG 1/D CELLULOID TUBING BOUND & GLUED TO FUSELAGE.
ALL LONGERONS FROM 1/8 SQ.
ALL SPACERS, UPRIGHTS & DIAGONALS 1/16 X 1/8 UNLESS OTHERWISE STATED
1/16 SHEET T.E.
1/16 X 1/8 RIBS & MAINSPAR
1/8 SQ. L.E.
COMPLETE STRIP OF 1/16 SHEET CEMENTED OVER 1/8 SHEET WHICH IS LET INTO BOTTOM BETWEEN CROSS MEMBERS.
1/32 PLY GLUED TO BOTTOM OF FUSELAGE TO PREVENT NUTS FROM PULLING OUT.
1' DIA. CELLULOID WHEELS.
SMALL PIECE OF CELLULOID GLUED TO TAILPLANE SEATING.
PAPER FAIRING
NUTS SUNK & GLUED INTO 1/8 SHEET. LET INTO BOTTOM OF FUSELAGE.
NUTS & BOLTS TO HOLD JET CLIP IN POSITION. CLIP IS SUPPLIED BY "JETEX".
1/8 SHEET WITH SMALL CELLULOID DISC GLUED TO BOTTOM TO TAKE DOWEL IN FIN.
WING SECURING PIN 4-OFF. 20.S.W.G.
1/8 SHEET RIBLET.
1/32 PLY DIHEDRAL KEEPER.
REAR U/C LEG. 2 OFF MAT'L 18 SWG. SOLDER TO FRONT LEG LEG IN POSITION SHOWN ON SIDE VIEW OF FUSELAGE.
FRONT U/C LEG 1 OFF MAT'L 20 SWG.
CENTRE SECTION. CONSTRUCTION AS FOR WING.
W1
W1
1/32 X 1/8 STRIP GLUED TO INSIDE OF RIB.
1/8 X 3/16 L.E.
3/32 SHEET MAIN SPAR TAPERING FROM 3/8 TO 1/4
ALL RIBS & RIBLETS FROM 1/16 SHEET.
W1
W2
W3
W4
W5
W6
W7
1 1/2 DIHEDRAL UNDER W7.
1 3/4 UNDER TIP.
DIHEDRAL KEEPER. 1/32 PLY.
5/16 X 1/8 T.E.
J.292.

METEOR IV

(SCALE 1/2" = 1 FT)

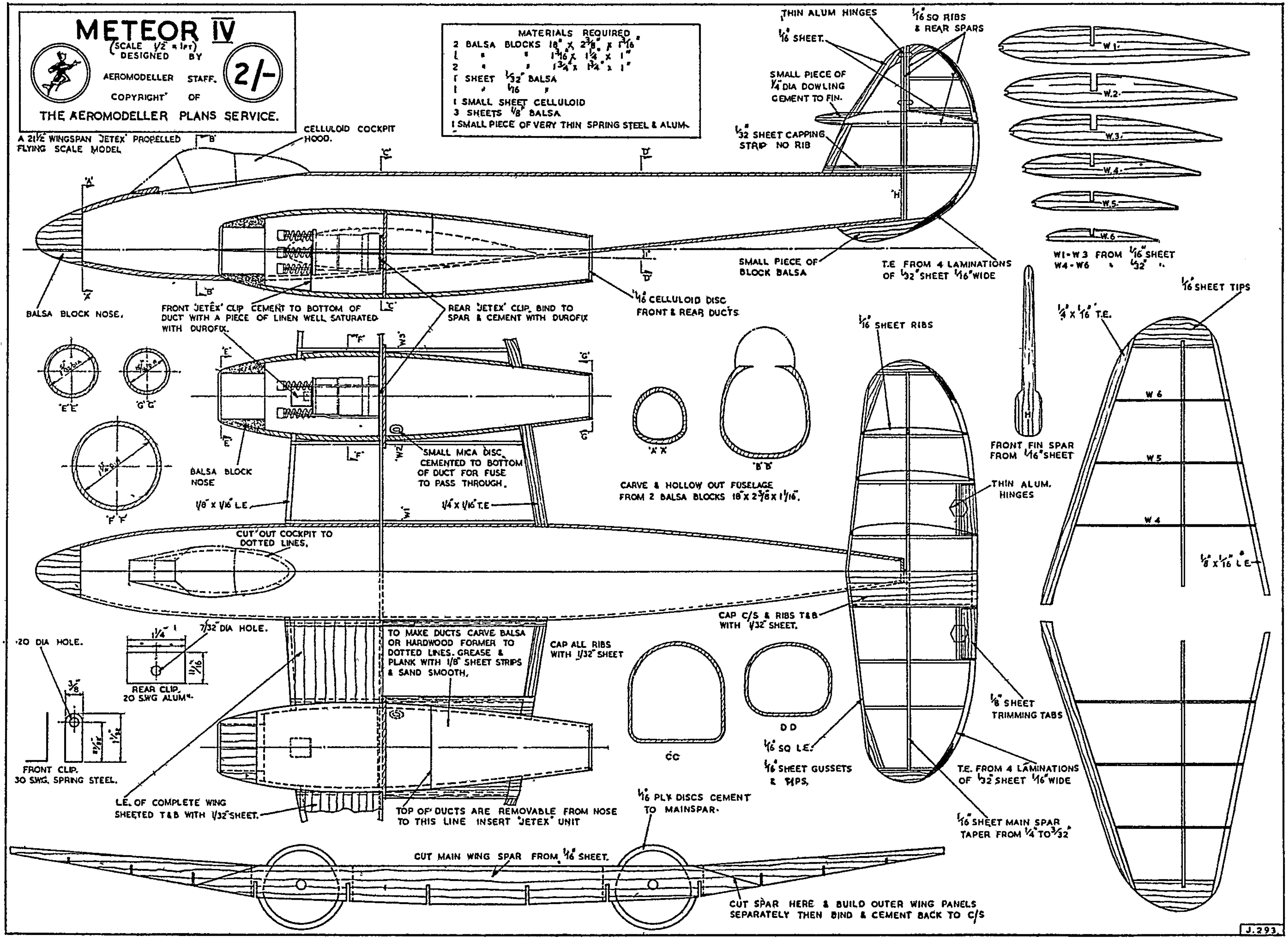
DESIGNED BY AEROMODELLER STAFF.

2/-

A 21 1/2" WINGSPAN 'JETEX' PROPELLED FLYING SCALE MODEL

MATERIALS REQUIRED

2 BALSA BLOCKS 18" x 2 3/8" x 1 1/16"
1 " " 1 3/16" x 1 1/4" x 1"
2 " " 1 3/4" x 1 3/4" x 1"
1 SHEET 1/32" BALSA
1 " 1/16 "
1 SMALL SHEET CELLULOID
3 SHEETS 1/8" BALSA
1 SMALL PIECE OF VERY THIN SPRING STEEL & ALUM.



WAKEFIELD TRIALS FINALISTS

AT the expense of being a couple of days late with this issue, we give here the list of those qualifying—via the Gutteridge Trophy Contest on May 2nd—for the Final Eliminating Trials that take place on June 6th.

The proposed venue for this important event is Leavesden Aerodrome, near Watford, and we trust the weather and general conditions are such that each and every contestant is able to give of his best in what will undoubtedly prove the " battle of the century " in more ways than one! Though poor weather conditions on May 2nd may have eliminated some experts, the following list shows that most of the expected finalists are there, together with a number who have yet to win their spurs in the top event in Aeromodelling.

The S.M.A.E. Council is to be congratulated on its decision to extend the percentage ratio to some 29 per cent., thus bringing the number qualifying for the meeting up to 100.

To the lucky hundred, our best wishes, and may conditions be such that the best six can be truly said to be our Champions. This is the first year in which a series of eliminations has been tried out, and the opinion of the modelling public shows that the system has been received with acclamation throughout the country. Let us hope that the winning six can produce such good form in America that the coveted Trophy will again find its home in the " tight little island."

LONDON AREA (34)

Warring, R. H.	Zombies	590·4	Lofts, D.	N. Hts.	293·6
Copland, R.	N. Hts.	544	Mayes, C. E.	West Essex	290·5
Clements, R.	Luton	477	Knight, J. B.	N. Kent	284·3
Gunn, J. H.	N. Hts.	468·3	Wingate, J.	Streatham	276·4
Judge, A. A.	Barnes	452·6	Howard, J.	N. Kent	266·1
Hinks, R.	Luton	445·6	Cole, D.	N. Kent	266
Standing, N.	Croydon	441·3	Ryde, L.	N. Hts.	260·4
Piggott, D.	Croydon	407	McPherson, R.	N. Hts.	257
North, J.	Croydon	389·7	Rumley, J.	N. Kent	243·3
Tillett, L.	Chingford	375	Glennie, A.	Brentford	236·5
Miller, S. A.	Luton	363	Draper, G.	Hatfield	235·9
Marshall, J.	Hayes	351·1	Stoffel, E.	Ilford	231
King, M.	West Essex	329·5	Minney, R.	Luton	223·7
Young, K.	N. Hts.	322·8	Morris, J.	Harrow	219·7
Young, N.	N. Hts.	319·9	Butler, D.	Surbiton	218·5
Brockman, P. A.	Zombies	314·3	Osman, E.	Edgware	217·4
Pitcher, J. L.	Croydon	296	Parker, A. R.	N. Kent	214·2

MIDLAND AREA (25)

Evans, E.	Northampton	624	Kimberley, G. B.	Birmingham	364·9
Revell, H. W.	Northampton	619	Lucas, J. M.	Northampton	364·5
Harrison, D. W. F.	Birmingham	537·4	Seaton, F.	Northampton	328·2
Elton, P.	Birmingham	502·4	Turner, L. M. V.	Rugby	324·7
Snowdon, P. J.	Northampton	483	Luck, R. A.	Northampton	315·5
Doughty, C.	Birmingham	477·8	Baxter, J.	Wolverhampton	309·4
Smith, F.	Northampton	470·5	Woodfield, K.	Walsall	304·4
Chesterton, R. B	Northampton	467·9	Salt, G. E.	Birmingham	300
Dalloway, W.	Birmingham	457·7	Barr, A. J.	Coventry	300
Adams, F.	Northampton	387	Wheeler, B.	Black Eagles	294·1
Wilkinson, M.	Northampton	380	Ward, S. A.	Wolves	272·8
Gater, E.	Five Towns	365·2	Kendrick, E.	Birmingham	251·1
Viles, A. H.	Worcester	249·2			

NORTHERN AREA (12)

Ramsden, E.	Wakefield	430	Eastwood, J. M.	Bradford	291·6
Lees, D.	Bradford	413	Dennison, W. J.	Bradford	247·2
Stott, L.	Bradford	394·2	Lees, N.	Bradford	220·6
Eckersley, S.	Bradford	345·3	North, E.	Bradford	183·3
Messom, B. H.	Bradford	310	Holbrook, J. M.	Bradford	167
Calvert, R.	Bradford	300	Dubery, V. R.	Leeds	163·3

WESTERN AREA (6)

Carter, E.	Bristol & West	439·1	Lee, A. H.	Bristol & West	223·1
Howse, R. T.	Bristol & West	432	Dorkin, F.	Tetbury	219·6
Garnett, M.	Bristol & West	232·5	Billows, G.	Bristol & West	206·6

SOUTHERN AREA (6)

Coxon, N.	Southampton	504·2	Pearce, B.	Southampton	259
Smith, P.	Bournemouth	373·1	McPhee, H.	Reading	232·7
Alexander, J.	Basingstoke	279·55	Frampton, J.	Reading	200·45

NORTH WESTERN AREA (9)

Haisman, B.	Wallasey	513	Clark, F.	Bolton	261·7
Wakefield, N.	Whitefield	468·3	Stringer, P.	Country Member	258·4
Hardman, J.	Rhyll	362	Whalley, T.	Whitefield	256·4
Woodhouse, R.	Whitefield	282·6	Ward, F.	Ashton	245
Brierley, P.	Oldham	210			

SOUTH WALES AREA (3)

Bicknell, D. A.	Bridgend	361·5	Vickery, M.	Swansea	154
Webb, N.	Swansea	84			

EAST MIDLAND AREA (2)

Roberts, —	Lincoln	300	Trotter, N.	Scunthorpe	213

SOUTH EASTERN AREA / EAST ANGLIAN AREA

Boxall, F.	Brighton	295·8	Field, P. E.	Belfairs	194·7

NORTH EASTERN AREA

Dewell, F. E.	Middlesbrough	182·5

A REVIEW OF PROVEN CONTROL LINE STUNT MODELS

WHILST the popularity of the control-line movement in America was initially built up on speed and sport flying, the past two years has seen a remarkable swing over to stunt and aerobatic flying. Now the emphasis is on the latter and models of this type have been developed to a high degree of perfection.

Jim Walker's "Fireball"—the model which really started the control-line movement—was actually the first model to fly inverted and loop, although this was essentially a " sport " design. Then followed numerous other designs and gradually the range of possible manœuvres grew. Certain basic requirements soon became established—the need for a symmetrical aerofoil section for inverted flying, for example. Yet the famous " Fireball " still held the stage. Fitted with a special symmetrical section wing and lightened to a degree it was the first model to perform manœuvres from inverted flight position and to demonstrate square loops.

The first stunt models were almost invariably large and fitted with the most powerful medium-speed motor available. Slagle's 1946 American Nationals winner, with its 415 square inches of wing area powered by the Super Cyclone 10 cc. motor is typical. But more recently smaller and lighter models have appeared with (American) Class B motors which perform equally well and have generally proved capable of taking hard knocks with less serious damage to the airframe.

Crashes with stunt models are still pretty frequent—even amongst the experts. Things happen quickly with the model flying at anything between 50 and 70 m.p.h. and it is all too easy to do the wrong thing at some crucial point in an advanced manœuvre.

The basic requirement for success is, of course, a model capable of performing the necessary manœuvres. There are no hard and fast rules as to the design layout for such a model, apart from one or two generalisations. By far the best method in designing a new model is to work on data relating to previously successful models.

In spite of the fact that there are a considerable number of highly successful stunt models in America these data are not always easy to find, especially by the average model builder with no American contacts. Table I has therefore been carefully prepared to meet this requirement and covers most of the well-known American—and a few British—designs which are fully aerobatic.

Of these models listed, "Hot Rock"—winner of the 1947 American Nationals Stunt Event—" Green Dragon ", " Super Zilch " and " Fireball " (stunt version) have proved that they can do *every manœuvre possible* with a control-line model. Probably a good many of the others could, as well, but data is lacking on this subject. Hence the figures in Table I should provide a very useful guide for new designs.

For stunt work, of course, a powerful *and reliable* motor is absolutely essential. The motor must run smoothly throughout the flight in whatever attitude the model assumes. This necessitates a stunt tank as a standard fitment, these tanks being specially designed to combat both centrifugal force (tending to pile the fuel against one side of the tank) and provide constant fuel flow in different flight attitudes.

Given the model, and the right motor and tank combination, the remainder is up to the flier. The only golden rule to success is practice—and the more practice an individual gets

Ref. Fig. A.

TABLE I. STUNT CONTROL LINE MODEL DESIGN DATA

Model	Wing Area Sw	Span (in.)	Chord (in.)	C.G. Posn. (in.)	Wing Section		Wing Position	Total Tail Area St		Elevator Area		Elevator Range		Moment Arm L. (in.)	Motor	Propeller	
					Type	Thickness % Chord		Sq. in.	%Sw	Sq. in.	%St	Up (deg.)	Down (deg.)			Dia.	Pitch
DRONETTE	206	35½	6	½	Symmetrical	9	High-Mid	60	29	24	40	—	—	12	Drone	10	12
HOT ROCK	261	38	7	—	Symmetrical	14	Low-Mid	65	25	36	55	45	45	10	Drone	11	10
BARNSTORMER ...	264	33½	8	—	Symmetrical	—	High	55	21	25	45	45	45	11¾	Super Tigre	—	—
GREEN DRAGON ...	470	50	9½	2½/3	NACA 99	—	Low	97·5	21	45	45	40	40	8	Orwick "64"	11½	—
PLAYBOY	410	50	8½	2½	Symmetrical	12½	Mid	88	21·5	40	45	40	45	10	Ohlsson "60"	12	6
ROOKIE	185	35½	5½	1½	Thin Clark Y	8	Mid	41	22	16	37½	25	15	11½	Class B Motors	—	—
SCIENTIFIC CYCLONE	220	36	6½	2	Clark Y	12½	Low	65	34	25	37½	35	15	11	Ohlsson "60"	12	8
TEFFT'S TERROR ...	310	40	8	—	Symmetrical	12½	High-Mid	72	23	32	45	—	—	16	Class C Motors	—	—
SLAGLE "46" ...	415	48	9	2	Symmetrical	14	Mid	96	23	45	47	40	30	8	Super Cyclone	12	—
SIDEWINDER ...	270	40	7	1	Symmetrical	15	Mid	70	26	40	57	45	45	10	Ohlsson "60"	12	6
FIREBALL	190	36	elliptic	1⅜/1¾	Symmetrical	12½	Mid	42	22·5	15	35	30	30	10	Class B Motors	—	—
SKY BOX	294/266	42/38	7	—	Symmetrical	—	High	74	—	30	—	45	45	12	B/C Motors	—	—
MADMAN	450	54	AV.8½	2½	NACA 99	—	Low	100	22	45	45	40	40	9	Orwick "64"	12	—
BOXCAR CHIEF ...	384	48	8	2	Symmetrical		High	96	25	48	50	45	45		Class C Motors	—	—
SUPER CINCH ...	250	36	7	2	Symmetrical		High	62·5	25	31·5	50	45	45	12	Class B Motors	—	—
STUNT ACE ...	205	36	6	—	Symmetrical	8	Mid	60	30	30	50	—	—	11	Class B Motors	—	—
AKRO-BAT ...	400	48	8½	—	Symmetrical	12½	Mid	120	30	60	50	40	40	10	Class C Motors	—	—
SUPER ZILCH ...	500	54	10	—	Symmetrical	14	Mid	75	15	30	40	—	—	9	Super Cyclone	—	—
LIL' ZILCH	250	52	7	—	Symmetrical	14	Mid	37·5	15	15	40	—	—	6	·19–·36 Motors	—	—

Ref. Fig. B.

TABLE II. CONTROL PLATE DATA

Type	a in.	c in.	d in.	y in.	Application	Examples
BAT	2	1/4–7/16	1/4–3/8	0–1/4	Most small control-line models 16–24 in. span.	Phantom, Wizard, Goblin, Stunter, Phantom Mite.
MERCURY	2	11/32–17/32	1/4–3/8	0–1/4	Most small control-line models 16–24 in. span.	Phantom, Wizard, Goblin, Stunter, Phantom Mite.
MERCURY	2¾	5/8–15/16	5/16–1/2	0–1/2	Medium size models up to 6–7 in. chord.	
AMERICAN JUNIOR ...	3⅞	5/8–7/8	1/2–3/4	0–1¼	Fireball Kit	
STANDARD AMERICAN LARGE TYPE	3	5/8–7/8	3/8–5/8	0–1	Most American stunt models	Dronette, Hot Rock, Slagle, Green, Dragon, etc., etc.

Where two figures are given for dimension, "c" the larger is for stunt work.

Heading photograph shows Dennis Allen's Super Cyclone powered stunt model taking off at the recent Round Pond television show put on by members of the West Essex club.

in, the better flier he will become. Dave Slagle—a consistent winner, although only in mid-teen age—practised for several *months*, flying for an hour or more *every day* to perfect his stunt routine for the 1947 Nationals. On the other hand, given the right model success may come more quickly. Paul Bender won the Columbus Ohio stunt event with a " Super Zilch " (built from a kit) on the model's tenth flight—and the Ohio State Championship on its seventeenth flight.

Certain leading data is omitted from Table I and covered in later tables. This is because many of the American designs listed are kit jobs and to avoid infringement of the Jim Walker patents on control line, details of control assembly, control plate layout, etc., are omitted from the plan.

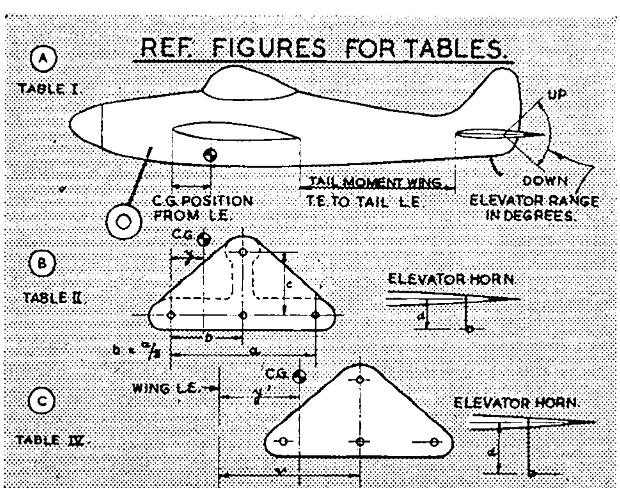
Table II attempts to remedy this omission by listing " standard " control plate sizes and Table IV gives rigging data on nine designs which can be linked up with similar models in Table I.

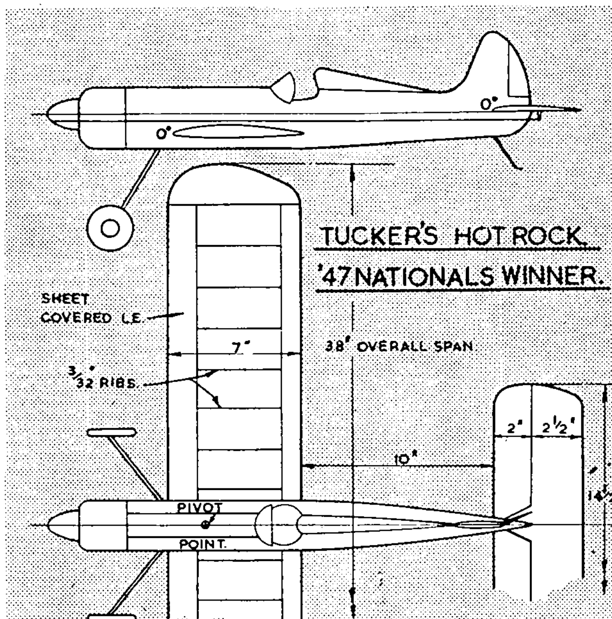
Table III gives loading data, which is very useful as a general guide in preliminary layout of a new design.

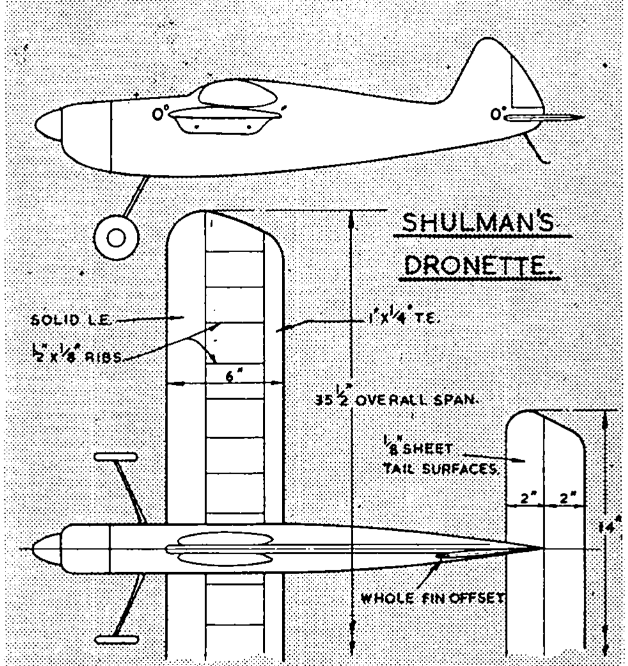
There remains but the picture, the actual outline shape of these various models. Almost invariably the wings are parallel chord with rounded tips. Fuselages are short and mainly based on crutch construction with sheet balsa sides, top and bottom. Tail surfaces are almost invariably cut from sheet balsa, linen tape hinges being common, although metal hinges are now coming into wider use. Linen or tape hinges tend to fray and tear under continual vibration.

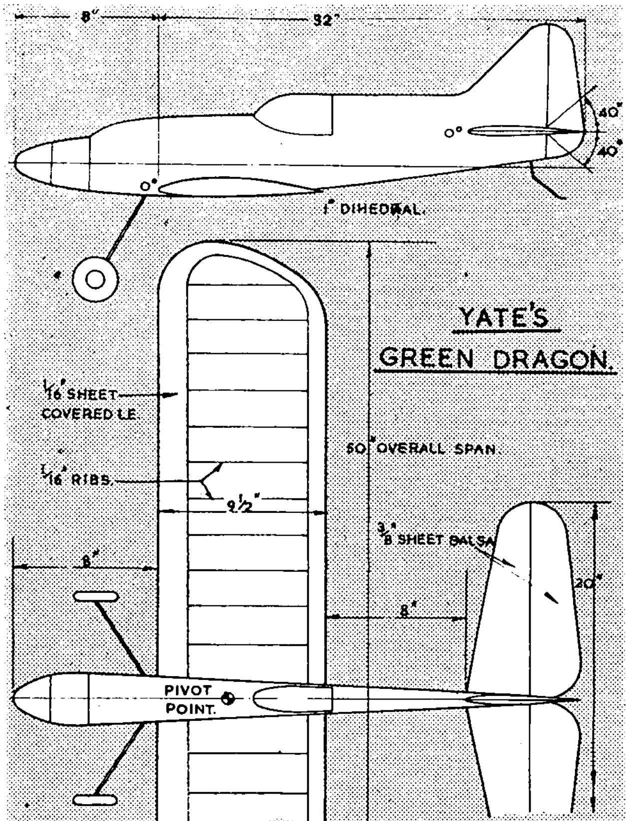
The four general arrangement drawings chosen are those of outstanding models with many contest places to their credit. Leading dimensions are given and the outlines are accurate enough to be scaled, if required.

The Green Dragon has an outstanding reputation for









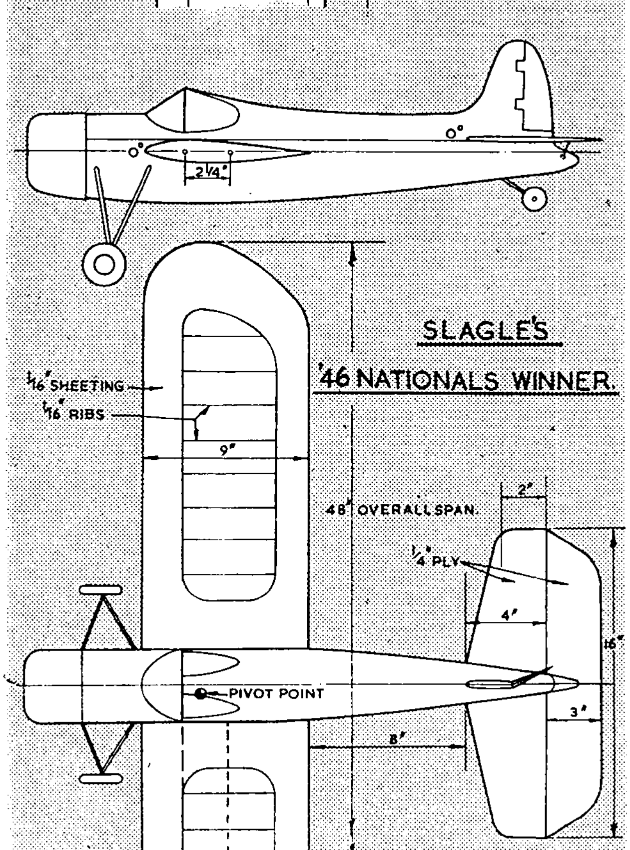


TABLE III. LOADING DATA

Model	Wing Area, sq. in.	Weight, ozs.	Wing Loading: ozs. per sq. ft.	Wing Loading: ozs. per 100 sq. in.	Power Loading, ozs. per c.c.
DRONETTE	206	25	17·0	12·1	5
HOT ROCK	261	26	14·4	10·0	5
PLAYBOY	410	50	17·5	12·2	5
ROOKIE	185	27	21·0	14·6	7
SCIENTIFIC CYCLONE	220	31	20·75	14·0	3
FIREBALL	190	20	15·2	10·5	5
SIDEWINDER ...	270	30	16·0	11·1	3

manœuvres from the inverted flight position and is typical of the larger type of model preferred by West Coast fliers.

Slagle's 1946 Nationals winner is typical of the large general-purpose stunt model, although the modern trend is towards a cleaner design.

Both the "Dronette" and "Hot Rock" are typical of Eastern practice, and both models have an outstanding contest record. A Drone diesel is the power unit in each case.

The "Dronette" has a fully aerobatic range, although the wing is a little small in area and a little too thin in section for best possible performance from the Drone diesel. Tucker's model is essentially based on the "Dronette" and is a particularly nice model to fly.

Most of the models listed in Table I are bigger than those used in this country and are flown on 70 ft. lines as standard. The medium size models, like the "Dronette", "Hot Rock" and "Rookie" give their best all-round performance on 55–60 ft. lines. Long lines on a model with a high power loading tends to make a true wing-over a breath-taking job—particularly to the pilot—but are an advantage for looping and similar manœuvres.

The following generalisations may be applied to the various data given in the tables.

(i) Reliable, powerful motor fitted with stunt tank.
(ii) Symmetrical section aerofoil.
(iii) All rigging angles zero, i.e., wings, tail and thrust line. Offset thrust is sometimes employed, but is not generally advised. Correct C.G. position and rudder offset should be sufficient to maintain taut lines.
(iv) Steel lines are invariably used—·010–·012 for medium size models; ·012–·015 for larger jobs.
(v) The rear line is invariably the "up" or "climb" line—i.e., the control horn is mounted *below* the elevators.

Whilst most of the designs detailed call for motors more powerful than those generally available in this country, scaled-down designs have proved quite successful. In fact, it has been recently proved that stunt flying is possible with small diesels of around 2 cc. capacity, although the actual flying may not be as spectacular or as smooth as that of the larger jobs with 6–10 cc. motors.

COMING CONTROL-LINE ATTRACTIONS

Next month we are featuring a special trade review of British Control-line products. Manufacturers have co-operated by supplying a selection of their kits and accessories, these being impartially reviewed on their respective merits. We feel sure that this review will be of great interest to all as will the excellent "Tyro Trainer" design that appears in the same issue by that well-known American expert Walter Musciano who produced the Speed King.

Ref. Fig. C.

TABLE IV. RIGGING DATA

Model	n in.	y in.	Remarks	d in.
DRONETTE	—	$\frac{1}{2}$	"n" dimension not specified on plan.	—
HOT ROCK	2	$\frac{7}{8}$–1	—	$\frac{1}{2}$
GREEN DRAGON ...	$3\frac{1}{2}$	$2\frac{1}{2}$–3	—	—
PLAYBOY	4	2	C.G. in front of front line.	$\frac{3}{4}$
ROOKIE	$2\frac{1}{2}$	$1\frac{1}{2}$	—	$\frac{1}{4}$
SCIENTIFIC CYCLONE	3	2	—	$\frac{3}{4}$
SLAGLE "46" ...	$3\frac{1}{3}$	2	—	$\frac{3}{4}$
SIDEWINDER ...	$2\frac{1}{8}$	$\frac{3}{4}$	—	$\frac{1}{2}$
FIREBALL	$3\frac{1}{4}$	$1\frac{1}{8}$–$1\frac{3}{4}$	Pivot point located well aft. C.G. in front of front line.	$\frac{1}{2}$–$\frac{3}{4}$

The aim of this new series is to "un-technicalise" technical subjects. Just how far it succeeds is for our readers to judge and correspondence dealing with any relevant subject is welcomed. The writer is better known to "Aeromodeller" readers as John Halifax, under which name he has for many months conducted a series of semi-technical articles which have aroused a great deal of interest, not to mention controversy between the "old-school" and the new. [ED.]

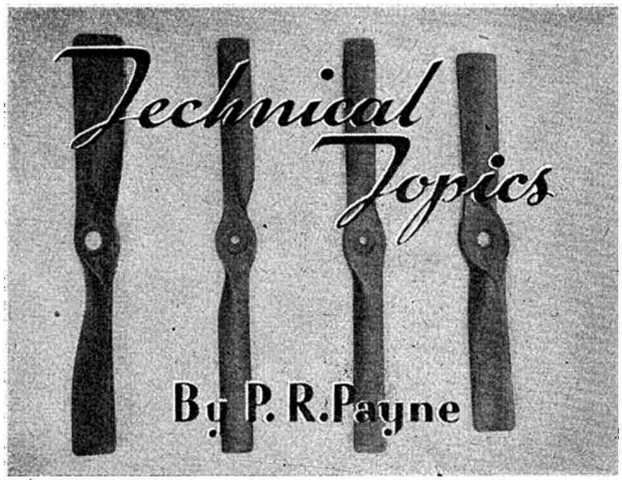


Photo above shows various power airscrew designs by the author. From left to right they are: Sparey 5 c.c. control-line, two Mills free flight and free flight Comp. E.D. All have excellent performance.

Airscrews.

"There is no doubt that to use conventional fixed pitch airscrews in modern rubber or petrol powered models, fitted with specially designed laminar flow wings, is an open contradiction and a sign of very unhealthy localisation of research efforts."

These words by Dr. Piattelli preceded a suggestion for more efficient airscrews in the December, 1947, issue of the AEROMODELLER, and although he is not the first to express such a sentiment, it will bear repetition. In fact most aeromodellers would do well to pin up his words in their bedrooms for the furtherance of nocturnal meditation! For to spend weeks of labour on the design and construction of a model, and then to fit it with a draught-producer carved to "sell-well" or "look-right" whichever the case may be—this seems to be the height of folly.

We have a few enlightened persons in our midst to-day, and their activities may be divided under two headings: variable pitch airscrew, and fixed pitch ones designed for a given set of conditions. Slotted airscrews are very interesting, but since their thrust is somewhat smaller than usual in flight they cannot be regarded as a practical proposition.

Variable Pitch Airscrews.

(1) *For power models.* These are designed to give the maximum possible thrust throughout the engine run, and it has been proved in practice that they do in fact give a shorter take-off. Once flying speed has been attained however, they become virtually fixed in pitch without the attendant advantages of being so constructed. And since take-off is not a particularly thorny problem anyway, we are forced to the conclusion that they are an unnecessary complication.

(2) *For control-line models.* Excepting only models designed to attain the maximum possible speed, variable pitch airscrews are here a very definite advantage. Not only can the engine be tuned to give maximum revs on the ground, but full engine power is available both for stunting and that critical moment when the model deliberates between take-off and nosing into the corrugated grass. These considerations alone should over-ride all objections grounded on mechanical difficulties.

(3) *For rubber models (outdoor).* The predominant requirement in this case is for the model to reach the greatest possible height before the end of the power run! This is a very different matter from getting maximum thrust, since the very fine pitch needed at the beginning of the run would allow the motor to turn at far too great a speed, thus wasting a large amount of its energy. Mr. Rutherford overcomes this on his airscrews by using a stop, but the ideal solution would appear to be in some form of torque control over the first ten seconds. "Consus" please note!

(4) *For indoor models.* The current practice of making airscrew blades so flexible that they go into coarse pitch with the initial burst of power—hence, prolonging the motor run—cannot here be bettered. Any form of mechanical device would almost certainly be prohibitive in weight.

Fixed Pitch Airscrews.

On the design and construction of airscrews for rubber motors experience is the only teacher. The continual variation of r.p.m. makes the matter difficult enough to start with, and when two identical motors give totally different results, the theorist is very apt to melt discreetly from view. It is even possible that airscrews without any "twist" at all in the blade may eventually become the vogue.

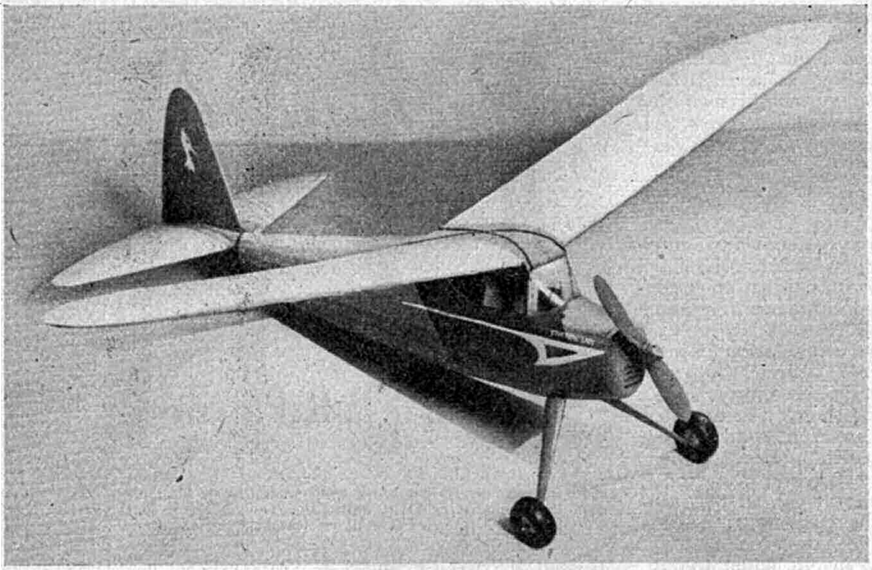
I.C. engines are a different matter, however. Not only is correct design possible, but essential if the best results are to be achieved. Helical pitch airscrews are out of date and the "non-helical pitch" form suggested years ago by D. A. Russell, M.I.Mech.E. and N. K. Walker, B.Sc., is at last coming into its own. To the beginner this innovation is undistinguishable from normal practice, but experienced modellers can recognise it by the pronounced "wash-in" at the tips. In this connection it is interesting to note that Henry J. Nicholls came to the conclusion that this wash-in was essential after conducting an extensive series of flight tests, although he was unaware of any theoretical vindication at that time. At the other extreme the writer designed a number of airscrews on purely theoretical considerations and found that the finished products generated approximately one third more static thrust than the best previously available, whilst the improvement in flight was even more noticeable. Airscrews of this type suitable for free flight models are described in the new series on British engines, and a study of the drawings is to be recommended. Their most noteworthy features, apart from the pitch are the square tips and the laminar flow blade section. Broadly speaking the reason for continuing the full blade width right out to the tips is that most of the thrust is generated here anyway. It *can* be argued that the efficiency is here lower than at the centre of the blade, but in practice we find that the improvement brought about the larger VL number (doubling the chord doubles the VL number) more than offsets this.

The chief disadvantage is that the finish must be very carefully done in order to maintain laminar flow as far as possible. Thus although such airscrews are available commercially in small quantities they cannot appeal to the average aeromodeller's pocket, and it looks as if we shall witness a retrogressive movement to the home-carved masterpiece for contest work at least.

Spinners.

The theorists said long ago that spinners were desirable: with our increased knowledge to-day it looks as if the optimum spinner diameter may be as much as 4/10 of the airscrew diameter. The reasons are two-fold; firstly, the airflow is improved with a resultant increase in thrust, and (on the model) a reduction in drag. Secondly, the portions of the blade near the hub are doing very little work anyway. These effects can combine to produce considerable increases in thrust: measurements in flight have not so far been made, but a case was recently cited to the writer when the *static thrust* was increased by three ounces. How much of this was due to the reduction in engine drag was not stated, but it was by no means the whole of it because the engine speed was decreased by several hundred r.p.m. due to the increased load.

Summing up, we may say that for out-door rubber and control-line models variable pitch airscrews are desirable but for all other categories, fixed pitch airscrews—provided that they are designed in accordance with modern developments—are more efficient, and likely to remain so in the absence of any revolutionary development.



ETHEREAL LADY

A 48 inch SPAN POWER MODEL

BY V. E. SMEED

The original " Ethereal Lady " still looks spick and span after six years' service. Below, the designer's brother, Bill Smeed, with his E.D. powered version.

ETHEREAL LADY is one of those amiable little aeroplanes that will put up with minor modifications, over-loading, glider-towing, and all the maltreatment inflicted on models by ingenious aeromodellers, and will still retain its viceless characteristics and delightful flying qualities. As a first power model, with the smaller engines, it is ideal, although not of the slab-sided construction normally recommended for first attempts. With larger engines it is a challenge to the pylons and freak models in its performance, and yet retains complete simplicity in trimming.

The maiden flight of the prototype was straight off the drawing board—5 mins. 40 secs. on a 40 sec. motor run, in non-thermal conditions. This model was powered with an Ohlsson 23, and a careful compilation of performances over a period of weeks gave an average rate of climb of 1,700 ft. per minute for this machine. A Mills-powered version climbed consistently at 800–900 f.p.m. So far five models have been built to this design—one with a Mills, two with E.D.'s, and two with Ohlsson 23's, one of which (the designer's) was converted to take a 2 c.c. Movo. Each of these models was built by a different builder, and none so far has cost more than 9/-, excluding motor and wheels, although built so far apart as South Africa, Germany, Yorkshire and Kent.

One trouble with the diesel motor applied to semi-scale and scale models is the difficulty of positioning the C.G. correctly with so much motor weight forward. Ballast seems a wasteful means of correctly relating the forces, and to provide a pleasing cabin and ready access to the motor without cranking the wings is a bit of a problem. Since, however, a semi-scale job is built for looks as well as performance, this weight set-up

does offer scope for a careful colour-dope finish. This is the case with the diesel-powered version of the " Lady "—the nose has been shortened as far as is practicable, and the fuselage is finished with two coats of clear dope, two of colour, and one of banana oil.

To anyone wishing to modify the design, it should be pointed out that, while an ample margin of longitudinal stability is inherent in the model, any increase in weight in the nose will mean ballasting and an increased pitching moment, with the consequent recovery-lag in a stall, etc.

Construction.

The construction throughout is perfectly straightforward, but the following points may help. Some eyebrows may be raised at some of the materials used—for instance, $\frac{1}{8}$" sheet wing ribs—but if the wood used is graded correctly, a sturdy and reasonably warp-proof yet surprisingly light structure will result. The prototype weighed 23 ozs. with the Ohlsson 23, ignition equipment, and heavy-duty batteries.

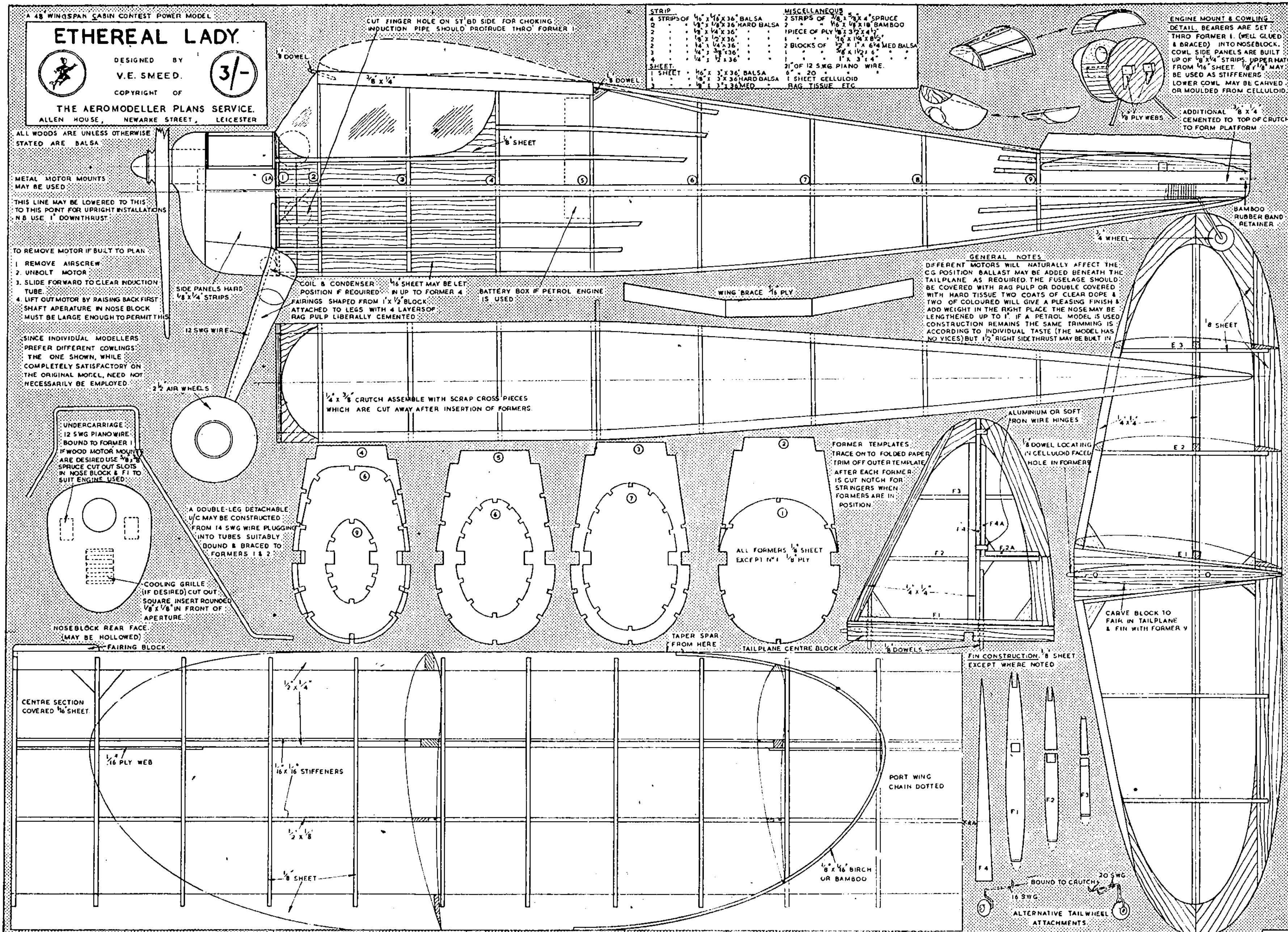
Fuselage.

This is commenced by laying down the $\frac{1}{4}$"×$\frac{3}{8}$" crutch. Scrap pieces of balsa are used to form a frame into which the formers can be slipped with a minimum of trouble. Before removing the crutch from the plan, mark in the positions of all formers. These are cut from $\frac{1}{8}$" medium sheet, and the centres may be cut out, leaving $\frac{1}{2}$" all round, if desired. Cement them in lightly, add the bottom centre stringer, and check that the formers are square before cementing them permanently. Observe that F1 is complete with bearers and undercarriage before being attached.

The wing runners come next, followed by the stringers. The tailwheel attachment should be bound in place before completing the lower stringers. When fitting the stringers, place each end and mark the positions of the required notches—the best way of avoiding those unsightly wavers. Notice that the top centre stringer locates in a notch cut in the centre of the top of F5, and that the next each side describe inward curves from the rear ends of the wing runners until resuming a normal course from F7 onwards. F6 is squared out at the top to assist in the transition from the flat top of F5 to the elliptical form of the after-fuselage. This construction provides a smooth and easy-to-cover fairing.

Odd corner-plates, cabin details, etc., may now be added. The cowling construction will vary with the type of motor used, the installation, and the individual builder's tastes. That shown on the plan has proved very satisfactory, since the noseblock is rigidly held to the bearers and is not likely to be dislodged in the event of one of those down-wind nose-overs. The sheet covering of the forward fuselage is optional, especially if rag-pulp tissue is used; it is, however, recommended

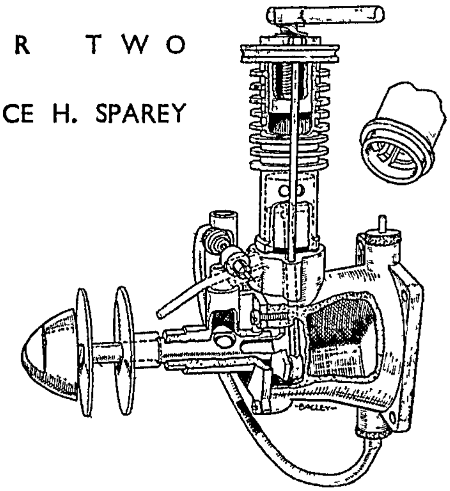
(*Continued on page 367*)


A 48" WINGSPAN CABIN CONTEST POWER MODEL
ETHEREAL LADY
DESIGNED BY V.E. SMEED.
3/-
COPYRIGHT OF THE AEROMODELLER PLANS SERVICE.
ALLEN HOUSE, NEWARKE STREET, LEICESTER
ALL WOODS ARE UNLESS OTHERWISE STATED ARE BALSA
METAL MOTOR MOUNTS MAY BE USED
THIS LINE MAY BE LOWERED TO THIS TO THIS POINT FOR UPRIGHT INSTALLATIONS N.B. USE 1° DOWNTHRUST
TO REMOVE MOTOR IF BUILT TO PLAN
1. REMOVE AIRSCREW
2. UNBOLT MOTOR
3. SLIDE FORWARD TO CLEAR INDUCTION TUBE.
4. LIFT OUT MOTOR BY RAISING BACK FIRST. SHAFT APERATURE IN NOSE BLOCK MUST BE LARGE ENOUGH TO PERMIT THIS
SINCE INDIVIDUAL MODELLERS PREFER DIFFERENT COWLINGS THE ONE SHOWN, WHILE COMPLETELY SATISFACTORY ON THE ORIGINAL MODEL, NEED NOT NECESSARILY BE EMPLOYED.
SIDE PANELS HARD 1/8" x 1/4" STRIPS
12 SWG WIRE
2 1/2" AIR WHEELS
UNDERCARRIAGE 12 SWG PIANO WIRE BOUND TO FORMER I. IF WOOD MOTOR MOUNTS ARE DESIRED USE 3/8" x 3/8" SPRUCE CUT OUT SLOTS IN NOSE BLOCK & F1 TO SUIT ENGINE USED.
A DOUBLE-LEG DETACHABLE U/C MAY BE CONSTRUCTED FROM 14 SWG WIRE PLUGGING INTO TUBES SUITABLY BOUND & BRACED TO FORMERS 1 & 2
COOLING GRILLE (IF DESIRED) CUT OUT SQUARE, INSERT ROUNDED 1/8" x 1/8" IN FRONT OF APERTURE.
NOSEBLOCK REAR FACE (MAY BE HOLLOWED)
FAIRING BLOCK
CUT FINGER HOLE ON ST'BD SIDE FOR CHOKING. INDUCTION PIPE SHOULD PROTRUDE THRO' FORMER I.
1/8" DOWEL
3/8" x 1/4"
1/8" DOWEL
1/8" SHEET
1A 1 2 3 4 5 6 7 8 9
COIL & CONDENSER POSITION IF REQUIRED
1/16" SHEET MAY BE LET IN UP TO FORMER 4
FAIRINGS SHAPED FROM 1" x 1/2" BLOCK. ATTACHED TO LEGS WITH 4 LAYERS OF RAG PULP LIBERALLY CEMENTED
BATTERY BOX IF PETROL ENGINE IS USED
WING BRACE 1/16" PLY
1/4" x 3/8" CRUTCH ASSEMBLE WITH SCRAP CROSS PIECES WHICH ARE CUT AWAY AFTER INSERTION OF FORMERS.
STRIP
4 STRIPS OF 1/16" x 1/16" x 36" BALSA
12 " " 1/8" x 1/8" x 36" HARD BALSA
2 " " 1/8" x 1/4" x 36" " "
2 " " 1/8" x 1/2" x 36" " "
2 " " 1/4" x 1/4" x 36" " "
3 " " 1/4" x 3/8" x 36" " "
4 " " 1/4" x 1/2" x 36" " "
SHEET
1 SHEET " 1/16" x 3" x 36" BALSA
1 " " 1/8" x 3" x 36" HARD BALSA
3 " " 1/8" x 3" x 36" MED "
MISCELLANEOUS
2 STRIPS OF 3/8" x 5/8" x 4" SPRUCE
2 " " 1/16" x 1/8" x 18" BAMBOO
1 PIECE OF PLY 1/8" x 3 1/2" x 4 1/2"
1 " " " 1/16" x 1 1/4" x 8 1/2"
2 BLOCKS OF 1/2" x 1" x 6 1/4" MED BALSA
1 " " 5/8" x 1 1/2" x 6" " "
1 " " 1" x 3" x 4" " "
21" OF 12 S.W.G. PIANO WIRE.
6" " 20 " " "
1 SHEET CELLULOID
RAG TISSUE ETC.
ENGINE MOUNT & COWLING DETAIL. BEARERS ARE SET THRO FORMER I. (WELL GLUED & BRACED) INTO NOSEBLOCK. COWL SIDE PANELS ARE BUILT UP OF 1/8" x 1/4" STRIPS. UPPER HATCH FROM 1/16" SHEET. 1/8" x 1/8" MAY BE USED AS STIFFENERS. LOWER COWL MAY BE CARVED OR MOULDED FROM CELLULOID.
1/8" PLY WEBS
ADDITIONAL 3/8" x 1/4" CEMENTED TO TOP OF CRUTCH TO FORM PLATFORM
BAMBOO RUBBER BAND RETAINER
3/4" WHEEL
GENERAL NOTES
DIFFERENT MOTORS WILL NATURALLY AFFECT THE CG POSITION. BALLAST MAY BE ADDED BENEATH THE TAILPLANE AS REQUIRED. THE FUSELAGE SHOULD BE COVERED WITH RAG PULP OR DOUBLE COVERED WITH HARD TISSUE. TWO COATS OF CLEAR DOPE & TWO OF COLOURED WILL GIVE A PLEASING FINISH & ADD WEIGHT IN THE RIGHT PLACE. THE NOSE MAY BE LENGTHENED UP TO 1". IF A PETROL MODEL IS USED CONSTRUCTION REMAINS THE SAME. TRIMMING IS ACCORDING TO INDIVIDUAL TASTE (THE MODEL HAS NO VICES) BUT 1 1/2° RIGHT SIDETHRUST MAY BE BUILT IN
1/8" SHEET
E3 E2 E1
1/4" x 1/4"
FORMER TEMPLATES. TRACE ON TO FOLDED PAPER TRIM OFF OUTER TEMPLATE AFTER EACH FORMER IS CUT NOTCH FOR STRINGERS WHEN FORMERS ARE IN POSITION
ALL FORMERS 1/8" SHEET EXCEPT Nº 1 1/8" PLY
ALUMINIUM OR SOFT IRON WIRE HINGES
1/8" DOWEL LOCATING IN CELLULOID FACED HOLE IN FORMERS
F3 F4 F4A F2 F2A F1
1/4" x 1/4"
TAILPLANE CENTRE BLOCK
1/8" DOWELS
CARVE BLOCK TO FAIR IN TAILPLANE & FIN WITH FORMER 9
FIN CONSTRUCTION 1/8" SHEET EXCEPT WHERE NOTED
F4 F1 F2 F3
BOUND TO CRUTCH
20 SWG
16 SWG
ALTERNATIVE TAILWHEEL ATTACHMENTS
TAPER SPAR FROM HERE
CENTRE SECTION COVERED 1/16" SHEET
1/4" 1/16" PLY WEB
1/2" x 1/4"
1/16" x 1/16" STIFFENERS
1/2" x 1/8"
1/8" SHEET
PORT WING CHAIN DOTTED
1/8" x 1/16" BIRCH OR BAMBOO
PET 291

Engine Analysis

NUMBER TWO

BY LAWRENCE H. SPAREY

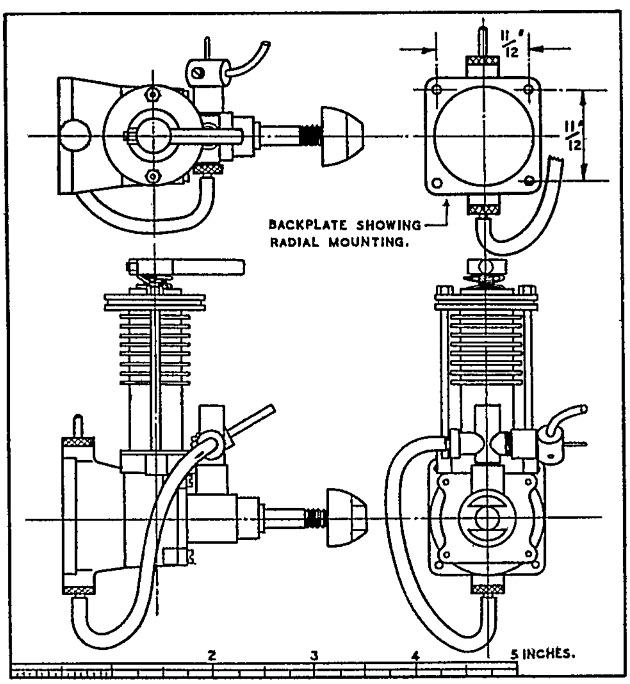


THE FROG "100" DIESEL

AS these series of tests proceed it becomes increasingly evident that considerable benefit to the aeromodelling community can accrue from the co-operation of specialists working along scientific lines. This is apparent from the results obtained with the propellors specially designed by Mr. P. R. Payne for each engine tested. B.H.P. figures are first obtained by Mr. Sparey, after which Mr. Payne takes over, and designs an airscrew to take advantage of the maximum h.p. output of the engine. The amazing results of this scientific approach are evident from the Static Thrust graphs obtained.

TEST

Engine : " Frog 100 " 1 c.c.
Fuel : Mills Diesel Fuel (2 parts fuel, 1 part Ethyl Ether).
Starting : Hand starting was used throughout. Engine was run inverted which is the maker's recommended position. As with all gravity fed carburettors, there is a tendency to open the needle valve too much, with consequent liability to flood the engine. Once, however, the correct position is found, the engine starts easily both when hot and cold. No cut-out is incorporated.



Running : Runs well and steadily over a wide speed range, and shows a flexibility unusual with diesel engines. This simplified testing greatly, as a large range of constant speeds could be attained. This is not of great practical value, however, as the b.h.p. falls rapidly with decrease in revs. per minute.
B.H.P. As is normally the case, power rises steeply with increase in revs. from ·0145 b.h.p. at 2,800 r.p.m. to a maximum of ·0575 b.h.p. at 8,100 revs. This maximum figure for b.h.p. may be considered exceptional for an engine of this capacity. Beyond 8·100 r.p.m. the power falls off steeply, so that at 10,000 r.p.m. the power output is ·042 b.h.p. This was the maximum speed at which the engine was tested.
Static Thrust. Using the maker's standard propellor a maximum thrust of 10 ozs. was obtained at 5,750 r.p.m. while at 4,500 r.p.m. the thrust was 7½ ozs. This steep decline in thrust as the revs. decrease is characteristic of most internal combustion engines.

A remarkable increase in thrust was obtained when using the Payne airscrew, as the graph shows a maximum Static Thrust output of 15 ozs. at 9,000 r.p.m. At 7,500 r.p.m. the thrust was 12 ozs. but below this speed the load was insufficient for consistent running. There is also no object in taking static thrust tests at obviously inefficient engine speeds.

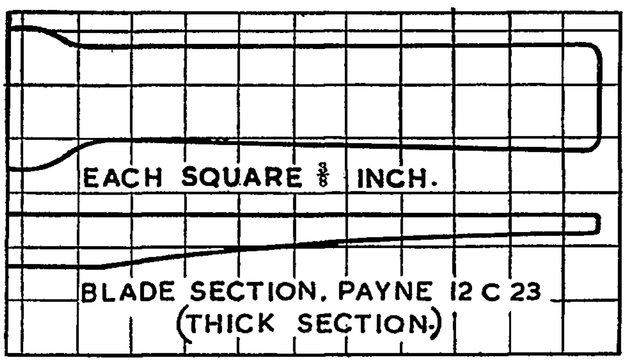
It is interesting to note that the Payne airscrew delivers its greatest thrust at a point beyond the maximum power output of the engine. This suggests that a slight modification of propellor design, so that maximum thrust could coincide with maximum power output, might yield yet better results. The engine, however, showed no signs of distress when run at 9,000 r.p.m. for long periods.

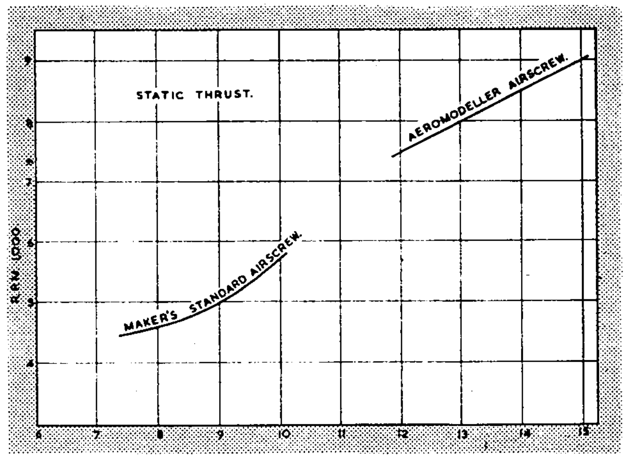
As we go to press we learn that improvements have been made to the cylinder head and carburettor assembly.

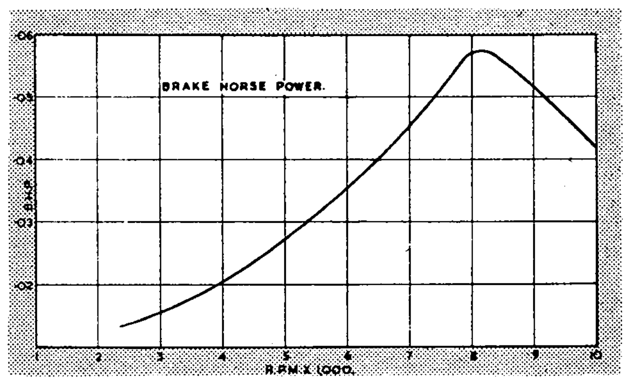
GENERAL AND CONSTRUCTIONAL DATA

Name. Frog " 100 ".
Manufacturers' Name and Address. International Model Aircraft, Morden Road, Merton, S.W.19. 'Phone No. Liberty 1041.
Retail Price. 60/- with airscrew.
Delivery. Ex stock.
Spares Service. Comprehensive (manufacturers and agents).
Type. Compression ignition " diesel ". 2 cycle, rotary valve induction.
Specified Fuel. Equal parts by volume of ether meth diesel fuel oil and lubricating oil (X.L.) etc.
Capacity. 1 cubic centimetre. ·061 cubic inches.
Weight. Bare 3·125 ozs.
Compression Ratio. 12-1 to 20-1.
Mounting. Radial, upright or inverted.
Recommended Airscrew. Free flight 9" diameter 5" pitch Control-line, 8" diameter 8" pitch.
Recommended Flywheel. 1½" diameter, weight 2¾ oz.

Tank. Integral with crankcase, capacity 9 c. cms.
Bore. ·375″
Stroke. ·55″
Cylinder. Meehanite, honed. Ports, two sets of exhaust and transfer ducts. Method of attachment, spigotted to crankcase with two holding down bolts through head.
Cylinder Head. Aluminium die-casting. Finned, with two holding down bolts.
Contra Piston. Meehanite, centreless ground, adjusting screw and lever.
Crankcase. Aluminium die casting.
Piston. Meehanite, centreless ground, flat-top.
Connecting Rod. Forged hyduminium.
Crankpin Bearing. Plain.
Crankshaft. Machined from solid.
Main Bearing. Meehanite, plain, drilled for valve.
Little End Bearing. Plain (silver steel gudgeon pin).
Crankshaft Valve. Rotary shaft (case hardened mild steel).
Special Features. Fully controllable from tick-over to maximum revs. High power to weight ratio. Special two-way adjustment is incorporated for needle valve. A cut-out is available as an extra.







ETHEREAL LADY *(Continued from page 364)*

for ham-fisted fliers ! A small area of sheet is essential round the finger choke-hole and round the timer site.

Wing.

The construction of the wing requires little comment. The 1/16″ × 1/16″ stiffeners were found to greatly reduce tissue sag between ribs. The leading edge may be covered with 1/32″ sheet if desired. The tips may be constructed from sheet, or, for the builders who look askance at one 1/8″ × 1/16″ spruce tip, a second length of spruce may be glued round the first.

Tail Surfaces.

These are straightforward and call for no special comment.

Motor Mounts.

The engine bearers and undercarriage are attached to F1 before gluing the former in. It should be borne in mind that this former is the keystone of the model—it is, in effect, an engine and undercart securely fastened to a ply bulkhead which is sort of followed around by a model. Remember that the strength of cement relies largely on its soaking into the material being cemented—ply will not absorb it and therefore Croid, Pafra, or a similar glue should always be used.

The near-cantilever bearers used on this model have proved satisfactory on many models built by the designer, but modifications may be made by anyone viewing the idea with suspicion. Metal mounts may be employed, in which case some means of rigidly affixing the noseblock must be devised. A piece of soft iron wire soldered between each (side) pair of bolt-heads, and a retaining strap under the heads (to prevent them from dropping out) makes a simple and foolproof means of bolting the engine in—the nuts may be dropped into place and tightened without the need to hold the heads.

The installation shown on the plan necessitates moving the motor forward and tilting to remove. This system is not possible with all types of motors; in the event of any difficulty a small piece of the noseblock at the top may be cut out and cemented to the front of the top hatch. With motors weighing 5 ozs. or under, the nose may be lengthened slightly, and in the event of a petrol motor being used, the positioning of the batteries allows the use of a considerably longer nose. The location of the timer is left to the individual builder, since this is a controversial point, though a box sited between F3 and F4 is recommended.

Undercarriage.

This is formed to plan from 12 s.w.g. piano wire and is bound and sewn to F1 before the insertion of the former into the crutch. The fairings are carved from 1″ × 1/2″ block—notice the clearance at the upper ends to avoid penetrating the covering in the event of excessive backward travel. The wire leg fits in a groove cut into the fairing, and the whole is secured by four wrappings of rag-pulp, liberally cemented.

Finish and Flying.

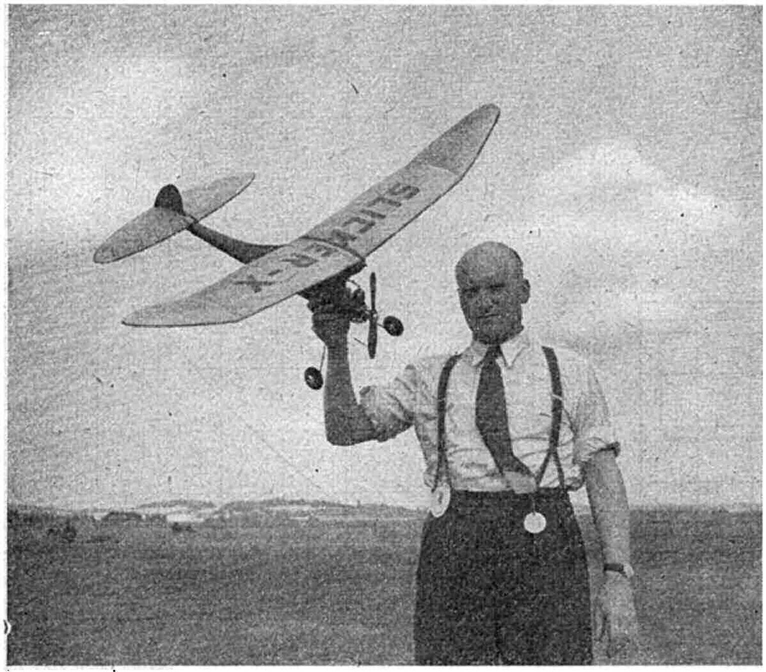
Rag-pulp is recommended ; this again is a matter of personal taste. If a lightweight tissue is used, double-covering is well worth while. This type of model can be made to look very attractive, and, as mentioned elsewhere, there is room for the builder to spread himself on his colour-scheme. A hole drilled in the bottom of the cowling at the extreme rear of the engine compartment, and a small V-piece cemented outside will protect the finish by collecting superfluous oil and allowing the slipstream to blow it clear of the model.

When glide tests seem satisfactory, trimming should be carried out for right-hand circles under power. The diameter of the circles will vary with the power available—with small motors a wide circle produces the most pleasing results. The higher-powered " Ladies " have all exhibited the ability to hold a tight spiral. A slight amount of sidethrust allows the model to be trimmed for a wider circle while gliding. The designer's present model (Movo-powered) requires two degrees right-thrust and slight right rudder.

Full size plans of Ethereal Lady (see ¼ scale reproduction) are available price 3/–, post free, from the Aeromodeller Plans Service Ltd., Allen House, Newarke Street, Leicester.

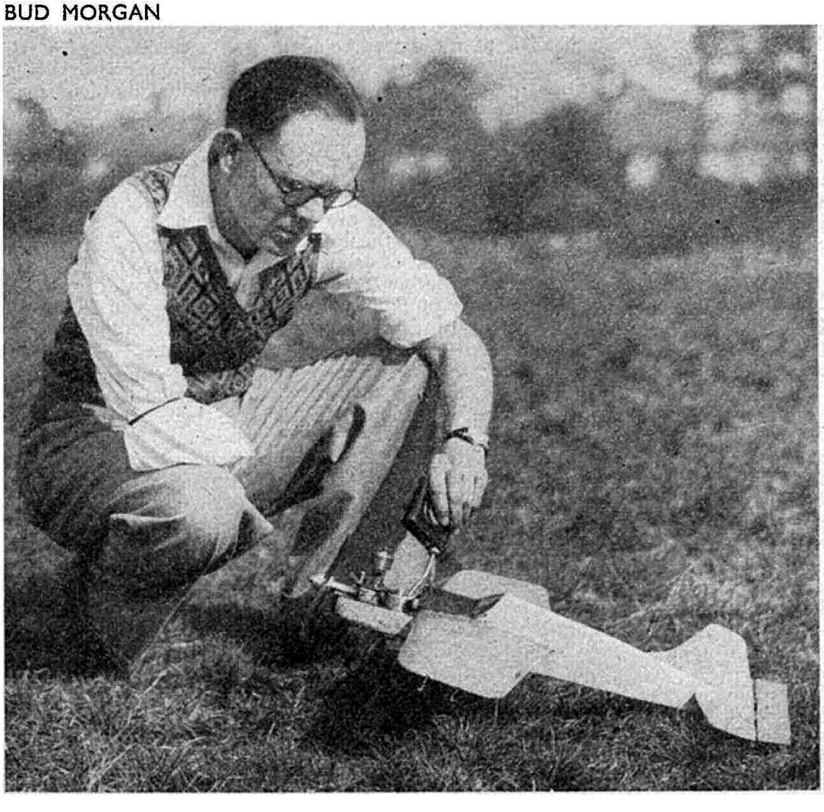
MEET THE MODELLERS

EDDIE KEIL



JIMMY WINGATE

BUD MORGAN



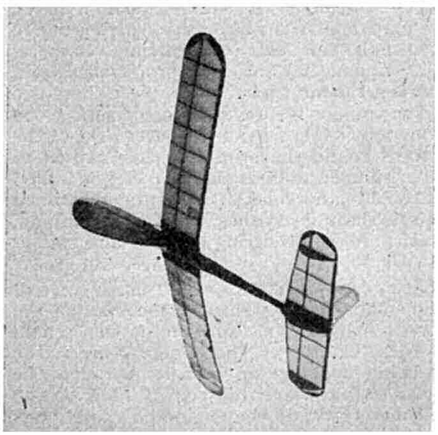
EDDIE KEIL started building in 1913 with "A" frame pushers. Interest has never flagged—he is an active member of the Essex Power Club and West Essex M.F.C. Also an honorary member of many others including Bournemouth, Cambridge, Hackney, etc. For several years a member of the Model Aircraft Trade. Likes all branches of aeromodelling, main interest free flight power. With his Arden powered Slicker, he won the All Herts Rally, came third in both British and Irish Nationals.

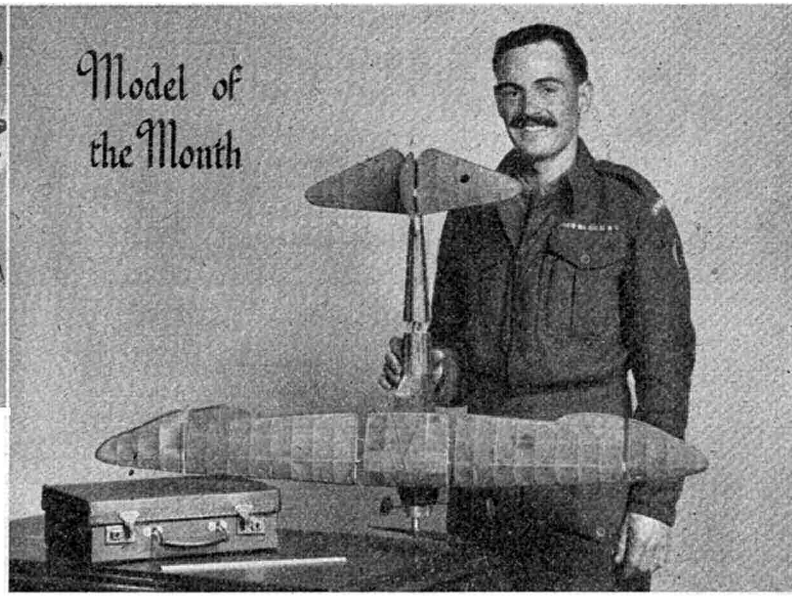
JIMMY WINGATE started modelling when he was 10. Has built hundreds of flying models since. Interested in indoor models for several years—Successes include Manchester Inter-Area 1948, Kodak Hall—London Area, Brentford—Chiswick Indoor Gala. Broke unrestricted rubber record with 31 : 32·2 in 1947. Junior Champion at the Nationals and London Area Junior Champion. Member of British team to Switzerland in June 1947. At present at school—hopes to work in the model department of a fullsize firm later. Now trying stunt control liners.

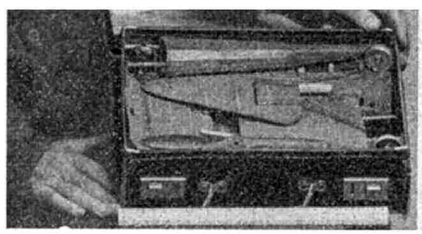
BUD MORGAN took to aeromodelling in hospital 20 years ago after losing right hand. Early member of Cardiff M.A.C. and held it together during the war. Has built several hundred models and holds most of the Club records including the duration since 1938. Holds 20 cups for Welsh contests—placed 3rd in 1941 Gamage. Had many successes last season—at present an enthusiastic control liner. Mrs. Morgan is also keen—has won 2nd and 3rd place in past Women's Challenge Cup contests.

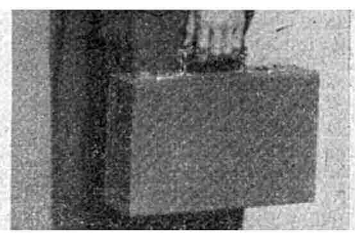
MODEL NEWS

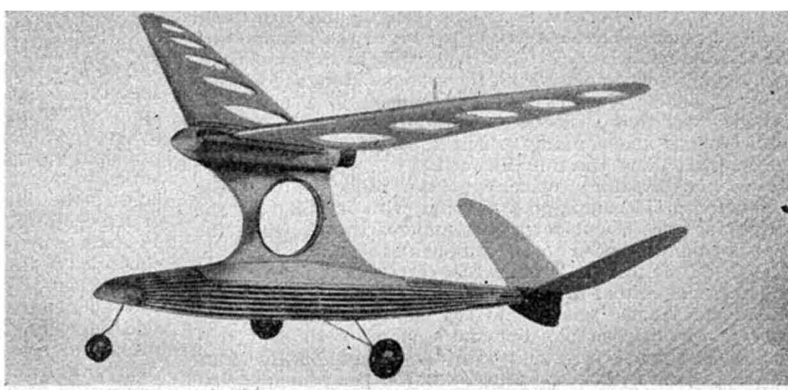
SELECTED ITEMS BY FLIAR PHIL











Take notice — the modeller with a pantechnicon is not only unpopular but out of date ! Our Model of the Month was designed by P. Clarke to fit in with Army posting and a small suitcase. The intriguing result is well brought out by the photos by J. D. Chidley of Chester. Note the foot rule in the photos which gives an excellent idea of the relative size of model and suitcase.

Above is a very nice action photo of J. G. Berry's " Dragonfly " glider going up on the line. Fliar Phil would like to see more like this — but keep them " newsy ". This little 30 in. span design appeared in an early *Aeromodeller* and gives its builder a good flat glide and pleasing line behaviour.

Squirts are back in the news again, and here is a fascinating and beautifully constructed little job by our Belgian friend Guy Raemakers. 36 in. span it has a vee tail, tricycle undercarriage, and weighs 9 ozs. all up. Known as Sky-daughter, its wing is specially designed to resist unstabilising pressures at high speed.

Last of all a treat for the solid modellers. Cast your envious glances on this, all you chisellers (don't get me wrong, lads). That finish was produced by the workroom boys of Chance-Vought Aircraft for wind tunnel tests on this model of the fractional aspect ratio fighter XF5U—I. The props are actually rotated by special motors for the tests. Until next month Fliar Phil gets on with mending his swim suit ready for some warm weather seaplane control-lining . . . .

ONCE again the prospect of a little sun draws Consus out of his shell to offer a few more titbits to the avid maws of the gadgeteers. This month in particular he has catered for the power enthusiasts, with a portion reserved for the rubberdubs. The power gadgets are designed in the main for our friends the dieselmen, though one or two are equally applicable to petroleers (best Consus aeromodellese—with acknowledgments to Dr. Forster for the last classification !).

Before we start, Consus has an apology to make. He was so overcome with his own modesty in not announcing that the bending die in the last " Gadget Review " was his idea that he clean forgot to announce that the Auto-Elevon control he also described was the invention of B. K. HERSEY of Borden. His sincere apologies, Mr. Hersey, and we hope to publish a photograph of the original machine in a forthcoming issue.

First is a really ingenious engine mounting which is one of those ideas that is so simple and effective that one always wonders why no one thought of it ages ago. It comes from D. VALENTINE of Dundee, who thought up the idea for his Mills. Shown in Fig. 1, the whole business is only an application of the normal tongue and box fitting which has long been so popular as a wing fixing. The mount is cut from a piece of thick plywood and incorporates a six-inch long tongue which is made a push fit in a long box built into the fuselage. The box can have balsa sides but is best made with ply top and bottom, the whole being bound with tissue and well glued. The engine is fitted on to the bearers, and can then be removed or fitted at will, while at the same time, by making similar mounts with the same size tongue for other types of engine, engines may be changed in a matter of seconds. All that is necessary in addition is a few strong rubber bands and a fixing to suit to prevent the thrust of the motor pulling the unit forward.

Now for breathing space with the rubber boys. The search for performance goes on, and with it still goes the search for an efficient retracting undercarriage. Quite the most brilliant solution to the problem is supplied by E. S. MOFFATT of Stoke-on-Trent, whose retracting and detracting undercart illustrated in Fig. 2 is probably the cleverest piece of gadgetry Consus has reviewed. Again the finished result is extraordinarily simple, but the amount of thought that Mr. Moffatt must have put into the design hardly bears thinking about ! The operation bears on the principle that one movement of the slide produces a double movement of the legs which are automatically synchronised, and the secret of the whole affair lies in correct adjustment of the sliding wire mechanism, and the location of the fibre bearing block. As tension is put upon the sliding wire " W," the legs first fold together and then retract right back past the horizontal until they are in such a position that they do not protrude from the bottom of the fuselage. By reversing the movement the undercarriage detracts with all the movements exactly reversed. The unit is light, compact, and it is a simple matter for the legs to work a trap-door which will completely enclose them when retracted.

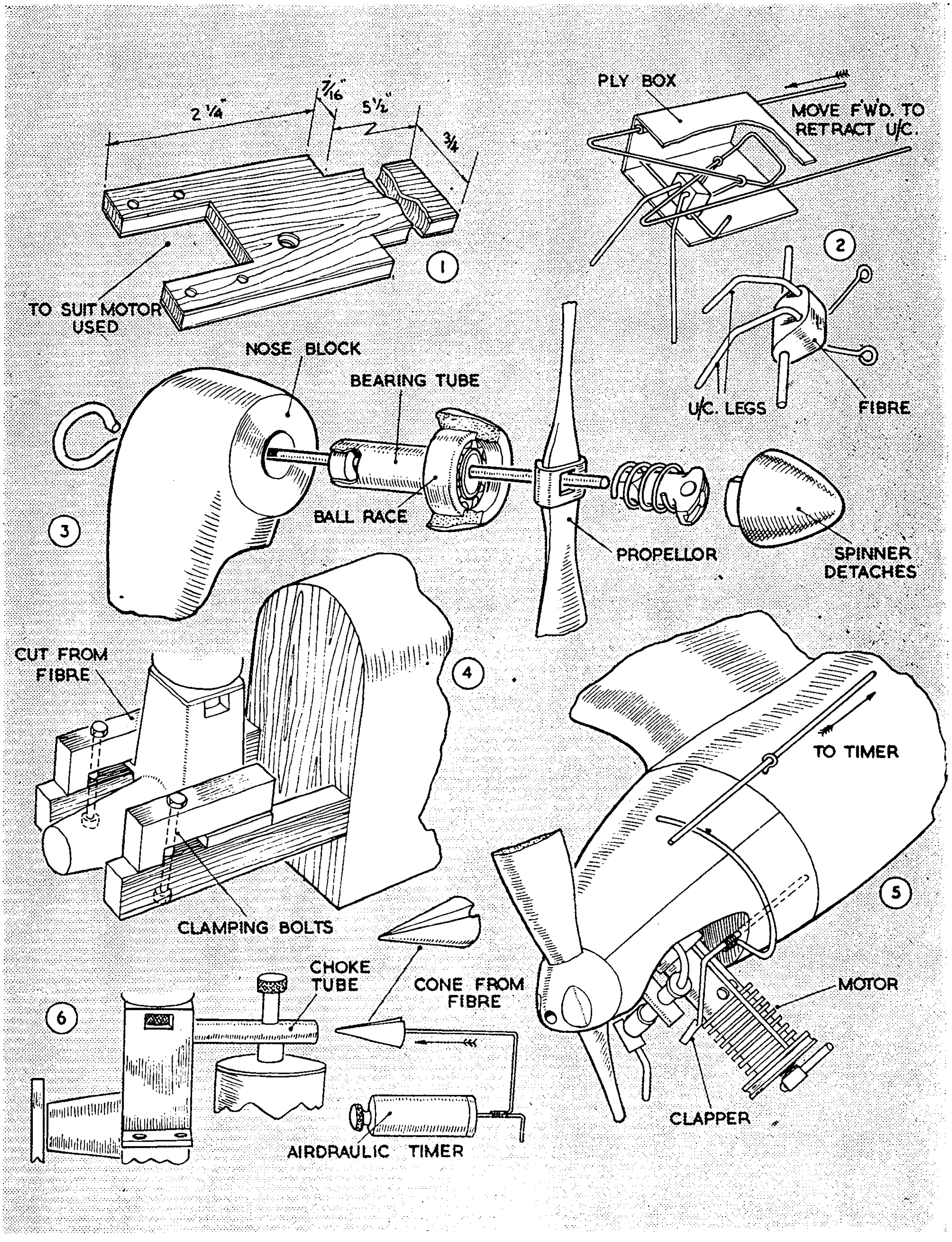
Readers will remember the popular little duration model " Trike " from the A.P.S. range, and its designer, D. COLLIER of Stockport. From him comes a new airscrew fixing designed for this model, which can, however, easily be applied to any other design without modification. Despite the rather involved appearance that Fig. 3 presents at first, the operation and assembly is really quite easy. The shaft is bent up from a cycle spoke running in a small piece of brass tube which is a snug fit in a piece of 3/16 in. aluminium tube. This latter goes right through the noseblock, having on its forward end a 3/16 in. ball bearing. An ordinary cycle spoke nut is screwed onto the end of the shaft, the squared portion at the end fitting into the square hole in the hub piece which is free to slide on prop boss to make the shaft self centring. A metal prop was used on the original, but a wooden prop can be used as effectively. Between the nut and the hub piece there is a small coil spring. The spinner is moulded from plastic wood around a round former the same size as the outer part of the ball bearing, split to fit round the prop and then carved to shape. On removal of spinner and nut the prop can be pulled straight off without touching noseblock. Advantages claimed are no bending of prop shaft in crashes, dead true running, easy prop replacement, and self-centring of shaft and rubber hook.

Fig. 4 takes us back to power corner and a useful way of knock-off mounting small diesels. Two angle clamps are made from fibre, or even hardwood, and the engine is held by the pressure of these clamps on the engine bearers, the clamps themselves being held by single bolts through the bearers in front of the engine bearer lugs. Any blow on the prop or engine itself merely twists the engine on the bearers or knocks it off. It is ideal for small motors but Consus would not recommend the method for motors of larger capacities owing to the vibration. The scheme is the brainchild of F. WHEELHOUSE of Leeds.

Last are two cut-out devices for diesels. Fig. 5 is a system specially designed for the Frog 100, but of course equally applicable to any engine with crankshaft induction. Designed by J. R. WARREN of Enfield, it works on the " clapper " principle—a clear advantage being that as the timer is not actually connected to the engine, in the event of a hard landing the timer is not damaged should the engine be offset or knocked off. The original was made from two pieces of 18 s.w.g. wire, one wire being hinged in a piece of brass tube concealed in the cowling. A snap action is obtained by a tensioned elastic band passed round the bend in the second wire. The other end can be fixed where it is convenient inside or outside the cowling. The original clapper was made from a piece of razor blade, faced with cloth. The timer wire of 22 s.w.g. slides through a wire guide which takes the pull of the elastic band. To operate press to the open position and push the timer wire forward. The timer wire now slides over the second wire and secures it. When the timer withdraws the arm the mechanism snaps shut.

Finally, to complete this really clever-clever " Gadget Review," a cunning contrivance from P. L. PETCH of West Wickham which not only cuts out the engine, but can be adjusted to throttle it right back to either a final tick-over or to a halt, at the end of the engine run. The controlling cone is made from any hard material, preferably perspex or similar fuel-impervious substance—though cellulosed hard wood may be used. The groove in this can only be determined by trial and error to suit the particular engine concerned. The tick-over system on control-line models prevents that unpleasant dive-in through an engine cut at a crucial moment—enough power is always left for a smooth engine-on landing.

As a birthday treat for his readers in August (Consus gets older *every* day) there will be another " Gadget Review." Strictly utility, so no dockets required !


2 1/4"
7/16"
5 1/2"
3/4
1
TO SUIT MOTOR USED
PLY BOX
MOVE F'WD. TO RETRACT U/C.
2
U/C. LEGS
FIBRE
NOSE BLOCK
BEARING TUBE
BALL RACE
3
PROPELLOR
SPINNER DETACHES
CUT FROM FIBRE
4
CLAMPING BOLTS
TO TIMER
5
MOTOR
CLAPPER
6
CHOKE TUBE
CONE FROM FIBRE
AIRDRAULIC TIMER

THE winding of rubber motors can be a tedious business and many an eggwhisk has been modified to assist this operation. As the motor of the average Wakefield type model offers greater resistance than a normal egg the resulting effects can reduce the eggwhisk to mass of tangled wire and, at times, involve a previously efficient airscrew.

Strong wheelbraces with reliable chucks have largely superseded eggwhisks, but difficulties can still arise. It is astonishing how varied the gear ratios can be between the handle and the chuck; the writer remembers a time when three braces, casually shared in the pleasant cameraderie of model flying, produced for a given number of turns on the handle the correct number of turns, too few (thus losing the fine edge of performance) or too many (invariably with depressing effects).

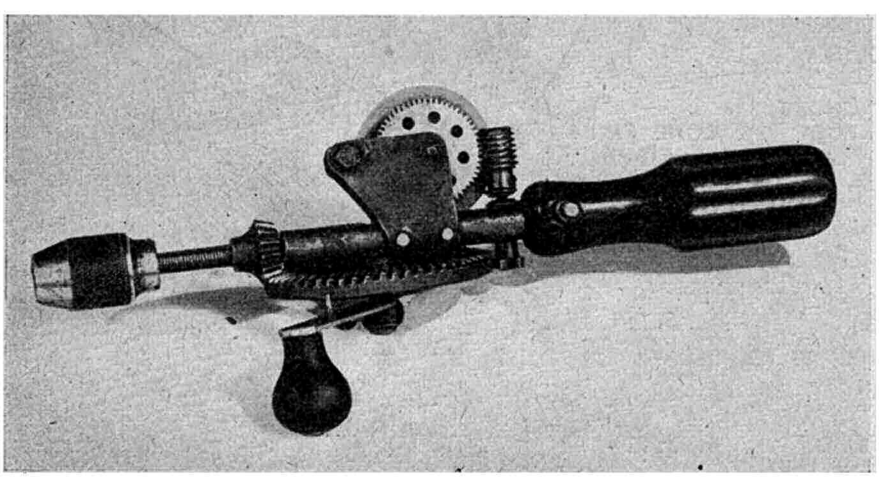
Even when one remembered the correct ratio the chance still existed of losing count or forgetting whether the first or the third hundred turns had been applied. For another thing the writer dislikes counting. Who wants to mumble feverishly when they could watch with complete nonchalance a rival's model fly gracefully into a holly bush ?

The former considerations (and not necessarily the latter !) indicated that some of the anxiety and tedium of winding might be eliminated if a counting device was fitted to the brace. The one described here can be adapted to any normal wheelbrace ; it is accurate, foolproof, can be reset to zero in a twinkling, costs a few shillings and can be made in an evening. My original counter was made with no other tools than a $\frac{1}{8}$ in. and 5/32 in. drill, a file, a pair of snips, pliers, soldering tackle—and the wheelbrace itself. Made in 1940, it has not only wound models, but has also been constantly used as a wheelbrace without appreciable wear on the mechanism.

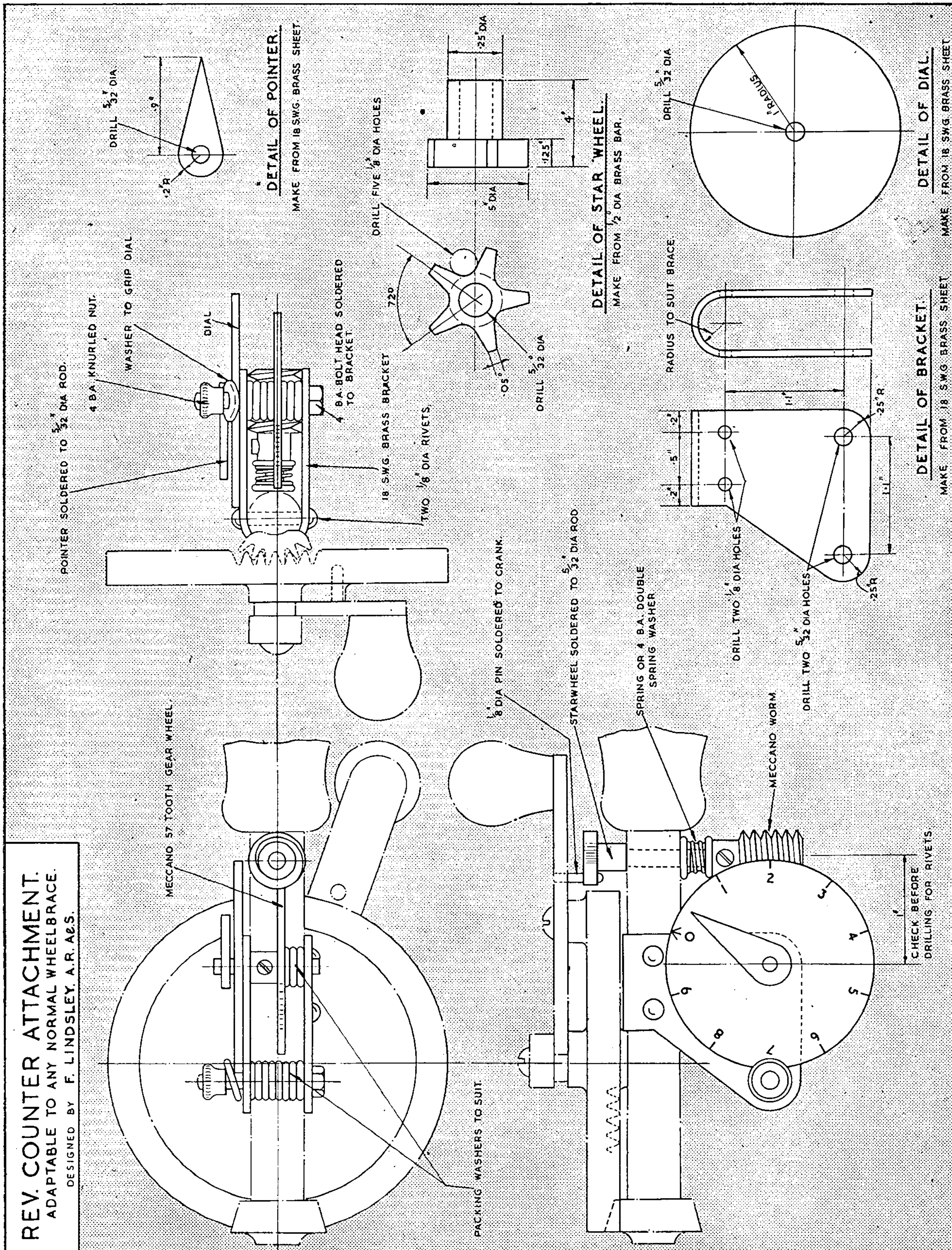
Layout. The general arrangement drawing shews the principle of the attachment. Initially the side grip must be removed from the brace. It is also a progressive idea to put a bolt through the top grip into the metal stem of the brace. I have had a " 'andle come off in me hand " and this affected the model which was about five feet away from the brace.

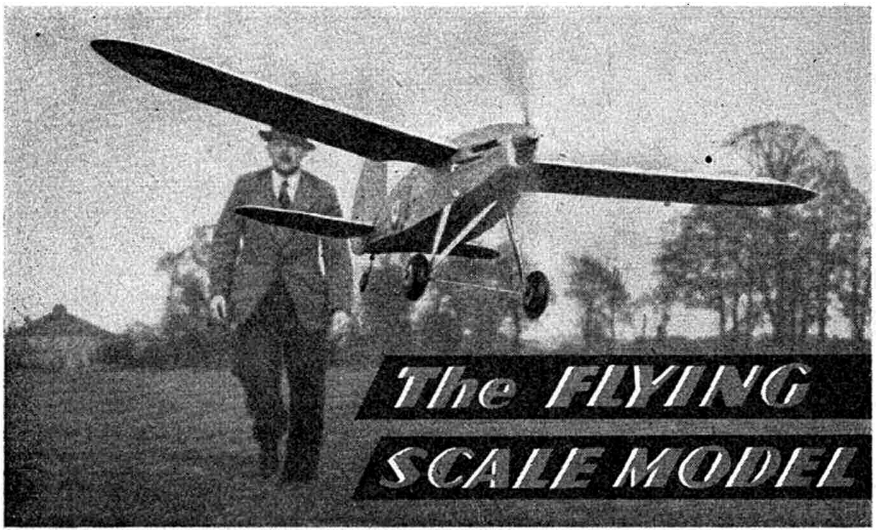
A striking pin soldered to the inside of the winding handle turns a five-toothed starwheel: the same principle as a cyclometer on a bicycle. The starwheel is on the same shaft as a standard Meccano worm which engages with a Meccano 57-tooth ($1\frac{1}{2}$ in. diameter) gearwheel. The gearwheel shaft is soldered to a pointer which rotates around the dial.

The dial is set to zero by rotating it until the " O " is opposite the pointer, the knurled nut is tightened to fix the dial and winds can be piled on *ad lib.* The dial is calibrated in " true " turns, *i.e.*, the number of turns actually given to the rubber.



A spring or double spring washer is placed on the worm shaft to eliminate end-float, which gives a slightly misleading reading and, more important, applies a little friction to the starwheel. If the latter is too free, the pin spins it (*a*) 3/10 of a turn and next time round the pin binds on top of a tooth, or (*b*) 2/5 of a turn, in which case the pointer reads double. If no suitable spring is available a rubber washer slightly compressed should prove adequate.


REV. COUNTER ATTACHMENT.
ADAPTABLE TO ANY NORMAL WHEELBRACE.
DESIGNED BY F. LINDSLEY. A.R. Ae.S.
DETAIL OF POINTER.
MAKE FROM 18 S.W.G. BRASS SHEET.
DRILL 5/32" DIA.
·9"
·2"R
DETAIL OF STAR WHEEL.
MAKE FROM 1/2" DIA BRASS BAR.
·25" DIA
·4"
·125"
·5" DIA
DRILL FIVE 1/8" DIA HOLES
72°
DRILL 5/32" DIA
·05"
DETAIL OF DIAL.
MAKE FROM 18 S.W.G. BRASS SHEET
DRILL 5/32" DIA
RADIUS
DETAIL OF BRACKET.
MAKE FROM 18 S.W.G. BRASS SHEET
RADIUS TO SUIT BRACE
1·1"
·2"
·5"
·25"R
DRILL TWO 1/8" DIA HOLES
DRILL TWO 5/32" DIA HOLES
POINTER SOLDERED TO 5/32" DIA ROD.
4 BA KNURLED NUT.
WASHER TO GRIP DIAL
DIAL
4 B.A. BOLT HEAD SOLDERED TO BRACKET
18 S.W.G. BRASS BRACKET
TWO 1/8" DIA RIVETS.
1/8" DIA PIN SOLDERED TO CRANK.
STARWHEEL SOLDERED TO 5/32" DIA ROD
SPRING OR 4 B.A. DOUBLE SPRING WASHER
MECCANO WORM.
CHECK BEFORE DRILLING FOR RIVETS
1"
MECCANO 57 TOOTH GEAR WHEEL.
PACKING WASHERS TO SUIT.
0
1
2
3
4
5
6
7
8
9



The FLYING SCALE MODEL

PART FOUR

By C. RUPERT MOORE

AFTER solving the Centre of Gravity and Torque problems the next is longitudinal stability.

Where area is not limited this is very simple. Like real aircraft the Centre of Lift of the wing is arranged to be behind the Centre of Gravity so that the aircraft is always trying to dive. This diving tendency is corrected by fitting a tail with negative lift. The area of tailplanes of real aircraft are rarely larger than one fifth the wing area and frequently only a tenth or even less. Because of scale effect, model tailplanes below one quarter the wing area are usually inefficient. This leaves us with a very difficult problem to solve. Let me make it clear lest I get bludgeoned with a slide rule or torn to pieces in a wind tunnel, that the following idea is only used because the limiting of area makes normal methods useless in most cases. No doubt the tail used does theoretically give more drag, but the price is well worth it when the area can be cut by at least 50 per cent. and still give perfect stability.

What is desired is a tail which, when the nose goes up, gives progressively more lift thus checking this tendency turning into a stall.

A so-called non-lifting tail setting does give more lift the nearer the wings approach the stall, for example, if a model of this type with wing at 0° and tail at —2° is approaching the stall the wings may have a temporary angle of attack of +10° when the tail will have +8°. The tail has positive lift in place of negative. (Fig. 1.)

Whether the tail can prevent the model attaining such an angle that a stall develops depends on whether *it has enough power to force the tail end up as rapidly as the nose is going up.* It occurred to me that in this state it would be a great advantage if the tail had a high lift section such as a Clark Y or R.A.F. 32. This would enable the area to be reduced considerably and yet keep the required power or lift. It should be practical to make a stall impossible with a thick section which would make the danger of a dive less and in turn make it less necessary for a large tail to pull it out of a dive. In the glide the tail must work at a negative lift setting. The no-lift angle is roughly found by finding the mid-point between the top and bottom of the tail at the maximum thickness and from the trailing edge through this point drawing a line. (Fig. 2.)

I tried this following setting on " Viper II ", the wing was set at 0° and the tail with the no-lift line at —2°.

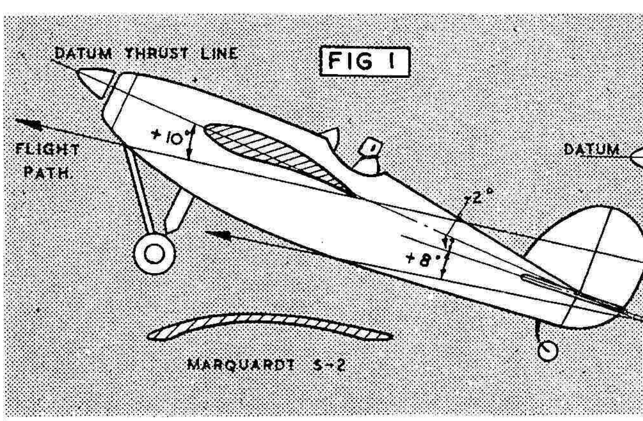
It was found that the result was exactly as hoped for, in the glide the tail *did* work like an ordinary negative lift setting. When the model started to climb the high lift section showed its advantage. The model appeared to be lifted, as it was being, at both ends at once.

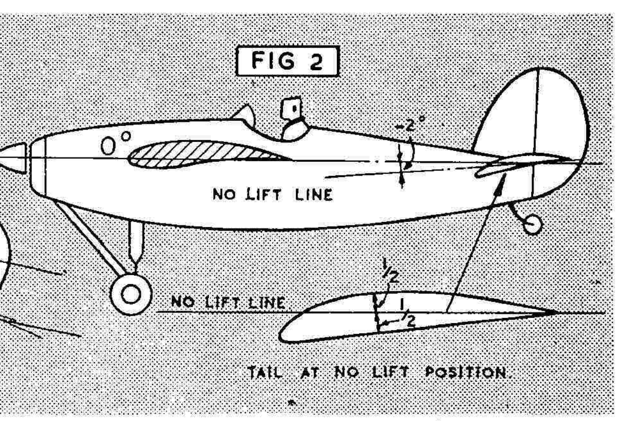
With this tail the duration was improved by 13 seconds because the climb was improved.

The true lifting tail where the tail is set at a positive angle and the C. of G. placed *behind* the centre of lift to make the model tail-heavy is not often applicable to scale models because the tail must have considerable area to prove efficient. This series of experiments with tails was carried out in 1936 and since then I have found it a decided advantage on every flying scale model I have built. I will quote two further models only. My " Tiger Moth " flies well with a tail of 6 per cent. larger area than true scale using a R.A.F.32 section set at 2° below no-lift. As true scale is only one tenth of the wing area this is remarkable especially when it is known that a symmetrical section tail 100 per cent. oversize still would not control the model.

The second model is my flying scale model Short " Scion ". Here with a tail of Clark Y section an increase of 50 per cent. was necessary, but with R.A.F.32 section it was reduced to only 20 per cent. increase. Using the queer Marquardt S-2 section the model was flown with absolutely true scale area tail, but as this tail was erratic in the dive I decided to use R.A.F.32.

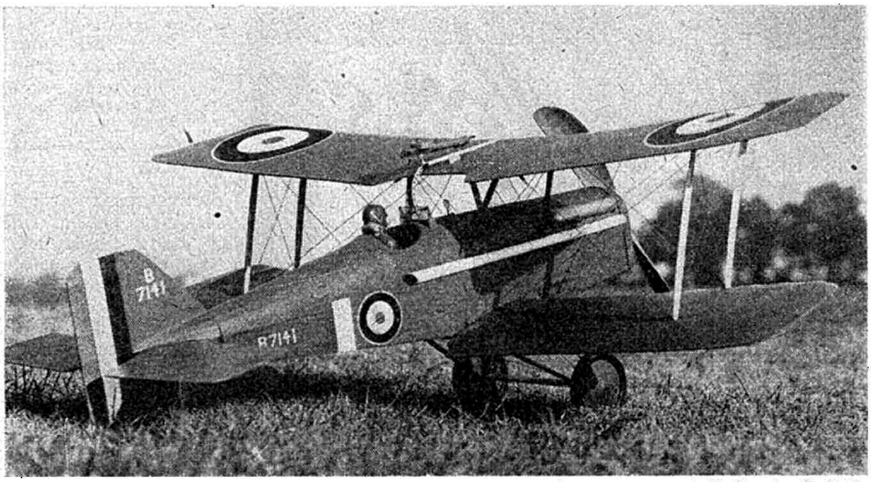
A rough idea of the section required for a model is as follows :— Where the tail is not smaller than one quarter the wing area ordinary symmetrical non-lifting sections can be used , where the area is between one quarter and one fifth use R.A.F.15, Clark Y.H. thinned to 80 per cent. thickness, or U.S.A.5 ; between one fifth and one sixth use Clark Y, R.A.F. 33, or U.S.A.35 ; below one sixth use R.A.F.32, N.A.C.A.98, N.A.C.A.6412, Eiffel 400 or similar high lift section using





higher lift sections the smaller the area until at the extreme end of the area scale try R.A.F.19 or Marquardt S.2.

It will be noted that this marked improvement has been achieved with no mechanical device whatever, but the final improvement is mechanical. It was noticed that it was possible to trim all the models I had built for glide with scale area and section tailplanes. It was also possible to trim for power flight using a fresh tail setting in conjunction with down-thrust. These two positions were separated by at the most 3° so the obvious solution was a self adjusting tailplane. This was done by arranging for ¼" travel on the rear end of the motor. A piano wire " tail shackle " was made in which was an oblong eye fitting over the tail anchorage peg. This shackle was connected to a spring-loaded lever in such a manner that when the motor ran out the shackle was pulled back by a rubber band. This allowed the lever to travel back and raise the trailing edge of the tail. (Fig. 3.)



Heading shows the writer's semi scale Viper. Above is J. M. Greenland's S.E.5, and below the writer's Short Scion. All using lifting tails.

The lever was made of balsa reinforced at the pivots with small circles of celluloid and a spring was made of 20 s.w.g. piano wire. The length of this lever should be such that it only just touches the main span when the tail is in the full-down position. This allows full adjustment by cementing layers of 1/64 in. sheet one at a time, until trimmed for glide. When the glide is perfect the motor should be wound. The tail will now drop on to the longerons owing to the lever travelling forward. For a first trial the top of the longerons should be packed so that the tail is only 1/16 in. lower than in the gliding position. Slight down-thrust should be added temporarily and gradually adjusted over a period of flights until the tail is at such an angle that down-thrust can be dispensed with altogether. When this angle has been found the packing should be cemented permanently to the top longerons. The final subtlety is to cover the tip of the lever with thin celluloid and also the underneath of the packing so that these two rubbing surfaces slide easily. Let me remind you—refinement alone makes gadgets foolproof.

It was found when fitting high lift tails that without the use of a mechanical trimmer, greater down-thrust was required in certain cases. Low-wing monoplanes appeared to be free from this disadvantage while biplanes suffered greatly from it. The degree was also affected by the length of nose in front of the C. of G. Owing to leverage, the longer the nose the less the angle required. These self trimming tails can be fitted to diesel engined models using a similar mechanism to the rudder control (or in conjunction with the rudder) described last month.

While experimenting with these tails it was observed that excessive down-thrust (more than 5°) created so much drag that more power had to be added, therefore, the necessity for a mechanical trimmer should be decided entirely on whether excessive down-thrust would be required without its use.

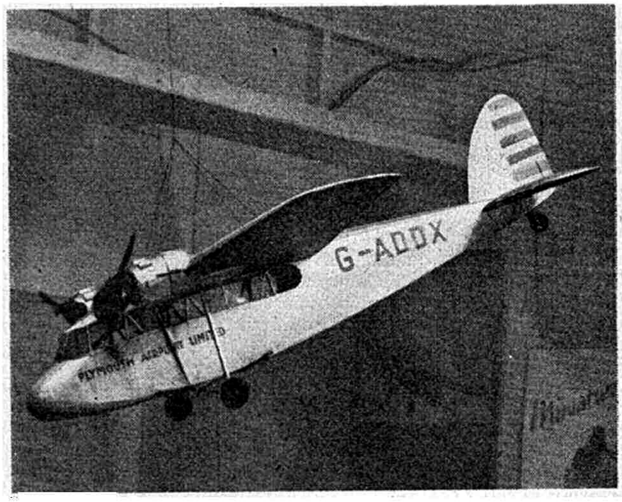
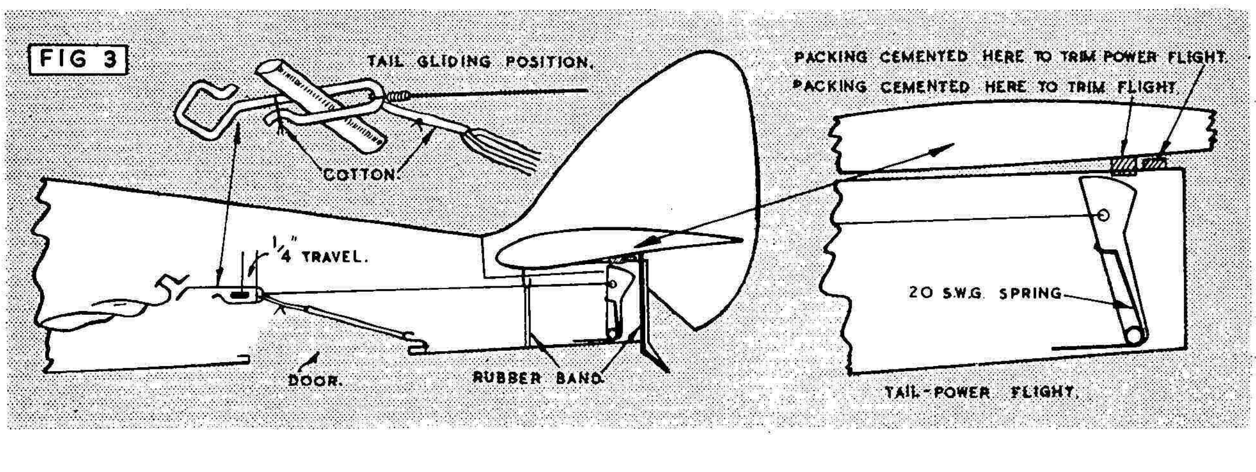
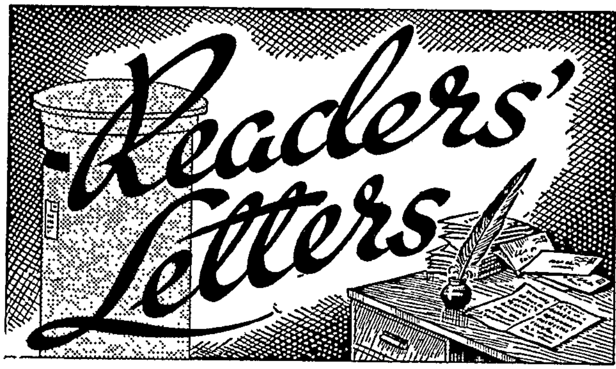


FIG 3





The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

DEAR SIR,

It would be interesting to have more details of the models Mr. West describes in his letter (April AEROMODELLER) regarding the use of sweepforward. The amount of sweep to use, the dihedral, fin area, etc., certainly present problems.

An untwisted swept-forward wing stalls at the root first, and at the same time the stall is gentle and C_L remains high. If such a wing were used with a tailplane the max. loss of downwash when the root stalled would produce a tail-up righting moment, and the model might well be " unstallable " in one sense.

On the other hand, the behaviour of a tail-less model of this sort seems to be very difficult to predict. Mr. West's ingenious theory about the inflow and outflow is not borne out by experiment. Except for a region about a mean chord inboard of the wing-tips, inflow and outflow exist mostly in the imagination as a means of visualising how the trailing vortices arise. These vortices are very fine grained (except near the tips) and any deflection of the airflow over a wing surface is not noticeable on wind tunnel tuft photographs. For a given angle of attack there is no doubt that sweep forward will reduce the lift slightly rather than increase it as Mr. West suggests.

I suggest that at low Reynolds numbers the rather sharp " underlip " of Clark Y produces a bad separation at small or negative angles of attack, and the consequent loss of negative lift causes the stability troubles described. I have noticed this effect on models having conventional tailplanes, with an almost flat undersurface.

I would like to take this opportunity of disagreeing with Mr. Halifax's condition for minimum sinking speed. In the January " Aerodynamic Design " he gives this as profile drag equal to induced drag. This is surely the condition for minimum *drag* assuming the profile drag coefficient to be independent of C_L and speed. The condition for minimum sinking speed for a model is much less simple, and works out to be a C_L about 0·2 or so below the stall.

Also I notice that the nomogram for minimum static margin in the April issue gives a totally different answer from the formula. Both answers take a bit of believing.

Farnborough. J. R. COLLINGBOURNE.

DEAR SIR,

While acknowledging Mr. C. Rupert Moore's undoubted pioneering in the field of accurate *rubber driven* flying scale models and his very large store of practical experience with this type, I feel I must suggest that Mr. Moore is out of his depth when it comes to power models. Those details and diagrams of very involved torque control systems for instance. I cannot believe the author was serious unless he has never handled the small diesels he suggests are so suitable. Apart from the frightening mechanical complexities of the whole affair as illustrated, the engine mountings would have made any power enthusiast scream with horror. In one case a flapping hinge and the other a swivelling wire ! I wonder if Mr. Moore has ever tried running or even starting an engine with one bearer nut loose, let alone the whole caboodle swinging in the breeze ? The amount of vibration present with even the smallest diesel would effectively prevent the use of either mounting in practice. And anyway, despite the cleverness of the systems, what useful purpose do they serve ? All they can give is one set movement of the rudder despite varying torque or flying conditions. That is quite useless. I have built Bagley's scale Nieuport, an excellent flying scale design and any fixed control settings give either too much or too little control at various points during the flight. The simplest solution is the automatic rudder idea borrowed from the Belgians and fitted to this model as standard practice. It solved all torque stability problems at once and it is impossible short of a mechanical breakdown which I have only known to happen once, to spin the model in with torque. The rudder has right movement only, and automatically adjusts itself to any degree of torque just as if a pilot was at the controls. Apart from which compare the simplicity of the system with the intricate arrangements suggested by Mr. Moore.

No, no, Mr. Moore. I am willing to wager that you have never used either of your schemes in a power model—and I'll wager you never will, with half the success of the more simple and sensible solution—the automatic (pendulum) rudder.

Ipswich, Suffolk. ROBIN BANKS.

DEAR SIR,

The letter by Messrs. Gibbings, etc., in the May AEROMODELLER is the inevitable result of writing " popular theory"; if the writer's statements are qualified he is told that his work is unreadable, and this quite justly. If, on the other hand, he breaks away from the style of an L.S.A.R.A. report the pundits open fire immediately.

Concerning the above letter, I should like to point out that " Factualities Part 5 " was written for the people who " mustn't have our wing chord less than three inches, etc. . ." Clearly I was not advocating the use of a flat plate for wings, but stressing the need for a proper appreciation of the minimum wing chord which may be used on a given model.

Secondly, although I know that the L.S.A.R.A. have finally defined the difference between " Transition " and " Separation " the article was written well before this advent. Regular readers must have known what I meant—since I have used the term time and time again, in this and other magazines—and that I have a precedent in Professor F. W. Schmitz who was studying the subject well before the formation of the L.S.A.R.A.

Thirdly, I cannot believe that " practical " modellers would revel in a discourse on pressure distribution.

Fourthly, I stated quite clearly at the end of " Aerodynamic Design " Part 16 that the subject was not completed and followed up with dynamic stability in Part 17, so any discussion is irrelevant.

Finally, the formula for tailplane efficiency from which the Part 16 Nomogram was drawn can be found in L.S.A.R.A. report No. 29 by N. K. Walker, B.Sc. and myself. It assumed the theoretical lift curve slope of 0·1 to hold true — which is done under super-critical conditions—and Mr. Chandler at least should know that the agreement obtained with practice is extremely good.

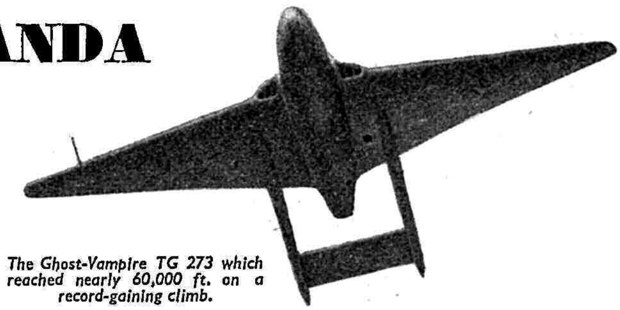
With regard to another letter, published in the April issue, I should like to breathe in Mr. Elliott's ear that if he can produce an airscrew with a performance—including structural —as good as one of my designs, I shall be very happy to give £5 to any Charity he desires.

In conclusion, I should like to comment on Mr. C. Rupert-Moore's article in the same issue, where he states that a reduction gear will reduce torque. Words fail me ! Surely Mr. Moore realises that torque and engine power are one and the same thing, and that it can only be reduced by throttling back, with the inevitable result that thrust will be reduced as well. There is only one method of counteracting it, and that the simple one of using sidethrust.

P. R. PAYNE.

MONTHLY MEMORANDA

BY OWEN G · THETFORD



The Ghost-Vampire TG 273 which reached nearly 60,000 ft. on a record-gaining climb.

World Altitude Record.

On March 23rd last the World Altitude Record for aeroplanes was gained for Great Britain by Mr. John Cunningham, D.S.O., D.F.C., flying the modified De Havilland Vampire jet-propelled fighter, a photograph of which heads this page.

The Royal Aero Club announces that the height attained on the record flight was 59,492 ft. (18,133 metres). The Vampire employed is basically a standard aircraft but has an increased wing span with pointed tips and a special De Havilland Ghost jet engine in place of the usual Goblin unit. The pointed extended wings of the Vampire recall a similar experiment which De Havilland's made with the Mosquito during the war years.

The previous record was gained by Italy in 1938, when Lt. Col. Mario Pezzi flew a Caproni biplane to 56,049 ft. Although after an interval of ten years the record has been raised by a relatively small margin, it must be remembered that the present achievement is that of a basically standard fighter and not that of a specially-designed " freak " aircraft such as all previous record-holders have been. The record Vampire is serially numbered TG 273.

Avro Athena.

Currently undergoing flight tests at Woodford, Cheshire, is the first prototype Avro Athena advanced trainer for the Royal Air Force, a photograph of which is at the foot of this page. Numbered VM 125 and finished in the new standard training colours of natural aluminium with yellow band around the rear fuselage and chord-wise on the wings, the first Athena is a Mk I fitted with an Armstrong-Siddeley Mamba gas turbine driving a normal airscrew. This version has been built to Specification T.7/45 and will be followed by two further Mk. I aircraft fitted with Rolls-Royce Dart prop-jet units. The Mk. II version, four of which have been ordered for testing prior to series production, differs from the Athena I in having a Rolls-Royce Merlin power plant instead of the gas turbines. Due to the greater weight of the Merlin, the wings have been moved forward 2 ft. 3 in. along the fuselage on this version.

The Athena is of all-metal stressed-skin construction and, conforming to the new training requirements initiated by the Prentice, is a three-seater. In conjunction with the Balliol, the Athena will replace the Harvard as the R.A.F.'s advanced trainer, and will take over from the stage reached by pupils in the Percival Prentice.

The Athena has a span of 40 ft., a length of 36 ft. 6 in., and a loaded weight of 7,191 lb. The maximum speed is 291 m.p.h. at 20,000 ft., at which height the cruising speed is 256 m.p.h. The initial rate of climb is 2,640 ft. per minute, the service ceiling 34,800 ft. and the landing speed 80 m.p.h.

The name Athena, incidentally, derives from the Greek *Athene*, known to mythology as the patron goddess of Athens and, appropriately enough, the goddess of wisdom.

Naval Aviation.

Recently revealed is that the first twin-engine single-seat fighter squadron is now in service with the Royal Navy.

The squadron concerned, No. 810 Squadron, is equipped with the De Havilland Sea Hornet, and is commanded by Lieutenant-Commander D. B. Law. The Sea Hornets display the letters " FD " above the fin flash, thus indicating their shore base as Ford, Sussex. Earlier in the year No. 801's Sea Hornets took part in the Naval exercises with H.M.A.C. *Implacable* in the Firth of Forth.

No. 801 Squadron is one of the oldest fighter squadrons in service with the Royal Navy, having been formed in April, 1933, from the old No. 401 (Fleet Fighter) Flight of the Fleet Air Arm. For many years No. 801 Squadron served in H.M.S. *Furious* and was equipped with Hawker Nimrod single-seat and Hawker Osprey two-seat fighters.

Last month reference was made in these columns to the code letter system used to indicate shore stations of Naval aircraft. It is now revealed that the system is also applied to Naval aircraft serving in the aircraft-carriers, a single letter on the fin identifying the carrier as follows :—"A" *Indomitable;* "B" *Indefatigable;* "C" *Implacable;* "D" *Illustrious;* "F" *Formidable;* "G" *Victorious;* "J" *Eagle;* "K" *Terrible;* "O" *Ocean;* "P" *Triumph;* "Q" *Vengeance;* "R" *Glory;* "T" *Theseus;* "V" *Venerable;* "W" *Warrior;* "X" *Magnificent and* "Y" *Unicorn.*

A final item of Naval Aviation news reaches us from the Fairey Aviation Co. Ltd. Contrary to earlier reports it is now stated that the Fairey Spearfish strike torpedo-bomber is not to be built in quantities for the Royal Navy. The five aircraft built to date are to be used for experimental purposes.

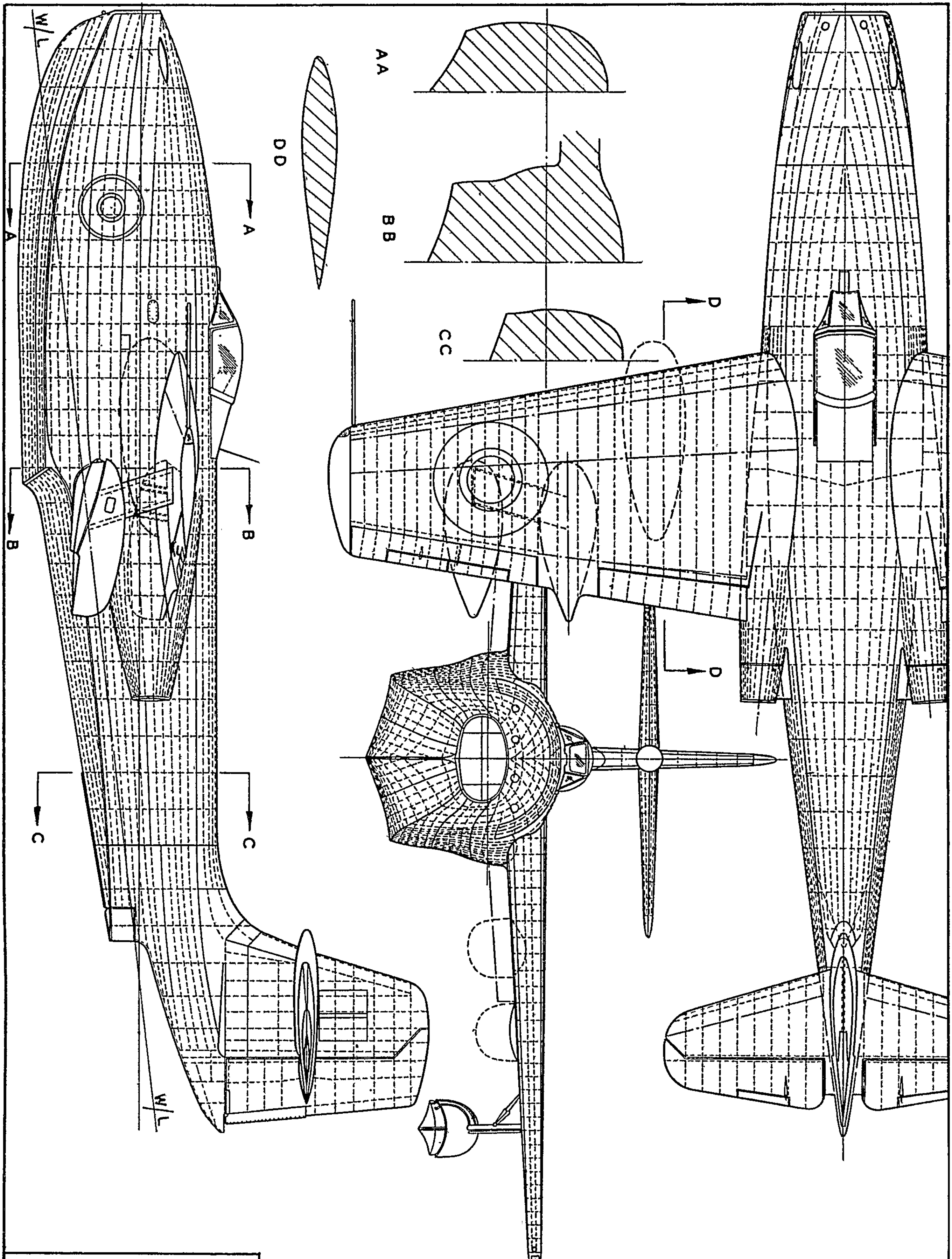
No. 213 Fighter Squadron.

Several readers have written to point out that No. 213 Fighter Squadron is still in existence at Khartoum.

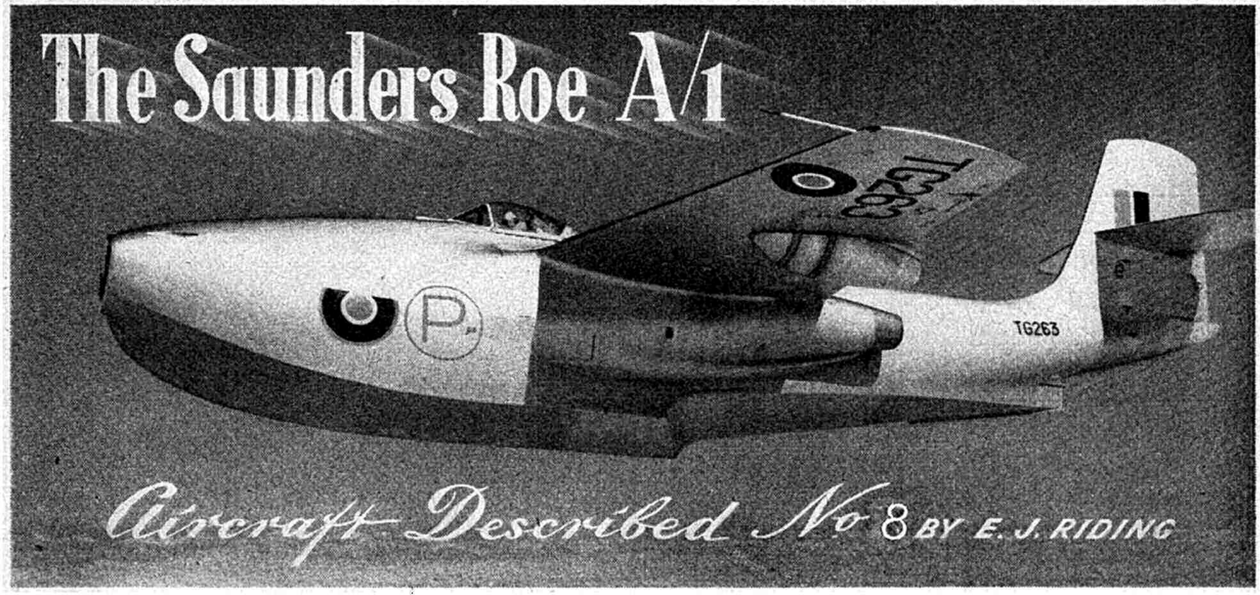
Hawker Tempest VI fighters replaced the Mustangs and in 1947 Nos. 6 and 213 Squadrons together formed No. 324 Wing, stationed at Nicosia in Cyprus. No. 6 Squadron's Tempests bear the code letters " JV " and those of No. 213 Squadron still display the letters " AK ". No. 6 Squadron, it will be recalled, was illustrated on this page last year as being noteworthy as the last Hurricane squadron.

No. 213 Squadron left Cyprus in September, 1947, and was stationed at Shallufa, near Suez, for some time before moving to its present station. No. 213's Tempests co-operated with R.A.F. Lincolns and Lancasters in " Operation Sunray " over the Canal Zone and again in the recent rocket-firing demonstrations at Khartoum.

First Avro single-engine trainer since the Tutor of 1933, the Athena is to replace the Harvard.



SAUNDERS-ROE S.R. A 1.



THE Single Seater flying boat provides a new category in Military Aviation, and credit must be given to Messrs. Saunders Roe of Cowes, Isle of Wight for carrying out the production and test flying of the first machine of this nature ever to be built.

The Saro A/1 is a single-seater jet flying boat equipped with two Metropolitan-Vickers F2/4 "Beryl" 10-stage axial flow jet turbines housed side-by-side inside the hull, the single air intake supplying both units is situated in the extreme nose and sufficiently clear of the water to prevent the entry of spray. At 7,700 r.p.m. each "Beryl", weighing 1,750 lbs. gives a static thrust of 3,850 lbs.

The close proximity of the two jet units facilitates single engine flying, and since the fuel consumption is in the neighbourhood of 1 lb. per hour of fuel per 1 lb. thrust, it will be obvious that the range of the aircraft can be lengthened considerably by this method of fuel economy.

The wing-tip floats, as will be seen from the heading photograph, can be retracted during flight. The method of retraction is interesting in that each float, during its movement upwards and inwards into the wing, rotates through an angle of ninety degrees about its own axis, thus when totally retracted the float is upside-down in relation to the datum line of the aircraft.

The armament consisting of four 20 mm. cannon is mounted well forward and immediately above the air intake orifice.

The pilot occupies a pressurised cabin in a position offering an excellent view in all directions. He is provided with an emergency ejection seat.

The construction is all-metal, great care being taken to fill and plug all plating lines and rivet heads in the forward portion of the hull. Aft of the step, the fuselage bulges considerably, each bulge terminating in a jet efflux nozzle at a point about 1½ feet aft of the trailing edge of the wing. The wing, incidentally, is of a high speed section and is built up around a single spar with chordwise ribs. The aspect ratio is 5 : 1.

The cantilever tailplane is situated midway up the fin where it is well clear of spray. A recent modification has been the addition of an acorn-shaped fairing at the junction of the tailplane and fin.

Three machines have been laid down at Cowes, the first one, TG.263 made its first flight in the hands of Mr. Geoffrey Tyson, the firm's Chief Test Pilot on July 16th, 1947. The second machine, TG.267 was more or less ready for flight at the time of our visit, and the third one was in an advanced state of construction.

The range can be increased if desired by the addition of two drop tanks each of 141 gallons capacity carried one beneath each wing inboard of the wing-tip floats.

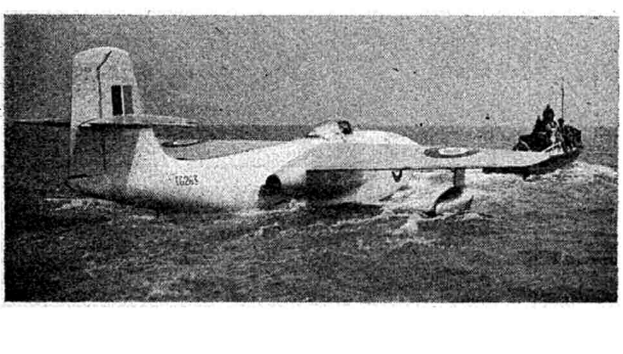
Colour : Aluminium all over, red, white and blue roundels outlined in yellow on fuselage and wings, red, white and blue fin flash, yellow circumscribed "P" experimental symbol on fuselage sides.

Specification : Full performance figures, etc., have not yet been issued, but the following figures have been made available for publication :—

Span : 46 ft. 0 ins.
Length : 50 ft. 0 ins.
Height : 17 ft. 0 ins.
Wing Area : 415 sq. ft.
Time to unstick : 12 seconds.
Max. Speed : Approx. 500 m.p.h.
Landing Speed : Approx. 100 m.p.h.

¼ in. to 1 ft. reproductions of the G. A. drawing can be obtained price 1/- from our Leicester Offices.

"Flight" Photos.



CLUB NEWS

By CLUBMAN

Club member Chesterton of Northampton demonstrates "that certain condition" in the Flight Cup. The standard "Jaguar" design by Gutteridge winner, E. W. Evans, has been adopted by the whole club with great success.

(Aeromodeller photo.)

A **WESTERN AREA** has been formed, with G. Elliott of 31, Creswicke Ave., Hanham, Bristol as secretary. Will all clubs who have not yet been contacted please get in touch with Mr. Elliott in order to get complete co-operation among all clubs in the district.

During test flying before the M.E. in the **SOUTH WALES AREA** the best flights of the day were set up (naturally!) top time being 10 : 57 o.o.s. by P. Smith's scaled up "Sunnanvind", being recovered 25 miles away. A. Schlieps model followed with a time of 7 : 32.

I had the pleasant job of officiating at the **NOTTINGHAMSHIRE** Rally on March 29th at Langar, when in spite of cold, windy conditions, some good flying and models were seen. 267 entries were received from twenty-two clubs, and the afternoon was enlivened by a display of stunt flying by Mr. Kirk, chief-test pilot in his Sparrowhawk. Contest results were :

THERE is such a spate of club reports this month, together with national comp. results, etc., I shall have to cut my usual natter to a minimum this month (sighs of relief all round!) and get straight down to business. Reference to the Editorial this month will give you the "gen" on happenings to come in the Isle of Man—sufficient for me to say that I shall be there (providing the Wakefield date does not clash, and I can get back from the States in time), and I for one look forward to what should be a really tip-top modeller's holiday.

By the time this is read the Nationals will be history, so I must leave it till next issue to say more about that particular meeting. All I pray for at this date is that the weather is kind to us. It is always a pity to see work and arrangements go for nothing owing to the one thing the organisers cannot lay on. (We are doing our best to get into this issue a stop press notice *re* the placemen in the Wakefield Trials, but I can say here that preliminary reports show that the weather was generally unkind, particularly so in some areas.)

Two new records in the National list are reported this month. Reg Parham of Worcester has pushed his existing record up to 4 : 26 in the Class "B" r.t.p. classification, whilst an initial speed r.t.p. record has been ratified for F. F. Heaton of Whitefield, the speed being 34·04 m.p.h. The Whitefield club has developed a new type of r.t.p. pylon, employing a solenoid and brush contacts. An application from A. Wilson for a power tail-less record of 2 : 20 had to be rejected owing to a motor run of over 30 seconds, the new maximum for record purposes. However, I don't doubt for a minute that he will soon put in a time with a new engine run.

Three Scottish National contests are to be held this year, Power at Dundee on the 11th July, rubber duration at Edinburgh on the 15th August, and Glider in Ayrshire on August 22nd. The Wakefield type contest for the Clyde Model Dockyard Trophy will take place in June, and organised by the Glasgow M.A.C.

The **SOUTHERN AREA RALLY** will take place on July 18th, when the usual contests will be held. Details from the Area Sec. B. Pearce, 104 Upper Shaftesbury Ave., Portswood, Southampton.

The **SOUTH EASTERN AREA** flew off the Flight and M.E. Cup events at Pelsham Aerodrome, St. Leonards and in spite of a very strong wind some exceptionally good flights were witnessed. Best was put up by Mr. Southgate of Tunbridge Wells whose rubber driven model disappeared after 3 : 59 and landed over an hour later at Eastbourne, having covered some 11 miles, 50% of this being over the sea. Best flight in the M.E. was by Mr. Boxall of Brighton, whose glider was o.o.s. after 5 : 50.

Open Rubber :	L. W. Turner	(Rugby)	2 : 30
	D. Harrison	(Birmingham)	2 : 21
	M. Hetherington	(Doncaster)	2 : 08
Open Glider :	I. Fairgrieve	(Derby)	1 : 47
	J. Hobbs	(Doncaster)	1 : 38·5
	G. B. Hocken	(S. Nottingham)	1 : 27
Open Power :	B. Spooner	(Derby)	9·6 ratio
	A. Oakley	(S. Nottingham)	8·75 "
	R. Acraman	(Derby)	8·27 "
Controlline :	J. W. Jones	(Birmingham)	46 points
	J. Pilsworth	(Nottingham)	34 "
	G. D. Pike	"	31 "
Concours :	S. A. Wade	(Loughborough)	
	Mrs. Stothers	(Leicester)	
	K. Stothers	"	

Readers interested in slope soaring are asked to note that the Clwyd Hill-Side Soaring Meeting will be organised as usual by the **MERSEYSIDE M.A.S.** and takes place on the 4th July. I want to get to this meeting myself, as I have yet to see real slope soaring with model gliders, and I'm always out for summat new!

A power driven model has been found on the roof of a building in the Enfield district, span approx. 36 ins. Anyone hopeful enough to claim should get in touch with G. J. Westaway of 103, Southbury Road, Enfield, Middlesex, otherwise finders keepers!

On April 9th Mr. C. M. Newton, Managing Director of Sywell ("Nationals") Aerodrome opened what was, in my opinion, the finest exhibition of model aircraft yet to be staged outside of a National exhibition. Organised by the **NORTHHAMPTON M.A.C.** a fine selection of models were attractively staged in a large hall, and control line demonstrations kept the public well on their toes. A. Adams won a cup for the best model on show, and the club are to be congratulated on a tip-top effort.

A "dummy run" by the **IPSWICH M.A.C.** produced some good flying and practice at smart starting and precision flying, but even so two models found timer trouble, one falling into the River Orwell—and falling to bits when rescued. E. Harwood looped and E.D. powered "Frog 45" control-liner four times—four and a half to be exact.

After a period of enforced semi-hibernation due to the absence of club rooms, the **MANCHESTER M.A.C.** are once more up and doing and busy building. A number of the chaps have "had a bash" at controlining, but given it up with the feeling that there is no future in it—and anyway does get monotonous after a while. This club stakes its claim to owning most engines per member—one bloke having no less than twelve. What about raffling a few off and letting some others get at some power flying.

The BURY & D.M.A.C. found the weather on Gamage Cup day up to expectations—gales, snow, hail and rain. They remained in the clubroom and tried to remember the last occasion they had decent weather for this event—there was none old enough present. A competition held on Good Friday with the Bolton and Farnworth clubs produced good flying by C. Lee, who won the glider event with a flight of 2 : 55 in a high wind, whilst A. Bennett placed second with 2 : 07.

The recently formed MIDDLESBROUGH M.A.C. had a day out with the Stockton lads on April 4th, and succeeded in raising some club records during the day. Mr. Kell put up the club power record to 4 : 13 from an 18 second motor run, whilst the Secs. rubber job " Much Winding " clocked 9 : 55, and on its first flight in the Gamage Cup was in the air for 35 minutes. (The ensuing cross country run nearly necessitated a new sec. for the club.)

The BIRMINGHAM M.A.C. lads came to life for the Black Eagles Rally held at Sutton Park, and walked off with three firsts and a second place. R. J. Perry won the rubber and glider classes with totals of 3 : 02·8 and 2 : 25·3 respectively, whilst H. N. Pilgrim won the power event with a total of 3 : 01 for two flights.

A team clash between the BELFAIRS M.A.C. and the Southend Senior and Thunderbugs clubs resulted in the Belfairs team finishing with a ratio of 4·92, the Southend " A " team placing second with 3·89. M. A. King of Belfairs put up the best individual ratio with 7·78.

The AMPLEFORTH COLLEGE M.A.C. glider record has again gone up, this time to 8 : 45 o.o.s. and again by R. A. Twomey. H. Morrogh's " Rapier " had the misfortune to be well and truly treed after a six minute flight, but not to be outdone by Col. Bowden's fire-engine idea, he secured the aid of the Sergt. Major of the school's Junior Training Corps, who cut through the offending branch with twenty-five shots from a ·22 rifle, and recovered the plane intact.

After many disappointments, the LEICESTER M.A.C. have secured the use of a fine flying field at Queniborough and really do the thing in style—one member serving ice cream and soft drinks from his caravan. A catering licence is to be applied for, and then the club should really " go to town ".

NATIONAL CONTEST RESULTS.

GAMAGE CUP

1	H. Tubbs	Leeds	737·5
2	A. B. Munden	Blackpool	521·9
3	F. E. Dewell	Middlesbrough	500·6
4	C. J. Davey	Blackpool	464·4
5	R. Calvert	Bradford	459·5
6	J. Bowerman	Kingsbury	455·5
7	M. N. Mackay	Edinburgh	454·5
8	R. T. Parham	Worcester	450·2
9	F. Best	Leeds	443
10	R. Hinks	Luton	374·75
11	A. G. Glennie	Brentford	374·7
12	J. North	Croydon	374·2

(158 entries from 45 clubs.)

FROG JUNIOR CUP

1	N. J. Hocking	Greenford	321·2
2	T. W. Geesing	Croydon	295
3	P. Flower	Hayes	270·5
4	J. Wingate	Streatham	261·7
5	J. P. Watkins	Croydon	242
6	V. Johnson	Southampton	238
7	J. Holmes	Blackheath	210·4
8	S. Jones	West Essex	193
9	V. Welch	Potters Bar	185
10	J. Anstead	Greenford	176·7
11	B. Kreeger	,,	172
12	J. O'Donnell	Whitefield	162

(31 entries from 21 clubs.)

M.E. No. 1 CUP

1	Croydon	1777·8
2	Hayes	1644
3	Birmingham	1635·8
4	Sth. Nottingham	1617·4
5	Worcester	1545·6
6	Bushy Park	1474·7

FLIGHT CUP

1	D. Lees	Bradford	824·2
2	R. Woodhouse	Whitefield	753
3	P. Ladd	Croydon	681·3
4	R. J. North	,,	655·5
5	P. Cock	Southampton	644
6	H. W. Revell	Northampton	640·6

Two records for the TORBAY M.C. were set up over Easter owing to fine weather. Following the attainment of a suitable flying field for power models, C. R. Olding, flying an E.D. powered " Spartan " clocked 1 : 45 o.o.s on a 20 second power run. The other record to go west was the glider duration now held by G. Wills, " Sunnanvind " with 6 : 00 o.o.s. The model was seen 20 minutes later, well up and about three miles away.

The MERSEYSIDE M.A.S. annual slope soaring meeting will again take place at Clwyd, (N. Wales) date July 4th. Full details can be obtained from the Merseyside Secretary. (This is a meeting I have promised myself to take in this season—providing I can fit it in with about a hundred other items.)

Sunday April 4th, the opening day of the BLACKHEATH M.F.C. greeted the members with appalling conditions. It just blew and blew, calming in the evening when all comp. flights were completed. R. A. Dyball won the Novices Contest, and the results of the Club Shield were :

D. Dudley	3 : 38·8	agg.
J. Holmes	3 : 30·4	,,
W. J. Bishop	3 : 11·2	,,

An interesting high light in the recent inter-club engine starting contest was the fine work put in by Dudley, who stripped and reassembled a choked jet in 30 seconds.

A very successful exhibition staged by the PETERBOROUGH M.A.C. included over 150 models, the power section comprising at least a third of the exhibits. Sqd. Ldr. Lord visited and demonstrated his Dynajet. Prizewinners were :

Power :	S. R. Venn	(Stentorian)
Scale :	W. R. Reed	(Tiger Moth)
Duration :	H. J. Wilson	(Wakefield)
Sailplanes :	R. Hemsworth	(Evander)

The annual Glider Gala organised by the SURBITON D.M.F.C. was well supported, over forty clubs and 250 competitors taking part in spite of a high wind. Full results were :—

Team :	Kingsbury	1527·9	
	Surbiton	1476·4	
	Croydon	1383·6	
	Edgware	1339·9	
Individual :	G. D. Miles	(Kingsbury)	8 : 12·4
	R. Honeycombe	(S'thern Cross)	8 : 07·6
	B. Gardner	(Fulham)	7 : 57·8
	L. Jessop	(Zephyrs)	7 : 50·2
	P. Allaker	(Surbiton)	7 : 52·7

With a severe handicap regarding flying space, the DERBY M.A.C. went all out for gaining experience at " away " events, and are certain attenders at all club rallies, etc., staged near their location. During the past twelve months the club took part in seven comps. gaining four firsts and a third.

A speed contest for control line models was the highlight of an exhibition staged by the WREXHAM M.A.C. A strong breeze caused some crashes and erratic flying, but a satisfactory day was spent. Using 31 ft. lines as standard, Mr. Tones clocked 54 m.p.h. with his Mills powered own design machine, this being top time of fifteen entrants. An engine starting contest on novel lines produced some good fun. Competitors were lined up ten feet from their engines, and on the word of command from the timekeepers had to go to their engines (all diesels incidentally) fill the tank with fuel, and start the engine by hand. Mr. Cuipt won with a time of 15 seconds, which is pretty good going in my opinion.

H. Tubbs of the LEEDS M.F.C. is to be congratulated on being the first member to bring a National award to the club, the Gamage Cup, the model used being an A.P.S. Gutteridge Trophy design, four years old and claiming to be the only model aeroplane to have served in the Army. His ten minute third flight constitutes a new club record. Junior member G. Joyce also set up a club glider record on the same day with an 8 minute flip.

There is a 99% possibility that Fairlop will be the venue for the WEST ESSEX AEROMODELLERS all control line meet on June 13th. Prizes comprise a number of American engines, and full details are to be obtained from K. F. Marsh, 43, Bressey Grove, E.18.

The DONCASTER & D.M.F.C. had a beano at the Area events at York on April 11th. Everyone agreed that thermals had never been so abundant, and in spite of five lost models, an excellent day's flying was had by all. Mick Hetherington's lightweight rubber job landed at Northallerton, some 36 miles from take-off. E. Arnold is flying his control line Tiger Moth with excellent consistency, the sight of a scale model stunting being well worth seeing.

B. Ackroyd of the **HALIFAX M.A.C.** won the glider event at a rally of East Lancashire clubs with an aggregate of 8 : 18, breaking his club record whilst doing so with a flight of 4 : 18 o.o.s. Other records in the club are H.L. rubber—7 : 08, R.O.G. rubber—2 : 22 and open glider—3 : 20, all held by E. North.

The **SOUTH BIRMINGHAM M.F.C.** club lightweight glider is still giving a good account of itself, best time to date being 4 : 10 o.o.s. flown by Alan Hewitt off the 300 ft. winch. Ian Yule has his ·1132 c.c. diesel running now, and shakes all who hears it! Stunt controliners are still digging trenches, and one member is seriously thinking of fitting undercarts top and bottom.

The **DARLINGTON M.A.C.** will be holding its 3rd Annual Rally at Croft Airport on the 6th June. Those travelling other than by private buses should contact the secretary so that transport can be laid on from Darlington to the Airport.

Another forthcoming event is the C. H. Roberts Cup for flying boats, due at Danson Park on September 5th under the direction of the **NORTH KENT M.A.S.** Details from A. D. Hall, 35, Maxey Road, Woolwich, S.E.18.

The newly organised **HULL & D.M.A.C.** has a very heavy calendar for the '48 season. Free flying is generally at Leconfield by kind permission of the O.C. Results of the recent Hull v Goole Trophy contests were as follows :—

Glider :	R. Greenwood	(Goole)	6 : 20 agg.
	E. Day	(Hull)	5 : 38 ,,
	L. Constable	(Hull)	4 : 04 ,,
Rubber :	C. Charlesworth	(Goole)	3 : 08 ,,
	R. Greenwood	(Goole)	2 : 41 ,,
	R. Towers	(Hull)	: 55 ,,
Power :	E. Magee	(Hull)	3 : 08 ,,
	C. Charlesworth	(Goole)	2 : 09 ,,
	H. Beer	(Hull)	1 : 00 ,,

Ted Watts of the **YEOVIL S.A.M.** broke the club duration record with his brand new Wakefield job, time 5 : 42. This machine is well fancied for the Area elimination for the Wakefield Trials. Recent comp. results show a win in the rubber driven class for D. Steele, aggregate 4 : 38, a similar win in the power section for K. B. Evans, time 4 : 17·5 and the sailplane class to R. Rooke with a flight of 7 : 42 o.o.s. with an " Ivory Gull ".

Scheduled for Sunday August 22nd is the 1948 All-Herts Rally organised by the **ST. ALBANS M.A.C.** Again the venue will be Radlett Aerodrome, (by kind permission of Sir Frederick Handley-Page) and comps. will include the usual concours, rubber duration, glider and gas, with additional classes for stunt and speed control liners. Prizes will be cups and currency.

The **BEVERLEY & D.M.A.C.** held an Open meeting at Leconfield on Easter Sunday, visited by a number of local clubs and a high wind. Results :—

Power :	A. Dixon	(Pegasus)	4 : 15 o.o.s.
	S. Linacre	(Hull & D)	2 : 18 ,,
	L. Wharram	(Hull & D)	: 16 ,,
Rubber :	R. Skinner	(Beverley)	2 : 12
	W. Branton	(Pegasus)	1 : 41 ,,
Glider :	J. M. Holbrook	(Leconfield)	6 : 43
	A. Brown	(Beverley)	3 : 28 ,,

The Beverley & District Annual Rally is being held on the 11th July, and entries (forms obtainable from the club secretary) must be in no later than July 4th.

Members of the **SOUTHEND MODELLERS ASSOC.** have been issued with special passes to the Municipal Airport for model flying—a stunt I recommend to others. Too many clubs lose the use of a good ground owing to " unofficial " fliers crashing in, causing trouble, and gumming up the works for the club with rights on the ground. Records in this club stand at :—

Power :	3 : 48 on 20 sec. motor run	D. Richardson
Sailplane :	12 : 11	K. Branfield
Canard Sailplane :	2 : 16	R. Chapman

Gamage Cup day was calm and sunny with the **STOCKTON & D.F.M.C.** but only one bod had a plane ready to take advantage of the conditions ! D. Perry, taking advantage of the numerous thermals, put up a new club power ratio record with his " Hi-Ball ". Following a 14·5 second engine run, he put in a total flight of 5 : 58·4, thus setting a new ratio of 24·7. K. Herbert raised the club r.o.g. record to 1 : 49 with a " Farthing Lightweight ", whilst D. Perry's " Fugitive " clocked 3 : 20 before getting well and truly treed.

The sailplane contest held by the **ST. MARY'S M.A.C.** went to H. Linklater whose " Thule " aggregated 13 : 4·8 with a best flight of 12 : 18·8 Next best was C. Evans 6 : 24·8 and R. Batty 5 : 10·9. L. Pike holds the club sailplane record with a time of 14 : 35 made with a scaled up " Farthing Sailplane ".

Eric Nicolle, writing from 18, Coolamin Road, Waratah, New South Wales, Australia, wishes to have pen friends in this country to correspond on all modelling matters. In the other direction, I. R. Forster of 24 Maple Road, Blaydon-on-Tyne, Co. Durham would like an American or French reader to write him. Age is fourteen.

Two chaps would like to start model clubs in their districts, so if anyone in the Sheldon area of Birmingham or Cheltenham would like to help out in this direction, get in touch with M. Hanson of 6, Farm Close, Solihull, or P. Harris of 165, Hewlatt Road, Cheltenham.

And that is enough for this month, so here's away to get brushed up for the Nationals, Wakefield Trials and all the other meetings due to take place between now and the next time I get down to sorting out Club News. Good flying, and kindly thermals.

The CLUBMAN.

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J. Post, 49, Alpine Road, Redhill, Surrey.
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G. Briggs, 3, Blundell Crescent, Hillside, Southport.
BORDER M.F.C.
E. J. Matthews, 11, Clifton Street, Denton Holme, Carlisle.
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J. Farrant, 14, Eccleston Road, W.13.

Owing to shortage of space various new clubs have been held over to next month.

(Continued on page 397)

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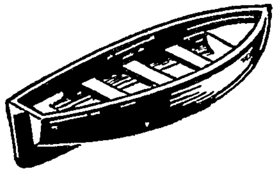

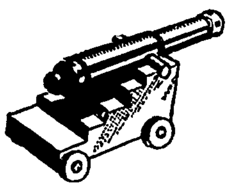

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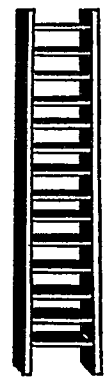

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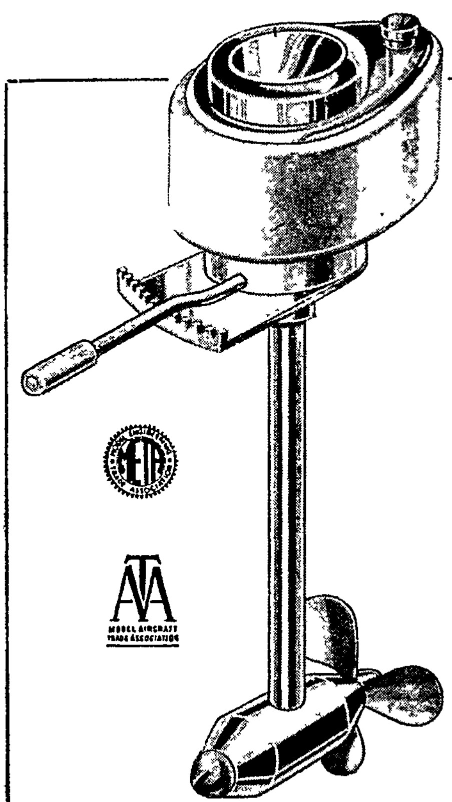

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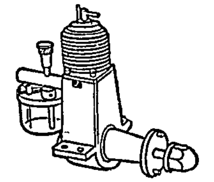

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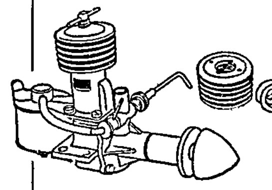

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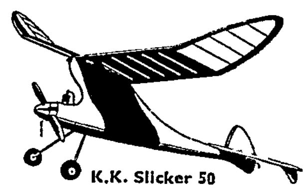

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Continued from page 383.

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