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JULY
1950

1/6

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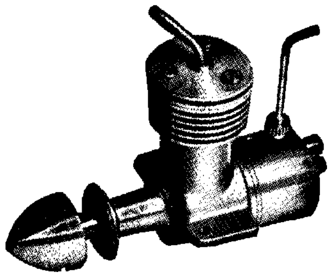
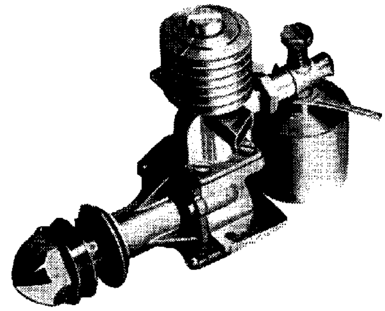


Designed by a picked staff of highly skilled aircraft engineers, many of whom are engaged solely on research and development work, these remarkable diesel engines are the achievement of an exceptional co-ordination of first-class technical ability, experienced workmanship and highest grade materials. Their performance and popularity are proved for all time.



E.D. 1 c.c. Mark I (BEE)

A very compact little motor with an overall height of 2¼ in., it weighs only 2¾ oz. Features a disc inlet valve with induction pipe going through centre of fuel tank. Bore ·437 in., static thrust 12 oz., stroke ·400, R.P.M. 7,000 plus.

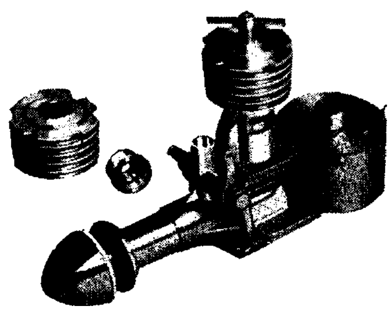
Price **£2 . 5 . 0**

E.D. Diesels.

E.D. 2 c.c. Mark II

Capable of developing ⅛ h.p., the total weight of this engine including airscrew is only 6½ oz. Produces static thrust of 16 to 18 oz. Bore ½ in., stroke ⅝ in., width 1⅞ in., length 4 in., height 3 in. Efficient working R.P.M. 6,500. Suitable for planes 3 ft. 6 in. to 5 ft. span.

Price **£2 . 15 . 0**



E.D. 2.49 c.c. Mark III

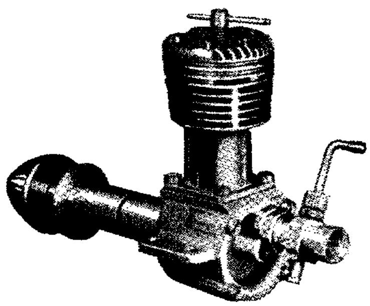
Holder of British speed record for " C " class cars at 50·5 m.p.h., this diesel has extended prop. shaft to simplify streamlining. Height 3¼ in., width 1⅞ in., length 5 in., weight 6 oz. Complete with conversion head for " Glo-plug "

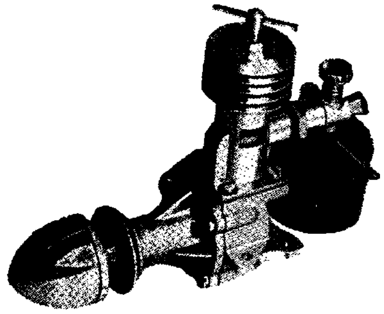
Price **£3 . 5 . 0**

E.D. 3.46 c.c. Mark IV

Developing 10,000 R.P.M., the three-forty-six is one of the finest engines for control-line and stunt flying. Its power is equal to any 5 c.c. on the market. Bore ·656 in., stroke ·625 in., height 3 in. width 1⅞ in., length 4⅞ in., weight 5¾ oz

Price **£3 . 12 . 6**





E.D. 2 c.c. COMPETITION SPECIAL

Holder of British speed record for control-line flight at 89·95 m.p.h. Ideal for control-line, stunt and speed competitions. Gives 23 oz. static thrust and incorporates vernier compression adjustment. Height 3 in., width 1⅞ in., length 4 in., weight 5¼ oz.

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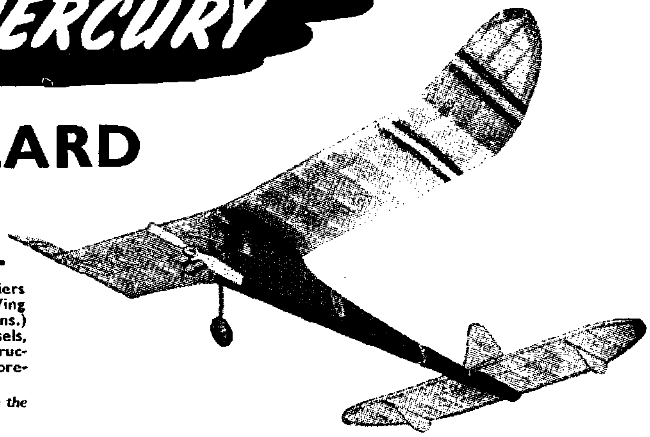
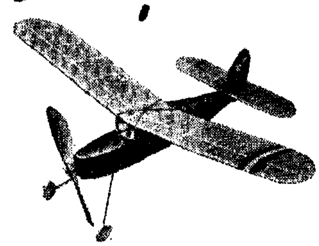
NEW! The MALLARD
COMPETITION POWER MODEL



Here is MERCURY'S first F/F Power Model and one which keen contest fliers can build with confidence. It conforms correctly to F.A.I. specifications. Wing span, 48 ins.; Wing area, 350 sq. ins.; Tail, 170 sq. ins. (Total, 520 sq. ins.) All up weight, 14½ ozs. O/A loading, 4 ozs./sq. ft. For radial mounting diesels, 1.5—2.5 c.c. Unique Mercury triangulated fuselage for extra robust construction. This is a standard Mercury Kit, and includes photo-view plan, pre-printed and cut Solarbo Balsa, "hardware" tissue, etc.

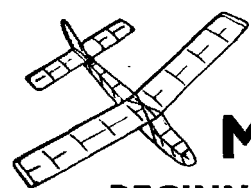
By the time this advertisement appears, your Dealer will be able to let you see the Mallard and tell you the price.

NEW! The MAYBUG
32" RUBBER DURATION



This 32 in. span semi-scale model is a true beginner's kit specially designed by Ron Young of Mercury Models, and is a direct follow-on from the Magpie. The Maybug is a smart-looking cabin job of robust design and one that builds very easily. Kit includes all necessary Solarbo Balsa and tissue, with photo-view plan and helpful building instructions.

Your Mercury Dealer will tell you the price.

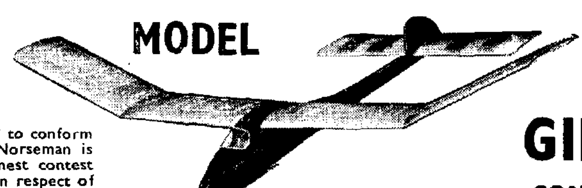


MAGPIE
BEGINNER'S GLIDER

This is the Kit chosen by Rev. F. Callan for his articles on "Modelling for Beginners," and newcomers cannot do better than keep to Mercury from the start. Magpie 24 in. glider kit includes all necessary Solarbo Balsa, tissue, cement and A-B-C simple plan and building instructions.

3/9

MERCURY'S SENSATIONAL NORDIC CONTEST MODEL
The Norseman



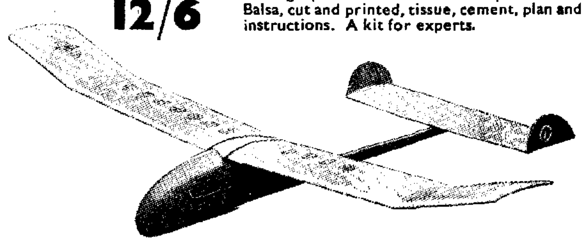
As well as being the first commercial model to conform exactly to Nordic A.2 specifications, the Norseman is already enthusiastically acclaimed as the finest contest sail-plane ever to be kitted. Every detail, in respect of quality, building and performance has been rigorously checked and re-checked to provide a model worthy of the important contests for which it was designed. Examine the Norseman kit for yourself and then note particularly the excellent plan with its real photo-views and clear building instructions. Kit includes ample pre-cut and pre-printed Solarbo Balsa, tissue—photo-view plan and instructions, etc.

17/6

GILI-CHOPPER
CONTEST SAIL-PLANE

A 42 in. span Sail-plane conforming to S.M.A.E. and F.A.I. standards, designed by Phil Guilmant. Has great inherent stability and low sinking speed. Kit includes ample Solarbo Balsa, cut and printed, tissue, cement, plan and instructions. A kit for experts.

12/6



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Working in a giant refrigerator at a temperature down to −40°F, Esso scientists check the ignition qualities of a newly-developed fuel in the test engine shown above. Data obtained from this ceaseless Esso research helps to produce a quicker-starting, faster MERCURY fuel for your engine.

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The result is a range of eight tip-top fuels that get absolute peak performance from every type of engine. There is one listed below which has been specially designed for *your* engine. If you would like further details, we will gladly send a fully descriptive leaflet.

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- TOP PERFORMANCE
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K.K. Skyjet " 100 " ..		5	6
K.K. Skyjet " 200 " ..		7	6
K.K. Junior " 60 " ..	£1	19	6
Frog Janus		15	0
Frog Centurion ..	£2	19	6
Frog Powavan.. ..	£1	5	0
Jetex Flying Wing ..		5	0
Jetex Vampire ..		5	0
Mercury Mallard (P/L)			
Frog Vixen		12	6

GLIDER

Halfax Tern 10/–, Halfax Albatross 25/–, Keilkraft Invader 6/6, Keilkraft Soarer Baby 5/–, Keilkraft Soarer Minor 8/6, Keilkraft Soarer Major 11/6, Frog Fairey 7/6, Keilkraft Cadet 4/–, Keilkraft Cub 2/6, Halfax Roma 7/6, Norseman 17/6.

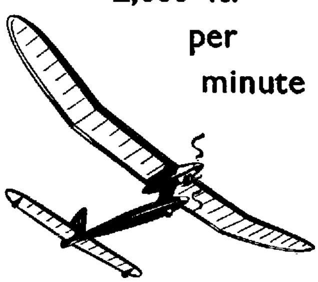
Don't forget your copy of **Radio Control for Models** by R/C expert **G. Honnest-Redlich.** This superb book will be in great demand because of its subject and you should order yours now. **Price 10/6**

... that he has been nosing round again and looking over some of the new designs **Frog** are getting ready for you. A whole series will be marketed soon and every aeromodeller will be able to choose one to suit his taste. **The Powavan** (below) is one of the series and Mac thinks you'll be very keen to own a **Firefly** which is due for release shortly. This is a very stable **biplane** power job for sport flying; then there's the **Vanfire** which is a truly magnificent fighter type control line model. **Keilkraft** are introducing their version of a Nordic class sailplane in the **Chief**, this job is really worth the effort of building and details will appear in our advert next month.

Powavan

2,000 ft. per minute

That much bandied word " new " is really applicable in the case of the **Frog Powavan** and no power modeller could want a better performance figure than 2,000 feet per minute; add to this the soaring sailplane glide and you've really got something worth having. The kit features first-class materials and many precision-cut parts. Provision is made for two motor cut-outs and a lift-up-tail dethermaliser. **Price 25/-**



RUBBER

Halfax Flying Minutes 21/–, Halfax Jaguar 21/–, Keilkraft Competitor 7/–, Keilkraft Playboy 3/3, Keilkraft Eaglet 4/6, Keilkraft Achilles 4/–, Keilkraft Ajax 6/–, Keilkraft Gipsy 10/6, Frog Venus 15/–, Frog Stratosphere 17/6, Frog Stardust 10/6, Frog Goblin 4/9.

RADIO CONTROL NEWS

E D

We confidently advertise the new E.D. R/C unit which will be acclaimed everywhere as the best yet. The whole unit, transmitter, receiver and escapement costs only £7. 19s. 6d. and the receiver, together with escapement and complete with batteries, weighs 7½ ozs.—and it's CRASHPROOF. Send for further details.

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We thank our customers in far away places for their continued support and in view of the many enquiries we receive about ordering goods advise as follows :—

- Check up on your currency regulations.
- Write us a letter first about your requirements.
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Without listing all the countries, generally speaking we can send goods to all parts of the world except " Iron Curtain " countries, and we'll have a try there if needs be.

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OUR H.P. SCHEME CONTINUES UNALTERED and engines with or without kits are available to mail or personal shoppers.

WHEN ENQUIRING OR ORDERING FOR H.P. BY MAIL, SEND NO CASH BUT S.A.E. FOR REPLY AND TERMS. No correspondence needing a reply can be answered if unaccompanied by stamped and addressed envelope.

153 *Modellers on the West side of London find it convenient to visit our shop at 153, Notting Hill Gate (one minute Notting Hill Gate Station, Underground), under the management of Bill Morley, and where you can be sure of getting the same up-to-the-minute service as at 308.*

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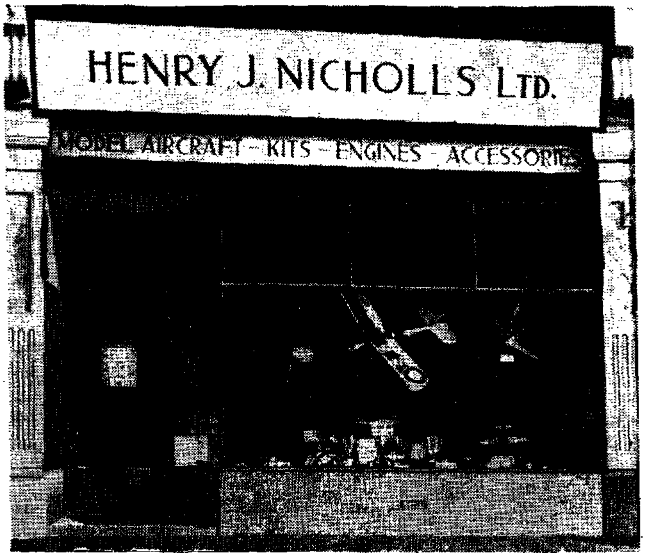

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MERCURY MUSKETEER 40" C/L STUNTER	19/6
NORSEMAN NORDEC SAILPLANE ...	17/6
MIDGET MUSTANG	21/-

Any Engine and Kit stocked may be bought together on the same H.P. agreement.

Large S.A.E. brings Easy Ref. No. 6

KITS BY KEIL, I.M.A., MERCURY, VERON, HALFAX, ETC.

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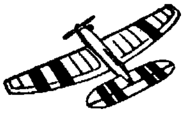
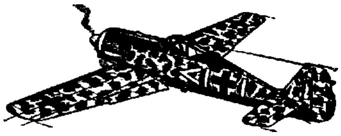

MUSKETEER

GAMAGES
Model Aeroplane Corner


NORSEMAN A.2. SAILPLANE

FOCKE WULF 190 A.3

33½ ins. wingspan. Stunt Scale. Phil Smith's latest and greatest addition to Veron's fine range of C/L scale models. Again the famous flap control gives the full stunt schedule in a model of outstanding realism. *Post free.* **19/6**

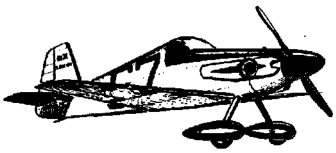


Power it with the new "FROG 500" Glow Motor, for top performance in this coming season's competitions. **75/-**

MUSKETEER
Wing span 40" Combines outstanding stunt performance of short coupled layout with tough fuselage construction Finished parts include ready-cut fuselage halves and spun aluminium cowling. **19/6**
Top left. *Post free.*

NORSEMAN A.2. SAILPLANE
The first design to be kitted conforming to the new Nordic A.2. standards—complete kit includes full size plan with real photo view of fuselage construction. Wing span 58 ins. **17/6**
Top right. *Post free.*

MIDGET MUSTANG



Span 24 ins. A scale C/L model which is ideal for team racing. Will complete the full stunt schedule and has a top speed of over 80 m.p.h. Spinner, Stunt tank parts, moulded cockpit cover. Sponge rubber wheels and pre-shaped parts. *Post free.* **21/-**

Ideal engines for this model are: Arrow, Javelin, Elfin 1·8, Mills 1·3 and Amco 3·5

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The choice of American Modellers—beginners and experts alike — is now available in limited supply
ORDER NOW!

- Three handles for light, medium and heavy work, built on the "chuck" principle for easy changing and firm grip.
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- All blades made of high-carbon-tempered steel, with the same shapes, curves and angles as surgical scalpels.

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Write for full particulars and leaflet.

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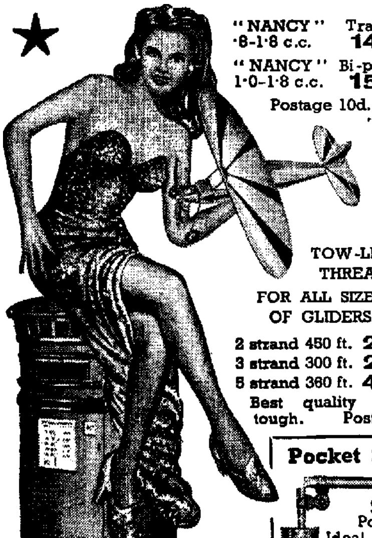

"NANCY" Trainer ·8-1·8 c.c. **14/6**
"NANCY" Bi-plane 1·0-1·8 c.c. **15/9**
Postage 10d.

TOW-LINE THREAD FOR ALL SIZES OF GLIDERS
2 strand 450 ft. **2/6**
3 strand 300 ft. **2/6**
5 strand 360 ft. **4/4**
Best quality and tough. Post 3d.

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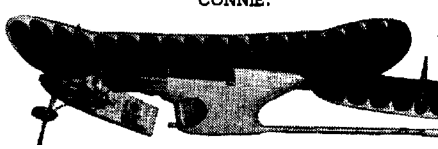
I am very pleased to see that you have taken my advice about the merits of the "Connie" Model. The Model that I am holding is the "Nancy" C/L Trainer. It still leads the way as the ideal beginner's Model. "Everything of the best!" stands for quality and wishes.
Miss SLIPSTREAM.

"CONNIE" J'S LATEST KIT!

33 ins. SPAN HIGH PERFORMANCE Free-flight design for Engines of ·75 to 1·5 c.c.s

Complete Kit of parts **13/6**
Postage 10d.

With Tough Dural Boom. This model by D. W. Jackson is a sheer joy to build and fly. The picture below shows some of the grand new features of "CONNIE."



Trade enquiries invited.

Model J'S Centre
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"LITTLE SAMSON" POCKET SPRING BALANCE (Pat.)

Will accurately weigh your model complete or in separate units reading in 1 oz. divisions to 4 lbs.—is very strong, light and non-rusting. Fully adjustable.
4/9
Post 3d.

C/L Linen Thread in bright colours, 150 ft. **1/3** Post 3d.
Plastic Tubing, 1½, 2, 2½, and 3 mm. **5**d. in packets of 12 ins.

Pocket Spray.

2/6
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Ideal for water shrinking tissue, spraying dope, varnish, poster colour,

"SLIPSTREAM" FUEL FUNNEL
Coloured Plastic **6**d.
Post 2½d.

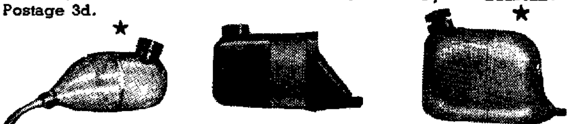
"SLIPSTREAM" FREE FLIGHT TANK (improved back)

Graduated **3/8**
Post 3d.
Small 3/- Large 3/11½ (Not graduated)

DUNLOP RUBBER for 1950 "Wakefields"
3/16" × 1/30"
1/4" × 1/30"
1/4" × 1/24"
10/6 per lb.

"SLIPSTREAM" SUPER STUNT C/L TANKS

Postage 3d.



Small **3/11½** (¼ oz.) Medium **3/11½** (½ oz.) Large **5/6** (½ oz.)
Prices include Purchase Tax.

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Because they maintain an unfailing fuel supply to the engine throughout the most complicated flight manœuvres, are the lightest, will not leak, and hold the greatest amount of fuel in the smallest space, are transparent, easy to fill and empty, are simple to instal, and the best value for money— ★Improved quality.

J'S MODEL CENTRE, 6, BLENHEIM GROVE, LONDON, S.E.15

AEROMODELLER
INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

International Contest Participation

TO sit in an Editorial armchair and produce workable ideas for others to carry out is reputed to be an easy matter, but to heed the " suggestions " put out by the co-editors of a certain contemporary paper would lead one to think that the only work required to put British Teams into every International aeromodelling field is to select certain men, announce to the world that participation is intended in such-and-such a contest, and blithely wait for pennies to fall from heaven !

Having had some slight experience in both collecting and contributing to past (and present) efforts to raise the necessary cash for such prestige participation in the International sphere, we have no hesitation in recording the hard fact that such finance is by no means simple to come by, and it means hard and unremitting work by a handful of keen, voluntary officials to produce the bare minimum required to secure the attendance of British representation at premier events. At such time as a surplus income allows the travel of Teams to minor events, we shall be the first to advocate the fullest British participation wherever possible.

It is significant that neither of the two critical gentlemen have seldom shown signs of being other than somewhat destructive in their published criticisms, and we have yet to witness an instance of their offering assistance —either physical or financial—in connection with any International meeting within our knowledge. Such criticism is, of course, cheap, and costs no more than the loss of a measure of respect from fellow aeromodellers !

Knocke Knocke—Who goes There!

Further to the information given on page 273 of our May issue, we understand that the offer of free accommodation to visitors at the Belgian Control Line Meeting is limited to the first four entries received from each country, and where an official team is nominated, this highly appreciated hospitality is naturally bespoken on their behalf. Whilst we have no doubt that special consideration will be given to fliers attending in a private capacity, we strongly advise such individuals to go prepared to meet all costs involved. Better safe than sorry !

Apparently, we are not the only country that finds it difficult to " raise the wind " for aeromodelling occasions, for we learn with regret that the Belgian meetings scheduled for the 18th and 19th June at Brussels have had to be cancelled owing to lack of finance.

Contents

VOL. XV. No. 174. JULY, 1950

Branded Goods

It is nearly ten years since a certain little wingfooted pageboy made his appearance as the trademark of *Aeromodeller Plans Service*. From his first rather diffident bow he was flown off his feet in the effort to keep pace with the multitude of readers who demanded his services in ever-increasing numbers. Year by year the range and variety of the goods he has offered have increased until from a modest half-dozen plans there are now some three hundred from which to choose. Where enquiries came in their tens from a limited number of purely local enthusiasts, it has now become necessary constantly to revise a mailing list of many thousands to avoid over complication, whilst wholesale and retail orders are shipped to all quarters of the world to an extent that continues to amaze us.

Just what does that little sign of the pageboy mean to the average reader ? In all modesty we can claim it is the only guarantee of quality in model aircraft plans that has achieved a world-wide reputation. Irrespective of language barriers it is a potent proof of the worthwhile nature of the design below, whether the builder is a Laplander from the Arctic Circle, a Bamangwato tribesman or a dapper New Yorker on Fifth Avenue. Such a reputation is not lightly gained, and we can recall our many staff conferences in the effort to achieve this ideal.

Each year we have been in the habit of publishing a list of additions to the service, and did, indeed, include a full list in that best-selling price list of ours "Service for Modellers" —some hundred thousand of which were distributed.

Now at last we can offer a special booklet devoted entirely to *Aeromodeller Plans Service*. We are offering this free of charge, and will post a copy to any reader sending a 2½d. stamp and self-addressed envelope.

But do not think that because we are giving it away it has little value ! This is the list that may be shaping your future modelling career. In its 32 pages, size 8½ × 5½ ins., will be found full specifications of every plan in the service with nearly two hundred of the designs illustrated in halftone and line. At the same time we are inaugurating our " rolled plans service " whereby for an extra shilling the careful builder can have his order sent uncreased in a stout cardboard tube. Whatever your aeromodelling interests there is an *A.P.S.* design to fill the bill, the products of the best aeromodelling brains in the country—no, the world !— at your service for a mere 2½d. stamp. Our first print is 50,000—just enough for one copy for each of our readers !

Copies are ready for immediate despatch, *but do please* send a stamped addressed envelope — 9" × 6" size preferably — with your request !

THE MODEL AERONAUTICAL
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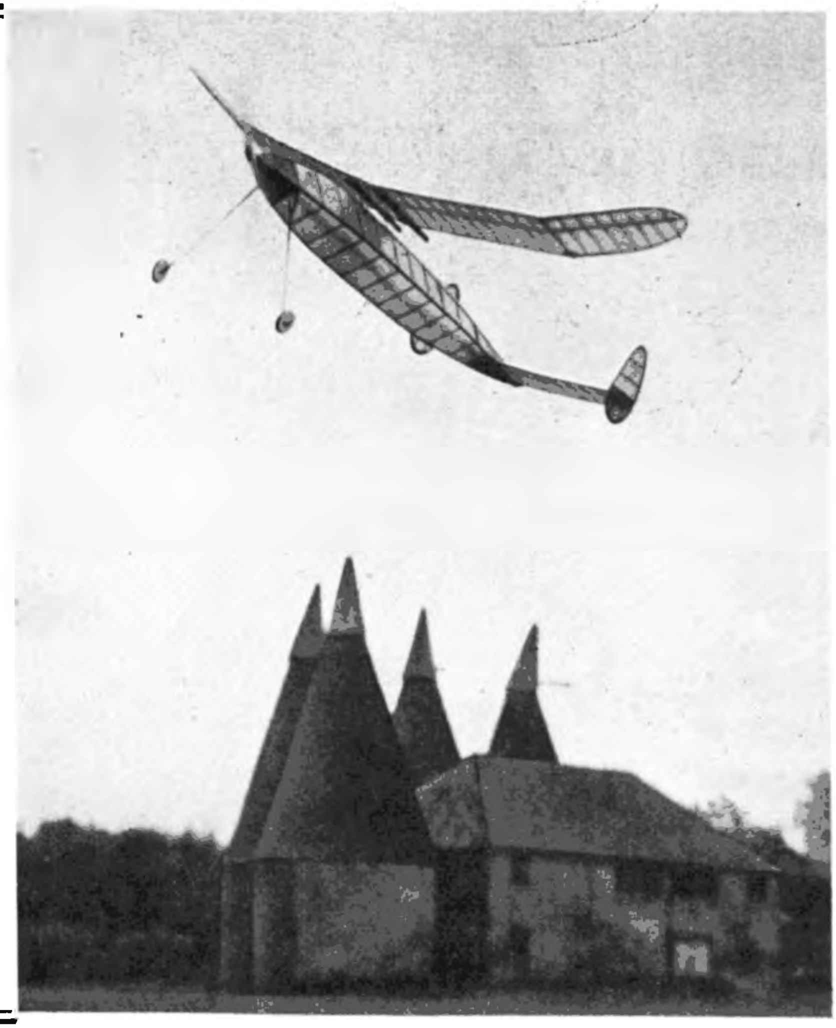


Those modellers who appreciate the finer points of flying will enjoy this scene of a lightweight hopping over the oast houses.

Aeromodelling Holiday Camps at Eaton Bray

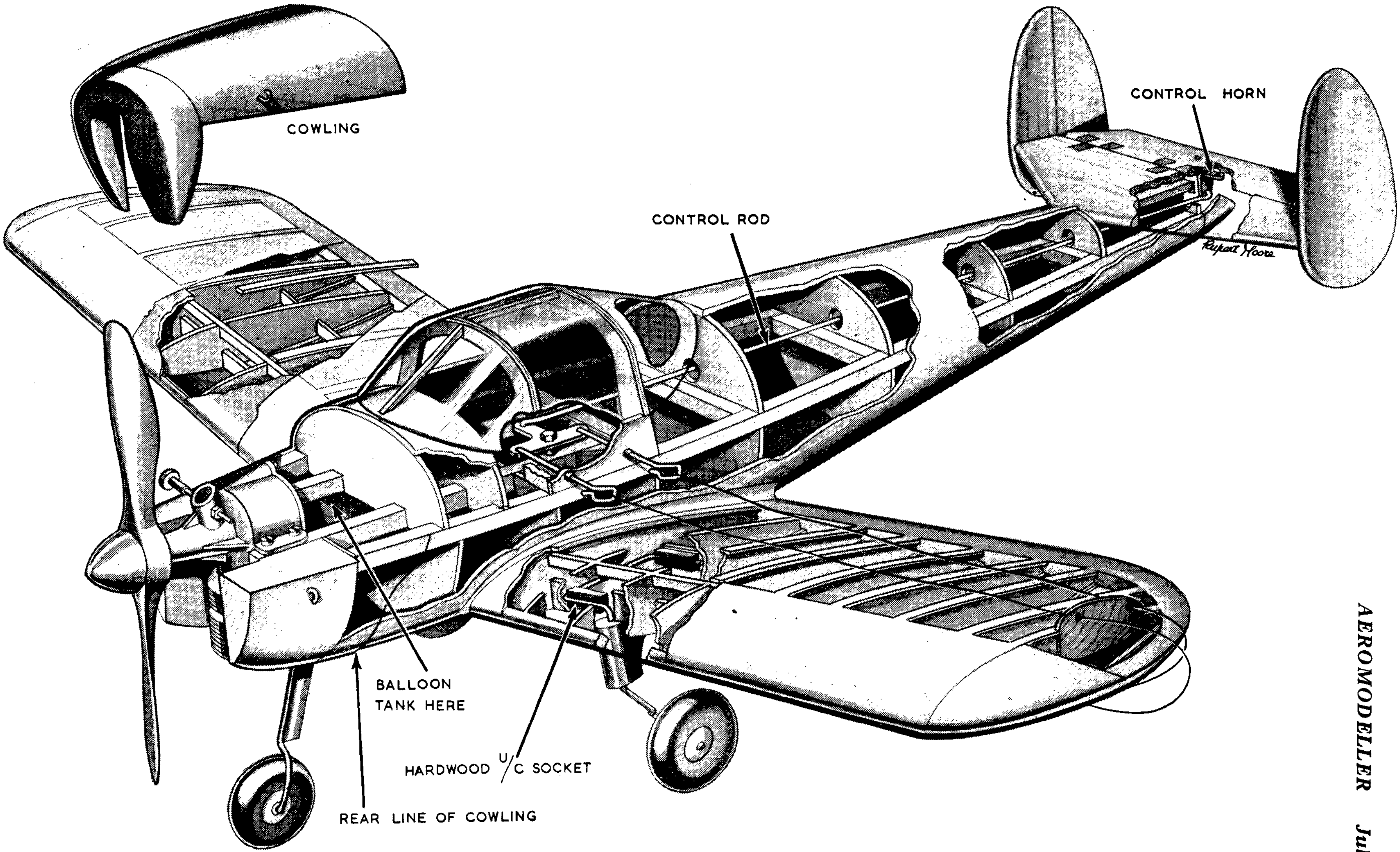
Whilst our staff endeavours to keep in active touch with as many aeromodellers as possible by their attendance at the larger rallies and by talks and lectures at clubs all over the country, there must still remain a large number of our readers to whom they have until now been little more than the names on our contents page. We are particularly pleased therefore to be able to draw attention to the re-opening of Aeromodelling Holiday Camps at Eaton Bray this summer. Improvements in supplies of such necessary items as sheets, and some relaxation on building restrictions enable us to offer them rather more than the Spartan conditions that have hitherto been the only accommodation available.

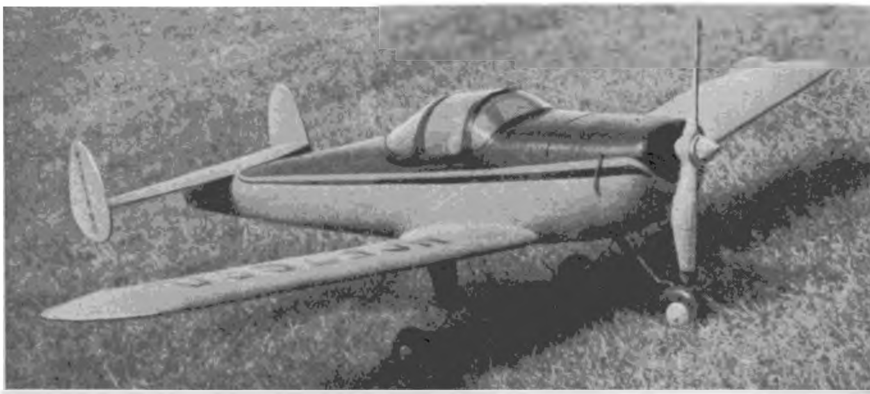
The AEROMODELLER staff will therefore be "at home" to those staying at the weekly aeromodelling holiday camps at Eaton Bray, to give talks on those aspects of the hobby in which they have specialized, and generally to act as father confessors to all with aeromodelling problems. Not only do these camps offer a splendid open-air holiday to club groups with ideal flying conditions on the doorstep all day and every day, but also afford the "lone hands," who still form the greater number of enthusiasts, an opportunity of meeting and indulging for once in collective flying, and that "nattering" so dear to the aeromodellers' hearts.

Some hundreds of enthusiasts have visited us in past years—we hope we meet many of them again in more congenial surroundings than they have braved before. To newcomers we would say that, for an all-in weekly charge of Seven Guineas, we, at Eaton Bray, can now provide comfortable dormitory accommodation, with spring beds, blankets, sheets and a separate wardrobe for each visitor, together with a model building workshop, equipped with handtools, reasonable supplies of building materials and all the expert instruction the visitor requires. In addition visitors will be able to take part in " group projects " where teams will combine under a team leader. The inner man will be well served with four square meals a day, while adequate washing facilities and showerbaths will provide against the ardours of a long model chase. These are the Holiday Camp dates :—

Saturday, 1st July—Saturday, 8th July.
Saturday, 22nd July—Saturday, 29th July.
Saturday, 29th July—Saturday, 5th August.
Saturday, 5th August—Saturday, 12th August.
Saturday, 2nd September—Saturday, 9th September.

Do not forget that in addition, the Fourth International Week takes place from 15th August to 25th August, when leading European and British experts will be contesting all classes of aeromodelling contest. In the past over two hundred tents have covered the perimeter during these popular weeks, and hundreds of enthusiasts have competed or watched their more skilful friends at work—we look forward to even more this year when the AEROMODELLER will be sponsoring the event with a handsome prize list.


COWLING
CONTROL ROD
CONTROL HORN
BALLOON TANK HERE
HARDWOOD U/C SOCKET
REAR LINE OF COWLING



A 39½-Inch SPAN SCALE STUNT C/L MODEL of the

ERCOUPE

BY D. DEELEY

Aged 27 . . . . married with one boy . . . . draughtsman . . . . hobbies painting and collecting records by Stan Kenton . . . . member of Birmingham M.A.C. . . . . has been getting cement on his trousers since the tender age of twelve.

WHILST we must acknowledge some inaccuracies in the scale outline of this unusually attractive stunt model, we consider its lines to be as near to true scale as any other, supposedly, scale model yet observed in Concours d'Elegance.

The following extracts from correspondence emphasise that this is a design born of experience, and not just another undeveloped layout.

In the beginning . . .

Dear Editor, *12th June*, 1949.
. . . Ercoupe . . . powered by E.D. 11 . . . about right for steady sports flying . . . happy to see it tootle around and stay in one piece . . . with greater elevator, would stunt . . . are you interested ? (*Signed*) Donald Deeley.

Dear Mr. Deeley, *15th June*, 1949.
. . . shall be pleased to consider . . . urge that you incorporate modifications to enable stunting . . .
(*Signed*) The Editor.

Dear Editor, *20th June*, 1949.
. . . I will build another model . . . for Amco 3·5 . . . no doubt that it will stunt . . . (*Signed*) D. Deeley.

Dear Mr. Deeley, *24th June*, 1949.
. . . good idea . . . (*Signed*) The Editor.

Dear Mr. Deeley, *25th January*, 1950.
. . . are you now able to supply stunt model ? . . .
(*Signed*) The Editor.

Dear Editor, *15th February*, 1950.
. . . have built another model with Yulon 30 . . . had Norman Long test it . . . over 50 m.p.h. . . . wings folded up . . . black mark ! . . . now rebuilt . . . Mr. Long has completed loops, inverted flight and vertical eights with it . . . sensitive and a little heavy . . . now drawing Mark III . . . (*Signed*) D. Deeley.

Dear Mr. Deeley, *20th February*, 1950.
. . . shall be pleased to receive drawings . . . sounds very promising . . . (*Signed*) The Editor.

Dear Editor, *26th February*, 1950.
. . . enclosing Mark III drawings . . . in my own humble opinion, the Gold Trophy should be re-drafted for this type of model . . . (*Signed*) D. Deeley.

There's the story; the conversion of both model and modeller from Sport to Stunt in six months !

CONSTRUCTION

Cut engine bearers to length. Pin down securely on plan view of crutch. Cut and fit $\frac{1}{8} \times \frac{1}{4}$ in. balsa crutch. Use plenty of cement. Cement lower halves of formers on top of crutch, after ply former (No. 1) has been suitably drilled to take front undercart strut bindings.

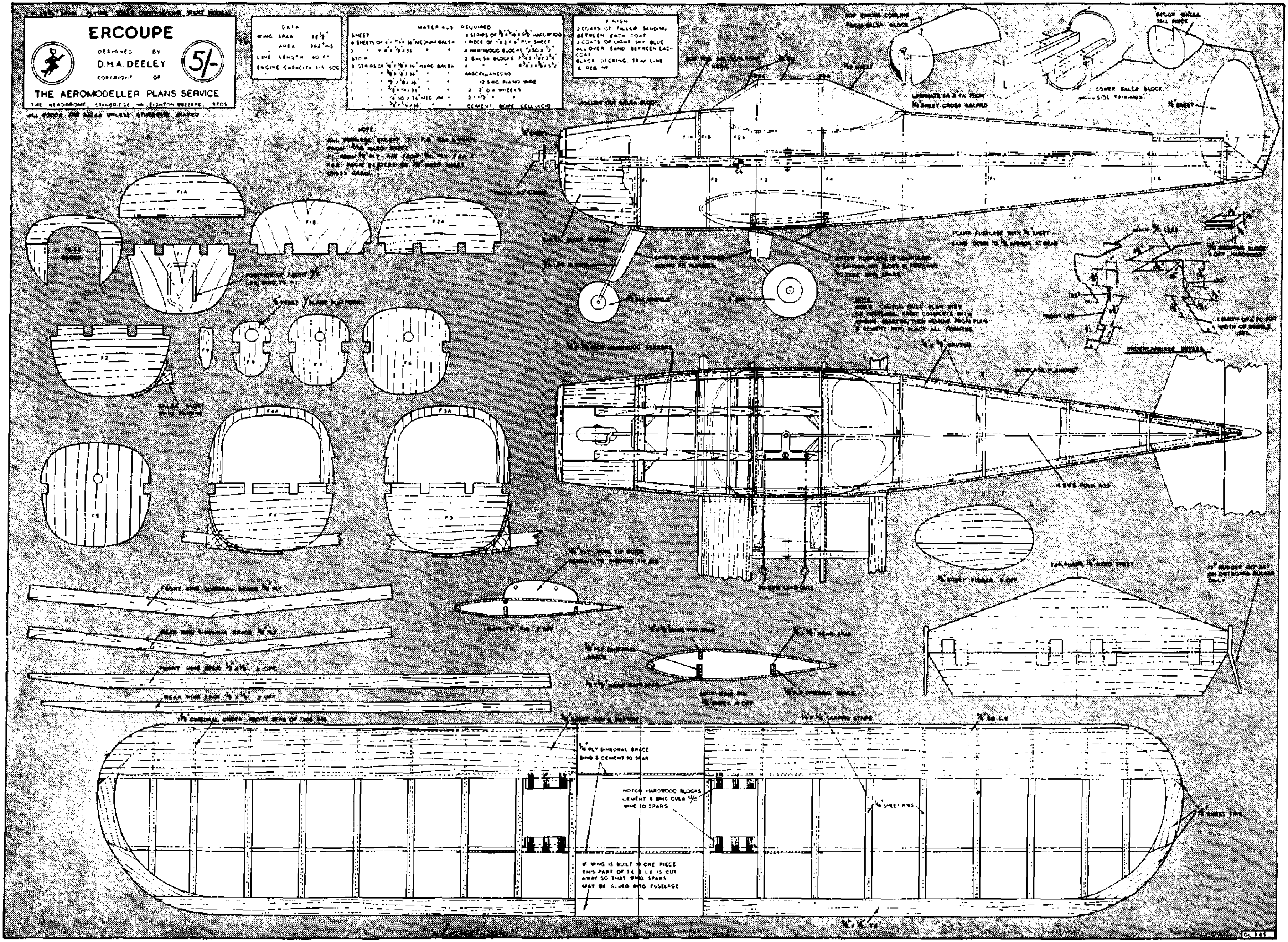
When dry, remove from plan and cement upper half of formers, over crutch, lining up with lower halves. Assemble control plate. Plate is pivoted on a bolt, or screw, through inner engine bearer.

Bend front wheel strut to shape, and bind and cement securely to former. Use cement liberally.

Commence planking fuselage, by cementing $\frac{1}{8} \times \frac{1}{4}$ in. strips along either side of the crutch. Continue down either side towards the bottom. Fit push rod and control wires, and finish planking. Cut out cockpit. Cement balsa cowling blocks in place, and rough cut to shape of fuselage.

Cut out ribs. Build up wing over spars. Fit leading and trailing edge and wing tips. Break wing at centre. Cut and fit ply braces, and hold in correct dihedral till dry. Bind spars and braces together. Bend main undercarriage legs to shape. Fix in place with hardwood blocks, and bind well with thread. Use lots of cement. Sheet cover wings, and lay cap-strips in place. Cut slots in fuselage to take wing spars. Pour lots of cement into these slots, and push wing up into position. Leave until really dry. Cut tailplane, and rudders. Fit control horn. Sand all over and cement rudders to tail. Cement tail to fuselage platform. Give fuselage and wing sheet covering (also tail assembly) one coat of filler (talc and banana oil). When dry, sand well. Repeat procedure again. Cover wings. Fit cockpit canopy. Lightly cement cowling cover in place. Carve and sand well. Give two coats grain filler. Paint complete job all over light blue. Sand well, give second coat. Paint black decking and trim line and numerals.

A well built pair ! Deeley Junior complete with Dad's model.



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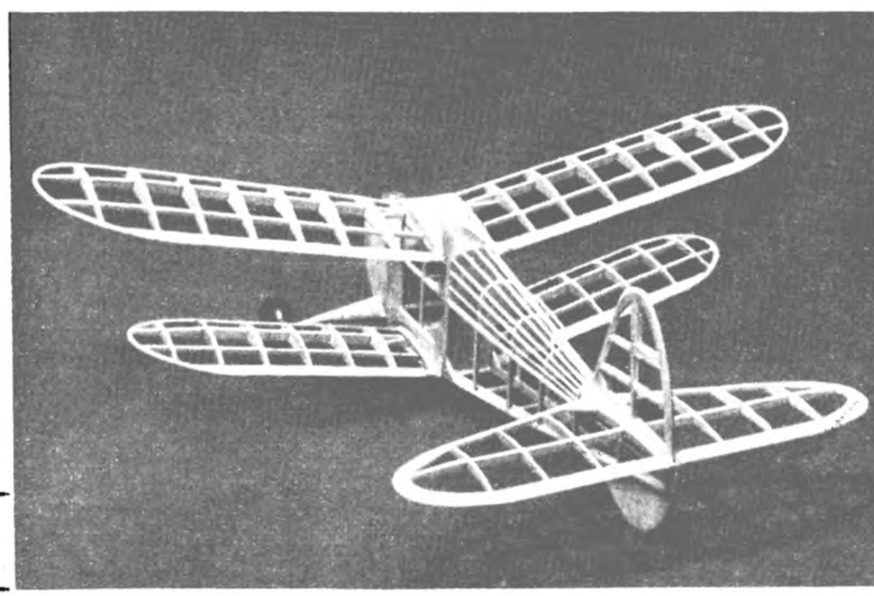
A 30 INCH SPAN SPORT BIPLANE FOR ENGINES UP TO 1·3c.c.

DESIGNED BY VIC SMEED

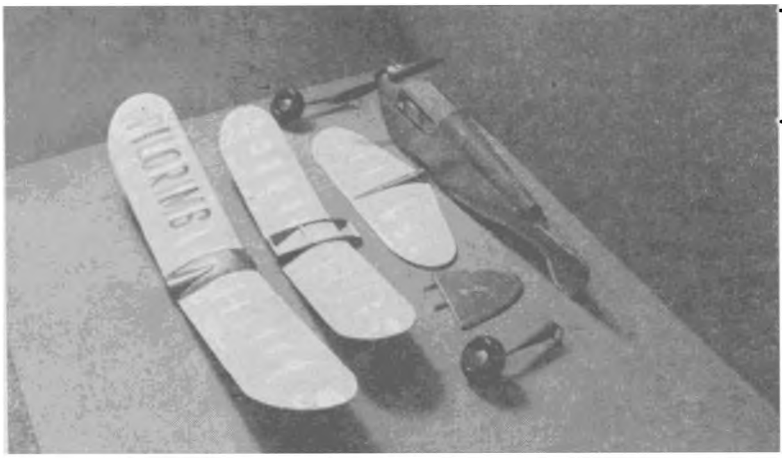
Coquette

COQUETTE was designed to be a rugged little biplane, simple, but good-looking, that would supply hours of enjoyment to the chap who flies for fun rather than for pots. It appears that only about 20 per cent. of this country's aeromodelling population are interested in a climb resembling that of a she-angel resisting the improper advances of Lucifer—most builders aren't particularly contest-minded, but want rather realism and a model that won't give them a two-mile trot each time it takes the air. The vertical ascent and super-floating descent were not major considerations in this design, and the result is a docile, easily-trimmed job that will still turn in ratios of 3 or 4 : 1 in late evening air. The ruggedness and simplicity are there, too, and good looks are only a question of taste after all. All round, Coquette is a job that can be undertaken with confidence by anyone who has produced one successful power model, and it was in fact designed to be within the scope of the relative beginner who wishes to break away from the normal monoplane lay-out. The following notes are written with this type of builder in view, and more experienced modellers are asked to excuse the somewhat lengthy treatment of some of the phases of the construction. Biplanes have been long neglected, due, in all probability, to the apparent tediousness of constructing a second wing and exaggerated difficulties in flight trim. Well, a biplane has to have two wings, and since they have to be made, any tediousness should be attacked in the design. Coquette's wings are simple to a degree, and if all the ribs are cut at one time and the wings built together, stage by stage, the extra work just isn't noticed. As for trimming troubles—four different biplanes (petrol and rubber) by the designer have required no change whatsoever from the original drawings, and Coquette, the first diesel-powered one, needed only one pinch of shot at the tail.

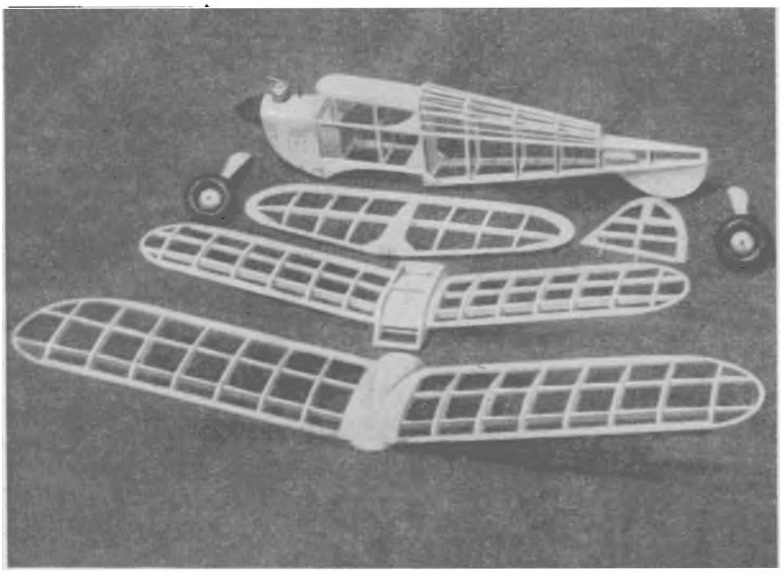
In view of the popularity of the E.D. " Bee ", the model was designed round this motor, using the normal upright mounting. Inversion would improve the looks immeasurably, and there is ample room within the cowling for this type of installation. Motors of ·6 c.c. upwards may be used, and the model seems quite capable of handling anything up to the Mills 1·3. It should be stressed that no larger motor than the Bee has been tried (the writer's second model, nylon covered, has a Mills ·75) but there is no reason to think that a little more power would produce viciousness. The climb with a



Simple yet robust construction, coupled with pleasing outlines serve to make ' Coquette ' an ideal model for those inexperienced in power flying.



Ease of transport has been carefully watched by designer Smeed, so much so that the whole model packs comfortably into a box measuring 30" × 6" × 5"



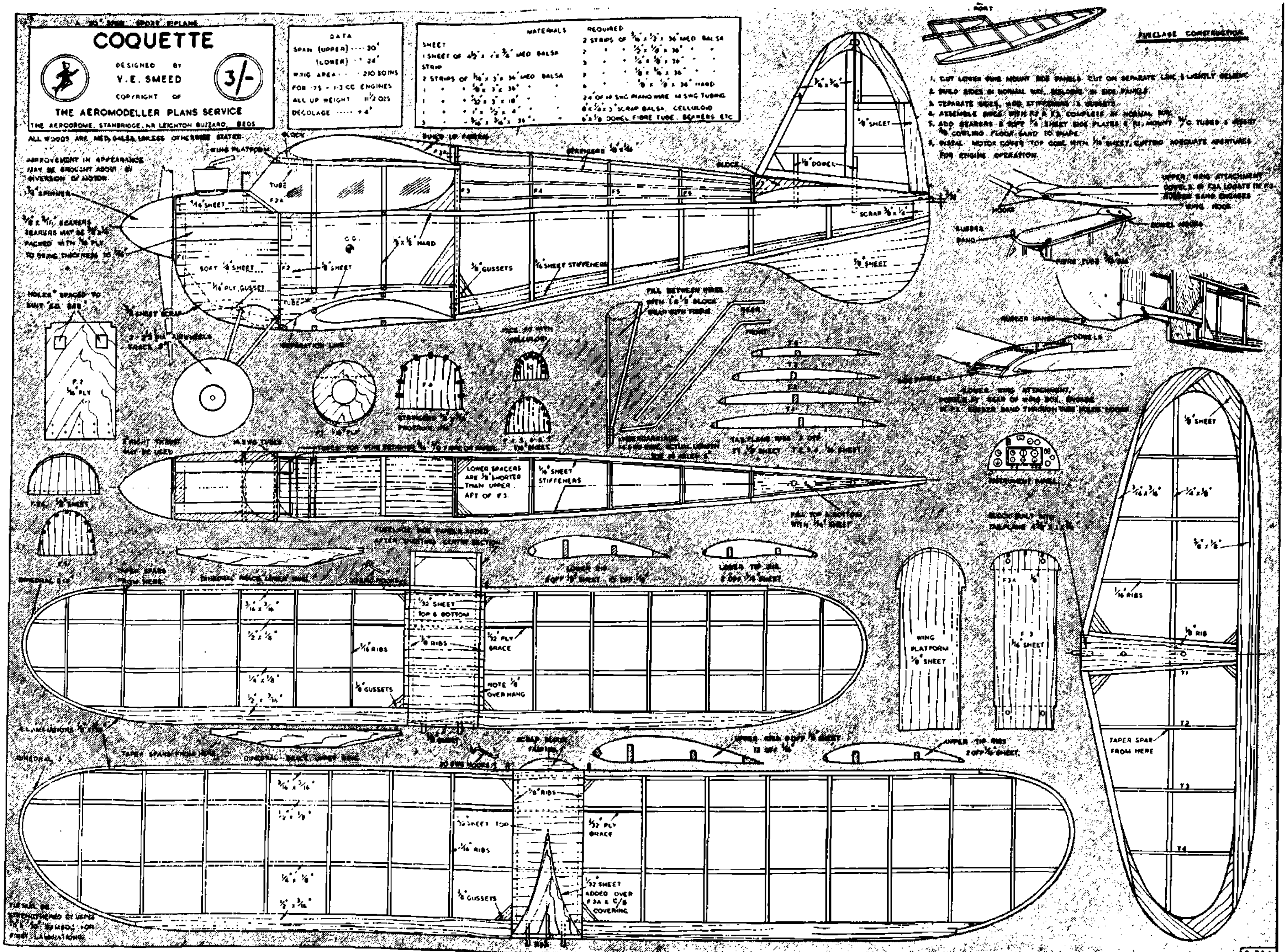
'Coquette' is shown here under the wing of her big sister 'Ethereal Lady'. The Pilgrims Insignia on her wings may well betoken many a weary pilgrimage by her fortunate builders recovering the model from its record flights.

Bee using an 8 × 4 ins. plastic prop is in the order of 400–500 feet per minute. With a wooden 8 × 4 ins. this rate is almost doubled, with no change of trim. The glide is pleasingly flat—the model's size makes it appear to scud along, but in actual fact the speed is low. Long, scalish take-offs and cushy landings result from the arrangement of the landing gear, which gives a ground attitude approaching the flying position. The original has landed in all sorts of terrain and has never once turned on its back. Among other advantages are the modest outlay required—a maximum of 12s. 6d., including dopes, but excluding wheels, motor, and prop.—and the fact that the whole job will pack in a box measuring only 30 × 6 × 5 ins.

In general, the structure is very straightforward, but intending builders should be careful to pick only medium balsa throughout, with the exception of the fuselage longerons and spacers, which should be hard. The same degree of strength could obviously be achieved by harder, smaller sections, but the large, medium-strength components offer more cementing area, easier work, and a greater resistance to warping. By careful grading of material the model could be built down to under 9 ozs. without sacrificing material strength. This would naturally boost performance, though the original flew very nicely at 11½ ozs., a weight which was achieved deliberately as being as heavy a model as would probably be produced by other builders. Of the 11½ ozs. almost an ounce is accounted for in dope; the model lends itself to a nice finish and doesn't set out to be a duration job, so why not bring it to a good gloss? With ailerons etc. marked in, and with civilian registration, it would bear some resemblance to such delightful machines as the Avro Commodore and the cabin Wacos of the mid '30s.

For anyone who really cannot face the prospect of two wings, the designer is "cautiously optimistic" as to results using the upper wing only. The lower wing attachment panels should be built into the fuselage and an extra rib added to each side of the upper wing, increasing the span to 33½ ins. The same construction should be used otherwise.

Fully detailed building instructions are available with the plan.



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TALISMAN

Mk. II

A 37 inch SPAN F.A.I. RUBBER DURATION MODEL

By L. W. V. Turner

25 years old . . . a lighting engineer . . . married . . . started modelling in 1937 . . . joined Rugby M.A.S. in '46 . . . has built most types and prefers F.F. duration . . . has an urge, unsatisfied as yet, to build a giant sailplane . . . has time for photography and collecting gramophone records, too !

THE Talisman originated from a 4 oz. duration model "Opus I" which was designed in the Spring of 1948. However, some brights bods. in the club room found a new name, "Hopeless One". Featuring a diamond fuselage with a built-up cabin, twin fins and a folding prop. it used to clock a consistent 2¾ mins. in still air. Not so hopeless after all ! Stability in the glide under windy conditions was not so good. "Opus II" (yes, Hopeless, too !) had a longer moment arm and a slightly heavier wing loading. Stability was improved a little, but fell short of that required. Performance was still just under 3 mins. After losing this kite in a tall tree, work was started on Talisman Mark I.

At the time, interest was growing in the S.M.A.E. Merit Certificates. Therefore, in order to bring the model up to F.A.I. weight, close attention was given to simple streamlining without adding too much weight. Diamond fuselage and twin fins were still retained. Twin fins, because the way I figured was that, if the central fin has to be supplemented by outrigged anti-spin fins in high powered ships, then why not go the whole hog and use two fins. Also tailplane efficiency and effective aspect ratio are higher ; at least, so say the theorists. The fixed wing position on top of the cabin in "Opus I and II" gave way to a smaller cross section streamlined pylon, which enabled fore and after adjustment for trimming. The decision to abandon the folding prop. and use a normal two-bladed free wheeler, was more than justified in that the glide was as stable in wind as in calm. With a spinner and nose stringers on the fuselage, the model began to look quite a clean job. On the Mark I, a single bamboo peg leg undercart sufficed for take-offs.

In spite of the foregoing, the weight was some ½ oz. under F.A.I. rules. As a shoe-horn would have been required to get any more rubber in the fuselage, plasticine was added in the nose and the wing moved right forward for balance, thus obtaining a beneficial increase in moment arm.

The work put in on development now showed signs of paying dividends. Test flights on low power returned 1½ to 2 mins. and, when trimmed for peak performance, 3 to 3½ mins. flights were the order of the day. The model was lost, 10 mins. o.o.s. one hot afternoon after foolishly putting on too long a D/T fuse. The kind soul who found it, wrapped it up in brown paper and forwarded it through the post. Needless to say, the postman pushed it under the door. The moral ? Well nobody in the club now labels their model "Please return to . . ." just "Please notify . . . will call and collect" !

The progress from Mark I to Mark II can be seen on the plan, the main difference being a twin wire undercart and small detail changes to obviate the need for ballast weight. A peg-leg undercart may do the job, but a normal twin leg allows R.O.G.'s to be tackled with confidence.

Performance. Up to the present, the model has only been entered in two competitions. The club "Open Rubber Competition 1949" in which the model was placed first with an aggregate for three flights of 595 seconds. Fourth place was obtained in the 1949 "S.M.A.E. Cup" with an aggregate of 710·5 seconds.

Between the 19th and 26th of June, 1949, seven consecutive flights were made giving an average time of 293 seconds, details of which are as follows :—

19th June, S.M.A.E. Cup Competitions. 410·5, 340 and 110·5 seconds.

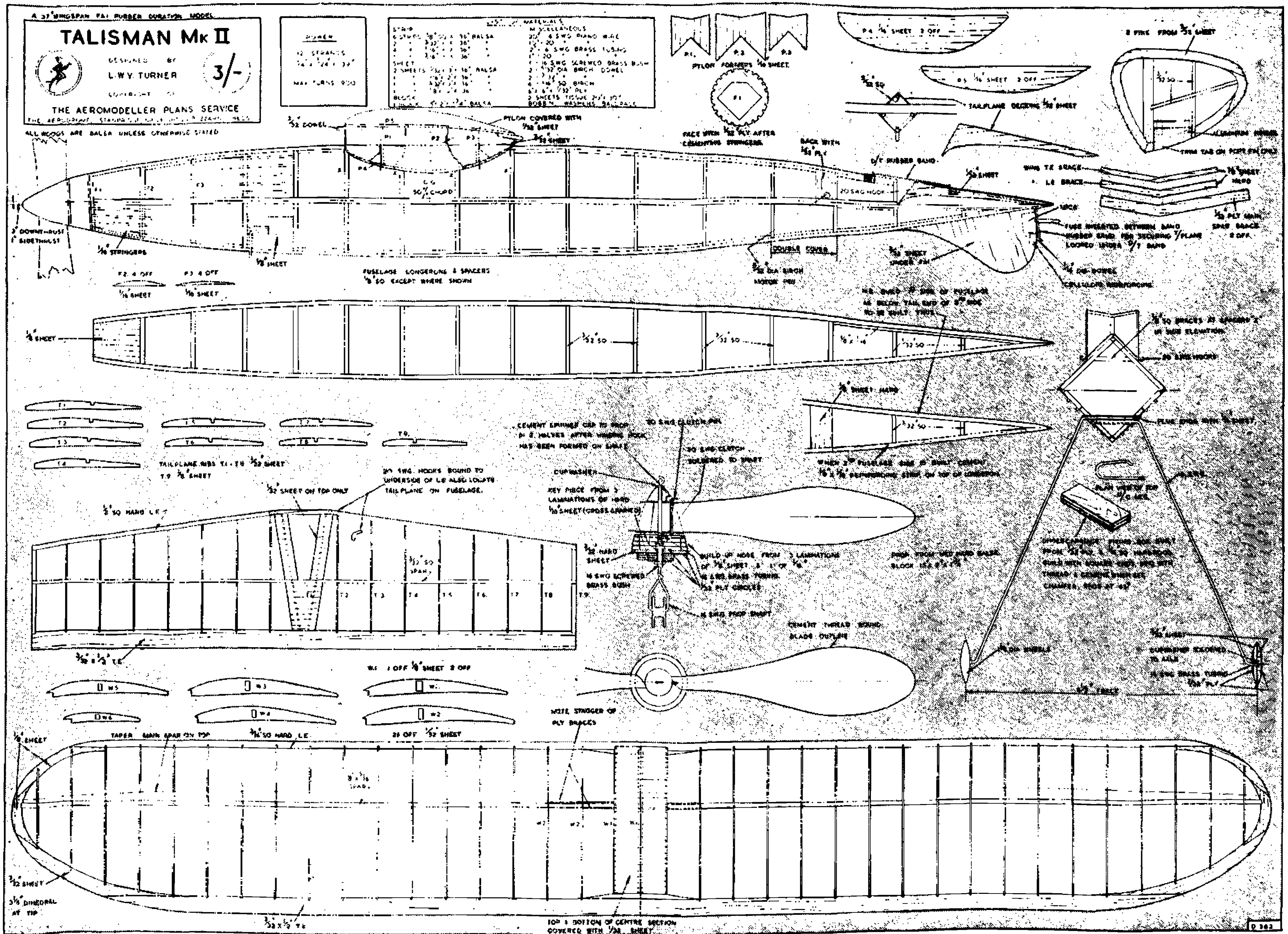
22nd June (evening) 205 seconds.

24th June (evening) 180 and 210 seconds.

26th June (afternoon) 600 seconds.

The best flight turned in so far, was on the second outing of the Mark II, when the model was timed for 703 seconds.

Fully detailed building instructions are supplied with the plan.



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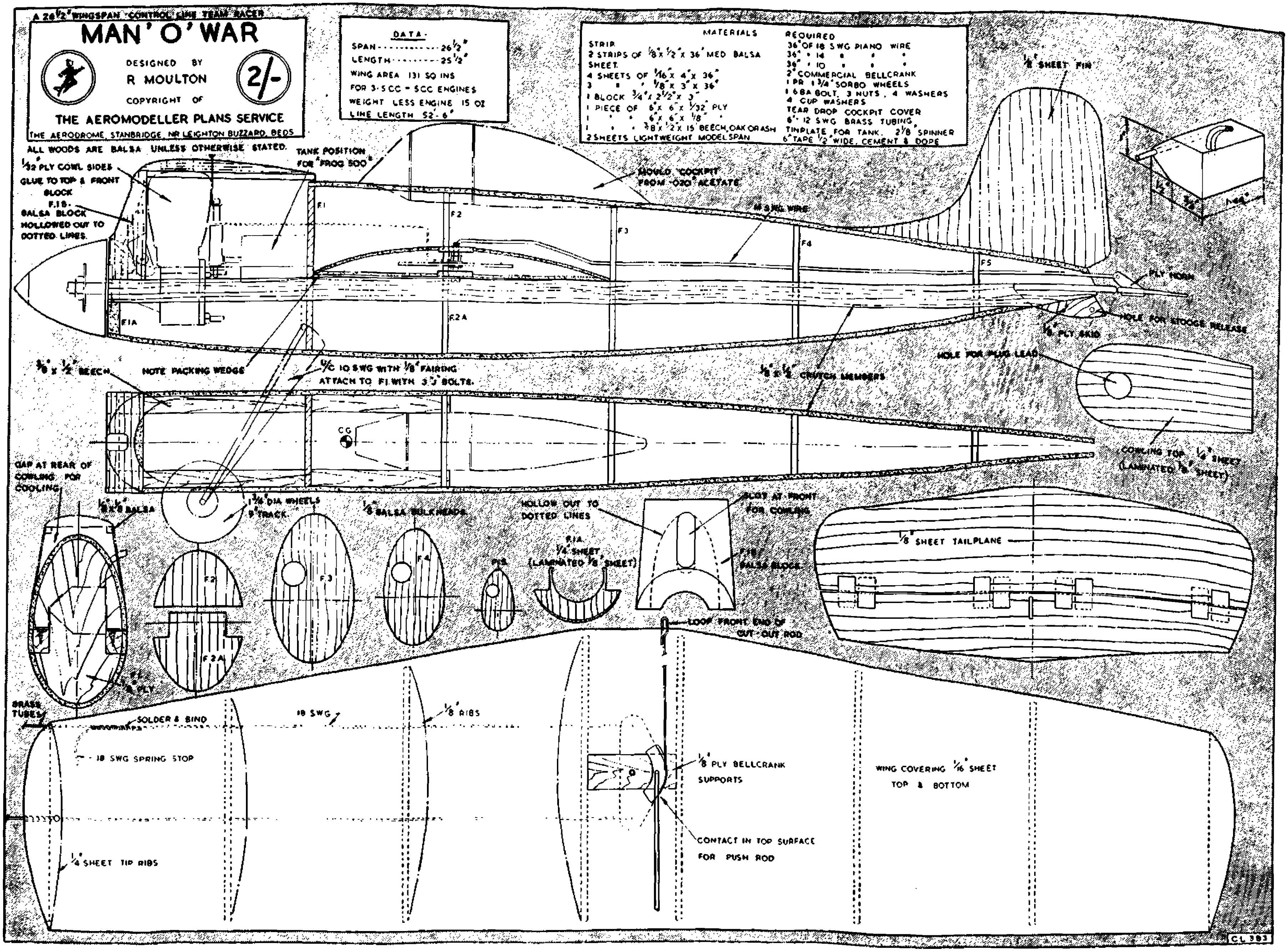

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A 26½ INCH SPAN TEAM RACER FOR 3·5 to 5 c.c. ENGINES

R. G. MOULTON

Age 26 . . . worked on "Wings" magazine in South Africa . . . "Aeroplane Spotter" over here . . . has recently joined our staff after a spell with H.J.N. ... unmarried, but no misogynist . . . member of West Essex Aeromodellers and Loughton Sky Rangers . . . hobbies; motor - cycling and—oh, yes—control line flying.

MAN-O-WAR

NAMED after the famous race-horse reputed never to have lost a race, Man-o-War has been designed from experience gained in three previous team-racers.

The prototype was built around a DeLong "30" 5 c.c. petrol motor, after an analysis of fuel consumption on all the suitable British motors, and the few American motors available to the designer. With a possible duration of 45–50 laps per tank, when run with coil ignition and petrol fuel, the 5 c.c. petrol motor compares very well with the average glow-plug motor of the same capacity which usually manages 30 laps.

If you wish to install an ignition motor, the coil should be mounted between F1 and F2 above the wing, the condenser mounted in the engine compartment and a hatch cut for access to the four half-pencell batteries which are mounted between F2a and F3. This will add up to 7 ounces of the total weight and will reduce the speed of the model because of the increased wing loading; but it also saves at least one refueling stop in a ten-mile race and provides easy starting.

While the original held a steady 65 m.p.h. throughout its flights it is possible that glow-plug powered versions will increase this speed by up to 10 m.p.h. The DeLong passed its peak long ago and is now a well-used and aged motor.

By departing from any attempt to provide a semi-scale version of a "Goodyear" racer, this model offers features found essential in the previous designs. Firstly, the alarming tendency to tumble tail over nose when landing, requires an undercarriage that is reasonably wide in track and very much in front of the centre of gravity. Secondly, the wise S.M.A.E. decision to make the minimum wing area large enough for manœuvrability, also requires a free and generous elevator. Thirdly, to facilitate ease of starting, the upright motor is best, if one wishes to avoid the hazard of flooding. Fourthly, it has a new wing section, almost a segment of a circle, which combines the assets of fast power flying and good còntrolable glide qualities.

For the 1950 All-Herts Rally, the organizing St. Albans club stipulates that a motor cut-out mechanism should be fitted. This is simply done by attaching a cut-out unit to the tank and passing a piece of 18 s.w.g. piano wire from it, through the bulkhead, to the bellcrank, so that, on sudden application of "up," the cut-out is jerked "off." To make this operation more positive, solder a spring stop to the "up" lead out as shown on the drawing. This prevents accidental cut-outs when jockeying for position in a race. For "Stooge" release, drill a hole in the ply tailskid.

BUILDING INSTRUCTIONS.

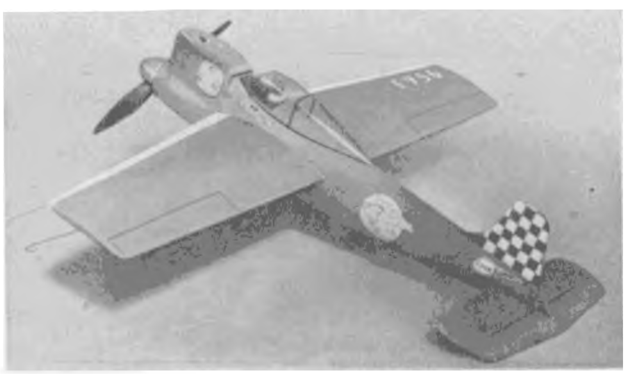
Wing. Begin by butting the 1/16 in. sheet to make two sheets 1/16×8×36 ins. Sandpaper each to the final finish desired on the wing surface. Cut one perfect plan view of the wing from one sheet and duplicate it with the addition of 3/16 in. along the T.E. This will allow for the rib camber. Bevel the lower surface and add the ribs, making sure to allow passage for the lead out wires in the port wing. Inset the 1/8 in. ply bellcrank support and fit the bellcrank assembly. After precementing each rib and the bevelled edges, glue the top surface in place and finally add the top ply bellcrank support. Cover with Modelspan and give two coats of sanding sealer.

Fuselage. Cut the 1/8×1/2 in. crutch members, precement and then fix the engine bearers to them. Attach plywood F1 complete with undercarriage which is held in place by three "J" bolts, or, a commercial box fitting. Cut two slivers of 1/8 in. sheet to allow 1/16 in. incidence for the wing and glue to the crutch. Glue the wing and all bulkheads to the crutch. Cut the tail unit from 1/8 in. sheet and hinge the elevator. Bend the push rod to length and fix the tail in place. Add the ply skid, tank and cut-out, engine and block F1b. Attach the 1/32 in. ply cowling sides and the 1/8×1/8 in. corner braces. After planking the entire fuselage, with 1/8 in. strips, fit the fin and then fuel proof all accessible parts of the engine compartment. Drill the cowl top for a box spanner to fit the plug, and cement in place.

Make sure that the filling and vent tubes for the tank are free of dust, plug them, the engine intake and exhaust before sanding to a smooth finish.

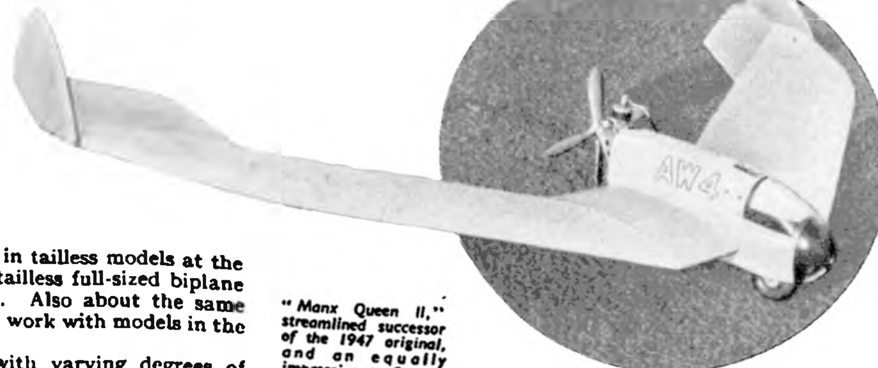
Cover the fuselage and tail unit with Modelspan and give two coats of sanding sealer. The original was all red with white trim and transfer decoration.

Flying. The best centre of gravity position is shown on the drawing. It may move as far back as the front line if necessary, but tail heaviness will affect the glide. Take off down wind, and do not be afraid to give too much "up" as a violent climb is easily corrected. Stunt fliers will find this model extremely smooth to fly.



Alec Wilson puts the

SPOTLIGHT on TAILLESS MODELS



"Manx Queen II," streamlined successor of the 1947 original, and an equally impressive performer.

THE writer first became interested in tailless models at the time that Dunne was flying his tailless full-sized biplane glider in the Highlands of Scotland. Also about the same time, Weiss was putting in some good work with models in the South.

Flying wing models were built with varying degrees of success, but nothing of note happened until 1945, when the author appeared on Hounslow Heath with a fearsome looking nine foot pusher tailless powered with a 10 c.c. petrol engine.

Much to the surprise of a small group of sceptical modellers, this machine rose gracefully from the ground, and completed three or four circuits before landing heavily in a ditch and knocking off the battery box.

Much valuable information was derived from this model before she was written off in September, 1946 at Eaton Bray. In 1947 the well known "Manx Queen" appeared, and later the streamlined version of the same machine (see heading photograph). These were beautiful flyers, and caused a lot of interest whenever they were flown. The latest machine is a ten foot Radio Control job with several notable features, which is quite the best flying machine the author has ever built, but more of this anon.

During all these experiments the author has been asked literally hundreds of questions on the how and why of tailless design, and as the Editor is also receiving many inquiries, it would seem that the time is ripe to foster this great and growing interest in this somewhat neglected branch of aero-modelling, with an article throwing the "Spotlight on Tailless".

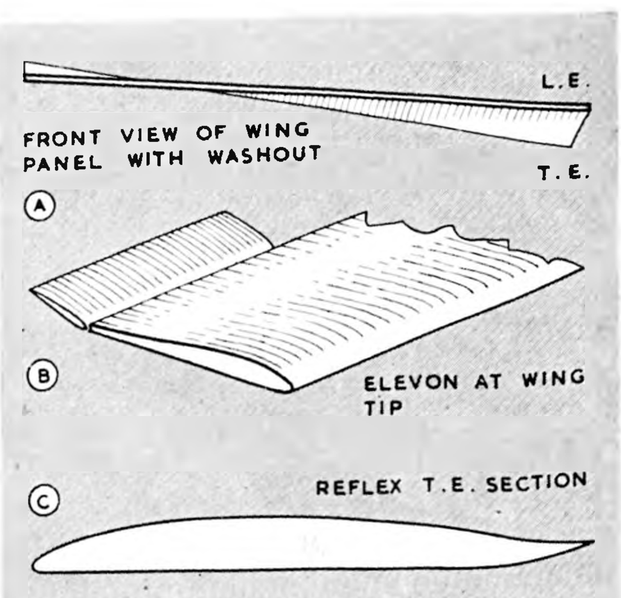


FIG. 1

The writer has regretfully come to the conclusion that, with the exception of wing sections, full-size data is of very little use to the modeller. The full-size machine, flying very fast with no inherent stability, depends on the quick brain and deft touch of the pilot to keep it flying, whereas the model, once in the air, has only its own corrective forces to counteract any outside upsetting agent. The full-size designer has a distinct advantage over the modeller, as he can build his "wing" as he pleases, whereas the model designer is hampered by F.A.I. regulations which limit the scope and variety of design.

Taking longitudinal, or fore and aft, stability first, this is fortunately fairly simple and can be obtained with three different methods, or a combination of any or all of them.

Longitudinal Stability.

Wash out. ((A) Fig. 1). This is largely in favour with the Dutch flyers on their large gliders. The wing panel is twisted from root to tip so that, from a positive angle of incidence at the root, it may assume as much as 10° negative at the tip. This arrangement is rather inefficient, as the outer part of the wing is not lifting at all, in fact, in the case of extreme washout a downwards pressure is generated. Excessive washout can only be successfully used on very lightly loaded gliders of about 2·5 ozs. per sq. foot. A powered machine with excessive washout would loop under power, and sink very rapidly on the glide. Slight washout, however, will be found very useful in our final design, and therefore must be kept in mind.

The elevon method (Fig. 1. (B)). In this a rather large airfoil or aileron is fixed to the wing tip trailing edge at 15° to 20° negative angle. A small portion of this is semi-adjustable with dural hinges for final trimming. This method was successfully used on the "Manx Queen", and can be strongly recommended for a first attempt model. Admitted they are rather unsightly, but their biggest fault is that they are so very sensitive. The slightest alteration to elevon angle will make a large difference to the flight of your model, so please be very ladylike in your touch when adjusting elevons. The model is controlled by adjusting the drag of these elevons. To get a left turn, the negative angle of the left elevon is increased, causing more drag on that wing, or the right elevon can be reduced, causing less drag on the right wing for the same effect.

Reflex Section Method (Fig. 1. (C)). Here a small portion of the wing section is turned up slightly at the trailing edge, as in the Clark Y.H. There is a slight loss of lift, and the method is insufficient by itself to give the stability required, and must be used in conjunction with A and/or B. The Swiss obtain sufficient stability for their flying planks with a very exaggerated reflex trailing edge, but this is paid for with a serious loss of wing efficiency. A simple, non-technical explanation to the modeller who wants to know what all this does, will be found by reference to the plan form in Fig. 2. in which it will be noted that much of the wing area is behind the C. of G. owing to the swept back wing. As all the negative angles just discussed are behind the C. of G., a downwards pressure is generated behind the C. of G. at normal flight attitudes. Should the nose of the machine rise, this pressure is reduced, or in acute cases the wing tips will lift, allowing the back to rise, and so right the model. Should the nose drop, these negative angles become more negative, generate more down pressure behind the C. of G. and so force the nose up. It may be of interest to the reader at this stage, to put before him the salient features of the writer's latest wing, which is perfectly stable and even the wing tips generate positive lift at normal flight attitudes. The features are as follows :—A reflex trailing edge (the whole section is based on the latest N.A.C.A. " H " series for flying wings), small elevons, about 4 per cent. of wing area set at 10° negative, and 2° washout at tips only.

Spiral Stability.

This is far more complicated and depends on our old friend C.L.A. Returning once again to the plan form in Fig. 2, the reader will readily see that the wing area behind the C. of G. has got to be taken into account when calculating our C.L.A. Much of the spinning of tailless models appears to be due to this point being overlooked. In other words, the wing tip areas are acting as fins to some extent. Spiral Instability is started when the machine banks and side slips inwards. The inside wing presents more surface and drag to the air stream, and as much of this area is behind the C. of G. and assisted by the fin, the back of the model is held up and the nose pulled down by gravity. The turn increases, the speed increases, the bank increases and the whole sequence of these events build up into a beautiful spiral dive into the ground which, although spectacular, is not quite what the builder wanted.

A reference to Fig. 3, which is a side elevation of a tailless model with tip fins and no side area in front of the C. of G., illustrates the side areas involved in the above catastrophe. Such a model would be very tricky as a glider and almost unflyable if fitted with a motor.

It would seem therefore, that the answer is to dispose of the tip fins and let the wing tips do the work, and on a glider this is possible, except that she would be very tricky on the line. Even if the modeller succeeded in towing up a tailless glider of this type, she would alter course very quickly, and when upset, would perform all those queer antics which we have seen tailless models do from time to time.

The answer is side area, both in front and behind the C. of G. That behind the C. of G. to give directional stability, and that in front of the C. of G. to hold the nose up when banking. Also, the writer is of the opinion that this side area acts as a damper on any effort of the machine to rotate on its own vertical axis.

On the writers latest, which shows no tendency to spin either way when under power, the *flat* side areas are quite generous. Flat is emphasized, as the " Jane Russell " side areas on " Manx Queen II " were not so effective.

To those readers who wish to calculate the effect of the outer wing areas on C.L.A. my advice is don't, as it is very complicated and unnecessary. Merely calculate the side areas of your centre section, not forgetting wheels, prop and engine on a power job, as for an orthodox machine, and so design your machine so that the C.L.A. is on, or very little behind, the C. of G. The designer will then find that with as little as 25° sweep back the machine will be directionally and spirally stable. With less sweep back than 25° the C.L.A. must be moved back in proportion, as one is losing the wing tip area fin effect.

On the controversial question of tip fins versus central fin, the writer finds that in actual practice there is not much to choose between them, and suggests that the would be designer tries out the system which appeals to him the most. So long as he adheres to the well known rules and practices relating to areas and movement arm, he will find that both systems work well. To assist the modellist who has an open mind on fin position, we will briefly run over the salient features of each.

Tip fins have the advantage of giving the greatest moment arm possible on a flying wing, especially if the designer wishes to merge his centre section into the wing proper. The disadvantages are a certain amount of unsightliness to some purists, vulnerability to damage, and a turbulence set up where the fin joints the wing. The only one of these three disadvantages to be given a second thought is turbulence. In the writers opinion the importance of this can be over-stressed, and that, at model flying speeds, the effect is negligible. So go right ahead, you tip fin enthusiasts.

Central fin position, which the writer is now using, is very effective *if given sufficient moment arm*, and the general effect of

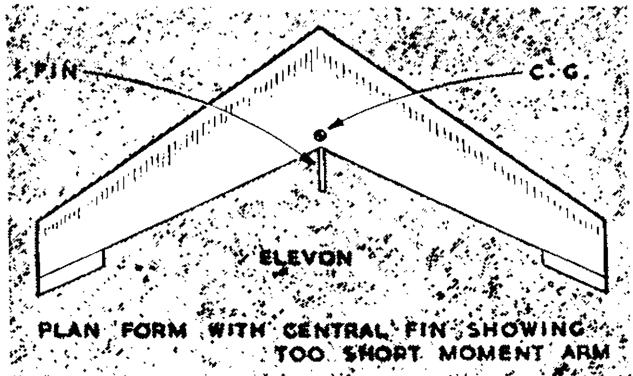


FIG. 2

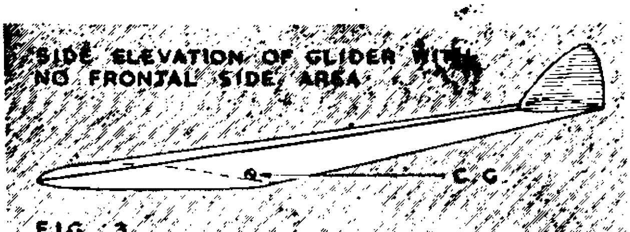


FIG. 3

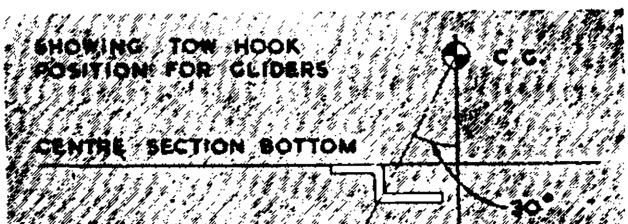


FIG. 4

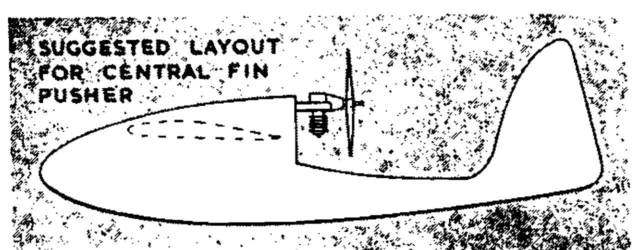
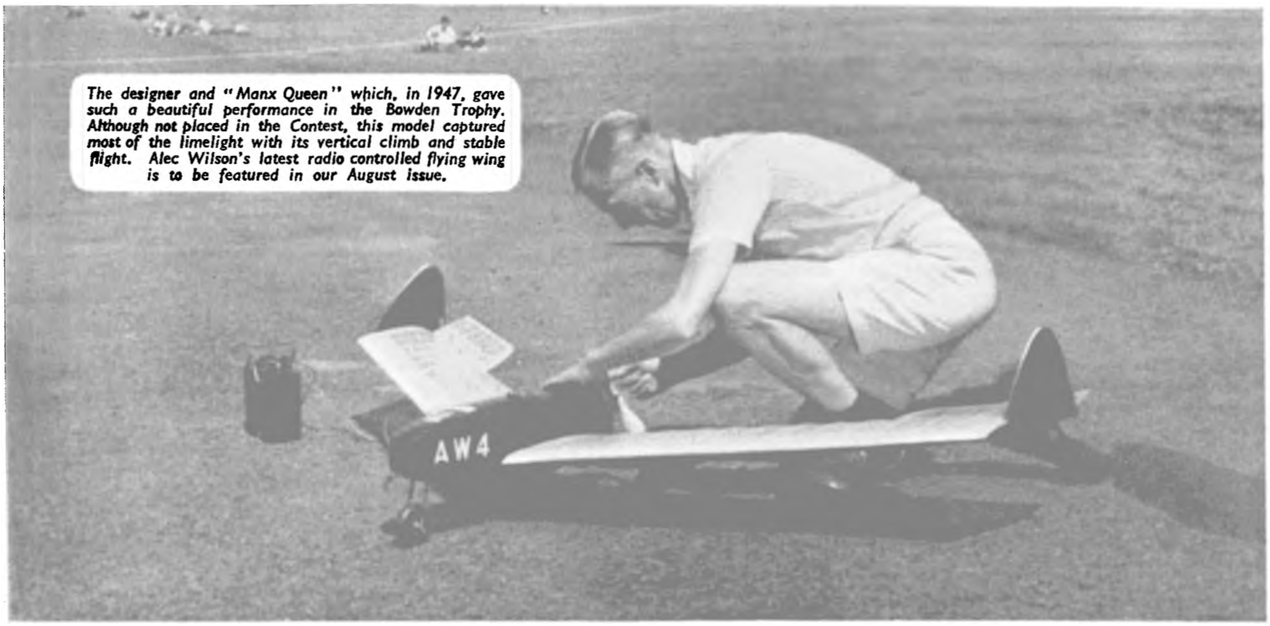


FIG. 5



The designer and "Manx Queen" which, in 1947, gave such a beautiful performance in the Bowden Trophy. Although not placed in the Contest, this model captured most of the limelight with its vertical climb and stable flight. Alec Wilson's latest radio controlled flying wing is to be featured in our August issue.

gracefulness in the air is most marked. Also, the wing tips, now being quite free of " Bits ", can be made to look quite pretty. To get the above mentioned moment arm with a central fin, it will be necessary to elongate the engine nacelle or centre section almost to a line drawn from wing tip to wing tip at the trailing edge. If using a powered machine with a tractor air screw and engine in front, this extension will be found most useful, in fact essential, to balance out the weight of the engine with batteries, ballast, or Radio Control equipment. With a pusher type of model, a little constructional scheming will be necessary to enable the builder to use a central fin, and a suggested layout, which has been used successfully across the " herring pond ", is depicted in Fig. 5. This fin boom should be reasonably strong, or it may snap in a rough landing in which the machine turns turtle.

Lateral Stability.

This, as in the orthodox machine, is taken care of with dihedral, or polyhedral angles, but with this slight difference. The sweepback in the wing also has a dihedral effect, so that the actual measured dihedral put on a swept back wing should be about 50 per cent. of that put on a straight wing. Three quarters of an inch for each foot span under each wing tip will be ample, and even this small amount can be reduced on a glider. Too much dihedral will cause a rocking motion to be set up when the model is upset by a gust. This rocking motion is often noticed in tailless with polyhedral, and the author puts his faith in straight dihedral.

General Observations.

Gliders. If your tailless glider hunts on the line it may be that your hook is *too far forward*, assuming that your side areas are correct. In effect, your hook position is now the C. of G., and if it is too far forward, you will have too much area behind the C. of G. which will set up the spinning tendencies mentioned before. If, however, your model describes a graceful arc into the ground, then your hook is too far back and the frontal areas are taking control. A good general purpose position for the hook is found by drawing a line from your true C. of G. 30° forward and where it bisects the bottom of your centre section is the hook position. This is illustrated in Fig. 4. When towing, try to keep the model at a constant speed. Tailless gliders get into trouble on the line when towing speed fluctuates.

Power Driven Machines. One of the most important suggestions here is to keep the power-weight ratio down, at least to start with. The main troubles with a high power—weight ratio, apart from any aerodynamic instability due to the models high air speed, is that torque reaction tries to put the model into the ground one way, and the gyroscopic action of the fast revving engine tries, and does, put the model down the other way. The writer gained many grey hairs trying to get a " Slicker " climb out of a relatively high powered light-weight last summer, but all he got out of it was much valuable experience. With revs. cut down, the same machine behaved perfectly. Nevertheless, the quest for a tailless duration model to compete with the pylons will still be carried on.

With a pusher, the engine is almost on the C. of G. and the thrust line can be kept straight. It is suggested that it is kept above the centre of resistance, to help keep the nose down under power. With a tractor however, the engine is now well away from the C. of G. and the thrust line can be treated as for an orthodox model. The author here must once again stress the extreme sensitivity of the power machine to the slightest alteration of elevon angle, and, on no account, let the machine turn against torque, until you have the machine properly trimmed. Then, wide circles against torque can be tried if the machine is not over-powered.

The amount of sweepback on the leading edge differs on every tailless model seen. The author, having tried everything from Swiss Planks with no sweepback to as much as 45°, has now settled on 35° as being reasonably efficient, stable, and pleasing to the eye.

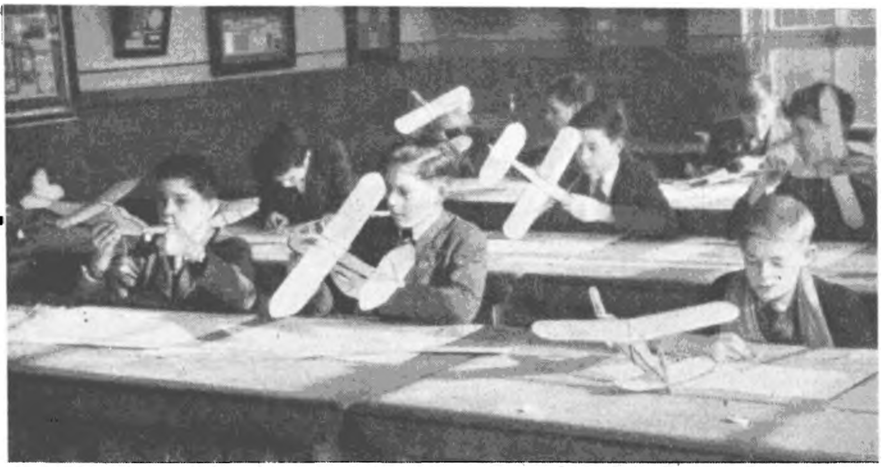
On a tapered wing, the sweepback on the trailing edge will, of course, be much less, and the whole effect is quite graceful.

To sum up, our 1950 contest tailless will have the following main features : (1) A sweep back of 35° on the leading edge. (2) A reflex section on the lines of a Clarke Y.H. or R.A.F. 33, with a preference for the former. (3) Small wing tips elevons set at about 10° negative. (4) Two to three degrees negative incidence in the wing tips only, starting about one and a half chords from tip. (5) And very important, flat side area both in front and behind the C. of G. This can be small on gliders, but generous on power models.

In conclusion, the author would like to remind readers that four short years ago, a powered tailless was a very rare novelty. Last summer one could always see two or three machines at the big meetings in the South. Next year there will be many more. So build that powered tailless you have been dreaming about, and join the happy band. You won't be a lone hand now that the ball has started rolling.

Aeromodelling in the School

BY D. E. TILLEY



Budding aeromodellers in the author's classroom.

IT began with a report from the Education Sub-Committee on practical subjects. The recommendation of the committee was that alternative courses should be provided for "B" and "C" stream pupils in Secondary Modern Schools.

Among the many suggestions contained in the report was one on model making, to scale, in any easily worked media. This, it was stated, should form part of a project.

To a balsa-addict, this could have only one interpretation. A long awaited opportunity had presented itself. What better alternative course could there be, in this air-minded age, than *aeromodelling*. Most European countries appreciate its educational potentialities—except Great Britain. Not even the role played by air-power in the war served to stir the authorities from their lethargy.

Without an official lead, only enthusiasts within the profession can bring about any improvement in the state of affairs. Regrettably, the number of "balsa-bashers" that become teachers is small. Many more will be needed if aeromodelling in school is to become a general practice. If this article succeeds in interesting one other person in the work, it will have served its purpose well.

The Scheme is Started.

For the price of a couple of aspirins and a packet of twenty, the scheme was born. Tentatively, on a small scale, it was launched into the curriculum. To-day, at the tender age of six months, the subject occupies seven out of twenty lightcraft periods per week.

Contrary to expectation, the scheme was sanctioned without question. Indeed, the headmaster gave it immediate and extensive encouragement. A £5 "sub.", from the school fund, was made available for the purchase of the initial equipment. This meant that there would be no need to wait for the arrival of the next requisition.

The necessary permission having been acquired, the organisation was commenced with vigour. Final details were settled and an order placed for the materials with the local "model shop". An hour or two with the proprietor provided the retail prices, ordering sizes and much general information. Several such visits have since been made for the third commodity only.

It was decided that the simplification of a popular duration model offered the easiest and quickest method of getting the scheme underway. Care was taken to ensure that the re-designed model incorporated all the basic aeromodelling skills.

The nature of the modifications made only 1/16 inch sheet and 1/16 inch square strip, together with a little soft-block, some Jap tissue and a liberal supply of cement, necessary. This has subsequently proved itself a very sound idea.

To ensure that the educational value of the project could not be denied, each student was required to make his own drawings. It was, of course, necessary to simplify this work. The extensive use of cardboard templates made it possible, and at the same time, ensured a standard of accuracy. The same templates were used later, in the actual construction of the model. It is perhaps indicative of the keenness of the next generation, and the interest of the hobby, that, as yet, no boy has failed to turn out a presentable drawing.

General Methods of Construction.

The students are now rapidly completing the second batch of production models. As no insuperable difficulties have yet been encountered, it can be assumed that the methods employed are successful. The following outline is not intended for constructional purposes, but to suggest a possible line of approach for elementary instruction in the craft.

Fuselage. In the "laying-out" stage, the necessity for thousands of straight-pins is obviated by the employment of fuselage frames. These are cut from 1/16 inch sheet balsa with the aid of cardboard templates. The frames are pinned to the plan and vertical bracing struts inserted.

The completed frames are then removed and mounted on a main-former. At the same time, the frames are cemented together at the tail. Two dorsal formers are then inserted and the bracing completed with 1/16 inch square strip.

Wings. Eight parallel-chord ribs are cut from 1/16 inch sheet (templates are recommended here), and notched top and bottom for the mainspar. A length of 1/16 inch square strip is then pinned to the plan and the ribs mounted. The trailing and leading edges are then added, in that order. An upper mainspar of 1/16 square is finally cemented into position.

Wing-tip formers can be left entirely to the pupils concerned. This results in an amazing variety of wing-tip shapes!

The dihedral angle, perhaps the most difficult part of the job, is then incorporated. This is first demonstrated by the teacher to the class as a whole. After many experiments, breaking and resetting the mainspar proved the most satisfactory method. Certainly it has structural drawbacks, but lends itself to the unpractised fingers of the young.

Tailplane and Fin. These are simply built on to the plan. The pupils can be entrusted to complete them without supervision. Again the final shape of the tip profiles varies with the taste of the constructor.

Undercarriage. This is built as a separate unit. The wire parts are bound and cemented to a subsidiary former and inserted in the completed fuselage against the main former.

The boys provide their own wheels.

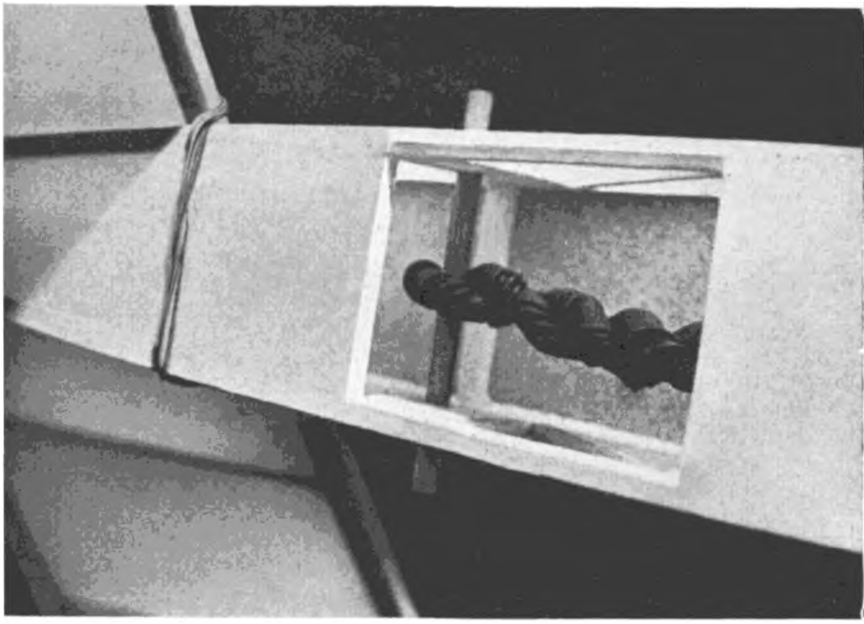
Noseblock and Propeller. Both are carved from soft balsa block. Yes! They *do* carve their own prop's.

Covering. Jap tissue is first cut into panels for each part. This prevents wastage and ensures that the grain is applied in the right direction. Tautening is achieved by the use of a scent spray filled with clean water.

Finally. For anyone who may be encouraged to follow the lead: Do not expect too much. Give plenty of advice and practical demonstrations.

Build a more advanced model yourself, to illustrate what can be done with patience and hard work. The author has constructed a model specifically for "effects". It has never flown, and probably never will, but you should see their faces when the little E.D. Comp. Special is running at full rev's.

(P.S. Keep away from the music-room on such occasions!)



Especially for the Beginner

PART VII

BY REV. F. CALLON

Fig. 1. This photograph shows the end of the rubber motor passing round the back peg. One panel is left uncovered so that the peg may be easily removed and threaded back into place through the loop.

THERE is only one way in which to become really first class at aeromodelling, and that is by building and flying models. The more you build, the more you learn, and the easier it becomes.

Next month this section will be featuring a very simple but very efficient rubber model. As its name, the WALTHEW RUBBER MODEL implies, it is based on the 30 in. wingspan WALTHEW GLIDER and is very similar to it in appearance. Once again Roland Scott has designed something which is easy to build, easy to fly, and easy on the pocket. I can thoroughly recommend it to every beginner as a first rubber model.

Last month's article on the nose-block, propeller and free-wheel device, was written round the WALTHEW RUBBER MODEL. In fact, the photographs were taken during the actual construction of the original. It will be a good idea to have the June and July numbers of the AEROMODELLER handy when you actually start building, since it will be impossible to repeat in detail everything they contain when describing the construction of the WALTHEW RUBBER MODEL in the August number.

The Back Peg.

As we saw last month, one end of the rubber motor is attached to the propeller shaft by being looped over the bobbin or hook at the front. The other end has to be held firmly in a central position at the rear of the fuselage. To do this, a strong piece of dowel—1/8 or 3/16 birch—is passed right through the fuselage from side to side, and the loop at the rear end of the rubber motor goes over it. Fig. 1 shows the back peg and rubber motor in place, photographed through a rectangular hole in the side of the fuselage. That hole was not caused by a heavy landing, nor was it put there just for the sake of the photograph . . .

I remember some years ago watching an enthusiast assemble his rubber model for a competition. The fuselage was completely covered and painted dead black, so that there was no chance of seeing what was going on inside. The only indication of where the back peg went was a pair of 3/16 in. diameter apertures, one on each side of the fuselage, in a position where one might expect the rubber motor to end. To insert the motor, the modeller fed the rubber into the front aperture of the fuselage, which he then held upwards so that the rubber hung vertically down inside. He then pushed the back peg a little way into the side of the fuselage, looked thoughtfully into the middle distance, and gently rocked the unit to and fro. The next step was to push the back peg into place right through the fuselage, and somehow or other it had found its way through the loop in the end of the rubber motor! Don't ask me how it was done.

The best method of making sure that the back peg will pass through the loop at the end of the rubber, is to leave uncovered the panel nearest to it underneath the fuselage. It is then generally possible to insert a helping finger and thumb and actually take hold of the rubber, and so work it round the dowel as this is pushed through the fuselage sides.

Supports for Back Peg.

The general layout of the supports should be clear enough from Fig. 2. On small models where the motor is not very strong, hard 1/16 sheet balsa is strong enough to withstand the pull on the peg. But make sure that it is *hard;* some kits supply too soft a grade for the job. If in doubt, cement a little square of celluloid or 1 mm. plywood to the inside of each support, and drill the peg hole through this. For stronger motors 1/8 sheet is used. When covering the fuselage make sure that the tissue is pasted into contact with the peg supports, as this strengthens them immensely.

If you are working from a kit, the supports will be marked out on sheet balsa with the grain running in the right direction. But if you are working from a plan alone, be very careful to have the grain running along the length of the support, *i.e.*, at right angles to the fuselage longerons. I once saw an example of what happens when the grain runs in the same direction as the pull on the peg: as soon as the motor was wound up the peg was ripped out of its support and shot towards the nose of the model, scattering spacers in all directions!

Undercarriage.

This unit, as was hinted last month, is nothing more than a necessary evil which must be added in order to save the propeller when the model lands. The only other time when it is any use is during competitions when one of the rules is a take-off from the ground, not a hand launch. This is generally referred to as "R.O.G."—short for "Rising off ground". If you are not intending to do any R.O.G. work, and if you are not extra particular about the appearance of the model, then a single wire strut with the end bent round a little instead of a wheel is quite efficient and saves weight.

The undercarriage is attached to the fuselage by being bound and cemented to the longerons and/or spacers. Use plenty of cement and gussets at this point, since it is here that most of the sudden strain of landing has to be taken.

The method of bending and attaching the undercarriage wire will be made clear on your plans. If an actual-size diagram of the final shape is given, use this to make sure that all the angles in the wire are correct ; lay the wire over the diagram, noting the exact spot where the angle occurs. Remove and bend with narrow-nosed pliers. Replace over the diagram and check the angle you have made, increasing or decreasing this with the pliers if necessary. Then pass to the next angle and repeat the process, until the entire undercarriage is bent to the correct shape.

Wheels.

Nearly every rubber model kit these days supplies ready shaped wheels. If your particular kit does not include them, or if you are working from a plan alone, then it is possible to make the wheels yourself, using laminated balsa sheet. In this case the centre of the wheel must be strengthened by thin plywood or by a small metal boss ; otherwise the wheel would soon be wobbling badly on its wire axle. Nowadays however, a few pence will buy an ultra-light pair of streamlined wheels made of celluloid or aluminium, a sound investment for any beginner.

There is only one way—one *good* way, that is—of fixing wheels onto the axle of the undercarriage, and that is by soldering. If you (or any of your friends) can use a soldering-iron, then this is your method : slip the wheel onto the axle, which should be held pointing up into the air. Push a piece of paper over the wire and against the wheel to give clearance. Next, slide a cup-washer down the axle, and drop a spot of solder inside the cup. After a few seconds you can tear away the paper, and there you are (Fig. 3). If your wheels are made of celluloid, use wet blotting-paper to give the clearance ; this lessens the danger of the celluloid shrivelling or burning in the heat.

Fig. 4 gives the alternative method—slide on the cup-washer the opposite way round, and bind the axle next to it with cotton soaked in cement. The process has to be repeated every time the wheel comes off ! From which statement you may deduce that this method is not a very satisfactory one.

In either case the extra length of axle should be snipped off fairly close, after the wheel has been fixed in place and after the solder or cement has hardened.

Torque.

Suppose you are holding a finished rubber model by the fuselage from underneath with your left hand, and that you turn the propeller a few times with your right hand in a clockwise direction. And now suppose that instead of releasing the propeller you keep hold of it firmly in your right hand and take away your left hand from the fuselage. What will happen ? The propeller cannot turn—you've got hold of it. Yet the rubber motor is trying its best to unwind. The only way it can do this is by turning the *fuselage* round ! And since the fuselage is attached to the opposite end of the rubber, the whole model (except the propeller) will turn in the same direction as you wound the propeller, *i.e.*, clockwise. This means that the port or left-hand half of the wing goes down, and the starboard half comes up (Fig. 5). Keep that fact fixed in your mind : left, down ; right, up.

People often talk about things being " as thin as air ", but air is really pretty solid stuff. It is thick enough at any rate to offer quite a considerable resistance to anything that tries to move through it. This resistance—air resistance—tends to stop a propeller turning, for instance. It does not do this nearly as effectively as you did just now by gripping hold of the propeller with your right hand, but has a sufficiently strong " grip " to start the rest of the model turning Which way ? Left wing down, right wing up, of course.

And that's really all there is to torque about (sorry, couldn't resist it !) on this particular subject.

Got the idea ? Torque is the tendency which a wound-up rubber motor has to turn a model's left wing down. This, if unchecked, makes the model bank into a left-hand turn. The stronger the motor, the more vicious is this left turn tendency, so that there may be danger of the model getting into a left-hand spiral dive with fatal results.

Continued on page 432

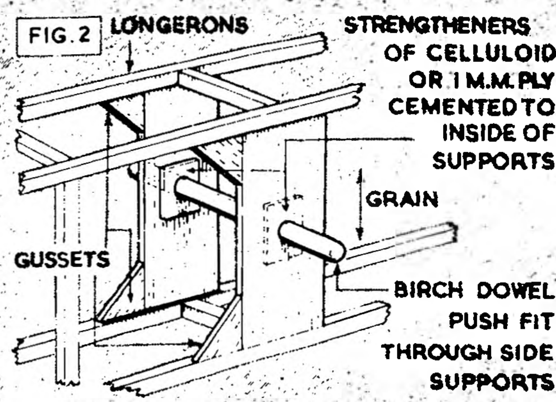
FIG. 2


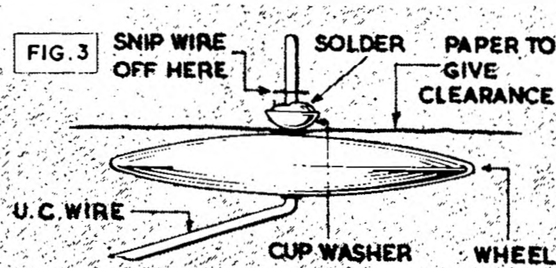
FIG. 3


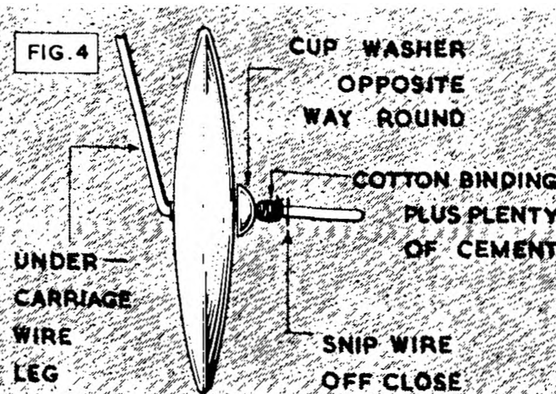
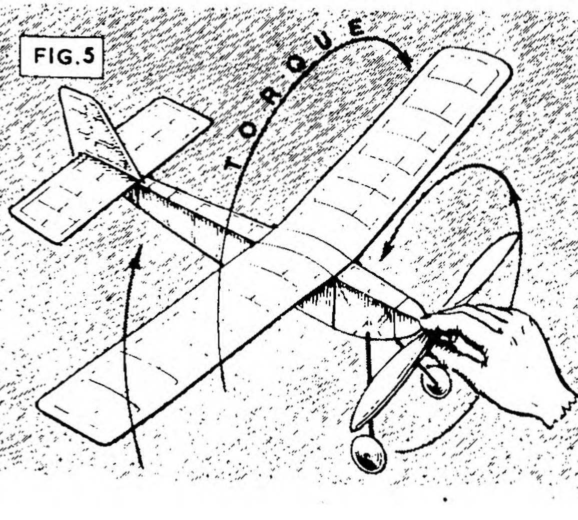
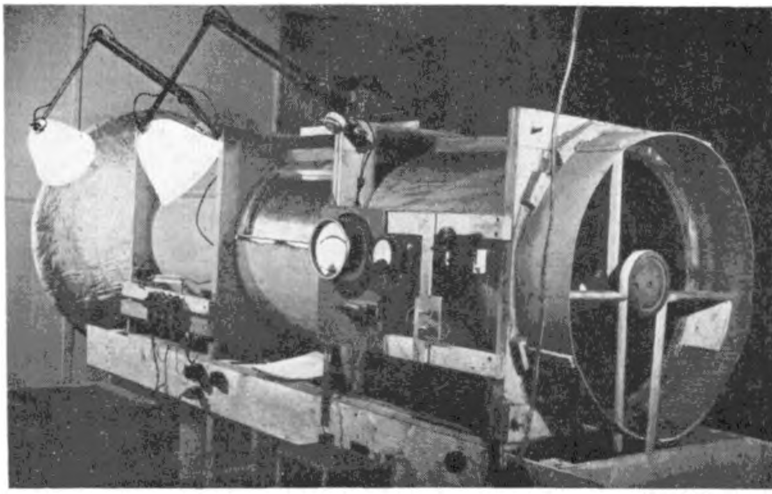
FIG. 4


FIG. 5




Wind Tunnel Tests on PROPELLERS

PART I
MEASURING TECHNIQUES & PRELIMINARY RESULTS

BY
N. K. WALKER, B.Sc., & J. FOLEY

LAST year Mr. Payne presented the results of L.S.A.R.A. measurements of the static thrust and power absorption of more than 50 model propellers and stated that these would be followed by a big series of tunnel tests. The whole job has proved more difficult than we expected and although the wind tunnel ran early in November the final version of the test equipment was not put in service until the end of March, 1950. As all the difficulties we met are in some ways common to all wind tunnel engine and propeller tests, we felt that a short description of these snags and our solutions would be of interest to other aeromodellers.

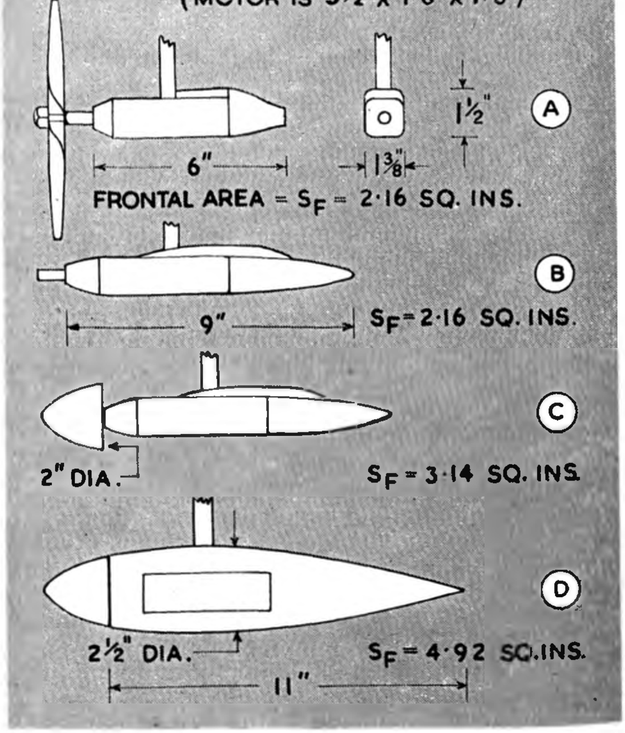
1. Accuracy of Results—Improvements to Apparatus. The measurements of propeller efficiency requires a knowledge of the thrust torque, propeller speed and wind speed and each of these is required to an accuracy of about $\pm\frac{1}{2}\%$ if a final accuracy of $\pm 1\%$ is required on propeller efficiency, while a rather higher order of accuracy is needed for r.p.m. measurements than for thrust or torque, since the coefficients C_P and C_T involve $(\text{r.p.m.})^2$.

The simplest measurements to tackle were the propeller torque and the wind speed. The first was obtained by a direct calibration of torque reaction on the motor against current, and the second by measuring the static pressure at a hole in the side of the tunnel on an inclined manometer. The torque calibration was found to be independent of motor speed, and so stable that after several months no change could be detected, but a recent check of the inclined manometer with a "step-up" gauge and pitot-tube showed that the velocity had been overestimated by 5 per cent. (The results for J and η in Figs. 2, 3, 4 and 5 should therefore be multiplied by 0·95 since these were not corrected).

A more difficult measurement was the propeller thrust. The original scheme was to allow the nacelle to swing freely against gravity and to measure the deflection, but this was abandoned and the motor is now supported on a cantilever steel tube containing the lead-in wires and hung from crossed-spring hinges. A dash-pot, balance weights and contacts for lights were arranged on a horizontal arm and the extreme end of the arm was connected to a spring balance. Unfortunately this arrangement proved very insensitive, and the trouble was traced to the excessive stability resulting from the spring balance. Efforts were made to reduce this, but were unsuccessful, and in the final arrangement the spring was removed. An additional graduated arm with a sliding weight was fitted, and the stability reduced to a very low value by balancing the weight of the motor with a large weight above the hinge. Accurate repeatability of the zero reading is essential for thrust measurements as the maximum efficiency occurs at a low thrust, and the latest balance is consistent to $\pm 0{\cdot}005$ ozs. with a maximum load of 10 ozs. while the earlier spring balance system was only consistent to $\pm 0{\cdot}4$ ozs.

Most trouble was experienced with the measurement of propeller r.p.m. Earlier static tests had given good results with a tiny A.C. generator mounted on the shaft of the motor and connected to the A.C. voltage scale of an Avometer, the calibration being checked from time to time against the A.C. mains. This arrangement gave a linear calibration of volts against r.p.m. which was perfectly consistent during the Summer, but during January and February, we found that the calibration, as checked by the A.C. mains wandered about 8 per cent. from day to day, sometimes even within a few minutes. A hurried check was made on the mains frequency variation, as the motor and generator seemed O.K. and we found to our horror that the supply in our district on a winter's

FIG. 1 OUTLINES AND DIMENSIONS OF STANDARD NACELLES. (MOTOR IS 3½" x 1⅛" x 1⅜")

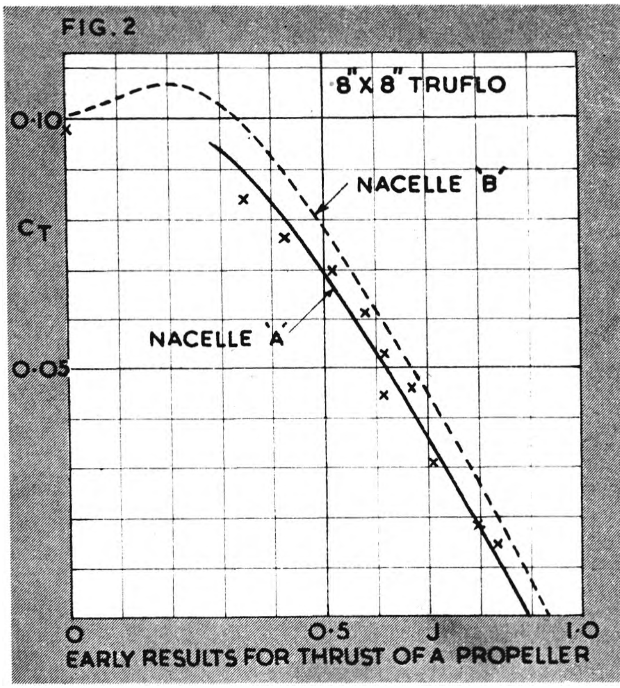


evening is likely to vary from 180 volts, 46½ cycles to 250 volts, 53 cycles, and that a change of frequency from 50 cycles to 49 cycles could occur while one watched the frequency meter*. We therefore abandoned the idea of using the mains frequency as a standard, and to go to some direct method capable of giving an accuracy of ±½ per cent. or so, as we still felt suspicious of the A.C. generator scheme. (Once bitten, twice shy ! ! !). The final scheme is a tiny 30 : 1 reduction gear mounted on the motor shaft which operates a make-and-break device connected to an electric Veeder counter. The time for 100 pips, or 3,000 revolutions of the prop is measured on a stopwatch, and under average conditions is about 40 to 100 seconds. As the stopwatch is accurate to about 1/5th second over this time, the accuracy is ±0·5 to ±0·2 per cent., and can be improved if required by timing a greater number of revolutions. There is no need to count the pips as these are presented on the face of the Veeder counter in the same way as mileage on a bicycle cyclometer. To ensure that the r.p.m. remain steady throughout the test, the thrust is fixed at a predetermined value, and the motor rheostat continually adjusted to hold the thrust balance arm hovering between the contacts.

A comparison between the accuracy shewn in Figs. 2 and 3, —measured with spring thrust balance and A.C. rev. counter,—and Figs. 4 and 5 showing similar results taken on the latest equipment shows that all our trouble has been worth while, and that the present gear can easily achieve the accuracy of ±2 per cent. originally thought necessary.

2. Drive from Tunnel Motor to Fan.

A further improvement to the plant as a whole has been the replacement of the A.C. 1/3rd h.p. single phase tunnel motor with round leather belting and step pulley drive by a 24 volt D.C. starter motor with push button speed control. The latter motor is powered by a second 30 volt power pack, and has a maximum power output of over 1 h.p., so we feared that the drive connecting it to the fan would be a serious problem, as with the earlier motor the belt often left the pulleys. We finally discovered the perfect belt in two thicknesses of 1 inch wide linen tape running on crowned pulleys 1 inch wide faced with medical sticking plaster to prevent slip. The final assembly is free from vibration, starts from rest without difficulty and the belt does not slip or jump, off the pulleys. With the present size of pulleys this motor gives a speed of 24 ft./sec. instead of 19 ft./sec., and higher speeds up to 32 ft./sec. could be obtained by changing the pulley size, though at these power consumptions the tunnel could not be run continuously.



EARLY RESULTS FOR THRUST OF A PROPELLER

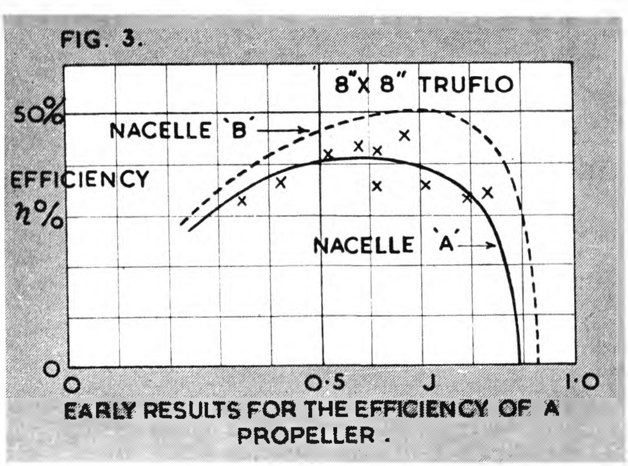
3. Nacelle Interference.

The results of Figs. 2–5 show a very large change of efficiency

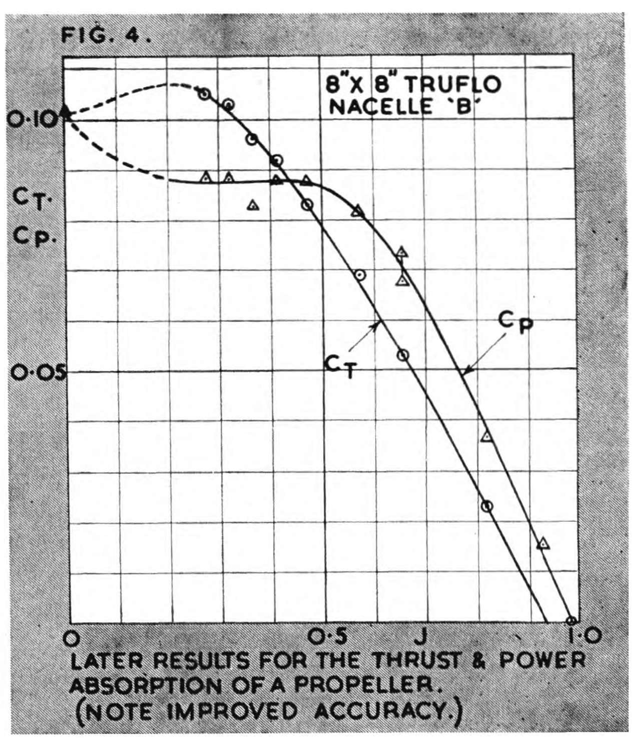
*If this sort of result is general throughout the country (check from your electric clock gains and losses) then the Electronic Stroboscope, is by no means as convenient an instrument as would appear at first sight. Early L.S.A.R.A. tests on engines by Worsnop and Walker showed that at each reading the whole calibration of the stroboscope had to be checked if accurate results were to be obtained since the calibration could wander 50 to 100 r.p.m. in a few minutes.

Now if the calibration standard of the instrument is a reed vibrating at mains frequency, as is usually the case, then the mains frequency must also be checked at the instant of calibration, requiring an additional instrument. This was in fact the procedure adopted in the engine tests mentioned.

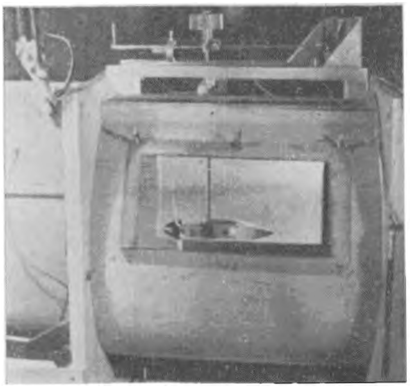
Present feeling in the L.S.A.R.A. Headquarters Group is that the mains cannot be used, even as an intermediary standard, and that for most testing simpler, cheaper and more accurate equipment than the electronic stroboscope can be devised.

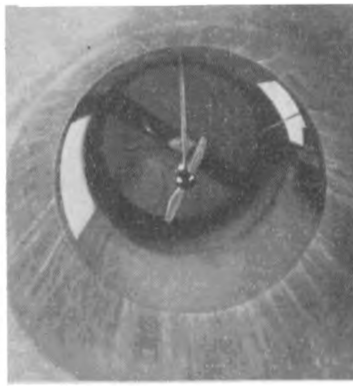


EARLY RESULTS FOR THE EFFICIENCY OF A PROPELLER.



LATER RESULTS FOR THE THRUST & POWER ABSORPTION OF A PROPELLER. (NOTE IMPROVED ACCURACY.)

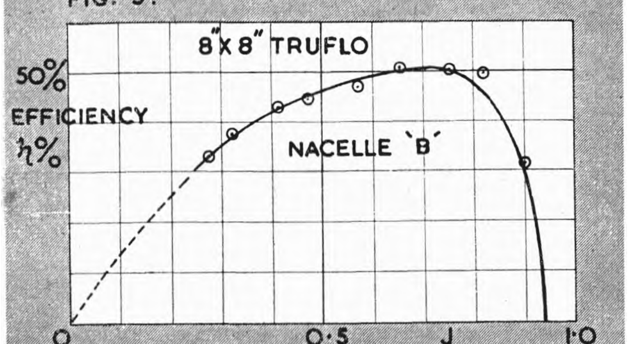




Left is a view of the test section of the tunnel. Note the observation window and the adjustable balance arm which is mounted above the test section out of the air flow.

Right is a view through the entry, which incidentally is surfaced with Plaster of Paris, vast quantities of which were needed to complete the job.

FIG. 5.



LATER RESULTS FOR THE EFFICIENCY OF A PROPELLER. (NOTE IMPROVED ACCURACY)

with nacelle shape. Apparently the blunter nacelles reduce the value of the thrust coefficient at a given J, without affecting the power required to drive the propeller, hence causing a large loss in efficiency. Tests will therefore be made on a number of nacelles for representative propellers—Fig. 1—and possibly on mock-ups of typical fuselages.

4. Propeller Efficiencies.

A further point which may surprise readers is the very low maximum efficiency of 50·5 per cent. (48 per cent. corrected) for an 8 × 8 ins. prop on a small faired nacelle. This result is, however, in agreement with the static tests, which indicated that the average of efficiency of model propellers would be about 2/3 of the values found in R. and M. 829 (L.S.A.R.A. Technical Note, No. 3). A complete series of 9 in. diameter propellers has now been tested on nacelle "B", and these results confirm this correction factor, although there are other detail differences which will be discussed by Mr. Payne in the next article.

References

(1) R. and M. 829.
(2) L.S.A.R.A. Technical Note, No. 3.

ESPECIALLY FOR THE BEGINNER. Continued from Page 429.

Trimming a Rubber Model.

The general principles are the same as those used for trimming a glider. The fact that we have torque to counteract means that rubber models must always be trimmed to fly in RIGHT HAND CIRCLES. The trim-tab therefore will always be set to the right.

First of all, hand-glide the model until a long, level glide is obtained, with a slight right turn. Since there is no weight box on a rubber model, a stall cannot be removed by adding lead shot. Instead, the wing must be moved slightly further back, away from the nose; this has the same effect as weighting the nose. If the design of the model does not allow the wing to be moved, then the angle of incidence of the wing—the angle at which it glides through the air compared with the centre-line of the fuselage—must be reduced. To do this, the T.E. of the wing is lifted by packing it up with a small piece of 1/16 sheet balsa. The same result can be achieved by packing up the *leading* edge of the tailplane. But beginners should choose a model which allows the wing to be moved forward or backward, as this is the simplest way of trimming for a good glide.

If the model tends to have a very short glide or to nose into the ground, then the wing needs moving forward. These adjustments of the wing position should be made only about 1/8 in. at a time, with another trial hand-glide after each change. Once again, if the wing cannot be moved, the short glide can be improved by packing up the *leading* edge of the wing, or the *trailing* edge of the tailplane.

When you are satisfied with the glide of the model, put on about fifty hand turns, and launch gently into whatever slight wind there may be. From now on, all trimming should be done by "off-setting" the nose-block. If the model tends to stall under power, put a small piece of 1/16 in. balsa between the top of the nose-block and the front of the fuselage. This points the propeller slightly downwards, and is called giving it downthrust. If the right turn begins to disappear, add right-thrust by packing the left side of the nose-block forward.

As more turns are applied, stretch-winding with the hand drill must be used, but we will see all about that next month along with the WALTHEW RUBBER MODEL.

Tailpiece.

Mr. R. L. Hobbs, of Watchet, Somerset, writes to say that he has built a WALTHEW glider, and took it out for the first time on Sunday, April 16th. After trimming, he launched it on a very short line at 20 feet. It climbed in 100 ft. circles, and fifteen minutes later, after a car chase and using binoculars, he saw it disappear into cumulus cloud at 300 ft., well out over the Bristol Channel and heading steadily for South Wales. The model had no name on it, being officially only on trials, but it could be identified by three small NGM transfers one on each wing tip and one near the nose, port side; the trim-tab was of thin card, and the tow-hooks of phosphor-bronze wire. If any modellers in the Barry–Cardiff area can take up the tale from here. I am sure that Mr. Hobbs will be pleased to hear from them. His full address is: Woodley, Dragon Cross, Washford, Watchet, Somerset.

TRADE REVIEW

THIS month we are able to review some of the novel accessory items recently introduced to the English modeller. A new type of engine bearer made by the ROYCE Engineering Company, London, S.E.4 begins our list. Supplied in three lengths, either drilled or undrilled, these bearers are guaranteed to be unbreakable in ordinary use. The only snag appears to be the need for $\frac{3}{8}$ in. thick bulkhead to support the cantilever bar. The bearers are priced at 3/3 for the short type which can be obtained ready drilled to suit any motor, or 3/6 and 4/- respectively for the undrilled 2 in. and 3 in. sizes.

From ROADWAY MODELS, New Malden, Surrey, we have a heavy weight pair of 2 in. rubber BALLOON WHEELS which can be supplied with 10 or 12 gauge bushes at 2/6 per pair; these are ideal for scale models where a replica of the high pressure type tyre is required and to be recommended for speed model dollies. The R.M. KWIKGLO plug connector will satisfy those modellers who wish to hide their glowplugs " below surface." Often the alligator clip system normally used for glowplug connections means a complete short circuit of the battery when left unattended and touching, and are very awkward to connect to cowled motors. This new connector is immediate in action and cannot short circuit. It is suited only to the ball top type of glowplug and sells at 1/6.

A new GLOW-PLUG, designed from long field experience by FRED GUEST, Feltham, Middlesex, is also considerably cheaper at 4/3 than other plugs. Similar in construction to the Ohlsson plug, this one has been designed and proved to be used without fear of burning out on a Dooling 61 running free on a flywheel. Also from F. GUEST is the VALVE-TANK which can be got in 1 cu. in. or 2 cu. in. capacities. Ideal for free flight models where glow-plug engines are used, these tanks have a shut off valve which can be operated by a timer and thus stop the flow of fuel to the engine. Another special tank from the same stable is the TEAM-TANK. Half round, so that it will fit snugly in the bottom of a streamlined fuselage, this tank is also ideal for small speed models, and holds 29 c.c. of fuel. The Valve-tanks are priced at 5/6 and the Team-tank at 4/6.

The MULTICRAFT Precision Cutting Tool marketed by PHILLIPS OMNIPOOL LIMITED, London, W.1, has the ideal feature of being able to carry its blades within a detachable screwed top. This top also has a pocket clip so that the unit may be carried with ease in the manner of a pen. Whilst the blades, which are made from Sheffield steel, are not as sharp as others to which we have become accustomed, this tool has many advantages, and priced at 5/4 including four blades it makes an inexpensive and ideal present for any modeller to receive from a generous pal.

MERCURY MODELS, London, N.7, add further to their range of useful accessories with TRIMSTRIP. This tough colour transfer is available in six combinations, 12 in. × 1½ in. at 6d. per strip. Each strip is divided into three ½ in. wide bands. Another TRIMSTRIP line is an 8 in. × 4 in. sheet of ½ in. checker patterns in two colours. These are particularly appealing to the team race fans whom we noticed at Brighton, who made full use of these checkers for decoration; they are priced at 6d. per sheet. Based on the latest American ideas the new MERCURY PRESSURE TANK for stunt flying has passed all *Aeromodeller* tests with flying colours. Particularly suited to glowplug motors this tank has the unique feature of providing a constant fuel feed throughout the entire flight.

Readers of the *Aeromodeller* will have noticed the regular appearance in the front pages of the list of courses available through BENNETT COLLEGE of Sheffield. First opened in 1900 this college has grown year by year. With 50 years experience of training by post and an expert staff ever ready to help the ambitious man to get to the top, many modellers have already availed themselves of the BENNETT COLLEGE plan of personal tuition. If you have not already read the list of courses available we suggest you refer to this month's advert and apply for the free particulars on any career you may wish to follow.

Indispensable to the keen modeller is MULTICORE SOLDER which is available in 6d. cartons at most model shops. Because it carries its own flux in two cores inside the solder, Multicore is extremely easy to use and clean in operation. Supplied in three different qualities the solder for radio and television contains three cores and is 18 gauge diameter. Model makers' MULTICORE has two cores and the metal mending quality which has a greater lead content is 16 gauge diameter. It is also possible to obtain MULTICORE in 60 ft. cartons at 5/- each. One of its greatest advantages is that flux may be removed with warm water.

Before the war, fine quality tissues were imported from Japan for us to use for covering. While it is impossible for us to repeat the Jap tissue in this country, the makers of MODELSPAN, who were the pre-war importers, have succeeded in producing a British made tissue which is superior to its counterpart in other countries. Available in two grades and recently produced in four colours MODELSPAN is tougher, easier to use, and moreover, easier to obtain than any other covering material we are aware of. The standard prices are lightweight 4d. per sheet, heavyweight 5d. per sheet, and coloured heavyweight 6d. per sheet.

Radio Review

BEFORE commencing this review of the first two radio control outfits to appear on the British market the writer would emphasise two points. Firstly, that at the time when these sets were received his radio knowledge was nil, and secondly that the sets have been used constantly over a period of some six months. The first point serves to emphasise that tests have been carried out from the aeromodelling aspect only and that this review is not a technical criticism of radio equipment. The second point is important for reliability over a prolonged period is an essential factor in view of the comparatively expensive nature of the equipment. The original *Aeromodeller* " Rudder Bug " was used as a test bed and surprisingly enough still lives to tell the tale. The writer could fill a book on his experiences since the first receiver was unpacked from its box, but must necessarily confine himself to the job in hand. Before doing so he would digress for a moment and point out for the benefit of the uninitiated, that never before has his aeromodelling offered such enjoyment and fascination as it has since he took up radio control flying.

One last word, and that is a tribute and a " thank you " to the two manufacturers whose equipment is described. Not only for providing the outfits and the advice that made this review possible, but also for their initiative in being the first to enter into a new, and at that time, untried field.

THE MERCURY COSSOR R/C UNIT

MANUFACTURERS : Messrs. Mercury Model Aircraft Supplies and Messrs. Cossor Ltd. PRICE : £13. 2s. 6d. less batteries.

TRANSMITTER.

Size : Height 11½ ins., width 7¾ ins., depth 6½ ins.

Controls : Rotating 8 position micro-switch with adjustable indicator dial. On–off switch.

Batteries : H.T. 120 volt radio battery. L.T. 1½ volt dry battery.

Aerial : 8 ft. sectioned monopole which plugs into socket on side of transmitter case.

Technical Description : A two valve push-pull oscillator with tuned plate and tuned grid circuits.

RECEIVER.

Size : 3 × 2¾ × 3⅜ ins. *Weight :* 4·15 ozs.

Controls : Single tuning control. Two on–off switches and sockets for milliameter.

Batteries : H.T. 67½ volt Battrymax B 101, or 3 22½ volt B 110 or B 122 in series. L.T. 1½ volt U.2, D 18 or 2 Pencells in parallel.

Aerial : 42 to 50 ins. according to installation.

Technical Description : Single valve, squegging super-regenerative oscillator designed to give as near a thyratron performance as possible with a normal valve.

ACTUATOR.

Size : 2¼ × 1⅝ × 2⅝ ins. *Weight :* 3·15 ozs.

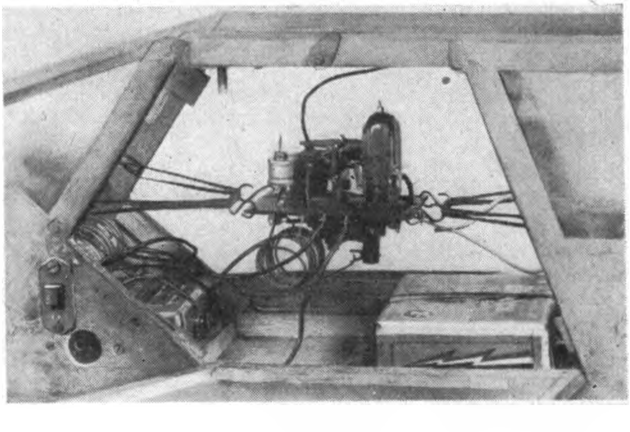
Batteries : 4½ volt pocket lamp type.

Technical Description : Clockwork actuated solenoid operated 8 pawl type.

This outfit arrived beautifully packed complete with 10 foolscap pages of instructions which we found adequately covered the testing and installation of equipment, not forgetting fault finding. No difficulty was experienced in wiring and installation such was the clarity of the instructions and diagrams. Wiring in particular was made simple and foolproof by means of a colour coding system. Unfortunately your reviewer's set developed unusual and baffling faults which very nearly discouraged him from radio control for good. Certainly they were not included in the fault finding chart and puzzled at least two knowledgeable radio enthusiasts in the bargain. However, the manufacturers were most co-operative, replacing valves per return on two or three occasions and even going to the extent of providing a replacement receiver. It eventually turned out that faulty valves were the cause of these peculiar happenings and when the original Cossor type were replaced with American war surplus 3 S 4's excellent results were at last obtained. Careful tuning produced a ground range of approximately 400 yards, and tuning it was subsequently learned, did not merely mean twiddling the tuning condensor. Three things must be systematically adjusted in relation to one another, namely, the tuning condensor, the squegging coil, and length of aerial.

The actuator is a most ingenious piece of equipment giving full rudder and full elevator movement with single channel radio equipment, and does in fact work most reliably. From the practical viewpoint it was, however, found almost impossible to use. Your reviewer has difficulty in coping with a four pawl sequence, *i.e.*, Left—Neutral—Right—Neutral, any additions to this and he just gives up !

Below we have the original installation of the Mercury Cossor receiver. A heavyweight actuator battery was in use on this occasion. Left, is F. H. Ashdowne who uses a Mercury receiver, shown here at the Ripmax contest.



E.D. receiver installation. The protective base is left on to keep out dust, etc., and also saves a lot of damage in the event of a prang. Right, is G. Honnest-Redlich, designer of the E.D. equipment, shown here with his "Electron V" at Fairlop where he won the Ripmax contest.

The transmitter is a sturdily built job and has proved 100 per cent. reliable since first used, but it was found to be lacking in range. For instance, using the same receiver but with the Dalton transmitter (described in our June issue) a ground range was obtained of well over one mile. Air range was of course o.o.s. which is good enough for anybody.

Summing up it can be said, that such is the sensitivity of the Mercury Cossor receiver that its adjustment and operation is not a job for those who lack radio experience. However, in the hands of a man with a fair knowledge of radio excellent results can be obtained. It is a significant point, that, almost without exception, the winners of the main radio control contests held to date have used Mercury Cossor receivers.

THE E.D. RADIO CONTROL UNIT.

MANUFACTURERS: Messrs. Electronic Developments, Ltd.
PRICE: £14. 10s. 0d. less batteries.

TRANSMITTER.

Size: height 9½ ins., width 4½ ins., depth 6 ins.
Controls: On–off switch and connection for external remote control.
Batteries: H.T. 120 volt radio battery, L.T. 2 volt accumulator.
Aerial: 8 ft. sectioned monopole attached to transmitter case.
Technical Description: A two valve pre-tuned L.F. modulator and H.F. oscillator circuit. Frequency stability ensured by careful construction and high Q tuning circuit. H.F. carrier permanently radiated on switching on. Keying modulates the carrier with an 800 cycle note.

This shows the E.D. actuator installation in our much used "Rudder Bug." The actuator is wound from underneath where a small panel is left uncovered for the purpose. The connecting links are of 22 S.W.G. piano wire.

RECEIVER.

Size: 5×3$\frac{7}{16}$×2½ ins. *Weight:* 7 ozs.
Controls: Single tuning control. On–off switch and phone sockets, external.
Batteries: L.T. 1½ volt, U.2., D 18, D 19, or 2 volt accumulator. H.T. 67½ volt Batrymax 101 or 3 B 122's in series.
Aerial: 12 ins. to 3½ ft. according to model and range.
Technical Description: A specially developed three valve circuit. Highly sensitive super-regenerative detector stage feeds screened grid L.F. amplifier, followed by a pentode valve which includes a positive reactive feed back circuit producing a heavy current change to actuate relay.

ACTUATOR.

Size: 3×1½×1½ ins. *Weight:* 2½ ozs.
Batteries: Three half Pencells in series or 4½ volt flat torch battery.
Technical Description: Clockwork actuated solenoid operated. Four pawl or two pawl types available.

This equipment was also very well packed and complete with instruction booklet. No difficulty was experienced in wiring the receiver and actuator. With this set as with the Mercury Cossor, snap fasteners were used for all battery connections and they have proved most satisfactory and reliable. It is necessary to purchase a pair of war surplus headphones for tuning in this instance, but these can be obtained for a few shillings. Tuning is simplicity itself and is not unduly sensitive. Ground range was well over one mile and air range a good deal farther than one could see. The radio has proved absolutely reliable and not one failure has been experienced to date since the original installation. Life of the L.T. battery is short owing to the heavy current drain from 3 valves. A U.2 lasts approximately 12 minutes and these have now been discarded in favour of D.18 s which last longer and weigh an ounce less. The original H.T. 67½ volt Battrymax is still in use and the grid batteries have been replaced once. The 4 pawl actuator proved most reliable but this was modified by cutting off two of the arms so converting it to the two pawl type. The writer has a great respect for the self-neutralising attributes of the two pawl type, especially after witnessing the results of a fractured lead when using the four pawl variety! It may be a heavier drain on the actuator battery but this is a small price to pay when compared with a new airframe. Apparently the Manufacturers also appreciate the point as we gather either type is now available.

The E.D. transmitter proved as trouble free as the receiver and the extension lead with its micro switch was found most convenient in operation.

There is no doubt that this is ideal equipment for the beginner as it is almost foolproof in operation and of course absolutely reliable. Owing to the weight of the flying equipment (approximately 30 ozs.) it must necessarily be used in large models and in this respect it is felt that Rudder Bug (864 sq. ins.) probably represents the minimum size of model permissible.

FRESH from a week end at the briny, scribe Fliar Phil depicts how to get past the loop and bunt stage without the customary prangs.

Take a lighthouse—preferably a tall one, and most definitely one which is isolated and not of the pier-end variety—plant yourself firmly on the upper deck. Next, obtain a nautical friend, complete with boat, and pay out the lines which should first be water-proofed with a liberal coat of tallow.

With at least 45 ft. clearance below, and unlimited room above, t'would be sacrilege to crash !

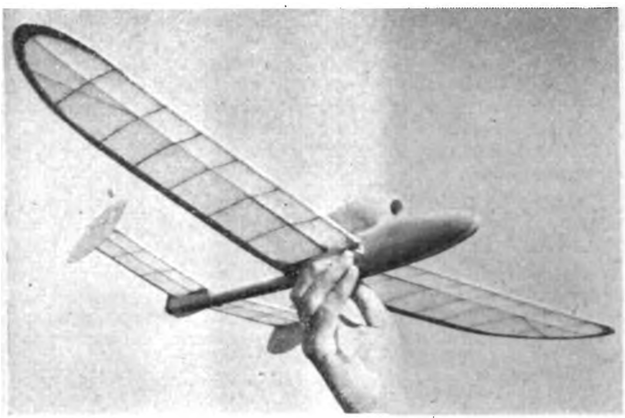
Chosen as July's " Model of the Month " is the smart ETA " 5 " powered Eros by K. D. J. Waller of Petersfield, Hants. Covered with silk the model weighs 4½ lbs. and has already re-paid its 600 constructional hours by winning the Senior Championship prize at the Alton & District model exhibition in March this year. A failing timer nearly lost this model on its first test flight ; but fortunately the full tank lasted no more than five minutes and the Eros " landed " unscratched in a tree. So, take heed and test your timers—some tanks would seem to last for hours !

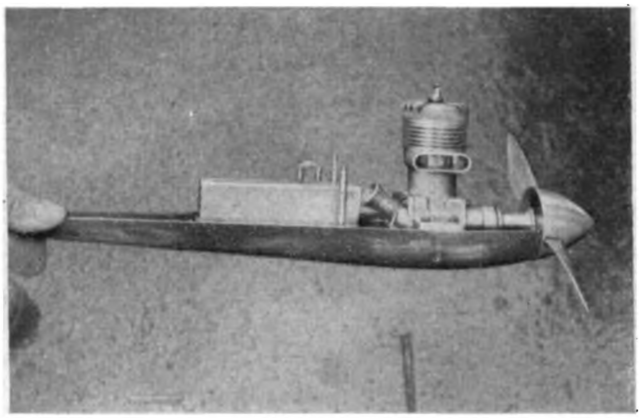
From a big 'un to a little 'un we have at the left, a baby stunt model seen at the Easter Monday Rally at Brighton. Designed and built by Mr. Rabbitt who is seen holding the model, this miniature flies on 12 ft. lines, and is powered by one of the later versions of the " K " ·2 c.c. diesel. It certainly brings back garden flying within the bounds of the average modelbod ; some might even manage a spot of control-line in the living room.

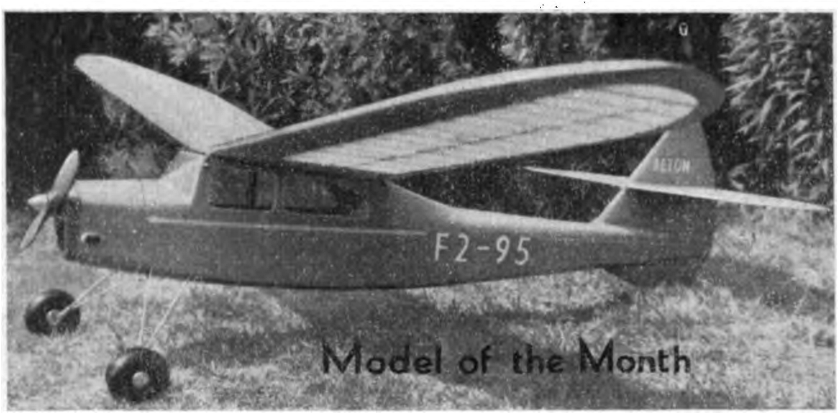
In the bottom left hand corner, is a novel layout for Jetex power. J. S. Simpson of Ripon, Yorkshire, is responsible for this 28 ins. wing span Jetex " 200 " duration model. It makes a change to see the Jetex cowled ; and very little effort is required to accomplish the clean appearance of a full scale jet unit.

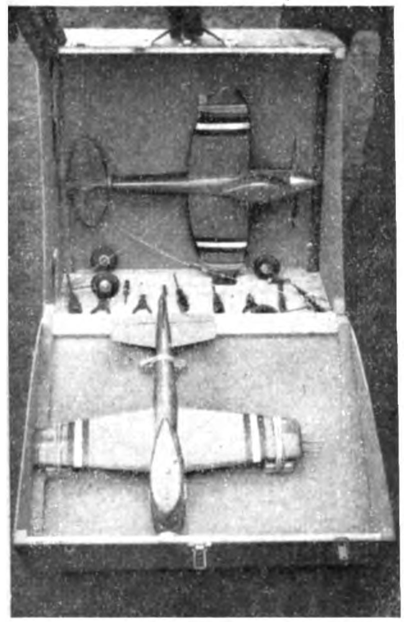
An entirely new engine by John Wood of the Croydon Club shows strains of Dooling, McCoy and the Nordec for which Mr. Wood was responsible. Fitted into a die-cast magnesium fuselage bottom which incorporates a special tank, this engine has a down-draught carburettor and was designed expressly for glo-plug operation. A novel feature in the unseen upper half of the model is the use of double cable for each lead out line and the thimble at the point where the flying wires are attached to the model.

Top of this page is an Amco ·87 c.c. powered Chrislea Super Ace by K. Braxton of the Southampton M.A.C. This photograph is a good example of how to get a





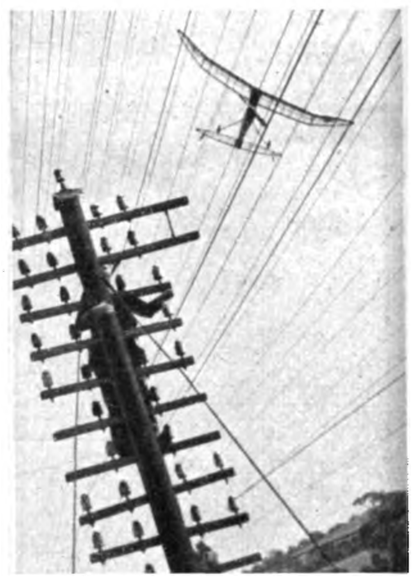




realistic angle shot by placing the camera at low level. Popular among free-flight scale fans, the Ace is built from A.P.S. plans and is just the job for smooth realism in model flight.

Top right corner reveals a Pandora's box of speed models by Alan Judge and Arthur Vickerage of the Zombies. Model in the back is powered by a Hornet motor and that in the foreground has a McCoy 49. Keener eyes will perceive an assortment of four screw drivers, three pairs of pliers and a hammer—a most comprehensive tool kit for the speed fan!

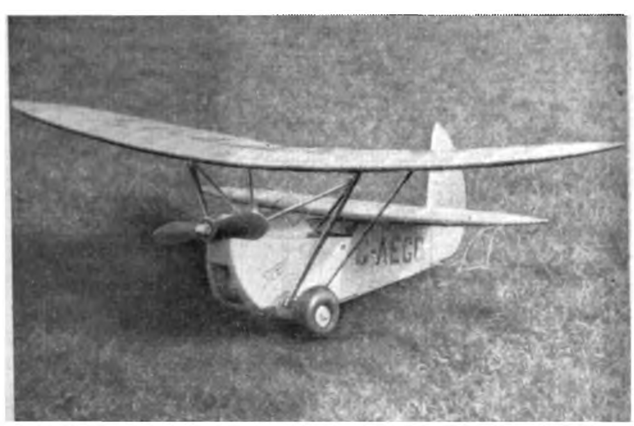
While Fliar Phil was up the lighthouse, friend O'Keeffe of Bristol was up the telegraph pole trying to retrieve his Slicker 42 from an unwelcome obstruction. The model was quite safely taken from its nesting place among the wires and lives to fly again. This is the first time we have seen a Slicker on lines.

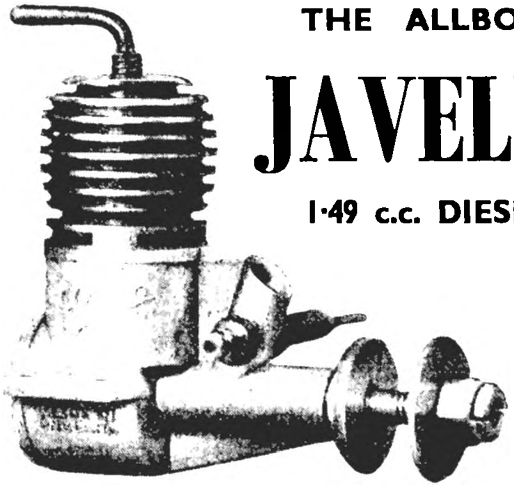


Pre-war enthusiasts will remember the ground hugging antics of " Pou du Ciel ", or " Flying Flea " at air displays. K. Lingford of Barnard Castle, Co. Durham, has a particular fascination for the tandem wing design and thinks quite rightly that it has great possibilities for control line or even free-flight aerobatics. Considering that all longitudinal trimming is made by altering the incidence on the main wing—there should be a chance that the " Flea " would master the ever difficult square loop. Modelled on the 1936 Abbott-Baynes cantilever " Flea ", Mr. Lingford's version has a total of 308 sq. ins. with a span of 33 ins. A Mills 1·3 c.c. provides sufficient power for training one in the use of a moving wing instead of the customary docile elevator. One uncomfortable vice, reports our Co. Durham friend, is that over controlling can stall the main wing and even though full " up " is given by the pilot, the " Flea " will dive until " down " is applied to unstall the wing.

Such should muddle the most expert of stunt fliers . . . who said there was nothing new left in control line flying ?

Our last exhibit this month is a 79 ins. version of the Piper Cub by A. R. Stokes of the Eastbourne Club. Being the first scale project tackled by Mr. Stokes and Radio controlled too, building time was spread over five months. An ETA 29 is used to power the job, which weighs just over 6 lb. Mercury Cossor Radio equipment is installed. Like Bristolian O'Keeffe, this "Cub" has also collected telephone lines and thus prompts Fliar Phil to organize a nation wide petition for removal of all overhead lines, whether telephone, electrical, or just plain cable.





THE ALLBON JAVELIN

1·49 c.c. DIESEL

NUMBER TWENTY-FIVE

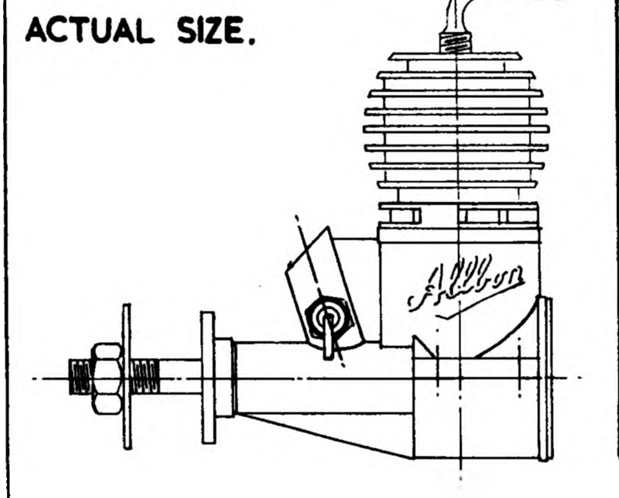
ONE of the outstanding characteristics of many modern miniature engines is the very large power/weight ratio which they show. Taking 1 lb./1 b.h.p. as a standard, there is at least one small engine which develops over this figure, while several others are well on the way. It was not so very many years ago that power/weight ratios of this category were considered high for full-sized aero engines, and it was deemed impossible for the smaller fry to get anywhere near this figure. The reason for this doubt was a purely physical one, based on the fact that whereas the *capacity* of an engine dropped in cubic ratio, the *linear measurements* dropped only as the square. That is to say, if the measurements of any given engine were halved, the capacity was reduced to one quarter of the original. Thus, the smaller an engine was made the greater the difference between the overall size and the capacity, because the latter decreased twice as fast as the former.

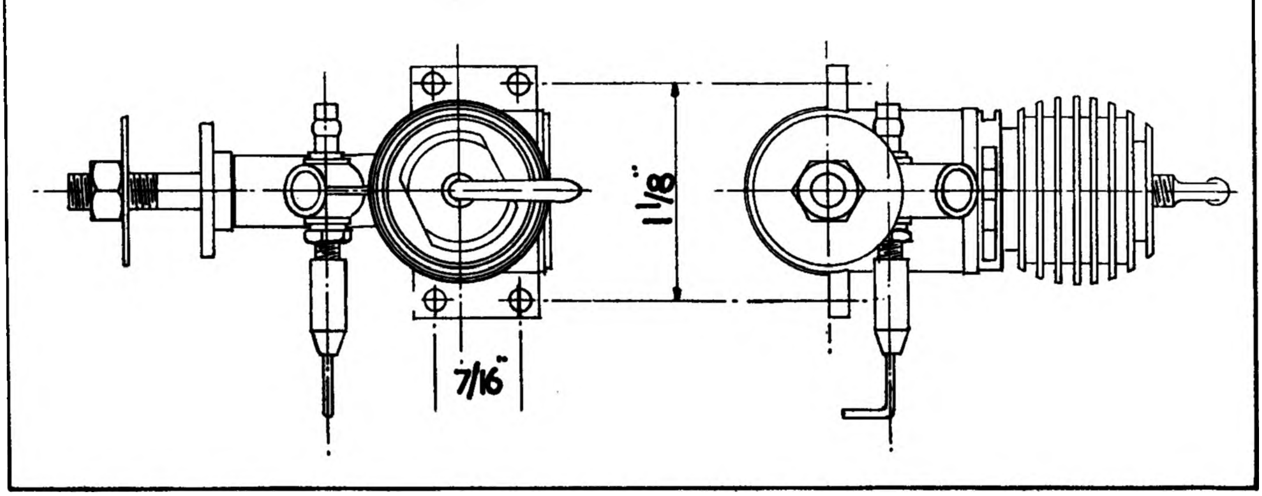
Modern designers have not, of course, found any magical method of overcoming this fundamental law of physics, and other reasons must be found for the improved power/weight characteristics. Perhaps the chief reason is to be seen in the improved porting arrangements ; while small bore/stroke ratios, improved fuels, etc., have all played their part. These features enable a much greater power output to be obtained from an engine of small capacity.

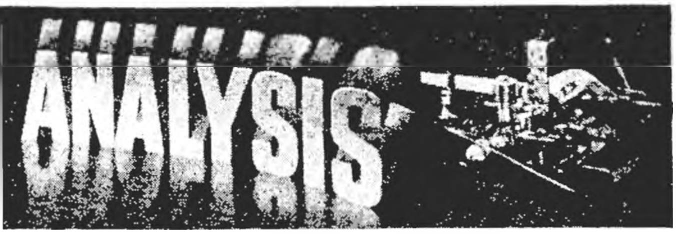
Hand-in-hand with these improvements, a greater attention to materials has enabled the components to be of lighter weight for equal strength, and a general cleaning-up of the designs, so that all superfluous metal is cut out altogether, has resulted in the little " super " engine of to-day.

The Allbon " Javelin " is typical of this modern trend, for we have here an engine weighing under 2¼ ozs., which develops almost 1/10 of a horse-power. The tests were free from any mechanical failures of any sort, and, more important still, the engine showed no signs of suffering from a rather gruelling

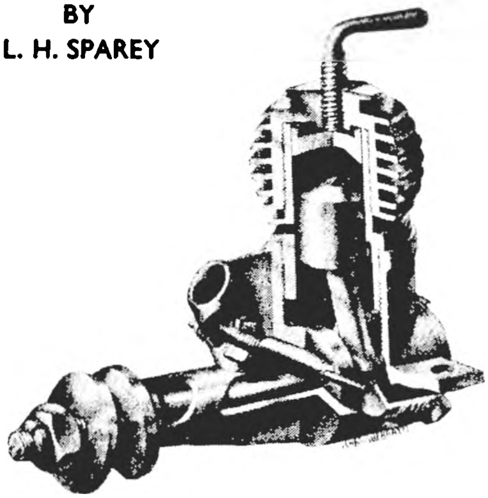
ACTUAL SIZE.







BY
L. H. SPAREY



ordeal, and was apparently in excellent condition. This seems to show that the materials used in its construction were quite up to their job. It is to be hoped, therefore, that engines of the "super-duper" type have now recovered from the teething troubles which did, at one time, beset them.

TEST

Engine : Allbon, Javelin, 1·49 c.c. Diesel.

Fuel : Mercury No. 3 and Mercury Special Ether, 1–1.

Starting : Pulley-and-cord for convenience of test; experimentally hand-started from time to time. Starting excellent under all conditions.

Running : This engine was exceptionally flexible for one of this type. Ran well and evenly at all speeds from 5,000 to 14,000 r.p.m. Throttle control not extremely sensitive, and this simplified starting. When cold, engine started more easily with compressing lever set for higher compression than was required for actual best running performance. As engine warmed up the speed increased as compression was lowered to correct amount.

B.H.P. : The maximum output seems to lie in the region of 12,000 r.p.m., but very little variation appears between 11,000 and 12,500 r.p.m.; while for all practical purposes this range could be extended to include any speed between 10,000 and 13,000, as the loss between these points is only ·005 b.h.p. A maximum output of ·099 b.h.p. was recorded at around 12,000 r.p.m. Power dropped steeply after the 13,000 mark, but the fall was more gradual in the lower speed ranges.

Checked Weight : 2·4 ozs. (less tank).

Power/Weight Ratio : ·665 b.h.p./lb.

Remarks : Engine performed well throughout tests: in particular, speed was extremely steady in the high ranges. In view of the small power loss over a fairly large speed range this engine should make a good control-line unit. Engine was run-in for 1 hour at 4,000 r.p.m.

Recommended Airscrews : Free Flight: 9×4 ins., 8×5 ins. Control Line Stunt: 7×6 ins. Speed: 6×10 ins.

Flywheel : 1½ ins. diam., approx. 2½ ozs. weight.

Bore : ·525 ins. Stroke: ·420 ins.

Cylinder : Meehanite. Radial ports: 3 exhaust, 3 transfer. Cylinder screws into crankcase.

Cylinder Head : Dural. Screwed onto cylinder.

Crankcase : Aluminium Alloy; adjusting screw in cylinder head.

Piston : Meehanite; dural gudgeon pin carrier. Conical top. No rings.

Connecting Rod : Hiduminium R.R.56 Forging.

Crankpin Bearing : Plain.

Crankshaft : Heat treated alloy steel, ground and polished.

Main Bearing : Plain, no bush. Little End Bearing: Plain.

Crankshaft Valve : Rotary shaft inlet valve.

Special Features : Gudgeon pin being retained inside piston prevents scoring of cylinder bore.

GENERAL CONSTRUCTIONAL DATA

Name : "Javelin".

Manufacturers : Allbon Engineering Co. (Sunbury) Ltd., 51a, Thames Street, Sunbury-on-Thames.

Retail Price : 55/–.

Delivery : Ex-stock.

Spares : Full spares and repair service available.

Type : Compression Ignition (Diesel).

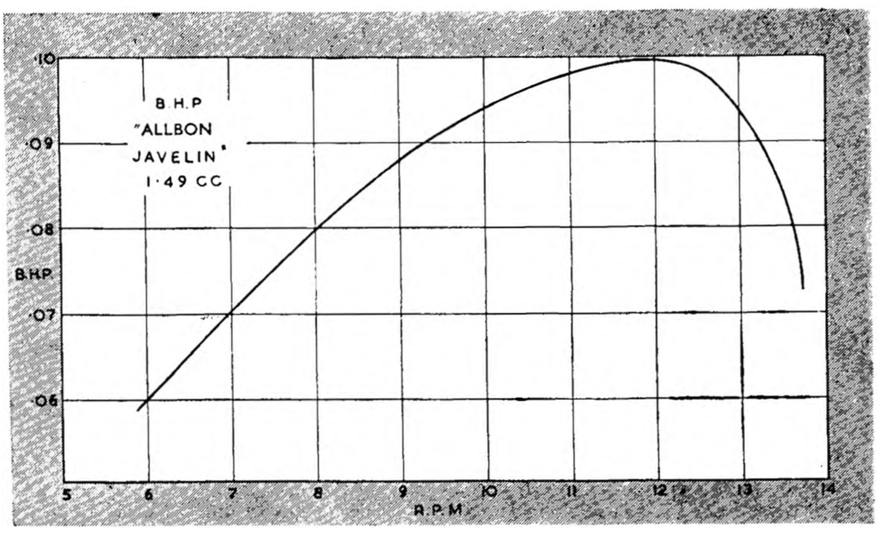
Specified Fuel : Mercury No. 3 and No. 8.

Capacity : 1·49 c.c., ·091 cu.ins.

Weight (bare) : 2¼ ozs.

Compression Ratio : adjustable.

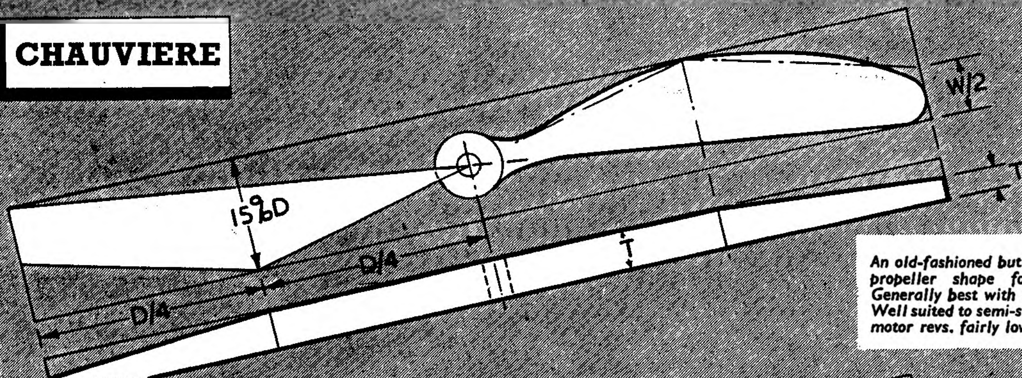
Mounting : Beam, upright or inverted.



POWER PROP REVIEW

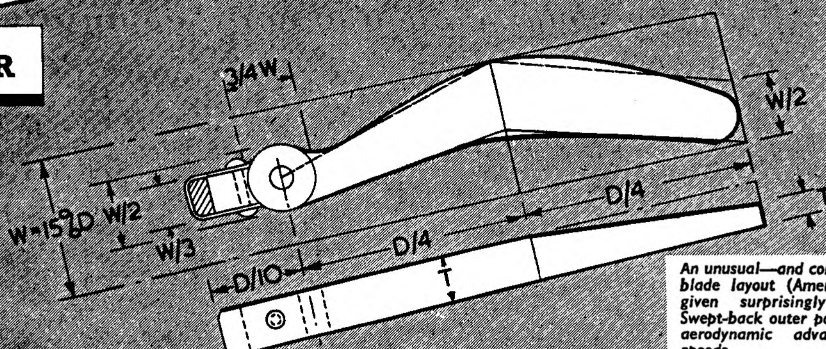
PART THREE

CHAUVIERE



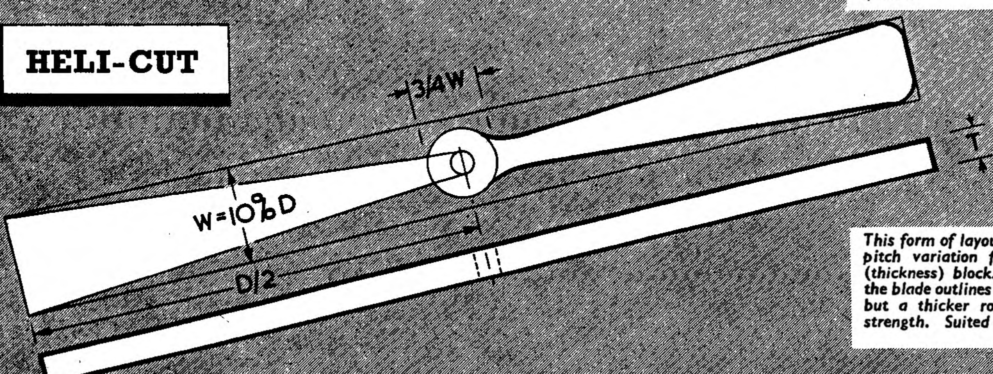
An old-fashioned but still quite useful propeller shape for sport flying. Generally best with low pitch values. Well suited to semi-scale models, with motor revs. fairly low.

SCIMITAR



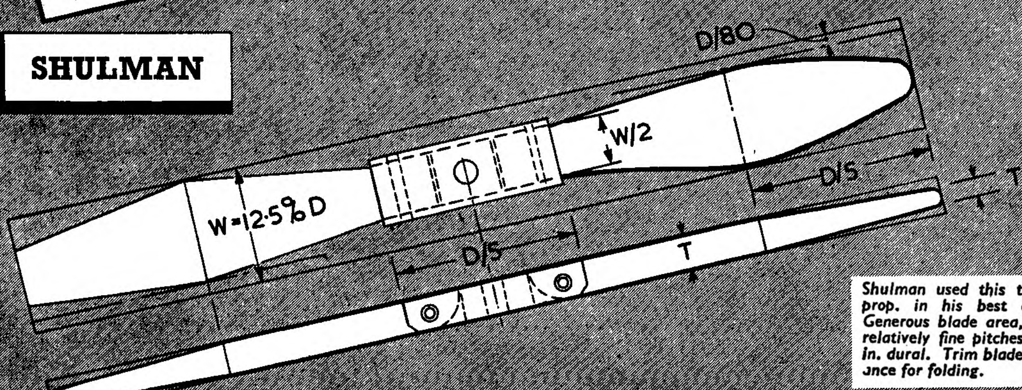
An unusual—and complicated—single blade layout (American) which has given surprisingly good results. Swept-back outer portion has certain aerodynamic advantage at high speeds.

HELI-CUT



This form of layout is used to produce pitch variation from an untapered (thickness) block. Strictly speaking the blade outlines should be diagonals. but a thicker root is necessary for strength. Suited to small diameters.

SHULMAN

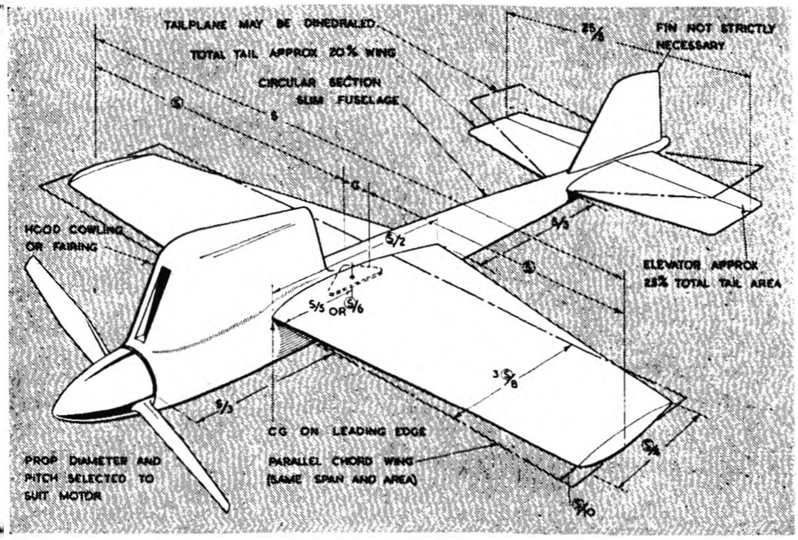


Shulman used this type of folding prop. in his best contest season. Generous blade area, and used with relatively fine pitches. Hub is 1/16 in. dural. Trim blade roots for clearance for folding.

It's DESIGNED for YOU!

NUMBER FOUR

CONTROL LINE SPEED MODELS



WITH regard to design layout, most models now conform to the conventional layout of slim, conical fuselage with hood-type cowling, straight tapered wings and tailplane with squared tips, mid- or shoulder-wing positioning and dolly or drop-out undercarriage. Generalised proportions are summarised in the heading illustration. Considerable variation in tailplane proportion is permissible without running into trouble, although it is better to err on the large size rather than cut down this area to a minimum. The saving in drag resulting from reduced tail area is very small and if the resultant area is *too* small, the model will have marginal longitudinal stability. In other words, it will tend to " hunt " or wander up and down on the line and may prove difficult, or even impossible, to keep under control.

Overall size of the model is determined by the motor to be used. It is usual to match model size to a specific motor, rather than to a specific *size* of motor, although, again, this does not appear at all critical.

Choice of motor resolves itself simply into choosing the most powerful motor available in any particular class. The chief criterion in this respect is motor size for, given two motors of similar efficiency, the one with greater capacity will have the greater power. In other words, for speed work, select a racing motor with the maximum possible capacity within the permitted class range.

Now what decides which is a racing motor ? Broadly, speaking, it is a motor which is capable of developing very high r.p.m., and this is about the most useful practical guide to selection. In the larger capacities, 5 c.c. and up, almost all motors of this type are characterised by ring-type pistons, short stroke and large port areas, with crankcase (rotary valve) induction a " must ". This last generalisation holds true in all sizes. The motor with rotary valve induction (as opposed to sideport induction) is invariably faster than its sideport counterpart.

With these larger racing motors, methanol fuels are standard and spark and glow ignition give comparable results. Maximum r.p.m. is usually obtained with glow ignition, but fuel proportions are generally much more critical. Spark ignition tends to be more reliable. Against spark ignition, of course, is the additional weight of the ignition equipment and the possibility of failure. Good flight batteries are essential, an indifferent battery being a constant source of trouble, and mechanical failure of the wiring system under constant vibration is always a hazard. A point against glow ignition is that if the model strikes the ground with the motor running, shearing off the propeller blades, the motor will usually continue to run, unbalanced and at very high speed, with the consequent risk of serious damage to a valuable motor.

The modern tendency, however, is to use glow-ignition almost exclusively and concentrate on finding the best possible fuel for the motor. Fuel requirements can, and do, vary with atmospheric conditions and so considerably attention must be given to this point if *consistent* high speeds are the aim.

In the lower range of motor sizes, ignition weight (and space requirements) generally rule out spark ignition, and so glow ignition is used right down to the smallest sizes. At the lower end of the range (2·5 c.c. and under) the diesel proves a comparable, and sometimes better, power plant. Suitable motors, corresponding to the various S.M.A.E. control line speed classes, are listed in Table I.

Once having decided the class of model, size must be proportioned accordingly. The generalised diagram shows

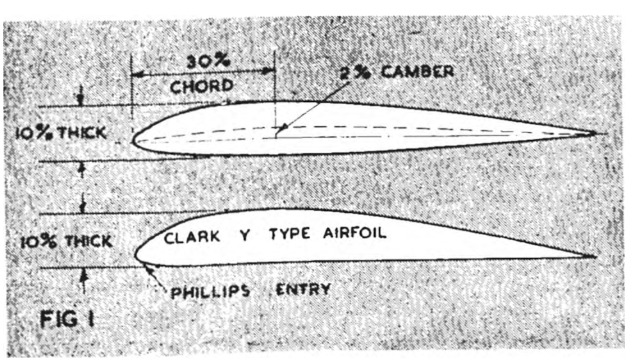


FIG 1

TABLE I. BRITISH SPEED C/L MOTORS

Class	I	II	III	IV	V	VI	VII
Capacity	0–1·5	1·51–2·5	2·51–3·5	3·51–5·0	5·01–8·5	8·51–15	Jet o. Rocket
	Javelin •	Mills 2.4 •	Amco 3.5 •	Yulon †	Yulon 49 †	Nordec †‡	Juggernaut
	Arrow †	Elfin 2.4 •	Eta 19 †	Eta 29 †		Rowell	
	Elfin 1.5 •	E.D. III •†	E.D. IV	Frog 500 †			
		Frog 250 •		Vulture •			

•Diesel. †Glow-plug. ‡Spark Ignition

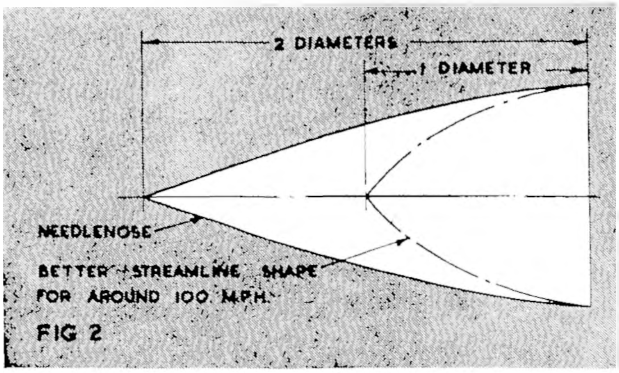


FIG 2

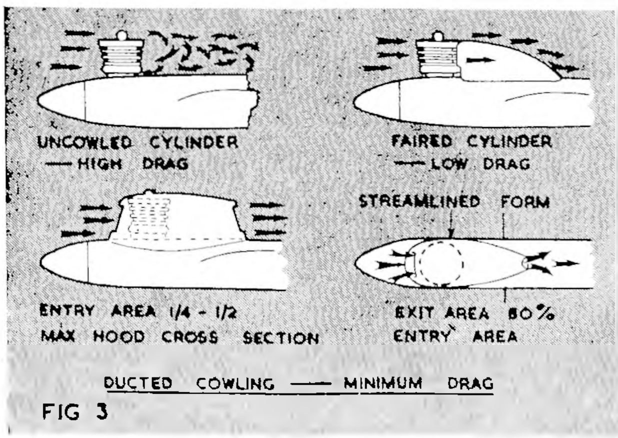


FIG 3

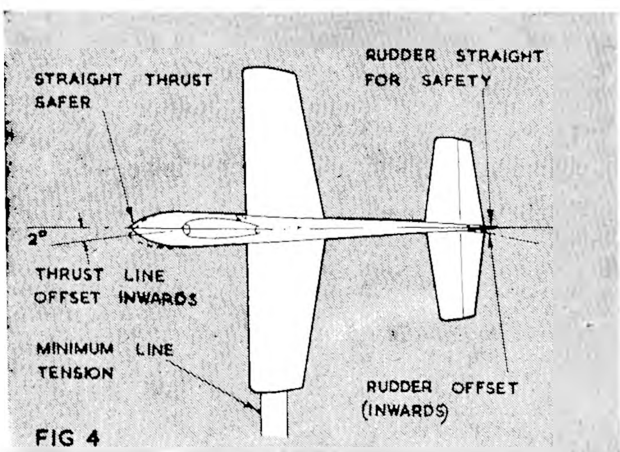


FIG 4

two simplified alternatives, one with a normal straight tapered wing, and the other a parallel chord wing of the same area but higher aspect ratio. Although there is very little theoretical justification for using high aspect ratio wings for speed work such types have proved popular and given excellent results, with aspect ratios even higher than that shown.

Gross wing area of this layout is $s\frac{(G+\frac{1}{2})}{2}$ where " s " is the actual semi-span of the wing itself, but it is usual to work to *nett* of actual wing area when this is $\frac{3s^2}{4}$. The solution for semi-span (wing only) is thus :—

$$s = \sqrt{\frac{4 \times \text{wing area}}{3}} = 2\sqrt{\frac{\text{wing area}}{3}}$$

Since wing area is not all that critical, calculated figures can be rounded off to a convenient number for ease of working.

Now in order to determine the best wing area for any particular class of model, we must first appreciate how wing area affects performance. Briefly, the problem is this; the greater the weight of the model, the greater the lift required to support it. This lift can be achieved either with a small wing (high wing loading) operating at a relatively high angle of attack, or a large wing (low wing loading) operating at a small angle of attack. Low wing loading conditions are desirable, since wing drag is lower under these conditions. But achieving this with a large wing leads to a vicious circle. The larger the wing, the greater its weight, and so on.

The solution is to work within a range of permissible wing area sizes and keep the total weight of the model down as much as possible, consistent with the necessary strength. The lighter you think you can make the model, the more nearly can you approach the lower wing area limit. Over-optimism in this respect will mean that your model will ultimately have to fly nose-up at higher drag, to achieve the necessary lift. Suggested wing area limits are listed in Table II. From this selection then follow the remaining proportions of the model.

To finalise the design layout, there are a number of details to be taken into consideration. First, the aerofoil sections. The tailplane can be dismissed quite simply; with its very small area a simple flat plate section will suffice, when this unit can be made out of thin ply to give adequate strength. The wing section, however, demands more careful treatment. Two drag-producing factors in aerofoil section design are camber and thickness. Drag increases as these increase. As far as thickness is concerned, drag increase with anything greater than a 15 per cent. thickness factor is prohibitive and, preferably, the section thickness should be somewhat less. A section thickness of about 10 per cent. of the chord is about the usual minimum. Thinning the section right down below this figure will not produce correspondingly better performance, for lift will taper off rapidly, leading to the same bad effects as high wing loading. In fact, it is probably better to err on the side of a slightly thicker section than an unduly thin one.

To get a reasonable amount of lift at a low operative angle of attack, some moderate degree of camber is desirable—somewhere in the region of 2 per cent. Thus, a good speed section will have a thickness of about 10 per cent. of the chord

TABLE III. AERODYNAMIC DATA

Class	Span	Root Chord	Tip Chord	Net Area	Section	LOA Excluding Spinner	Moment Arm Wing TE to Tail LE	Tail Span	Area	Elevator Area	Notes
I	13	2½	1½	24	Flat lifting	12	4½	5	6	1½	Cylinder fairing may be used instead of Hood type cowling
II	14½	2¾	1½	30	Flat lifting	13	5	5½	8	2	
III	16	3	2	38	Bi-convex	15	5½	6	10	2½	
IV	17½	3½	2	44	Bi-convex	16	6	7	10	2½	Hood type cowling
V	20	4½	2	60	Bi-convex	19	7	8½	14	3	Hood type cowling
VI	20	6	4	92	Bi-convex	20	8	9	18	5	Hood type cowling

TABLE II. WING AREA SIZES.

Class	I	II	III	IV	V	VI	VII
Net wing area sq. inches	20–30	25–40	30–45	35–50	50–80	80–110	90–130

and a camber of about 2 per cent. Position of maximum camber is not likely to have a great effect.

A section fulfilling these requirements would be NACA 2310, although almost any conventional aerofoil form proportioned on similar lines could be expected to give similar results —Fig. 1. Such sections, it will be noted, are of the bi-convex type.

Chord sizes on control line model wings are so small that efficiencies are problematical, so a more practical section with a flat undersurface is likely to give almost identical performance. Such a section, of course, has the great advantage that the wing can be built flat over the plan. For ordinates, a normal Clark Y section thinned to 10 per cent. will be as good as any. It is, in fact, probably more important to build the wings true and free from any twist than attempt some slight refinement of section.

Regarding the very thin section sometimes used, these, as we have seen, will probably have to operate at a rather high angle of attack and in such cases high aspect ratio will be effective in reducing induced drag. But this does not appear to be the best solution to the problem, although it has the practical advantage that a light weight, thin section, high aspect ratio wing can be made direct from solid balsa.

Spinner shape is another mis-understood detail. The present trend is towards long, pointed spinners of the supersonic type, presumably on the basis that high speed models need " high speed " spinner shapes. However, from the aerodynamic point of view, the top speed on control line models is in the lower speed range of full size aerodynamics, where best streamline shapes are somewhat bluntish in appearance. A properly shaped blunt spinner on a speed model may, in fact, have lower drag than that given by the more pointed entry—Fig. 2. About the only justification for a long pointed spinner is from the aesthetic point of view.

But the most abused subject of all is cowling design. At model speeds—say above about 75 m.p.h.—the drag of a bare cylinder projecting from the fuselage outline is appreciable —Fig. 3—and some form of fairing is necessary. The object of such a fairing or cowling should be to smooth out and control the airstream immediately in the wake of the cylinder, which can be done by the fairing form shown in the second illustration. Enclosing the cylinder in a hood-type cowling does not automatically guarantee a drag saving over the first condition, and may have a very much higher drag than the simple fairing, unless properly ducted. The common error is to cut only a very small entry slot in the hood cowling so that turbulence is virtually built up around this area. Without the hood, turbulence would start farther aft at the cylinder itself.

To be properly effective, a hood cowling must have correctly proportioned entry and exit openings. Also, the inside of the cowling should be smooth and properly shaped, so that the airstream is not forced to change direction, but flows smoothly past the cylinder and out through the exit slot. The normal turbulence behind the cylinder is then smoothed out.

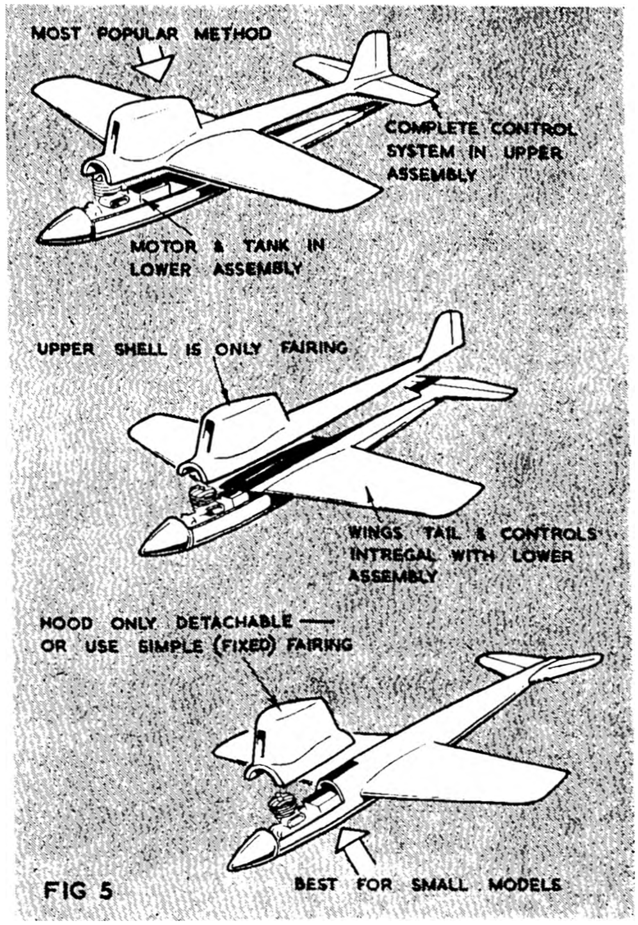


FIG 5

Cowlings are sometimes made asymmetric to impart a sidethrust on the nose of the model, to prevent the nose yawing, in, or out, as the case may be. Normally the designer avoids the problems of offset rigging, using straight thrust and fin settings as shown in Fig. 4. This is by far the *safest* method of rigging. However, for maximum performance, reducing line tension by rigging the model to fly in a " natural " circle is commonly adopted. The usual method is to offset the thrust line inwards. If overdone, and about 2 degrees sidethrust is the limit, the model will not maintain line tension, control will be lost and the model will roll inwards into the ground. Even if rigged to trim out with adequate control at top speed,

TABLE IV CONSTRUCTION DATA

Class	WINGS Type	WINGS Spars	WINGS Covering	FUSELAGE Type	FUSELAGE Upper Shell	FUSELAGE Lower Shell	Motor Mount	TAIL UNIT Material	TAIL UNIT Hinge	Undercart	Notes
I	Solid or Sparless	—	[illegible] sheet	Hollow Log	Balsa	Balsa	Hardwood	[illegible] Balsa or 3/64 ply	Tape	Drop-out	Integral Construction
II											
III	Sparless	—	[illegible] sheet	Hollow Log	Balsa	Balsa	Hardwood	[illegible] ply	Tape	Drop-out	
IV	Sparless Monospar or metal		[illegible] balsa								Two-shell Assembly
V		Birch		Hollow Log or Crutch	Pine	Pine	Hardwood or metal	5/64 or [illegible] ply	Wire & Tube	Drop-out or Dolly	
VI			·015 Alclad								

at lower speeds, *i.e.*, after take off and accelerating up to top speed, the model may still roll inwards. Striking the right compromise is difficult, and best left to the experts.

Straight rigging generally gives good results with comparative safety. No offset rudder should be needed, in fact, no vertical tail surfaces are really necessary at all. It is now common to dispense with the fin and give the tailplane a dihedral angle which, although the aerodynamic effects may be negligible, does keep this unit clear of the ground during landing and thus minimise the risk of damage.

To conclude this design analysis, a few brief words on undercarriage gear. A drop-off undercarriage of some form is essential for rise off ground flights. The drag of a fixed unit is much too high. Opinion appears to be equally divided between the merits of the three-or four wheeled dolly (the former more usual) and the two-or three wheel drop out unit. Both have their respective advantages and disadvantages.

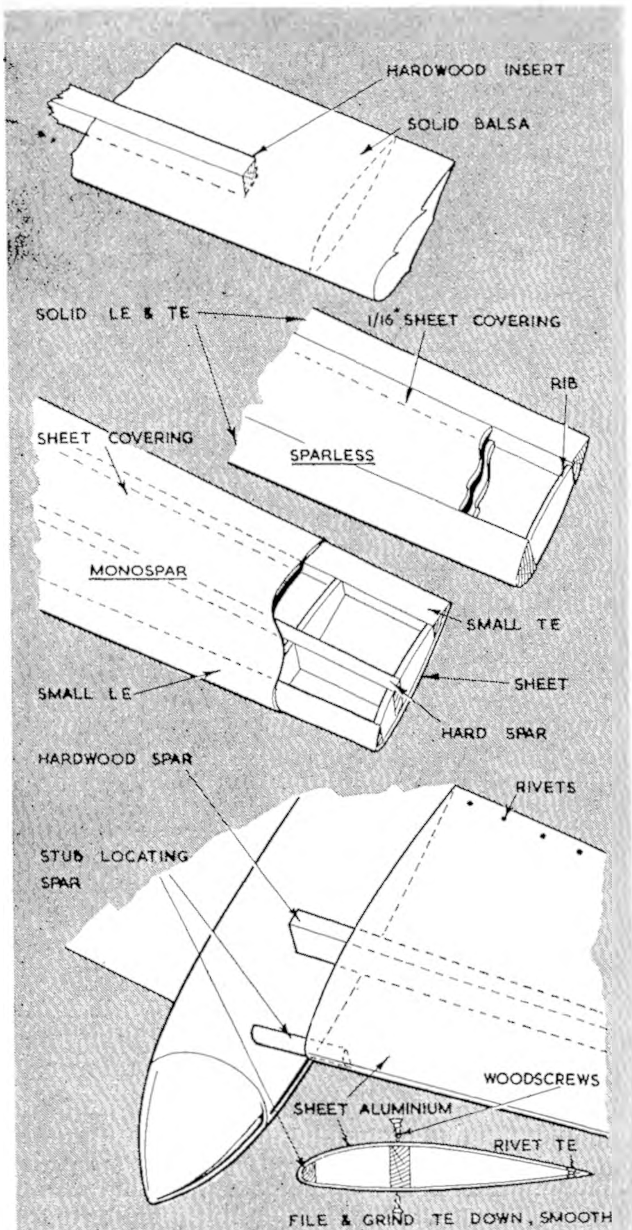


FIG 6

The drop-out type is probably simpler to operate. In any case, rise off ground flights will prove hazardous from all but quite smooth grounds and whatever unit is employed must be " tailor-made " to suit the particular model.

Structurally the fuselages of most speed models are carved from solid block ; balsa in the case of the smaller models, and turned from pine or similar hardwood and hollowed out in the larger sizes. Motor mounts are of hardwood or sometimes metal (dural). Sometimes the mounts are extended aft for the length of the fuselage to form a crutch carrying the upper and lower shells.

Fig. 5 shows the three main methods of construction of the complete model. The most popular method is to split the model into two major components, held together by suitable locating screws (*e.g.* cut down bicycle spokes). The upper shell then simply becomes a fairing, or, more usually, the motor unit is housed in the lower shell, and the wings, tail unit and control system complete in the upper component. Both these methods are particularly suited to the larger sizes of model.

The smaller models are generally built as one integral unit, with the hood portion detachable, or cut away, for access to the motor controls. The very small size of fuselage involved does not readily permit of splitting it into two halves.

Some of the best methods of wing construction are detailed in Fig. 6. Solid wings are popular in the smaller sizes, with or without a hardwood strengthening piece inset across the centre section. A similar, but lighter, form of construction is to use large solid leading and trailing edges and sheet ribs, then 1/16 sheet balsa covering top and bottom.

Built-up wings are generally employed on the larger models, these being almost invariably of the monospar type. The spar can be made of hardwood. Sheet covering is used throughout, a skin of at least 1/16 in. thickness being necessary, otherwise it will not be possible to sand down smooth without working the skin down unduly thin over the rib positions. Thin sheet will lead to buckling and a distorted section.

Metal construction has been applied to speed control line models with considerable success. Metal fuselages are beyond the scope of the average model builder, but metal wings are not so difficult. Metal wings and a wooden fuselage make an effective combination.

Basis of the wing structure is then a hardwood spar. ·015 sheet aluminium or alclad is then used for the metal wing skins, bent round and folded back over itself to form a conventional aerofoil section and then riveted along the trailing edge. The wing panels are then mounted on the hardwood spar and secured with countersunk wood screws—Fig. 6. Tips can be of balsa or hardwood plugged in place and sanded down to a suitable section. Locating stub spars will be necessary to make a stable wing-fuselage joint ; one at the leading edge, at least, and possibly another at, or near, the trailing edge.

Such wings compare very well, weight for weight, with built up wood wings and can be finished to a very smooth, durable, surface. They *are* more difficult to make, particularly in forming to the aerofoil section required. If damaged in a crash landing, they can usually be straightened out if the damage is only slight. Major damage calls for a replacement wing, which is infinitely easier to fit than trying to repair a broken built-up wing.

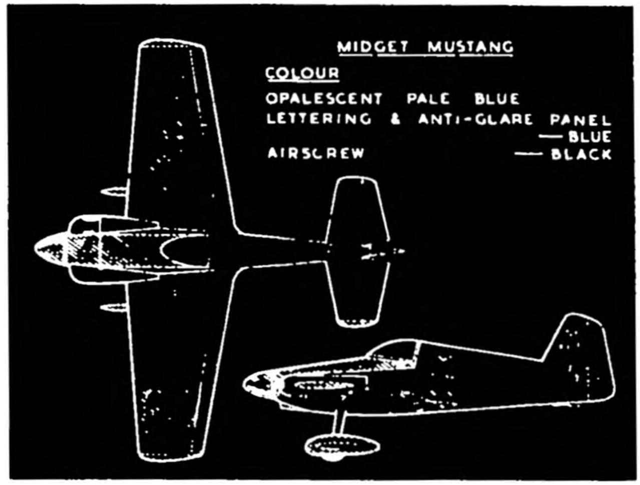
As a guide to structural proportions, the various methods best suited to different sizes of model are summarised in the CONSTRUCTIONAL DATA table. Aerodynamic layout is similarly summarised in a separate table.

IN OUR NEXT ISSUE!

Plans of N. G. Taylor's 132·4 m.p.h. British record holding class VII speed model " LAZYBONES III ".

3 RACERS

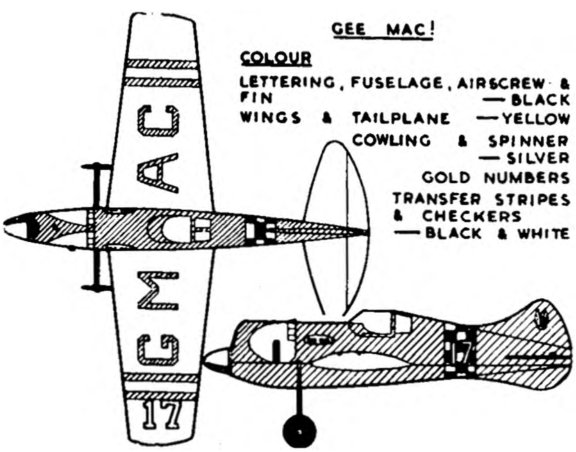
The growing interest in Team Racing has prompted the presentation of the three top placing racers at Brighton. This event was the first of its kind to be held in this country.



MIDGET MUSTANG

Built and Designed by : Phil Smith (Bournemouth).
Span : 24 ins. **Effective Wing Area :** 101 sq. ins.
Weight : 12 oz.
Airscrew : Self-carved, 9 ins. dia. × 6 ins. pitch. Hydulignum for best range.
Self-carved, 8 ins. dia. × 8 ins. pitch. Hydulignum for fastest flying.
Range : 34 laps per 1 oz. fuel at 63 m.p.h.
Refuelling Times per 10 miles : 5 (five). **Restarting Time :** 55 seconds.
Engine : Amco 3·5 c.c. **Fuel:** 40% diesel oil, 30% Solvolene oil, 30% Ether, 1½% added Amyl Nitrate.
Construction : Bulkhead and sheet covered fuselage, tissue covered built up wing. Solid tail unit. NO flaps ! ! !

NOTES :—This is a scale model of the Long Midget racer, with the exception of undercarriage and elevator which are slightly modified. Has symmetrical section and is also a sport/stunt model. Design is commercial.
Successes : First place at Brighton S.E. Area Championships.



GEE-MAC

Built and Designed by : Barry Evans (Guildford).
Span : 28 ins. **Effective Wing Area :** 127 sq. ins.
Weight : 24 ozs.
Airscrew : Truflex, 9 ins. dia. × 8 ins. pitch. Clipped to suit.
Range : 39 laps per 1 oz. fuel at 65 m.p.h. (Can be improved to 45 laps at 75 m.p.h. with different airscrew and fuel.)
Refuelling Times per 10 miles : 5 (five). **Restarting Time :** 60 seconds.
Engine : Frog 500. **Fuel :** Own Methanol based formula.
Construction : Hollow log lower fuselage. Planked removeable upper half. Metal cowl. Solid tail unit. 1/16 in. sheet covered wing. Hardwood spar.

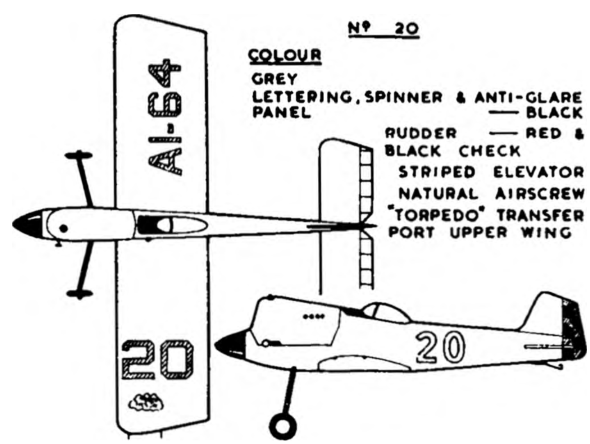
NOTES :—This model has an INSET fin to relieve line tension, and a wing-tip balance weight in the outboard tip.
Successes : Second place at Brighton S.E. Area Championships.

NUMBER TWENTY

Built and Designed by : Harry Witney (St. Albans).
Span : 26 ins. **Effective Wing Area :** 126 sq. ins.
Weight : 18 ozs.
Airscrew : Stant, 9 ins. dia. × 6 ins. pitch, rounded tips.
Range : Approximately 40 laps per 1 oz. fuel at 70 m.p.h.
Refuelling Times per 10 miles : 5 (five). **Restarting Time :** 50 seconds.
Engine : K. & B. Torpedo 29, 5 c.c., glowplug. **Fuel :** unspecified.
Construction : Monocoque stressed skin sheet wing. Block fuselage. Solid tail unit.

NOTES :—Extremely small air outlets on cowling. Small elevator. Model needed fuel-proofing. Had it not crashed, it would have offered strong competition to the other models in the Brighton finals.

Successes : Third place at S.E. Area Championships.



PRESENTING nine of the many ideas stored in your Scribe's gadget files, he must apologize for holding over the suggestions sent in earlier this year. These will be published as space permits in future issues.

Don't get discouraged, bods. Whatever you send in will be analysed for originality and you will be notified whether your idea is accepted for publication or not. Though sometimes it takes a while for us to get around to publication date you will eventually see your idea in print.

Ever have trouble in making a stunt tank for your control-line models ? Then look at No. 1 for here Mr. W. J. Mellors of Plumstead suggests a method of using fine copper gauze, such as can be bought at what used to be the 3d. and 6d. stores. Easily bent and soldered, the gauze can be worked (and cut with scissors) into the shape of the traditional wedge tank. It is easy to punch holes for the ventilator and feed tubes, which may or may not be soldered into position. If you avoid soldering, several coats of cement rubbed into the gauze will fill all the holes, and a covering of rag tissue, doped on, will render the tank leak proof. For glow plug fuels, soldering is recommended with the use of fuel proof finish instead of a cement and dope to seal the gauze.

From the same 3d. and 6d. stores comes another suggested tank by Mr. Higgins of Warrington. No. 2 is a version of the now popular " balloon " type stunt tank. When used with diesel fuels, the balloon is notorious for its short life. This problem is overcome by using an inflated plastic fish, found on the toy counter. Cut off the tail of the fish and push a length of tubing to the opposite end of the " balloon ", fold the open neck neatly round the plastic tubing and secure with a tightly wrapped elastic band.

When filling this tank make sure to squeeze all excess air from it by holding the pointed end with the end of the tubing uppermost, and squeezing lightly. By holding to the light, it is possible to see whether any air is left inside the " balloon ".

A few days after Mr. J. Bowker of Warwick submitted idea number 3, which is for a free flight limited tank, another identical tank was sent in from another part of the country. Some coincidence !

Mr. Bowker's idea is made from an empty " Esso " lighter fuel capsule of the large transparent type. Cut off the top portion and smear the interior with a coat of cement. Obtain a small piece of thick walled acetate tubing which is used for aerating aquariums. Taper off one end of the tubing with a pencil sharpener and cut a disc of 1/16 in. celluloid to fit tightly inside the " Esso " capsule. In the centre of this disc drill a hole of slightly smaller diameter than the outside dimension of the acetate tubing. Cut another disc with a central hole of a larger diameter than the acetate tubing. The top and the two smaller rings which are attached to the acetate need no explanation. Wind a coil spring from a short length of control-line wire. Assembly is in the following order. First, decide how much fuel you will want your motor to consume each flight, and arrange the disc with the smallest central hole in such a position as to limit this amount of fuel. Then, insert the other disc and cement the lower smaller ring to the acetate plunger. Attach the coil spring, slide over the top which is now cemented to the capsule and fix the top ring to the acetate plunger, making sure that when the plunger is pressed down, the limited fuel section (No. 1 chamber) is sealed off.

Fuel is fed from the tank to the engine by a hole in the teat at the base of the capsule. To fill, raise the central plunger and hold up with a small wedge of wood under the upper ring. Pour in through the central hole, until compartments one and two are filled.

Once the engine has been started and is ready for flying, the wedge can be removed, when the plunger drops and seals off No. 2 chamber from No. 1 chamber, which will be drained by the engine. Some trial and error may be involved in testing where exactly to put the lower disc, but nevertheless this idea is not as difficult to make as it may sound, and what is more important it really does work !

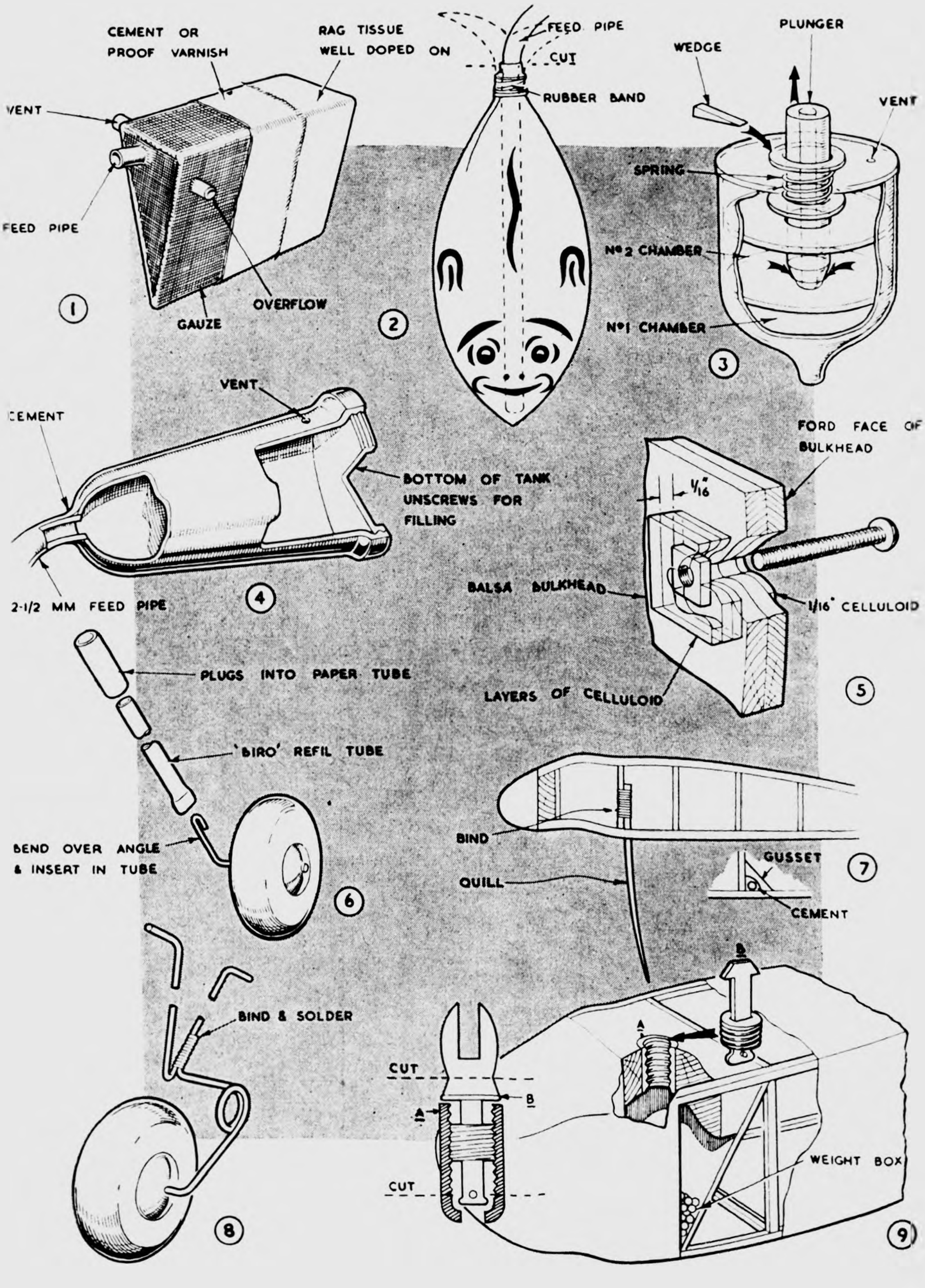
Yet another tank is illustrated in number 4, where Mr. J. Clark of the Glasgow Barnstormers submits another of the 3d. and 6d. stores items which is ideally suited as a tank for engines up to 3½ c.c. It is a common or kitchen salt cellar, with but one modification in the piece of tubing which must be cemented to adapt the pouring hole to a length of neoprene. By tipping the model to one side the original filling cap can be used for fuel filling.

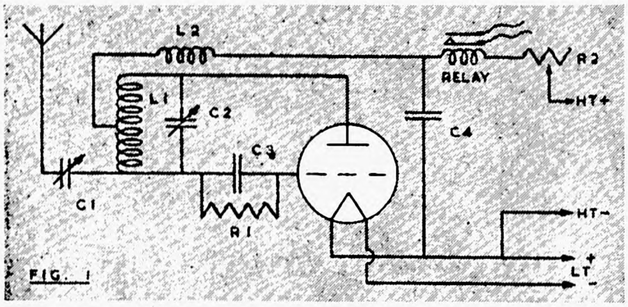
Idea Number 5 eliminates the use of plywood for engine bulkheads and provides a novel system of locking engine mounting nuts to the rear facing of the bulkhead. Mr. E. J. Moffatt has discovered that two layers of ¼ in. balsa, with opposite grain, are sufficient to hold in radial mounted engines. The front layer is faced with a piece of 1/16 in. celluloid around each bolt hole, and on the rear facing is cemented a sandwich of three squares of 1/16 in. celluloid. In the centre of these three squares the nut is locked in a recess. Thus, when a bolt is inserted through the front, after passing through the engine, it meets the nut on the rear face which is prevented from turning because it is locked in position by the cemented sandwich of celluloid.

From Arbroath, David Webster submits number 6, an idea which utilizes Biro refill tubes as a shock absorbing undercarriage leg, on lightweight rubber models. The material is easily cemented to the fuselage, and has a remarkable degree of flexibility. An alternative is submitted by Master David Platt of Ilford, who has been using quills (stripped of course) for the same purpose. As you see in number 7, the wheel is not used with a quill, since the pointed and curved end allows r.o.g. flights to be made, providing the model is a lightweight.

An excellent idea in shock absorption for undercarriage legs is illustrated in number 8, for rubber models. The idea is not limited to the smaller job, but can be used on larger powered models with 12g wire axles. On the smaller models Mr. S. Kemp of Streatham Hill suggests that the smaller gauge wire be coiled before being bent back and formed into the actual axle. With the power model, such a coil is not necessary ; the " V " is sufficient to allow 3/16 in. to ¼ in. shock to be taken in the axle before the load is transmitted through the leg to the fuselage. This idea has been used on ultra heavyweight power models in the U.S.A. though we have not yet witnessed it on the flying fields of England.

Lastly, in number 9, Mr. B. Tileney of High Wycombe has an idea for neat and effective weight box " plugs " in sailplanes and gliders. All that is needed is a spade terminal as used for aerial and earth wireless connections. Cut off the prongs and cut the plastic body to the required length. The plastic body is then glued into the top portion of the ballast box and through it, it is easy to pour lead shot or small bearings until the correct balance is found. The hole is then blocked by screwing in the remains of the spade terminal.


CEMENT OR PROOF VARNISH
RAG TISSUE WELL DOPED ON
VENT
FEED PIPE
OVERFLOW
GAUZE
1
FEED PIPE
CUT
RUBBER BAND
2
WEDGE
PLUNGER
VENT
SPRING
Nº 2 CHAMBER
Nº 1 CHAMBER
3
VENT
CEMENT
BOTTOM OF TANK UNSCREWS FOR FILLING
2-1/2 MM FEED PIPE
4
FORD FACE OF BULKHEAD
1/16"
BALSA BULKHEAD
1/16" CELLULOID
LAYERS OF CELLULOID
5
PLUGS INTO PAPER TUBE
'BIRO' REFIL TUBE
BEND OVER ANGLE & INSERT IN TUBE
6
BIND
QUILL
GUSSET
CEMENT
7
BIND & SOLDER
8
CUT
A
B
CUT
WEIGHT BOX
9



RADIO CONTROL NOTES

BY HOWARD BOYS

Receiver Working.

TAKE a simple circuit for radio control as shown in Fig. 1. The transmitted signal is collected by the aerial, and passes through C1 and C3 to the grid of the valve. The tuned circuit L1 C2 is tuned to the transmitter frequency to cause a big voltage to be built up at that frequency. C1 is adjusted to give the best coupling between the aerial and the receiver. The signal on the grid alters the flow of electrons to the anode, which alters the high tension current flowing. It is this alteration in anode current which is used to operate the relay, and so switch the actuating device.

In ordinary receiver working, when the receiver is switched on, electrons begin to flow, and the circuit is arranged so that energy is fed back from the anode to the grid. This causes the valve to produce a radio frequency current of its own, and it is then said to be oscillating. This oscillation reduces the flow of anode current. By a suitable choice of components, another oscillation at a much lower frequency is introduced, which prevents the first oscillation from building up to its full extent, and then it is said to be " quenched ", and the anode current is increased. Sometimes, as in the Cossor receiver, the quench is obtained from tuned coils. Receivers that operate in a state of oscillation are called " super-regenerative ", and when they do not have quench coils they are said to be " self quenched ". The anode current is fed through the relay, and the radio frequency choke L2 and half the coil L1 to the anode. L2 being an inductance that is not tuned chokes back radio frequency currents, but forms an easy path for the direct H.T. current. What radio frequency currents do get past the choke are shorted across the H.T. battery by the by-pass condenser C4. When a signal reaches the grid of the valve, down goes the flow of electrons, and bang goes the relay—if everything is adjusted correctly.

Some valves have been specially designed for this super-regenerative circuit for model control. The R.K. 61 in America, and now the Hivac XFG 1 here. These valves are " gas triodes " which means triode valves with a small quantity of a special gas inside, instead of the usual vacuum. These gas triodes give a much greater change in anode current than ordinary valves. For instance, in the receiver described in the *Aeromodeller* for Oct., 1949, the change is about ·4 m.a., but with the R.K. 61 it can be 1½ m.a., and in the Hivac XFG 1 it can be as much as 2½ m.a. The chief advantage of this is much better operation of the relay. These gas triodes are quite often referred to as " thyratrons " but they behave differently from ordinary thyratrons. With the XFG 1 and the R.K. 61 the anode current goes up and down according to the signal on the grid, but with a thyratron, after a voltage on the grid has sent the current up, the H.T. supply has to be broken to stop the current. It is the transmitter signal which sends the current down, or stops it in a radio control receiver.

A reader has had very promising results with a solenoid operated actuator working off 12 volts. It was so beautifully simple that he sent it along, with a request for information on making it work off 4½ volts, as the 12 volt battery was too heavy to carry in a model aeroplane. It is perfectly natural to think along these lines, but there is a snag. The pull of a solenoid or electro magnet depends on " watts " and not just volts. Electrical power is measured in watts, 746 watts being equal to one horse power. The number of watts is given by the volts multiplied by the amperes. Amperes, usually called amps for short, is the rate of flow, in the same way that the rate of flow of water in a river or pipe is measured in gallons per minute. Volts is the driving force pushing the amps along, in the same way that water is pushed along the pipe by pressure. The rate of flow through the solenoid was 2½ amps, so the power taken by the actuator was 12 times 2½ which equals 30 watts. If the solenoid was rebuilt to work off 4½ volts and give the same power it would still require 30 watts. 30 watts divided by 4½ volts equals 6 2/3 amps. Now consider the battery power necessary to keep this solenoid going, using say No. 8 batteries. The writer has carried out tests on No. 8 batteries and found that discharging at a rate of 1 amp the voltage drops to 1½ and the battery lasts about 10 minutes, or say one flight, and this is using it on and off for 20 seconds at a time. To supply the 12 volts and 2½ amps will require 8 batteries long by 2½ wide, that is 20 of them. To supply a similar solenoid for 4½ volts which requires 6 2/3 amps will mean 3 batteries long and 6 2/3 batteries wide which again comes to 20 altogether. Perhaps the 8 batteries long ought to be explained a bit more fully. A No. 8 battery gives 3 volts, but that is only when no current is flowing. With the battery in use, the voltage falls ; the more current flowing the lower the voltage falls till with 1 amp flowing the voltage is only 1½. Since the voltage of each battery is only 1½ it will take 8 in series to give 12 volts. As one string of 8 batteries can only supply 1 amp it will need 2½ strings of 8 to give 2½ amps. It is impossible to use a half battery in this way, but it does show the way it works. The same explanation can be applied to the 3 batteries long and 6 2/3 wide.

The reason this solenoid actuator needs so much battery power is because it wastes so much in leakage of the magnetism. Fig. 2 shows a diagram of this actuator, and shows how the plunger is pulled into the solenoid. When a current is passed through a coil of wire, it produces a magnetic force, the lines of this force going along the inside and round the outside. If a piece of iron is put into the solenoid, the magnetic force produced in the iron is about a thousand times greater than the force produced in air. The path taken by the lines of force is called the magnetic circuit, and any part of this circuit that is air, takes about a thousand times as much electricity as the same amount in iron, to produce the same magnetic force. The simplicity of the solenoid makes it very wasteful. With a little complication it can be improved a great deal. Fig. 3 shows the scheme, and it consists of putting iron round as much of the magnetic circuit as possible. The air gap left now is a little bit to give room for the plunger to slide, and the space inside that determines the stroke, or length of plunger movement. The smaller the total air gap, the greater the pull though the smaller the movement. This solenoid is a form of electro magnet, and another type is the tractive electro magnet, which is shown in Fig. 4. In this type, instead of having a moving core or plunger, the core is fixed, and an armature is pulled towards it. This type is only suitable for a

FIG. 2

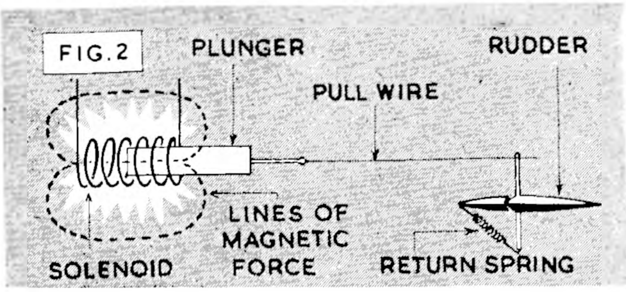
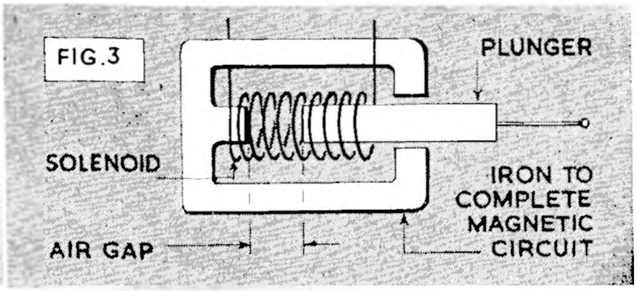


FIG. 3



small movement since the movement is only half the air gap, and the pull varies inversely as the gap squared, that is, if the gap is increased 2 times, the pull becomes ½ times ½, which is a quarter. If the gap is increased 4 times, the pull will be ¼ times ¼ which is 1/16 (one sixteenth). In Fig. 5 one end of the armature has been made to rest on the magnet core so that there is only one gap, so the movement at " a " will equal the gap, and by extending a lever to " b ", the movement at " b " will be twice the gap. Due to this lever the pull at " b " will be only half the pull at " a ". Suppose the movement at " a " is 1/8 of an inch and the pull one ounce, the movement at " b " will be ¼ inch and the pull half an ounnce. If now the gap is reduced to 1/16 inch the movement will be 1/16 inch but the pull will be 4 ounces (the pull varies inversely as the square of the gap). The movement at " b " will be 1/8 inch, and the pull 2 ounces. If the lever is now extended so that " b " is 4 inches from the hinge, the movement at " b " will be brought back to ¼ inch, and the pull now being ¼ that at " a " comes to 1 ounce. By halving the gap and increasing the leverage to get back the same movement, the pull has been doubled. It is possible to make an actuator of this type with the gap reduced to 25 or 30 thousandths of an inch. If a large movement is absolutely necessary, then the solenoid type of Fig. 3 is the one to choose.

The pull of an electro magnet also varies as the square of the ampere turns. The ampere turns is the current in amps multiplied by the number of turns of wire in the coil, and if either the current, or the number of turns is doubled, the pull will be increased four times. Now to push twice the number of amps through the coil will require twice the voltage, and twice the volts times twice the amps is four times the watts. The pull then is proportional to the number of watts. To double the number of turns is not usually practical, but for illustration imagine the magnet in Fig. 4 with one coil. This will give a certain pull, and the turns can then be doubled by adding another coil. This extra coil will naturally need as much electricity as the first, so to supply twice the turns will require twice the volts to maintain the same flow of current, or amps.

After volts, amps and watts, it only needs a little information on resistance to complete what is perhaps the most useful of all pieces of electrical knowledge. Resistance is the force opposing the flow of electricity, and there is a simple relation between volts, amps and ohms (which is what resistance is measured in). This relation is that volts divided by ohms equals amps. If volts is represented by the figure 6, ohms by 3 and amps by 2, volts, ohms, and amps can be changed round so that if two are known the other can be found as long as the figures work out right. Ohms times amps equals volts ($3 \times 2 = 6$), and so on.

It seems about time something was written about using ex-government equipment for radio control apparatus. Except for relays and 1S4, and 3S4 valves for receivers, other useful material will be confined mostly to transmitters, and test gear. Take valves first for instance. A type known by the number 3B7/1291 is available at a cost of 5s. 0d. and is similar in a number of respect to the 3A5 or DCC90, the only real electrical difference to bother about being that it will take more high tension without overloading. This will allow the building of a high power transmitter using 1½ or 3 volts low tension supply according to how it is connected up. Other valves will mostly need a 6 volt accumulator for the low tension supply, though the 6C4 at 7s. 6d. could be run from two cycle lamp batteries, and will handle more power than is allowed for model control. Other 6 volt valves are the EF50 or VR91, SP61 or VR65 either of which can be used in pairs to handle the 5 watts allowed. EF50s cost 3s. 6d. to 5s. 0d. each, and SP61s 1s. 6d. to 3s. 6d. each. There is also the 7193 at 2s. 6d., and the 6V6 at 7s. 6d. and 6J6 at 9s. 6d. all useful, for maximum allowable power. Since a 6 volt accumulator is required for these, it can also be used with a motor generator, or vibrator pack to supply the high tension for the transmitter. A vibrator pack suitable for 6 volts costs nearly 30s. 0d. but suitable motor generators are available much cheaper. One of these has a permanent magnet field, and is rated at 20 watts with 11 to 12 volts input, and 480 volts output, the price being 7s. 6d. to 10s. 0d. Using a

Brian Hewitt, 1949 Gold Trophy winner prepares his radio control model at Walsall during the Ripmax contest.

FIG. 4

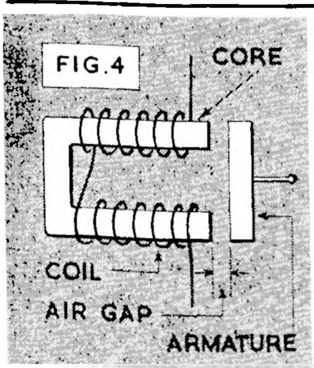
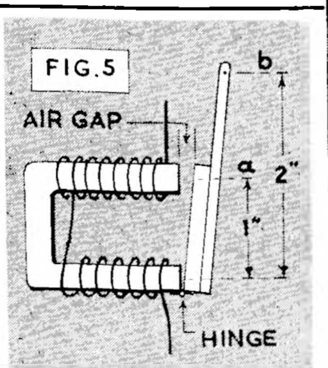


FIG. 5

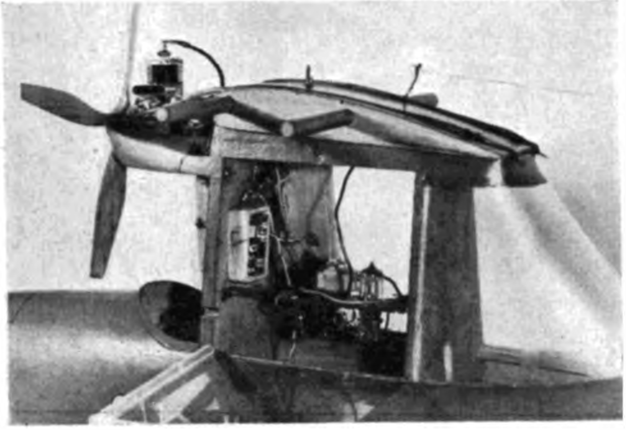


6 volt input, an output of 250 volts at 30 milliamps is obtainable which is more than necessary for a 5 watt transmitter. Another motor generator is available at about 5s. 0d. which has an output of 200 volts and 6 volts, with an input of 12 volts. If a 6 volt accumulator is connected to the 6 and 12 volt terminals the right way, an output of 30 milliamps at 120 volts can be obtained. Although not up to the maximum allowable, it is quite useful. Connected up the wrong way round, the output is much less. Accumulators rated at 6 volts are not readily available, but 2 volt are at 6s. 0d. to 8s. 6d. each, and some 12 volt can be split into two of 6 volts each.

Other useful items include aerials, meters, high tension batteries, and small things like fixed and variable condensers, and resistances. The best way to find these things is to visit government surplus stores and look round, and also obtain lists from various advertisers that cannot be visited. The addresses of these firms can be found in the more popular radio journals. " Practical Wireless ", " Wireless World ", " Short Wave Magazine ", etc.).

Now we have something really special in radio control models to illustrate this page, the happily named " Cat's Whisker " built by Squadron Leader E. D. Cable. " C.W." was originally intended to be powered with an Anderson Spitfire and have a span of nine feet, but traditional kitchen table building facilities weighed the scales in favour of a more modest 6 ft. 3 in. span and an Ohlsson 29. Nevertheless all up weight comes out at 6 lbs. 12 ozs., giving a wing loading of 20 ozs./sq. ft., which may horrify some readers. It is certainly amazing the way the little 5 c.c. copes, though some credit is due to the NACA 6412 wing section employed.

The main points of the layout will be readily apparent from the pictures. Inherent stability is afforded by the pylon mounted polyhedral wing and high thrust line. Super ground stability for take off and landing are given by the shallow undercart, only sufficient belly clearance being given to clear the daisies, which makes nosing over well nigh impossible. The extreme forward position of heavy H.T. and L.T. batteries prevents them from damaging radio and wiring should there be a prang. Large cabin with full size down-hinge access windows give adequate elbow room without weakening the main fuselage structure. Entire receiver, relay, escapement battery, wiring and " nosepiece " for rubber escapement motor can really be got at in a moment.



Other details that may interest R.C. fans—apart from the actual set which is an American Good Bros. receiver—are rudder linkage on Rudder Bug lines, with variable rudder travel, which is accomplished via a cellophane tape covered window ; integral fin—no rudder band fixing here is recommended ; and completely detachable undercart for ease of transport.

A letter from Mr. Dalton states that the capacity of his transmitter tuning condenser is 30 pf. and not 100 pf. as given in the article. This value of 100 pf. was estimated by the writer from his own tuning condensed which has since been measured at 40 pf. However, a 30 pf. or 40 pf. tuning condenser can be used quite safely but it may be necessary to add another condenser in parallel as stated in the article.

Here is a further extract from Mr. Dalton's letter. " Tuning up details as given under the final survey could be presented in a slightly more technical manner, and I suggest the following terminology might prove acceptable.

" In order to operate this equipment on the correct frequence range, advantage can be taken of the characteristics of the super-regenerative circuit of the receiver. That characteristic, which ensures a diminution of the hiss when the frequency is tuned, corresponds to the wave length of the aerial with which it is used. It remains, therefore, simply to replace the relay with a pair of earphones, and having a correct half-wave aerial resonant to 27 megacycles, will rotate the trimmer condenser until the diminution of hiss is obtained. Alternatively, the relay could be left in circuit, together with an 0–5 ma. meter in series, and the trimmer condenser rotated until the dip in the anode current is obtained.

" This method of tuning ensures that the correct frequency band is being operated and the transmitter can then quite simply be tuned to the same frequency as the receiver.

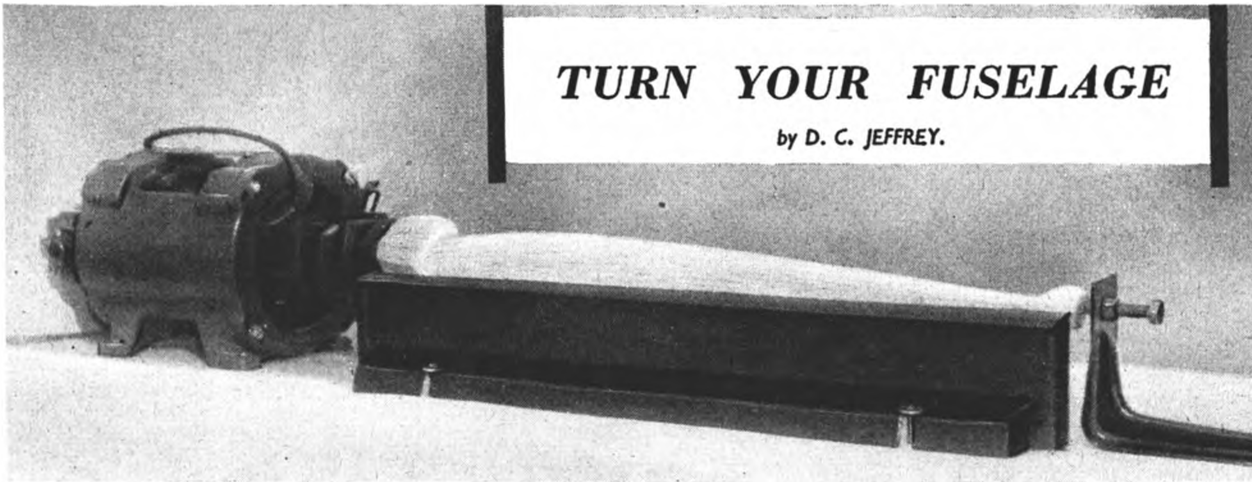
" This, of course, was the real reason why it was recommended that the transmitter be tuned to the receiver, and I do feel it is important that this very useful characteristic of super regenerative receivers should be known, and taken advantage of by the Radio Control Fraternity in the *Aeromodeller*."

The Editor has also asked me to point out a correction to H. J. Nicholls article on a XFG1 receiver in the May issue. On page 300, right hand column, 10th line from the bottom, is a sentence reading " you should therefore adjust the value of C2 so that together with your relay it gives this total value." " C2 " should, of course, read " R2."

Now a true story to finish with. A certain radio control man was met by a friend one day and asked if it was true that his boat had sunk. " Yes " he said, and related that having fitted this boat to test out the radio gear for his model aeroplane, he was having a bit of fun one day chasing a couple of ducks. These ducks dived, and in the excitement he gave down elevator, and had not seen the boat since ! !

TURN YOUR FUSELAGE

by D. C. JEFFREY.



EVERYBODY likes the slim, sleek lines of a circular section fuselage, but the average aeromodeller often fights shy of it because it is relatively difficult to make, although he knows it to be the most efficient fuselage, aerodynamically.

Now that ex-Govt. mains motors can be picked up cheaply, I found that a simple "lathe" capable of first-class work, could be quickly improvised for wood-turning at a fraction of the cost of a commercial lathe. My plan was to use the motor itself as the "headstock" so saving belts, separate bearings, etc. This results in a drive which is at once powerful, direct and uncomplicated. You do not require to have any skill in turning to operate this lathe, and it will be found so effective and delightful to use that I think you'll agree that its construction will be amply repaid.

The illustration shows the set-up. The motor used is an ex-R.A.F. 24 v./1,200 v. motor-generator made originally by Messrs. Hoover Ltd. to a first-class specification, and now obtainable for 25/– from Messrs. Clydesdale Supply Co. Ltd., Glasgow (no strings !). It can be connected to run as a series motor on a 230/250 v. single phase supply at a speed of approx. 3,000 r.p.m., which speed is about right for turning balsa. A 4-pole 1,450 r.p.m. squirrel cage motor is too low in speed for this work, but an ⅙ h.p. or ¼ h.p. 2-pole squirrel cage motor (split phase type, etc.) running at 2,850 r.p.m. would, of course, be excellent. In general, it should be remembered that the softer the materials to be turned, the higher the cutting speeds required.

A centre line should be drawn carefully on the bench, and the motor, headstock and the separate tailstock bolted or screwed accurately in position on this line. If this lining-up is not done correctly the drive connection to the part being turned will give trouble. I made my tailstock, or back centre, from an old shelf bracket, but it could also readily be made of hardwood using a large woodscrew as the centre. This centre must be made adjustable to compensate for centre wear on the wood being turned. It should have a smooth point of approximately 60° included angle and not less than ¼ in. outside diameter.

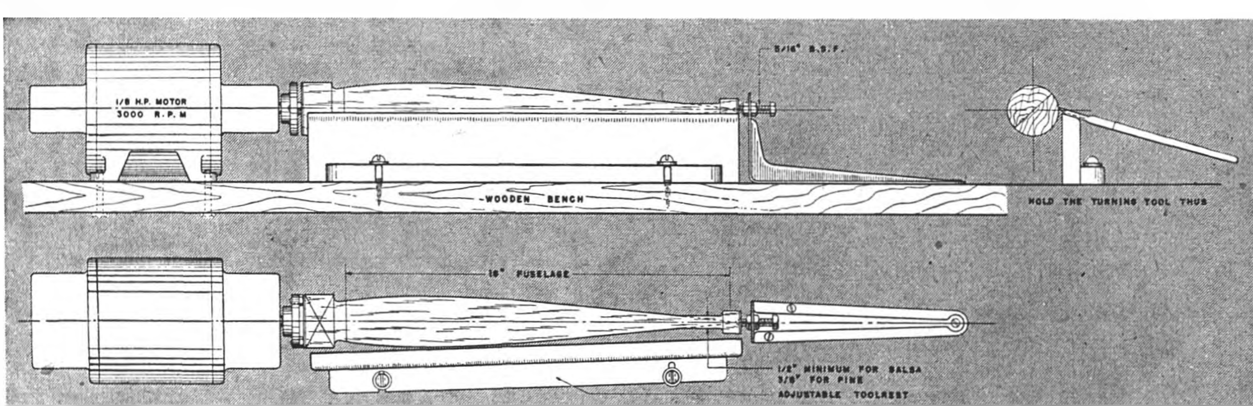
The drive from the motor shaft is through a small faceplate having two ¼ in. diameter pegs screwed into it at 1¾ in. centres. These pegs are sunk into the endwood at the correct position to make the job turn truly, and no conventional "live" centre is used as it is unnecessary for this work.

I find, however, that balsa is so soft that the back centre and the two driving holes must be reinforced by cementing on suitable pieces of 1/16 in. ply, otherwise excessive wear takes place. This would be unnecessary when turning a hardwood fuselage.

The tool rest can be of hardwood or metal and should be exactly centre height. It should be the full length of the work and adjustable, in and out, to bring the support as close to the work as possible.

My turning tool is simply a lino-carving gouge as used for hollowing out balsa. It cost only 3d. and fits an ordinary penholder. I keep the gouge very sharp with a hone and it cuts beautifully. A template of the profile required is made and it is surprising how quickly and accurately this can be reproduced. Sandpapering and several coats of banana oil should be applied while the job is in the lathe. A coat of grey primer, if required, can also be given and smoothed-up quickly and accurately while the fuselage is still between the centres.

Yes, definitely, turn your fuselage !



WORLD NEWS

BY ARIEL

TO commence our news from foreign parts this month we have two items concerning the Wakefield Contest in Finland, and the A.2 Glider Contest in Sweden.

The Wakefield Contest is to be held at the Finnish Aeronautical Association Soaring School at Jamijarvi, in Western Finland. Competitors will be arriving either by sea or air at Helsinki, Turku or Pori on July 20th, and transport has been arranged for them to the Contest site.

The Swedish A.2 Contest will be based at Gothenburg and not at Eslov as previously announced. The actual Competition is to be held at Trollhattan, a town situated approximately 80 km. north of Gothenburg. Competitors will be arriving at Gothenburg on Friday, July 28th, and the local offices of the Swedish Aero Club will be open from 8 a.m. in the morning until 12 p.m. at night, to receive them. The actual contest will take place on Sunday, July 30th, and each National Aero Club is allowed to enter a team of four competitors, who must hold F.A.I. licences. Competitors will be billeted in the " Skatas " camp in Gothenburg, where they will be housed and fed at very low cost.

Of interest in the rules is that which concerns "no flights," of which one only is allowed in each round. However, a " no flight " consists of a maximum of 20 seconds which is considerably longer than we have been used to in this country. Also of interest is the fact that all competitors must complete a model declaration form on which they must enter the full specifications of their model together with a three-view drawing with all dimensions given in centimetres. No doubt there will be some headaches among the British team in this respect !

Notes on U.S.S.R. Nationals, at Silikatnaja, in August, 1949. (Our correspondent's name is withheld by request. He was an eye-witness at the meeting).

(1) During the Contest each flyaway was retrieved by a full-size aircraft.

(2) Four Classes : (1) Gliders.
(2) Waterplanes : (a) rubber-driven ; (b) petrol.
(3) Petrol-driven R.O.G. (4) Rubber R.O.G.

(3) Some well-built models, but standard generally low.

(4) Babaiane's petrol-driven model was very heavy, the engine ran erratically and only became airborne at the sixth attempt. The motor run was for 10 minutes, the whole flight lasted 17 minutes 36 seconds and another world record was created. There was no limit to the motor run for power models. Average r.p.m. of engines was 3,500 to 4,500.

(5) On the 9th and 10th of August a power contest was flown, with a 20-second motor run limit. The Winner's ratio was 55, second 12.

(6) Rubber models unimpressive as quality of rubber very

Top left : Shows an aid to long duration. PO-2 biplane circles the field, in radio contact with the Contest Marshal. Below, a glider goes up on the line. One down : Oleg Gaevsky, Speed Control Line International Record Holder (Class III) with 116 km.p.h. (72.5 m.p.h.) makes adjustment, while Petukoff, who built the engine, looks on.

Two down : Georges Lioubouchkine, Free Flight Power duration International Record holder, who achieved a flight of 3 hrs. 48 mins. and a height of 4125 metres (13,406 ft.), thus capturing the Height Record at the same time. Bottom : Sokolov Y. Konstantinovitch won a 5000 rouble prize with this flying scale model.

poor. Motors of 3/8 in. × 3/8 in. total cross-section and 40 in. long could take only 320 turns safely (counted). Some aeromodellers used 2–4 skeins with gears. 90 per cent. of models followed practice of winding hook on prop. shaft. Flying height was between 50 ft. and 85 ft., average duration 1–1½ mins. and motor runs about 35 secs. Nasonov's 40-in. rubber model, of 10 ozs., made a flight of 1 hr. 16 mins.

(7) The power waterplanes were all very old-fashioned designs ; with no limit to the motor run one of them made an International Record of 1 hour 47 minutes.

(8) The sailplanes were of 6 ft. 6 ins. to 11 ft. 4½ ins. span and put up good performances. Chord depth 10% to 12%.

(9) The free flight power speed model of Martynov and Gorin was very interesting. Beautifully built and a precision performer, it was powered with a 3 c.c. diesel and incorporated a special trim tab in the tailplane. Best speed was under 31 m.p.h. Russians have not yet succeeded in the 100 metres Speed Class.

(10) The control-line models were of very simple design and none flew more than 10 laps. Speeds never exceeded 62 m.p.h., except for an International Record of 72·5 m.p.h., (not under F.A.I. rules, of course.) One jet model was present, but it did not function.

(11) Vassilchenko flew his radio control model—rudder control and two-speed engine—best flight being 2½ minutes, which ended in a crash.

Throughout the Contests a full-size plane circled the starting point. In the event of a flyaway the pilot was signalled by a Commissar and given the model's direction, whereupon it was followed. Another aircraft took off immediately to take up starting point duty. In all, nine aircraft were used in this Contest to chase flyaways.

Ages of competitors : 2 of 10 years, 57 of 10–15 years, 159 of 15–20 years, 69 of 20–25 years, 30 over 25 years. A total of 317.

Types of Models :

Gliders—123	Power—20 (scale)
Rubber—80 (Folding prop.)	,, — 2 (speed)
,, —81 (fixed prop.)	,, — 1 (canard)
,, — 3 (tailless)	,, — 2 (pusher)
,, — 1 (canard)	,, — 3 (flying wing)
,, — 1 (speed models)	,, —66 (waterplanes)
,, —78 (waterplanes)	,, — 5 (helicopter)

There were three R.C. models and three of the power models had diesel engines.

Pakistan. A full report of the All-Pakistan Aeromodellers Second Annual Rally was sent in by Mr. Rusi B. Mobed, Secretary of the Aeromodellers' Society, Karachi, who supervised the three months' preparatory organisation.

The Mauripur Modelling Club, Air Scouts of Karachi and Model Engineers' Club of the Royal Pakistan Air Force who participated, were circularised three months ahead ; the local papers also co-operated, before and after the event.

There were over forty entries, including power semi-scale and contest, rubber jobs, gliders and control line models.

Clifton Ground, at which the Rally was held, was filled with spectators by 9.0 on the morning of the 5th February and preparations for the first contest, the Concours d'Elegance, got under way, while two judges were appointed. Mr. Kemp, U.K. Trade Commissioner in Pakistan and Wing Commander Aziz of the Royal Pakistan Air Force were chosen and, apparently, their final choice of the winner was only made after considerable deliberation.

Mr. Mobed's " Black Magic " gained him first prize, while or Mr. Lindsley, of Pakistan Aviation Ltd., his own design was second. After a first flight of 87 seconds, " Black Magic " was unfortunate in landing on one wing tip at the end of the second flight, which put it out of action for the day.

The semi-scale power was won by Flt./Sgt. Hurdis G. Farley, member of the Mauripur Club and Instructor to the Karachi Air Scouts, flying an enlarged version of the Frog 45, with an average time of 20 minutes. By this, he won the Aeromodellers' Society Challenge Cup presented by Minocher Cowasji, Esq., which he holds for one year.

Flt./Sgt. Farley also won the Society's Challenge Shield, presented by Khan Saheb Jahengir J. Mobed, with his Slicker 50 taking first place in the power contest. This Shield he also holds for one year. The time put up was 28·5 minutes.

The Mauripur Club had yet another success when Colin E. Lenox won a pair of 4½-inch Caton Airwheels for the best C.L. flight of the day, while Flt./Sgt. Farley completed his hat trick by winning the open glider contest.

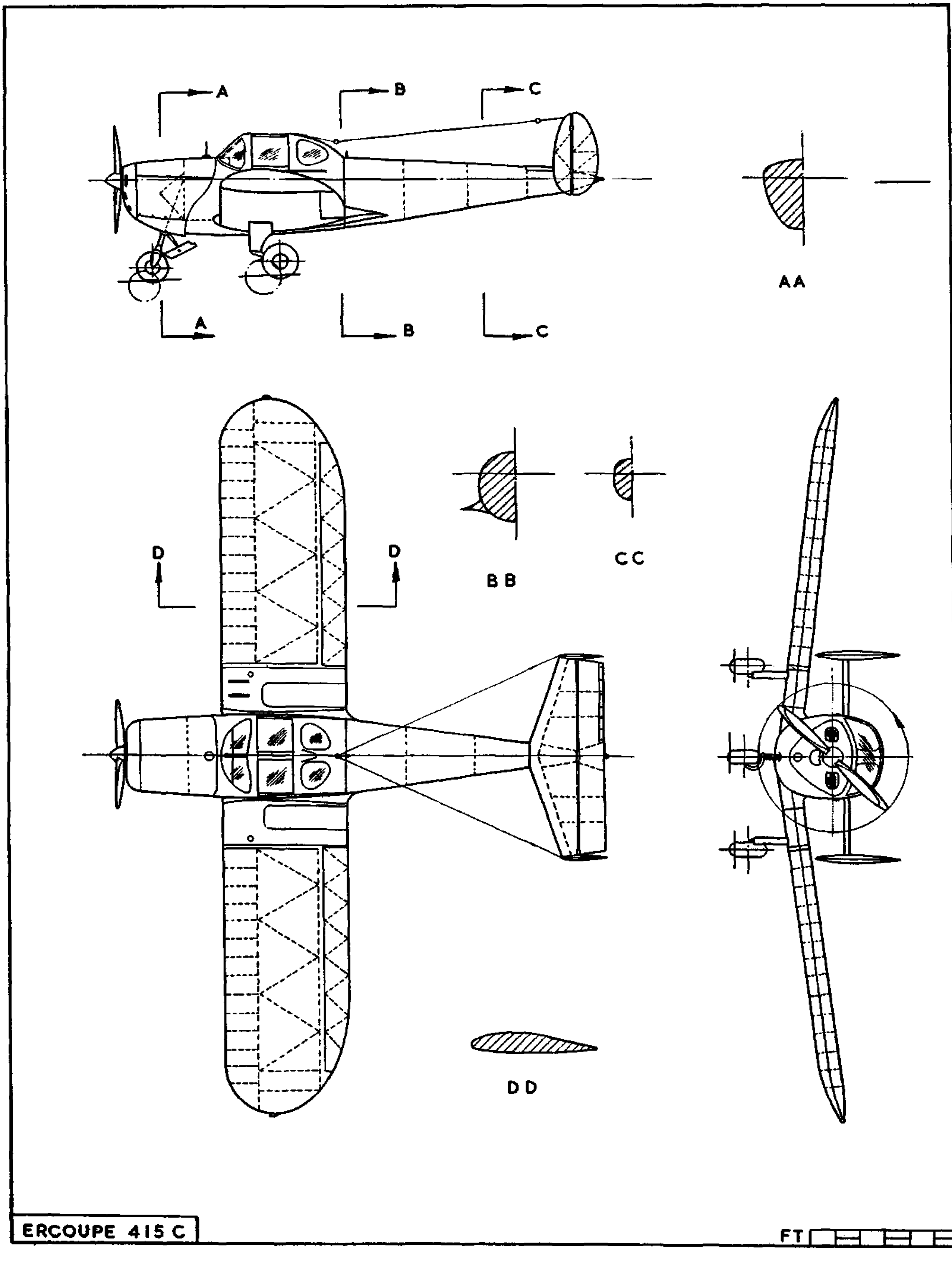
In the Junior Classes, the Patel family of the Aeromodellers' Society, Karachi, took the honours. The power contest was won by Rohinton M. Patel with a Frog combination of Strato " D " and 180. Average time was 21 minutes. Sam M. Patel clocked 4 minutes 45 seconds with a Frog " Venus " to take first prize in the rubber duration.

Amongst the distinguished guests present were Air Vice Marshal R. L. R. Atcherly, O.C. in C. Royal Pakistan Air Force, who presented the prizes, high ranking officials of B.O.A.C. and the Civil Aviation Department and others.

A cordon of Scouts was used to keep the spectators at a distance from the models, the local canteen contractor supplied food and drink, a 1937 Austin was on hand for retrieving models (tho' it required pushing to start) and a sound system was used to announce events and keep the guests entertained.

Some members of the Karachi Aeromodellers' Society "snapped" at the Rally. Mr. Secretary Mobed, wearing sun-glasses is holding his Controliner Flicker. Power modellers will recognise the other models without queueing. Flight Sergeant Hurdis Farley of the Mauripur Club won the Society's Silver Challenge Cup and Shield. He is seen, right, with his trophies and one of his winning models, a Slicker 50.

The smaller cup is, doubtless, the Open Glider award.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ERCOUPE 415 C
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AIRCRAFT DESCRIBED
No. 33 BY
C. RUPERT MOORE A.R.C.A.

THE ERCO 415c

ERCOUPE

THE Ercoupe is the product of the Engineering and Research Corporation of the U.S.A. It is a two-seater, dual controlled, private owner type of all metal construction and with a tricycle undercarriage.

This aircraft is the culmination of a series designed by Frederick Weick. During his period with the " National Advisory Committee for Aeronautics ", he experimented with spin-proof aeroplanes. On joining the Engineering and Research Corporation he designed the smaller prototype from which the second prototype, the 415, was evolved. Both these aircraft had 55 h.p. Erco engines which were also prototypes themselves. This experimental engine was replaced by a 75 h.p. Continental C.75 air cooled, 4-cylinder horizontally opposed engine, when it became known as the 415c.

The most unusual feature of this aircraft is its controls. There is no 'joystick' but a horizontal control column projecting from the dash board. This is capable of sliding horizontally fore and aft and is connected to the elevators. The " spectacle " wheel at the end of the column controls both rudders and ailerons with the same movement, these two controls are interconnected, making a rudder bar unnecessary. The object of this is to prevent spinning.

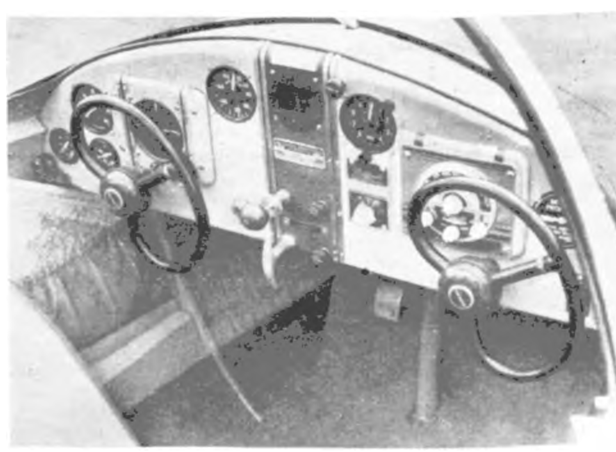
This aeroplane, with its generous dihedral, cannot be either spun or rolled. In spite of the unconventional controls the few experienced pilots I have spoken to, who have flown this type, speak highly of it.

Construction : The fuselage is an all metal, stress-skin monocoque structure. The centre section which supports the main wheels and has the fuel tanks as the leading edge, is metal covered. The outer wing panels have a single main spar of metal, in front of which are stamped sheet riblets and the stamped sheet ribs themselves are triangulated. The L.E. and ailerons are metal covered. The tail unit, including control surfaces, is metal covered.

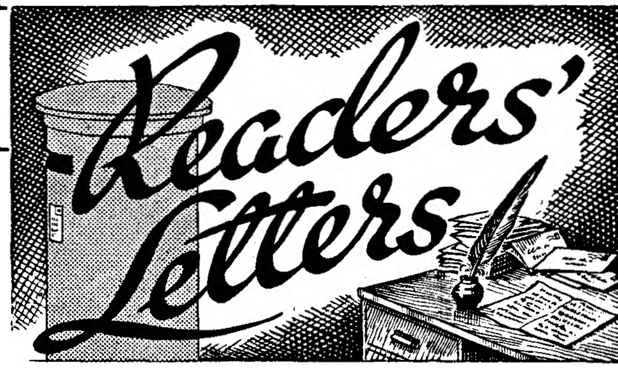
The undercarriage deserves some mention. All wheels have a very large travel up and down, the front wheel being 9 in. below the grounded position in flight. This leg has a very neat fairing which is fixed to the anti-shimmy link. The fairing projects aft when on the ground but as the wheel drops and the link opens, the fairing lines itself up behind the leg. This wheel is also interconnected with the rudders and ailerons and steers. The cockpit canopy is very neat, being in two halves, each half of which slides down into the fuselage side. No flaps are fitted.

Colour : Very few Ercoupes have been seen in this country, and there is no reliable source of information of American registration, at short notice. The Belgian registered OO–WAG, shown on the cover, is natural metal with indigo letters. G–AKFC was also metal with black letters.

Specifications : Length : 20 ft. 9 in. Span : 30 ft. 0 in. Height : 5 ft. 11 in. Wing area : 142 sq. ft. (gross). Loaded weight : 1,260 lbs. Tare weight : 750 lbs. Max. speed : 127 at sea level. Cruising speed : 110 m.p.h. at 1,000 feet. Stalling speed : 48 m.p.h. Range : 500 miles. Ceiling : 14,000 ft.



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 SIRS,

I have built the 24 ft. span Queens Cup machine featured in your excellent May issue (see Page 279) but please can you tell me if my wife and I will be able to fly in F.A.I. Contests as I seem to remember something about eleven feet. The larger size of machine is evidently due to your newly announced policy of giving even greater value for slightly increased cost.

We find it very comfortable in the pylon except when the rubber bunches, but are fitting special roller-bearing cushions and expect to get right to the seat of the trouble shortly. On the first flight the machine stalled but now we just move further forwards when the prop. folds, although I got a fractured kneecap when it didn't miss me.

Taplin Trophy enthusiasts may be interested to know that this machine has been used to test my revolutionary new model finish. This is a high-gloss dope which completely eliminates drag. For duration models this is rather unfortunate since :

$$Tv = To/\sqrt{1-\frac{V^2}{C^2}}$$

and therefore the faster models fly the less time they stay up. This can be carried to extremes with the new dope as my second model came back as three and a half balsa-tree seeds.

Looking forward to more of these interesting little models.

" The Winders," *Yours truly,*
Longstretch, Bunching. M. I. SPRINT.

Anything can happen when the printer drops one little ^{1} *!—Ed.*

DEAR SIR,

I don't know if this letter will be published but I hope so. I do feel I should like to say how much I agree with Ron Warring in his answer to John Barker's article Debunking Offset Towhooks. I am not one to rely too much on theory, but what I have to say is written purely from experience I have gained through two years' extensive experiment on offset towhooks. So far as I can see, the need for a straight tow is most desirable near the ground, when the model gets to about three-quarters of the way up you usually slow right down on towing, therefore the pull of line is still counteracting the turn until the model reaches the top of its tow when of course it flies off the line and glides round into its correct turn. Personally I feel that the best way of towing a glider is with two hooks, one either side of the fuselage, thereby giving a perfect tow, also a fair amount of turn can be given without having a bad effect on the tow. I should like to know what Ron Warring thinks of this idea.

Dormansland, Surrey. L. FUZZARD.

DEAR SIR,

Might I venture to suggest that designers of control line speed models are (besides being in a very deep rut) barking up the wrong tree, inasmuch as power, in itself, does not necessarily mean speed. Compare the speeds of the Brabazon with 20,000 h.p. and the Spitfire with 2,000, while the S.M.A.E. Class II record is above that in Class IIIa.

So stop chasing the will-o-the-wisp of power, and pay a little attention to design. The essence of streamlining is to offer as little resistance to the airflow as possible. Now the current pseudo-American models fulfil this requirement, but *only* on the assumption that the airflow is parallel to the datum line. This is obviously untrue, since the propeller imparts a helical motion to the slipstream. It is easy to show that the actual angle of attack of the centre part of the wing is anything up to 65°, which means an enormous amount of drag. Likewise for the tail and cowling you might as well stick a parachute on the tail and have done with it !

Now, since the exact calculation of the slipstream over the model is well-nigh impossible, the obvious thing to do is to adopt a *pusher* lay-out ; thus ensuring that the airflow over the model is more or less undisturbed. So either mount the engine in front and drive the propeller by an extension shaft, or reverse the usual layout and design a canard.

Bournemouth. J. H. WAVISH.

DEAR SIR,

I am not an expert control-liner, but I am learning. Already I have learnt one salient point ; a powerful engine combined with an established set-up and low weight will do anything. Anything, that is, within the experience of the flyer. Already there are experts who can do everything possible, so that the best I can hope for, under the existing ruling, is to equal their performance after much practice.

This is not very encouraging. A hobby or sport must automatically lose its interest once the optimum performance has been attained, and this optimum *has* been attained. Where then the interest ? As sport flying the interest is still there, in that I shall always enjoy a spot of stunting, but there is none of the keen and concentrated effort required in, say, the design, construction, and flying of a successful Wakefield model, where an optimum performance is unrealisable.

What I would like to suggest is a tightening-up of the ruling for stunt control-line competitions. In fact I believe that, if the rules were so framed as to make it almost impossible to obtain maximum stunt points, the interest in control-line stunt models would be boosted tremendously. Now is the time to introduce new rules, when the optimum performance has been reached, and before the nation-wide interest flags.

The restrictions I have in mind are something like this :—

1. Minimum weight of 8 ozs. per c.c. of engine, and minimum wing loading of 12 ozs. per 100 sq. ins.
2. Minimum moment arm of 1·5 average wing chords from T.E. of wing to L.E. of tailplane at junction with fuselage.
3. Maximum line length of 70 ft.
4. Extra possible 50 points on concours basis, judged *after* the competition.
5. Extra possible 100 points for a scale model, with a loss of 20 points for every variation of 10 per cent. on scale areas or scale linear measurements. And *please* a loss of up to 75 points for a cylinder-pot projecting from the cowl. These points to be allocated *before* the competition and are in addition to those points in 4.

These rules, or similar, perhaps stricter ones, would ensure that any modeller intent on entering stunt competitions would have to give considerable thought to design, as well as being an experienced flyer. He would have to be *good*.

I should be interested to hear other readers' views on this, as I am sure that there are others who, like myself, prefer some definite design problem they can get their teeth into.

As things stand, the production of a control-line model is too simple ; it's all in the flying.

Newcastle-on-Tyne. W. ROGER ORMEROD.

While there is little reason for Mr. Ormerod's rules 2 and 3, his other suggestions might well be considered. However, control-line contest organizers know fully that Stunt events take a lot of supervision, and the added complication of specification rules might not be welcomed on the field.—Ed.

CLUB NEWS

BY CLUBMAN

WELL chaps, after last month's absence of reports, there is naturally summat of a pile up, so we are getting right into them without delay this month, and I await your comments on last month's controversial items for discussion next time.

I presume those of you interested have already made a note of the **IRISH NATIONALS** dates, but to refresh your memories, and to bring into line those who have not known this before, the contests this year will be spread over two days, with control-line on Saturday, 8th July, and the standard Wakefield and F.F. Power events on the Sunday. Venue will probably be the usual Baldonnel Airport.

Quite a number of Areas have come forward with news this month—Spring is definitely in the air again! **EAST ANGLIA** report very average conditions at Willingale for the April meeting, the air being quite dead except for a short period mid-day. However, the standard of flying has greatly improved, and some good times were put up. P. Hewitt of Halstead made the best showing in the Wakefield class with a total of 670 seconds, while P. Wyatt of Ipswich flew best with power models to aggregate 570 seconds. J. Gorham, who flew a " Rudder Bug " in the Ripmax event completed two legs of the course, and then had the actuator battery fail on him. (Incidentally, watch this chap Gorham for this year's championships. He is placed high in nearly all the national contests held to date.

The **NORTH WESTERN** chaps flew at Hawarden (Chester) and had a good time if one can go from the Area news-sheet. It would appear that some clubs still cannot get used to the fact that national contests are a serious affair, and apparently want to do just as and when *they* like, and to hell with the organisers and the rest of the entry. Time they were brought to book, and I'm pleased to read the N.W. comp. sec.'s statement that they will be taken care of. W. Houghton of Rhyll made best showing in the Gutteridge with a total of 589·3 secs, with E. Lord of Accrington, top man in the Halfax.

The **MIDLAND AREA** is very chuff with itself at present, having made a good start to the season with wins in both the Gutteridge and Pilcher Cup events, also having nine British Records to its credit. Entries for the April 16th contests were very good, actually more than the large London Area. 64 entries were made in the Gutteridge against London's 98, but the situation was reversed in the Halfax with 98 Midland and 55 London. Reg Parham made two maximum flights and a third of 3 : 44·5 to win the Gutteridge Trophy, Chesterton coming second and Revell third. Roy Monks did well to total 260 seconds, when winning the Pilcher Cup in very dirty weather, putting up the best Midland times in the Halfax.

LONDON AREA members are asked to provide accommodation for provincial finalists in the Wakefield and A/2 glider trials, due to take place at Fairlop on the 11th June, and this move will be well appreciated by those chaps who have to travel some distance to take their chance at making one or other of the Teams. Some good times were put up in the April contests, Bob Copland placing highest in the Gutteridge with 769·8 seconds (3rd in the final listing) and Norman Marcus of Croydon top in the Halfax, and finally winning the event with a total of 636·9 seconds. In contrast to nearly all other areas, the radio-control event was well supported with 22 entries, no less than two scoring a near maximum. In the final listing, three chaps tie in the Ripmax contest with 300 points apiece, and a fly-off is indicated at some future date. This should be worth going a long way to witness.

Last year's Wakefield Team man, F. Holland, could only manage second place at this year's **SOUTH WALES AREA** event, so will be all out to improve his position on May 14th. This area is holding its events at Fairwood Aerodrome this year, the chief being the annual Welsh Rally on August 13th.

A junior, P. Sullivan of Luton, showed the big boys the way home in the **SOUTH MIDLAND AREA** Gutteridge event, totalling 678·5. Eric Smith, last year's best man in the British Team, had a most unusual run of bad luck, losing his No. 1 Wakefield through d.t. failure, busting his No. 2, and then his recovered No. 1 on a test flight ! ! I always did say, make your test flight official, they're always the best !

R. F. L. Gosling with the AEROMODELLER Trophy which he won at the Northern Models Exhibition, this year.

Though fine weather prevailed, there was a fairly stiff breeze for the **SOUTH WESTERN AREA** contests in April, and several promising models were cracked up. But what a poor entry for an Area—five for the Gutteridge, and six for the Halfax ! Longest flight of the day went to J. Higgins with a time of 6 : 47 when winning the scratch Glider event.

In excellent flying weather, club members from all over the **WESTERN AREA** gathered at Yeovilton in April, where G. Woolls (Bristol and West) put up a score of 830·2 in the Gutteridge to take him into second place in the combined listing. Another Bristolian H. Middleton topped the times in the Area Halfax returns with 422·8, but the best flight of the day could undoubtedly have been set up by F. R. Lee of Bath whose 10-gallon Stetson threatened to become airborne (with wearer) at any moment !

Some very good, yet entirely ignored, mathematics are given in the **NORTHERN AREA** news-sheet for May. To quote : "*energy.*" You know what this is ? It is what makes a modeller run a mile to retrieve his model. Strangely enough said modeller does not seem to have enough energy to stand with a stop-watch in his hand while some other mug runs a mile ! It is only common-sense to realise that for every contest you enter there are 6 timekeepers required (or three times the same two if you want to argue), apart from the recording work. If every modeller entered, then for all to pull their weight every modeller should time six other flights.

" Now we know that everyone does not enter, and we know that there are many energetic and valuable members of our movement who, whether they fly in contests or not, are prepared—without any compensation whatever—to time 60 flights if they can. Let's *all* pitch in this year and show appreciation of their efforts by taking some of the work off them. There is a very real danger that those who sit back and wait for contest to be run for them may suddenly find that there are no contests ! " There's something worth thinking about there, for I know of a number of volunteers who are getting more and more cheesed off with the grousing ' sit-back-and-let-the-other-mug-do-it ' types, who want to do all the flying and none of the work.

The annual **SURBITON & D.M.F.C.** Glider Gala was held on Epsom Downs on March 26th in sunny but rather windy weather, which did not deter a big entry from all the glider fans. First place went to A. G. Russell of Kentish Nomads with a time of 751·6 seconds, second D. Yeabsley (Croydon), 600 seconds, and third Cripps (Apsley) with 599·4 seconds. Best junior was Hilton of North Downs who did very well to aggregate 503 seconds. Park M.A.L. won the team prize for the second year running, returning home plus cup and minus several inches of footwear.

The Alton, Basingstoke and R.A.F. Odiham clubs got together and staged the **NORTH HAMPSHIRE RALLY** at

Lasham aerodrome on April 30th, with the following : results

Open Power	R. A. Ward	(Croydon)	9 : 28
	J. C. Crowson	(Newbury)	4 : 40.6
	B. J. Lanham	(West Essex)	4 : 29.4
Open Rubber	A. G. Rodaway	(West Middx.)	9 : 37.1
	F. G. Davies	(Berkhampsted)	9 : 31.2
	P. Allaker	(Surbiton)	9 : 23.6
Open Glider	D. Yeabsley	(Croydon)	10 : 33.8
	G. Fuller	(St. Albans)	9 : 01
	B. Chambers	(Croydon)	8 : 29.5
Radio-Control	G. Honnest-Redlich	(Bushy Park)	105 points
C-L Stunt	J. P. Butters	(St. Albans)	274 ,,

A good start to the flying season has been made by members of the **ASHTON M.A.C.** C. Wyatt gave the annual record sheet a boost by clocking 2 : 49 with an ageing rubber job, whilst J. Chadwick made 3 : 17 in the catapult glider class on the same day. In club contests, the *lower of two* flights method has been used to determine the winner, and proved to be one of the fairest systems yet tried.

The **ROCHDALE & D.M.F.C.** have been lucky enough to secure the services of King's Cup winner, Mr. F. Danhedly, as their first president. This group has a fine slope soaring site, which is available to other clubs, who must however obtain written permission at least a fortnight in advance.

I congratulate the **CREWE & D.M.F.C.** on putting out a very fine booklet designed for the attraction of members to the club, etc. This brochure has been well thought out, incorporating details of club activities, list of officials and addresses, membership application form, etc. I would advise clubs to get hold of a copy of this as it forms a very good example of local publicity well worth following.

WALSALL M.A.C. are getting ready for their August Bank Holiday C/L Rally, full details of which can be obtained from Mr. J. H. Breedon, 43, Caldmore Road, Walsall. This annual event is fast becoming a feature of Midland activities, and is blessed with plenty of support from the local authorities.

Members of the **DARLINGTON M.A.C.** are well into the intricacies of A/2 gliders, and have had plenty of success, if lost models can be counted in this qualification. J. Walker lost his prototype, and had to get down to it in a hurry to construct a new job for the Pilcher. Most popular type at the moment is the " Ambassador ", designed by club secretary R. C. Poad, this being a 68-inch span job weighing 15·5 ozs. with flip-up tail d/t operated by a baby Elmic timer.

Full marks to **ST. ALBANS M.A.C.** press secretary, Ken Brookes, a lad who could show a few professionals the way to go about things. His first press release for the All Herts Rally (July 23rd at Radlett) gives plenty of the right kind of gen, and this is available to all interested (and who isn't) via programmes obtainable from Mr. J. Greening, 14a, Holywell Hill, St. Albans, Herts, price 7½d. post free.

The **FLYING SADDLERS M.A.C.** announce the almost complete eclipse of C/L by free flight jobs, with gliders predominating. In power, comp. sec. D. Braes continues to amaze local clubs with his K.N.5, a functional design which follows current American West Coast practice, with a 450 sq. in. low aspect ratio wing and long moment arm. Originally designed for a 2·49 Elfin, it was test flown with the 1·8 Elfin and proved so good that this smaller motor was retained.

The perfect aeromodeller, E. W Evans of Northampton, repairs his " Clipper " during the Gutteridge Trophy.

Since its foundation in November last, the **BELPER & D.M.A.C.** has made steady progress. Being essentially a youth organisation, the average age of members is on the low side, but this in no way affects the standard of modelling, which is very high on the whole. One of the biggest combined ops' has been the construction of a trailer, which has proven very useful, containing about 20 models.

The **PETERBOROUGH M.A.C.** held their third annual exhibition last month, and some 2,000 folk passed through to admire the handiwork of the members. Your humble had the honour of opening the show, and was assisted in judging the exhibits by Eddie Cosh and " Rip ", there being about 140 models on show. Continuous r.t.p. flying was carried out, in addition to C/L flying in the school yard—as the public well knew when a jet job got going ! Winners were A. Pennington (Wisbech) in the power class with his ' Centurion ', R. A. Stagles (also of Wisbech) control-line, L. Fisher (again of Wisbech) in the rubber section with a ' Contestor ', and the sailplane class to D. A. and S. Laxton of Oundle with a very well built ' Thermalist '. A very unusual model by L. G. Hall of Huntingdon took the prize for unorthodox model, this being a canard type rubber job, with a most unusual wing section of which we hope to hear results.

Appalling weather conditions met the **LEEDS M.F.C.** for the Gamage and Pilcher events, best aggregate for the former being by Vic Dubery, who scored 200·5 seconds. Out of nine entries in the Pilcher, only four got any times, two of these being juniors ! Mick (' unorthodox ') Baines caused quite a stir at a recent meeting by clocking 22 m.p.h. with a Jetex-powered 1/72nd scale " Supermarine Attacker "—scale speed of 1,584 m.p.h. ! !

When Douglas Willis of the B.B.C. opened the **UPTON M.F.C.** exhibition, the high-light was a Mills-powered R/C launch, built by S. Reynolds and K. Toyer. Models ranged from a 10 ft. span sailplane to a 10 in. span r.t.p. job, and were judged by S.M.A.E. comp. sec. Val Turner, who awarded prizes to R. Walsh as best senior, and A. Bull as the top junior.

The opening rally of the **BEVERLEY & D.M.A.C.** on Easter Sunday was a complete debacle, no-one managing to get a model to the field in one piece, let alone fly ! This group's Open Rally takes place at Leconfield on July 2nd.

Rufforth was the venue for the first Northern Area rally on April 16th, when fine weather gave good flying conditions. Silvio Lanfranchi put up the best show in a power event with a score of 6 : 33, whilst E. Muxlow of Sheffield made best time in the Gutteridge with a total of 8 : 54. A special glider event resulted in a win for B. Thompson of Darlington (Junior) with a total of 9 : 34·2. Junior member Roy Hodgson of the **YORK M.A.S.** set up a junior club record with his " Dream Bogey ", flying o.o.s. in 6 : 20, being recovered too late to take part in the second and third rounds of the contest.

Hard luck came the way of J. O'Donnel of the **WHITEFIELD M.A.C.**, losing his Wakefield model after an untimed flight of some 15 minutes, only getting it back the day after the Gutteridge event. The only two members to fly in this contest made good times, H. O'Donnell's spare model making a best flight of 6 : 05 and an aggregate of 9 : 06, his No 1 job having shed a prop. blade for no apparent reason, wiping off the fuselage front in the process. R. Woodhouse had a total of 8 : 10 with a new Wakefield, the trimming of which was curtailed by landing in the River Irwell the morning before!

In his speech when opening the exhibition staged by the **LEICESTER M.A.C.**, the Lord Mayor of the city gave the opinion that for every juvenile delinquent who made the headlines, there were a score who developed initiative and a healthy interest in their hobbies, and the clubs to which they belonged. The standard of the exhibits was very good, the shortage of pylon types being very noticeable. Best model in the show was by Gordon Hallam, who showed a (practically) scale Miles, whilst other classes went to G. E. Dunmore (Power and Glider), R. Tailby (C/L) and J. Marsh (Rubber). Bob Manning won the novices class with a Chryslea Ace.

At Fairlop recently two flights were made which are worthy of mention. D. Hewitt of the **BLACKHEATH M.F.C.** got a 4 : 00 o.o.s. with his Amco ·87 pylon model, and returned some hours later with model seen to land some 50 minutes after launching—his chief grouse being the 4d. return bus fare ! Earlier in the morning M. Jobling's chuck glider got wanderlust and went away in 4 : 11. The model landed in a garden about 4 miles away after approx. 90 minutes flying. That's how to make sixpence go a long way ! !

The clubs on the Isle of Wight have banded themselves into a committee known as the **AFFILIATED MODEL CLUBS (I. of W.)** for the purposes of conducting a sub-section of the Southern Area. Their first rally was held at Bembridge Airport on May 7th, when good times were set up in spite of unsettled weather.

Radio-control, so far neglected by the **OLDHAM & D. M.A.C.** members is likely to catch on following a lecture on the subject by Mr. J. Anrep. This chap covered basic theory in a manner guaranteed to enlighten anyone with the most elementary knowledge of electrics. A rash of Nordic gliders has appeared in the club—as usual, just in time for the eliminators. A flight worthy of note was that made by A. Lawton's original design, the model being followed for over 10 minutes, after having been hand launched for a test flight from the clubs new ground. The old field seemed to grow smaller every week—or maybe the models are improving !

BRISTOL ACES M.A.C. held a novel type of contest, where a two-minute glider flight was equivalent to a 75 second rubber flight, or a power ratio of 7–1. This worked out well, and more events of this nature will be held in future. First man was J. F. Price who scored 271 points with a Wakefield job, getting a two-flight aggregate of 269 seconds. This club is holding its Bartlett Trophy Contest again this year, and all clubs within reach will be contacted.

Those taking advantage of the extra basic on May 7th had unexpected entertainment when attracted by the strains of music coming from a remote spot on the Wiltshire Downs. This was the venue of a slope-soaring meeting conducted by the **SWINDON M.A.C.**, where, in spite of a slightly damp atmosphere some very fine flights were witnessed. Smooth organisation, plus proper co-operation from competitors brought the main event to an early close, enabling a couple of 'quickies' to be squeezed in. Results were :

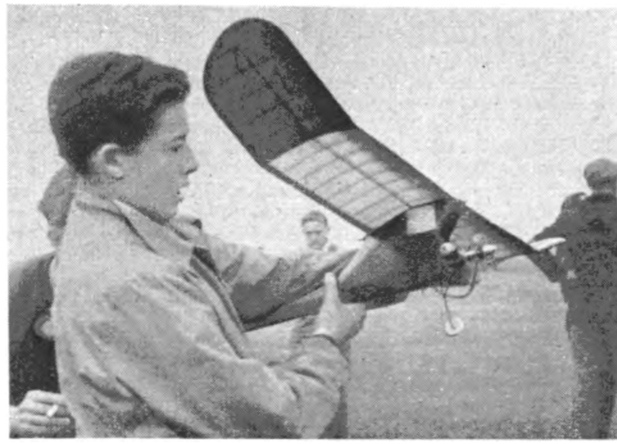
Slope soaring	**P. Gosney**	**(Yeovil)**	**3 : 02.9 (2 flight agg.)**
	G. Genner	**(Swindon)**	**2 : 44** ,,
	R. Parsons	**(Swindon)**	**2 : 16.8** ,,
Power-Ratio	**R. H. Smith**	**(Swindon)**	**9.411**
	R. J. Hillman	**(Bristol)**	**5–1**
Open rubber	**G. S. Perry**	**(Yeovil)**	**1 : 47**
	F. Mann	**(Yeovil)**	**0 : 32.5**

The 1950 contest for the "Flying Dutchman Trophy" (K.L.M.) will be staged by the **GLASGOW M.A.C.** at Abbotsinch Aerodrome on August 6th. Full details may be obtained from Mr. R. Todd, 273, New Edinburgh Road, Uddingstone, by Glasgow, or Mr. J. Fergusson, 14, Lang Street, Paisley.

The bright weather in March brought along a goodly batch of club records for the **SOUTHERN CROSS A.C.** A. Stuart hooked a thermal from a hand launch to get 5 : 25 o.o.s. with his lightweight glider, and K. Donald clocked 68·12 m.p.h. with a new team racer, thus retaining the Class II speed record. This chap also put up 9½ minutes to place fourth at the Surbiton glider gala. Useful publicity for aeromodelling in general, and the club in particular, was provided by the clubs third annual exhibition, where J. Faulkner won the championship trophy with a C/L version "Spitfire 22", a beautiful piece of work. Junior class went to J. Gander of Southwick, who exhibited a scale Avro 504K.

The **HUDDERSFIELD AIR LEAGUE M.A.C.** has innovated a good system for dealing with off-the-record grumbling which undermines so many clubs. The idea is simple, and has resulted in what is termed a 'grumble night', taking place before each committee meeting. They take the form of an open forum, under the chairman, where members air their views and grievances with no holds barred. Each subject is thrashed out in general terms, and the sec. makes notes for the committee to work out in detail at their meeting. At first the grumbles were many and varied, but these have died down to one or two, which is a happy state of affairs for the club—and particularly the committee. More important is the fact that it gives the ordinary member a sense of responsibility in that he is helping to run the club.

During the past month, several models have been lost by the **PRESTWICH M.A.S.**, including three power jobs. At Hawarden for the Gutteridge, "Titch" Bennett clocked 6 : 00 o.o.s. with his 'Zombie' on its first competition flight, the model travelling 8 miles.



Elfin-powered version of N. G. Marcus' "Firecracker" in London Area Hamley Trophy

PARK M.A.L. are doing well in this year's London Area knock-out contests, having beaten Bushy Park and Pharos. Pharos had hard luck when one of their big gliders got lost on its first flight, the d/t not acting according to rules. Parody and Sallabank did text book flights of 5 minutes plus on a day of few thermals.

Bods of the **CHORLEY & D.M.A.C.** are pleased to report successful negotiations for the use of Chorley football ground for the holding of a C/L rally, date to be given later. The club has gone mainly free flight this year with a good sprinkling of R/C—in fact 90 per cent. of the cats in the district are now minus whiskers !

WORCESTER M.A.C. are naturally pleased with Reg Parhams two new indoor records, and the collection of the Gutteridge Trophy. C/L speed flying is taking up most of A. Viles time, and he has reached 129 m.p.h. with his class VI job, powered with a twin glo-plug engine of 10 c.c.

The **CHESTER M.A.S.** wishes to thank all those who attended Hawarden Aerodrome on April 16th and left the place as clean as a new pin—or as an aerodrome should be left ! Pity it takes a bad instance to bring about a necessary improvement. The club contest for the glider cup held a fortnight later was won by G. Tomlinson with 71 seconds, the Williamson Cup for juniors going to M. Chidley with the better time of 81·6 seconds.

The Bentley Heath M.F.C. has disbanded, most of the members transferring to the Knowle club, which has splendid H.Q. and flying fields. Another group to fold its tents is the Westbourne M.A.C. owing to general lack of support.

Following a general reshuffle in the **FURNESS M.A.S.**, the club has got down to a more ambitious programme, with much better turn outs at the flying field. Junior members seem to shun rubber and gliders, being very keen on power, and whispering about radio-control ! A list of club records, compiled from the previous year's contests, gave the following

Wakefield	**C. Culver**	**1 : 19·6**
Rubber	**C. Culver**	**3 : 55·4**
Glider	**W. Wheeler**	**4 : 25·4**
Power-Ratio	**D. Watts**	**5–1**

A few days later the open rubber record was broken three times, firstly by H. Hockes, whose lightweight put up a time of 6 : 20·2. Then Culver beat him with a time of 6 : 40, only to find P. J. Finnigan completely smashing his figure with a time of 14 : 02 o.o.s. made with a 28-inch span 'Pinnochio'.

During a local Youth Week, the **FARNHAM M.A.C.** gave a demonstration of C/L flying and a static show. The flying had to be squeezed into a space of forty minutes, but in that time the spectators—and I suspect the competitors—were fully entertained. Streamer cutting was the highlight, and the 'ground staff' of re-fuellers, etc., had their work cut out.

Club records have been pushed around a bit in the **WEST ESSEX AEROMODELLERS**, A. W. Green setting a new H.L. rubber figure of 6 : 20, and the open Glider class going to

C. E. Mayes with 10 : 47·8. This club drew the doughty North Kent club in its first bash at the L. Area knock-out, the rules of optional hand launching calling for comment in the W.E. Newsheet as follows: "We were amused by one delegate's suggestion that the majority of fliers could not H.L. their models. We have seen some excellent hand-launched R.O.G.'s which in future will be legitimate!" We could not agree more.

Eric (Yulons) Wiggall's 'Toreador' made a flight of over 10 miles from a 20-second engine run at a meeting of the **CHELTENHAM M.A.C.**, the owner finally giving up owing to lack of fuel in his own vehicle! A little more in the car, and a little less in the plane, and everyone will be happy again. The Fry Brothers 'Ruddy-er-Bug' crashed on its first outing, and has apparently been bouncing all over the landscape ever since. Seems summat is always going wrong in a manner that never happens at home.

The following overseas chaps want to contact pen-pals on this side, so anyone interested in conducting a pen-and-ink session can get in touch with any of these fellows. Keith Mathison, Round Hill, Alberta, Canada; Edward A. Crabl 1523 Spaight Street Madison 4, Wisconsin, U.S.A.; and Paul Melin, Avanlea, Saskatchewan, Canada.

Tall Story of the month goes to R. E. Sidwell of Bedford who relates that, whilst flying a hurriedly constructed "Scalded Kitten", the tailplane broke on two occasions, followed by the engine mounting. The job being repaired with Britfix (advert.) the model was again launched. "On this last flight the model reached some height when, due to vibration, the engine mount came apart and the motor parted company with the rest of the model. The model did a tail slide, and after one stall recovered to make a perfectly stable *tail first* glide, touching down to a perfect landing." How would one go on for contest work—or even record claiming—in a case of this nature; one part of the flight with a hot power job, finishing up with a canard glider!!

With which thought we leave you for another month, and trust the weather is kind to all aeromodellers from now onwards. We've had our share of variation to date, and it's time we had some stable stuff in order to trim all those new models that took up so much of our time during the winter.

Till next month, good flying and bags of thermals.

The CLUBMAN.

NEW CLUBS.

BENFLEET M.A.C.
H. Goode, 226, Philmead Road, South Benfleet, Essex.
R.A.F. BASSINGBOURN M.A.C.
Sgt. D. R. Smith, Sergeants Mess, R.A.F. Bassingbourn, Nr. Royston, Herts.
SEAFORD & D.M.A.C.
R. H. Mitson, 19, High Street, Seaford, Sussex.
STROUD & D.M.A.C.
A. R. Richings, "Grevilla," Cheltenham Road, Stroud, Glos.
CHAMELEON M.F.C.
R. R. Broomfield, 47, Coomer Road, Fulham, S.W.6.
BOLTON WOODS BALSA BUTCHERS
L. G. Perris, 162, Bolton Hall Road, Bolton Woods, Bradford, Yorks.
KENSINGTON & D.M.C.
L. Davies, 36, Compayne Gardens, London, N.W.6.
FORREST COTTAGE M.A.C.
H. Rollinson, 21, Hapassah Street, Siddal, Halifax, Yorks.
WORKINGTON & D.M.F.C.
T. Leathers, 58, Middle Row, Northside, Workington, Cumb.
ORBIT LEWISHAM M.F.C.
R. P. Johnson, 16, Wisteria Road, Lewisham, S.E.13.

SECRETARIAL CHANGES.

KIRKCALDY M.A.C.
P. Montgomery, 87, Dysart Road, Kirkcaldy, Fife.
FARNHAM M.A.C.
M. P. Hayter, 25, Tor Road, Farnham, Surrey.
HULL "PEGASUS" M.F.C.
G. H. Harrison, 15, Rutland Road, Spring Bank West, Hull, Yorks.
BLAIRGOWRIE M.A.C.
G. P. Anderson, 3, Beeches Road, Blairgowrie.
SOUTHEND SENIOR M.C.
R. A. Chowns, 515, Fairfax Drive, Westcliff-on-Sea, Essex.
ROSSENDALE VALLEY M.F.C.
F. Nuttall, 6, Cowfoot Lane, Bacup, Lancs.
ORPINGTON FALCONS M.F.C.
E. R. Hancock, 5, Romilley Terrace, Worlds End Lane, Green Street Green, Farnborough, Kent.
LOUGHBOROUGH COLLEGE M.A.C.
D. C. Sugden, Loughborough College, Loughborough, Leics.
WINCHESTER M.A.S.
H. J. Childs, 26, Cromwell Road, Winchester, Hants.
LLANIDLOES M.A.C.
G. Hindley, 3, Wellington Terrace, Llanidloes, Mont.
WALSALL M.A.C.
D. F. Marshall, 61, South Street, Walsall, Staffs.
WISBECH M.C.
J. C. Porteous, 14, Magazine Close, Wisbech, Cambs.

STOP PRESS AREA RESULTS, WESTON & K. & M.A.A. CUPS

NORTHERN AREA. After almost a week of beautiful weather and ideal conditions, the Clerk of the Weather again dished up the usual tenth-tenth cloud and cold wind that is fast becoming recognised as the usual flying weather on big competition days in the North. In spite of this, some 250–300 fliers turned out at Rufforth for the Second Wakefield Eliminator and the Nordic Glider events. Needless to say the usual collection of clots were also present and spent their time walking across growing crops and twirling their spin dizzies about 50 yards down wind of the take-off points, much to the delight of competitors and officials. (*Why let 'em? — Ed.*)

The Sheffield club made no mistake in the Nordic contest and had very little trouble in overcoming the opposition, taking the first six places with ease. After an exciting third round, Chas. Exley ran out the winner, two-fifths of a second in front of his club mate F. W. Walker. Jimmy Walker of Darlington had an unlucky day, losing his beautifully finished O.D. on its second flight at 7 mins.

In the "Weston," popular Vic Dubery of Leeds flew steadily to top the list with 616 secs., closely followed by Rutter of Harrogate with 594·6 secs. (Vic certainly takes his Wakefields seriously, he has already built his next year's model !) Ted Muxlow, in spite of a bad first flight and a resultant repair job, managed to pull into third place with an aggregate of 355 secs., and the very consistent Stan Eckersley was again with the leaders.

WESTON CUP

1.	Dubery, V.	Leeds	615·0
2.	Rutter	Harrogate	594·6
3.	Eckersley, S.	Bradford	505·0
4.	Cameron, G.	Leeds	404·2
5.	Tubbs, H.	Leeds	372·5
6.	Muxlow, T.	Sheffield	355·0

NORDIC A/2

1.	Exley, C.	Sheffield	549·6
2.	Walker, F. W.	Sheffield	549·4
3.	Cartwright, F.	Sheffield	547·15
4.	Poole, T.	Sheffield	501·6
5.	Gordon, D. F.	Sheffield	454·6
6.	Orr, H.	Sheffield	437·6

NORTH-WESTERN AREA. The field used was just outside Bury, and here also the weather conditions were extremely unfavourable. Very strong easterly winds sent models crashing to earth, or way out over the valley and soon out of sight. The sun was very bright, but did not stop the cold wind from keeping away many would-be contestants—there were only a 100 or so instead of the usual crowds. Many of the totals given below are for only two flights, the wind accounting for many machines before the schedule had been completed.

WESTON CUP

1.	Currington, E. G.	Prestwich	258·7
2.	Duncan, R.	Cheadle	258·0
3.	Hargreaves, E.	Prestwich	237·7
4.	Davey, J.	Blackpool	233·9
5.	Bennett, D.	Prestwich	205·3
6.	Owen, J.	Blackpool	176·0

K. & M.A.A. CUP

1.	Bennett, D.	Prestwich	423·6
2.	Cropper, A.	Whitefield	391·8
3.	Faulkner, B.	Cheadle	363·4
4.	Targett, S.	Prestwich	346·3
5.	Thomas, M.	Oldham	264·4
6.	Maxwell, B.	Preston	261·0

MIDLAND AREA. After three days running of fine, hot weather, the conditions met with at Anstey Aerodrome on the 14th May were downright disheartening, with a near-gale, dull sky and surprisingly low temperature. On top of this, the range of visibility was so short that many models were penalised, only a few being lucky enough to get a small patch of bright weather which enabled the models to be kept in sight for more than four minutes.

In spite of this handicap, the standard of flying was extremely high, and many enthusiasts were evidently all-out to make up what they had lost on the Gutteridge "leg." The odd unlucky spot came when two chaps launched their models at the same time (though well separated on the tarmac) and a mid-air crash put paid to two fellows' hopes. This was nothing compared to the unthinking photographer who got right in the way of Ted Evans' model on his third flight take-off ! Evans was forced to use a reserve model as a consequence, but did well enough to place high in the combined totals, after a rather poor day at the first eliminators, and finally totalled enough points to run out top man at Anstey in the Wakefield section.

A/2 gliders did extremely well all things considered, though a great deal of wandering on the line was witnessed with some designs. The popularity of this contest was evident from the entry, which was nearly a third more than for the Weston, this probably being accounted for by the fact that some would-be contestants for the latter event thought better of it in view of the weather and a poor score in the first round.

WESTON CUP

1.	Evans, E. W.	Northampton	529·5
2.	Revell, H. W.	Northampton	508·4
3.	Richmond, J. S.	Wolves	495·5
4.	Noakes, J. A. D.	Birmingham	495·2
5.	Parham, R. T.	Worcester	493·2
6.	Chesterton, R. B.	Loughborough College	480·8

K. & M.A.A. CUP

1.	Moore, H. E.	West Coventry	598·1
2.	Smith, D. C.	Loughborough College	572·45
3.	Wheeler, B.	Birmingham	568·6
4.	Hill, D.	Wolves	488·1
5.	Taylor, W. E. L.	Non-member	463·3
6.	Cuthbert, T.	Birmingham	448·7

Best flight in the Glider event was 4 : 48·5 by L. Whittall (Birmingham), but unfortunately his model was not recovered. Noakes and Fulwell (Sheldon) both made flights of 4 : 10 with Wakefields.

The combined results of the Gutteridge/Weston events places Parham at the top with a score of 1,317·7, Chesterton next with 1,136·4, and Revell third with 1,087·2. With other very good scores in the top dozen places, the Midland Area contingent should be strong enough to show their expected paces at the Trials, and again at least one place on the teams.

SOUTH MIDLAND AREA. Held at Henlow Aerodrome, a new stamping ground for the Area, which proved an excellent flying field with bags of co-operation from the R.A.F., the May 14th competitions were not blessed with good weather. A strong wind, overcast conditions and abnormally low temperature did not make for pleasant flying conditions. Eric Smith made up for his nil score in the first round of the Wakefield eliminators by three spot-on flights and would undoubtedly have earned a maximum under normal weather conditions. Luton swept the board with the next four places in the Weston and we had the amusing experience of losing second placer Roy Clements for several hours although his model was brought back shortly after landing. Glider flying was of a poor standard, only Minney and Hinks of Luton showing any real skill with the tow line. A good 80 per cent. of the models were unstable on the line, and the boys will certainly need to pull their socks up for the semi-finals.

K. & M.A.A. CUP

1.	Minney, R.	Luton	480·55
2.	Hinks, R.	Luton	337·25
3.	Jeffery, R. J.	Reading	248·5
4.	Beeson, E.	Reading	210·0
5.	Forward, F.	Berkamsted	162·25
6.	Haddock, C.	Reading	155·5

WESTON CUP

1.	Smith, E.	Icarians	742·0
2.	Clements, R.	Luton	488·25
3.	Brown, R.	Luton	457·5
4.	Hinks, R.	Luton	440·0
5.	Sullivan	Luton	389·5
6.	Sandy, R.	Henley	323·5

SOUTH-WESTERN AREA. Held at Haldon Aerodrome, this Area had fine clear weather, but the usual wind was well in evidence, making matchwood of many models. The first three models to place in the Weston Cup were all to the design of Mr. R. Norton of Plymouth M.F.C. — which is rapidly becoming the standard design in that part of the country.

WESTON CUP

1.	Norton, R.	Plymouth	343·0
2.	Tancock, D.	Plymouth	302·3
3.	Woodfine, G.	Plymouth	239·0

K. & M.A.A. CUP

1.	Penny, D.	Torquay	132·1
2.	Wagg, E. A.	Plymouth	53·6
3.	Miller, L.	Torquay	43·8

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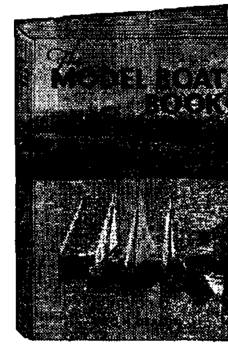

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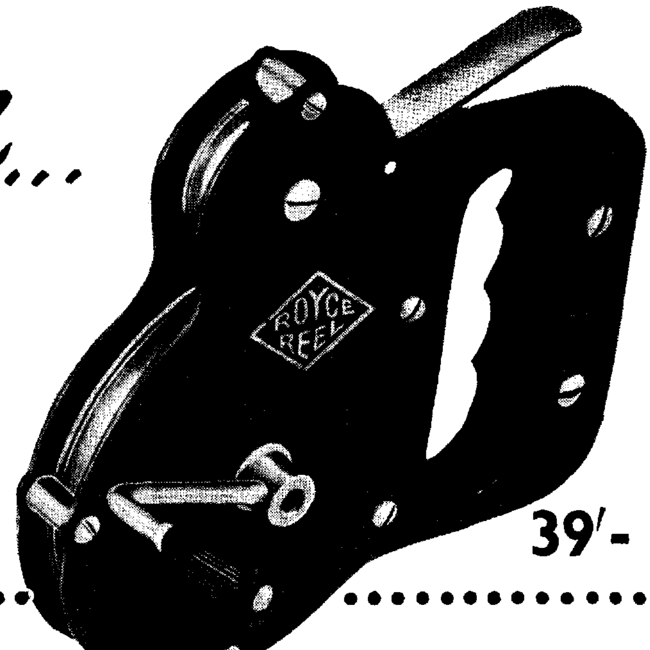

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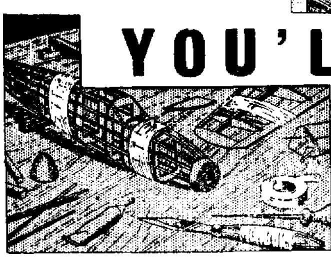

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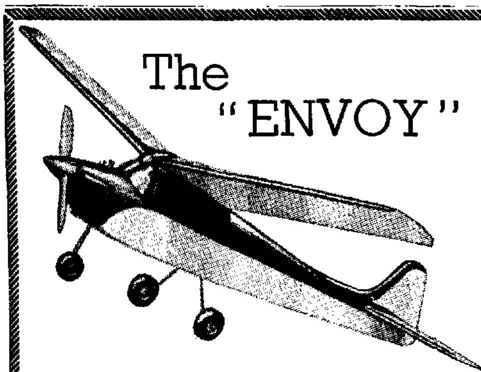

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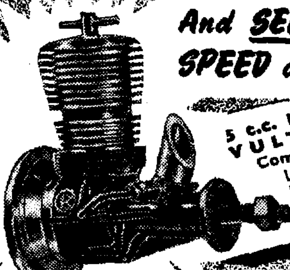

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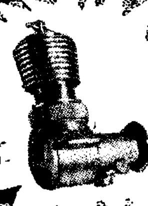

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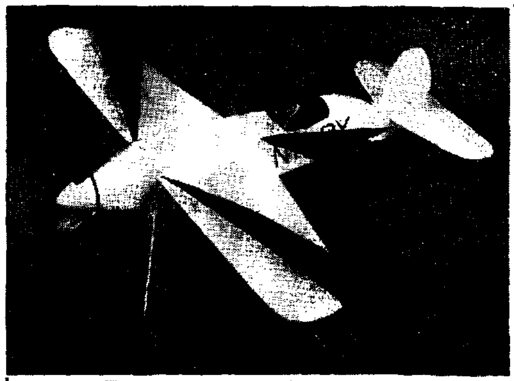

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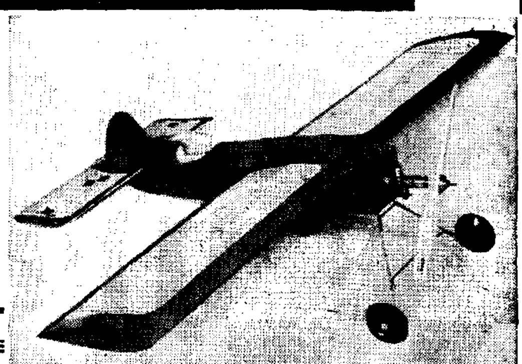

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