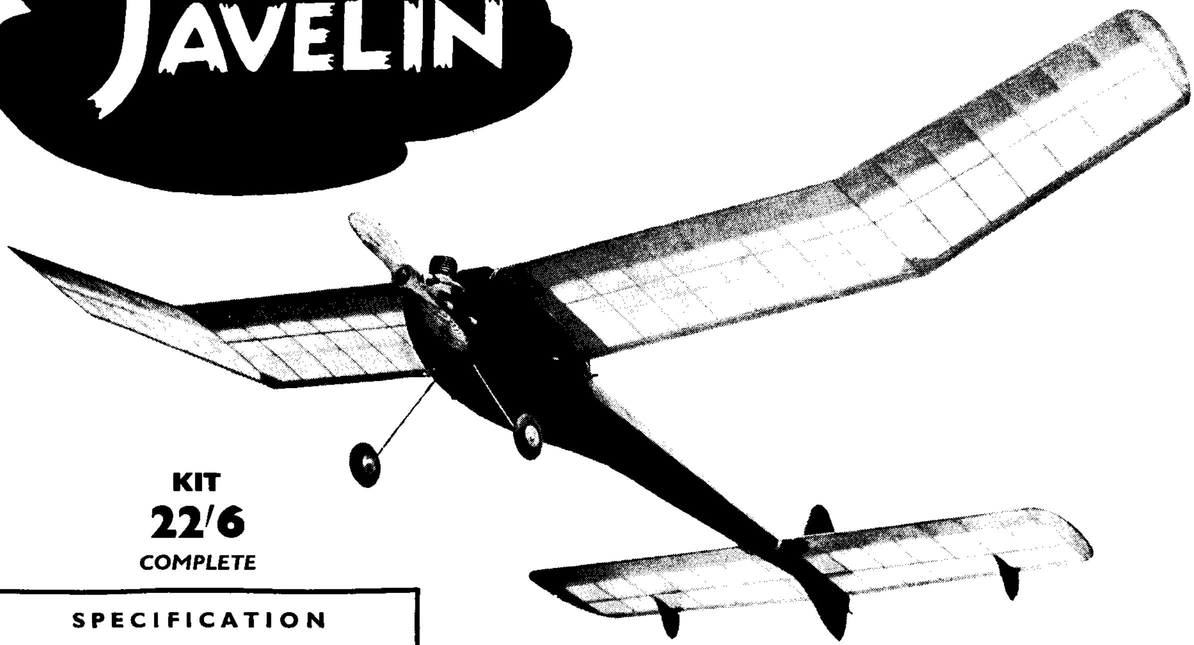
AEROMODELLER

CONTENTS

FEBRUARY 1951 1'6

JAVELIN



KIT
22/6
COMPLETE

SPECIFICATION	
WINGSPAN 50″	LENGTH 29″
WING AREA 283 sq. ins. (1·96 sq. ft.)	
WEIGHT 12 ozs.	WING LOADING 6 ozs./sq. ft.

- ★ **Fully detailed Plan and Building Instructions, Best Quality "Solarbo" Balsa Wood, Plywood, etc.**
- ★ **Pre-formed Undercarriage and Profiled Nose-blocks, Efficient Dethermaliser System.**
- ★ **Designed to give maximum flight performance with the new Allbon "Javelin" and Elfin 1·49 engines.**

TWO VITAL QUESTIONS ANSWERED. . .

How can I eliminate the vicious spinning tendencies shown by my Pylon layout models ?

The high thrust line and low C.L.A. of the "Javelin" have proved to have the best spin-proof and stable flight characteristics, including "snap-roll" recovery from any looping position.

How can I control the lightly loaded model under power ?

To control the power flight of the "Javelin" we have the most useful asset of increased wing and tail areas, replacing the unnecessary drag of a heavily-loaded machine and resulting in exceptional gliding qualities for contest work.

Designed to F.A.I. requirements this model represents the absolute in modern free-flight design. Featuring positive "flip-up" tail D/T system, compact fuel tank, timer, cut-out assembly, this kit is abundant in all that is necessary to make contest power flying a certainty.

DOPES TITANINE FINISHES

CEMENTS.

FORMULA "B"	Quick Drying	Price **5d., 7d. and 1/-** per tube.
FORMULA "C"	Tissue Adhesive	Price **4d. and 6d.** per tube.

DOPES.

	½oz.	1oz.	2oz.	4oz.	6oz.	½pt.
Clear Dope. Medium tautening and suitable for small and medium models ...	—	**8d.**	**1/-**	**1/9**	**2/6**	**3/6**
Glider Dope. Extra strong tautening and suitable for large and heavy models. Ideal for use on Silk, Nylon or Rag Tissue ...	—	**8d.**	**1/-**	**1/9**	**2/6**	**3/6**
Banana Oil. Non-tautening and waterproof. Suitable for light-weights. Of superior "banana oil" finish it can be used as a final surface treatment on large gliders, seaplanes, etc. etc.	—	**8d.**	**1/-**	**1/9**	**2/6**	**3/6**
"Supergloss." Glossy coloured dopes available in the following shades :— White, Light, Medium and Dark Blue, Green, Black, Cream, Brown, Orange, Red, Yellow, Silver, Grey and Transparent	**6d.**	**10d.**	**1/6**	**2/3**	**3/-**	**4/-**
Thinners. For use with all "Titanine" Cellulose Dopes and Lacquers ...	—	—	**8d.**	**1/3**	**1/8**	—
WOODFILLERS.						
Sanding Sealer. An easily sanded priming compound which ensures a perfect finish on Balsa Wood ...	—	**8d.**	**1/-**	**1/9**	**2/6**	**3/6**

FUEL PROOFER

Specially prepared transparent medium which dries within 10 mins. of application. Renders surfaces immune from all methanol and diesel fuels.

2 oz. **1/6** ; ½ pt. **4/-**

(Replacement 1 oz. Hardener, **9d.** bottle.)

STILL A FEW LEFT!

HALFAX "Power Plus" Props. in polished mahogany. Price 1/9

- 8″ diam. × 6″, 10″ pitch.
- 9″ diam. × 6″, 8″ pitch.
- 10″ diam. × 10″ pitch.
- 11″ diam. × 6″, 8″, 10″ pitch.
- 12″ diam. × 6″, 8″, 10″ pitch.

"ALBATROSS" Plan Pack	**7/6**
"Rapier" Plan Pack	**3/6**

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ALL EYES ARE NOW ON MERCURY

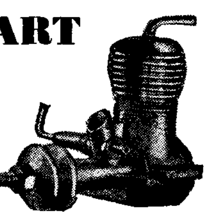
19 Firsts in 1950

We know of at least 19 firsts won by Mercury " over-the-counter " kits in 1950, and doubtless there must be many more. For a house producing kits on a commercial basis, this is indeed an outstanding and enviable record, and is the finest possible testimony that any modeller wants. There have been important Mercury wins in all classes : C/L speed and stunt ; F/F duration and sailplane. What better proof is there of the wisdom of buying and building Mercury.

Under the direct personal supervision of Henry J. Nicholls, the name of Mercury has steadily risen to a position of pre-eminence in aero-modelling, and what Mercury design and produce is always closely watched as a lead to the latest developments. Now come the first models off in a programme of free-flight flying scale designs far ahead of anything yet offered in commercial kit construction. First the Monocoupe, and next the Stinson 105. For construction, finish and realism both in appearance and flight, these two Mercury models are wonderful, and they definitely represent to-day's best values.

YOUR MERCURY DEALER SELLS THESE LINES

ALLBON DART



As successful in its class as the Javelin, and the right answer to economical running. Its power/weight ratio is terrific and independent test report testifies to its excellent starting and running characteristics. 0·5 c.c. Diesel for builders of smaller flying models. Inc. P.T 65/6

MORE POWER LESS COSTS

Reduction in the prices of Mercury Fuels makes it still easier for you to choose the right Mercury grade and fly with. There's a super-blended grade for every motor. No. 1, 1/9; No. 2, 3, 5, 8, 2/6; No. 4, 6, 2/- ; No 7. special 3/6.

THE WORLD'S FINEST FINISHES

CELLON Model Aircraft Finishes come to you at a time when you want to be positive that you apply only the best finish to your lovingly built model. There are CELLON Dopes, Coloured Dopes, Sanding Sealer and Thinners available. Your Mercury Dealer stocks them at popular prices.

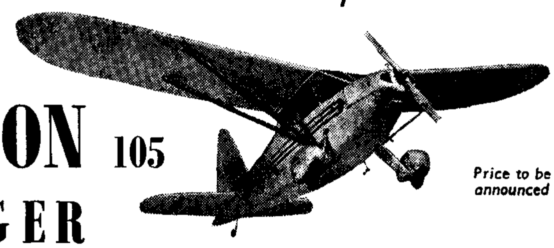
Mr. DEALER

1950 Sales proved that Mercury sell on price and quality. YOU can profit from our 1951 programme by giving all MERCURY lines prominent display. It's Performance that makes Modellers buy Mercury.

THE TREND IS TO F/F SCALE

Here is the

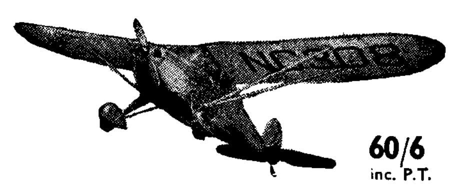
STINSON 105 VOYAGER



Price to be announced

Here is the second design in Mercury's brilliantly exciting new programme for 1951. Designed for the Allbon Dart 0·5, it features such refinements as knock-off wing, sprung undercarriage, and scale instrument panel (in plan) as well as true scale appearance and high standard of finish. This 42" cabin model is virtually uncrashable, and the kit is absolutely complete except for cement, dope and airwheels. Full size plan is included together with instructions so clearly prepared that anyone with average experience can build this Mercury Model with success assured.

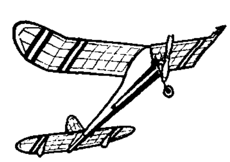
MONOCOUPE L.7A



What a model for the man who takes pride in his building. This 64" span looks and behaves like the real thing, whilst its construction is sheer joy to the modeller who builds intelligently. For 1·5 c.c. to 2·5 c.c. diesels. Ideal for radio-control. A de-luxe kit which includes everything of the best. 3-sheet plan. Complete instructions.

60/6 inc. P.T.

For Junior Contestants



JUNIOR MALLARD

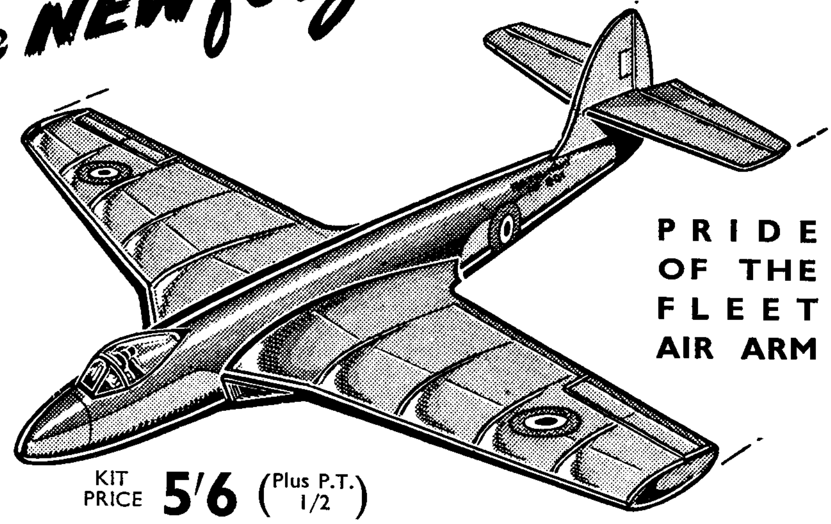
Here's a model with plenty of pep, that only needs an 0·5 to 0·87 diesel to power it. It's the smaller version of the contest-winning Mallard and is bang-on for the younger ambitious Duration Contest Flyer. Mercury standard kit, inc. P.T. Inc. Purchase Tax. **13/9**

Look for this Sign at your Dealer's

MERCURY MODEL AIRCRAFT SUPPLIES LTD., LONDON, N.7.

THE HAWKER "SEA-HAWK"

Something NEW for Jet-enthusiasts



INTRODUCING THE FIRST OF A NEW SERIES OF SCALE MODEL JET FIGHTERS

This 18″ span scale model—ideally designed for "JETEX 50" is a beautifully streamlined replica of the Naval Jet Fighter.

The motor unit is very cleverly concealed in a fuselage slot easily accessible and perfectly preserving the graceful contours and smooth flight of the prototype.

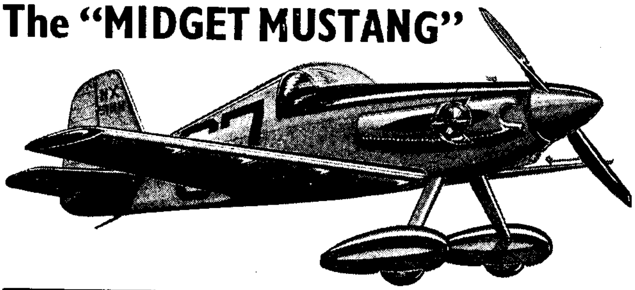
The Super Quality Kit contains graded strip and printed sheet, cement and all materials including Cockpit Cover and Transfer roundels, etc.

SPAN 18″ WEIGHT (Bare) 1¼ ozs.

KIT PRICE 5/6 (Plus P.T. 1/2)

PRIDE OF THE FLEET AIR ARM

The "MIDGET MUSTANG"



SLEEK AND FAST . . .

. . . A VERON "SUPER" KIT

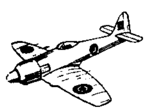
This perfect scale model of the American light sport plane is an ideal Team Racer. With speeds reaching 60 to 80 m.p.h. it will leave all the rest standing ! !

The stunt performance is truly astounding.

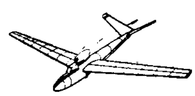
This is one of the most complete kits we have ever produced—it contains everything you need including several ready-cut-out balsa and ply parts, also a 30″×40″ Plan, showing detailed stages of construction.

KIT PRICE 21/- PLUS 4/8 P.T.

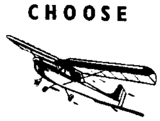
VERON OFFER YOU OVER 70 KITS FROM WHICH TO CHOOSE



SEA FURY X
Kit Price 22/6
(Plus P.T. 5/-)



FOUGA CYCLONE
Kit Price 4/6
(Plus P.T. 1/-)

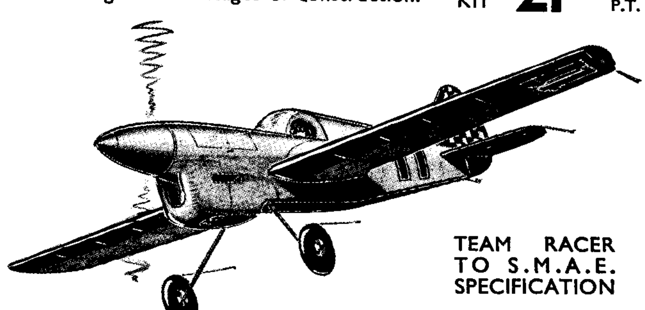


The SKYSKOOTER
Kit Price ... ... 25/- (Plus P.T. 5/6)

The FOCKE WULF
Kit Price 19/6
(Plus P.T. 4/4)

GET THE NEW 1951 VERON CATALOGUE FROM YOUR DEALER

SPITFIRE 22
Kit Price 27/6
(Plus P.T. 6/1)



TEAM RACER TO S.M.A.E. SPECIFICATION

LOOKS GOOD... The "PHILIBUSTER" ...IS GOOD!

Good looks and performance usually go hand in hand. This 28½″ span model has everything! Including top line Veron quality. A super racer thoughtfully designed on practical experience. Will take all Glow-plug and Diesel Motors up to 5 c.c. (inverted) such E.D. Mk. IV, Frog 500, Amco 3·5, etc.

KIT PRICE 23/6 (Plus 5/2 P.T.)

VERON

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Modellers overseas haven't the chances we have, to pop into the model shop round the corner, yet their enthusiasm isn't damped. Every post brings us orders, letters and requests for advice from all over the world. We take pride in supplying fellow modellers overseas, and enjoy helping in every way we can. We take great care in packing, and do our best to ensure prompt delivery.

February Selection

" Best of the Best "

F/F FLYING SCALE

Mercury Monocoupe	68/6
Mercury Stinson L/105	22/6
K.K. Ladybird	22/7

F/F DURATION

K.K. Slicker Series—all at ruling prices.
K.K. Flying Scale Series, when ready.

Mercury Mallard	18/4
Junior Mallard	13/9
Jetex Meteor "50"	9/2
E.D. Radio Queen	78/6
Mercury Maybug	8/3

ENGINES : ALLBON, AMCO, E.D., ELFIN, FROG (250 and 500), YULON, MILLS, and the sensational D.C.350 all at prices advertised by the makers.

CONTROL-LINE KITS

Team Racers

Veron Philibuster	22/7
Mercury Mk. I	19/3
K.K. Scout Biplane	27/6

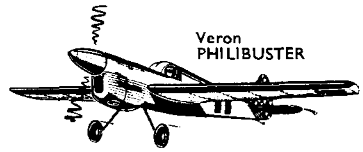
Stunt and Speed

Mercury Junior Musketeer ...	18/4
Musketeer	22/-
K.K. Stunt King	22/7
K.K. Stunt Queen	25/8
K.K. Skystreak	11/7
Mercury Speedwagon "60" ...	29/6

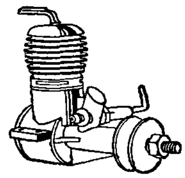
Full stocks by leading makers always available.

ACCESSORIES include E.D. and E.C.C. Radio Control Equipment, Cellon Finishes, Stant Props., Mercury C/L handle, and all lines by leading makers. Also large stocks of Solarbo Balsa.

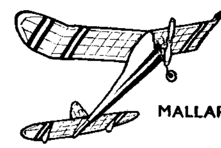
UNTIL FURTHER NOTICE our Engine Repair Dept. will be closed.



Veron PHILIBUSTER



ALLBON DART



MALLARD

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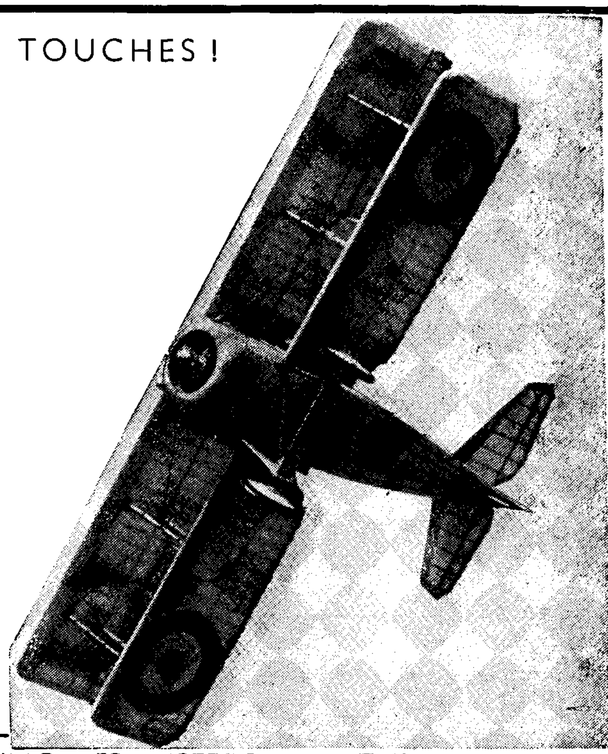

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Aeromodeller Annual 1950, 160 *pages, size* $8\frac{1}{2} \times 5\frac{1}{2}$ *ins. Profusely illustrated,* 57 *plans, wide range of articles, contest results, engine analysis, club badges, etc.*

(By post **8/3** *from the publishers).*

The '49 Annual is still available at the same price.

PRICE **7/6**

1948 To encourage newcomers to complete their sets we are offering the first Annual (1948) at a special reduced price. Remember it does not date ! **5/-**

If in any difficulty obtaining any or all o these Aeromodeller Annuals send direct to the publishers for by return delivery. Add 9d. postage for one copy, 1/- for two or three.

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Dear Customers- At the time of printing, we are still able to offer you most of our KITS and RADIO UNITS at pre-tax prices. This does not apply to raw materials, Dopes etc, which are tax-free, or engines (see below). Please order your requirements now and take advantage of our large stocks.

Yours sincerely, RIP & MAX.

N.B. All prices shown below are pre-tax. To get new prices when applicable add $22\frac{1}{2}\%$ (4/6d. in the £)

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GLIDERS

Frog Fairy 30"	7/6
Frog Prince 60"	25/-
Frog Vanda 40"	9/6
Halfax Roma 40"	7/6
KK Cadet 30"	4/-
KK Cub 20" (also Jetex 50)	2/6
KK Chief 64" (A-2 Class)	18/6
KK Invader 40"	6/6
KK Minimoa 50"	7/-
KK Soarer Baby 36"	5/-
KK Soarer Minor 48"	8/-
KK Soarer Major 60"	11/6
Mercury G-Chopper 42"	12/6
Mercury Magpie 24"	3/9
Mercury Norseman 58"	17/6
Skyrova Glider 16"	1/6
Southern Sailer 24"	3/9
Southern Sloper 36"	6/6
Veron Coronette 26"	3/3
Veron Verosonic 46"	9/6

RUBBER

Frog Goblin 24"	4/9
Frog Saturn 30"	10/6
Frog Stardust 37"	10/6
Frog Stratosphere 42"	17/6
Halfax Minor 22"	3/3
Halfax Major 30"	5/6
Halfax Jaguar 44"	21/-
KK Ace 30"	5/-
KK Achilles 24"	4/-
KK Ajax 30"	6/-
KK Competitor 32"	7/-
KK Eaglet 24"	4/6
KK Gypsy 40"	10/6
KK Orion 23"	3/6
KK Playboy 20"	3/3
KK Senator 32"	5/6
Mercury Maybug 32"	7/6
Premier Cruiser Pup 30"	9/6
Skyrova Duration 16"	1/6
Veron Goblin 20"	3/3
Veron Rascal 24"	3/6
Veron Sentinel 34"	10/-

RUBBER SCALE

Airyda Hurricane 16"	2/6
Airyda Tipsy 16"	2/6
KK Piper Cub 26"	6/-
KK Pixie (semi-scale)	4/-
Royles Tiger Moth 31"	18/6
Skyrova Auster 12"	1/6
Skyrova Tiger Moth 12"	1/6
Skyleada Spitfire 16"	2/-
Skyleada Tempest 16"	2/-

and many more.

KITS FOR JETEX

Jetex Flying Wing (50)	5/-
Jetex Durajet (200)	14/6
Jetex Vampire (scale) (50)	5/-
KK Skyjet 50 (50)	3/9
KK Skyjet 100 (100)	5/6
KK Skyjet 200 (200)	7/6
Veron Airojet (100)	7/6
Veron Cirrojet (200)	10/6
Veron Fouga Cyclone (50)	4/6
Veron Minojet (50)	3/-

POWER F/F

Frog Centurion 60"	63/-
Frog Janus 44"	15/-
Frog Janus 44"	15/-
Frog '45' 45"	27/6
Frog Strato-D 42"	15/-
Frog Vixen 36"	12/6
Halfax Hermes 41"	15/6
KK Bandit 44"	18/6
KK Cumulus 54"	
KK Outlaw 50"	22/6
KK Pirate 34"	12/-
KK Scorpion 44"	32/-
KK Slicker Mite 32"	9/6
KK Slicker 42"	17/6
KK Slicker '50' 50"	25/-
KK Southerner Mite 32"	10/6
KK Southerner 60"	40/-
KK Super Slicker 60"	35/-

Mercury Mallard 48"	17/6
Mercury Monocoupe 64" (semi-scale)	
Shaws Envoy 40"	14/9

FOR RADIO

ED Radio Queen 84"	92/6
Halfax Spartan 60"	38/6
KK Falcon 96"	107/6
KK Junior '60' 60"	39/6
Veron Skyskooter 48"	25/-
Veron Stentorian 72"	69/6

C/LINE STUNT

Frog Vandiver	13/-
Frog Radius	17/6
Halfax Millsbomb Mk II	18/6
J's Nancy	14/6
KK Phantom Mite	11/6
KK Phantom	18/6
KK Skystreak 26	9/6
KK Skystreak 40	10/6
KK Stuntmaster	19/6
KK Stunt King	18/6
KK Stunt Queen	
Mercury Junior Monitor	14/6
Mercury Monitor	27/6
Mercury Junior Musketeer	14/6
Mercury Musketeer	19/6
Shaws Dervish	19/6
Veron Nipper	9/6
Veron Bee Bug	11/6

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Regent S.E.5.A.	8/9
Regent Hawker Fury	8/9
Modelair Nieuport Scout	19/6
Modelair Bristol Bulldog	22/6
Royles Tempest	15/-
Royles Tiger Moth	21/-
Veron F W 190	19/6
Veron Sea Fury	22/6
Veron Seafire	27/6

TEAM RACERS

KK Scout (Biplane)	22/6
Mercury T.R.1	17/6
Veron Midget Mustang	21/-

C/LINE SPEED

Mercury Midge	5/6
Mercury Speed Wagon 20	12/6
Mercury Speed Wagon 30	14/6
Mercury Speed Wagon 60	29/6

ENGINES

Allbon Arrow 1·49 c.c.	GP	55/-
Allbon Dart ·5 c.c.	D	52/6
Allbon 2·8 c.c.	D	96/-
Allbon Javelin 1·49 c.c.	D	55/-
Amco ·87 c.c.	D	72/6
Amco 3·5 c.c.	D or GP	97/6
E.D. Bee 1 c.c.	D	45/-
E.D. Mk. II 2 c.c.	D	55/-
E.D. Comp/Special 2 c.c.	D	57/6
E.D. Mk. III 2·49 c.c.	D & GP	65/-
E.D. Mk. IV 3·46 c.c.	D	72/6
Elfin 1·49 c.c.	D	59/6
Elfin 1·8 c.c.	D	79/6
Elfin 2·49 c.c. 1950.	D	69/6
Elfin 2·4 c.c.	D	89/6
ETA '19'	GP	124/5
ETA '29'	GP	149/6
Frog '250' 2·5 c.c.	D	72/6
Frog '500' 5 c.c.	GP	75/-
Mills ·75 c.c.	D	50/-
Mills ·75 c.c. (with cutout)	D	55/-
Mills 1·3 c.c.	D	75/-
Mills 2·4 c.c.	D	84/-
Nordec RG 10 10 c.c.	GP	200/-
Nordec R 10 10 c.c.	P	210/-
Nordec RG 10 Special 10 c.c	GP	240/-
Nordec R 10 Special 10 c.c.	P	250/-
Wildcat 5 c.c.	D	77/6
Yulon '29' 5 c.c.	GP	79/6
Yulon '49' 8·2 c.c.	GP	99/6

JETEX UNITS

Jetex 50 Outfit	9/6
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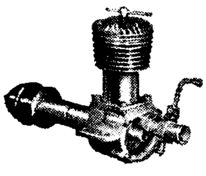

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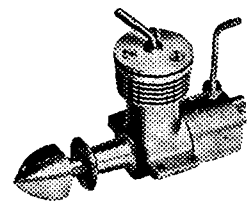

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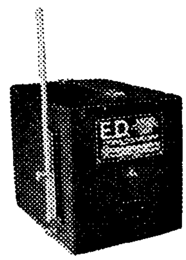

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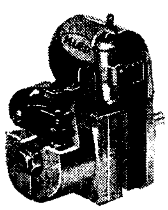

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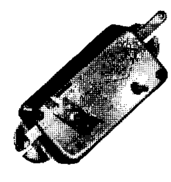

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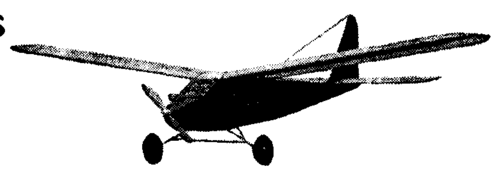

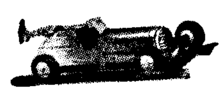

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AEROMODELLER

INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

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Calling All Champions !

THE early announcement by the F.A.I. Models Commission of the countries organising the accepted Championship Events of the aeromodelling calendar, together with dates, though not as yet the exact venues, will enable champions, actual and would-be to concentrate on their particular aspects and put in the extra effort that makes the difference between good and excellent.

Four events have been granted Championship status as follows :—

Free Flight Power Championships	France	June 15th–17th.
Wakefield Trophy	Finland	July 7th–8th.
Control Line Championships	Belgium	July 29th.
Nordic A/2 Sailplane	Yugoslavia	August 15th–20th.

These events cover the principal aeromodelling sub-divisions, leaving only the AEROMODELLER International Radio Control event to complete the full range. It is not known at this stage whether the F.A.I. Models Commission will grant Championship status to this event. Conservative judgment might be to allow only a limited international permit for its first year until the extent of support can be better judged.

The sponsoring countries have all demonstrated their abilities in the past, both as competent organisers of model events and as affable hosts. Yugoslavia, it is true, have not held an international meeting ince pre-war days, but their teams attending the main contests of 950 showed a keen interest in all phases of contest organisation, and visitors may be assured of a warm welcome from their very active Aero Club.

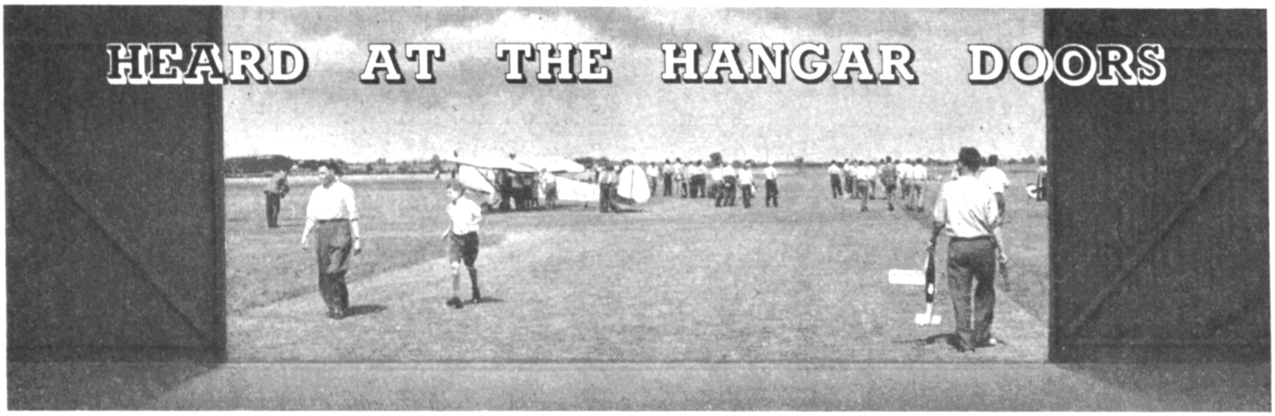
We do most sincerely hope that adequate funds can be gathered to ensure British participation at all these meetings. In any event there can be no excuse for not making the effort in good time with nearly six months to go before the first team would be sent abroad.

The prestige value of regular participation in overseas sporting events is incalculable, as indeed the more propaganda-minded nations have long known. Any team on foreign soil must willy-nilly be regarded as "hidden-exports" of goodwill: whether their conduct is to be counted as good or bad diplomacy depends entirely on the individuals concerned and their team managers. And by this we do not mean win at all costs; it is sometimes of more value to future sporting relationships to be classed as good sports than good players!

The principle of selecting British teams by open-to-all trials puts the reward of one or more overseas trips within the reach of all keen contest fliers. With such a goal to aim at, quality and quantity of entries may well attain a standard sufficient to put a fair share of these fine trophies within our reach. Let us hope this, the first year of the second half of the twentieth century, may prove a vintage one for British aeromodelling enterprise.

Cover Photograph . . . . .

Features Roy N. Yeabsley, outstanding sailplane exponent with his model "Revenge," full details of which are given in this issue. Although Roy's past successes have been obtained with his now famous "giant" class model "Sunspot", his capabilities in the A/2 sphere as portrayed by "Revenge" have been well proved. Successes to date include the K. & M.A.A. Cup, the S.M.A.E. Cup and the International A/2 Contest at Eaton Bray.



Congratulations and Condolences.

We deplore the state of affairs whereby a junior is publicly declared the 1950 Champion, and then, on a correction being notified, to find that it takes no less than seven weeks for the true situation to be elicited. Anyone can make mistakes, but there is surely no excuse for dilly-dallying to put matters right.

D. H. Rumley of Kentish Nomads was declared the top junior for 1950, but it was ultimately discovered that F. E. Howkins of the Birmingham M.A.C. had scored ten points more than Rumley, and the records corrected. Whilst congratulating Frank Howkins on his success, we sincerely condole with young Rumley on what must have been a bitter disappointment. It is no joke to have one's hopes raised, only to have them dashed at the last minute.

However, we are proud to place on record that the "loser" took the matter in true sporting spirit, and proved once again that the younger element in present-day aeromodelling has all it takes to keep the hobby in the front line of sporting events.

British v. American Records.

We hear much from time to time from certain Jeremiah's about the failings of British aeromodelling when compared with happenings in the States, so it is hoped that the following comparative list of model aircraft Records will serve to show that we are not all that far behind. Perhaps it would be well to further point out the accepted wide difference in our respective general weather conditions, for it is a well known fact that on the large continents it is usual to expect more stable conditions than we enjoy here, even though they do in turn suffer more from extremes of meteorological variation.

Category	American	British
R.O.G. Rubber	26 : 33	35 : 00
R.O.W. Rubber	8 : 01	8 : 55·4
Autogiro Rubber	0 : 43·8	0 : 39·5
Helicopter Rubber	8 : 55	2 : 43·7
Glider (Tow launch)	30 : 00	63 : 46
Glider (Hand launched)	19 : 32·8	7 : 05·2
Power A	24 : 20	31 : 05
Power B	25 : 01	20 : 28
Power C	30 : 00	6 : 46
Power R.O.W.	2 : 55·8	2 : 59·4
C/Line A (British Class III)	120·27 m.p.h.	89·1 m.p.h.
C/Line B (British Class IV)	135·08 m.p.h.	107·1 m.p.h.
C/Line C (British Class V)	134·68 m.p.h.	118·4 m.p.h.
C/Line D (British Class VI)	162·53 m.p.h.	132·6 m.p.h.
C/Line Jet	149·49 m.p.h.	133·3 m.p.h.
Indoor H. L. Stick	32 : 19·8	18 : 52
R.O.G. Stick	25 : 54·6	8 : 42
R.O.G. Fuselage	24 : 35·2	6 : 42
Autogiro	3 : 53·7	0 : 32·2
Helicopter	5 : 34·4	2 : 00

It will be seen that, though we are well outclassed in the Indoor section, and some miles behind in C/L Speed, in Free Flight categories we are ahead in some classes.

Indoor flying has received very little attention here since before the war, but it is hoped that the introduction of an Indoor Nationals in the 1951 programme will stimulate interest in this fascinating type of model. Copland and others have shown that a good " outdoor " man can also be among the best at " flimsy flying ", and we look forward to a few new British records at the Manchester meeting next August.

A little more encouragement to the C/L Speed boys would inevitably " up " our records, and the introduction of International C/L Speed Championships will almost certainly bring about more application to this branch of the aeromodelling hobby.

The big difference in times between the American and British records in the larger engine class for F/F Power shows an obvious lack of application to the giant size model over here, a factor well illustrated at any meeting where power modellers gather. The smaller jobs are in the great majority, and the few big models seen are very seldom built for hot contest (or record) work.

All our Yesterdays.

The turn of the half-century encourages us to look back at the long line of AEROMODELLER volumes on our shelves and wonder just how many of our readers were with us at the start, and have remained our faithful, if not always uncomplaining, supporters ever since. How many, for example, can regard our Hangar Door heading without memories of its pre-war contents, and indulge themselves in nostalgic recollections of those carefree years ? How many, again, are comparative newcomers to our ranks with but a few years of aeromodelling experience behind them, or may even be thumbing these pages as the first of any aeromodelling literature they have ever handled. To them we would extend a particular welcome to join that most friendly band of enthusiasts, with devotees wherever there are a few acres of green grass to fly over. Their problems are all before them : perhaps they may find some of our articles a little beyond them at present, though we do endeavour to cater each month for the beginner as well as the expert, but let them take heart and remember that our staff will be happy to reply personally to their queries if they care to write in. This is just part of our service which we are delighted to fulfill for the good of the cause. Let us hear from you, our friends, both old and new !

Three for Us !

Latest news from the parks battle concerns Chelmsford Council who recently had their application for a bye-law banning the flying of Model Aircraft in Chelmsford recreation ground rejected by the Home Office. We understand a suitable site will now be allotted to the lucky locals.

Walton and Weybridge Council have given the use of a suitable field to the St. Georges Heights Club for C/L flying, stating that they felt it in the National interest to do so.

Another appreciative Council, Slough, has brought smiles to the somewhat lined faces of local club officials who have

long been lobbying for a flying field. A bouquet to Councillor Mrs. Smallbone, whose unremitting efforts on behalf of the Slough boys finally won them flying space.

Hardy Annual!

By dint of weekend work and quite a few evenings our bindery was able to send off all orders for AEROMODELLER ANNUAL, 1950, to the wholesalers in time for pre-Christmas delivery. We hope you got yours in good time. Those who may have waited in the vain hope of receiving it as a Christmas present, or even may have only just got round to thinking of buying their copy should make haste, for this, the third of the series, bids fair to outsell even the high totals reached in previous years. There is too little paper about to permit of any reprint for a very long time, so our advice is get your copy now!

A few copies of the 1949 ANNUAL are still available at 7/6 to complete your sets: whilst those who may not have been enthusiasts so long ago as 1948 can get the first issue at a specially reduced price of 5/-, again while they last!

Who Carries the Baby?

Many arguments heard in the past will no longer be aired, for at last a definite ruling has been obtained relative to broken (or cut?) towlines in competitions. Interpretation of the correct action in such cases has been varied in different districts in the past, but from now onwards such occurrences are dealt with by the following new rule introduced in the National regulations :—

> *GENERAL COMPETITION RULE—11 (f).—In the event of a tow line breaking during the towing of a glider a flight will be recorded; timing commencing when the line breaks. Fouled lines will count as a "no flight" for both competitors.*

Thus, the onus is placed upon the competitor to ensure that his equipment is in proper order. Too often have we witnessed the ridiculous state of affairs where a whole club turns up at a major contest with one bit of string between them, from which are launched all sizes and weights of models, and, when said line either becomes hopelessly entangled or gives up the ghost in disgust, organisation and other competitors are delayed whilst frantic efforts are made to borrow the necessary. It is comparable to a club turning up at a Wakefield contest with one rubber motor between them, and expecting to succeed!

So, see to it that your line and winch or other container are in tip-top condition—and above all, make absolutely certain that no more than 328 feet of line is on the reel.

Bound Volumes.

Long ago we found the only way to keep copies of any monthly publication was to have them bound. Left in an untidy pile they eventually incur family displeasure and go the way of all things during some domestic blitz or spring clean, or are borrowed by the forgetful type, who place little value on your precious back numbers. We have made our usual arrangements to bind up readers' copies of AEROMODELLER at 10/6 per volume; while for those unable to provide the necessary copies—perhaps for reasons suggested—we have a few ready bound volumes available. An advertisement on the subject appears on page 126.

Aeromodellers Abroad.

The prompt announcement of the main international aeromodelling events of the year encourages us to make the suggestion that an organised party of supporters to attend the major events might not only give all the pleasure of a holiday abroad to those coming but also give our official teams a measure of encouragement so often lacking in "away" matches. There is ample time to save up for such a trip in the months ahead, and, if sufficient response is received, we should be very happy to organise such a trip, escorting the party from a London meeting place to the contest, arranging hotels and suchlike—all matters somewhat baffling to those going overseas for the first time. Parents might feel happier, in the case of our younger readers, for the knowledge that some experienced traveller was conducting the party.

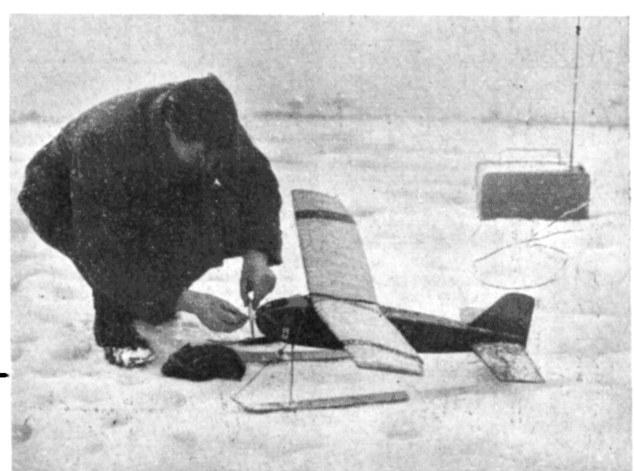
Parties of eight or more should be able to obtain travel and hotel concessions, so please let us hear from all those interested in such a project for any or all of the Championship events detailed elsewhere. In an early issue we will publish details of estimated costs of the trips. As some indication, the Belgian visit would probably cost about £10 a head for adults, juniors a little cheaper, whilst the French trip would be about the same for a long week-end. Parties to Jugoslavia and Finland, being so much more distant, would come more expensive, and mean at least a week's absence travelling by the least expensive routes.

Sparks from the Radio Front.

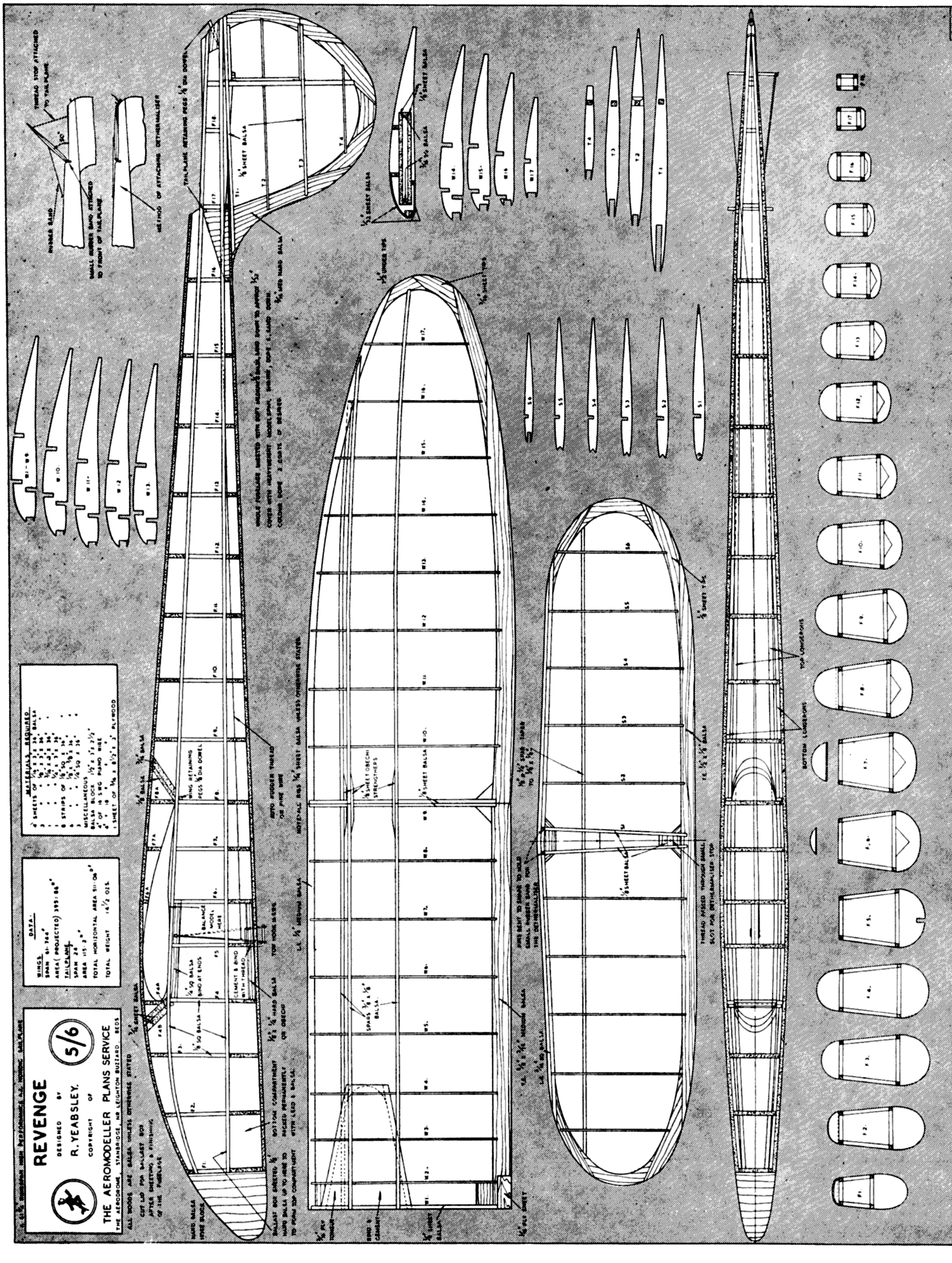
"Here she goes," said Bill Tickner (W.E.A.) on November 19th as he flipped the micro-switch and selected 'UP' elevator. Bingo! five loops in a very rapid row . . . the first fully controlled elevator loops we've yet heard of outside of Jim Walker's territory . . . and marking the start of a new phase in radio control, judging by the influx of two-receiver models and dual purpose actuators at Fairlop's radio corner. Den Allen's Taplin winner now boasts two of everything, the extra gadgetry being hooked up to an elevator of stunt 'Box-car' proportions . . . should be mighty interesting when Den gets it sorted out, for we remember his long list of 'first to do' bunts, eights, inverted, etc., in C/L. Maybe the field will be following him through R/C stunt, too.

Radio Control on Skis!

Aeromodellers being what they are, no one in the Editorial Office looked askance when Assistant Editor Harry Hundleby announced that he was going flying in a snow storm last December. Admittedly a few casual passers by were seen to tap their heads significantly at the sight of a somewhat snow-covered figure setting up a transmitter on the aerodrome at Eaton Bray. From an aeromodelling point of view the experiment was interesting and the take-offs and landings on skis brought sighs of appreciation from aeromodelling-members of the staff. Landings were a particular pleasure, the model running for some distance across the snow before coming to rest. We wonder was this the first radio control model to be flown equipped with skis?



Skis are pivoted at existing axle points, have rubber tensioners in front to keep points up, and thread at rear which permits them to trail at approximately ten degrees. Drag is quite considerable in the air, whereas ground friction is almost negligible, resulting in very rapid take-offs.



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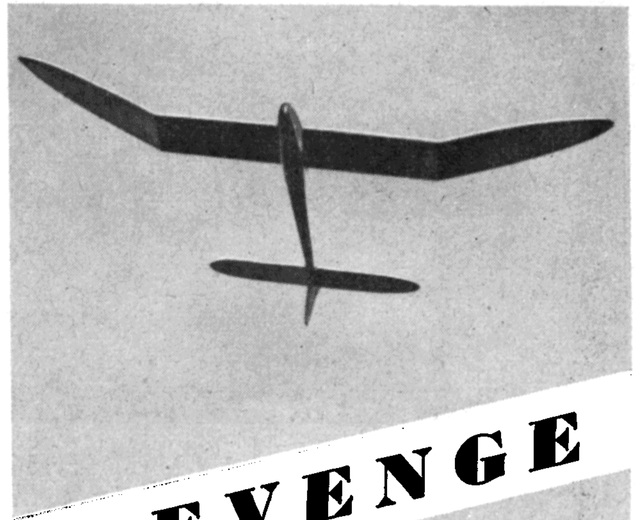
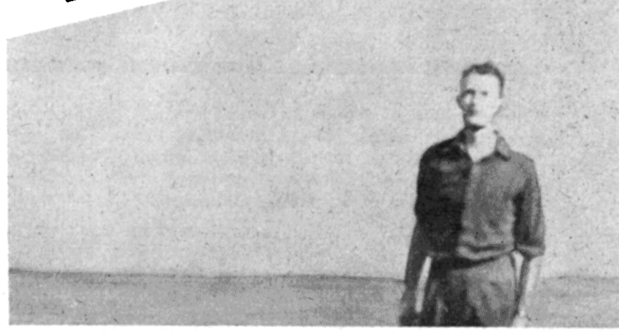
We are proud to present the most successful contest sailplane of 1950—half the size of his famous 'SUNSPOT',—a 61½ ins. A/2 Nordic class design by that glider ace from Croydon, ROY N. YEABSLEY.



REVENGE



ROY YEABSLEY has set a consistent contest winning standard that no other glider enthusiast has matched. Top man in three of the most important events of 1950: the K. & M.A.A. Cup, the S.M.A.E. Cup and International A/2 Contest at Eaton Bray, plus leading position in the team contests for the London Area Inter-club Challenge and the Thames M.A.C. Cup, make Roy a glider expert unparalleled in British aeromodelling.

We recorded our own regret at Roy's failure to qualify for the A/2 team to go to Sweden (readers may remember he failed to beat the clock and return his third flight before the contest closing time), and perhaps the apt nomenclature, " Revenge," has helped to sweeten the pill of disappointment taken on that occasion.

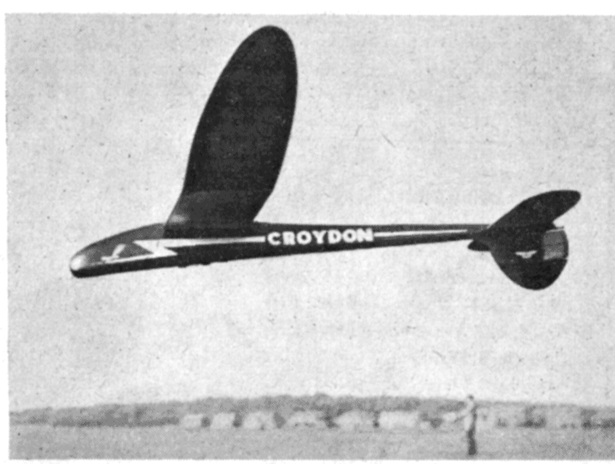
" Revenge " is unusual for its underslung fin, and consequent stability when on tow or dethermalised descent. It is light, at 14·5 ounces, yet conforms to all F.A.I. restrictions. It is a streamliner that has gained the utmost respect wherever it has competed.

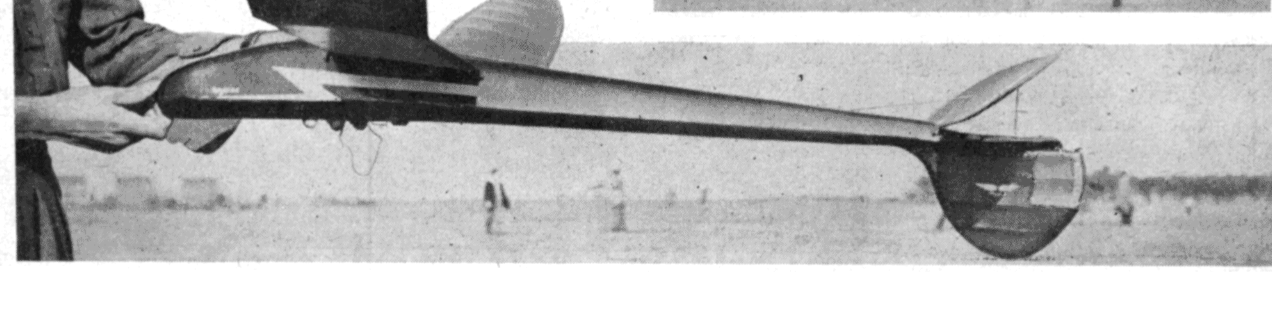
Full building instructions are issued with each plan: but as a foretaste for readers, we present the following extract on trimming notes by Roy, for no doubt many of his rivals are anxious to know his system.

TRIMMING NOTES

The model should be balanced at 45% wing chord from the L.E., the weight is then left alone, and all adjustments are carried out on the tailplane and rudder. Hand-launch into wind, so that straight flight is obtained, then tow up on a short line; if the model sinks without any sign of a stall, pack up the T.E. until a stall is just apparent, but if it is stalling badly then raise the L.E. Now obtain a turn with about 150 ft. circles; the packing under the T.E. may be increased until the stall is again apparent. The pull necessary to straighten the rudder should not be too great, otherwise the rudder will act while still on the line.

For contest work, the straightened rudder should be so adjusted that it will be able to swing the model over to the left when at the top of the line, so that the model will turn straight away into a climb. If allowed to be launched off to the right, against the turn, the model will take time to gain enough penetrating speed and veer round into the turn.





Designer demonstrates the tip-up tailplane operated by a fuse.

PHŒNIX

A 72 INCH SPAN CABIN POWER MODEL FOR ENGINES FROM 3·5 TO 5 C.Cs.

DESIGNED BY BOB WOOLLETT

BOB Woollett has a happy knack of employing eliptical shapes in his designs. Readers will remember his very successful " Wren " of 42 inches span which was featured as an AEROMODELLER design some time ago, and over 1,000 Wren's have been built from A.P.S. plans to date.

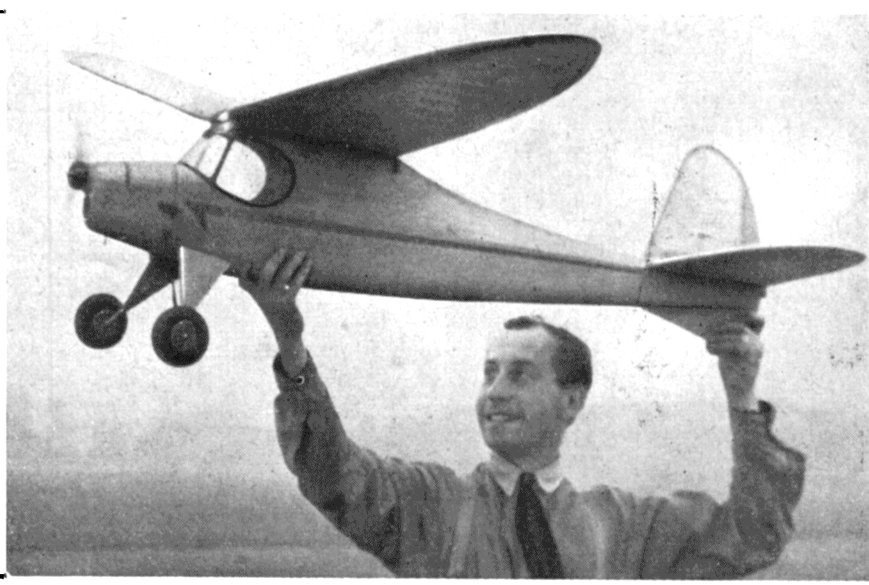
" Phœnix " is the Wren's bigger brother, and the version we present here is a Mk. II which has been flight tested for over a year. Employing a Reeves 3·4 c.c. diesel, the prototype weighed 3 lbs. 10 ozs. giving an ideal wing loading of just under 12 ozs. per sq. ft. Radio control enthusiasts might find this an attractive feature, for there is little doubt that Phœnix could be converted to R/C, and would then come near to the proven ideal radio control wing loading of 14 oz. per sq. ft.

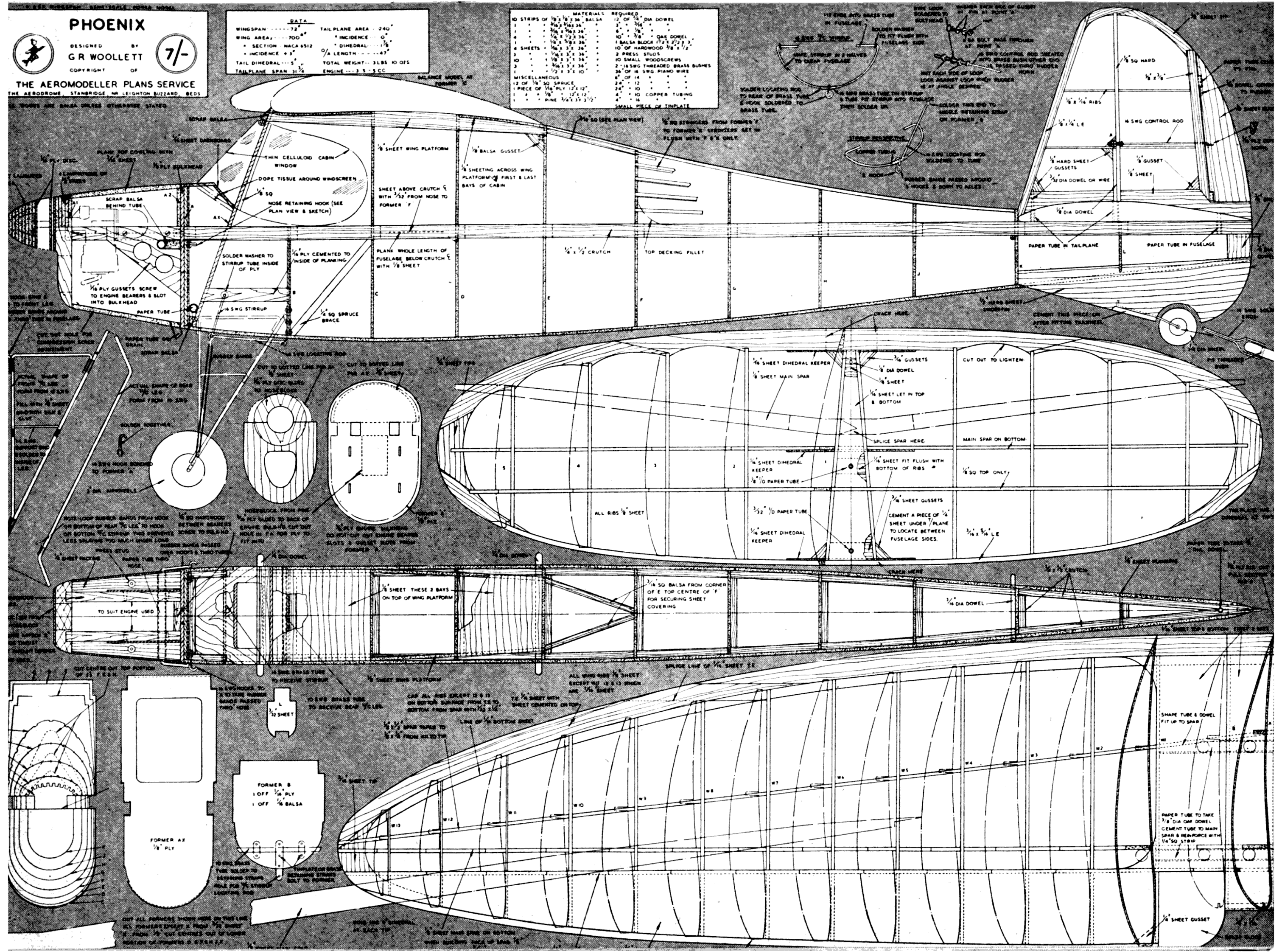
Phœnix displays the same stable characteristics of the Wren, and is a very attractive machine to behold in flight. Moreover the novel and very positive method of rudder trimming developed by Bob Woollett, ensures that repeated flights can be made to the same flight pattern with absolute consistency. If fitted with a more powerful 5 c.c. motor, a lively performance is guaranteed ; though 3·5 c.c. is ample for good performance general flying.

Other very special features of this good-looker is the quickly detachable engine power egg, which can also knock off in the event of a crash, and the stirrup used with the undercarriage, which completely absorbs all landing shocks with elastic band tension. The original was enamelled Celestial Blue fuselage, wing and tail outlines, with Silver doped flying surfaces and Red fuselage flash and name.

Full constructional details are enclosed with each copy of the full size plan (see ⅛ scale reproduction opposite).

THE DESIGNER . . . . Bob Woollett, shown here with prototype "Phœnix" . . . . 30 . . . . married . . . . 14 years in R.A.F. . . . . Built first model 19 years ago—non-flying Airspeed Ferry of 3-ply . . . . sold to Vicar for 4/– . . . . Interested in all types except indoor . . . . prefers diesel flying scale and semi-scale . . . . Won S.M.A.E. Solids Trophy No. 1, 1944 . . . . Tries to get "Solids" finish on flying models . . . . other hobbies : photography, woodwork, playing and watching cricket . . . . Lives at Yalding, Kent.




PHOENIX
DESIGNED BY G R WOOLLETT
COPYRIGHT OF
THE AEROMODELLER PLANS SERVICE
THE AERODROME, STANBRIDGE, NR LEIGHTON BUZZARD, BEDS
7/-
DATA
WINGSPAN 72"
WING AREA 700□"
SECTION NACA 6512
INCIDENCE +3°
TAIL DIHEDRAL 5"
TAILPLANE SPAN 31½"
TAILPLANE AREA 240□"
INCIDENCE 0°
DIHEDRAL 1⅛"
O/A LENGTH 47"
TOTAL WEIGHT 3 LBS 10 OZS
ENGINE 3.5-5 CC
MATERIALS REQUIRED
MISCELLANEOUS
SMALL PIECE OF TINPLATE
BALANCE MODEL AT FORMER 'C'
THIN CELLULOID CABIN WINDOW
DOPE TISSUE AROUND WINDSCREEN
NOSE RETAINING HOOK (SEE PLAN VIEW & SKETCH)
SCRAP BALSA BEHIND TUBE
1/16 PLY GUSSETS SCREW TO ENGINE BEARERS & SLOT INTO BULKHEAD
PAPER TUBE
SOLDER WASHER TO STIRRUP TUBE INSIDE OF PLY
1/16 PLY CEMENTED TO INSIDE OF PLANKING
16 SWG STIRRUP
1/4 SQ SPRUCE BRACE
1/8 SHEET WING PLATFORM
1/8 BALSA GUSSET
1/8 SHEETING ACROSS WING PLATFORM OF FIRST & LAST BAYS OF CABIN
SHEET ABOVE CRUTCH ℄ WITH 1/32 FROM NOSE TO FORMER 'F'
PLANK WHOLE LENGTH OF FUSELAGE BELOW CRUTCH ℄ WITH 1/8 SHEET
1/4 x 1/2 CRUTCH
TOP DECKING FILLET
PAPER TUBE IN TAILPLANE
PAPER TUBE IN FUSELAGE
1/8 SQ HARD
1/8 x 1/16 RIBS
1/8 x 1/4 LE
16 SWG CONTROL ROD
1/8 HARD SHEET GUSSETS
1/8 GUSSET
1/8 SHEET
3/32 DIA DOWEL OR WIRE
1/8 DIA DOWEL
1/16 SHEET DIHEDRAL KEEPER
1/8 SHEET MAIN SPAR
3/16 GUSSETS
1/8 DIA DOWEL
1/16 SHEET LET IN TOP & BOTTOM
CUT OUT TO LIGHTEN
SPLICE SPAR HERE
MAIN SPAR ON BOTTOM
1/16 SHEET FIT FLUSH WITH BOTTOM OF RIBS
1/8 SQ TOP ONLY
1/8 I/D PAPER TUBE
3/16 SHEET GUSSETS
CEMENT A PIECE OF 1/4 SHEET UNDER T/PLANE TO LOCATE BETWEEN FUSELAGE SIDES.
3/32 I/D PAPER TUBE
1/16 SHEET DIHEDRAL KEEPER
3/16 x 5/16 LE
ALL RIBS 1/8 SHEET
2" DIA AIRWHEELS
SOLDER TOGETHER
TO SUIT ENGINE USED
1/8 SHEET THESE 2 BAYS ON TOP OF WING PLATFORM
3/16 SQ BALSA FROM CORNER OF E TOP CENTRE OF 'F' FOR SECURING SHEET COVERING
3/16 DIA DOWEL
1/8 SHEET WING PLATFORM
3/32 SHEET
FORMER B
1 OFF 1/16 PLY
1 OFF 1/8 BALSA
FORMER AX
1/8 PLY
SHAPE TUBE & DOWEL FIT UP TO SPAR
PAPER TUBE TO TAKE 3/8 DIA OAK DOWEL CEMENT TUBE TO MAIN SPAR & REINFORCE WITH 1/4 SQ STRIP
1/4 SHEET GUSSET
1/4 SHEET TIP
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
W13

BUILD NORMAN MARCUS' HIGH CLIMBER

Hereward "the wakefield"

HERE it is at last! A good, consistent and yet simple-to-build Wakefield, which has proved itself with the best of them.

During 1949 this model came fifth in the Gutteridge Trophy with 763·4 seconds and seventh in the Wakefield Trials with 711·25 seconds. The model was renovated for 1950; at the Irish Nationals it came third with 508·4 seconds in spite of having no trimming flights for two months. Returning home it collected first in the Open Rubber event at St. Albans Rally. The model has so far completed five maximum flights and many over three minutes.

"Hereward"—the Wake—is suggested for newcomers to the hobby who have built a few rubber models. The construction should be simple enough for most up-and-coming enthusiasts. "Hereward" is built in the true Marcus tradition in that *no HARD balsa is used*—it breaks the razor blades!

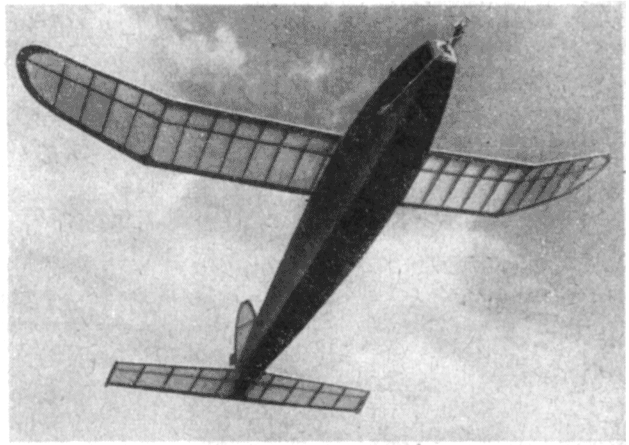
Medium and soft balsa, when used discreetly, give ample strength (for normal use) with springiness and *light* weight. If this type of wood is used, however, it must be carefully picked, i.e., straight grained, and even textured.

Construction.

Build both sides of the fuselage together, on top of each other—when dry, remove sides and separate. Cut all top and bottom spacers and arrange in order: cement two, both top and bottom, at the widest point of the fuselage and hold the nose and tail spacers together with rubber bands. Allow to set, and then add the rest of the spacers (working away from the widest point), holding the longerons in position with the aid of bands. This method gives a perfect rectangular fuselage without the need for formers or jigs. Cement the fin on to the port longeron as shown, not forgetting the 3/32 in. packing piece. Finally add the undercarriage, sheeting, gussets, etc.

The wing is quite conventional and is built in the usual manner. The L.E. is cemented in position as a straight ¼×¼ in. strip. Add the leading edge sheeting after the centre dihedral has been fixed. N.B.—The L.E. shape is very important and no irregularities should be tolerated.

To build the tailplane, pin the L.E. and T.E. to the board, and cement the ⅛×1/16 in. pieces of the ribs in position.



Now cement the spars in place, before adding the ⅛×1/32 in. "uppers." The tail is covered, but *not* water-sprayed or doped, before adding the tip fins.

The propeller is carved from medium quarter grained balsa. The original was sanded to a maximum thickness of about 1/16 in. (beginners are advised to make the maximum thickness between 3/32 in. and ⅛ in.), with a maximum camber of 3/32 in. Drill the hole for the 14G tubing, after the ply hub sides have been fixed. The 14G shaft has never bent in spite of repeated D.T. landings.

Credit must be given to Jack North for his ingenious non-slip, non-twist "S" hook device—seems so simple . . . now! This relieves the strain on the hinge when winding (and on the winder!) and the propeller is not subject to damage with rubber breakage.

The wing, tail and fin are covered with Jap tissue, whilst the fuselage is covered with heavyweight Modelspan. A shrinking-cum-waterproof mixture is made by adding banana oil (½), castor oil (a few drips per ounce) to clear dope (⅛). Apply two coats of this mixture to the fuselage and the centre part of the wing, and one coat to the tail, fin and wing tips.

Even if the weights of the individual parts differ from the original, the complete weight of the airframe should be kept below 4 ozs. if possible. The remainder of the required 8 ozs. is made up with 16 strands of ¼×1/24 in. Dunlop 6010 of approximately 45 ins. length.

The C.G. position is about 2 ins. in front of the T.E. but any difference up to 1 in. either way should not really affect the performance. Adjust the C.G. with ballast, or by moving the wing, if necessary.

Test on a calm evening, obtain a smooth flat glide, by adjusting wing incidence: there should be no tendency to stall. Downthrust may be needed when full turns are applied, to cure the initial stall.

The dethermaliser is of the parachute type, a diameter of 10 ins. being recommended.

New Rule Version.

Introduction of the new Wakefield rules prompts Norman Marcus to suggest that an extra 2 ins. be added to the centre section of the wing, giving a projected wing area of approximately 212 sq. ins., and the tail area increased to 80 sq. ins. by increasing the 4 ins. chord to 4½ ins. at centre, 3 ins. to 3½ ins. at tip, and the span to 20 ins.

The fuselage can be reduced in size (cross section) by thinning the sides to 3½ ins. max. depth and retaining the plan view (i.e., 3 ins.). A wire pylon of 18 g. wire should be added to keep the wing in its original position. An increase in fin area will probably be required to retain stability.

FULL SIZE PLANS (SEE ¼ SCALE REPRODUCTION OPPOSITE) ARE AVAILABLE IN THE USUAL WAY FROM THE AEROMODELLER PLANS SERVICE.

A 42" WINGSPAN WAKEFIELD MODEL

HEREWARD

DESIGNED BY

N. G. MARCUS

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3/6

THE AEROMODELLER PLANS SERVICE
THE AERODROME, STANBRIDGE, NR LEIGHTON BUZZARD, BEDS

ALL WOODS ARE BALSA UNLESS OTHERWISE STATED.

WEIGHTS

FUSELAGE & FIN	1·78 OZS
WING	0·94 "
PROPELLER ASSEMBLY	0·92 "
TAILPLANE	0·27 "
	3·91 "

MAKE UP WEIGHT OF MODEL TO 8 OZ + WITH RUBBER USE 16 OR 18 STRANDS 1/4" x 1/24" DUNLOP APPROX 45" LONG

DATA.

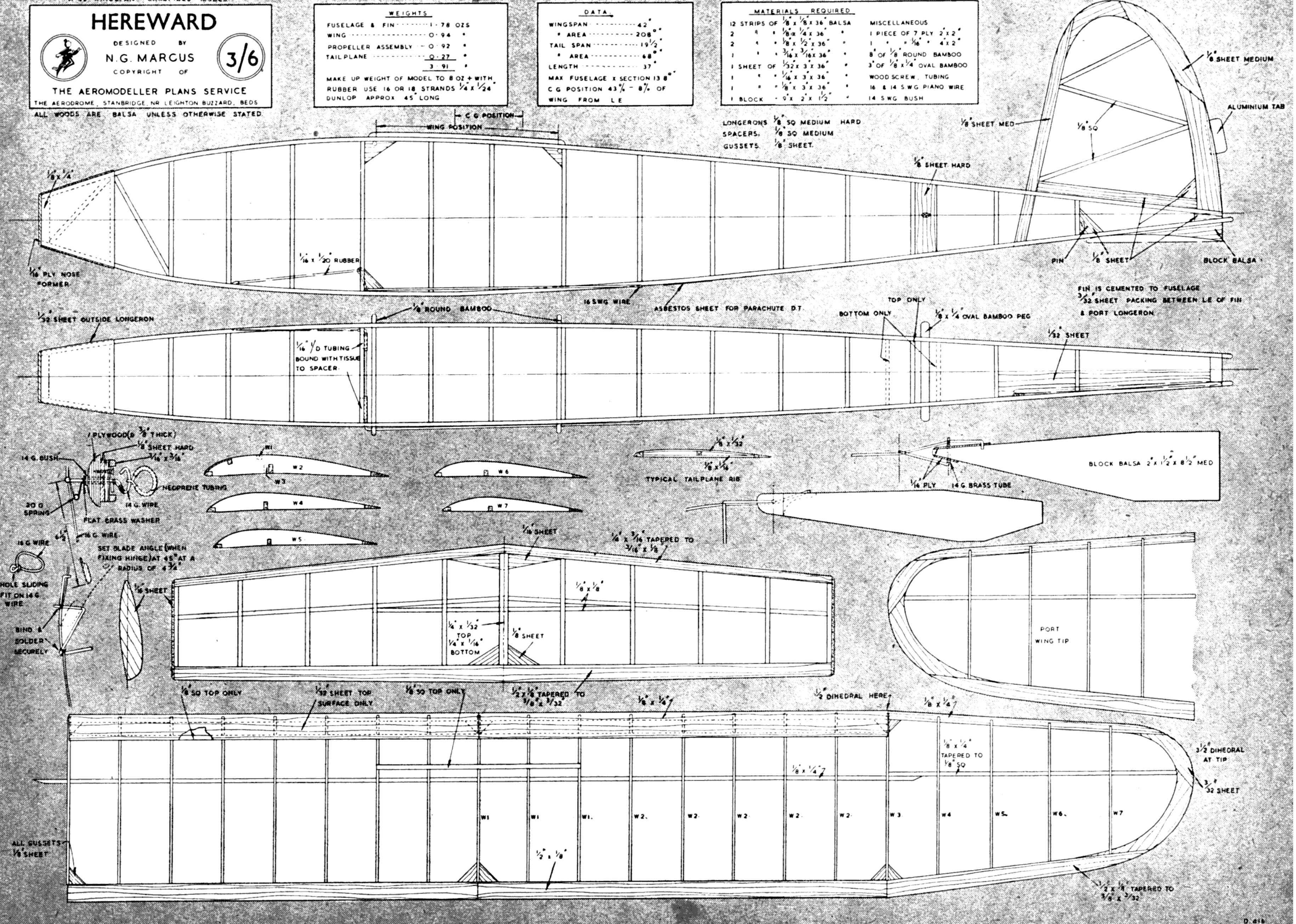
WINGSPAN	42"
" AREA	208""
TAIL SPAN	19 1/2"
" AREA	68""
LENGTH	37"
MAX FUSELAGE X SECTION	13 8""

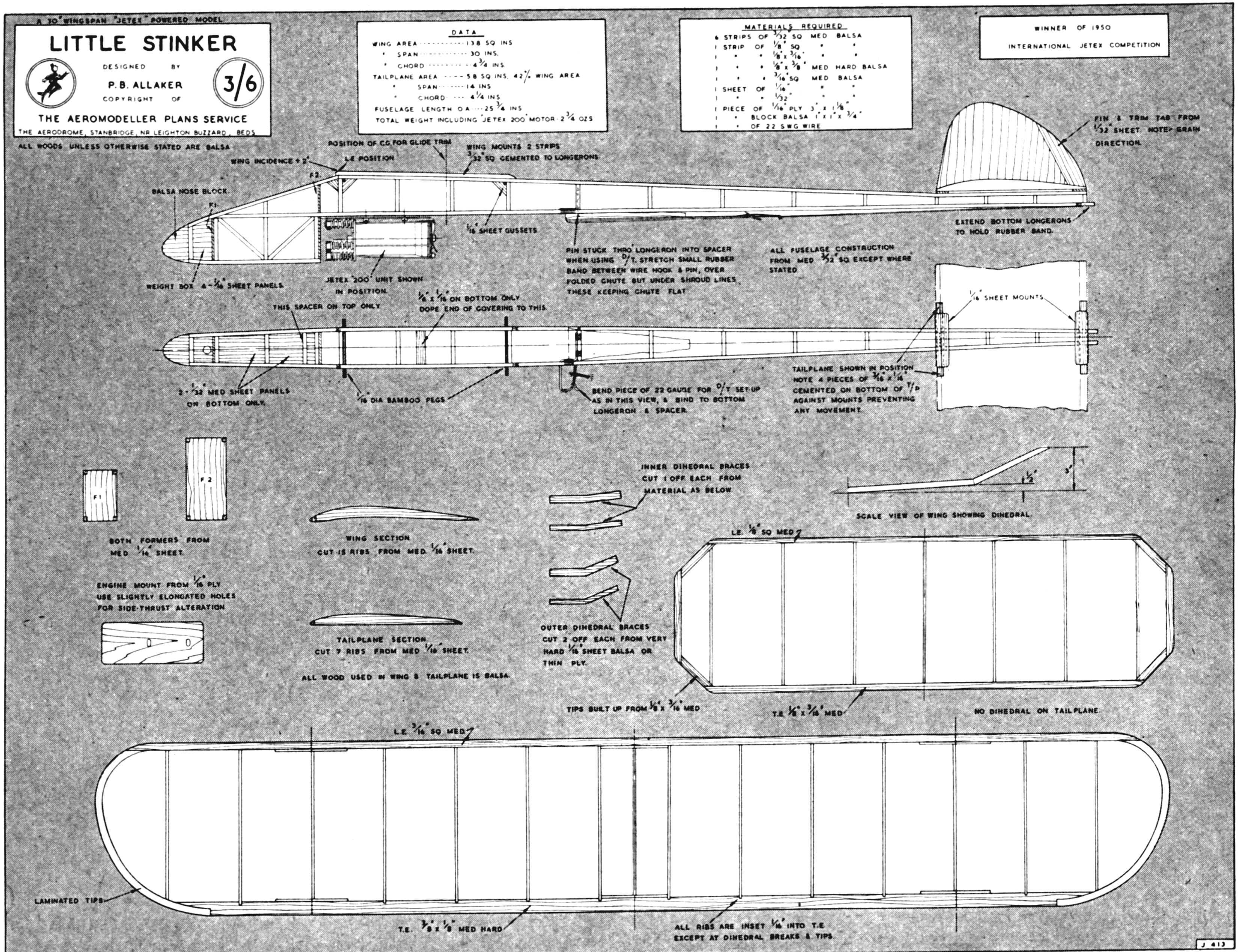
C G POSITION 43% – 8% OF WING FROM L E

MATERIALS REQUIRED

12 STRIPS OF	1/8" x 1/8" x 36" BALSA	MISCELLANEOUS
2 " "	1/8" x 1/4" x 36" "	1 PIECE OF 7 PLY 2" x 2"
2 " "	1/8" x 1/2" x 36" "	1 " " 1/16" " 4" x 2"
1 " "	3/16" x 3/16" x 36" "	8" OF 1/8" ROUND BAMBOO
1 SHEET OF	1/32" x 3" x 36" "	3" OF 1/8" x 1/4" OVAL BAMBOO
1 " "	1/16" x 3" x 36" "	WOOD SCREW, TUBING
1 " "	1/8" x 3" x 36" "	16 & 14 S.W.G PIANO WIRE
1 BLOCK	9" x 2" x 1 1/2" "	14 S.W.G BUSH

LONGERONS 1/8" SQ MEDIUM HARD
SPACERS. 1/8" SQ MEDIUM
GUSSETS. 1/8" SHEET.





THIS IS A 1/4 SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 3/6 POST FREE, FROM THE AEROMODELLER PLANS SERVICE.

"Little Stinker"

WINNER OF THE 1950 "JETEX" CONTEST

DESIGNED BY P. B. ALLAKER

THE DESIGNER: Age 19 ... member of Surbiton Club .... Aviation apprentice ... interested in motor cycling .... is 100% Contest minded, preferring Galas, Rallies, and Inter-club contests. Dotes especially on lightweight rubber types.

A STUDY of this successful high performance contest design leaves no doubt that the designer is a lightweight enthusiast. His performance at Fairlop under most adverse weather conditions amply proved the capabilities of this model, the flight times being 114·7 seconds and 122·7 seconds. In his opinion the following design requirements were necessary in order to obtain maximum performance with a Jetex model:—

1. Ultra light weight; this being very necessary if a fast and high climb is desired.

2. Have a comparatively low centre of gravity, i.e., motor mounted under the fuselage.

3. Have a large tailplane area and moment arm to stop power looping and to give a good pull-out into the glide.

Construction.

Fuselage: Build this in the usual manner, i.e., lay down two sides, remove from plan and fit in the two formers together with the spacers. Panel the nose pay (weight box) and cement on the roughly shaped nose block, finishing this off when the cement has thoroughly dried. Notice that the wing and tailplane mounts are added after covering.

Before covering, carefully round off the corners of the longerons. Do not forget to bind in the wire for the dethermaliser fuse.

Attach motor clip to mount with 6 B.A. nuts and bolts. These can be slackened off afterwards if it is necessary to alter sidethrust.

Cover with Jap or light weight Modelspan tissue (original was black), water shrink or steam, and give one thin coat of clear dope.

Wing: Cut out the wing ribs as shewn on the plan and pre-shape the trailing edge completely, sanding down to a knife edge. Then lay T.E. in position on plan. Mark on the necessary rib notches, remove from plan and cut away notches with a sharp razor blade.

Cut a template from stiff cardboard to the inside contour of the tips. Now cut 12 strips (6 for each tip) from medium

1/32 sheet, 1/8 in. deep and long enough to bend around the template, leaving say 1/2 in. surplus at each end.

It is a simple job now to smear cement along each of the six strips and bend them round the template altogether, though this must be done quickly before the cement has a chance to set. Allow this lamination to dry thoroughly before attempting the other tip.

After removing the structure from the plan, shape the leading edge and tips, add the dihedral braces, checking the amount of dihedral, and finally sand smooth all over.

Cover with Jap or light weight Modelspan (original had yellow inner panels and black outer), shrink, and give one very thin coat of clear dope.

Tailplane and fin: This is simple enough, though be careful not to select wood that is too soft, for it is important that the tailplane is kept free from warps.

Cover top and bottom with Jap or light weight Modelspan (original was yellow), but do not shrink or dope. Fin was black. After covering, cement on fin and position tailplane squarely on fuselage; cement on the locking pieces and check to see that there is no movement, otherwise consistent flying will never be achieved.

The trim tab is not hinged but securely cemented when model is finally trimmed.

Flying: Before attempting any trimming, assemble the whole job and check for warps; they can be taken out in the steam from a kettle. Check for C.G. position and add weight if necessary.

When trimming for glide, make certain the unit is empty, a charge will put the C.G. further forward and will upset the final trim. After the glide has been perfected, a short power run can be made. It is best to saw a single charge in half.

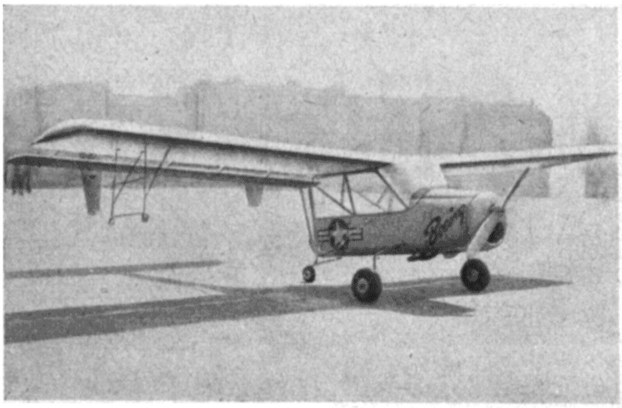
The original model had no side or down thrust on the unit and just a little right trim tab. This gave a gentle right turn on the climb and a wide right circle on glide. On future models I intend to tighten up the glide turn, giving the motor sufficient left thrust to stop any spinning.

Be sure to add your name and address label before trimming and always set the D/T in operation. Use an 8 in. diameter parachute, with a 1 1/4 in. dia. hole in the centre.

AEROMODELLING

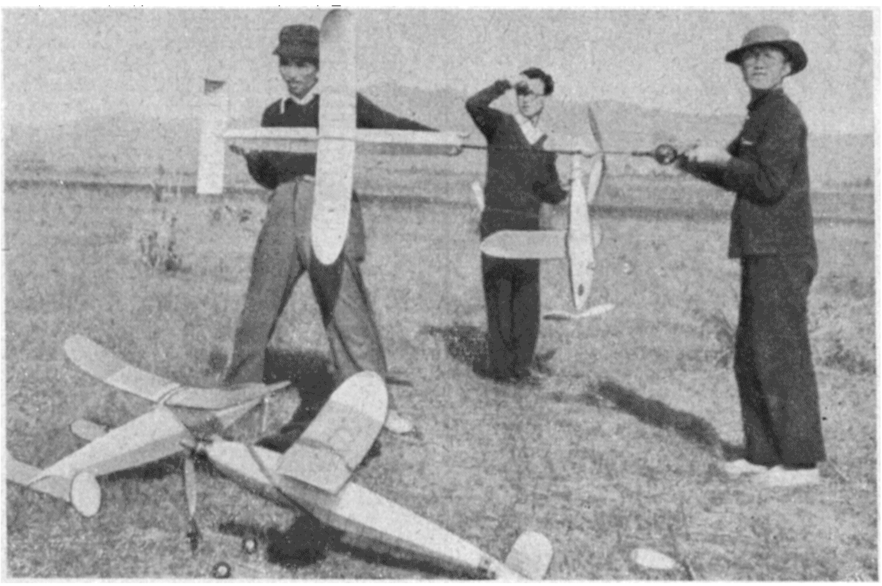
By HIDEMASA KIMURA

Dr. Eng. Professor of Mech. Eng. at Nihon University. Sometime member of Aeronautical Research Institute, Tokyo. Full size designer . . . Aeromodeller for over 30 years.



SINCE the end of the War, we Japanese have been prohibited from studying, building and flying real aeroplanes, and now aeromodelling is the only aviation activity in this country. But even aeromodelling was stopped just after our defeat, owing to the worst economic condition of our country.

In 1946, some model enthusiasts among U.S. occupation soldiers began to fly their U control gas models at Tokyo and other cities. It was the first time for us to see control line models, and it was very impressive for us to hear the roar of modern American gas engines which had much higher performance that the pre-war types. Incited by their activities we began to study control line models, and established the Tokyo International Model Airplane Club (T.I.M.A.C.) to fraternise with foreign soldiers by aeromodelling. Since 1947, T.I.M.A.C. meets for control line models have been held two or three times a year at Tokyo Palace Field. Most Japanese boys are much interested in U control scale models.



IN JAPAN TODAY

Heading pictures show on left: The Author.

Next: Boating party with hydroplanes on Lake Yamanaka, with Mt. Fujiyama in background.

On right: Wakefields at the Sky Friends' November meeting.

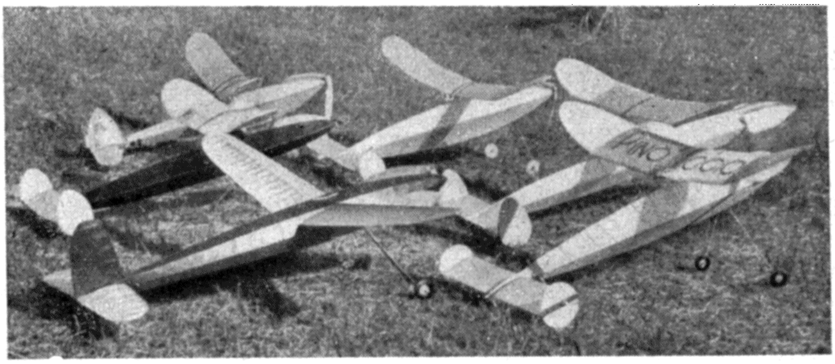
Left centre: Boeing L15 C/L built by H. Iwata. Span, 6¾ ft.; weight, 5¾ lbs.; power, Ohlsson 60.

Bottom row, left to right: Winding up at the Japanese Wakefields. K. Miyoshi, the winner and his model can be seen behind the winders.

Pod and boom glider is held by builder Y. Mikami.

" Diana " Arden 099 powered free-flight model with builder—again H. Iwata.

Boeing B29 C/L model. Span, 8 ft. 2 in.; weight, 15½ lbs.; powered with four Mamiya 60 (Japanese) engines. Speed 60 m.p.h. Take-off run, 18 yards. Retractable wheels. Builder S. Mamiya.



The " Sky Friends " is the leading club for free flight boys. Among the members, there are real aeroplane designers such as me and K. Honjo, who designed the famous " Betty " bomber during the War. In May 1950 the club had the first Wakefield contest at Osaka Airport, in August the first hydroplane meet at Lake Yamanaka, near Mt. Fuji, and in November the second Wakefield at Ishioka, near Tokyo. The winner of the second Wakefield was K. Miyoshi, whose average time was 2 min. 44·1 sec.

The National Model Aircraft Governing Body in Japan is the Model Airplane Federation of Japan (M.A.F.J.) which was established in the fall of 1949. They held the first all Japan Model Airplane Meet in April this year and the second All Japan Meet in October. At the second meet the leading records were as follows :—

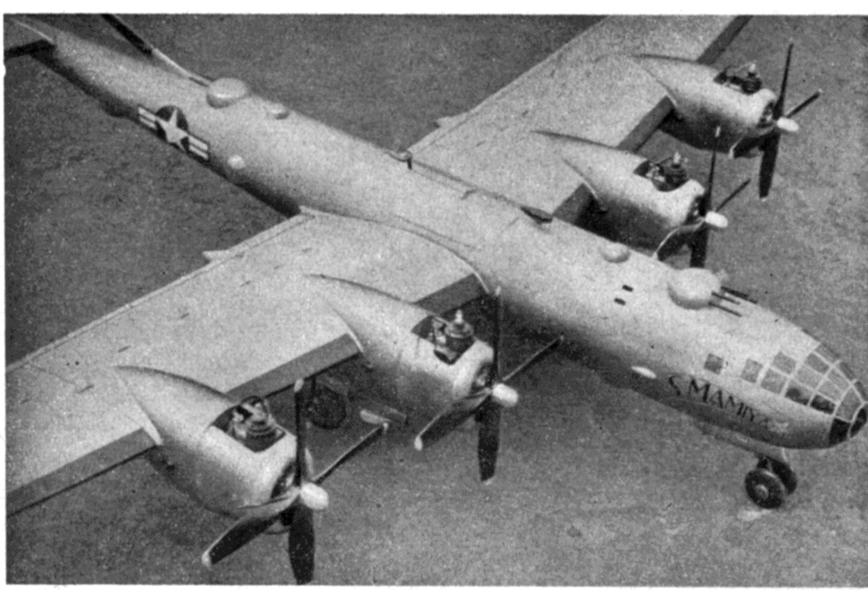
Tow Line Glider	H. Kudu	12 min. 23·5 sec.	(total of three flights)
Outdoor Rubber	I. Yamada	7 min. 22·5 sec.	do.
Free Flight Gas	K. Hattori	(Arden 199) 10 min. 09·7 sec.	do.
Control Line Speed	H. Kobayashi	Class B (O.S. 29) 105·2 m.p.h.	
	H. Kuno	Class D (McCoy 60) 126·0 m.p.h.	
Control Line Stunt	K. Suzuki	278 pts.	

Most Japanese boys are very handy at workmanship and can build very ingenious models. The construction weight of models is very light, but most models are somewhat delicate and not so rugged. It is very interesting to find that the trend of model aeroplanes is similar to the real Japanese aircraft during the War, which were very light and manœuvreable as compared with foreign aircraft.

The materials most widely used for model workmanship are " Hinoki " (similar to spruce), " Kiri " (specific gravity 0·2, suitable for planking), bamboo and Japanese tissue.

The technical features of Japanese free flight models are low aspect ratio wing with long tail moment arm. This trend is probably due to the influence of some rubber models designed by me during the War. The lower the aspect ratio is, the lower the profile drag is, due to the larger Reynold's number, and the more rigid and accurate the wing construction is, and these advantages will more than cover the increase of induced drag—this is my opinion.

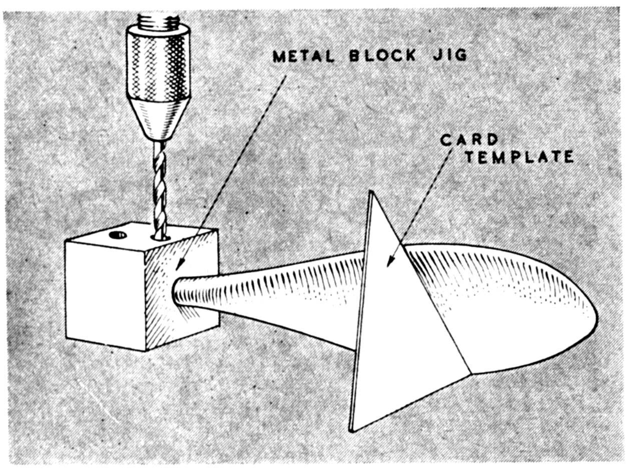
At present we are very sorry that we cannot get good rubber. With Japanese rubber, safe number of turns for Wakefield class is only 600 or so. The Japanese engine production has been concentrated on the small gasoline engines with glowplug. Most of them have the displacement under 0·199 inches.

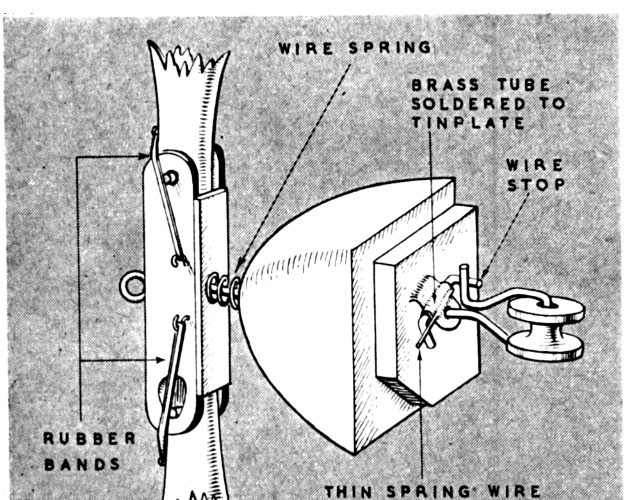


EASY PROP FOLDING

BY GEORGE WOOLLS

Photo left shows single bladed airscrew in the extended position. Right, is the airscrew folded showing peg dropped down into the slot, free wheel disengaged and the blade lying flat along the fuselage.





THE argument "to freewheel or fold" is still as rife as ever; contests are won with equal facility by either, and I do not intend to take cudgels for either side now.

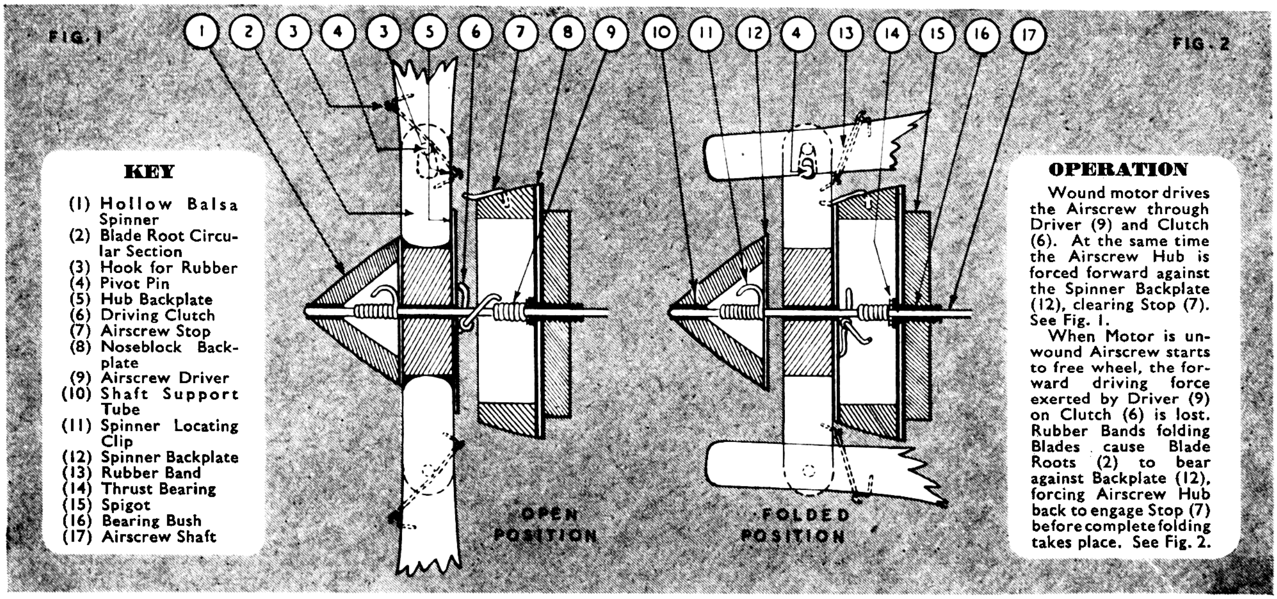
However, while I am still at the moment in love with the simplicity of the freewheel, I have been toying with the idea of folders again. Oh yes, I have used them, and I have been almost scared of them by the difficulty of getting the blades to fold flat. The skew hinge works, if you get it right, but that "getting right" can be no easy matter. It is hard to be sure that the hinge angles are correct until you cut the prop and fold it, and then there are hours of juggling if they are not right. Then when you start playing with blade, hub and hinge separately, the fun starts and the correct pitch goes haywire.

As I wanted to try a double-bladed folder the thought of all this, plus the fact that I like both blades to have the same pitch angles, decided me to try and think up some other way of doing the job.

After much sketching and thought, the solution became plain, and once seen, the scheme seemed so obvious and simple, that I can't understand why it has never been published before, and skew hinges thrown out of the window long ago.

As will be seen from the sketches, the blades are pivoted between side plates extending from the hub. The blade roots are of circular section, and as the blade folds the pivot drops down the slotted pivot hole in one side plate, causing the blade to twist through its pitch angle, and to lie flat on the fuselage. In the case of a single blade folding on the top of the fuselage, this action will take place solely under the action of air pressure and gravity on the folding blade. However, where the blade must fold on the side as in the case of a double-bladed folder, the blade must be caused to twist by means of an elastic band arranged as shown. This band should pass over the hook on the blade, from one side plate to the other (not just on the slot side) in order to eliminate friction due to the blade root bearing on one side plate only when folding.

This method does, I think you will agree, simplify folding, but we haven't finished yet with the advantages. Provided that the diameters of the blade roots are the same, blades may be replaced or changed, thus allowing experiments with different diameters, pitches, and shapes to be made. The



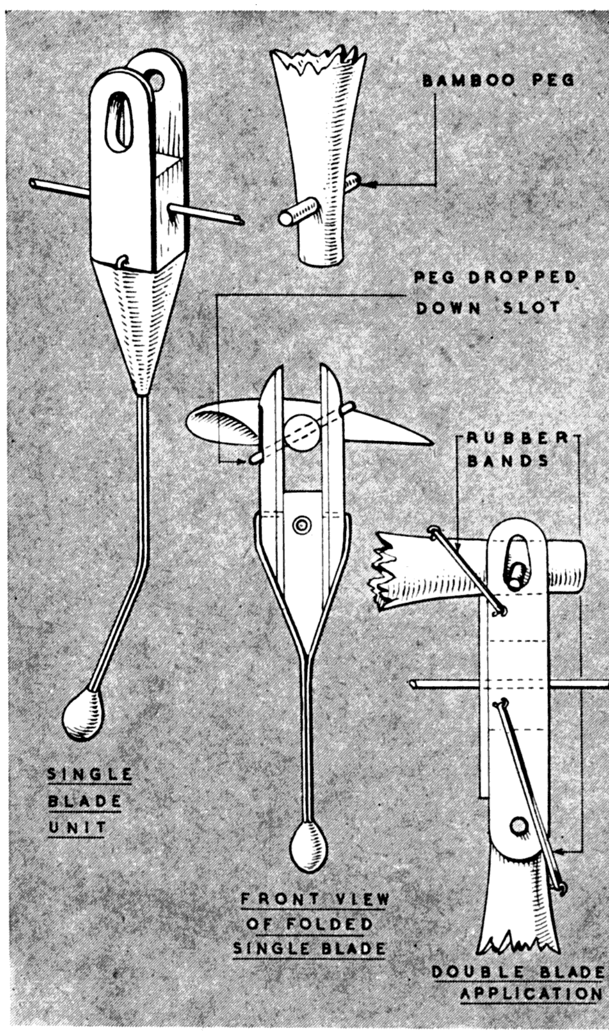
blades will always fall flat as long as the slot is long enough. A slot equal in length to the diameter of the blade root will allow a prop having a pitch/diameter ratio of $1\frac{1}{2}$ to 1 to fold flat, a higher pitch/diameter ratio will require a longer slot.

It will be seen that it is the angle with respect to the blade, at which the pivot passes through the blade root, that governs the pitch, therefore care should be taken when drilling this. Make the hub complete with side plates drilled and slotted. Fit the blade in place and mark it's root through the hole in the side plate. Draw a line right around the root coinciding with this mark. Support the root on a wooden block, set the blade to correct angle by means of a template, and drill a hole horizontally through the exact centre of the root slot. Four hands are required for this job. A jig, consisting of a rectangular block of metal drilled through the centre, with a hole to suit the blade root and at right angles to suit the pin hole, will simplify the drilling and increase the accuracy.

Having solved the folding problem I did a bit more thinking; with this " set up " for folding, hand winding may be indulged in, not normally an easy proposition, as apart from holding the blades out, one normally has to push the tensioning spring back, so that the stop-bar clears the locating pin. To solve this, we find another application of the Garami type free-wheel (the best yet). The stop pin is hinged and lightly spring loaded, as shown, so that when winding, the pin is forced down and over-run, but is always there to do its job when the time comes.

It should be possible to do away with the automatic stop, and tensioner in the case of a single-bladed folder. If a normal free-wheel is used, the counter weight will swing low directly the blade starts to fold, causing it to fall on the top of the fuselage.

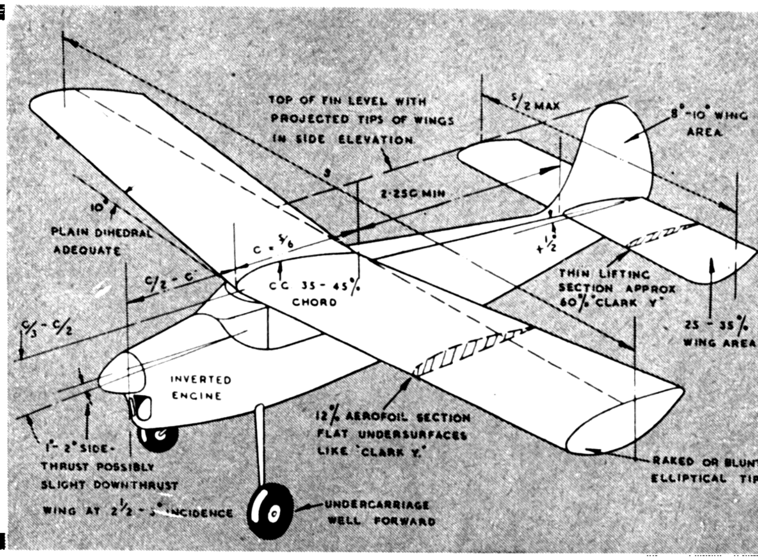
A method of eliminating the spring tensioning on a double-bladed folder, enabling a pre-tensioned motor to be used, is illustrated in Fig. 1 and 2 at the top of this page and may prove worth trying. Fig. 1 shows the unit in the open position, and Fig. 2 in the folded position. The Clutch (6) is a normal type "Garami" free wheel, as shown in the lower figure on the opposite page, except that the arms are bent at an acute angle, but there is one spring wire stop. My own experiments along these lines indicate that the scheme is a practical one, but that the hub must be an easy sliding fit on the shaft.



It's DESIGNED for YOU

NUMBER EIGHT

CABIN POWER



ON the face of it there may not appear to be a very great deal of difference between the design of a power duration model of the pylon layout and one with a cabin. Some cabin models, in fact, maintain the same high wing position, only instead of a pylon pure and simple, the forebody of the fuselage is so shaped to incorporate a cabin front and a certain semi-scale appearance. These, however, are not true cabin models. They are still pylon models on account of their wing positioning and are designed and laid out on similar lines (AEROMODELLER, June, 1950).

The true cabin model is not a duration type as such, although some may have a comparable performance. As a general rule, however, they use less powerful motors for the same size of model and wing loading may also be greater.

The type of cabin model chosen is intended for sport flying rather than contest work. Stability remains the first and most important feature, but appearance can be considered on an equal basis with performance. In duration design, appearance is generally a secondary consideration.

Power Loading.

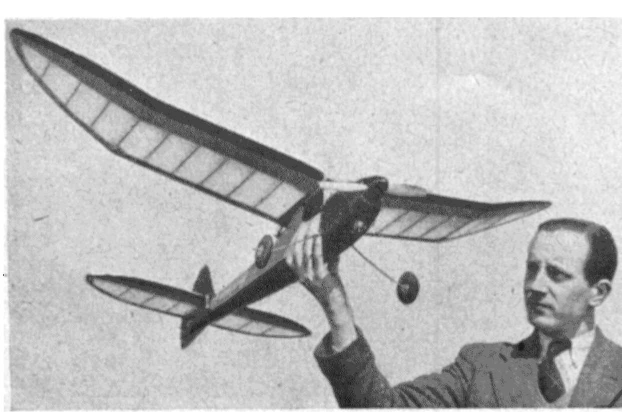
Now in the design article covering power duration we emphasized the fact that such models are generally over-powered and it was this excessive power which led to so much difficulty in trimming. Some people will, quite justly, claim that power duration models are the most difficult type to trim on this score, although that is not the true state of affairs. It is not trimming that is so difficult as much as the original *design* being at fault. Being overpowered, the margin of stability is reduced, and hence trimming does become tricky. The fact that a power model can be difficult to trim is really a pointer to the fact that the *original design* is at fault somewhere. Any model with marginal stability is bound to be tricky to trim.

We should be able to avoid many of these difficulties with the sports type of cabin model, for there is not the call for an extremely rapid rate of climb and the excessively powerful motor. As an example—a 1 c.c. motor will fly a 4 ft. span, 350 to 400 sq. ins., cabin model quite well, if only a moderate climb is required, whereas motors of 5 c.c. or more have been used in the same size of model for duration work. The **Zipper,** pioneer model of the pylon type with 488 sq. in. wing area, used a motor of anything between 5 and 10 c.c.

There is, of course, the danger of going to the other extreme and producing an underpowered model. Under certain conditions underpowering can be as harmful as overpowering. The latter may introduce stability troubles but the former can be almost as disastrous in being insufficient to keep the model under control in gusts as might be experienced in windy weather. The true sports model must be just as capable of flying in winds when that little extra power is so helpful.

Our choice, then, is for the moderately powered cabin model which will have quite a good climb, but not approaching the usual duration standards. If the design proves stable enough it could, of course, be 'hotted up' by using a more powerful motor, but the bulk of evidence is against the true cabin type as a contest model. The cabin contest model is usually the 'cabin-pylon'.

Strictly speaking the *size* of the model should be related to the individual motor to be used—a wing of sufficient area to 'tame' the power of that motor. Wing area alone, can be taken as the criterion as most of the other factors affecting performance, such as wing loading and the proportions of the other components (and consequently their drag values) follow naturally. The one point on which this simple rule falls down,



The attractive cabin power model held by designer Bill Lunn of the Victoria Model Flying Club, is the latest of a series of his designs. Points to note in this view are the eliptical tip portions of both wing and tail surfaces, plus the touch of realism added by shortening the wing chord for the small centre section. The inverted Mills 2·4 c.c. Diesel is easily accessible, yet cowled in a realistic manner. Span is 54 ins. and weight 20 ounces.

however, is that it cannot truly be applied directly to *motor* size. There is a considerable difference in power output, for example, between the Allbon **Javelin** and **Arrow.** Both motors are of the same size but the ' ideal ' cabin sports model for each would be of different size.

It is virtually impossible to list all available motors together with the optimum size of sports model and so only a few selected examples are given in Table I. General figures, with the limitation just mentioned, are given in Fig. 1. Towards the top of the graph, it will be noticed, wing area required tapers off. This is due for a variety of reasons, not the least being that an excessively large model is not desirable. At the lower end of the scale—the smallest size of motors—layout size can approach more nearly to duration standards, although introducing the element of more difficult trim. Fortunately, however, for sport flying there is a generous margin in ' power required ' for any particular design.

Wing Design.

Proportions of the rest of the model can then be laid out with reference to the selected wing size, as detailed in the heading drawing. Wing span is a good criterion for the proportioning and layout of the rest of the components on almost every type of model and the cabin design is no exception. However, for a given wing area we must decide the aspect ratio before we can arrive at the span, for

$$\text{Aspect ratio} = \frac{\text{span}}{\text{average chord.}}$$

Broadly speaking, increasing the aspect ratio of a wing of given area increases its efficiency, but since the sports model is not basically concerned with efficiency, choice of aspect ratio should be considered on the basis of structural design and appearance. As regards the former a figure of between six and eight generally gives the most economic structure, i.e., the greatest strength/weight ratio, whilst the latter is largely a matter of taste.

A plain rectangular wing with an aspect ratio of six, therefore, is a very good standard which, with blunt elliptic tips, has quite a good appearance. A more squared tip form with very simple sheet construction is an alternative which is now finding favour, and again is quite satisfactory—Fig. 2. If a taper wing is decided on then the aspect ratio can be increased to around eight. The taper ratio should be kept low, to avoid both the undesirable (unstable) effect of a small tip chord and keep the root chord to a reasonable figure. A suitable platform is shown in Fig. 3, fitting in nicely with blunt, rounded or raked tips. The taper should be proportioned equally on both leading and trailing edge or one third of the leading edge and two thirds on the trailing edge. Aerodynamically there is little to choose between the two.

Tail Area.

Tailplane size can be directly related to wing area. It will not be necessary to use the large tailplane sizes common with the modern power duration model, but the proportion required for adequate stability will vary with the size of the model. Small models will need a proportionately larger tailplane than the larger ones. At the lower end of the scale, for example, it is considered unwise to use a tailplane area of much less than one third of the wing area. When the wing area approaches 1,000 sq. ins. or more, a tailplane of only 20 per cent. can be adequate, although few designers work right down to this limit. The approximate relationship is given in graphical form in Fig. 4.

There is no point in making the tailplane too small. A smaller tailplane may result in a certain reduction in overall drag, but at the expense of decreasing longitudinal stability. Far better to err on the side of having a tailplane larger than strictly necessary.

Against this, of course, is the fact that a large tailplane detracts from the semi-scale appearance of the model and so the figures worked out for Fig. 4 represent a satisfactory compromise. Little harm will result from varying these a small amount either way.

The two remaining factors determining longitudinal stability are, then, centre of gravity position and tailplane moment arm. Both are important, but we can fix a minimum for the latter of about 2·25 times the root chord of the wing when, with the tailplane proportion already arrived at, tailplane power will be quite adequate. Too long a tail moment will spoil the appearance of the completed model, and so a maximum of three times the root wing chord is suggested.

C.G. Position.

Selection of the best centre of gravity position must take into account a number of other factors. The wing is considerably lower, relative to the thrust line, than that of the pylon model and less power is being used. Nor is absolute

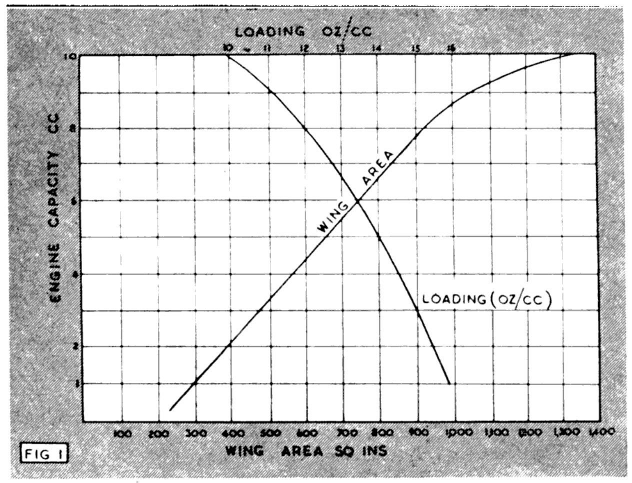


FIG 1

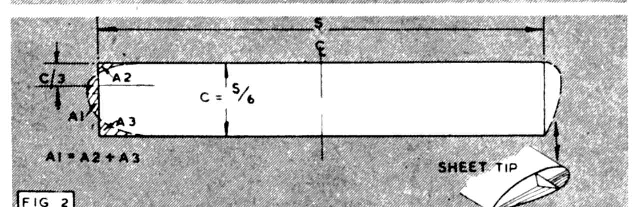


FIG 2

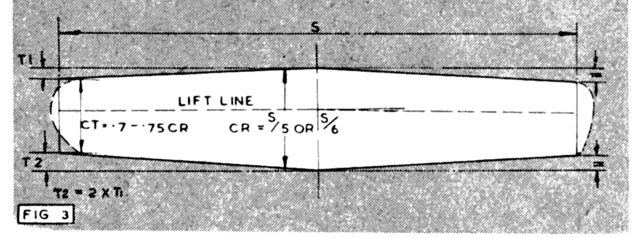


FIG 3

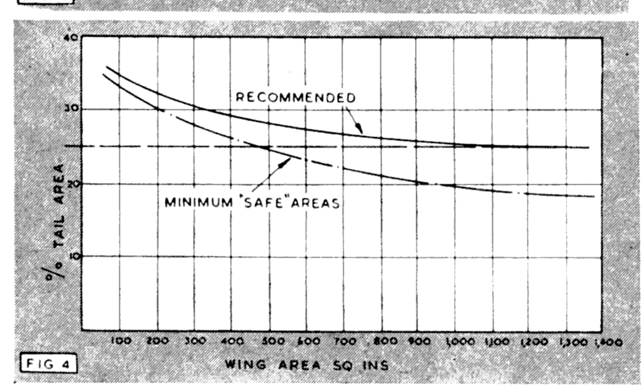


FIG 4

performance so important. There is little point, therefore, in using an aft centre of gravity position and possibly re-introducing stability troubles. In other words, the tailplane should not be considered as a definite lifting component whence, by so doing, we make its adjustment less critical.

At the same time, bringing the centre of gravity right forward so that the tailplane is normally operating as a stabilizer pure and simple (i.e., all the lift coming from the wings) does not necessarily produce the best set-up of forces—Fig. 5.

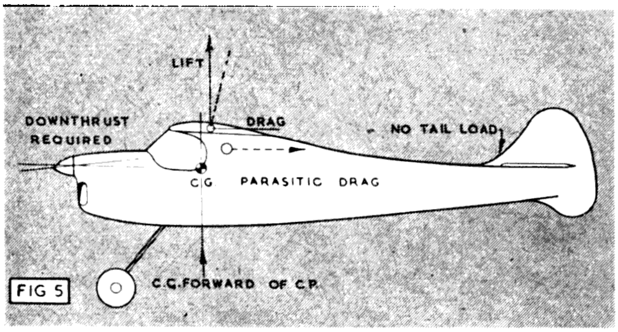


FIG 5

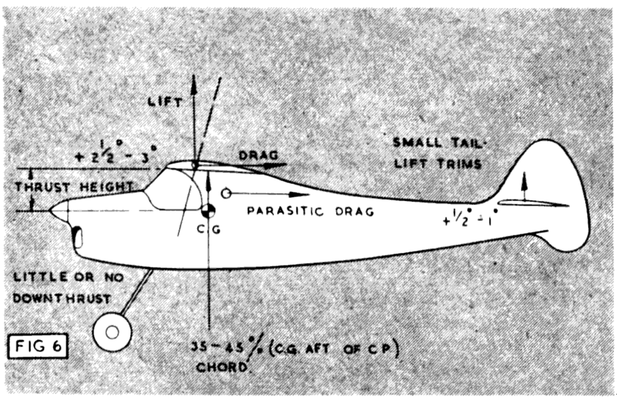


FIG 6

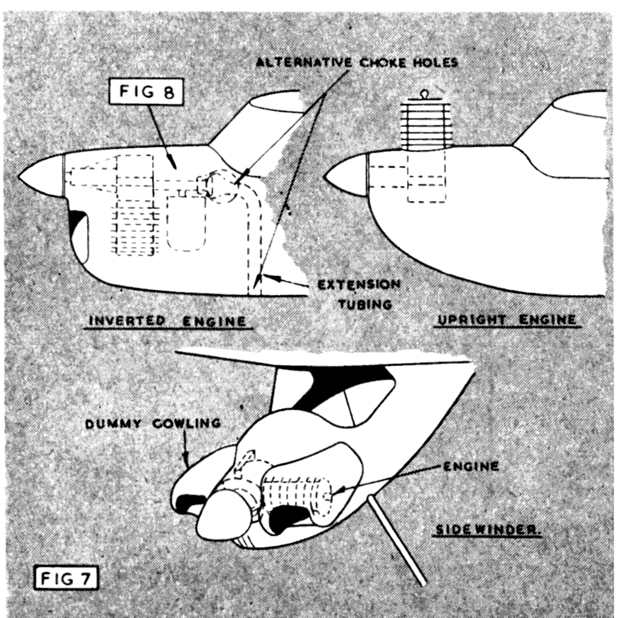


FIG 7

Generally, to control such an arrangement under power af air downthrust angle is required, since the stalling tendency is aggravated the moment the model noses up, with a straight thrust line. Downthrust may provide a safe way of flying a model so rigged, but the use of an excessive downthrust angle again tends to spoil the appearance.

In practice, best results appear to be obtained when the C.G. is moved back again to somewhere between 35 and 45 per cent. of the chord, when the tailplane is normally called

TABLE I

Motor	Wing Area, sq. in.	Total Weight, ozs.
Allbon Dart	250	10— 12
Mills ·75	200— 250	10— 12
Amco ·87	250	10— 12
E.D. Bee	250— 325	14— 24
Frog 100	300	16— 20
Mills II	350	14— 24
Allbon Arrow	350	16— 20
Allbon Javelin	400	16— 24
Elfin 1·8	400	16— 24
E.D. Comp. Special	500	20— 30
Mills 2·49	500	24— 36
Amco 3·5	600— 700	30— 48
D.C. 350	600— 700	30— 48
E.D. IV	600— 700	28— 40
Frog 500	800—1000	40— 50
Yulon 29	800—1000	40— 50
Yulon 49	1000—1200	50— 75
Ohlsson 60	1000—1400	80—100

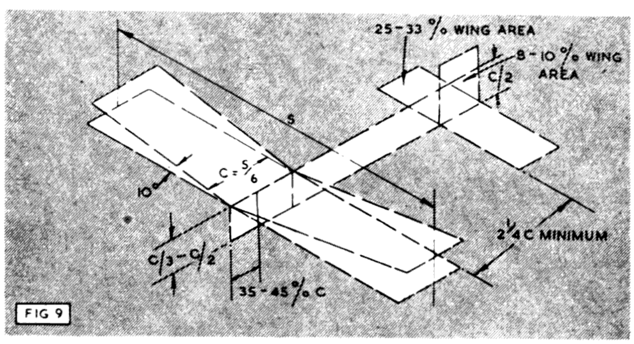


FIG 9

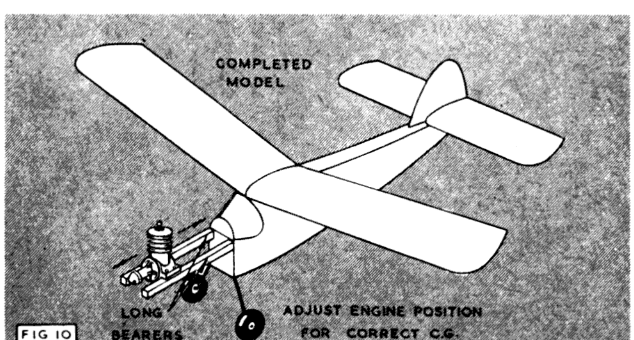


FIG 10

upon to carry a small proportion of the total lift—Fig. 6. The need for any downthrust is then eliminated, or at least reduced to a degree or so.

The actual balance will, of course, depend also on the height of the wing above the thrust line—chosen as the simplest determining factor. The greater this is, the more desirable it is to use the aft or 45 per cent, C.G. position. Normally, however, this figure should be kept within one third and not more than one half of the root chord.

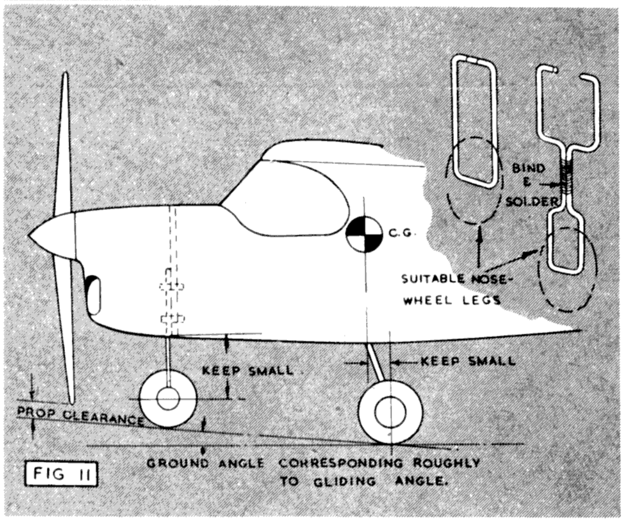


FIG 11

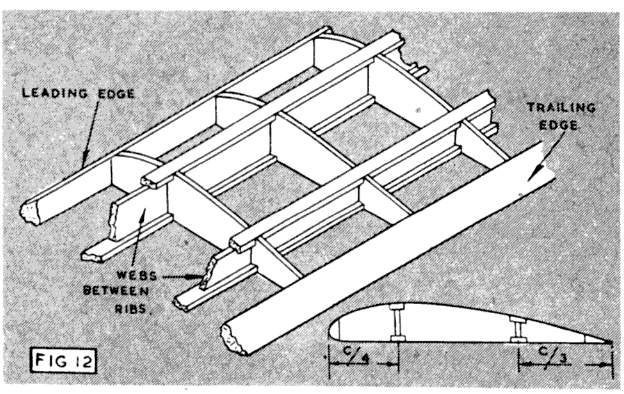


FIG 12

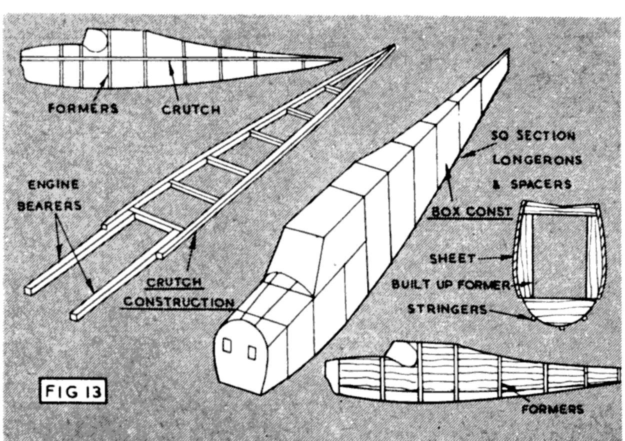


FIG 13

Motor Mounting.

One result of this latter recommendation is that the thrust line should preferably be high, even coming above the centre of gravity of the whole model, if possible. It may in many cases be necessary to bring it above the centre of gravity ultimately—with downthrust. To achieve this thrust line position—Fig. 7—and still enclose the motor to preserve semi-scale appearance an inverted motor installation is practically essential. If mounted upright the top of the cylinder will amost certainly come somewhere on a level with the top of the cabin and prove impossible to cowl in properly. Here appearance again must be the deciding factor. If the ready accessibility and easy operation of an upright motor is to be retained, appearance is likely to suffer as a consequence. Otherwise with an inverted, cowled-in motor, access to the controls and tank must be provided either by hinging the cowling or providing suitable cut-outs. In any case, with an inverted motor, ready access must be given to the open end of the induction tube for choking—either a hole in the side of the cowling or an extension tube on the induction pipe coming to the outside of the fuselage or cowling—Fig. 8. Sidewinder mounting is another possibility calling for dummy cowling on one side, but this does not appear to have found favour.

With wing and tailplane proportions decided, together with the tail moment arm, the centre of gravity position and the distance of the wing above the thrust line, other details of the outline design can be sketched around this skeleton—Fig. 9. The vertical position of the tailplane does not appear to be critical. The usual place is on, or somewhere near, the thrust line. Aerodynamically its efficiency can be expected to be a maximum when it is located somewhere in the region between the wing trailing edge level and a line parallel to this one, half of the wing chord below it. The length of the nose, which will depend largely on the motor weight, is a variable which can be adjusted to achieve the correct centre of gravity position of the completed model. General figures are given in the heading drawing, these varying with the size of the model. A shorter nose is required to balance on a small model, mainly because the motor weight in such cases is proportionately larger than in the bigger models.

If in doubt, it is best to complete the whole model, less motor assembly, as shown in Fig. 10, leaving just the motor bearers protruding. These should be longer than necessary. The motor can then be rested on these and the correct mounting position established for the final balance of the whole model. Some slight allowance can be made for the weight of the cowling to be added to complete the model.

Structurally, the cabin type sports model offers considerable scope for ingenuity. Extreme light weight is not so necessary and a robust, rigid frame should be the aim. At the same time there is no point in increasing total weight unduly. The more the model weighs the greater the landing shocks and the increased possibility of damage. Landing, in fact, brings up an interesting point.

The Undercarriage.

In the smaller models employing motors of up to about 1·5 c.c. a simple tricycle gear is generally excellent and more trouble-free than the conventional gear. The larger (and heavier) the model, the more difficult it becomes to produce a front leg unit which is capable of withstanding the landing loads.

The type of layout required is detailed in Fig. 11. The rear wheels need only to be a short distance behind the centre of gravity of the model whilst the front leg should be as far forward as possible. It will be this front leg which will take almost all the initial landing load. The rear legs take a comparatively light load and therefore fairly small gauge wire is quite satisfactory—14 s.w.g. for models up to 24 ounces. The front leg, however, must be strengthened or sprung. Double wire legs of the type shown are generally satisfactory. It also helps, too, to adjust the ground angle to approximately that of the gliding angle of the model so that when the model does land, all three wheels touch at about the same time.

TABLE II. AERODYNAMIC DATA

	WING				TAILPLANE				Moment Arm (in.)	L.O.A. (in.)	Motor
	Area (sq. in.)	Span (in.)	Chord (in.)	Section	Area (sq. in.)	Span (in.)	Chord (in.)	Section			
A	260	40	6½	Clark Y	90	20	4½	60% Clark Y	15	30	·5*–·75 c.c.*
B	340	45	7½	Clark Y	110	22	5	60% Clark Y	17	34	1*–1·5 c.c.*†
C	442	52	8½	Clark Y	144	24	6	60% Clark Y	20	40	1·5*–2 c.c.*†
D	600	60	10	Clark Y	180	30	6	80% Clark Y	24	46	3·5 c.c.†*
E	770	70	11	NACA 4412	208	32	6½	80% Clark Y	26	52	5 c.c.*†‡
F	1040	80	13	NACA 4412	245	35	7	80% Clark Y	30	60	7·5–10 c.c.†‡

* Diesel. † Glowplug. ‡ Spark ignition.

Many people fail to understand why a tricycle undercart model does not tip over immediately the front leg touches the ground. The answer is quite simple. All the time the model is moving forwards, the wings are still generating lift and it is the wing lift which keeps the model level. By the time the wing lift has dropped off, all three wheels are rolling along the ground and the model stops on a level keel. *It is surprising* just how stable a properly designed tricycle undercarriage can be on sports models.

Structure.

For the wing frame design of all sports models we would strongly recommend a modern spar arrangement which gives exceptional rigidity and freedom from warps at a reasonable light weight. This is a two-spar wing, and thus suited to almost every size of sports model, where built-up beam spars are used—Fig. 12. The basis of this arrangement is that the two top and bottom spars—virtually strips of sheet—are strongly resistant to bending. The top spar is in compression under bending load and the bottom one in tension. If left unsupported they would buckle, hence the space between them is filled with a spar web. Main job of this web is to stop the upper and lower spar members from bending and buckling and each web itself is not highly stressed. Hence it can be of quite light material.

Further, the webs are cut as separate units to fit between each rib station. Only the top and bottom spars extend unbroken from tip to tip. The system is considerably stronger than a normal two spar arrangement with either solid spars, or top and bottom (square or rectangular section) spars.

In the smallest sizes of models ordinary monospar construction may be considered adequate, but when it is remembered that this two-spar system has been adopted for Wakefield tailplanes to give rigidity at no increase in weight over a normal monospar system, the advantage of the built-up spare system should be obvious. Similar construction can, of course, be used for the tailplane of the cabin sports model.

The fuselage lends itself to three different methods of construction—Fig. 13. Of the three illustrated, the crutch method is the stronger, but involves the use of a considerable number of formers with attendant stringers. The box-type fuselage is still the simplest and lightest. It should also be strong enough for any size of sports model if generous longeron sizes are selected. Appearance can, of course, be improved by adding fairings top and/or bottom, if desired. The third method is one which has recently found favour in America. It is really a form of crutch construction with wider sheet portions replacing the crutch. In some respects it is a cross between ordinary 'box' construction with sheet sides and orthodox crutch construction. Its application should be obvious from the diagram. It lends itself to the production of pleasing fuselage lines.

Finally a word about covering. For all but the smallest models we cannot speak too highly of nylon as a covering material for sports models (and other large power models). Nylon is easy to apply if used damp, takes dope well and is extremely tough and durable. Tissue has the one basic defect, that it is readily punctured or torn and, if too many coats of dope are applied, it becomes brittle and splits on impact. Some tissues are worse that others in this respect. As a recent example, a 6 ft. span sports type power model (actually a radio controlled model) making a bad landing and ground looping, resulted in the (silkspan) covering splitting *from tip to tip right along the wing*. A nylon-covered wing would have remained undamaged under similar circumstances.

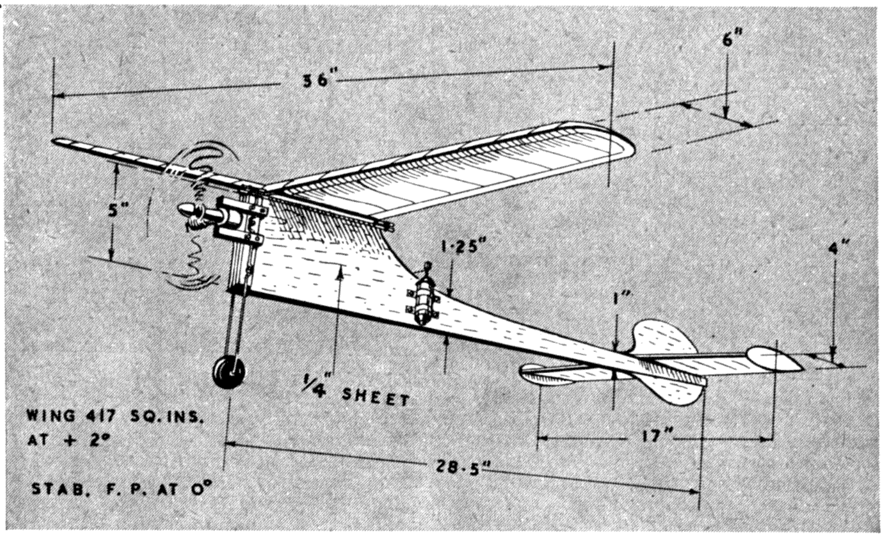
Leading aerodynamic and structural design data are summarized in Tables II and III whilst the salient layout features suitable to the cabin-type sports model are detailed in the heading drawing. Within these basic recommendations it should be possible to produce an infinite variety of designs.

TABLE III. STRUCTURAL DATA

		WINGS					FUSELAGE			TAILPLANE		
	Type	L.E.	Spars	T.E.	Ribs	Covering	Type	Material size	Covering	Type	Covering	Under-carriage
A	Mono-spar	3/8 × 3/16	3/16 sheet	3/4 × 3/16	1/32	Tissue	Box	3/16 sq.	Tissue	Mono-spar	Tissue	14 s.w.g. tricycle
B	Two-spar	3/8 × 1/4	3/32 sheet	3/4 × 3/16	1/32	Silk or tissue	Box	1/4 sq.	Silk or tissue	Two-spar	Tissue	14 s.w.g. tricycle
C	Two-spar	3/8 × 1/4	1/8 sheet	3/4 × 1/4	1/32	Silk or nylon	Box	1/4 sq.	Silk	Two-spar	Silk or tissue	14 s.w.g. trike or *orthodox*
D	Two-spar	3/8 sq.	1/8 sheet	1 × 1/4	1/8	Nylon	Box or crutch	1/4 sq. or 1/2 × 3/16	Silk or nylon	Two-spar	Silk or nylon	12 s.w.g. wire
E	Two-spar	3/8 sq.	3/16 sheet	1 × 1/4	1/8	Nylon	Box or crutch	1/4 sq. or 1/2 × 1/4	Nylon	Two-spar	Nylon	10 s.w.g. wire
F	Two-spar	1/2 sq.	1/4 sheet	1 × 1/4	1/8 or 3/16	Nylon	Sheet box	1/8 sheet	Nylon	Two-spar	Nylon	10 s.w.g. wire 'V'

MORE ABOUT THE THRUSTLINE

FROM FRANK BETHWAITE EXPERT MODELLER FROM DOWN UNDER IN NEW ZEALAND



FRANK ZAIC'S recent article about his troubles in controlling looping in a high-powered model, prompts me to recount a similar sort of experiment.

For some time I have been frankly doubtful about the superiority of the " pylon ", set-up, and so in a rather rough-and-ready way I compared various force arrangements by building a " Skeleton " model which proved to be incredibly tough and which looked like the one sketched here.

The motor was a Mills 1·3 c.c., mounted sidewinder fashion on pieces of soft aluminium. All up weight was around 10 ozs. so performance was apt to be spectacular in trim, and disastrous out of trim.

To begin with, the motor was bolted on in the lowest position possible—the model was thus a pure " pylon ". A little experiment to find the best propellor—found to be a very light, narrow and thin-bladed 10×5 ins.—and we were set to begin.

The model was forced to fly in four flight patterns; left climb, left glide, then right climb, left glide, later left climb, right glide, and finally right climb, right glide. Once all these had been flown, the thrust line was shifted to half-way up the " nose ", and the whole thing repeated. Finally, the motor was re-positioned again as high as possible, and the four basic patterns flown again. All this took about six weeks of pleasant spare-time flying. I used about 18 wooden propellors and smashed two 9×6 ins. plastics as well. The model, at the end, was fit only for burning. Heaven knows how it lasted as long as it did.

No holds were barred in forcing the desired flight pattern. Down-thrust, side thrust, wing warp, and rudder were all used in varying degrees. Some of the patterns were only just stable—it was impossible to do more than fluke an odd desired flight—others however, were clearly " natural ".

The lessons that I learned were thus :—

High Thrustline v Low.

1. A high thrust-line arrangement is desirable rather than a low-thrust " pylon " set-up. It is more stable, easier to control, needs less thrust off-set to control it, and most important, it is faster climbing. It's chief virtues are most apparent in really turbulent conditions, when it will punch through unaffected, in conditions under which a " pylon " will quickly spin in.

2. Any configuration can be made to fly its " natural " flight pattern with reasonable consistency. These natural patterns for this model were :—

Pylon.—A right hand turn under power, with a wide left turn on the glide. Despite all adjustments, the climb tended to remain a rather steeply banked turn, prone to become a diving turn in conditions of turbulence. I found it impossible to achieve consistent vertical climbs. They only looped or fell off to either side, despite extremes of down-thrust, etc.

High-thrust.—A wide left turn under power, with glide to the right or desired—tight or open. The climb here was perfection, it gained speed in a shallow left turn, with the nose rising all the time, and very soon was quite vertical, with the model rolling gently to the right—if the motor faltered, the model just dipped back into its left turn, and resumed the vertical as soon as the motor picked up. High wind and turbulence had no effect in displacing the flight pattern. It is significant that during these tests I had no case of a crash under power when using this adjustment, and very few indeed, with any high-thrust arrangement despite the pattern being flown.

Sidethrust v Downthrust.

3. The method I found most effective in controlling looping was side thrust, not down-thrust. Let us compare the methods.

(1) Thrust line reasonably straight ahead, and as much down as necessary. This arrangement will cause a high-powered model to open out its loop, such that it may, with large enough radius, roll right way up between the vertical on the way up, and the inverted over the top. Any rudder will, however, cause a pure turn, which is liable to end either flat or diving, and once a dive begins, with the motor flat out, the rudder merely gains effectiveness as speed builds up and radius tightens, and the result is nasty. Torque, and gyroscopic effect will not prevent this.

(2) Thrust line not down, or only a little, and deflected considerably to right or left. This arrangement will cause the model to pull bodily sideways, slightly. This side pull both turns, and tends to roll, e.g. left thrust tends to produce a left turn and a right roll.

Now, provided that the decolage (difference between incidence of wing and tail) is fairly small, and thus looping radius large, it requires relatively little side-thrust to produce a rate of roll greater than the rate of looping. And if the rudder is set for a turn opposite to that induced by the side-thrust, the result is perfection, i.e., the flight pattern described above. Note particularly that, under power, the rudder will tend to bring the nose up if the power turns goes flat—(side thrust should always be sufficient to ensure that the turn does not reverse, under power, due to the action of the rudder).

These lessons have since been used in trimming much larger and high-powered models, with complete success.

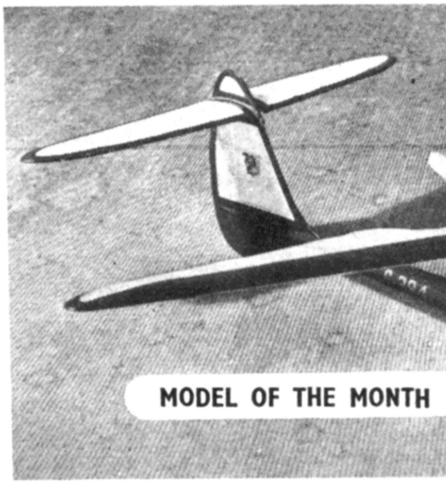
TAKE heed team racers, and study the flagrant knavery depicted in this month's instalment of your favourite Phil's Fliaring activity. That wicked varlet of the Downtown Rowdies, Spike (the fallen angle) Snipkwik, found the pace of your noble scribe's racer too fast for his own ignoble effort. So, living up to his cutting name, he whipped out a crafty pair of tin clippers to shorten the opposition's lines of communication, so to speak. Little did he know what kind of a shock he was due for! For, up to the mark on all team-race rascalities, Fliar Phil had taken the precaution of passing multitudes of electricity through those piano wires. Spike (the singed mitt, as he is now called), has well and truly fused himself out of the team league.

Central figure of this model news is a neat little pusher with curvatious lines. Designed by Vic "Tomboy" Smeed, it bears the very apt name of "Shove Ha'penny" and uses a Mills 1·3 c.c. diesel to do the shoving. A trifle on the heavy side of the scales at eighteen ounces, it should be quite a smart sport flier, and very cheap on props too! Smartly finished Royal Blue and trimmed with Sky Blue stripes, the model collected first place in the unorthodox section of the Concours d'Elegance at the 1950 Northern Heights Gala—good shoving Mr. Ashby (Canterbury Pilgrims) who made this elegant pusher.

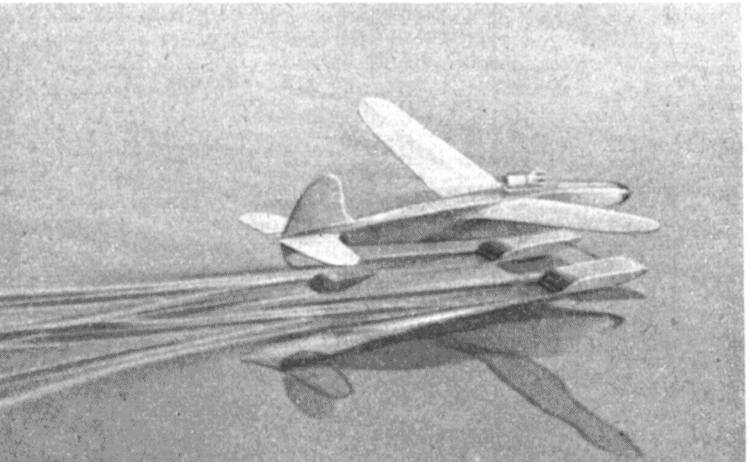
Up at top left is an uncovered stunter with unusual diagonally placed ribs. Designed and built around an Amco ·87 c.c. diesel by J. R. Bishop, of Wirral, the airframe weight, without the motor of course, is a diminutive two ounces. Don't sneeze, Mr. Bishop—not until you've got the motor fitted! Span is 23 ins. and chord 5 ins., giving a reasonable 115 sq. ins. wing area for stunts. Photographical readers might care to know that this smart and very sharp view was taken with the aid of one 100-watt bulb and one 75-watt bulb, with the camera set at f16. and exposure at 30 seconds.

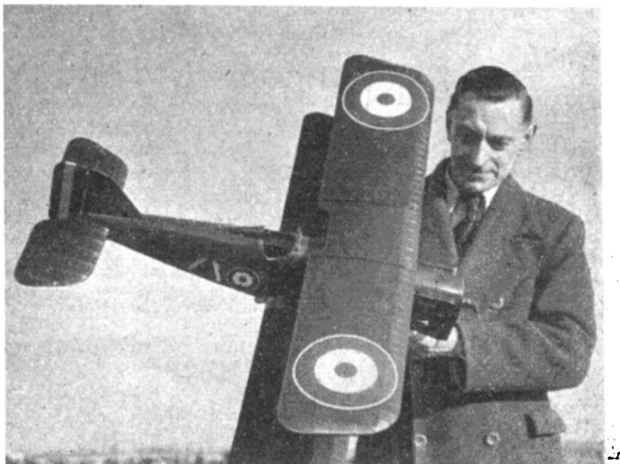
Next in the top row is another Fiat from Captain Cæsar Milani's stable of scale control-liners and another example of good indoor photography. The inverted Frog 500 is completely hidden in this 36-in. version of the famous aerobatic Fiat C.R. 32. Silver paintwork on the cowling has been stippled to give the same effect as the full-size circular buffing on the real cowling, and, incidentally, what an ideal cowling it is for keeping the Frog at even running temperature. Less bulky than the C.R. 42, illustrated in September's Model News, this C.R. 32 should be up to the loop stage by the time you read this.

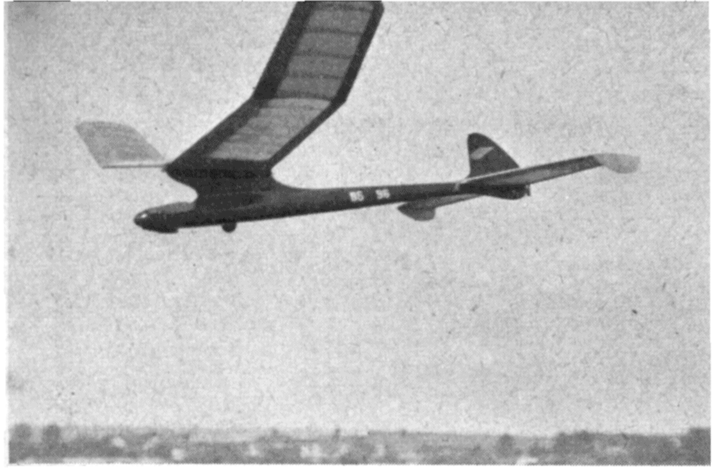
Yes, you've guessed right, that's another A.P.S. Flamingo winging its way down in a sleek glide. This Ed. Stoffel shot is of designer Roy Collins' own latest version of his hot pylon contest job. Folding prop on an Amco 3·5 diesel and a retracting pegleg are features of the new version for '51 contests. This view characterises the tail-up glide path perfectly.

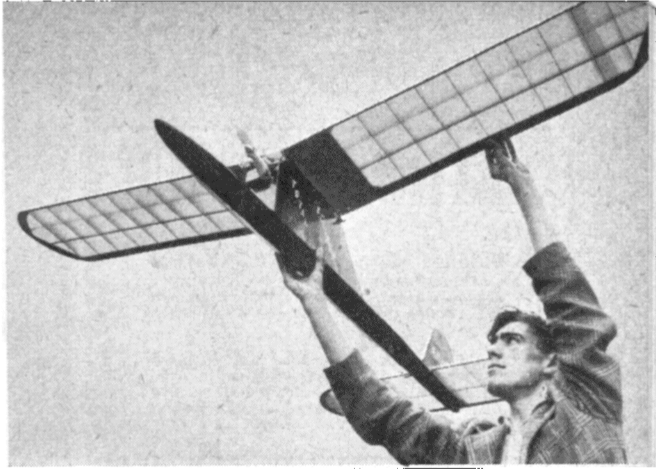


MODEL OF THE MONTH









Over at the top right is a mammoth of a model for an Elfin 2·49. Designed by 17-year-old Malcolm Sedgwick of Skipton-in-Craven, the " Total Eclipse " (he must have been chasing it in its shadow !) is 76 in. span and weighs 2 lbs. 3 ozs. Despite the size, it has quite a high rate of climb, with 750 sq. ins. to help it get up there, and as we may well expect, the glide is, well, just like a sailplane.

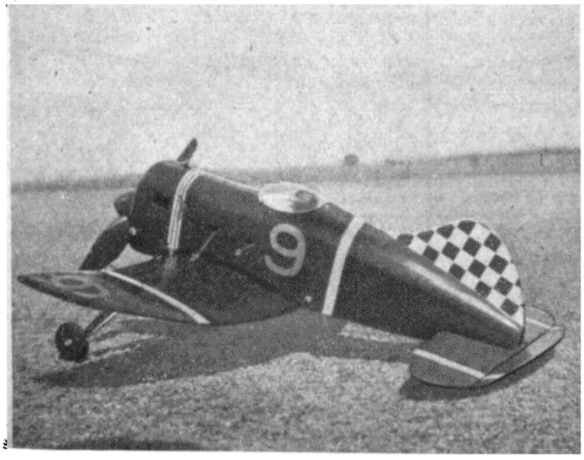
Across the bottom, left, is a sight to bring shudders to many a Wakefield fan. Fancy a Warring Wakefield . . . with Jetex power, and no rubber to bunch ! But as you'll see, it is quite a different version altogether of the famous rubber design. Equipped with two Fabre type floats in wheel position and an additional float at the tail, this Wakefield has a Jetex 350 atop of the fuselage. Judging by the way that airframe is cleaving its way across the smooth water, "old-timer" F. A. Lowe, of Beeston, should be well satisfied with his novel conversion. Not a bad idea, eh bods ?

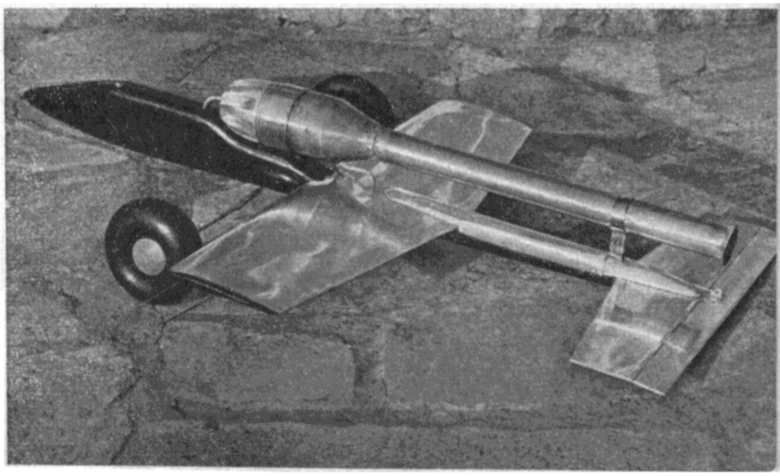
Next in the row is another E. Stoffel shot, taken at Fairlop ; this time one of the most scalish scale models we have yet seen. Proud owner is R. J. Hutchins—remember his De H. Rapide, model of the month some time back ? His latest effort, shown here is a one-eighth scale S.E.5a, 40 ins. span (looks much bigger, doesn't it ?) and powered by Frog 100, as in the Rapide.

Ah-hah, another team racer in the next pic. and an unusual one at that. Detachable wings, tip dihedral, and outside lead-outs, plus the radical side profile and checkered fin, make it quite different. Just in case you think there's something familiar about the model, we'll break the news and let you know that's a Phantom tail and elevator at the back end. Designer David Ramsay of Bristol fitted the job with a Kestrel 1·9 c.c. diesel, but found it uneconomic on fuel for racing, and not sufficiently tight enough on the 52 ft. lines : so the model is now retired to sports flying. Looks rather like a caricature on those new S.M.A.E. rules . . . 4-in. fuselages and all that, eh ? Photogs please note : this picture was taken by a Hawkeye *Box* camera with a portrait attachment fitted.

Bottom right is one of those loud and cleaving jet jobs, fast disappearing from model-meets these days. This photo by Peter Robinson is of Ray Dennis' (Grimsby) speedster, which features aluminium wing and tail assembly. Span is 22 ins. and length 32 ins., the jet a Juggernaut. Outboard wing encloses the H.T. lead to the starting plug, a booster socket in the wing-tip is used for quick get-away ; would be fun if it short circuited when Joe Soap was holding the wings, eh ?

Well, it will soon be Dam . . . I mean Gamage Cup day, and the '51 comps will be going full bore . . . must get the old universal plane ready bods, it's coming up fine . . . let you have a preview sometime; but right now it's still a strong secret ! ! !





PETROL VAPOUR

Colonel C · E · BOWDEN
continues his article from our December issue by describing the principle on which the model radio control set works.

Right, the author's radio model which has definite Bowden characteristics. Note the tuning hole, switch and phones socket, grouped together just below the wing.

I SHOULD like to add a few words to the first part of this article published in the December 1950 issue before continuing with the principles upon which the model radio outfit works.

Firstly, I have found it well worth while fitting a H/T switch on my battery box. This prevents any leakage of the H/T battery through the receiver when the set is left switched off for a week or two, by the main switch. I have found that such leakage does sometimes occur and this extra switch is well worth while.

Secondly, if you fly a large model use two D.18's wired in parallel. You can afford the extra weight and this will give you a whole afternoon's flying without a change.

Thirdly, where a reader can afford a milliameter it is far better to use same for tuning (see Fig. 8). They can be obtained for as little as 4/9 and have an advantage over the headphones in as much as they do not rely on the human ear, which can sometimes be in an optimistic mood.

The principle upon which model radio, and in particular the E.D. set, works. A signal is received, in all types of model radio, with a certain "standing" current at the valves. On receipt of the signal the valves either "dip" or lower the current (as on most sets), or they "raise the current" from a low standing current as is the case of the E.D. three valve set. *Whichever principle is used, the "relay" operates on this alteration of current through the valve or valves.* As the relay operates, it closes points which in effect act as a switch to the servo motor's battery. When the servo motor is "switched on" by the relay points closing, it pulls the rudder over. Although the "dipping" principle is cheaper and more simple to manufacture, it calls for greater adjustment skill on the part of the operator, as with the "hard" valves used in the earlier radio control outfits the dip has been very fine and with little latitude. This is O.K. for the experienced, but not so suitable for the novice. Last year we saw the new baby thyratron gas-filled valve introduced which produces a greater current dip for a smaller battery consumption, and this will eventually make the lot of the novice easier. (It has! See pages 106, 107, 108—*Ed.*) I am playing with one of the new "babies" at the moment. In the meantime, we have our completely foolproof E.D. larger three valve set well tried in the hands of the public, which works on exactly the reverse principle to the dip, and being so simple to operate and tune, I feel that there will always be a market for it by the discerning who do not mind a slightly larger model.

Let us now see how this set that *"raises the standing current"* works.

(*a*). The E.D. transmitter is arranged to send out a constant "carrier" when switched on, but not keyed for a signal. This "carrier" is then "modulated" when a signal is sent by pressing the thumbswitch. The modulation of note can be heard through tuning earphones—the receiver of course being switched on, and the thumbswitch on transmitter held on. It rises to a louder note. When the loudest note is obtained by moving the tuning arm to the best position, the receiver is tuned, and flying can begin. It is as simple as that. The beginner's dream! This loudest note means that the "standing current" at the valves *has been raised* through modulation of the carrier, and the raised current has operated the relay, as shown in Fig. 8 after study of Fig. 7.

(*b*). *The relay.* The relay operates as shown in Fig. 7. Let us follow its action in detail, for it is a very important component. When the receiver valves pass a GREATER CURRENT than the low STANDING CURRENT, through the relay coil (B), it attracts the arm (X), which closes the points (A), which switch on the actuator battery. The actuator then pulls over the rudder.

(*c*). *Checking the current rise by meter.* Now follow Fig. 8. It is not strictly necessary to have a milliameter, but it is instructive, and an ex-government meter can be obtained cheaply. This meter should be plugged into the headphones socket on the model. The headphones should be the cheap low resistance type, for about one shilling and sixpence at a disposals stores.

Let us assume that our beginner has indulged in a meter to watch what goes on, and that he has first tuned the receiver to the loudest note as described in para. (*a*) above. He now again switches on the reciever, but with meter plugged in instead of headphones so that he can see what happens instead of listening. He will observe what is called the "idling current" registering at maybe $1\frac{1}{2}$ ma. (milliamps). He now switches on the transmitter, and as the "carrier" comes in, the lower "STANDING CURRENT" arrives, registering somewhere between just over 0 ma. and 1 ma., (probably about $\frac{1}{2}$ ma.). *It is kept low by the GRID-BIAS battery, explained in a later para.* 9. The relay as set at the works (and will not require subsequent resetting) *is made to click in at just over 2 ma., but not before.* As explained above in sub para. (*b*) when the relay clicks in on the E.D. receiver the points are closed and the servo does its stuff by pulling over the rudder.

(*d*). *"Modulation" of the "carrier" wave.* Now press the transmitter thumbswitch, and the "carrier" emanating from the transmitter aerial is modulated. If the phones are plugged in, the louder note is heard, but as the meter is temporarily in, we observe that the low "standing current" has risen on receipt of signal, right up to between 3 and 4 ma. *This has passed the point at 2 ma. where the relay operates.* Our rudder is therefore hard over. As the signal is switched off, the meter needle will swing back to its former low "standing current" and the relay will go back. The rudder will return to neutral.

(*e*). We may now summarize by saying that IN THE E.D. PRINCIPLE THERE IS A LOW STANDING CURRENT (CONTROLLED BY GRID-BIAS BATTERY), WHICH RISES TO A HIGHER CURRENT ON RECEIPT OF A SIGNAL, WHICH OPERATES THE RELAY WHEN THE CURRENT PASSES 2 ma. The significance of this is that we can safely use small batteries, for should the battery output drop unduly during flight, the worst that can happen is for the next signal not to get there, in

which case the controls will be safely centralised and the model just fly as a stable free flight craft until the power ends in a glide to earth. There will be no stuck on rudder and maybe a crash, as would probably happen with a " dipping " receiver under these circumstances, or if it were badly timed as regards relay.

(*f*). *Possible sticking on of relay easily eliminated.* With the E.D. principle there are virtually only two things that could cause one of these devastating sticking on relay troubles, and both are highly unlikely. Provided the set is O.K., both can be insured against. The first is, residual magnetism might occur in the actuator arm, but this will not happen if the arm is properly tinned, which is very carefully carried out on all the latest actuators. The second possibility is a low grid-bias battery which is fully explained below.

The action of the GRID-BIAS BATTERY. The grid-bias battery, in non-technical terms, damps down the " standing current " to the low current of ½ ma., shown in Fig. 8. The battery is 6 volt, and has no drain on it other than deterioration through old age called " shelf life ". It therefore only requires very infrequent change. Should the voltage however drop through *anno domini*, it means that the " standing current " will rise near or past the 2 ma. where the relay clicks in. This may cause either a fluttering rudder or a stuck on rudder. But provided that the newcomer realises this cause, he will occasionally change his grid-bias battery and if he has a meter he can check up that the " standing current " has not risen, when he has switched on receiver and transmitter, without keying a signal. If the current is high, then change to a new 6 volt grid-bias, and there will be no stuck on relays with this system. *This is a greater asset than many newcomers to radio may realise!*

The L.T. battery. As there are three valves to be heated by the L.T. current, the L.T. battery requires frequent change, being the only battery that does. It is fortunately a cheap battery, and the three valves are well worth this small concession in that they provide the outstanding range of this set working on a low power transmitter. I personally use a deaf aid " Ever-ready " D.18 battery, which has a two pin plug socket so that the battery can be changed in a moment. In non-technical terms, the first valve detects the signal and the other two valves amplify it to greater sensitivity.

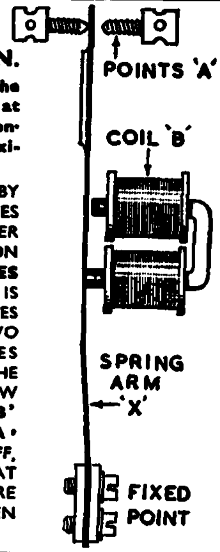
Flying instructions in the form of a drill. If the beginner has grasped the foregoing, and has wired his set and batteries properly according to the makers' sketch and my battery sketch Fig. 2, and he has got his low standing current by correct 6 volt grid-bias battery, all that he has to do on arrival at the flying field is to place a new L.T. " Ever ready " D.18 into its two pin plug in the battery box, and then set about the very simple tuning as a drill movement given below.

(*a*). Switch on transmitter and model main switch. Move tuning arm gently, with headphones plugged in, until you hear the LOUDEST TUNING NOTE, whilst someone, or yourself, keys and holds on the transmitter to send a signal.

Fig. 7 DIAGRAMMATIC SKETCH OF RELAY ACTION.

Some relays are different in shape but the same principle applies. Relays are set at works and should not require alteration. With the E.D. points fall in at 2 m.a. approximately but not below this figure.

ELECTRICAL COILS 'B' ARE ACTUATED BY CURRENT CHANGES THROUGH THE VALVES DUE TO SIGNALS RECEIVED. AS CARRIER WAVE IS MODULATED BY TRANSMITTER ON SIGNAL BEING SENT, THE CURRENT RISES (See Fig. 8) AND THE SPRING ARM 'X' IS ATTRACTED TO TOP COIL 'B'. THIS CLOSES POINTS 'A' WHICH SWITCHES ON SERVO MOTOR, WHICH IN TURN OPERATES RUDDER. WHEN SIGNAL IS RELEASED THE RAISED CURRENT DROPS BACK TO LOW STANDING CURRENT AND RELAY COIL 'B' CEASES TO ATTRACT ARM 'X'. POINTS 'A' ARE OPEN, SERVO MOTOR SWITCHED OFF, AND RUDDER CENTRALISED. NOTE THAT THERE IS ALWAYS A GAP BETWEEN CORE OF COIL 'B' AND SPRING ARM 'X' EVEN WHEN GAP BETWEEN 'A' IS CLOSED.



Now try moving the rudder a few times by keying intermittent signal. Switch off transmitter and receiver to conserve batteries.

(*b*). Take model about 30 yds. away. It is not necessary on this set to go a long way off as most " dipping " sets require. Switch on transmitter and receiver, with headphones plugged in, and again get helper to key transmitter, *holding down the signal*, whilst you gently move tuning lever if necessary to loudest note. This is done in a moment. Now switch off both transmitter and receiver. You have done your " Distance " check.

(*c*). Bring model back to transmitter and take off area. Start motor up, switch on transmitter and receiver and test for a few rudder flaps against possible effect of engine vibration. Arrange that your last signal was left rudder, so that you will have right rudder to counteract any possible swing to the left on take off due to engine propeller torque reaction, and release the model.

(*d*). As you have plenty of range with this set, keep the model flying into wind away from you until it gets to a really good height, by short sharp turns to left and right, taking off these very quickly before any height is lost on the turn. When right up high you can start manœuvring, remembering that a prolonged turn loses height and ultimately gets into a spiral dive if kept on too long. If you want to indulge in these to purposely lose height, be careful to brace your wings and see that they are very firmly kept on by adequate rubber, because a lot of extra speed is gained in these manœuvres.

Fig. 8 WHAT THE MILLIAMETER SHOWS.

(Meter is plugged into Headphone socket, see Fig. 5.)

THE RELAY IS SET BY MANUFACTURERS TO CLICK IN SOMEWHERE WITHIN THE SHADED AREA. USUALLY NEAR TO 2 M.A. BUT NEVER BELOW THIS FIGURE.
(B) THE STANDING CURRENT SHOULD BE APPROXIMATELY WITHIN THIS AREA **WHEN TRANSMITTER IS SWITCHED ON BUT NO SIGNAL IS BEING SENT.** IF THE GRID BIAS BATTERY (6-volt) IS LOW THE STANDING CURRENT (approximately ½ m.a.) WILL RISE TO NEAR, OR OVER 2 M.A., WHERE THE RELAY CLICKS IN. CONTROLS MIGHT THEN STICK ON OR FLUTTER. **PROVIDED STANDING CURRENT IS KEPT LOW (AS SHOWN ON METER) BY GOOD GRID BIAS BATTERY, CONTROLS CANNOT STICK ON THROUGH RELAY REMAINING ON AFTER SIGNAL IS TAKEN OFF. GRID BIAS BATTERY IS** THEREFORE IMPORTANT **AND MUST BE " UP ".**

ACTION

(1) Standing current is ½ m.a. with receiver switched on and,

(2) Transmitter switched on.

(3) Press transmitter key —(thumb switch) meter pointer will now swing over to 3 to 4 m.a.—

(4) As it passes 2 m.a. the relay will work, and will switch on the servo motor which in turn operates the rudder.

ESPECIALLY FOR

PART XIII. IN WHICH THE REV. F.

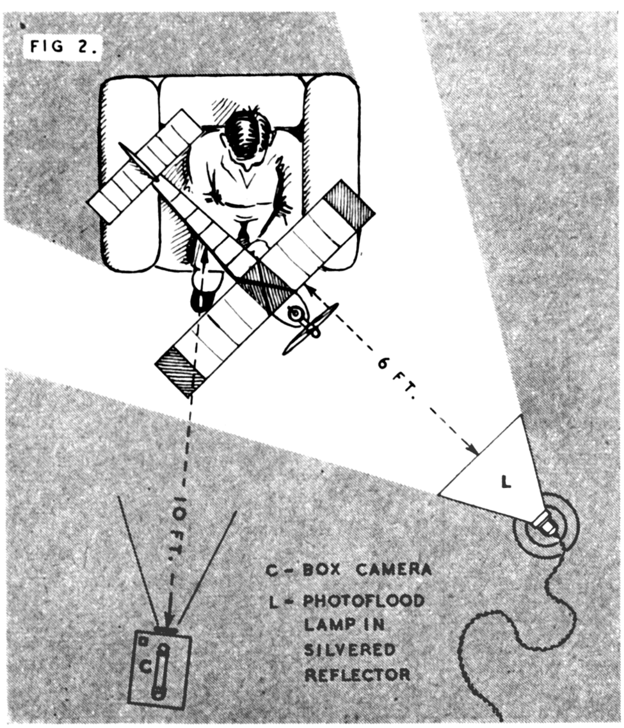
AT this time of the year, when the sun is very low, very misty, or (more likely) very absent, better photographs can be taken indoors than will be possible outside. Even the simplest of cameras can be used successfully as long as the shutter will give a time exposure.

Obviously an expensive camera can be expected to give better results than a cheap one, but if you have been satisfied with what your camera can do out in the sunshine, then a little extra care will ensure equally satisfactory results in artificial light. And the cost need not be more than two or three shillings.

Equipment Needed.

There is only one piece of **essential** equipment (in addition to the film), and that is a very bright bulb. You can buy one of these for about 2s. 6d. from any photographic shop. Ask for a No. 1 Photoflood bulb to suit the mains voltage in your district—which is probably the usual 230/250 volts. These small bulbs have a life of only two hours, but that is long enough for a great number of photographs; and while they last they give a light of about 500 watts. This means that the length of the exposure can be cut down to about one tenth of what would be necessary in ordinary room lighting.

Another very useful, though not absolutely essential accessory, is a silvered reflector for the bulb. Small portable reflectors complete with flex and plug cost 22s. 6d., so it is not worth while buying one unless you intend to do quite a lot of indoor photography. A wire cable release and a tripod are also very useful, but it is easy enough to get on without them given sufficient care.



Arranging the Model.

The simplest "set-up" is obtained by letting someone hold the model. The photograph then becomes a shot of " so-and-so plus model taken in the front room ". The person holding the model is seated comfortably in an armchair, and the model arranged so as to rest steadily on some part of the chair, since it must not move at all during the exposure. The background to this picture will be the drawing room wallpaper or the fireplace or even the piano ; none of which are very apt backgrounds for a model plane, but good enough for a homely record of a modeller and his model. The biggest advantage of such an arrangement is that there is no need to pull the room to pieces in search of a plain, undistracting background. The light is switched on and held at the correct angle and distance, the camera fixed up, and the job is finished in a very short time. (See Figs. 1 and 2.)

Without doubt the most difficult shot to take indoors is that of a model by itself. In this case the attention must be centred on the model alone, and a plain, undistracting background is absolutely essential. If the model is light in colour, the background should be dark ; if the model is dark, the background should be light. I have found that the easiest way to obtain a uniformly plain background indoors is to drape a rug or blanket over the backs of a couple of chairs and a little way out over the floor. The model is then placed on the rug at the foot of the chair backs, and the photograph taken of it at a slightly downward angle as it stands on the floor. (Fig. 4.)

Which of these settings are you going to try ? If there are the usual eight exposures on your type of film, I would suggest an attempt at both, making two exposures (with different times) of each setting, and leaving the remaining photographs for a general view of the family at the tea table, or perhaps the baby asleep in his pram. Which should please the people who count !

The Film to Use.

For indoor photographs panchromatic film is essential, and it should be the most sensitive material available. Kodak Super XX, or Ilford H.P.3 is the film to use. And remember to cover over the red window at the back of the camera with light-proof adhesive tape. This should only be removed for as short a time as possible while the film is being wound on to the next exposure position—and don't stand too near the room light while doing this. These fast panchromatic films are a few pence dearer than the chrome type, but they are absolutely essential when artificial light is being used.

Arranging the Light.

If you have not got a silvered reflector for your photoflood bulb, plug it into a reading lamp (with the shade removed) or just into a socket on the end of a flex. If a reflector is used the distance from the lamp to the subject should be 6 feet ; with no reflector the distance should be reduced to about 4 feet. In this latter case, care must be taken to see that the direct light from the bulb does not shine into the lens of the camera, so a piece of card or a book must be held so as to keep the camera shaded from the light.

THE BEGINNER

CALLON DISCUSSES INDOOR PHOTOGRAPHY.

In order to find the best position for the photoflood, move it about from side to side with the subject in position, and note when the arrangement of light and shadow seems most pleasing. You will probably find that the best position for the lamp is about one yard to the right or left of the camera and a couple of feet higher than the subject.

Fixing up the Camera.

In the absence of a tripod the camera should be placed near the edge of a **steady** table, or for a low shot, on a wooden chair seat. If it has to be directed downwards, place a piece of wood or a hard-backed book of the correct thickness under the rear part of the camera. When taking the photograph, the left hand should be pressed firmly down on the top of the camera, while the shutter is opened and closed as delicately as possible with the right hand (Fig. 3). The slightest movement of the camera during the exposure will mean a blurred picture.

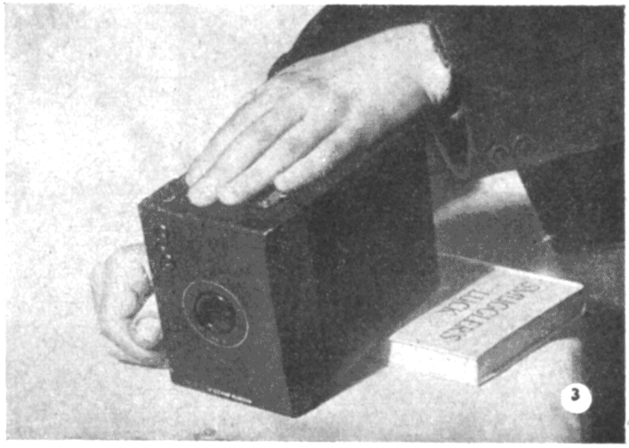
If your camera is capable of focussing at different distances, you will first choose the best position, then measure the distance from the camera to the subject, and set the focussing scale to this distance. With a non-focussing type of camera such as the box variety, it is impossible to approach the subject any nearer than about ten feet, so make sure that the camera really is that distance away. Even though you would like to go nearer it would be useless to do so, for the picture would certainly be blurred. The only way out of this difficulty would be to take your camera along to a photographic shop and enquire whether there were any portrait attachments or close-up supplementary lenses available for it. Otherwise you will have to keep your distance—even though ten feet is right across the room!

Making the Exposure.

When the subject and the lighting and the distance have all been arranged to your satisfaction, set the shutter to "time", and stand by for action.

The exposures will be measured in seconds, and with a box camera (which has a lens aperture of f.8 or f.11—but don't let that worry you), the first exposure should be one second, and the next one—after winding on the film—four seconds. It is always safer to give alternative exposures like this, for if one does not come out too well, the other almost certainly will, and you can make a note of the better exposure for next time.

A second is quite a long time, too. The easiest way of calculating one second is to count 1–2–3–4 fairly slowly and regularly. You can check the speed of your counting by repeating 1–2–3–4 **five times** while observing the second finger on a watch. If the second finger moves more than five spaces, you are counting too slowly.



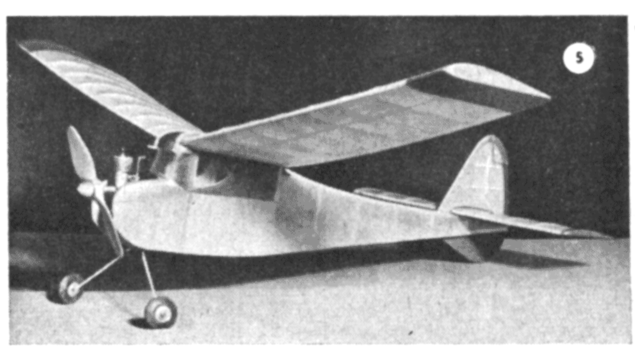
To make the first exposure of one second, open the shutter as you count the first "one" and close it after the "four". So it should go something like this: OPEN–2–3–4–CLOSE. Then wind on the film for the four-second exposure, leaving the subject, light, and distance as they were. Count out the four seconds like this: OPEN–2–3–4–TWO–2–3–4–THREE–2–3–4–FOUR–2–3–4–CLOSE. Then wind on the film at once ready for the next shot.

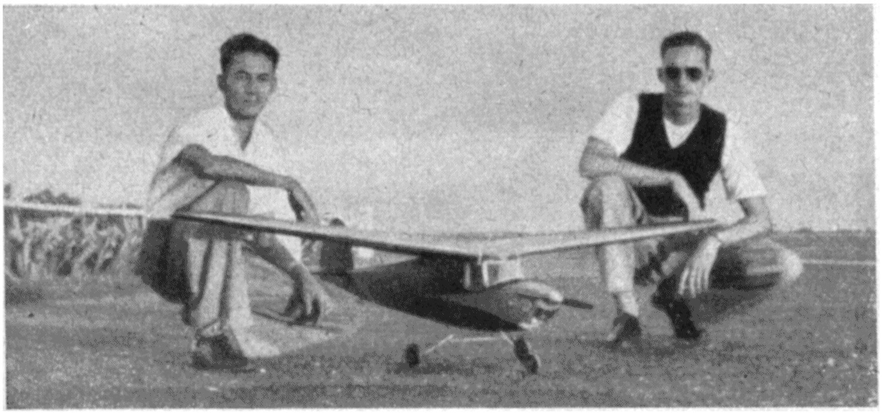
Developing and Printing.

The ideal way of getting films developed and printed is to do it yourself. But for those of you who leave this to the local chemist, here are a few interesting facts. The price for D & P work has been fixed at 9d. for developing the film, and 3½d. for each contact print. So no matter who does the job you have to pay the same price for it.

Sometimes the local chemist is a highly skilled photographer who will have your films ready in a few days' time; but this is not always the case. In fact, you may have to wait several weeks for prints which are disappointing owing to careless processing—and the cost remains the same. So make sure that you send the film to a reliable firm. And if the Editor lets this pass, I can recommend a firm which I have found to surpass all others in this particular line of work. The address is: Osborne & Campion, Ltd., 122, East Park Road, Leicester—and the firm has no connection whatever either with myself (except as a satisfied customer) or the AEROMODELLER. A film posted to them on Sunday evening, together with a 3s. 3½d. postal order for cost and postage back, is normally returned by the first post on Tuesday morning; and the workmanship is first rate. Any change there may be is returned in the form of a credit note which can be used with the next order.

Fig. 3 shows how to hold the camera during a time exposure. The rear part is raised and the left hand is kept pressing firmly down on to the top of the camera, while the shutter is opened and closed by the right hand. Fig. 4 gives the set-up for an indoor photograph of a model. A dark-coloured rug has been draped down from a bookcase to the floor to provide the background. The light and the camera are also shown in position. Fig. 5. The final picture. The arrangement was like that given in Fig. 4, except that the camera was placed much nearer to the ground so as to give an uninterrupted view of fin.





WORLD NEWS

by

ARIEL

Garth Drew and John Harrison of Jamaica with their Ohlsson 29 powered modified Stentorian. Photo by Richard Bronday, taken at Palisados Airport.

WITH all good wishes to his readers throughout the World, for a happy and prosperous 1951 with an abundance of successful modelling, Ariel once again, dips into his international mailbag and offers a selection of varied photographs and news items.

British West Indies. Another new source of aeromodelling news is Richard Bronday of Kingston, Jamaica, who wrote the first letter to be received from the B.W.I. by "World News".

We thank him for the complimentary remarks about the magazine, which he has read for several years.

He is a Committee Member of the Jamaica Aeromodellers Club, whose members are supplied with the American model aero journals as well as the AEROMODELLER, so have a variety of appropriate reading matter. President of the Club is Garth Drew, ex-R.A.F., and the Vice-President is Jimmy Brown, Chief Mechanic for Pan American World Airlines and K.L.M., in Jamaica.

Bronday has just built a "Rudderbug" from A.P.S. plans, which he is going to power with an ETA 29 and which, at the time of writing, was soon to have its test flights. The Club President's Mills ·75 powered Martinets have proved so successful that he has challenged another member, who has a McCoy 19 powered Skybo, to a duel. Winner gets a Mills ·75.

Several well-supported contests have been held on the island, at which British and American engines and several very fine trophies, from the U.S.A., have been given as prizes.

In Control Line Speed, keen competition exists between the Little Rocket and McCoy combination, and E.T.A. 29 powered Circulators. A further letter and more pictures are on the way from this correspondent and are looked forward to with interest.

Pakistan. A further letter from Sergeant McCafferty, Secretary of the Mauripur Modelling Club, tells us that flying activities were curtailed by bad weather and that one or two stalwarts who braved the very high winds and sandstorms were rewarded with the inevitable disaster.

However, Club members have not been idle, the clubroom being open daily with everyone engaged on building for the good weather to come. The models numbered some twenty-eight at the time of writing, so the great day was eagerly awaited. Due to lack of kits and materials many free-lance designs were in evidence and several of these have already proved good performers in the local poor weather conditions.

Thanks to two members who spent their leave in the U.K. everyone has an engine of some sort, and there are fourteen engines in the Club although it has only ten members.

As a result of the previous mention of this Club in "World News", an ex-member (1946 vintage) has written to them, giving information of activities in his time and all the present members were very pleased to hear from him. They would be glad if any other one-time Mauripur types would drop them a line and add a little more history to the records.

Portuguese East Africa. By a somewhat roundabout route, we learn a little of aeromodelling activity in yet another country. Antonio Neves, who lives in Boston, Massachusetts, spent some time in P.E.A., and sent a couple of photographs which were taken when he was at Lourenco Marques. Unfortunately they were not sufficiently clear for reproduction, and, as the subject matter was interesting, this is a disappointment. Only too often do we receive photos, which we would be pleased to publish, but which, because of poor quality, have to be excluded, and we would take this opportunity to bring this point to the attention of our correspondents. Please send us photographs, but make sure that they are in focus and properly exposed. If possible, send the negatives, failing which, the largest possible black and white glossy print. If the subject matter is interesting, some of your photos will certainly appear in this feature, and we do need good photos.

We apologise to Mr. Neves for using him as an excuse for a plea for good pictures, but as the contents of his letter were entirely descriptive of the pictures he sent, he will appreciate the point. He tells us that he will send detailed news of aeromodelling in Portuguese East Africa, and we look forward to seeing this.

U.S.A. We hear pretty regularly from Bob Linn, of Los Angeles, and are always pleased to receive his letters which are full of interesting information. The latest to hand tells of the post-war difficulties of model airplane traders in the States and one in particular. An established manufacturer of well-known kits and engines, who, until a short while ago carried quite an extensive range, has now been reduced to producing his most popular Power Model Kit, exclusively. This is extremely popular and is for small engines, that of our correspondent being powered with a Mills ·75.

The newest engines to reach popularity in the West are the Attwood "Wasp" and K. & B. "Big Infant", both of ·099 cu. ins. These, Bob Linn tells us, are the first engines to give the Mills ·75 real competition in the ½ A Free Flight class.

A local contest in this class was put on by a couple of the Club members and drew about 60 entrants. There was a five minute limit rule and although the weather was non-thermal, some good average times were made.

Among Linn's collection of engines, he now treasures a Micron which a friend brought back from a holiday in France. This power unit is in a scale Aeronca K which flies beautifully and looks and sounds most realistic.

Argentina. The last paragraph of a business letter from Aldo L. Caravario of Rosario, supplies us with news of his club, the Association Rosarina Aeromodelista, which has ninety members. The majority are glider enthusiasts, with rubber in second place. Four members of this club were selected and flew in the Wakefield Class Contest held in Buenos Aires.

Three of them were placed, being first, fifth and sixth. These were Antoni G. Garcia, Ricardo Gonalez, and Ruben Mata. Further news and photographs are on the way from Rosario, also.

R.A.F., B.A.F.O. World News is pleased to present another "first" event, this being the First Annual Flying Competition of the British Air Forces of Occupation Model Flying Association, held at Buckeburg, Germany.

Corporal Skinner of Air H.Q., sent us some "gen" and photographs and we had further excellent official pictures from the Chairman, Sqn. Ldr. Couch, M.B.E., D.F.C., via Sqn. Ldr. Cable, Secretary of the M.F.A. in this country.

We quote from Cpl. Skinner's letter: ". . . most of the R.A.F. Stations entered a team. Unfortunately the weather was against us, and the majority of events were flown off in a wind of around 32 m.p.h. (this being confirmed by Flying Control on the Airfield, who, incidentally, thought us mad). Nevertheless, prangs were few and the standard of enthusiasm left nothing to be desired.

To be able to judge the size of these competitions one has only to look at the initial entry sheet. The Headquarters Club, of which I am a member, alone entered 42 models, 38 of which were power, ranging from 1 c.c. to 15 c.c. The latter powered a 9 ft. radio controlled Auster, with its nearest rivals, from our entries, being a 10 c.c. Nordec - powered Chrislea Ace, and a similarly engined speed model (of original design) with which I hope to create a record . . ."

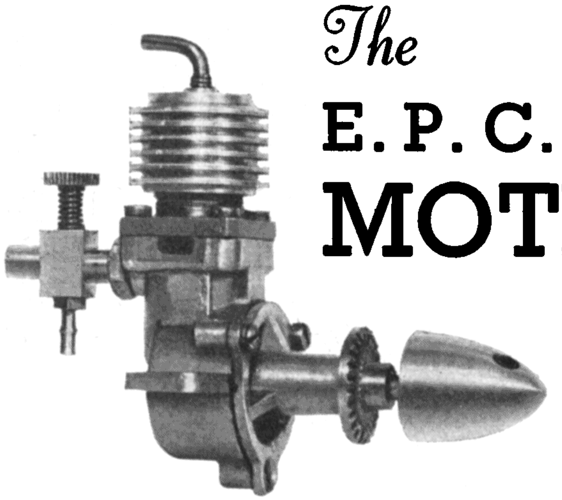
Cpl. Skinner has been a modeller for twelve years and a regular reader of the AEROMODELLER for a good many, and he deplored the fact that although the hobby has been carried on for some time in B.A.F.O. it has never had a mention in this magazine. This gives us the opportunity to ask for news from British Forces Overseas: we had taken it for granted that they would let us have modelling news, but now ask them to do so definitely, with photographs if possible.

Returning to Cpl. Skinner, whose F.W. 190 is being admired in the photograph, he tells us that this gained him first place in the Flying Scale Concours d'Elegance. It incorporates a timed, retracting and detracting undercart, detailed cockpit and all the trimmings. Powered with an Amco 3·5 it flies at just over seventy and will almost do "the book". He intended to enter the C.L. Stunt Event at the Contest, but this was cancelled owing to the wind, after two models had been written off.

H.Q., M.C. returned with the Shield, six cups, two medals, and satisfied feelings, to which we would add our congratulations.

B.A.F.O., Buckeburg, Germany. Above, the Judges of the Concours d'Elegance admire Cpl. Skinner's winning F.W.190. Below, a group of competitors on the airfield. This was the first of the Annual Flying Competitions to be held by the Command Flying Association.

A group of Lascari Air Scouts, Malta. Our correspondent, George Curmi, who contributed the photo, holds his Centurion. The Lascari Air Scouts are a similar body to the A.T.C. in Great Britain.



The E.P.C. MOTH

SMALL diesel engines of under 1 c.c. capacity are appearing with increasing frequency upon the British market, so that they may no longer be regarded as a somewhat experimental venture into the realms of engine design. The latest to reach us is the E.P.C. Moth, of ·85 c.c. capacity, a little engine which seems to be extremely well-made, robust, and of pleasing appearance. In design it is rather reminiscent of the earlier diesel engines of larger capacity, and the use of die-castings for the crankcase, stout steel cylinder, and turned screwed-on cylinder head, call particularly to mind those Italian engines which gave us such good service.

It will thus be seen that this engine falls rather into the utility class than in the " hot-stuff " category ; in fact, the whole engine appears to have been designed for hard wear and rough usage —which is not such a bad aim after all. No attempt has been made to incorporate high-speed porting arrangements, short-stroke, and other features usually associated with super high-speed motors, and the result has been to give us a robust little unit, at a weight of around 2 ozs., which should appeal to the man who flys for pleasure rather than for records.

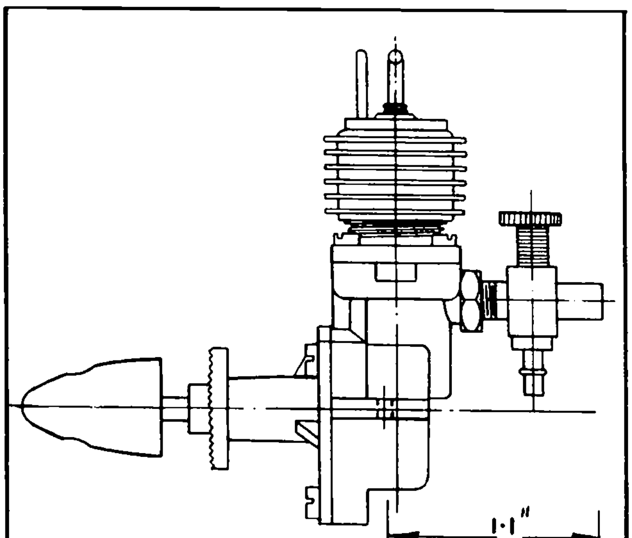
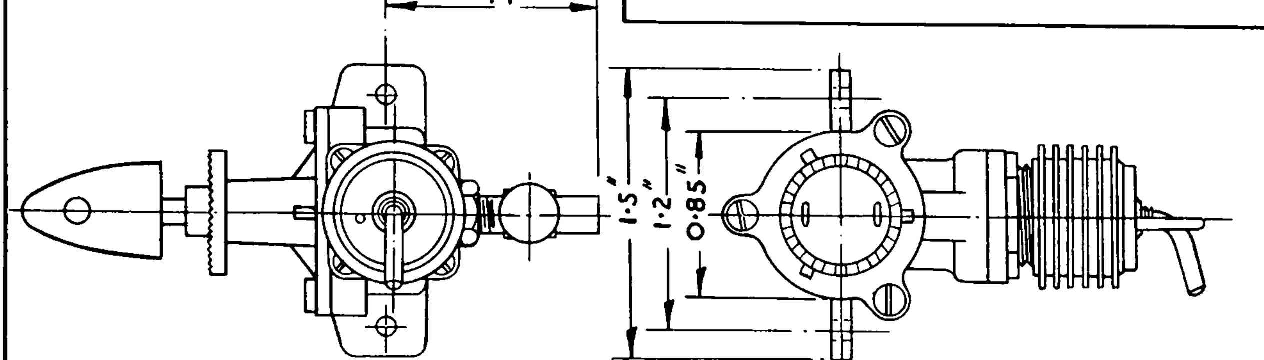
As speeds go to-day, the maximum r.p.m. of the " Moth " may be considered modest. The engine did not seem too happy when running in excess of 9,000 r.p.m. In the maker's literature, the b.h.p. is given as ·038 at 8,500 r.p.m. Nevertheless, I succeeded in pushing the revs. beyond 9,000, and obtained at 9,700 a maximum output of ·042 b.h.p. I must confess that this was not done without some difficulty, as at around this speed the engine seemed to prefer to run in short bursts, sufficient, however, for readings to be obtained. It would seem that speeds in excess of about 9,000 r.p.m. might not be reliable enough for general flying purposes, and that steady results would be better obtained at the manufacturer's figure. It will be noted that the output obtained at 8,500 r.p.m. was almost ·04 b.h.p., a figure much in excess of that claimed by the makers. It is likely that a difference in the fuels used, and a prolonged running-in process, may account for the variation in findings.

TEST

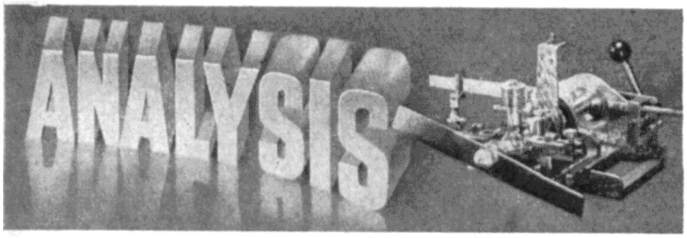
Engine : E.P.C. " Moth " ·85 c.c. Diesel.

Fuel : Mercury No. 3 plus Ether.

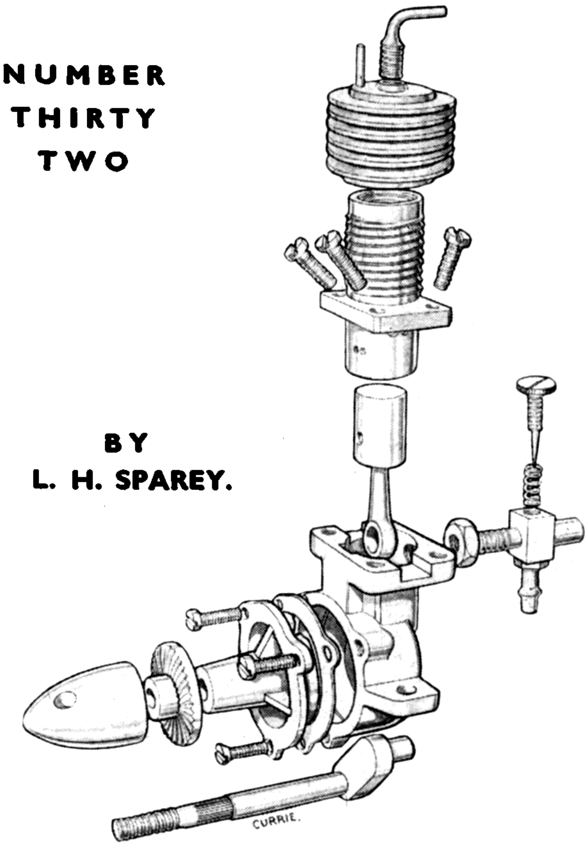
Starting : Following the maker's instructions for settings, the engine started readily enough with hand-flicking, but a little trouble was found in adjusting the controls to give steady running at speed above about 7,500 r.p.m. Once the settings had been found, however, no difficulty was experi-

SCALE. FULL SIZE.



NUMBER THIRTY TWO



BY L. H. SPAREY.

enced in duplicating the correct adjustments for good performance. The carburettor needle control seems to be rather on the sensitive side.

Running : The preceeding paragraph really gives the running characteristics of the engine, but, as already stated, the engine was happiest at speeds below 9,000 r.p.m.

B.H.P. : The engine was tested from 5,000 r.p.m. onwards, and at the lowest speed a b.h.p. output of ·023 was recorded. Output then rises steadily, reaching ·0335 b.h.p. at 7,000 r.p.m., ·038 b.h.p. at 8,000 r.p.m. with a maximum of ·042 b.h.p. at 9,700 r.p.m. Beyond this speed output falls rapidly, until it is but ·029 b.h.p. at 10,900 r.p.m.

The useful part of the curve lying between 7,500 and 9,000 shows a difference of only ·005 b.h.p. between these points.

Checked Weight : 1·9 ozs. (less tank) maker's weight, 2 ozs.

Power/weight Ratio : ·616 b.h.p./lb.

Remarks : This engine, selling at the remarkably low price of 35s. 11d., including purchase tax, is extremely good value, and shows no signs of cheapness in appearance, quality or workmanship. All parts have a clean, machined appearance, and seem to be remarkably sturdy in construction. It should be ideally suitable for the beginner, and the general-purpose flyer.

GENERAL CONSTRUCTIONAL DATA

Name : E.P.C. Moth.

Manufacturers : E.P.C. Engineering Co. Ltd., Cameron Street, Haydn Road, Sherwood, Nottingham.

Retail Price : £1. 15s. 11d., inclusive of purchase tax.

Delivery : Ex-stock.

Spares : Ex-stock.

Type : Compression Ignition Diesel.

Specified Fuel : Mills Blue Label 2 pts., Ether 1 pt.

Capacity : ·85 c.c., ·048 cu. ins.

Weight : 2 ozs. less tank.

Compression Ratio : Variable.

Mounting : Beam upright or inverted.

Recommended Airscrew : 7×4 ins. for free flight.

Bore : ·375 ins.

Stroke : ·472 ins.

Cylinder : Cast Iron.

Cylinder Head : Alloy, integral with fins.

Crankcase : Pressure die cast. D.T.D. 424 Alloy.

Piston : Steel, hardened and centreless ground.

Connecting Rod : Mild steel.

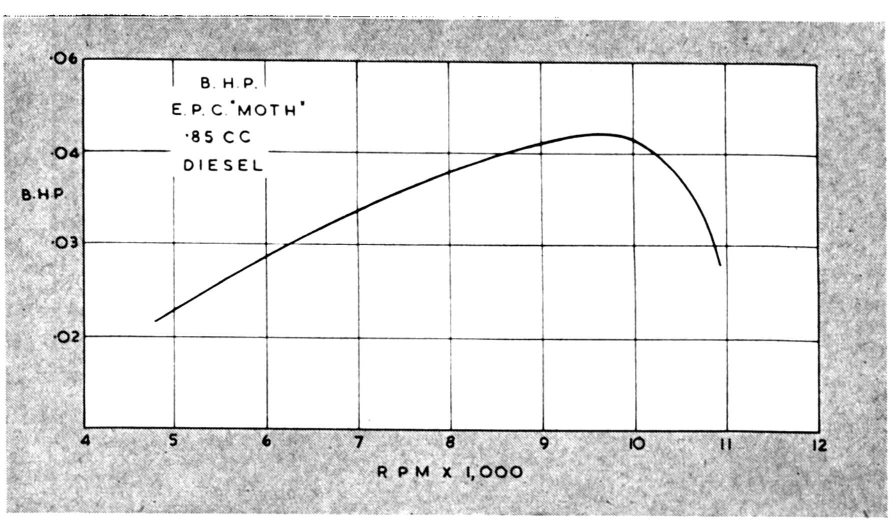
Crankshaft : 10 ton shear steel.

Main Bearing : Phosphor bronze bush, in die-cast D.T.D. 424 alloy front end.

Induction : Sideport.

Contra Piston : Steel, hardened and centreless ground.

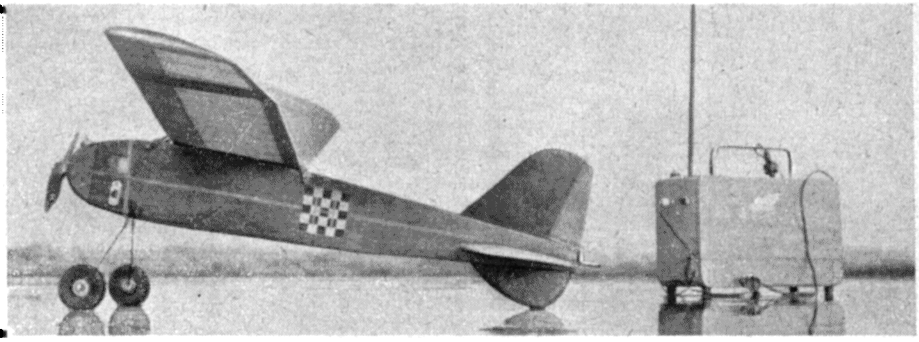
Special Features : Simple porting arranged for easy starting. Robust construction.



RADIO REVIEW

PART I

THE E.C.C. TELE-COMMANDER



THIS is the first of a series of Reviews on the latest commercial radio control outfits. Each outfit has been thoroughly tested by our staff over a prolonged period.

Manufacturers: Messrs. Electronic Control Components, 48, Swinbrook Road, London, W.10

Delivery 4 weeks, full spares service.

Transmitter

Four types available, "Standard", "Pilot", "International" and "Clubman", the one under test being the "International".

Size: 15×8½×5½ ins. **Price:** "International", £6. 15s. 0d.

Controls: Plug-in aerial socket, on-off switch, pilot lamp, built-in milliameter, plated carrying handle and seven foot keying lead with push-button switch.

Batteries: H.T. 120–150 volts. L.T. 1·5 volts All-dry 32

Aerial: Quarter wave sectional monopole.

Technical Description: The basic transmitter consists of a push-pull stabilized oscillator circuit, the tuning condenser being of the air space type, affording the greatest reliability against flash-over and R.F. losses. The coil is of low-loss formerless construction. In order to conform to the G.P.O. regulations, the entire tuning assembly is sealed in a metal box, only the valves being external. Coupling to the aerial is effected by a two-turn link loosely coupled to allow the greatest degree of stability. A double wound keying choke prevents signal strength fluctuation on movement of the lead.

Remarks: Firstly we would comment on the aesthetic qualities of the transmitter, and would compliment the manufacturers on a first class piece of design. Available in a black crackle finish and also in the following colours—blue, grey, brown, red or green (5/- extra for colour)—this outfit looks good and, furthermore, *is* good. From a functional point of view the design is also excellent. We liked the sturdily made carrying handle and the red pilot lamp, which, coupled with the built-in milliameter, tells at a glance that the unit is operating. On the model under test, the three quarter back was speedily removed to disclose on the inside a bracket, into which are packed the aerial and the keying lead for ease of transport. According to the manufacturers the average milliameter reading with a full aerial and the keying lead fully unwrapped, should be approximately 35 milliamps, and this reading may rise to as high as 50 milliamps when the transmitter is stood on damp ground. On our particular set the reading was on the low side, i.e., between 22 and 26 milliamps, using a standard 120-volt H.T. battery. This could have been increased by adjustment or by increasing the in-put voltage slightly, but we deemed this unnecessary for the following reasons:—Obviously the less current drawn the longer the life of our H.T. battery and as the range was far more than needed even with this low current reading then it was decided to leave well alone. We checked the range on the ground up to 3,000 feet (over half a mile), and at this distance had difficulty in seeing our helpers, never mind the model. In the air we found it impossible to fly out of range unless we were prepared to first lose sight of the model.

Receiver (Type 950A).

Price: £3. 10s. 0d. **Size:** 1½×2½×1½ ins. **Weight:** 2 ozs.

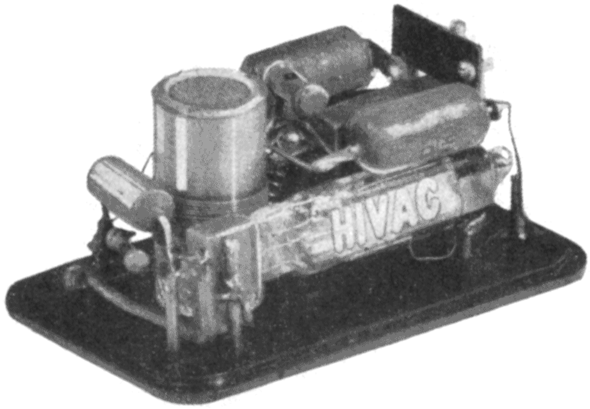
Controls: Slotted brass grub screw for tuning. Adjusting screw for relay.

Accessories: Paxolin tuning key, trimming condenser, limiting resistor, four-pin plug and socket, two-pin plug and socket, double-pole on-off switch, one yard of thin stranded 3-cord connecting wire with sufficient Hellerman sleeves.

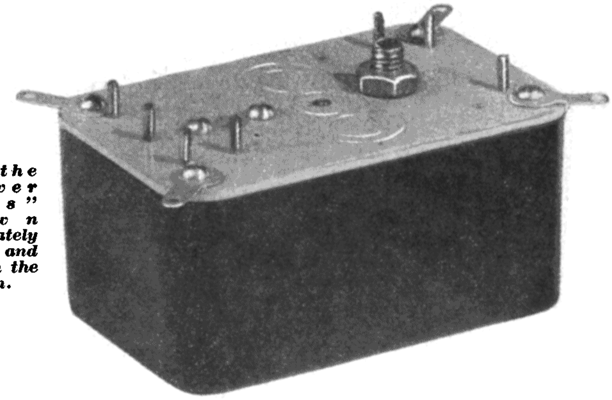
Batteries: H.T., two 22½-volt B 122's in series. L.T., 1½-volt half Pencell U12.

Technical Description: A one-valve super-regenerative circuit, using the English gas triode, the Hivac XFG1. Permeability tuning is used mainly to permit easy tuning, which at the same time, when varied over the tuning range, does not alter appreciably the L.C. ratio and in turn the bias of the valve. This is in fact a very important factor in maintaining the full efficiency of the receiver and the correct operation of the gas triode whose characteristics are known to change throughout its life. The alteration of bias to the valve is provided by means of the variable aerial trimmer, which has definite advantages over the fixed "long or short" type of aerial connection, as it can be adjusted to a finer degree of accuracy. With the characteristics of the XFG1 likely to vary from valve to valve, it may be found that when a new valve is inserted to replace one that is expended, that either the standing current may be higher and the change smaller, or else the reverse, i.e., standing

Heading photo shows test model designed especially for this equipment, with "International" transmitter in the background. Left, is a closeup of the superbly designed transmitter, note the pilot lamp and milliameter.



Left, the Receiver "works" shown approximately full size and right with the case on.



current lower, and the change increased. It should be possible to correct either of these two conditions by use of the limiting resistor and the aerial trimmer. Should, however, the change in valve characteristics be extreme, then the semi-fixed condenser across the coil may be varied in value to suit the particular valve—by removing the turns from the free end and compensating tuning by means of the normal tuning adjustment screw. With the review set the valve was merely replaced, only slight alterations to the aerial trimmer and limiting resistor being necessary.

General Description : The receiver is enclosed in a sturdy low-loss bakelite case, method of attachment being four tags, one in each corner. Connections are in the shape of brass pins.

Remarks : This magnificent little set has given us several months of use to date. It is 100% reliable, if properly treated, and the only difficulties we have experienced have been a direct result of somewhat drastic usage. We have two slight criticisms, the first concerns the metal attachment tags. These are bent in the form of hooks, and very naturally we mounted the receiver by four strong rubber bands looped over these hooks. Then came our first hard prang, and it was hard, the model having left its wing behind in the air ! Result —shock of impact opened out the aforementioned hooks, permitting the receiver to hit against the front bulkhead. A cracked receiver case and a relay knocked out of adjustment was the total damage. Lesson learnt was to thread the bands *through* the holes in the mounting tags and for good measure we also cemented a sorbo rubber pad against the front bulkhead, just in case ! The manufacturers might well fit somewhat sturdier tags, although if they are used in the manner described above, then no trouble of this sort should be experienced. The other slight criticism was the fact that when our set was in tune the iron core was actually touching the bakelite case, i.e., the tuning adjustment screw could not be screwed in any farther. This in no way affected the set, and on mentioning it to the manufacturers they stated that the point had already been amended on all future receivers.

Although fully detailed instructions for assembly and installation are given by the manufacturers, we intend to pass on the benefits of our own experience to readers, repeating some of the manufacturer's advice in addition.

First job on receipt of the receiver is to place it firmly on one side and thoroughly read the instructional leaflet supplied. Study carefully the wiring diagram and then intelligently position the various accessories in your model. By this we mean place the meter socket, limiting resistor and aerial trimmer on the same side of the model, keeping the socket and the resistor fairly close to one another.

Obviously it is essential to be able to read the milliameter when adjusting the limiting resistor and also the aerial trimmer. Incidentally, do not " twiddle " unnecessarily with the trimming condenser as they are not intended for constant adjustment and can cause some peculiar happenings when faulty. In our particular model all the above-mentioned controls are on the starboard side and the switch and battery doors on the port side. The switch is up the front, conveniently placed for thumb operation by a normal right handed launcher, i.e., launcher can hold the model in both hands and switch on with his left hand without relinquishing his hold up front. The receiver is mounted on its side with the controls again facing starboard, so that literally all the adjustable controls are on the same side of the model. We have a small circular hole through the fuselage which coincides with the tuning control and one merely inserts the tuning tool which is self positioning.

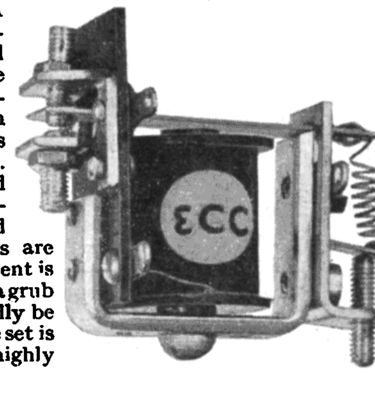
Aerial length varies according to the valve, but with a new outfit some 40 ins. after the condenser is a good approximate length to start with. Make sure that the resistor is screwed to minimum (fully anti-clockwise), switch on, and then slowly advance the resistor until the correct current reading is indicated on the milliameter. With each receiver is a blue card giving the required standing current and also the current values at which the relay makes and breaks. On our review set we had a standing current of up to three milliamps maximum with new batteries and new valve, and this was reduced to 1·6 milliamps by means of the variable resistor. As our valve grew older it was eventually found necessary to increase the aerial length to some 5 feet, at which length it has remained ever since, indicating some sort of optimum we imagine for the particular valve in use. Incidentally, a sign that your aerial length is insufficient is a wavering milliameter needle, the same effect also becoming apparent when L.T. batteries are run down.

Tuning should be carried out at over 100 yards range, all that is necessary being to adjust the tuning screw by means of the paxolin tool to obtain the maximum drop when the transmitter is keyed.

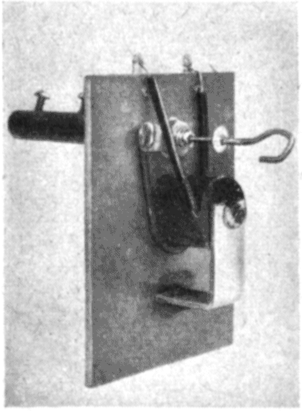
Changing a valve is simplicity itself with this receiver by virtue of a small plastic valve holder of the plug-in variety. It is only necessary to trim the new valve leads to the same length as those of the old valve. Scrape the ends and then plug in, making sure that the red spot is at the bottom, and that the leads go into their correct holes.

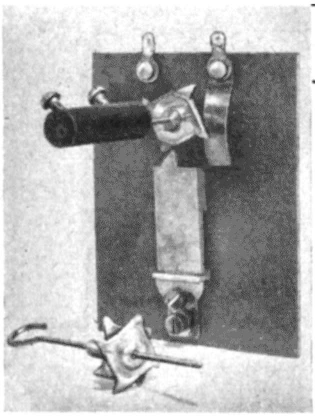
Type 5A Relay.

Price : 25/--. **Weight :** ½ oz. **Size :** 1 × 1¼ × ⅜ ins. This relay, which is of the balance armature type, is of course included in the 950A receiver. It is, however, also sold separately for those enthusiasts who prefer to build their own receivers, hence this separate description.



A special alloy reed is used which is knife-edge balanced, and solid silver contacts are employed. Adjustment is affected by means of a grub screw and can actually be carried out whilst the set is in operation. With a highly





Front and rear views of the escapement showing both types of rotor. Note in the left-hand photo, the washer soldered to the shaft which serves as a positive stop when winding.

sensitive relay of this type, the amount of adjustment necessary to effect a considerable difference between the operating values is infinitesimal. In point of fact, a quarter of a turn on the adjusting screw made a difference of ·4 m.a. to the " hold in " figure for our particular example. The makers claim that they can be adjusted to change from contact to contact on a current change of 50 micro-amps between ·5 m.a. and 3 m.a. Coil resistances for these relays are available between 1,000 to 6,000 ohms and they are wound in gauges up to 48 s.w.g.

As mentioned earlier we knocked our particular relay out of adjustment, and on examination discovered that the reed had been moved to one side, thus putting the points out of alignment. It was necessary to slacken off the armature retaining screws, reposition the reed and finally readjust the tension on the return spring. Space does not permit a description of this, and although it is within the capabilities of the average skilled aeromodeller, we recommend that inexperienced readers leave well alone, returning their sets to the manufacturers should the need arise. This is, however, most unlikely, as only the earlier type of relays were prone to a little side play on the reed. Later versions have the reed slots machine cut for accuracy, so preventing any side movement. The manufacturers were good enough to replace our earlier type of relay by one of their later models, which we wired in our receiver and it has, as a matter of interest, proved faultless in spite of a fair quota of spins-in and heavy landings.

Type 3 Escapement.

Price: 17/6 (additional rotors 3/- each). **Size:** $2\frac{1}{4} \times 1\frac{3}{4}$ ins. (Paxolin panel can be trimmed to $2 \times \frac{3}{4}$ in. if required).

Power: 1 or 2 strands of 3/16 in. flat rubber.

Weight: $\frac{3}{4}$ oz.

Batteries: 3 volts (2 half pencells minimum).

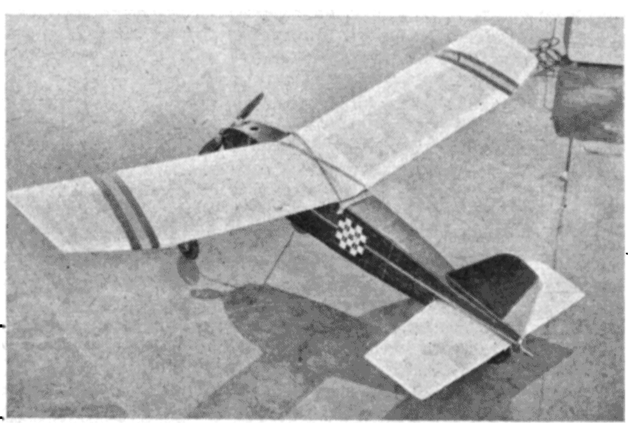
Description: This is a most unique design as can be seen from the photographs and was in fact the first commercial escapement in this country to feature a current saving device. The designer, Mr. G. Court, is to be congratulated. The rotor may be interchanged with either the popular self centring type or the four position type. For the newcomer to radio control the self centring type giving rudder only is a definite " must ". If, however, the more experienced reader requires one auxiliary control such as engine cut-out or speed variation, then the four position type is the most suitable. The switch spring, normally used for opening and closing the current saving device with the self centring type, may be used in half rudder position to short out the ignition or to operate a solenoid for cutting diesel or glowplug motors.

The unit is best mounted in a slot accessible from a hatch in the top of the fuselage, it can then be removed for inspection or rotor change without any " unglueing ". When installing the escapement it is important to ensure that the rubber motor, spindle and any extension shaft are in a straight line. It is wound anti-clockwise by withdrawing the crank and as recommended we soldered a small washer on the hook side of the shaft to serve as a positive stop when withdrawing the crank for winding, and understand that this is likely to be fitted on future production models. We had slight trouble when first installing our own example with the teeth jumping. On examination this was found to be due to play in the armature, which permitted the armature to move sideways when under pressure from the star wheel teeth, when the tension of the rubber motor was on. This was easily corrected by adjusting the half moon shaped stop that locks the armature to its retaining yoke, and the unit has given 100 per cent. reliable service ever since.

It is an extremely positive escapement, and most economical on batteries. By virtue of its three-volt operation, it does of course score over other commercial units by saving the weight of a half Pencell, i.e., half an ounce. Two half pencells in series being quite sufficient for several weeks of constant flying. Be careful not to turn the crank in the wrong direction when winding as this is liable to force up the leaf spring so that it touches the outer teeth of the star wheel when in either the " left " or " right " positions, which will obviously result in a heavy current drain.

Features that we like are, the ball race which is fitted to the shaft for easier running, and the cunning use of a small piece of bicycle valve tubing as a return spring. This can, incidentally, be adjusted for tension by merely moving it up or down behind the armature. Very detailed instructions are given for the operation and installation of this unit and even the beginner will have no difficulty if he follows them closely. One point that the manufacturers stress and we would echo their remarks, is that under no circumstances should tubing be used as a rear bearing as it tends to bind should the shaft not be dead in line. Far better to use a strip of brass drilled with several holes, this to be finally cemented in position when the hole for best alignment has been found.

Which brings us to the conclusion of this review with congratulations to the manufacturers on producing what is virtually a foolproof radio outfit. Certainly its operation is well within the capabilities of the average aeromodeller and it is a significant fact that out of the eight major R/C events held so far in this country E.C.C. equipment has taken no less than six first places.



Harry Hundleby designed the test model which has proved highly successful. Details are: Span, 48 ins.; Area, 353 sq. ins.; Length, 29 ins.; Moment Arm, 10 ins.; Weight, 31 ozs.; Lifting Tail. Allbon Javelin powered.

CONTEST CONSIDERATIONS by the Editor

I HAVE no doubt that many interested readers have seriously considered the articles published in the December, 1950, and January, 1951, issues on the subject of model aircraft contests, and am equally certain that the views expressed have been thoroughly discussed and pulled to bits.

As was to be expected, the loudest voices raised in criticism of past conditions came from those who usually do all the flying and little else, and it should be understood at the outset that any improvement in the conduct of contests in this country can only come about through a reasoned and impartial study of the questions on both sides.

While Phil Guilmant treated the average rally organisation in somewhat lighthearted fashion, two or three points are none-the-less worth careful consideration. Chief amongst these is the requirement that all officials should be clearly identifiable, as it is most confusing for a stranger on the ground to identify individuals with their official positions purely by means of a list of names in the programme.

One essential at any meeting either big or small is the final cleaning up of the ground, and I do not need to mention some recent instances where excellent fields have been lost to the aeromodelling fraternity through failure to adequately deal with this situation. The logical answer seems to me to be the system adopted at the York Nationals, where members of one of the local clubs organised a scavenging squad equipped with sacks and cartons.

A final point extracted from Guilmant's article is on the subject of prizes. It appears that nowadays there has developed an outlook which values the material prize at the end of a meeting more than the fun and honour of competing, and there is a section in existence to-day with very inflated ideas of what their efforts are worth.

I further deplore the " looking a gift horse in the mouth " attitude adopted by some successful flyers who, on receiving a kit or other material award for their efforts, turn up their noses and express in no uncertain terms their deprecation of the award in question. Although I should like to see a return to pre-war standards, where the vast majority of competitors were satisfied to fly for the fun of the thing and a possible cup or certificate as a record of their prowess, we must face up to facts and move with the times. Whilst not in favour of cash awards it would appear that the best method of satisfying most tastes would be to award vouchers of agreed value which can be cashed at the winner's local model shop for goods of which he himself is in need.

Barry Haisman was obviously writing from experience gained at the 1950 Daily Dispatch Rally, in my opinion one of the best organised meetings held in this country. As he stated, the first thing to consider is the type of meeting required. For meetings at which National Contests are to be competed obviously the maximum effort must be laid on, but rules and other requirements can obviously be modified to suit purely local Rallies.

Haisman's chief contribution is his suggestion of securing a panel of officials who can co-operate and work together until each man knows his job thoroughly. Whilst it would be difficult to secure this optimum on a national basis, I have no doubt that with suitable application by a group of enthusiastic administrators this could be done, for it is surely high time that the old method of calling for volunteers haphazardly five minutes before a contest is due to start is discontinued.

Ron Warring had a number of pertinent comments to make on past arrangements and I wonder whether he was really serious in all his criticisms regarding completely scrapping the existing rules. It is obvious that the current regulations have been built up over a number of years, each season showing up loopholes which have to be closed by modification of existing rules or writing in fresh regulations.

Regarding his remarks on the subject of reserve models in the Wakefield eliminators it is obvious that modification of the written rules is required, for although it was the intention that reserve models (no number stated) could be used in order to get a full three flight result, this was not apparent enough from the rules as written.

The prop and wing tip method of launching is in my opinion an example of weakness, in which an effort was made to fit the rules to the delinquent instead of the other way round. This system was introduced in order to eliminate pushing but the obvious solution would have been the eliminate the pusher himself ! I am certain that the vast majority of modellers both here and in other countries would appreciate a modification of the launching rules to allow the model to be held in any manner on the ground, providing that no push was given.

Warring's final comment is on the subject of timekeeping and this, as always, is probably the most vexed question of the lot. For some years past I have advocated that timekeeping should be brought up to a higher level, and proposed at an earlier date a system of grading of timekeepers in an effort to improve the situation. This suggestion was obviously too radical at the time of its proposal although I think we are rapidly approaching the day when some cleaning up must be introduced.

My proposal was that before a person could be accepted as an official S.M.A.E. timekeeper he should be able to assure those responsible that he is possession of a reasonable standard of eyesight, and is both able to operate and read a stop watch correctly.

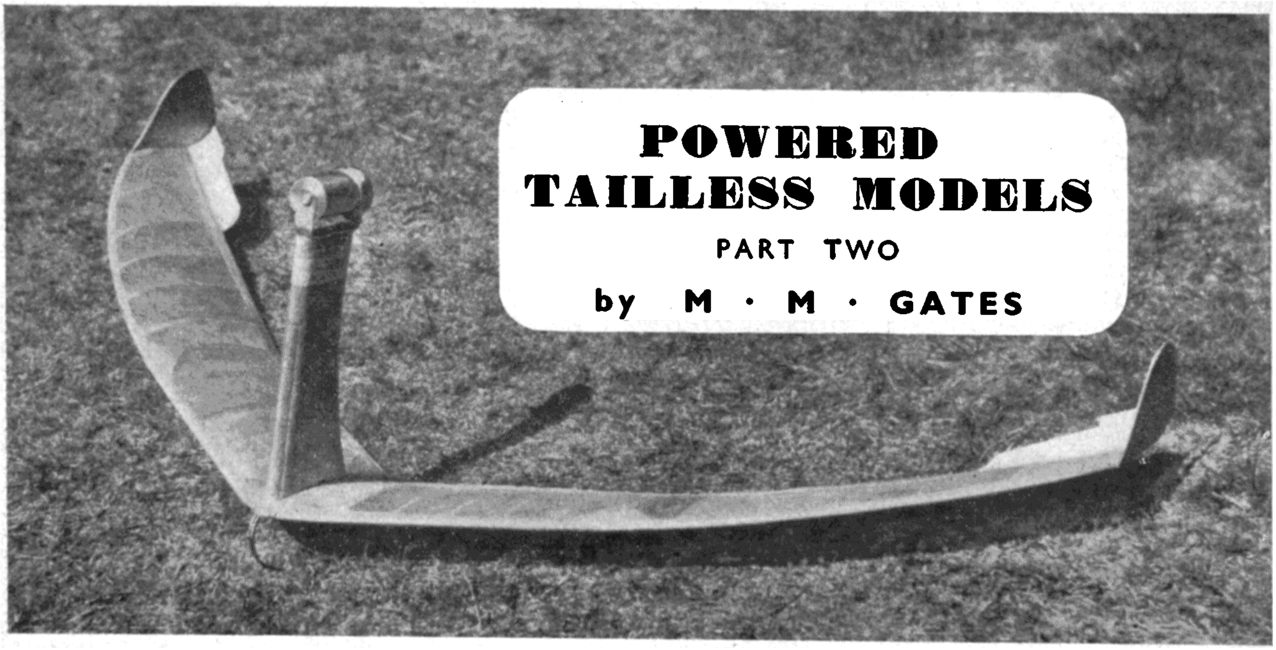
A simple examination of would-be official timekeepers could be quite easily conducted in clubs, or better still by Area committees. Persons who make the grade in this initial simple examination would then be recommended and accepted as official timekeepers and issued with a badge or card to indicate their qualification. Following on this a panel of experts could be eventually secured by creating first and second class timekeepers, individuals graduating to these categories by virtue of a stated period of timekeeping with no complaints lodged about their abilities.

Ron's final point regarding the " out of sight " rule requires some deep thinking for it is obvious that in a number of cases machines are clocked off (quite correctly) when passing from the sight of the timekeepers, yet obviously well able to register a maximum if the conditions permitted keeping in sight. Obviously a model disappearing O.O.S. at a great height *could* be awarded a maximum by the jury, but what of those cases where a model is fast disappearing downwind at an average altitude ? The model may or may not remain airborne for a number of minutes, but nobody at the starting point could guarantee that a model would continue in flight or suddenly lose altitude and land.

Finally, what about Mr. May's winning design for competition area layout ? Generally the scheme illustrated would meet most cases but the chief criticism is that the Control Line arenas are too close to the main control centre, and the noise question would seriously handicap the general conduct of affairs. It would be better if this arena were shifted either to the extreme right of the contest area, preferably adjacent to the rubber take-off.

I very much doubt the advisability of fully roping off the glider take-off area, as under some conditions a competitor needs quite a long run and it is not fair to place handicaps such as ropes and stakes in his way whilst running with his eyes fixed on the model !

The remaining criticism I have is regarding P.A. equipment. Experience proves that with multiple contests taking place it is too much to expect any centralised system to carry to all parts of the oontest area, and it therefore becomes necessary to have extension speakers carried to different points so that each sub-centre can be adequately informed and instructed.



POWERED TAILLESS MODELS

PART TWO

by M · M · GATES

IN Part One of this article we considered the general picture presented by tailless power models. This month I want to get right down to the meat of the subject and to give the fundamental equations involved. However, since one man's meat (in this case the mathematician's) may be another's poison, the equations are given only for reference, and no difficulty should be found in following the theory, if the graphs are studied. Few readers, I expect, can realise the full implications of an equation merely by looking at it, but the Engine Analysis power curves will have made graphs familiar to most AEROMODELLER readers.

Climbing Theory.

I have developed the theory at the same time as making flight tests, and have found it very helpful. So far I have only attempted to solve the problem mathematically for three types of climb :

(*a*) The so-called normal climb with no turn, which is the best for low thrusts.

(*b*) The limiting angle climb, without turn, for high thrusts ; being the steepest angle at which the model may climb and remain stable.

(*c*) The vertical climb, without turn, for high thrusts, assuming it is possible. In actual fact some turn is necessary, but its effect on the rate of climb is probably small.

When the thrust exceeds the weight of the model, there is a climbing angle which cannot be exceeded without the flight path becoming unstable, and the model usually loops. Now this happens although the model is longitudinally stable, so it is necessary to distinguish it from longitudinal instability. I will therefore refer to it as flight path instability. Longitudinal stability is the tendency of a model to fly at a constant angle of incidence. I define flight path stability as the tendency of a model to fly in a steady attitude.

I have not yet investigated theoretically, the apparent stabilising effect of turn, nor its effect on performance, but it seems that fairly small rates of turn considerably increase the flight path stability.

The following equations apply to the various types of climb, assuming that the thrust is constant, which is true for a jet model, and very nearly true for a powered model. It is also assumed that the drag coefficient is constant under all flying conditions, which the L.S.A.R.A. has found to be true for tailless models. The following symbols are used :—

T/W thrust/weight ratio $=$ r
C_L lift coefficient drag during the climb.
C_D drag coefficient.
θ climbing angle.
V_c rate of climb in feet per minute.
w wing loading in oz./sq. ft.

Climb		C_L/C_D	V_c
Best Normal	$\sin\theta=\frac{2r}{3}$	$\frac{9}{r^2}-4$	$167{\cdot}6\sqrt{\frac{wr^3}{C_D}}$
Limiting Angle	$\sin\theta=\frac{1}{r}$	$\frac{1}{\sqrt{r^2-1}}$	$435\sqrt{\frac{w}{C_D}\frac{(r^2-1)}{r^3}}$
Vertical	$\theta=90°$	$C_L=O$	$435\sqrt{\frac{w}{C_D}(r-1)}$

From Fig 1, the curve of the climbing angle θ plotted against the thrust/weight ratio, it will be seen that the steepest stable angle of climb which is efficient is 55°, at T/W 1·22. At smaller T/W ratios it is *possible* to climb more steeply, but the actual rate of climb is smaller than could be obtained by holding the nose down. This graph is useful for checking that your model is climbing at its most efficient angle.

The curves for C_L/C_D, Fig. 2, really show the variations of lift coefficient, since the drag coefficient is constant. They show clearly how the lift coefficient has to be low for fast climbs.

The rate of climb graph, Fig. 3, is rather more complicated, since the rate of climb depends not only upon T/W, but also upon the wing loading and the drag coefficient. The curves are plotted for the usual range of drag coefficients, for a wing loading of 4 oz./sq. ft. To convert for any other wing loading, multiply by $\sqrt{\frac{w}{4.}}$ The most surprising feature of the curves is the fact that, an increase in the thrust/weight ratio actually results in a decrease in the rate of climb at the

Heading photo shows the author's Ghoul II, a fast climbing model with a tall jet pylon found necessary for limiting angle climb. Spiral stability was improved by increasing the dihedral.

limiting angle, when T/W exceeds 1·73, if the wing loading is unaltered.

Downthrust.

It is surprising how few modellers really understand how and why downthrust works. I have known quite experienced modellers who thought all you had to do was to incline the thrustline downwards, irrespective of the position of the power unit. Of course, in fact, it is the moment (force × arm) produced by the thrust about the centre of gravity which determines the downthrust. On a conventional power model, part of this moment is produced directly by the thrust, but most of it is produced by the effect of the slipstream on the tailplane. It is no use tilting the thrustline of, say, a Jetex model with the unit close to the C.G.; you must raise the jet bodily. Angular downthrust is usually of little value on a tailless model, since there is no slipstream-tail effect, and the power unit is not usually far forward of the C.G.

From the longitudinal stability theory mentioned in Part One it will be obvious, that if we want to make a model fly at a low angle of attack, as in the climb, it is necessary to apply a downthrust proportional to the static stability margin (h). It can be proved that the required downthrust moment arm (call it H) in inches is given by :—

$$H = h\left(\frac{L}{D} - \frac{1}{r}\right) \quad \text{for level flight}$$

$$H = \frac{h}{3}\left(\frac{L}{D} - \sqrt{\frac{9}{r^2} - 4}\right) \quad \text{for best normal climb}$$

$$H = h\left(\frac{L}{D} - \frac{1}{\sqrt{r^2-1}}\right)\left(\frac{r^2-1}{r^2}\right) \quad \text{for limiting angle climb}$$

$$H = h\left(1 - \frac{1}{r}\right)\left(\frac{L}{D}\right) \quad \text{or a vertical climb}$$

where h = static margin in inches.
L/d = lift/drag ratio on the *glide*.
r = thrust/weight ratio.

The above equations, which are plotted in Fig. 4, give very good results on tailless models, when the aerodynamic centre of the wing is not far above or below the centre of gravity. If the C.G. is far above the wing an additional factor will have to be added to allow for the moment of the model's weight in the climb. Thus the downthrust will have to be increased.

To get an idea of the downthrusts required, let us investigate a typical case.

A 34 in. span flying wing, aspect ratio of 7. Thrust : 5·5 oz. Weight : 3·67 oz. L/D ratio on the glide : 7·3. Static margin 30% mean chord.

$$\text{Hence mean chord} = \frac{34}{7} = 4{\cdot}86 \text{ ins.}$$

$$\text{Static margin} = \frac{30}{100} \times 4{\cdot}86 = 1{\cdot}46 \text{ ins.}$$

$$\frac{T}{W} = r = \frac{5{\cdot}5}{3{\cdot}67} = 1{\cdot}50$$

From the above formula for limiting angle climb

$$\text{Downthrust } H = 1{\cdot}46\left(7{\cdot}3 - \frac{1}{\sqrt{1{\cdot}5^2-1}}\right)\left(\frac{1{\cdot}5^2-1}{1{\cdot}5^2}\right) = 5{\cdot}13\text{ins.}$$

Thus the thrustline will need to be 5·1 inches above the C.G. of the model, whose mean chord is only 4·86 inches. It is easy to see that if the jet is at all heavy compared with the airframe, the centre of gravity will be high, making an additional downthrust necessary, until the thrustline is easily

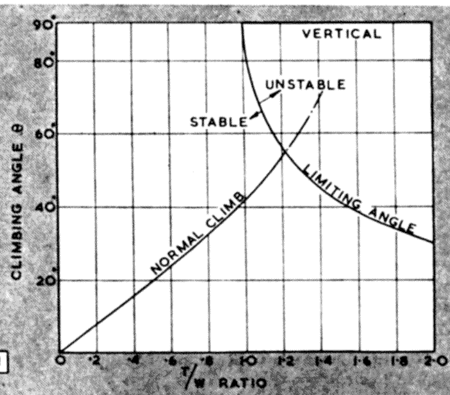


FIG 1

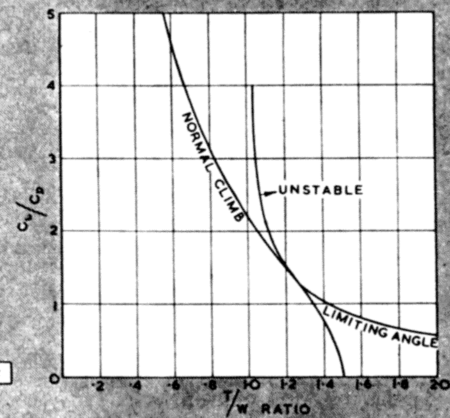


FIG 2

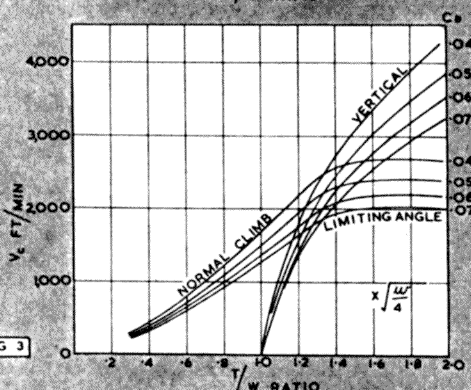


FIG 3

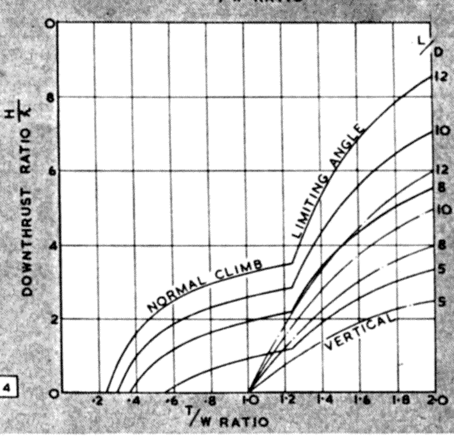


FIG 4

8 inches above the centre section of the wing. The exact amount depends upon the position of the C.G. Actually the limiting angle climb is about the worst case, but the downthrust obviously has a profound effect upon the design of the model. In particular, the resulting high centre of gravity tends to reduce the longitudinal stability when gliding. To counter this, larger elevon angles are necessary, which result in increased drag. Similarly, more dihedral is required for lateral stability.

How can we reduce downthrusts, and yet use high thrusts ? From the graph, the steeper the angle of climb, the smaller is the required downthrust. On this count, a diesel model would appear to have an advantage over a jet, since it can with greater safety use turn to obtain a steep climb.

An investigation into longitudinal stability indicates that downthrust gives a model increased stability. However, the same climbing trim could be obtained by lowering the elevons. These could be connected to the engine mounting, which would be on hinges. In this case the climbing stability is the same as for the glide. This arrangement is obviously unsuitable where the thrust is liable to vary considerably, for a deficiency of thrust would cause a dive. The main advantages to set against the added complication are the reduced drag on the climb, and the low centre of gravity. I estimate that the weight of the mechanism would be more than offset by the reduced pylon weight in most cases, so the idea would appear to be well worth a trial.

A further idea, which I do not favour so much is to connect the elevons to a type of pendulum control, adjusted so that the elevons droop when the model passes a certain angle, say 70 degs. from the horizontal, thus restricting the model to a reasonable climbing angle. I must admit to a distrust of all pendulum controls, so I won't recommend this idea. Yet another possible means of elevon operation, is to use a timer. On a power model it could also be used to operate the cut-out, thus ensuring simultaneous operation. With a jet model the length of burning varies very little, so the timer could be arranged to operate at the correct moment. The grave disadvantage of this method is that the model is likely to dive in if the engine stops prematurely.

Tests Results.

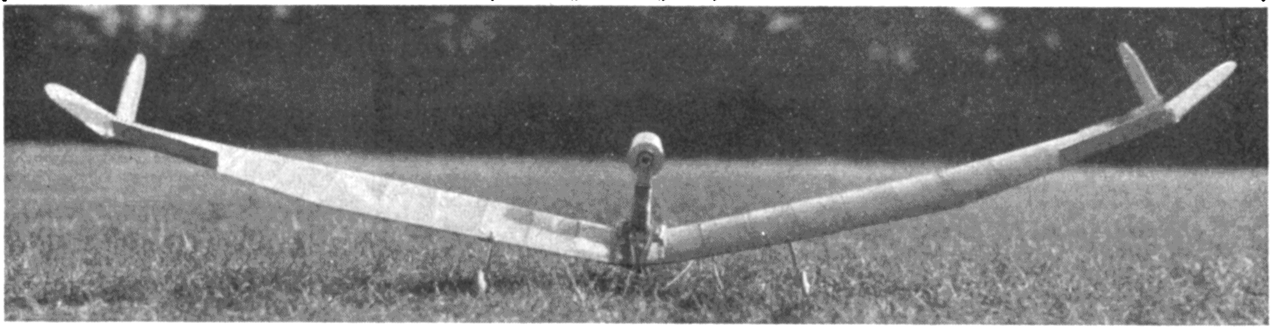
A large number of flights have been made with my three jet tailless models, the Ghouls I, II and III. The Ghoul II, with a thrust/weight ratio of 1·5 was trimmed for a limiting angle climb, although at first the downthrust was insufficient, which resulted in a series of loops. Increasing the downthrust produced an apparently stable climb at about 70 degs., with a slow turn to the left. This is contrary to the limiting angle theory, but it only proved consistent in calm weather. Accordingly, the downthrust was again increased, to attain a limiting angle climb. This gave better flight path stability in the longitudinal sense, but spirally it was too sensitive, especially in windy weather. An improvement was made by increasing the dihedral.

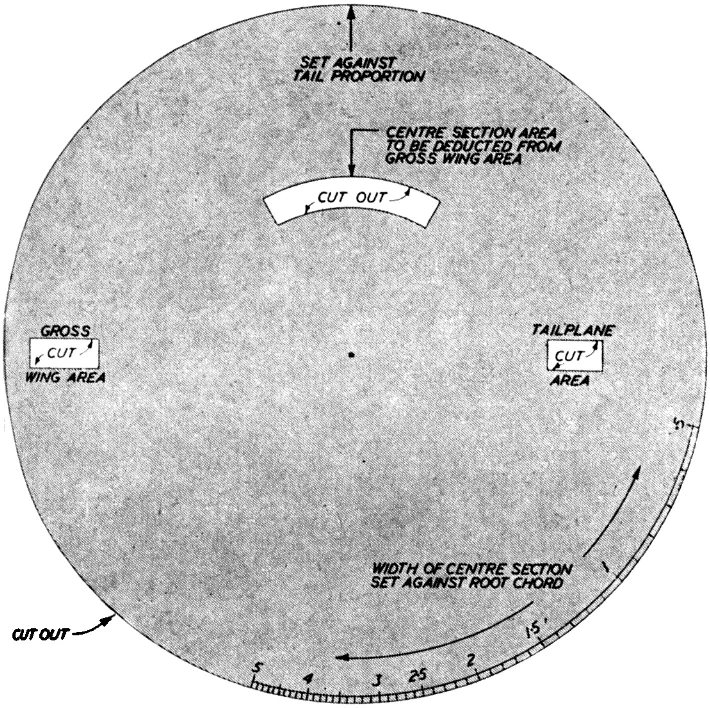
An earlier model, the Ghoul I, was used to obtain a vertical climb, with a thrust/weight ratio of 1 to 1·2. As will be seen, it had more dihedral than the Ghoul II, the idea being that it should half roll if it passed the vertical. At first the model would go into a series of perfect loops from an R.O.G., gaining height all the time. This continued when the fins were reduced in area and 2-inch, 45 degs. dihedralled tips were added, although it was then also possible to climb in a fast, flat spiral which did not seem very efficient. Trimming it to fly straight only produced half rolls off the top of a loop when the power ran out in the inverted position. However, when the fins were reduced in area to negligible proportions, and the model was given just a trace of turn, a steady spiral climb was obtained of between 45 degs. and 90 degs. as the thrust and weight varied. A straight trim gave a genuine half loop-half roll climb, which looked very untidy at such a high speed. Dutch rolling was rather noticeable on the glide. The most satisfactory trim for a high-powered tailless model would seem to be a near-vertical slow-turning climb deriving its stability from generous dihedral rather than by adjusting the downthrust.

The Ghoul III is a rather larger model (hence of lower T/W ratio) and has so far been flown on a Jetex 200, Jetex 350 and with two 350's. Its most remarkable characteristic is that it insists on flying straight, in spite of efforts to make it turn, with trim tabs on wing and fins. The downthrusts were calculated and proved to be very near to the correct values, only slight alterations being necessary.

Before passing on to the important matter of overall duration, I should mention one or two of the unexpected happenings with the Ghoul I. Firstly, rolling in the climb. This was cured by holding the jet pylon on with more powerful rubber bands. Apparently it was not held securely enough, for the trouble was cured. Secondly, spiralling into the ground when launched, even though the previous flight had been perfectly stable. This, I suspect is due to the thrustline being asymmetrical, possibly because of careless loading, or dirt in the jet. It occurred to both the Ghouls I and II on several occasions.

The rear view, below, is of the Ghoul I, with elevons and fins trimmed to give a spiral climb. The jet unit on this model is mounted lower than on Ghoul II, and produces a half-loop, half-roll flight path if allowed to fly straight. Climbing stability was improved by reducing the fin area.





having trouble with the new rules?
TRY RON WARRING'S

WAKEFIELD ....DESIGN COMPUTOR

PROPORTIONING a Wakefield design to the new specification calling for a total wing and tailplane area of between 263·5 and 294·5 sq. ins. can lead to a lot of time being spent in working out different wing and tail area proportions and sizes within these new limits. To obviate such calculations this design scale has been drawn up to give instantaneous readings for wing and tail area required for different tailplane *proportions*.

Tailplane proportion—*i.e.*, tailplane area expressed as a percentage of the wing area—is an important design factor. Under the old rules, tailplane area was limited to a maximum of 33% of the wing area. Under the new rules there is no limit on tailplane size, provided the combined wing and tail area comes within the limits specified. Most designers will want to take advantage of this change and boost tailplane proportion above that previously used. The scale has therefore been laid out with tailplane *proportions* as the main criterion.

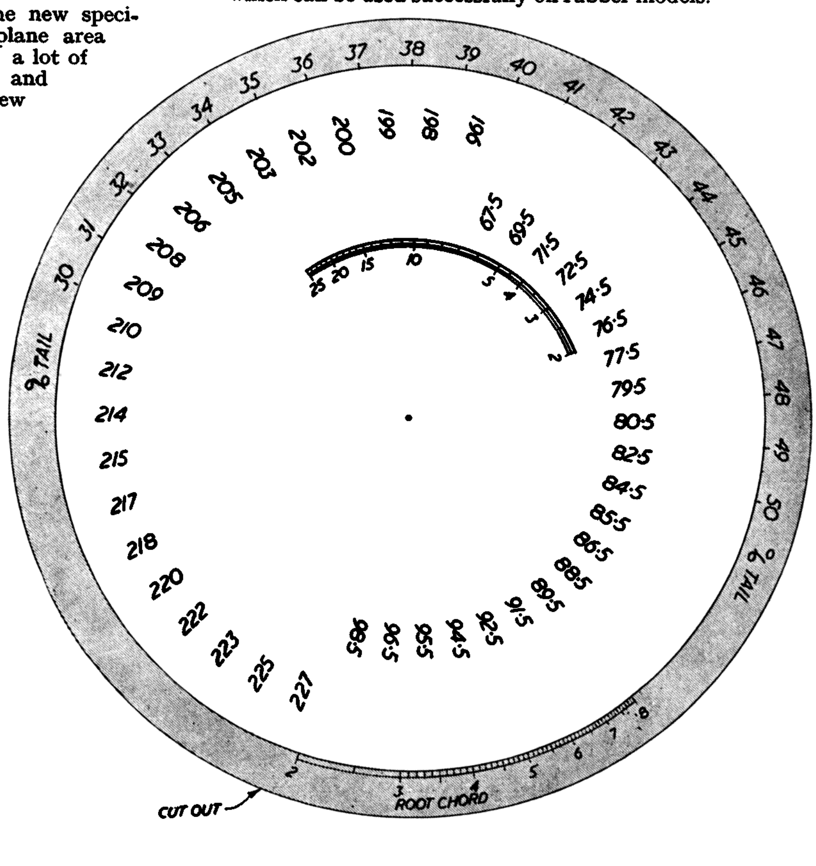
At the same time designers will also want to work to the upper limit of the new area rule, *i.e.*, making the total wing and tailplane area come right up to the 294·5 sq. ins. maximum permitted. The figures for wing and tailplane area have therefore been calculated to give this maximum total area.

Finally, there is the question of centre section area. The new rules are based on gross wing (and tailplane) area, so that on shoulder and mid-wing designs the imaginary centre section counts as wing area. On such designs, therefore, the actual or net area of the wings must be adjusted accordingly.

The Scale. First, the construction of the scale. All that is necessary is to cut out the two printed discs carefully and paste on to thin card or thin ply. The two discs are then pivoted together at the exact centre so that one can be rotated relative to the other. It is important to get the pivot point at the exact centre, otherwise the readings of centre section area read off the circular scale will not be accurate.

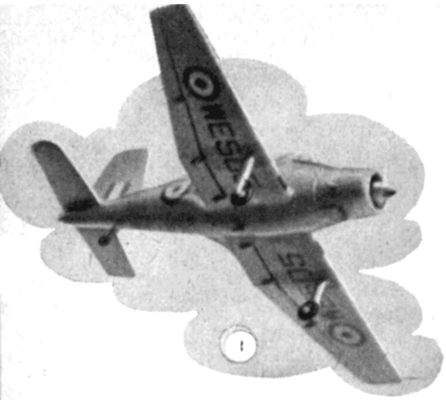
To use the scale, set the arrow against the tail-plane proportion required. For example, on a shoulder-wing model the designer may think it best to use a 35% tailplane. Setting the arrow against ' 35 ', the required (gross) wing and tail areas can be read off as they appear in their respective ' windows '. In this case the figures are 218 and 76·5 sq. ins., respectively. If, now, the model is a shoulder or mid-wing type, the centre section area must also be found. Using the two smaller scales, setting root chord against centre section width (average width if the centre section is tapered), centre section area can be read off opposite the arrow in the third ' window '. This has to be deducted from the gross wing area previously determined to find the actual net area of the wings to be built. The difference between net and gross areas is clearly defined in " It's Designed for You—Wakefields " in the December AEROMODELLER. Where the model is of the normal high or shoulder-wing type, with a one piece wing, of course, it is not necessary to carry out this second operation. The first wing and tailplane areas found are those required.

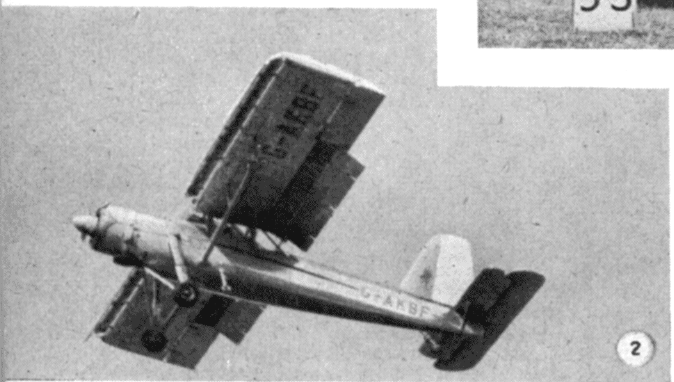
This scale enables the designer to investigate quickly and accurately the different wing and tailplane sizes for different tailplane proportions. The original tailplane proportion chosen, for example, may give a wing on the small side—say under 200 sq. ins.—particularly in the case of shoulder or mid-wing layout and can be reduced slightly—one per cent. at a time—until a better solution is found. The range of tailplane proportions given, incidentally—from 30 to 50%—represents the range which can be used successfully on rubber models.

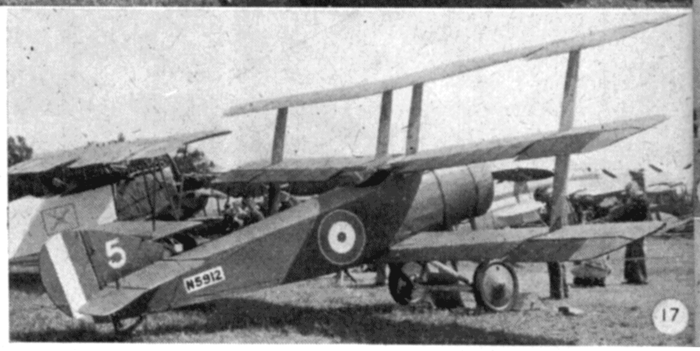


PLANES

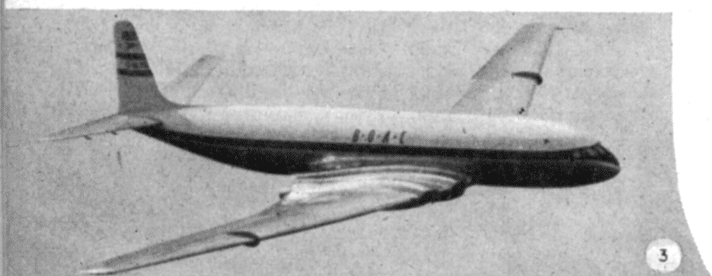
FOR THE ATTENTION OF SCALE ENTHUSIASTS

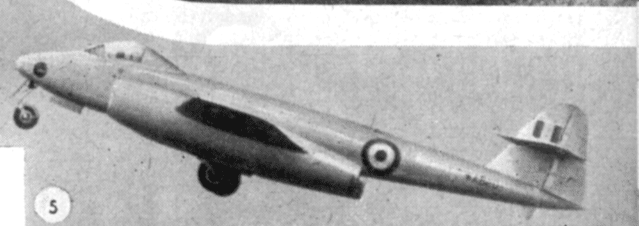




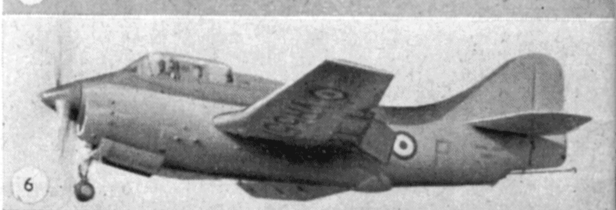


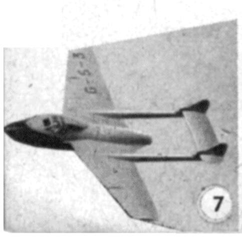
ANCIENT

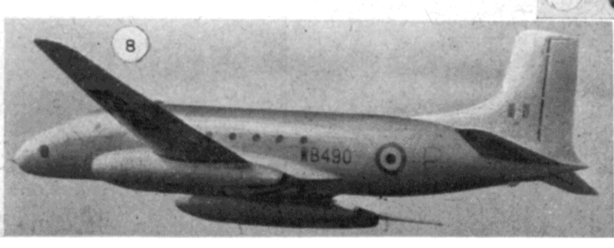


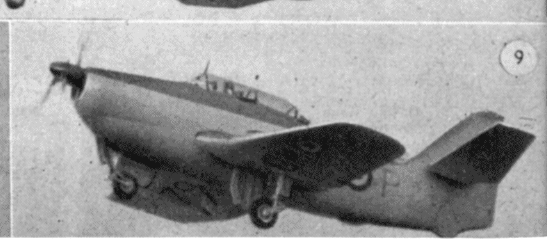


1. Handley Page (Reading) H.P.R.2.
2. Scottish Aviation Prestwick Pioneer Mk. 2.
3. De Havilland Comet.
4. Vickers Tay-Viscount.
5. Gloster Sapphire-Meteor.
6. Fairy 17.
7. De Havilland Venom Mk. 2.
8. Avro Ashton
9. Blackburn Y.A.5.
10. Blackburn & G.A. Universal Freighter.
11. Supermarine 535
12. Avro 707B.

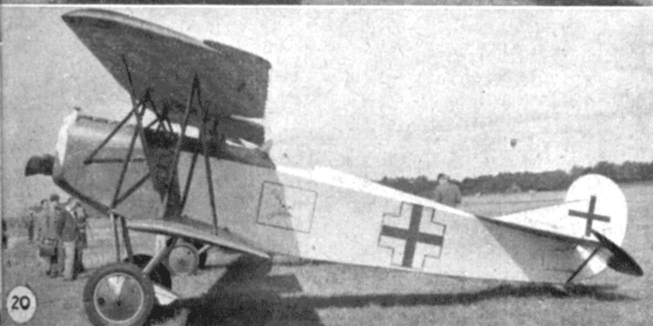


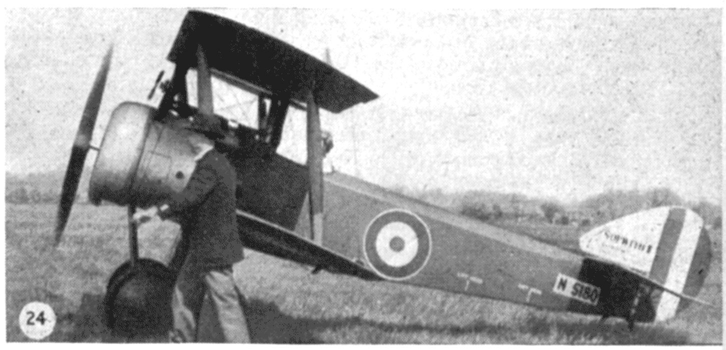


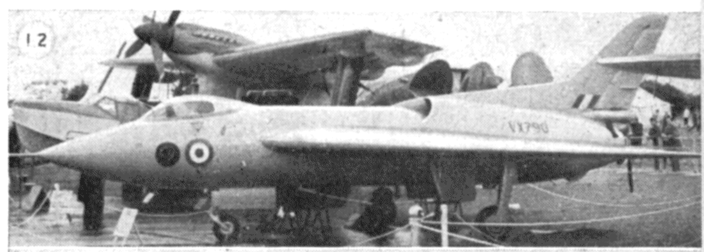




13. Percival P.56.
14. Gloster/A.W. Meteor XI.
15. Hawker P.1081.
16. Hawker Cygnet.
17. Sopwith Triplane.
18. Hawker Hart.
19. S.E.5a.
20. Fokker D.VII.
21. Sopwith Camel.
22. Avro 504k.
23. S.E.5a. and L.V.G. C-5.
24. Sopwith Pup

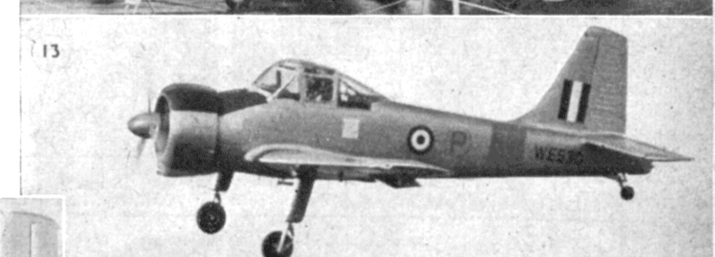


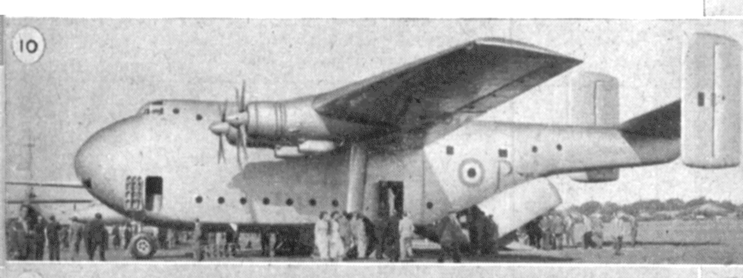


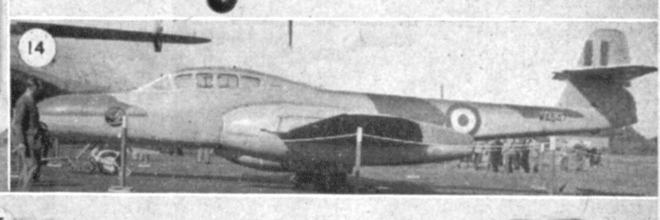


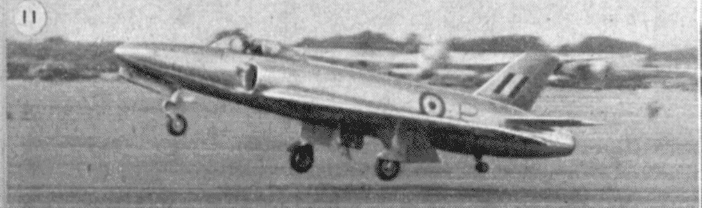
& MODERN

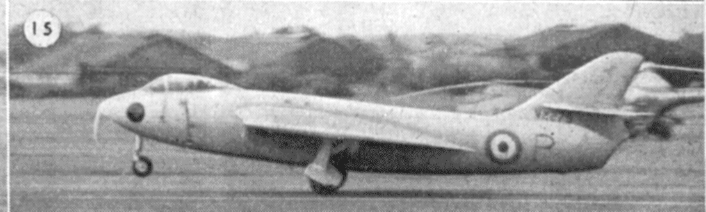
A Selection of 1950 Photos by G. A. CULL











1950 CONTEST AVERAGE TABLES

THESE figures should be of interest to all contest fliers for they show not only the frequency with which the same names crop up in the " top ten " of major contests, but also the average times recorded by these experts over the whole season. In other words, these are the consistent times which anyone would have to better in order to come out on top.

Over the season, the comparison is, perhaps, not quite a fair one. Those modellers who have flown in almost all the competitions find their overall average pulled down somewhat by participation in an event where the weather is just plain " lousy " and their times are low, even though they may have placed very high in that particular event. But this method of analysis is certainly the best—if not the only—way of getting a true insight as to who are the " experts " in the various contest fields.

In preparing the tables, events considered have been limited to major S.M.A.E. contests and the international events abroad. As with cricket averages tables, too, we have fixed certain minimum qualifications, such as number of contests entered or number of contest flights made. In this way we have aimed at presenting an overall picture of the 1950 contest programme rather than include single outstanding performances.

The main " rubber averages " table we have prepared on individual " Wakefield " contests, including the major international events. The Farrow Shield, being an " open " rubber team event, was not considered in preparing this list, but since individual performances in this latter contest are available and a considerable proportion of the twenty-odd modellers in the main table did, in fact, participate, we have included a further table with Farrow Shield times incorporated.

In the case of gliders we have considered five main S.M.A.E. contests and the Nordic International itself. In this table, it will be noticed, there is not the same close grouping of prominent names and the overall average is lower.

Power duration proved particularly difficult to analyse. There were only four major contests to consider and two of these were based of flight duration and two on ratio (total duration to motor run). Two contests do not provide sufficient data for a reasonable table and so we have adopted the process of transforming " ratio " performance to " flight time " performance.

In the power competitions, too, we were up against the difficulty that few names appeared in more than two contests and the same names appeared but rarely in the top of the lists. A preliminary qualification was made, therefore, namely that only those fliers who have placed in the top ten in any *one* contest would be included in the analysis and the final results then tabulated with a further qualification that participation in at least two contests was necessary for inclusion in the table.

Well—those are " cricket averages " tables applied to the sport of aeromodelling. We think it is something which should have been done before, adding a new interest to competition matters. They have their limitations, of course, but give a pretty clear indication of " who's who " in each class of model flying. Your own views as our readers would be very much appreciated. Would you like to see these tables appear from time to time throughout the contest season—just like cricket averages appear in the sports pages of the newspapers ? Or would you prefer to wait until the end of the 1951 season for a complete analysis once more ?

Gliders. Qualification: Minimum of 6 contest flights.

Name	Contests	Flights	Aggregate	Average	Placings			
					1	2	3	first ten
R. Yeabsley	5	13	2871·9	220·0	3	–	–	5
J. Marshall	2	6	1078·7	179·8	–	–	–	2
T. Bootland	3	9	1601·2	178·7	–	–	–	1
P. Gilbert	3	9	1515·1	168·3	–	1	–	1
L. Barr	4	11	1835·3	166·8	–	–	–	2
R. Teasell	3	8	1358·3	162·5	–	1	–	1
M. Hanson	5	15	2369·4	158·0	1	–	1	2
D. Bennet	5	14	2149·4	153·6	–	–	1	2
R. Hinks	4	12	1738·9	144·9	–	1	–	1
R.Ward	3	8	1078·3	134·8	–	–	–	2
R. Geesing	4	11	1321·8	120·2	–	–	–	1
B. Wheeler	4	11	1213·6	110·3	–	–	–	–
R. Monks	4	10	968·1	96·8	1	–	–	1
J. McKenna	2	6	569·0	94·8	–	–	–	–
D. Yeabsley	4	11	991·6	90·1	–	–	–	–

Rubber Duration (incl. Farrow Shield). Qual.: Min. of 4 contests.

Name	Aggregate	No. of Flights	Average
R. Copland	3856·1	19	202·8
R. Chesterton	2251·4	12	188·0
J. B. Knight	3754	20	187·7
F. Holland	1851·8	10	185·2
E. Evans	2920	16	182·5
J. Pitcher	2881	16	180·0
R. Warring	3760	21	179·0
H. Stevens	2853·4	17	168·0
J. Tangney	2176·8	13	167·2
J. North	2337·6	14	167·0
E. Smith	1969·4	12	164·1
F. Adams	2301·3	15	154·0
H. Revell	1945·4	13	150·0
N. Marcus	2326·7	17	137·0
R. Clements	2158·5	17	127·0

Wakefield Rubber. (Includes non-Wakefield rubber events where entrants flew Wakefield models). Qual.: Min. of 8 contests entered.

Name	Contests entered	Aggregate	Flights	Average	Maximums	Placings			
						1	2	3	first ten
R. Copland	6	3422·4	16	214·0	5	3	–	1	6
F. Holland	3	1683·85	8	210·5	2	1	–	–	1
R. Chesterton	3	1783·1	9	198·1	1	–	–	–	1
E. Evans	5	2914·0	15	194·0	1	–	2	–	3
J. Pitcher	5	2481·4	13	191·0	2	–	–	1	2
R. Cole	3	1664·8	9	185·0	2	–	–	–	–
R. Warring	8	3628·6	20	182·0	3	–	–	1	7
E. Smith	4	1793·4	10	179·3	2	1	1	–	2
J. B. Knight	6	3033·1	17	178·2	3	1	1	–	2
L. Ryde	3	1587·8	9	176·4	2	–	–	–	2
R. Parham	3	1532·4	9	170·3	2	1	–	–	1
H. Stevens	5	2533·4	15	169·0	1	–	–	–	3
D. Elmes	3	1518·4	9	168·7	1	–	–	–	–
J. North	4	1850·0	11	168·2	–	–	–	–	1
J. Tangney	5	2176·8	13	167·2	2	–	1	–	2
H. Revell	4	1588·0	10	158·8	–	–	–	–	–
F. Adams	4	1780·1	12	148·3	1	–	–	–	1
G. Wools	3	1201·4	9	133·5	1	–	1	–	1
N. Marcus	5	1818·5	14	129·7	1	–	–	1	2
R. Clements	5	1782·25	14	127·5	–	–	–	–	–
P. Taylor	4	1414·7	12	118·7	2	–	–	1	1

Power Duration. Qual.: Min. of 2 contests. In first ten of any one National contest. Ratios revolved to " flight times ".

Name	Contests entered	Flights	Aggregate	Average	Placings		
					1	2	3
N. Marcus	3	7	1335·3	190·7	2	–	–
P. Wyatt	2	6	1006·8	167·8	–	1	–
C. J. Davey	2	5	832·2	166·5	–	–	1
N. A. Clark	2	5	733·4	146·7	–	–	–
J. A. Gorham	4	11	1371·7	126·5	1	–	–
D. F. Pepperell	2	6	721·2	120·2	1	–	–
J. B. Knight	3	8	938	117·25	–	–	–
E. Lord	3	8	895·5	112·0	–	1	–
R. Ladd	2	6	665·9	111·0	–	1	–
J. G. Eiffiander	3	8	837·2	104·5	–	–	–
N. Pilgrim	2	6	601·1	100·2	–	–	–

CLUB NEWS

Cardiff clubster pays homage to his Powerhouse at Swansea,—scene of the 1951 Nationals next August.

SOME misgivings have been voiced relative to the new Wakefield model specification, though to my surprise it is not the inclusion of centre section area that is the main bone of contention. The chief point of argument seems to be regarding the standard 10 square inches minimum to the fuselage cross section, some thinking this may bring about some freakish fuselages, taking advantage of the minimum cross section with no limitation on length. The biggest factor against such freak " pencil-fuselages " is the requirement that powerful rubber motors as used in Wakefields need a minimum clearance space, and in fact the general tendency in recent years has been to widen out the nose and tail portions to overcome the bunching of motors that gives so much trouble. However, this season will show to just what extent the new specification will prove an improvement or otherwise.

Reference to the November, 1938, issue of the AEROMODELLER produces the following extract :—" *The 1938 season has shown that the large wind shovel type prop and single motor can more than hold its own in duration competitions. No doubt, if the minimum weight was increased considerably, the gear fans would come into their own, but under present rules the disadvantages seem to outweigh the advantages of gears* ". Seems that the pendulum has swung again doesn't it ? It will be very interesting to see to what extent Ellila's double win will influence future design, but in my opinion it is still a toss-up between the single motor job and gears . . . it all depends where you are flying.

I regret to note from the current edition of " Seadog ", the news-sheet of the **SOUTH EASTERN AREA,** that a certain lack of cohesion is in being, causing the officials some misgivings. Probable cause is the loss made on their 1950 C/L Rally which may have put the wind up some sections ! Or could it be a divided loyalty with much of the Area so close to London activities? Let's hope they soon pull round and rally to the officials working on their behalf. Southern Cross M.A.C. won the Area knock-out contest with a score of 623·5 against their nearest rivals, Ashford, who scored 511·6.

The **LONDON AREA** control line meeting saw some higher speeds than usual, due we are told to a spot of Northern Exclusive weather ! The cooler atmosphere had a beneficial effect on the models, and Fred Guest managed to set up a new British Record in Class IV. Full results were :—

Class I	C. Chandler	(Ilford)	65 m.p.h.	(Javelin)
Class II	J. Dilly	(Croydon)	77·4 m.p.h.	(Elfin 1·8)
Class III	J. Clayton	(E. London)	83·3 ,,	(Amco 3·5)
Class IV	F. Guest	(C/Member)	116·9 ,,	(Dooling 29)
Class V	L. Sparkes	(E. London)	92·7 ,,	(McCoy 49)
Class VI	D. Hellmore	(E. London)	106·6 ,,	(McCoy 60)
Class VII	D. Hellmore	(E. London)	105·9 ,,	(Dyna-jet)

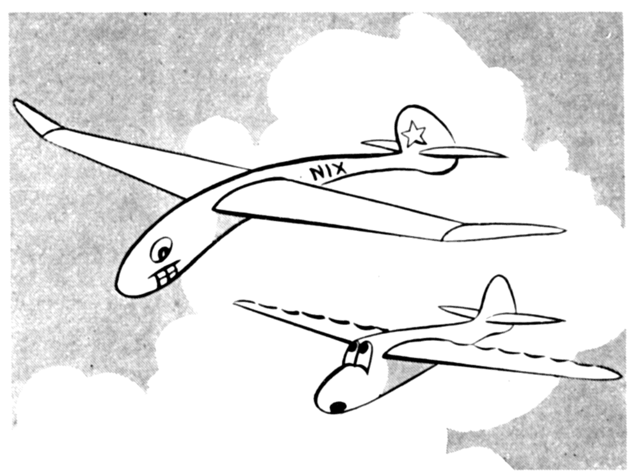
Ken Muscutt and " Funf " Taylor of **WEST ESSEX** won the Stunt and Team events.

The **NORTH WESTERN AREA** report a very successful year, the culminating point being the highly successful " Daily Dispatch " Rally which aided the very useful cash balance carried forward. At their A.G.M., which I had the pleasure of attending, all officers were re-elected for the 1951 season. **SHEFFIELD M.A.S.** were declared the winners of the Rootes Trophy, and other cups were awarded during the social evening that followed, where everyone seemed to have a jolly time. I know I thoroughly enjoyed myself !

Winter Rallies seem to becoming popular, and the **WESTERN AREA** are to try one out on the 28th January at Lulsgate Aerodrome, this ground now being sought as available to all Area clubs. The Bristol lads have also gained the ear of the local council, and now have use of a local park for C/L flying.

Having accumulated a comfortable credit balance at the bank the **MIDLAND AREA** are going all out for obtaining a complete field outfit for the proper conduct of Area contests. As a start P A equipment and a small marquee will be purchased, also a planimeter for the quick and accurate checking of wing areas, etc., whilst at a later date it is hoped to obtain some form of trailer on which the whole outfit can be packed for transport to any venue.

The **WEST OF SCOTLAND AREA** seem to be on the right track, and hold their Area meetings at various points of interest, thus giving the delegates a break from the general



" It's no good making eyes at me Patrushka, I'm up here for three days making another world record."

Lutonian clubmen smile happily for the camera-man. With interests in every phase of aeromodelling, the club might well adopt the APS 'Unlimited' stunter in the foreground, as a symbol of their enthusiasm.

business discussions. The last such meeting was held at Prestwick Airport, and much time was spent in the control tower; next will be at Scottish Aviation's factory. This Area is naturally bucked at the acceptance of their suggestion of a United Kingdom Challenge Match, which it is hoped to stage at Heathfield, right on the boundaries of Prestwick. (I have seen this airfield, and believe me it is a grand spot for model flying, with a really good stretch of country for retrieving purposes.)

During the past weeks, activity in the **WEST YORKS M.A.S.** has been restricted owing to the bad weather, though some very nice flying has been witnessed from an A.P.S. "Coquette", which has proved to be very stable and reliable. A "Norseman" built by the club P.R.O., Mr. Pickles (bet his name's Wilfred ! !) has set up a flight of 3 : 49 hand-launched, which will undoubtedly be claimed as a new British Record for the class. The weather on this occasion was truly terrible, and no other flier risked putting up a model.

CHEADLE & D.M.A.C. seem to have tied the nationalised road transport in a few knots, for on the occasion of an inter-club meeting this had to be postponed due to forgetting the slight detail of booking the necessary coach! This balanced out the previous occasion when three coaches turned up when only one had been ordered ! ! However, when the comp. did get cracking the Cheadle boys carried out "orders" to clean things up, Duncan winning the power duration event with 3 : 42·4, Evans took honours in the glider class with 4 : 30·4, and Duncan came up again with top time in the open rubber event with 3 : 49. Altogether a good days work.

A dinner staged by the **CRYSTAL PALACE M.A.C.** brought a successful season to a fitting end, and the general picture augers well for the 1951 season. Mr. Ben Mendez won the "Advertiser Cup" for the best showing in all contests in spite of the poor weather encountered. A good touch to the social function was a display of winning contest models.

Though situated in a sparsely populated part of the country, the **BRAUNTON & NORTH DEVON M.F.C.** are doing a good job, particularly in their application to the junior section. (Far too many clubs tend to ignore the junior element, overlooking the fact that these youngsters are their members of tomorrow.) With access to Chivenor Aerodrome flying facilities are good, and some more senior members to help out generally would be welcomed. Any lone hands in the Braunton district?

Taking advantage of my trip North to the North Western Area, I stepped in at the **HUDDERSFIELD AIR LEAGUE M.A.C.** on the previous evening to show them the AEROMODELLER Wakefield films, and was pleased to find a goodly audience, the evening having been thrown open to other clubs from the surrounding area.

Numbering around the 35 mark, the **ALNWICK & D.M.C.** have recently become affiliated to the S.M.A.E. With easy access to a grand piece of model flying country—Alnwick Moor, with not a tree for miles—long distance flying seems to be the vogue, Jack Hall holding the record at present with a trip of over 3 miles. A very successful jumble sale held last November realised £30 for the club funds, first purchase from same being a couple of take-off boards.

Handicapped during 1950 by lack of a clubroom and flying field, this difficulty has now been overcome by the **BELFAIRS M.A.C.** In spite of the field snags, the club placed 17th in the Plugge Cup, and two British Records have been gained by C. Cullen's A/2 glider design.

The following little ode, culled from the **WINCHESTER M.A.S.** news-letter should appeal to you, :—

"ODE TO THE WEATHER"

(Or—One day we shall pay it back)

That England is a pleasant land
Few people will deny,
But among the sceptics you will find
Those who wish to fly.

Of weather there is little choice—
Of wind and rain we can have either.
Or just for fun we can have both
But never, never, never neither.

The strongest wind that blows we find
Causes despondency and alarm,
By sweeping us off the Hockley Downs
Over into the sewage farm!

In the mire we wade and wallow,
Risking many a plague and infection.
Oh how we love a gentle breeze
That comes from a Southerly direction.

Though we may grumble quite a bit
You will find that in the main
We fliers are a buoyant lot.
(We need to be with all that rain!)

A highly successful Open Night was staged by the **BROWNING M.E.C.** which drew an immense crowd of visitors from the S.E. London area. Top prize went to D. Coombes for his scale "Tempest", and so much interest was created that a further show of a like nature will be put on soon.

The **LEEDS M.F.C.** has had a good average placing in 1950 contests, resulting in a 5th place in the Farrow Shield, and 4th in the Plugge Cup. The 1950 club records are as follows :—

Rubber :	V. R. Dubery	5 : 36
Power :	H. Tubbs	2 : 46
Glider T.L. :	G. Joyce	8 : 22
Glider H.L. :	A. Archer	4 : 45

The recently formed **WEST HANTS AEROMODELLER'S ASSOCIATION** held a full programme in really shocking weather for the E. Rankine Gray Cup, which finally went to Joe Squires. We are promised details of a "junior encouragement" scheme from this club as matters develop.

Braunton and N. Devon club has an eye to the future, judging by the proportion of younger members in this photo. Good luck to them! Many a senior expert of to-day can produce a similar view of his short trousered self.

The Annual Dinner of the **EASTBOURNE M.F.C.** was a special affair, celebrating as it did the coming-of-age of the club, among the guests being one of the original members. The season finished on a note of great hope for the future, especially now that the Eastbourne Corporation have agreed to the Club's request for a C/L ground, and granted a six month trial period on ground in one of the parks. These concessions have only been obtained after the Club's rigid adherence to a gentlemen's agreement not to fly in public parks and spaces for approximately 18 months upon the rejection of their first application.

As well as a very successful exhibition at the local Odeon cinema, outdoor flying with the **WHITEFIELD M.A.C.** has not been neglected, best flight during November being J. O'Donnell's 3 : 45 with a 3 ft. glider, also winning the " Normac Cup ". This contest was held with several inches of snow on the ground, and a two minute flight limit was ineffective, most models being out of sight in around 100 seconds. M. O'Donnell's power job, lost after a 25 minute flight in September, has been returned after being out in the elements for 10 weeks—the engine started with no trouble !

We don't hear much of r.t.p. activities these days, but the **MIDDLESBROUGH M.A.C.** have got cracking on the indoor stuff with a contest for class A models. Tom Chambers made three good flights aggregating 465 seconds to chalk up a win, with L. Stevens second. Third man A. M. Robson would have placed higher but for a damaged model, which prevented a third flight. One knowing father seeing the display, said he thought a " Musketeer " would cause a lot of damage if the line broke indoors at 70 m.p.h. The lads quickly explained the difference between r.t.p. and C/L ! !

The **HAYES & D.M.A.C.** put on a fine show of models at the annual Fairey Horticultural Society's show, and are now determined to hold an exhibition of their won in the spring. Much radio control flying is going on in this club, especially by Alec Wilson, Sid Whistler and Dave Burton.

Acquisition of a disused Nissen hut on the local aerodrome has given some of the **LEICESTER M.A.C.** members a busy time, renovation being under way in readiness for the coming season. Central feature will be a stove, the expected technique being one flight, one warm up, one flight, etc., etc.

The third Annual Dinner of the **BIRMINGHAM M.A.C.** was a grand affair, the evening being livened by a show of conjuring that was well worth experiencing. The artist had a new line of patter that went down well with the boys ! Frank Howkins carried off most of the silverware (Cups you clot, not the knives and forks) and received a great ovation when the news was made known that he had been declared the 1950 Junior Champion.

Current list of meetings for the **INTERNATIONAL RADIO CONTROLLED MODELS SOCIETY** gives the following :—

London Group.—Jan. 14 and Feb. 11th, 2 p.m. at the "Horshoe Hotel", Tottenham Court Road.
Manchester Group.—Jan. 21st., 2.30 p.m., Wellington Chambers, Victoria Street.
Tyneside Group. — Jan. 26th, 7.30 p.m., 176, Westgate Road, Newcastle, 1.
Birmingham Group.—Feb. 3rd., 2.30 p.m., Birmingham University Edmund Street.

And so to this month's Tall Story. I. S. Anderson of Meadow House, Redhill, Surrey, was flying a small Jetex "50" powered model on a calm day, the model climbing to about 100 ft. before entering its glide. The flight in question followed the usual pattern until it was noticed that the smoke trail was not decreasing, and flames appeared, burning through the wing retaining band. The flaming fuselage and tail unit fell, and were totally destroyed. The wing apparently caught a thermal, for it started revolving and disappeared o.o.s. upwards after two minutes. Remains—one slightly singed Jetex "50" ! !

With which I say goodbye for another month, and look forward to hearing from more clubs that indoor activity is receiving its proper share of attention. Quite a lot can be learnt from such flying, and there are a number of records that could well be bettered.

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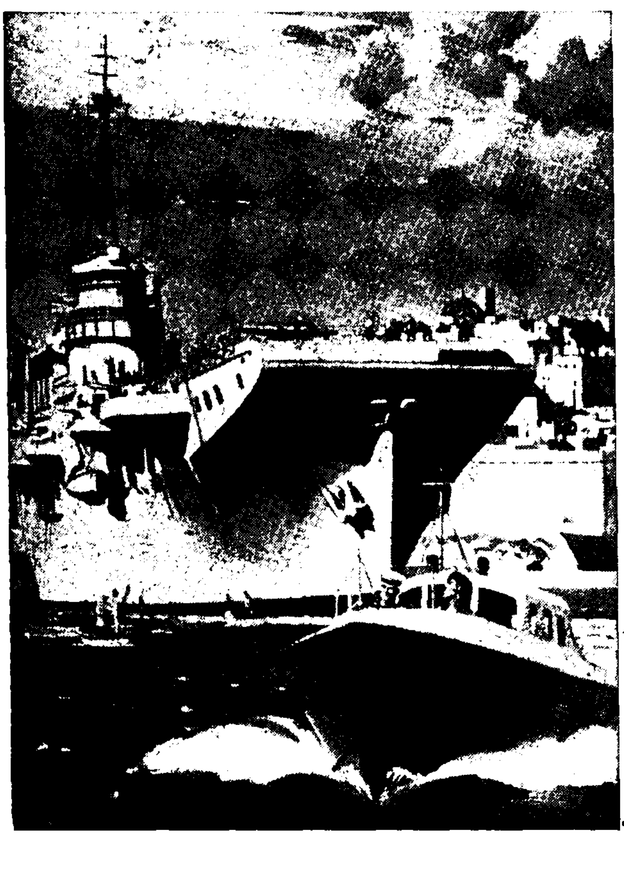

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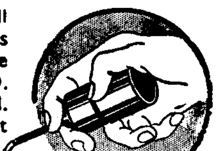

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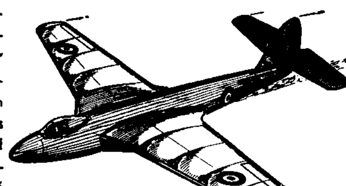

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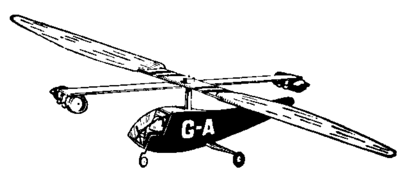

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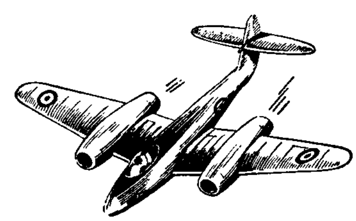

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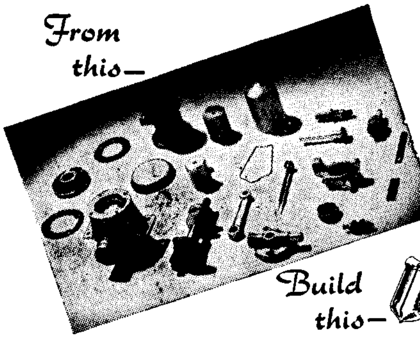

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(*continued on page* 119.)

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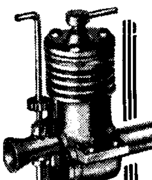

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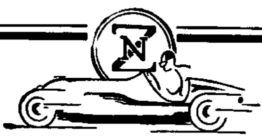

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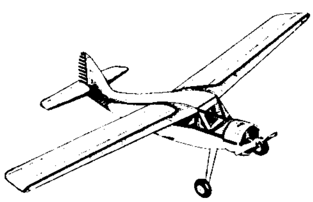

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Falcon	96″	107/6
Cumulus	54″	Price later

JETEX

Skyjet 50	18″	3/9
Skyjet 100	24″	5/6
Skyjet 200	32″	7/6

CONTROL LINE

Phantom Mite	16″	11/6
Phantom	21″	18/6
Scout Biplane (Team Racer)	20″	22/6
Stuntmaster	30″	19/6
Stunt King	36″	18/6
Stunt Queen	40″	Price later
Skystreak 26	26″	9/6
Skystreak 40 (Basic kit)	40″	10/6

DURATION

Playboy	20″	3/3
Orion	23″	3/6
Achilles	24″	4/-
Eaglet	24″	4/6
Ajax	30″	6/-
Ace	30″	5/-
Competitor	32″	7/-
Senator	32″	5/6
Gypsy	40″	10/6
Contestor	$45\frac{1}{2}$″	23/6

GLIDERS

Chief (A-2 class)	64″	18/6
Invader	40″	6/6
Minimoa	50″	7/-
Soarer Baby	36″	5/-
Soarer Minor	48″	8/-
Soarer Major	60″	11/6
Cadet	30″	4/-
Cub 20″ (also for Jetex 50)		2/6

CHUCK GLIDER

Vega	12″	1/3
Spook	$12\frac{1}{2}$″	1/6
Polaris	20″	2/6
Comet	24″	3/6

FLYING SCALE

Piper Cub	$26\frac{1}{2}$″	6/-
Pixie (Semi-Scale)	23″	4/-

WE REGRET TO ANNOUNCE THAT ALL THE ABOVE PRICES ARE NOW PLUS PURCHASE TAX

KEIL KRAFT *Kits and Accessories*

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