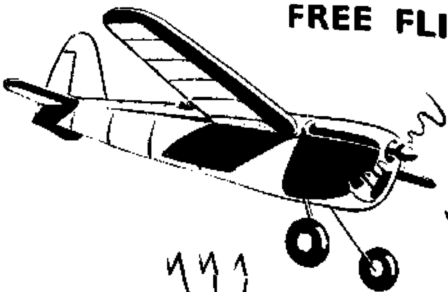
AEROMODELLER

FEB.
1950

1/3

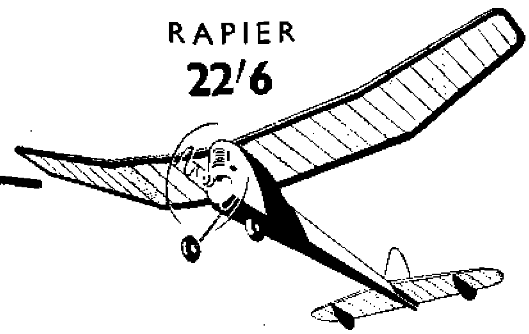
WHETHER

FREE FLIGHT —



RAPIER

22/6



— CONTROL LINE

RADIO CONTROL

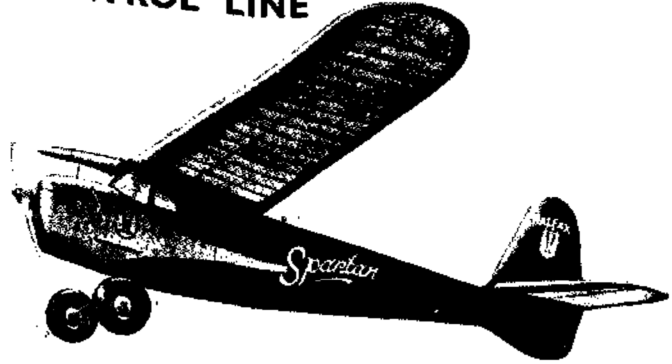
"the finishing touch—"

SEE YOUR LOCAL MODEL DEALER NOW FOR DETAILS OF THE NEW, SCREW CAPPED, POPULAR 4 OZ. BOTTLE

PRICE

Clears. 1/9

Coloured. 2/3



THE HALFAX "SPARTAN"

THE NEW "MAJOR"

WINGSPAN 30 ins OVERALL LENGTH 26 ins.

Kit contains all strip and printed sheet in finest quality "SOLARBO" wood. Fully detailed PHOTO-VIZ Plan and Building Instructions with descriptive diagrams, Covering Tissue, Cement, Semi-finished Balsa Propeller, Wheels, Rubber Motor, etc., etc. PRICE **5/6**

THE NEW "MINOR"

Owing to the tremendous popularity of this model we are now able to offer this kit at a new reduced price. The PHOTO-VIZ Plan presents a new and up-to-date method of showing all constructional detail in a clear, crisp, super-detailed manner, thus saving time in construction and yet ensuring accurate reproduction. PRICE **3/3**

★ *LOOK OUT FOR THE NEW EYE APPEALING CARTONS AT YOUR LOCAL MODEL DEALER.*

F M A M
UNITAS

HALFAX MODELS LTD.

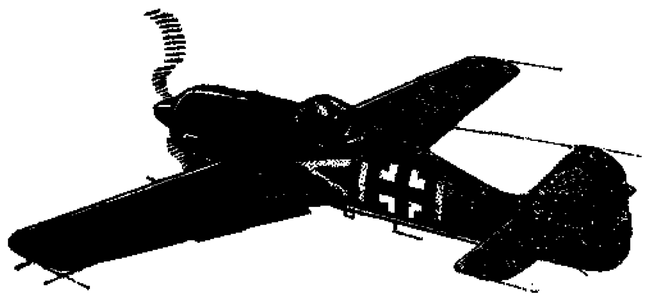
GREEN MOUNT WORKS HALFAX PRODUCTS HALIFAX YORKSHIRE

MANUFACTURERS IMPORTERS EXPORTERS

Grams: "AEROMODEL," HALIFAX. Phone: HALIFAX 2729

VERON

Tested—Tried—Triumphant!

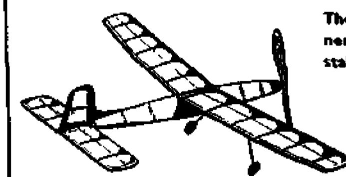


The FOCKE-WULF 190 A.3.

Verons amazing new true-scale control line model. Powered by a Diesel or Glow-plug Motor of 3 to 8 c.c. this famous German war-plane gives an astounding performance flying at speeds exceeding 60 m.p.h. The now famous flap and elevator control ensure stunting capabilities which are phenomenal. With a span of 33½" its clean straight lines make it ideally simple to build.
VERONS OUTSTANDING VALUE KIT **19/6**

Here are Two NEW Models

The "GOBLIN" 20" SPAN LIGHTWEIGHT DURATION MODEL

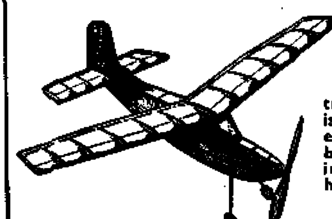


"A Wakefield in miniature"

The ideal kit for the beginner. Flies with perfect stability. Kit contains everything you need for building and flying — including a semi-finished hand-carved Balsa airscrew.

KIT PRICE **3/3**

The "RASCAL" 24" SPAN LIGHTWEIGHT CABIN DURATION MODEL



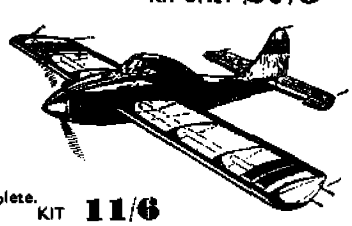
A model which has superb performance, excellent flying qualities and is designed in the "modern trend"—its performance is excellent. Kit contains everything necessary to build and fly the model, including a semi-finished hand-carved balsa prop.

KIT PRICE **4/6**

★ SEE THEM AT YOUR DEALER

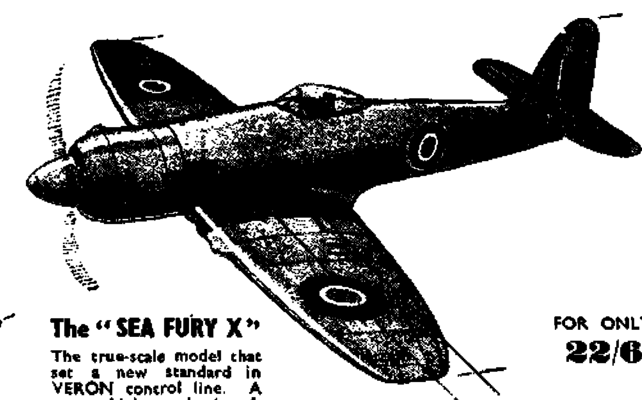
The "SPITFIRE 22"

An accurate model of the famous war-time fighter plane which has won outstanding praise for its amazing performance—yet again the flap and elevator control allows an experienced flyer to perform every stunt in the "book". All parts necessary to build this wonderful plane are included in the VERON KIT. Third place winner in Open Stunt Contest Langar Rally, Sept. 11th. KIT ONLY **27/6**



The "BEE-BUG"

This snappy little "stunter" designed for the small Diesel Motor up to 1 c.c. 108 sq. ins. of area make it fast. Horn balanced elevator ensures easy control. Short tail moment arm gives it tight looping radius. 6½ oz. complete. KIT **11/6**



The "SEA FURY X"

The true-scale model that set a new standard in VERON control line. A super high-speed aircraft which flies between 50 and 60-m.p.h. Stunts and manoeuvres like its "real-life brother". Another plane for the experienced flyer.

FOR ONLY **22/6**

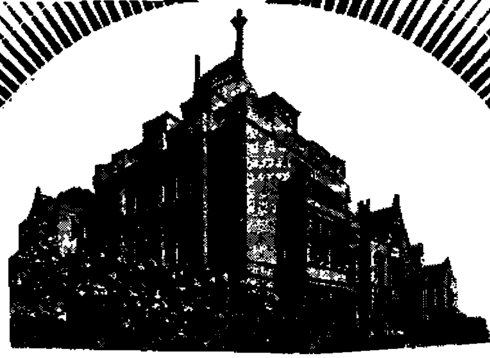
RETAILERS! WE CARRY A COMPLETE STOCK OF ALL MODEL AIRCRAFT SUNDRIES AND ACCESSORIES, BALSA WOOD, CELLULOSES, PROPELLERS, WIRE, ENGINES, HARDWARE, CONTROL LINE EQUIPMENT, ETC., AND CAN GIVE IMMEDIATE RETURN DELIVERY.

AUSTRALIAN DISTRIBUTORS: Scientific Hobby Distributors, 350, Queen St., Brisbane, Australia.
INDIAN DISTRIBUTORS: K. L. Roy, 8, Lee Road, Calcutta.

MODEL AIRCRAFT LTD. BOURNEMOUTH

Phone: SOUTHBOURNE 2783

1900-1950



The Bennett College

THE MOST SUCCESSFUL AND MOST PROGRESSIVE CORRESPONDENCE COLLEGE IN THE WORLD

Celebrates

FIFTY YEARS

of success in training by post

WE CAN TRAIN YOU AS WE HAVE TRAINED THOUSANDS OF OTHERS

- Aviation (Engineering and Wireless)
- Book-keeping
- Building
- Cambridge Senior School Certificate
- Carpentry and Joinery
- Chemistry
- Civil Service
- All Commercial Subjects
- Commercial Art
- Draughtsmanship
- Engineering
- General Education
- Institute of Housing
- Inst. Mun. Eng.
- Journalism
- Languages
- Mathematics
- Matriculation
- Mining
- Plastics
- Plumbing
- Police Special Course
- Quantity Surveying
- Radio Service Engineering
- Salesmanship
- Sanitation
- Secretarial Examinations
- Shorthand (Pitmans)
- Short Story Writing
- Structural Engineering
- Surveying (R.I.C.S. Exams.)
- Teachers of Handicrafts
- Telecommunications (City and Guilds)
- Television
- Wireless Telegraphy

If your requirements are not listed above, write us for free advice.

It is with pardonable pride that we announce the FIFTIETH ANNIVERSARY of the founding of The Bennett College, Sheffield.

This success can be attributed to just one main factor—EFFICIENCY. We believe that The Bennett College teaches with a thoroughness that is unequalled in any other source of tuition. That this home study is highly successful is proved by the 50 years of continuous progress and prosperity, and the ever-growing number of successful students who have passed through the College to reach posts of high responsibility, and big salaried appointments in every field of commerce and industry.

To our students, in every part of the World, we send our Cordial Greetings on this memorable occasion in the history of The Bennett College. To the many men and women whom we are yet to welcome as students, we extend a hearty invitation to join NOW. There is still room at the top for The Bennett College trained man.

★ **SEND THIS COUPON *NOW!***

To Dept. 119c, THE BENNETT COLLEGE Ltd. SHEFFIELD, ENGLAND

Please send me (free of charge) particulars of.................................
Your private advice about.................................
(Cross out line which does not apply)

PLEASE WRITE IN BLOCK LETTERS

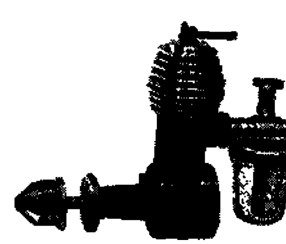
NAME.................................

ADDRESS.................................

Raylite

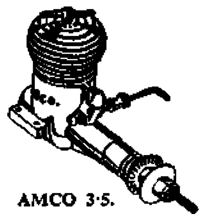
— the tally for —

The new Mills 0·75 is outstanding value for money at £2 10 0. Weighing 1½ ozs. it turns an 8 × 4 in. prop over at 8,000 r.p.m. You can be sure of first-class performance, design and workmanship when it comes from the Mills house.



ENGINES

Raylite Panther ...	£5	19	6
Amco 3·5	£4	17	6
Frog "100"	£2	8	0
Frog "160"	£2	8	0
Frog "180"	£2	14	9
Frog "500"	£3	15	0
Mills Mk II	£3	15	0
Mills 0·75	£2	15	0
Mills 2·4	£4	4	0
Elfin 1·8	£3	19	6
Elfin 2·4	£4	9	6
E.T.A. "29" G P ...	£7	9	5
E.T.A. "19" G P ...	£6	4	5
E.D. Bee	£2	5	0
E.D. 3·46	£4	12	6
Jetex "50"		9	6
Jetex "100"		19	6
Jetex "200"	£1	7	6
Jetex "350"	£1	17	6
Allbon Arrow G P ...	£2	15	0



AMCO 3·5.

In the hands of the experienced flyer this hot motor is capable of outstanding results. Ideal for intermediate stunt jobs.

Price £4 · 17 · 6

CONTROL LINE

K.K. Phantom		18	6
K.K. Phantom Mite ...		15	6
K.K. Stuntmaster ...		19	6
K.K. Stunt King		18	6
K.K. Skystreak		9	6
Veron Sea Fury	£1	2	6
Veron Spitfire	£1	7	6
Veron Focke-Wulf "190"		19	6
Veron Bee-Bug		11	6
Frog Vandiver		12	6
Halfax Mills Bomb ...		18	6
Mercury Marlin		19	6
Debolt Super Bipe ...	£1	9	6
Kan-doo	£1	5	0
Playboy		17	6
Shaws Dervish		19	6
Bristol Bulldog	£1	2	6
Super Screw Aerobat ...		10	6
Super Screw Babet ...	£1	5	6
Nieuport		19	6

One of the old reliables, the Junior "60" is the ideal job to start with for those who feel they want something bigger. Well adapted to radio control work as well, it should have a big comeback with modellers.

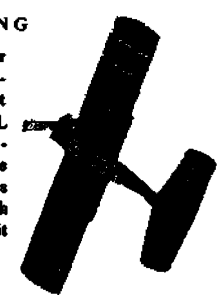
Price 39/6

——— that he has been collecting "gen" about the E.C.C. radio control outfit. A well produced job and technically sound in design it represents one of the best sets of equipment on the market at present. Operationally it is simple and reliable to use. What is of more use to modellers, however, is that it can be purchased in units. No need to lay out a large sum of money, just get the parts, as and when you require them. Drawings can be supplied separately at 7/6 and modellers who would like to start on R/C work are invited to write for information.

STUNT KING

Gold Trophy winner at the 1949 Nationals. The year's best design kitted for C/L stunt fans, experienced C/L wallahs will welcome this K.K. product with the enthusiasm it deserves.

Price 18/6



Have you got a copy of the "Model Planes Annual"? Plenty of first-class designs to suit the tastes of every aeromodeller, informative articles and well balanced reading go to make this magazine a MUST. Send for yours NOW. Price 2/6.

GLIDER

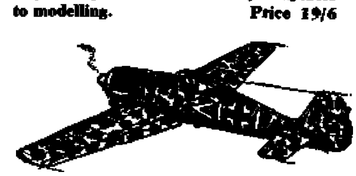
Halfax Tern 10/–, Halfax Albatross 25/–, Keilkraft Invader 6/6, Keilkraft Soarer Baby 5/–, Keilkraft Soarer Minor 8/6, Keilkraft Soarer Major 11/6, Frog Fairey 7/6, Sunnanvind 10/6.

RUBBER

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

Latest addition to Veron's fine range of C/L scale jobs is the Focke-Wulf "190" illustrated below. Unique design of the original fighter makes it easily adaptable to modelling.

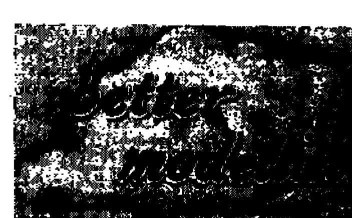
Price 19/6



FREE FLIGHT

K.K. Slicker	£1	2	6
K.K. Slicker "50" ...	£1	12	6
K.K. Slicker Mite ...		10	6
K.K. Bandit	£1	1	0
K.K. Outlaw	£1	7	0
K.K. Southerner ...	£2	7	6
K.K. Southerner Mite		11	6
K.K. Pirate		13	6
K.K. Skyjet "50" ...		3	9
K.K. Skyjet "100" ...		5	6
K.K. Skyjet "200" ...		7	6
K.K. Junior "60" ...	£1	19	6
K.K. Falcon	£5	17	6
Frog Strato-D		17	6
Frog Janus		17	6
Frog Centurion ...	£2	19	4
Frog Vixen		12	6
Vernon Streaker ...		19	9
Chrislea Ace	£1	15	0
Halfax Hermes ...		18	6

Quite a few "bods" up and down the country have found the name "Raylite" worth remembering. For since we started advertising, the majority of our customers have become regulars. We feel sure that you'll agree that this is the yardstick of a good mail order service. Once they start with "Raylite" ——— THEY STAY.



RAYLITE SUPPLIES LTD., 21 ARKWRIGHT STREET, NOTTINGHAM.

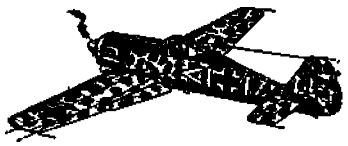
BUD MORGAN

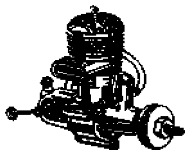
THE MODEL AIRCRAFT SPECIALIST

SEND NOW FOR SUPPLEMENT No. 2. Gives all the GEN on the latest KITS, ENGINES, ACCESSORIES, etc. before they are advertised.

FOCKE-WULF 190A.3

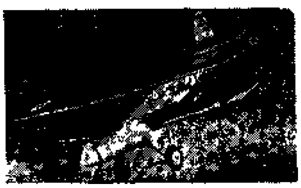
The latest Veron Scale Control line job. Powered with the FROG 500, YULON or Amco 3·5 c.c. this plane will give an amazing performance. Kit only 19/6.





The finest VALUE in ENGINES to-day. The **FROG 500 GLOW PLUG Engine** Price 75/-. See International's Advert. for full particulars.

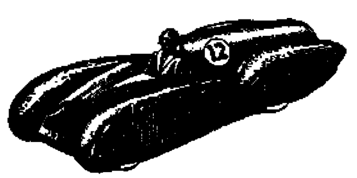
HAWKER FURY. The Scale Control line model that really does STUNT. 25" span, suitable for engines 1·5 c.c. to 3·5 c.c. Plan-pack kit for only 8/9. Also S.E.5A. Price 8/9.



Now in stock NEW KITS Now in stock

K.K. SKYSTREAK 26, C/L for E.D. Bee, etc., wing span 26", weight 6 ozs. Price 9/6. K.K. SOUTHERNER 60. Price 47/6. K.K. STUNT KING, 37½". Price 18/6. K.K. Supersonic Spinner, screw-on 1½", 2/6. 1¾" diameter, 3/-. Postage 3d. For full particulars of these kits see Keil Kraft advertisement on back page.

MAGPIE beginner's Glider 3/9. GOBLIN 20" span duration 3/3. RASCAL 24" span Cabin Duration 4/6. BABETTE Duration 4/6. YOLANDE Free Flight for E.D. Bee 10/6. GILEY Duration 4/-.



JETEX Jet Propelled Racing Car. The Fastest Car for its size in the world. This CAR is ready made, and includes Jet Motor, Pylon Box, Accessories and Fuel all for 17/6.

BOOKS FOR MODELLERS

MODEL CAR MANUAL by G. H. Deason	7/6
AEROMODELLER ANNUAL 1949	7/6
MODEL BOAT BOOK ... by G. H. Deason	7/6
MODEL PLANES ANNUAL	2/6

BOOK YOUR ORDER NOW for the NEW MODEL AVIATION, 1950. Price reduced to 2/-. Every Aeromodeller should have a copy of this latest, of the Aviation Series.

AEROMODELLERS, if YOU want YOUR ORDERS by RETURN of POST and SECURELY PACKED SEND THEM to BUD MORGAN, 22, CASTLE ARCADE, CARDIFF.

MY LATEST PRICE LISTS for MODEL AIRCRAFT KITS, ENGINES RACE CARS, POWER BOATS, BALSA WOOD, MICROMODELS and FUELS 6d. Post Free. MODEL RAILWAYS 3d.

Keilkraft 9d. I.M.A. 6d. Mercury 6d. Drome 1/- all first class Catalogues.

22, CASTLE ARCADE, CARDIFF

Phone 8085

BALSA WOOD!!!

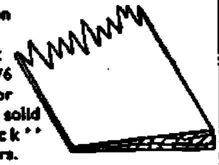
For kit manufacturers, aeromodellers and retailers. The following are just a few sizes taken from our enormous range.

BALSA SHEET 3' Lengths

1/32"×3"	9d. each
1/16"×3"	9d. each
3/32"×3"	10½d. each
1/8"×3"	1/- each
3/16"×3"	1/2 each
1/4"×3"	1/3 each
1/32"×2"	6d. each
1/16"×2"	8d. each
3/32"×2"	9d. each
1/8"×2"	10d. each

We can offer the trade large quantities of block up to 18" in length which we can machine to your dimensions into sheet, strip, wing panels, etc.

3 Section BALSA 3/8"×3"× 3/8" .. 1/6 Ideal for wings on solid "Chuck" Gliders.



BALSA STRIP 3' Lengths

1/16" sq	1/- doz.
1/16"×1/8"	1/3 doz.
3/32"×3/32"	2/- doz.
1/16"×1/4"	2/- doz.
1/16"×3/8"	2/6 doz.
1/8" sq.	1/- doz.
1/8"×3/16"	1/6 doz.
1/8"×1/4"	2/- doz.
1/8"×3/8"	3/- doz.
1/8"×1/2"	4/- doz.
3/16" sq.	2/- doz.
3/16"×1/4"	3/- doz.
3/16"×1/2"	3/6 doz.
3/16"×3/8"	4/- doz.
1/4" sq.	3/6 doz.
1/4"×1/2"	5/- doz.
1/4"×1"	6/- doz.
1/2" sq.	6/- doz.

4' Selected BALSA FOR PETROL MODELS

1/8"×1/2" ..	4d. each
1/8"×3/4" ..	5d. each
1/8"×1" ..	6d. each
3/16" sq. ..	4d. each
3/16"×3/8" ..	5d. each
1/4" sq. ..	7d. each
1/4"×1/2" ..	10d. each
3/8" sq. ..	10d. each
1/4"×3/4" ..	11d. each

Note: 1/6 must be added to all orders as 4' Stock has to be consigned by Rail.

3' Trailing Edge.

1/4"×3/32" ..	3d.
5/16"×3/32" ..	4d.
3/8"×3/32" ..	4½d.
1/2"×1/8" ..	5d.
5/8"×3/16" ..	6d.

SPRUCE, MAHOGANY AND OBECHE SHEET 3' Lengths

1/32"×3"	1/- each
1/16"×3"	1/2 each
1/8"×3"	1/2 each
3/32"×3"	1/2 each
1/4"×3"	1/4 each
1/32"×2"	8d. each
1/16"×2"	8d. each
3/32"×2"	10½d. each
1/8"×2"	1/- each

SPRUCE, MAHOGANY AND OBECHE STRIP 3' Lengths

1/16" sq.	2/- doz.
1/16"×1/8"	2/- doz.
1/16"×3/16"	2/9 doz.
1/16"×1/4"	3/- doz.
3/32" sq.	2/9 doz.
3/32"×1/4"	3/- doz.
3/32"×3/8"	3/3 doz.
1/8" sq.	2/9 doz.
1/8"×3/16"	3/- doz.
1/8"×1/4"	3/3 doz.
1/8"×3/8"	3/9 doz.
3/16" sq.	4/- doz.
3/16"×1/4"	4/9 doz.
3/16"×3/8"	4/9 doz.
3/16"×1/2"	5/3 doz.
1/4" sq.	4/- doz.
1/4"×1/2"	6/- doz.

OBECHE BLOCK

1"×3"×12"	6d. each
1"×3½"×12"	8d. each
1"×1"×12"	6d. each
1"×1½"×14"	7d. each

Distributors for **E.D. ENGINES AND FUEL**

E.D. Mark I "Bee" ..	£2 5 0
E.D. Mark II Standard	3 10 0
E.D. Mark III	4 5 0
E.D. Comp Special ..	3 17 6
E.D. Ready Mixed Fuel	3/- per tin

TRADE SUPPLIED AT USUAL TRADE DISCOUNTS

Postage and Packing on Orders 3/- to 5/- add 9d., 5/- to 10/- add 1/-; 10/- to 20/- add 1/4; over £1 post free.

TRADE SUPPLIED—ENQUIRIES INVITED

E. LAW & SON (TIMBER) LTD.,

272-274, HIGH ST., SUTTON, SURREY.

TELEPHONE: VIGILANT 8291 (2 lines)

NOW!

MILLS offer you—

1 **S.75 c.c. (with cut-out) 55/-**

FREE FLIGHT: Avro 504K — Chilton D.W.II — Chrislea Super Ace — Gossamer — Hermes — Hoppity — Jaunty — Junior Zipper — M.S. Hornet — Martinet — Pinocchio II — Piper Cub — Pirate — S.E.5a — Scalded Kitten — Slicker Mite — Southerner Mite — Yolande — Zephyr.

2 **P.75 c.c. (without cut-out) 50/-**

CONTROL LINE: Aerobat — Bee Bug — Comet — Cyclone — Li'l Zowie — Marlin Mite — Nipper — Phantom Mite — Sopwich Triplane.

3 **1·3 c.c. (with cut-out) 75/-**

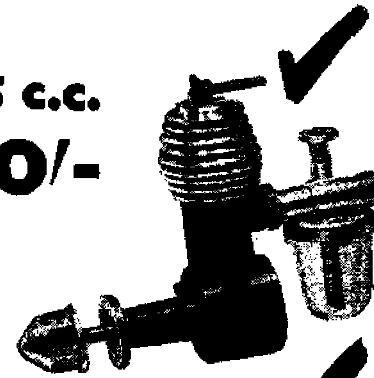
FREE FLIGHT: Auster J.4 — Bandit — Frankenstein — Junior Zipper — Seabee — Slicker.
CONTROL LINE: Ariel — Cheetah — Dervish — Hawker Fury Fighter — Mills Bomb — Phantom — Rival — Sabre — Stuntmaster — Tipsy Junior.

4 **2·4 c.c. (with cut-out) 84/-**

FREE FLIGHT: Buck's Duck — Eros — Hobo — Horsall — Southerner — Spartan — Scentorian — Super Slicker — Windy Ain't it.
CONTROL LINE: Babet — Hawker Fury Fighter — Kandoo — Magnette — Sea Fury X — Sirius — Tempest Tipsy Junior (CL/322)

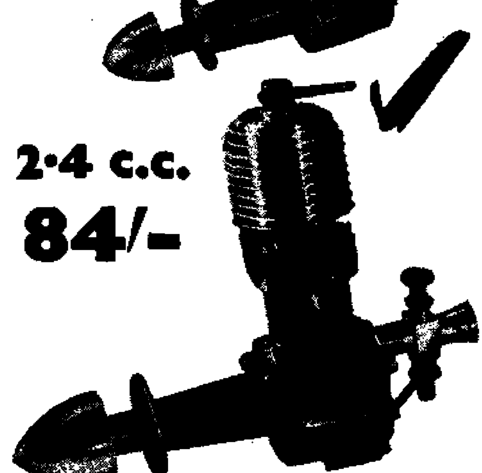
ALWAYS USE Mill's Blue Label Fuel, 3/– per standard bottle. You can save money by asking your dealer to re-fill your empty bottle with genuine Blue Label Fuel at 2/6 per ½-pint.

·75 c.c.
50/-



1·3 c.c.
75/-

2·4 c.c.
84/-



MILLS DIESEL

SOLE DISTRIBUTION (Trade only)

MILLS BROS. (MODEL ENGINEERS) LTD.
143, GOLDSWORTH ROAD,
WOKING - - - SURREY

AEROMODELLER

INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

Contents

VOL. XV. No. 169. FEBRUARY, 1950

R.A.F. Modellers

It is with some considerable pleasure that we read recently a statement to the effect that for several years there has been noticeable enthusiasm for aeromodelling amongst all ranks and branches of the R.A.F. Amazing how they find these things out! An even more staggering announcement is that following an increased (*sic*) interest in light aircraft activities amongst its personnel, the Powers-That-Be of the R.A.F. have decided to form a Royal Air Force Gliding and Soaring Association . . .

We have only to bear in mind the intense activity in model building throughout the A.T.C. and the lower ranks of the R.A.F., and for that matter, the Army and Navy services, which most of us have known to exist during the past ten years, to realize that there has been a large amount of enthusiasm which has been quite poorly supported, and which in many cases has been allowed to fade away . . . and *now* it is about to be officially recognized!

It is to be hoped that following this recent announcement some real work will be done in catering for the needs of those many hundreds and thousands of enthusiasts.

We understand that the R.A.F. Model Aircraft Association has been formed and that Group Captain C. F. Pearce, of Technical Training Command, has been elected Chairman. Readers will be interested to know that Squadron Leader R. B. Lord, A.F.C., who has from time to time contributed to our pages, has been elected Secretary. We understand from him that shortly it is hoped to finalize arrangements with a view to organizing a number of competitions during the present year.

With a view to supporting the R.A.F. Model Aircraft Association, the Aeromodeller has offered to put up a trophy for annual competition, and already we have heard from Squadron Leader Lord of acceptance on behalf of the Association. It is to be hoped that all aeromodellers who, when entering their period of national service, and do so in the R.A.F., will enquire for particulars of their nearest club with a view to supporting it and keeping alive their interest in the aeromodelling movement.

With regard to "full sized" activities, we understand that it is the ultimate object of the R.A.F. Gliding and Soaring Association to "build up a gliding and soaring organization through which all ranks of the R.A.F. may learn to fly, at a cost compatible with the pay and resources of the most junior airman." We understand that approval has been obtained for the use of R.A.F., Detling, as a gliding site, and that already some half dozen primary and intermediate gliders, together with a winch for launching, have been offered. Let us wish both of these new associations all the success they deserve, and hope that the Powers-That-Be will provide adequate financial support and the appropriate facilities to enable these very worthwhile activities to be developed on the largest possible scale.

Plans Service

During the past few weeks a considerable reorganizing of our well-known plans service has been carried out at the premises at Eaton Bray. As a result, the series of plans of model cars, model boats and light engineering accessories has been incorporated with the "A.P.S." series of plans of all types of flying model aircraft—all these, so far as concerns printing, warehousing, despatch and so on. The result of this reorganizing is that a 24-hour delivery service for any type of plan can now be promised, and aeromodellers may order any kind of "mixture" of plans at the same time and need not, from now onwards, discriminate between "A.P.S." and other types (model cars, boats and light engineering accessories and so on).

Two catalogues are under active preparation. The first, dealing with the range of plans of model cars, boats and light engineering accessories, etc., is now at the printers and copies should be available by the end of January. Readers who write in enclosing a stamped addressed envelope (foolscap size if possible please) will be able to receive a copy immediately. The catalogue of A.P.S. flying type plans is, of course, a considerably larger proposition, but compilation is well under way and it is hoped to have copies available for distribution by the end of February. In each of these catalogues practically every model is illustrated and full details of it, together with size of plan, price, etc., are given.

Paper Supplies

Readers will no doubt have read in the daily press of the forthcoming removal of quota restrictions on paper supplies for magazines, and shortly publishers will be able to buy paper free of licence and limited only to the amount can obtain.

The result of this will be that not only can every potential reader of the Aeromodeller be supplied with a copy of this magazine, but that the troubles from which our associate magazines—*The Model Mechanic* and *Model Cars*—have suffered on account of very severely restricted paper supplies will, at one stroke, be removed.

The most important result of this release from control is that publication from the beginning of this year will be regularly each month, and there should be no more grumbles from readers at the irregular rate of publication which, perforce, has so greatly handicapped these two magazines in the past two years.

The approximate publishing dates will be—*Model Cars*, the 3rd of the month, dated for month of publication; and *The Model Mechanic*, the 18th of the month, dated the month following month of publication. Publication price of each magazine, 2/-. Copies of both magazines can, of course, be obtained from any model shop or newsagent, or by direct subscription at the rate of 25/- for 12 issues, or 13/- for 6 issues.

THE MODEL AERONAUTICAL JOURNAL OF THE BRITISH EMPIRE

ESTABLISHED 1935

Managing Editor :
D · A · RUSSELL, M.I.Mech.E.

Editor :
C · S · RUSHBROOKE

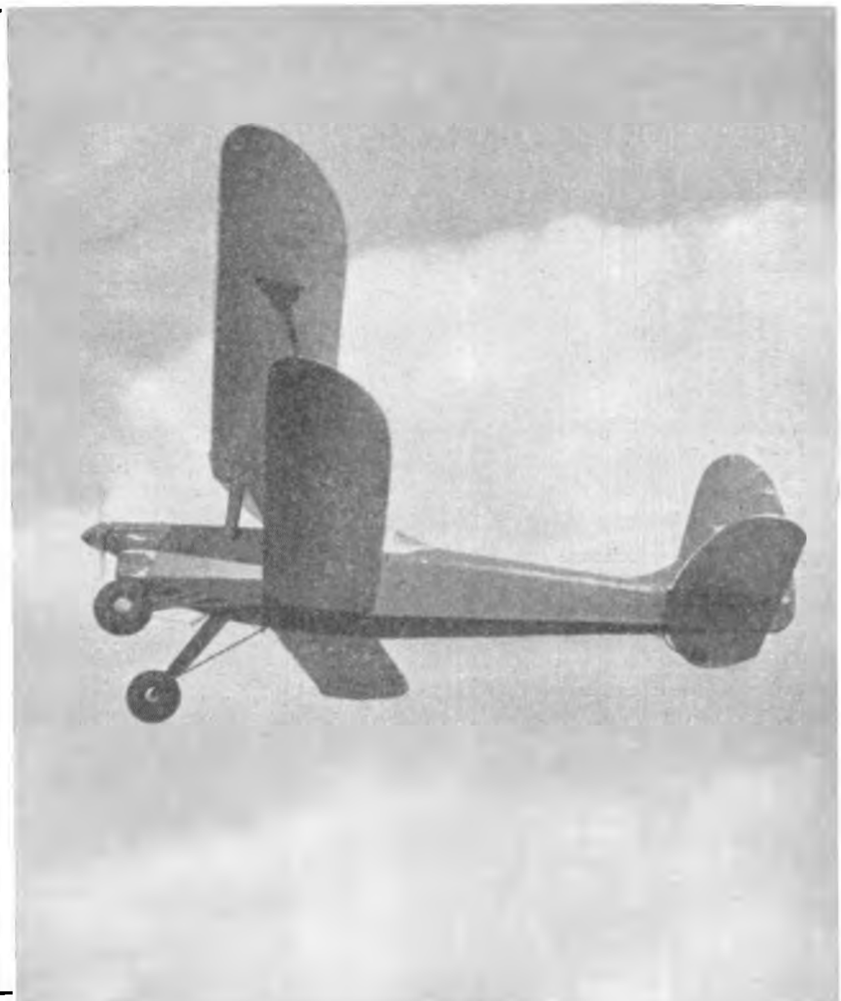
Assistant Editor :
H · G · HUNDLEBY

Public Relations Officer :
D · J · LAIDLAW-DICKSON

Published monthly on the 25th of the month previous to date of issue by the Proprietors :
The Model Aeronautical Press Ltd., Allen House, Newarke Street, Leicester.
Subscription rate 18/6 per annum prepaid (including Christmas Double Number)
Available to subscribers and Model Shops in the U.S.A. from Gull Model Airplane Co., 10 East Overlea Avenue, Baltimore, 6, M.D. Subscription rate $3. Trade enquiries invited.

Advertisement Office :
THE AERODROME,
Billington Road, Stanbridge,
Nr. Leighton Buzzard, Beds.
Telephone : - - - - - - - - - - *Eaton Bray 246*

Editorial Offices :
ALLEN HOUSE, NEWARKE STREET, LEICESTER. Tel. : LEICESTER 65322



The name of Brooks of Blackheath is synonymous with bi-planes. Here is his latest effort, a 5-foot span Ouragon powered model featuring a sliding cabin hood and full fuselage details, caught in flight by the camera of Ed. Stoffel.

You have been warned !

Yet once again—and with no apologies whatsoever—we issue a reminder with regard to readers obtaining third party insurance cover by means of the N.G.M. insurance.

It is interesting to know that this insurance has now been running for over ten years and that it has provided a very necessary protection to many thousands of readers. Nevertheless, we know for a fact that nothing like all the aeromodellers in this country are yet insured. If the necessary premium amounted to any sum of consequence there might be explanation (but still no excuse) for an aeromodeller not insuring against third party claims; but when a year's protection can be obtained for a few pence in the case of rubber-driven model aircraft, and for the price of thirty cigarettes in the case of power driven aircraft, then we are left to wonder why there are any uninsured readers at all!

On the back inside cover of this issue appears a small advertisement on behalf of the N.G.M. in which short particulars are given of the various insurances available. This notice will appear regularly from now onwards as we have from time to time received complaints—particularly from new readers—that although they have heard of this insurance, they have not known where to apply.

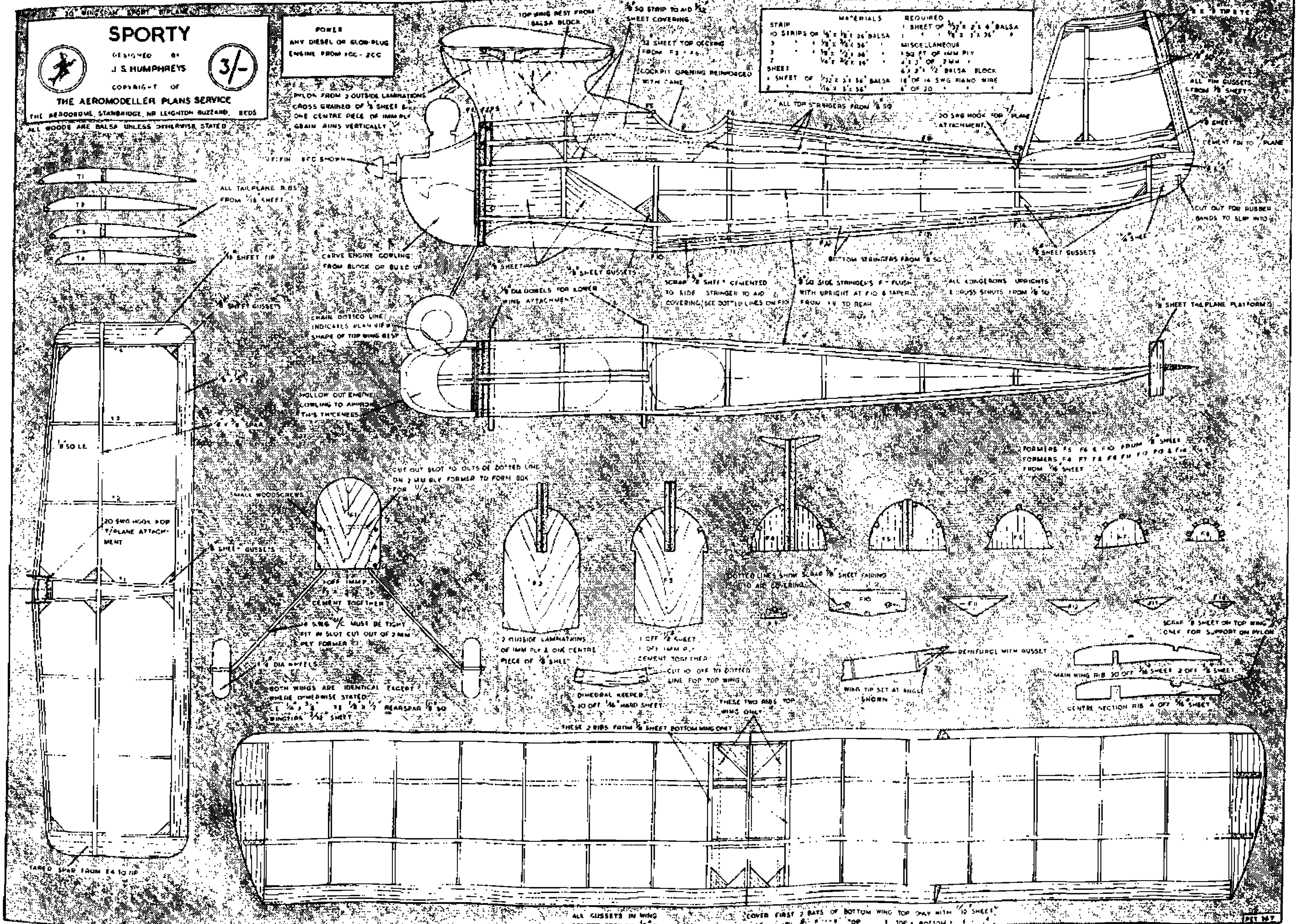
Originally the insurance provided cover only for aeromodellers—it was the first insurance scheme in the world to be negotiated—but in response to popular requests it was, some time ago, extended to include model cars and model boats, and consequently the name was changed from the National Guild of Aeromodellers to the National Guild of Modellers.

We hope that all aeromodellers, particularly those flying the larger and faster types of power-driven model aircraft, who yet remain uninsured will consider further, *and at an early date*, their responsibilities not only to fellow aeromodellers and to the movement, but to the general public whose goodwill and interest it is so necessary to maintain. " Fly With Care " is a simple and easy motto to live up to, but with the best of intentions accidents may still happen, sometimes with drastic results. That they should happen may under certain circumstances be no reflection on the aeromodeller, but that the consequences inevitably to someone *other* than the aeromodeller concerned should not be mitigated by the payment of proper compensation is unforgivable.

1950 Programme

The Wakefield Contest will take place in Finland on Sunday, July 23rd, and on the following Sunday, July 30th, there will be held an International Glider contest in Sweden.

The fourth International Week will be held at Eaton Bray from Wednesday, August 16th, until the following Wednesday, August 23rd. Particulars of the programme of this fourth International Week will be announced, we hope, in our next issue.



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

A 30 INCH SPAN SPORT BI-PLANE

DESIGNED BY J. S. HUMPHREYS

Age 28 years . . . . . Secretary "Saints" M.A.C. . . . . . interested mainly in large power models . . . . . modeller for 17 years . . . . . now bitten by Radio Control bug . . . . prefers Sport flying to Contest work.

SPORTY

THIS neat little biplane was sent by the designer to the Editorial offices for us to test and photograph. As a result we enjoyed a very pleasant hour's flying with a model that is delightful to handle, surprisingly stable in flight and very pretty indeed to watch. Biplanes have flight characteristics that are different to the ordinary run of models. We can never really explain what it is, we only know that we never tire of watching them in the air and this one is no exception. And now let us make way for the designer's own comments:—

"Sporty", as the name suggests, designed for sport flying, was thought out originally, for ease of construction, straightforward trimming, good looks and use with small engines. It has proved to be a reliable and consistent flyer in all weathers, powered with a variety of engines from ·75 c.c. to 1·8 c.c.

All radially mounted engines have used the same bulkhead, and for beam mountings, Juneero metal strip formed the bearers. Differences of engine weights have so little effect on the trim, that slight alteration of tailplane incidence is all that is necessary. If ignition equipment is used, locate it directly above the lower wing.

Construction is quite straightforward and should present the newcomer to power models with no difficulties.

The fuselage is of the orthodox rectangular type with formers and stringers added, to which the pylon is attached. The latter is constructed first, and should be weighted while setting, to avoid distortion.

The front formers "C" are next cut from 1 m.m. ply and 1/8 sheet balsa, laminated as shown on the plan. Cut slots in F2 and F3 for location of the pylon and cement them together.

Undercarriage-box formers F1 are now cut from 1 m.m. and 2 m.m. ply and glued in position to the front of F2. The bolt-holes for mounting the engine should now be marked out and drilled.

Having built the basic fuselage in the normal way, add pylon and front former unit and, when thoroughly dry, remainder of formers and stringers, completing the fuselage construction.

Upper and lower wings are identical except for the position of the centre-section ribs, which provide the correct seatings for the fuselage and pylon. Note that the tip sheet is raised at the tip; this aids the model's stability. Regarding stability; do not substitute wing-struts for the pylon in an endeavour to obtain scale appearance. The alteration in the side area will make the model very prone to spinning.

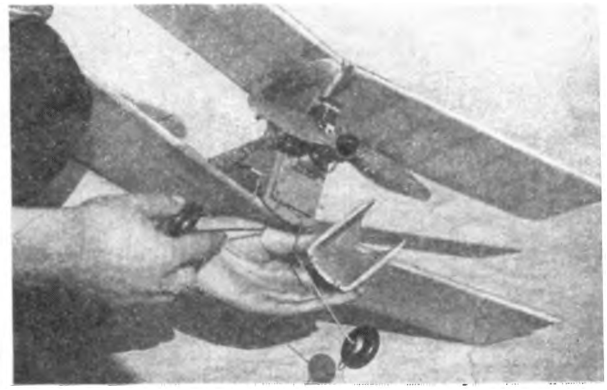
All information necessary to construct the tail unit will be found on the plan.

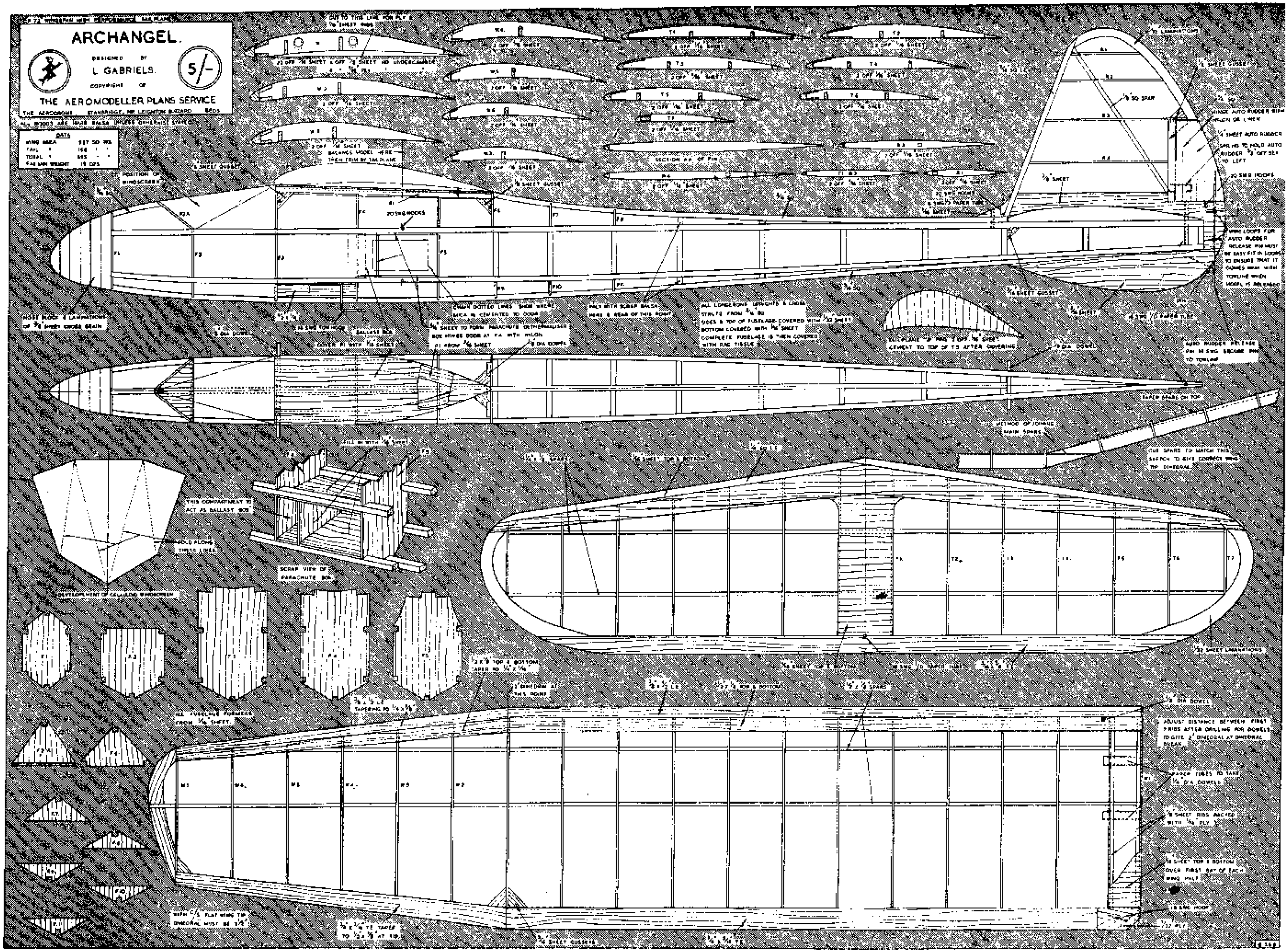
The lower powered models should be covered with lightweight tissue, those with more powerful engines a heavy grade, resulting in a very robust model.

Neither down nor side thrust is used, as the combination of torque and right rudder was found to produce a tight left power turn and a small radius right gliding turn. These provide the perfect trim for flying from small fields.

For a real scale-type take-off, fit "Sporty" with a small pair of airwheels and you will get quite a kick from watching her, especially if you have seen the present day near-vertical contest take-offs.

A clever feature of the design lies in the fact that the undercarriage automatically locks the cowling in position; as can be seen from the right-hand photo below, left shows Sporty as tested at Eaton Bray powered with an M.S. diesel.





THIS IS A 1/5 SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 5/- POST FREE FROM THE AEROMODELLER PLANS SERVICE

L. GABRIELS'

23 years old . . . . press toolmaker by trade . . . . started modelling 11 years ago, but due to study and service in R.A.F. had little time until '48 . . . . Press Sec. to Oldham and District M.A.C. . . . . uses own lathe for engine making . . . . first interest sailplanes, second power . . . . other hobby photography, used mainly with models.

DESIGNED to stand up to hard knocks and the windy weather of the North-Western Area, the original is now 18 months old and still flying. As a result of one of its two fly-aways, the model spent 14 winter weeks on open moorland. The only damage suffered was a few tears in the tissue and a warped tailplane. Archangel can be built on a 30 in. drawing board.

The flight times average over 4 minutes, and consistency is the hallmark of the model's performance. It has been well placed regularly in Contests, always in the first half dozen.

Construction.

Start by cutting out the formers and write your name and address on F3, so that it can be seen inside the cabin.

Now mark out the two sides by piercing the outline on the plan on to 1/32nd in. sheet balsa using a pin. Cement the four side longerons in place on the sides and add vertical spacers.

Mark the former positions on the sides and cement the formers in place, setting them squarely. The cement having dried, join the rear ends and clamp. Check for alignment.

Cut cross-braces in pairs and fit between side longerons. Now add paper tubes and hooks, and then sand fuselage.

After sheet-covering, fix nose-block and cover fuselage with rag tissue. Two coats of clear dope finely sanded, the addition of the windscreen and colour dope complete the fuselage. The door of the dethermalizer 'chute compartment should be separated with a sharp blade and hinged with nylon.

Make up the mainspars, building in the outboard dihedral. Cut out four ply root ribs and face with 1/8th in. sheet balsa. Clamp these together, *ribs No. 2 being* 1/10*th in. higher than ribs No.* 1 and drill the dowel holes.

Cement paper tubes at right angles to ribs No. 1. Thread ribs No. 2 loosely onto the tubes and insert mainspars. Support these at the correct dihedral angle on a level surface, insert $\frac{1}{4}$ in. dowels in the tubes and adjust distance between ribs to make dowels parallel with level surface. The whole set of ribs is now cemented in place. Now add trailing edge and wing-tips and, after sanding to ensure a a flat seating for the leading edge, cement this member in place. Add appropriate sheeting, sand and cover. Balance wings before and after covering.

Construction of tailplane and fin is straightforward, the only point to be watched being the fixing of the auto-rudder. If the locking-pin should fail to pull out, the results will be disastrous, so ensure that the wire rings are a loose fit and lined up correctly. For the same reason, the rudder spring must not be too strong.

The prototype was covered with Jap tissue, which was found to be the strongest available. Grain should, of course run from root to tip on wings and tailplane.

Two coats of thinned heavy waterproof dope were applied first, followed by two coats mixed with 5% of castor oil. Experiment may be necessary as to the best quantity of castor oil to add with a particular brand of dope. The proper percentage will prevent over-shrinking and consequently, warps, and make a completely waterproof job.

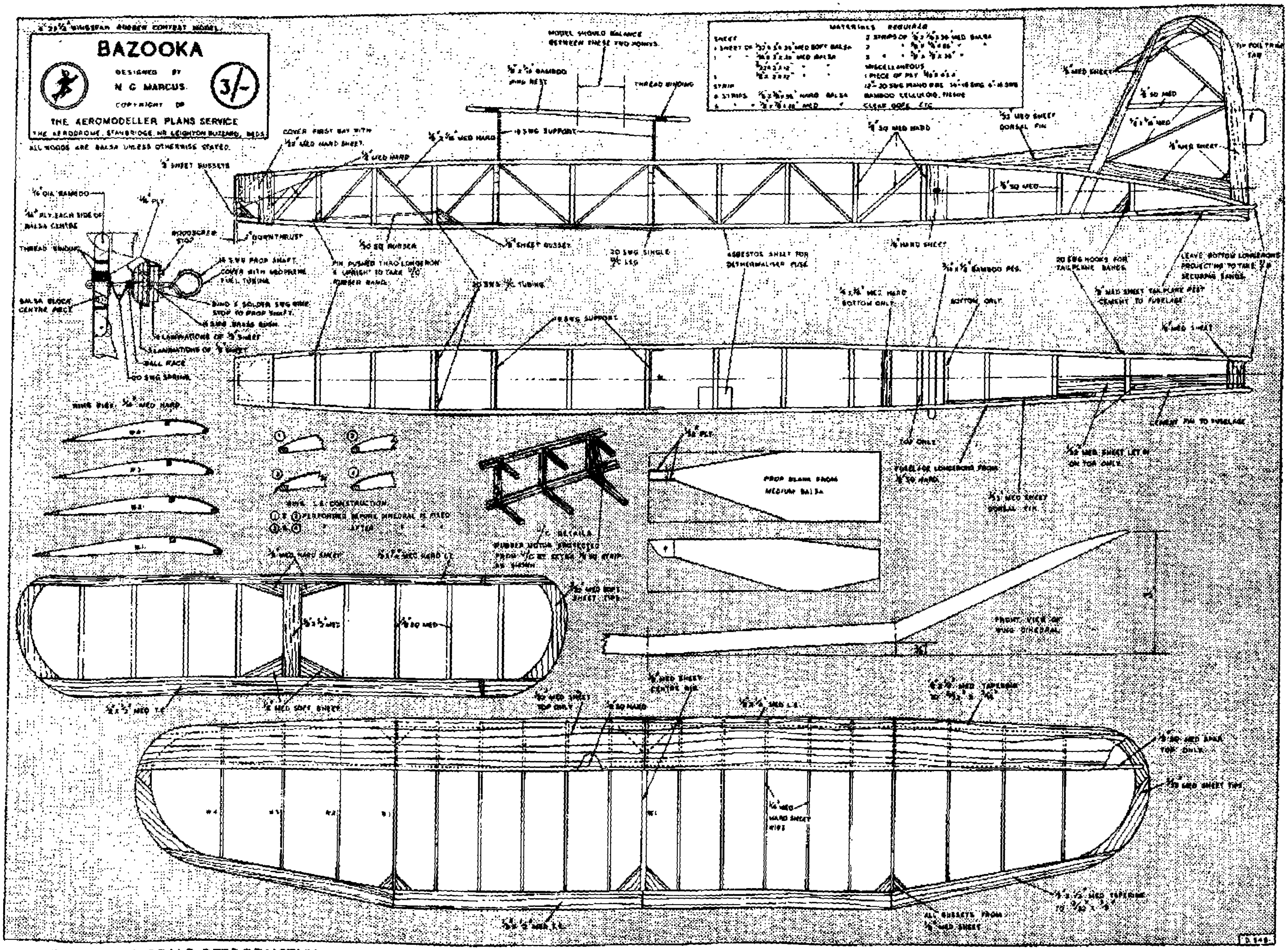
The dethermalizer has been used in all weathers, and there have been only two flyaways as a result. In both cases the cause was faulty fuses; the use of parachute nylon, with its crease-resisting qualities, makes the 'chute 100 per cent. foolproof.

The 'chute is 14 ins. square and has four shroud lines, attached one at each corner, these being 14 ins. long. In the centre of the 'chute, a 3 in. diam. hole is cut. All edges should be hemmed or doped to avoid fraying. The 'chute is attached to a hook on the fuselage under the tailplane and an elastic band draws it out of its compartment when the door is released.

Trimming.

First, check all surfaces for warps and if any are present, remove. It is bad policy to endeavour to cancel out warps with the rudder: in level flight the results may be fair, but on the line, towing difficulty may be experienced. When the C.G. has been adjusted to the position shown, limit all trimming to the tailplane.

Tailplane fixing, auto-rudder and locking-pin attachment are shown, left, and the dethermalizer 'chute stowed in its compartment with the door open, right.



THIS IS A ¼ SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 3/- POST FREE FROM THE AEROMODELLER PLANS SERVICE

A 29½" SPAN RUBBER CONTEST MODEL, DESIGNED BY N. G. MARCUS

WITH the introduction of the present F.A.I. rules during 1948, a new type of rubber model design for competition work was indicated. Fortunately, these rules showed some foresight in the actual layout of the model, but, for rubber models of small dimensions at least, they also imposed a rather heavy weight loading Large models, of the Wakefield type, may be superior, but they are too expensive, and take too long to build, for continuous competition work.

In " Bazooka " we have the type of job that would previously have been rejected on appearance alone. The writer, however, succeeded in astounding certain London Area critics with the model's amazing climb—superior to many "hot" duration gas models ! A study of its brief flight record should convince most that the model definitely has possibilities.

The wing and tail areas were kept as small as was thought possible, so as to keep the total weight down to a minimum.

Now for the competition details, which are few as the model has only been flown in three competitions to date. The actual flight times are as follows :—1949 Flight Cup : 5 mins. +, 76 secs., 3 mins. 40 secs. Model Aircraft Cup : 2 mins. 53 secs., 5 mins.+. Farrow Shield : 1 min. 30 secs., 5 mins.+, 5 mins.+.

Both the under 2 minute flights were due to inferior or fatigued rubber. The second flight at the Nationals was the cause of considerable controversy : the model flew o.o.s. for just over 5 mins. (the actual timekeepers and various witnesses can verify this) but the flight was recorded as 56 secs. ! ! ! Nuff said ! Anyway, it was not the model's fault that it did not win the Trophy !

These flights average at over three and a half minutes which is up to the best contest standard.

The Model.

As usual, in the writer's designs, the construction is essentially simple, being easy to build and more important, easy to repair.

The fuselage has diagonal bracing so as to relieve the covering of some of the torsional strain due to the large motor. The top longerons at the tail should be steamed to shape before pinning in position on the plan. The covering on the original fuselage was red Bamboo paper, but the Burmese tissue available would be excellent. The Burmese should preferably be sprayed with thinned coloured dope, after shrinking, so as to aid visibility.

The wing should present no problem. A good method of doing the sheeting is to cement the edge of a piece of 1/32 in. sheet (cut slightly over-length) to the top of the mainspar, fix with pins (small) and let it dry. Now cement the top of the ribs from underneath and the leading edge. Bend the sheet over, and allow to set whilst fixed by pins. Trim surplus sheet away when pins have been removed and sand to the desired section.

The tailplane and fin assembly are self-explanatory. Note that the fin is cemented to the port longerons of the fuselage. Cover all flying surfaces with Jap tissue, water spray and dope with discretion.

The propellor may seem a trifle large for the model, but it must be remembered that it has to absorb a large amount of power from the rubber motor. A smaller propeller would result in a very short and inefficient power run. The blades should be carved from even-grained medium block, to maximum thickness of 1/8 in. (except near hub, of course) with a maximum undercamber of 1/16 in. All plywood joints must be " Durofixed ".

2¾ ozs. of rubber (arranged 36 ins. long) brings the weight of the finished model to above that required by the rules. This may seem terrific power for such a small model, but with propeller illustrated it gives a motor run of over 45 secs. on 800 turns. And the climb is something that must be seen to be believed !

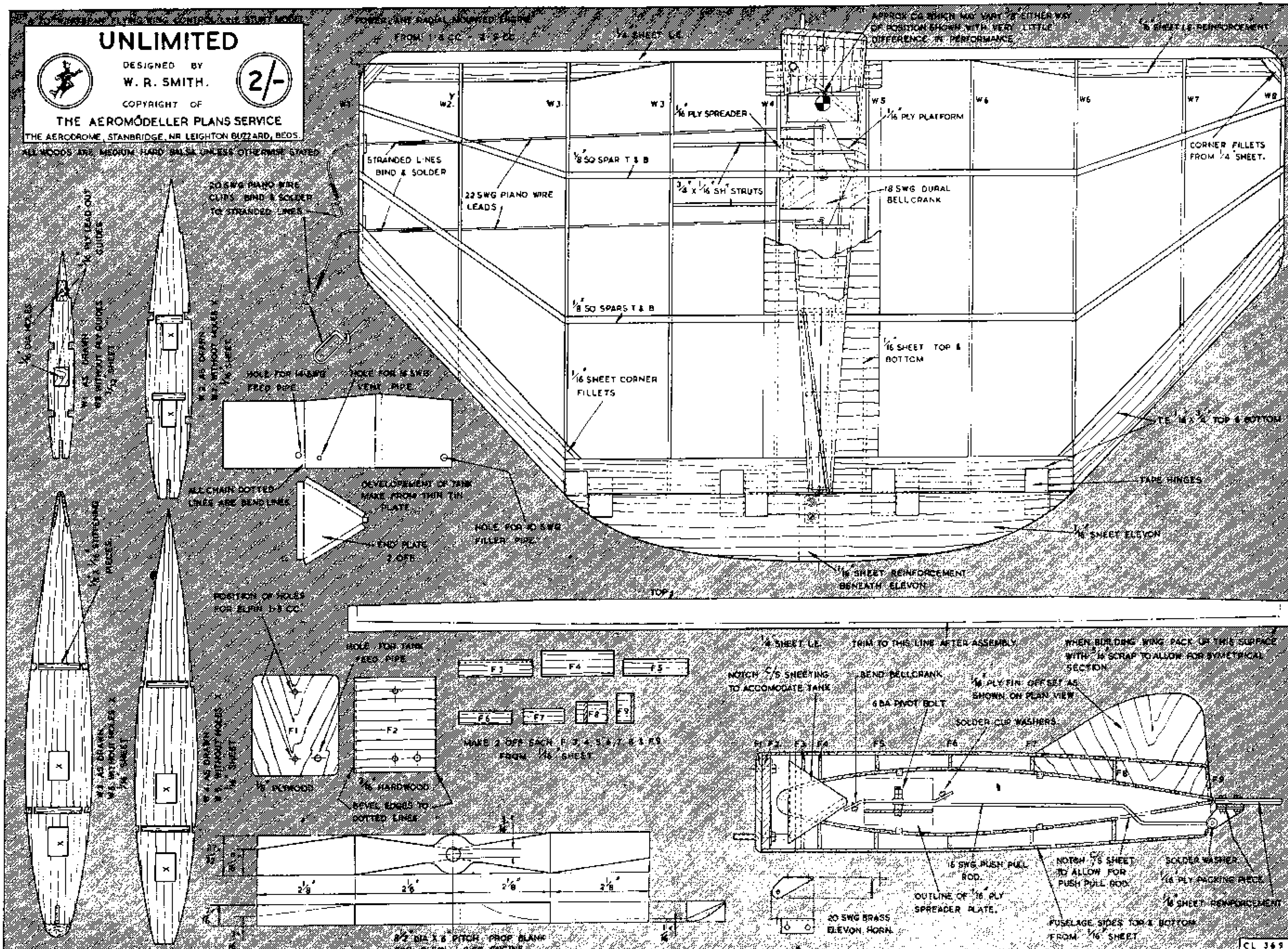
To trim " Bazooka " successfully, one has to be very careful about one thing, which is " do not add more turn that is necessary for the power-flight." Keeping this in mind take the model out one *calm* evening. Adjust for glide by moving wing. If still incorrect, cure by increasing positive incidence of wing for diving, and positive to tail for stalling (remember, add slivers of wood to T.E. for positive incidence on tail). Check glide by having a low power flight. " Bazooka " glides best in 100 ft. diameter circles to the right, when just on the stall.

Now start " putting on the winds "; the model should—if you are lucky—turn in about 100 ft., during the last circle, before the prop folds. Add turn as required. It is important that this last power circle should be no sharper. From here-on do *not* touch the rudder. Correct all power stalls by increasing the downthrust. The reason for this procedure is, if the initial power stalls are cured by side thrust, it will be found that after the first burst, i.e. high torque has died off, the right hand turn will gradually increase with time until the model spins in —I know, I have had some ! !

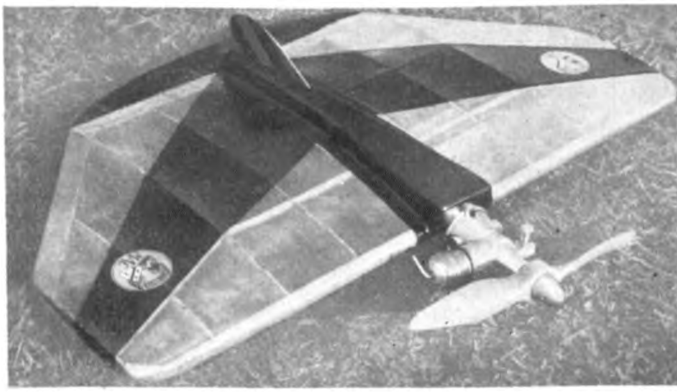
Now wind her up to the limit. Let her go and watch one of the most amazing climbs you have ever seen ! ! The prop will fold some 300–400 feet up, according to the rubber, etc.

Well, there she is ! A few hours work and you too can have a body (and a wing and tail, etc.) like mine !

NOTE. A parachute dethermaliser was used. The 'chute was fixed externally just behind wing.



THIS IS A 1/3 SCALE REPRODUCTION OF THE FULL SIZE PLANS WHICH ARE AVAILABLE PRICE 2/- POST FREE FROM THE AEROMODELLER PLANS SERVICE



UNLIMITED

A 20 INCH SPAN STUNT WING DESIGNED BY RON SMITH

Member Worcester M.A.C. . . . 25 years old . . . . draughtsman by profession . . . . single and unattached . . . . interested in all branches of aeromodelling . . . . accent on Stunt C/L at present . . . . enjoys music and plays violin . . . . amongst other diversions, watches County cricket.

THE general approach to control line stunt flying, which in the past has been widely supported and recommended to beginners, normally takes place in three chapters. Each is associated with a different type of model, classified as trainer, semi-stunt and stunt models respectively. Arguments in support of this course are apparently dependent, mainly, on the assumption that the beginner will be unable to cope with the sensitivity of a stunt job and that the stunter will have insufficient strength to withstand bad crashes.

Now that we have time to relax after the initial impact of control line stunting in this country, we can consider the merits of the above method of training and whether, in the light of personal experience, this method of training should still be propagated.

The trainer model usually consists of a solid or semi-solid job of small wing area—consequently high wing loading—which is capable of staggering off the deck, buzzing around at a fair speed on short lines, grudgingly acknowledging receipt of control from the pilot and invulnerability to crash landings. Its capabilities are limited to shallow climbs and dives.

Having obtained the " feel " of sluggish control, we then proceed to build a semi-stunt model which the designer usually claims to be capable of wingovers and loops, sometimes more. This type has somewhat lighter wing loading than the initial trainer, but is yet sturdy enough to withstand many crashes. In practice we usually find the semi-stunter to be capable of carrying out semi-loops and semi-wingovers with a toppling tendency at high level flight. It is capable of withstanding more crashes than some stunt machines, less than the primary trainer.

We are now sufficiently skilful to venture our hand with a stunter, looking forward to this stage with some trepidation. This model is lighter and has more wing area than our two previous models, probably also a lower flying speed. After spending hours coaxing loops out of our intermediate job, we find this model is easier to fly (as nowadays we do not use excessive elevator movements), is more responsive and, curiously, does not tend to fall towards the pilot during a wingover. After the misgivings during our first two stages, we find that stunt flying is, nevertheless, an enjoyable pastime even though the stunter is subject to breakage during the first few flights. These crashes took place despite the fact that we built and flew our first two ships specifically to avoid such occurrences.

From these comments (and I think most fliers will agree with them) it is obvious that the building and flying of " training " and " semi-stunt " aircraft is uneconomical and a complete waste of time as far as the keen student of stunt flying is concerned, providing of course that our stunt job is at least as crashproof as the first two types. The model described in this article is as strong as any trainer, yet capable of performing the whole book with ease. This is the type of model that should be built by the intending stunt pilot in preference to the old-fashioned trainer.

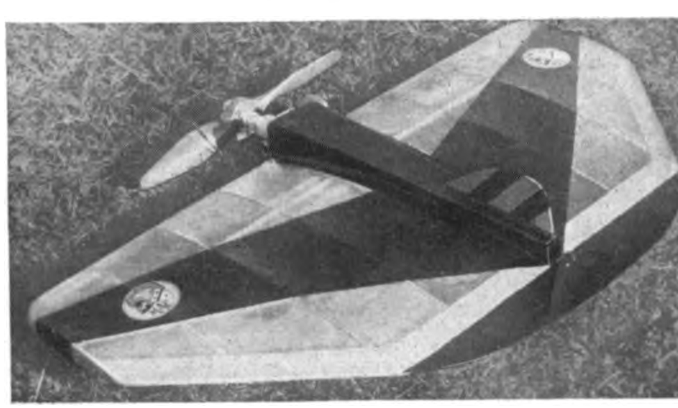
At the time this model was thought out—the winter of 1948/9—stunt flying was at the " looping and wingover " stage with the Worcester Club; bunts and inverted flying usually met with unenviable results. This machine, then, was primarily designed as a fully stuntable training aircraft able to perform the whole stunt schedule and yet be strong enough to withstand the inevitable crashes which occur during the training—and more advanced—phases of stunt flying, *i.e.* to withstand a vertical dive taken to the usual bitter end.

The choice of a flying wing for this purpose had not then been made, but when the following requirements were considered, such a type of model became the obvious choice :—

(1) Wing loading must be low.
(2) Flying speed of about 50 m.p.h.
(3) High manœuvrability.
(4) Preferably a symmetrical layout.
(5) Capacity to withstand heavy punishment.
(6) Building to be simple and straightforward.

Experience with free flight wings had shown that most of these factors are inherent features of that layout. Virtual elimination of a fuselage would obviously reduce wing loading as compared with an orthodox machine. Alternatively, sturdier construction could be adopted without increase in comparative wing loading. A characteristic of most tailless models is their relatively high flying speed and, as a C/L job would not require washout, drag would be minimised. A feature of badly trimmed free flight wings is their ability to perform flick loops at the least provocation. If this vicious tendency could be suitably harnessed, it would certainly ensure responsive control and high stuntability. A symmetrical layout could obviously be attained without difficulty, while speed and simplicity of construction would depend on general layout and good practical design. One apparent constructional advantage, however, would be the relatively small number of components. From these pointers emerged a layout almost identical to that of the model as finally developed and illustrated in these pages.

Diesels being more reliable than " Glo-plug " for stunt work, and a motor of 1·5 to 2 c.c. being desirable for economic



operation, an "Elfin" was delegated to be the power unit for this aircraft. Proportions of the wings were then decided accordingly.

A low aspect ratio wing was chosen for two reasons. Firstly, a comparatively high relationship between moment arm and span to reduce sensitivity (if you have seen those free flight tailless jobs flick looping you will know what I mean). Also, the strength of a wing increases enormously as the aspect ratio is reduced. This is due to the two-fold reason that, for any given area and airfoil, reduction in aspect ratio causes a decrease in span and, at the same time, an increase in depth due to extension of chord. Consider the wing to act as a beam and the virtues of a low A.R. will then be apparent. A straightforward mental comparison can be gathered if we consider two equal area wings with A.R's of say 50 : 1 and 1 : 1.

The wing outline form was derived to keep the mean centre of pressure comparatively close to the centre of gravity of the machine. Also, this permitted the use of an unbroken deep leading edge which would withstand plenty of knocking about. As the depth-span ratio was high, only light main spars would be necessary. Finally, the elevon could be hinged directly to the centre section trailing edge.

A functional fuselage of light sheet could be built to the wing. This would support a mounting plate for the motor, house the tank and control gear and serve as a handhold for launching purposes. Fins added to both top and bottom of the fuselage would complete a symmetrical design. Plans were then drawn out incorporating these ideas.

The prototype received its trial flights during 1948/49 and immediately confirmed the theories on which it was based. It was found to be too highly manœvrable (45° up and down movement, a moderate amount it may be recalled, in those days), was fast and strong and had a healthy appetite for propellers. All that needed to be done was to desensitise control to make the model a practical proposition. Unfortunately, this particular machine met its end before trials were completed owing to the action of an anonymous person who must have had extremely large feet!

Model No. 2 was then rapidly constructed, being similar to the prototype but silk covered. This provided great additional strength, enabling one to dive the model straight into the deck from a wingover without injury. The very slight increase in weight, by using silk instead of tissue, was completely justified in practice. Elevon movement was reduced to 20° each way, the handle centres decreased to 3 ins. This model handled nicely and fulfilled its purpose. It made hundreds of flights before being discarded due to sheer fatigue.

One of the interesting phenomena associated with this type of model is the rapid increase in sensitivity once a critical speed has been reached. Flying speed and sensitivity are thus related, which in practice means that use of a different airscrew needs a different amount of packing under the elevon horn, *i.e.* as speed is increased elevon movement must be decreased. An 8½ × 6 in. airscrew to the blank shown on the plan gives good results and can be quickly carved. Fit an 8 ins. × 8 ins. American type free flight propeller, the speed jumps and the model will be really hot and difficult to control. Use of an 8 × 8 ins. "Truflex" is to be recommended, however. This provides a sound optimum flying speed with low rate of prop. replacement.

The Mark III "Unlimited," as shown on the plan, is similar to previous models, but has had the square corners removed, softening its appearance and improvements found by flying experience have also been introduced. For instance, the underfin has been found unnecessary, the top fin offset has been decreased. This version is the strongest of the family, but performance has not been impaired.

Best results have been obtained using 48 ft. 0 ins. plain steel lines *equipped with swivels at the handle end :* Drome and Mercury No. 3 fuels and home-made mixtures containing elements of Mercury Nos. 3 and 6 and Mills fuels have all been used. The motor should be tuned until it gives maximum performance; the needle valve is then opened as much as possible. This provides best flying performance with nitrated fuels. The needle valve and body should be reduced in length the needle being re-soldered to suit new conditions; valve body replacements will not then be frequent if the model is crashed while inverted. A drop-off undercart may be fitted, details being given on the plan, although hand launching is quite satisfactory even when carried out in a careless manner. If the model is used as a primary trainer, use ⅛ in. packing under the elevon horn and an 8 × 6 in. "Truflex".

Choose good quality medium hard tough balsa for this model and use a strong cement such as Britfix, pre-cementing throughout. Pre-fabrication speeds assembly, so cut all main parts to shape (except fuselage formers) and make tank before starting building. Building sequence is important and the following order should be maintained :—

Wing.

Cement ⅛ × 1/16 in. stiffeners to ribs and cut holes in port side ribs to clear lead wires.

The leading edge is pinned in position over the plan using 5/16 in. packing to cater for symmetrical wing section. Ribs are cemented in position, being lined up flush with the top of the leading edge; it will be necessary to support the outer ribs with 11/16 in. packing at the trailing edge. When cement sets, add the underside T.E.'s, the top ⅛ in. sq. spars and finally the top T.E.'s.

Remove wing from building board and fix the underside spars, the 1/16 in. sheet outer L.E. reinforcement pieces, wing tip corner blocks, T.E. corner fillets and the underside centre section sheeting. The L.E. can now be trimmed to shape and the wing tips rounded.

Controls.

Fit the 1/16 in. ply spreader plate, the bellcrank platform (with pivot screw in position), the 1/16 in. sheet struts, the ply lead wire guides and the elevon. Use plenty of cement on the tape hinges. Notch the centre section sheeting to allow for push-pull rod movement and drill the guides 1/16 in. dia. for lead-out wires. The controls are now added; first fit the elevon horn with 8 B.A. bolts and then the push-pull rod. Up and down movement of the elevon should be equal, and can be made so by varying the bends in the push-pull rod, thus altering its length. When the elevon is functioning satisfactorily, solder washers to the ends of the push-pull rod. Add the 22 s.w.g. lead out wires (with stranded lines soldered to them) and, after the stranded lines have been threaded through the guides, the control line clips.

Notch the front centre-section sheeting as required and cement tank in position. Fix the centre section top sheeting.

Fuselage.

Cement the 1/8 in. ply front bulkhead to the 3/16 in. hardwood block and drill for the engine fixing bolts and tank outlet tube. Bolt tin strip in position, solder nuts, wipe off surplus flux, and cement strip to hardwood block. Make a good job of these last two operations during construction to avoid remorseful incidents later on.

Slide fuselage sides along wing, front bulkhead along outlet tube and cement together and to wing. The rectangular fuselage formers are cut from 1/16 in. sheet and trimmed to size as construction proceeds—their exact position is not important. The tail end underside former consists of only 1/8 × 1/16 in. strip, clearance for elevon horn being necessary in this case.

Allow surplus wood on the top and underside sheeting. Press sheets against inlet and vent tubes and rotate to puncture wood. Trim off ends of sheets to obtain snug fit against front bulkhead and cement to front bulkhead, side sheeting and formers.

When cement is dry, pare away surplus sheet to sides of fuselage and cut off and file vent tubes flush with top sheeting. Slot top sheeting and fix fin. Round off all corners of fuselage and sand complete model.

Covering.

Cover wings with parachute—or equal—silk, which can be coloured with Jiffey dye, cold method; this is effective and well worth the extra 4d. Iron silk before applying. Pull covering, slightly dampened, drum tight over framework using Gripfix or similar photopaste as adhesive. Do not water shrink. Give fabric one coat of dope, fuselage and fin one coat of dope and talcum powder to help fill the grain. Sand fuselage and fin. Colour dope fuselage, fin, elevon and anywhere on wings that may be desired.

Finish the model with one coat of hot-fuel proofer.

Wing Loading

BY J. H. MAXWELL

2½ ozs. per sq. ft.! This campus powered midget was designed with the aid of the information given in this article.

WHEN designing a new model, we have often felt the need for a simple method of arriving at the best wing loading—and no doubt other model designers have felt likewise. Yet, to the best of our knowledge, no guidance on this very important point has ever been published. We therefore decided to investigate the matter.

By referring to a " weights book " which records the weights of most of our models for the past eleven years, we were able to plot a graph of wing loading against wing area. This is reproduced in Fig. 1.

Then, from the graph we derived a formula, *viz.* :—

$$\text{Wing loading} = \sqrt{\text{Wing area}} \times 0{\cdot}00282$$

where wing loading is in ozs. per sq. inch, and wing area is in sq. inches.

Next, to check the graph and its associated formula, we assembled a mass of data relating to the weights and wing areas of numerous successful models, both British and American. These, when compared with the graph, showed very good agreement. So good, in fact, that we have no hesitation in saying that the graph and formula may safely be applied to any type of free-flight model, whether glider, rubber driven, or power. By employing them, a model designer can tackle a model much larger or smaller than anything he has ever built before, knowing exactly what the wing loading ought to be.

Medium weight models.

Now, we are not suggesting that there is only one possible wing loading for any particular wing area. What we do claim is that use of the graph or formula will result in " medium weight " models, of which a typical example is the present-day 8 oz. Wakefield.

There is, moreover, no need to stick exactly to the indicated figures. They may be increased or decreased by as much as 25 per cent. without making any appreciable difference to the model's performance. Over 25 per cent. increase takes the model into the heavyweight class, and over 25 per cent. decrease makes it a lightweight.

In practice, instead of the wing loading, it is sometimes useful to know the best weight for a given wing area. Alternatively, if the desired weight is known, one may wish to find the best wing area. These two needs are met by the modified graph, Fig. 2, or by the formulæ

$$\text{Weight} = (\text{wing area})^{\frac{3}{2}} \times 0{\cdot}00282$$

and wing area=(weight /0·00282) $^{\frac{2}{3}}$ where weight is in ozs.

(Perhaps we should make it clear at this point that the two graphs, Figs. 1 and 2, are complete in themselves. The formulæ, which give precisely the same answers, are given simply for the benefit of those who prefer their data in that form.)

Example.

To demonstrate that the graphs and formulæ are, in fact, of practical value, let us take an example. Suppose you are designing a radio-controlled model. You estimate that the all-up weight will be 5 lbs. (80 ozs.), and wish to know what the wing area should be. Reference to Fig. 2 gives the required area as 930 sq. in. (6·5 sq. ft.). Now, turning to Fig. 1, you will find that the wing loading corresponding to 930 sq. in. is 0·086 oz./sq. in. or 12·4 oz./sq. ft., and it is most interesting to note that the Good brothers' latest " Rudder Bug " radio-controlled model has a wing loading of 12·3 oz./sq. ft.

Possibly you may think that if the graphs are correct for radio-controlled models, they will indicate wing loadings which are too high for power duration models. On the contrary, we find that such models as " Slicker " series come out slightly above the graph, though still within the 25 per cent. Also, as previously mentioned, an 8 oz. Wakefield falls exactly on the graph.

Another fact which may be of interest is that the formulæ are correct even for full-size sailplanes and ultra-light aircraft.

F.A.I. loading.

As an interesting sidelight, Fig. 1 shows up the weakness of loading rules such as the F.A.I. rule. You will observe on this graph a line marked " F.A.I.". This was arrived at by taking the F.A.I. ruling of 3·93 oz./sq. ft. of the total horizontal surface, and assuming that the wing area constitutes 75 per cent. of the total (*i.e.*, tail area equals 33⅓ per cent. of wing area).

It is evident that a large model of, say, 800 sq. in. wing area built down to the F.A.I. weight rule is really very lightly loaded, as compared with a small model which also complies with the rule.

This, rather than aerodynamic efficiency is, we believe, the reason for the superiority of large model gliders.

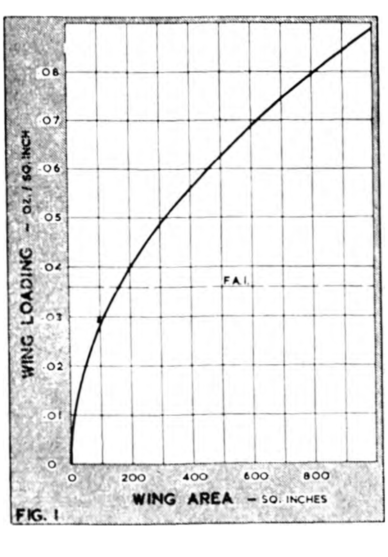


FIG. 1

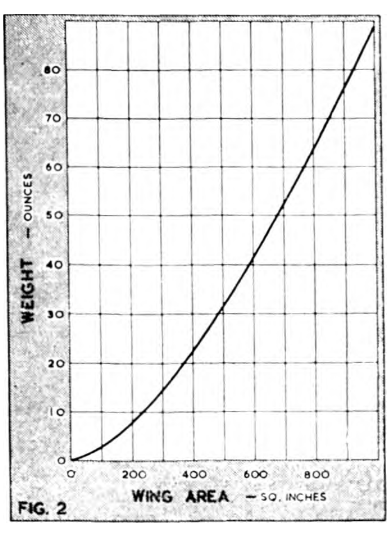


FIG. 2

Rudder Bug

PART II—INSTALLATION OF RADIO EQUIPMENT

"THE secret of successful radio control flying is really no secret at all but close adherence to two maxima. One is a thoroughly tested radio control installation ; the other is the rigid following of a systematic checking procedure."

These words by Walter Good should be framed and hung over the bench of every would-be R/C flyer. Stick to the principles he advocates and your new, and as yet unblemished, Rudder Bug will at least stay in the latter state. Ignore them and you will be unwinding the aerial coil from the tailskid !

And now to business—we assume that following Part I your Rudder Bug is complete all but the fuselage covering. We also assume that you have thoroughly bench tested your radio equipment and satisfied yourself that it is 100 per cent. perfect. Follow the manufacturer s instructions implicitly in this respect, keep all wiring as short as possible, use the same switch as that intended for the model, and thoroughly acquaint yourself with the operation of the equipment.

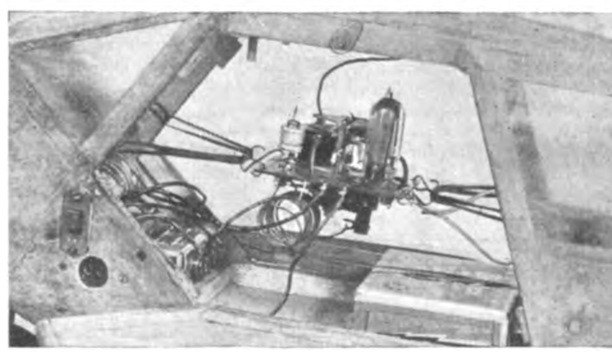
Installation of the equipment in the airframe is the next all important step, and here there must necessarily be a certain amount of variance according to the type of unit employed. We used a Mercury Cossor receiver and will describe its installation in detail, which will at least serve as a basis to those using other types of apparatus. As observant readers will have noticed we have varied switch positions, shorting plug position and the aerial installation since Part I was prepared : this in the course of experiments made to counteract peculiarities of our own particular receiver. These faults were eventually traced to the valve and we have found the American made 3S4 war surplus valve to be far better in performance and reliability than the original. Both wiring layouts, *i.e.*, the one shown in Part I and the one used since, operated successfully once the valve trouble was settled.

You should know by now from your bench tests the ideal aerial length for your set. If it is longer than the fuselage to fin arrangements used on the Good prototype then run it along the trailing edge of the wing, secured by transparent tape with a lead-in in the shape of a small pin and socket as shown in the photograph on this page.

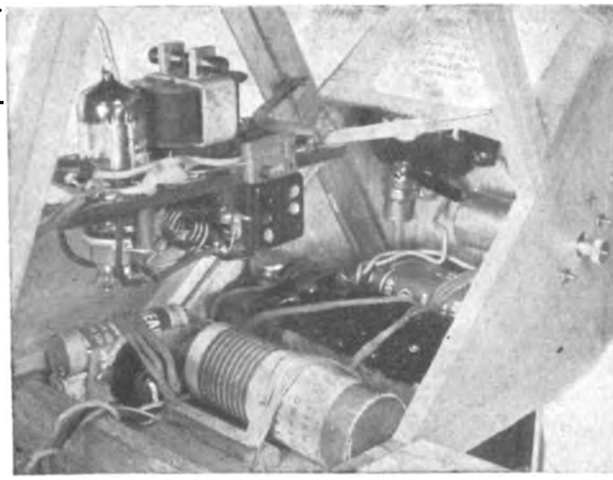
The receiver is suspended by rubber bands stretched from the four hooks cemented to the fuselage sides to " S " hooks attached to each corner of the paxolin base. At least four 1/8" rubber bands should be used at each end of the receiver, so that the severest of shocks will not spring it against the top or sides of the fuselage.

Before describing the installation of the actuator we would mention that two alternative layouts are shown. One,

Heading photo shows the model climbing over our photographer's head after take-off. Other two views show installation of Mercury Cossor Equipment in Rudder Bug. Note the aerial plug protruding just above the door in the lower photo. This for a modified aerial system which was run along the trailing edge of the wing.



Walt Good's set-up showing Good Bros. receiver. Note position of coil and condenser for spark ignition.



Walter Good's original, using a rubber-driven escapement and the other, a magnetic actuator, used on the AEROMODELLER Rudder Bug. The choice is left to the individual reader although we recommend that beginners use the latter system as it is the simplest and eliminates " Pilot error " to a large extent. Installation of the Good Brothers escapement and rudder linkage system can be readily grasped from Figs. 1 and 3 and the photograph on page 89. The escapement is mounted on the two cross members and it should be noted that the arm from the rudder may be bent up or down so as to increase or decrease the amount of rudder movement. It is important that the linkage is absolutely free in movement so that it cannot bind in any position. A few turns on the rubber should cause the system to work and 2 strands (one loop) of 3/32 flat rubber are recommended. The forward end of the rubber is reached through the cabin door (Fig. 2) and is wound with a hand drill to approximately 400 turns which should be adequate for several days' flying.

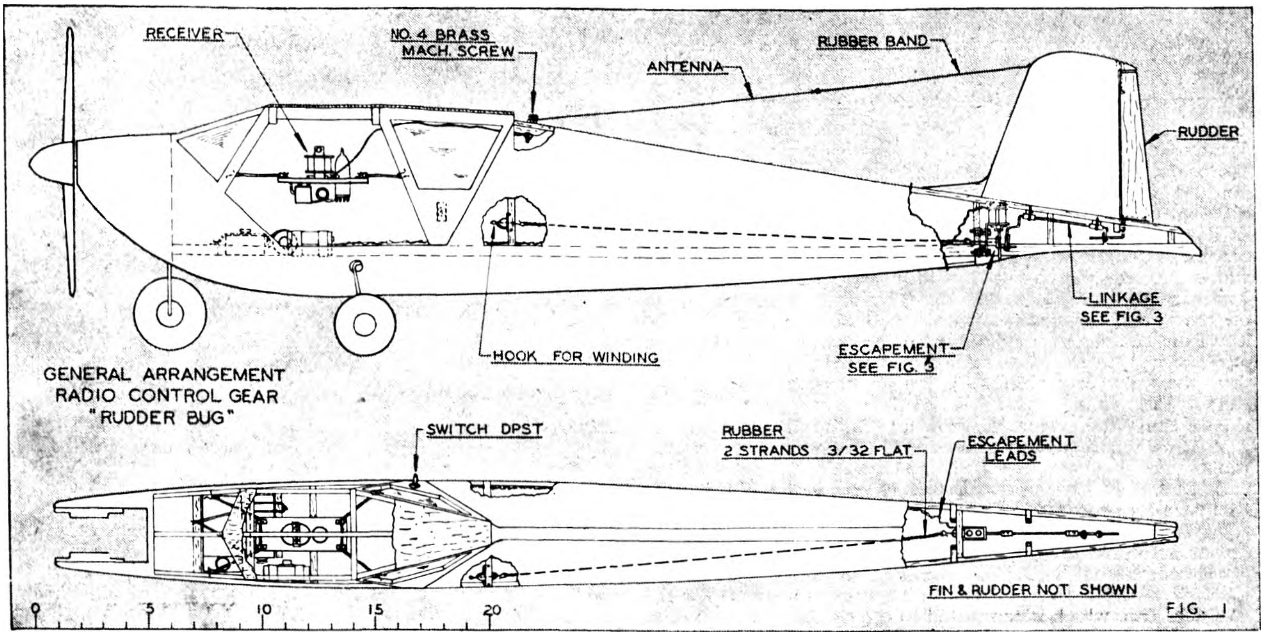
We used the solenoid and armature set up from a Mercury Cossor actuator for our magnetic actuator. The conversion is quite simple as can be seen from Fig. 4. A battery terminal soldered to the top of the armature serves as a socket for the 16 s.w.g. arm, which is connected to the rudder arm by a link, again adjustable so as to alter the degree of rudder movement. Howard Boys describes this type of actuator more generally on page 103. Its main advantage lies in the fact that one has no sequence to remember. The model is trimmed to fly in left-hand circles (with neutral rudder, torque invariably supplies this). Transmitter " on " then supplies right-hand circles; with transmitter " off ", one is circling happily to the left. A " straight " course is easily achieved by a little of both. For the R/C tyro it is a first-class training system with a high safety factor and we thoroughly recommend it. Experts will point out that the receiver and actuator circuits suffer heavier use than with the normal system but we have experienced no excessive battery drain, etc., in this respect.

Walt Good's answer to the problem of remembering sequence with the normal rubber-driven escapement system may be best described by quoting the Doctor himself. "The heaviest criticism of the escapement-type control has always been levelled at the possibility of forgetting which rudder position comes next after resting awhile in Neutral. Experience has shown that practice soon " conditions " the operator so he knows what comes next, except when he becomes flustered or confused, and this does happen occasionally! Thus, it was decided to build a laboratory model of an idea which would make the switch automatic, thereby "remembering" for the operator (Fig. 5). A surplus 250 r.p.m. motor (A) operated on 12 volts, instead of its rated 27 volts, is the driving power. Running continually, it applies torque through a slipping friction clutch (B) to a spoked drum (C). Drum rotation is prevented when the control stick (D) blocks passage of one of the spokes. Motion of the control stick from Right to Neutral allows the drum to rotate one-quarter turn, very similar to the escapement. Note how the cam and contactor (E) at the end of the drum sends one pulse for each quarter turn. Returning the stick to the Right allows drum motion of three-quarters of a turn and sends out three pulses, just the right number to step the escapement to Left, to Neutral, and to Right. This all happens in the short time interval of less than one-half second as the drum speed is set for about 2 r.p.s. In use, the control stick may be wiggled crazily through any series of motions and the escapement always ends in the same position as the control The original switch was constructed by Loran Wenrich, at the Johns Hopkins Applied Physics Laboratory after considerable hours of labour. It worked so nicely in the workshop that we quickly clapped it in a box and took it to the field. Many flights, including radio control take-offs, have been executed by this switch, with the effect of allowing more freedom on the part of the operator. Even a rectangular landing approach pattern consisting of four consecutive right turns offers no mental hazards. A secondary advantage appears in that loss of synchronization between the control and rudder immediately indicates trouble and not a poor memory.

The automatic switch as here presented is not intended as a constructional feature but to show the embodiment of an idea which most probably can be duplicated by a variety of methods.

The type of actuator used naturally governs the battery necessary for its operation and once this has been decided, assemble the complete model and then position all the batteries to balance the model at a near proximity to the correct C.G. position. Make a bulkhead in front of each battery and anchor them most securely with strong rubber bands, using either pegs or hooks as shown in the various photographs. Instal your switch, of the double pole variety if you are using Walt Good's escapement system, or two single pole switches in the case of the magnetic actuator. In the Good system one side

Left is the Aeromodeller version with magnetic actuator installation and a similar view of Walt Good's prototype with rubber-driven actuator.



GENERAL ARRANGEMENT RADIO CONTROL GEAR "RUDDER BUG"

FIG. 1

of the switch opens the filament circuit and the other the escapement circuit. Check that the resistance of each switch does not exceed 1/10 ohm ; if it does, discard it.

You are now ready to commence wiring so make sure you are using the right type of wire. Under no circumstances use the single core variety as it eventually breaks under vibration. Multi-strand insulated 22 gauge flex is ideal. Use one of the cored solders marketed specially for radio work but do not use an acid flux if you prefer plain solder. Clean and tin all joints before soldering, do not bare any more of the wire than is necessary, and you will avoid trouble. We cannot over-emphasise the importance of ensuring that every connection is a good one. " Dry " joints, as they are known to radio enthusiasts, can cause endless trouble and remember that one bad connection may necessitate a new Rudder Bug !

Twist together the two actuator leads and tack them along the floor of the fuselage preferably to one of the crutch sides (this keeps them as far away from the aerial as is possible) and then complete the rest of the wiring. You will find dress snap fasteners ideal for battery connections. Solder the male portions to the battery and the female portions to the end of your lead wires. Check that the fasteners themselves are a real snap fit. Batteries used for the AEROMODELLER Rudder Bug with the Mercury Cossor equipment were as follows :—H/T 67½ volt Batrymax, (12½ ozs.) ; L/T 1½ volts U.2. (3½ ozs.) ; and a 4½ volt heavy duty battery (13¼ ozs.) for the magnetic actuator. Other weights are : wiring and switches 1¼ ozs. ; receiver 4¾ ozs ; magnetic actuator 2 ozs., making a total of 37¼ ozs. This may seem a lot to some people, but as the Rudder Bug with Yulon installed makes light of it, we preferred reliability to the saving of weight by using smaller and less reliable batteries.

The position of socket for the milliametre connections is important and should be so arranged that the meter leads are kept to an absolute minimum as they tend to act like aerials and alter the tuning when the meter is disconnected.

With the installation now completed, thoroughly test the equipment before disconnecting and removing the receiver, prior to covering the fuselage.

Possibly a few details on tuning the Mercury Cossor receiver would be helpful at this stage :—Firstly look for the test card that should be attached to your receiver which gives the idling current and relay settings. It is always a good point to check the latter figures and this can be done very simply in the following manner. Connect a 10,000 ohm variable resistance in series with the milliameter which enables one to vary the standing receiver current. Connect to the actuator terminals on the receiver a circuit consisting of a 1½ volt battery and bulb. Switch on your receiver, which we will say has an idling current of 3·1 mm. and then gradually reduce the current by means of the resistance until you reach the point when the relay just "breaks," this being indicated by the bulb in the actuator circuit. Make a note of the reading from your milliameter and then increase your current again slowly until the

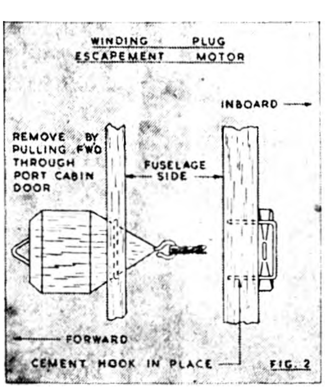


FIG. 2

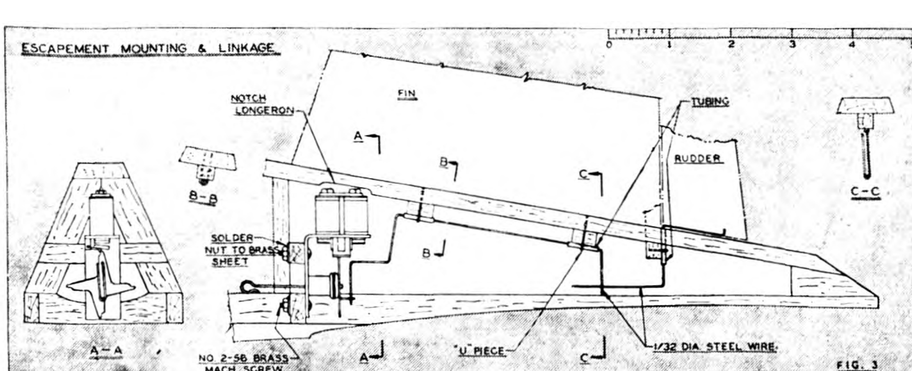
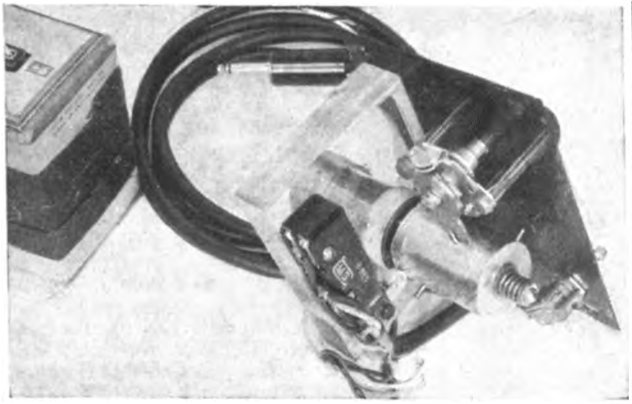
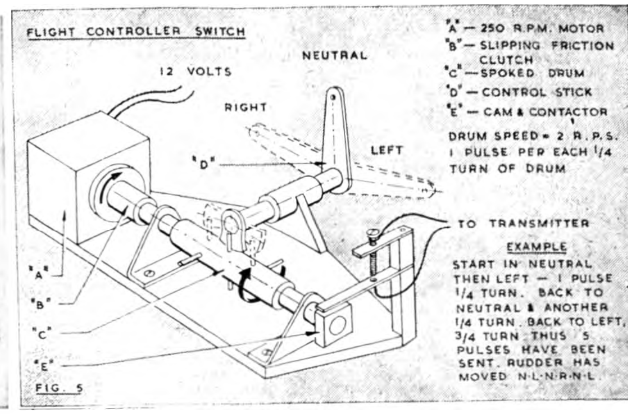


FIG. 3





Photograph is of the flight controller unit. Note the three pegs on the drum, the fourth being out of sight underneath.

relay "makes" again noting your reading. In this case we will say the readings were 2·7 ma. and 2·9 ma. Should the difference between the relay settings be more than ·2 ma. then the set should be returned to the manufacturers for adjustment. Unless you are experienced at such a job leave relay adjustment well alone. As our idling current is 3·1 ma. *i.e.*, ·2 ma. above the relay figure we are O.K. Should the relay figure have been, say, ·3 ma. then we should increase the idling current to 3·2 ma. This can be done within reasonable limits of course, by increasing the aerial length (decreasing lowers the figure). Idling current can also be adjusted by means of the brass screw protruding from the squegging coil. The ideal being, correct current in keeping with maximum sensitivity, this is obtained by combined adjustment to both aerial length and squegging coil.

Now disconnect the variable resistance and then switch on the set which we will assume is idling at the correct current, in our case 3·1 ma. Key the transmitter and adjust the tuning condenser by means of an insulated " key " (we cut ours from paxolin) so as to obtain maximum current drop. With our example the current should fall to at least 2 ma. and you can check that the relay is operating satisfactorily by again observing the bulb in the actuator circuit.

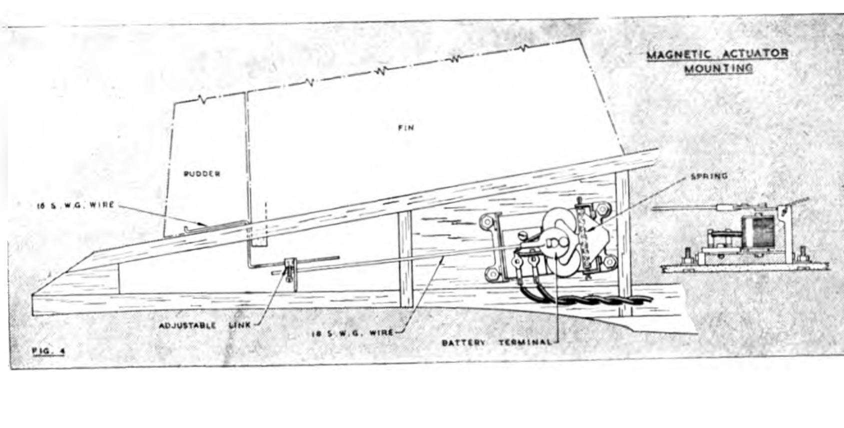
Now with the set operating satisfactorily at close range, take the model at least 100 yards from the transmitter, preferably in an open field away from such objects as cars, etc., and again check operation. You will now find that although the idling current is exactly as it was it only drops to about 2·2 ma. in our example, or at longer range probably only 2·4 ma. However, with our lowest relay setting at 2·7 ma. we are still ·3 ma. below that figure which is O.K. As, at the other end of the scale, you should never have a current drop which is less than ·2 ma. below the lower relay figure.

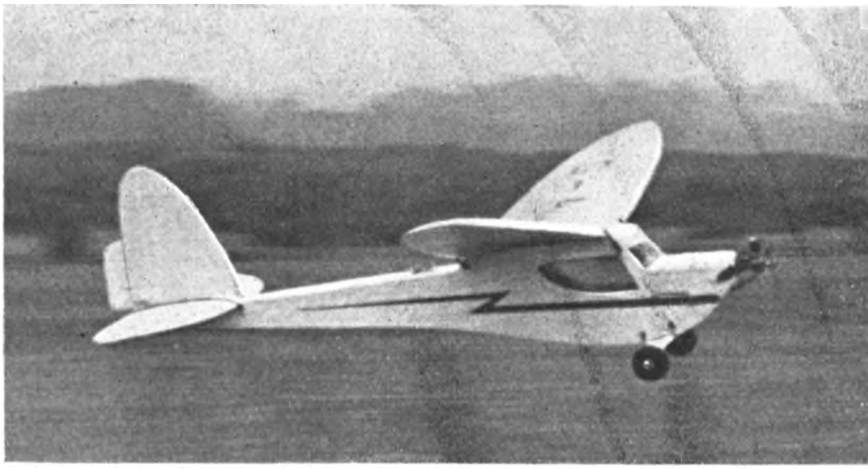
Slight re-tuning may be found necessary at this stage and less we forget—do not forget to remove the milliameter from the circuit and check that the set operates O.K. with the shorting plug in its place.

The model itself should now be completed and ready for free flight tests. These should first be conducted unladen and then with appropriate payload. There is little point in removing the batteries but a suitable weight should be suspended in place of the receiver. If this is your first R/C model conduct the usual flight tests and then trim for gentle left hand turns and if you are using a magnetic actuator trim also for right hand turns with the actuator " on ". Satisfy yourself that Rudder Bug will fly in circles either to the left or to the right without spinning, which it should do quite easily. Having done so, retire to the workshop, replace the receiver and again conduct a thorough radio ground test, including range checks. This should be repeated with the motor running in order to ensure that vibration is not effecting the sensitive relay. It will also serve to magnify any bad connections and draw your attention to them. If you have any trouble with the escapement skipping, or in the case of a magnetic actuator jumping on and off, your sensitive relay is probably at fault. Either the contact is set too close to the idling current reading, or your receiver mounting bands are too tight. *Whatever your troubles, cure them before going near the flying field.*

Incidentally, we wired a micro-switch with extension lead to our Mercury Cossor transmitter, for ease of operation with the magnetic actuator set-up.

Now comes the great moment—make a final check of every detail as far as both radio and model are concerned. Start the motor, switch on actuator, receiver and transmitter (even the experts have been known to forget these all-important items) and get your helper to hold the model; do a final check on rudder movement with the engine running, and away you go. Allow the model to gain height and complete one full turn to the left before commencing any manœuvres. The rest is largely a matter of experience, but like control line flying, do not try to be too clever at first. The results are so much more expensive!





PETROL VAPOUR

BY

C · E · BOWDEN

Radio is the present rage.

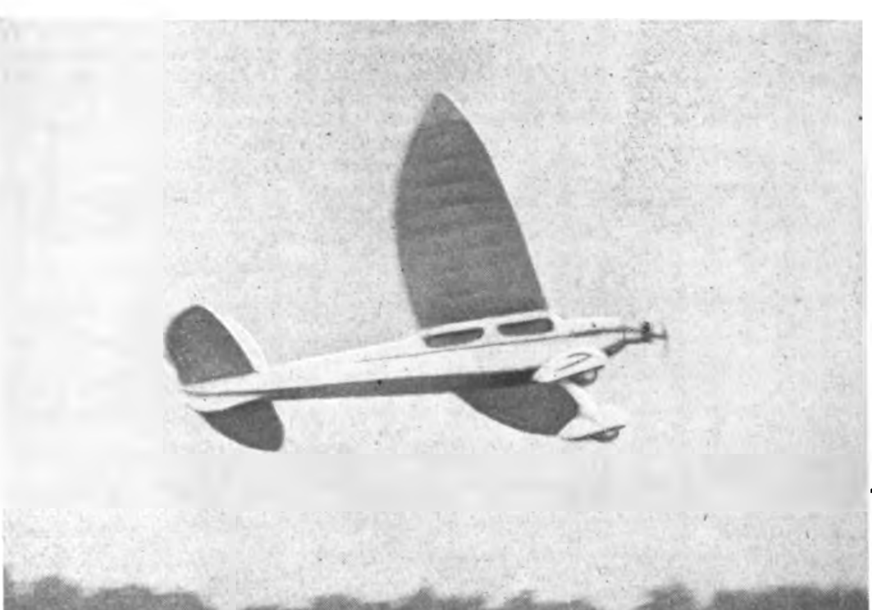
WHAT I am going to say in this article will affect every newcomer to radio. It may make or mar his flying and save his pocket. From correspondence and discussions I have with modellers who aspire to controlling their models by radio, I have gathered that an awful lot of people have an entirely wrong conception of radio flying. The main theme of the uninitiated who has never flown a full sized plane as a pilot, or who has no experience of free model flight, is that you connect up elevator and rudder to the servo motor, or actuator as some call it, and hey presto, you send a signal for left rudder and the model turns steadily to the left in cricles until you give right rudder when it turns to the right until you tire and put it back onto a central course. If you give it up elevator, the model climbs, and when you want to dive, down elevator does the trick. That when the engine is cut by radio, the model is steeered to a spot landing by the operator. A lovely dream!

Although the present state of radio has gone a long way, and is definitely the most exciting and intriguing form of model flying, it bears little relation to the above description. There are quite a number of snags, flying control as well as aircraft design, and also the radio side. You need not know a fearful lot about radio, for you will soon pick up sufficient by experience, and if you are a full sized plane pilot the actual flying control will be much easier to grasp.

I am going to assume that you are not a " pilot " and know little about design, so I am going to take you through with a flight or two of trouble with my pal " Radio Moron ". This may put you into one or two vital pictures for success as a beginning to your radio life.

Keep it simple.

It is a good idea to suppress all thoughts of complicating the issue by adding elevator and engine cut-out for a start. Take a leaf from the book of the winning Americans in their radio competitions for a number of years and learn to operate simple rudder control first. There will be plenty to overcome, believe me. Radio reliability, aircraft reliability, and flight control reliability have all to be learnt and coordinated. Whatever you do, choose a stable ship and not a tricky parasol or pylon with its centres of this and that changing as you alter trim by controls. All centres of " this and that " want to be grouped. By this I mean, don't have a very low thrust line with a very high centre of drag above a pylon, or some such difficulty added to the problem. A high wing with high thrust line or a low wing with low thrust line will be far easier to control. That is what the winning radio maestros do, at the present initial stages of radio development. C. R. Jeffries flew with genuine reliability with the most simple flying machine and one control during the War in this country, when he was developing radio controlled models for the Government. He followed the American idea of simplicity. Later we can complicate the job when we have mastered the principles. Mind you I do not say you cannot fly with several controls, but I am just suggesting that the early boys have shown us the way to begin! Later you can connect up other controls but I think many novices do not realise that you cannot, generally speaking, give both rudder and elevator together on the simple sets available. It is a matter of controls being operated in sequence, and one is inclined to forget the sequence in the heat of the moment, whereas it is easy to remember that the last control was



Heading photo. shows the author's ten-foot span "Poole Puffin" in R.C. flight just after take-off. Note very deep belly for spiral stability. Left is " Whitewings", of 78" span and 6½ lbs. weight, with radio. The Yulon G.P. engine saves ignition weight, allowing radio batteries of good capacity.

left rudder and your next will be to centralise and then right rudder. Even with this there are snags, as we shall see.

Up elevator and down elevator full on can do some funny things especially when engine torque is there to add to the chaos. So let us make a start with rudder only.

Radio can make a perfectly stable model crash, if you do not know the answer.

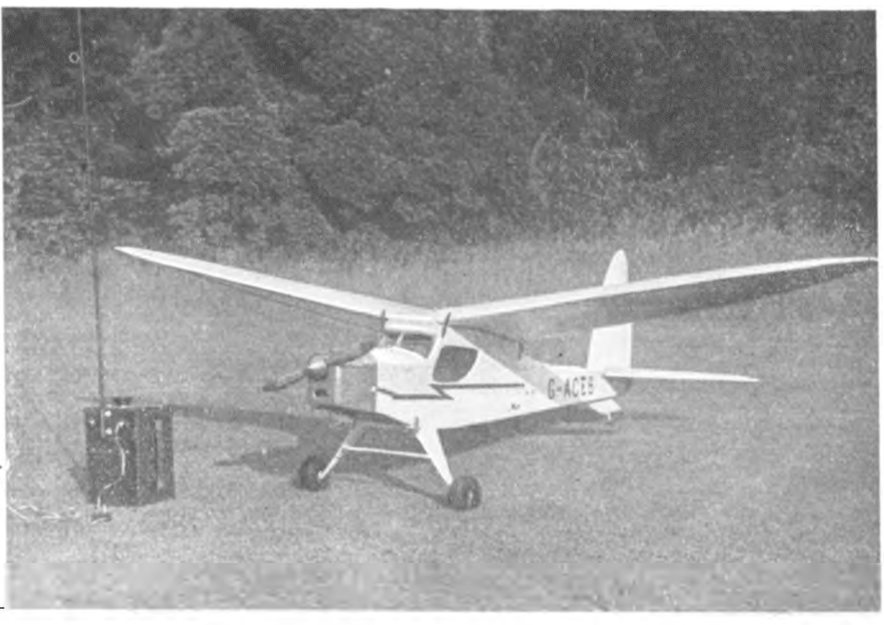
I fear I am going to explode a few comfortable beliefs held by many newcomers contemplating beautiful flying control. It is however, better to enter the project with one's eyes wide open, for in this way success will be achieved and the new man will not give it up in disgust or despair, and I can definitely say that radio control is well worth it, and doubtless we shall develop this highly exciting sport to a complicated flight pattern with a minimum of effort, but it has not got there yet. One enthusiast from a far away outpost of the Empire complained to me that a certain model, which I knew to be a very stable freeflighter, suffered from spiral instability when fitted with radio. He evidently had not grasped the elementary facts of flying controls.

I am therefore going to take you for a flight or two as promised with our " Radio Moron ", and see how we sort out his worries. " R. M." owns a very stable freeflighter even in dirty British weather, and yet our pal crashes it on its first flight. If he had taken a few precautions he would have got away with it, so let us learn by his mistakes. On the second flight he crashes through the lack of a little elementary flying knowledge. After a few severe words of advice, which he takes to heart, followed by a little practice, at first rather shaky, his efforts earn him the same initials but for " Moron " substitute " Maestro".

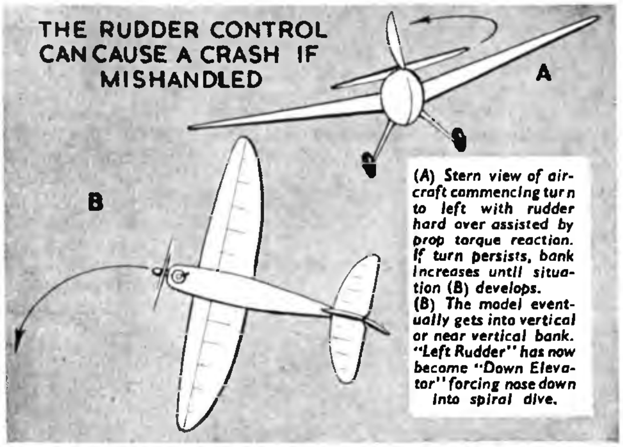
Our friend gets the motor running after he has given a test tune-up on the radio which appeared to be functioning well on the ground. He gives a few flips of the rudder whilst the engine is running, to test against vibration effects and then shouts to his stooge to release the model which runs along into the wind until it is hit by a gust and swings to the right. R. M. who has his transmitter nicely behind the model where he can see the effect of early rudder movements, sends a signal to give left rudder because he has wisely remembered that his last movement was right rudder. With great excitement, for it is his first radio flight, he observes the tail kick over to the right but the thrill is short lived, for with amazement he notes that the nose rapidly drops and the bank increases as the model turns quickly to the left assisted by engine torque. R. M. with magnificent presence of mind gives the model central rudder and even continues on with the left lurch into a cartwheel crash and quite a bit of damage. He is dumbfounded, for he has never seen this model do this since the days before he learnt to get the thrust line right, under free-flight conditions. He is all the more devastated, because he has taken the trouble to fly the model free flight loaded with full radio equipment to make sure he has not upset the balance by all the extra weight of radio gear. In fact, he had shown unusual intelligence for one so dumb. " What the heck can the matter be ? " We will save him from a future of similar disaster by explaining that on this particular set the relay has STUCK ON, and has failed to let the rudder off. Hence the left-handed crash, although R. M. had given subsequent right rudder, and it was not the servo motor's fault as he at first suspected.

This sticking on of the relay is a far more frequent happening than people imagine. I have had it happen to a large 10-footer, and I have seen it happen more than once. On one occasion a friend's normally very stable American " Rudderbug " model whipped into a sudden spiral spin which ended in a bundle of matchwood from a great height, caused by a sticking relay. Relays are still the greatest nigger in the woodpile in my opinion, for they are operating under difficult circumstances with very small power. I hear there is a foolproof one just coming on the market which I intend to try. Certainly the others I have had have not reached infallible foolproofness. In fact it has been the only real item to give me trouble on commercial sets. There are a number of reasons why R. M.'s relay might have stuck on, but I and my friend came to the conclusion that the most probable cause in our own cases was due to using very small H.T. batteries of the deaf aid types. Thus the voltage dropped a trifle due to test work and flying, and the dip for the relay altered. Accordingly we used the larger Ever-ready B. 101, and also a larger L.T. Ever-ready D. 9 instead of the small D. 18. We have since had no failures due to this sticking score, which can have such devastating results to an otherwise normally stable model. I now use a thumb switch, and when I use an E.D. servo with different sets, I turn up two of the operating arms to make them inoperative, and as a result I can press the thumb switch, hold on the rudder until I release, when (provided the relay does not stick) the rudder is automatically returned to centre. This method ensures easier control than by knob turning, and means that, should the next signal fail to materialize, the model will have a centralised rudder, and will fly away until the timer cuts the engine, without damage due to an " On rudder ". Thus I find that slightly larger radio batteries and this thumb switch-cum-return-to-neutral as the switch is released, have made for reliability.

Now we come to our friend's flight, after he has repaired the damage. This time his model is loaded with adequate batteries, or at least entirely new baby ones full to capacity. Full of as much optimistic hope and inexperience of his subject as a modern Cabinet Minister, he lets the model climb in easy very wide free flight circles, giving a signal to turn left with the model at a good height. The new obedient relay functions perfectly, so our pal holds the left turn on, thinking he will bring her right round into wind after a complete circle. The model starts a distinct turn to the left, augmented by the torque by the engine. With alarming rapidity the normally stable model starts to bank excessively and down goes the nose, height is rapidly lost, and once



The author's semi-scale radio model of large size, powered with an American Forster 14 c.c. petrol engine. Petrol engines need not be elaborately screened to prevent interference if simple remedies are adopted.



(A) Stern view of aircraft commencing turn to left with rudder hard over assisted by prop torque reaction. If turn persists, bank increases until situation (B) develops. (B) The model eventually gets into vertical or near vertical bank. "Left Rudder" has now become "Down Elevator" forcing nose down into spiral dive.

again R.M. who is rapidly becoming bewildered by this darned radio business cannot think why the confounded aircraft does not turn easily in a left-hand circle as it used to do under free flight conditions, without excessive bank.

This time there is fortunately a " full sized " pilot watching, who shouts " give her centralised rudder and then a bit of right rudder ". R. M. who prides himself as being fast off the mark, operates the button as told, and finds that after rather an ugly dive and stall the model straightens out again with all its old stability.

" Hell! that was a near one. This model suffers from spiral instability, and I would like to meet that bird who designed her to tell him exactly what I think of the fool," cries our shaken hero.

At this very moment, by some staggering coincidence, who should appear but the designer himself! Life is that way, and this designer has overheard R. M.'s remarks, and like all well-known designers he does not suffer fools gladly, and he has a powerful temper when the children of his great brain are unjustly cursed. He snatches the control button from our Moron's hand and raves. " Now you clot, if there is anything suffering from spiral instability around here it is you. Listen to me. This model is the most stable of models because I designed it. Got that! Did you not know that every aircraft model or full sized, will bank if turned by full rudder, and the bank will increase unless it is held off by opposite aileron control. There is no aileron on these radio models and if there was you could not put it on whilst the rudder is on and use these controls progressively and together. Therefore, my merry clot, you must start your turn to the left by rudder, realising that because it is to the left and the engine torque will accelerate the banked turn, you quickly centralise, go rapidly through right rudder if necessary, centralise and give another burst of left rudder, and so on, so that your turn is really made in a series of turns and you then practise until you get it smooth, my lad! *You should know that as an aircraft gets into a severe bank on its side the rudder is now in the position of an elevator, and if you keep it hard over, it will become a down elevator and the nose will be forced down in spite of the BEAUTIFULLY balanced side areas I have taken so much trouble to provide for miserable types likeyou.* (See above.) Can your—er'—intelligence not grasp that prop torque will always cause a more rapid turn to the left than to the right, and so your anticipatory check by controls must be faster when turning to the left than to the right. I suppose it is too much to expect you to grasp, that as we turn our radio model to the right against torque, the movement will be harder, and my great brain has given you a rudder sufficiently large to do this. That the nose will tend to rise and the model may stall until the turn develops if you have fitted it with a far too powerful motor. Yes, I thought so. — You — words fail me utterly. There is my beautifully designed model fitted with a darned great overpowered engine by your unthinking person just because you have never done anything else than fly a brick around at the end of a string grossly overpowered in order to keep it away from you. Furthermore my friend can you not see that if you wish to lose height on a radio model, or if you wish to stunt, which God forbid in your present state of unpreparedness, you can keep the model in a turn until it overbanks, the rudder becoming an elevator dives it down into a spin until you lose height in a big way, and you then give it opposite rudder, and if the wings hold on you may even shoot up and loop. Now for heaven's sake watch me turn this properly, my Moron. Hell! it has flown out of range whilst I have been so kindly and gently explaining matters. If you can find the wretched thing, run after it. Hurry. I suppose you have your name on the crate? No? Well I expected that!"

Lateral control by pendulum.

I have always been most impressed by the flying of over-powered scale low wing models by " Natsnees " Norman, with his pendulum control to ailerons. I intend to try pendulum control for radio with a view to automatically taking off bank on a turn. This would not suit the stunt fiends, but would make the dream of the novice come true, enabling him to turn *ad. lib.* with rudder only without getting into increasing banking troubles. It would be like the correcting hand of a pilot on his aileron controls.

Stability features.

A deep bellied fuselage holds up the nose on a turn, hence my special radio model "Poole Puffin", **(see heading photo.)** The American Dick Schumaker has actually fitted a belly fin on his radio model for this purpose. On more normal looking models I fit spats or large area wheels, which, by the way, should be airwheels to cope with the extra weight of radio gear. I also insist that the undercart legs shall be filled in on my models. These aids all give side area low down forward to aid turns. Note the spats and filled-in legs of my model " Whitewings " seen flying under radio control on page **93** Some people foolishly omit the filling in of legs on my models I note, when they build to my designs.

The advantage of glow plug ignition.

The modern 5 c.c. glow plug motor is ideal for the medium size radio model. If a small revving prop is used to suit glow plug work, it has great power and no ignition weight. The latter can allow greater weight for larger capacity radio batteries, which spells radio reliability. The model seen flying under radio control on page **92** weighs 6¼ lbs. with large radio batteries and has a wing span of 78 inches. It is powered by one of the new YULON glow plug engines with 9 inch plastic prop of medium pitch.

Petrol motor spark ignition.

Large models require petrol motors as yet. I have found that there is no need to screen the ignition to prevent radio interference, provided I place all my ignition gear well forward with the motor. The radio wiring, batteries, and receiver are located aft around the C.G. position. Tests with motor running flat out show not the slightest flicker of interference on the meter.

This is worth knowing, because a radio " expert " recently explained to me the most complicated screening arrangement he considered was necessary.

Final thoughts.

Radio opens up a great new era of model flight development giving new lifeblood to the movement. Luckily there is plenty to discover, for this experimental factor is the life and soul of model work. I have two projects which may fire others with similar thoughts. The first is a radio controlled flying boat for operating over my nearby Poole Harbour water. This is not quite such an easy project as some people may think. The second is to exploit the realistic looking low wing model for radio work. A well designed low wing is exceptionally stable. I am a stability fiend, and one of my most stable models for all weathers is a low wing freeflighter—no kidding! A low wing will take off better, or more steadily, and will glide well and land like a honey on its aircushion as it approaches the ground. It is not so liable to stall when turned from left rudder to right. All this suits radio work. There are just two musts. These are, a slab sided lower part of the fuselage to get good keel area. The top decking can be monocoque for looks. The thrust line must be low.

Q. I am designing a model fitted with engines at either end of a nacelle, i.e., *the fore engine will rotate a tractor airscrew, and the rear a pusher. Should the pitch of the rear (pusher) prop be greater than the front on account of the added velocity of the airstream on account of the front prop ?* (*T. S., Westerleigh.*)

A. Tests on contra-rotating airscrews show that the increased velocity of the slipstream from the front propeller is just about cancelled out by its rotation, so that the angle of attack of the rear prop blade differs by one degree at the most. For practical conditions this means that both props should have the same pitch. Quite apart from this, the torque of an engine is materially constant up to the max. b.h.p./r.p.m. and thus quite large variations in r.p.m. of one of the engines will have no noticeable effect on the model.

* * * *

Q. I desire to ascertain the characteristics of the laminar-flow section now being used on my control-line models (sketch forwarded), which has a maximum thickness of 12·5 per cent. at 66 per cent. chord. The main idea is to delay the transition from laminar to turbulent flow, thus reducing parasitic drag. (*K. F. N., London.*)

A. As the section described is not a laminar flow section, and as the laminar boundary does not in fact separate from the wing on a control-line model, this question is rather difficult to answer properly without a long screed on aerofoil theory. Briefly, the laminar boundary layers occur over the front part of a c/l model wing, and changes to a turbulent boundary layer. The point where this change occurs is the " transition point " and its position depends on the shape of the section and the surface finish. On a wing with a badly finished leading edge the transition point may be nearly at the leading edge.

The skin friction, and hence the drag, caused by a turbulent boundary layer is roughly twice that due to a laminar boundary layer. Hence, *for low drag* we want as much of the wing as possible covered by a laminar boundary layer, but the sacrifices necessary to attain this reduce the maximum lift of the wing considerably. Because of this, and because wing drag is of no importance on a stunt model, it is difficult to see any advantage in using this type of section.

Finally, a laminar flow section must be designed mathematically and requires a very considerable knowledge and a calculating machine. A sketched-out section is useless! (Incidentally, Henry J. Nicholls used a laminar flow section on a stunt job about two years ago. It would be interesting to hear whether he detected any improvement.)

* * * *

Q. What is the difference between a World and an F.A.I. model aircraft record ? (*" Curious," York.*)

A. World records comprise the ultimate figures irrespective of the *type* of model used ; *i.e.*, the world record for duration of flight is currently held by Georges Lioubouchkine of Russia with a time of 3 hrs. 48 min. 45 secs., made by a power-driven machine, but this could also be secured by a glider or rubber-powered model. There are only five " World " records, being for duration, height, distance, speed (in a straight line, *i.e.*, free-flight), and speed in a circular course, *i.e.*, control-line. All other records are classified into sections according to type of model employed, these again being sub-divided into duration, distance and height categories, and are F.A.I. International records.

Thus it will be seen that, whilst Haslach of Switzerland holds the top duration for sailplanes at 2 hrs. 21 mins. 6 secs. (thus virtually being the best in the world), this technically counts as an International and not a World record.

* * * *

Q. I wish to modify the A.P.S. " Sea-Bee " by increasing the wing chord to 9 ins. Would a Clark Y section be suitable, and would my " Frog 180 " be powerful enough ? (*L. G. D., Stroud Green.*)

A. There should be no disadvantage in increasing the wing area as proposed other than losing the scale dimensions. Clark Y has always proved a good all-round standby, and could well be employed. This also applies to your engine.

Q. I am having trouble with fuel feed to my diesel engine, fitted to a normal type C/L airframe. With either gravity or suction location of the tank, the engine cuts out as the machine gathers speed. Can you suggest a remedy ? (*R. L. D., Peterboro'.*)

A. Your trouble is apparently surge in the fuel lead, and has been cured in some cases by forming a loop in the lead. Another cause may be the suction effect created by air passing across the filler and overflow tubes. This can be cured by bevelling off the ends of the tubes on the forward facing side.

* * * *

Q. Can you inform me of a substance which may be mixed with glossy coloured dopes in order to produce a matt finish ? (*D. V., Charlton.*)

A. The procedure used by most expert model builders is to finish the model completely with high gloss materials, then lightly rub down with Durex wet-or-dry sandpaper, which gives the required matt finish. (Should any reader know a better method, we welcome information which will be passed to " D. V.".)

* * * *

Q. Should the air inlet of a helmet cowling be larger than the exit, or vice versa ? (*A. E. T., Whitstable.*)

A. A general study of successful designs indicates that the inlet to such a cowling should be larger than the exit. Our personal opinion—untried in practice—is that the opposite should apply, thus getting a better scavenging action on the venturi principle.

* * * *

Q. What kind of gearing is used on a multi-engined model, and how is it fixed to the engine ? (*A. F., Putney.*)

A. The most successful method we have seen to date is that used by Taplin, in which two engine crankshafts were bridged by a lay shaft through bevel gears. The effect of this was to maintain constant speed between the engines, but has not proved popular with aeromodellers generally.

* * * *

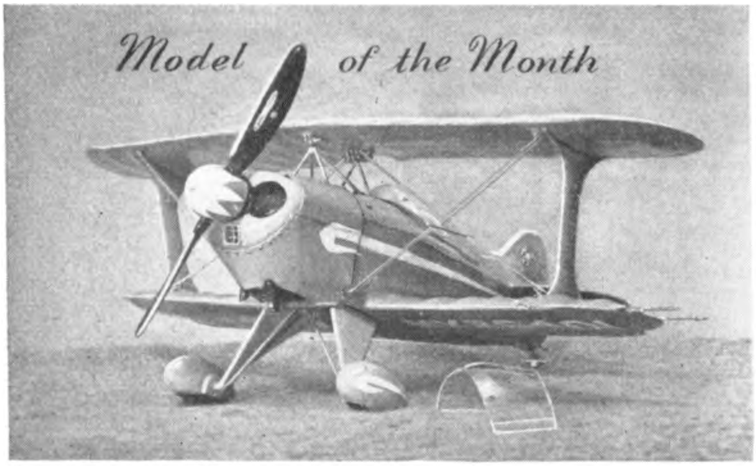
Q. How does one qualify for the honour " Champion of the Rally " ?) (*I. S., Dartmouth.*)

A. Usually, points are awarded in each contest in the programme according to the finishing position gained, the highest total points scorer being the " Champ." He is usually the individual who demonstrates his versatility in most branches of aeromodelling—an averagely consistent flier with all types of model being considered better than one who only enters one contest, even if he wins that event.

* * * *

Q. My diesel engine is using an abnormal amount of fuel. What is the cause of the trouble ? (*J. H., Skegness.*)

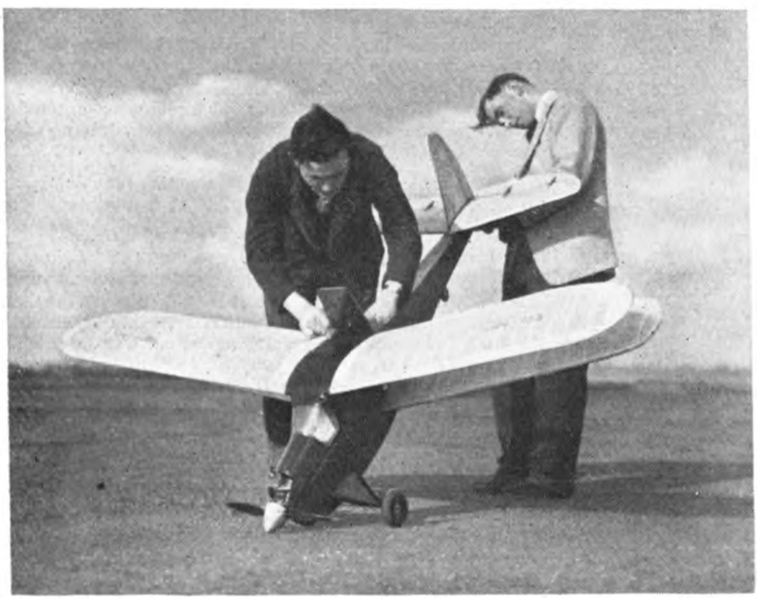
A. Carefully check whether there is any leakage from either the tank or fuel leads. Check whether slipstream action is creating suction across the tank filler opening, thus sucking fuel out from the tank.



FLIAR PHIL is now beginning to receive the results of his impassioned appeal for more and better model photographs, and this month top marks go to P. Donovan Hickie of Horley, Surrey, for his control-line model of Betty Skelton's Pitts Special Biplane "Little Stinker II."

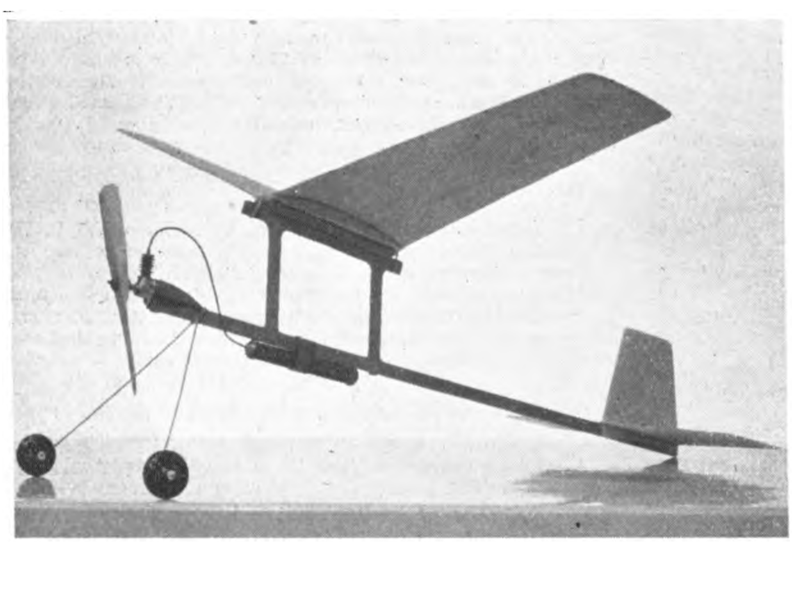
Readers will remember that Miss Skelton came over from America for the *Daily Express* Air Display at Gatwick last July, where she gave some very emotioning aerobatic displays. Judging from the photograph, the Pitts Special has made an ideal control-line stunt model, and reader Hickie by using a third line with which to control the ailerons hopes to open up new spheres of aerobatic possibilities.

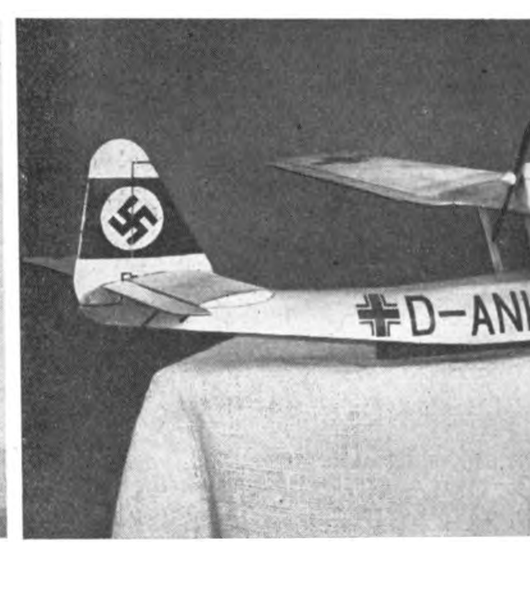
The machine is built to a scale of 1 in. to 1 ft. and is powered by an Amco 3·5 c.c. engine fitted with a glow-plug adaptor. It incorporates several novel features, including a device fitted to the undercarriage shock legs whereby contact on landing actuates an engine cut-off. Plywood and aluminium are used in the construction of the airframe, the only balsa parts being the wing ribs. The all-up weight is 14 oz., and a speed of 70 m.p.h. has been attained.



Proceeding in an anti-clockwise direction, photo No. 2 (by E. Stoffel of Ilford), shows W. Taylor and S. Bryett of the West Essex Club carrying out flying adjustments to their 6½ ft. span radio-controlled biplane. The model is powered by a 10 c.c. Anderson engine, and is equipped with a Mercury receiver and a home-made transmitter and actuator of Bryett's own design.

"Campex," the fascinating and compact-looking little pylon model shown in photo No. 3, was designed and built as a flying test bed for the Campus A-100 Carbon Dioxide engine by J. H. Maxwell of Filton, Bristol. This little machine has a wing span of but 15 ins. and a length of 13½ ins. It weighs ·78 oz. and is capable of two or three flights per C02 container. For size and simplicity "Campex" certainly takes a lot of beating! For photographic fiends, the following gen may save them a headache or two :— Lighting, one 100 watt lamp 5 ft. away from





model, one 60 watt lamp below and behind it. Exposure :—25 minutes at F.64, using P.1200 plates.

The centre photo shows a most ambitious project by R. J. Allum of Ipswich. The model is a flying scale Dornier Do.18K, having a wing span of 5 ft. and an all-up weight of 2¼ lbs.

It is powered by a Mills Mk. 1 and an E.D. Bee located in the front and rear positions of the engine nacelle respectively.

Trial flights using the Mills engine only were highly successful, the model climbing to a height of about 100 ft. and gliding down to a perfect landing—on a specially designed landing dolly fitted prior to flying the machine from water.

Flight on both engines proved disastrous, for, after rocketing to 50 ft., the model turned and dived into the ground at full bore, resulting in a complete write-off.

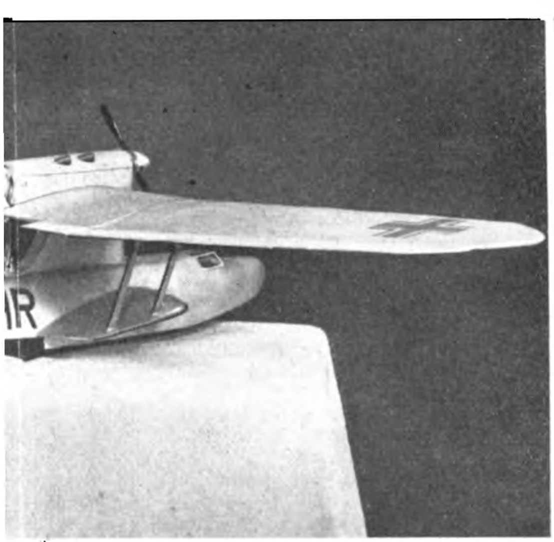
Next we have a fine action shot—again by E. Stoffel of Ilford—showing the first flight of a semi-scale low-wing monoplane by R. Moulton. (In the photograph, the expression on the dummy pilot's face is only outrivalled for tenseness by that of the designer !)

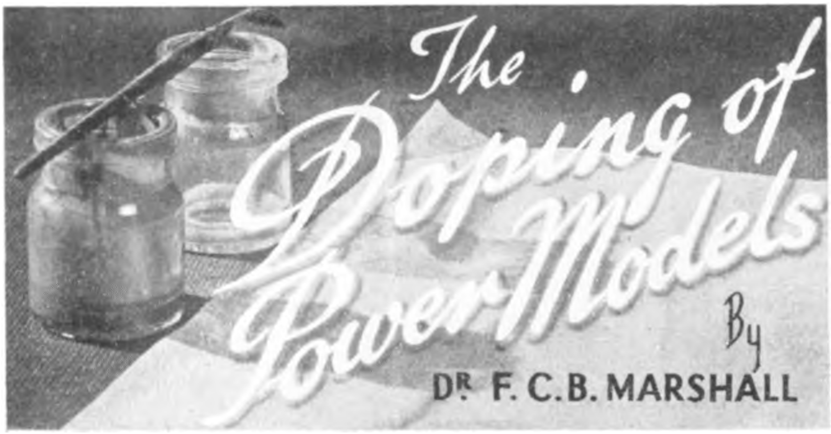
This model has a wing span of 6 ft., and is powered by a 10 c.c. Super Cyclone engine.

Next we have another good action picture showing an unusual-looking sailplane by B. Page of Esher. Lynx-eyed readers will rightly deduce that the model is a Canard, and is therefore flying *towards* the camera.

Photo at top right shows a flying scale model of the Heston Army Observation Post—a pusher monoplane with tricycle undercart by M. M. Gates of Teddington, from whom we should be interested to hear details concerning the behaviour of the machine in flight.

Although retiring for a spell of Winter Sport, where he hopes to join the local inhabitants in their pursuits of hopping from precipice to precipice—and back, Fliar Phil reminds his readers that he is still open to receive photographs of that new model, taken before its first flight if possible !





UNTIL fairly recently the finishing of model aircraft presented little difficulty, and the standard of perfection achieved depended mainly upon the patience and fastidiousness of the individual aeromodeller. Finishing procedure had become more or less standardised along well recognised lines. Balsa surfaces were flatted, preferably grain-filled, and then given several coats of cellulose dope, the job being finished off by polishing with cutting paste or brass polish, whilst silk or tissue surfaces were shrunk, given one or two coats of shrinking dope followed by two coats of either coloured cellulose dope or clear cellulose (banana oil).

The advent of the miniature Diesel engine left the finishing position more or less unchanged since most commercial diesel fuels *are substantially without action on a good cellulose enamel.* If a " cellulose " dope is appreciably softened or dissolved by diesel fuel, this is a reflection on the quality of the dope, which is probably a cheap " industrial " quality finish, heavily overloaded with Ester Gum or other cheap resins and containing very little cellulose nitrate. But, with the increasing popularity of the Glo-Plug engine, using Methanol/Castor Oil fuels, a new finishing problem arose, namely, how to achieve an attractive finish which would remain presentable after glo-fuel had been spilled upon it and been blown all over it by the engine exhaust. Cellulose finishes are unsatisfactory since they readily dissolve in alcohol fuels, and this prompted manufacturers to bring out methanol-resistant finishes to meet the modellers' new need.

Unfortunately there seems to be a widespread—and quite erroneous—impression amongst aeromodellers that these new " Fuel-Proof " Dopes are totally proof against *all types of fuel*, both glo- and diesel. Because of limitations imposed on the paint manufacturer by the insistence of the aeromodelling public on ease of application and extreme quickness of drying, certain synthetic resin/drying oil varnish combinations which would resist almost anything—but require 24 to 48 hours to harden off properly—are ruled out.

Thus, the manufacturer, who cannot utilise the *chemical* action due to oxidation by the air (which takes time), has to formulate finishes which rely for drying solely on the *physical* evaporation of the solvents (thinners) used in their formulation. It follows that the film formed when these lacquers dry cannot be insoluble in *all* solvents, otherwise it would never have been possible to dissolve up the ingredients of which the lacquer is composed. In practice, therefore, resins, etc., are employed which are soluble in solvents as unlike the fuel to be resisted as possible. In the case of dopes resistant to alcohol fuels, resins are used which do not dissolve in alcohols, the lacquer being prepared with, for example, coal-tar solvents like toluene and xylene. Such resins may well dissolve, partly or wholly, in the hydrocarbons used in making diesel fuels. *The term " Fuel-Proof Dope ", therefore, usually means a dope resistant to glo-fuels but not necessarily to diesel fuels*—although some well formulated fuel-proofers on the market also possess a marked resistance to diesel fuels as well.

The object of this short technical note is to try to halt the very prevelant practice amongst modellers of finishing *every* model in " fuel-proof " under the misguided impression that this is the best thing to do whatever power unit it is intended to install.

The most successful procedure to be adopted is to finish Diesel models with high grade Cellulose dopes and *not to use fuel-proofer at all.* A good " automobile quality " Cellulose Enamel should be totally resistant to diesel fuels under all normal conditions. If, however, it is intended to fit the model with a Glo-Plug engine it is best finished in Coloured Fuel-Proofer. This can be applied direct to a sanded balsa surface and immediately over cellulose shrinking dope on silk or tissue without causing loss of tautness. Alternatively the aircraft may be finished in cellulose in the usual way and then given one or two coats of Clear Fuel Proofer—but this tends to add unnecessary weight.

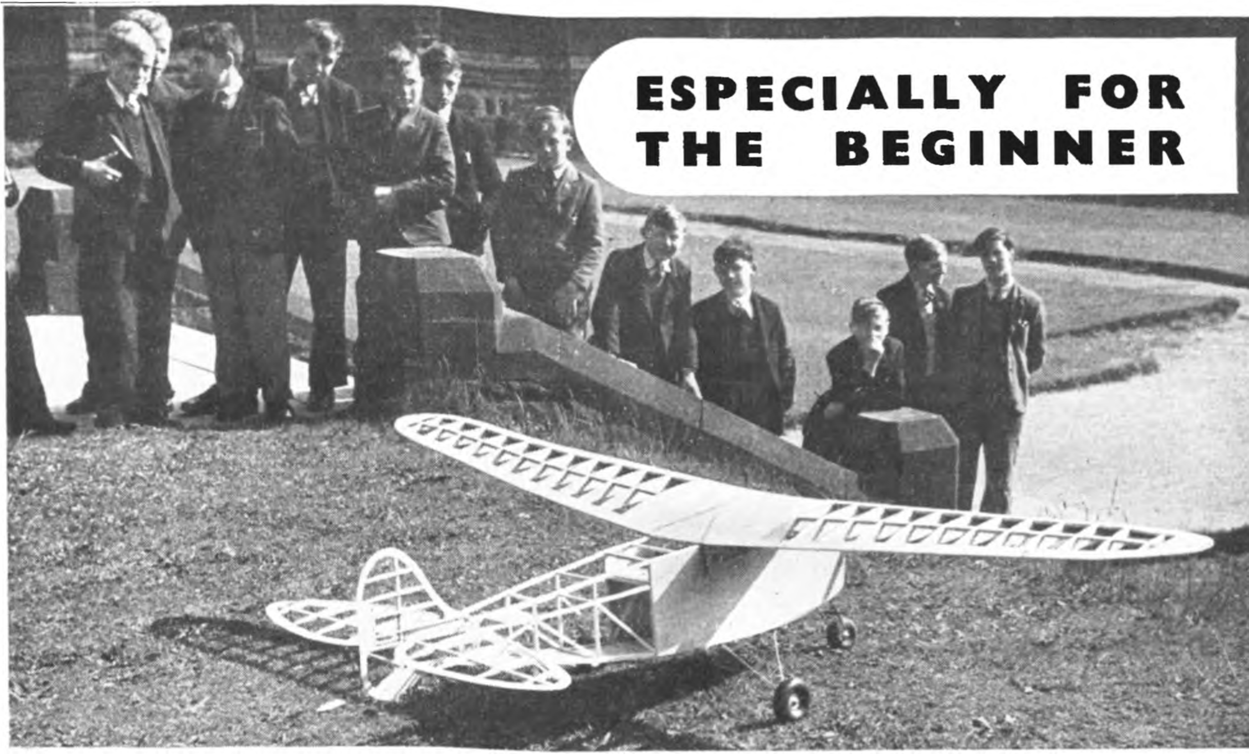
Since most diesel engines lie in the " below 5 c.c." class and most Glo-Plug engines in the " above 5 c.c." class it is seldom that the same airframe is intended to carry alternatively both diesel and glo-ignition power units. When this position *does* arise the best technique is to finish in Cellulose for diesel operation, later giving a coat of Clear Fuel Proofer over the cellulose if a Glo-plug engine is installed. Should diesel propulsion subsequently be reverted to, the thin film of clear fuel-proof lacquer can readily be washed off with a little of the manufacturer's Fuel-Proof Thinners, leaving the underlying cellulose finish intact.*

Finally, the *interior* of the fuselage should not be overlooked. However resistant the exterior finish may be to the fuel used the model will still become sodden and heavy if great care is not taken to ensure that the engine compartment and the neighbourhood of the tank are also doped with cellulose (for diesel) of "Fuel-Proofer" (for glo-fuel). It is always safest to give the *whole inside* of the fuselage of a power model two coats of the appropriate dope. It should not be overlooked that glo-fuels, as well as soaking into balsa and making it heavy, also soften and dissolve cement joints—and many a fine model has become soggy, and finally disintegrated, through lack of attention to this elementary precaution.

Good quality dope and a little care in applying it, pays dividends. Note the finish of this Stinson Reliant 1/12 scale C.L. model built by C. B. Jackson of the Ashton M.A.C.

** This applies to Barron Fuel Proof Dope and may not necessarily be true of all fuel proofers.*

ESPECIALLY FOR THE BEGINNER



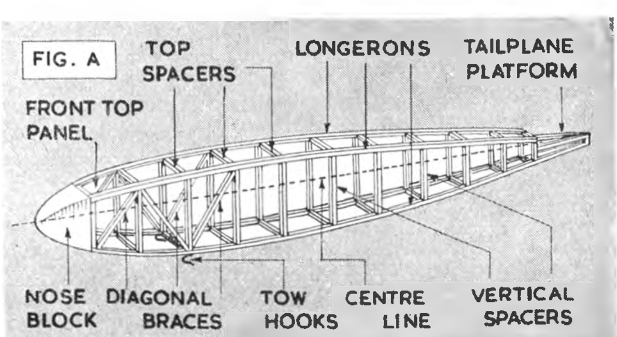
As further evidence of the Author's modelling enthusiasm, here is his latest effort, a Radio Control model, under critical scrutiny.

PART II. BY THE REV. F. CALLON

WELL, folks, how are things going?

Any records (or models!) smashed yet? You should have finished at least one model by now. If not, then you really must speed up production. I will be particularly interested to hear how the WALTHEW is behaving itself, and would mention, for the benefit of those who found that a section of the building instructions was missing, that a fully detailed leaflet of the Walthew Glider can be obtained free on application to the Editor. Don't forget that this series is intended to help YOU, so if you are stumped by some difficulty or other, why not drop a line about it? The chances are that someone else has come across the same snag, so a printed explanation may help lots of people as well as yourself. Don't be too disheartened if your first effort was rather untidy; it is very unlikely that you are supplied with a left hand on the end of *both* arms (like the young gentleman in last month's cartoon, working on the piano), so you will work more neatly as you gain more experience.

In this article I want to deal with the construction of the entire fuselage framework of a slab-sided glider. The following figure should explain the names of the various parts clearly enough. Have a good look at it before reading on.



Building the Fuselage.

Lay out the plan over your work-board, cover with grease-proof paper, and pin down flat. If you are working from a kit, be sure you pick out the correct size of balsa strip for the longerons; they will probably be either 1/8 in. square or 3/32 in. square. You will soon be able to pick them out at a glance. Lay these along the curves marked for them on the plan, and pin them in position with straight pins pushed in on alternate sides of each strip. Cut your spacers (and diagonal braces, if any) as accurately as possible. Dab a little balsa cement on the ends of each one, and lightly smooth it off again with the finger. This is called "pre-cementing," and makes for stronger joints. When all the spacers are pre-cemented, start at one end of the fuselage, dab cement on each end of appropriate spacer and also on the part of each longeron which it is to touch, and slip it into position over the line marked for it on the plan. Work your way down the fuselage with the other spacers in the same manner.

These joints you have made are called "butt joints," *i.e.,* they are "end-on." If the strips provided for the longerons are not long enough to reach from end to end of the fuselage, you will have to join two pieces of strip by means of a "scarfe joint." To do this, make a slanting cut about $\frac{3}{4}$ in. long at the two ends which are to be joined. The cuts must both slant at the same angle. Now make a "lane" of straight pins, pushed vertically into the board along either side of one of the strips, **Fig. B.** Pre-cement, then *re*-cement the slanting edges, and push them tightly face to face inside the "lane". When dry the joint should be sandpapered smooth, and will be the strongest part of the longeron.

(Continued overleaf)

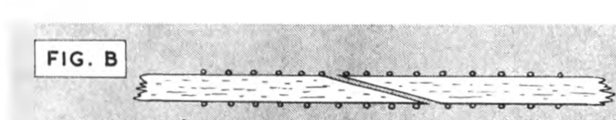


Fig. 1. Two sides of fuselage pinned down one over the other above the plan of the side elevation (side view). The top elevation outline (i.e., view from above) can be seen just below on the plan.

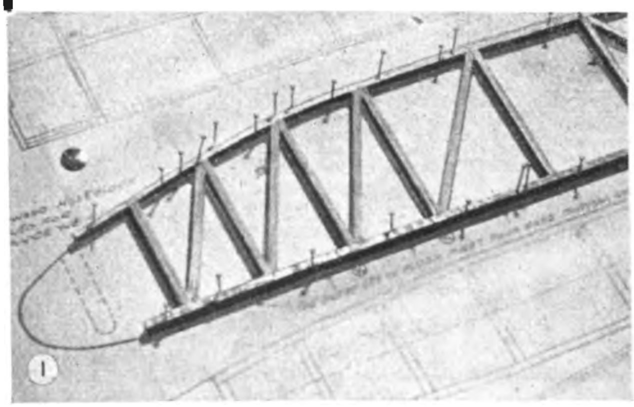
Fig. 2. The two sides of the fuselage are here being sliced apart with a razor blade. First trim off the overlap at nose and tail.

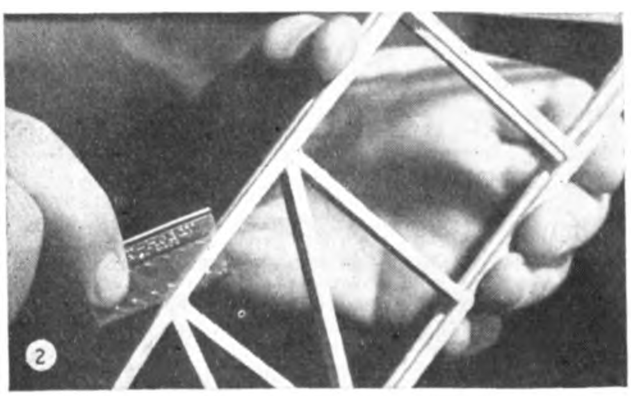
Fig. 3. One side of the fuselage is pinned vertically (with drawing pins) over the place marked for it on the top elevation of the plan at the deepest part of the lower longerons. The two top (T.T.) and bottom (B.B.) spacers for this point have already been cut over the plan.

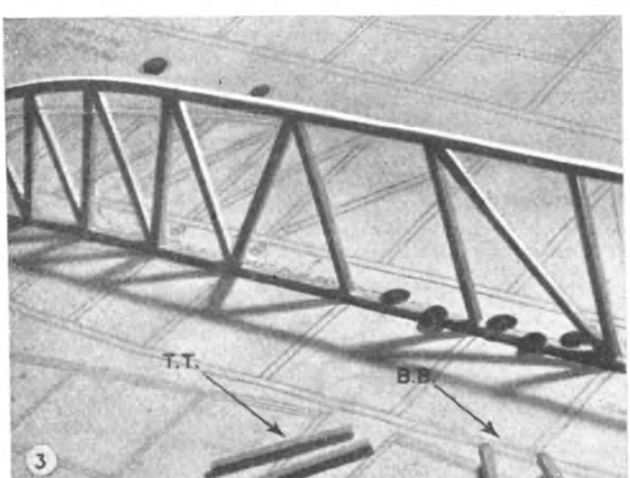
Fig. 4. The two lower spacers (B.B.) are here cemented against the vertical side and held in place by two drawing pins. The other side of the fuselage is ready at hand.

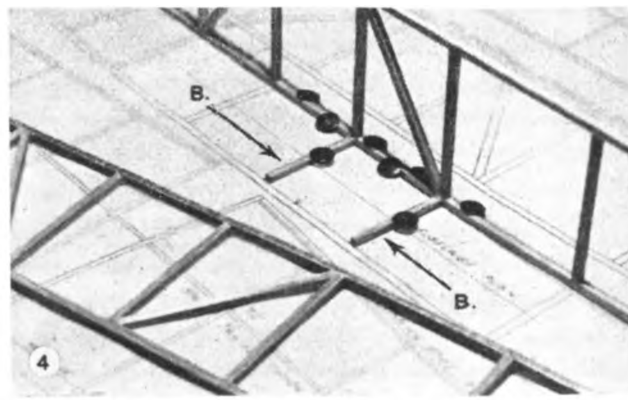
Fig. 5. The free ends of spacers B.B. are cemented, and the second side of the fuselage is pushed up vertically against them and held in position until set.

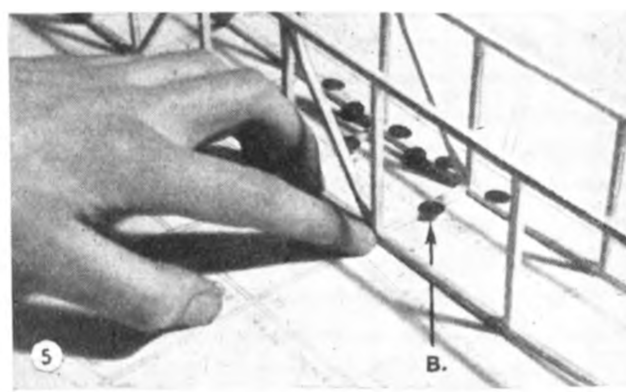
Fig. 6. The two top spacers (T.T.) are now cemented and held in position until set—sixty seconds or so. Note tube of cement on extreme right of picture. This has a nozzle (obtainable from model shops) which is a great help in getting cement into odd corners of the structure.

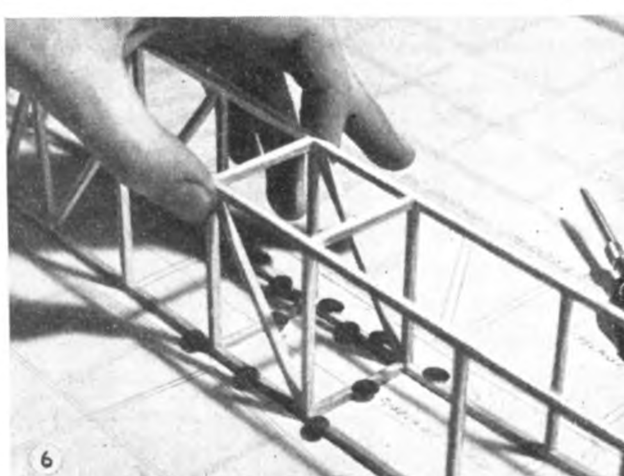












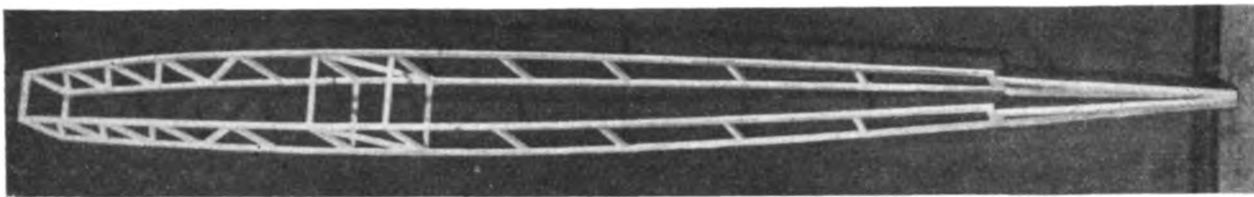


Fig. 7. Nose spacers are put in, and the sides drawn together and cemented at the tail. Remove from the plan and add all the other top and bottom spacers, cutting them accurately in pairs over the top elevation of the plan. Nose-block and tow-hooks can now be fixed in position.

When you have put all the spacers in place, leave the first side of the fuselage where it is, and slide in the two longerons of the second side between the vertical pins, and push them down on top of the first two longerons. Add another set of spacers over the existing one (Fig. 1). Leave for a few minutes to dry, then remove both sides together from the plan, sand the curves smooth, and slice carefully apart with a razor blade wherever they have stuck (Fig. 2). Now take in your *right* hand a large drinking glass full of beer (or lemonade), raise it to your lips, take several good . . . You can manage this without instructions ? Sorry, old man, I was forgetting. It IS dry work, though, isn't it ?

The piecing together of the rest of the fuselage should be obvious enough (Figs. 3–7). Cut the noseblock roughly to shape, cement it firmly in position, and *when properly dry* use first rough sandpaper, then smooth, to finish it off following the line of curve of the fuselage. Finally, bend a piece of piano wire to the shape of the tow hooks given on the plan, and bind them with ordinary cotton at the point indicated. When binding wire to balsa aways bind *loosely*. This does not mean slackly either, but is another way of saying " not closely." The binding on the handle of a cricket bat is *close* binding ; loose binding leaves plenty of space between the threads (as when a spring is pulled out) so that the balsa cement can get through to the wood beneath.

And that's all there is to the fuselage. Not so very difficult after all, is it ?

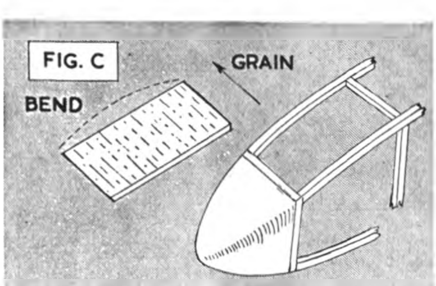
Odds and Ends

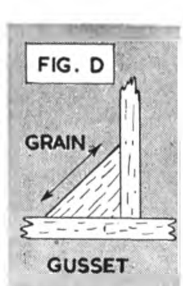
Before going on to the building of the wing, we might have a look at one or two general points.

Sheeting in. Plans often tell you to " sheet in " certain areas on the model. Likely places are the front panel (*i.e.*, the area between the first and second spacers from the noseblock) of a fuselage, or the centre part of a wing where the dihedral joint occurs. Pick up a small piece of 1/16th sheet balsa, and try bending it. WITH the grain of the wood, it will bend quite easily, but if you bend it ACROSS the grain it will snap. Areas which have to be sheeted in are often curved —such as the top of a wing. So always cut your piece of sheeting so that it will curve with the grain. Cut the piece of sheet on the large side to start with, and gradually shave it down until it is a snug fit before cementing in position. If you cut the edges to slant ever so slightly inwards, the panel will push into place like a wedge, and the joints will be almost invisible from outside. **(Fig. C.)**

Gussets. These are small triangles of sheet balsa, cemented into corners where there is some extra strain to be expected. You often find them inside wing tips, where the two halves of a wing are joined together, or (on rubber models) where the undercarriage meets the fuselage. They give immense strength when cut to an accurate fit.

Always cut gussets with the grain of the wood running across the angle, *i.e.*, if the gusset is shaped like a right-angle triangle, the grain must be parallel with the hypotenuse or longest side. **(Fig. D.)**





Tail Piece

It's a pity that the AEROMODELLER does not run a series of analyses of *feelings* as well as of engines. If you have done any flying you will know what I mean. There is the very complicated mixed feeling a modeller gets when watching his latest effort disappearing at about 1,000 feet ; I don't suppose you have had this as yet. There is nothing mixed about the feelings which a fatal spiral dive brings about, and you may very easily have had one of those. When you do have a smash-up, remember this : *anything* can be mended. And it is far easier to patch up a badly smashed model than to build a new one. I have had models run over by lorries, power-dived into fragments, and (in the case of a rubber model) crushed into a mass of broken spars and tissue by an over-strong motor ; but they have all eventually taken the air again.

Later on I hope to give some detailed hints on patching up breakages, but for the present here are some general ideas. Always cut the covering tissue away from the part of the frame which has to be mended before starting to work on the wood. Work directly above the plan wherever possible, to ensure that the original lines are followed. When piecing in broken lengths of longeron, use scarfe joints at both ends. And finally, stiffen up the whole job with as many gussets as you can find places for—as long as too much weight is not added. When the framework is finished, cut out suitable patches of tissue and recover the gaps using tissue *cement* wherever there is dope or banana oil on the underneath surfaces : tissue *paste* will not take. Water-shrink the patches, and when quite dry, re-dope them.

It seems almost too obvious to add that there is no future in flying a mended model again before you have worked out exactly WHY the smash took place, and taken suitable precautions against a repetition.

RADIO CONTROL NOTES

BY HOWARD BOYS

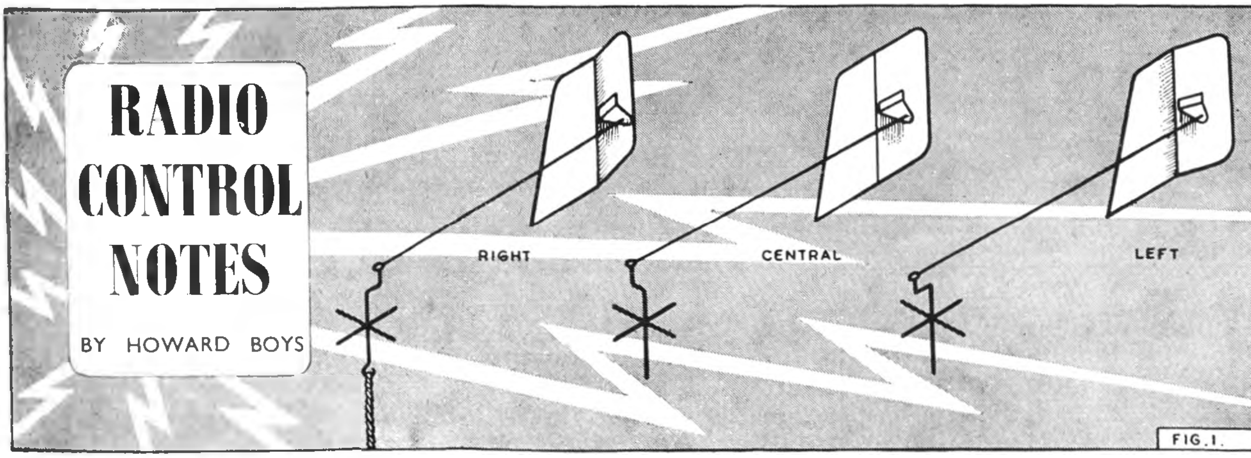


FIG. 1.

IT is evident that a number of modellers want to know about radio control right from the very beginning, so let us start with these. The idea of radio control is of course, to make the model do what we want it to, but it is as well to start with one control only. Taking a practical view, we see that a wéll made model properly trimmed will fly itself and it is not difficult to make such a model. Given enough height such a model will right itself from any disturbance and bring itself onto an even keel. What it will not do is to bring itself back to a particular direction. So some sort of directional control is the first type of control needed, and it is natural to think of turning the rudder, which is quite satisfactory.

For a start then, let us see how the rudder can be turned right or left as we wish. The simplest method is the sequence control, in which switching on and off the transmitter makes the rudder go right, central, left, central, right, and so on. The rudder can be turned by a crank, see Fig. 1, the crank being rotated by means of a rubber motor. This crank and rubber motor form an actuator. Don't get mixed up with terms; it is neither a servo nor a relay, but just an actuator. The radio is now used to control this actuator, and to stop the crank in any of the four positions, right, central, left, or central again, in that order. This can be done with a magnetically operated escapement, of which there are two types as shown in Fig. 2. One has four arms and switching on and off again, allows it to rotate a quarter of a turn. The other one has two arms and switching on allows it to rotate a quarter of a turn, while switching off lets it go another quarter turn. The advantage of the second one is that it is arranged so that the rudder is only turned while a signal is being received by the model, and if the model goes out of range of the transmitter it sets the rudder central. The second one is generally referred to as a self-centering type and is advised for first attempts with a power model, as a power model will so easily spiral down and crash if the rudder is held over for long. The escapement and actuator crank are built into one unit, and usually referred to as just an escapement. At any rate it does not become an actuator until power is added.

The escapement is connected to the receiver in such a way that, when the transmitter button is pressed, current flows through the electro magnet in the escapement. This means that with the self-centering type, the rudder is held to one side or the other as long as the transmitter button is held on. The rudder will go first to one side and then to the other. If a left turn has just been made, the next signal would be a right turn, but if another left was wanted, it would only mean making two signals, and the right turn position would be passed so quickly that the model would not have time to turn right. A four arm escapement design has been described in the AEROMODELLER for October, 1949, but unfortunately it was given the name servo. The name servo has been used very often by people who do not know any better, but it is not always their fault, so no discredit is meant to Mr. Dews. The writer just wants the correct words used to avoid misunderstandings. A servo is a power amplifier, people understand an

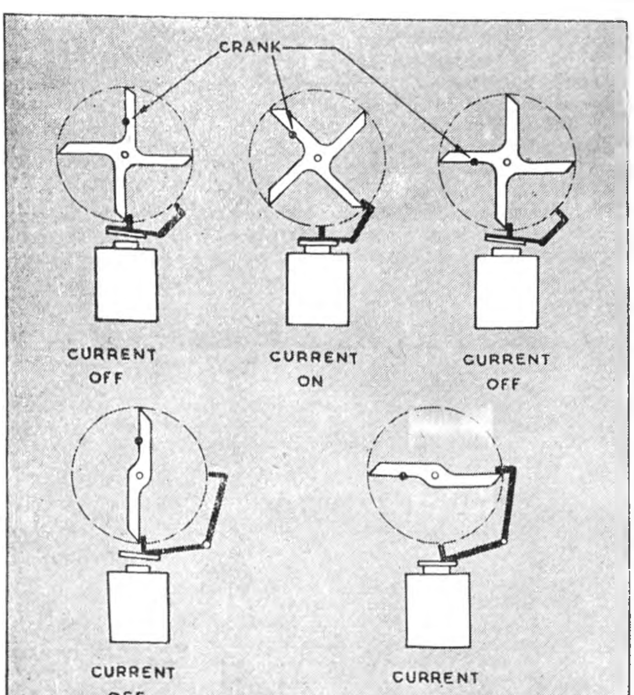


FIG. 2.

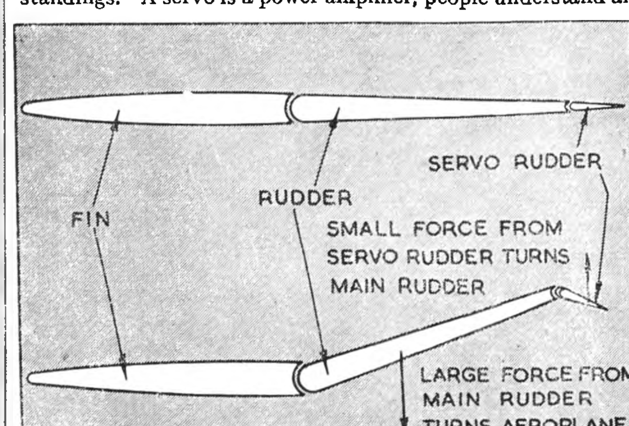


FIG 3

amplifier as applied to speaking, where someone speaks into a microphone, and the sound comes out of a loud speaker, very much amplified. It is the same voice and same words, but very much louder. A servo does the same sort of thing with power. Fig. 3 shows a servo rudder. It does not take much power to turn the servo rudder, but that turns the main rudder which turns the aeroplane. The amount the large rudder turns depends on how much the servo rudder is moved, and the aeroplane turns accordingly.

A Magnetic Actuator for Radio Control.

This system of control actuation was discovered due to trouble developing with escapements, owing to engine vibration, on two of the writer's models. The system proved more successful than was expected, and is shown diagramatically in Fig. 4. It consists of a simple electro magnet A with an armature B, hinged at C, with a stop D. The armature is extended by lever E, and coupled by rod F to lever G which is attached to the rudder H, (or other control) which is pivoted at J. The rudder is biased by spring K which is overcome by the pull of the electro magnet when energised. The energising current to the magnet from battery L is controlled by the receiver relay M. On receipt of a signal the relay contacts close, the magnet pulls the armature, moving the rudder. The rudder is set to turn the model fairly sharply to the left, and pressing the button on the transmitter pulls the rudder over and turns the model to the right.

If the transmitter is switched on and off quickly the rudder will move quickly, and if moved quickly enough, will not have time to turn the model, so it will keep fairly straight. If the rudder is held over to the right for a little longer than it is allowed to stay on the left, the model will be turned more right than left. If the switching on and off is speeded up sufficiently, the rudder itself will not have time to move right over and will take up an intermediate position, depending on the time the transmitter is on compared with the time off. This pulsing of the transmitter can be done by a mechanical or electrically operated switch, with a lever to vary the time on and off. The type of switch needed is shown in Fig. 5 in which O is a cylinder which is cut in two diagonally, the solid portion being an electrical conductor, and the dotted portion being an insulator. This cylinder is rotated by clockwork or an electric motor. The brush P is attached to one lead of the transmitter, and makes connection with the cylinder. The brush Q is attached to the other lead of the transmitter, and is made to slide along the cylinder by means of a lever, from full " off " position to full " on " position.

This gives proportional control with existing radio sets without any modification to those sets.

Without the transmitter switch arrangement, you get " bang-bang " control that is specially suitable for beginners. The model is set to turn left in ordinary free flight, then with radio switched on and the transmitter button pressed the model turns right. If it goes out of range it just keeps turning left. Take-off is a bit " snakish " but all you have to remember is to turn the model as soon as it looks as though it will need it, and stop the turn again before it has turned as much as seems necessary.

The actuator for this control is shown in Fig. 6 and its parts in Fig. 7. It is quite simple except for winding the magnet core. Those who are not accustomed to winding magnets would do better to make bobbins of thin card or plastic which can be wound before putting on the core. Plastic bobbins could be turned with a drilled hole and the core filed to fit. If card bobbins are used they must be well supported on a rod with washers on each end so they are not squeezed in or the ends squeezed out while winding or else the core will not fit.

Note the direction of winding the two poles of the core. If no bobbin is used the core must be wrapped with a thin piece of paper, and after winding one pole the direction of winding is reversed for the other pole. When bobbins are used, they can both be wound the same way, but the outside wire of one must be connected to the inside of the other.

Use good soft iron for the core and the armature, stuff cut from a scrap relay is suitable. When soldering the lever to the armature the armature should be held flat on the magnet,

(Continued on page 115)

FIG 4

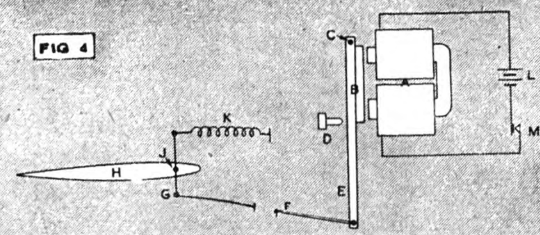


FIG 5

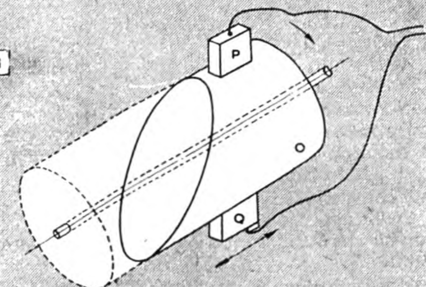
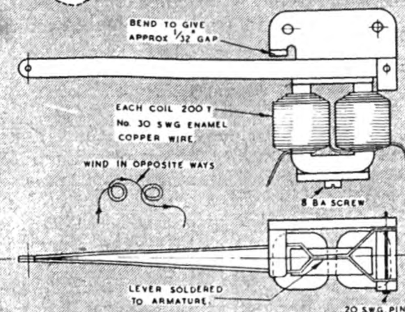
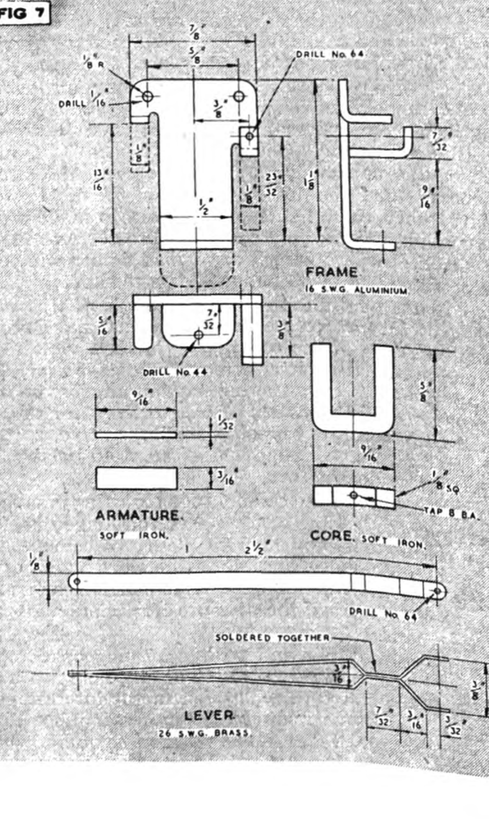


FIG 6



THE H.B. MAGNETIC ACTUATOR

FIG 7



ONE of your Scribe's New Year Resolutions (the other one) was to provide you with even bigger and better Gadgets and, stap me, you'll get 'em, if he has to think them up himself. Perish the thought!

But seriously, you types, send them in if you think other modellers would be interested; it is just possible that no one else has thought of it first, and, even if they have, maybe they've kept it to themselves.

Fitting the deed to the word, herewith sundry ideas of interest to all types of aeromodellers . . . read on, you too may find the answer here (or is your problem more in Auntie Agatha's line ?).

No. 1 of this Review is yet another method of Solo Release for C.L. models, sent in by A. Fry of Beckenham, and is the simplest we have seen.

The drawing is self-explanatory; all wire is 18 s.w.g., the peg in the fuselage projects about 3/8" inch and full "up" releases the model. All clear ?

E. V. Piercy of Fallowfield, Manchester, sent in No. 2, which will be found useful by all power modellers and C.L. types, in particular, with their large fuel tanks. This filler has the advantage that it will fit into the neck of a bottle, so the fuel can be mixed in, and dispensed from, the same container. Obtain a household fly-spray (put that down, Willy, the flies have not finished with it yet) of the type which has a euphonium-like twist in the neck. Remove the brass nozzle and force a piece of plastic tubing over the new end, as shown in the drawing. Plastic tubing stretches more easily when warmed, but do not overheat it. Insert a short length of aluminium tube into the other end of the plastic, fit the cork into the bottle and you will be able to fill the tank quickly and cleanly. Worth having around the place, don't you think ?

No. 3 is T. Westacott's brainwave for mounting radially where the model has beam mounts built in. He lives in Exmouth, Devon, and manufactured it from 16 s.w.g. brass sheet (the mounting, clot, not Exmouth). Dimensions depend on the particular engine to be used, the size of the beam mounts and the distance between them. It would be necessary, when these figures are known, to make a drawing before cutting and bending the sheet brass. As will be seen in our sketch, the two flanges are drilled for screwing down to the bearers and the result should be quite rigid.

Barry Evans of Guildford offers a couple of tips which he has found useful (*not* for the Grand National and Derby), and they may well be of use to others. With a view to saving props. and money (the latter is more difficult, by far), he buys them in pairs and, when the inevitable happens, he makes a third prop. from the remains. Refer to No. 4 for the method and note that accurate saw-cuts are imperative, so that the two halves fit snugly. Slight adjustment to balance can be made when the glue has set.

His other idea is to use celluloid for repairing cracked balsa members such as leading edges, spars and longerons. Cut to size, the celluloid is applied with plenty of cement and the repair is well nigh indestructible. One piece on either side of a fracture does the trick and the same idea can be utilised to protect the wood against the pressure of rubber bands, as with wing attachment.

If you fly rubber jobs and possess an old pocket watch (a half-hunter is better than no watch at all), here is a neat and original idea for a free-wheel, which might interest you. S. Heyland of Maidstone removed the necessary (see drawing) from a superannuated (pensioned off, don't you know) watch, soldered the appropriate toothed wheels onto the prop. shaft in the order shown and pushed the back of the prop. onto the teeth of the front wheel. When the motor is wound up with the standard brace, the teeth take up automatically.

We do feel that the addition of a small spring between the front driving wheel and that with which it mates, of sufficient strength to push the prop. forward when the motor has unwound, would make the device more certain in operation. The installation should be very well hidden and does not need pre-setting and, of course, is ready-made.

Cowling attachment is the next item and there is nothing ugly or unwieldy about the method offered by D. M. Storror of Birmingham. It can be used with either hinged or loose cowlings and should be readily adaptable to other parts of models, which are removable. The clips are cut from thin sheet brass and bent to the shape shown in No. 6. The only fixed dimension is that of the lower flange, which is ¼ inch deep. The hole in it is 1/16 inch diameter and the upper flange is perforated with numerous holes of about 1/32 inch diameter. The latter make for better cementing. An old gramophone needle pushed and cemented into the fuselage completes the clip. Close the cowling and the flange snaps onto the needle; to open, lift the flange with a thumb-nail (still attached to the thumb will do).

Drawing No. 7 illustrates the contribution of W. G. Taylor of Gateshead and it is for the benefit of power modellers who use one engine with a number of different models. It permits a somewhat quicker transfer than the bolting and unbolting usually required, especially when someone has borrowed the spanner you need.

Construction is quite clear from the drawing; the ply boxes should be bound for strength (gummed paper was used originally, but silk would do !), and the wire pin is inserted after the bearers are pushed right home (quite ! !). To make a really good job, there should be no play when the bearers are in the boxes. Note that the holes for the retaining pin are oval, to allow for the passage of the hook.

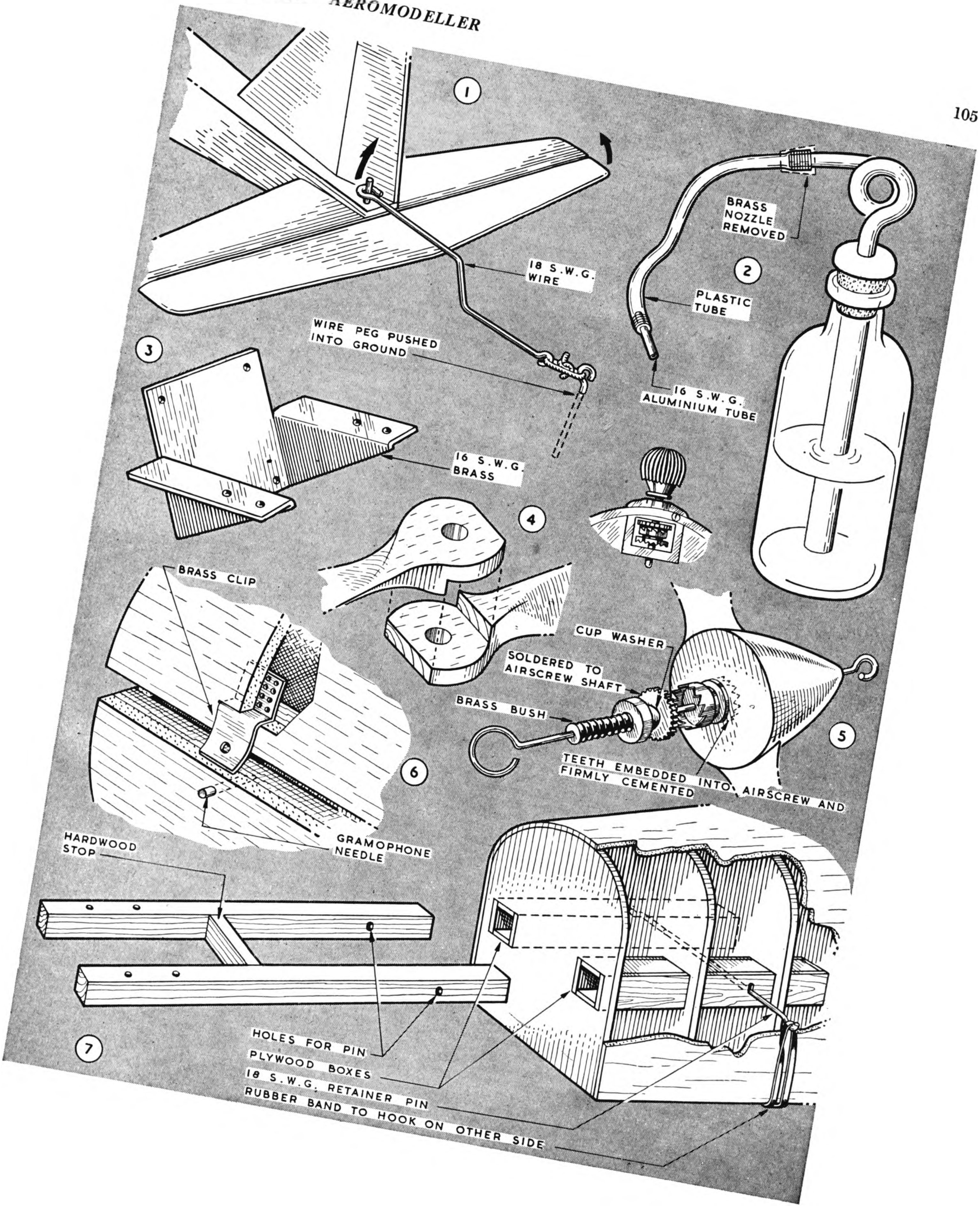
Leaving the Art Gallery, we now pass on to a gadget requiring no illustrations.

The whole point of airwheels being the air inside them, they are inclined to be somewhat less useful when punctured. After which pearl of wisdom, yours truly presents a cunning method of airwheels puncture repairing, sent along by V. A. Drew who resides in Ferndown, Dorset. (Resides makes a nice change from "of.") The multum in parvo, modus operandi or what have you costs about one bob and is an outfit called, suitably enough, "U-Need-It." As this is manufactured for filling holes in bicycle tyres, it can be obtained, no doubt, at a cycle shop (more pearls of wisdom).

The outfit comprises a tin of rubber cement and a tin of plastic, which can be softened, if necessary, with a small quantity of petrol. A small hole in the airwheel can be cured by simply smearing plastic rubber over it, while larger punctures will need the material squeezed into them. This is a big improvement on the usual tyre patch method, which on such a small tyre is bound to be clumsy and not too secure.

This is a multi-purpose material so other uses connected with aeromodelling will suggest themselves to the ingenious reader.

Which releases yours truly until the next time; he now retires to the filing cabinet and sorts out the next offering, happy with the thought that he has, once more, got you worried as to whether there wasn't a better method of fixing that undercart, after all.


1
18 S.W.G. WIRE
WIRE PEG PUSHED INTO GROUND
2
BRASS NOZZLE REMOVED
PLASTIC TUBE
16 S.W.G. ALUMINIUM TUBE
3
16 S.W.G. BRASS
4
BRASS CLIP
6
GRAMOPHONE NEEDLE
CUP WASHER
SOLDERED TO AIRSCREW SHAFT
BRASS BUSH
5
TEETH EMBEDDED INTO AIRSCREW AND FIRMLY CEMENTED
HARDWOOD STOP
7
HOLES FOR PIN
PLYWOOD BOXES
18 S.W.G. RETAINER PIN
RUBBER BAND TO HOOK ON OTHER SIDE

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

DEAR SIR,

May I, at the risk of losing the friendship of R. F. L. Gosling and Frank Zaic, support the A/2 class sailplane model, so ably defended by Per Weishaupt? It is true that this size will probably meet some opposition on the Continent—and maybe in Great Britain—on account of its relatively small size. One of the reasons why one feels at a disadvantage with a small model is that the large and very large model stays in sight of the time-keepers very much longer. Using one basic formula the odds are even.

Let us then go all out to develop this medium-sized sailplane which, as Weishaupt points out, requires considerable ability on the part of the designer-builder-flyer, and that is what an International Contest should require.

I would make so bold as to say that in this field a " lucky win " is quite out of the question, provided a time stop is used and the totals or averages of three flights are compared.

Holland. J. VAN HATTUM.

DEAR SIR,

The 1949 Wakefield Cup Competition was the twelfth anniversary of the inauguration of the rules under which it will be flown (with the exception of the recently-applied five minute limit). The reforming zeal of the Council in 1936 was praiseworthy, even if its attempt to reduce duration by increasing the wing-loading was a pathetic failure.

It is not clear whether the present stagnant position is due to a fear that another change in rules might be as futile as the last one, or whether the incentive to raise the level of skill required does not exist. It would be most encouraging (though unlikely) if the present S.M.A.E. Council were to gracefully acknowledge the fact that a mistake was made and set about doing something to remedy it.

The position now is that the Wakefield specification no longer provides a sufficient challenge to designing ability and ingenuity. Flying skill is, and should remain, the criterion, but is it not time that other factors were brought into consideration? Many experienced Wakefield fliers to whom I have spoken on the subject agree that there is no longer any " meat " in the specification. May I take this opportunity to urge them to express their views in writing?

Modern Wakefields closely approach the ultimate in the design of rubber-driven models, consistent with the amount of rubber which may conveniently be handled; yet although the obvious solution may appear to be an increase in weight this, by itself, would not serve much useful purpose. The heavier machines would be strengthened and faster flying versions of what we fly now, and though streamlining would pay good dividends, it would simply mean piling on the rubber (and the agony involved in winding it) which is undesirable. But to increase the minimum total weight to 12 ounces, and at the same time *limit motor weight to* 3 *ounces*, would certainly demand that the modeller exert himself to produce a superior machine.

If the Wakefield Competition is to continue as the classic of model aeronautics, let the rules be designed to draw upon modellers' abilities to the maximum possible degree.

Liverpool. B. V. HAISMAN.

Mr. Haisman in his zeal overlooks the most important fact that the Council decided against any alteration in Wakefield model specification until at least 1950, *their views being that,*
(a) to alter the specification immediately we had regained the Cup could possibly be construed as a manœuvre to retain the trophy by altering things to suit ourselves, and
(b) any proposed alteration to the model specification must be available in ample time to circularise the world wide model aeronautical movement in order to give intending foreign competitors the same time for development as ourselves. (ED.)

DEAR SIR,

Are all aeromodellers becoming girl-minded to the extent that they have to mix girls with their hobby?

I was shocked when I saw the amount of pictures and articles concerning girls in the December number. Must we have our Model of the Month confused and contaminated with Southgate beauty queens (good though they may be in their own circles)?

The two articles would be quite amusing if published one at a time, and as to the " Auntie Agatha Advises " I strongly oppose it becoming a serial.

Why have our female models confused with aero models?

I would like to hear some other views.

Hertford. R. A. ANDERSON.

" Auntie Agatha " is merely a " Xmas Humoresque " and is too busy with her other problems to appear regularly! As to our views on feminine pulchritude . . . . hm!! We assure Reader Anderson that it's Models before Maidens for at least 11 months of the year.

DEAR SIR,

I feel that I ought to write and tell you how much we of the Wallasey M.A.C. appreciate your efforts in the aeromodelling world. Your generous action with regard to such items as the printing of your Club list and Trade directory, etc., and even further the thought of sending a Christmas card (and a very useful one at that too) must sometimes be overlooked and taken for granted by many. However, it certainly is not so by us and we wish yourselves all the very best for the coming year. Keep up the good work!

Wallasey M.A.C. J. INKESTEN, Hon. Sec.

Bouquet humbly acknowledged and very much appreciated. (ED.)

A GHASTLY FETE——

There were kidneys and saucers
And barn doors on hawsers
Littering the old village green,
For the event of the day
Was a control-line display
By the lads of the East Wessex team.
They first flew a bloater
With deeply-finned motor,
And fish-lines completing the scheme,
While the second showed mettle
With a jet-propelled kettle,
That vanished in a flurry of steam.
Then we all had to thank
Mr. J. Arthur Rank
When the Third Man appeared on the scene,
To cause quite a dither
With a diesel powered zither
That whirled with a musical scream,
And whose special manœuvre
Was no four-leaf-clover
But part of the Harry Lime theme.
Then just as he pranged it
(Or should I say " twanged it "?)
I awoke from the horrible dream.

Romford, Essex. L. RANSON.

American News Letter

BY BILL WINTER

This P-51 by Mark Altmann placed second in the Senior Age Group (1948 Nationals) out of several dozen scale model entries. Picture by Parnell Schoenky.

IN years of watching the flying scale event at the various National contests, and, at times, in acting as a judge, the writer long since grew cynical that simple, practical rules would ever be evolved. Well, this month, we can say a little about new proposed rules—probably accepted by the time you read this—and about the near-final draft of the Team Racing rules which we have before us. Both sets of rules are alike in one thing. They are most complicated.

The flying scale rules require five pages, single spaced, and the team racing rules six-and-a-half pages. We can't hope, therefore, to do more than skim the highlights. A remarkable feature of the scale rules is that the machine is described as a replica (and etc.) which may be of two types: rubber-powered free flight; and control-line gas powered. It will shock our English cousins to see nothing about the gas-powered free flight. The explanation is that things just developed this way and that the gas free flight has been conspicuous by its absence at the Nationals. Of course, slamming the door on free flight gas is a grave mistake. The confusion is added to when you consider that the event, until last year, always had poor representation among entrants, but had the maximum appeal to the crowds.

A unique point in the rules is the timing of the rubber-powered models. Total points per flight should not exceed 100. Each second or fraction thereof is to be divided into the 100, giving a standard number of points per second. This co-efficient is multiplied by the seconds of duration of each entrant for his flight standing.

Other points are awarded for fidelity to scale and workmanship, there being 100 points to each of these two divisions or, counting flight, a maximum of 300 theoretically available points. Both fidelity and workmanship break down this way: detail 20, wings 15, fuselage 15, landing gear 15, tail 15, power plant 10, finish 10.

Now here are some of the major control-line rules. Engines are limited to 1·250 cubic inch displacement, or a cross-section of the tail point (when jet is used) of 1·250 square inches minimum. Line specs are the same as A.M.A. rules, except where displacement is less than ·100 cubic inch, in which case lines may be 35 feet long. For displacements over ·500, the lines should not exceed 70 feet. A pull test of ten times gross weight is required, except where that weight is more than six pounds, when the maximum pull tests is not to exceed 60 pounds.

Except that detail, both in fidelity and workmanship, gets 15 instead of 20 points; and that finish merits 15 rather than 10, " static " points are the same as rubber-powered. Flying points are . . . well.

Starting (within 60 seconds) gets you 10 points. So will climb, take-off, and a normal five-lap flight. That's 40 total. Then there is a gimmick called prototype flying which will earn you another 50, and the final 10 is filled in by the landing. The idea behind prototype flying is simply that the machine should fly in a manner appropriate to the real plane. In other words, a bomber flies like a bomber; a transport performs after the manner of an airliner; a fighter has to stunt and strafe presumably; and a private plane just mills around. In the past it was obviously ridiculous to expect a B-29 to match the flight pattern of a Buster racer. But now it looks as if the cagy contestant would enter private planes, these requiring nothing much in manœuvres, and thus levelling everyone's piloting skill.

One vital rule is that scale should not exceed one inch to the foot. This, it can be predicted, will raise howls in the hinterland. Some popular racers will be midgets, limited to small engines. Strong letters already indicate that such small machines are the bane of small contests with rough, poorly graded flight circles where the little ships have an affinity for flipping over.

While the scale picture always has been one of confusion, the team racing rules at least benefit by the precise development and experimenting done by the First All Speed Team (FAST) who seem to have sold the country on the idea. The main points have been mentioned here before. Some added features appear in the final draft. Models are to be judged on appearance and realism as well. Twenty points will be added to the points won in the four races envisioned by the rules (½ mile—7 laps; 1½ miles—21 laps; 5 miles—70 laps; and 10 miles—140 laps). Points for the ½ mile heat are: 1st—15, 2nd—10, 3rd—5, 4th—2. In the 1½ mile heat: 20, 15, 10, 5. In the 5 mile race it is 30, 20, 15 and 10. The 10 mile race runs from 50 for 1st, through 40, 30 and 20 for 2nd, 3rd and 4th.

Flight area is to be marked in concentric circles of 5 feet, 15 feet, 55 feet, and 75 feet. Thus, if the pilot moves out between the 5 and 15 foot circles, his ship automatically will land in the area between 65 and 75 feet. Refueling and servicing zone is beyond the 75 foot circle. Pilots must stay within the 5 foot circle during the actual racing. Pilots whose ships are down for any reason must lie on the ground outside of the 15 foot circle. Pilots may not retrieve models, or leave the racing zone during a race without permission of the starting judge. After refueling, or when ready to take off again, the pilot moves back within the 15 foot radius circle, and, when airborne, goes into the centre circle. To qualify, the pilot must, among other things, make a qualifying flight consisting of a smooth take-off or start, according to the procedure to be used in starting, and fly a ½ mile course, smooth and level. He must also demonstrate the engine speed control device or engine shut-off, and land, to complete the qualification flight. Of course, the ship must be processed according to rules and pass a general safety inspection, including the 20G pull test.

Three methods of starting are explicitly outlined. These are mechanical-release race-horse start; hand-release race-horse start; and flying start. The necessary judges, procedures, flying rules, and so on are impressively detailed. While no finer set of rules have ever been written for any event the event itself is inherently complicated. When veteran fliers put on a team race, it is a tremendous spectacle. But out in the bushes, maybe only one entrant per heat, sometimes two, will get their engines started. The run of the mill modeller can't be counted on even to start an engine.

One big result of the team racing idea is that modellers everywhere have discovered the fun of flying more than one in the centre of a circle. With big tanks, they can mill around until the tardiest starter gets his ship airborne. Then they fly for the fun of it. Another result has been a great increase in " combat." This is a wild and woolly sport enjoyed by everyone. Ribbon cutting combat seems to be as much fun as a barrel of monkeys. At larger contests team racing will, however, always be a sight to see.

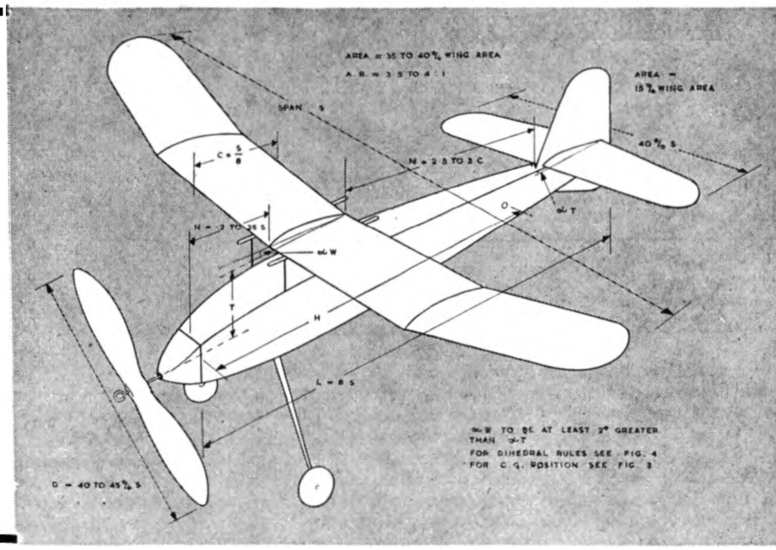
It's designed for you!

Number One—Rubber Models

PART I

This series, prepared in close collaboration with Ron Warring, is intended to bridge the gap at present existing between theory and practice. Taking each type of model in turn, design characteristics will be summarised and presented in simple, tabular form, with a proportioned drawing of a typical model, where all the data given can be applied directly to any projected design. Emphasis throughout is on the practical application of these data. There are no formulæ to master and any theoretical discussion is confined strictly to the problem in hand—that of designing a stable, efficient model capable of contest-standard performance in each type.

From the data given, any enthusiast with no previous knowledge of the subject should be able to produce a successful "own-design", yet at the same time we think that the treatment adopted will also provide material of interest for even the specialists in each subject.



FOR the first type of model in this series we have chosen *rubber duration*, which, we fear, has been rather neglected of late. Wakefields, of course, are the best known type of model in the world and have produced a list of famous designers who specialise in this particular class of rubber model. Competition, as a result, is pretty severe in all Wakefield contests, which is often sufficient to frighten off the average modeller. Yet the results obtained, as with any other type of model, are only partly due to the design itself. The rest is entirely the result of the individual's skill, experience and judgment and luck on the competition day! That is why a good design alone is no criterion of success. Plans of many outstanding Wakefield models are available and hundreds and hundreds of Jaguars and Zombies alone have been built by different modellers. Only a few of them reach a consistently high standard, which is direct proof that there is more to success than just *building* a good design. Yet the fact that some modellers *do* achieve success with standard designs (two Jaguars and two Zombies in the 1949 Wakefield team, for example) only goes to show that to achieve success *the design must be right in the first place.*

No one can advance any particular set of theoretically-derived formulæ for design, since basic theory is so much modified by practical requirements. Experience, is, in fact, the only reliable way to get results, gradually eliminating the weaknesses from any particular layout until we arrive at a set of proportions which we know, from previous results, will give a satisfactory performance. And generally these differ considerably with different types of model, so that what is a good layout for a rubber design does not necessarily make a good power model, and so on.

Our object in this series is to take each *type* of model in turn and describe, fully, a generalised layout which can be adapted to any size, with all proportions worked out and suitable alternatives for airframe construction. In other words, we are summarising the experience gained to date with each type of model and presenting the whole picture in a form which should be most useful to would-be designers. Anyone with even little or no experience should then be able to produce a *successful* design of his own by following these general proportions, fitting in his own shapes and outlines.

We have started with the rubber model for one very good reason. Free flight power models are undoubtedly the most popular type of model, in numbers, at least, and modellers are particularly well catered for here as regards the variety of kits available. But power modelling is, on the whole, expensive. Fuel, propeller replacements and engine repairs can make serious inroads into the modeller's pocket—and it is all too easy to lose the model, complete with its relatively costly motor, by flying it away in thermal weather. Rubber modelling, by comparison, is cheap and whether you fly for fun or in contests, it can be just as satisfying. Many modellers, in fact, openly state that they get far more enjoyment out of a two to three minute flight with a rubber model than a comparable duration with any other type, so that it is a pity, indeed, that the rubber model has become relatively neglected with the rise in popularity of the free flight power machines.

However, enough of talking round the subject. Let us get right down to the problems associated with design.

Stability is probably the greatest single factor affecting design, for it is better to have a stable, but relatively inefficient model to work on, than a very efficient model from the aerodynamic (performance) standpoint which is *unstable.* You just cannot obtain consistent results with an unstable model.

Complete automatic stability must be achieved in three directions, *longitudinally* (or "up and down"); *laterally* and *directionally* (i.e., so that the model flies on a true course, whether straight or circular, without sideslipping or yawing); and *spirally* (where the model flies in circles without spinning or stalling, or otherwise becoming unstable). It is not enough to ensure that the model trims out and flies smoothly under ideal conditions, i.e., still air, for there must be sufficient reserve of stability to ensure that if it is displaced by a gust of wind, for example, it will return to its true flight path. It is possible to have a model which will fly quite stably until it is upset by some outside force, when it becomes unstable. This means that it has not sufficient reserve of stability or, in technical language, whilst it is *statically* stable, it is *dynamically* unstable.

Longitudinal stability is largely taken care of by a tailplane of adequate area. A wing in itself is unstable (unless specially designed as in the case of tailless models) and so needs coupling up to another aerofoil surface—the tailplane—to give a stable combination. American terminology for tailplane is, in fact, *stabiliser.*

A tailplane area of about one quarter of the wing area is really the smallest satisfactory size, and it is generally better to make it considerably larger than this. Much will depend upon the dimension "T"—the height of the wing above the thrust line, and the moment arm, "M". In practice, there is less variation in the latter.

As a general rule, the distance between the trailing edge of the wing and the leading edge of the tailplane ("M") should never be less than twice the chord, and preferably greater. There is a logical limit to the greater value, for as "M" is increased, so the weight of the rear fuselage is increased and the tailplane weight moved farther back. This means either a longer nose to balance (resulting in an over-long fuselage), or moving the rear rubber anchorage forward to get the motor weight forward. This latter practice is adopted on most models of the parasol-lightweight layout, but should not be overdone. Overall fuselage length is the final deciding factor, as this should never be greater than the span, preferably much less. A long fuselage means more weight, greater area and consquently more drag.

An average figure for " M " is, therefore, 2·5 to 3 C (where C is the wing chord). In the case of tapered wings, " C " may be taken as the root chord, when the corresponding value for " M " can be reduced to 2 × C as a *minimum* figure (never less).

The greater the value of " T ", the greater the tailplane area required for an adequate margin of stability. Thus for shoulder wing models a tailplane area of one third of the wing area is quite adequate. For high wing models the same figure will apply, although an increase to 35 per cent. will be beneficial. For parasol models (i.e., greater " T "), 35 per cent. is about the minimum figure for best results and it is not uncommon to boost this area to 40 or 45 per cent. of the wing area.

That is not to say that models of this type will not perform satisfactorily with smaller tailplanes; they will. In the Wakefield class, for example, tailplane area is restricted to a *maximum* of one third of the wing area and a parasol Wakefield will perform along with the best of the shoulder wing designs. But from the point of view of over-all stability, the parasol wing models would be better if they could use a larger tailplane. Therefore, unless tied by specific rules like the Wakefield, use a larger tailplane proportion in such cases.

Now the final *balance* for longitudinal trim is obtained by adjusting the wing and tailplane incidences, together with the centre of gravity position. It is possible to trim a model to fly with the centre of gravity at almost any position from the leading edge of the wing to the trailing edge, or even farther aft. If the C.G. comes in front of the centre of pressure (or point of application of the lift) of the wings (Fig. 1), then obviously the tailplane will have to be rigged so as to have a download applied during flight. That is, it will be set at some considerable *negative* incidence. Similarly, if the C.G. comes aft (Fig. 2.) of the centre of pressure of the wing, the tailplane will have to carry an upload to balance, which means that it will be rigged at some *positive* angle of incidence. The farther aft the C.G., the more lift the tailplane must supply to balance.

Of course, the centre of pressure of the wing itself is not a fixed point, it varies with the attitude of the wing (*i.e.*, the actual flight attitude or angle of attack, which must not be confused with rigging incidence. *Rigging incidence* is the angle at which the wing or tailplane is rigged relative to some datum line, usually the centre line of the fuselage). There is no need, however, to complicate the issue for, when a rubber model is flying at its best trim, the corresponding angle of attack of the wings is around 7 to 8 degrees and the centre of pressure of most conventional aerofoils under these conditions is about 30 per cent. of the chord back from the leading edge.

Arriving at the best solution for longitudinal stability and *longitudinal trim* for a rubber model is far more complex than with any other type, for we have to contend with a varying thrust output. It is comparatively easy to work out a solution for *stability alone*, such as generous use of downthrust, but to use the power *efficiently* often requires a considerable degree of skill in trimming. The design characteristics outlined can do no more than give you the tools for the job, here, *i.e.*, a stable layout.

Thus, whilst theoretically it is possible to rig a model to fly with almost any C.G. position within the wing chord, there are many other factors to consider as well. C.G. *forward* gives the greatest margin of stability, but is inefficient from the point of view that, whilst the wings are lifting upwards, the tailplane is actually " lifting " downwards and counteracting part of the

(*Continued on page 115*)

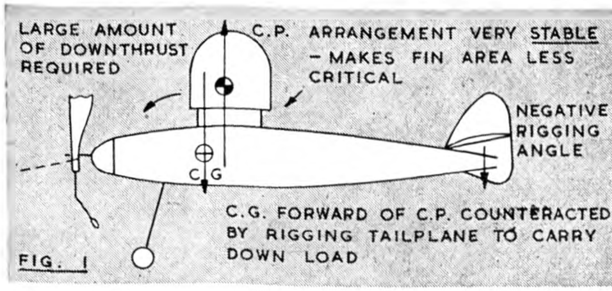


FIG. 1

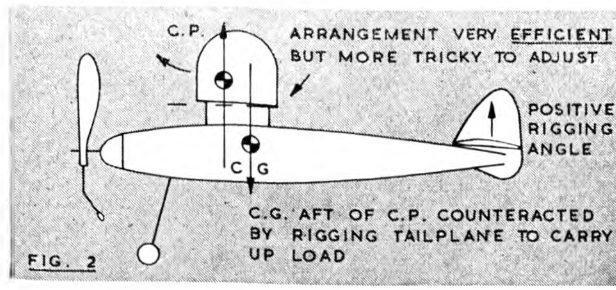


FIG. 2

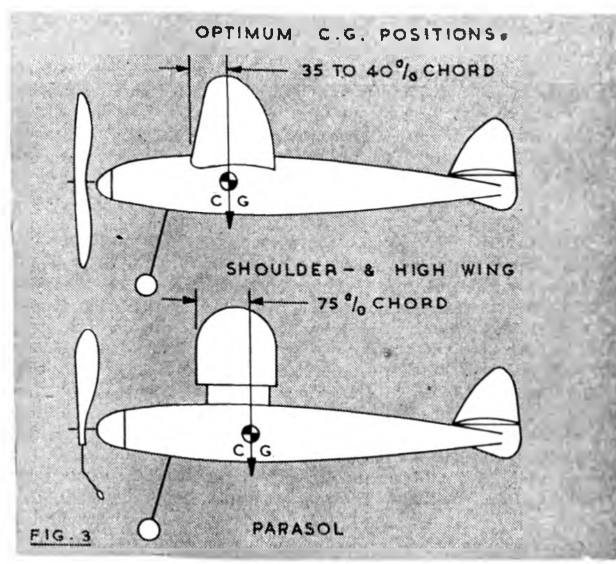


FIG. 3

TABLE I. AERODYNAMIC DATA
(Basic design figures selected to convenient simple dimensions)

*Note.—This span is based on a square tip. Adjust rounded tip to give same area. †35% WING AREA, adjust if necessary.

Approx. wing area sq. in.	Span * S in.	Chord C in.	Section	Tailplane† Span in.	Tailplane† Chord in.	Section	L in.	N in.	M in.	Fin area sq. in.	Prop. dia. Dm	Lightweight H "	Lightweight T in.	Lightweight P in.	Heavyweight H "	Heavyweight T in.	Heavyweight P in.
100 (98)	28	3½	Clark Y	11	3	Flat Plate	22½	7	9	15	12	15	2¼	15	17	1	18
150 (153)	34	4½	Marquardt Thin Davis etc.	13½	4	Flat Plate	28	8	11½	23	14	19	2½	17	21	1½	21
200 (200)	40	5	Joukowski R.A.F. 32 etc.	15½	4½	60% Clark Y	33	9	14½	30	17	22	3½	20	23½	2	25
300 (288)	48	6	Joukowski NACA 6412 etc.	20	5	60% Clark Y	38½	11	16½	43	20	27	5	24	28	2½	30

AIRCRAFT DESCRIBED No. 28

The SOPWITH BUFFALO

BY E · J · RIDING

THE Sopwith Buffalo was one of the many British aircraft of the 1914–18 war period which, but for the Armistice, might have made a name for themselves had hostilities continued into 1919. Large government contracts had been placed with the Sopwith Aviation Company for this type, but these were automatically cancelled after victory had been achieved. The Buffalo also carried the distinction of being the last Sopwith type to be produced during the war.

The influence of previous Sopwith types, for instance the Camel, Snipe and Salamander, can be traced in the lines of the Buffalo—indeed, it might almost be described as the two-seater version of the Salamander, but whereas the Salamander was used exclusively for trench straffing, the Buffalo was a reconnaissance aircraft, the armament consisting of one forward firing Vickers gun mounted on the fuselage decking immediately in front of the pilot's cockpit, and a Lewis gun on a Scarff ring on the rear cockpit. Like the Salamander, the whole of the front portion of the fuselage was constructed primarily from armour plate.

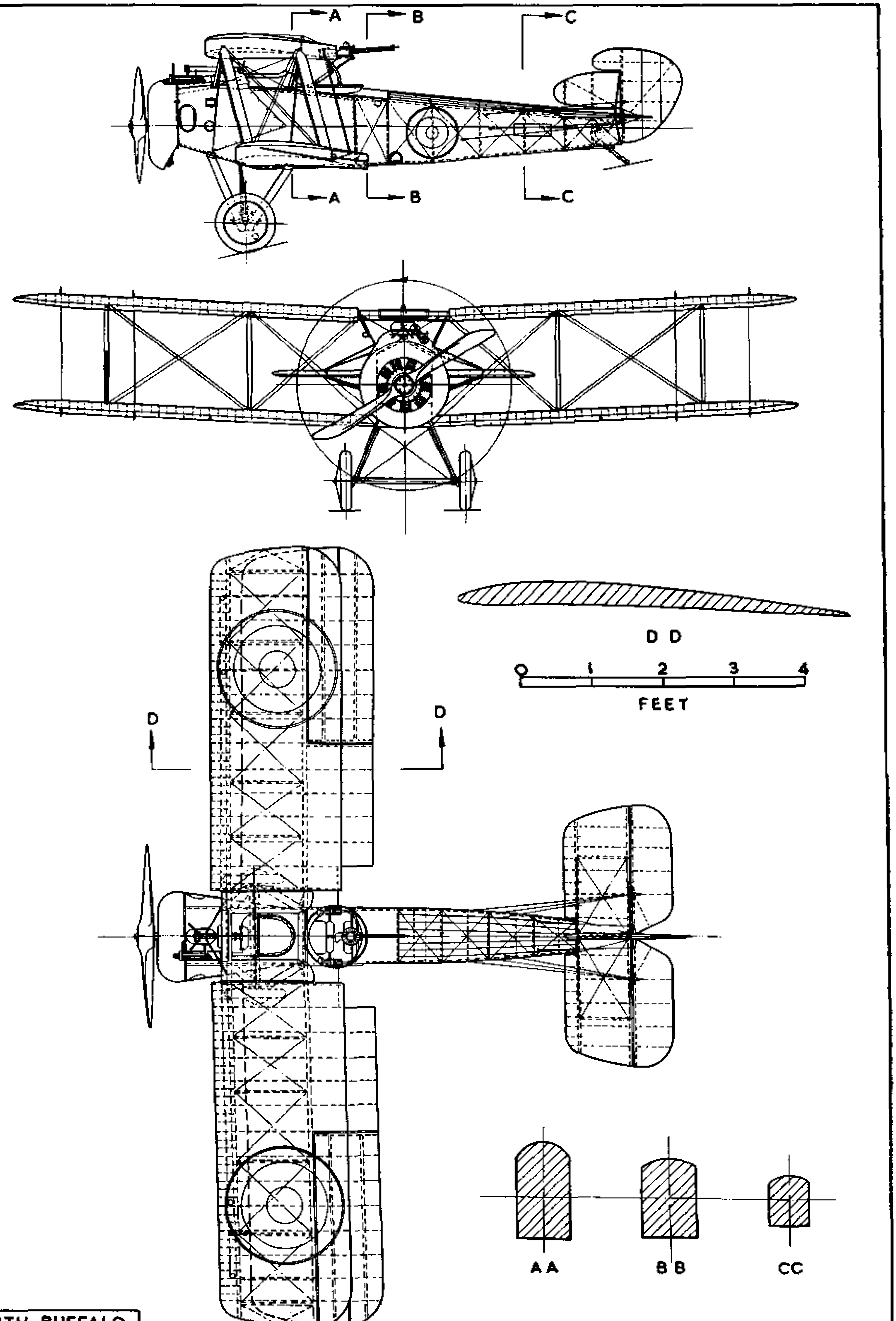
The fuel tanks of about 25 gallons total capacity were situated in the fuselage, the gravity tank being between the top longerons aft of the engine, and the main tank beneath the pilot's seat. Power was supplied by a 200–230 h.p. B.R.2 nine-cylinder air- cooled rotary engine.

Construction: With the exception of the forward portion of the fuselage already described, the machine was of standard Sopwith wood and fabric construction. The rear half of the fuselage consisted of four ash longerons with cross members and braced by means of tensioned piano wire, surmounted by the usual ply formers and spruce stringers forming the fuselage decking, the whole being fabric covered. The wings and tailplane were also of wooden construction with fabric covering, the former employing spindled spruce spars and built up ribs. Spruce interplane struts and streamlined steel bracing wires completed the wing structure. Each undercarriage Vee was made from streamlined steel tubing, springing being effected by rubber cord wrapped round the axle and anchored to cleats located on the tubes forming the Vees. The axle was of the usual Sopwith pattern, hinged at the mid-point, whereby each wheel had in effect individual springing. Down loads were taken by a check cable attached to the hinge point and anchored to the centre of a fuselage cross member.

Colour: Standard camouflage scheme for the period. Armoured portion of fuselage and engine cowling ring battleship grey, remainder of fuselage drab green. Top surfaces of wings and tailplane drab green, under surfaces of fuselage, wings and tailplane clear doped. Interplane struts natural varnished wood. Undercarriage legs battleship grey. Red, white and blue roundels on fuselage sides, top surface of upper wings and under surfaces of lower wings, those on the fuselage sides and top wing being outlined with a thin white ring. Red, white and blue rudder flash with the red stripe adjacent to the trailing edge. Wheel discs drab green.

Specification: Length: **23 ft. $3\frac{1}{2}$ ins.** Span: **34 ft. 6 ins.** Height: **9 ft. 6 ins.** Wing area: **326 sq. ft.** Loaded weight: **3,100 lbs.** Tare weight: **2,230 lbs.** Max. speed: **100 m.p.h. at 5,000 ft.** Landing speed: **60 m.p.h.** Range: **275 miles.**

$\frac{1}{4}$ in. to 1 ft. reproductions of the G.A. drawing may be obtained price 1/– from A.P.S.



SOPWITH BUFFALO

THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

The following details are given pending the publication of the 1950 Handbook. It should be noted that certain dates may be amended in view of the proposed alteration of certain Bank Holidays this year.

1950 COMPETITION PROGRAMME

Month	Date	Contest	Class	
April	9th	GAMAGE CUP	Unrestricted Rubber	Decentralised.
		PILCHER CUP	Unrestricted Glider	
„	16th	*RIPMAX TROPHY	Radio Control	AREA "SPRING" RALLY
		*GUTTERIDGE TROPHY	1st Wakefield Qualifier	
		*HALIFAX TROPHY	Open Power Duration	
„	30th	KEIL TROPHY	Open Power Duration	Decentralised.
		LADY SHELLEY CUP	Tailless	
May	14th	*WESTON CUP	2nd Wakefield Qualifier	AREA.
		*K. & M.A.A. CUP	A/2 "Nordic" Glider	
„	27th	"GOLD" TROPHY and other Control-line Contests		NATIONALS
„	28th	*THURSTON CUP	F.A.I. Glider	
		*MODEL AIRCRAFT TROPHY	F.A.I. Rubber	
		WOMEN'S CHALLENGE CUP	Rubber/Glider	
„	29th	*SIR JOHN SHELLEY CUP	Power Duration	
		*S.M.A.E. RADIO-CONTROL CUP	Radio Control	
June	11th	WAKEFIELD TRIALS	Selected entry from meetings held April 16th and May 14th	Centralised.
		A/2 GLIDER TRIALS		
„	25th	HAMLEY TROPHY	Open Power Duration	Decentralised.
July	9th	CONTROL-LINE STUNT AND SPEED (July 23rd—Wakefield Finals ; July 30th—A/2 Glider Finals)		AREA.
August	6th & 7th	BOWDEN TROPHY	Open Power Duration	Centralised.
		TAPLIN TROPHY	Radio Control	
		CONTROL-LINE SPEED		
Sept.	3rd	*FARROW SHIELD	Team Rubber (Open)	AREA "AUTUMN" RALLY.
		*MODEL ENGINEER CUP	Team Glider (Open)	
		*ASTRAL TROPHY	Power Ratio	
„	17th	S.M.A.E. CUP	Open Glider	Decentralised.
		FLIGHT CUP	Open Rubber	
		FROG JUNIOR CUP	Open Rubber	

THE PLUGGE CUP (Club Championship) will be awarded on the Weston (Wakefield), K. & M.A.A. (A/2 Glider), Astral (Power Ratio), Farrow (Team Rubber) and the Model Engineer (Team Glider).

As it is agreed that past methods of deciding the Individual Champion at the "Nationals" does not produce the best "all-rounder," a new system is introduced for 1950. All contests marked * will be counted, i.e., contests held on Area days plus the Nationals, and points will be awarded similar to that in operation for the Plugge Cup. The allocation is as follows :—

1st	50 points	6th	9 points	All other competitors will receive 1 point on entry.
2nd	36 „	7th	6 „	
3rd	26 „	8th	4 „	
4th	18 „	9th	3 „	
5th	13 „	10th	2 „	

The top points scorer at the end of the season will receive the title of BRITISH CHAMPION.

The JUNIOR CHAMPION will be that junior member who places highest on the list; thus a junior could win both awards.

The two Team events will be conducted as ordinary individual contests for points scoring, the top four from each club being considered as the club Team.

The rules for the Bowden Trophy are yet to be confirmed. The precision type of contest has not proved popular enough to warrant retention in a National programme, and the donor has been approached for his approval to alter the rules to a more acceptable basis.

A CONTROL-LINE CHAMPIONSHIP will be awarded on the results of the "Gold" Trophy and the Speed and other control-line classes staged at the "Nationals" and a further meeting on August 7th.

IMPORTANT. The percentage of top placers from each Area for the Wakefield Trials will be based on the combined times set up in both the Gutteridge and Weston Cup contests. By introducing this "double eliminator" it is hoped to still further weed out the entry, and at the same time reduce the possibility of a good man being kept out of the Trials by virtue of an "off day" or the odd spot of bad luck at one Eliminator, as has happened in the past.

PROVIDING the necessary finance can be raised, teams will be sent both to Finland for the Wakefield, and Sweden for the A/2 Glider meeting.

Study of the 1950 programme will indicate the introduction of a certain number of unrestricted (open) contests on the following basis :—

ALL Decentralised contests are "open" type, thus eliminating any processing troubles.

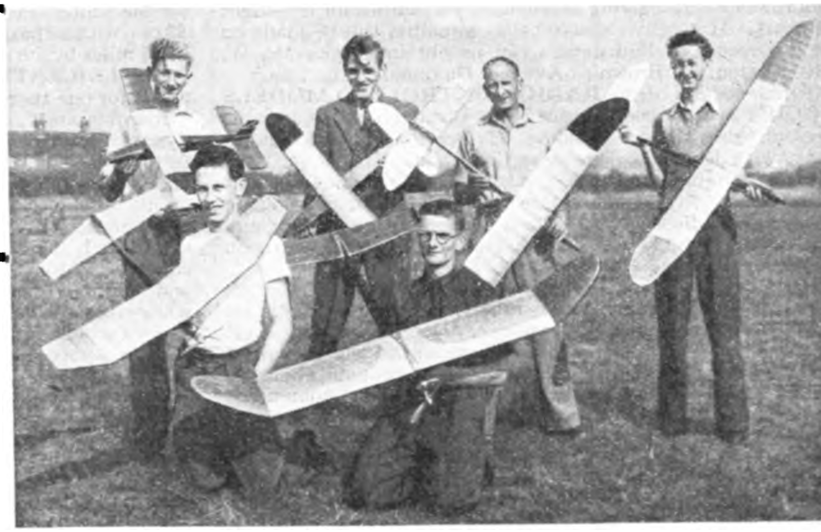
AREA contests will entail a minimum of processing.

FULL PROCESSING can be carried out at special centralised events.

NOTE.—An "open" contest indicates that no restrictions are imposed relative to fuselage X section or loading.

The 5 minute flight limit is again in force, and all contests close at 7 p.m. sharp.

CLUB NEWS



Members of the Surbiton and District M.F.C. who took part in a de-centralised competition with the New York Aeroneers at Fairlop, at the end of last season.

WELL, how goes 1950 and all those splendid New Year resolutions connected with so many new models? Got that Wakefield built yet, and that A/2 Glider . . . or are you like me, still thinking about them. It's amazing the way time slips by without you noticing it, for I always seem to get the building board out just as the weather turns fine again, and bang goes all my plans for yet another year!

Following my usual habits of getting around, this past month saw me at the **NORTHERN HEIGHTS M.F.C.** annual dinner, and a very good show it was. Graced by the usual attendance of notabilities in the flying world, this chummy affair combined just about everything that goes to make up a proper aeromodelling "do". Bags of fun was created when a "line-shooters" prize was announced, the recipient Geoff Moss being compelled to undo parcel after parcel to finally reveal small twin aeroplanes revolving around a tower. You can imagine the comments!! One very interesting feature of the evening was the show of films displayed by member Cox, a collection that would do credit to professional celluloid bashers. Some of his close-up action shots are remarkable.

Later in the month I had the pleasure of attending the second annual Dinner of the **BIRMINGHAM M.A.C.**, where a real Xmas atmosphere prevailed. President Sir Robert Bird was in fine form, and gave members something to think about by suggesting other means of utilising rubber than just twisting it; also giving his opinion that aeromodellers were producing physical appearances in the same way that you could tell a "horsy" man!!

Mr. Houlberg paid credit to the club in his address, and was in turn congratulated on his achievements during 40 years of aeromodelling, it being my pleasure to add personal congratulations when it came to my turn to "stand up, speak up, and shut up". Lady Bird presented the imposing array of cups, etc., which included the S.M.A.E. Radio Control Trophy won by members Doughty and Kenyon. The evening finished with a showing of the Aeromodeller Wakefield films, after the inevitable chasing around to find a point that gave the necessary juice! Always seems to happen to me.

A few days ago I had the honour of opening the Hobbies and Crafts Exhibition staged by the **SHEFFIELD SOCIETY OF AEROMODELLERS** in conjunction with other hobby clubs in the city. An extremely impressive array of models was on show, and the Cutlers must be congratulated on a first class show, with some excellent examples of aeromodelling on view. My task of judging the aero exhibits was no sinecure, the winners all showing a very high standard of workmanship. The idea of combining an aeromodelling exhibition with such other hobbies as boats, photography, needlework, etc., etc., paid dividends, as the lady visitors felt they were as well catered for as the "mad aeromodeller" section, and the chaps were let off the lead long enough to have a good look at, and natter about, the models hung over the entire hall.

The latest issue of the **A.M.A.** leaflet gives news of new records that make interesting comparison with our own achievements. The Control-line Class A speed record (roughly equivalent to our Class III) now goes to the credit of Lew Mahieu with 126·76 m.p.h. compared with our J. G. Carters 89·1 m.p.h. The next higher class, B (our Class IV) is held again by Mahieu with 134·23 m.p.h. (ours C. L. Houghton, 91 m.p.h.) and Lew also holds the Class C (similar to the British class V) at 150·63 m.p.h., which is still some way ahead of Cyril Shaw's 118·42 m.p.h. I'd like to see a real contest between the best chaps in both countries under the same conditions, which is perhaps not too much to hope for after this year. The introduction of electrical timing for speed events is a move in the right direction, and the F.A.I. give May, 1950, as the dead-line for the installation of such apparatus for the setting up of International records.

The "Flypaper" is a monthly publication put out in South Africa by a hard working bunch of lads, and so far consists of a few duplicated sheets pinned together. However, from such acorns big mags. grow, and I wish the Editor and his staff every success. The alteration in currency following devaluation has brought about an increase in costs of American engines, some 33 per cent advance being foreseen. Wakefield models receive a fair deal of attention, some question regarding specification indicating that the current rules are not as well-known—or as redundant—as some chaps over here think.

The **NORTHERN AREA** held its 1949 A.G.M. at Leeds on the 10th December, when Mr. E. P. Anderton was elected Chairman, with popular Sam Messom (anyone got a bow for my "fiddle"?) again being returned to the office of Secretary. The Area has been commended for the good behaviour of its members when flying at Clifton and Rofforth; all meetings have also shown a profit! It is proposed that trophies be bought for an Area inter-club knock-out contest.

A fortnight earlier the **EAST ANGLIAN AREA** held its A.G.M., reports showing that a very successful season had been concluded, two National trophies being gained by Area members. M. A. King of Belfairs won the K. & M.A.A. Cup, and the Taplin Trophy went to F. Ashdowne and Son.

A **R.A.F. MODEL AIRCRAFT ASSOCIATION,** to which Station model aircraft clubs, and individual serving personnel may affiliate, has been formed. There are known to be approximately 2,000 model aircraft enthusiasts in the R.A.F., and it is believed that a far greater number exist, and may come forward now that model aircraft activities in the Service are to be put on an organised basis. There are some 150 model aircraft clubs throughout the R.A.F. Representatives of all commands have been appointed, with Group Captain C. F. Pearce of Debden as Chairman, and well known S/Ldr. R. B. Lord as Secretary. "The average airman does not get airborne very often" said G/Capt. Pearce "but interest in model aircraft is a very important thing, and can teach members of the R.A.F. a great deal about real aircraft."

The usual **ANNUAL INDOOR RALLY,** which is held in Manchester each year, will be held in 1950 on Sunday, February 19th, commencing at 11 a.m. and continuing until 5.30 p.m. This time the event will be held in a much larger hall than hitherto, giving excellent opportunities for free-flight contests. It is fully expected that attempts will be made on British records. Full details can be obtained from Mr. W. Titterington, 17, Brownlea Avenue, Dukinfield, Cheshire.

A new section of the **RADIO CONTROLLED MODELS SOCIETY** has been formed in Birmingham under the Secretaryship of G. F. Golding, 32, Beechfield Road, Smethwick, with Dr. A. C. Dawes as Chairman. The majority of those attending the initial meeting were model aircraft enthusiasts. Arrangements are well in hand for the holding of the first Radio Controlled Boats contest in this country, and will be held at the famous pond at Fleetwood, Lancs., on Easter Sunday and Monday.

Formed in August, 1948, the **TOTTENHAM M.F.C.** numbers some eighteen keen members, who recently took part in an exhibition at very short notice. Members of the public were conducted round the exhibits by stewards, who explained the main features, the friendly atmosphere brought about by this method comparing favourably with the puzzled, sometimes embarrassed faces seen at some shows!

Indoor R.T.P. meetings have commenced with the **DARLINGTON M.A.C.** and any modellers around the town are invited to join in the fun. Meetings are held in the Corporation Road School hall every Thursday evening from 7 to 9 p.m. Three " Thermalists " are being built plus a 10 ft. span canard glider, so the clubroom is somewhat tight for room nowadays

The **GRIMSBY & D.M.A.C.** held two comps. recently for the Spyvee and Ogle Cups, these being for glider and rubber respectively, interest in these types having been confined to a very few enthusiasts in the past. Winner of the glider event was junior Alan Train, with Pete Munday taking the other event with his newly built " Gypsy ". A club records book has been started in order to stimulate interest.

CRYSTAL PALACE M.A.C. held a well attended A.G.M. on the 28th November, both the Chairman and President stressing the need for new members since National Service is constantly depleting the number of active members in the club. Prizes were presented by President Mr. Cooley, the championship being collected by N. F. Whisler.

News from the **DUBLIN M.F.C.** indicates that Billy Brazier is getting a couple of Wakefields ready for 1950—all visitors being frisked for cameras, slide-rules, etc. The 1950 **IRISH NATIONALS** have been scheduled for the 8th and 9th July, the first day being devoted to control-line events, and the Sunday will see the usual Wakefield and free-flight Power contests. The D.M.F.C. Championship Cup has been awarded to " Billy " with 2077·1 points.

The M.A.C.I. (Irish S.M.A.E.) has created three Areas in the country, and inter-area events will be staged. Norman Osborne of Belfast was presented with the Irish National Championship Cup, a worthy winner in view of his all-round excellence during 1949.

Johnny Ross was an easy winner of the **WINCHESTER & D.M.F.C.** second Glider contest, due mainly to being the only entrant to get his model well up on the towline. Breaking the club F.A.I. Sailplane record with a flight of 2 : 03, his total for the comp. was 5 : 41·8, with R. H. Lewis second with 3 : 37. Ross is well in the running for the club championship.

The **EAST LONDON M.A.C.** are naturally rather elated at the results of the London Area speed contests at Chigwell where they obtained three 1st places. A most successful exhibition was held on December 5th, with about 70 models on show, plus a table full of " hot " American engines. Suspicious looking characters were frisked on the way out!! The concours was won by P. O'Sullivan's superbly finished De Bolt Speedwagon, with L. Owen's " Gypsy Wakefield " second.

Although not yet a year old, the **R.A.F. NORTH LUFFENHAM M.A.C.** is progressing well in spite of postings and returns to civvy street. Main interest lies in radio control, there being three sets in operation at present, all " home-made ". Pilot Officer Gregory's " Nieuport Scout " often gives a polished display around the field, but sad is F/O Feather for forgetting to put his name and address on his " Igo " . . . 20 minutes o.o.s.

Ray Booth of the **MANCHESTER M.A.C.** has again upheld his reputation by raising the Indoor Tailless H.L. record to 1 : 17·4. The use of a local cinema has been secured once a month, and they hope to get cracking on indoor jobs for the winter season. A three channel R/C receiver weighing 23 ozs. with all batteries and servos has been operated at a range of 3½ miles by a 5 watt Tx, powered by a 5v car battery.

The **LEICESTER M.A.C.** annual social was a good show, and I for one thoroughly enjoyed myself: you should see me " frog flapping ", applying the Einstein theory and full aerodynamic principles! Flying is again taking place at Stoughton Aerodrome—at any rate for the winter session whilst no crops are growing. " Lofty " has fitted a pop-up tail dethermaliser on his " Lulu " and the results have to be seen to be believed. On operation, the plane does a " flip-loop " then mushes down vertically! This club has control-liners and another section christened " touch-liners ". This type stands on the touch lines and bawls criticisms to the world in general—or starts a whispering campaign in the back rows. This hat is being thrown around in several sizes—does it fit you!!

After a very successful season, during which members were highly placed in National competitions, the **LIVERPOOL M.A.S.** held its A.G.M. on November 26th. Mrs. Dillon was again elected Secretary, with hubby as Chairman. It has been decided that in future club records will be based on an average of three consecutive flights, as this would tend to eliminate " lucky flights ". Worth trying in my opinion, and I shall be interested to learn the results of this experiment.

The first indoor flying meeting of the **CHEADLE & D.M.A.S.** was coupled with an exhibition, an interesting innovation. The championship and Bamford Precision Trophy were won by H. H. Bamford, Jnr. Interest in radio-control is on the increase with this power-conscious club.

Indoor flying is also going strong with the **BEVERLEY & D.M.A.C.**, the hall of a local school having been secured. Class A r.t.p. models are in the majority, a recent comp. attracting eleven entries, winner being A. C. Brown with an aggregate of 2 : 52·7. The indoor record changes week by week, the present holder being J. Botterill with 1 : 18 using a tissue covered " Thistledown ". In the outdoor field, Colin Dews is pressing on with his 1950 R/C units, and the club hopes to send a fairly strong team to the Nationals.

Despite having only a handful of flying members, the **WHITEFIELD M.A.C.** had a successful season during 1949. Successes include prizes at every rally attended, and the top Northern club in the Plugge Cup. Club records are being pushed up, and include three of over 10 minutes—open glider 12 : 20, F.A.I. 22 : 15 and H.L. rubber 10 : 47·6.

With the close of 1949, the **LEEDS M.F.C.** club championship figures and records have now been issued. H. Tubbs receives the General Championship, with G. Cameron and V. Dubery runners-up, while with the Power Championship the last two mentioned go up to first and second, with Tubbs third. Records are :—

Rubber :	H. Tubbs	6 : 33	Power :	H. Tubbs	11 : 09
Glider :	G. Joyce	21 : 00	Speed :	H. V. Foster	97 m.p.h.

Indoor meetings are continuing with the **MERSEYSIDE M.A.S.** and attendances pick up. The " Edwards R.T.P. Cup " contest was flown off on December 16th, being easily won by Secretary Alexander with a total of 6 : 06·7 for two flights. His model was a " Thistledown ", and how he piles on something like 1,800 turns is still a mystery to most members.

The **SURBITON & D.M.F.C.** wish to announce their Glider Gala, to be held on March 26th at Epsom Downs. Towline length has been increased to the standard 328 ft. and no one who has more than this amount of line on the spool will be allowed to fly! Full details from Secretary D. Butler.

Miles Thomas has lately been raising his own Indoor Tailless r.o.g. record, his latest effort celebrating Xmas with a time of 1 : 26·5. It is expected that when the **OLDHAM & D.M.A.C.** can borrow a larger hall, Mike will be the first to reach two minutes. At present the roof's the limit, preventing the model giving its best performance, hand launching being done at almost floor level.

The **WEST ESSEX M.A.C.** news sheet notes a great deal of interest in radio control, some expert members being numbered in this club. The following quotes from their latest " mag " amused me.

More Questions and Answers (with apologies).

Q. I am somewhat confused by the number of abbreviations in use nowadays. What does H.J.N. stand for?

A. Just tired of sittin', I guess.

Q. I have tried my hand at several radio jobs, but without success. What advice can you offer me?
A. Come home, Jim Edwards.
Q. My girl friend is bitterly opposed to my aeromodelling activities. How can I overcome her resistance?
A. Well, you see ——BLA-A-CK M-A-A-RK.
Q. I live in a densely populated part of London. Where is the best place for me to fly on Sunday?
A. Try Fairlop. You'll feel quite at home.
Q. Lately I have seen several references to power/ratio contests. What does this mean?
A. Crack-ups galore.

Jim Butcher of Kingman, Kansas, U.S.A., asks our assistance in tracing an English modeller who sent him an engine on an exchange basis. It appears that Butcher has mislaid the chap's name and address and is naturally anxious to contact him in order to complete the deal. If the sender reads this please get in touch right away, giving details of the engine sent, etc.

Fourteen year old J. G. Priebe of Moola, via Dalby, Queensland, Australia, wants a pen pal, as also does Mac Hyde of 298, Wellington Street, Ingersoll, Ontario, Canada, who wants someone around 15–18. He used to correspond with a lad named Geoffrey Eastough and would especially like to hear from him again.

Roux van der Merwe of Jan Smuts House, Rhodes University College, Grahamstown, C.P. South Africa, is trying to build up as wide an international correspondence as possible, and is very keen to correspond with a modeller of some experience (preferably over 18 years of age) in Holland or Belgium. If anyone interested finds difficulty in writing English, he points out that he understands Dutch.

This month's Tall Story comes from D. Longman of Edgware who writes: "In 1947 a young and inexperienced modeller built a new rubber job and doped same all red. However, it was found that he had thinned the dope with rubber lubricant—and the result can well be imagined! A week later his plane was as tacky as if it had been painted with treacle—but at last in desperation he wound it up and flew. Strangely enough it flew well, flights being characterised by a rocket climb and a pleasing variety of landing places.

"On landing, however, it picked up a memento of the occasion—bits of grass, a dead leaf or two, and even snails became firmly stuck to it. W . . . never bothered to pull them off, the prize being a small caterpillar that came to a sticky end under the port wing. After hundreds of flights over many weeks the tissue was still visible between the masses of botanical specimens and still of the consistency of a flypaper, the drag of these finally becoming such that W . . . pensioned the job off and we never saw it again.

"However, we feel sure that the 'Flying Haystack' as it became known is still in flying trim somewhere still proudly displaying its collection of odds and ends; still as sticky as ever; and only requiring a few hundred turns to wander off on another souvenir-hunting expedition". The CLUBMAN.

NEW CLUBS

1st BATTALION GRENADIER GUARDS M.A.C.
Capt. I. M. Erskine, 1st Battalion, Grenadier Guards, M.E.L.F.(1).
BENTLEY HEATH M.F.C.
W. Leech, 168, Mill Lane, Bentley Heath, Warws.
ICKENHAM COMMUNITY ASSOCIATION M.A.C.
P. L. Rivens, 62, Burnham Ave., Ickenham, Nr. Uxbridge, Middx.

SECRETARIAL CHANGES

TOW LAW M.A.C.
L. Rand, 33a, High Street, Tow Law, Bishop Auckland.
BREDBURY & ROMILEY M.A.C.
D. Taylor, 34, Welbeck Road, Hyde, Ches.
RUISLIP M.A.C.
D. Sullivan, 15, Denecroft Road, Eastcote, Middx.
WIMBLEDON & D.M.A.C.
K. Gardiner, 18, Holye Road, Tooting, S.W.17.
BRADFORD M.A.C.
N. Bateson, 32, Mavis Street, Bradford, Yorks.

RADIO CONTROL NOTES *(continued from page 108)*

and this can easily be done by connecting the wires to a U2 cell. The dimensions are not very important except that the lever pin must be a good fit with no loose movement, since the magnet gap at this end is so small.

There are several ways of using this actuator, the simplest probably being similar to that fitted on the writer's model, and shown diagramatically in Fig. 4. The rod F was made from 3/16 inch square balsa, with an SBA screw fixed up for adjustment. The lever G was made from flat strip with a number of holes to vary the effective length from 1/8 to 3/8 inches. For the spring K a thin rubber band was used stretched just tightly enough to pull the rudder over against the slipstream. A No. 8 battery was found satisfactory for the actuator for a number of flights. If the magnet gap is increased or more pull required a larger battery would be needed.

As an indication of the power of the actuator, brief details are given of the writer's model on which it was tested. Wing span 48 inches, chord 9 inches, total all up weight 34½ to 36½ ounces, depending on the radio receiver. It is a robust high wing type powered with a 1·2 c.c. Foursome engine with a 9×5½ in. E.D. plastic airscrew. The original radio fitted was a modified Cossor receiver but has now been replaced by a lighter homemade set. The fin is 7×3½ ins. and the rudder 7×2 ins. and is set about ¼ inch to the left, and pulled about ½ inch to the right. This gives lots of turn under power, and still leaves good control on the glide.

Although the system just described is covered by a provisional patent, the writer has no wish to stop the home constructor from experimenting and the details are given to enable him to build satisfactory equipment.

IT'S DESIGNED FOR YOU *(continued from page 109)*

wing lift, virtually equivalent to a reduction in wing area. Also, the fact that the tailplane has to be rigged at some appreciable *negative* angle makes thrust adjustment awkward. With the tail at a negative angle to the thrust line, a marked stalling tendency will be present under power, calling for considerable downthrust to counteract. In fact, it is a characteristic of rubber models with a forward C.G. position that a large amount of downthrust is usually necessary.

This, in itself, is not wasteful of power, contrary to popular belief, but does not make for easy rise-off-ground flights. When the model is released, there is a tendency for the downward inclined thrust to tip the model right forward, before it has picked up sufficient airspeed for the tailplane to become effective and correct the nosing-over tendency. In actual practice, the tailplane comes right up, forcing the wings into a very small or even negative angle of attack, whence they have low drag but very little lift, so that the model gathers speed quickly but takes off flat, rather than leaps off the ground into its normal climbing attitude.

On the other hand, the danger of a rearward C.G. position is this; to achieve balance the tailplane must contribute a good proportion of lift, which means that it must be at a positive angle. In extreme cases, this positive angle may be as much as the angle of incidence of the wings themselves. This may give satisfactory *static* balance, but is liable to be *dynamically unstable*, for both wing and tailplane stall at the same attitude. In other words, the correcting or stabilising feature of the tailplane has been destroyed and there may be no recovery from a stall, should this occur, or the tailplane may take charge and override the wing lift, forcing the nose of the model down and holding it down in an ever-steepening dive.

To guard against just this, there must be a certain angular difference between the wing and tailplane rigging incidences. Strictly speaking, it is only necessary to have an angular difference between the operating angles of attack. This can be achieved with identical rigging incidences, since the airflow over the wings is deflected downwards and artificially introduces different angles of attack in these two components. The danger here is, however, that under certain conditions, downwash over the wings may disappear, so that the combination (wing and tailplane) is left with no angular difference and hence no stability to recover.

Three degrees is the accepted figure for angular difference between wings and tailplane incidence, which only corresponds to a C.G. position of about 35 to 40 per cent. of the wing chord. This combination is the best for all shoulder and high-wing designs. For parasol models, however, a C.G. position further aft is desirable—75 per cent. of the chord from the leading edge being an average figure. To still retain some angular difference in wing and tailplane setting, we can see, at once, how a larger *tailplane area* is beneficial.

Model Car Manual

CONTENTS
Elementary Working Models – Simple Continentals – M. G. Magnette – Working Scale Realism – Making a Rubber Driven Racer – High-speed Competition Car – Unorthodox Propellants – Building from Kits – Transmission – Fuel Tanks – Mechanically Controlled Models – Rail Track Racing.

Speed C/L enthusiasts are finding new excitement in running model cars. This book by G. H. Deason will suit the aeromodeller as so many models use balsa or part balsa construction. There are designs to please everybody from simple friction drive to racing 100 m.p.h. prototypes. Don't let your engines get rusty during the winter months—have a go!

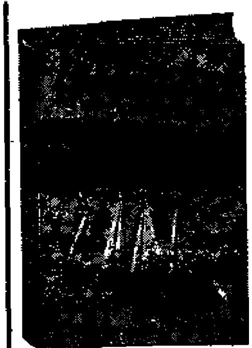
128 pages printed on white art paper, size 8½ × 5½ ins. Over 100 new half-tone and line illustrations. Bound in cloth and stiff card cover, gilt blocked title. Three colour dust cover. Price **7/6**

CONTROL LINE MODEL AIRCRAFT

CONTENTS
The Beginning – Choice of a First Model – Design – The Fuselage – Wings – Control Systems – Control Plates – Elevator Horns and Hinges – Empennages – Undercarriages and Dollies – Engines, Cowls, Tanks and Starters – Airscrews, Practical and Theoretical – Control Lines, Reels and Handles – Elementary flying.

Now is the time to read up the elements of control line flying. This book is intended for the beginner and not-so-expert and will lead you from your first kit to your first loop with the least possible amount of pranging on the way. Only fundamental knowledge is assumed, and the book is as essential to the newcomer as a prop for his engine.

128 pages, white art paper, size 8½ × 5½ ins. 100 illustrations, plans and line drawings. Cloth and card bound, gilt blocked title. Three colour pictorial dust cover. Price **7/6**



Now on Sale!

The best book for the novice boat builder!

CONTENTS
Sailing Sharpie – Centreboard Dinghy – Bermudan Sloop – M-Class Racing Yacht – Simple Electric Launch – Hydroplanes for engines 1–2½ c.c. – Hard Chine Cabin Cruiser – River Cruiser *Dubarry* – A.S.R.L. and their Construction – Clockwork British Power Boat – Rubber-driven Vosper A.S.R.L. – Two Power-driven A.S.R.L.'s. – Jetex Power Hydroplane – Decorative Galleon – R.A.F. Tender – Model Steam Plants – Electric and Diesel Installations.

128 pages, white art paper, 8½ × 5½ ins. Over 100 illustrations plans and line drawings. Cloth and card bound, gilt blocked title. Three colour photographic dust cover. **7/6**

From Model Shops and Booksellers everywhere. In case of difficulty direct from the publishers. Price each 8/3 *Post free.*

THE AERODROME · BILLINGTON ROAD · STANBRIDGE · Nr. LEIGHTON BUZZARD

CLASSIFIED ADVERTISEMENTS

PRESS DATE for April issue—Feb. 20th, 1950

ADVERTISEMENT RATES

Private — Minimum 18 words 6s., and 4d. per word for each subsequent word.

Trade — Minimum 18 words 12s., and 8d. per word for each subsequent word.

Box numbers are permissible — to count as 6 words when costing the advertisement.

COPY and Box No. replies should be sent to the Classified Advertisement Department, The "Aeromodeller," The Aerodrome, Billington Road, Stanbridge, Beds.

FOR SALE

New unused Anderson Baby Spitfires, 75/–. Ardens ·099, ball bearing, spark-ignition, 97/6. Elmes, 13, Quebec Road, Ilford, Essex.

Few new motors, McCoy, Ohlsson, etc. Reasonable prices. S.A.E. for list. C. Edwards, "Bryntirion", Church Lane, Pinhoe, Exeter.

New Engines, McCoy Redhead, 49, Baby Spitfire, Nordec, also bench tested Micron 10 c.c. Box No. 258.

Selling up! No offers please. American Kits—Carl Colberg's Comet Sailplane for 5–10 c.c. engines, £4; Stunt 6 c.c.; De Luxe "Madman Yates Jnr.", £2; Models Unlimited "Jester", £1. 15s.; scale 3·5 c.c. "Mister Mulligan" by Stirling (spun alloy cowl), £2; Semi-scale 10 c.c. Enterprise Pirate, £1. 15s. Engines—New Dooling 61, plus electrics-boxed, £18; Orwick 64, 61, running perfect, plus electrics, £12. New electrical U-Reely, spare wire, £5. Box No. 257.

Eta 5, diesel, bench run only, also Flywheel, £3. 10s. or offer. H. Hanan, Mevagissey, Cornwall.

New rotary valve Torpedo 30 special, Ohlsson glow-plug. Offers to:—D. Lea, 63, Church Street, Harpurhey, Manchester.

New Rollerised Ohlssons, Infant Torpedoes, McCoys (19–60), Atwoods, Ardens, etc., S.A.E. for list. Box No. 256.

New bench tested K.B.29, £6. 10s. Ohlsson 23 R.V., £5. 10s. Ohlsson 60, £6. 10s. Triumph 49, £8. Nordec £8. Little used Ohlsson 19, £4. Craggs, 148, Earls Hall Avenue, Prittlewell, Southend, Essex.

"Flights" August, 1944, to date. "Aeroplanes" May, 1944 to September, 1948. Any reasonable offer considered. Foulkes, 28, Prince Street, Rochdale, Lancs.

Brand new E.D. Radio Control Unit and Rudevator tested only. Owner emigrating. £12. or nearest offer. Partington, 4. St. Margarets Road, Ruislip, Middlesex.

Guaranteed engines for sale. McCoy Series 20A, £12; Fleetwind 66, £6; Bantam 199, £4; Attwood Champion, £8; Arden 099, £3. 10s.; Nordec 10 c.c., £6; E.D. Comp., £2; Amco ·87, 35/–; Keil K6, £4; Frog Redglow, 35/–. Full details on request. R. Scott, 185, Cambridge Road, St. Helens, Lancs.

McCoy 36. Just broken in, 15,000 revs. with 9½×6 in. prop., £7. Timms, 45, Cumberland Road, North Harrow, Middlesex.

"A.T.C." and "Air Reserve" Gazettes, May, 1942 to December, 1948, inclusive. Offers. Hurst, 50, Sidney Road, Rugby.

£30 worth engines, planes, cheap. Including E.T.A. 29, perfect. E.T.A., 5 c.c. Frog 100 diesels. Eros, flying boats, etc. S.A.E. for lists. Tyler, "Homeleigh", West Looe, Cornwall.

"1066" made up car chassis. Adapted for E.D. Mk. III. Price £6. or nearest offer. A. Wiggin, St. Cloud, Callow End, Worcester.

Little used "McCoy 60," needle valve slightly damaged, but in perfect working order. Complete with three plugs and coil, £10 or near offer. Also, used Super-Cyclone, £6. Inwood, 5, The Crescent, Teynham, Kent.

Three brand new Rocket ·45 motors disc value induction, £6 each. Also Forster 99 with 2-speed points, £10. Forster 29·305, £6. 15s., each, etc. All new and unrun. H. Goodman, The Laurels, Bleadon, Somerset.

American Merlin 23, special carburettor, super tuned. £3 or nearest. E. Cable, 12, Hough Green, Chester.

Frog 175 and 100 Bench run 30/– each. E.D. Comp. 60/–. Amco 3·5 30/–. McKean, 7, Belgrave Place, Corstorphine, Edinburgh, 12.

WANTED

Clean copies of "Air Trails", January, 1946, to November, 1948, wanted. Dinkel, Melbourne Street, Royston, Herts.

TRADE

Back issues of the AEROMODELLER can be obtained from W. H. Forway, 353, Manford Way, Chigwell, Essex.

North East Engine Depot, 6, Victoria Street, Goole. Part exchange of engines. Special offer, engines from, £1. 5s. All engines guaranteed.

Have you got your "Juneero Annual" yet? Price 1/–, from Juneero dealers everywhere. Post free, 1s. 2d. from Juneero, Ltd., Stirling Corner, Boreham Wood, Herts.

New Machinery from stock. Half-inch Motorised Drilling Machines £18. 10s. Wood Planing Machines from £8. 10s. Sanding Machines from £7. Forge Blowers, Paint Spray Plants, Electric Motors, Grinders, etc. Deferred terms available. Catalogue from manufacturers: John A. M. Steel, Dept. 74, Bingley, Yorks.

Build your own Radio control receiver. Sensitive relays 5,000 ohms. Current change ·2 M.A. Weight 2½ ozs. Type SCR 522 as specified in the AEROMODELLER, October, 1949, 12s. 6d. each. Postage 6d. Precise Model Kraft, 38, Northam Road, Six Dials, Southampton.

Coil Winders and Speaker repairers. Prompt service, guaranteed service. L.S. Repair Service, 49, Trinity Road, Upper Tooting, S.W.17.

North East Engine Depot, 6, Victoria Street, Goole, Yorks. Part exchange specialists, new and second-hand engines in stock. Every engine guaranteed. Write to us first. Engines from 25/–.

American Magazines, one year's supply post free. "Model Airplane News", 25/–; "Air Trails", 24/–; "Flying", 38s. 9d. For full list send Stamp to Willen Ltd. (Dept. 1), 101, Fleet Street, London, E.C.4.

SITUATIONS VACANT

Business opportunity for keen modeller. Model Exhibition of 30 models in portable building. Raised Miniature Race Track. Situated in popular Fun Fair at South Coast Resort. To be sold as complete business. Large scope. Further particulars on application to Box No. 259.

Experienced Accountant, keen aeromodellist, wide knowledge Taxation and Office organisation, offers his services to Retail Traders in London Area evenings and week-ends. Moderate fees by arrangement. Box No. 255.

NOTICES.

Messrs. Keil Kraft wish to correct any misunderstanding that may have arisen over a notice sent out to the Trade, to the effect that Mr. E. Keil, senior partner in the firm, was deceased. The gentleman in question was the father of Keil Krafts' Managing Director E. H. (Eddie) Keil, who wishes to thank the many people who have sent condolences.

Messrs. Durex, manufacturers of Durex Cellulose Tape, point out that the effect of an explosion and fire at their factory is not nearly so serious as was reported by the press in various parts of the country. There will in fact only be a slight interruption in maintaining supplies of tape to their customers.

ERRATA.

Bill Winter informs us that the aerofoil quoted in the December 1949 issue in his R/C article should have read Gottingen 549 not Gottingen 279, and where he remarked that "after a bad crash the *rudder* was unbroken" it should have read "*radio* unbroken."

In the table at the end of Per Weishaupt's article on sailplanes in the January issue the total area and mainplane area for the JAL–62 are given as 40·5 sq. dm. (669 sq. ins.) and 33·2 sq. dm. (465 sq. ins.) respectively; these should read total area 33·2 sq. dm. (514 sq. ins.) and mainplane area 25·9 sq. dm. (401 sq. ins.). Tailplane area should read 7·85 sq. dm. (113 sq. ins.).

"POST BY-RETURN" ALWAYS!

SEVEN SEPARATE LISTS
2d. each or 6d. for seven. 1. Aircraft kits and accessories. 2. Ship kits and fittings. 3. "00" and "0" Gauge Railway. 4. Engines, spares and fuels. 5. Micromodels. 6. Balsa and Hardwoods. 7. Books.
ALL GOODS SENT POST FREE.

CONTROL LINE KITS

Regent S.E.5a Plan-pack (or will make F. F. version)	8/9
Regent Hawker Fury Plan-pack	8/9
Keil Skystreak 26"	9/6
Keil Stunt King 37½"	18/6
Veron Focke Wulf 33½"	19/6
Veron Bee Bug 22"	11/6
Skyleada Comet 20"	11/6
Don Nifty 26"	12/6
Don Rival 22"	10/6

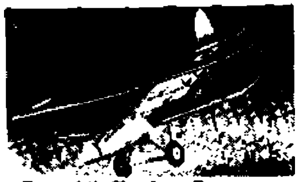
FREE FLIGHT POWER

Skyleada Zipper 44"	21/-
Skyleada Zipper Junior 31"	14/6
Halifax Hermes	15/6
Keil Southerner 60"	47/6
Keil Junior 60"	39/6

RUBBER POWERED KITS

Veron Streaker 37"	19/6
K.K. Gipsy 40"	10/6
K.K. Ajax 30"	6/-
K.K. Competitor 32"	7/-
Skyleada F/S Auster	5/-
Skyleada F/S Grasshopper	5/-
Skyleada F/S Tempest	5/-

ACCESSORIES
R.A.F. Roundels 2", 3", 4" 3d., 4d., 6d. each.
Letter and numerals 2", Gold Black Outline 2d. each.
Solid Colour Transfer Sheets 12"×7", six colours 1/3 each.



"Regent" Hawker Fury.
25½" W/S 2 to 3·5 c.c.

GLIDERS

Mercury Magpie 24"	3/9

ENGINES

	£	s.	d.
Amco 3·5	£4	17	6
Elfin 1·8	£3	19	6
Elfin 2·49	£4	19	6
Eta 29	£7	9	5
Frog 100	£2	8	0
Frog 160	£2	8	0
Frog 180	£2	14	9
Frog 500	£3	15	0
Allbon Arrow	£2	15	0
E.D. Bee	£2	5	0
E.D. Mk. II 2 c.c.	£3	10	0
E.D. Mk. II Comp. Spec.	£3	17	6
E.D. Mk. III 2·49	£4	5	0
E.D. Mk. IV 3·46	£4	12	6
Kalper ·32	£2	12	6
Mills ·75	£2	15	0
Mills 1·3	£3	15	0
Mills 2·4	£4	4	0
Jetex 50		9	6
Jetex 100		19	6
Jetex 200	£1	7	6
Jetex 350	£1	17	6

South Coast MODELS

37, WEST STREET, BRIGHTON, SUSSEX. *Phone: Brighton 6790*

"CALEY" Super Diesel Fuel, ½ pt. 3/-, post 6d. (First in 1946, still best)
"CALEY EASIFLO" Dopes, no brush marks, one coat covers, 2 oz. 1/-, cols. 1/3, ½ pt. 4/- & 4/6 post extra.
"Clyde" Yacht and Cruiser kits, finished metal hull etc. List 3 penny stamps.
Largest stock in Scotland of all makes of Diesel and Petrol engines.
Mercury and E.D. Radio Control Units, Lathes, Milling Machines, Shapers, Bench Drills, etc. H.P. over 2 years (Scotland only).
Parts to order. Engine repairs others can't tackle

CALEDONIA MODEL Co.

Model and Precision Engineers

TRUCUT AIRSCREWS

PRIME IMPORTED BEECH. PITCHES EVEN NUMBERS ONLY

6"	7 & 8"	9 & 10"	11"	12"	13" Dia.
1/6	1/7	1/9	1/11	2/3	2/6 ea.
4-12"	4-12"	4-10"	4-8"	4-8"	6" PITCH.

Accurate Pitch and Section. Require only Sanding.
TRADE: Usual full discounts. Write for Samples.

PROGRESS AERO WORKS
CHESTER ROAD, MACCLESFIELD. Telephone: 3891

REDUCED PRICES of MILLS ENGINES

·75 c.c. 55/- 1·3 c.c. 75/- 2·4 c.c. 84/-
New Model ·75 c.c. without Cut-out 50/-

KITS FOR RADIO CONTROL
E.D. RADIO QUEEN 90" Span £4. 18. 6
Falcon 96" £5. 17. 6 Stentorian 72" £3. 9. 6
E.D. R/c Unit £14. 10. 0 Mercury R/c Unit £13.2.6
E.D. Mk. IV, 3·46 c.c. Diesel £4. 12. 6

Race Cars ★ Ships ★ Model Railways

JONES BROS of CHISWICK
(½-min. from Turnham Green Station).
56, Turnham Green Terrace, W.4
Phone CHI 0858

Insurance is essential to every Aeromodeller

Benefit from the protection afforded by the Guild's THIRD-PARTY INSURANCE POLICY which is underwritten by Lloyds. Can you take the risk of having a claim made against you for injury to a third party, possibly running into many thousands of pounds? Obviously not, and it is plain common sense to take advantage of the Guild's service, through which any claims up to £5,000 can be met, all for a ridiculously small annual premium. Models of all types are covered and attractive transfers and badges are available.

Send 2½d. stamp for full particulars to:—
ALLEN HOUSE · NEWARKE STREET LEICESTER

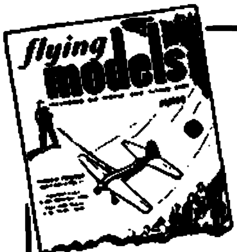
NGM

Third Party Cover for Rubber models, Sailplanes and Gliders. 9d.

Third Party Cover for models powered with internal combustion/diesel engines 2/6

Third Party Cover for models powered by Rocket Jet, Steam, etc. 5/0

Enrolment for total loss of models by o.o.s. Rubber and Glider 2/0 Rocket powered 4/0



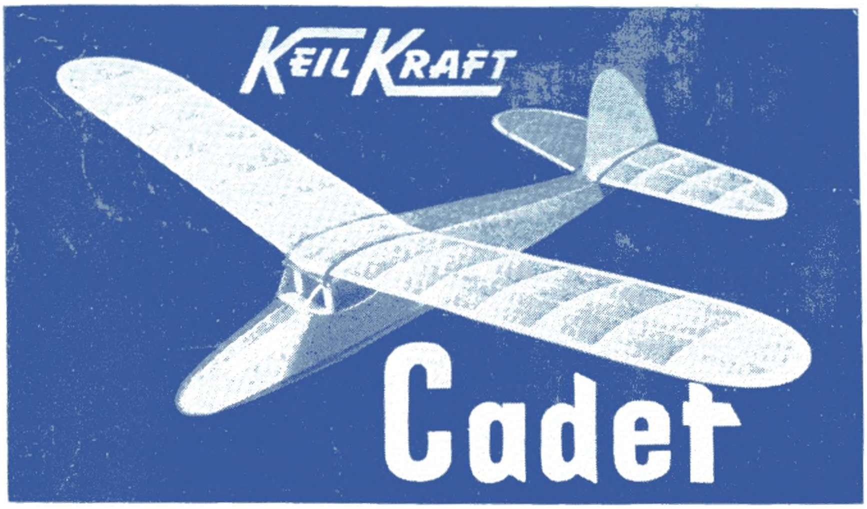
FOR THE LATEST IN AMERICAN MODELS

See FLYING MODELS, the only American magazine devoted exclusively to model aviation! Every issue includes how-to-build data on all types of new model aircraft . . . full-size plans . . . worthwhile hints . . . photographs galore . . . and features for sport aplenty! For beginners as well as experts. Published every other month. Annual (6-issue) subscription: 12/6. Mail your order and remittance today to: Atlas Publishing & Distributing Company, Ltd., Dept. A, 18 Bride Lane, Fleet St., London E. C. 4.

Conditions of Sale . . . .

All advertisement enquiries to . . . .
THE AERODROME, BILLINGTON ROAD, STANBRIDGE
Nr. LEIGHTON BUZZARD . . . . BEDFORDSHIRE
Telephone: EATON BRAY 246

Made and printed in Great Britain by Alabaster, Passmore & Sons, Ltd., London and Maidstone, for the Proprietors and Publishers, The Model Aeronautical Press, Ltd., Allen House, Newarke Street, Leicester. Trade Distributors: Horace Marshall & Son, Ltd., Temple House, Tallis Street, London, E.C.4—C1001. Sole Agent for Australasia: G. Mason, 4, Princes Walk, Melbourne. Registered at the G.P.O. for transmission by Canadian Magazine Post.



A NEW 30-in. SPAN *Semi Scale* GLIDER

A simple model for the beginner, the Cadet has the good looks for which all Keilkraft designs are noted. The performance would satisfy even the most advanced modeller. Contents are up to that high standard which has made Keilkraft Kits famous the world over.

Sensational Value at
4/- Complete Kit

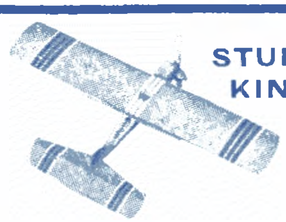
The SOUTHERNER

Bill Dean's graceful 60" Cabin Model. Elliptical wing. Full size installation drawings for 12 popular engines 47/6

SKYSTREAK 26

Supreme for stunt flying with motors up to 1 c.c. or 2½ ozs. weight. 26 in. span DRY KIT 9/6

STUNT KING



The SENSATIONAL 1949 NATIONALS WINNER!
Span 37½". Weight 15 ozs. 18/6

Don't Forget

your copy of this lavish 48-page production. Contains articles on building, covering, engine operation, etc., and complete list of K.K. kits and accessories 9D.

At your local model shop.

EACH KIT the *FINEST* IN ITS CLASS

FREE FLIGHT POWER		
Slicker Mite	32"	10/6
Slicker	42"	22/6
Slicker 50	50"	32/6
Super Slicker	60"	47/6
Southerner Mite	32"	11/6
Southerner	60"	47/6
Pirate	34"	13/6
Bandit	44"	21/-
Outlaw	50"	27/6
Scorpion	44"	37/6
Junior 60	60"	39/6
Falcon	96"	117/6
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	20"	22/6
Stuntmaster	30"	19/6
Stunt King	36"	18/6
Skystreak 26	26"	9/6
DURATION		
Playboy	20"	3/3
Orion	23"	3/6
Achilles	24"	4/-
Eaglet	24"	4/6
Ajax	30"	6/-
Competitor	32"	7/-
Gypsy	40"	10/6
Contestor	45½"	23/6
GLIDERS		
Invader	40"	6/6
Minimoa	50"	7/-
Soarer Baby	36"	5/-
Soarer Minor	48"	8/-
Soarer Major	60"	11/6
Cadet	30"	4/-
CHUCK GLIDERS		
Vega	12"	1/3
Spook	12½"	1/6
Polaris	20"	2/6
Comet	24"	3/6
FLYING SCALE		
Lysander	22"	6/-
Spitfire	22"	6/-
Mustang	24"	6/-
Zero	24"	6/-
F.W. 190	35"	6/-
Hurricane	25½"	6/-
Tempest	26"	6/-
Typhoon	26½"	6/-
Piper Cub	26½"	6/-
Thunderbolt	27"	6/-

KEIL KRAFT *Kits and Accessories*

Manufactured by E. KEIL & Co. Ltd., LONDON, E 2

Distributors for E.D., AMCO and NORDEC engines, JETEX motors and kits. ELMIC and BAT accessories. E.C.C. Radio Control Equipment.