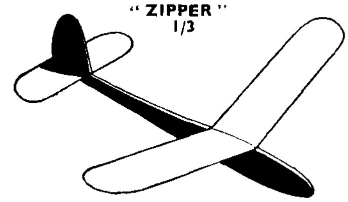
# AEROMODELLER

JUNE
1950

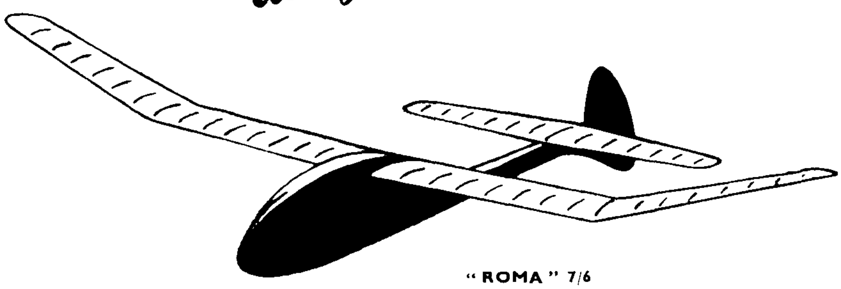
1/6

# ★★★★ "FOUR-STAR" PERFORMANCE *at your fingertips!*



"ZIPPER" 1/3

This 12″ wingspan mini-glider kit contains all necessary parts to construct this attractive little model. It can be built in ½-hour and has a fine performance.



"ROMA" 7/6

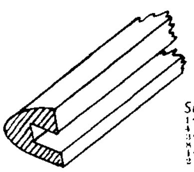
A slick new-style contest glider designed to the latest gliding technique with correct disposition of side areas to give maximum stability and performance both on the tow-line and under hand-launch conditions. Offset Tow Hooks make trimming for thermal flights an easy job.

**SPECIFICATION**
Span 40″ Overall length 28″
Wing area 157·5 sq. in.
Wing loading 2·72 oz/sq. ft.

## GLIDER KITS

★ *Easy to Trim*
★ *Troublefree Flying*
★ *"Contest Proved"*
★ *Economical Buying*

**LEADING EDGE SECTION.**

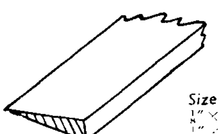


| Size | Price |
|---|---|
| ¼″ | 4d. |
| ⅜″ | 6d. |
| ½″ | 8d. |

(in 36″ lengths).

Requiring only light sanding after assembly. Rebated rear service for lightness and guide to notching for wing ribs.

**TRAILING EDGE SECTION.**

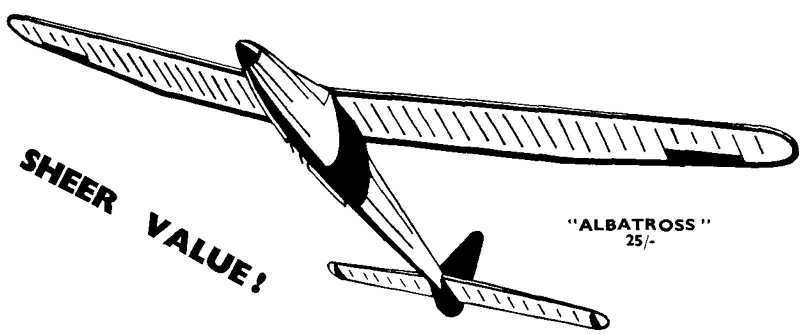


| Size | Price |
|---|---|
| ⅛″ × ⅜″ | 4d. |
| ⅛″ × ½″ | 4½d. |
| 1/16″ × ¾″ | 6d. |

(In 36″ lengths).

Requiring only light sanding after assembly. One of the more tedious items of construction eliminated.

**SHEER VALUE!**



"ALBATROSS" 25/-

**"ALBATROSS" PLAN PACK**—Now is the chance to build this 66″ span High Performance Sailplane which may be easily converted to "Nordic" Specification with the addition of three wing root panels either side.

Price **7/6**

(with full set of 13 printed Balsa Sheets and detailed plan).

F M A M W UNITAS

# HALFAX MODELS LTD

GREEN MOUNT WORKS · HALFAX PRODUCTS · HALIFAX YORKSHIRE

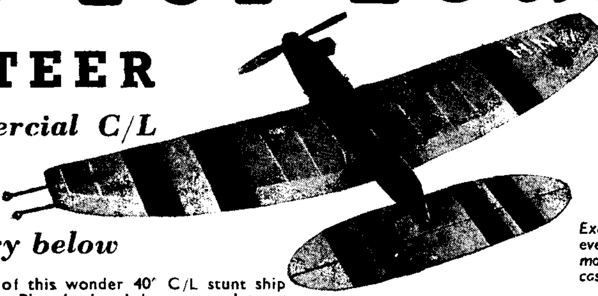
**MANUFACTURERS** **IMPORTERS** **EXPORTERS**

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

# See for Yourself!

## MUSKETEER

*The first commercial C/L Kit ever to win in an important contest—see story below*



Note the contents of this wonder 40″ C/L stunt ship which include 2-sheet Plan, 4 printed sheets, complete set of pre-shaped Solarbo balsa parts, wire, transfers, pre-fabricated fuselage, ample tissue, spun aluminium cowling, hardware bellcrank, elevator, horn, nuts, bolts, etc.), building instructions. Absolutely complete except dope, cement and tank.

**19/6**

## YOUR MERCURY DEALER WILL BE GLAD TO SHOW YOU

*Examine any Mercury Kit in detail, and then see how every essential part is included for building the complete model, with only final accessories to be added in certain cases. See how Mercury give you :—*

★ CLEARNESS OF PLAN.
★ QUALITY OF WOOD.
★ CLEARNESS OF PRINTING ON WOOD.
★ INTELLIGENT BUILDING INSTRUCTIONS.
★ OUTSTANDING DESIGN.

*—then see how much you save yourself by buying a Complete Mercury Kit.*

## THE NORSEMAN

*Mercury's Sensational Nordic Kit*

Here is another special contest design this time from Phil Guilmant in association with Mercury. The kit is complete (except dope) and exact to Nordic A.2 specification. By following the plan with its real photo-views, you will have a perfectly correct conforming contest model. Ask your dealer to show you this splendid kit.

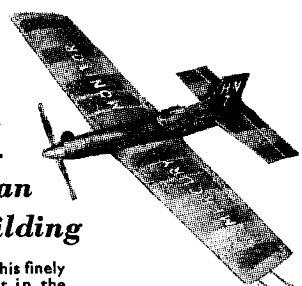
**17/6**

### MERCURY *Mallard*

Watch next month for details of Mercury's newest kit sensation—a super 48″ F/F contest model of excellent design and unusually rugged construction. The Mallard is for flying with 1·5-2·5 c.c. diesel engines, and the kit will be complete and up to the best Mercury Kit standards.

## MONITOR

*A de-luxe Kit for the man who takes pride in his building*

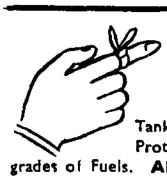


For sheer kit quality plus top-level performance, this finely designed C/L speed stunter remains a highlight in the Mercury Programme. Plan enables Frog 500 or Yulon 29 to be built in as well as Amco 3·5. Kit complete (except dope).

**27/6**

## A FIELD-DAY FOR MERCURY AT BRIGHTON

The S.E. Area C/L Championship Contests at Brighton on Easter Monday will long be remembered as a most outstanding day for Mercury. First Mr. L. Steward (W. Essex Club) tied for first place in the Open Stunt Contest, flying a Musketeer built from the standard kit of parts as advertised. THIS IS THE FIRST TIME A COMMERCIALLY DESIGNED KIT HAS EVER WON SUCH AN IMPORTANT EVENT. Mr. Steward used a Frog 500 running on Mercury Nos. 5 and 7, also a Mercury Pressure-Feed Tank and Mercury C/L wire. Next, Mr. Cyril Shaw (Zombies) came 1st in the Class I speed contest by flying at 72 m.p.h. (subject to official confirmation) with an Allbon Javelin (another exclusive Mercury line), using Mercury No. 3, whilst it was quite clear to see that on the field, contestant after contestant was using one or another item of Mercury equipment. More than ever modellers to-day choose MERCURY FOR BETTER MODELLING.

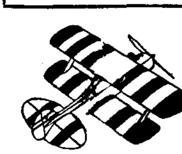


**DON'T FORGET** Ajustalyne Handle ● Mercury Bell Cranks ● Elevator Horns ● Fuel Funnels ● Fuel Filters ● Engine Bearers ● Needle Valve Assemblies ● C/L Wire ● Balsa Cutting Tools ● Pressure Feed Tanks ● C/L Racing Tanks ● Aerolac ● Cement ● Rubber Lubricant ● Plug Protectors ● Spanners ● Boost Plugs ● Spinners ● Musketeer Cockpits ● 8 grades of Fuels. **ALSO distributed by Mercury:**—Allbon Engines, Stant Props., E.D., Amco, Yulon, Nordec Engines, Solarbo Balsa, Dunlop Rubber, Bat Accessories, Esso Handy Oil, Hivac "Thyratron" Valves, etc., etc. **Ask your Dealer for the Mercury Catalogue 6d.**

# MERCURY MODELS

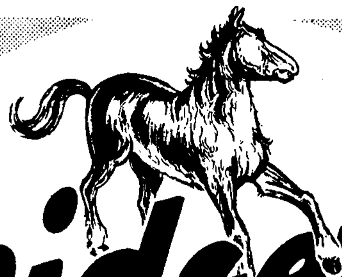
MERCURY MODEL AIRCRAFT SUPPLIES LTD., LONDON, N.7

TRADE ONLY SUPPLIED



**MERCURY DE-BOLT SUPER BIPE** is the ideal stunt trainer for Frog 500 or Yulon 29 or 49. This rugged and completely dependable model is a real "toughy" for punishment.
De-Luxe Kit 29/6

# The Midget Mustang FROM THE VERON Range



## BRITAIN'S FIRST KIT FOR A TEAM RACER WINS BRITAIN'S FIRST INTERNATIONAL TEAM RACE

PHIL SMITH FLYING HIS PROTOTYPE AMCO 3·5 POWERED MIDGET MUSTANG WON THE INTERNATIONAL TEAM RACE EVENT AT BRIGHTON'S MODEL FLYING CHAMPIONSHIPS, TO WIN THE SPLENDID M.A.T.A. TROPHY AT AN AVERAGE SPEED OF 65 M.P.H.

SPECIALLY DESIGNED TO SUIT THE MORE POPULAR SIZES OF BRITISH DIESEL AND GLOW-PLUG MOTORS SUCH AS:—

Allbon "ARROW" & "JAVELIN" 1·49 c.c., ELFIN 1·3, 1·8 & 2·4 c.c., MILLS 1·3 c.c., AMCO 3·5 c.c., etc.

MAXIMUM ENGINE WEIGHT 6 ozs.

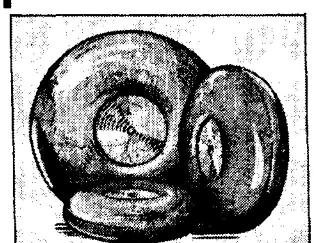
THE FINEST CONTROL LINE KIT EVER PRODUCED FOR **21/-**

**DETAILS GIVEN FOR CONSTRUCTION OF 1 oz. TANK**

SPAN 24" (Area 101 sq. ins.)
LENGTH 21" WEIGHT (Bare) 8½ to 9 ozs.
SPEED RANGE 60 to 80 m.p.h.

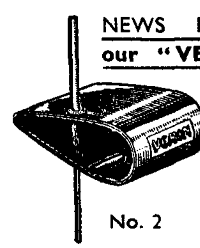
**VERON**

***A FEW SELECTIONS FROM THE NEW "VERON" 1950 CATALOGUE 6d.***
(Obtainable from your dealer)



**WHEELS**
Lightweight Sorbo Balloon wheels with light-alloy centres. Ideal for scale models. *The most realistic balloon wheels ever produced.* Drilled for 16 and 14 S.W.G.
*Available in 3 sizes:—*
1½" diam. .. .. .. 2/6
2" .. .. .. 3/6
2½" .. .. .. 5/-

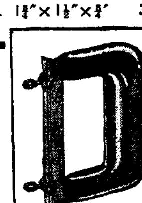
NEWS FOR TEAM RACERS! our "VERON" GOLD SEAL TANK No. 3 holds exactly 29·5 c.c. of fuel



No. 2

| | | | |
|---|---|---|---|
| No. 1 | LARGE | 2¼"×2"×1½" | 6/- |
| No. 2 | MED. | 2¼"×1½"×1" | 4/- |
| No. 3 | SMALL | 1¾"×1½"×¾" | 3/- |

**"VEROGRIP"** Control line (pat. app. for) Handle.
The adjustment EVERYBODY wants!—variable line gap from ⅞" to 4⅝". Vary your degrees of control from fine to coarse for speed, team race, sport and stunt. Lightweight metal 3/6

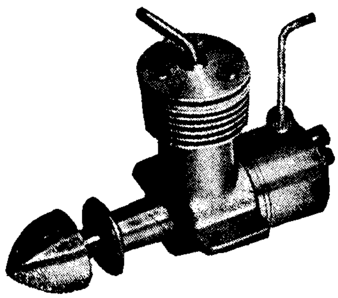


Australian Distributors: Scientific Hobby Distributors, 352 Queen Street, Brisbane. Australia.
Indian Distributors: K. L. Roy, 8 Lee Road, Calcutta, India.

MODEL AIRCRAFT (bournemouth) LTD. [illegible] Place BOURNEMOUTH
'Phone SOUTHBOURNE 2783

# ALL PERFECT—ALL PROVED

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

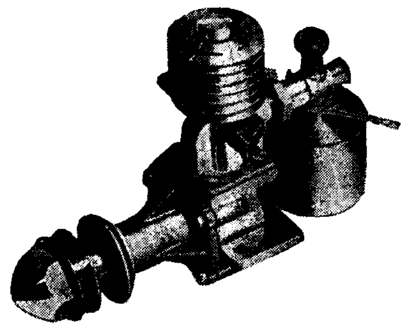


**E.D. 1 c.c. Mark I (BEE)**

A very compact little motor with an overall height of $2\frac{1}{4}$ in., it weighs only $2\frac{3}{8}$ oz. Features a disc inlet valve with induction pipe going through centre of fuel tank. Bore ·437 in., static thrust 12 oz., stroke ·400, R.P.M. 7,000 plus.

Price **£2 5 0**

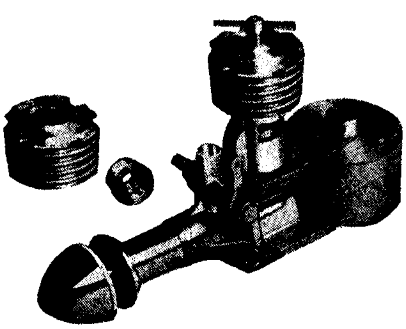
**E.D. Diesels.**



**E.D. 2 c.c. Mark II**

Capable of developing $\frac{1}{8}$ h.p., the total weight of this engine including airscrew is only $6\frac{1}{2}$ oz. Produces static thrust of 16 to 18 oz. Bore $\frac{1}{2}$ in., stroke $\frac{5}{8}$ in., width $1\frac{7}{8}$ in., length 4 in., height 3 in. Efficient working R.P.M. 6,500. Suitable for planes 3 ft. 6 in. to 5 ft. span.

Price **£3 10 0**



**E.D. 2.49 c.c. Mark III**

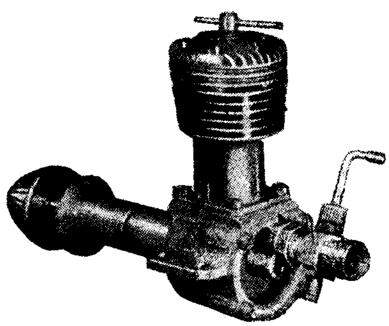
Holder of British speed record for " C " class cars at 50·5 m.p.h., this diesel has extended prop. shaft to simplify streamlining. Height $3\frac{1}{4}$ in., width $1\frac{7}{8}$ in., length 5 in., weight 6 oz. Complete with conversion head for " Glo-plug ".

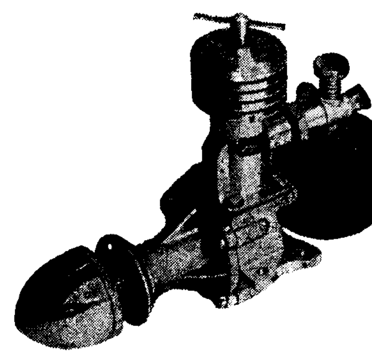
Price **£4 5 0**

**E.D. 3.46 c.c. Mark IV**

Developing 10,000 R.P.M., the three-forty-six is one of the finest engines for control-line and stunt flying. Its power is equal to any 5 c.c. on the market. Bore ·656 in., stroke ·625 in., height 3 in., width $1\frac{7}{8}$ in., length $4\frac{7}{8}$ in., weight $5\frac{3}{4}$ oz.

Price **£4 12 6**





**E.D. 2 c.c. COMPETITION SPECIAL**

Holder of British speed record for control-line flight at 89·95 m.p.h. Ideal for control-line, stunt and speed competitions. Gives 23 oz. static thrust and incorporates vernier compression adjustment. Height 3 in., width $1\frac{7}{8}$ in., length 4 in., weight $5\frac{1}{2}$ oz. Price **£3 17 6**

**ORDER FROM YOUR MODEL SHOP**

**E.D. ELECTRONIC DEVELOPMENTS (SURREY) LTD**

KINGSTON ON THAMES 1223

DEVELOPMENT ENGINEERS

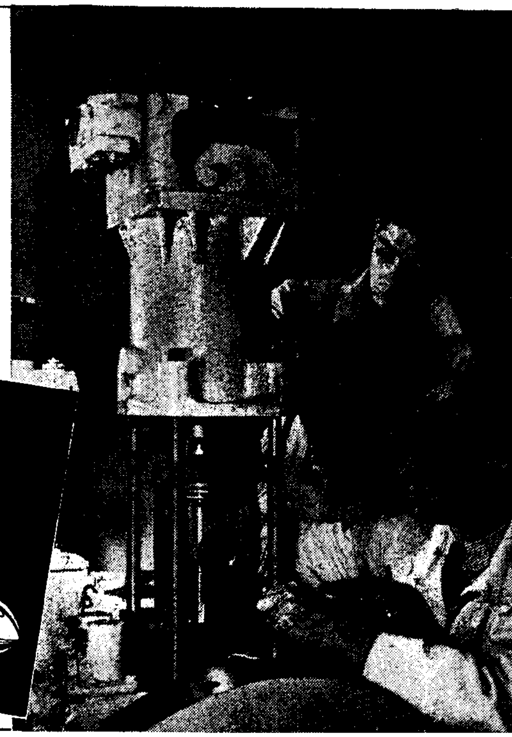
18, VILLIERS ROAD, KINGSTON-ON-THAMES, SURREY, ENGLAND.

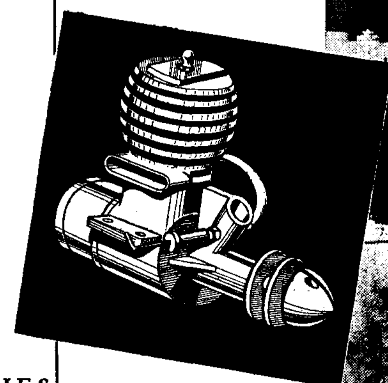
S.M.A.E. UNITAS

# *Esso Serves the Aero Modeller through Mercury Fuels*

SPECIALLY DEVELOPED IN Esso LABORATORIES

Data obtained from this large diesel engine, running under controlled conditions in the Esso Laboratories, is used to improve the quality of lubricants used in Mercury Fuels.





Here they are — a range of fuels to give you trigger-quick starting and a superb flexibility that will make even 'vertical eights' easy — a power output that will put you away out in front in Club Competitions. The name is MERCURY, the most successful and popular range of fuels in the aero-modelling world.

Unlike home-made 'dopes,' there is no hit-or-miss method in the make up of MERCURY fuels. Eighty diesel and a hundred and fifty glow-plug mixtures have been evolved and rigorously tested by Esso Laboratories in close co-operation with the Henry Nicholls Research Group and practical aero-modelling experts.

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

MERCURY FUELS GIVE

- SWIFT STARTING
- STEADY RUNNING
- TOP PERFORMANCE
- MAXIMUM ENGINE LIFE

*There is a* **MERCURY FUEL** *specially blended for every type of Model Engine*

1 For all spark ignition engines

2 For all spark ignition racing engines

3 For all diesel engines

4 For all glow-plug engines

5 For all racing glow-plug engines

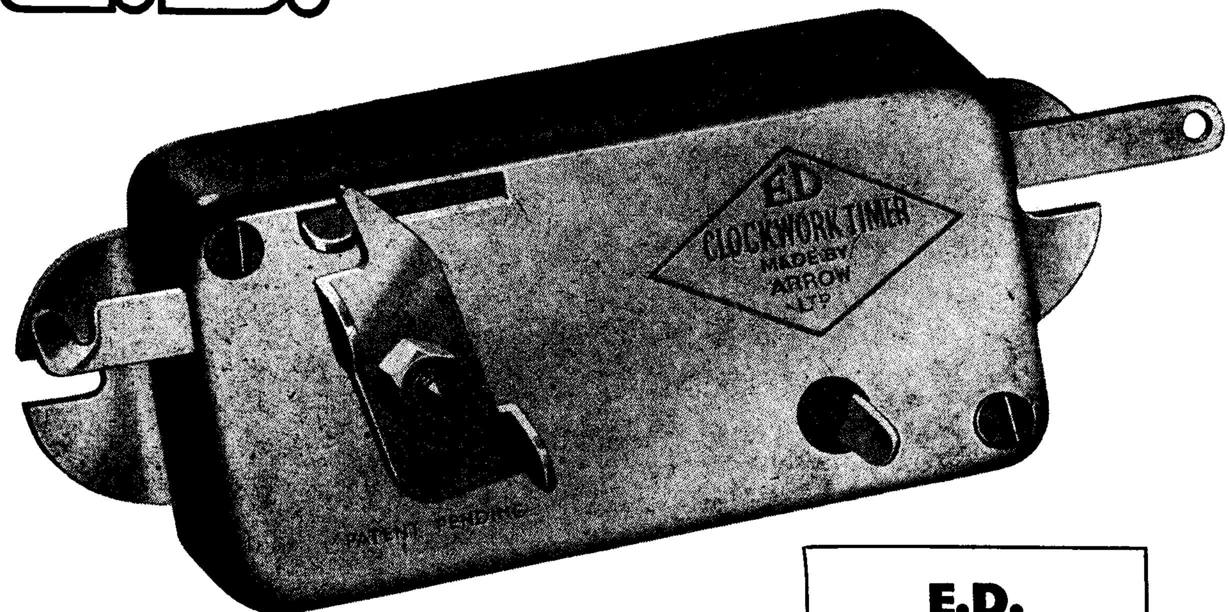
6 For all diesel engines — requires no ether

7 The record breaking racing fuel

8 Ready-mixed first-pressing castor lubricant for diesel engines.

MERCURY MODELS, 308 Holloway Road, London, N.7. (Wholesale only). Tel. No: North 4272

# E.D. Clockwork TIMER




## ANOTHER E.D. Masterpiece!

The only Clockwork Timer on the market. Weighs under 1 oz. Gives a total run of 50–60 seconds and has a pull of 7 ozs. Clockwork accuracy and, as with all E.D. products, absolutely reliable. $1\frac{3}{4}$ in. $\times \frac{7}{8}$ in. $\times \frac{1}{2}$ in. PRICE **15/6**

## E.D. PLASTIC PROPELLERS

We've run these Propellers at high speed and pushed a screw-driver through the blades—we've also run them with the tips grinding against a concrete floor—and they haven't broken or bent. E.D. Plastic Propellers are practically unbreakable and will stand crash landings. They do not flex in flight and the pitch can be altered by heating and stays put. Obtainable in all sizes from **2/-** each.

ORDER FROM YOUR MODEL SHOP

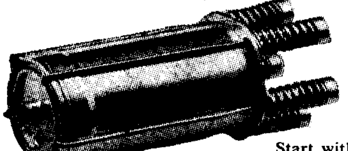
**E.D. ELECTRONIC DEVELOPMENTS (SURREY) LTD**

DEVELOPMENT ENGINEERS

KINGSTON ON THAMES 1223 18, VILLIERS ROAD, KINGSTON-ON-THAMES, SURREY, ENGLAND.

**TROUBLE-FREE FLYING WITH JETEX.**

Jetex means power flying without the snags or weight. If you have not tried jet flying yet get on the ball right away—it's tops.
Jetex 100 illustrated .. 19/6



GET JET MINDED

Start with a Vampire and see for yourself the possibilities of Jetex flying.

# Raylite

## GLIDER

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

## RUBBER

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

## POWER

| | £ | s. | d. |
|---|---|---|---|
| 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. 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 |
| Frog Janus .. .. | | 15 | 0 |
| Frog Centurion .. | £2 | 19 | 6 |
| Frog Powavan .. | £1 | 5 | 0 |
| Jetex Flying Wing .. | | 5 | 0 |
| Jetex Vampire .. | | 5 | 0 |

## ENGINES

| | £ | s. | d. |
|---|---|---|---|
| Amco 3.5 .. .. | £4 | 17 | 6 |
| Frog " 180 " .. .. | £2 | 14 | 9 |
| Frog " 500 " .. .. | £3 | 15 | 0 |
| Mills S·75 .. .. | £2 | 10 | 0 |
| Mills P·75 .. .. | £2 | 15 | 0 |
| Elfin 1·8 .. .. | £3 | 19 | 6 |
| Elfin 2·4 .. .. | £4 | 9 | 6 |
| E.T.A. " 29 " G/P .. | £7 | 9 | 6 |
| 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 |
| Elfin 1·49 c.c. .. | £2 | 19 | 6 |
| Yulon " 29 " .. .. | £3 | 19 | 6 |
| Yulon " 49 " | £4 | 19 | 6 |

## CONTROL LINE

| | £ | s. | d. |
|---|---|---|---|
| K.K. Phantom.. .. | | 18 | 6 |
| K.K. Phantom Mite .. | | 11 | 6 |
| K.K. Stunt King .. | | 18 | 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 |
| Mercury Marlin .. | | 19 | 6 |
| Mercury Monitor .. | £1 | 7 | 6 |
| Shaw's Dervish .. | | 19 | 6 |
| Bristol Bulldog .. | £1 | 2 | 6 |
| Mercury Musketeer .. | | 19 | 6 |
| Veron Mustang .. | £1 | 1 | 0 |
| Keilkraft Skystreak " 26 " | | 9 | 6 |
| SE.5A Plan Pack .. | | 8 | 9 |
| Fury Plan Pack .. | | 8 | 9 |

**HIVAC THYRATRON**
Remote control valve for R/C work, the equivalent of the RK.61 .. 17/6

**VERON HANDISPRAY**
A compact hand spray for thin cellulose, adaptable to any screw-top can. 2/6

**ENGINE STANDS**
Universal engine test stand, fully adjustable and essential for power enthusiasts .. 12/6

**TACKEY TAPE**
Put it on the required part and dope those trimming lines in. When dry just pull the Tackey tape away. 9½d. per roll.

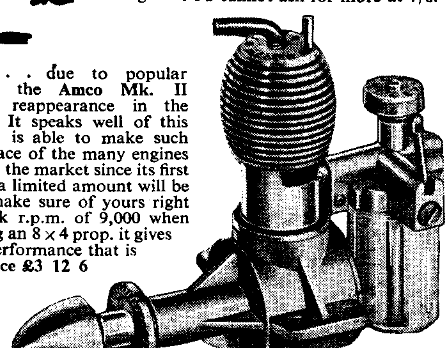
**CATON WHEELS**
The perfect wheel for R/C jobs where good accessories are wanted. Pneumatic 4½ in. precision wheel. 21/- per pair.

**ELMIC TIMERS**
The most reliable diesel timer available, engineered throughout and light in weight .. 5/6

Order your copy of the latest Model Aviation publication now, bags of plans and top-notch articles by the leaders of model aeronautics.
Price 2/-


. . . that interest in gliders and sailplanes is on the up and up. Many lads he has talked to recently say they are getting a new sort of thrill from motorless flight. In fact some are frank about it and admit that it's a nice change from the worries of power flying. Mac doesn't know an awful lot about glider technique and he wanted to try it so he looked over a kit of the **Halfax 40-in. Roma** and decided to buy it. Outstanding points about it are simple building methods (which are always best), fine all weather performance, and good all-round design. You cannot ask for more at 7/6.

**Encore** . . . . . due to popular demand the **Amco Mk. II** makes a welcome reappearance in the small engine field. It speaks well of this classic diesel that it is able to make such a comeback in the face of the many engines that have come on to the market since its first introduction. Only a limited amount will be made available so make sure of yours right away. With a peak r.p.m. of 9,000 when fully run in and using an 8 x 4 prop. it gives a contest winning performance that is unbeatable .. Price £3 12 6



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AEROMODELLER
INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

## "Eddie" Riding

IT IS with great regret that we refer to the death, in a flying accident on Good Friday last, of Mr. E. J. Riding, chief draftsman and photographer to the AEROMODELLER.

Mr. Riding first became associated with our organization in 1940, when we commenced the publication of a series of articles on flying scale models, whilst in the latter part of that year he contributed a number of plans for the first volume of the " Aircraft of the Fighting Powers" series.

Throughout the last war, Mr. Riding was in the Aircraft Inspectorate Department of the Air Ministry, and on release at the end of the war he joined us full time.

His knowledge was encyclopædic. Since boyhood he had taken a wide interest in aircraft, and during the past 20 years had compiled what is probably the most comprehensive range of photographs and data in connection with full-sized aircraft.

In the aeromodelling world he achieved a much respected reputation, both for construction and layout of design, of a number of very popular flying scale models.

As a photographer, his ability enabled him to produce some of the finest air-to-air shots of full-sized aircraft, and at the same time to photograph for the organization at Eaton Bray all kinds of model aircraft, boats, engines, etc.

As a man, he was liked by all for his integrity, even-tempered manner, and devotion to all that was good and high-class in flying, whether full-sized or model.

It was in the course of his duties as chief photographer to our organization that he met his death, together with the pilot of the aircraft, Stanley Orton Bradshaw, and another passenger, Mr. N. C. Stoneham. His tragic death at the age of 34 will be mourned, not only by his widow and three young children, not only by us at Eaton Bray, but by the many friends he had made both personally and by way of correspondence, throughout the aeromodelling movement.

For myself, I would only add that he was my closest friend and that his passing has robbed me of the loyal support of one I had come to know so intimately and respect so whole-heartedly in the course of my 10 years' association with him. D.A.R.

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## Manners maketh the Modeller

" Clubman " has some very pertinent remarks to make this month appertaining to the current trend towards unsporting behaviour witnessed on many flying fields. It is usual to dismiss such criticisms nowadays as a sign of the times but is that any excuse ? Those of us who remember the " good old days " would find it hard to recall many comparable instances that are commonly witnessed today, and it is very difficult to foresee any speedy solution to the problem.

Is it an outcome of a (perhaps) too rapid growth of the aeromodelling movement in this country, with its consequent influx of a percentage of casual enthusiasts who adopt the modern " couldn't care less " attitude ? We have heard the opinion expressed that the present day market is partly to blame, for, whereas before the War a modeller had to really work to produce a high-class contest design and machine, all a newcomer has to do today is to purchase a good kit—in which all the thinking has been done for him—cut on the " dotted line ", assemble and cover. On this basis, the average careful workman can produce a model that will win any contest, given ordinary luck.

Whilst we do not carp at such progress on behalf of the newcomer to our chosen hobby, we do feel that such advancement has created a shortage of the patience that went with pre-war modelling, and as a consequence a deterioration of average good conduct amongst the competitive modellers, for restraint was ever a partner of patience.

## Whither Power Flying?

A letter recently received from a very well-known correspondent throws the spotlight on an increasingly vexed problem—the ability of the present-day power-driven model, and its flier ! Instancing a big meeting he attended, he states " the show put up by free-flight power was depressing ; in fact if I had not known that this type of model is capable of turning in consistently good flights, I would have been inclined to think the whole thing a waste of time. Model after model went screaming up, turned in or over, and splintered to pieces on the runway "

In calmer weather most of them would have got away with it, and the result would have been most spectacular. But, dash it all, how often do we *have* calmer weather ? We are using American methods in an English climate, and they just won't work "

We cannot but agree with this writer, for on the same day, but in a distant part of the country where conditions were better, the same sorry story was going on all day long. We ourselves witnessed a succession of prangs that should never have happened—even less in full view of a non-aeromodelling public. It seems that the average contestant nowadays can think of no other way of flying than screaming his model up as high as possible within the limits of a restricted engine run, and very few get away with it. It was noticeable that a high percentage of the top men did *not* make rocketing take-offs, *but* their models were capable of a fine, steady rate of climb

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*Scene in the line-testing pits at the South-East Area S.M.A.E. Control-line Championships held at Brighton on Easter Monday. The model in the foreground is P. Westbrooks' Attwood Champion powered S.E.5a.*

after a smooth take-off, producing flights that were worthy of the name and a pleasure to watch.

Our correspondent suggests a solution, this being to lengthen the permitted power run in contests, for " this would permit a certain amount of underpowering with a tremendous increase in stability, even in windy weather ". Whilst appreciating this point of view, we cannot agree that this would produce any improvement, for the " jet-propelled " boys would still aim for that screaming take-off and climb, which, with a longer motor run would mean more and more lost models, and contest organisation becoming more and more tangled up with the majority of the entry down-wind looking for lost models.

What is the answer ? Frankly we ourselves do not know, but it would be interesting to have the views of readers, both competition fans and others, for by the pooling of such ideas a solution may be found.

## The 1950 British Nationals

FOR the first time since their introduction the British Nationals are to be held a considerable distance from the home counties, and the main annual pilgrimage of competition minded modellers will be in the direction of Clifton Aerodrome, York, instead of the all-familiar Fairlop. This is the direct result of a proposal by certain members of the S.M.A.E., to whom praise is due for a wise and equitable suggestion, that the venue for the Nationals should circulate on a roster basis throughout the country.

People in other parts of this island have long complained that the Society was somewhat " London minded " when it came to competition matters, and agreement by the Council to the roster system was not only prudent but also a disclaimer.

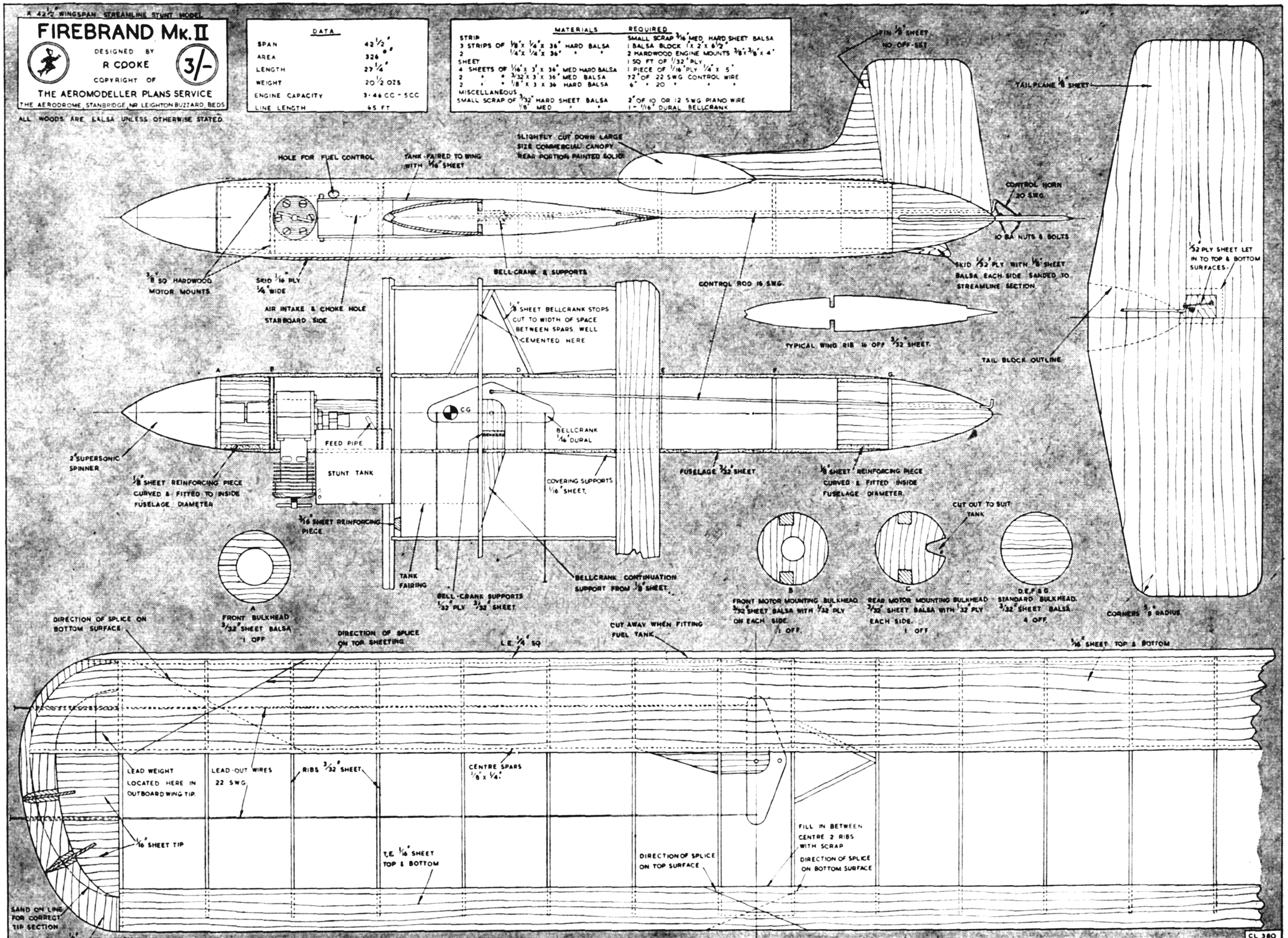
We would discreetly mention at this stage, that quite a large percentage of the modellers we have encountered in our travels, rarely carry their thoughts and ideas past the boundaries of their own flying fields, and that this failing is national and not confined to any one section of the aeromodelling community. We therefore urge all competition fliers in the South, the East, and the West to make their best efforts to be in York from the 27th to the 29th of May, when they will undoubtedly be assured of a real northern welcome.

To those in the North we would say, we have oft heard the complaint that you were unable to participate in national events owing to the travel distances involved. Here then, is your opportunity. May we see northern modellers by the thousand.

To *all* who attend we draw attention to our preceding paragraphs on the subject of competition manners and litter. Let everyone make certain that the disgrace at Sealand is not repeated at Clifton Aerodrome.

## Vacancy

A vacancy exists at Eaton Bray for a " solid scale " model builder. Must be skilled in detail work. Age 20-25. Salary about £5 a week. Applications invited immediately.

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**A 42½ INCH WINGSPAN STREAM-LINE STUNT MODEL DESIGNED BY RALPH COOKE**

**Member Rotherham D.M.F.C. . . . . 26 years old . . . municipal cost clerk . . . keen on stunt, free-flight power and glider contest flying . . . . aeromodeller for 14 years . . . . . was a flight engineer on Avro Lancasters**

PRESENTING a new form of tubular balsa fuselage construction, the Firebrand is a fast flying stunter suited to the latest 3·5 c.c. to 5 c.c. motors. Its sleek lines are apt to mislead one into thinking in terms of frailty, whereas it has proven tough beyond comparison with other standard forms of structure.

We have seen wound sheet, planked and commercial paper-bound sheet used on other control-liners and free-flighters, but this wrapped construction is different. Firstly, it allows the " works " to be put inside with the least difficulty (ever tangled the push-pull rod with the formers in a planked job ?), and secondly, it's the quickest built all-balsa fuselage, outside the crude box type.

**Building Instructions.** Firebrand is built in three stages. First make the fuselage halves, then the wings and tailplane and, finally, assemble the whole in strict sequence.

**Fuselage Halves.** Find a round former of approximate fuselage diameter. Cut out from 3/32 in. medium sheet balsa two fuselage halves 3½ in. wide and of exact length. Mark all bulkhead positions on the inside surfaces and steam the outside surface. During the steaming, the side will naturally curve, so place it on the former occasionally to check that it will bend the full curve without forcing. When sufficiently bent lay the side on the former and either pin or wind tight with a piece of elastic. Dry the curved balsa near a fire for ten minutes and then repeat the process for the second half. Cut out all bulkheads and halve each, with the exception of B and C (the two supporting the engine mountings). Cut out the portion occupied by the wing in each half and cement each bulkhead firmly in its correct place. Bulging between bulkheads can be removed by a skin of cement to pull in the offensive spot. Cement in place the ⅛ in. soft sheet reinforcing pieces at the nose and tail, which are formed in the same way as the fuselage side. These can be made with 3 in. wide balsa plus a small strip for packing. Cut out the plan view of the tail block from ⅛ in. sheet, and cement temporarily to each side of it a block of 1×2 in. soft balsa, with the grain fore and aft. Mark out the diameter of the fuselage on one end and sand and carve the block to shape. Separate the halves from the ⅛ in. centre core and cut a strip approximately ⅛ in. wide across the forward end of the core. Now pin all three together again, using this strip instead of the full plan view of the core. (This allows easy fitting of the tailplane.)

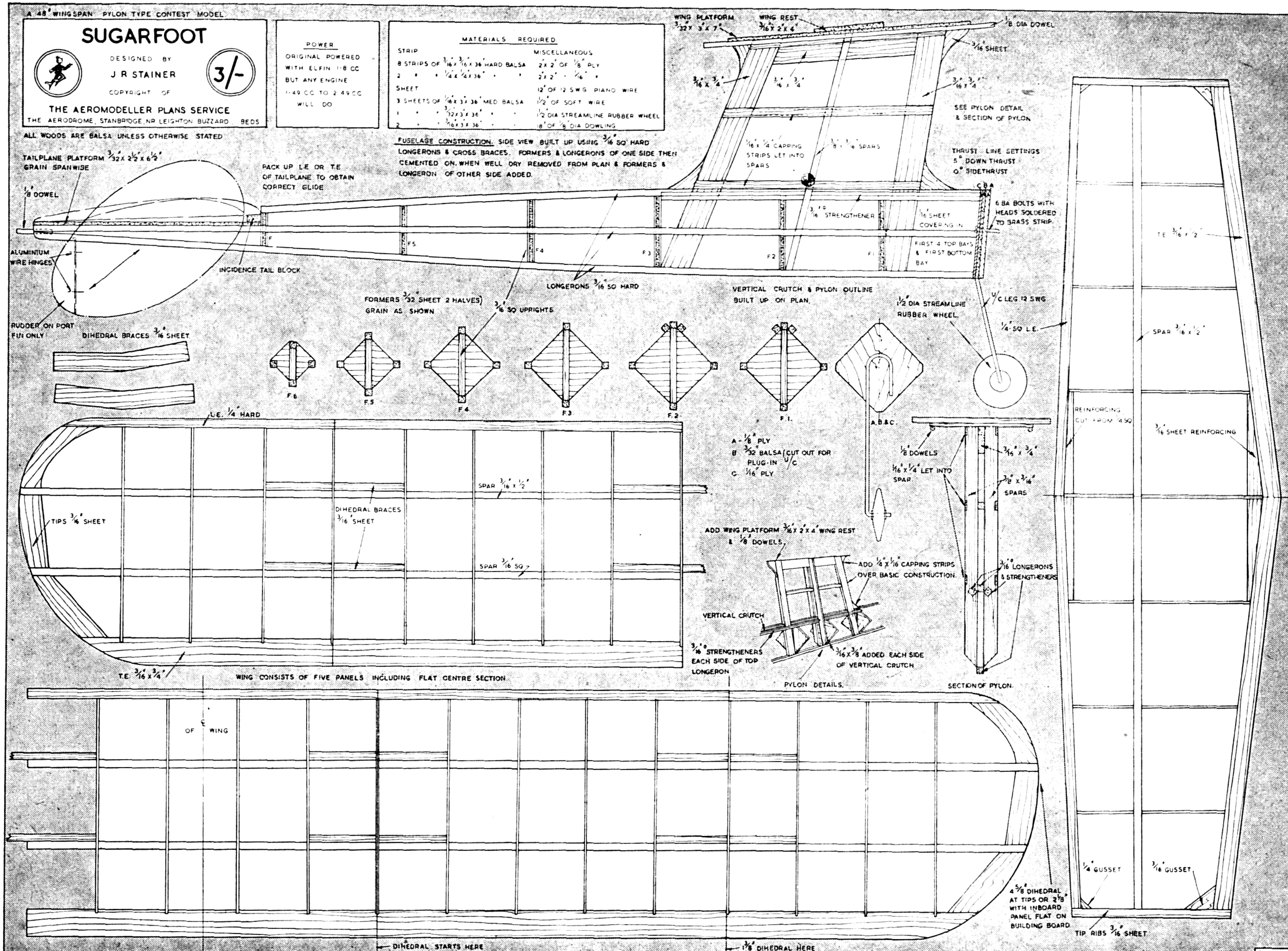
Fasten the two fuselage halves together with elastic bands and cement the tail blocks to the fuselage, checking that the slot for the tailplane coincides with the dividing line between the two halves. When firm, separate the two halves and carve the rear ends to merge into the tail blocks.

**Mainplane.** Cut the ribs from 3/32 in. sheet and sandwich eight between two 1/32 in. plywood templates, to position the holes for the lead out wires. Cut the leading edge, spars, and trailing edge pieces from hard balsa and begin to construct the wing by pinning a spar to the plan view, noting that the spar must be raised 1/16 in. off the board for correct alignment. Assemble the ribs to the spar, add the upper spar, the trailing edge top and the leading edges. When set, remove from the plan and add the bottom trailing edge piece. Check for warps as the wing is assembled. Add the wing tips. Cut back the inboard centre rib 3/16 in. and fit the leading edge reinforcing piece of 3/16 in. sheet, which is ¼ in. deep at the front and ⅜ in. deep at the rear, conforming with the wing section. Make up the bellcrank assembly of ply faced 3/32 in. balsa and fit in position between the centre spars. The bellcrank is of dural pivoted with a piece of heavy gauge steel wire which is cemented in place after the lead-outs are fixed, and soldered with cup washers at the bellcrank end. Add other strengthening supports. The lead weight on the outboard tip must be very firmly fixed, and should balance the model laterally at a point 1 in. outboard of the fuselage centre line. Complete the wing by covering the leading edge portion with 1/16 in. sheet, noting the splice position on the plan.

**The Tailplane and Elevator** are of sheet and cut as per plan.

**Final Assembly.** Carve the outer faces of the engine mounts to the section shown and assemble complete with engine on to the bulkheads, glueing the whole unit firmly into the fuselage lower half. Remove the engine and give all exposed parts a coat of thick coloured dope to resist oil. Adjust the venturi tube and needle valve assembly, so that the needle projects through the upper fuselage half at the correct angle of approximately 45°, sloping towards the inside of the circle. While

*Continued at foot of page 382*

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# SUGARFOOT

## A 48 in. SPAN CONTEST PYLON MODEL

by J. R. STAINER

SUGARFOOT is the result of several experimental models, designed and flown during 1948, to determine the best layout for a high-performance, free-flight contest model. The experiments proved that the powered sailplane was not only safest, but was, far and away, the most consistent high performer. The combination of pylon layout and large, powerful lifting tailplane, gave a fast climb and rapid recovery when the engine cut, and the glide prompted several people to suggest that a tow-hook be fixed to the fuselage and the model used as a sailplane, instead !

The first Sugarfoot won the East Kent Area Rally in April, 1949, since then Sugar " feet " have proved consistent winners in local contests. 8th place, with a flight of 131 secs. was gained in the Coronation Cup, on a 9 sec. motor run. The average still-air ratio of this model is about 12 : 1, and 8 mins. 35 secs. was made on an 11 sec. motor run, the model being found 10 miles away.

**Construction** is perfectly straightforward, but a few suggestions might prove useful.

**Fuselage** is built up on a vertical crutch, top and bottom longerons being pinned down to the plan. These are followed, in order, by the 3/16×3/16 in. uprights, 3/16×¾ in. pylon outline, half formers and longeron of the port side, after which the fuselage is removed from the plan. Formers and longeron of the starboard side are now added. 3/16×3/16 in. strengtheners to the pylon outline are next, then 3/16×⅜ in. vertical members, pylon capping strips, 3/32×2×7 in. platform, 3/16×2×4 in. wing-rest, front bulkhead and front planking.

**Undercarriage** must be a tight fit in its box, to be certain that it will not drop out when the engine starts.

**Wing** is built-up of five panels, allowing a flat centre-section and aiding stability. Make sure that the dihedral braces are glued in very firmly.

**Tailplane and Fins** should be covered and doped before cementing together as an anti-warp precaution. Twin fins avoid blanketing by the pylon.

**Covering** should be of a strong material such as rag or Modelspan tissue, given two coats of clear dope plus colour dope, to taste. It is advisable to pin down flying surfaces while the clear dope is drying.

**Flying.** Although no particular vices have been evident and the model may be flown safely by a comparative novice, *careful trimming is very important.* The following trim, used by the designer, will ensure the best possible results, and the model is easy to trim if this is done properly.

Test glide first, until a very slight stall is apparent in straight gliding flight, after which eliminate this stall with the correct amount of left rudder, to give the model a fairly tight gliding circle.

For first power flights it is a good idea to mount the prop. back to front thus reducing the thrust considerably. The model should climb almost vertically in left-hand turns. If no vicious tendencies show up under reduced power, turn the prop. around the right way and increase the power to " full bore".

Power flight adjustments should be made by means of thrustline alteration, only ; once the correct glide has been obtained, leave it alone. If the left power turn is too tight, give the engine right side-thrust ; conversely, give left side-thrust. Tendencies to either dive or loop are cured by up-thrust and down-thrust, respectively. These adjustments are made by inserting washers between the crankcase and the front bulkhead, on the engine bolts, or with small pieces of plywood in the same positions.

The model has been found perfectly safe, trimmed for both power and glide circles to the left, and the most rapid recovery, when the motor cuts, is ensured by this arrangement. No serious loss of height has been experienced, Sugarfoot just side-slipping out of the climb into the glide, with two stalls as the most ever seen. R.O.G. flights are quite straightforward, despite the small monowheel undercarriage, as the model becomes airborne almost immediately.

**Member Canterbury Pilgrims M.F.C. . . . 17 years old . . . Student apprentice at the Bristol Aeroplane Company . . . Keen on C/L speed, Free-flight and Sailplanes . . . other hobbies, Full-size Gliding, Cycling and Music.**

A pop-up dethermalizer is recommended, allowing the tail to rise to an angle of 35°. Although a timer would be the safest method of operating the dethermalizer, a fuse could be used, to save weight.

The best propeller will, doubtless, be found by the builder of the model, but the designer obtained excellent results with an 8×6 in. Trupitch.

**Alternative Power Units** are the Frog 180 and 160, Arden ·099, Mills Mk. 2, Elfin 1·49, Allbon Arrow and Javelin, Reeves 1·8, and K " Kestrel ". Alteration to the nose of the model will be necessary to keep the C.G. in the right place, where the engine used is lighter or heavier, to any marked degree, than the Elfin 1·8.

**Weight** of the completed model with engine must be over 12½ ozs., if being entered in F.A.I. contests. Average weight has come out at 12½ to 13 ozs.

For engines of the Amco 3·5 class, scale up Sugarfoot to 60 in. span ; for E.D. Bee and Mills ·75, scale down to 36 in.

THERE is no reason why Slope Soaring should be limited to aeromods in the few highlands we have in these Isles or to our counterparts in the Alps of Europe. Hoverking is good on any hillock or slope when the wind is favourable.

On its second outing Pete tells us: "Launched from a 100 ft. hill, the model remained into wind for 2½ minutes, soaring beautifully before turning downwind." Which emphasises that this design incorporates the prime essential of a slope soarer, the ability to hang nose into wind without losing height.

Those who have yet to see a slope soarer rise and fall with each change of wind current, have thrills in store. With the sole exception of the flat Fen-lands and eastern areas in Lincolnshire, it is possible to find a soaring site within easy distance of each town in the British Isles.

Hoverking also lends itself well to a powered sailplane. A small diesel or gloplug motor can be mounted on a pylon high enough to allow propeller clearance, and positioned between the nose and wing leading edge.

### Constructional Notes—

**Fuselage:** Select hard ¼ in.×¼ in. balsa for the longerons and spacers. Pin the longerons over the side view, joining them with scarf joints at least 1 in. long. Cut and cement all the spacers except those at the wing position, which are added after the ¼ in. sheet has been slotted for the wing tongues and fixed. Now cut the ¼ in. sheet for the nose box and fix in place. Repeat the operation for the second side, building directly over the first side. Remove both sides together and sand the outlines before separating.

Pin the sides upright over the top view on the plan. Cut all the spacers and fit those at the wing position first. The ¼ in. sheet for the nose box is cemented into place as the fuselage is drawn together. Use rubber bands to hold in place until the cement is dry. Similarly, the rear of the fuselage is brought together and the remaining spacers are added, together with the sheet which supports the fin outline.

The wing tongues should be cut from 3/16 in. plywood and cemented firmly in position.

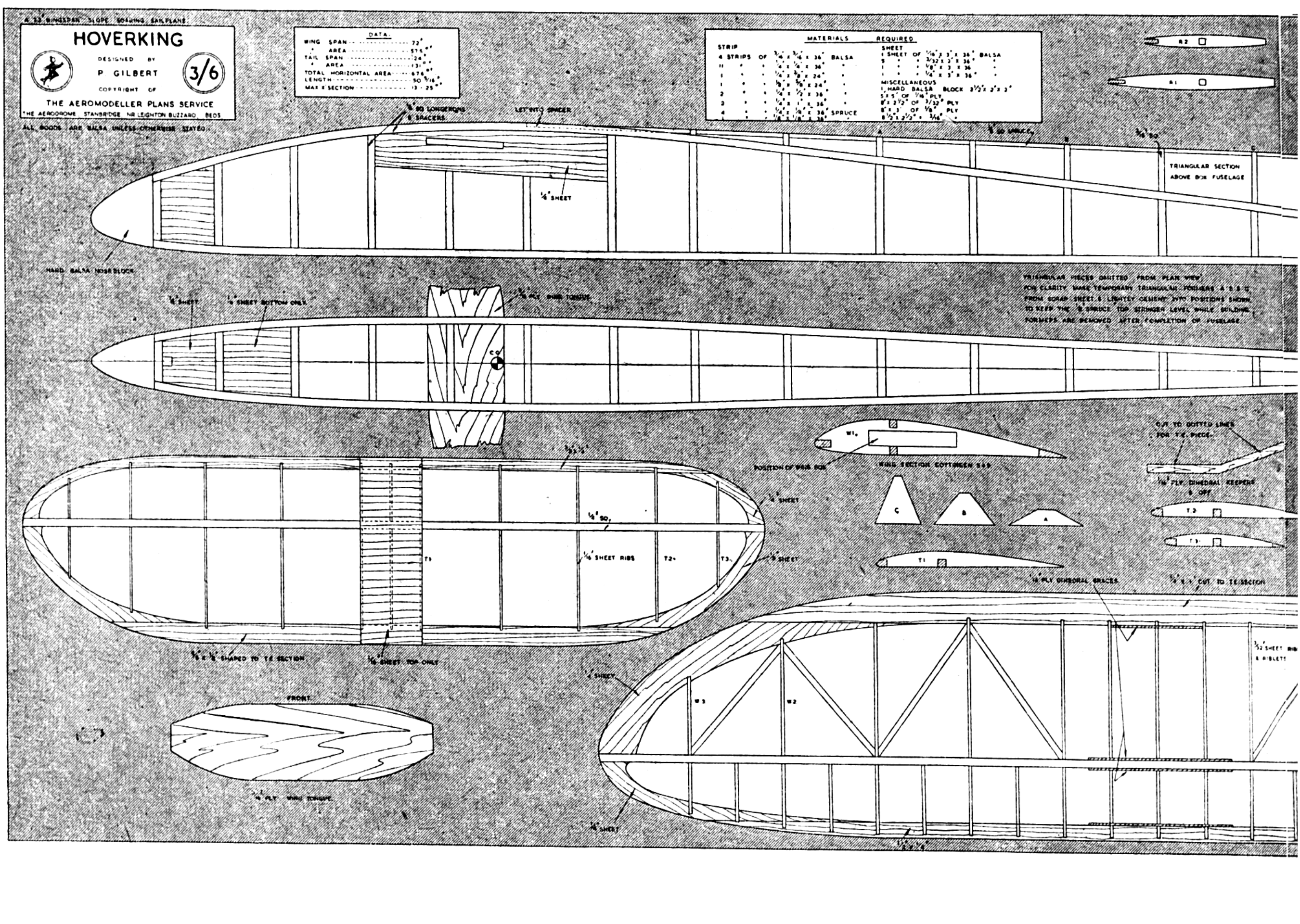
Build the fin outline, cut out the fin ribs and cement them to the spar. Add the fin outline and slot the complete assembly into the sheet on the fuselage. Add the ¼ in. sheet lower fin and the 3/16 in. square sloping spacers.

Slot a piece of ⅛ in. square spruce into the spacer in front of the wing T.E. and join its other end, halfway up the fin outline. Support this spruce longeron with 3/32 in. sheet triangular firmers. Finally laminate the nose block and fix in place.

**Mainplane:** Cut the ribs from 3/32 in. medium sheet and the two end ribs from 1/16 in. ply. Slot eight of the ribs to take the boxes, which are made of ⅛ in. plywood and bound with thread. Attach four ribs on to each wing box. Notch and shape the ¼ in. hard T.E. and pin in place over the plan. Add the ribs to the ¼ in. square spruce spar and the T.E., altering the ribs at the tip at the same time to conform with the taper. Complete by adding L.E. top spar and wing tip. When dry, cut the spars to the correct angle so that they fit flush when the 1/16 in. ply dihedral keepers are cemented in position. Finally, add the wing diagonal bracing.

**Tailplane:** Repeat the procedure as for the wing, adding the centre section sheeting whilst still pinned to the plan.

**Covering:** The original model was covered with heavyweight rag tissue and coloured with black Aerolac on the fuselage and fin with yellow wings and tailplane. This provides



light-weight colouring which is completely waterproof and not affected by damp weather.

**Trimming:** When trimmed in calm weather the model should have a long, very fast, shallow glide with no tendency to keep the nose up. When hand launched on flat ground into a moderate wind, the model should float, but if the wind momentarily stops or slows it should put its nose down and take a long time to pull out. Unless the model is trimmed like this it will stall when soaring instead of climbing at the slightest puff of wind. It is naturally trimmed to fly straight.

Having trimmed the model over flat ground, try a launch from rising ground. Launch with the nose slightly down and put plenty of effort into the actual throw. An over-powerful launch should result in a slight soar, followed by a smooth nose-down approach to a landing. Launching at too slow a speed is indicated by a fast sink without much forward motion.

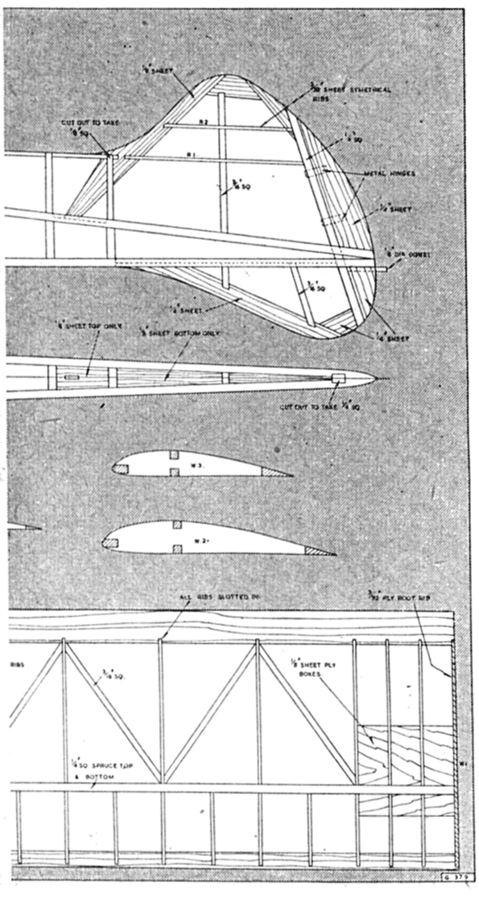
**FULL SIZE PLANS (SEE 1/6th SCALE REPRODUCTION BELOW) ARE AVAILABLE PRICE 3/6 POST FREE FROM THE AEROMODELLER PLANS SERVICE**

# HOVERKING

A 72 INCH SPAN SLOPE SOARER BY

**P · GILBERT**

**Member Pharos M.A.C. . . . Age 18 . . . Works at Admiralty research Lab. . . . Designed "Thunderking", 1949 Nationals winner . . . Now keen on Wakefields and F.A.I. rubber jobs.**





# "Eddie" Riding

## An Appreciation

by

**C. Rupert Moore**

"EDDIE" Riding's association with aircraft commenced in his boyhood days, and the furtherance of the development of aviation in this country—both model and full-sized—was his hobby as well as his work.

After leaving Manchester Grammar School he was apprenticed to A. V. Roe Co. where he "served his time" in the traditional way, passing through all departments in the course of an apprenticeship extending over several years. From A. V. Roe he "graduated" to Cobham's Circus, and we find him living the rough life of the "pioneer" servicing a variety of aircraft types, both night and day. This experience took him to many parts of the country and undoubtedly gave him an excellent "schooling" in the art of getting a job done with efficiency and speed despite all types of handicaps.

Mr. Riding and I first met at the beginning of the war when he was a junior inspector in the Air Inspectorate Department of the Air Ministry at Faireys. This was shortly after his wedding which, incidentally, proved of the happiest. At this time he was producing magnificent non-flying scale models such as the "Leopard Moth"; "Cadet"; "Avro 504K" and "Blackburn Dart". This last machine was, I think, the first of many to be described in the AEROMODELLER.

In this type of aeromodelling he became unique. He built the airframe absolutely true to detail and as far as possible used the same materials as used in the real aircraft. The whole model was then covered with scale thickness fabric, which was doped with correct red under-coating and finished in the usual manner.

Riding's first flying scale model was the "Widgeon," which he brought to my studio, in Radlett, to test. It was a winner from the start, and was followed with the ¼th scale "B.E.2.C." in its original form; the "Bristol 77"; the Bristol "Bullet" and the Fairchild "Argus". As the smaller sizes of diesel engines became practical, most of these models were converted from rubber to "power"; whilst the "Chrislea Ace"—one of his most popular models—was designed from the start as a power model.

His latest model, the "Mistlethrush," was practically completed when his life was so tragically ended; but it is hoped in the coming months to instal the power unit and test fly this model, which, if successful, will be described in the AEROMODELLER—probably towards the end of this year

Riding's activities in connection with full sized aircraft were, in many respects, complementary to his modelling activities.

During his war time experiences in the Air Ministry—in which he finished up as Chief Inspector—he flew on many hundreds of tests in all types of military aircraft. Many a time has my house been "shot up" at virtually 0 feet! The engine noise would bring me from my studio to observe a "Mosquito" or some other aircraft "in circuit", and to my enthusiastic wave he would reply with a wing-waggle, and away he and his colleague would fly . . until the next time!

Whilst it was only recently that he "took his ticket" as a civilian pilot, he had many hundreds of hours passenger and dual flying and was well known as a pilot for his steadiness.

As modelling instructor to the A.T.C. he was responsible for organizing flights for the boys in an Anson belonging to A.T.A. and piloted by S. O. Bradshaw. These two gave up many weekends just to get the lads into the air. Bradshaw had some 3,000 hours in his log book and over 70 aircraft types. He was a pilot of distinction, and had much in common with Eddie Riding. It is a tragedy that these two met their end together—in fact a treble tragedy, because there was a second passenger, Mr. N. C. Stoneham of the Redhill Flying Club, with them—in the aircraft which crashed at Boston.

All the photographs illustrating Riding's flying scale models, and most of those photographs illustrating his monthly series of articles "Aircraft Described", and many of the photographs which appeared in "Air Review" and the "Harborough" range of books, were taken by Eddie Riding.

He was a man of many parts, whose wide experience of both model and full-sized aircraft enabled him to give of his best and provide a service to his friends and readers which was unique in its comprehensiveness and detail.

Since his death I have become increasingly aware of his generosity and the interest he took in encouraging air-mindedness in young enthusiasts. A number of youngsters have phoned me to say that they had their first taste of "duel" flying with him, and that he would help them out with their expenses and so on.

Eddie Riding leaves three young children, the eldest "Dickie" 8 years of age, who for some time had shared his father's intense enthusiasm for aircraft and flying in them. Like his father young Dickie was interested in, and conscientious in attention to, describing carefully the aircraft with which he was immediately concerned. Both full sized and model aviation have lost an enthusiast who must surely be regarded as irreplaceable; I certainly have lost an irreplaceable friend.

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1. Blackburn "Dart".
2. AVRO "Avian".
3. AVRO 504k.
4. DH 95 "Leopard Moth".
5. AVRO "Cadet".
6. Fairchild "Argus".
7. BE2c.
8. ABC "Robin".
9. Bristol "Bullet".
10. Bristol 77 Racer.

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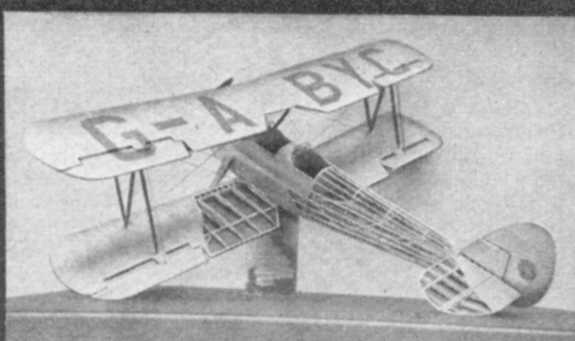

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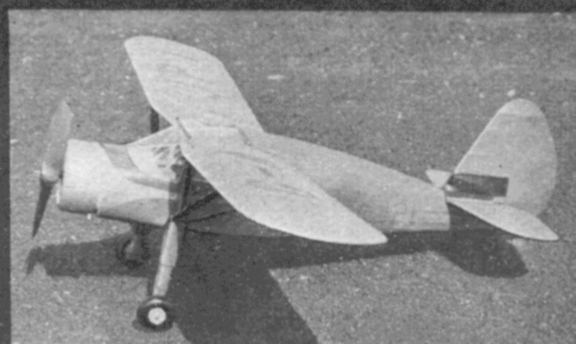
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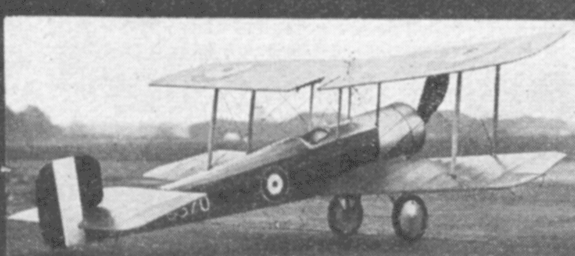
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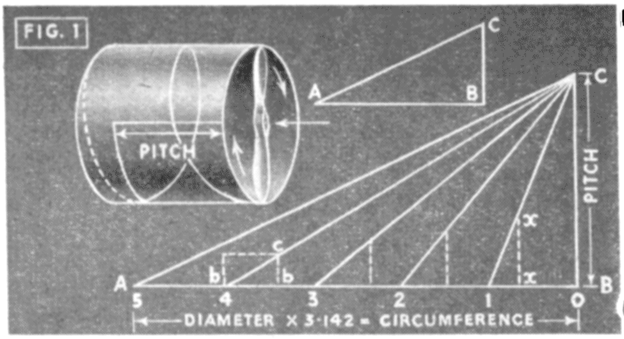
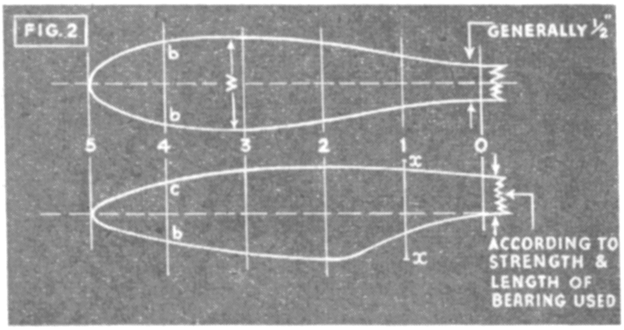
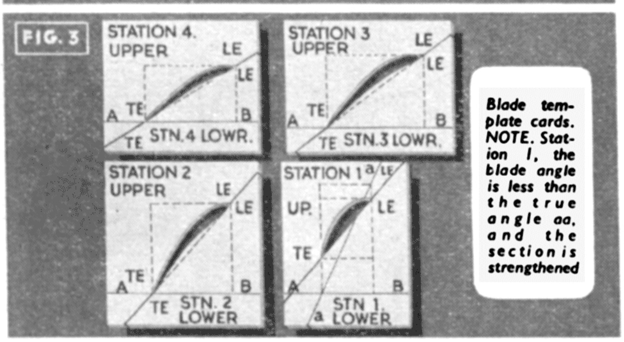
10

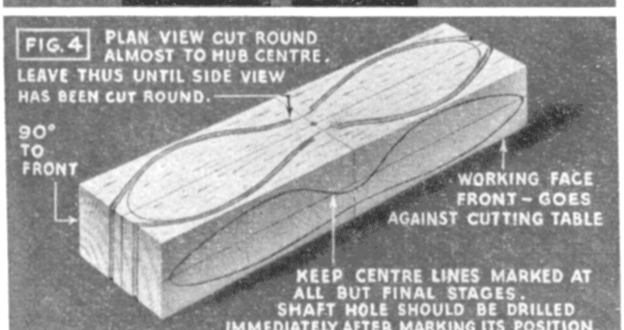
# AIRSCREW CARVING

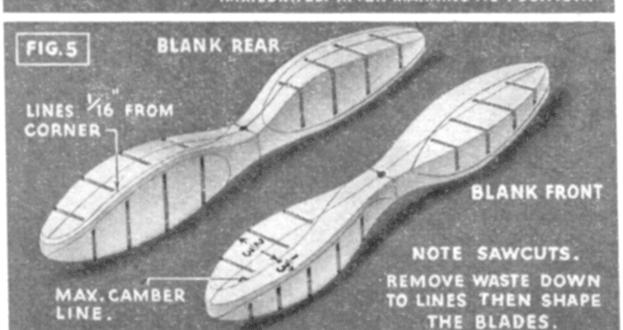
BY R. COLEMAN




PERHAPS the vast majority of aeromodelling enthusiasts are, like myself, just a bit shy of advanced mathematics as delivered in all-frightening array in some theoretical arguments! Yet, because we are not experts at figures, we ought not to leave it to someone else to reason out. We might do our best to try and understand, remembering that maths. can always be broken down into separate bits and the more easily digested. I sometimes strongly suspect that some experts are prone to " show off " their genius, where, with a simpler and equally effective presentation of figures they could benefit a wider circle of readers. My object here is to try and provide without maths, a working method for carving balsa airscrews, especially for those who have no method, and to whom " twisted blades " have hitherto remained a mystery. Plainly for beginners, by a relative beginner.

### Pitch and Paper Work.

Pitch is a word used so often among aeromodellers that it becomes almost a password.

If someone begins an Americanism like " Nuts " at this point, that is just the right idea. Take a bolt as well as a nut and screw 'em together. The answer is, in one complete revolution of the nut: pitch. That is, the distance the nut travels along the bolt in one turn is called the pitch of the thread on the bolt.

Similarly, in one complete revolution of an airscrew the forward travel is the pitch. Consider Fig. 1. Imagine a hollow tube of the airscrew's diameter. If the airscrew could pass through the tube, the tips of the blades would describe a spiral throughout the length, upon the inside of the cylinder. In Fig. 1 the spiral or helix is shown on the outside, and when laid out flat, is found to be a straight line forming the hypotenuse of a right-angled triangle ACB, the pitch being the perpendicular CB. The base of the triangle is the circumference of the cylinder or tube. If this triangle is cut out of paper and wound around a suitable cylinder, the idea is clearly illustrated.

The pitch we are concerned with is the geometrical pitch, or the pitch angle that may be drawn on paper and used to determine the blank size. There is no point in discussing the various differences that crop up all along the line, such as between geometrical and actual pitch, known as slip.

The following generalisations provide a quick way of arriving at the dimensions required for the layout of an airscrew. This cannot be called design work, and naturally the results are not as fine as those obtained in the application of a full mathematical " orchestra " to any particular airscrew for a particular model. I refer readers to Chapter V of " Airscrews for the Aeromodeller ".

First decisions: (1) Diameter; (2) Pitch.

(1) Diameter generally is about 1/3 of the wingspan. Let us assume a model of about 28 ins. span, giving airscrew diameter as 10 ins.

(2) Pitch depends upon what sort of performance is required. Shall we have a snappy climb with all the power devoted to getting the model "upstairs" in a short time, relying on the glide? Or shall we have a moderate climb and longer cruise . . . or a slow climb and long cruise?

Pitch and Diameter are expressed as ratios as follows :—

(i) Snappy climb, short cruise (approx.) $\frac{\text{pitch}}{\text{diameter}} = 1$

(ii) Moderate climb and cruise ,, ,, $= 1{\cdot}5$

(iii) Slow climb, long cruise ,, ,, $= 2$

Let us assume a P/D ratio of 1·5 for moderate climb and cruise. Then : (1) Diameter 10 ins. ; (2) Pitch $10 \times 1{\cdot}5 = 15$ ins.

We can now draw a triangle ACB as in Fig. 1, making the perpendicular CB 15 inches, and the base AB equal to the airscrew circumference, or 3·142 times the diameter, *i.e.* 31·42 inches. This triangle, if drawn full size, will occupy a considerable size of paper. It will be more convenient to scale down these lengths to say 1/3 CB will then be 5 inches and AB 10·47 inches.

Complete the triangle with the hypotenuse and divide the base AB into a regular number of stations, say 0 (hub) to 5 (these correspond with one-inch stations along the blade : there may be more, say 10, half-inch stations along the blade as required). Join each station with a line to the point C at the apex of the triangle. The angle between base AB and each line is the blade angle at that station.

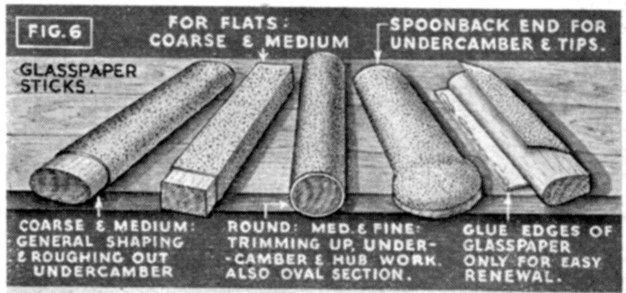
Now draw the plan of one blade. The maximum blade width is generally about 1/8 diameter and situated towards the tip, say 1/4 to 1/5 blade length from the tip. Refer to Fig. 2. Blade width marked W near station 3. If the centre line is drawn first followed by the smooth curving line of one half of the blade, the paper can then be folded over at the centre line and the other half blade traced through from the back. This gives a symmetrical form. Make the hub about 1/2 inch wide. Mark off the regular stations 0 to 5 corresponding to those on base AB. Note carefully that the spaces are five equal : those on the blade are shorter than those on the triangle base.

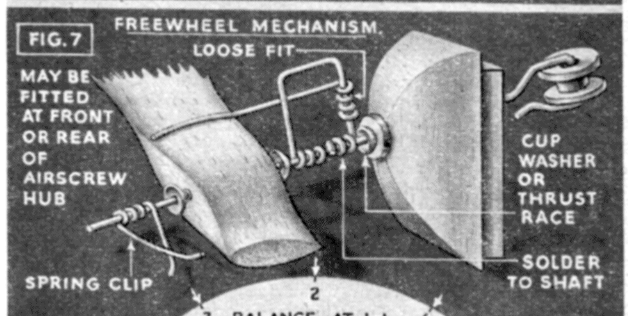
Refer to Figs. 1 & 2. Draw the blade side view. By taking the blade width at station 4 (bb) and laying it along line AB we arrive at the point to erect the perpendicular (bc). This gives the size of the blank at station 4. The perpendicular (bc) is taken from the drawing (Fig. 1) and evenly balanced about the centre line of the blade side view as in Fig. 2.

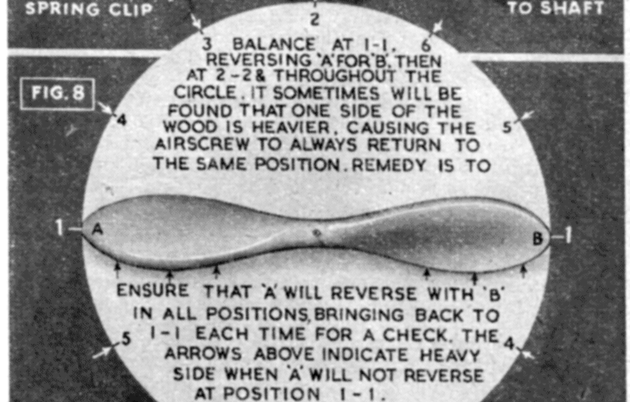
The smooth curves of the side view may be drawn through the ends of all perpendiculars (bc) erected at all stations. Towards the hub the true pitch angle has to be departed from in order to keep the hub to a reasonable width ; the back of the airscrew is generally cut away and sometimes also the front. For lightweights this is a definite advantage, saving weight, and in all cases reducing drag. If when drawing the plan view of the blades it is remembered to keep the shape nice and slim towards the hub, the more conveniently will the side view work out, there being less need to depart from the true lengths of perpendicular (indicated xx).

The drawings may be transferred to a suitable block of balsa wood, using a piece of soft carbon paper and a pencil to trace the shapes through. It is best to draw a centre line down the length of the block first and locate the centre with a pin passed through the drawing. Use a pin through the centre line at tip also. Thus when one blade is traced through, the drawing may be pivoted round on the centre pin, lined up, and the second blade traced through. A better way is to make accurate cardboard templates of the plan and side views, marking centre lines, stations and other information upon them ; they may be used time and time again for reproductions of the same airscrew.

If we want to make a really accurate job of the carving process—which is recommended for all contest models—this is one way : Make card templates to the airfoil section being used and use them as a check along the blade as in the manner adopted by " solid " fans to check their fuselages, etc. This will entail a considerable amount of extra draughtsmanship ; all useless unless a high standard of pencil-work is resolved upon. It is no use being "fluffy"—the pencil must be hard



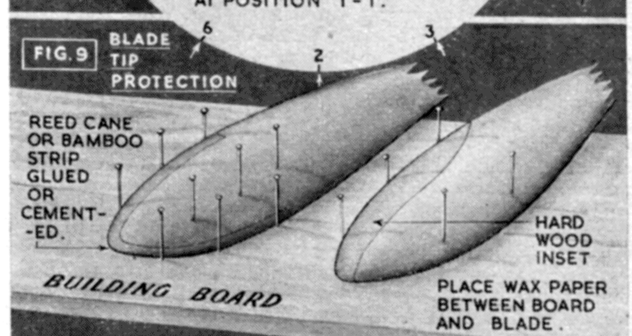
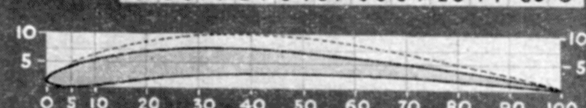




FIG. 10 AIRFOIL CO-ORDINATES. OTHER SECTIONS MAY OFTEN BE SUITABLE; SOMETIMES CONSIDERABLY MODIFIED.

| FROM L.E. % CHORD | 0 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UPPER | ·6 | 3·9 | 5·2 | 7·35 | 7·6 | 7·35 | 6·7 | 5·85 | 4·75 | 3·55 | 2·15 | 0 |
| LOWER | ·6 | 0·0 | ·7 | 2·4 | 3·4 | 3·7 | 3·6 | 3·1 | 2·5 | 1·7 | ·85 | 0 |



NOTE :- IN PRACTICE, UPPER SURFACE OFTEN IS OF A GREATER CAMBER (DOTTED LINE) FOR STRENGTH & EASE OF MANIPULATION.

and sharp and measurements should be made with spring-bow dividers from an accurate scale. The largest balsa airscrew is rarely more than eighteen inches and therefore the largest width of blade or chord not more than 2½ ins.—generally 1 to 2½ ins. Airfoil sections for airscrews are considerably thinner than those of wings—to draw an accurate airfoil from a table of co-ordinates is reasonable enough at the greatest width of the blade, yet towards the tips and hub the chord lessens and how fine are the upper and lower surface measurements!

Fig. 3 shows a set of card templates for the 10-inch airscrew we have considered. There are four cards, each cut through at the pitch angle, making two halves. If the line AB is first drawn upon a card the rectangle indicating the section of the airscrew blank (broken lines) can be added from Fig. 1 or side and plan view, and thence the blade angle from corner to corner, upon which is drawn the airfoil section of the particular station. The shape is cut out and the card divided so as to fit, one half above, one half below the blade. Use a pointed piece of razor blade for cutting the cards, which can be thin post-card.

Towards the hub the section should change gradually from an undercambered normal section to first a flat undersurface, then convex, then the section fattens up into a kind of oval, until it disappears into the hub.

Draw the largest airfoil first, using the co-ordinates (Fig. 10). Then draw as many of the other large ones from co-ordinates as possible, and from the smallest of these the sections towards the tip and hub can be developed. It is a good point to draw them on fine tracing paper, when one section may be laid over the other and "seen through" to check the gradual change of section. Bear in mind the maximum thickness. The thickness/chord ratio is quite large at the hub, depending upon the strength required. Think of the max. blade thickness as being the main tapered spar of the " wing ".

Having drawn the sections, transferred them to card templates marked (each half) with the station number and " LE " and " TE " for leading and trailing edges (quick reference), we are ready to consider

## Carving the Airscrew.

The block of wood should be "square" on all faces. The plan view (from the templates or traced with carbon) should be drawn on one face. Make one side at 90° with the front. If possible obtain the use of a bench drilling machine for the drilling of the shaft hole at the hub—drilled from the back so that the working face goes against the drill table and the hole is therefore at a perfect right angle. Do make certain of this in the interests of true running at the final stage. Now the blank has to be cut out of the block, keeping all faces square, and I have found no better instrument for this than a bandsaw machine having a 3/8 in. or 1/2 in. blade. Perhaps the lone aeromod. will not appreciate this so much because a bandsaw is generally out of reach. I do not see why a club cannot organize something in such cases—to get them cut out *en masse* down at the local cabinet-maker's dept. (It is remarkable how many friendly foremen there are in the woodworking industry.) A jigsaw machine is the next best thing, although hardly sturdy enough to cut a large blank.

Otherwise the job has to be done by hand, using tenon saw, SHARP KNIFE, COARSE GLASSPAPER blocks and plenty of elbow-grease.

Cut the blank as shown in Fig. 4, *i.e.*, cut round with band-saw or tenon almost to the hub, then come back and cut completely around the side view. In this way no inaccuracies occur such as if the plan view were cut completely around, and the side view would have to be marked on the curving side, with consequent shortening of the template if applied direct to the wood.

Fig. 5 shows the blank cut out and marked ready for carving. Note the diagonal saw cuts which make the removal of the main mass of wood so much easier. Cut the wood away in long sweeping strokes and always try to appreciate in advance any changes in grain direction, *i.e.*, do not cut always from the one point. Towards the later stages of the knife work shavings are taken off in various directions, conforming to the blade twist. Remove the wood right down to the lines. Keep the blades flat but follow the twist in knife work. Then gradually shave down the tips and take off the angle at the max camber line. Begin to slim down the hub; and carefully shave away for the beginnings of the undercamber. It goes without saying that the KNIFE must be SHARP. Balsa is a "spongy" type of wood and nothing but the keenest edge will give satisfactory control in the carving process. Keep an oilstone handy. Use a thin-bladed knife, which must be flexible to a certain extent. An old non-stainless table knife ground down to a taper is ideal.

The remainder of the shaping is carried out with glasspaper. Make a number of glasspaper sticks as in Fig. 6 and, starting with the coarse ones, work the blades down until the section templates begin to show signs of fitting over their respective stations, which should be kept marked at LE and TE all along the blades. If not using section templates, then we have to go by touch to tell when the blades are thin enough, and whether they are accurately matched. Use a fairly broad half-round glasspaper stick to scoop out the undercamber. It is more important to match the blades than it is to stick to the actual section.

If we have been careful in the drawing work, and have not rushed the shaping we may be surprised at the ease and smart appointment of the section cards as they begin to " click " into place along the blade. Here is the reward for painstaking work! We do know, at the end, that one blade really is the same size and shape as the other, within the limits of ordinary methods. What is also very pleasing is that the final balancing for weight (after the free-wheel bush and the shaft bearing are fitted) is carried out in record time. By templates, the blades are very nearly the same weight; generally it is the freewheel pawl or bush which makes the difference and has to be allowed for. For ordinary (no spinner) duration models, I do not recommend a free-wheel mechanism which has a pawl through the hub, because it also weakens the airscrew at a point where the greatest strength is required. Fig. 7 shows a good freewheel which always works, and allows of easy interchange of props.

Balancing, smoothing off, final section checks and the fitting of hub bearings, etc., are complementary operations and must be worked one with the other. The airscrew cannot be balanced until a smooth bearing complete with plywood reinforcements is fitted. The hub cannot be glasspapered off completely until after the plywood faces are set. Absolute balance is delayed until after the finish is applied, when a brush of dope on the lighter blade will often cure the fault. Study Fig. 8 carefully. Balancing can be the most tedious part of the whole airscrew, especially if it happens to be a piece of timber of uneven density. In some cases I have been obliged to sink small lead weights into a light blade before it would respond. Obviously then, careful selection of wood in the first place is half the balancing battle at the end.

## Finish.

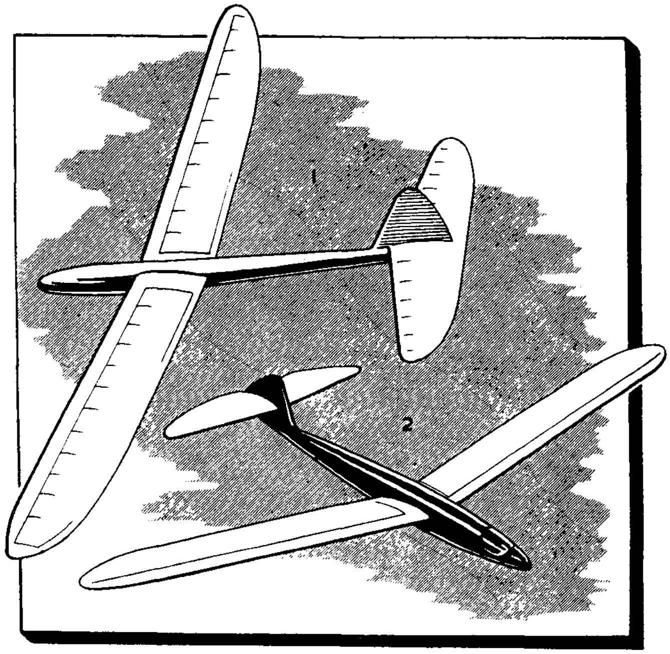
Some form of protection for the tips of the blades is advisable. Fig. 9 shows two methods. Don't overlook this point—so many good airscrews are ruined as their blade tips gradually disintegrate against hard ground. For a good, serviceable finish without too much fuss, I cover my airscrews with tissue after a coat of dope to help lay the grain. A coat of banana oil is helpful to finish off and to produce the final balance. There is plenty of room for experiment. I have french polished, wax polished, cellulosed, silk covered, dope and talcum powdered. For a light job, give one coat of banana oil only, followed by a light glasspapering.

The finish is a really important factor, in which fine glass-paper and garnet paper so often play too little a part. If the job's worth starting, it is worth finishing . . . properly!

Speed in carving? Well, if it is taken to heart, after carving about a dozen airscrews, a competition size ought to take little over an hour to bring to a flyable stage (excluding paper work). So in a day's flying we might come to be thankful that we remembered to throw a couple of spare blanks into the box in the early hours of the morning. . .

# Model Aviation in HOLLAND

BY J • VAN HATTUM




**Historical.**

Model aviation began in Holland in 1910, but died out after the first World War, and only got going again about 1930. In 1933 the movement was taken over by the Royal Dutch Aero Club and gradually shaped into its present form. It was soon realised that a separate organisation, whether a federation or affiliated society, would not be in a position to take full advantage of the assistance of the Aero Club. Members understood that this meant less independance, but an independance which would entail entire financial responsibility for all activities of the organisation. Incorporated as a full section in the Aero Club, aeromodellers take full advantage of a highly specialised administration, large-scale propaganda and publicity.

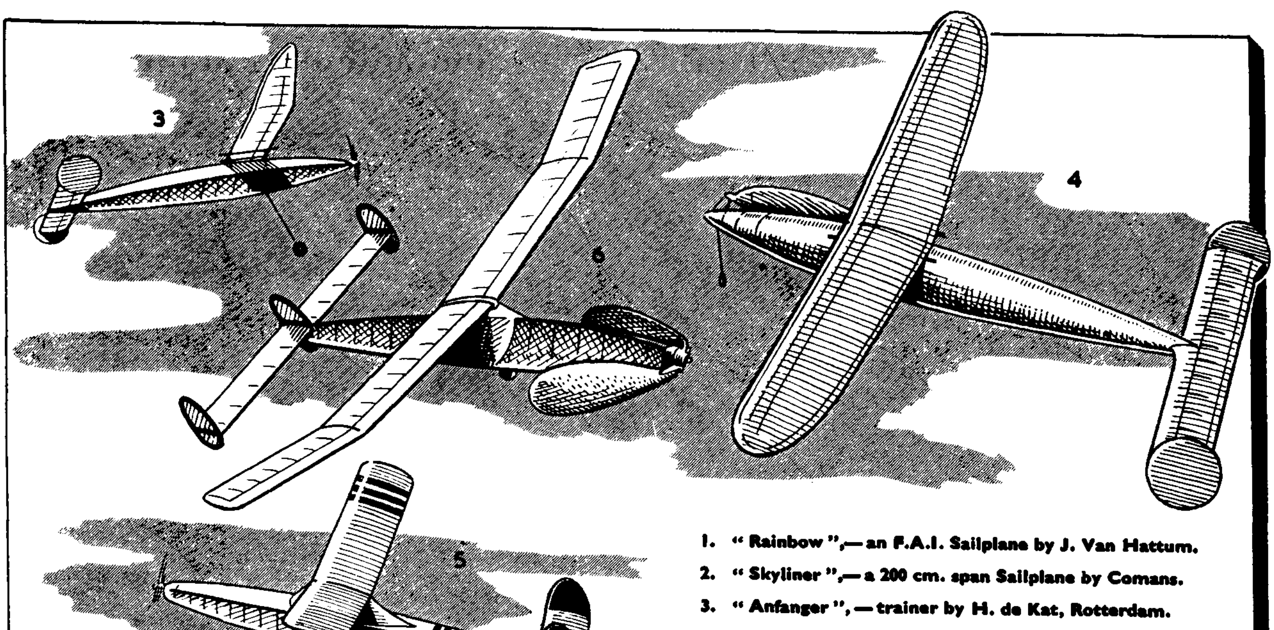
So far as the running of competitions is concerned, the issue of licences, the technical development, etc., the seotion is a completely independent body.

**Technical.**

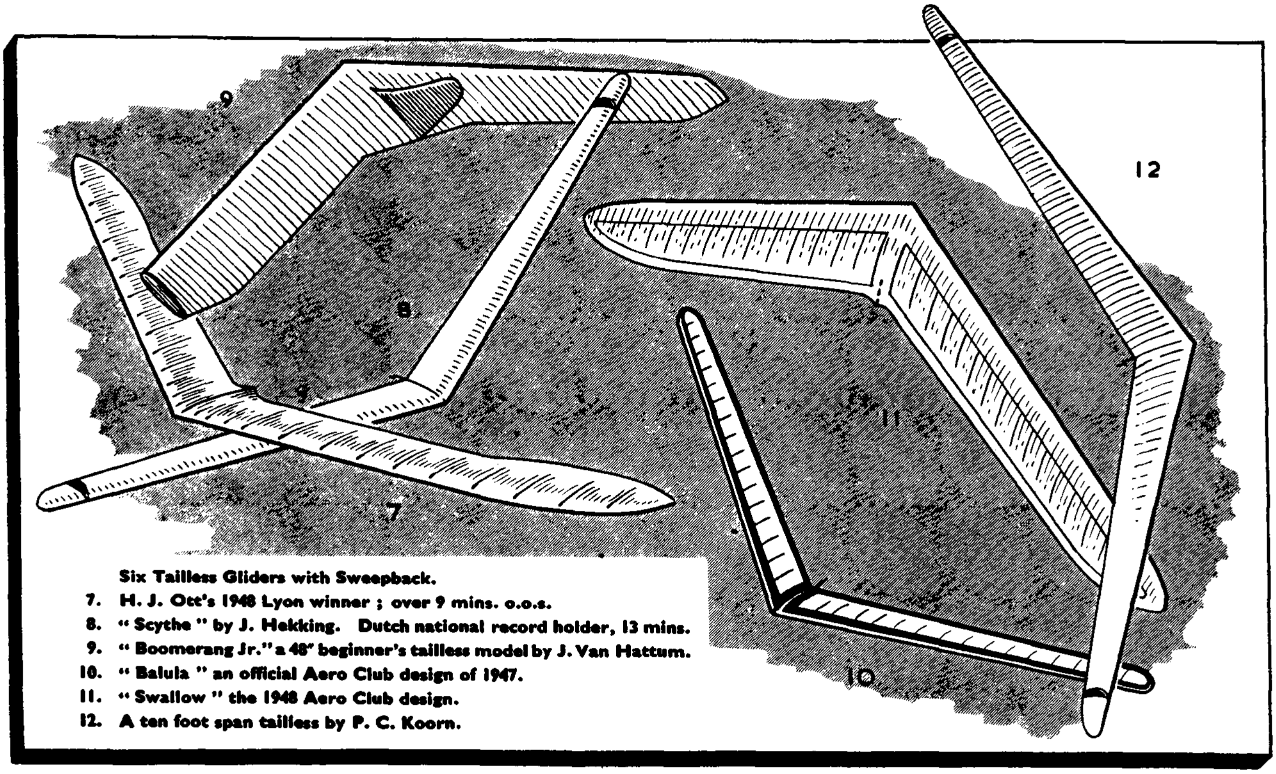
**Power-driven models.** Before the war, Holland built nearly all types of model aircraft that were popular abroad. Petrol-driven models, however, were in only a small quantity and the first competition for this type was not held until 1940. By then the import of motors was limited to the Kratsch and Eisfeld and those, with a few Brown Juniors and Syncro Aces which were already in the country, had to serve us for not less than five years. It speaks for the quality of pre-war motors that some are still in active service.

Lately we have been able to obtain a fair number of British motors of medium size, while a good many members have managed to collect various British, French, Italian and American makes, in one way or another. But only in 1949 could we say that the handling of the motors and flying of the models had reached a fair standard; a year or so ago it was quite common to have a dozen entries for a contest with the entrants swinging propellers most of the day, to get just a few flights.

With a better supply of motors there also came more interest in control-line flying, which was first looked down upon as a useless side-line. We now realise how difficult and interesting it can be, and 1949 saw our first competitions. This year we hope to be able to find one or two fliers who can compete with experts abroad. The general trend is towards stunt flying, as we lack the real "hot" racing engines. Two good engines are being manufactured in Holland by Veenhoven; a 10 c.c. glow-plug turning up to 14,000 r.p.m. and an equally lively G.P. engine of 4·5 c.c.




1. "Rainbow",—an F.A.I. Sailplane by J. Van Hattum.
2. "Skyliner",—a 200 cm. span Sailplane by Comans.
3. "Anfanger",—trainer by H. de Kat, Rotterdam.
4. A Wakefield by P. Seton, Dordrecht.
5. de Kat's 1949 Wakefield. Took 1st place at Brussels.
6. Wakefield by J. de Jong, Amsterdam.




**Six Tailless Gliders with Sweepback.**
7. H. J. Ott's 1948 Lyon winner ; over 9 mins. o.o.s.
8. " Scythe " by J. Hekking. Dutch national record holder, 13 mins.
9. " Boomerang Jr." a 48" beginner's tailless model by J. Van Hattum.
10. " Balula " an official Aero Club design of 1947.
11. " Swallow " the 1948 Aero Club design.
12. A ten foot span tailless by P. C. Koorn.

Free-flight models for piston engines are mostly original designs and follow either the semi-scale cabin layout or the high-performance pylon lines, popular everywhere.

**Rubber-driven Models.**

Next come the rubber-driven models. Just before the war, intensive propaganda had resulted in about 1 rubber model to 3 gliders. Now, however, owing to complete lack of rubber during the war years, the ratio is more like 5 to 1. A drawback which still exists is the greatly increased price of rubber and one day's competition flying will finish a Wakefield motor, which is an expensive business.

Wakefields are becoming popular amongst the elite, and they are either designed by the builder or made from foreign plans. The 1939 Korda is still very successful, and builders have steadily improved it so that it can hold its own with recent designs.

An interesting class of rubber models was created during the war when rubber was scarce. This is known as Class 41 and has a limited motor weight of between 30 and 40 grammes (approx 1 oz. to 1½ ozs.). It has produced some very fine designs which, in many cases, are a useful start for the would-be Wakefield man.

**Gliders.**

I have left the biggest class for the last. It is also the class in which we are best able to compete on an international scale. Gliders have developed intensively since 1931, starting with German plans. As soon as we felt strong enough however, attention was paid to the creation of Dutch-designed models and, in the National Championships, the champion is still required to fly a model of his own design.

Dutch gliders still possess certain characteristics which place them in the same class as the Swiss, Belgian and Danish models rather than the British, Italian or French. They are all launched by tow-line. Liberal use is made of hardwood, with balsa usually limited to minor components such as ribs, wingtips, sheeting and covering of monocoque fuselages. (In this connection we may remark that power-driven and Wakefield models follow the normal balsa wood trend and use very little hardwood in their construction.)

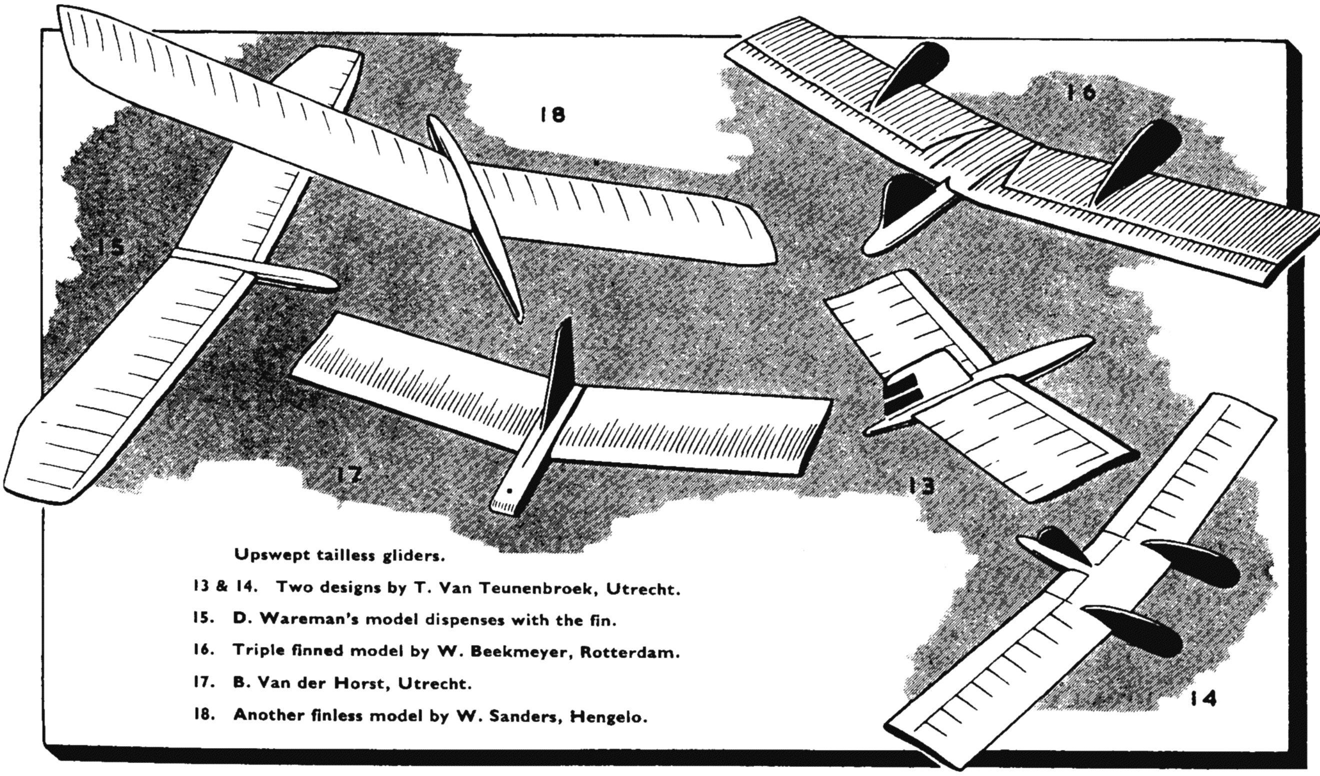
In general lines, Dutch gliders can be divided into three classes :—(A), simple, strong models, usually of the beginners' or intermediate type, possessing box-type fuselages with little aerodynamic refinement. (B), medium-size competition models, representing the halfway house between simple layout, and group (C), large models of very refined design. There are naturally many examples which do not fit entirely in any class, such as the carefully designed models to the Coupe Daumerie rules. It may be said that the tendency to use parallel chord wings with fairly blunt tips is growing, with straight and swept-back leading edges sharing on a fifty-fifty basis. Fuselages are commonly of the many-sided cross-section type, some with a multitude of stringers and a few with true smoothly planked monocoque construction. General opinion seems to be, that the building of a perfectly streamlined model takes so much more time and effort than the more functional counterpart, that it does not pay, especially when a model may be lost on its first flight through failure of the dethermaliser system.

For some years use has been made of fairly thin wing-sections, somewhat on the American and Scandinavian lines. The difficulty of making such thin, high-aspect ratio wings sufficiently strong and stiff is usually solved by the use of a balsa-covered nose. It has been proved that this need not, necessarily, be a closed torsion box, but can be on the upper surface only. Modern thought also tends to a rearrangement of the main spars, which have, in many cases, moved upwards into the top contour so as to connect up with the nose sheeting. Covering is generally of paper, as light silk has been rationed until very recently, and is, moreover, very expensive.

Trimming of our models follows modern practice with rearward centre of gravity (about 50 per cent. of the mean aerodynamic chord) and a small difference between the angles of attack of wing and tailplane. Small fins are used to give the model sensitivity to thermals—with the pious hope that the model will turn into the thermal instead of away from it.

**Special Types.**

Tailless, tandem and canard models generally attract only the builders who like to tackle a hornet's nest. Thanks to these enterprising folk, the hornets have been very nearly chased from the home of the tailless. In 1947, a new line was started with tailless gliders of fair size and high aspect ratio (20 and more), using normal concave section over about




Upswept tailless gliders.

13 & 14. Two designs by T. Van Teunenbroek, Utrecht.

15. D. Wareman's model dispenses with the fin.

16. Triple finned model by W. Beekmeyer, Rotterdam.

17. B. Van der Horst, Utrecht.

18. Another finless model by W. Sanders, Hengelo.

three-quarter span, with washout on the remaining part. These models proved capable of competing with normal gliders. An example is J. F. W. Hekking's "Scythe", National duration record holder, and P. C. Koorn's very similar design which ended in second place in Lyon in 1948. This contest was won by H. J. Ott, scoring a 9 min. o.o.s. flight with a more conventional type, which has since set up an Indonesian record of more than 7 mins.

There are not many tandems in Holland, but Van der Caaij, Koorn and Beekeijer usually put up good performances. The same applies to canard gliders which are built by Hagedoorn, Koorn, Aarts and Gordijn.

A fairly new type is the "flying plank", which became known in Holland after we saw the Swiss models "do the impossible". Thanks to the co-operation of Roger Stamm, of Lausanne, we started with plenty of advice and on sound principles. As a result, some very promising designs have been evolved. One of the most active experimenters. T. van Teunenbroek, was awarded a cup for his valuable work, In this group are also D. Wareman, W. Beekmeijer, B. v. d. Horst and W. Sanders. We expect to see powered versions, which may actually be free of the vices that still appear in the tow-line launch. At least one British builder, belonging to the Ipswich Club, has obtained excellent results with the powered plank, as we could witness on Bowden Trophy day last year. Very few have yet tried powered flight with the "normal" tailless model, except S. van Asten who is conducting a series of valuable experiments.

### Prominent Modellers.

To name the most successful and enterprising Dutch modellers, is a task both embarrassing and likely to be unfair. In the glider field there are so many outstanding fliers that I will first name the 1949 Champion, W. Luxemburg, and his 1948 predecessor, H. Kirchman. Many who came to England are still in the foreground ; van der Caaij, Vriend and Hekking. still gain good places. Most go in for free-flight power. In this class the 1949 Championship went to Berends of the Arnhem M.A.C. and close rivals are the twin brothers Poll and van Wilgenburg.

Top Wakefield man is H. L. F. de Kat of the Rotterdam M.A.C. who has specialised in the type since 1937. Rivalry is strong between Rotterdam, Dordrecht and The Hague. De Kat's fellow members A. Goudswaard, M. Gordijn, a 1949 Champion, and young C. de Vries, fight it out with Dordrecht's star team consisting of the brothers G. and A. Dijkstra, Gaillard and P. W. Seton. The Hague is well represented by S. J. Esmeijer, secretary, and V. A. M. Lodewijckx, but National Champion 1948, H. Lutjens, has left for Indonesia. Amsterdam is another rival with J. de Jong and H. v. d. Woerd most prominent.

This summary leaves out many who would merit a mention of their hard work and only lack of space forces me to withhold the due that is their right. Aeromodelling is necessarily a co-operative hobby and the right club spirit often proves essential to win success.

Reading this you will find that modelling in England and Holland has much in common. If the methods of construction differ slightly and shapes may be unusual to your eye, there is still the patience and perseverance and the real ability to think things out to a logical conclusion that will be the same all over the world. And when your model suffers a bad crack-up, think on it that the same may just have happened to your colleague in France Denmark or . . . Holland.

Below : Teunissen, Arnhem and his E.D. C/Special powered model.


OUR earlier request for news items and photographs of interest to the World's aeromodellers has, already, borne fruit, and letters are coming in from all points of the compass.

**France.** An interesting letter arrived at the AEROMODELLER office from a French schoolmaster aged 24, M. P. Lerebour of Evreux. He will be teaching English in a French school and is married with an 18 months old boy, already interested in aircraft. An aeromodeller for 11 years, he has designed and built models ranging from solids to gliders and rubber jobs, orthodox and unorthodox. Prefacing his news with some very complimentary remarks about the AEROMODELLER (for which we thank him), he tells us that in 1947 he was an assistant teacher in Scotland and did slope-soaring with model sailplanes around Cupar-Fife. A canard which made hundreds of flights in the park at Cupar, prompted the local kids to say " That ane flies backies ".

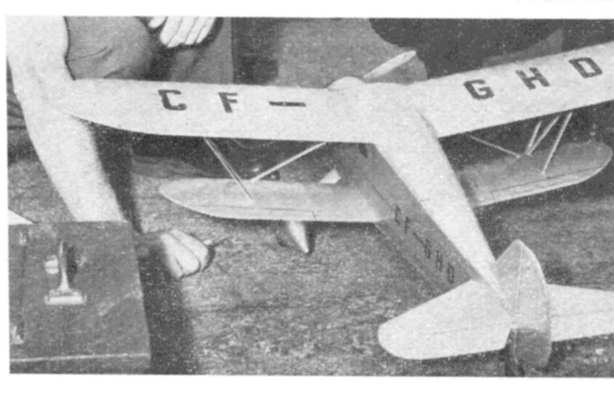
He has carried out a considerable amount of research in the sailplane line and tells us that he now means to try Wakefields, Radio control, L.D.C. 2-rotored autogiros, and later, he hopes, helicopters.

As a member of the " Reseau de Sport de l'Air " (Ultra-Light Aircraft Association) he is interested in full scale light planes. He feels that control line flying could be well used for experiments with various layouts, e.g., Tendem, Flying Flea, canards, annular wings, autogiros, etc.

He intends re-building and refining some of his older and more interesting designs which, he says, will fly as well as any, and promises to send photographs and gen, when this has been done.

*Monsieur P. Lerebour, right, an active and experienced French aeromodeller, one time student teacher in Scotland, now teaching English in a French School.*

*Canadian Controliners, below, are typical of the trend in that country; scale models. Harry McDougall, who sent in the pictures, reported that many have an exhibition finish with performance to match, and that the biplanes, with their realistic performance, are a thrill to watch.*




**Italy.** Just to hand from Carlo Dioni, in Rome, are full results of the Contest for the Coppa Tevere, a Challenge Cup presented by Dick Van de Velde, an English aeromodeller, resident in Rome some years ago.

This, the first centralised Italian contest for 1950, was flown on the 25th and 26th of March, under the auspices of the Aero Club of Rome. Many teams with twenty in each, and a hundred individual contestants entered, some Clubs entering more than one team.

The Glider and Rubber-driven events were flown on the first day, in excellent weather and there were many flights of the maximum time of 5 minutes. First, in Sailplanes, went to Gianni Pavesi of Milan, at the head of 30 contestants. The Rubber-driven entries, both Wakefield and F.A.I., numbered 33, and Guido Fea of Turin came out as top man, with his double-geared job, to F.A.I. specification.

Many Wakefields put up top times, and it is difficult to judge which type would make the best showing in windy weather.

Power models were flown on the 26th, the day starting with calm weather, but deteriorating to a high wind later. Although the average flight times were 3–3½ minutes, many models were lost o.o.s. First place was taken by Roberto Bacchi of Reggio Emilia ; there were 28 entrants.

Of the 18 teams competing, the A team of C.A.R., Rome, lead the field, with the Reggio Emilia A team in second place.

Dioni rounds off his report with the opinion that, although the Italian boys are behind the British and American with Power models, they can hold their own in the Rubber and Glider Classes.

**England.** The 1/8½ scale Dakota, is the ambitious R.C. project of F. W. Borders, of Stockwell, London, member of the West Essex Aeromodellers. Scaled up, originally, from a 1/72 plan, the model has a span of 10 ft. 10 ins., and weighs about 15 pounds. The engines are Forster 99s, each having a two-speed timer, actuated by individual radios. With the receiver on, the retarded contact is in circuit, but receipt of signal substitutes the advanced contact. This, with the special automatic variable pitch props., gives a change from 2,000 revs. to 8,000. At speeds below 5,000 revs., the pitch is slightly negative, varying proportionately up to 10 ins., at 10,000 revs.

It is intended to obtain directional and elevational control through the engines, so no other controls are fitted.

At the time of writing, the Dakota has passed its ground tests satisfactorily. It remains still until a signal is given,

when, with power on one engine, the result is a turn of about 20 ft. radius. On both engines, it shoots forward and lifts off rough grass in about 30 ft., at which point, up to now, the engines have been throttled back for immediate landing. New Forsters, with magnetos, will be fitted before the first test flight, the original engines being old and of differing characteristics.

The radios are of similar type to the new E.C.C. set, having extreme range and sensitivity.

Retracting and detracting undercarts, landing and interior lights, and the dropping of dummies by parachute, are plans for the future.

**Belgium.** Jean Bocqué, of Brussels, has been working on Radio Control since 1946, and has sent us details and photos of his latest project. He tells us that, in general, R.C. is still in the experimental stage in Belgium, most enthusiasts constructing their own equipment, with very little technical " gen " on which to work. It was some time before he obtained satisfactory results and had to build several sets, before doing so.

The aircraft in the photograph has a span of 5 ft. and is, as our correspondent puts it, of conventional construction. Power is supplied by a 2·8 diesel, the make of which M. Bocqué does not specify (Ouragon, perhaps ?).

The home-made receiver is a super regenerative detector with an R.K.61 valve, mounted on plexiglass.

The all-up weight of the plane is 900 grammes (31·8 ozs.), the weight of the receiver and escapement being 200 grammes (7·5 ozs.). The actuator battery required is of 1½ volts.

The transmitter is housed in an aluminium box and uses a fairly simple push-pull circuit on the 54 megacycle band.

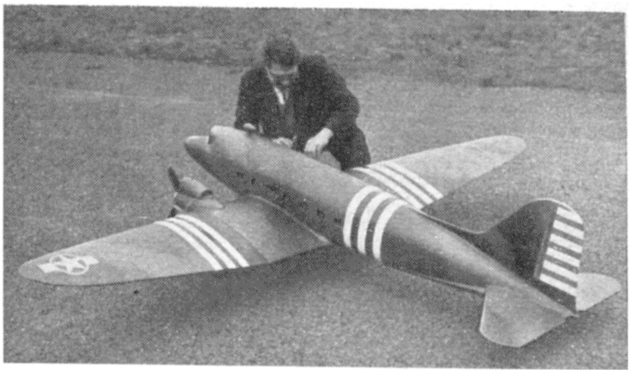
The mast is telescopic, 8 ft. high, and carries folded dipole antennæ, held in cardboard tubes. The tripod base, to which the transmitted is attached, makes for more stable support.

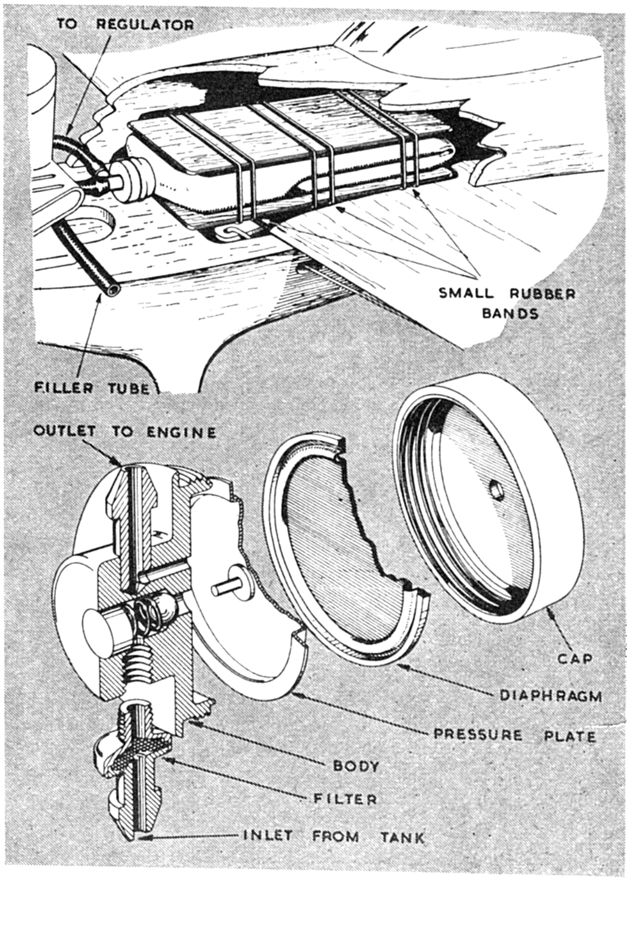
Radio Control exponents elsewhere will find the variations on their own systems of interest.

**U.S.A.** Bill Winter sends details of a sensational new gadget, the Jim Walker fuel regulator. This system involves a coin size, but thicker, metal housing for a diaphragm which controls the fuel feed through a ball-spring valve from a pressure tank. The tank resembles a baby hot water bottle, and is placed between two thin pieces of plywood, wrapped with rubbers to produce the pressure feed. Advantages include complete freedom from richening up or leaning out, an engine running smoothly under all circumstances, in any position. An unexpected result was found at Bill's local hobby shop (45 miles away) when an under-powered Arden stunter, addicted to fuel flow troubles, suddenly came to life with the new regulator and did every manœuvre in the book. Walker's regulator has been under development for a long time and a number of engineering firms gave up on the diaphragm problem due to swelling action of glow fuels.

**Germany.** Bremen correspondent Hans Justus Meier, keeping us up to date with modelling activities in the British Zone, says that, in March, flying was curtailed by weather conditions. The year's events began on Easter Monday near Hamburg. We look forward to a report on this first meeting. He has sent us two copies of a small magazine printed in the Russian Zone and published for the modelling groups of the Free German Youth. The material is suitable for beginners and the trend seems to be to start from the bottom and build up a strong modelling movement. Apparently there are at present differences of opinion among the supporters of this programme and these may possibly be divided between the former modellers, who either develop useful new plans or copy well established designs, and a second group designing new models, who have as yet insufficient experience of model design to make them practical. The F.D.J. also publishes simple plans of which Herr Meier sent us two, one of a profile chuck glider, printed on thin cardboard, the other a 23 ins. span glider to be made up, largely of paper. Herr Meier states that it is no use judging the projected programme of the Youth groups by this type of plan ; future developments alone will show the value of the work.

By way of tailpiece, another request for news items and photos ; we can't have too many. The more we get, the more truly World wide will be this feature.





# EXPERIENCES WITH WATERPLANES

By M. Garnett

*The Author suits action . . . . .*

THE article in the January AEROMODELLER on Waterborne Modelling by D. D. Hebden has inspired these short notes of my own experiences with model seaplanes in Bristol.

Due to limitations in suitable stretches of water locally, only rubber driven twin and three float type seaplanes have been operated, and in all cases, flights were of the water-air-land pattern. Only on two occasions have I seen air-water landings, and the two models were firstly a six foot span glider which stuck in the mud, and secondly a lightweight duration type which remained afloat supported by two oversize wheels.

For a maritime city, Bristol is singularly badly off for suitable lakes in the parks and there are none suited for model aircraft, or even for model yachts. Consequently, all my flying has been from a small duck pond at Stoke Gifford, or from Priddy Pool, which is a well known dew pond on the Mendips. The duck pond is about twenty feet square, with banks about three feet high on three sides, and no bank on the remaining side. There the land is marshy, and often covered with clumps of nettles over which my models have to fly. Water level fluctuates appreciably, and is highest at the end of the summer, whilst like all small ponds, there is plenty of weed, floating logs and bottles, etc., plus of course the inevitable bedstead. The main advantage of the site is that the nearest obstacle—a line of telegraph wires—is about fifty yards away, and the nearest trees about a hundred yards; retrieving is fairly simple with a long pole, although models must invariably get a partial ducking. Priddy Pool is about a hundred yards square, and when I last used it was covered with rushes except for a strip about fifteen yards wide down one side. There is a line of trees along one side of the pool, whilst the land surrounding is either open heath, or newly forested ground with closely spaced young conifers between three and four feet high. There is no boat on the water, and the retrieve must be by swimming.

Models used were all converted from landplanes, and in each case, no aerodynamic modification was required after fitting the floats. The general size of models ranged from about 120–180 sq. in. wing area, built fairly lightly, and with no provision against water beyond possibly an extra coat of banana oil. It is possible to waterproof a model, but if this is done, and there is a weak spot, then it is even more difficult to get the water out again. A normally finished model will be completely filled with water on its first ducking, but provided great care is exercised in lifting the framework out of the water, a few pin holes in the right places will soon clear the interiors, and in any case, there may be another ducking on the next attempt. Rubber motors do not appear to suffer immediately from repeated immersions, and whilst the old soft soap lubricants work up a fine lather, modern types seem to have an oily base, and are not affected. Rather more power must be used than for a comparable landplane, to provide the necessary urge to unstick from the water, and to overcome the float drag in the air. Shoulder, high, or parasol wing monoplanes are the best types to use, although biplanes have proved successful on many occasions. Low wings look very nice, but the floats pull the centre of drag down and it is difficult to get reasonable trim without considerable upthrust.

The three float layout is the most common for models, although it is virtually obsolete on full size types, being

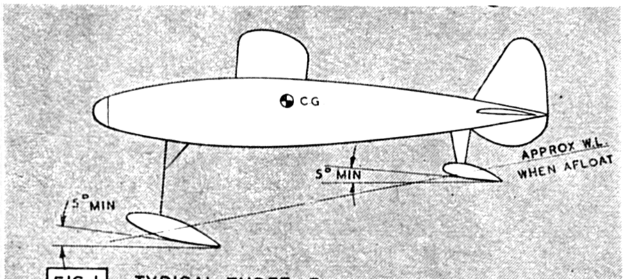



FIG 1 TYPICAL THREE FLOAT MODEL LAYOUT

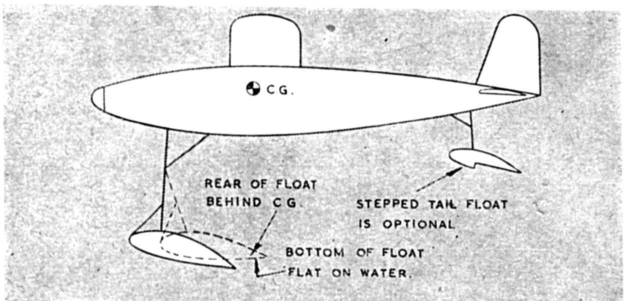



FIG 2 EFFECT OF WEAK FRONT FLOAT LEGS

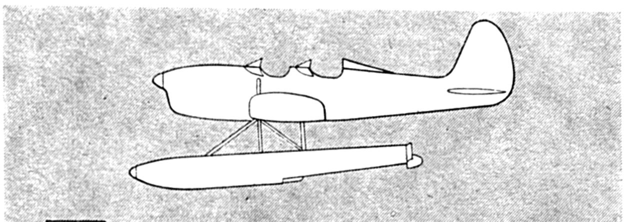


FIG 3 TYPICAL MODERN SEAPLANE RYAN STM-S2

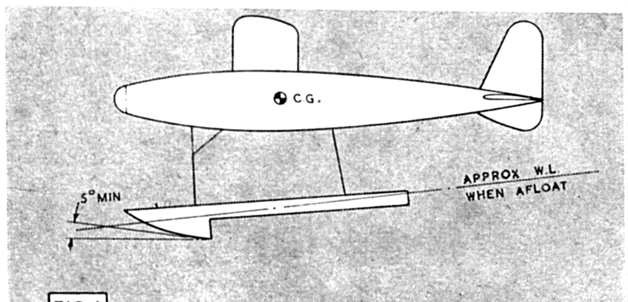



FIG 4 TYPICAL MODEL TWIN FLOAT LAYOUT

replaced by single or twin float assemblies. A typical three float layout is shown in Fig. 1 : it consists of two front floats which take the place of the normal wheels, and a smaller tail float. Design of the floats is not critical—they may be of the semi-streamlined variety shown, or they may be simple rectangular pontoons, with the bottom surface turned up at the front. The main thing is to have an angular rear, and to have the bottom surface sloping upwards relative to the water surface and to the model in its normal flying attitude : this will ensure that the water pressure always tends to push the model upwards. The rear of the front floats should finish forward of the C.G., and preferably no further back than the leading edges of the wing. If this is not done, after the tail float has left the water, the drag of the front floats will cause the model to nose right over—with the floats well forward, the weight of the model counteracts this until the floats leave the water. It is surprising how much water drag is present, and float attachments must be sufficiently rigid to prevent any possibility of movement. Fig. 2 shows one of my models which suffered in this way, and absolutely refused to take off—the model just taxying around until it nosed over, or hit the bank. It was cured by a thread from the nose to the nose of the floats, when no further trouble was experienced. I have found that it pays to fit two permanent spreader bars to the front floats to prevent the floats twisting independently, and hence taking off independently, and also to prevent the track from varying in the water. Size of floats obviously depends on the model weight, but I would suggest that each front float be capable of sustaining the entire model, and the tail float about two-thirds of the weight. The required float size and volume can easily be obtained by assuming a length/breadth ratio of 3 or 4, and that a cubic inch of float will support 0·577 ounces. There is no advantage in departing from a rectangular cross section—indeed, the water performance will suffer if you attempt to round off the corners.

The simplest construction for floats is from medium soft 1/32 ins. sheet balsa, with a few spacers across the grain. My own method is to join two sides with a few cross braces sheet in the bottom , fit the spreader bars and legs ; finally sheet in the top. Floats should be covered completely with tissue, doped, and waterproofed either by several coats of banana oil, or a thin coat of copal varnish. Personally, I prefer varnish, and I have never had any trouble with leakages, despite numerous landings on gravel and rough ground. As a guide to weight, the complete set of floats, including struts, should not exceed 1·2 ounces. Before venturing out to the local pond, it is preferable to check the floats for water-tightness, and size, and I use the domestic bath. It is not normally possible to fit wings and tail, so ballast is added in the right places, and the model left floating for about half an hour, " just to make sure." Incidentally, the well known " Diasphere " probably represents the limit you can go to with the tail float, as published photographs show only the forward tip of the float out of the water.

Trimming the model presents little difficulty : first a check for glide, and then power flights hand launched to about three quarters of full turns. Downthrust should be reduced as far as possible, even to the extent of introducing upthrust, until the model begins to stall, and for safe water-borne performance, a fairly stright initial power climb is preferable, with turns on the glider. Nearly full power is needed for take-off, and the model should be pointing directly into wind. One of the following is bound to happen on release :—

(*a*) The model will take straight off after a run of three feet or so, and climb away.

(*b*) The model will move forward, but not the floats, and so there will be a nose over, after which the airscrew will try to drag the model underwater.

(*c*) One front float only will lift, and the model will pirouette on the waterborne float until it is across wind, when it will topple over.

(*d*) The model will skim over the water on the front floats only, but refuse to take off.

(*e*) The model will chug steadily along on all three floats until something rescues it.

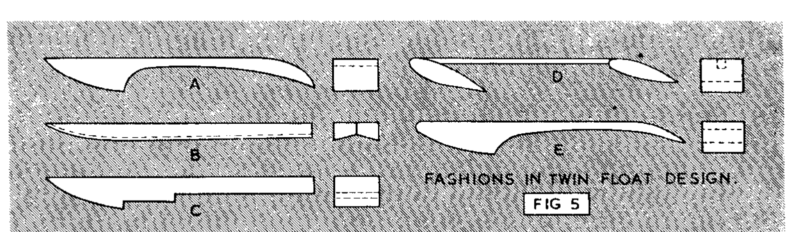
The remedy for (*b*), (*c*) and (*d*) is to check the rigidity of the floats, and to make sure one is not waterlogged. If all is well here. floats may not be in alignment with the fuselage, or the model was not launched into wind. In the case of (*e*), more power is needed.

Without any pretence at technical knowledge of waterborne performances, my own view of twin floats is that the high drag coupled with the relatively high thrust line, will always tend to push the nose of the floats down. This is counteracted by having adequate buoyancy forward, which, with a forward step position, tends to make the nose either too long, or too fat, so that planing angles are reduced. It is relatively easy to get the model to plane, supported on the step and the rear of the floats, and using rectangular section floats, I have never found any need for air vents at the step. However, even when the model is planing, it is being held down by the two planing edges, and as these are more or less equally spaced about the C.G., the model is quite happy to remain like it. If the front step is moved aft, more load is put on the rear step, and this will dig in and slow up the model. Then as the model slows, the front step sinks into the water, drag is increased, and porpoising starts.

Several methods of overcoming this difficulty have been tried, and various float shapes are shown in Fig. 5. " A " has been found successful, and works by reducing the rear planing surface. " B " has an inverted V-bottom (based on the Hickman sea sledge), was a complete failure and had every fault imaginable : however, the addition of a step forward as in Fig. 4, cured everything, although I doubt whether the bottom shape had anything to do with this. " C " has worked quite well, and probably the double step helped the model up on to the main step quickly, so that the initial burst of power got the model off. " D " is a logical development of " A " by removing unnecessary body and surfaces in contact with the water. It comprised two floats joined by a strip of ¼ in. sq. balsa and roused a storm when I first produced it. Protests died down after I replaced the balsa strip by a flat fairing, and the final take-off resembled a conventional three float model. " E " is a logical development of " D " and it will be observed that it is very similar to " A ".

The twin float variety calls for much more thought and ingenuity, and I have not heard of them being used anywhere else in this country. A typical layout for a full size aircraft is shown in Fig. 3, and it will be noticed that the step in the float is about under the C.G. I have never managed to get this layout to work in a model, and always, the step has to be further forward, as in Fig. 4. Floats are quite long, from twelve to fifteen inches on a three foot span model, and they should be rigged so that, when the model is planing on the centre and aft steps, the angle of attack is about 50. Some adjustment of this angle probably will be found necessary, and it is an advantage to make the rear float supports of wire, so that they can be bent to shorten their effective length. All my previous remarks on rigidity of float supports apply even more for twin floats, and care must be taken in making adjustments to ensure that the floats remain parallel.

To sum up, three float seaplanes present little difficulty, provided reasonable proportions are maintained, together with a rigid assembly : twin float models are more representative of modern practice, and they require much more consideration of waterborne performance.



FASHIONS IN TWIN FLOAT DESIGN.
FIG 5

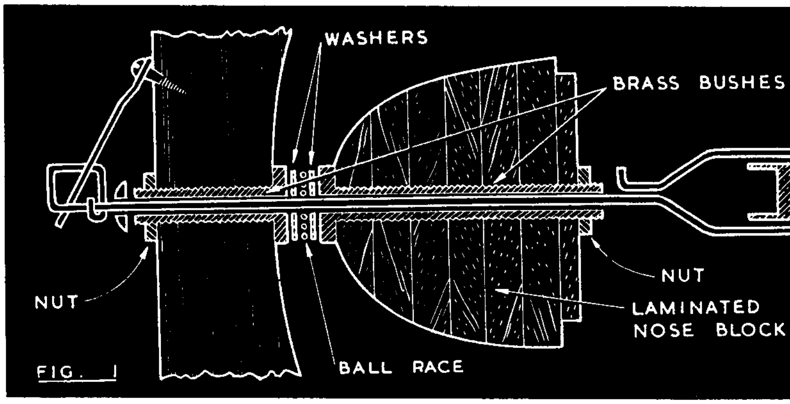



FIG. 1

# ESPECIALLY FOR THE BEGINNER

PART VI.

BY REV. F. CALLON

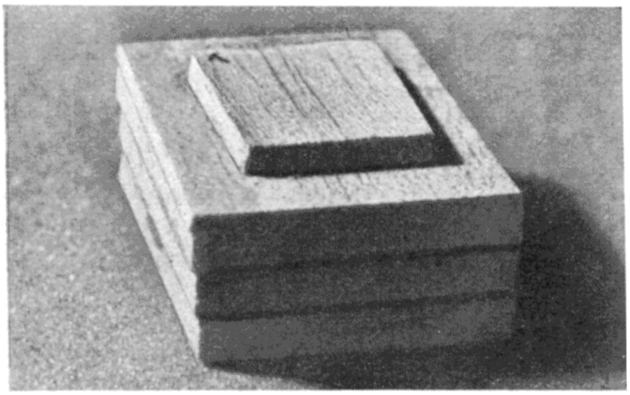
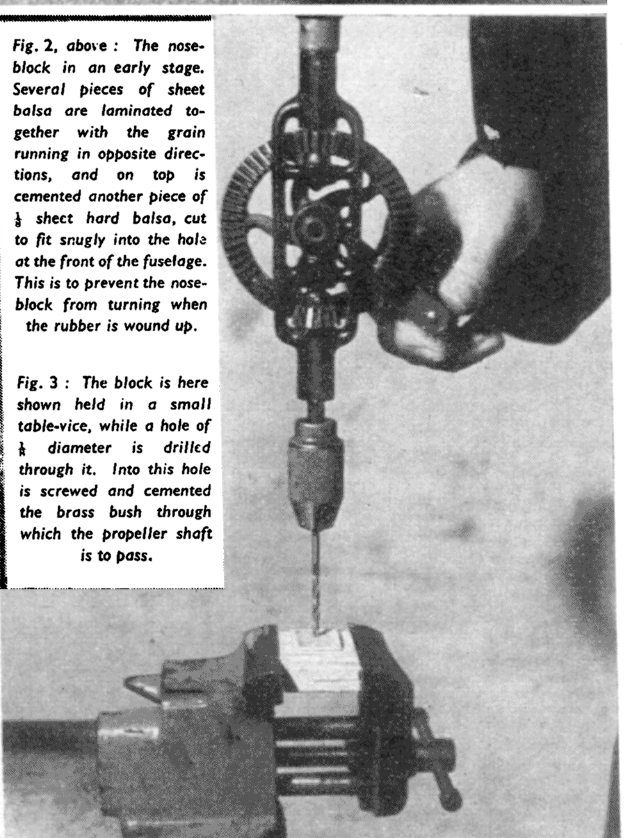


*Fig. 2, above: The nose-block in an early stage. Several pieces of sheet balsa are laminated together with the grain running in opposite directions, and on top is cemented another piece of 1/8 sheet hard balsa, cut to fit snugly into the hole at the front of the fuselage. This is to prevent the nose-block from turning when the rubber is wound up.*

*Fig. 3: The block is here shown held in a small table-vice, while a hole of 1/8 diameter is drilled through it. Into this hole is screwed and cemented the brass bush through which the propeller shaft is to pass.*



**What's the Difference ?**

What has a rubber model got that a glider hasn't ?

Well, to start with, it has a propeller and an undercarriage. And the main reason why it has an undercarriage is because it has a propeller. That's not as silly as it sounds, old man. The propeller on rubber models is carved out of fairly fragile balsa wood, and if it happens to be the first part of the plane to touch the ground when landing—well, that sometimes means a new propeller. To prevent this, one or two pieces of wire or thin cane are attached to the underside of the fuselage in such a way that *they* will always touch down before the prop. This normally means that the entire plane tosses over on landing; not very graceful, but the prop. remains whole.

Closer inspection of the nose of a rubber model reveals some wire bent into a circle, diamond or square, sticking out in front of the prop. and then passing right through it and through the nose block. This is called the propeller shaft. The other end inside the fuselage is also bent round. Over it are looped a number of strands of elastic which pass along to a peg of cane or hardwood at the rear of the plane. When the propeller is turned in a clockwise direction the strands of elastic wind round each other, and when the propeller is released they drive it back again in an anti-clockwise direction, thus tending to move the model forward. We saw last month, that if a glider is hand-launched at a speed which is faster than its normal gliding speed, then it rises quite steeply at first, until it loses the effect of the extra strong push it has been given. With rubber models, the extra push comes from the elastic motor untwisting, and turning the propeller as it does so. And since this push is a continuous one, the model continues to rise as long as the propeller is turning sufficiently fast. Obviously, the faster the propeller turns, and the longer it keeps turning, the higher the model is going to climb, and the longer it is going to stay up. The more rubber the better, then ? Well, not quite. For one thing, rubber weighs a lot, so that you cannot put a whacking big motor into a small model; and for another, the more strands that are added of any given size, the less is the number of turns which can be put on without risk of the elastic snapping.

But this is all very technical, so suppose we have a look at the differences of *construction* between a rubber model and a glider. Most of these are centred round the front end of the fuselage so we will start there.

**The Propeller.**

This, as has been mentioned, is carved out of a single block of balsa wood. Since prop. carving is a very tricky job, your best plan as a beginner is to spend two or three shillings on a ready-carved one. It can be anything from 1/3 to 1/2 the wing-span of the model in length. Personally I prefer the larger sizes, since these turn more slowly and so keep turning for a longer time for the same number of winds on the rubber motor.

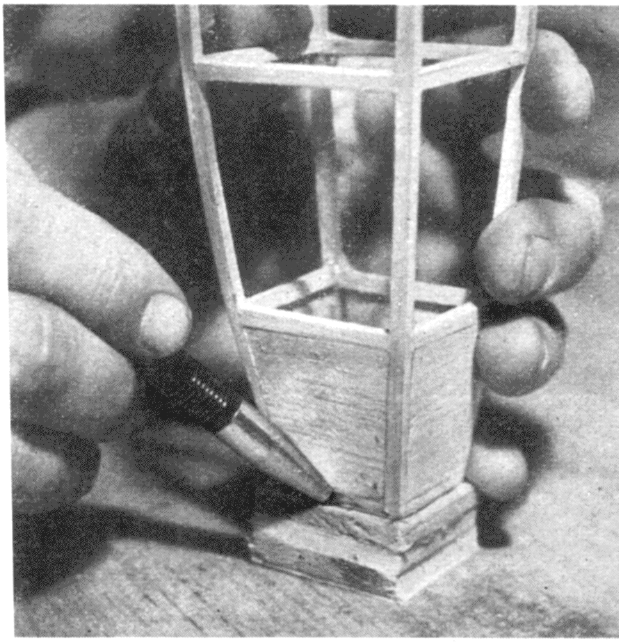
Even though your propeller is ready carved, there is still quite a lot of work to be done on it. To start with, it will most probably be only roughly sanded, so you must go carefully all over it with extra fine sandpaper until it is perfectly smooth.

Now have a good look at Fig. 1, which is a cross-section of the centre of the propeller and nose-block. Through each of these units a hole must be drilled into which is screwed a brass "bush". The bushes are small, threaded bolts with a hole running through their centres. The size of this hole must be chosen to fit whatever size or gauge of wire you are going to use for the propeller shaft. Thus 18 gauge wire will need an 18 gauge bush; 16 gauge wire a 16 gauge bush, and so on. Incidentally, the bigger the number of the gauge, the *smaller* the diameter of the wire. Thus 20 gauge is thinner than 18 gauge, and 18 gauge thinner than 16 gauge. For small models, 18 gauge will do, but for stronger motors 16 gauge is safer, for a bent propeller shaft can almost shake a model to pieces on full turns.

But as they say in the books, we digress. When you have sanded your propeller it must be drilled to take the bush. Most bushes are just over $\frac{1}{8}$ in. outside diameter, so you will need a $\frac{1}{8}$ in. bit, and of course you will need a hand-drill with which to use it. I am afraid that a drill is a " must " for rubber modelling. You need it both in the construction of the model and later for winding up the rubber motor. A good one costs about 15/-. At the same time you might as well get the following sizes of bits: 1/16, 3/32, 1/8, and 3/16. They cost about a shilling each.

Measure the propeller carefully from tip to tip, and mark the exact centre. Lay it down flat on the workboard, and either get someone to hold it steady, or drive a couple of pins through the thick part near the centre and into the board. Then, making quite sure that the drill is held vertically, drill a $\frac{1}{8}$ in. hole through the centre. Now squirt some balsa cement down the hole and screw in the boss from the rear face. This will leave the flat head of the boss nearest to where the nose-block is going to be. Clean out any cement which may have got *inside* the boss by pushing through it a short length of the correct gauge of wire dipped in thinners. If the other end of the boss sticks out at the front of the propeller, screw on the nut, and put a fillet of cement all round to stop it turning.

In order to strengthen the propeller some people believe in covering it with tissue and then doping it. This is not an easy job, and I have found that dope alone is quite sufficient if you put on enough. Using a soft brush, put on a fairly thick coat of clear dope all over the propeller. When it is dry, you will find that the balsa wood has become quite rough to the



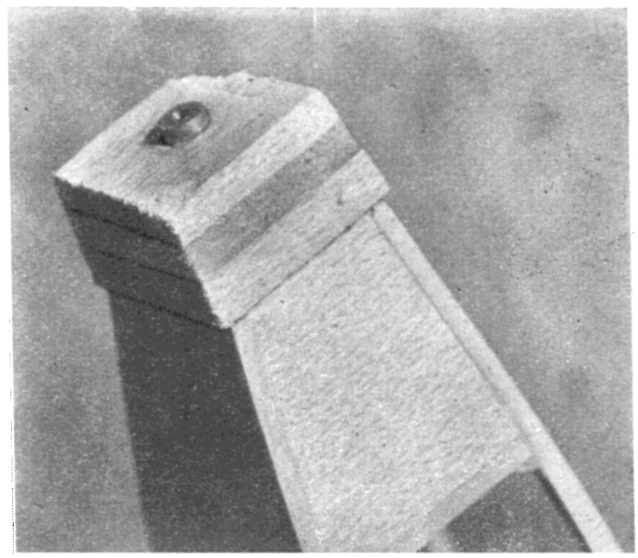
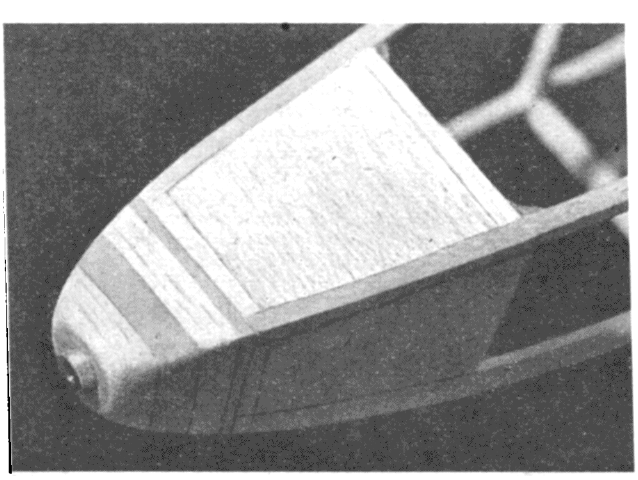


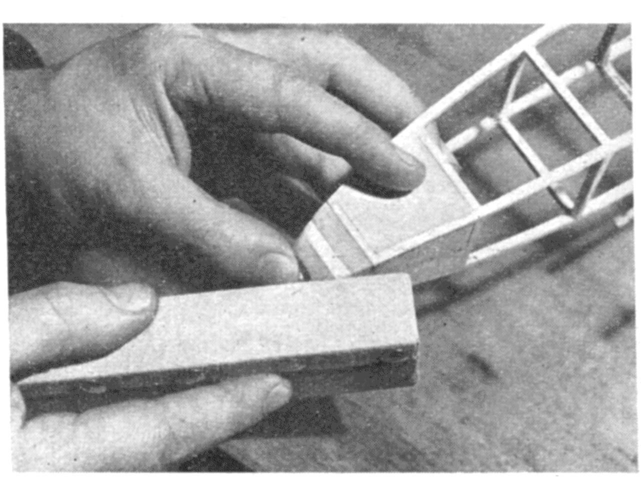
*Fig. 4: The unit is pushed into position against the nose of the fuselage, and the outline of the fuselage is here being marked out onto it with a roll-ball pen.*

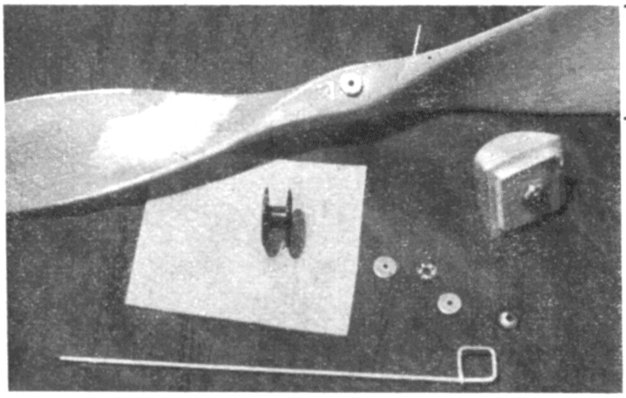
*Fig. 5: The nose-block placed in position after having been roughly sawn to shape along the lines just marked out. The flat head of the brass boss can be seen projecting from the centre.*

*Fig. 6: Sandpaper wrapped round a block of wood is here being used to sand down the nose block along the lines of the fuselage.*

*Fig. 7, below: The nose-block in position and sanded to shape; a fairly tight fit, but easily detachable. It is now ready for a final polishing and a few coats of clear dope.*







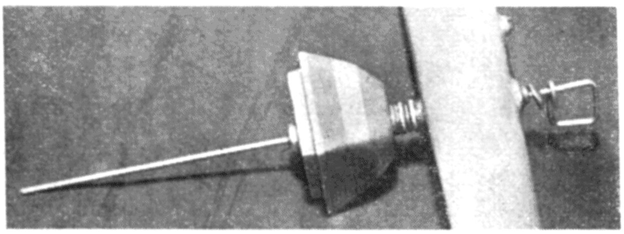


*Fig. 8 : All the units ready for assembly : propeller and nose-block with bushes in place; propeller shaft with one end bent into a square for the free-wheel clutch; flat washers and ball-race ; cup-washer; bobbin.*

*Fig. 9 : Onto the propeller shaft are threaded in this order :—cup-washer, propeller, flat washer, ball-race, flat washer, nose-block.*

touch. Sand it smooth again with fine sandpaper, and apply a second coat of clear dope. When this dries it will leave the balsa *slightly* rough, so once again sand it smooth. Add a third and fourth coat of dope, allowing the previous one to dry properly before adding another. A fifth coat, of coloured dope, may be added according to taste if you wish.

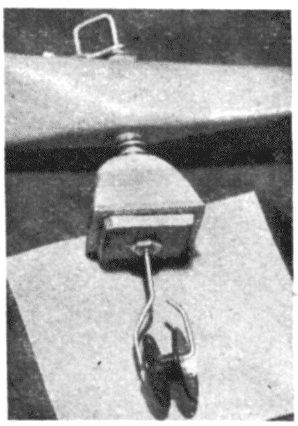
**Making the Nose-Block.**

The nose-block may be carved out of a single block of balsa, but a much stronger job will be made of it if you use laminated sheet. " Laminating " means sandwiching together several layers of sheet balsa with cement taking the place of the jam ! When laminating, always make sure that the grain runs in opposite directions on each consecutive piece of sheet, *i.e.*, north to south on the first, east to west on the second, north to south on the third, and so on. Start by cutting three or four squares of ⅛ sheet slightly bigger in area than the outside measurements of the front end of the fuselage, and laminate them together. Leave them for several hours to dry thoroughly, either with a weight pressing onto them or squeezed gently in a small vice. Next, cut a piece of *hard* ⅛ sheet to fit snugly inside the aperture at the front end of the fuselage, and cement this on top of the laminated pieces. (Fig. 2). The rest of the process should be made quite clear by Figs. 3–7.

**Free-Wheeling Devices.**

When all the turns on the rubber motor have unwound, and the model is (we hope) high up in the air, it will naturally stop climbing and start to glide. And this is when the propeller not only becomes useless, but is a perfect nuisance. A piece of wood about a foot long, stuck across the nose of that glider you have just finished would not improve its performance. And it is just the same with a gliding rubber model. There are various ways of lessening or removing the propeller's resistance to the air. Some propellers are made to fold up completely when the motor has run out, but since we are using a fixed propeller, the best thing we can do is to make it keep on turning on its own—*i.e.*, free-wheeling—as soon as it has finished its job of driving the plane upwards. Fig. 8 to 12 should give you a good idea of the simplest of these free-wheeling devices. When you are screwing in the driving arm, leave it loose enough to swing round when given a light push ; otherwise it will tend to stick and prevent the propeller from slipping its clutch and free-wheeling.

When you have finished assembling the front unit, don't forget to put a drop of oil inside the bosses and on the ball-race, so that the shaft can turn freely.



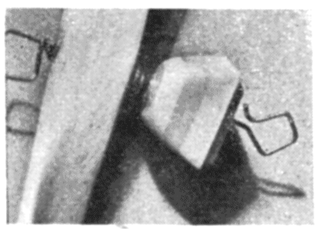


*Fig. 10, left : The bobbin is slipped onto the end, and the shaft bent round as shown. Since the bobbin is a very loose fit on the wire, it must be packed tightly in place by means of a wedge of hardwood.*

*Fig. 10a, above : Alternative methods of bending the shaft without using a bobbin. Bicycle valve-tubing must in this case be threaded over the wire to prevent it cutting into the rubber motor.*

Figs. 10 and 13 show the best way of attaching the rubber motor to the propeller shaft—over a small bobbin. The advantages of this method are great. There is no danger of the rubber being cut into by the wire. Even more important is the fact that the bobbin can be adjusted until it is *exactly* in line with the rest of the propeller shaft, and held in this position by the hardwood packing. This means that as the rubber motor unwinds it is held in the exact centre of the fuselage, and there is far less danger of its being whipped around like a skipping rope, thus causing the whole plane to shudder violently in flight. This " shuddering " can ruin the model's climb, and anything up to half the motor's power is wasted by it.

Bending piano wire into propeller shafts is not easy, particularly with a gauge as thick as 16 gauge. You need a strong pair of hands and a certain amount of knack. So don't be surprised if you need two or three tries before making a satisfactory job of it.

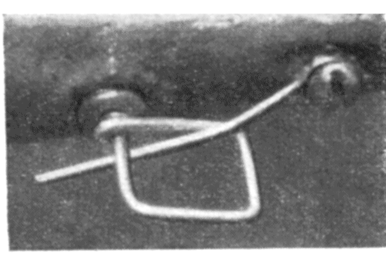


*Fig. 11, left : Driving arm and free-wheel device all in one. A small loop is bent onto a short piece of 20 gauge piano wire, and through the loop a ½" screw passes into the propeller about an inch away from its centre. When threaded through the " square " end of the prop. shaft, this little piece of wire drives the propeller round as the rubber motor turns the shaft. When the turns on the motor run out, the shaft stops turning ; the driving arm slips out of the square, and the prop. is left to free-wheel as the model glides through the air. (See also Fig.12. below).*

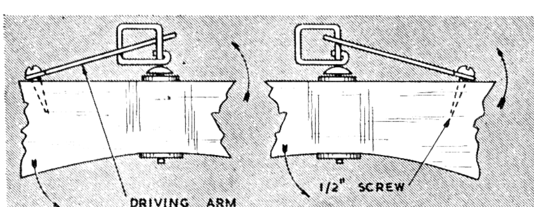



FIG. 12

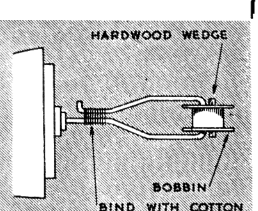



FIG. 13


**AIRCRAFT DESCRIBED No. 32**

BY G. CULL AND E. J. RIDING

## THE BRISTOL
# BRABAZON I

*Photo: Central Press.*

TOWARDS the end of last year, at the suggestion of the Bristol Aeroplane Company, my late colleague and friend, E. J. Riding decided to embark on the most ambitious article yet attempted in this series, ambitious because of the very magnitude of the subject, the Bristol Brabazon.

During February he accordingly spent several days at Filton, photographing, making preliminary sketches and collecting a mass of detailed information from which to construct a drawing, to his well known and long-established standards. That his last drawing was left unfinished was a great pity for it has had to be completed without the information he collected at first hand, and in one of those going-to-press rushes that an emergency makes unavoidable in magazine work. This, however, will not be the last of E. J. Riding's work to appear as two further articles had been started, which will be completed and printed in due course.

It was eight years ago that a Government Committee was set up to formulate the types of civil aircraft Britain would need after the war. From the specifications it was obvious that the production of largest type would be a task of proportions which the British aircraft industry had never before encountered, but it was appropriate that the design and construction should be entrusted to Bristol's with their large design staff, extensive works and long experience. Some main components were built to half scale for structural tests, after which the final arrangement was decided and the first drawings were issued in April, 1945.

Although having no official name, the design had by this time borrowed that of the famous Lord who was chairman of the committee of its origin. Work on the jigs for the construction of the fuselage was started in October, 1945, and a year later the fuselage and centre section were well advanced. The overall dimensions of the Brabazon made its assembly impossible in the existing flight shed, and so an assembly hall was built for this purpose with a floor space of 7½ acres. The moving of the fuselage of the Brabazon into the new assembly hall was foreseen to be a ticklish job, hence the name " Operation Shoe-Horn ", but prior calculation ensured its success. Work then progressed steadily, until November 1948 found the aircraft virtually complete.

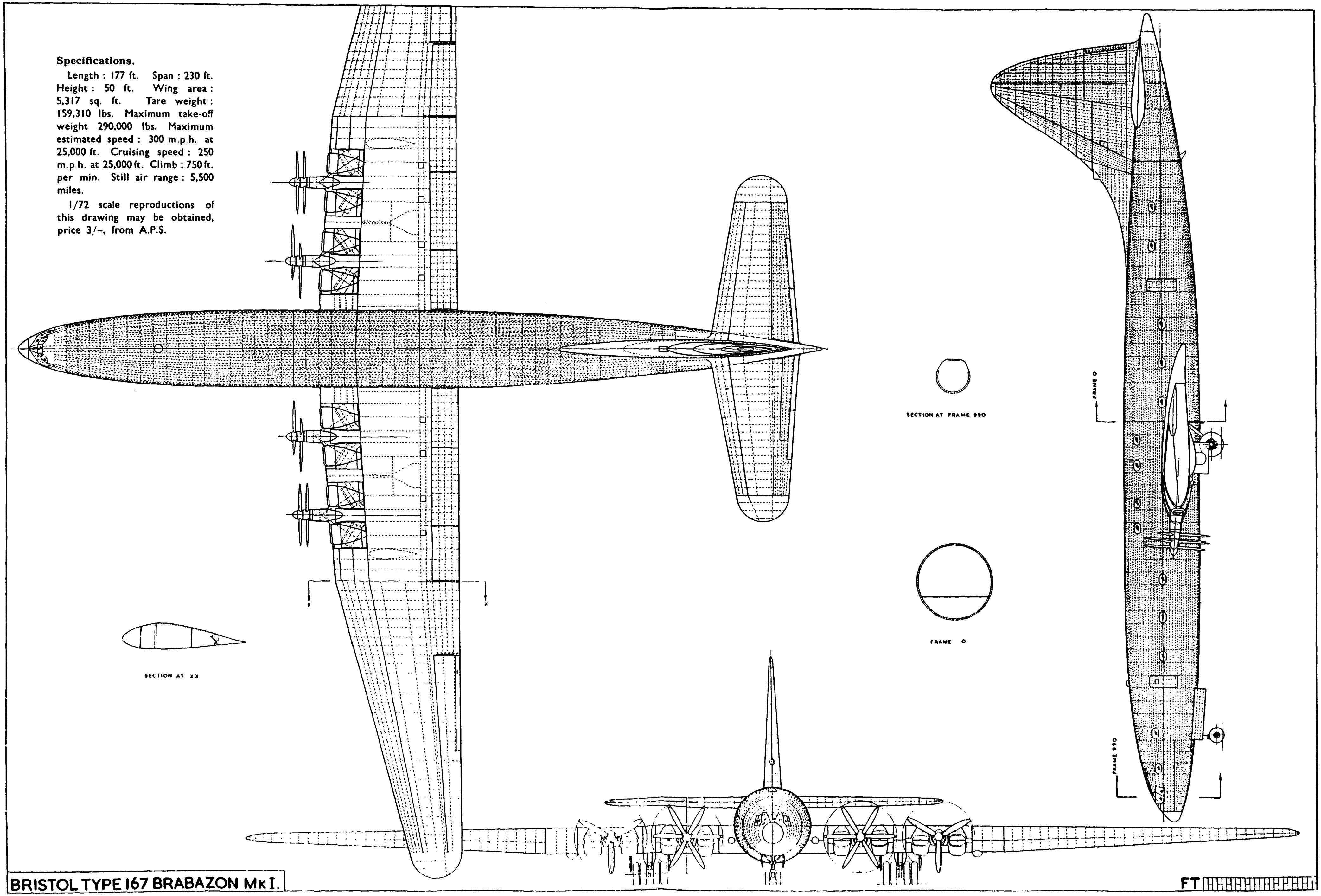
This marked the beginning of a year-long programme of ground testing ;—the most extensive and exacting series of tests ever conducted on a prototype in this country. As a result, when the Brabazon was eventually ready for taxying trials, every item of equipment and component of the airframe had successfully passed exacting tests and re-checks and so it was with great confidence that A. J. Pegg, his co-pilot and eight flight observers took the new air liner through the ground trials, and on the second day of these, September 4th, decided to take-off. With no preliminary hops the Brabazon I unstuck in 500 yards and landed after 27 minutes, stopping in 600 yards with the inboard propellers in reverse pitch.

The Brabazon I will not go into service, but the Brabazon II is intended for B.O.A.C. for use on the London/New York route, accommodating one hundred passengers with five attendant stewards and a flight crew of seven. The passenger layout features a forward rest room for the crew, a lounge ahead of the wing with the dining saloon and lounge bar over the wing. A cine-projector and radio form part of the equipment in the after lounge, toilets and galley will be beneath the dining saloon and baggage and mail stowage is below decks. Pressurisation enables the conditions normally found at 8,000

**Specifications.**

Length : 177 ft. Span : 230 ft. Height : 50 ft. Wing area : 5,317 sq. ft. Tare weight : 159,310 lbs. Maximum take-off weight 290,000 lbs. Maximum estimated speed : 300 m.p.h. at 25,000 ft. Cruising speed : 250 m.p.h. at 25,000 ft. Climb : 750 ft. per min. Still air range : 5,500 miles.

1/72 scale reproductions of this drawing may be obtained, price 3/–, from A.P.S.




BRISTOL TYPE 167 BRABAZON Mk I.

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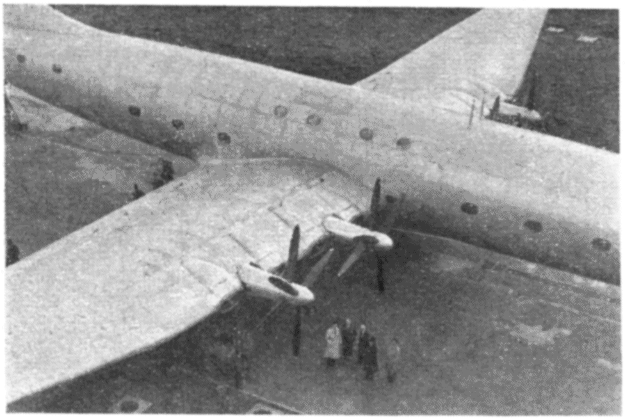
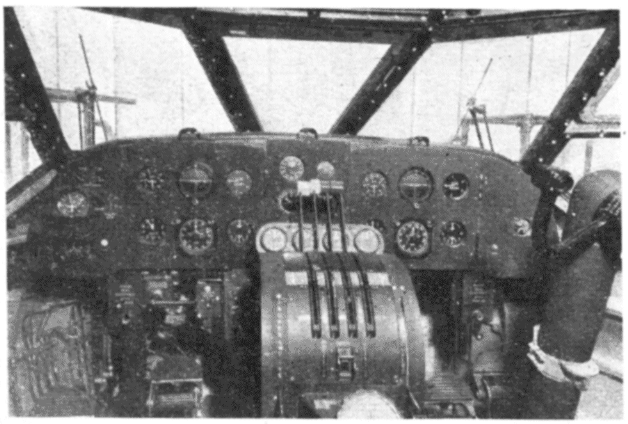
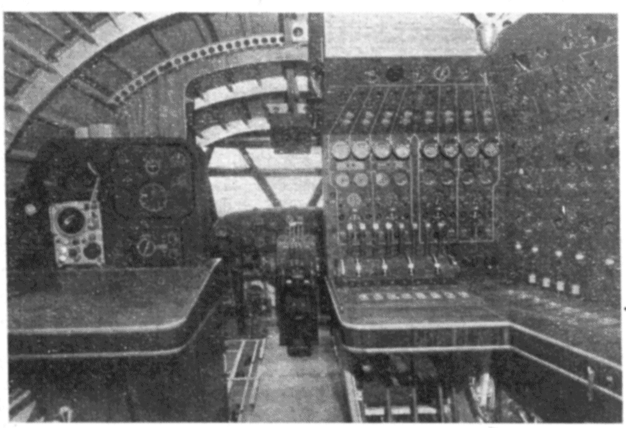






feet to be preserved while cruising at 25,000 feet in the comfort of the smoother air of high altitudes.

The fuselage of the Brabazon I, however, has more technical furnishings and is more than half filled with test equipment with a thousand instrument dials and oscillographs to record every aspect and condition of flight. These are grouped in twelve panels and all instrument readings are automatically recorded, many by the twelve cameras installed. Two Centaurus 20 radial engines drive each propeller, each being mounted at an angle of 32 degs. to the propeller shafts. Extension shafts from each engine run to a gearbox in each propeller " stalk " from whence the two co-axial shafts run forward to the propellers. Each engine bay is accessible in flight and can be completely flooded with methyl-bromide in the case of fire. Although the engines are completely enclosed within the wing contour, cooling by leading edge intakes has proved to be more efficient than in the normal radial cowling.

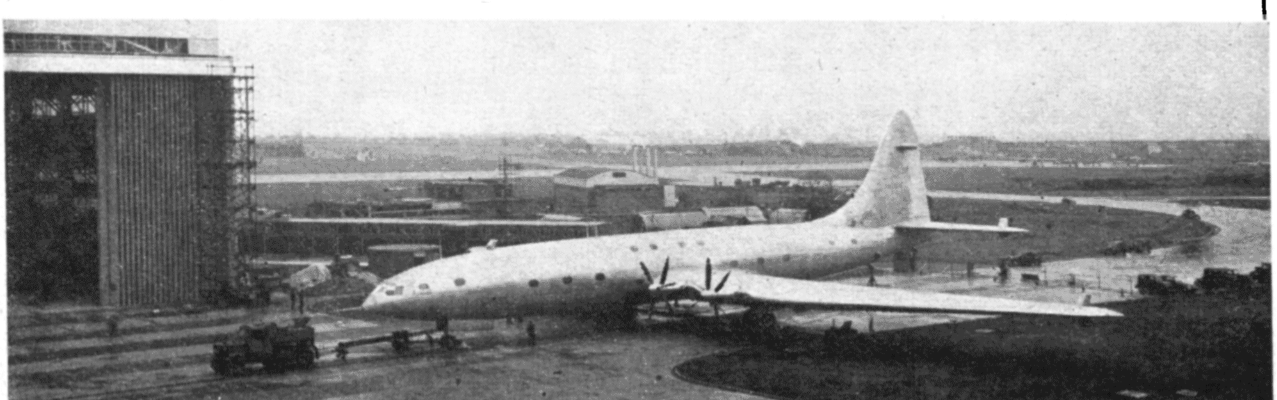
The area of the control surfaces dictated that they be power operated, and in this direction the Bristol engineers worked closely with the Royal Aircraft Establishment and produced a system where hydraulic actuation dealt with the actual air pressure loads but retained sufficient resistance to give the normal " feel " of the controls. Twenty-eight flexible wing fuel tanks accommodate 13,650 gallons but 150 gallons of this is unusable as the camber of the wings prevents it reaching the fuel pumps.

The flight testing continues with speeds, altitude and load being progressively increased and the Brabazon has been stalled and flown on three propellers. Brabazon II is taking shape in the assembly hall and her first flight will be awaited with more than usual interest for she will be the first 100-seater prop-jet air-liner to go into service.

### Construction.

**Fuselage :** Circular section throughout except at extreme tail. Stringers notched into frames with riveted light alloy stressed skin covering. **Wings :** Conventional construction with spars and spanwise stringers with stressed skin covering reaching 3/16 in. thickness at points of maximum stress on centre section. Plain flaps are in eight sections. Control surfaces are stressed skin structures with no aerodynamic balances. Large mass balances are fitted for trial flights only. (Mark II controls all manual with aerodynamic balances and servos.) Four contra-rotating, six-blade, reversible pitch propellers are driven by eight Bristol Centaurus 20 eighteen-cylinder, two-row sleeve-valve radial engines developing 2,500 h.p. at take-off. (Mark II will have Bristol Proteus propeller, turbines.) Twin nose-wheels retract backwards. Two main undercarriage units each carry two wheels retract into wings and are enclosed by fairing doors (four wheels on each leg as fitted on first flight are temporary only). (Mark II will have four wheel bogies.)

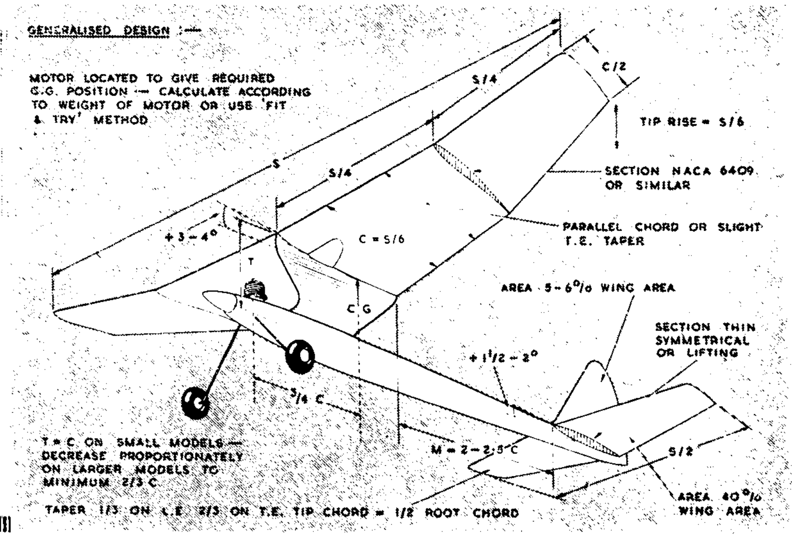
*Top. From a lofty perch, the photographer was still unable to get all the " Brab." in one picture. Below, the pilot's instrument panel looks, unexpectedly, bare, the explanation being found in the shot below, which shows the flight engineer's station. At bottom of page, the Brabazon is being towed back to her assembly hall and part of the 2,725 yard runway can be seen in the background.*



# It's DESIGNED for YOU!

NUMBER THREE

## POWER DURATION




POWER Duration models undoubtedly have the highest mortality rate of any type of model aircraft (What about Stunt Controliners ? Ed.). On the face of it they should be simpler to make stable and trim than a rubber powered model : for in the first case we have a constant thrust, and the second a varying thrust, so that power-on conditions are constant with a power model, but continually changing with a rubber job.

The main reason why so many power models exhibit instability and often come to a sticky, and abrupt, end, is simply a matter of the *degree* of power applied. Whereas in a rubber driven model even a really fast climb to, say, three hundred feet, is seldom accomplished in anything under thirty or forty seconds, a good power duration model, properly trimmed, can reach a similar altitude in ten seconds or less.

As soon as you speed up a model stability problems become magnified, and what might be a perfectly stable layout at lower speeds becomes hopelessly unstable. Furthermore, even with the best of designs, the margin of stability is reduced, so even the slightest error in trimming may lead to instability in an otherwise stable machine.

Bearing in mind then, that most power duration models are *overpowered*, and therefore require an extreme reserve of stability, we can appreciate the popularity of the pylon design, for this does definitely give the most stable layout under such conditions.

Glide stability is relatively unimportant; any model layout with conventional proportions can be trimmed for a stable glide, and the pylon type is certainly no exception here. It does not have a *better* glide, but it can be trimmed to have a glide performance comparable, at least, with that of the best of a more streamlined layout.

With power on, however, the pylon set-up would not appear particularly good at first sight—Fig. 1. The high mounted wing positioned well above the line of thrust, gives a strong looping tendency. But this is readily combated by tail lift, rigging the tailplane at some positive incidence (and also ensuring a positive angle of attack during flight), so that this cancels out the nose-up moment of the thrust—and the faster the model flies the more pronounced is this effect.

With positive tailplane incidence, an aft C.G. position is also necessary for balance, which turns the design into a tandem wing machine with both wings and tailplane contributing lift. Generally the tailplane is lifting strongly, which means that there is very little difference between wing incidence and tailplane incidence when properly trimmed. The danger is in getting this difference too small, when the tailplane may take over completely and force the model down into an ever-steepening dive. The farther aft the C.G. (which virtually means the less the difference in incidence between wings and tailplane) the more critical the layout becomes to adjust, although flying with the C.G. on the trailing edge of the wing, or even behind it is still quite practicable, with careful trimming.

The tailplane, then, is one of the major stabilising factors in the pylon layout and, provided it is not misused, is extremely efficient as such. Hence, it is not difficult to appreciate the modern tendency to use larger and larger tailplane areas on power duration designs ; 40%, 45% and even 50% of the wing area being used more and more.

Lowering the centre of resistance with a shoulder wing design, or raising the thrust line to near the wing position does not necessarily provide a better answer. In fact, practice has shown to date that such models are even more tricky to adjust, as they must still balance with the C.G.well aft for adequate longitudinal stability, and the whole layout is then more critical than the comparable pylon design. A shoulder wing design, for example, is very difficult to trim for climb without looping, or spiralling in if made to turn. Adjustment can be made a little less critical by moving the C.G. forward and re-adjusting the tailplane incidence, but then an excessive down thrust angle is generally necessary.

Without going into any more detail regarding the merits and disadvantages of the various design layouts we would state, simply, that at the present state of knowledge and development, the pylon layout is undoubtedly the most satisfactory where sheer duration is the aim. Accepting that, we can then average out the various proportions for a successful design layout.

Before this, however, let us first consider the model's size. American influence has given British designers a rather unfortunate lead in that the first British power duration models were almost all based on current American trends. These, at the time, were all built down to specific wing and power loadings, so that in the British field, the relatively heavily loaded power duration model became the " standard " when the rules called only for F.A.I. loading, which is very light indeed. These first designs, with their subsequent influence on later British competition models, have rather tended to produce the overpowered model—or rather the *under-sized* model for the capacity of motor used—with all its exaggerated stability problems. Now that loading rules have been largely scrapped in America, the trend there is towards larger and larger models for the same size of motor which, while possibly losing out as regards rate of climb, should be far less critical (and therefore more consistent), and definitely score on the glide. There is no doubt that the larger the model the better its aerodynamic efficiency as reflected in glide performance.

In recommending design figures, therefore, we shall tend towards a larger size of model than has hitherto been British practice, but which we think is the right approach to a

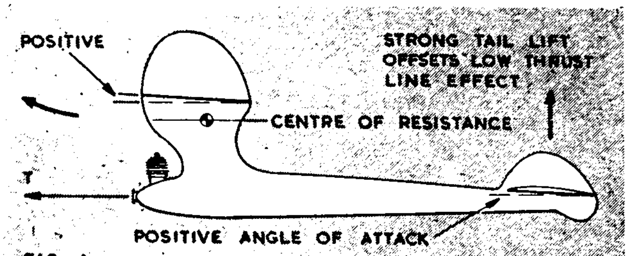



FIG. 1

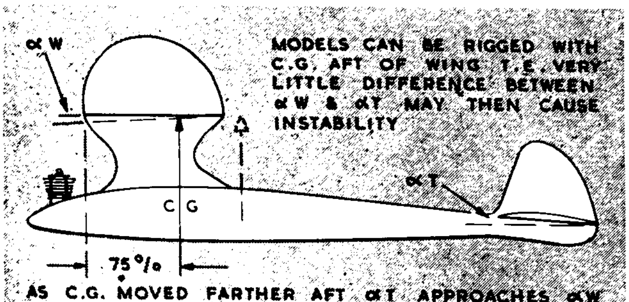



FIG. 2

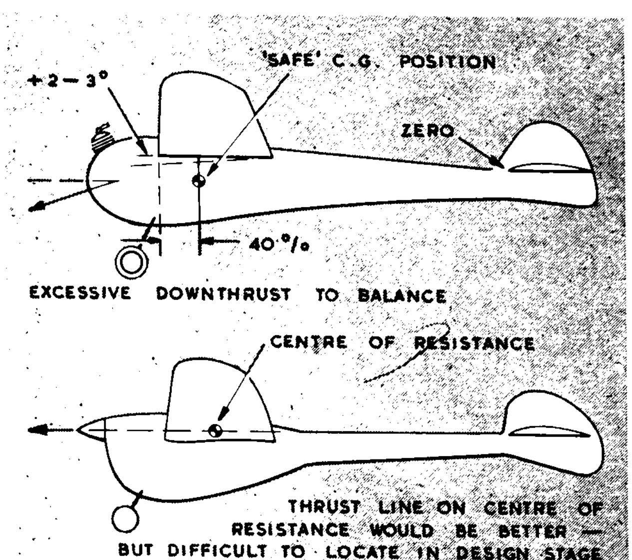



FIG. 3

contest model under present rules. Although these rules are quite open as regards power loading and only restrict wing loading to F.A.I. specification, they are not helpful in one respect—duration of power run permitted. F.A.I. rules permit a maximum of 30 seconds for the power run, whilst most British contests are run with a limit of twenty seconds, fifteen seconds, or even ten seconds. Obviously the length of power run permitted for contest work affects the design of the model, and should therefore be standardised for all contests. A model designed for duration from a ten second power run, for example, would have a very rapid climb (calling for a smaller *size* of model), and it would be critical. If flown in a contest where a 30 second power run was permitted its rate of climb would be unnecessarily high. For the thirty seconds power run a larger model with a more moderate climb would be better, with its greater consistency, and still be capable of putting up limit flights on account of its better glide.

However, for the moment at least, this question must remain unanswered and we must compromise by assuming that 20 seconds is about the maximum power run likely to be permitted in most contests, with 15 seconds as a likely minimum, both of which still justify a relatively large model.

The two things to be decided, then, are the size of the model (expressed in wing area) for the motor to be used, and the wing loading. We will deal with the latter first.

The smaller the model the more noticeable the effect of a higher wing loading, due to the decreasing aerodynamic efficiency. Thus, for models of around 200 sq. in. and less, maximum wing loading should be around 3 ounces per 100 sq. ins. and certainly never more than 4 ounces per 100 sq. in. But, before we go any further let us reduce F.A.I. loading rules to more convenient figures and see how our limits fit in.

Converting the F.A.I. loading figures of 2·73 ozs. per 100 sq. in. *total* area into wing loading for different tailplane proportions, we have :—

| Tailplane area %age of wing area | 35% | 40% | 45% | 50% |
|---|---|---|---|---|
| Wing loading reqd. ozs. per 100 sq. in. | 3·69 | 3·82 | 3·96 | 4·1 |

It will be seen, then, that with a tailplane of 45% area the 4 oz. per 100 sq. in. maximum figure suggested for the smallest class of model still conforms. In fact, small models of this type are capable of really excellent durations and can be as useful for contest work as the largest size.

As the size of the model goes up, the possible wing loading can increase, with no apparent ill effect. In fact, it is *desirable* to increase the structure weight to get a more robust aeroplane and one less " lively " to trim. There is no particular rule as to how maximum loading varies with area, but suggested figures are laid out in the form of a graph in Fig. 4. Higher loadings than the upper limit shown, tend to produce a model which has a sinking speed too high to take full advantage of thermal lift on every possible occasion, and is therefore, not really suitable for consistent contest work. Models with quite high wing loading *will* still soar in strong thermals, but it is the ability to prolong the glide in weak thermals which counts where consistent top performance is the aim.

The next thing we have to decide is the total wing area, which is not quite as easy as might first appear. Logically, wing area should be related to motor capacity—so many sq. in. per c.c.—but motors of near or identical capacity frequently have different power outputs. What might be right for one motor may be far too much area for another in the same class. However, short of listing every available motor and calculating at length the best probable wing area, after finding the power output of that motor, relating wing area to motor capacity in a general manner is probably the only solution. Further practical experience with any particular motor may indicate that its power output is really equivalent to that of an average motor of larger capacity, and choice can be adjusted accordingly. The following table has been drawn up relative to average motors of the capacities quoted.

Having arrived at the wing area we have decided to use, based on the power plant, it is then a simple matter to calculate the optimum loading from Fig. 4, expressed in terms of total weight. In other words, wing area (just found) times loading figure equivalent to this area, gives the design total weight of the finished model. Subtract from this the weight of the motor and propeller to be used, and you have the weight of the airframe, which should then be proportioned out roughly as under :—

Note that in Fig. 4 loading values are given for wing area figures and so the tailplane proportion must be decided right at the beginning and checked back against F.A.I. loading rules. The diagram of general design proportions recommends a tailplane area of only 40 per cent. of the wing area, partly on account of the fact that the size of the model is rather larger than usual. If you prefer, or want to use, a smaller model, then probably the 45 per cent. tailplane area would be better. Both sizes will give total loadings above the minimum required for F.A.I. rules, in all model sizes. There does not appear to be any real need to use a 50 per cent.

tailplane area except in special cases.

All the major design layout factors are summarised in the generalised figure, so there should be no need to elaborate on the various points. As regards the shape of the individual components, this is largely non-critical. Straight-tapered wings with raked or rounded tips appear equally as efficient as elliptic wings. As a general rule we would say that the centre portion should be of parallel chord, or with slight taper, and tip panels tapered down to roughly one half of the root chord, or made of blunt elliptic plan form. There does not appear to be any particular advantage in specially shaped tip sections, such as swept back leading edge.

Tailplane planform should preferably be tapered, if only to reduce the possibility of warping. A properly designed (structurally) elliptic planform is nice, but straight taper on both leading and trailing edges with squared tips is equally effective. Section can then either be thin "lifting" (i.e. flat undersurface), or symmetrical. Either are equally effective as regards lift and drag developed at small angles of attack. The main thing is to keep the tailplane section reasonably thin—certainly never as thick as the section of the wing.

For the wing, generously cambered sections of the NACA 6409 type have proved about the best for medium and light loadings, possibly using a slightly thicker section with similar camber characteristics, such as NACA 6412, on heavier loadings. The section does not need to be thicker than this (12 per cent.) in any case, nor should it ever be much thinner than 9 per cent. Where a good glide is required, avoid, too, thin sections with a flat undersurface. Sections of this type can give an extremely rapid climb, but gliding speed is generally high, and consequently the sinking speed suffers.

Constructional details are very much a matter of personal choice. As far as the fuselage goes, crutch construction, in one form or another, should be used whenever possible as this makes for strength with reasonably light weight, and ease of construction. Data which should prove helpful in deciding other airframe details are summarised in the second design table.

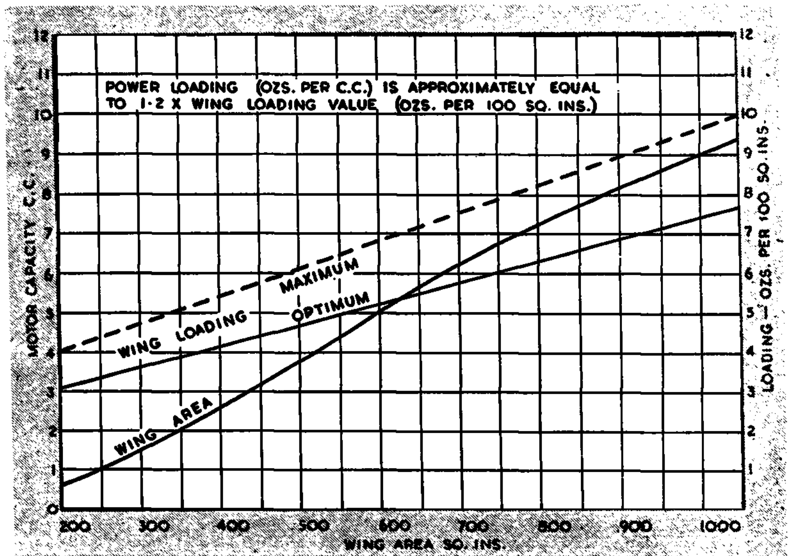



FIG. 4

**TABLE A**

| Motor Capacity | Examples | Wing Area required in sq. ins. 40% Tailplane Area |
|---|---|---|
| 0·5–1 c.c. | Mills ·75 | 100–175 |
| | Amco ·87 | 150–200 |
| | Frog 100 | 250 |
| 1–2 c.c. | Mills 1·3 | 275 |
| | Frog 160 | 300 |
| | E.D. Comp Special | 300–350 |
| 2/3·5 c.c. | Elfin 2·4 | 400–450 |
| | Amco 3·5 | 450–500 |
| 3·5–5 c.c. | Frog 500 | 600 |
| | Yulon | 600 |
| | Eta 29 | 600 |
| 5–10 c.c. | Ohlsson 60 | 1000 |
| | Super Cyclone | 1000–1200 |
| | Nordec | 1200 |

**TABLE B**

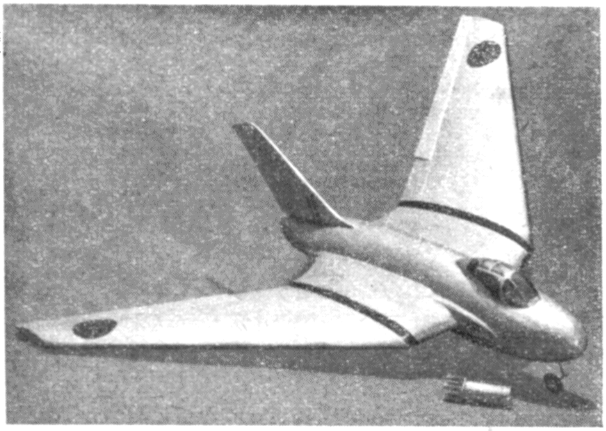
| Component | Wings | Fuselage | Tail Unit | Undercarriage | Motor Mount |
|---|---|---|---|---|---|
| %Airframe Weight | 27·5 | 32·5 | 10 | 12·5 | 17·5 |

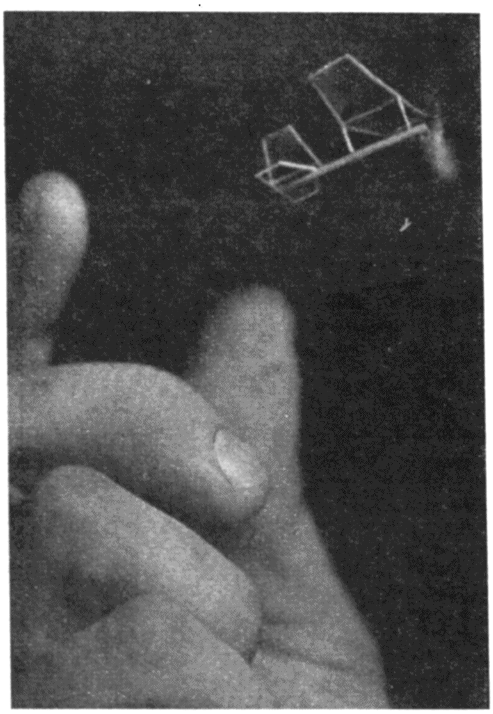
**AERODYNAMIC DATA**

| Model Size (round figures) | Motors | Span | Root Chord | Section | Planform | Dihedral Tip Rise | C.G. from L.E. | T | M | Tailplane Area | Tailplane Span | Fin area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 250 | 1 c.c. | 42 | 7 | Naca 6409 | St. taper tips | 6 | 5 | 5 | 16 | 100 | 20 | 12·5 |
| 350 | 2 c.c. | 50 | 8 | „ „ | St. taper tips | 7 | 6 | 6½ | 18 | 140 | 24 | 17·5 |
| 500 | 3·5 c.c. | 60 | 10 | „ „ | Blunt ellipse tips | 9 | 7½ | 7 | 22 | 200 | 30 | 25 |
| 800 | 5-7·5 c.c. | 75 | 12 | Naca 6412 | „ „ „ | 10 | 9 | 8 | 28 | 300 | 36 | 40 |
| 1200 | 10 c.c. | 92 | 15 | „ „ | „ „ „ | 12 | 12 | 9 | 30 | 400 | 44 | 70 |

**STRUCTURAL DATA**

| | WINGS | | | | | | FUSELAGE | | | | TAILPLANE | | UNDERCART | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model Size | Type | L.E. | Spar(s) | T.E. | Ribs | Covering | Type | Basic | Stringers | Covering | Type | Covering | Wire | Wheel dia. |
| 250 | Mono-spar | ¼ sq. | ⅛×¼ | ⅜×1/16 | 1/16 | Tissue | Box | 1/16 sq. | — | Modelspan | mon-spar | Tissue | 14 swg | 2 |
| 350 | „ | ¼×⅜ | ¼×3/16 | ⅜×1/16 | 1/32 | Double Tissue | Box | ¼ sq. | — | 1/32 balsa | „ | Modelspan | 1/32 | 2¼ |
| 500 | two-spar | ⅜ sq. | ¼×3/16 | ½×⅛ | 1/32 | Sheet L.E. | Crutch | ⅛×¼ | — | 1/16 balsa | two-spar | „ | 1/16 | 2½ |
| 800 | „ | ⅜ sq. | 1×¼ | ½×⅛ | ⅛ | Modelspan | Crutch | ⅛×¼ | ¼×⅛ | Modelspan | „ | „ | 1/16 | 2¾ |
| 1200 | | ½ sq. | 1 to ¾×¼ | 1¼×¼ | ⅛ | Modelspan | Crutch | ¼×⅜ | ⅜×⅛ | „ | „ | „ | ⅛ | 3½ |



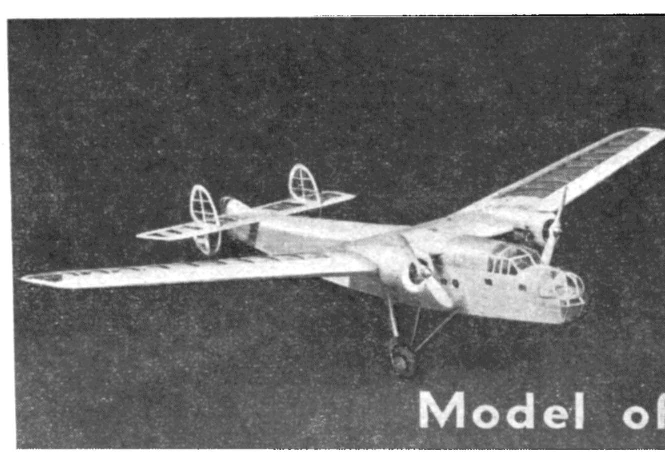
INSPIRED by the rarest of provocative sirens, Fliar Phil returns to the fold this month with one of the smartest nose-pieces it has ever been his good fortune to chip. Note her rotund lines, those appealing peepers, and " sweet as honey " lips. She's a " Cutta Stark " to beat all comers. Pity her when she prangs, won't you fellows.

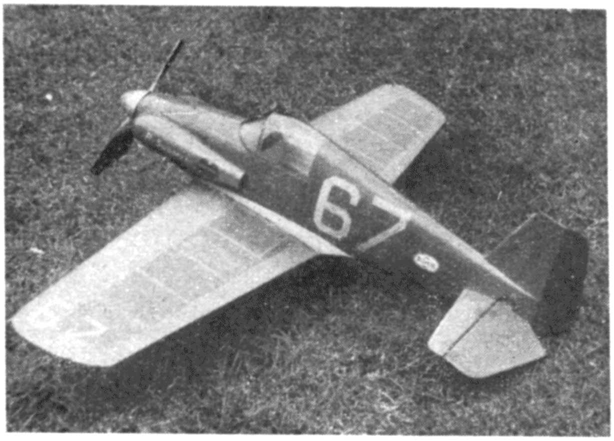
A star with a less attractive conk is pictured in duplicate at the bottom of these pages. It is the result of five weeks' work on the part of J. Bridgewood of Doncaster. Started early in January, Fliar Phil has been kept well informed of the progress schedule of this twin engined 1/18 scale Bristol Bombay. With a span of 5 ft. 4 ins. and weighing only 2 lb. 14 oz., it has two E.D. Bees to keep things moving. On the first test flight F. P. gathers that designer Bridgewood and spectators had a heart-swelling 57 seconds. Due to unsynchronized motors, the Bombay described an unrealistic flight path involving prolonged vertical banks! Fliar Phil shares Mr. Bridgewood's confidence in the job's flying prospects, once the synchronization bug is ironed out.

Top left is a " fizz" job by Mr. Mathews of Norwich. All balsa construction gives a good representation of stressed skin on the De. H.108 which, in this case, has its Goblin replaced by a Jetex 100. Elevons are used for trimming—a task F. P. would not relish without a handful of handbook on tailless technique.

Thanks to W.O. D. J. B. Hicks out in B.A.O.R., Fliar Phil is able to present THE smallest flying model of the month. Weighing only 0·00067 oz., this baby is 0·94 ins. span with a wing area of 0·29 sq. ins. W.O. Hicks reports that designer Guenter Maibaum persevered through 50 test flights before he achieved regular 2 second flips on 100 turns. Normally a Wakefield enthusiast, Herr Maibaum designed this job after reading that the world's smallest job was 1½ ins. wingspan. Incidentally, the model has value, the prop. bearing is a watch jewel!

Bottom left, Mr. F. E. Phelps of Harrow submits a nice indoor shot of his Frog " Saturn ". Finished red and silver with white trimmings, neat workmanship is well emphasised in this angle shot. Exposure





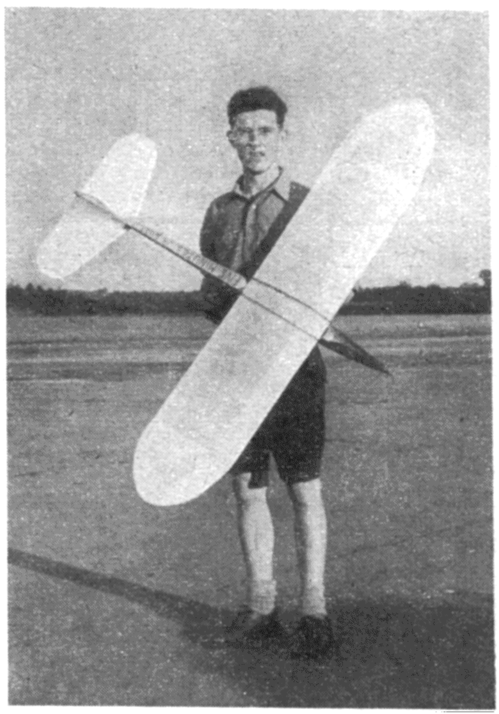

1/25 at f.4·5 with plus X film.

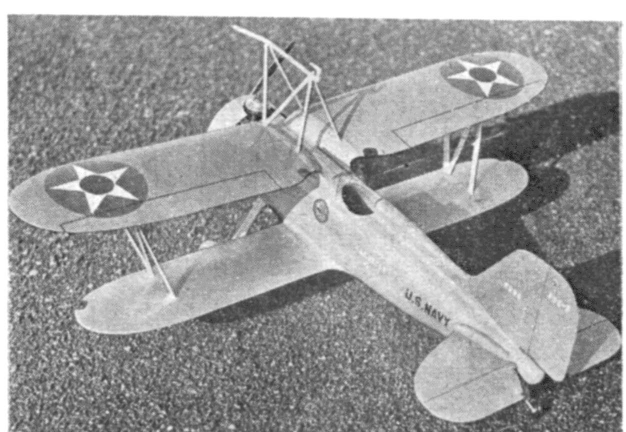
Top of the right-hand page there's a scale control-liner with team racing just oozing from racy features. Sidewinder helmet cowls enclose an Elfin engine and lead out wires are passed through the wing. Without a caption Fliar Phil had to resort to the files to sort this one from the rest of the bunch, and he came through with the answer that it's the earliest of Dave Long's racers, known as the Long P-Shooter. Later versions with one-piece cabins, larger elevators and with wing mounted undercart are called the Long Midget or Midget Mustang. K. Miller of Croydon sent the picture.

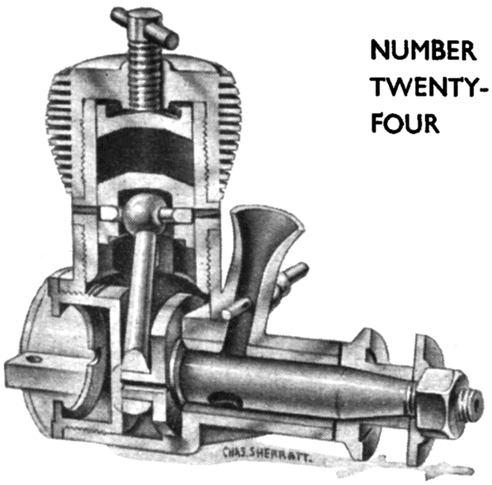
For the boys who like 'em fast and heavy F. P. presents John Dodd's scale Hawker Demon. 72 ins. span and weighing 7½ lb., it has no less than a McCoy 60 series 20 as a power unit. You may expect anything with that combination ; the Newcastle lads can confirm its fighter-like climb with a roll off the top to add a flavour of realism. A. Bainbridge, who took the photo, tells us that the glide is fast and flat, but doesn't mention the wind whistling through the wires.

From K. T. Davies of Evesham we have a pic. of S. Byrd holding his " Dream Bogey " (by D. Posner, August, '49 AEROMODELLER). Dressed for a running session, Fliar Phil suspects Mr. Byrd knows a thing or three about thermal-hooking properties of low-aspect ratio design.

Lastly, down in the bottom right corner, noted U.S. designer/draughtsman, Paul Plecan, sends us a view of his Arden ·199 cu. ins. powered scale control line model of the Curtiss F.9C–2 " Sparrowhawk ". Paul has had more scale jobs published in American magazines than F. P. can remember—this one appears to be up to his usual standards. This tiny 25 ft. span fighter plane was used in 1933 for U.S. Navy Aircraft carriers and, believe it or not, for hooking on underneath airships. The hook arrangement over the upper wing was flown on to a corresponding fixture on the airship. Makes one wonder what the boffins will be thinking of next, doesn't it, chums ? Anyhow, it's most comforting to discover, at long last, that there really is such a thing as a Sky-hook!

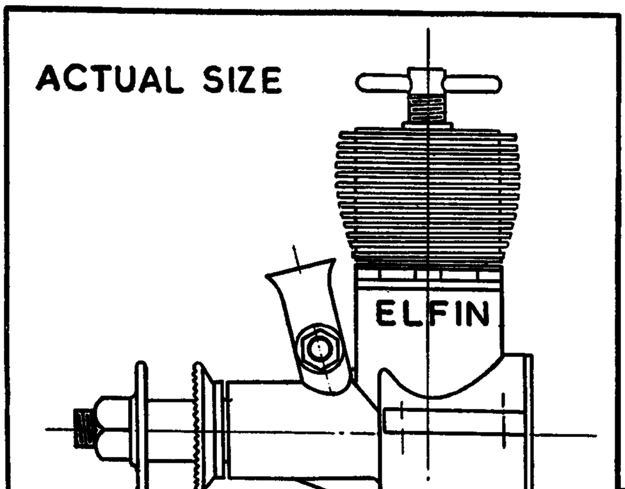





NUMBER TWENTY-FOUR


# *The* ELFIN 1·49



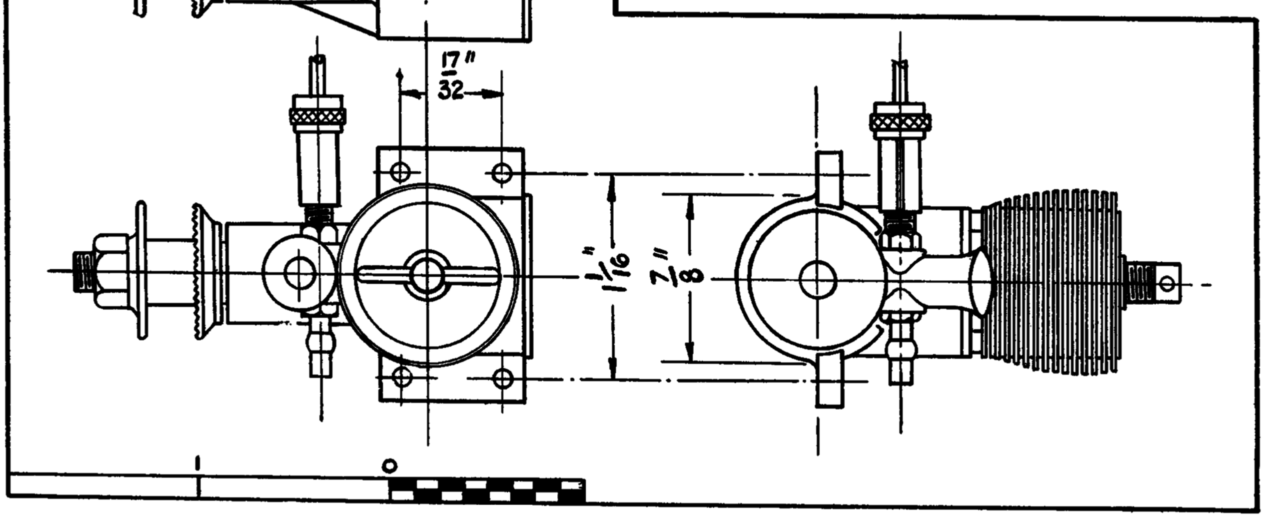

AN opportunity has just arisen to test two small diesels of identical capacity but of different manufacture, and the comparative results are most interesting. Both these engines are of the modern, " hot-stuff " type, using uniflow porting, short stroke, and rotary inlet valve via the crankshaft. They are, in fact, so extremely similar in design that a change over of the cylinder heads would make difficult to distinguish which was which at a casual glance.

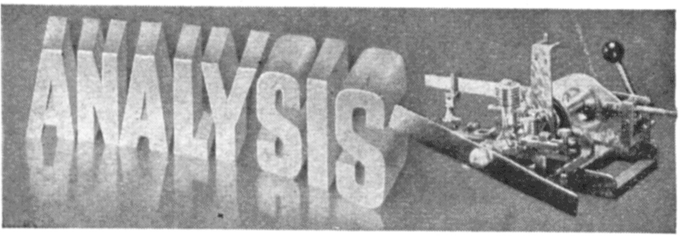
Such a similarity in appearance is almost bound to occur when designers are aiming at the same thing, because logical thinking along similar lines is bound to lead to similar conclusions. Anyone who has tried to take out a patent will have been amazed at the number of similar ideas which have been invented, in almost identical form, by folk living poles apart. When two things, such as small engines, bear a marked resemblance to one another, it is extremely unsafe to say that either of them has been " copied " from the other. Especially is this so when design is centred around a highly-specialised product such as small engines.

What is more interesting than a mere external resemblance is the fact that the performance of these two units showed a very close comparison. The peak output was, in fact, almost identical—only ·005 b.h.p. variation—although it is true that the r.p.m. at which this occurred was higher in the one engine than the other.

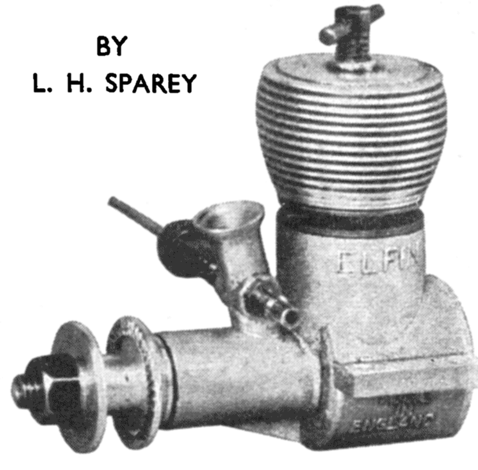
In a future issue the test report of one of these engines will appear ; meanwhile we give here the report on the other—the " Elfin " 1·49 c.c. diesel. Readers will remember that in the issue of July last there appeared a report on the " Elfin " 1·8 c.c. diesel, and that the figure of ·1138 b.h.p. was recorded at 12,100 r.p.m. The smaller engine shows a remarkable consistency of performance, and the output is just about what one might expect from the smaller capacity ; the running characteristics of the two engines are almost identical.

The handling qualities of the 1·49 c.c. engine are excellent, and the running was smooth and consistent at all the useful speed ranges. At the very low end of the r.p.m. scale the running was not so good, and power output fell alarmingly.






BY
L. H. SPAREY



This is undoubtedly due to the porting arrangements, which seem to be designed for the quick cut-off necessary for high-speed efficiency. The engine was also notable for the extremely high speed at which the maximum power output was developed —almost 14,000 r.p.m. This is, I believe, the highest maximum speed/power figure yet recorded for miniature diesel engines.

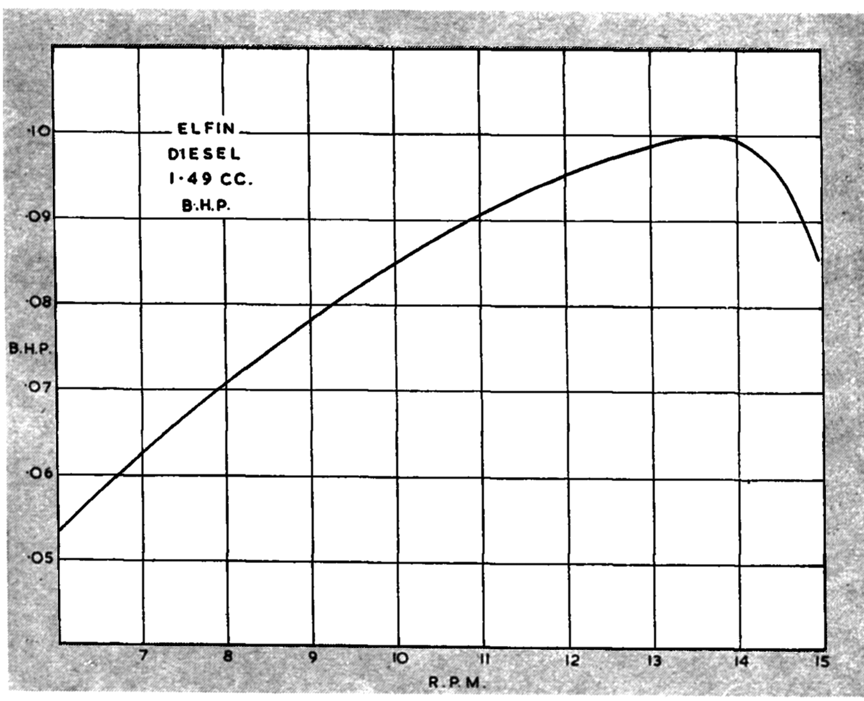
In spite of the high speed at which this engine was tested, no mechanical trouble was experienced, and the unscrewing of parts which was encountered while testing the larger Elfin engine seems to have been cured.

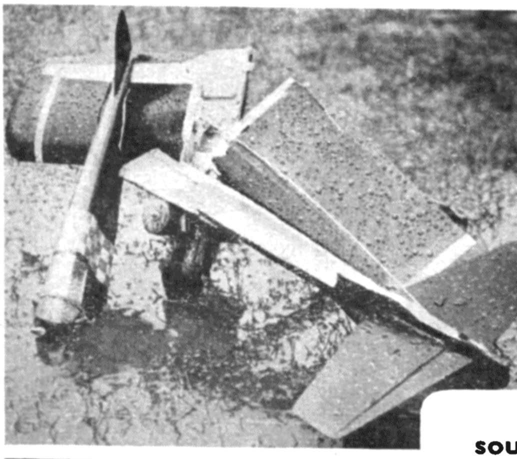
## TEST

**Engine :** " Elfin " 1·49 c.c. Diesel.
**Fuel :** Mercury No. 3 and Mercury Special Ether : 1–1.
**Starting :** The engine was experimentally hand-started from time to time, with engine both hot and cold, and response was immediate in all cases. For convenience, pulley and cord starting was employed for the main tests. The starting position of the needle valve, as marked on the test card, was fairly accurate, and should enable the novice to obtain a quick start.
**Running :** Extremely consistent at all speeds above about 5,000 r.p.m., but was inclined to be " lumpy " at speeds below this figure. Considering that this unit is definitely in the " hot " class, it was remarkably free from temperament.
**B.H.P. :** A maximum output of exactly ·10 b.h.p. was recorded at the high figure of 13,700 r.p.m. The peak of the curve is not exceptionally flat, as between 12,000 and 14,000 r.p.m. the rather large drop of ·005 b.h.p. is encountered. At 10,000 r.p.m. the output is reduced to ·085 b.h.p., and at the lowest tested speed of 6,000 r.p.m. the output was only ·053 b.h.p. At the other end of the scale it will be seen that power drops steeply once the 14,000 r.p.m. mark has been reached. It seems desirable that this engine be run between 13 and 14,000 r.p.m. for maximum efficiency.
**Checked Weight :** 2·7 ozs. less tank.
**Power / Weight Ratio :** ·549 b.h.p./lb.
**Remarks:** The engine was run-in for one hour at 5,000 r.p.m., and no mechanical trouble was experienced throughout the tests. An interesting feature of this engine lies in the use of cast iron for the piston and main bearings — a material which I strongly advocated for these purposes in this journal as long ago as 1935. When properly fitted and run-in such bearings can be practically everlasting.

## GENERAL CONSTRUCTIONAL DATA

**Name :** Elfin.
**Manufacturers :** Aerol Engineering, Henry Street, Edge Lane, Liverpool 13.
**Retail Price :** £2. 19s. 6d
**Delivery :** Immediate.
**Spares :** Immediate.
**Type :** Compression Ignition.
**Specified Fuel :** Castor oil 1/3, paraffin 1/3, ether 1/3.
**Capacity :** 1·49 c.c., ·091 cu. in.
**Weight (bare) :** 2¼ ozs.
**Compression Ratio :** 14 : 1 to 10 : 1.
**Mounting :** Beam, upright or inverted.
**Recommended Airscrews :** Free Flight, 8 in. × 4 in. Control Line, 7 in. × 6 in.
**Recommended Flywheel :** 3 ozs.
**Bore :** ·503 in. **Stroke :** ·460 in.
**Cylinder :** One piece, attached by 40 T.P.I. thread.
**Cylinder Head :** 40 T.P.I. thread.
**Crankcase :** Pressure die-cast.
**Piston :** Angular deflector, no rings.
**Connecting Rod :** Duralumin.
**Crankpin Bearing :** Plain. **Crankshaft :** Nickel chrome.
**Main Bearing :** Cast iron. **Little End Bearing :** Plain.
**Crankshaft Valve :** Rotary valve.
**Cylinder Liner :** Nickel chrome steel.





SOUTH EAST AREA S.M.A.E.

# CONTROL - LINE CHAMPIONSHIPS

## BRIGHTON, 1950

*Top left: Don Butler's (Surbiton) Torpedo team racer finished this way!*

*Above: Phil Smith prepares in front of the stands.*

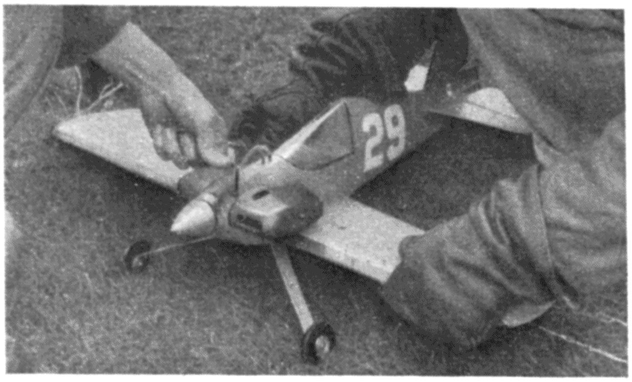
*Below: Ken Muscatt (W.E.) came equipped for bad weather. Model is 670 sq. ins. with Anderson Spitfire.*

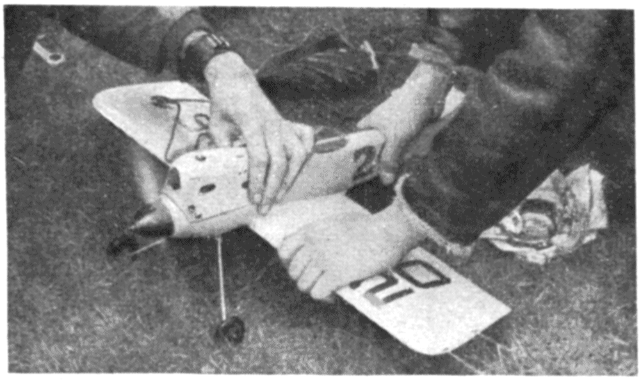
AFTER weeks of high-pressure planning, organizers and contestants at the Easter Monday Brighton affair had their ardours well and truly dampened by an exceptionally inconsiderate weather man. But despite the driving rain, the gale force blasts, a hardy crowd applauded a large entry of over 300, even hardier, contestants.

In spite of the weather, all the eleven scheduled contests ran without squabble and only one torrential downpour succeeded in delaying progress. Four new records were established during the day.

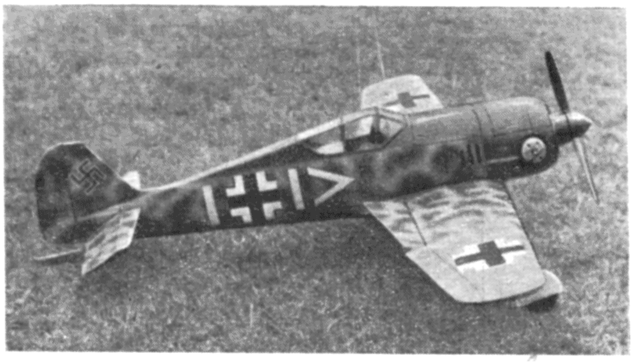
Class I speed entries, though a little slow at getting themselves organized, soon attracted attention to the fast pylon work required of the pilot. When making his record run at 72 m.p.h., Cyril Shaw, who is new to the small motor class, was rotating about the pylon faster than the 10 c.c. winner who returned a commendable 132·35 m.p.h. Second place was taken by Mr. Allbon, who, like Cyril Shaw, was using one of his own design " Javelin " 1·49 c.c. diesels.

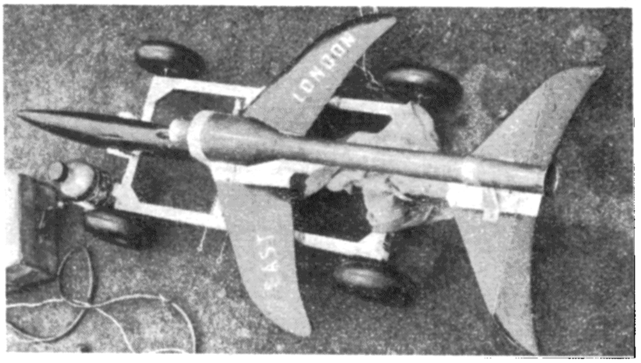
Class II provided another of those close finishes where stop-watch or timer can decide a winner. D. Free, now firmly











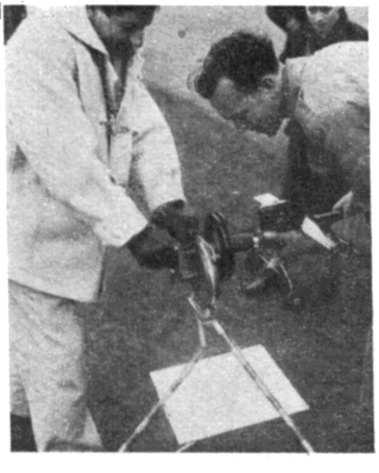


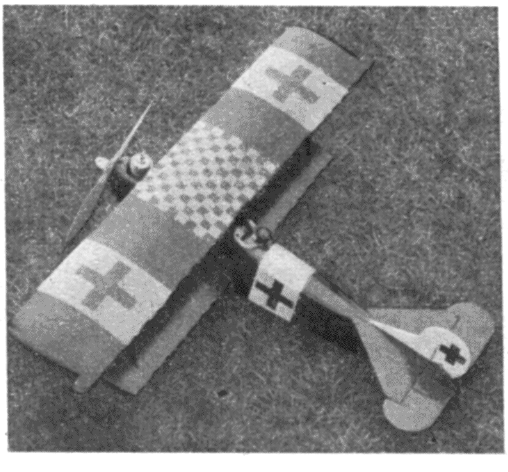
established as a speed winner in Classes I and II, returned a new record run at 90 m.p.h., whilst second place went to T. Wilson who was only ·05 m.p.h. slower. Both used Elfin 2·49 diesels and both had to rotate at an equivalent of 180 m.p.h. in Class VI!

Class III returned no result despite 40 attempts, which reflects some digit trouble, whilst Class IV was won by Derek Salter at the very slow speed of 66·6 m.p.h., almost exactly half of the present American record for this class. In Class V, Cyril Shaw won the Biscuit Barrel with a fair 108·5 m.p.h. with the old faithful McCoy 49 powered "Hearse" and P. Kelsey ran close second with 106·5 m.p.h. But it was in Classes VI and VII that the fast men really went to town. Quite early, but nevertheless despite a 30 m.p.h. wind, N. G. Taylor of the Wimbledon Power Club, flew a beautifully built and absolutely orthodox model at a checked and double checked 132.35 m.p.h. In fact, this job appeared to be so outstandingly fast that many independent watches were used on this run, by unofficial witnesses, and some returned 136 m.p.h. over the earlier laps before official timing began.

*On opposite page: Top, Ted Buxton gallops back to base with the St. Alban's team racer during the eliminators. Bottom, Icarus, by John Coasby (Icarians) is a streamline version of his 850 sq. ins. Taurus. Model is McCoy 60 powered and flies on 100 ft. lines.*

*On this page: Top left, Frog 500 team racer by England of the Zombies. Right, The St. Albans team race finalist was K & B Torpedo powered. Centre left, E.D. Mk. IV powered F.W.190 by Phil Smith (Bournemouth) was one of three entered in the scale events. Centre right, one of the many jet entries, this supersonic styled special from the East London Club has a Red-Head Juggernaut. The four wheeled dolly is made from angle aluminium. Bottom left, Allen Judge and Arthur Vicarage of the Zombies have a converted grindstone for an automatic starter. Mounted on collapsible a tripod, it is easy to transport. Centre, Norman Butcher's winning Fokker D.7. is a smaller version of his 1949 model. This one has an Elfin 2.49 c.c., . . . and a doll in the cockpit! Right, R. Foskett holds the new British Jet record holder before its 143 m.p.h. flight. Model built and flown by R. Stovold has a Dynajet..*






*Right, N. G. Taylor displays his 132 m.p.h. record-holding model, plans of which will appear in the August "Aeromodeller." McCoy 60 engine, composite metal and wood structure . . . with a fool-proof undercarriage.*

*Lower, winning model in the team race was the Midget Mustang (Amco 3.5) by Phil Smith.*

Second place was taken by the indefatigable Dave Evans who was making his, now annual, excursion to the championships from Weston-super-Mare. Flying at 112·5 m.p.h., he was closely followed by Mr. Taylor's other "Lazy-bones" at 110·5 m.p.h.

Jet specialists Stovold and Foskett from Guildford took first and second respectively in Class VII. R. Stovold's horrisonous missile broke the previous jet record and pushed it very near to the American figure with 143·9 m.p.h. Engineering influence in the construction of this year's jet entries adds slight confidence to their safety factor.

Introducing a new competition in the Scale Speed event, the S.E. Area were apprehensive in estimating how many entries they could expect; but Phil Smith's good figure of 72 m.p.h. with his "Spitfire" reflects well from a small though enthusiastic entry.

Among the scale models on the field, a Bristol Racer, complete with two dummy pots and one real Frog 500 to represent the full-size motor deserves special mention. A very "wire and frame" style Caudron by Fred Guest and a large version of the Long "P-Shooter" (Frog 500) looked impressive among the miscellany of a Mew Gull, Tipsy Jr, Globe Swift, a large scale S.E.5, a Pitts Special, two Sopwith Pups, three different sized F.W.190's and Norman Butcher's winner of the scale stunt—an Elfin 2·49 c.c. powered Fokker D.7. Unfortunately the scale jobs were sadly affected by the wind and their stunting abilities were thus severely crippled . . . most of them completely crippled.

Despite a large entry in the open stunt, only about 30 fliers braved the wind to attempt an unusual stunt schedule. First person observed to complete his vertical eights, three in succession, was "Funf" Taylor, winner of the same contest in 1949. His flight completed the whole schedule and ended with a spectacular display of "Kite" flying, the model being suspended 10 ft. up for some few seconds before deciding to let gravity have a chance. Dennis Allen amused the stands by taking off and then having his model blown inverted and forced around the circle despite corrective control, and Ken Muscutt had his Anderson powered monster battered so hard during a wing-over that the inertia broke the wingtip balance weight free and left a somewhat tattered wingtip. Tieing with Taylor for first place, "Stoo" Steward returned his usual high standard of smooth flying with a Frog 500 powered Musketeer.

Main event of the day, the Team Race Final, provided an exhilarating finale to what otherwise might have been a day tinged with disappointment.

*Continued on page* 382.

*Below left: Many sets of lines failed to pass the Official pull test. Here an anxious owner awaits the verdict. At the other end, below right: Derek Salter (East London) hangs on to Helmore's jet model for its 40 lb. pull test.*


*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,

One of the most painful misnomers heard these days is the term "spin" when describing any helically-pathed descent earthwards. The mistake is fostered by several well-known writers as well as numerous lesser-known characters, and not a bit helped by the common appellage "anti-spin fins" applied to sub-rudders. "Spin" is short and convenient, but surely it isn't pedantic to call a spiral dive "a spiral dive" when it IS a spiral dive? Apart from the frothing at the mouth experienced by anyone familiar with aeronautical evolutions, the growing popularity of radio-control renders it imperative that aeromodellers understand exactly what these gyrations are. How can a standard sequence of manœuvres be arrived at if modellers are under the impression that two entirely separate and different evolutions are one and the same thing? There is a world of difference between the two conditions, and an explanation of each will show the absurdity of grouping them under one name and may even cast a little light on what causes them and the cures that can be effected. Let's take the gentler first—the spin.

A spin is the condition of an aircraft normally following on a state of stall and yaw, and THE STALL AND YAW REMAIN THROUGHOUT THE DURATION OF THE SPIN. The situation usually arises from a turn during which the aircraft approaches the stall. The inner wing of the turn, travelling slower, will stall a wee bit before the outer. The inner wing will therefore drop, increasing the angle of attack by reason of the change in direction of the relative airflow. This increases the stall on that wing, while the decrease in angle of attack of the outer wing further removes it from the stall. A state of "autorotation" is thus set up. The nose of the aircraft will drop due to the forces exerted by the tail unit, and a slow dive results, the aircraft rotating about its longitudinal axis, which axis is in turn rotating about the main axis of the spin, due to the lift remaining from the unstalled wing and other interference factors. The speed does not increase, although the spin may tighten, in which case the increase in the vertical component of the velocity gives an impression of a general speed increase. In some aircraft further tightening up produces the uncommon phenomenon of a flat spin, when the tail is thrown to the outside of the circle and ultimately the machine is rotating about its VERTICAL axis.

The cure for a full-size spin is full opposite rudder, stick central or forward until the spin resolves itself into a straight dive. Some aircraft must be held in the spin—will, in fact, recover themselves to normal flight if the controls are released. A correctly designed model WILL NOT SPIN—it recovers, due to high inherent stability, while the spin is incipient. Full rudder on a R/C job will not spin it unless it is applied in conjunction with a stall, and the model should not stay in the spin for more than a turn unless it has insufficient fin area and/or too much rudder area for safety in gentler manœuvres. The only true spins the writer has ever seen in model aviation have been when models have had their fins and rudders become completely detached. In no case was damage more than would be expected from a roughish landing, due to the very low rate of descent.

On the other hand, a spiral dive is almost always the prelude to extensive repairs. All full-size aircraft will hold a spiral, due to the fact that they have a small amount of inherent stability, though recovery through correctly applied controls is simple enough. The condition is simply a diving turn, arising from the dropping of the nose of an aircraft in a normal turn. The speed commences to build up and the increase of lift on the outer wing (due again to its higher speed) increases the bank. After passing 45 degrees (approximately) the elevators take the place of the rudder, and holding back on the stick, or, in the case of a model, the large longitudinal dihedral, tightens up the turn, which increases the bank, and so on. The speed builds up continually until terminal velocity is approached.

Full-size recovery is effected by forward and opposite stick followed by centralised rudder, then stick back to pull out of the resulting straight dive. A model's large inherent stability works against it in a spiral—it is in a stable set-up and, unfortunately, is not likely to recover. There is no cure unless it by a frightening system of pendulums or something—no system has been published as far as is known. Prevention is the only course, and this is something over which controversy has raged for at least twenty years. It hardly falls within the scope of this letter—all we hope is that perhaps one or two readers (?) will see the light and in future call a spin or a spiral dive by its proper name. There really IS a difference.

Canterbury. V. E. Smeed.

Dear Sir,

Until recent years it was the custom to make flying scale models to twelfth scale or smaller; consequently the average model seen was about 160 sq. ins. wing area and 36 ins. span. Models of this size were relatively cheap, and easy to construct and transport; yet they were big enough for consistent flight performance in reasonable weather conditions.

These models were, of course, rubber driven, and the advent of the small diesel was hailed by we enthusiasts as a great step forward, as it opened up a wide fresh field of practical prototypes. There was no further need to search for prototypes with long noses, indeed the reverse became the case, and limited airscrew diameter was no longer a serious handicap. Small engines suited to this size of model appeared on the market and everything appeared rosy.

But to-day—where are these small diesels? Why is there no engine between 0·3 c.c. and 0·75 c.c. on the market? Why must flying scale enthusiasts be confined to light models under 30 ins. span, or to large models over 45 ins. span? Surely many people are discouraged from building because of this size limitation. It is true that larger engines on the market are light enough, and are suitable if they are always run throttled down, but is this a practical solution?

I believe there is a considerable market for an engine suited to this size of model, not a hot engine, but one which is easy starting, and clean running, to install inside a scale cowling. Judged by present-day standards, about 0·4 or 0·5 c.c. will suffice, with flying weight, including airscrew, around 1·5 ounces. And could engine manufacturers try to produce a small cylinder to facilitate cowling?

Bristol. M. Garnett.

*The difficulties involved by mass production of diesels less than 0·5 c.c. capacity are not generally appreciated. One manufacturer of a successful miniature reported a wastage of 50 per cent. of all parts made, due to failure to match up. Two other manufacturers ceased production, stating that the small motor is not a commercial proposition. However, Mr. Garnett will no doubt be pleased to learn that the new ALLBON DART diesel is due for distribution in August. This 0·5 c.c. motor will weigh less than 1·5 ounce, use a 7 in. airscrew and be only 1⅝ ins. high.* (Ed.)

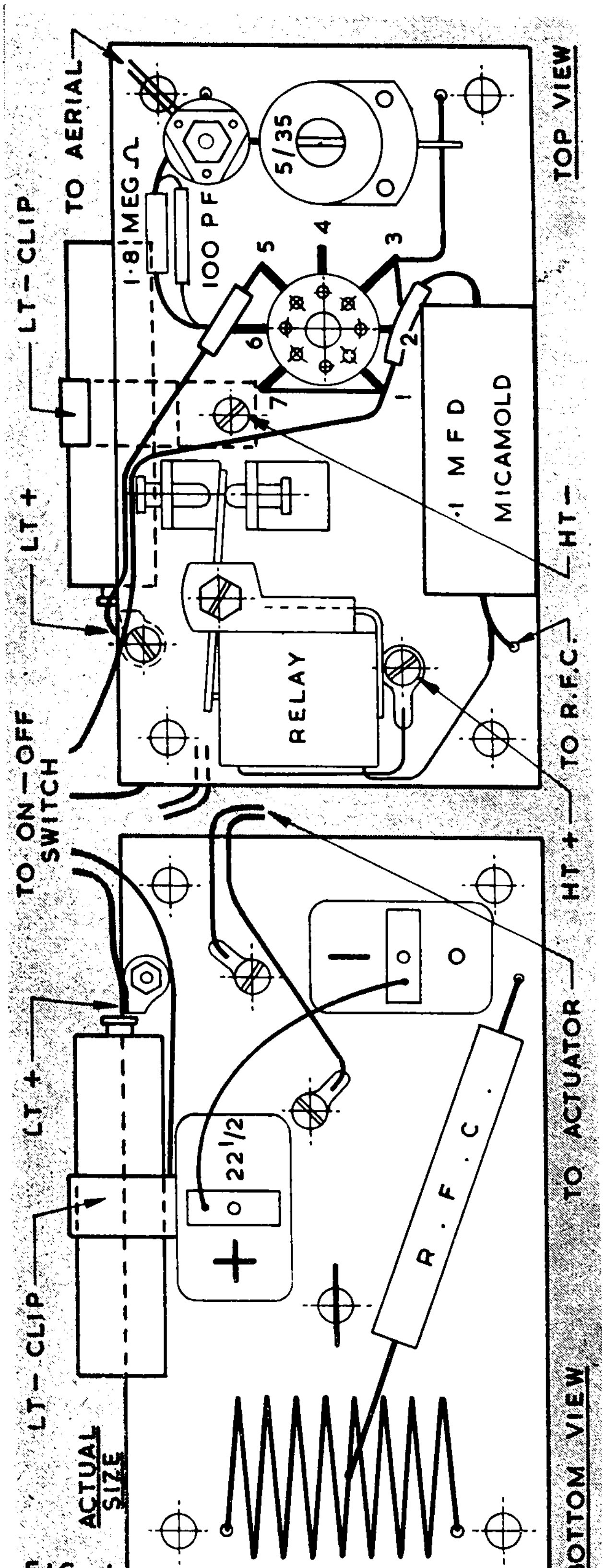



FIG. 1

# RADIO CONTROL NOTES

THIS MONTH OUR CONTRIBUTOR, HOWARD BOYS, DESCRIBES AN OUTSTANDING UNIT CONSTRUCTED BY ONE OF OUR TECHNICALLY-MINDED READERS,

**L. P. DALTON**

JUST after Christmas a letter arrived from Mr. L. P. Dalton of Ashtead, giving a few particulars of his radio control equipment, and claiming a range of 600 yards on very low power, using 1·4 volt valves. Only 45 volts H.T. being used on the receiver, and 90 volts on the transmitter. Mr. Dalton felt his equipment would help the radio control movement by providing satisfactory results on power below the maximum allowed, since if the maximum were exceeded, the movement would fall into disrepute and possibly be banned altogether. An offer was made to loan the equipment for test, which was accepted by the writer to see if the very excellent results could be reproduced without too much trouble. The equipment duly arrived all labelled up with notes for operating. In view of later experience this was most necessary. Instead of tuning the receiver to the transmitter, Mr. Dalton advised tuning the transmitter to the receiver. Readers will see why later. An interesting arrangement in the receiver provides for the batteries to be mounted on the panel, thereby allowing a quick change from one model to another.

Since radio is such a peculiar thing to deal with, Mr. Dalton's equipment was not tampered with in any way except for unscrewing one H.T. lead to connect in a milliameter. A new receiver was built as nearly like Mr. Dalton's as available components would allow. It refused to work until both sides of the tuning condenser were touched at the same time. A resister across the tuning coil improved things, but a fixed condenser of 35 pf. made the set work properly though by this time it had gone off frequency a bit. Eventually one of the local shops produced the right type of tuning condenser and the receiver worked, the frequency being corrected by altering the tuning coil. Strangely enough the tuning condenser alters the anode current a great deal and seems to be the most important item in adjusting the working of the receiver. The sensitivity depends on the setting of the tuning condenser, and the tuning has to be done mainly by adjusting the coil alone. During experiments on this receiver, it was found that with no relay or other resistance in the H.T. lead the tuning condenser could be adjusted to give an anode current of 3 ma. which dropped to ½ ma. on receipt of a signal. Unfortunately the range or sensitivity appeared to be only about a third of that

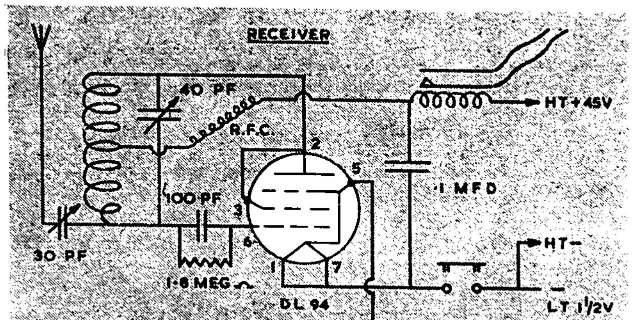
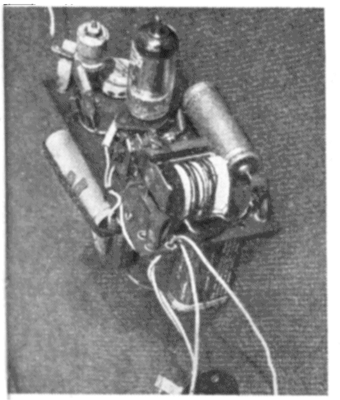
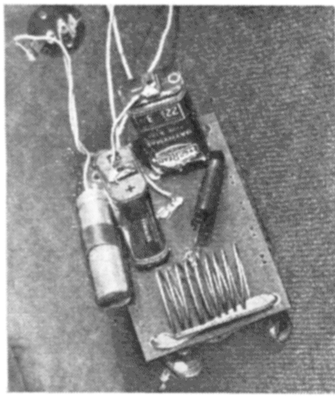



FIG. 2

*Extreme left is top view of receiver, while that to right shows underside with compact attachment of batteries.*

obtainable with the anode current set to between 1 and 1½ ma. with the relay in circuit.

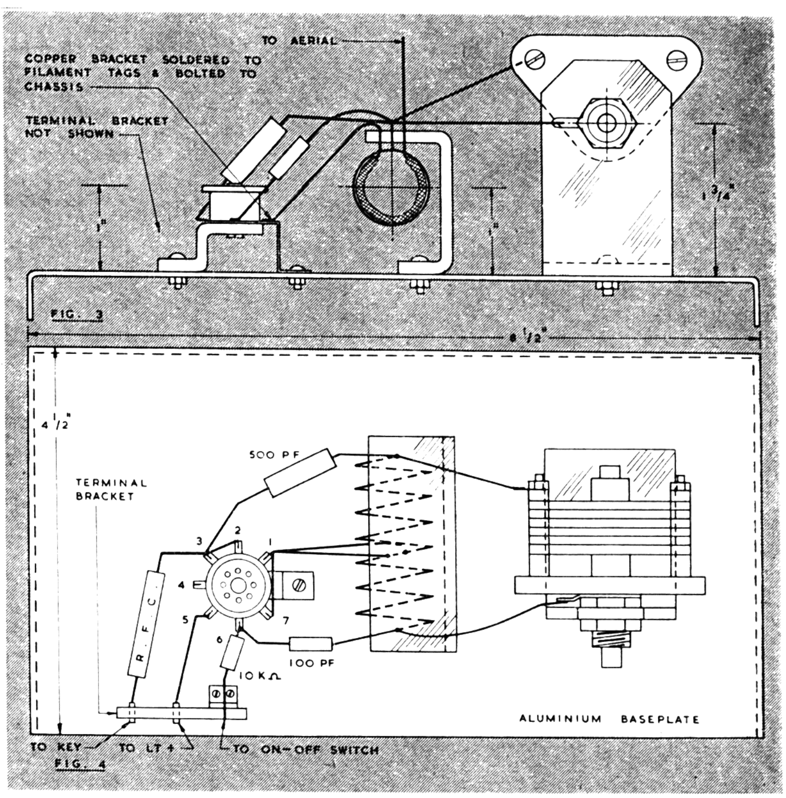
Final tests for range were carried out on the local aerodrome. Mr. Dalton's transmitter was left standing on the grass with ten year old Michael Boys in charge. The receiver was placed on a seat in the writer's car, with a flashlamp in the relay circuit, under the watchful eye of six year old Trevor Boys. The car was driven along the runway until the flashing ceased. At this point the car speedometer registered just one mile, but previous checking against many milestones revealed that the speedometer read 2·15 times the correct distance. The true range on the ground then works out at 800 yards. At that distance it is not possible to tell whether a model is coming or going so you might as well pack up anyway. It might be mentioned that tuning in was done by tuning the transmitter without its aerial, at a distance of about 20 yards by the sight of the flashing bulb. The receiver had previously been tuned to a Cossor transmitter. The Cossor transmitter was tried, using the same 90-volt H.T. battery as the Dalton transmitter and gave the same range as near as could be told. It may have been about 20 yards less. However, Mr. Dalton's transmitter uses one Mullard D.L.94 valve taking 14 ma. whereas the Cossor transmitter uses two valves taking altogether 24 ma. The valves are being over-run about the same amount in both cases, but this is not very harmful in view of the intermittent use. The Cossor transmitter is in fact designed to use 120 volts H.T. which is over-running to a great extent.

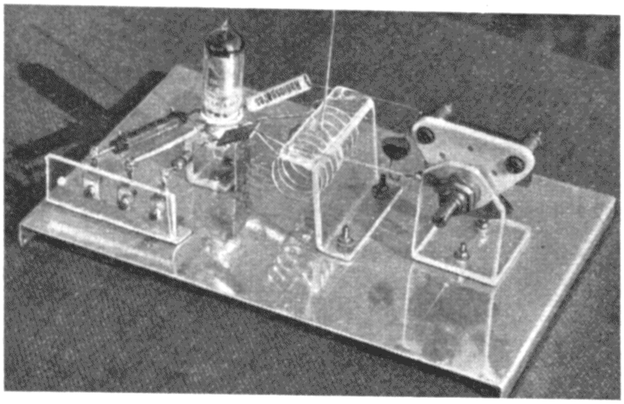
## Receiver.

The results given by Mr. Dalton's equipment are most gratifying, so now let us get on with a description of the construction, starting with the receiver. Fig. 1 shows two views full size so that all positions can be measured up. The panel is made from Paxolin or similar insulating board about 1/16 in. thick, 4 ins. long and 2¼ ins. wide. Holes are drilled at the corners for slinging, on rubber bands. The dimensions for all the parts can be measured from the plan. The tuning coil is mounted by pushing its two ends through holes 1¼ ins. apart, and bending them flat on to the panel. The ends of the tuning condenser are soldered on to the coil ends. The valve holder is a paxolin type with a washer just above the solder tags. The solder tags are opened out flat, and the central tube pushed through a hole in the panel and held with a small wire peg. Holes for 6 B.A. screws are required at the points marked HT–HT and against LT. The relay should be 5,000 ohms resistance, and a sensitive type such as the SCR 522, and is mounted as shown. The H.T. Batteries are the Ever Ready B122, and the holes in the brass end pieces are tapped 6 B.A. for mounting on the panel at H.T. and H.T. Between the battery and the panel at H.T. is fixed a thin brass strip, which is then bent up alongside the battery, and then round a " Penlite " cell without its paper case, which forms the L.T. battery. At L.T. is another thin brass strip bolted to the panel and bent at right angles to bear on the brass cap of the L.T. battery. The cell is held against the strip with a rubber band. The R.F.C. is made by winding 65 turns of thin wire on a ¼-in. diameter former such as plastic rod or tube, and the turns should be spaced out to a length of 1½ ins. The tuning coil consists of 20 inches of 18 gauge tinned copper wire wound to make 9 turns, stretched out to 1¼ ins. A ⅝ in. diameter former is about right. The actual length of wire may have to be altered to get the set to tune properly. The aerial trimmer is the Phillips beehive or concentric type. The tuning condenser may be referred to as a 35 or 40 pf. ceramic trimmer, and should be of the type illustrated. The ·1 mfd. fixed condenser can be a different type of the same value. The writer has used a miniature type. Wiring is carried out in accordance with the illustration and the circuit diagram which is given in Fig. 2. The tapping point on the tuning coil is in the centre. A frame should be made on which the receiver can be slung for tuning and adjustment. The receiver aerial is made from thin flexible wire and should be about 28 ins. long, and is soldered to the aerial trimming condenser.

## Transmitter.

The transmitter is shown in Figs. 3 and 4 with the circuit diagram in Fig. 5 and is very simply made. It is built on an aluminium base plate or chassis, which is then bolted into a biscuit tin. The brackets for mounting the tuning coil, condenser, and valve holder, can very conveniently be made from scrap perspex, which is easily cut and bent to shape. All dimensions can be scaled up from the plan. The tuning coil





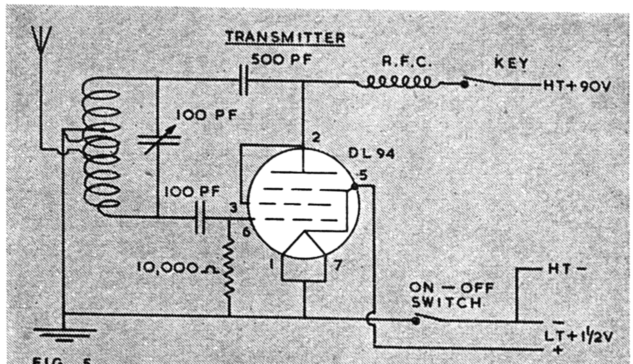
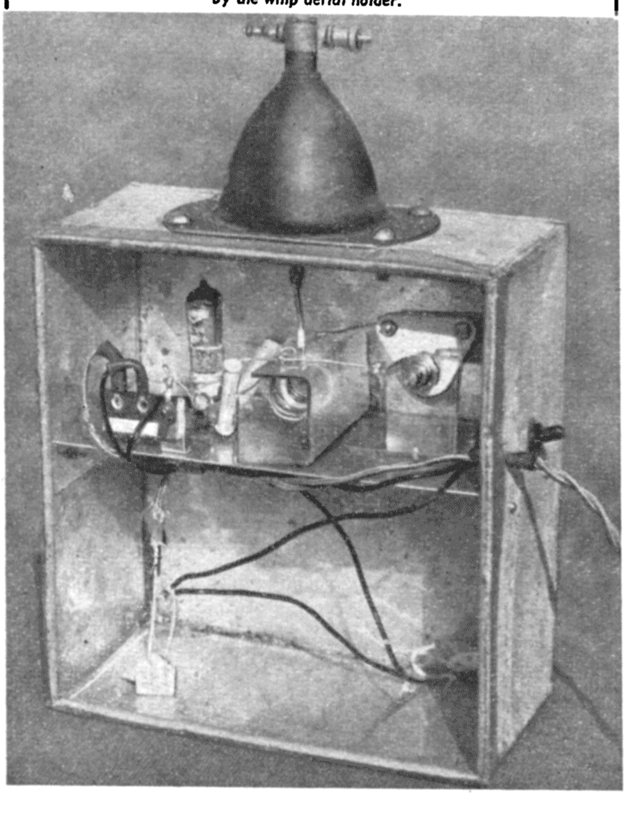


FIG. 5

consists of 8 turns of 18 gauge tinned copper wire ⅞ ins. diameter, stretched to 2 ins. long. A No. 8 battery makes a convenient former for this. It is tapped at 3½ turns from the anode, or 500 pf. condenser end, and taken to the filament tags on the valve holder which are earthed to the chassis. The aerial coupling coil is just 1 turn, insulated with a piece of sleeving, interleaved in the middle of the tuning coil, close up to the earthed tap. One end of the aerial coil goes to the earthed filament tags. A 100 pf. tuning condenser was not available for the writer's copy receiver, so a 40 pf. was used. It was then found necessary to add a 35 pf. fixed condenser in parallel to make the transmitter oscillate properly, and this corrected the frequency at the same time. The terminal bracket is held with a small angle bracket to which the 10,000-ohm grid resister is soldered, the lead from the on-off switch also being soldered to this angle bracket. The key mentioned can be an ordinary push-button, or other convenient switch for controlling the model. The R.F.C. is made in the same way

*The transmitter, above, on its aluminium base, showing simplicity of layout. Below, in its biscuit tin case, surmounted by the whip aerial holder.*



as that for the receiver but these can be obtained as standard items from any good radio dealer. An ex-government 8 ft. collapsible whip aerial with its rubber mounting base is excellent for the transmitter, the base being fixed on top of the biscuit tin. Failing this the aerial lead should be taken through an insulator in the top of the tin, and from this point the aerial should measure 8 ft. 4 ins.

**Tuning Up.**

To get this equipment operating it will be necessary in the first instance to obtain the use of a transmitter or signal generator set to the correct frequency. The receiver is then put on a stand with a milliametre reading 0–5 milliamps. connected between the relay and the R.F.C. Plug in a Mullard DL 94 valve and switch on. With the aerial trimmer mostly unscrewed, and the borrowed transmitter switched on, rotate the tuning condenser and see if a spot can be found where the anode current dips down, If no dip is obtained screw in the aerial trimmer a bit and try again. If still no dip, check the transmitter to see that it is working properly. This of course needs a receiver in working order. Next in order check the batteries, wiring and joints, and if all this fails call in a friend. If the receiver is built properly however, there should be no trouble. When the dip in the anode current occurs, tune the condenser to the point where the current is at its lowest. Switch the transmitter on and off, and adjust the aerial trimmer to give the greatest current change. Now connect up the batteries to the home-made transmitter, and tune that in with its condenser to the point where it causes the receiver anode current to drop. Switch off the transmitter and note the value of the anode current. It should be between 1 and 1½ ma. If not, rotate the tuning condenser until it is about 1¼ ma. Switch on the home-made transmitter and re-tune it to the receiver, noting whether more or less condenser is in. If more condenser is in, there may be too much wire in the receiver tuning coil. Now tune the receiver to give different values of anode current between 1 and 1½ ma. and, keeping the transmitter in tune, see at what point the change in anode current with signal is greatest. Also try reducing the transmitter H.T., and note the value of the anode current at which the transmitter can be moved furthest away and still give a movement of the meter needle. Set the tuning condenser to give this current and try different tuning coils with more or less wire with the same number of turns until it tunes to the correct frequency as given by the borrowed transmitter of signal generator. The current drop should be about half to three quarters of a milliamp. Adjust the relay so that it will pull on at about ·1 ma. below the standing anode current, and drops off at about ·05 ma. below this figure. It is often recommended that ·2 ma. below the standing current is the best value at which the relay should pull on, but with the type of relay specified, closer working seems quite satisfactory, with a consequent increase in range.

Here is a valuable hint. Always remove the valve before touching any wires or battery leads even though the set is switched off.

The Mullard D.L. 94 valves used in this transmitter and receiver have not been on the market long, so don't be surprised if your dealer has to order them for you.

# TECHNICAL TOPICS

BY P. R. PAYNE

A BY-PRODUCT of the AEROMODELLER-financed L.S.A.R.A. test programme on props has been the installation of a test rig by the author at Bristol to supplement the work carried out at Farnborough. This is made up of both AEROMODELLER and L.S.A.R.A. equipment and with the arrival of a few more parts from Farnborough (such as the electronic rev. counter) should be ready for operation.

One of the first new ideas to be tried out on it will be the slotted propeller suggested by Dr. Fidia Piattelli in the December 1947 issue. In his article he pointed out that high pitch props are always stalled under take-off conditions (a fact which is self-evident with high speed control line models) and, with a rubber powered model, the prop is usually stalled or partly stalled for the first part of the climb. He suggested that if a slat were built along the leading edge of the blade, as for a normal wing, this bad quality of fixed pitch props could be overcome. The only likely disadvantage of this scheme is that in flight the slat may cause extra drag with a consequent reduction in efficiency. The object of the projected tests will be to determine the slat position for maximum take-off thrust, and to measure its effect on efficiency under normal flight conditions

The two prototype props are being made at the time of writing, and were designed to the writer's specification by Mr. R. Stainer. In the early days of "Payne-props" the writer tried one out with metal tips, but fortunately no one was hurt; but since in the slotted prop designs the slat is made from Duralumin sheet it was thought advisable to do a little stressing just in case. The following is a short resumé of the conclusions reached for our particular designs, but they probably can be applied to all normal designs.

**Stresses in a propeller Blade.**

It was found that the loads on a blade are due to two effects: centrifugal force and the "aerodynamic" loads of thrust and torque. In detail they are as follows,—

(a) The total air loads which tend to cause bending..
(b) The centrifugal force due to the rotating mass of the propeller; this tends to reduce the effect of (a) and also tends to pull the blades off the hub.
(c) Torsional loads tending to increase the pitch which are due to the centre of pressure being towards the leading edge.
(d) An opposite torsional load which tends to reduce pitch, due to the C.G. of any cross-sections not lying in the plane of rotation.

In addition, gyroscopic loads are experienced during changes of flight direction and the presence of vibration causes severe inertia loads, but the former may be neglected for model work and the latter cannot be calculated for practical purposes, but only minimised by experience and careful carving.

Of the four loads given above it is found that for a normal blade shape (c) and (d) may be neglected when wood is the material used. With the L.S.A.R.A.-tested "Truflex" props it will be remembered, (d) was smaller because the blade was very nearly symmetrical, and load (c) caused the pitch to increase with increasing revs, so that these cannot be neglected when the material used is flexible.

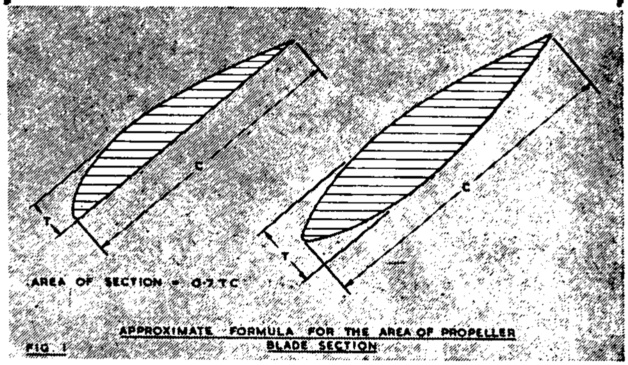
Of the remaining two loads, it was found that with the two slotted props (b) was by far the greatest, which leads to the conclusion that if any doubt is felt about a new design it is sufficient to work out the maximum tensile stress likely to be experienced in the blade, and to ensure that this is less than half the permissible stress for the material.

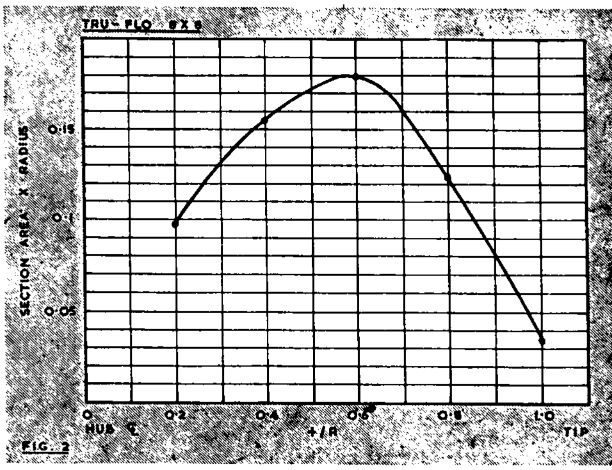
The formulæ for centrifugal load and stress are as follows:—
The centrifugal load at any radius rl is given by

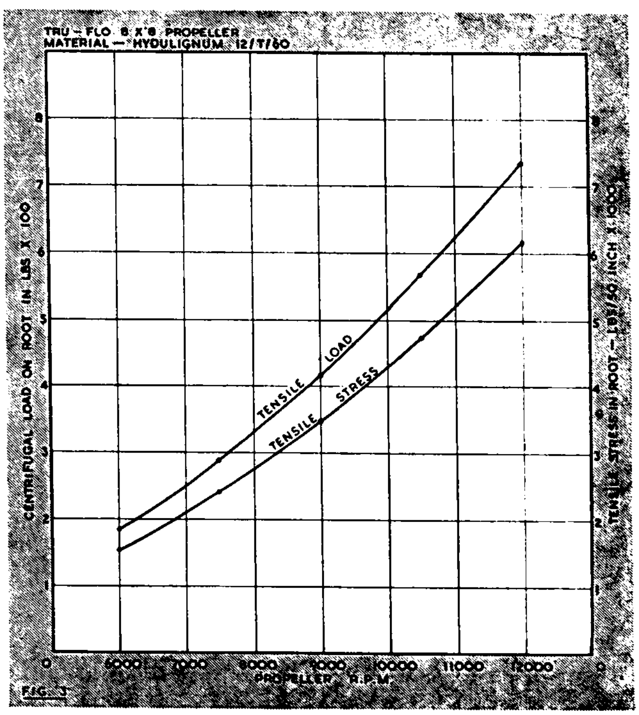
$$\frac{F_{r_1}}{n^2} = 1\cdot226\, D \int_{r_1}^{R} Ar\, dr \qquad \text{Equation (1)}$$

and the stress at radius $r_1$ is

$$S_{r_1} = \frac{F_{r_1}}{A_{r_1}} \qquad \text{Equation (2)}$$



Where $F_{r_1}$ = Centrifugal load in lbs.
n = revs per second of prop.
D = density of material in lbs./cubic inch
$F_{r_1}$ = stress at $r_1$ in lbs./sq. inch.
$A_{r_1}$ = area of blade section at $r_1$ in sq. inches obtainable from Fig. 1).

and the values to be integrated are
$r_1$ any radius r in inches.
A area of blade section at radius r (obtainable from figure 1).

A method of solving equation (1) is as follows. Take $r_1$ as the radius 0·2R where R is the total radius of the prop. Then for 0·2R, 0·4R, 0·6R, 0·8R and R calculate $r_1$ and $A_1$ as in table 1. Plot Ar against $r_1$ as in fig. 2 and find the area under the curve by counting the squares : (i.e. on this graph one division on the vertical axis 0·01 and one division on the vertical axis 0·1. Therefore one square is equal to $0{\cdot}01 \times 0{\cdot}1 = 0{\cdot}001$ and the integrated value of A r dr will be the number of squares under the curve between the limits 0·2R and R multiplied by 0·001). In this case the answer is 0·432.

The density of Hydulignum is 0·03475 lbs./cubic inch and substituting in equation (1)

$$\frac{\text{Load at } 0{\cdot}2R}{n2} = 1{\cdot}226 \times {\cdot}03475 \times 0{\cdot}432 = {\cdot}0184$$

From this the actual load on the blade roots can be found by multiplying by $n^2$ and a curve is plotted for both loads and stress in fig. 3. Since the maximum revs at which this prop is run would not exceed about 12,000 RPM, the root has a factor of safety of 4·3.

**General uses of the method.**

It is not of course suggested that normal prop designs in normal materials be stressed as we have done above because apart from any other considerations the greatest loads experienced occur during flight below ground level. It is put forward however because we have found its use essential when pieces of foreign matter are attached to the blade, and also because the material used by some experimenters for flexible props has a low tensile strength with a consequent danger of shattering. In addition it is very useful in the design of variable pitch props such as Mr. Rutherford's, described in the July 1947 issue.

**Torque Bars.**

Since the AEROMODELLER financed the L.S.A.R.A. tests on some hydulignum torque bars some time ago the results have been analysed and at the time of writing a report is being printed for general issue Classed as unrestricted its title is, "The Theory and performance of rectangular-sectioned torque bars" Report No. 38 by P. R. Payne, N. K. Walker, B.Sc., and F. E. Deudney, B.Sc. (Eng.). Price 1/10d. In order to arrive at a satisfactory formula which would accurately predict the power absorbed by any rectangular-sectioned bar it was necessary to investigate mathematically the nature of the airflow near the bar, and it was found that the air on the advancing face of the bar was thrown outwards by centrifugal force. This meant that there was a continuous flow of air from the centre of the bar to the tip continuing directly out from the tip. This theoretical prediction was experimentally verified by getting in the right place to feel the draught, and the fact that it varied as the square of the revs ($n^2$) was checked by the writer with measurements on a similar set-up. Thus the power absorbed by a bar is made up of two components :—

(1) "profile power," or the power needed to overcome the drag of the two "blades" as with a prop.
(2) "induced power," or the power used in accelerating a mass of air radially outwards in the plane of rotation.

It was found that the profile power was considerably affected by the sharpness of the bar edges. When a piece of fine sandpaper was rubbed down each edge three times on one specimen the power absorbed at a given RPM was quite appreciably reduced.

As mentioned in a previous "Technical Topics" torque bars can either be used to measure the power developed by a motor, or if the motor is mounted on a torque balance they can be used to measure RPM. For most modellers a balance is much easier to make than an electronic rev. counter and thus the latter application is probably the most useful.

Incidentally, it is understood that an L.S.A.R.A. Report will shortly be issued on the electronic rev. counters now being used. In principle these consist of a small dynamo which is connected to a voltmeter. The dynamo should be as small as possible (an "Electro-rotor" is ideal) and if a small rubber sucker is attached to the shaft it can be pushed directly onto the engine spinner. Now since the voltage out-put of the generator will depend on the revs. the scale of the voltmeter can be re-graduated in RPM (this calibration is best done with a few torque bars) and if a number of resistances are shunted into the circuit by a multiposition switch, the scale can be used to read from say 0 to 1000 RPM ; from 0 to 10,000 RPM ; and from 0 to 30,000 RPM. The number and accuracy of the different ranges can be adjusted to suit the constructor.

Probably the biggest advantage of this method of measuring revs. (apart from its accuracy of about 2%) is that the generator only absorbs about half an inch oz. of the motor torque.

**Firebrand**—*continued from page 343*

the motor unit assembly is drying in the lower half, alter the large size "F. Guest" stunt tank by unsweating the feed pipe and sealing hole. Enter another feed pipe as shown in the drawing. Cover the tank with rag tissue so that it can be cemented in place on the fuselage. Fit the wing to the lower half of the fuselage, cutting away the leading edge for the tank. Check the fit of the top half over the wing and sand the fuselage as necessary. Now fix the mainplane in position with pins, and temporarily mount the tailplane in order to bend the control rod to accurate length. It will be necessary to cut away the bulkheads and the tail block in the upper half for control rod clearance. Check any tendency to twist in the fuselage and make sure that the wing and tailplane are both neutral to the thrust lines. Cut out from the top half, the access holes for choking, needle valve, and to give a good fit round the engine. With the engine firmly fixed glue the wings to the lower half and then add the tailplane and upper fuselage halves completing the assembly by adding the fin. Remember that each of these joints is important and should be precemented. The tank may be streamlined into the mainplane with 1/16 in. sheet. Prepare the model for covering and coat all exposed balsa parts liberally with sanding sealer, then cover with lightweight "Modelspan". After doping, colour the model to your requirements with "Aerolac".

To fit a drop-out undercarriage, drill holes may be drilled for prong fittings through the balsa centre of the bulkhead "B." Line length on the original was 65 ft., using light Lay-strate.

**S.E. Area C/L Championships**—*cont. from p. 376*

The Bournemouth team (P. Smith, N. Clark, W. Gilbert) flying Phil Smith's Midget "Mustang" (Amco 3·5 c.c.) had completed five miles at 22·02 m.p.h. Guildford (B. Evans, D. Kemp, D. Scott) completed the course at 26·57 m.p.h. with Evans' "Gee-Mac" (Frog 500) ; and St. Albans (H. Witney, T. Buxton, P. Wright) averaged 17·57 m.p.h. with Witney's No. 20 (K & B Torpedo).

Away to a good start, all three appeared to fly at about the same impressive speed when about the tenth lap, the St. Albans entry dived in suddenly, Harry Witney had been a little faster than the others and the model edged to the front, but Harry couldn't get around the pylon quick enough. Evans and Smith landed for their first refuelling after about 29 laps and 31 laps respectively. Quite suddenly during the fifth run for each, Evans' model turned in vertically, it looked like a line break. (We discovered afterwards that he got mixed up with the pylon, tried to bring his hand over his head and gave the wrong control.)

After a fifth refuelling the Midget "Mustang" completed its last six laps of the ten mile race alone and Phil jubilantly looped the 101 sq. in. Amco 3·5 c.c. racer consecutively and started inverted flight before the motor cut. The 10 miles were completed at 44·4 m.p.h.

So ended a most confusing day. In his speech at the evening's Dinner, His Worship the Mayor of Brighton (whose co-operation greatly aided the organization), promised future use of the same superb ground for future annual events.

# THE AEROMODELLER RALLY

## 15-25th August
## 4th International Model Aircraft Meeting

***Approved and Listed in International Calendar by the F.A.I.***

AT EATON BRAY SPORTSDROME

BILLINGTON ROAD, STANBRIDGE, Nr. LEIGHTON BUZZARD.

## CONTEST PROGRAMME

| | |
|---|---|
| **Wednesday, 16th August :** | **Settling in, Test Flying, etc.** |
| **Thursday, 17th August :** | **F.A.I. Sailplanes.** |
| **Friday, 18th August :** | **Stunt and Scale Stunt Control Line.** |
| **Saturday, 19th August :** | **C/L Speed. R/C Demonstrations.** |
| **Sunday, 20th August :** | **Power (Ratio). A2 Sailplanes.** |
| **Monday, 21st August :** | **Rubber. Prizegiving Dinner.** |
| **Tuesday, 22nd August :** | **End of Contest. Rest of week camp open** |
| **Wednesday, 23rd August :** | **for residence.** |

WE are happy to invite our many British and overseas friends to the Fourth International Week at Eaton Bray, which will be known as the AEROMODELLER Rally under the sponsorship of this journal. In all, accommodation will be available for up to one hundred foreign visitors under the pleasantest conditions. Dormitory accommodation will be split up into rooms housing about sixteen in each, with separate shower and toilet facilities. A limited number of single and double rooms will be prepared for chiefs of visiting teams, who will usually be older men entitled to the additional privacy. English visitors will be able to mess with foreign visitors, but during this meeting dormitory accommodation for British visitors will be limited to twenty entrants only to preserve equable distribution. To keep everybody happy, the model building and repair shop will be located fifty yards from the sleeping quarters so that sleepers may do so in peace while all-night workers and engine runners may equally indulge themselves.

A special feature of this meeting is that it is being run to suit the contestants' pleasure first and foremost. One class of contest only per day is being run. First round will take place each morning and the other two after lunch, to a strict time schedule. It is hoped that British support will balance our visitors in numbers and quality. To this end the S.M.A.E. are invited to nominate two entries for each class, whilst any Proficiency Certificate Holder or entrant who has been placed in first twenty of a post-war *National* event may enter. Contests are open by *pre-entry only*—NO ENTRIES ACCEPTED ON THE FIELD WHATEVER. Would-be visitors and entrants should apply for entry forms and further details to the Organiser, D. J. Laidlaw-Dickson, address as above.

**General.**

1. Eaton Bray Sportsdrome Ltd., are pleased to invite visitors from Overseas to their Fourth International Week.
2. The meeting has been arranged to provide daily contests over six days, with option to remain for a further three days after the competitions for sightseeing, etc., if desired.

**Invitation of Entrants.**

3. Invitations are beihg sent to the accepted organising bodies of all countries in Europe, the Near East and America, and individually to *bona fide* foreign enthusiasts who have already visited Eaton Bray or expressed the wish to do so.
4. In the case of British entrants the S.M.A.E. are invited to nominate two members from their clubs in each event. British entries will also be accepted from those who have been placed in the leading twenty in an appropriate post-war National contest or have appropriate S.M.A.E. Certificates of Efficiency. *It is obligatory for Competitors to be in possession of a current F.A.I. Competitor's Licence.*

**Financial Arrangements.**

5. Foreign visitors will be housed in dormitories on the airfield and will be provided with beds, bedding and three main meals daily at an inclusive charge of £7. 7s. 0d. for the meeting.
6. Camping facilities are available for British visitors wishing to stay at the airfield during the meeting. Water supplies and lavatories are available but British visitors must bring their own beds, bedding and tents. Full catering is available for visitors surrendering the usual ration documents, covering their stay.
7. Foreign visitors wishing to bring their wives would not normally be accommodated at the airfield, but the organisers will be happy to arrange local hotel accommodation which would be at the visitors' own charge.
8. Visitors will also be responsible for defraying the cost of :—
   (*a*) Travel to and from their homes to Eaton Bray.
   (*b*) Pocket money and out of pocket expenses during their stay.
   (*c*) Models for entry in the various contests.
9. There are no entry fees to any of the Eaton Bray contests.
10. Visitors must be *bona fide* model aircraft enthusiasts able to and willing to enter not less than three contests during the meeting.
11. Where a visa system exists the organisers will be pleased to make representations to the British Consulates concerned on behalf of intending visitors, provided they are requested to do so by the organising bodies of such countries,

who must give the names and addresses and personal particulars of their nominees.

12. English will be the official language, but principal announcements will also be made in French. French, German and Italian speaking stewards will be available to assist visitors.

13. Motor coaches will be provided, departing from S.M.A.E. Headquarters, Londonderry House, Park Lane, London, W.1, at 6 p.m. on Tuesday, 15th August.

14. Intending visitors must notify E.B.S. of their intention to accept the invitation by Air Mail to arrive not later than 24th July, 1950, in order that adequate arrangements may be made. Governing bodies may make group bookings without specifying names if that is more convenient to them.

15. Governing bodies will assist the management by giving an indication as soon as possible of the probable response to their members.

16. Brief contest rules are attached and except as therein qualified will form the basis of all contests run.

17. It must be emphasised that while visitors from many lands will be assembled at Eaton Bray, contests will be run on an individual basis, and the object of these annual meetings is to promote good feelings amongst aeromodelling enthusiasts and to give them opportunities for meeting in friendly competition.

18. A Visitors' Committee will be formed of representatives of the nations present. to act in liaison with the management to secure the fullest possible enjoyment for all.

## Brief Contest Rules.

**Generally.**

1. Contest Rules shall be the general contest rules for model aircraft as laid down by the F.A.I. Models Commission as briefly recapitulated herein. In any case of doubt the relevant F.A.I. rule shall be accepted as final.

2. Only one model in each class may be entered by competitors and shall be constructed by the entrant.

**Rubber Duration Contest.**

3. (*a*) Any fuselage model complying with F.A.I. Formula powered by rubber shall be eligible.

(*b*) All flights shall rise off ground, when the model must be allowed to rise by itself and be released entirely without pushing, pulling or lifting.

(*c*) The winner shall be the entrant of the model with the highest aggregate time for three flights, or such lesser number of flights as he may have had.

**Power Models.**

4. (*a*) All models driven by petrol or diesel engines and complying with F.A.I. formulas shall be eligible.

(*b*) All models shall be insured against third party risks.

(*c*) An efficient mechanical or fuel metering device shall be fitted in all models limiting duration of engine run to two minutes.

(*d*) No model shall be flown with bent or defective airscrew.

(*e*) Rule 3 (*b*) shall apply.

(*f*) In power contest engine run shall be not less than 10 nor more than 20 seconds.

(*g*) The winner of Power Contest shall be determined by dividing the duration of motor run into total duration of flight in each round and dividing the aggregate of these ratios by number of flights prescribed.

**Sailplane Contests.**

5. (*a*) Any model having no motive power and sustained by surfaces remaining fixed during flight built to the F.A.I. Formulas will be eligible.

(*b*) Length of towline shall be 328 feet (100 metres) for either winch or running launch in accordance with F.A.I. decision of 10/9/45.

**A2 International Class Sailplane Contest.**

6. (*a*) Any model as 5 (*a*) above having total wing area between 495–526 sq. ins. fuselage section equal to wing area divided by 100 and aminimum weight of 14·46 ozs.

(*b*) Rules 5 (b) and 5 (c) shall apply.

7. **Aerobatic Control Line.**
8. **Aerobatic Control Line (Scale)**
9. **Speed Control Line.**

{Rules as published in 1950 S.M.A.E. Handbook. Obtainable from Secretary, S.M.A.E., Londonderry House, Park Lane, London, W.1.

**Timing.**

10. (*a*) A flight commences from the moment that the model is released or in the case of sailplanes from the moment that towline eye is released which must be distinguishable by a pennant or other visible appendage.

(*b*) A flight ends when the model touches any obstacle, or sheds some part of its structure or passes out of sight of timekeeper.

(*c*) The timekeeper (or timekeepers) shall not move from the place where timing of the flight commenced.

(*d*) Binoculars or other optical devices may not be used except tinted glasses worn by timekeepers to protect their eyes from undue strain, should they so desire.

(*e*) In each round an entrant has the right to restart his flight once if :—
For all models the flight is less than 10 seconds,
*and/or* For power models the motor run is less than 10 or more than 20 seconds.

**Timekeeping Procedure.**

11. (*a*) One timekeeping team shall be allocated to each ten entrants.

(*b*) One timekeeping team shall consist of :—
1. Timekeeper provided by organisers
2. Timekeeper provided by visitors.
3. Time recorder clerk (who may also perform duties as (1),or (2)).

(*c*) In each round the time allotted shall be divided by the number of entrants for which the timekeeping team is responsible and it will be their sole concern to register a flight in each time division (e.g., 10 entrants 2 hours for the round means that one flight must take place every 12 minutes).

(*d*) Flights will take place according to flight numbers lowest in each group first

(*e*) Timekeeping teams will change their entrants after each round.

(*f*) No flights will be started after the end of each round has been announced. A 15 minute warning will be given.

(*g*) Flights not taken in the balloted flight order may be taken after other competitors have flown provided that there is sufficient time left, but no *right* shall exist to make such a lapsed flight after end of round has been signalled.

## Prizes.

(*a*) Value of prizes to a total of £150 is indicated under each event.

(*b*) The Aeromodeller Challenge Trophy (inaugurated in 1946 and at present held by E. Fillon of France) will be awarded for the best all-round performance assessed on points gained in the contest.

(*c*) These points will be on the basis of :—
1st—20, 2nd—17, 3rd—15, 4th—14.
and in 1 point reductions to 17th place 1 point—for Glider Power and Rubber events.

(*d*) In control line events each section having 20 or more entrants :—
1st—10, 2nd—7, 3rd—5, 4th—4.
then in 1 point reductions to 6th place 2 points. Any unplaced finalists shall count 1 point.

Control Line sections having less than 20 entries shall count.-
1st—5, 2nd—3, 3rd—2.
any unplaced finalists counting 1 point.

(*e*) Souvenir medals will be awarded to all entrants qualifying for Trophy points, but not more than one such medal will be given to each entrant entitled.

(*f*) Certificates will be awarded to all entrants not qualifying as above.

## Contests and Prize List.

Prizes to value of £150 and the Aeromodeller Challenge Trophy presented by the Aeromodeller.

F.A.I. Sailplane Contest.
1st—£6, 2nd—£4, 3rd—£3, 4th—£2, 5th—£1.
Total £16.

Control Line Aerobatics.
1st—£5, 2nd—£3, 3rd—£1. 8 Finalists to receive special medal value £1 each. Total £17.

Control Line—Scale Aerobatics.
As aerobatics above. Total £17.

Control Line—Speed.
1st—£5, 2nd—£3, 3rd—£1. Winners calculated on a handicap basis on "all class" basis.
Medals for each class winner value £1 each (if any class unrepresented, award added to highest entry class).
Total £16.

Power Ratio/Duration.
1st—£10, 2nd—£5, 3rd—£3, 4th—£2, 5th—£1.
Total £21.

A2 Sailplane.
1st—£5, 2nd—£4, 3rd—£3, 4th—£2, 5th—£1.
Total £15.

F.A.I. Rubber.
As A2 Sailplane. Total £15.
In addition Souvenir Medals will be awarded to all entries qualifying for Aeromodeller Trophy points (limited to one per person) and then down the list to next qualifying entries to a value of £33.
Total awards £150.

Champion of the Meeting will also hold the Aeromodeller Hundred Guinea Silver Gilt Trophy for one year.

The Control Line Finalists and Class Winners medals will be additional and superior to the souvenir medals and may be won without limitation on number gained.

## Note on Prizes.

*The £1 value souvenir medals will also be awarded where 3rd or 5th prize is to that value, except in C/L events where an alternative will be given (winner already having finalist or class medal).*

*These medals will have winged emblem on obverse and commemorative inscription on reverse. Material silver or white metal.*

*Point winners will be similar in bronze.*

# Club News

BY CLUBMAN

*A field scene featuring the Quinton M.A.C.*

I START off with an apology this month to all Press Secs. who have sent in reports for this issue, but whose efforts will not see the light of day until next month. At the time our last issue went to press a decision regarding the change of publication date was still pending, and it was not possible to give the "gen" in time. Therefore, this issue is the first in which we can advise you of the alteration, and in fairness to all who were working to the old date, we are holding over current reports till next month.

Remember fellows, the *10th* of the month from now onwards, and as usual, send in to our Leicester Editorial offices in plenty of time. In the past I have been able to wangle in a few late comers, but in view of the general tightening up in our printing schedule, the 10th will be strictly adhered to in future, which means your report must be posted by at least the 9th for publication the following month.

## Shades of Brighton!

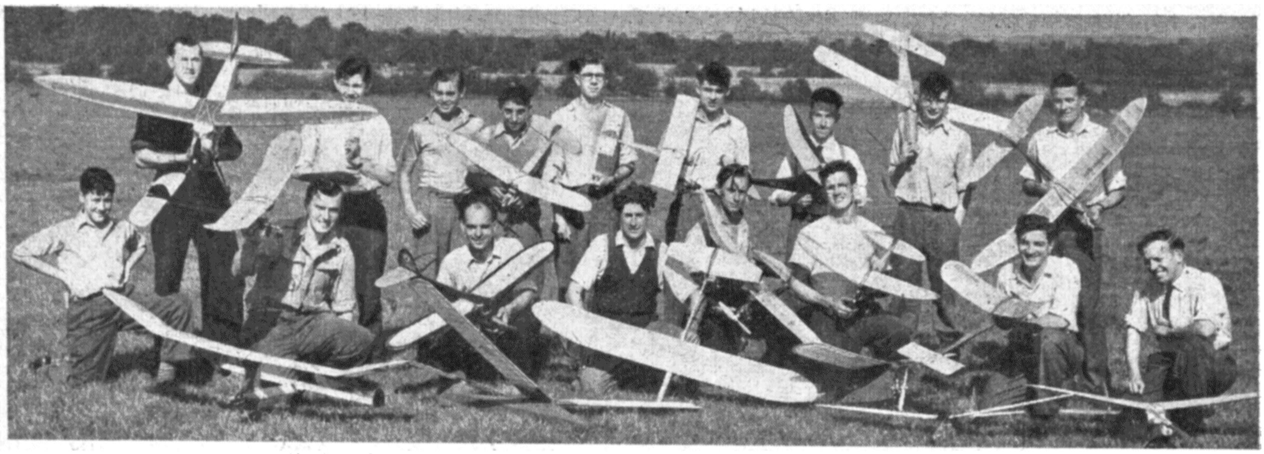

The holding over of reports gives me space to have a natter about a couple of items very vital to club life, and I shall be pleased to have your reactions to the following controversial matters.

Firstly, I have had the opportunity to visit three model aircraft exhibitions in widely separated parts of the country within the past fortnight, these being—in order—Brighton, Leicester and Peterborough. In each case a very fine display had been got together by the harassed organisers, and full advantage had been taken of the somewhat limited facilities afforded by school rooms, etc., to display our hobby to the general public.

But—and here comes the rub—what attitude must be taken by the officials when deciding what to put on show, and what to discreetly keep from the public eye! This is a most ticklish point, as I well know from personal experience, for it is very easy to thoroughly upset a good club member whose workmanship is not of the highest, by suggesting that his offering is not quite up to the general standard required for show purposes. This can sometimes be got around by hanging said model at such a height that the worst faults are not obvious, but this is not always possible, and the Show Committee have a grouse on their hands!

This situation is further aggravated by that section of the exhibitors who will persist in the practice of attempting to hide indifferent workmanship under coat upon coat of bright coloured, high-gloss dope. Will they never realise that the very fact of using a gloss finish only accentuates constructional flaws! It has to be a very well built and sanded model that will properly take a high polish with advantage.

One other fault seen on 75 per cent. of models built, whether for show or functional purposes, is the use of thin sheet covering in which (*a*) the wood has received no preliminary sanding,



Members of the Ashford M.F.C. form a happy group, at their flying field at Shadoxhurst, Kent.

Well, Mr. Bryant, you wouldn't put it away when you were told.

and circular saw marks describe a beautiful series of arcs across the surface, or (*b*) the job has been sanded down in position until (probably in an effort to get rid of those saw marks) the sheet covering is almost worn through on the high spots where formers, etc., are located.

The answer is to use a thicker grade of sheet material, which can be of a softer grade than necessary when using the thinner type, and sand down in position using where possible a sanding block,

I have mentioned the three clubs as affording quite recent examples, but the criticisms offered are true of every exhibition I have attended, and I would appreciate the views of readers, both exhibitors and organisers, on these very vexed problems. (As a point of interest, in my experience at least 50 per cent. of awards are taken by models employing no colouring at all, relying solely on careful construction and meticulous covering.)

Controversial item No. 2 is the rank bad behaviour by certain types on the flying field. I recently attended a meeting at which the organisers had their hands full with a large entry for a series of contests, and witnessed four examples of ill manners that would be hard to beat.

Clot No. 1 was the lad whose power model pranged immediately after take-off, whereupon said sporty type ripped the engine out and proceeded to stamp the remains of his model into the grass runway in a display of temper one would not expect from a five-year-old. A delightful exhibition in front of a crowd numbering some hundreds !

Nos. 2 and 3 were the groups of lads who (*a*) broke into private store premises on the aerodrome perimeter, and (*b*) who tried taking a derelict fuselage to parts outside one of the hangars. It's hard enough to get permission for airfields these days without the "helpful" activities of such nitwits, and quite frankly, if I had my way I'd blacklist such types from all organised aeromodelling for the rest of the year.

The biscuit was however taken by No. 4 (no boy this time !) who rolled up at 5 p.m. (comps. had started at 11 a.m.) and wanted to fly his power model in the contest. On being told this was out of the question as the rest of the entry were already well into the third round, the "gentleman" calmly walked out smack in front of the competitors flying rubber jobs, started up and took off right in front of the contest area. The remarks of the competitors can be appreciated, also their glee when said

An indoor scene at the Boston and District M.A.C.

**SOUTH-EASTERN AREA CONTROL-LINE CHAMPIONSHIPS—BRIGHTON**

**RESULTS**

| | | | |
|---|---|---|---|
| **SPEED:** | | | |
| Class I | 1st | C. Shaw (Zombies) | 72 m.p.h. |
| | 2nd | A. Allbon (Bushy Park) | 66·66 m.p.h. |
| Class II | 1st | D. Free (Surbiton) | *90 m.p.h. |
| | 2nd | T. Wilson (Malden) | 89·95 m.p.h. |
| Class III | | No results. | |
| Class IV | 1st | D. Salter (East London) | 66·66 m.p.h. |
| Class V | 1st | C. Shaw (Zombies) | 108·45 m.p.h. |
| | 2nd | P. Kelsey (Cheam) | 106·51 m.p.h. |
| Class VI | 1st | N. Taylor (Wimbledon) | *132·35 m.p.h. |
| | 2nd | P. Evans (Weston) | 112·5 m.p.h. |
| | 3rd | N. Taylor (Wimbledon) | 110·4 m.p.h. |
| Class VII | 1st | R. Stovold (Guildford) | *143·95 m.p.h. |
| | 2nd | D. Foskett (Guildford) | 125 m.p.h. |
| **OPEN STUNT:** | 1st | W. H. Taylor (W. Essex) / L. Steward (W. Essex) | T/e 132 pts. (poss. 140) |
| | 3rd | K. Muscatt (W. Essex) | 115 pts. |
| **SCALE STUNT:** | 1st | N. J. Butcher (Croydon) | 98 pts. (poss. 140) |
| | 2nd | D. Pallmer (Basingstoke) | 94 pts. |
| | 3rd | P. O. Smith (Chingford) | 86 pts. |
| **SCALE SPEED:** | 1st | P. Smith (Bournemouth) | 72 m.p.h. |
| | 2nd | K. Wilson (Malden) | 48·63 m.p.h. |
| **TEAM RACE:** | 1st | Bournemouth | 44·44 m.p.h. for 10 miles |
| | 2nd | Guildford | |
| | 3rd | St. Albans | |

Note:—In the eliminators (5 miles) the speeds were:—

| | |
|---|---|
| Bournemouth | 22·02 m.p.h. |
| Guildford | 26·57 m.p.h. |
| St. Albans | 17·57 m.p.h. |

In the finals only Bournemouth completed the 10 miles.

**RECORDS**

| | |
|---|---|
| M.A.T.A. Trophy (Team Race) | Bournemouth |
| Sussex Cup (Scale Speed) | P. Smith (Bournemouth) |
| Skipworth Trophy (Scale Stunt) | N. Butcher |
| Mullett Cup (Area Open Stunt) | D. Bowles (Hastings) |
| Towner Trophy (Highest Speed by Area Competitor)— | D. Kemp (Guildford)—89·1 m.p.h. |

* New Records (yet to be ratified).

model landed bang on top of the tallest hangar! He did *not* get any assistance in retrieving!!

In my opinion, such types will not see reason until drastic steps are taken to penalise them in one form or another, and it is no good doing it in one place if they are allowed to get away with it in another. I feel it is high time action was taken on a national basis to show these distinctly unsporting individuals that such behaviour will not be tolerated, and on this point I welcome comments and suggestions from the vast majority who play the game and, fortunately, mitigate the bad impressions created by the aeromodelling Spivs.

And having got that off my chest, here's to next month, and a return to usual Club News topics!

THE CLUBMAN.

**GAMAGE CUP (9/4/1950)**

| | | | |
|---|---|---|---|
| 1. | E. Smith | Icarians | 413·2 |
| 2. | J. S. Richmond | Wolves | 382·2 |
| 3. | R. H. Warring | Zombies | 253·3 |
| 4. | B. G. Hope | Men of Kent | 233 |
| 5. | S. Allen | Evesham | 220·8 |
| 6. | J. Tangey | Croydon | 212·5 |
| 7. | E. Bennett | Croydon | 203·9 |
| 8. | V. R. Dubery | Leeds | 200·5 |
| 9. | R. Yeabsley | Croydon | 200·1 |
| 10. | J. Guard | Southampton | 167·5 |
| 11. | J. A. Gorham | Ipswich | 153 |
| 12. | V. Johnson | Southampton | 151·4 |

(45 entries)

**PILCHER CUP (9/4/1950)**

| | | | |
|---|---|---|---|
| 1. | R. Monks | Birmingham | 260 |
| 2. | J. Holt | Upton | 232·8 |
| 3. | L. W. Whittall | Birmingham | 195 |
| 4. | H. R. Turner | Northern Heights | 168 |
| 5. | P. North | Cardiff | 160 |
| 6. | D. A. Lawrence | Wayfarers | 144 |
| 7. | M. J. Grew | Chelmsford | 138 |
| 8. | R. Jones | Wayfarers | 128·5 |
| 9. | C. H. Middleton | Bristol and West | 125 |
| 10. | J. A. Gorham | Ipswich | 119 |
| 11. | L. Fox | Leeds | 118 |
| 12. | L. Saunders | Chelmsford | 102·1 |

(50 entries)

**GUTTERIDGE TROPHY (16/4/1950)**

| | | | |
|---|---|---|---|
| 1. | R. T. Parham | Worcester | 824·5 |
| 2. | G. Woolls | Bristol and West | 793 |
| 3. | R. Copland | Northern Heights | 767·9 |
| 4. | R. Spratley | Hayes | 760·5 |
| 5. | J. L. Pitcher | Croydon | 759 |
| 6. | P. Gilbert | Pharos | 748·3 |
| 7. | C. Mayes | West Essex | 725 |
| 8. | A. G. Russell | Kentish Nomads | 722 |
| 9. | G. W. Woodfine | Plymouth | 713 |
| 10. | R. Casswell | Hatfield | 696 |
| 11. | R. A. Collins | West Essex | 695 |
| 12. | F. Dobson | Zombies | 681·5 |

(417 entries)

**HALFAX TROPHY (16/4/1950)**

| | | | |
|---|---|---|---|
| 1. | N. G. Marcus | Croydon | 639·9 |
| 2. | E. Lord | Accrington | 622 |
| 3. | R. Grasmeder | West Essex | 603·2 |
| 4. | C. J. Davey | Blackpool | 587 |
| 5. | R. Amor | Ilford | 578 |
| 6. | P. Wyatt | Ipswich | 570 |
| 7. | J. B. Knight | Kentish Nomads | 551·7 |
| 8. | P. Clarke | Lincoln | 536 |
| 9. | J. Eifflander | Macclesfield | 522·6 |
| 10. | J. A. Gorham | Ipswich | 517·7 |
| 11. | A. Stubbs | Crewe | 492·5 |
| 12. | J. Hurst | Preston | 492·1 |

(455 entries)

**RIPMAX (Radio Control) TROPHY (16/4/1950)**

| | | | |
|---|---|---|---|
| 1. | F. H. Ashdowne | Southend Senior | 300 points (maximum) |
| | K. Honnest-Redlich | Isle of Thanet | |
| | R. W. Birkhead | St. Georges Heights | |
| 2. | S. Allen | Battersea | 210 points |
| 3. | J. A. Gorham | Ipswich | 200 points |
| | O. Hemsley | Bushy Park | |
| | Hook Bros. | Zombies | |
| | W. Taylor | West Essex | |
| | P. Wallace | Battersea | |
| | F. Knowles | Redhill | |
| 4. | M. A. Ayers | High Wycombe | 165 points |
| 5. | J. Howard | Kentish Nomads | 125 points |

(31 entries)



*continued on page 400*

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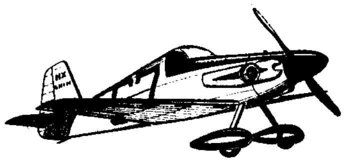
# Bud Morgan

## Model Aircraft Specialist



"Sleek and Fast." The latest SUPER Kit! Veron "MIDGET MUSTANG". For scale speed, speed stunt work and team racing. 24" span, for engines 1 to 3·5 c.c. Kit contains stunt tank parts, ready-made cowlings, cockpit, rubber wheels and metal spinner .. .. PRICE 21/-

### ENGINES

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|---|---|---|---|
| E.D. Bee 1 c.c. | 45/- | Mills 2·4 c.c. | 84/- |
| E.D. Comp. Special 2 c.c. | 77/6 | Allbon Javelin 1·49 c.c. | 55/- |
| E.D. Mk. III 2·49 c.c. | 85/- | Allbon Arrow G/P 1·49 c.c. | 55/- |
| E.D. Mk. IV 3·46 c.c. | 92/6 | Frog 500 G/P | 75/- |
| Elfin 1·49 c.c. | 59/6 | Amco 3·5 c.c. | 97/6 |
| Elfin 1·8 c.c. | 79/6 | Kestrel 1·9 c.c. | 45/- |
| Elfin 2·4 c.c. | 89/6 | Tornado 1·9 c.c. G/P | 49/6 |
| Mills ·75 c.c. | 50/- | Wildcat 5 c.c. | 77/6 |
| Mills ·75 c.c., with c/out | 55/- | Falcon 2 c.c. | 59/6 |
| Mills Mk. II 1·3 c.c. | 75/- | | |

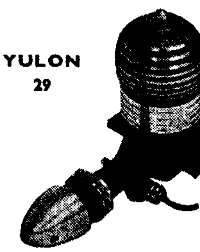
### CONTROL LINE

| | | | |
|---|---|---|---|
| K.K. Skystreak 40" 3 to 5 c.c. | 10/6 | Speedwagon 30" 5 c.c. | 14/6 |
| K.K. Skystreak 26" ·75 to 1 c.c. | 9/6 | Speedwagon 20" 3·5 c.c. | 12/6 |
| Musketeer 40" 5 c.c. | 19/6 | Comet 20" 1 c.c. | 11/6 |
| Focke-Wulf 190 33" 5 c.c. | 19/6 | Auster 27" 1 c.c. | 7/6 |
| Spitfire 22 27" 1 to 3 c.c. | 27/6 | Marlin Mite 26" 1 to 1·5 c.c. | 13/6 |
| Babette 3 to 5 c.c. | 25/- | K.K. Stunt King 1·5 to 3 c.c. | 18/6 |
| Bee-Bug 22" ·75 to 1 c.c. | 11/6 | Frog Vandiver 1 to 1·6 c.c. | 12/6 |
| Jnr. Monitor 30" 1·5 to 2·5 c.c. | 14/6 | Dervish 1·5 to 3 c.c. | 19/6 |
| | | Marlin 32" 1·8 to 3·5 c.c. | 19/6 |
| | | Nifty 26" 2 c.c. | 12/6 |
| | | Menace 27" 2 c.c. | 7/6 |

Better even than the "30" which won the 1949 C/L Nationals. This fine Glow-Plug Engine is a terrific performer, and offers unbeatable value to the exacting modeller. CAPACITY 4·89 c.c. Weight 5½ ozs.

PRICE 79/6

**YULON 29**



NEW YULON "49" CAPACITY 8·2 c.c. Weight 6½ ozs.

PRICE 99/6

| GLIDER | | RUBBER | |
|---|---|---|---|
| Albatross 60" | 25/- | Major 30" | 5/6 |
| Prince 60" | 25/- | Minor 20" | 3/3 |
| Roma 40" | 7/6 | Sentinel 34" | 10/- |
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| Norseman, see Mercury Ad. | 17/6 | Goblin 20" | 3/3 |
| Soarer Major 60" | 11/6 | Gipsy 40" | 10/6 |
| Soarer Minor 48" | 8/- | Jaguar | 21/- |
| Soarer Baby 36" | 5/- | Flying Minutes 48" | 21/- |
| Cadet 30" | 4/- | Stardust 40" | 10/6 |
| Cub 20" | 2/6 | Frog Goblin 28" | 4/9 |

| POWER | | JETEX POWER | |
|---|---|---|---|
| Frog 45 | 27/6 | K.K. Cub for 50 | 2/6 |
| Vixen 36" | 12/6 | Skyjet 50 for 50 | 3/9 |
| Janus 44" | 15/- | Min-o-Jet for 50 | 3/- |
| Envoy 40" | 14/9 | Vampire for 50 | 5/- |
| Pirate 34" | 13/6 | Flying Wing for 50 | 5/- |
| Zipper Jnr. | 14/6 | Skyjet 100 for 100 | 5/6 |

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| 1/16"×2" | 6d. each |
| 1/8"×2" | 8d. each |
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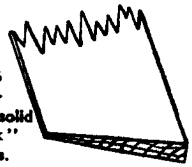

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| 1/16"×3/8" | 2/6 doz. |
| 1/8" sq. | 1/- doz. |
| 1/8"×3/16" | 1/6 doz. |
| 1/8"×1/4" | 2/- doz. |
| 1/8"×3/8" | 3/- doz. |
| 1/8"×1/2" | 4/- doz. |
| 3/16" sq. | 2/- doz. |
| 3/16"×1/4" | 3/- doz. |
| 3/16"×3/8" | 3/6 doz. |
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| 3/16"×3" | 1/2 each |
| 1/4"×3" | 1/4 each |
| 1/16"×2" | 8d. each |
| 1/8"×2" | 8d. each |
| 3/16"×2" | 10½d. each |
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| 3/32"×3/8" | 3/3 doz. |
| 1/8" sq. | 2/9 doz. |
| 1/8"×3/32" | 3/- doz. |
| 1/8"×1/4" | 3/3 doz. |
| 1/8"×3/8" | 3/9 doz. |
| 3/16" sq. | 4/- doz. |
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| 3/16"×3/8" | 4/9 doz. |
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| 1/4" sq. | 7d. each |
| 1/4"×1/2" | 10d. each |
| 3/8" sq. | 10d. each |
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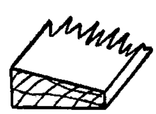
**3' Trailing Edge.**



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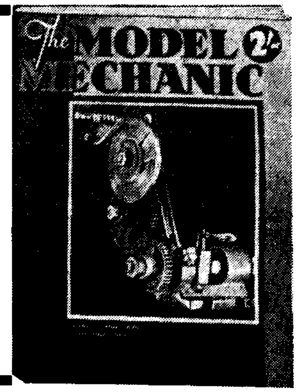




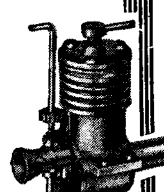



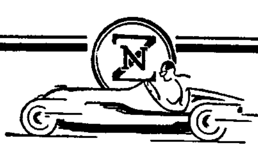


(*continued from page 387*)

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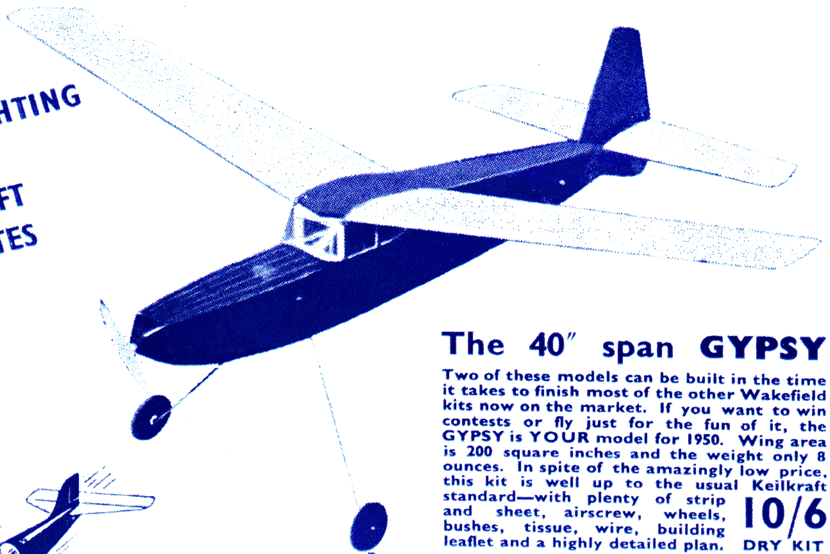

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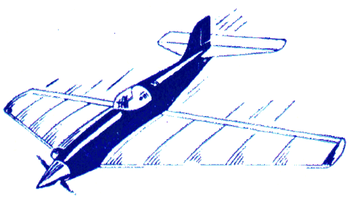

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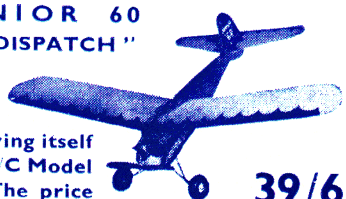
**SKYSTREAK 40 (Basic Kit) ... ... 10/6**

*Keilkraft* **JUNIOR 60 WINS "DAILY DISPATCH" 1949 R/C EVENT**



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| 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″ | 9/6 |
| Skystreak 40 (Basic Kit) | | 10/6 |
| **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 | 45¼″ | 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/– |
| Cub 20″ (Also for Jetex 50) | | 2/6 |
| **CHUCK GLIDERS** | | |
| Vega | 12″ | 1/3 |
| Spook | 12½″ | 1/6 |
| Polaris | 20″ | 2/6 |
| Comet | 24″ | 3/6 |

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