MODEL AIRCRAFT

Bresswell

IN THIS ISSUE

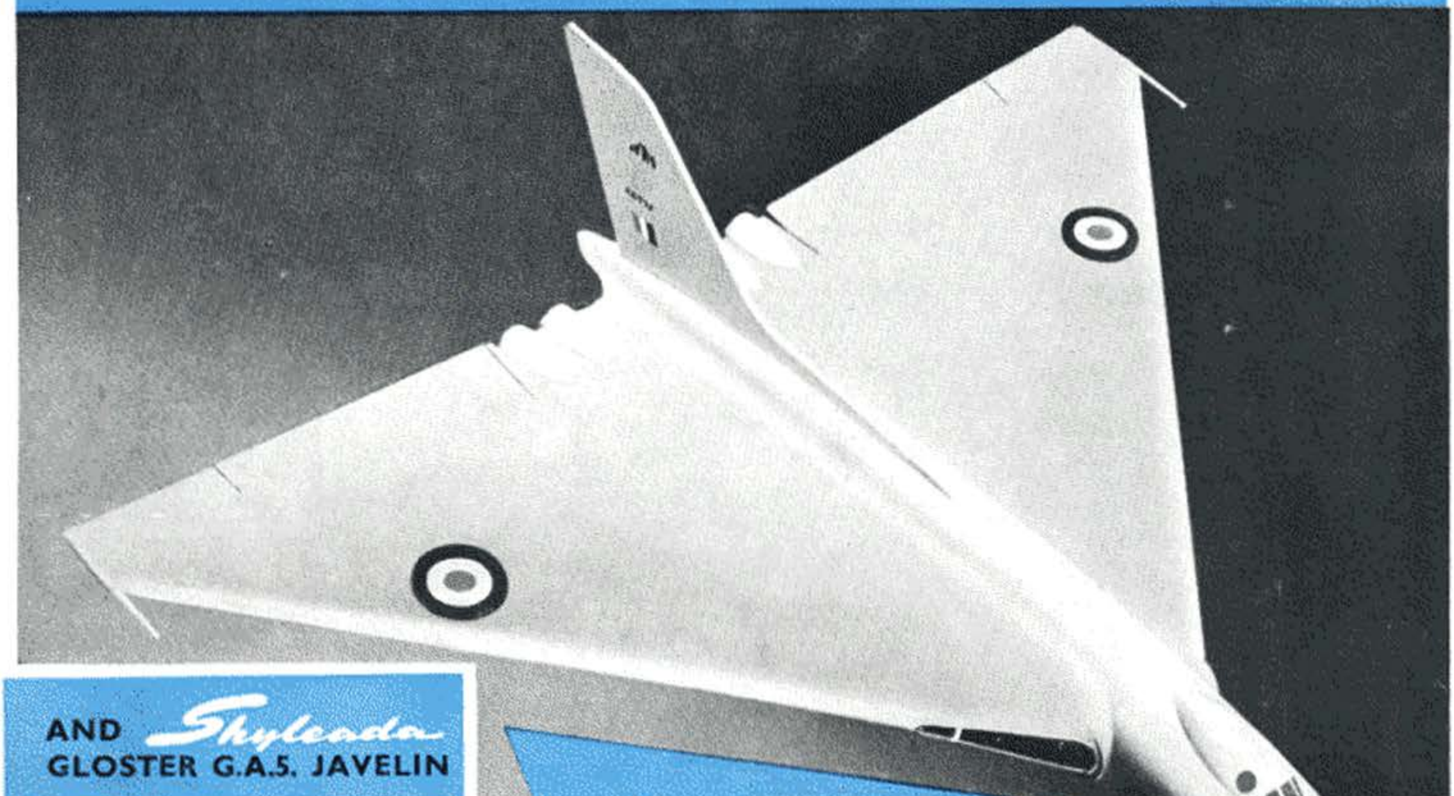
FEBRUARY, 1953

● TOWLINE STABILITY ● THREE PLANS OF INTERESTING MODELS ● LOTS OF RUBBER ● M.A. BEGINNER'S COURSE ● WIND IN THE WIRES ● TOPICAL TWISTS ● PROTOTYPES WORTH MODELLING ● ACCENT ON POWER ● PHOTONEWS

1'6

Skyleada present **SENSATIONAL**

ADDITIONS TO THEIR FLYING SCALE SERIES



AND **Skyleada**
GLOSTER G.A.5. JAVELIN

The new Skyleada Flying Scale Jet Series also includes the Avro 707A and the M.I.G. 15. Every kit contains all the materials necessary for building the finished model, including cement. A special feature of the series is the crystal clear accurate-scale moulded cockpit cover supplied with each kit.

A TRULY MAGNIFICENT MODEL OF THE WORLD'S FIRST DELTA WING BOMBER

These new Skyleada kits make today's most exciting news for aeromodellers. Easy to build, thrilling to fly, you'll be proud to own these beautiful true-scale models. Designed for power by Jetex 50. Your retailer will show you the Avro 698, the Gloster Javelin and other Skyleada quality kits.

3/8
INCLUDING PURCHASE TAX

Manfd. by **BRITISH MODEL AIRCRAFT MFG. CO. LTD.**
180, LONDON ROAD, MITCHAM, SURREY

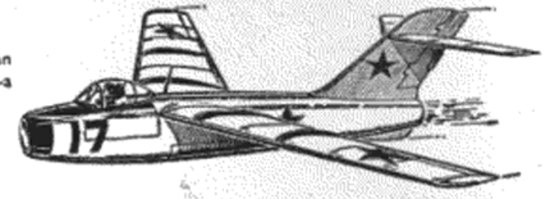
"VERON" for VALUE!

YOU JUST CAN'T GO WRONG IF YOU CHOOSE "VERON"

A plane which will bring you right up to date !

LAVOCHKIN 17 This 37" span model of the famous Russian fighter incorporates the new "IMP" (Pat. Pending) method of propulsion—a ducted impeller giving this model the nearest approach to real jet flight yet attained. For .5 to .87 motors. Kit includes stage-by-stage plan and READY-MADE IMPELLER and STARTING PULLEY.

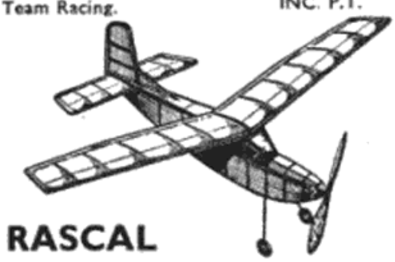
KIT PRICE **30/6** Inc. P. Tax.



MIDGET MUSTANG

24" span control line replica of the American sport plane. Suitable for 1.3 to 3.5 c.c. motors, E.D. 2.46, Amco 3.5, etc. Speed 60-80 m.p.h. Ideal for Class "A" Team Racing.

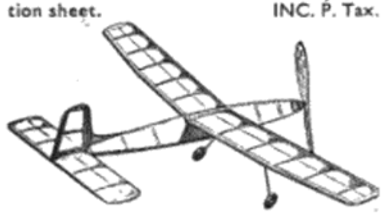
KIT PRICE **27/6** INC. P.T.



RASCAL

24" span Duration flight model—a slick little cabin job on modern lines unequalled by any other commercial kit made today. Kit has everything you require excepting dope. Complete with ready carved Balsa Propeller and instruction sheet.

KIT PRICE **6/8** INC. P. Tax.



GOBLIN

20" span duration model. Ideal for the newcomer to modelling. Looks, and flies like a "Wakefield" in miniature Complete kit with semi-finished airscrew.

KIT PRICE **4/7** INC. P. TAX.

★ **MAKE SURE THAT DURING 1953 YOU . . .**

BUILD WITH VERON KITS!

ASK YOUR DEALER FOR OUR FREE POCKET FOLDER

"SABRE"

THE "PLANE IN THE NEWS"

18" span super quality kit of the swept wing jet, now on its way to this country in large numbers. Kit includes perfectly laid out plan together with cockpit covers, all materials and insignia transfers. For Jetex 50.

KIT PRICE **6/8** INC. P. TAX

VORTEX

66" span high efficiency International Nordic A/2 Sail-plane completed after many months' research by Phil Smith, Verons designer. Kit contains details for auto rudder and "tip-up" tail dethermalizer.

KIT PRICE **22/7** INC. P. TAX.

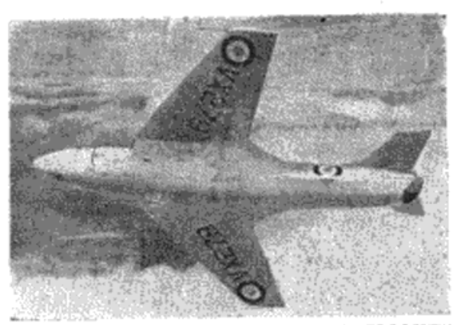


Photo by courtesy of "FLIGHT"

HAWKER P.1081 (*illustrated*). Famous prototype. Inc. P.T. 2/6

P.1067 HUNTER. Latest for Fighter Command. Inc. P.T. 2/6

SABRE F.86. Korean front-liner. Inc. P.T. 2/6

BOULTON-PAUL P.111. Delta planform. Inc. P.T. 2/6

SUPERMARINE 508. High speed plane. Inc. P.T. 2/6

SUPERMARINE 510. Now developed into the "Swift." Inc. P.T. 2/6

★SOLIDS

Here is an almost unlimited range from which to choose. Now is your chance to make full use of the dark evenings—VERON solids give you hours of pleasure and the completed model will be treasured with pride. See your dealer NOW !

VENOM N.F.2. All weather fighter. Inc. P.T. 2/6

CUTLASS. The U.S. tailless fighter. Inc. P.T. 2/6

MIG 15. Soviet warplane. Inc. P.T. 3/4

La. 17. Companion to the MiG 15. Inc. P.T. 3/4

METEOR 8. Well-known R.A.F. fighter. Inc. P.T. 4/3

CANBERRA B.1. Jet bomber. Inc. P.T. 6/8

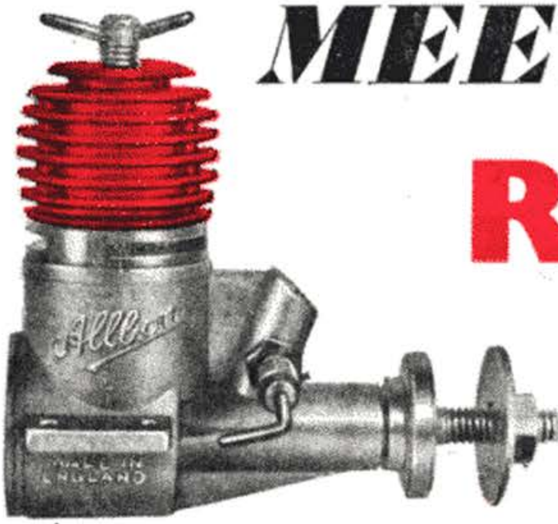
WATCH OUT FOR ADDITIONS TO THIS OUTSTANDING RANGE

VERON

MODEL AIRCRAFT (Bournemouth) LTD., Norwood Place, BOURNEMOUTH

Tel.: SOUTHBOURNE 43061

MEET THE NEW REDHEADS



ALLBON Mk II JAVELIN

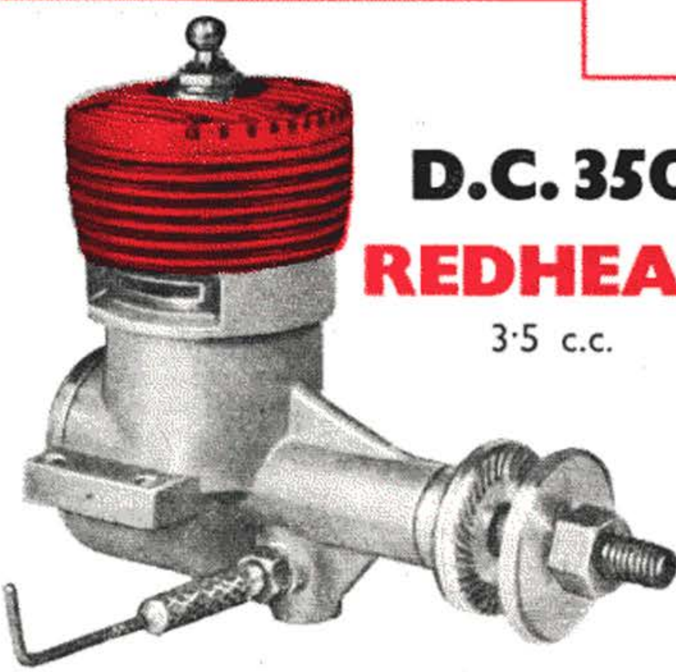
1·49 c.c. 68/3 INC. TAX

The Mk. II Javelin is now available and is a worthy successor to the engine that has already established itself as the finest diesel in its class.

ALLBON Mk II DART

0·5 c.c. 67/6 INC. TAX

The Dart is still maintaining its reputation as the world's most popular diesel and this new Mk. II version incorporates many improvements which have raised efficiency and reliability to the highest possible peak.



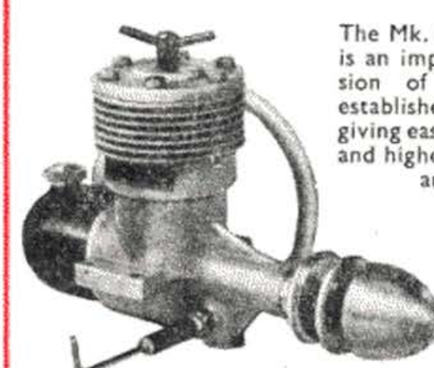
D.C. 350 REDHEAD

3·5 c.c.

For those who prefer glow plug engines, the D.C. Redhead is the ideal engine, combining the virtues of easy starting with the power output of a racing engine. Price **82/6**

D.C. 350 Mk II DIESEL

3·5 c.c. 82/6



The Mk. II D.C. 350 is an improved version of the well established Mk. I, giving easier starting and higher performance.

Sole Distributors: E. KEIL & CO. LTD., 195, Hackney Road, E.2. Tel. Shoreditch 5336

FOR SUCCESSFUL FLYING

THERE IS NOTHING TO BEAT A KEILKRAFT MODEL

Quality First

BUILD and FLY these

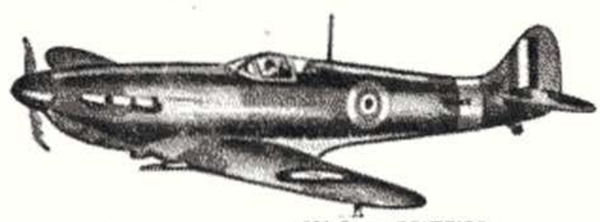
FAMOUS FIGHTERS of World War II !

Accurate flying scale models of the winners of the Battle of Britain

These are the two best-known planes of the war, and their names are written large in aviation history. Keilkraft offer two wonderful kits of these great "old timers"—kits that you will enjoy building, and at a price to suit your pocket.

ONLY **3/8** EACH

Your KEILKRAFT dealer will be pleased to show you



18" Span SPITFIRE

20" Span HURRICANE

KIT CONTENTS INCLUDE—
Plastic prop. and wheels, ample balsa strip and sheet, cement, tissue, wire, celluloid, ready shaped tailplane, full-size plan and building and flying instructions.

DOLPHIN

30" Span Towline Glider

This high performance model will delight the hearts of all glider fans with its smooth, effortless flying. The kit includes full size plan, building and flying instructions, and ample building materials. **4/11**

Have you seen the KEILKRAFT

Ready-to-fly GREMLIN ?

Price **4/7** *complete*

Completely prefabricated model with excellent performance. 17½" wing span.
Ask to see one at any model shop.

K.K. GALLEONS

Hull sides, decks and sails are printed in colour on suitable material. Anchors, crows nests, etc., moulded in plastic.

SANTA MARIA
REVENGE
MAYFLOWER
BOUNTY
GOLDEN HIND
ARK ROYAL

Six authentic models each approx 6" long. Each **4/11**

K.K. SOLIDS

Since this new series was introduced a few weeks ago the demand has been so great that it exceeds the supply. Production is being stepped up as soon as possible.

The range includes: SWIFT, SABRE, ATTACKER, SHOOTING STAR, HUNTER, MIG-15 all at 2/9 each. VENOM, METEOR 3/9 each.

NOT MANY COPIES LEFT!

KEILKRAFT HANDBOOK 1952-3
100 pages of articles and complete K.K. catalogue **1/3**

The finest model aircraft kits in the world

Manufactured by
E. KEIL & COMPANY LTD
LONDON, E.2.
(WHOLESALE ONLY)

KEILKRAFT

Distributors for E.D., ELFIN, and AMCO engines : JETEX kits and motors : ELMIC, BAT and SOLARBO : E.C.C. R/C equipment

MODEL AIRCRAFT

Managing Editor
E. F. H. COSH

Consulting Editor
A. F. HOULBERG, A.F.R.Ae.S.

Advertisement Manager
J. V. FORBES-BUCKINGHAM

FEBRUARY, 1953. Vol. 12. No. 2

Contents

EDITORIAL

The F.A.I. scheme to inaugurate a centralised meeting at which the World Championships for Rubber, Power, Glider and C/L models were to be held, has, so we understand, received a very distinct set-back. It seems now that it is extremely doubtful whether the scheme which was envisaged at the Madrid Conference of the F.A.I. held in May, 1952, can now be realised.

The basic difficulty from the start, as we have already pointed out, has been raising the necessary funds to cover not only the cost of organising the meeting, but also the travelling and accommodation expenses of the competitors. It was hoped that the F.A.I.'s appeal to the aircraft industry of the world through the national aero clubs would receive sufficient support to enable the scheme to go forward. We now learn, however, that whilst the airline operators and aircraft firms in the various countries are prepared to assist their own national clubs to varying extents, they are quite definitely not prepared to contribute to a common fund which would also benefit the nationals of other countries.

The model aircraft movement is not sufficiently strong financially to stand the strain of subsidising the cost of sending competitors to a central championship meeting—even if it could finance the running of the event itself, and it is obvious that if the scheme is to go ahead, some other means of raising the necessary funds must be found. Quite definitely the funds must be available before the scheme goes any further, as it would be sheer folly to start an event of this nature if it could not be made a *continued* success in future years—a point which seems to have been completely overlooked by those who wanted to run the meeting in this country in 1953.

Cover Story

This month's cover started life at the Nationals last year, and shows two members of the Gosport M.A.C. with a striking-looking stunt model. C. Sawyer on the left built it, while D. Tanner produced the very fine blood red sprayed finish. They certainly seem pleased with the result !

THE JOURNAL OF THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

Published on the 20th of each month prior to the date of issue by PERCIVAL MARSHALL & COMPANY LTD. 19-20 NOEL STREET, LONDON, W.1. Telephone: GERrard 8811 Annual Subscription 20s. 0d. post paid.

Here and There

COMMENTS ON CURRENT TOPICS

MOVING HOUSE By the time you read this paragraph, we will have left our old premises in Great Queen Street, and have MODEL AIRCRAFT comfortably installed in a new home, for this month Percival Marshall and Co., the publishers, will have moved to new modern offices in Noel Street, near Oxford Circus.

During the war, the company was bombed out of its Kingsway building and since then has been "making do" in a building of venerable age. Now, however, we shall know the luxuries of central heating, fluorescent lighting and windows that really shut. Visitors to MODEL AIRCRAFT who in the past have toiled up the stairs will also appreciate the services of the lift, no less than ourselves, who had to negotiate those stairs many times each day!

From now on, then, correspondence should be addressed to MODEL AIRCRAFT, 19-20, Noel Street, London, W.1, and our telephone number is GERrard 8811.

WEDDING BELLS "M.A.'s" gossip writer came up the other day with the news that Cyril Mays, well-known West Essex member, is getting married in April to a young lady from the land of the maple leaf. Unfortunately we shall be losing him, for he will be emigrating with his Canadian bride and settling in Montreal. The best of luck, Cyril! Perhaps you could form a club with the numbers of English modellers now over there!

P.R.O's. PLEASE NOTE About this time of the year many clubs will have elected new press officers to take over the job of "spreading the news" of the club's activities, and at first the new man may not be sure of the best way of preparing a report for the Club News pages of MODEL AIRCRAFT.

The main thing to remember is that a report is published mainly to interest members of *other* clubs, who probably will not know personally the characters mentioned. Therefore "family" gags will be lost on the readers. Secondly, the ideal report from our point of view is one that can be sent straight to the printer with no alteration. A glance through the published reports will show the style we want, but here are the features of a good report:

1. About 150-200 words in length.
2. Typewritten, double-spaced, or *clearly* handwritten, preferably on every other line of ruled foolscap. This enables us to make alterations between the lines.
3. One side of the paper only and on reasonable size sheets—please, not on folded sheets of quarto notepaper!
4. Reports go to the printer on the *15th of the month before* publication. If we receive them after that date they will have to wait until the next issue; if much earlier, they will not be topical.
5. Reports should be written specially for Club News—not sent as a personal letter to the Editor. There is no need to send a covering letter at all; just head the report with the name of the club and it will be obvious what it is. While we like to see club and area news-sheets, they are rarely suitable for reports and need a great deal of time spent on sorting out and rewriting.
6. Above all, we want *news*, not lists of contest results with their rows of flight times that mean little to anyone outside the club. And if nothing noteworthy has happened recently, it is a waste of time to write: "Bad weather has held up club flying this month but the boys are busy building and Joe Blank has nearly finished his 1953 Wakefield." This is not news, so give it a miss this month and wait until something interesting happens.
7. Finally, if you are electing a P.R.O., pick one who speaks English, and can spell too—remember "deisle" is spelt *diesel*. And not too much slang, please, or too many queer abbreviations.

YOUR SLIP IS SHOWING Only the slip, this time, may be a technical one—winding a rubber model, launching a glider, or starting up the engine of a power model. If the nervous competitor makes a mistake and gets himself into temporary trouble, be sure that there will be a dozen helpers ready and willing to give him all the assistance they can. That is one of the nicest things about contest flying. Your closest rival would willingly lend you his spare motor or help you recover your model from the top of a tall tree—knowing full well that if you do get in your other flight you stand a good chance of beating him.

No, whatever else may be said about model flying, sportsmanship is still there at its best. There are the "unfortunate" incidents, as well, but usually one of the parties concerned has no connection with aero-modelling. More often than not, too, the members of our movement who make the most fuss are the least active on the flying field.

FOG-BOUND The Northern Heights Gala Day is renowned for taking place in perfect weather conditions year after year, but the club certainly had to pay for it on the occasion of their 21st anniversary dinner and dance. It took place on that weekend in December when we had The Fog! Dinner was served after a delay to allow for latecomers, but a number of guests failed to arrive at all. Among them, unfortunately, were Air Chief Marshal Sir Hugh P. Lloyd and S/Ldr. Neville Duke and Mrs. Duke. With the bonnet of the editorial car frequently going o.o.s., we nearly didn't make it ourselves!

However, the dining hall was agreeably full when the proceedings began with Dr. A. P. Thurston, the president of the club, in the chair. Mr. M. R. Knight proposed the health of the club and Mr. A. T. Widgery replied. Dr. Cheetham of the South Africa division of the R.Ae.S., who was also present at the S.M.A.E. dinner, replied to Malcolm Young, who proposed the health of the guests. Geoff Moss proposed the toast to "The Ladies" and Mrs. Buckingham, one of the club's most active members, replied.

After the trophies had been presented by Mrs. Cheetham, the revels continued with dancing under the M.C.-ship of Max Coote, rounding off a very enjoyable evening.

Except, of course, that after it was over, there was The Fog!

RON GREAVES It is with regret that we have to announce the death of Ron Greaves, secretary of the South Birmingham M.F.C., who recently met with a fatal accident. Ron was a founder member of the club and had been secretary for ten years. He was well known all over the country and to quite a number of continental modellers, but he will be particularly missed by his friends in the Midlands.

REMEMBER BILL WHITE? Pre-war and post-war model flier. Member and secretary of the Blackheath Model Flying Club. That is how older modellers will think of Bill White, and remember him as one of the most likeable of men and the best of model builders. He was killed in a road accident not long after the war.

Blackheath and Epsom Downs were Bill's flying grounds and we understood that when the Bill White Memorial Trophy was instituted that Blackheath was to be the annual venue. This winter contest, however, became so popular that it seemed inevitable that it should be transferred to a large airfield. Hence Fairlop has been used for the past two years. With Fairlop not available for the 1953 contest, the venue moved to Epsom Downs—a decision with which we heartily concur. Whatever Epsom may lack as a modern contest 'drome it was one of Bill's own favourite flying fields.

By the time this appears in print the 1953 Bill White contest will be over with, we hope, happy memories of an enjoyable event. If these words also serve to recall memories of the man whose name the cup bears they will have fulfilled their purpose.

HANDS ACROSS THE SEA One of the most interesting aspects of the correspondence that comes into this office is the large number of letters we receive from readers overseas. One such letter came recently from Guatemala, in Central America. Andrew Bobkowski tells us how flying conditions there are almost ideal, with thermals almost embarrassing in their strength. It is not unusual for chuck gliders to be lost in them—one such model landing 25 miles away after crossing a mountain range! However in the rainy season there are mornings "when the air is dead and thick like evaporated milk," and trouble is experienced with rubber motors, which do not like the warm humid atmosphere. There is an active club in Guatemala with some 40 members and contest flying in all categories is popular. The Guatemalans are hoping to send a team to the Wakefield in Sweden next year, and the photograph shows Andrew with one of his models. Incidentally, he would be glad to hear from any readers in tropical countries who can give advice on the care of rubber motors in these climates. We will pass on any letters.

Another letter came from a 17-year-old German modeller, Wolfgang Laurig, who would like to exchange correspondence with an English lad about the same age. He writes English (quite well!) and his address is:

Wolfgang Laurig, Offenbad/Main, Kaiserstrasse 54, Postfad 101, Germany.

Yet another reader who has asked us to find him a pen-pal lives in Burma. Free-flight power models are his main interest, but he also builds gliders and rubber models. His address is:

Sai Mya Tha, 46, Willington Hall, University of Rangoon, Rangoon, Burma.

A striking photograph of Andrew Bobkowski (see above) with one of his Wakefields—Ted Evans's "Jaguar" design.

QUICKSILVER

BY E. FEARNLEY

BASED on contemporary designs now coming into service with the R.A.F. *Quicksilver* looks and flies like its big brothers.

Build the model round the engine. As shown, a Mills 1.3, Elfin "149" or Javelin, or similar will be O.K., though of course the actual climb will vary with the available power.

Fuselage

Build a centre keel of $\frac{1}{8}$-in. square and sheet where indicated on the plan, and while this is setting trace the formers on to $\frac{1}{8}$-in. sheet with carbon paper. The engine bearers are fitted over the keel with suitable notches cut in. Be sure that the spacing of the bearers is right for your engine.

Cement the formers to either side of the keel, and when thoroughly set fasten on rear undercarriage with thread stitches and plenty of cement, and bolt front legs to engine bearers. The fuselage can then be sheeted up with strips of $\frac{1}{16}$-in. sheet about half-an-inch wide in the middle, tapering to a point at the back. Choose your wood carefully for this—the medium springy type. Avoid the soft or hard varieties. Cement well and bind with strip elastic while drying. Trim off where the wing fits, and strip round the edges with $\frac{1}{8}$-in. × $\frac{1}{4}$-in., strengthened with gussets.

A good sandpapering will finish this. Dope on tissue over the wood covering, and the result is a tough egg which will stand a tremendous beating, and streamlined to the nth degree. Cut out the right side to take the engine. Nibble away bit by bit until the engine just wriggles in.

The Fin

There is little in the fin, but it must be strong enough to take the tailplane on top. The $\frac{3}{8}$ in. square spar is notched down to the fuselage bottom. The leading edge is faired into the dorsal stringer. A soft $\frac{1}{2}$-in. sheet top is fitted and this must be at the right incidence. Test the fin for line-up nosewards, and when dead straight, cover with soft $\frac{1}{16}$-in. sheet and fair into the sheet body. Add the bottom sheet underfin and the trim tab hinged with soft wire.

The Tail

This is built on the well known cap-strip system. Strip ribs are pinned to the plans, the leading, trailing edges and spars are cemented in place, and the top strips are cemented to the leading edge and mainspar. When this is well set, bend the cap strips down to the trailing edges, trim to fit, and cement and pin until dry. Add the tips, and finish well with sandpaper.

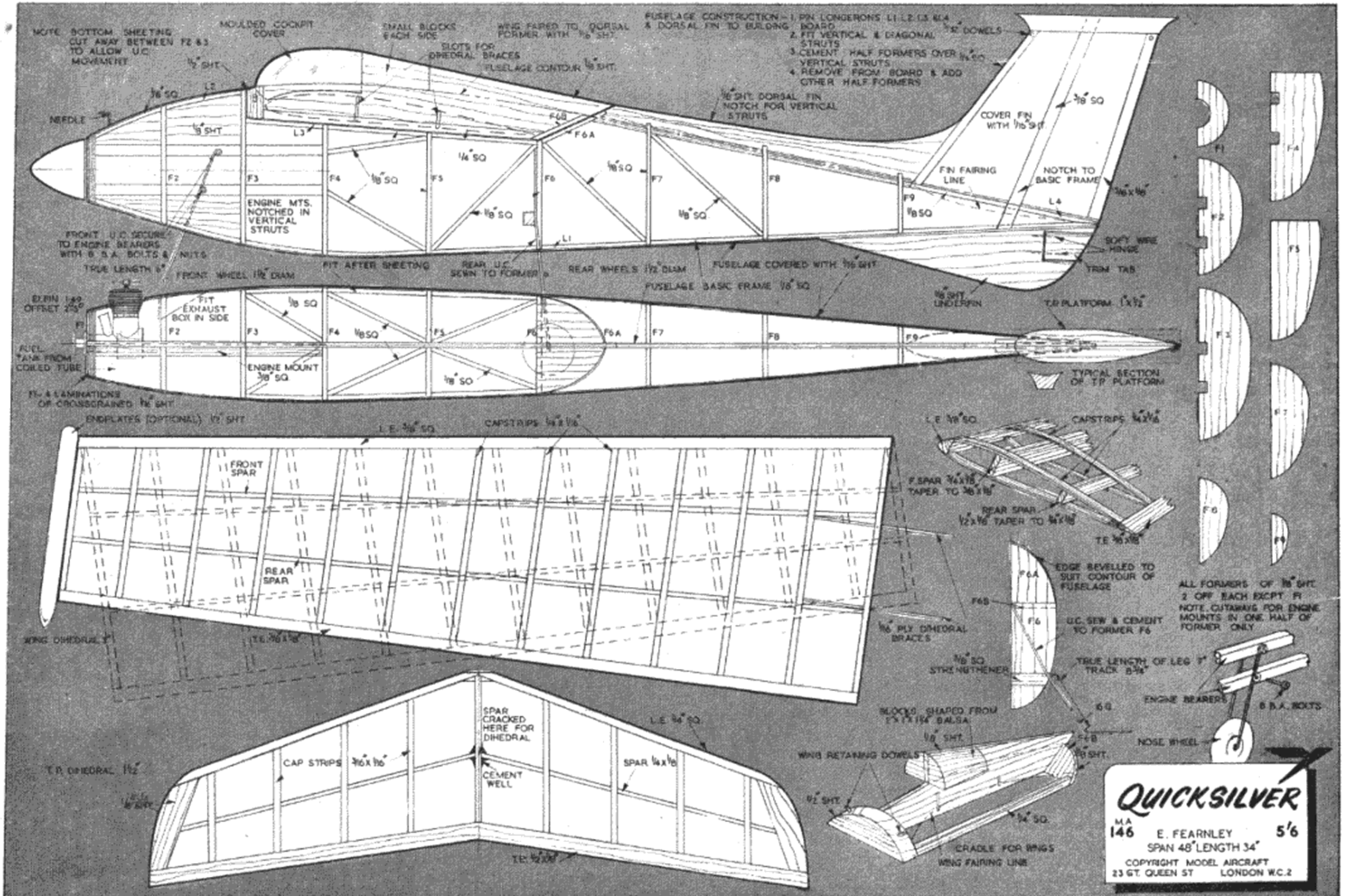
The Wings

As the tail, it is cap-stripped and the above details apply. Cut the two spars exactly to size of hard wood, and pin the bottom strips to the plan. Add the L.E. and T.E. as before, and add the spars. Cement the top cap strips to the L.E. and front spar, and when set bend to the T.E. and cement to this and rear spar. The imitation tip tanks are $\frac{1}{2}$-in. sheet, and act as strengtheners and also end plates. Two plywood dihedral keepers are required. Cut these, and notch into the sheet wood centre keel cut with the fuselage. On a flat table cement the two wing panels with the keepers in place and prop up the wing tips with boxes. Be sure that the centre keel is dead upright. When dry add the cradle to the underside, and the $\frac{1}{2}$-in. sheet front former, and the $\frac{1}{8}$-in. rear one. At this point fit it to the fuselage frequently and fair it all in. Add the sheet top fairing to the rearwards, and the front part. Finish off with a moulded cockpit and head fairing, and any other details required.

Miscellaneous

The KK push-on spinner was modified to stay on at the 13,000 revs. required, with an internal bolt.

For a fuel tank use a 24 in. length of tubing coiled in the opposite side to the engine. I run the engine until the last two or three coils are left with fuel in, and this saves tempers and heart strain. A plastic prop. is a must. Use the one recommended by the engine makers. A four inch pitch is usual. Cover the model with heavyweight tissue and after one coat of clear dope, silver it to finish.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT 19-20, NOEL STREET, LONDON, W.1, 5s. 6d., POST FREE.

TOWLINE STABILITY

By RON WARRING

WHILST, basically, the glider is the simplest of all types of models to trim and fly, and model glider performance has now reached exceptionally high standards, there is still one major factor of glider design which is relatively an unknown. That is the performance of the glider on the towline.

Until a few years ago the proportion of gliders which were *really* stable on tow was quite small. In fact, at a contest, you generally saw three distinct types of launch—models which were stable on tow and went up perfectly straight ; those with a moderate degree of stability which, depending on the skill of the launcher, either reached the full height of the line or suffered a premature release; and models which were hopelessly unstable on tow and either crashed or slipped off the line at a very low altitude.

During the past year or so there has been a noticeable improvement in towline stability. The proportion of unsuccessful launches has become much less, but still there are only a minority of models which tow up perfectly straight and true under all conditions. The others have to be " played " up to the end of the line.

Now the remarkable thing is that no designer can really lay down what makes a glider stable on tow. Almost all the successful designs have been proportioned " by eye," as it were, rather than out of consideration of the theoretical side of towline stability or even a full understanding of the problems involved. Some modellers, we know, have conducted practical tests on towline stability, but the majority of results have been of a " negative " rather than a " positive " nature. In other words, such tests have indicated how a model can be made *unstable* on tow rather than stable ! Glider designers who have suffered from towline instability will appreciate just how difficult it is to track down and cure the fault. It seems, almost, that a new design is either stable on tow, or it is not. If it is in the " hopelessly unstable "

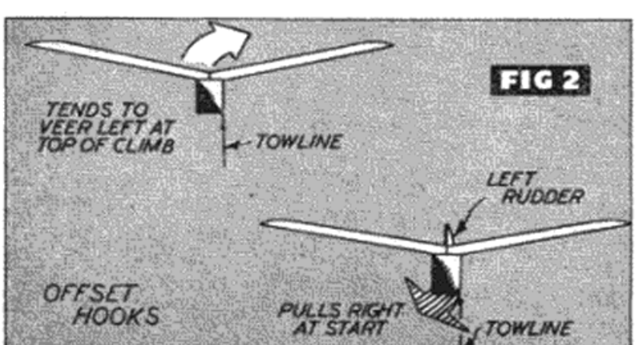


FIG 2

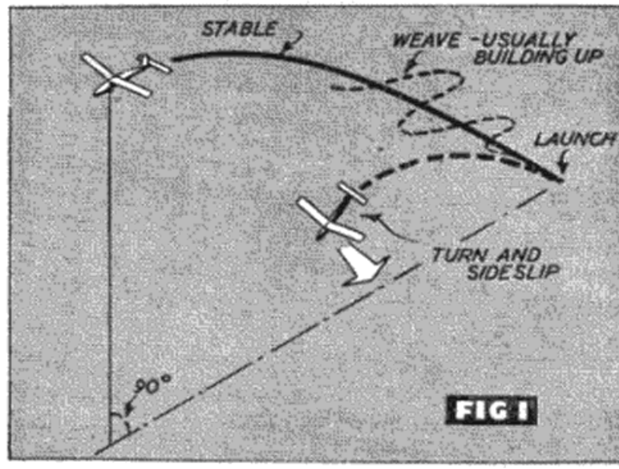


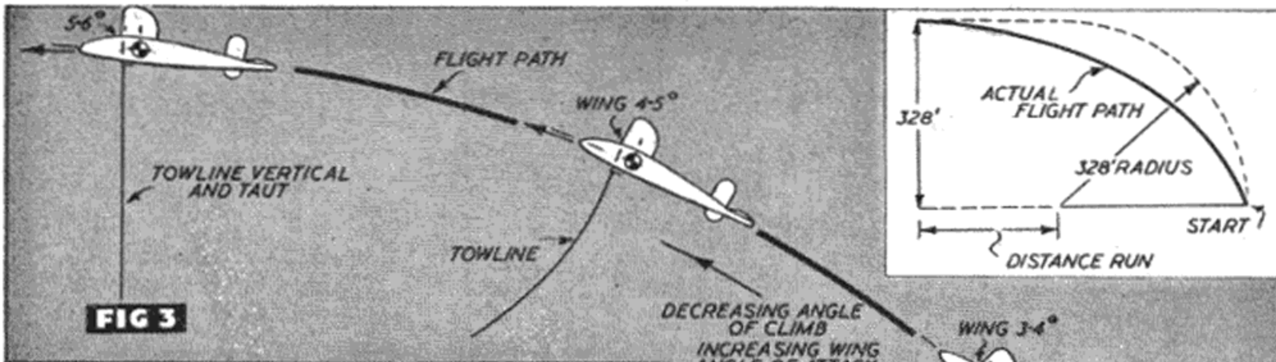
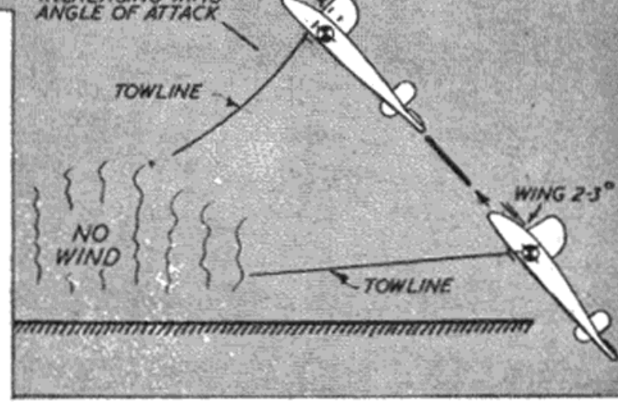
FIG I

category, then there is no simple cure—only a major design change in an attempt to right matters.

One thing we do know. It *is* possible to produce a glider which is perfectly stable on tow *under all conditions*. Windy or calm it will tow up straight and unwavering to the full height of the line. It does not matter whether it is launched out of wind or not. It will still come round and rise to full height, even passing in front of the launcher so that the line itself passes the vertical. If there is a slight wind, in fact, all that the launcher has to do is to stand still, after a short preliminary run when the model is first released.

As a generalisation it is very much easier to tow a glider up straight in calm conditions than when there is a wind. In fact, many models which tow up quite satisfactorily in calm are unstable on tow in a wind. The obvious inference is that such models are stable at low speeds on tow, but unstable at higher speeds. There are a whole range of different possibilities. A good calm weather model may be quite hopeless in a wind or only *occasionally* misbehave in rough weather. And there are a variety of reasons why this should occur, not all of them aerodynamic (i.e. due to the aerodynamic outline of the design). For example, the wings of some gliders are definitely not rigid enough to stand up to winds without distorting and this is almost bound to cause instability on tow. At the other extreme we get the type of model which is normally quite satisfactory under most conditions but then, for one reason or another, suddenly develops a violent swing immediately after release and goes right over sideways into the ground. This can happen in light winds as well as strong winds, and the cause here is *not* wing distortion.

Two practical examples come to mind which throw some interesting light on the subject of towline stability. The first is the case of a perfectly stable model which was deliberately made *unstable*. The

second that of an unstable model with which many attempts were made to rectify the fault.

Taking the stable model first, it could be made unstable under tow by any of four methods. The first, and most obvious, was to offset the rudder for a fairly close turn in free-flight. On tow the model just turned in this direction and, if held on the line, eventually sideslipped into the ground. The second was to increase the amount of negative incidence on the tailplane (without correcting the c.g. position). In other words, with the model tending to stall in free-flight it became unstable on tow. The third was to move the tow hook *forwards*. The fourth was to move the centre of gravity aft, retrimming for a normal glide.

Now what can we learn from this? Different designs may prove the exception to the rule, but the old accepted axiom of a "forward hook" for rough weather appears something of a fallacy. In fact the modern trend is to move the tow hook farther and farther *back*, with respect to the c.g. and it is noticeable that the modern model is more stable on tow than its earlier counterpart.

This, however, is something to be approached cautiously. Moving the tow hook back is definitely advantageous as far as height reached on tow is concerned. When a model which is otherwise stable will not tow up to the full height of the line, almost certainly the tow hook is too far forward. With the tow hook in the optimum position it is possible to get the model right overhead with a relatively heavy line. But the lightest of lines will not help if the tow hook is too far forward.

Another feature making for maximum height on the line is negative tailplane incidence—one of the "unstabilising" features for towing. It is also noticeable that some of the best models for "coming overhead" on the line with the minimum of attention from the launcher have a very high *angle* of climb, particularly during the initial stages of the launch. This is a feature which is acceptable in calm conditions, but may lead to trouble in winds. We will discuss this in more detail a little later on.

As far as moving the centre of gravity forwards is concerned this is one of the few simple changes which can often make an unstable model stable on the line. In other words, if you have a model which will not tow properly, try moving the centre of gravity forwards and retrimming the glide. This may prove the answer to your problem.

The effect of moving the centre of gravity forwards is a complex one. It alters the trim of the model and, apparently anomalously, calls for a reduction in (positive) tailplane incidence and may even require negative incidence. At the same time, of course, if the tow hook position is fixed, it has the effect of moving the tow hook *back*, relative to the c.g. Since a forward movement of the c.g. is generally a stabilising condition we can take it that the unstabilising effect of a "negative tailplane" is less than the stabilising effect of a rearward hook position. In the model in question a c.g. position at 35 per cent. chord represented a stable condition for tow, whilst a small movement back to 40 per cent chord introduced instability of the "wandering" kind.

This brings up a further point in that there are several kinds of towline instability. For our purpose we can group them as two distinct types. In one the model weaves or wanders first to one side and then the other when on tow—a "wandering" movement which frequently gets worse, until the model is uncontrollable. If a model weaves in light winds, then almost certainly this weave will be worse in rough weather. It is, largely, a function of the airspeed. The faster the model is moving through the air, the more pronounced the instability or "wandering." It is this type of instability which is the most difficult to cure.

The other type of instability is where the model pulls off to one side instead of towing straight and continues in that direction until eventually it is sideslipping downwards. Depending on how marked this effect is, running towards the model to slacken off the line (or in some cases running in the opposite direction in an attempt to pull the model straight) either corrects the tendency or has no effect.

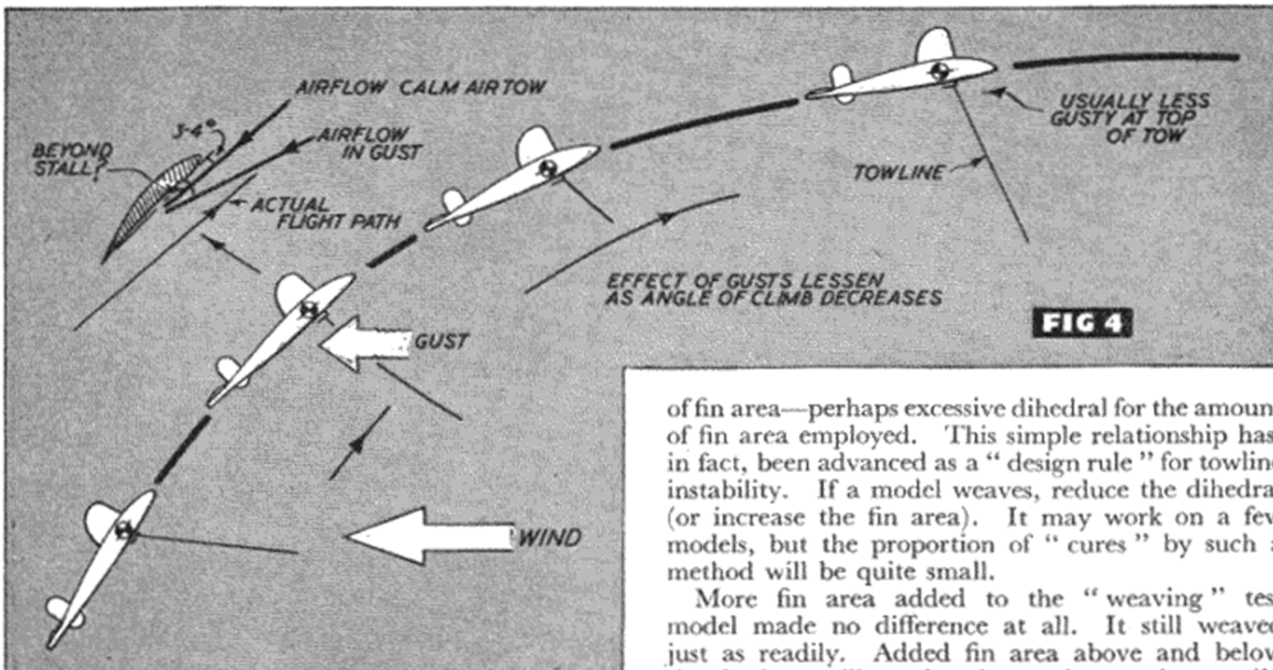


FIG 4

Logically the model is directionally unstable. It just wants to fly a curved path and, being constrained by the line, this curved path develops into a sideslip. A stable model with rudder offset—or perhaps a warp—will behave in such a manner. Often the models which normally tow straight are extremely critical on directional trim. If, for any reason, one of the surfaces is offset (perhaps a wing or tail out of line), they will exhibit this form of instability.

Now many people have attempted to cure such a fault—i.e. directional instability—by adding more fin area or keel area, on the principle that the greater the aft side area the stronger the tendency to fly (i.e. tow) straight. Seldom, however, does this work out in practice. Such devices as drogues attached temporarily to the model on tow and trailing behind will not necessarily straighten the tow. A model which is directionally unstable will still pull off to one side. The answer, in fact, lies not in gadgetry but in the design of the model itself.

In the case of the unstable test model previously mentioned, the towline instability was of the "weaving" type. Now at first sight it would be logical to assume that this could be due to lack of fin area—perhaps excessive dihedral for the amount of fin area employed. This simple relationship has, in fact, been advanced as a "design rule" for towline instability. If a model weaves, reduce the dihedral (or increase the fin area). It may work on a few models, but the proportion of "cures" by such a method will be quite small.

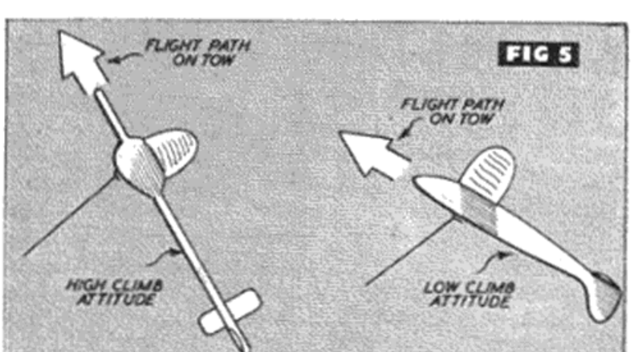


FIG 5

More fin area added to the "weaving" test model made no difference at all. It still weaved just as readily. Added fin area above and below the fuselage still produced negative results, as did quite large dorsal and/or ventral fin strakes. In other words, the solution did not lie in the disposition of the side areas. Moving the c.g. forward tended to lessen the tendency to weave, but did not eliminate it. To have any marked effect the c.g. had to be brought forward to the ridiculous position of 20 per cent. of the chord. The most marked improvement was found when the model was deliberately under-elevated so that the free flight glide was really a shallow dive, but a certain tendency to weave was still there.

All the fin area on top, or all the fin area below—neither appears to be a *major* factor affecting towline instability. Yet some models are sensitive in this respect. One small kit model in its original form was unstable on tow until the underfin was reduced in size until its area became almost negligible. With such a small change it became quite stable on the line. All the time we are coming up against these apparent contradictions!

Considered opinion now seems to be that when a model weaves on tow it is really the wings which are at fault, and in particular the wing tips. If one wing tip stalls, then the model will naturally veer off in that direction. At the same time the roll induced, for the model is still being pulled forwards on the line, may then result in the angle of attack of the other wing tip increasing to beyond the stalling point which now also stalls, just as the first wing tip is recovering, as it were. Back goes the model the other way, and so on.

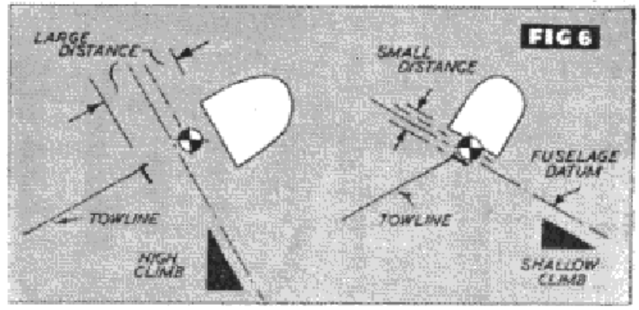
The same effect, but to a lesser extent, would be noticeable if the wing tips were heavy—inertia might build up a weaving motion against the corrective action of an otherwise properly proportioned model. Of the two, wing tip stalling would appear by far the most important factor.

How can this be prevented? Well, washing out the wing from root to tip would appear desirable, provided this was exactly the same on both wings. An asymmetric washout would have the effect of inducing a turn which would have to be corrected by other means. Whilst many modellers do still employ " offset " devices very successfully (such as towhooks offset to one side to counteract the turning effect, on tow, of a permanently offset rudder or trim tab), a perfectly symmetrical line up for a glider would appear by far to be the better practice. In other words, a model rigged and trimmed to fly dead straight. For circling free-flight one or other of the auto-rudder devices can then be employed.

A study of the actual flight path followed by a glider on tow both in still air and gusty weather lends support to the " wing tip stalling " theory. In still air, for example, although the climbing angle of the model *relative to the ground* is quite high the actual angle of attack of the wings may remain quite low. Almost certainly at the beginning of the launch, if the model is towed fairly fast to get it under way, the angle of attack of the wings is quite small. As the model reaches the peak of its climb and slows up, the angle of attack probably increases until right at the top the model is virtually flying at the same angle of attack as in free-flight. If the model is trimmed to glide at minimum sinking speed, this angle will be quite near the stalling angle of the wing.

It is a fact that it is at the top of the climb where, to put it in an " Irish " way, a stable model is least stable. In other words, the higher the angle of attack of the wings under tow the greater the tendency for the model to become unstable. If the margin of stability is low, the model may actually become unstable and start to weave or fly off to one side. Bearing this in mind, look at Fig. 4, and see what happens when a model is towed up in gusty weather.

If the launcher is skilled he can adjust the towing speed of the model to approximately the same as that for " still air " conditions. He reduces the speed of tow by running towards the model. But there is not much he can do when a sudden horizontal gust



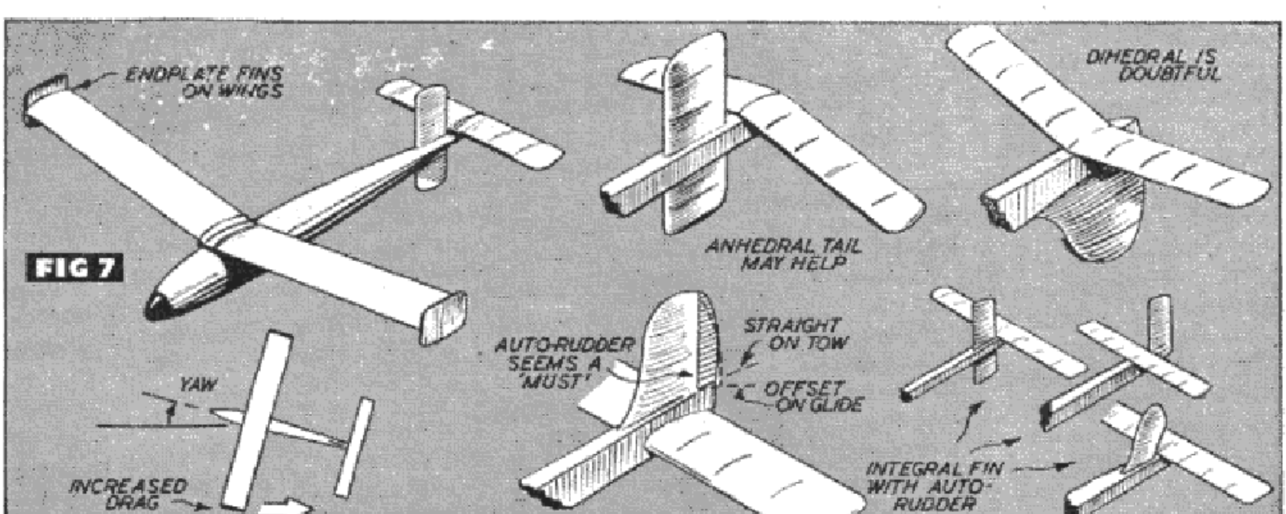
struck the model on the way up. This gust velocity, compounded with the normal towing velocity of the model may produce a new airstream direction over the model which corresponds to a very high angle of attack, even beyond the stalling point. The odds are that the wing tips will stall first and we have the right conditions set up for a weave.

There are at least two things that can be done to combat " gust stalling." In the first place, if possible, we could lay out our design so that if the angle of attack is suddenly increased the whole wing stalls together and the model does *not* dip or roll off to one side. But that in itself is a major design problem.

The other is to reduce the *angle* of climb so that the *effect* of a sudden gust is less marked. In other words, make the model go up on the towline more on a level keel as in Fig. 5, rather than in a near-vertical climbing attitude. One way of doing this is to move the tow hook position forwards—but this may mean loss of final height and, as we have previously seen, moving the tow hook forward may itself be an unstabilising feature.

Have we any other solution? Well, there is one we might try. One of the ways to get a model to climb steeply on tow is to locate the tow hook well below the centre of gravity, or the wings (Fig. 6). Conversely, if we raise the tow hook position up close to the centre of gravity and the wings the tendency to climb steeply should be reduced. This means a shallow fuselage or, at least, a short vertical

(*Continued on page* 91)



MODEL AIRCRAFT ENGINE TESTS

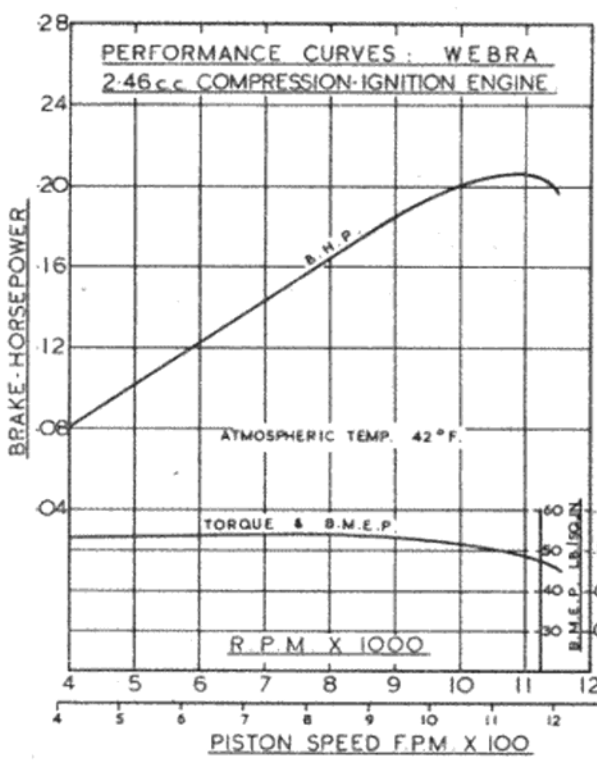
No. 44. The WEBRA 2.46 c.c.

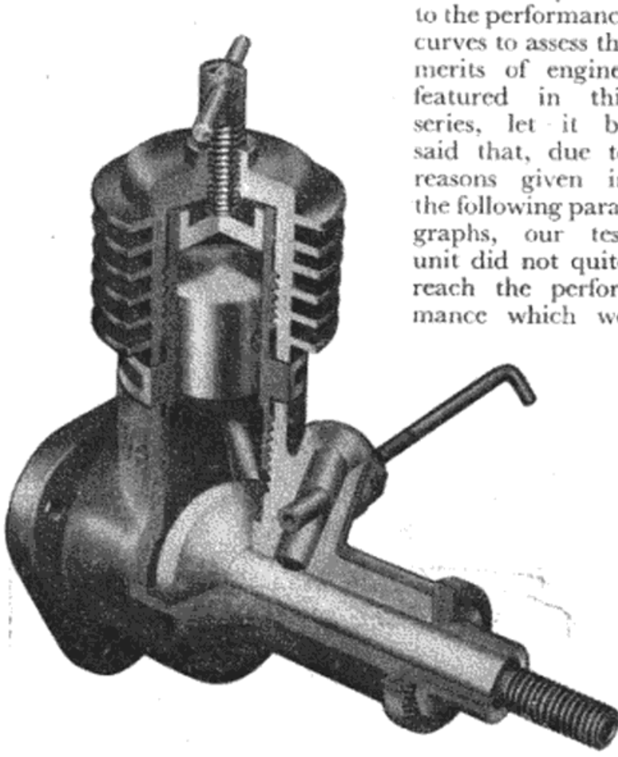
THROUGH the co-operation of the Berlin firm, Modell-Technik, we have been able to conduct a test on Germany's most popular model aircraft engine, the 2.46 c.c. Webra.

This is a diesel and follows the well-known "International" class formula of a shaft-valve, annular porting and light weight. The Webra is actually one of the lightest 2.5 c.c. diesels yet seen and, in consequence, has one of the highest power-to-weight ratios realised among F.A.I. Class "I" diesels.

Brief details of the Webra's history and of its place in German modelling activities have already been given in MODEL AIRCRAFT ("Accent on Power" —December, 1952) and this report will, therefore, concentrate mainly on the engine's actual performance and behaviour. Suffice it to say that the Webra is a neat and functional design with a general standard of casting and machining well up to expected European standards.

For the benefit of those who immediately look to the performance curves to assess the merits of engines featured in this series, let it be said that, due to reasons given in the following paragraphs, our test unit did not quite reach the performance which we feel that this design is capable of delivering. Therefore, too much should not be assumed from the fact that the Webra may only appear as of "average" performance according to the figures obtained from this single test example.





Specification

Type : Single-cylinder, air-cooled, two-cycle, compression-ignition. Induction via shaft-type rotary-valve with sub-piston supplementary air induction. Annular type exhaust and transfer porting with conical crown piston.

Swept volume : 2.463 c.c. (.1503 cu. in.).

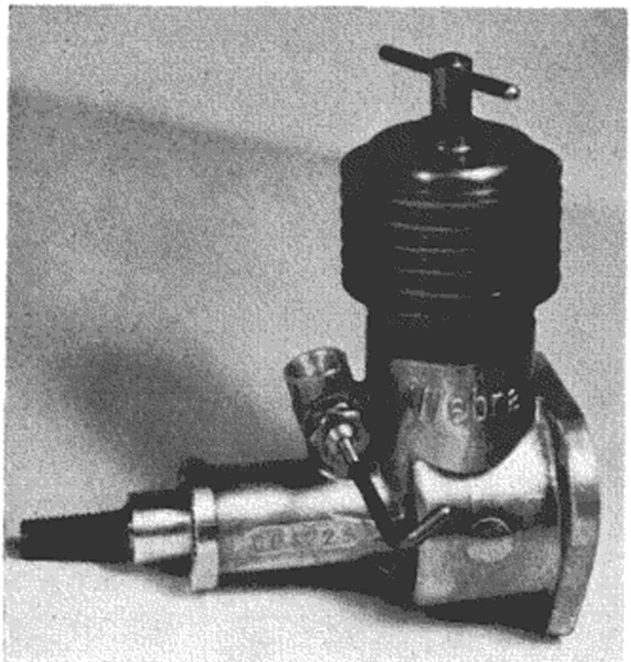
Bore : 14 mm. (.5512 in.) Stroke : 16 mm. (.6299 in.).

Compression-ratio : variable.

Stroke/Bore ratio : 1.143 : 1.

Weight : 3.6 oz.

General structural data : Pressure die-cast aluminium alloy crankcase with screw-in rear cover and



integral main bearing housing. Hardened steel cylinder-liner, threaded into crankcase. Machined aluminium alloy cylinder-barrel, anodised and threaded on to cylinder-liner. Hardened steel crankshaft with full disc type web. Cast-iron, lapped piston with gudgeon-pin pressed in. Cast-iron contra-piston. Spray-bar type needle-valve with brass body. Dural prop. drive collet fitted on crankshaft taper. 3-point bulkhead type mounting lugs.

Test Engine Data

Running time logged prior to test : 1 hour.

Fuel used : Mercury No. 8 (castor base).

Performance

In general, all engines to this popular formula, i.e., 2.5 c.c., annular port, shaft valve, respond to much the same starting technique and the Webra is no exception. It starts very easily, hot or cold, and is not at all critical. With the needle-valve set in the running position—1¼ turns open on the test engine—the Webra will start after a couple of choked flicks. When starting up from cold for the first time, about five choked flicks were used. At no time was it found necessary to prime through the exhaust ports, although this method can, of course, be used if preferred.

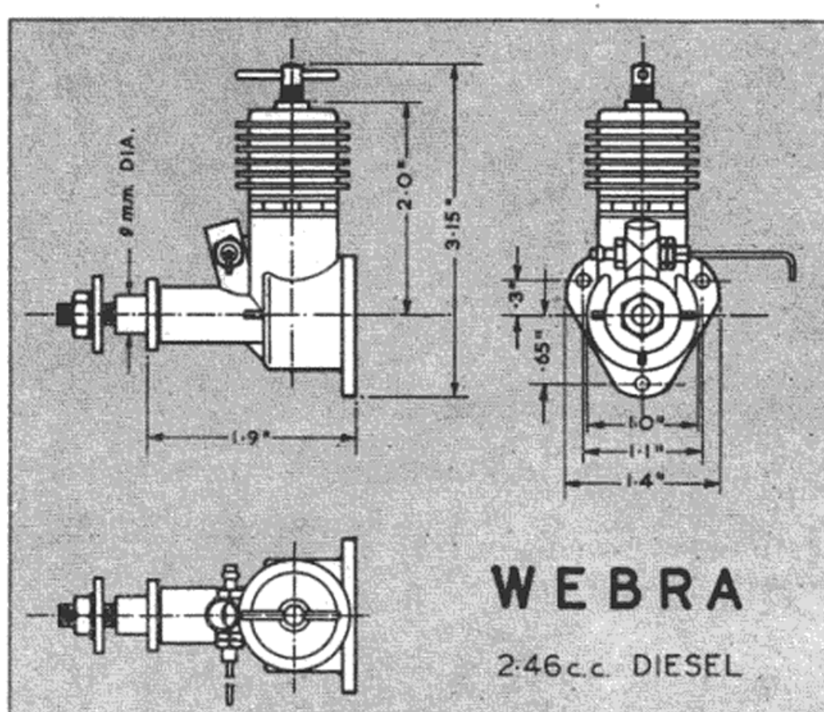
It was not stated how long the test unit had been run before reaching our hands and a check run-in period of one hour was given before the test. From this, the engine seemed to be reasonably well run-in and ready for high-speed runs: it held even speeds under load and power loss when hot was only very slight.

However, our test engine did have one unfortunate fault. This appeared to be due to the cylinder not having been lapped out quite parallel, resulting in a tendency for the piston to tighten towards top-dead-centre and in an extremely tight contra-piston. This complicated the tests somewhat. As expected, the added frictional loss due to tightness at the top of the stroke resulted in a lower torque being developed than that indicated by the makers' performance figures, although, surprisingly, torque was still good and would therefore indicate that the Webra is actually capable of above average performance in this respect. We would, in consequence, judge the makers' claim of .22/.23 b.h.p. at 11,000/12,000 r.p.m. to be a fair one.

Due to the tightness of the contra-piston, it was necessary, when altering compression to suit load, to make each readjustment towards the critical setting by *increasing* compression only, and not by backing off from excess compression. This difficulty has, of course, been experienced with other engines and was disclosed in a recent test of a British ½ c.c. diesel. Once the engine was running, the contra-piston would not return when the compression-screw was released and, when hot, it also became difficult to increase compression.

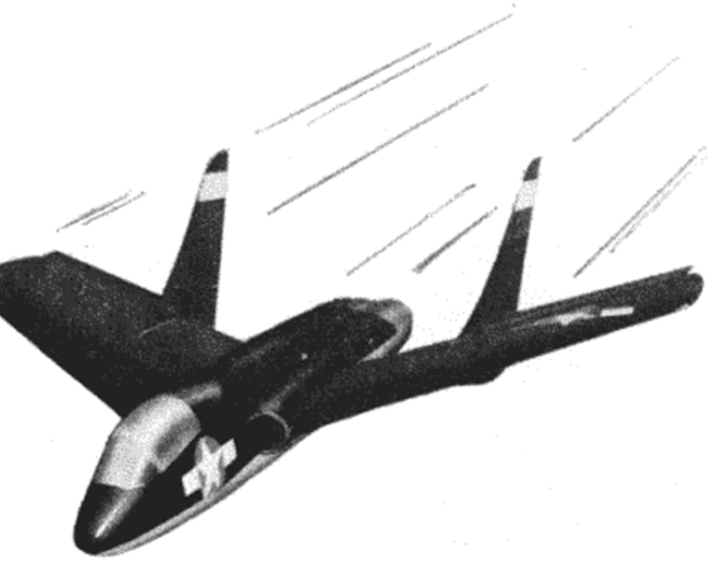
In all fairness to the manufacturers of the Webra, however, we must emphasise that the difficulty we encountered with our test unit is not likely to be generally experienced. We mention it because it is

(*Continued on page* 80)



VOUGHT F7U-1 Cutlass

BY A. E. HATFULL



THE *Cutlass* is the U.S. Navy's first tailless twin-jet fighter and although rather large for duty as a carrier based fighter it has been enthusiastically acclaimed by those who have sampled its flying qualities. Readers of the American magazine *Aero Digest* will no doubt have seen the comprehensive write-up on the *Cutlass*.

An important feature of the model *Cutlass* is the 2 deg. " toe-in " on each fin giving a drogue effect which contributes to directional stability.

Fuselage

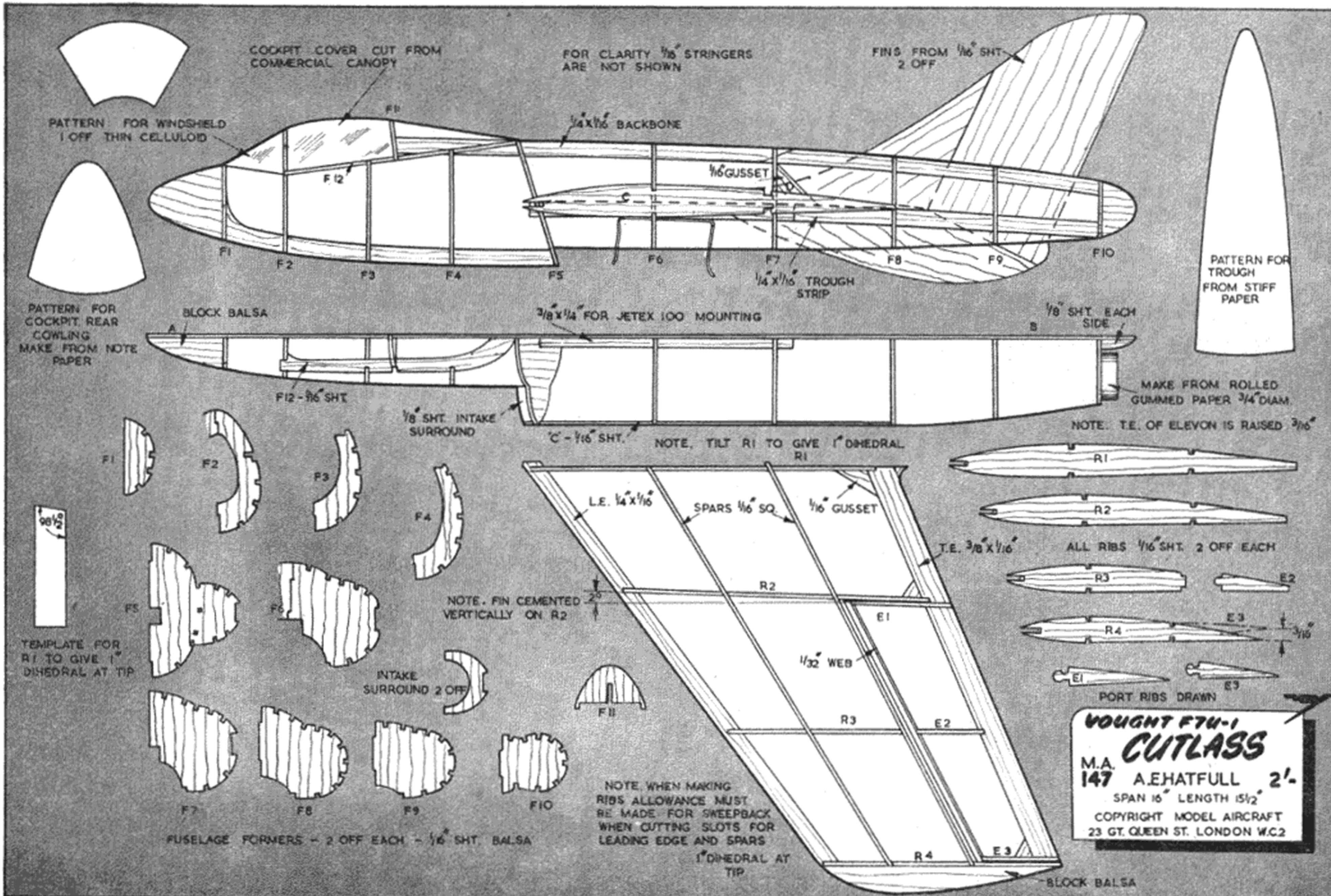
Pin pieces *A* and *B* to the plan. Note that *A* carries the nose block profile, and *B* carries the profile of the fairing between the twin jet orifices at the rear. Pin $\frac{1}{4}$ in. × $\frac{1}{16}$ in. " backbone " and " trough strip " pieces in place, cementing joins. Cement piece *D* in place on the trough strip. Cement half formers 1, 2, 5, 6, 7, 8, 9 and 10 perfectly upright over their positions on the plan. Add piece 12, which forms the cockpit cover base, then cement formers 3 and 4 in place. Cement piece *C* into the notches in formers 5 and 6, 7 and 8. Cement the $\frac{1}{16}$ in. square stringers into the notches in the formers. Remove this side from plan when dry, and cement the opposite side formers and stringers, etc., in position. Add former 11. Cement the piece of $\frac{3}{8}$ in. × $\frac{1}{4}$ in. balsa into the slots in formers 5, 6 and the recess formed by piece *D* and former 7. Add the noseblock in two halves and also the pieces of $\frac{1}{8}$-in. sheet on each side of *B* at the rear. From a commercial " bubble cover " cut the centre portion of the cockpit cover, add the windscreen cut from celluloid to the pattern shown, and the rear fairing cut from notepaper to the pattern shown. Cement the notepaper trough pattern in place in the recesses in formers 7, 8 and 9. The original model required the addition of a small amount of nose weight; this may be avoided (to advantage) by filling in with $\frac{1}{16}$-in. sheet between stringers and between formers 1 and 2. Cement and screw the Jetex " 100 " clip in the position shown. Add the $\frac{1}{8}$-in. sheet surround to the air intakes on former 5 (each side) and sand off the corners. Sand off all former protrusions and rough corners on the stringers, etc. Tissue cover the fuselage using " bands " of tissue wrapping around the fuselage, one former bay at a time. Water shrink and clear dope.

Wings

Pin the lower spars in place on the plan. Cement the ribs in place, tilt rib *R1* to give 1 in. dihedral where shown when assembled to the fuselage. Note the angular offset of *R2* which forms a base for the fins. Cement the $\frac{1}{4}$-in. × $\frac{1}{16}$-in. L.E. into the rib slots. Add the top spars. Note the L.E. and rear spars are left protruding to fit into piece *C* of the fuselage. Build the elevons in place while the wing is still pinned down, this ensures a good fit. " Web " the elevon spars as indicated with 1/32-in. sheet. Remove the wings from plan, separate the elevons. Add the block balsa tips, gussets, etc., then sand wings smooth all over. Tissue cover the wings and elevons separately. Water shrink and clear dope. Cut out the fins as indicated (multi direction grain avoids twisting) sand smooth and free from saw marks, clear dope and sand smooth again. Cement the elevons *lightly* (for adjustment) in place with their T.E.'s raised $\frac{3}{16}$ in. (as shown) from the T.E.'s of the wing rib *R4*. Carefully assemble the wings to pieces *C* on the fuselage, cement the fins directly over the ribs *R2* (above and below), check the fins are vertical in the front view, and that they are flush to the inner faces of *E1*. Midnight blue being unobtainable in dope the original was " doped " with Belco brushing cellulose.

Flying

Test glide the model with the Jetex " 100 " loaded. Use plasticine to obviate dive or stall. If you notice a *pronounced* tendency to turn in either direction it is hardly likely to be the fins, so check this out on the elevons. A truer picture of the model's condition of trim will be found if it is launched from a hill top. Take care to balance the model in a lateral direction as well as longitudinally as it is important with block balsa wing tips that balance is obtained. When the glide is straight and fast, light the blue touch paper, etc. Incidentally, a strip rubber catapult launch (as solid glider practice) has proved far superior to hand launching for these scale jet fighters.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT, 19-20, NOEL STREET, LONDON, W.1, 2s. 0d., POST FREE.

Trimming for flight

BEFORE a newly completed model is flown, there is a certain amount of checking and adjustment to be done. This is quite a simple matter and need not take very long.

It is, nevertheless, of the utmost importance and may mean the difference between your model proving to be a successful flier and its being totally unstable—perhaps to the extent of being badly damaged in a resulting crash.

The whole secret of stability, which is the essence of satisfactory flight, is in the proper balance of the model and correct alignment of the wings and tail. Few readers will want to go into the intricacies of aerodynamics at this stage —most will be anxious to try out their newly-built models—so we will avoid purely theoretical considerations and concentrate on the model itself and explaining the practical applications of simple aerodynamics only where this is absolutely essential.

The MA Beginners Course Part 7

Taking the *Gnome* fuselage, we observe, if we look at it in side view, that the wing and tail platforms are set on the fuselage at different angles (see Fig. 1). The tail, it will be seen, is parallel with the top of the fuselage-boom, whereas the wing platform is inclined very slightly upwards towards the front, so that the underside of the wing is tilted at a small angle to the airstream when the model is in flight.

This is one of the elementary rules of rigging an aeroplane for flight. The wing is always inclined at a positive angle to a line drawn parallel with the tailplane, and the angle between them is called the longitudinal dihedral angle.*

If, therefore, we draw two lines, corresponding to the angles of the wing and tail (Fig. 2), and then measure the angle of their intersection with a protractor (Fig. 3), we shall be able to check that we have the necessary longitudinal dihedral.

On the *Gnome*, this found to be 4 deg., which is enough to ensure an adequate reserve of longitudinal stability. Generally, 2 deg. is considered to be the safe minimum.

* Strictly speaking, this is an over-simplification of the case since it is possible, in certain cases, to rig the tailplane and wing at the same angle and still produce stable flight, but this is extremely rare with free-flight model aircraft and need not bother us here.

Usually the respective angles of the mainplane and tailplane, incidence- or rigging-angles, as they are called, are marked against a common datum or centre-line on the side elevation of the aircraft. The wing may be rigged at a positive angle (i.e. with the leading edge higher than the trailing-edge as on the *Gnome*), which is usual, or it may be rigged parallel with the datum line. In the case of a wing being rigged at zero, or only a very small positive angle, the tail will usually be at a negative angle, thus preserving the all-important longitudinal dihedral angle.

With the *Gnome*, we have chosen the top of the fuselage boom as our datum line. Thus, the tailplane is at zero degrees incidence and the wing at 4 deg. positive incidence.

Now, the amount of lifting force which a flying surface will give depends on its size, the angle at which it meets the air, the aerofoil-section used and the speed at which it is pulled through the air.

Therefore, since the wing is invariably bigger than the tailplane and is inclined at a greater incidence angle, it follows that the wing will generate much more lift than the tail.

This means that the front end of the aircraft will tend to rear up, and, to balance out this condition, we simply add a certain amount of weight to the nose. Actually, what we do is to bring the centre-of-gravity forward. All flight movements have the centre-of-gravity as their axis and, technically, what happens is that we shift the centre-of-gravity (c.g.) forward, until the moment-arm, or lever, through which the wing operates, is reduced to a point where it is balanced out by the much longer moment-arm through which the tailplane operates and which multiplies its effectiveness.

This may mean that the wing is producing lift which is centred slightly ahead of the c.g. and is being balanced by tail lift. Alternatively, the wing lift may be behind the c.g. and the consequent nose-down, or diving tendency, counteracted by a negative or down-load on the tailplane by reason of a negative rigging angle.

This is purely a matter of relative c.g. positions and tailplane angles : a forward c.g. requires a negative tail setting while a rearward c.g. requires a positive setting. Generally speaking, full-size aircraft tend towards forward c.g. locations while model aircraft more commonly use a more rearward c.g.—hence the use of larger tailplanes on models.

The c.g. position is generally referred to relative to the chord of the wing. A "25 per cent. c.g." means that the balance-point lies one-quarter of the chord from the leading-edge. A "100 per cent. c.g." means that the centre-of-gravity is located at the extreme trailing-edge. These figures, incidentally, may be regarded as the upper and lower limits for model aircraft.

The *Gnome* should balance at the one-third chord point—i.e. a 33-1/3 per cent. c.g.

No less important than the correct rigging angles and location of the centre-of-gravity are the alignment of the wing and tail surfaces and their freedom from warps.

The first thing to do is to check the tailplane for warps. Hold the unit in both hands at arm's length with the trailing edge towards you. By lowering the leading edge slightly, you can sight across the chord and note whether the trailing edge is precisely parallel with the leading edge (Fig. 5).

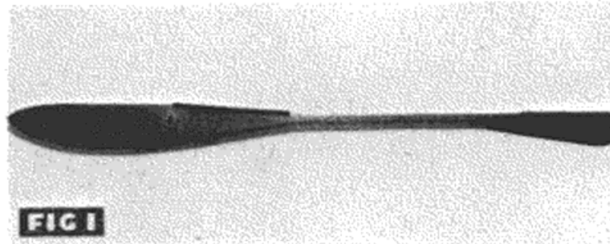
A great deal of trouble can be caused by warped surfaces. Do not tolerate them.

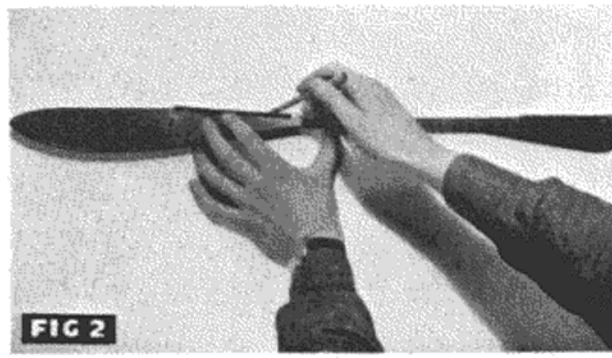
If you built and covered your wing and tail properly and pinned them down after doping, you should not have any serious warps. Of the two, the tailplane is the most likely to warp because, being of a thinner section and lighter construction, it is less rigid than the wing.

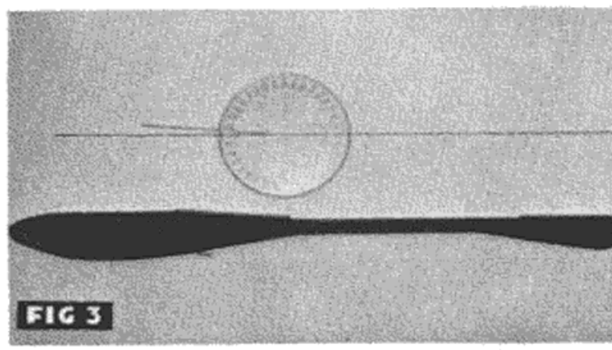
If you find, however, that the wing or tailplane has warped so that one side is at a different incidence angle from the other, you can correct them quite simple as follows.

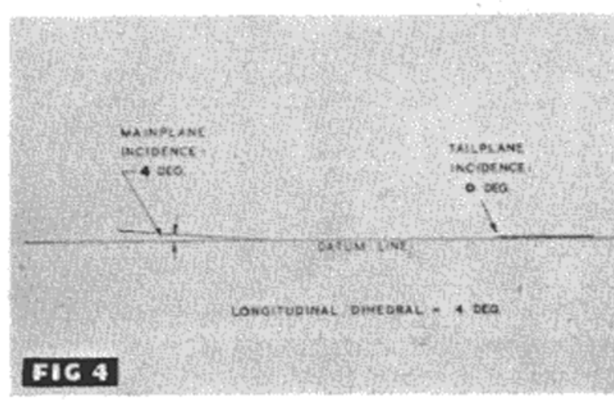
Hold the unit comfortably in front of you with both hands across the chord and positioned at each end of the section to be straightened. Exert just sufficient twisting action to bring the surface back into alignment, plus a fraction in the opposite direction. Now hold it thus in front of an electric radiator, or over an oil stove or similar heating apparatus, for about 20 or 30 seconds so that the whole section becomes slightly warmed. Then, still holding it set, transfer the surface to a cool part of the room for a minute or two. Upon release, it will be found that the offending warp has been effectively removed. You will soon find it quite easy to re-set surfaces true by this simple method.

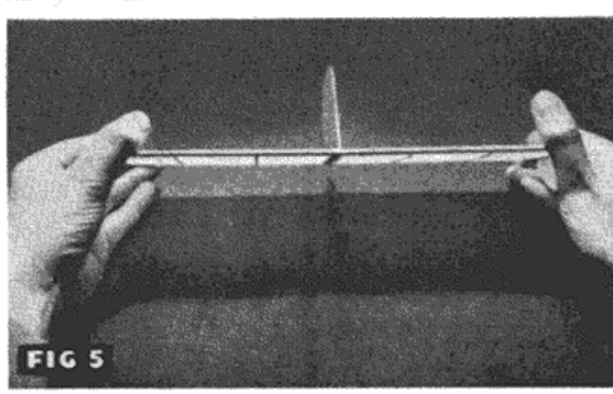
When checking wings, it should be noted that a slight warp at the tips is sometimes permissible. It is not unusual to find that the designer specifies











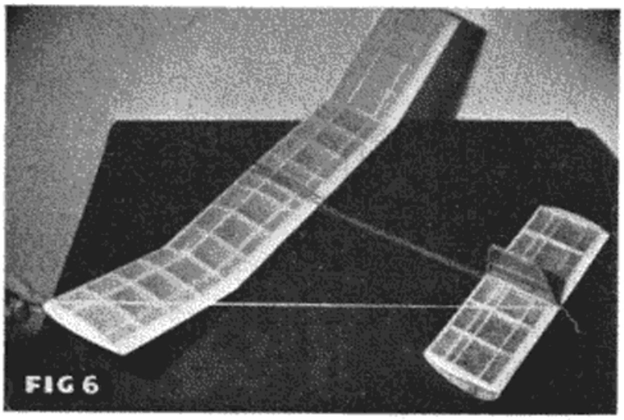
1. Side view of the "Gnome" fuselage showing the respective angles of the wing and tail platforms.

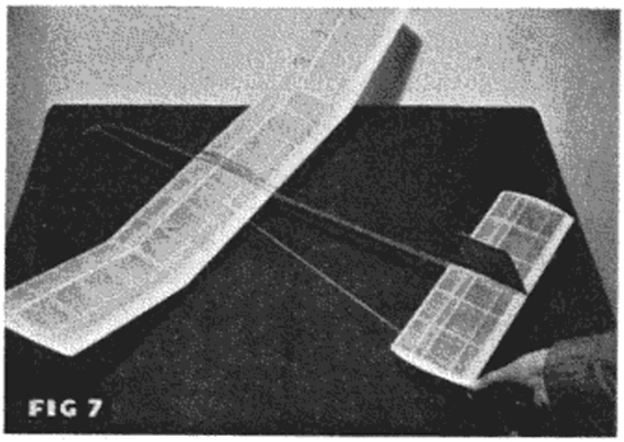
2. Checking the incidence angles : Stage 1, marking off the wing and tail angles.

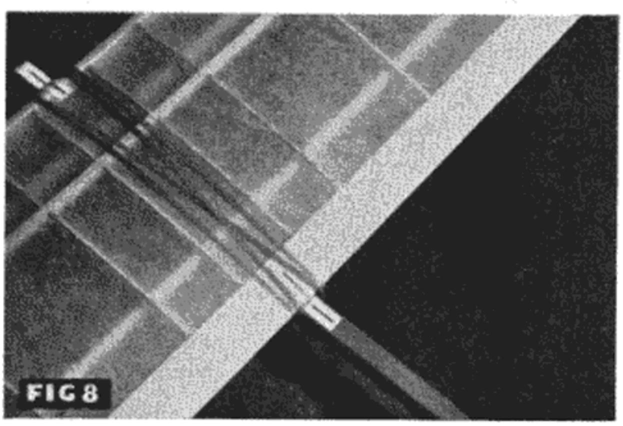
3. Stage 2, checking the mainplane angle by means of a protractor.

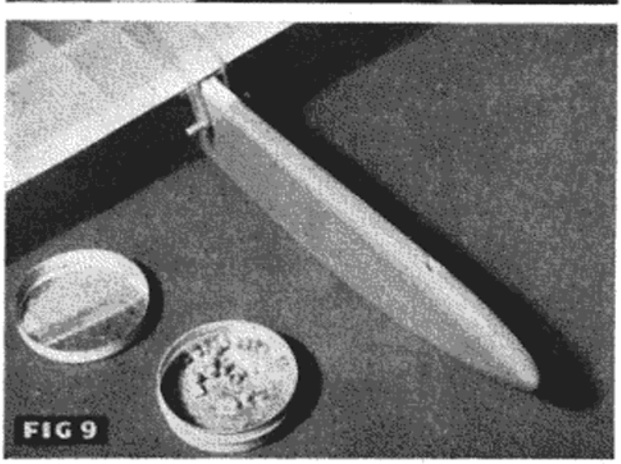
4. Stage 3, the longitudinal line-up of the "Gnome," which gives a longitudinal dihedral of 4 degrees.

5. Checking the tailplane for warps.









"wash-out" at the wing tips. This means that the wing panel is twisted slightly so that the extreme tips are, perhaps, one degree less incidence than the centre section. Therefore, if your wings have a very slight negative twist towards the tips, and provided that the twist is equal in both wings, you need not bother too much about this. Do not, however, allow "wash-in" (i.e. increased angle of incidence at the tips) unless the plans specify this.

The next thing to do is to check the alignment of the wing and tail on the fuselage. First make sure that they are level on the fuselage—that is, that one side is not lower than the other—and that the wing and tail are in alignment with one another. The quickest way to check the latter is to hold the model at arm's length with the tail towards you so that it can be lined up with the wing.

Now make sure that the wing and tail are at right-angles to the centre-line of the fuselage in plan view. The simplest way of checking this is by means of a piece of thread attached to a pin. First push the pin into the end of the tailboom and measure the distance to a convenient point on the wing tip. Check this against the same point on the other wing tip, making sure that the wing is centred on the fuselage, and swivel the wing on its mounting until both measurements are identical (Fig. 6.)

The same method is used for aligning the tailplane. In this case, of course, the pin is pushed into the nose of the fuselage (Fig. 7).

To enable these settings to be kept, it is a good idea to mark the wing with suitable centring lines as shown in Fig. 8. The tail can be similarly dealt with, although, when vertical fins are fitted to the tailplane (as on the *Gnome*) a better method is to "key" the tail-unit on to the fuselage so that it cannot move and upset directional trim.

The easiest way of doing this is to cement four small pieces of $\frac{1}{16}$ in. sq. balsa on the underside of the tailplane so that they will butt against the edges of the tail platform, front and back, on either side. Keying on both tailplane and mainplane, incidentally, is considered essential for power-duration type models.

Flying surfaces are usually held on to the fuselage with rubber bands, which form an effectively firm, yet shock-absorbent method of attachment. Make sure that you have sufficient rubber to prevent the wing or tail from lifting during flight and remember that strong bands, lightly stretched, are better than thin bands stretched to their limit.

The final stage of getting a glider ready for flight is ballasting. Lead shot is generally the most convenient form of ballast. Feed the shot into the ballast-box until the model balances at the designed balance point (Fig. 10). Don't risk upsetting trim

---

6. Checking wing alignment by means of a piece of thread.

7. Checking tailplane alignment.

8. Indian-ink centre-marks ensure accurate assembly of wing on fuselage.

9. Lead shot is a convenient form of ballast for gliders.

by leaving the ballast-box unsealed so that the shot can find its way out again ; seal the hole with a small strip of cellulose tape.

Flying a simple glider is easy but we are not out of the wood yet, so try to pick a calm day for your first flight and a suitable site free from any sort of obstruction.

Hold the model slightly behind the balance point, with the nose into wind and pointing downwards very slightly. Do not point the nose skywards.

One does not need to run with a model of the *Gnome's* size and weight, but don't just flick it into the air. Launch as smoothly as you can, letting go of the fuselage as your arm is extended to its fullest extent, and with a " follow-through " action.

The model should glide gently down on an even keel. If it should veer off to left or right, look again for the warps we have been talking about and check the fin alignment. If necessary, use the rubber tab to counteract any turn.

It is difficult to say how far the model should glide, since this depends on the strength of any wind present. An almost imperceptible air movement will shorten the distance, but in conditions of dead still air, a good model should touch-down up to ten or a dozen yards away when launched from five or six feet.

If you can launch from a slight slope, so much the better. This will give a longer flight that will give you a better opportunity to check adjustments.

If the model stalls, i.e. raises its nose, slows up and then dives, this may be due to you having launched it too fast, or to the wind being too strong, or to a little of each. Therefore check this again before making any adjustment.

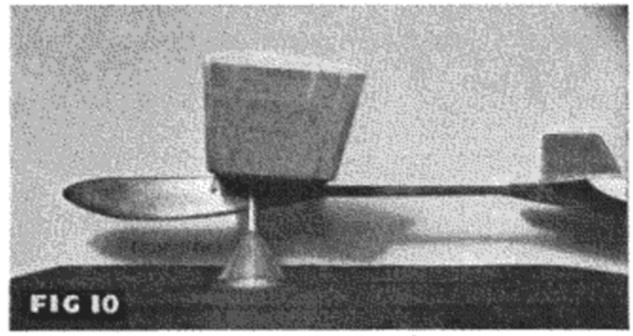
If the model continues to stall, you can do one of two things : add more ballast or pack up the leading-edge of the tailplane. As we have seen, the *Gnome* has ample reserve longitudinal dihedral, so it is permissible, with this model, to pack up the leading-edge of the tail $\frac{1}{16}$ in. or so with a strip of balsa.

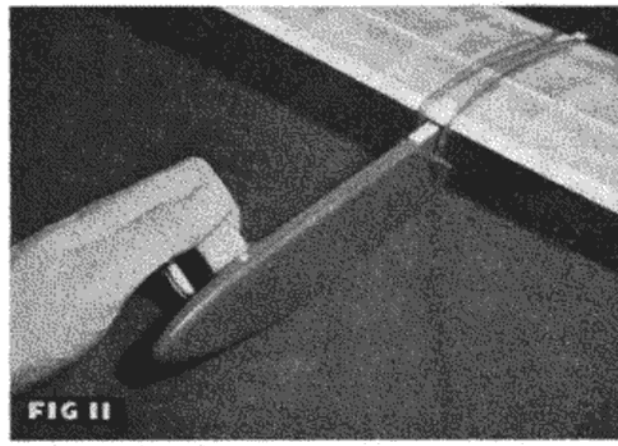
Should the model dive, take out some of the ballast—just a few shot at a time—until the model just begins to stall. Then stop.

Two courses are now open to you. Either you may replace just sufficient ballast to iron out the slight stall (which is the best method if you are going to confine your flights to hand-launching and slope-soaring) or you may adopt the contest-fliers' method of setting the rudder tab to give a slight turn (this being the more popular for towline-launched flights). The turn will automatically dispose of the slight stall and the model will be flying very close to its minimum sinking speed, which is what we all aim at.

From this point onward, avoid changing the trim.

This is enough to digest at one sitting. We will deal with the adjustments which follow on from this point, for two-line launching and powered models, in a later article.





10. When correctly ballasted, the " Gnome " balances at the 1/3rd chord point.

11. Sealing the ballast-box with cellulose tape.

SLOTTED PROPS

Some suggestions by **A. M. Colbridge**

SOME sixteen years ago the now defunct *Model Aeroplane Constructor* announced the discovery of a "revolutionary design feature for propellers." That was all, no further clue as to what it might be. A little later it transpired that it was a slotted propeller for which a much higher efficiency was claimed than common to an ordinary propeller. Perhaps the most pertinent comment at the time was "that cutting holes in propellers was by no means a new thing."

It was about the same period, older modellers may remember, that one of Zaic's original "Year-books" carried a plan of a Wakefield with return gears. Well, the re-discovery of the return gear system has been one of the main features of modern Wakefield flying. Perhaps the contemporary idea of a slotted propeller was pretty good, too.

Fig. 1 analyses the normal "working conditions" of a propeller. It need not be a rubber model propeller. All "power driven" models utilising a propeller to generate thrust must operate on the same principle. For convenience we will take a rubber model with a propeller of, say, 16 in. diameter and 24 in. pitch. Its average "operating speed" is 10 revs. per second, which is a fair figure for most rubber models.

As most modellers are aware a propeller never advances its full pitch distance per revolution under working conditions. In other words, there is a certain amount of slip in air and the actual pitch is that much less than the true or geometric pitch. Thus instead of advancing 24 in. every revolution the propeller advances, say, 19 in. A simple geometric construction will then show us that the working angle of attack of the blades of that propeller is 7 deg. approximately.

If the model noses up into a stall it will lose flying speed. In other words, even if the propeller r.p.m. stays the same, the rate of advance *of the whole model* will be less. As far as the propeller is concerned this means that there is more slip and an increase in the working angle of attack. Fig. 2 analyses this particular example.

Instead of a working angle of attack of some 7 deg. the actual angle of attack of the propeller blades is now 18 deg., assuming that the "advance per revolution" has dropped from 19 in. to 12 in. This will be well beyond the stalling angle of the propeller blades, so two things will happen.

Since the propeller blades are now stalled they will not be generating so much thrust. At the same time they will be generating a lot more drag, tending to slow up the rate of revolution and thus further decrease the thrust. As a consequence the model loses thrust just when it needs it most—to pull it forward and out of that nose-up attitude.

The more you think about it the stronger the argument in favour of at least *trying out* propellers with systems to delay the stall. The generally accepted method of increasing the stalling angle of an aerofoil (and propeller blades work like aerofoils) is to fit slots. If the blade shape of the normal propeller is usually elliptic in outline, this presents no special difficulties. Letter-box slots are used, cut in the blade itself about one-fifth of the chord back from the leading edge and curving to conform to the shape of the leading edge. These slots should be raked back at an angle of about 40 deg., as shown in Fig. 3.

With parallel chord propeller blades a system giving better control of the actual layout would consist of fixed slats mounted just ahead and slightly below the leading edge of the propeller blade. It might be a little difficult to obtain the necessary curve

FIG 1

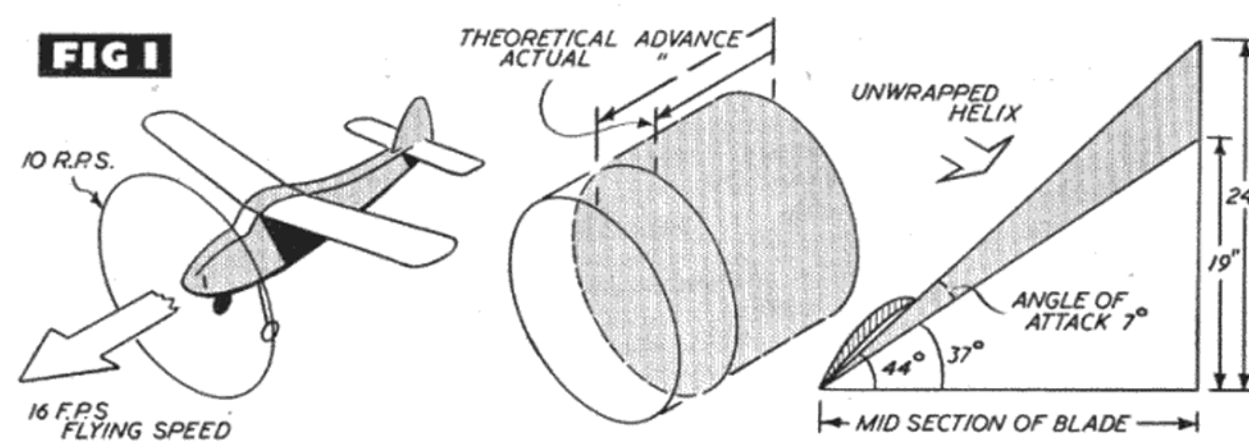
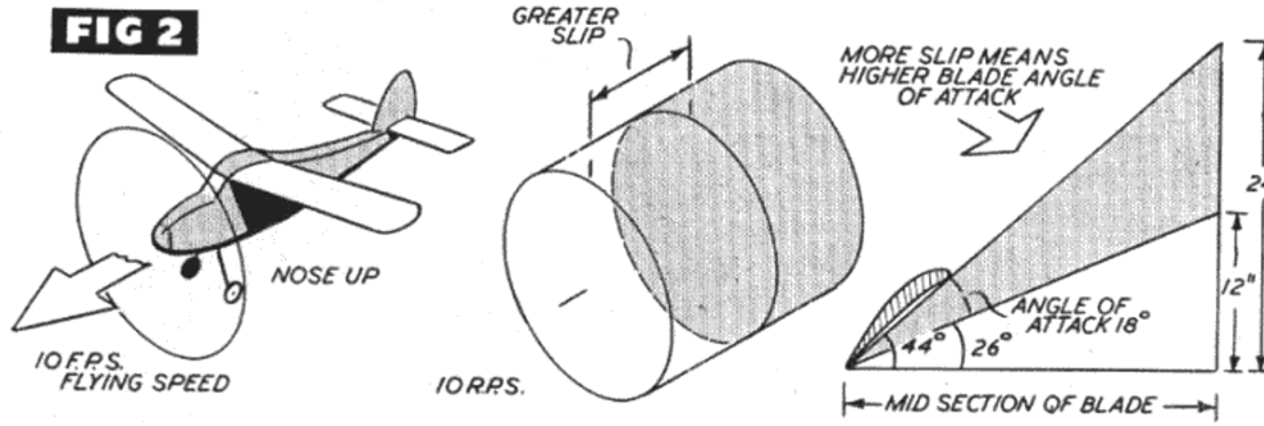


FIG 2



but certainly not impossible. The main disadvantage of fixed slats of this type would be their vulnerability as compared with the letter-box type.

Perhaps, however, a turbulator strip would do the same job as a slot, and be far more convenient to arrange. A 1/32 sq. strip just behind the leading edge of the blade may well increase the stalling angle of that blade by several degrees—enough to stop the blade from stalling when the model loses flying speed momentarily and it is in the lap of the gods whether it stalls or recovers. Turbulators may well *ensure* recovery from such a temporary upset. After all, they work quite well on model wings. If authorities differ as to their possible merits in increasing wing efficiency, most will agree that they definitely increase the stalling angle of any wing section. There is no reason why they should not do the same to a propeller blade section.

Slotted propellers are worth the experiment. There may be something new to learn here. A slotted propeller may make it possible to use higher pitches on contest models, increasing the length of the power run and using the latter part of the power run more effectively. On power models they may be part of the answer, at least, to models " hanging on the prop " without climbing appreciably.

If you are thinking of trying them, however, make sure that you try the experiment on a model which is already properly trimmed. A slotted propeller will not save a model which was over-elevated and going to stall anyway. But it may make it possible to trim models much nearer their stalling angle under power with a consequent increase in overall performance.

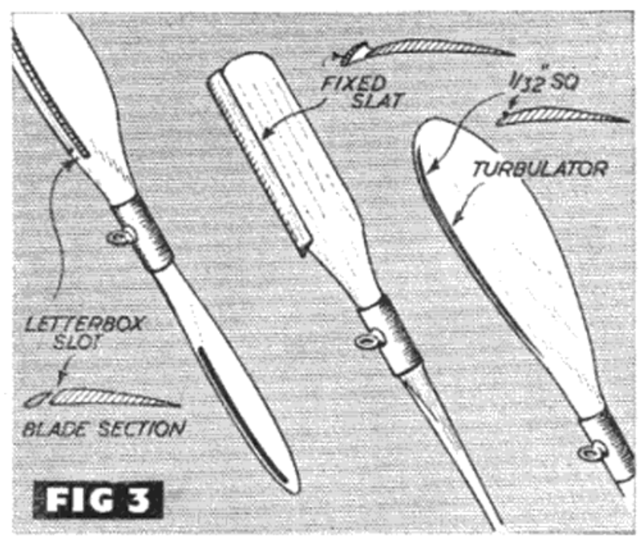
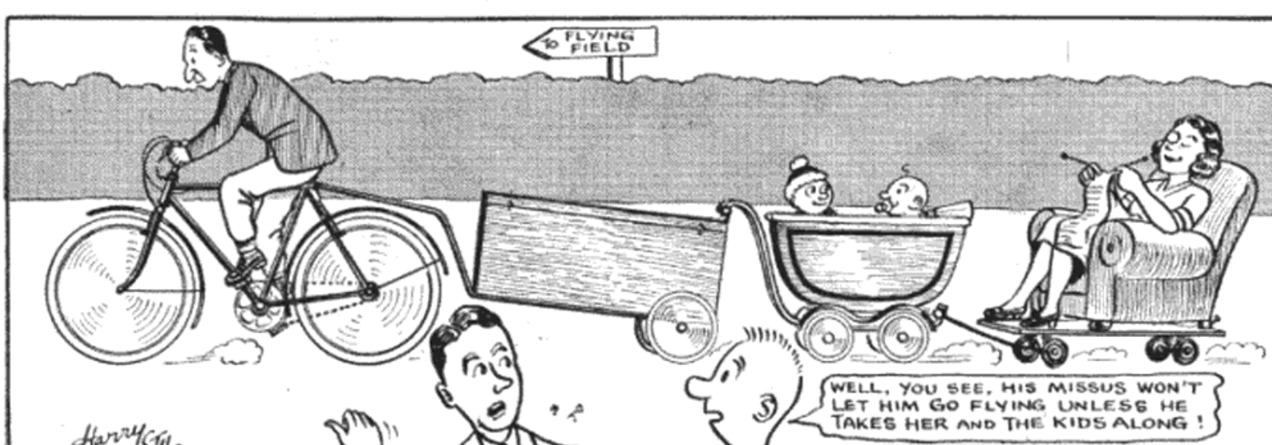
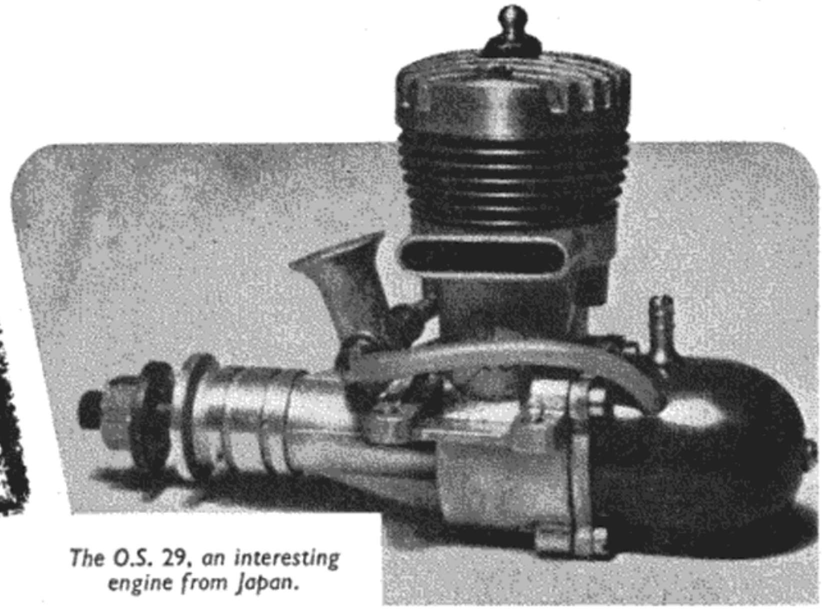


FIG 3

STRANGE BUT (ALMOST) TRUE By Harry Stil



World Tour



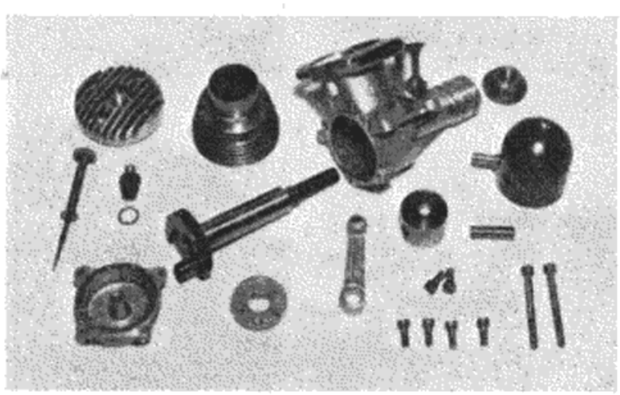
The O.S. 29, an interesting engine from Japan.

ACCENT ON POWER
By
P. G. F. CHINN

FROM time to time we hear of model aircraft engines being built in Japan. Various types and sizes have appeared, mainly of the glowplug type and bearing, not surprisingly, some resemblance to post-war American designs.

Few of these, however, have been seen outside Japan itself and so it was with considerable interest that the writer availed himself of a recent offer to sample what is one of the leading Japanese model aircraft engines, the O.S.29. For this kind offer we have to thank S. A. C. Brian Fairey, R.A.F., who obtained the engine through an American friend stationed in Japan.

Since the Japanese have a great reputation for being able to copy Western ideas—even to an occasional trade-mark thrown in for good measure and to cause confusion in the export markets—one might be forgiven for suspecting that all their model engines would bear strong resemblance to successful European or American products. After all, some Western manufacturers have made little attempt to disguise the fact that newly introduced models are closely based on some already successful (usually American) design.



Component parts of the Japanese O.S. 29 glow-plug engine.

It is all the more surprising, therefore, to find that the O.S.29 cannot, by any stretch of the imagination, be called a " copy " of any known production model engine. Certain features found in current models it does have, but this is inevitable for, if we are going to split hairs, there is not a single model engine on the market which does not owe something to a previous design. While there is nothing entirely original in any of the O.S.29's design and constructional features when taken individually, they do add up to something which is not readily identifiable with any other production design.

Briefly, the O.S.29 is a shaft-valve 5 c.c. glowplug engine with annular porting. This, in itself, is unusual. Most 5 c.c. glowplug engines are of the simple loop-scavenged type with exhaust and transfer ports on opposite sides of the cylinder and an assymmetric baffle piston. 360-deg. porting, although largely originating in the U.S.A., is not found at all on any 5 c.c., or larger, engine in that country—in fact the largest annular port American engine at the present time is the 2.45 c.c. Cub .14.

In Europe, this type of porting has been used on one or two larger engines, notably the French Micron " 10 " and " 28 " model and the British Yulon " 30," " 29 " and " 49 " engines. The actual cylinder ports on the O.S.29, however, are not in the form of small circular holes as on these French and British marques; instead they take the form of slots, similar to those of the Miles 5 c.c. disc-valve diesel and E.D. 2.46.

As can be seen from the photograph, the O.S.29 is of attractive appearance. The big aluminium head is deeply finned and the cylinder cooling fins, which are integral with the cylinder, are neatly tapered.

The main casting, which comprises the crankcase and main bearing housing, is quite clean and has integral twin exhaust tracts and transfer passages. The beam type mounting lugs might not, perhaps, stand up to a bad crack-up so well as some, but there is a machined section at the front of the bearing housing by which extra support can be given.

The cylinder is actually held down by two long machine-screws only. These pass through the head and fins and thread into the crankcase fore and aft. Although three, or four, screws is now a more common method of attaching cylinder assemblies, two screws have been previously on engines of similar capacity. Two extra screws secure the head to the cylinder.

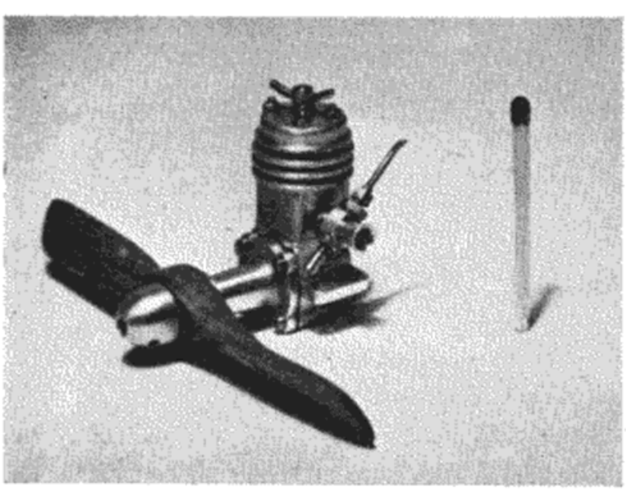
The crankshaft is of the counterbalanced type and has an 11 mm. journal, 42 mm. long. The bronze main bearing in which it runs was not especially good on the engine we inspected, but there is adequate bearing surface area. There is a good, strong connecting-rod which is bushed at the lower end.

The piston is of the lapped type with a slight conical crown. On the test example a small blow-hole was detected in the lower part of the skirt. A full floating gudgeon-pin is used. Bore is 19 mm. and the piston strokes 17 mm. giving 4.82 c.c. or .294 cu. in.

The cylinder ports are identical except that the exhaust are slightly deeper than the transfer. There are actually four ports to each—exhaust and transfer—but located so that they are in very closely spaced pairs, left and right and separated, front and back, by about $\frac{5}{16}$ in. There is, of course, a flange separating transfer and exhaust which seals the top of the transfer passages. The passages are not full 360-deg. as on, for example, the E.D. 2.46, but comprise two large volume side passages which widen out to almost encircle the cylinder at the top.

The crankcase rear cover is attached with four screws and has a lug in the centre which is tapped to receive the tank retaining screw. The tank is in light gauge aluminium and coloured red.

The "Sun" glowplug fitted is very similar to the original Arden plug and the complete motor weighs $7\frac{1}{4}$ oz. including tank. The O.S.29 is an easy starter and performance is comparable with most other "sport" type 5 c.c. engines. In Japan, speeds exceeding 100 m.p.h. have been claimed with O.S.29 powered speed models.



R. G. Cameron's tiny .145 c.c. diesel. It has a bore and stroke of $\frac{3}{16}$ in. x $\frac{5}{16}$ in.

Lately, Bill Atwood, pioneer American model engine designer and manufacturer, has begun importing O.S.29's for sale in the United States. They are listed at $14.95, which is the same price as the Dooling 29 and by no means undercuts United States built 5 c.c. engines. If the O.S.29 can be sold at such a price in direct competition with American products (and only a few people are likely to buy simply for the novelty of possessing a Japanese engine) there can be no better endorsement and the manufacturers should feel pleased with their effort.

The Cameron .15 c.c. Diesel

When model diesels first came on the scene, there were many subsequent attempts to produce smaller and smaller engines. 1 c.c. soon gave place to $\frac{1}{2}$ c.c. and $\frac{1}{2}$ c.c., in its turn, to $\frac{1}{4}$ c.c. One or two experimenters produced even smaller engines and, in Britain, the "K" Hawk of slightly less than 0.2 c.c. was in production for some time.

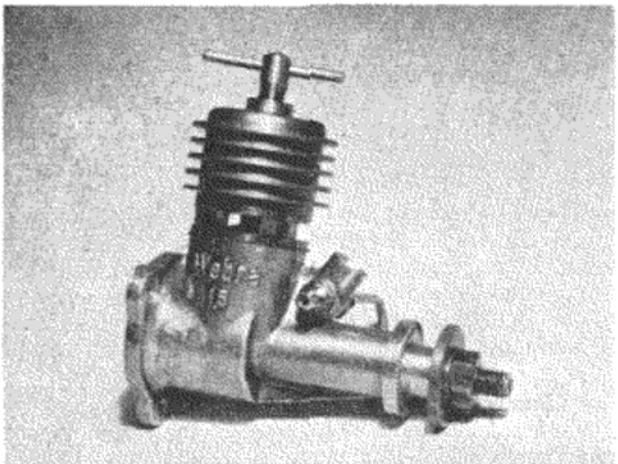
On the other side of the Atlantic, Ray Arden, whose Atom and Arden engines made model engine history, was building even smaller spark-ignition and glowplug motors, one of which had the almost unbelievably minute cylinder capacity of only one-fortieth of a c.c.

The smallest British engines to be put into regular production were the .2 c.c. "K" Hawk, already mentioned, and the .32 c.c. Kalper, but, until the advent of the $\frac{1}{2}$ c.c. types now being produced in Britain and the $\frac{1}{2}$-A class in the U.S.A., no widespread interest in really small engines for actual model use has been shown.

Nevertheless, there is always something rather fascinating about a nicely turned out baby engine—particularly (or so the writer feels) tiny crankshafts and minute pistons and con-rods, and it was with interest and pleasure that we have been examining the latest baby diesel from R. G. Cameron of Gatehouse-of-Fleet, Kirkcudbrightshire. Mr. Cameron is a watchmaker and model car enthusiast and the two obviously go well together when it comes to a project such as this.

This little engine has a bore of only .1875 in. and the stroke is .3125 in. (i.e. $\frac{3}{16}$ in. $\times$ $\frac{5}{16}$ in.) giving a swept volume of .0086 cu. in. or .145 c.c., which is substantially smaller than any production motor yet seen and is less than one-third of the displacement of the smallest British engine at present on the market. It is of the usual variable compression type and uses the 3-port type layout, there being single inlet, transfer and exhaust ports. The carburettor is mounted on the side, the exhaust port is at the back and the transfer in front.

The builder gives some interesting information on the construction of this little motor. The cylinder is of tool steel, glass hardened in water and lapped out to a mirror finish and the piston is cast-iron with a duralumin gudgeon-pin yoke screwed into internal threads. The pin itself is of tool steel and hardened. The connecting-rod was made from nickel-steel cut from a Norton motor-cycle con-rod and case hardened.



The new German Webra 1.5 high-performance diesel.

It is notable for its relatively large diameter big-end, the crankpin being of unusually generous dimensions for such a small engine.

The crankshaft was built up from tool steel and nickel-steel and is obviously very stiff, the crankpin and main journal almost overlapping. The main bearing is of cast-iron and the alloy housing is flanged and neatly attached to the front of the crankcase with four screws in the manner of racing type engines. The crankcase was cut from solid dural bar and the cylinder barrel, which includes the internal transfer passage and machined cooling fins, is shrunk on to the cylinder-liner. The cylinder head is of Hiduminium and has a brass thread insert for the compression adjusting screw. The cylinder assembly is attached to the crankcase by means of four long stainless-steel studs and nuts. The carburettor body is of dural and the needle-valve is of the open jet type.

Being built only as an experiment and enjoying none of the advantages which are open to mass-produced engines using die-castings, the little Cameron diesel makes no special claims to light weight and scales approximately 1½ oz.—or about the same as a production ½ c.c. engine. It is, however, very strongly made and if we are to eventually have smaller engines than the currently available capacities, it is felt that a little more attention on the part of engine manufacturers, to strength rather than fractional savings in weight, would not come amiss.

Webra 1.5

In the December "Accent on Power," in which the German model aircraft engine market was surveyed, we mentioned the new 1.5 c.c. Webra engine. This engine is now in production and one of the first off has now been received from Berlin.

Externally, the engine resembles the Webra 2.46 model, being a radial mount unit of the same general layout. The stroke/bore ratio of the new model is, however, very much lower, so much so, in fact, that, despite its 40 per cent. smaller swept volume, plus a thicker cylinder wall, the external diameter of the liner is actually the same as that of the larger engine. The cylinder wall thickness is very much greater than that of other similar engines, which should have certain advantages, namely: better heat dissipation, greater resistance to distortion, as well as allowing deeper transfer grooves than would otherwise be possible with the porting arrangements used.

The porting differs somewhat from the 2.46 model, the annular exhaust and transfer being divided into three segments, instead of four, and the transfer grooves extending between the exhaust ports and above their lower edges so that theirs is a bigger overlap of exhaust and transfer opening. This system resembles that used on the Yulon "Eagle" engine and also on the Frog "150." Unlike either of these two engines, however, it is used in conjunction with a conical crown piston.

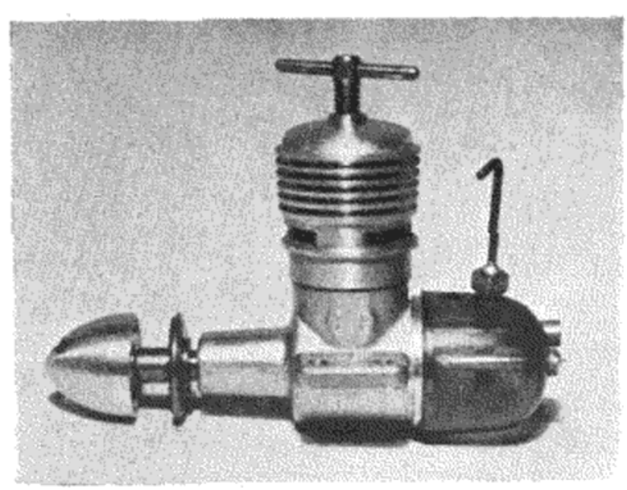
The new model handles nicely, being easy to start and responsive to control. The contra-piston is smooth in action and returned readily to lower settings on releasing the adjusting screw, giving a useful measure of speed control without touching the needle-valve. Undoubtedly, the Webra 1.5 is among the more powerful 1.5 c.c. engines, although whether, in fact, the test engine will eventually reach the very high output claimed remains the subject of a future test report. The actual output claimed is approximately .175 b.h.p. at some 14,000-14,500 r.p.m., a performance substantially in excess of anything yet realised with a 1.5 c.c. unit.

E.D. 1.46

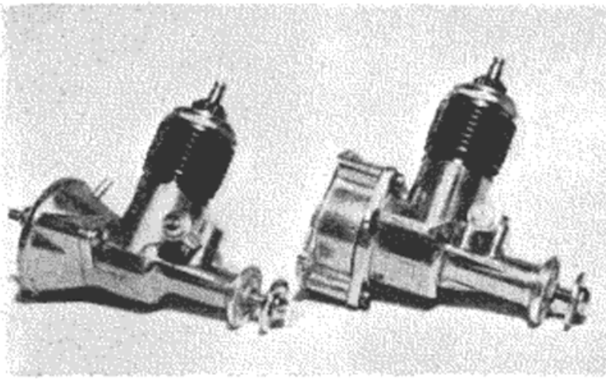
In the same capacity group as the Webra 1.5 is the new E.D. 1.46. Earlier in these articles we commented on the fact that new E.D. engines, unlike the ranges of other manufacturers, seldom show any strong similarity to previous models.

The new 1.46, however, embodies several features found in existing E.D. models, yet again, these are combined to produce a different layout than any previously used in the E.D. range.

Externally, it combines the appearance of the two smaller E.D. models, the popular disc-valve "Bee"



E.D.'s new 1.46 model shows E.D. "Bee" and ·46 influence.



The new Herkimer-O.K. " Cub " ·049X competition ½-A engine (left) compared with the standard 049.

and the more recently introduced shaft-valve " 46." It has the " Bee " pattern crankcase including the same type of simple carburettor tube partially enclosed in a green plastic fuel tank with needle-valve extending through the top and even has the " Bee " type steel drive washer and spinner nut.

The cylinder, however, follows the present pattern of Miles-designed E.D. engines in having radial porting with a 360-deg. transfer passage between the lower part of the cylinder and the main casting. On the 1.46, the whole cylinder is held down by the outer finned alloy barrel which screws over the crankcase in the manner of the .46 model. (See cutaway drawing, July, 1952, MODEL AIRCRAFT.) The piston, however, is of the flat-top type and the exhaust openings in the barrel are in the form of slots instead of the eight circular ports on the .46.

O.K. Cub .049X

In the recent test report on the Herkimer-O.K. Cub .049 engine we mentioned a new model which was at that time about to be put on the market, the .049X. One of these units has now been received from the U.S.A. and gives us an opportunity to compare it with the original .049.

The .049X in no way supersedes the .049 model. It has been designed primarily for competition work and is lighter, more compact and more powerful than the standard model. Nor is it simply a modified version of the existing .049 for it uses none of the main components of the earlier engine. Cylinder, piston, con-rod, crankcase and crankshaft are all different.

Bore and stroke of the .049X are .420 in. × .360 in., giving a stroke/bore ratio of only .857 : 1, as compared with 1.064 : 1 for the .049. Radial type mounting is used with a conical tank-mount similar to that first used on the Atwood Wasp. An alternative rear cover is, however, supplied for use when a separate fuel tank is employed and results in an even more compact engine.

The .049X has, of course, Herkimer's special type of radial porting and shows their usual high standard of finish.

A " Full-size " Model Diesel

In the past, model engines have generally been based on full-size practice. The model diesel became the exception by breaking away from the usual spark-ignition, petrol-engine layout. Now the process has been reversed with the introduction of the " Lohmann " compression-ignition cycle-motor.

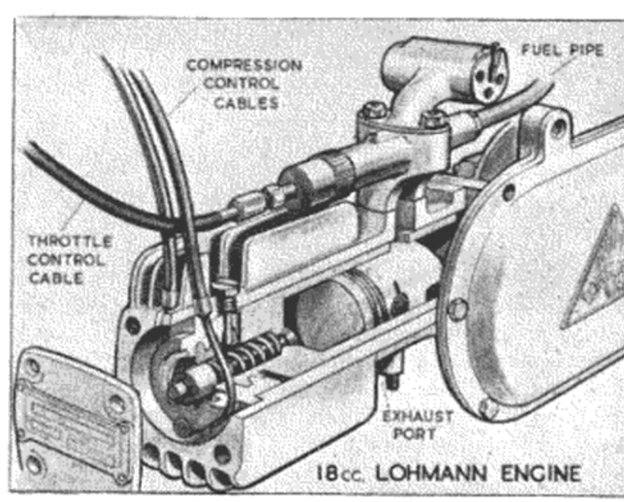
Model enthusiasts visiting the recent Cycle and Motor Cycle Show at Earls Court may have seen this interesting little motor on the stand of Messrs. Britax (London) Ltd., who are importing these German made units. Actually, the Lohmann, although new to this country, has been available in Germany for over three years, during which time the engine has been thoroughly tested and developed and large numbers manufactured.

The Lohmann is of the three-port, two-stroke-cycle type and is but little bigger than some of the larger types of model aircraft engines, having a 28 mm. (1.102 in.) bore cylinder and a 30 mm. (1.18 in.) stroke, giving a swept volume of 18.47 c.c.

The principle of operation is exactly the same as a model diesel, auto-ignition being obtained by means of variable compression, although a petrol base fuel is used. A contra-piston is not employed, however, the sliding cylinder-liner method of compression-ratio adjustment being used instead. Compression adjustment is under the control of the rider by means of a handle-bar twist-grip and flexible cable. The carburettor is also of the " model " pattern, being a simple needle-valve type in place of the miniature float-type carburettor usual to these motors.

The Lohmann is mounted below the bottom bracket of the cycle with the cylinder horizontal and facing forward and transmission is via a 3-to-1 reduction primary drive and a roller secondary drive on to the rear tyre with a toggle action. Ball journal main bearings are used. Operational r.p.m. are 5,000-6,000 and the engine will give a road speed of 20-25 m.p.h. under no wind and level road conditions. For hill-climbing and, presumably, when starting off from low speeds, compression is reduced by means of the twist-grip. The engine is nominally rated at ¾ h.p. weighs 12 lb. and costs 24 guineas.

Personally, we think that a push-bike equipped with one of these little cycle-motors should be just the thing for recovery work.



OVER THE COUNTER

MODERN MODELS

12, THE MARKET, LOWFIELD STREET, DARTFORD, KENT

Started in April, 1949, by two brothers, Alan and Keith Blanks, on a small scale, Modern Models is now a well stocked shop capable of dealing with aeromodellers' needs in the rapidly growing Dartford area.

Although all *real* modellers know where the shop is, there are still some, much to the chagrin of the two brothers, who enter and say " Well, I never knew there was a model shop here." Perhaps this will help to cure that fault.

Besides personal callers in the shop, post orders are sent not only all over the U.K. but also to different parts of the world.

The aim of the proprietors is to provide a service to modellers which will be second to none.

Hivac Ltd. have recently announced that the price of their XFG-1 valves is to be reduced to 18s. 4d. Of this, 3s. 4d. is accounted for by purchase tax. The change actually represents a reduction in the retail price of 17s. 6d. to 15s.

One of the main factors making this favourable price change possible is the increase in export sales, particularly to America.

* * *

More Jetex-powered flying scale " deltas " are scheduled for early production by British Model Aircraft. These new Skyleada models will include the Avro *Vulcan* and Gloster *Javelin*. Keilkraft also have a flying scale *Javelin* on the stocks.

* * *

Some of the finest examples of modern kit production are the new Jetex " tailored " kits featuring fuselage halves pre-formed from thin sheet balsa and all the remaining sheet parts die cut. These virtually open up a new era in flying scale models of jet prototypes. A little more expensive than the built-up kits, perhaps—but accuracy is assured, and look at the time you save !

* * *

Contest modellers will no doubt be interested to find that Barry Wheeler's International Power Championship model is already on the market in kit form. Suitable for any 1.5 c.c. motor, this is just the sort of job with which to break into the power contest field. The kit is by Chuck Doughty, of 128, Arthur Street, Birmingham, 10.

We have received a kit and from first inspection it seems to be to a high standard. We hope to review this model in a future edition of Model Aircraft when it has been built.

* * *

Here is a good tip a retailer passed on concerning dope brushes. When you get a new brush, make sure that the bristles are really secure by clamping the metal part in a vice or large pair of pliers. Often this job is not completed properly in the manufacturing process.

* * *

Wakefield modellers can now buy ⅞ in. diameter dural gears direct from E. W. Evans (Super Model Aircraft Supplies) at the price of 4s. 3d. per pair. These gear sets also include bearing eyelets and a leaflet describing how to make suitable gear units. As Ted Evans was one of the first to use geared Wakefields in this country, his experience in this field is a sure guarantee of quality.

Did you know that British model aircraft goods predominate on the Australian market ? The advertisement pages of " Model Hobbies," Australia's model aircraft magazine, read like our own journal, with whole pages devoted to E-D engines, Veron kits, Keilkraft products, and so on. The Australian pound is worth approximately 16s. of our money, so prices are relatively high, even without purchase tax. A Frog " 500," for example, costs £5 15s.

We sincerely hope that the recently announced restrictions on imports into Australia from the sterling area will not affect sales in this valuable export market.

* * *

The present range of eight solid scale models by Keilkraft are amongst the most accurate of their type in the world. One feature we particularly liked was the inclusion of a small plastic occupant for the pilot's cockpit !

* * *

Whilst it has been common knowledge that the bulk of American motor sales during the past two or three years has been confined to half-A sizes, the extent of these sales can better be appreciated by a study of the figures of *one* manufacturer's output. The firm in question is the Mel Anderson Manufacturing Company. During the past 18 months they have sold : 350,000 Baby Spitfires, 220,000 Spitzy's, 190,000 Royals.

A grand total of over three-quarters of a million, or almost ten thousand engines a week !

OVER THE COUNTER ——— KIT REVIEW

SKYLEADA S.E.5a

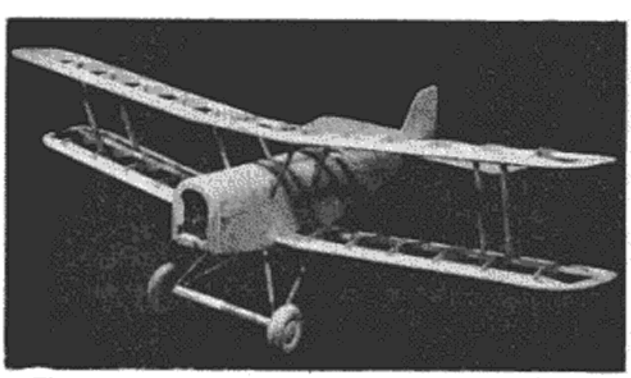
This is the first *Skyleada* kit we have had the opportunity of reviewing in this feature. For more than ten years now *British Model Aircraft* have enjoyed a sound reputation for the production of good, honest kits at really low prices—kits which make up into models which are really flyable with no fancy constructional ideas or elaborate building methods, but models to build and enjoy.

The *S.E.5a* kit falls into just this category—a good, honest model design of rugged construction, straightforward to build and thoroughly flight tested. With a span of 27 in., this scale model will take any of the "baby" engines of 0.5 to 1 c.c. capacity. Half-c.c. motors can be completely enclosed in the cowling. With larger motors it may be necessary to have the top of the cylinder protruding. The low thrust line of the prototype does allow all motors to be mounted in an upright position—generally accepted as best for ease of operation.

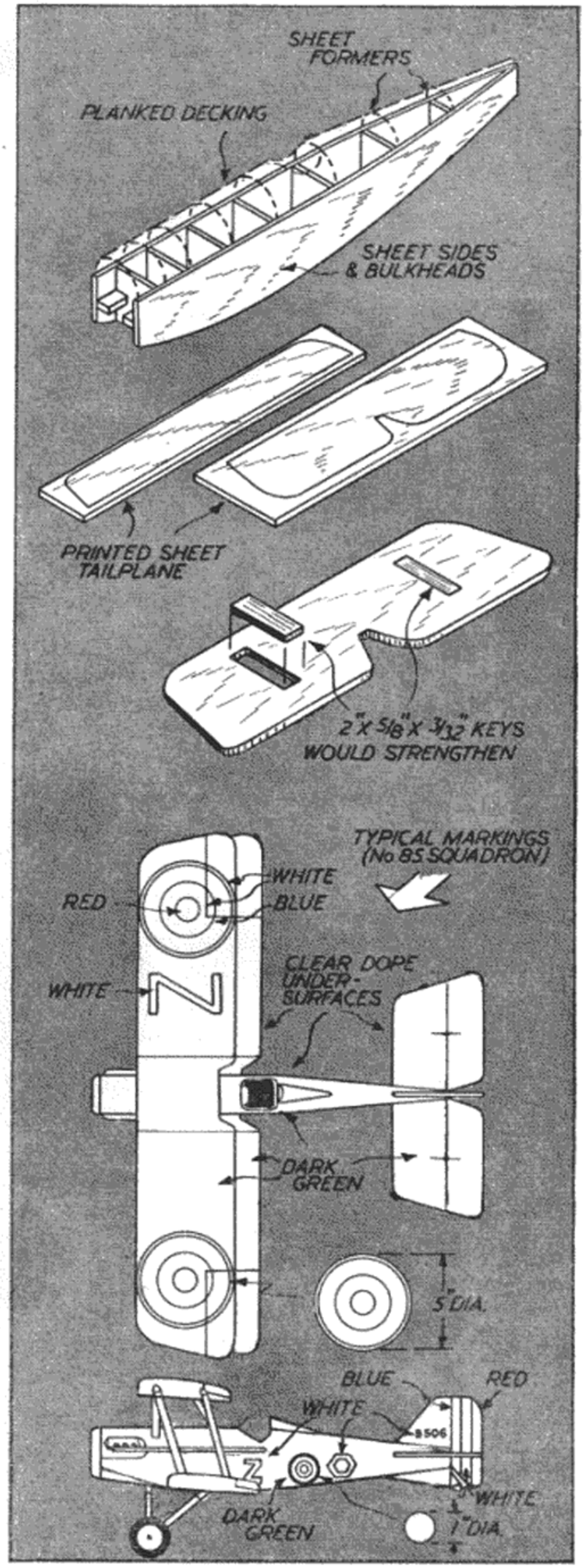
Contents of the kit are quite complete. It includes cement (a very welcome touch in these days), fuselage sides cut to shape, shaped leading and trailing edges, seven printed sheets and ample sheet, strip and block (including bamboo and hardwood for struts and motor mounts). The turned obeche wheels, whilst excellently produced, are, unfortunately, rather too thick in section to be true to scale. Wood quality in the kit we examined was good throughout.

The instruction leaflet given with the kit includes brief details on colouring, armament, etc. We could not help thinking that it is a pity some of these details could not have been included on the plan—or a separate drawing supplied showing the *S.E.5a's* in full "scale" detail, although the manufacturer says in his leaflet that these are not included as they would confuse the plan.

Obviously this kit model is intended for flying and as a basis for building up a detailed flying scale model, if the owner prefers. The serious scale modeller, however, would be advised to check over the outlines first—particularly the wing tips. Notwithstanding its limitations in this respect, however, the Skyleada *S.E.5a* should be a model which scale enthusiasts will enjoy building—and flying.

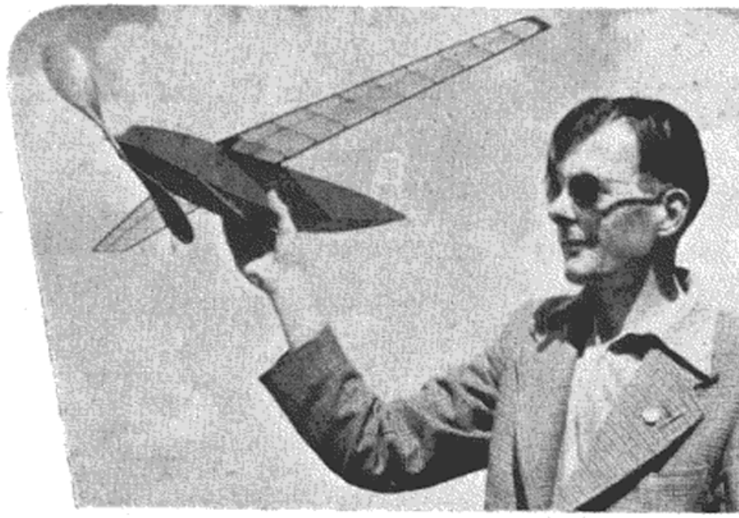


The review kit under construction, before covering.



PIPISTRELLE

AN UNUSUAL TAILLESS RUBBER MODEL FOR THE SPORT FLIER



By G. Woolls

"PIPISTRELLE" is the result of a desire for a model of unusual appearance which could be flown as a sport model within a smallish flying ground.

Experience gained with the biplane *Dragonfly* (M.A., March, 1951) which had a sharply swept back upper wing, indicated that a tailless model would probably "fill the bill."

While *Pipistrelle* is not claimed to be the ultimate tailless design, it has been flown regularly for some six months or more, and has shown a consistent performance. Stability under power is of a very high order, and its ability to fly well and quite steadily in very gusty conditions is quite remarkable.

Fuselage

This is of the elementary box type with the two sides built directly on the plan, one on top of the other. Before separating, add the extra $\frac{1}{16}$-in. sheet at the rear rubber peg location, and drill a pilot hole, about $\frac{1}{8}$ in. diameter through both sides, and the holes for wing hold-down dowels. Assemble the two sides and fit the central stringer along the bottom of the wing groove last.

Mainplanes

A little more detail may be of help here, for the 10 deg. wash-out is *built in*—this is preferable to building flat and warping afterwards. Make template of root and tip ribs from ply, or preferably tin-plate. Sandwich nine pieces of $\frac{1}{16}$-in. sheet between them, hold in place by long pins through the lot and shape down the balsa, cut the slots for the spars. Make two sets of ribs, right and left hand.

The $\frac{3}{8}$ in. × $\frac{1}{8}$ in. trailing edge should be cut to length and notched to suit the ribs. Wing tips and root ribs are cut from $\frac{1}{8}$-in. sheet, the latter using the root template but with the bottom left flat. The slot for the lower spar must therefore be deeper.

Assemble by laying down the L.E. and the root rib flat on the plan, the rib should lean inward slightly against the dihedral template. The wash-out template is laid on the plan under the wing tip, and the tip and T.E. assembled. Now the ribs are fitted taking care that the T.E. which does not touch the plan except at the root end, remains straight. Fit $\frac{1}{8}$ in. × $\frac{1}{16}$ in. top spar and when all is dry, remove wing from board and fit lower spar. The fitting of wing-joining dowel tubes, etc., should be straightforward. The front of the wing tip should be 3 in. above the bottom of the root ribs, i.e. 3 in. dihedral under each tip.

Elevons

These are fitted to the wings by means of C/L elevator type hinges. After covering, a balsa "horn" is cemented to the elevon. A rubber band retains the elevon at its correct angle and adjustment may be made by thin card packing cemented under the front of the "horn."

N.B.—The use of the usual aluminium hinges was discontinued due to the difficulty of adjusting accurately, and their liability to be knocked from their setting if the model overturned on landing.

Cover the entire model with tissue and dope. Use a few drops of castor oil in the dope, especially when treating wings and fin, in order to prevent warping.

Flying

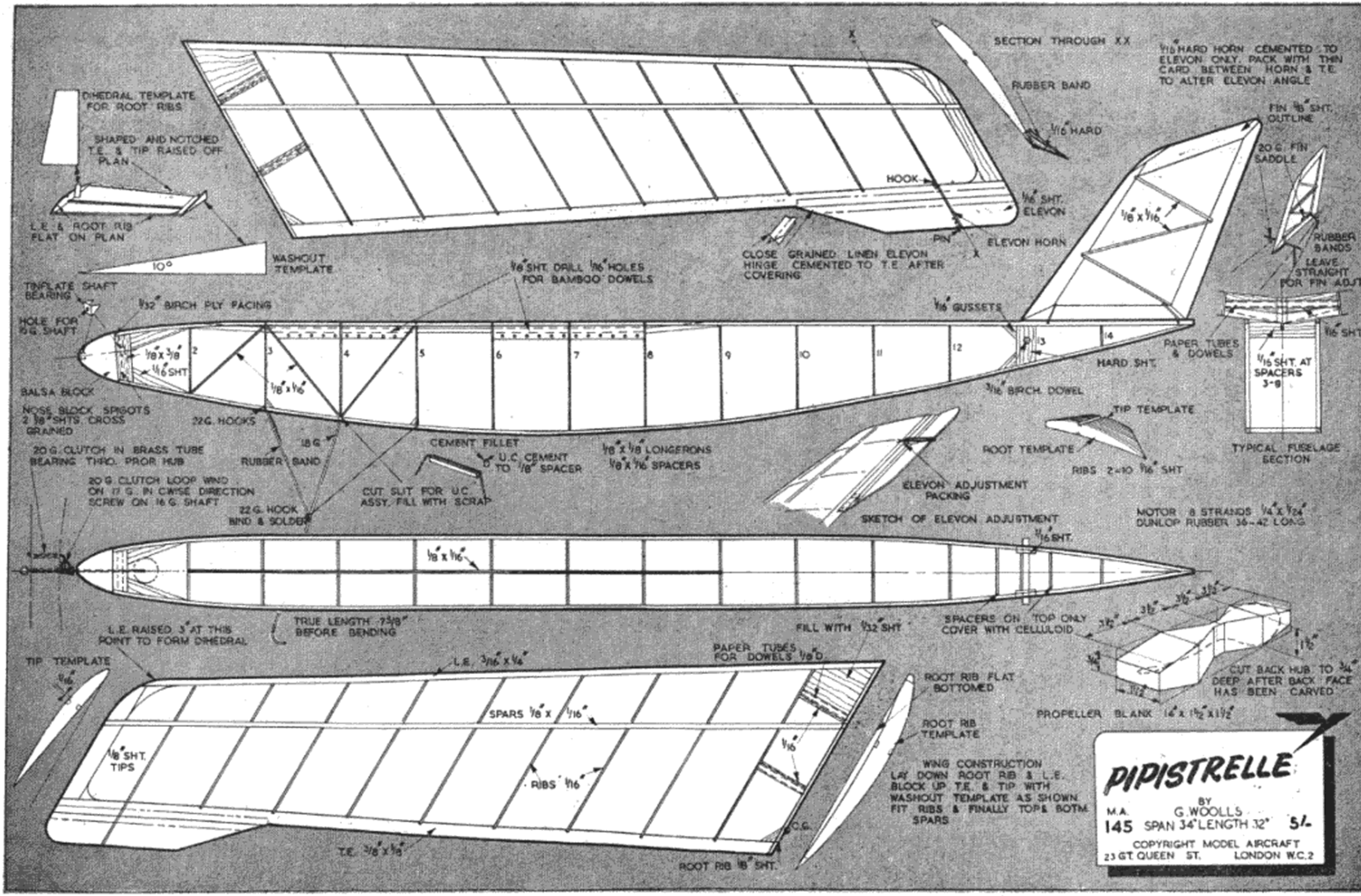
Eight strands of $\frac{1}{4}$ × 1/24 Dunlop rubber from 36 in. to 42 in. long is recommended. This should be pre-tensioned.

First check for warps, i.e. see that the wing, L.E. and T.E. are straight, and that the wings have similar "washout."

As a start, adjust the elevons to an angle of about 30 deg. to the wing tip, and assemble wing on fuselage so that the model balances at $\frac{3}{4}$ in. from the T.E. at the centre section.

Given a calm day, hand glides may be indulged in, slightly less negative elevon angle may be used if stalling results, but if a considerable change of angle from that given is required, move the wing back a little. In the case of "dives," reverse above procedure.

The prototype is very safe under power, even on full turns, so powered flights may be started quite soon. A L.H. turn—with torque—is recommended and this may be accomplished with a combination of thrust off-set and rudder. Elevons can be used for turn, but make adjustments very carefully as they are extremely sensitive.



FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT 19-20, NOEL STREET, LONDON, W.1 5s. 0d., POST FREE.

Model Talk

By Bill Dean

F/Lt. Davidson and his original design R/C model—the "Racon"

● PROWLING AROUND with our camera at the ready, at one of the last contests of the '52 season, we suddenly spotted a likely victim. He was wearing blue jeans, lumberjack shirt, baseball cap, superb "MacArthur" sunglasses and looking even more American than the Statue of Liberty. Just to complete the picture, he held in his hand a *Little Rocket* speed job, powered with a shiny new McCoy "19." We clicked the shutter, got out our notebook and asked in which part of the States he lived. It was with some regret that he admitted he was in actual fact a native of these shores and had lived in Stepney all his life. "Anyway mate," he continued, "what part of the world do *you* come from?" We twirled the ends of our jet-black moustache nervously, muttered something about being a special correspondent for *Modellismo* and set off for our next quarry—a character clad in an old sports jacket, flannel bags and cycle clips, who was dejectedly flicking away at a vintage Mills 1.3 and would almost certainly turn out to be a visitor from Florida at least. . . . Moral: That man waiting at the bus-stop wearing a baseball helmet may *not* be Jim Walker after all.

★ ★ ★

● HERE ARE a few helpful hints for an engine manufacturer about to launch a new powerplant. First, cut away the air intake tube at an acute angle for easy choking . . . fit a fuel cut-out or at least give suggestions for attaching one . . . see that the lower faces of the mounting flanges are on the centre line of the engine for easy installation . . . list the best prop. sizes (diameter *and* pitch) for different types of models in both F/F and C/L categories . . . name all suitable kit designs and give an indication of the size of model (wing area and weight) that the engine will fly . . . detail the best method of mounting, not forgetting bearer sizes . . . finally, provide a full size 3-view drawing of the engine—to aid installation in original designs.

We wrote the above in "Power Talk" just four years ago, but judging by some of the engines that have appeared in the meantime, these remarks can certainly bear a little repetition.

Ian Dowsett and his lethal-looking glider design, which he flew at the last R.A.F. Championship.

★ ★ ★

● THE NEW Whitney Straight (Area Championships) Trophy was presented to the winners—the N.W. area—at the Annual S.M.A.E. Dinner and Dance on November 22nd. In our opinion, it is the finest trophy ever presented to the Society and designer P. E. Norman is to be complimented on a fine piece of work. P.E told us that he set out to symbolise the modern swept-wing trend in jet aircraft and in this he has certainly succeeded—as those who have seen the actual trophy or the illustration of it in the November MODEL AIRCRAFT will agree. The three aircraft were cast in aluminium, the support bent from dural and the base carved from ironwood. Several months elapsed between the first rough sketches and the completion of the trophy—and we hear that P.E. spent a considerable time scouring round the timber yards in the London Dock area before he finally found the exact piece of wood he needed for the base alone.

★ ★ ★

● WE CAME across an old pre-war newspaper cutting the other day, which featured a *Daily*

Express sponsored glider kit. Whoever designed it obviously did not want to have any truck with that new fangled stuff called " balsa " and intended that this model should last for years and years. Although this was a real utility effort (hardwood framework, covered with brown paper !), a few thermal flights were reported from builders in this country and overseas. As a publicity stunt, one staff-built model was heaved from the top of the Eiffel Tower and subsequently landed several miles away.

Those were the days when you could get a chuck glider simply by sending off a few corn-flake packet tops—and the " twopenny bloods " often gave away card cut-out flying models by Rigby. Another memory of the 'thirties is the *Swan Sailplane*—a ready-to-fly " wing " of hardwood and ply construction which had an amazing performance when launched from a two-post ground catapult. The famous old Frog *Interceptor* of the same period is still a toyshop favourite, having undergone little change over the years, apart from the introduction of a modern bubble canopy in place of the original open cockpit.

★ ★ ★

● 1ST.-LT. G. EVANS CODDING is a real F/F scale addict—the pictures at the foot of this page being a fair sample of his many successful designs. The replica of the ever popular *Fokker D-8* is built to a scale of 1/12 and powered with an old Mighty Atom, running on glo-ignition. The *Monocoupe Clipped-Wing* 110 *Special* is a bigger proposition altogether—being 1/6 full size (span 60 in.), with an Ohlsson "60" up front. Construction is entirely of hardwood ; the cowl is hand-beaten from aluminium and the all-up weight 3 lb. The *Cessna* 140 performs well with its Mills .75 and has logged many hours in the air. This same modeller has several new designs planned for the Dart .5 and Elfin .49—such as Udet's *Flamingo* (sport plane) and some of the more colourful old Russian and Japanese biplane fighters.

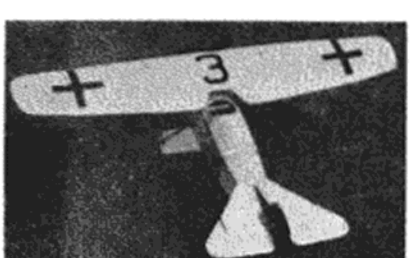
★ ★ ★

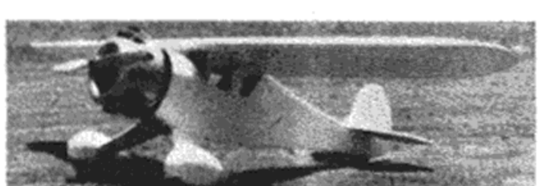
In Brief

We wonder how many readers remember Paul Plecan's *Gas Flea* which appeared in " Flying Aces " some fifteen years ago. A. C. Jordan of Cambridge tells us that he came across the plans recently, liked the look of it and built one for the E.D. .46. He reports that it flies very well in " old-man " fashion and does not look at all dated—being a shoulder-wing, pod and boom, single leg job. Construction differs little from present day practice—sheeted leading edges and built up trailing edges being among the features

Ray Gibbs's " Crescendo "—fastest model in Class 6 (138.9 m.p.h.) at the S.M.A.E. C/L Championships.

We've just discovered the perfect design for a ducted fan model in a " full-size " journal—the little known *Stipa-Caproni*, which was built in 1933. This aircraft featured a hollow barrel-like fuselage, with the powerplant and airscrew set *inside* the nose. Flying surfaces were conventional, but the general effect of the oversize fuselage was startling. By comparison, the *Gee-Bee Racer* was a slender beauty . . . Where are all the ducted fan designs ? Apart from Phil's *Lavochkin*, we've only seen three other original designs. In the States, no plans have appeared since that first article by Tom Purcell was printed. Berkley's were reported to be experimenting with a design of this type, but so far nothing has been announced of the kit. In " M.A.N. at Work," Bill Winter tells of Tom Purcell's new Torp .049 *Sabre* which climbs like a sport F/F. We read that fan-man Purcell once had his tie sucked in the nose opening ! Those little American glo-motors appear to be ideally suited for ducted fan propulsion.





Scale F/F trio by Lt. G. Evans Codding (U.S.A.F.)—Left to right : 1/12 Fokker D8 ; Monocoupe 110 ; Cessna 140.

One of the Ripmax stand attractions at the last "M.E." Exhibition was Maureen O'Neil (herself a model!) seen here with the new Frog Mirage ½-A team racer.

A report in *R.A.F. Review* gives the news that Ed. Rogers of Weybridge hopes to fly his twin-engined ten footer to a height of 30,000 feet and cover a distance of 300 miles, when he makes his attempt to break the Russian duration record of 6 hours 23 minutes. Of course, nobody but a model shop proprietor could afford all that fuel! Incidentally, Ed has cut off those notorious side-whiskers and scaled down his moustache. It appears that too many young model-builders thought he was Father Christmas last December—and expected him to give the stuff away.

Gone are the days when modellers used to make up their own D/T fuse. Those in the know, use ordinary lamp-wick—obtainable from any ironmongers. It burns slowly (about 1½ in. in five minutes) and once ignited, little short of a bucket of water will put it out. . . . Judging from what we saw at last year's model meetings, the 2.46 *Racer* must easily be the most popular contest power-plant ever produced by the E.D. concern. It would certainly rank high on the list of our own choice of six "Desert Island Diesels," provided of course we had an inexhaustible supply of fuel!

Northern Heights can always be relied upon to provide "Grade A" weather for their Gala Days, but how they tripped up when it came to the N.H. Annual Dinner and Dance last December 6th. In case you've forgotten, it was more than somewhat FOGGY that night. We spent several hours trying to get from our home base just twenty miles away to the hotel where it was being held in London—but had to give up when the front end of the bonnet began to disappear in the murky stuff. Wonderful example of the still air conditions that the Wakefield boys are always talking about.

After taking over ten minutes to *neatly* repair a nasty tear in the wing covering of a new F/F (no mean achievement when a cold wind is blowing around your ears and your hands are quite numb), we discovered that the very same stone which had caused the hole was now securely sealed up in the space between ribs W3 and W4. We hadn't the heart to tear the covering again to get it out, so we now have a model that flies one wing low and rattles. . . . Talking about wings—if you ever have to cover a slightly warped panel, try this tip. Lightly cement the panel to the building board with a few dabs of cement. Allow to set, then cover the upper surfaces and water dope. Slice the panel free with a razor blade when dry, then cover the underside in the normal way.

Amco designer Ted Martin (now in Canada) had a first rate engine test article in the December issue of an American model magazine—dealing with the new two-speed K. & B. 19.

Latest modeller to emigrate to Canada is Alan Indge—a former Zombie club member. We hear that Alan also got married shortly before leaving.

Engine Tests

(*Continued from page* 61)

the purpose of these reports to give a full and accurate account of our findings and because it explains the fact that the performance obtained, though still good, is slightly down on the figures claimed. We would add that recent experience of another Webra engine, the new 1.5 c.c. model, disclosed no such similar trouble.

Although the Webra shaft is of the plain full disc web type and makes no pretence of being counterbalanced, the engine runs fairly smoothly. On test it also held even speeds under full load over a useful r.p.m. range.

The needle-valve is responsive without being too critical and has the added refinement of locking-nuts on a split thread to give positive adjustment unaffected by vibration or wear. The Tee-type compression-lever is fitted with the tommy-bar slightly off-centre which facilitates identification of control settings. There was no tendency for the cylinder liner or barrel to loosen on their threads, as is sometimes found with similar designs.

Propeller dimensions recommended by the manufacturers are well chosen and are as follows. Free-flight, 10 in. diameter by 4 in. pitch, or 9 in. × 4 in.; C/L stunt, 9 × 6 or 8 × 8; C/L speed, 7 × 10. These, if of modern medium-narrow blade design, will allow revolutions to approach the peak output in the air.

Power/Weight Ratio (as tested): .916 b.h.p./lb.

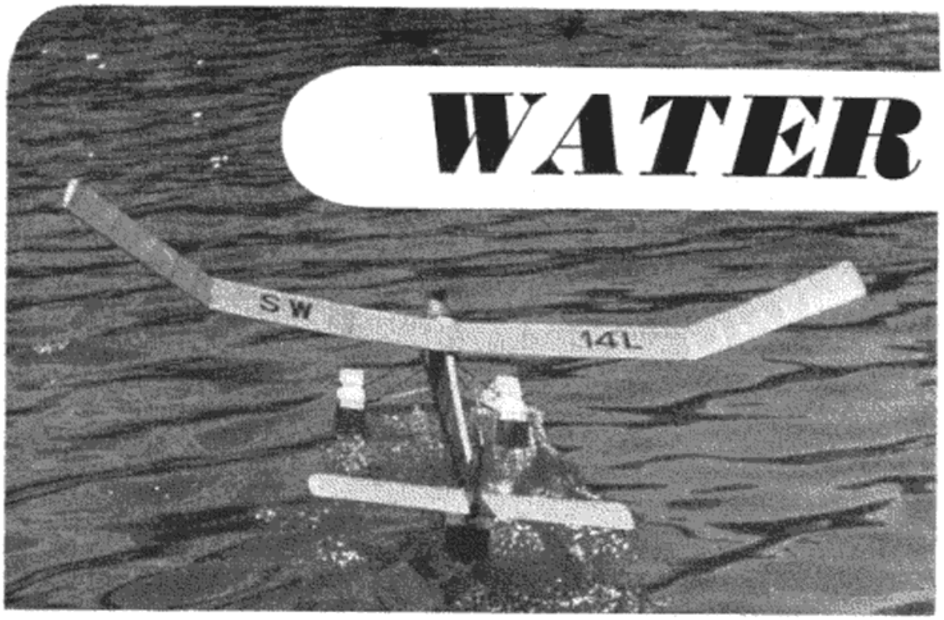
Power/Displacement Ratio (as tested): 84 h.b.p./litre.

WATER WINGS

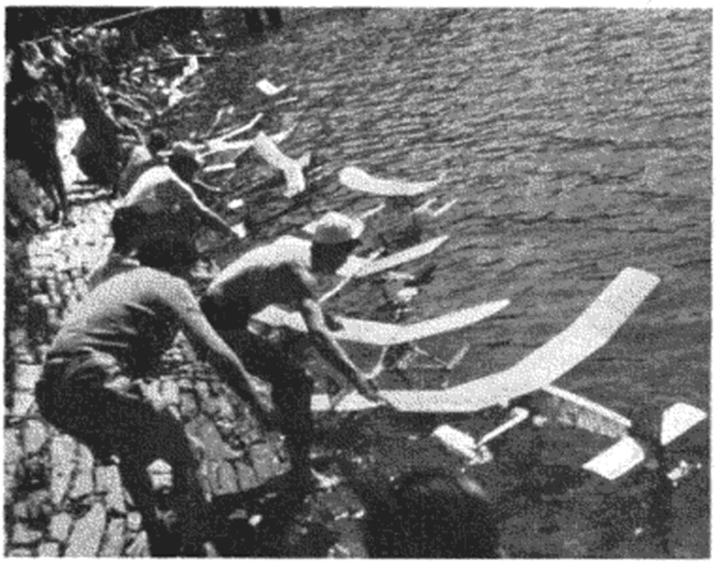
In Great Britain, model waterplane flying has never been really popular, for the simple reason that there are very few suitably large stretches of water from which to operate. However in Switzerland, with its many lakes and hot summer weather, waterplanes have a large following, and these pictures, taken at the national waterplane contest on Lake Lucerne last summer, convey well the ideal conditions the Swiss enjoy for these events. And yet, perhaps modellers in Scotland and the Lake District could run similar contests?

Photographed by

MAURICE DUFEY



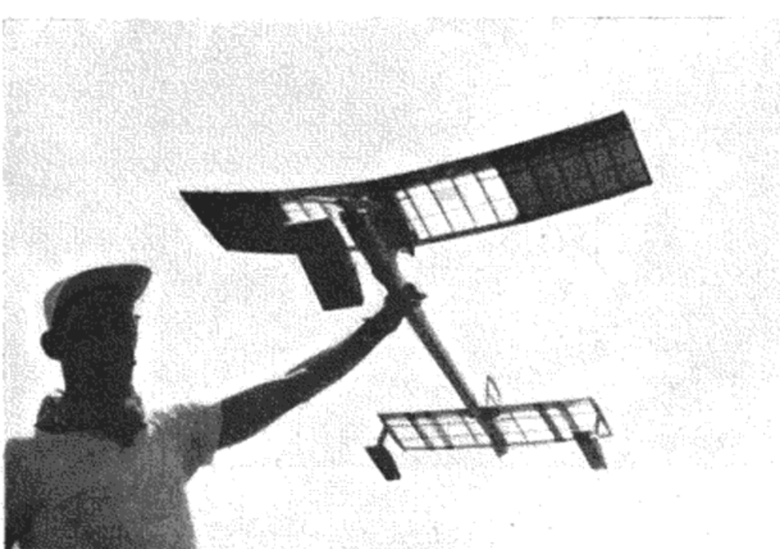
Away goes a model by H. Fischer, of Schoenenwerd, who finished fourth.



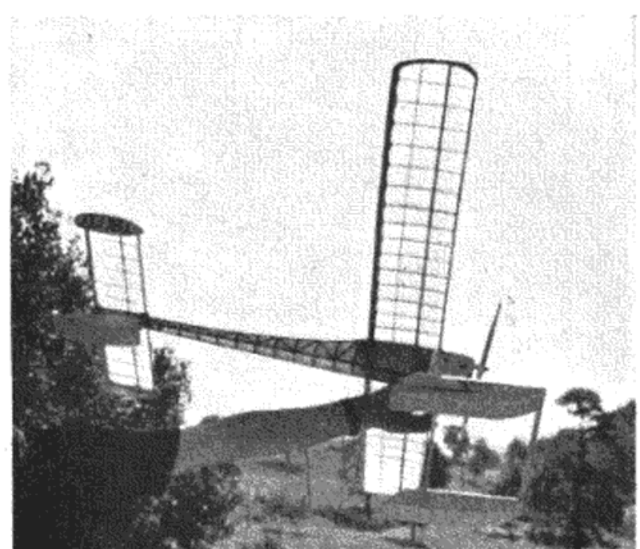
An impressive line-up in the sunshine for the flotation test which all models have to undergo before flying.

An assistant dangles a handkerchief to find the wind direction for Giovanni Ossola, of Lugano, who came third.

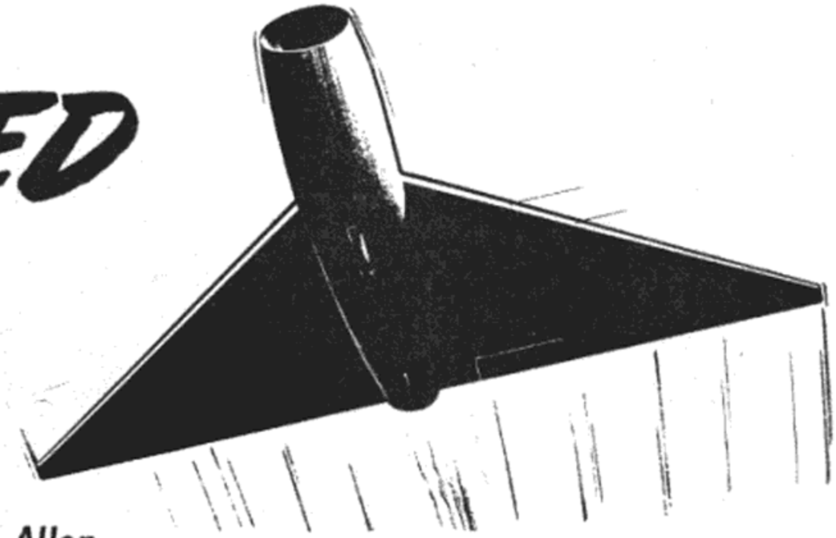
The contest was won by a Dutchman, Pieters, who while living in Switzerland is a member of the Winterthur club.



Schmitter, of Thoune, came second. A top Swiss flier, he also won the national contests for gliders and flying wings.



DUCTED DELTA



A control-line ducted fan project with a number of interesting features

By G. Clay and Gordon Allen

THIS model is a project evolved mainly by Mr. G. Clay for the coming flying season and has been designed to investigate the possibilities of ducted fan propulsion for C/L models using a take-off dolly. From experience thus gained it is hoped to produce a larger free flight version. Construction of the prototype is now under way and as can be seen from the drawings no effort has been spared to give the model the cleanest of lines coupled with sound and original design features.

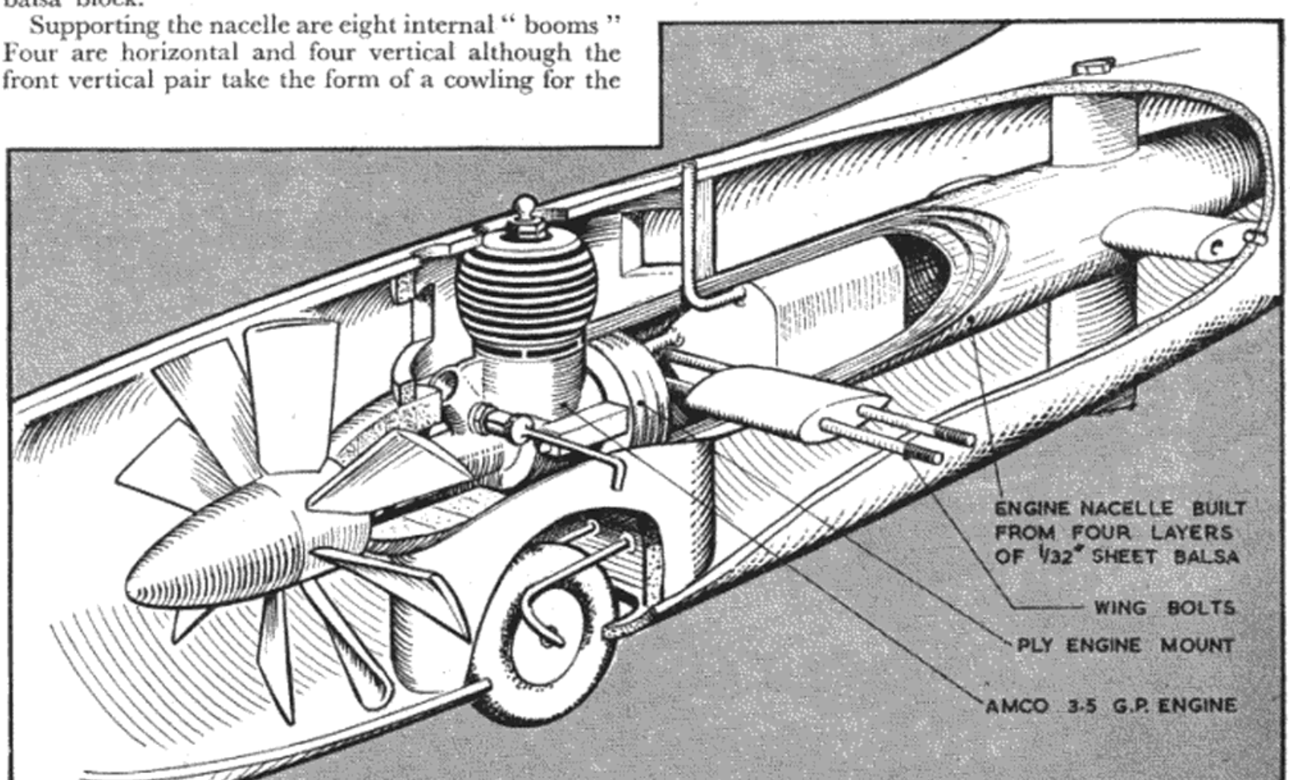
The rotor and engine assembly are carried on an inner central nacelle which is circular in section and made by laminating four planked thicknesses of 1/32-in. sheet balsa over a preturned hardwood form. The engine is mounted within the nacelle on a ply bulkhead as indicated and the nose of the nacelle is faired towards the rotor spinner with a laminated balsa block.

Supporting the nacelle are eight internal " booms " Four are horizontal and four vertical although the front vertical pair take the form of a cowling for the engine and single wheel sprung undercarriage. The cowl is carved from balsa block and carries intake and outlet for cooling air to the cylinder head.

Through the four horizontal booms pass four 6-B.A. bolts which fasten the wings and the internals as a unit. A single 6-B.A. bolt passes through the two rear vertical booms the head of which also secures the dural tailskid.

The fuselage, like the inner nacelle, is circular in section and is built up similarly as indicated in the sketches. Fin and rudder are fixed and made from laminated sheet balsa.

The wings are covered with $\frac{1}{16}$-in. sheet balsa and sanded to 3/64 in. thick. Structure consists of root ribs and tip rib carried on two box spars, leading and trailing edge. Two root ribs placed close together carry blocks between them to take the wing fixing

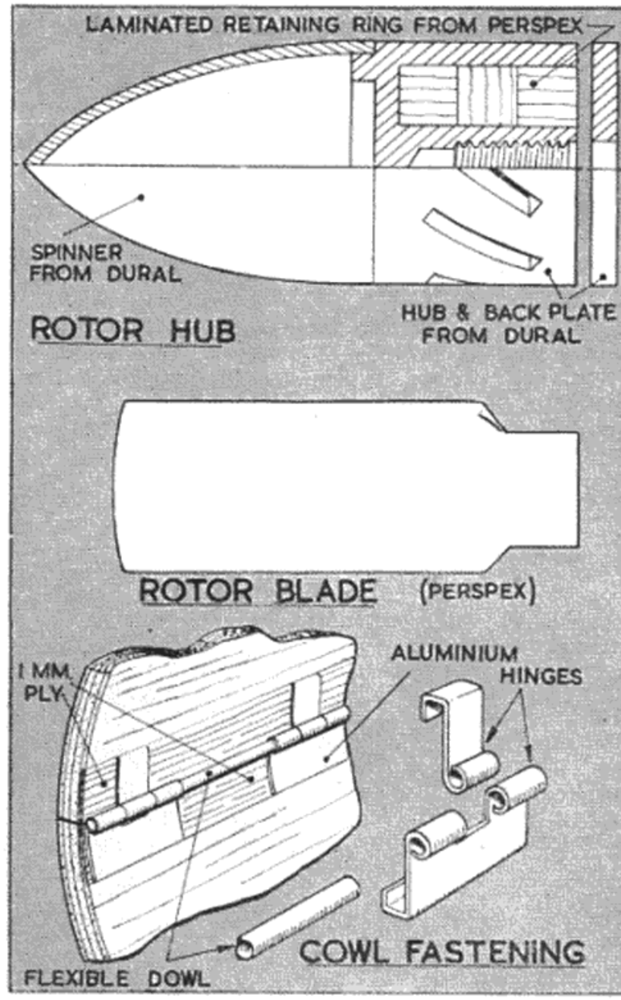


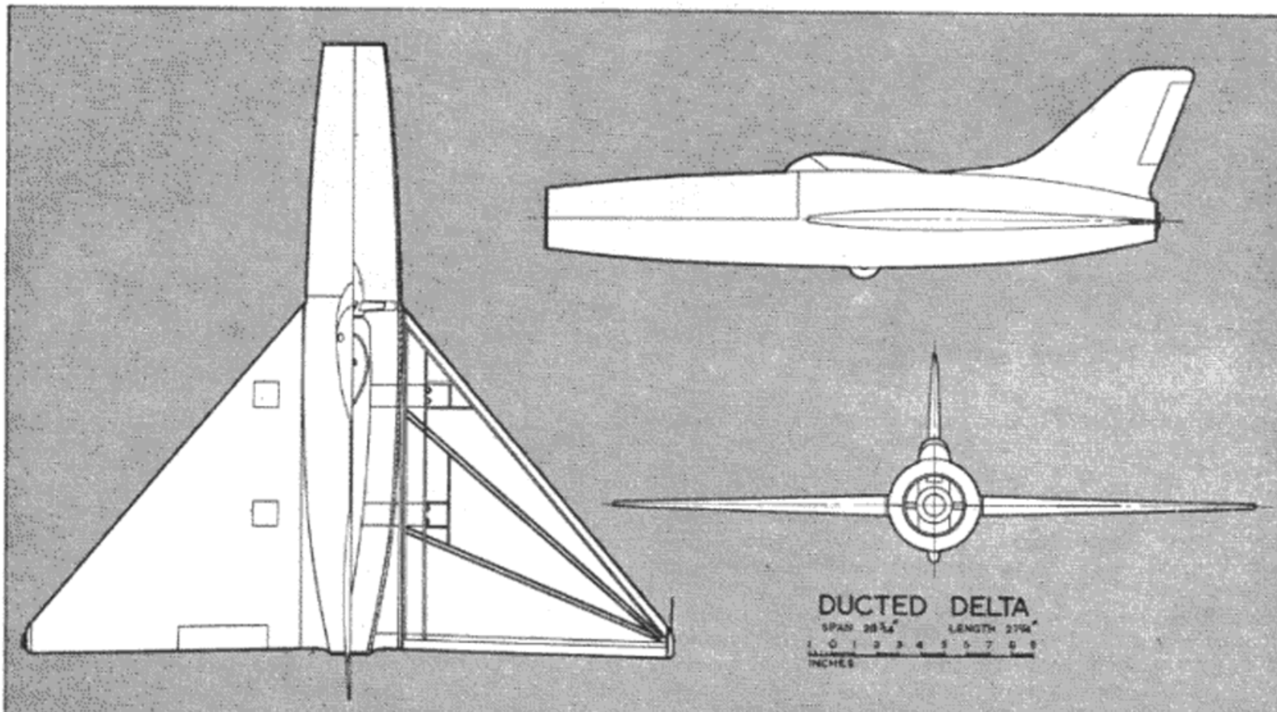
bolts protruding from the fuselage. The airfoil section is NACA symmetrical formed, apart from the ribs mentioned, by the contour of the spars. The port wing carries controls and the fuselage canopy is to be made either from block, or built up, celluloid covered and fastened with press studs.

Rotor construction is rather novel. The hub is turned from dural which is recessed to take a Perspex ring with a neat fit. This Perspex insert and the hub are slotted at an attack angle to receive eight Perspex rotor blades, the latter being secured with Perspex cement thus making a foolproof joint. The insert is made up of three laminations of ¼-in. sheet Perspex joined with Perspex cement and then turned to suit the hub. Each blade is made from ⅛-in. sheet Perspex, filed to an airfoil section, polished, and heat twisted to give a suitable pitch. It is most important to use regulation Perspex cement in units of this kind since it "welds" the material together and makes an indestructible joint. The spinner is a force fit over the spigot on the hub, while the back-plate is a disc of dural.

An engine and rotor access cowling is cut from the shell of the fuselage and is made readily detachable as shown in the detail sketch. Aluminium hinges are formed and fastened through strips of millimetre ply. The completed strips are then glued one at each side of the junction of the cowl and the fuselage, and flush with the inner laminations. Flexible dowels (fine bone knitting needles) retain the cowl and are easily removed from the nose of the fuselage.

The engine is started by a flexible drive from an electric or geared hand winder while choking is accomplished by a specially shaped dowel. Needle valve control extends through the main engine cowl and the outer shell.





Letters to the Editor

● 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

AERODROMES AND DURATION

Dear Sir,—Like a very large number of your readers, I view with increasing concern the situation regarding flying fields. In my opinion, one of the main objections to our use of many flying fields is, and let's face it, the indiscriminate trampling over fields by enthusiasts searching for lost models. This recovery business is in any case, I believe, one of the reasons why an increasing number of people will be discouraged from entering contests. Of course, the answer is, as we hear every day, limitation of maximum flight time.

With power models, the answer is easy. Shorten the power run. Many power modellers say that this will increase the luck element. Maybe. Personally, I believe it will make them put on their thinking caps, and really sort out that power-cut stall recovery.

The shorter line for gliders again is obvious, but here, perhaps, is the answer to the limitation of flight time of rubber models. I think that those who really know that particular science will agree, that limitation of rubber weight is the only method. If the rubber is cut to a definite proportion of the airframe weight, then the following method requires neither weights nor calculation.

As a suggestion, let the rubber weight be half the airframe weight. All that is required is a simple beam balance, with one arm twice as long as the other. The model is hung from the short arm, while the rubber motor is hung on the long arm. If the motor is exactly half the airframe weight the two will balance, while it will be immediately obvious if the motor is at all overweight.

Surely each area could find someone to make up such an item. Each could then be checked by the S.M.A.E. Tech. Secretary, and then all semi-centralised and centralised meetings could run, quite simply, restricted rubber contests.

Surely something on these lines could be organised, particularly in view of the fact that Langley may be used for the British Nationals this year, and though power and glider times will be cut, nothing has been done to bring rubber into line.

Yours faithfully,

Braintree, Essex. P. Hewitt.

IT'S NOT FAIR !

Dear Sir,—I have read your article on team selection in December Model Aircraft, and it fills me with disgust to think that the journal of the S.M.A.E. should take such an unsportsmanlike outlook on the whole thing. It looks to me that the team would be made up of a selected few year after year, and the poor mugs like myself who help pay to send the teams abroad don't even get a chance. It's not right. After all, we do fly for the sport of it, and not just to hunt pots. Another thing—the Americans and ourselves have won the Wakefield more times than anyone else, and I have never heard tell of the other countries moaning about it as *some* of us do. There are only two ways to select a team as far as I can see and they are: eliminators and trials as now held, or eliminators and trials held one year ahead of the contest. There are snags, I know, but at least everyone has a chance.

Yours faithfully,

Tipton, Staffs. R. O'Neill.

TWINS AND TURNS

Dear Sir,—I have read with interest Col. H. J. Taplin's article in your December edition on multi-engined free-flight models. It surprises me to find that, although he has succeeded in making his models function as desired, he apparently does not understand the reason for his success. In view of this, I submit the following explanation of the subject for the benefit of those modellers who may wish to develop this branch of aeromodelling.

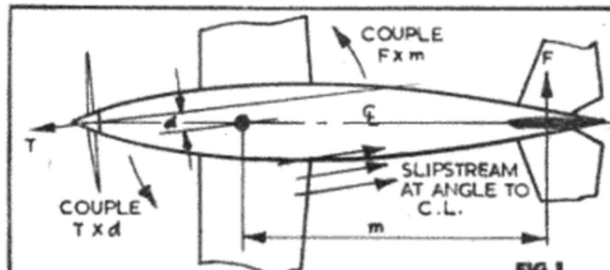


FIG. 1

In Fig. 1 we see the effect of sidethrust on a normal aircraft. The first effect is to create a turning moment or couple, about the centre of gravity (G). The amount of this couple can be found easily by multiplying the thrust by the distance of the thrust line from the c.g.—i.e., the turning moment $= T \times d$, in the direction shown in Fig. 1. There is also a considerable effect caused by the slipstream which is at an angle to the fin. There is thus a side force created on the fin, acting through a moment arm (M) about the c.g., so that there is another moment, equal to $F \times M$, and acting in the same direction as the first. This second moment cannot be found except by experiment since none of the factors causing the force on the fin can be found accurately.

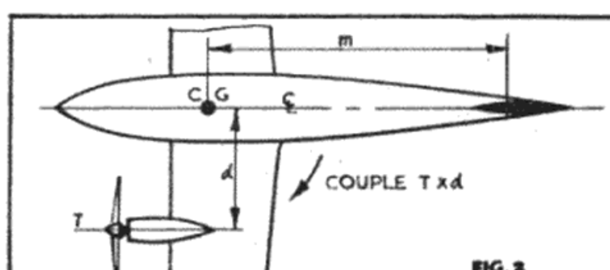
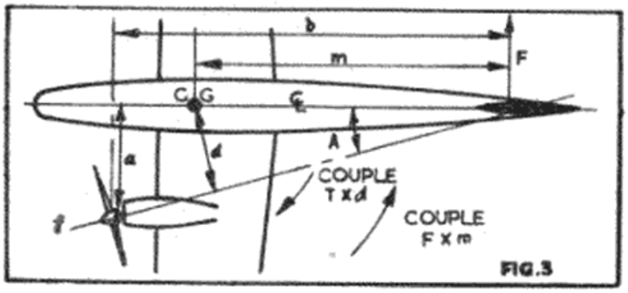


FIG. 2

Fig. 2 shows the force set-up for an engine mounted on a wing and with the thrust line parallel with the fuselage. As before, there is a moment produced by the thrust equal to $T \times d$, but since there is no airflow at an angle to the fin, this is now the only moment about the c.g. Rudder correction can be made to balance this, but of course this would be useless in a take-off when the rudder is at first ineffective. The use of fins placed in the slipstream, so that each fin balances the turn induced by the corresponding engine, can provide straight flight on one engine.

We now come to the arrangement used by Col. Taplin in his twin-engined machine. This is shown in Fig. 3.



The turning moment of the engine is still equal to $T \times d$, but this is now opposed by the action of the slipstream on the fin, which creates a force F and thus applies a moment equal to $F \times m$. The amount of this force depends on the amount of fin area subject to the action of the slipstream, and this may be varied either by altering the disposition of the fin area, or by adjusting the thrust angle.

When laying out the rigging of a multi-engined model, the initial angle of the thrust line A, may be easily obtained by drawing a plan view of the model and joining the propeller hub to a point about 1/3 back from the fin leading edge. For those who prefer to calculate the angle, this may be found from :

$$\tan A = \frac{a}{b} = \frac{\text{(Dist. from prop. hub to C/L)}}{\text{(Dist. from prop. position to fin C of P along C/L)}}$$

The angle calculated by Col. Taplin from $\tan A = \frac{\textit{engine offset}}{\frac{1}{2}\textit{ span}}$ has nothing to do with the problem. The reason for the apparent results is that usually the distance "b" is approximately the same on the semi-span, so the angle obtained is nearly the same. Note that if the slipstream is kept clear of the fin (which includes rear fuselage area), offsetting the thrust-line will not give straight flight, unless the effect is so great as to bodily drag the aircraft sideways till the "weathercock" effect balances the thrust moment.

Yours faithfully,

Edgware, Middx. D. N. Campbell.

ANOTHER READER JOINS IN

Dear Sir,—I was very interested to read Col. Taplin's article on Multi-Engined Free Flight Models which appeared in your December issue. However, Col. Taplin appears to reduce the problems of twin-engined flight to the calculation of a simple sum. Offset angle = angle of the co-tangent of the ratio $\frac{\frac{1}{2}\textit{ span}}{\textit{engine offset}}$

I cannot see how Col. Taplin arrived at this result, for whilst it may give reasonably correct answers for the models which he himself has flown, it cannot be true in all cases. Obviously variations in dihedral angle and placement of fin areas, to name but two variables which vary from model to model, will affect the required angle of offset. I would suggest that the angle of offset is in most cases more dependent on the fuselage length than the wing span.

Perhaps Col. Taplin will either develop his formula further, or alternatively give some further data on the models to which it is applicable, so that other modellers can intelligently relate it to their own twin engine projects.

Any modeller intending to build a twin free-flighter would be well advised to design his model on scale or semi-scale lines. I would suggest that just enough power to fly level on one engine should be aimed at. Designs with closely-spaced engines, large fuselages, and turn "toed-in" fins should be best, such as the *Catalina*, *Wayfarer* and *Harrow*.

Let us hope that the popularity of ½ c.c. engines will also increase the popularity of free-flight twins, to which they seem eminently suited.

Yours faithfully,

Tadworth, Surrey. M. M. Gates.

THE COLONEL REPLIES

Dear Sir,—I have studied Mr. Campbell's comments and theory at some length, and whilst he does not appear to dispute that my method will work, he quarrels with the reasons I gave for the results.

I am not prepared to go into the higher technicalities, with which Mr. Campbell may be more competent to deal than myself. I am, however, more concerned with the fact that I conceived a theory which I proceeded to put into practice, and found it worked.

There is, however, one point of interest in your correspondent's letter which is shown in his Fig. 2. He quotes the turning force of an outboard engine as the Couple = $T \times d$, where d = the distance of the offset of the engine of the centre of gravity. Apparently on this theory, that the centre of gravity is shifted on to the line of thrust of this engine there should be no turning movement, in other words, the machine should fly straight. Would it?

There is one other point which Mr. Campbell appears to have missed and that is the distance in front of the leading edge of the wing at which the propeller boss is located. It would appear to be only necessary to exaggerate this distance to an absurdity to find that the propeller even set at 90 deg. will, in fact, have a very considerable turning force on the machine. Under such circumstances it would appear, in fact, that the machine would rotate on its own axis.

If the publicity of this correspondence has the effect of creating interest in multi-engined models it will, at any rate, have added something to the progress of the hobby,

Yours faithfully,

Birchington, Kent. H. J. Taplin.

SPINNING ROTORS

Dear Sir,—A few of us in England and the United States are forming the "International Helicopter Society." We are boys mostly of teen-age who are, as the name suggests, interested in helicopters and rotary-winged aircraft in general. We write to each other trading ideas for flying helicopter and autogiro models and we trade plans for the same ; we also send aviation and model magazines to each other. As we are a very young organisation we are looking for more members, regardless of age, who have any interest in helicopters, whether full scale or models. Anyone interested in joining please contact me, Bob Tennenbaum, 461 Fort Washington Ave., New York 33, N.Y., U.S.A. I will send you complete details on the I.H.S. and will give you the name of the nearest member to you, if there is one, so we will have not only an international society but local clubs as well. Here's a call for all those spinning with rotors to meet as one body.

Yours faithfully,

New York. Bob Tennenbaum.

Wind in the Wires

By A. W. Garry

FROM time to time, since the writer first designed and flew a successful flying scale model aeroplane (a spruce and silk, rubber driven S.E.5A, in 1932), experience has evolved simple and practical devices which have assisted greatly towards the construction and flying of successful scale model biplanes. A few of them are given herewith in the hope that they may prove of interest to fellow "wind-in-the-wires" enthusiasts.

Fig. 1 shows a resilient, shock-absorbing undercarriage particularly suitable for model aircraft of the Great War, when undercarriages were more or less standardised. The front legs are cut from strong $\frac{3}{16}$ plywood grooved at the top to take the 16 g. wire fitments. The rear fitting pivots in 18 g. wire clips bound to the longerons, and the front fitting is "cranked" to form a lever normally held in place to the fuselage by elastic bands looped around a dowel across the fuselage. The bottom bay in the fuselage, against which the "lever" abuts, must, of course, be sheeted in with hard balsa to form a stop. The degree of damping can be varied by the addition of further elastic bands. The rear legs are formed from strip leather, so as to be capable of flexing under shock.

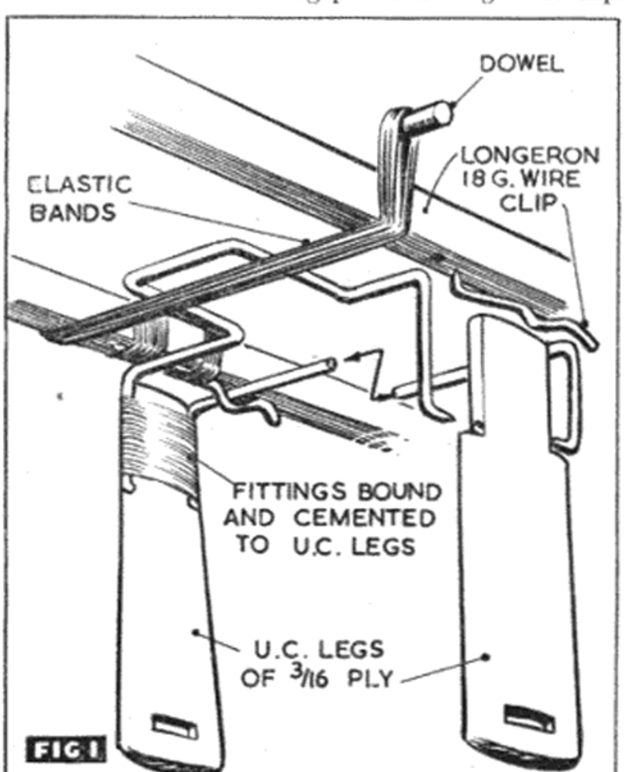


FIG 1

To facilitate the filling of the fuel tank without the need of removing the cowling, the writer uses a fountain pen filler inserted in a small aperture above the filler orifice. They can be obtained from any good stationers, or from chemists, where they are known as "ear droppers." In addition to acting as tank fillers, they also form an excellent means of metering the fuel, and so regulating the length of engine run.

The dull metallic sheen of exhaust pipes, cylinder blocks, radiators and gun barrels—so prominent a feature of World War I aircraft—may be realistically simulated by the application of grate polish. When dry, polish with a soft cloth to bring up the dull black lustre. It should be noted that grate polish will not "take" on doped or cemented surfaces, so avoid it on components to be so treated.

Those impossible-to-buy, and difficult-to-copy disc wheels of Great War aircraft, may be easily and realistically made by the following method. Wheel centres of the correct scale diameter are cut from $\frac{1}{8}$ in. or $\frac{3}{16}$ in. plywood and the usual brass bushes inserted. Semi-circular tyre "blanks" should be cut from sheet balsa, and cemented each side of the plywood disc. When the cement has hardened, circumscribe with compasses two "guide" lines around the tyre blanks. Carve the tyres roughly to shape and then insert the bush into the chuck of a hand drill. Now if the drill is, in turn, clamped

The heading picture shows a realistic flying scale model of an F.E.8 airborne over Epsom Downs. The model was built by V. King, of Thames Valley, and photographed by K. J. Miller.

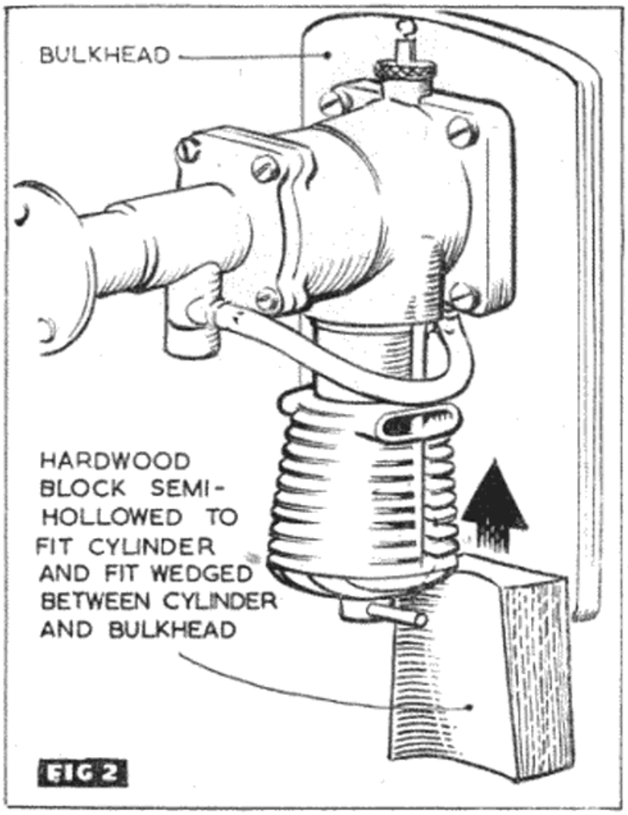


FIG 2

between the jaws of a vice, we have a simple lathe. By rotating the drill handle, and "playing" fine sandpaper over the circumference, the tyres can be easily and accurately formed. The wheel discs are cut from stiff card and cemented into place. The tyres themselves can be realistically simulated by painting on grate polish and polishing as above. Scale model fliers, who, like the writer, use long-stroke diesels, installed inverted, will appreciate the cylinder-head "steady," shown in Fig. 2. In its simplest form, it takes the form of a hardwood block, shaped to fit the cylinder barrel, and inserted as a wedge between the cylinder and the bulkhead So installed, it performs two functions—(*a*) by absorbing vibration to which long stroke engines are particularly prone, it increases r.p.m. and (*b*) it reinforces the cylinder against the possibility of damage in a heavy landing. The writer speaks here from experience, having once had the cylinder of his Frog "100" wiped off in a dive on to frostbound ground.

A simple vernier adjustment of the rudder is shown in Fig. 3. A pin is inserted into the front of the fin, so as to project about ⅛ in. This pin is inserted into a hard balsa block cemented to the appropriate bulkhead and is held in place by an elastic band as shown. When the correct position for the fin is found, mark it plainly. The fin, of course, pivots in brass or celluloid tubing cemented to the rear of the fuselage.

Scale type tailplanes, of the divided elevator type shown in Fig. 4, are structurally weak and sometimes a fast nose-over landing will cause them to fracture across the centre. The leading edge and mainspar should therefore be reinforced across the centre bay with hardwood strip.

After extensive experimenting the writer has found the 9½ in. × 4 in. K.K. Truflex propeller to be the best all round airscrew for flying scale aircraft powered with 1-1.5 c.c. motors. The highest ultimate thrust is not necessary for flying scale aircraft as opposed to contest models. The heavy plastic airscrew gives a flywheel effect and adds greatly to the steady realistic flight characteristic of the flying scale biplane.

Do not use wire to brace a biplane structure. Always use strong carpet thread (No. 18). In a really heavy "crackup" the thread will snap without structural damage, whereas wire bracing will nearly always uproot inter plane strut attachments.

Finally, in the interests of inherent stability, let the writer repeat his advice given in an earlier article. When designing a flying scale biplane, always have the lower main-plane rigged at practically zero incidence—certainly at never more than half the positive incidence of the top mainplane. The writer has never seen any practical reason given as to why this difference in mainplane incidences should so markedly improve stability, but it definitely does. The most plausible explanation is, that by rigging the top mainplane at a greater angle of incidence, it exercises more "lift" than the lower plane, thus creating a pendulum effect.

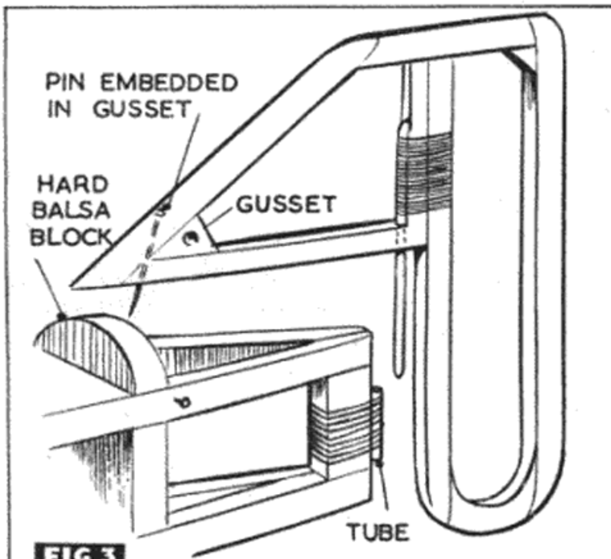


FIG 3
ELASTIC BAND PASSES THROUGH GUSSET AND OVER PINS

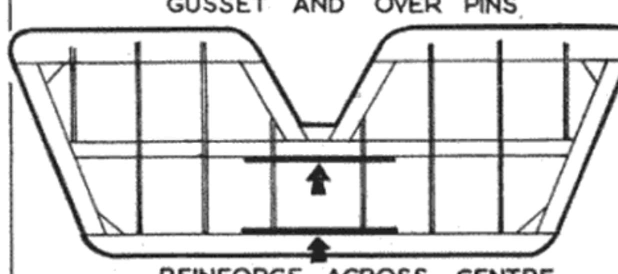


FIG 4
REINFORCE ACROSS CENTRE BAY WITH HARDWOOD STRIP

Prototypes Worth Modelling

No. 29. THE HENRY FARMAN BIPLANE OF 1912

By C. B. Maycock

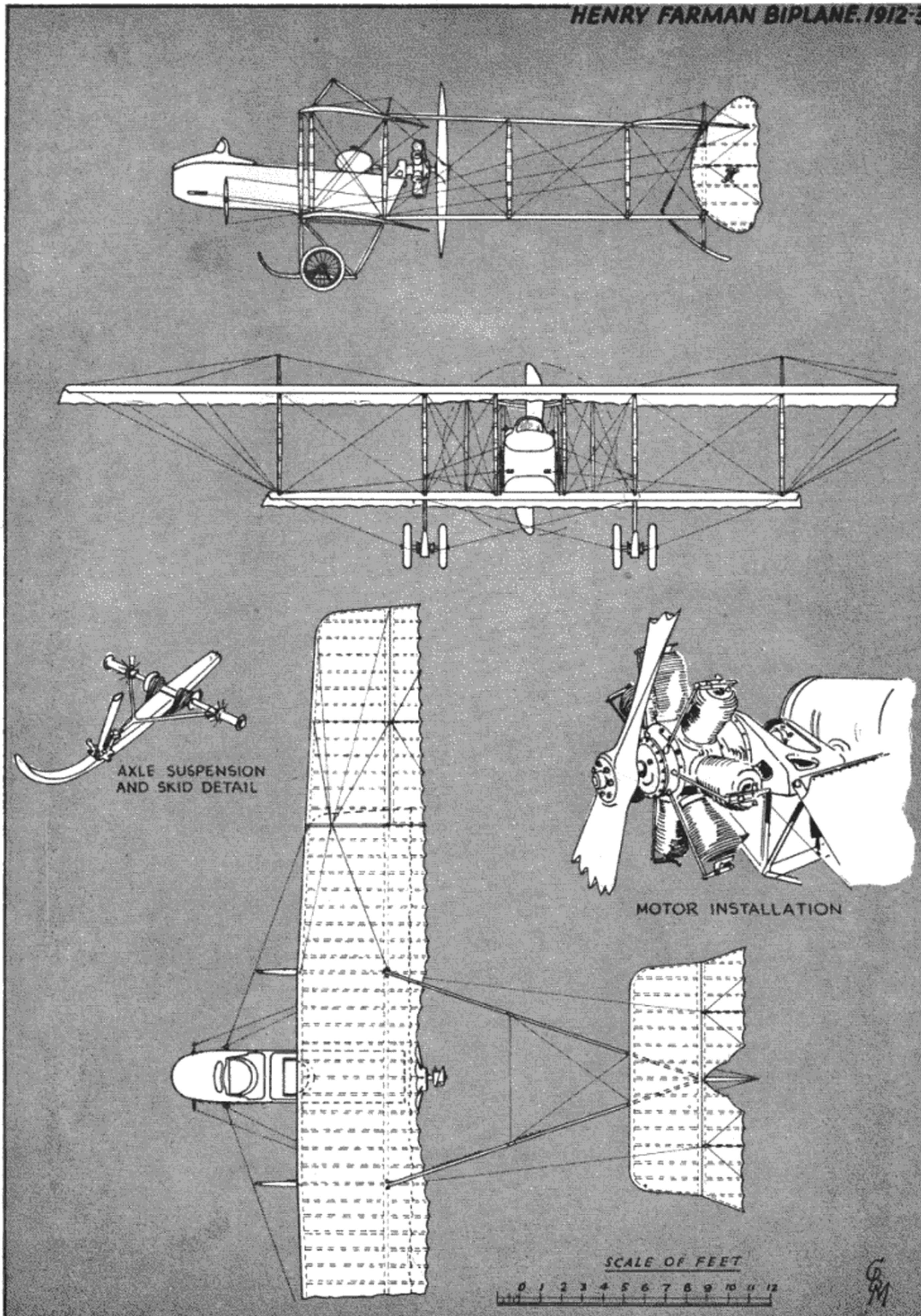
OUR choice of model this month belongs definitely to the "cap round the wrong way" era—just take a look at the pilot in the photograph! This machine was very famous in its day, and a common sight at Brooklands or Hendon aerodromes. They were easily distinguishable from their contemporary the Maurice Farman by the great overhang of the outer wing panels on the top plane, and by the distinctive shape of the rudder.

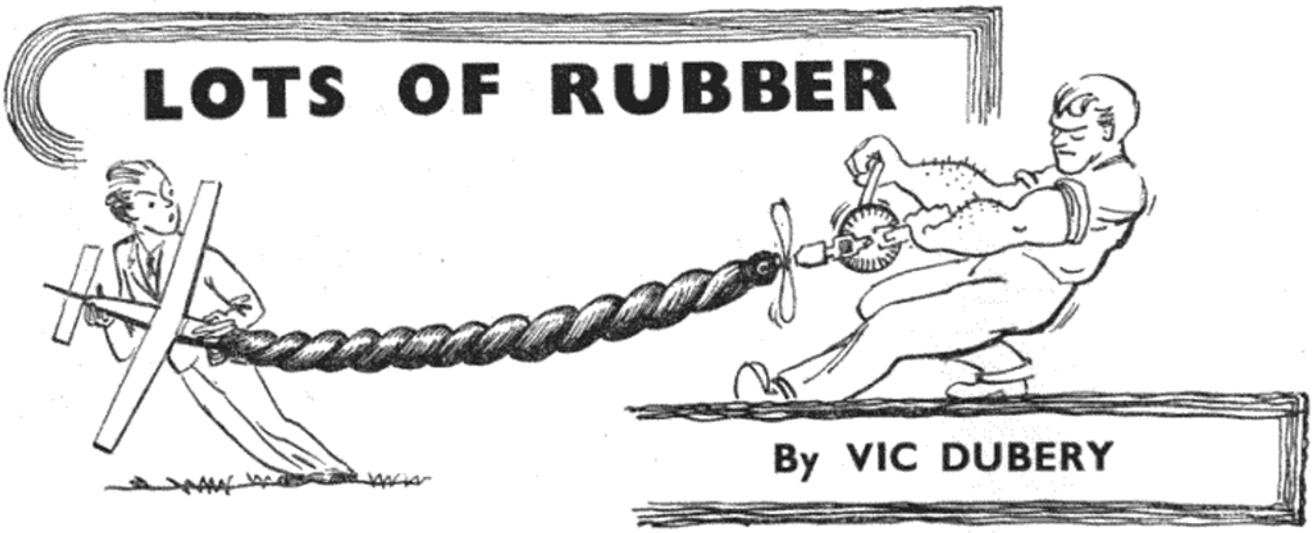
The nacelle containing the pilot, fuel tank and rotary motor, was of the usual ash and spruce, bridge structure, wire braced and canvas covered. The pilot had some protection from the elements in the form of an aluminium decking swept up to embrace a celluloid wind-screen. The rudder bar projected out of the nose of the nacelle and the wires leading from it were rove through fairleads on the vertical struts to the tail booms and thence to the control horn on the rudder. The elevator controls were served in like manner. The aileron cables were fed through the hollow spindle actuating the elevator control horns. They went direct to a pulley at the base of the outboard leading interplane strut and from there to the trailing edge of the ailerons. These latter were in the outer panels of the top plane only. The balancing cables were fed through pulleys on the upper leading edge. One of the eye-catching details of these machines was the large sheet brass fuel tank secured by thin steel straps to a cradle bolted to the top longerons of the nacelle. Behind this was a standard 80 h.p. Gnôme rotary motor of seven cylinders, having push rod operated exhaust and automatic inlet valves. This motor was bolted to a Chauvière laminated mahogany two blade airscrew. The tail booms were ash and the struts spruce, as were the interplane struts. It might be as well to note here that the workmanship on all these early "stick and string" machines was of a very high order. The finish on all exposed woodwork was like that of a good quality tennis racquet. The airscrew was highly french-polished and could hold its own in the matter of finish with the best dining tables!

The caption on this old photograph reads, "M. Chevillard in Henry Farman machine just descended after remarkable 'fancy' flight with passenger."

The wings were very simple in construction. The main spar formed the leading edge and the rear spar was approximately one third chord from the trail-edge The trailing edge followed the current practice of the time in that it was a single piano wire stretched full span along the tips of the ribs. There were twenty-five ribs in each half span of the upper planes and three ribs between at the centre section. The tailplane had seven ribs each side and the rudder six. The undercarriage struts were of ash and composed of port and starboard N-struts supporting the ash skids and braced together by wire cables. The twin wheels mounted on short axles were supported by rubber cord wound round a spool through which the axle was threaded, the wheels were held in track by a Y-shaped radius rod which also served to restrict the travel of the axle should the rubber be stretched to the limit in a heavy landing. In modelling the wire bicycle-type wheels it might be a thought to get into touch with the model car enthusiasts in the model engineering clubs. They are now adept at making realistic wire wheels.

As an alternative a clear Perspex disc scored to represent wire spokes might serve at a pinch and would probably stand rougher treatment. With regard to colours the materials used were clear varnished, and aluminium and brass were left bright. The steel cylinders were highly polished and the engine mounting black. The rudder usually carried the monogram "HF" in script characters. The top speed of these machines was about 50 to 55 m.p.h. and the landing speed about 20 m.p.h. The take off run was about the length of a football pitch and on landing, having no brakes, they rolled and rolled and rolled!


HENRY FARMAN BIPLANE. 1912-3
AXLE SUSPENSION AND SKID DETAIL
MOTOR INSTALLATION
SCALE OF FEET
0 1 2 3 4 5 6 7 8 9 10 11 12



LOTS OF RUBBER

By VIC DUBERY

ONE club meeting during the winter we had a Wakefield night. Apart from the usual "I wouldn't be seen dead with a heap like that" conversation, two or three of the Wakefield enthusiasts had an interesting chat on the subject of power-to-weight ratios. To be more precise, the subject was about the weight of rubber which should be used. It all started with some rude remarks about the alleged flimsiness of the writer's 3-oz.-airframe effort.

The idea of the criticism was that it is not necessary to go to such lengths to achieve high performance.

. . . knotted liquorice . . .

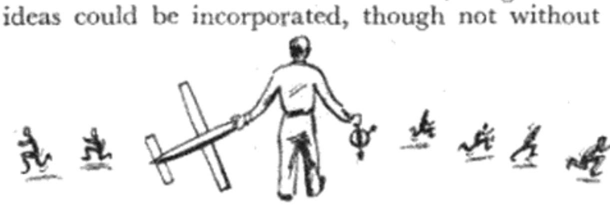
All we need do is to step up the amount of rubber in existing conventional designs. Then we would not have a model that disintegrates at a sneeze (like mine!).

Let us examine the simple arithmetic of this. We had a good selection of what are regarded as light models. Besides mine, Joe's was $3\frac{1}{2}$ oz., Bunny's 4 and Don's $4\frac{1}{2}$. (The characters, but not the models, are fictitious!) To maintain the same rubber-airframe weight ratio as my job with its 5 oz. motor, Joe would need 5 5/6 oz. of rubber, Bunny 6 2/3 oz. and Don no less than $7\frac{1}{2}$ oz. Now that is a whole lot of rubber, though it may be all right for Don because he is one of these tough guys with the bulging biceps. The question of winding is very important. If Don does not, or cannot, store the maximum amount of energy in his $7\frac{1}{2}$ oz., then some of his rubber is just pay-load and he might as well use less and have a lighter model.

The problem, however, is not just one of winding. Where is he going to put all that thrashing, knotted liquorice? The only solution is to increase the size of the fuselage in one of two ways. The simplest way is to lengthen it. Compare the 5 oz. and the $7\frac{1}{2}$ oz. skein of rubber. The former consists of 16 strands 56 in. long between 30 in. in a 38 in. fuselage. The latter would have to be, say, 18 strands, 75 in. long. Ignoring any fractional increase in width desirable this gives him another 19 in. of rubber to accommodate requiring at least 10 in. more fuselage. Here he will be committed to extra weight to the tune of approximately $\frac{3}{8}$ oz. on his existing $1\frac{1}{4}$ oz. fuselage. The alternative to this is to use twin gears and widen the fuselage, but this is even worse, because the gear train would be nearly $\frac{3}{8}$ oz. itself. The latter would, however, be preferable because the motor could be wound $3\frac{3}{4}$ oz. at a time. I doubt whether even Don's strength could cope with winding $7\frac{1}{2}$ oz. at one go, and in any case who would hold the model? The same difficulties to a lesser degree apply to Messrs. Joe and Bunny. It begins to appear that notwithstanding the difficulty of building down to such a low weight it is a much more practical solution for increasing performance than just adding rubber.

Now even this is not the whole story. Those other blokes, to keep up the ratio, have saddled themselves with high total weight: Joe 9 1/3, Bunny 10 2/3, and strong-arm Don 12 oz., plus the increases I have shown that would be necessary to accommodate more rubber. Their "stronger" models are going to be more vulnerable than my flimsy job because of their greater momentum.

So far we have not considered the glide at all. By keeping the same "power"-weight ratio we have ensured that they all reach the same height. But the heavier models will sink faster and their total time will be less. To avoid this, drag-reducing ideas could be incorporated, though not without a

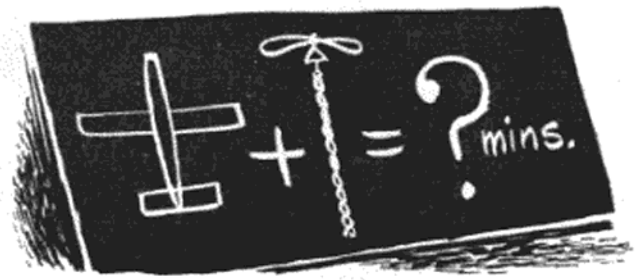


. . . who's going to hold it . . .

further weight penalty. In other words, to match the performance of the flimsy model even more rubber is required. This is why past Wakefield Cup winners can be seen with chuck gliders.

Now just a word to those people who think they can make a five-minute rubber model. The writer has kept careful records of his Wakefields dating back to a replica of Judge's model built in 1937. It appears from this information that most other modellers are far too optimistic in their estimates of performance—even when they, too, have plenty of data to use. The writer's *Wild Goose* design appears to be capable of a " still air " time of $3\frac{1}{2}$ min. when everything is just perfect, with new rubber and full turns. This is with airframe and rubber motor weighing 4 oz. each.

Now we will go back to some simple arithmetic again to investigate attempts to improve the performance. It is necessary to ensure that the total weight remains at 8 oz. to avoid increasing the sinking speed. Any percentage improvement in height of climb will then give the same improvement in gliding time and thus the same total improvement. Well, suppose we save $\frac{1}{2}$ oz. on the airframe and make the rubber $4\frac{1}{2}$ oz. This is a power gain of one-eighth only. A gain of one-eighth on $3\frac{1}{2}$ min. gives $3\frac{15}{16}$ min. A gain of a quarter (5 oz. of rubber in a 3 oz. airframe) gives $4\frac{3}{8}$ min. To get five minutes with the existing model we would need $5\frac{3}{4}$ oz. of rubber in a $2\frac{1}{4}$ oz. airframe. It could be done, but how do we test a model that lasts only one flight?



. . . simple arithmetic . . .

If you have a model that is 15 per cent. more efficient than mine and will *always* do four minutes on 4 oz. of rubber you are only a little better off. To get five minutes you will require 5 oz. of rubber in a 3 oz. airframe while still retaining the feathering prop., retracting undercarriage, streamlining, or whatever it is that made it so efficient.

Try these simple calculations based upon your previous models' weights and performances and you will see why there are not yet showers of five-minute Wakefields!

TOWLINE STABILITY

Continued from page 59

distance between tow hook and wings. There is evidence to support the theory that the nearer the centre of pressure of the wings, the centre of gravity and the tow hook can be got together in a vertical direction the better. Other designers might argue that this is reducing the " parasol stability " of the normal glider arrangement. The complete answer can only be determined by practical tests.

There are a number of other design features which might be considered by glider designers who suffer from the bugbear of towline instability. None of these are " gadgets " for, lacking as we are in a complete understanding of the subject, a gadget like a drogue is more in the nature of a despairing effort to right an unknown " wrong " rather than a constructive attempt to get down to the root of the trouble. The one exception is an auto-rudder. This seems a very desirable device for " straight " towline trim to be achieved and still get normal circling free flight. There is, however, even a debatable point here. Previously we showed how over-elevating a model can introduce instability. If a model is trimmed for circling free-flight and then set for straight trim for tow (with an auto-rudder) it is virtually over-elevated in towing trim.

Of the features which might be included in the design, many are worthy of serious consideration. Wing tip fins, for example should have a stabilising effect if the model yaws off a straight course on tow. The forward moving fin should have more drag than the opposite tip fin, tending to correct the yaw. Yet the number of gliders we have seen with wing endplates could be counted on the fingers of one hand. Is this because they do not work out in practice —or have people not tried them out?

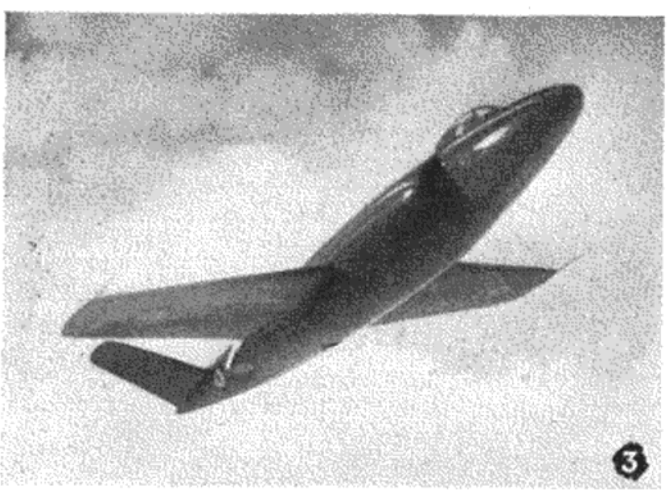
Then there are dihedralled and anhedralled tailplanes. Contrary to popular opinion a dihedralled tailplane does not necessarily benefit stability. In fact, of the two, anhedral is to be preferred. But, if it comes to the point neither should be necessary.

Regarding wing shapes it seems, if the " tip stalling " theory holds good, that parallel chord wings should be better than tapered wings. Parallel chord wings tend to stall first at the centre section; tapered wings stall first at the tip. To ensure an even stall on a tapered wing washout is necessary and, in general, the blunter the tip shape the greater the degree of washout required. And perhaps those heavily under-cambered glider sections are not so good for stability, after all.

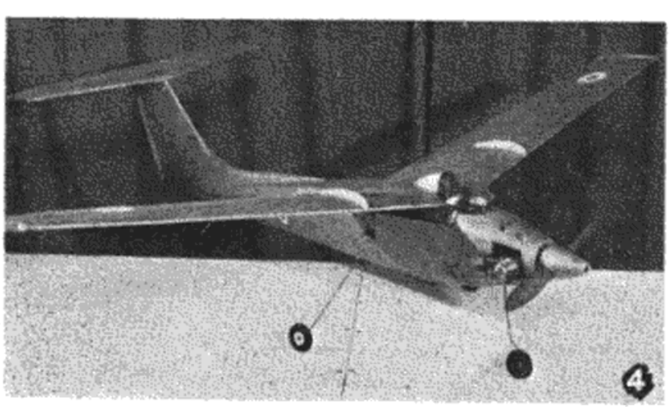
Bearing all the points mentioned in mind it may seem something of a miracle that so many gliders do tow up satisfactorily. But remember the criterion. Just how many gliders are perfectly and automatically stable under *all* conditions? How often is it the skill of the man at the end of the towline which gets the model up to the end of the line on a gusty day? We take our hats off to those designers who can, and do, consistently produce gliders with excellent towline stability. To the others who suffer in this respect, we would offer our sympathies—and the consolation that a good many other people are in the same boat!

PHOTONEWS

2



3



4

ONCE again our camera-wielding readers have produced a fine collection of photographs for Photonews, and we congratulate them on a specially good show this month. We head our column with **No. 1**, a photograph of a very well-known young lady in the team-race world. Bridget McCann of Worksop has flown her Class " B " team racer all through two seasons and has only failed to place once. During '51 it was powered by an E.D. 3.46, and was modified last year to take a Frog " 500." Keep it up, Bridget !

No. 2 was sent to us by W. Turley, of Malton, Yorks, and shows Malton club member Mike Wilson (now in the R.A.F.) launching Mike Scales' o/d glider, a consistent performer in A-2 contests.

It is hard to believe that **No. 3** is not a flying shot of a full-size machine, but it is actually a fine photograph by N. E. Townsend of a 1/72 solid *Supermarine* 508 by D. L. Page of London, S.W.2. The excellent finish on the model was obtained with the aid of *over forty* coats of cellulose ! Photograph types may be interested to know that the realistic sky was in fact " printed in " from another negative during enlarging.

The next model, **No. 4**, shows a marked resemblance to *Quicksilver*, featured on page 54, and is in fact its predecessor—*Millsbomb*. Powered by a Mills 1.3, this streamlined effort by E. Fearnley was lost in a cornfield on one of its early flights, but after lying there for three weeks in rain and shine it was recovered during harvesting when it was nearly run over by the tractor. However the model was undamaged and the engine started almost first flick ! The photograph was taken before the model was cleaned up at all after its rescue.

No. 5 came from K. R. Waddingham of Arnold, Notts, and depicts a prop-flicking session starring George Pritchett with his E.D. 346-powered stunt model *Juggler*. It seems that white jockey caps are conventional wear on flying fields nowadays !

Our Star Model (and Star Picture) this month is **No. 6**. Here we have a fine flying shot by Ed. Stoffel of a fine Mercury *Aeronca Sedan*, built by Bill and Alan Piper. The model is powered by an Elfin 1.49, which Bill says is quite powerful enough for realistic flights with this 3 lb. model.

S. Newton and M. J. Dumble seem happily satisfied with the performance of their R/C *Monocoupe* in photograph **No. 7**. Photographed by J. L.

5

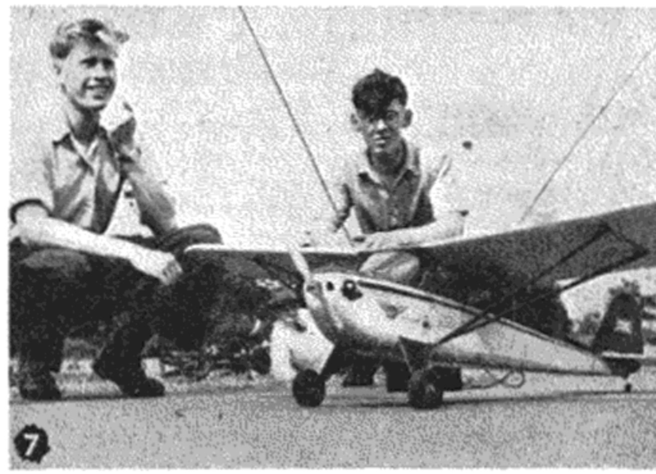
6

Genlloud of Lowestoft, the model is operated with a Flight Control Mk. 4 transmitter and H.J.N. receiver and is reported to perform well.

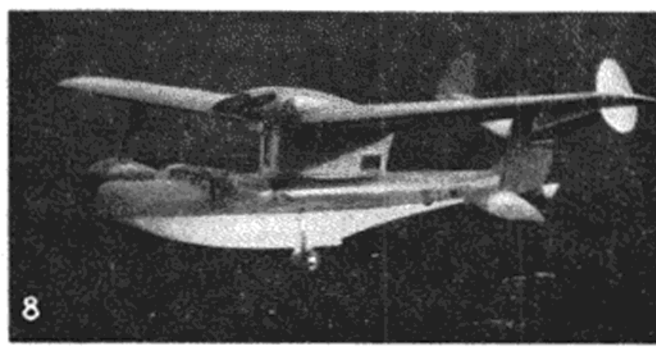
A real "best-seller" in the Model Aircraft Plans Service is M. W. Payne's flying scale model of the Supermarine *Seagull*. It seems to appeal particularly to the scale modellers and we have seen many good examples of this interesting model. Photograph **No. 8** came to us from Peter Hewett, secretary of the Lambeth M.F.C., who vouches for the performance of his E.D. Bee-powered specimen.

Ray Malmstrom has been well known (or notorious ?) for many years for his cartoon drawings and his equally bizarre models, and the man himself is shown in **No. 9** with his latest er-er-well, he calls it his Family Controliner and the occupants represent his wife, two children and himself. The cat is yet to be added. The heads are made from ping-pong balls, the model (?) is powered by a Mills .75 and even flies well ! We are informed that the plans were produced by holding Globe *Swift* 3-views in front of a distorting mirror ! The photograph is by Bill Dean.

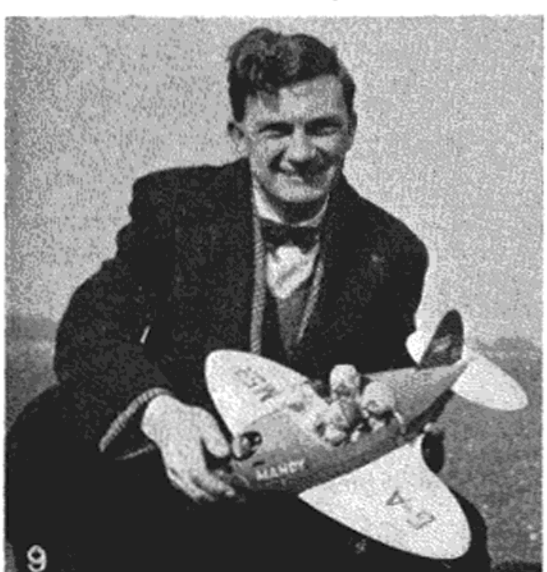
Lastly, **No. 10** came from J. B. Stewart of Salisbury and shows his "half-pint" sailplane built for a club competition open to gliders with a maximum wing area of 150 sq. in. So far this contest has not been held, and rumours have it that the performance was so good on its test flights that no one else bothered to build !



7



8



9

10

Keeping a LOG BOOK

By G. Smith

AT this time of the year, when our thoughts turn to plans for the coming flying season, the question arises as to whether it will be better to start an entirely new design or stick to " old faithful " and incorporate some modifications. Whatever the choice, the main object should be to learn from past experience and avoid any repetition of errors.

Some memories linger longer than others and we usually bring to mind our most successful models. It is often difficult to remember all the essential details which went to make that model a winner. One way of avoiding this is to put a little time and effort into keeping a simple log of model activities and then the problem is well on the way to being solved.

There are several good reasons for keeping a log book should you feel dubious and think it a waste of time. The most important is that the log provides a handy reference to your modelling career and to my mind this is invaluable. At a moment's notice you can look back and see exactly what the best fuel was you used, the types of propellers which gave the best performances with certain models, the most satisfactory length of tow line used, what rubber motor gave the best climb and a host of other valuable pieces of information.

Should you wish to delve really deep into model problems you can be sure that little log book will turn up the answer. For instance it tells you the following important facts :

(*a*) How often you fly.
(*b*) The exact life of each model.
(*c*) Your progress in any or all branches.
(*d*) Your successes or failures in contests, with the reasons.

It is not my intention to ramble on at length with advice on how a log book should be kept. Knowing full well that an modeller, probably more than most people, is at heart a true individualist, makes it all too apparent that he will make out his own log book to suit himself and his individual requirements. However, for guidance the specimen pages from my own will give food for thought and most likely give you the lines on which to work.

If you hate writing then forget the idea, but if you have a few moments to spare each week-end then why not give it a try. I feel sure you will not regret your decision and will probably grow keener with each new entry as the history of your personal model flying activities is unfolded.

SPECIMEN PAGE FOR CONTROL-LINE

Date	Place	Name of Model	Type of Model	Engine and Propeller	Fuel	Remarks
1/9/51	Wakefield	Vandiver	Stunt	Frog " 180 " (8 x 8)	Own brand	General flying, seven flights practising loops, climbs, dives. No damage. Tended to mush on pull-out.
8/9/51	York	Own design	Team Racer	Elfin 1.49 (8 x 4)	E.D Standard	Northern Area Team Race Eliminators. No wins but good practice. Speed 55 m.p.h. Pit stops 5. Time for stops—100 secs.

SPECIMEN PAGE FOR FREE-FLIGHT

Date	Place	Name of Model	Type of Model	Timekeepers	Time	Remarks
5/9/51	Wakefield	Eager Beaver	(R)	J. Brown D. Lee	2m. 15s.	Test with 300/400 turns. Climbed well but poor glide.
5/9/51	Wakefield	Vanda	(G)	J. Brown D. Lee	1m. 5s. 1m. 10s. 2m. 0s.	Club Glider Contest. Placed 3rd from 11 entries. Needs glide flattening out a bit. Must try packing tail up a bit more.
10/9/51	Doncaster	" Gala Day " own design	(P)	H.White F. Ogley	3m. 0s.	Model Rally Power Contest. One flight only; model crashed on second flight and badly damaged.

Note.—Letters under heading " Type of Model " denote : Glider (G) ; Rubber (R) ; Power (P), etc.

Topical Twists

Teenage Tactics

Many and desperate are the measures which are being constantly applied to that age old problem of youthful origin, the junior club member. One which recently caught my attention was the idea of taking him into the club on a month's trial.

Now, while I quite agree that putting up with a junior member for a whole month is certainly a trial, I should have thought that "ordeal" would have been a better word.

● ● ●

Purists at Play

Almost a century ago, so we are informed, the first model aircraft took the air. Its flight duration, though feeble by present standards, took it several hundred feet to establish the only world record yet unclaimed by the Russians.

Peculiarly enough, the designer of this first crop-destroyer made no further effort to improve upon its modest performance, and we must therefore presume that he was deterred from so doing by interference from the earlier purists, who criticised his model for not looking like the real thing. Possibly, he and the old gentleman who flew a model bird on television some time ago are one and the same person, having persisted all these years in making a model to look and fly like the only real thing in existence at that time—a bird.

Queer lot, these purists, come to think of it, with their fanatical insistence on the "real thing," and their almost grovelling desire to please the general public. Strangely enough, their conception of the "real thing" seems to be timelessly set upon a vintage type of high wing cabin model which few members of this jet-propelled generation have ever seen, or would wish to see. They are rather reminiscent of those "motoring" types one occasionally sees honking their way through the country lanes, complete with dust coats, flat caps and vintage Bentley, and who are totally oblivious of some thirty years of mechanical progress.

Having sought to petrify free-flight development to their own antiquated ideals it seems that they are now turning their attention to team racing. Already they are harping at the appearance of the few progressive designs that have broken away from the popular conception of a racing model. I pity the poor aeromod of some thirty years hence when he tries to introduce his tailless, wingless, bodyless rocket projectile into the happy circle.

● ● ●

Model Pre-fab.

At one time, in America, model aircraft used to be quite some hobby ; that is before commercial exploitation humbled it to the status of a sideline on the departmental toy counter. Now no longer does Junior gasp out his envious "Gee!" at the flying field pyrotechnics of the bigger guys, he just grabs himself a couple of bucks, hies off to the nearest toy bazaar for the latest, pre-fabricated, ready-to-fly super model, and is in there pitching with the best of 'em.

Since, on the American scene, model building is as dead as Vaudeville, we learn with surprise that there are still a few rugged individualists of the adult variety who manfully pursue the ancient hobby in the good, old fashioned way.

Some idea of the heroic nature of their struggle for survival can be got by imagining yourself trimming out the new Wakefield job in, say, Central Park. Inevitably there happens along a couple of the Junior breed, complete with television eyes and Hopalong Cassidy outfits. But they haven't come to gape at you in childish admiration. No Sirree! They're all set to try out a slick line in ready-to-fly stunters. And as they reel out the lines you wince to hear one remark to the other : "Hey! Get a load of the schmoo with the bagful of rubber. Guess some guys don't never grow up." After which they get down to a complicated stunt schedule under the indulgent glances of the passers-by.

Meantime, some public-spirited citizen, alarmed at the sight of a grown-up person playing with a toy aeroplane, has duly notified the authorities, and it is only a matter of time before you are being forcibly removed to the local psychiatric clinic.

● ● ●

Topsyturvia

Browsing through a model journal I came across the delightful phrase : "Downward Lift." I, personally, could make no more sense of that than you will of the following, for which I make no apology :

Upward descending
The little plane flew,
And the farther it went
The bigger it grew.
The higher it climbed
The lower it sank,
And the straighter its course
The tighter its bank.
With its lateral pitch
All smoothly erratic,
And its forward momentum
Decidedly static,
The longer it flew
The shorter its flight,
Until quite close at hand
It went out of sight.

● ● ●

Simply Gripping !

We read of a unique and daring feat performed by a certain stunt expert ; holding the control handle in his teeth while executing various intricate maneouvres.

This is somewhat reminiscent of my first attempt at looping. What happened to the handle at the time I don't quite know, but I don't think somehow that it was in my mouth—there was only just enough room for my heart.

Someone has remarked that you always meet the same people downwind of the contest area.

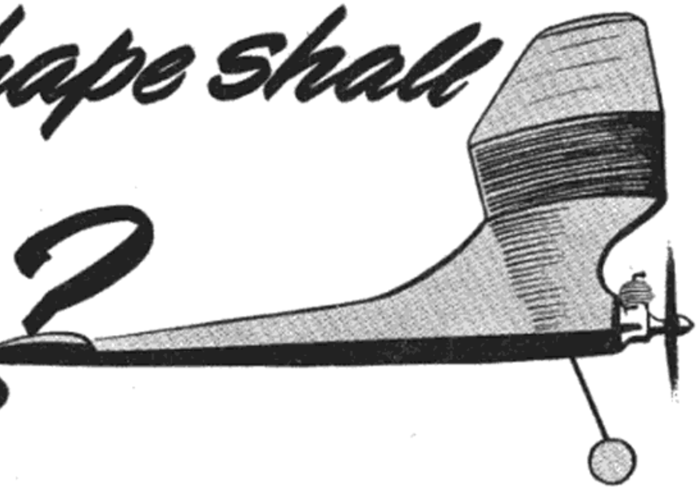
Possibly he was referring to those apoplectic old gentlemen who are given to the eccentric habit of waving angry fists from the edges of cornfields.

● ● ●

From a personal point of view I find the reports of notable models being used as museum exhibits most flattering. Only too frequently am I asked from which museum I obtain my models.

Pylonius

What shape shall it be?



By Clive Bates

HAVE you ever thought what effect the shape and position of the fin has on the appearance of a model?—On any model, from a Wakefield to a team racer, a correctly profiled fin can make all the difference between a mediocre or decent looking design.

It is no good realising that the fin is all wrong after the model is built—the drawing board is the place where the work should be done. Look at two otherwise similar designs in which the fin shape differs and it is soon easy to spot which looks the best. There are no definite rules to follow, it is just a matter of taste and common sense.

Several new fin styles have been developed in post-war years, perhaps the most notable being Bill Dean's *Slicker* type, featuring a raked-forward curved leading edge with a gentle sloping curve to the rear (Fig. 1). It is obvious that this type of fin would be no good on, say, a tricycle undercart semi-scale job. Here the ideal layout would be twin fins, perhaps as used on the Miles series of light planes (Fig. 2).

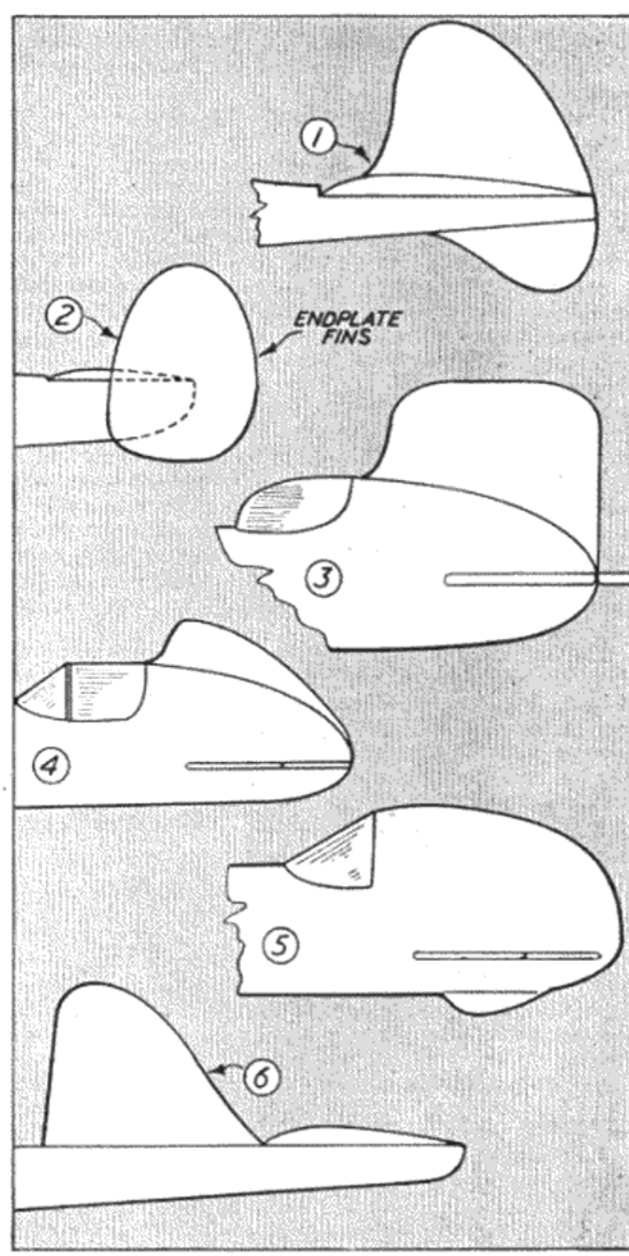
Yet another post-war style is the successful application of the squarish fin to a streamlined fuselage, as in the *Mercury Monitor* stunter which is clearly demonstrated in Fig. 3.

Team racers, where scale appearance is essential, offer considerable scope for variation of fin style. Here, selection of the right fin shape will entirely depend on the profile of the fuselage (Figs. 4 and 5). Because a dihedralled " butterfly " tail will go with one type of fuselage does not necessarily mean that it will suit another.

Sailplanes are one of the most graceful forms of model flying, and the fin should help to make the model look graceful, not completely ruin the rear end of the model as in some designs.

There are several alternative positions in which the fin is usually placed on a sailplane. Many Scandinavian designers favour fins placed in front of the tailplane, and in this case the rear of the fin can be faired into the fuselage with pleasing results (Fig. 6).

Pete Gilbert and Laurie Barr, of the Pharos Club, use an attractive fin shape on their *Thunderking* series of giant gliders, rather on the same lines as



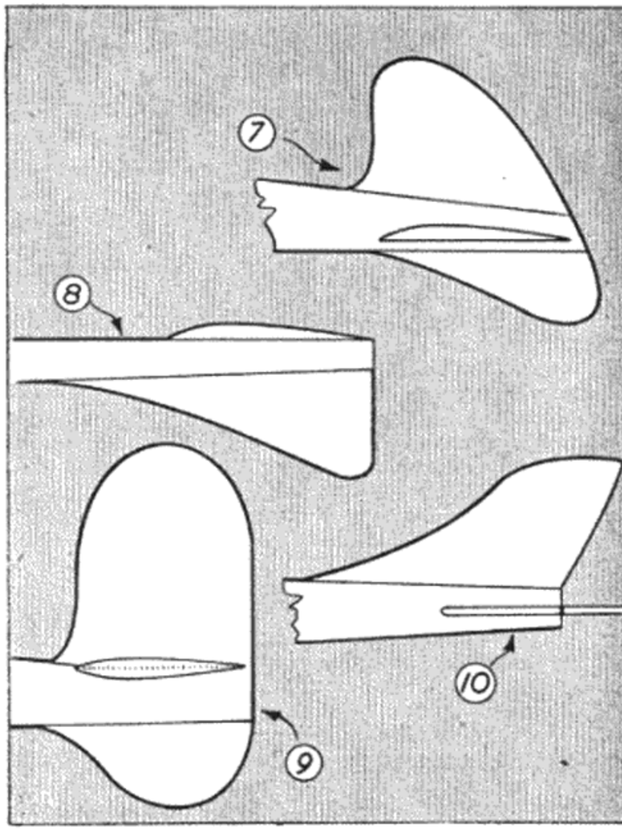
the *Slicker* style, but with a more pointed ellipse (Fig. 7). Roy Yeabsley favours a more blunt profile (Fig. 9) and in some of his earlier *Sunbug* series, placed the fin behind the tailplane.

Particularly with free flight designs slipstream considerations affect the positioning of the fin. One solution to this problem is to follow the style of Roy Yeabsley's 1950 A/2 design and place the entire fin beneath the fuselage. If this is done the fin can be so faired into the fuselage that the rear of the model is finished in a graceful curve that blends well with the general appearance of the model. (Fig. 8.)

For some reason, some of the worst fins are to be seen on stunt models, usually freelance designs. However, Ken Muscutt, of West Essex, has created an interesting design for his stunt and team race designs. Here the fin has considerable sweepback and lends rather a speedy appearance to the model.

On speed designs a fin is often omitted altogether, and sometimes dihedralled tail surfaces are used, though these are rather vulnerable in a case of a nose-over landing. If a fin is used on a speed model it should be designed to accentuate the appearance of streamlining and speed. Fig. 10 shows a typical example of this type of fin.

Whatever your choice of fin profile, please let us avoid those terrible pre-war "shovel" fins that completely ruin the appearance of a model. A little thought at the drawing board stage can make a world of difference to the looks of a model.



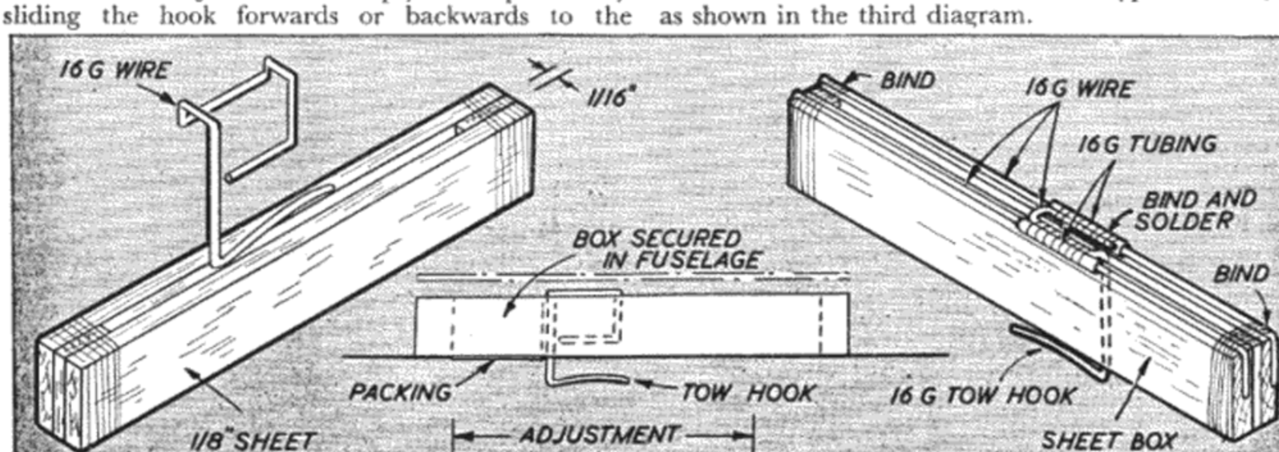
AN ADJUSTABLE GLIDER TOW HOOK

A SINGLE adjustable tow hook seems preferable on a glider to "alternative tow hook positions" as represented by a profusion of separate hooks under the fuselage. We have seen several examples of the single adjustable hook and one or two have proved very satisfactory.

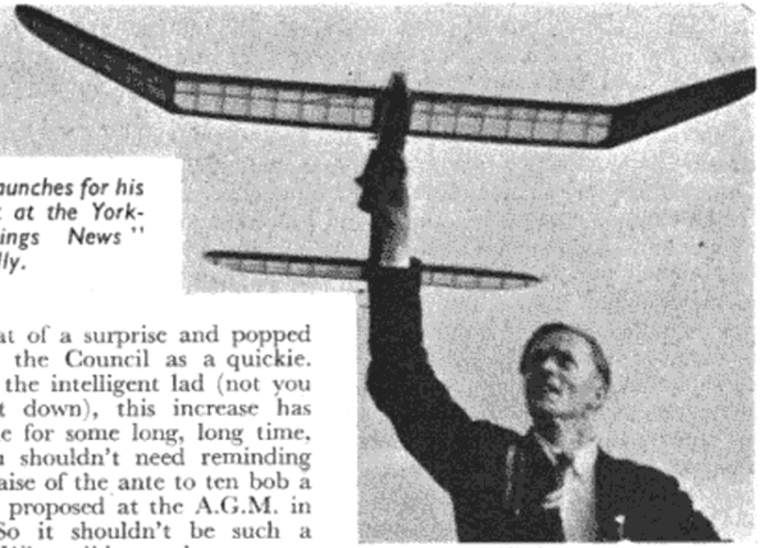
The hook itself is simply a sliding fit between a balsa "box" securely cemented in the underside of the fuselage. The top of the hook is extended and bent to fit over the box, as shown. This shape holds the hook in correct fore and aft alignment. Fore and aft adjustment is simply accomplished by sliding the hook forwards or backwards to the required position, then locking in place with a wedge of scrap balsa.

The hook is free to knock up into the fuselage on landing, unless protected by a skid extending to a greater depth than the hook. Upward movement can be limited by a strip of balsa cemented in the fuselage above the box. See second diagram.

This type of adjustable tow hook has the advantage of simplicity in that no soldering is required. In this respect it is considerably easier to make than the more elaborate fitting which is a sliding fit over internal wire runners above the same type of "box," as shown in the third diagram.



Northern Notes



Bill Farrance launches for his brother Ernest at the Yorkshire "Evenings News" Rally.

★ WELL, MY lucky lads and lasses, I hope you have all got over your Christmas headaches and empty bottles. Lucky me, due to delays in the post my last Christmas bottle was well and truly late in arriving, hence I can work up a hangover to get rid of the hangover that was left over from the hangover of Boxing Day. How did the Christmas present racket work out with you all? Did you show a profit. No? Remember to send me a note early next November and take my special course in Present Shedding, or How to Get Rid of the Antimacassar from Aunty Jane in exchange for an E.D. 2.46 from Uncle Fred. If you can read, you can follow this simple plan, one price to all, no wholesale or half price to juniors.

★ NO DOUBT everything you look at these days will have very deep blue and curly edges, particularly the idea of raising eight and eightpence for the pleasure of chasing yourselves cockeyed around the peritrack at Rufforth. Cheer up lads, its not half as bad as it seems; what's tuppence a week to you bloated lot of capitalists—if you can weather the storm of Purchase Tax, and a wife who doesn't think much about your little toy aeroplanes, one fag less a week wouldn't kill you. As was aptly remarked in my hearing t'other day, if one-eighth sheet went up by tuppence tomorrow there wouldn't be one modeller less the day after. Or would there?

★ NO DOUBT many of you will be thinking that the whole idea was somewhat of a surprise and popped over by the Council as a quickie. Now to the intelligent lad (not you Jack, sit down), this increase has been due for some long, long time, and you shouldn't need reminding that a raise of the ante to ten bob a nut was proposed at the A.G.M. in 1951. So it shouldn't be such a shock. What did surprise me was the extremely poor attendance at the meeting itself, less than four per cent. of the affiliated clubs being represented. Oh, I know, look at the expense, etc., etc., but, and a very big but, there were people in the Northern Area who advertised their intention of attending and who begged for the pleasure of acting as proxy delegate for some other club than their own. What with the people who actually went to the meeting, and people who were in London at the time, over half the clubs in the area could have been represented had they so wished. Turning to the increase itself, I can say on very good authority that it had been very carefully studied by the members of your council and every avenue explored in order to make the new affiliation fee as low as possible, as some of you may know there were two alternatives offered, full participation in all International events besides the normal National programme at eight and eight and four and four, or a National programme only at five bob and half a crown. These two recommendations were put to the meeting, and it was left entirely to the clubs present which should be put into force. These figures were worked out on the present basis of expenditure and allow for a certain amount of falling off in membership, but at the same time should permit the building up of a small reserve of capital which the society badly needs. It should be remembered also that the increase in fees will also mean an increase in income for the areas, with corresponding increases in facilities within the area. One further point, one club asked why these proposals were not put before areas to be discussed before the A.G.M. The answer to that of course is that the A.G.M. is a meeting of member clubs only; areas as such cannot put forward their opinions, nor can the area delegate vote in any way. Well, there it is chaps, I see a lot of the workings inside the movement, which cannot be appreciated by the average modeller, and my personal opinion is that this increase has been over-due for a long time. If the whole idea flops, the "what do we get out of the S.M.A.E." type of flier can look forward to the end of organised aeromodelling. And a last word to the "what do we get" blokes, *they are* the S.M.A.E. if only the silly clots would see it.

Billy Lamb with his Wakefield

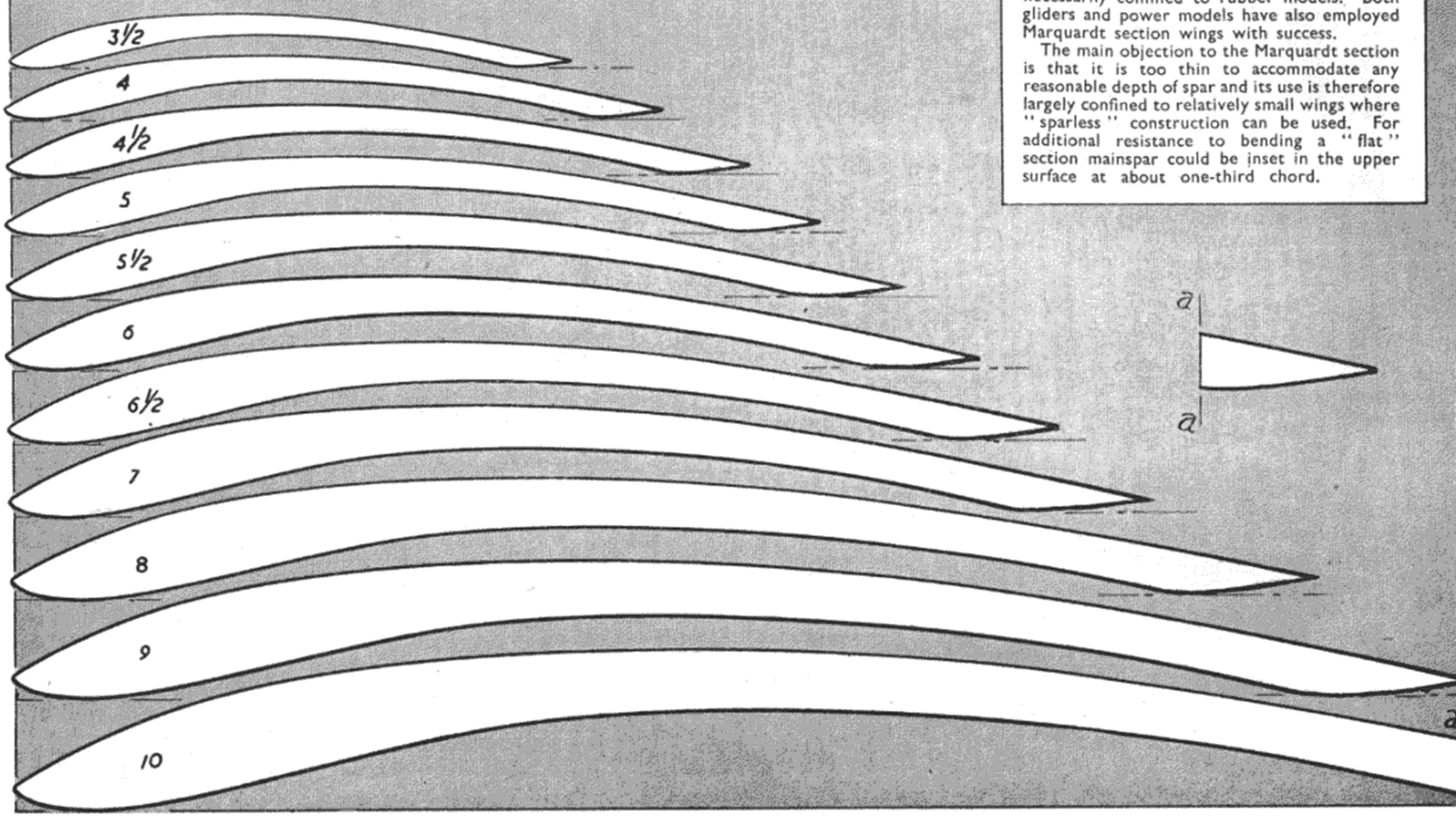
★ AT THE moment things seem to be very quiet in the aeromodelling world, although one still sees the little gang huddled in a corner and hears the mysterious words "potential duration," "still air," etc., etc. About the only news we have, is that a recent advert, offering gears has solved quite a few problems in the north, and that the York lads are going into strict training in order to get their ten foot trailers from York to Rufforth without damage, or convictions for obstruction. There is no truth in the rumour that one laddie has found a way of using the top tube of his bike frame as an A/2 fuselage, although the idea would certainly solve both problems of construction and transport. Even my staunch correspondent from the north-west seems to have run out of news this month, and of course to look for news from the north-east is nearly as bad as looking for a British victory in the Wakefield. Ah, well! Looks as if we shall have to fall back on more adventures of a certain northern aeromod of days long ago if things don't look up soon. (Not in this column you don't—ED.)

MARQUARDT

The Marquardt used to be a very popular wing section when ultra-lightweight models were all the rage. It is, undoubtedly, still one of the best "duration" sections for models having a light wing loading and its use is not necessarily confined to rubber models. Both gliders and power models have also employed Marquardt section wings with success.

The main objection to the Marquardt section is that it is too thin to accommodate any reasonable depth of spar and its use is therefore largely confined to relatively small wings where "sparless" construction can be used. For additional resistance to bending a "flat" section mainspar could be inset in the upper surface at about one-third chord.

STATION	0	2·5	5	10	20	30	40	50	60	70	80	90	100
UPPER	3·75	6·5	8·0	9·9	11·9	12·6	12·4	11·4	10·0	7·9	5·5	2·7	0·0
LOWER	3·75	1·37	·87	·12	·37	1·2	1·7	2·4	2·6	2·7	2·5	1·5	0·0



From the S.M.A.E. and the CLUBS

NORTH WESTERN AREA

The double event on November 29th of the A.G.M. and dinner proved to be the "best ever" social event of the N.W. Area. In his opening remarks before the prize giving, Mr. Foulkes referred to a dinner the week before in London which judging by the number of trophies before him must have been only a rehearsal.

The oldest trophy, the K.M.A.A. graced the table and the newest, the beautiful "Whitney Straight" trophy which was won by our 18-man scratch team at Cranfield. Admittedly we had an advantage over all other areas in the weather which was our usual "still air" conditions of a slight 25 m.p.h. breeze.

We recently gave our interpretation of the new rules a practical test. The rain *did not* stop at any period of the day but far from being a wash out, the rules were given a working out.

Opinions vary—rubber models certainly caused the major trouble of processing. A two to one balance was used—air frame at one end and rubber at t'other, the process taking about 2½ minutes to complete. One way to overcome the difficulty would be to enforce a "spot check." Gliders it is thought, require 200 ft. lines *not* 150 ft. as used. Power is O.K. at 10 sec.

We will let "Dekka" Bennett sum up: "This is the first contest I have been to where (a) I have not lost a model and (b) I have felt fresh at the end of the day."

The Area is to hold a winter rally at Tilstock; date not yet fixed, but some time in January.

LUTON & DISTRICT M.A.S.

Second competition in the winter programme for open power was won by D. Bateman with his Amco powered *Desperado*. Sad news at the club's A.G.M. was that of higher subscriptions owing to higher S.M.A.E. fees. A merry night was had by all at the dinner and social evening with a seasonable atmosphere pervading. Trophies were also awarded during the evening: the club championship cup, and bronze medal for top rubber flier both going to F. Chapman, with G. Moss collecting the junior championship. At the height of festivities Father Christmas arrived to present toys to the kiddies.

FORESTERS (NOTTINGHAM) M.F.C.

The Foresters (Nottingham) M.F.C. held their third annual dinner and dance recently, about 50 people demolishing a five course meal. The president, Mr. Lowe, then presented the club with two handsome cups of pre-war vintage, two stopwatches, and a pile of "lolly," all resulting from the wind-up of the old Nottingham & District M.A.C. Thanks were expressed by our chairman, Allan Harrison, for these magnificent gifts. Mrs. Lowe then presented the other club cups to odd bods for club competition successes. Fun, games, square-dancing, etc., then followed, the more nervous types retiring to (or under) the bar.

Sensation at the A.G.M. resulted when the minutes of the previous A.G.M were intoned. There in blue-black and off-white was a resolution decreeing that the next A.G.M. would be held in March, 1953, and there we were in November! Completely undeterred, the club voted in the committee, with the mixture mainly as before; the most important change being the creation of a new post; that of honorary rodent operative. The club was alarmed at the rapid disintegration of the furniture in the club hut (not to mention models) due to the peculiar diet of said rats.

Dave Bainbridge learned the folly of not using a d/t even when snow lies thick. His new A2 lead him a merry dance over the (frozen) canal, and finally eluded him on the edge of the Trent. The model, which has a long fuselage was later recovered some 4 miles away.

TYNEMOUTH M.A.C.

On Sunday, December 7th, the newly formed Novocastria M.A.C. (Newcastle) challenged Tynemouth to a friendly contest on Newcastle Town Moor. There was a splendid turnout on both sides, visibility was down to 100 yards at times, but still-air conditions kept models pretty well overhead. Tynemouth came on top in all events and a good time was had by all.

AEROBODS OF NOTE

No. 11

D. W. ROWE

A team racer of distinction. Has struck fear into the hearts of his rivals with a slick speedster known as *Red Lightning*.

BRADFORD M.A.C.

The Bradford M.A.C. can look back on 1952 as its most successful season for many years. In addition to the already well-known victories achieved by our redoubtable president, Silvio Lanfranchi, in bringing home to Britain the World Power Championship and in winning the Halfax Trophy, a new system of club competitions put into operation at the beginning of the year, whereby members can use any type of F/F model in all six contests, has resulted in a greatly increased entry to each event, and has done much to promote active interest in competition flying. The two best aggregates at the end of the season determine the winner in each category, each man receiving a trophy.

The winners for 1952 are:

Power Trophy for power models: S. Lanfranchi, 25 min. 9 sec.

Silvio Trophy for tow-line gliders: S. Eckersley, 12 min. 13 sec.

Driver Cup for rubber models: A. P. Miller, 13 min. 29 sec.

In addition, the Brown Muff and Adcock Trophies for the best total aggregates for seniors and juniors throughout the season were awarded to A. Collinson (33 min. 21 sec.) and F. Ellison (15 min. 29 sec.) respectively. J. Deacon won the Cripps Cup for hand-launched gliders.

The club also succeeded in reaching the semi-final of the Northern Area Knock-out, flown at Baildon on August 24th, against the West Yorks Club, but were defeated by a narrow margin.

WIMBLEDON POWER M.A.C.

It is with regret that we have to announce the cessation of the Battersea & District Aeromodellers activities. The six or seven remaining keen members have now joined the above named club which was incidentally in a similar position. This merger, will we hope try to keep some organised aeromodelling on the map locally. A reshuffle of officers has been completed and positions have been occupied by members from both clubs. A local ground is available for C/L flying up to 2 p.m. Sundays, a 40s. fine being imposed for any motor running after that time. This may seem stiff but at least we know where we stand with the local council! We are now starting a drive for new members.

GLASGOW M.A.C., GLASGOW BARNSTORMERS M.A.C. AND LANARK M.F.C.

The above clubs decided that at the close of the contest season an endeavour would be made to arrange a series of contests to be held during the winter; as a result the first contest of this series was held at Lanark M.F.C. flying ground on Lanark golf course.

The contest was a challenge match in three classes, F/F unrestricted power, rubber and glider. The weather proved almost ideal but for the cold, and many competitors prayed for a moderate fly-away to give them a little warmth in their exertions during recovery.

Ian Cochrane (Barnstomers) and J. Battey (Glasgow) found the local hazard, the loch, the first landed on the island, the second in the loch. Others were more fortunate and flying proceeded smoothly; a wide variety of sport models added to the interest and all competitors agreed at the conclusion of the contest that it had been proved a success and that another would be welcomed.

CHEADLE M.A.S.

We have done little flying this month, mainly a round of social events, the latest being our dinner—and what a night!

It started in the George and finished in the George with a bit in between comprising the dinner—very good too.

All the trophies have gone to our "absent friends" in the R.A.F. Garth Evans takes rubber, glider and championship, and Gerry Brimelow the power cup.

Stan Cooper, also not present, working away from home, took the newly presented C/L cup mainly due to his T/R activities.

The absence of a film show resulted in an excellent idea from Ray Jenyon, the chairman, namely a debate.

From this lively discussion we arrived at the following conclusions:

New members are scared away from joining this or any club by the 15s. a year subscriptions, and yet this will have to be increased because of S.M.A.E. affiliation fees going up.

We decided to offer a new member a six months' probation entry into the club, on the assumption that he cannot enter S.M.A.E. competitions. If he finds an interest in contests then he can become a full member. For 2s. 6d. we hope in the future to lead the beginner on the right path, show him, what, and how to build and further—how to fly the model. One member suggested giving old models to new members to encourage them.

WORKSOP AEROMODELLERS

At the club's recent A.G.M. it was decided that the past season's activities had been generally satisfactory. Fewer contests were entered than in 1951, and fewer first places were gained, but we were "in the money" at every contest attended, except Skegness. Bridget McCann has replaced Pete Russell as our star performer. With her class "B" team-racer, now in its second year of racing, she has placed in every event she has entered. The rest of the club have failed to cover themselves in glory, but they have formed and trained several promising pit crews, ready for 1953. There is quite a lot of activity during the off-season, flying-for-fun, experimenting with new designs, and getting ready for an exhibition to be held in February. A team race challenge match has been arranged with the "Foresters," and this may be extended into a full-scale rally.

In view of the remarks in the November Editorial, it is interesting to note that, due to difficulties with flying grounds and retrieving from "hostile native country," F/F is almost dead, and mainly confined to very small gliders, on the principle that it is not safe to risk an engine or a valuable model.

HALIFAX M.A.C.

The A.G.M. of the above club was held in the new club room at the Corporation Arms on November 13th, 1952. This resulted in a new committee being elected as follows: President, Mr. L. Stott. Chairman, Mr. J. Marsland. Vice-chairman, Mr. J. Magson. Press secretary, Mr. K. Grant. Secretary-treasurer, Mr. E. North. Competition secretary, Mr. A. Nobbs.

Several new members were accepted and the club is now 25 strong.

After a not-so-good 1952 season we are looking forward to a better year and Wakefields are taking prominence, with North flying a 50 in. fuselage, stick-type, complete with 22 in. diameter narrow bladed folder and 5 oz. rubber. Average time on half turns is 2½ min. so far. Grant has a 50 in. diamond job with a 19 in. folder, 3¼ oz. airframe and 5 oz. rubber. Flight pattern of both models is right-hand climb, left-hand glide. Hirst, Nobbs and Tattersall are still flying moderate length freewheelers quite consistently.

A new junior member, J. G. Wright, is flying a Mallard with great promise whilst M. Childs is trying both power and Nordic gliders with great success. An experimental 6 ft. job is being built by Grant whilst North is trying a geared job.

Club designs for glider, power and rubber are being thought out with hopes of getting our new members either contest minded—or should we say retrieving!

THE HUDDERSFIELD DISTRICT M.A.C.

The Huddersfield District M.A.C. hold a "junior night" every Tuesday, when, under the watchful eye of D. G. ("Sparks") Earnshaw, they get busy mass producing *Lulu's*. This programme is proving very popular. As all materials are provided free by the club, the usual question "where do I get the cash?" has been replaced by "what do we build next?".

All club records are to be scrapped in favour of a new set, under the new line length and power run rules.

January 17th has been fixed for the club *Concours*, after which several members hope to try their hands at r.t.p.

CANTERBURY PILRGIMS M.F.C.

Having had our contest efforts spoilt by foot and mouth disease restrictions on our flying field during the past season, a considerable amount of test flying is going on now that these are lifted.

Our club contests have now been completed, mainly through the help of the Deal and Ashford clubs. Eric Rigden cleaned up the power ratio trophy, while Woodruffe won rubber, sailplane and individual. Don Powell has probably got in more flying time than anybody else, and had two consecutive flights of 7 min. 30 sec. and 15 min. 20 sec. with an A/2 job which had enough undercamber to make a Marquardt look like a flat plate.

Charlie Ashby, our concours man, has raked in the usual one or two trophies for his nicely built efforts, while Verne Mount was very unlucky not to win the club sailplane trophy with his consistent *Marauder*.

And finally, don't mention the name John Ashby to Woodruffe, for this pint-sized twelve-year-old left him standing in the last round of the club rubber trophy.

SUNDERLAND & DIST. M.A.C.

At the Newcastle Town Moor, the area knock-out competition, Sunderland-Tynemouth took place in adverse conditions.

Our luck was well out. Tommy Short lost his O.D. glider on the first flight, o.o.s. 3 min.

George Jackson was the rubber entrant and he put up three flights of 1½ min. each.

Our main hope was for the power competition, in which Tommy Tate's *Mallard* takes a bit of beating. This was soon shattered by a clumsy footed spectator, who tried out his own ideas for a dethermaliser.

Bill Stones has been active again, winning second prize in a local comp. Good luck to him and here's to a first next time.

CRYSTAL PALACE M.A.C.

Everyone apparently enjoyed themselves at the club's annual general meeting held on November 22nd, at Williamsons Restaurant, Upper Norwood.

The club chairman, Mr. Mendez, opened the proceedings with a speech.

After the very enjoyable dinner came the presentations, the first of which was the presenting of the *Crystal Palace Advertiser* Annual Championship Cup to Mr. R. Swales. Next came the presentation of the Vale Shield to Mr. J. Rodgers, winner of the concours d'elegance competition, the shield was presented to the club by Mr. J. Vale, the club president.

In addition to this, prizes were awarded to Mr. R. Swales, winner of the free flight power ratio and stunt, Mr. J. Rodgers winner of the glider, and Mr. G. Lister, winner of the rubber duration competitions.

A gift was presented to Mr. and Mrs. Suters from the club members in appreciation of the hospitality shown to them in allowing a room to be used as a club room over the past year.

The evening was rounded off with a film show which proved to be very amusing.

Club membership is still rather low and the secretary would like to hear from anyone wishing to join an aero club. Drop a line to the club secretary, Mr. J. Baggett, 57, Taylors Lane, Sydenham, S.E.26. The club has great prospects for the coming year; we are hoping to organise a full contest season next year but this, of course, depends entirely upon the weather.

WHITEFIELD M.A.C.

The club has just completed its most successful contest season ever, having collected seven S.M.A.E. trophies, and secured second place in the Plugge Cup. Individual winners were J. O'Donnell, with Thurston, "Model Aircraft" and Senior Championship: H. O'Donnell with the K.M.A.A. and Junior Championship, and A. D. Bennett with the Keil and Caton Trophies. Next year's results should be most interesting and we hope (and intend) even more impressive!

Four club contests have been arranged for February and include two under the proposed 1953 rules, i.e., 200 ft. T.L. glider and rubber (motor one-third the all-up weight). Whatever next year's rules are, the club intend to have had some previous contest experience of them!

Indoor r.t.p. flying has been resurrected to enliven the club meetings, A. D. Bennett having managed 1 min. 28 sec. with a tissue-covered tailless pusher.

Three members of the York M.A.S. who started their modelling careers as juniors. On the left is Bill Lamb, winner of the 1952 C.M.A. cup. In the centre is Mike Steel who with the other member, Roy Hodgson, helped the York club to the final of the Northern Area Knock-out competition.

MODEL AIRCRAFT GUIDE TO

YOUR BEST MODEL SHOPS

RETAILERS
ADVERTISE ON THESE PAGES TO REACH THE LIVE MODELLERS IN YOUR TOWN

READERS
YOU CAN DEAL WITH THESE MODEL SHOPS WITH COMPLETE CONFIDENCE

BIRMINGHAM Tel.: Central 1223

Model Aerodrome Ltd.

43, TEMPLE ROW.
Ships, Railways, Aircraft, etc.

BIRMINGHAM Tel.: Northern 5569

The Model Mecca

204-206, WITTON ROAD, 6,
A 100% Modelling Shop. Aircraft Kits, etc. Trix "OO" L.M.S. Co. "O" gauge. 5 and 5A buses pass door.
WRITE, PHONE or CALL

BIRMINGHAM Tel.: Selly Oak 1645

Turners Modeldrome

734, PERSHORE ROAD, SELLY PARK
Model aircraft supplies, Keilkraft, Veron and Jetex kits. Personal attention of D. J. Turner

BOLTON

Roland Scott

The Model Specialist
147, DERBY STREET
The best shop for miles around

BRIGHTON Tel.: Brighton 26790

Model Aerodrome Ltd.

37, WEST STREET.
Ships, Railways, Aircraft, etc.

BRISTOL

The Model Airport

51, COLSTON STREET
Get your supplies from the leading M.A. shop in the town

CANTERBURY Tel.: 48212

Meers (Engineering) Ltd.

22, SUN STREET
(Under the Shadow of the Cathedral)
Agents and stockists for leading Model Manufacturers.
Personal and Postal Service

CARDIFF Tel.: 29065

Bud Morgan

THE MODEL AIRCRAFT SPECIALIST
22/22a CASTLE ARCADE
Largest model aircraft stock in the country, **PLUS** *first class mail order service. Send for my 1952 price-list, No. 2.*—**FREE**

COVENTRY Tel.: 6315

Beesley's

89, SPON END
For all your Model Aircraft requirements. Personal attention. Mail order

COVENTRY Tel.: 63317

Coventry's Model Shops

21 HALES STREET & 62, LOWER FORD STREET
YOU WANT IT ....
....................WE'VE GOT IT
Phone or Postcard for C.O.D. Orders

DARTFORD

Modern Models

12, THE MARKET, LOWFIELD STREET, DARTFORD, KENT
Whether you call or whether you post, we claim we've got more stock than most

EDINBURGH Tel.: 3205

The Scotia Model Co.

40, CHAMBERS STREET
Let Mr. Wade advise you. Leading stockists for Kits, Keilkraft, Balsa and Model Aero Supplies, etc.

YOUR BEST MODEL SHOPS—CONT'D.

MANCHESTER Tel.: Blackfriars 1922

The Model Shop

13 BOOTLE STREET, DEANSGATE

We have **EVERYTHING** *in stock for the aeromodeller Kits, Engines and Accessories*

MANCHESTER Tel.: Blackfriars 9156

Model Supply Stores

17, BRAZENNOSE STREET

for absolute satisfaction come to us for your model aircraft requirements
Northern factors for SKYLEADA kits

MITCHAM Tel.: Mitcham 1514

Mitcham Models Co.

243/5 LONDON ROAD, MITCHAM

Model aircraft kits and accessories specialists
Model engineering tools etc. Yachts and trains

ORPINGTON Tel.: Orp. 7903

Cray Model Craft

155, HIGH STREET, ORPINGTON, KENT

The **only** *model shop in Orpington*

SHEFFIELD

Hobbies Ltd.

4, ST. PAUL'S PARADE

A branch of the firm which is known to Modellers throughout the world. All M.A. requirements stocked

SOUTH AFRICA

A. W. Yardley (Pty) Ltd.

33, KERK STREET, JOHANNESBURG

Model plane, model ship and model railway supplies from the leading British and American factories

SOUTHAMPTON

Hobbies Ltd.

25, BERNARD STREET

A branch of the firm which is known to Modellers throughout the world. All M.A. requirements stocked

SUTTON Tel.: Vigilant 8292

E. L. S. Model Supplies

272, HIGH STREET, SUTTON, SURREY

Surrey's Hobby Centre. By return Postal Service
Complete stock of all M.A. requirements. Personal attention from Norman Butcher

TEDDINGTON Tel.: Molesey 4349

W. H. Price

86, BROAD STREET, TEDDINGTON, MIDDX.

For all modelling requirements. Speciality resin bonded ply, balsa, beech, obeche, spruce

WESTCLIFF-ON-SEA Tel: Southend 2896

Paramount Model Aviation

695, LONDON RD., WESTCLIFF

We stock only the best

PARAMOUNT MODEL AVIATION

695, LONDON ROAD, WESTCLIFF

CONTROL LINE WIRE

150ft. COILS OF 33 s.w.g.

ONLY **2/- COIL**

MAIL ORDERS OVER 20/- POST FREE

TRADE SUPPLIED

MODEL AIRCRAFT

68

PAGES OF INFORMATION, PICTURES & PLANS MONTHLY.

To any part of the world we will send you a copy of each issue for 12 months

for £1

OR ITS EQUIVALENT IN FOREIGN CURRENCY.

SUBSCRIPTION DEPARTMENT
MODEL AIRCRAFT
19-20, NOEL STREET, LONDON, W.1

MODEL AIRCRAFT CLASSIFIED ADS

Private 3d. per word prepaid. *Trade*, 6d. per word prepaid. Minimum 18 words. Box No. 2s. 6d

FOR SALE

BARGAINS GALORE. No trouble at all. Peruse carefully the advertisements in this issue and see for yourself.

AMERICA'S famous magazines. One year's supply. "Model Airplane News," 25s.; "Flying," 35s. Free booklet listing all others sent on request.—WILLEN LTD. (Dept. 22), 101, Fleet Street, London, E.C.4.

OHLSSON "23" ENGINE, £4 10s., spark ignition, new (not run). —Box No. 249, MODEL AIRCRAFT offices.

ZEISS SUPER IKONTA 531 CAMERA, f/3.5 T-coated Tessar lens. Case, hood, filters, Ikometer, £60.—Box No. 250, MODEL AIRCRAFT offices.

ATLANTIC MODELS, 335, Bradford Street, Birmingham, 5, announce new list available for the trade. Aircraft, marquetry, galleons, engines, railways, accessories for all models.

MILES (E.D.) 5 c.c. DIESEL (see May, 1951 "Model Aircraft") £6. Dart .5 c.c., £2. Comp. Special 2.c.c. £1 10s. 0d. Amco 3.5 and Accessories, £2. Slicker Mite Kit, 5s. Jetex 100 and "Smokey Joe," 5s.—VENNER, 3, Strathmore Drive, Dunfermline, Fife.

WANTED

PLANS of pre-1941 British and American petrol models, any type, condition unimportant, preferably obsolete, ½A glow plug engines, new, in exchange for pre-1941 American engines or rotary-valve diesels (new.). LT. CODDING, Shaftesbury Military Hospital, Shaftesbury, Dorset.

BALSA WOOD

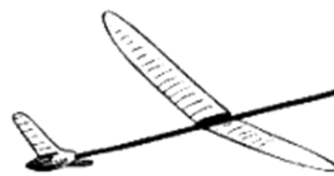
We are Specialists in the Machining of Balsa wood strip, sheet and block. Send s.a.e. for comprehensive price list. We also specialise in OBECHE, SPRUCE, ASH, PLYWOOD, etc., for the Model Trade. Prompt attention given to Trade enquiries.

E. LAW & SON (TIMBER) LTD.
272/4, HIGH STREET,
SUTTON, SURREY
Phone: VIGILANT 8291-2

NOW'S the TIME . . .

. . . TO BUILD THAT COMPETITION WINNER
CHOOSE A PLAN FROM THESE SUCCESSFUL MODELS

M.A. 117 RED SWAN ... 5/6
Henry Tubbs' outstanding model which in addition to other competition successes, gained second place in the 1951 Wakefield contest.



M.A. 118 TOOTHPICK ... 5/6
This unconventional A-2 glider by Austrian Oscar Czepa, won the 1951 Swedish Cup contest in Yugoslavia.

M.A. 109 WHIPLASH ... 6/-
Bill Taylor's very successful radio controlled model which was the winner of the 1951 S.M.A.E. International R/C Contest.

M.A. 113 WARD'S WAGON 6/-
The 1951 PAA-load contest winner, which has also a fine performance for other power duration contests. Designed by Ron Ward.

M.A. 121 CONTENDER ... 5/6
This remarkable pylon model by J. A. Gorham has more contest successes to its credit than any other model of its type.

M.A. 88 RED LIGHTNING 3/3
A good-looking Class B team-racer design by D. W. Rowe, which has had many victories at gala days and rallies.

M.A. PLANS DEPT., 19-20 NOEL ST., LONDON, W.1

TRUCUT

NEW! 5" & 6" Dia. + 3" Pitch 1/10 ea. Inc. P.T.

AIRSCREWS

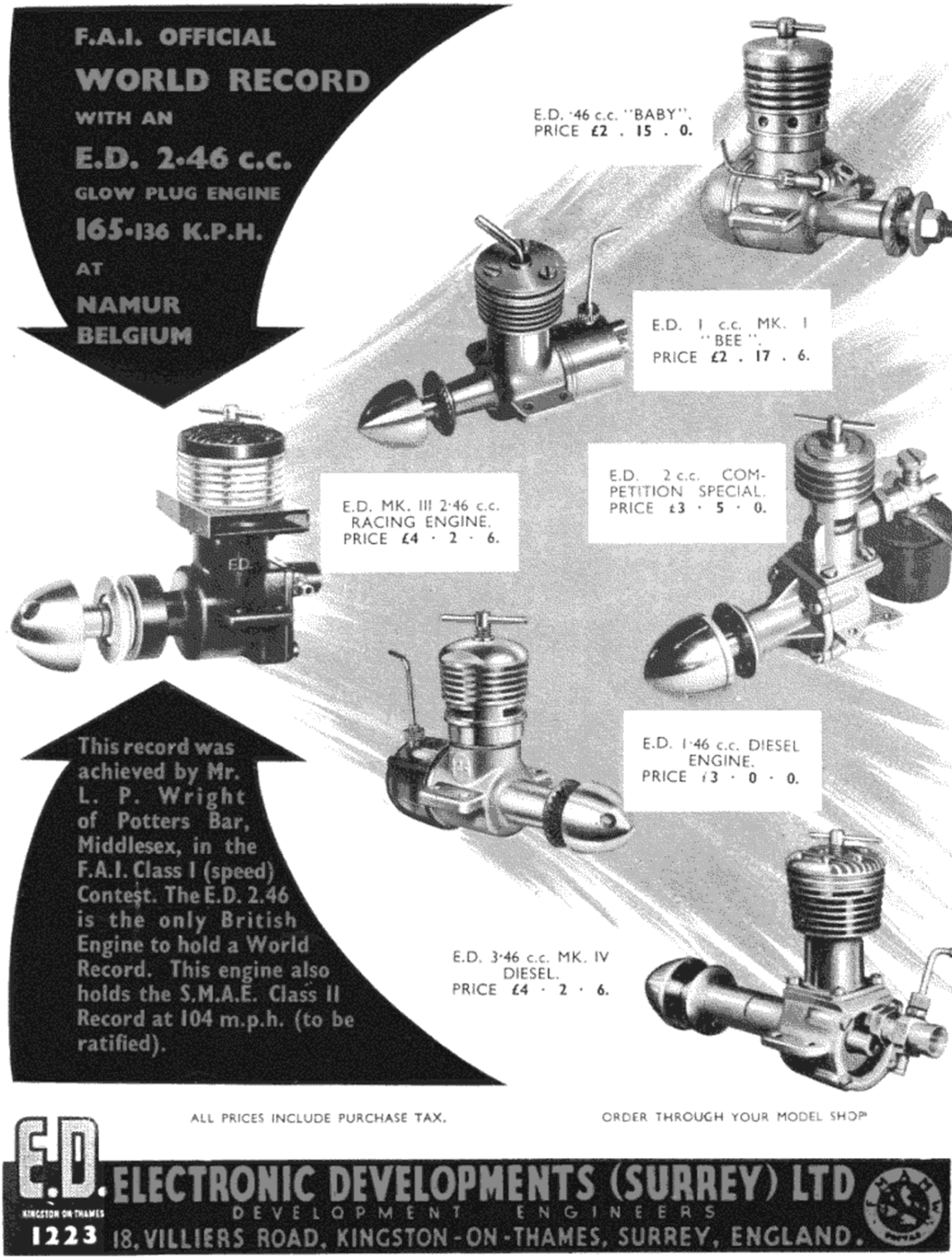
THE CHOICE OF WINNERS :

FOLLOW THEIR LEAD ———— FLY TRUCUT

	6"	7 & 8"	9 & 10"	11"	12"	13"	14" DIA.
	1/10	1/11	2/1½	2/4	2/9	3/0½	3/7 each inc. P.T.
PITCHES	4-12"	4-12"	4-12"	4-12"	4-8"	6-8"	6" EVEN NUMBERS ONLY

OBTAIN FROM YOUR MODEL SHOP! **PROGRESS AERO WORKS, CHESTER RD., MACCLESFIELD**

Printed in Great Britain for the Proprietors by ELECTRICAL PRESS LTD., Cordwallis Works, Maidenhead, Berks, and published by PERCIVAL MARSHALL & CO. LTD., 19-20 Noel Street, London, W.1.
Sole Canadian distributors—Messrs. Gordon & Gotch Ltd., 43, Victoria Street, Toronto 1, Canada.
Registered for transmission by Magazine Post to Canada including Newfoundland.



F.A.I. OFFICIAL
WORLD RECORD
WITH AN
E.D. 2·46 c.c.
GLOW PLUG ENGINE
165·136 K.P.H.
AT
NAMUR
BELGIUM
E.D. ·46 c.c. "BABY". PRICE £2 . 15 . 0.
E.D. 1 c.c. MK. 1 "BEE". PRICE £2 . 17 . 6.
E.D. MK. III 2·46 c.c. RACING ENGINE. PRICE £4 · 2 · 6.
E.D. 2 c.c. COMPETITION SPECIAL. PRICE £3 · 5 · 0.
E.D. 1·46 c.c. DIESEL ENGINE. PRICE £3 · 0 · 0.
E.D. 3·46 c.c. MK. IV DIESEL. PRICE £4 · 2 · 6.
This record was achieved by Mr. L. P. Wright of Potters Bar, Middlesex, in the F.A.I. Class I (speed) Contest. The E.D. 2.46 is the only British Engine to hold a World Record. This engine also holds the S.M.A.E. Class II Record at 104 m.p.h. (to be ratified).
ALL PRICES INCLUDE PURCHASE TAX.
ORDER THROUGH YOUR MODEL SHOP
E.D.
KINGSTON ON THAMES 1223
ELECTRONIC DEVELOPMENTS (SURREY) LTD
DEVELOPMENT ENGINEERS
18, VILLIERS ROAD, KINGSTON-ON-THAMES, SURREY, ENGLAND.