AEROMODELLER

JUNE
1949

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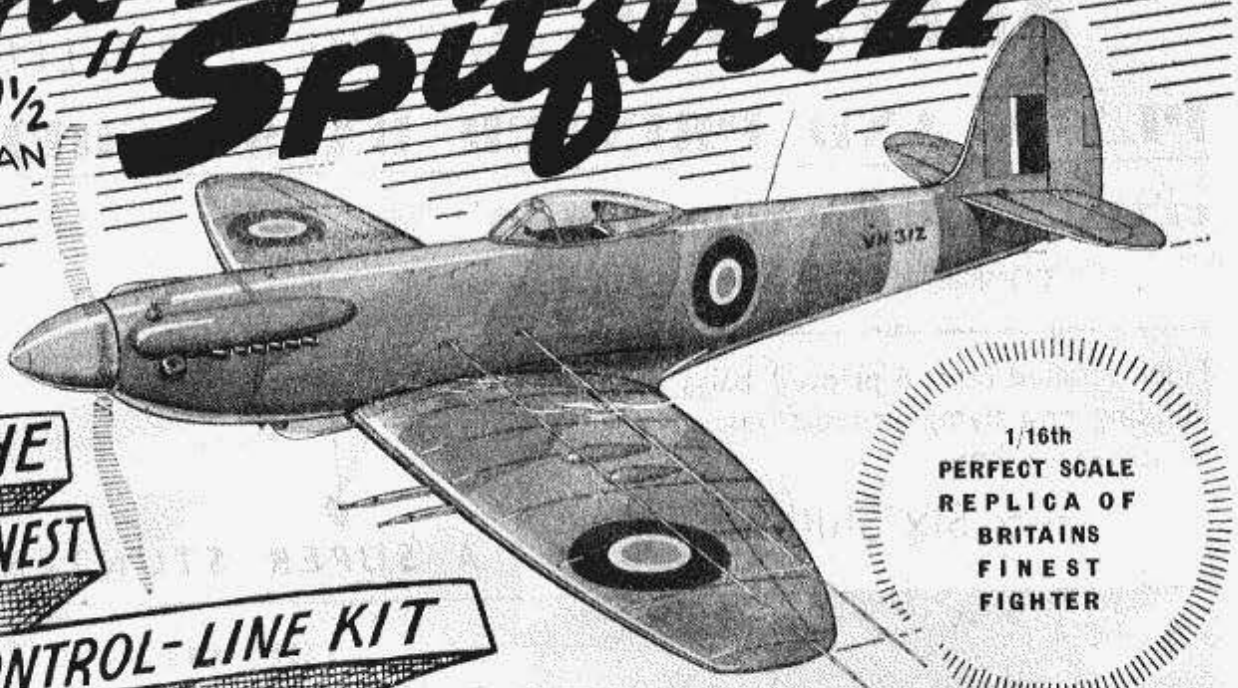
27½ SPAN



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CONTROL LINE MODEL AIRCRAFT

Compiled by
D. J. LAIDLAW-DICKSON

Edited by
D. A. RUSSELL, M.I.Mech.E.

CONTROL LINE MODEL AIRCRAFT is intended to offer suitable guidance and instruction to the many thousands of ordinary aeromodellers who are already struggling with the initial stages of flying, or hope to do so in the near future. It does not pretend to teach the expert anything—as if one could !—but it will help the newcomer to this fascinating branch of flying to avoid the sometimes expensive pitfalls that can beset him. It answers in its pages many of those questions that have always seemed too obvious for the well-known authorities to even mention ; it takes the would-be flyer in easy steps from his first model, usually a kit, to his first loop. Constructional methods as applicable to control line work are discussed and considered. We have frankly searched the best sources available for skilled advice on all aspects, and to this "know-how" is allied our own practical experience learned the hard way as absolute beginners, through a bucketful of broken props to comparative skill.

Orders should now be placed with your local model shop or bookseller for immediate delivery. See that you get your copy and join the band of *successful* control line flyers.

CONTENTS

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Size 8½ × 5½ ins. 128 pages, white art paper. Fully illustrated photos and line drawings. Nearly 35,000 words. 3-colour dust jacket. Cloth and card bound, gilt titling. **PRICE** **7/6**

AEROMODELLER ANNUAL

CONTENTS

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Best of the world's models described and illustrated with photos and dimensioned drawings. Thirty models include world record holders national champions, sailplanes, rubber, power, speed and stunt control-liners.

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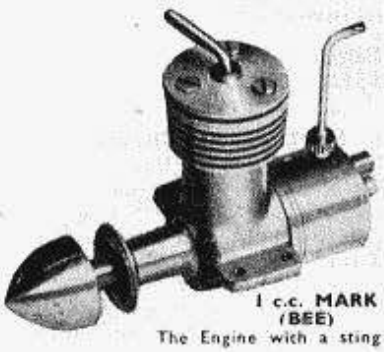

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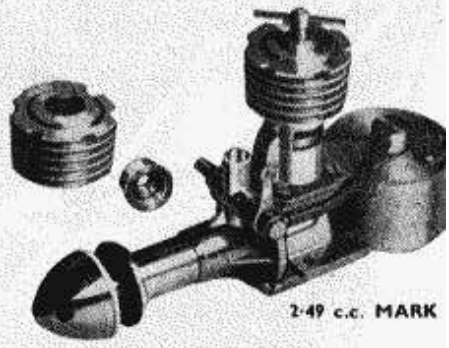

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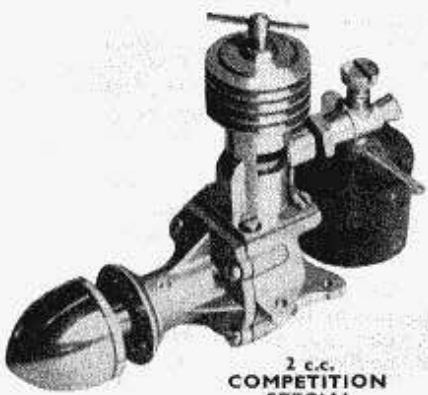

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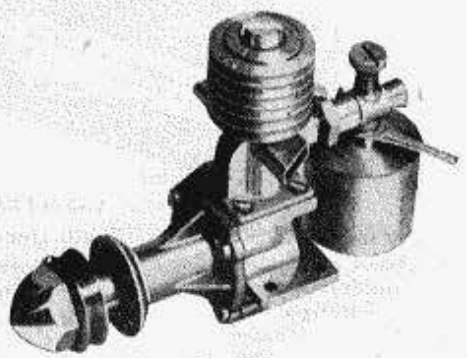

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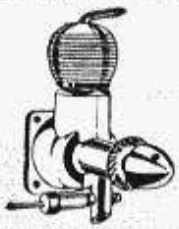

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The technique and skill which went into making the 1·8 such a phenomenal success has been used to advantage in producing a new ELFIN which is going to fill a real need for an engine of this capacity and power. In performance it is everything you would expect of an engine carrying the name ELFIN, and as a competition model this new 2·49 is going to be a real winner.

89/6

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The engine that made the Marlin possible, it remains the most popular competition Diesel in its class. **79/6**

ALLBON THE DEPENDABLE DIESEL

Fastidious modellers continue to insist on this craftsman-built 2·8 c.c. Diesel. The Mk. 11 version is a beautifully engineered job with a performance to be proud of.

£4 · 19 · 6

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The world's most efficient handle is now reduced in price. All C/L flyers need it.

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AMCO 3·5 c.c.

The design, power and performance of this AMCO masterpiece place it amongst the world's finest motors. Every possible feature for the betterment of C/L performance has been built into it, and in the hands of experienced flyers, terrific results are being achieved already with AMCO 3·5.

97/6

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It has always been our declared policy that when improvements in our engine fuels became possible, they would be passed on at once to users. We are pleased therefore, to announce improvements in the following three fuels now on sale everywhere.

No. 2. RACING METHANOL (GREEN LABEL) Improved formula guarantees easier starting. Price unchanged for 8 oz. bottle. **3/–**

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No. 6. Now contains water resistant, anti-corrosive component. New formula allows No. 6 fuel to be used long before new engines are fully run-in. Remains the foremost fuel of its kind. Price per 8 oz. bottle reduced to **3/–**

Modellers insist more and more on Mercury Fuels. No. 3 Diesel Fuel (Orange Label) is good for all Diesels.

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MERCURY ETHER
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FULLY AEROBATIC LIGHTWEIGHT STUNT MODEL

Brings to C/L flying an added sense of realism through its elegant streamlined proportions. The Marlin has actually performed vertical and overhead "eights" in standard trim, as well as all the other approved advance stunts. Designed for the Elfin 1·8, it can also be flown with the new Elfin 2·49, Arden 199, Ohlsson 23 and other radial mounted engines.

Kit contains Mercury SUPREX Plan. Printed and cut, top quality Solarbo, spinner, tank kit, cement, tissue, wire, etc.—everything in fact, except dope. **19/6**

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World's Fastest

With an official speed of 163 m.p.h., this is the world's fastest C/L plane. Made by Mercury, under licence from U.S.A. Can be flown with the following engines— E.T.A. "29", G. Plug, Yulon 5 c.c. G. plug, Nordec 10 c.c. Petrol or G. Plug.

Kit complete **29/6**

Release Date to Trade—June 1st.

Dealers are invited to send for our latest trade lists which we shall be happy to forward them regularly.

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Managing Director: F. BARNARD.

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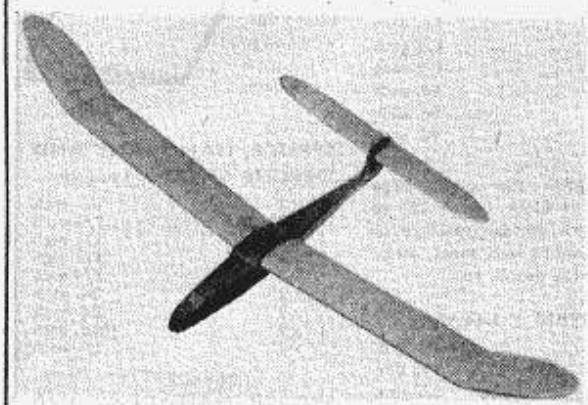


7 ft. wing span, high performance Sailplane, designed by Ray Silver. Conforming to F.A.I. regulations. Kit contains cut-out wing ribs, wing tips, tailplane ribs, shaped trailing edges, ample wood, tissue, cement, blue print, etc.

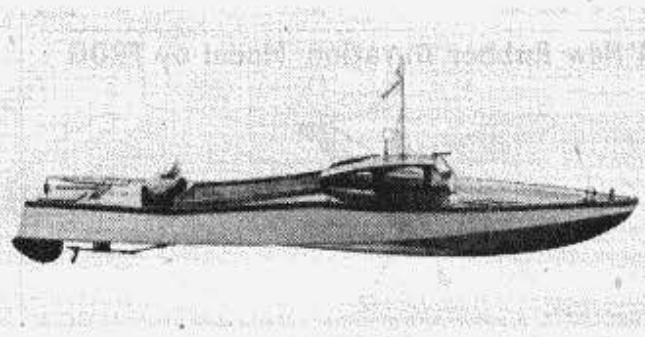
This Month's FREE OFFER

With EVERY ORDER for one of these kits or engine, or other goods value £1 we are giving ABSOLUTELY FREE a cloth-bound Pocket Log-book 6×4 ins., full of model data and laid out for personal model records (normally sold at 3/–).

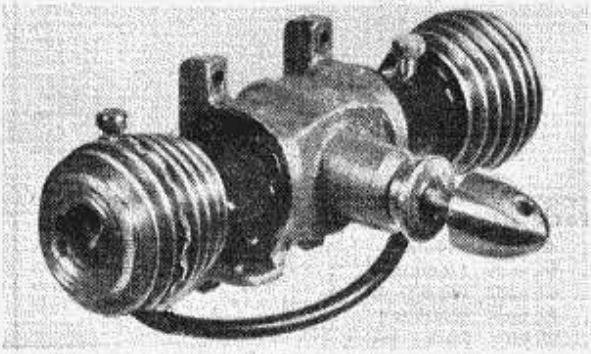
REMEMBER—IF IT'S GOOD WE STOCK IT ! ! Order your general model requirements when sending for these kits—or ask for full catalogue.

Look out for Further Offers and New Kits next month.

P.M.4. "GYPSY AVENGER" 35/-



34 in. high-speed Cabin Cruiser. Designed by Cecil Phillips and suitable for any 2 c.c. to 3·5 c.c. diesel or petrol engine. Kit contains decking cut to shape, finished propeller shaft and tube and universal joint. Ample supply of spruce and other materials, blue print, etc.



"LIONHEART" 2·48 Dsl./G.P.

Capacity 2·48 c.c. Weight 5½ ozs. Revs. per min. 6–7,000. Bore ·580 ins. Stroke ·595 ins. Recommended Revs. 5,500 (10×6 prop.)

OUTSTANDING POINTS OF NOTE.

1. Robust.
2. Beam or Bulkhead installation optional.
3. Powerful for its capacity.
4. Easy to start.
5. Variable comparison for Glow plug working (a patented feature).
6. Variable compression for Diesel running.
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9. Full scale appearance lending itself to adaptation to Flying Scale models.
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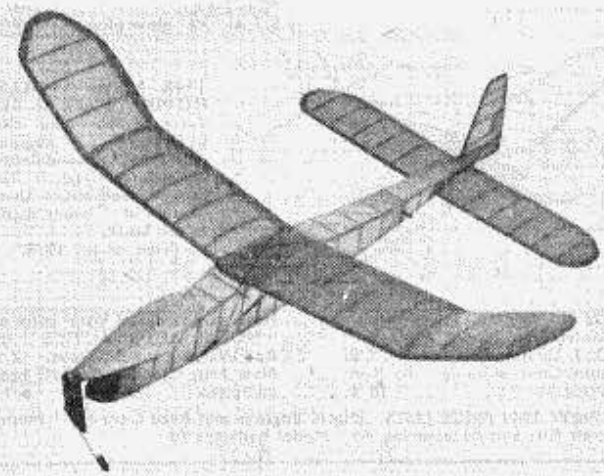
"LUCIFER" 18/6



35 in. lightweight duration conforming to F.A.I. regulations, designed by Richard Vahey. Kit contains cut-out wing ribs, ample wood, tissue, cement, blueprint, etc. Finished single-bladed propeller.

AEROMODELLER
INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

Contents

VOL. XIV. No. 161 JUNE, 1949

Your "Aeromodeller"

THE response to a request made in last month's Editorial to readers who in the past have suffered from late delivery of their copies of the magazine, should let us have full particulars, has brought quite an interesting amount of correspondence. Generally speaking, it seems that distribution of the magazine is fairly evenly timed throughout the country but, as we have from time to time previously acknowledged, individual copies of the magazine have quite often been received some days after the publication date of the 25th of the month.

Now, in accordance with our promise, great efforts have been made by all concerned to get *this current issue* distributed throughout the length and breadth of the country so that copies could be on sale everywhere by the 25th of May. Will any reader or model shop proprietor, who has not received his copy/supplies by the 25th of the month, please let us have a postcard to Head Office at the Aerodrome, Eaton Bray, and we will look into the matter immediately.

An Appeal to the Trade

As part of the service to our readers, we have in the past compiled and distributed free, lists of all model clubs and model shops in the country.

Last month "Clubman" made an appeal to Club Secretaries to complete and return to him, as soon as possible, forms which have been distributed to every known model aircraft club in the country and on which particulars of membership, and so on, could be entered.

Now, in this Editorial, an appeal is made to every model aircraft dealer in the country to send us a postcard giving thereon, his name and address and the number of copies of the AEROMODELLER which he sells each month.

It has long been felt that if a survey could be made of the whole of the country, most valuable information both to the model aircraft movement itself, and to the trade, could be obtained.

The organisation of the AEROMODELLER is capable of, and in fact, willing, to carry out the considerable amount of colating and tabulating work necessary to produce this survey; and it is hoped that dealers, model aircraft clubs' secretaries, and individual aeromodellers will co-operate in making this survey as comprehensive as possible. As soon as the survey has been completed a complete list of model aircraft clubs, with secretaries' name and address, and a complete list of model aircraft shops throughout the country, will be printed and copies will be distributed free to anyone sending in their name and address and a stamped and addressed envelope.

Already from the returns received by "Clubman", one very interesting and significant fact has been revealed. The preponderance of aeromodellers who are flying petrol planes has vastly increased during the past two or three years, and in some instances the percentage of members who are so interested is as high as 80 per cent. A quick calculation reveals that the membership figure for clubs in this country may well now be about 14–16,000 so that the percentage who are flying power models may be as high as 10–12,000.

This figure of 10–12,000 for "power" enthusiasts is representative only of the clubs. Our knowledge of the output of model aircraft engines by the manufacturers in this country is such that we know that there must be a vastly *larger body* of aeromodellers *outside* the club movement who also are interested in power models.

Yet we have to admit that, whilst the number of aeromodellers who have availed themselves of the N.G.A. Third Party cover has recently shown a healthy increase, still the fact is plainly revealed that by far the larger proportion, *flying power-driven models in this country*, are NOT yet covered against Third Party claims. For the reason, as we have before now stated on these pages, that the N.G.A. Third Party Insurance is virtually a non-profit making concern, we make no apology for once again stressing the necessity of all enthusiasts flying power model aircraft, availing themselves of Third Party Insurance cover. It is a duty they owe, not only to themselves, but to the general public, whose goodwill, if they wish to have continued, and in fact, expanded, facilities for the flying of power-driven model aircraft throughout the country, *must be retained*.

00-TIT

One of the most popular post-war light aircraft is the Tipsy Junior, designed and manufactured by the Fairey Aviation Company, and the latest design to emanate from the AEROMODELLER offices is a flying scale model of this popular light aircraft, by Mr. H. G. Hundleby. The model has been designed and developed especially for control-line flying and in this respect it shows to the fullest advantage the merits of this phase of aeromodelling. It has been well tested and is capable of all the normal stunt manœuvres, with the added advantages of scale appearance.

The photographs on the following page which accompany the author's description of the model, well illustrates how faithfully the designer has reproduced externally the scale of the full-sized machine.

Particular attention is drawn to the fact that, for the first time, plans of the model are offered in three sizes :—

(*a*) The model as described in this issue, *i.e.*, 1½ in. to 1 ft. (28½ in. span). Price 4/–.

(*b*) 1½ in. to 1 ft. (34 in. span). Price 5/–.

(*c*) 1¾ in. to 1 ft. (39½ in. span). Price 6/–.

Copies of each of the three sizes of plans are, of course, available through the Aeromodeller Plans Service, and we feel sure that this latest innovation in offering the choice of *three sizes* of model, will be much appreciated by our readers. Particularly as it enables a Tipsy to be built for almost any size of engine.

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Pilot, full size and model! Featuring the Tipsy Junior stunt control line model described in this issue.

Quality and Quantity

Readers will, no doubt, have read in the Daily Press, the Board of Trade's announcement to the effect that in the near future, paper supplies to periodicals will be increased by 50 per cent. We have devoted considerable thought as to how we can best make use of this handsome increase and are pleased to announce three improvements. Two of these are operative from the current issue and the third will be operative from the August issue.

Firstly, this issue contains a further eight pages and, at long last, we return to our pre-war size of 64 pages, plus cover. Secondly, the print order, which for many months past has been "pegged", has been usefully increased and it should now be possible for every aeromodeller in the country to obtain a copy of the magazine without difficulty. To this end, we would invite the co-operation of model shop dealers, in ordering a few extra copies to ensure that enquirers will not be disappointed. Thirdly, from the August issue onwards, the quality and thickness of the centre 32 pages of the magazine, *i.e.*, those carrying the text, will be considerably improved. The result will be that the reproduction of the many half-tone illustrations—one of the most attractive and appreciated features of the AEROMODELLER—will also be greatly improved.

In addition we shall be using a much stouter cover paper so eliminating the possibility of the cover becoming detached from the body of the magazine. A criticism that we know has been justified in the past but which we have unfortunately been unable to remedy until now.

It is hoped that towards the end of the year a further increase in paper supplies will be made, and if so, consideration will be given to printing the advertisement pages of the magazine also on this improved paper.

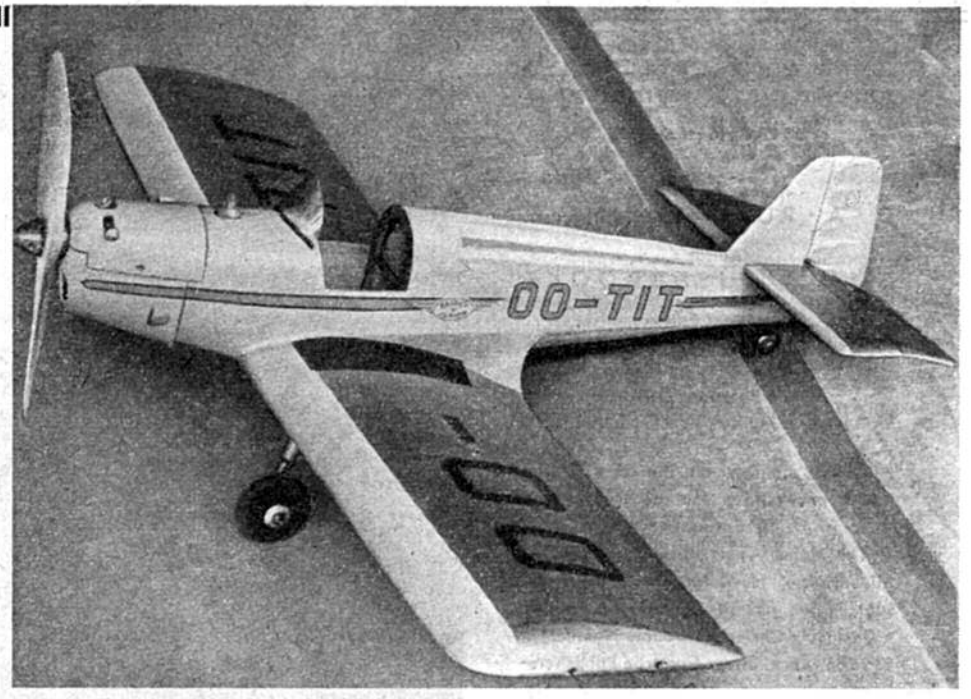
The additional number of pages will enable the range of contents of each issue to be usefully extended, and will, of course, involve the publishers in increased expenditure on account of blocks, editorial and production charges. However, despite there being no appreciable reduction in paper, printing and block *costs*, there will not, of course, be any increase in the price of the magazine. Future issues of the AEROMODELLER will, therefore, offer even greater value and a wider range of articles than ever before.

Of course, when we reach that happy era of complete freedom from paper restrictions, only then shall we truly be able to give our readers their ideal journal. Remember, our guide is your correspondence. Constructive criticism is always welcome at AEROMODELLER Offices.

A 28 INCH SPAN CONTROL LINE MODEL DESIGNED FOR MOTORS FROM 1 c.c TO 2 c.c. THAT COMBINES SCALE LOOKS WITH FULL MANŒUVRABILITY

BY

H · G · HUNDLEBY



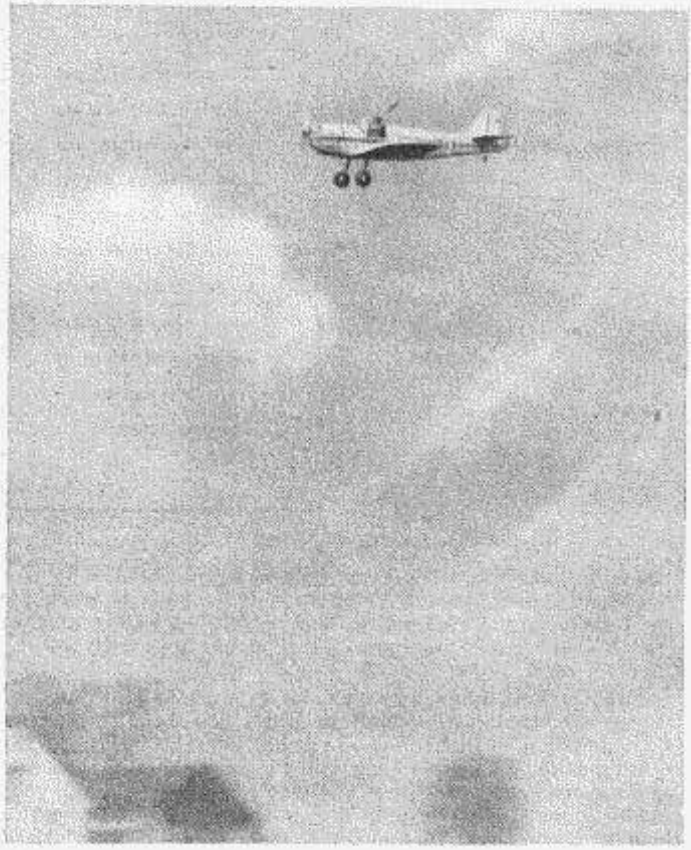
TIPSY JUNIOR STUNT MODEL

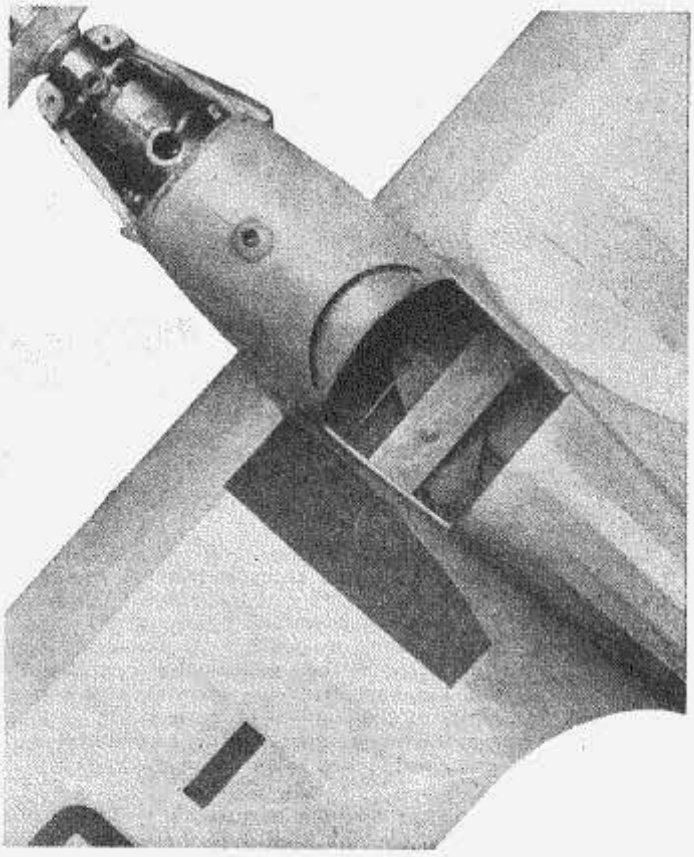
ONE glance at the full-sized Tipsy Junior and I realised that here was an almost perfect scale stunt model. In fact, one could almost imagine the prototype machine having been designed for that specified purpose. E. J. Riding, who has seen E. O. Tips' delightful little aircraft in flight, tells me that its manœuvrability really is exceptional and the model I am happy to say, possesses very similar qualities. It is sensitive to control, and I warn beginners here and now that it is not a model on which to learn to fly. But for experts and those fliers similar to myself, who can manage loops and a little precarious inverted flying, here, as our American friends would say, is a " dream ship ".

Finished in the correct colour scheme of silver, primrose yellow and red, it is indeed a pleasure to behold and the prototype with that astounding " Elfin " diesel is undoubtedly a pleasure to fly. The prototype was designed around this particular engine, the cowling fitting it like a glove, with the intake and compression lever just protruding.

When first test flown the model was over sensitive and provided many anxious moments, but once this was remedied by adjustment to the control plate no further trouble was experienced. The original has, however, suffered several prangs, including a vertical dive on to concrete. Nevertheless, it is still flying at the time of writing. I mention this because it is my considered opinion that all control line models should be so constructed as to withstand heavy smashes, which they

" Aeromodeller " Photos.





all suffer at some time in their career, usually through pilot trouble. The crashes sustained by the Tipsy had the advantage of proving the durability of the particular construction used. The two-ply formers that link up with the wing spars are of course the most important items. They are the " keys " which lock the whole structure into one, and I cannot overemphasise the importance of making them accurately and from first class plywood.

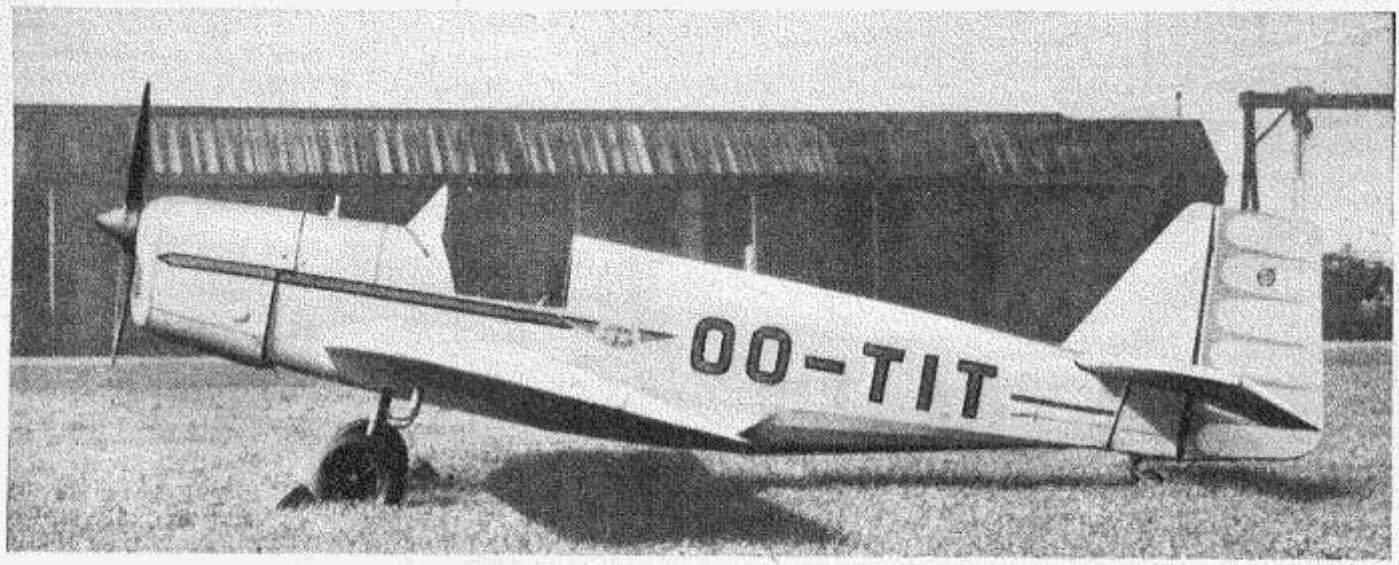
Construction generally is quite straightforward. The two sheet balsa sides being inverted over the plan for the addition of the cross members, etc. When this basic frame is assembled add most carefully the two main formers, remembering to attach the undercarriage to F.5 before doing so. Build the

Heading photograph gives a general view of the model and ably demonstrates the colour scheme.

Top left shows a view of the model in flight. Top right a close-up showing the engine installation, also the control plate. Note the easy accessibility, the way fuel lead has been shaped in view of the close fit of the cowling.

Two photographs at the foot of these pages give an idea of the scale appearance. For practical reasons the undercarriage was slightly lengthened and also given a small forward rake.

Aeromodeller Photos.



The photograph left and the one at the foot of the page demonstrate the vast difference a pilot makes to scale appearance. The cylinder head of the Elfin can just be seen, also the outlet cooling vent which is most important to prevent overheating.

wing flat in the usual way and crack it through the exact centre but do not add the sheeting at this stage. Insert the dihedral keeper between the spars and finally offer up complete wing to the fuselage, pre-coating all surfaces before glueing. Unlike most control-line models the control leads and rod can be added and soldered after the main structure is completed, by virtue of the wide, open cockpit. The wing sheeting and fuselage stringers are added after the wing and fuselage have been united.

Readers will note that a symmetrical wing section is not used, instead a bi-convex section similar to those used in full-sized practice is employed. This was done for two reasons, firstly to preserve scale appearance and secondly because the writer does not believe that fully symmetrical sections are essential for stunt work. Flight tests proved this latter assumption correct as the model flies inverted most happily. True the nose is slightly up when in the inverted position, but then so is the nose on the full size machine when in a similar attitude so why spoil scale flight characteristics?

With stunt models becoming lighter and lighter readers may query the 13¼ ozs. of the Tipsy. Having flown several lightweight stunt models I personally prefer to feel just a little more on the end of the lines. The Tipsy is light enough in its present form and has an ample reserve of power. It performs just the same stunt manœuvres as the average functional stunt model, combined with that real aeroplane look that is doubly enhanced by the dummy pilot.

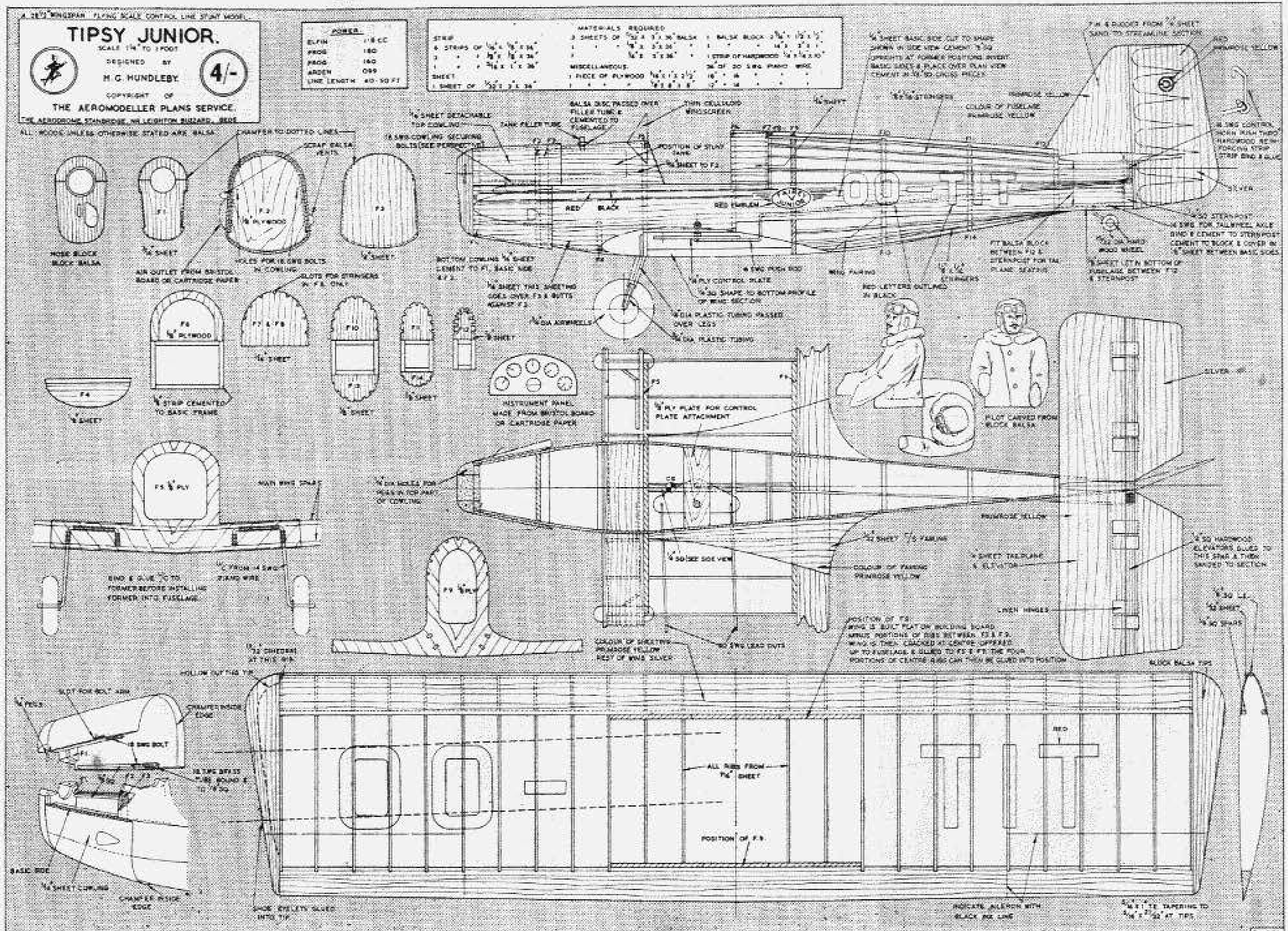
Regarding the "Elfin" I would recommend that readers use either an 8×6 or 8×5 propeller as I find that the 8×8 or 8×10 airscrews generally recommended for stunt work are far too coarse in pitch and do not permit the higher revs. at which this engine's maximum b.h.p. would appear to lie.

For your test flying, select a calm day, use 45 foot lines and if you are not too proficient use a desensitiser. Check your C.G. position, which on no account should be aft of the point marked on the plan, carry out the usual line checks, and you are ready to go. A useful tip to remember, should your model prove slightly nose heavy, is to cast the tailwheel in lead, or better still filch a wheel from small brother's lead motor car as I did! A level surface for take-off is necessary in view of the scale diameter wheels and you will also find it necessary to give full up elevator to hold the tail down, in view of the almost scale position of the undercarriage. Watch out, however, for the point at which the model becomes airborne, as it flies fast and will go into a very rapid ground loop if you hold that particular control position.

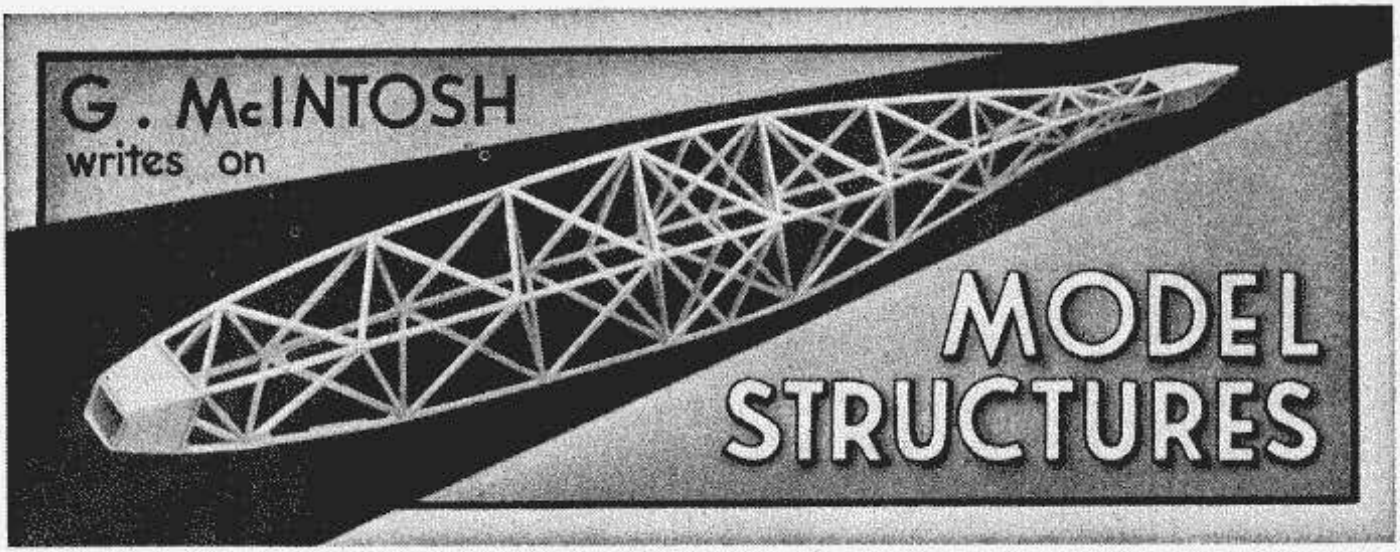
When you are fully acquainted with your Tipsy try fitting the pilot with a chute and bale him out by means of a third line and quick release, when in the inverted position. It is most effective!

There are three sizes of models of which plans are available. C.L.321 (28½ in. span—motors from 1-2 c.c.), which is that described in the article; price 4/-. C.L.322 (34 in. span—motors from 2·5 c.c. to 5 c.c.); price 5/-. C.L.323 (39½ in. span—motors from 5 c.c. to 10 c.c.); price 6/-. These are all available post free from the Aeromodeller Plans Service.

Aeromodeller Photos:



FLYING SCALE CONTROL LINE STUNT MODEL
TIPSY JUNIOR.
DESIGNED BY
H. G. HUNDLEBY.
COPYRIGHT OF
THE AEROMODELLER PLANS SERVICE.
4/-
ALL WOODS UNLESS OTHERWISE STATED ARE BALSA
POWER
ELFIN
FROG
FROG
ARDEN
LINE LENGTH 40-50 FT.
MATERIALS REQUIRED
NOSE BLOCK BLOCK BALSA
CHAMFER TO DOTTED LINES
SCRAP BALSA VENTS
AIR OUTLET FROM BRISTOL BOARD OR CARTRIDGE PAPER
HOLES FOR 18 SWG BOLTS IN COWLING
SLOTS FOR STRINGERS IN F.6 ONLY
TANK FILLER TUBE
THIN CELLULOID WINDSCREEN
POSITION OF STUNT TANK
RED
BLACK
RED EMBLEM
COLOUR OF FUSELAGE PRIMROSE YELLOW
SILVER
RED LETTERS OUTLINED IN BLACK
WING FAIRING
STRINGERS
INSTRUMENT PANEL MADE FROM BRISTOL BOARD OR CARTRIDGE PAPER
PLY PLATE FOR CONTROL PLATE ATTACHMENT
PILOT CARVED FROM BLOCK BALSA
PRIMROSE YELLOW
COLOUR OF FAIRING PRIMROSE YELLOW
LINEN HINGES
COLOUR OF SHEETING PRIMROSE YELLOW REST OF WING SILVER
BLOCK BALSA TIPS
ALL RIBS FROM 1/16" SHEET
POSITION OF F.9.
INDICATE AILERON WITH BLACK INK LINE
BASIC SIDE
CHAMFER INSIDE EDGE
CL 331



RECENTLY I tried doing some stressing on a large model intended for radio control; that is, I found the loads on the structure, hence the optimum size for each member and a considerable saving in weight over normal methods of design. I do not think it possible for the ordinary modeller to use these methods as he has not had the necessary technical training, but by applying some of the basic rules he can get nearly the same results. Here first of all are one or two simple rules :—

Firstly for members subject to bending :—

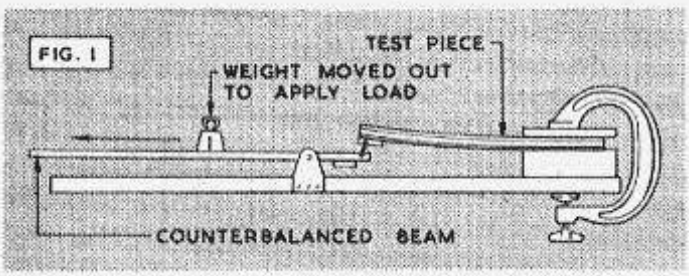
1. Keep the member as deep as possible in the plane of bending. 2. Keep all the material as far from the centre line as possible, that is, use large booms and thin webs or spars and do not have members running along the centre line of a fuselage, it may be easier to build but the material would be better used near the skin.

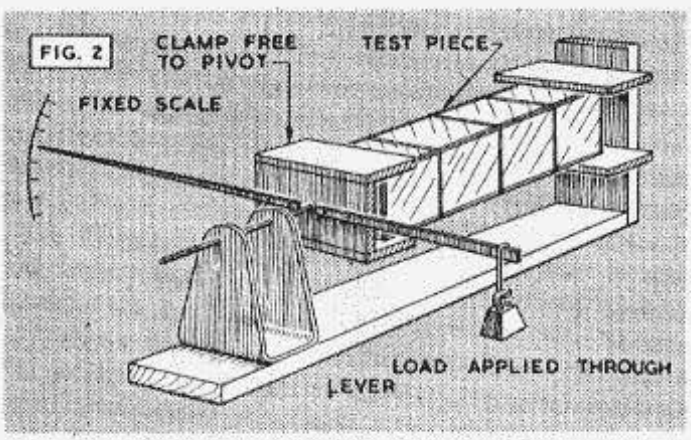
For members subject to twisting :—

3. Always use a closed box or tubular section, never a C shape section. 4. Keep the enclosed cross sectional area as large as possible. 5. Never use flat sections, keep the section as near a square or circle as possible, that is, with the material well away from the centre.

For members subject to end load (mainly compression) :—

6. Treat the member as both of the previous cases, in other words treat it as a strut as well as a beam.





To illustrate the effect of these basic rules on design I have calculated the relative efficiency of several different types of structure, checking the results by means of tests. For bending tests the rig shown in Fig. 1 was used while the torsion tests were done on the rig shown in Fig. 2, I think they should be self explanatory. To avoid errors due to the variation in strength of any grade of balsa, I used the same material for each test piece in any one batch of tests. If any of the results seemed surprising I checked them by other methods so the results quoted should be fairly near the truth.

Starting with the simplest type of fuselage I have made a comparison of the relative strength to weight ratios of several silhouette fuselages for control line models. On this type the failure is usually due to bending sideways as there is sufficient depth to take the vertical bending, so in each of the test pieces shown in Fig. 3 the depth is constant. The weight of each piece is the same and the strength is quoted as a percentage of that of a simple $\frac{1}{4}$ in. hard sheet balsa fuselage 1 in. deep. From the results you can see that type (c) is the strongest while by adding more spruce as in (d) the strength drops. Where type (c) is used the best results are obtained by keeping the depth of spruce equal to half the fuselage depth, although if the fuselage tapers sharply and is not too long it is better if the depth is kept constant at half the depth of the shallowest part of the fuselage. Rule 1 is shown rather well by (c) and (e), both using the same amount of hard wood but the strength differing by 70 per cent. when the wood is used properly. Carrying this rule a bit farther (g) shows the effect of putting the material well out giving a deep beam, it also rubs in the lesson in rule 2, as by using the same wood used in (a) the strength is increased by 280 per cent. Due to the present flood of gliders with high tailplanes and pylon jobs with outrigged underfins the torsional stiffness of the fuselage is becoming more critical so I think this should be the next item on the agenda. From Fig. 4 it can be seen that for a given size of fuselage the simple geodetic type (b) is the most efficient, beating its nearest rival by 100 per cent., this is due to the fact that each member runs round the fuselage from nose to tail, it is not enough just to use two Warren girder sides with the top and bottom as in type (a). If you want to keep the diameter down, a monocoque fuselage of the same strength is only one quarter the size, the weight being constant. It would seem from this that the best type of fuselage would have a monocoque nose to cater for the high crash loads with a diamond or square rear fuselage of type (b) to cater for the torque and to keep the pitching inertia down.

On the tissue-covered type of fuselage there is always the chance of the tissue becoming flabby due to damp or being torn, so it would be as well to mention that in both type (a) and (c) 90 per cent. of the strength in torsion lies in the tissue, while in type (b) only 50 per cent. of the strength is due to the tissue. In all cases the strength of the fuselage in bending and torsion is not affected by the formers; as long as they are well made it makes no difference if they are wound or solid, so it's no good cross bracing the formers of type (a) in the hope that it will stiffen up. Another popular fallacy is that a nice hefty crutch down the centre line of the fuselage will strengthen it, actually the effect is negligible as you would expect from rule 5. If you do use a crutch of the Slicker type for ease of construction, just remember that if the crutch was made of sheet it would only add a mere 20 per cent. to the strength instead of somewhere about 100 per cent. if the material was kept near the skin; on the Banshee " X " type the improvement would be even greater if the wood was used to make a monocoque fuselage. If possible you should avoid cutouts for cockpits or the like, as they change the section from a closed to an open one with a big decrease in strength, you will get some idea of the penalty from the following figures. On a monocoque fuselage a cockpit cutout removing 25 per cent. of the circumference drops the strength by 30 per cent, while a 35 per cent. cutout drops the strength by 70 per cent. If cutouts are unavoidable you can regain some of the strength by putting back twice the amount of material removed by the cutout as reinforcing round the hole. When a monocoque fuselage is being used all the concentrated loads applied by wing joints, engine mountings, undercarriage, etc., should be applied to specially strengthened bulkheads so that the load can be split up into a form that the shell can cope with. For a given cross sectional area the monocoque fuselage is roughly ten times stronger than any other type but it is only three times as heavy.

In each of the above examples it will be seen that any increase in strength is due to the application of one or other of the rules I gave earlier on.

Everyone knows that to get good results out of a model it needs to be carefully trimmed, and if these results are to be consistent the model must stay in trim. This means that all the flying surfaces, wings, tailplane and fin, must be both strong enough to take normal hard landings, and stiff enough to prevent warping.

Before we can start designing an efficient structure we will have to sort out the loads on the structure and get a rough idea of how they will be carried by the various members, so for a start we will have a look at warping. This bugbear is caused by uneven shrinking of the covering, putting unbalanced loads on the framework, which deflects producing that lovely corkscrew effect you sometimes get when you dope a wing. The warping loads in the covering are reacted by the basic framework so that it needs to be as stiff as possible if it is not to deflect; it's no good relying on the skin taking the torque loads caused by warping, it will not as it is too busy applying them. The best way of keeping the framework stiff is to use a tubular member, or failing this, members with as large a cross sectional area as possible in the chordwise plane, in fact just apply the rules for torque mentioned previously. By the way, if you do not close the torque box by means of a spar web filling the whole depth you will lose most of the stiffness: I am afraid this is often forgotten, even the experts seem to forget. When I tested the various wings shown in Fig. 5 the box type was so stiff it did not even register any deflection when the others were nearly off the scale, so I think we can take it that type C is the most efficient as far as stiffness is concerned. The other types of structure followed in the order A, B, E, D, F, with A being roughly twice as stiff as F, and the others spaced at equal intervals between the two extremes. If you examine these results, I think you will see that it is more efficient to have one large area in torsion than several smaller areas of the same total area. When the covering was added the stiffness was increased by roughly 20% on the Clark Y type of section, but only 10% on the lightweight type. If stiffness is required, but you cannot afford the weight of a sheeted leading edge,

FIG. 3

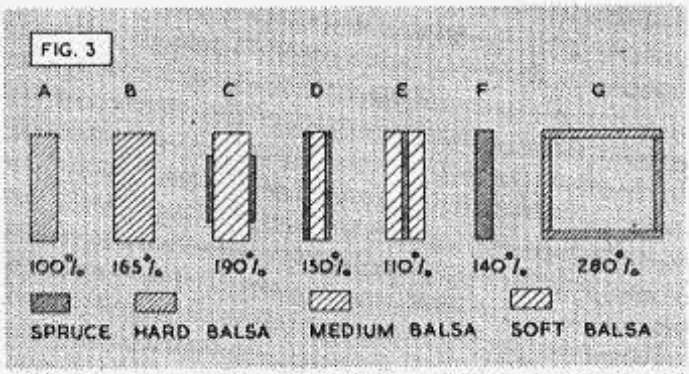


FIG. 4

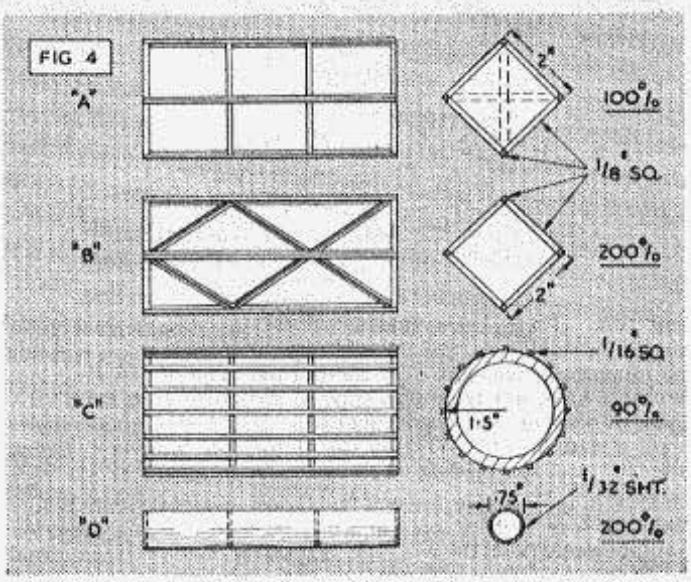


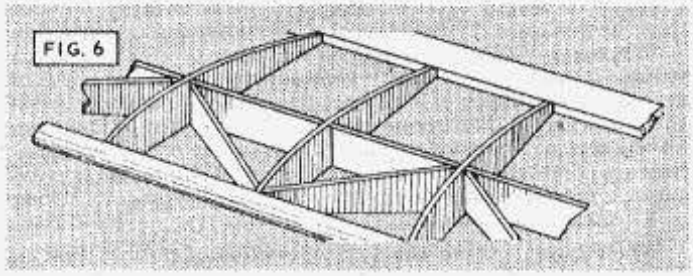
FIG. 5

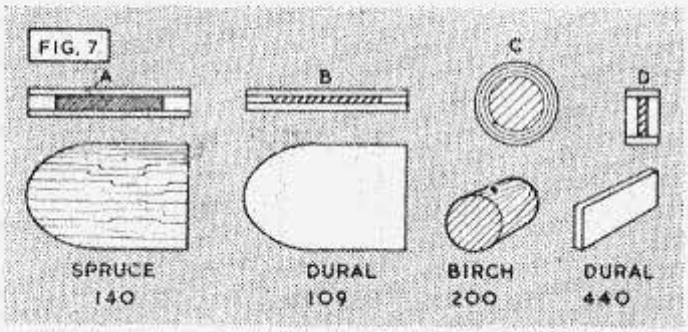
BENDING STRENGTH
EFFICIENCY = BREAKING LOAD / WEIGHT

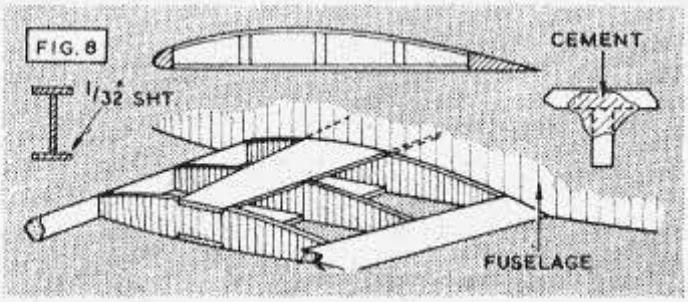
FIGURES QUOTED ARE PERCENTAGES OF TYPE "A" EFFICIENCY

SECTION / STRUCTURE	1 MARQUARDT S.2	2 EIFFEL 431	3 CLARK Y
A	100	100	100
B	150	80	90
C	290	210	250
D	—	90	90
E	—	70	60
F	—	130	130

FIG. 6







the type of structure shown in Fig. 6 should give good results, although on the thinner type of section there will not be much improvement over the normal type of construction. So far I have not tried this type of structure with a LSARA type of section, but theoretically it should give good results with a spar at 40 to 50% on the chord and bracing between the spar and the leading edge.

Assuming that we have a knock-off wing, we can ignore bending fore and aft on the wing, as loads in this direction would merely push the wing off. However, loads acting normal to the wing surface will produce high bending stresses at the root. Usually this is combined with some torque but for the purposes of this article we can ignore the torque, leaving a case very similar to the bending of the fuselage, except for the fact that we are free to move our material about a bit more. The same rules apply, namely that all the material must be kept as far away as possible from the cross sectional centre of the spar and that the section must be kept as deep as possible, although the depth will usually be fixed by aerodynamic rather than structural factors. Once the wing section has been fixed up, the spar should be designed so as to fill up the full depth, otherwise weight will be wasted, after all the strength of a spar varies immensely as the square of the depth (you halve the depth then the weight has to be doubled to get the same strength).

Before we go any further I had better explain the tests tabulated in Fig. 5. I tested several different types of construction that are in general use to-day on three different sections, representing lightweights, medium weight models and heavyweights. As the section is not usually fixed by structural criteria, I have not compared the different sections, but have only made a comparison of the bending strength of the different types of construction. The figures quoted are percentages of the strength to weight ratio of the sparless type of construction, *i.e.* if the structure was the same weight as the sparless type, but was twice as strong, it would have a strength to weight ratio of 200. I think it is fairly obvious that the box nose (C) is the most efficient type of construction as it is roughly twice as strong as the other types and is much stiffer. E and F are a pretty good illustration of the effect of decreasing the depth of a section, the only difference between the two wings is that in one case the spars consist of members on the top and bottom surface, whilst in the other the members are combined as one span and moved down to the bottom surface, not much of a change, yet F is roughly twice as strong as E for the same weight.

When I was testing the various sections I noticed that in every case the failure occurred at the leading edge, or very close to it, in no case did the trailing edge fail, suggesting that most of the load is carried by the front third of the chord regardless of the type of structure. To check this, I tried out a multispar type, first complete, then with the rear pair of spars removed and got the interesting result that both failed at the same load.

Attachment points are a good thing if they are made knock-offable, but are liable to make far too heavy a wing if there are too many, no matter how well they are designed. In Fig. 7 I have shown four types of joints that have been used successfully in the past, in each case I have quoted the strength to weight ratio of the joint, allowing for any box required. Types A and B are the common tongue and box, one having a Dural tongue, and the other a Spruce tongue of the same shape. The results are probably rather surprising but they are similar to the results for the slab fuselage, the low figure for the Dural tongue being due to the large decrease in depth. Both C and D are deeper with a corresponding improvement in efficiency, especially in the Dural tongue which is by far the best although I have not taken into account the fact that the spar booms could act as the top and bottom of the box and the web as the sides, thus giving no increase in weight. So far I have only seen this type on Fillons glider and one of my own design, and I cannot think why it is not used more often as it can be made very light, roughly half the weight of the usual type of tongue. As for knocking-off, in my experience it is very good as any fore and aft loads cause the wing to pivot about the leading or trailing edge at the joint, the tongue bending slightly as it comes out. On a 7 ft. 6 in. radio control model I built recently, I used a tongue ¼ in. deep and ·05 in. thick which was strong enough to take five times the models weight supplied half way out along the semispan, yet the wing came off without damage after a cartwheel at somewhere about 20 m.p.h.

Turning to ribs, their main job in life is to distribute the air loads among the spars and keep the correct contour, so that unless there are any large concentrated loads to distribute they can be kept very light. The two most efficient types are the built-up girder rib and the " I " section shown in Fig. 8 with the built-up, " I " section being both easier to build and lighter.

Where the chord is large, say 12 ins. or more, then it is probably better to use a built-up girder rib with the bracing running as shown unless the rib is fairly deep, say 12% thickness, in which case diagonal bracing should be used on the front portion. If the joints are made as shown in Fig. 8 with a smear of cement on either side, then the bracing should be stiff enough to support the rib booms. Where the rib joins the spar and trailing edge a gusset of thin scrap balsa, lying flush with the skin, will help the rib to take side loads due to loads in the tissue.

While on the subject of gussets, it is as well to mention that where a member is faired into another member by means of a gradual change of section, the danger of local high stress is removed so where the sheeting over the nose joins sheeting right across the chord they should meet in a smooth curve, not in a sharp right-angle. Recently I have noticed that some control line models, using sparless wings, have a bit of reinforcing at the root as shown in Fig. 8: why I cannot say, as unless the sheet is carried out to the tip the reinforcing will not carry any load. This is due to the fact that the load due to bending is in the leading and trailing edges and can only get to the reinforcing through the ribs in torsion, which is practically impossible unless the rib is about ¼ in. thick.

There is really very little to add on the subject of tail units as they are virtually smaller and usually thinner wings so that all I have said about wings applies equally well. There is just one extra point, however, and that is mounting the surfaces on the fuselage, it is no good having a stiff unit if the mounting is sloppy, so steer clear of press studs unless they are acting in shear. Make the joint as rigid as possible even at the expense of knock-offability. Where tailplanes are held on by rubber bands going over pegs on the fuselage a better knock-off fixing is arrived at if the front pegs are raked forward so that the rubber can slip off easily.

In conclusion please try and think before you slap on a bit of sheet, you will find it pays in the long run. Happy crashes!

BILL WINTER writes . . .

AMERICAN NEWS LETTER

RECEIVING but scant attention last year, due to its last-minute inauguration before the Nationals, the Pan American "PAA-LOAD" event should be quite popular during 1949. With $4,670 cash prizes to be awarded at seventeen A.M.A. sanctioned meets, plus the '49 Nationals, one could say it should be! However, "Pan Am" has devised an exceptionally interesting kind of contest.

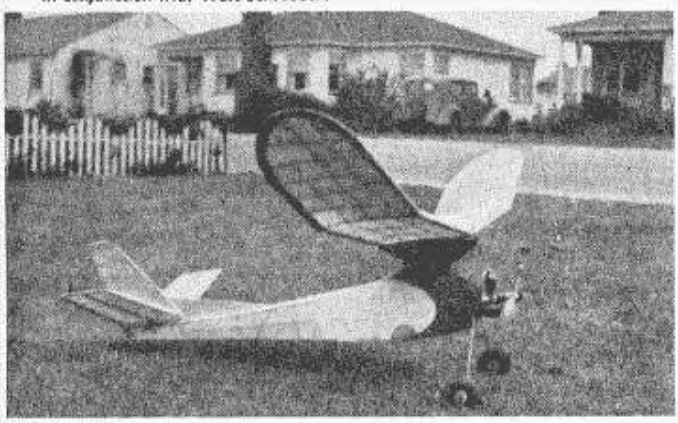
Limited to engines of a maximum displacement of ·30 last year, the event now is divided into two classes, for A and B engines or, up to ·20, and from ·20 to ·30 cubic inch displacement. The catch, of course, is the pay load and the restrictions on its location within the airplane. Pay load consists of four-ounce "figures," one being carried by A models and two by the B jobs. Each figure is a 3 in. square, 1 in. thick, surmounted by a 1-in. cube, the result being a crude approximation of a human body. Pilot or pilot and passenger may be carried tandem or side-by-side but must have visibility. (1 in. wide window or wind-shield space) fore and to the sides. Adaptations of kits indicate that for the B model a minimum of 6 ft. of span with, say, an Ohlsson 29, is required. With the exception of the power limitation a fairly hot airplane can be devised. Surprisingly enough, soaring flights may occur.

In the radio control field, only the continued restriction by the Federal Communications Commission that the operator must be licensed, prevents a veritable boom. Even so, the activity is on the upswing. Berkeley has bought the manufacturing rights for the Aero Trol equipment, which equipment has proved itself in the field. The Good Brothers equipment, probably our most famous up to now, remains available. And at least two new manufacturers are entering the lists.

Ed Lorenze, whose radio control articles some of you must have seen in an American magazine, is introducing an outfit that features a receiver slightly less in dimensions and weight than the Aero Trol (likewise designed by Lorenze). The control unit gives two controls on but a single channel. Details of this revolutionary feature are not yet known at this writing.

From California comes news of still another "RC" outfit, this time by Rockwood Radio Controls. While Rockwood's name as a contributor to model airplane magazines is not well known, the radio boys say his work in radio publications is very impressive. It is known, too, that an active radio control club on the Coast, which shows an unusual interest in scale jobs (five channels have been mentioned in trade papers) is under the aegis of Rockwood. Rockwood's three-tube receiver measures $5\frac{1}{4} \times 1\frac{7}{8}$ ins. and the motor-driven servos come in at $1\frac{1}{2}$ ounces each.

Bob Linn of Los Angeles sent us this picture of his modified "Play Boy." Heading photo shows Bill Winter with 1949 Wakefield design, developed in conjunction with Walt Schroeder.



Correspondence with Lorenze, and with Harry Guyer, genial representative of Beacon Electronics (Goods), highlights possibilities of weight savings, hence smaller airplanes. Planned for Control Research's new equipment is a Baby Spitfire model (displacement ·045), while Guyer lists nine ounces total for batteries, receiver and relay, and escapement Smaller batteries wear quickly—30-45 minutes for filament batteries—hence run up cost of operation prohibitively.

The rash of "baby" engines begins to show trends. Baby Spitfire at ·045, with samples widely distributed, may be beaten out in the shops by the OK Cub, of ·049 displacement. If the latter gets out first, Herkimer (who makes the OK engines) will reap the best of the harvest. Duramatic has a small engine coming up, to be followed by a still smaller unit, but isn't talking about displacements. Various large meets have scheduled "One-Half Class A" events for engines of up to ·045 or less than ·09. This latter is aimed at the unfortunate Arden ·099 which is too small to compete with engines like its big brother the ·199 and now, apparently, is considered too big to compete with the little fellows . . . Official circles are stunned by the lack of interest in the Wakefield eliminations. Perhaps underpublicized, the trials attracted two hundred odd hopefuls. Some major clubs sending no entrants . . . Disturbed by the rubber troubles experienced by American Wakefield team at Akron, U.S. Rubber is providing 1/24th thick rubber strands to twenty-five Wakefield fliers designated by the A.M.A. This is field test of the new thicker strands. Having tried both Dunlop and U.S. in new ship, the writer so far can't choose between them. Of different characteristics, both types of rubber offer special advantages, perhaps disadvantages . . . Financial statement of the Academy of Aeronautics for 1948 reveals a total income of $25,554·67 against a total expense of $28,290·58 for an excess of operating expense of $2,735·91 . . . Liability insurance for members of A.M.A. has unusual wrinkle. Individual members are not insured but report damage claims to headquarters. National Aeronautic Association, parent body, makes good when the contestant is found legally liable and when all reasonable precautions have been taken according to law . . . Royal Canadian Flying Clubs Association has helped form Model Aeronautics Association of Canada with F.A.I. franchise. A.M.A. no longer issues fliers' licenses to Canadians and all American contest directors have been told to honour M.A.A.C. licenses presented at A.M.A. sanctioned meets.

A 30" WINGSPAN JET SPEED TRAINER

JET TRAINER.

DESIGNED BY
R.C.JUDE.

3/-

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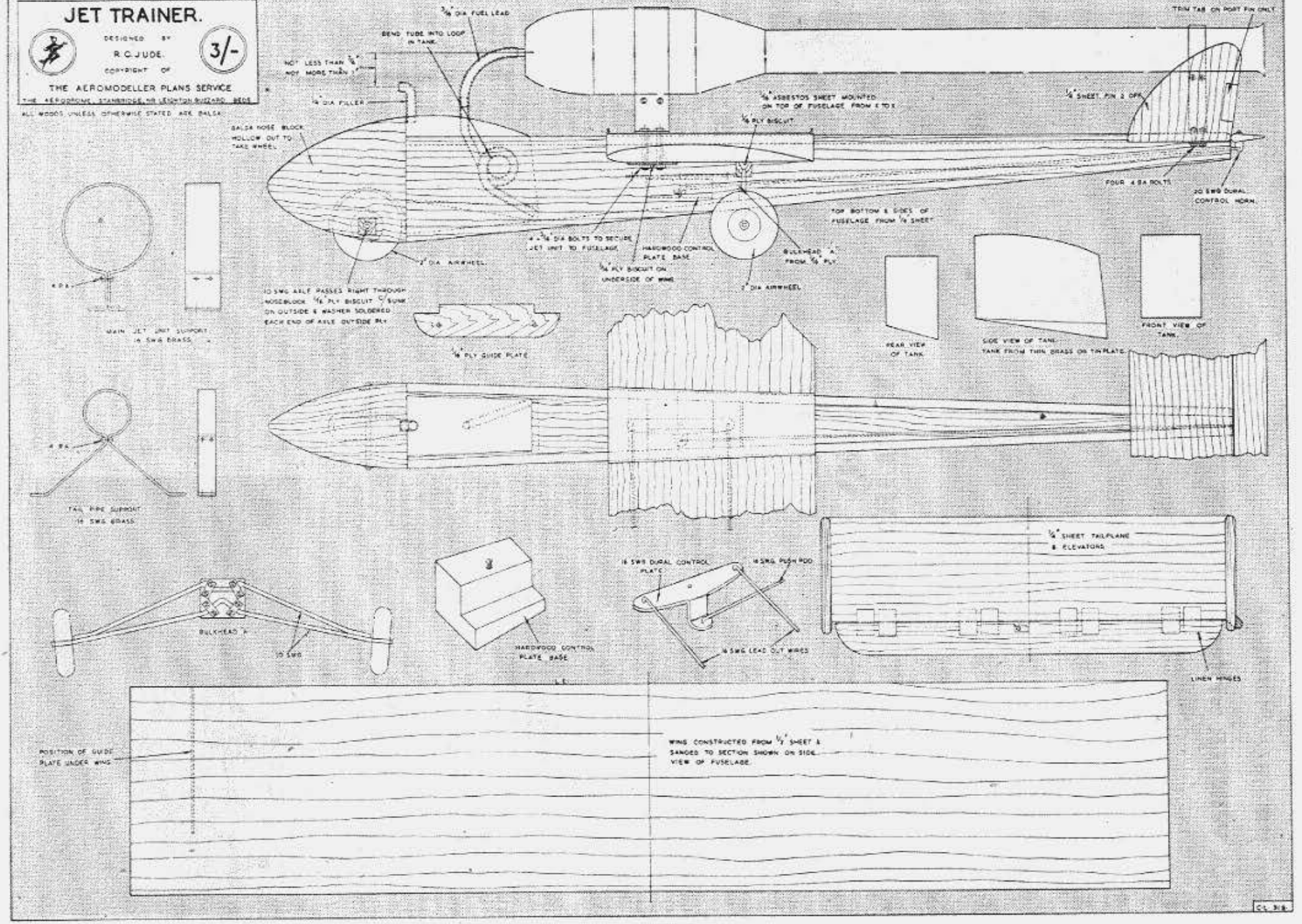
THE AERODROME, STANBRIDGE, NR LEIGHTON BUZZARD, BEDS

ALL WOODS UNLESS OTHERWISE STATED ARE BALSA



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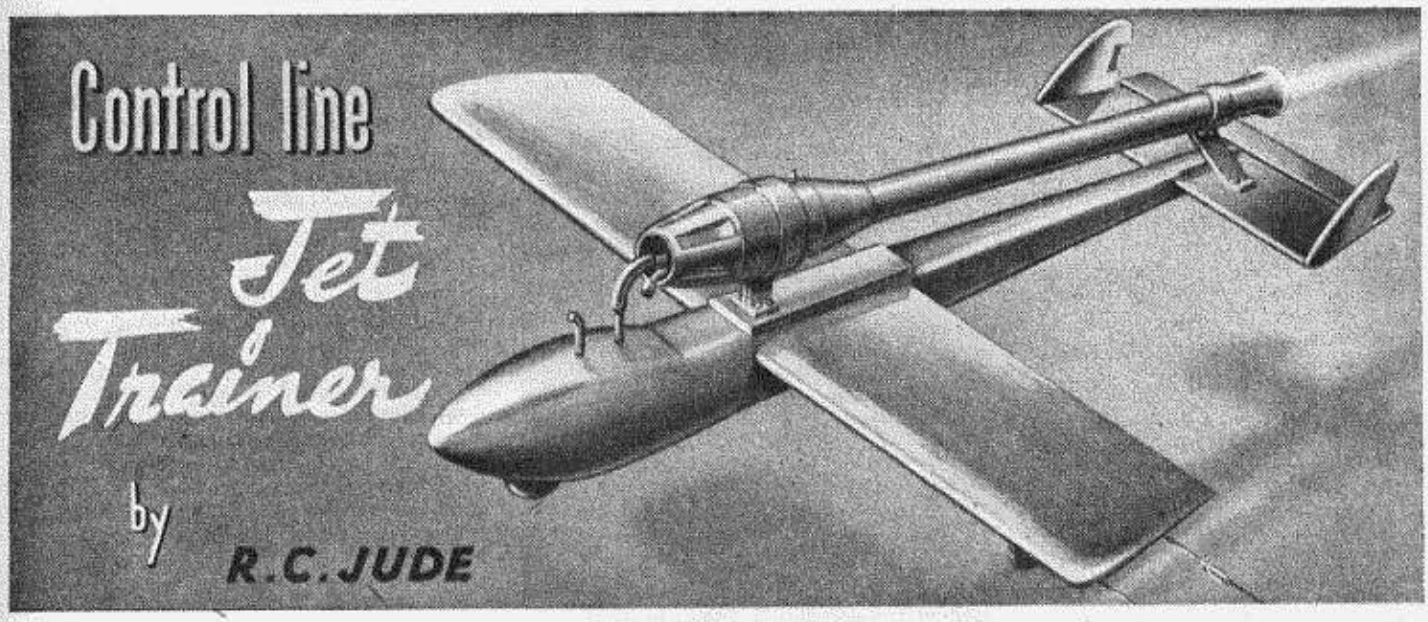


Control line Jet Trainer

by R.C. JUDE

WITH the placing of a very efficient resonating jet unit on the British market there will no doubt be many control line enthusiasts who will wish to try out a jet model, but the change in speed from a normal airscrew model is very considerable and it cannot be too strongly emphasised that a jet trainer is very necessary to bridge the gap before proceeding with the construction of a very high speed jet model.

The model herewith described is simple and robust and is far from slow. The original model completed some fifty flights without showing any signs of damage or strain before it was placed on the retired list and the ultimate speed model was started. This model is capable of some one hundred to one hundred and ten miles per hour.

The design is shown with a tricycle undercarriage and performed well with it, but the speed was greatly increased with the use of a take off dolly. It is suggested that the unit shown is used to keep the speed of the " Speedbird " down. One small note, if a dolly is used, do not forget to fit a light alloy or ply skid to the base of the fuselage or else during the first landing you will soon realise the true meaning of the expression " whittling down ".

The fuselage is in the main constructed of ¼ in. hard balsa sheet and the two sides and base should be cut out as shown. Cement well together. Shape and fit nose block after having fitted the nose wheel. Construct and fit elevator actuating gear and shaft. The control bell plate being cut from hardwood and must be very securely attached for very obvious reasons. Attach main undercarriage unit to bulkhead " A ".

The wing is made from ½ in. balsa sheet and should be carved and sanded to the section shown. Before attaching wing fix plywood biscuit to the underside to take the power unit attachment bolts. Fix wing very securely. The tailplane is of ¼ in. balsa and will eventually carry the tailpipe support of the power unit. Do not exceed the size or movement of the elevator. Very little offset, if any, is required on the rudder tab since there is no torque re-action and only sufficient adjustment is required to offset the pull of the control cables.

Before the top section of the fuselage is fitted into position construct the main attachment collar for the power unit. A very thin gauge steel or slightly heavier gauge copper sheet will suit this job. Assemble the collar and attach by means of four 3/16 in. steel bolts to the top decking, remembering to bolt the sheet of ply already mentioned to prevent the nuts from pulling through. A small sheet of thin asbestos shaped to fit the top of the fuselage should be attached by means of the holding down bolts and power unit bracket. (See diagram.)

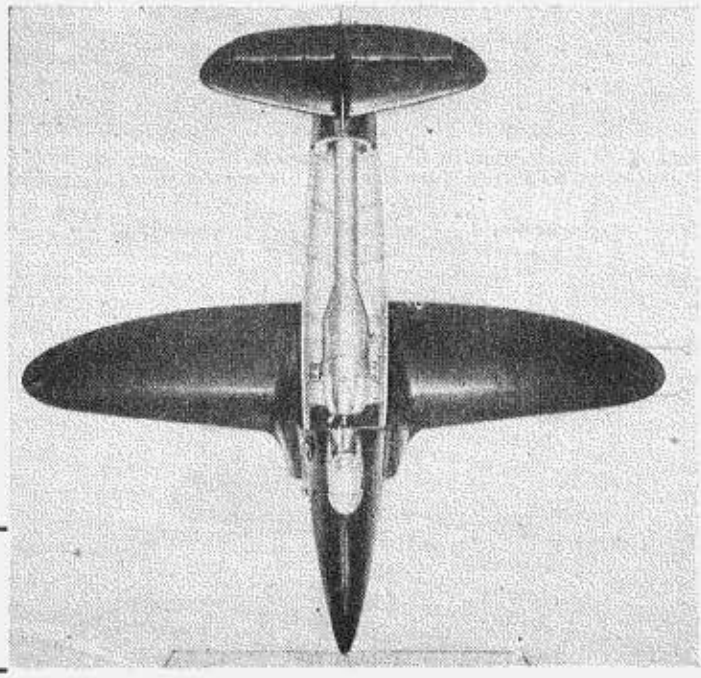
Cover the whole fuselage, wings and tailplane, etc., with tissue, dope and colour to desire. Bright red and yellow are excellent colours since they can be readily seen against an average background. Do not dope or colour the asbestos sheet.

Construct the fuel tank according to the diagram and do not forget to coil the fuel line as shown. This will prevent the fuel supply cutting when taking off from rough ground.

Follow exactly the size of the tubing used, it may seem to have a very large diameter, but then this is a very thirsty power unit.

Attach the power unit, fix the tail pipe support, couple up the fuel line and away to the flying field.

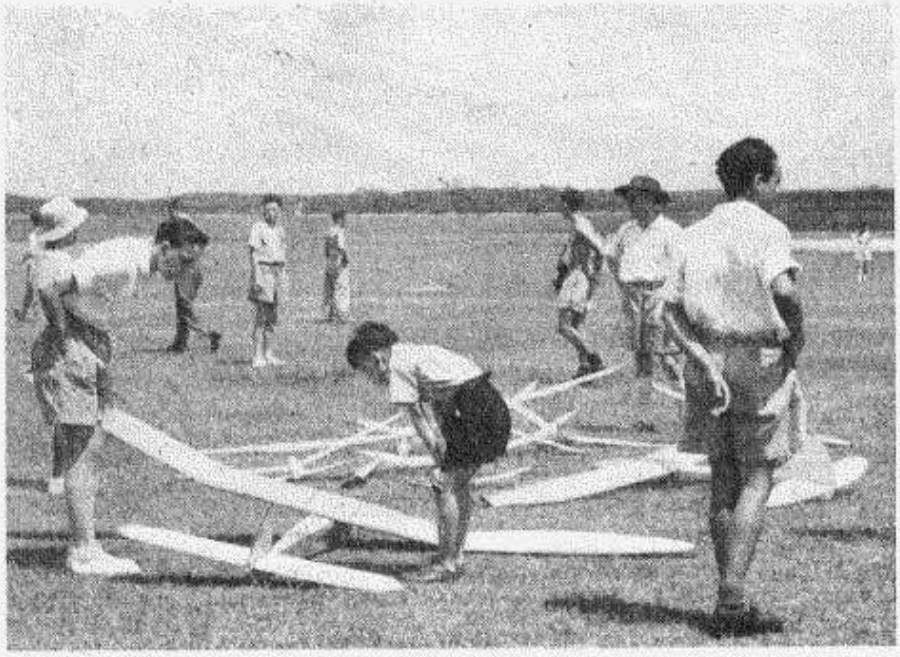
Since the model is on three wheels it can be held on the ground as long as you like and need not be hauled off the ground in a stalled condition. Once airborne watch the model with great care for it is quite sensitive. Remember, if the model is being flown at shoulder height, at a speed of some three figures, it does not take very many split seconds to fly the model very firmly into the ground.



Right, shows a view of the " works " of a more advanced jet design by J. McStea, also illustrated in last month's Model News, that will be of interest to jet enthusiasts.

SINGAPORE STORY

PIECED TOGETHER BY THE BOFFIN

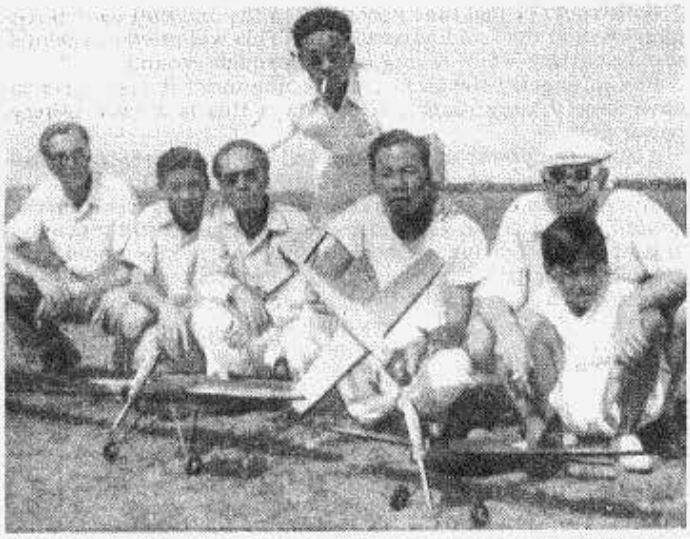


Pleasant prospect of extensive flying field and some of the competitors and their sailplanes at a recent contest at the R.A.F. Maintenance Base (Far East) Seletar.

IT used to be said that when two Scots met in some fairly farflung outpost of the Empire they immediately formed a Caledonian Club. Be that as it may, the modern R.A.F. practice seems to follow that example by starting an aeromodelling group forthwith. The seed flourishes, and in next to no time the local population have ceased grumbling at the high price of rice and switched to grumbling at the weather in the best British style, at too many thermals, or too few, and at the time it takes the AEROMODELLER to reach the village. Singapore and adjoining Malayan outposts can definitely be classed amongst the most active of these aeromodelling centres overseas. So much has come along recently that we cannot do better than let some of these model bods have their say.

First, Mr. F. D. Miller, now home again in Lincoln, gives a vivid picture of the community of interests in Singapore and neighbouring Seletar Island.

"Singapore aeromodellers are keen as mustard on the hobby—or is it the sport? And Singapore Island, about the size of the Isle of Wight, has a mixed indigenous population of Malay, Chinese, Indian and European wherein talent for modelling is by no means restricted to any one race. There are, too, a not inconsiderable number of migratory birds—R.A.F. boys and army types who step in with the "goods" occasionally. Singapore aeromodellers need no introduction, however, but I write these notes to illustrate some of their latest activities. They follow affairs in the U.K. with considerable interest. American supplies of course keep their eyes eastwards too.



Some of the local enthusiasts who have become thoroughly control-line minded. Leading builder and flyer Mr. Tham Seng Leong is in centre of group holding model.

Below: Mixture of British and U.S. notions—an E.D. powered Ryan "Fireball" control liner built by R.A.F. type Wilmot.

Many of the people here made models throughout the Jap occupation however, and kept them "dark" until the liberation. Materials, almost non-existent in 1946, were replenished from Australian and American sources as they became available, but not much from anywhere could be got until late 1947 when I took back samples of the latest marketed English model C.I. engines—most of which caught on immediately . . .

The Singaporean will not be much impressed by rubber duration records. Singapore thermals can have few to match them and can turn a duration contest—dethermalisers and all—into a fifty per cent. farce. Likewise, the Singaporean doesn't like to lavish care on the finish of a model unless it is to go into a museum, for, having got it up two or three hundred feet, the problem of getting it down is only equalled as often by the job of following it into the jungle. But the precision finish and performance of control-line models I have seen shows there is no lack of talent or critical appreciation of a good job, however, not of a good kit from the shop.

R.A.F. chaps on the island at Seletar have sometimes handled control-line and free flight models very well, as would be expected. Through their courtesy local enthusiasts have frequent use of excellent flying grounds. Wide open spaces clear of rubber or jungle are by no means common, and for that reason control-line seems to be gaining in popularity. It is to be regretted that some of the very first model C.I. engines to appear and which were brought out by or sent out to R.A.F. devotees made such a poor comparison with the American engines—the finish at any rate—finished some of them. But recent British engines are proving their rugged dependability and the numbers to be seen are increasing.

They have an almost clear field at present with smaller control-line jobs which are popular. And by the time the flyers are expert enough to want bigger and faster models no doubt we'll have some to offer. The humidity of Singapore is such as to make battery ignition a perpetual bugbear. Add to that the frequent and sudden downpouring rains and one can understand why C.I. engines are popular."

Our correspondent then goes on to speak of some of the local talent—leading expert is Mr. Tham Seng Leong who goes in for big engines and fast control-liners. What he flies today seems the job for Singapore tomorrow. Another enthusiast is local schoolmaster Mr. Carnegie. As the R.A.F. boys come home it will be on residents like this that we must rely to keep them flying, and, above all, to provide regular gen on their activities for our pages.

Over to the Air Ministry News Service, who provide a vivid description of a recent contest at Seletar when no less than five clubs, including the local Singapore civilian club, took part.

"The first of a regular series of inter-club model aircraft competitions was recently held at the R.A.F. Station Seletar, 12 miles north-east of Singapore.

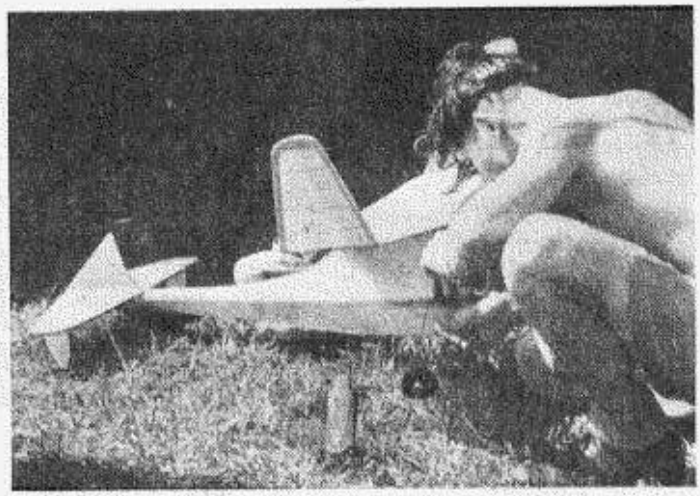
Five teams entered—R.A.F. Stations Seletar, Sembawang, and Changi, R.E.M.E. Singapore, and the civilian Singapore Aeromodelling Society.

There was a good entry in all classes, including sailplanes and gliders, rubber motored (non-scale and scale), and free flight power-driven aircraft.

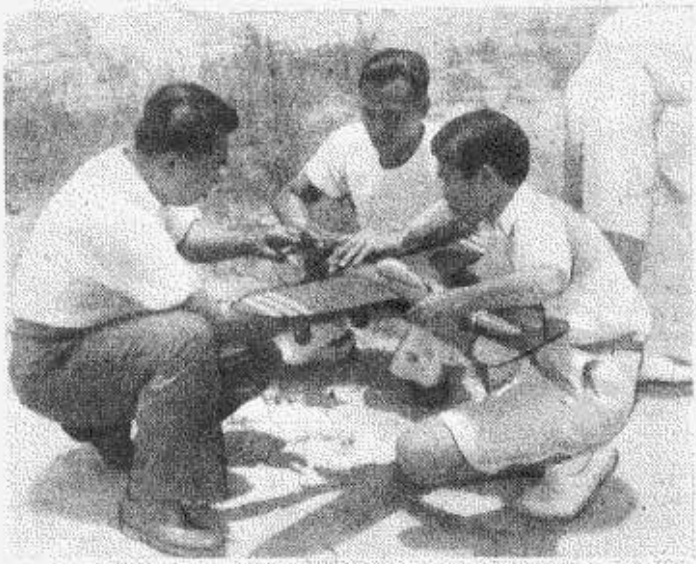
High winds and occasional heavy rain showers had a detrimental effect on endurance times. Models were rather quickly blown down with rapid loss of height and there were several 'prangs' due to adverse conditions.

There were seven entrants in the rubber motor duration class, which was won by the Singapore Aeromodelling Society, followed by two R.A.F. entrants. All models conformed to Wakefield specifications.

Sailplanes and gliders were combined in one class, the winner being Aircraftsman P. Davis of Seletar, with a model of his own design, 'Secret Weapon No. 1' (aggregate 327 seconds). This model, which has a 10-ft. span with a maximum

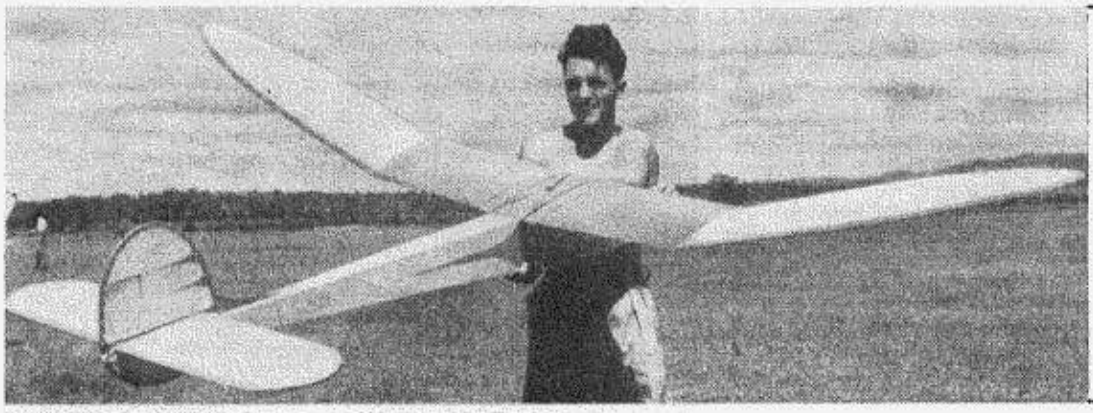


J. McHard tends his Banshee. Maximum state of undress is the wear, even the models go in for light coloured tissue, and the fuel bottle should be kept in the shade.

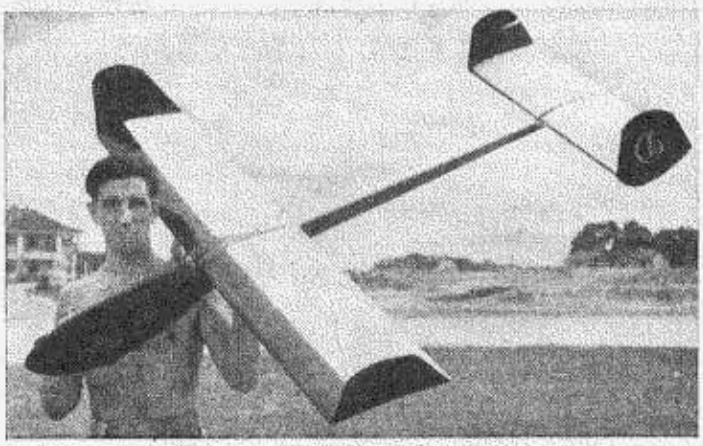


Centre right: Another shot of Mr. Tham Seng Leong starting up a Drone engined control-liner. Many and varied are the models but local talent is more than capable of putting up a show with anything that has wings.

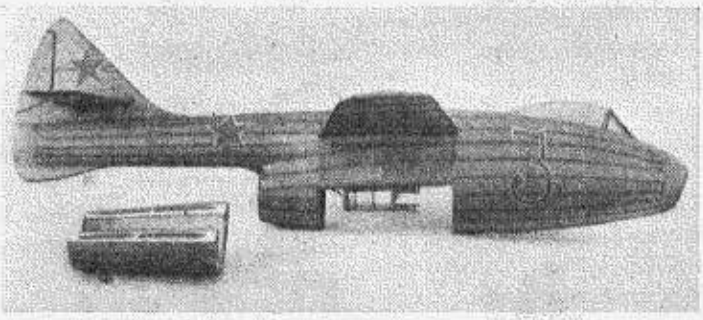
Bottom right: Much appreciated shade in the shape of the Seletar M.F.C. tent which acted as a field repair section. In the foreground will be noted the double-size Sunnanvind mentioned in the text. Once again the emphasis seems on how much to undress for these occasions.



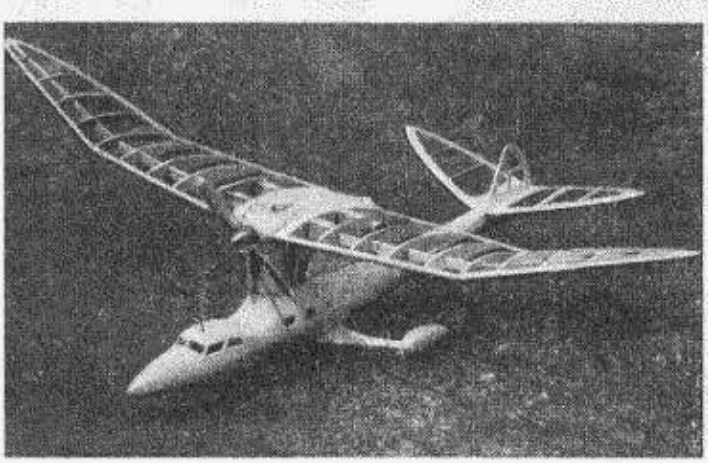
They like them large in the R.A.F.! L.A.C. Webster of Castle Douglas with his ten-foot span "Sunspot" at the Seletar Meeting. But even in this modeller's paradise they found a high enough wind to snap off the wings at the dihedral brace—or was it a little easing up on the cementing?



Another view of the large Sunnanvind which put up some quite worthwhile times on the island.



Jetex powered scale version of Russian MIG fighter built by McHard—a neat and satisfactory flying job. Below: A rather less successful machine built by the same enthusiast, born of the Red Sea crossing and yet to prove itself a real flying model—the climate did something terrible to the dihedral and rather spoiled things.



root chord of 3 ins., was an excellent example of first class workmanship combined with novel design.

Corporal F. Simmonds (Seletar), of Swinton, Lancs, was second with an aggregate of 289 seconds, while a second 'Secret Weapon,' in reality an orthodox Sunnavind scaled up to double size, gained third place for L.A.C. D. Webster (Seletar) of Castle Douglas, Kirkcudbright. This model achieved the best individual time of the day, 2 mins. 38 secs. A 'Flying Wing' built by A.C. C. A. Rideout (Seletar) of Halesowen, showed marked qualities of ingenuity and craftsmanship, and is later to be fitted with a jet engine.

Among the scale free flight power-driven aircraft demonstrated was a Nieuport made by Aircraftsman J. D. McHard (Sembawang), of Nether Edge, Sheffield.

A contest for non-scale free flight power-driven models based on a ratio performance was won by L.A.C. J. E. Wells, of Chichester, followed by A.C. A. E. Kelly, of Eastbourne.

The Seletar Model Flying Club was re-opened shortly after the liberation in 1945, and in the last three years has held a uniformly high record of successful model flying in the Island."

Another correspondent from Seletar, L. F. Hayward, gives another angle on flying over there; describing a contest with the local civilian club, he writes:

". . . Our first setback came when one of their gliders took first place with a thermal flight to 2 : 45. This may seem a little low, but all daytime glider flying is done with a 100-foot towline to avoid thermals as much as possible, as it is no joke to lose models continuously in the Johore Straits."

Referring to a leave trip to Penang, he was lucky enough to see one of their local club meetings:

". . . The trimming and flying of the rubber models was excellent. The gliders were not so good, but better, I think, than their Singaporean counterparts. They have a good system of dividing their members into two groups, one in which only previous non-winners fly, and the other containing ex-winners. In general, the local models are behind modern trends, nearly all slabsiders with long fuselages. Gliders are of all shapes and sizes, no particular trend being followed. I think they will improve once a national organisation is formed. I have heard that there is a club at Ipok who are trying to organise some Malayan Nationals!"

Another old friend of ours, J. McHard of Sembawang, writes: ". . . the chaps are often so eager to get started that to send for plans from England would cause an unbearable period of torture, so the quarter scale AEROMODELLER reproductions are enlarged photographically." McHard is in the Photographic Section so should know all about it—as his photographs ably testify.

So, in the words of the travelogue commentator, we leave the glamorous shores of Singapore, with their vexatious thermals, battery-killing humidity, and enthusiastic aeromods combing the beaches for lost models. . . .

DUTCH RECORD HOLDING TANDEM GLIDER

BY R. DYKMAN AND J.v.d. CAAY

The B.D.12.

THE 1948 International Week Experimental Contest at Eaton Bray produced many novel and surprisingly efficient unorthodox designs. Amongst those outstanding was this Dutch record-holding tandem glider, the B.D.12. From a paragon of launches it disappeared o.o.s. with the greatest of ease, and impressed by its performance, we secured the design for the benefit of those readers who like something a little different.

Originally developed by R. Dykman over a period of five years, the design was finally modified and improved by J. v. d. Caay, who brought it to its present stage of development and broke the Dutch Experimental Record with a time of 8 mins. 55 secs. o.o.s.

The advantages of tandem models have been given on many occasions in the AEROMODELLER, but no harm is done in quoting them again. In a tandem the flying load is distributed more or less evenly between two wings so that the C.G. lies approximately halfway along the fuselage (between formers 8 and 9 on this particular design). Any nose-up movement of the front wing is immediately counteracted by a nose-down moment of the rear wing by virtue of its increased lift due to the increased angle of attack. The secret of a successful tandem lies in the correct correlation of these two moments. On the B.D.12 this is achieved by rigging the front wing at 4° and the rear wing at 0°. The front wing uses a N.A.C.A.6412 section and the rear wing this same section with no undercamber. Both wings are dihedralled, and to prevent over-stability occurring in the shape of a rocking to and fro around the rolling axis in flight the rear wing has the so-called Leipziger dihedral which can be seen in the photographs and plan. The rear wing is mounted higher than the front wing—this, together with the Leipziger dihedral, diminishing the mutual influences of both wings which can be a nightmare with this type of model.

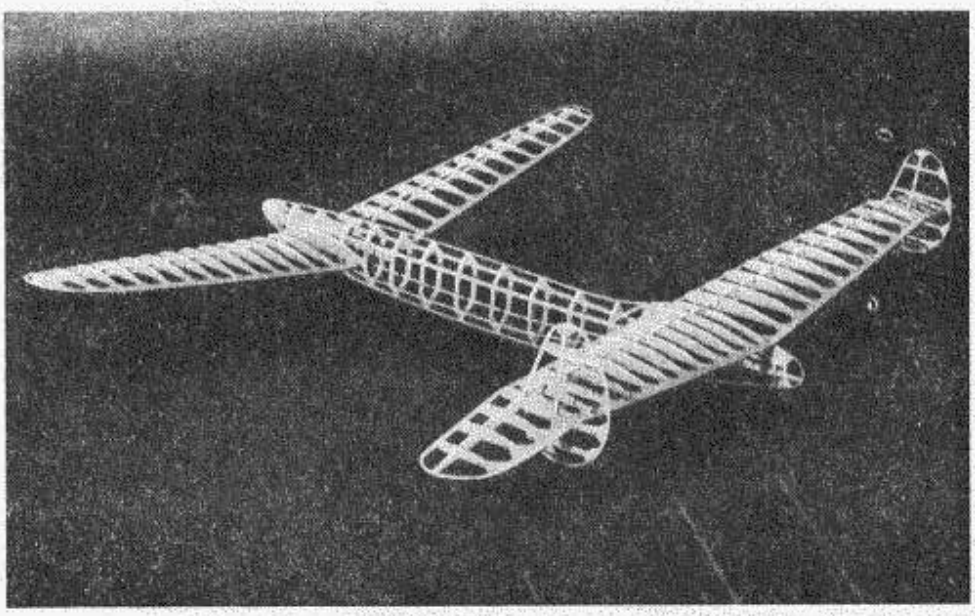
The fins, indispensable for tow-line work, are fitted into the slots in the rear wing and held by rubber bands. With two wings to build, the manufacture of ribs by the template and sandwich method is well advised; cutting out 58 ribs takes an awful lot of spare time!

Fuselage construction is simple, the best method being to fit the formers to the main longerons first, adding the other longerons afterwards, making sure that everything is correctly aligned. Accurate construction and rigging are essential for models of this type as wing warps in particular will play havoc when flying.

Much patience will be needed in the trimming of this model as the tandem is far more sensitive than a normal glider, although fundamental methods of trimming still apply. Choose a calm day for initial tests, and above all, make sure that the mainplanes are correctly rigged.

Full size plans, price 3/6 post free, are available from the Aeromodeller Plans Service. See ½-scale reproduction overleaf.

R. Dykman . . . . once active modeller . . . . now retired from game . . . J.v.d. Caay . . . well known over here by virtue of his many visits with Dutch International Team . . . . builds gliders and power models . . . married . . . three children . . . . telephone engineer . instructor at the Hague Model Aero Club . . . . flew with Dutch Glider Team and also in Bowden Trophy at Fairlop last year.



A 55' SPAN DUTCH RECORD HOLDING TANDEM GLIDER

B.D. 12.

DESIGNED BY

R DYKMAN & Jvd CAAY

3/6

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

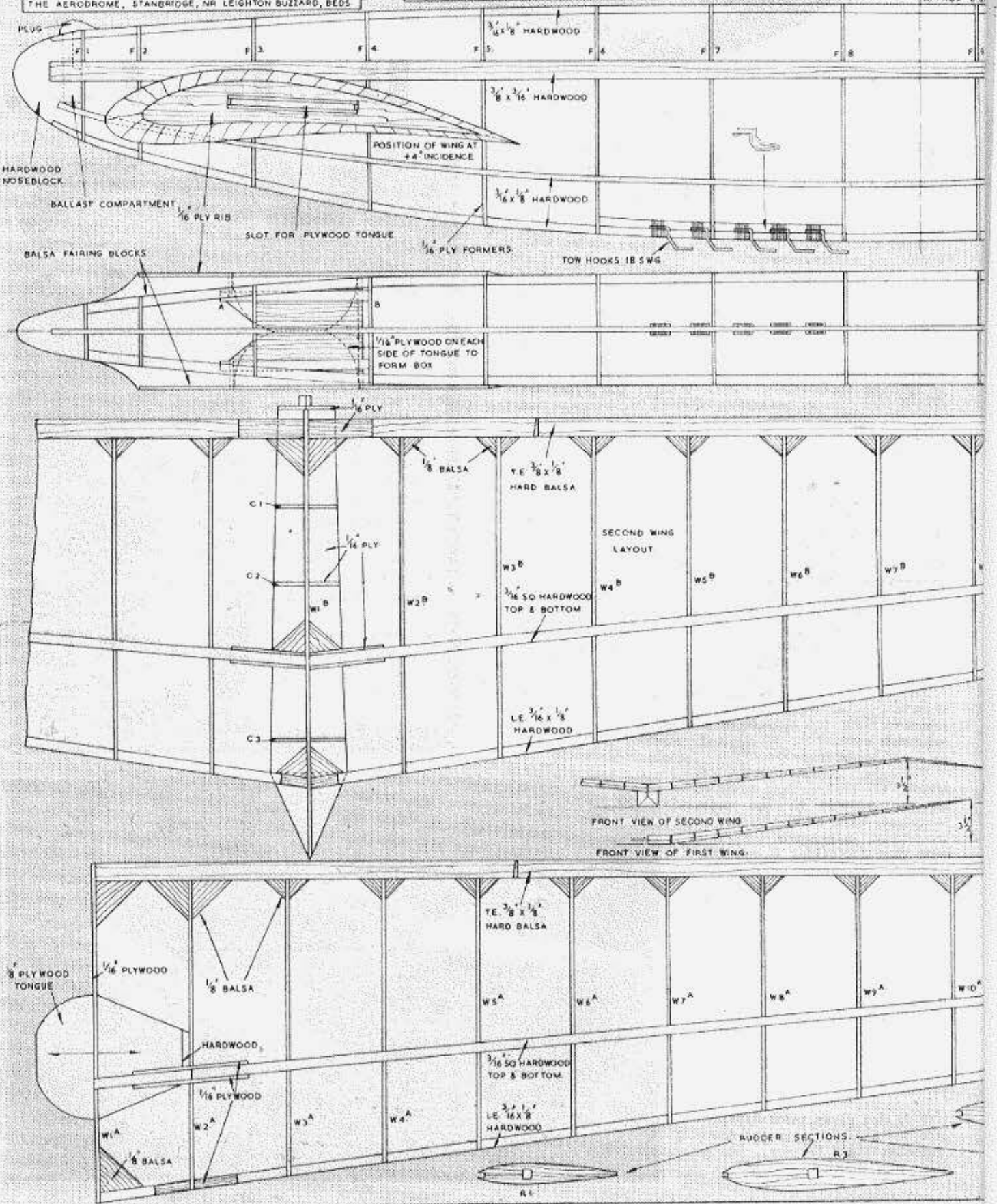
MATERIALS REQUIRED

SHEET
4 SHEETS OF 1/16" X 3" X 36" BALSA
1 " " 1/8" X 3" X 36" "

STRIP
1 STRIP OF 3/16" X 3/16" X 36" BALSA

MISCELLANEOUS
1½ SQ FT OF 1/16" PLYWOOD
4 STRIPS OF 1/8" X 3/16" X 40" HARDWOOD
8 STRIPS OF 3/16" X 3/16" X 36" HARDWOOD
2 " " 3/16" X 3/8" X 40" "
18" X 6" OF 1/8" PLYWOOD
HARDWOOD BLOCK 1 3/8" X 2 1/4" X 1 3/16"
6" OF 1/8" DIA DOWLING
2 STRIPS OF 3/32" X 3/32" X 36" BAMBOO
18" OF 18SWG PIANO WIRE

APPROX C.G.



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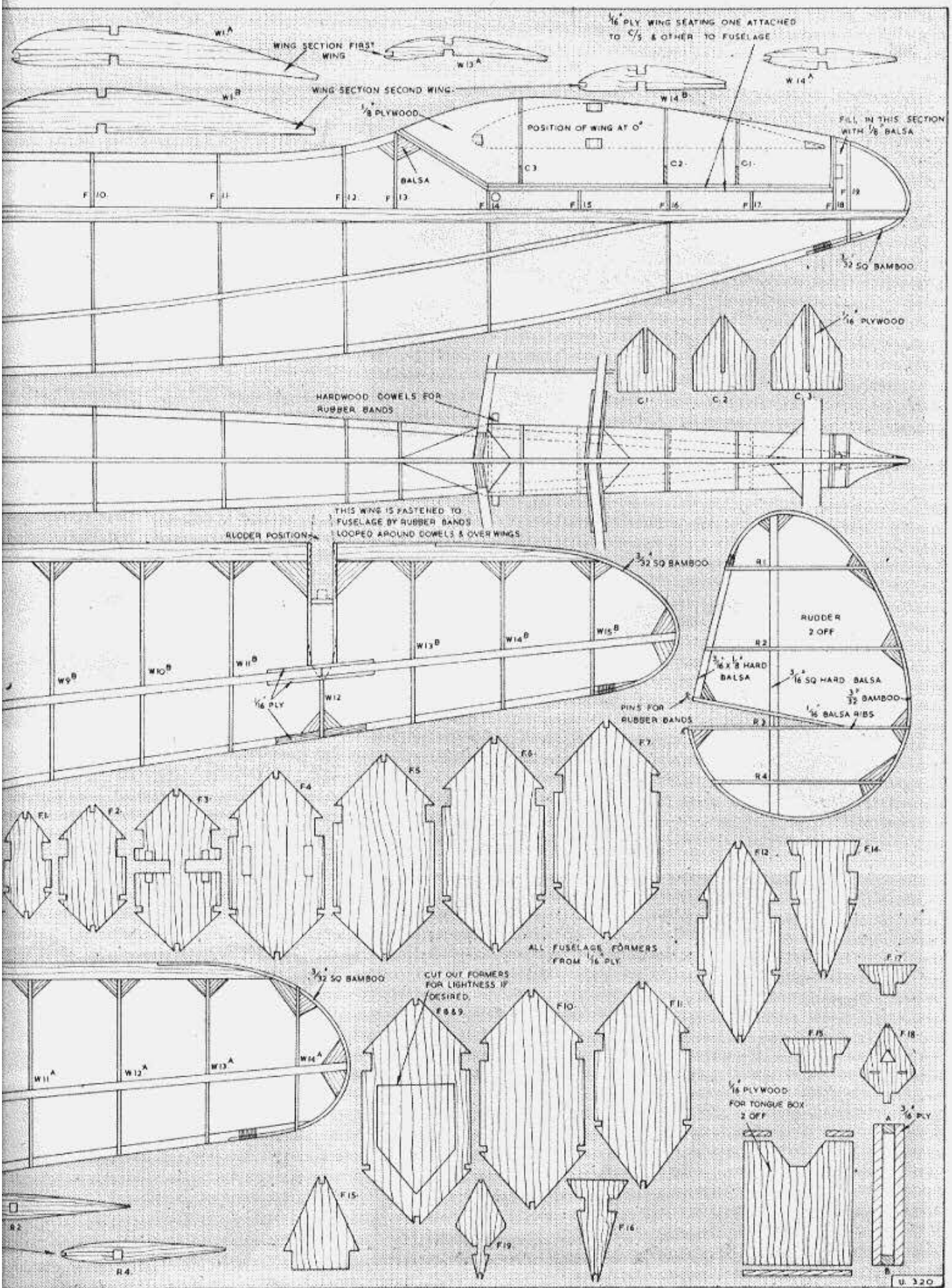
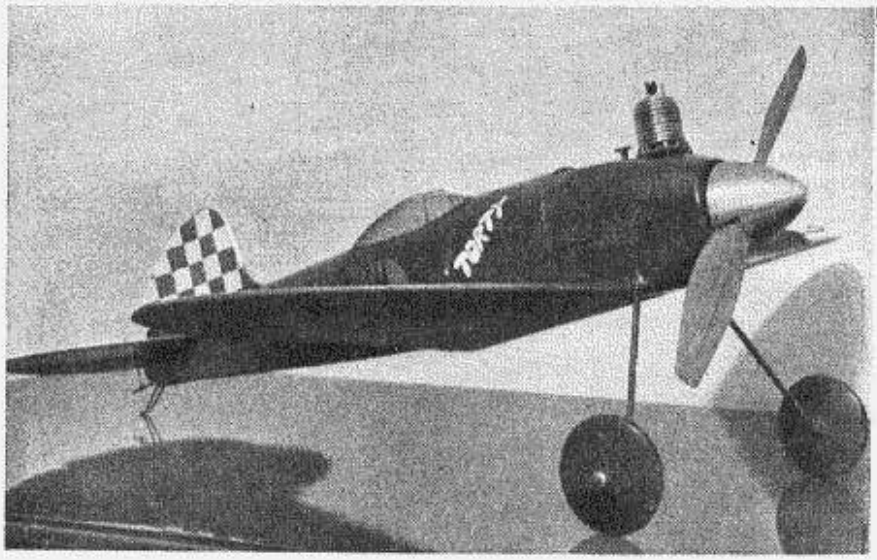
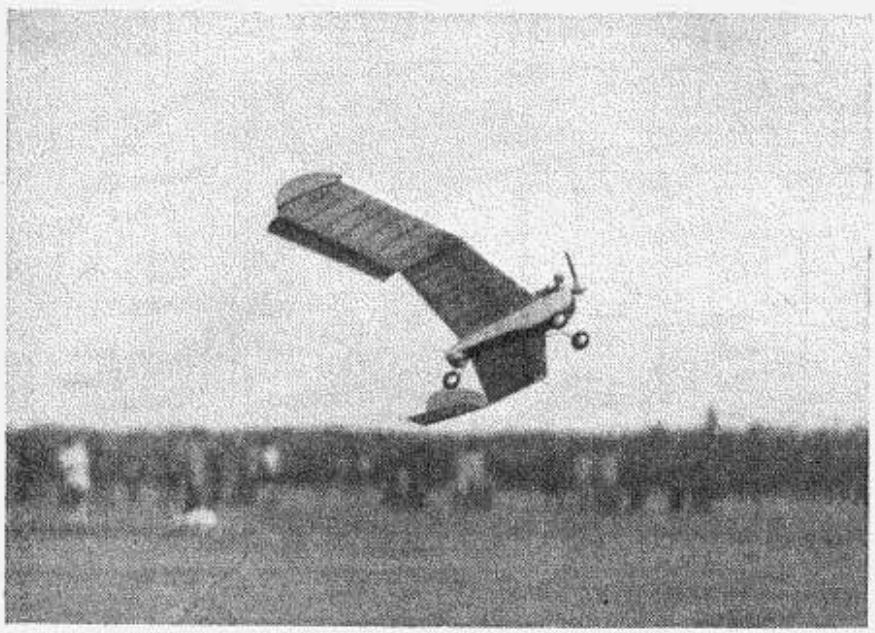
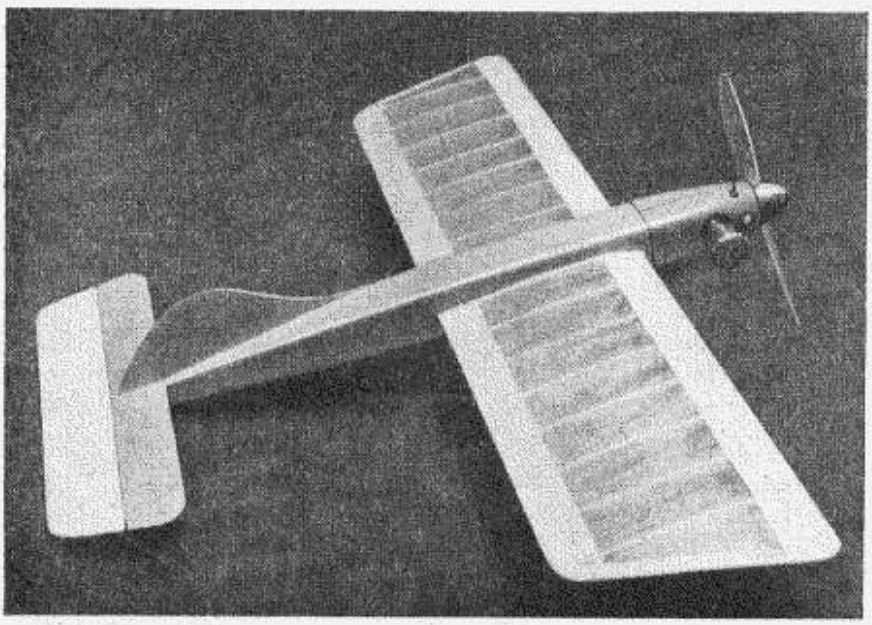


RE AVAILABLE PRICE 3/6 FROM THE AEROMODELLER PLANS SERVICE.







AS far as Fliar Phil's knowledge of radio control goes, squegging may be the cat's whiskers, but little else is crystal clear to him . . .

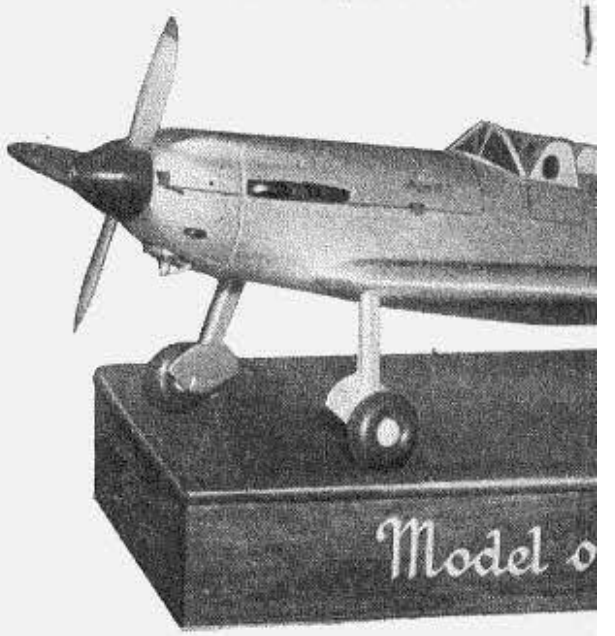
Our Model of the Month is an excellent replica of that veteran Plans Service favourite, Dr. Forster's "Spitfire," powered by a Stentor 6 c.c. and built by J. Appi, manager of the Horse Shoe Restaurant, London. A classic finish merits highest marks for this most attractive effort, which is now waiting power flights after promising test glides.

Mr. Appi remarks in his letter that he also has a radio control job almost ready to take the air and mentions that we may consider aeromodelling a strange hobby for a restaurant manager. Not at all, Mr. Appi. Amongst our readers we have a municipal rodentologist, a deep sea diver and a water diviner, to mention but a few who have joined the "appi" band.

Top left is a first-class photograph of that old beginners' delight, the Phantom, now dished up in immaculate guise by R. Adams, of London. It is a pleasant change to find a control-line model whose owner has had the nerve to take this trouble over his machine!

The photograph centre left is another fine example of an action shot which really needs a superlative to describe it. Taken by J. A. Mountain of Southampton, it shows an E.D.-powered tailless model built by R. Conner of Heston, taking the air at last year's St. Albans Rally. More like this, please.

It is seldom that a stunt control-liner of the



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dore like this, please.
control-liner of the

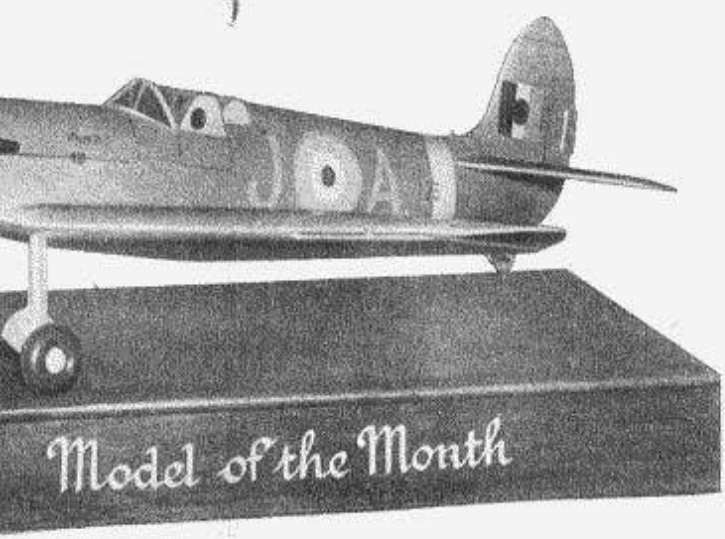
boxcar type presents a not unattractive appearance, but, bottom left, E. C. Pearcy's 36 in. span, 270 sq. in., 20 ozs. stunt model powered by a K. Vulture is quite a handsome effort. It flies at around the 60 mark, has a drop off undercarriage, and is claimed to perform everything in the book. It certainly looks capable of it. Incidentally the photograph was taken by J. Bell with an exposure of 1 minute at F.32 using a 100 watt diffused bulb.

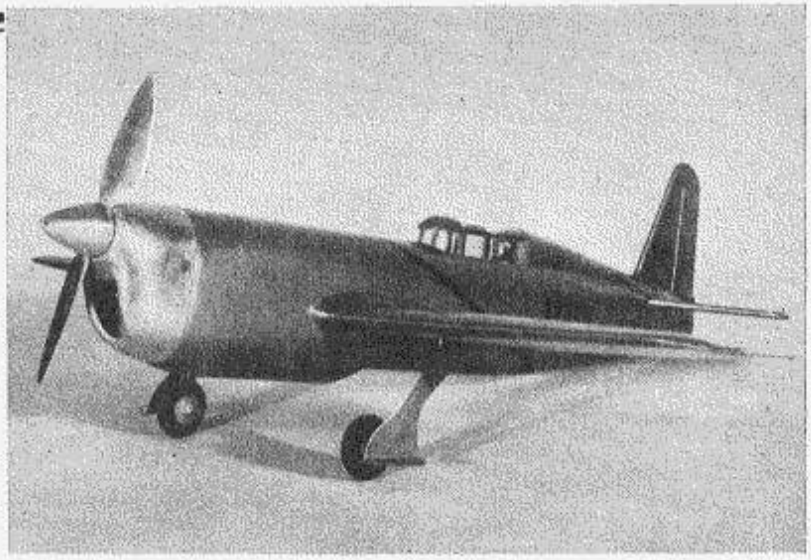
As can be seen from the photo top right and others on this page, the flying scale model is coming into its own both in control-line and free flight. This tasty control-line machine is a scale Caudron Racer built by R. I. Newman of Gloucester, and powered by a Mills 1·3.

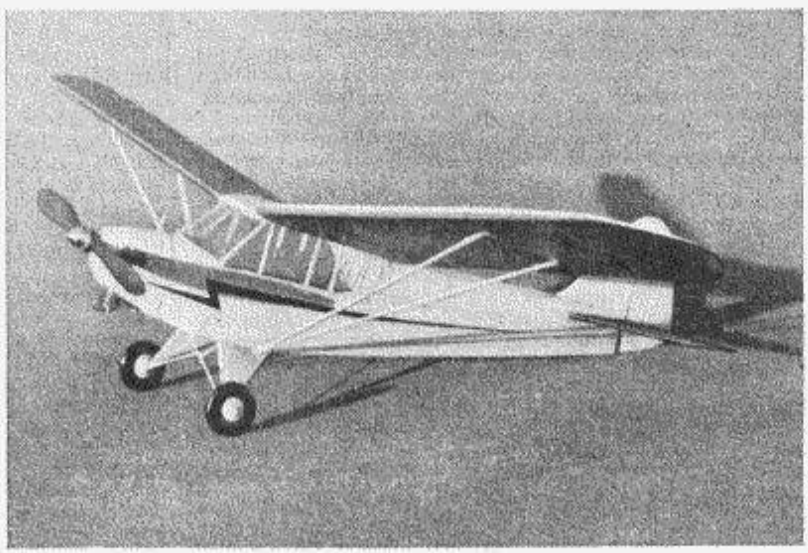
And yet another! This time a free flight flying scale model of the Piper Cub, built by W. C. Blake of Southwick. This is a baby model, being only 26 in. span, 2¼ ozs. in weight, and powered by a Kalper ·3, but despite its diminutive size its best performance has been 5¼ mins. on a 2 min. engine run at a recent club meeting.

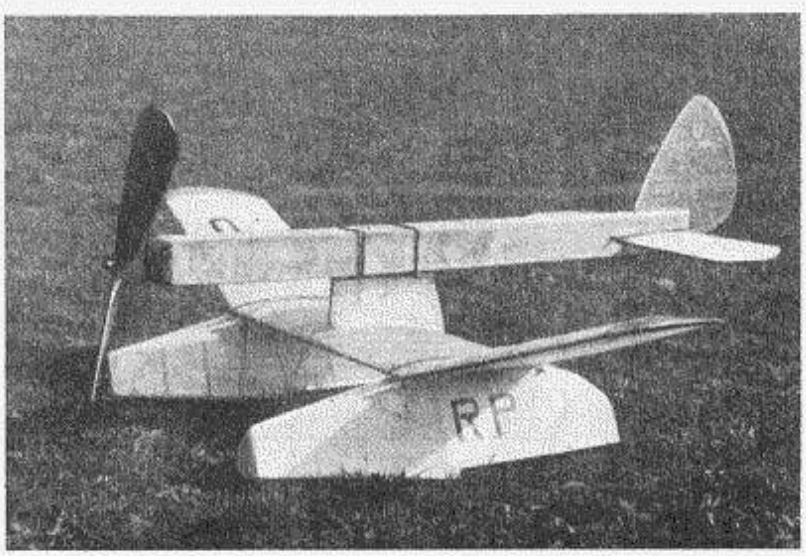
Fliar Phil doesn't know if D. Tilleray, member of the R.P. model flying club who built the unorthodox flying boat illustrated bottom right, has christened it "Puss in Boots," but he offers it the name at absolutely no charge. Still, if it works why not?

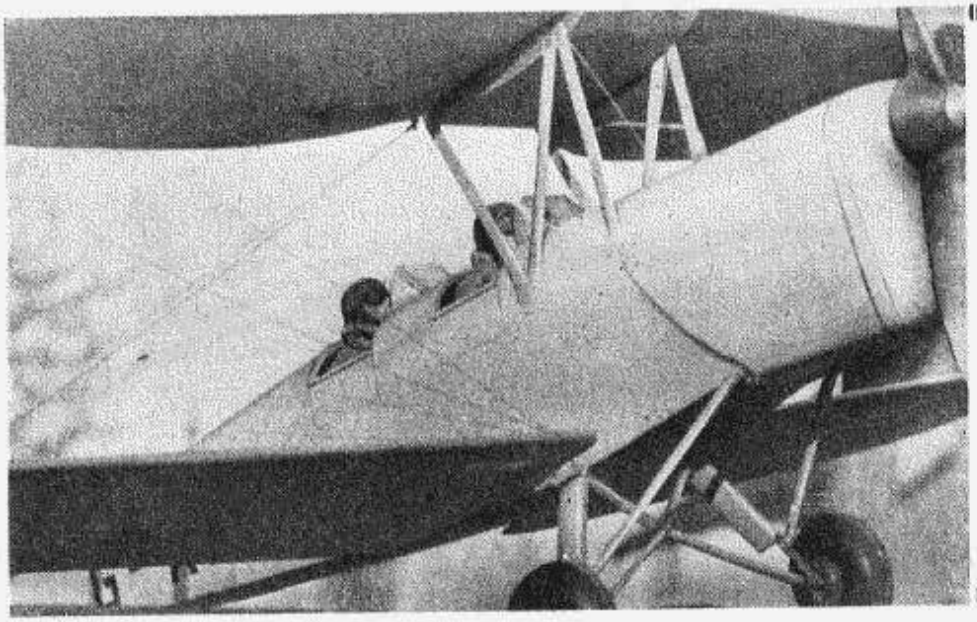
Well, back to the work bench, and Fliar Phil will see what current odds and ends he can accumulate for you next month (all right, all right! a pun it was . . .).











THE FLYING SCALE MODEL

PART TEN

BY

C. RUPERT MOORE, A.R.C.A.

I HAVE now reached the point when I cannot avoid the description of moulding paper any longer. I use it for all my wheels. For the Typhoon, the weight alone is enough to prohibit the use of any other material. Comparing weights, similar sized wheels (2¾ in. diameter) are as follows:— Plastic, 1·5 ozs.; Pneumatic, 1·25 ozs.; Paper, 0·65 ozs. per pair. Where retraction is necessary, pneumatic tyres are a nuisance as inflation becomes critical because of limited clearance in the wheel wells. Where airscrew clearance is very small, air wheels only reduce their effective diameter.

Moulded paper has unique properties, its weight ratio to balsa is about the same as aluminium to spruce or ash, thus making it ideal for cowlings. Its strength is enormous, the experimental wheels for Viper 1, made in 1936, are still in use. Six layers thick of paper is slightly resilient, the thicker the more solid, the thinner the more pliable. It can be used as the merest shell, as for the personnel in my Tiger Moth. Each man weighs a tenth of an ounce, the weight of a sixpence. Together they are 1 per cent. of the model's total weight. The all-balsa cowlings of my Blenheim have been replaced by moulded paper ones, saving *one third* of their weight.

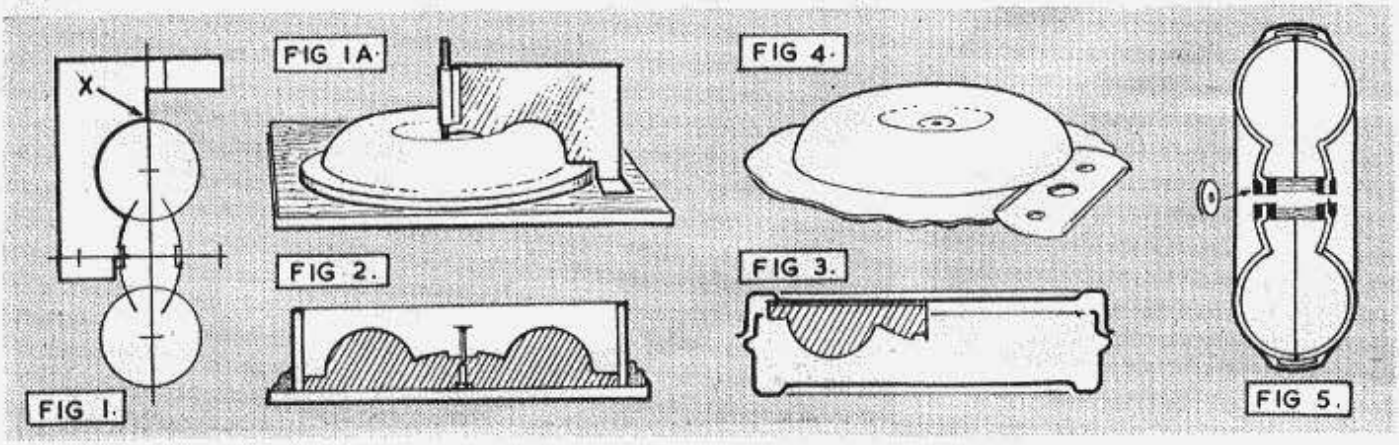
I am going to describe alternative methods of making the 2¾ in. diameter Typhoon wheel. There are three distinct stages, the making of the pattern, the making of the mould and the actual moulding of the paper. This wheel is symmetrical (Fig. 1) and therefore needs only a half mould. The section should be drawn full size, plus an allowance for shrinkage. Below is a simple table from experience.

Below 3 in. diameter, shrinkage is 3 per cent., approx.
Below 5 in. diameter, shrinkage is 4 per cent., approx.
Below 7 in. diameter, shrinkage is 5 per cent., approx.

The simplest material to make the patter of is Plasticine, and this is how it is done. From sheet tin, cut a template. The template should follow the centre line at X for ⅛ in. *This is a vital point.* The template is bent round an axle which slots into a screwed bush in the centre of a *flat* board. (Figs. 1A and 2.) To act as a guide, the other end of the template is bent to a right-angle. With the bush as centre, a disc of Plasticine is built up on the board. By revolving the template a perfect pattern is cut. Clear waste from template frequently. It will be seen that X has formed a perfectly true rim; on this depends the accuracy of the wheel.

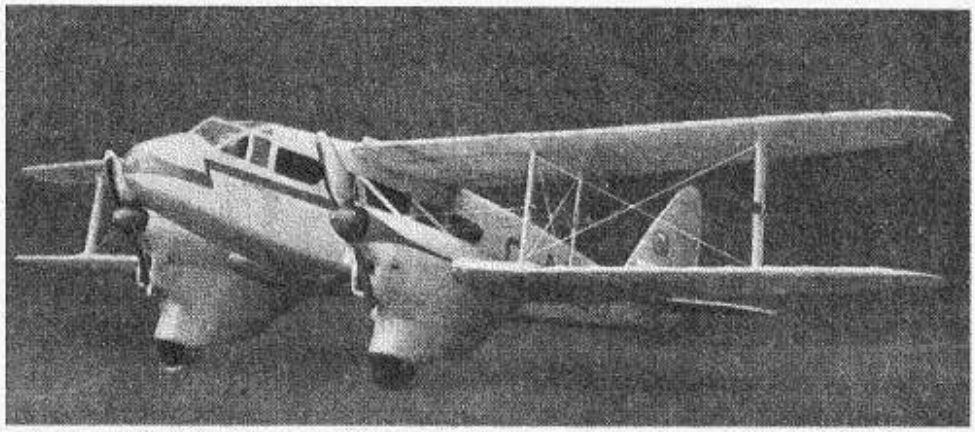
This pattern is then prepared for the mould. A cardboard wall, high enough to give ¼ in. thickness to the thinnest part of the mould, is put round the pattern and held in place with Plasticine (Fig. 2). A nail is put into the axle hole so that it becomes part of the mould. (This nail pierces each layer of the pressing.) About ½ lb. of *Plaster of Paris* (Commercial Grade) is required for this mould. This can be ordered from any good chemist or artists' colourman. Building material is too coarse. To half a large cup of cold water should be added three or four heaped dessertspoons of plaster. Sprinkle plaster into the water and mix up with fingers. With an old brush, paint this plaster all over the pattern face to prevent blow holes, and then pour in level with top of walls. There is no harm in mixing fresh plaster and adding if required.

In about an hour the mould should be carefully removed. If necessary, take the Plasticine from the board and dig out from the back. If it comes off easily however, true with template and make a second mould; it is helpful. This mould must be bone dry before priming thoroughly with dope



Heading photo left, shows the author's original Tiger Moth complete with papier-mâché crew.

Right, is a very beautiful scale control line D.H.89a by Mr. Jones of Cardiff. Weighing 3lb. the model will take off on one motor and has a wing span of 48 ins.



inside to make it non-absorbent. It will take several days on its own to dry, but the process can be speeded up by putting it in the airing cupboard. Excessive heat should be avoided.

When primed *keep the mould well greased with vaseline.*

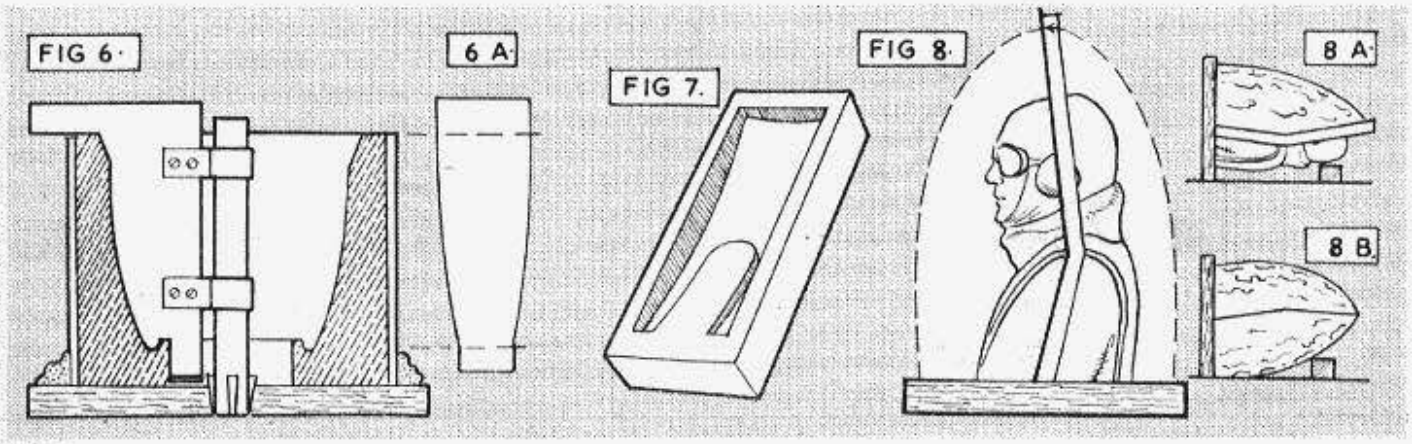
If a suitable tobacco tin is available, the circular type with the rubber seal round its middle, the two processes can be reduced to one. The rubber is removed. To the inside of the lid is soldered, or bolted, a male template (Fig. 3). The tin is half filled with plaster and the lid revolved. As the plaster sets a mould is cut. Do not use the plaster to build up once it begins to " go off," otherwise " rotten " patches will appear. Mix fresh plaster and pour in instead. Keep template clean while working.

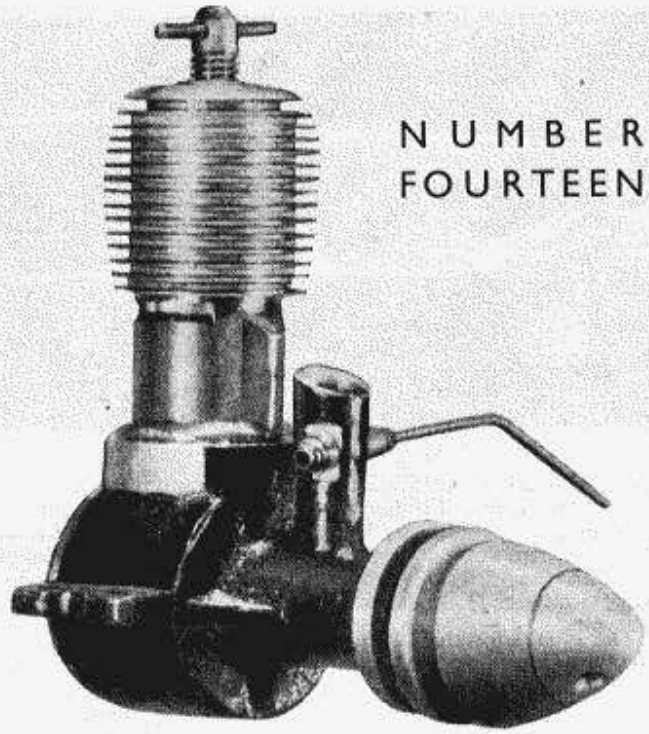
The best material for pressings is newspaper. As paper must be used wet, the siccative must have a water basis. There is little to choose between Gripfix and *very thick* flour paste, which incidentally must be brought to the boil when making. Six circles of newspaper 1½ in. greater diameter than the mould are cut. These are dipped in water and stood in a pile to soak. The first layer is put in with no paste at all. It is worked from the axle spike out to the tyre. Do not stretch the paper, ease it into place. Folds on the back do not matter. *Work the paper over the rim* to form a " brim." Paste all over the inside of this paper. The following five layers of wet paper are pasted back and front and worked individually one on top of the other with the thumb from the axle outwards. Heat deforms pressings, so after an hour fill the back of the pressing with Plasticine, shake the wet paper pressing out of the mould and stand face upwards on a flat surface to dry. Not only does this free the mould for the next half, but it allows the outside to dry first, thus shrinking on to itself.

When bone dry, the pressings are banana oiled inside and out. The thick celluloid washer bearings are cemented into their cavities outside and also inside (four to each wheel). Only now should the " brim " be cut off. Lay flat and cut as shown in Fig. 4. A balsa hub is made to space the centre and is cemented to one half. When set, cement the rims and hub and bring together. Test for true by spinning on an axle. Adjust by turning the halves in opposite directions (Fig. 5). (Use pins if necessary.) When set, sand the rim and cover the joint with three layers of ¼ in. newspaper strip. Finally, cover the tread with black bias binding, using Durofix and banana oil mixed. Use dull black dope for the tyre.

The mould for the Blenheim's cowlings was made by this revolving template principle (Fig. 6). A piece of ⅜ in. brass tube wedged into a hole in a ¾ in. thick base board formed the axis. The template was cut from 18 s.w.g. Dural scrap; tin straps were bolted round this axis to form bearings. Plaster was poured into the cardboard walls and the template revolved, the mould being produced by the " tobacco " tin method. Plaster was added a cupful at a time. Pressings were built up from 2 in. wide gores (Fig. 6A), three layers thick, newspaper and paste. The front rim was reinforced with reed cane. The Blenheim wheel doors were modelled in Plasticine on a sheet of glass, a mould was made and three layer pressings taken (Fig. 7). For diesel cowlings, 10 or 15 layers can be used when a high finish is possible, the pressings being thick enough to sand. I have made landing lights, wing fillets, leading edge slots, etc., etc., and even a 48th scale R.T.P. Mustang in this manner, gross weight 0·4 ozs.

Pilots are made by a similar method, the photographs show the instructor and pupil in a Tiger Moth and also a Plasticine model ready for the mould. As a rule only the head and shoulders are required (Fig. 8). This should be made on a board. When complete, a wall of Plasticine is put over the head and shoulders where the mould is to join like a halo. The model is laid face up (Fig. 8A) and plaster sprinkled on the front. As it sets it is built up. When hard, the " halo wall " is removed and the exposed plaster edge is painted with a thick soap solution to stop the back mould sticking to the front. The model is laid face down (Fig. 8B) and the back mould built up. Pressings are made from bamboo paper and paste, three layers in suitable shapes. Fill the nose of the man with a pellet of paste and bamboo paper.





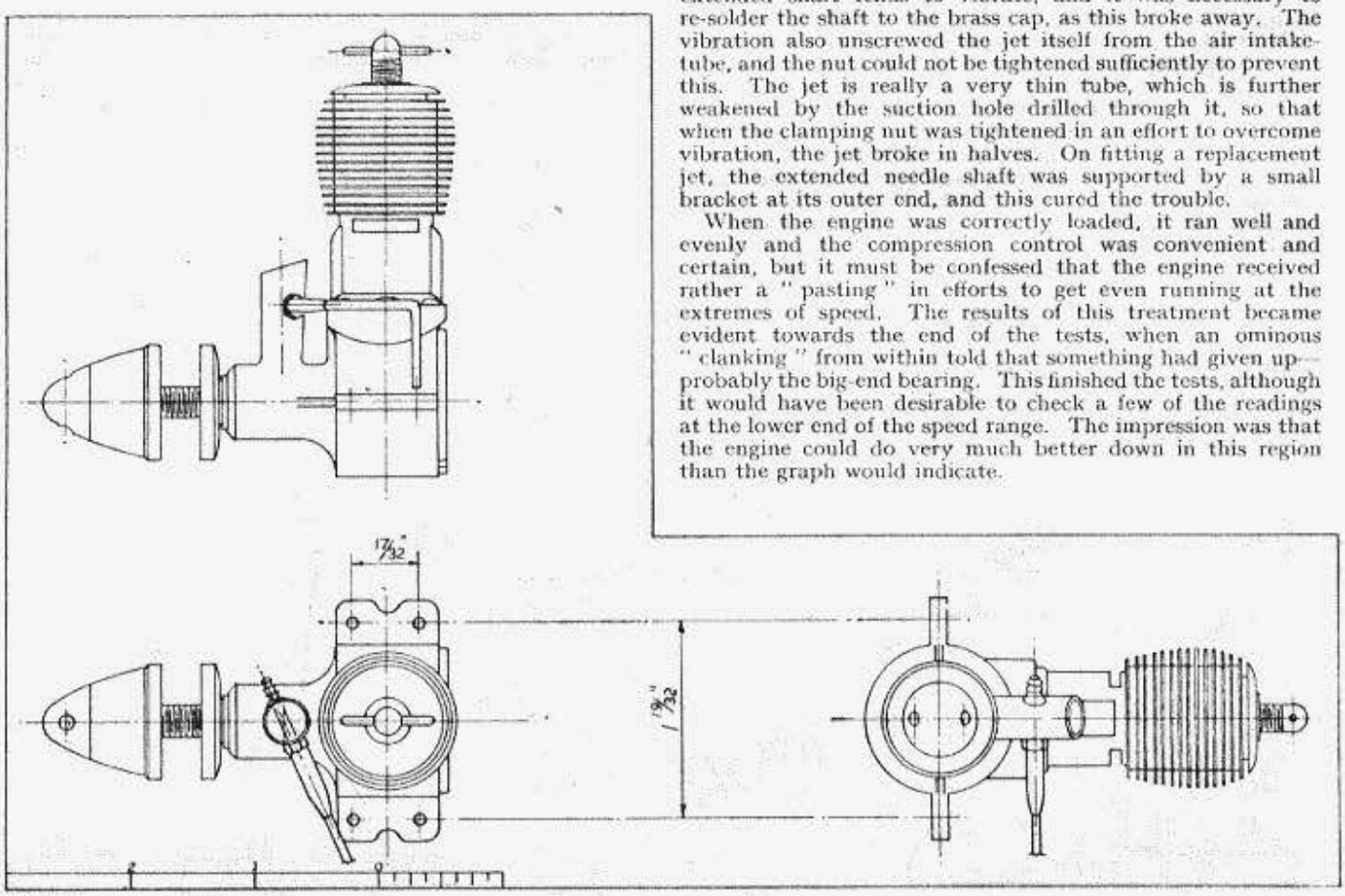
NUMBER FOURTEEN

The WESTON 3·5 c.c. STUNT SPECIAL

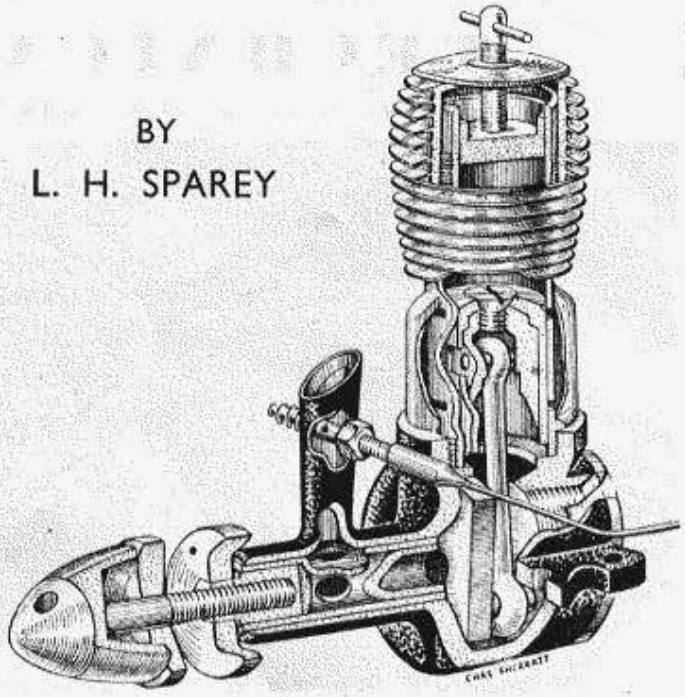
ALTHOUGH of quite orthodox design this "Weston" diesel is of particularly pleasing appearance, due to the neat fixing of the cylinder to the crankcase, and to the general freedom from attached "bits and pieces." The makers claim that this engine has been specially designed for control-line work, and that the throttle control is such that it will adapt itself to the varying flight conditions met with in this branch of the pastime. In practice, it seems that this has been achieved by making the control extremely insensitive, so that it may not be so readily affected by sudden changes in flying conditions. While this is no doubt effective in actual use it certainly made the bench testing extremely difficult, as the engine is really only happy when running at about 6,000 to 7,000 r.p.m. Fortunately, this speed coincides with the point of maximum output; in fact, it was almost bound to do so because, at the extremes of speed, the engine ran in erratic, short bursts.

If this type of carburettor design makes for better flying performance, then the behaviour on the test bench is unimportant, so that it may not be quite fair to say that throughout the tests the carburettor was very much in the spotlight. The engine embodies a crankshaft type of rotary inlet valve, with the air intake cast integral with the bearing housing, while an extended shaft of the control needle is swept back so that the fingers are well clear of the propeller. This extended shaft tends to vibrate, and it was necessary to re-solder the shaft to the brass cap, as this broke away. The vibration also unscrewed the jet itself from the air intake-tube, and the nut could not be tightened sufficiently to prevent this. The jet is really a very thin tube, which is further weakened by the suction hole drilled through it, so that when the clamping nut was tightened in an effort to overcome vibration, the jet broke in halves. On fitting a replacement jet, the extended needle shaft was supported by a small bracket at its outer end, and this cured the trouble.

When the engine was correctly loaded, it ran well and evenly and the compression control was convenient and certain, but it must be confessed that the engine received rather a "pasting" in efforts to get even running at the extremes of speed. The results of this treatment became evident towards the end of the tests, when an ominous "clanking" from within told that something had given up—probably the big-end bearing. This finished the tests, although it would have been desirable to check a few of the readings at the lower end of the speed range. The impression was that the engine could do very much better down in this region than the graph would indicate.



BY
L. H. SPAREY

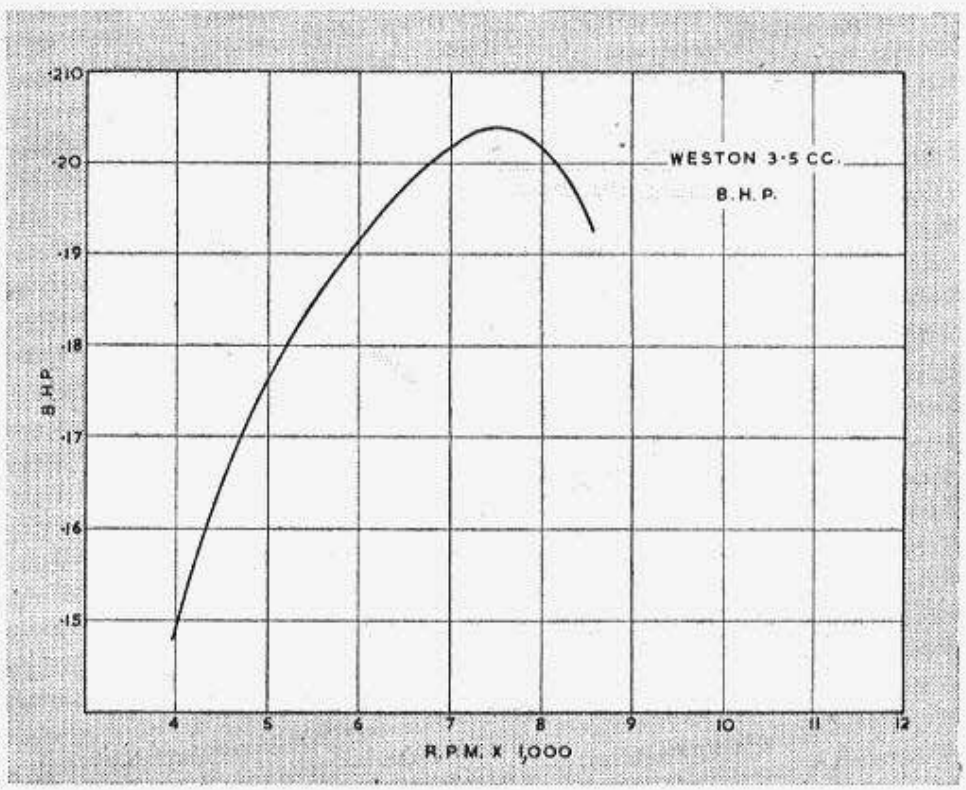


TEST.

Engine : Weston, 3·5 c.c. diesel.
Fuel : Maker's recommended.
Starting : Mainly hand-starting was used, although the cord-and-pulley method was resorted to for starting when lightly loaded for high speeds. Engine starts well by hand at its useful loadings.
Running : Runs well and steadily at speeds of approximately 6,000 to 7,000 r.p.m., but carburettor is not designed for flexibility of running. It must be remembered, however, that flexibility is no asset in model aeroplane work, but is necessary to obtain a power curve of any useful length.
B.H.P. : As was to be expected from the running characteristics, the power curve for this engine is rather steep, although not unduly peaked at the apex. We see, therefore, that while a maximum b.h.p. output of ·204 is given at 7,500 r.p.m. a drop of about 700 r.p.m. either side of this figure only reduces the output by ·004 b.h.p. At 9,000 r.p.m. the output is, by assumption, about ·170 b.h.p., while at the other end of the scale power is down to ·149 b.h.p at 4,000 r.p.m. The peak output may be considered good for an engine of this capacity.
Checked Weight : 4¼ ozs.
Power/Weight Ratio : ·740 b.h.p./lb.
Remarks : This engine is remarkable for having the exceptional power/weight ratio of ·740 b.h.p. per lb.—the highest of any engine yet tested. This is accounted for by the very light weight, 4¼ ozs., although there is no petrol tank fitted. Even with a reasonable allowance for this, the figure would still be exceptionally high. At the same time, it is felt that this light weight has been attained, to some degree, by a sacrifice of a few details which would prove of benefit, such as a more sturdy design of the carburettor. This is the only point of criticism, as the rest of the engine seems very pleasing indeed.

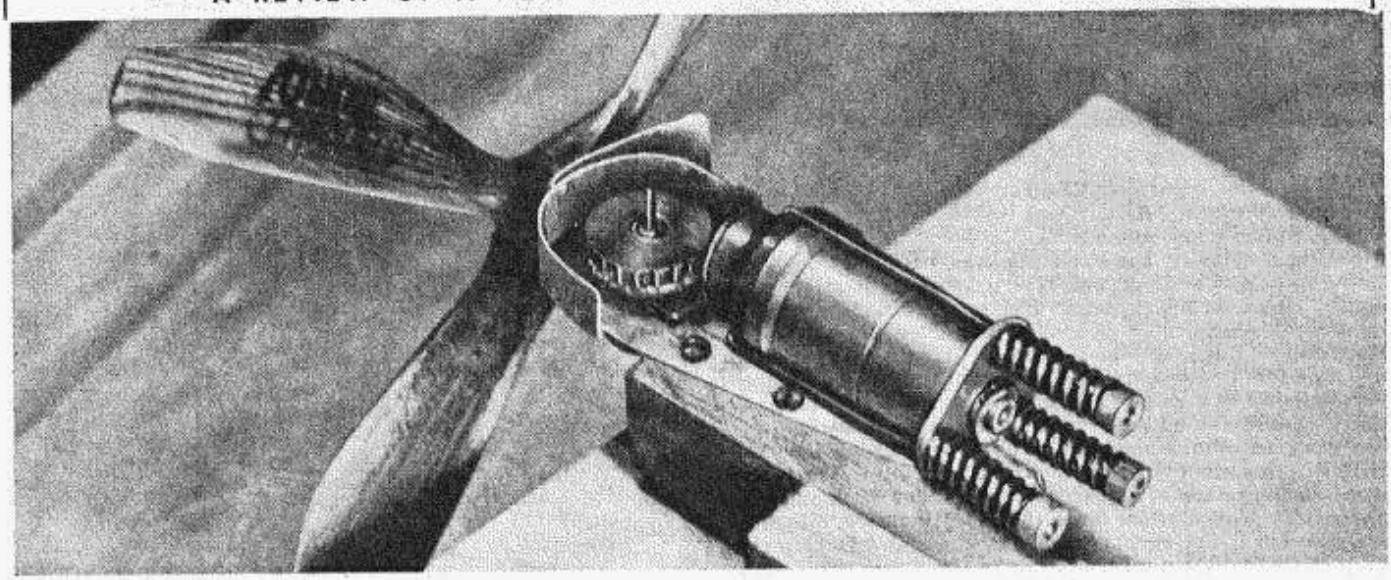
GENERAL DATA

Name : Weston 3·5 c.c. Stunt Special.
Manufacturer : Messrs. Weston Model Aero Supplies, 1, Oxford Street, Weston-Super-Mare.
Retail Price : £4. 10s. 0d. inclusive of purchase tax.
Delivery : Ex stock.
Spares : Ex stock Engine must be returned for servicing.
Type : Compression Ignition (Diesel).
Specified Fuel : Mercury No. 3.
Capacity : 3·5 cubic centimetres, ·215 cubic inches.
Weight : Bare 4¼ ozs.
Compression Ratio : Variable.
Mounting : Beam, upright and inverted.
Recommended Airscrews : 9×6 Tru-flo Stunt. 8×8 Tornado Toothpick Speed. Use standard flywheel spinner.
Tank : Not supplied.
Bore : ·625 ins., 15·375 m.m.
Stroke : ·687 ins., 16·450 m.m.
Cylinder : Heat-treated Vigilant steel.
Cylinder Head : High grade Duralumin.
Contra Piston : 5 per cent. nickel chrome steel.
Crankcase : Die cast aluminium.
Piston : Mehanite.
Connecting Rod : Hyduminium alloy.
Main Bearing : Plain.
Little End Bearing : Plain.
Valve : Rotary crankshaft.
Special Features : Light alloy bolt type crankshaft extension incorporating spinner to reduce broken crankshaft. Replacement bolts 2s. each.
Special Flywheel Spinner available for speed flying.



TECHNICAL TOPICS

A REVIEW OF A NEW TURBO-PROP UNIT BY P. R. PAYNE



Turbo Props.

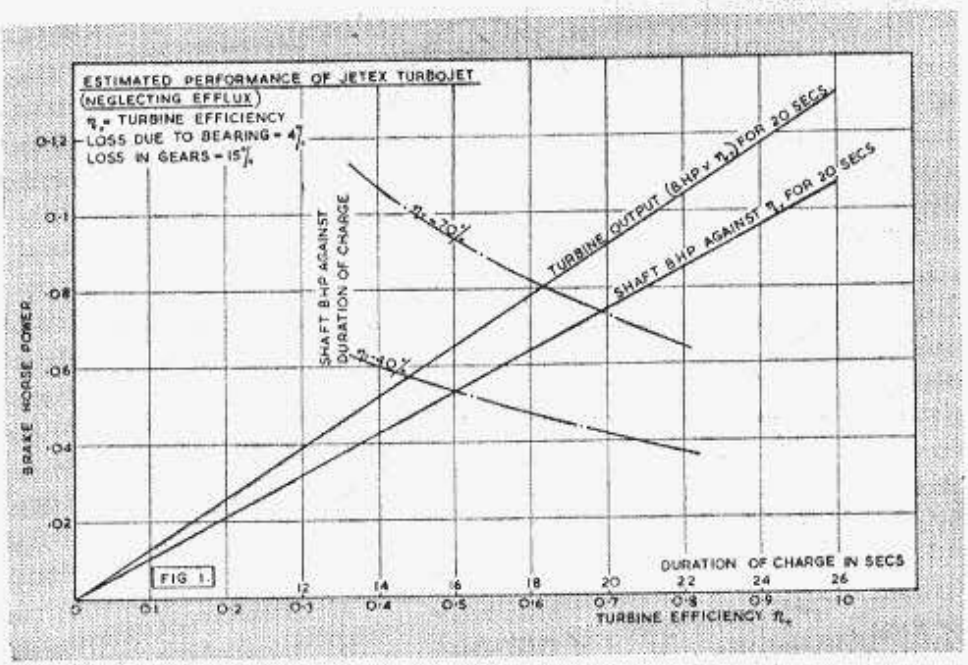
SINCE the internal combustion engine was first used in aeromodelling the years have seen a steady increase in power/weight ratio, until we now have, in the Glo-plug engine, a source of power which gives more b.h.p. per pound weight than many full size aero engines. There is no need to go into mathematics to realise that if full size designers set one b.h.p. per pound as the limit, model designers are unlikely to go much in excess of this. Most commercial designs are capable of improvement, it is true, but there already are signs that the very best engines are becoming increasingly reluctant to improve their performances.

The reason is fairly simple, like most deterrents to progress. Of every 100 units of energy in the fuel, about 60 are lost in heat, via the exhaust gases, and cylinder head. A further 10 are wasted on friction, leaving a maximum of 30 to do useful work if the porting is perfectly made. If the porting is badly designed, or carelessly manufactured, even less useful work is done.

Cramming more fuel per second into the cylinder will of course increase the power output of an engine, but there is a limit to the amount which can be supplied without increasing the overall weight. We now seem to be nearing that limit.

It has often been suggested that jet units will enable more of the fuel's energy to be usefully harnessed. In a way this is true, and it is probable that the kinetic energy of the blast issuing from a Dynajet is considerably greater than the energy which would be produced by an I.C. engine of the same weight. But in terms of thrust the latter will win hands down every time because a propeller is so much more efficient at the low speeds necessary with a free flight model.

Theoretically, the turbo-prop is the ideal compromise because it combines the thermal efficiency of a jet unit with the high low-speed thrust of an airscrew. It is therefore very interesting to see that Messrs. Wilmot, Mansour & Co. Ltd. have attempted to produce a suitable unit of this type. The kinetic energy of the gas stream provided by the Jetex 100 unit is 71·5 foot pounds per second (0·13 b.h.p.), and from this must be subtracted the losses incurred at the turbine and the losses incurred in the transmission. With the very inefficient turbine used at the moment the unit produces about the same amount of power as a 0·75 c.c. diesel motor. There is no doubt however, that the unit can be considerably improved upon, which would of course also improve the power output.



Turbine Efficiency. The success or failure of the unit depends on the efficiency of the turbine. If it can be increased to 40 per cent. the unit will provide as much power as

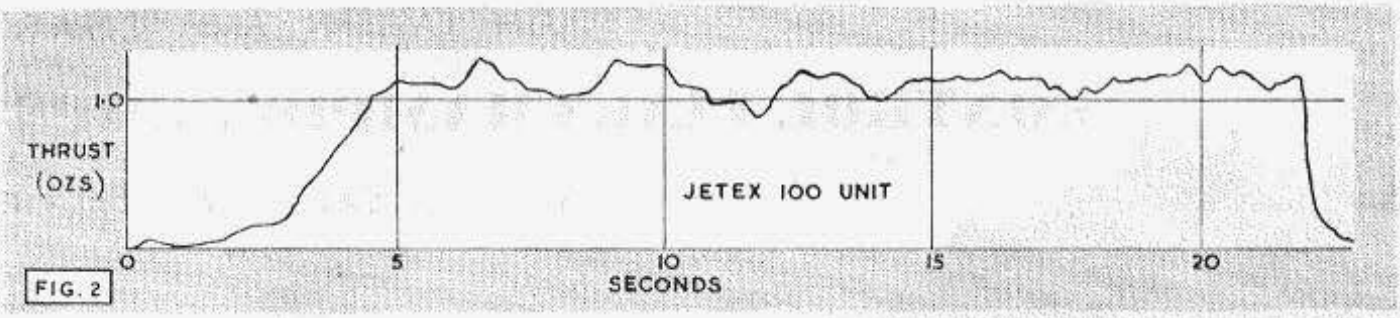


FIG. 2

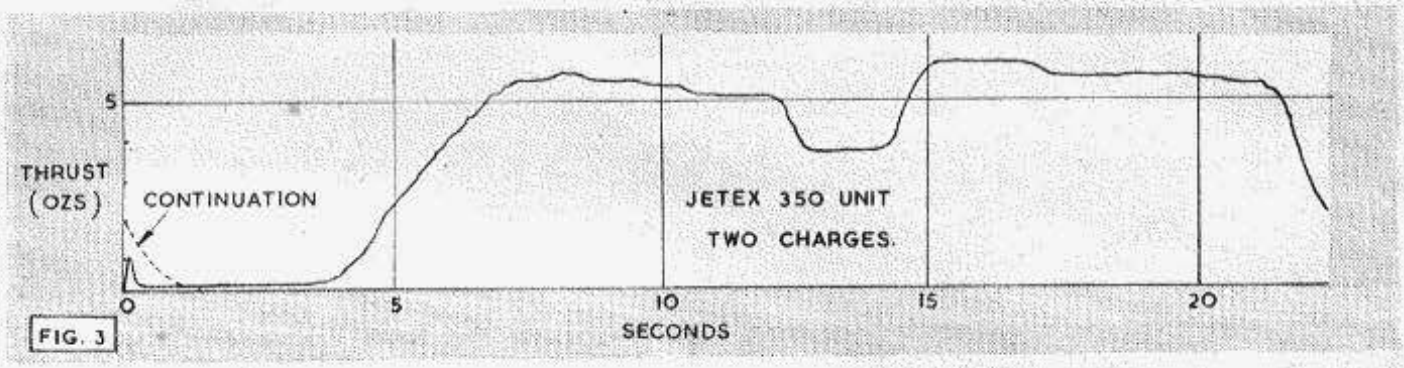


FIG. 3

the Frog 100 for 16 seconds, and since it weighs less than two ounces it should be very attractive for duration models. From engineering considerations alone there is no reason why efficiency should not be increased to 70 per cent., giving a power/weight ratio of about 0·95 b.h.p./lb. for 14 seconds, and it is believed that the L.S.A.R.A.—who have been testing the unit—are now considering whether such increases are possible.

Fig. 1 gives the calculated performance of the unit for various efficiencies and Table 2 some idea of the measured performance to date.

The Prototype. As shown by the accompanying photos, this is little more than an experimental mock-up at the moment, and as the designers made the forgivable mistake of not realising just how much power they were going to get, the construction is rather light. This has limited the amount of testing which has been done up to the time of writing. Indeed, when the writer first tried it out, his report contained such passages as :—

" **Test 2.** For this test the 7 in. four-bladed propeller was used, and great care was taken to see that it was firmly locked. The unit was mounted on a Static Thrust rig.

" Five seconds after starting, the airscrew started to slow down, whilst the turbine accelerated to a very high speed, emitting a piercing scream. (N.B.—Top speed was about 2,000 m.p.h.) It was later found that the soldered joint between the shaft and the face plate had failed, and that friction of the worm gear had forced the mating gear forward towards the propeller. This in turn wrecked the rear thrust bearing, and the whole shaft moved forward about $\frac{1}{4}$ in. The turbine bearings appeared in good order."

Since the L.S.A.R.A. received the unit the same troubles have been encountered, but they have now manufactured stouter components, it is understood, and this has enabled a few measurements to be taken. The latest news is that the Jetex 100 unit exploded, and thus it is not possible to give any detailed results this month but provisional figures are given in Table 2.

These setbacks are to be expected, of course, and are only described in order to give some idea of the design of this type.

Jetex Rocket Units. Many readers of my last article have expressed surprise at the very high thrust obtained with 350 unit, particularly since the manufacturers have been claiming much less. The tests were made by the L.S.A.R.A. and Table 1 gives some idea of the individual readings. Specially interesting was the discovery that a dirty gauze reduced the thrust, but increased the duration. This seems to indicate that by varying the size of the venturi it will be possible to have greater thrust for a shorter period, or vice versa.

Figs. 2 and 3 show thrust plotted against time, and substantiates the manufacturer's claim for comparatively constant thrust. The actual line of the thrust varies throughout the run by about 10 degrees because of the wick core which is left in the venturi

TABLE 1

Jetex 350 unit

Thrust (ozs.)	Time (secs.)	
4.65	8.6	one charge.
5.5	7.5	
5.1	17	two charges.
5.0	17.8	
5.06	8.5	Average for one charge.

TABLE 2

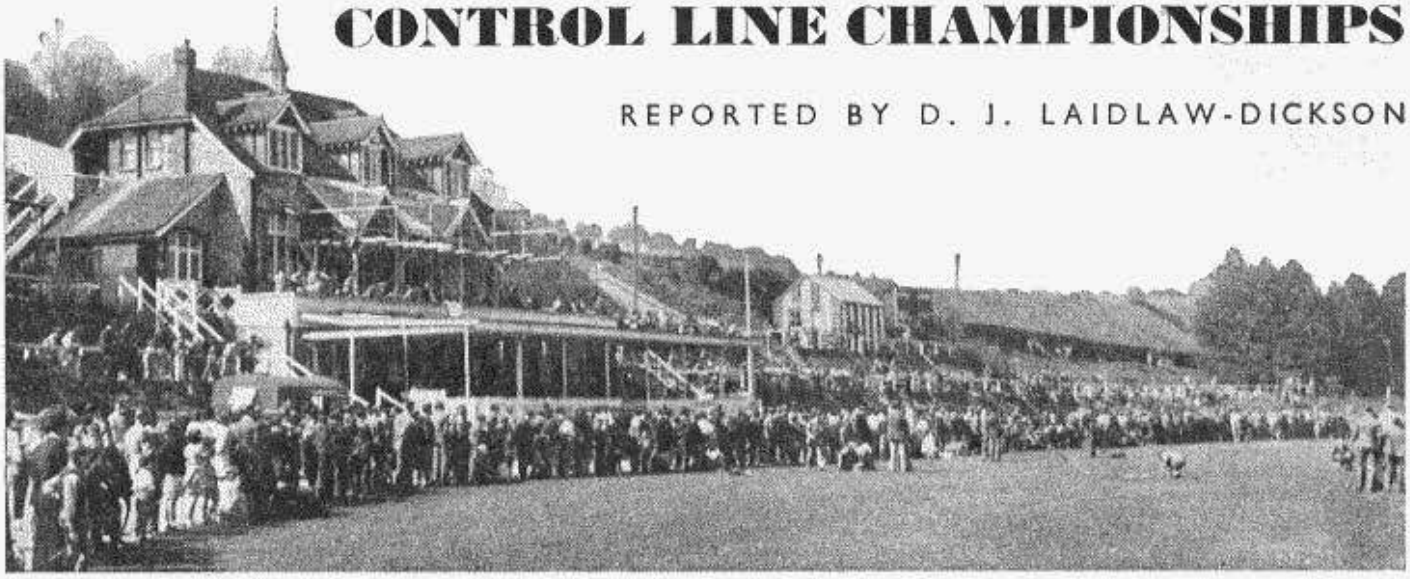
Performance o Jetex Turbo-prop with four-bladed 7 in. diam. Propeller

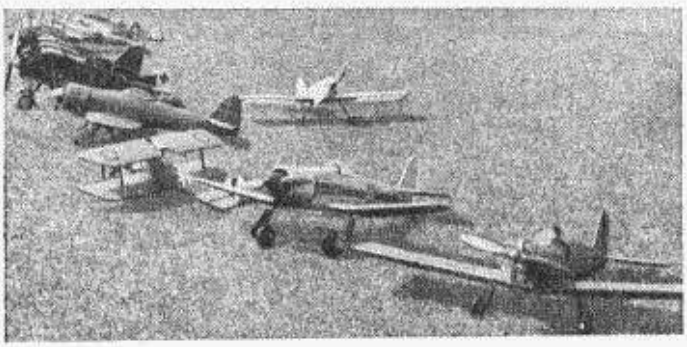
Turbine	R.P.M.	Static Thrust
As shown in photo	Over 4,000	—
With cover on top of turbine ...	Over 5,000	—
With cover and space between blades and casing reduced to $\frac{1}{32}$"	Over 6,000	10·5 ozs.

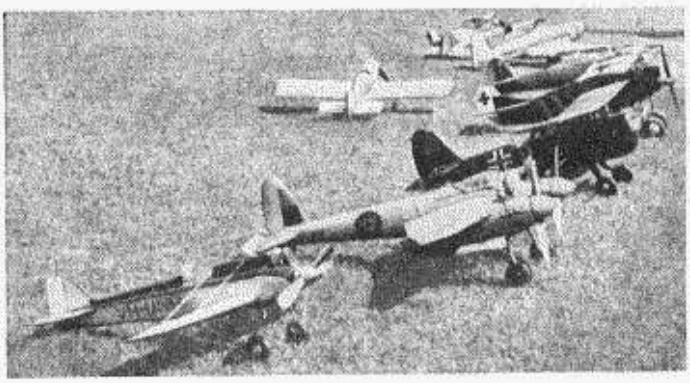
SOUTH EASTERN AREA S.M.A.E.

CONTROL LINE CHAMPIONSHIPS

REPORTED BY D. J. LAIDLAW-DICKSON







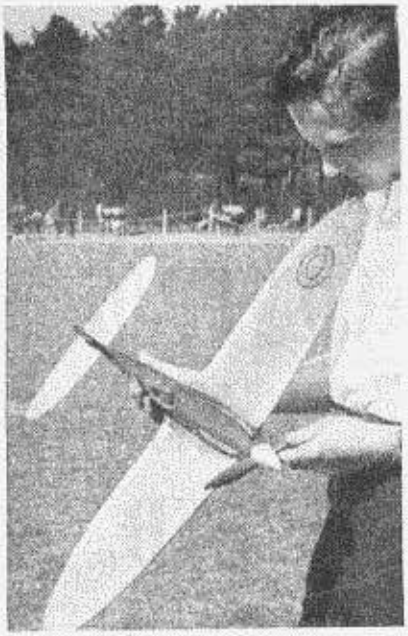
IN staging the first South Eastern Area Control Line Championships at Dover, on Easter Monday, the Dover Youth Club certainly showed the south of England what can be done in the way of venue and local co-operation. Not only was the Crabble Athletic Ground—pride of the Kent Cricket Club—placed at their disposal but the meeting received the wholehearted support of the local authorities, with the Mayor, Alderman A. T. Goodfellow, J.P.—who more than lived up to his name!—to open proceedings and welcome visitors, and the Mayoress to distribute the prizes at the end. Glorious weather encouraged between five and six thousand visitors who must have gained a more than useful appreciation of the scope of this side of aeromodelling.

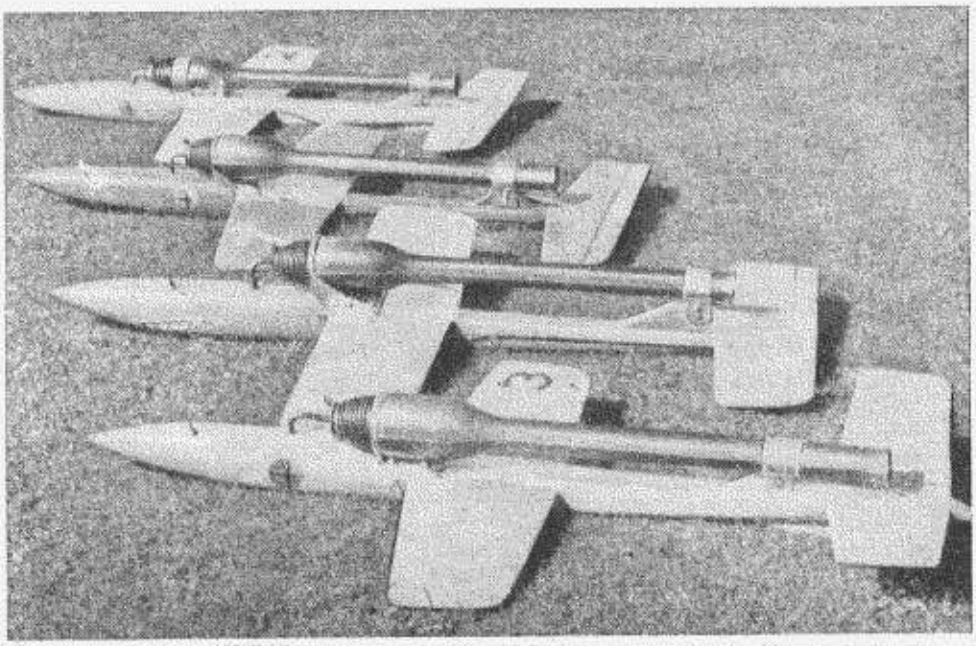
Nearly thirty clubs took part in the meeting, coming from as far afield as Weston-super-Mare; most of the interested London clubs sent parties, including a coach from West Essex; Kent and Surrey clubs also gave adequate support. In all there were nearly two hundred entries, of which 175 actually became airborne. It is interesting to note that while the Open Stunt Class attracted the largest single entry at 49, the aggregate of speed entries was over twice as strong, including no less than seven in the Jet Class.

Five flight circles were available, three for speed and two for stunt, but, as usual, the competitors were slow to make use of them. In spite of p.a. demands no more than a trickle put in contest flights until well after lunch. This may well have detracted from the enjoyment of uninformed spectators, particularly as not until late in the afternoon was general permission given for visitors to make non-contest flights. These, incidentally, offered at least as much entertainment as the contests—with several groups of up to four flyers performing in the same circle. For future events, a resident circus of this nature would do much to keep up general interest between flights.

In the speed classes, except in the smallest sizes, a predominant American interest was still noted, with "Little Rocket" and variants the principal design. Power units featured McCoy 19's, 29's and 49's with the new Eta 29 and the Rowell 60 making a bow for contest placings. In Classes I and II, Mills Mark II and Elfin seemed to have it all their own way without foreign invasion. The really short smooth turf was much appreciated by many of the speed aspirants who found difficulty in getting models off their "chariots"—

Heading: Some idea of the crowd and the flying ground—only flyers were allowed on the pitch.
Centre pictures: Line-up of scale entries. In the lower picture winning Fokker D.7 will be noted.
Bottom: Cuckoo in the nest! Henry J. Nicholls' R.C. monster that attracted much attention in its taxying trials, though too big to fly out of the ground.

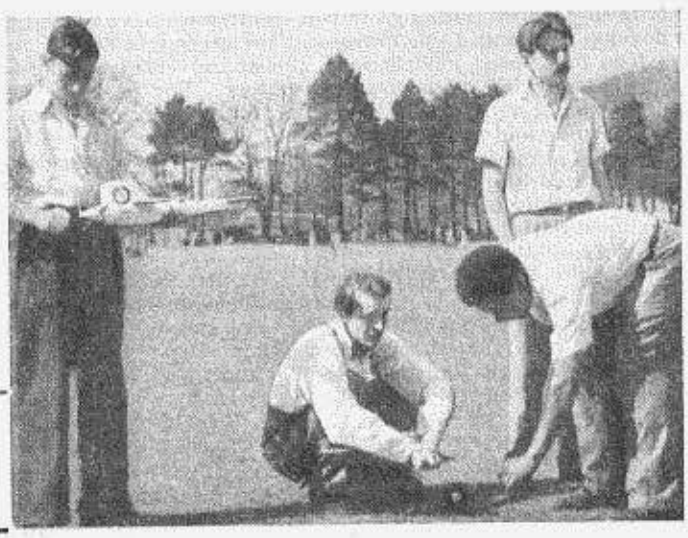




one flyer must have made at least twenty unavailing ground laps!—but further research on the pylon yokes is desirable, for those provided must have proved a source of continual worry to contestants, lacking any arm rests. The jet entries were headed by a formidable entry from Guildford, who provided the winner and second. As a spectacle they were sensational—including one model that came down in flames, and was borne away by juvenile souvenir hunters—but only three of the seven completed their required number of laps. Bill Dean spent a vast time entertaining the crowd with a series of abortive efforts, and some fine sprinting between model and pylon. All the models successful were Dynajet powered, and all Squirts, or Squirt-variants—so here again we appear to be following in American footsteps.

In addition to the Open Stunt event, a Scale Stunt Class was introduced for the first time, following the recommended S.M.A.E. Rules. This attracted about a dozen entries, and provided flights from mediocre to first-class. Winner N. J. Butcher of Hastings, who was also Competition Secretary of the meeting, flying a Fokker D.7, K and B.29 powered, left literally nothing in the stunt schedule undone, and would have placed well in the Open Stunt on his performance.

The Open Stunt produced a large proportion of failures due to comp. nerves from obviously competent and often well-known entrants. Comparing the general standard with last year it is clear that far more flyers are capable of the full aerobatic schedule, and, moreover, are willing to come forward and have a go, but the skill of those " at the top " has not improved in proportion, which makes the winner by no means a foregone conclusion. All of which is good for contests. Equally encouraging is the design trend, now all towards British engines of small and medium size, with Elfin, E.D., and K to the fore. Few models sported undercarriages, and while side-winder mounting was quite general the " flatfish " has given place largely to slabsider designs, some with streamlined entries. Winner W. H. C. Taylor, flying an E.D. Mark III powered slabsider, with parallel chord wings, gave a polished performance that could hardly be faulted. Points were lost virtually only on 8's not flown. In passing, we must record one " special manœuvre " provided by a non-winner, who lay on his back and looped from that posture (we had to explain that the *model* was required to do the manœuvre!). *Results on page 384.*



Top left : Marlin—first semi-scale kit to be fully aerobatic—seen at Dover.
Top right : Formidable Guildford contingent of jet entries, which includes Foskett's winner.
Centre : Dennis Allen and friends have a combined operation. The kneeling gentleman is giddy but still flying!
Bottom : In the line pits. Speed merchants having their lines tested.

CONTROL LINE SPEED DESIGN

PART ONE BY R · H · WARRING

CONTROL LINE flying started in America around 1940–41. The original control line method was G-line—single line tethered flight similar to our own indoor R.T.P. flying, but with the pole held by the pilot—developed by Victor Stanzel. Shortly afterwards Jim Walker introduced U-control, the basis of all modern control line technique. Jim Walker, in fact, demonstrated his Fireball U-control model throughout America during 1940–41 and was virtually responsible for the boom in this new phase of aeromodelling.

The Fireball was undoubtedly one of the most popular models during the early years of control line flying. It became the basis for the first speed models, interest in speed developing very rapidly as the movement got under way. Speed flying was, in fact, the logical form of contest for control line and as such received most attention. Stunt flying followed much later in America, although in this country we have tended to develop the control line movement the other way round.

The first speed models were almost universally "sports" jobs fitted with more powerful motors. For example, the ubiquitous Fireball was fitted with almost every conceivable motor up to and including the Super Cyclone, the latter giving it a high speed in the 80 m.p.h. class. It is very difficult to trace the early development of the speed control line model since virtually no rules were enforced at that stage, with no National records or even National contests. The early history must be all-American, since the sport definitely developed there. Speed flying started in this country with knowledge of some four or five years' American development and hence has not passed through the same teething stages. In fact, any adequate treatment of speed control liners must be predominantly a survey of American practice, our own efforts to date being based absolutely on this.

The "home" of speed control line development is undoubtedly the Californian or West Coast area of America. Outside of this, very few outstanding speed fliers have appeared until recently, when design appears to have reached somewhere near its ultimate limit; and present speed models are almost all closely related to the standard speed model layout produced by the West Coast modellers. The one outstanding exception from the East Coast (American) area is Harold de Bolt, whose advanced designs will be discussed in more detail later on.

Certainly the West Coast was the first area to run large scale speed contests and produce the first 100 m.p.h. models. From the modified sports model with clipped wings and the most powerful motor available, many of the first speed jobs were similar in layout to Keith Goodman's winner at the 1943 West Coast "Nationals" at a speed of 92·07 m.p.h. Best unofficial time recorded by this model was actually 115 m.p.h.—an exceptional figure for 1943 when most of the experts had considerable difficulty in getting up to the 90 m.p.h. mark. (Fig. 2.)

This model is most interesting on account of the inverted motor installation with a ducted cowling. Wing area was quite large, with a thin aerofoil section. The short fixed undercarriage was actually anchored in this cowling immediately behind the cylinder of the motor.

Also in this same year—1943—appeared the first of a long line of speed models by Don Newberger, now recognised as one of the world experts in this field. This model was also very similar in layout, with inverted Super Cyclone motor and a long fuselage. In contrast, however, the wings were of relatively small span and area—18 ins. span against an overall length of 26 inches—with a thin symmetrical section.

At about this time a considerable boost was given to the speed performance by the introduction of the Hornet motor—originally produced for race car work, but now adapted for model aircraft. This motor—again a West Coast product—outclassed any comparable "standard" motor and established the first rule of speed models that, for highest speeds, a racing motor is imperative. Racing motors are generally defined as those motors developing their maximum power at 15,000 r.p.m. or more, as opposed to the 8–10,000 r.p.m. maximum for most free flight motors.

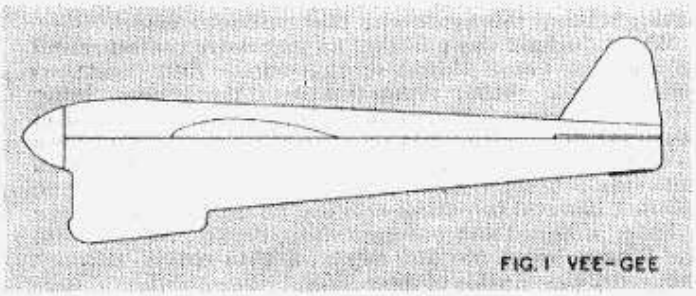
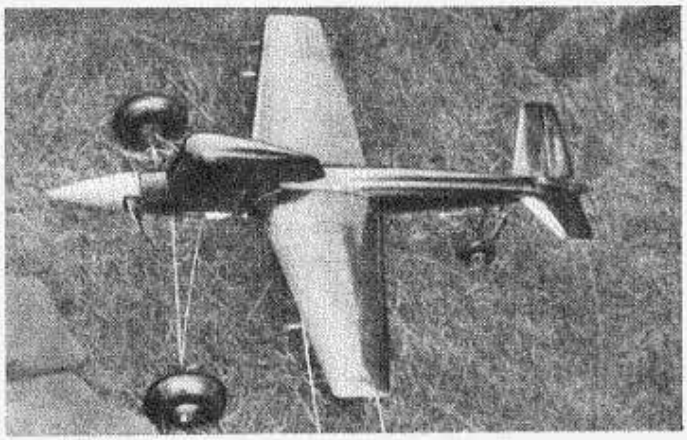


FIG. 1 VEE-GEE



Heading photo left, shows speed scene at last year's Northern Heights Gala featuring Cyril Shaw with his McCoy 49 job at the starter, and John Wood's Nordec powered model in the foreground. Right, is another Shaw model this time with a Fox 59. This model somewhat modified is capable of 120 m.p.h. and was flown by Bill Dean at the recent Dover Rally.

With a racing power plant available, speed design then went off at a tangent from the correct path. Wings were clipped more and more to reduce area (and drag) and the sections thinned to a degree. Weight went up as stronger airframes were produced to withstand the very powerful motors and the rough usage in 80–90 m.p.h. " landings ".

It was quickly realised, however, that increasing the wing loading beyond a certain limit produced a decrease in performance, with thin, small-area wings, the model had to fly at an appreciable nose-up attitude for the wings to develop enough lift to support the machine—the idea that a speed control line model does not need wings at all being a fallacy. To counteract this, of course, the wings could be rigged at a considerable positive angle of attack, but either method produced a higher overall drag than that of a similar model with larger wings.

Hence after a series of clipped wing projectiles, the present-day speed model began to appear, with moderate wing area and moderate wing loadings. Speeds then jumped from around the 100 m.p.h. mark to 130 m.p.h. and more. The final stage up to 150 m.p.h. and more has been more a matter of refinements in detail design (e.g., reduction in wetted area) and motor tuning (coupled with doped fuels) and propeller-motor combinations.

About the last of the successful inverted-motor racers was the Vee Gee, designed by Granger Williams and Virgil Clark (Fig. 1). During 1943–4 this model achieved many successes, top official speed with a Hornet being 112 m.p.h. This model has a fairly generous wing area and thick section. The wings, were, in fact, sharply tapered to the tips, with span reduced to 18 inches and total length 22 inches. A dolly undercarriage was specified, although hand launched flights could be made.

By the beginning of 1944 rules for speed flying had been introduced and interest in competition work became greater. The models were being "cleaned-up" all round and the undercarriage disappeared as an unnecessary source of parasitic drag. Who first used a dolly for control line work is not known, but the principle had, of course, been employed before for free flight models. Albert Weathers produced his Mystery Man in 1939 as a free flight power contest model with a dolly undercarriage, utilising a loophole in the existing rules to dispense with this unit entirely once airborne.

One of the most outstanding models to appear during 1946—virtually the end of the next stage of development—was the Jughaid by Ernest Babcock, another name now universally associated with control line work. This model is shown in Fig. 3 and the low aspect ratio, sharply tapered wings are outstanding. The wing plan form is, in fact, still similar to that of the Vee Gee. But the fuselage has now been reduced to a streamlined shape of circular cross section, with a large spinner providing a good entry. Virtually the whole of the cylinder of the motor projects beyond the lines of the fuselage and is uncowled.

The motor used in this case was again the Hornet and Jughaid held the class record during 1946 with a speed of 113·5 m.p.h. Ultimate top speed was estimated at around 130 m.p.h. although there is no official record of the Babcock's

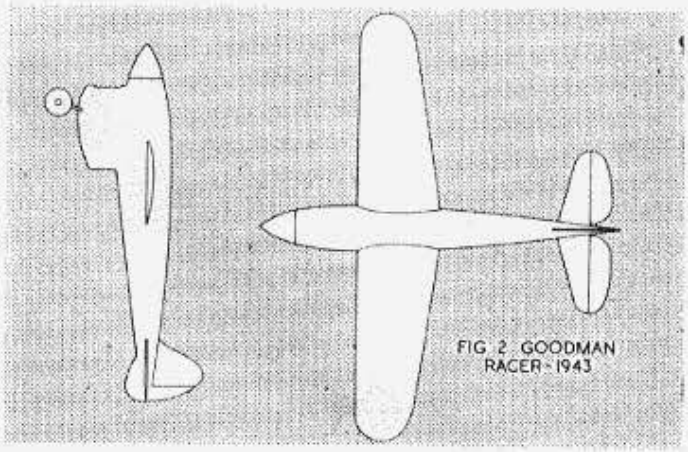


FIG 2 GOODMAN RACER - 1943

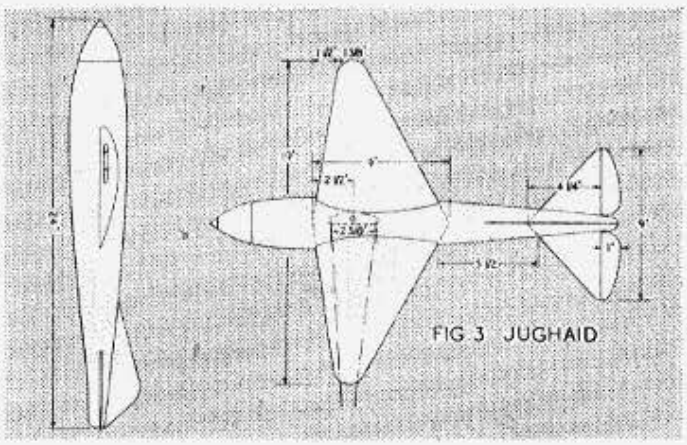


FIG 3 JUGHAID

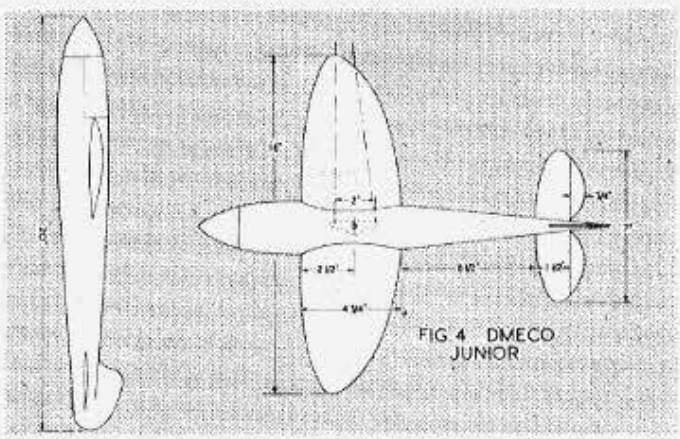


FIG 4 DMECO JUNIOR

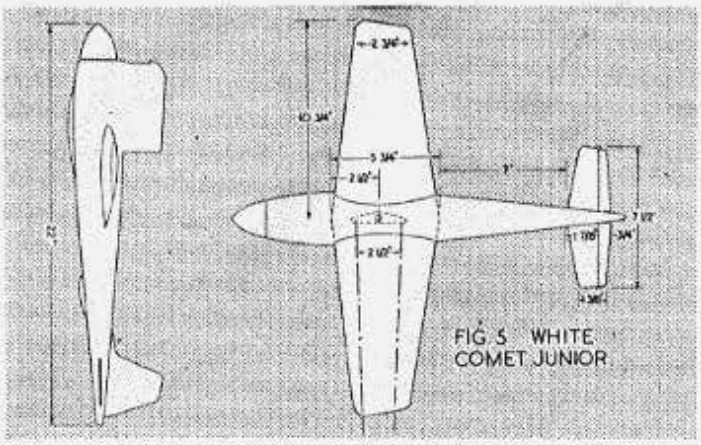


FIG. 5 WHITE COMET JUNIOR

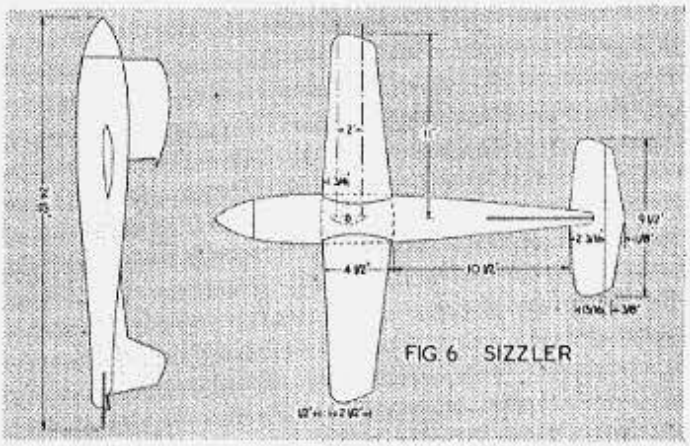


FIG. 6 SIZZLER

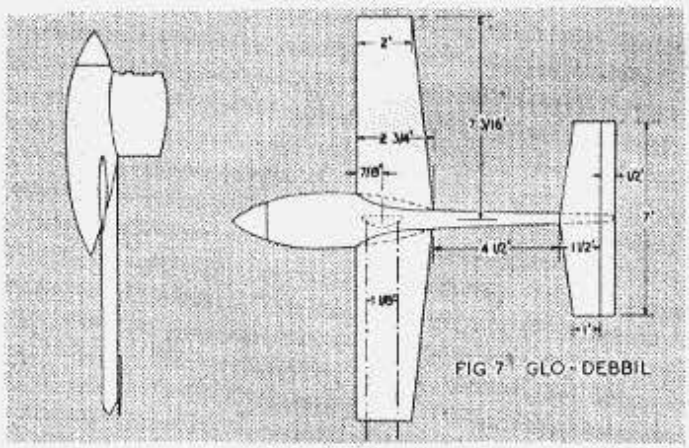


FIG. 7 GLO-DEBBIL

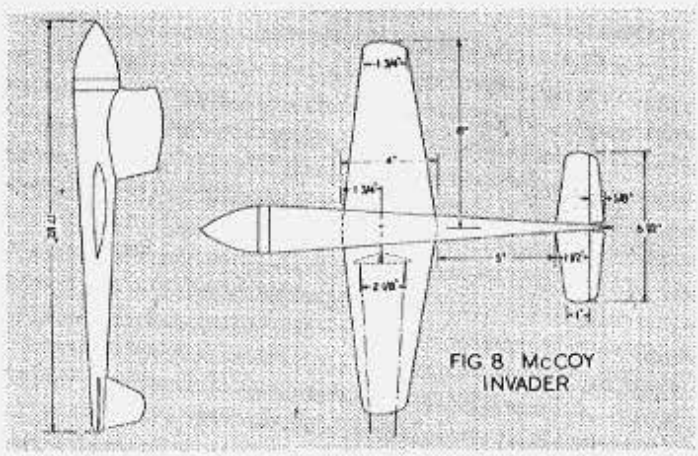


FIG. 8 McCOY INVADER

having reached this figure with that particular model.

Whilst Jughaid was piling up an impressive contest record on the West Coast, Harold de Bolt on the East Coast was establishing a similar reputation with the Dmeco Senior (Hornet powered). The original Dmeco senior produced in 1945, was so successful that the same design was scaled down to class B, resulting in the Dmeco Junior—(Fig. 4). Main difference between the two layouts is in the wing plan form, de Bolt always favouring the elliptic shape. Again the cylinder projected and was uncowled. Best official time with the Dmeco Senior was 106 m.p.h., a 1945 record, although the model was capable of more.

Meantime another layout appeared on the West Coast which has now become virtually the standard for speed models. Typical of these was the White Comet by Don Newberger—the White Comet Junior being shown in Fig. 5.

Here the fuselage is slimmed down as far as possible, leaving just enough room to accommodate the ignition circuit and flight batteries; and the whole of the cylinder enclosed by a hooded cowling, properly ducted to give adequate cooling and smooth the airflow. Wings, it will be noticed, had assumed quite generous proportions and the section was quite thick and bi-convex in form.

Several models appeared which could be classed half way between these two types. In these the cylinder projected as in the Jughaid and Dmeco, but the airflow was smoothed by a fairing immediately behind the cylinder. A definite reduction in drag was realised, but the hooded cowling, properly shaped, has undoubtedly proved the better aerodynamic form.

Most modern speed model designs are very similar in form to the White Comet and its contemporaries, although further developments have taken place.

The trend towards higher aspect ratios is well illustrated by Sizzler (Fig. 6) which had a fine contest record and won a place in the 1948 Nationals, despite the fact that the design was then some two years old. Several versions of this model were actually produced, one of the most successful having two degree negative rigging incidence on the wings.

Another modern high aspect ratio racer is the Little Rocket by J. L. Sadler, full details of which were published last month, the fuselage being slimmed to a slight pod and boom effect. Vertical tail surfaces, i.e., fin and rudder, have disappeared as being no longer necessary for directional control.

Carrying the pod and boom effect still further, one of Don Newberger's latest models, the Glo-Debbil, is shown in Fig. 7. Reduction of fuselage wetted area is desirable in order to reduce overall drag to a minimum. The introduction of glow plug motors for racing work has enabled smaller cross-sections to be used, since there is no internal component to cater for other than the fuel tank. Thus the glow plug motor is attractive on two scores—smaller fuselage and reduced overall weight. Some modern speed models still have rather an exaggerated fuselage cross-section, but most designers now reduce frontal area as much as possible, even filing off the mounting lugs from the motor and using another fixing, and filing off the fins at each side to reduce the width of the hood. This latter is hardly necessary since a properly shaped ducted cowling can have a negligible drag figure.

One of the finest examples of "orthodox" speed design is Snowflake (AEROMODELLER ANNUAL) which is typical of the best hooded racers with conventional spark ignition. New materials are constantly being investigated and metal construction is coming to the fore. As an outstanding model of this type Fig. 8 details the McCoy Invader, designed by Ed. Sharp for the McCoy 29. With this motor best speed is 140 m.p.h. The fuselage of the Invader is absolutely the minimum possible for a spark ignition motor. In order to get everything in the tank has been shaped to fit around the wing mainspar, with the ignition components strung down the fuselage, just leaving room for the push rod to move freely. Glow plug ignition will, of course, obviate this difficulty.

Another modern design—White Fawn—has proved particularly successful with 5 c.c. racing motors and uses very high aspect ratio wings and an unconventional form of hooded cowling—(Fig. 9). Despite its excellent performance it is probable that it could be improved by fitting a more con-

ventional hood and eliminating the fin, both to reduce drag. White Fawn has another interesting feature in that cam control is used instead of normal U-control with a control plate. Cam control is far less sensitive and it is claimed that it makes the model easier to fly.

White Fawn can also be taken as a typical example of the modern way of rigging a speed model, but to appreciate the points involved some study of the subject is first necessary. In a normal anti-clockwise circuit, torque tends to roll the model inwards. To reverse this tendency and obtain maximum line stability and tension some modellers prefer to fly the other way round. All the de Bolt designs, for example, are rigged for clockwise circuits.

However, it was eventually realised that maximum line tension was neither necessary nor desirable. With the model pulling outwards strongly, part of the thrust is wasted. Maximum speed would only be realised if the model were flying in a natural circle with only just sufficient pull on the lines to maintain control. This resulted in thrust offset *with* the circle and rudder offset *with* the circle, the scheme used with White Fawn.

A definite increase in performance is obtained with such rigging, torque, thrust and rudder power all contributing to turn the model *with* the circle. If overdone, of course, the model will roll inwards and control will be lost. The thrust setting is the most critical and about 2 degrees is the absolute maximum which can be used with safety.

There is one great disadvantage with this scheme. If carried to the " safe " extreme the model only trims out at top speed and at any speed less than this line tension may be nil, or the model may come in. It may be necessary to hold the model onto its take-off dolly until a speed approaching 80–90 m.p.h. has been built up when there is sufficient line tension for control. At the end of the flight the model must be landed at high speed before control is lost again.

The problem of adequate control with minimum line tension is complicated by the fin effect of the forward placed hooded cowling. If the model yaws, the force on the cowling tends to push the nose out, increasing the yaw. Extreme measures, such as asymmetric cowlings, have been used to counteract this, but forward C.G. location and inward sidethrust are generally sufficient to overcome such effects. In any case, the hood generally extends aft well past the centre of gravity.

Harold de Bolt has tackled this particular problem in some detail and the layout of his latest speed designs—the Speedwagon series—is definitely unorthodox. The model flies in clockwise circuits, so that torque is rolling the model outwards. The thrust line is offset 2 degrees *inwards* and the cowling is asymmetric. The fuselage centre line itself is curved around this point. For extreme longitudinal stability, the pivot point is located well forwards, nearly at the leading edge and the centre of gravity placed *over the pivot*. The front line as a consequence is in front of the wing.

This particular model is a good example of a design rigged for circular flight with minimum line tension. Below 90 m.p.h. very little control response is available and ultra-high speed take-offs are necessary. Similarly with landings. Yet in Class A, powered by the Bantam motor, Speedwagons have won nearly every important event entered and the Speedwagon 49 with a McCoy 49 motor has established a record of 163 m.p.h., which is faster than the present Class D record (10 c.c. motors). Hitherto all the highest speeds have been recorded with the largest motors. The Speedwagon is detailed in Fig. 10.

To conclude this development section, Fig. 11 shows a typical British speed model of late 1948, where American influence is obvious. This actual model is designed for British Class I and II, with alternative motors. Since these motors will be diesel or glow plug times the fuselage is very slim. Maximum cross-section is very little larger than the spinner diameter.

The majority of the speed models discussed employ dolly undercarriages for take-off, with the exception of the de Bolt designs, which use a drop-out unit, and Sadlers' Little Rocket series, using another form of drop-out undercarriage. In this country drop-out undercarriages are more widely favoured than dollies. Details of the type of undercarriage used are included in the data tables. *(To be cont.)*

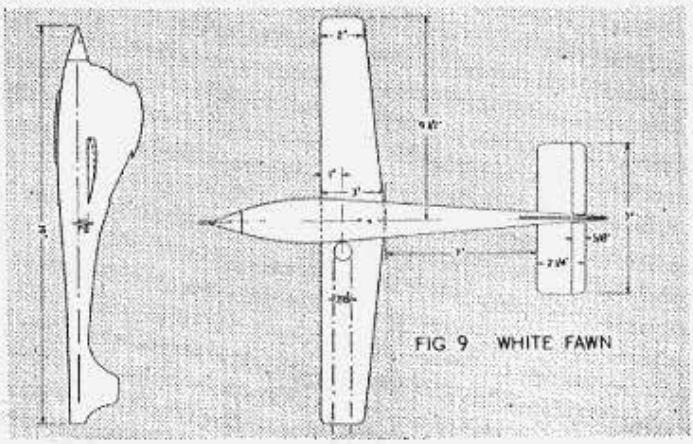


FIG 9 WHITE FAWN

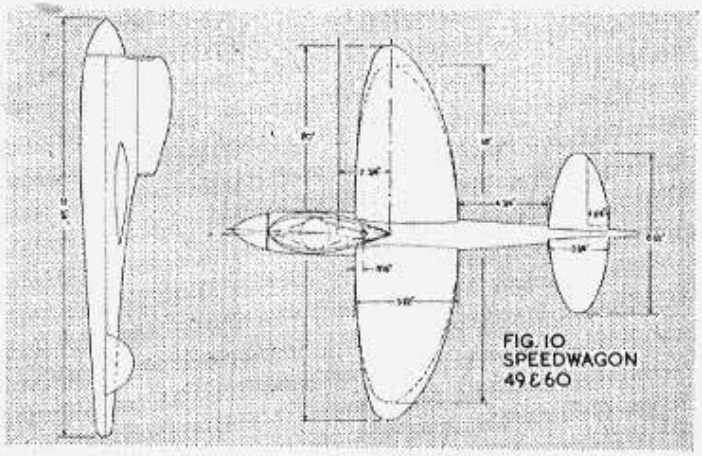


FIG. 10 SPEEDWAGON 49 & 60

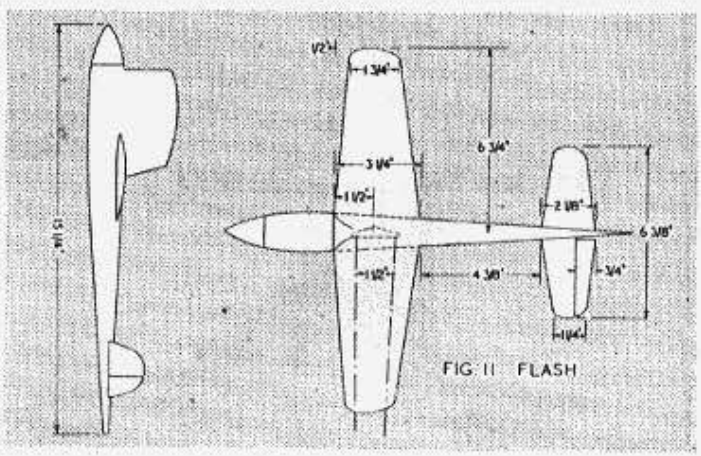
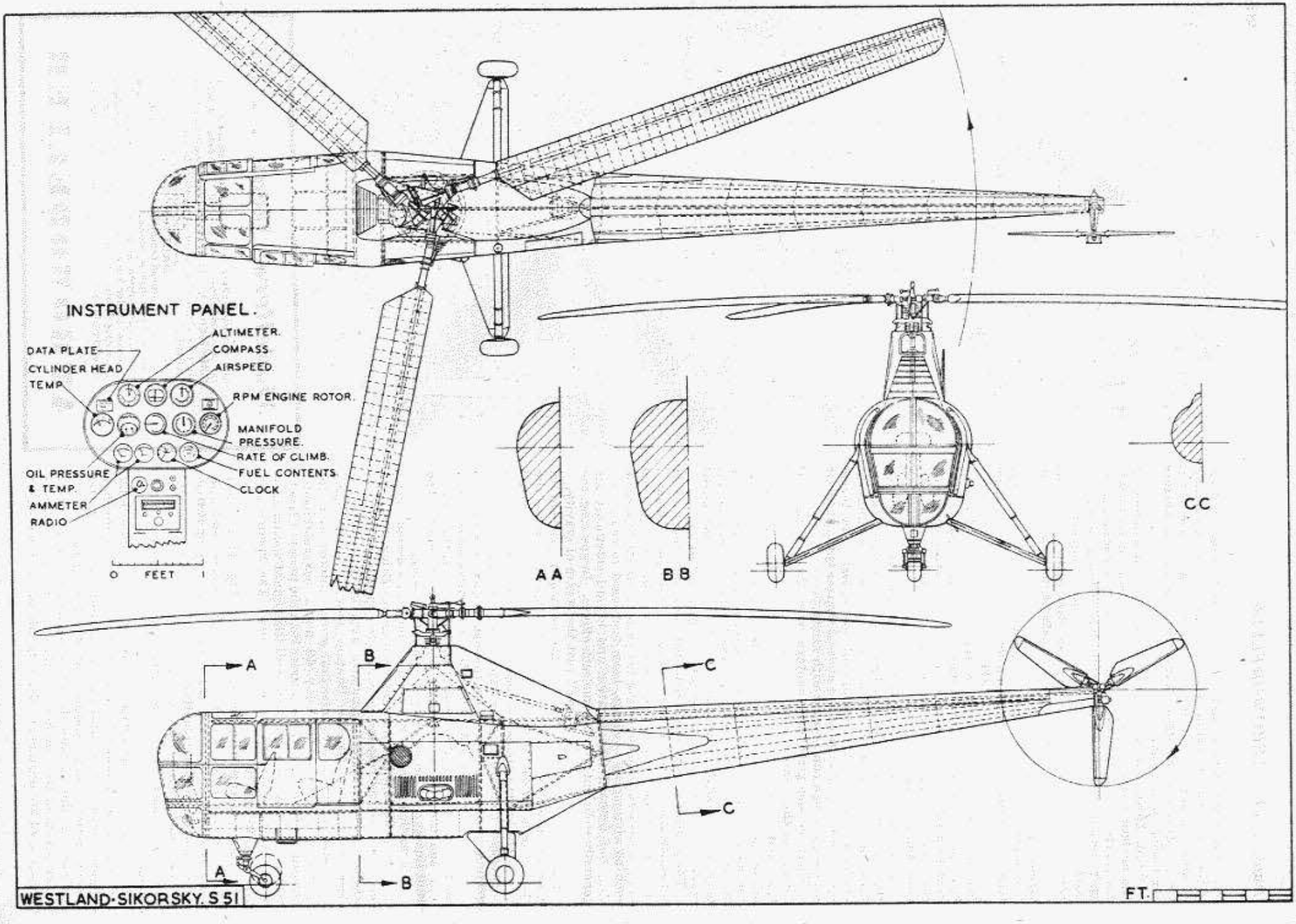


FIG 11 FLASH


INSTRUMENT PANEL.
DATA PLATE
CYLINDER HEAD TEMP.
OIL PRESSURE & TEMP.
AMMETER
RADIO
ALTIMETER.
COMPASS
AIRSPEED.
RPM ENGINE ROTOR.
MANIFOLD PRESSURE.
RATE OF CLIMB.
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AIRCRAFT DESCRIBED
No. 20

The

WESTLAND SIKORSKY S.51

BY E · J · RIDING

THE Sikorsky S.51, developed from the military R.4, 5, and 6 designs, was the first helicopter in the world to be adopted for commercial use.

Production of the Westland-Sikorsky S.51 at Yeovil has been under way for several months now and machines have been supplied to the British European Airways Helicopter Flight during recent weeks.

Six Sikorsky-built S.51's were imported into this country originally and have been in use at Yeovil for development work, and at Peterborough by B.E.A. in connection with their experimental helicopter postal services in East Anglia.

Early in 1948, B.E.A., in collaboration with the G.P.O., carried out experiments in Somerset and Dorset, carrying dummy mail, and despite rough weather, 96 per cent. regularity was achieved over a period of five weeks. Then, on June 1st, 1948, the first "live" mail service was started in East Anglia with Peterborough as starting point. Each morning at 09 55 hours an S.51 left for Great Yarmouth via King's Lynn, Wells-next-the-Sea, Sheringham, Cromer, Norwich, Thetford, Diss and Harleston, returning from Great Yarmouth at 17·35 hours via Lowestoft, Beccles, Norwich and Dereham. This service ran from Mondays to Fridays, the flight on Saturdays being from Peterborough to Norwich direct, in the mornings only.

A recent achievement of the S.51 was the first London–Paris (City centres) helicopter flight on April 27th last, when G–ALIK piloted by Alan Bristow took off from the roof of the Metropolis Garage, Olympia, and landed 2 hrs. 20 mins. later on L'Esplanade des Invalides, Paris, refuelling en route at Le Touquet.

The U.S.A.-built machines were registered as follows: G–AJHW (still at Yeovil), G–AJOO (owned by Pest Control, Cambridgeshire), G–AJOP (transferred to R.A.F.), G–AJOR, G–AJOV and G–AKCU (now with B.E.A. Helicopter Flight). An initial batch of thirty machines has been planned at Yeovil, and the first five Westland-built S.51's have been registered G–AKTW, G–ALEG, G–ALIK, G–ALEI and G–ALIL. At the time of our visit most of the above were undergoing flight trials and should be ready for delivery by the time this appears in print.

The main difference between the British and American versions lies in the installation of the 550 h.p. Alvis Leonides engine instead of the Pratt and Whitney Wasp Junior B4. Our heading photograph shows G–AJHW (now fitted with dual control) being flown by one of the many pupils attending the helicopter conversion course at Yeovil under the direction of Mr. A. Bristow, the firm's Chief Helicopter Pilot.

Construction. The fuselage cabin and engine bay are of semi-monocoque and welded steel tubular construction respectively. The tail cone supporting the rear rotor and transmission shaft is a light alloy monocoque.

The three rotor blades each consist of a main steel tubular spar, a secondary spar and aerofoil section ribs spaced about 6 ins. apart, carrying the plywood covering. The Alvis Leonides engine is mounted vertically in the steel tubular portion of the fuselage, where it drives the rotor assembly through a gearbox and Hardy-Spicer couplings. Power is led off from the gearbox by means of a transmission shaft running through the tail cone to the directional rotor.

Seating accommodation is provided for pilot and three passengers, the pilot sitting in front and the passengers sitting side-by-side on a continuous seat at the rear of the cabin. The cabin is fitted with two sliding doors, the one on the port side being for the passengers, and the one on the starboard side being for the pilot.

Eighty-three gallons of fuel are carried in two tanks situated one forward and one aft of the engine bay. In controlling the S.51 normal stick and rudder movements produce changes in pitch in the main and directional rotors respectively.

Colour. G–AJHW. Royal blue fuselage with yellow lettering, grey rotor pylon and fuselage flash. Aluminium rotor blades. G–ALIL. Aluminium all over with black letters.

Specification. Length (less rotors): 41 ft. 0 ins. Rotor circle diameter: 48 ft. 0 ins. Height: 12 ft. 11 ins. Tare Weight: 3,850 lbs. Max. loaded weight: 5,100 lbs. Max. speed: 103 m.p.h. Cruising speed: 85 m.p.h. Service ceiling: 14,000 ft. Range: 300 miles at cruising speed.

Quarter-inch to one-foot reproductions of the G.A. drawing obtainable price 1s. from Aeromodeller Plans Service. Copies of photographs at usual rates from Eaton Bray Studios.

Aeromodeller Photos.

S.M.A.E. NEWS

Minutes of an AREA OFFICERS' CONFERENCE held on APRIL 24th, 1949.

Mr. A. F. Houlberg in the Chair.

With thirty Council Members and Area Officers in attendance, the Meeting opened with an address by the Chairman. He welcomed the visitors and explained the purpose of the Meeting, which had been called in order to provide facilities for discussion of Area business, and in particular a general consideration of administrative details to mutual advantage.

Inter-Area Publicity.

Mr. C. S. Rushbrooke (Midland Area) proposed that :—

" Copies of all Area News-Sheets and /or other literature be distributed to all other Areas, thus ensuring that Area Committees are *au fait* with happenings in all parts of the country."

Mr. E. F. H. Cosh (London Area) seconded the proposal, and the meeting voted a unanimous acceptance.

Organised Sales Drive.

A further proposition from Mr. Rushbrooke that :—

" Areas conduct an organised sales drive in order to shift as much S.M.A.E. stock as possible at the earliest opportunity, thus assisting the Society's finance at this difficult time "

was again seconded by Mr. Cosh, and passed unanimously.

Mr. H. G. Hundleby (South Midland Area) suggested that a standard printed Order Form be prepared by Headquarters, and distributed to Area Secretaries, thus ensuring uniformity and lessening the work on a number of individuals.

Area Boundaries.

Mr. H. W. Barker (East Midland Area) proposed that :—

" Area boundaries be revised at the end of 1949."

Mr. C. S. Rushbrooke moved an amendment that :—

" Area boundaries remain as published, and the normal system of re-allocation by Council be adhered to to meet individual cases."

The amendment being put to the Meeting, voting resulted 24–0 in favour, and the proposition was lost.

A general discussion on Publicity, particularly with regard to the National and Technical press took place, and a number of matters were explained to the meeting.

Distribution of Minutes.

Mr. Rushbrooke gave as his opinion that in order to distribute the fullest information on Council matters to Area officials :—

" Copies of Council Minutes should be distributed to *both* Area Secretaries and Council Delegates."

In seconding the proposal, Mr. P. T. Guilmant (Southern Area) pointed out that in many cases the two Area officials mentioned were not in close touch, and the present method of forwarding copies of Minutes to the Delegate only sometimes left the " key " man, i.e. Secretary, short of vital information.

Insurance.

The Insurance Officer, Mr. H. W. Barker, distributed a leaflet dealing with Insurance matters that had been the cause of some misunderstanding in the past, and gave a general résumé of the situation at this date.

Messrs. Cosh and Gordon also spoke on this important subject, and the opinion was given that the days of ultra-cheap Insurance for model aircraft were numbered.

The meeting was asked to pay particular attention to the very important requirements connected with Society contests and Insurance, also Registration.

Mr. Barker in his further capacity as Treasurer explained his suggested simple method of book-keeping, which he required adopting as standard in all Areas. Sample accounts sheets were handed to the officials in attendance.

Standard Affiliation Date.

Mr. Wilson (East Midland Area) asked the meeting to consider the advantages of all Affiliation Fees becoming due on January 1st each year, giving as his opinion that this would (after the initial period of adoption) ease the work on all officials, both Area and Council, and the Society would be in a much better position to prepare an annual Budget than as at present. Though general discussion took place, and the meeting left this a worth-while scheme, on definite proposition was put to the meeting.

Future Meetings.

Mr. R. F. L. Gosling (North-Western Area) voiced his appreciation of the opportunity given by the current meeting to both meet and discuss matters of interest to all Area officials, and proposed that further meetings of a like nature be held bi-annually, preferably at the beginning and end of the flying season.

Seconded by Mr. L. F. Ilsley (London Area), the proposition met with unanimous approval, and it was agreed to hold the 2nd Area Officials' Conference on Sunday, October, 2nd, 1949.

28th April, 1949. HON. SECRETARY.

CONTEST CALENDAR

June 5/6th	BRITISH NATIONALS	Fairlop. Cent.
June 12th	NORTHERN CHAMPIONSHIPS	Sealand.
June 19th	S.M.A.E. CUP—F.A.I. Rubber	D/C
	PILCHER CUP—F.A.I. Glider	D/C
	West Essex Gala	Fairlop.
June 26th	Foresters M.A.C. Rally	Langar.
	Northern Heights Gala.	
July 2nd	WAKEFIELD TRIALS	Fairlop. Cent.
July 17th	WOMEN'S CHALLENGE CUP—Rubber/Glider	D/C
	FROG JUNIOR CUP—Rubber	D/C
	Blackheath M.F.C. Open Day	Epsom Downs.
	Southern Area Rally	Stoney Cross.
July 31st	WAKEFIELD TROPHY	Cent.
Aug. 1st	BOWDEN TROPHY—Precision Power	Cent.
	INTERNATIONAL POWER—Power Ratio	Cent.
Aug. 14th	Irish Nationals	Dublin and Baldonnell.
	Brentford & Chiswick Gala Day.	
Aug. 21st	FARROW SHIELD—F.A.I. Team Rubber	Area.
	K. & M.A.A. CUP—F.A.I. Glider	Area.
Aug. 28th	All Herts. Rally	Radlett.
Sept. 4th	Huddersfield Air League Rally	Crosland Moor.
Sept. 11th	WESTON CUP—Wakefield	D/C
	LADY SHELLEY CUP—Tailless	D/C
Sept. 12th, 14th, 16th	Isle of Man Rally.	
Sept. 18th	Southern Counties Rally.	
Sept. 25th	KEIL TROPHY—Power Ratio	North/South Cent.
	HAMLEY TROPHY—Power Precision	North/South Cent.
	CONTROL-LINE SPEED	North/South Cent.

FLIGHT CUP

E. Stoffell	Ilford	804
H. W. Revell	Northampton	766·8
R. Luck	Northampton	663·4
R. Monks	Birmingham	662·4
A. E. Bolton	Birmingham	617·5
J. Truffler	Blackheath	617·2
E. Muxlow	Sheffield	613·8
B. A. Meffon	York	597·8
C. Haddock	Reading	596·9
N. Marcus	Croydon	596
N. Standing	Croydon	587
F. Marshall	Boston	586

265 Competitors

MODEL ENGINEER CUP

P.M.A.L.	2432·8	Hayes	1952·5
Croydon	2167·9	North Kent	1916·8
Wayfarers	2153·7	Southern Cross	1874
Belfairs	2111·7	Wolves	1862·8
Icarians	2063	Northern Heights	1820·7
Pharos	2063·1	Northampton	1774·9

97 Clubs

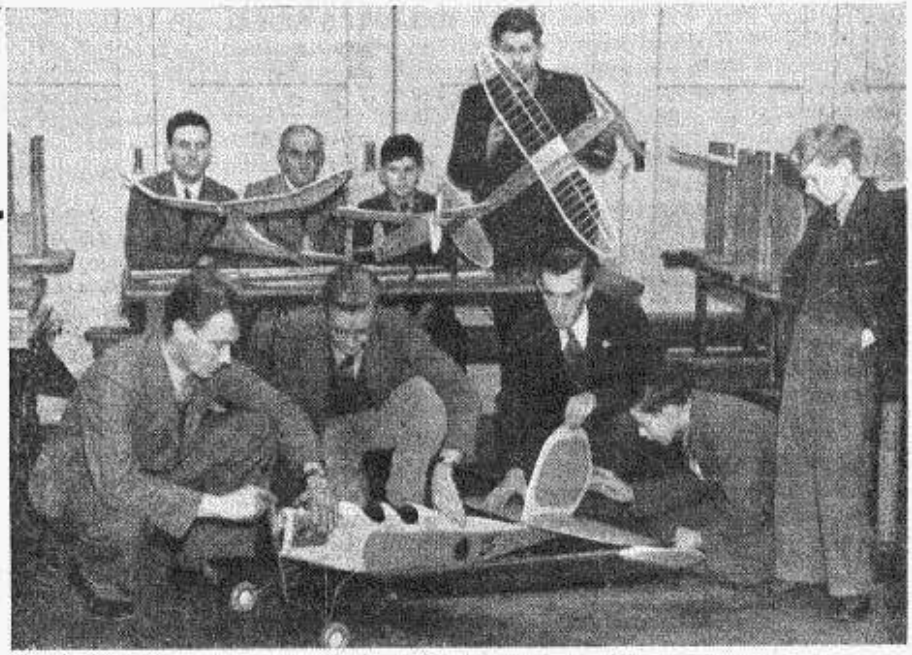
Results. South-Eastern Area Control-line Championships

	Class			M.p.h.
	I	D. C. Butler	Surbiton	58·5
	II	K. Musket	W. Essex	68·17
	IIIA	E. J. Buxton	St. Albans	71
Speed	IIIB	I. Monkhouse	Brighton	97·84
	IV	J. Paffre	Weston C.L.	96·79
	V	G. Indge	W. Kent	90·91
	VI	D. Foskett	Guildford	115·4

				Points
Open Stunt	1st.	W. H. C.Taylor	W. Essex	265
	2nd.	R. Prentice	Chingford	250
	3rd.	K. F. Marsh	W. Essex	234
Scale Stunt	1st.	N. J. Butcher	Hastings	165
	2nd.	R. Bonsey	W. Middlesex	111
	3rd.	D. Bowles	Hastings	90

CLUB NEWS

BY CLUBMAN



Members of the Maidstone and District M.F.C. at one of their weekly meetings held at a first-rate clubroom

NATURALLY at this time of the year the main topic of conversation is contests, and the chief consideration the weather. The Stop Press results of the "Gamage Cup" event (see page 323, May issue) indicated the remarkably low response to this contest, accounted for of course by the appalling weather conditions obtaining all over the country. A study of the full results would indicate generally better conditions the further North one went, although from north country reports it was not so much a case of better conditions as a determination to fly and take "pot luck". These tactics bore fruit as you can see from the results, only one place in the top twelve going south of the Midlands.

With such a bad start to the contest season it is pleasing to record that exactly opposite conditions prevailed over the Easter week-end and again on May 1st for the "Astral" and "Halfax" Trophy events. At any rate, at Leicester, May Day was almost ideal for flying, and I learn that some terrific flights were set up. This is a good thing, as nothing is more disheartening than to prepare for a contest and then to have your efforts discounted by conditions over which you have no control.

H. W. Revell of Northampton seems to be all set for a winning season; he placed second in both the "Gamage" and "Flight" Cup events, flying, I understand, his 1949 Wakefield.

Following the announcement in last month's issue of the preparation of a new list of clubs operating in these Islands, a number of the clubs circularised have still to make a return. It is a great pity that so many people require follow-up letters to bring a reply to a simple request. Can it be that some secretaries do not know suthcient about the club they control to give the answers?

The most astounding revelation is the number of secretarial changes of which we had not been advised, and it would be as well to point out to club officials that listing in our records enables us to refer local enquiries from would-be members to various clubs, and it is therefore essential that we have the correct particulars for the re-directing of such enquiries. Will all clubs therefore kindly co-operate and advise us *immediately* of any secretarial or address change, to mutual advantage.

Overseas interest in the 1949 Wakefield Contest is evidenced in the following extracts from model publications just received. The January–February issue of the "Pacemaker" (the Pretoria, South Africa, club paper) states that "the first six in the Wakefield comp. at this year's Nationals will have their models sent to England to compete for the Wakefield Trophy in August." New Zealand sends news that "through the good services of Tasman Empire Airways and their associates, New Zealand will once again be represented. The advantages of modern air travel will ensure a quick passage of our entries through the tropics, and also allow us the maximum time in which to prepare our team." It does not seem clear whether the models only or the fliers also will be transported, but let us hope it is the latter.

I have been receiving a number of enquiries recently for details of various S.M.A.E. contests, some of which require lengthy replies in order to give necessary details. Will interested enquirers please note that they can obtain full details of the National programme, together with complete rules, etc., by purchasing the 1949 S.M.A.E. Handbook, price 1s. 6d. from the Secretary S.M.A.E., Londonderry House, Park Lane, London, W.1.

Another matter I get continual enquiries about is the why and wherefore of German participation in International aeromodelling events. The Foreign Office now state that aeromodelling is not allowed in the British or American Zones of Germany, as it was found that clubs were being used as a cloak for other activities. Official instructions are to discourage the exchange of correspondence until further notice.

Mr. A. West of 1, Woodland Avenue, Snodland, Kent, has in his possession a power model that landed in his firm's grounds at New Hythe, near Maidstone, in the early days of April. Powered by an E.D. Mark I engine, the model is pylon type, polyhedral wing job with a diamond section fuselage, and the owner can claim the job on application, quoting the engine number. (I doubt if he even knows this, as there are absolutely no identification marks on the machine, and no timer was fitted. Another of those careless types!)

When I first heard the following story I had "ma doots" as to its authenticity, but confirmation came by letter from the flier, and indicates a most unusual happening. G. H. Upson of South Harrow was flying his "Elfin" powered semi-scale stunt control-liner, when he lost control of the job as it came out of inverted flight. Letting go the handle in order to save as much damage as possible, he (and many spectators) was amazed to see the model circle upwards, trailing the lines and handle, until it finally disappeared from sight at some two thousand feet altitude, motor still running! Coloured green and white, the owner would appreciate any news of this most unusual "thermal hunter".

The foregoing exploit rather overshadows a similar happening that occurred in Liverpool. S. Neil Norman of the Aintree club let go during a wing-over, and the model free-flighted for some two minutes. One way to get good duration flights!!!

The South and North Nottingham clubs have combined to form the **FORESTERS M.F.C.** This club will be responsible for the organising of a Rally at Langar on June 26th. Past experience proving that the greatest fault of all rallies is the shortage of labour, the Foresters are appointing teams of four to represent the club in the contests, and the whole of the balance of membership is mucking in on necessary jobs. Five competitions will be held, and will run simultaneously from 10 a.m. to 7 p.m. Send for further details to R. Noble, 57, Collygate Road, Trent Bridge, Nottingham.

Further details to hand regarding the **ISLE OF MAN RALLY** place the contests as follows:—Monday, September 12th: Concours, Rubber duration and Gliders; Wednesday: Tailless and Power; Friday: Control line Stunt and Speed. Don't forget that the motor cycle racing takes place on the Tuesday and Thursday, so how about booking for a full week of activities and fun?

February 26th was the day for the **BELFAIRS M.A.C.** exhibition, P. E. Feild taking most of the prizes as usual. J. Truscott took the junior honours with an ambitious control line "Tempest" powered by a Super Cyclone. An inter-club glider contest with the Southend Senior boys resulted in a win for the Belfairs team who totalled 714·9 to Southend's 263·49. M. A. King put up the best individual total with 4 : 26·5. C. P. Cullen set an amazing power ratio figure with his Arden powered job, ratio 47. (Engine run not stated.)

To save endless repetition I will confine comment on the Gamage Cup reports by nearly all clubs to the effect that never was the tag "Damage" more apt, and each and every club has the same tale to tell of almost impossible conditions, with the odd good flight squeezed in somewhere during the day. Congratulations to those who did brave the elements and turn in some extremely good times in view of the conditions.

An engine starting contest staged by the **LUTON & D.M.A.S.** proved interesting. Prior to the event it seemed certain that it should be won by an upright petrol engine, but to everyone's amazement except the owner's (so he says!) Sid Miller's inverted Frog 100 took first place. Starting time was only 5 seconds from cold, the engine running the required 20 seconds. Another diesel, an own-design affair by Jack Simmons, placed second, while the only petrol job, Bob Minney's Frog 1·75, came third. After much fiddling and smoke C. Houghton was fourth with his glow-plug McCoy 19.

I am pleased to note that Secretary Mrs. Eves of the **UPTON M.F.C.** has been made a life member in appreciation of her services to the club. D. Ridgewell, their top rubber fan, had bad luck when his lightweight tried conclusions with a train, the only thing left being a folding prop.!

Formed last September as the result of a public meeting called for all local people interested in aeromodelling, the **NEW MILTON M.A.C.** has got away to a good start, with a fine clubroom and 34 members. Control-lining has been a regular feature of winter activities, and I learn that a R/C glider is taking shape in some secluded back room.

The **PORTSMOUTH D.M.A.C.** has secured the use of Thorny Island Aerodrome, and hope to get really cracking this season. They hope to present as usual the Southern Counties Rally again this year, provisional date September 18th. Secretary R. C. F. Day proved the winner of the rubber and glider cups awarded on a year round points basis.

Favoured with good flying weather at Easter (who wasn't) Sealand was the venue for about 500 aeromodellers who went home feeling well satisfied with the prospects of the day. Models had to really get upstairs to contact thermals, but several flyaways were recorded. B. V. Haisman (**LIVERPOOL M.A.S.**) did very well, but was unfortunate to lose a brand new Wakefield after an o.o.s. flight of 5 minutes. Sailplanes performed majestically throughout the day, but were dogged by the need to get up very high to record high times. I. S. Cameron reports a new rubber job that has piled up an aggregate of 27 minutes on nine flights during three outings.

I. Peacock, a junior member, took top place in the concours held by the **BEVERLEY & D.M.A.C.**, a senior, N. Jackson, taking second and third. The Beverley annual Rally will be held on July 10th, and full details are obtainable from the Secretary.

Scale control line models are very popular with the **EXETER M.A.C.**, no less than eleven being in use. Most ambitious are a "Viking" powered with two "Mills", also an Oxford similarly powered. Both are very sensitive and fast, and can wing-over comfortably.

The annual sailplane competition of the **ST. MARY'S M.A.C.** was held under fine conditions at Easter, and some expert handling on the towline was seen, and good times recorded. Outstanding flight of the day was made by G. R. Cole whose canard model flew 5 : 40 o.o.s., setting up a new club record. Winner of the event was D. Kirby who aggregated 11 : 07·45 for two flights, followed by A. Attewell (7 : 28·8) and C. O. R. Evans (6 : 35·65). All the winners' models were lost on their second flights in a three flight contest.

During a test flight at Grantham, secretary S. Marshall of the **BOSTON & D.M.A.C.** made a flight of 15 : 38 o.o.s. with a "Jaguar", fortunately getting it back in time for the competition, which it won with times of 4 : 18, 3 : 40 and 3 : 20. B. Holden placed third in the power event with a ratio of 10–1 whilst two gliders "went for a Burton" in the sailplane event. In fact, quite a day out for the Bostonians.

L. W. Turner of the **RUGBY M.E.S.** made flights of 3 : 16·5, 1 : 28 and 5 : 10·5 to win the club rubber competition on Easter Sunday. S. Burton won the glider event with a total of 6 : 13·3 flying a "King Falcon", and K. Sansom totalled 4 : 46 with his "Slicker".

Free flight having given way somewhat to control-lining, the **GUILDFORD & D.M.A.C.** have put their knowledge to good use, as demonstrated at the Dover meeting. Dave Foskett made the headlines with his 115 m.p.h., and of course there was Ron Stovold's firemaking act which put him out of the contest. Reffles had some hard luck when his Dooling powered job only hit 94 m.p.h. as this model had clocked 110 m.p.h. only the night before on its first test flights.

Owning some eighteen American engines, the **WORCESTER M.A.C.** have come to the conclusion that, for easy starting, the British diesel takes some beating! Ron Smith seems to have reached the ultimate with his "Elfin" powered flying wing, which does everything in (and out of) the book as a matter of course—but has broken 45 props whilst earning this reputation!!

Congratulations to the **BOURNEMOUTH M.A.S.** on a really sound handbook handed to new members. Setting out terms of membership, names of officials, and full contest rules for the season, this booklet contains all the information for a member, gen that has to be assiduously sought by members in some other clubs.

The **SALISBURY & D.M.E.S.** were pleased to welcome visitors from the Winchester and Eastleigh clubs for their rally at Easter, held under ideal conditions. E. Higlett won both the stunt and speed control-line events, collecting 200 points and a speed of 54·1 respectively. Mr. Walsh set up times of 4 : 24·8 and 3 : 42·2 to win the sailplane and rubber classes, the power event going to Mr. Wells with a ratio of 15.

T. Berryman of the **THAMES VALLEY M.A.C.** had bad luck when competing for his club against Surbiton in the first round of the London Area knock-out competition. His model took off, touched down again, and then went away for an o.o.s. flight and was lost. Of course the timekeepers had clocked off when the machine touched down first time! P. Taylor had a perfect flight, but broke a wing on landing, whilst R. Kendal had his model stolen after landing behind some bushes. Following this the club decided to call it a day!!

L. Gabriels of the **OLDHAM & D.M.A.C.** still "fiddles about" with autogiros despite adverse comments on his sanity. Average duration of his original "test bed" is 25–30 seconds. It has been found necessary to double surface the rotor blades to handle more power, but a new, larger model is being built with a view to having a go at the British outdoor record. I learn that these models climb fast and have a reasonable glide, so prolonged thermal flights should be possible.

After many weeks of shocking weather, the **LEICESTER M.A.C.** managed to fly off three competitions on Easter Sunday. In spite of the weather times were low, G. Hull being the only one to hook a thermal. His Frog 100 powered 36 in. span pylon job went straight up o.o.s. on a test flight, and was later recovered from some six miles away. The Smarthwaite Bros. are flying a K.K. Falcon fitted with Mercury-Cossor unit, using rudder control alone, and getting excellent results. Control-lining is dropping off, and semi-scale jobs are getting a great deal of support.

The **AMPLEFORTH COLLEGE M.A.C.** power record has been cracked twice by R. Twomey's "Minotaur" which first set up a time of 7 : 43, and later raised this to 10 : 31 o.o.s. H. Pitel's Elfin powered "Hell's Angel" (holder of the club ratio record of 14·7) secured a ratio of 22·7, but was unfortunately minus official timekeepers. A large entry of flying wings and canards was seen in the "unorthodox" contest, won by Twomey's canard "Egret" with a three-flight aggregate of 5 : 19. During the course of the competition D. Goodman's helicopter (replica of Musgrove's record holder) set up a new club record of 40 seconds.

Forty **WEST ESSEX AEROMODELLERS** enjoyed Easter Monday at Dover, though most went for the ride! Four prizes were brought back by the flying members. Mike

Hollingsworth hooked a thermal for a 23 : 1 ratio flight in the club's "Walthamstow Post" trophy to get him first place ahead of Eddie (always second) Keil. Sid Sutherland has a "special manœuvre" that has to be seen to be believed—a figure eight *on the glide!*

FULHAM M.A.C. and Battersea recently held one of their periodical inter-club contests, this time a power event. Fulham won with an average ratio of 8·73–1 against Battersea's 6–1. D. Vincent put up the best individual ratio of 13·2–1, next best being S. Dyne, Junior with 7·4–1.

The **PEGASUS M.A.C.** have been flying whenever the weather permitted, and on April 17th the club glider record was twice broken, first by J. Harley with a flight of 3 : 10, and later by J. A. Stanley with 3 : 13. A rubber duration record of 3 : 00 o.o.s. was set by J. Burnes.

The **SURBITON & D.M.F.C.** first round "do" in the London Area competitions was marred by lost and stolen models, plus a strong wind. (Epsom Downs could do with a few more police it seems!) An unusual occurrence was witnessed during the Easter competitions, when R. Norris was flying his 8 ft. span "Fugitive" glider. The dethermaliser parachute became detached from the model, and just stayed perfectly still in the air for about 3 minutes before finally obeying Newton's law.

The **CIRENCESTER & D.M.A.C.'s** first attempt at an exhibition was a success, with 85 models on show. Outstanding exhibit was a 104 in. span "Piper Cub" powered with an Ohlson 60. Built by two local members whilst stationed in Southern Rhodesia with the R.A.F., it was brought back in a special 9 ft. crate. It will shortly be fitted for radio control.

Joef Vartecky of Mala Sterberkova 8, PRAHA VII, Czechoslovakia, is looking for a pen-pal from this country. With 15 years' experience, his main interest is flying wings. Another overseas reader who wants to correspond with someone on this side of the water is J. J. Yellen, of 64, East Avenue, New Brunswick, N.J., U.S.A., and he is anxious to start up an exchange with engines. Now, don't all rush.

Well, that seems to be the lot for this month, so get those models polished up for the Nationals, and let's hope that the non-aeromodelling crowd at Fairlop will give us model maniacs a chance for once in a while. And I do suggest that some very worth-while help could be given by non-fliers if they stationed themselves down-wind of the take-off spots in order to prevent the pinching racket that is getting Fairlop such a bad name with aeromodellers. Time one or two of the spivs were caught and made an example of.

The CLUBMAN.

NEW CLUBS.

WATERLOO M.A.C.
G. A. Hull, 63, Roupell Street, Waterloo, London, S.E.1.
DEESIDE M.E. & C.S.
I. G. Robinson, 3, Richmond Road, Wefire Park, Connah's Quay, Cheshire.
1218 SQUADRON M.F.C.
L. J. Patten, 2, Fort Road, Newhaven, Sussex.
SEAHAM & D.M.C.
R. M. Bainbridge, 5, Victoria Street, Seaham, Co. Durham.
NEW MILTON M.A.C.
C. E. Jefferies, 48, Oakwood Avenue, New Milton.
EAST HAM FEDERATION of M.A.C.'S.
J. Darby, 49, Mafeking Avenue, East Ham, E.6.
SOUTH BRADFORD M.A.C.
F. J. Freeman, 1, Holdsworth Street, Wyke, Bradford, Yorks.
LLANIDLOES M.A.C.
G. Morgan, Tetbury House, High Street, Llanidloes, Mont.
OLDBURY M.F.C.
H. W. Gilbert, 35, Apollo Road, Rood End, Oldbury, B'ham.
BOSTON & D.M.A.C.
S. Marshall, 8, Langrick Road, Boston, Lincs.
MATLOCK & D.M.C.
E. P. Drabble, Tansley Wood, Lumsdale, Matlock, Derbyshire.

SECRETARIAL CHANGES.

ASHFORD M.A.C.
R. Webb, 221, Godinton Road, Ashford, Kent.
EXETER M.A.C.
M. W. Payne, 1, College Avenue, Exeter.
IPSWICH M.A.C.
J. A. Gorham, 47, Clarkson Street, Ipswich.
ST. MARY'S M.A.C.
T. Wooderson, 43, Alexandra Avenue, Camberley, Surrey.
RUGBY M.E.S.
F. Powell, 63, York Street, Rugby.
SOUTH BRISTOL M.A.C.
D. H. Ramsay, 28, Hampstead Road, Brislington, Bristol 4.
PLUMSTEAD & D.M.A.C.
G. J. Frewer, 60, Crumpsall Street, Abbey Wood, S.E.2.

L.S.A.R.A. NEWS

L.S.A.R.A. No. 3 Tunnel. This tunnel was designed and constructed to our specification by Mr. P. J. Castle, and he has made a magnificent job of it. Unfortunately he was called up last year, and has therefore loaned the tunnel to the Battersea Polytechnic. Mr. M. M. Gates, an L.S.A.R.A. member, will operate the tunnel. He is engaged on a year's full time research on aerofoils, characteristics at low speeds, and we hope for interesting results. The accompanying photo taken from the entry end, shows the considerable contraction ratio essential for very low speeds.

Commercial Test-Work. One of the new departures in L.S.A.R.A. work has been the inauguration of the "Commercial Test" scheme. If the L.S.A.R.A. is to fill the same place in model aeronautics as the R.A.E., and the N.P.L. in the full scale world, it is essential that we should be able to offer the services of trained research teams to the Model Aircraft Trade. Facilities are now available for the following work :—

Engine testing, Rocket thrust recording, Static thrust testing of airscrews, Static power tests of airscrews and torque bars, Flight testing of aircraft—(measurement of lift drag and stability characteristics).

PROGRESS OF FOREIGN SECTIONS

Palestine. During the troubled period last year we naturally had no news from Dr. Piattelli, but now the new state of Israel seems to be firmly established we hope that communications will be restored with the Palestine section.

Germany. Professor F. W. Schmitz has joined the L.S.A.R.A. and hopes to organise a programme of work in Germany. Prospective German members should contact:—N. J. Meier, Kirchweg 33, 23 Bremen, U.S. Enclave, Germany.

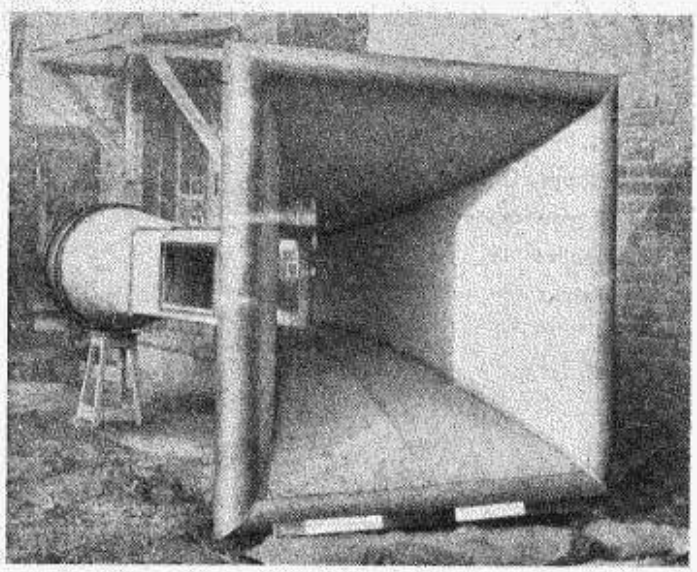
Canada. The Canadian section is now being organised by:— Mr. D. H. Henshaw, 112, Rothesay Avenue, Hamilton, Ontario, Canada.

Mr. Henshaw has been working for two years on the construction of a low turbulence tunnel, from a G.A. drawing supplied by the L.S.A.R.A. Headquarters, and this tunnel is now completed and working. The first report from Mr. Henshaw's group has been issued, and we have just received two more reports dealing with the design of the tunnel, and with preliminary results on the N.60 aerofoil.

U.S.A. We now have a number of keen U.S. members, including Dr. W. A. Good, the U.S. Radio Control expert, and we hope that a section will soon be formed. Prospective members should contact :—Wm. J. Werbach, 2138, Abbott Street, San Diego 7, California, U.S.A.

India. Mr. H. L. Roy, 8, Lee Road, Calcutta, 20, has formed an Indian Section of the L.S.A.R.A., with three members, and the All-India Aeromodellers' Association has become an "associated body" of the L.S.A.R.A.

A list of available reports will be found on page 400. *Copies may be obtained from The Director of Research, 23, West Rd., Hanley Estate, Farnborough, Hants.*



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New Arden 099, ball-bearings, £5. 17s. 6d. Arden 199, uncompleted run-in, excellent, £7. 5s. Pacemaker 59, good condition, £5. 5s. Super Cyclone, coil, excellent condition, £6. 5s. New Torpedo 29, £8. 5s. Ohlsson 23, good condition, uncompleted run-in, £4. 10s. 14A, Holywell Hill, St. Albans, Herts.

New Dynajet, Arden ·099, ball-bearing, and slightly used Arden ·199. What offers. Cable, 12, Hough Green, Chester.

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LIST OF L.S.A.R.A. PUBLICATIONS

FIRST ISSUE

Report No.	Class	Publication	By	Cost s.	d.
2	"B"	"Longitudinal Stability"	N. K. Walker, B.Sc.	1	0
5	"C"	"Strength of Glued Joints"	"C"	0	5
7	"C"	"Preliminary Results of Accurate Glide Tests on Typical Models."	N. K. Walker, B.Sc.	0	10
8	"B"	"Preliminary Smoke and Drag Tests in the L.S.A.R.A. No. 2 Wind Tunnell."	N. K. Walker, B.Sc. and R. H. W. Annenberg, B.Sc.(Eng.).	1	0
11	"BC"	"The L.S.A.R.A. No. 2 Wind Tunnel."	N. K. Walker, B.Sc.	0	10
12	"C/B"	"Standard Procedure for Glide Tests, Various Results."	N. K. Walker, B.Sc.	1	0
Technical Note					
1	"C/B"	"Charts for the Estimation of Downwash."	R. H. W. Annenberg, B.Sc.(Eng.).	0	8
				5	9

SECOND ISSUE

Report No.	Class	Publication	By	Cost s.	d.
13	"B"	"How to measure or Estimate the Radius of Gyration and Moment of Inertia of a Model."	J. H. Maxwell	0	7
14	"BC"	"Application of Tirotational Potential Flow Theory to Slope Soaring" (Part I).	R. H. W. Annenberg, B.Sc.(Eng.)	0	6
15	"C"	"The Weight and Strength of Various Types of Tissues including the effect of Dope."	F. A. W. Williams, (Arnold Wathew)	1	3
17	"C/B"	"The Rolling Robin."	N. K. Walker, B.Sc. and R. H. W. Annenberg, B.Sc.(Eng.).	0	8
Technical Note					
2	"B"	"A Short description of Recent Low Speed Tunnel Tests made in Germany by F. W. Schmitz."	P. R. Payne	1	2
				4	2

THIRD ISSUE

Report No.	Class	Publication	By	Cost s.	d.
18	"BC"	"Introduction to Structure Design and Stressing of Components."	R. H. W. Annenberg, B.Sc.(Eng.).	1	3
19	"C"	"Report on the Design and Construction of Tel Aviv Smoke Tunnel No. 1."	Dr. F. J. Piatelli	0	10
20	"C"	"A Thickness Gauge."	J. H. Maxwell	0	4
21	"B"	"A simple method of Measuring Airfoil Characteristics in a Wind Tunnel without a Balance."	E. Dewing	0	6
22		"A Torsion-Bar Loading Gauge."	P. R. Doudney B.Sc. (Eng.).	0	6
				4	3

FOURTH ISSUE

Report No.	Class	Publication	By	Cost s.	d.
6	"BC"	"Lateral Stability—Part I"	N. K. Walker, B.Sc.	1	2
9	"C"	"Preliminary Smoke Tests in the No. 2 Wind Tunnel—2 Fuselages."	R. H. W. Annenberg, B.Sc. (Eng.)., and N. K. Walker, B.Sc.	0	7
24	"B"	"The Use of the 'Polar Curve' of Cdw against Cl and 'Power Factor Grids' for Performance Estimation."	R. H. W. Annenberg, B.Sc.(Eng.).	1	4
25	"B/C"	"The 'Weybridge' Smoke Tunnel."	G. Gimpel, B.Sc. (Eng.).	1	0
26	"B/C"	"Glide Tests on the 'Two Engine' Rocket Propelled Tailless Model."	Howard Boys	0	10
				4	11

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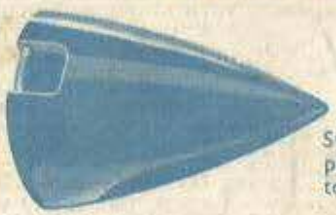

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