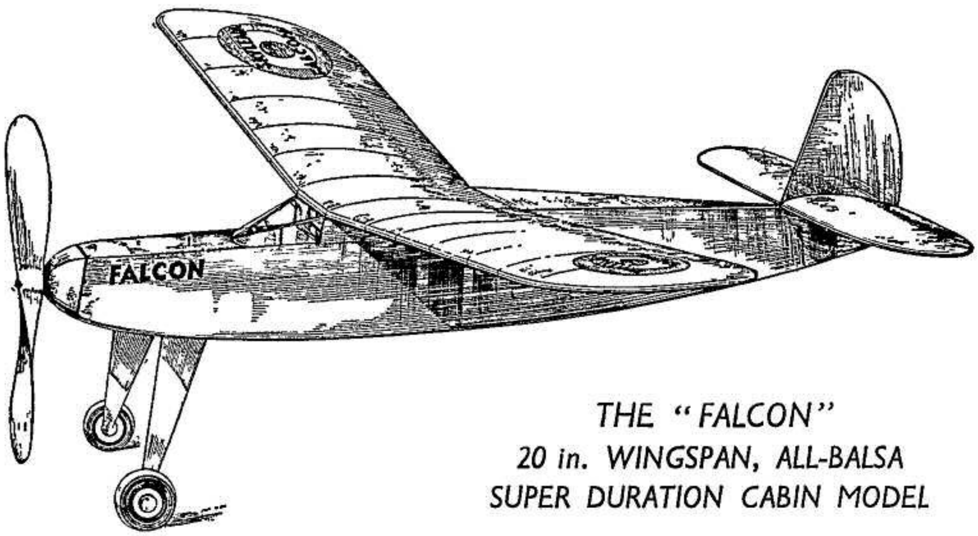
AERO MODELLER

AUG. - 1942
VOL. 7 No. 81
ONE SHILLING

HERE'S A MODEL YOU CAN REALLY BUILD AND FLY

IT'S A **SKYLEADA**—THAT'S WHY!



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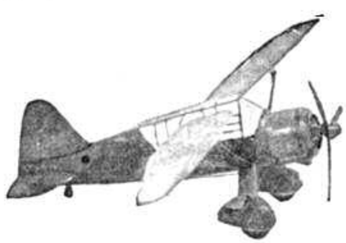
20 in. WINGSPAN, ALL-BALSA
SUPER DURATION CABIN MODEL

THIS NEW SKYLEADA KIT INCLUDES BALSA PRINTED SHEET, AMPLE BALSA STRIP, TISSUE, WHEELS, WIRE, UNDERCARRIAGE, BALSA CEMENT, RUBBER, COLOURED TRANSFER INSIGNIAS, AND SHAPED BALSA PROPELLER BLANK. COMPLETE WITH FULL INSTRUCTIONS AND FULL SIZE DETAILED PLAN, ETC., ETC.

COMPLETE **3/6** KIT

A smart and sturdy model, easy to build, with an excellent flying performance.



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1/9 LYSANDER, HURRICANE, FAIREY BATTLE, MESSERSCHMITT 109F, SPITFIRE, HELL DIVER, HEINKEL 113, RUSSIAN RATA I-16, BLACKBURN SKUA, GLOSTER GLADIATOR, GRUMMAN FIGHTER F2FI, HAWKER FURY. AIRACOBRA, DEFIANT, HENSCHEL 126.

MULTI-ENGINE KITS (8–9 in. wing span) FOR BOEING FORTRESS, LIBERATOR, MANCHESTER, SHORT STIRLING, HALIFAX .. **3/-**

Your local stockist should be able to supply these kits, but if you have to write direct tell us his name and address and please include postage and packing cost. 4d. extra for solids, 5d. for the "Falcon"

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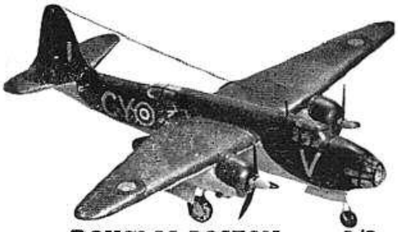
MODELS OF THE MOMENT

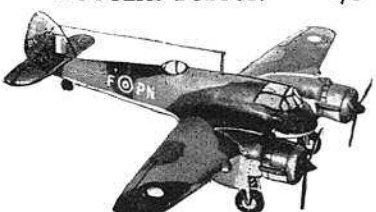
C.M.A. SOLID SCALE MODEL KITS

SCALE ¼ in.—1 ft.

Kits contain all parts cut to shape, seats, cement, correct transfer insignia, three bottles of dope, sandpaper, fully detailed blue-print, and complete instructions.

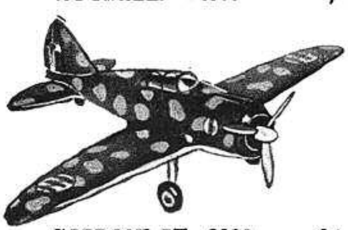


DOUGLAS BOSTON 8/3



BEAUFIGHTER. 7/11

LOCKHEED P.38. 8/9



CAPRONI RE. 2000 6/-

WESTLAND LYSANDER. 6/-

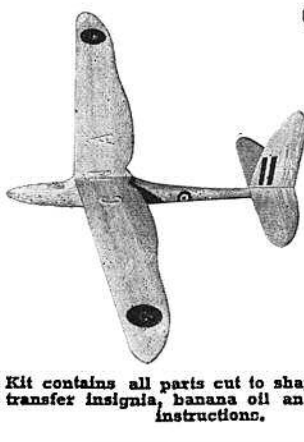
RATA I—16 5/3

SUPERMARINE SPITFIRE. 5/3

MODELS NOT ILLUSTRATED

S.E.5	4/11
PFALZ D.12	4/11
MESSERSCHMITT B.F.109	4/11
MORANE SAULNIER 405	5/3
BRISTOL FIGHTER	5/3
HAWKER HURRICANE	5/3
D.H. DRAGONFLY	5/6
FAIREY BATTLE	5/6
CURTISS P.37	6/3
BELL AIRACOBRA	6/3
BLACKBURN SKUA	6/9

THE C.M.A. GLIDER



COMPLETE KIT OF PARTS 2/6

20″ Wingspan

Kit contains all parts cut to shape, cement, transfer insignia, banana oil and complete instructions.

WHOLESALE ONLY

See your dealer first. If he cannot supply send direct to us, enclosing dealer's name and address and 6d. extra for postage and packing.

Manufactured by

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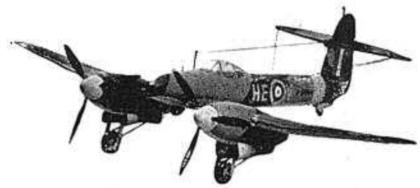
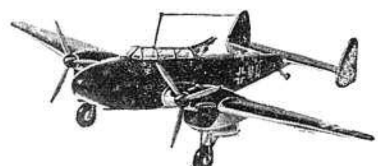


WESTLAND WHIRLWIND 6/6

FOKKER G.1. (DUTCH) 8/11

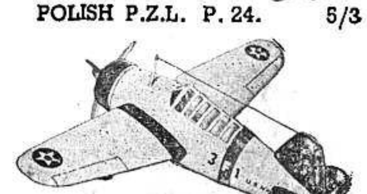
BRISTOL BLENHEIM. 6/11



MESSERSCHMITT M.E.110. 6/11

BOULTON PAUL DEFIANT. 6/9

POLISH P.Z.L. P. 24. 5/3



BREWSTER BUFFALO. 6/9

"EAGLE"

(VERON SERIES KITS)

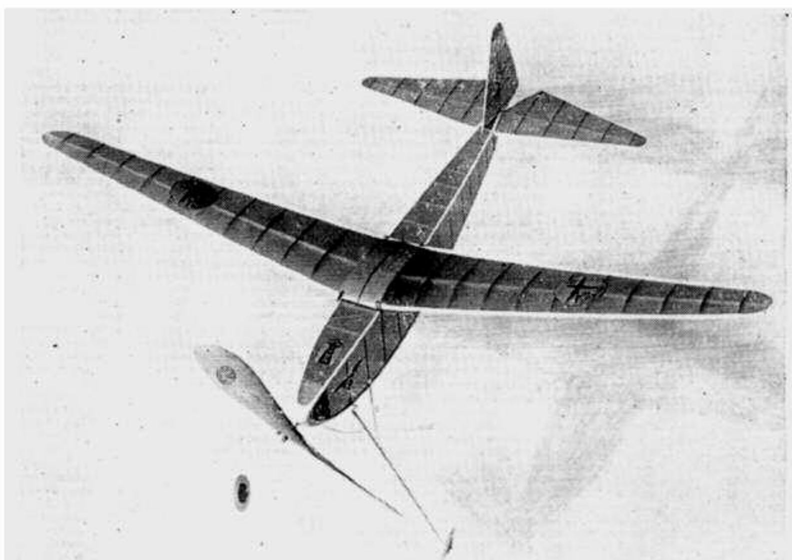
WINS GRAFTON CUP (WITH TWO FLIGHTS ONLY)

(OFFICIAL TIMES: 1st FLIGHT 10 mins. 22 secs., 2nd FLIGHT 12 mins. 3 secs., OUT OF SIGHT.)

ALSO 1st PLACE

EDINBURGH MODEL EXHIBITION

(OPEN TO ALL GREAT BRITAIN)



(ACTUAL WINNING MODEL)

A SUPER DURATION MODEL BUILT FROM A SUPER KIT

KIT CONTAINS: FULL SIZE PLAN, CUT-OUT RIBS AND FORMERS, SPARS READY CUT WITH DIHEDRAL ANGLE SCIENTIFICALLY INCORPORATED, RUBBER MOTOR, CEMENT, DOPE, TISSUE, SHAPED PROPELLER SHAFT, PROPELLER BLOCK, etc.

AT LOW COST, 18/4 Plus 7d. post.

Read what Mr. W. A. Hogg (Builder of Winning Model) writes :—

20th May, 1942.

Dear Sirs,

I thought it may interest you to know that my "Eagle" which won the Scottish championship last December has added yet another success to its credit, namely the "Grafton" cup.

The event which was for the 200 sq. in. class attracted twenty-two competitors. Only two flights were required by the "Eagle" to win the event. Times :—1st. flight 10 mins. 22 secs., 2nd. flight 12 mins. 3 secs. O.O.S.

I again wish to congratulate your firm for marketing such a fine performer.

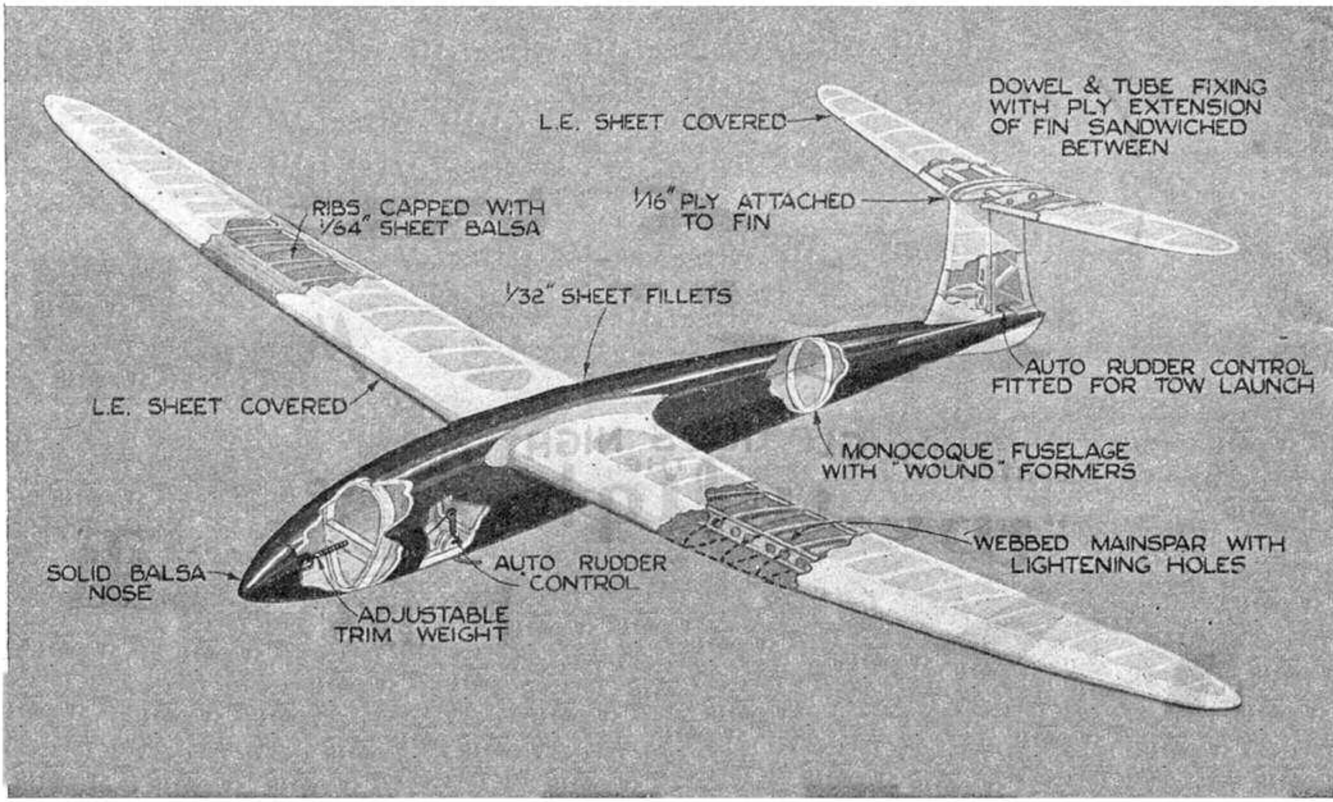
Yours faithfully,
W. A. Hogg, Hon. Sec. Edinburgh Model Flying Club.

SCOTTISH READERS: IF YOUR DEALER DOES NOT STOCK "VERON," "VERONITE" or "TRUSCALE" KITS SEND TO **FRANK ROYLE, 54, STH. CLERK ST., EDINBURGH 8.** (Phone: 41460)

OR TO THE DESIGNERS AND MANUFACTURERS

MODEL AIRCRAFT STORES (BOURNEMOUTH) LTD.

127b HANKINSON RD., BOURNEMOUTH Phone: WINTON 1922



The trend of modern sailplane design is well illustrated in this cut-away reproduction of R. H. Warring's latest machine. Streamlining is carried to a fine degree and the wing roots carefully flared into the lines of the fuselage. The high position of the tailplane, which is becoming increasingly popular of late, is also noteworthy and results in a marked increase in lateral stability. This machine is typical of the nine models fully described in R. H. Warring's latest book, "MODEL GLIDERS," and actually demonstrates the application of the design chapters. Full details of this new book are given on page 353 of this issue.

CONTENTS OF THIS ISSUE

THE AERO MODELLER

(INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR") Established in 1936

(Proprietors: Model Aeronautical Press, Ltd.)

THE MODEL AERONAUTICAL JOURNAL OF THE BRITISH EMPIRE

Managing Editor: D. A. Russell, *A.M.I.Mech.E.* *Editor:* C. S. Rushbrooke

Vol. VII - No. 81 AUGUST, 1942

ALLEN HOUSE, NEWARKE ST., LEICESTER

EDITORIAL

FEW readers, we can imagine, would guess correctly the ratio of area occupied by the type on a page of THE AERO-MODELLER to the overall size of the page . . . yet it is (or rather *was*) only some 70 per cent.! That is to say that nearly one-third of the total area, forming the margin, was left blank! Under war-time conditions that could not continue indefinitely, and this present issue of THE AERO-MODELLER shows a reduction in area of paper left blank as margin. True the type is also slightly reduced, but that is balanced by there being 4 pages more than in previous issues.

Thus a considerable economy in paper has been achieved, but *not* at the expense of the contents of the Journal. We apologise to those readers who have their AERO-MODELLERS bound, but feel sure that they will appreciate the position, and that our duty is to make the fullest use of the paper made available to us.

Model Gliders.

During the past few months, there has been a large increase in the amount of interest shown in model gliders, and the announcement on page 353 of this issue of the latest "Harborough" publication, will undoubtedly meet a long felt want on the part of model glider "fans."

This book represents an absolutely complete course on the subject, and deals with every aspect of the design, construction and flying of all types of powerless aircraft models.

In addition to many explanatory chapters, plans and building instructions for NINE different contest models are included, and full size working drawings of each of these models are available through The Aero-Modeller Plans Service. Full particulars of these models are also given on page 353.

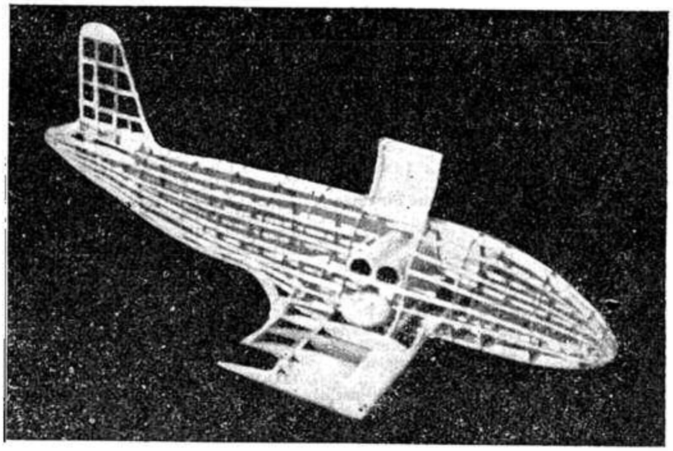
Author of "Model Gliders," which costs 4s. from any model shop or bookseller, or 4s. 4½d. post free from THE AERO-MODELLER offices, is R. H. Warring, who is steadily developing a reputation for accurate up-to-date knowledge by his writings on aero-modelling subjects.

Experts can be Wrong.

Experts can be wrong . . . but we were certainly *not* wrong when we decided to put out a whole series of tapered airfoil sections. These AIRFOIL SHEETS have been in constant demand, the only "complaint" received being one to the effect that they should have been produced years ago! At a purely nominal cost of only 6d. each, they represent really fine value, giving as they do graded profiles ranging from 9 in. chord to 3 in. chord by ½ in. steps, and fully covering the range of normal model wings. There is a separate sheet for each of the 36 most popular model sections, and each sheet gives in addition a graph of the main aerodynamic characteristics of the section concerned. The complete set of 36 sheets may be obtained at the special price of 15s. post free.

Petrol 'Planes Obsolescent?

The mention of jet-propelled models in the July AERO-MODELLER has brought an interesting letter from the Astronautical Society of this country, and a photograph of one of their models is reproduced beneath. The Stratoplane, as it is called, derives its propulsion from a thermal jet unit in the following manner. Air is drawn into the unit, compressed, and then heated by injecting and igniting petrol.



The resulting mixture expands and is ultimately ejected at the rear. The pressure difference so caused by the expansion drives a turbine, which, being coupled to the compresser, enables the thermal unit to function without the aid of the rocket unit, and also provides the thrust necessary for forward flight.

S.O.S. Once Again!

We have cheques for three contributors in respect of material appearing in recent editions of this Journal, but we are unable to forward same as we are unaware of their latest addresses. If they will write we shall be pleased to let them have their dues by return. Their names are:—

L/Cpl. T. C. Watson .. (June Gadget Review.)
J. J. Chambers .. (Gladiator photo, July.)
R. M. Roberts .. .. (Editorial photo, July.)

Off the Secret List.

We would ask readers to study the photograph on this page with care. To all intents and purposes it is a wicked-looking fighter just off the secret list—yet it is actually only 20 in. span! This first-class free-lance mid-wing fighter design makes an admirable flying model and reduced scale working drawings are given on page 369 of this issue. FULL SIZE working drawings are available through The Aero-Modeller Plans Service, price 1s. 6d. post free.

This is a welcome escape from the stereotyped duration model and, judging by actual flight tests, its performance does not suffer.

We would further remind readers of another semi-scale model available through the Aeromodeller Plans Service—the Jackdaw. Details of a grand competition for this machine were given on pages 246 and 247 of the June AERO-MODELLER.

D. A. R.

NATIONAL RECORDS

Below we publish the latest Records Chart as recently evolved by the S.M.A.E. It will be noted that the hand launch record has been abolished and each type divided into three classes. Readers are referred to page 56 of the February AERO-MODELLER for a full explanation of the type designation. The list of current British records is given on page 374 of this issue.

DURATION ONLY (EXCEPT SPEED RECORDS).

Record Type		Class A	Class B	Class C
Rubber Outdoor Monoplane Fuselage	R O G	Unrestricted	Up to 144 square ins. 5 ounces min. weight.	Up to 210 square ins. 8 ounces min. weight.
" " " "	R.O.W. (Tank or Open)	"	"	"
" " " "	Type I-I-P-O.R.O.G.	"	"	"
" " " "	Type I-I-P-O.R.O.W. (Tank or Open)	"	"	"
" " " "	Type O-I-P-I.R.O.G.	"	"	"
" " " "	Type O-I-P-I.R.O.W. (Tank or Open)	"	"	"
" " " "	Type P-I-I-P.R.O.G.	"	"	"
" " Biplane Fuselage	Type O-P-2-I.R.O.G.	"	"	"
" " " "	Type O-P-2-I.R.O.W. (Tank or Open)	"	"	"
" " " "	Type O-2-P-I.R.O.G.	"	"	"
" " " "	Type O-2-P-I.R.O.W. (Tank or Open)	"	"	"
" " Tailless Fuselage	Type O-I-P-O or O-P-I-O.R.O.G.	"	"	"
" " " "	Type O-I-P-O or O-P-I-O.R.O.W. (Tank or Open)	"	"	"
" " Rotorplane Fuselage	R.O.G.	"	"	"
" " Helicopter Fuselage	R.O.G.	"	"	"
" " Ornithopter Fuselage	R.O.G.	"	"	"
" " Scale Fuselage	R.O.G.	"	"	"
" " " "	R.O.W. (Tank or Open)	"	"	"
" " Flying Boat Fuselage	R.O.W. (Open Water Only)	"	"	"
Petrol Monoplane Fuselage	R.O.G.	Unrestricted (motor not exceeding 2·5 c.c.)	Unrestricted (motor 2·5 to 5 c.c.)	Unrestricted (motor 5 c.c. to 10 c.c.)
" " "	R.O.W. (Tank or Open)	"	"	"
" Biplane Fuselage	R.O.G.	"	"	"
" " "	R.O.W. (Tank or Open)	"	"	"
" Flying Boat Fuselage	R.O.W. (Open Water Only)	"	"	"
Glider Hand Launched F.A.I. Rules		70 to 150 cms. span	150 to 250 cms. span	250 to 350 cms. span
" Tow-line Launched F.A.I. Rules	Line 100 metres (328 ft.) (run not to exceed 75 metres)	"	"	"
" Winch Launched F.A.I. Rules	Line 200 metres (655 ft.)	"	"	"
Speed (any type)	R.O.G.	Unrestricted	"	"
Rubber Indoor Monoplane Fuse	R.O.G.			
" " Biplane Fuselage	R.O.G.			
" " Monoplane Stick	R.O.G.			
" " Biplane Stick	R.O.G.			
" " Rotorplane	R.O.G.			
" " Helicopter	R.O.G.			
" " Ornithopter	R.O.G.			
" " Scale	R.O.G.			
" " Round the Pole	R.O.G. Class A. 1 oz. maximum			
" " " " "	R.O.G. Class B. 2 oz. maximum			

Fuselage Formula for: *Fuselage Models* $\frac{L^2}{100}$ *Gliders* $\frac{L^2}{200}$ *Flying Boats* $\frac{L^2}{50}$

Glider Records:—

Loading must not be less than 4·92 ounces or more than 16·48 ounces per square foot.

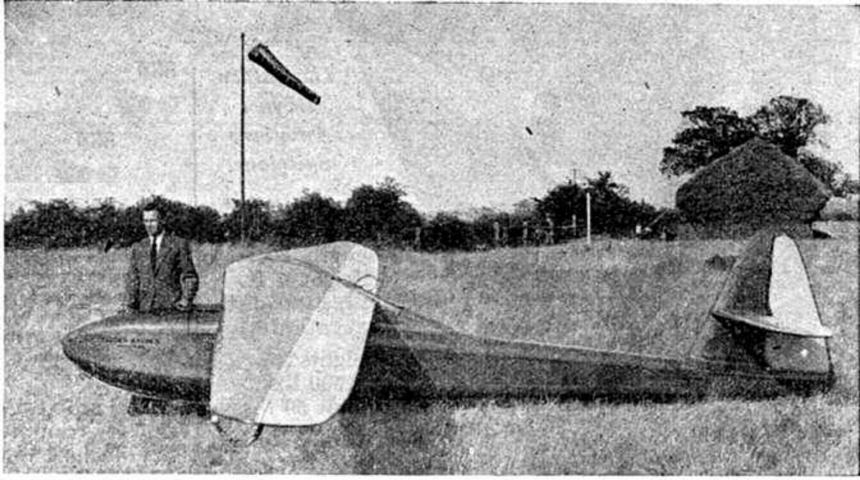
A rubber shock absorber, not exceeding 150 centimetres unstretched, may be used in the line for Two-Line or Winch Launched Records.

REPRODUCED FROM THE S.M.A.E. JOURNAL.

THE AUXILIARY SAILPLANE

by KINGSLEY H. FORRESTER

The ideal model both from the point of view of efficiency and duration is, without doubt, the powered sailplane. Compared with full size aircraft the efficiency of the majority of models is relatively poor, and with a view to improving this situation we commend this article to all serious modellers.



Photographs by courtesy of "The Aeroplane."

At the present time there appear to be two groups of aeromodellers, namely, the sailplane group and a group devoted to the flying of rubber or petrol driven models.

Some few years ago a full-size sailplane of high efficiency was evolved by Mr. L. E. Baynes which, at the instigation of the late Sir John V. Carden, was fitted with a Villiers two-stroke motor cycle engine of 249 cc.

The beauty of the arrangement was that the engine, complete with airscrew, was retractible into the contour of the fuselage when the sailplane, under the propulsion of the engine, had reached a height sufficient for soaring. The sailplane was of the high-wing type, the engine being inverted and arranged behind the wing. The engine unit was pivotally mounted so that when the airscrew was stopped in a vertical position, the engine and airscrew could be retracted into the fuselage; the well in the fuselage being then closed by a pair of lever-operated doors, which, during retraction, were engaged by the airscrew and closed over the engine.

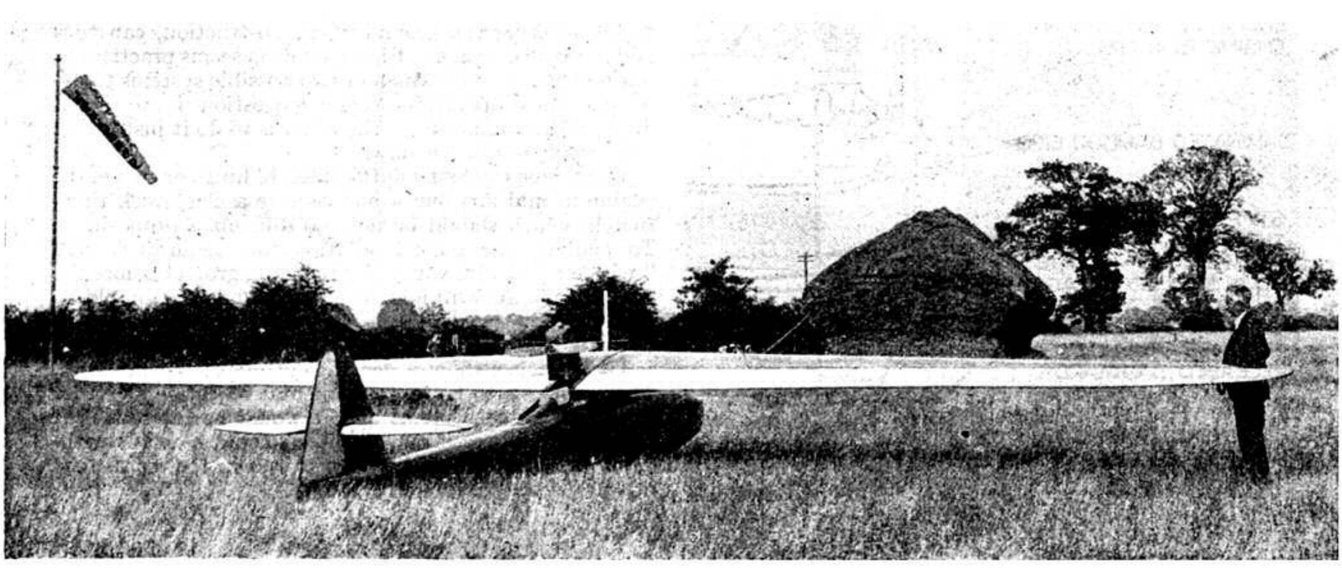
The sailplane was very successful, and was demonstrated on numerous occasions, including the Royal Aeronautical Club's Garden party; but, owing no doubt to the sudden death of the inventor as a result of a Belgian liner crash, was never marketed to a serious extent.

The idea appears to commend itself to model sailplane enthusiasts, and would no doubt be applicable to rubber propulsion as well as to propulsion by petrol engines. With an airscrew having folding blades there should be no difficulty in completely retracting it within the contour of the fuselage when a sufficient height had been reached; the folding blades obviating the necessity of stopping the airscrew with the blades in a vertical position.

The general arrangement of the power unit on the original sailplane evolved by Mr. L. E. Baynes is shown in the photographs. The sailplane with the engine retracted had gliding ratio of approx. 1 in 24, and consequently was of high efficiency despite the additional weight of the power unit.

Perhaps, when the ban is raised, some of those miniature I.C. engines could be brought out of cold storage and fitted to existing sailplanes. The idea appears to have possibilities, and it would at any rate enable a petrol engine propelled aircraft to be evolved which would have clean lines and an efficient gliding angle. It would, in fact, possess all, or practically all, the good points and aerodynamic efficiency of the carefully designed sailplane whilst getting rid of that gliding bogey of petrol engine enthusiasts, namely, a stationary airscrew.

If anyone cares to experiment with the idea it should be borne in mind that the engine unit should be arranged to pivot about a point which will not affect the position of the C.G. of the machine to any marked degree as a result of retraction.



The Carden Baynes Auxiliary Sailplane.

Dimensions:
Span 45 ft. 6 ins.
Length 20 ft.
Height 4 ft.
Wing area 120 sq.ft.
Aspect ratio 16:1.

Weights:
Total 500 lbs.
Motor unit 50 lbs.

Gliding angle 16:1.
Sinking speed 2.2 ft. sec.
Rate of climb 230 ft. min.
Cruising speed
35–40 m.p.h.

PETROL MODELS
WITHOUT UNDERCARRIAGES

This short article was submitted quite independent of the one on the previous page and has much in common. In spite of the title there would appear no reason why the idea should not be applied to a conventional model with an undercarriage and would probably result in an increased gliding performance.

The problem of retractable undercarriages for petrol models is not an easy one if only for the reason that the size of wheels which have to be used makes their stowage within the wing or fuselage difficult without some elaborate, and probably fragile, system of twisting them out of the direction in which they must be in order to function as wheels. In fact the problem is altogether "too much of a good thing" for most of us. And yet the whole trend of modern aircraft design *is* to fly with wheels tucked in, so what are we to do about it?

The following answer to the problem has not been tried, but is put forward as a suggestion which it is believed would work. It has, of course, the drawback that the model must be hand launched, but many of us will not object greatly to this. On the other hand some weight (as well as head resistance) and quite a bit of expense can be saved.

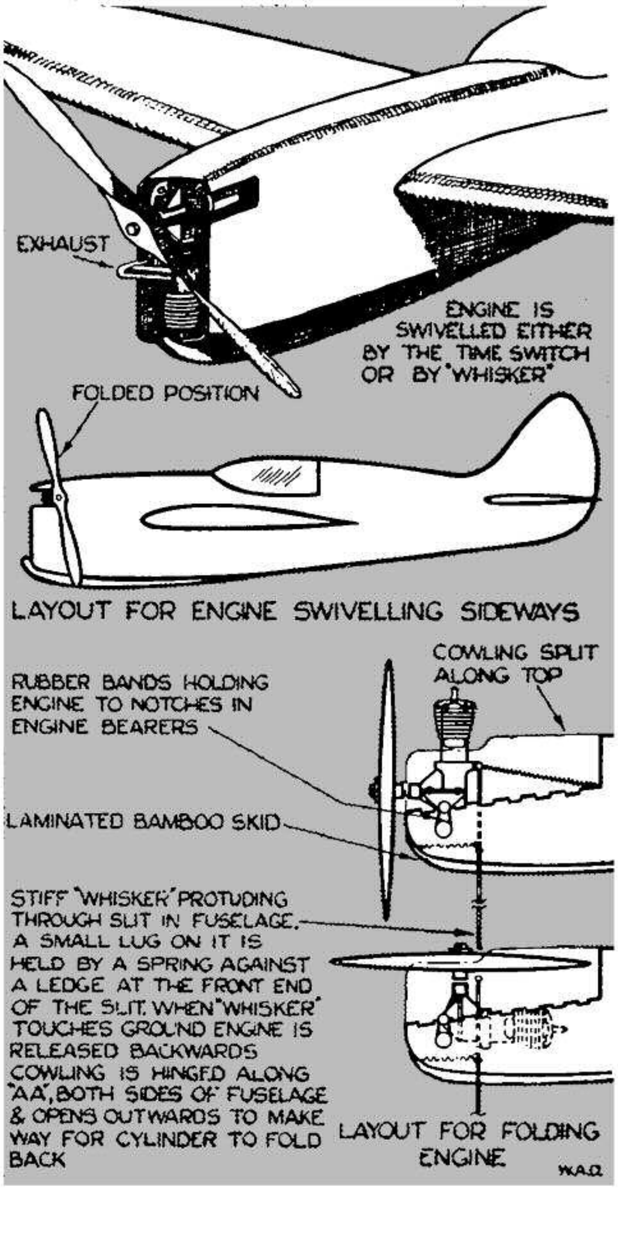
Briefly, the principle is to "dodge the problem" by arranging to get the airscrew out of the way, or into such a position that it can get itself out of the way, before the landing is made. The landing is then made as for a glider. Such landings are smoother than those made with wheels, certainly on any but extremely smooth ground, and there is less risk of "nosing over." With a little ingenuity it should be possible to make a very realistic and normal looking fuselage whilst still catering for the skid on which the landing is to be made.

In fact, one is making normal the "belly landing" which the modern pilot uses if forced down away from an aerodrome—he generally gets away with it with little worse than a damaged airscrew and a "tummy" (aeroplane, not human!) which has been scratched or dented.

The possible solutions are either to swing the engine so that the airscrew boss is pointing upwards or to twist it so that the propellor boss is pointing to the left or right of the line of flight. In either case an airscrew blade, meeting the ground or an obstruction, can turn and so avoid damage. Either solution seems practicable, but one must decide which of two possible systems to use to put into operation. One suggestion is to do it directly the engine stops, the other is to do it just before the aeroplane touches down.

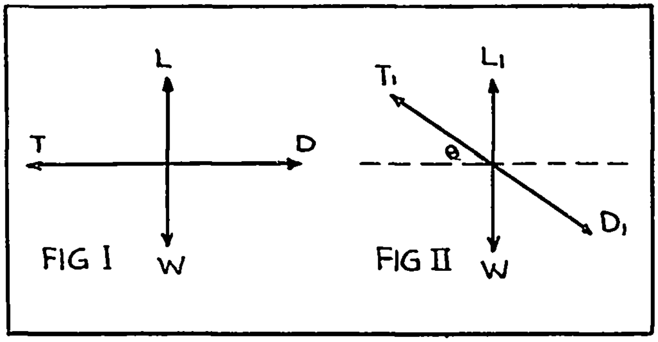
To achieve the first solution (i.e., to hinge or swivel the engine in mid air) one would require a clockwork time-switch, which should be not too difficult a proposition. To achieve the second solution one requires a stiff "whisker" of wire which, by touching ground before the aeroplane lands, will fold the engine, and (if it should be running) cut the ignition. This is the easier answer of the two, mechanically.

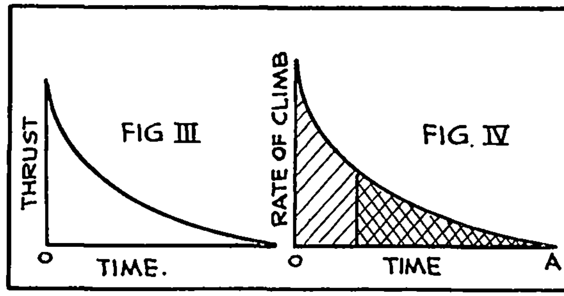
The sketches show a general outline of the proposal. There appears to be no fundamental objection to either of the proposed systems and it would be interesting if someone could try it out—the tests could be made without the engine actually having to run in the air so that no laws would be broken!!



COMPUTATION OF HEIGHT

By R. WATSON





Simple performance calculations are always intriguing and we feel that many readers will be interested in this short article on height finding. It is obviously impossible to deal with this subject exhaustively in one page, but by assuming certain conditions at the start of the analysis, the whole process is greatly simplified.

FOR the purpose of this analysis it is necessary to assume that during the climb, if the model is in equilibrium, that the angle of attack of the wing is the same as the angle of incidence relative to the thrust line.

Consider figures 1 and 2.

Let Lift in level flight $= a$ lbs.
Let Total Drag in level flight $= b$ lbs.
Let thrust for a small portion of the climb $= c$ lbs.
Inclination to horizontal during climb $= \theta$

Velocity Factor (i.e. Velocity during climb/Velocity during level flight) $= x$.

Resolving vertically for equilibrium in fig. 2 :—

$$L_1 - W = \sin\theta\,(D_1 - T_1).$$

Substituting for actual values :—

$$ax^2 - a = \sin\theta\,(bx^2 - c) \quad \text{(i)}$$

Suppose that the model travels a small distance 1, and consider the energy during climb :—

Energy available from motor $= c.1.$
Potential energy gained by model $= a.1.\sin\theta.$
Energy lost due to Drag $= 1.x^2.b.$

Equating energy available to energy used :—

$$c.1. = a.1.\sin\theta + 1.x^2.b.$$

$$\therefore x^2 = \frac{c - a\sin\theta}{b} \quad \text{(ii)}$$

Substitute in (i) :—

$$\frac{a\,(c - a\sin\theta)}{b} - a = \sin\theta\,(c - a\sin\theta - c).$$

$$\therefore ac - a^2\sin\theta - ab = -ab\sin^2\theta.$$

Hence

$$b.\sin^2\theta - a\sin\theta + (c - b) = 0.$$

Using the solution for a general quadratic :—

$$\sin\theta = \frac{a \pm \sqrt{a^2 + 4b^2 - 4bc}}{2b} \quad \text{(iii)}$$

$$\left(\text{From } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}\right)$$

Resubstituting in (ii) :—

$$x^2 = \frac{2bc - a^2 \mp a\sqrt{a^2 + 4b^2 - 4bc}}{2b^2} \quad \text{(iv)}$$

Now the rate of climb of a model is given by $xV\sin\theta$, where V is the velocity of the model in level flight. Figure 3 shows the Thrust-Time curve for a particular combination and by constructing a table as below and knowing the value of V then it is possible to find the rate of climb corresponding to a given thrust by substitution and hence construct a Rate of Climb-Time curve—see Fig. 4. By measuring the area under this latter curve we can find the height attained. Although slightly laborious this method is perfectly sound and by means of a graph connecting Turns with Thrust the height attained with any given number of turns can be readily found.

Consider the Time axis in Fig. 4. The point θ corresponds to 100 per cent. (i.e. maximum) turns and the point A to zero turns. From the Thrust-Time and Thrust-Turns graphs the relation between Turns and Time can be found thus :—

If the graph Turns-Time is drawn the height of the model after a power run corresponding to a certain percentage of the maximum turns is given by the area enclosed by a perpendicular erected at that particular point on the Turns axis, the axis itself and the curve. Thus in Figure 4 the height is given by the area of the double shaded portion.

Note.—When evaluating numerically in equations (iii) and (iv) the negative sign should be taken in (iii) and the positive sign in (iv).

Table 1.

Thrust	Sin θ	Low Velocity	Velocity Factor	Rate of Climb

The easiest way to find the area under the Rate of Climb/Time graph is to work on squared paper and then count the squares enclosed by the bounding lines. Half squares are counted as one and anything under this ignored. The area may also be computed by any of the regular mathematical methods such as Simpson's Rule.

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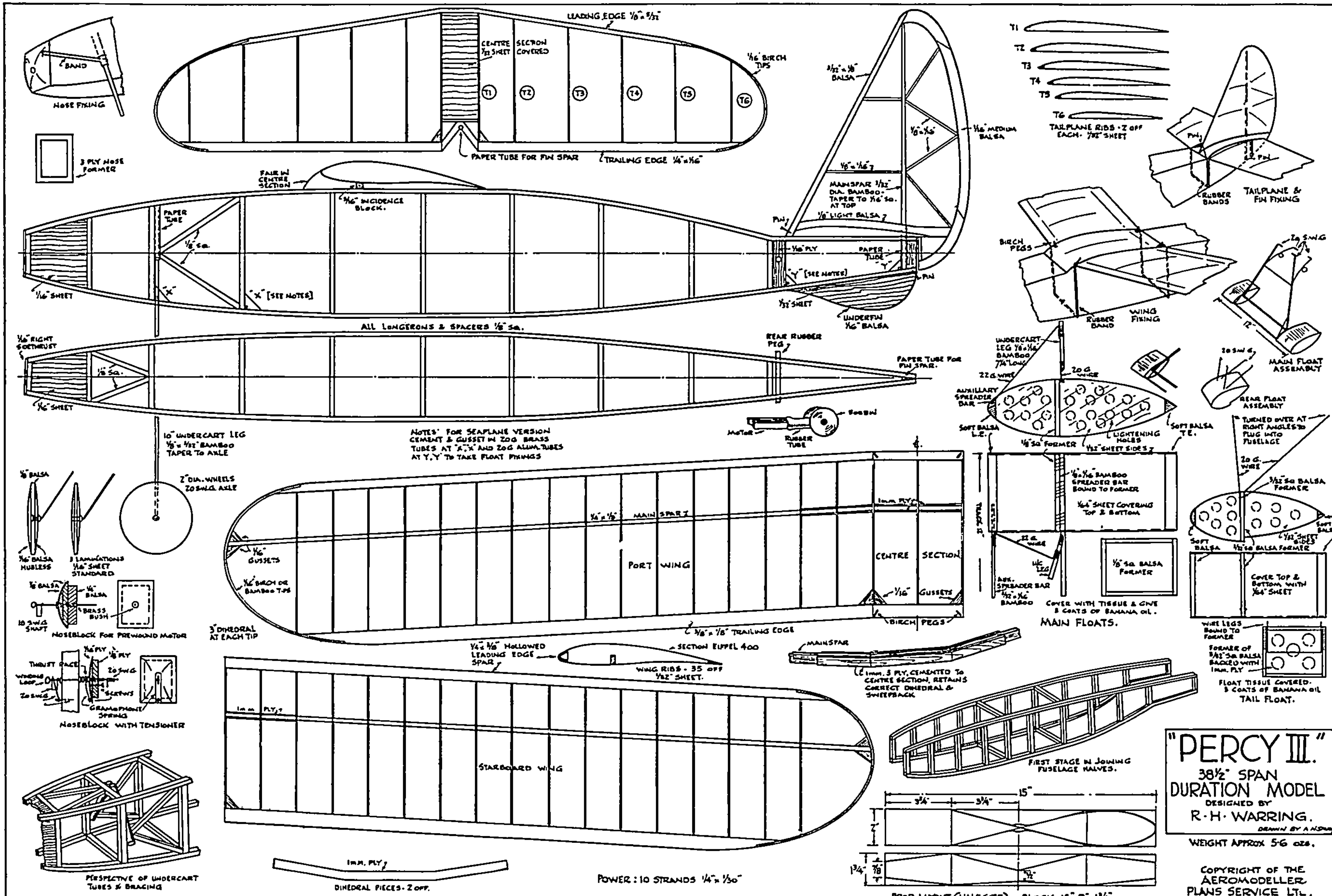
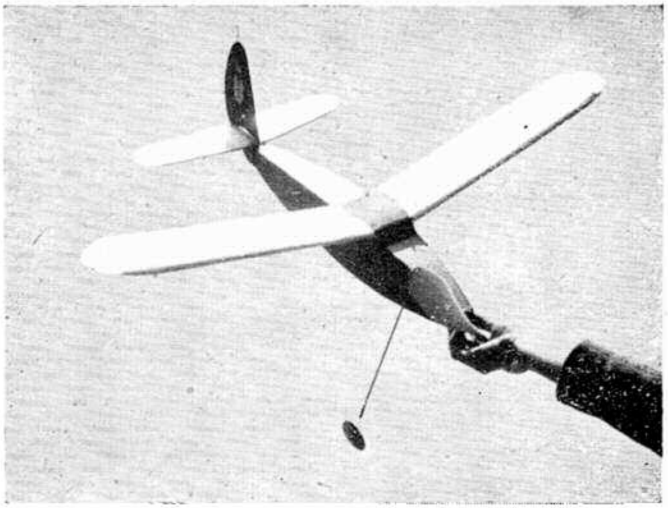


ONE QUARTER SCALE PLAN.



"PERCY" *by* R. H. WARRING

This month we present a straightforward yet highly efficient contest model designed to F.A.I. regulations and with a very fine performance. It may be flown equally well as a landplane or seaplane, full details for both versions being given on the plan, and should prove the ideal machine for the average flier. FULL SIZE WORKING DRAWINGS AVAILABLE THROUGH THE AEROMODELLER PLANS SERVICE, LTD. PRICE 3/- EACH, POST FREE

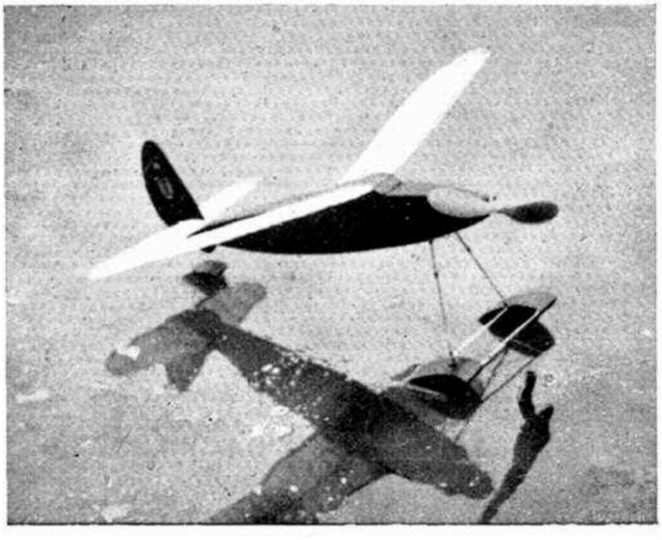
THE original model from which the line of "Percies" was developed first flew in early 1937 and was a rather unusual departure from the other models of that day on account of the high power weight ratio employed. The overall dimensions were quite small, wing span 35 in., with a parallel chord, swept-back wing, Clark Y wing and tailplane and a fuselage with a "belly."

This model has been duplicated by some of the junior members of the West Sussex Model Aircraft Society and holds the junior club record. Its climb is typically American—one terrific burst of power carrying the model upwards in a "corkscrew" climb, giving a 2 min. duration on a 50 sec. motor run.

It was felt that this model was too small and so, at the end of 1937, a further type was developed with increased span, altered fuselage shape and other minor modifications. Percy I, as this new model was christened, flew away on its second flight in the 1938 Gamage Cup and was eventually found six miles away, although the official time was only 3 mins. 46 secs. o.o.s. It flew again shortly afterwards and this time was not returned.

Due acknowledgement must be made at this point to the influence of Bob Copland's famous "Northern Star" upon the general design.

Percy II followed with a modified fin and larger prop. It was so successful that jigs were made for the model and six were built by different club members, the best four of which made up our 1938 National Cup Team. At Faireys, one of these models broke its prop. during test flying and also its rubber before its first competition flight. Despite this handicap the other models flew well enough to place the team seventh on the final results. All machines were coloured black and white with the word "Littlehampton" in block letters on each wing. The effect was quite pleasing and many complimentary remarks were passed about them.



A further modification was made soon after to bring Percy up to more modern standards and so mark III was produced fitted with a fully cantilever, plug-in undercarriage. A pleasing increase in performance was noticed with this, the average duration being in the neighbourhood of 2½–3 mins., with the same prop. and power as before.

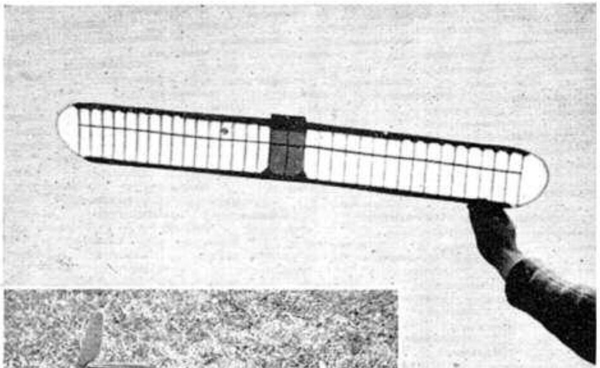
Various structural alterations were also tried at this stage and a "sparless" wing was standard for Percy III for a considerable time, see photos. What appears to be a spar in this photograph is really a thin strip of 1/32 in. sheet balsa, ⅛ in. wide recessed into the bottom of the ribs and was used only as an aid to covering. The tissue was secured to this and to the undersides of the ribs between this and the trailing edge, giving a true undercamber. Towards the tips the large leading edge was cut away slightly for lightness.

Percy IV was another step forward, but now became a specialist's model. A single leg undercarriage retracting forwards was employed with twin fins to give the necessary "tricycle" for take offs. The tailplane was now placed below the fuselage at the rear (actually resting against the bottom longerons), in order to get a more robust fin construction as the depth of the latter did not then need to be so great.

The life of this Percy was not very long. After *one* preliminary hop, in which a slight stall was apparent, the next flight, made after the necessary adjustments, was 2½ mins. on 400 turns. On 800 turns Percy took off smoothly, undercarriage retracted perfectly, and then disappeared straight up after 6½ mins. This flight was carried out in a large field near the sea coast and since the drift was towards the water there is little doubt of the fate of that model!

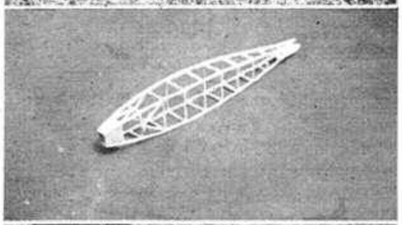
The model designed to replace this, mark V, had the same features with the addition of a two-bladed folding prop. However, it is still waiting to be finished, for at this time I was concentrating mainly on Wakefields and now, since the outbreak of war, I have had little time for even those. A sketch will be given next month of the main features of this model, but it is recommended that the standard Percy be built first and the mark V produced later as a "special" model.

The seaplane version of Percy was produced by fitting floats to the mark II. In the accompanying plans, however, the necessary modifications to the mark III are shown. The performance of either of these as a seaplane is excellent. With the additional weight and drag of the three floats, flying with the same prop. and power, it was placed first in the local seaplane competition with an average of 115 secs., the last flight of 108 secs. R.O.W.



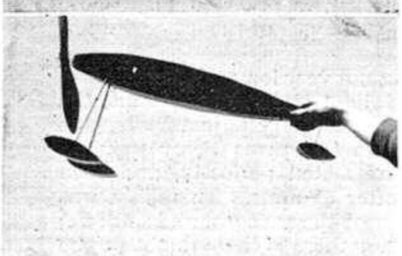
Above—The 'sparless' wing.

Percy II fuselage, tail unit, etc.

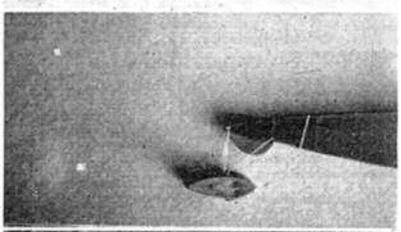


Mk. III fuselage uncovered. Note the undercarriage bracing struts.

The seaplane version with three floats of streamlined section—well braced.



The general float layout. Note the step in the tailfloat and the auxiliary bracing on front floats.



The tail float. Wire mounted, plugging into the fuselage.

The original model from which "Percy" was developed.

being carried out in a downpour of rain. Its best flight of 2 mins. 6 secs. still stands as the official club record. With the same power, but with a 14 in. prop., this time has been bettered on several occasions, and this model is shown in the photographs on this page.

The performance of all the "Percies" built has been excellent; many club members have obtained their first 3 min. + flights with this type. They have held both the club H.L. and R.O.G. records on many occasions and still hold the ladies record of over 3 mins. With my own models I have had 40 mins. H.L. and 15 mins. H.L. with Percy III, 12½ mins. and 14½ mins. with Percy II, besides numerous flights of 3–10 mins. with all the others. In rough weather they are particularly stable and reasonably damage-proof, often flying when all other types are grounded. Percy II won a competition in a howling gale with a flight of 75 secs. *out of sight*, when every other model that attempted to fly "folded up" before launching.

Detailed description of Percy.

Design. The object of the design was to obtain a robust model suitable for competition work and, at the same time, one that is quite easily duplicated. A high degree of stability was required with maximum efficiency.

Excellent longitudinal stability is obtained by slight sweepback to the wings and a 32 per cent. tailplane, necessary on account of the rather short moment arm of the latter. The prop. is large, but 3 in. dihedral under each wing tip takes care of the torque and, with 1/16 in. sidethrust, gives a nice, even circle with no altitude lost on turning during the power run.

Provided that this amount of sidethrust is not exceeded, lateral stability is of a very high order and the model does *not* spin after a stall. The fin is light and well proportioned and at no time is it too powerful or too weak. No twin tab is incorporated, adjustment being obtained by moving the whole fin.

Details—Wings. With the possible exception of the airscrew, the wings are the most important part of the whole model and great care must be taken in their construction to ensure absolute accuracy. Several types of construction have been tried, but, although the large leading and trailing edge with no intermediate spars gives a really good section, a more robust unit is obtained by employing a mainspar. A large leading edge should still be used, but hollowed out for lightness. A good entry is essential for efficiency. To retain the dihedral and also considerably strengthen the wing the centre section of the mainspar and out to about 2 in. along each wing, half should be strengthened by facing with 1 m.m. 3-ply with the grain running horizontally. The mainspar is continued to the wing tip and tapers in depth from the last rib outwards.

By spacing the ribs at 1 in. intervals a pretty true section is employed. If light balsa is used the weight of the additional ribs is very small and, in any case, they may be cut out if necessary to bring the weight down to the correct value. A modified R.A.F. 32 section is employed and has proved excellent both for power flight and soaring.

Tailplane. This is of extremely light construction and is actually the weakest part of the whole model. I have only suffered one broken tailplane on Percy and that was no fault of the model. It landed on some houses after a fly-away and tumbled down on to a pathway. However, some people have broken them and if you feel nervous as to its strength fit an additional spar of 5/32 in. by 1/16 in. balsa from tip to tip.

The section used is thin Clark Y and although the ribs are spaced rather far apart it gives good lift when required.

Fin. Mainly of 1/16 in. balsa with a bamboo mainspar, this is very strong and light, seldom being damaged in the roughest of "landings." The ribs aft of the spar are triangulated for greater strength.

Prop. and Nose. Two types are shown on the plan, one with a spring tensioner for the rubber and one for a "corded" motor. The latter saves any soldering, but the former method is often preferred. Bobbins are fitted as standard. Various diameters and pitches have been used from 14 in. small area blades to 16 in. diameter "paddle blades." It was finally decided to use a 15 in. diameter prop. with large blade area and a pitch 1·75 times the diameter. For the seaplane this should be reduced to 14 in. diameter.

Undercarriage. For landplane, simple bamboo legs, ⅛ in. by 3/32 in., tapering to just over 1/16 in. diameter with 20 s.w.g. axles and 2 in. diameter wheels. The latter may be of the hubless type if desired.

For the seaplane version three floats are employed. Two main floats, well forward and "cocked up" so that the model gets off quickly. No steps are incorporated. The unit is well braced and takes rough landings well. It is, however, a trifle heavy. The tail float is stepped to ensure that the rear of the model lifts quickly and is also turned to the right slightly making for a straight take-off by helping neutralise torque. The various units are illustrated in the accompanying photographs.

Data for Percy III.

Weights :		ozs.
Wing	=	1·000
Fuselage	=	·875
Undercarriage	=	·400
Tailplane and fin ..	=	·400
Prop. and nose	=	1·000
Rubber	=	2·000
Total	=	5·675

Prop. 15 in. diameter from block 15 in. by 2 in. by 1¾ in.
Power, 2 oz. (i.e. approx. 10 yards), ¼ in. by 1/30 in. rubber made into ten (10) to twelve (12) strands.

Wing span	=	38·5 in.
Length over all	=	28 in.
Wing area	=	172 sq. in.
Tailplane area	=	56 sq. in.
Required weight, F.A.I. rules ..	=	5·66 oz.

Percy IIs.

Wings, fuselage and tailplane (as above)	=	2·275*
Rubber	=	2·000
Main floats	=	·875
Tail float	=	·200
Prop. and nose	=	·750
Total	=	6·100

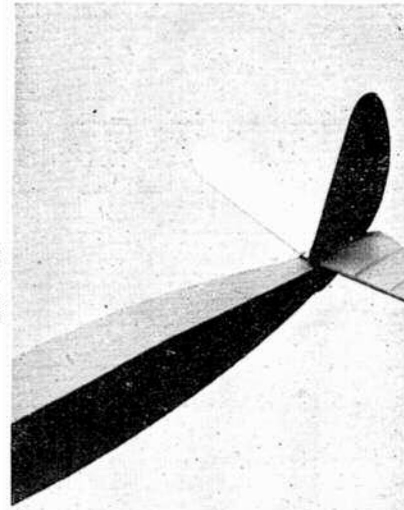
* Some weight may be saved on the wings to reduce the total to just under 6 oz.

Super-lightweight Percy (not to F.A.I. rules).
Light grade balsa used throughout, ribs cut out and spar sizes somewhat reduced.

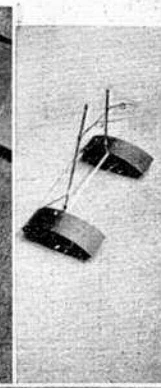
Wings	·75
Fuselage	·75
Undercarriage..	·375
Tailplane and fin	·375
Prop. and nose	·75
Rubber..	1·20
Total	4·20

Power : 12 strands 3/16 in. or 8 strands ¼ in. rubber.

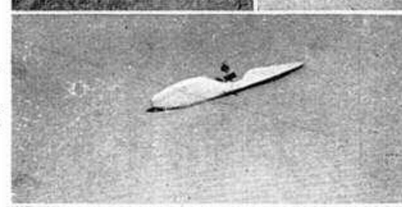
(to be concluded next month.)



The tail unit showing the tapered "sparless" tailplane, the large fin and the simple rubber band fixing



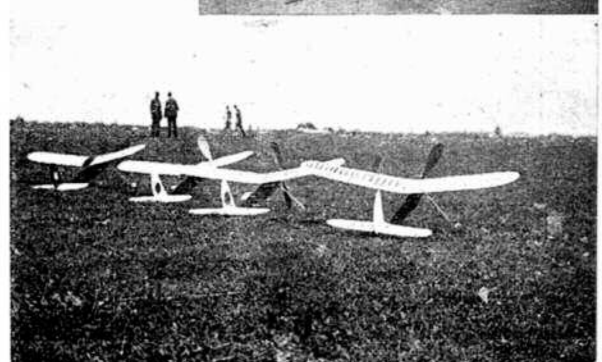
The cantilever plug-in undercarriage leg and right, the front float assembly.

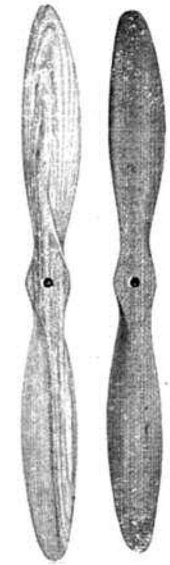


The airscrew and noseblock. Note the wide blades and the cut-away at the hub to reduce drag.

The seaplane version. Note the "sit" on the water.

Below: The West Sussex National Cup Team of four Percies.





PETROL TOPICS

By
J. F. P. Forster

1

2

The two heading photographs show an interesting attempt at faking by G. Wickington, of Bitterne, Southampton. The machine is a free-lance, semi-scale model of 50 ins. span, powered by an Ohlsson 23. In the upper photograph the model is near the camera and the figure apparently resting his hand on the wing tip is many feet away in the background. Photograph No. 3 is a 5 ft. 6 in. span Leopard Moth constructed by L. A. C. Barker, now stationed in Southern Rhodesia with the R.A.F

AS mentioned in the June issue, two items of interest to Scale-type Low-Wing builders have come to hand from correspondents, and I propose to deal with them this month in some detail, because, owing to the influence of " the present disturbance " on the outlook of at least the younger Petroleers, and particularly on those young men who " were just going to start building petrol models " before said " disturbance " upset their plans, I feel the scale type of model is likely to attract more recruits to our hobby immediately after the war than any other type.

Many men now in the R.A.F., with ideas mainly based on full-size practice, are also likely to take up the hobby, and will naturally have a leaning towards producing some of the types with which they worked (or even flew) during the war. With the overwhelming prevalence of the low-wing monoplane, they will at once come up against the problem of wing and undercart fixation already well ventilated in this feature. The " crash-proof " merchants like myself will still be on the lookout for means of preserving realism with the ability to stand up to " unorthodox landings " (if these can be said to describe the alighting of one's models in tree-tops and hedgerows), while those who insist on relative rigidity, and faithful reproduction of prototypes, will presumably interest themselves in radio control, and become, as it were, our bomber command, and build comparatively large and heavy twin-engined types. These too, however, are mostly mid or low-wings, as, presumably, will be most of the first Civil airliners after the war, and the chaps who fly them will require super flying grounds or loaned full-sized aerodromes, if they are not going to become a public menace ! !

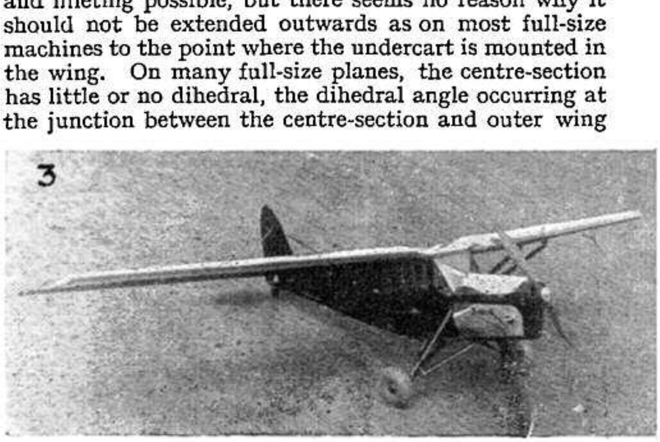
If I may be allowed one more digression before coming to the point, I would hazard the opinion that the " duration " type of petrol model is dead in this country (if indeed it ever seriously lived ?). We simply haven't the wide open spaces necessary for those rocket-like climbs into the blue, to be followed by an almost everlasting glide (possibly into the next county !). The engine efficiency fiends and super streamliners will have to come down to the equivalent of a track for the like-minded motor car racing enthusiasts, such as Brooklands. Like the speed boat fans, they will have to tether their machines (or maybe projectiles) and fly R.T.P. There does not appear to be much object in building a non-scale type except for pure low-speed aerodynamic experiment. Apart therefore from the two foregoing types, models will most likely fall into the scale or semi-scale class either with or without radio control.

Various methods of attaching the outer panels of low-wing models have been discussed from time to time, with particular reference to the difficulty of getting sufficient rigidity, combined with " give " in the event of accident. Blows due to wing-tip landings tend to strain the wing tip both upwards and backwards, and plugging them into a fixed centre-section which is realistically faired into the fuselage, causes them to pivot on the weakest point, namely the trailing edge. In a short time the T.E. of the outer wing panel or of the centre-section itself usually buckles.

G. H. Cox, of Draycott, Derby, sends sketch Fig. (1) of an excellently crash-proof arrangement based on the tongue and box method advocated by L. G. Temple, of glider fame, and described in Petrol Topics (May, 1941) but with the addition of a movable and detachable centre-section. The tongue and box allow for backward movement, while the centre-section being held in position by internal rubber bands, allows for upward blows and will also " slew " round to some extent, thus reducing the likelihood of damage to the trailing edge.

This centre-section not only makes perfect wing-fairing and filleting possible, but there seems no reason why it should not be extended outwards as on most full-size machines to the point where the undercart is mounted in the wing. On many full-size planes, the centre-section has little or no dihedral, the dihedral angle occurring at the junction between the centre-section and outer wing

3



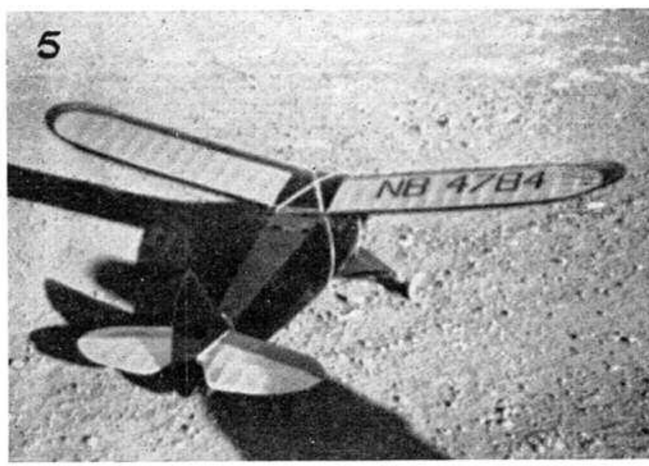
4

Photograph 4 illustrates a 6 ft. 6 in. span semi-scale model also built and flown by L. A. C. Barker. The power unit is a Brown. It has made many good flights. Our first feeling on studying these snaps was one of envy. Just look at that wonderful flying field!

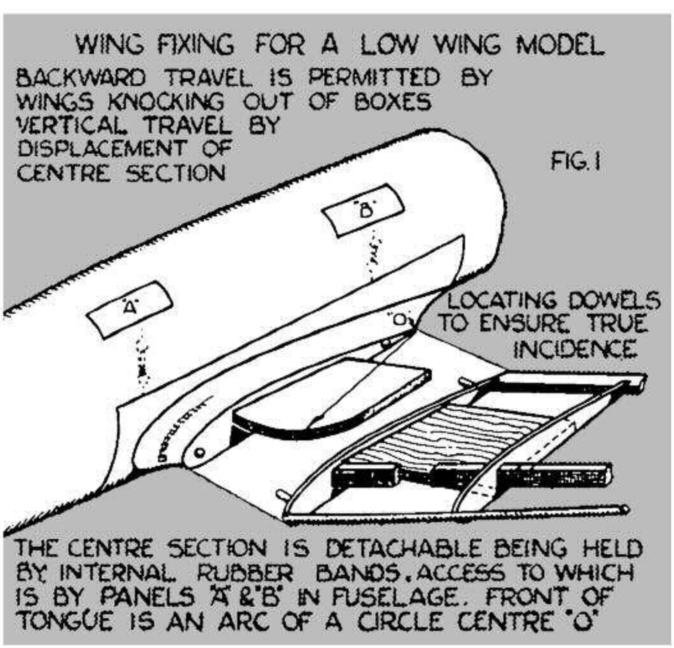
panel. Either of these arrangements can be faithfully carried out in a model using this wing-fixing, and, furthermore, it seems likely that the all-up weight can be reduced :—Almost all the landing and flying strains are taken by this centre-section if the undercarriage is mounted on it. This is the only part which requires to be built really robustly. The fuselage has only to carry the engine and tail surfaces, and withstand relatively light tailwheel (or skid) shocks; it should therefore be possible to build the fuselage considerably lighter than is the case using strong and heavy longerons, uprights, etc., and monocoque fuselages can be similarly built with less "reinforcements" to take landing strains. The fuselage in effect simply sits on the centre-section, and, if a detachable engine mounting is used, only requires a good strong front bulkhead to support the engine.

G. H. Cox is building a low-wing model incorporating this wing and centre-section, but unfortunately sounds like spoiling the scale type appearance by fitting an undercart mounted in the fuselage as on *high-wings*, on the lines of D. A. Russell's G-ADAR, a high-wing cabin monoplane, and which in this case is not perhaps the best type to use. He promises us photos of the completed model "soon", however, so perhaps I had better reserve judgment on final appearances. He has also worked out its wing-loading at 11 ozs./sq. ft., (how, I can't say!). Personally, I usually form a rough (and usually optimistic) idea of this when building a model, but daren't publish it until the model is complete! Power: Spitfire 2.5 c.c.; Span 5 ft, 5 ins.

The other item of interest to scale type low-wing builders is the undercarriage of an ambitious radio-controlled job now building, sent in by A. J. Cope, of Westbury-on-Trym, which was promised in the June instalment of "Topics." Quite apart from its very neat and simple retracting mechanism (also to be radio-controlled, of course), I took a very good view of the



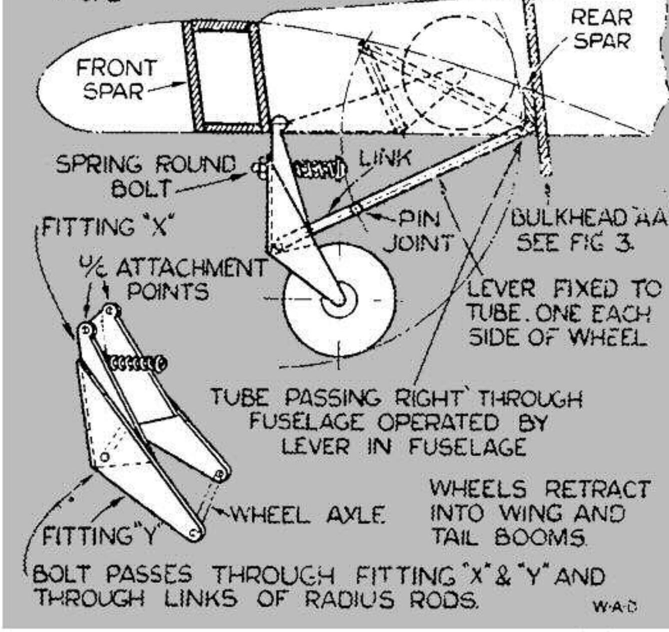
Another shot of L. A. C. Barker's job. A really sound job built and flown under active service conditions and many miles away from the home country.
Fig. 1 (bottom left) shows a knock-out wing fixing for low wing machines, based on the well-known glider method.



cunning upward and backward shock travel of the lower component carrying the landing wheel, as I thought this would appeal to the "practical flyers" (if any) who still read this feature. As will be seen from his self-explanatory sketches, these are intended as tricycle undercart legs; (all three retracting; the rear pair into tail booms, the model being a pusher). but, dispensing with the retracting mechanism, they are easily adaptable to any ordinary low-wing model, mounted somewhere between the leading edge and main spar of a centre-section of the type already discussed earlier in this article.

Owing to the space consumed by these sketches I fear the Editor will reach for his blue pencil if I embark on any more subjects this month. It is quite like "old times" to be able to present a "correspondents' instalment" of "Topics," and I hope it may stimulate some

FIG. 2



Figs. 2 and 3 give details of A. J. Cope's radio controlled model. In addition to the normal throttle, rudder and elevator controls the three undercarriage wheels are also to be retracted at will. The general design is a praiseworthy departure from the orthodox and the fitting of letter-box slots is interesting.

more of you hibernating Petroleers to come out of your shells. The June instalment, largely devoted to engine design, has already produced some interesting correspondence, including a letter from R. V. Bentley, of Blackpool, who brings up the question of dual v. single ignition, and also wants to know what is likely to be the most popular post-war engine capacity in this country, and suggests we put the latter to a popular vote. If the Editor has no objection, we might do this through the columns of Petrol Topics. [Certainly. Who said I had a blue pencil ? ? *Ed.*].

Regarding dual ignition, not many Petroleers can have been lucky enough to have secured dual ignition engines before the import ban stopped American examples coming into the country, but if anyone is in a position to express an opinion after trial of such engines, correspondence in this connection will be welcomed. Though possibly making for extra power, the weight of twin coils would seem to detract from any advantage gained when such engines are used for aero work, doubtless the real advantage is apparent when used to power model racing cars which were becoming so popular in U.S.A. a year or two ago.

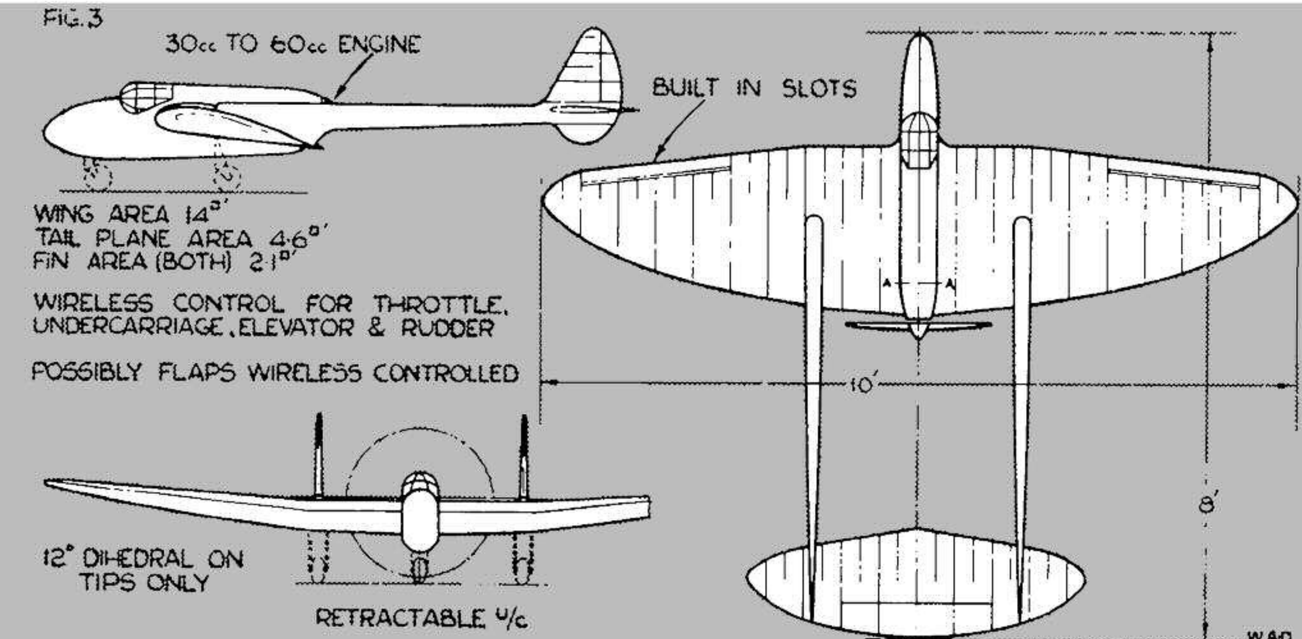
Apart from the radio control fiends, and a comparatively few " Big Stuff " enthusiasts, the vast majority of younger Petroleers in this country are not (or for some time after the war, may not be) blessed with cars, and the problem of transporting large models, coupled with the small size of the average field, would seem to favour the small model of not much more than 6 feet span. If so, engines between 3 and 6 c.cs. would fit the bill. We ought to try and be in a position, immediately the war is over (or before if possible), to give any prospective maker's definite ideas on what *we* want in this respect. Send in your ideas, and if there are enough, I will give you the average results or persuade the Editor to organise a free-for-all vote of the most popular engine capacity.

The following table gives particulars of some of the better known petrol engines.

Name.	Maker.	Capacity.	Bore.	Stroke.	Bare weight.
Ohlsson '23'	Ohlsson and Rice	.232 cu. in.	11/16 in.	5/8 in.	4 ozs.
Ohlsson '19'	" "	.199 cu. in.			3.75 ozs.
Brown Jnr.	Brown Jnr. Motors	9 c.c.	7/8 in.	13/16 in.	6.5 ozs.
Loutrel	G.H.Q.	9 c.c.	15/16 in.	3/4 in.	10 ozs.
Phantom P.30.	Phantom Motors	.295 cu. in.	.710 in.	.750 in.	5.25 ozs.
Price Midget	Price Motors	.24 cu. in.	11/16 in.	21/32 in.	3.5 ozs.
Baby	Hallam	2.3 c.c.	9/16 in.	5/8 in.	3.5 ozs.
Nipper	"	5.85 c.c.	25/32 in.	3/4 in.	6 ozs.
O.K. Special	Herkimer	.604 cu. in.	.95 ins.	.9 ins.	7.5 ozs.
O.K..49	"	.493 cu. ins.	.9 in.	.775 in.	6.75 ozs.
O.K. Twin	"	1,208 cu. ins.	.9 in.	.905 in.	22 ozs. complete less battery.
Comet		18 c.c.	1 1/32 ins.	1.25 ins.	16.5 ozs.

To convert c.c. into cu. ins., multiply by .061.
To convert cu. ins. into c.c., multiply by 16.39.
Vide May Technical Topics.

FIG. 3



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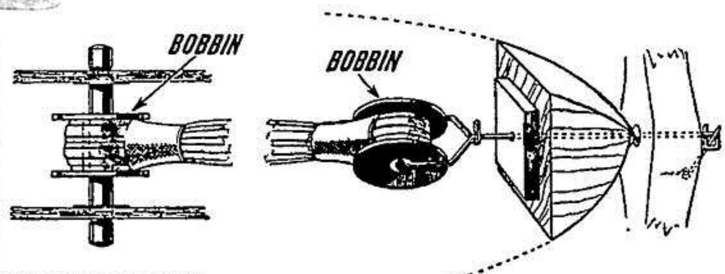

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"MAJOR" ,, ,, 3/16", 1/4" ,, ,, ,,	2d. ,,	,,	18 ,,	2d. ,,
"STANDARD" POWERFUL 1/4" ,, ,, ,,	2½d. ,,	,,	18 ,,	2d. ,,
			16 ,,	2½d. ,,
"LITTLE GIANTS" ,, 1/4" ,, ,, ,,	3d. ,,	,,	16 ,,	2½d. ,,

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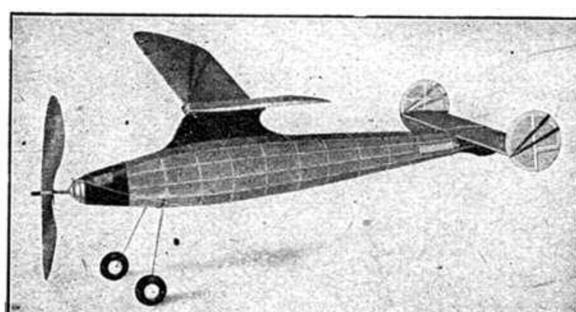

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I 16b RATA

By J. A. F. HALLS

DETAILS of the Rata were given in the November, 1941, AERO-MODELLER, and readers who would like to try a model a little out of the ordinary should build this one. It is a very fast flier, fairly heavy (the original weighed about 3 ozs.), and thus balsa is not essential. Approximately 75 per cent. substitutes were used in the original model which, however, was too nose heavy with the undercarriage attached. This was removed for flying and, using a hardwood propeller, the model was strong enough to take the strain of belly landings although it would be better to fly it over long grass. By careful choice of materials, this unbalance could be remedied and an undercarriage permanently fitted.

Fuselage.

Cut out the keels from 3/32 in. balsa or 1/16 in. sheet substitute. As shown in the plan, the bottom keel is made from two parts which should be stuck together and allowed to set on the plan.

The formers are cut from 1/16 in. sheet and slotted to accommodate the 1/16 in. square balsa stringers. A large diameter dowel is used as a building jig—a broom stick will do the job nicely—and the formers are mounted on this in their respective positions. Add the keels and stringers, taking care to get the line-up accurate. For hardwoods, a rather slower drying glue is better than balsa cement.

Wings.

Rib A is cemented to formers 1, 2, 3, 4 and 5 on the fuselage. Build up the rest of the wings on the plan, firstly pinning the spars in their correct positions. Notch the ribs as shown and cement in position on the plan. Finally, add the leading and trailing edges which should be raised slightly by inserting small pieces of balsa between them and the plan. The wing tip is added after the wing has been removed, but be sure to get this true.

Tail Unit.

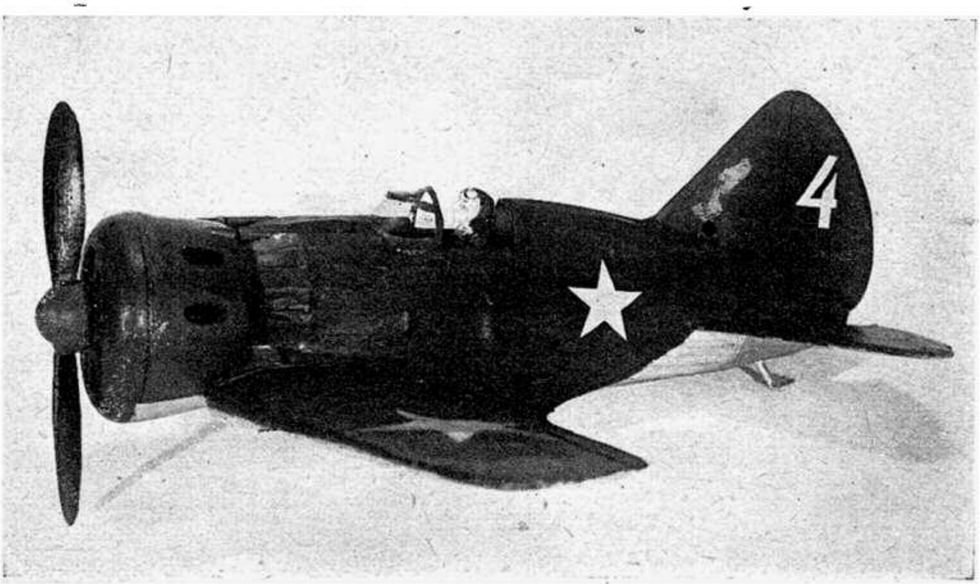
Layout and cement together the fin outline on the plan and while this is setting, cut out R1, R2, R3, and cement them in position on R4. When the outline has set, remove from the plan and cement in this other framework. Finally add R5, clean up with sandpaper, cover and cement to the fuselage.

The tailplane is built up in an exactly similar manner and each half is cemented to the fuselage in the correct position.

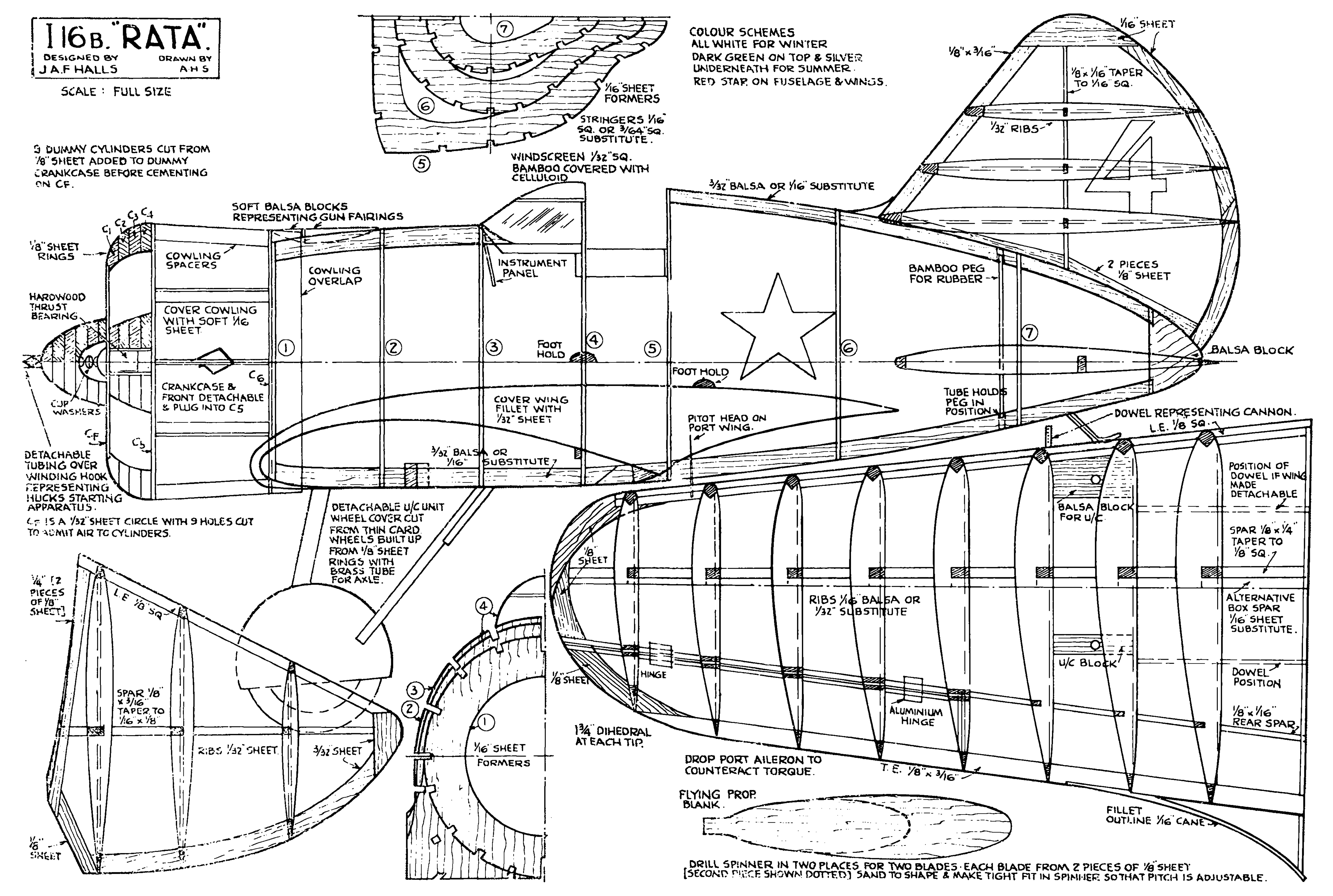
THE 1–16 "RATA"

Span : 31 ft. 3 ins. Length : 21 ft. 11 ins.
Height : 10 ft. 4 ins.
Wing area : 204 sq. ft. (approx.)
Weights : Empty 4,910 lbs.
Loaded 6,100 lbs.
Loadings : Wing 30 lbs. sq. ft.
Power : 5·5 lbs./H.P.
Engines : 1–16 — M.25 (Wright Cyclone).
1–16B — M.63 (Wright Cyclone).
Armament : Two machine guns in fuselage and two in wings.

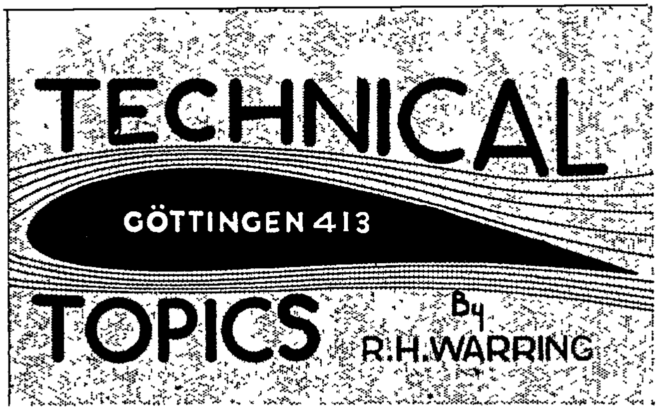
Reprinted from Aircraft of the Fighting Powers, Vol. II



Mr. Halls is to be congratulated on the excellence of his photographs, which are remarkably fine efforts. Although no great durations are to be expected from a model of this type, it makes a fine, speedy scale flier, fit to add to any collection. Colouring is dark green top surfaces with silver undersides.



116B. "RATA".
DESIGNED BY J.A.F. HALLS
DRAWN BY A.H.S
SCALE: FULL SIZE
1/16" SHEET FORMERS
STRINGERS 1/16" SQ. OR 3/64" SQ. SUBSTITUTE.
COLOUR SCHEMES
ALL WHITE FOR WINTER
DARK GREEN ON TOP & SILVER UNDERNEATH FOR SUMMER.
RED STAR ON FUSELAGE & WINGS.
1/16" SHEET
1/8" x 3/16"
1/8" x 1/16" TAPER TO 1/16" SQ.
1/32" RIBS
9 DUMMY CYLINDERS CUT FROM 1/8" SHEET ADDED TO DUMMY CRANKCASE BEFORE CEMENTING ON CF.
WINDSCREEN 1/32" SQ. BAMBOO COVERED WITH CELLULOID
3/32" BALSA OR 1/16" SUBSTITUTE
SOFT BALSA BLOCKS REPRESENTING GUN FAIRINGS
1/8" SHEET RINGS
COWLING SPACERS
COWLING OVERLAP
INSTRUMENT PANEL
BAMBOO PEG FOR RUBBER
2 PIECES 1/8" SHEET
HARDWOOD THRUST BEARING
COVER COWLING WITH SOFT 1/16 SHEET
FOOT HOLD
BALSA BLOCK
CRANKCASE & FRONT DETACHABLE & PLUG INTO C5
FOOT HOLD
CUP WASHERS
COVER WING FILLET WITH 1/32" SHEET
TUBE HOLDS PEG IN POSITION
PITOT HEAD ON PORT WING.
DOWEL REPRESENTING CANNON.
L.E. 1/8 SQ.
DETACHABLE TUBING OVER WINDING HOOK REPRESENTING HUCKS STARTING APPARATUS.
3/32" BALSA OR 1/16" SUBSTITUTE
POSITION OF DOWEL IF WING MADE DETACHABLE
CF IS A 1/32" SHEET CIRCLE WITH 9 HOLES CUT TO ADMIT AIR TO CYLINDERS.
DETACHABLE U/C UNIT WHEEL COVER CUT FROM THIN CARD. WHEELS BUILT UP FROM 1/8" SHEET RINGS WITH BRASS TUBE FOR AXLE.
BALSA BLOCK FOR U/C.
1/8" SHEET
SPAR 1/8 x 1/4" TAPER TO 1/8" SQ.
1/4" [2 PIECES OF 1/8" SHEET]
L.E. 1/8 SQ.
RIBS 1/16 BALSA OR 1/32" SUBSTITUTE
ALTERNATIVE BOX SPAR 1/16" SHEET SUBSTITUTE.
U/C BLOCK
HINGE
1/8" SHEET
DOWEL POSITION
SPAR 1/8 x 3/16 TAPER TO 1/16 x 1/8
ALUMINIUM HINGE
1/8" x 1/16" REAR SPAR
1 3/4" DIHEDRAL AT EACH TIP.
1/16" SHEET FORMERS
RIBS 1/32" SHEET
3/32" SHEET
DROP PORT AILERON TO COUNTERACT TORQUE.
T.E. 1/8" x 3/16"
FLYING PROP BLANK.
FILLET OUTLINE 1/16" CANE
1/8" SHEET
DRILL SPINNER IN TWO PLACES FOR TWO BLADES. EACH BLADE FROM 2 PIECES OF 1/8" SHEET (SECOND PIECE SHOWN DOTTED) SAND TO SHAPE & MAKE TIGHT FIT IN SPINNER SO THAT PITCH IS ADJUSTABLE.



ARISING out of my article on " The Modified R.A.F. 32 Airfoil " in the June issue of THE AEROMODELLER, several readers have inquired if there are many generalisations that may be applied to all airfoil sections. To a certain extent there are, but each theoretical assumption is subject to modifications found necessary by practical results. For most normal sections the agreement is quite good.

In general the slope of the lift curve is approximately constant for all airfoils (of the same aspect ratio) from zero lift to about 80 per cent. of C_L max. and the curve is linear over this range, i.e., a straight line. Beyond the upper value the lift curve falls off rapidly at the stall, which phenomenon, incidentally, normal fluid theory fails to predict, although more recent development work has suggested that it may eventually be possible to reach agreement between theory and practice in this region. Thus, over the working range of incidences we can state that :—

$C_L = k\ (\alpha + \beta)$.

Where α = angle of incidence: $-\beta$ is the angle of no lift and k is the slope of the lift curve.

To find k proceed as follows :—The general equation for incidence taking into account aspect ratio correction is :—

$$\alpha = \alpha_{\infty} + \frac{C_L}{\pi A}$$

whence $\dfrac{d\alpha}{dC_L} = \dfrac{d\alpha_{\infty}}{dC_L} + \dfrac{1}{\pi A}$ $\left\{\dfrac{d\alpha}{dC_L} = \dfrac{1}{\text{slope of left curve.}}\right\}$

where A = aspect ratio.

Now for two dimensional flow theory states that for a thin airfoil whose camber line is an arc of a circle the slope of the left curve is 2π (using radian measure),

i.e., $\dfrac{d\alpha_{\infty}}{dC_L} = \dfrac{1}{\pi}$ Hence the equation becomes

$$\frac{d\alpha}{dC_L} = \frac{1}{2\pi} + \frac{1}{\pi A} = \frac{1}{\pi}\left(\frac{A+2}{2A}\right)$$

Hence slope of lift curve, i.e., k, $= \dfrac{2\pi A}{2+A}$

and the first equation becomes :—

$$C_L = \frac{2\pi A}{2+A}\left(\alpha + \beta\right)$$

Or, expressing in degrees instead of radian measure :—

$$C_L = \frac{\cdot 104A}{2+A}\left(\alpha + \beta\right)$$

The value of β, the angle of no lift, depends primarily upon the shape of the centre line and the actual thickness is only of secondary importance. Thus, if the equation of the centre line is known, it is possible to calculate β, although the working involved is, in some cases, of a complex nature.

Take the simplest case, i.e., that of a symmetrical or so-called streamlined section. The centre line is obviously a line whose equation is y = o, i.e., β = o and this is confirmed in practice for the angle of no lift of a symmetrical section is 0 degrees.

The next case is when the centre line is a circular arc. β is now given simply by the equation

$$\beta = 2y$$

where y is the *camber* of the centre line, i.e., the ratio of the height of the maximum ordinate to the length of the centre line. *It should be carefully noted that the value of* β *given by this equation is measured from the geometric chord* and not the lower tangent chord.

Where the equation of the centre line is of any other form it is necessary to resort to integral calculus and space does not permit me to discuss this at length. The general equation is

$$\beta = \int_0 \frac{y\,dx}{\pi(1-x)\ (\sqrt{x(1-x)})} = \int_0 y.f_1(x)dx.$$

A further important factor is the calculation of the moment coefficient. Now for some reason or other the fact of considering the moment of the resultant aerodynamic force about the leading edge of an airfoil is regarded with something akin to awe, whereas it is actually quite simple and of great importance. The general formula for the moment about the leading edge is very similar to the familiar lift and drag formulæ and is :—

$$M = k_m c \rho S V^2$$

where c = chord length and k_m is the moment coefficient. This latter is frequently quoted in tables of airfoil characteristic data. An approximate formula connecting this with the familiar centre of pressure coefficient, i.e., C.P. position from L.E. divided by 100, is :—

$$k_{c.p.} = \frac{2\ k_m}{C_L}$$

Hence the C.P. position follows simply.

In general all values of k_m are negative since the moment about the leading edge is an anti-clockwise one (i.e., " diving "). In other words the C.P. is generally behind the leading edge.

The curve of k_m plotted against incidence or C_L is also, to all intent, a straight line of constant slope whose value is approximately —·24. The importance of the value of k_m at zero lift is at once realised and, calling this k_{m_0} :—

$$k_m = -\cdot 12C_L + k_{m_0}.$$

Now, km can be calculated in a similar manner to β and, like this latter quantity, is zero for a symmetrical section. For an airfoil whose centre line is a circular arc

$$k_{m_0} = -\frac{\pi}{2}y, \quad y = \text{camber as before.}$$

The general equation covering centre lines of any degree is

$$k_{m_0} = -\frac{\pi}{4}\beta + \mu_0$$

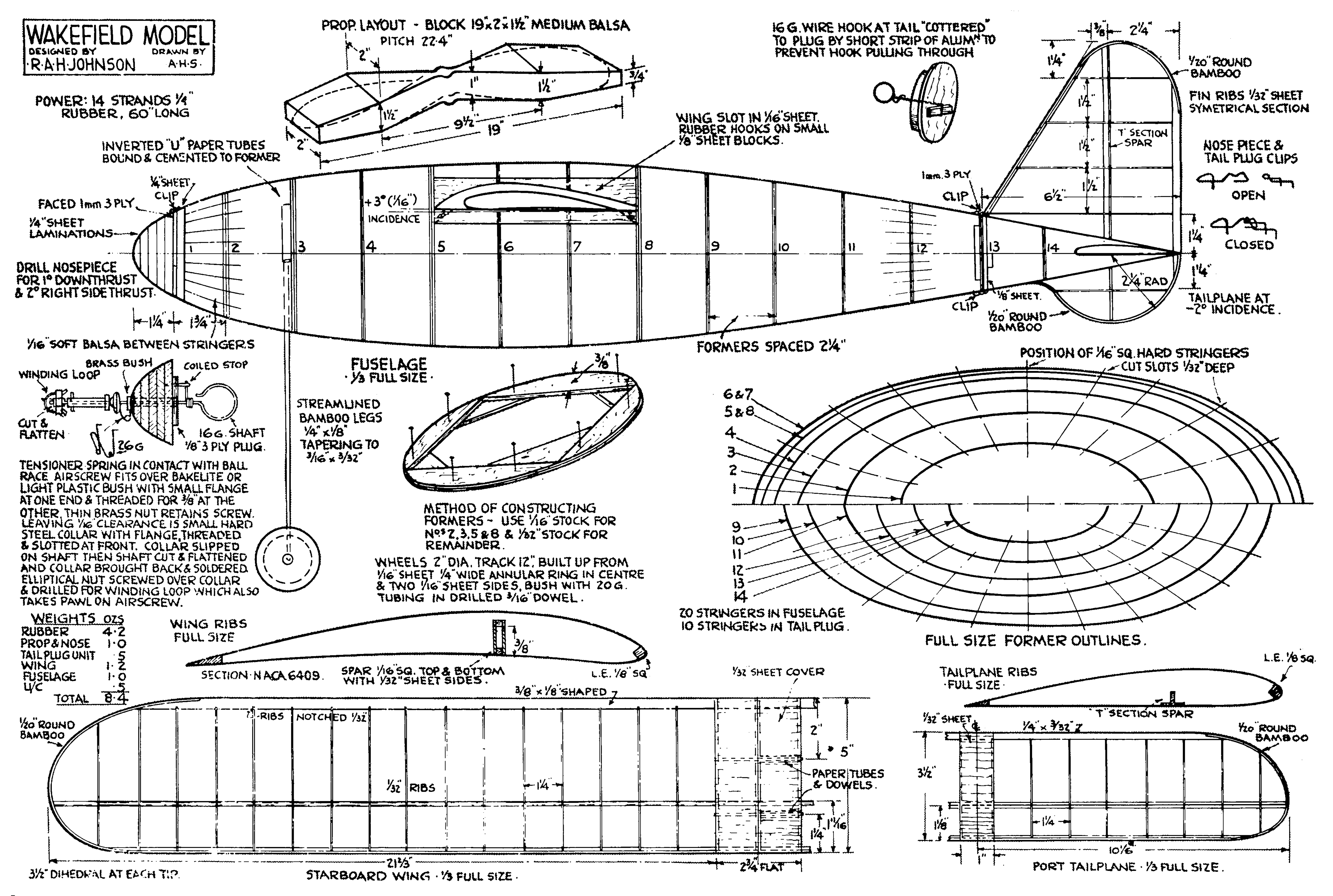
where $\mu_0 = -\displaystyle\int_0 \frac{y(1-2x)}{\sqrt{x(1-x)}}$, $dx = \displaystyle\int_0^1 y f(x).dx.$

Knowing k_{m_0}, km follows and hence the C.P. position can be calculated.

As a final note to this month's chat the profile drag of the majority of airfoils can be put in the form of an equation such as :—

$$C_{Dp} = a + b\ (C_L - d)^2.$$

where a, b and d are constants depending upon the profile ; but this is subject for a further article.


WAKEFIELD MODEL
DESIGNED BY R·A·H·JOHNSON
DRAWN BY A·H·S·
POWER: 14 STRANDS 1/4" RUBBER, 60" LONG
PROP. LAYOUT - BLOCK 19"x2"x1½" MEDIUM BALSA
PITCH 22·4"
2"
1"
1½"
3/4"
1½"
9½"
19"
2"
16 G. WIRE HOOK AT TAIL "COTTERED" TO PLUG BY SHORT STRIP OF ALUMN. TO PREVENT HOOK PULLING THROUGH
3/8"
2¼"
1¼"
1/20" ROUND BAMBOO
FIN RIBS 1/32" SHEET SYMETRICAL SECTION
1½"
"T" SECTION SPAR
1½"
1½"
6½"
NOSE PIECE & TAIL PLUG CLIPS
OPEN
CLOSED
1mm. 3 PLY
CLIP
1¼"
1¼"
2¼" RAD
TAILPLANE AT -2° INCIDENCE.
CLIP
1/8" SHEET.
1/20" ROUND BAMBOO
WING SLOT IN 1/16" SHEET. RUBBER HOOKS ON SMALL 1/8" SHEET BLOCKS.
INVERTED "U" PAPER TUBES BOUND & CEMENTED TO FORMER
1/4" SHEET CLIP
FACED 1mm 3 PLY
1/4" SHEET LAMINATIONS
+3° (1/16") INCIDENCE
1 2 3 4 5 6 7 8 9 10 11 12 13 14
DRILL NOSEPIECE FOR 1° DOWNTHRUST & 2° RIGHT SIDE THRUST.
1¼"
1¾"
1/16" SOFT BALSA BETWEEN STRINGERS
FORMERS SPACED 2¼"
FUSELAGE ·1/3 FULL SIZE·
BRASS BUSH
COILED STOP
WINDING LOOP
CUT & FLATTEN
26G
16G. SHAFT
1/8" 3 PLY PLUG.
STREAMLINED BAMBOO LEGS 1/4" x 1/8" TAPERING TO 3/16" x 3/32"
3/8"
TENSIONER SPRING IN CONTACT WITH BALL RACE. AIRSCREW FITS OVER BAKELITE OR LIGHT PLASTIC BUSH WITH SMALL FLANGE AT ONE END & THREADED FOR 3/8" AT THE OTHER. THIN BRASS NUT RETAINS SCREW. LEAVING 1/16" CLEARANCE IS SMALL HARD STEEL COLLAR WITH FLANGE, THREADED & SLOTTED AT FRONT. COLLAR SLIPPED ON SHAFT THEN SHAFT CUT & FLATTENED AND COLLAR BROUGHT BACK & SOLDERED. ELLIPTICAL NUT SCREWED OVER COLLAR & DRILLED FOR WINDING LOOP WHICH ALSO TAKES PAWL ON AIRSCREW.
METHOD OF CONSTRUCTING FORMERS - USE 1/16" STOCK FOR NOS 2, 3, 5 & 8 & 1/32" STOCK FOR REMAINDER.
WHEELS 2" DIA. TRACK 12", BUILT UP FROM 1/16" SHEET 1/4" WIDE ANNULAR RING IN CENTRE & TWO 1/16" SHEET SIDES, BUSH WITH 20G. TUBING IN DRILLED 3/16" DOWEL.
POSITION OF 1/16" SQ. HARD STRINGERS
CUT SLOTS 1/32" DEEP
6&7
5&8
4
3
2
1
9
10
11
12
13
14
20 STRINGERS IN FUSELAGE
10 STRINGERS IN TAIL PLUG.
FULL SIZE FORMER OUTLINES.
WEIGHTS OZS
RUBBER 4·2
PROP & NOSE 1·0
TAIL PLUG UNIT ·5
WING 1·2
FUSELAGE 1·0
U/C ·5
TOTAL 8·4
WING RIBS FULL SIZE
3/8"
SECTION N.A.C.A. 6409.
SPAR 1/16" SQ. TOP & BOTTOM WITH 1/32" SHEET SIDES.
L.E. 1/8" SQ.
1/32" SHEET COVER
3/8" x 1/8" SHAPED
1/20" ROUND BAMBOO
"T" RIBS NOTCHED 1/32"
2"
5"
1/32" RIBS
1¼
PAPER TUBES & DOWELS.
1¼"
1 11/16"
21⅓"
2¼" FLAT
3½" DIHEDRAL AT EACH TIP.
STARBOARD WING · 1/3 FULL SIZE ·
TAILPLANE RIBS ·FULL SIZE·
L.E. 1/8 SQ.
"T" SECTION SPAR
1/32" SHEET
1/4" x 3/32"
1/20" ROUND BAMBOO
3½"
1⅛"
1¼
10⅛"
1"
PORT TAILPLANE · 1/3 FULL SIZE.

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A WAKEFIELD MODEL By R. A. H. JOHNSON

IN this model the dihedral has been made 2 in. for each foot of half-span. This may appear to be too much, but the present loading requires more power than before, and more power in turn produces increased torque, which must be absorbed, in part at least, by the dihedral.

The airscrew is of the American type and is 19 in. diameter, a size which has proved its worth for some time in America, and is now becoming popular in England, especially in the North.

The power is not abnormal, but the energy conserved in the four ounces odd of rubber is expended in at least a sixty seconds' prop. run during which time the model has reached a height of about 350 feet, and is ready for a minimum glide of two minutes.

The model in general has very clean outlines, all surface curves being formed by the whole or part of ellipses.

As always, the fuselage is the first consideration. The outlines of the plan and elevation are symmetrical streamline sections, and the fuselage cross-section is a 2–1 ellipse throughout. The fact that the fuselage is symmetrical makes for a simple, light and, above all, structurally and aerodynamically efficient frame. The rubber tension is perfectly central, and no diagonal struts are required to retain the fuselage in the shape, say, of an aerofoil section. The fuselage is of a deep section primarily to regain some directional stability which appears to be lacking in most streamlined fuselage models.

The fuselage is built on the former and multi-stringer principle to retain as near as possible the elliptical cross-section. All formers except those near the wing, nose and tail-plug, are of medium 1/32 in. sheet, ⅜ in. wide.

The slots for the 1/16 in. sq. hard stringers are made 1/32 in. deep to retain a smooth covering surface. The fuselage is assembled either on a jig or by the half-shell method. The number of stringers at the tail is reduced to keep the tail light, and the elevator and fin are cemented in position to make the plug and empeurage a solid unit. The 16-gauge rubber hook at the tail is "cottered" to the plug former by a short strip of aluminium to prevent the hook pulling through, as shown in figure 2.

The slot for the wing is strengthened by medium 1/16 in. sheet and the rubber hooks are cemented to small ⅛ in. sheet blocks. The fuselage round the nose and tail plug is strengthened for handling by letting in pieces of 1/16 in. soft sheet between the stringers.

The low aspect-ratio of about nine is used in the wing to retain the effectiveness of the aerofoil as far as possible, smaller sections than 3 in. chord being only as efficient as a flat plate at velocities greater than 10 m.p.h.

The ribs are slotted 1/32 in. into the shaped trailing edge, and a sharp leading edge is obtained by the use of a sanded ⅛ in. sq. spare on edge.

The centre spar is an important feature, being a box-section ⅜ in. deep, which is slotted into the ribs to eliminate contact with the covering.

The fin is of conventional design, and symmetrical in section; the portion below the fuselage also acts as a tail-skid. Small section spars are used to keep the weight down to a minimum, as is also the case with the elevator. The elevator is of Clark Y-section set at about —2° incidence.

The spars of the tail surfaces are medium ⅛ in. sq. for the leading edges, T-section for the centre spars and reduced trailing edge section for the trailing edges.

When complete, the tail-plug assembly should not weigh more than ½ *oz.* The undercarriage is very light in construction, since it incorporates metal only at the wheels. Tapered bamboo legs of streamline section plug into a paper-tube bent into an inverted U and cemented and bound to the fuselage former. The tube is formed on a section identical with that of the legs and protrudes a short distance from the fuselage. Care is taken to ensure that the motor has plenty of play and does not touch the tubing in any place.

The wheels are constructed from three pieces of 1/16 in. medium sheet, the centre piece being an annular ring ¼ in. wide; these pieces are cemented together with the adjacent grains at 60°. For the bushing, 3/16 in. dowel is drilled through its centre and 20-g. tubing is forced into the hole and cemented. This "sandwich" is then cut into ¼ in. lengths and cemented through the wheels. A very strong bushing is then obtained with very little weight.

The nose-piece is shown on the plan; the actual plug being of ⅛ in. 3-ply and elliptical in shape.

The shaft is of 16-g. steel wire (spring); the hook is formed in the usual way and a small tensioner sprag is fitted. The tensioner catch is a decapitated brass screw, which may be screwed in or out of the plug to adjust the tensioning device.

The nose-piece proper carries a brass bush and is faced in front with 1/16 in. 3-ply, which acts as a solid base for the bush flange and the tensioner spring.

Forward of the bush is a device which up to the present has proved fool-proof.

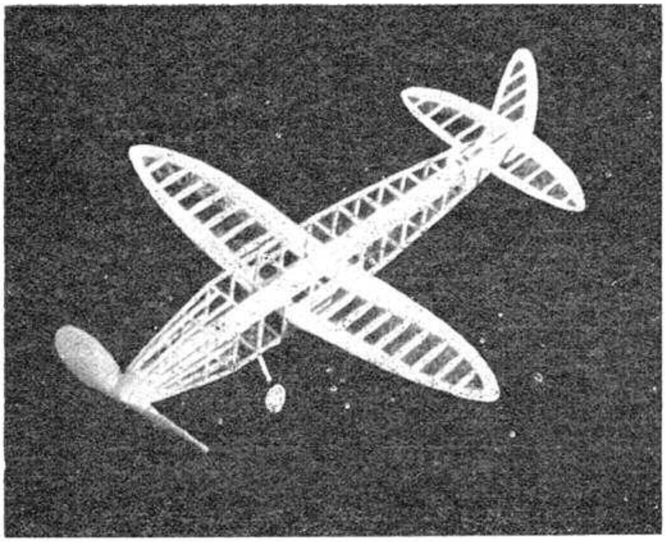
The tensioner spring is of a "mousetrap" shape, which allows for its removal and adjustment. This is in contact with an American ball-bearing thrust washer which takes the thrust of a soldered cup-washer. Forward of this is a bush about 1¼ in. long and 7/32 in. diameter with a small flange at one end and threaded for ⅜ in. at the other. This bush is of bakelite or some other light plastic, and it is over this that the airscrew is fitted to bear against the flange. A thin brass nut retains the screw in position. Leaving a clearance of 1/16 in. is a small hard steel collar which is threaded and slotted at the front and which has a small flange also. This collar is slipped on the shaft, the shaft is cut and flattened, and the collar is brought back and soldered. The collar is then "keyed" on.

Over this collar is screwed a nut of elliptical shape, which is drilled for the wire attachment shown for winding. The wire loop also incorporates the loops for the pawl on the airscrew.

The airscrew is of typical American design and shape. It is carved from a block 19 in. × 2 in. × 1½ in. of medium balsa.

The cut-away at the boss is performed after the carving of the concave surface in order to retain the true pitch angles. The blades are finished with the American "scoop" effect, the section being similar to N.A.C.A. 6409, and the tips are kept well-rounded. The pawl is of 20-g. wire turning on a thin brass screw which passes through a small piece of aluminium sheet cemented to the blade, and into the blade.

REDUCED SCALE WORKING DRAWINGS ON PAGES 354 and 355.



THE TRAVELAIRE SPEEDSTER

By R. A. BROWN

THE model described in this article was built with one object in view: namely, to try and prove that it is not necessary to have a high wing loading in order to obtain speed. The Travelaire Speedster has a wing loading of only 6·33 oz./sq. ft. and yet to the surprise of all present at Hurlingham it repeatedly covered the 150 ft. course at speeds of 30 m.p.h. The beauty of this design is that torque trouble seems to be quite small, and wash-in on the anti-torque wing appears to be the best way to counteract it. Also, no trouble was experienced in keeping the 'plane on its course, a dead straight flight being obtained each time. Admittedly, 30 m.p.h. is not a great speed, but it is a commendable beginning for light models in this country, and the writer is quite confident that a development of this design will reach speeds equal to those attained by our American friends.

Construction.

The model is built on ordinary lightweight principles, and if the drawings are followed accurately there should be no difficulty in the construction.

Fuselage and Undercarriage.

The fuselage is made of 1/8 in. sq. balsa longerons and cross pieces and both sides should be constructed together to ensure a neat square finish. It will be noticed that a round nose has been used to cut down drag, and this is made by cementing a round former of 1/16 in. thick birch on the front of the body and adding auxiliary stringers of 1/8 in. sq. balsa. The turtlebacks over which the stringers pass are cut from medium hard 1/16 in. stock. Their size and shape can easily be obtained by first referring to the side and then the plan view. The wing is housed through pieces of 1/8 in. medium hard balsa, and the receiving slots should be cut to the same size as the wing section to obtain a tight fit.

Likewise, the same applies to the stabilizer housing. The undercarriage, which is bent from 16 s.w.g. wire, can now be cemented into position, and must be securely braced as shown, with sheet balsa of 1/8 in. medium stock. It will be noticed that the rubber motor runs through a balsa tube, made from 1/32 in. veneer. This is covered with paper and doped to stop splitting, and is cemented into position before the addition of the round front former. This prevents lubricant from the motor spoiling the covering.

Fin, Stabilizer and Wing.

Little need be said about the fin construction as all dimensions, etc., are clearly shown on the drawing. The wood used should be of medium soft balsa, and the section is quite flat. It will be seen that all airfoils have their ribs let in 1/16 in. in the leading and trailing edges. The stabilizer and wing are two-third ellipses and feature wide spars, giving plenty of strength: a good point in speed models. The section used on the wing is shown on the side elevation of the fuselage, and can be easily scaled up to full size. When forming the dihedral on the wing it will be found much easier to actually cut a V out of the leading and trailing edges instead of just cracking the spars to give the required angle. A liberal amount of cement should be used on these joints, and the tip of the wing can be propped up to the required 1½ in. When thoroughly dry, added strength can be obtained by placing a cement film over all four joints. It should be remembered that the wings of speed models are subject to excessive damage if contact is made with any solid object, and with this in mind it is worth while to select a really hard piece of balsa for the leading edge.

Nose-piece and Propeller.

The nose-piece must be made from hard balsa and, before cementing the four pieces of 1/8 in. sheet together, it is advisable to place a cement film over each one and allow them to thoroughly dry.. They can now be cemented together, forming a very solid block. A screwed bush is used to take the propeller shaft and should be set for a thrust line of 2° right offset and 1° down. A piece of 3/16 in. thick hard balsa can be cemented to the back of the nose block, having cut it, for a firm fit in the front former. The propeller should not be difficult to carve as it is from hard balsa. The writer found it best to have a fixed propeller, as this slowed the model as soon as the power ran out.

Assembling.

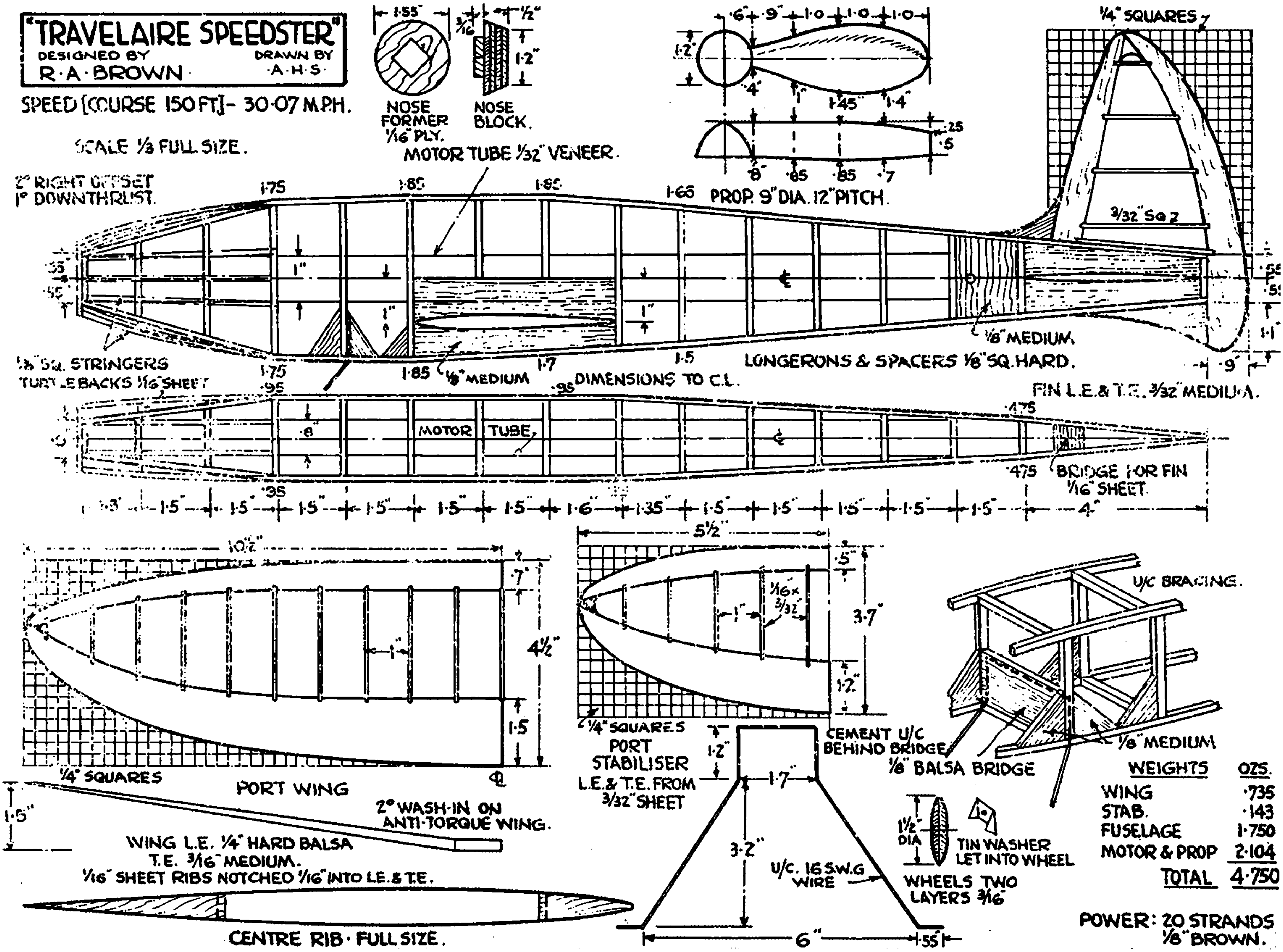
Make up a motor of 20 strands of 1/8 in. brown rubber and secure each end with a few loops of string. The motor should just span the distance between the propeller shaft and the rear bamboo peg, and the string stops the rubber from climbing right up the shaft. The propeller shaft should have a small loop bent in the end as shown. This permits of stretch-winding the rubber. A Jasco ball race works well in getting smooth running and should definitely be used in preference to ordinary washers. Make sure that the model lines up well and that there is a resultant incidence of 0° between the stabilizer and wing. As before stated, the model should be given wash-in on the anti-torque wing to the extent of 2°.

Flying.

Keep on increasing the turns of the motor until the model just gets off the ground. If the 'plane won't unstick try adding a little incidence to the wing. Any variation from a straight flight can be corrected by thrust adjustments. It is best to give the ship a hard push when making flights, as a fast start brings the corrective wash-in into opposing propeller torque straight away, just when it is most needed.

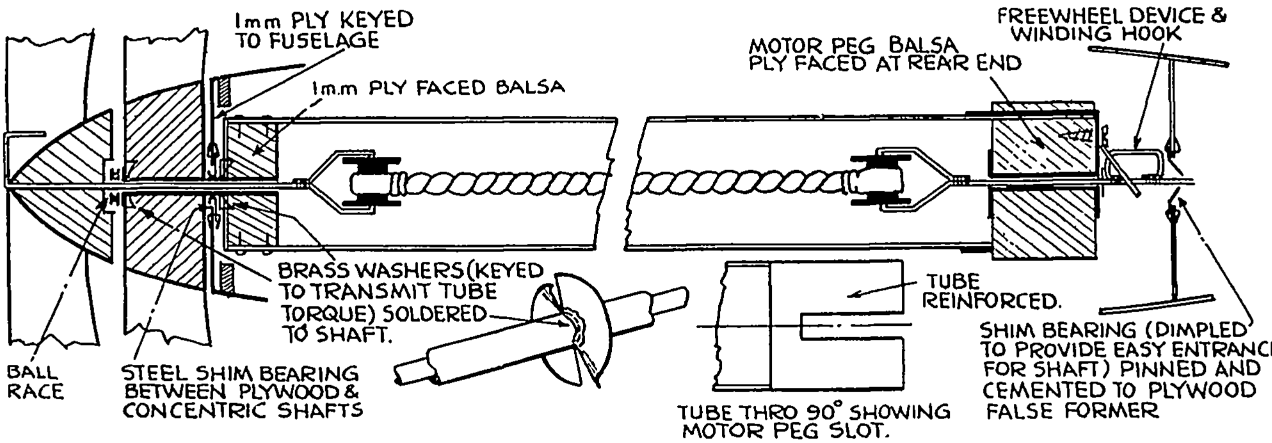
Unfortunately, the original model was very under-powered during the contest and covered more than twice the required distance. Bringing the power up to 30 strands should greatly increase the speed, in fact power might be added until the motor run just sees the model over the course.

The Travelaire Speedster flies about 18 in. above the ground.



"TRAVELAIRE SPEEDSTER"
DESIGNED BY R·A·BROWN
DRAWN BY A·H·S
SPEED [COURSE 150 FT] - 30·07 M.P.H.
SCALE 1/3 FULL SIZE.
NOSE FORMER 1/16" PLY.
NOSE BLOCK.
MOTOR TUBE 1/32" VENEER.
PROP. 9" DIA. 12" PITCH.
1/4" SQUARES
3/32" SQ.
2° RIGHT OFFSET
1° DOWNTHRUST.
1/8" MEDIUM.
LONGERONS & SPACERS 1/8" SQ. HARD.
1/8" SQ. STRINGERS
TURTLE BACKS 1/16" SHEET
1/8" MEDIUM
DIMENSIONS TO C.L.
FIN L.E. & T.E. 3/32" MEDIUM.
MOTOR TUBE
BRIDGE FOR FIN 1/16" SHEET.
PORT WING
1/4" SQUARES
2° WASH-IN ON ANTI-TORQUE WING.
WING L.E. 1/4" HARD BALSA
T.E. 3/16" MEDIUM.
1/16" SHEET RIBS NOTCHED 1/16" INTO L.E. & T.E.
CENTRE RIB · FULL SIZE.
1/4" SQUARES
PORT STABILISER
L.E. & T.E. FROM 3/32" SHEET
CEMENT U/C BEHIND BRIDGE
1/8" BALSA BRIDGE
U/C. 16 S.W.G. WIRE
U/C BRACING.
1/8" MEDIUM
TIN WASHER LET INTO WHEEL
WHEELS TWO LAYERS 3/16"
1 1/2" DIA
WEIGHTS OZS.
WING ·735
STAB. ·143
FUSELAGE 1·750
MOTOR & PROP 2·104
TOTAL 4·750
POWER: 20 STRANDS 1/8" BROWN.

CONTRA PROPS WITHOUT GEARS by E. C. PREECE & E. G. PLANAS



THE application of counter-revolution twin airscrews to model aircraft seems to have awakened a small amount of popular interest of late, and the time seems ripe for a little informal treatise on the subject and the introduction of a practical advance in the simplification of such models.

When one considers the tremendous advantages of this method of propulsion when used with full-scale aircraft and the fact that these advantages are even greater in modelling scale it seems strange that so very little has been done in this interesting field.

The first conclusion to be drawn from this state of affairs is that most of us do not fully realise the fact that the flight of our models will be benefitted by this system to an extent which goes far beyond anything obtainable by the use of fantastic airfoil sections, retractable under-carts, incredibly plaited motor skeins, or even the results dreamed of in the most soaring flights of imagination by the most besotted " end plate " enthusiast. In this connection, one has but to cast one's mind back to the last club rally when those beautiful little models did things so very nicely when given a hundred turns on the rubber, but which, when subjected to the unfair treatment of 75 per cent. full power, behaved more after the fashion of bewitched and slightly epileptic bats. One thinks also of the unmanly shifts and distortions adopted to correct this state of affairs ; down-thrust, side-thrust, any but the most efficient thrust ; wingwarp, nose weight, tail weight, sliding weight, offset fin, lifting section fin, and any other kind of despairing expedient. Any and all of these to mollify this horrid monster of torque that dashes our models to the ground, flies them in vertical ellipses and even finally tangles them up in our own trousers. Any expedient is used, that is, other than the obvious remedy of re-designing the model to eliminate this distressing torque reaction at its source.

The only other conclusion to be drawn from this reluctance is that the difficulty of construction of such models is so great that, whilst one fully appreciates the blessings of " no torque," the imagination boggles at this nightmare of gear-boxes and motors and returns willy-nilly to the prescription of desperate remedies for the suicidal tendencies evinced by our latest " Wakefield."

How then to obtain this end without the multiplicity of bits considered hitherto to be inseparable from it ?

Design along the usual lines indicated the use of gear-box and two rubber motors. Weight was thereby enormously increased as was also the risk of failure due to the complication of the power mechanism generally. Again, the construction of the necessary gear-box within reasonable limits of dimension and weight and at the same time of sound workmanship was usually beyond the powers of the average model builder.

In passing it may be noted that this " average model builder " in the case where he has flogged up sufficient enthusiasm and has that optimistic nature which is willing to try anything once, essays the construction of the motor mechanism (the term " lash-up " would occur to the uncharitable) usually with results that fall into one or more of the following classes :—

(1) A gear-box of such ponderous weight as to ruin all chances of climbing flight and of such unbridled dimensions as to make any possibility of streamlining appear preposterous.

(2) A gear-box of reasonable dimensions and weight but of such fantastically flimsy construction and/or indifferent workmanship that ultimate breakdown of a spectacular nature during winding or whilst in flight is a virtual certainty.

(3) A gear-box of a design and construction such as to introduce friction of an order which makes any rotation at all a matter of wonder and the absorbsion of 33⅓ per cent. of the available power an under-estimate.

(4) Twin airscrews which, due to the practical impossibility of utilising the folding principle and the difficulty of free-wheeling, produce in the free glide a drag roughly equivalent to that of a row of venetian blinds.

(5) A resultant fuselage shape which, even with the addition of tortuously contrived spinners, has an entry not much better than that of a London bus, and due to twin rubber motors, of a section that appears to fall into neither the streamlined nor the slab-sided class. As the motors cannot be wound from the front the empennage is made detachable, a function which it usually fulfils immediately after launching.

It should be admitted at this point, in all humility, that the writers have themselves obtained ALL of the results (1) to (5). That was in the days before their epoch-making discovery, and the memory of them still, on occasion, brings them from a troubled sleep, bedewed with clammy sweat and with a prayer on their lips!

The sketch is self-explanatory of the proposed application. In broad outline, the rubber motor is housed in a motor tube, the front airscrew being driven in the normal way from the impulse of the front end of the skein. The tube is so arranged that it is free to rotate in the fuselage and the rear screw being, in effect, solid with the motor tube, the impulse from the rear end of the skein is transmitted by the tube to the rear airscrew and thus rotates it in opposition to the front one. If the bearings to the tube and those at the shaft are made with reasonable care the impulse to the two screws should be equal and the loss by friction no greater than that in any normal arrangement. The motor tube can be constructed from paper wound on a broom handle with casein cement; two layers of light drawing paper will give all the necessary strength and will be of moderate weight.

It may here be pointed out, as a matter of interest, that the whole arrangement is a good practical demonstration of the principles involved in all problems concerning counter-rotation of airscrews from a single shaft engine. There has been some discussion around the question of torque reaction in these cases in the correspondence columns of a national aeronautical weekly recently. The contrivance now under review does quite clearly show how torque reaction to the aircraft is virtually eliminated; i.e., it can be seen that the opposition of rotation is actually produced by the torque reaction of the motor and the reaction is thus absorbed. A little consideration will confirm that this is so in any counter-rotation device operated from a single shaft engine. Though this " aside " is introduced apologetically it might be said that the subject should be a useful one for the study by modeller members of the Air Training Corps. In all probability, we shall be blessed by the hard-worked instructors of this organisation for the suggestion.

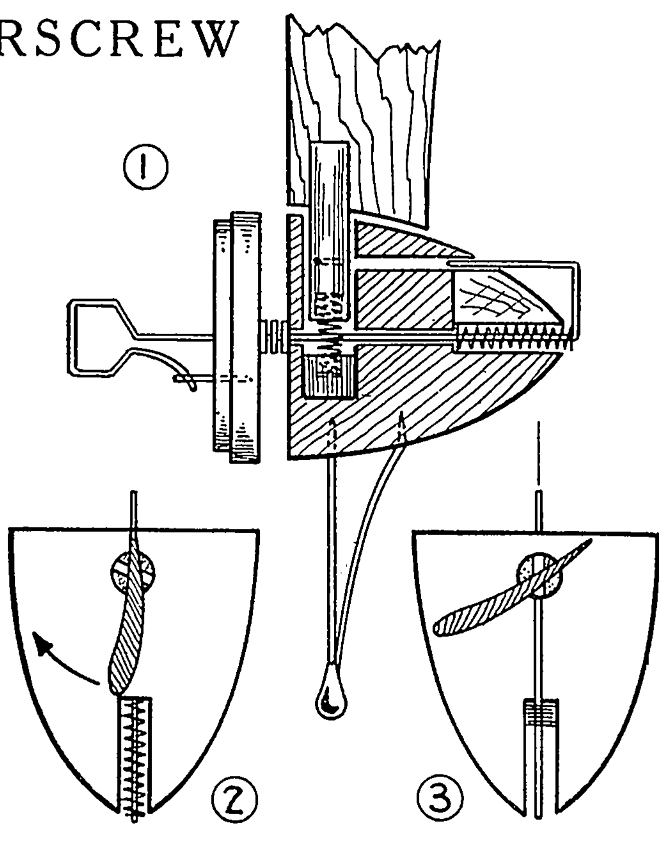
To revert to the subject of this article, it is claimed that the mechanism described will eliminate a good deal of the difficulties of design and of construction in such applications. The gear-box is superseded and with this goes half the headache in these designs. It is possible to arrive at a fuselage shape which will be symmetrical about its longitudinal axis so making a good streamlined form fairly easy of attainment. The whole power unit is readily detachable from the fuselage, winding being thereby facilitated, and though the power unit, as a whole, may be said to be on the heavy side, this objection is partly offset by the light fuselage construction made possible by the removal of all motor stresses. It should be possible in practice, to construct a model on these lines little heavier than one of the conventional single screw type, and, in any case, much less heavy than any other known " contra-prop " method.

Free-wheeling of the airscrews can be obtained by the incorporation of a single free-wheel device of any usual type at the rear end of the motor tube. One airscrew will then carry round the motor tube and the other the rubber motor, but the load of these should be small and the added drag from this source negligible.

A FEATHERING AIRSCREW

by P. O'KEEFE

The single blade is fitted on a dowel rod, which turns freely in a hole in the propeller boss (see Fig. 1). To the bottom of this rod is attached a light spring, the lower end of which is pushed into a little plastic wood at the bottom of the hole and left to set with blade running fore and aft along the boss, as in Fig. 2. Drill a hole in the front of the boss, as seen in Fig. 1, and drop a spring in it. Now turn the blade to the angle you desire it to fly at, hold it there firmly, and drill a small hole into the boss at right-angles to the dowel, and continue drilling into the dowel for a short distance. Slice away the wood between this hole and the centre one. The hook is shaped, as shown, and the shaft passed through the boss, between the coils of the dowel spring, passes through the larger spring, and is shaped as shown, the end sliding in the small hole. The shaft is pushed in at the front until the hook clears the stop, and the propeller wound. As the shaft is drawn in towards the dowel rod twist the blade to its flying position and continue winding until the end of the shaft enters the hole in the dowel. This holds the blade in the correct position during flight, but directly the power dies out the large spring forces the shaft out of the dowel, at which the blade jumps back to its former position, turned by the smaller spring.



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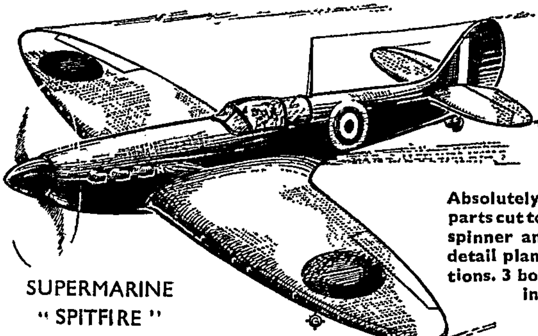

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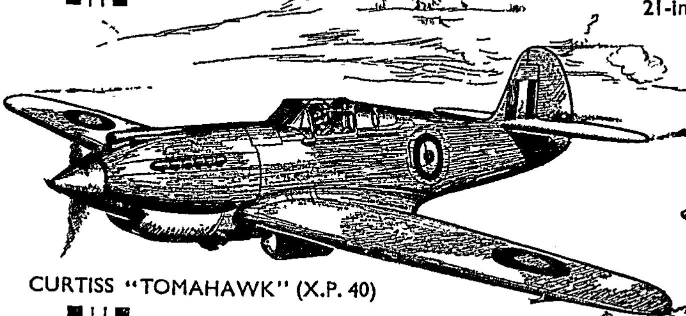

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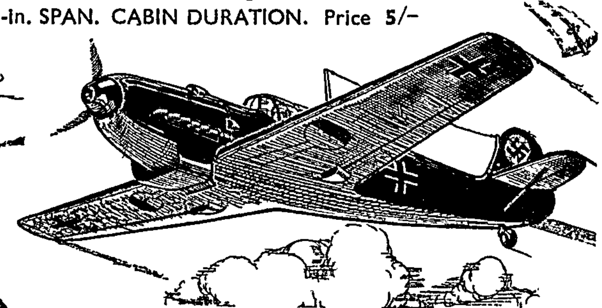

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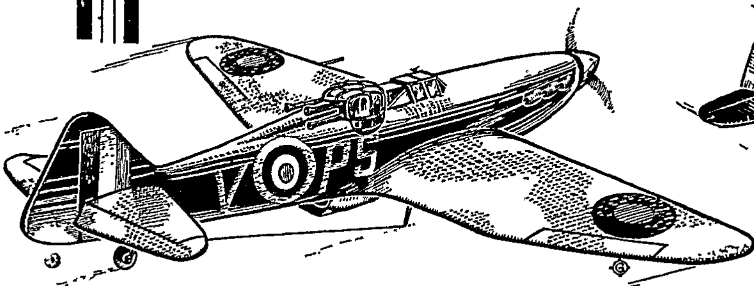

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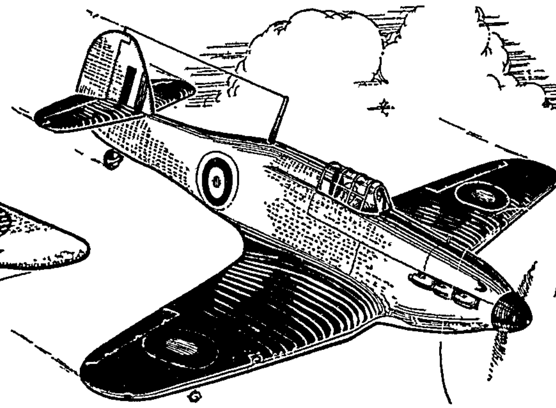

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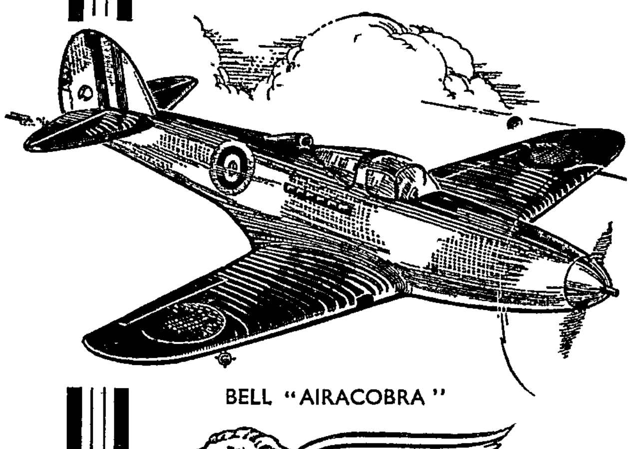

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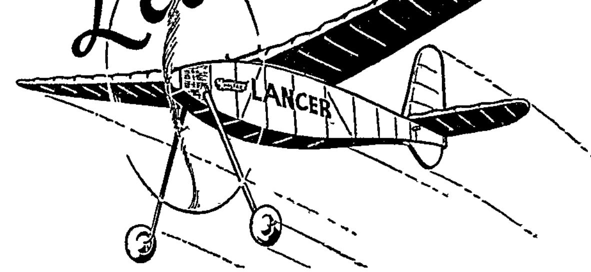

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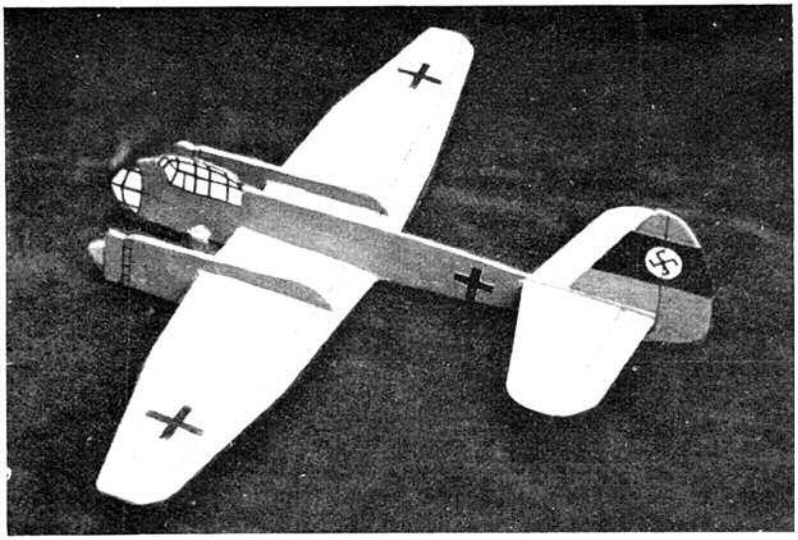


SILHOUETTE GLIDERS

By W. J. KAY

A novel type of flying scale model which is both easy to build and extremely instructive. It will appeal to the young aeromodeller as a realistic flying model and to the older followers on account of its obvious recognition possibilities.

FULL SIZE PLANS OF THE "ENSIGN" AND J.U.88 GLIDERS are given on the following pages.

THE JUNKERS Ju.88 SILHOUETTE GLIDER

Fuselage.

The shape of the fuselage is traced on to a sheet of hard balsa, $\frac{1}{8}$ in. thick. Slots are carefully cut in to accommodate the wings and elevator. Next, the fuselage is rounded as shown in the section drawing. The cabin may be indicated by drawing the outline in indian ink on silver paper. The rudder is cut out separate and streamlined with fine sandpaper. It is glued in position after the stabilizer.

Wings.

These are cut in one piece by tracing the outline and turning over to form the right panel. The leading edge is then rounded and the trailing edge tapered. The leading edge is also cambered by steaming and carefully bending. The dihedral is made by placing a weight on one panel and a block, $1\frac{1}{8}$ in. high, under the other.

Engines.

These are cut from $\frac{1}{8}$ in. sheet and slotted to fit over the wings. They are then rounded like the fuselage.

Stabilizer.

This is cut to shape from 1/16 in. hard balsa and lightly sandpapered.

THE "ENSIGN" SILHOUETTE GLIDER

Fuselage.

This is cut to the outline shape from a sheet of medium hard $\frac{1}{8}$ in. sheet balsa, with the aid of a razor blade. The edges are rounded with sandpaper, and the slots cut for the wing and tail units. The catapult hook is cut from a block of $\frac{1}{2}$ in. soft pine, and slotted to fit on to the fuselage. It is then firmly cemented in place.

Wing.

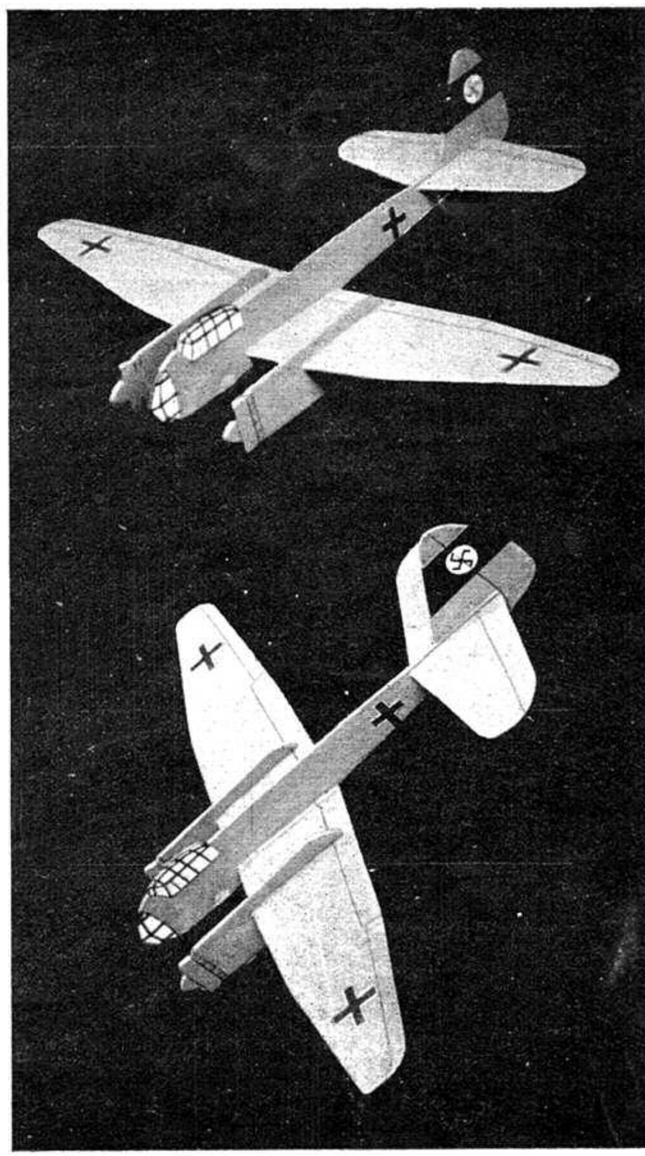
A sheet of $\frac{1}{8}$ in. medium hard balsa is required for this. It is of one piece, cut to outline, and sanded to a streamline section. Then by careful steaming and bending it is given $1\frac{1}{8}$ in. dihedral under each tip. The wing is then slipped into the slot in the fuselage, and the underside bent to the right camber, and cemented.

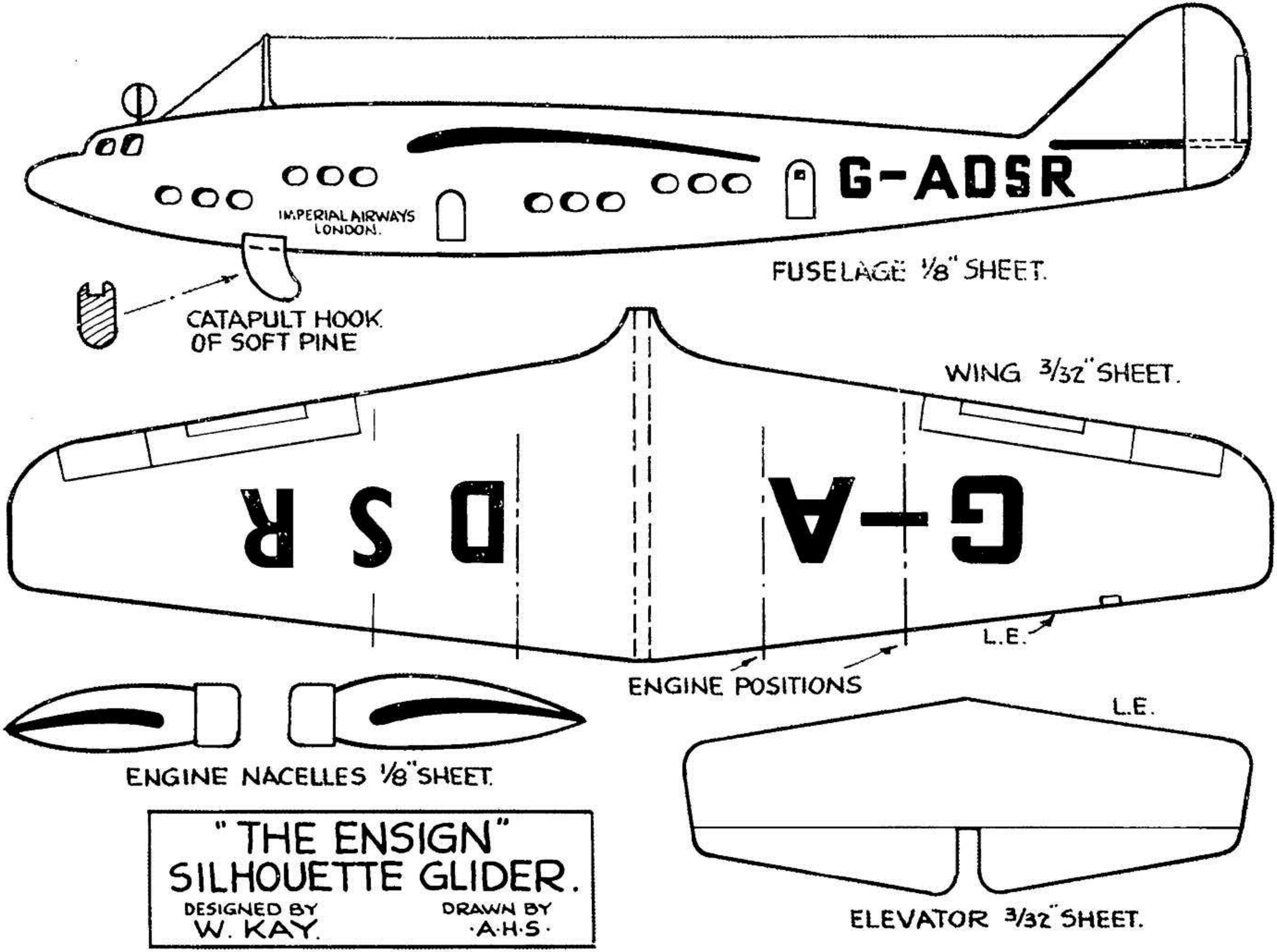
Engine Nacelles.

These are cut to outline from $\frac{1}{8}$ in. sheet, and firmly cemented to the wing.

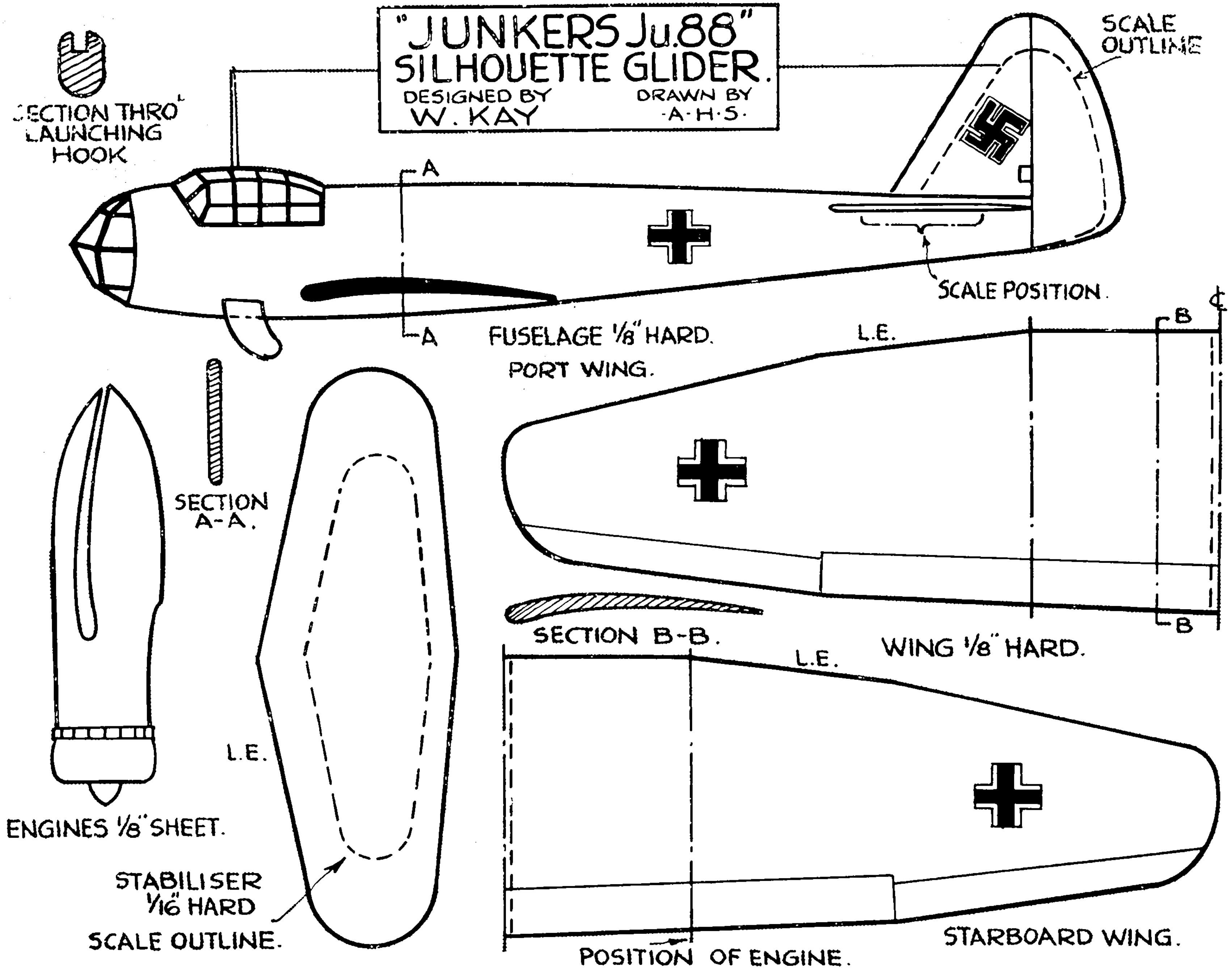
Elevator.

Like the wing, this is constructed of 3/32 in. sheet, and cemented in place to line up with the wing.





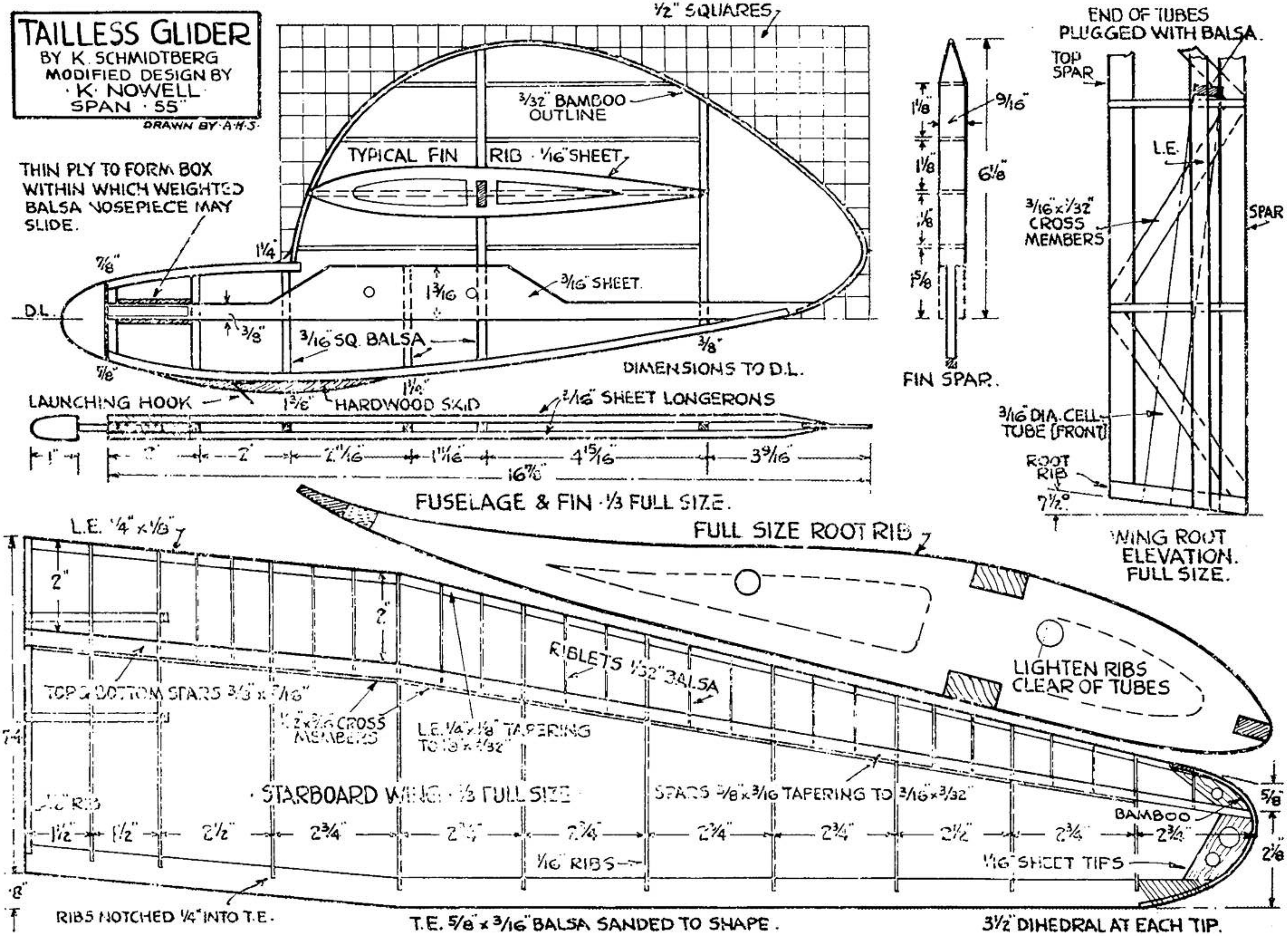
"THE ENSIGN"
SILHOUETTE GLIDER.
DESIGNED BY W. KAY. DRAWN BY ·A·H·S·

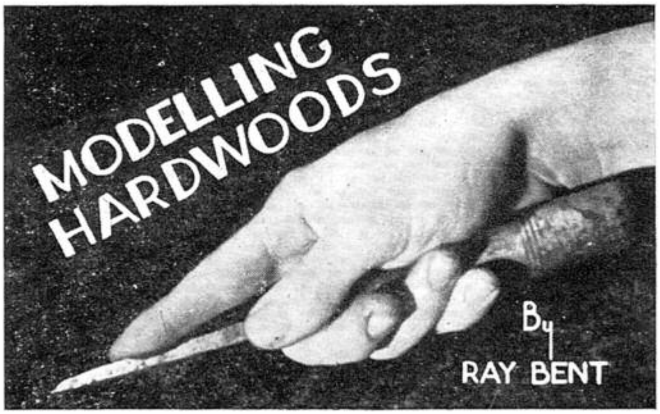

"JUNKERS Ju.88"
SILHOUETTE GLIDER.
DESIGNED BY
W. KAY
DRAWN BY
·A·H·S·
SECTION THRO' LAUNCHING HOOK
SCALE OUTLINE
SCALE POSITION.
A
A
FUSELAGE 1/8" HARD.
PORT WING.
L.E.
B
B
SECTION A-A.
SECTION B-B.
WING 1/8" HARD.
L.E.
L.E.
ENGINES 1/8" SHEET.
STABILISER 1/16" HARD
SCALE OUTLINE.
STARBOARD WING.
POSITION OF ENGINE.

TAILLESS GLIDER

BY K. SCHMIDTBERG
MODIFIED DESIGN BY
K. NOWELL
SPAN 55"

DRAWN BY A.H.S.





The shortage of balsa wood is becoming so acute that even manufacturers have switched over to producing kits in hard woods. Many modellers, however, particularly the not-so-experienced, seem to find considerable difficulty in working with hard woods such as obeche, white pine and American whitewood. This need not be so if you change your methods for, after all, you can hardly expect a razor blade to carve mahogany with the same ease that it slides through balsa.

Modelling in hard woods offers considerable scope if you use the right tools, finished models, besides having a much better appearance, are more durable. You will also economise on dope by using hard wood because it is not so absorbent as balsa. The latter is to be preferred in the construction of tail units and fairings only, where its flexibility allows more liberty to be taken.

You can probably find all the wood you need in your own home. When turning out the box-room in search of salvage, put those old pieces of wood on one side. Provided you have a set of aircraft model plans, you can build your models entirely from scrap wood and thus reduce your costs by more than half. My own preference, however, is for mahogany if it can be obtained.

The tools I use myself may serve as a useful guide when you turn your hand to the hard woods. First you will need a good chisel which *must* be kept well-sharpened. A ½-inch serves for most purpose although a ¼-inch will prove useful for finer details. Most of the cutting is done with the chisels but a razor blade can still be usefully employed in shaping exhaust ports and other small features and is also to be preferred for "marking in" the control surfaces, i.e., flaps, ailerons and rudder.

A small tenon saw is needed for "roughing out" your working blocks of the fuselage and main planes and will also save you time if used for cutting away large pieces of surplus wood. Plastic wood is also a necessary item in your equipment. If your fingers begin to get sticky when using it just dip them in clear dope. For drilling small holes I use a jeweller's chuck but a hot needle serves the purpose quite satisfactorily. You cannot hope to finish off your models decently without some good glasspaper. The three grades for which you will find most use are: Middle 2 (Coarse), Fine 2 (Medium Grade) and Flour (Very Fine).

Even if equipped with all the above-mentioned tools you will be ill-advised to tackle too ambitious a model at your first attempt. Choose something simple so that, if anything goes amiss, your disappointment will not be as great. A suitable model for your first attempt is a low wing single-engined monoplane such as the faithful Hurricane. Assuming that you choose such a type, here is perhaps the best way to set about it :—

The first task is to cut out your working blocks. Having worked out the actual measurement of the aircraft to the scale that you intend to use (1/72 is most suitable if the model is for your own interest) you will have to cut out the following five blocks with the tenon saw :—(*a*) Fuselage, (*b*) Two main planes, (*c*) Tail plane and (*d*) Rudder. Cut these in the form of regular-shaped blocks, making their various dimensions equal to the size of the largest individual section of the particular part.

The time spent on fashioning wheels and airscrews is rarely worth while. You will do better to buy these ready-made together with some transfer markings and dope.

When you have cut your blocks to size, you can then concentrate on taking each part one stage further. Trace out the side view of the fuselage on the appropriate block and cut away the majority of the surplus wood with the tenon saw. This will save considerable time and if done correctly should leave about 1/16 inch to be chiselled off.

The wood should be held firmly well between the thumb and forefinger so as to leave as much as possible of the wood clear of the hand and the chisel is grasped in the other hand at the point where the blade meets the handle. If you steady the blade by placing your thumb along its side and the index finger on top, about one inch from the cutting edge, as in the photograph, you will have perfect control over it.

Holding the fuselage block close to the body you can chisel away your fuselage shape quite easily, but do take care to work the chisel away from the body and on the part of the wood well above your hand. You will find it easier too if you chisel in the direction of the slopes as in Fig. 1.

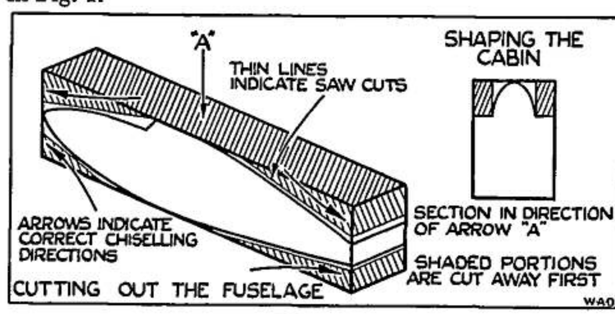


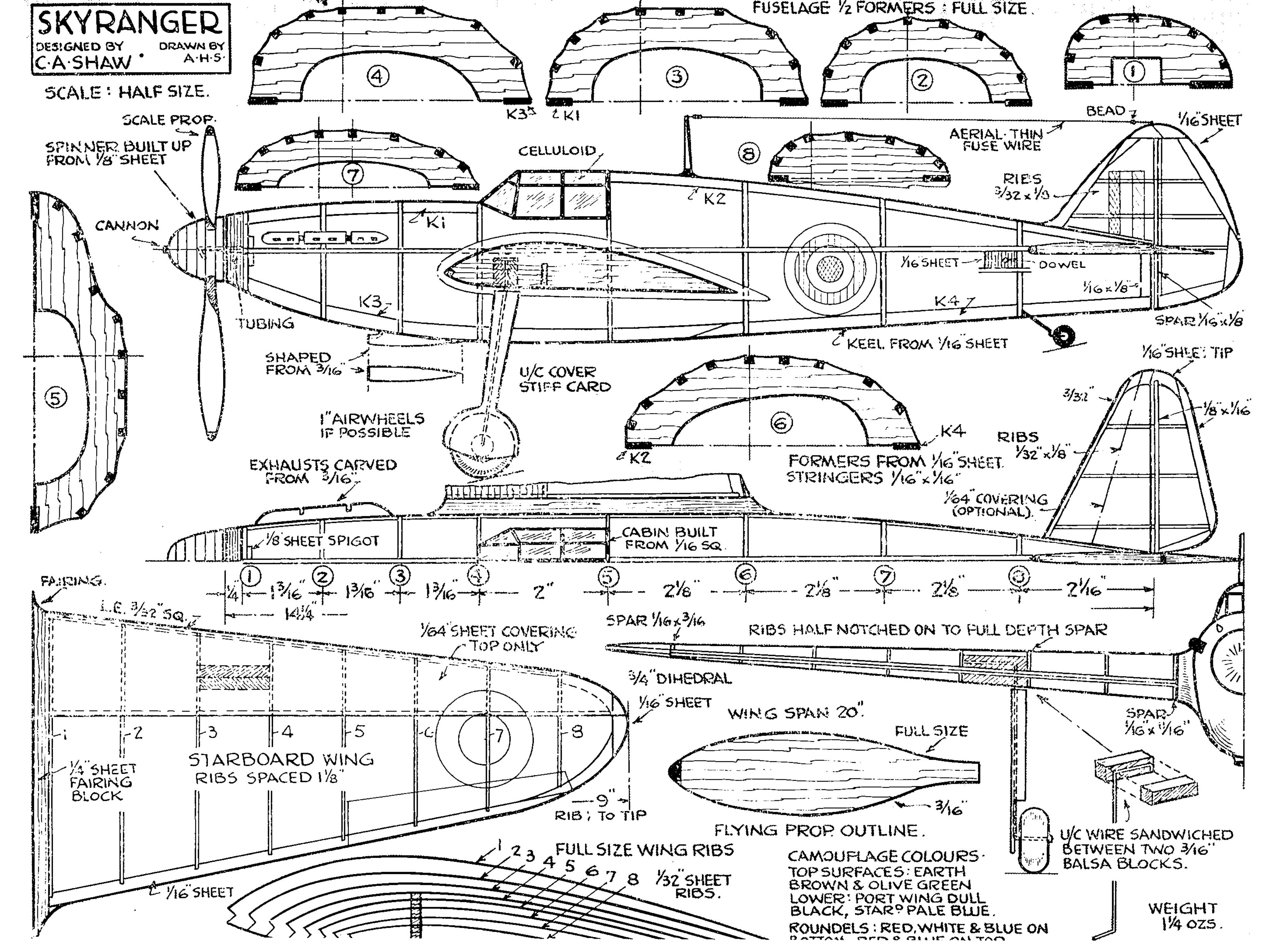
Fig. 1

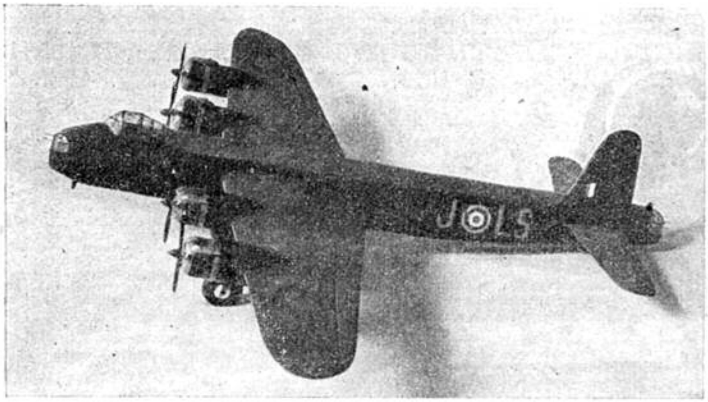
Having shaped your fuselage correctly from the side view you should then sketch the plan shape accurately on the top of the block.

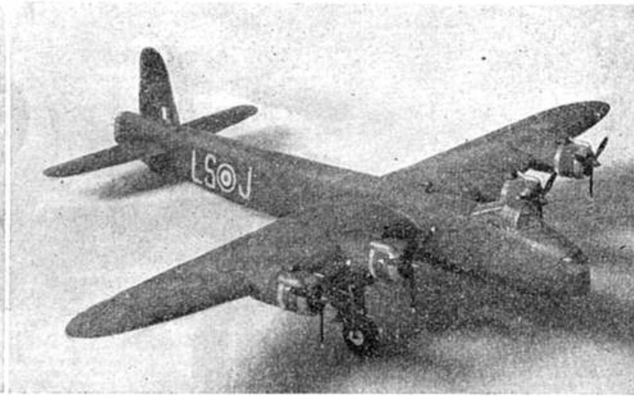
Now chisel downwards along the cabin sides, leaving a rectangular piece whose breadth is that of the widest part of the cabin, as shown in diagram 2.

The rounded shape of the cabin can then be dealt with more easily and by gently paring off the remaining surplus you will soon have completed your fuselage in the rough.

Try to visualise each stage of the construction in advance. This may save you making errors and in this connection rough diagrams can also be of great assistance. Above all, don't try to hurry just for the pleasure of seeing the finished model. Gazing at slipshod work will only make you realise that you would have done better had you taken your time.


SKYRANGER
DESIGNED BY C·A·SHAW
DRAWN BY A·H·S·
SCALE: HALF SIZE.
FUSELAGE ½ FORMERS: FULL SIZE.
SCALE PROP.
SPINNER BUILT UP FROM 1/8" SHEET
CANNON
TUBING
CELLULOID
K1
K2
K3
K4
BEAD
1/16" SHEET
AERIAL: THIN FUSE WIRE
RIBS 3/32 x 1/8
1/16 SHEET
DOWEL
1/16 x 1/8
SPAR 1/16 x 1/8
KEEL FROM 1/16" SHEET
SHAPED FROM 3/16"
U/C COVER STIFF CARD
1" AIRWHEELS IF POSSIBLE
1/16" SHEET TIP
3/32"
1/8" x 1/16"
RIBS 1/32" x 1/8
FORMERS FROM 1/16" SHEET. STRINGERS 1/16" x 1/16"
1/64" COVERING (OPTIONAL).
EXHAUSTS CARVED FROM 3/16"
1/8" SHEET SPIGOT
CABIN BUILT FROM 1/16 SQ.
1/4
1 3/16"
1 3/16"
1 3/16"
2"
2 1/8"
2 1/8"
2 1/8"
2 1/16"
14 1/4
FAIRING.
L.E. 3/32" SQ.
1/64" SHEET COVERING TOP ONLY
3/4" DIHEDRAL
1/16" SHEET
STARBOARD WING RIBS SPACED 1 1/8"
1/4" SHEET FAIRING BLOCK
9"
RIB; TO TIP
1/16" SHEET
SPAR 1/16 x 3/16
RIBS HALF NOTCHED ON TO FULL DEPTH SPAR
WING SPAN 20".
FULL SIZE
3/16"
FLYING PROP OUTLINE.
SPAR 1/16" x 1/16"
U/C WIRE SANDWICHED BETWEEN TWO 3/16" BALSA BLOCKS.
FULL SIZE WING RIBS
1/32" SHEET RIBS.
CAMOUFLAGE COLOURS.
TOP SURFACES: EARTH BROWN & OLIVE GREEN
LOWER: PORT WING DULL BLACK, STARº PALE BLUE.
ROUNDELS: RED, WHITE & BLUE ON
WEIGHT 1¼ OZS.





A fine model of the Stirling built by A. H. Woollen of Finchley. Compare with last month's photographs.

MONTHLY MEMORANDA

No. 6 of Series

By O. G. THETFORD

Albacores in Libya

Fleet Air Arm aeroplanes are now operating from land aerodromes alongside the Royal Air Force, Australian, South African and Free French units in the Western Desert in support of the Eighth Army. During recent months a force of Fairey Albacore T.S.R. biplanes detached from aircraft carriers has been used in night bombing raids on enemy aerodromes and supply bases in company with the usual Wellingtons and Blenheims. These improvised Albacores—sole representatives of a first-line biplane in British service—retain their regulation Temperate Sea Scheme camouflage, i.e.: sea grey and slate grey on the upper surfaces, but the under surfaces and the lower half of the fuselage are painted a night-flying black in place of the usual "sky" shade. The vertical tail surfaces are not black as called for by the landplane night scheme but are treated as "upper surfaces." In accordance with F.A.A. custom the squadron numeral together with an individual identification letter is painted on the fuselage aft of the cockade and is picked out in white against the night-black. One squadron carries the markings "4A," "4B," "4C," etc., and another "5A," "5B," etc. The Albacore bearing the mark "5L" is serially numbered T 9249.

Night-flying Markings

A minor alteration to the national markings carried by night fighters and night bombers of the R.A.F. has become noticeable of late. Probably with the intention of escaping the searchlights the total area of white both in the fuselage cockade and the fin "flash" has been decreased by roughly one half, with a corresponding increase in the red and blue rings and stripes. The white stripe of the tail "flash" is now only one-eighth the total width of the flash from fore to aft. The yellow and white rings of the cockade are equally wide, being approximately one-quarter the width of the blue ring.

The policy of using letters as the individual recognition marking of aircraft within an operational unit has been abandoned by the Stirlings of one squadron in favour of numerals which are carried in the place formerly occupied by the individual letter.

Another "Black Douglas"

Known throughout the Service as the "Black Douglas," the Douglas DB-7 Havoc I became famous for its "night intrusion" exploits over enemy aerodromes during the past winter and it is now joined by its more powerful successor, the Boston III, which has already proved its worth as a Blenheim replacement on daylight raids. A night-flying R.C.A.F. squadron has been equipped with Boston IIIs and carries the new form of national insignia described in a preceding paragraph. The squadron code letters are "TH" carried beneath the rear gunner's cockpit, whilst the individual letter is painted below the pilot's cabin. Boston III "TH-O" bears the serial number W 8265 in red aft of the cockade; machine Z is numbered Z 2226.

Hurricanes—German and Greek

What is believed to be the first Hurricane to bear German national markings was recently discovered on a German landing ground during an advance in Libya. The machine retained British camouflage, but the squadron markings and fin stripes were painted out and the cockades replaced by the black cross. This ill-fated Hurricane was numbered V 7670.

Hurricanes now form the equipment of a fighter squadron of the Royal Hellenic Air Force. They are distinguishable from the British squadrons because of the blue, white and blue spinner which is carried.

Latin and Nordic Spitfires

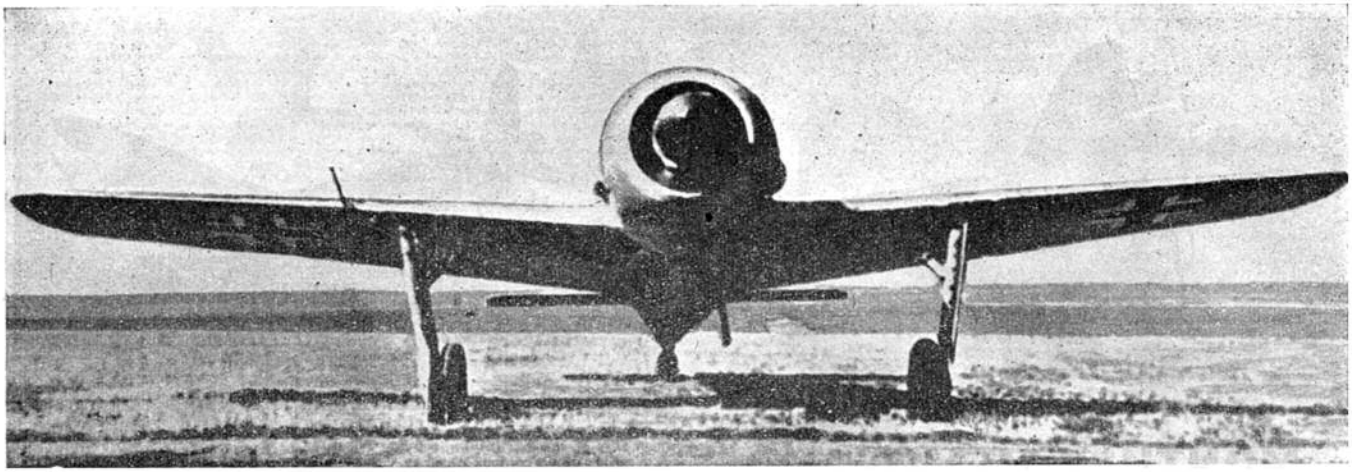
Belgian, French and Norwegian fighter squadrons of Fighter Command are now equipped with Spitfire V aircraft and have taken part in daylight sweeps. The Belgian squadron has the letters "MN" aft of the cockade; the Free French squadron the letters "GW" ahead of the cockade and the Norwegian unit the marking "AH" in the same location.

Sea-Rescue Service Aircraft

The rescue of fallen airmen from rubber dinghies in the waters around the British Isles is carried out by a mixed force of obsolescent Walrus amphibians and Lysander A-C monoplanes, the latter acting as scouts for the former which alight near the dinghies and pick up the survivors. These machines are camouflaged in sea grey and slate grey on the upper surfaces and are "sky" underneath. On the fuselage the words "Royal Navy" are painted immediately above the serial number. One Walrus has the code letters "AQ" ahead of the cockade, letter "N" aft and the serial number W 3026. Another Walrus of the same unit is numbered W 2737.

On Official Duties

An unusual civil type in war paint is the American Beechcraft cabin biplane which is employed on communications duties by the American Embassy in this country. Dark green and earth above and yellow below, the machine carries the usual national insignia and is numbered DR 628. A Lockheed Model 12A light transport painted in the same manner as the Beechcraft carries the serial number X 9316.



FIGHTING AIRCRAFT OF THE PRESENT WAR—XX.

THE FOCKE-WULF Fw 190H. By H. J. COOPER

COMPARATIVELY early in the War there were rumours of a German fighter fitted with a radial motor and resembling the American Curtiss Hawk 75A, though it was nearly two years before the Focke-Wulf Fw 190H was nominally recognised.

In September of last year pilots began reporting isolated encounters with this type, and its appearance has steadily increased until at present many of them are being met and shot down by the Royal Air Force's sweeping fighters over the Channel and enemy littoral. Large numbers of them are now in service with the *jagdstaffeln* of the *Luftwaffe*, though this aeroplane's advantage over the well-tried Me 109F is not readily apparent; its maximum speed is, in fact, less. The only reason for its production appears to be a shortage of inline motors. The production of a fighter with a speed less than that of its predecessors is in contrast to the development of new British fighters already in service, which are faster and more heavily-armed than the fighters which opened the War.

The Fw 190 is a design of Dipl.-Ing. Kurt Tank, who was responsible for the Fw 200 Condor and the Fw 189 twin-boom reconnaissance monoplane, and is built by the Focke-Wulf Flugzeugbau G.m.b.H. at Johannistal.

The installation of a radial motor in a German fighter is practically unprecedented. In spite of the large frontal area the overall dimensions of the fuselage have been kept remarkably small, and a nose-heavy appearance results. Though the speed of the Fw 190 is not good, its first-class powers of manœuvre are considered sufficient recompense.

The Fw 190 is of all-metal construction and covered with a stressed metal skin. The wing is fairly thin, and with almost equal taper on leading- and trailing-edges. Ailerons have metal frames and are covered with fabric, as are the split flaps between the ailerons and fuselage.

The tail-unit is of similar construction to the wing, the fixed surfaces being covered with smooth metal sheet and the rudder and elevators with fabric.

An unusual feature of the Fw 190 as a German fighter lies in the extra wide undercarriage track of approximately 13 ft., which is twice as wide as that of the Me 109 or Spitfire. The two legs fold inwards towards the fuselage and are covered completely with plates attached to the legs and below the fuselage. This arrangement is as on the Heinkel He 113. The tail-wheel only partly retracts.

The motor of the Fw 190 is the fourteen-cylinder two-row air-cooled radial B.M.W. 801, which develops 1,600 h.p. It is totally enclosed in a long-chord cowling, and cooling is assisted by a fan in front. A three-bladed airscrew of 11 ft. 6 in. diameter is fitted.

The armament of the Fw 190 is still well below that of R.A.F. fighters, and is believed to consist of four large-bore machine-guns mounted two in each wing, while some reports indicate a mixed armament of cannon and machine-guns.

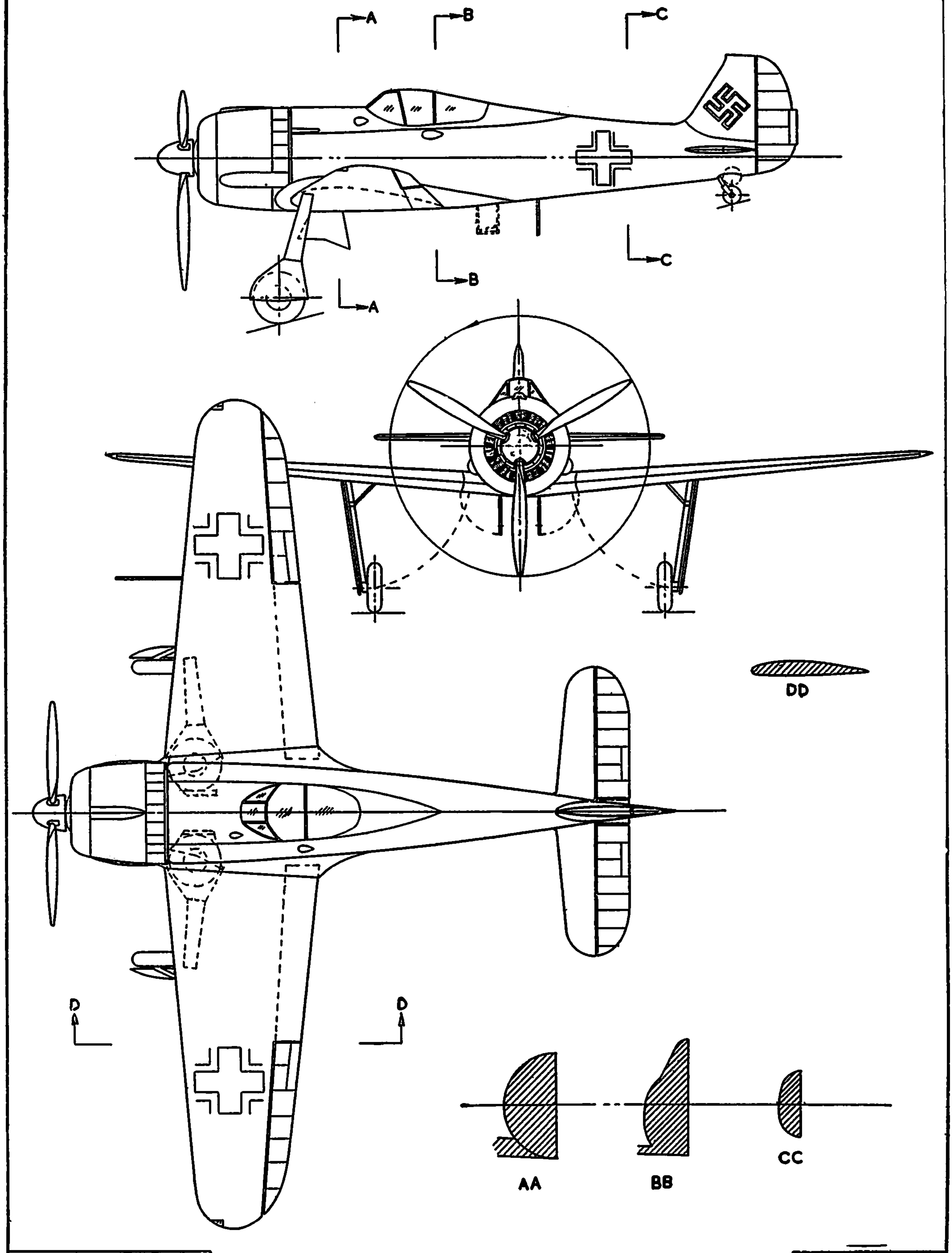
The Fw 190 bears a certain resemblance to many of the radial-powered monoplanes in this country, though it is mostly like the Vultee 48 Vanguard. The plan view of the wing and the arrangement of the undercarriage make confusion slightly excusable, but in the side view the high rudder of the Vanguard is in contrast to that of the German aircraft.

German fighters at present are coloured on the sides and upper surfaces with light sky-blue (like Coastal Command Spitfires) and are a very pale blue, almost white, underneath. Black plain crosses outlined in white are carried at each wing-tip, above and below, and on each side of the fuselage. A white-outlined black swastika is carried on the fin. Identification letters are carried on the fuselage and below the wing. One machine carries the letters KB in front of the cross on the port side of the fuselage and the letters PO aft. On the starboard side the KB is nearest the fin. Underneath the KB is painted under the starboard wing with the cross between them and the tops of the letters nearest the leading-edge. The other two letters are similarly painted under the port wing.

The maximum speed of the Fw 190 is estimated at 370 m.p.h. at 18,000 ft. As is well known, the maximum speed of the Spitfire V is over 400 m.p.h., and it has only to be observed executing aerobatics for its manœuvrability to be appreciated. The German machine has a range of 525 miles at an operating speed of 300 m.p.h., which is probably better than the Spitfire's, and the service ceiling is given as 38,000 ft.

Exact dimensions are not available, but they are approximately: span, 37 ft.; length, 28 ft. 11 in. The wing area is 194 sq. ft., which makes the wing loading 36 lbs./sq. ft. The power loading for an all-up weight of 7,000 lbs. is 4·5 lbs./h.p.

Next Month: The D.H. Hornet Moth Communications Biplane.



FOCKE-WULF Fw 190H.

FT.

S. M. A. E.

Official List of

BRITISH RECORDS

January, 1942

OUTDOOR RECORDS

		M.	S.
Fuselage :—			
R.O.G. (International)	R. Copland	33	9
R.O.G. (British)	R. Skinner	31	31
H.L.	R. H. Warring	26	45.6
Biplane R.O.G.	J. O. Young	31	5.125
Seaplane R.O.W. (open)	R. W. Mackenzie	8	16.3
,, ,, (tank)	J. Marshall	6	24
Seaplane Biplane R.O.W. (open)	C. W. Needham	7	17.7
,, ,, (tank)	J. Morris	2	11
1-1-P-O R.O.G.	D. A. Pavely	1	37.1
P-1-1-P	E. Hurley	1	25.5
O-1-P-1 H.L.	W. J. S. Murray	3	0.2
,, R.O.W. (open)	R. T. Parham	1	3.3
,, ,, (tank)	R. T. Parham		45
,, R.O.G.	R. W. Mackenzie	1	54.4
O-2-P-1 R.O.G.	F. A. Bunce	1	16.5
0-1-P-2-1 ,,	F. A. Bunce		49.6
P-1-P-1 H.L.	H. C. Baines		47.6
Petrol Engined R.O.G.	A. T. Frazer	16	25
Compressed Air Engined R.O.G.	D. A. Pavely	1	7.6
Non-fuselage :—			
Compressed Air Engined R.O.G.	D. A. Pavely	1	10

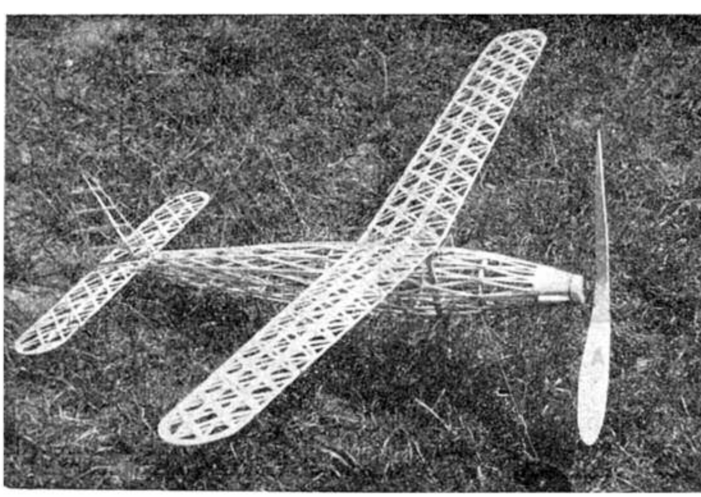
		M.	S.
Glider :—			
H.L.	A. D. Piggott	3	59.75
Catapult	E. W. Chasteneuf	20	0.7
Tow-line (100 ft.)	R. F. L. Gosling	1	25.5
Winch	L. B. Mawby	36	31
Flying Scale :—			
R.O.G.	S. R. Crow	1	49.35
H.L.	S. R. Crow	1	2.15
Flying Boat :—			
R.O.W.	P. M. H. Lewis		33
R.O.W. (Petrol Engined)	C. E. Bowden		30.4
Rotor Plane :—			
R.O.G.	S. R. Crow		39.5
H.L.	S. R. Crow		49.45
Ornithopter :—			
H.L.	A. B. Rainey		24.2
Tail-less :—			
H.L.	A. Howard Boys	2	5.75
R.O.G.	A. Howard Boys	1	24.5
Speed	C.H.Debenham	33.25 m.p.h.	

INDOOR RECORDS

		M.	S.
Fuselage :—			
H.L.	D. Gilbert	6	44.4
R.O.G.	D. Gilbert	4	33
Biplane H.L.	L. B. Mawby	1	37.4
,, R.O.G.	L. B. Mawby		57.1
Stick :—			
H.L.	R. Copland	18	52
R.O.G.	R. W. Mackenzie	8	48.2

		M.	S.
Rotor Plane :—			
H.L.	L. B. Mawby		44
R.O.G.	L. B. Mawby		32.2
Helicopter :—			
H.L.	R. W. Mackenzie	1	32
R.O.G.	R. W. Mackenzie	1	38
ROUND THE POLE.			
Fuselage R.O.G. (Class A)	K. A. Young	3	8

The above list is quoted from the Official Journal of the S.M.A.E. Many of these records form the basis of the new classification system recently introduced, but many new records are now available for interested modellers. The new Records Chart is given on page 336.



Club News

By CLUBMAN

The results are to hand for the Weston Cup and National Cup events, and make interesting reading. The improved weather conditions have had a marked effect on the times set up, and some really amazing durations must have been clocked in the Weston event. Individual times for each flight are not given, but the winner's total of over 29 minutes for three flights shows some real "durating." I am very pleased to see that a Scottish club has worked its way into the top stages, and altogether the honours go round very well over the country.

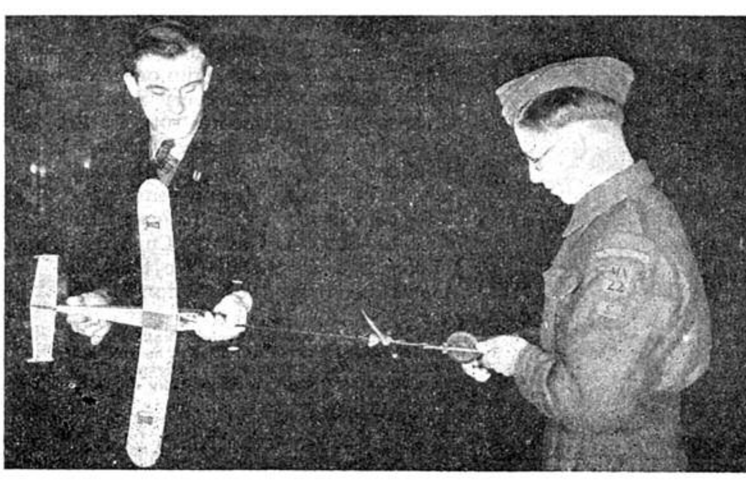
Bushey Park seems to be on a winning streak, having a 1st and 3rd in the Weston, and carrying off the National Cup. Congratulations. It is surprising to find only 17 clubs competing for this important contest, and most of those were from what might be termed the "greater London" area. What happened to all the other affiliated clubs? Getting cold feet or too much wind?

Entries for the Weston Cup were 43 per cent. down on the Gamage Cup affair, but this is undoubtedly accounted for by the fact that the Gamage is a "free-for-all" from a model point of view, while the Weston requires a special type of machine. I still feel, however, that far too many clubs—and individuals—suffer from an inferiority complex when it comes to National competitions. You know the trouble, "Oh, we shouldn't stand an earthly against some of the older and bigger clubs." Which, of course, is so much eyewash, as events prove time after time. One must make a start some time, and it seems futile to me to undertake affiliation, and then not bother to partake in the contests arranged for them.

Club officials will note that they are now given until the Thursday following a contest in which to present their lists to the Competition Secretary. I am asked to remind them, however, that the rules state entries must be received by the FIRST POST THURSDAY MORNING. This rule was extended to allow for the various postal delays encountered under war-time conditions, and NOT as another couple of days procrastination on the part of dilatory officials. Competition secretaries please take note! There is plenty of time to get the results in now, and any lists received after the first post on the Thursday following the event will be disqualified.

NATIONAL CUP.	Secs.
Bushey Park	1801·2
Harrow	1305·1
Northern Heights	1246·
Brighton	1099·5
Luton	1082·5
Croydon	1007·75
Blackheath	988·45
Stewarton	972·
Streatham	835·3
Birmingham	811·2
Stratford on Avon	799·
Oxford	685·5
Walton	589·5
Bristol	573·5
Pharos	497·4
British Airways (Bristol)	446·
Halstead	395·
WESTON CUP.	**Secs.**
Wright, M. (Bushey Park)	1777·5
Burns, R. (Stewarton)	1192·4
Taylor, A. H. (Bushey Park)	1076·
Calvert, R. (Halifax)	889·
Townsend, J. (Ilkley)	807·5
Ryde, L. (Northern Heights)	774·
Jennings, M. (Bath)	614·8
Buckeridge, Mrs. (Pharos)	555·2
Jones, W. (Golden Wings)	539·6
Lofts, F. (Northern Heights)	537·25
Lees, N. (Halifax)	482·2
Bishop, W. (Blackheath)	457.8
(87 Competitors.)	

Top: *Len Stott gets his model away to a fine start in the Gamage Cup contest.*
Below: *Activities at the recent indoor meeting staged by the Kodak Club. Note interesting model at right built by G. Hullam, who turns out some fine models, in spite of a crippled hand.*
Opposite: *A geodetic model constructed by R. Todd of the Glasgow M.F.C.; and right, P. W. Grange of St. Leonards wins a 10/6 prize with this snap of his "Spencer-Larsen," built from A.M. plans.*



Mr. Ripley of the Ashton & D.M.A.C. shows off his "R.A.H.37." Flying capabilities are exceptional with this model.

An interesting letter is to hand from R. Schreiden, a Belgian member of the R.A.F. He left Belgium over a year ago, and has travelled in diverse ways to reach this country three months ago. He has always been interested in aeromodelling, and would be pleased to hear from others, especially of his own nationality, who would help in the setting up of a model group. He may be contacted at St. Dunstan's, Graham Street, Gt. Malvern.

In view of the shortage of model building materials in this country, and the large numbers of grouses we get in consequence, it may be of interest to you to know that the American industry is getting hard pressed, although perhaps not yet to the same extent as the British industry. Model petrol engines, which pre-war were almost "two-a-penny," are now becoming in very short supply, and there is a big movement going ahead at present in order to obtain a greater supply of raw materials to maintain the industry. It is also amusing to note that, following a number of heated arguments in this country on the limitation of petrol model flying, a great number of writers in the American model magazines are stressing the importance of drastically limiting the duration of this type of model, and pointing out the dangers of confusing the petrol model with the full-size machine. All sorts of ideas and rules and regulations have been suggested, and it seems possible that competition flights will be made on a maximum engine run of 15 seconds, and dethermalisers will become a necessary (if not official) requirement. One suggestion is that flight times over a certain limit are disqualified, and there is no doubt about it that the accent will be on skill of control rather than out-and-out thermal hunting.

One last item of interest before going on to the usual reports is the statement that the study and building of model aircraft are to become a compulsory subject in French schools. Whether or not we follow this step in this country, it is rather too early, or perhaps too optimistic, to make a forecast, but I am of the opinion that we cannot afford to lag behind other countries in this respect much longer.

The article by Mr. Temple in the February issue will give an idea of what had been accomplished on the Continent before the war, and I cannot help but feel that more attention must be given to the theory and practice of flight in this country than in the past. So far we have relied on the personal inclinations (and chance interest) of individuals to take up flying, but I am sure that this number would be greatly increased could a little interest and knowledge be engendered during the schooling period. However, this is one of those things about which we shall have to wait and see, but, as the radio comedian says, "It makes yer fink."

Gliders are receiving a great deal of attention these days, and undoubtedly we shall see even more of this type of model in the coming months. And to think a glider was almost a *rara avis* only a couple of years ago, in spite of the boost given by the King Peter Cup contest. Still, the current shortage of rubber and lighter woods has stimulated interest in this fascinating phase of the hobby, and no one can deny that it is an ill wind, etc., etc. (Corluvaduck! Fancy having the nerve to talk about *Wind* in an aero-modellists' mag. !)

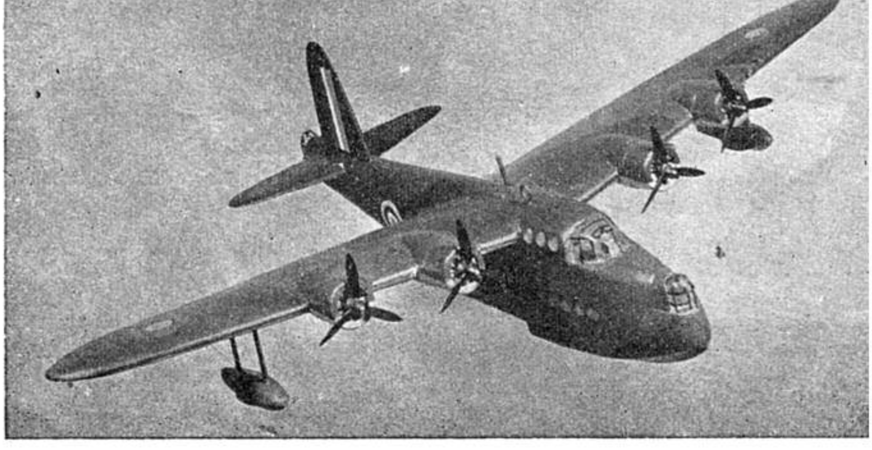
Many new glider records are being set up among the clubs, the first to be notified this time being 1 : 31 tow-launched by E. Oldroyd, of the HEALEY & D.M.A.C., the model being a "Kirby Kite."

The CARDIFF M.A.C. is holding the Second Welsh Rally at the Ely Racecourse, Cardiff, on the 16th August, and intending competitors are asked to contact the Press Secretary, Mr. T. Lewis, "The Bungalow," Alps Quarry, Wenvoe, Cardiff, for full particulars, etc. Teams will consist of pairs, and models may be flown by proxy.

Word comes from the NORTHERN HEIGHTS M.F.C., and makes good reading. Quoting the report we find that :—

"Despite the fact that so very many of our senior members are serving with the Forces, the Northern Heights 'Sock' still flies merrily. We have over 300 members and are enrolling new ones every week. For the convenience of members we hold indoor meetings on three evenings a week at Southgate, Edmonton and Hornsey, our average weekly attendance being over 80 ; and we muster 100 or more on the Flying Field each Sunday.

"We started serious outdoor flying at Easter and we have run one, two or three competitions every Sunday since and including May 10th for all types of models. In the competition field we have had some successes: S.M.A.E. Pole Flying—first for February, with highest aggregates, first and second. Gamage Cup, first. National Cup, third. We took 35 members over to the Croydon Clubs'



How's this for a well-built solid 'Sunderland.'? Builder is B. O'Connor of Hull, and he used test tubes for turrets, curtain rod for engines, Grip-fix tins for cowlings. Inside is fully detailed.

Gala Day, succeeded in winning the trophy for the open duration contest; all other contests had to be scratched owing to the weather, otherwise we were hoping to get some more."

Several R.A.F. members have visited American clubs while training in the States, one in particular, R/O Tansley, collecting five firsts out of six competitions at a Florida meeting. Nice work! The club's Open Day is provisionally fixed for September 13th, and all are very welcome.

The first local model aero and boat contest staged in Barnsley was organised by M/s. T. Garner & Son, Ltd., and proved a huge success, entries being received from practically every school and youth organisation in the county borough. The entries were heaviest for the Solid Scale Aeroplane Class, followed very closely by the Naval Craft Class, plans for which were given to the boys by the National Savings Committee. Thousands of these plans were distributed free of charge.

Word from the MODEL AERONAUTICS COUNCIL OF EIRE gives the pleasing news that many of their members now in the Old Country are welcomed by local clubs, and I am sure this spirit does much to foster goodwill for contests in the long-hoped-for days of peace. The Secretary, Mr. J. Jones, will be pleased to put visitors to Eire in touch with Irish clubs on being contacted at N.A.I.D.A., 3, St. Stephen's Green, Dublin.

A number of contests are being arranged over there in August and October, the most interesting being a *Petrol Model Event.* Shades of the past! Three events, Wakefield, Team and Petrol, will take place on the Collinstown Aerodrome, County Dublin, on the 16th August, commencing at 1.30 p.m. (Shall have to get my passport and stink-wagon dusted.)

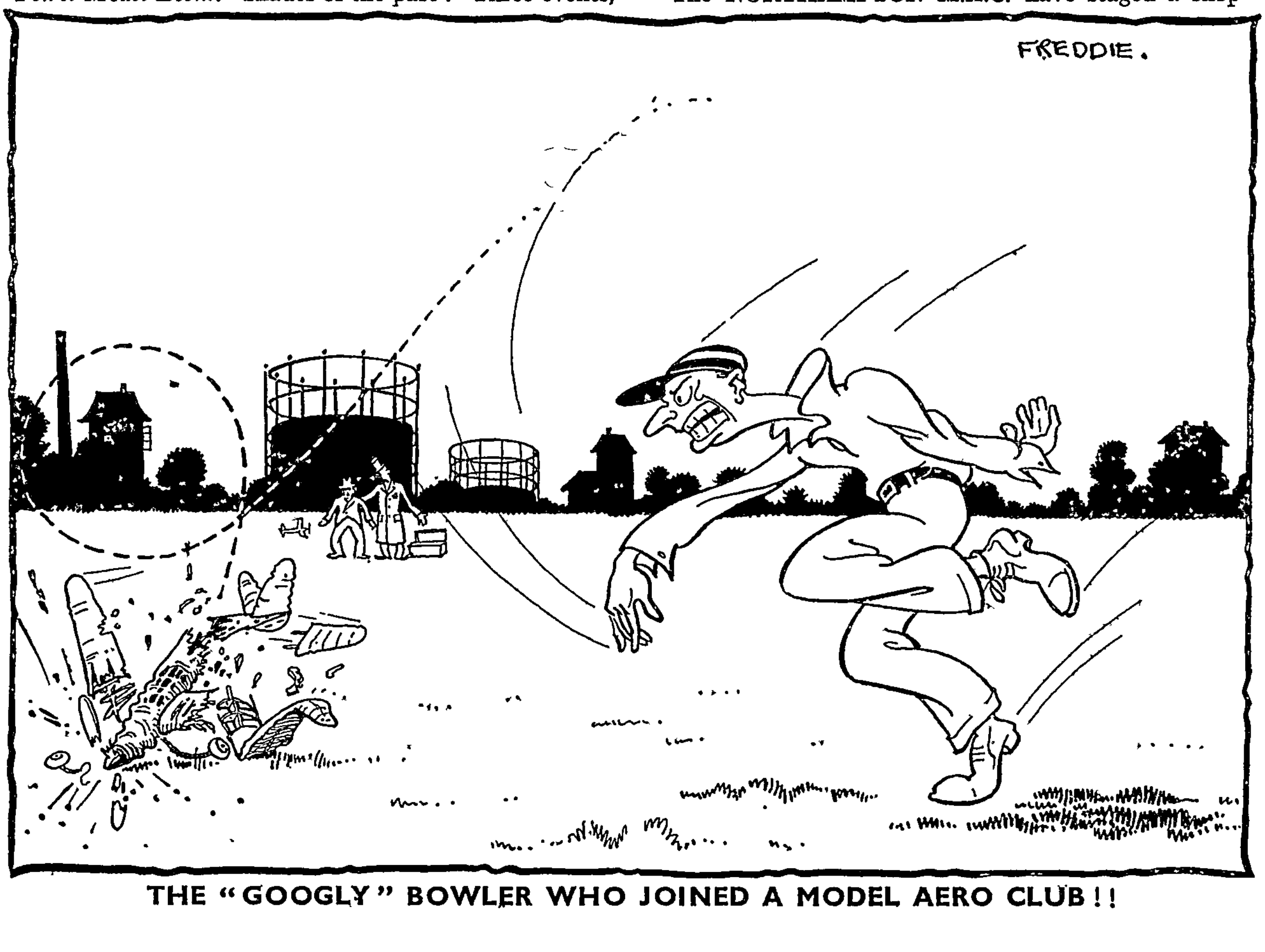
Grantham now has a model aero club, to be named the GRANTHAM M.A.C., Secretary being D. Porter, of 30, Sidney Street, Grantham, and new members are as welcome as calm days. £15 was raised for club funds by a dance, so they have a good send-off. Club record is 1 : 28, set up by R. Squire's "Macclesfield Marvel."

Another National event will be the contest for the C.M.D. TROPHY, to be organised by the GLASGOW M.A.C., on the 29th August. Intending competitors and club secretaries should write for particulars and entry forms to Mr. G. Leask, 2, Whitefield Terrace, Kirkhill, Cambuslang, Lanarkshire. The contest will be conducted on decentralised lines.

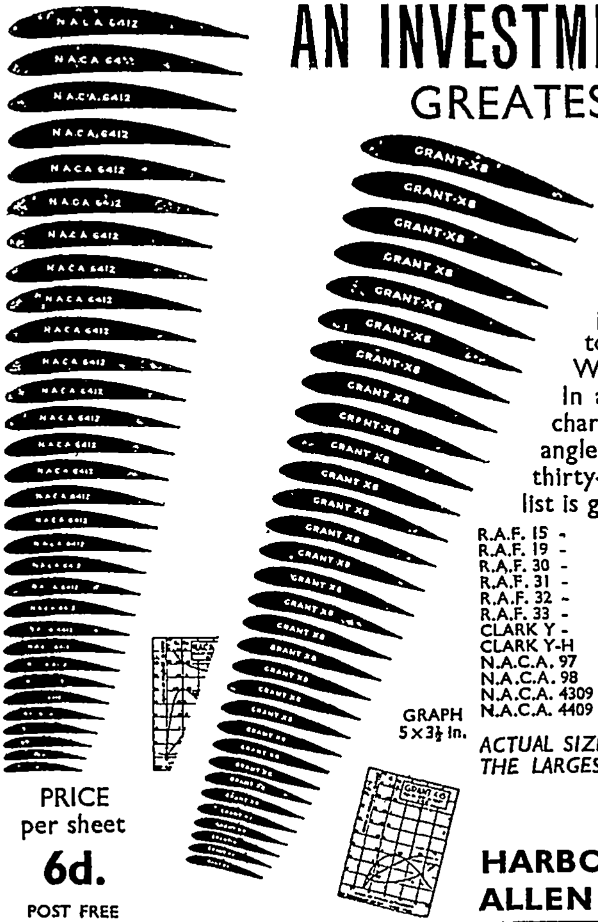
Things are still going strong with the STREATHAM AEROMODELLERS, the greatest trouble being lack of time rather than shortage of materials. Les Pribyl has clocked up a new record with 4 : 35, while the Junior competition was won by R. Bleeker.

First competition of the year in the MOUNTAIN ASH M.A.C. resulted in a win for T. Horseman, whose model averaged 44·6 secs., runners-up being M/s. Bartlett and Wilkins. (This club sympathises with the Bury club because, although several of their members are in the A.T.C. and have offered to form a model section, they have met with a stony silence.)

The NORTHAMPTON M.A.C. have staged a shop-



THE "GOOGLY" BOWLER WHO JOINED A MODEL AERO CLUB!!



window display of models in Abington Street, Northampton, to last a month or so, and after only one week the result has been several new members, bringing the membership up to thirty.

June 14th was the first club meeting date on which the weather was good for flying. Mr. Bailey put up regular durations of approximately 2 mins. with his Evans' "Rocket," and some nice gliding was achieved by Mr. Meakins with his "Chasteneuf 20-minute Glider."

C. Garraway, of the EXETER M.A.C., won a competition in a roaring gale, totalling 214 secs., handsomely beating D. M. Peters (167 secs.) and A. W, Potts (135 secs.). Models were under 150 sq. in., so the times are pretty good considering the conditions.

Dick Booth, of the LEEDS M.F.C., had a real bit of "modeller's luck" when, after sitting up till the small hours finishing a model for a competition the next day, he rose at 6 a.m. to test said model—and lost it on the second flip, and it ain't been seen since ! ! 'Ard lines I calls it. But listen what happened to Brother Vauvelle. His "Lynx" disappeared behind some houses, and by the time the perspiring owner had located the stray, the owner of the house which got in the way of the model was *mending the prop. with inch nails ! ! !* C. Furse now holds the club record with a flight of 1 : 25.

F. Davies, of the LEICESTER M.A.C., has raised the club glider record to 3 : 10, winning the Stafford Glider Cup at the same time. This club is organising a Midland Rally, to take place at Scraptoft on Sunday, August 2nd. Full particulars are available from the Secretary, D. M. Dawson, 127, Birstall Street, Leicester. It is hoped that all the Midland clubs will support this event to the best of their ability.

The BLACKHEATH M.F.C. has now resumed meetings at its old place, the Ladywell Men's Institute, and anyone interested in the hobby is welcomed.

Yet another club to announce a Rally is the BURY & D.M.A.C., which will stage its event on the 16th August. Full details from G. Ashworth, of 286, Ainsworth Road.

CROYDON & D.M.A.C. OPEN DAY—AUGUST 3RD
at Tattenham Corner, Epsom Downs.

Time.	*Contest.*	*Entry Fee.*	*Prizes. 1st.*	*2nd.*	*3rd.*
11–3.30	Open	6d.	Trophy	10/–	6/–
3.30–4.30	Team (of 4)	4/–	20/–	10/–	—
4.30–6	Sailplane	6d.	Trophy	7/6	5/–

Competitor nearest to secret time : 5/–.

The EASTBOURNE M.F.C. has almost doubled its membership during the last month, and have run off several competitions. Some members of the Brighton club were welcomed, and some interesting flying took place, the Brighton lads really putting it across the local chaps. H. J. Towner won the nominations event with an error of only ·4 secs. Mr. F. H. Boxall made the best time of the day with a flight of 2 : 09, and won the general duration event. Brighton won the team event with a total of 681·5 points, Eastbourne totalling 485·8 points. In a later event, J. Finch won the Monthly Cup with a winch-launched flight of 1 : 25·5, setting up a new record.

Club records were twice broken when the WOKING & D.M.A.C. held their Memorial Trophy (knockout) Competition on Sunday, 14th June. C. West's 'plane clocked 19 mins. 21 secs. o.o.s., and has not yet been returned. A. Webb won the competition and broke Mr. West's record with his Dick Korda model. This 'plane, hand-launched, landed back on the flying field after a flight of 21 mins. 6 secs. Total time : 29 mins. 26½ secs. Other members consider the flight to be due to the ministrations of the local Brains Trust ! !

The HARROW M.A.C. is now settling down at its new Flying Ground, off Bessingby Road, Ruislip, but all recent competitions have been flown in a high wind, with the result that two standardized times have been recorded with great regularity by timekeepers, namely : 5½ secs. and 60 secs. o.o.s. On the very few calm days the field, which is surrounded by houses, has proved to be the centre of a tubular thermal current, and models straying out of the thermal have been tipped up and back again into the thermal by upcurrents.

On the 29th March, F. Howarth made a flight of 13 mins., which beat his best of last year, and the model landed back again in his hand on this occasion ! ! (Please note the best flight of last season was 11 mins. 49 secs., and not just over 6 mins. as reported.)

W. J. Prescott also made a flight of 11 mins. 6 secs. in the National Cup in which the club put up a total of 1,305 secs. A team was entered in the Gamage Cup, but owing to high winds the results were not at all good.

Three out of the four "Major" and "Pinora" Competitions have been flown off and the result is still very much in the balance. On the 31st May a friendly competition was held with the Pharos Club, which resulted in a win for the home team (364 secs. against 288 for twelve flights).

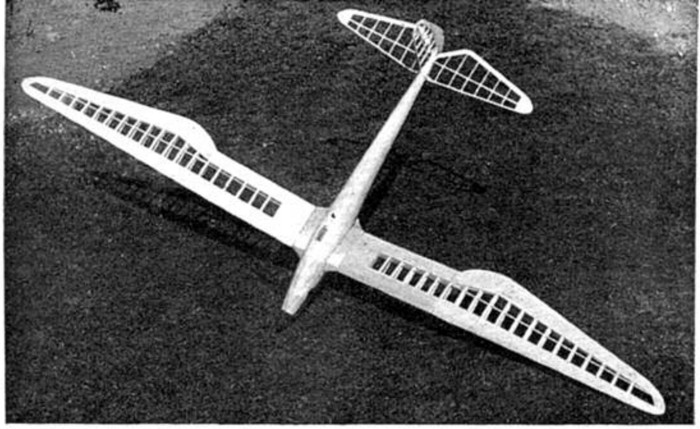
W. Louch, of the SOUTH BIRMINGHAM M.F.C., holds five out of the eight club records, his best time being in the H.L. heavyweight class, with a figure of 6 : 22. W. Noy, the junior leader, won a nomination event, clocking 30·9 for a stated time of 31 secs. Close going, my lad.

Gliders are coming to the fore in the LANCASTER M.A.S., J. P. Swindlehurst holding the club record with his "King Falcon," with a time of 2 : 08·8. Other records are as follows :—

Scale	1 : 03	Lightweight	7 : 31·4
Wakefield	2 : 13	Heavyweight	2 : 8·8

The "non-balsa model" record stands at 1 : 02, and is a type of record worth while encouraging in all clubs. (An error was made in announcing the name of the Secretary. This gentleman is J. P. Swindlehurst, of 6, Whitby Road, Morecambe.)

The BEVERLEY & D.M.A.C. Gala Day was again spoilt by a gale, and nearly every model was damaged.



A beautifully-finished "Condor" built by E. H. Davies of Brixham. Note the finely executed planking of the fuselage.

Results were :—

Gliders	1. Moses (York), av. 96 secs.
	2. Longson (Beverley), av. 68 secs.
	3. Kilby (Hull), av. 28 secs.
Under 30 ins.	1. Fawcett (York), av. 50 secs.
	2. Hutchinson (Ripon), av. 40 secs.
	3. Elliot (Ripon), av. 38 secs.
Over 30 ins.	1. Townsend (Ilkley), av. 47 secs.
	2. Longson (Beverley), av. 42 secs.
	3. Moses (York), 32 secs.
Wakefield	1. Littlewood (Hull).
	2. Townsend (Ilkley).
Flying Scale	1. Verity (Hull).
	2. Townsend (Ilkley).

Mr. Longson and Mr. Elliott lost their models in the morning after about 3 mins. o.o.s.

The STIRLING M.A.C. raised the sum of £40 from a local exhibition, over 2,000 people seeing over 200 models on show. A new r.t.p. record was set up during the show, time being 1 : 25. Best outdoor time to date is 2 : 30.

Two new clubs to report this month are the WELLINGTON SCHOOL M.A.C., Secretary T. C. Odhams, of the School House; and the FARNHAM & D.M.A.C., Secretary I. Crossley, of 2, Gatehouse Cottages, Rowledge, Farnham. Splendid flying fields are available, and members are welcomed.

F. de Montaigne, of 18, Bedford Street, Brighton, Sussex, requires a new (or nearly new) "Ohlsson 19" or "Baby Cyclone"; J. R. Purchase, of Edenbridge Motor Co., Edenbridge, Kent, has a G.H.Q. engine and accessories for disposal; and A. Imrie, of 2, Highlea, Humbie, East Lothian, has a "Veron Eagle" and a set of castings for an engine of 7/16 stroke and 7/16 bore for sale.

And so, off to bed for the sleep of the just ! (No, no, Willie, not just tight—just, just. Oh, heck! you know what I mean !) I always feel a glow of satisfaction when I've finished these monthly ramblings, though what my readers feel is summat different, mayhap ! ! Still, to receive criticisms shows that the columns are read, and that is certainly a feather in my cap . . . if I wore one.

Cheerio, blokes ; and carry on both building 'em and flying 'em. You've all still a lot to learn and, as for me, I doubt if I've even started yet. The CLUBMAN.

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Whitstable, Tankerton & D.M.A.C. : A. E. Souch, 69, Douglas Avenue, Whitstable.

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