AERO MODELLER

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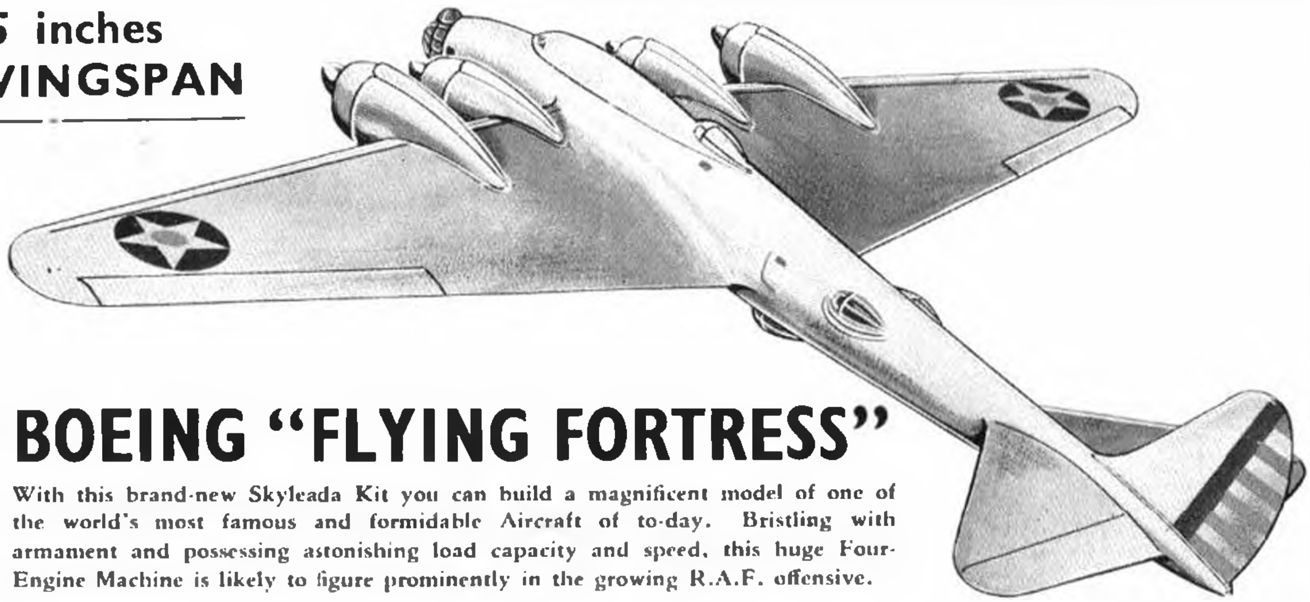

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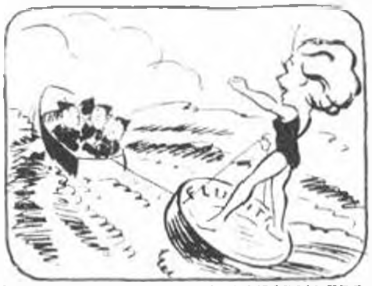

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W. G. EVANS & SONS regret to repeat that Balsa Wood is still not available for Model Aeroplane Construction, and that although a limited stock of other woods is still held, extreme pressure of Government orders forbids for the time being any deliveries for model work.

★

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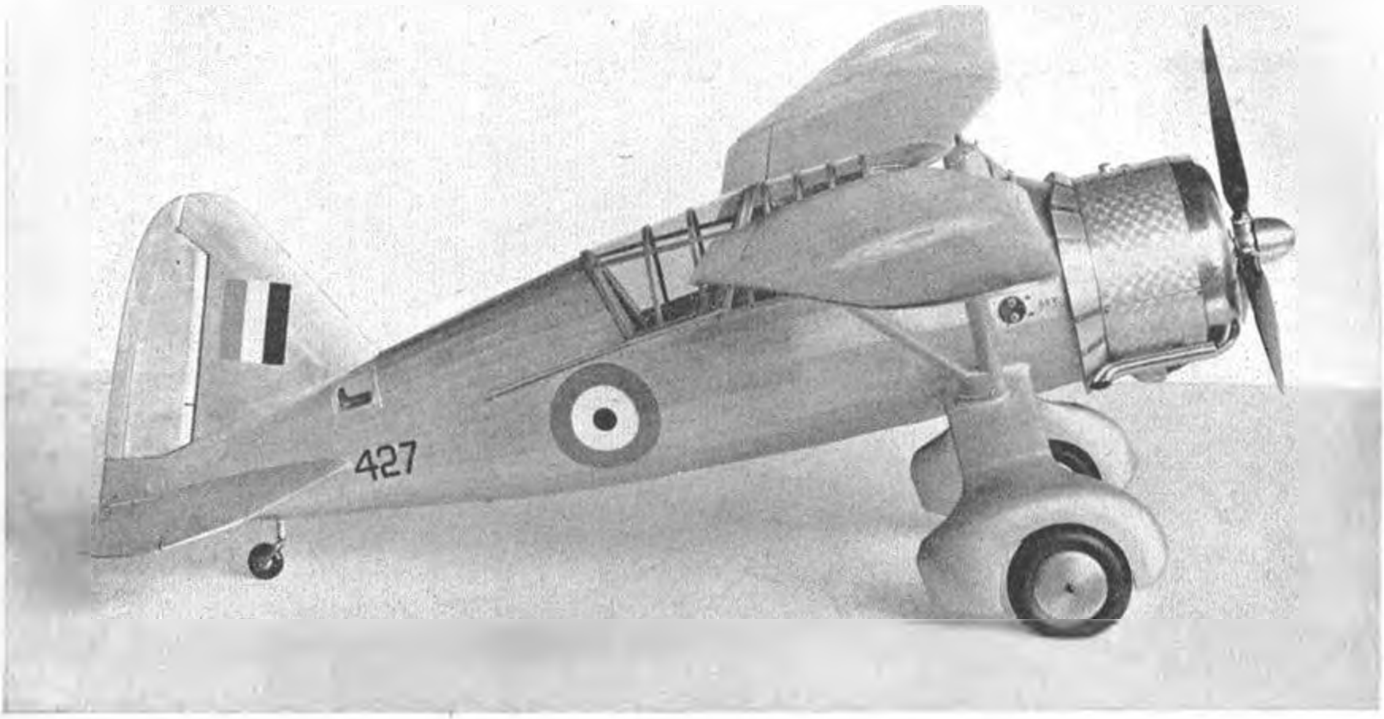
THE WORK OF A CRAFTSMAN . . .



Quite the finest model petrol 'plane we have yet seen is shown above. Built by Corporal A. Welsberg, a member of the Polish Air Force somewhere in England, the model is to 1/10 scale, i.e. the span is 5 ft. The motor is a 3 cc. Ohlsson, which is mounted in the inverted position. The three-blade airscrew is adjustable for pitch, flaps are fitted to the wings, and trimming tabs to the rudder and elevators. The tail-wheel is sprung, whilst the main wheels are pneumatic. All-up weight is a trifle over 8 lb., and with the flaps down the machine has actually taken off on a short tethered flight.

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The AERO MODELLER

INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR"

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Editorial

ONE of the nicest characteristics of the average aero-modeller is his sense of humour.

Rarely does one meet aero-modellers without this valuable asset, and the letter from the two Army officers, published on pages 392/3 of our last issue was from two such enthusiasts, well endowed with this " commodity."

We so enjoyed this letter, descriptive of their incompetent fooleries, that we thought it worth while publishing it in full, complete with illustrations by " Freddie."

That it has amused many of our readers is shown by the comments on it in the considerable correspondence we now receive daily on all manner of subjects.

That this letter has been taken *most* seriously by *one* aero-modeller, and has given offence would appear to be revealed by the following letter, which, at the request of its writer, we publish in full:

The Editor,

SIR,

The letter to the Editor in the July issue of THE AERO-MODELLER from Captain Lymon Crawford-Brown and Lieut. Corkett, afforded me great amusement. I always think it is funny when people buy commercial model kits and proceed to build same with total disregard for the instructions and specification as laid down by the designer, and then, when the model does not perform to expectations, calmly blame the design. May I ask on what authority the learned gentlemen base their statement that " wing tip dihedral is baloney "? Perhaps the *expert* aero-modellers who have used wing tip dihedral on their models and won contests with same are all wrong? It may also interest the Captain and Lieutenant that the model that took second place in the Gamage Cup with 1091·2 sec. aggregate, flown by Mr. Jennings, of Bath, was an Ajax, complete with wing tip dihedral. His last flight was 17 min. 0·0 sec. May I humbly suggest that Captain Crawford-Brown and Lieutenant Corkett ask Mr. Jennings *his* opinion of wing tip dihedral? They would no doubt learn something of use to them in their aero-modelling career.

Yours truly,

THE DESIGNER OF THE AJAX.
Louis A. Heath, Fitter IIa, R.A.F.

The writer of this letter, it will be noted, records his " amusement " at the letter from the worthy Captain and Lieutenant, but apparently it was a rather sardonic amusement, in that he seems to have thought that the Army was taking its aero-modelling quite seriously!

We are thankful to say that, to date, we have *not* received complaints from the designers of the several model aircraft which were named *as well as* the Ajax, and which appear to have performed equally badly . . . in the incapable hands that bestowed such loving and hasty care upon them!

Neither have we thought fit to complain at the condemnation of our humble selves, our plans, and Mr. Stubbs's book, " Design of Wakefield Models "!

For the benefit of any other serious-minded aero-modellers who might possibly think along the same lines as Mr. Heath, we would say that the letter from Captain Crawford Brown and Lieutenant Corkett was published by us as a humorous commentary on aero-modelling, and that we are quite certain that no criticism of any kit named in the letter was intended to be taken seriously.

"Scale Plans of Military Aircraft" in print again

We draw attention to the advertisement on the back outside cover of this issue, announcing that " Scale Plans of Military Aircraft " is now again in print.

The thirty-nine plans have been entirely redrawn and brought up-to-date in the light of more recently disclosed information.

Copies may be obtained direct from Allen House, Newarke Street, Leicester, or from any bookseller or W. H. Smith's bookstall.

Model Aeroplane Clubs

We have just compiled an up-to-date list of model aeroplane clubs in this country.

This list gives the names of the club and the name and address of the secretary, together with general information regarding the organisation of the Society of Model Aeronautical Engineers, and is in the form of a poster.

On the back of this poster are given the names and addresses of some 250 model shops and booksellers who carry stocks of the range of books on model aircraft, published by the Harborough Publishing Co. Ltd.

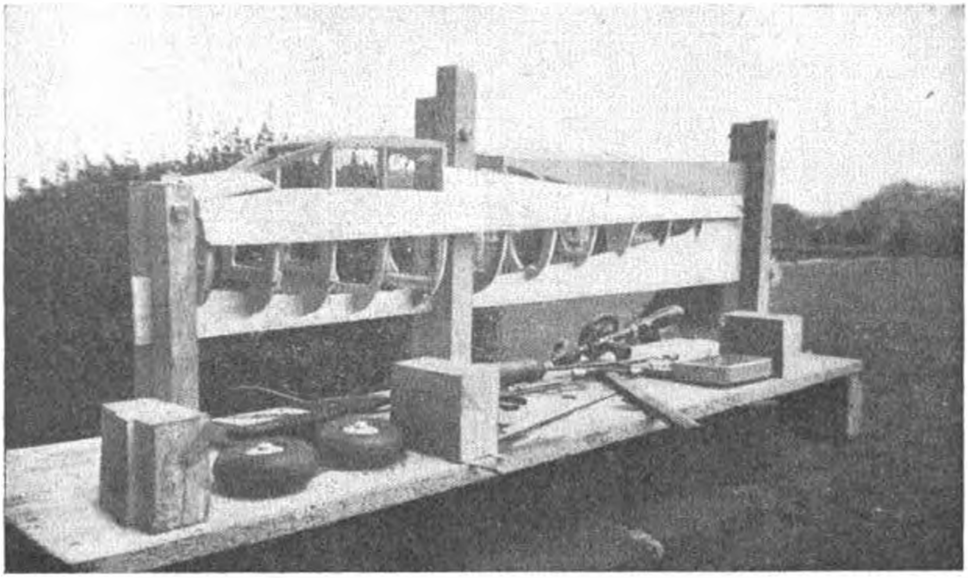
Copies of this poster are available, free of charge, and will be sent to interested readers who send us a stamped addressed envelope, which must be not less than 8 in. by 5 in. in size.

D. A. R.

A FUSELAGE JIG

Designed Photographed and Described

By H. FRICK



ONE of the advantages of a jig is that it holds the fuelage rigid while you are bending $\frac{1}{8}$ in. sheet balsa or stringers round it, enabling you to use both hands instead of one for holding the 'plane and the other only for construction.

First get a strong plank of convenient size and draw a straight line about 6 in. from one edge along the length of the plank. On either end nail, screw or stick two blocks of wood about 30 in. apart or to the required distance, the blocks being about 4 in. by 2 in. by 3 in. Now screw on the uprights, which consist of about $1\frac{1}{2}$ in. squared wood of required height. Drill a $\frac{3}{16}$ in. hole through top and bottom, and two corresponding holes in the outer uprights. It is not important for these to be at right-angles to the base, as this will most likely be warped, but it is important to have them true to each other; this can be done with a straight-edge, stretched thread or, better still, with the eye, by looking along the jig from one end. If nails are used put in one or two only, then tap the jig true and insert more nails later.

Do the same with the centre support and true up as before. If the alignment is much out, shallow metal wedges can be inserted under the faulty edge of the blocks and driven in as required. This can be seen under the centre block in the photo.

Use $\frac{1}{8}$ in. sheet balsa for the backbone and cut it so that it protrudes about $1\frac{3}{4}$ in. over the fuselage at either end. Then draw the outline on it and cut out the inner portion (shown unshaded in Fig. 1) as though you were cutting the inner edge of an ordinary backbone. To do the underneath of the fuselage and accessories it can be inverted in the jig, leaving out the centre post. The sheet backbone can also be used as part of the fin (see Fig. 1). This makes sure that the fin is true and helps greatly to strengthen it. When the fuselage is completed the excess backbone may be cut flush and sanded smooth. To take the 'plane out of the jig loosen all the six bolts, taking the one on top of post 2 right out. The fuselage may then be slid out upwards.

Wing Fixing.

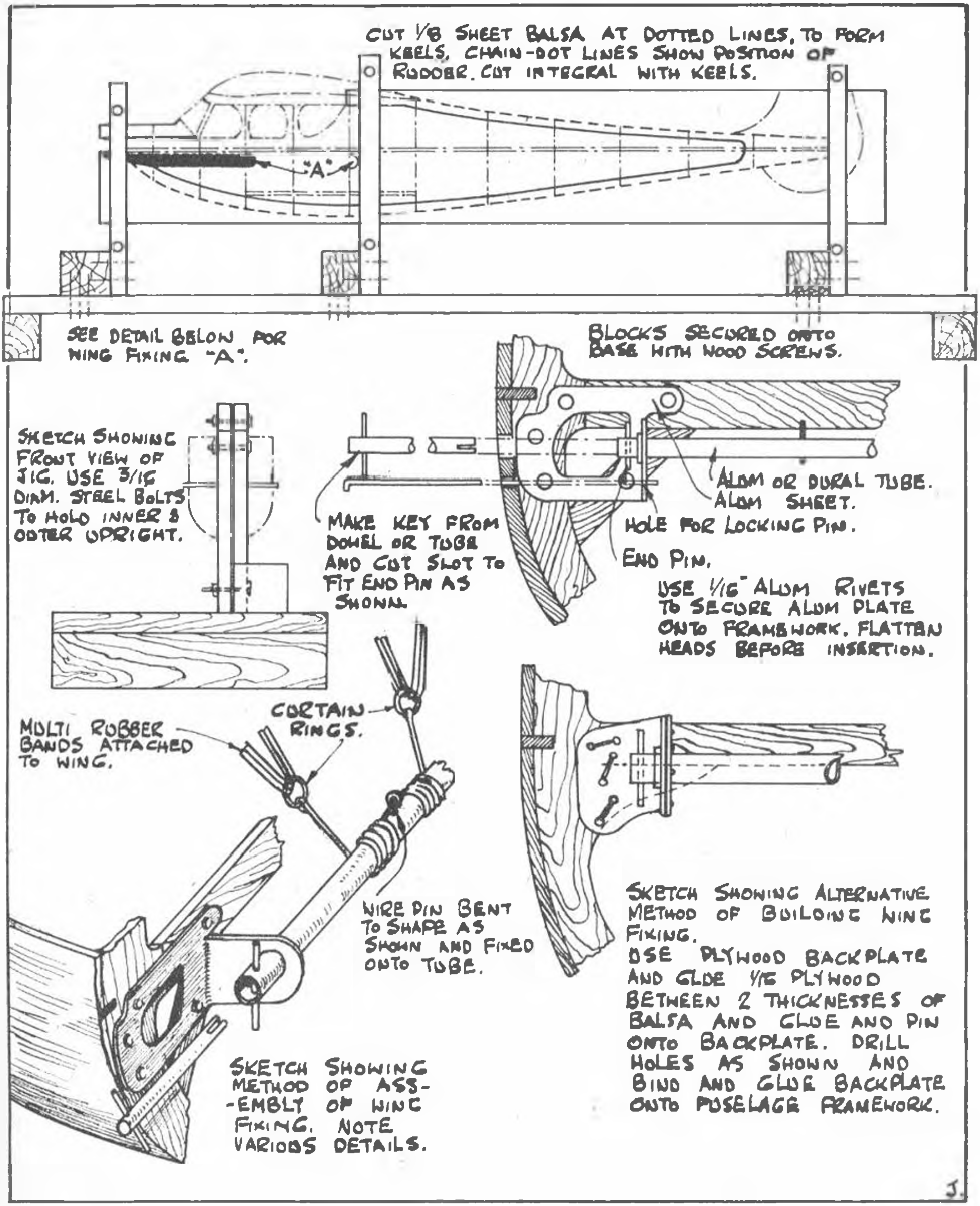
A completely enclosed, efficient and easy-to-get-at wing fixing is very seldom seen. In fact, I have yet to see one completed. I have been experimenting with one and put the result on my petrol model. I will not say it's efficient, as the 'plane is still in the making, but I have hung a 4 lb. weight on each bracket—which is much above its normal load of about $\frac{3}{4}$ lb. on each—and it would hold still more. It enables you to have the wing about 6 in. off the fuselage to work on the batteries, etc.; then you just wind the wing on tight. I think this has been done before and exhibited at some big petrol model meeting and commented on in THE AERO-MODELLER, but I assure you this is no copy, as I, nor anyone else I know, has seen it.

The size and shape of the bracket depends on the size, shape and available space. I used $\frac{1}{16}$ in. aluminium rivets, heads flattened as shown. The flat head goes on the wood side and cut the rivet so an $\frac{1}{8}$ in. is left protruding out of the metal to rivet over. When the rivets are inserted add plenty of glue in the holes; this keeps the wood from spreading and adds greatly to its strength. When riveting place a suitable metal block on the flat head of the rivet, using a light riveting hammer or snap. I did this when the 'plane was on the jig and half completed, so it should be very easy when the former is free. I used a $\frac{1}{4}$ in. 22 gauge duralumin tube about $2\frac{1}{2}$ in. long with $\frac{1}{16}$ in. rod bamboo or wire through either end, being held in by two blobs of glue or solder on the inside of the tube. Of course, the end pins should be a tight fit to begin with; I used small duralumin taper pins, which makes a very permanent job.

The key may be made from any rod or tube that either fits in or over the main tube, with a slot cut in at the end to take the end pin. All one can see on the finished 'plane is two small holes in the side of the fuselage—one to take the " T " key and the other the locking pin whose purpose it is to lock the end pin when the wing is tight in position. This passes through the fuselage and then into the bracket.

If preferred, wood may be used as shown. Glue the bracket; then bind it across the grain to stop splitting. Use plenty of glue on the binding and wood. Use $\frac{1}{16}$ in. or $\frac{1}{8}$ in. ply slab, stuck and screwed, and make a strong filleted joint.

For the fixing itself use strong flexible thread with small curtain rings and multi elastic bands attached to an inlaid hook in the wing. Make sure not to wind it up so much that the elastic bands get wound on to the tube, as I have found this inefficient, for the elastic gets stretched in some places, causing it to slip and become loose.

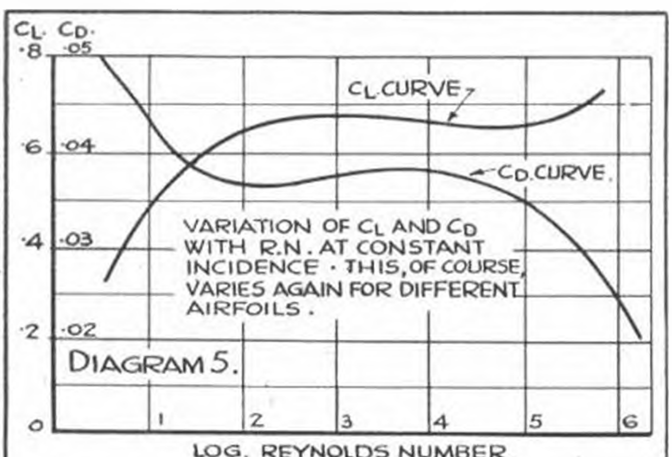

CUT 1/8 SHEET BALSA AT DOTTED LINES, TO FORM KEELS. CHAIN-DOT LINES SHOW POSITION OF RUDDER. CUT INTEGRAL WITH KEELS.
"A"
SEE DETAIL BELOW FOR WING FIXING "A".
BLOCKS SECURED ONTO BASE WITH WOOD SCREWS.
SKETCH SHOWING FRONT VIEW OF JIG. USE 3/16 DIAM. STEEL BOLTS TO HOLD INNER & OUTER UPRIGHT.
MAKE KEY FROM DOWEL OR TUBE AND CUT SLOT TO FIT END PIN AS SHOWN.
ALUM OR DURAL TUBE.
ALUM SHEET.
HOLE FOR LOCKING PIN.
END PIN.
USE 1/16" ALUM RIVETS TO SECURE ALUM PLATE ONTO FRAMEWORK. FLATTEN HEADS BEFORE INSERTION.
MULTI RUBBER BANDS ATTACHED TO WING.
CURTAIN RINGS.
WIRE PIN BENT TO SHAPE AS SHOWN AND FIXED ONTO TUBE.
SKETCH SHOWING ALTERNATIVE METHOD OF BUILDING WING FIXING.
USE PLYWOOD BACKPLATE AND GLUE 1/16 PLYWOOD BETWEEN 2 THICKNESSES OF BALSA AND GLUE AND PIN ONTO BACKPLATE. DRILL HOLES AS SHOWN AND BIND AND GLUE BACKPLATE ONTO FUSELAGE FRAMEWORK.
SKETCH SHOWING METHOD OF ASS--EMBLY OF WING FIXING. NOTE VARIOUS DETAILS.
J.

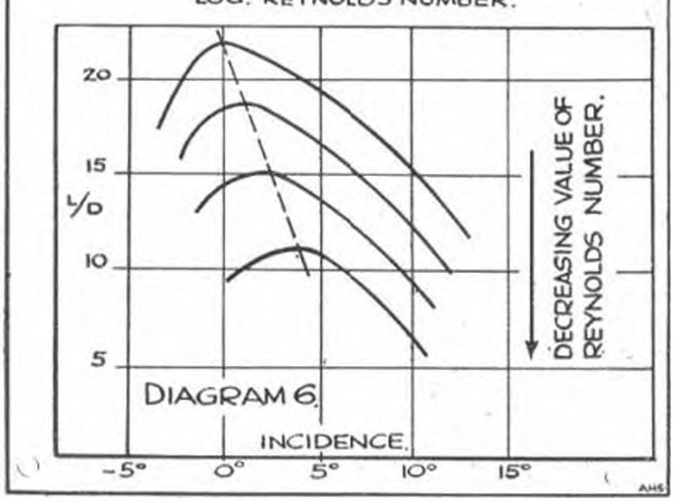
THE REYNOLDS NUMBER

WE often find the expression "at a Reynolds Number of," or "with increasing values of the Reynolds Number . . ." cropping up, especially with regard to airfoils and their characteristics, but too many people have only a vague notion of its meaning. Many are apt to remember what they have read in text-books and say "Oh, it's scale effect," and leave it at that, without looking into the matter further. Well, it's quite an important question, because the Reynolds Number, or R.N., is continually turning up in advanced aerodynamics.

Consider a 4 in. airfoil moving at 28 ft./sec. and an 8 in. airfoil also at 28 ft./sec. Both are travelling at the same velocity, but the 8 in. (chord) airfoil is obviously being affected by *twice* the number of molecules, and therefore we can reasonably expect its characteristics to be slightly different. This is so, and, as a point of interest, the Reynolds Number of the larger airfoil is *twice* that of the smaller.

We can also see now that some standard of reference is required for test and experimental work. If data for a wing section employed on a 'plane to fly at 60 m.p.h. has been collected at a different speed, the results will be different, even if the *size* of the airfoil was the same in each case. One of the most important items accompanying airfoil data, then, is the Reynolds Number at which the test was carried out.





Let us go right back to the beginning and see how the Reynolds Number came into being. Consider a circular cylinder of diameter d placed at right-angles to a given airstream of constant velocity v ft./sec. The length of the cylinder is immaterial, as it will not affect the calculation, but it must be sufficiently great that any air disturbance due to the flow over the ends will not affect the part we are concerned with. Now it is reasonable to suppose, and experiment has verified, that the force acting on this cylinder will be proportional to:

(i) A function of the velocity, v.
(ii) A function of the diameter, d.
(iii) A function of the density of the air (considered constant), ρ.
(iv) A function of the viscosity, μ (also constant).

There are no other likely factors to consider. (Actually there are one or two more minor contributaries, but these may be ignored; otherwise the calculation will become too involved).

Now, if the ultimate force—call it R—is proportional to each of the above in turn it is proportional to their product and we can write our general equation in the form:

(1) $R = Kv.^{w}d.^{x}\rho.^{y}\mu.^{z}$

where K is a constant introduced to permit an equality sign to be used and w, x, y and z are indices of v, d, ρ and μ yet to be determined.

We can find the values of these indices by balancing the dimensions on each side of the equation like this:

R is a force, its dimension is thus MLT^{-2} (i.e. mass × acceleration).
V is a *velocity*, its dimension is thus LT^{-1} (i.e. length/time).
d is a *diameter*, its dimension is thus L (length).
ρ is a *density*, its dimension is thus ML^{-3} (i.e. mass/volume).
μ is a *viscosity*, its dimension is thus $ML^{-1}T^{-1}$ (i.e. $\frac{\text{mass}}{\text{length}}$ (per unit time)).

Substituting the various dimensions in equation (1) we must have for consistency.

$$MLT^{-2} = K.L^{w}T^{-w}.L^{x}.M^{y}L^{-3y}.M^{z}L^{-z}T^{-z}.$$

Whence: $1 = y + z.$
$1 = w + x - 3y - z.$
$-2 = -w - z.$

Having only three equations, we must express three of the exponents in terms of the other, as follows:

$w = 2 - z.$
$x = 2 - z.$
$y = 1 - z.$

Thus, substituting in equation (1) again:

$$R = K.v^{2-z}.d^{2-z}.\rho^{1-z}\mu^{z}.$$
$$= Kv^2d^2\rho\left(\frac{\mu}{vd\rho}\right)^{z}$$
$$= Kv^2d^2\rho\left(\frac{vd\rho}{\mu}\right)^{-z}$$

Now, μ/ρ is known as the kinematic *viscosity* of the air, ($1{\cdot}59 \times 10^{-4}$ ft.^{2}/sec. at S.T.P.), and is usually denoted by γ. Substituting in the above:

$$R = Kv^2d^2\,\delta\left(\frac{vd}{\gamma}\right)^{-z}$$

By R. H. Warring

To simplify still further, combine the constant K and $\left(\frac{vd}{\gamma}\right)^{-x}$ into a general function $\rho\left(\frac{vd}{\gamma}\right)$: the equation then becomes :

$$R = \rho v^2 d^2 \delta\left(\frac{vd}{\gamma}\right)$$

One more step ; d^2 is an area, and so let us write A in its place :

$$R = \rho A v^2 \delta\left(\frac{vd}{\gamma}\right)$$

We have now got our familiar general formula (minus constant which we have ecombined in the function) with a function of $\frac{vd}{\gamma}$ tacked on.

This group, or function, $\frac{vd}{\gamma}$ is called the *Reynolds Number*, and is very important in comparative calculations. We are now in a position to calculate the Reynolds Number from the above, but in that form it is rather cumbersome. For easy working :

$$\text{From } R = \frac{Vd}{\gamma}$$

R.N. of wing $= 6{,}300 \times v$ (ft./sec.) $\times$ chord (*feet*).

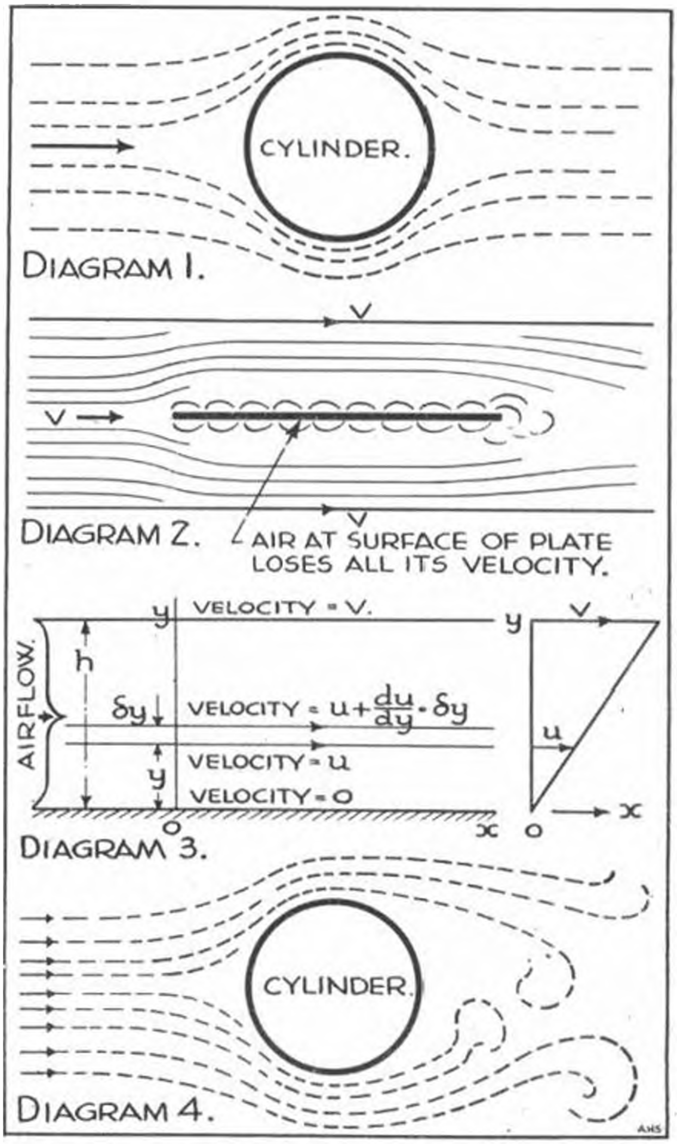
So much for that ; we should now know what Reynolds Number means when we come across it, but let us go on to see what effect a change in R.N. has on the characteristics of the airflow past anything—not necessarily wings.

At slow speeds air is sluggish, due to its inertia. Yes, even air has an appreciable mass—1 cu. ft. weighs 1·227 oz. at St.T.P.—and in flowing past a strut, wing, etc., would tend to conform to the shape of the obstruction, i.e. the flow would be *streamlined*, see Diagram 1. But we must be cautious at this point, for we are on dangerous ground.

Imagine a small, rigid but very thin plate held stationary and parallel to a uniform airflow. It might be expected that, on account of its extreme thinness, the disturbance would be negligible. This is far from true, however. Air coming in contact with the plate is brought to rest and air passing close by has its velocity considerably reduced—Diagram 2.

To find out what is happening we must imagine that we can see the atoms of air as they pass very close to the plate. However smooth the plate, its surface is only a network of atoms, too, and such as to have considerable attraction for any other nearby atoms. Thus the nearby air atoms flowing past are attracted, and we get a film of condensed air molecules actually on the plate itself. These do not remain attached to the plate indefinitely, though ; they receive energy, partly from the body of the plate and partly from bombardment by free air molecules, and when this energy reaches a certain quantity (actually equivalent to the latent heat of evaporation) the molecules free themselves and once more return to the airstream. Thus, although we get a thin layer of air adjacent to the plate at rest at the surface of the plate, the molecules in this stationary air are continually jumping out again and being replaced by others.

When these molecules jump out, too, they have to be speeded up again, thus retarding the general airflow to a considerable depth from the plate. The result is something



as in Diagram 3. O is the surface of the plate we are considering, and the parallel line above it the point at which the airflow is V, again the velocity of the stream. The velocity of air touching O is equal to O. Draw Ox in the fixed plate and Oy perpendicular to it.

The next bit involves the use of calculus ; some people may prefer to " skip " it. The result is interesting, however.

Consider a stratum of air thickness δy, the lower edge of which is distance y from Ox. If the velocity at the lower face is u that on the upper surface of the stratum will be $u + \frac{du}{dy}\delta y$. On the lower face there is a retarding force, since other strata of air nearer Ox have less velocity. This retarding force is equal to $\mu \frac{du}{dy}$. Similarly on the upper face of the stratum there is an accelerating force, because the strata above δy are moving with a velocity approaching V. This acceleration is equal to $\mu \frac{d(u + \frac{du}{dy}\delta y)}{dy}$

$\therefore$ Total force is equal to the difference of these two and expressed as an accelerating force along Ox :

$$= \mu\left(\frac{d(u + \frac{du}{dy}\delta y)}{dy} - \frac{du}{dy}\right)$$

$$= \mu\frac{d^2u}{dy^2}\delta y.$$

But this force must be zero, as the resultant laminar flow is steady :

$\therefore \frac{d^2u}{dy^2} = O$ (as μ or δy are not zero).

From which we get by integrating twice :

$u = Ay + B$

To find A and B, take $u = o$, $y = u$; and $u = V$, $y = h$.

Then $A = \frac{V}{h}$, $B = O$.

And so the original equation becomes :

$$u = \frac{V}{h}y$$

Thus the velocity of airflow at a distance y, within the boundary layer can be simply calculated, knowing the thickness of the boundary layer. (The thickness of the boundary layer is taken as the distance from the surface at which the air is moving at a velocity of 95 per cent of that of the airstream. h therefore equals 100/95 times the theoretical boundary layer thickness. A formula giving this thickness is :

$$T = 4{\cdot}5\sqrt{\frac{ve}{V}}$$

Where v = kinematic viscosity of the air.
e = distance from leading edge (in feet).
V = velocity of airflow (ft./sec.).

Put an airfoil, strut, fuselage, etc., in the airstream and we get a similar result.

Thus the airflow over such objects seems to be laminar, but this is not always so. Let us return to our original cylinder. If the velocity increases, all the other factors remaining constant, it seems reasonable to expect that it will eventually tend to fly tangentially off the surface—Diagram 4. Or, if we increase the diameter of the cylinder we might expect the same result. Increase in density (i.e. decrease of kinematic viscosity which equals μ/ρ) would again help such a break away.

Do you see where we are leading? All the factors mentioned above mean an increase in Reynolds Number ($\frac{vd}{v}$), and it seems that with increasing R.N. we will get a different condition of flow *This is exactly what does happen*. When the Reynolds Number increases beyond a certain critical point the flow over an airfoil, plate, strut, etc., changes from purely laminar to a *turbulent* flow with a decided change in characteristics.

It is a well-known fact that stalling incidences of airfoils are extremely sensitive to Reynolds Numbers, and also that model wings stall far earlier than full-size wings. In the former the flow is mostly laminar, and such a flow tends to break away from the surface of the airfoil and rejoin the main flow at a fairly small angle. Now let me quote from Frank Zaic's 1938 Year Book, page 15 : " . . . . Mr. Jacobs thought of placing a ⅛ in. diameter rod a short distance behind the leading edge. The idea being to produce a turbulent flow with which to combat turbulent boundary layer . . . the experiment worked like a charm and the sections followed the action similar to that of high Reynolds Number." Well, he was actually reproducing artificially higher Reynolds Number conditions, at the cost of an increase in drag.

When the Reynolds Number changes the coefficients of aerodynamic force change as well, but this change may be rapid over a small range of R.N., or contrariwise. However, if these coefficients are plotted against corresponding values of R.N. they should lie in a single curve. This curve would then represent δ (R.N.) between the limits of our experiment. Diagram 5 gives a very rough idea how C_L and C_D vary with changing Reynolds Number. Notice how badly off we are at the model end of the scale (low R.N.).

Diagram 6 shows the falling off of the L/D ratio with decreasing R.N. Some of you may remember a few remarkably large rubber-driven models of about six feet wing span which were flown on (should it be over?) Wimbledon Common some years ago, and the durations of 2 min. plus. It is generally agreed that rubber-driven models over about 250 sq. in. wing area do not give very good results, but these seemed to disprove the " experts." I think that they provide a good example of increased efficiency due to greater size. I am not advocating the building of larger models, however. Far from it ! They are much too costly and there are other things to consider as well. Fancy spending ten bob on a rubber motor ! Whilst thermals still exist let us keep to Wakefield size and below.

I do, however, sincerely believe that for serious flying nothing under 36 in. wing span should suffice. (Not indoors, of course—I, for one, would take ages to make a film to cover a 48 in. span microfilm wing !)

The main idea of this article was not to discourse on models, though, but to try and explain something about that mysterious quantity, the Reynolds Number. Too many people avoid discussing it outright, and although I have only done it in a very sketchy manner, I hope it has started someone " furiously to think ! "

(NOTE.—It may be of interest to some readers to learn that Osborne Reynolds first discovered the significance of the quantity $\frac{Vl}{v}$ and so it was called after his name. The actual expression R (or more truly A, aerodynamic force) = $\rho\, d^2v^2\, \delta\frac{Vl}{\gamma}$ is known as *Rayleigh's Formula*).

YES! BE PREPARED

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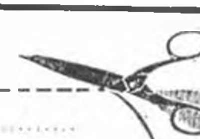

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A "CABIN BIPLANE" MODEL

By R. DOWNES

FOR some reason the biplane is a type of machine that has never quite received the attention of aero modellers that it deserves. At the end of last year, having completed still another " high wing " job I determined to give monoplanes a rest, and, being an enthusiast for the smaller-sized models, decided to turn my attention to designing a biplane with a span of under 24 inches, together with sturdy construction which would put the machine into the " all weather " class.

I soon came to the conclusion that one probable reason why modellists have neglected the biplane is the problem of obtaining a simple yet rigid interplane link. This difficulty has been overcome in the model described, and is directly responsible for its rather unorthodox appearance, due to the underslung lower plane.

It will be seen that two centre sections, joined by two " V " struts, form the only link between the main-planes. In spite of its delicate appearance this method of construction is actually very strong, and has the added advantages of ensuring accurate alignment of incidence of the main-planes and eliminating damage to interplane struts in the event of a heavy wing landing.

The machine as a whole is further strengthened by covering the fuselage with $\frac{1}{32}$ in. sheet balsa and incorporating a very rigid yet light-weight wing construction. This is obtained by covering each wing with $\frac{1}{32}$ in. sheet balsa to a depth of approximately one-third of the chord.

The " Sportster " has a good performance for its size and will do a steady 40 to 50 seconds, best flight so far being one of 73 seconds. In addition, the model has a rapid take-off and a high rate of climb.

The model conforms to S.M.A.E. fuselage formulæ, and has a wing area of 76 sq. in. Total weight, including propeller and motor, is 2¼ oz.

Fuselage.

Constructed in the normal manner by pinning down the balsa sizes indicated on the plan. The two sides are built one on top of the other for reasons of accuracy, and afterwards joined together with the cross-pieces.

The undercarriage supports consist of two short lengths of 18 gauge aluminium tubing, bound and cemented to two additional cross pieces of ⅛ in. by ⅛ in. balsa, which in turn are cemented across the lower longerons. It should be noted that the nose cowling former D is cemented across the top of a $\frac{3}{32}$ in. by $\frac{3}{16}$ in. cross-pieces, and the former A is cemented on top of the nose cross-piece cut from $\frac{3}{32}$ in. sheet.

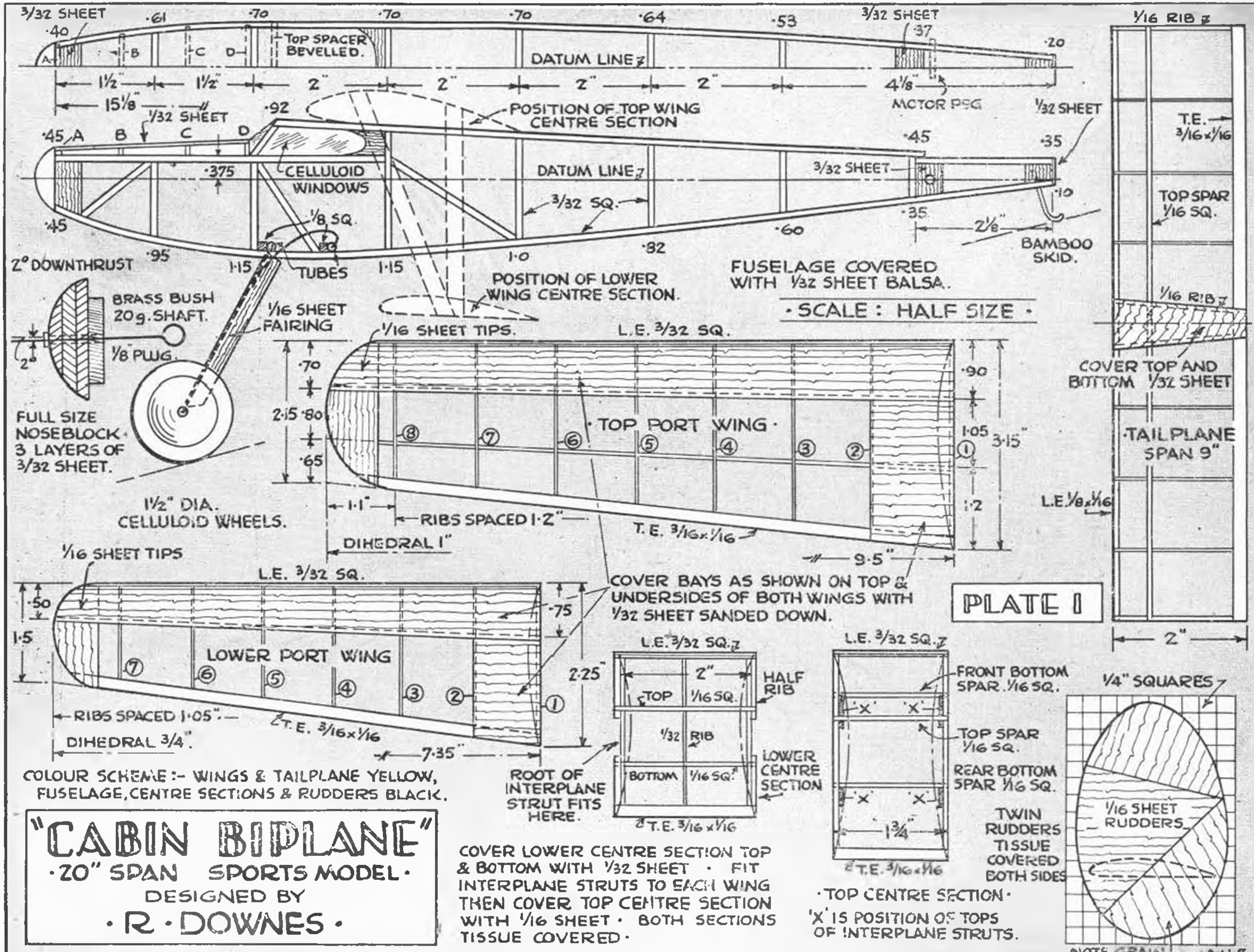
After covering the nose cowling formers with $\frac{1}{32}$ in. balsa sheet, the cabin roof and windshield are cut from thin celluloid in one piece and cemented in place, the windshield being bent down over the bevelled cross piece at the extremities of the upper fuselage longerons, and cemented to the cabin side supports only. The windshield will then assume a curved section. The cabin side windows are now cut out and fitted; finally, the entire fuselage is covered with $\frac{1}{32}$ in. sheet balsa sanded down to a smooth surface. By holding the model up to a strong light, it will be possible to mark the positions of the undercarriage supports by forcing a pin through the sides of the fuselage and into the aluminium tubes.

Nose-block.

Constructed of three layers of $\frac{3}{32}$ in. balsa sheet so that the grain of the middle piece opposes that of the two outside pieces. Before finally sanding to shape, fit the locating piece of ⅛ in balsa sheet. Drill out the nose-block to take the brass propeller bush, or alternatively a piece of brass tubing. This propeller shaft bearing should be inserted at an angle to give 2° down thrust.

Undercarriage and Tail Skid.

Bend one leg and wheel spindle from a length of 18 s.w.g. piano wire in the manner indicated in the sketch on the plan, and push the wire through the balsa fuselage side



COLOUR SCHEME :- WINGS & TAILPLANE YELLOW, FUSELAGE, CENTRE SECTIONS & RUDDERS BLACK.

"CABIN BIPLANE"

·20" SPAN SPORTS MODEL·

DESIGNED BY

·R·DOWNES·

COVER LOWER CENTRE SECTION TOP & BOTTOM WITH 1/32 SHEET · FIT INTERPLANE STRUTS TO EACH WING THEN COVER TOP CENTRE SECTION WITH 1/16 SHEET · BOTH SECTIONS TISSUE COVERED·

·TOP CENTRE SECTION·

'X' IS POSITION OF TOPS OF INTERPLANE STRUTS.

and through the aluminium tubing. The protruding wire is then bent downwards and outwards to form the other undercarriage leg. Length of each leg = 4 in. Wheel track = 5¼ in.

The two rear undercarriage supports are bent to shape as shown, the ends slipped into the rear fuselage tubing, and the front ends soldered to the undercarriage legs. Four inch lengths of streamlined celluloid tubing are slipped over the undercarriage legs to give them "body." As an alternative, pieces of $\frac{1}{16}$ in. sheet balsa may be bound and cemented to the undercarriage legs. Two 1½ in. diam. celluloid wheels complete the undercarriage unit.

The tail skid is bent from a short length of $\frac{1}{16}$ in. bamboo and cemented in position at the tail end of the fuselage.

Centre Sections and Interplane Struts.

The upper and lower centre sections are built up on the plan. Trace off the centre section ribs on to $\frac{1}{16}$ in. sheet balsa, and proceed with the construction of the top centre section first. The two ribs are set inwards at an angle of 5°. The top centre section is completely covered in two sections with $\frac{1}{16}$ in. sheet balsa, but before doing so it is necessary to construct and fit the interplane struts.

Pin down to the interplane strut template two lengths of ¼ in. by $\frac{1}{16}$ in. *hard* balsa. Carefully trim off the ends, also taper the lower end of the rear strut to conform to the rear edge of the front strut. Mark off in pencil the position of the dotted line, which indicates the position of the lower edges of the top centre section ribs. Now remove struts from the plan and firmly cement them together at the root.

Two pairs of identical struts are required, and they must be checked together, as absolute accuracy is essential. It is particularly important that roots are cut accurately along the line indicated on the plan, as this line determines the incidence of the lower planes.

The top ends of the interplane struts are cemented to the inner surfaces of the top centre section ribs. Make sure that the lower edges of the ribs lie along the pencilled lines on the struts. Reference to the top centre section plan and the fuselage side elevation will indicate the exact position of the front and rear struts in relation to the centre section spars.

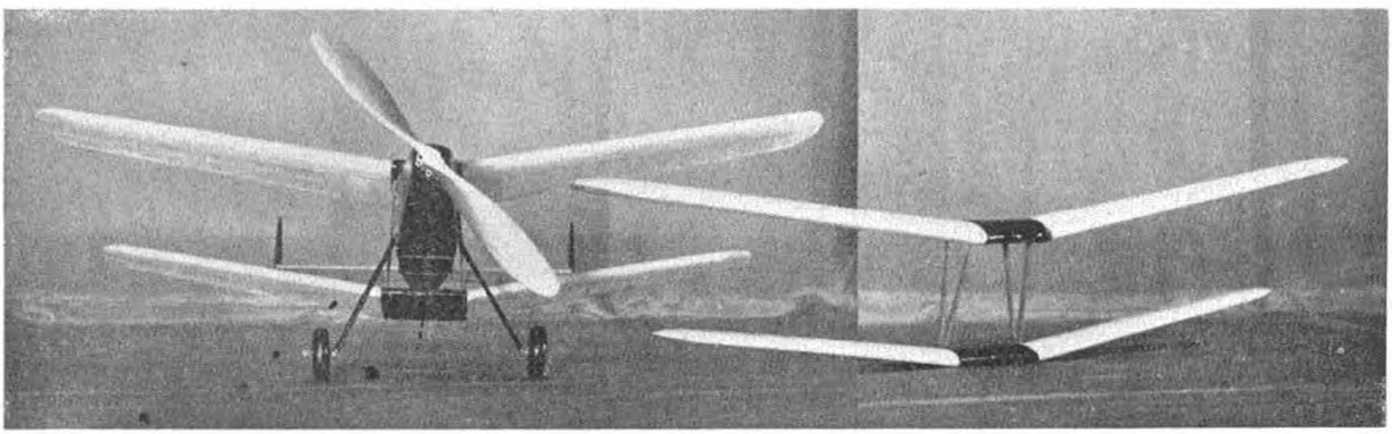
The top centre section can now be covered with $\frac{1}{16}$ in. sheet balsa in two pieces joining at the leading and trailing edges. It will be necessary to rebate the underside covering to accommodate the interplane struts.

The lower centre section is constructed in the same manner. This is wider than its upper counterpart, and the inward setting of the centre section ribs correctly splays out the roots of the interplane struts to fit the lower centre section. Before uniting the two centre sections, the lower centre section half-ribs are fitted, as these form "insets" into which fit the strut roots. Cover the underside of the lower centre section with $\frac{1}{32}$ in. sheet balsa, cement the interplane strut roots into place, and finally cover the top side of the lower centre section with $\frac{1}{32}$ in. sheet balsa.

Top Wings.

Pin down the leading and trailing edges to the plan; cement in place the $\frac{1}{16}$ in. sheet balsa wing tips and ribs.

The top and lower spars are secured, and the space between the leading edge and top spar on *both top and underside surfaces* is covered with $\frac{1}{32}$ in. sheet balsa sanded down. Cover the top surface first by cementing a piece of $\frac{1}{32}$ in. sheet along the top spar, applying cement to each rib and the leading edge, and securing the balsa sheet in place by rubber bands round the wing until set. The



covering is then trimmed off at the leading edge and smoothed down. An equal distance across the chord is now covered on the underside of the wing.

Similarly, the remainder of the first "bay" between ribs 1 and 2 is covered on both surfaces with $\frac{1}{32}$ in. sheet. Reference to the sketch will make this clear.

To construct the right-hand half-wings it will be necessary to take a tracing from the plans and build the right-hand half-wings on the reverse side of the tracing.

Lower Wings.

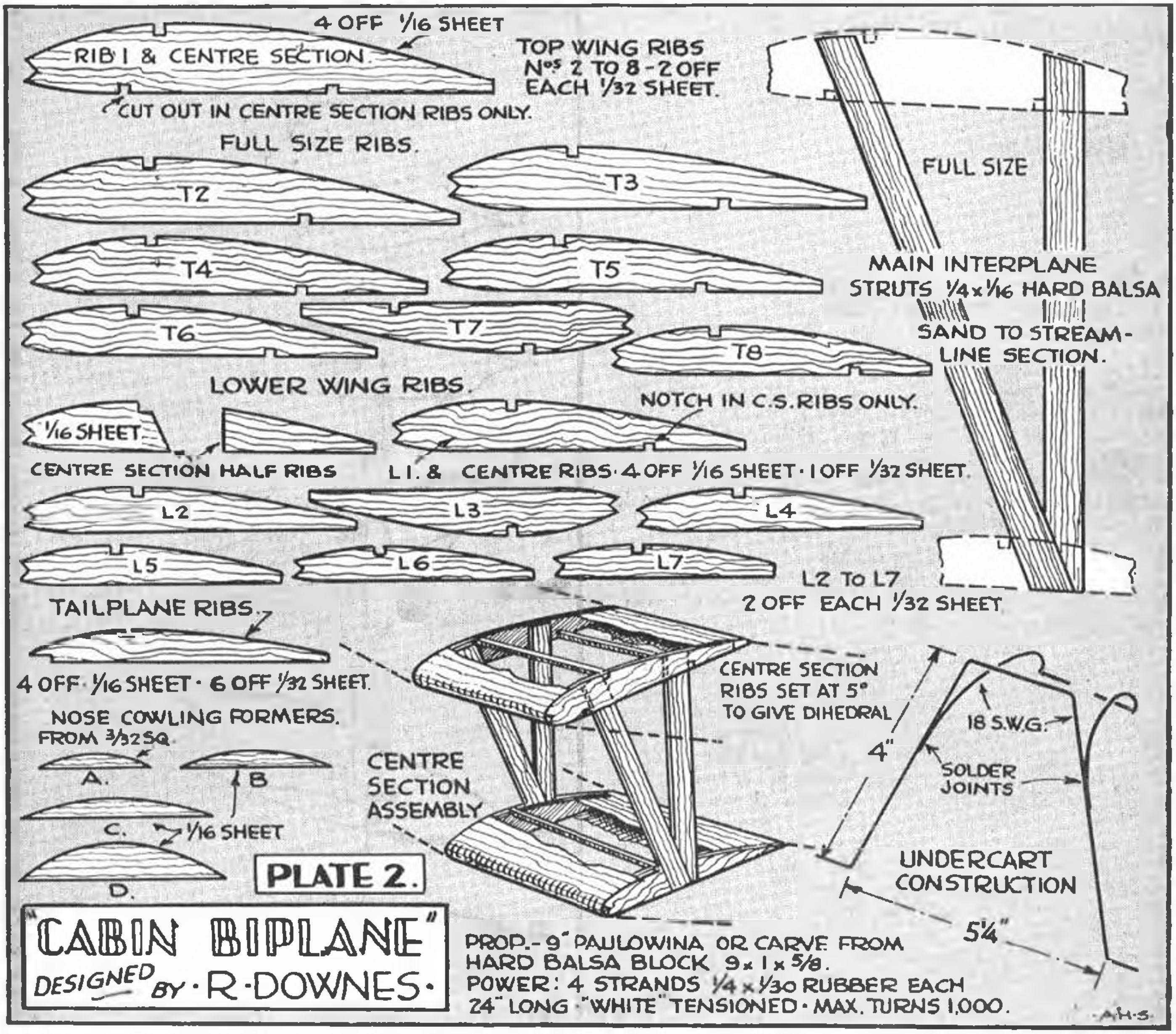
These are constructed in the same way as the top wings, but with a dihedral of three-quarters of an inch at the wing tips.

Covering and Fixing Wings.

Both wings and centre sections are now covered with tissue and water sprayed. When dry, give the wings *only* two coats of banana oil. The half wings are cemented by their roots to the centre sections, care being taken to see that the upper and lower wings are parallel.

Tail-plane.

This is of simple design, and is built "on the plan." The small centre section is covered on both surfaces with $\frac{1}{32}$ in. sheet balsa, and the tail then covered with tissue, water sprayed, and given one coat of banana oil.



Twin Rudders.

These are cut in three sections from 1/16 in. sheet balsa. The sections are cemented together edgewise, with the grain in opposing directions to prevent warping. Cover with tissue and cement to the tail-plane end-ribs in the position indicated.

Finishing the Model.

The fuselage and centre sections are given two thin coats of glossy dope of a colour in suitable contrast to the wing tissue.

The wing unit is secured by placing two rubber bands over the fuselage, sliding the tail end of the fuselage between the interplane struts and securing the rubber bands over the top centre section by means of a small wire " S " hook. The tail-plane is fixed by a single rubber band passing from in front of the rear rubber peg, over the tail centre section and over the tail skid.

Propeller and Motor.

Use a standard 9 in. diameter " Pawlonia " wood propeller, driven by four strands of ¼ in. by 1/30 in. rubber, each strand being 24 in. in length and tensioned. A free-wheel device can be incorporated if desired.

Flying the Model.

The motor is stretch-wound, and after several windings will accommodate 1,000 turns. A piece of 1/16 in. square balsa inserted between the nose-block and fuselage imparted sufficient side-thrust to make the model climb in a gentle right-hand turn (against the torque). It is best to let the machine take off in a direction slightly sideways to the wind, so that it will climb into it. The position of the wings, as indicated in the fuselage side-elevation, will be found to be approximately correct, but on windy days set the main-planes back about a quarter of an inch.

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LOW-WING MODELS

By HOWARD BOYS

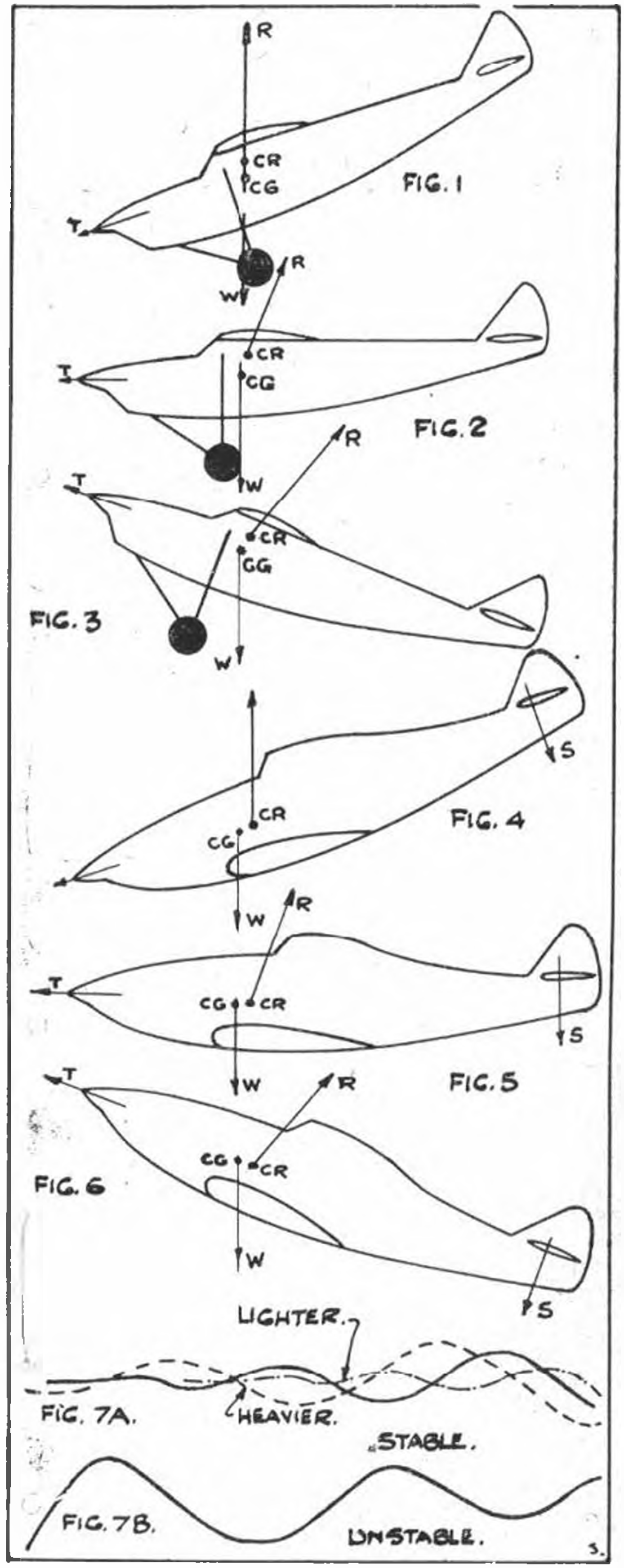
MY remarks in these articles will be mainly on scale models, though many of them will also concern the duration type.

Why I am writing so much about low-wing models is because most full-size machines are low-wings, and scale models are gaining in popularity. As I go further with these articles (I do not know how long they will last) I want to give particulars of a method by which it will be a straightforward and simple job to make a low-wing model stable enough to give a good flight. I have not finally worked it out yet, but am getting towards it.

In the first place, low wing models are usually reckoned as "difficult," and the belief has gone round so strongly that it seems to me that people build low-wing scale models without expecting them to fly very well. Also I do not like the way people say that low-wings are difficult, just because they hear others say so. As an example of this I will relate a little experience of mine. One day, when the weather was a bit breezy, I was trying out a true-to-scale model of the B.A. Swallow. Things were not going too well, though under the circumstances I did not think they were too bad, when a friend came along. In the course of our conversation he remarked that low-wings were difficult. I asked why he should say so, since he had a low-wing semi-scale model that did a regular 60 sec. with never a crack-up, and asked if he had any difficulty. He said he had no difficulty, and admitted that he only said they were difficult because they were generally reckoned to be difficult. Well! I have heard the statement so often that I have almost been guilty of repeating it, even though I have had no difficulty to speak of. That, I think, is because of the way and the time I started building models that really flew, so I will recount the start of my successful aero modelling career. Ahem!

I built my first successful model in the year 1930, and it was based on the Pelly Fry small seaplane, a 22 in. span high-wing model with rectangular fuselage, built of spruce, ply, wire, and silk covered. Circular fuselages and low wing were supposed to be more efficient than rectangular fuselages and high-wing, so in my ignorance I made a round (in places) fuselage, and low-wing, and of course wheel chassis. I also redesigned the tail-plane and fin to look more like the Schneider Trophy machines. The model weigh 2¼ oz., was perfectly stable, and flew beautifully on many flights of 25 sec. I think it was good, because I experimented patiently with the wing incidence and position. In those days no one seemed to be aware of any difficulty, except that of fixing the wing to the fuselage.

Well, now let us look into the possible causes of difficulty, and see what we can do about it. In the first place, I do not think it will be possible to get as good a duration from a low wing as a high-wing, but I think the low-wing would score in the matter of speed. Figs. 1—6 illustrate the



difference. Let us first consider the model gliding as in Fig. 1. In this, W represents the weight of the model acting at the centre of gravity, and R represents the result of all the aerodynamic forces, that is, the lift and drag of everything. To get the best glide, the wing is moved forward—or back with a duration model—or the C.G. is moved with a scale model. The C.G. then always tends to come vertically under the point marked C.R. like the swing of a pendulum, and as the speed increases or decreases the point C.R. will tend to move forwards or backwards, to keep the model in a certain angle of glide.

Fig. 2 shows the model in horizontal flight, and here the nose is partly held up by the thrust. As the thrust decreases the weight tends to pull the nose down into the gliding angle.

Fig. 3 shows the model climbing, and here the extra thrust is pulling the nose higher. The thrust line is shown passing through the C.G., though it may not do so. Sometimes the propeller is tilted downwards, so that the thrust line is nearer to C.R., and does not tend to pull the nose up so much.

Now we come to the low-wing model, and it is shown gliding in Fig. 4. The letters mean the same, except that the force on the tail-plane is shown separately, since I think it is easier to see what happens. With the low-wing we are not likely to get the C.G. much below the C.R., so we cannot get the pendulum effect, but as the speed increases so R increases, tending to raise the model; but, more important, S increases, and rotates the C.G. round the C.R., pulling the nose up until the speed decreases again. With the model in horizontal flight (Fig. 5), it is again the extra speed that keeps the nose up, by means of the increased force on the tail-plane. The thrust line will most likely need setting to prevent the nose going too high. Now we come to the climb (Fig. 6), and this is, I think, where we come to the chief difficulty. I am not quite sure what happens here, but it seems fatal to allow the model to climb at anything more than a small angle. If the model gets above this angle, the climb seems to keep increasing at a high rate until the machine stalls. I think it may be that the slipstream on the tail does not decrease as the forward speed of the model decreases, and since the slipstream does not decrease the force S does not decrease to let the tail up. This certainly seems feasible, since "down-thrust" often helps low-wing models, in spite of the fact that there is always a tendency to hold the nose down. There is something else that may have a bearing on this matter, and that is that when the C.G. gets above the level of C.R. its tendency to pull the nose down decreases. It looks from this that a tail-plane giving a fair lift might help, but I am not sure of that at the moment. I have not made any investigations that way so far, as I have never liked lifting tails, for the simple reason that if the model should get into a dive it is most unlikely to get out. Well, I may look into that later. However, I think it is due to this downward pull required from the propeller, to keep the climb from getting too steep, that a low-wing model will never put up such a good duration as the high-wing type.

Before going further, I think I ought to mention that in Figs. 1—6 it is assumed that there is no change in the incidence or angle of attack of the model. It is only the attitude, that is, climbing or gliding, that alters. We want the incidence to stay at its most efficient angle, and the means to do this will be mentioned later.

The next thing I want to deal with is the effect of the weight and its distribution.

The first thing is that the heavier the model the faster it will have to fly to stay in the air, and the more power it will need to fly it. It is, however, other effects with which I am concerned just now. Fig. 7 shows what is called the phugoid motion of the machine. One is stable and the other is unstable. I expect most of you will have seen, at some time or another, a model proceeding as though a barman had got hold of the joystick. Well, with a stable model, if something upsets it slightly, it will climb and dive alternately, each up and down getting less until it again flies smoothly. With the unstable model the dives and climbs get worse, and the model usually finishes in bits. Suppose we have a model that goes up and down just like the thick line in Fig. 7a. If that model was made heavier in some way it would behave more like the line shown dotted, and if the model was made lighter in some way it would fly like the chain dotted line. That is not all. Think of the model you first thought of, and suppose you could alter it in some way that would spread the weight out. Just to see what happens, imagine you had two heavy formers in the middle where the C.G. is, and then cut them to bits and put the bits at the nose and tail so that the model balanced just the same as it did at first, then it would behave like the heavier model again. Now take it the other way round, and suppose you could collect some of the weight from the nose and tail and put it in a bunch at the C.G., although the total weight is the same, the model would behave like the lighter model. This bunching up and spreading out of the weight alters what is called the inertia of the model. That is, its tendency to stay put, or, when once moved, its tendency to keep moving in the same direction at the same speed. This means that the lighter a model is, other things being equal, the quicker is the recovery from any upset, or, to be more correct, the less the inertia the quicker the recovery. Of course, the inertia also works the other way round, and the greater the inertia the less the likelihood of the model being upset. I prefer the quicker recovery—it is not so hard on the models.

There are two causes of instability, such as that shown in Fig. 7b. One is the C.G. being too far back—and that is the most likely—and the other is the tail-plane area being too small. With a duration type model you can push the wing back a bit, but with a scale model it means adding weight to the nose, though it might be possible to reduce the weight at the rear. One way, for instance, is to shorten the motor. If the tail-plane is too small the cure is obvious, but a small tail-plane can be counteracted by having the centre of gravity far enough forward. It may be interesting to note here that a machine without a tail is made stable by having the C.G. forward of the centre of lift, and balanced by a down load at the rear. This is usually produced by the upward tilt of the wing tips, though in one machine of recent design a small stabiliser in the form of a floating wing is fixed forward of the C.G. to hold the nose up, this acting in the same way as a down load at the rear. My idea with scale models is to treat them rather like tail-less models. That is, to have the C.G. well forward and then use what tail area there is to produce the down load at the rear. The idea certainly works with my model Swallow, which has a tail-plane area only 17·5 per cent of the wing area.

Well, this is something to be going on with. I have some figures to work out and graphs to draw for the next article, which will deal with the position of the C.G.

QUESTIONS —— AND ANSWERS CONDUCTED By the EDITOR

Q. *Can you give me details of the "Fokker D.23," and the "Koolhoven F.K.LL"?*—(W. A. S., Alresford).

A. *Fokker D.23*: Single-seat fighter, two motors, one tractor, and one pusher, tricycle undercarriage. Nacelle and twin booms.

Motors are Walter Sagittas, but before the invasion of the Low Countries it was intended to fit Rolls-Royce Merlins. The wing span is 37 ft. 9 in.

A maximum speed of 341 m.p.h. was attained with Isotta-Frascini engines.

Only one D.23 was built, as experiments had not been extended sufficiently to justify production.

Koolhoven F.K.55: Single-seat fighter monoplane. Lorraine "Sterna" 1,000 h.p. motor, driving two opposite-rotating airscrews. Wheels retracted into bottom of fuselage.

Span, 31 ft. 6 in.; length, 30 ft. 5 in.; height, 8 ft. 6 in. One shell-gun and four machine-guns. Maximum speed, 348 m.p.h.; landing speed, 65 m.p.h.; climb, 3,346 ft./min.

Only a few were produced, but experiments were still being made up to May, 1940.

Q. *Can you give me any details about the "Bell Airabonita"?*—(T. W. A., Horsham).

A. The "Airabonita" is a special version of the "Airacobra." The nose wheel has been removed and replaced by a tail-skid and deck arrester gear, but otherwise the two aircraft are identical.

Q. *Can you give me the main details of the "Deperdussin Monoplane" of* 1911?—(A. P., Bristol).

A. I regret that our records contain but few particulars of the "Deperdussin Monoplane" of 1911.

This aeroplane was improved, however, and three years later, at the outbreak of the Great War, was probably the fastest aeroplane in existence.

It was equipped with a 160 h.p. Gnome engine, and had a speed of around 125 m.p.h.

Main dimensions were: Span, 21 ft. 10 in., length, 20 ft. 0 in.; track, 4 ft. 0 in.; chord, 5 ft. 3 in.; tail-plane span, 6 ft. 9 in.

Q. *Can you tell me the power unit and dimensions of the "G.A. Cygnet," "A. W. Scimitar," "Bristol Fighter," "Potez* 160 1 : 2·6 *scale model"; "Lockheed XP.38," "Payen Flechair," and "Curtiss SBC—4 Helldiver"?*—(D. G. W., Middlesbrough).

A. *G.A. Cygnet*: 135 h.p. Gipsy-Major motor; span, 34 ft. 6 in.; length, 23 ft. 3 in.; height, 7 ft. 0 in. (Instruction for building a flying model of this 'plane appeared in the May issue of THE AERO-MODELLER).

A. W. Scimitar: 720 h.p. Armstrong-Siddeley Tiger motor; span, 33 ft. 0 in.; length, 25 ft. 0 in.; height, 11 ft. 7 in.

Bristol Fighter: 250 h.p. or 350 h.p. Rolls-Royce Falcon motor. Span, 39 ft. 3 in.; length, 25 ft. 9 in.; height, 10 ft. 1 in.

Potez 160 1 : 2·6 *scale model*: Six 40 h.p. Train engines. Span, 58 ft. 0 in.; length, 40 ft. 6 in.; height, 11 ft. 3 in.

Lockheed X.P.38: Now called the P.38 "Lightning." Two Allison V-1710-C15 motors. Span, 52 ft. 0 in.; length, 37 ft. 10 in.; height, 9 ft. 10¼ in. (Modelling instructions were given in the June issue).

Payen Flechair. Two 100 h.p. Salmson motors. No other particulars available. This aeroplane was only experimental, and did not go into production.

Curtiss SBC-4 Helldiver: Called the Cleveland in the R.A.F. 840 h.p., Wright Cyclone G motor. Span, 34 ft. 0 in.; length, 27 ft. 5 in., height, 10 ft. 3 in.

Q. *Can you tell me the best method for making transparent cabins, turrets, etc.; also what are the correct colourings of the "Westland Lysander" and the "Morane Saulnier" serving with the Free French Forces?*—(J. W. P., Cowley).

A. The method of making these depends largely upon the kind of turret or cabin.

If a cabin similar to that of, say a "Defiant," is required, the best way is to build up a wire framework and cover neatly with small sheets of stout celluloid.

A gun turret or rounded nose-piece, as on a "Hampden" or "Blenheim," should be made by building a wire framework round the finished portion of the wood, cutting away the unwanted wood and fitting the wire frame into position, covering it with celluloid or "Cellophane."

The transparent material can be made more pliable if soaked in boiling water, but this method is not easy and requires a good deal of practice.

Regarding the "Westland Lysander," this aeroplane is painted in the usual way with green and brown camouflage on all sides and supper surfaces and underneath the fuselage, and silver or pale blue under the wings and tail plane. Red and blue cockades are carried on top of the wings, red, white and blue ones underneath, and four-colour cockades on each side of the fuselage. Stripes are painted on each side of the fin with the red foremost.

A "Moraine Saulnier MS.406C," is similarly painted, except that the fuselage is also blue underneath, and the port wing is black underneath. Small French cockades, the opposite of our own, are painted on each side of the fuselage behind the British markings.

Q. *What are the dimensions and power unit of the "Bucker Jungmeister"?*—(D. W., Middlesbrough).

A. 160 h.p. Siemens Sh.14A seven-cylinder radial air-cooled motor. Span, 21 ft. 7½ in.; length, 19 ft. 4 in.; height, 7 ft. 4½ in.; wing area, 130 sq. ft.

Q. *Please give dimensions, etc., of the following aircraft: "Lockheed 14" Transport (Super Electra), "Douglas D.C.2," "Douglas D.C.3," and "Boeing* 2470."—(J. R. L., Sutton Coldfield).

A. *Lockheed* 14: Two 900 h.p. Wright Cyclone GR-1820-F62 radial motors. Span, 65 ft. 6 in., length, 44 ft. 2½ in.; height, 11 ft. 10½ in.; tail-plane span, 26 ft. 6 in.; max. wing chord, 13 ft. 6 in.; max. tail-plane chord, 6 ft. 9 in.

Douglas D.C.2: Two 875 h.p. Wright Cyclone GR-1820-F52 radial motors. Span, 85 ft. 0 in.; length, 62 ft. 0 in.; height, 16 ft. 4 in., track, 16 ft. 0 in.

Douglas D.C.3: Two 1,100 h.p. Wright Cyclone GR 1820 G102a radial motors. Span, 95 ft. 0 in.; length, 64 ft. 5½ in., height, 16 ft. 4 in.; tail-plane span, 27 ft. 0 in.; max. wing chord, 14 ft. 0 in.

Boeing 247D: Two 550 h.p. Pratt and Whitney Wasp R.1340-S1-D1 radial motors. Span, 74 ft. 0 in.; length, 51 ft. 4 in.; height, 12 ft. 1¾ in.

All the above-mentioned engines are approximately 4 ft. 6 in. in diameter.

Q. *Can you tell me the difference between a "Vildebeest" and a "Vincent," also between a "Walrus" and a "Supermarine Seagull"?*—(J. W. K., Wolverhampton).

A. Regarding the two Vickers torpedo bombers, the "Vincent" is externally identical with the "Vildebeest," but carries slightly differing equipment. The "Vincent" has been used in the Middle East, and is still in use with the Royal New Zealand Air Force.

The "Walrus" and the "Seagull Mk.V" are the same type of aircraft, the latter name being used by the Royal Australian Air Force.

Q. *Can you give me the position of crew's seats and position of controls and instruments of the "Do.215"?*—(R. J. R., Kingston-on-Thames).

A. The "Dornier Do.215" medium bomber carries a crew of four, and the positions of their seats and instruments are as follows:

The pilot sits in the nose on the port side with a dashboard just below the raised front window. His control column is of the "spectacles" type, and projects in front of him from the side of the fuselage.

The front gunner sits beside him on the starboard side, facing forward.

The rear gunner sits facing backwards just behind the pilot and fires his movable gun through the rear raised window.

A hinged entrance panel in the bottom of the fuselage between the pilot and the rear gunner allows the other members of the crew, the lower gunner-bomber, access, and he lies in a prone position along the panel when in position, facing backwards.

Q. *Can you tell me how the undercarriage of a "Spitfire" retracts; also the address of Messrs. Woodasons, and do they sell finished models?*—(R. E. C., Leyton)

A. The Spitfire's undercarriage consists of two oleo pneumatic legs, which are raised outwardly into the undersurfaces of the wings.

The legs twist slightly as they are raised so that the wheels lie flat.

The address of Messrs. Woodason Aircraft Models is Heston Airport, Hounslow, Middlesex. They supply only finished models, and do not make kits.

Q. *Which is the smallest aeroplane and the smallest flying-boat in the world?*—(P. A., Linthorpe).

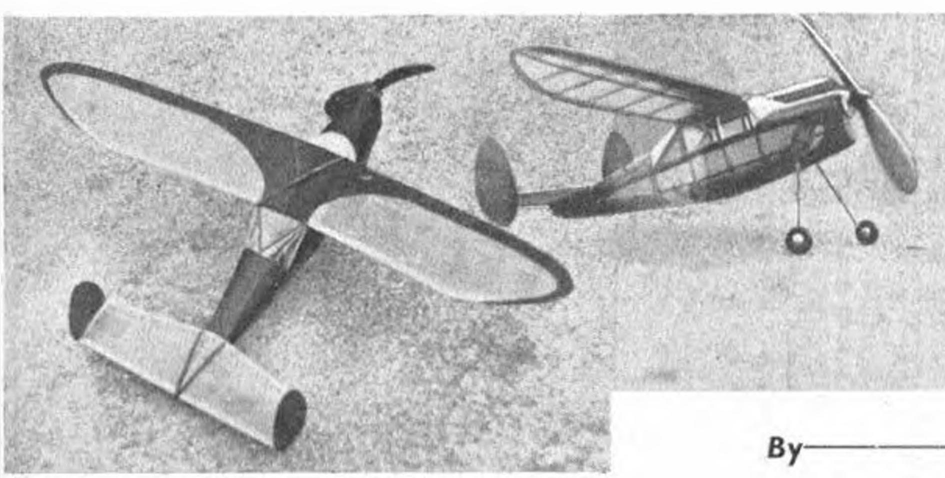
A. Your question is rather difficult to answer, as the "smallest aeroplane" may mean the one with the smallest wing-span or the one with lowest all-up weight.

In America some very small monoplanes have been produced for various racing events with wing-spans of around 20 ft., and weighing about five hundred pounds, but it appears that the Flagg Monoplane is one of the smallest.

This minute aircraft is a low wing monoplane fitted with a 90 h.p. Pobjoy motor, and does about 235 m.p.h. It has a span of only 13 ft.; is 12 ft. long and 4 ft. 2 in. high. The wing area is 24·8 sq. ft. This is probably the smallest wing ever used. The loaded weight is 700 lb.

The smallest flying-boat is apparently the "Scheldesmeeuw," which has a wing-span of about 20 ft. It was a Dutch design by M. Slot.

THE "A.M." CABIN DURATION MODEL



Here is a handy little job for you to to build. Designed as a compromise between the out-and-out duration model and the scale machine, this model is both sturdy and small enough to carry round without creating caustic comments from irate bus conductors.

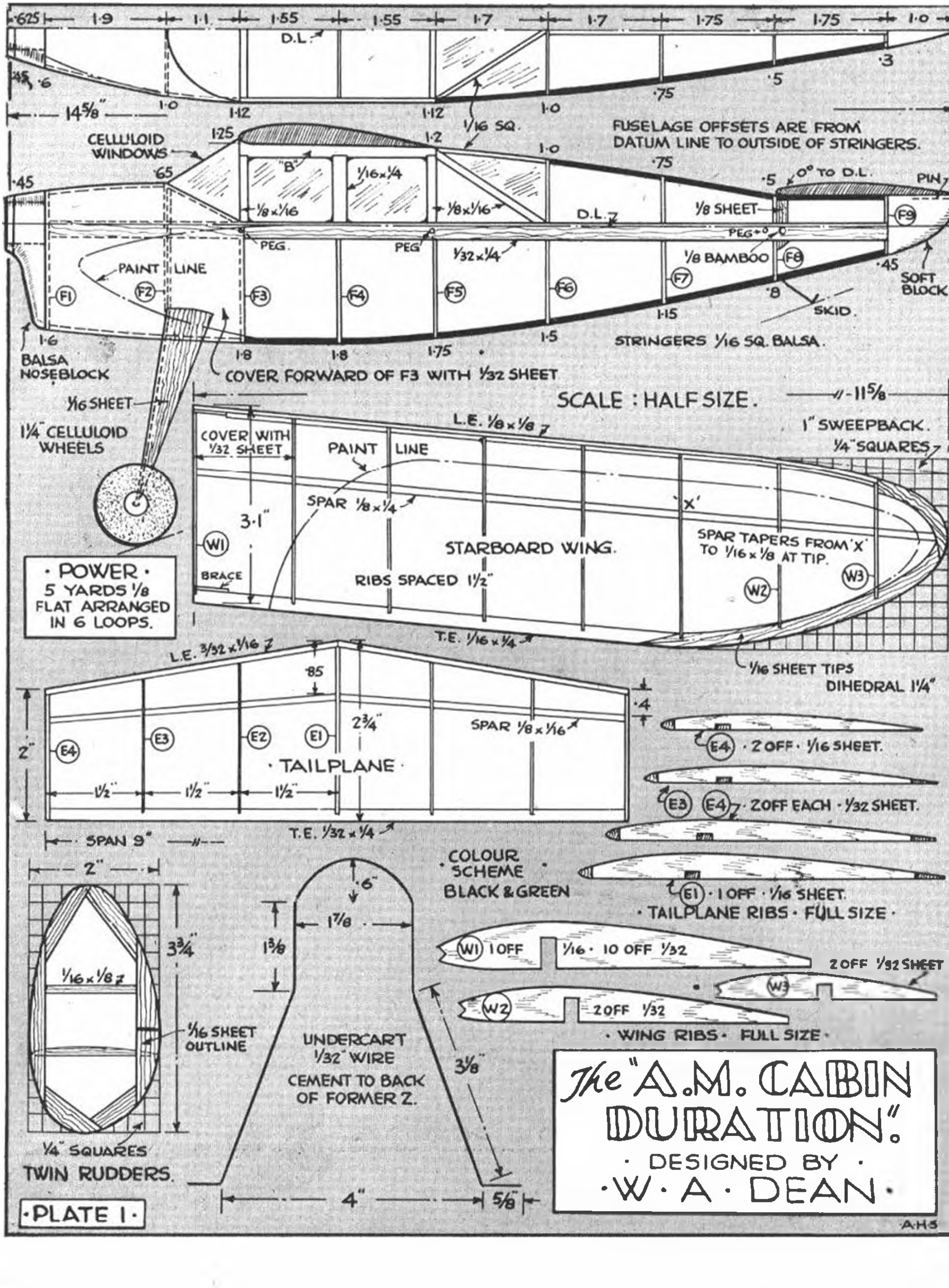
Full size detailed drawings are obtainable from THE AERO-MODELLER Plans Service at 1s. 6d. per set.

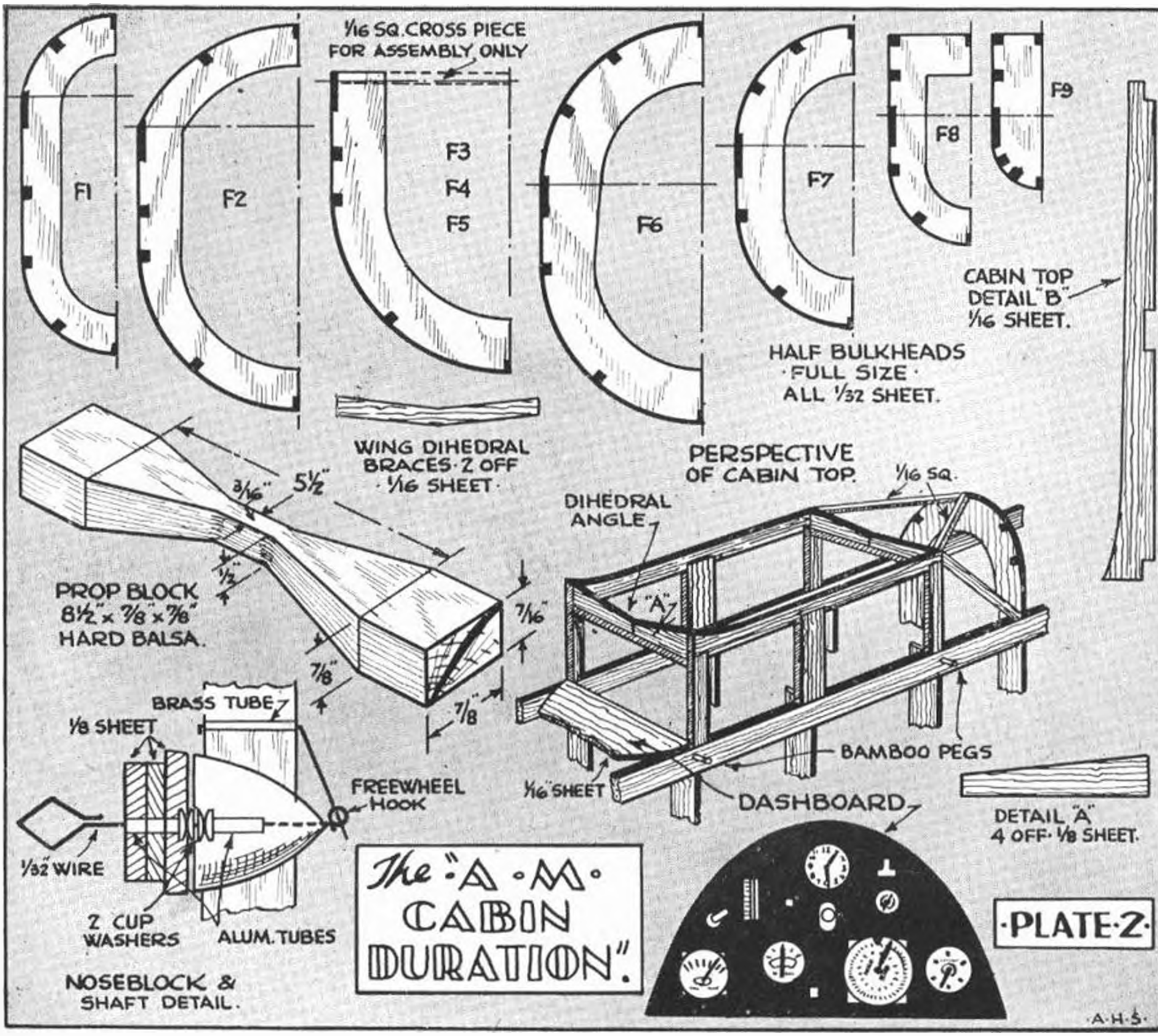
By—W. A. DEAN

THIS little job is the result of an effort to produce a semi scale model that would turn in fairly long flights, comparable with other duration models of similar size. As is only natural, the weight is slightly more, but as will be seen from the photographs, the 'plane is very graceful in appearance, compensating for this slight increase. Like Mr. J. S. Brookes I believe that models of about 20 in. span can prove very interesting, although I fail to see that, as he puts it, all torque and stability problems are magnified out of all proportion to the size of the model. If this is the case then, may I ask why Mr. James, in order to overcome these severe (?) obstacles, designed his "Sunbug" similar in every respect except size (as far as I can see) to any other slab-sided model of Wakefield size?

Construction of the model is quite straightforward, the only unorthodox part being the fuselage, so the building instructions need not occupy much space.

Commence by cementing Formers No. 3, 4 and 5 to the


FUSELAGE OFFSETS ARE FROM DATUM LINE TO OUTSIDE OF STRINGERS.
CELLULOID WINDOWS
1/16 SQ.
1/16x1/4
1/8x1/16
1/8 SHEET
0° TO D.L.
PIN
PEG
1/32x1/4
1/8 BAMBOO
SOFT BLOCK
PAINT LINE
SKID.
STRINGERS 1/16 SQ. BALSA.
BALSA NOSEBLOCK
COVER FORWARD OF F3 WITH 1/32 SHEET
1/16 SHEET
1 1/4" CELLULOID WHEELS
SCALE : HALF SIZE.
L.E. 1/8x1/8
1" SWEEPBACK.
1/4" SQUARES
COVER WITH 1/32 SHEET
SPAR 1/8x1/4
STARBOARD WING.
SPAR TAPERS FROM 'X' TO 1/16x1/8 AT TIP.
RIBS SPACED 1 1/2"
BRACE
T.E. 1/16x1/4
1/16 SHEET TIPS
DIHEDRAL 1 1/4"
· POWER ·
5 YARDS 1/8 FLAT ARRANGED IN 6 LOOPS.
L.E. 3/32x1/16
SPAR 1/8x1/16
· TAILPLANE ·
T.E. 1/32x1/4
SPAN 9"
E4 · 2 OFF · 1/16 SHEET.
E3 E4 · 2 OFF EACH · 1/32 SHEET.
E1 · 1 OFF · 1/16 SHEET.
· TAILPLANE RIBS · FULL SIZE ·
COLOUR SCHEME BLACK & GREEN
W1 1 OFF 1/16 · 10 OFF 1/32
2 OFF 1/32 SHEET
W2 2 OFF 1/32
· WING RIBS · FULL SIZE ·
1/16x1/8
1/16 SHEET OUTLINE
1/4" SQUARES
TWIN RUDDERS.
UNDERCART 1/32" WIRE
CEMENT TO BACK OF FORMER 2.
·PLATE I·
The "A.M. CABIN DURATION".
· DESIGNED BY ·
· W · A · DEAN ·
A.H.S.



two side longerons of $\frac{1}{16}$ in. by $\frac{1}{4}$ in., pieces of $\frac{1}{16}$ in. by $\frac{3}{16}$ in. being used to prevent them being pulled together until the remaining formers are in position. (See plan). Next comes the cabin assembly and the other formers, followed by the $\frac{1}{16}$ in. by $\frac{1}{16}$ in. stringers. The nose block is roughly carved and finished off after cementing to the fuselage. Access to the elastic is from the top of cabin between F8 and F9, which is left uncovered for this purpose. The cabin windows are covered with very thin celluloid sheet. A simple free wheel is shown on the plan, but one behind the propeller looks neater, and also allows propellers to be changed easily.

The wings and tail-plane are made in the usual manner and kept in position with elastic bands.

The original model was finished in black and green. (The separating lines are given as dot dash on the plan). Two coats of dope are given after first tightening the paper with water.

When complete, balance by the centre section. Add weight, if necessary, until the model balances at about one-third behind the leading edge. Carry out test flights in calm weather, gradually increasing the turns until the maximum of 500 or so turns is reached. Adjust to circle to the right, that is, away from the torque, and a fast steep climb will result.

GADGET REVIEW

CONDUCTED BY M·R·KNIGHT · ILLUSTRATED BY C·RUPERT·MOORE.

THE conducting of the Gadget Review by a modeller whose activities have tended towards the elimination of "gadgetry" may seem anomalous, not to say amusing.

When birch and silk were the customary constructional materials, and geared motors the accepted accompaniment, the writer exhibited a preference for the simplicity and convenience of plain wire airscrew-shafts—*ad lib.* from the coil! Subsequently, no marked predilection has been shown towards folding airscrews, retracting undercarriages and similar modern inconveniences. And where pilotless flying is concerned, particularly with the all-weather type of model, gadgetry in general is still regarded as *tending* to involve complication without conferring sufficient advantage by way of compensation.

That is quite a different attitude, however, from deeming gadgetry redundant under all circumstances. Some devices may merit publicity by virtue of their ingenuity, even though they may be far from indispensable. In other cases, though an entirely practical application may not have been worked out, the idea may point the way to eventual gain in performance or convenience. Some suggestions, of course, though representing a departure from accepted practice, may not constitute an improvement. It will be for the writer to sort them out and weigh them up! And before someone retorts, "Heaven help the poor inventor," let one hasten to add that, though difficult to please, where gadgetry is concerned, one does not propose to be devastatingly critical.

In fact, acceptance of the work of conducting this monthly review is justified by concurrence in the editorial opinion that not only readers, but also senders of ideas, may benefit—though the latter may, on occasion, suffer somewhat!—from a policy which may perhaps not unfittingly be defined as "being cruel to be kind."

The desire to avoid personal bias prompts the selection, for the first description, of an idea relating to a type of model of which the writer is not enamoured. It is a sliding, crash-proof wing mount suited to a "parasol" with streamlined fuselage. Devised by Mr. B. R. Aldridge, of Romford, who is a practical modeller, it has the merit of dispensing with centre-section struts and bracing, which are prone to come off badly (actually as well as metaphorically) in collisions with trees, bicycles and small boys' faces, and is certainly neater and more pleasing.

The rails of the seating-box (see Fig. 1) and, of course, the base of the wing-mount which slides therein, must be of good tough wood, or wear and tear will speedily result in a rickety seating. Mr. Aldridge suggests that, the most satisfactory wing position having been found, the mount should be secured with cement, and the slots in the top of the fuselage covered over. This would reduce the risk of inadvertent change in trim, but at the expense of some reduction in shock-absorbing ability. A-A are bamboo pegs for wing fixing.

From the same modeller comes a device for holding wings true while the covering is drying after shrinking or doping (Fig. 2). By the insertion of suitable packing beneath one end of the trailing-edge clamp, wash-out could be incorporated. The decrease in angle would, of course, be continuous from root to tip, and the more usual tip wash-out would necessitate a hingeing of the end of the clamp. Inversion of the trailing-edge clamp should serve for wings with reflex trailing edge.

An idea for reducing the vulnerability of twin fins is submitted by Mr. A. F. Syms, of Bursledon, Hants (see Fig. 3). It entails a model of sufficient size (say, to the Wakefield formula) to allow for the weight of a box spar in the tail plane. Despite the ever-present problem of keeping the rear end of the model light, the idea seems well worth developing. The sender suggests applying a similar idea to the fixing of a wing to the fuselage, but one feels that rigidity under all conditions would not be secured without a very sturdy, and therefore heavy, seating. Another reader's idea, on similar lines, but probably better suited to a light model, appeared in the June AERO-MODELLER.

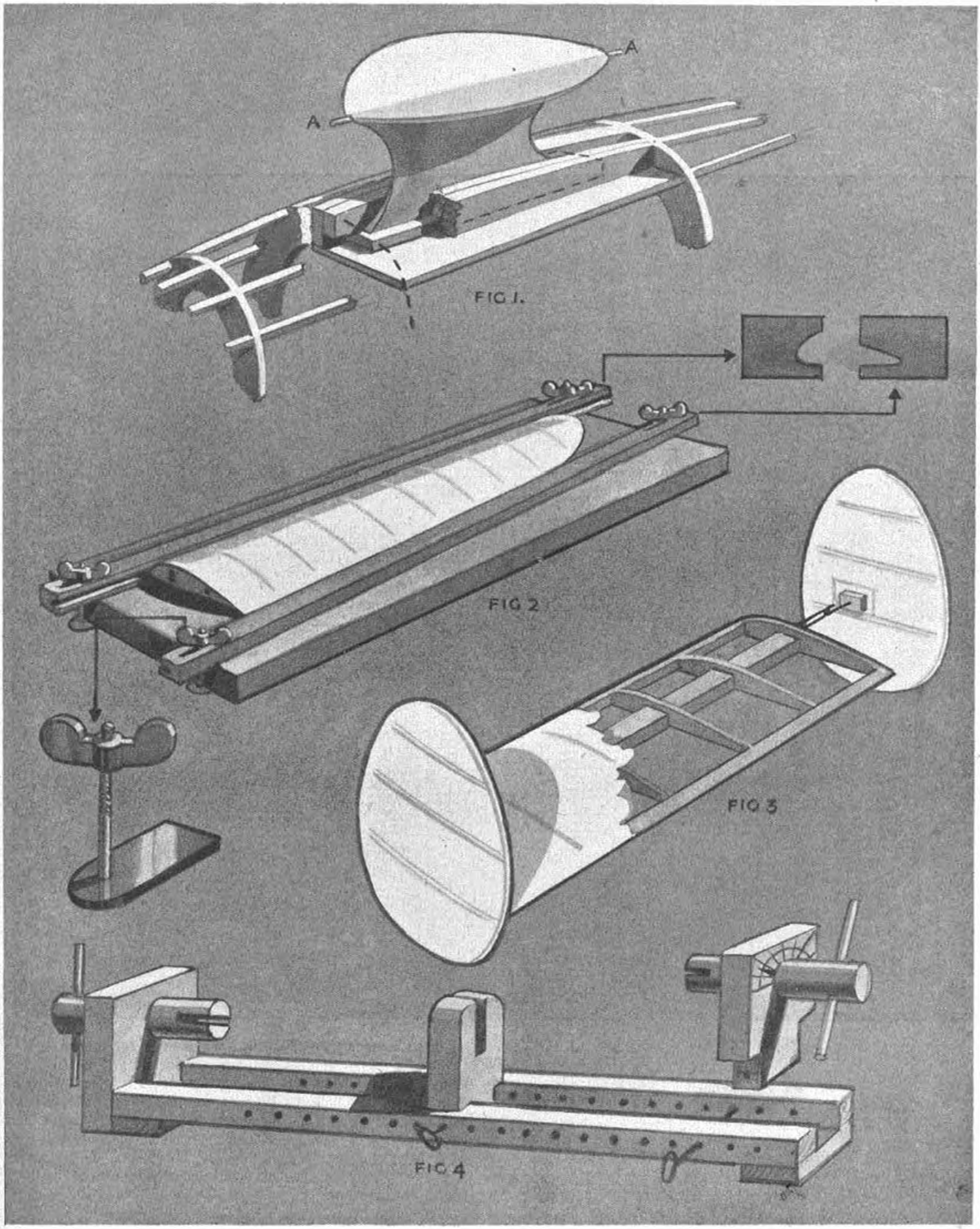
A means of forming airscrews from $\frac{1}{4}$ in. or $\frac{3}{8}$ in. balsa sheet is depicted in Fig. 4, and is the work of Mr. A. H. Weekes, of Ashford, Kent. Though less efficient than carved airscrews, these "bentwood" types would probably function tolerably well on lightly-loaded models and would assist in conserving our meagre supplies of timber.

A diameter of 5 in. and upwards can be obtained, the centre-piece which holds the boss, and one of the end chucks which hold the blade-tips, being adjustable. These chucks are formed from pieces of broom-handle (war spreads to the kitchen!) and are a sufficiently tight fit in the holders to obviate the need for thumbscrews. On the outside face of the nearer holder will be noticed a scale of degrees, and a clock-hand screwed to the chuck forms a pointer. The chucks are held in position by sardine-tin openers filed smooth!

Mr. L. F. Shelton, of Hatfield, sends an ingenious idea for a "double-duty" undercarriage which, having taken the model off the ground, shall produce lift sufficient to pay for itself, instead of becoming a performance-reducing "passenger" (Fig. 5). He appears to rely on the lift-reaction from the outer face of each strut-cum-winglet to raise it to a flying position. The reviewer has not tried the idea, and has learned to be sparing in the use of the word "impossible," but mechanical retraction would seem to be needed to secure *equal* and *simultaneous* raising of each strut.

As to the practical value, there could scarcely be much margin between a size of winglet capable of real work and one which made itself felt in an unpleasant change in trim.

An idea for a practical undercarriage on "oleo" lines is submitted by Mr. R. L. Aaron, of Ilford (see Fig. 6). Such a landing gear is not ideal, since it is really intended to deal with the stresses of a "three-pointer" rather than the "fly-on-to-the-ground" proclivity of the pilotless model.

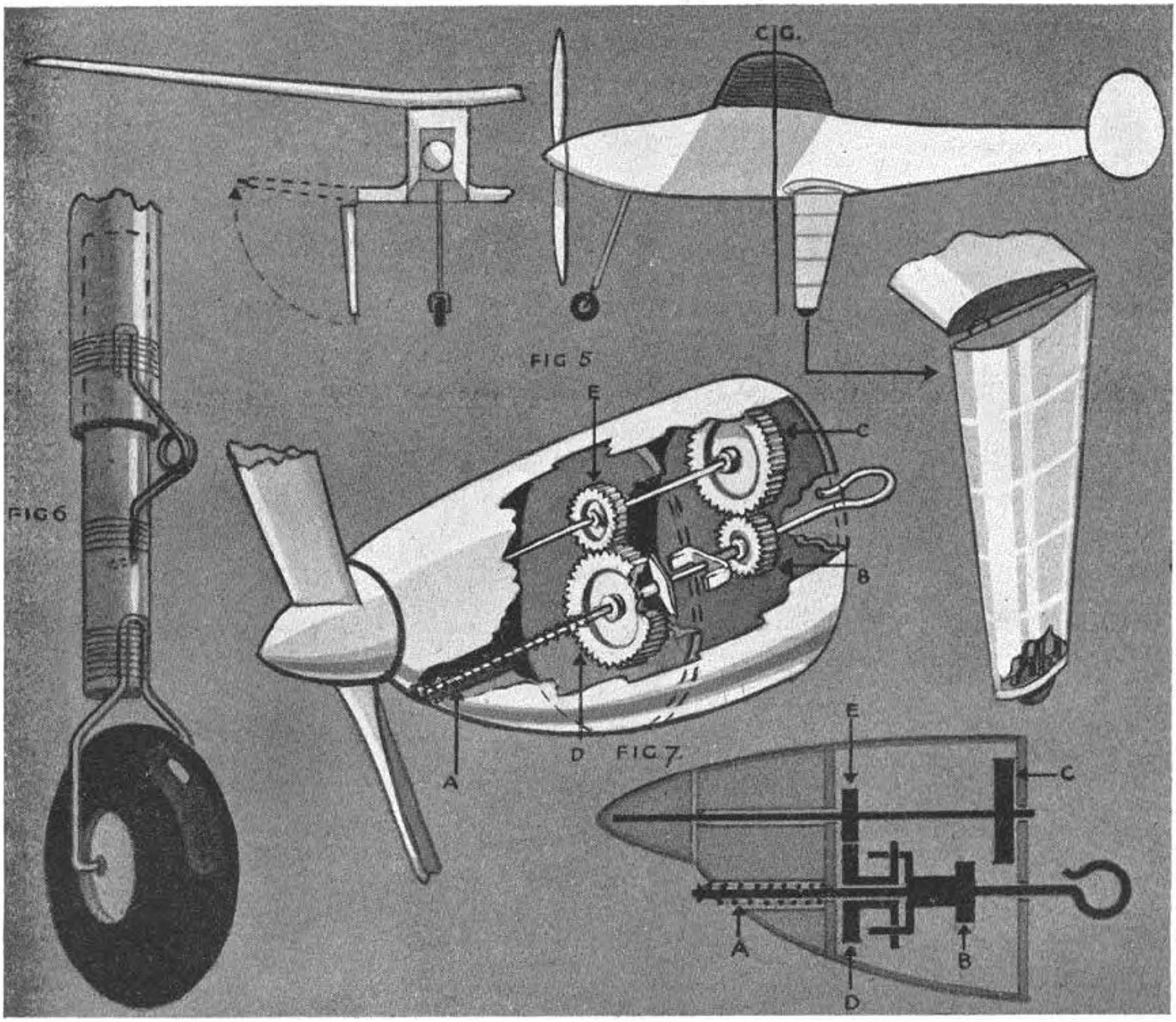

A
A
FIG 1.
FIG 2
FIG 3
FIG 4

But where circumstances impel a single-strut undercarriage, as is often the case in scale modelling, here is a means of imparting a reasonable degree of springing.

One suggests that only the doubling of the ends of the "safety-pin" will ensure the retention of fore and aft alignment.

Our concluding description is of a "two-speed" gear (Fig. 7), with which Mr. A. J. Smith has been experimenting for some months. The object is to reduce the initial surge of power from a rubber motor, the varying output of which constitutes one of the biggest problems in securing satisfactory line-up, and to conserve some of the energy for the later stages of the flight.

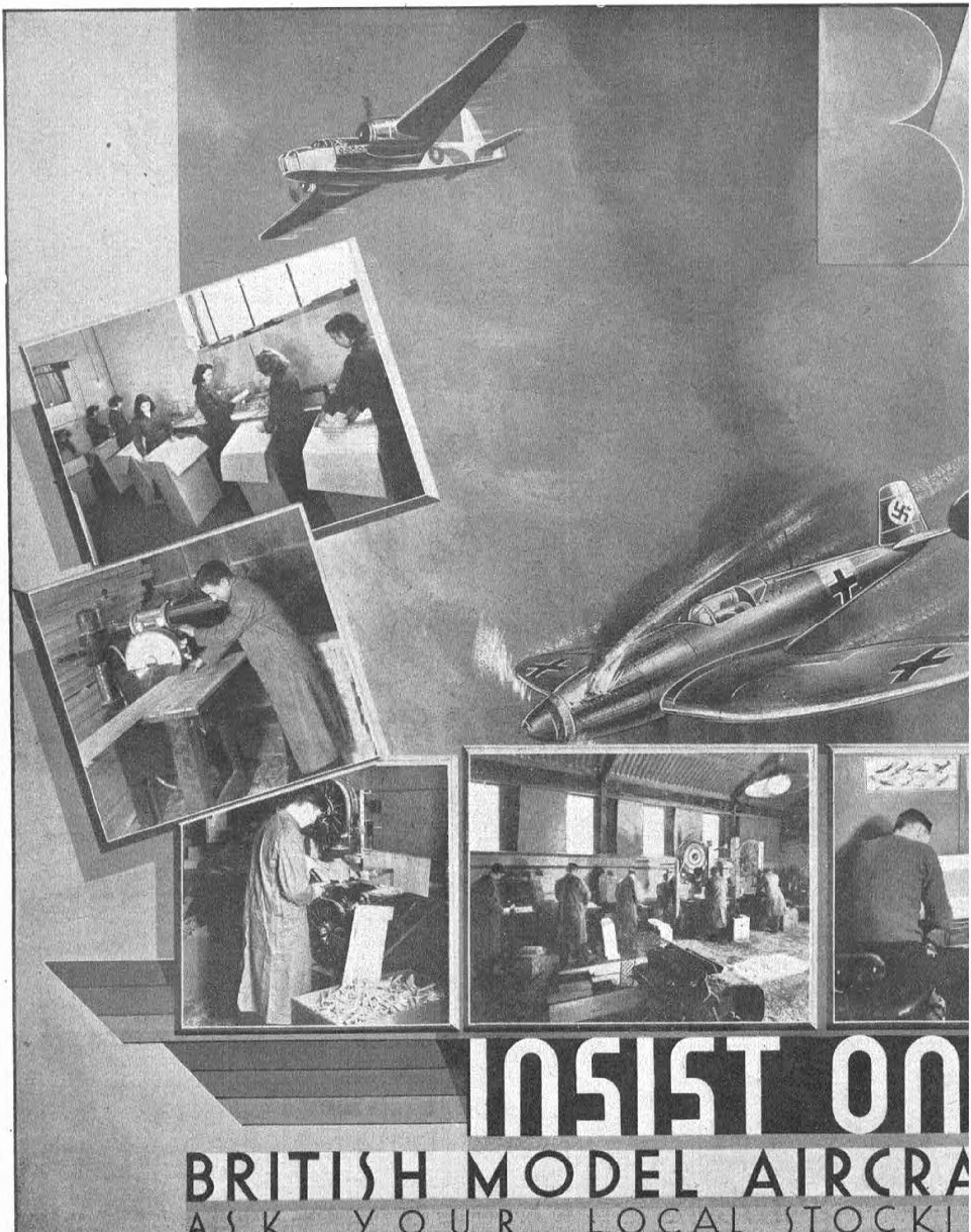
The device operates in the following manner. When the rubber skein is fully wound the motor shaft is pulled rearwards, compressing spring "A" and meshing gear wheels "B" and "C." This results in the airscrew turning at a speed lower than that of the motor shaft. As the tension of the motor lessens, spring "A" pulls the motor shaft forward. This disengages wheels "B" and "C," and the clutch on the motor shaft then brings into action gear wheel "D," which, being mounted loosely on the shaft, has until now been idling. Power is now transmitted through wheels "D" and "E," and airscrew rotation is accordingly speeded up.



The sketches show alternative positions for the front train of gears, namely, in front or behind the former. Personally, I should prefer the former location, thus providing a closed "box" that could be treated as an oil box.

Mr. Smith puts forward the idea as an interesting experiment rather than for immediate application to contest models. One suggests that it will demand shafts sufficiently sturdy to eliminate flexing, and a quality of workmanship distinctly above the average.

WELL, HOW DO YOU LIKE GADGET REVIEW IN ITS NEW FORM? THE EDITOR WILL APPRECIATE YOUR VIEWS ON THIS NEW SERIES, AND INVITES FURTHER CONTRIBUTIONS TO THIS FEATURE FROM READERS



INSIST ON
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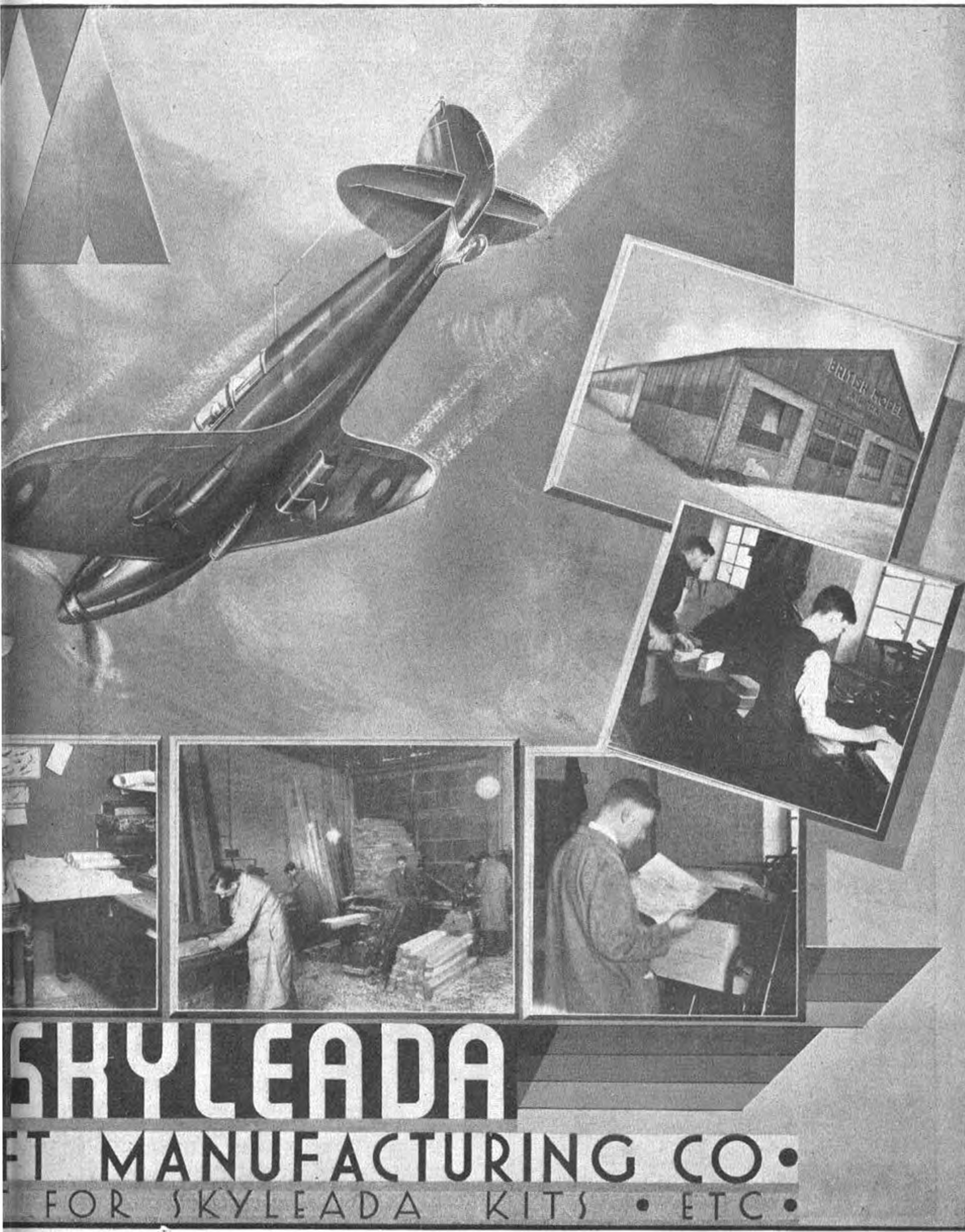
ASK YOUR LOCAL STOCKI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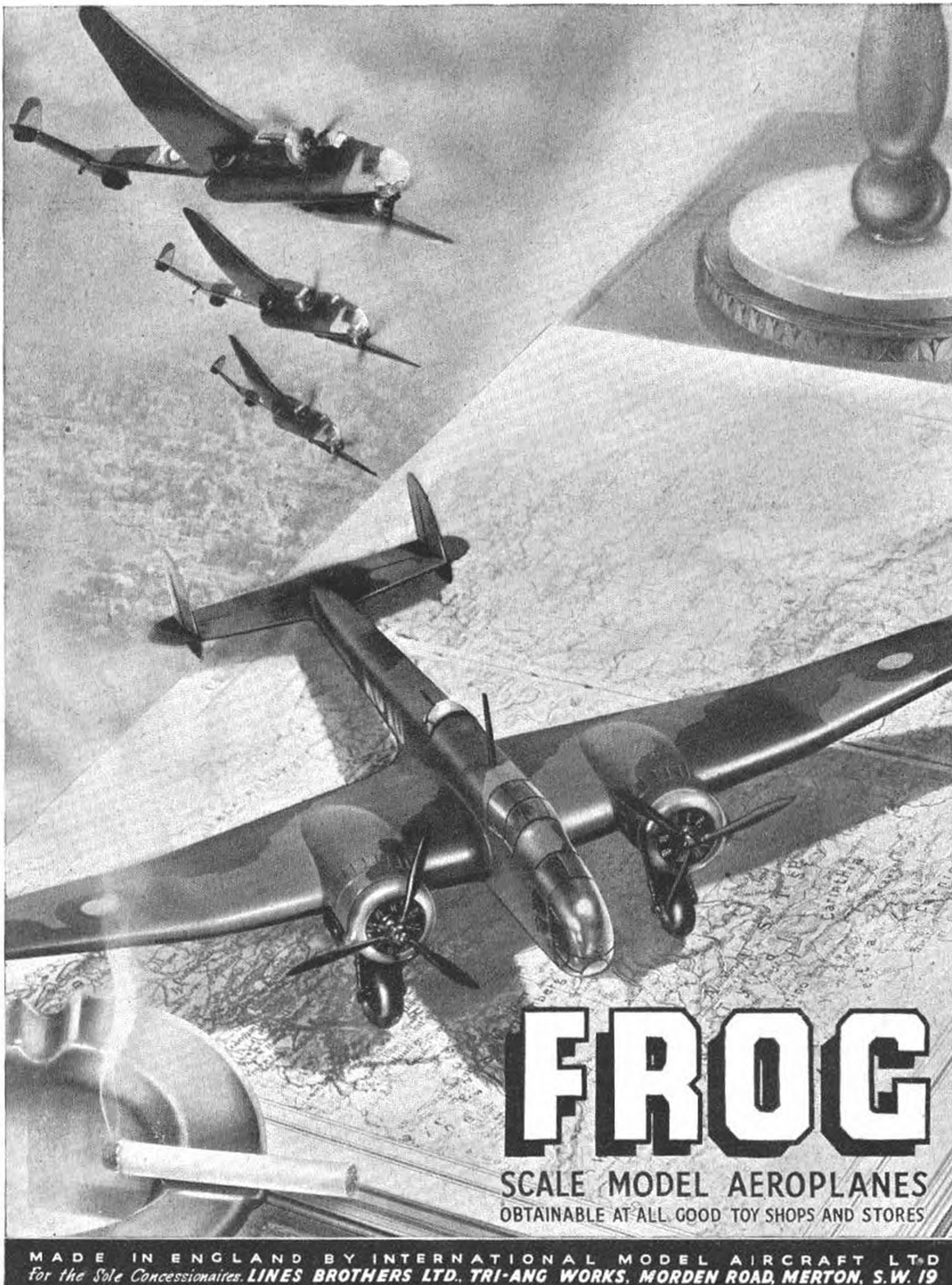
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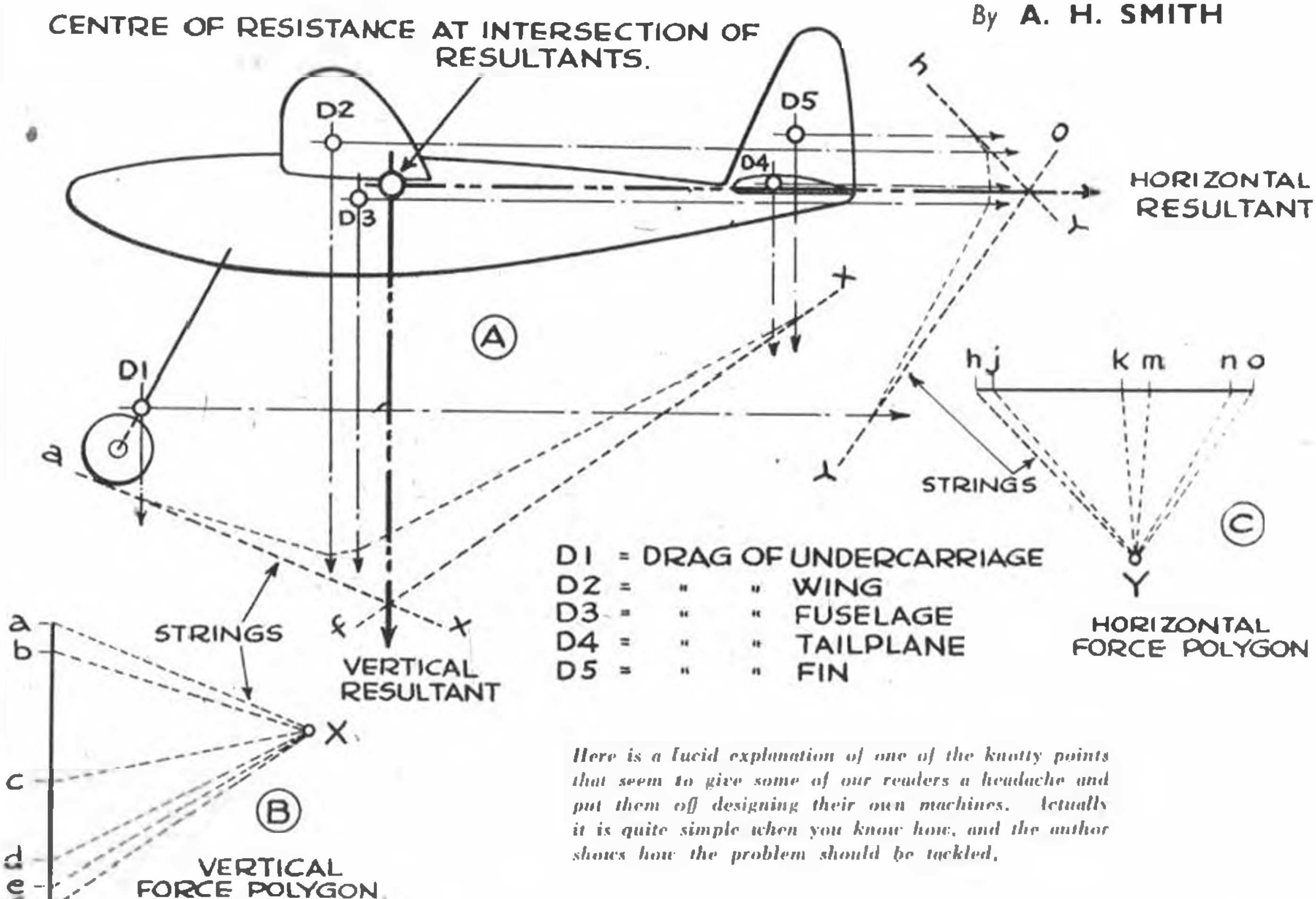
HOW TO DETERMINE THE CENTRE OF RESISTANCE OF YOUR MODEL

By A. H. SMITH



Here is a lucid explanation of one of the knotty points that seem to give some of our readers a headache and put them off designing their own machines. Actually it is quite simple when you know how, and the author shows how the problem should be tackled.

THE centre of resistance, or drag, of a model, is the point at which the drag of the individual component parts is balanced and, for normal horizontal flight stability, it is usual to arrange the forces so that it is above the thrust line and also behind the centre of gravity.

The drag component of each part being known, with its own centre of resistance, a side view of the model is drawn to scale as accurately as possible, as in sketch at (A), and vertical lines projected from D1, D2—D5.

At (B) the vertical line a.f. represents the total drag of the model, in ounces, to some convenient scale, and the component values D1, D2, D3 in the order in which they appear, are marked off at a.b. b.c. c.d. d.e. e.f.

A "pole" X can be chosen at any point, and the divisions a, b, c connected to it, the strings forming a force polygon.

Next, at (A), a line a.x is drawn parallel to a.x in (B), then a parallel to b.x in (B) is drawn from the vertical projection of D1 at the intersection of a.x to the vertical projection D2, c.x.—f.x are drawn in the correct order parallel to the force polygon "strings" forming a string polygon at (A).

The intersection of the outside strings a.x and f.x gives the vertical resultant of the drag forces.

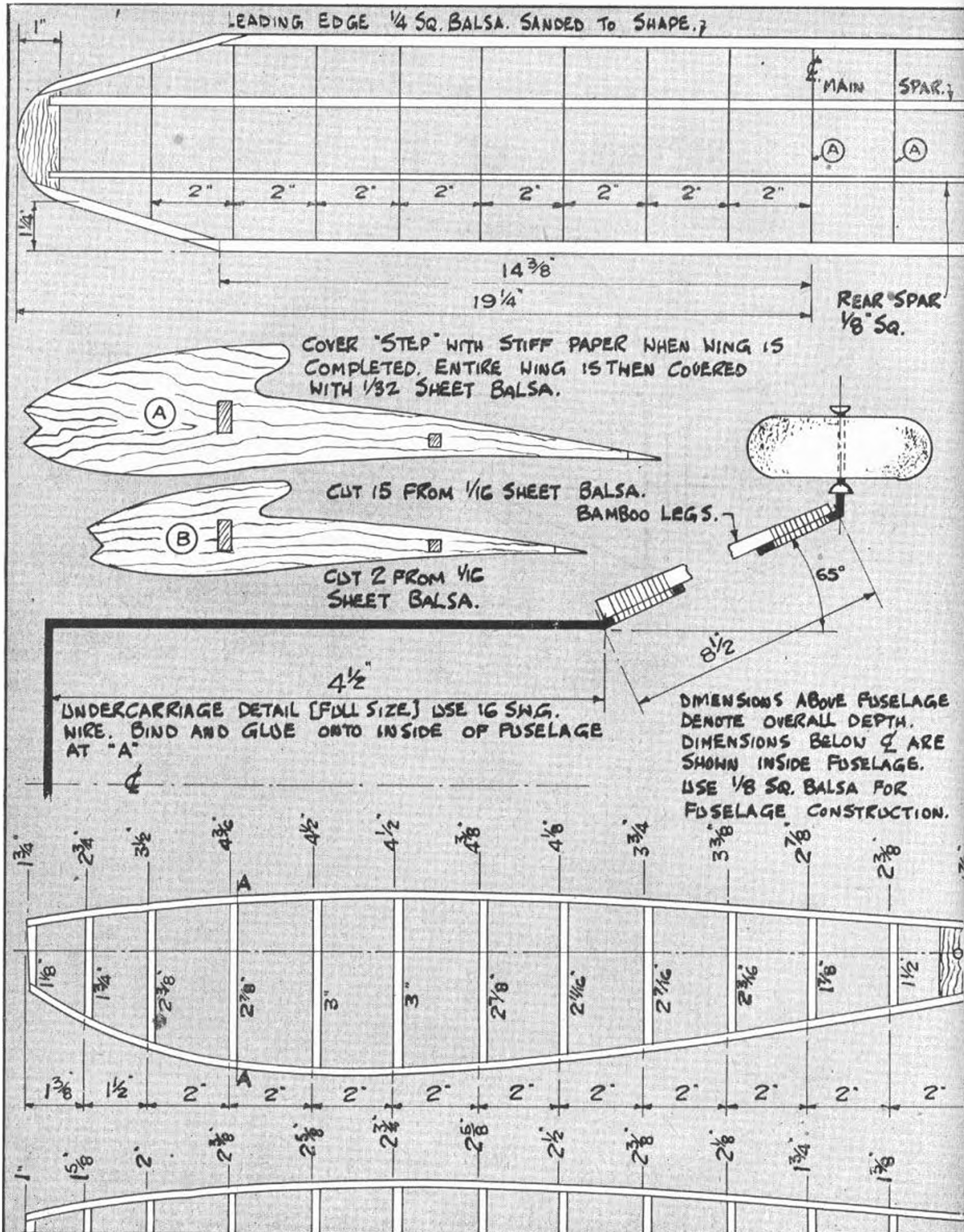
Horizontal projections of each component drag centre are now drawn, and at (C) values are again marked off, in the order in which they appear, h.o being the total drag force.

Connecting the points h, j, k—o to a "pole" Y, the force polygon is made, and at (A) h.y is drawn parallel to h.y in (C), j.y in (C) is drawn in at (A) from the horizontal projection of D5 to D2.

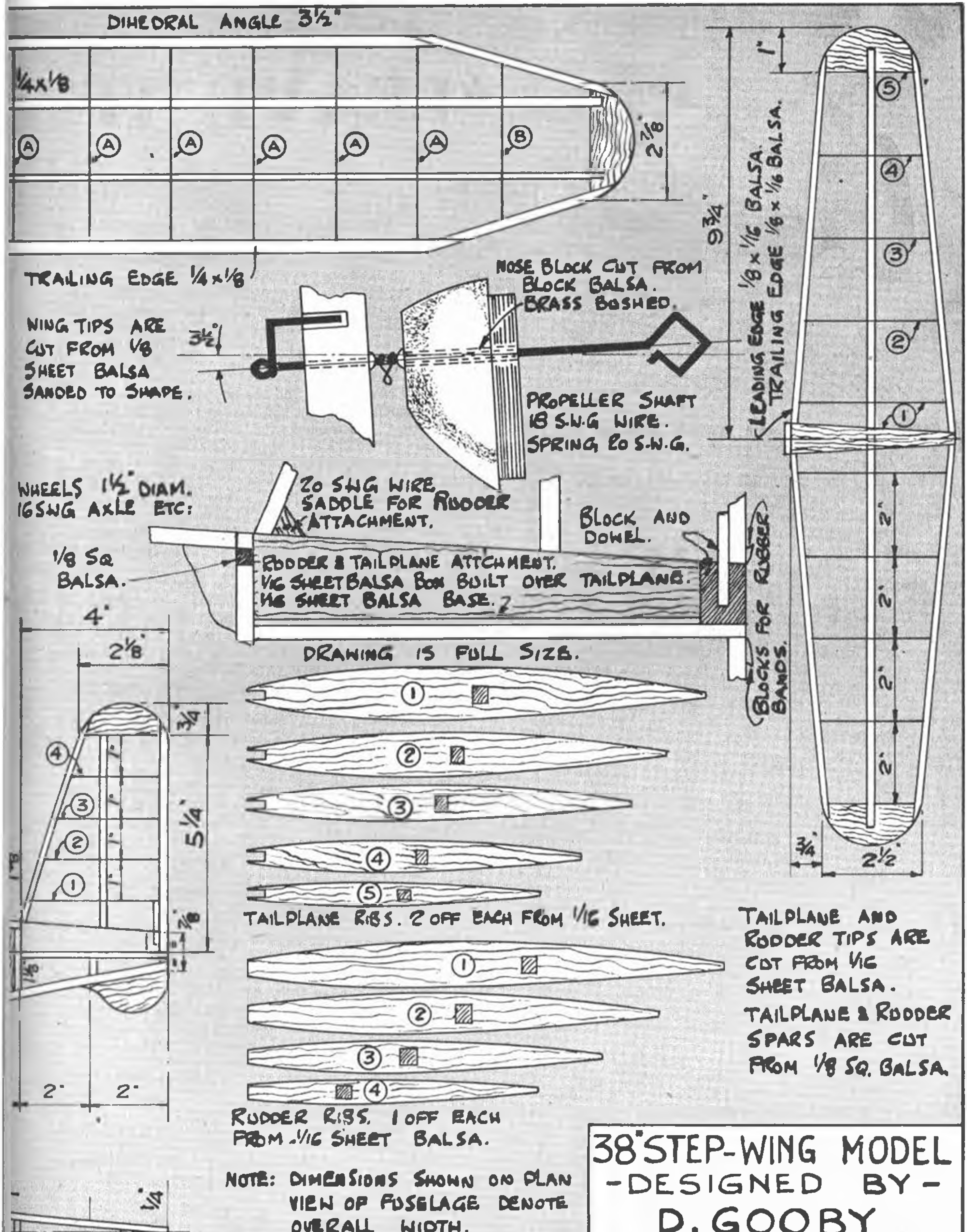
The other strings are then drawn in, and the intersection of the outside strings h.y and Yo give the horizontal resultant of the drag forces.

The centre of resistance of the model is then given by the intersection of the vertical and horizontal resultants.

The weight and disposition of the centre of gravity of the component parts being known, this method can also be used to find the centre of gravity of the model, taking into account, of course, the airscrew and rubber weights.



LEADING EDGE 1/4 SQ. BALSA. SANDED TO SHAPE.
1"
℄ MAIN SPAR.
A
A
2" 2" 2" 2" 2" 2" 2" 2"
1 1/4"
14 3/8"
19 1/4"
REAR SPAR 1/8" SQ.
COVER "STEP" WITH STIFF PAPER WHEN WING IS COMPLETED. ENTIRE WING IS THEN COVERED WITH 1/32 SHEET BALSA.
A
CUT 15 FROM 1/16 SHEET BALSA.
BAMBOO LEGS.
B
CUT 2 FROM 1/16 SHEET BALSA.
65°
8 1/2
4 1/2"
UNDERCARRIAGE DETAIL [FULL SIZE] USE 16 SWG. WIRE. BIND AND GLUE ONTO INSIDE OF FUSELAGE AT "A"
DIMENSIONS ABOVE FUSELAGE DENOTE OVERALL DEPTH. DIMENSIONS BELOW ℄ ARE SHOWN INSIDE FUSELAGE. USE 1/8 SQ. BALSA FOR FUSELAGE CONSTRUCTION.
℄
1 3/4 2 1/4 3 1/2 4 3/16 4 1/2 4 1/2 4 3/8 4 1/8 3 3/4 3 3/8 2 7/8 2 3/8
A
1 1/8 1 3/4 2 3/8 2 7/8 3" 3" 2 7/8 2 11/16 2 7/16 2 3/16 1 7/8 1 1/2
A
1 3/8 1 1/2" 2" 2" 2" 2" 2" 2" 2" 2" 2" 2"
1" 1 5/8 2" 2 3/8 2 5/8 2 3/4 2 5/8 2 1/2 2 3/8 2 1/8 1 3/4 1 3/8


DIHEDRAL ANGLE 3½°
¼x⅛
2⅞
TRAILING EDGE ¼x⅛
WING TIPS ARE CUT FROM ⅛ SHEET BALSA SANDED TO SHAPE.
3½°
NOSE BLOCK CUT FROM BLOCK BALSA.
BRASS BUSHED.
PROPELLER SHAFT 18 S.W.G WIRE.
SPRING 20 S.W.G.
9¾"
1"
LEADING EDGE ⅛ x 1/16 BALSA.
TRAILING EDGE ⅛ x 1/16 BALSA.
WHEELS 1½" DIAM. 16SWG AXLE ETC:
20 SWG WIRE SADDLE FOR RUDDER ATTACHMENT.
BLOCK AND DOWEL.
⅛ SQ BALSA.
RUDDER & TAILPLANE ATTACHMENT.
1/16 SHEET BALSA BOX BUILT OVER TAILPLANE.
1/16 SHEET BALSA BASE.
BLOCKS FOR RUBBER BANDS.
4"
2⅛"
¾"
5¼"
⅞
2"
2"
DRAWING IS FULL SIZE.
TAILPLANE RIBS. 2 OFF EACH FROM 1/16 SHEET.
¾
2½
TAILPLANE AND RUDDER TIPS ARE CUT FROM 1/16 SHEET BALSA.
TAILPLANE & RUDDER SPARS ARE CUT FROM ⅛ SQ. BALSA.
RUDDER RIBS. 1 OFF EACH FROM 1/16 SHEET BALSA.
NOTE: DIMENSIONS SHOWN ON PLAN VIEW OF FUSELAGE DENOTE OVERALL WIDTH.
38" STEP-WING MODEL
-DESIGNED BY-
D. GOOBY

"LEAVE IT

MOST of you are aware that the pilots of R.A.F. bombers know the "automatic pilot" by a nick-name—"George."

The model I propose to tell you about is also known as "George," but it did not receive its name on account of its "automatic pilot" but through a misprint in the local paper, which reported that "Mr. Rippon made successful initial test flights with his George model." Actually it should have read "Gouge" for "George," as the model was designed to our Gouge Cup rules (or S.M.A.E. new formula). However, my fellow-members seized on the name, and "George" it is for ever.

On mature consideration, I feel that the name is really well merited, for even as the full-sized aeroplane equipped with "automatic pilot George" has a large measure of automatic stability, so a special feature of "George the model" is automatic stability, and once the model has left my charge I can safely "leave it to George" to deliver the goods. Whatever the conditions, "George" is quite at home, and, providing I cross my fingers and touch wood while he cruises around the trees, generally comes in for a safe landing.

I often wonder why it is that many people, and model-makers in particular, look with a jaundiced eye upon something that is a little out of the ordinary, and adopt a prejudiced attitude from the outset. I suppose they are like the "old boy" who, seeing an elephant for the first time, ejaculated, "There ain't no sech thing!" It is a fact that something like this attitude is adopted towards aero-modellers who produce something different.

Instead of pondering over the whys and wherefores of the "something different" and wondering just why the designer has done it, they condemn the idea just because (1) they don't like the look of it, and (2) they are unable to understand it, and cannot be bothered to try. In other words they prefer to be just ordinary, and stick to slavish copying.

Now, I happen to be one of those queer individuals who will try anything once, and if it turns out O.K. I'll adopt and adapt it to my special ends, and, what is more important, I only do so with ideas that are a definite gain. I've no use on my models for gadgets that don't work, or only work when the spirit moves them. I've tried plenty as experiments, but when a model has a job of real work to do, the less it is hampered with mechanical gadgets to go wrong at inconvenient times the better!

Now, among the ideas that have really paid for the trouble spent in development is the "Duraplane" wing, and without going into a long story, it was the direct outcome of experiments in automatic stability (obviously the kind we need in models) with a view to designing a Wakefield type model capable of doing its stuff in windy weather.

As a direct result of those experiments, I can go to the r.o.g. board in the roughest weather with a model equipped with "Duraplane" wings, with perfect confidence, knowing that the model will make a clean get-away and not bowl over on to a wing tip, for the principle of the flaps well behind the C.G. and C.P. prevent the tendency to turn over or turn away down-wind too quickly.

I, in common with most aero-modellers, am liable to get all "het up" and excited when taking part in a competition, and just as liable to make mistakes in trimming or launching a model, and I know how serious it is to be harassed by a gusty wind at the "take-off" board. I know, too, as a result of timing literally hundreds of competition flights, the mistakes that all flyers make under these same harassing conditions—how they hesitate to let go, how they feel indefinite about their side thrust adjustment, the fin adjustment, or if the down-thrust is going to be enough. In fact, I've been appealed to many times by competitors in their nervous tension for an opinion. Now, this is all wrong, and I declare now, as I have always done, that rather than argue the point about ultra-efficient wings, and wing sections, aero-modellers would do better to concentrate on a robust stability which refuses to be upset by weather conditions, bad trim and even clumsiness and nerves at the take-off board.

Most of you know that thermal flying is largely a matter of right conditions and lots of luck in hitting the thermal at the right time and spot, but I have proved to my own satisfaction, and to the satisfaction of the timekeepers concerned, that a model does not have to have super sections, super streamline or super line-up to take advantage of thermals. But it does have to be a stable model with a good average performance, and, given the right conditions, will profit equally from the same advantages as the ultra-efficient job.

Round about 1934, when I became interested in the Wakefield Contest, high lift and highly tapered wings were enjoying a craze, and I remember how so many models, on taking-off in a gusty wind, dropped a wing and dived into the ground, in spite of careful trimming by experienced modellers. I thought this all wrong, and although I was ready to concede that the models were of a very efficient type, I could not agree then, and neither do I now, that they were efficient in the right way, namely, that they were incapable of being upset and would get clean away on being released from the r.o.g. board, whatever the conditions.

Until you can be confident of this desirable feature, you cannot be sure that you will be pulling your weight in your club effort. I know quite well that you will answer, "Yes, but 'So-and-so' pulled off 'So-and-so' under filthy conditions." Well, so he might have done, but I'll bet he was worried all the same!

No, I feel that the battle is more than half won if you can get your model right away, and well up; and then anything may happen.

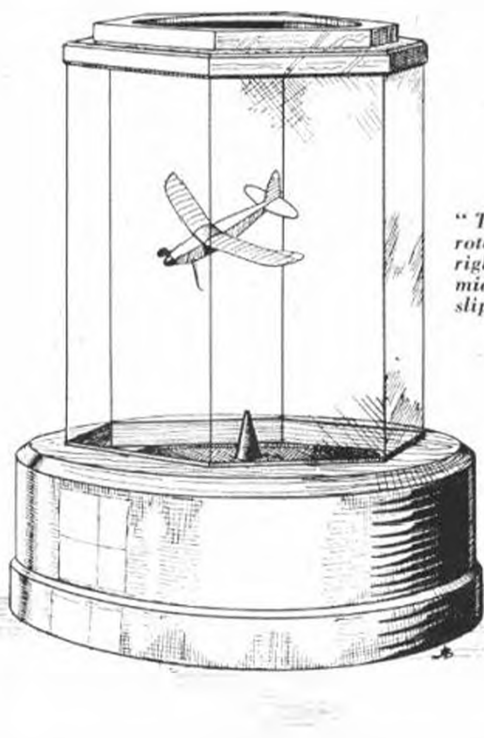
"TO GEORGE"

Fully detailed description and plans for building the model that won the 1940 "Flight Cup" competition.

Says C. A. RIPPON

It is an interesting fact that the only times that I've used the original Duraplane wing design I've got away on thermals, *and* had a spot of bother with the fin both times, which, with a more conventional type of wing, may have proved disastrous; but, beyond a fine demonstration of spin correction, nothing untoward happened, and this happens to be the strong point of the wing design.

At the last Model Engineering Exhibition the R.A.F. had a demonstration vertical wind tunnel in which various solid 1/72 scale models of well known aircraft were spun, and in the course of conversation about models and modelling, I pointed out to the sergeant in charge that aero-modellers designed their models to avoid accidental spinning. "Oh," said he, "but we can make any model 'plane spin in this tunnel." "But not without distorting the trim," I replied.



"There it was — rotating grandly, right slap in the middle of the slipstream . . . ."

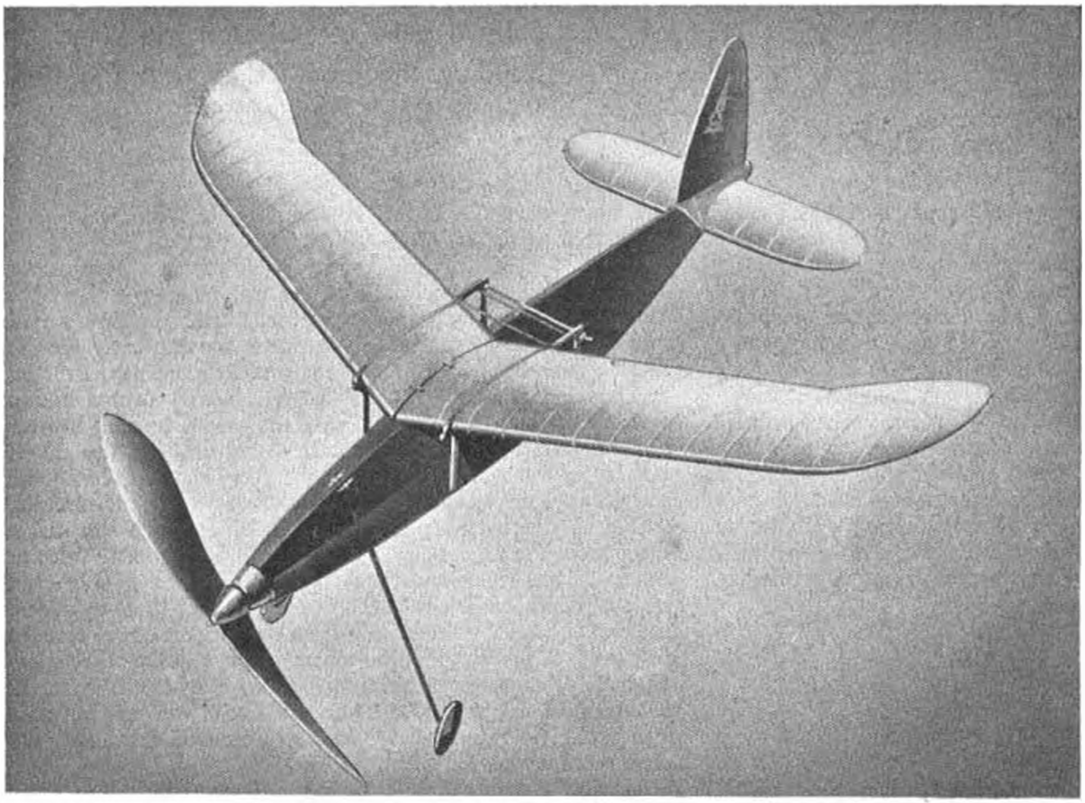
The argument waxed hot, and in the end I declared I would make him a model he couldn't spin without radical alteration. He accepted my challenge, so I made a miniature Duraplane. Well, they played with it on and off for a couple of days, trying this dodge and that (loading the tail with Plasticine was one!). At last he came along and invited me to see my model spinning slowly and perfectly! Believe me, it looked good. There it was, rotating grandly, right slap in the middle of the slipstream from the fan, and by varying the speed it rose and fell, practically under perfect control. But what had he done to get this result? He had had to remove one wing flap and one wheel, which had the result of upsetting the side areas. When these parts were replaced, the model would commence one rotation only, and then the pressure on the outer flap would increase, and never once did it fail to straighten the model up and cause it to dive out of the slipstream.

In the "Flight" Cup Contest, these features were reproduced, for on the second flight the fin, which was of light construction, developed a warp which, after the power had run down, caused the model to turn too violently to the right. It so happened that at the critical moment the model was soaring at about 150 ft.–200 ft., nearly over a clump of trees surrounding a pond. On the model turning in over this hazard it flew into a severe down-draught (no doubt caused by the water), and then the fun began. The model started to spin viciously, did about one-and-a-half circuits, and then the outside flap took control and out she came. Once more the model came within the influence of the down-draught, the right-hand turn accelerated into a spin, but once more she came out. After about four of these episodes, the model finally veered away from the vicious down-draught to make a perfect landing on the far side of the trees. Naturally, I took precautions before the third flight to ensure that the fin did not "do the dirty" on me, but here was a case in point where the precaution of extra stability once more saved the day.

Having excused myself for using Duraplane wings (said he, tongue in cheek!), let us consider a few interesting facts about the new S.M.A.E. Formula Contest.

Those of you who remember Mr. Knight's "Kinglet" will recollect that it had 1 sq. ft. of area, weighed about 5 oz.—5½ oz., and had a 12 in. fine pitch hardwood airscrew driven by eight strands of ¼ in. flat rubber. Many of these models were made and flown ("many" being a very conservative estimate) and I've lost count of the number of people who commenced their model activities with the good old "Kinglet." The average duration of this birch, wire and silk model was 30 sec. to 60 sec., according to how well it was built and trimmed, but it is worth nothing that even rough jobs were capable of sound flying, and I well remember timing one of them for eight minutes out of sight!

A few years ago the Northern Heights were casting around for a new popular contest for the President's Cup, and the "Kinglet" specification seemed to me to meet the case for a popular model, the size being suitable for carting around, the cost of building it modest, and it was capable of a good average performance. I felt that with the added convenience and ease of balsa wood construction, here was the job we needed. In order that we could compare results better, we decided to limit the weight of rubber to 1 oz.—and, curiously enough, those of us who have flown the type do not find any advantage at all in increasing the amount of rubber, providing you do not increase the diameter of the airscrew above 14 in. As we seem to be able to get the models up to a soarable height with a 14 in. diameter propeller easily, I cannot see any advantage in either increasing the loading per sq. ft. of the model, or the drag occasioned by the bigger propeller. After several years' trial of this competition, the resultant models proved quite worth while, and very interesting, and this brought us to 1940 and the S.M.A.E. competition programme. Owing to the desirability of curtailing soaring models and the probable difficulties with supplies and increased cost of building models,



This photo of the finished product will give you a good idea of the sleek and unconventional lines of this "out-of-the-rut" model.

the present "S.M.A.E. New Formula" was put forward as a possible solution of the problem, and, as usual, there cropped up a number of criticisms which have since proved groundless!

I was told that it was a retrograde step for one thing, and would stifle enterprise. All I can say now is that events have proved otherwise, because both my models, built to the specification, i.e. the Air Cadet and the "Flight" Cup winner, have proved steady and sturdy flyers, and have given good account of themselves.

I felt that to justify the formula it was up to me to "have a go," and so I designed "George"—adapting, as was natural for me, the Duraplane wing. I broke fresh ground as far as I was concerned in using a diamond fuselage, in order to get a parasol lay-out with the minimum interference between the wing and the fuselage. The undercarriage was a simple but effective sprung cantilever type with which I had been experimenting for some time, and it seems to be the complete answer to all the criticisms levelled at the conventional plug-in cantilever undercarriage. The tail sat upon the two horizontal longerons, and was located and kept secure by the saddle to which the fin was fixed. Altogether a simple, effective and portable model. The wing, which was built in two halves, and joined in the centre by tape, could be folded for convenience, and when in the open position, was held together with wire forks. The bearers for the wing were arranged so that the incidence could be varied. The airscrew was a fairly slow-running specimen, and, it will be noted, has well swept back blades, which have the effect of steadying the running and cancelling out a lot of the rubber "slap" that we get when the speed of revolution of the rubber motor coincides with a "period" in the model.

Just a point of interest to those of you who have an "Air Cadet" model. You can definitely improve it by making a pair of wings to the specification of those on "George, the only modification necessary being to lengthen the runners that are on top of the fuselage in a forward direction, as the swept-back wing will sit farther towards the nose of the model. You will then be able to "push" the model, using less down-thrust, and not be worried by the model "peeling off" at the top of the climb into a spin or side-slip, with its consequent disastrous finish.

The "Duraplane" wing as used on "George" has the flaps arranged somewhat differently to the original version. On that, the wing had no built-in "wash-out" but about five degrees on the flaps, which were well aft of the C.G. and C.P. In to-day's specimen the wing has a reversal of incidence from the centre to the tips, and the flaps (when the model is flying level) have no negative or positive incidence; but they have a powerful extra corrective effect when the model tends to stall or dive. Something of the same idea has been used in the form of small discs mounted on rods which stick out well behind the main wing on some American indoor models, and I assume the effect is much the same.

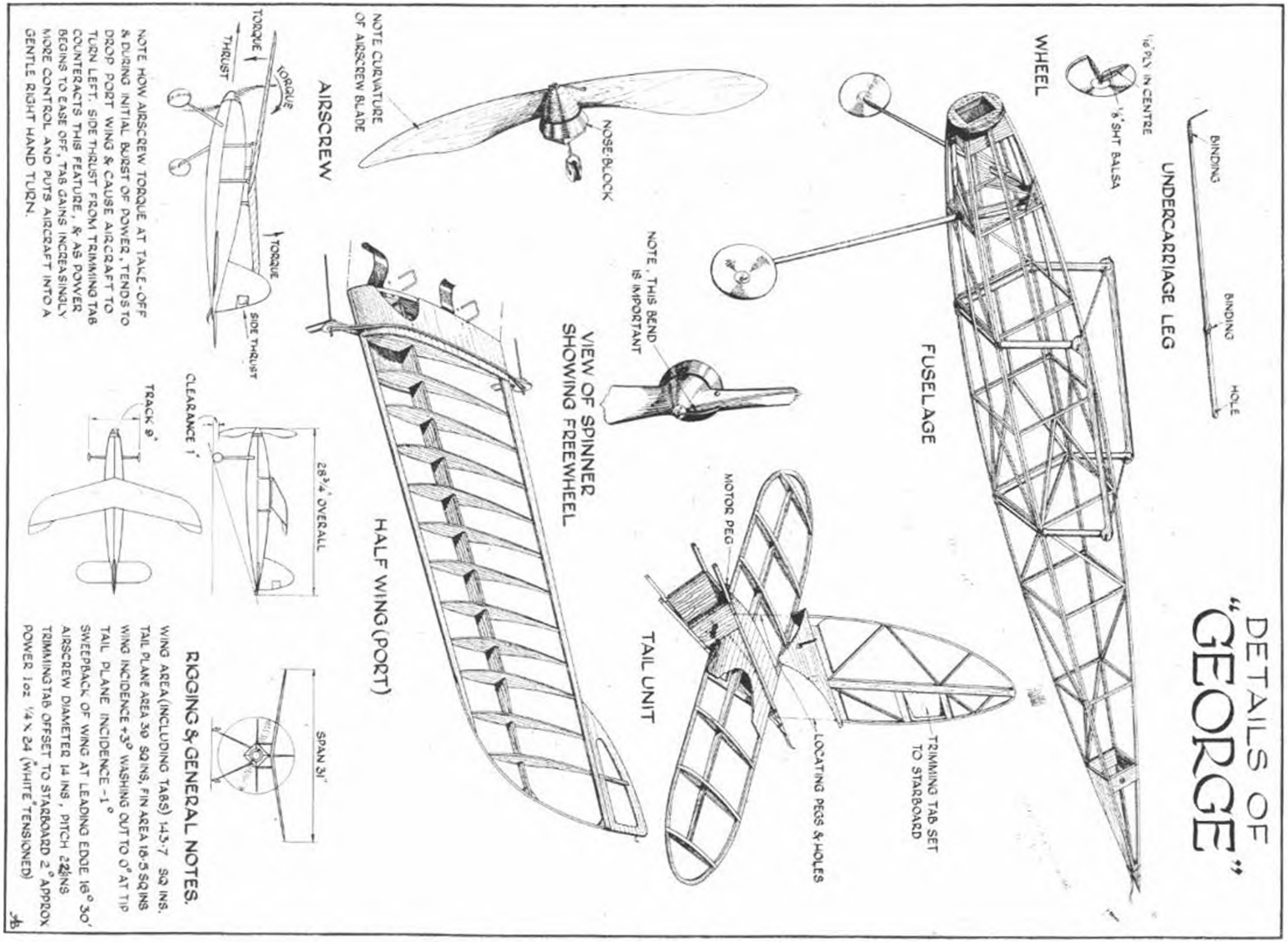
One most useful effect is that if the model takes-off and attempts to turn right or left too suddenly, the speeded-up outside wing is depressed, and before the model can dive into the ground or turn over it is clear away.

Of course, the usual precautions must be taken to avoid unwanted warps; although the type of wing is a great help to safe flying it is not an excuse for bad work!

Longitudinal stability is further improved to the extent that the wings may be moved quite a long way fore and aft of their correct setting without any disastrous results, so that, should you change your propeller and it is not of the same weight as the one replaced (and you forget to check up the longitudinal balance) nothing very serious may be noticed. If the propeller is lighter, as the power dies off and the lifting tail loses its effect, the model will probably sink on an even keel.

Conversely, if the model is nose heavy it will not dive into the ground but simply refuse to climb, for as soon as the downward speed increases the inverted flaps are depressed and the nose is lifted, or maybe the tail drops a little. So you see the thing is foolproof so long as your work is reasonably accurate.

Note the unusual type of wing, a well known "Rippon" feature, and noted for the extreme stability it imparts to any model. The detailed sketches, when studied in conjunction with the building instructions, leave no points unanswered to the builder, and should enable a first class replica to be produced by the most recent newcomer to aero-modelling.



BUILDING INSTRUCTIONS

Fully detailed drawings on pages 472 and 473

THE construction of "George" calls for no special comment, as it follows well known and sound principles. The fuselage, a quite ordinary square box structure, is made from $\frac{3}{32}$ in. by $\frac{3}{32}$ in. balsa wood, and is strengthened at the front by extra stringers, which build it into an eight-sided nose, which lends itself to a good entry, and fairs nicely with a spinner propeller. As is usual, two of the fuselage sides are built one on top of the other with pieces of waxed paper in between the two to avoid them inadvertently sticking together, and as the structure is square, it is a good idea to cut each set of four cross-members at the same time. You will then get them all alike, and when the final assembly of the fuselage is taken in hand you then have the minimum amount of fitting to do. When the fuselage is complete, turn it diagonally and use the two horizontal longerons as the "datum line." From this all measurements for rig must be made, so please be quite certain that you do not distort your longerons in the assembly. It will be noted that under the tail seating the tail end of the fuselage is strengthened by cross-grained $\frac{1}{32}$ in. sheet balsa wood, and the bamboo tail skid is fixed by means of glue and thread. The tail plane slides into the open portion above, and the fin, which is held in position by two small rubber bands, keeps all secure. There is room, too, for a little packing to prop the leading or trailing edge of the tail up, should it prove necessary. The tail-plane has an outline of $\frac{3}{32}$ in. by $\frac{3}{32}$ in. birch which, when the tail has been built, is sanded down to a "D" section, giving it a good entry. The type of construction follows the method described for the "Air Cadet," and is simple and effective. A "V"-shaped piece of $\frac{1}{8}$ in. flat balsa wood, suitably lightened, serves to locate the tail plane correctly. It will be noted that the centre section is covered with $\frac{1}{32}$ in. sheet balsa wood on top and underneath.

The fin also has an outline of $\frac{3}{32}$ in. by $\frac{3}{32}$ in. birch, and the front end of it pokes through the $\frac{1}{32}$ in. sheet balsa wood saddle, and locates in a hole in the top longeron at the point where it is reinforced to take the motor peg. A "V" shaped 22 s.w.g. wire saddle, the lower ends of which form two hooks for the front rubber band, is cemented in place. The fin, therefore, sits very securely in position, and the whole tail assembly need never give you any trouble. A small $\frac{1}{16}$ in. sheet balsa wood trimmer is built into the rear of the fin, but note especially that the birch wood trailing edge is *not* cut away, the fin is independent, but is made a neat fit. Care should be taken to ensure that the trimmer doesn't flop about.

The principle of the undercarriage explains itself on the drawings, and is a modification of the popular "plug-in" leg cantilever type. Many people seem to experience a great deal of trouble with plug-in legs, and the paper tubes, and it was on this account that I experimented with rubber sprung specimens, and the method depicted is as near "foolproof" as possible, and very effective. The important feature to observe is that the top of each leg must be about $\frac{1}{4}$-inch away from the balsa wood plate, through which the doubled rubber band is threaded and secured by the bamboo pin. This is to allow the leg to swing backwards quite freely. It will be noticed that there are two balsa wood struts fixed inside the fuselage in the same plane as the undercarriage legs. These serve a double purpose; they prevent the tension on the rubber band springs pulling in the undersides of the fuselage, which possibility is, of course, accentuated when the model lands, and they also serve to prevent the legs swinging forward, and act as a steady for them. Care should be taken, therefore, to see that they are fitted *forward* of the legs. The actual bamboo legs are of a flat oval section, and taper from top to bottom. They pass through balsa wood plates, which may be reinforced by sheet celluloid or thin plywood, and are retained in their correct position by a binding of thread at the point of entry into the fuselage. The hole in the balsa wood plates should be a snug fit so that the legs may swing to and fro, but not twist, otherwise a "rdunken expression" is given to the undercarriage. The wheel axles are flattened where they are bound to the leg, in order to prevent the axle twisting. The holes at the top of the legs are best burnt through with red hot 16 s.w.g. wire; this, providing excessive pressure is not used, prevents the bamboo splitting. A binding of fine thread consolidates the job. To fix the undercarriage into position all you need is a piece of straight (20 s.w.g.) steel wire, with a long narrow hook at one end and a loop to hook on to your finger at the other. Thread the wire hook through from the top of the fuselage and out of the appropriate hole at the bottom. Thread your rubber band through the top of the bamboo leg, and hook your wire "puller" into it, and as you draw it through note carefully that the leg is the correct way round, otherwise your wheel will be facing inwards. Having drawn it through, and before disengaging the "puller," push your fine bamboo pin through the rubber loop, relax—and "bob's your uncle." "Fit and forget!" No spreader should be necessary if the instructions have been followed correctly.

The Wing.

It must be pretty obvious from my earlier remarks that I would not go to the trouble of making a wing which entails a fair amount more thought in lay-out, and extra work, than the more conventional type, unless I had satisfied myself that I was definitely going to gain. Wings embodying "inherent stability" would have been developed more for full-sized aircraft, if every known rule of the game hadn't been broken through the demands of war and the era of machines that could be "chucked about" very quickly. Slowly but surely transport 'planes are reverting to "inherent stability," but the modern difference is that the stability is to a large extent under direct control of the pilot, and is represented by such gadgets as "George," the automatic pilot, flaps and slots, etc., and the pilot can cut them out, or let them in to suit the conditions of the moment. Well, we model flyers want all of the "inherent stability" all of the time, and this wing is my contribution towards the solution of the problem of maintaining height and equilibrium. Not the perfect solution, may be, but very satisfying and dependable. The two half-wings have main spars of $\frac{1}{16}$ in. sheet balsa wood, and they *do not* taper in thickness; the thickness of the section remains constant up to the last two or three ribs. Each half-wing is swept back

16½ deg., and is tapered towards the tip on the trailing edge only. By using a master rib section which has the last 1 in. or so of the trailing edge portion parallel, it is quite easy to cut out a set of ribs and fit them between the leading and trailing edge. You will find that the amount of under-camber diminishes towards the tips of the wings and so gives the effect of washout. The leading edges are of ⅛ in. by ⅛ in. hard balsa wood set into the ribs diamond fashion, and the ribs, which are 1 in. apart, are of $\frac{1}{32}$ in. sheet balsa wood. So that the centre portions shall sit firmly in place and maintain the correct incidence the undersides of the wings are reinforced with $\frac{1}{32}$ in. sheet balsa wood of hard quality, and at the points where the " ⊓ " shaped pins plug in, are further reinforced locally on the inner side of the ribs. The wings are covered with $\frac{1}{32}$ in. sheet balsa wood over the centre bays. The dihedral angle is determined by the angle at which the centre ribs are set, and if the angle is found to be insufficient (I won't say incorrectly built in, we never make mistakes do we? Or do we?) it can be adjusted by glasspapering the end ribs carefully. As the two half-wings are held together on the underside by two tapes, it is an easy matter to reset them after the adjustment. Points to watch out for to avoid trouble are:—

(1) Be certain that the two half wings are swept back exactly the same amount.
(2) That no warps are built into them.
(3) That they register correctly at the centres.
(4) That the dihedral angle is equal on each wing half.
(5) That the flaps are exactly similar, and are glued *flat* on to the underside of the trailing edges at the wing tips, not a negative or positive angle to them.

The wing tip flaps are cut from hard $\frac{1}{16}$ in. sheet, and in order that they remain flat, a portion is cut out, and in addition, very thin celluloid sheet is cemented round the edges, which helps not only to keep each one flat, but reinforces the cross grain of the wood, so that it doesn't split or curl up. It will be noted that the straight edge of the underside of each flap is bevelled and faired into the underside of the wing.

The " ⊓ " pins are made from 20 s.w.g. steel wire, and it's a good idea to bush the holes into which they fit. The wings are secured to the incidence pylons by light rubber bands drawn across fore and aft.

The pylons are made from ⅛ in. by $\frac{1}{16}$ in. bamboo, bent by means of dry heat—not burnt—to the shape of the diamond, and bound lightly where they touch each longeron, and just a spot of fish glue to secure them. The holes for the incidence adjustment are burned through with 20 s.w.g. steel wire, and the incidence pieces are shaped from $\frac{1}{16}$ in. plywood, the pins securing them in place run right across, and are made from bamboo. The rubber bands which hold the wings in place also serve to secure the incidence pieces.

The Airscrew.

The airscrew, as I have already explained, is a special design of my own, and you are not bound to use one exactly like it, but what is advisable is to keep to the same diameter pitch ratio, because I have found the happy combination which suits the 1 oz. weight rubber motor specified. The motor I found best to give me a quick take-off and good climb was 1 oz. of ¼ in. by 1/24 in. Dunlop, made into a skein of 6 strands tensioned by a " lance " type " rope tensioning " system. This is the same method as explained in my article on the Air Cadet.

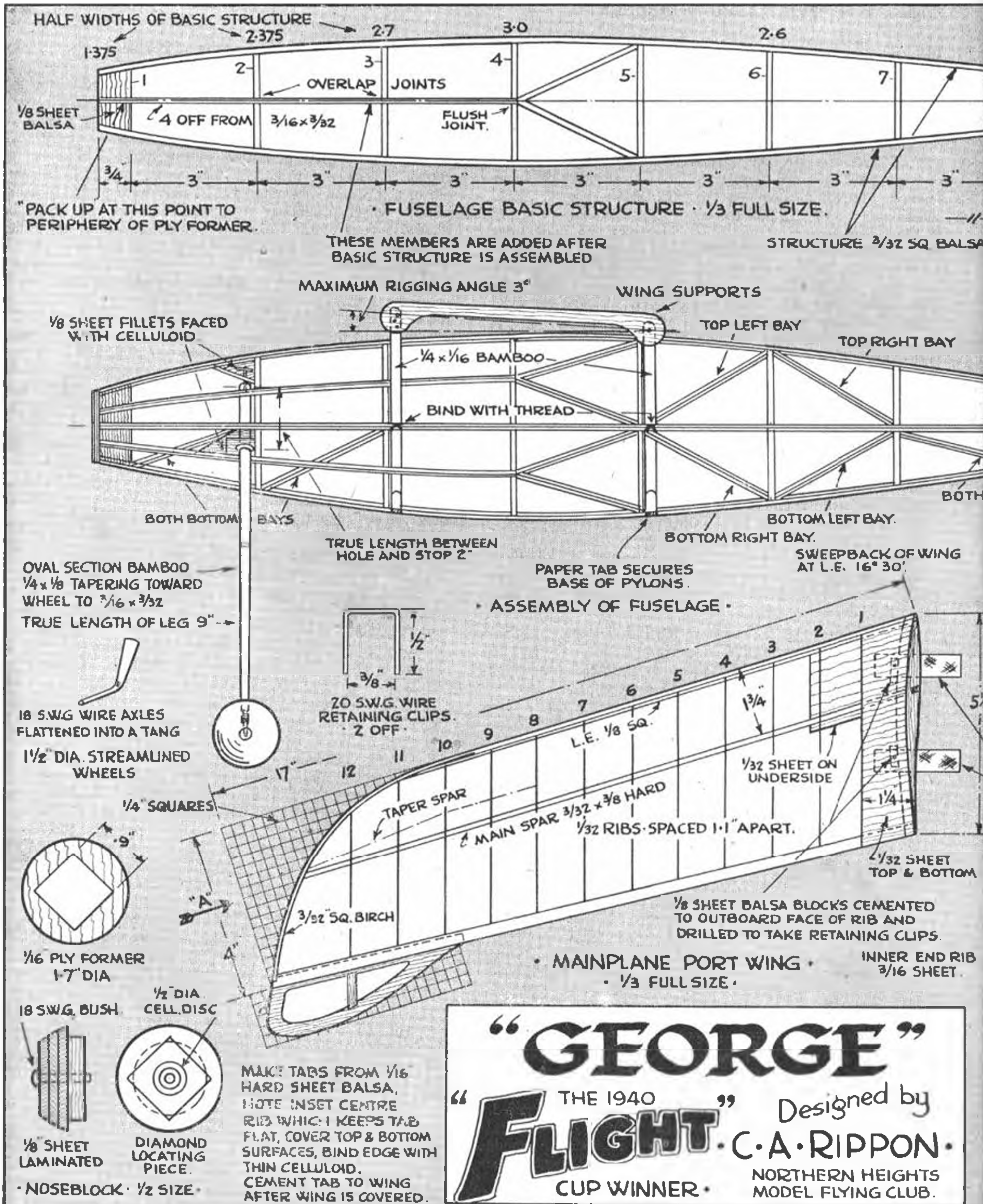
The diameter of the airscrew is 14 in., and the working pitch 22½ in. I can spot some of the duration fans raising their eyebrows at this information, especially my friends of the Halifax Club, who I noted in Club Reports would have liked to have been permitted to use more than 1 oz. of rubber. I suspect that they were trying to get a " quart out of a pint pot," in other words, they were probably using paddle wheel propellers with steep pitches. It can't be done; if your motor weight is limited you must try other means of getting the desired results than by having too much drag occasioned by wide blades and steep pitches. George's propeller has a very fine pitch at the extreme tip, and it increases pretty quickly to the working point 2½ in. from the tip. From there to the boss the change of pitch is more gradual, and the " air brake " effect of the almost parallel blade seems to slow the propeller up just sufficient to use up the power efficiently, the average run of the motor being 60 seconds actual (about 75 seconds static on test) on 800 turns, with a well " run in " new motor. Fully wound it gives 2½—3 in. torque oz., quite sufficient to give the model a fine, lively take-off, and which calls for careful adjustment of the " lifting tail " to avoid loss of climb.

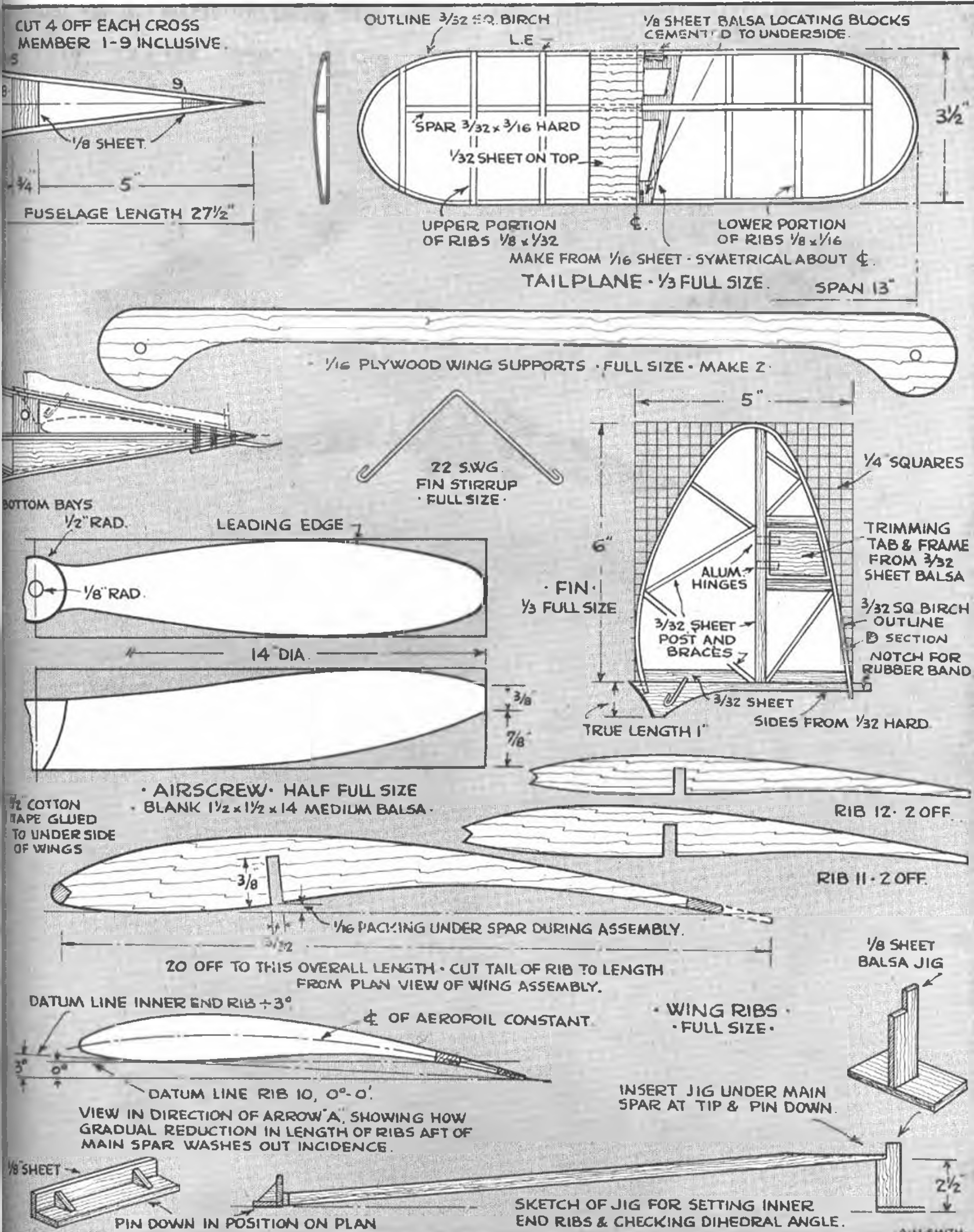
I notice that many flyers overlook this very important point, for they mess around for hours with finger turns until they are satisfied that the model is " just right," then on go full turns with the winder, and they find the model just *isn't* right, and they glumly pick up two propeller blades from where the model " hit the deck ! "

Please, for your own pocket, and peace of mind, be sure that your longitudinal trim is correct for full power, and that it will climb, and not dive straight into the ground. I know! I've had some! We've made these mistakes in the past, that's why I take this opportunity of reminding you of it.

The average duration of George in " still air " (i.e. when the Northern Heights " Gnats " come out about 8—10 in the evening) has been 80—100 seconds on 700 turns, which for a model possessing quite a lot of parasitic drag is not too bad; when the air is lively the duration is seldom less than 120—180 seconds, and in the competition which was run under perfect soaring conditions, the times were 120 seconds not fully wound (" safety first ") 170·/ seconds, the second flight being timed out of sight behind a farm; actually the model was about 4½ minutes in the air. On the third flight it disappeared into the clouds after 998 seconds, so I'm sure you'll agree that 1 oz. of rubber is all that is necessary for good results with models built to the new S.M.A.E. formula, and I hope that my experiences and suggestions will help many of you to make a real effort to pull off the " Flight Cup " in the future. The weights of the component parts are as follow:—

Fuselage and undercarriage	1⅝ oz.
Wings	1⅛ ..
Tail and fin	⅜ ..
Airscrew and nose block, shaft, rubber peg and two bobbins, and ball race ...	⅞ ..
Rubber motor	1 ..
Total weight	5¼ oz.

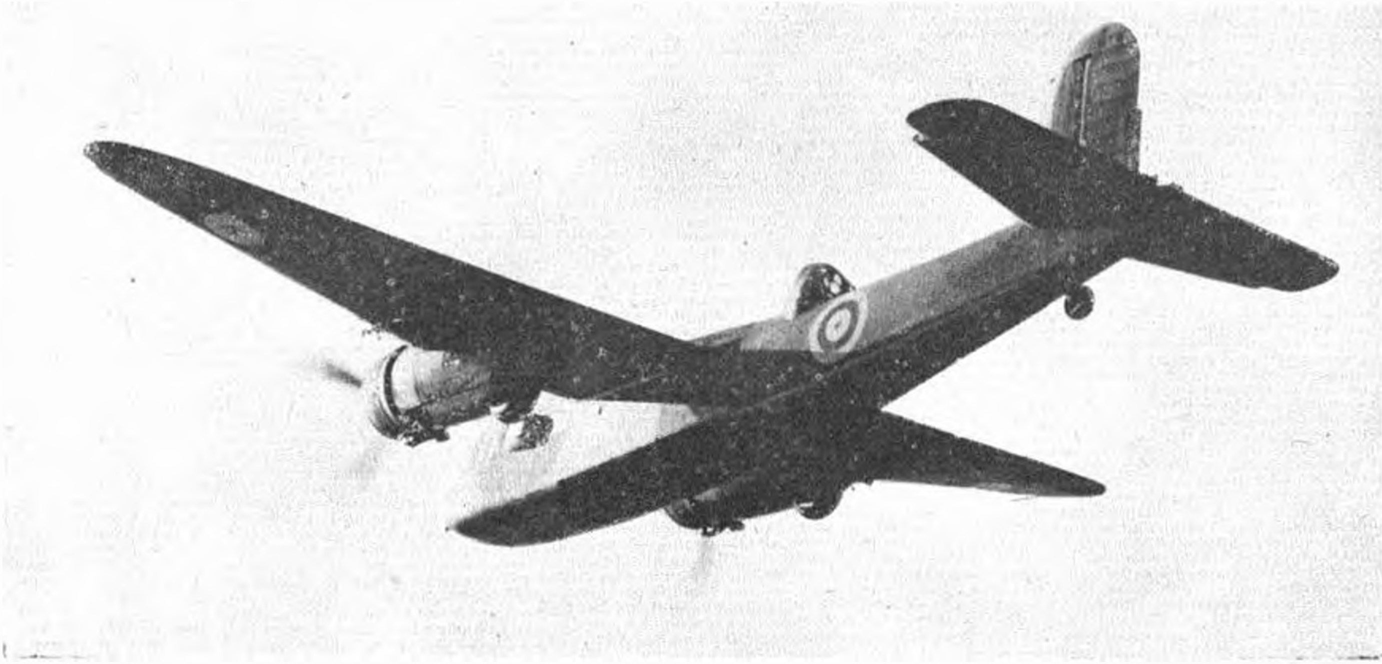

HALF WIDTHS OF BASIC STRUCTURE
1·375
2·375
2·7
3·0
2·6
OVERLAP JOINTS
1/8 SHEET BALSA
4 OFF FROM 3/16×3/32
FLUSH JOINT.
"PACK UP AT THIS POINT TO PERIPHERY OF PLY FORMER.
· FUSELAGE BASIC STRUCTURE · 1/3 FULL SIZE.
THESE MEMBERS ARE ADDED AFTER BASIC STRUCTURE IS ASSEMBLED
STRUCTURE 3/32 SQ BALSA
MAXIMUM RIGGING ANGLE 3°
WING SUPPORTS
1/8 SHEET FILLETS FACED WITH CELLULOID
1/4×1/16 BAMBOO
TOP LEFT BAY
TOP RIGHT BAY
BIND WITH THREAD
BOTH BOTTOM BAYS
TRUE LENGTH BETWEEN HOLE AND STOP 2"
PAPER TAB SECURES BASE OF PYLONS.
BOTTOM RIGHT BAY.
BOTTOM LEFT BAY.
SWEEPBACK OF WING AT L.E. 16° 30'.
OVAL SECTION BAMBOO 1/4×1/8 TAPERING TOWARD WHEEL TO 3/16×3/32
TRUE LENGTH OF LEG 9"
· ASSEMBLY OF FUSELAGE ·
18 S.W.G WIRE AXLES FLATTENED INTO A TANG
1 1/2" DIA. STREAMLINED WHEELS
20 S.W.G. WIRE RETAINING CLIPS. · 2 OFF ·
L.E. 1/8 SQ.
1/32 SHEET ON UNDERSIDE
1/4" SQUARES
TAPER SPAR
MAIN SPAR 3/32×3/8 HARD
1/32 RIBS·SPACED 1·1" APART.
1/32 SHEET TOP & BOTTOM
3/32" SQ. BIRCH
1/8 SHEET BALSA BLOCKS CEMENTED TO OUTBOARD FACE OF RIB AND DRILLED TO TAKE RETAINING CLIPS.
1/16 PLY FORMER 1·7" DIA
· MAINPLANE PORT WING · · 1/3 FULL SIZE ·
INNER END RIB 3/16 SHEET.
18 S.W.G. BUSH
1/2" DIA CELL. DISC
1/8" SHEET LAMINATED
DIAMOND LOCATING PIECE.
· NOSEBLOCK · 1/2 SIZE ·
MAKE TABS FROM 1/16" HARD SHEET BALSA, NOTE INSET CENTRE RIB WHICH KEEPS TAB FLAT, COVER TOP & BOTTOM SURFACES, BIND EDGE WITH THIN CELLULOID. CEMENT TAB TO WING AFTER WING IS COVERED.
"GEORGE"
"THE 1940 FLIGHT CUP WINNER"
Designed by · C·A·RIPPON ·
NORTHERN HEIGHTS MODEL FLYING CLUB.


CUT 4 OFF EACH CROSS MEMBER 1-9 INCLUSIVE.
1/8 SHEET.
5"
FUSELAGE LENGTH 27½"
OUTLINE 3/32 SQ. BIRCH
L.E
1/8 SHEET BALSA LOCATING BLOCKS CEMENTED TO UNDERSIDE.
SPAR 3/32 x 3/16 HARD
1/32 SHEET ON TOP
3½"
UPPER PORTION OF RIBS 1/8 x 1/32
LOWER PORTION OF RIBS 1/8 x 1/16
MAKE FROM 1/16 SHEET · SYMETRICAL ABOUT ℄.
TAILPLANE · 1/3 FULL SIZE.
SPAN 13"
· 1/16 PLYWOOD WING SUPPORTS · FULL SIZE · MAKE 2 ·
22 S.W.G. FIN STIRRUP · FULL SIZE ·
5"
1/4" SQUARES
6"
TRIMMING TAB & FRAME FROM 3/32 SHEET BALSA
ALUM. HINGES
· FIN · 1/3 FULL SIZE
3/32 SHEET POST AND BRACES
3/32 SQ BIRCH OUTLINE
B SECTION
NOTCH FOR RUBBER BAND
3/32 SHEET
TRUE LENGTH 1"
SIDES FROM 1/32 HARD
BOTTOM BAYS
1/2" RAD.
LEADING EDGE
1/8" RAD.
14" DIA.
3/8"
7/8"
· AIRSCREW · HALF FULL SIZE
· BLANK 1½ x 1½ x 14 MEDIUM BALSA ·
½" COTTON TAPE GLUED TO UNDER SIDE OF WINGS
RIB 12 · 2 OFF
RIB 11 · 2 OFF
3/8
1/16 PACKING UNDER SPAR DURING ASSEMBLY.
20 OFF TO THIS OVERALL LENGTH · CUT TAIL OF RIB TO LENGTH FROM PLAN VIEW OF WING ASSEMBLY.
1/8 SHEET BALSA JIG
DATUM LINE INNER END RIB +3°
℄ OF AEROFOIL CONSTANT
· WING RIBS · · FULL SIZE ·
3°
0°
DATUM LINE RIB 10, 0°-0'.
VIEW IN DIRECTION OF ARROW 'A', SHOWING HOW GRADUAL REDUCTION IN LENGTH OF RIBS AFT OF MAIN SPAR WASHES OUT INCIDENCE.
INSERT JIG UNDER MAIN SPAR AT TIP & PIN DOWN.
1/8" SHEET
2½"
PIN DOWN IN POSITION ON PLAN
SKETCH OF JIG FOR SETTING INNER END RIBS & CHECKING DIHEDRAL ANGLE.
A.H. SMITH

FIGHTING AIRCRAFT OF THE PRESENT WAR—VII

THE BLACKBURN "BOTHA" 1

By H. J. COOPER



Photos by Courtesy of Air Ministry

THE Botha is not radically a new aeroplane. Readers may recall that one of Mr. C. E. Turner's brilliant paintings for an advertisement of the Blackburn Company about five years ago showed a twin-engined high-wing monoplane from which the Botha is obviously developed. This machine looked rather like a high-winged Anson and was apparently intended for similar duties, but evolution has placed it in the same category as the Bristol Beaufort general reconnaissance and torpedo bomber.

After the Botha had been flying for a considerable time (it first appeared before a number of Members of Parliament at Northolt in 1939), its existence was revealed in January of this year, and, surprisingly enough, the Air Ministry allowed a useful amount of information, including general arrangement drawings, to be released for publication. This action is so unusual that one suspects an illusion, a trick with mirrors, a trap, that perhaps after all particulars of one of our latest aeroplanes to go into service have not been made public: perhaps the Botha is not passing into general squadron use. Is it, like the Hawker Henley, to be used as a trainer when its performance has been awaited with interest? [Since this article was written the Botha has in fact been brought into service as an operational trainer.—ED.] It appears that the information has been issued vicariously after the Ministry has been asked for particulars of our new types which are still known by name only in this country but are well-known elsewhere.

The Botha is apparently named after General Louis Botha, who fought against us in the South African War, and with us in the Great War, which nomenclature suggests that, if the Botha is issued to General Reconnaissance or Bomber Squadrons, it may see service in Africa. The Air Ministry can usually be relied upon to christen our military aircraft with singularly appropriate names—with the exception of the name "Knuckleduster" launched on to the Short R.24/31 gull-winged flying-boat of 1934, which should clearly have been called the "Seagull."

The Botha is a two-motored, high-wing cantilever monoplane designed for torpedo-bombing and general purposes. The high wing allows an excellent downward view from the cabin, and the short nose permits the pilot a similar facility forward. The Botha is of all-metal construction, except for the covering of the tail control surfaces, and carries a crew of four.

The fuselage is of monocoque structure, flush riveted, and is unusually long in relation to the wing span.

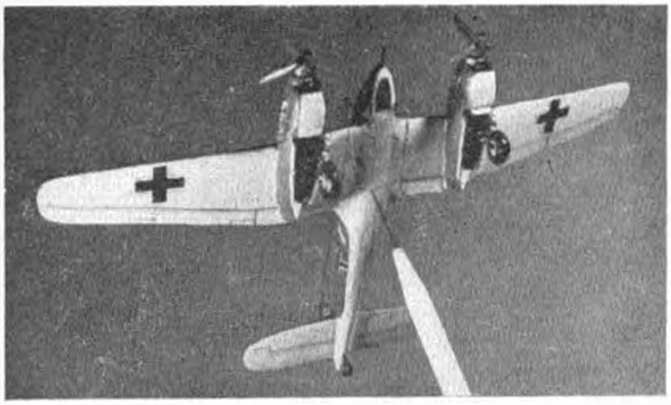
The wing is built up in three parts: the centre-section bearing the motor nacelles and two outer sections. The outer sections taper sharply and have a high dihedral angle. Hydraulically-operated flaps are fitted to the trailing edge of the parallel centre-section, while ailerons are fitted to the outer portions.

The tail unit is of stressed-skin metal construction, except for the fabric covering of the rudder and elevators. Both surfaces are fitted with trimming tabs and are aerodynamically balanced. The fin and rudder are set slightly in front of the leading edge of the tail-plane, similar to the Skuas.

The undercarriage of the Botha consists of two forked legs which retract back and up into the motor nacelles, doors closing them, but leaving a small portion of each wheel exposed. The tail-wheel does not retract. Hydraulically operated brakes are fitted to the main landing wheels.

The motors fitted to the Botha are Bristol Perseus Xa sleeve valve radials, each developing 930 h.p., encased in cowlings, with leading edge exhaust collector-rings and controllable cooling gills. Three-bladed, constant speed controllable pitch airscrews are fitted. The main petrol and oil tanks are carried in the centre-section of the wing.

The crew, consisting of pilot, navigator/bomb aimer, gunner and wireless operator, are accommodated in an enclosed



The prize of 10/6 announced in our May issue for a model of the Focke Wulf Fw 187 has been awarded to S. W. Lane, of Parsons Green, whose entry is shown above.

cabin. A communication passage extends along the starboard side between forward and rear gun positions. The cabin and pilot's cockpit are entered by a door on the starboard side. The pilot is situated on the port side. To give the bomb-aimer on the starboard side a wider view, the glazing on that side has been extended to the bottom of the nose. Beyond the pilot's cabin on either side are bay windows for observation.

The power-operated gun-turret amidships is entered from the rear of the main cabin.

Full naval equipment, including collapsible dinghy, inflation bottle, sea-markers and complete wireless and electrical gear, is carried. A streamlined direction-finding ring is carried beside the radio mast above the cabin.

The armament of the Botha has not been officially announced, but twin Browning guns in the rear turret are apparent. Possibly this number can be increased to four, and other guns will be carried forward. The unusual design of the turret will be noticed. Bombs and torpedoes are carried in a bay beneath the cabin and released through doors.

The highly-tapered wing of the Botha and its upswept tail with the single fin and rudder will be important points in its identification. The wing is of low span (only eight feet less than the length) and rather different from any other aeroplane. It most resembles that of the Saro Lerwick. In a side view the fin and rudder suggest a Wellington, but the small tapered portion of the wing projecting above the fuselage, and the gun turret, are points sufficient to discriminate between the two types. On the ground in certain views the Botha resembles the Flamingo, or Hertfordshire, but the monoplane it is most like is the American Douglas D.C.5. This aeroplane, however, has a tricycle undercarriage and is slightly larger, having a span of 78 feet. No gun is carried on the Douglas, as it was designed for more peaceful intentions, but the likeness is apparent in all aspects. The Douglas has not yet appeared in this country, but it is in production, so no one should be surprised if it does.

The production Botha is coloured according to standard practice. No data, apart from the following dimensions, are available: Span, 59 ft.; lgth., 51 ft. 1½ in.; hght., 14 ft. 7½ in.

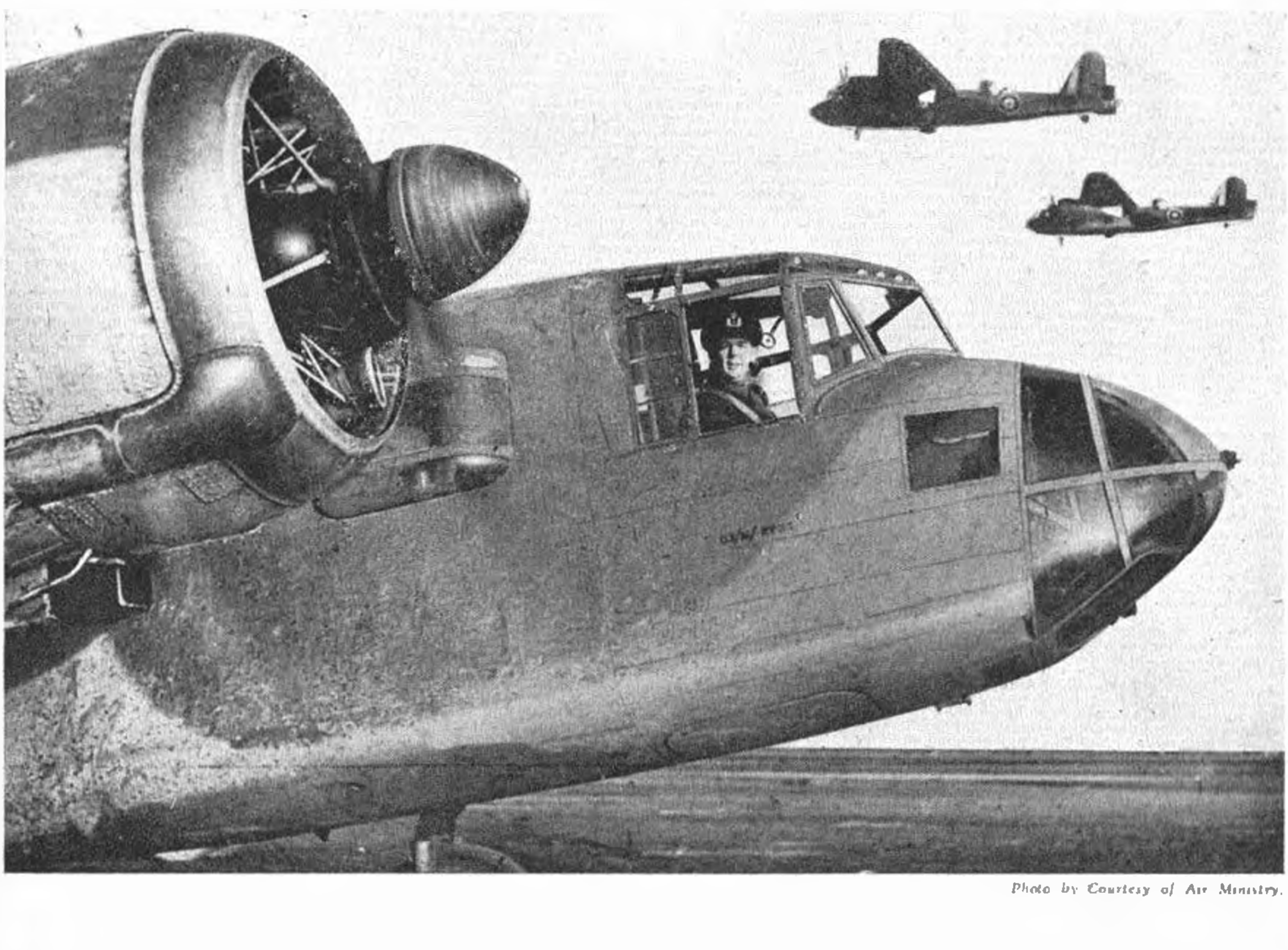
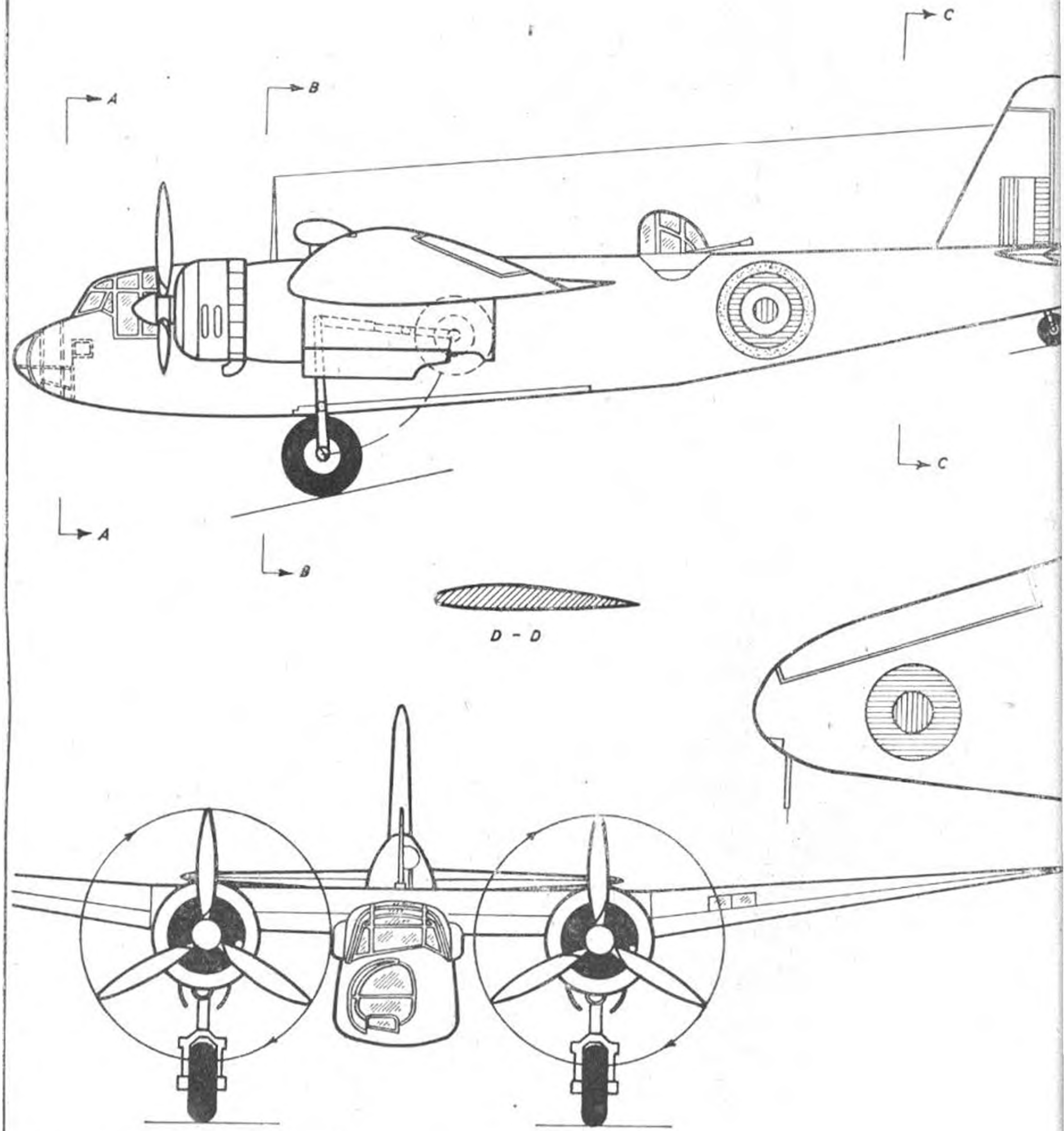
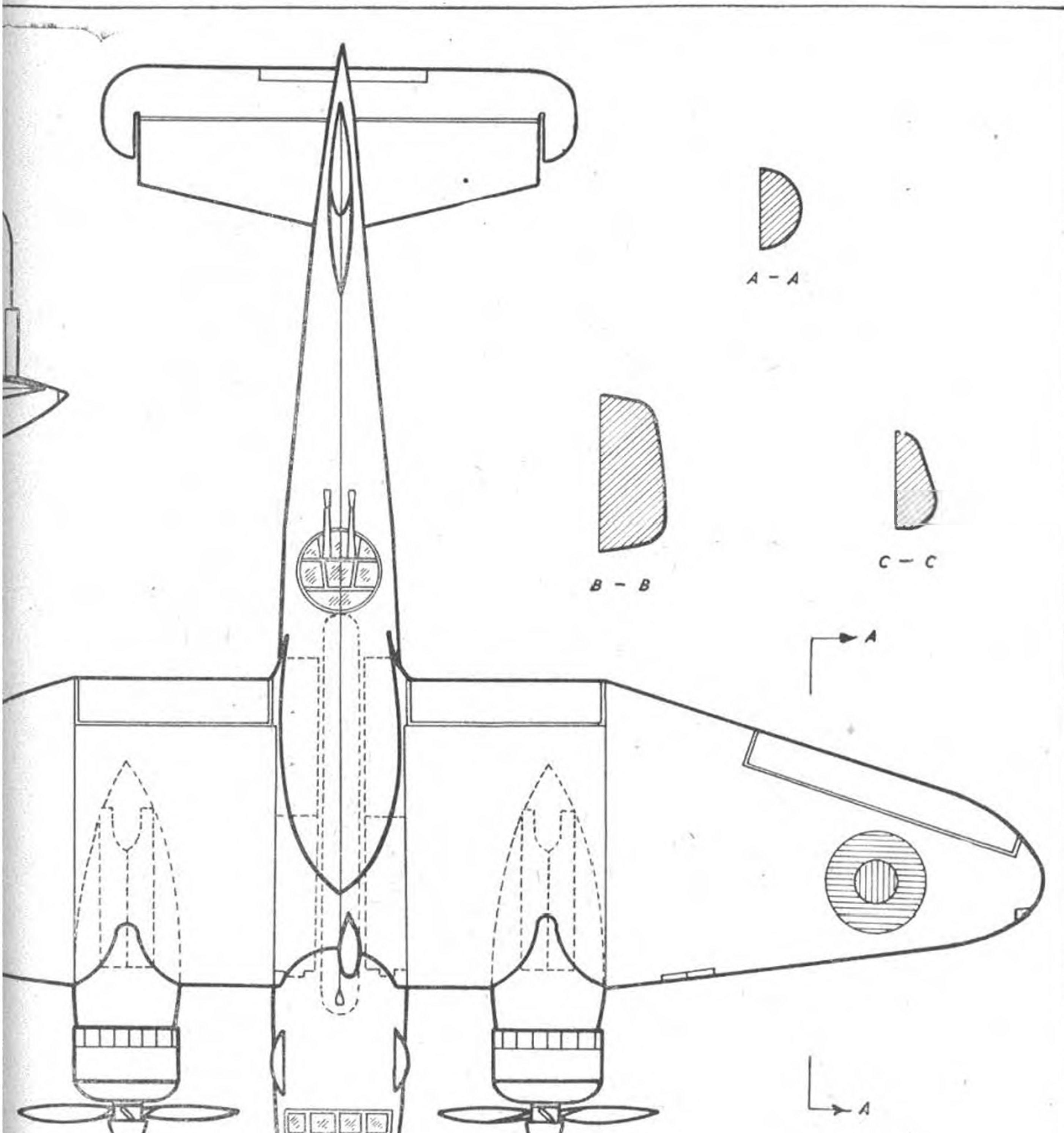


Photo by Courtesy of Air Ministry.

A NEW GENERAL RECONNAISSANCE TORPEDO BOMBER



THE BLACKBURN "BOTHA" I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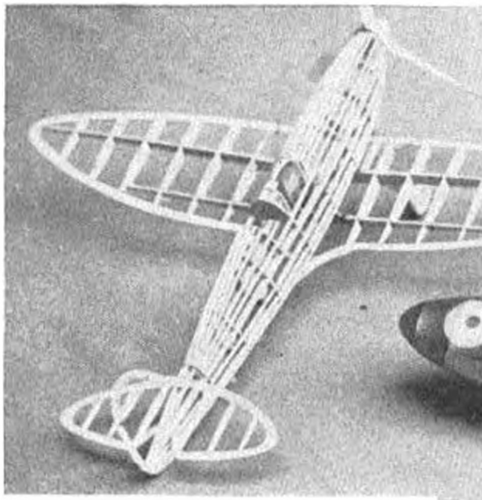
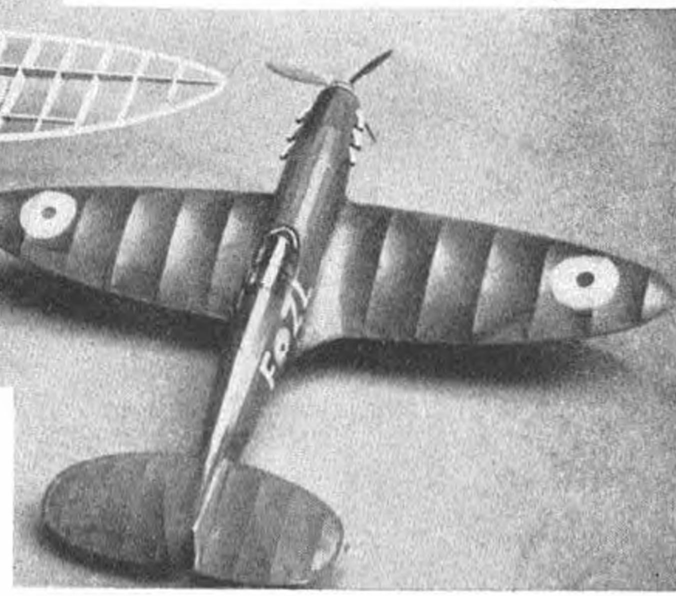
CLUB NEWS





Our prize-winning photo this month is submitted by Miss Colton, of Great Missenden, and shows two models built by A. E. Galeota. (Please note that photos sent in for this monthly competition should be at least post-card size, and preferably on glossy paper).

By "CLUBMAN"

As you will note from the list of National Cup results, given here, the North has come out on top for the first time in years, and will, I am sure, give a great deal of satisfaction to some quarters who have not been feeling too kindly disposed towards official matters recently! I do not say this with my tongue in my cheek, but certain folk—no names, no pack drill—have been doing a lot of talking (and, it must be admitted, no " doing ") about things in general, and I feel the result of this event as now published will remove some misgivings.

From which some of you will wonder what is in the wind—and I'm not going to tell you! Sufficient for me to say to certain quarters, " Don't go jumping at fences until you know what is happening; and, anyway, see that your jumping boots are in order first."

While on the subject of national competitions, let me *once again* give a kick in the pants to some club officials who are not doing their job properly. I maintain that the Competition Secretary has quite enough on his plate without having to wet-nurse some inconsiderate blighters who, after all, are the first ones to bleat if their entries are queried owing to their lack of attention to detail. A classic example has recently come to light, for which there was no excuse, and it says much for the tolerance of some officials that they didn't raise a stink over the matter. So all you who have been entrusted with official duties—see that you carry them out in a proper manner, and, before cribbing at the S.M.A.E., make sure that your own house is in order. As the comedian says: " What's the matter wit you, what's the matter wit you. Want a kick in the pants? "

NATIONAL CUP RESULTS.

Ashton & D.M.A.C.	2429·5 points
Thames Valley M.A.C.	2380·0 ,,
Blackheath M.F.C.	1756·9 ,,
Walton & D.M.A.C.	1555·5 ,,

I have noticed of late, when reading through some American model magazines, that they have adopted an interesting system of denoting flight times, and I thought it would be a good idea to adopt their method in these columns, making for both standardisation and the saving in space. Whereas in past reports a flight of 6 min. 38·15 sec. has taken up quite a bit of space, in future this will be shown as 6 : 38·15; in other words, the minutes figures will be shown in front of the colon (:) and the seconds figure following. I have been considering this for some time, and I think you will agree with me that some sort of standardisation would be very helpful. I am no slavish follower of American methods, but I certainly do not hesitate to adopt those that can be of benefit.

I see from the S.M.A.E. report that the new certificate for issuing to affiliated clubs is now ready, and also that a standardised form of member's card is being prepared for issue to the clubs. This, I am sure, is one of the really worth-while directions in which the governing body can help the subsidiary clubs, whether large or small.

I am also pleased to note that Mr. Jennings, of the BATH M.A.C., has had his flight of 17 : 48 accepted for the " Caton " Trophy this year; but if the present weather continues, I can see this time being handsomely beaten. As a matter of fact, in one of the reports this month I am informed of a flight of over 33 : 00, but I do not know whether this was officially timed by the proper officials. If not, this is pretty hard luck, as this would have constituted a new national record.

The ILKLEY M.A.C. have forwarded an idea for post-war activities in the shape of a club Challenge Trophy to be competed for annually by any club in the North-Eastern and North-Western areas (S.M.A.E. area scheme). The suggestion is to select up to twelve members per club, and the total of the top three competitors' flights from each club to count as points, each having three flights. (This is, of course, on the same lines as the 1941 National Cup rules.) These chaps would like the views of other clubs in their area on this subject, as, if sufficient response is forthcoming, they will go ahead with the preliminary arrangements and see about wangling a decent " pot " from somebody. (If the response warrants it, it may be possible to run this stunt as a decentralised event until after the war.)

Another news sheet from our old friend Prof. Bobrovsky

contains an interesting note regarding "flapper" models. He states that "an ornithopter model wing should have an average of five wing movements, whereas all the designs printed up to date have only two, one of which—the up and down strokes of the whole wings—is mechanical, and the second—angle of attack—changes during the strokes. All these put the flappers in a very primitive class." Well, has anybody any suggestions to make on that particular subject? It is one that has been avoided by the majority of designers, and I should certainly like to see what some of our "freak" merchants have to say.

I have been forwarded a "flash news" item to the effect that the Northern Heights M.F.C. seem to have walked away with the S.M.A.E. r.t.p. contests. I am sorry to note that this innovation did not receive better support, but I suppose, as usual, it takes a couple of years for things to sink in in some districts! The best individual flights for the three months were as follows:

February.—K. Young (N.H.), 188 sec.
March.—K. Young (N.H.), 150 sec.
April.—R. Crowe (Ilkley), 152·5 sec.

Young scored the best individual aggregate in each month with totals of 367, 292 and 371·5 sec.

Blackheath Model Flying Club

OPEN DAY, AUGUST 10th, 1941

Flying Ground: Epsom Downs, nr. Tattenham Corner Station.
Commencing 11 a.m.

CONTESTS

(1) Open Duration (any type of model).
(2) Team Contest (1941 National Cup Rules).
(3) Glider Contest (winch launch; S.M.A.E. fuselage formula).
(4) Flying Scale (any scale).

Further particulars:
Mr. M. W. White, 81 Manor Avenue, Brockley, S.E.4

ROLL OUT THE MODELS!

Recent activities of this club include National Cup day, when Mr. Simonds lost his second 'plane this year with a flight of over 9:00. Mr. R. Mackenzie and Mr. D. Piggott also kept the ball rolling with respective times of 3:35 and 5:47. The Club Glider Contest was also held during the afternoon, with the following results:

	1st	2nd	3rd
R. E. Galbreath ...	87·3 sec.	90·9 sec.	72·2 sec.
D. Piggott	78·5 ,,	73·4 ,,	66·6 ,,
H. C. Baines ...	43·2 ,,	33·2 ,,	—

Mr. Temple is still busy on his 1941 sail-plane. This machine boasts a total wing area of 520 sq. in. and a loading of 11 oz. per sq. ft. It is fitted with dihedralled tailplane set high on the fin, and the whole job has been finished with a glass-like surface of lacquer.

G. Pagan, of the ROWDITCH (Derby) M.A.C., won both the Light-weight and Open Duration events of the

A series of photographs taken at the Dundee M.A.C. exhibition. Note the arrangement of the small solid models.

club with times of 1 : 05 and 58 sec. respectively, while R. J. Baker won the Medium class with 1 : 04. After losing their field owing to " mowing grass " notices, another fine plot of 15 acres has been obtained. Lucky blighters!

The HEYWOOD M.A.C. invited the members of the Bury Club over for a contest to decide who is " cock o' the district," and a very enjoyable time was had by all. High wind spoilt an otherwise perfect day, and times were poor in consequence, C. Hall winning the only event staged with a time of 25 sec.

B. V. Haisman, of the ALLERTON AND D.M.F.C., lost his new Wakefield recently on a test flight, but it was fortunately recovered undamaged. (Incidentally, he was using five degrees incidence, Mr. Maxwell!) A. R. Topham has raised the flying scale record to 1 : 03·5 with an " Interstate Cadet."

The SCUNTHORPE CLUB is progressive if small, and a number of them still manage to get in a spot of flying when conditions permit. An exhibition held in aid of the Red Cross raised a matter of £16, which you will agree is good going for a small concern. Models are lost in this district with regularity, the best flight yet being a " lost Korda " at 9 : 55.

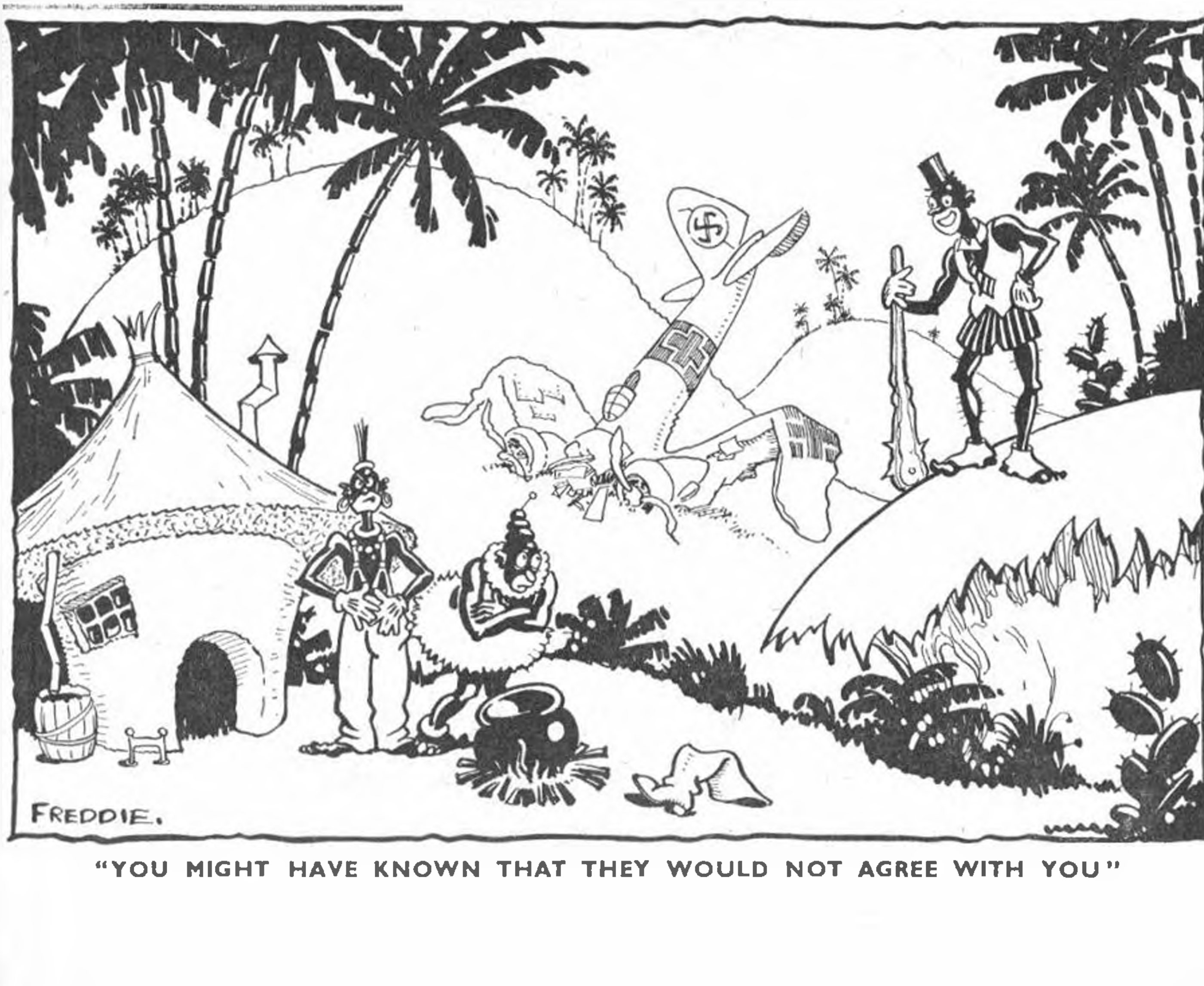
The HALSTEAD M.A.C., for once in years, had fine weather for their Rally, and, after getting his model treed on a test flight, H. Cox piled in and broke the club record with a flight of 13 : 14·2 o.o.s. Two spectators followed the model on cycles and timed it for over 25 minutes! A spotters' section has been formed in the club, and C. J. Richardson won the first test with 93·7 per cent. Nice work!

The " Record Cup " belonging to the LIVERPOOL M.A.C. goes to the breaker of the previous club record, so competition is keen at all times. H. Cottam now holds this " pot " with a time of 1 : 09.

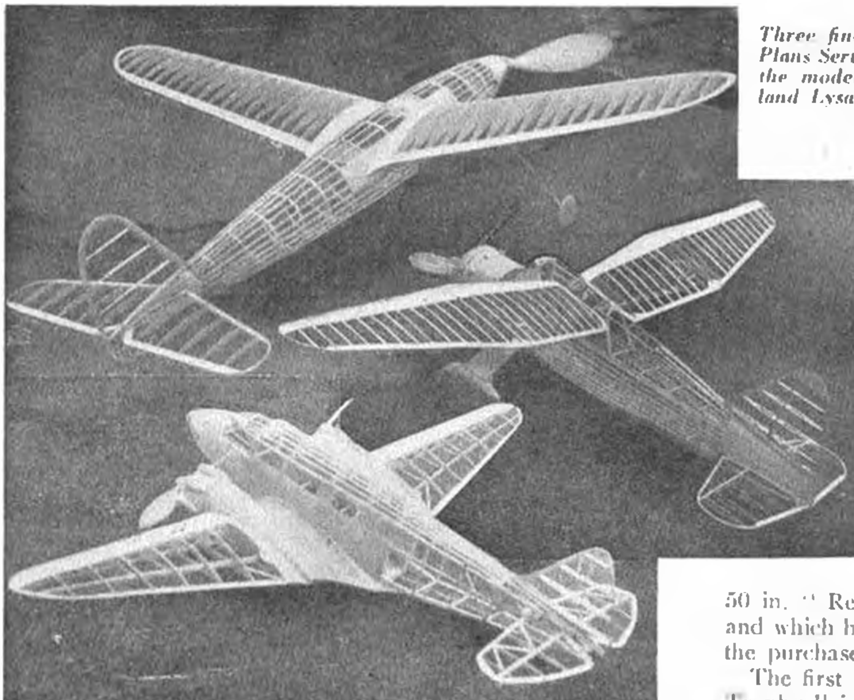
I am informed that M. Jennings, who placed second in the Gamage Cup, is a junior member of the BATH M.A.C.—and his fellow-members are somewhat proud of him! Unfortunately, he lost his model on its flight of 17 : 45 o.o.s., which is just bad luck. A new member, F. Smallwood, won the " Loel Guinness " trophy, flying a well-made " geared " job. (Don't hear much about gears these days, do we?)

J. D. Lockwood, of the JUNIOR TECHNICAL CLUB, has fitted a " floating wing " (see June issue) and had excellent results, flying both with and without a tail-plane. I shall be pleased to hear of any other experiences with this device—it certainly has possibilities.

Remarkable weather saw a " rill mill " of thermals recently at the RIPON M.F.C. ground, and E. Lonsdale proceeded to break the record with a flight of 12 : 50, the model landing only a quarter-of-a mile from the take-off. This is quite unusual, especially with me! If I do one of my rare 30 seconds I invariably have to chase it for about a mile. And at my age, too!



"YOU MIGHT HAVE KNOWN THAT THEY WOULD NOT AGREE WITH YOU"



Three fine examples of models built from the Aero-Modeller Plans Service. Built by members of the Mountain Ash M.A.C., the models are respectively "Copland's Wakefield," "Westland Lysander" and "Airspeed Envoy."

The KENDAL M.A.C. are using the local race-course as a flying ground, and this is evidently proving quite effective, as D. Barratt has established a new record, flying a Keil Kraft "Achilles" for 33 : 38 o.o.s., this eventually being found near the owner's home, approximately seven miles away. (Was this flight officially timed? If so, it constitutes a new British national record, the present figure being just over 31 : 00 by Dicky Skinner, of Beverley.)

Another chap to break records is D. Halls, of the PLYMOUTH AND D.M.A.C., who flew his model 2 : 31 o.o.s. The 'plane was last seen tickling a balloon barrage! These chaps have linked up with the local Hornby Club and have gained a hall for indoor flying and a number of new friends in consequence. I. Mitch has set up a club indoor record of 44·5 sec., though it is not stated whether this was r.t.p. or free flying.

The activities of the ILFORD AERO-MODELLERS have recommenced under the joint-secretaryship of Messrs. T. Heckles and J. G. Dodds, of 215 Beehive Lane, Ilford. New members will be welcomed, and should apply to the secretary's address. The club is holding regular meetings on Hailnaught Plain on Sunday evenings, and in Christchurch School Hall on Wednesday evenings, between 7 and 9.30 p.m.

Some good flights have been made by the ULSTER M.A.C. members this year, including a 5 : 00 o.o.s. by Mr. Daulman's "Korda," being found fifteen miles away. The same gentleman also broke the club record with a 7 : 00 flight o.o.s. with a "Condor Clipper."

The HINCKLEY M.A.C. have arranged an inter-club meeting with the Leicester and Loughborough clubs, and it is interesting to note that two of the Hinckley team members have recently broken club records with flights of 3 : 15·8 and 3 : 42·4. One of the members is busy on an ambitious 50 in. "Rearwin Speedster," which already weighs 16 oz. and which he hopes to fly—if his banking account will stand the purchase of sufficient rubber.

The first holder of the CHINGFORD M.F.C. "Forest Trophy" is R. (Tich) Negri, who set up a creditable total of 236 points. J. Holgate has collared the "President's" Cup with a flight of 2 : 58.

The WORKSOP M.A.C. has increased its balsa butchering, and new records have been set up, ranging from 1 : 07·1 t.l. sailplane to 1 : 33 h.l. duration. Two public r.t.p. competitions have been held, both of which were well attended, and about £20 raised in aid of charities.

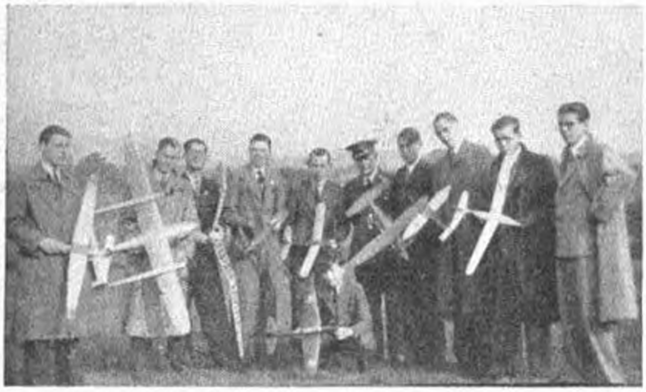
The HEAVITREE (Exeter) M.A.C. have lost their former flying field until the hay has been gathered, but this has not stopped flying, and D. M. Peters succeeded in raising the club h.l. record to 4 : 24.

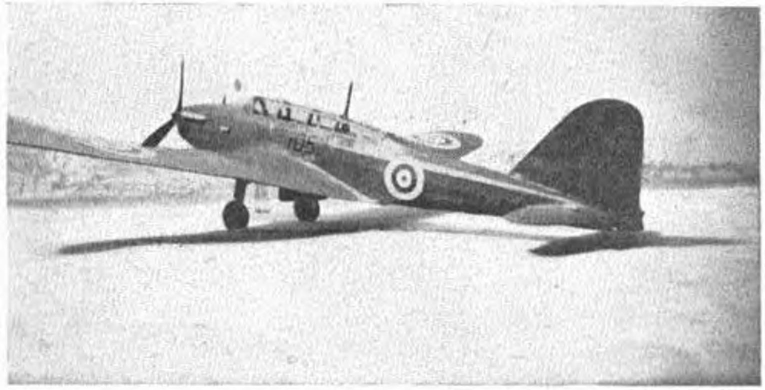
S. Rigby, of the EAST BIRMINGHAM M.A.C., won the first event on their programme, averaging 53 sec. with his "Ajax." J. Hinde recently set up a fine flight of 10 : 05 o.o.s with his "Korda" model.

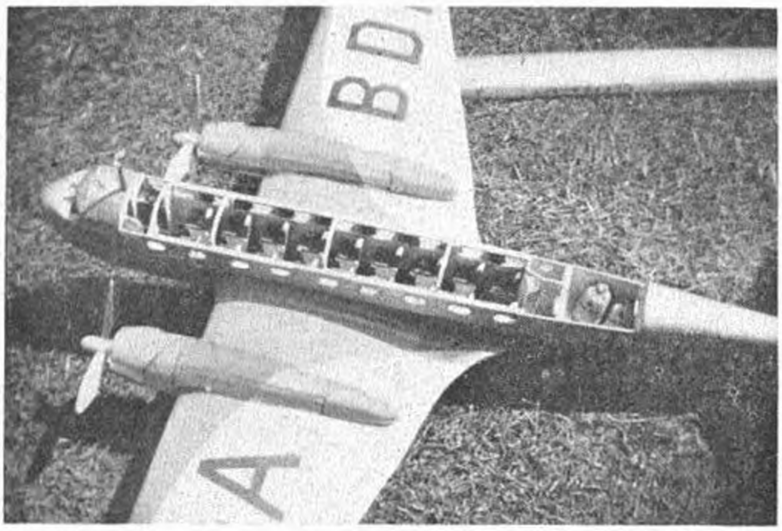
> The OXFORD M.A.C. are to hold an "OPEN DAY" on August 3rd, and it is hoped that a good turn-up of entrants will take place; also, the help of the Clerk of the Weather is solicited! Who knows, I may even get that far myself.

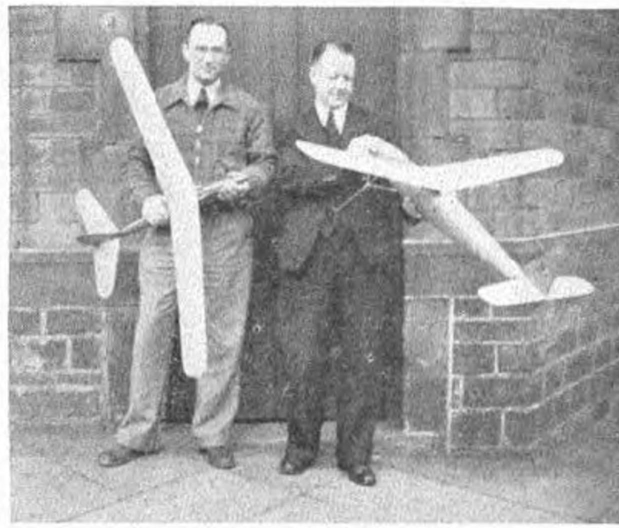
D. J. Dawson, of the LEICESTER M.A.C., made the best club flight in the "Gamage Cup" with a time of 6 : 03, and again clocked best figures when flying in the "National Cup" with a time of 5 : 21, this latest time being the club r.o.g. record for a Wakefield class.

Membership of the ST. HELENS M.A.C. is increasing, so that it now stands at 36, including five lady members. I am told that these fair creatures are about to start building models under the guidance of certain of the males. R. Scott holds the club glider record with a time of 1 : 43, while the club duration figure has been pushed up by Mr. Adrian to 3 : 12. A general social event, attended by 100 guests, was brightened by an exhibition of model aircraft presented by the members, and an exhibition of r.t.p. flying









Top: The Heavitree (Exeter) M.A.C. and models. A well-built scale model by A. F. Leighton, of Bletchley.
Middle: Fine detail work on a 40 in. " Wibault 670," by D. J. Armstrong-Smith. Judges Stott and Lees with prize-winning models at Huddersfield.
Bottom: A. Clarke, of Consett, with a gull wing duration model. My, how you've changed! Anybody know who it is?

was given to an amused but thoroughly interested audience.

The main activity of the STEWARTON M.A.C. has been the staging of an exhibition during War Weapons Week, and, by dint of many repairs to semi-retired machines, a total of fifty-two was gathered and the show duly held. No charge was made for admission, but a total of £484 4s. 6d. was handed over to swell the total for the town, which, considering that there are only 3,000 inhabitants, makes this one of the best efforts I have yet heard of. As a point of interest (and of assistance to others who may be contem-

The AERO MODELLER Plans Service

"COPLAND'S WAKEFIELD"

(By R. Copland, world record holder)

Bob Copland, long famed for his designs and flying of the high class contest type of model, has designed this machine on the latest aeronautical practice. Of super streamline, shoulder wing category, this model embodies the best ideas yet produced.

Span, 44" Plans 1/3 post free.

"BEGINNER'S BIPLANE"

(By H. L. Woollard)

A simply designed biplane, suitable for a first model, and capable of very good average flights. Handy size for transport.

Span, 25½" Plans 1/6 post free.

"A.M. CABIN MONOPLANE"

A handy little model with realistic looks.

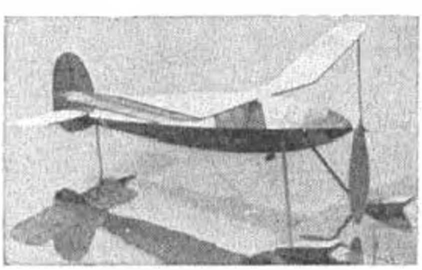
Span, 23" Plans 1/6 post free.

"CURLEW"

(By K. W. S. Turner)

Designed by an aero-modeller well known for his abilities in the North, this tow-line glider embodies many new features, and is a real "good looker." With a wing area of 207 sq. inches, and weighing 5¼ oz., the original has flown for over five minutes.

Span, 46" Plans 3/- post free.

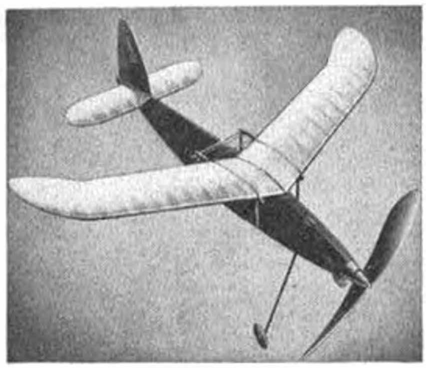


"DIASPHERE"

Holder of the World's record for its class, this model may also be equipped as a land 'plane.

Span, 36" Plans 2/6 post free.

The proof of the pudding is in the eating, and we can claim to have the most satisfied collection of customers of any business. Commendation on our Plans Service feature is a daily occurence in our post-bag, and we in return are doing our best to present the very best in aero-modelling designs. Successes with "A.M" designs are many, the outstanding performance this month being the winning for the second year in succession of the Gamage Cup with the "ISIS." Space economy prevents a complete monthly listing of our designs, but a special catalogue is almost ready, and will be sent to anyone sending a 2½d. stamp.



"GEORGE"

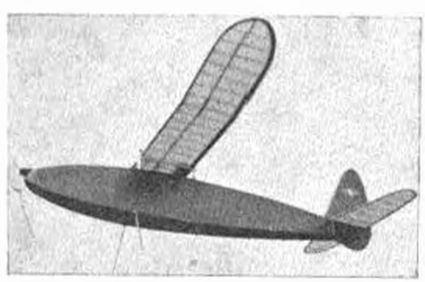
(By C. A. Rippon)
Winner of the 1940 "Flight Cup."

Fully described in this month's issue, this model should meet the demands of a machine complying with the new "Flight Cup" formulæ, and useful for all competition work.

Span, 34" Plans 2/6 post free.

IMPORTANT NOTICE

Owing to the lack of space, we are unable to print a full list monthly of our designs. With the continued addition each month of new designs, it is impossible to keep a current catalogue, so will readers please note that if a particular model is not advertised each month, it does not follow that it has been withdrawn. All designs listed since the inception of Plans Service are still available.



"GUTTERIDGE TROPHY WINNER"

(By N. Blacklock)

A parasol type Wakefield model that has set up some remarkable flight performances.

Span, 42" Plans 3/6 post free.

SEE NEXT MONTH FOR A SPECIAL "SOLIDS" ANNOUNCEMENT

"ISIS"

1940-41 Gamage Cup Winner
(By A. F. Houlberg, A.M.I.Ae.E.)

Sound design counts yet again, and, for the first time in the history of the event, the same model design flown by the same competitor, has won this keenly contested event for the second year in succession. Robustness allied with super duration make this a tip-top model worthy of any "stable."

Span, 44" Plans 3/6 post free.

"BIPLANE SPORTS"

(By D. D. Edwards)

A handy little biplane of 29" span, this model should appeal to those looking for a robust model for general flying.

Span, 29" Plans 2/6 post free.

"CABIN BIPLANE"

A strong, handy little model for beginner and expert.

Span, 20" Plans 1/6 post free.

"MINERVA"

(By J. E. Fraser)

A streamlined, gull-wing biplane of advanced design, this model should appeal to all who are giving attention to this type of model. The original has flown for over 2½ minutes, and has an average flight performance of over 90 seconds.

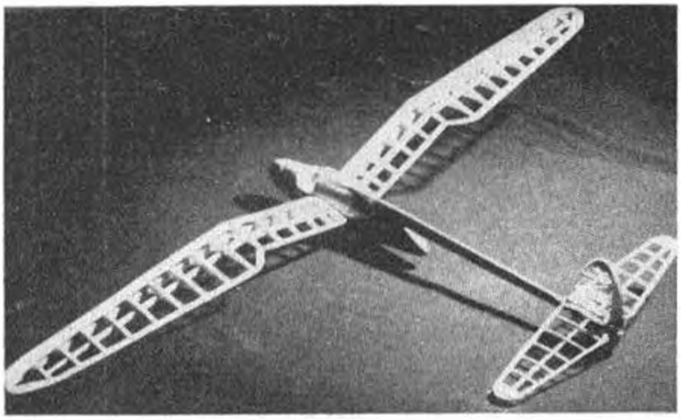
Span, 36" Plans 2/6 post free.

"HENSCHEL Hs 126"

A fine model employing many unusual constructional features.

Span 35" Plans 3/6 post free.

The AERO MODELLER Allen House Newarke St. Leicester



5 ft. glider, designed and built by P. G. Browne, of Aldenham School M.A.C.

plating staging an exhibition of a like nature), visitors were taken round the exhibition in parties, each in charge of a club member, being shown first a table laid out with the raw material for building a model, and so on in progressive stages until the completed model made its appearance.

The STRATFORD-ON-AVON M.A.C. are helping their local A.T.C. squad by loaning them 1/72 scale models of 'planes to illustrate their lectures on aircraft identification. This is a very good stunt, and is one I can commend to other clubs. R. Higham, flying a "Halcyon" built from AERO-MODELLER plans, has raised the h.l. record to 4 : 00.

The team entered by the THAMES VALLEY M.A.C. for the "National Cup" did very well, averaging over 3 : 00 each, which is certainly consistent, if nothing else. A sudden spell of fine weather followed days of heavy rain, and thermals were abundant.

A new club to commence operations is the MILLOM M.A.C., Secretary, K. Thompson, Oxford House, Cambridge Street, Millom, Cumberland. D. Heron holds both the h.l. and r.o.g. records for this club at the moment with flights of 2 : 01 and 1 : 41 respectively.

The first competition of the season with the DUNDEE M.A.C. resulted in J. Boe winning with a total of 211 points, followed by I. Morton, 172 points, and J. Ogilvie, 124 points.

An interesting system of deciding competitions has been instituted by the ALDERSHOT M.A.C., where the average of the two worst of three flights is taken. It is hoped by this method to cut out the all-too-numerous cases when one lucky thermal flight wins the club cup. Mr. Standing won the first event of the season, averaging 60 sec.

At the annual general meeting of the CHELMSFORD S.M.E., it was proposed that the aircraft section should be formed into a separate club, and after discussion this move has been adopted for a probationary period of one year. This club is now known as the CHELMSFORD M.A.C. A good flying field is available, and a club-room suitable for r.t.p. flying, so there is every reason for the immediate success of this club.

Numerous competitions have been held by the TORQUAY AND D.M.A.C., resulting in wins for :

G. Pearce (solid model event), "Short Sunderland."
L. J. Taylor (open duration), 3 : 21·5 aggregate.
"Kay Cup."—R. Perrett, 5 : 06 aggregate.
Nearest 100 sec.—G. F. Brown (1 : 43).

Brown is a member of the newly-formed A.T.C. team in this club, whose subs. have been paid by one of their officers, who considers aero-modelling a useful addition to ordinary A.T.C. training.

Things have been happening at WOKING, where the local club have been indulging in A.G.M., water contests and two competitions on one day. The A.G.M., presided over by Squadron-Leader Featherstone, R.A.F., was well attended, but "Pop" Gunner seemed to be taking most of the cups away, and, not being satisfied with them, proceeded to walk off with the "Boy Andrews" Memorial Trophy for seaplanes with which this club opened the ball. However, this stirred Secretary Biggs to action, who won his own competition and the club "Gamage" in the same afternoon with a job he persists in calling a "Special" instead of the "Korda" all the experts diagnose! Case of calling a spade a fork? This particular meeting was so successful, producing seventeen entries, and those nearly all finishers with good aggregates, that one philosopher was tempted to inquire if there really was a war on!

After going to a lot of trouble arranging a competition, an official expects some sort of support, but unfortunately this did not happen recently at a BLACKPOOL AND FYLDE M.A.S. meeting. However, a subsequent event brought fine weather and a good turn up, so two competitions were held, resulting as follows :

NOMINATION.

A. Munden (error, 6·7 sec.).
D. Evans (error, 8·3 sec.).

R.O.G. DURATION.

D. Evans (aggregate, 4 : 27·9).
T. Bailey (aggregate, 4 : 05·6).

Nearly all the flights in the latter event were o.o.s.

D. Fletcher, of the KINGSTON UPON HULL M.A.C., has set up a new figure for club duration models, clocking 6 : 47, the model being found about three miles away. On the same day P. R. Watts set up a new tow-launch glider record with a gull-wing design, time 6 : 25. Unfortunately, this model has not been recovered.

I am told that this event " will be run as a Rally, and *not* as they have been in various parts of the country. Visit Ashton and notice how they do things in a proper way, without fear or favour." Well, well, well, you're committed to it now, boys, so here's hoping your claims are justified! Wish I could get to all these meetings notified.

Mr. Harris, of the PORTSMOUTH AND D.M.A.S., won the annual Whit-Sunday contest with an o.o.s. flight of 2 : 43—a new club record. Owing to calling-up of the secretary, all communications should now be sent to Mr. Callen, 288 Lake Road, Portsmouth.

Following the notice in last month's issue for activity in the Guildford district, I am informed that a club has been in existence there for the past three years, with rooms at the local Y.M.C.A. Whilst I am thankful for this notification, it is surprising to learn that this club has been hiding its light under so many bushels, as this is the first we have heard of it. Not exactly what you'd call publicity hounds, are they? And you see what happens when some one in the district wants to join a club——. A prospective member naturally expects to be informed through THE AERO MODELLER, and I wonder how many more clubs are losing new members owing to similar lack of enterprise.

The bright star in the WALTON AND D.M.A.C. at the moment is Mr. Fields, who placed fourth in the " Gamage " Cup. He clocked 10 : 02 on his first flight, and unfortunately damaged his machine, else his final aggregate would have been much better. Mr. Wyman, who flew 6 : 42·5 o.o.s. in the same event, had another fine flight in the " National," losing his model after 7 : 15.

Whit-Sunday saw the " first leg " of a clash between the HALIFAX M.A.C. and the Northern Heights chaps, when Messrs. Copland and Bell put it across the Northern Cocks. No times are given, but I am assured that full revenge will be sought in August, when the boys travel down South for a return event. Mrs. Hubbard is giving the lads something to think about these days, having built a tip-top model that is showing its paces well. Until the end of August, flying now takes place on Baildon Moor, Bradford.

Capt. Horner, of the LANCASTER M.A.S., has presented a cup for competition among machines built from wood other than balsa, to be known as the " War Cup." Sound scheme this, and one to be recommended to other clubs. Shortage of balsa should not cause a stoppage in building—the fellows used to build before balsa was heard of! A r.t.p. scale event was won by A. F. Bond, flying a " Defiant " to an aggregate of 1 : 24·25, while the record for this class has been put up to 29 sec. by the same chap.

Ashton and District M.A.C.

" OPEN RALLY," SEPTEMBER 14th, 1941

Open Duration. Gliders.
Wakefield. Nomination.
1/72 Scale Concours.

The outdoor season opened with a heavy weight competition, winner being C. C. Horner, who totalled 3 : 57·6, runner-up being A. F. Bond with 3 : 22. B. Halliwell won the biplane event, while Capt. Horner has raised his own scale record to 42 sec. with his " Piper Cub."

Efforts are being made to revive the YORK M.A.S., which was allowed to lapse at the end of 1939, and prospects are asked to go and see Mr. L. Fawcett at 84 St. Saviourgate, York, without delay.

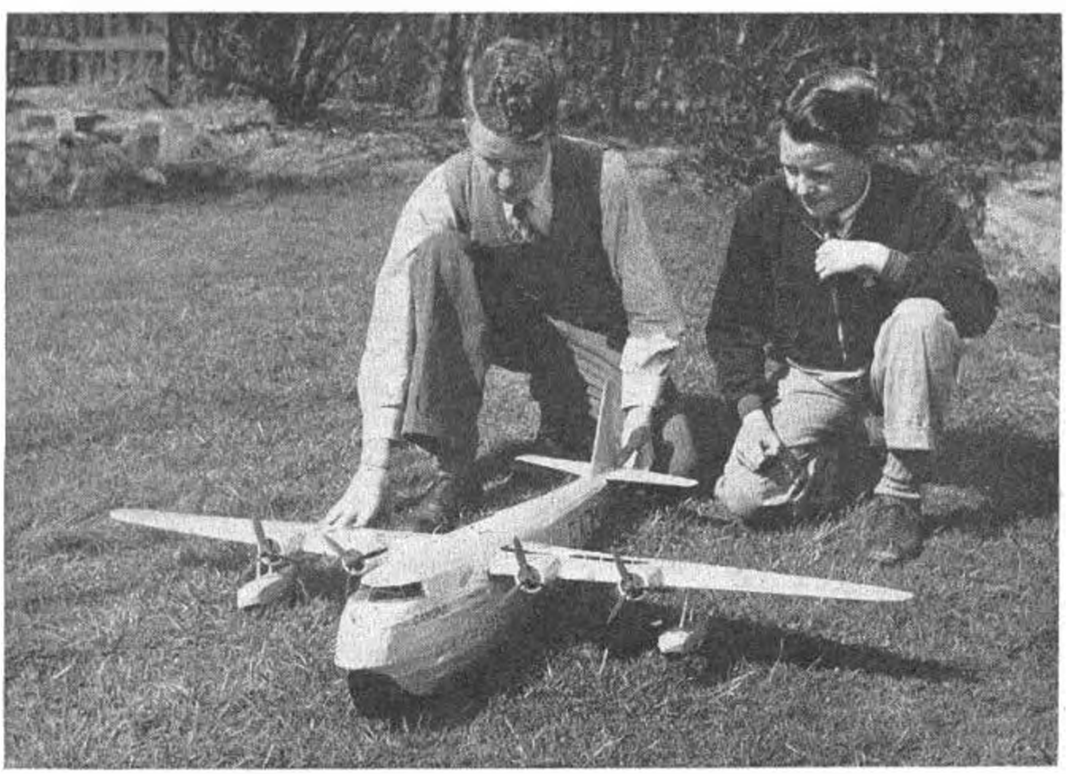
Events were well supported at a recent competition day held by the TAUNTON AND D.M.A.C., the only snag being the high wind. Results were as follow:

Light weight.—H. A. Simpson (2 : 51·3 aggregate).

Medium weight.—H. G. Radford (2 : 10·2 aggregate).

Nomination.—H. G. Radford.

Ah!—here are the times for that Halifax—N.H. event I told you about earlier. The NORTHERN HEIGHTS M.F.C. state that their team of two aggregated 980·7 sec. against Halifax's 597·95 sec. Best flight of the day was set up by Copland with a time of



The " Canopus," shown in the January issue, is now finished.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS

Notes on a Council Meeting held at the Royal Aero Club, 119 Piccadilly, on June 15th, 1941, at 11 a.m.

The Minutes of the Council Meeting held on April 6th were read and confirmed.

Mr. C. A. Rippon, the Vice-Chairman, took the chair.

Business Arising from the Minutes.

Mr. Bell produced the new certificates, which will be issued to all affiliated clubs.

The Council then considered the membership cards for the use of affiliated clubs, and it was decided to purchase 5,000 of these. It is hoped they will be ready in a short time.

The wording of the new certificate which will be issued to prize-winners was also considered. The design will be similar to the affiliation certificate. It is hoped that these will be in the hands of last year's prize winners, together with the prizes very shortly.

Mr. L. J. Hawkins gave his interim report, which showed the finances of the Society to be still progressing favourably.

Correspondence.

A further letter from Mr. W. A. Edwards, regarding patron membership, was read. The Council suggested that under the new constitutional rules Mr. Edwards could do the movement greater service by assisting his local affiliated club.

Mr. J. C. Smith, the Hon. Competition Secretary, stated that he had received a late entry for the National Competition. There appeared to be some reasons for the delay. Mr. Smith was asked to write to the club concerned before announcing the results of the competition.

Mr. Smith had received an application for the Caton Trophy from Mr. C. M. Jennings, Junr., of Bath. The flight was made during the Gamage Cup Competition, the duration being 17 min. 48 sec. This was the best time of several similar applications.

An application was received from Mr. E. Hurley for a record made with a model of the P.I.I.P. type, the time being 1 min. 21·5 sec. This record was granted.

Affiliations.

The Leven (Fife) and Swindon Clubs were affiliated.

Reaffiliations.

The following clubs were reaffiliated: Bath, Blackpool, Edinburgh, Notts, Westland, Wirral and Woking.

A tentative suggestion from a large club that affiliation fees should be increased was considered by the Council. The Council have no powers to increase the affiliation fees, but warmly appreciated the motive behind the suggestion, which was to increase the Society's financial assets. The club was thanked, and its representative suggested that perhaps a donation to the Society might be made.

Considerable discussion took place on the proposal to inaugurate the Wakefield Fund. Some Council members considered that a fund started now would be a nucleus for an after-the-war big effort. Other Council members considered that the time was inopportune for this type of activity. Mr. Bell was asked to make a precis of the various opinions, and place the matter on the agenda for a future delegate meeting.

A letter from the Harrow Club stated that their Open Day on July 27th had had to be cancelled owing to the difficulty in obtaining a suitable flying ground. Mr. Rippon suggested that members of the Harrow Club should join in with the Northern Heights on that day in order to compete for the Gutteridge Trophy.

The meeting closed at 1 p.m. with a vote of thanks to the chair.

H. York, *Hon. Press Secretary.*

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5 : 26, while both Bell and D. Lees lost their models on the second flight. While this event was going on, the boys at home held a "scratch" contest, the winner being a junior member, L. Frankel, who clocked 6 : 00 o.o.s. A low wing event was won by C. R. Clarke, followed by R. Jeffery and L. Ryde.

A biplane event held by the TROWBRIDGE AND D.M.A.C. was won by V. D. Wilkins with an aggregate of 3 : 23, though I am told his flying was not up to form on this occasion. This chap also won a "best of three h.l." competition with 6 : 16·77, closely followed by L. W. Dallimore with 6 : 03·12, the event closing with two thermal fly-aways.

The EASTBOURNE M.F.C. is still going great guns under the guidance of Mr. Towner, and a very successful exhibition has been staged. £6 was collected in weight-guessing competitions, while a well-known actress auctioned a model Spitfire for the total of 35s. I hope to show a photo of this show at some later date.

A new club has been formed in Walthamstow, so those who are interested should get in touch with L. Phipps at 44 Waverley Road, or H. Bateman at 151 High Street, E.17. Here's luck!

J. Grundy averaged 1 : 07 to win the first competition of the newly-formed BIRKDALE AND HILLSIDE M.A.C., also setting up a record of 80 sec. for the club. D. Pye holds two other records in this group with 1 : 10 for the 150 sq. in. class and 42 sec. for gliders. Somewhat poor times are due to the bad weather they have been having in that district.

The EASTERN ENFIELD M.A.C. have sent me a copy of their journal, and this is a very well-thought-out and ambitious effort. A number of interesting items are included, the chief among these being an article on "Designing Your Model," this being linked up with an "own design" competition to be staged by the club this year. K. Smith won a recent competition, and at the same time put up a new club record of 4 : 05.

The ILKLEY M.A.C. rally was unfortunately cussed with bad weather, rain and wind, and it had a dampening effect on the meeting. Fifteen competitors entered for the nearest to 40 sec. event and thirty for the open duration. Considering the conditions, entries were surprisingly high, but it was noticed that most of the Wakefield models were rather under-powered for the strength of the wind. D. Hinchcliffe, of Batley, made the best flight of the day with his streamlined Wakefield model, clocking 2 : 59·5 o.o.s. F. Burnell (Batley) flew very consistently to win the r.o.g. open duration contest with a total of 4 : 12. The full results are as follow:

NEAREST 40 SEC.

1. T. Schofield (Leeds) ... ... 41·2 sec.
2. C. Furse (Leeds) ... ... 33·2 ,,

GLIDER CONTEST.

1. K. Robinson (Ashton) ... ... 1 : 19·6
2. L. Silvio (Bradford) ... ... 1 : 26

OPEN DURATION, R.O.G.

1. F. Burnell (Batley) ... ... 4 : 12
2. N. Hayes (Ashton) ... ... 3 : 56·8
3. R. Hill (Ashton) ... ... 3 : 40·4

WAKEFIELD DURATION.

1. D. Hinchcliffe (Batley). (One flight only) ... ... 2 : 59·5
2. E. Brown (Ashton) ... ... 2 : 19·5

Subsequent events in this club are the setting up of a new r.t.p. record by R. Crowe with a time of 2 : 32·5 and the staging of an exhibition during the War Weapons Week. May 11th seemed to be a real record-breaking day with these chaps, when J. Townsend broke the h.l. heavyweight record with a flight of 9 : 17 and K. Anning raised the scale h.l. record to 1 : 11 with a beautiful 1 in. scale "Rearwin Speedster."

The newly-formed HESTON M.A.C. held its first officials meeting recently, and one complete factor was decided upon, inasmuch as every member must belong to the N.G.A. Affiliation to the S.M.A.E. is being applied for, and interested modellers are asked to get in touch with the Secretary, C. McGuire, c/o Dubbins, 5 Oak Avenue, Heston. This chap put up the best times at a recent meeting with 1 : 48 h.l. and 1 : 28 r.o.g.

The BEXLEY A.F.S. chaps whose photographs appeared in an earlier issue of THE AERO MODELLER recently helped in an exhibition at the local W.W.W., and their model aircraft display was an unqualified success. Eleven 'planes were raffled, while a mock auction was held as the grand finale, when a Dolphin Wakefield realised £90. (Yes, that figure is absolutely correct, even though it sounds almost impossible.) Altogether, £897 was realised by the exhibition. (The A.F.S. altogether raised £27,000 out of a total of £45,000 collected at the "Amateur Depots.") Station "B" Section, who sent in this report, got out a new stunt called "spinning the bomber," namely, a "Blenheim" with an arrow which revolved over Hamm, Berlin, Ruhr, etc., bringing in an average of £10 per evening.

I am sorry to hear that the HAWICK A.M.C. has suspended activities owing to A.T.C. and other duties putting too much call on their time. However, some of the chaps are still building models, and promise a walloping for the Sassenachs sometime in the future.

Between seventy and eighty members of the READING AND D.M.A.C. turned up to compete for the "Morley Cup," the winner being Mr. Dunn with a time of 3 : 44, followed by Beakbane, 3 : 39, and Simmonds, 3 : 00. An unofficial and unusual record was set up at this meeting, when not one rubber motor was broken.

That's the lot for this month, chaps, and I think the reports show a welcome increase in activities. Who said this war could get us down? Till next month.

THE "CLUBMAN."