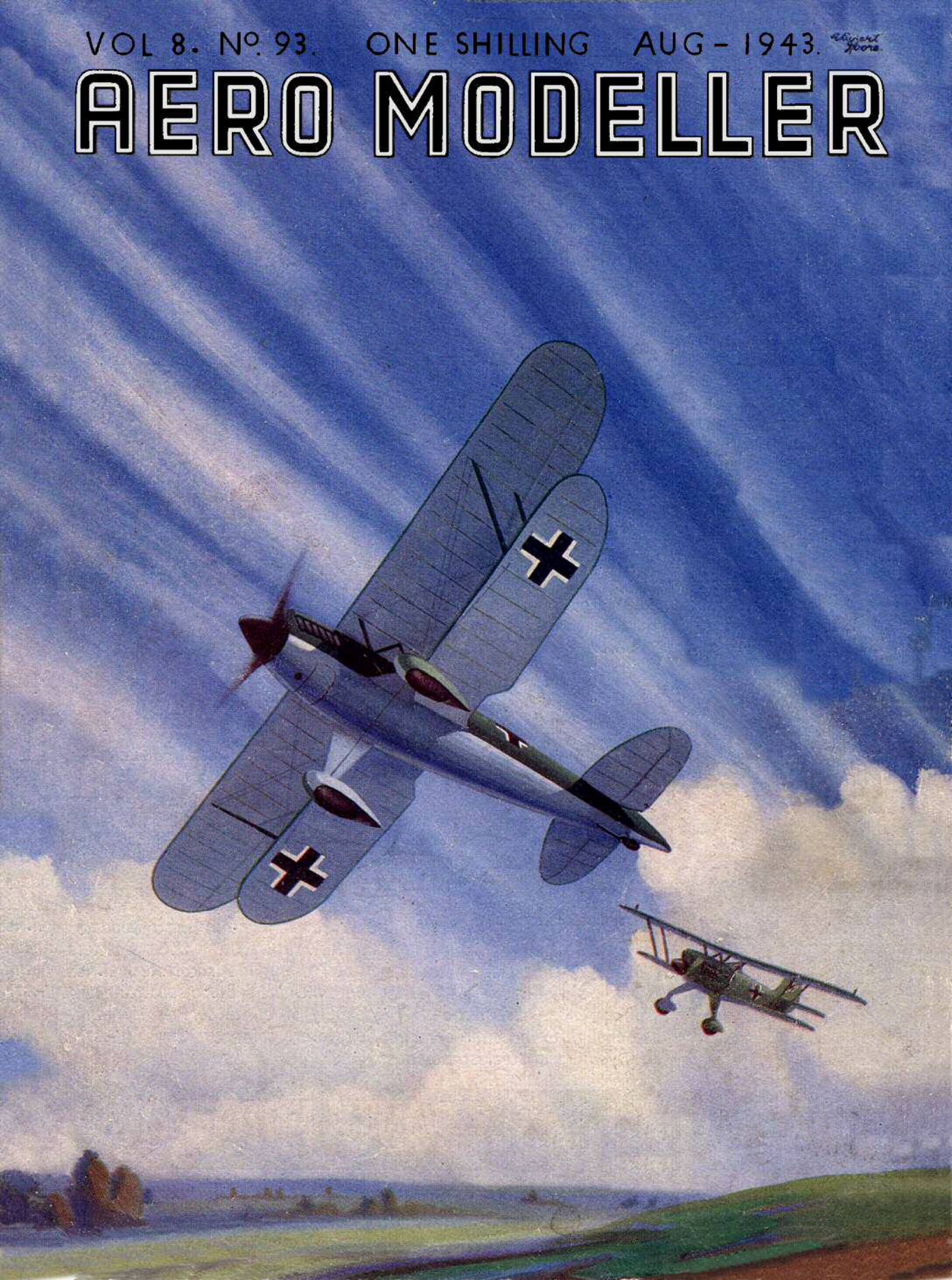
VOL 8. Nº. 93. ONE SHILLING AUG - 1943.

AERO MODELLER



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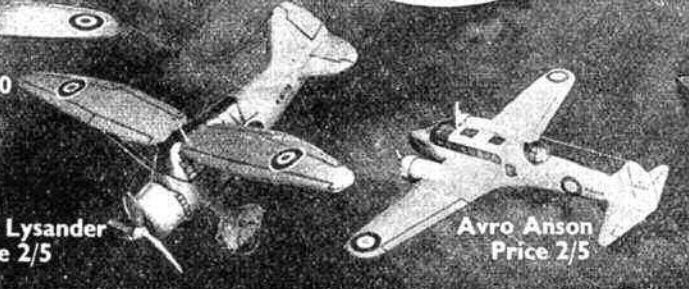

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EDITORIAL

DESPITE the limitations of war-time flying, interest in gliders continues to steadily expand, and it is with pleasure that we record an increase in the British Hand Launched Glider Record to 5 minutes 38.5 seconds by Mr. R. F. L. Gosling, of Liverpool, flying his "Ivory Gull."

This model was described in our January issue (pages 641–2–3) and has a span of 50 in. It has been available through the Aero Modeller Plans Service for some little while, at a price of 3s., post free.

The Typhoon.

In our centre pages this month we illustrate a 1 in. flying scale model of the Hawker Typhoon, designed and built by Mr. C. Rupert Moore. An ambitious subject for a flying scale model, the Typhoon is well worth the time and trouble spent in building it, and is a real "good looker" as may be seen in the photographs shown. The model has an automatic retracting and detracting undercarriage and tail wheel unit, operated by a light and simple but efficient mechanism controlled by the tension of the rubber motor. The nose is mounted on an ingenious and original type of roller bearing which eliminates entirely "whip," the construction of which allows the rubber motor to be carried right into the nose block, so keeping the weight well forward. Full size scale plans of the model are available through the Plans Service, price 4s. post free.

Vacancies on the "Aero Modeller" Staff.

Elsewhere in this issue appears an advertisement in regard to a number of vacancies on the staff of THE AERO MODELLER. We emphasise that none of these advertisements applies to persons of military age or otherwise eligible for National Service, unless they are Ex-Service men or otherwise outside the scope of the National Service Registration Acts.

New Books.

Announcement is made in this issue of "Camouflage, '14–18 Aircraft," by O. G. Thetford. Not only does this book give a vast amount of information not before available in the space of one volume, but it contains eight pages of coloured plates showing complete aircraft and many units such as engines, airscrews, machine guns, undercarriages, etc., etc., all painted in their true colours, with a view to enabling aeromodellers to colour their models as accurately as possible. These plates are the work of Messrs. E. J. Riding and C. Rupert Moore.

Another book coming along is "Model Water Planes," which, of course, includes flying boats; and with a view to making this book as attractive as possible, readers are invited to send in photographs of their models, both on the water and in flight. Payment will, of course, be made for those used. Incidentally, we would remind readers that we are always pleased to hear from them with particulars and, if possible, photographs of interesting models, with a view to their being described in THE AERO MODELLER. Good remuneration is paid for all MSS. accepted, appropriate allowance being made for photographs and/or plans when supplied and published.

"Jackdaw" Competition.

We would remind readers that our "Wings for Victory" competition closes on July 31st.

"Wagon Wheels."

One consequence of the rubber shortage has been that aeromodellers cannot obtain pneumatic tyres for their models, and the small but enthusiastic band of race car fans are very much handicapped. Now a contributor has come along with a really ingenious method of making double tread pneumatic tyres from cycle inner tubes. Oh no! Not the dodge most of us know of—of cutting a piece of tube and joining the ends with a sleeve: never a really satisfactory method! This new idea is really quite original and highly ingenious. Nevertheless, it is simple and no cost is involved, other than that of a length of push cycle inner tube and one or two odd rubber patches. Full particulars, with illustrations, will be published in our next issue. D. A. R.

CONTENTS OF THIS ISSUE

AN ELECTRIC R.T.P. "MILES MAGISTER"

by H · A · C · HASSALL

BEFORE beginning to describe this model, perhaps a few words concerning the manner in which it came into being would not be out of place. In the first place, the approach of yet another Indoor Flying Season, and the news of the impending Wings for Victory Exhibitions, set me thinking about the possibilities of producing something a little out of the ordinary, and, at the same time, something which would provide an interesting *moving* exhibit, which would not require too much looking after. In order to fulfil these requirements, I decided that I must have a flying model, preferably one built true to scale, which would not require winding up. After weighing up quite a number of ideas, I came to the conclusion that the only source of power which could meet these requirements was electricity.

Having arrived at this momentous decision, I cheerfully set about the task of producing a suitable electric motor, but soon found that it was not quite so simple as all that. Having made up my mind the approximate size and weight of model I intended to use, I manufactured a small motor to work on about 12 volts, and fitted to it a propeller of 8 in. diameter and 8 in. pitch. When connected up to a 12 volt transformer, this seemed to me to produce quite a satisfying little slipstream, so I installed it in a plane, which I can only describe as a Flying Broomstick, being made up with a hardwood stick, undercarriage, and wings and tail unit borrowed from one of my old duration models. I then proceeded to try out the model round a small pylon which I had made ready. The only result was that the model (?) taxied gaily round and round at a speed of about 8 m.p.h., and positively refused to come unstuck. Having made myself thoroughly dizzy with watching the darn thing, I decided to stop it, and examine the motor. More shocks, for when I caught hold of it I found out it was nearly red hot.

However, I had discovered enough to convince me that it could be done, so another motor was made, and this was more successful, the model now condescending to travel at about 12 m.p.h., and one wheel actually left the ground, although I still found trouble with overheating. By this time I had a better idea what was needed, so I partly reconstructed the motor, and tried again. This time the model became properly airborne for the first time, but again there was trouble with overheating, so I decided to do away with the transformer and use accumulators. The immediate result of this was to pick up the maximum speed of the motor by about 20 per cent., and after running for quite five minutes I found it absolutely cold.

Since being built into the Miles Magister (built from AERO MODELLER plans, with the exception of the modifications necessary for the accommodation of the motor), the motor has run for periods totalling over an hour, and has given every satisfaction, so I will now proceed to give some data regarding this little power plant.

A very good idea of the design and construction can be obtained from the photographs reproduced here, and Figs. 1 and 2 will give the necessary details of measurements for the field and armature cores. I shall not go into full description of the actual constructional work, as I feel sure that this can be safely left to the individual builder, and anyhow, would require far too much space. The following data should be all that is necessary to allow any modeller of average ingenuity to produce a thoroughly satisfactory motor. The only point on which I should like to lay particular emphasis is the absolute necessity for not exceeding the amount of air-gap indicated, as this will make an enormous difference to the power developed by the motor.

(1) Field Coil. Layer wound with 200 turns 24 S.W.G. double cotton covered wire.

(2) Armature. Wound with 100 turns 26 S.W.G. enamel covered wire on each of the three poles.

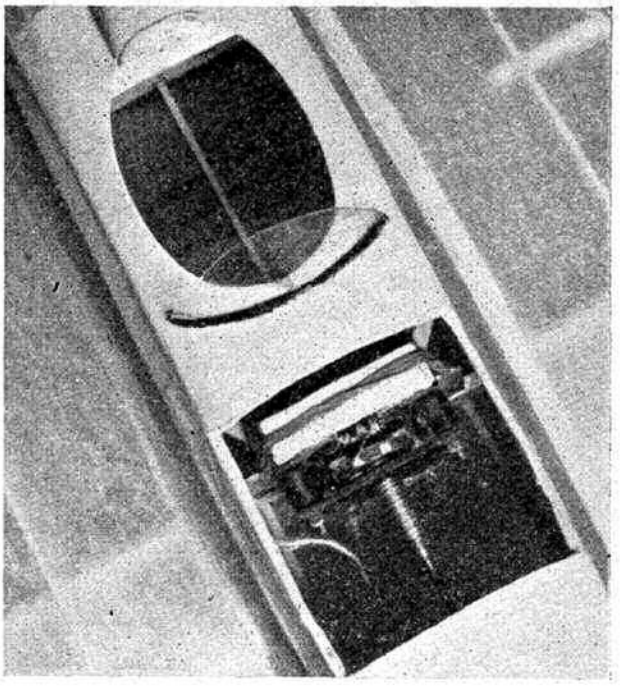
(3) Commutator. Made in the form of a flat disc of Tufnal or Paxolin, with brass or copper segments, as shown in sketch.

(4) Brushes. Made from very thin phosphor bronze sheet.

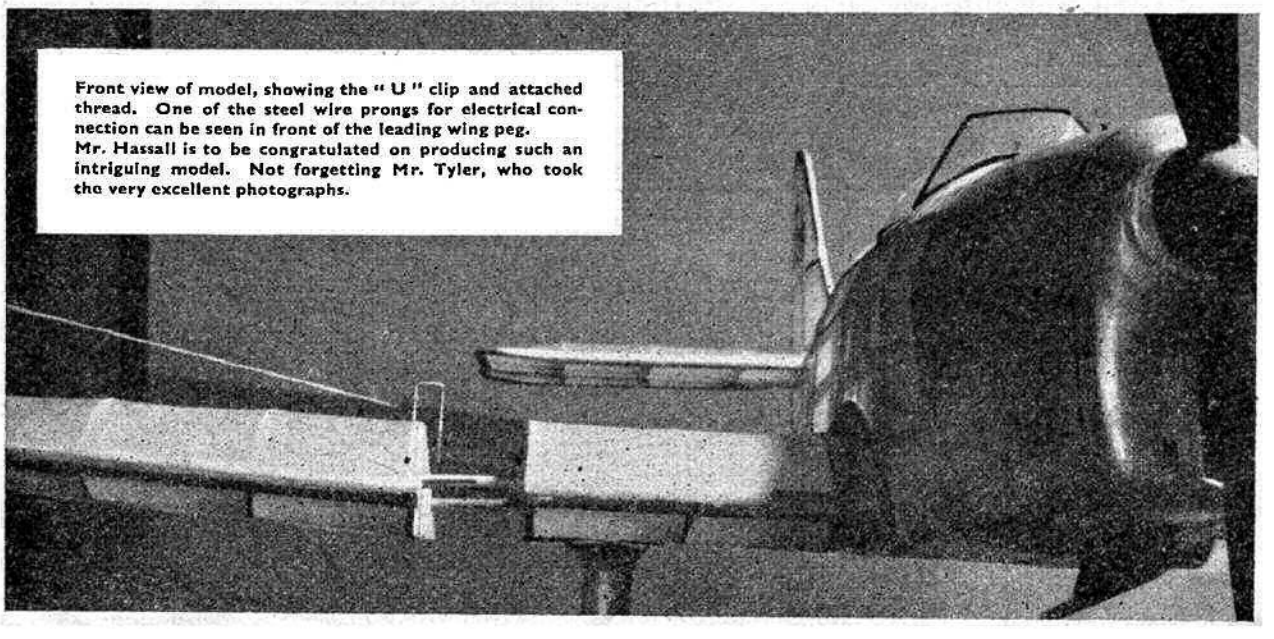
(5) Air-gap between field and armature poles should not exceed ·003 in., preferably less. Armature and field coil connected in series.

Regarding the installation of the motor in the model, I again refer you to the photographs (for which, by the way, I have to thank my fellow club member, Mr. P. E. Tyler). A very good idea of the general lay-out can be obtained from them, and Fig. 3 will, I think, explain those details which are not quite clear. The only point worthy of special mention is the actual position of the motor in my own model. The centre of the field frame core and the centre of the main spar exactly coincide. The propeller shaft is made of 18-gauge wire, and great care should be taken during the building-up process to ensure that a very small amount of up-thrust is obtained, and accurate alignment between motor and shaft. The flexible coupling is wound with 22-gauge piano wire, and is in two sections. The larger diameter portion must be wound to a slightly smaller size than the motor shaft, and the direction of winding must be such that when the coil is screwed on to the shaft, in a clockwise direction, the tendency is for the coils to open. The smaller diameter coil is wound to fit the 18-gauge propeller shaft, and is then soldered to the shaft. It will then be found that the smaller coil will screw into the larger one, and the two can be soldered together. My motor and propeller are designed to run clockwise.

The terminal board shown in Fig. 4 will be found very useful, as it allows the motor connecting wires to be detached quickly for the purpose of removing the motor from the model for adjustment, etc. The continuation wires, which are soldered to the clips shown on the terminal board, are then taken through the wing ribs, in a line with the paper tube forward of the main spar, and are soldered to the two brass tubes shown on either side of the paper tube, as shown in Fig. 5. From there the electrical connection is made up via the steel wire prongs, which are attached to either side of the hardwood dowel on the outer wing panel (Fig. 5), and thence through the remaining ribs to the wing tip. The connections at the wing tip consist of 20-gauge steel wire hooks, which are firmly bound to either side of the main spar, and the continuation wires are soldered to same. One hook comes out straight from the tip, the other is left about 2 in. longer, and is cranked upwards, the top end having a length of strong thread attached. The other end of the thread is fastened to a " U " clip, which serves to hold the stub wing and outer panel together, and in this way the pull of the model is taken by the thread. This arrangement was found necessary in order to ensure that the model would preserve an even keel during take-off. The photograph below clearly shows the " U " clip with thread attached.



Bird's-eye view of model, showing front and rear cockpits. The front cockpit cover is removed, giving access to the electric motor and terminal board. The latter is on the right-hand side of the cockpit, a lead can be seen connecting it to the motor. Note the flexible coupling and method of holding down the motor.



Front view of model, showing the " U " clip and attached thread. One of the steel wire prongs for electrical connection can be seen in front of the leading wing peg. Mr. Hassall is to be congratulated on producing such an intriguing model. Not forgetting Mr. Tyler, who took the very excellent photographs.

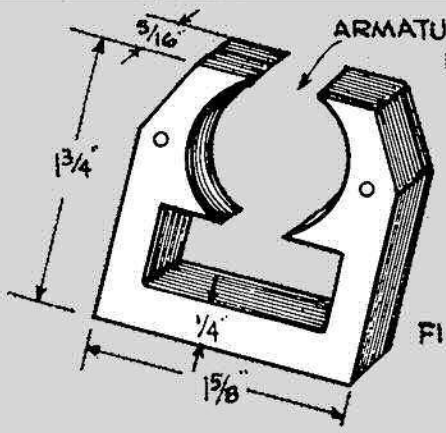


FIG.1.

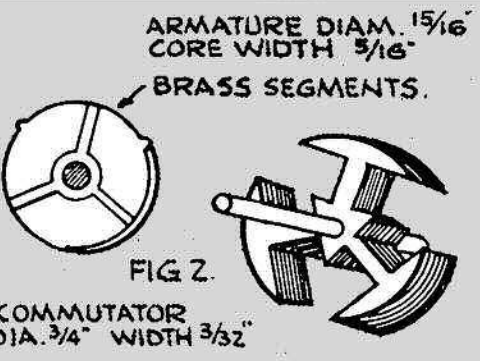
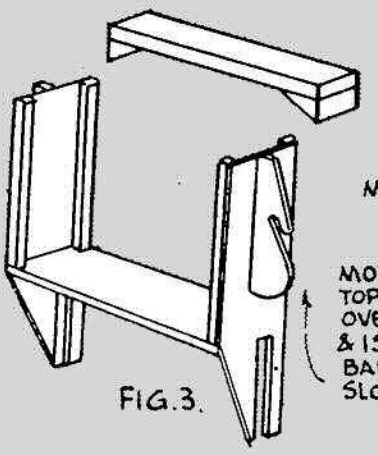


FIG.2.

COMMUTATOR
DIA. 3/4" WIDTH 3/32"



MOTOR HOUSING
& BRIDGE.

MOTOR SLIDES IN FROM TOP, BRIDGE GOES OVER MOTOR FRAME & IS HELD BY RUBBER BANDS LOOPED IN SLOTS.

FIG.3.

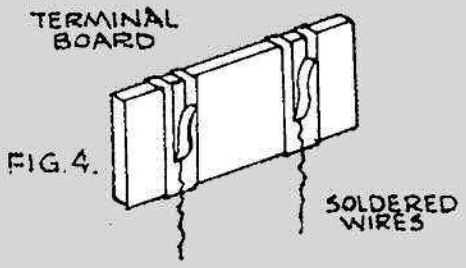


FIG.4.

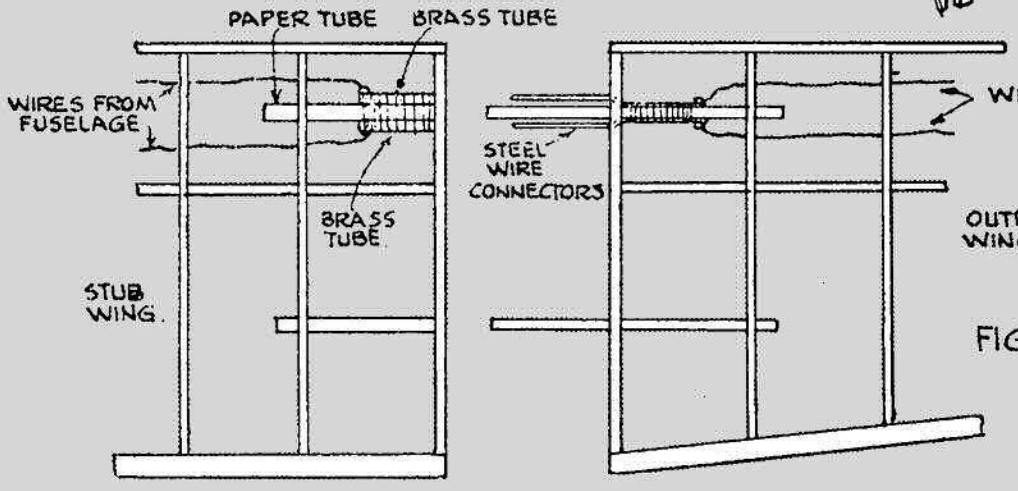


FIG.5.

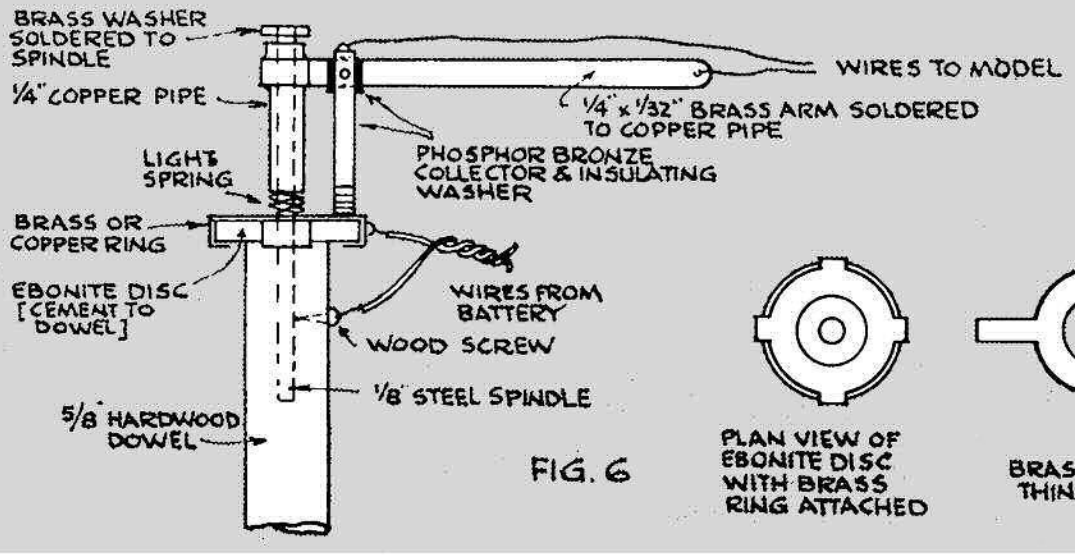
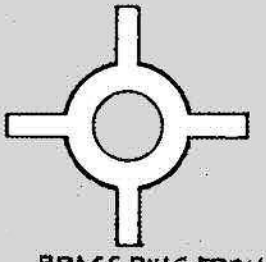


FIG.6

PLAN VIEW OF
EBONITE DISC
WITH BRASS
RING ATTACHED

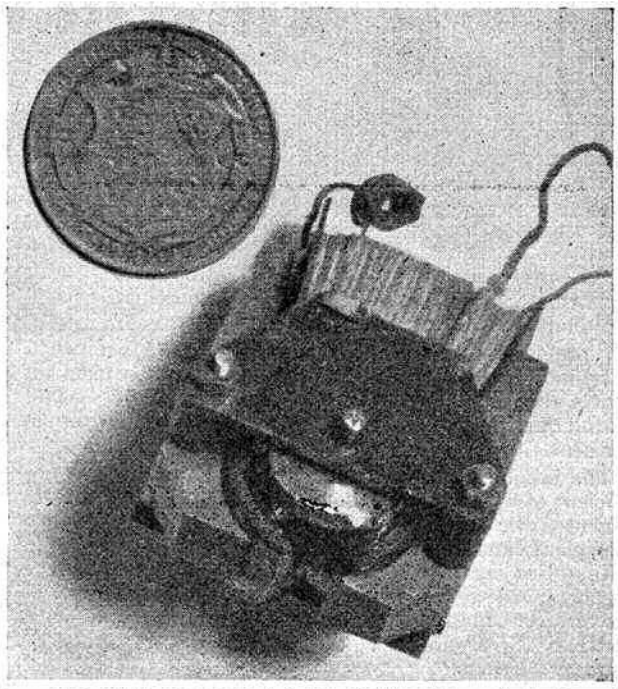


BRASS RING FROM
THIN SHEET

The remaining item of equipment, which is the special top required for the pylon, is shown in Fig. 6, and is sufficiently clear to require no verbal description, apart from pointing out that the length of the two 26-gauge double silk covered wires will be governed by the amount of space available for flying the model. One of these wires should be left about two inches longer than the other. The shorter one is then attached to the upper wing tip connector, and the longer one to the lower.

Speed control of the motor is obtained by means of a suitable variable resistance, such as are sold for use with Hornby or Trix electric trains, although it may be found necessary to re-set the automatic circuit breaker usually fitted to same, as the current consumption of the motor just described is somewhat higher than that of the average electric train motor.

All that now remains is to assemble the whole outfit, covering the main feeder wires to the pylon with a suitable piece of thin cardboard at the point where the model wheel track will have to cross it, and you are now ready for the great moment. I will close, wishing all those who make this experiment the very best of luck.



The motor complete weighs 3½ ozs. and is certainly a very compact little power unit. This is well demonstrated by comparing it with the half-crown. Both the Field Coil and Commutator can be seen in this photograph.

1/72 Scale D.H. 91 ALBATROSS

BY D · H · MIDDLETON

THE model depicted below is a fine example of enthusiastic solid modelling. Some idea of the large amount of detail involved can be gathered from the following précis of its construction.

Fuselage—hard balsa, sections checked by templates at 1 in. stations. Pilot's enclosure hollowed out with seats, control wheels, rudder pedals, control bar and electric lighting installed. Roof of control cabin—dural sheet. Main cabin windows of mica.

Wings—hard balsa, in two halves, joined by means of two plywood spars running between the inboard engine nacelles. These spars maintain correct dihedral. Wing root fillets of plastic wood on a 1 mm. ply base. Control conduits and pipelines installed in wheel wells, also motor for undercarriage retraction. The under centre section fairing panel is 1 mm. ply.

Engine nacelles—hard balsa, cooling air exits of ·200 in. shim steel. Exhausts of dural wire with cabin heater muffs on inboard engine exhausts.

Landing lights in leading edge and navigation lights on tips.

Tail unit—hard balsa.

Tail wheel—fork made of brass tube swaged to form fork end. Wheel of hardwood.

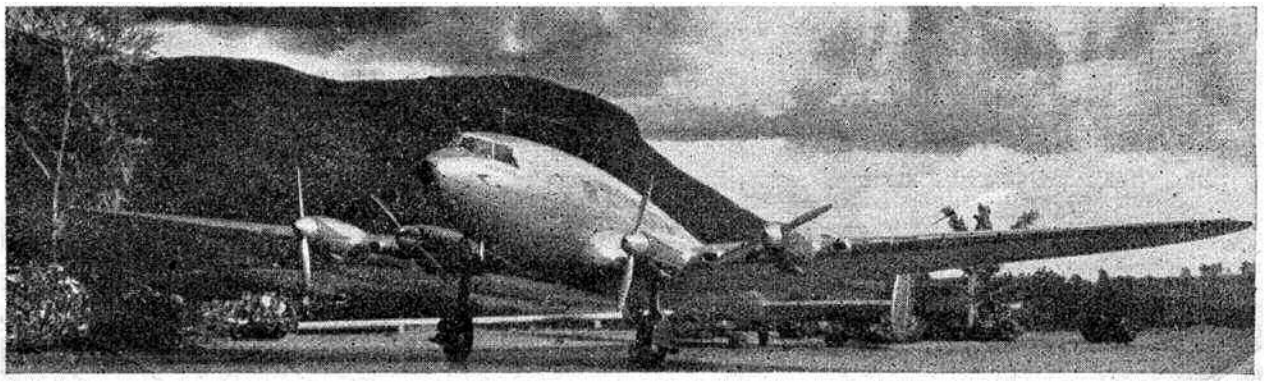
Undercarriage—scale model of actual light alloy casting, wire main structural members with template webs soldered in. Ends of wire sweated into brass tube. The electric lighting leads run down this tube through the wheel and the tube is then surrounded by celluloid tube to conceal wiring. Torque links are fitted.

Airscrews — duralumin blades and turned dural spinners.

Finish—approximately 25 coats of cellulose filler and four coats of aluminium dope ; registration letters blue cellulose and one final coat of clear varnish.

Final details.—Direction finding aerial loop, main radio antennæ, pilot head, comprising trailing antennæ fairlead. Trimming tab controls, elevator horn balances, cabin door hinges.

Total time—approximately 1,400 hours spread over a period of 2½ years.



AIRSCREW DESIGN

By P · F · RAY

In any theoretical work on model aeronautics, assumptions as to the efficiency of these small models and their component parts as compared with full-size aircraft always have to be made. There are two main assumptions which have to be dealt with in the design of airscrews. The first is the efficiency of the transfer of the potential energy of the rubber to both the energy of motion of the model in flight and the potential energy of the model as it climbs.

I previously took this efficiency to be 75 per cent., but I now realise from actual results and also from an article by R. Burns in the January, 1942, AERO MODELLER that this efficiency may be as low as 50 per cent.

The second assumption is the value of C_L, the co-efficient of lift of the airfoil section of the airscrew blade. Airfoils with chords of 3 in. or less are stated to be very inefficient, and blades usually have chords of less than 3 in. But against this small chord is balanced the higher speed of the blades. The Reynolds number of an airscrew blade may therefore be comparable with the R.N. of a model wing and thus the C_Ls may be similar.

The C_L of R.A.F. 32 at L/D maximum is about 0·9 for an aspect ratio of 9, but as will be seen later no harm will be done if we take a lower value of, say, 0·7.

Warring in his book on Airscrews shows that the absolute theoretical efficiency of an airscrew depends on the " actual pitch " angle of the blades, the drag of the blades and the inflow factor (pages 9 and 15). I have neglected the inflow factor but allowed for the other efficiency by taking the H.P. used to be torque × speed of blade and not the usual thrust × speed of model.

PITCH.

The diagram represents a section of an airscrew blade through the resultant centre of pressure which Stubbs calls a representative point. EB represents the rotational distance travelled by this point in one revolution, and BD represents the distance travelled forward by this point during one revolution. θ_1 is therefore the " actual pitch " angle, and taking the angle of attack to be 5° then (θ_1+5) is the geometric pitch angle.

The lift of the section is at right-angles to the direction of motion; the drag is in the same direction. The resultant of the lift and drag forces, i.e. the total reaction, is at an angle $\tan^{-1} D/L$ with the lift and this angle is denoted by γ.

The total reaction is resolved into its two components Torque and Thrust.

$$\frac{\text{Torque}}{\text{Thrust}} = \tan(\theta_1+\gamma)$$

Now the horse-power transmitted by the blade

$$= \frac{\text{Torque (lbs.)} \times \text{speed (f.p.s.)}}{550}$$

$$= \frac{\text{Thrust (ozs.)} \times \tan(\theta_1+\gamma) \times 2\pi r n}{16 \times 12 \times 550}$$

where n is the number of revs. per second of the airscrew

r is the radius, in inches, of the representative point.

Assuming that this representative point is 65 per cent. of the total radius R distant from the centre

$$r = \cdot 65\ R = \cdot 325\ D.$$

$$\therefore \text{H.P.} = \frac{T \tan(\theta_1+\gamma) \times 2 \times 3 \cdot 142 \times \cdot 325\ D \times n}{16 \times 12 \times 550}$$

$$= \frac{T\ n\ D \tan(\theta_1+\gamma)}{51750}$$

Let the efficiency of transfer of energy from the rubber to the blades be E per cent. where E = 50 to 70.

$$\therefore \text{Total H.P. necessary} = \frac{T\ n\ D \tan(\theta_1+\gamma)}{51750} \times \frac{100}{E}$$

The horse-power available from a rubber motor is proportional to the weight of rubber used (ω) and inversely proportional to the time of power run (t) on full turns.

$$\therefore \text{H.P.} \propto \frac{\omega}{t} \qquad \therefore \text{H.P.} = \frac{k\omega}{t}$$

where k is a constant. The value of k used in " Nomographs " is 0·27.

$$\therefore \text{H.P.} = \frac{\cdot 27\omega}{t}$$

But t the time of power run

$$= \frac{\text{Maximum number of turns of airscrew}}{\text{Average revs.}} = \frac{N}{n}$$

$$\therefore \text{H.P.} = \frac{\cdot 27\ \omega}{t} = \frac{\cdot 27\ \omega}{\frac{N}{n}} = \frac{\cdot 27\ \omega\ n}{N}$$

Equating the H.P. necessary and the H.P. available

$$\frac{T\ n\ D \tan(\theta_1+Y)}{517 \cdot 5\ E} = \frac{\cdot 27\ \omega\ n}{N}$$

$$\therefore \tan(\theta_1+\gamma) = \frac{517 \cdot 5 \times \cdot 27\ E\ \omega\ n}{T\ n\ N\ D}$$

$$= \frac{139 \cdot 7\ E\ \omega}{T\ N\ D}$$

$$\text{Tan}(\theta_1+\gamma) = \frac{140\ E\ \omega}{T\ N\ D}$$

This last equation is of fundamental importance. Knowing

1. The weight of rubber. ω ozs.
2. The maximum turns of the airscrew. N
3. The thrust required from the airscrew. T ozs.
4. The diameter of the propeller. D ins.

and assuming

5. The efficiency of the system. E
6. The lift and drag ratio of the blade. $\gamma = \tan^{-1} D/L$

the value θ_1 the actual pitch angle at the representative point can be found and thus the actual and geometric pitches can be calculated.

Example 1. A model contains 1 oz. of rubber which fully wound will give 1,000 turns to the airscrew using gears. A 10 in. diameter airscrew is to be used and the thrust required is 2 oz.

Assume E to be 55 and $\frac{L}{D} = 14 \quad \therefore \frac{D}{L} = \frac{1}{14} \quad \gamma = 4°.$

$$\text{Now } \tan(\theta_1+\gamma) = \frac{140\ E\ \omega}{T\ N\ D}$$

$$\tan(\theta_1+4) = \frac{140\times 55\times 1}{2\times 1000\times 10}$$

$$= \cdot 3850$$

$$(\theta_1+4) = 21°$$

$$\theta_1 = 17°$$

Radius at representative point = 3·25 in.

$\therefore$ *Actual pitch* (distance per rev.) $= 2\pi r \tan\theta_1 = 6{\cdot}25$ in.

Geometric pitch $= 2\pi r \tan(\theta_1+5) = 8{\cdot}25$ in.

AREA.

The required area, of the airscrew blades can now be found as follows :—

From the usual formula $L = C_L \frac{\rho}{2} A V^2$

$$\text{from which } A = \frac{2L}{C_L \rho V^2}$$

Putting L in ozs. and A in sq. inches

$$A = \frac{2\times 144}{\cdot 002378\times 16} \times \frac{L}{C_L U^2} = \frac{7570\ L}{C_L V^2}$$

$$\text{Now } L = R \text{ approx.} = \frac{\text{Thrust}}{\cos(\theta_1+\gamma)}$$

and V = the velocity of the representative point

$$= \frac{\text{velocity of rotation}}{\cos\theta_1}$$

$$= \frac{2\pi\times\cdot 325\ D\times n}{12\cos\theta_1} \quad \text{(D is in inches)}$$

$\therefore$ Substituting for L and V

$$A = 7570\frac{L}{C_L U^2}$$

$$= 7570 \times \frac{\text{Thrust}}{\cos(\theta_1+\gamma)} \times \frac{144\cos^2\theta_1}{D^2 n^2 \pi^2 \times \cdot 65^2} \times \frac{L}{C_L}$$

$$= \frac{261200\ \text{Thrust}}{D^2 n^2} \times \frac{\cos^2\theta_1}{\cos(\theta_1+\gamma)} \times \frac{L}{C_L}$$

Assume C_L to be ·7 then

$$A = \frac{373000\times\text{Thrust}}{D^2 n^2} \times \frac{\cos^2\theta_1}{\cos(\theta_1+\gamma)}$$

To simplify this formula we can put $\frac{\cos^2\theta_1}{\cos(\theta_1+\gamma)} = 1$

and then $A = \frac{373000\times\text{Thrust}}{D^2 n^2}$

Taking the quantities on the right-hand side of this equation

1. The thrust (in ozs.) and diameter (inches) are known quantities.
2. The revolutions per second of the airscrew

$$= \frac{\text{Speed of model}}{\text{Actual pitch}} \quad \text{(Neglecting inflow).}$$

Therefore A the area can be calculated.

Example 2. The model taken in example 1 flies at 16·5 f.p.s. What is the area of the airscrew necessary ?

Data. T = 2. D = 10 in. P actual = 6·25 in. U = 16·5 f.p.s.

$$\therefore n = \frac{16{\cdot}5\times 12}{6{\cdot}25} = 31{\cdot}7 \text{ revs. per sec.}$$

$$A = \frac{373000\times 2}{10^2\times 31{\cdot}7^2}$$

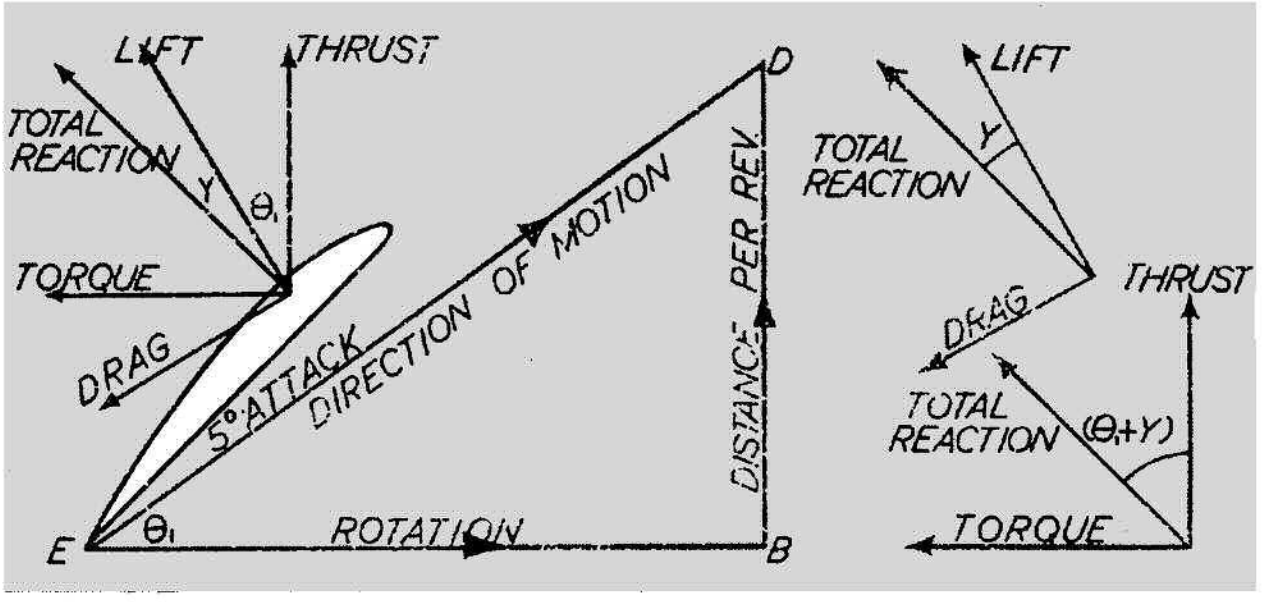
$$= \underline{\underline{7{\cdot}44 \text{ sq. ins.}}}$$

PRACTICAL WORK.

Find the speed of the model during gliding flight with the airscrew giving no drag, e.g. replace the airscrew by a streamlined piece of plasticine of equal weight. Calculate the thrust required from the propeller. (Drag $+W\sin\varkappa \propto$ where $\varkappa\propto$ = angle of climb.) Calculate the pitch and area of the required airscrew.

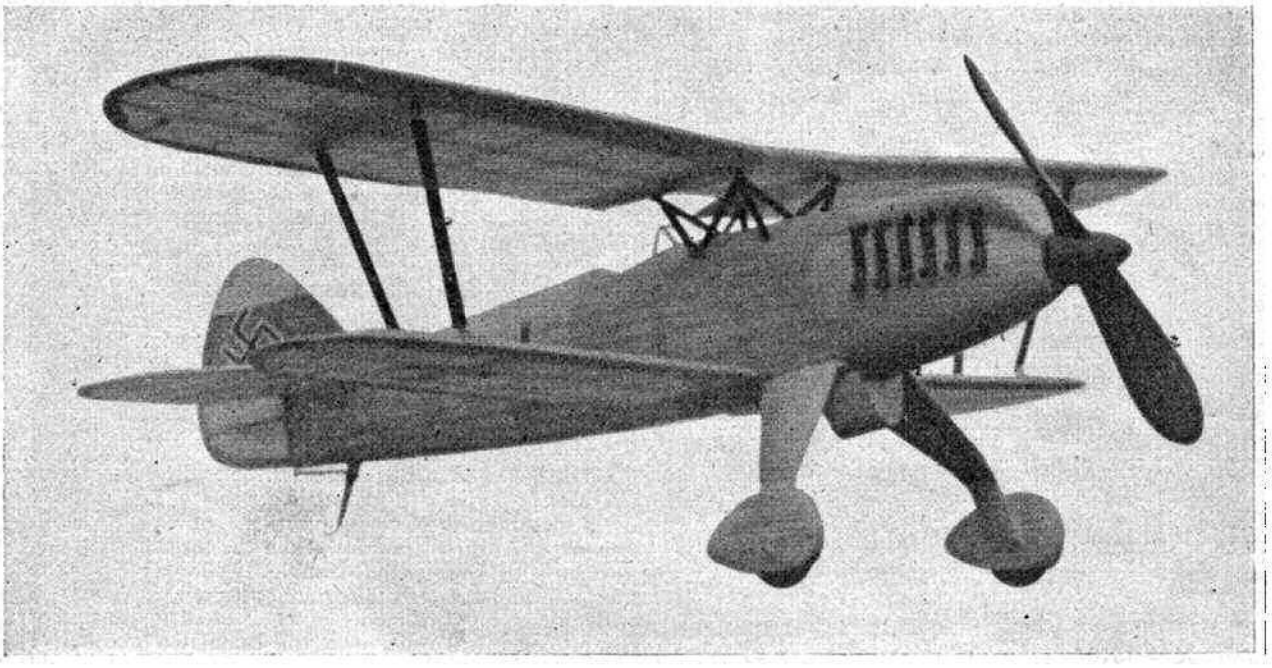
Before giving the model any powered flights find if the propeller will revolve at the calculated number of revs. If it is too slow the area is too great, and should be cut down. If too fast, the area is too small ; either the airscrew does not correspond with the calculated area or we have taken too high a value of C_L in the theory.

When the airscrew revolves at the proper speed, find the angle at which the model climbs. If it differs from the estimated angle then we have given a wrong value to E the efficiency, or the value we have allowed for the thrust is faulty.



A 30" Span Flying Scale HEINKEL HE 51

BY G · R · WOOLLETT



THIS model has proved to be a steady flier and is capable of average flights of 30 secs under normal conditions, though it is definitely a fine weather model and should not be hurled into the air when its performance cannot be appreciated.

An unexpected freak of versatility in its make-up was discovered when, during gliding experiments, it was tested with a few turns on the motor and the lower planes removed. It put up a steady flight of a few secs! This was increased upon further turns being applied and a little alteration in trim will give good flights in this form. But beware gusty days!

BUILDING THE MODEL.

Fuselage.

Commence construction on the fuselage. Cut out of 1/16 in. hard balsa sheet all formers and fit with cardboard templates having a square hole in the centre for mounting on assembly jig in the usual way. Mark position of all stringers. Sew and securely cement the brass u/c tubes in position on F3 and mark on F4, 3 and 5 positions of c/s strut supports. Now fit root rib spars in position. Note that there are two spars on F5—one each side. Shape and attach the wire tailskid to F9, then assemble all formers on wooden jig and mount in a vice.

Cement 1/16 in. sq. hard balsa stringers in position and u/c spruce bracing struts from F 4. Before cementing top stringers fit accurately Sp. 1, 2, 3 and 4. The paper tubes for bracing threads may now be secured in position and the nose and top decking planked in with soft 1/16 in. balsa. The cockpit is cut out after the fuselage has been sanded. Shape now and fit the two cylinder blocks and fill the " vee " in, when dry, with a third block of soft balsa.

Particular care should be exercised when fitting the tailplane datum spars to give +1 degree incidence as shown. Fit the 1/16 in. ply bamboo motor peg anchorage after drilling $\frac{1}{8}$ in. diameter hole for the peg.

The bottom stringer S 15 severed at the front of the skid is reinforced by a wedge of 1/16 in. scrap balsa cemented to F 9. The rear continuation of this stringer is similarly braced. When dry complete the skid fairing and fit balsa wedge to retain elastic band from fin.

The planked portion of the fuselage can now be sanded dead smooth and the cockpit cut out, also the holes for the c/s struts. Give two coats of banana oil sanding in between and two coats of yellow gloss dope after covering entire fuselage with superfine tissue.

Assemble the c/s struts and bind and glue securely (seccotine). Fit and align on the fuselage securing to decking and Sp. 1, 2, 3 and 4 with seccotine. Put aside the completed fuselage to dry. The tissue covering is of yellow superfine, water sprayed and coated with one application of banana oil. Fit root ribs at this point.

Undercarriage.

The construction should give little difficulty if the wire assembly is bent and soldered correctly then marked on each fairing sheet so that when the grooves are sanded to take the wires (16 g.) the alignment is accurate. Ensure that all joints are liberally cemented and both spats fitted square. Sand smooth and finish as for nose planking—tissue cover.

Mainplanes.

These follow usual construction, the top plane being sheet covered from leading edge to front dual spars (1/16 in. square) while the lower ones have a solid balsa leading edge which can be hollowed to a channel section.

A trimming tab is fitted to port top plane in order to counteract airscrew torque. Flutter is prevented by packing between tab and ribs M 7 and M 8.

Complete both top planes and c/s, ensuring that strut attachments are aligned correctly and securely. Cement both planes to c/s to give 4 degrees dihedral. Glue a small patch of card over all strut lugs before covering with superfine yellow tissue to rib M 8. Use separate piece for tip. Water spray and give two coats of banana oil.

With the lower planes, ensure that dowels are positioned squarely and securely. No washout is necessary on any plane. Fit lower c/s dowel tubes over dowels in bottom planes, coat with seccotine, and position in fuselage. Set planes to 2 degrees dihedral and allow tubes to set before removing.

The interplane struts are of balsa 3/16 in. by 1/16 in. with end fittings shaped from domestic pins bound and glued in position.

Tailplane and Fin.

This is of relatively small area but stability is not affected owing to the difference in c.p. position of top and lower mainplanes. The tailplane is of non-lifting section set at + 1 degree α. After completing and covering as for mainplanes, cement a small balsa block under the leading edge to prevent rocking on the datum spars. The fin is cemented to the top of the tailplane fairing with its flat surface (starboard) parallel to longitudinal axis. The fin outline of balsa is pinned over the drawing and fin post and ribs cemented into position. Fit bamboo locating dowel and pin for retaining tail unit on the fuselage. Shape and fit tab, the top bamboo hinge being fitted to its hole in R 2 and glued to a slot in tab.

Cover fin with red tissue on both sides between ribs R 1 and R 3. Remainder as for wings. Give one coat of banana oil. Fit assembly and align on fuselage.

Airscrew.

This is of normal construction employing a free wheel in the spinner. Carved from hardwood, polished and given one coat of black cellulose.

Testing.

The motor (10 strands of 3/16 in. flat rubber) is previously tensioned in the fuselage. Assemble mainplanes and tail unit.

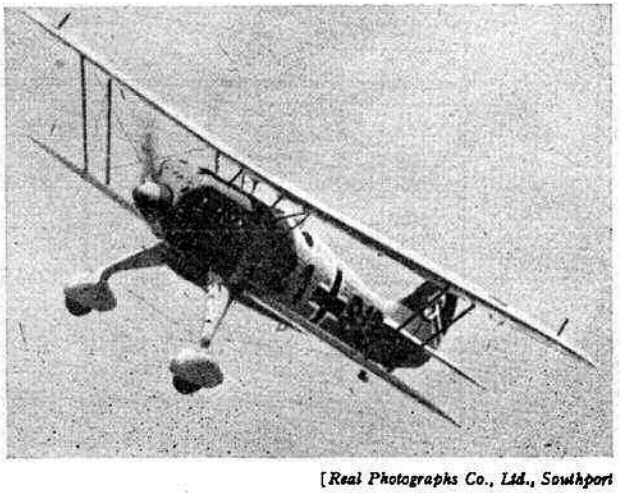
The top plane is attached by balsa dowels through the lug eyes, these dowels trapping lengths of waxed thread pushed in position with them. The ends of thread can be knotted to the remainder of thread. Fit port interplane struts and thread to top plane. Pass thread through paper tubes in fuselage and attach to top of starboard interplane struts on underside of top plane. Now fit lower planes and bottom ends of interplane struts and bracing thread from c/s struts. The lower planes are held to fuselage by an elastic band passing through fuselage tube and anchoring to bamboo pegs on root ribs of planes. Do not forget interplane strut incidence braces. Tension must not be excessive. Loose ends of thread should be neatly cut off.

Secure the undercarriage as follows: Slide into position, over each undercarriage plug-in wire a $\frac{1}{2}$ in. length of aluminium tube, then push undercarriage home in its tubes in F 3. This increases effective length of undercarriage and reduces the risk of excessive springing which might allow the undercarriage fairings to foul the bottom of the fuselage.

Check for glide over long grass with as little breeze as possible. Check trim in the usual manner. No efforts should be spared in getting absolute gliding trim before attempting to power flight, as a model of this type demands great care in trimming.

Wind on a few turns and launch. Do not use tabs until near trim has been obtained by inserting a lead pellet in a hole in the cylinder block as shown on the drawings. Seal hole with balsa plug when trim is correct.

The model averages 25 to 35 seconds and the longest flight recorded was of 48 seconds. It has a smooth take-off from the board and has been flown with interplane struts and thread bracing removed. Do not attempt this, however, except under ideal conditions with plenty of long grass.

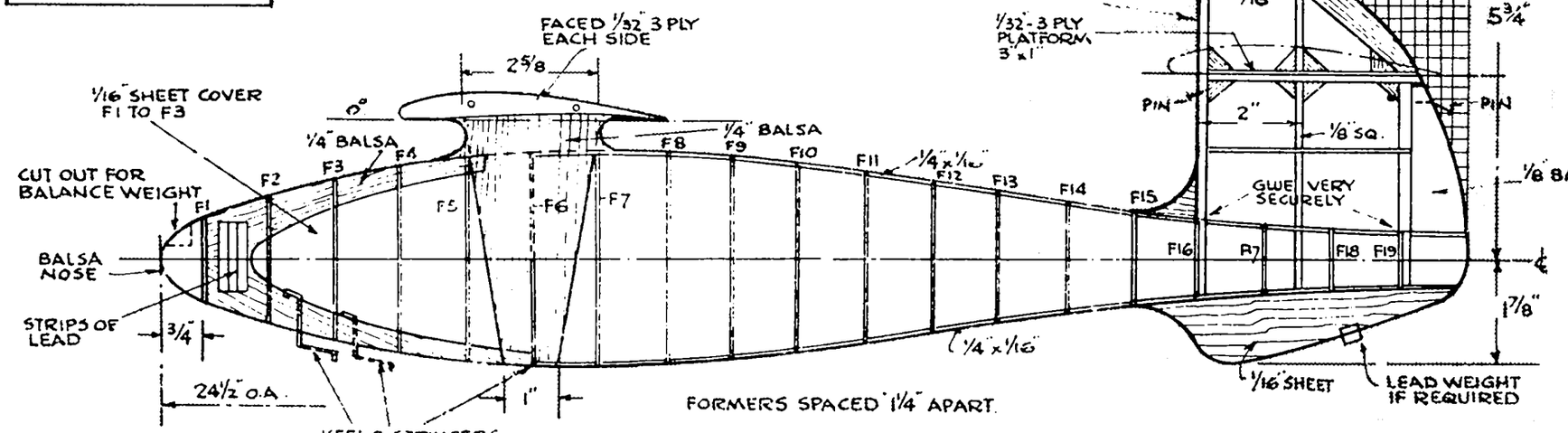


[*Real Photographs Co., Ltd., Southport*

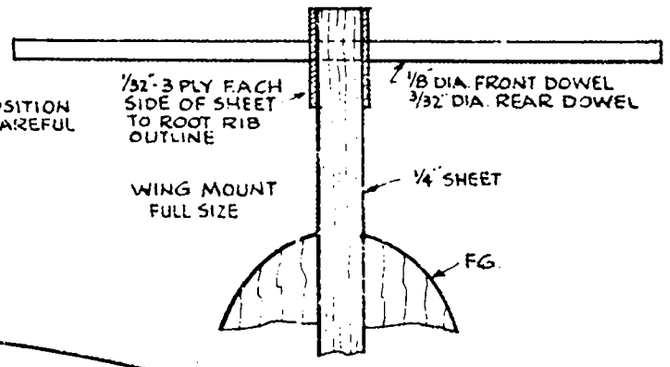
"G.L.I." GLIDER.

DESIGNED BY J.H. GOTCH. 5 ft. span

FUSELAGE · 1/3 FULL SIZE ·



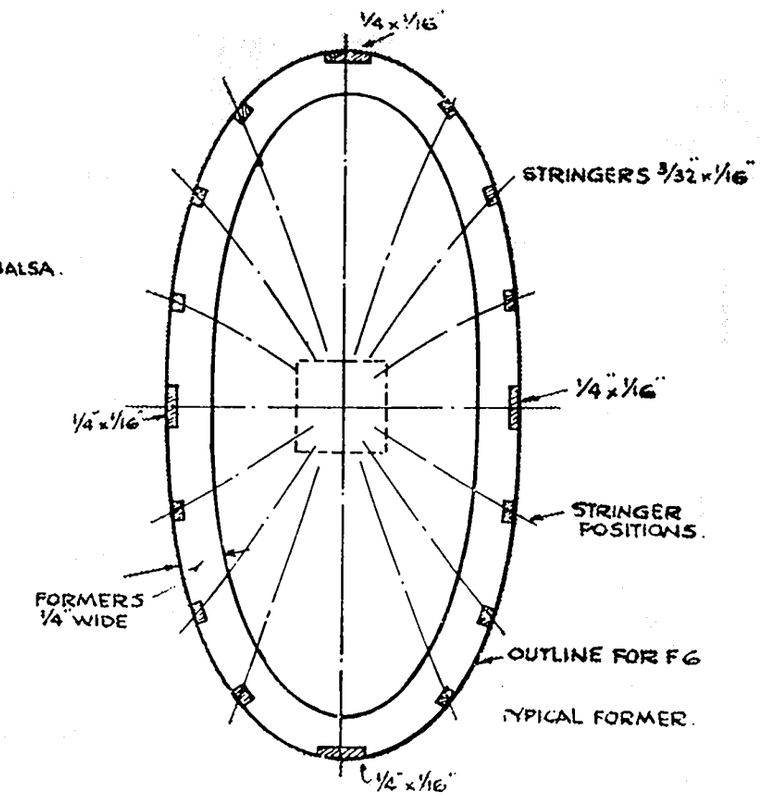
FUSELAGE FORMER DEPTHS			
F1	1·5	F11	3·2
F2	2·4	F12	2·8
F3	3·0	F13	2·4
F4	3·5	F14	2·0
F5	3·9	F15	1·7
F6	4·0	F16	1·5
F7	4·0	F17	1·25
F8	3·9	F18	1·0
F9	3·8	F19	1·0
F10	3·5		



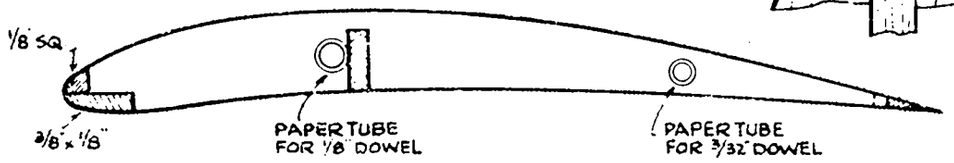
MAKE CARDBOARD TEMPLATES TO INSIDE OF FORMERS WITH 1/2" SQ. HOLE FOR ASSEMBLY ROD.

ALL FORMERS 1/16" BALSA

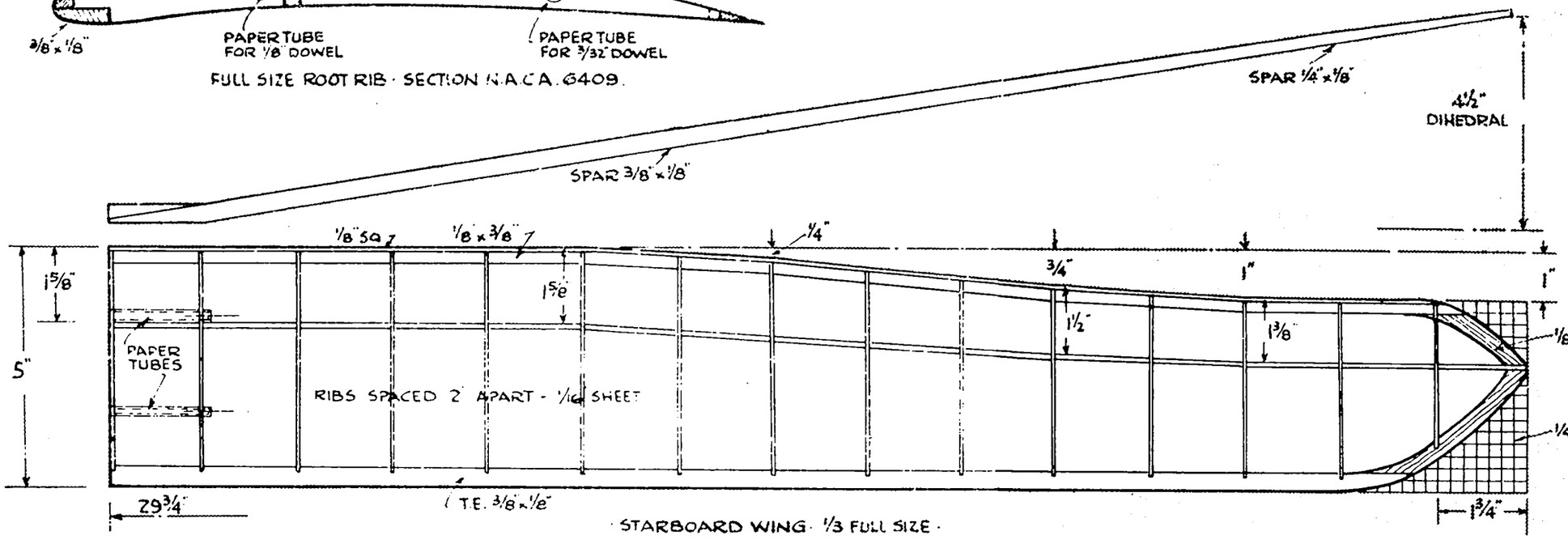
FG LEFT SOLID & HALF NOTCHED TO WING MOUNT.



FUSELAGE FORMERS ALL 2:1 ELLIPSES CUT FROM 1/16" SHEET · NOTCH FOR 1/4"x1/16" & 3/32"x1/16" STRINGERS

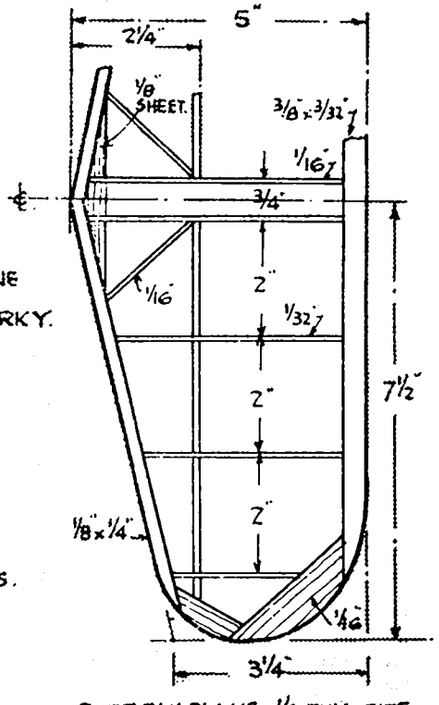


FULL SIZE ROOT RIB · SECTION N.A.C.A. 6409.



STARBOARD WING · 1/3 FULL SIZE ·

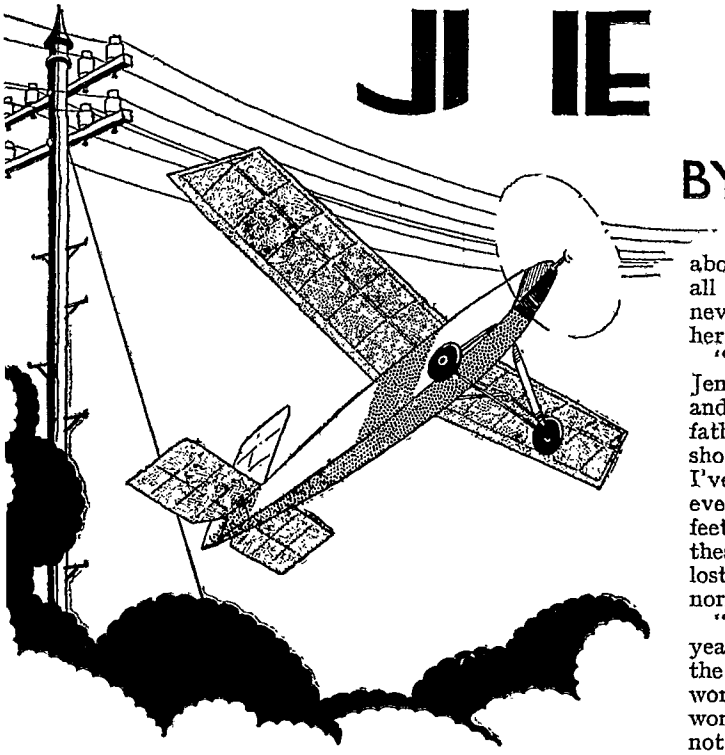
TAILPLANE SECTION 75% CLARKY.



PORT TAILPLANE · 1/3 FULL SIZE

JENNIE

BY H·G·BILBROUGH



"The trouble with most of you chaps is that you look upon a model aeroplane as simply a lot of wood and paper stuck together. You go to the shop and buy a kit in a pretty box; you take it home and put it together; sooner or later you smash it up; then you save up to buy another kit. That's all there is to it. You don't seem to realize that a model 'plane can have a brain of its own. Can have, I said, because not all have; in fact, it's really only the few. It all depends on the environment, or the owner or something like that, I suppose. I don't really know—or care, for that matter. But you can take it from me that some model 'planes can think in the same way as any human being, and act far more intelligently. Take Jennie for example.

"Jennie belonged to this club when I first joined, and that's a good many years ago. I say 'belonged to the club' because no one in particular owned her; she was simply part of the club equipment. The rumour was that she had been designed and built by several of the club's original members, but nobody was really sure.

"How she first came to be christened was another mystery, but the name 'Jennie' had been doped in big blue letters across the fin for as long as anyone could remember.

"When I first joined this club 'Jennie' was already counted as far above human understanding. At first I was rather sceptical, but I soon became convinced. The way that model behaved was simply uncanny. Often I've marvelled as I've watched her bank neatly, just in time to avoid an obstacle; and every time she glided in from over there by the road, she would fly under the telegraph wires with just enough height to clear the hedge on the other side. All the time she was with the club she never even collided with anything, much less crashed.

"Some of the younger members used to take advantage of her good nature. Often they would come up here flying in the evening and, forgetting all about Jennie's existence, would leave her in the field all night. Apparently Jennie didn't mind for by never so much as a warped stabiliser, would she show her disapproval.

"Young Ginger Ashworth did his best to spoil Jennie's good temper. Often he would take her home and fly her from a tiny piece of waste land behind his father's shop in the High Street, but Jennie never showed the slightest 'temperment.' No end of times I've watched her circle over the shops and houses and even the railway, and finally make a landing a few feet from where she had taken off. Flying under these conditions any normal 'plane would have been lost or smashed within five minutes, but Jennie was not normal.

"Jennie's big moment came one afternoon some years ago, when we had arranged a competition with the Haywood Club. Several days before the contest, word went round that the Haywood boys were getting wonderful times out of their new balsa jobs, so we, not to be outdone, forgot about our spruce and silk and rushed off orders for balsa-wood and tissue.

"These new, and to us, strange materials, arrived three days before the competition. There was some midnight oil burnt during those few days, I can tell you.

"I shall always remember that competition. The weather was very warm, but with sudden strong, tricky gusts of wind that smashed out Jerry-built balsa models right and left. The Haywood boys, with their more experience and better models, were putting up times that we could hardly believe. By the time the main duration event was due to start Billings, our Competition Secretary, was tearing his hair, for only two of our models remained in any way flyable.

"'What about Jennie for the third model?' somebody suggested, after Billings had practically sworn himself hoarse. Everyone turned and looked at the big model standing uncomplainingly in the broiling sun.

"'She's our only chance,' Billings agreed savagely, after much thought. 'There's no time for any of you lame-brains to go home for another model, even supposing you've sense enough to have one ready. Wind her up somebody!'

"We picked Jennie up and gave her full turns and then a whole lot more. She was one of those 'planes that you can wind with complete confidence, knowing the motor will never give itself wrong notions.

"This competition, I had better explain, was the usual sort of thing—two teams, three members and three R.O.G. flights each.

"One of the Haywood boys went first and it was nearly three minutes later when his 'plane landed in the next field. It was our turn next and after a spot of daisy-cutting followed by a couple of stalls the model climbed a bit. Just over a minute. Things didn't look too grand and it was the same story next time. The Haywood Club were averaging nearly three minutes and we couldn't beat half that time.

"Jennie's was the last flight of the first round and all eyes were on the big machine as it took off with a polite buzz from the twin gears and the big laminated propeller

flickering in the sun. We didn't openly show much confidence, but somehow we knew Jennie wouldn't let us down. She circled round, climbing all the time, and when the power ran out, started a slow flat glide. She landed a few yards away and everyone clustered round the time-keeper. Three minutes dead—very good for an old bus, but still not good enough.

" The second round was just a repetition of the first. Our 'planes—Jennie included—couldn't hold the Haywood boys.

" At the start of the third round everyone was putting up much the same times. The position seemed worse than hopeless for when came Jennie's last turn—which, of course, was the last flight of the competition—we needed 11 minutes 17 seconds to win.

" Jennie took off and began her usual long, turning climb. Hardly daring to hope, we watched her. Long after we knew the motor had run out, she still continued circling and climbing slightly. At four minutes we thought there might be a chance. Anxiously, we divided our attention between the time-keeper and Jennie. Five minutes came and she was still well up. At seven minutes things didn't look so good, for she had come very low. Just as it seemed as if she would go out of sight behind the elm tree she began lifting again. Ten minutes, and all our lads were grinning. Eleven minutes—even Billings was grinning. Seventeen seconds later a cheer went up and at the same moment Jennie banked suddenly and began a long glide down, then flattened-out and landed almost on the take-off board.

" From that day onwards Jennie was considered almost sacred. The more irresponsible members were forbidden to fly her, and at all times a watchful eye was kept on her. Someone oiled her gearbox—the only thing that could be found which possibly needed attention—and two new motors were bought out of the club funds.

" During the next few weeks various chaps appeared with rulers and large sheets of paper and started doing big measuring and drawing acts; and a few weeks later they turned up with highly-coloured copies of Jennie. None of these 'planes was successful; their owners swore about them and reported them as being heavy and wickedly unstable. Of course, these poor saps had copied Jennie faithfully, but they didn't realize that the body is no good without the brain behind it.

" After a time, however, a change began to come over things; a change so gradual that at first it was not noticeable. Since the competition we had all taken to balsa construction, and several of us had put up times that made Jennie's eleven minutes-odd look pretty feeble. As a result there came occasional meetings when everyone, busy with their own models, forgot all about the big birch and silk machine in the club room. Gradually, these days became more and more frequent. Praying inwardly, we would launch our flashy streamliners into a choppy breeze, while down in the far corner of the field, several of the very young members would be alternately flying and man-handling Jennie amongst the bushes. Later still, even the youngsters rarely flew her; she spent all the summer afternoons forgotten in the dust on top of the club room cupboard, far from the smooth hum of propellers and the sudden flash of doped wings lifting into the sun.

" It was on one of these scorching afternoons that Alec Barnes broke the club duration record. His four-and-sixpenny kit model had climbed like a rocket and for seemingly an eternity had soared and turned, silhouetted against the white clouds above it. Eventually it landed some distance away and Alec set off in search of it.

"I had no model with me and after I had watched Alec's 'plane out of sight I walked down the road to the club room and fetched Jennie out. It took me some time to dust her down and I had only just finished winding-up when Alec came back with his 'plane.

" ' Playing with the clothes horse ? ' he asked, grinning, as he passed me.

" I didn't answer him at first. Somehow his remark annoyed me. After all, Jennie had been flying long before he had been thought of.

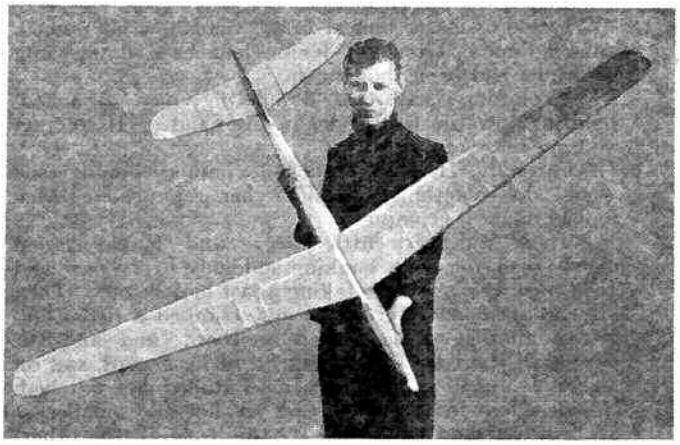
" ' You don't call that flying, do you ? ' I asked, pointing towards the model in his hand. ' If so, just you get an eyeful of this.'

" Carefully, I hand-launched Jennie, hoping she would do something to revive her reputation. Alex looked on, still grinning.

" There was very little breeze and Jennie circled slowly over the field, banking suddenly every now and then, just as if she were taking a last look round. Then she swooped low over our heads, climbed a little, and began another circle; then another; and another, lifting all the time. Alec, fearful of his record, ran off to see if anyone was timing her. I stayed and watched. Jennie's four-foot span getting smaller and smaller as she wheeled and climbed. By this time all the others were squinting at what was now a slowly-moving black speck, and later, not even that. It was a cloudless sky and Jennie had vanished right into it.

" That was the last we ever saw of Jennie, although she carried the Secretary's name and address. But if you ask me she never came down, or if she did it was into more appreciative hands than ours. Jennie knew when she wasn't wanted. Jennie was human."

CONTINENTAL MODEL SAILPLANES



ARTICLE 3

FRANCE

L. G. TEMPLE

I am afraid it will be very difficult adequately to describe French model sailplanes in a few hundred words. They possessed no national characteristics such as we find when we examine the German or Italian designs; the French have always been individualists in all things, and so we find that their models were of no distinct national types, but varied from the simple conversions of rubber-driven designs, right up to large models that were nearly full-scale sailplanes in miniature.

Large numbers of these simpler models were made of balsa and tissue in a manner similar to a Wakefield model. They were generally very difficult to trim on a windy day, but were undoubtedly the easiest models to get up to a great height on the towline. I have seen small models, up to 5 feet span, win contests simply because they gained such altitude that they outflew better machines, though their flights were nothing but a series of tremendous stalls and dives. Sometimes the fuselage on small models were made from blocks of solid balsa, carved to shape and hollowed out to a certain extent. Remember that, in pre-war France, there were ample aeromodelling supplies.

One could buy unlimited first-class balsa very cheaply, and such items as ¼ mm. plywood, silk, jap tissue and model dope were in great demand. There was, however, very little bamboo tissue, ply was not widely use except the very thin variety (which was marvellous stuff), and real glider dope seemed unheard of wherever the model builders gathered. Knowing these facts, we can see that, for many people, the cheapest and easiest type of model sailplane was one on rather "rubber model" lines, and the size was frequently less than 6-feet span.

Because of the universal balsa construction, nearly all French models had two characteristics: light loading, and, in the larger examples, complicated construction. At least, they had far more actual pieces of wood in them than the German or Italian machines, though the hardwood jobs built in the axis countries took quite as long to make; there were so many lightening holes to fret out one by one.

Perhaps the most publicised model sailplane in the world, after the German "Grosse Winkler," was the French designed "Helene Boucher." It was large—about 8 feet 6 inches span—and has won contests as far off as the Argentine; it flew in the King Peter Cup Competition at Fairey's in 1939. This model is an excellent example of advanced French design in the 1938–9 period, so we can analyse it to give us a rough idea of how their larger models were built. It flew beautifully, but also crashed most impressively when anything went wrong; I have seen them fold up like concertinas at times.

The fuselage had balsa formers and longerons of fairly strong construction, and the whole was sheeted with thin balsa and subsequently covered with silk or paper. A small celluloid cabin was incorporated in front of the wing. The normal arrangement for launching and landing was a single fixed hook, a skid and a tailwheel, but I have seen replicas with multiple or adjustable hooks. This fuselage was typical of the better class French models; streamline was good, though not perfect, and the lines were graceful. The cross-section was a flattened oval, actually it was a bit too deep and narrow, this being a common fault among the French models.

The fin, of remarkably small area, was really an extension of the rear part of the fuselage, which was very deep; it was therefore not a true fin but more like a flattened version of the dorsal fin on an American Fortress II. bomber. The tailplane was large and set high up, with a biconvex airfoil and no dihedral, and was plugged to the fin in two halves, with very weak dowels. The French definitely disliked the idea of lifting tails on sailplanes, though they used them a lot on rubber-driven models.

"Helene Boucher's" wing was sharply tapered, and employed a R.A.F. 32 airfoil. It was monospar construction with a sheeted nose portion and the dihedral was not excessive, being about ¾ inch per foot of half-span. The two halves plugged into a small centre-section and the whole wing was then strapped down on

the cabin roof with large rubber bands. Silk covering was used.

This short description suggests that the model was entirely orthodox except perhaps for the peculiar dorsal fin, which I have only seen on one other sailplane—the German "Gentsch," of 1932. Having watched both these machines in action, I can vouch for the excellent weathercock stability of this type of fuselage and fin. The highly-tapered wing was also typical of French design. These aeromodellers knew little or nothing about aerodynamics and built their models wholly from past experience and their individual ideas of good looks, but by using washout on the tips they produced stable wings even with as high a root to tip ratio as 4 : 1. In France the only airfoils used to any extent were R.A.F. 32, Eiffel 400 and 431, and Clark Y. Some models came out with Grant or Abrail airfoils, but the average modeller had never even heard of these. You would be amazed at the lack of technical knowledge shown by even the winners of big contests in pre-war France.

The gull-wing was rather popular over there, but the most common type was a high wing with struts. This might almost be called typically French. There were little runners on top of an oval or circular streamline fuselage, and the centre rib of the wing was suitably grooved to fit on them, with the struts hanging on—somehow—by means of dress snaps or small wire clip fittings. Sometimes they came adrift during the winch launch, but at least the system was good in that the complete wing flew off when the model crashed.

The loading used on most French sailplanes was 6 or 7 oz./sq. ft. Not many were more heavily loaded than this. All builders adhered strictly to the F.A.1 fuselage formula, and, speaking of fuselages, theirs were very often almost "pod and boom" in shape, with a great drooping forward part and a thin tail end, which often broke in a hard landing. This shape necessitates an unduly large fin, especially if the wing is set well back from the nose, as it often was on a French model. Sweepback was very popular too, but was becoming a little less so by the Autumn of 1939.

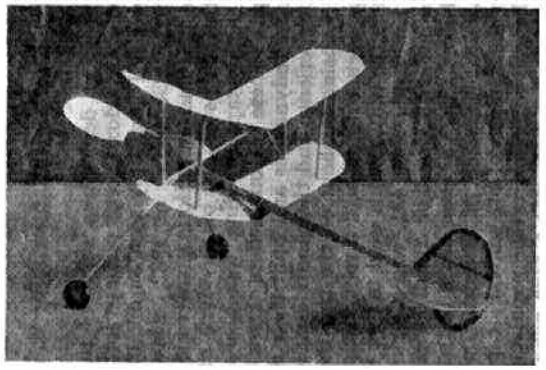
French aeromodellers were definitely good at covering their models; not only had they the skill but they could choose pleasing colour effects and knew how to decorate their completed models. Glossy enamels were often used, with striking effect, and most high-grade sailplanes had lacquered fuselages and shiny varnished flying surfaces. They also used a new form of covering somewhat like the familiar cellophane: this was known as "Rodophane," and was, of course, dead smooth and most effective in use. Produced in a variety of colours, it was the most perfect covering for models that I have ever seen.

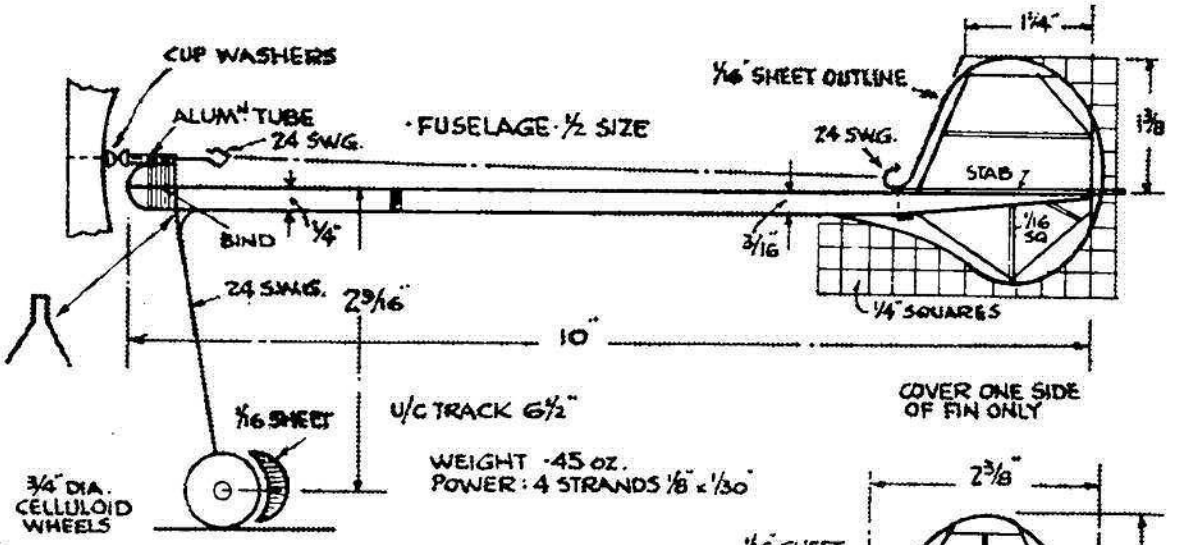
Winch launching had been developed to a fine art in France, more so than in most countries. Model after model was "played" up to incredible altitudes at the French contests, using the full 200 metres of line. They used greased winches with ratios of from 6 : 1 to 10 : 1 on the drum, and the winch was held by the operator, never stalked to the ground.

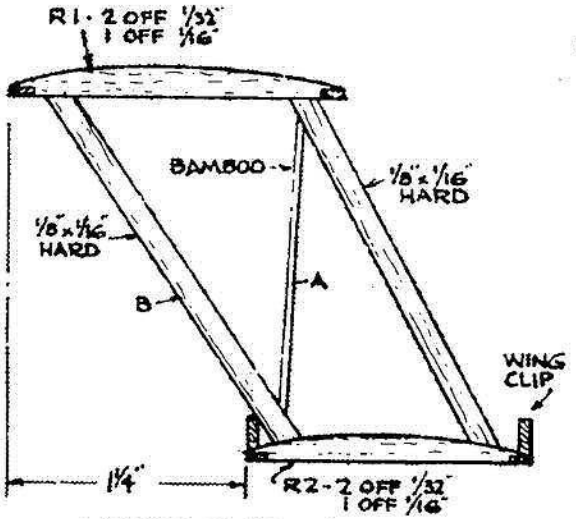
In conclusion, in model sailplane dessign, construction and flying in France I can only think of three things that were truly representative of the sport all over the country: the winch launch, the balsa cement they used—"la colle Céko"—and their excitement over a winning flight.

"PULSKI."

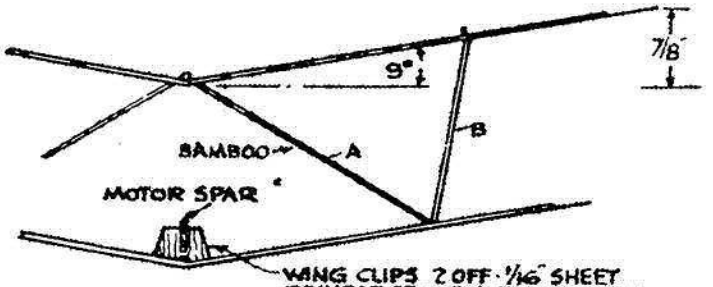
PROP BLANK
6"x3/4"x1/2"



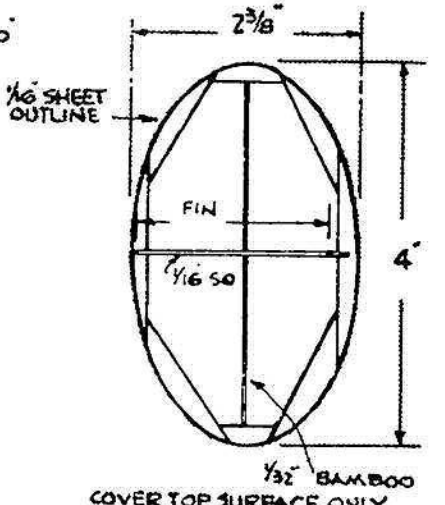




·INTERPLANE STRUTS · FULL SIZE ·

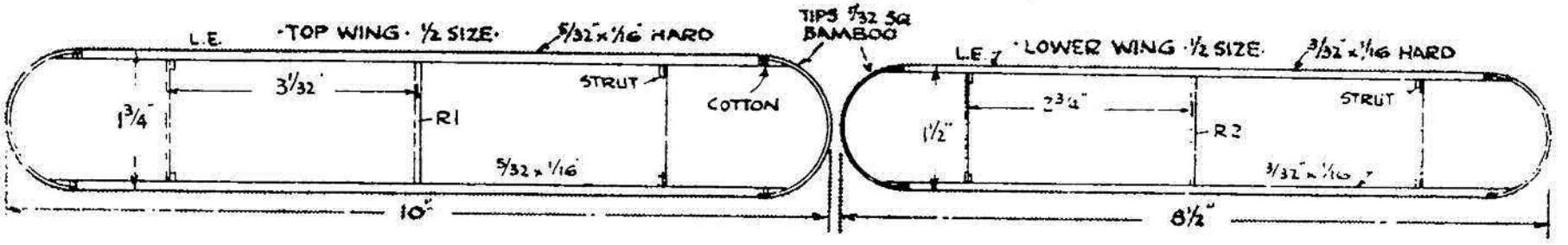


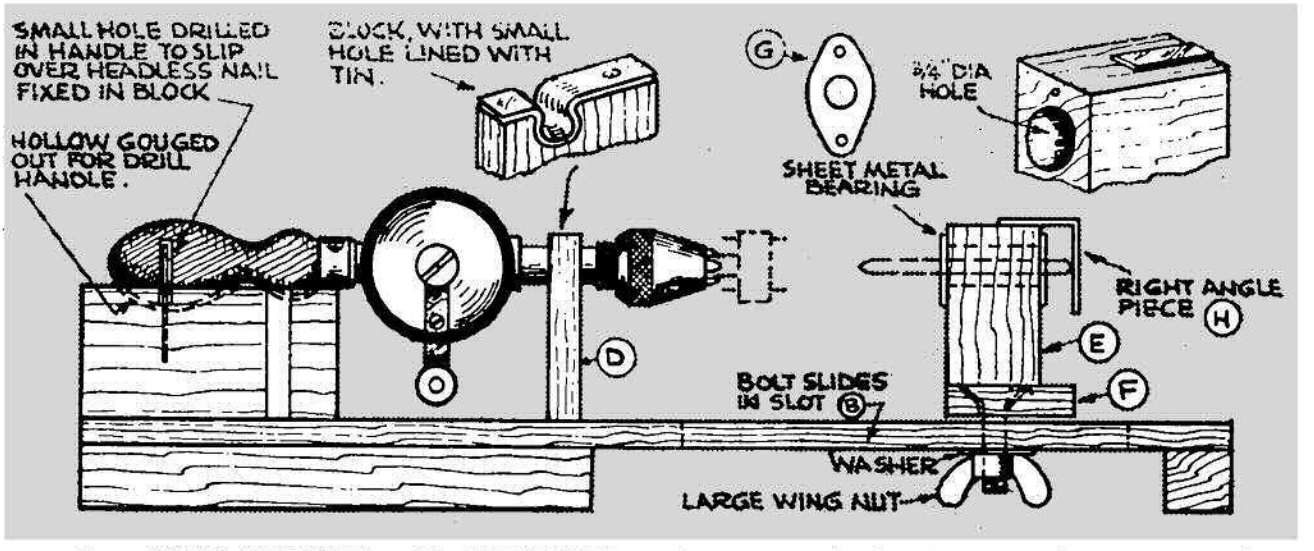
RIGGING DETAIL ½ SIZE ·



COVER TOP SURFACE ONLY.
· STABILISER · ½ SIZE.

SUPERFINE TISSUE TOP SURFACES ONLY.





A SIMPLE LATHE

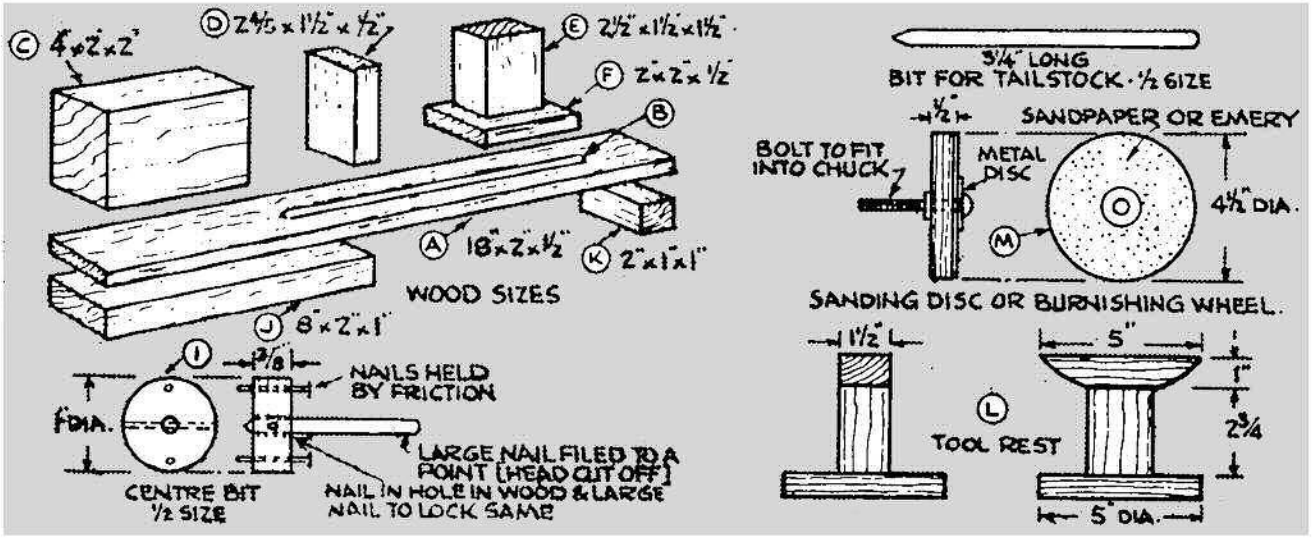
By RONALD McRAE.

My chum and I often experienced the need of a small lathe for turning wheels and cowlings.

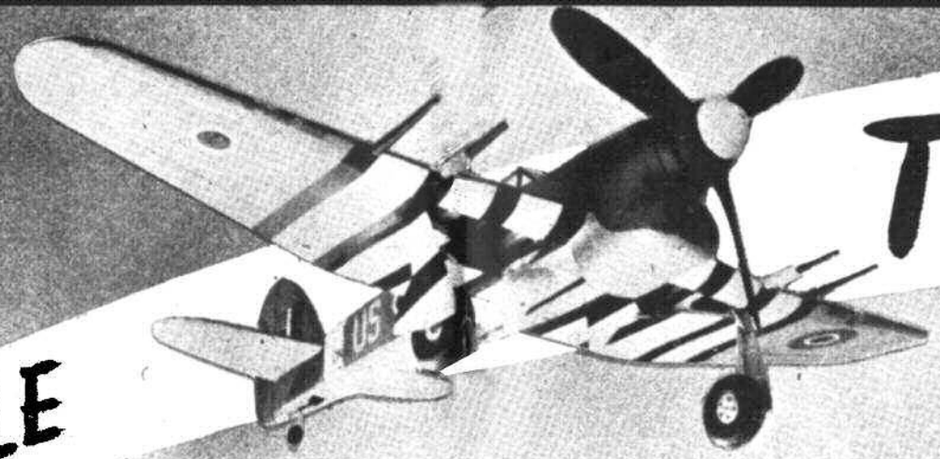
We first made the bed of the lathe from hardwood, then we shaped up the headstock block, gouging it out to form a firm support for the drill. A headless nail was driven in the gouged out portion. This fits into a small hole in the handle of the drill, keeping it quite steady, although leaving the drill detachable. The forward headstock block was then made, and the two blocks screw nailed on to the lathe bed.

The bed blocks were next made and fixed on in a similar manner. We then adjusted the metal lining of the forward headstock block until the axis of the drill was exactly parallel to the lathe bed and pointing along the slot in the lathe bed. Next, we fastened the screw in the tailstock board and screw nailed on the bored block. The bit for the tailstock was made from a piece of round rod (an old Meccano axle or large nail would do.) We then drilled a hole of slightly larger diameter than the round rod in each of two pieces of sheet metal for bearings. The bearings were then adjusted so that the tailstock bit lay along the produced axis of the drill. This is important. The right angle piece was next mounted and the centre bit made from a wood circle of 1 in. diameter cut out with a fret-saw. The sanding disc is useful for many jobs and the tool rest is essential.

To turn a wheel, take a piece of wood of the wheel's thickness, draw on the wheel and shave off excess wood with knife or chisel. Drill hole in centre of wheel. Fix centre bit in drill chuck. Fix the wheel hole on centre point and push wood firmly on to other points. Move up tailstock and fix tailstock bit in other side or hole. Tighten up wing nut. One person turns the wheel while the other operates the tool. The wheel should be turned as fast as possible (250 revs./min. is a good speed.) Roughing down should be done with a rasp, finishing with file and sandpaper. The end of a circular file is excellent for gouging out a wheel for tyre effect. For a cowling, take piece of wood of suitable length and drill hole of required inside diameter. Remove excess wood as for wheel and fit a plug of wood in hole. Mark centre of hole on both ends of plug (which should be of same length as cowling) and fit in lathe. The cowling can then be turned like a wheel.



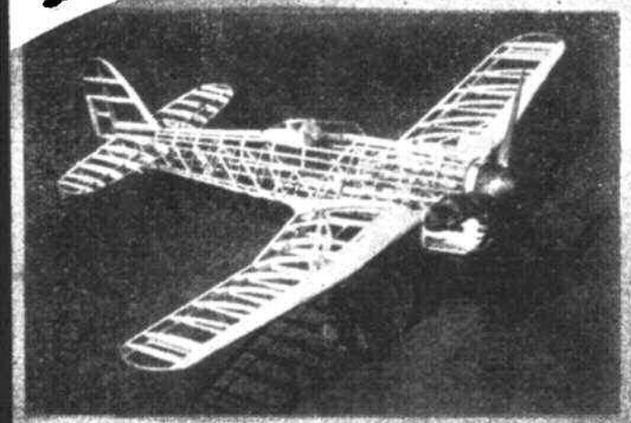
TYPHOON



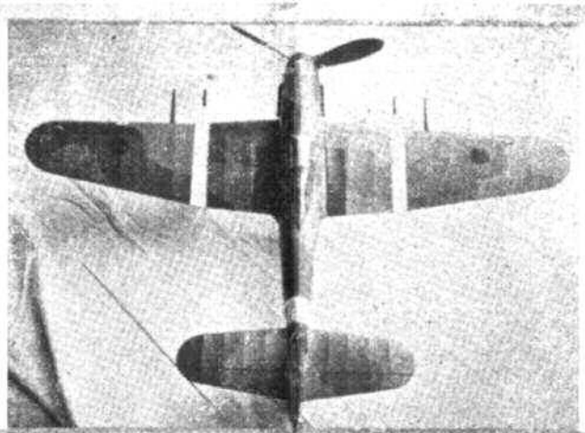
1 inch to 1 ft FLYING SCALE

DESIGNED BY C. R. MOORE, A.R.C.A.

Following our usual practice when illustrating flying scale models, we publish photographs of the full-sized aircraft shown in positions similar to those in which the model was placed for photographing. The top left-hand photograph is of the model, and that on the right is of the full-sized aircraft. Of the two bottom corner photographs, that on the right is of the full-sized aircraft and that on the left the model. The photograph above is of the model, as also are the two lower centre photographs.

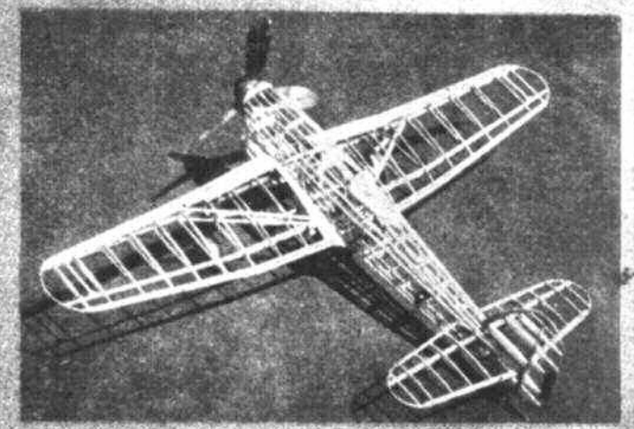


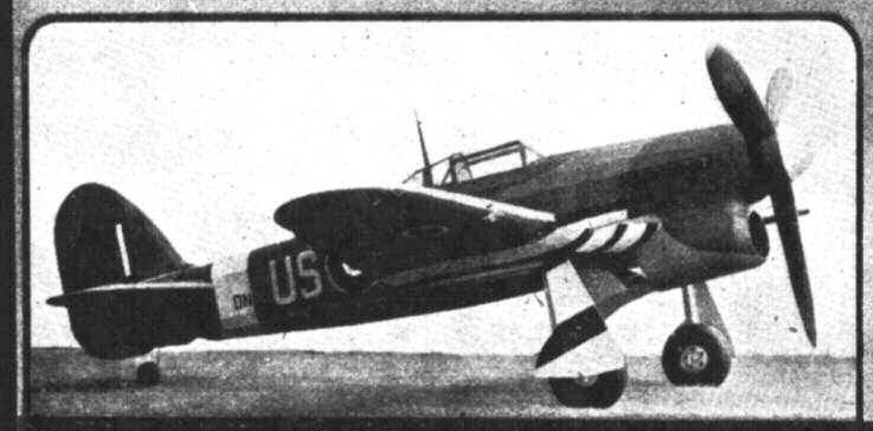
The two photographs of the uncovered model clearly show its construction and the method of mounting the wings in an easily "knock offable" manner. This model will undoubtedly be acknowledged as one of the finest yet introduced in the Aeromodeller Plans Service.

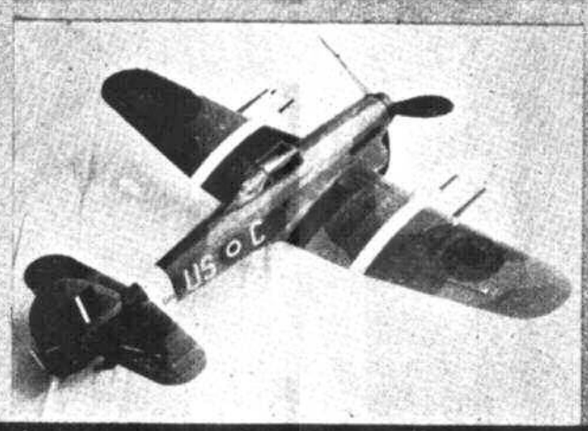


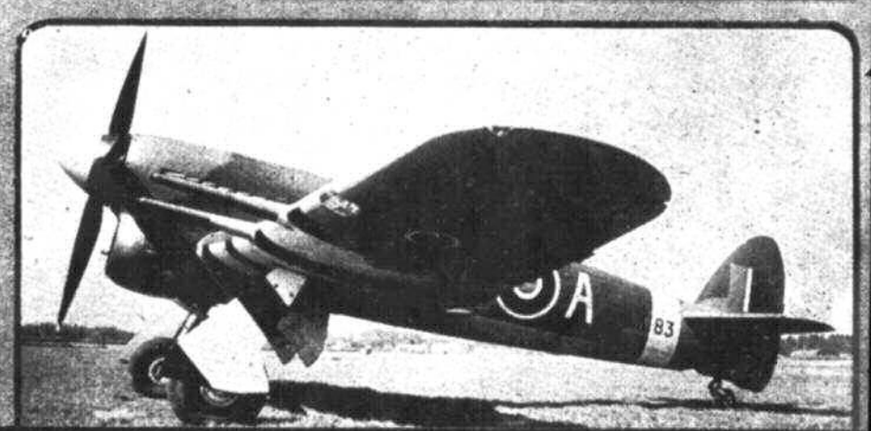
This fine looking machine is capable of good flights. The under-carriage units and tail wheel are fully retractable and detractable operation being controlled by the tension of the rubber motor.
Plans will be available on or about August the 10th.

★









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"G.H.D." SPRINT SPECIAL. Triple Geared Rubber Driven Race Car.

By C. H. DEASON.

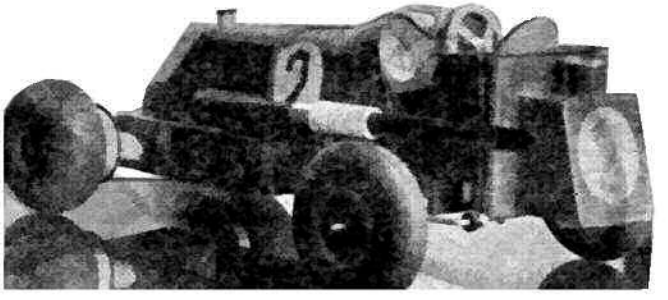
This model race car is constructed of scrap material that is immediately to hand. Bonnet, scuttle and dumbiron fairing may be made of thin card, whilst any suitable hardwood will be satisfactory for the chassis side-members, provided that the bracing is sufficiently rigid.

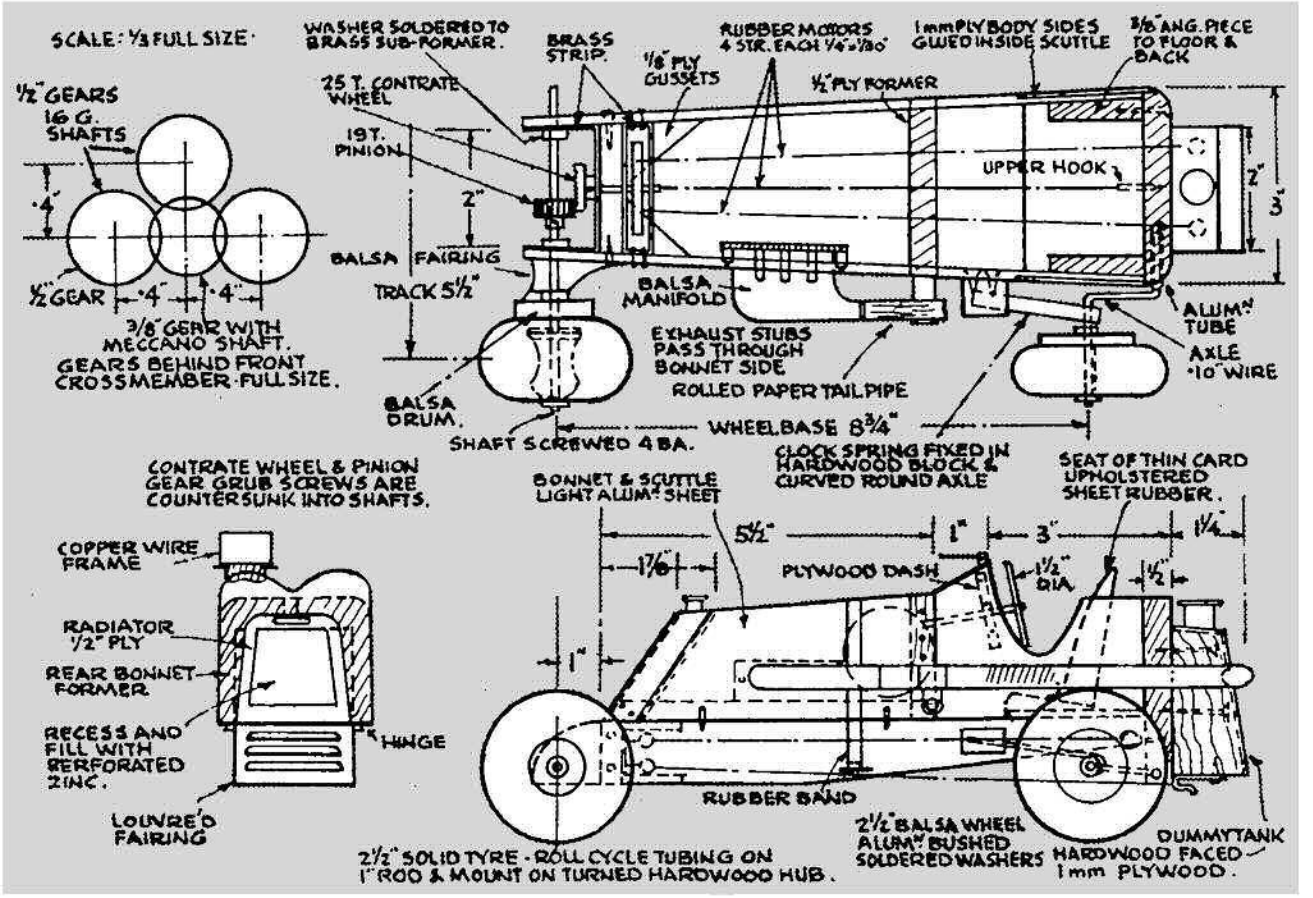
Rear springing is best taken care of by light clock spring, although laminated 1mm ply was originally used. No attempt has been made to incorporate steering, directional control being achieved by bending the rear axles.

The front wheels take approximately half length of cycle tubing, but this will depend on the size and thickness used. It may be found necessary to cut the tubing into two lengths, and reverse the curve of the moulding to avoid eccentricity. The resulting wheel is rather heavy but quite resilient, and in appearance almost equal to an airwheel. The inner ends should be well solutioned, and trimmed off after mounting on the hubs.

For long distance R.T.P. runs I have an alternative 50 tooth contrate wheel, for use with double power. Meccano wheels and shafts have proved suitable, but the shafts should be drilled to take the set-screws.

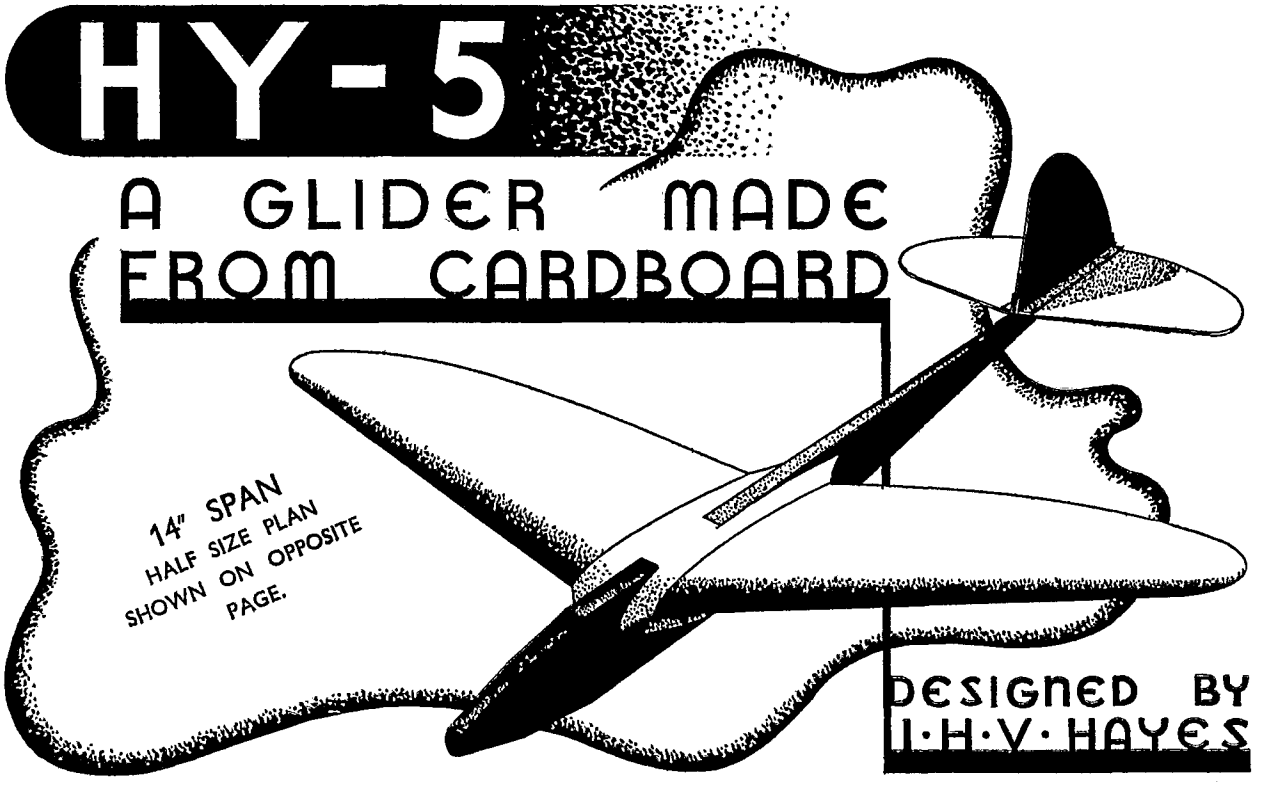
The whole car and chassis is painted British Racing Green, with aluminium radiator, spring anchorages and filler cap. The steering wheel is of 1mm ply, bound with thread. A large dia. rev. counter is cut in the 1.m. dash panel, the dial being marked out and glued to the back behind celluloid.





HY-5

A GLIDER MADE FROM CARDBOARD



DESIGNED BY
I·H·V·HAYES

My introduction to the sport of model aircraft flying, was by way of a series of, not very successful, cardboard flying (?) models. This method of construction was then forgotten until just recently, when the balsa shortage necessitated the use of other materials. The results obtained were very satisfactory, and enabled me to continue the construction of the "Solid" type of glider, a type which I had been forced to neglect as a result of this shortage.

The cardboard used is of the thin white variety, bought in sheets approximately 32" by 23", for fivepence or sixpence. The stage in assembling the parts which occasioned the most thought was fixing the wing to a fuselage which was only ¼" wide. The usual method, of course, is to build up fillets with plastic wood, but due to the flexibility of the cardboard this cracked after a time. Also the moisture in the plastic wood tended to cause the cardboard to wrinkle. So it was decided to build the fillet out of the same material as the rest of the 'Plane. The rather angular shape thus formed does not detract from the appearance of the model.

FUSELAGE :—

This is cut out in one piece, folded and glued as shown to make a fuselage 1" deep and ¼" wide. Do not forget to cut out the wing slot on both sides.

FILLET :—

Study the head-on and the dotted side view before folding. The folds are made so that the flaps can be glued in their respective positions—A to A and B to B etc. The fillet can then be slid into position along the fuselage, and glued in place. The fillet must be glued to the top and bottom of the fuselage. The wing is threaded through both fillet and fuselage and glued firmly.

WING :—

The wing is also made in one piece. Glue is spread along the trailing edge about ⅛" wide. The top surface is then bent to the approximate camber and held in place to the lower surface by "Trombone" paper fasteners. Once the two surfaces are clipped together they can be adjusted, to obtain the correct shape. Make sure that the trailing edge forms a straight line when looked at from the rear. Any "Waves" can be eliminated by slightly bending up or down, when the two surfaces should slide over each other, between the clips. DO NOT use a quick drying cement. When the camber has been formed and the glue is dry, the wing tips are packed up to give a dihedral of 2½". The top centre surfaces are allowed to overlap, glue being smeared on the lower one to form a strong joint. Any superfluous cardboard is now cut off, and the trailing edge and tips lightly sandpapered to a smooth curve. When dry the wing will probably be found to have assumed a slight under-camber, do not try to flatten this out.

TAIL :—

The tail surfaces are simply cut out of flat cardboard and glued on the top of the fuselage. The fin is fixed to the tailplane by two angles of cardboard, this giving a better job than flanging the bottom of the fin.

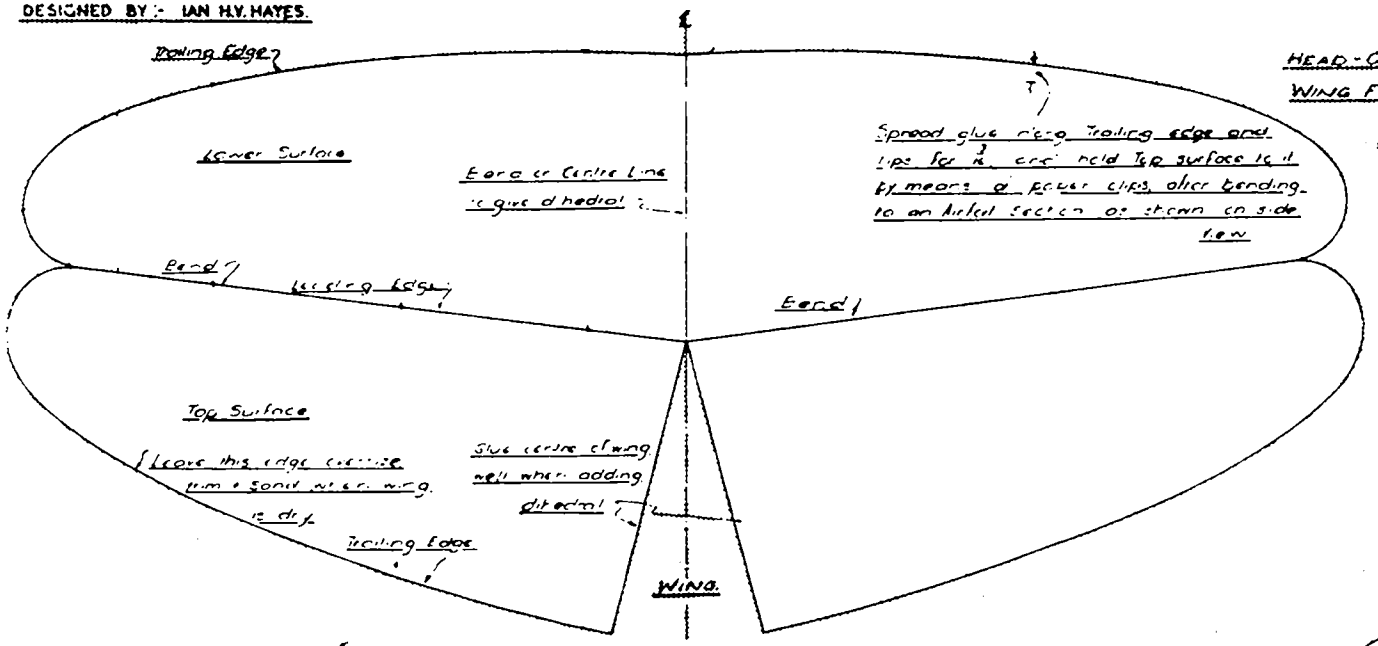
The balance weight, in the form of clay, etc., is contained in a paper tube glued in the nose. The square nose of the fuselage, when dry, is bent to a circular shape to accommodate this tube. One end of the tube is sealed off by a disc of cardboard, and the other end by a shaped plug of wood, which is glued in place, after the correct balance has been obtained.

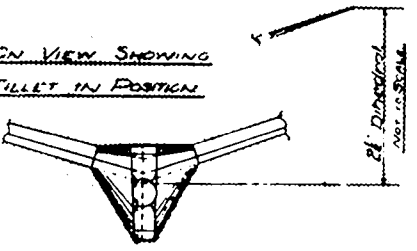
The model is adjusted in the usual manner by gliding from shoulder height, and adding weight until the maximum glide is obtained.

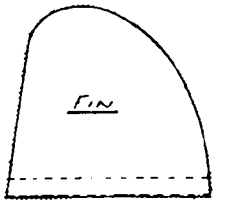
A coat of **thick** shellac may be given to protect the model from moisture. But it must be thick or else it will cause the cardboard to warp.

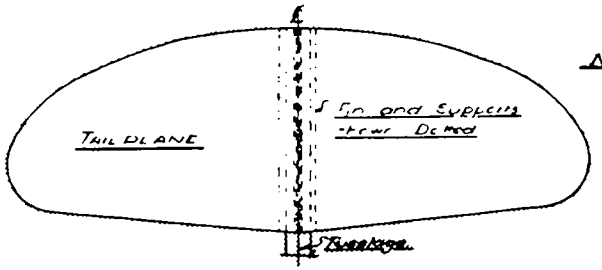
"Hy-5"

DESIGNED BY :- IAN H.V. HAYES.

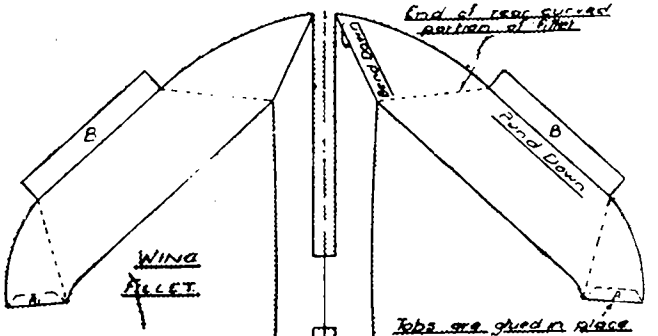


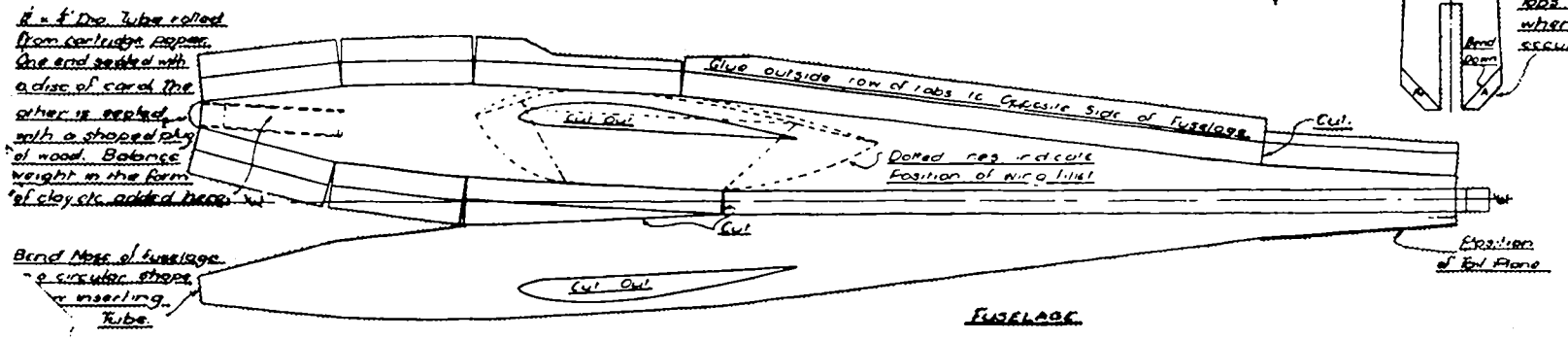






Note :-
The material used throughout is thin white cardboard. Or any suitable alternative
Slow drying glue is used for all joints.
Paint :- 1 coat Thin Shellac.





DESIGN OF LIGHT WEIGHT SPARS

By D. G. CROUDSON, Stud.R.Ae.S.

This article deals with the problem of producing strong and yet very light mainspars for large models, especially Wakefield models, etc., where the weight must be kept down to a minimum, for the shape of the spar has every effect upon the weight, strength, and stiffness of a model wing.

As is well-known, the tapered wing is a more economical structure than the rectangular wing, because a greater part of the lift is taken by the inner half of the wing, than by the outer half, but even so, a great deal can be done to lighten tapered spars.

Let us consider the half-wing of a normal shoulder-wing model. This is in effect a cantilever beam, the loading of which may be graphically represented as in Fig. 1a. For a rectangular plan form this figure would be a rectangle falling away at the tip. In this case the actual shape of the figure depends upon the amount of taper of wing; the calculation of these figures involves rather complicated mathematics and so sets of curves are available for different degrees of taper. The shear force over the semi-span can now be determined by integrating the loading diagram; this again involves higher mathematics, but fortunately the process can be quite simply carried out graphically by dividing the loading diagram into vertical strips. The area of each strip is computed, and the ordinates on the shear force diagram corresponding to the centre-lines of these strips are proportional to the areas. Fig. 1b shows the shear force diagram, and similarly, Fig. 1c shows the bending moment diagram, constructed by integrating the shear force diagram in the same fashion.

Now, if we examine this bending moment diagram, it will be noticed that the bending moment varies from zero at the tip to a maximum at the root, and that the bending moment over the greater part of the semi-span is small compared with that at the root. Then, since the B.M. over the outer third or so is very small, this part of the spar may be made as light as is possible to be compatible with the general construction. At this point, in full size design, the Moment of Resistence of the proposed section at the tip is calculated and superimposed on the B.M. diagram, the Moment of Resistence being the 'strength' of the section or the maximum B.M. which the section will take. It will be seen that the M.R. is going to increase towards the root at a rate determined by the amount of taper of the spar but not at the same rate as the B.M. However, if we had made the section to be strong enough at the root, it would have been much too strong, and therefore heavy, at the tip, unless we had a very large degree of taper on the spar.

The method of overcoming this difficulty is as follows:—A suitable point on the M.R. curve, just before it cuts the B.M. curve, is chosen. The cross-sectional area of the spar at this point is increased by adding doublers on the outside edges of the spar, thus increasing the M.R. of the section. This new M.R. is now calculated and superimposed on the B.M. diagram at the point B. Thus, BB^1 represents the increase of strength at B. From B^1 another line is drawn parallel to AB. Similarly, at the point C on this line just before it cuts the B.M. curve, more doublers are added, putting the M.R. of the section up to C^1. Usually, two or three changes of section will be sufficient to cut down the weight considerably. The shaded area between the B.M. and M.R. curves gives the reserve strength, since the B.M. gives the strength required, and the M.R. curve the strength available. At any point on the spar M.R./B.M. = Safety Factor.

General Construction of Built-up Spars.

Fig. 2 shows the lift acting on a section of a spar. Equal and opposite reactions R are induced at the points of attachment of the section. Then the moment about the root due to the lift is opposed by the couple R.d. where d = dist. between points of attachment (in this case the flanges.)

These reactions produce a compression in the top flange and a tension in the lower. Thus it can be seen that the flanges of the spar take all the load due to bending, whilst the web takes care of the shear force in the spar, which tends to buckle it. This shear force is small compared with the forces due to bending, and so the web may be made just strong enough to prevent buckling.

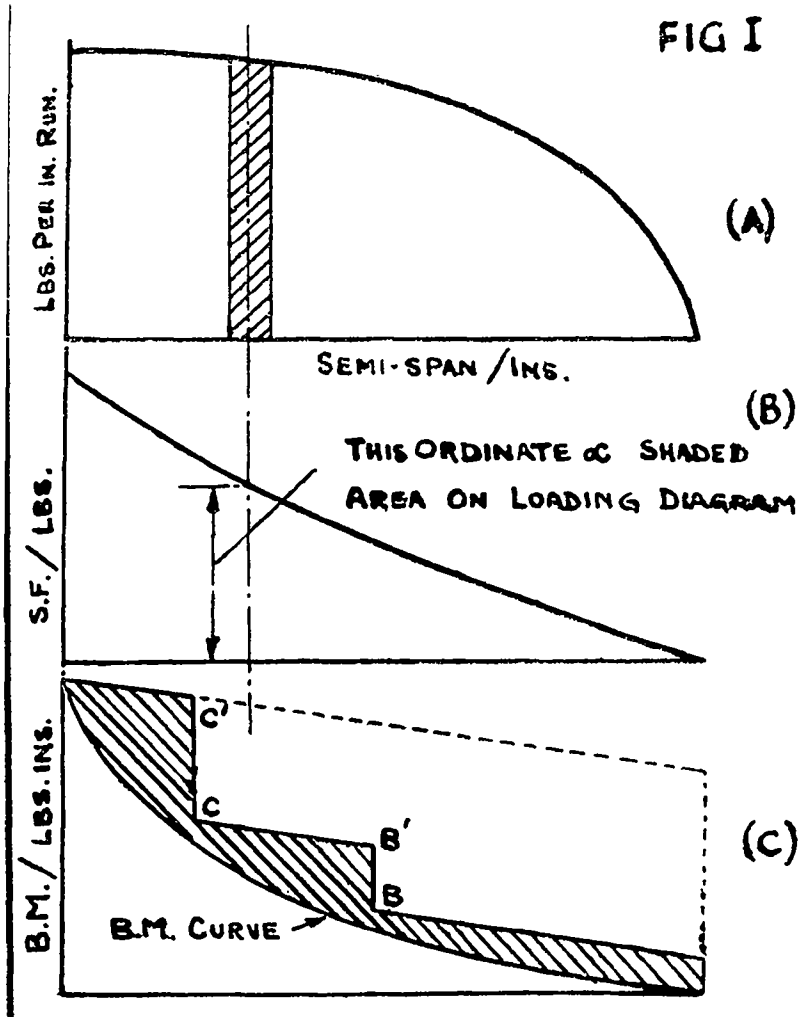
From these considerations it follows that I-sections are the most economical sections to use, as their Moments of Inertia are very high for their mass. A suitable I-section can be made up of sheet balsa web and doublers, $\frac{1}{16}$" sheet being suitable for models from 4 to 6 feet. (Do not forget that the thinner the section, the higher the stresses). The doublers are added on at the points B and C. These could also be $\frac{1}{16}$" sheet, or else three or four of $\frac{1}{32}$" sheet. The idea is to have the strongest section at the root tapering as smoothly as possible towards the tip. If the web is fairly deep it may be safeguarded against buckling by means of $\frac{1}{16}$" square stiffeners, either vertical or zig-zag. Lightening holes should be put into the web especially near the tip. The section at the root should be left untouched, or, in the case of very large models, strengthened for wing attachments by attaching $\frac{1}{32}$" sheet to each side of the web together with one or two stiffeners. The doublers should be well chamfered off at the changes in section, and the lightening holes sanded out well with a piece of sandpaper over a pencil. These precautions are taken to prevent concentrations of stress, which if allowed, would weaken the spar. The ribs should be allowed to project slightly above the spar, so that the covering takes up its own shape on tightening.

The general arrangement of such a spar is shown in Fig. 3.

It will be found that a spar of this type is very strong in torsion, and a better method of making up the wing would be to use a cartridge paper leading edge instead of square balsa. Again, if this cartridge paper were extended up to the flanges of the spar, a box section would be formed in which half the usual number of ribs would suffice, thus saving time and balsa.

In conclusion, I may say that, although the process of building up a spar of this type may seem rather complicated to some, it is really very simple, and gives satisfaction as regards lightness and strength. Also, I hope that the few notes on the stressing of spars will help to bring peace to some furrowed brows!

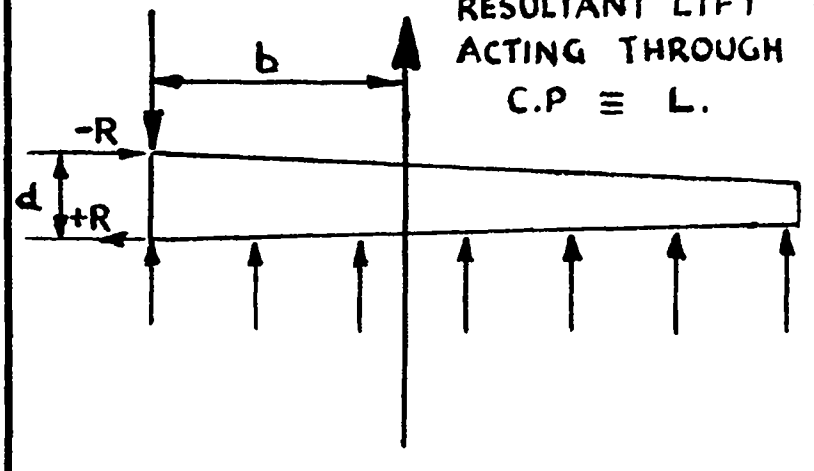
FIG I



S.F = L

FIG.2.

RESULTANT LIFT ACTING THROUGH C.P ≡ L.

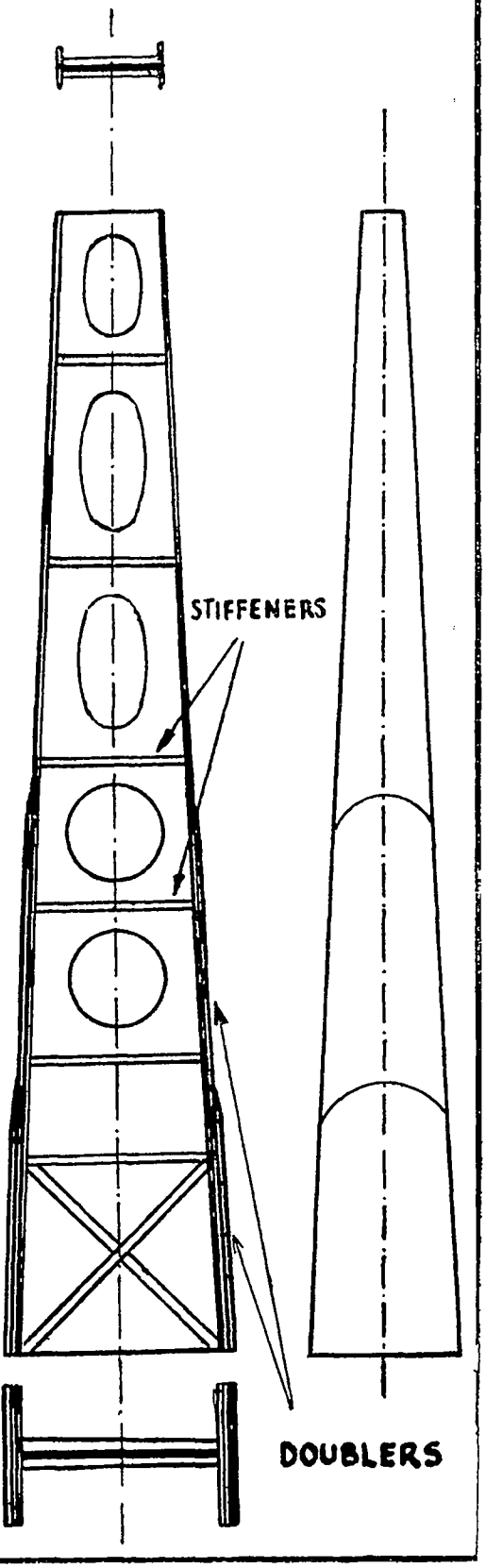


MOMENT DUE TO LIFT = $L \times b = R \times d$.

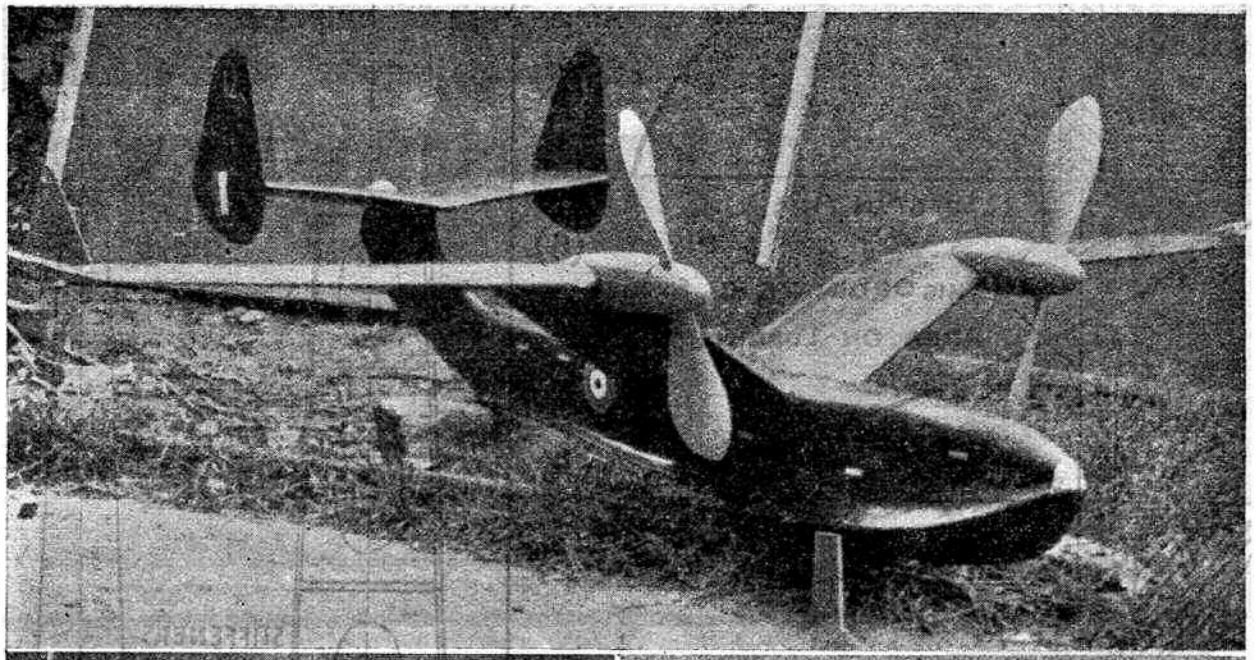
$\therefore R = L \times \frac{b}{d}$.

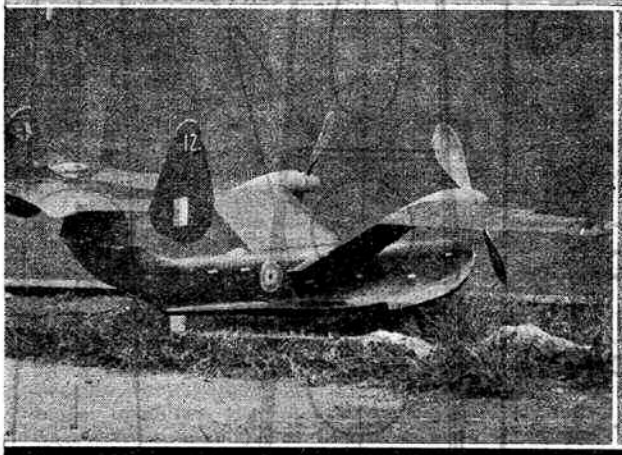
G.A OF SPAR. (NOT TO SCALE.)

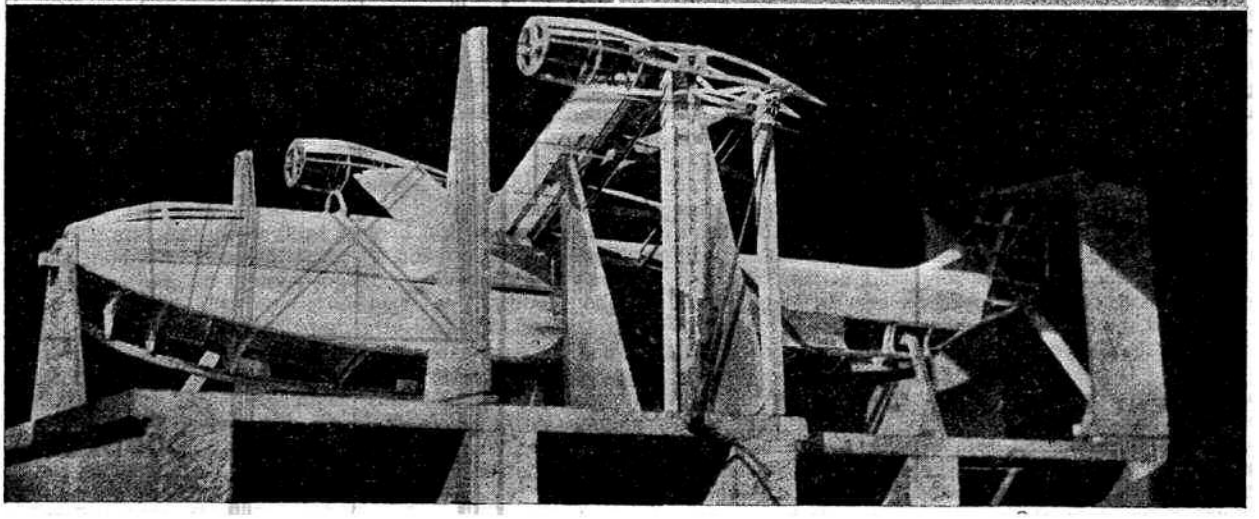
FIG.3.



"THE GULL" . . A 52½-in. Span Twin Engine

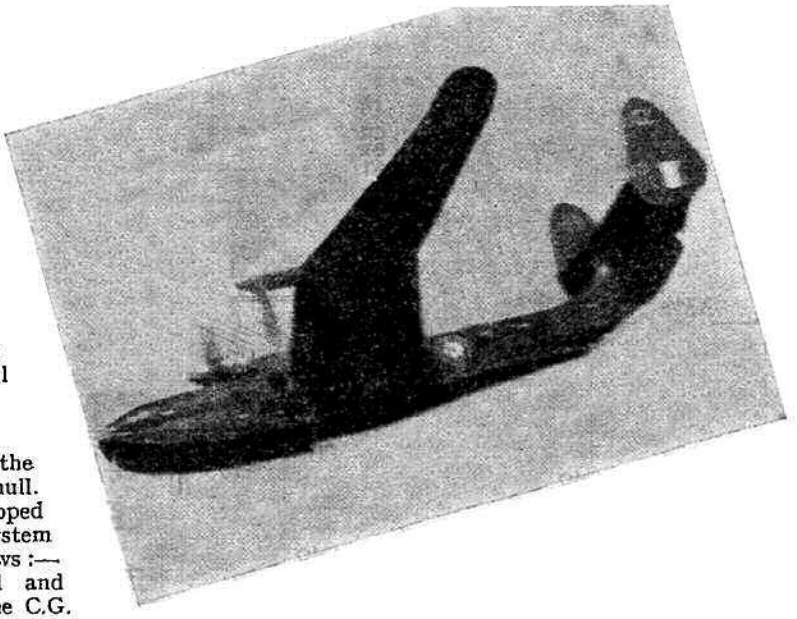






Flying Boat

By A. K. E. GYFORD.



This particularly handsome scale type flying boat is capable of making consistently good flights. R.O.W.

The photographs on these pages show its unique and graceful lines. The one bottom left very clearly demonstrates the Jig method of construction comparable with that of full size aircraft.

Built in slots are employed in the main wings and the method of construction will be quite simple to follow from the plan.

Drive.

A flexible drive is provided from the rubber motors which are located in the hull. The drive as shown on the plan was developed after considerable experiment with a system of scratules. The idea briefly was as follows :— Four motors were located in the hull and cranked together approximately under the C.G. Further cranks to the airscrews were carried through the front portion of the wings. A great deal of trouble was experienced with sticking at T.D.C., however, and it was finally decided to use gears and flexible drives. Each flexible drive is 12" in length. They are attached to the airscrew shafts and gear box drive stubs by tapered copper and solder. Whipping is prevented by two steel bearings and five sets of $\frac{3}{64}$" fly plates drilled to take the flexible shaft at the appropriate angles.

The mechanism may be a little stiff when new but with careful running in this will soon disappear.

All soldered joints should be very truly made, especially in the case of the copper tubes as considerable strain is taken by these joints.

Power.

The motors are arranged as follows :— Four of 8 strands $\frac{1}{4}$" flat 20" long on lower set of hooks and two of 6 strands $\frac{1}{4}$" 18" long on top set of hooks. Safe turns 560. Weight of rubber 3.75 ozs.

Data.

Span 52$\frac{1}{2}$"
Overall length 36$\frac{3}{4}$"
Weight 15$\frac{3}{4}$ ozs.
Wing Area 2 square feet.
Airfoil Section R.A.F. 32.
Angle of incidence 4$\frac{1}{2}$°
Angle of sit (front to rear step) 5$\frac{1}{4}$°

Airscrews.

Diam. 11"
Pitch 14$\frac{3}{4}$"
Blade Width 1. $\frac{23}{32}$"
Pitch Angle 23°

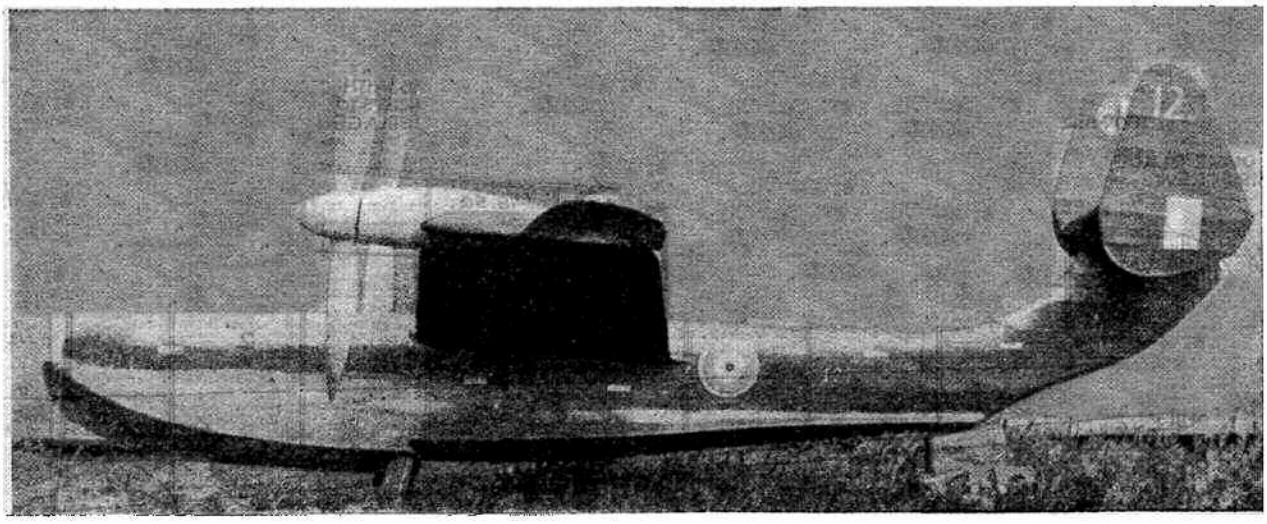
Built up with 6 pieces $\frac{3}{16}$" and 1 piece of $\frac{1}{4}$" Balsa
Blade area 13$\frac{1}{4}$ square inches (each airscrew)
Two airscrews rotating in opposite directions.

Each airscrew has a free wheel and clutch and may be removed from the shaft.

The hull is balsa covered and has a detachable hatch for easy access to the gear box.

The "Gull" will fully justify, both in flying capabilities and general good looks, use of material and the time spent on its construction.

It is stable in flight and has a very flat glide.



"TWINNERTOO".

DESIGNED BY
J·A·SIZER· A.R.Ae.S.

TYPICAL SECTION OF FUSELAGE

CROSS BRACES AT STATIONS 4-7

SKETCH OF CHANGE FROM RECTANGULAR TO TRIANGULAR FUSELAGE SECTION

DORSAL MEMBER.

·FUSELAGE·1/3 FULL SIZE·

33½" OFFSETS TO 1·15 DATUM

1·5 1½" 1/16" SQ. 1/16" BAMBOO OR REED CELLOPHANE ·15"

·8" 1/16" GUSSETS

1 2 3 4 5 6 7 8 9 10 11 12 13

·8 1·35 1/32" SHEET BOTH SIDES OF FUSELAGE. 1/8 SQ. FRAME

DATUM

1" 2" 2¼" 1⅞" 1·7 2⅛" 2¼" 2⅛" 1·7 2⅜" 2¾" 2" 2" 2" 2" 6¾"

1·0 1·125 1·125

DATUM

RUBBER BANDS SECURE SADDLE TO WING

RECTANGULAR FUSELAGE. CHANGE IN THIS BAY TRIANGULAR FUSELAGE

1/16 SQ. STRINGERS

OFFSETS TO LONGERON ·85 ·3

1·25 1·4 1·5 1·5 1/32 GAP 1·25 ·7 1/32 GAP ·45

BLOCK UP FRONT & REAR TO TAKE PINS

BALSA BLOCK

℄ THRUST FUSELAGE DATUM 1⅜" 1/8 SQ.

F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12

·55 1·1 1·45 1·6 1¾" 1·6 1·625 1·625 1·6 1·5 1·4 1·2 1·0 ·8

1½" 1¾" 1¾" 1¾" 1½" 1½" 1½" 1½" 1½" 1½" 1¼" 1⅛"

·625 625 ·625

·625 1·0 1·0

16 5/8"

2" DIA. WHEELS.

16G. U/C WIRES BOUND & CEMENTED TO F6 WITH CROSS BRACE & STRUTS TO STATION 4 ON FUSELAGE.

POWER: 12 LOOPS 1/8"x3/32" 20" LONG

12" DIA. 2 BLADE AIRSCREW.

1/8" SHEET. 1/8 SQ.

⅞" 1⅛" 1" 1½" WEB 1¾" 2" 1/16" RIBS. 2" SET RIB AT AN ANGLE 1½" 2½" 6"

PORT WING OUTER PANEL ·⅓ FULL SIZE·

18½"

2" 3/4" 1" 1/8" SHEET 1/8 SQ. PIN 3/16x1/16 1/8" SHEET SHAPED

RIBS THINNED R.A.F. 30 1/16" SHEET

1/8" SQ. 1" 8" 4¼"

FILLET 1/4x1/16 1/8x1/4 1·35 1·35

1/8" SHEET SECTION 1"

FILLET 1½" TAILPLANE FILLET.

1¼ DIA TAILWHEEL.

1" 2¾" ½" 1/8" SHEET SHAPED WEB GUSSET 1/8 SQ. 1/4x1/8 1½" 10⅛" 1/4x1/16 2" 1/16 RIBS RIBS RAF THINNED 30

4¼"

STARBOARD TAILPLANE ·⅓ FULL SIZE·

3/16x1/16 1/4x1/16

·WING CENTRE SECTION & OUTERPANEL ROOT RIB· FULL SIZE·

FRAME 1/32" SQ.

·NACELLE· SADDLE

COVER SIDES, TOP & ENDS 1/32 SHEET.

HARDWOOD PEG ATTACHMENT

WING FRONT SPAR

BIND TO 1/8" SHEET

BIND TO SPACER SOLDER

18G.

TAIL WHEEL FIXING.

℄ OF FUSELAGE 1¼ 1·7 1·7 1" 1" ℄ OF NACELLE

1/8 SQ. ℄ SPAR 3/8x1/32 CAPPING 1/8x1/32 CAPPING

STARBOARD CENTRE SECTION ⅓ FULL SIZE

1/32 & SHEET TOP BOTTOM. ℄ SPAR 1/4x1/8

7½"

1/16" SHEET FORMERS.

SECTION AT NACELLE FRAME 1.

SECTION AT NACELLE FRAME 6

2¾" 7½"

WING DIHEDRAL

DESIGN & CONSTRUCTION OF GLIDERS IN WAR-TIME

by D · J · HODGSON & T · P · MAWSON

THE advances that have been made in recent months in the design and construction of gliders are a very heartening indication of the possibilities for this type of model that lie in the post-war world. The shortage of rubber has necessarily reduced the number of powered jobs, and consequently the once neglected glider has come into its own. Although, as we have said, great advances have been made in the right direction, we feel that there is rather a tendency for some modellers to lapse into rather clumsy methods of construction and general layout, and to excuse this by pointing out the attendant difficulties of working hardwoods. We can well sympathise, as we have had some rather wearying experiences ourselves in this respect. Nevertheless this is not a sufficient basis to justify slab-siders, and crude conglomerations of struts and external rubber bands.

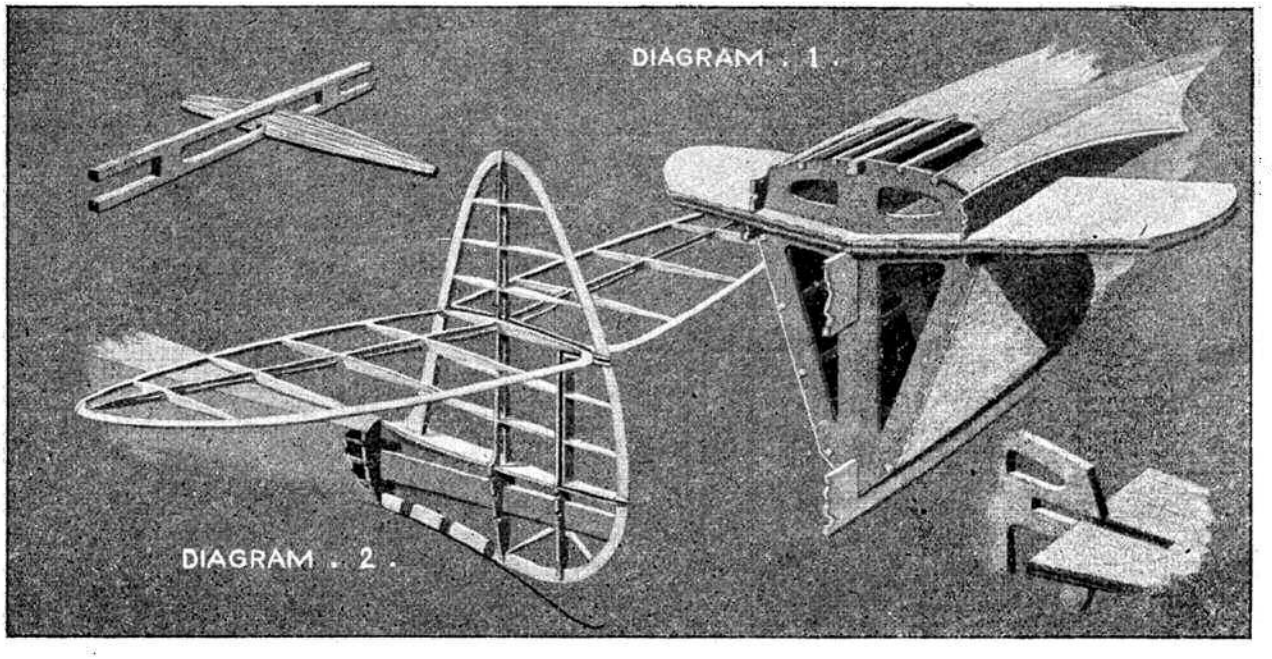
On examination of the requirements of an efficient model glider, it would seem that the type as outlined by George Temple and R. H. Warring would constitute the ideal. But, although we recognise the undoubtable efficiency of this type, it would seem that it is in a potential rut, and so the development of new, but aerodynamically sound, general layouts should be given every consideration. If we analyse the underlying principles of the well-established types, we see the guiding ideas for further experiment. Unlike a rubber-driven model, in which the performance depends to a large extent upon the weight, a glider can be built quite heavy. In fact, as has been shown by George Temple, better results are often obtained with quite reasonable wing loadings, the stability being considerably improved. The heavy glider is also enhanced by the fact that it is much more an all-weather job than the lighter model. Also, a heavy model can be built very strong; but, and we consider this as most important, the parts of the model which usually tend to be weak and not crashproof should be constructed in a strong manner without any fear of inducing too high a wing loading. The main points of structural weakness we have found in gliders, both of our own design and of others, have been the wing fixing, the tail fixing, and the nose portion.

We will quickly run through the general requirements for a hardwood glider. To commence with the fuselage: from the structural aspect, the monocoque fuselage would appear to be an impracticable form of construction in hardwoods. However, a model should be sheet-covered to as great a degree as possible. The improvement in finish and strength more than justifies the work involved. The elliptical or oval cross-section is really the best form, but unfortunately, with a view to covering with hardwoods, these sections present difficulties. A slightly modified section, such as is shown in diagram 1, is very easy to cover, even in 1/32 in. hard. However, it should be remembered that hardwoods are more difficult to sandpaper than the balsa sheet. If the fuselage is properly designed, and full use made of the woods employed, it can be a sure foundation for really strong wing and tail fixings, which are the chief stumbling blocks of many designs.

No wing fixing can be as successful as a properly designed "tongue and box." The box should be made of 1/16 in. hard sheet, and strongly glued (i.e. not with cement). Three-ply can conveniently be used for the tongues, which we have found are best situated in the fuselage, where they can be set at the correct angle so that no joint is used. Diagram 1 will amplify this point.

Now we come to the fin fixing. For a glider, if the tailplanes are detachable, we have found that the best method is to make the fin as part of the fuselage, and as such it can be made strong. Our general method, of which many variations can be made, is to run a centre keel right through the middle of the glider, and to fix the fin to this. Again, diagram 2 will help to clarify this point. Also shown in the same diagram is a form of tailplane spar, which has proved very successful.

As for the wings, we would only commend the general principles laid down by Messrs. Temple and Warring, and add our hearty approval of their condemnation of the "R.A.F. 32 and 3 degrees incidence" system of so-called design.



MONTHLY MEMORANDA

By O · G · THETFORD

Mosquito Marks.

Four varying marks of the Mosquito (D.H.98) all fitted with the Rolls-Royce Merlin XXI motor may now be mentioned. The Mosquito I was the prototype bomber, serially numbered W 4050, and differed from succeeding Mosquitoes in having short nacelles and a span of only 52 ft. 6 in. It had green and brown camouflage on the upper surfaces and Sky Type S on the under surfaces with no cockades beneath the wings. The old type national markings with a wide white stripe were carried.

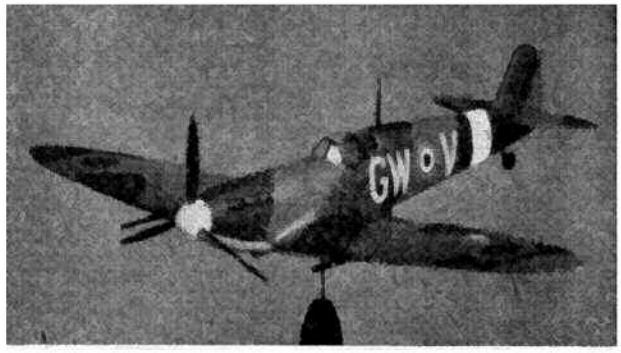
The Mosquito II is the fighter version with gun battery in the nose and differs from other Mosquitoes in having a flat bullet-proof windscreen. The prototype fighter version was serially numbered W 4052. Fighter Mosquitoes have either (*a*) sea grey medium and dark green upper surfaces with sea grey under surfaces for day duties, or (*b*) sea grey medium and dark green upper surfaces with soot black under surfaces for night duties. The Mosquito III is a dual-control trainer liable to be painted with any of the variations of colour schemes carried by the various operational versions. The Mosquito IV is the day bomber and reconnaissance version. It carries a 2,000 lb. bomb load but no armament. Bomb-aimer's window in the nose. Day bomber versions have dark green and dark earth upper surfaces with Sky Type " S " under surfaces. Mosquito IVs used on reconnaissance duties are usually painted azure blue all over.

Lafayette Warhawks.

A fighter squadron of the Fighting French Air Force in North Africa has been equipped with Curtiss P-40F Warhawk fighters presented by subscribers from the United States. These French Warhawks carry the American Indian Chief insignia made famous by the Escadrille Lafayette which flew Nieuports and Spads in the 1914–18 War and Curtiss Hawk 75s in the early phases of this war. The new Warhawks carry red, white and pale blue roundels on the wings and fuselage and similar coloured vertical stripes on the rudder with the blue next to the hinge post. Camouflage consists of large patches of light green, buff and reddish brown on the upper surfaces and pale grey under surfaces.

Thunderbolt on Operations.

Squadrons of the U.S.A.A.F. in Great Britain have been using the Republic P-47B Thunderbolt fighter on offensive sweeps and escort patrols over enemy territory since May, 1943. The Thunderbolts of one of the first squadrons to go into action carry distinctive markings in the form of a white band around the leading-edge of the cowling extending about a foot aft; a white horizontal band across the fin and rudder just above the serial number (in yellow) and chordwise white bands of similar width across each tailplane and elevator, close to the tips. Some of the machines carry the yellow encircling ring around the fuselage star whilst others are without.



Another " Wings for Victory " winner. The Spitfire Vb built by J. P. Jefferies of Hounslow.

Mustang Attack-Bomber.

Several squadrons of the U.S.A.A.F. are now using the attack-bomber version of the Mustang P-51 fighter designated the A-36. It seems likely that the type will form part of the equipment of the newly-formed Support Command in this country. The A-36s which have gone into service so far have carried their service number in large yellow numerals on the fuselage sides just aft of the national star. Two A-36 Mustangs are numbered 283707 and 283716. Standard U.S.A.A.F. fighter camouflage is carried.

The New Corsair in Service.

The Vought-Sikorsky Corsair F4U-2 naval fighters are now in service with the U.S. Navy in the Pacific theatre of war against the Japanese. The production version differs from the prototype in having a longer nose, improved motor and cockpit set farther aft. The production Corsairs are painted in the latest regulation Navy fashion with azure blue upper surfaces and white under surfaces. The under surfaces of the outer panels of the wing are azure blue, however, like the upper surfaces.

The Corsair is also being built by the Brewster Company, where the type is known as the F3A-1. The Corsair is thus in service as both the F4U-2 and the F3A-1, both types being identical except for their respective constructors.

Australian Spitfires.

Mk. V Spitfires in service with the Royal Australian Air Force have a modified form of national marking, applied also to other Allied types, consisting of the usual roundel with the red centre-spot removed. This is to obviate confusion with the Japanese red circle markings, and it will be remembered that a similar stratagem was forced upon the U.S. Navy Department earlier in the war. The white strip of the fin " flash " is considerably wider than that standardised in this country and the African theatre.

Equipment for Turkey.

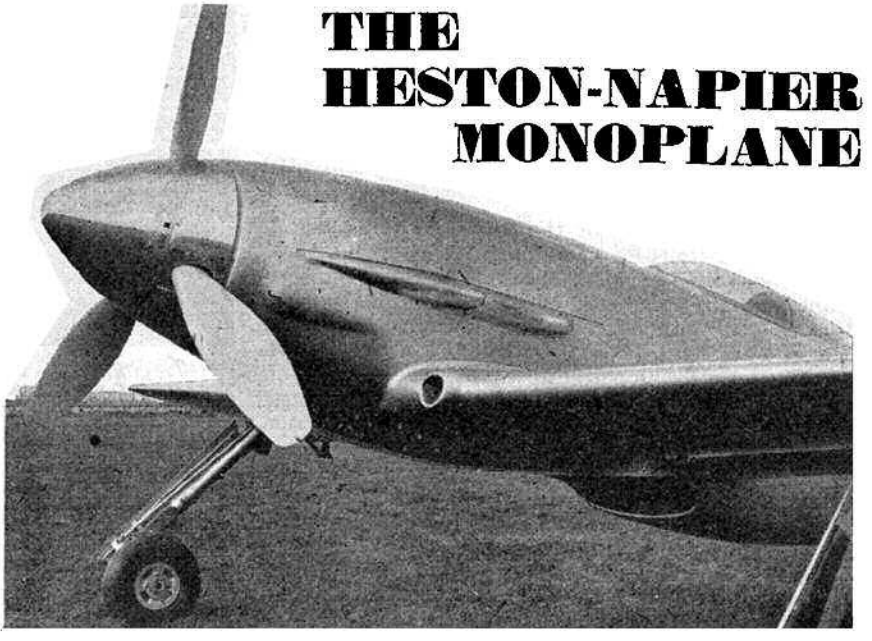
Batches of Hurricane IIcs and Blenheim Vs have recently been delivered to the Turkish Air Force. They carry British type camouflage (Middle East variation) and the Turkish national insignia, a white star and crescent against a red rudder and against a red square with white edging on the wings. One of the Blenheim Vs was numbered BA 488.

AEROPLANES DESCRIBED VII

By H · J · COOPER

NEXT MONTH:
THE FAIREY FANTÔME

THE HESTON-NAPIER MONOPLANE



IN December, 1938, design work was commenced on a small low-wing monoplane intended to establish for Great Britain the World's Speed Record. By the time that the aircraft was able to make its first flight, on 12th June, 1940, the record stood (as it now stands) at 468·94 m.p.h. and was held by Germany. The machine used for the flight was a special racing version of the well-known Messerschmitt Me 109.

Much ingenuity went into the design of the Heston monoplane, which was patriotically sponsored by Lord Nuffield, and it is unfortunate that the outbreak of war prevented further development. The first flight ended in calamity, for after about five minutes' flight the Napier Sabre motor became overheated, and the machine stalled from 30 ft. while landing. It was completely wrecked, and the project had to be abandoned. Two machines were under construction, but the second was not completed. The monoplane, however, appeared to be an exceptionally good machine (it was hoped that it would attain 480 m.p.h.), and it may be possible to regain the record with it when the war is ended.

The Heston monoplane was of wooden construction, and consequently its lines were rather better than might have been the case if metal had been used.

The fuselage was a semi-monocoque and of conventional construction, with spruce formers and stringers close together and covered with birch plywood. The wing was built up on two spars made from Saro "Compregnated" (compressed and impregnated) wood, with spruce ribs and a covering of 3/16 in. birch plywood. Control surfaces were of metal with fabric covering.

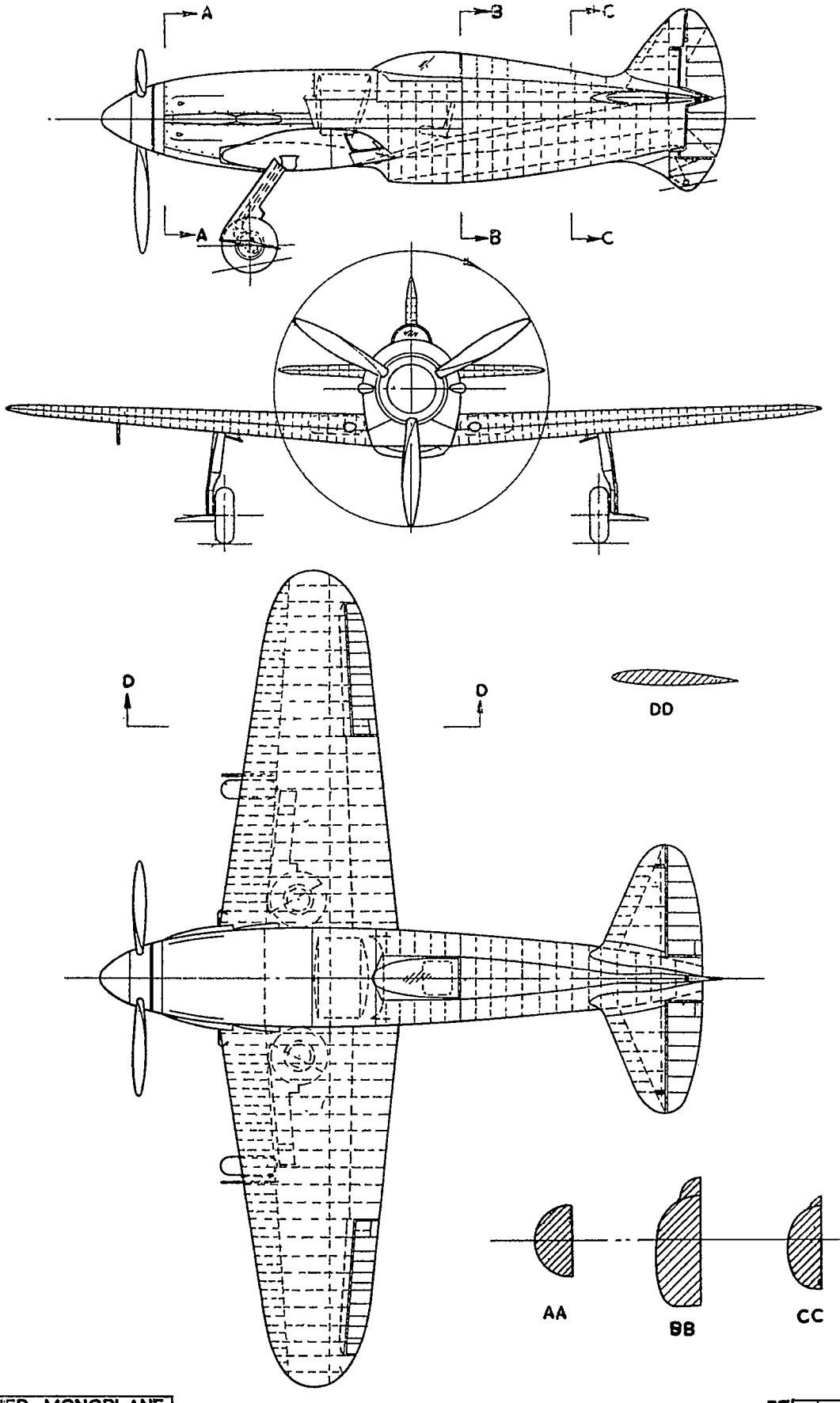
The undercarriage was of exceptionally wide track (14 ft. 9½ in.) but subsequently this appeared rather high in view of the surprisingly small amount of torque experienced.

The motor fitted was the 24-cylinder Napier Sabre H in-line, develops about 2,300 h.p., and is similar to that of the Typhoon. A 10 ft. 9 in. De Havilland-Hamilton three-bladed constant-speed airscrew was fitted. Cooling was by a Gallay radiator system in the lower rear fuselage, and air was discharged from a duct at the rudder post.

The first machine, G-AFOK, was finished in aluminium, and to attain a smooth finish eighteen coats were applied and rubbed down by hand. The registration letters were in dark blue, and on the wings were 3 ft. deep and 1 ft. 9 in. wide. On the fuselage they were 1 ft. 3 in. deep. The letters G-AFOL were allotted to the second machine.

Data: Span, 32 ft. 0½ in.; root chord, 7 ft.; tip chord, 3 ft. 2½ in.; length, 24 ft. 7¼ in.; tail-plane span, 10 ft. 9 in.; wing area, 167·6 sq. ft.; wing loading, 43 lbs./sq. ft.

Photos by D. Napier & Son Ltd.



HESTON-NAPIER MONOPLANE.

FT.

Club News

No prize offered for guessing what this modeller is thinking as his model skims off the grass. Taken at the Birmingham M.A.C. ground on Gamage Cup Day.

By CLUBMAN

THE weather does not seem to be helping National Contests this year, the general complaint being, as in previous years, wind and rain. However, it is apparent from reports that the M.E. No. 2 Cup was favoured with generally better conditions and quite a number of models were lost, some unfortunately on their first flights. R. Double of the Stratford-on-Avon Club had extremely bad luck, his model flying o.o.s. on his first two flights and unfortunately was not recovered from his second flight in time to show a three-flight aggregate.

Honours again went very well round the country, but, unfortunately, owing to a slight misunderstanding regarding the allocation of points, the Plugge Cup position is not quite definite at the time of writing. You will remember that last year bonus points were given on contests based on the entry for the Gamage Cup, but this year rather a curious precedent arises.

For, I think, the first time in history, the entry for the Gamage Cup has been surpassed, the M.E. No. 2 event attracting 173 entries as against 149 for the Gamage. In consequence the matter will have to come up for discussion at a Council Meeting and for the time being I am unable to give you accurate figures.

The National Cup was supported by 21 Clubs (surely a very poor proportion from over 100 affiliated Clubs) and the Birmingham M.A.C. are to be congratulated on their fine win. London area clubs are bunched immediately behind them and then we swing from one end of the country to the other. The full results of this event and the first 12 places in the M.E. No. 2 Cup are given in a separate panel.

Many of the older Aero Modellers will remember that old stalwart Pelly Fry, and recall his models flying with great efficiency at a time when many of our present readers did not know a longeron from a stringer. It is interesting to record that " P. F." is now a Wing Commander in the R.A.F. and has recently been awarded the D.S.O.

Congratulations are due to the well-known designer, R. F. L. Gosling of the Merseyside M.A.C., who has well and truly smashed the British Hand-launched Glider record. Together with other members of his Club he journeyed to Clydd Hills (which, I am assured, is a really tip-top gliding site), and with his " Ivory Gull " (*plans available through* AERO MODELLER *Plans Service, 3s. post free*) he broke the old time of 3 minutes 10 seconds, held for some years by W. E. Evans, with a flight of 5 minutes 35·8 seconds. Anyone who has tried it will appreciate that this is some going for hand-launched gliding.

A suggestion comes to hand from Mr. W. Boddey under the heading of " Save the old-timers." I think the idea is well worth passing on to readers and quote herewith his letter in full. I shall be pleased to hear from readers their views on this subject.

" *To suggest to model aircraft enthusiasts that they endeavour to save veteran aeroplanes from destruction is something of a tall order, for an aeroplane isn't the easiest of properties to house for restoration purposes, nor yet to find. The latter factor, however, might well be taken as a sound reason for spurring on such work, for it implies a danger that very soon all links with the grand and glorious past will be gone for ever. It is possible that some of the more go-ahead model clubs may respond to the idea of first trying to find and then to restore, early aircraft to a decent state of preservation and perhaps, ultimately, to flying order. Those clubs located away from the towns should not find it an insuperable problem to obtain a barn or outhouse in which to house a machine that is worthy of much loving care and attention. So far as finding suitable*

specimens is concerned, I confess I am at a loss to give any very concrete advice, but no doubt painstaking search of old hangars, aerodrome outhouses and even garages will result in a few intriguing veterans coming to light. If those who seek to save such aircraft make exhaustive enquiries amongst friends who have access to widely-spaced airfields, and if those who already know of old machines now rotting away uncared for will drop me a line c/o THE AERO MODELLER, *I think we may yet save a number of irreplaceable specimens from total destruction.*

"Before the war, apart from historic aircraft that were buried, as it were, in museums such as South Kensington Science Museum, two fine private collections of veterans existed in this country. Up at Biggleswade the late R. O. Shuttleworth, who died flying with the R.A.F., had carefully rebuilt a number of such machines. These included a 1909 *cross-Channel type Bleriot in flying trim and a* 1912 *Depperdussin. Shuttleworth's aircraft appeared in post-war Hendon displays alongside the most modern machines and certainly made short hops where others merely taxied around. We should be thankful that these quite irreplaceable machines are being carefully preserved by his mother.*

"The other collection was got together by another racing motorist and veteran car enthusiast, Richard G. J. Nash, who had a special shed built at Brooklands to accommodate them. He used to get up early on still, summer mornings to fly these early craft, which included a 1912 *Farman biplane with* 120 *h.p. V-*12 *Renault engine once used personally by Maurice Farman, a* 1909 *Borzoni-engined Bleriot, a* 1915 *Boulton Paul Sopwith 'Camel' with a beautifully rebuilt* 140 *h.p. Clerget rotary motor, and a* 1912 *type G.*3 *Caudron. The last named was found in France and was actually flown over to Nash 'on the quiet' by Ken Waller, who gallantly cruised across the Channel from Brussels at some* 53 *m.p.h., the long-idle* 90 *h.p. Anzani engine running at* 1,100 *r.p.m.*

"I doubt very much whether any more aircraft of the last war period or earlier remain to be saved, alas! but the more interesting of the machines of the nineteen-twenties have also all but disappeared, so I think this appeal is, if anything, overdue.

NATIONAL CUP,
13th June, 1943.

		Aggregate
1.	Birmingham	1462·45
2.	Walthamstow	1430·8
3.	Northern Heights	1234·0
4.	Cheam	1085·3
5.	Bushy Park	989·7
6.	Croydon	907·45
7.	Leeds	896·8
8.	Hayes	894·6
9.	Merseyside	818·4
10.	Aylestone	805·1
11.	Surbiton	760·4
12.	Luton	734·5
13.	Pharos	723·6
14.	Oxford	708·4
15.	Streatham	692·8
16.	Blackheath	682·2
17.	Leicester	597·0
18.	Sale	594·0
19.	Carlisle	530·5
20.	Harrow	481·2
21.	Bristol	451·0

With the Merseyside club at their record-breaking meeting at Clwyd Hills, near Ruthin. Mr. Gosling, present record holder, is seen at the extreme left, holding his model "Ivory Gull."

"Nearly ten years ago I examined the British Aviation Register at the Air Ministry and was shocked to find how the old-timers had fallen by the wayside. A few Bristol Fighters—Mavrogordato, now in the R.A.F., used to fly one for fun—and various versions of the Avro 504 *were listed, but even at that time only two D.H.*6 *were on the Register. At the time when Blackburn 'Lincocks' had been relegated to the auxiliary squadrons, the only real veterans I was able to trace were a few D.H.*9 *and D.H.*9J, *a number of S.E.*5*s, and a solitary Parnell 'Pixie.' Where are they now? It must be over a dozen years ago that a list of* 349 *privately owned aircraft in use in this country was published and then, with enthusiasm running high, only five early light aeroplanes were on the list—an Avro 'Baby,' a Beardmore 'Wee Bee,' the A.N.E.C., an Austin 'Whippet,' and a Cranwell, which was apparently the old C.L.A.*2 *designed by Comper. I fear that not even these five early machines exist to-day. The war has brought back sidcots and helmets' but the salvage drive must have accounted for many of the still all too rare existing veteran aeroplanes. Can we save those that do remain? The Veteran Car Club has been largely responsible for saving several hundred motor cars made before* 1904, *and it would be a fine thing if the model aero clubs could preserve a few historic aircraft—machines that, once broken up for scrap, can never happen again. If nothing remains to be saved we can seek solace in models, aided by those excellent* AERO MODELLER *plans of* 1914–18 *types, to which I hope others of early civil and sporting types will be added after the war. But I would very much like to hear of any real veterans that are still with us, so perhaps anyone who comes upon such will write to me or, better still, to 'The Clubman,' who could then let interested club secretaries in on the 'finds.'"*

The show put on by the READING M.A.C. for the town's Wings for Victory Week was a great success, and attracted over 160 local entries. Scale models were of course well in evidence, and some beautiful examples of workmanship were seen. Allan Davies won the senior competition with a tip-top model "Wellington," with all parts working, including gun swivel! Keith Manning won the junior section with a "Stirling" complete with full bomb load and working parts.

Flying, flying scale and gliders were few. Petrol models included an interesting design by R. E. Buswell.

MODEL ENGINEER No. 2 CUP, 9th May, 1943.

	Aggregate of 3 Flights
1. G. W. W. Harris (Croydon)	624·6
2. R. Double (Stratford-on-Avon) ..	507·0
3. W. H. Bushell (Birmingham) ..	498·4
4. M. Farthing (Croydon)	480·7
5. M. Wright (Bushy Park)	471·6
6. I. S. Cameron (Merseyside)	405·9
7. D. Worby (Cheam)	401·8
8. A. S. Cox (Northern Heights) ..	400·2
9. C. Pendlebury (Blackpool)	391·5
10. A. T. Gow (Harrow)	380·7
11. D. Taylor (Streatham)	363·7
12. D. Perkins (Walthamstow)	356·2

(Number of entries 173)

He entered a low-wing monoplane, 31 in. span, total weight 21 ounces. The engine of 2·5 c.c. is built into the wing base, and a cowling almost completely conceals the engine. There is no rudder, but well dihedraled tail, and I am assured that the model flies really well. (Don't ask me where he tested it !)

The EDINBURGH M.F.C. are to hold a gala day at their field at Dreghorn on August 22nd, when contests will be held for Wakefield, Flying Scale, Gliders, Duration and Nomination. Full particulars from the Secretary, J. H. Young, 4 Delhaig, Gorgie, Edinburgh 11.

A new club known as the MEDWAY M.A.C. has commenced operations, and have two wireless control units in the making, several gliders, and at least one model for an attempt on the British speed record. Secretary is J. Silver, of 129, Featherby Road, Gillingham, Kent.

The NEWTON ABBOT & D.M.A.C. is progressing, both with indoor and outdoor activities, two records recently going the way of all such trifles ! R. Wood broke the outdoor record with a time of 1 : 13 with his " Clipper," while L. Webber holds the indoor record with 50 seconds r.t.p.

The STEWARTON M.A.C. has opened a new clubroom in an empty shop. The members spent some hectic nights cleaning it out and scrubbing the floor, and on going down to repaint the place, found a gang of painters in charge who had been instructed to do the job by a friend of the club who wishes to remain anonymous ! Nice work, lads. The new premises were opened with a film show, when fifteen new members were enrolled as a result of the shop window publicity. The older hands are going to be mighty busy instructing for the next few months.

A group of Scottish aero modellers have formed a new association known as the AYRSHIRE AEROMODELLERS' ASSOCIATION. Displays were held in Ayr and Kilmarnock for " Wings " week, 77 models being on show at the first place, and slightly fewer at Kilmarnock. A " Lancaster " built by J. Thompson of Ayr won a prize at both shows, so it seems quality counts. At any rate, the judges spent nearly three hours on their job, so no one can say they skimped the job !

The BEVERLEY & D.M.A.C. had over 65 models on show for their " do," and the exhibition raised over £20 for the Red Cross. The gala day projected for the " Wings " week had to be postponed owing to rain, and was held on the 20th June in a high wind. Winners were Duration (two events), R. Skinner, Wakefield, J. Press, and Gliders, R. T. Ragg.

Combining with the local works Spotters and Spotters' Clubs, CHELMSFORD M.A.C. held a very successful exhibition in the Public Library during the week May 29-June 5, close on 200 models being on exhibition, which were viewed by nearly 3,000 people during the week.

The exhibitors included Chelmsford M.A.C., Halstead M.F.C., Mr. L. G. Temple, S.M.A.E., Messrs. Crompton Parkinson Co. Spotters, Messrs. Hoffmann Manufacturing Co. Spotters, Marconi's Wireless Telegraph Co. Ltd. Spotters and the Royal Observer Corps. The local prizes for single and multi-engined solids were both won by Marconi's Wireless Telegraph Co. Ltd. Spotters.

In the National Award Contest, Mr. L. G. Temple's Glider was the outstanding exhibit, and many curious theories were advanced as to the method used for achieving that marvellous finish.

The results in the National Contest were :

Solids : D. Smith of Halstead M.F.C. (" Sunderland").

Duration : G. Foden, Chelmsford M.A.C. (own design).

Glider : L. G. Temple (" Celestial Horseman").

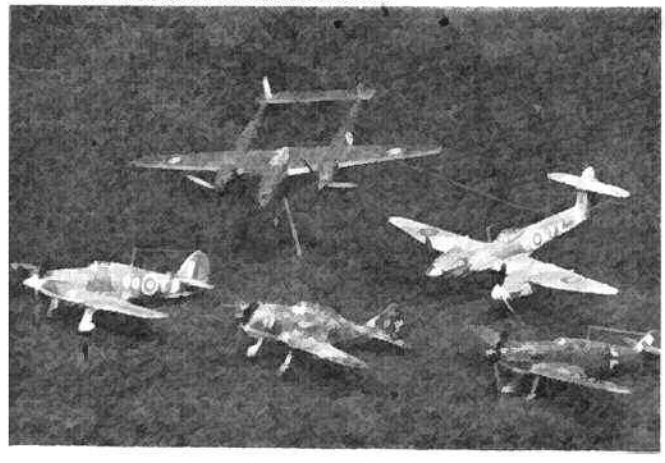
Under 16 years of age : R. Kelsey, C.M.A.C., with a duration model.

The RHYL & PRESTATYN M.F.C. found a nice crop of thermals recently, and the glider record got busted twice in the same afternoon. First honours went to J. M. Hardman with a time of 2 : 56·3, this time being later broken by 3 : 50 o.o.s. by Phil Hawkins. Both flights were made from a 200 ft. towline, using the pulley system. This club's main complaint is wind, and how to get rid of it. Ever tried bi-carbonate of soda ?

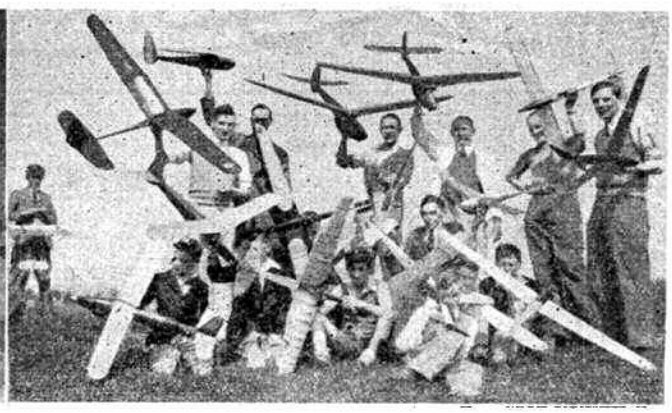
The STOCKPORT & D.M.A.C. have been lucky enough to obtain a " large stock of rubber." . . . Well, well, I daren't print the address of the secretary or he'll get snowed under with begging letters ! One member has a " Warrior " engine which unfortunately has a split crankcase, and would be pleased to know if any reader has a spare part to oblige with.

Interchange of visits between the BLACKHEATH M.F.S. and the NORTHERN HEIGHTS M.F.S. has been a welcome feature of the past few weeks. Out of this has sprung the London District Inter-club Challenge Cup for the general good, and a crop of new ideas for the club. As the result of seeing a lantern lecture at the

A nice display of solid models constructed by G. W. and R. Rose of the Coventry M.A.C. Not much fault could be found with these models !



Prizewinners at the Bromley Solid M.A.C. looking very pleased with themselves—at least one is!



Leicester M.A.C. lads look very pleased with themselves and their gliders.

N.H., Blackheath have decided to build an Epidiascope (is the spelling right?). Tech. Sec. Ron Galbreath is an optical engineer, while other metalworking and electrical members are rallying round for their share. Delivery anticipated by the winter season.

C. Saunders' winning glider has been adopted as a club model. Plans are being prepared and six members at least will be making. Model is simple in construction: box slabsider, with extra long moment arm, tip dihedral. Sturdy and aerodynamically sound yet not beyond the powers of comparatively inexperienced builders; span 4 ft. 6 in. Winner of Club "Norman Dixon Memorial Trophy" with 168 seconds in three flights off 150 ft. line: 3rd Eastbourne Rally in "stormy weather."

A good party attended the Eastbourne Rally on June 13th. It proved an unlucky day for Messrs. Bishop and Trusler, who intended to camp out on the field. This is forbidden so near the coast, and they spent an unhappy night being "moved on" by the "local constable" as well as by surprise packets from "That Man." Times were not good, but Cyril Saunders managed to grab a 2nd in the 45 second contest.

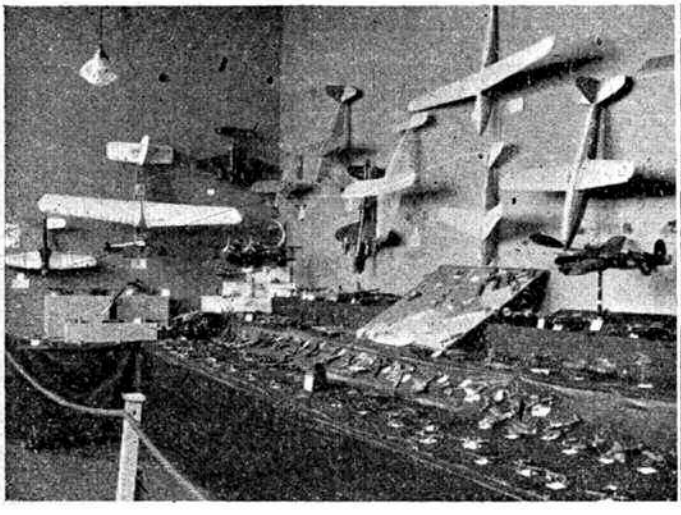
LEEDS M.F.C. made entries for the M.E. No. 2 and National Cups, the weather being not quite as bad as usual. H. Tubbs lost his model on the first flight in both contests, his first job being taken o.o.s. after 1: 30, while in the National his "Mick Farthing Lightweight" disappeared after 3: 37. Another flyaway was C. Furse's "Gutteridge Trophy Winner" with a time of 3: 18·2, but fortunately this was on the third flight, and the model aggregated 6: 49·6. The best flight of last month was made by P. Holt's model with 3: 58, while R. Mann's "Puffin" raised the running launch record for gliders to 1: 25·5, and B. Crocker pushed the h.l. glider figure up to 37·8 seconds.

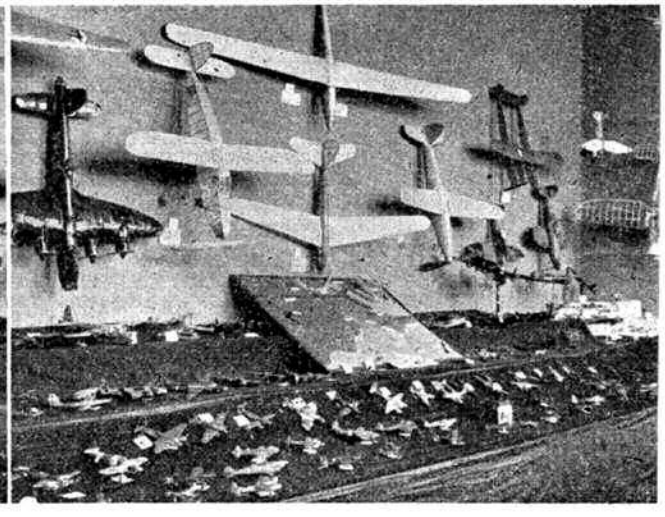
Owing to the generally bad weather conditions, nothing very spectacular has been accomplished by the LEICESTER M.A.C., best flight of the season being B. A. Germany's flight of 2: 53 o.o.s. on his first flight in the M.E. No. 2 Cup.

During Horsham's Wings for Victory Week, the organisers staged a flying contest which resulted in a win for J. Leach (Jeep) with 1: 04, runners-up being H. R. S. Holland (Jeep) 38·5 seconds, and Cadet Harwood (Cruiser Pup) 37·2 seconds.

Wind and rain curse the BLACKPOOL & FYLDE M.A.C. (and so say all of us!). However, they were lucky in the "Model Engineers' event, and although there was quite a wind blowing there were also quite a number of thermals and some reasonably good times. Two club records were broken during this competition: Mr. Bentley broke the class "B" record with a flight of 166·5 seconds o.o.s., flying a machine of his own design, and C. Pendlebury (age 16) broke the "open" record with a time of 198·2 seconds o.o.s., flying a "Diasphere." C. Pendlebury also holds the Club open glider record, having clocked a time of 260 seconds o.o.s. while testing prior to a competition.

Part of the exhibition staged at Reading for the town's Wings for Victory week effort. Some display of solids, what?





A new club, the BARROW JUNIOR M.A.C., has been formed to take the place of the former Furness M.A.S., now defunct during wartime. Flying and Solids sections have been formed, and membership is limited to persons between 13 and 20 years of age. Secretary is A. Porter of 57, Roose Road, Barrow-in-Furness.

A club has been formed in ELLESMERE PORT, and although only a few weeks old has already over twenty members. Great interest in gliders is evident, and the club record is held by the secretary, F. R. Tipping, with a time of 1 : 10. In the duration class, N. Titley holds the "under 150 square inches" class with 1 : 15, while B. Jones holds the larger class with 1 : 08. This club is short of a stop-watch, and would be pleased to hear from anyone who has one for disposal. Please write to the secretary at 1, Oldhall Drive, Whitby, Ellesmere Port.

In the past month many of the PENN M.A.C. records (and models) have been set up or broken. Below is a list of the club's records to date :—

Duration	H.L.	5 : 2 secs. o.o.s.	Mr. I. E. Hough
,,	R.O.G.	1 : 2 ,,	Mr. S. Ward
Gliders	Towline	: 47 ,,	Mr. D. Newman
R.T.P.	H.L.	: 52 ,,	Mr. S. Ward
Class A	R.O.G.	: 30 ,,	Mr. P. A. Fisher
Free Indoor Flying	H.L.	: 31 ,,	Mr. G. Griffin

The model that holds the club H.L. record was designed by Mr. Hough and was actually kept in sight for 23 mins. by the chaps who chased it. When last seen it was at about 2,500 ft., and nothing has been heard of the model, although the local newspaper published a small article on the model's flight. Mr. Ward also lost a model after being unofficially timed for 20 minutes.

It was a very footsore MERSEYSIDE M.A.S. team that arrived at Clwyd Hills on June 6th, to attempt to raise the British H.L. record for gliders. Boxes were opened revealing machines of all shapes and sizes, the greatest attraction being I. S. Cameron's "Tarpon," the glider of exceptionally clean design and streamlining, mentioned in THE AERO MODELLER in March.

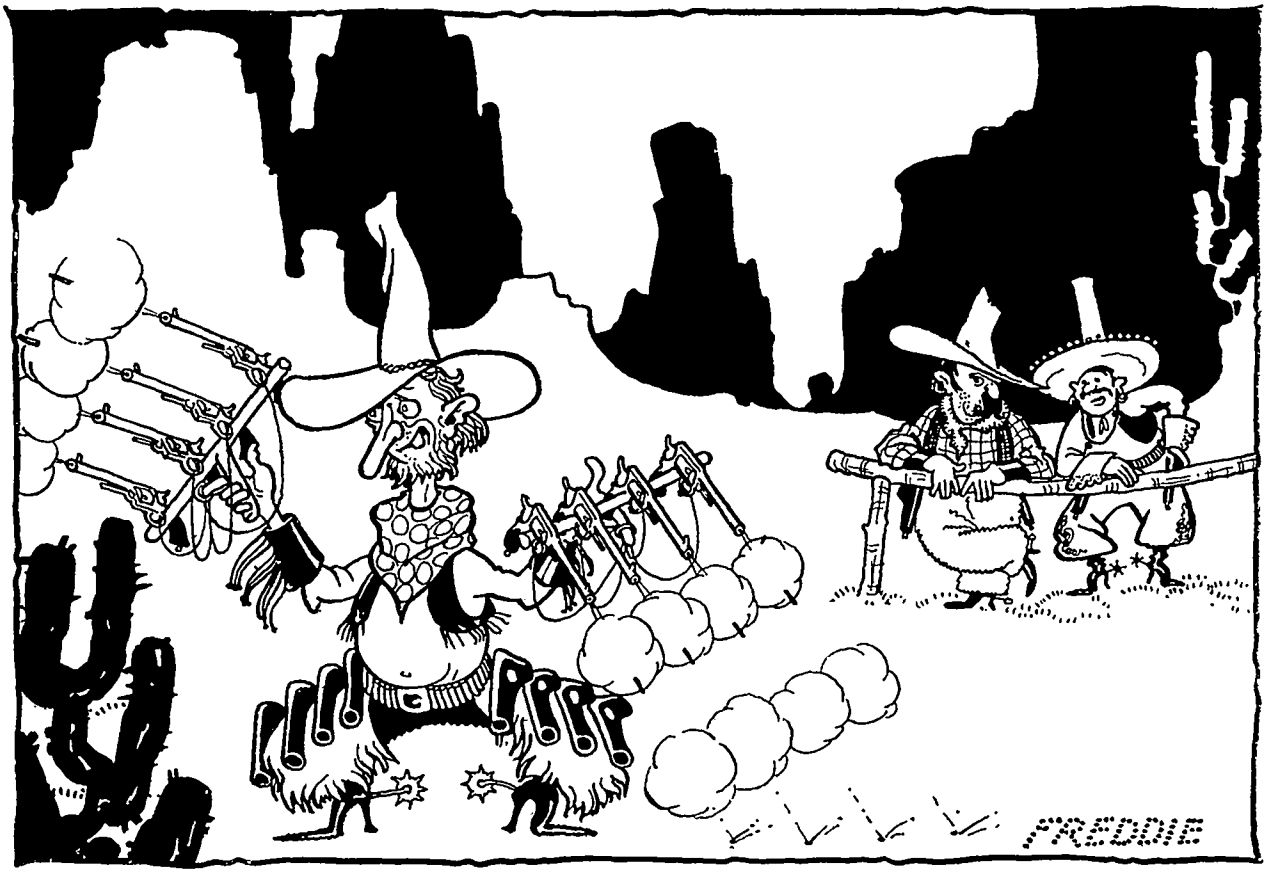
Trimming flights were made and then members settled down to some serious flying.

Forty-five minutes after his arrival, Mr. R. F. L. Gosling well and truly surpassed the standing record with a flight of 5 : 35·8 made by his well-known "Ivory Gull II."

The following are the times for the afternoon's flying :—

Cameron	"Tarpon," 1 : 25·9, 1 : 58·8, 2 : 25·0
Gosling	"Ivory Gull," 5 : 35·8
	"Poody," 1 : 17·5
	"Heron," 35·0
Davies	"Tawny," 40·1
Lloyd	"Beauglider," 42·0, 57·0, 2 : 0·5
Davison	"Aeolus," 1 : 5·9, 2 : 55·0, 1 : 14·2, 1 : 5·0
	"Scale," 1 : 16·4, 1 : 14·0
Watson	"Elite II.," 29·1, 33·0
Routledge	"Buzzard," 18·0
Dean	"Ivory Gull," 22·0, 35·0, 1 : 33·8
Young	"Buzzard," 44·0, 24·0, 1 : 42·0

Never did the club think such a thrill lay in hillside soaring. With this thought, and the fact that the



"SINCE THE BATTLE OF BRITAIN HE'S BEEN AN EIGHT GUN FIGHTER."

record lay with a member of the club, they returned home.

The OXFORD M.A.C. staged an exhibition of flying on Port Meadow in aid of the local Wings for Victory Week. This went quite well, but the flying was hampered by a huge crowd who disregarded all notices and fought for the honour of retrieving models, much to the grief of the owners! Weather was fair, but no thermals were in evidence, and no spectacular flights were put up. A. A. Courtney did his stuff as usual and won the duration event, his youngster carrying off the gliding competition.

No. 99 (Folkestone) Squadron A.T.C. Model Club started well by putting on a show in conjunction with the Home Guard in the local Wings for Victory Week, when about 120 models were on show, 50 of them being made by two members.

This club is mainly a "Solids" club but a few are "flying" members, the club record being 1 min. 30 secs., put up by D. Rochefort's "Ajax."

The WORCESTER M.A.C. opened the 1943 season (its first) with a Rally at Malvern in connection with Wings for Victory Week there. Flying conditions were very bad but a good show was put up despite difficulties and proved very popular.

On May 28th, the club held an Open Rally at Worcester, in support of Worcester Wings for Victory Week. A crowd of over 800 spectators gathered to witness the show, the proceeds of which were donated to charity. The winners of the principal event were S. J. Pollard, W.M.A.C., aggregate time of two flights 184 secs., runner up F/O R. L. Biggs, W.M.A.C., aggregate time 144 secs.

The club's next Rally will be held on Sunday, August 1st, at Worcester. There are six flying events and three cups to be awarded. The main event will be an Open Duration Competition for the Worcester Corporation Challenge Cup, the present holder being Mr. Tyler of the Birmingham M.A.C.

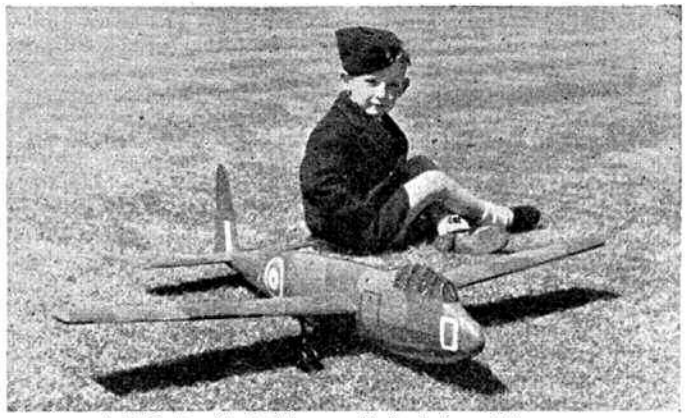
F. Lewis of the BIRMINGHAM M.A.C. set up an aggregate of 858·2 secs. with his model to win the club Junior Cup, followed by R. Cocane with 655·5 secs., and N. Lancashire, 553·1 secs. This event was run in two heats of three flights each to ensure consistency of performance (something I should like to see more of). In one nomination event, N. Lancashire's model fuselage made a flight of 35 secs., the wing setting up a time of 155 secs. Poor old timekeepers—what do they time in an event of this kind?.

The newly formed KING'S HEATH & D.M.A.C. held an indoor r.t.p. competition for models with a span of 20 in., of original design, all substitute woods, and maximum wing area of 80 square ins. Two h.l. and one r.o.g. flights had to be made, the winner being I. Henderson with 1 : 19. The club duration record is 55 secs., the towline launch glider figure being held by twelve-year-old D. R. Oliver with 2 : 07.

The GLASGOW M.A.C. has secured a very fine flying ground at Kirkhill, and hope to stage the C.M.D. contest there on August 7th, at 3 p.m. The winter season finished up with a win for R. Burns by one point over G. Leask, who, however, raised the club r.t.p. record to 1:53.

During the Tutbury R.D.C. Wings for Victory Week a competition was arranged by the authorities, there being six main sections. Five members of the STRETTON M.A.C. entered with twelve models and carried off seven prizes against competition from 66 others. Best flight of the day was by F. N. Dowson, whose model flew 1 : 24 o.o.s.

R. Gallagher of the BRADFORD M.A.C. seems to be putting it across the rest of the lads lately, his latest success being in the Silvio & Scarth Cup events. His aggregate of 269 secs. included the best flight of the day of 2 : 30. G. Adcock came second a long way behind with an aggregate of 183, and F. M. Gallagher third with 173.



A. R. Parker (junior) poses with Senior's model of the "Hotspur," built from A.M. plans.

M.E. No. 2 Cup Day seems to have been the cue for flyaways, and Ron Double of the STRATFORD-ON-AVON M.A.C. sent his "Korda" o.o.s. on its first competition flight after 3 : 04, breaking the club record at the same time. The model recovered in good order, and followed up with another flyaway on its second flip with 5 : 23. Unfortunately, the model was not found in time for its third flight, thus robbing the owner of a win in the National event, his two flights gaining him second place. Hard cheese! I hear, of a "Stothers Glider" being built here entirely of substitute woods, in which the fuselage alone weighs 11 ounces! The complete model is not expected to weigh more than about 2 lbs!

Two more new clubs to report are the NEWBURY M.A.C., Secretary D. H. Carter, 20, Croft Lane, Speen, Newbury; and the DENSTONE M.A.C., guiding light here being P. C. Rider of Heywood House, Denstone College, Uttoxeter.

W. Moon of 1, Gloucester Road, Staple Hill, near Bristol, is anxious to start a club in that district, and wishes anyone interested to contact him at once.

And, for a change, a letter from overseas asks for a pen pal of between 13–15 years of age for C. Israelstam, 63, Harley Street, Berea, Johannesburg, Transvaal, South Africa. Now then, you foreign stamp collectors, here's your chance!

H. D. Mason of 5, Rose Hill Street, Heywood, Lancs., wishes to swap 1½ lbs. of rubber strip (and cash) for a 2–3 c.c. engine complete; W. Boddy, 129, Fleet Road, Cove, Hants, wants to purchase a model race car—

PILCHER CUP (Gliders)
27th June, 1943

			Aggregate 3 flights
1.	J. Marshall	Hayes	988.2
2.	J. P. Buckeridge	Pharos	849.8
3.	W. Weight	Harrow	829.2
4.	F. F. Houchin	Pharos	627.1
5.	A. Impey	Luton	626.4
6.	R. F. L. Gosling	Merseyside	605.4
7.	J. Townsend	Ilkley	463
8.	C. Daniels	Hayes	456.5
9.	C. H. Watson	Merseyside	416
10.	A. Wilson	Hayes	382.9
11.	M. Farthing	Croydon	360.7
12.	I. S. Cameron	Merseyside	355

Best time of day: W. Weight 13 min. 49.2 secs.
(161 entries from 30 clubs.)

complete or less engine; A. E. Landon, 4, Goodwin Road, Shepherd's Bush, W.12, wants to exchange a full year's issue of the "Aeroplane" for 1941 for a flying scale model or monocoque Wakefield model; and finally L. Pattison of 22, Powell Street, West Hartlepool, has the following complete models for sale: "Northern Star" (22s. 6d.), 30 in. Duration (17s. 6d.), Wakefield (25s.), Copland's Wakefield (17s. 6d.). The latter model is not quite completed, and all models are in special plywood boxes.

And so to bed. How many times have I said that since the time I started these columns? Shows how I burn the midnight oil (candle in my case) in your interests. However, it's a bad day that has no shut-eye, so off we go for another month. Cheerio!

The CLUBMAN.

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24	"	¼" to 2"	"	16	" 5/– "

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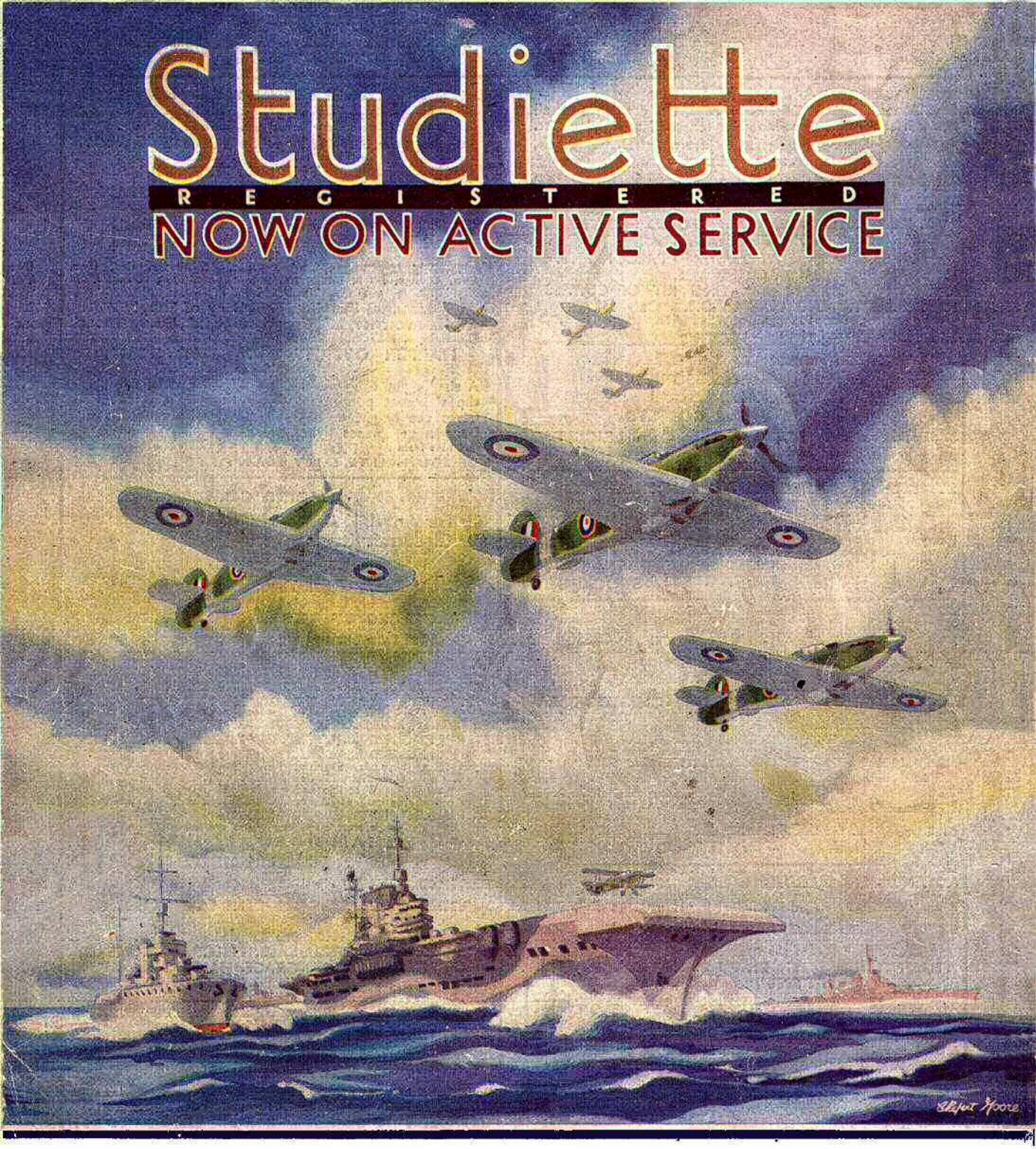

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