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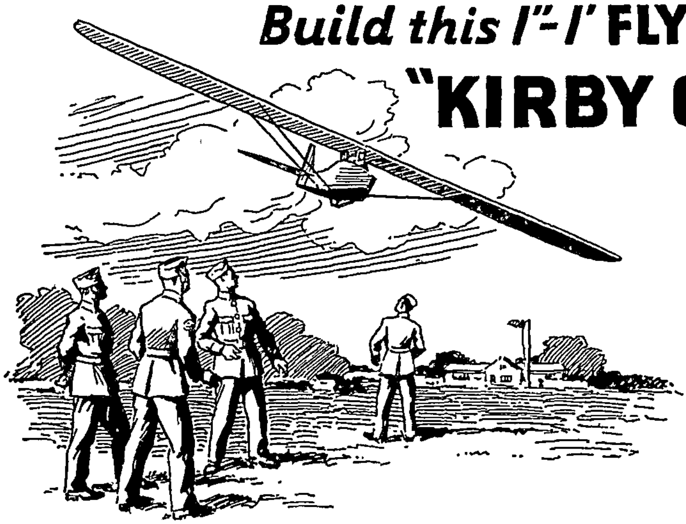

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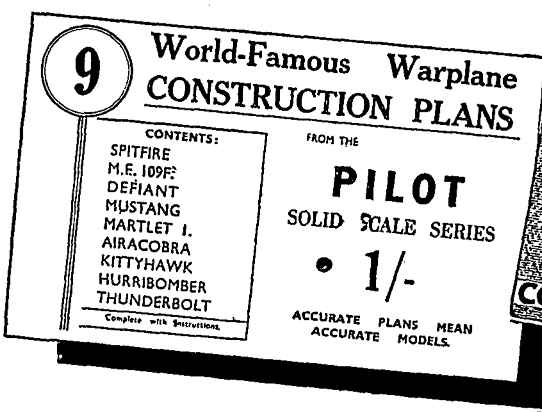

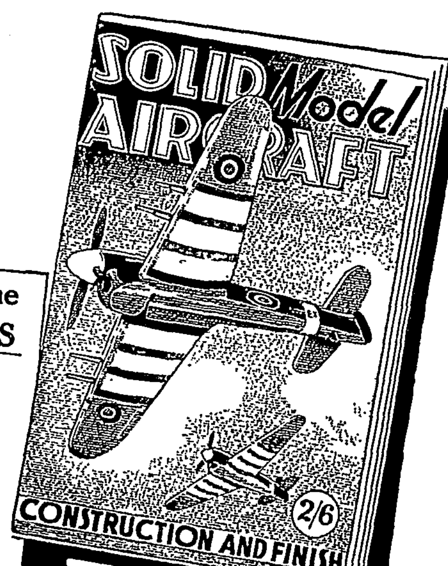

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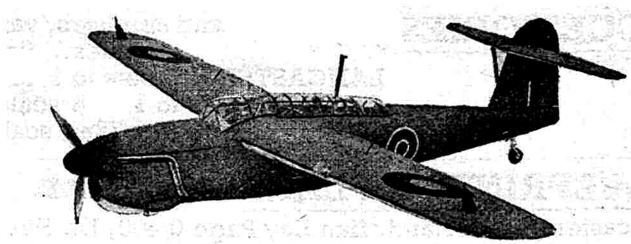

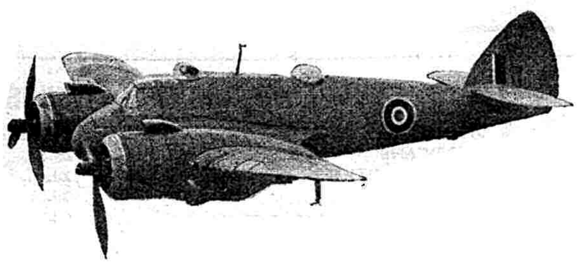

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Achievements in War—Ambitions in Peace

Flying begins with the Model.

Aviation is going to change the entire social and economic life of this country, and, indeed, the whole world after the War. There will be more air travel for business, for pleasure and for the transport of freight. In fact, flying will become the greatest and most progressive development in the future of civilisation.

Aeromodelling will be so closely bound up with aeronautical science and engineering as to become inseparable and inter-dependent. Flying, whether in War or Peace, starts with the experimental model. It has been so ever since the days of the early pioneers, and will continue to be so for all time. The modellers of to-day are the designers, constructors and aviators of to-morrow.

We feel, therefore, that the time is opportune to discuss past performance, future aspirations, and the part that the making and marketing of supplies of all kinds will play in aiding universal progress and development in the pre-education of Youth, and in influencing national air-consciousness throughout the country in the years that lie ahead.

Accordingly we publish this article on the M.A.T.A. in the interests of the Model Aircraft movement, together with a complete list of members in the centre pages of this issue.

A Piece of the Past.

Way back in 1938 when there were rumours of war, when the policy of appeasement almost erased the word "aviation" from our vocabulary, and sane men were striving to maintain mental balance and normality, a number of makers of model aircraft met under the leadership of Mr. F. R. Barnard, who is still the revered chairman, and formed themselves into what was perhaps then the smallest, albeit the most ambitious, organisation in the country—The Model Aircraft Trade Association. The growing force of aeromodellers was in need of some guidance and some guarantee that there would be an adequate supply of materials and accessories. The retail trade also required some definite assurance that the status of the whole industry would be maintained, and that quality would not be sacrificed or prices marked down below an economic minimum. Few Associations have striven more conscientiously to fulfil beyond the letter the objects for which it was founded.

Pride in Performance.

Those early pioneers can be congratulated on the move they then made, on the manner in which their path was not diverted by the outbreak of the inevitable War, and the fact that they were not influenced by the inane idea to curtail and restrict all things regarded as non-contributory to the war effort. With a foresight, commendable and consistent, those founder-members continued along their plotted course. If it was not then evident in the minds of those who rallied round the founders, it has been obvious to everyone since, that they were embarking on something of high national importance, something well designed and secure that would lead the way throughout the War and plan to continue into the Peace . . .

Only those who have been actively engaged in the ceaseless development of model aircraft supplies and in the continuous improvement in technique can appreciate the vital part members of the Association have played in this War. M.A.T.A. has made it possible for hundreds of thousands, instead of the few, to take up this all-absorbing and nationally important hobby and science of aeromodelling.

Enthusiasts are mostly unaware that when supplies of those rare commodities, balsa and rubber strip, do become available, then it is the M.A.T.A. who distributes them throughout the country in the most equitable manner possible.

Year by year the demand for their products has increased. Trading figures show that the turnover during the year ended May, 1943, was some three and a half times that for the same period of 1940. These are grand figures, but still further progress has been made since then, showing that the number of persons interested—and consistently interested in model aeronautics—is multiplying hundreds by thousands. The process is proceeding. The national urge towards airmindedness and pre-education in aviation is becoming insatiable, insistent and inestimable.

Breaking the Bonds.

But the war contribution does not end there. Members of the Model Aircraft Trade Association have produced other products besides aeromodelling materials. Much of their work has been of high Government priority, and cannot be detailed for security reasons until the end of hostilities. They have also given their machinery, their labour and their time to the vital matters of World War production.

The M.A.T.A. has also fought a "war"—a war against the balsa "black marketeer," against the producer of inferior kits, and against the many cases of trade misuse of balsa. These are but a few of the many problems that have beset the M.A.T.A. Problems which the Organisation is constantly solving for the benefit of all aeromodellers.

Under the chairmanship of Mr. D. A. Russell, M.I.Mech.E., the manufacturers' section has progressively increased in membership and importance, and, through its sub-committees, dealt successfully with numerous problems affecting the general interest of the industry, bringing it into conference with a number of Government departments. Valuable concessions have been won for the benefit of the manufacturers, the retailers and the movement generally.

A Vision with a Purpose.

Needless to say, planning for Peace has been carried out with the same foresight that has characterised all the Association's actions, and in the firm belief that not only this country, but the whole world, is rapidly approaching the " Air Age " when everyone will take to aviation just as they took to trains, cycles and motor transport. It is a logical " next step " in human progress. Children will be taught the rules of the sky as they have been made to understand the rules of the road. It will become an accumulative activity from the kindergarten to the senior high school, gathering momentum as time strides forward. Careers will be shaped through the medium of aeromodelling, and will increase in force and purpose when those now in the Services return to civilian pursuits.

Model aeronautical engineering will then assume its rightful place as one of the world's greatest, most healthful and educationally valuable hobbies and sports.

The vision is there, and when the present restrictions are removed and materials flow forward in greater volume, members of the Model Aircraft Trade Association will be in a position to meet and to satisfy all demands from the trade and the public both at home and overseas. All the skill and ingenuity that the best of British brains can command, will still go into the making of kits, accessories, plans, blue-prints, " the gears and the gadgets," for the aeromodeller.

Looking to the future, especially to post-war days, we see many other problems and issues that will affect all those connected with aeromodelling, both enthusiast and trader alike, and it is *essential* that the future is approached with a complete understanding and co-operation between both sections of the movement.

Non-Flying Scale Modelling

AN enthusiastic modeller now serving with the C.M.F. writes deploring the present trend of non-flying scale modelling. As we ourselves feel a good deal more could be done to improve this aspect of the hobby, we quote below extracts from this reader's letter.

" I take a very good view of the series of articles on scale aero engines. It is the first step in the direction of well detailed scale models and away from those horrid little solid models designed primarily for recognition purposes. Since the shortage of rubber and balsa many modellers have fallen into the 1/72nd rut. I think the sooner we get away from these small solid scale models which usually contain 50 per cent. ready-made accessories (engines, cowls, airscrews, wheels, undercarts, cockpit covers and transfers) the sooner will the real art of modelling come into its own.

"If I had the time I would delve into the details of construction, etc., of the larger scaled, fully-detailed models. Basically, I think that small gauge brass tubing would do well for all tubular fuselage construction, while the wings could be made from hardwood and m/m three-ply. A scale engine with removable cowl is essential. All other details should follow full-sized practice as closely as possible.

"I know the old cry will arise—why waste so much time on constructional details and then hide everything with the final covering ? There are several ways of getting round this difficulty and I think the models in the South Kensington Science Museum show a few methods of revealing internal construction."

When we first decided to publish this series of engine models, we had a shrewd idea as to the degree of popularity they would attain. We felt that the time had come for new life to be infused into the realm of non-flying scale modelling.

We have before us as we write, the 1/20th scale Typhoon, winner of the S.M.A.E. Solids Contest, built by Mr. G. R. Woollett. Apart from first-class construction and finish, the model makes an instant appeal on account of the immense amount of detail work. One feels that here indeed is a MODEL aircraft, not a mere representation of doubtful aerodynamic value.

We are of the opinion that no such work can be successfully attempted in 1/72nd scale, except in the case of the larger models. For aircraft recognition purposes 1/72nd models are undoubtedly ideal. Here, small size is an advantage as a comparatively large number of models may be placed in one spot ; absence of detail may be tolerated as spotters need not bother with such points as cockpit layout, undercarriage retraction systems, correct airscrew blade shape and " handing " engine details, etc. A further point in favour of 1/72nd size is that, owing to the kits containing, as our correspondent says " 50 per cent. ready-made accessories," models may be turned out quickly, an asset often required for recognition training.

Looking at the matter, however, from the point of view of a model being a faithful reproduction of the real thing, we suggest that non-flying scale modellers should give full consideration to building to a larger scale, say 1/48, 1/36 or even 1/24. Admittedly, more time will be required to turn out a model ; more thought and care will have to go into design and construction. But the keen modeller will not be put out by such considerations. His skill and pride of craftsmanship will take first place over ease and quantity of production. The results of such care, patience and enterprise will, without question, further the cause of the aeromodelling movement. We await, with interest, to see what response there is to the " Solid " Competitions announced by the A.B.A., who evidently shares the same views as our reader on this matter.

CONTENTS OF THIS ISSUE

EYES OVER EUROPE

BY FRANCIS J. KNIGHT

M.A.P Photo.

THE secrets of Hitler's Europe are being uncovered every day by our latest Intelligence weapon—the reconnaissance aircraft. Until now, very little news has been available about these aircraft, the men who fly them and the work they do.

Flying at great heights and at speeds of more than 400 miles an hour, these Allied newsgetters deliver the goods in record time. The Photographic Reconnaissance Units to which they belong do a vast amount of vital work for the Allied armies and navies, of which the task of thoroughly photographing air raid damage is only a small part.

Apart from reconnaissances over thousands of square miles of sea by R.A.F. Coastal Command, aircraft of the P.R.U. fly regularly along the whole European coastline from Norway to Italy and deep into Hitler's Europe. Much of the strategic planning for the Allied invasion of Europe has been based on information obtained in these flights. The continued success of the campaign in Europe depends largely on early and accurate news of enemy moves, which can only be obtained by aerial observation.

From the regular strategic flights by reconnaissance pilots a valuable picture of enemy-occupied country is built up. The flights are made deep into enemy territory and give information concerning the movement of troops, the condition of railways, roads and canals, building and construction work going on and various other matters of immediate interest to the Allied Commanders.

Securing good aerial pictures from great heights is an exact science, and the reconnaissance crews are intensively trained in the technique. The navigators must all be first-class and the pilots need more than ordinary skill in airmanship. The aircraft must fly on an absolutely even keel and must be exactly over the target when the films are exposed. The slightest deviation from the level will so distort the scene below that a false and useless picture results.

It is essential that the lenses are set at the correct focal length and, for this, there are several features to be taken into account. For P.R.U. aircraft on a specific mission this is done at base, but many flights are made, particularly over the sea, where the object is to photograph anything of particular interest. Crews of these machines must be able to adjust their apparatus instantly in order to get the best results. Hand-held cameras are used for this work.

Reconnaissance flights are every bit as dangerous as bombing raids. The aircraft fly singly and rely mainly on their speed and the skilful use of cloud cover to get away from any attackers. They are picked up by Nazi radio-location stations as soon as they cross the coastline of Europe, and, when their mission is to photograph air raid damage, their destination is easy to guess, and enemy fighters can be thrown in their path.

Sometimes, they must circle over their target, waiting for a break in the clouds through which they can swoop to flatten out below and snatch their pictures. Neither bad weather nor enemy opposition can make them turn back so long as there is a possible chance of success.

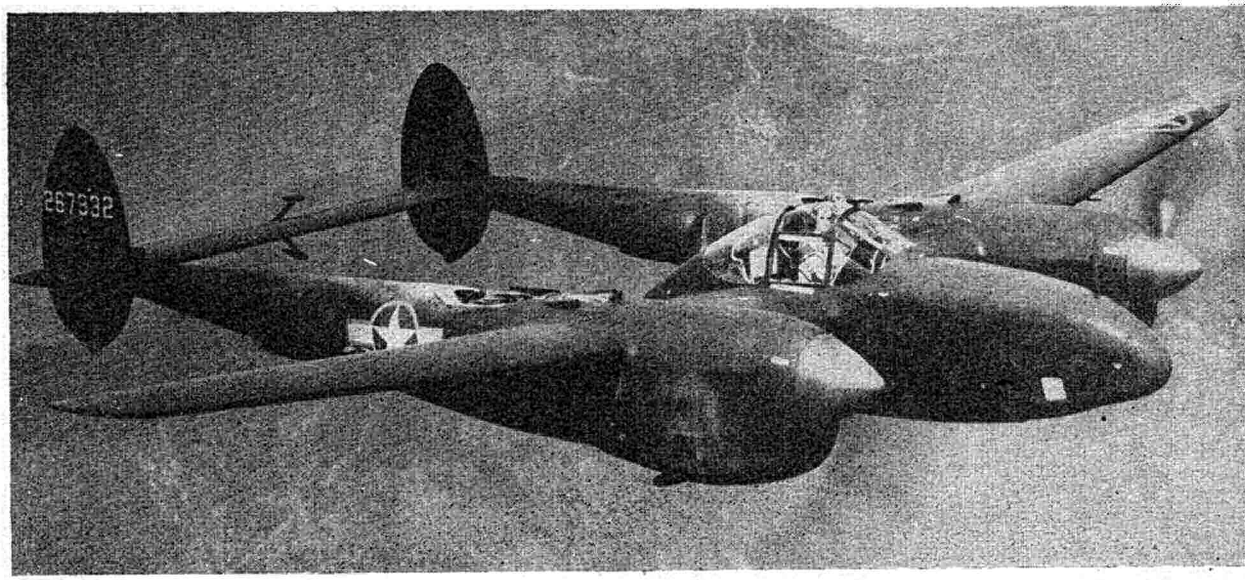
An idea of the work involved can be gathered from the fact that the films brought back by a single reconnaissance aircraft will often run to 1,500 prints.

The safe return of the aircraft with the exposed films is only the end of the first round in the battle for news. The prints must be closely studied and the secrets which they contain laid bare.

The film is rushed through the developing process, the prints made and despatched at top speed to the Intelligence Officers who do the interpretation work.

These men have one of the most responsible jobs in the Air Services. Failure to interpret aright the significance of some tiny marking on the prints they examine may mean the loss of an opportunity of inflicting heavy damage on the enemy. If it is a print for the Army, the oversight might easily mislead the Army Commanders and result in heavy losses. The matter is complicated by the extensive and clever use of camouflage by the enemy. The reconnaissance photographs are usually taken at great heights, which, curiously enough, weakens the effect of camouflage, which can sometimes be seen quite clearly on the finished print.

The first task of the interpreters is to find the actual location of the photograph. This is not always a simple matter if the country is without any distinguishing features or if a heavily-bombed section of a large town is depicted. The unloading of two or three thousand



tons on a district overnight is apt to make the recognition of even familiar scenes difficult.

The men of the Photographic Reconnaissance Unit have their own methods of dealing with these awkward situations and routine difficulties of this sort do not worry them. Neither are they put out by the normally unfamiliar nature of the viewpoint.

Most of the photographs are taken from a position immediately above the object and so have an odd appearance. Hills and valleys look alike, buildings appear as roofs only, trees as little round blobs and motor lorries on the roads look like small beetles. The dimension of height is missing.

Fortunately, the P.R.U. interpreters are provided with a device which enables them to see things as they really are. Two consecutive aerial photographs viewed through a stereoscope throw up the dimension of height with startling clearness.

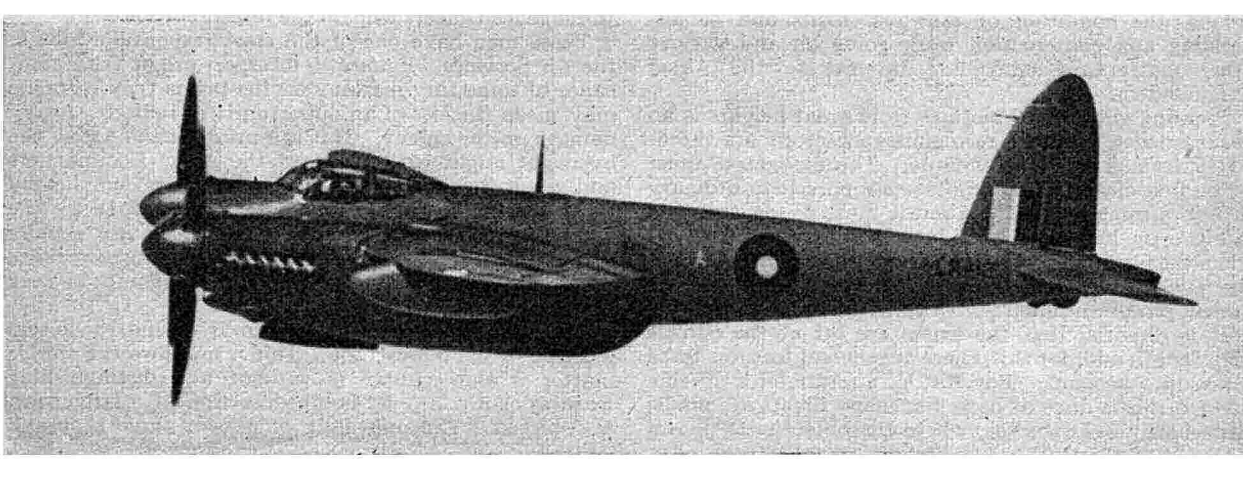
Although these vertical photographs which show the ground in plan are the general rule for reconnaissance work, oblique photographs of specific objects, especially in a battle area, are invaluable. Such photographs show the ground in relief and differences in height can be seen clearly. When an objective is to be attacked it is obviously a great advantage to have such photographs on hand. The positions of hedges and other natural cover can be seen. The attackers can familiarize themselves with the details and make their plans accordingly.

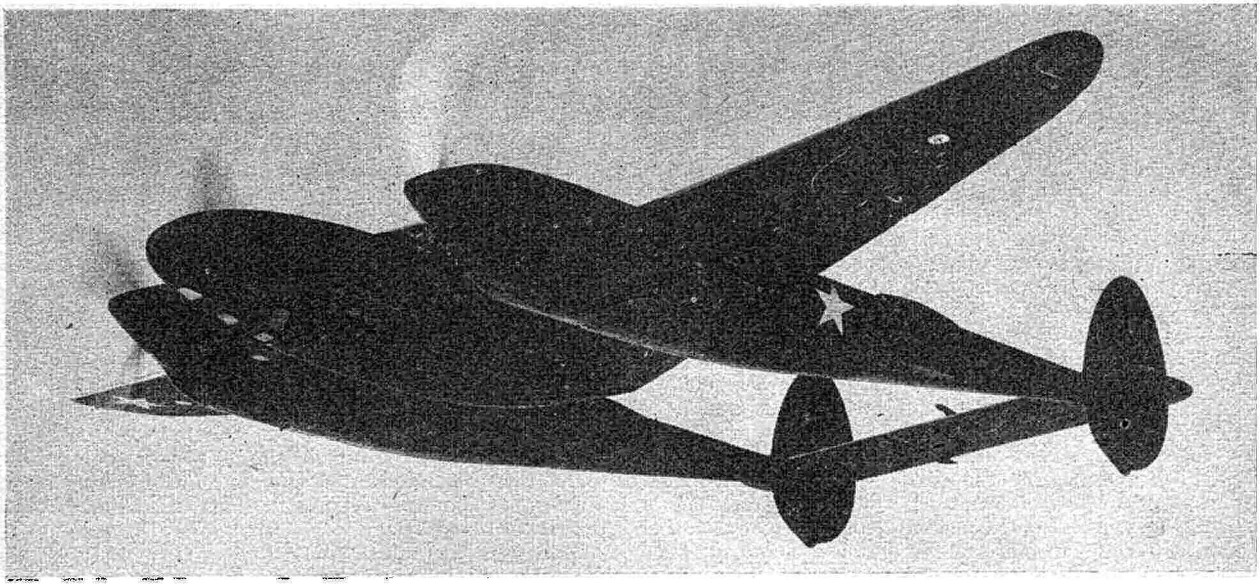
The P.R.U. interpreters must be able to detect the slightest thing out of the ordinary in any of the prints. Such signs as tiny rings on the ground may indicate the erection of telegraph poles, which probably means that troops have been drafted into the locality. Very faint tracks across fields may have been made by troops walking to and from gun sites. A few small dots may really be dispersed aircraft from a new aerodrome.

Reconnaissance of a target area is always done in a series of overlapping photographs. The surplus parts are cut out and the prints fitted together into what is called a mosaic. It is really an aerial map of a complete section of country or a specified area.

This branch of photographic work is likely to be of immense value to the Allies in the Pacific campaign against Japan. The mobile dark rooms, equipped with self-contained lighting and refrigerating plant to ensure

At the top of this page and the next are pictures of the F-5a Lightning, used extensively for P.R. work. (Photos: Lockheed Aircraft.) Below is the P.R. Mosquito, the Mark number of which may not be released. Note the long-range fuel tanks. (Photo: Air Ministry.)





efficiency in all climates gives the Army Commanders first-class information about the difficult country in which they are fighting.

Many times, the first indication of "something doing" has come from the vigilant P.R.U. men. An outstanding example is that of the R.A.F. Coastal Command pilot, reconnoitring the coastline of Norway who surprised two enemy warships in Dobric Fjord. Like all reconnaissance men, he had been trained in ship recognition and he had his suspicions of the larger vessel. Diving low, he got his pictures and made for his base to report. One searching scrutiny of the wet print was enough for the Intelligence Officer to confirm the pilot's suspicions. "That's a battleship, all right. It's the *Bismarck* !"

The British Admiralty were told at once and preparations made for an immediate attack by torpedo-carrying aircraft. The weather was foul and the hunt for the would-be commerce raider lasted for eight days, but that first reconnaissance print by an alert pilot spelled the doom of the Nazi battleship as surely as did the torpedoes which eventually sent her to the bottom.

This example also shows clearly the vital need for speed in dealing with reconnaissance work. If the enemy knows he has been seen, and he usually does, he will do his best to get out of an area which has become dangerous. If he succeeds before an Allied attack can be made, an opportunity has been lost.

Reconnaissance over the sea, particularly in winter, is a thankless task. The crew may fly for hours in foul weather and in conditions of extreme discomfort without spotting a single worthwhile object. Yet they must never relax. In the waste of dull grey waters there might suddenly appear a U-boat periscope or a raft with survivors from some torpedoed vessel. Reconnaissance aircraft have been the means of rescuing some hundreds of merchant seamen from the water, while their timely warning of U-boats sent crackling back to base over the radio-telephone have saved many others from a similar fate.

In modern war, the camera is a vital weapon and it is one which the Allies are exploiting to the full. It is good to know that German reconnaissance work is definitely not as good as our own, while that of the Japanese is markedly inferior.

The Spitfire XI (below) is the latest released type to be used for Photographic Reconnaissance. The deeper motor cowling is the most obvious distinguishing point. P.R. aircraft are coloured blue all over, the exact shade varying according to the height at which the type normally operates.

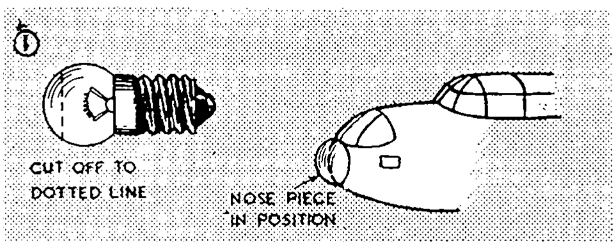
M.A.P. Photo.

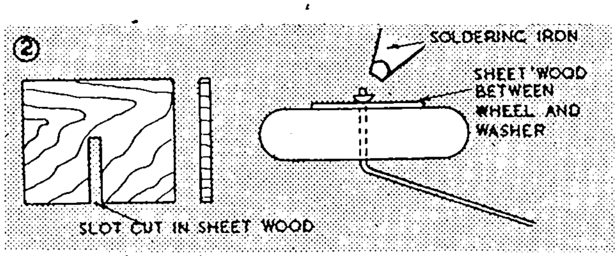
GADGET REVIEW

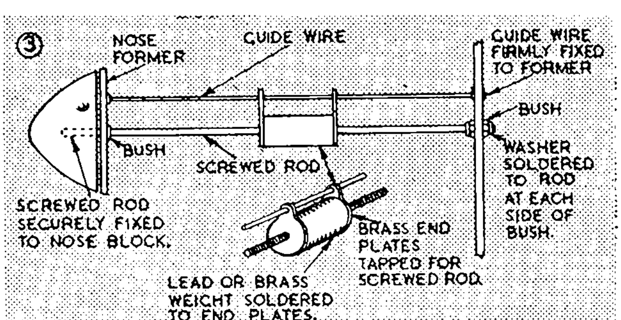
By "Bonsus"

THIS is the third Gadget Review in the new series and I want to start it off with a word of warning. Readers will remember my pointing out that the success of the Review depended entirely on themselves. A check-up before going to print with this issue shows that stocks are, so to speak, running low, and, as things stand at the moment, there are nowhere near enough ideas coming in to keep the feature going successfully. Readers who have had their MSS. and sketches returned to them may feel rather disgruntled when they read these lines. To them I offer my regrets and the assurance that every gadget or idea received is given very careful consideration. Unfortunately, however, quite a considerable number of modellers, especially the younger ones, send in devices which have been in general use or widely known for some considerable time. On the other hand I receive schemes as yet untried, many of which appear to have little hope of success.

I do not wish by any means to damp youthful enthusiasm, but I always have to bear in mind that Gadget Review has to appeal to the majority of modellers, both young and old, inexperienced and experienced, whatever aspect of the hobby they may be interested in. I do earnestly request, therefore, that before sending in their gadgets or ideas, modellers should satisfy themselves that the schemes have either not been widely used before or that they do actually operate satisfactorily.







J. BURN sends in yet another idea for making cockpit covers for solids. He uses sheet gelatine, which he says is obtainable in the Sunderland area. It costs about twopence for a sheet roughly 8 in. by 3 in. It is not always quite flat, but the 'umps and 'ollers are easily removed when moulding. Hot water will quickly dissolve gelatine so that only warm water should be used when moulding. The gelatine becomes soft in a few seconds and then is shaped in the usual way on a wooden mould. It is not necessary to coat the mould with candle grease, but if this little extra trouble is taken the mould may be more easily removed. When cutting the gelatine a surplus should be left for pinning under the mould so that it may be left in position for a couple of hours until it has hardened off. The surplus is then trimmed away.

Two tips for solids come from A. W. SMITH, of Leicester. The first was looked upon with some trepidation by AEROMODELLER staff, but I present it to readers for experiment. Our correspondent tells us that he makes nose pieces for models such as the Lancaster, Marauder, etc., by cutting off the top of a torch bulb and cementing it into position. The result should be good provided the top of the bulb can be removed without damage. Mr. Smith suggests this should be carried out as follows :—A small scratch is made on the surface of the glass and this is gently lengthened until it circles the bulb. The scratch is deepened until it becomes a shallow groove. Now a small hole is made in the groove into which the point of a penknife is inserted. If the knife is given a slight turn the bulb should fracture neatly along the groove. The scratching and groove making is done with a razor blade. See Fig. 1.

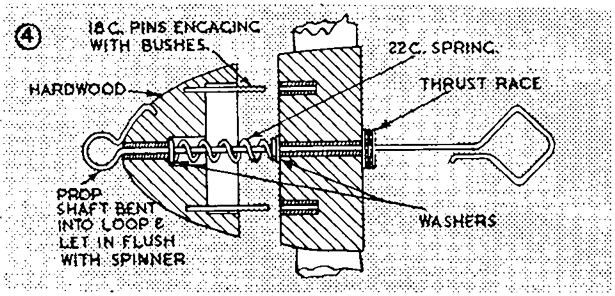
(Our tame Expert, to whom we gave the job of testing Mr. Smith's theory, now wanders about with a vacant look and his hands in plaster.—Ed.)

The second tip is better known, being intended to prevent damage to celluloid wheels when soldering retaining washers to the axles. Fig. 2 is self-explanatory. A thin piece of sheet wood has a slot cut in it and serves as a base for the washer to rest upon while the solder is applied.

Glider fans will be interested in the very neat method for C.G. corrections on gliders, sent in by J. S. McCHESNEY, of Dalrymple, Ayrshire. Fig. 3 shows the device clearly and a lengthy description will be unnecessary. Briefly, the device consists of a weight running on a guide rod and threaded on to a screwed rod. The screwed rod is, in this case, mounted to No. 7 fuselage former at the one end, and bolted to the noseblock at the other end. For weight adjustment the noseblock is turned (and with it the screwed rod), and the weight is made to move up or down the fuselage according to which way the block is turned.

A straightforward freewheeling clutch which has the advantage of fitting neatly into a spinner, has been devised by F. ONIONS, of Liverpool. This will be found in Diagram 4 and the method of construction should need no description.

There may be many modellers who are attracted by the peardrop fuselage shape, but are stumped when it comes to the point of calculating the cross-sectional area of the formers. G. W. AIREY, of Yorkshire, has

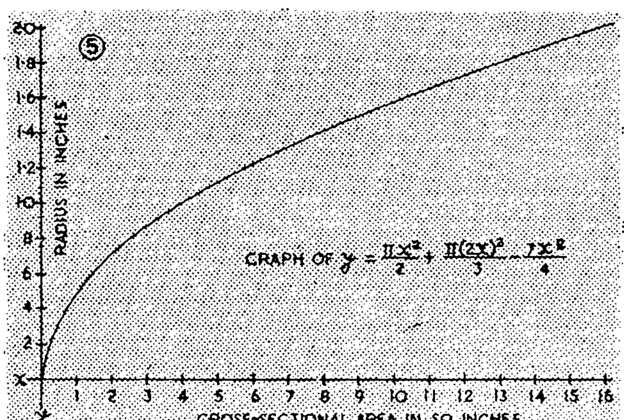


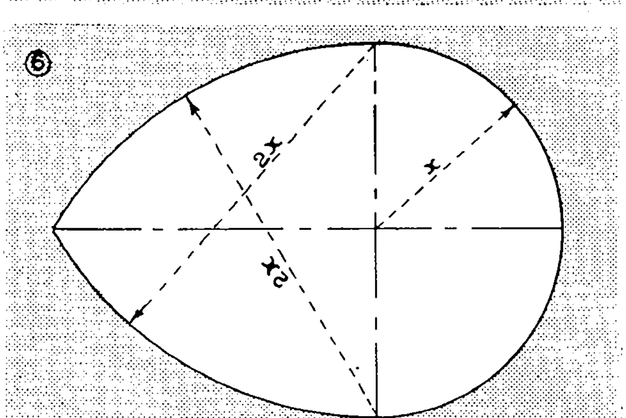
overcome this difficulty. He says: "The following method of obtaining the cross-sectional area is very accurate and gives much better results than any other method in use. The necessary formula is :—

$$y = \frac{\pi x^2}{2} + \frac{\pi (2x)^2}{3} - \frac{7x^2}{4}$$

When y=cross-sectional area
x=radius of former
$\pi = 3{\cdot}14$.

"Using this formula, the area of several formers of radius 5 in. to 2 in. are determined, and these areas are plotted on a graph against the radius. Fig. 5. The graph may then be used to find the area of any peardrop former within the limits of the graph, and, even more valuable, to find the correct radius to use to give a certain cross-sectional area. This method is only applicable to the true peardrop section illustrated in Fig. 6, which gives a ratio of height to breadth of 2·75 to 2, and to which the formula given applies.





BOOK REVIEW

(BY "D · B · M · W")

GLIDING AND SOARING

Major ALOIS SITEK and Flt./Lt. VERNON BLUNT

115 pages, size $8\frac{1}{2} \times 5\frac{1}{2}$ ins. Alliance Press Ltd. 6/–

Many present-day pilots flying modern operational aircraft day in and day out will undoubtedly take up gliding as a means of restful relaxation when their present task is over. To all who may, perhaps, be thinking along these lines I recommend this book

Full justice to the subject can hardly be done in a work of this size. One feels that the authors have had difficulty in getting everything in and the end comes surprisingly quickly. Nevertheless, a considerable amount of useful and interesting information has been given. As is probably well known, Germany, prior to the outbreak of war, was far ahead of the rest of the world in the development of gliding and soaring. Immediately after the last war the Germans, forbidden to fly powered aircraft by the Peace Treaty, took up gliding to a large extent. They saw in this way how a large number of pilots could be trained and the nation as a whole made air-minded.

Great Britain, as is usual, was well behind, but in the years immediately preceding the war, development was going ahead rapidly. The authors devote a chapter to the history of gliding throughout the world, and Great Britain is dealt with specially by Dr. A. E. Slater. Other chapters deal with the atmosphere, theory of flight, glider construction, a general description of gliders and sailplanes and learning the art of soaring.

In dealing with the theory of flight, the authors, rather unfortunately, use the expression "wind" when describing the action of the air movement in relation to an aircraft. It would, perhaps, have been better to have used the generally accepted term "airflow." The vision conjured up in the mind of the reader by the word "wind" is apt to be a little misleading. The chapter on weather is excellent, the reader being given a very clear picture of this important aspect of gliding. Also extremely interesting is the chapter on learning to glide. But here, again, one feels the authors need far more space.

The book is well illustrated with line sketches, and there are four interesting photographs.

THE MODEL AEROPLANE MANUAL

L. H. SPAREY and C. A. RIPPON.

236 pages, size 7×5 ins. Percival Marshall. 7/6

This is the third edition of this well-known work and, as the authors say, although it has not been fundamentally altered, certain portions have been rewritten. The book caters mainly for the beginner and "next stage" modeller, and, with this in mind, the authors have seen fit to exclude some of the more advanced matter contained in earlier editions. In a way this seems rather a pity, because the beginner, once having got started and made one or two successful models, soon thirsts for more knowledge and rapidly absorbs information of a more advanced nature. It is to be hoped that the authors may one day take upon themselves to either enlarge the present work or produce a similar volume catering for the more experienced builder.

To return, however, to the present, and "The Model Aeroplane Manual," I can truthfully say that it is a most comprehensive work. Every aspect of the hobby is covered from the fundamentals and theory of flight to the very latest design of high performance duration type of model. Each individual component of the model aeroplane is dealt with, very often by a chapter of its own. The beginner, working with the Manual in front of him, will, without doubt

(*continued on page* 499)

AN ALTERNATIVE SOURCE OF POWER

BY P. E. N. GWYNNE

NUMEROUS contributors and correspondents in the AEROMODELLER have stressed the handicap under which the whole movement is labouring due to the critical rubber situation.

The idea which the writer puts forward should not be interpreted as embodying a scheme which will be as efficient as rubber power, but one which might indicate an avenue of research which will eventually revive activities, particularly in the Wakefield class of model. A few simple calculations are appended giving a rough basis of comparison.

The theory may, perhaps, be made clearer by outlining the difference between two forms of energy. Firstly, there is potential energy which may be represented by a lake of water situated on a mountain side; the water, although perfectly still, possesses potential energy which can be converted to useful work if it is allowed to fall to a lower level and in so doing operates a water turbine or similar device. Secondly, there is kinetic energy, which can be represented by a small stream flowing fairly fast; a paddle wheel inserted in the stream will be carried round by the flow of water and so produce useful work.

A tightly wound skein of elastic represents potential energy, as does the fuel in the tank of a petrol motor, and cannot be converted to useful work, *i.e.*, producing thrust from an airscrew unless it is released. Now, work cannot be obtained from any mechanism unless some form of energy, potential or kinetic, is present. In the case of a rubber motor, energy is stored by winding it up, and will remain there as potential energy for an indefinite period. All models, even gliders (by virtue of their height) operate on what is initially potential energy; as far as the writer is aware, no steps have been taken to utilise kinetic energy as a source of power.

Briefly, the principal is to utilise a weight, equivalent to the weight of rubber in any given model, and set it in motion sufficiently fast so that some appreciable time will elapse before it slows down and, while it is in motion, use the kinetic energy to drive the airscrew.

To form a basis of comparison preliminary calculations have been made for a model with the following main data:—

Wing area, 200 sq. ins...	= 1·39 sq. ft.
Weight, 8 oz.	= ·5 lb.
Weight of rubber, 3 oz.	= ·1875 lb.
Max. turns, 1,000.	
Duration of motor run 1 minute—60 secs.	
L/D when climbing ..	.. 10 : 1
CL when climbing ..	.. ·6
Propeller diameter, 18 ins.	= 1·5 ft.

Now, 1 lb. of rubber can store approximately 1,000 ft./lb. of energy, so that 3 oz. stores

$$\frac{1{,}000 \times 3}{16} = 187{\cdot}5 \text{ ft./lb.}$$

This energy is dissipated in 1 minute, giving an average power output of $\frac{187{\cdot}5}{33{,}000} = {\cdot}0057$ h.p.

The flying speed at a lift coefficient (C_L) of ·6 =

$$\sqrt{\frac{{\cdot}5}{1{\cdot}39 \times {\cdot}00256 \times {\cdot}6}} = 15 \text{ m.p.h. or } 22 \text{ f.p.s.}$$

At an L/D of 10 the drag will be ·05 b, and the horsepower required is given by the formula $\frac{\text{M.P.H.} \times \text{DRAG.}}{375}$

Interpolating, we get $\frac{15 \times {\cdot}05}{375} = {\cdot}002$ h.p.,

This excess h.p. is obviously ·0057—·002, which equals ·0037 h.p., and this is available for climb, working on the standard formula $\frac{\text{EXCESS h.p.} \times 33{,}000.}{\text{WT. of MACHINE}}$ Substituting the derived figures we have $\frac{{\cdot}0037 \times 33{,}000}{{\cdot}5} =$ 244 ft. per minute rate of climb. This appears reasonable as a check on the design of the model.

At a flying speed of 22 f.p.s. the average thrust available can be calculated from THRUST (lb) $= \frac{550 \times \text{h.p.}}{\text{f.p.s.}}$ and in this case amounts to ·1425 lb. (It should be mentioned that although this thrust figure greatly exceeds the drag the excess is utilised for climb.)

Airscrews, like aerofoils, have lift and drag which are referred to as thrust and torque, the torque being, for good airscrews, about 10 per cent. of the thrust, so for the above airscrew the torque will be ·01425 lb.

Supposing the 3 oz. of rubber are removed and replaced by two 1½-oz. weights situated on the tip of each airscrew blade to give a flywheel effect, the mean diameter between the weights will be about 17 ins. or 1·42 ft., and the distance through which the weights travel per revolution will be $\pi \times 1{\cdot}42$, or 4·45 ft.

The formula for acceleration and deceleration is derived from Newton's Second Law of Motion, and is represented by:—

$$P \times t = \frac{M \times (V - U)}{9}$$

Where P = accelerating or decelerating force in lb.
t = elapsed time in seconds.
M = weight of moving body in lb.
V = final speed of body in f.p.s.
U = initial speed of body in f.p.s.
g = gravity = 32 f.p.s.p.s.

As the retarding force on the airscrew is that due to its aerodynamic drag, *i.e.*, torque, the initial speed of the weights (U) can be calculated:—

$$- {\cdot}01425 \times 60 = \frac{{\cdot}1875\ (0 - U)}{32}$$

$\therefore$ U = 145 f.p.s.

(Note that a minus sign is used for P as it is a retarding and not an accelerating force.)

As the weights travel through 4·45 ft. per revolution the initial revs. required will be $\frac{145}{4{\cdot}45} = 32{\cdot}7$ revs. per sec. or 1,960 r.p.m.

Thus, if the airscrew is spun round to a speed of approximately 2,000 r.p.m. it represents, in kinetic energy, a source of power equivalent to the same weight of rubber. As it is relatively easy to turn by hand at speeds up to 200 r.p.m., a gear ratio of 10 : 1 on the winding device should be adequate.

The disadvantages of such a scheme fall into the following groups :—

(*a*) Loss of initial momentum. When the airscrew is turning while the machine is stationary there will be a great drop of efficiency which can only be overcome by minimising the elapsed time between releasing the winder and launching or over-revving to begin with. It must be noted that too great a degree of over-revving will not be beneficial unless the pitch of the airscrew is diminished.

(*b*) Centrifugal loads. These will be high and care must be taken to adequately secure the weights to each blade. On the airscrew taken as a reference the tension on each blade due to centrifugal force, at 2,000 r.p.m., amounts to 45·4 lb., enough to cause damage or injury if it flew loose. It is suggested that a piece of piano wire, suitably anchored in each weight is imbedded in the airscrew or led along the leading edges, where it would protect the blade to some extent.

The weights, of course, would form the tip of the airscrew, *i.e.*, be of the same shape, section and blade angle as an equivalent wooden airscrew tip.

(*c*) Gyroscopic couples. These, too, would amount to some magnitude, about ·87 ft. lb. on the airscrew previously described, and, if the model is trimmed to fly in small circles, would produce a violent climb or dive according to the direction of turning in relation to the rotation (clockwise or counter-clockwise) of the airscrew. Even when the model was flying straight, gusts tending to turn the machine off its course would have the same effect.

It is barely possible, in favourable circumstances, that the gyroscopic couple could produce a stabilising effect, but the best answer to the problem would be counter rotating airscrews or a contra-prop. Not only would this neutralise the adverse couples, but, as the weight in each blade would only need to be half that required for a two-bladed normal airscrew, the centrifugal loads would be correspondingly reduced.

Apart from minor details, such as the intricacy of making the airscrew, the building of the winder (which could be spring or cartridge operated) and the effort required to wind up to take-off r.p.m., the three points mentioned cover the main technical disadvantages and the methods of getting over them.

To counterbalance these we have a fair number of advantages :—

(*a*) The possibility of flying old or new models, previously grounded due to the rubber shortage and a method that might give up to 75 per cent. of the performance obtained with rubber.

(*b*) Longer life of models. There is no possibility of a model being almost completely destroyed due to the elastic breaking when winding. Moreover, the airscrew being fairly rugged is not easily broken and some form of "knock-off" mounting, similar to those used on petrol engined models, can be easily devised.

(*c*) Centre of gravity further forward. As over 30 per cent. of the model's weight is concentrated at the extreme nose, such models will conform more nearly than existing types to the load distribution of full-size aircraft, and one can visualise the possibility of producing flying scale models with scale tail-surfaces, scale airscrews and under-carriages. Performance depends entirely on initial r.p.m. and pitch, which present an unlimited field of development.

(*d*) Saving in weight. Fuselages need not be stiffened up to withstand the tension and torsional loads of rubber motors. With the centre of gravity well forward the wing can be moved further forward with a corresponding decrease in fuselage length or tail-surface area.

(*e*) Consistent performance. It is well known that rubber-powered models vary in performance due to deterioration of the motive power and the effect of temperature on the rubber. With the momentum principle these disadvantages are nullified.

(*f*) Possibility of further refinement. With such a large centrifugal force acting on the blades of the airscrew it should be possible to utilise this to give some variation in disc area or blade angle and produce a "constant thrust" airscrew. Constant power would entail constant rate of climb, using the available power in the most economical way to obtain altitude and consequent duration.

This article is not intended to do more than convey the basic idea to all bona-fide amateur aeromodellers who are free to experiment with it and develop it until some degree of satisfaction is obtained. It is, however, pointed out to all manufacturers and dealers that steps are being taken to protect this system and certain aspects of its development.

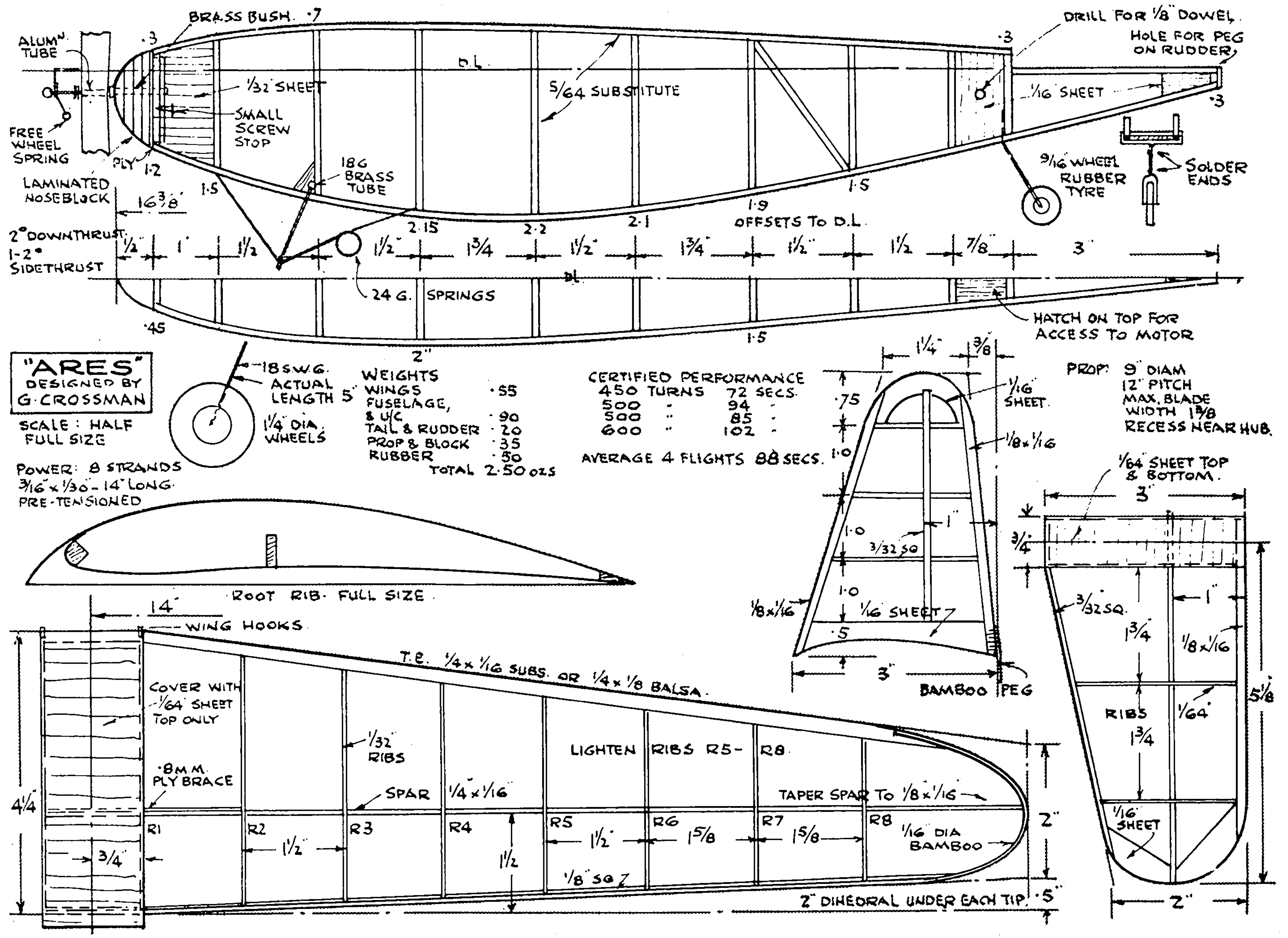
[We have not yet reached the stage of jet-propelled model aircraft. There are, however, sources of power other than rubber and petrol motors. In this article the author propounds a novel theory, as yet untried, which we publish without comment. Readers are invited to further this interesting topic with their views.—Editor.]

BOOK REVIEW continued from page 497.

produce a successful machine. He will, of course, be working along conventional lines and in effect be producing replicas of proven models. But, as the authors rightly point out, this is the quickest and safest method of acquiring technique, and technique is the outcome of skill and experience.

The chapter on flying scale models is interesting and timely. There is no doubt about the increasing importance of this aspect of model work. It is important not only from the point of view of overcoming the greater difficulties that this type of modelling entails, but also from the point of view of recognition of the movement by the general public. To-day no one will deny that the public is air-minded. This being the case there can be no doubt that the average member of the public will be more inclined to treat aeromodelling seriously if he sees models flying which closely resemble the real aircraft. And no one will deny the importance to the movement of recognition by the general public. The authors' remarks on this type of modelling are worthy of note. ". . . . Although the duration of flight is usually short, it is of very pleasing nature, and there are few sights to compare with that of a well-trimmed scale model in operation. Furthermore, they make a pleasant change from the stereotyped duration model, where individuality has to be sacrificed upon the altar of efficiency." How true! Readers will do well to study this chapter with care.

I could not do better in ending this short review than to quote the authors again, this time the opening lines of the Manual. "It is essential to the success of any undertaking that it must first be understood just what it is one wishes to do." The wisdom of these words are beyond doubt. "The Model Aeroplane Manual" is more than the first step in "understanding just what it is one wishes to do."


"ARES"
DESIGNED BY
G. CROSSMAN
SCALE: HALF FULL SIZE
POWER: 8 STRANDS 3/16" x 1/30 - 14" LONG PRE-TENSIONED
BRASS BUSH. ·7
ALUMN. TUBE
FREE WHEEL SPRING
PLY
LAMINATED NOSEBLOCK
2° DOWNTHRUST
1-2° SIDETHRUST
1/32 SHEET
SMALL SCREW STOP
18G BRASS TUBE
5/64 SUBSTITUTE
D.L.
OFFSETS TO D.L.
DRILL FOR 1/8" DOWEL
HOLE FOR PEG ON RUDDER
1/16 SHEET
9/16 WHEEL RUBBER TYRE
SOLDER ENDS
24 G. SPRINGS
HATCH ON TOP FOR ACCESS TO MOTOR
18 S.W.G. ACTUAL LENGTH 5"
1 1/4 DIA. WHEELS
WEIGHTS
WINGS ·55
FUSELAGE, & U/C ·90
TAIL & RUDDER ·20
PROP & BLOCK ·35
RUBBER ·50
TOTAL 2·50 OZS
CERTIFIED PERFORMANCE
450 TURNS 72 SECS.
500 " 94 "
500 " 85 "
600 " 102 "
AVERAGE 4 FLIGHTS 88 SECS.
PROP: 9" DIAM
12" PITCH
MAX. BLADE WIDTH 1 3/8
RECESS NEAR HUB.
1/16 SHEET
1/8 x 1/16
3/32 SQ
1/16 SHEET
BAMBOO PEG
1/64 SHEET TOP & BOTTOM.
3/32 SQ.
1/8 x 1/16
RIBS
1/64
1/16 SHEET
ROOT RIB FULL SIZE
WING HOOKS
T.E. 1/4 x 1/16 SUBS. OR 1/4 x 1/8 BALSA.
COVER WITH 1/64 SHEET TOP ONLY
·8 M.M. PLY BRACE
1/32 RIBS
SPAR
1/4" x 1/16
LIGHTEN RIBS R5 - R8
TAPER SPAR TO 1/8 x 1/16
R1 R2 R3 R4 R5 R6 R7 R8
1/16 DIA BAMBOO
1/8" SQ
2" DIHEDRAL UNDER EACH TIP.

SUGGESTED METHOD OF DETERMINING THE BEST ASPECT RATIO FOR A GIVEN WING AREA

BY D · W · COOPER, B.Sc.(Hons.)

THE following equations have been derived by considering the duration model primarily as a sailplane to which motive power has been added. This approach may not be agreeable to some readers who prefer to rely upon power run for the duration of their flights.

As Mr. Maxwell has pointed out, Profile Drag is not proportional directly to the reciprocal of Reynold's Number, but the values of " K " given in the table, will correct for this.

The method employed is to obtain the Power Factor in terms of constants and one variable " R." As the sinking speed will be inversely proportional to the Power Factor, we shall obviously require the highest value of this expression in order to obtain the longest possible duration of glide. Hence the expression is differentiated with respect to the variable " R," and equated to zero.

C_L = coefficient of lift
C_D = ,, ,, drag } C_{DT} = equivalent coefficient of total drag.
V = velocity in feet per second.
R = Aspect Ratio.
A = Area of aerofoil in feet².
S = Span in feet.

$$\text{Power Factor} \propto \frac{C_L^{3/2}}{C_{DT}} \qquad (1)$$

$$\text{Induced drag} \propto \frac{C_L^2}{\pi R} \qquad (2)$$

$$\text{Profile drag} \propto \frac{1}{VL} \qquad (3)$$

In equation (3) we require " L," a linear dimension in feet, to be transferred to units of Aspect Ratio.

Thus we have $R = \frac{S^2}{A}$ but $L = \frac{A}{S}$

$$\therefore L = \sqrt{A/R} \qquad (4)$$

$$\text{Total Drag} \propto \left\{ \frac{C_L^2}{\pi R} + \frac{1}{V}\sqrt{\frac{R}{A}} \right\}$$

$$\propto \left\{ \frac{C_L^2 V\sqrt{A} + \pi R^{3/2}}{R \pi V \sqrt{A}} \right\}$$

From (1) above we have therefore

$$\text{Power Factor} \propto \frac{C_L^{3/2} R \pi V \sqrt{A}}{V\sqrt{A} C_L^2 + \pi R^{3/2}}$$

for most efficient value, differentiate Power Factor with respect to R, and equate to zero.

$$\frac{d\ (P.F.)}{d\ (R)} \propto (C_L^{3/2} \pi V\sqrt{A})\ (V\sqrt{A}\ C_L^2 + \pi R^{3/2}) - (C_L^{3/2} R \pi V \sqrt{A}) \left(\frac{3}{2}\pi R^{1/2}\right)$$

$$or\ V\sqrt{A}\, C_L^2 + \pi R^{3/2} = \frac{3}{2}\pi R^{3/2}$$

$$\therefore R^{3/2} \propto \frac{2\, V\sqrt{A}\ \ C_L^2}{\pi} \qquad (5)$$

This formula is very easily obtained and will be much more readily applicable than the graphical methods.

Let us take a few figures representative of a " Wakefield " model.

Area = 1·39 ft². V = 22. f.p.s. C_L say 0·8.

$$\text{then } R^{3/2} \propto \frac{44 \times 1{\cdot}18 \times {\cdot}64}{3{\cdot}1416} \quad \text{or } R \propto 4{\cdot}82$$

This bears out Mr. Maxwell's graph reasonably well if the formula is taken in the form above.

For practical results we may re-write it as follows :—

$$R^{3/2} = K\, \frac{2V\sqrt{A}\, C_L^2}{\pi} \qquad (6)$$

The writer suggests the following values of K :—

Area sq. ins.	K
100	1·1
125	1·39
150	1·84
175	2·31
200	2·83
225	3·37
250 and over	3·95

Using the value of " K " equivalent to a wing area of 200 sq. ins. we have

$$R^{3/2} = \frac{5{\cdot}66\, V\sqrt{A}\, C_L^2}{\pi} = \frac{5{\cdot}66 \times 22 \times 1{\cdot}18 \times {\cdot}64}{\pi} = 30{\cdot}0$$

$$R = 9{\cdot}66$$

Conclusions.

It can be seen from equation (6) that the Aspect Ratio will be increased for increasing values of V. This of course is to be expected as higher velocities give higher values of Reynold's Number, hence permitting of some reduction in chord dimension.

Although from the theoretical standpoint an Aspect Ratio of six may seem desirable, there are other factors not considered in the above treatment.

A wing of low A.R. will give less control against rolling, and, unless gears are used, the diameter of the airscrew disc may be such as to bring over 50 per cent. of the wing area into turbulent air, during power flight. Not the least important point is the C.P. movement along the chord, which may prove very troublesome. It is generally found that such wings require tailplanes of greater area than those of higher A.R.

Points in favour of low A.R. are greater structural strength against bending and against torsion, as well as greater handling strength.

The writer has not been able to catalogue a sufficient number of results of. practical tests to justify the proposition of these formulæ as criteria of design. It is hoped therefore that readers will compare their own results gained from flying experience, with the calculated values, and the writer will appreciate any comments if sent c/o the Editor.

THE CARIBOU SWINDLE

THE DOCUMENTS FROM THE CASE PRESENTED IMPARTIALLY

BY ROBERT JAMIESON

Copy of letter from H. B. McGillicuddy to Model Aircraft Assurance Coy.

Dear Sirs,

I enclose my policy herewith and claim twenty-five pounds (£25) compensation for damage sustained to my prize glider " Caribou " at a model airplane meeting held on 25th ult.

The sailplane was safely parked in the model enclosure when a visiting competitor—a Mr. C. U. Tremble—tripped in passing and fell heavily right on top of it. The fuselage is completely smashed, both wing stubs damaged and, in fact, the whole machine will require to be almost entirely re-built.

As this model has won the Auchengargle Trophy, the League Cup (twice) and the St. Leger three times, in addition to being highly commended at the recent Muckle Mire Exhibition, I consider the sum claimed is not excessive.

Yours faithfully,
H. B. McGillicuddy.

Mr. C. U. Tremble to Model Aircraft Assurance Coy.

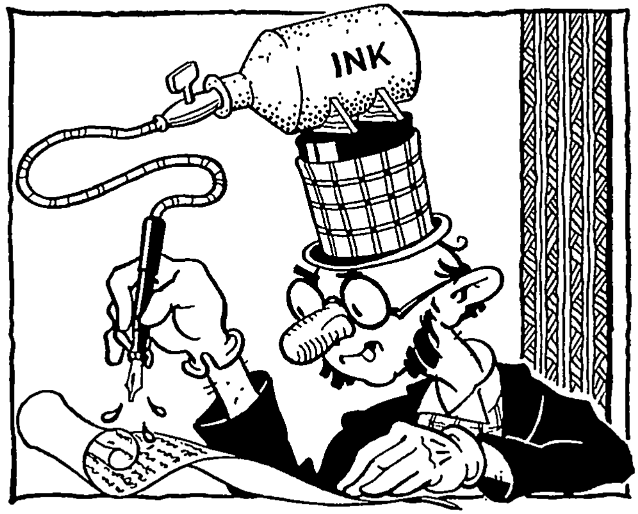
Dear Sirs,

I am the holder of policy No. 7125, and under its provisions hereby claim twenty pounds (£20) for damage sustained to my " Caribou " model glider at a meeting held at Muckle Mire on 25th ult.

The model was attached to the towline preparatory to launching when a Mr. H. B. McGillicuddy of Auchengargle tripped over the towline in passing, causing the model to be jerked from my assistant's hands and dashed violently to the ground.

The fuselage is completely smashed, and both wing stubs damaged. As this machine took many months to build, and has already won several major competitions, the sum claimed is, I consider, well below its real value.

Yours faithfully,
C. U. Tremble.



Model Aircraft Assurance Coy. to Mr. H. B. McGillicuddy.

Dear Sir,

We have your letter lodging a claim for damage to your " Caribou " model; but as we have just received a similar claim from a Mr. C. U. Tremble for similar damage to what appears to be an identical model, and sustained on the same occasion, we regret our inability to settle this claim immediately, as we shall have to make enquiries from our local agent, and this will cause a slight delay.

Yours faithfully,
For M.A.C. Assurance Coy.,
I. Ferret Emout.

H. B. McGillicuddy to Mr. C. U. Tremble.

Dear Sir,

We have just learned of your claim against the Assurance Coy., and stand aghast at your amazing effrontery. Reluctant as we are to issue threats, nevertheless we regret to inform you that unless this preposterous claim is dropped at once we shall—without fear of consequences to ourselves—reveal the whole truth of what happened. A story calculated to send a thrill of horror and disgust through every aeromodelling clubroom in the country.

Yours faithfully,
H. B. McGillicuddy.

C. U. Tremble to H. B. McGillicuddy.

Dear Sir,

You've got a nerve—you old hay-bag! Talk about brass neck! O.K. Go ahead and spill it; but two can play at that game, and it won't get you anywhere. And I'll still be cashing a nice cheque for twenty quid no matter what yarn you think up.

No Sir! I got nothing to be scared of—and even if I had it would take more than a fungus-frilled old sour-puss like you to make me lay off.

Yours horribly,
C. U. Tremble.

H. B. McGillicuddy to Model Aircraft Assurance Coy.

Dear Sirs,

I have your reply regarding Mr. Tremble's letter, and hasten to assure you that his claim will not bear investigation; apart from the fact that the model is mine. From a *natural desire not to cry stinking fish I withheld the whole story from my previous letter, only divulging what was necessary to establish my claim. Here are the facts.*

I was not taking part in the competition, but had merely taken the " Caribou " down to the field for exhibition purposes. The model was the centre of an admiring crowd when Drambuie, my pet seagull—and as gentle a bird as ever swallowed a sardine—swooped down to land on my shoulder. Mr. Tremble was hurrying up to join the group when Drambuie flew over his head. As my back was toward him he made a swipe at the seagull with his walking stick.

At Drambuie's squawk of alarm I turned and caught him with his stick still up-raised. Angry words ensued, and Tremble advanced toward me with his stick still in the air. Drambuie—thinking I was about to be attacked—flew at Mr. Tremble, squawking and flapping his wings. Tremble retreated at once and, tripping over a tuft, fell heavily on top of the model, which sustained the damage already described.

Yours faithfully,
H. B. McGillicuddy.

C. U. Tremble to Model Aircraft Assurance Coy.

Dear Sirs,

I realise now that it will be necessary to reveal the whole story regarding the damage to my glider. My reticence is a natural desire not to drag the internal brawls of the aeromodelling fraternity into the limelight, rather than any desire to shield Maestro McGillicuddy, for the man is a brother aeromod.—even if he is an old so-and-so.

McGillicuddy had made himself obnoxious during the meeting, by forcing his attentions on Miss Emma Bright, my secretary, who was with me. We bore his attentions patiently for a while, but at last I could stand it no longer, and sent him about his business.

He went off to the pub adjoining the flying field—to emerge a little later somewhat flushed of face and unsteady in his walk. Seeing Miss Bright still standing beside me he again approached, making facetious remarks and shouting " Taxi."

Miss Bright tried to pass over the situation by smiling, but he took this as encouragement, and came still nearer, smiling and waving his hat. Staggering a little in his walk he tripped over the towline and fell heavily on top of the model, which sustained the damage already described.

Yours faithfully,
C. U. Tremble.

Statement—made by Snooky Munro, of Muckle Mire M.A.C., to local representative of Model Aircraft Assurance Coy.

" That there glider belonged to a Canadian Pilot who spent his leave mucking about with the Teuchle Toorie mob. He left the glider with them when his time was up, saying they could have it as he'd had his fun out of it, and it didn't matter if it got smashed up—but Tumps McWhippet said they'd keep it for him.

McWhippet brought it down to the field that day, and when his back was turned Old Mac and Tremble got hold of it and were going to fly it but they started arguing about something. The Maestro got het up and said Tremble was a (Deleted, Ed.) *and Tremble said Old Mac was an old gas-bag who knew nowt about owt. McGillicuddy went haywire and fetched Tremble a poke in the stomach with the glider that doubled him up, and then Tremble let out a roar, he did, and snatched the 'plane away from Mac. Then he made a swipe at the Maestro with it, and knocked his hat off, and then another swipe—a proper fourpenny 'un—and crowned him and his skull needed about a yard of sticking plaster, trusting this meets with your approval.*

Oh, and I nearly forgot : Tumps McWhippet said they'd better get another glider made to replace it, pronto. Old Mac asked him where the money was to come from, but Tumps said that was their lookout, and the last I saw of them they was fighting over the pieces. Trusting this finds you the same, as it leaves me likewise."

Model Aircraft Assurance Coy. to H. B. McGillicuddy.

Dear Sir,

Re your claim for damages to your glider.

We have now had this matter thoroughly investigated, and from the information now in our possession we believe your claim to be false and fraudulent, and have, therefore, asked the authorities to issue a warrant for your arrest.

Assuring you of our best service at all times,

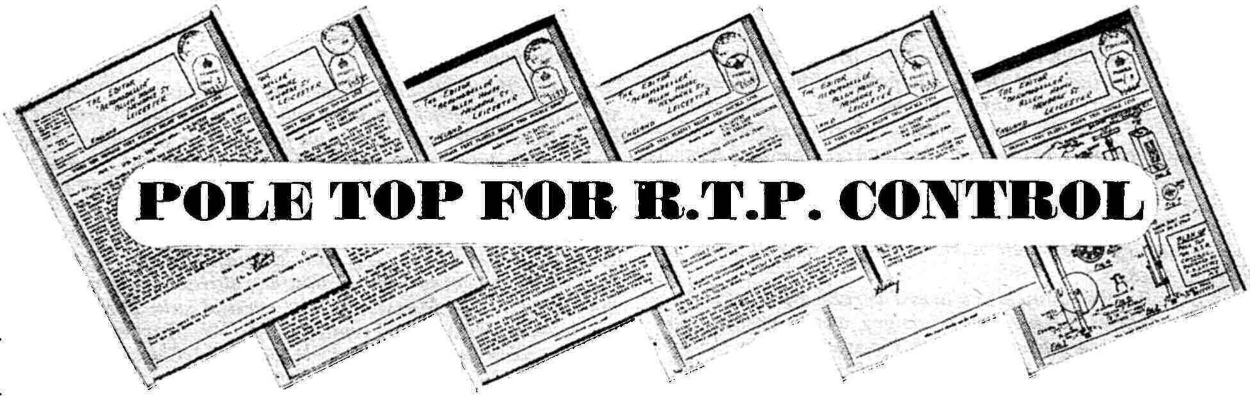
Yours faithfully,
For M.A.C. Assurance Coy.,
I. Ferret Emout.

TELEGRAM—to C. U. Tremble.

YOU WIN STOP SO MUCH FOR BRITISH JUSTICE STOP AM FLEEING TO HILLS TO JOIN THE GORILLAS STOP McGILLICUDDY

TELEGRAM—to H. B. McGillicuddy.

WIN NOTHING STOP COPS ARE AFTER ME SO WILL HAVE TO SCRAM STOP HOPE THAT HIDE OUT IN HILLS WILL HOLD TWO FOR I'M COMING WITH YOU SO BE SEEING YOU OLD TIMER STOP TREMBLE



POLE TOP FOR R.T.P. CONTROL

BY

E · B · LATTEY

The whole of this article, including the sketches, arrived at the Aeromodeller Editorial Offices by Airgraph from New Zealand. Credit is due to the postal authorities who not only clipped all the separate sheets together but placed them in the right order!

ABOUT the middle of 1940, after pole flying more or less every model I had, it occurred to me that if some form of control could be added to R.T.P. flying it would be much more interesting. The result of this was that I managed to work out a very simple method of elevator control which could be applied to R.T.P. This was successfully used by the Wellington (N.Z.) M.A.C., in their Clubroom and worked well. The model used was a "Pylon Patroller," as described in the February AEROMODELLER, 1940, which gave flights of from 45 to 60 seconds and which gave us a lot of interesting flying. It was a bit heavier than the prototype, but this was necessary in order to make the controls function reliably.

Since that date I have had the germ of an idea for a more elaborate control which would do away with the overhead pole used in the first system, but until recently have not had the time to go ahead with the job. However, I have now built it and it has proved to be moderately easy to construct and is thoroughly reliable in action. Using it in conjunction with the Pylon Patroller it is possible to set up a pole for controlled R.T.P. flying in a few minutes. I am now building an electric motor for a scale model along the lines of that described in the August AEROMODELLER, 1943, by Mr. Hassall. It will have to be a somewhat slower flyer than Mr. Hassall's, as the controlling of a 15 m.p.h. model in a smallish hall would be tricky to say the least of it.

I shall describe both methods of control as, for those who have the necessary low Clubroom ceiling and do not wish to build the other gadget, the original method we used here in Wellington will give plenty of scope for climbing and diving practice, to say nothing of take-offs and landings.

Method No. 1 is as follows:—Two poles are used: one on the floor and one from the ceiling. Their ends should come to within 1 in. of each other at a point about 4 ft. from the floor and of course they must be vertically in a line. Attached to the side and projecting over the end of each pole is a small metal tube about 3 in. long and $\frac{1}{8}$ in. inside diameter. The adjacent ends of these tubes, which should be about $\frac{1}{4}$ in. apart and absolutely opposite each other, should be made as smooth as possible. A good method is to solder a $\frac{1}{8}$ in. diameter tubular rivet in the ends. This has a rounded polished head and will cause very little friction. The threads are carried from the crank arm under the centre section of the 'plane's wing through small wire loops under the starboard wing tip and one each through the tubes, one going up to the ceiling and one down to the floor. These threads are then carried round pulleys to a control column outside the circle round which the model is flying.

Method No. 2, which cuts out the overhead pole, necessitates the manufacture of a small piece of apparatus which can easily be constructed by anyone who can use a soldering iron for fairly fine work, and who has the necessary patience to make an accurate job. The principle on which it works is fairly obvious from the drawing but it is briefly this. The lines from the control column are taken two or three times round the wheel A and revolve it about a third of a turn. This, through the connecting arm B raises or lowers the ball-bearing collar C to the central collar to which is attached the disc D. This disc raises or lowers the wires which are soldered on to the upper collar K, and which pass freely through holes in the bottom of the box, thus moving K up or down the central tube M. The horns on K in turn move the forks T, which move the grooved fibre wheel X through a quarter of a turn. The control threads to the model are taken round this wheel X and as this wheel turns they give the movement necessary to work the elevators on the model. It is necessary to secure the thread to wheel X at a point on the inside between the forks to prevent it slipping. The threads are held taut by the centrifugal force exerted by the model and any change of length in either one is taken up immediately by the movement of the elevators. The whole of the apparatus above and including the inner collar of the ball-bearing collar C revolves round the central tube M, which is screwed to the top of an ordinary telescopic camera tripod.

If an electrically-driven model is used the wires for the necessary current can be brought up through the central tube and attached to two brass tracks as shown. This is the method advocated by Mr. Hassall in driving his model, except that in this case the brushes are working upside down and there are two of them instead of one as the current is not run through the central pole. The long arm is insulated from the central tube by strapping it round a revolving collar with fibre between the arm and the collar.

The main aim must be to cut down friction both in the circular motion of the apparatus round the pole and in the up and down motion of the collar K and disc D. This calls for careful workmanship and accurate fitting.

The material used was as follows:—1. Central tube M.—Brass tube $\frac{1}{8}$ in. inside diameter, 3/16 in. O.D. Length, $7\frac{3}{4}$ in. 2. Sliding collars K and J.—Brass tube

3/16 in. inside diameter, ¼ in. O.D. 3. Fixed bearing collars taking weight of apparatus, one each side of disc R to which box is soldered—same as K and J. 4. Box, disc R and D, connecting arm B, forks T—26 S.W.G. brass sheet. 5. Ball-bearing collar C—S.K.F. ball-bearing collar O.D., 1 1/16 in. 6. Wheel A.—Wooden wheel 1½ in. diameter with groove cut in it. 7. Wheel X. —Diameter, ¾ in., turned from 3/16 in. fibre sheet; 1/16 in. groove in it. 8. Straps for strapping round B.B. collar C and bearings for wheel A are 26 S.W.G. copper sheet. 1/16 in. bolts were used for tightening straps.

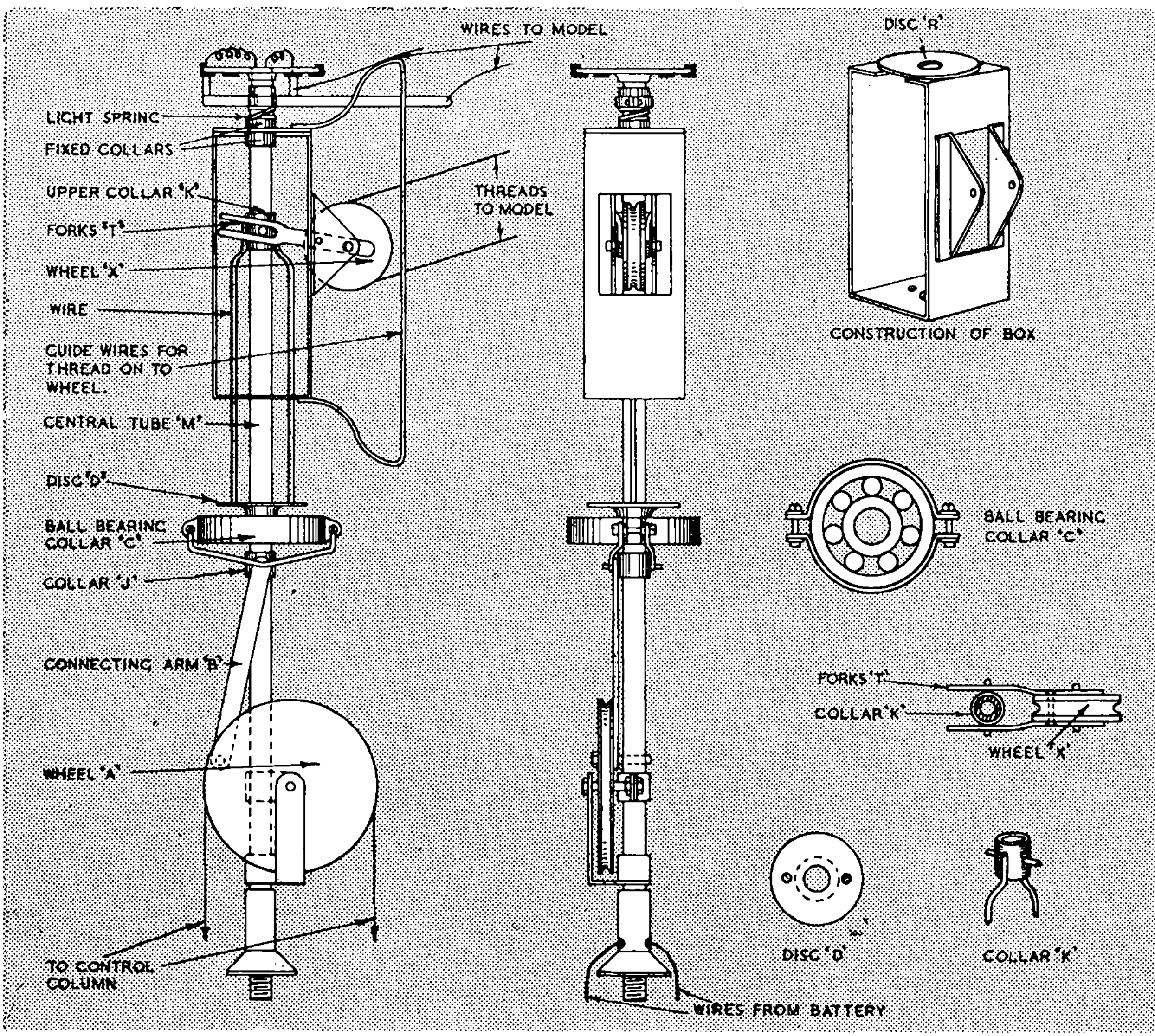
The hardest jobs encountered were to sweat the second fixed bearing collar of the two holding disc R in position without soldering the disc itself to the tube and to solder on the brass tube L (which must be a tight push fit into inner collar of B.B. collar C), to the disc D, getting it dead central in relation to the hole in D and at the same time solder the lower ends of the wires to D. The application of a smear of liquid glue to parts you do not wish to stick will prevent the solder from sticking.

Disc R, the bottom of the box and disc D must revolve easily round the central tube without any side play and disc R must be a clean fit without any sticking between the fixed collars above and below it.

A smooth wire guide is soldered to the top and bottom of the box as shown in Fig. 1. This is to ensure that the threads will not be pulled out of the groove in X by the action of the model pulling the gadget round. This guide, which is not shown in Fig. 2, must be vertical and in line with the groove on the wheel.

The easiest method of assembly will be to first of all locate and attach disc R to the central tube by sweating on the fixed collars. After this the box can be made and also the various other parts. They can be all assembled for a test without making any permanent fixtures other than tacking the top of the box to disc R.

The attached drawing is not absolutely to scale and the apparatus can be built any size. The only thing which has to be watched is to see that the limits of movement of K are the same as those for the collar C and that the movement of wheel A gives sufficient up and down movement to work K through about ninety degrees, which is a quarter of a turn for wheel X.



THE DESOUTTER SPORTS COUPÉ

BY E · J · RIDING

Photos by E. J. Riding

Desoutter Mk. II

THE Desoutter Coupé was the first light three-seat cabin monoplane to be built in this country. In 1929, the newly formed Desoutter Company, with works at Croydon aerodrome, acquired the rights to build the Dutch Koolhoven F.K.41 monoplane, one of which was sent over from the Koolhoven factory as a pattern for the Desoutter concern to work from. It was registered G–AAGC in April of that year.

Production commenced at Croydon towards the end of 1929, and a large order was placed by National Flying Services, Ltd., who ran a chain of flying clubs all over the country. Batches of Desoutters for N.F.S. were registered G–AANA to G–AANE and G–AAPP to G–AAPU inclusive.

The Desoutter was a wooden aircraft, the fuselage being a slab-sided structure consisting of spruce longerons and cross members covered with 1½ mm. three-ply reinforced by three external spruce stringers running down the sides. The fully-cantilever wing utilised spruce and plywood box spars on to which were threaded sinple spruce ribs, the whole being covered with plywood. The wing bracing consisted of six streamlined steel tubular struts arranged three a side attached to the bottom longerons as shown in the G.A. drawing. A 20-gallon gravity fuel tank was situated in the centre-section. The tailplane was also plywood covered and similar in construction to the wing. The rudder and elevators were light, fabric-covered steel tubular frames. The undercarriage was a departure from the normal practice at that time, and had an exceptionally wide track, shocks being taken by rubber blocks in compression contained in shock legs attached to the under-side of the front wing spar.

In 1930 an improved version known as the Mk. II, was built, embodying improvements such as an inverted type of engine, redesigned ailerons and tail surfaces and wheel brakes, if desired.

Desoutters of both types appeared with regularity at all the important flying meetings during the early and middle 'thirties. Three were entered in the 1930 King's Cup Race, but none of them succeeded in gaining a place.

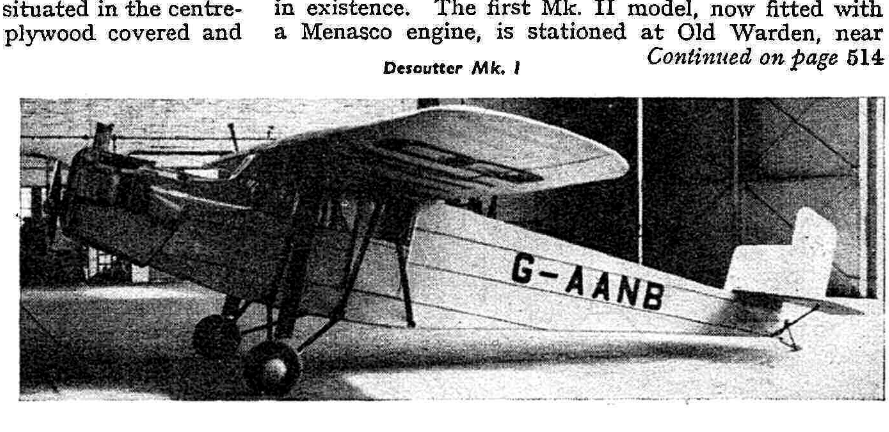
In 1933, however, Capt. E. D. Ayre, with Mr. L. W. Grahame as engineer, put up a very creditable performance in G–AAPZ (Hermes II engine), finishing fourth, at an average speed of 115 m.p.h. 'PZ was entered again the following year, but retired during the preliminary heats.

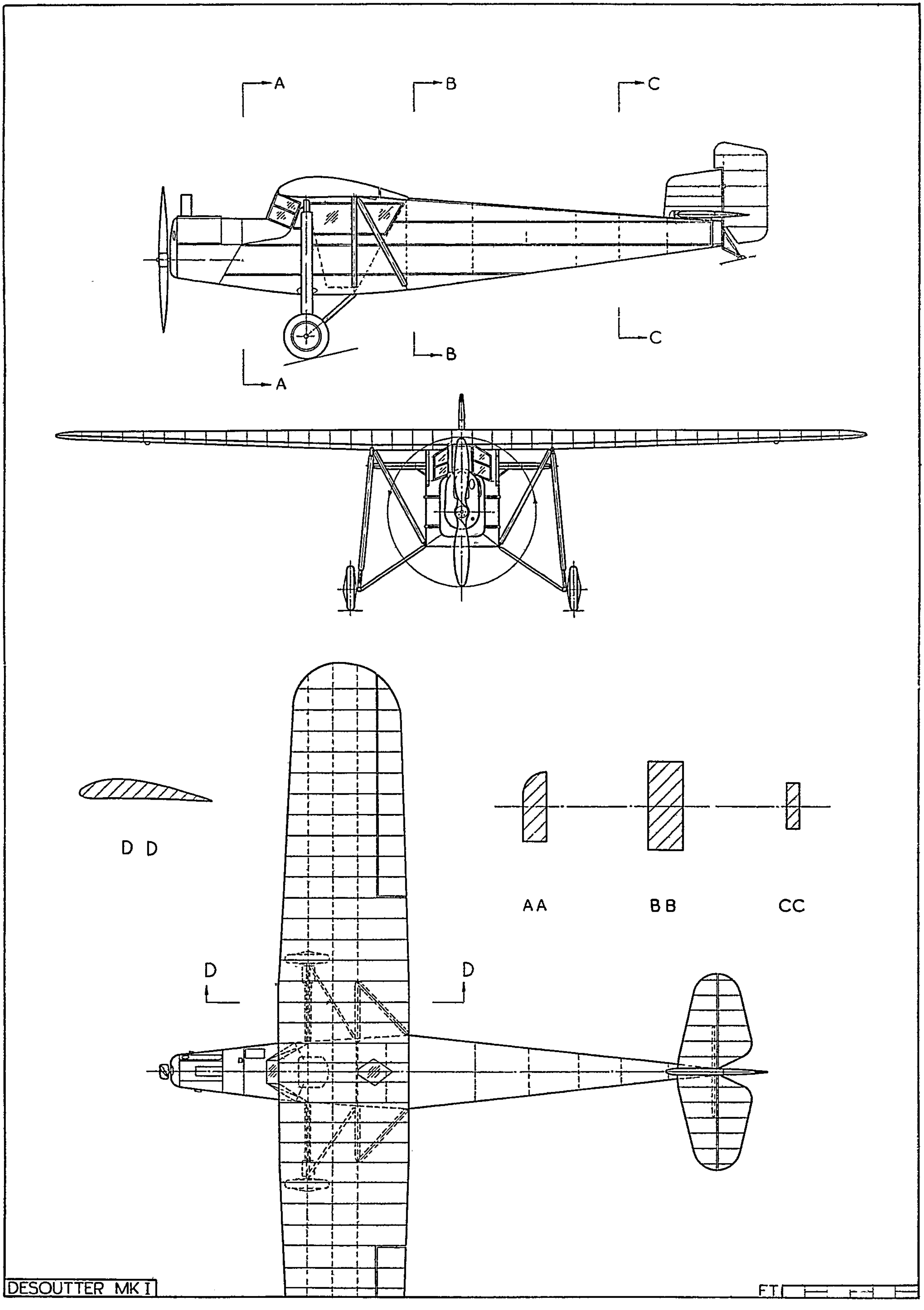
In 1932 the British Red Cross Association acquired a Desoutter for use as an air ambulance. This machine was registered G–ABRN and was stationed at Barton Airport, Manchester. It was later owned by the Lancashire Aero Club and the Wiltshire School of Flying, and at present appears to be owned by a private owner at North Berwick. Another Desoutter also used for Red Cross work was G–ABMW. This machine has been seen flying quite recently in R.A.F. training colours, bearing the service serial number HM560.

Considering that only about 40 Desoutters were built, it is noteworthy that at least thirteen of them are still in existence. The first Mk. II model, now fitted with a Menasco engine, is stationed at Old Warden, near

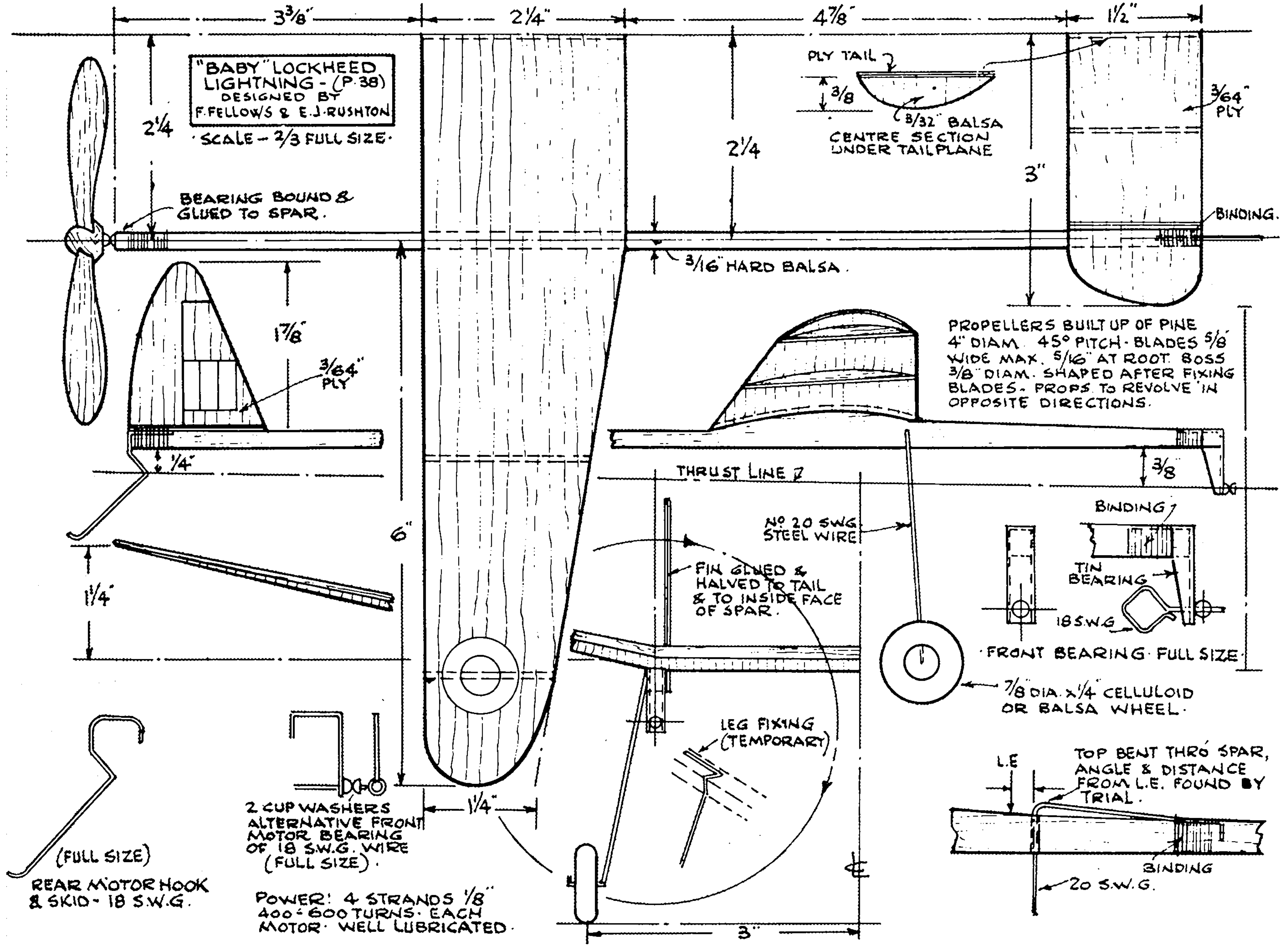
Continued on page 514

Desoutter Mk. I





DESOUTTER MK I



"BABY" LOCKHEED LIGHTNING - (P.38)
DESIGNED BY F. FELLOWS & E.J. RUSHTON
SCALE - 2/3 FULL SIZE
3 3/8"
2 1/4"
4 7/8"
1 1/2"
2 1/4
2 1/4
3"
PLY TAIL
3/8
3/32" BALSA
CENTRE SECTION UNDER TAILPLANE
3/64" PLY
BEARING BOUND & GLUED TO SPAR.
BINDING.
3/16" HARD BALSA.
1 7/8"
3/64" PLY
1/4"
PROPELLERS BUILT UP OF PINE 4" DIAM. 45° PITCH. BLADES 5/8" WIDE MAX. 5/16" AT ROOT. BOSS 3/8" DIAM. SHAPED AFTER FIXING BLADES. PROPS. TO REVOLVE IN OPPOSITE DIRECTIONS.
THRUST LINE
3/8
6"
1 1/4"
No 20 SWG STEEL WIRE
FIN GLUED & HALVED TO TAIL & TO INSIDE FACE OF SPAR.
BINDING
TIN BEARING
18 S.W.G
FRONT BEARING FULL SIZE
7/8" DIA. x 1/4" CELLULOID OR BALSA WHEEL.
LEG FIXING (TEMPORARY)
1 1/4"
L.E
TOP BENT THRO' SPAR, ANGLE & DISTANCE FROM L.E. FOUND BY TRIAL.
BINDING
20 S.W.G.
(FULL SIZE)
REAR MOTOR HOOK & SKID - 18 S.W.G.
2 CUP WASHERS
ALTERNATIVE FRONT MOTOR BEARING OF 18 S.W.G. WIRE (FULL SIZE).
POWER: 4 STRANDS 1/8" 400-600 TURNS. EACH MOTOR WELL LUBRICATED.
3"

THE MODEL AIRCRAFT TRADE ASSOCIATION

CHAIRMAN
F. R. BARNARD
SECRETARY
C. J. BRADSTREET
92, DURHAM ROAD,
EAST FINCHLEY, N.2

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TO assist in promoting the advancement of the science of Model Aeronautical Engineering, and to raise the status of the industry by supplying only the best quality materials.

To encourage business relationships between Members of the Association, and to supply, as far as possible, the products of its Members ; and to provide, through them, for the adequate supply of necessary materials and appliances necessary to the proper maintenance of the Trade.

To consider all matters affecting the protection and the general interests of Model Aircraft Manufacturers—whether said Manufacturers are or are not Members of the Association —also Importers, Wholesalers or Retailers ; and to take such good action as may be deemed advisable to safeguard in advance such interests.

There are two sections of Membership :—
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The Model Aircraft Trade Association was formed in 1938 and the Manufacturers' Section was formed in June, 1941.

On the following pages are given the names and addresses of the present membership, *viz.*, 122 Full Members and 28 Associate Members.

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56, Station Road, Letchworth.

A. & F. Bew.
52, Market Place, Burslem.

H. Chinn & Son.
High Street, Banstead, Surrey.

City Cabinet Works.
94, St. Clements, Oxford.

Clitheroe Model Aircraft Depot.
28, Whalley Road, Clitheroe.

The Craft Shop.
212, Waterloo Street, Burton-on-Trent.

A. N. Cutler.
7, Bridge Street, Worcester.

Edinburgh Model Aeroplane Supplies.
20A, Grindlay Street, Edinburgh.

Fosters.
221, Beckenham Road, Beckenham.

" Garisans."
91, Turnpike Lane, Hornsey, N.8.

S. J. Garwood.
37, Mawneys Road, Romford.

Godfrey's Model Aircraft.
192, London Road, Croydon.

H. E. Goodchild.
16, Victoria Street, Windsor.

Green & Winter, Ltd.
8, Market Place, St. Albans.

Green Man Garage (Whetstone, Ltd.).
1308, High Road, Whetstone, N.20.

Arthur Hay.
65, High Street, Alton, Hants.

Thos. H. Heyes.
98, Hough Lane, Leyland, Lancs.

J. G. Hill.
54, Eign Street, Hereford.

F. H. Ibbotson.
16. Chester Road; New Oscott, Sutton Coldfield.

" Johns."
72, Beulah Road, Thornton Heath, Surrey.

Jones Bros.
56, Turnham Green Terrace, W.4.

Lewis's.
Smithfield Street, Oswestry.

Loveard's.
4, North Street, Hornchurch, Essex.

Lucas's.
17, Houghton Street, Liverpool, I.

A. J. Maggs.
72, Radstock Road, Midsomer Norton, Nr. Bath.

Maloney's Model Stores.
45, High Street, Romford.

Marsh & Russell.
64, Market Street, Watford, Herts.

A. C. May.
361, Fulham Palace Road, S.W.6.

A. F. Mills.
108, High Street, Welling, Kent.

A. J. Myland.
27, Lampton Road, Hounslow, Middlesex.

New Age Bookshop.
9, Olympia Arcade, Kirkcaldy.

Henry W. Nicks.
1, Fore Street, Kingsteignton, Devon.

Northern Radio & Model Supplies.
61, Skinnergate, Darlington.

Pratts' Cycle & Sports Outfitters.
37, Yorkshire Street, Morecambe.

Ratcliffe's Toyeries, Ltd.
96, St. Peter's Street, Derby.

John Roadley & Sons, Ltd.
161, Cheapside, Birmingham, 12.

St. Albans Model Depot.
1, Hatfield Road, St. Albans, Herts.

Scholes Radio.
151A, Broadway, Hendon, N.W.9

D. J. Sibley.
139, Wennington Road, Rainham.

G. Sleep.
22, King's Road, Reading, Berks.

A. J. Sneezum & Son.
31-35, Norwich Road, Ipswich.

The Sports & Model Shop.
194, Melbourne Road, Coventry.

Henry Start & Sons.
61, Victoria Street, Wolverhampton.

Stemp Bros.
355, New Cross Road, London, S.E.14.

John Ure & Son.
100B, Manor Street, Falkirk.

A. Volkel & Son.
Supply Stores, Bank Street, Castleford.

E. Waltons,
61, King Street, Maidenhead.

Watford Model Exchange.
29, Queen's Road, Watford, Herts.

Welsh Model Supplies.
2, High Street, Llandaff, Cardiff.

T. Westlake & Co.
18, Bank Street, Newquay.

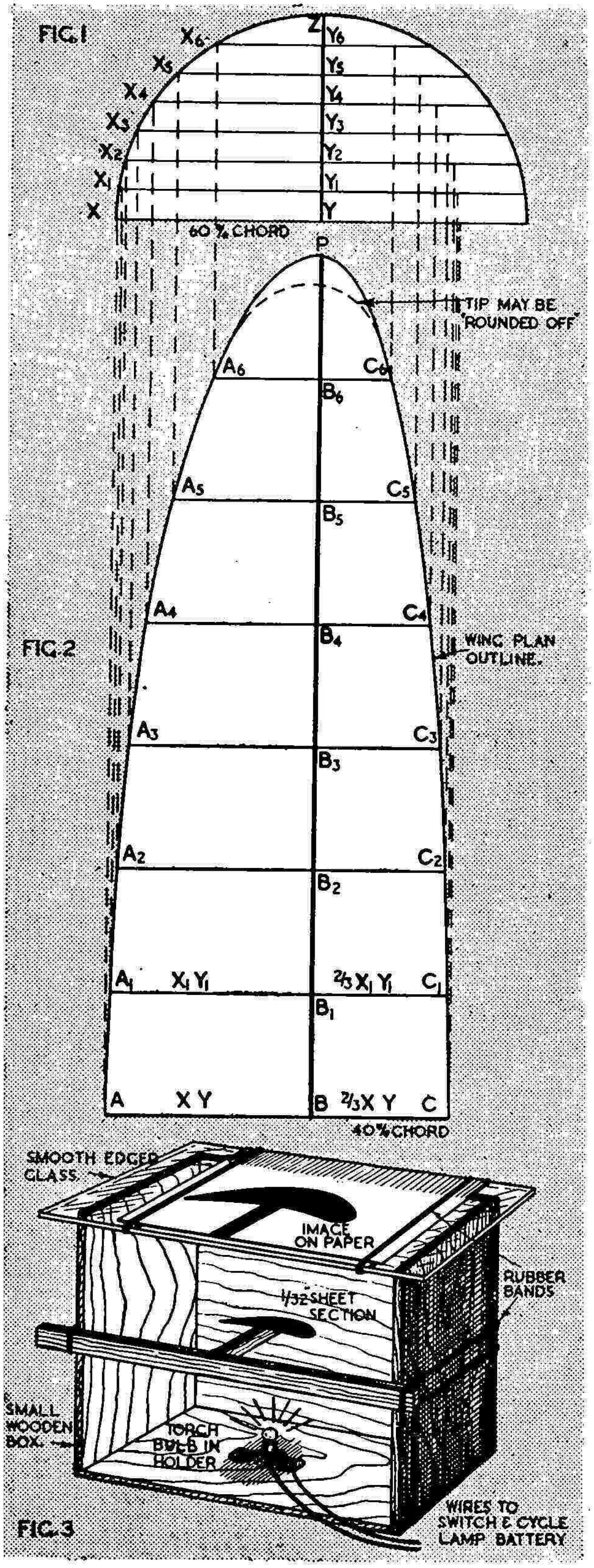
Whitehead's Model Airport.
718, Eastern Avenue, Ilford.

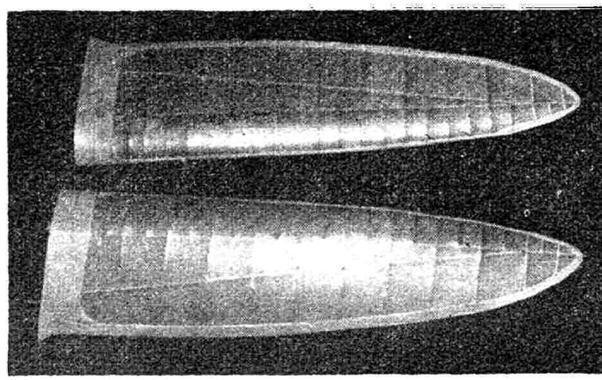
F. S. Whitbread.
115, Windmill Lane, Smethwick.

The Woodcraft Shop.
220, Normanton Road, Derby

ELLIPTICAL WINGS

PART I BY A. O. SUTCLIFFE





It is not proposed to explain the aerodynamic advantages of the elliptical wing here, as these have been fully dealt with in the AEROMODELLER and several of the Harborough books. It is sufficient to remind readers that the ellipse is generally agreed to be the most efficient wing plan form and, by using a well-designed and constructed elliptical wing instead of the more usual constant or tapered chord type, a considerable improvement is usually obtained, both in performance and appearance.

Due to the fact that the mainspar of a wing has to be placed approximately at the centre of pressure of the aerofoil (i.e., at 35–40 per cent. of the chord from the leading edge), and that building an elliptically curved mainspar would introduce unnecessary complications, a "compound ellipse" (i.e., Spitfire type), plan form is generally used. Two half-ellipses, the front one half or two-thirds as wide as the rear one, are "joined together," the mainspar being at the junction. This makes no difference to the aerodynamic qualities of the wing, but overcomes great structural difficulties. When the aspect ratio is high the tips are sometimes rounded off prematurely after the chord has come down to less than three inches, in order to avoid small, inefficient tip chords.

When designing an elliptical wing the first thing to do is to decide the wing area and aspect ratio required. The area of a pair of elliptical wings equals $3{\cdot}142 \times \frac{1}{2}$ chord $\times$ semi-span. The aspect ratio may be a little lower than is usual with the constant or tapered chord wings. The best figures are 6–9 for rubber-driven machines, 8–10 for gliders up to 45 in. span, 9–15 for larger models. For a "Wakefield," 8–9 is a good ratio, giving a span of 40–44 in. and a root chord of 6–7 in., which is quite efficient for a model of this size.

Plan Outline.

Having decided the dimensions of the wing and the respective widths of the front and rear half-ellipses, a plan has to be drawn out full size for construction purposes. Many excellent methods of constructing ellipses have been explained from time to time, but I do not advise the use of "pins and thread" in this case. The method I have always used is shown in Fig. 1. A semi-circle is drawn of radius XY equal to the width of the rear half-ellipse of the wing. A line YZ is drawn perpendicular to XY, cutting the semi-circle at Z. Divide this line into a convenient number of equal parts (say between 6 and 12), and then lines X_1, Y_1, etc., are drawn parallel to XY. A straight line of length equal to the length of one wing is then drawn on the plan. Fig. 2. This is divided up into the same number of equal parts as YZ and light constructional lines A_1, A_2, etc., equal to X_1, Y_1, etc., are drawn at right angles to this line from the points of division B_1, B_2, etc. This is repeated on the other side of the line, only this time using half or two thirds X'_1, Y_1, etc. The points A_1, A^2, etc., and C_1, C_2, etc., are now joined by careful use of French curves to give the plan outline. This will be quite clear from the diagrams. This method gives an accurate ellipse and is much simpler than it sounds. If it is desired to round off the tip, as mentioned, allowance should be made for the reduction in span and area and the outline plotted as before. Then, when completed, the necessary alteration is made to the tip.

Section.

The quickest and easiest method of making a set of ribs for elliptical wings employing one of the common sections, is the use of AEROMODELLER Plans Service Aerofoil Section Sheets. For unorthodox sections, however, I use the simple device described in the AEROMODELLER "Gadget Review" of October, 1941; this is reproduced in Fig. 3. A section which is about half the root chord in length is plotted and cut out from 1/32 in. sheet. This is fixed to the slide, care being taken to ensure that it is perfectly horizontal. A piece of thin paper is placed on the glass, the light switched on and the slide moved up or down until the image is the required size. The outline is then drawn on the paper with a pencil and the aid of French curves. A set of rib sections of the required size is thus made. The tip ribs are designed separately. In any case these are usually of different section.

This method may sound crude, but it surprised me how accurate the sections turned out. A better method, but for photographers only, would be to "photostat" the sections.

Dihedral.

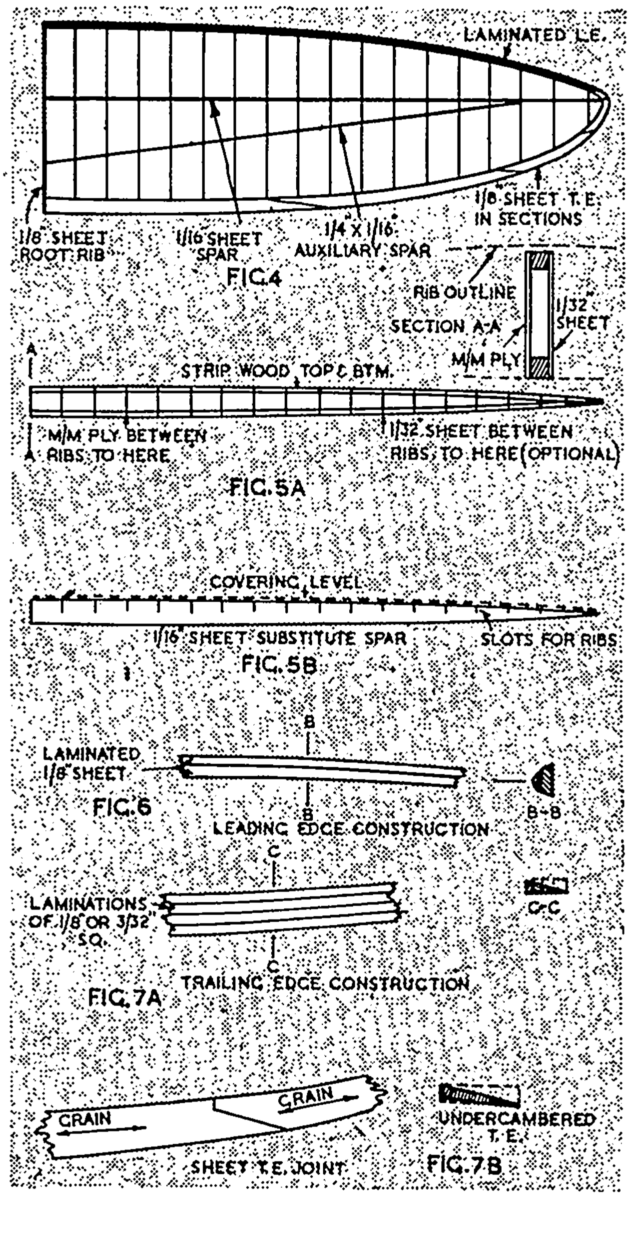
This is usually a matter for the modeller's individual taste, but I think the plain dihedral is best in this case. Polyhedral and tip dihedral introduce structural complications and spoil the curved lines of the wing. Mr. Warring's "elliptical dihedral" would, of course, be ideal, but the constructional difficulties would be enormous. Anyway, the very slight increase in stability and improvement in appearance hardly justifies the risk of inaccuracy and the trouble taken. About the same dihedral angle or slightly more than is generally used, is about right. I use about 10 degrees, or 2 in. under each tip per foot of semi-span, on a shoulder wing machine.

Construction.

Perhaps the main reason why so few people attempt elliptical wings is that they fear the construction, not the designing. Now, an elliptical wing *is* more difficult to build than one of constant or tapered chord. But not *much* more, and no insuperable difficulties, to the experienced builder, are involved. No modeller seems to grudge building a super curved "De Havilland" type tailplane or fin, but most shun the idea of going to a little extra trouble over the wings. This is difficult to understand in view of the fact that the wing shape is so much more important than the tailplane shape.

Types of Construction.

Most of the usual types of construction may be used, but one or two are definitely impracticable. The "sparless" type is one of these, unless one has large quantities of thick section-balsa and is addicted to prodigious carving. Anyway, this method is unsatisfactory as the strength/weight ratio is low. I cannot see how the hollow leading and trailing edge type is possible in this case. I defy anyone to bend a piece of 1/16 in. sheet round the noses of a set of elliptical wing ribs and obtain an elliptical wing! Furthermore, I do not advise a multi-spar wing. Besides the complication involved, I never could see any advantage in having a number of weak spars set all round the ribs, giving the wing a similar section to the side view of a hardy cucumber! A good deep sheet mainspar of elliptical shape, is best with a small secondary spar forming a triangle with it and the root rib if the trailing edge is thin (Fig. 4). The type of construction employed depends largely on the section. It is advisable to choose sections such as Clark Y, Grant X-8, N.A.C.A. 4412, U.S.A. 35b, Eiffel 431, N.22 and Gottingen 398 and 436, wherever possible, as these sections have flat, or nearly flat, deep trailing edges, and this is important as it saves a lot of trouble.



Spars.

The most common type—two pieces of strip, one let into the underside of the ribs and the other into the top vertically above the first, is very suitable. This may be webbed with 1/32 in. sheet, together with 1 m.m. ply near the root, for extra strength (Fig. 5a).

I have found that a spar cut to shape from 1/16 in. hard sheet substitute, and with the ribs slotted into it " egg-box " fashion, make a very strong wing (Fig. 5b). If, in addition, a secondary spar of 3/16 in. or ¼ in. × 1/16 in. strip is fitted into slots cut in the under side of the ribs to form a triangle with the mainspar and the root rib, as mentioned earlier, an almost untwistable wing results (Fig. 4). Care should be taken, however, in the case of an undercambered wing, to arrange the depth of each slot so that the spar is straight, and not bent when viewed in vertical position, as this would warp the wing.

A deep box spar, of ⅛ in. square and 1/32 in. sheet, could be used on large wings. This would have to be elliptical in front view, of course, to suit the varying depth of the ribs.

An ordinary flat-strip monospar could be used on small wings, but the sheet spar is much better as it makes for a more favourable distribution of strength and weight. For large wings a spar built up in any of the well-known ways should be employed, it being elliptical like the sheet spar.

Leading Edges.

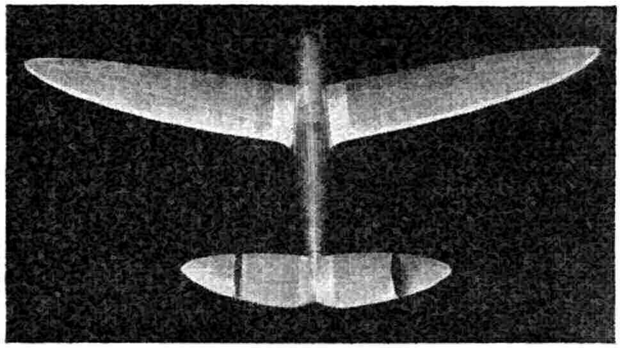
For small models the leading edge should consist of a piece of ⅛ in. square tapered towards the tip, shaped to the correct section, steamed to the outline of the leading edge of the wing and cemented to the flat noses of the ribs. It should not be set on edge. For larger wings ⅛ in. square may still be used, set on edge if desired, but it would appear that something stronger is called for. A piece of ¼ in. × ⅛ in., set vertically, answers well. This, shaped as before, makes a strong leading edge, but if something thicker is required it is necessary to laminate two or more pieces ⅛ in. thick, as it is impracticable to bend any wood thicker than ⅛ in. to the required shape. A laminated leading edge will retain its curvature better than an ordinary one and thus will not tend to pull the wing out of shape (Fig. 6).

For those who wish to try it I will say that it *is* possible to cover the leading edge of an elliptical wing up to the spar with sheet—I have seen it done. If the wing is of high aspect ratio and the section employed has a reasonably flat-topped nose (e.g., Eiffel 431), this may be done with one piece on top and one piece underneath, but otherwise several strips may be needed, one butted against the next.

Trailing Edges.

These can only be bent from single strips of wood if the trailing edge of the section is very thick, necessitating only a narrow strip of wood. However, this is an unsatisfactory method. On the other hand, it is practicable to make up the width required with several strips ⅛ in. × 3/32 in. wide, *glued* to each other, bent to outline shape while the glue is still wet and sanded to streamline shape when dry (Fig. 6a). This makes a strong trailing edge, but there is danger of the laminations parting, especially where cut down thin, if the gluing is not done thoroughly.

It is best to cut the trailing edge from sheet. This may sound wasteful, but actually it is very economical if it is made in three or/four sections, with the grain running along each section (Fig. 6b). The trailing edge of my " Wakefield," which is ⅛ in. × ½ in. at the root, was cut in three sections from ⅛ in. × ⅝ in. strip, so there was not much waste there.



The author's Wakefield model, incorporating elliptical wings and tail surfaces and ' triangulated ' mainspars.

If there is any undercamber of the trailing edge of the section this must be *carved into* the wood (Fig. 7b).

Ribs.

Each rib must be traced separately from its profile drawing, as already described. Ribs may be made in the usual way from sheet and, as they will be fairly large near the root, here they may be lightened. The root-rib itself should be made of ⅛ in. sheet for rigidity. If the leading edge is sheet-covered the ribs should be cap-stripped.

Rib spacing should be 1 in. to 1½ in. according to the chord, in order to maintain an efficient section. On the " Wakefield " a riblet to each rib was used, giving a spacing of 1 in. in front of the spar and 2 in. behind it. But I have come to the conclusion that these riblets definitely spoil the section and I do not advise their use.

If the rib-tails are very thin they should be gusseted to the trailing edge and should always be slotted into it in any case. On large wings the ribs may be built up and used in conjunction with a built-up spar. As all the ribs are different in size and thus cannot be mass-produced, there is plenty of scope for individual attention. In all cases great care should be exercised in the cutting of slots for spars, as otherwise a variation in incidence will be discovered when the spars are fitted. Accuracy is as essential as ever and a little extra care and time spent in the production of the ribs is always worth while.

(To be continued.)

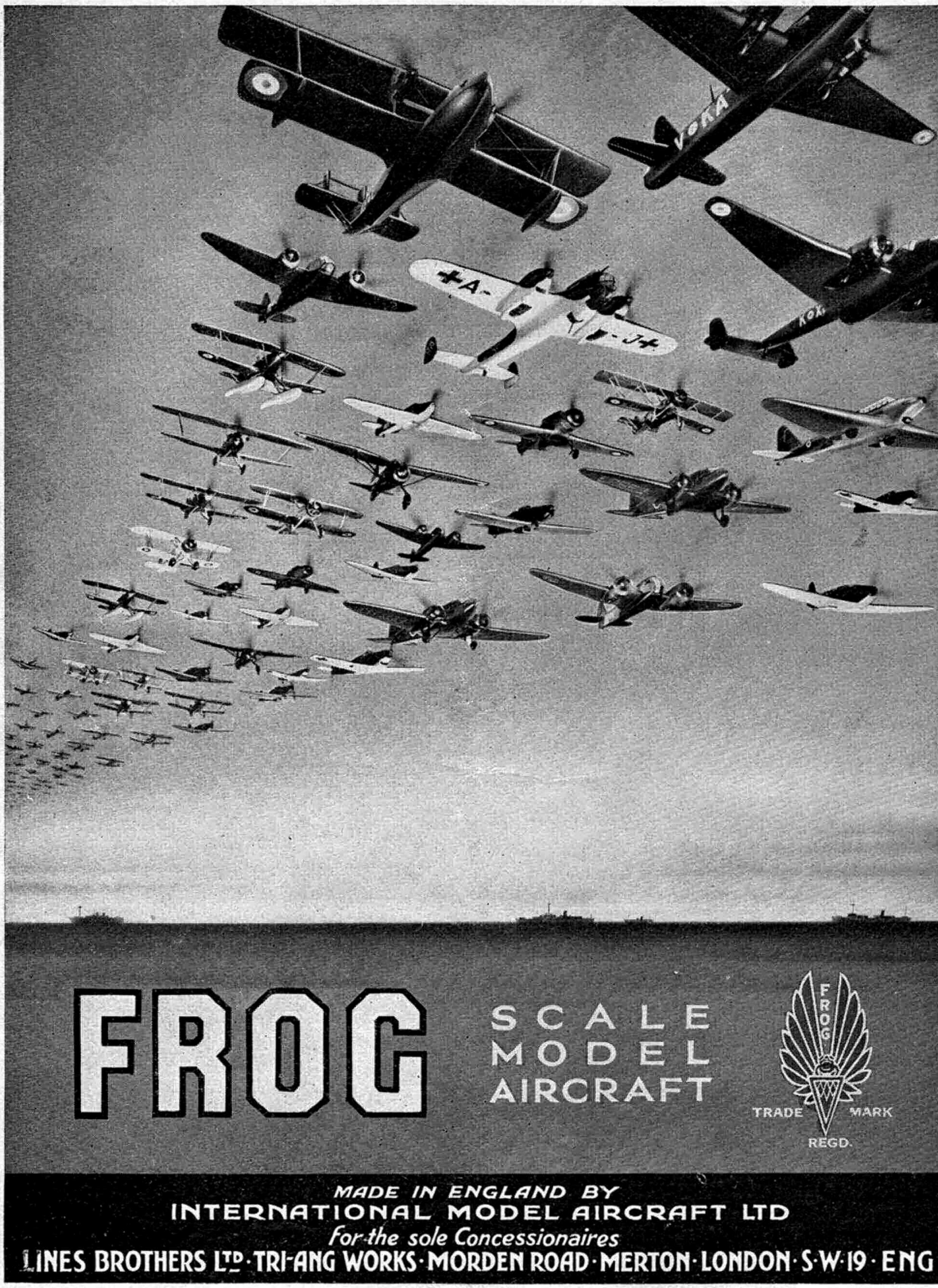
THE DESOUTTER SPORTS COUPÉ *Cont. from p. 507*

Biggleswade, and formerly belonged to the late R. O. Shuttleworth. G–AANB was originally the property of National Flying Services, Ltd., and was painted in their colours: top half of fuselage black, bottom half orange; white letters superimposed upon the black surface and aluminium wings. In 1939 it was stationed at Castle Bromwich and had a bright yellow fuselage with black letters, the flying surfaces being aluminium. It was impressed for duties with the R.A.F. in January, 1942.

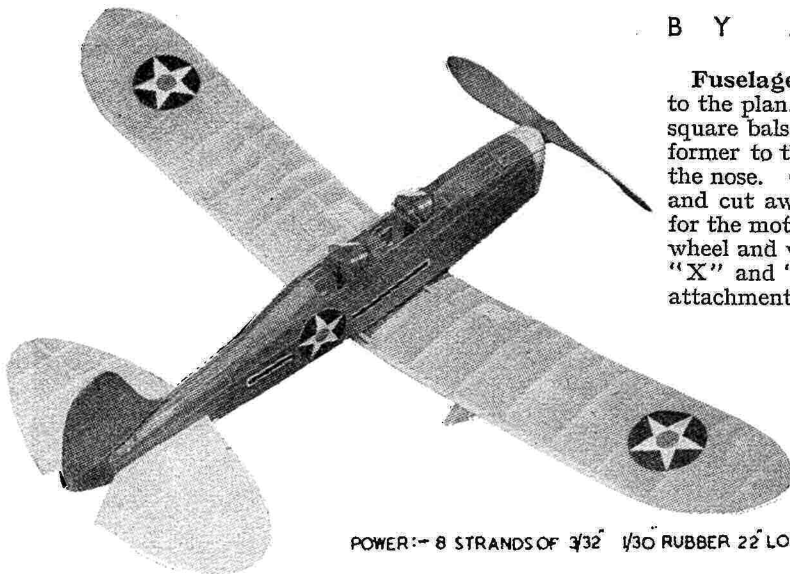
Specification: Three-seat cabin monoplane. Pilot in front, passengers side by side in rear seat.

Mark I: Span, 36 ft.; length, 27 ft.; height, 7 ft.; wing area, 190 sq. ft.; weight (empty), 1,100 lbs., (loaded), 1,900 lbs.; max. speed, 115 m.p.h., cruising, 100 m.p.h., landing, 50 m.p.h.; range, 450 miles; ceiling, 18,000 ft. Power plants: 95 h.p. A.D.C. "Cirrus III," 4-in-line air-cooled; 105–115 h.p. "Cirrus Hermes I," 4-in-line air-cooled.

Mark II: Span, 35 ft. 8 ins.; length, 26 ft.; height, 7 ft.; wing area, 183 sq. ft.; weight (empty), 1,180 lbs., (loaded), 1,900 lbs.; max. speed, 125 m.p.h., cruising 100 m.p.h., landing, 50 m.p.h.; range 500 miles; ceiling, 20,000 ft. Power plant: 120 h.p. D.H. " Gipsy III " inverted 4-in-line air-cooled engine.


FROG
SCALE
MODEL
AIRCRAFT
FROG
TRADE MARK
REGD.
MADE IN ENGLAND BY
INTERNATIONAL MODEL AIRCRAFT LTD
For the sole Concessionaires
LINES BROTHERS LTD · TRI-ANG WORKS · MORDEN ROAD · MERTON · LONDON · S·W·19 · ENG

PLAN BELOW
IS HALF SIZE



THE RYAN P.T-20

BY K · EDGERTON

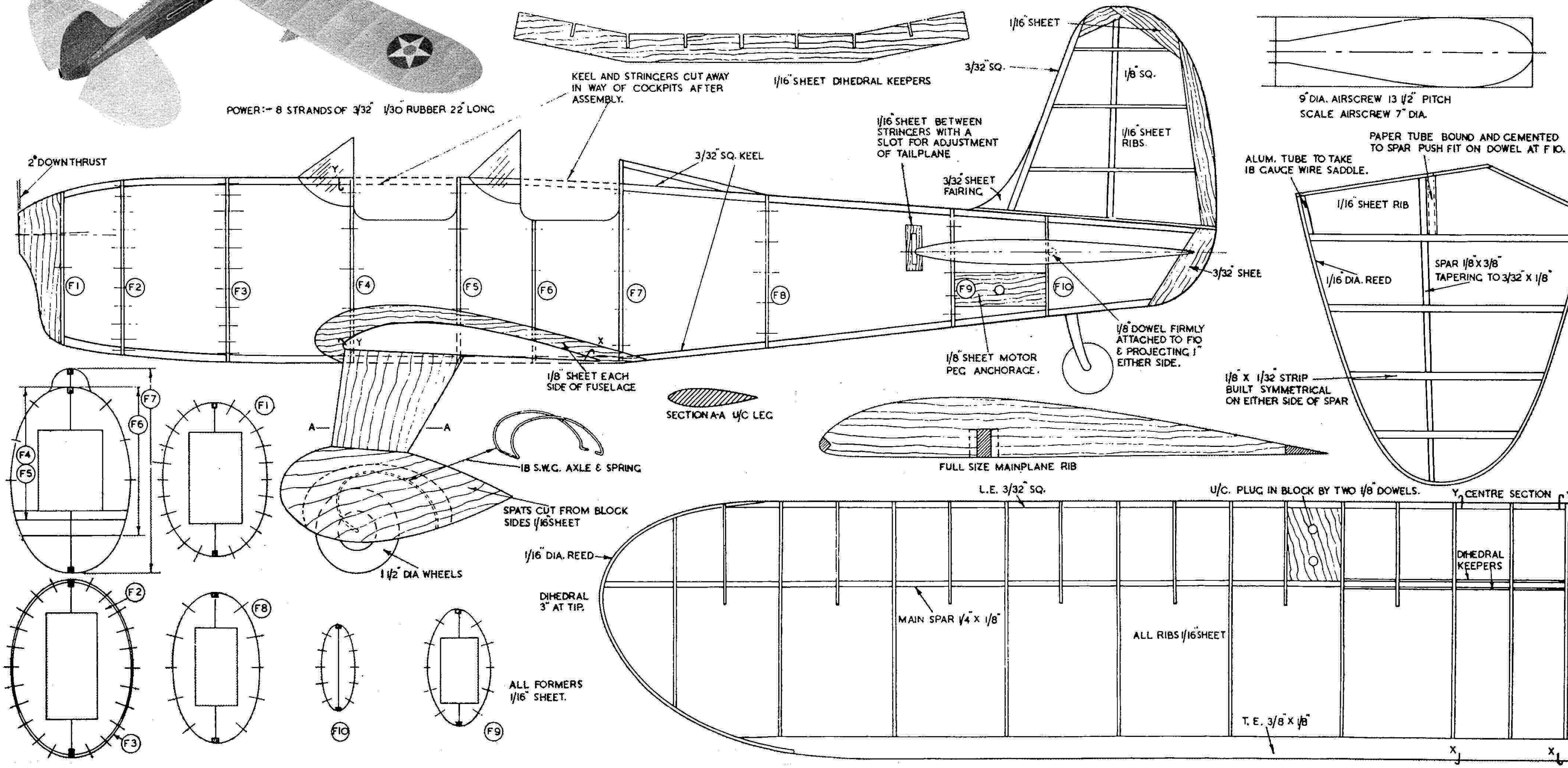
Fuselage. Consists of a 3/32 in. square outline pinned to the plan. Add half-formers and stringers of 1/16 in. square balsa. Take off plan when dry and attach half-former to the other side. Note the extra stringers near the nose. Glue at each side the 1/8 in. sheet wing fairing and cut away the 3/32 in. square outline. The sheet for the motor peg is added together with a dummy tail wheel and windscreens. The wing attachment hooks at "X" and "Y" are also put in position. The method of attachment is as follows :—There are hooks "X" "X" and "Y" "Y" on the centre section of the wing. Around these a rubber band is passed and fitted to the corresponding hook on the fuselage. That is, the rubber band from "X" "X" on the wing fits over hook "X" on the fuselage.

Wings are built on the plan and no difficulty should be experienced. After building the tips should be propped up to give 3 in. dihedral. The centre is held by a piece of 1/16 in. sheet or 3-ply on each side of the spars. The centre section may be covered with 1/32 in. sheet to protect it from the fuselage. The U/C blocks must be secured very firmly in the wing.

Undercarriage should be made from very light material. The spars are carved from block about 1/2 in. thick and the centres cut away. The wheels and springs (see plan) are then fixed in place and 1/16 in. hard sheet is added to each side. The springs and axles are made from one piece of 18 S.W.G. wire.

Tail. This is built on the plan. No difficulty should be experienced on the fin, and with a little care on the elevators a very light tail unit should result. If desired the tail ribs could be cut from sheet. The fin uses a similar section to the tailplane. The tail and fin are glued to the fuselage. The tail is set at 0:0 incidence.

Finish. The whole machine was covered with yellow tissue and the fuselage and wings given two coats of dope while for the tail unit one coat sufficed. U.S.A. markings were attached to the fin. For true scale bracing should be added to the wings and tail, but as this model was intended primarily for flying this was omitted.



Readers' . . . . . . Letters

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

DEAR SIR,

Reference your April issue of the AEROMODELLER which I have just received, quoting caption under photograph on page 256. "We have yet to see models of this standard in this country. British 'solid' modellers had better look to their laurels."

Please don't blame the poor British modeller—blame yourselves! What can the average modeller do if the only support he gets for scale models is either 1/72nd solid or flying scale. There have never been any articles on super detailed scale exhibition modelling. As long as your own narrow-minded policy continues to follow the track of 1/72nd solids there will never be any scale models to compare with those superb and intricately detailed models which are comparatively common in Canada and the U.S.

Let us forget that there ever were SOLID models and on to ½ in. scale (or more) models which are something more than chunks of wood, with the likeness of some full-sized craft *painted on!*

It is my firm opinion that there is not a single modeller in the country (including Duration fans) who would not like to have at least one such model in his drawing-room proudly flaunting the skill of its builder.

C.M.F. F. C. NEVILLE.

[*We invite other readers' views*—ED.]

DEAR SIR,

I have had only two year's experience at aeromodelling and have been keenly interested in the various formulae which are published for the benefit (?) of the aeromodeller. Now I have with success used some of these formulae, being careful first to fully understand them and also to prove them to be true.

One, however, I cannot believe, and that one is the rate of climb formula found in Mr. Russell's and other books: the formula is $R/C = \frac{\text{EXCESS HP} \times 33{,}000}{W}$ ft. per min.

This would be true if the excess horse-power was pulling the aeroplane upwards, but this is not the case. The excess horse-power over that required for normal level flight will produce a higher speed which in turn will produce an excess lift. Now it is this excess lift which will determine the rate of climb. In my opinion, the highest R/C will be when the lift for normal flight and excess lift equals the weight and the resistance to upward motion.

The excess lift will be easy to find, but the resistance to upward motion will be rather complex, involving many factors.

I hope I have made my theory quite clear, and that other people will prove and understand formulae before they apply them. What do other readers think?

Cheshire. B. FAULKNER.

DEAR SIR,

Having read Mr. R. Flanagan's letter in the June issue of the AEROMODELLER, we feel that this would be a good opportunity to straighten out one or two misconceptions held by many aeromodellers.

Referring to the first part of Mr. Flanagan's letter relating to the climb of a model aircraft. If he will look up the article by one of the writers in the February issue of the AEROMODELLER he will find a proof of the formula $Vc = V\sqrt{\cos\theta}$—(5), which shows that the climbing speed of a model must necessarily be less than that for normal level flight as a model aircraft flies essentially at a constant angle of incidence.

We interpret Mr. Warring's figures as 16 f.p.s. relating to climb under initial burst of power, 20 f.p.s. end of climb, and 24 f.p.s. normal level flight. The latter speed for end of cruise is taken as meaning level flight and not gliding.

We do not know where Mr. Flanagan has found his well-known rule or statement of aerodynamics, but would put forward the following observations:—

(1) The model climbs because the thrust and not the speed is more than that required for normal level flight. The excess power thus available over and above that required to overcome drag is absorbed in lifting the model, *i.e.*, increasing its potential energy.

(2) Cruising: the attitude of the model remains unchanged and the slight increase in speed is brought about as shown in the above equation. As θ decreases, cos θ increases until it reaches one when $\theta = O$ and $Vc = V$. θ of course decreases as the excess thrust decreases.

(3) End of cruise: when the thrust from the motor disappears the nose of the model drops until the drag is balanced by the component of the model's weight, acting along the thrust line. It still, however, retains the same angle of incidence or attitude in relation to its new flight path.

We also would like to know how Mr. Warring read his airspeed indicator. Did he borrow Drambuie for the afternoon?

We have stated above that the angle of incidence does not vary with thrust, but readers can, of course, see that this implies a properly designed model in which lift, drag, thrust and weight all act at right angles through one point. If the centre of pressure does not coincide with the centre of gravity, and this couple is balanced by another couple due to thrust and drag not being in line, the angle of incidence will, of course, vary with thrust, though any consequent speed variation will be small. We accept no responsibility for improperly designed models requiring downthrust! Incidentally, as far as glide is concerned the formula $Vc = V\sqrt{\cos\theta}$ still holds, although Vc is now the gliding speed.

Referring to airscrews, maximum efficiency is required throughout the flight. Mr. Flanagan appears to assume that $J = \frac{V}{nD}$, and therefore V/n must be kept constant. This, however, is not so far as variable pitch airscrews are concerned, as J for maximum efficiency will vary with the pitch setting of the blades. For maximum efficiency under any conditions of forward speed and revolutions, the angle of incidence of the blades must be such that the C_L/C_D ratio is a maximum. It is this angle of incidence that must be kept constant under varying torque conditions.

To absorb the high initial power we must have either high revolutions with the blades at their best angle or a high torque coefficient, which means a very coarse blade setting. This latter condition will be very inefficient as the C_L/C_D ratio of the blades will be low and, in fact, may even reach the stalled condition. If Mr. Flanagan will draw out the velocity triangles of a blade section for a constant forward speed for both high and low revolutions he will find that for high revolutions the pitch must be kept low, and for low revolutions the pitch must be coarse. The blades must therefore vary from fine to coarse pitch throughout the flight.

We hope the above will help Mr. Flanagan to straighten out his ideas, if not his airscrew helix, but would add from experience that a little knowledge is a dangerous thing. Seriously, however, we welcome the fact that the AEROMODELLER is progressively-minded enough to spare valuable space to raise these controversial subjects as in doing so many interesting points come to light. Old and misconceived ideas are replaced by more accurate theories and the aeromodelling world in general benefits

"C." & "D."

[*Mr. Flanagan has asked us to point out various typographical errors in his original article. In paragraphs* 6 *and* 10 *the word* altitude *should read* attitude, *and we requote paragraph* 10 *in which certain words were omitted.*

" The explanation lies in the fact that the climbing attitude of a model is not induced as a result of an increased forward speed, but as a result of the thrust acting about the centre of resistance of the model, causing a ' nosing up ' tendency ; this ' nosing up ' effect being in proportion to the thrust developed, and causing the model to climb, even though the climbing velocity might be less than the average level flight velocity."

Much correspondence has reached us on the above subject, and we hope to publish further letters in due course.—Ed.]

Dear Sir,

I have been reading the Aeromodeller for some five or six years, and with one exception I consider it a fine magazine. In recent years there have appeared various articles by mathematical geniuses who endeavour to enlighten one on aeromodelling merely by the use of figures. Personally, I had to give up trying to understand them long ago, but I am sure I do not speak for myself alone when I say that many of the people who read the Aeromodeller just look at these articles and say, " Here's some more of this indoor theory," and just pass on to the next page. I agree that a certain amount of theory has to be used in aeromodelling, but why don't we see these people who are so good at putting it on paper running at the top of competitions ? If they are as clever as they try to make out in their articles let us see them prove it. According to the way they write, it should be a walkover for them with their theories. For myself, I should like to see articles by the men who win the competitions. Looking through an old edition of " The Model Aeroplane Constructor " I found I enjoyed the articles which were precise and easy to understand. There you had articles by the men who won the competitions, not a lot of theory only. So let us see articles that the average modeller can understand and wait until the theorists *prove* their articles by winning a National Competition or at least getting in the first few places.

Bristol. W. J. Gould.

[*We invite views from other readers on this point. Also contributions from Competition winners—as to why they won—and from losers—as to why they lost !—Ed.*]

Dear Sir,

I wonder if I might be permitted to reply to the two Readers' Letters, in the July Aeromodeller, which directly concern me ?

Aspect Ratio.

Mr. Harvey deserves credit for being the first to publicly cast doubts on the high aspect ratio fetish, but I fear that his contentions were lost on the aeromodelling public at that time, because his final formula was of little practical value. As he mentions, it is applicable only when the Cl. is 0·4 ; but, further, it is restricted to VL. values of less than 8.

Downthrust.

The chances are that Mr. Annenberg will be somewhat taken aback when I state that his suggestions are in line with my theory, and not contrary to it. Yet such is the case. Mine is a general theory covering all thrust line positions in the vertical plane, and the fact that Mr. Annenberg wishes to design a model having no " downthrust " in no way lessens the need for a " downthrust " theory. He might as well say that by setting a tailplane at its no-lift angle of attack he can dispense with the general theory of lift. Possibly the confusion arises from references, in my article, to the pitching moment exerted by the thrust, but there is no earthly reason why this pitching moment should not be zero. And the theory applies equally well whether the thrust's pitching moment be 0 in. oz. or, say, 6 in. oz.

It may interest Mr. Annenberg to know that my last two experimental duration models incorporated precisely the set-up he suggests. On the other hand, in some types of model a varying pitching moment is beneficial. Examples of this may be found in rubber-driven speed models, and in those models-gone-wrong—the flying bombs.

J. H. Maxwell.

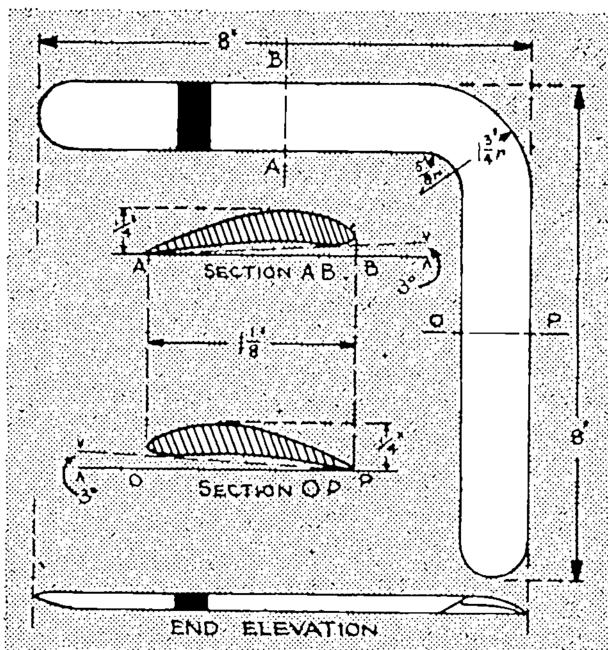
HOW TO MAKE AND THROW A BOOMERANG

BY E · BUSH

Cut out the shape of the boomerang, as shown in the drawing, from $\frac{1}{4}$ in. plywood. If the sheet available is not large enough the arms can be joined and glued at the centre. File the arms to the cross-sectional shape as shown on the drawing, but only as far as the radius at the centre. This part is shaped when the arms are finished, so as to absorb their change of inclination, or twist. The tips should then be filed upwards as indicated, and the boomerang finished off with a fine grade glasspaper. A ring is drawn around one arm (*i.e.*, the one indicated), after which a layer of varnish can be applied.

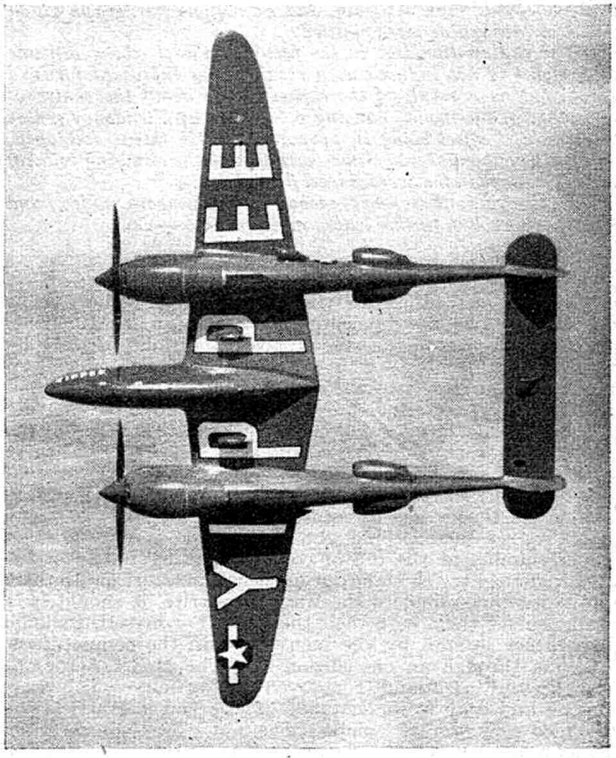
The boomerang is now ready to be thrown. Grip it between thumb and two fingers of the right hand, as in the diagram. Holding the boomerang vertically, with the CONCAVE edge forward, draw the right arm back over your shoulder and throw the boomerang parallel with the ground, imparting to it as much rotation as possible. The boomerang will then describe a circle in clockwise direction and return to the near vicinity of the thrower.

By trial and error (*i.e.*, altering the angle slightly from the vertical when throwing), the boomerang can be made to return directly to the thrower, and be caught by the hand that threw it.



MONTHLY · MEMORANDA ·

BY O · G · THETFORD



This P.38, painted all red and christened "Yippee" (Y.P-38), was flown over workers at the Lockheed Aircraft Corporation's works at Burbank, California. It symbolised the 13,000th warplane turned out by the factory, and the 5,000th "Lightning" produced by Lockheed.

Pacific Roundels——

INFORMATION on British aircraft markings in the Pacific and S.E. Asia, often requested by readers, is singularly difficult to obtain because of the vigorous censorship prevailing in this war theatre. Scraps of information do leak out sometimes, however, and a recent report states that the latest roundel used on R.A.F., R.A.A.F. and R.N.Z.A.F. aeroplanes in this area consists of a standard red, white and blue and yellow marking against a white rectangle, generally similar to the present United States national insignia. Prior to this announcement, the standard roundel in the Pacific was blue and white, with the red centre removed. On some machines the blue and white fuselage roundel was outlined in yellow against the camouflage. Aircraft operating in the Pacific with British markings now include the Vickers Armstrongs Spitfire VII, the Hawker Hurricane IIC (Tropical) and IID (Tropical), the De Havilland Mosquito, the Bristol Beaufighter, the Bristol Beaufort, the Short Sunderland III, the Vultee Vengeance, the Curtiss Helldiver (monoplane), the Curtiss Kittyhawk, the Commonwealth Boomerang and the Lockheed Ventura.

Those British Lightings——

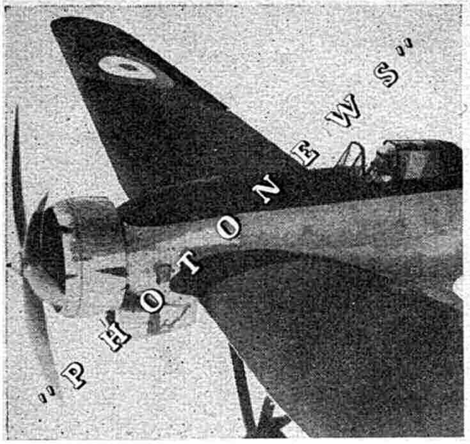
There has been much confusion about the use of the Lockheed Lightning in the R.A.F. It all started with the release of photographs in 1942, showing a Lightning in British roundels and camouflage. It was generally concluded that the type was scheduled for service with British fighter squadrons, but this was neither confirmed nor denied in official quarters. This atmosphere of secrecy surrounded the British Lightning for two years and it is only recently that the full story has been told by the Lockheed Aircraft Corporation.

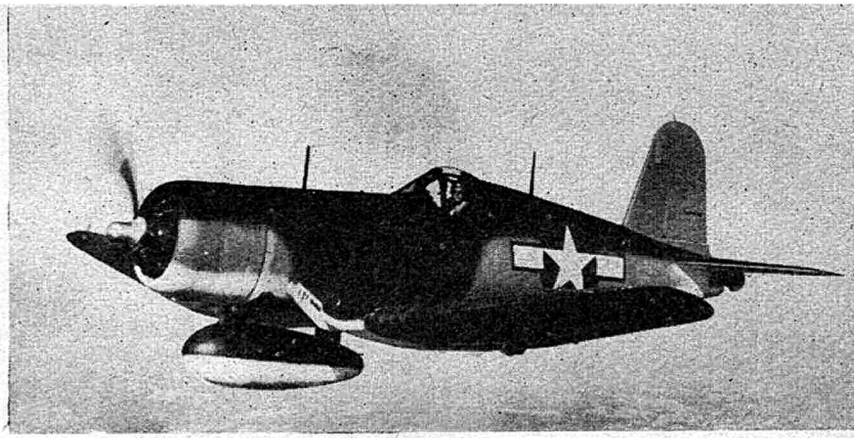
The British Government placed an order for the "Lightning I," known to the manufacturers as the Model 322–61, in March, 1940, and the first machine to this order was delivered in December, 1941. The "Lightning I" was waggishly described by Lockheed engineers as the "castrated P–38," because it was specially built *without* turbo-superchargers or counter-rotating airscrews. As later types of Allison were still restricted, the old C–15 motor used in the original XP–38 prototype was fitted in the British Lightning, and armament consisted of a 20 mm. cannon and four ·50 calibre guns in the nose. Further modifications to British order included a British instrument panel and British radio installation. Extensive tests with the first "Lightning I" proved the machine unsatisfactory for R.A.F. use, and the 143 machines which had been built were converted back into U.S. versions for the U.S. Army. These ex-British Lightnings were used for advanced trainers and given the designation P–322. They all had the C–15 motor taken out and an Allison F–5 installed in its place.

Late in 1941 work on a second British version, the 'Lightning II," commenced. The "Lightning II" was known to the Lockheed Corporation as the Model 322–60, and the "first-off" was delivered in August, 1942. The mistake of deleting the turbo-superchargers and counter-rotating airscrews had been realised by the British authorities, and "Lightning II" incorporated both features. However, the "Lightning II" also failed to meet with the approval of the R.A.F., and British versions in the U.S.A. were re-built with Allison F–10 motors as P–322 advanced trainers for the U.S.A.A.F. All the converted machines received U.S. Army camouflage in place of their British markings.

Two Miles Fighters——

News was released in June, 1944, of two Miles fighter monoplanes built in just over nine weeks during the Battle of Britain in 1940. They were specially produced to meet the possibility of a shortage of fighters, but as this situation never arose did not go into production. The Miles M.20, as it was called, was of wooden construction and to simplify production had fixed undercarriage and a standard Merlin XX "power-egg." Many Master training aeroplane parts were utilised. There were two versions produced, a land fighter and a Fleet fighter. The land fighter was uncamouflaged and carried the experimental number "U 9" on the fuselage (which had no roundel); red, white and blue stripes on the fin, and red, white and blue roundels on the wings. The Fleet fighter, numbered "U–0228," was shadow-shaded in green and brown on the upper surfaces and duck-egg blue underneath. It had red, white and blue stripes on the fin; red, white, blue and yellow roundel on the fuselage; red and blue above the wings; and red, white and blue beneath. Both fighters were ahead of their time in having a "tear-drop" cockpit hood for the pilot. The Fleet version had special catapult points and modified spats. The airscrew and spinner was finished black on both types.





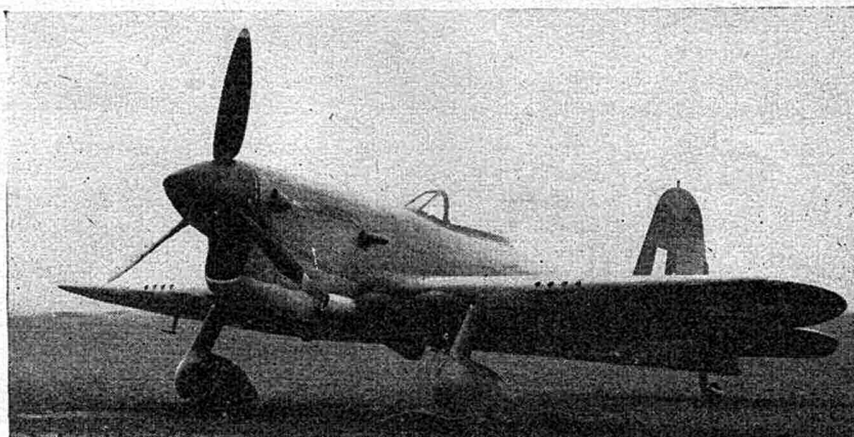
What is it? (above.) **Answer on page 531.**
Fox Photo.

Above, right, is a new picture of the Chance Vought Corsair II, now fitted with a droppable long-range tank. *(Photo: United Aircraft Corporation.)*

Right: The Miles M-20 fighter of 1940, which did not go into production.
(Photo: Miles Aircraft, Ltd.)

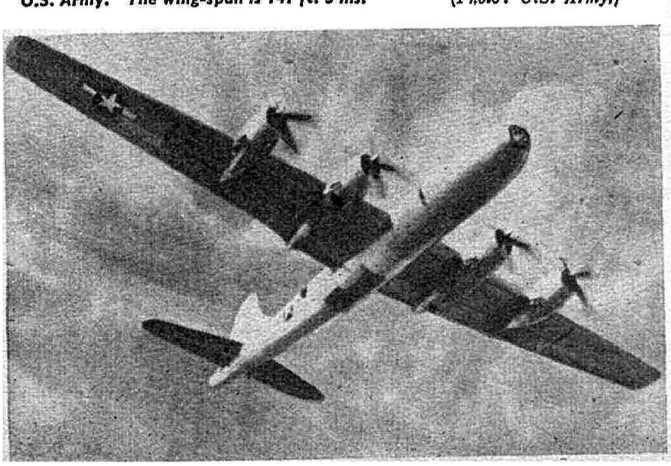
Below is the latest version of Mustang, the P-51D fitted with a "blister" cockpit.
(Photo: North American Aviation.)

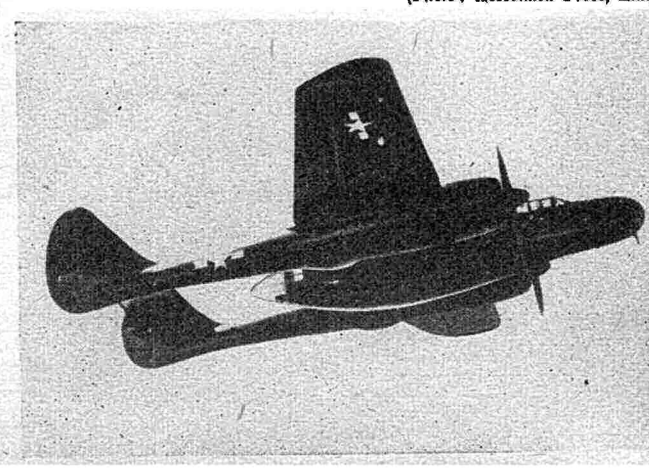
Below, right, is the Boeing AT-15 Crewmaker.
(Photo: U.S. Army.)



The Boeing B-29 Superfortress (below) is now in service with the U.S. Army. The wing-span is 141 ft. 3 ins. *(Photo: U.S. Army.)*

Northrop's P-61 Black Widow, photographed on its test flights.
(Photo: Associated Press, Ltd.)



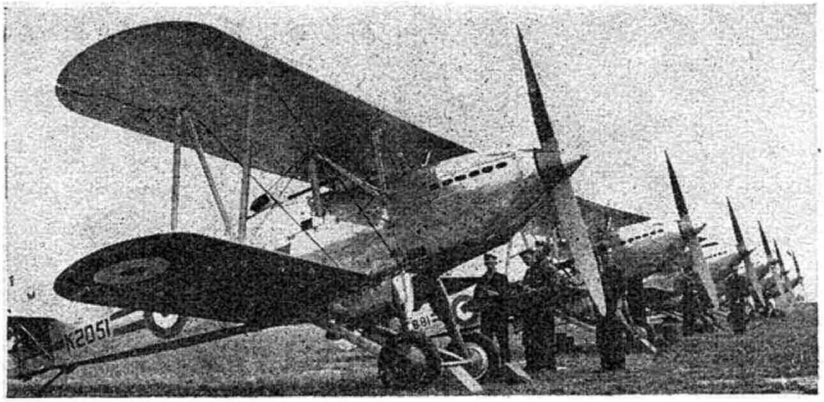


AEROPLANES DESCRIBED XX

THE HAWKER FURY

BY H · J · COOPER

NEXT MONTH: The Spitfire XII.



The Aerobatic Flight of No. 1 (F) Squadron ready to leave for Zürich, with two reserve aircraft. (*Fox photo.*)

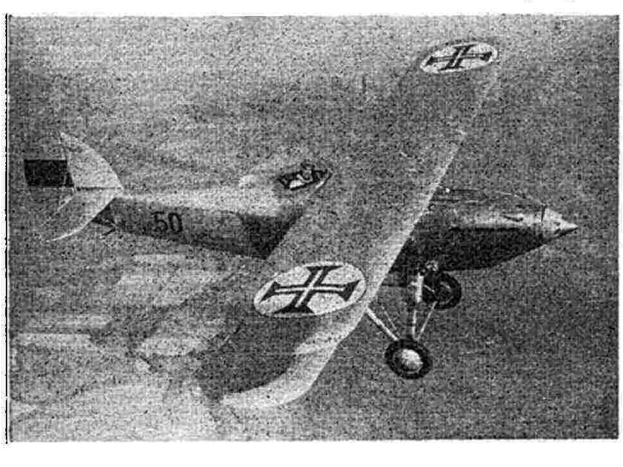
IN 1929 the H.G. Hawker Engineering Company (now Hawker Aircraft, Ltd.) produced two outstanding fighter designs, the first being the Jupiter-powered biplane built to Air Ministry specification F.20/27, and the second the Hornet with a Rolls-Royce F.XI motor. Both of these aircraft had a maximum speed of 214 m.p.h. at 10,000 feet (about 50 m.p.h. faster than standard fighters then in service with the Royal Air Force), and from them was developed the Fury high-performance interceptor, the immediate predecessor of the Hurricane.

The Fury was an aristocrat in aircraft design. Lethal and polished, it had the air of a Raffles, with long elegant legs and finely-poised efficiency. Exceptionally responsive to controls, the Fury was ideal as an interceptor.

Mr. C. Rupert Moore's cover painting this month shows the Aerobatic Flight of Furies of No. 1 (Fighter) Squadron, which propagated the thoroughness of R.A.F. training in 1937.

Flight aerobatics with three aircraft in formation call for flying of the highest standard, with perfect judgment on the part of the pilots and 100 per cent. perfection in the rigging of the aircraft and the tuning of their motors. When a fourth machine is added "in the box" it must fly just sufficiently below the leading aircraft to avoid the slipstream from it, and the increased difficulty can be readily imagined.

"Flight" photo.



The Fury as supplied to Portugal.

This Flight performed at the 1937 and final Hendon Air Display, and was subsequently sent to Zürich to take part in the International Air Meeting later the same year. Finer flying has never been seen. The manner in which the flight looped in line astern, and formed a "diamond" formation on the second loop, was fascinating and very pretty. The rolls off the tops of loops, with the fourth aircraft just so much below the others were almost incredible. And they were executed at only about five hundred feet up.

After the appearance of the Fury I (Kestrel Is) in 1930, a later version was fitted with the Kestrel IIs motor, and there were other minor modifications. A metal panel was fitted in the fuselage immediately below the cockpit, and "N" centre-section struts were fitted in place of the former parallel type. The prototype Fury was numbered K 1926.

In 1933 a new machine was produced. It was called the Super-Fury, and was fitted with a 1,000 h.p. Kestrel S motor. It was generally similar in appearance to the standard Fury, but had tapered wings, with V interplane struts and slightly decreased span. The Super-Fury had a maximum speed of 245 m.p.h., but did not go into production.

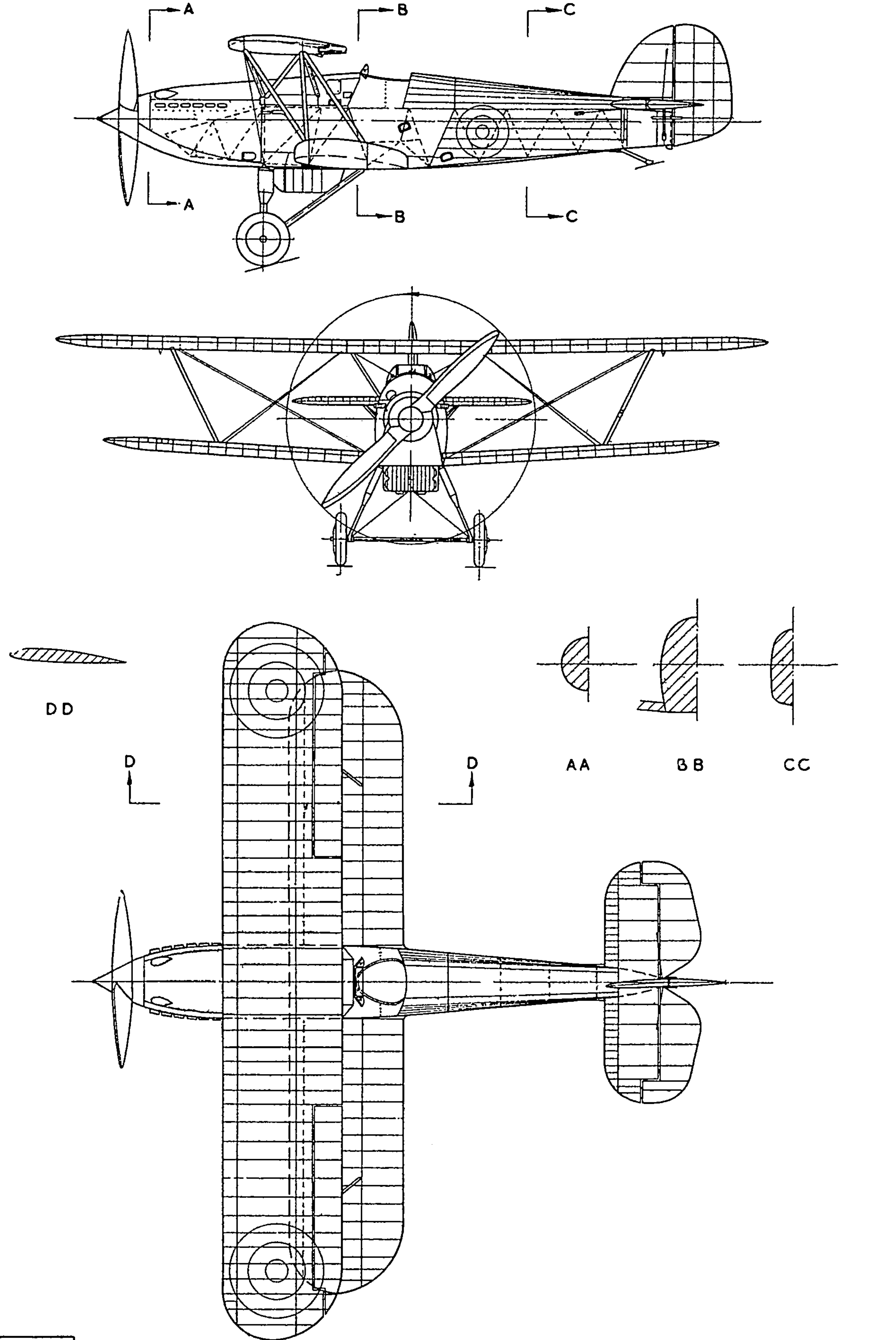
The same machine, K 3586, was modified in 1934 and became known as the Super-Fury II, or High-Speed Fury. It was fitted with a 700 h.p. Goshawk motor and did 238 m.p.h. A normal constant-chord upper plane was used, but the tapered lower plane of the Super-Fury was retained.

Also in 1934 was produced a single-seat biplane to specification F.7/30, to which specification was also built the Gloster biplane later known as the Gladiator. The Hawker F.7/30, or P.V.3, was slightly larger than the earlier Furies, and was, in fact, rather more like the Hart, it having a swept-back upper wing.

The standard Fury was later fitted with a Kestrel V motor, and there was a development aircraft known as the Intermediate Fury.

The Fury II was produced late in 1934 and went into service with No. 25 (Fighter) Squadron, R.A.F. This machine was fitted with wheel-spats and had a maximum speed of 223 m.p.h. It was also supplied, with minor modifications, to the Royal South African Air Force.

The Fury was replaced in the R.A.F. as a standard



HAWKER . FURY I

FT.

No. 25 (F) Squadron flying Fury IIs in echelon formation.
(*Photo: "The Aeroplane."*)

fighter in 1938, and was then relegated for training purposes. It is now known as the Fury (T).

The Fury has been fitted with other types of motor, both in-line and radial, and has been supplied in quantity to many foreign governments.

In 1933 a Panther-powered Fury was supplied to the Norwegian Air Service, and Furies fitted with Bristol Mercury and Pratt & Whitney Hornet radials were supplied to Iran.

The Fury was also fitted experimentally with the French Lorraine in-line motor, and the Portuguese *Aeronautica Milita* ordered some Kestrel IIs-powered versions.

A standard Fury bearing the civilian registration letters G–ABSE and fitted with a Kestrel IIs motor, is operated by the Hawker Company as an exhibition aircraft, and another machine is flying as a test-bed for the Merlin motor. This aircraft has a tapered lower wing, and does about 265 m.p.h.

Two further variations are those supplied to Spain and Jugoslavia in 1936. They both have Dowty undercarriage legs, like the Gladiator's, and rather deeper radiator tunnels than the former Furies. The Spanish-Fury had a 700 h.p. Hispano-Suiza XII Xbrs motor. Jugoslav-Furies built by Hawker's had 745 h.p. Kestrel XVIs, but those built under licence in Jugoslavia were equipped with Hispano-Suiza Nb motors. These Jugoslav-Furies had a maximum speed of 252 m.p.h., and were the fastest of the series to go into service.

At the time the Fury was being developed from the Hornet and the F.20/27, its naval version, the Nimrod (first known as the Norn) was emerging from the Hoopee fleet-fighter, having a Bristol Mercury radial motor.

The Nimrod was powered by a Kestrel Is motor, and, apart from one or two minor points, was identical externally with the Fury.

The Mk. II, however, had a wing-span increased to 33 ft. 6½ ins., and had a Kestrel IIs motor. The Nimrod could be fitted with a wheel or float undercarriage, and, like the Fury, formed the equipment of the Naval Air Services of Japan and Denmark being built under licence in the latter country.

The Fury was delivered to only three R.A.F. squadrons —Nos. 1, 25 and 43—and all were silver-doped. Each squadron had a distinctive marking, No. 1's being a pair of parallel red bars joined at the ends painted between the roundels on the upper wing and on the fuselage sides. In the latter position the bars tapered and met aft of the roundel, and were broken by the serial number in black.

The Aerobatic Flight bore the serial numbers K 2039, K 2043, K 2881 and K 5673. The latter machine was the Flight Commander's and had the fin and tailplane painted red, as were the wheels of all four. The squadron crest, a winged figure 1, was carried in a white spearhead on the fin of each aircraft.

No. 25 Squadron's marking was similar to No. 1's, but was in black, and the bars were not joined at the ends. No. 43 Squadron carried black and white dicing in the same positions.

The Fury was built on the Hawker patented steel-tube principle, and was covered with fabric, except for the metal panels forward of the cockpit.

Specification: Hawker Fury I (525 *h.p. Kestrel IIs*) Max. speed, 214 m.p.h. at 13,000 ft.; climb to 10,000 ft.: 9⅔ min.; landing speed, 70 m.p.h.; loaded weight, 3,310 lbs.; span (upper), 30 ft. 0 ins.; (lower), 26 ft. 0¼ in.; (centre-section), 5 ft. 6 ins.; chord (upper), 5 ft. 0 ins.; (lower), 4 ft. 10 ins.; length, 26 ft. 8¾ ins.; tailplane span, 10 ft. 0 ins.; tailplane chord, 2 ft. 3⅜ ins.; elevator chord, 1 ft. 8½ ins.; track, 5 ft. 9½ ins.; air-screw diameter, 10 ft. 6 ins.; incidence (upper), 3 degrees 20 mins.; (lower), 3 degrees 50 mins.; dihedral (upper), 1 degree; (lower), 3 degrees 30 mins.; fin offset (to port), 3 degrees; wing area, 251 sq. ft. Armament: 2 synchronised Vickers m/c. guns in fuselage.

The Spanish-Fury with Hispano motor and Dowty undercarriage.
"Flight" photo.

The Persian-Fury with Hornet motor.
(*Photo: Hawker Aircraft, Ltd.*)

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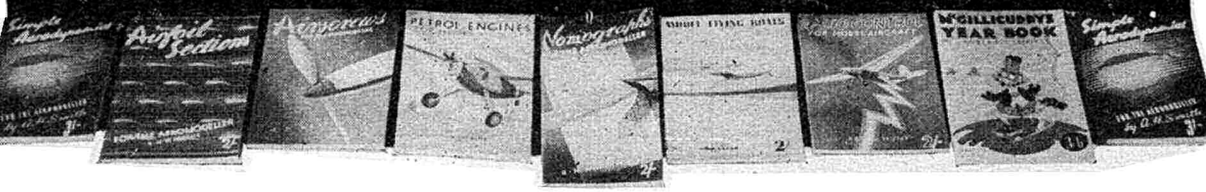

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CLUB NEWS

BY CLUBMAN

IN spite of a good start to the season (remember, the Gamage Cup actually lived down it's nickname of "Damage" Cup!), the modeller's bugbear, WIND, has put in its unwelcome appearance in no uncertain manner in the later competitions, with detrimental effects to times, models, and, I am sure, competitor's tempers.

However, it takes more than a drop of wind to put the skids under aeromodeller's efforts, and the times set up are a good indication of the determination of the keen flier. However, the numbers of club members who actually compete are still an infinitesimal section of the modelling public, and I still cannot find out a reason for this state of affairs. I realise that all are not interested in competition flying, but, after all, such competitive work forms the major portion of all club activities, yet the numbers who venture into the various types of National competition are a mere flea-bite in comparison with the club memberships. Anyone any ideas on the subject—and, what is more important, any suggestions for an improvement in the situation?

The Pharos Club are going great guns this year, taking the first six places in the M.E. No. 2 Cup, and, in fact, placing high in all events to date. Aylestone are running them a close second, as will be seen from the accompanying list of Plugge Cup positions; and it is pleasing to note the way some of the provincial clubs are killing the old bogey of the past, when London clubs seemed to have things all their own way. To those clubs who have yet to make a showing in the events I would recommend the study of past records, where it will be noted that some of to-day's highest standing clubs were in a very small way only a short time ago. It is not necessary to be a big club to make a show in competition work—all that is required is keenness, consistency, and regular entry into all events.

The NORTHERN AREA COUNCIL seem to be getting well into stride, and a well got up "News" is being distributed to all clubs in their area—both affiliated and unaffiliated. This is a good idea, and should encourage the affiliation of unattached clubs. (Perhaps the S.M.A.E. could take a leaf from the Northern book and likewise cater to some extent to unaffiliated clubs. Nothing like showing the public some of the benefits to be gained by full membership!)

One or two interesting bits of news from abroad this month. A. Hutchings writes from North Africa with news of his model building, and advising that the sun plays "old Harry" with covering—tightening and slackening off without warning. He has witnessed several meetings of a French model sailplane club, but states "the attitude of the members towards us was not exactly cordial!" What did you do—pinch all their beer?

B. E. D. Beckett writes from Egypt as follows: "*As secretary of the Worcester M.A.C. I was associated with aeromodelling in England until 1943. I am now Y.M.C.A. Welfare Officer attached R.A.F. in Egypt, and have been able to start a model club at the centre which I control. There are about twenty keen members, and some come along almost daily. Rubber is unobtainable, so we have to content ourselves with gliders, and as I write the boys are busy constructing a 7 ft. glider from which they expect great things. The rolling sand dunes here, stretching for miles with no obstructions, should be grand for models, but I shudder to think what would happen to a model should it get mixed up with a whirlwind!*"

A lady of Leeds M.F.C. complete with a "Flying Minutes." This photograph was sent by B. B. Crocker who complains of the lack of interest in Model Flying in the Leeds district. Frankly, we cannot understand it!

Another reader, Midshipman P. Baillie Lane, has just returned from Canada, where his parachute packer turned out to be Jack Adams, the well-known Canadian modeller, who sent his fine model over here in 1936 for the Wakefield Cup event, the model being flown by the Editor. Jack still models, but on a much restricted scale these days.

A large contingent from the ULSTER M.A.C. travelled south to Dublin, and spent a hectic week-end at the Fourth "Irish Nationals," organised by the Model Aeronautics Council of Eire. Jim Dunnigan won the principal event, for Wakefield models of Irish design. The Ulster lads also won the inter-club team glider event, and the well-known Dr. Charles placed second in the petrol event. This latter event was a real thrill for most of the chaps, many of them having never seen a petrol model airborne before! The contests were, as always, a perfect piece of organisation, the several thousand spectators being kept in control and fully informed through an excellent public address system.

The AYLESTONE M.F.C. are certainly piling up the Plugge Cup points, as will be seen from the list published elsewhere, and it looks like being a fighting finish between them and Pharos for the 1944 honours. Consistency of flights has been a big feature of the competitions, as evidenced by W. Jones' flights of 2 : 32·6, 2 : 37·4 and 2 : 04·1 in the Flight Cup. J. Tomlinson timed 2 : 16·2, 2 : 01·8 and 6·61—this latter flight being a new club r.o.g. record.

BLACKPOOL & FYLDE M.A.C. are pegging away at the S.M.A.E. contests in spite of absolutely l——y weather on most comp. days. R. V. Bentley seems to be doing most of the high times, and scored 171·2 secs. in the National Cup team effort. D. H. Whittaker leads the club championship to date with 426·7 points, Bentley being runner up.

The BUSHY PARK M.F.C. report some excellent

Like many of us, P. Teeman of Tunbridge Wells is waiting for the "piping days of peace" when engines are plentiful again. At present his 4-foot span petrol plane "Miss San Diego," is being flown as a glider.

flying in the Weston Cup event. A. H. Taylor's model, which won the Blackheath and Bushy Park open glider contests, made the best flight—2 : 45·5 o.o.s., next best time being 2 : 35 o.o.s. by A. Wright. The latter model has since won the Croydon Club's Rally, on which day A. T. and A. H. Taylor's gliders were lost, A. T.'s time of 2 : 33 being best of the day, in spite of low cloud and persistent rain.

After a long silence, news comes from the GRANTHAM M.A.C., who seem to have been doing plenty of glider flying recently. S. W. Spackman brought out an unfinished "pod and boom" job for testing in readiness for the Weston Cup, and after a few hand launches, an attempt was made off the winch. Away went the model for a new record of 10 : 43, the owner chasing it for 45 minutes before giving it up. However, the model was safely retrieved, but could not repeat its performance in the main event, when R. S. Shipley set up a new club record for tow launch gliders of 1 : 31. Several scale gliders have appeared recently, O. J. Lee's 40-in. span "Waco Hadrian" setting a scale towline record of 1 : 26·2. Finally, a new H.L. record of 4 : 55 was set up by J. Barker.

STEWARTON M.A.C. put on a good model show for the local "Salute the Soldier" week, and a total of £75 was handed over to the Savings Committee. Some research into low speed flying has resulted in a light model glider, A.R.6, with variable weight distribution, but results cannot be reported yet as the first trial ended when a horse ate the tail unit, and a second effort ending when the model tried to knock down a tree! The effort continues.

Performance is on the up and up with the STRETTON M.A.C. F. Vale's "Percy III" clocking 3 : 48 r.o.g.; D. A. Lacey's glider flying for 4 : 10; and F. N. Dowson's glider travelling over two miles for a time of 3 : 15. Lacey's model was actually in flight for over ten minutes.

On June 9th, the NORTHERN HEIGHTS M.F.C. welcomed members of the Cheam Club, and an interesting debate was held on the relative merits of Lightweight and Heavyweight models. No conclusive results appear to have been reached; at any rate none are mentioned. F. E. Wilson had bad luck in the National Cup contest, his model flying o.o.s. on its first flight after 2 : 52·5, was retrieved and again flew o.o.s. after 4 : 24, and again found too late to make a third flight. A Handicap contest was held for new members, winner being J. R. Miller with a total of 121·5 points, closely followed by D. E. Ackland with 98 points.

On July 23rd a team from the N.H. M.F.C. visited Brentford in the first round of the London District Cup, the results being as follows :—

Brentford and Chiswick.

Rubber.	A. Young	234	points.
	P. Gilbert	106	,,
Glider.	W. Marley	575	,,
	R. Connor	236	,,
	Total	633.5	points.

Northern Heights.

Rubber.	F. E. Wilson	388	points.
	D. Lofts	323	,,
Glider.	R. Copland	221	,,
	J. Davall	202·5	,,
	Total	1634·5	points.

David Kay, of 43, Saffron Street, Bletchley, Bucks., has managed to get a junior aeromodelling club going, known as the WATER EATON M.A.C., but finds it rather a handful. He would be obliged if an older chap could give a hand in running things, and I trust some older enthusiast will come to his help following this notice.

D. J. Bartlett has raised the MOUNTAIN ASH M.A.C. record to 1 : 38 with his Cloud "Zenith," T. Horseman holding the glider figure with 2 : 00. This club has been busy putting on a number of shows, and collected second and third places in the W. for V. show at Cardiff. Unfortunately, all the models received damage of some sort.

Due to bad weather, the activities of the BRISTOL & WEST M.A.C. have been confined to two or three barely reasonable flying days. In the National Cup event, the weather at first promising, turned windy, and finally rain set in. Generally low aggregates were set up, the models either being rapidly blown out of sight or forced down. K. Moon put up the best aggregate with 2 : 54·5. In the club Novice's Cup held on the same day, D. Jones lost his model on the second flight, timed 6 : 18·4, and won the contest with an aggregate of 7 : 08·7. (Beginner's luck ?) E. Hurley has produced a 5 ft. span glider with pod and boom fuselage and knock-off wings, the construction being almost entirely of newspaper—even to the boom. The result has been a strong, but rather heavy model, with a very smooth finish on wings and fuselage. It is considered that the type of construction has possibilities when a better bonding agent can be found for the paper.

While the weather at the LEEDS M.F.C. ground was not too bad on Pilcher Cup day, times were generally on the short side, best flight of the day being by B. Crocker's "Mick Farthing Glider," which went o.o.s. after 3 : 37·5 on its first flight. Only one entry was forthcoming for the Flight Cup, H. Tubbs aggregating 3 : 14·9.

The lads of the BIRMINGHAM M.A.C. have flown one or two comps., got wet, baked, half baked, won nowt, and are still smiling! Pilcher Cup day was a real soaker, and models were dried round a fire in a hut in between flights. (One lad hid his modesty in a cape while he dried his trousers !) A model meeting staged in aid of the "Brighter Birmingham" effort went off extremely well. Weather was ideal, the wind blowing in the only direction that gave the models a clear run for any distance, though times were lower than hoped for, owing to downdraughts from a row of houses. Results were :—

Open Duration.

R. Oliver (Kings Heath)	.. ..	4 : 28·7
F. Chatwin (B.M.A.C.)	.. ..	2 : 31·5
R. Perry (B.M.A.C.)	.. .. ..	1 : 42·8

Gliders.

D. Blair (B.M.A.C.)	.. .. ..	1 : 51·4
D. W. Harrison (B.M.A.C.)	.. ..	1 : 49
J. Craven (B.M.A.C.)	.. .. ..	1 : 20·6

Nomination.

M. Withy (Kings Heath)	..	·8 secs. error
M. Gregory (Kings Heath)	..	1·2 ,, ,,
G. Bradwell (B.M.A.C.)	..	1·3 ,, ,,

Gliders seem to be receiving all the attention of the LANCASTER & MORECAMBE M.A.C., the results of two recent competitions being :—

"Hornet Glider Cup."

A. Brown (King Falcon)	.. .. ..	8 : 41
P. Angus (Atalanta)	.. ..	3 : 14
J. Swindlehurst (King Falcon)	.. ..	3 : 12

"Lightweight Gliders."

S. Ellis (Atalanta)	.. .. ..	5 : 09·7
P. Angus (Atalanta)	.. ..	4 : 49·4
A. Brown (Atalanta)	.. .. ..	3 : 05

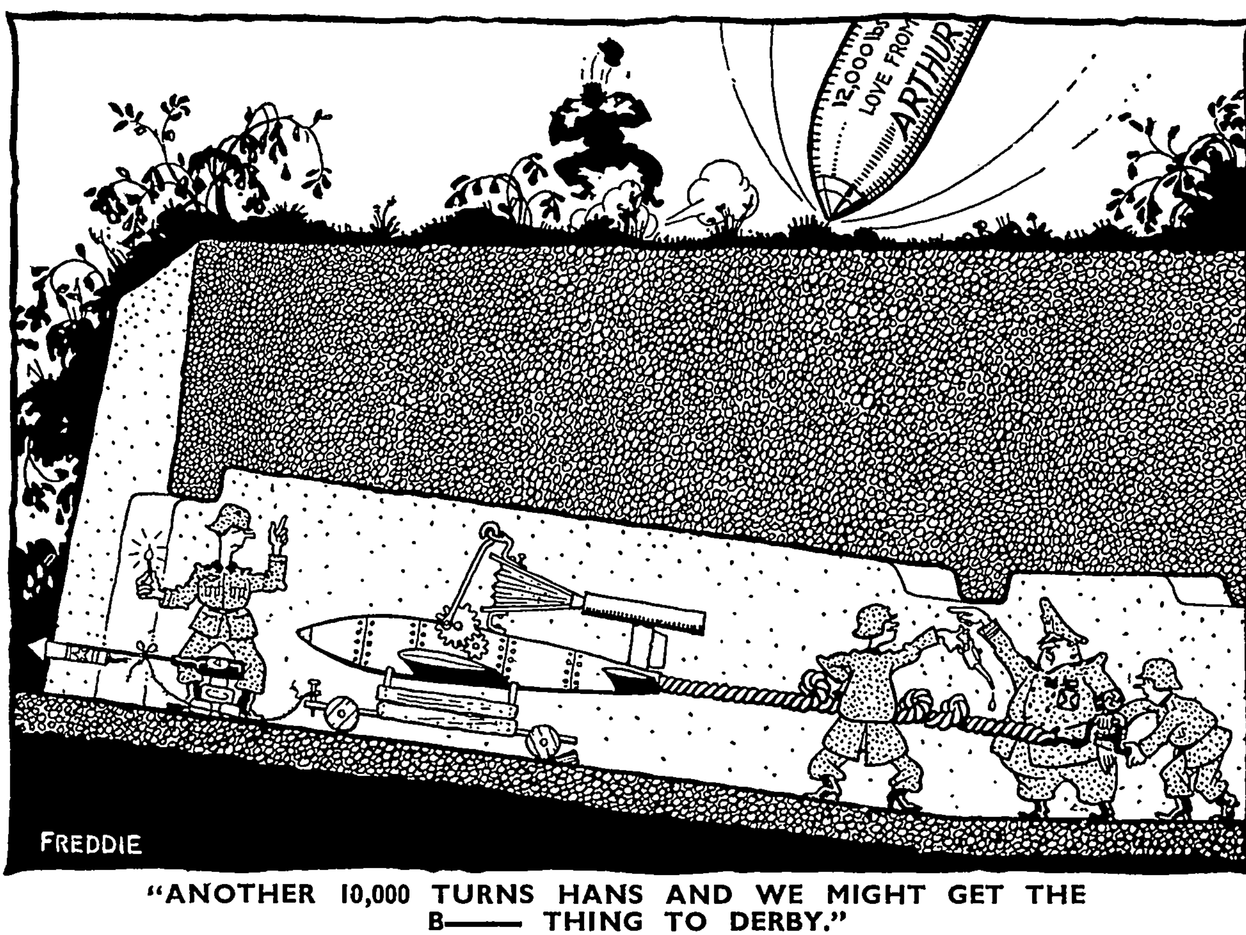
Swindlehurst broke the club glider record with a flight of ·9 : 04 o.o.s. with his model "Atalantis," a modified "Atalanta" with a wingspan of 78 ins.

Some good flying was recently witnessed on Baildon Moor when members of the BRADFORD M.A.C. competed for the "Silvio" Cup. T. London was the winner with a total time of 2 : 56·6, R. Gallagher putting up best time of the day with 1 : 26·2. A fortnight later, on about the best day so far experienced at this ground, N. Lees set up a new club record of 7 : 38, flying his Wakefield fitted with twin folding prop, retracting undercart and dethermaliser.

The TAUNTON & D.M.A.C. is still carrying on despite war conditions, activities being mainly centred around gliders. Some good flights have been witnessed, and the club record to date is held by J. Ford, whose model flew for 5 : 00 o.o.s. from a tow launch.

A small party of the SURBITON & D.M.F.C. cycled to Epsom Downs for the Croydon Gala (perhaps a boat would have been a better mode of transport !), and T. Laming won the junior "free for all"; D. Butler placing second in the senior event. The latter member put up a flight of 5 : 20·8 in the Flight Cup contest, weather being "almost perfect." What a change to hear that sort of news !

The weather around Norwich (and other areas !) has been too bad for (polite) words lately, but on the 16th July the club record was well and truly broken by junior



"ANOTHER 10,000 TURNS HANS AND WE MIGHT GET THE B—— THING TO DERBY."

PLUGGE CUP POSITIONS.

(Up to and including Flight Cup.)

1.	Pharos	2,932 points
2.	Aylestone	2,917 ,,
3.	Cheam	2,768 ,,
4.	Croydon	2,766 ,,
5.	Streatham	2,739 ,,
6.	Birmingham	2,735 ,,
7.	Blackheath	2,632 ,,
8.	Northern Heights	2,566 ,,
9.	Merseyside	2,562 ,,
10.	Surbiton	2,400 ,,
11.	Walthamstow	2,312 ,,
12.	Leeds	2,155 ,,

NATIONAL CUP.

1.	Rhyll M.A.C.	2008·9 secs.
2.	Pharos M.A.C.	1741·6 ,,
3.	Aylestone M.A.C.	1565 ,,
4.	Northern Heights	1484·5 ,,
5.	Birmingham M.A.C.	1381·7 ,,
6.	Merseyside M.A.S.	1274·6 ,,
7.	Surbiton M.A.C.	1255·6 ,,
8.	Blackheath M.F.C.	1135 ,,
9.	Croydon M.A.C.	1130·2 ,,
10.	Bradford M.A.S.	1103 ,,
11.	West Yorks M.A.S.	1086·1 ,,
12.	Streatham M.A.C.	904·5 ,,

(Teams from 26 clubs entered. Weather—windy.)

Best time : A. Armes (Pharos) 725 secs.

FLIGHT CUP.

		Points.
Young, A.	Brentford	780·1
Tomlinson, J.	Aylestone	675
Alexander, A. W. F.	Pharos	595·1
Cove, D.	Cheam	558·8
Dridney, F.	Walthamstow	547·2
Butler, D.	Surbiton	514·5
Jones, W.	Aylestone	434·1
Calvert, R.	West Yorks	424·6
Hawkins, P.	Rhyll	406
Buckeridge, J. P.	Pharos	395·6
Hughes, D. R.	Merseyside	381·2
Ivory, F.	Aylestone	367·6

(84 entries from 24 clubs.)

GUTTERIDGE TROPHY CONTEST.

		Secs.
1. D. W. Harrison	Birmingham	813·7
2. A. H. Lee	Bristol	651·55
3. R. Calvert	W. Yorks	618·4
4. N. Lees	Bradford	384·5
5. D. Lofts	Northern Heights	331·5
6. L. L. Pitcher	Croydon	327·6

Winner : D. W. Harrison, Birmingham.

England the winning country.

49 entries. 14 clubs. Average weather, windy and bright.

Best individual flight :

D. W. Harrison, Birmingham....666·2 secs.

NEW CLUBS.

BARFORD M.F.C.

R. Tillett, "Apple Acre," Barford, Norfolk.

WALTHAM & ENFIELD M.A.C.

B. Pegg, 96, Bullsmoor Lane, Enfield, Middlesex.

195 (Grimsby) SQUADRON A.T.C. M.A.C.

15, Melbourne Avenue, Grimsby, Lincs.

The Council of the S.M.A.E. thank everyone who has written to them recently, with kind offers of assistance, which are very greatly appreciated. Numbers have already forwarded orders for copies of the Journal without waiting to hear the cost or proposed contents. The Council assures you that they will strive to give you what you want in the Journal, and confidently expect the Club Report Section to be very popular. A number of clubs have been sending in details of their activities, and everyone is asked to write to the Editor as soon as possible, giving the news of his club. While on the subject of letters, the S.M.A.E. will be pleased to receive any suggestions for Indoor Contests, etc., for the winter months, as although they may be a long way off, it will give the Council time to consider them and make any necessary arrangements, and will also enable full details to be published in this News in ample time.

Many unaffiliated clubs are showing an increasing interest in the activities of the S.M.A.E. nowadays, and the Council would be glad if any members would let them know of the names and addresses of unaffiliated clubs in their area, as they would like to contact them from time to time informing them of items of special interest.

Entries into contests still remain encouragingly high in spite of poor weather conditions, and competition is keen for the leading places. Several new names have crept into the competition list, and are to be congratulated on their fine showing.

There is important news to hand of another grand contest open to all members of the S.M.A.E. The Bristol Aeroplane Company are presenting a fine trophy to the Society for competition among its members for the best Bristol Product model. This is open to Solid Scale Models, Flying Scale models (either rubber or power driven) of Bristol machines of any type, and there is no reason why some model engineers should not attempt a scale replica of a Bristol engine, or indeed, any of the mechanical units for which this firm is famous.

Models should be ready for judging by October 31st, 1944. Further details can be obtained from the Hon. Secretary of the S.M.A.E.

All those interested in the proposed Sir John Shelley Power-Driven Model Contest to be held on September 3rd, on a Midland Club's ground, should write to Mr. H. J. Towner, "Trencrom," King's Drive, Eastbourne, Sussex. We may not be able to give last minute details of this competition in the News in time, so write off as soon as possible.

The S.M.A.E. Northern Area are holding a contest open to all clubs on their circulation list, whether affiliated or not. This contest is to be held during October and is for open sailplane. Any type of launch with a towline of 300 ft. is permitted.

There is no truth in the rumour that all entrants into competitions must wind their own motors this season, although the matter may be raised at the next A.G.M. This should give everyone plenty of time to think it over.

member P. Hornagold. Winch launched into a very slight westerly wind, the model—a "Mick Farthing Glider"—gained height very quickly until it was a mere speck in the blue, remaining almost stationary over the field for some twenty minutes, and finally flew o.o.s. after an official time of 26 : 15. Model was recovered eventually from a farm some five miles away.

The NORTH KENT M.A.C. are flying on two grounds nowadays, though weather has curtailed flying to a great extent. A friendly competition arranged with the Sidcup section of the Blackheath Club (gliders only) resulted as follows :—

E. Lewis (Blackheath)	244·8
J. Upton (North Kent)	148·4
A. R. Parker (North Kent)	147·6
— Athey (Blackheath)	134·3
I. Lewis (Blackheath)	101·5
A. Hall (North Kent)	70·8

R. H. Bishop of 95, Drysdale Avenue, Chingford, E.4 (late of the R.A.F.), proposes forming a model club in that district to be known as the Lea Valley M.A.C., and requests all interested to get in touch with him at the above address. J. Ross, of 60, Craigendmuir Street, Blackhill, Glasgow, E.1, is also desirous of getting a club going, so hop to it.

That's all for this month, and the weather looks like being just a little kinder, so here's hoping you all find bags of thermals—and get your models back ! T.T.F.N. and M.G.B.T.S.W. (Guess that one had you beat—it's "May Gremlins Boost the Stop Watch.")

THE CLUBMAN.

ASSOCIATION OF BRITISH AEROMODELLERS.

Due to a misunderstanding, it was stated that the A.B.A. Competitions announced in last month's issue, were open to members only. These competitions are, in fact, "OPEN" to all aeromodellers, whether they belong to the A.B.A. or not.

Donations List No. 3.

	£	s.	d.
Trade Donations—			
A. N. Cutler, Worcester	1	1	0
J. & L. Randall, Ltd., Middlesex ..	5	0	0
Celestor Mfg. Co., Forest Hill ..	26	5	0
S. J. Garwood, Romford	1	1	0
St. Albans Model Depot, Herts. ..	1	1	0
H. F. Whitehead & Son, Essex ..	1	1	0
Maloney's, Romford		10	6
	£35	19	6
Other Donations—			
A. Sandeson	1	1	0
D. G. Darby		10	6
H. Heritage		7	6
R. E. Woodroffe		10	0
Sqd. Ldr. R. Watson	5	0	0
J. B. Richards	1	1	0
F. W. M. Power..	1	0	0
P. Derbyshire		5	0
	£9	15	0
To carry from List No. 2 ..	530	18	0
	£576	12	6

A.B.A. COMPETITIONS.

Entries are coming in fast and all aeromodellers are urged to take advantage of the splendid prizes offered.

Closing date for the following classes is Dec. 31st, 1944

1. Rubber-Driven Duration Models.
2. Rubber-Driven Flying Scale Models.
6. Sailplanes.
7. Rubber-Driven Seaplanes and Flying Boats.

Closing date for the following classes is Mar. 31st, 1945

3. Non-Flying Scale Models.
4. Power-Driven Models.
5. Motive Power Plants of any type other than Rubber.
8. Experimental Models.

All enquiries to the Secretary:

28, HANOVER STREET, LONDON, W.1

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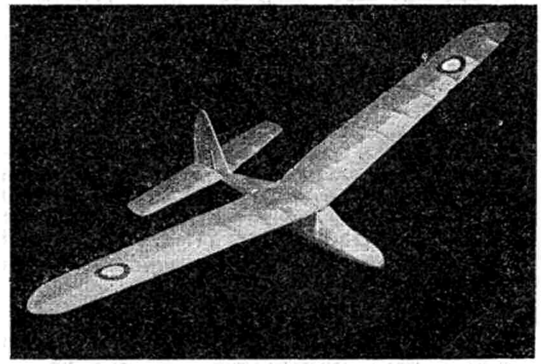

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No. 3	50 ,, ,,	12/11	

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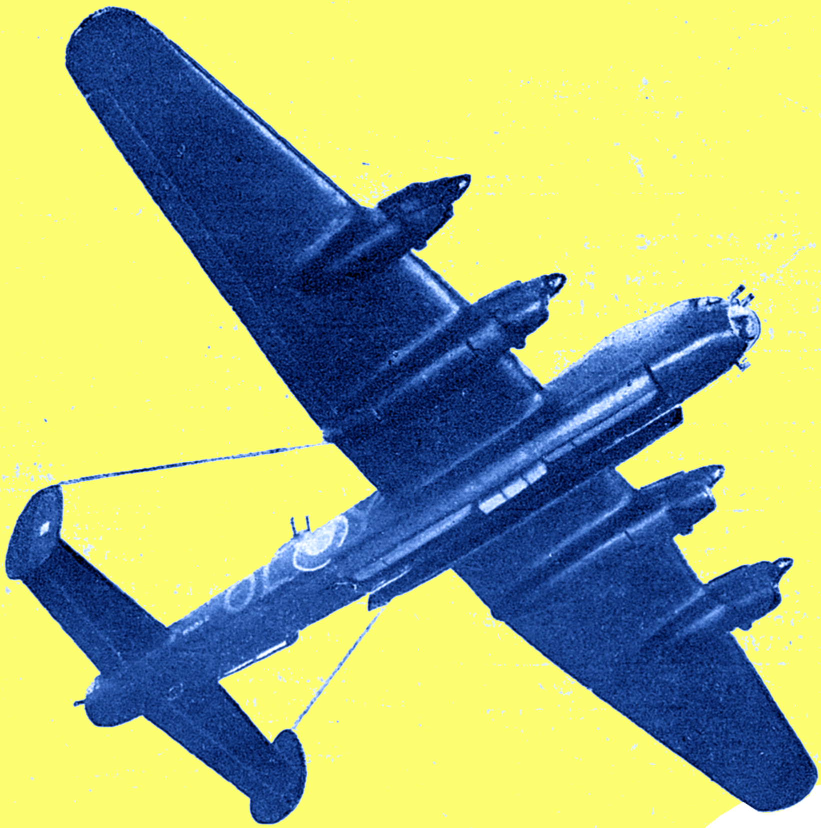
For accuracy and detail



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