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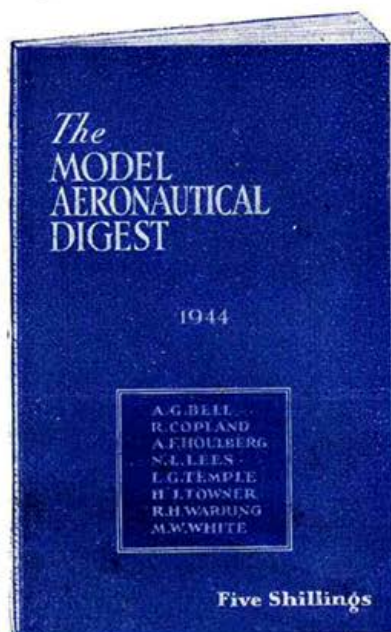
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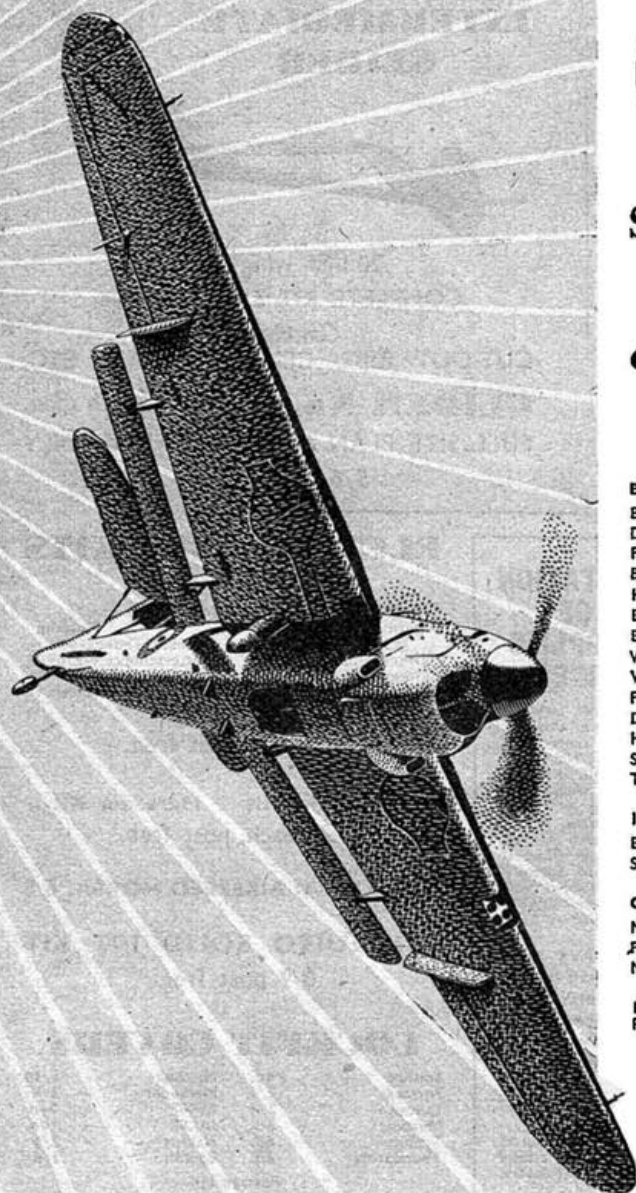
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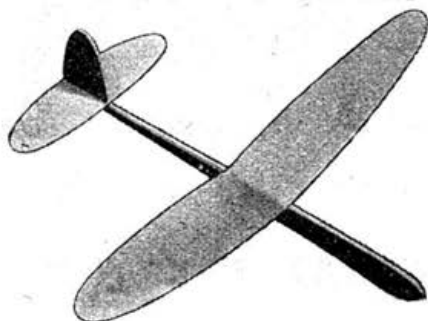


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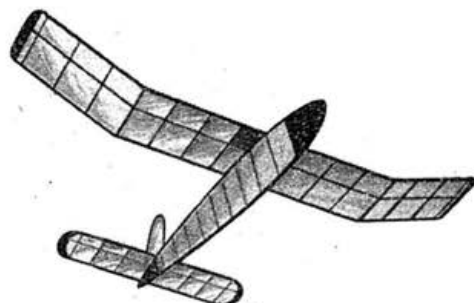


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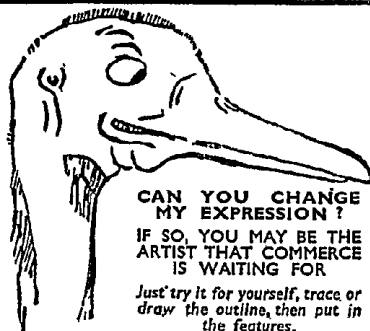
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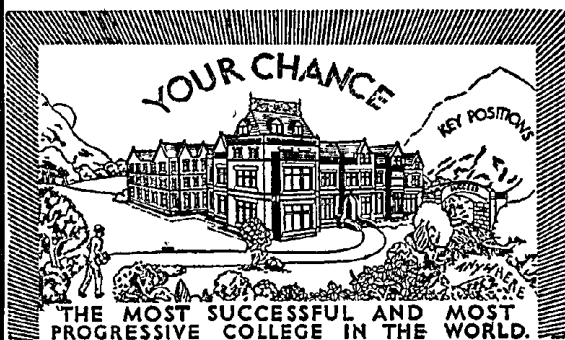
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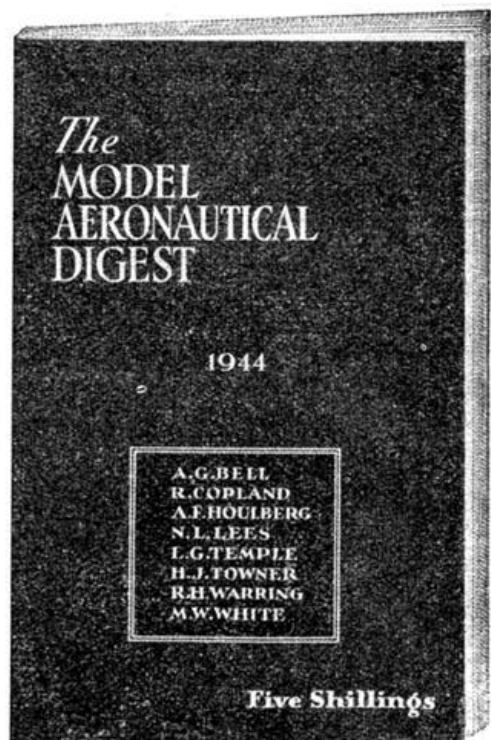
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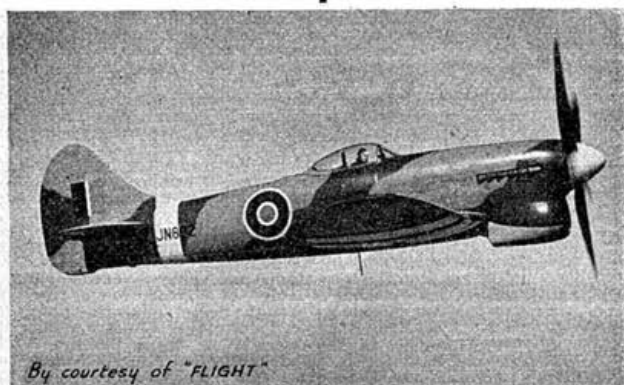
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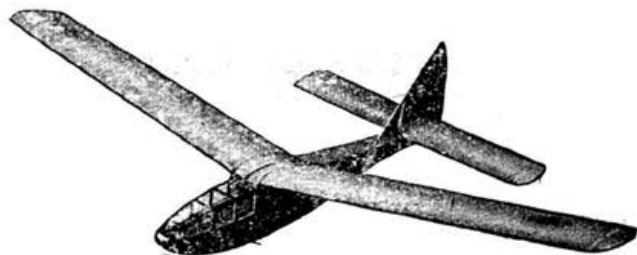
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*The Model Aeronautical Journal of the British Empire*

Established 1936

VOL. X No. 113

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## EXHIBITION AFTERMATH

"The tumult and the shouting dies, the Captains and the Kings depart," and then comes the business of picking up the pieces. For pieces there will be, however well-ordered the occasion.

The occasion to which we wish to refer is the Aero-modeller Exhibition at Dorland Hall. To expect that a show of such magnitude could be staged without any models being lost or damaged would indeed indicate optimism of a high order, and we were not surprised that a few modellers refused to risk it, as they put it. Actually, however, the percentage of casualties was amazingly low, and we are publishing the actual figures in the belief that potential organisers and exhibitors will be encouraged to learn what can be achieved when proper care is taken.

At Dorland Hall over 700 models were on view, and they were seen by about 20,000 people. Thanks to a detailed system of registration, inspection and packing, the percentage of damage and loss was kept down to a very low figure. Seven of the lost models were so tiny that it is quite possible that they were not stolen, but blown away and swept up, and if the average of casualties is based on the *volume* of the exhibits instead of on the *number*, the figure drops to about .03 per cent. But for an out-of-the-way incident, this figure would have been even lower, for no fewer than five models were damaged

by a large airfoil section in wood which was swept from the gallery by the surging forward of enthusiastic visitors. Three other models were damaged by visitors, thirteen suffered in transit (which, of course, the organisers could not have prevented), and 10 exhibits were stolen, including the seven midgets already mentioned.

In organising the show, the question of compensation had not been overlooked. The exhibits had been insured for £5,000 for the period of display and during transit to and fro. Claims amounting to £41 were received, and have been met, including £23 10s. 6d. in respect of damage, and £17 12s. 6d. in respect of loss. For the most part the claimants appreciated that every care possible had been taken and, as a matter of interest, in both the instances where bitter complaint was made, the damage had not occurred during the show, but during the models' homeward journey.

In refreshing contrast was the sporting attitude of one of the youngest exhibitors, Noel Bray, who, in assessing the damage to his model at the modest figure of 7s. 6d., wrote: "You could not expect to have all those hundreds of models journeying to the Hall, on view, and going back, without a few being damaged, and as far as I am concerned I do not mind in the least. I think it was a wonderful Exhibition. Congratulations!"

## "Kicks and Ha'pence"

The letter published in the February AEROMODELLER, in which three readers jointly took us to task in respect of the inclusion of certain types of articles, has brought us a spate of correspondence expressing various viewpoints. We are glad to receive these letters, and in accordance with our policy, they are being studied carefully with a view to giving readers what they want.

But giving readers what they want confronts us with a problem of some magnitude, namely, getting the individual reader to see that his viewpoint is not necessarily the only one, or the best, or a view shared by all intelligent people. Human nature is largely as pictured in the classic story of the Three Tailors of Tooley Street, who issued a manifesto beginning, "We, the people of England . . ." and it is possibly quite natural for people to exclaim, "Look at all this bilge" as they encounter articles included primarily for other types of reader. But surely the realistic attitude is to drop the "All the world's queer bar thee and me" viewpoint, and reflect that other tastes besides one's own have a claim on editorial consideration.

We shall do our best to meet the criticisms referred to—and any others, of course—but, first of all, for the sake

of a truer perspective, let us examine a few of them. One writer complains of "masses of figures amounting to little more than wishful thinking on the part of the authors" and "mental gymnastics for a minority of readers." Another sad epistle refers to "technical articles passed over with a groan."

But the very next letter opened puts the opposite viewpoint, namely, that "theoretical articles are essential to progress, otherwise we should perpetually be building to other people's designs." Yet another writer, replying directly to the suggestion that most of our theoretical discourses are "absolutely unfathomable to the average modeller, by which is meant one who is not a mathematical genius and who has not acquired his or her B.Sc.," declares that "to master aerodynamics as applied to models requires only an elementary knowledge of algebra and trigonometry as now taught in most schools, and the mathematical efficiency needed is merely that of the A.T.C. Part II Proficiency Examination." Another reader declares, "Theory stimulates the desire to create one's own designs, and is wholly worthy of the six per cent. space you devote to it." Then there is the reader who says frankly that he is

"bored to death with endless descriptions of wind tunnels," but would like some "gen" on fin and tail-plane shapes.

Let us turn now to critics who regard advertisements (or, at any rate, those which do not appeal to them) as an intrusion on space that ought to be filled with reading matter. One writer, to be sure, does concede the point that advertising helps to maintain the standard of the magazine. But the truth is—that it is advertising which *makes the magazine possible at the published price*, for the cost of any such publication is always much greater than the popular price charged for a copy, and the alternative to advertising is a subsidy from some interested party. In short, "honey without the bee" would be nice if one could get it. Advertisers, therefore, are deserving of acceptance as friends and co-operators instead of tiresome billetees. Further, few readers have any idea of how much advertising revenue is needed, and the best answer, perhaps, to the critic who complained of eight full-page and eleven half-page advertisements in one issue and urged that the limit per advertiser should

be a quarter-page, is that we should very much like to meet a canvasser who could persuade an advertiser to pay a full-page rate for a quarter-page announcement!

Experience shows, incidentally, that for every reader who pens a letter of complaint, there are many who, while they do not get—and cannot expect—a magazine which contains exactly what they want, are quite happy to continue with what they do get.

All the same, in furtherance of our policy of considering any reasonable viewpoint, we propose at an early date to conduct another "Gallup Poll," not to determine what kind of articles are wanted, for each has a certain number of supporters, but with the idea of ascertaining just what proportion of demand there is for each type. This will obviously guide us in our proportioning of space. We shall be happy if every reader will express his or her views, albeit in the spirit of that "blood loyalty" that, despite our temperamental differences, should—and, we believe, does—animate the aeromodelling family.

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## LOW SPEED RESEARCH

With considerable interest and satisfaction we record the formation of the "Low Speed Aerodynamics Research Association," for there is an undoubted need for an advisory organisation to undertake, as this group intends, the co-ordination of research work and the placing of the theoretical side of model aeronautics on a sound foundation.

An extensive programme of research has been embarked upon, and in this connection the Association will offer financial and other assistance to its members. It will circulate among them the results of research as soon as available and before they are ready for general release, and will seek to obtain and distribute among them technical information already published but out of print or otherwise difficult to obtain. With a view to the improvement of the status of model aeronautics as a science the L.S.A.R.A. will study the application of model results to full-scale.

The Association is independent of, but will co-operate with all organisations concerned with the wider aspects of aeromodelling. Full members, who will constitute the Council governing the Association's activities, will be accepted only on the recommendation of the Research Committee, who will satisfy themselves as to the applicant's ability to assist in the general research programme. The subscription has been kept down to 10s. 6d. in order that no potentially useful member shall be kept away by financial difficulties, and this sum entitles the member to the news letter, the loan of the Association's equipment, and the opportunity of purchasing all reports. Associate membership is open to anyone interested in low speed research, the fee is 7s. 6d. per annum, and transfer to full membership is open to suitable applicants. Further details may be obtained from the Director of Research, Mr. N. K. Walker, B.Sc., "Leahurst," Jenner Road, Guildford, Surrey.

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## A.B.A. Calling

Several interesting items appear in the latest news sheet of the Association of British Aeromodellers.

The first is the decision to form a research section. A committee has already been appointed, and the Secretary is Mr. H. E. White, who will be remembered for his work on speed models, biplanes, and twin-motored (rubber) flying boats, one of which was persuaded to take off a canvas tank on a festive occasion at the Fairey Aviation Company's Great West Aerodrome. The Committee also includes Mr. L. H. Sparey, well known for his work on small petrol motors, and for his writings on model aircraft topics.

The research programme includes investigation in the field of aerodynamics (airfoils, aircrews, airflow, lift and drag), power units (rubber, petrol, compressed air, jet, thermo-dynamic, mechanical), structures (design and strength of materials), and hydrodynamics (stability,

fluid mechanics, and hydraulics)

Item No. 2 is a call for voluntary aeromodelling instructors for units of the A.T.C. (already linked with A.B.A.), men's clubs, evening institutes, etc., so that the numbers who will undoubtedly be attracted to our hobby as soon as wartime activities diminish, will not fall away through lack of sound guidance. "Service is the rent we pay for our room on earth" quotes the newsletter in offering to put volunteers in touch with those needing their services.

Final item is the invitation to anyone interested to write an essay (up to 5,000 words) on any topic related to model aeronautics. The closing date for entries is November 30th, 1945, and Mr. D. A. Russell, Managing Editor of the AEROMODELLER, has offered a ten-guinea medal and a ten-guinea cash prize for the best efforts. It is hoped that this contest may be held annually.



### First Rocket Kit?

What is probably the first kit of parts for a rocket-propelled model aircraft—a slick high-wing cabin job with twin fins—is being advertised by an American firm: "Imagine a plane that streaks thru the air steaming a vapor trail behind it," reads the firm's announcement. "... Easy to build ... no propeller to carve, no rubber motor ... no torque to upset stability. Launched by a gun that releases carbon-dioxide in the 'Rocket-Unit.'" Incidentally, on the strength of the advertisement wording, a British national newspaper hailed this model, "propelled by a small rocket unit in capsule form," as a jet plane!

### A Career in Aviation

The article dealing with the proposed new College of Aeronautics which appeared in the January AEROMODELLER, and in which were outlined the plans which an inter-departmental committee has laid before the Government; has evoked considerable interest, and enquiries have been received from numerous readers as to where and when they can enrol as students, or if that is not yet possible, whether there is some register on which their names can be placed.

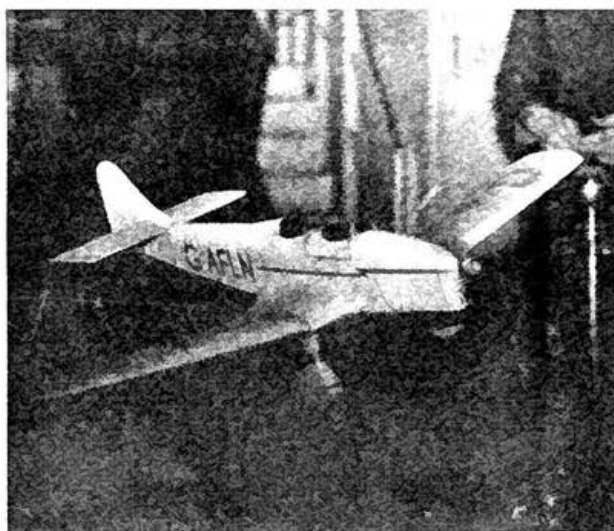
We have made enquiries, and the Ministry of Education, who have the matter in hand, inform us that it is not yet possible to say when enrolment can begin, or give any idea of the method of enrolment. The whole question of setting up such a College is still under consideration, and in due course further announcements will be made.

### Insignia

Many "solids" enthusiasts have admired the fascinating and amusing—and sometimes daring!—insignia that decorate the Thunderbolts, Marauders and Fortresses of the U.S. Army Air Force, but hitherto their intricacy has prevented them being reproduced effectively except by modellers with considerable artistic ability. Now, thanks to the Astral Aero Model Company, of Leeds, these signs have been brought within the reach of all through the medium of waterslide transfers in a wide range of sizes. Two famous "Forts" are included—"Memphis Belle" of film fame, and "Scarlet O'Hara."

### An Apology

We regret that owing to a typographical error Vice-Admiral Boyd, Fifth Sea Lord was erroneously described as the First Sea Lord in our last issue.



### Model Flies 1,000 Miles

A love of "seeing the wheels go round" is characteristic of most people, young or old, and we are still receiving appreciative references to the round-the-pole electric-motored Miles Magister model, demonstrated throughout the Dorland Hall Exhibition.

It has been computed that this model shown above, designed and constructed by Mr. J. S. Evans, flew over 1,000 miles during the Exhibition. In this time it wore out a pair of wheels and two motors, and made a measurable impression on the concrete base!

Mr. Evans not only sportingly lent this valuable model, but came from Kettering during the show to check it and replace the motor. The modest sixpences paid by visitors for the privilege of operating the machine benefitted the R.A.F. Benevolent Fund to the extent of £35. In acknowledging this sum, the Honorary Secretary of the Fund wrote, "Lord Riversdale, the Chairman of the Fund, asks me to send to all who helped to make the Exhibition such a success, his very grateful thanks, and the assurance that such support is particularly welcome now that the Royal Air Force plays so prominent a part in the offensive."

This tethered flying offers distinct possibilities, and with the development of such refinements as controllable ailerons, elevators, etc., some interesting experiments could be made. We understand that Mr. Evans is, in fact, already at work on these lines, his choice of prototype for the new venture being a de Havilland Mosquito.

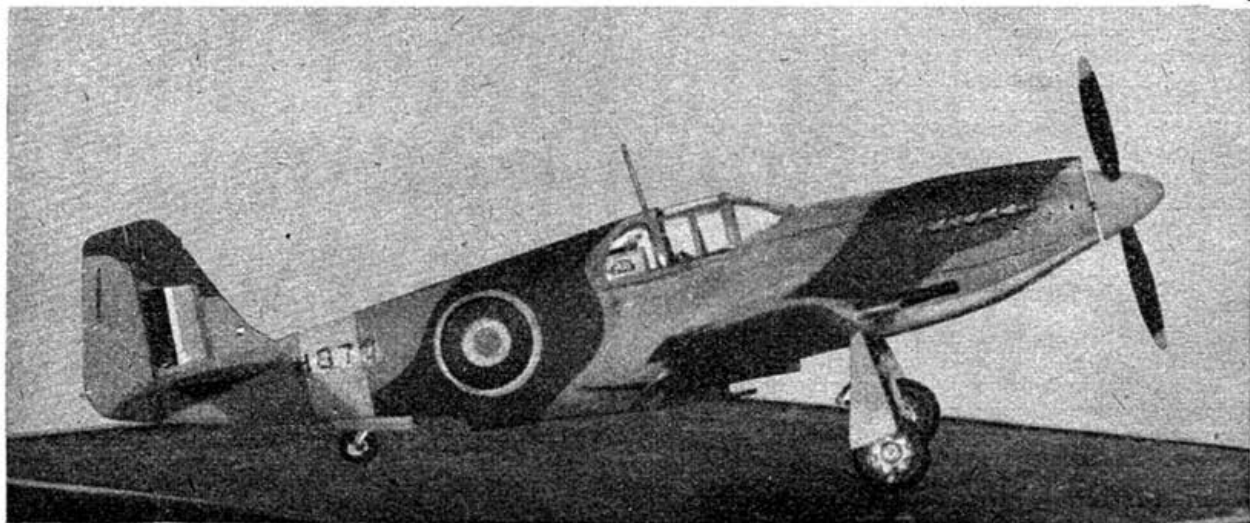
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# 1/72nd SCALE MUSTANG 1A

(THE 4 CANNON VERSION) By J. ELWELL



THE distinction of being the first single-engine fighter aircraft based in Great Britain to penetrate into Germany belongs to the youngest brother of the Mustang 1a, and was earned on October 21st, 1942, when a number of Mustang III's attacked targets in the Dortmund-Ems canal, a distance of 600-700 miles.

This in itself has made this aircraft a popular choice amongst aeromodellers, but chief amongst its attractions for me was its beautiful lines compared with most American single-engine aircraft.

The Mustang I, fitted with the Allison V-1710-F3R engine rated at 1,150 h.p., at only 11,700 feet, had an armament of four .05 and four .30 machine-guns. It went into operational duties with the R.A.F. Army Co-operation Command in July, 1942, and continued in this role for some months, attacking targets in occupied territory in addition to taking useful photographs with the oblique camera fitted.

In the meantime, developments were proceeding to bring the aircraft more into line with present-day European standards, and two very important changes were next recorded. The Mustang 1a appeared with a new Allison engine rated at 1,125 h.p. at 15,000 feet and with an armament of four 20 m.m. cannon. This version is the subject I chose. Who amongst us has not been thrilled with the amazing shots shown in the news reels of these aircraft on their spectacular train-wrecking missions prior to the opening of the Second Front?

Newer versions are even now writing fresh history for the famous team of designers which made this fighter available to our Air Force at a time when fighter aircraft were very badly needed indeed.

This 1/72nd scale miniature was designed and built solely as an exhibition model, and as such requires a great deal of work which may seem unnecessary to some builders. However, when complete and on its mahogany polished stand, it more than repays one for the extra time spent. The undercarriage is fixed in the "down" position, but the wells are hollowed out, this being much more satisfactory than painting.

The model is constructed of yellow pine, but Canary wood or Agba will do if pine is not available.

I used Mr. Cooper's drawing which appeared in the December, 1943, issue of AEROMODELLER, not because I know Mr. Cooper personally, but because after perusing all the plans I could get hold of, they were the most detailed.

I believe this model to be of more interest to the experienced builder than a beginner, so we can dispense with a detailed account of the first stages of construction, but the marking out must be extremely accurate, and metal templates should be used wherever possible to ensure accuracy of outline and contours.

I am a firm believer in any "solid" model being entirely constructed by the builder, and lathes and machine tools were not used in the construction. The only parts purchased were the wheels, and they required cleaning up and the hubs re-shaping to conform to true-scale.

The fuselage should be marked out on to the wooden block, and carved, including spinner, radiator and cockpit cover, but minus the air intake and the small piece in front of the radiator. The thick line on Fig. 1 gives the side view.

The mainplane is of course made in one piece, with the dihedral fashioned with a saw cut down the C/L, afterwards filling this cut with glue and propping the tips to the required angle until set. Fig. 2 shows the plan view of mainplane to be transferred on to the wood.

The tail unit shapes are of course self explanatory, but the shaded portions shown are thinned down to about 1/16 in. thick to fit into saw cuts in the end of the fuselage.

Here I would like to emphasise the bad mistake of using very rough sandpaper or files. The marks they make can never be completely erased. The method I prefer after carving is scraping with either blade or broken glass, and finally finishing with fine sandpaper until an absolutely silk-like finish is obtained on all surfaces and edges.

Let us now assume that the four main components are cleaned up to the shapes shown in the drawings 1, 2, 3 and 6.

Taking the mainplane first, carefully mark out with

a sharp pencil and a 6-in. steel rule, the position of all the moving surfaces, landing lights, ammunition magazines and trim tabs, as well as the recesses to take the alighting gear. The flaps and ailerons are of the "frise" type and to simulate these, draw the inner lines approximately  $3/64$  in. further inwards as shown in the dotted lines, Fig. 2, and cut out, using a thin new razor blade, and working from both upper and lower surfaces. It will be understood now that the flaps and ailerons themselves are now  $3/64$  in. wider than they appear in the plan view. Clean up the leading edges to an airfoil section, and put on one side. Now obtain four lengths of  $1/32$  in. square pine and glue in position on the top and bottom edges. When set clean up to fair into the top and bottom surfaces of the mainplane, and also sand slightly in between to allow the leading edges of the moving surfaces to sit in and move freely.

The drawing, Fig. 5, shows how the flaps are hinged with  $1/64$  in. split pins and tiny lengths of wire. It is advisable to drill the holes in the flaps before cutting out the slots for the split pin head. The forked end of the split pin need not be glued into the hole in the mainplane, as the tension of the split pin is quite sufficient to hold the flap in. This allows the flaps to be removed easily for painting.

It is essential that the spinner and the front end of the fuselage shall be as near circular as it is possible to obtain. I ensured this by obtaining two metal washers of the correct diameter, and gluing them on to the end of the spinner and fuselage. Sand down to the edges of the

washers, and remove washers before finally pinning on the spinner and finishing off with very fine glasspaper.

The portion B is hollowed out until the walls are about  $1/32$  in. thick, and is later glued back in position when the mainplane is attached to the fuselage.

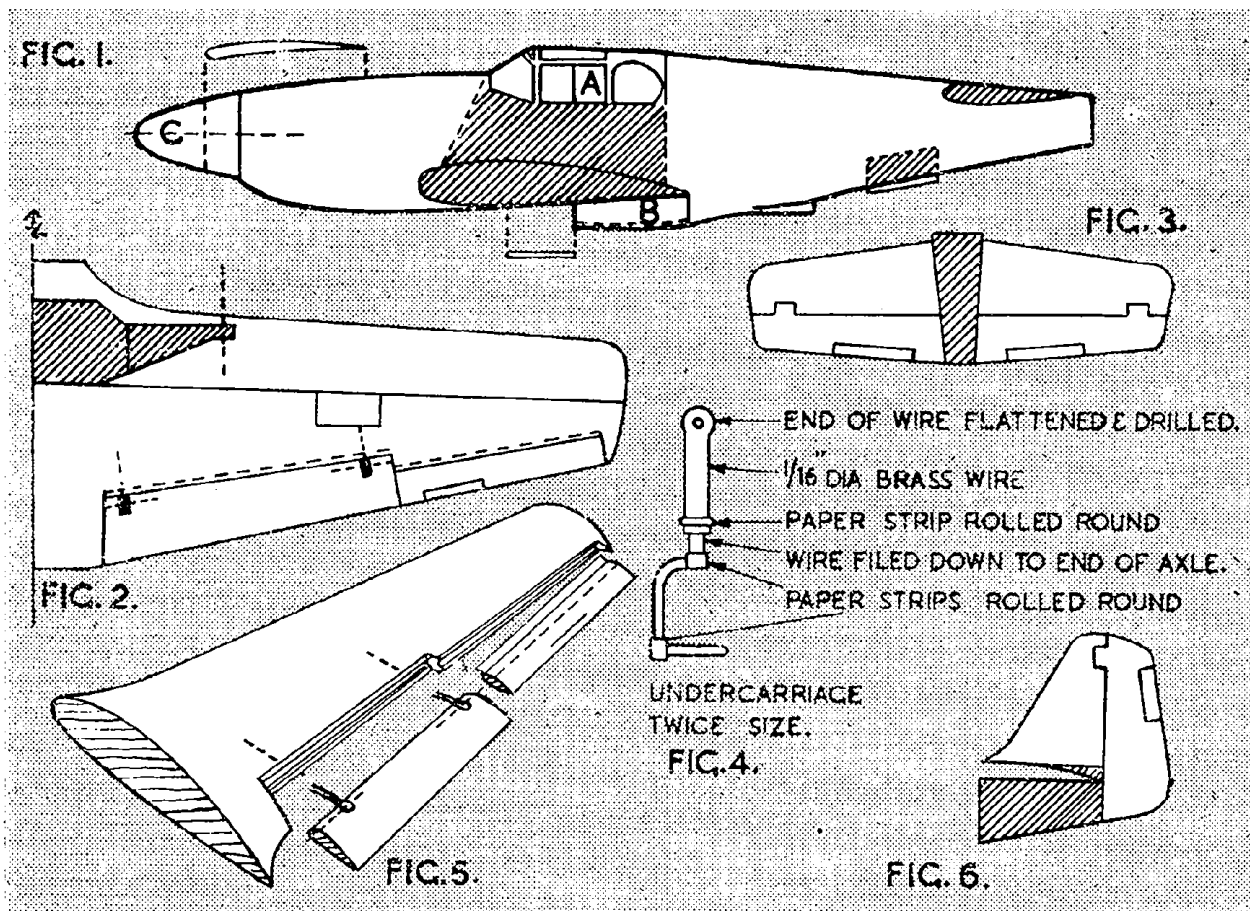
The rear portion of A was the only part of the wooden cockpit cover used, and this should be cut off the remainder and carefully hollowed until the dome is about  $1/64$  in. thick, after which the radiused rear windows may be carefully marked out on it, and cut out with a piece of sharp blade broken to a point.

The cover itself was built up of thin pieces of celluloid with the joints covered over with thin gummed paper. The result was good, and the paper seems just the correct depth for the almost flush framework of the real aircraft.

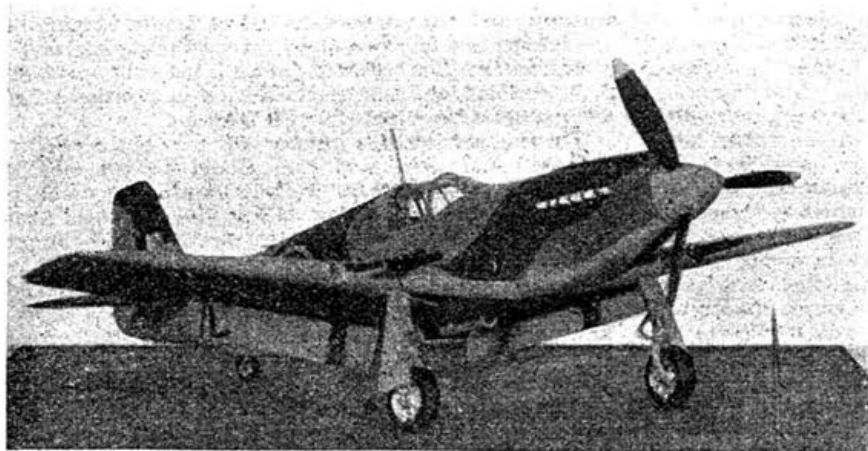
The interior of the fuselage may be left to the builder's discretion, but my own was quite detailed, and was according to my observations of the real aircraft and partly from one of Mr. Clarke's excellent cut-away detail drawings kindly supplied by "The Aeroplane."

The movable portions of the tailplane are not of "frise" type, so it is only necessary to cut them out neatly, shape the leading edge to an airfoil section and fasten to the tailplane and fin. The hinges are tiny strips of thin tracing paper or vellum, for which slots are cut with a sharp blade in the rear edges and leading edges. (NOTE.—This paper strip need only be glued into the slot in elevator and rudder. This enables the moving surfaces to be easily removed and replaced to facilitate painting.)

(Continued overleaf.)







The undercarriage is made up of two small lengths of 14 s.w.g. brass wire filed down as shown in Fig. 4. The thicker portions shown are tiny strips of thin gummed paper rolled around the wire until sufficient thickness is obtained.

The wheel wells should be cut right through the mainplane, and then cleaned up with small files. 1/16 in. thick sheet portions are finally glued in the upper surface, and when dry are sanded down to conform to the airfoil section. Cartridge shutes and landing lights are cut with a sharp blade, and to complete the mainplane at this stage, two holes are drilled at A to take the pin in the top of the oleo leg.

The very first job to be done on the fuselage is to accurately mark out the centre of, and drill the spinner portion. A great deal depends on your accuracy here, as to whether the spinner revolves accurately when

fitted with prop. blades. Next neatly cut away intact, and put away safely the portions marked A, B and C. The shaded portions shown may next be drilled and carved away. The cockpit should also be hollowed as shown by the dotted lines, the walls being left about 1/32 in. thick.

Now as I remarked in a previous paragraph, the craftsmanship of modelling comes in when one models something just as well by hand as can be done by machine. The wheels, as I remarked in the beginning, were the only part bought ready-made, and required

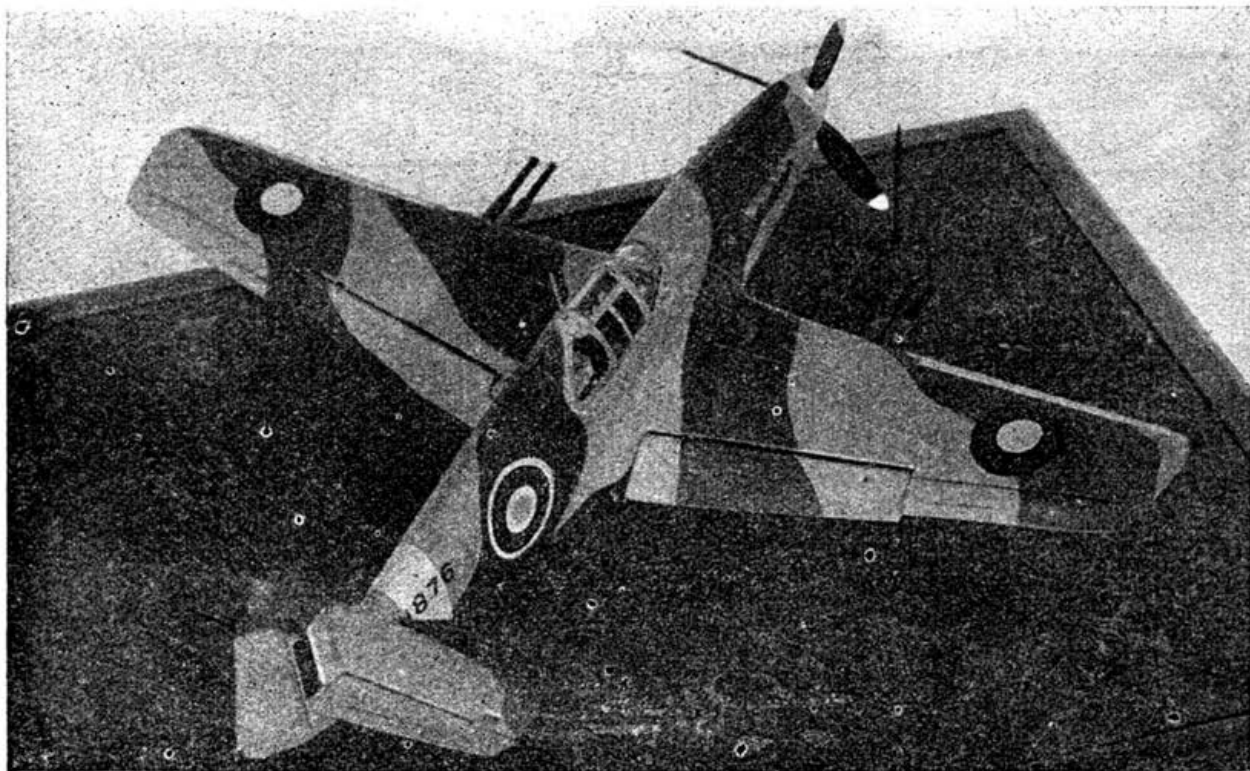
punching at intervals round the centre to imitate the lightened cast hub.

Painting can make or mar any model, and this is equally true if a super job has been made of the construction.

First give the model two or three coats of clear thin dope, sanding between each, followed by one coat of thin light grey paint.

The thin pencil lines where panels or joints appear in the covering I found very effective, and should be done after the first priming coat of grey. Two coats of camouflage and the necessary roundels and striping complete the model.

Given reasonable care in construction and painting a really grand finish can be obtained, and in conclusion I shall be pleased to answer any queries *re* "solids" if the letters are sent to me c/o AEROMODELLER, Leicester, and a s.a.e. is enclosed.



# 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,

I would like to point out what seem to me to be some faults in Mr. Cooper's method of calculating aspect ratio.

I find it very hard to accept his treatment of profile drag, which he relates to  $\frac{1}{VL}$  and to nothing else. This is as

much as to say that profile drag is not related to the section camber or thickness, but even a casual investigation of R. & M. 1117 will show that, in the case of the two thicker sections reported on in addition to RAF 32, the profile drag is higher, and the value of  $VL$  at which the efficiency falls is also higher. In fact a thick section tested has such an unusual airflow that it could not be stalled at low  $VL$  values, below  $45^\circ$  incidence. To confirm the suggestion of some relationship between thickness and the critical value of  $VL$ , there are reports of tests made in Boston, on microfilm sections of zero thickness, at  $VL$  of 1, which indicate that these have profile drags at this extremely low  $VL$  value which compare with the drag of RAF 32 at  $VL$  of 12. I cannot accept Mr. Cooper's formula as of general application, without some modification to allow for these factors, although it may be of use for one section only.

I would like very much to know how Mr. Cooper found the values of "K" which he gives. The formula indicates A.R. values which agree with recent practice, but the whole idea behind the research done by Mr. Maxwell, and the flying tests by the writer reported below, was to change this practice and attempt to improve efficiency as a result. There arises a suspicion that Mr. Cooper simply chose "K" values to bring the A.R. values given by the formula to agreement with practice, but surely we ought to reverse this, and find the best A.R. value from the drag point of view, and if this is too low, as it may be from the torque control point of view, we must alter it with our eyes open, and make a compromise, balancing the extra drag against better control. Any other way does not seem justifiable, as we would not be using the results of theory correctly if we did not allow it to guide our practice, which is its proper function in model aeronautics. At least in the writer's opinion.

The difficulties of stability which Mr. Cooper anticipates will not arise in any insuperable form. It is useless to compare models for stability unless stability factors have been calculated, and this should be done when designing low A.R. models, in place of using a rule-of-thumb relationship between span and length, which will be upset because of the shorter spans. During trials made this season, when flying the smaller of the two gliders shown in the photograph, which had a stability factor of 0.71 alongside another of similar area but with A.R. 9.5 as against 5.95 for the model shown, the rate of recovery after flight disturbance was found to be very slightly worse for the low A.R. model. The high A.R. model had a stability factor of 0.88, which indicates that it ought to be a little more stable, so there cannot be much extra instability due to the difference in A.R. values.

The two models shown have these design details: Larger model: span 54 in., area 344 sq. in., A.R. 8.45, weight 15 oz., section RAF 32 with reduced thickness and more under-camber, stability factor 0.66, chord in centre  $7\frac{1}{2}$  in., tip taper from  $13\frac{1}{2}$  in. from tip. Smaller model: span 36 in., area 220 sq. in., A.R. 5.95, weight as built  $4\frac{1}{2}$  oz., when stability factor is 0.875, but 1 oz. of lead added at C.G. gives weight  $5\frac{1}{2}$  oz. and stability factor of 0.71, section NACA 4409, chord in centre 7 in., tip taper from 12 in. from tip.

Both models were built on the American crutch system.

When these models are in best trim, they have very flat glides, and it seems that the best glide occurs at speeds rather lower than the wing loading would indicate, as far as can be judged by watching the speeds of these and other models, without measurement. If this is confirmed by the results of others, it would indicate that the best trim occurs at higher  $Cl$  value. Perhaps high A.R. gliders have to be flown at higher speeds than they were designed for, to obtain better results from the wing due to the high  $VL$ . Judging from the angle of glide, the  $L/D$  ratio of the A.R. 5.95 model is as good as any of the high A.R. models of comparable size, which would rather indicate that this type of model will stand development and repay any time spent on it, and confirms that the profile drag is important, in wing design.

The stability factors given above were all calculated by a method devised by the writer, and the point of adding weight at the C.G. is that it increases the total weight without increasing the moment of inertia. This is a sure cure for instability due to bad weight distribution, as built, with a stability factor of 0.875, the small glider was stable in the sense that it would recover from flight disturbance, but it took rather too long over it, and lost rather too much height, so the factor of 0.71 was obtained, and a great improvement resulted. Due to ill-health, the writer has not flown a rubber-driven model with a low A.R. wing, but the owner of a Scottish Wakefield of only 38 in. span reports that the stability is very good.

As far as trim is concerned, the tailplane tips are usually rather nearer the wing vortices and have thus more downwash to run in, so the longitudinal dihedral will be a little less than normal. There are no other variations.

Ayrshire.

ROBERT BURNS.

DEAR SIR,

Two of Mr. I. S. Cameron's sailplanes have struck me as being rather interesting. His "Elmira," featured in the February, 1943, AEROMODELLER, is alleged to have the remarkably low sinking speed of 1 ft./sec., and the average duration of his "Tarpon" (photograph in August, 1944, AEROMODELLER) is claimed to be 2 minutes from 150 feet of line.

It is noticed that the former is of F.A.I. specification, whilst the latter appears to be of the same type. Yet in his book "Model Gliders," Mr. Warrington states that the average sinking

(Continued on page 253.)





## "Dope" from

WE recently received a very informative letter, complete with photographs, from an Australian modeller now serving in H.M. Forces. We found so much of interest in his letter that it was decided to pass on the information which should give Aeromodellers in this country a glimpse of the movement "Down-Under."

## "Down Under"

Photo No. 1



The trend of model design in Australia follows American practice very closely; American model magazines being read far more widely than any others, mainly owing to the fact that they are far easier to obtain. The accompanying photos show some of the activities and models of the Model Aeroplane Association of South Australia, which was composed of several model clubs in the suburbs of Adelaide. All clubs worked together for major competitions, which were usually held once a month. At each of the other three week-ends they organized their own competitions, and flew individually on their own flying grounds.

Photo No. 1 shows Hank Struck's design "New Ruler," built from plans appearing in the American magazine *Air Trails*. The model illustrated is one of many built and flown when limited motor run competitions first became popular in Australia.

It was mainly the superior performance of the "New Ruler," compared with the Carl Goldberg's "Zipper," that led to the rapid disappearance of this and other similar freak types of model with a super high power-loading. With the advent of the "New Ruler" the more orthodox models began to gain a footing and grow in popularity.

Photo No. 2 shows an example of the large, slow-flying type of petrol model which originated from America, and was very popular and successful before flights on timed motor runs became the order of the day. The model shown was originally intended for radio control, but the war intercepted and prevented the venture. When first built it weighed under 5 lb., and when powered by a Brown Junior engine; flew consistently with 2½ lb. payload. This model is also shown in the

Photo No. 3







Photo No. 4

heading photo, but fitted with a normal undercarriage instead of the mono-wheel shown in the other photo.

From Photo No. 2 it would also appear that despite the enticing aspect of the flying grounds in the other photos, trees still get in the way at times!

Photos Nos. 3 and 5 are close-ups of the Berkeley Cavalier, which has rather better lines than the average American gas job. However, it still sports the spidery wire undercart and ugly upright uncowed engine, so dear to the hearts of American modellers.

Photo No. 4 is of an original design by our correspondent. The span is 6 ft., with a chord of 10 ins. The model ready to fly weighs 24 lbs., and is powered by a Denny-mite engine (which ranks high in the builder's opinion of model motors).

The model features a rather novel gull-wing construction, built in two halves on a 3-ply jig. All spars are built up, but in a very simple manner, the main and rear spars being of box type, and the leading and trailing edges laminated. The fuselage is a plan slab-side rounding off to an elliptical nose. The tailplane section is thinned M.6, and the wing section Eiffel 431. The designer informs us that the model had amazing stability in a tight spiral climb and a very flat glide.

Photo No. 6 shows a collection of models typical of the trend of design towards the end of the 1930's. All except three of the models illustrated are of original design. The three exceptions will be recognised, no doubt, by petrol enthusiasts as a Berkeley Buccaneer, Berkeley Cavalier, and a 2 T.D. coupe, from *Model Airplane News* plans.

Photo No. 7 taken at the Glenelg Club shows a section of the line-up on regular flying days. Most of the models



Photo No. 5



Photo No. 6

are general purpose "utility" models for pleasure flying now outclassed by the more modern competition types.

To conclude, it would appear that all the models have a definite American flavour, and as in America, petrol models appear to be greatly in predominance. It is a pity that British designs have been so scarce and hard to obtain, but now that so many Australian enthusiasts have visited this country as a result of the War; and will take back with them memories of the models they have seen and the Modellers they have met, it may well be assumed that greater liaison and exchange of ideas will exist between the Movement of this country and that of the Commonwealth of Australia in the happier days of Peace.

Photo No. 7



# THE HESTON "PHOENIX"

BY  
E. J. RIDING



Photo by E. J. Riding.

IN 1934 the interests of the Comper Aircraft Company, designers and builders of a series of well known single-seater light aircraft, were taken over by the Heston Aircraft Company and their first production was the "Phoenix," a single-engined five-seater commercial or private owner's aeroplane of rather unusual design.

An all-wooden machine, the fuselage consisted of a forward half of normal streamlined rectangular section the rear portion being a monocoque shell, the whole being plywood covered with an extra protective covering of fabric doped on to the plywood. The wing embodied the usual spruce box spars and lattice type ribs, covered from the leading edge to the front spar with plywood and the remainder with fabric. The lower or stub wing served two purposes, i.e., to house the wheels when retracted and to provide a substantial support for the wing bracing struts. It ran right across the fuselage and was built up on two box spars with a plywood covering. The tail surfaces were of similar construction with ply-covered leading edges and fabric-covered remainder.

Dual control was fitted, pilot and co-pilot sitting in front with the three passengers behind, their seats

arranged in the form of a Vee with the apex pointing aft. The Dowty undercarriage retracted inwards, tucking the wheels in between the spars of the stub wing by means of hydraulic jacks manually operated from the cabin. Power was supplied by a 200 h.p. De Havilland "Gipsy VI" 6-cylinder inverted in-line aircooled engine. The design of the cabin gave the occupants armchair comfort and at the time it was claimed to be the quietest aeroplane on the British market. Large luggage space, electric engine starter and full night-flying equipment made it a useful machine for feeder line and charter work. The "Phoenix" was later fitted with a "Gipsy VI" series II engine driving a two-bladed v.p. airscrew, giving it a slightly better performance.

About half-a-dozen "Phoenix" were built, five of them: G-ADAD, G-AEHJ, G-AEMT, G-AESV and G-AEYX were registered in this country. They were all impressed for service in the R.A.F. early in 1940 with the exception of G-ADAD, which was sold to an operator in Greece in September, 1936, where it was re-registered SX-AAH.

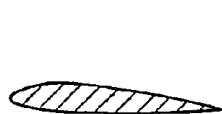
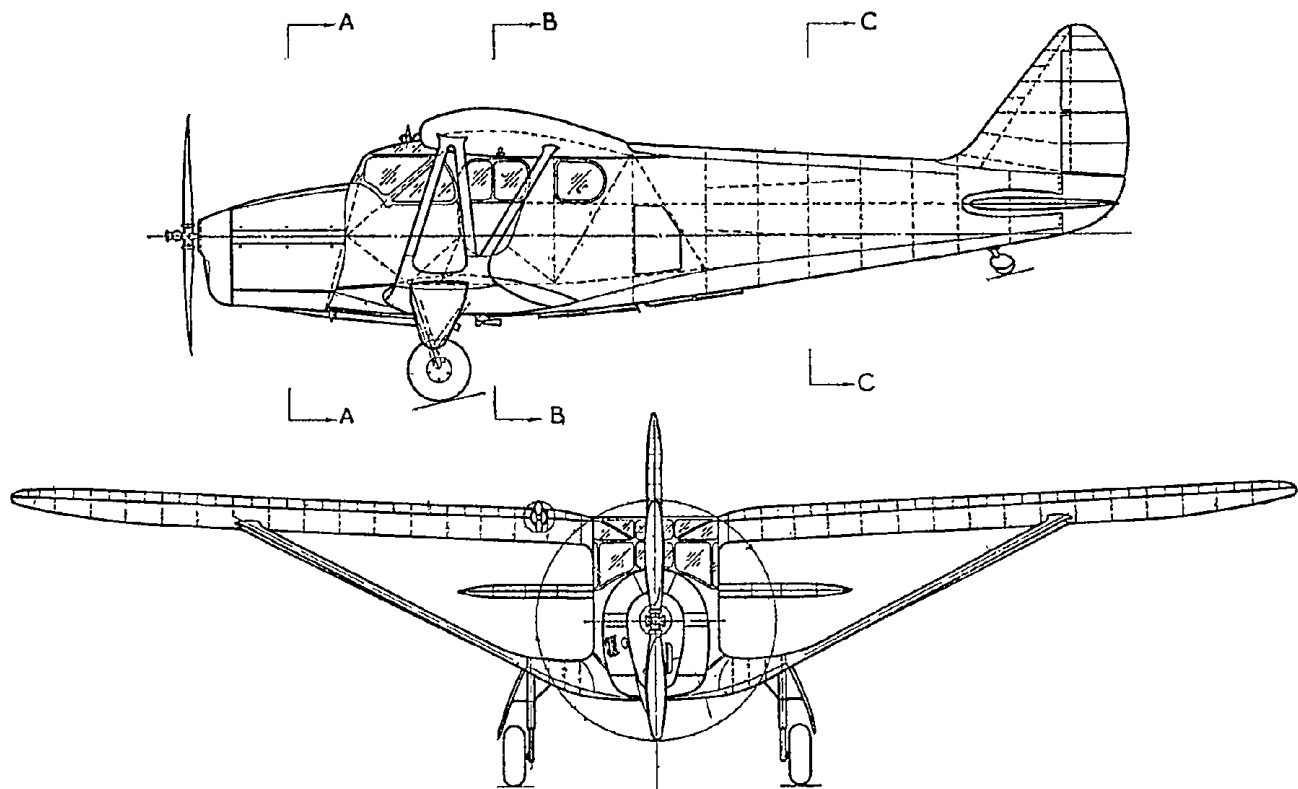
The accompanying photograph of G-AESV was taken at Redhill aerodrome in August, 1937, when the machine belonged to Standard Telephones and Cables, Ltd., the colour scheme being dark yellow with black letters and silver wings.

Other "Phoenix" owners were: Luton Flying Club (G-AEMT), S. T. Worth, Heston (G-AEYX) and British-American Air Services, Ltd. (G-AEHJ).

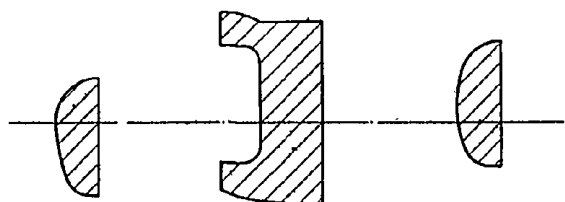
**Specification:** Length, 30 ft. 2 in.; span, 40 ft. 4 in.; height, 8 ft. 7 in.; wing area, 270 sq. ft.; tare weight, 2,000 lb.; loaded weight, 3,300 lb.; max. speed, 145 m.p.h.; cruising, 125 m.p.h.; landing, 50 m.p.h.; ceiling, 14,000 ft.; range, 700 miles.



Photo by A. J. Jackson.



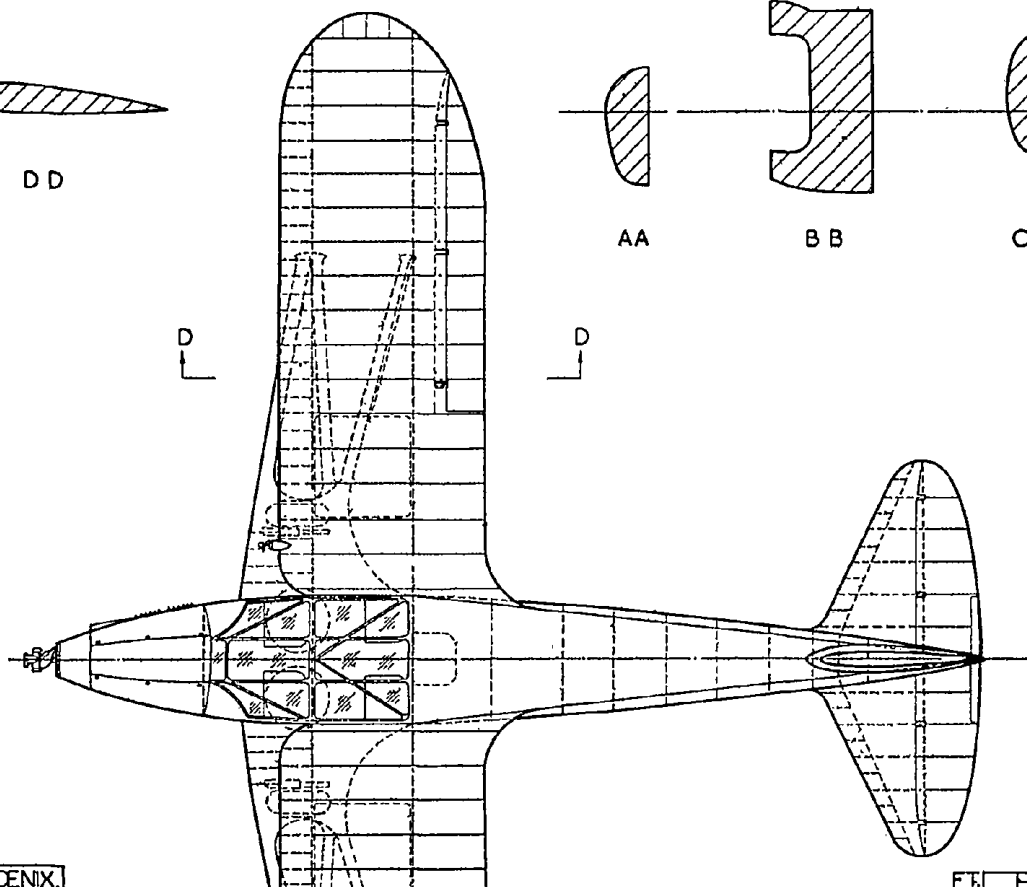
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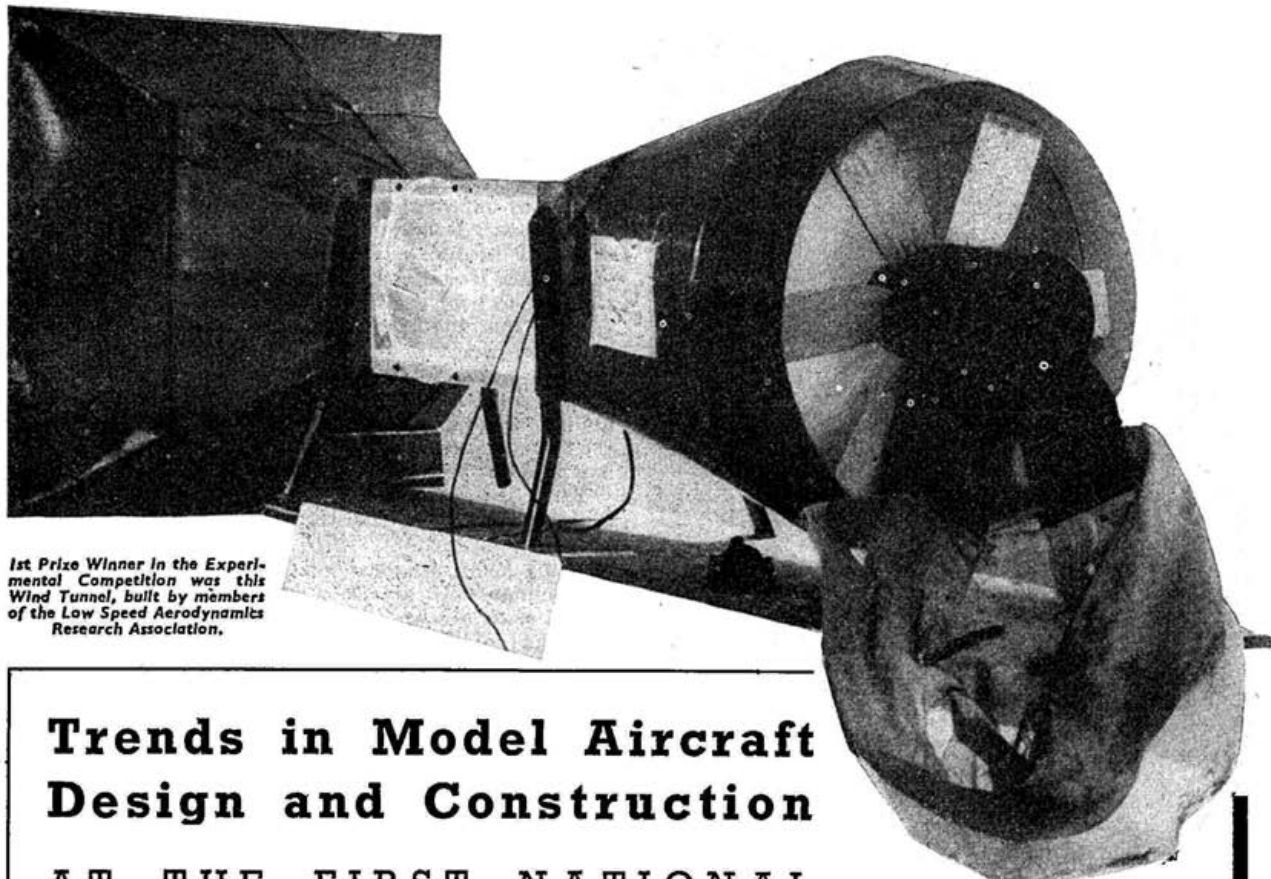
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1st Prize Winner in the Experimental Competition was this Wind Tunnel, built by members of the Low Speed Aerodynamics Research Association.

## Trends in Model Aircraft Design and Construction

### AT THE FIRST NATIONAL MODEL AIRCRAFT EXHIBITION

BY

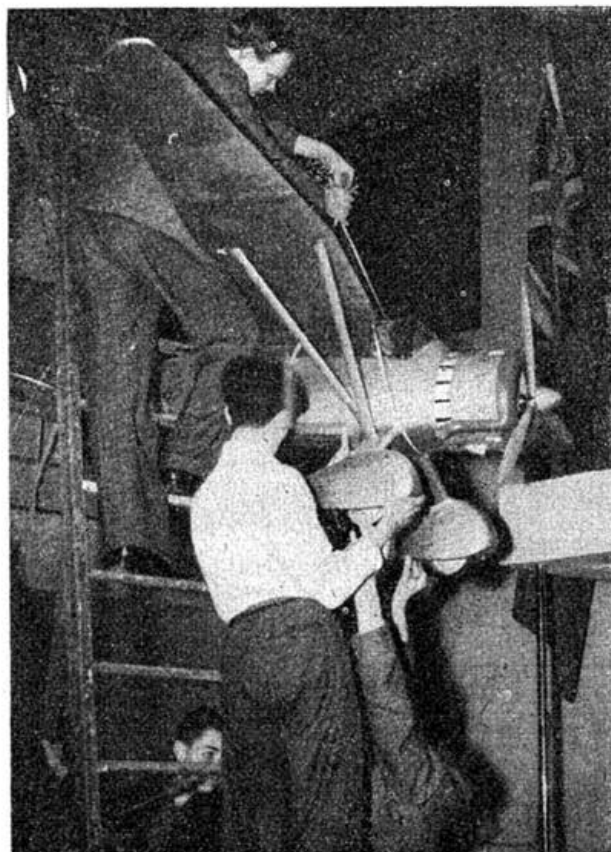
H · E · WHITE, B.Sc.

AT the opening of the first National Exhibition of Model Aircraft, I was immediately impressed, in the sense that the wonderful collection of exhibits displayed a "character" which had generally been missing from previous attempts to gather together some sort of representative show of model aircraft. I gazed thoughtfully at the spectacle as it was presented to me in the long entrance hall of the exhibition, at the wonderful examples of power-driven models of every size, from Col. Bowden's pretty little 48 in. span biplane, with its circular streamlined fuselage, elliptical wings with enterprising looking slots, and the characteristic white enamel of which our leading petroleer is so fond, up to what is surely the most wonderfully conceived model aircraft yet produced in this country, if not in the world—Mr. Russell's 1/5th scale Lysander, with its four-cylinder engine, and promise of radio control. I saw some fine examples of 1 in.-to-the-foot flying scale models; Mr. Moore's "Scion"—and the machine which must surely prove to be the most popular of its type in the Exhibition, his "Typhoon" with its working undercarriage, and its impressive size; whilst hanging in the fairway was Mr. Riding's B.E.2c, looking as if it had come back to life from the flying grounds of the other war, which so many present-day aeromodellers cannot even remember.

Mr. Towner's beautiful "Albacore," looking almost as

large as the real one as I looked at it from the distance, was "flying" near to Mr. Dare's beautifully finished and painted "Kingfisher." Gliders were there, too, forcing themselves upon my bewildered attention. Mr. Temple's perfect model, with its enormous span, and its intricate detailed construction, carried out with such skilled craftsmanship, that it would be a credit to any workman or group of workmen in the aircraft world to-day, spread its graceful wings right across the hall, from one stand to the other. Mr. Pollard's slim, graceful craft was hanging on my right, and others of these silent man-made birds with long tapering wings could be seen hanging in space, looking as if they were ready to slide gently forward through the air.

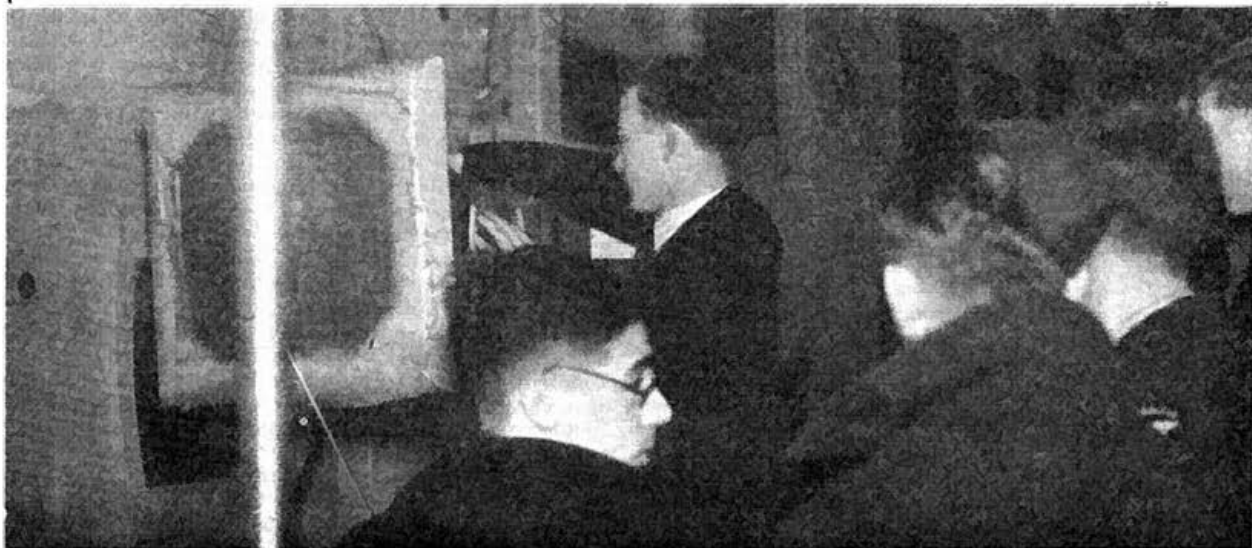
By the time I had reached the end of the entrance hall, my attention was immediately arrested by Mr. Evans' little 1 in. scale Miles Magister, making most intriguing take-offs, flights and landings, under perfect control; flying around a pylon to which it was attached, and apparently willing to repeat the performance, and keep on doing it for the rest of the week. What is more, I could see that around the corner and on the balcony above were more models, each possessing some individual characteristic which made it an "exhibit" in its own right. This gave me the clue which I had been puzzling my head to discover ever since I had entered. Why was this show so "different"? What was it that interested



(Above.) Cf. of three members of the Aeromodeller Staff versus Cd. of the Lysander I. The hanging of Mr. D. A. Russell's well-known "Lizzie" was no small job.

(Top right.) Shows a galaxy of models on the A.P.S. Stand, including such favourites as Cpl. Welsberg's "R.W.D.8" and Mr. C. Rupert Moore's "Typhoon". In the immediate foreground can be seen Mr. D. A. Russell's "Vulcan".

(Below.) D. S. Walker, brother of the celebrated "N.K.," demonstrates the Wind Tunnel for the benefit of members of the R.A.F.



me so much apart from the general excellence of the models, and my own interest in all model engineering? The reason was that a *spirit of progress in design* and construction was so strongly in evidence. This was not simply a collection of 'planes built to a specification; indeed, hardly a single specimen of the usual stereotyped "duration" model was to be seen: the aeromodeller had evidently been taking advantage of present-day conditions to improve the breed, in spite of set-backs and restrictions. I was soon in conversation with several of the many American soldiers who made their way around the stands, looking as surprised as I was. It was most amusing to hear the way in which they expressed their surprise that anybody in this great city was "interested in model airplanes at all." I noted also their keen interest in the flying scale models, because their size, robust construction and general appearance of "flyability," made them a very different proposition from the flying scale model made from kits of parts which they had seen during the pre-war years.

The Exhibition was bound to reveal to the critical observer the signs of the struggle through which we have been making our way with patience and perseverance in many fields of endeavour during the past five years. In common with all other activities not directly connected with the war effort, aeromodelling has suffered setbacks; of which difficulty in obtaining materials has been the worst. Furthermore the lack of flying grounds, often owing to the needs of war-time agriculture, has restricted our activities, whilst transport difficulties have combined to make it almost impossible for many of us to take ourselves and our unwieldy boxes to flying grounds as we could find.

The Government ban on power-driven flying, and restrictions upon gliders, have also tended to slow up progress. Lastly, but by no means least important, the absence on war service of many of our most enthusiastic aeromodellers has been a very serious setback.

Although these restricting influences have been at work for such a long time, aeromodellers have shown that their hobby has not only been recreative, but its value as a means of relaxation from long hours of work and the strain of abnormal conditions has been an inspiration to the many thousands of its devotees, as evidenced by the progress in design and construction





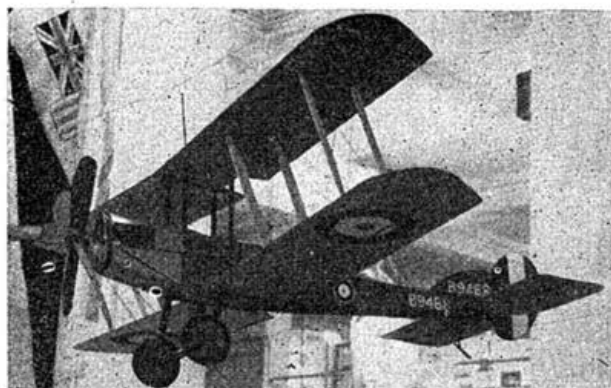
which is shown in a large number of the models exhibited.

Furthermore, an entirely new interest has been developing as a direct result of the war—the study of the technique of “solid” scale modelling, which shows an enormous advance over anything seen at any previous Exhibitions of model work. Not only has this branch of aeromodelling been taken up seriously by many well-known model flyers, probably due in many cases to the keen interest taken by all mechanically-minded people in the development of full-size aircraft, but the art of making “solid” models has been encouraged because of its educational value to students of full-size aircraft, either in service or pre-service training units, or for the purpose of studying aircraft recognition.

The most striking effect of present conditions, which made itself felt immediately upon entering the main hall of the Exhibition, was the development of the glider. Before the War, this branch of modelling had not kept pace with the advances made in rubber-driven model aircraft of all types, the glider being more often than not merely an adaptation of the normal “duration” model. Now the absence of rubber and balsa wood may have had something to do with this very progressive movement, but it was evident even to the inexperienced observer that model gliders had been developing along the same lines as their full-size prototypes, and some beautiful examples of design and construction were to be seen. Nearly all the gliders shown bore evidence of well-conceived attempts to reduce parasitic drag to a minimum, and the effects of high-aspect ratios and high-wing loadings had evidently been carefully studied. Their beautifully streamlined planked fuselages were generally given a smooth or glossy finish which was probably used to decrease drag, and certainly made them very attractive looking, besides giving the builders an opportunity to make use of a new technique in finishing. Metal wing-stubs and main wing-sections were used in several models, and I noticed that automatic controls were being applied to rudders and elevators; is it possible that we may soon have gliders which will soar under some form of automatic sensitive control in the same way as the full-size glider? The technique of launching has also been considerably improved during the war period, and I saw one example of the system of pulleys now almost universally used for tow-line launching.

Almost as striking as the improvement in gliders was the development of the flying-scale model. The design and construction of these models have undergone such changes that the machines shown bore very little resemblance to the duration-record holders of this type of six years ago. I cannot help thinking that duration-hunting did very little to encourage the development of the true flying-scale model, and I am quite sure that the prospect of soaring was not envisaged by the designers of the wonderful examples on show. As small scale reproductions of the full-size machines, capable of taking off, flying, and landing so that they might also resemble their full-size prototypes in performing these functions, they presented practically a new phase in this sphere. Mr. Towner—a well-known pioneer in this work—was represented by an “Albacore,” complete with torpedo, and an Airspeed Oxford; whilst Mr. Moore’s “Typhoon” with its long rubber drive, and automatically-controlled undercarriage, represented the most recent development of this branch of modelling. The fact that these really were flying scale models was demonstrated by the film which was on show, in which several of the models were shown in flight, and I particularly noticed the steady flying of Mr. Moore’s “Scion” with its ingeniously-driven twin airscrews. The popular 1 in. scale apparently allows the designer sufficient scope to include some most promising developments, such as automatic controls and fully working details, and we may expect to see some wonderful models of this type in the near future.

Personally, I have a weakness for the “semi-scale” type mentioned by Lord Brabazon in his opening speech, a term which is often used to describe model aircraft which are designed primarily for their flying capabilities, but in which the question of appearance is also studied, so that the model may bear some resemblance to a full-size aircraft when it is in the air. Several machines of this type were on show, and I feel that I must make particular mention of Mr. Rippon’s neat little “Pedigree Pup,” which, although less than 36 ins. in span, and weighing less than 3½ ozs., has a fully retractable undercarriage fitted into the leading edge of the wing. This retracts automatically in a most realistic manner after the take-off, and the little low-wing cabin model flies in a most impressive manner.

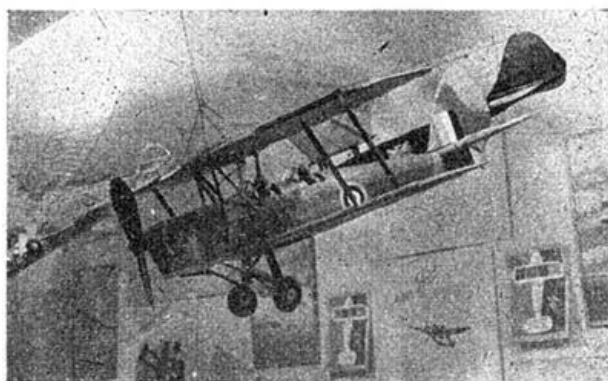
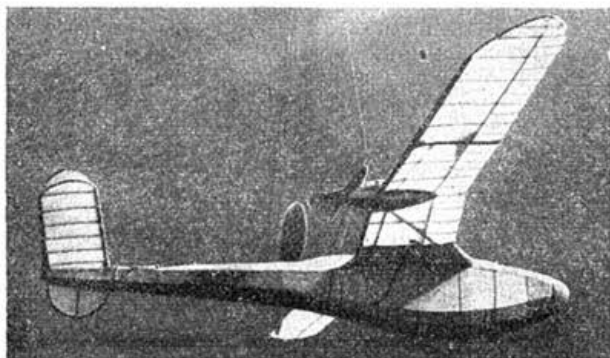


(Above.) Mr. E. J. Riding's magnificent flying scale model of the B.E.2c. (Right.) Mr. C. Rupert Moore's Tiger Moth complete with occupants; just behind the Moth can be seen the tail of the "IGO", one of last season's most successful sailplanes.

The "duration" type of model was decidedly in the minority—as we should expect in view of the shortage of rubber, for which these models have a very large appetite—but amongst the few on show I was pleased to note the same tendency to design along progressive lines that had been so noticeable throughout the Exhibition. Mr. Proctor entered a streamlined elliptical "Wakefield" type 'plane with folding single-bladed propeller, retractable single-wheel undercarriage, high-wing, mounted on a streamlined "platform," and a twin-finned tail. Internal rubber bands were used to secure the wings, and an unusual and neat method of stiffening the leading edge of the wing was a noteworthy feature. This machine was, in fact, a collection of all that is more or less generally recognised as the most up-to-date practice in this type of 'plane.

There was a sizeable number of petrol-driven machines on show, and although the development of this type of model has been hampered by restriction or absence of supplies of materials for building and covering, engines have been unobtainable, and the Government ban has (until recently) made it impossible to fly the 'planes; the modern progressive trend was still evident. Progress was indicated in three directions:—

- (1) towards the production of larger models, suitable for radio control;
- (2) towards smaller models, owing to the urge for portability and economy in cost of building;
- (3) towards "scale" appearance.



Furthermore the many technical problems which have been worrying the petrol-driven designer for years have been tackled in a sound, workmanlike way, without sacrificing appearance. Undercarriages, for instance, were in all cases practical and capable of standing up to the enormous strains to which they are submitted. I cannot help wondering whether we ought not seriously to tackle this problem the right way round, i.e., study the problems of landing, because until we do this it will be practically impossible to use retracting undercars. After all, slots are coming into use, why not flaps? Col. Bowden's little biplane had slots in all the wings. Wheels, of course, were often not all they might be, but then airwheels have disappeared from the suppliers, together with suitable covering materials for these big machines. One can hardly expect a man to go without new socks in order to provide coupons to buy silk, whilst even the heavy grade of bamboo paper which we used so freely before the war is now unobtainable. Engine mounts showed no great originality, but the tendency to cowl the engine was well developed. Mr. Tansley's modified "Premier Lion" had the engine mounted in an adjustable bearer-frame: this machine, by the way, was the finest example of covering I have seen for some time. Col. Bowden's engine was mounted in his usual fashion, on a platform held on by rubber bands (where, oh where, does he get all those rubber bands?). The engine in Mr. Balfour's 66 in. span high-wing was cowed very neatly with a spun aluminium casing, and both Mr. Tansley's machine and Mr. Welsberg's scale trainer had beaten metal casings fitted over the engine mounts just like the bonnet sides of a car. Mr. Simes of the A.B.A. Council, showed a huge low-wing model, with its engine mounted per Col. Bowden's system, which is probably excellent from the point of view of safety and ease of maintenance, but leave much to be desired where appearance is concerned. Flight-timers are of great importance nowadays: clockwork seems to be the

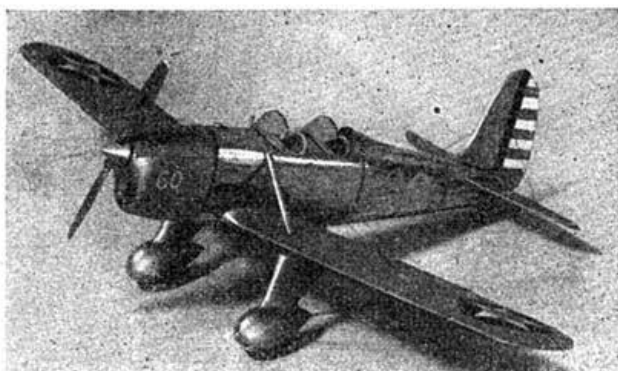
(Left.) Mr. C. Rupert Moore's "Twin Gull", a novel and successful experiment with a "Wakefield" type model. Twin contra-rotating airscrews are employed, driven by the well-known "Moore Drive".

(Right.) A Wind Tunnel model of the Miles M-39 Libellula experimental aircraft. A full-size scale aircraft of this machine, known as the M-39B and powered with two Gipsy VI motors, has been successfully flown by Mr. George Miles, the designer.





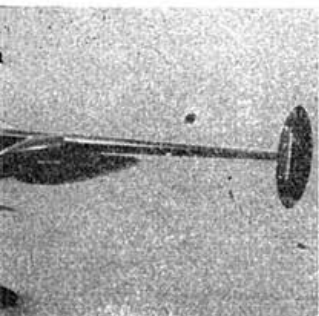
favourite, the timer in the Polish trainer being a particularly good example: it was simple and rapid in operation, and performed two functions, working a tow-line release in the tail, and also switching off the ignition. I could see no timer on Col. Bowden's biplane, but as I know his tactics far too well to imagine he would not allow for such an accessory in one of his designs, I imagine this is one of the machines on which he straps the accumulator-cum-timer unit which he recently described for us. Mr. Tansley's timer worked on the airleak principle, with a dash-pot cylinder. Mr. Russell's two 'planes are already so well known that any reference to their design is almost superfluous, but I feel that I must mention the very neat and effective springing to the undercarriage of his "Vulcan" in which the streamlined legs of the undercart spring backwards—against internal rubber bands—through slots in the underside of the fuselage; and also compliment him on his enterprise in fitting the "Lizzie" with a real undercart, presumably with the intention of doing as I have already suggested, i.e., make the model land properly. Radio control will no doubt assist him to achieve this desirable end. Only two engines were shown. One was an experimental engine of Mr. Sparey's, which I understand was intended to make the work of the amateur engine builder as simple as possible. Its most interesting feature was his new contact breaker, which seems to be the solution of the petrol user's main problem—dirty points. I have seen these points after the engine had been running for long periods, clean and bright and completely free from oil. I imagine that a number of engines will be coming on to the market as soon as circumstances permit, and that the popularity of the petrol-driven model will follow as a matter of course—I notice that the U.S.A. has already begun to produce small engines again, the advertising pages of their aeromodel papers looking very pleasantly like old times.



(Above.) Mr. J. H. Elmes' super detailed flying scale "Ryan PT-16". This model includes movable controls operated by the rudder bar and control column, the latter being removable for flying purposes and the controls may then be locked. A feature of this model was the excellent metal covering on the fuselage. (Left.) Mr. E. J. Riding's built-up scale model of the famous "Avro 504K".

Before leaving the subject of power-driven 'planes I must refer to Mr. Evan's R.T.P. electrically-driven 1 in. scale Miles "Magister." The 'plane has already been described in this journal, but the fact that this machine was flown round its pylon, with a restricted radius of only 7 ft. 6 in., taking-off and touching-down on the rough concrete floor continuously throughout the whole period of the Exhibition is no mean achievement! Its absolute reliability and ease of control suggest many possibilities for indoor flying in the future, and Mr. Evans told me that he is already working on the question of remote control for elevators and rudder, which would make this little 'plane a very fascinating model to handle. It is at present worked from a car accumulator, owing to the fact that the high power-weight ratio necessary in the motor is more easily achieved by using D.C., but one may hope that it will be possible to develop a suitable motor working from the A.C. mains, which would enormously increase the popularity of this type of power unit. I believe Mr. Evans intends to produce a smaller motor, weighing only 1½ oz., suitable for a model of about 15 in. wing span. I cannot help feeling that a model such as the "Mosquito," with twin engines of this type, complete with remote-controlled elevators and even ailerons and rudder, would cause a sensation at some of our indoor flying meetings and public demonstrations.

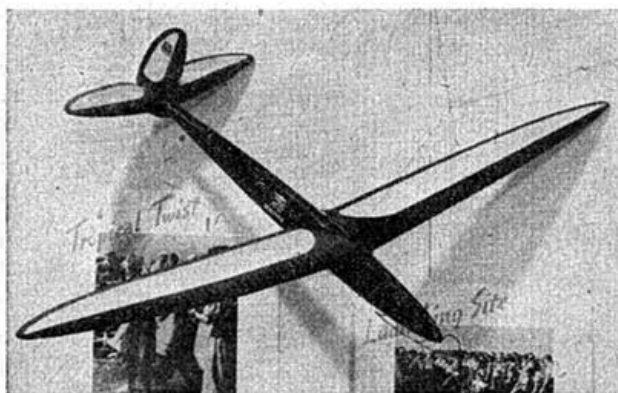
I spoke about the progressive attitude towards design displayed by the present-day aeromodeler to Mr. Lodge, the energetic and enthusiastic secretary of the A.B.A.,



(Right.) Undoubtedly the most outstanding model of the Exhibition was this 1/24th scale "Falrey Firefly", built by Mr. C. A. Tildman, a draughtsman employed by the "Falrey Aviation Company". Over 2,800 working hours were spent on the model which is a perfect replica of the full-size aircraft. All the controls operate from the cockpit. Working parts include the following:—Sliding cockpit canopy, flaps, retracting undercarriage and tail-wheel, folding wings, catapult spools, and many other details too numerous to mention. This model is the nearest approach to a scale modeller's dream that we have yet seen.



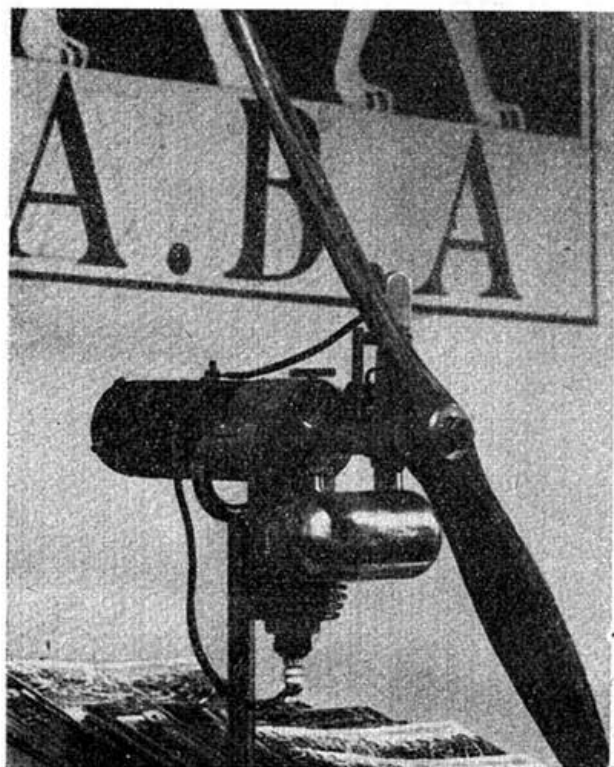




Messrs. A. D. C. Pollard and A. E. Laws 7 ft. span sailplane. Of elliptical design throughout, this beautiful model has extraordinary clean lines, it weighs 18 ozs., has an A.R. of 17:1 and incorporates dural wing tongues. A Götting 532 airfoil section is employed and the lifting tailplane is of Clark Y section. Note the buffer skid, providing excellent protection for the nose.

whom I met on the Association's stand. He informed me that the A.B.A. have already formed a Research Committee, and the new Research Section will be able to encourage, and also actually to carry out, research on the most up-to-date lines into the many problems of low-speed aerodynamics. As the Association grows in strength, its resources will become increasingly available for this purpose, which, Mr. Lodge tells me, was one of the principal reasons for its original inception. Mr. Russell has already offered a very handsome cash prize and a medal for the encouragement of papers on research into any subject allied with model aerodynamics by members of this section.

Further evidence of the general recognition of this trend was given by Mr. Lodge when he also stated that he had contacted a number of recognised expert members of the A.B.A. in the various branches of aeromodelling, to whom he forwarded the large number of requests



which he was continually receiving from members—particularly junior members—on design and construction. In this way the Association is able to ensure that the more youthful element of our great family will start where the older members leave off, and not have to plough the same ground again: they can attack the problem of present-day design with all the experience of those who have gone before them at their disposal.

A most interesting exhibit from this point of view was the 5½ in. wind tunnel constructed by Mr. N. K. Walker and members of the Low Speed Aerodynamic Research Association. This association has been formed by aeromodellers, like Messrs. Walker and Annenberg, who are already engaged in aerodynamic research work for the Government, and who are enthusiastically devoting their spare time, skill, and energy, to this extremely important matter of low-speed research. Their work is entirely voluntary, and arises out of the desire for accurate information and progress in design. The benefits which such work will ultimately bring to all designers of small aircraft can hardly be overestimated.

The tunnel consists essentially of a rectangular tube, 5½ in. square, faced on both vertical sides with transparent plates. A circular inset is fitted to each of these plates into which airfoil sections, or any other details which it is desired to test, may be fixed; and a graduated scale enables these test pieces to be adjusted to any desired angle of incidence to the airflow. A current of air is drawn through the tunnel by a small electric motor driving a 12 in. diameter six-bladed airscrew, and somewhat elaborate precautions have been taken to smooth out the airflow at the entrance. This is achieved in two stages. The air first passes through a silk gauze, and then through a honeycomb arrangement of vanes enclosed in a funnel-shaped casing. This tends to correct any disturbance, at the low air-speeds used, in the incoming air which might easily be caused by the nearby presence of one of the operators, for instance. The air passes thence through a second funnel-shaped duct which acts in the same way as the rubber attachment fitted to water taps—to smooth out the flow. When it is realised that such low air-speeds as 4 ft. per second are used, the need for these precautions will be obvious. Fittings shown on the stand were a movable pitot head inside the tunnel fitted with external control. This is used to examine the "wake" in the rear of sections being tested, and drag may be calculated by this means. Two specially constructed manometers were shown, used for measuring the pressure of air in the tunnel, so that accurate estimations of velocity may be made, and a simple but effective apparatus for generating smoke which made visual observation of the airflow possible. At the moment no balance is provided to enable measurement of lift to be made; but this, and other apparatus will shortly be available.

2nd Prize Winner in the Experimental Competition was this 7.5 c.c. rotary disc inlet valve engine designed and built by Mr. Laurence H. Sporey. One of its outstanding features was a novel experimental contact breaker. Note also the ebonite case containing coil and condenser, which simplifies the external wiring on the unit to a large extent.

A 1/5th scale "Miles Master II" advanced training monoplane, built by members of the Miles Technical School. This beautiful model included a fully detailed cockpit interior complete with scale instrument panel and a sliding canopy. Also in this photograph are shown, left, a scale model of the "Miles Monarch" and right, a scale model of the "Miles African Messenger".

The overall length of the tunnel is 4 ft. 6 in., and the total height with its stand about 4 ft. Most of the actual research work involves an almost incredible amount of calculation, in order to make useful deductions in standard form from the measurements obtained. Apart from this, however, an interesting demonstration was given by Mr. Annenberg of the rapid observation of the behaviour of wing sections. An R.A.F. 32 section was tested and the condition of the airflow was made visible with smoke. The effects of adjustment to various angles of incidence up to the stalling point could be easily seen, the breaking up of the airstream at about 10° of incidence being most impressive. After this a new section—designed by the demonstrators as the result of experiments in the wind tunnel—was demonstrated, and the behaviour of the airstream under the same conditions as before was very convincing.

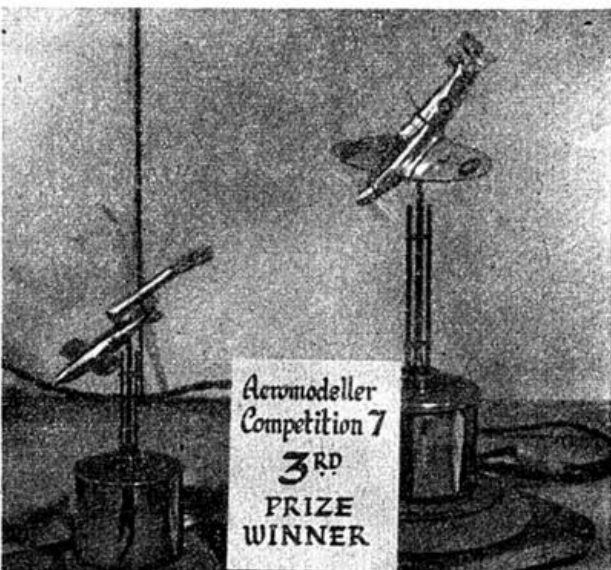
This exhibit was an outstanding example of the serious thought now being given to the design of small aircraft. It is extremely unlikely that the aerodynamic data at present available, which has been obtained from wind-tunnel research, carried out by full-size concerns, is of any value to the aeromodeller, owing to the fact that these figures are all the result of high-speed experimental work. This attempt at real scientific measurement of velocities, drag, and lift, should be of the greatest value to the progress of our hobby, and do more than anything else to bring it to the notice of the serious experimenter. Mr. Annenberg stated that he has already started work on the construction of a larger tunnel of a similar type, 12 in. in diameter, which will allow much more scope for the research worker.

Although it may not appear at first sight to have any direct bearing on model aircraft practice, I was extremely interested in the model race car stand, since it was obvious on closer examination that this branch of activity is undoubtedly a development of aeromodelling. It has already attracted many of our leading petrol-driven aircraft enthusiasts—Mr. Russell himself being an example—probably owing to the possibilities of making use of model air-wheels and petrol engines during the idle years of the "ban." Such engines as Mr. Westbury's "Kestrel," and two or three well-known American engines, were shown mounted in little race cars. The main point which bears on the subject of this review is that in this sphere the same attitude towards genuine scientific methods was to be found. Mr. Wright, honorary secretary of the British Model Race Car Club, told me that he had constructed a machine for testing the behaviour of rubber wheels of various kinds. Air-wheels of the pneumatic type being difficult to obtain, substitutes of many kinds have been successfully tried out. The machine can be adjusted to turn the wheels at any desired speed up to an equivalent of a road speed

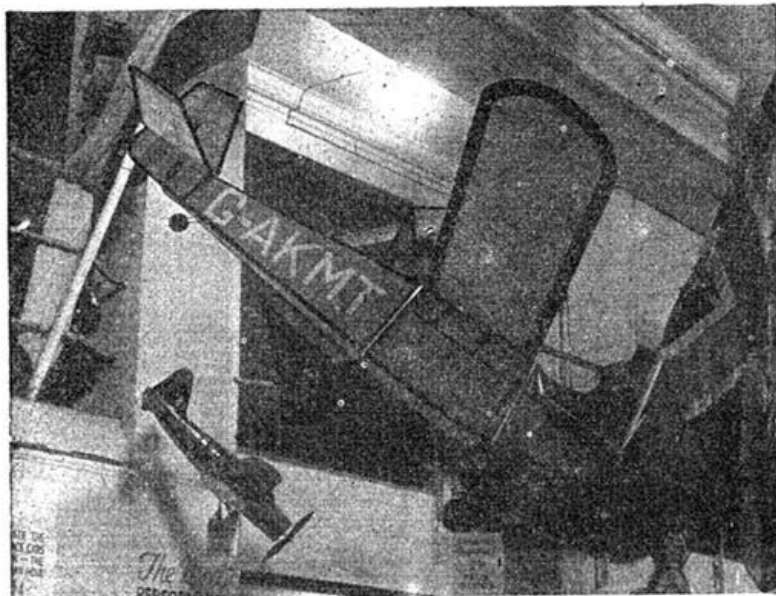


of 75 m.p.h. and it may interest readers to know that at road speeds over 45 m.p.h. solid rubber tyres can be seen to expand visibly, and tend to leave the rim—a phenomenon which had already occurred in practice. Air-wheels of the light pneumatic type, sold before the war for power-driven model aircraft, could be seen to become badly distorted under the stress of centrifugal force, and some means had to be found to prevent this.

The exhibition of "solid" scale models would need an article to itself to do it justice. The models ranged from tiny specimens which could have been packed into a matchbox up to large professionally-made wind-tunnel models of 1/2 in. scale and over. The standard of workmanship was so good that I did not envy the judges their task of choosing prize winners. For the solid enthusiast there were many fascinating examples of detailed work. A Fairey "Firefly," shown with one of its wings folded back, was absolutely complete in every detail, built to 1/24 scale. A "Typhoon" of about the same scale, was complete to the very smallest detail, all its control surfaces were working, operated from a column and rudderbar inside a fully equipped

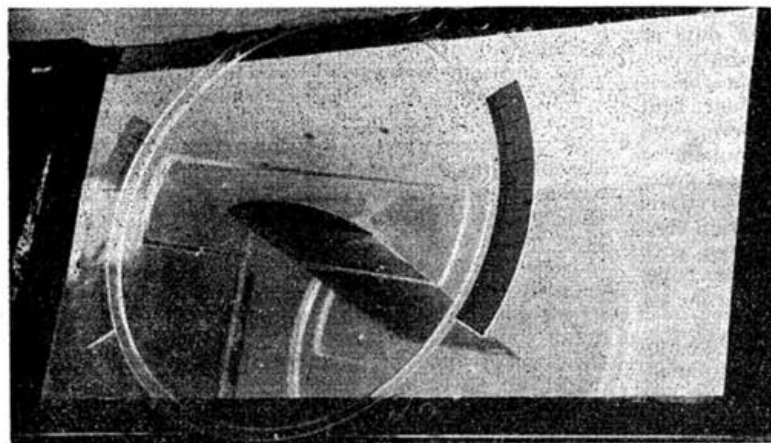


Modelling in brass, by Mr. J. Rhodes. This novel display attracted a great deal of attention with a revolving propeller on the Spitfire and a small buzzer which emulated a Doodle-bug. To its credit this model ran continuously for the duration of the Exhibition.



(Left.) Mr. Tansley's modified "Premier Lion", 2nd Prize Winner in the Petrol Model Competition. In the background can be seen Mr. Dare's "Kingfisher".

(Centre.) A close-up of the test section of the L.S.A.R.A. Wind Tunnel. By rotating the disc the angle of attack of the airfoil section under test can be varied and read off the scales. This excellent exhibit attracted large crowds and received special mention from the judges.



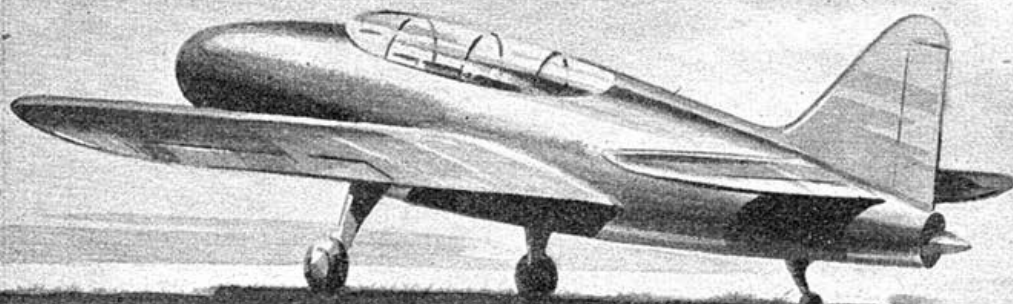
cockpit; whilst all external fittings, such as hand-holds, footstep, undercarriage retracting mechanism, and even the rockets and their racks, were reproduced in perfect detail. Mr. Temple, of "Celestial Horseman" fame, showed a  $\frac{1}{4}$  in. scale "Heston" racer, with his usual perfect finish, and also a  $\frac{1}{72}$  scale Focke-Wulf 190 made in Normandy after D-Day, out of odds and ends, and finished to represent the exact appearance of the plane as he saw it. It would seem that the popular  $\frac{1}{72}$  scale is likely to be replaced by  $\frac{1}{48}$  scale, which allows much more detail to be reproduced. I was rather surprised to find that only three models were fitted with electric motors. One was made by the Dagra Engineering Co., Ltd., in a  $\frac{3}{8}$  in. scale "Typhoon" exhibited on their stand; a  $\frac{1}{72}$  scale "Typhoon" was shown on the A.B.A. stand; and the third was a polished brass model of a "Spitfire" chasing a flying bomb, by Mr. Rhodes, in which the airscrew of the plane was driven by an electric motor in the base. It is quite impossible to attempt to deal with the enormous variety of these models in the space at my command, but the Exhibition showed that the art of solid scale modelling has made great strides since the pre-war period, and is attracting the serious worker with its possibilities.

The Exhibition was the first of what we all hope is going to be the Annual Event of the aeromodelling "year," and the progressive spirit which has enabled such a show of models to be made during these difficult times will continue to inspire not only those who were fortunate enough to be able to visit Dorland Hall, but the whole of our movement; so that next year's show may be something towards which every aeromodeller may look forward, resolving through his own exhibit to carry on the adventurous tradition of the true experimenter, which has been so well displayed in the past.

(Left.) One of the many American visitors to the Exhibition was Lt. L. Baer of the U.S.A.A.F. Before taking up his duties as a Pathfinder Navigator Instructor, Lt. Baer was a member of the "Milwaukee Aeronauts" and a participant in the 1939 "Wakefield". A keen modelling enthusiast, Lt. Baer is shown here discussing points on the "R.W.D.8" with Mr. H. G. Hundieby, Assistant Editor of the "Aeromodeller".



**FUTURE PLANS..**



**AND FUTURE PLANES!**

*All in good time! The planes of the future are on the way. The plans are on the drawing boards. But eager aeromodellers must curb their (quite excusable) impatience. The new model kits will be put into production as soon as service demands permit~*

**TRUE-TO-SCALE REALISM PLUS PERFORMANCE**

Present and future Keil Kraft Kit models, like their prototypes, are built to do a specific job of work. And, how they do it! In a sense Keil Kraft Kits are more than models—for a model need not necessarily perform. But Keil Kraft Kit models are supreme in their fidelity to the originals—and their performance is **REAL DURATION FLIGHT**.

We deeply regret that owing to the Limitation of Supplies Order, we are temporarily unable to supply until further notice.

**SCALE AND DURATION FLYING MODELS AND GLIDERS.** Only Spitfire and Hurricane in the Flying Scale Range.

**AJAX.** 30 in. high-wing, cabin. Duration model. Fuselage complies with S.M.A.E. formula. Kit comprises: Ready-cut ribs, instructions, easy-to-read plan, cement, tissue, paste, rubber and all materials for complete construction **5/6**

**ACHILLES.** 24 in. high-wing, cabin. Duration model. Fuselage complies with S.M.A.E. formula. Kit comprises: Ready-cut ribs, easy-to-read plan, cement, tissue, paste, rubber and all materials for complete construction. **3/8**

**GLIDER RANGE.** 30 in. Victory Glider, **4/6** 20 in. "Polaris" Solid Glider, **2/6** 12 in. "Vega," **1/6** Coming shortly 40 in. "Invader."

Accessories always available. Cements, Dopes, Wheels, Cowls, Transfers, Cockpits, etc., etc., true to usual Keil Kraft standards.

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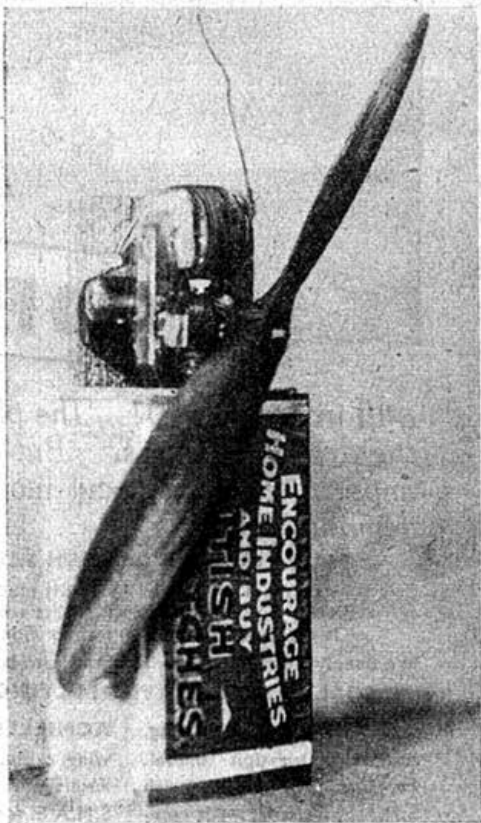
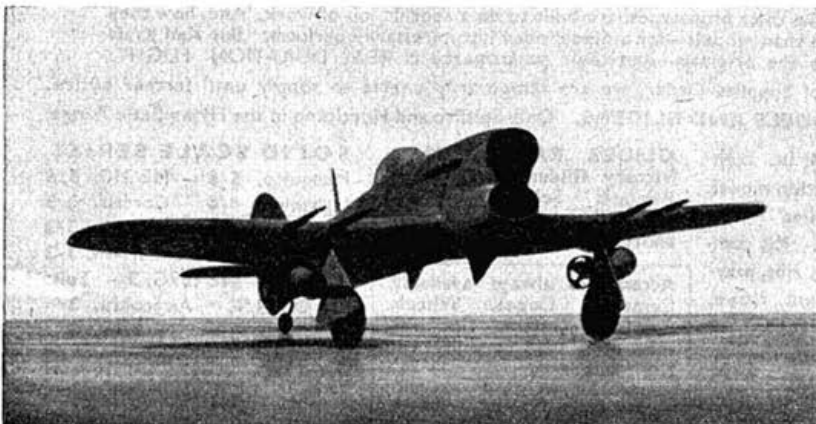
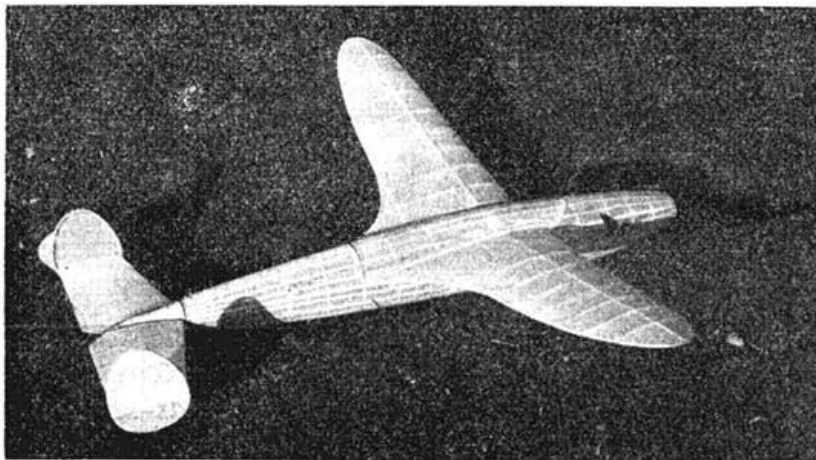
Also distributors for: SKYLEADA, STUDIETTE, TRUSCALE, VERNON, ETC.

# MODEL

This excellent action shot of a Spitfire VB is the work of our old friend G. R. Woollett. Who would realize that this was not the actual aircraft? Note the undercarriage retracting in the correct manner. Features such as this add that extra touch of realism that makes a first-class picture.

(Centre left) is a "Wakefield" model, built and designed by O. J. Lee. The model, of hardwood construction, weighs 8½ ozs. and flies successfully on 2 ozs. of rubber, the average duration to date, without thermals, being 90 secs. Incidentally, the model bears the name "Freddie," being inspired by a "Freddie" cartoon that appeared in the January, 1942 "Aeromodeller." "There is many a true line drawn in jest."

(Bottom left). A 1/72nd scale "Typhoon IB," built by G. Tester and photographed by K. R. Butterfield.



Above, a small electric motor (actual size shown) built by H. Slack, for use in electric R.T.P. models. This appears to be an "up-and-coming" branch of aeromodelling, in which should see some interesting developments during the next year or so.

Below, left to right respectively, a Douglas A-20, Havoc, Typhoon and Ju 88, all built to 1/72nd scale by Cpl. Moss, R.A.F.

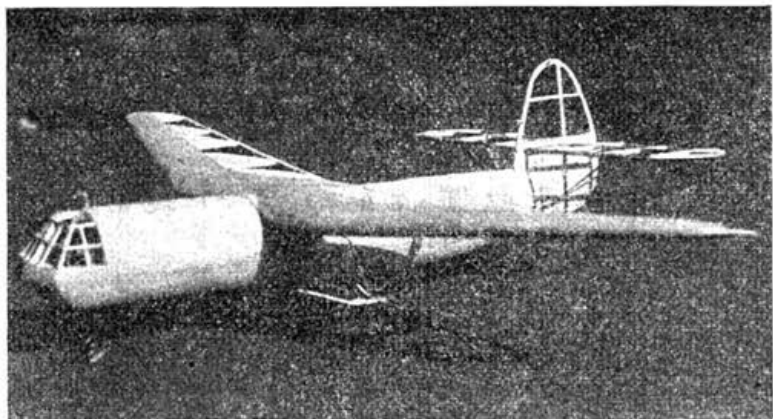


# NEWS

A 22" span "Airspeed Horsa," built by T. Robinson and photographed by K. Weldon. This model is a slightly modified version of that described in the September, 1943, "Aeromodeller." Instead of a balance weight in the nose, weight was added by incorporating detailed cockpit fittings, a gooa scheme from all aspects.

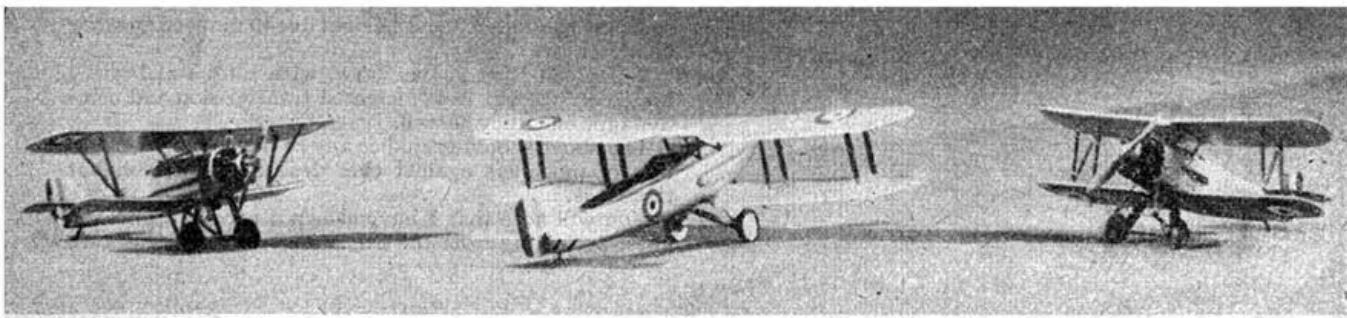
(Centre right). An excellent model of the D.H. Comet, built and photographed by Pte. Gundry of the R.A.S.C. This forerunner of the Mosquito brings with it an atmosphere of the pleasant days of peace.

(Bottom right). An unusual "Wakefield" model built by R. D. Gavin, who states that he became tired of the usual orthodox type. We must congratulate Mr. Gavin on producing a model of extremely pleasing lines. The model utilizes gears and is a very consistent performer.



Above, a 1½ scale "Ivory Gull" in flight. Built by J. S. Gilmore, this model, which is silk-covered, weighs 35 ozs. and is a comparatively slow flier, best flight to date being 5 mins. o.o.s.

Below, left to right, an A.W. Siskin, Falrey III F and a Falrey Flycatcher, all to 1/72nd scale, built by F. S. Stringer and his brother.





# FOR DESIGNERS

## PART II

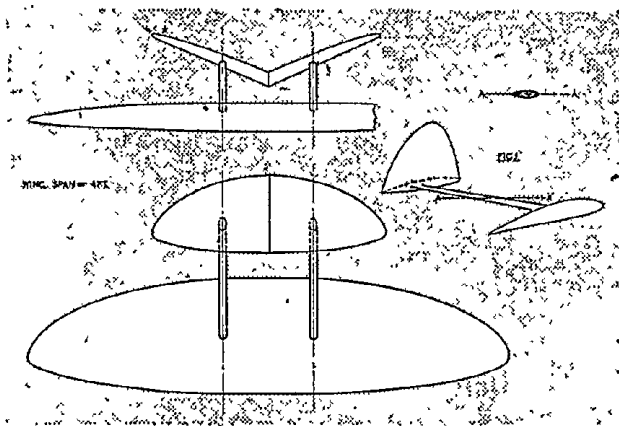
BY P · R · PAYNE, A.M.N. Inst. E.

THE object of this article is to put forward a project for the interest of experimental modellers. It is really a modification of my tandem described in the previous "For Designers," and although no flying model has, as yet, been constructed on these lines, several models of my tandem have been flying well, as I mentioned in my last article.

If my reader has read the first "For Designers," he will already be aware of some of the disadvantages (or rather my ideas on the disadvantages) of the orthodox and other aircraft layouts, so I will not dwell upon them here. Suffice to say that this modification of the tandem practically eliminates fuselage drag, as well as fin and tailplane drag. Thus, in effect, practically all the drag is wing drag, and the layout is a form of flying wing(s) aircraft, without, however, having the disadvantages usually associated with this type.

As far as aerodynamic design is concerned the drawings are fairly self-explanatory. There are some points to be cleared up, however, so we will deal with each project in turn.

Firstly, the sailplane shown in Fig. 1. This is an actual project, P/EXL-32/12 by my system of lettering, and is at the moment undergoing detail design, so by 1950 it should be in the course of construction! The drawing is not to scale, the rear wing being larger than shown on the plan. The leading wing airfoil section can be either a bi-convex or a concave section, but in the case of the latter, care must be taken to see that the C.P. travel of the section chosen is not excessive (e.g. I should not advise the use of R.A.F. 19, or N.A.C.A. 6712, but sections such as GOTTINGEN 387 or N.A.C.A. 4412 are



quite suitable. In plainer language, use common sense and, "Airfoil Sections," by R. H. Warring!). The section of the rear wing should be a thin, low drag airfoil. On this particular model I have used GOTTINGEN 387 for the leading wing, and 4 A.D.1 for the rear wing. With respect to the last section, some designers may not have access to data on it, so I have included a graph of its characteristics, and ordinates at the end of this article.

Might I murmur a hushed appeal here? Stress that rear plane and those supports. The only loads they will normally be subject to are flight loads and inertial loads on landing (the last phrase is not *meant* to be funny!). The more *scientifically* light the rear plane can be made, the stouter can be the construction of the front wing and/or the better will be the performance. A gadget on the "weak link" principle can be incorporated for crashes.

With the exception of fuselage drag already mentioned, I would refer readers to my first article for the advantages of this layout.

Now let us consider Fig. 2. Power designers will immediately condemn the project because there is no fuselage for a long motor. This, however, is where the thick wing section comes in, for the motor can quite easily be put in the wing, running in the direction of the lateral axis. I think it was in Mr. Russell's "The Design and Construction of Flying Model Aircraft" that I first saw this idea, which immediately appealed to me. Obviously, it is the ideal system for the layout we are considering. The power may be transmitted to the airscrew(s) by Moore's patent drive, Townner's "curtain wire" (I believe that is correct), or just plain "cogs." The latter seems the more attractive proposition, as the speed of the airscrew can thus be increased (and the diameter consequently decreased) at the same time.

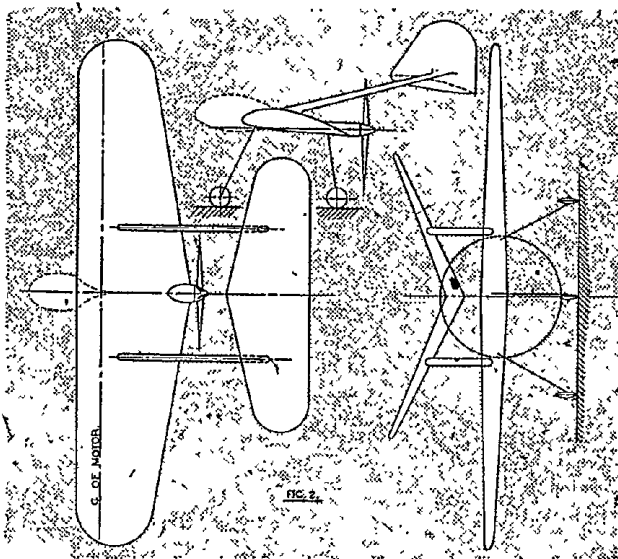
Whilst talking about airscrews, I should like to digress for a moment. The designer has two alternatives before him.

1. He can have *two* airscrews, rotating in opposite directions and thus cancelling out torque, and also reducing the undercarriage height due to reduced airscrew diameter, or

2. He can have *one* airscrew, with torque and lanky undercarriage but with increased transmission and aerodynamic efficiency as well.

The above should prejudice any of the younger generation of modellers against ever designing a model, but there it is.

You will note that I have shown a nacelle (in broken lines) projecting from the L.E. This would in any case



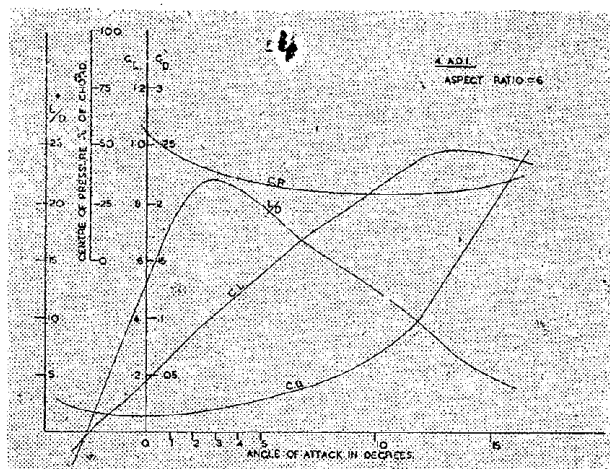
be necessary in a small full-size machine of this layout, but it might be incorporated into a model:—

- For scale effect.
- If the model is tail heavy.
- If the judges "cut up rough" about regarding the lateral cross sectional area of the centre section of the wing as the fuselage cross sectional area. (Some ruling by the A.B.A. might clarify matters here.)

The main wing should be stoutly constructed, and have either the part of the wing in front of the main spar, or the whole wing, covered with sheet wood. Having covered *elliptical* wings with *obeechi* sheet, I know it can be done. This stressed skin construction will prevent the wing from warping with the torque of the motor, and with this layout there is plenty of weight to spare for it.

Here then, is the modified layout. I can recommend it as being theoretically sound, this being borne out in practice with similar fuselage models. The fact that this layout is more efficient as a sailplane than a fuselage tandem does not necessarily prove that it would be more efficient for power. The reduced transmission efficiency coupled with what, in practice, will probably be a weaker motor than that of a fuselage machine, may annul the aerodynamic advantages gained. This, however, is for the designer to decide.

Just one word more. If by studying "Airfoil Sections," by Warring, or Government research publications, the designer can find two suitable airfoils, in which the  $CL^{1/2}/C_D$  max. of the rear wing occurs at  $\alpha$  2° to 4° less than the corresponding  $\alpha$  of the leading wing, the performance of the machine will be improved by setting both wings at their power factor max. angle.



AIRFOIL SECTION 4.A.D.1 ORDINATES.

Station	0	3.16	6.3	12.05	19.0	25.4	31.7	38.0
Upper Surface	0	1.03	3.15	4.76	5.03	6.15	6.38	6.45
Lower Surface	0	-1.13	-1.25	-1.43	-1.5	-1.6	-1.65	-1.05

Station	..	..	40.9	55.7	64.5	73.5	82.8	91.2	100
Upper Surface	..	..	0.28	5.78	5.03	4.18	3.22	2.03	0
Lower Surface	..	..	-1.03	-1.56	-1.38	-1.18	-0.82	-0.70	0

## READERS' LETTERS.

*Continued from page 235.*

speed of a good glider is about 3 ft./sec., although a lower rate of descent may be accomplished. I agree that it is accomplished, yet Mr. Cameron's performance seems little short of amazing. Without in any way doubting Mr. Cameron's figures, I would like to know how he does it.

It is generally agreed that for this size (40-60 in.) a medium or lightweight glider, well designed, can put up a better show in reasonable weather than its F.A.I. counterpart. My own

3 oz./sq. ft. 50 in. span glider does a consistent 2½ minutes from a 300 foot line, in fairly calm weather, the height obtained on the line being no more than 200 feet, indicating a sinking speed of roughly 1½ ft./sec. Tests with an F.A.I. glider of the same size show a rate of descent of a little over 2 ft. sec.

If anybody can tell me where I go wrong, I should be grateful, but in my opinion the advantage (?) of a loading of 5 oz. or over is not felt until a span of 6 feet or over is reached.

Bristol.

C. MIDDLETON.

## WANTS AND DISPOSALS

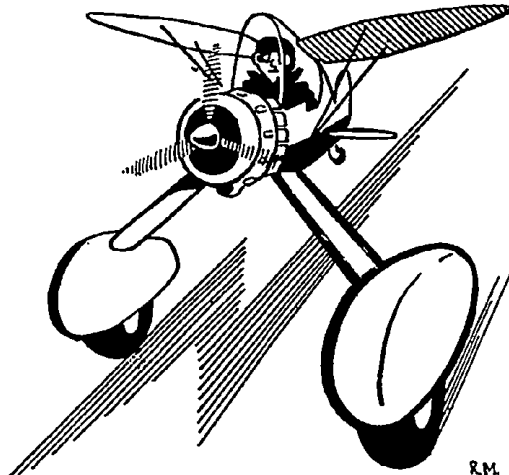
### WANTS—

(1) "Aircraft of the Fighting Powers," Vols. I and II, in good condition.—Mr. Jones, 70, Sycamore Drive, Latch Estate, Chester. (2) AEROMODELLER, November, 1941. Plan and castings of any 2.5 c.c. engine.—P. Deuss, 110, Rusthall Avenue, Bedford Park, London, W.4. (3) Pair 2½ in. airwheels.—R. Reason, 59, Forest Avenue, Fishponds, Bristol. (4) Pair 2½ in. dia. airwheels.—K. G. Simmons, "Brooklyn," 87, Greenway Road, Taunton, Somerset. (5) Flight timer. Pair of 3 in. airwheels.—A. Brann, 77, Carlisle Street, Splott, Cardiff. (6) Pair 2½ in. dia. airwheels.—R. McLaughlin, 104, Westminster Road, Handsworth, Birmingham, 20. (7) AEROMODELLERS, "Model Airplane News," "Flying Aces," 1936-42.—W. Fretwell, 40, Ella Bank Road, Marpool, Heanor, Notts. (8) 8-9 in. dia. prop., 4½ in. pitch.—A. Batstone, Cushog, Pentwyn Road, Deganny, N. Wales. (9) Pair 2 in. airwheels. Rev. counter.—N. Coward, Hope Lodge, Congorbury, nr. Bristol, Som. (10) Pair 3 in. dia. airwheels. Heavy bamboo paper or Jap silk.—W. A. Williams, 7, Escourt Road, Lidget Green, Bradford, Yorks.

### DISPOSALS—

(1) AEROMODELLERS, Jan. 1930-Dec. 1943.—Flt. Sgt. R. F. Waller, 57, Wistaston, Crewe, Ches. (2) AEROMODELLERS, Aug. 1942-Nov. 1944, excellent condition, 15s.—P. G. Conquest, 7, Grenfell Drive, Bradford Moor, Bradford. (3) "Aircraft of the Fighting Powers," Vols. 1, 2, 3 and 4, 23 complete or 17s. 6d. each.—M. Lieberman, 11, Weald Way, Romford, Essex. (4) 5 ft. 6 in. span petrol model with 5 c.c. Kestrel petrol engine, complete in travelling case and in perfect condition, £10. 1 c.c. engine, £4.—J. Harris, 75, Abbott's Walk, Boxley Heath, Kent. (5) "Aircraft of the Fighting Powers," Vols. I and II, 14s. 6d. each or will exchange for air books.—D. Bradley, 73, Craig Street, Darlington. (6) Gwynn Aero engine complete with prop. As new, only two test runs.—Offers to H. S. Lees, 8, Thanet Grove, Perry Barr, Birmingham, 22B.

## CARICAPLANES No. 2



FAMOUS FOR ITS "PILOT," AS WELL AS ITS "SPATS," IS  
Mr. D. A. RUSSELL'S 1/5th LYSANDER

# MONTHLY MEMORANDA

BY O. G. THETFORD

## B.O.A.C.'s Fleet.

In response to a request by many readers for information on the markings and registration letters of British civil transport aircraft, we are publishing a list of the aircraft at present operated, or recently operated, by British Overseas Airways Corporation. This is as complete as censorship regulations allow at the time of going to press.

All British civil transports are camouflaged in dark green and dark earth on the upper surfaces, or sometimes in dark green and dark slate grey, and are painted silver underneath. Since the early weeks of 1945 certain aircraft going into service with B.O.A.C., including Lancastrians and Liberators, have been left aluminium all over.

British civil registration letters are painted in black above and below the wings and on the sides of the fuselage and are outlined in silver. They are underlined by red, white and blue stripes (each 6 ins. deep) on the fuselage and beneath the wings, and by red and blue stripes above the wing. An interesting point is that the red and blue stripes are retained above the wing of all-silver aircraft recently going into service. Red, white and blue bands are painted on the fin(s) and the B.O.A.C. insignia, a blue "Speed-Bird" on the nose. Aircraft which are named carry the name in block capitals beneath the pilot's cabin.

**Armstrong-Whitworth. ENSIGN. ("E" Class).**  
Ensign: G-ADSR. Eddystone: G-ADSW. Elsinore: G-ADST. Explorer: G-ADSV. Egeria: G-ADSS. Euterpe: G-ADSU. Emptyean: G-ADSY. Echo: G-ADTB. Everest: G-AFZU.

**Avro. Type XIX (Civil Anson): G-AGLB. LANCASTRIAN: G-AGLF. YORK: G-AGJA.** (Many others in service, no further details yet released.)

**Boeing. Type 314 Boat. Bristol: G-AGBZ. Berwick: G-AGCA. Bangor: G-AGCB.**

**Consolidated. Model 28-3 Boat. GUBA: G-AGBJ. CATALINA: G-AGFL, G-AGFM. LIBERATOR: (Mk. I): G-AGCD, G-AGHG. (Mk. II): G-AGEL, G-AGEM, G-AGKU (now transferred to QANTAS). (Mk. III): G-AGFN, G-AGFO, G-AGFP, G-AGFR, G-AGFS.**

**De Havilland. FLAMINGO ("K" Class).** King Alfred: G-AFYF. King Richard: G-AFYJ. King James: G-AFYK. King Charles: G-AFYL. King William: G-AGBY. MOSQUITO: (Mk. III): G-AGGC, G-AGGD, G-AGGE, G-AGGH. (Mk. IV): G-AGFV.

**Douglas. DAKOTA: (Mk. I): G-AGFX, G-AGFY, G-AGFZ, G-AGGA, G-AGCB, G-AGGI. (Mk. II): G-AGHE, G-AGHF, G-AGHH, G-AGHJ, G-AGHK, G-AGHL, G-AGHM, G-AGHN, G-AGHO, G-AGHP, G-AGHR, G-AGHS, G-AGHT, G-AGHU.**

**Lockheed. ELECTRA. "Leith": G-AEPR. "Lea": G-AFCS. SUPER-ELECTRA. "Lothair": G-AFKE. LODESTAR. "Loch Lomond": G-AGDC. "Loch Lyon": G-AGDK. "Leicester": G-AGBP. "Lewes": G-AGBR. "Lichfield": G-AGBS. "Lincoln": G-AGBT. "Lowestoft": G-AGBU.**



N.A. Mustang of the Chinese Air Force.

British Official Photograph.

"Ludlow": G-AGBV. "Lynhurst": G-AGBW. "Llandaff": G-AGBX. "Lake Mariut": G-AGCM. "Lake Victoria": G-AGCN. "Lake Albert": G-AGCO. "Lake Edward": G-AGCP. "Lake Timsah": G-AGCT. "Lake Kivu": G-AGCU. "Lake Chad": G-AGCV. "Lake Rukwa": G-AGCY. "Loch Losna": G-AGDD. "Loch Lesja": G-AGDE. "Loch Loen": G-AGEI, G-AGEH, G-AGIG, G-AGIL, G-AGIM, G-AGIN, G-AGJH.

**Short. Type S.23 Boat ("C" Class).** Canopus: G-ADHL. Cambria: G-ADUV. "Castor": G-ADUW. "Cordelia": G-AEUD. "Corsair": G-ADVB. "Cameronian": G-AEUE. "Coorong": G-AEUI. "Carpentaria": G-AFJB. "Coote": G-AFBL. **Type S.30 Boat (Modified "C" Class).** "Champion": G-AFCT. "Cathay": G-AFKZ. **Type S.33 Boat (Strengthened "C" Class).** "Cleopatra": G-AFRA. **Type S.25 Boat (Civil Sunderland):** G-AGER, G-AGET, G-AGEU, G-AGEV, G-AGEW, G-AGHV, G-AGHW, G-AGHX, G-AGHZ, G-AGIA, G-AGIB. **Type S.26 Boat ("G" Class).** "Golden Hind": G-AFCI.

**Vickers-Armstrongs. WARWICK: G-AGFK, G-AGEX (now passed to R.A.F. Transport Command).**

## R.A.F. Flashbacks—5.

The first two-seat fighter to be used by the R.A.F. since the Bristol Fighter of Great War days, the Hawker Demon, is the subject of this month's "Flashback." The aeroplane in the picture, K 4500, is the Squadron Leader's machine of No. 604 (County of Middlesex) (Fighter) Squadron of the Auxiliary Air Force. This squadron flew Hawker Demon biplanes from the mid-thirties until shortly before the outbreak of war in 1939. Their squadron marking on wings and fuselage consisted of mid-brown and stone triangles. Two other Auxiliary units flying Demons, Nos. 600 and 601, had similar markings in red and white and red and black respectively. Regular squadrons of the R.A.F. operating Demons included No. 23 (red and blue squares); No. 29 (red diagonals); No. 41 (red band); and No. 64 (red and blue diamond marking). About 1936-37 an improved Demon was produced by Boulton and Paul, fitted with a power-driven turret in the rear cockpit. Batches of Turret-Demons were numbered K 5697, K 5698, K 5699, etc.

As a fighter version of the famous Hart bomber, the Demon reached a top speed of about 190 m.p.h. with a de-rated Rolls-Royce Kestrel motor. Its counterpart in the present war has been the Boulton-Paul Defiant.



# PHOTONEWS

(Top right.) **FOLDED FAIREY** :—A Fairey Firefly two-seat fighter (Rolls-Royce Griffon) of the Royal Navy with wings folded.  
(M.A.P. Photo.)

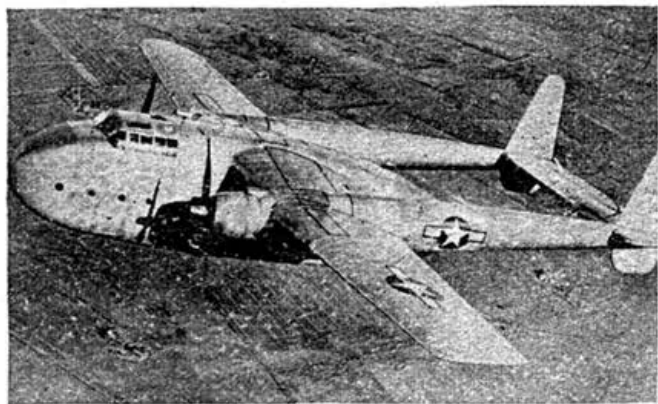
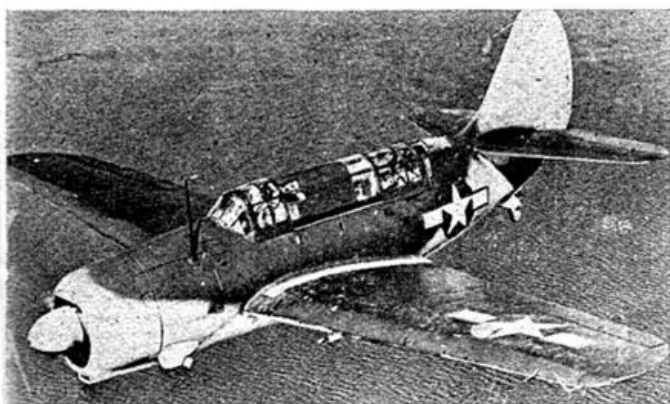
(Top left.) **A DEMON FROM HENDON** :—The Squadron-Leader's Hawker Demon, K 4500, of No. 604 (F) Squadron, Auxiliary Air Force. This unit flew Demons at Hendon before the War. ("Flight" Photo.)

(Middle left.) **NAVAL DIVE-BOMBER** :—The Curtiss SB2C-1 Hell-diver monoplane is now a key type in the U.S. Navy's Pacific operations.  
(O.W.I. Photo.)

(Second right.) **MONSTROUS MARS** :—A 200 ft. span Martin Mars flying-boat of the U.S. Navy photographed on its test flight.  
(U.S. Navy Photo.)

(Third right.) **A PACKET OF CARGO** :—The Fairchild C-82 Packet twin-boom transport aeroplane of the U.S. Army carries 40 troops over a range of 3,500 miles.  
(O.W.I. Photo.)

(Bottom.) **"TANGERINE" TOUCHES DOWN** :—A U.S. Ninth Air Force North American P-51D Mustang with the new extended fin, returning from a mission. Note the checkerboard round the nose, indicating the fighter squadron to which it belongs.  
(Associated Press Photo.)





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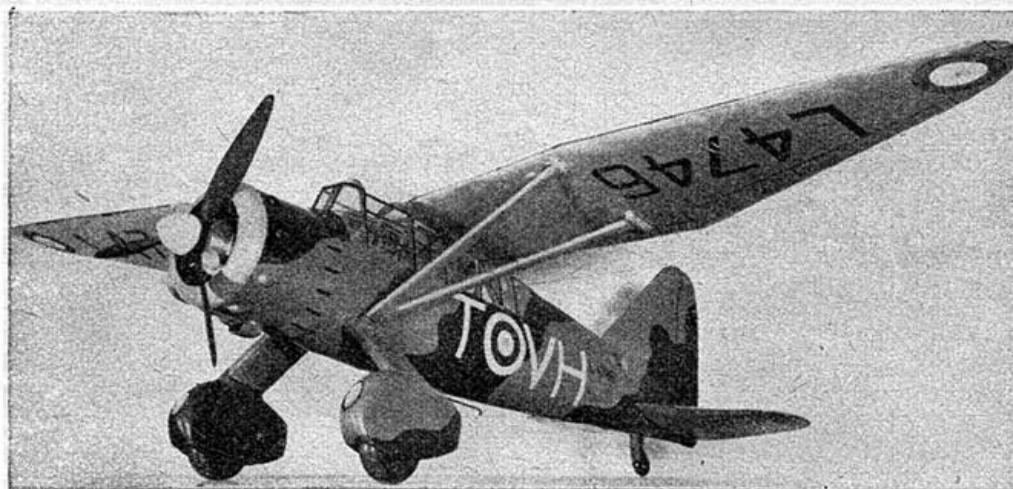
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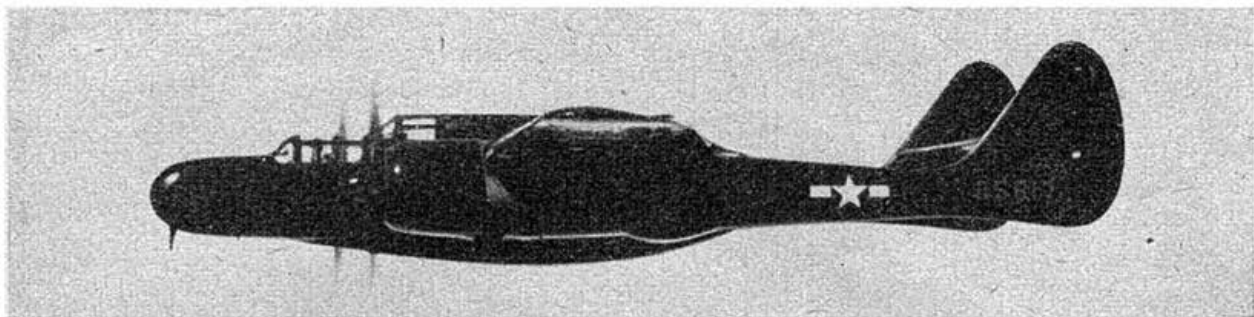
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## AEROPLANES DESCRIBED XXVI BY H · J · COOPER



Photos by courtesy of Northrop Aviation Inc.

## THE NORTHROP P-61 BLACK WIDOW

\*Next Month: The Gloster Gauntlet I

**N**ORTHROP'S Black Widow, the P-61 of the U.S. Army, is a much larger aircraft than is perhaps realised. Its span of 66 ft. is 14 ft. greater than the Lightning's, and its length of 48 ft. 11 ins. is only 3 ft. short of the Mitchell's. The all-up weight is 26,000 lb. —roughly twice the loaded weight of the first Blenheims.

The Black Widow is the first U.S. aircraft to be designed from the beginning as a night-fighter, and was first conceived at the time of the night-bombing which followed the Battle of Britain. Many lessons learnt during that period have been embodied in the design, and the prototype made its first flight on 28th May, 1942. Production models in service with the U.S. Army first flew on operations on 5th July last year, and Black Widows are now in regular service over the Continent and in the Pacific. On their first encounter with the enemy on 14th August last they shot down four German night-raiders.

The Black Widow cannot be said to possess any fine aerodynamic lines, but it is reported by American pilots

to be ideal for night-fighting, and its great weight ensures a steady platform when making an attack. A crew of two or three is carried and the armament includes four .50 machine-guns in the dorsal position and four 20 mm. cannons, fitted in the bulge below the nacelle.

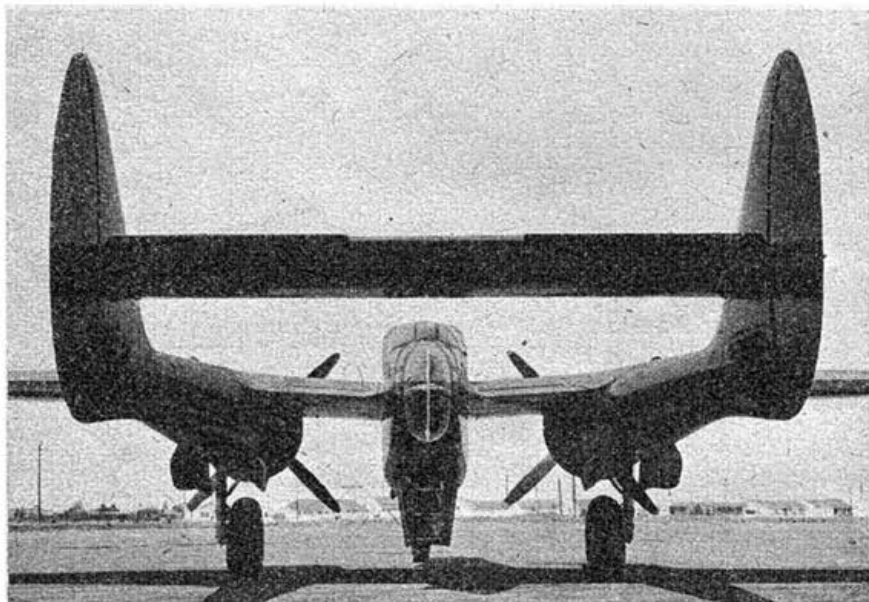
The pilot sits in the forward cockpit and the observer-gunner, who operates the four .50 guns by a remote control, is in the next position. The second gunner is situated in the rear turret, and has a good rearward and downward view from the moulded perspex dome. Access is by a retractable door in the floor behind the trailing-edge of the wing, and a similar entrance below the pilot's cockpit.

The whole aeroplane is a metal structure with metal covering, except for the movable control surfaces. The broad-chord tapered mainplanes are fitted with large trailing-edge plain-hinge flaps, and it is reported that the Black Widow has been flown as slowly as 75 m.p.h. The stalling speed officially quoted, however, is 90 m.p.h., while pilots usually come in at 100 m.p.h. A short landing and take-off run is claimed.

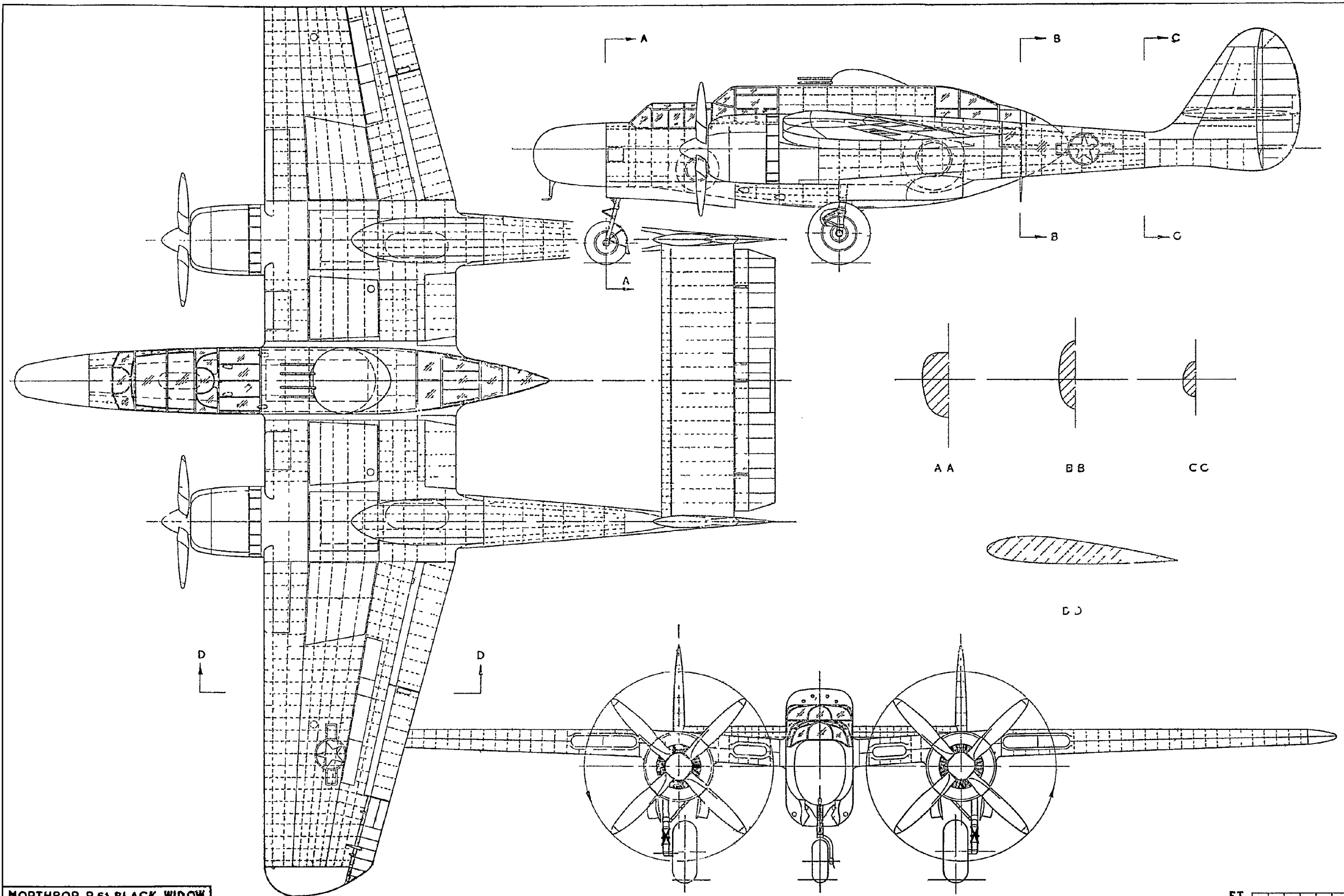
An interesting point about the P-61 is the fact that unusually small ailerons are fitted, and American stories tell of a new form of lateral control being incorporated.

Two Pratt & Whitney Double-Wasp R-2800 eighteen-cylinder air-cooled radial motors are fitted, and each develops 2,100 h.p. and drives a four-bladed Curtiss-Electric airscrew.

Black Widows in service are coloured all black and carry the usual U.S. markings on the outer sides of the tail-booms, above the port wing and below the star-board wing. The aircraft aerial number is carried in yellow at the extreme end of each boom, and has been observed on some machines below each wing, the tops towards the leading-edge. Invasion stripes are carried on wings and booms. (Plan overleaf)

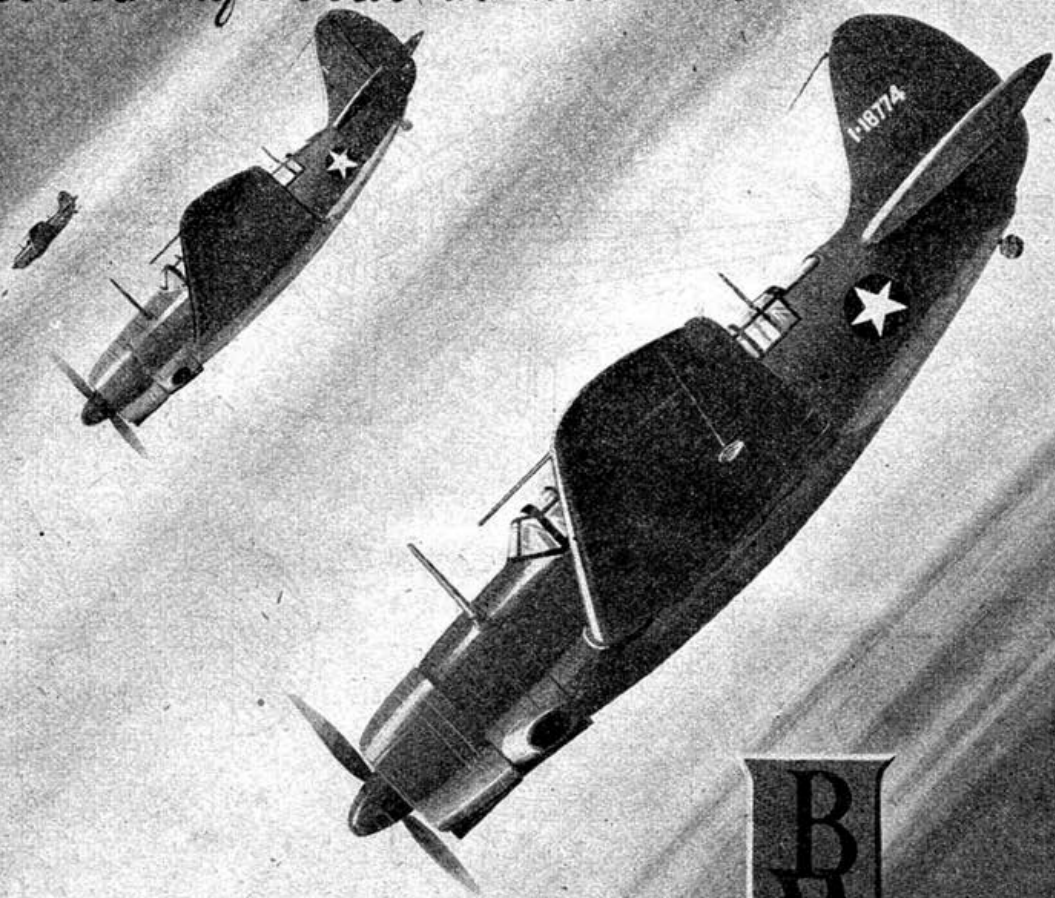




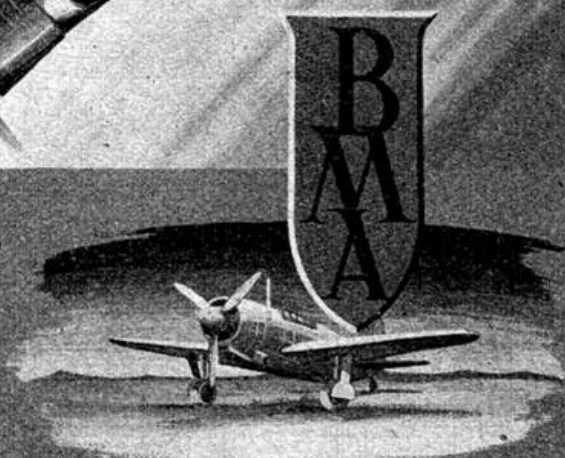


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# CLUB NEWS BY CLUBMAN



*Cheery members of the Wallasey Model Aero Club on their flying ground, with a promising collection of models.*

S.M.A.E. affiliated clubs are going to require a good deal of decent weather this summer if they are to complete the programme set for them this year! Running from April 15th to September 16th, a total of twenty-one separate competitions will be contested, which methinks will take all of anyone's time if it is intended to compete in all available comps. for such honours as the Individual Championship.

Wisely, the gathering at the recent Annual General Meeting of the S.M.A.E. voted for the deletion of the Gutteridge Trophy contest from the Plugge Cup scoring, as the increasing shortage of suitable rubber makes the flying of a Wakefield type model almost prohibitive these days. It was pointed out that the rubber required for one Wakefield job would fly two or three smaller and lighter models, with a consequent better chance of competing in the majority of the programme.

Another good thing was the voting out of a 10 per cent. bonus for all gliders complying to the F.A.I. formulae. It is generally recognised nowadays that the heavy type of glider can more than hold its own with the lighter types on normal flying days, though of course the "paper bag" has the advantage under very calm conditions. However, that condition does not occur often enough in these blessed isles to make a great deal of difference, and in any case I do not think the enthusiasts who build to F.A.I. formulae feel in need of any fictitious boosting of their flying times, but would much prefer to beat the lightweight bug on equal terms.

This year saw the first try-out of a postal ballot scheme for the election of officers for the 1945 season. This is a method I have continually plugged for some years past, and I am very pleased at the outcome of this first attempt, there being a 50 per cent. provincial representation on the 1945 Council. In my opinion this is still not large enough, as a nation-wide movement should have a nation-wide representation, but it is a start in the right direction, and it only remains now for all clubs and

individual members to use their vote for matters to get on a really national footing.

I was surprised—and somewhat disappointed—to find that only 48 out of some 150 affiliated clubs availed themselves of their voting rights, and will be interested to know just which clubs did not vote—and why! Presumably some of the newer clubs felt they did not know enough about things or the persons nominated to voice a worth-while opinion, but that should not prevent votes being cast. On this subject I would suggest to the Council that in future a list of the nominees should be accompanied by a brief, standardised description of the candidates and their qualifications, in order to assist the many clubs who have no opportunity of personal contact with the persons they vote into official positions.

Y. Vandeveld, a Belgian refugee who has lived in this country for the past five years, is a keen aeromodeller, and would like to get into contact with any other Belgian enthusiasts now in this country. His address is "Brickfield Cottage," Littlethorpe, Ripon, Yorks.

The AYLESTONE M.F.C. were well represented at the last Birmingham inter-club indoor competitions, and W. Jones, flying a 20 in. span shoulder-wing model of his own design, managed to take second place in the Class A event. J. Bones is clocking good times with his r.t.p. model, having broken both junior records in the past few weeks, times being:—

H.L. 2:14 R.O.G. 2:35

This chap, flying a  $\frac{1}{4}$ -size "Lazybones," has recently broken his own microfilm free flying record. Taking advantage of the first fine Sunday of the year, H. Spikings tried out his seaplane. The model took off from one of the many puddles now dotting the flying field, and after climbing swiftly, came to rest in the top of a tree after a time of 52 seconds—a new club record.

A new club, the WEST COVENTRY M.A.C., formed on the 21st January, held an indoor meeting recently,





Reader R. S. Martindale holding his well-built "Leander" sailplane built from A.P.S. plans. A very creditable effort for a 14-year old.

where mainly outdoor models were flown owing to the "indoor flying season being too far advanced." My experience of the English climate is that one can always afford to have an indoor model on hand—one gets far more chance of flying it!! An outdoor meeting was spoilt by the old bugbear—wind—but nevertheless matters augur well for the foundation of a good club. Here's luck, Coventry.

"Aero-Notes," the official club magazine of the BLACKPOOL & FYLDE M.A.C., celebrates its first birthday with the current number, and I wish to add my own "many happy returns" to those from the club members. This magazine is a worth-while effort, and I am sure does much to hold a club together with all the odds and ends of domestic news, etc. As is usual, most of the work in producing such a paper is done by one or two "mugs," but 'twas ever thus in club life, and fortunately the Poolites do not let it worry them. The statement of finance forwarded with my copy shows this club to be in a very sound position, and run on really business-like lines, and I congratulate this club on being one of the soundest in existence. (Not often I hand out words of praise, is it?—but when it is warranted I like to do the right thing!)

The READING & D.M.A.C. has taken on a new lease of life after various ups and downs attributed to the conditions of the times, membership being around the 60 mark. A new series of indoor meetings are receiving good support, averaging a dozen r.t.p. models per meeting. E. Chandler is r.t.p. champ. at the moment with a time of 2:13.8, Mr. Shuffle being a good second with 1:05. F/Lt. Dunn gave an interesting talk on gliding recently, this being followed by pole flying. Results as follows:—

1st	Shuffle	2:25	agg. of 3 flights.
2nd	Harris	1:47	" "
3rd	Beeson	1:40	" "

GREENFIELD M.A.C. have just completed two contests, the January solids event going to A. P. Lees with his Dessouter Mk. I built from A.M. plans, while the Class B indoor event went to J. Davenport with a time of 1:03, followed by A. Gatley, 0:54, and D. Hill, 0:50.

At a general meeting of the Cathcart & District Model Engineering Club, it was decided to disband and reconstitute under the new title of the CATHCART &

DISTRICT MODEL ENGINEERING SOCIETY. The society has eighty-one members, the majority aeromodellers, who have quite a few models ready for when better weather comes along. All interested aeromodellers should call at the clubrooms (185, Clarkston Road, Cathcart, Glasgow), on any night of the week except Sundays.

The BRISTOL & WEST M.A.C. held their annual prize-giving meeting on January 27th, the cups, etc., being presented by Mr. R. T. Howse. M. Garnett was the big winner last year, carrying off the "Championship Cup," "Consistency Cup," "Scale Model Trophy" and the "Twin Float Seaplane Trophy." K. Moon collected the "Biplane Cup" and "Glider Cup," A. H. Lee the "Packer Cup" and R. Morgan the "Secretary's Cup." Everyone is hard at it building for the new season, and as the press secretary says—"looking at the proposed S.M.A.E. programme one wonders where all the rubber is coming from to participate in these events!"

MERSEYSIDE M.A.S. have at last succeeded in obtaining a room for indoor meetings, and a meeting held in January attracted seven models. R. F. L. Gosling, flying a diamond fuselage, twin fin, mono-wheel undercart model, made the best time with 1:06, next best times being by Hughes, 1:02, and Jackson, 0:53. Mr. Gray created a sensation with his speed model, clocking 20.6 m.p.h.—and twice taking the pole with it!! Eventually one member was persuaded to crouch under the pole to support it, and some complete flights were made. The meeting came to an end with the model winding itself around the pylon and nearly executing the pole holder.

The NORTHERN HEIGHTS M.F.C. met the Streatham Aeromodellers in the semi-final of the London Area R.T.P. Contest, and a very keen and enjoyable competition was the result. Northern Heights won by a narrow margin, totalling 432.75 seconds against Streatham's 415.5. R. Copland made the best flight of the evening with 4:03.25. A visit was paid to the Brentford & Chiswick M.F.C. on their Open Day, when another battle took place with the Streathamites. The N.H. team, comprising Copland and Wilson, once again won by a narrow margin with 1,686 secs. to 1,641.6. Bob Copland won the Individual Duration Contest with 647 secs. for three flights, Wilson coming fourth with 559 secs. In the Speed contest, A. C. Turner took first and second prizes with 27.4 m.p.h. and 28 m.p.h. R. Rock of Streatham has raised the British record for r.t.p. models to 4:16.5, so it is now a race to see who is going to be first to top the five minute mark.

A building class for junior members is proving very popular with the DONCASTER & D.M.F.C. The club r.t.p. record was recently raised by Mick Hetherington to 2:30.4, he also holding the record for scale work with a time of 51.75 secs. His younger brother, B. Hetherington, holds the junior record with 1:30.4, Class B.

Much interest has been roused in the NORTHAMPTON M.A.C. by reaction-propelled models, chiefly by Howard Boys and D. Pettitt. Considerable progress has been made by Boys with a rocket-propelled all-balsa flying-wing model flown r.t.p.

Following an unofficial discussion between several local model aeroplane enthusiasts, it has been decided to form a club in the Orford district of Warrington, to be known as the ORFORD M.A.C. Temporary headquarters have been obtained, and activities will provide scope for both solids and flying types. Older modellers will be particularly welcome. Applications should be forwarded to J. C. Green, 85, Northway, Orford, Warrington, Lancs.

The GREAT YARMOUTH M.A.C. started activities on February 3rd, at the St. Peter's School, Dene Side, Great Yarmouth, when a demonstration of indoor flying was given by J. Bacon. A challenge received from the Norwich M.A.C. has been readily accepted and everyone is hard at it turning out new models in readiness. This club meets every Saturday evening from 7-10 p.m. and Sundays from 11 a.m. to 5 p.m.

A number of other new clubs send in particulars this month, and are noted at the end of these columns.

The Stretton M.A.C. has united with the Burton M.A.C., and will in future be known as the BURTON-ON-TRENT M.A.C. All correspondence to be forwarded to F. N. Dowson, 47, Mosley Street, Burton-on-Trent.

Quite a batch of readers wish to start aeromodelling clubs in their districts, and readers interested are asked to contact the following gentlemen with a view to getting things going:— R. Downhill, 479, Uxbridge Road, Southall, Middlesex; D. Edwards, Bullwood, Hockley, Essex; D. T. Higgin, 57, Antrobus Road, Handsworth, Birmingham; J. R. Leigh, 118, Dunlace Road, Clapton,

London, E.5; R. Sanders, 16, Walhouse Road, Walsall, Staffs.

And so, for another month I leave you to get those outdoor kites good and ready, and let's hope we have plenty of decent flying weather for a change. Oh to be able to say, "I'll take my jobs out next Sunday and have a nice day's flying, with no crashes." It usually turns out that it snows like stink, or the wind nearly takes the flier off, let alone the model. Anyway, here's hoping.

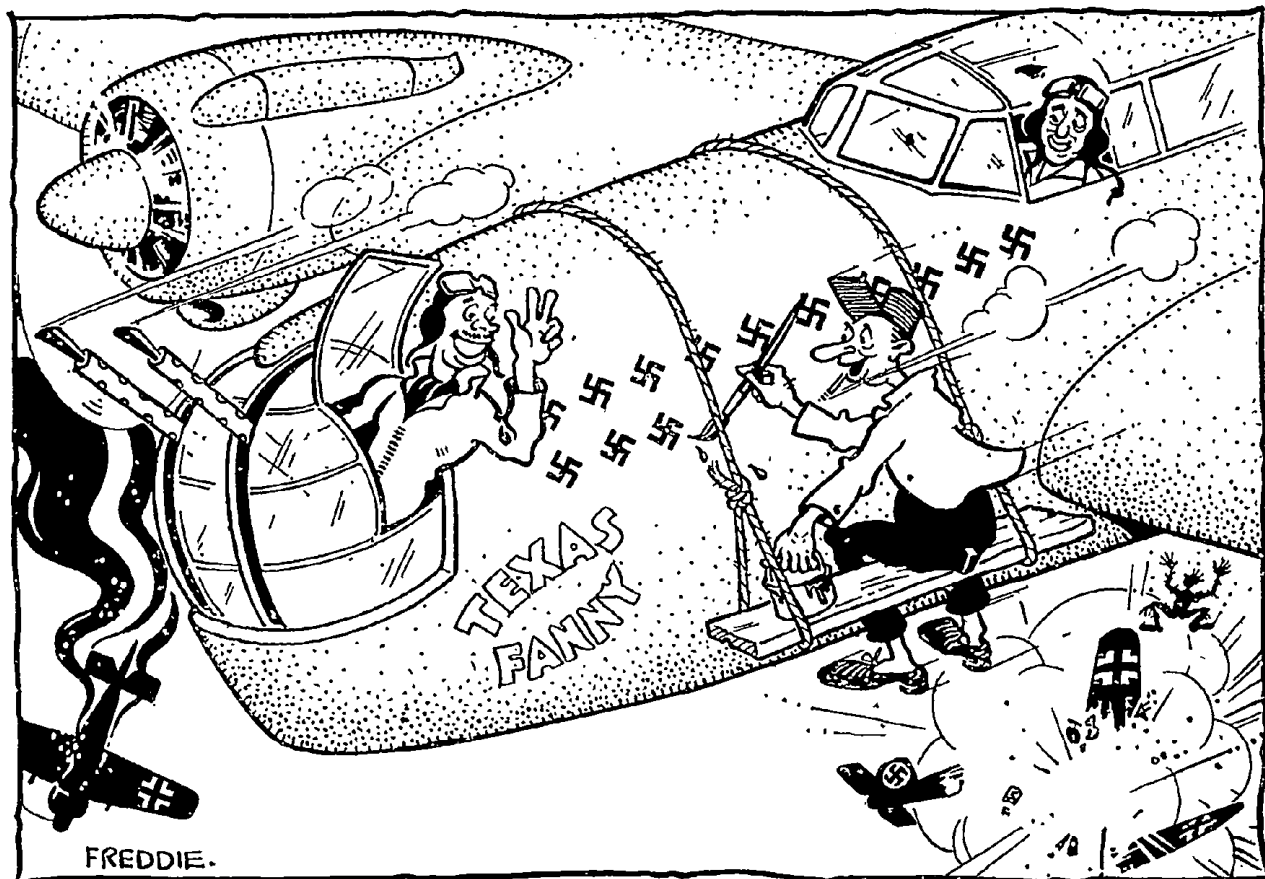
THE CLUBMAN.

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GREAT YARMOUTH M.A.C.  
W. W. Grimmer, 90, St. George's Road, Great Yarmouth.  
WEST COVENTRY M.A.C.  
R. Gunn, 272, Allesley Old Road, Coventry.  
GOTHERINGTON A.M.C.  
J. A. Hamsey, Yew Tree Farm, Gotherington, Nr. Cheltenham, Glos.  
LOUGHBOROUGH COLLEGE M.A.C.  
R. E. Téhry, c/o Loughborough College, Leicestershire.  
VICTORIA M.A.C.  
S. S. Levy, 47, Strahan Road, Bow, London, E.3.  
LLANDOVERY COLLEGE GLIDER CLUB.  
J. G. Poley, The College, Llandovery, Carmarthenshire.  
FRANCIS STREET (DERBY) A.M.C.  
B. F. Chadwick, 4, Francis Street, Nottingham Road, Derby.  
BOGNOR REGIS & D.M.F.C.  
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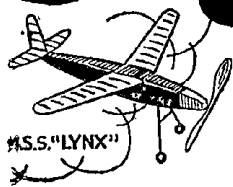
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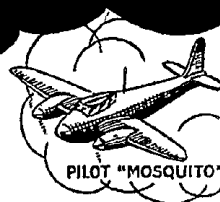
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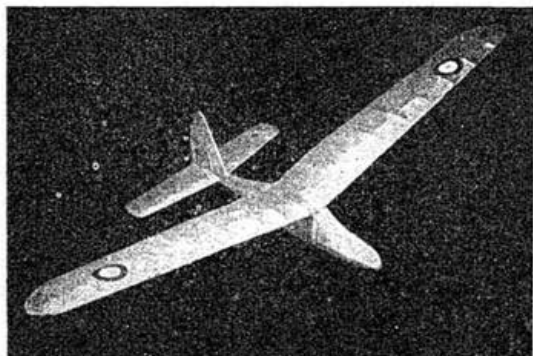
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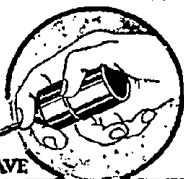
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