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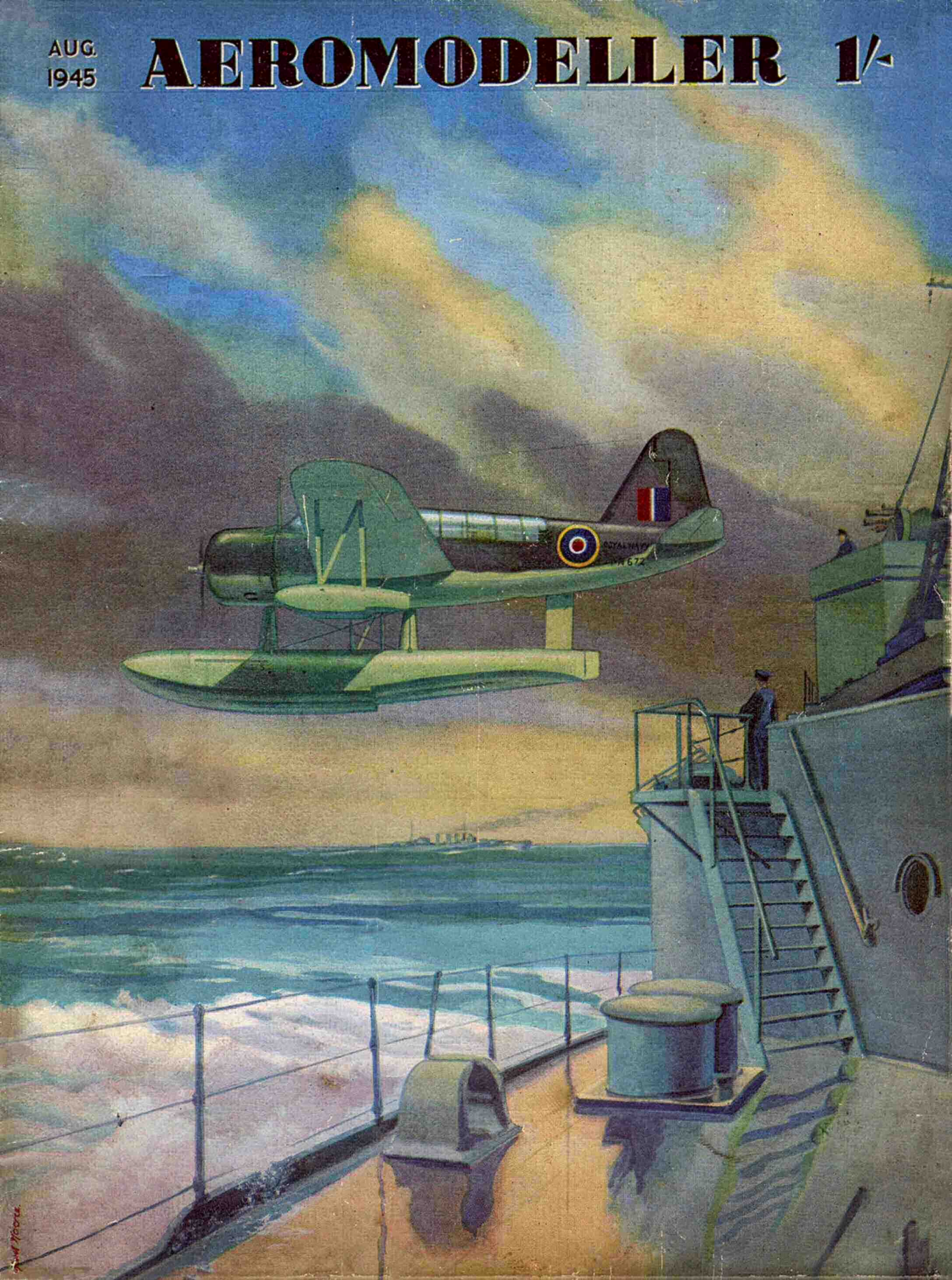

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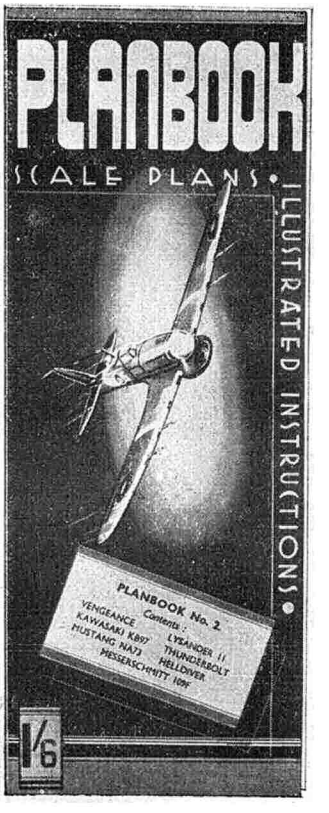

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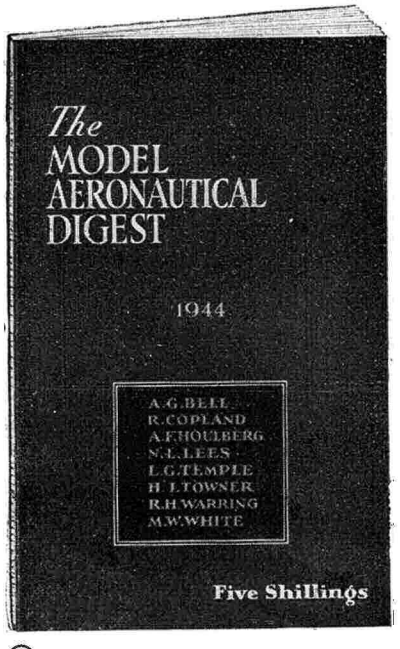

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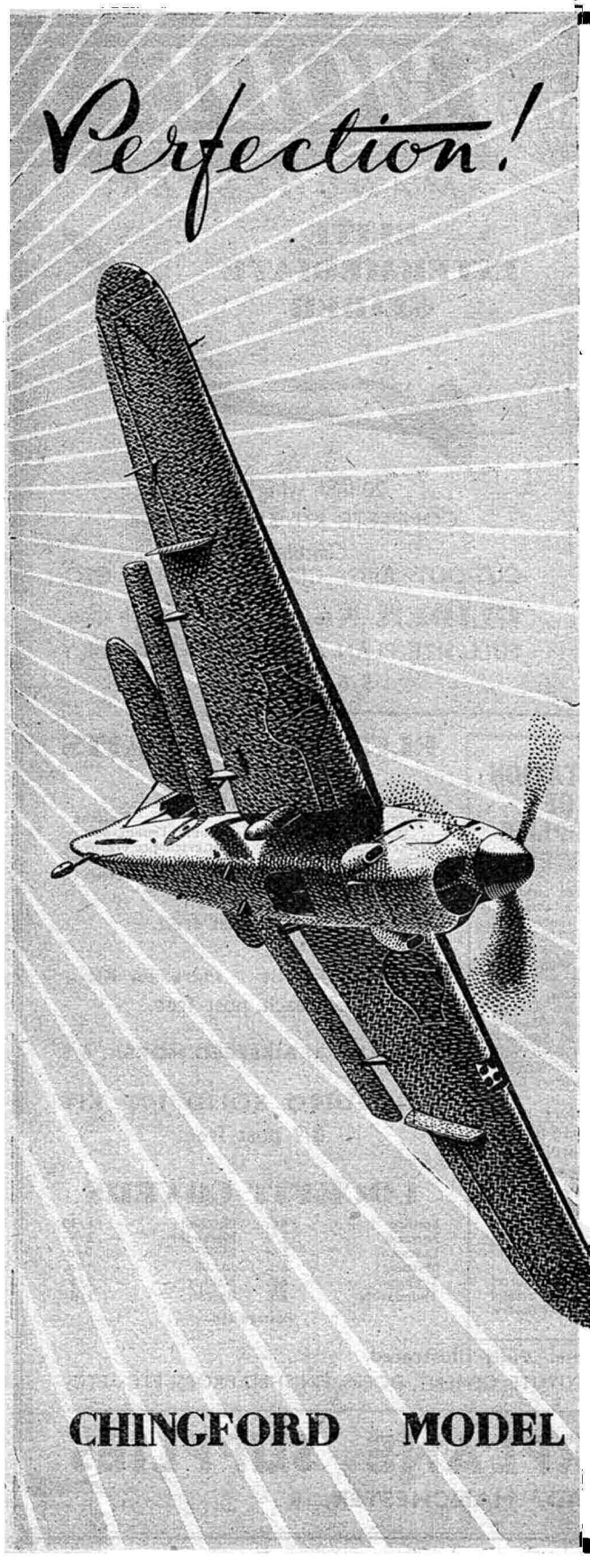

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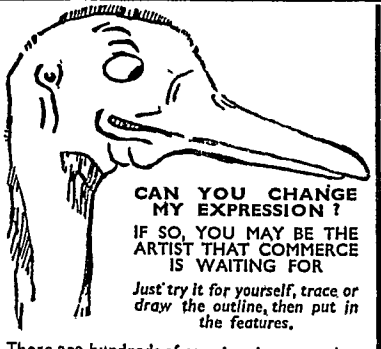

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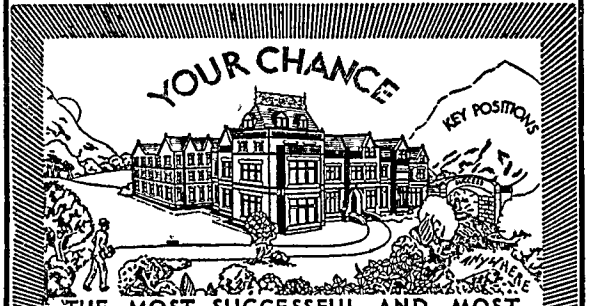

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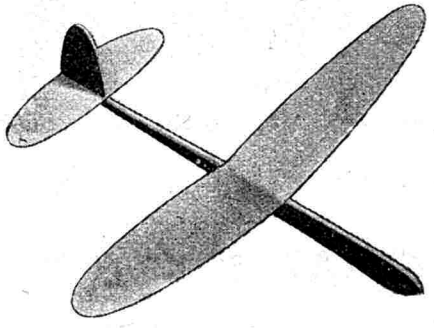

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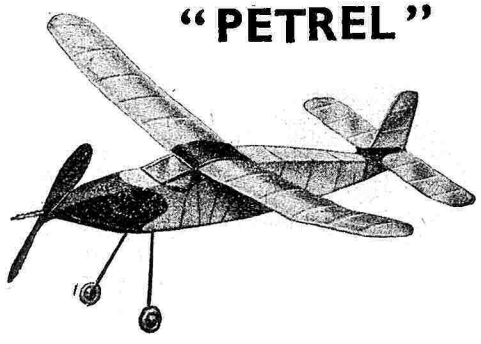

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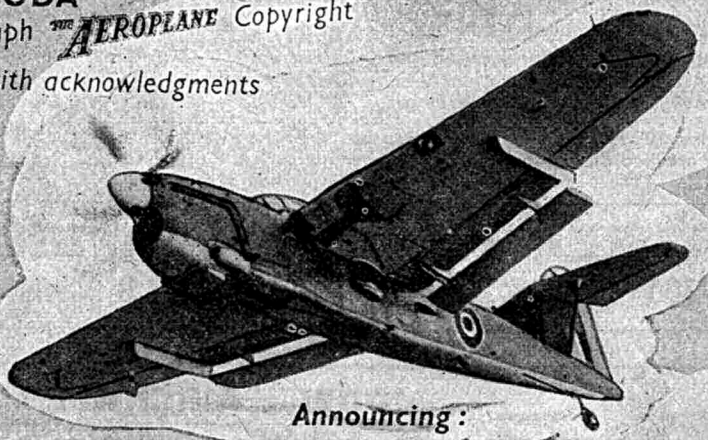

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EDITORIAL

NO POLITICS!

By the time these words are being read, the results of the General Election will be available, and thus will end—satisfactorily or not, time alone will tell—an episode which has not been conspicuous for that high-minded blending of clear judgment and sound feeling that characterises human beings at their best and brightest.

Curious it certainly is, and yet very obviously true, that however near to that ideal the ordinary individual may approach on some occasions, rarely is he at his best when politics are the subject at issue. And some, even, who in other directions reveal quite a high order of intelligence, tend to talk drivel with as much natural facility as their less gifted contemporaries. Further, reason—like Homer—having nodded, there is left nothing to hold in check the working of the heart of man which, if it be less desperately wicked than some would have us believe, nevertheless is certainly capable of some queer quirks.

Happily, the gall-like bitterness that so often results is sometimes relieved by a dash of humour, as when a daily newspaper published recently a delightful cartoon depicting Beaverbrook as the sinister old gaffer and Churchill, who has been asked " What about controls ? " standing on one leg in obvious embarrassment as he murmurs " I'll have to ask me dad " ! Next morning a rival paper countered with an editorial article headlined " Goody, goody ! But Mr. Attlee will have to ask Mr. Laskee ! " These flashes of good-humoured banter hurt nobody, but many people take their politics so seriously as to be distinctly unpleasant.

Were all the ill-feeling, the clouding of the real issues, the interminable argument, the senseless mud-slinging —not to mention the brainfag—to eventuate in a decision that is generally acceptable and clearly productive of unhampered progress, we might well console ourselves with the reflection that these things constitute the price we must pay, but—alas and alack !—the result rarely pleases and rarely lasts long.

At this point it may perhaps be asked, why are we holding forth on politics, especially at such length, in a journal devoted to aeromodelling ? The answer is not far to seek, and is simply this—that the aeromodelling movement having its own particular brand of politics (in common with most other groups of the troublesome *genus homo*), and the proprietors of this journal being engaged at the moment in organising a new enterprise of some magnitude and from which much benefit should accrue to all concerned, including the movement generally, we feel that it is not a moment too soon to say with regard to this new venture, " No politics," or if you prefer, " Yer can't do that there 'ere ! " We refer, of course, to Eaton Bray.

Eaton Bray is the first aerodrome in the world to be organised solely for the enjoyment of aeromodellers. We had something to say about it last month, and we hope that we succeeded in getting you as keen about it as we feel ourselves. Eaton Bray can and should be the best thing yet in aeromodelling. We are quite convinced of that. But we are equally convinced that unless it is run strictly on a basis of " No politics " it will succeed merely in being the biggest nuisance yet !

Aeromodelling is a delightful pastime—some of us believe it to be the finest pastime—and in the movement there are many delightful people. But however roseate the spectacles through which we view it, we cannot fail to perceive the cliques and factions, and lurking among the pots of banana oil and tins of " lube," so to speak—a modicum of suspicion and prejudice. We want Eaton Bray to become a rallying point for modellers of all types and temperaments and outlooks and allegiances, a place where all can meet on even terms, where friendships are formed and technical progress is achieved. Under no circumstances, therefore, can the proprietors allow themselves to become involved in politics, of the aeronautical or any other brand, and Eaton Bray will be available to all—to individuals and to groups such as the S.M.A.E., the A.B.A., the A.T.C., the Scouts, etc.—on the same terms. To which we would add that we trust the same absence of bias or prejudice will be shown *to* the management as *by* it.

Let us clarify this last point by a brief reference to a previous venture of ours. Early this year we staged a big exhibition of model aircraft, and numerous individuals and groups responded to our invitation to take part (incidentally without charge), to the general benefit and enjoyment. But one group did *not* co-operate with us, and it has been whispered that the reason was that certain members of this group who had had their knuckles rapped by us chose to construe this as evidence of bias on our part ; they accordingly persuaded their colleagues that if our invitation was accepted, their group's exhibits would undoubtedly be shoved away in some obscure corner while another group which we were popularly supposed to favour would be accorded the place of honour. People can do as they like about invitations, of course, but when they act for others the inevitable and very regrettable result of mean-mindedness is that the group in question suffers a loss.

If the reason for this particular group's non-participation was not as suggested, we will take back what we have said, of course. But in stating that Eaton Bray will be available to all on even terms, we take leave to add that anyone acting for others who allows personal prejudice to hold him back from " playing ball " will be rendering his group a poor service.

We trust that no one will imagine from the foregoing that we wish to stress this matter of the letting of Eaton Bray for rallies, etc. As a matter of fact, sufficient enquiries are being received to suggest that care will have to be taken not to restrict unduly the use of the ground by the thousands of individual modellers who will wish to come along on Saturday or Sunday for a day's flying News of progress at Eaton Bray will be found on a later page, but here we are concerned solely to expound our policy of " No politics." We invite careful consideration of the points we have sought to make, and we trust that the result will be to induce modellers generally to co-operate with us in making this new venture a source of benefit to the entire aeromodelling community.

To "Frat" or not to "Frat"

It is a far cry from the days when model glider teams from France, Holland, Poland, Czechoslovakia, Hungary, Germany and other nations competed for the King Peter Trophy at Fairey's Great West Aerodrome, Heath Row, to the present days when Britain, America and Russia are grappling with the stupendous problems of a continent of half-starved peoples, and military high-ups are having to issue pronouncements as to whether Tommy and Joe shall or shall not fraternise with the nation that has brought things to this desperate pass. In those far-off days of (comparative) peace, it probably seemed to most of us that King Peter, donor of the trophy that bears his name, was a singularly suitable leader for a young and progressive nation—a keen young sportsman with (from our point of view) a highly commendable interest in a truly modern pastime. Today he seems to be the focal point of one of the bitterest of political controversies, and doubtless has no time for model aeronautics.

Sport seems to have been about the one field of activity in which, in the past days, international, geographical, physical, and mental barriers were transcended, and the pity is that this spirit could not have been carried over into other departments of life. Modellers certainly helped to show the way, and this was not so very surprising, for it is in the realm of sport—in the cultivation of the team spirit—that there is acquired that habit of seeing things from the other fellow's point of view that is the foundation of good citizenship and international co-operation.

We believe, therefore, that it will be a good thing for many people when we modellers can resume our friendly tussles with enthusiasts of other nations. Just how soon this can happen, however, and Germany, who has so badly blotted her copy-book, can be included, we would not venture to predict. We should hate, on the one hand, to see an early exercise of the "let bygones be bygones" attitude, even if this were possible, for in so serious a setting it would surely represent the last word in blind fatuity. Europe has suffered too desperately for us to contemplate with any satisfaction an easy-going attitude to a race whose members have been responsible for such barbarities. But we should equally hate, on the other hand, to think that the present set-up was other than a temporary, if necessarily protracted, expedient, and that nationalism run riot was a complaint that would never yield to wise and patient treatment.

The point that we wish to make is that just as in the past aeromodelling was in the forefront of the move towards mutual understanding and appreciation among the nations, so it can play a similar pioneering part in the days to come when the need will be greater than ever before. But we must be ready to play this role when the opportunity arrives, and we shall certainly miss the bus if in the meantime we do not learn to keep our own house in order, to seek consistently to extend our mental horizon and cultivate an attitude of genuine goodwill to those of our own nation and our own immediate circle whose ideas are different from our own. It is a far cry, is it not, from the petty jealousies and suspicions and intolerance that are to be found among aeromodellers, to the farsightedness and breadth of mind that gave the world the full-scale aeroplane. They have a great tradition to uphold, and we also should be worthy of it.

We do not suggest that aeromodellers have worse dispositions than other sportsmen. Rather is it that ours is of all sports the one least conducive to the team spirit, for it is basically an individualistic occupation. People engage in designing, constructing, trimming, and flying (apart from help in the early stages) as individuals rather than in groups, and their efforts can therefore become entirely self-centred and self-satisfied. We need to guard against this if we are to play the part that all true sportsmen can play in leading a crazed world back to ways of mutual appreciation and co-operation. To this end we welcome the widening tendency to include team events in our contest programmes. These should tend towards some subduing of the ego that ordinarily makes us so thoroughly content to plough our own insignificant little furrow while we regard the other fellow's efforts as something stupid or worse.

Let us keep in mind the fact—which we are so fond of stressing—that aeromodelling is not playing with ingenious toys, that it is an art and a sport, and something more even than that—a highly effective medium for the spreading of understanding and co-operation between the peoples of many nations. And let us ask ourselves if our own contribution is a hindrance or a help.

Air Magazine De Luxe

Many readers will have seen on the bookstalls a few weeks ago a magazine with a tasteful blue cover bearing a large photograph of a Mosquito and a title that probably struck a chord of memory—"Air Review." This was formerly the title of a pocket size journal issued by the Air League of the British Empire, but it is now being produced by the technical organisation responsible for the production of the AEROMODELLER, the "Aircraft of the Fighting Powers" series, the "Book of Miles Aircraft," etc., and completely transformed into the aeronautical magazine de luxe.

The first of this new series, out a few weeks ago, contained within its 70 pages—printed, incidentally, on fine white art paper—informative and readable articles on such subjects as the early history of British air transport, the Imperial Airways fleet from the D.H.34 of 1924 to the Frobisher of 1938/9 (with 23 illustrations), a critique of Britain's internal air transport by Prof. G. T. R. Hill, designer of the Pterodactyls, a biography of G. H. Miles, designer of the so-called "Tail-first" series of aircraft known as the Libellula type; a flight test report on the Typhoon, a special article on the Lancastrian, general arrangement drawings of eight aircraft, a review of aeronautical books and films, an article on aviation in Parliament, and an impressive album of aeronautical photographs. A few copies still of this first number are available at 3s. 0d. each (post paid, 3s. 5d.) from Air Review Ltd., Wilmary House, Merton Lane, London, N.6.

The second number has just appeared, and readers who would like a copy would be well advised not to delay in asking for it at their local book or model shop.

EATON BRAY MODEL SPORTSDROME

As stated in last month's Editorial, full facilities and amenities will not be available until next year, but from Saturday, September 15th of *this* year, the Aerodrome will be available on Saturdays and Sundays for the flying of all types of model aircraft, from 10 a.m. until 9 p.m.

Admission charges will be 1s. per adult person, 6d. per person under sixteen years of age. Both these charges will be reduced by half for admission after 3 p.m. on both days.

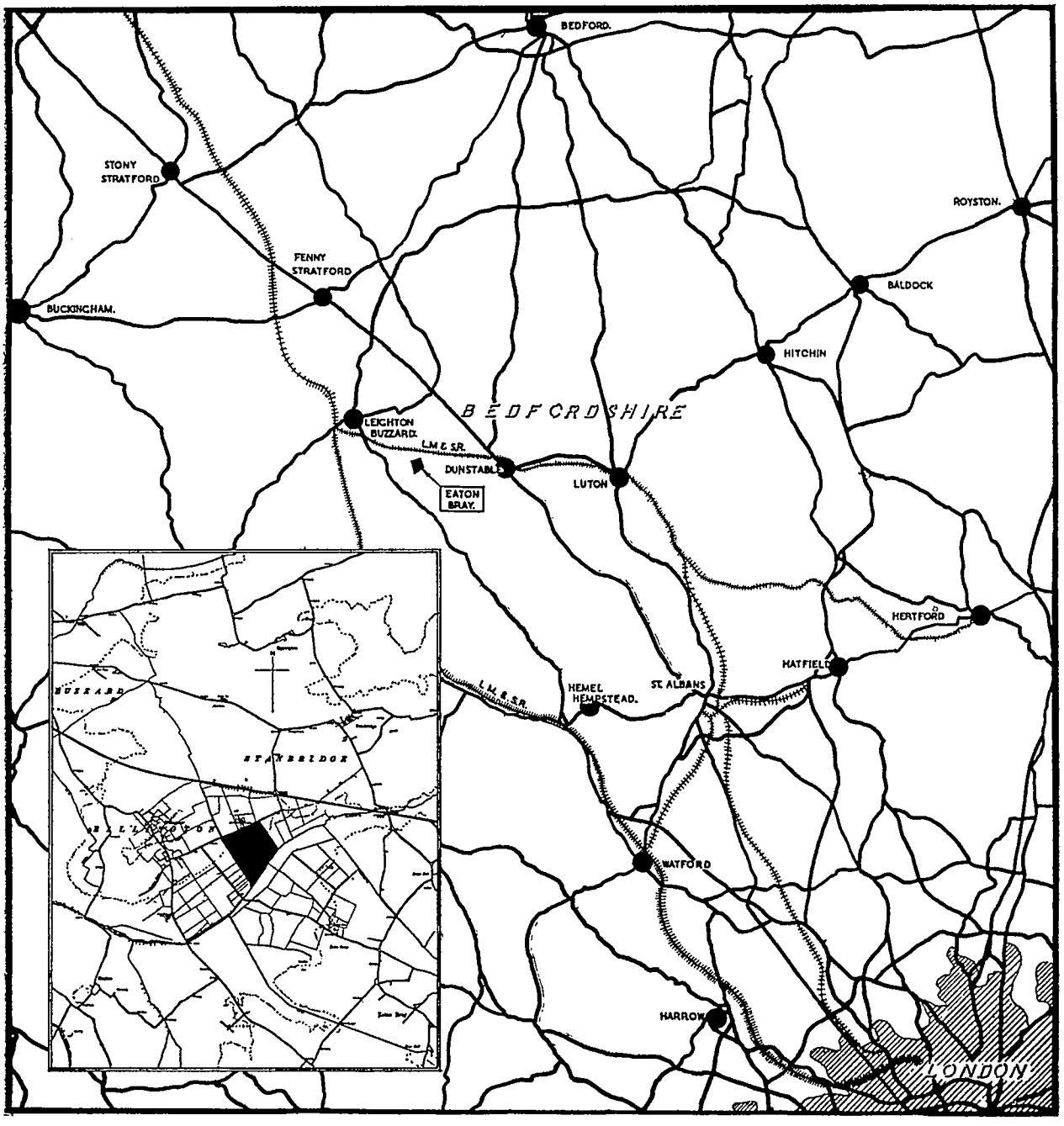
Water for drinking purposes and lavatory accommodation for both sexes will be available free. A limited amount of protection from rain, will, it is hoped, be available, if required.

Cars, motor cycles and bicycles may be parked round the sides of the Aerodrome.

There will be no organized competitions this year, but club members may organize competitions amongst themselves, subject to non-interference with the flying of other visitors.

Flying may take place on any part of the Aerodrome subject to the general directions of the Aerodrome Manager.

Owing to the grass having been sown as recently as the Spring of this year, the normal close cropped surface will hardly have been consolidated. Small temporary take-off boards will be available.



The BALSA BEDOUINS

WE hail as a very worthy achievement the formation and growth of the Middle East Model Aircraft Club. Under the benign and secretarial eye of P/O B. E. D. Beckett, who provided us with the information contained in this article, the club has flourished and now possesses over 40 members. When we at home grumble about the short supplies of modelling materials, we can take our hats off to these keen chaps who have overcome their disadvantages with such commendable results. Over there materials are scarce, balsa appears with the blue moon, and substitutes prove too brittle for easy workmanship. The only way in which these enthusiasts are blessed is with regard to their flying field, which appears to consist of a considerable portion of the Sahara. Despite the advantages of having so much clear space at their disposal, it seems probable that in the heat of the day a tree, though a modeller's bugbear in England, would become a godsend out there just for the welcome shelter it would afford from the scorching sun.

The club's activities have been mainly confined to duration models as these involve the least material, and the occasional small supplies of balsa obtainable are used entirely in the construction of this type of model. The size is necessarily on the small side, as this allows more models to be built from the club's meagre supplies of materials, but a larger model, a sailplane, is now under construction, the building being at present held up while a hunt takes place for less brittle woods.

A " solid " section has also been started as the influx of new members has brought into the club a number of keen followers of this branch of aeromodelling.

The flying models were at first mainly built from plans appearing in the AEROMODELLER, and the results achieved were very good, the models proving excellent flyers. More recently, several models of original design have appeared and have achieved considerable success. Three of these are illustrated here: " Miss Egypt," designed by the Secretary, P/O B. E. D. Beckett; " Hilda," designed by P/O M. Laws; and the " Trike-plane," designed by P/O R. Mugg, featuring, as its name suggests, a tricycle undercart.

Ace flyer of the Model Aircraft Club is F/Sgt. Calverley, who was a member of Bradford Model Aircraft Club before enlisting in the R.A.F. as an air gunner. The model he flies so successfully is a " Cleo " built from plans appearing in the AEROMODELLER. Two other models built from AEROMODELLER plans that have proved popular with the club members are the " Skyrocket " and " Jumpin' Jive." A photo of F/Sgt. Calverley holding the " Skyrocket " appeared with the Club News heading in the March issue, and P/O B. E. D. Beckett also sends us some interesting details of his own model, " Miss Egypt." This model, illustrated in this article, is a neat little duration model of orthodox design. Span is 30 in., length 20 in., and the all-up weight is 2¾ ozs. Not at all bad considering the difficulties that attended its construction. The maximum duration at the time of writing has been 2 : 04, and we wonder if this is the first established record in Egypt? We note that the photographs on these pages were all taken by a No. 2 " Box Brownie " acquired whilst out there.

Whenever a parcel of AEROMODELLERS arrives an amazing number of men congregate to ask for the loan of copies, in answer to the notice on the club board. We are glad to see the progress this club has made and is making, and congratulate P/O Beckett and the founder members for their enterprise in forming the club, and all the club members for the great effort they have made and the good show they have put up under adverse conditions. Good luck M.E.M.A.C. !

EXCUSE PLEASE MISTER?(!) P/O Beckett's servant Abdul shows a keen interest in his master's models.

THE BEDOUINS . . . .

The heading photo shows a group of Middle East "Fliars" gathered round a "Magic Carpet" of their models. Above shows some of the Bedouins, including P/O's Beckett and Mugg, working in the Club room. P/O Mugg looks a trifle worried—we wonder if he's hearing ticking noises from his "Trikeplane." On the right the Sec. P/O Beckett retrieves the "Skyrocket" from the roof of the Y.M.C.A. and glides it gently back to terra firma.

. . . . AND THEIR BALSA ! !

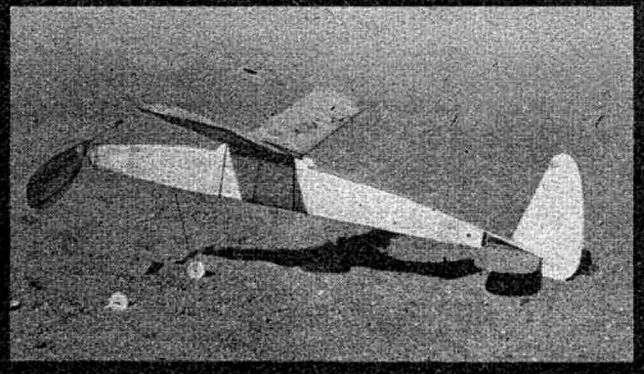
(Left) *P/O M. Law's "Hilda" duration model of original design which has proved itself a successful flyer.*

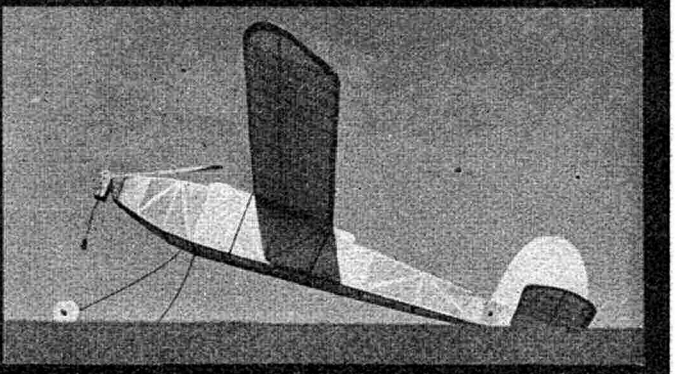
(Centre left) *The Club's "Cleo," built from plans appearing in the "Aeromodeller."*

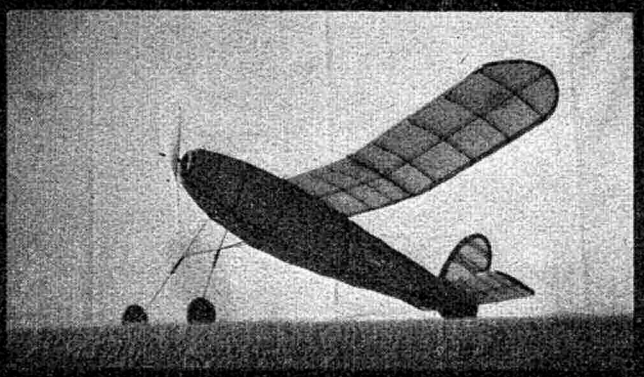
(Centre right) *The "Skyrocket," also built from Aeromodeller plans.*

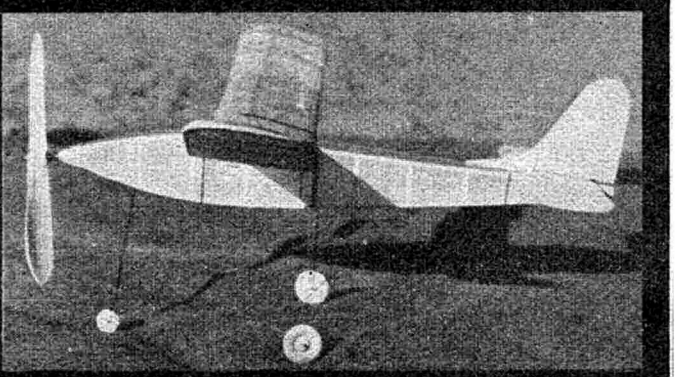
(Bottom left) *"Miss Egypt," designed by P/O Beckett and the holder (at the time of writing) of the Club's duration record of 2·04.*

(Bottom right) *P/O Mugg's "Trikeplane" of original design. The extended fin and neat cantilever wire undercart are well shown in the photograph.*

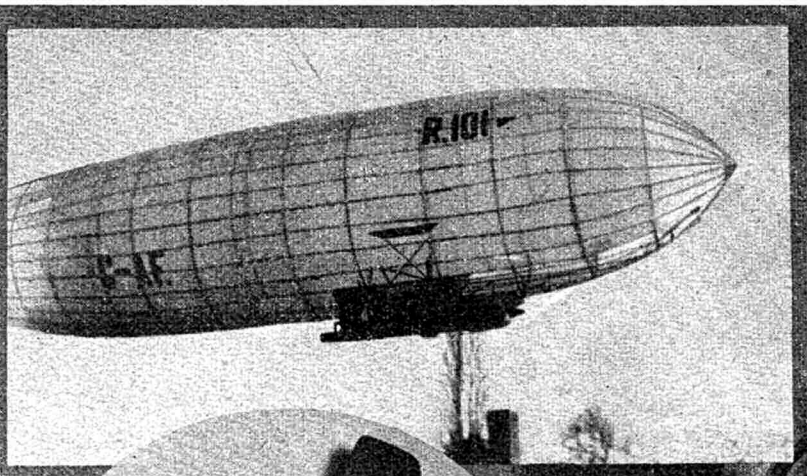


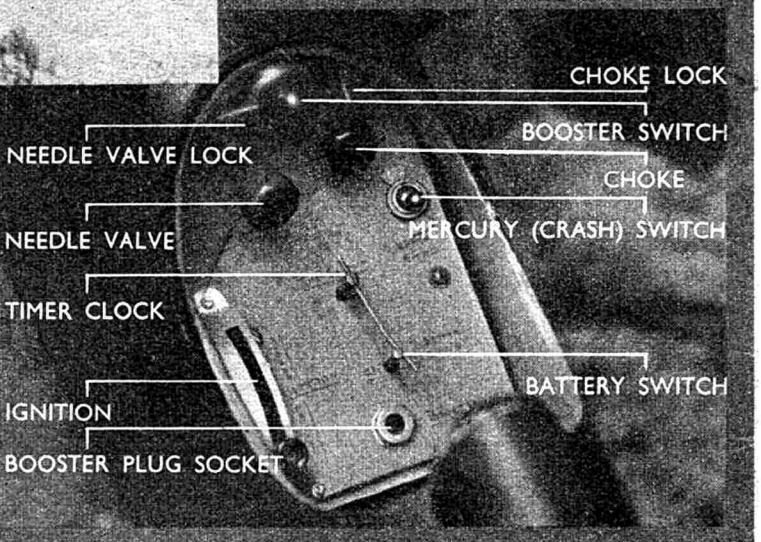




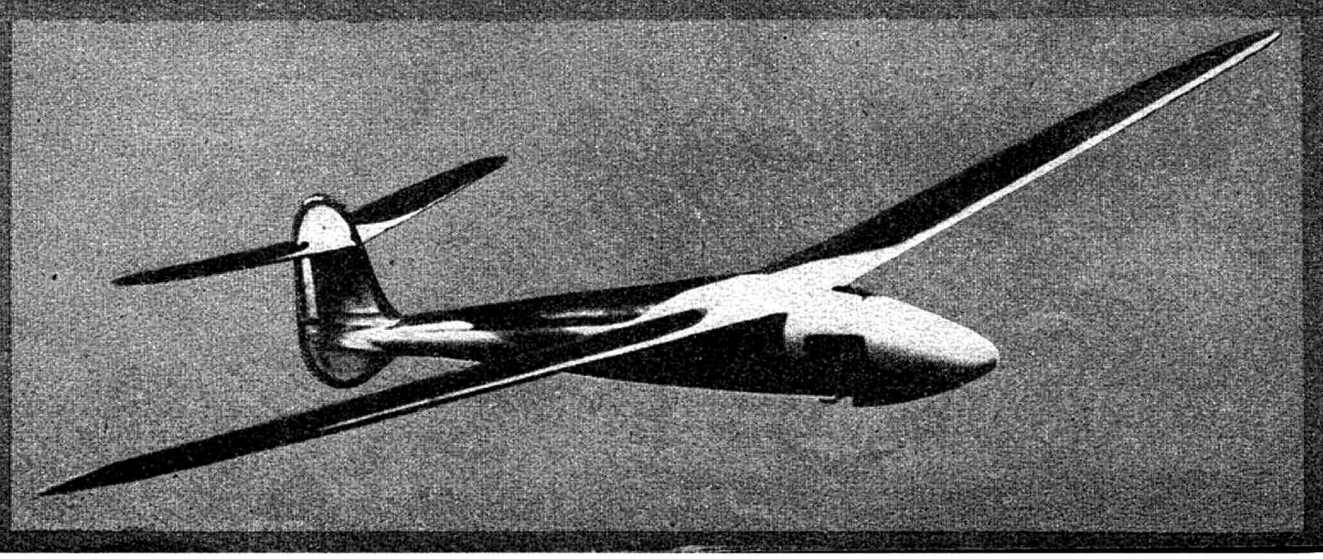


MODEL NEWS





(Top left.) GASBAG.—An enterprising model airship built by R. Eustance. The model is 9' long and 2' in diameter. With a lifting power of 2 lbs., it has two electric engines, and can carry a camera.
(Centre left.) JERRY JET.—A very neat 1/72nd scale M.E. 163 with an excellent finish, built by E. Tucker of Finchley.
(Above). COCKPIT CLOSE-UP—of "Brainstorm II," built by Geoff. Dunmore of Leicester, who very wisely does not believe in having his fingers abused by the propellor, all the engine controls being situated in the cockpit as indicated.
(Left.) WHIRLIBOMBER—by G. R. Woollett of Yalding. This fine model, of built-up construction, is well up to his usual standard, with every possible part movable or detachable in the correct manner.
(Bottom.) FIVE FOOTER—glider of very appealing lines and creditable performance, designed and built by H. A. Wardell of Edinburgh.

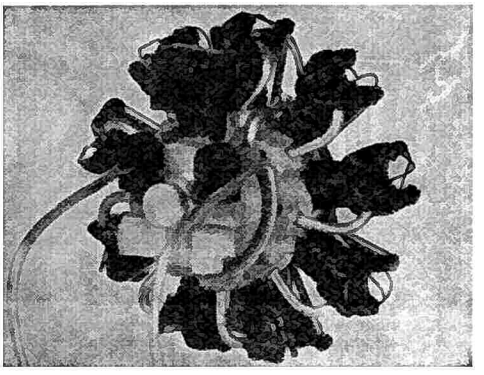


1/48th SCALE SOLID MODEL MOTORS

ARTICLE VIII

The WRIGHT CYCLONE IX

BY S·B·S



CONSTRUCTION is similar to previous radial engines described in this series, except that the cylinders have been considerably simplified. In the drawings, O is the cylinder, which I threaded with a 2 B.A. die. If you haven't a die, run a fine saw cut through a 2 B.A. nut—you will find that it will form a good thread on the 9-gauge plastic knitting needle which forms the material. The cylinder head, L, is made from needle also, of 4-gauge. These are filed to the slight taper shown; fluted along the top with a small round file, and drilled 1/16th in. in four places. Two shallow holes at the ends of the flute, and two on the walls of the piece immediately below the two horns. The former holes are for the plug leads, and the latter, only one of which is used in the model, for the induction pipe K. The arrangement is seen best in the rear drawing. Procedure is: cut the 9-sided crankcase D; thread a length of needle; cut off the nine lengths; cement to D; and then fit the heads L.

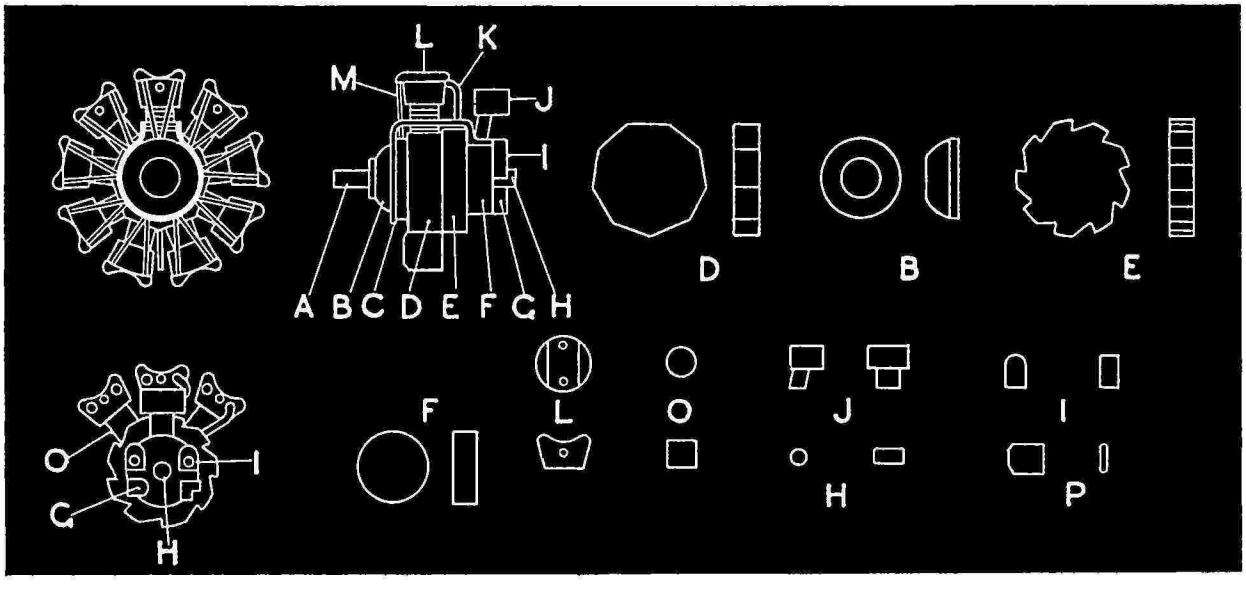
Fit B, and when firm, drill a pair of pin holes in the rim below each cylinder. Into these holes fit short bits of ordinary plated pins so that the tops coincide with the horns on the cylinder heads. To complete the junction with these rocker boxes, as they should be called, I moulded over a tiny spot of fire clay, smoothed to shape. Damp the pin ends to make the clay stick.

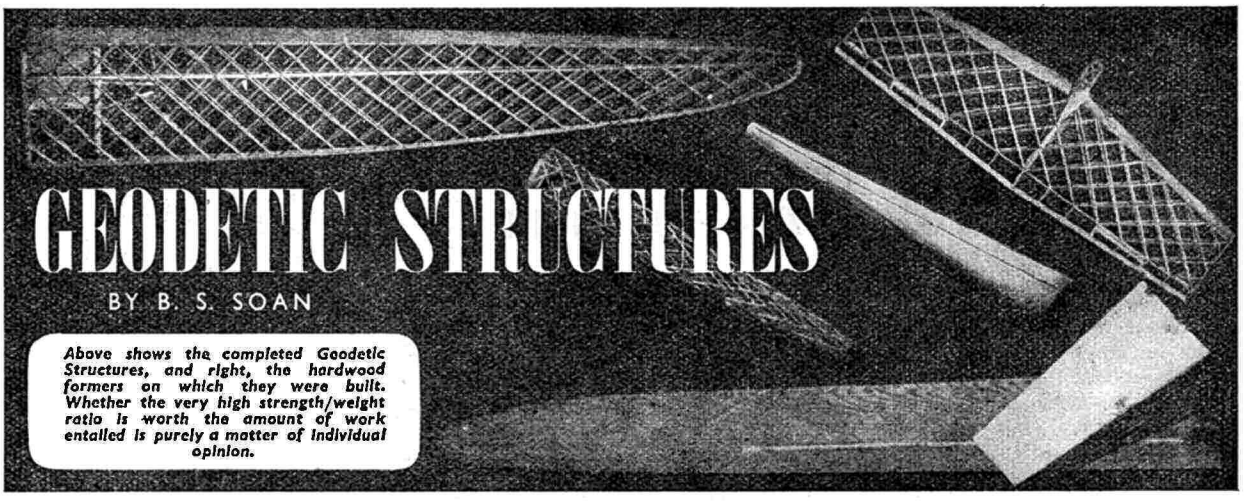
Round the rim of B you will see a heavy wire lead, which in the side view passes to the rear of the engine, being led either side of the upright cylinder. This is of 20-gauge tinned fuse wire and represents the ignition conduit. The two ends terminate at the magnetos I. After shaping this conduit and getting it to lie nicely, remove it and loop about 1½ in. of 36-gauge wire round it opposite the position of each cylinder. These fine wires are the spark plug leads, and the two ends of each are led to the shallow 1/16th in. holes you should have drilled in the flute of the cylinder heads L. Secure them with a dab of cement.

The rest of the engine should be easy. Shallow 1/16th in. holes are drilled in the nine flats on piece E to take the ends of the induction pipes K. These latter are fitted and secured with a dab of cement at each end. The disc F, and the various auxiliaries, G, H, I and J, are straightforward and need no comment, except that I advise you to colour the latter before you fit them.

P is the oil sump and is simply a tiny flat piece, the edges of which are smoothed off, and is cemented in between the two bottom cylinders. The prop shaft is of 11-gauge needle, and a small B.A. brass washer is slipped over it and cemented against the nose of B.

Finally, colouring. I did the cylinders black, also I and J. All wires and pins were left their natural bright colour, and the crankcase and attendant cases B, D, P, E, F, G and H, were coloured a light grey. The stand is simply a bit of 20-gauge tinned fuse wire bent to shape. All auxiliaries were made from various sections of knitting needles: it works better than wood.





GEODETIC STRUCTURES

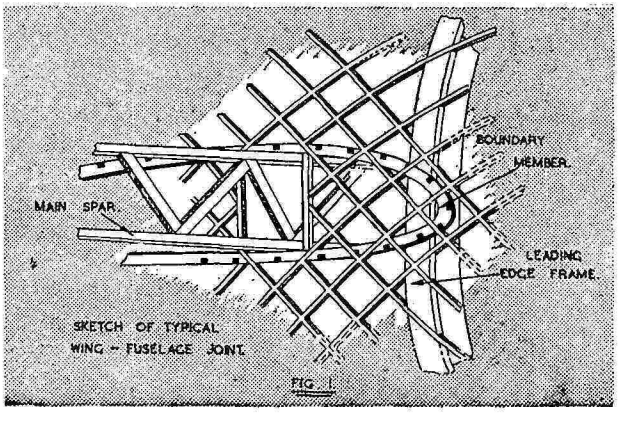
BY B. S. SOAN

Above shows the completed Geodetic Structures, and right, the hardwood formers on which they were built. Whether the very high strength/weight ratio is worth the amount of work entailed is purely a matter of individual opinion.

GEODETICS have been used as a primary structure with great success in the Vickers-Armstrong Wellesley, Wellington and Warwick, and there is no reason why they should not be used in this role in the model world. As in monocoque construction, the material is concentrated round the skin of the aircraft, which gives a high strength/weight ratio. The disadvantage of monocoque, however, is that it fails in buckling long before the full compressive stress is developed. By concentrating the material into geodetics the buckling stress is increased to about 80 per cent. of the maximum compressive stress.

The application of geodetic construction to models is best considered under two headings—as applied to, first, fuselages, and second, wing and tail units. In fuselage design it is assumed that slab-sided types introduce no difficulties and are therefore not considered in the following notes.

The first problem is to decide the approximate magnitude and direction of forces acting on the fuselage, due to the wing and tail fixings and undercarriage mountings. These must be distributed over as large a number of geodetics as possible—in short, right round the fuselage. This is accomplished by building frames into the fuselage to receive the spars, etc. In some cases it is possible to make up an internal structure to transfer the undercarriage loads to the wing root fixing. This is an advantage because it cuts down the number of frames required and reduces the stress in the fuselage between the undercarriage and the wing, which would otherwise have to transmit these loads and be strengthened accordingly. Around any gaps that have to be cut in the structure the geodetics must be strengthened. The only other members required are four or six longerons to prevent the structure collapsing under a longitudinal compressive load such as a rubber motor; these are, of course, unnecessary if a motor tube is used. Next the fuselage must be split up into components from which it is possible to extract an internal former. The structure can be either divided down the centre along a longeron top and bottom or alternatively cross-sectionally at one or more points; at, say, a wing frame which is usually at the maximum depth of the fuselage. (Fig. 1.)



A great advantage of geodetic construction is that it imposes no limitations on the outline of flying surfaces and is also, due to its torsional rigidity, exceptionally well suited for high aspect ratio designs. When the wing is built into the fuselage, the spars should pass right through it, if possible, or be built into frames, while the geodetics may be anchored by a boundary member which is fastened to the side of the fuselage. At the wing joints, the ruling for the fuselage stressing applies—that is, the attachment stresses of tongues, boxes, dowels or tubes must be distributed over the geodetics by means of a root rib and one or two others to support the attachment members further out. Owing to the sharp curvature at the leading edge, it is difficult to take the geodetic members right round without splitting the wood. A better arrangement is to have a leading edge spar at about 10 per cent. chord and to build up a sheet leading edge over riblets. This at once provides a substantial resistance to hitting obstacles, most of the resistance to bending not already supplied by the geodetic structure, and brings the centre of gravity of the wing well within the limits of the centre of pressure movement. The other components required are a trailing edge, and, if it is felt that the structure is not quite strong enough in bending, a compression boom may be incorporated in the upper surface at the maximum depth and/or a number of tension members in the lower surface. It is advisable to insert vertical members between the two surfaces at the maximum depth to keep them apart and, if the chord is fairly big, it may be found necessary to build in one or two crackers (Fig. 2). If it is decided that trim tabs are required on a tail plane, rather than cut into the geodetic structure, terminate

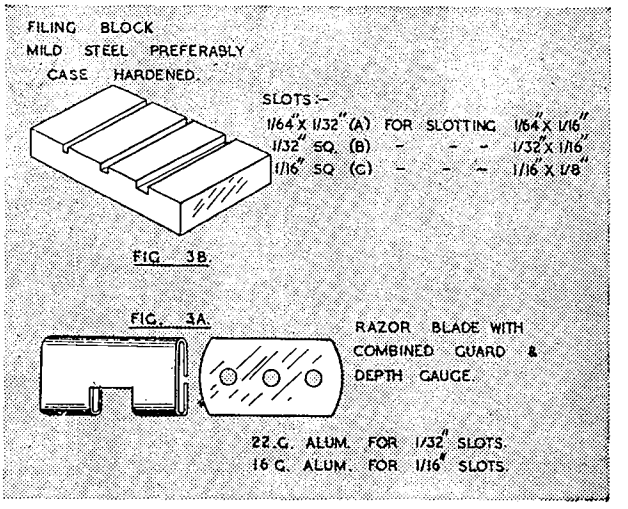
the latter at a trailing edge spar. The trim tabs can be fitted behind this spar and the gaps filled in with a false work trailing edge. In most cases it will be found that fins are too small to make it worth while building them on this principle.

The jigging of a wing or tail plane presents little difficulty especially if it is tapered in any way. An internal former is again the best; E. Lioffel's idea in his article "Geodetic Construction," of using a rib template and cutting the geodetics from sheet wood, has two disadvantages. First, unless one is prepared to calculate, plot and make innumerable different templates, one is limited to parallel chord wings and tail planes. Secondly, a considerable amount of strength is lost because the end parts of each geodetic member have the grain running across instead of along them.

The examples shown in the photograph are of a 7 ft. sail plane. The geodetics are 1/16 in. square, that being the smallest size of wood obtainable at the present time. The weight of the wing is 2¼ ozs., which is balsa throughout except for a sheet substitute and celluloid leading edge and sheet substitute box. The wing could be lighter as the structure is very much stronger than it need be. The weight of the trailing half of the fuselage and the tail plane shown together with two fins complete is 1·6 oz. These have been entirely build of balsa, except for short lengths of cane, dowel and 1 mm. ply. To comply with the F.A.I. rules, the front half of the fuselage, the covering and the dope must weigh 9 oz.

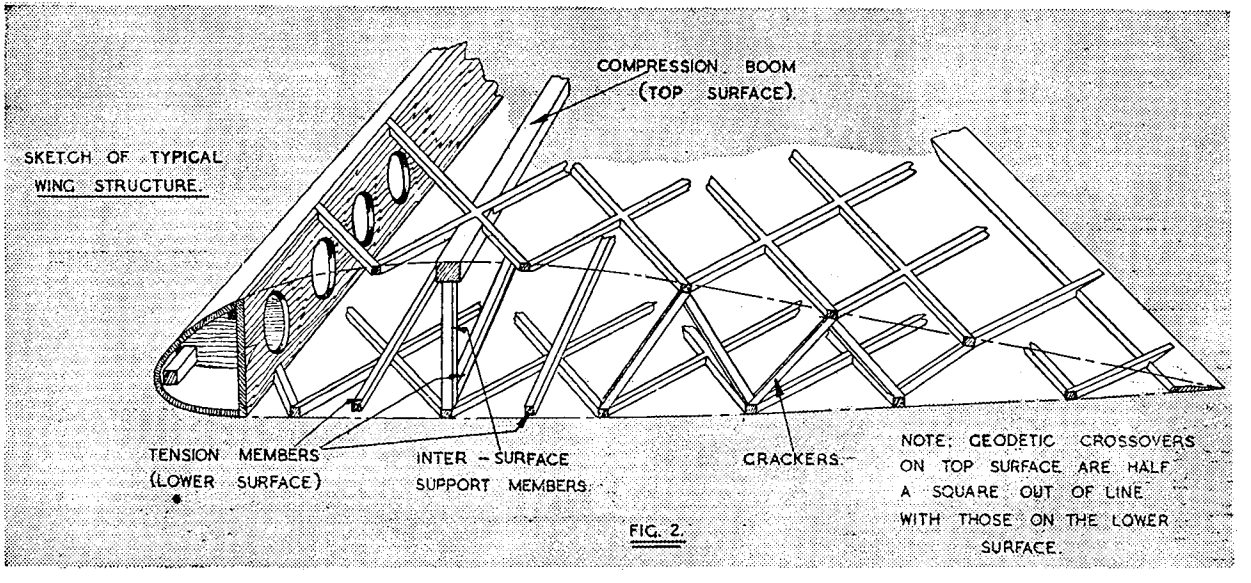
One of the only disadvantages of geodetic construction is the difficulty of obtaining sufficiently small material. The section should be at least twice as deep as it is wide and 1/16 in. by 1/64 in. and 1/16 in. by 1/32 in. are the best sizes for 'planes up to 6 or 7 ft. Without overcrowding, the squares should be as small as possible, because this presents a good supporting surface for the covering. For geodetic structures, the ideal covering should shrink in one direction only. Aeromodellers are fortunate in having such a covering already at hand, in other words, bamboo tissue. This should be used with the grain running chordwise and circumferentially round the fuselage.

Much patience is required in making the joints, the number of them runs into two or three thousand on a 6 or 7 ft. job. Two methods for notching the wood



which are quite satisfactory are described below. First, a razor blade with a piece of 22 g. aluminium bent as in Fig. 3a cuts the wood to the correct depth. The small cube between the two cuts is easily removed with a penknife or the tang of a file. Second, a square file used with a filing block as in Fig. 3b is a very rapid method provided that the position of the cross-overs is known before the members are fastened on the former.

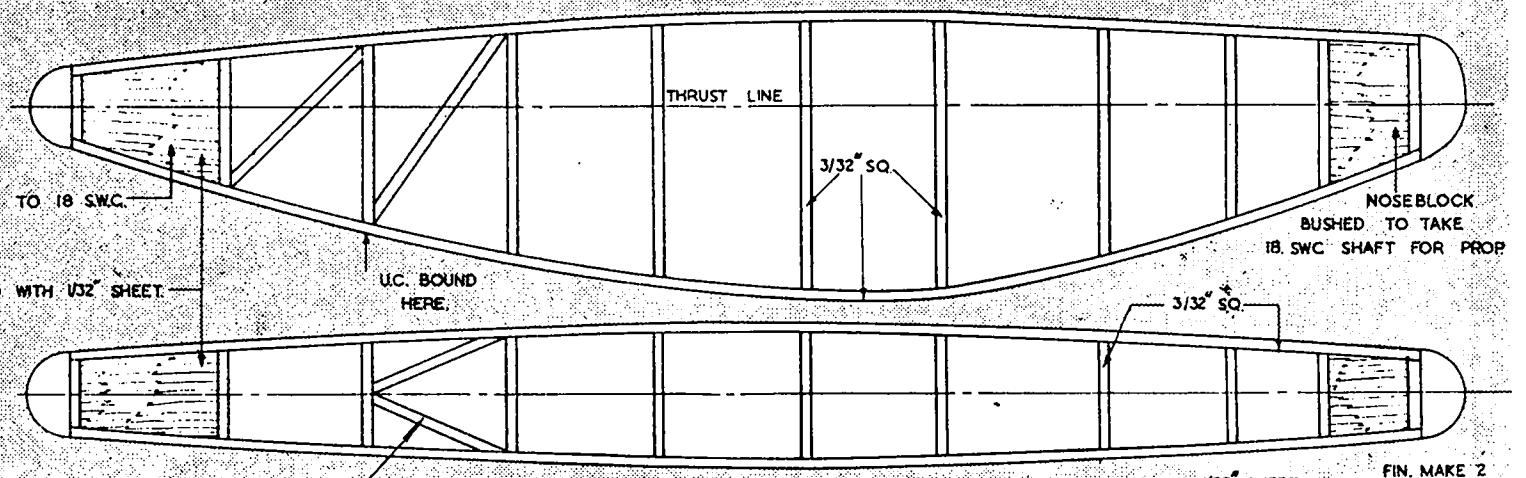
Lastly, here are one or two points that will be of assistance. Rub grease on to the former before starting so that the cement will not stick to it. When making fuselage members it is advisable to soak them, wrap them round the former and allow to dry before notching. If this is not done the wood may split, since it is not only bent but also twisted quite considerably. It has not been found necessary to soak the wing and tail plane members, because their curvature is not very great. When joining two geodetic panels together, e.g., two halves of a tail plane, be careful to set them dead true before fixing, because the torsional rigidity of the structure very effectively prevents one from warping the surfaces afterwards to correct them.



"PUSHER 9"

DESIGNED BY

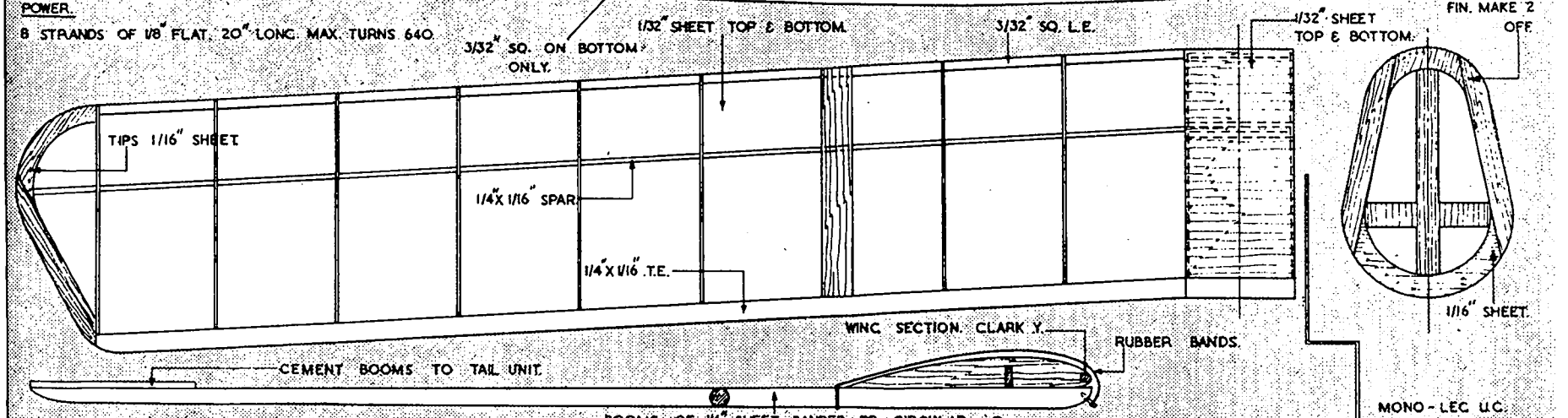
D. A. BEARHAM

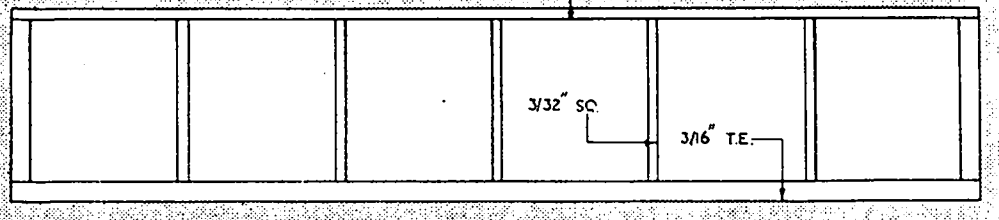


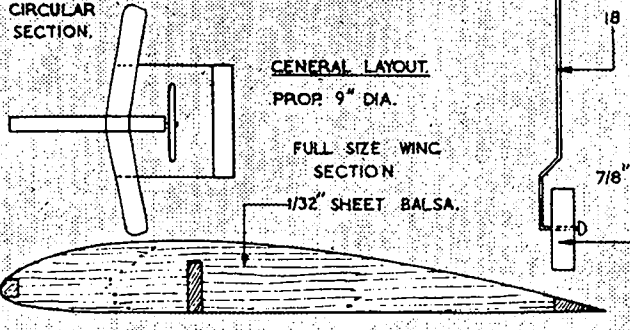
SCALE :- 1/2 SIZE.

POWER.

8 STRANDS OF 1/8" FLAT, 20" LONG. MAX. TURNS 640.







PETROL TOPICS

BY

DR. J · F · P · FORSTER

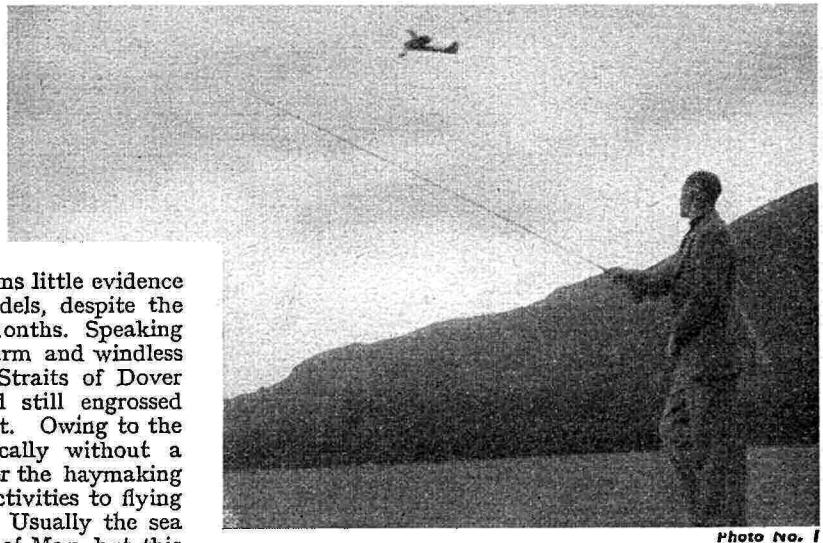


Photo No. 1

AT the time of writing there still seems little evidence of extensive flying of petrol models, despite the lifting of the ban for over twelve months. Speaking for myself, the exceptional spell of warm and windless weather in April (*not* confined to the Straits of Dover at last!) caught me unprepared, and still engrossed in the construction of a new flying boat. Owing to the "ploughing campaign" I am practically without a flying field for land machines until after the haymaking about July, so I usually confine my activities to flying boats during this period of the year. Usually the sea is not very inviting till the latter end of May, but this year saw several sails in the channel at Easter!!

Judging by past experience I think we can confidently look forward to three weeks of filthy weather starting the day I squirt the last shot of paint on to my latest model!! For those who missed my previous reference to my "Flit" gun, let me once more commend to them this method of spray painting models. The finish is even, and the weight of dope and paint on the model is reduced appreciably when compared with careful and slow application by a brush. It is a bit extravagant in paint, and more so with acetone thinner, but results and speed justify it to my way of thinking.

Several letters express disappointment at not seeing my Scale Spitfire at the Dorland Hall Exhibition. In view of the glowing reports of the exhibition, the writers of said letters cannot have been so disappointed as I was in not being able to get *myself* up there, still less the Spit. However, for the information of any similarly interested readers living or passing within hailing distance of Oxford Circus, it is now slung up on exhibition at the A.B.A. offices, 28, Hanover Street, bearing the honourable scars of a recent failure to hop one of the ubiquitous local hedges. I hadn't time to replace the imitation oleo legs (already suffering from their immersion in the sea, as per my last Petrol Topics) before my trip up to London, so I stripped them off altogether. I also removed my one and only trusty Cyclone—not because I didn't trust you lads (!!), but because I am heavily involved in engine experiments utilising the moving parts thereof in a crankcase of my own design and crude construction on a newly acquired lathe!!

There, too, can be seen the red fibre prop. referred to in last month's Petrol Topics in answer to the query from J. Moonie, of Lanark. I am sorry I have not yet raised the energy to make a new spinner to enclose this prop. hub. Using wooden props I carve these integral with a disc the same diameter as the spinner, but I can't afford the weight of this using red fibre, and a new spinner with slots to fit over the blades is now necessary.

Industrious American.

One of the most interesting and amusing letters for some time comes from R. F. Davis, serving in the U.S. Navy and stationed at the time in Falmouth, Cornwall. With an average of a 12–20 page letter per week for some time now, he has succeeded in giving me a very vivid impression of model activities in the States up to the time of Pearl Harbour, and it behoves me to try and pass on at least a few of his spiciest bits to readers of "Topics."

In Great Britain before the war, any man who dared to declare that he was or had been the owner of a Hi-speed Torpedo, a Brown, an O.K., 2 Ohlsson 60 "Customs," 2 Atoms, an Ohlsson 23 and a 19, a Forster 29 and a Bantam, would live in fear of a visit from the Income Tax authorities! In America this was not so; not because said authorities are any less inquisitive than ours but because apart from the ridiculous difference in price, trade sponsored competitions are the rule rather than the exception in America, and in addition to trophies galore and cash prizes, engines are nearly always offered as prizes in their competitions. Frequently, too, engines are offered as prizes for rubber-driven contests, and thus the "boys" graduate early to the ranks of petroleers. I suppose this phrase will call forth howls of rage from confirmed rubber-ears and anti-petrol merchants, but I can't help feeling that if only engines were cheap and easily obtainable over here, we should very soon see a tremendous jump in the numbers of active petroleers in this country after the war, and a golden opportunity awaits the men with courage to embark on quantity production of a really sound British engine as soon as conditions permit.

I do not think R. F. Davis is typical of American modellers, however, and I was interested to learn that although he has built innumerable "high performance" and "Pylon" jobs both from typical American kits and from his own design, and deliberately gone out to win a number of contests big and small, partly for the fun of it but frequently for the engine offered as prize, he secretly leaned towards more realistic-looking models. In America the lads have not had much success with scale type models, largely because they have not put enough thought and experiment into developing practical and crash-proof structures, The immediate result was the development of what we have come to look upon as contest freaks.

U-Control.

Owing to the cessation of imports of American model journals during the early years of the war, very little

Photo No. 2

was at first heard over here of the sudden swing of the pendulum that took place not long before Pearl Harbour — U-control practically took the country by storm, and has remained very popular ever since. The models now being flown by U-control are very nearly (and in many cases truly), *scale* models, and certainly so far as twin-engined machines are concerned, this seems the only way to fly and land them in one piece, short of radio control.

Personally I regard U-control of scale models as a confession of abject failure in the first instance. However, it has recently been developed in two directions, both of which offer interest, and I haven't a doubt that it will claim many enthusiasts in this country. Some of my most faithful readers may recall the account I gave of my own stumbling efforts in this direction in Petrol Topics (February, 1941), in which I flew old P-3 tethered to the end of my trout fly rod and line, and photo 1, taken in poor light by my friend Lt.-Col. Bowden, caught me in the act about Xmas, 1939.

I had hopes then of stimulating the S.M.A.E. to approach the authorities over getting permission for tethered flying of petrol models during the ban, but in this uncertain world there was no infallible guarantee that broken lines might not occur accidentally on purpose (!) and my model was a perfectly efficient free flying model.

Here lies the difference in many of the latest American U-control jobs: many of these have very small wing areas, and it seems to me doubtful if some of them would fly at all, were it not for the centrifugal force exerted on the line at high speeds. The two directions mentioned above, in which tethered flying of petrol models is developing now, are multiple U-control, in which engine throttle or ignition timer control as well as elevator and retractable undercarts and flaps, etc., are provided for, and the sheer speed model.

The practicability of the sheer speed petrol model will naturally be a tremendous stimulus to the engine side of the hobby, and like power boats and race cars, this is likely to appeal to a number of men who are primarily model engineers, rather than aeromodellers. Although airscrew design will enter very vitally into this branch of the science, I am personally very much afraid of the inevitable tendency for such machines to become "flying engines" instead of flying aeroplanes. Wings may become smaller and smaller; rudders and fins will become superfluous, until we get nothing but super streamlined engine nacelles housing howling power units, hurtling round at speeds in excess of 100 m.p.h. Already comes news from America of such speeds, and I'm beginning to wonder whether this can seriously be considered aeromodelling.

If it comes in this country, and I think it will, I think we must insist on the preservation of a genuine self-supporting aircraft by deciding maximum permissible wing loadings, and minimum permissible tether lines. The use of long lines in any sort of wind makes the tethered flying of ordinary slow flying petrol models a tricky business, as I know, but there are further possibilities and perhaps attractions for those with strong noses!! The flying of speed models indoors in suitably sized and ventilated buildings might produce a thrilling winter's evening spectacle (while visibility lasted through the haze of blue smoke!!) and I present this idea to "Freddie," should he care to elaborate it: he will doubtless provide gasmasks for the audience!!

Reverting to Davis's letters, the following quotation shows what can be done in the States, and also shows his own feelings about the usual American Pylon jobs: "1942 was my first and last year with gas models, but I really went at it tooth and nail. Built some twenty kit models, entered and won several contests which netted me several of the already mentioned engines, kits and supplies. I co-organised a local Model Club, designed and built three successful models of my own, *finally getting back to the realistic type.*" (The italics are mine.) "The year 1942 didn't show me much that looked like a real airplane, and I was thuro'ly disgusted with the enthusiasm modellers generally wasted on freaks such as our nationally known 'Interceptor' and sticks."

This, coming from an American, rather goes to show that there, too, there is an underlying desire for the scale type of model, which I have frequently considered as likely to claim many more adherents than hitherto

Photo No. 3

Photo No. 2 shows R. F. Davis with models and friends. Photo No. 3 is of the "Spook" 78 in. span, held by a friend. Photo No. 4 shows a collection of typical American "gas models". From left to right, "Shorty," "Spook" 78 in. span, "Ranger," "Scamp," "A.A."

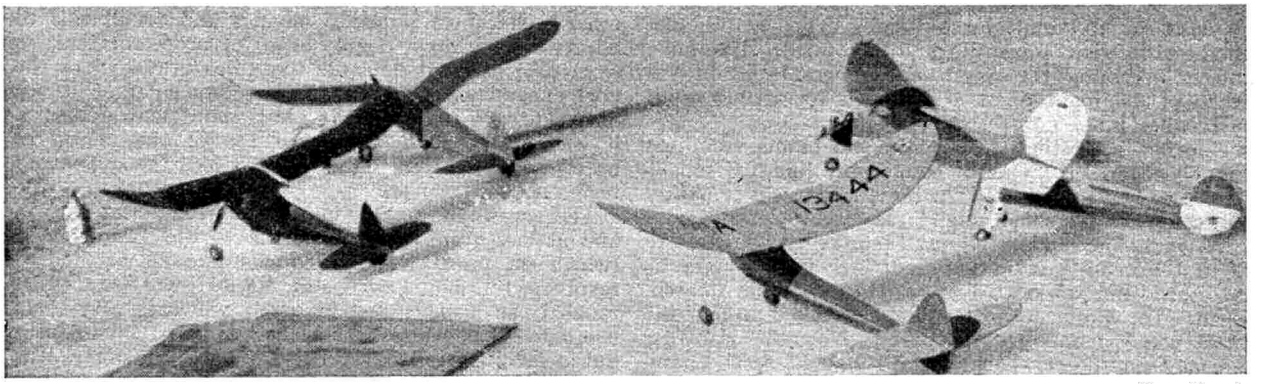


Photo No. 4

over here. So far their way of approaching it has been via U-control. I have spent the last five or six years trying to develop practical and crash-proof *free flying* scale models, and Davis expresses amazement at low-wing types especially. Apparently the low-wing model is practically unknown in America, or at least was so until tethered flying became the rage. Although I have shown that tethered flying with or without U-control may have its points, I can't help feeling that it is more or less cheating so far as stability is concerned, and I think apart from speed contests, can never hope to rival the free-flying scale type model either as an achievement or as a spectacle.

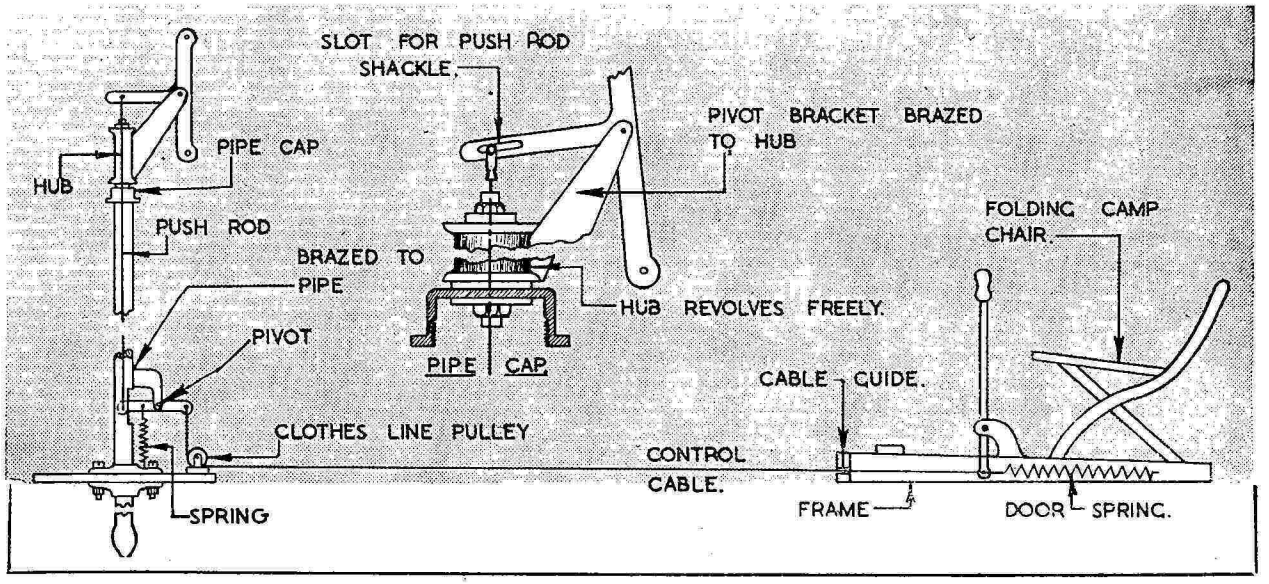
To get back to Davis's purpose in writing, he states: "It is my wish that in the future there should be closer contact between modellers of this and my own country, and I am asking you to help us in this matter. I for one intend to do all I can to return our designs to more realistic appearing machines. This will sure take time and work and the pen of a much better writer than myself, but with the help of my (reorganised) club I am going to try."

If space permitted the quoting of more of this correspondent's prodigious output, readers would, I am sure, agree that no better pen than his is likely to be found, nor need it be looked for.

By way of a pat on the back for us, he adds that considering how early the war cut us off "I think you've done a great job, and take it from me we haven't advanced much during your inactivity, and furthermore the progress we have made is in the wrong direction, tho' I'm not saying we haven't learned plenty; it's just that our models don't look much like real airplanes." Well, I think we in Great Britain can certainly agree with his last sentence, though Lord knows there were some pretty horrific-looking models over here before the war!!

One of his choicest remarks is that some American modelling terms must "wrench sniggers" from English modellers. Like all Americans he forgets the Scots, the Welsh and Irish, but we'll forgive him that for that gorgeous expression. Apparently our "bulkheads" tickle him as much as their "firewalls" tickle us.

The three other photos this month show us a good sample of the types of gas jobs built and flown by Davis and his friends in Michigan. Lakes are numerous in his part of the State and they use the ice extensively as ideal flying grounds in winter. He tells me he intends to get busy on flying boats after the war and is taking some Mermaid plans back with him. The only photo of himself shows him in U.S. Navy uniform with a gull-wing slab-sider called "Spook," which is a 48 in. replica of the larger 72 in. gull-wing affair held by his friend. He also sends us the sketch of the remote U-control unit



he designed and built for his club. This enables the operator to view proceedings from outside the circle, and is becoming the usual method employed in the States. The main pivot is provided by an old front cycle-wheel hub.

Another interesting letter comes this month from one who signs himself "One of your many hundred fans—A. E. Pye," of Kingston. The reason for this is evidently because he wants something!! He has just acquired a lathe and some Hallam Nipper castings, and intends to fit a "Forster" induction and fuel feed system as described and advocated in AEROMODELLER (March, 1944). He wants me to "spill the-beans" as to "the exact way" I enlarged the ports. Now this is rather a tricky question! The Nipper I bought second-hand was, as far as I can ascertain, finished and assembled by the makers, so I take it that the ports were as designed by the makers. The cylinder of the Nipper simply consists of a steel sleeve enclosed in the two halves of the aluminium outer casing carrying cooling fins, so it is a very simple matter with a small square file with one side ground off smooth to enlarge these ports. Personally I eventually enlarged all the ports but started with the exhaust. Originally this was nothing like as wide as the corresponding opening in the aluminium cylinder casing, and furthermore I found that the piston top travelled a considerable distance below its lower margin before reaching bottom dead centre, thus not giving nearly as big an opening as was possible assuming the *upper* margin of the port was correct. The position of the upper margin is of course vital, as this governs the port timing, i.e., the moment at which the port *begins* to open on the down stroke. I checked this against other well-known powerful engines and found this to be correct within a degree or so of prop. rotation, so from that moment onwards the quicker and wider the port can open the better. I therefore enlarged it not only sideways some 1/16 in., but also downwards until it was nearly as deep as the top of the piston at bottom dead centre. I then reassembled the engine and tested it.

There was considerable improvement in power output, and at last quite a healthy crack to the exhaust note (which on most Hallams sounds like an attenuated raspberry!!), but I was still not satisfied, so I next tackled the transfer passage itself, which is very small compared to most American engines, and I smoothed it out as much as possible and also widened the port to the same width as the passage in the aluminium casting. This improved things tremendously and I eventually widened the inlet port also. The crankcase compression on all the Nippers I have handled is exceptionally good, and I couldn't help feeling that here was a potentially good engine being starved and choked all round. After this lapse of time I still maintain that by this "judicious enlargement of the ports, performance *has* improved out of all recognition."

Before closing—there was a printer's error in my May "Topics." On page 301, line 27, a line was omitted after the word "light", the complete sentence should have read as follows:—

. . . light. By then we were so far out that we could see round the local headland (which forms the frontispiece of the latest editions of D. A. Russell's and my own books), which meant that we were more than a mile off shore!

DESIGN FOR A HAND-LAUNCHED PETROL MODEL WITH A RETRACTED UNDERCART

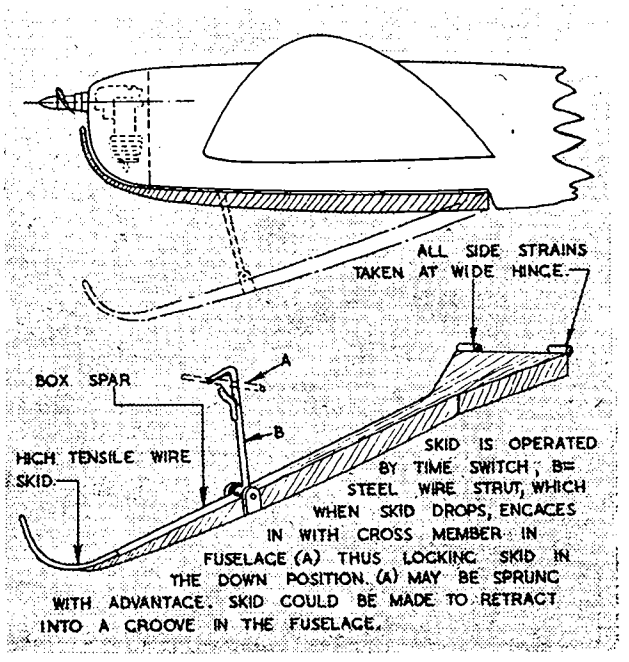
BY H · J · P

So few full-sized aeroplanes (or birds for that matter) now fly about with their undercarriages hanging down that there is a natural urge to abolish this excrescence on model aeroplanes.

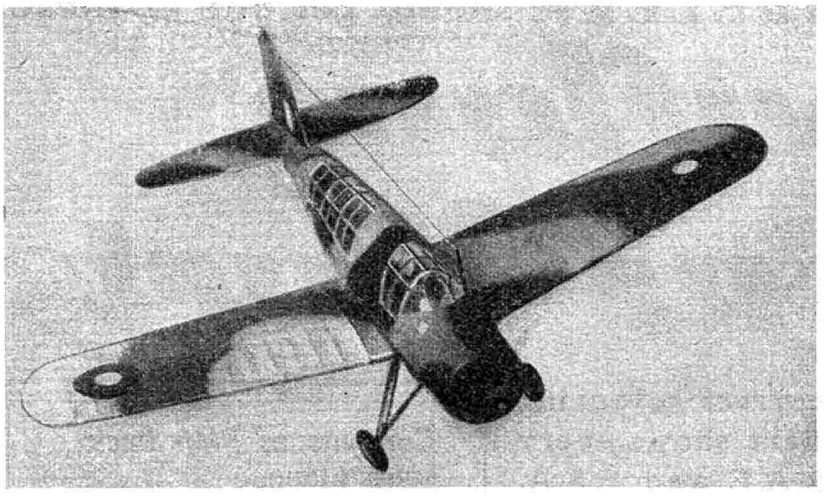
That successful retracting and detracting undercarts can be designed and made to work on petrol models is highly probable. But it will not be easy. If we accept hand launching and concentrate only on producing something to absorb the *landing* the problem is far easier.

The writer has already made the suggestion for a swivelling engine, which will (at the end of its run or when near the ground) tilt so that the plane of the propeller is no longer at right angles to the direction of motion but slewed round so as to enable the propeller to turn without breaking, if it hits the ground.

The following proposal is considered a better one and, though untried (owing to the impossibility of doing so whilst chasing the Hun through Holland), is considered worth publishing abroad for someone to toy with. The sketches give the general idea. A very light effort only on the part of the time switch, applied to the catch holding the strut B in its "up" position, would be needed, the skid would then drop by gravity and lock in the landing position. A small amount of springing could easily be incorporated on the strut or its fixing and would give adequate up and down movement for the skid.



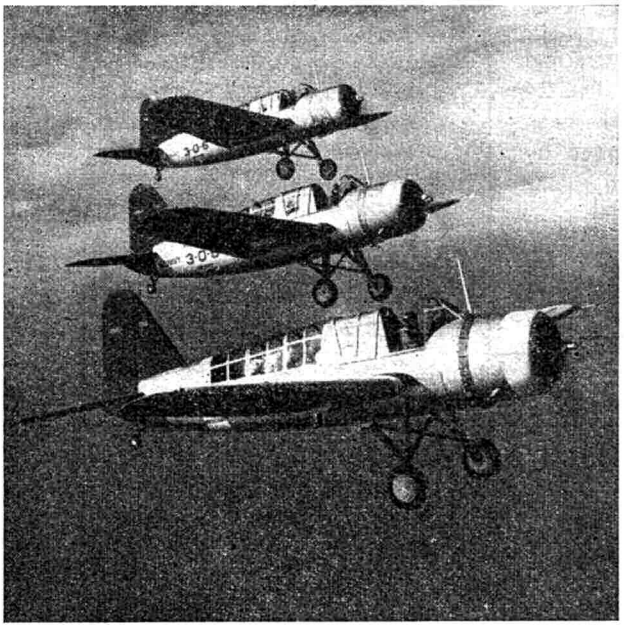
A 1-inch to 1-foot Flying Scale Vought



DESIGNED BY

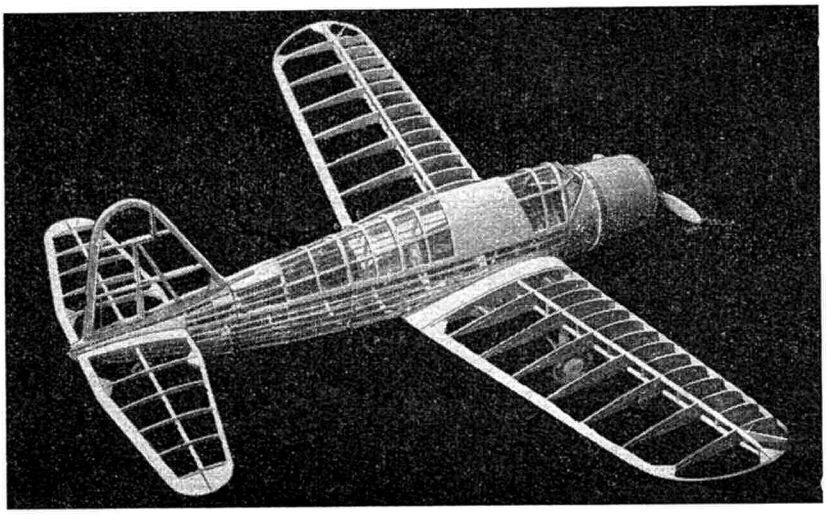
The Vought-Sikorsky OS 2U-1 was originally used by the U.S. Navy as an observation scout monoplane. Adopted later by the Fleet Air Arm and designated the "Kingfisher," it was utilised for similar purposes before being relegated for use as a catapult trainer. There are two versions, the float version being the subject for C. Rupert Moore's cover painting this month, and is shown being catapulted from the deck of a battleship. Those of us who visited The First National Exhibition of Model Aircraft this year will well remember Mr. Dare's prizewinning model of the landplane version.

Here then is the model for the benefit of all those modellers who enjoy building a first-class flying scale model with a first class performance.



ALTHOUGH in no sense a difficult model to construct, the author would not advise beginners to attempt to build it. The reason this comparatively unknown type was built is obvious when the size of the tail and fin are examined on the drawing; they are both to scale.

Fuselage. This is constructed on the well-known laminated ring principle, designed and perfected by Mr. C. A. Rippon. First cut out the egg-shaped formers in stiff card approximately ⅛ in. to 3/16 in. in thickness; these are best cut in half vertically and stuck together again with brown sticky paper. This can then be cut through when all the stringers are on and easily withdrawn. Cut 3 ft. strips of 1/32 in. balsa 3/16 in. wide, soak these first, then wind them round the formers till there are five thicknesses on each former, with the exception of No. 9a, which has only four. When these strips are dry, remove from formers carefully, and cement them together again. Make up the necessary jig as indicated in the perspective drawing, but before threading the formers on the ½ in. square rod, add the wing fixing tubes and strengthening blocks to rings 4 and 5, also undercart brass tube to ring 4a, working here with great accuracy as the line-up of the wings and the centre section will depend a great deal on this. When cementing these tubes on to the rings make them long to project approximately 1½ in. beyond the stub wings on both sides, as later on the wings are lined up on these before the tubes are cut through.

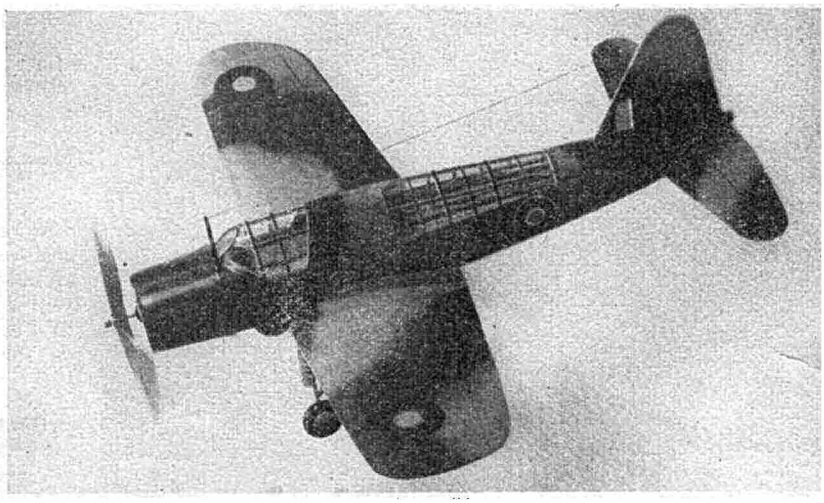


Space out the formers with the rings on as on the drawing, making sure that they are square with the rod both vertically and horizontally. A point to watch here is that ring No. 4a is not assembled on the jig with the others, it is cemented in place after the fuselage is removed from the jig and before the horizontal struts for the cockpit are in place.

Start by cementing on the two main longerons of 3/16 in. by 1/16 in. balsa approximately half way down the fuselage, then add the stringers, etc. The detachable rear part of the fuselage is best built on the jig with the rest of the fuselage as far as possible, and cut through between

-Sikorsky KINGFISHER

H. F. DARE



rings 9 and 9a when the majority of the stringers are on, the keel and the rest of the construction can be added after removal from the jig.

The reasons for making the tail unit hinged and detachable are for ease of transport, and one can wind up each motor separately from the rear, then snap up the tail unit and clip in position again, knowing that the tail is still set in the same position as before winding, the two small bamboo pegs locating the unit from any side movement.

After covering the cowling and the fuselage where indicated on the drawing with the 1/32 in. sheet balsa, make the solid rounded part of the cowling edge as sectioned on the drawing by cementing pieces of $\frac{1}{8}$ in. sheet balsa cut 3 in. by $\frac{1}{2}$ in. wide, the grain running the short way, end to end, long enough to go four times round. A good round glass jam jar is ideal for making up this ring. When dry, remove and cement to $\frac{1}{8}$ in. sheet ring made up as drawing, then cement to cowling and sand to shape. The cooling gills are constructed in a similar way, pieces of $\frac{1}{8}$ in. sheet, $\frac{1}{2}$ in. wide, grain running the short way cemented together, then sanded to a triangular section and cemented round the cowling in the correct position; the slots are cut when the whole thing is dry. If the aerial mast is required a hole is cut in the fuselage and strengthened inside with a small block of balsa, and a block is also cemented on the bottom of the fuselage immediately below the hole, to locate the other end of the mast, the mast is made of bamboo.

Cut and fit pieces of celluloid for the glasshouse and cockpit, cementing strips of 1/32 in. sheet over the celluloid to indicate the framework, with the exception of the flat front window; this has a piece of 1/16 in. square birch steamed to shape and cemented over the celluloid and the 3/32 in. square birch of the flat window framework. The stub wings are built up as drawing, leaving tubes projecting through end ribs. Top and bottom of the stub wings are covered in 1/32 in. sheet balsa.

Fin. This is built integral with the rear part of the fuselage and the drawing explains the construction of this. Soft wire or aluminium is used for the hinges.

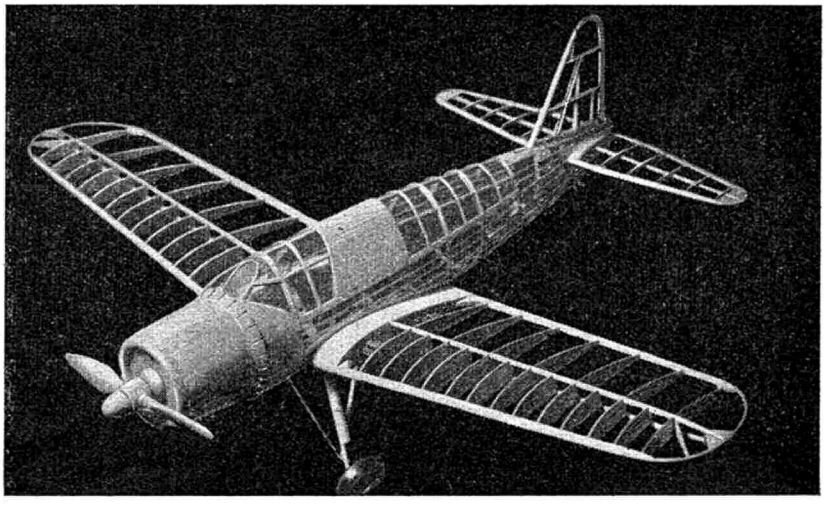
Tail. Build as plan and adjusted on the model for incidence by packing small pieces of balsa under or over the trailing edge. These pieces also hold the tail in position for flying.

Wings. First cut out two sets of ribs as drawing and shape up leading and trailing edges, assemble right half of wing on drawing, for the left half, trace off wing plan and build up on reverse side of tracing. The leading edge will have to be packed up with scrap balsa to meet the ribs when assembling. When both wing halves are perfectly dry, cut holes for paper tubes in end ribs and slide on to paper tubes, cementing in position and adjusting for dihedral. Add balsa stiffening pieces to paper tubes where they come through between ribs 1 and 2, when set and dry, cut through tubes. This method of assembly enables one to get the correct dihedral and ensures that the wing plugs line up.

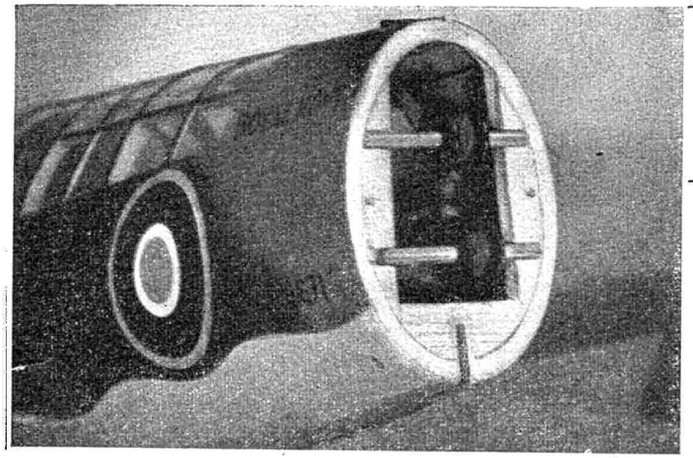
Gearbox and Nose Block.

Two $\frac{5}{8}$ in. gears and one $\frac{1}{2}$ in. gear and a piece of brass sheet approximately 1/16 in. thick are required.

First cut the brass sheet to shape and drill the fixing holes. Before drilling the holes for the 16 gauge bushes and hole for prop. shaft, pin the gear wheels on a board in a straight line with the brass bracket underneath in the correct position and interleave a piece of tissue between gear teeth. This ensures the correct meshing with little backlash. Remove this of course after drilling, drill the bracket through the wheels with a 16 gauge drill, keeping it dead upright all the time, dismantle, and using the holes as centres drill the 3-ply nose block, remove and drill out the outer two holes in the bracket



The scale appearance and sturdy construction of the model are fully emphasised by the photographs on these pages. Note the scale airscrew in the uncovered views. Centre left is a flight of the U.S. Navy version, the OS 2U-1.



The method of attachment for the tail assembly can be seen from the accompanying photographs. The tongue at the bottom of the rear section (lower photograph) fits into the slot below the bobbins (top photograph) and is held by a peg.

to take the brass bushes, then sweat them in position after screwing on the locknuts. Make up nose block with brass bush for prop. shaft and balsa block. The motor shafts are of 16 gauge piano wire and are first formed as on drawing to take "Major 'Run-True'" bobbins, then assemble gearbox by threading these shafts through bushes on bracket, adding thrust races and sweating the $\frac{5}{8}$ in. gears in position, sweat the $\frac{1}{4}$ in. gear

on to the prop. shaft. Assemble gearbox by bolting bracket to 3-ply and make up and sweat freewheel loop in position.

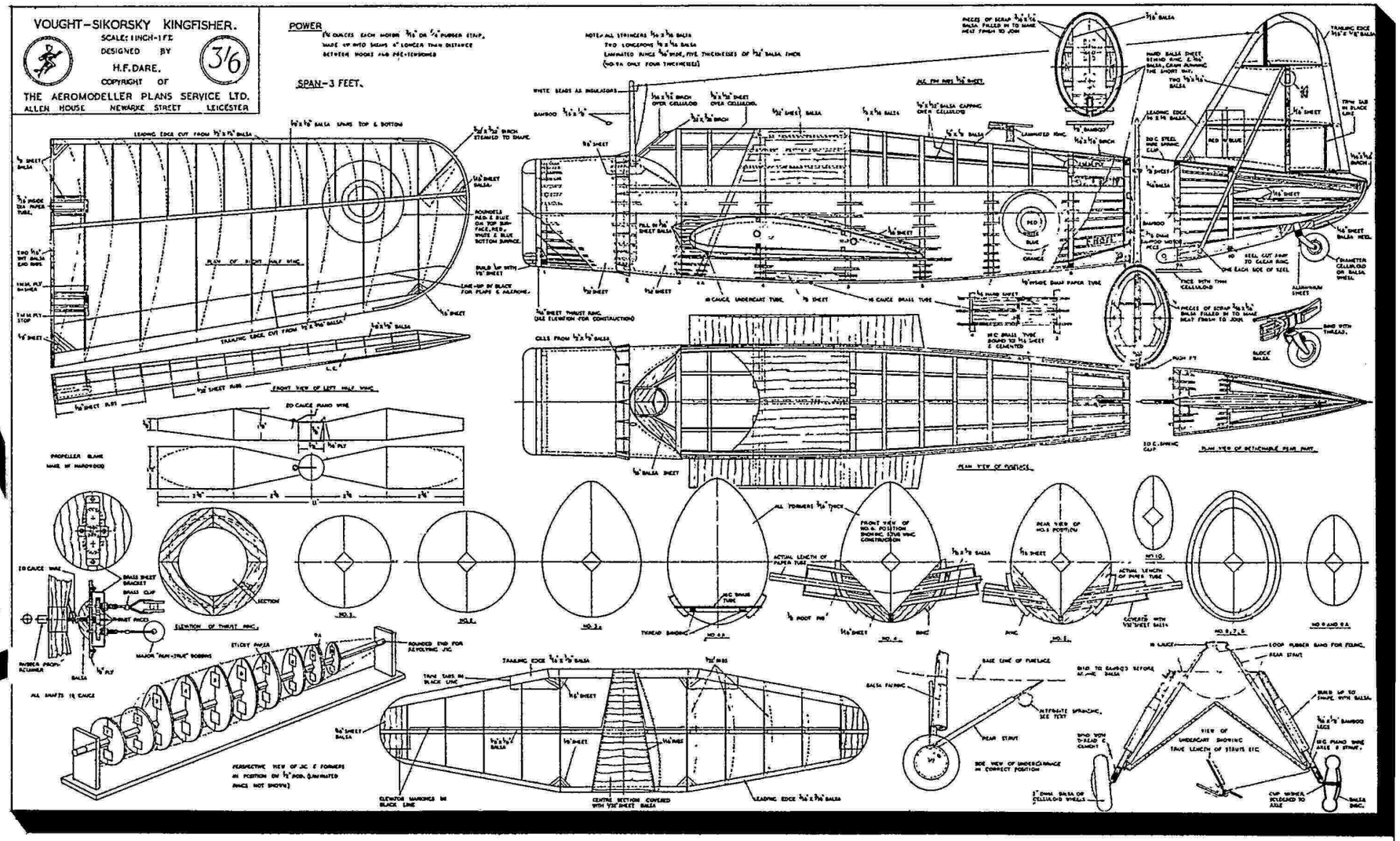
Prop. This should be of hard wood, the original was of mahogany. The weight is useful here in helping to balance the model and is of course less prone to damage. The original prop. was carved "left-handed." This is not essential but if one is winding up from the rear one can wind right-handed, which is usually easier and quicker.

Undercart. This is perfectly straightforward and made up as on drawing. Extra springing can be achieved by adding a loop (shown on drawing) in the rear struts; this spoils the scale effect slightly but helps greatly in the shock absorbing. These rear struts plug into the small piece of 18 gauge brass tube in position under the fuselage and are held in position by looping a small rubber band round the two ends before plugging in.

Covering. Cover the fuselage and wings with heavy tissue and the tail, fin and detachable rear of fuselage with lighter tissue. Paint or spray the usual camouflage colours (if British version is required), earth and dark green, with sky blue on under surfaces. Add the appropriate roundels by transfers or painting them on, indicate elevators, ailerons, etc., by black lines, also the words "British Navy" and machine number in black.

Motor. The model is powered by two skeins of $1\frac{1}{4}$ oz., each of 3/16 in. or $\frac{1}{4}$ in. rubber made up into loops 4 in. longer than between the hooks and pre-tensioned by the "White" method.

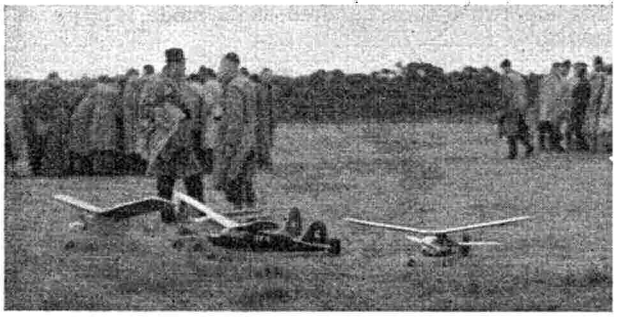
Flying. No downthrust was needed on the original, and a 1/16 in. or so sidethrust took care of the torque. Test for glide in the usual way, adjusting the tail by packing small pieces of balsa under or over the trailing edge. A good number of turns will be required for the first hop, two or three hundred, as the model is fairly well loaded.



THE SIR JOHN SHELLEY CUP 1945

HELD AT SUTTON PARK BIRMINGHAM JUNE 3rd.

OI ! NO PUSHING !—The winner, Silvio Lanfranchi, turns his model into the wind prior to the take-off. The garb of the spectators gives some indication of the weather conditions. (Right.) Bill White's model just before hitting the ground on one of his unlucky take-offs. (Extreme right.) R. C. Monks, model climbs steeply on his second flight.



". . a typical English competition day . . ."

" . I've got a spark . "

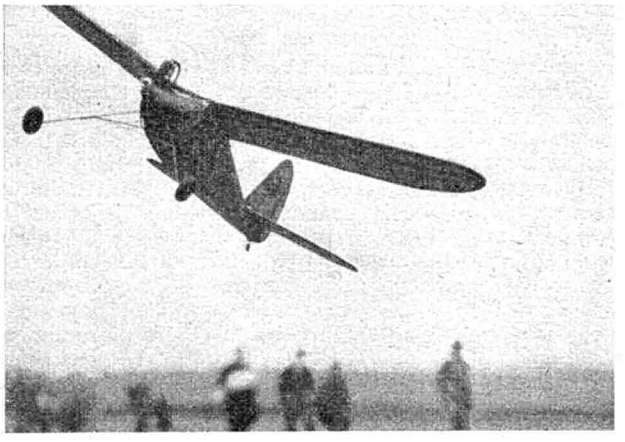
AS usual—we say this from bitter experience—the prevailing climatic conditions were atrocious. In fact—the weather was *lousy !* The rain, which fell in a consistent and penetrating drizzle all day, damped everything except the competitors' enthusiasm. Another unhelpful factor was the wind, which varied from a fresh breeze to gale force. All in all, it may have been considered a typical English competition day.

The contest was for three flights of nominated times : first flight, 60 secs. ; second, 45 secs. ; and third, 30 secs. It was intended to start at eleven o'clock, but was postponed to the early afternoon in the hope of a break in the weather. No such fortunate occurrence taking place, the petroleers finally got down to it and began assembling their machines. While the majority of spectators remained huddled in the rain, the contestants made as much use of the tents as possible for running in their engines under cover. Some amusement was provided by the muffled cries and remarks of victory or defeat occasionally reaching our ears from the interiors. The triumphant shriek of " I've got a spark " from one small tent evoked a smile from those outside.

Much interest was shown when Geoff. Dunmore of Leicester unpacked his 8 ft. span parasol wing semi-scale job, which was truly a superb piece of workmanship. The model had an ingenious remote control for the engine (an interesting 9 c.c. type, designed by a friend, Marcus Morris), and this control, operated from a dash-board in the scale type cockpit, was a very praiseworthy effort. Dunmore, however, was unfortunately unable to fly off owing to engine trouble later in the day.

The engine trouble gremlin did not pick Dunmore as his only victim. Amongst the others was Bill White of Northern Heights, who took the field for the first fly-off. The model, his own design, weighed 4¾ lbs., and incorporated a planked monocoque fuselage, specially stressed elliptical wings and tail and a parasol pylon-mounted wing, with a transparent fairing in front. The engine, a 10 c.c. Brown Junior, was mounted upright in a neat aluminium cowling. He was dogged by bad luck, however, all through the afternoon. Each time his model unstuck the wind caught it and flung it back on the ground, and here the complicated structure of wings and tail proved itself many a time, never suffering the slightest damage, though, finally, the trouble with his engine forced him to abandon the attempt.

". . . a superb piece of workmanship . . ."
Geoff. Dunmore of Leicester.

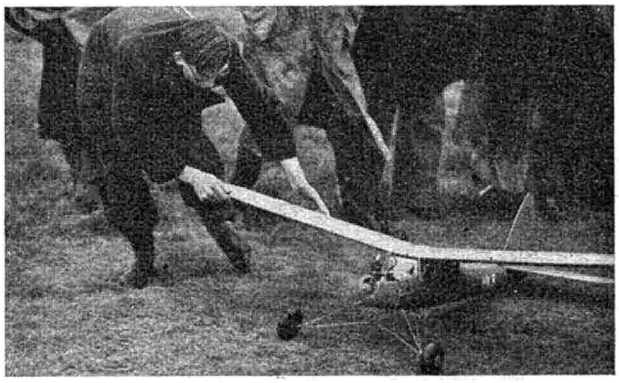


The next competitor was D. Worby, of Cheam, flying a 6 ft. span, 690 sq. ins. area job weighing 4¼ lbs. Here again Nemesis was hovering around the corner. The model got away a little unsteadily but rose like a lift when the wind caught it a few feet above the ground. At about a hundred and fifty feet it turned and cruised down wind ; when it turned back into the wind, however, things began to happen. The wings, which had shown decided ornithic tendencies all the time, now developed a very marked flutter, until, finally, even the string with which the flying surfaces were liberally adorned proved unavailing and the starboard wing broke clean off. The resulting vertical dive brought a gasp of horror from the spectators ! Contact with Mother Earth proved disastrous, as the preceding journey was a little too fast for the framework—which suffered in consequence, providing the one complete smash without which spectators go home disgruntled and no contest is really complete !

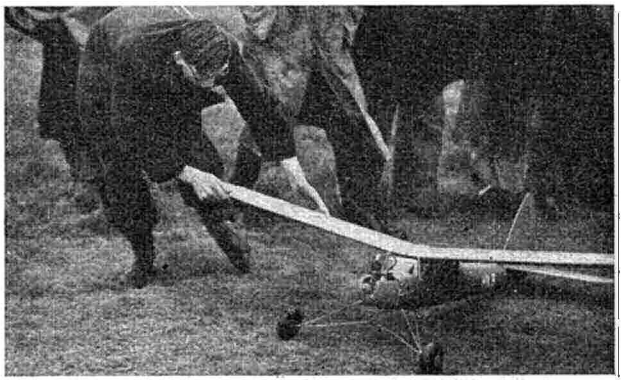
This unfortunate accident did not seem to deter the rest of the competitors, the next to sally forth being R. C. Monks of Birmingham, but his machine was badly trimmed and clocked only 7 secs. He improved considerably on the second flight, clocking 32·5, and with his third flight, one of the last of the day, he stood a fair chance of third place. He needed to get within 6 secs. of the nominated 30 secs., but was unlucky, and finally placed fourth.

S. Chatwin of Birmingham, who finally placed second, provided some of the best take-offs in the contest. He was flying a 6 ft. span model powered with a Brown Junior engine. The take-offs were smooth, steady and leisured, and the machine showed a very high degree of stability while in the air. His first flight was the longest of the competition, clocking 79 secs., 19 secs. error. His second of 48 secs. was also noteworthy, being only 3 secs. from the nominated time.

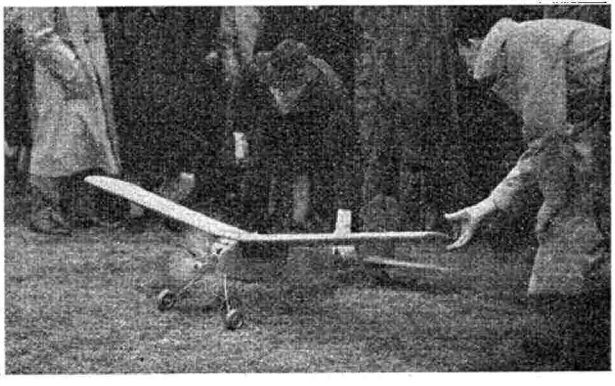
In a contest of this kind a consistent model coupled with a good knowledge of its characteristics becomes a deciding factor. This was well demonstrated by last year's winner, Silvio Lanfranchi of Bradford, who again walked off with the laurels, a well-earned first place achieved by the consistent performance of his model, a 5 ft. 6 in. span " Indian Chief." A steady climb and ensuing flat glide enabled him to gauge the duration with considerable accuracy.



". . . some of the best take-offs in the contest . . ."
S. Chatwin of Birmingham.

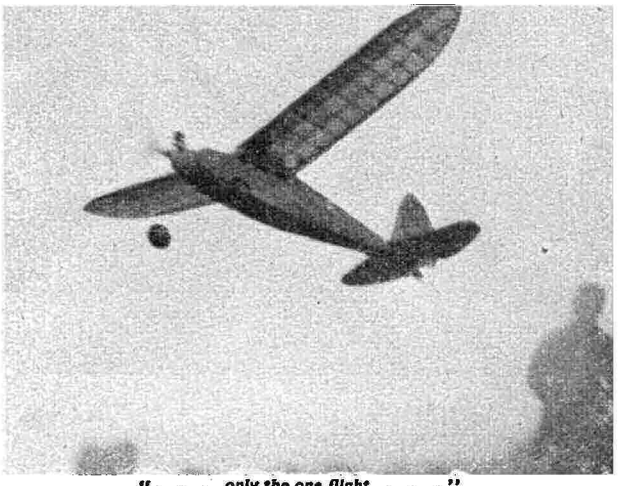


". . . a snappy-looking 56 in. span monoplane . . ."
Norman Lees of Bradford.



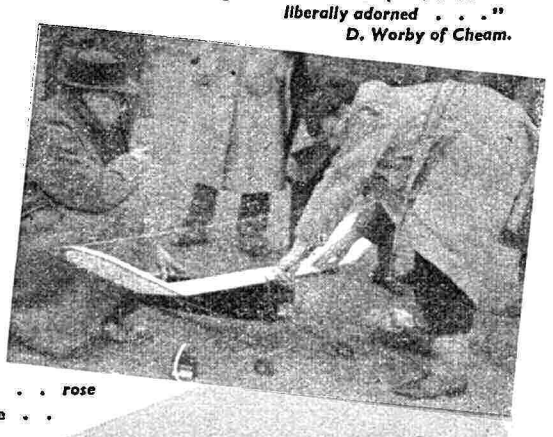
". . . possessed of Nazi instincts . . ."
H. B. Scarth of Bradford.

First it looked as though a close fight was due between Silvio and Norman Lees, also of Bradford. He made his first flight before Silvio took the air, and his model, a snappy looking 56 in. span monoplane powered with an Ohlsson 23, climbed steadily and landed about half a mile away, clocking 58 secs. out of the required minute. Unfortunately, being trimmed to reduce the glide, it landed rather heavily, bending the engine mounting and upsetting the thrust line, which resulted in the model behaving capriciously for the rest of the afternoon. The bad behaviour of the model disqualified him for a second flight, as although three attempts were allowed the model never managed to get away. The last flight was again abortive and was only 6 secs. At the start of one attempt, the model, rising steadily but slowly, looked as if it would get away, but unfortunately it was launched too near the tarpaulin covered " pits " at the bottom of the flying field. It failed to clear these and smashed straight into the top, narrowly missing the somewhat shaken shelterers inside.



". . . only the one flight . . ."
A. Austwick of Bradford.

". . . the string with which the surfaces were liberally adorned . . ."
D. Worby of Cheam.



". . . rose like . . .

. . . a lift . . ."

". . . a little too fast for the framework . . ."

". . another unlucky competitor . . ."
G. H. Ginns of Coventry.

As usual, one model seemed possessed of Nazi instincts and proceeded to " Stuka " the crowd and, as last year, the AEROMODELLER photographer seemed to be the target. The model, H. B. Scarth's Comet III, swung round in a vicious right bank at an altitude of about 2 ft., and headed for the spectators. With an effort worthy of the Olympic Games, our photographer neatly hurdled the port wing, and both he and the model escaped without detriment. Scarth, a Bradford competitor, improved with a second flight of 35 secs.

The only other competitors who flew were A. Austwick and A. W. Cripps, both of Bradford. Both made only the one flight. G. H. Ginns, another unlucky competitor, was unable to fly his interesting 54 in. span model powered with a much modified Ohlsson 23.

A most notable feature of this year's contest was the phenomenal reliability of the Bradford Club's engines. Reliability was conspicuous by its absence as far as most other competitors were concerned. Well, you others **—Howzaboutit ? (!)**

RESULTS

Entrant	1st Flight (60 sec.)	2nd Flight (45 sec.)	3rd Flight (30 sec.)	Total Error
S. Lanfranchi (Bradford) ..	55	32	31	10
F. Chatwin (Birmingham) ..	79	48	9	43
N. Lees (Bradford)	58	—		71
R. Monks (Birmingham) ..	7	32·5	—	95·5
H. Scarth (Bradford)	0	25	—	104
A. W. Cripps (Bradford) ..	29	—	—	100
A. Austwick (Bradford) ..	22	—	—	113

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,

May I add a few notes to those previously given on the Aspect Ratio question, and also take the opportunity to demonstrate the lines on which the values of K were calculated.

Derivation of Formula.

$$C_D = \frac{N}{R_e^n} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where C_D = coefficient of drag
N = some constant dependent on the nature, value of α and size of aerofoil.
R_e = Reynolds Number.

Then if A = aspect ratio
υ = Kinematic viscosity of air
V = linear velocity of airstream.
S = Wing area

we have

$$\text{Total drag} \propto \left[\frac{N\,\upsilon^n\,A_2^n}{V^n\,S_2^n} + \frac{C_L^{\,2}}{\pi A} \right]$$

differentiating and equating to zero, we obtain the relationship

$$A^{\frac{1+n}{2}} = \frac{2V^nS_2^nC_L^{\,2}}{\pi^n N \upsilon^n} \quad \ldots\ldots\ldots\ldots (2)$$

Based upon Blasius' form of equation*, the index " n " was taken as 0·5 (since $R < 10^5$). And total equivalent coefficient of drag = ·072 for a machine having dimensions similar to those mentioned in the article, *i.e.* $S = 1{\cdot}39$; $V = 22$; $C_L = 0{\cdot}8$.

From (1) $N = .072\sqrt{69{,}000}$ where Re is the estimated value at which the aerofoil will work if the chord is about 6 in. then $N = 18{\cdot}9$.

Substituting in (2)

$$A^{1{\cdot}5} = \frac{2 \times 4{\cdot}69 \times 1{\cdot}088 \times {\cdot}64}{\pi \times 0{\cdot}5 \times 18{\cdot}9 \times {\cdot}0131} = 16{\cdot}8$$

$$A^{1{\cdot}5} = 29{\cdot}52 \qquad A = 9{\cdot}6$$

or A

This compares with A $1{\cdot}5 = 30$ by the previous formula, and was the method used to obtain the values of K previously given.

Now a few comments upon the points raised by Mr. Burns. The original article was not intended necessarily to support Mr. Maxwell's opinions, but to suggest a possible method of proving or disproving them. The constants given were intended to cover average cases, and also to permit of the use of an equation much more easily handled than (2) above. For highly specialised models the general form can be used and taken to any degree of accuracy desired.

Regarding the question of stability; the points mentioned by the writer were the result of experience gained in handling both his own and witnessing the flights of other low A.R. machines! The point of adding mass to the C.G. of a machine to reduce its radius of gyration surely is not intended to apply to a powered model. How many owners of a Wakefield machine would be prepared to add additional 22 per cent. dead weight to obtain satisfactory stability? The small glider illustrated by Mr. Burns happens to be of similar dimensions to a Wakefield machine, and I should like to put one or two questions concerning it.

(i) Were the original calculations made for a machine of 4½ ozs. or 5½ ozs. weight?

(ii) What would be the effect upon the stability of the model if a further 3½ ozs. weight were added in a form of aircscrew, undercarriage and rubber?

By Mr. Burns' reasoning (since the above load would be well distributed) it would not be very good. Perhaps we may have more information on the method of comparing models by the " stability factor."

(iii) Whence did Mr. Burns obtain his test data upon the " modified " RAF 32 he uses on the afore-mentioned machine?

My own interest in the A.R. question was aroused in the first instance by a desire to obtain aerofoil sections of much more accurate profile than seems common. In this direction I now have the use of a modern profile checking machine!

Until our models can be accurately built and rigged, it is misleading to quote comparative performance figures. This is probably one of the reasons why experienced " practical " modellers using wind sections of their own " design " can so often carry away the trophies!

Derby. D. W. COOPER.

**Blasius' form of equation mentioned by Mr. Cooper is for the skin frictional drag of a flat plate, and gives* $C_D = 2{\cdot}654\sqrt{\frac{1}{R}}$ *for a laminar boundary layer.*—ED.

DEAR SIR,

In the March issue of AEROMODELLER, you published a letter signed E. N. Bray which condemns wholly the contact breaker design by Mr. Edmunds in your October issue, 1944. I think he has gone too far, however, as by so doing he condemns all the other types which incorporate similar layouts, the Hallam 10 c.c. being one and Dr. Forster's another. As for Mr. Bray's criticism concerning the contact breaker points being oblique to each other in their approach, I do not think there are any which are not. All motor-cycle and car magnetos and distributors, etc., normally work on the same lines, perhaps Mr. Bray has one particular example in mind. I have made contact breakers based on magneto designs since I have experience of all makes, and therefore had all the data before me. I made them with the rocker arm trailed and shod with fibre, also as per M. L. tappet operated. Prior to Mr. Edmunds design, I was using one based on a motor-cycle magneto in which a shod heel trailed against rotation with springs which I could vary as desired. *Mr. Edmunds made it quite clear that his design was for the amateur*—easily made with existing materials to hand. I have made one on these lines altered to suit my engine as he suggested in his article. The rocker arm I silver-soldered together with a gunmetal bush in the centre, this I reamed out and press fitted a Chainette inner roller, pin to suit put through. The rocker has a " shod " heel, this being cut out of fibre from a magneto rocker arm. The spring is anchored here by a small screw, and is of the half reversed type, its other end being anchored above the adjustable contact-point, the screws used being 1/16 in. Whitworth. I have not fitted the screws to hold the insulating block; instead, holes were drilled right through to take dural rivets. I have only one criticism to make of Mr. Edmunds' design and that is the amount of material he mentioned as being approximately sufficient, *i.e.* two inches; in actual fact for a 10 c.c. Hallam 3 in. would be necessary.

Gatehouse of Fleet. R. G. CAMERON.

It is interesting to note that most well-known petroleers advocate the use of the type of contact breaker which Mr. Bray so vigorously condemned, having themselves used it successfully for years.—ED.

We regret that a Reader's name was omitted from his letter in the July issue. He was M. F. Boulesteix, R.A.F.—ED.

Photo by courtesy of "Flight"

THE COMPER "SWIFT"

BY
E · J · RIDING

THE Swift was the seventh of a series of successful light aeroplane designs originated by the late Nicholas Comper. Whilst serving with the R.A.F., Comper had built two small two-seater biplanes and a parasol monoplane for the Cranwell Light Aeroplane Club, and the Swift, or C.L.A.7 to give it its official designation was intended to meet the demands for a high performance single seater sporting aircraft.

The first Swift, registered G–AARX, first flew in the latter part of 1929. Fitted with a 35 h.p. A.B.C. "Scorpion" twin cylinder aircooled engine it was a familiar sight at most of the important air meetings during 1930.

A factory was acquired at the old wartime aerodrome at Hooton, near Birkenhead and the Swift put into production during the same year.

A variety of motors were tried out on the first few production machines and eventually it was decided to standardise the 70–80 h.p. Pobjoy seven cylinder aircooled radial. Between 1930 and 1933 a total of 37 Swifts were turned out at Hooton; three of these G–ABWH, G–ABWW and G–ACBY were fitted with the 120 h.p. four cylinder in-line D.H. "Gipsy III" motor in order to obtain a still higher performance.

In November, 1931, C. A. Butler flew a Pobjoy engined Swift, G–ABRE, from England to Australia in the then record time of 9 days, 2 hours and 29 min.

For this remarkable flight the machine was fitted with two petrol tanks of 14½ and 27½ gallons capacity, two oil tanks and a supply of drinking water, bringing the total loaded weight up to 1,160 lbs., or nearly double its weight when empty. In spite of the extra load the machine got off in 120 yards and was able to maintain a climb of 720 ft./min.

In the sporting world the Swift achieved a distinction shared by no other type of aircraft in that it was entered for every King's Cup air race from 1931 until 1939 with the exception of the 1938 race. In the 1932 contest, G–ABWW piloted by E. H. Fielden gained second place at an average speed of 155 m.p.h. and in 1933 G–ABUU, a Pobjoy engined version again took second place at 126·89 m.p.h. Even as late as 1938 the Swift was able to challenge modern designs, the annual race to the Isle of Man being won by S. T. Lowe on G–ABWW at an average speed of 159 m.p.h.

The Swift was an all wooden machine with steel fittings at points of stress and fabric covering. The undercarriage shock absorbers were housed inside the fuselage and the folding wings enabled the machine to be stored in a normal sized lock-up garage. The price when new was £550 ready to fly away.

There are still eight Swifts on the civil register so it is quite likely that the type will take its part in post-war sporting flying.

SPECIFICATION.

A.B.C. "Scorpion II."

Span, 24 ft. 0 in.; length, 18 ft. 4 in.; wing area, 90 sq. ft.; weight (empty), 470 lbs.; speed (max.), 105 m.p.h.; speed (landing), 35 m.p.h.; ceiling, 14,000 ft.

Pobjoy 'R.'

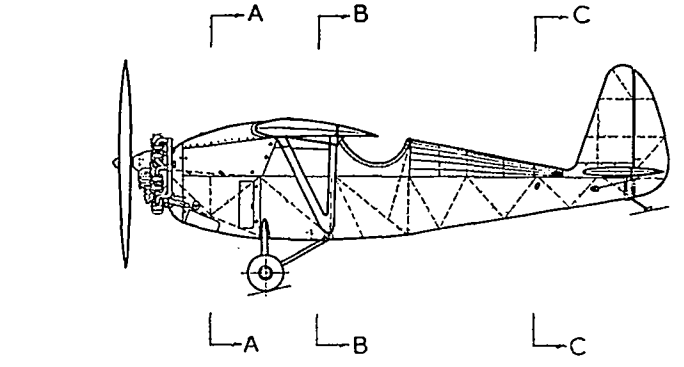
Span, 24 ft. 0 in.; length, 18 ft. 4 in.; wing area, 90 sq. ft.; weight (empty), 540 lbs.; speed (max.), 140 m.p.h.; speed (landing), 40 m.p.h.; ceiling, 22,000 ft.

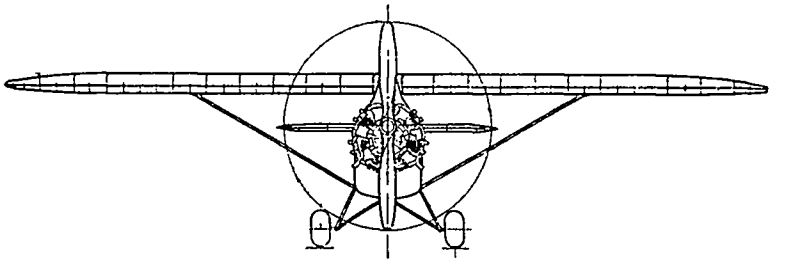
D.H. "Gipsy III."

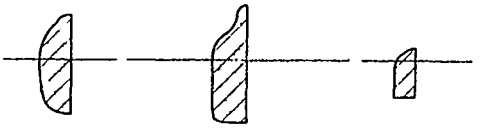
Span, 24 ft. 0 in.; length, 17 ft. 6 in.; wing area, 90 sq. ft.; weight (empty), 610 lbs.; speed (max.), 165 m.p.h.; speed (landing), 50 m.p.h.; ceiling, 20,000 ft.

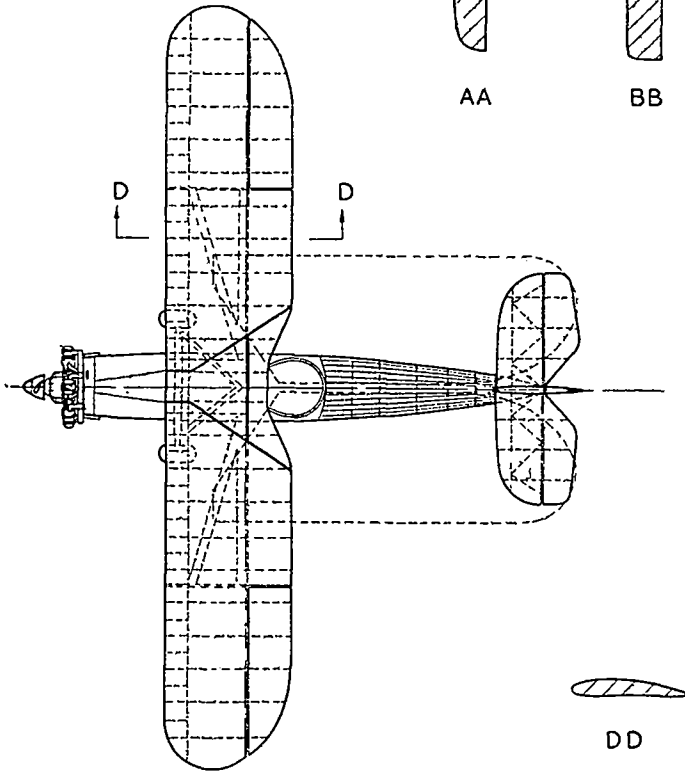
Photo by courtesy of "Flight"

Photo E. J. Riding







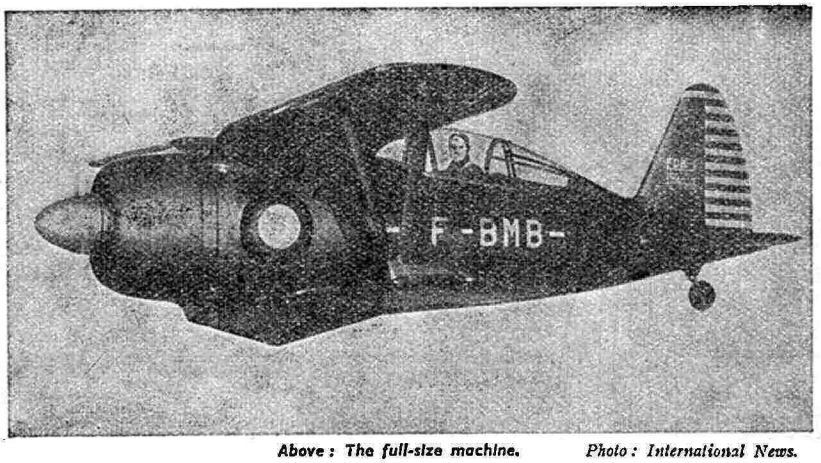


COMPER SWIFT

FT.

A FLYING SCALE MODEL OF THE CANADIAN CAR & FOUNDRY CO. GREGOR F.D.B-1

BY J · A · F · HALLS



Above : The full-size machine. *Photo : International News.*

THE last of the biplanes, the Gregor, was the first all-Canadian fighter and was a very creditable effort. It was powered with a Pratt and Whitney Wasp junior, which gave it a speed of almost 300 m.p.h. The Wasp junior develops about 750 h.p. at rated altitude, and if we compare this with biplanes of similar horse-power we see that the C.C.F. engineers have produced a very worthy first effort.

The span of 28 ft. gave a moderate wing loading, and the landing speed was by no means excessive (flaps were, of course, fitted). The armament was two 0·5 cal. machine guns considered sufficient in 1938, when the Gregor first appeared. No detailed performance figures were given out, so the description must necessarily be short. The C.C.F. is now (as far as is known) building Hurricanes.

The Fuselage.

Cut formers from $\frac{1}{16}$ in. sheet balsa, keels from $\frac{1}{16}$ in. sheet substitute. Pin keels to plan, add *left* formers, leave to set, and check that they are at right angles to keel. Add $\frac{1}{16}$ in. square stringers; while setting make cowl; 1, 2 and 3 are $\frac{1}{8}$ in. soft sheet rings (1 and 2 are rings, 3 is a disc with a square hole about its centre), size determined by block on dummy crankcase. Cement 1, 2 and 3 together; now build up crankcase from two $\frac{1}{8}$ in. sheet discs and a block, which must be a tight fit in the square hole in 3. Add cowling spacers and 4, cover with $\frac{1}{16}$ in. sheet. Remove half fuselage from plan and complete other half. Add soft balsa blocks at tail end as shown. MS is a master stringer and should be hardwood, as it takes the soft wire hoops, which are the cabin formers.

Tail-Unit.

Insert cowling plugs into paper tubes cemented to keel—put in rod and tubes before covering cowling and fuselage with $\frac{1}{16}$ in. sheet. Build direct on plan as shown

Wings.

As for tail-unit. N.B.—Extend L.E. of lower wing $\frac{3}{8}$ in. inwards. The top wing is gulled from D. The spar T.E. and L.E. are cracked and cemented to that when viewed frontally; the bottom of C is $\frac{3}{8}$ in. below the bottom of D.

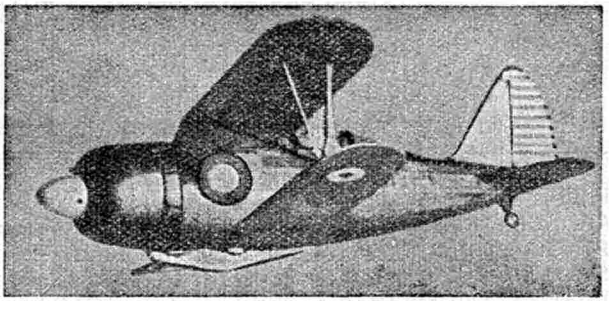
Assembly.

Sandpaper all parts, cement tail-unit to fuselage, tailplane no incidence, check angles constantly until set. Cement on cowling. Add lower wing, fix the extended portion of the L.E. to the keel and 6; there should be $\frac{1}{4}$ in. dihedral at each wing tip. At this stage all parts are covered with red tissue, tautened with a water spray and then clear doped. Add upper wing and struts, the latter are doped red: dihedral same as for lower wing. Insert upper wing 2 to 3° incidence, lower wing none. Complete the cabin and add the tailwheel. The $\frac{1}{4}$ in. sheet "oil cooler" is now added and doped red. For strut and undercart detail examine photos. Spinner is silver and either made from $\frac{1}{8}$ in. sheet rings or turned from hardwood on a lathe; propeller blades are black. There are alternate red and yellow stripes on the rudder; on the fuselage are the letters C–F–BMB in yellow. The wheels are flush surfaced, made from two discs of $\frac{1}{8}$ in. sheet: incorporate internal hubs. (The cabin may be made sliding and the undercart retractable, as on the original.) The propeller blades are a tight sliding fit in the spinner so as to be v.p. The winding hook extends in front of the spinner, the rear of which is slightly hollowed to take three cup washers. As this is a small model make sure that the propeller is well balanced before attempting flying. Propeller shaft 18 s.w.g. piano wire.

Flying.

Fly R.T.P. or in calm weather. If obtainable use 4-6-8 strands of $\frac{3}{8}$ in. flat rubber to suit conditions. In free flight the model has made $\frac{1}{4}$ minute flights consistently and should be capable of more R.T.P.

Below : The model



GREGOR FDB-1

DESIGNED BY

J. A. F. HALLS

1/8" SHEET

3

2

1

INSPECTION HATCH, HINGED TO FUSELAGE WITH SILK. THE HATCH IS CUT OUT AFTER COVERING WITH 1/32" SHT.

1/4"

3/8"

1/4"

ALUMINIUM TUBING

DUMMY COMPRESSION LEG

WIRE LEG

RUBBER STRIP UNSTRETCHED LENGTH 1/2"

THE DUMMY COMPRESSION LEG IS USED ONLY FOR SHOW PURPOSES. THE WIRE LEGS ARE PULLED DOWN BY RUBBER STRIP (WHICH IS STILL UNDER TENSION IN DOWN POSITION). THE CARD-BOARD COVER PLATES COMING AGAINST THE "OIL COOLER" ENSURE THE U.C. TAKES UP THE CORRECT DOWN POSITION.

CARDBOARD COVER PLATES

TRACK 2 1/8"

FRONT VIEW. NOT TO SCALE

C

B

A

SEE UNDERCART DETAILS. PART 3 FOR EXPLANTION

PROP SHAFT

WASHERS A&C ARE SOLDERED TO PROP SHAFT, B TO CROSS BAR

PROP BLADE MAKE THREE FROM 2 PIECES OF 1/8" SHT.

SECOND PIECE SHOWN DOTTED

FRONT PART OF FUSELAGE FILLED IN WITH 1/16" SHT. (SCRAP)

ABOVE LINE Z–Z COVER WITH 1/32" SHEET, THEN CUT OUT U.C. RETRACT-ION HOLES LE.-WHEEL WELL ETC.

COWLING SPACERS ARE FROM 1/16" × 1/8" CONCENTRIC

CABIN FORMERS FROM SOFT WIRE

11

12

L.E. FROM 1/16" × 1/8" TAPERED TO 1/16" SQ.

FRAMEWORK 1/16" SQ.

13

1/16" SHEET

COWLING IS COVER-ED WITH SOFT 1/16" SHEET

7A

11

12

13

COCKPIT COVER MOULDED IN ONE PIECE, IF SLIDING CUT INTO SECTIONS LATER.

TAILPLANE FRAMEWORK FROM 1/16" SQ. EXCEPT WHERE MENTIONED

1/16" × 1/8"

THIS LEG IS DUMMY

1/16" SQ SUBSTITUTE

MASTER STRINGER

SPINNER BUILT UP OF 1/8" SHT.

1/16" SHEET

SOFT BALSA BLOCKS

COWLING PLUGS ONTO FUSELAGE

BAMBOO RODS X IN COWLING PLUG INTO TUBES Y.

X

Y

1

2

3

4

5

6

7

8

9

10

KEEL FROM 1/16" SHEET SUBSTITUTE 1/16" ROUND CANE

T.E. 1/16" × 1/8"

1/16" SHEET

WING RIBS ACTUAL SIZE

C1&C2 FROM 1/8" SHEET

ALUMINIUM TUBING

CUP WASHER

C1

C2

DUMMY CRANKCASE

OIL COOLER 1/4" SHT

ARMS

INSPECTION HATCH

WINDING HOOK

TENSION OF MOTOR

SPRING

CROSS BAR

WIRE SPRING ON UNDERCART

RIB A IS CEMENT-ED TO FORMERS 6 & 7. THE L.E. EXTENSION IS CEMENTED TO FRONT OF FORMER 6 & TO KEEL. T.E. EXTENSION IS CEMENT-ED TO KEEL.

A

L.E. 3/32" SQ.

SPAR 1/16" × 1/8" TAPER TO 1/16" SQ.

T.E. 1/16" × 1/8"

1/16" ROUND CANE

1/16" SHEET GUSSETS

D

C

STRINGERS FROM 1/16" SQ.

ALL FORMERS FROM 1/16" SHEET

7A

10

9

8

7

4,5 & 6

FORMERS 4 & 5 ARE IDENTICAL EXCEPT FOR STRING-ER SLOTS IN 5.

6 IS A LITTLE BIGGER THAN 5 AND A LITTLE SMALLER THAN 7

STRUT FROM 1/16" HARD SHEET

ALL WING RIBS FROM 1/16" SHEET

L.E. 3/32" SQ.

COMPOUND ELLIPTICAL FORMERS

BY M · LANGHAM

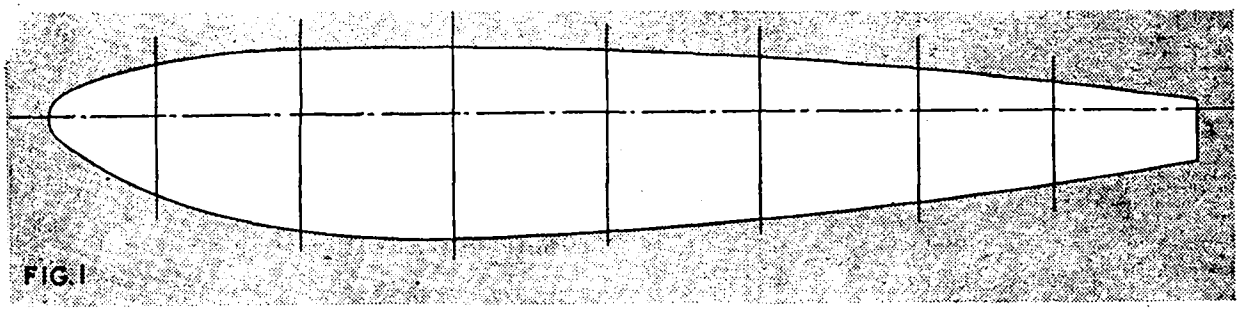


FIG. 1

NO doubt many modellers have experienced the snags which arise in the drawing of formers for a fuselage of elliptical section, or one in which the section changes from circular at the front to oval amidships, and to a very narrow vertical section at the tail or sternpost. The difficulty lies in drawing each former so that the change of shape from one former to the next will blend and form that smooth flow of lines so essential to a perfectly streamlined shape.

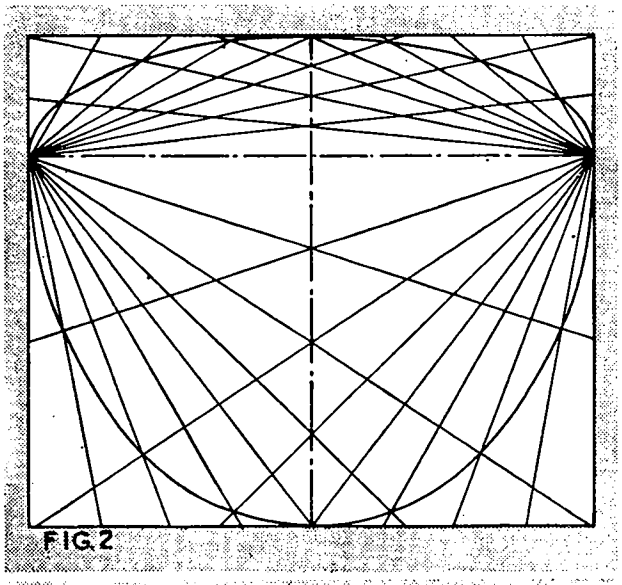


FIG. 2

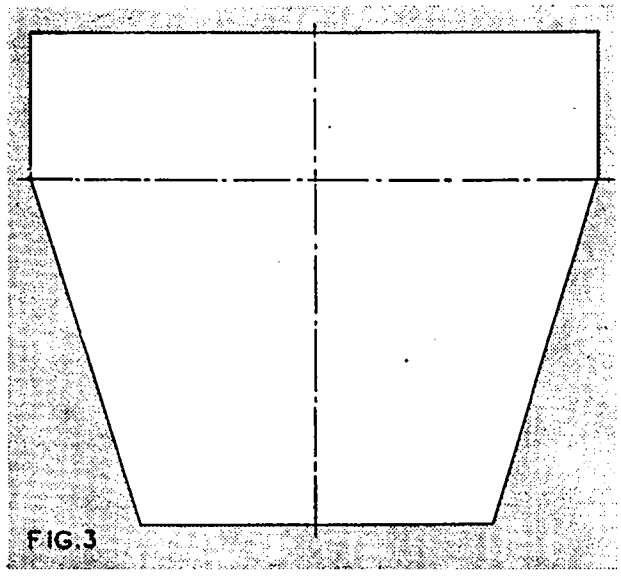


FIG. 3

Many methods have been suggested which make it easy to draw an oval or elliptical section within a given width and depth, but when the width/depth ratio or the general shape of the former is required to change, then the 'ills and 'ollows begin to form on those smooth lines the modeller is trying to achieve.

Here is a method of drawing those formers to achieve the desired results, which is not nearly so tedious as any " rule of thumb " method.

On a side elevation drawing of the fuselage, mark in the position of each former by means of a vertical line, and then throughout the length of the fuselage draw a datum line to cross each former at the point of its maximum width. (Fig. 1.) This line may or may not be horizontal, but in the most orthodox streamline shape it will be straight.

From the plan and side elevation, measure off the maximum width and depth of the fuselage at the position of each former, and from these measurements draw each as a rectangle. Bisect the rectangle vertically, and draw a line horizontally across it in the position marked on its depth by the datum line. In the upper part of the rectangle, mark off the vertical centre line into a number of equal divisions, four to eight, and divide each half of the top line into the same number of divisions. (The greater the number of divisions, the more accurate will be the finished drawing, but too many will only tend to cause confusion.) Draw in the cross lines to the division marks as indicated in Fig. 2, and put in a dot where the lines intersect as shown. For the lower part of the rectangle, invert the drawing and repeat the above procedure. A line drawn joining the dots will produce the shape of the former.

To draw a former which is more egg-shaped, or more pointed at the lower extremity, it is only necessary to " squeeze in " the bottom part of the rectangle as shown in Fig. 3.

The little time that is spent in the careful drawing of each former will be found well worth while when it comes to applying the stringers or planking, and we have at last avoided those 'ills and 'ollows.

In some cases, in order to conform to certain specifications, it may be necessary to calculate the cross-sectional area of the fuselage at a particular former. This can be done by applying the following formula :—

$$\frac{\pi ab}{2} = \text{area}$$

where a = *half* the width of the former, and b = *full* depth of the former.

"KING HARRY"

DESIGNED BY
K. EDGERTON.

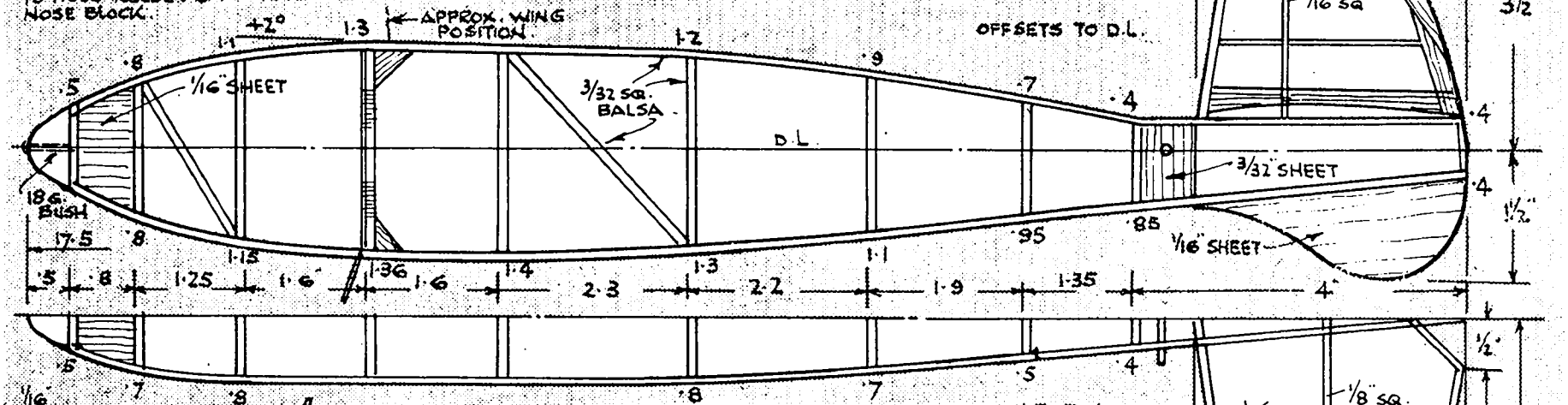
- SCALE - ½ FULL SIZE -

PROP. 10" DIA. CARVE FROM HARD BALSA 10" x 1¼" x 1"
18 S.W.G. SHAFT WITH FREEWHEEL

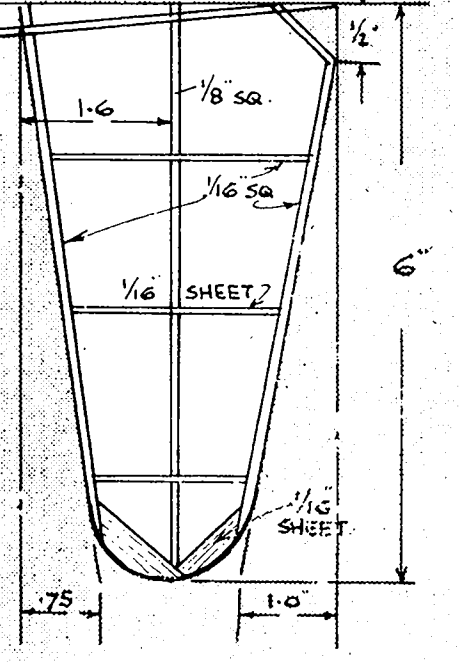
POWER: 4 STRANDS 3/16" x 1/20" - 20" LONG OR 6 STRANDS FOR FASTER CLIMB.

WEIGHT: 1·75 OZS. AVERAGE DURATION 70 SECS.

CEMENT 1/16" DIA. BAMBOO THRO' FUSELAGE TO HOLD RUBBER BAND SECURING NOSE BLOCK.



OFFSETS TO D.L.



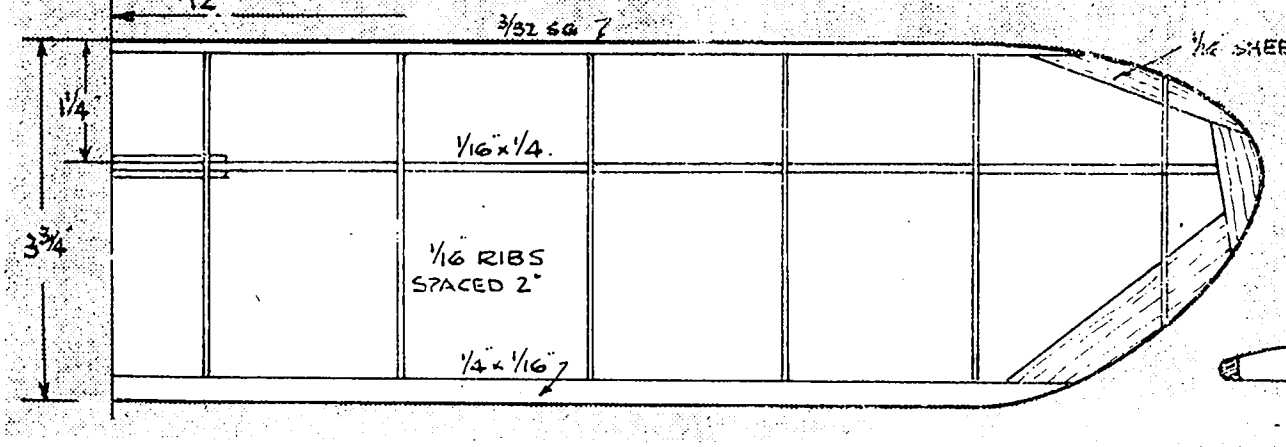
1/16" SIDETHRUST

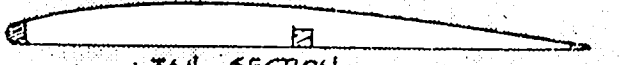
18 S.W.G. SINGLE LEG UNDERCART BENT ROUND FUSELAGE & BOUND.

1" DIA. WHEEL.

WING SECTION - FULL SIZE -

CEMENT FIN TO TAIL & ADJUST FOR TRIM BY MOVING WHOLE UNIT.





TAIL SECTION

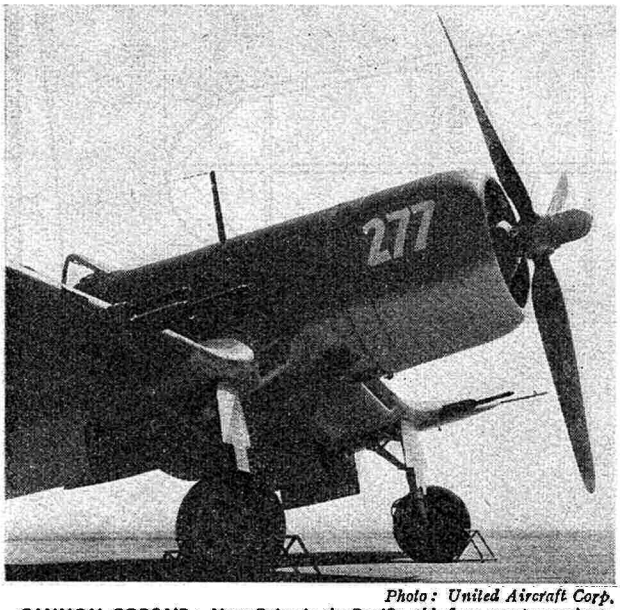


Photo: United Aircraft Corp.

CANNON-CORSAIR: *Now flying in the Pacific, this four-cannon variant of the Corsair is designated F4U-1D.*

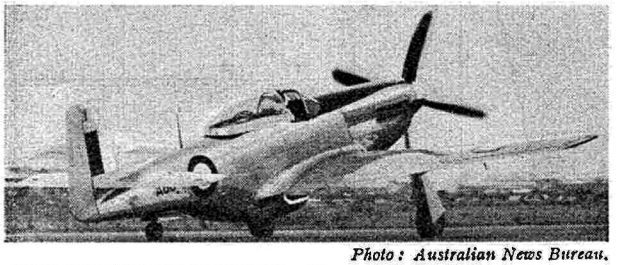


Photo: Australian News Bureau.

COMMONWEALTH MUSTANG: *The first Australian-built Mustang, numbers of which are now serving with the R.A.A.F. in the Pacific.*

Photo: Flight.

HALIFAX ANCESTOR: *A Handley Page Heyford, standard R.A.F. night bomber in the nineteen-thirties. See R.A.F. Flashbacks on opposite page.*

MONTHLY

BY O · G ·

A Cannon-armed Corsair.

The Chance Vought F4U Corsair fighter and fighter-bomber has won great renown with the United States Marine Corps in the Pacific theatre, where it is also operating from aircraft-carriers of the Royal Navy.

News is now released of an improved model which is armed with four fixed 20 mm. cannon in the wings in place of the conventional six ·50 calibre machine-guns.

Tadpole Transport.

Miles Aircraft, Ltd.'s latest production for the post-war civil market is the M.57 Aerovan, intended as a light freighter, ambulance, or ten-seat feeder-line aircraft. The peculiar " tadpole " fuselage layout enables a normal saloon car to be driven directly into the freight compartment through a 5-ft. square loading entrance at the rear. The flaps (similar to those of the Messenger) enable the Aerovan to operate from the smallest landing grounds. The Aerovan, of wooden construction, has a span of 50 ft., a length of 36 ft., and is fitted with two 140 h.p. Gipsy Major motors. Cruising speed is 110 m.p.h., range 450 miles, payload 2,245 lb., cubic capacity 530 cubic feet, and loaded weight 5,900 lb.

The prototype, all-silver, and numbered U-0248, was fitted with two 150 h.p. Cirrus Major motors.

The Lancaster " Aries."

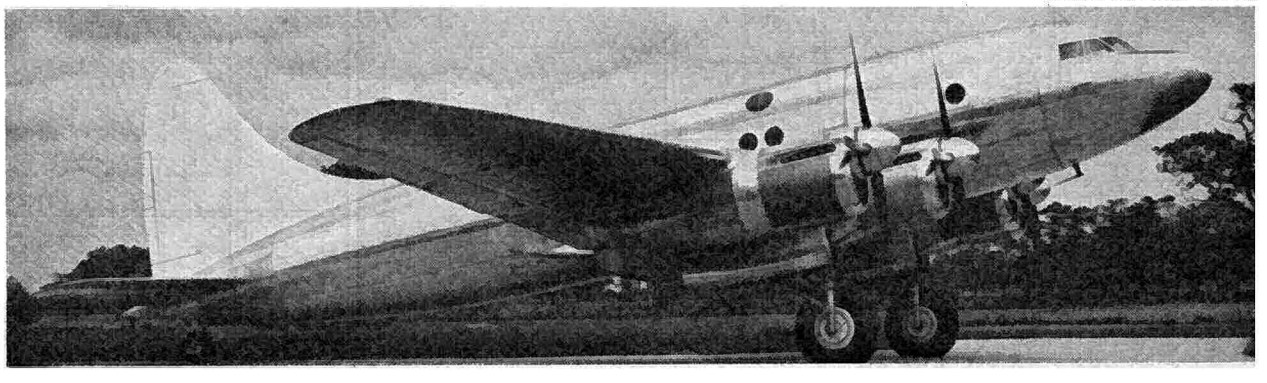
The converted Lancaster bomber " Aries," which carried out research flights over the North Pole from the Empire Air Navigation School, Shawbury, bears the R.A.F. serial number PD 328. " Aries " is the natural metal finish all over and has red, white and blue roundels on the wings and similar roundels with encircling yellow ring on the fuselage.

Avro's Tudor.

Innocent of markings and glistening silver all over, the prototype Tudor I civil transport was test-flown at Ringway Airport in June last. Two production aircraft are being prepared for B.O.A.C.'s route to Montreal. Fitted with four Rolls-Royce Merlins, the Tudor I has a span of 120 ft., a length of 80 ft., a 10 ft. diameter circular pressurised fuselage and accommodation for up to 24 passengers. Maximum speed is 346 m.p.h. at 25,000 ft. and the cruising range at 295 m.p.h is 3,700 miles. The loaded weight is over 34 tons. Under the Brabazon Scheme the Tudor I is known as the Avro XX.

TRANSATLANTIC TUDOR: *The Avro 688 Tudor I, fitted with four Rolls-Royce Merlin 100 motors.*

Photo: A. V. Roe and Co.



MEMORANDA

THETFORD

Britain's Largest Flying-boat.

Originally built as a general reconnaissance aircraft to replace the Sunderland, the Short S.35 Shetland is now undergoing civil conversion. Fitted with four of the new Bristol Centaurus radials of over 2,500 h.p., the Shetland has a span of 150 ft., a length of 110 ft., and a loaded weight of 130,000 lb. The civil version will seat up to 70 passengers. The top speed is 267 m.p.h. at 4,000 ft. Cruising at 184 m.p.h. with a payload of 7,640 lb. the range is 4,650 miles. With a payload of 30,000 lb. the range is reduced to 2,076 miles.

Australian Mustangs.

Built by Commonwealth Aircraft of Melbourne, the first Australian Mustang flew in the Spring of this year. This Mustang was all-silver except for a black anti-dazzle panel on the motor cowling, and carried blue and white roundels on the wings and fuselage, and blue and white stripes on the fin. Australian type number on rear fuselage was "A-68", in black.

A "Clipped" Thunderbolt.

The latest clipped wing P-47N has redesigned wings of 42 ft. 6 ins. span accommodating extra fuel tanks increasing the range to 2,000 miles. Other modifications include the dorsal fin fillet, also a feature of late sub-series P-47D fighters, P-47D-25 etc. Armament of P-47N includes eight ·50 fixed guns, ten rocket-projectiles, and two 1,000 lb bombs. The Thunderbolt on this page, photographed at an A.S.C. Base in this country, bore the Army designation P-47N-5-RE.

R.A.F. Flashbacks—9.

The Handley Page Heyford III. (two Rolls-Royce Kestrel VI motors) was the last biplane heavy night bomber to serve with the R.A.F. before the onset of the monoplane generation. Heyfords joined the R.A.F. in 1933, replacing Vickers Virginia X night bombers of No. 99 (B) Squadron, and until 1937 it also equipped Nos. 9, 10, 58 and 102 (B) Squadrons.

Heyfords were painted dark green all over and had red and blue roundels on the wings and fuselage. The serial number was painted in black beneath the lower wings and on the rear fuselage. A batch of Heyfords was numbered between K3489 and K3503.

Photo: Miles Aircraft Ltd.

AN AIR CARAVAN: The Miles Aerovan prototype, U-0248.

A. T. P. Photo.

P-47N: Latest Thunderbolt with redesigned wings, increased range and dorsal fin fillet. Destined for Pacific Zone.

A. T. P. Photo.

P-38L: Latest Lightning carries 4,000 lb. bomb-load, has range of 3,000 miles and top speed better than 425 mph.

A. T. P. Photo.

SHETLAND PROTOTYPE: The original military Shetland with the turrets faired over.

TRANSPOLAR "LANC.": The famous Lancaster "Arles" showing the Lancastrian-type nose and tail fairings and the scanner beneath the rear fuselage. *Photo: Graphic Photo Union.*

AEROPLANES DESCRIBED XXX

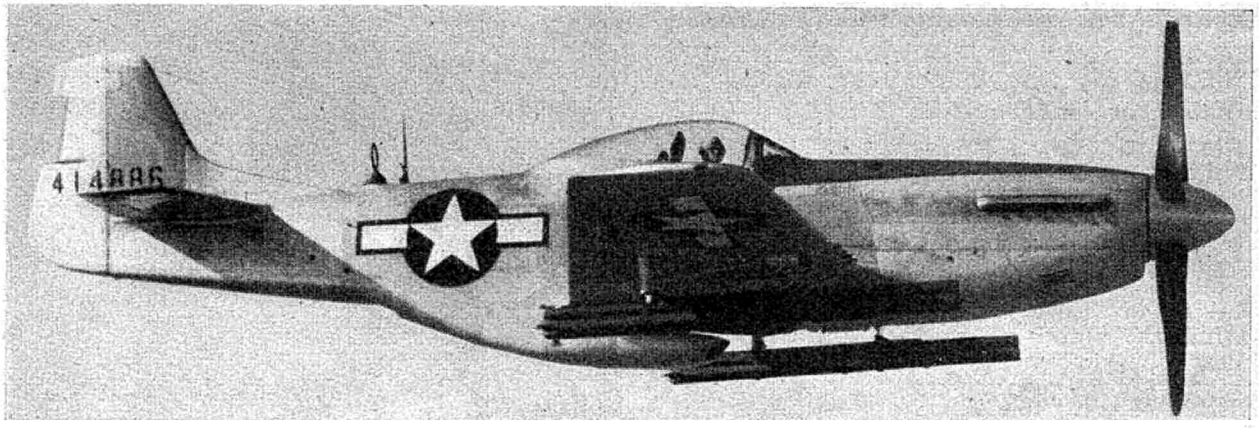


Photo by courtesy of North American Aviation Inc.

The North American P-51D-5 MUSTANG IV

FOLLOWING the dramatic raid on Brunswick by Fortresses and Liberators on January 11th, 1944, when the long-range P-51B went into action for the first time as an escort fighter, the Mustang was progressively improved and the closing weeks of the War in Europe saw it established as the foremost American fighter and one of the most outstanding aircraft of its day. The long-range Mustang was responsible for the final defeat of the *Luftwaffe's* attempts to prevent American daylight bombing. During the summer of 1944 all P-47 Thunderbolts based in Great Britain for escort duties were superseded by the Mustang, and the P-47s were sent to France as close-support fighters.

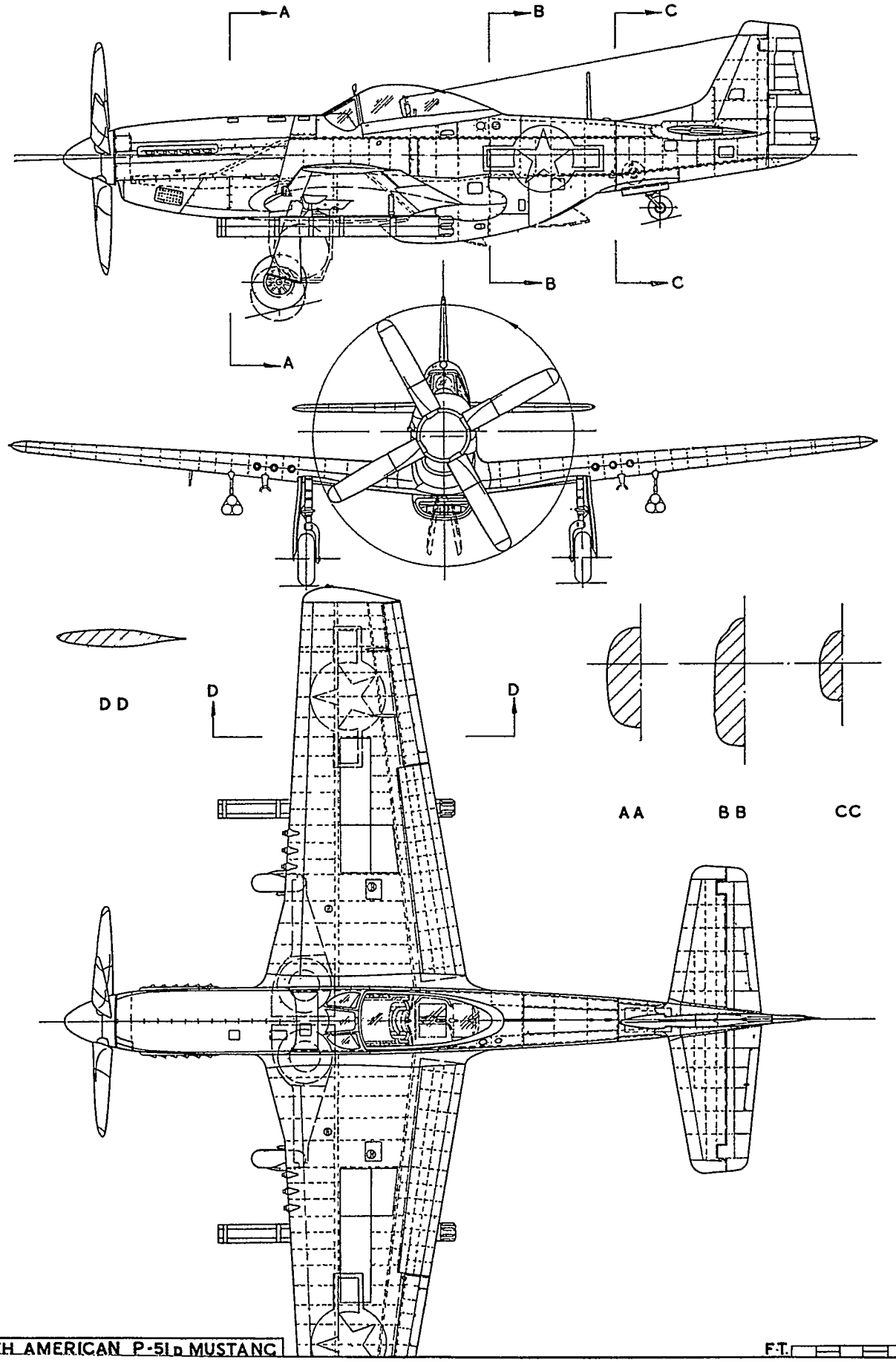
Two views of Mustangs of a British-based Fighter Group, taken shortly before VE-day. Heading the page is a P-51D fitted with rocket-tubes.

The P-51B, built at Inglewood, and the P-51C, built at Dallas and supplied to the R.A.F. as the Mustang III, differed from the earlier Mustang in having a Merlin motor in place of the Allison, a four-blade airscrew, and provision for two auxiliary drop-tanks each carrying 75 gallons, giving a total fuel capacity of 290 gallons. Special extra long-range versions could carry two drop-tanks of over 125 gallons capacity each. These modifications raised the speed from 370 m.p.h. to 425 m.p.h., the ceiling from 30,000 ft. to over 40,000 ft., and resulted in a tactical radius of operations of over 1,000 miles.

The P-51D, introduced into all U.S. Fighter Groups in England during the summer of 1944, provided better visibility for the pilot by the installation of a " bubble " cockpit hood and speed was increased still more by narrowing the rear fuselage structure which reduced drag. Later sub-series of the P-51D, designated P,51D-3-NA and subsequent, were fitted with a modified empennage having a fillet increasing the fin area and compensating for loss in directional stability caused by the rear fuselage change. Minor alterations in the P-51D and P-51E included the fitting of air intake filters either side of the nose duct, three ·50 guns in each wing in place of two, and a rigid radio mast in place of the whip aerial. In service with the R.A.F., the P-51D is the Mustang IV. Photographic versions with the U.S.A.A.F. are designated F-6 and some P-51K versions have a 35 mm. camera mounted in the fin for taking combat pictures.

By virtue of its long range, the P-51D has already been in action in the Pacific for over a year. Mustangs in this theatre are armed with rocket-projectile " bazookas " and some carry one 500 lb. depth-charge beneath each wing. The first Australian-built Mustang emerged from the Commonwealth Aircraft Corporation's factory in April, 1945, and many are now serving with the R.A.A.F. Fifty P-51Ds have also been supplied to the Swedish Air Force.

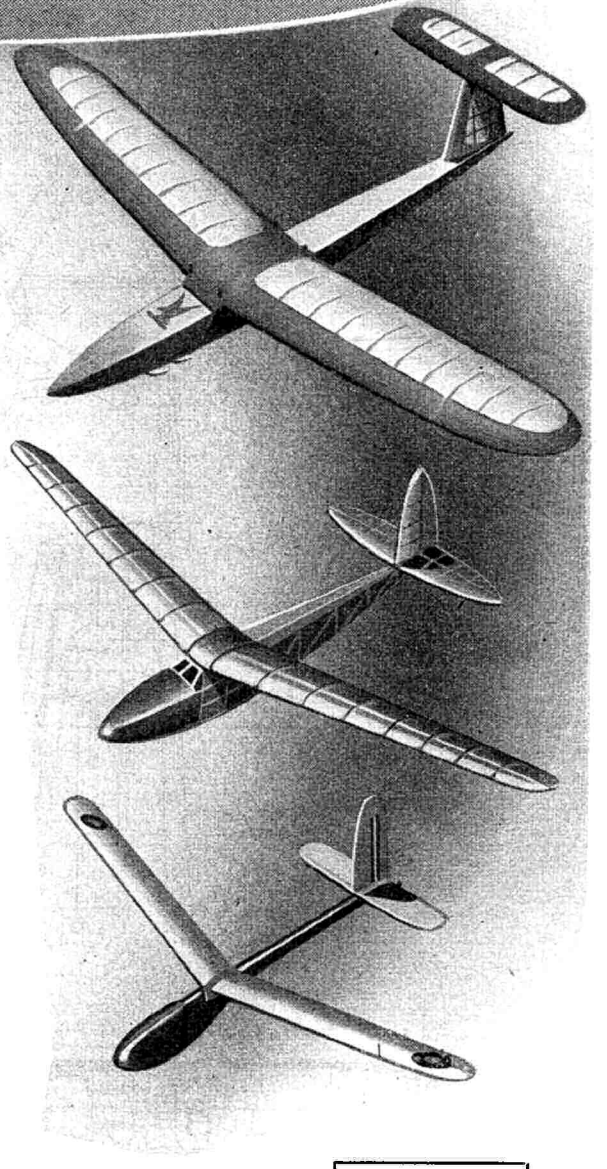
SPECIFICATION : (P-51D-5-NA) : One 1,520 h.p. Packard Merlin 228 (V-1650-7) motor. Span : 37 ft. 5/16 in. Length : 33 ft. 4 in. Wing area : 233·2 sq. ft. Loaded weight : 10,000 lb. Wing loading : 42·9 lb./sq. ft. Max. speed : 450 m.p.h. Range : 2,000 miles. Service ceiling : 40,000 ft. Armament : Six ·50 calibre machine-guns and two 500 lb. bombs or depth-charges.



NORTH AMERICAN P-51D MUSTANG

F.T.

Efficiently Designed FOR ALL COMPETITION & AMATEUR ENTHUSIASTS



"CLUB" CONTEST GLIDER

The last word in tow-line glider design, having negative incidence wing tips. Span 48 ins. Weight 8 ozs. Triangular plywood fuselage, high tail, mounted on fin. Comprehensive kit. Easy to construct. Full detailed plan.

15/6

"CLUB" PLANER GLIDER

A very efficient little tow-line glider of streamlined, symmetrical design. Easy to contruct. Stringer fuselage. Comprehensive kit. Full detailed plan.

5/-

"CLUB" ELF GLIDER

A small, all wood, hand or catapult launched glider with cambered wings and negative wing tip incidence. The most remarkable performer of its size on the market. Easy to construct with full detailed plan.

3/-

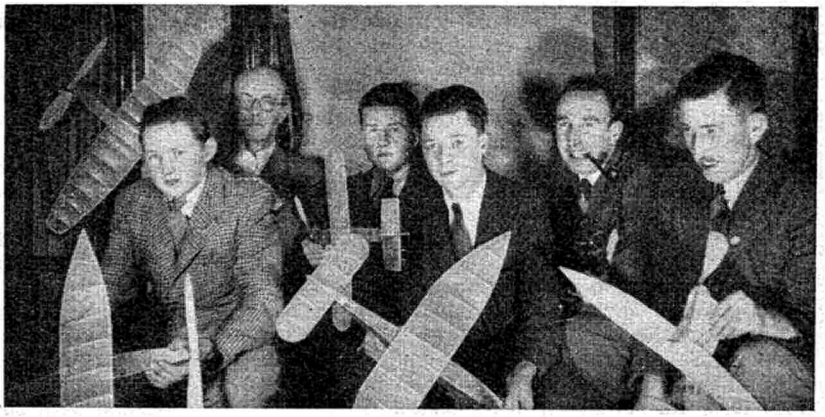
Watch for announcements of our new catalogue and guide.

Model Aerodrome

141. STRATFORD RD. BIRMINGHAM, 11.

Club News

BY CLUBMAN



A group of members of the Ulster M.A.C. complete with their indoor models.

I START this month with a grouse! No—not the weather, though goodness knows this has been enough to make one give up modelling and join the local knitting jamboree.

My grouse is with the S.M.A.E., and I think fully justified in view of the circumstances. As you are fully aware, much agitation took place for the lifting of the ban on petrol model flying, and when, after much negotiation, we were once again allowed to fly our models, petrol fans presumably thought that their needs in the competition world would be catered for in an organised manner.

Has this taken place? With the Sir John Shelley Cup contest as an example, I say definitely not. This meeting (fully reported elsewhere in this issue), one of the few centralised events in the official calendar, was notable for a complete lack of official organisation, and must have given the visitors a very poor opinion of an official National contest. Chaps took the trouble to travel from such widely separated places as Bristol, London, Coventry, Leicester and Bradford, to find what? Study the following and consider whether this is a satisfactory state of affairs :—

(*a*) The Birmingham M.A.C., who had obtained permission for the use of the flying ground some weeks in advance, had received an official communication *the day before* thanking them for their efforts, and stating that one official would be attending to conduct the contest.

(*b*) By noon, with competitors kicking their heels and wanting to get cracking, no start had been made. The only official available was a competitor, and therefore not in a position to conduct the meeting.

(*c*) No rules or entry forms were available until after the meeting had been concluded.

Had the weather been anything like reasonable, folks could have cheerfully stood about nattering, test flying, etc., but with pouring rain and a gale blowing, you can imagine the feelings of some who were there, and agree that grouses were justified.

The Birmingham chaps did a good job in looking after things as best they could, and my bouquet goes to "Chuck" Doughty for erecting a fine shelter from a tarpaulin and stakes, and his wife for turning out innumerable cups of tea that were a godsend.

By noon, the Editor—who was on leave and attending as an interested spectator—suggested that he, in company with Mr. Hassall, the Birmingham Club secretary, organise the entry and get the flying started, and things got under way. With the expected official arriving about 3 p.m., the contest was concluded after many breaks for the appalling weather to abate, and it says much for the enthusiasm of the competitors that the event was so successfully flown.

The thing I want to stress is the apparent lack of interest on the part of the organising body, and to point out to them the need for an improvement in future events. Such conduct does much to undermine confidence, and one would have thought that in view of recent criticisms such obvious loopholes for grousing would never have occurred. Remember, this was a *National* competition, with an unpredictable entry, and required organised attention. Surely, after the war period of comparative inactivity as far as competition matters is concerned, one would have expected organisation at least equal to, or even better than, 1939. Has decentralisation, with the clubs themselves "carrying the can," atrophied the S.M.A.E.'s ability to conduct centralised contests?

I shall be pleased to publish any official reply that may be forthcoming, but feel fully justified in pointing out this unfortunate state of affairs, and requesting the Society to pull its socks up.

A number of other competitions have been concluded this past few weeks, and it appears that, with one or two exceptions, the London area clubs are carrying all before them this year. Now then, the provincials, get a move on! You've done it before, and it can be done again. There's still plenty of time to get cracking, so see if you can get the Plugge Cup away from the London boys for a change.

The LEICESTER M.A.C. began its outdoor season with an inter-club match with the Aylestone lads, though with a 40 m.p.h. wind blowing, the chaps were glad to avail themselves of whatever shelter a haystack could offer! This ground is not called Bleak Hill for nothing!! Dunmore's new semi-scale lightweight glider of 7 ft. span carries a gas job flight-timer which operates a parachute dethermaliser. Optimist?

The OSWIN AVENUE M.A.C. (Balby) have good facilities in their club—workroom 88 ft. by 25 ft. fitted up with ten work benches, two large halls, and a quadrangle, which the lads are fitting up with four lights in order to cater for night flying, and, last but not least, a club canteen. Not many so well off as these lads, I'll bet. A recent glider competition resulted in a win for B. Barton, who flew his "King Falcon" for a best flight of 3 : 21. R. Taylor came a good second with an "Ivory Gull," which flew for 3 : 11, B. Beardsley placing third with a flight of 1 : 25.

The MERSEYSIDE M.A.S. have been dogged with

poor weather for the National contests, the best time put up in the National Cup being only 1 : 36 by Mr. Jackson's new model "Gremlin's Nest." R. F. L. Gosling once again set up the best time in the Pilcher Cup with a time of 1 : 50, flying his famous sailplane "Judy," holder of the club long-distance record of 13 miles.

P. Hipkiss of the WALLASEY M.A.C. has been putting up some very consistent flights with his model "Firefly." From a 600 ft. towline, three consecutive flights were 5 : 15, 4 : 46 and 5 : 10.

A series of non-mathematical lectures on Simple Aerodynamics as applied to model aircraft has been arranged by the BLACKHEATH M.A.C., to be given by Mr. C. H. Saunders. R. H. Warring has set up some new kind of record by losing five out of six models taken out for tests. Rather an expensive record ! !

J. Murcock of the DALMALLINGTON YOUTH S.A. hit a riser with his Chasteneuf glider recently, and clocked over 20 minutes. As usual, only one watch was available, though later in the day he did manage to raise the club record to 2 : 29.

The COVENTRY M.A.C. had a good start to the outdoor season when B. Whitehouse put up a time of 15 : 01 with his "Igo," the machine being recovered from 10 miles away. L. Watts flew his "Omega" for 7 : 17·2, while R. Draper, flying a converted Wakefield, had times of 5 : 15, 5 : 00 and 3 : 30. S. Sunderland had 5 : 00 with his "Beauglider," while G. Rae set up 3 : 48 with his own design glider. Quite a day out, I should say, and the weather must have been just right.

A branch of the A.B.A. has recently been formed in Cardiff, and will open with an invitation meeting on July 22nd to be held on Ely Racecourse. Contests will include sections for gliders, rubber driven (duration, semi-scale and scale), and a *concours d'élégance*. Full particulars should be obtained from Mr. R. S. Prior, 64, Pethybridge Road, Ely, Cardiff. A membership campaign is at present being conducted, and full details may be had from the Hon. Branch Secretary, T. P. Grant, 41, Vaughan Avenue, Llandaff, Cardiff.

The STIRLING M.F.C. have at long last been convinced that such things as thermals do exist ! Four models have recently caught these elusive gremlins, and two at least were timed o.o.s. straight upwards. P. Russell holds the club record for winch launch gliders with a time of 7 : 40·4, while G. Marshall holds the towline record with 6 : 01.

The LEEDS M.F.C. have made good use of the few good flying days, K. Lloyd setting up a new club record when flying his model "Mascot" in the National Cup event. Time was 7 : 10 o.o.s. and lost, the team totalling 17 : 20·9 with only three members. K. Anderson broke the glider towline record with 5 : 15 o.o.s.

The usual high wind and rainstorms prevailed at Blackpool for the BLACKPOOL & FYLDE M.A.S. attempt in the M.E. No. 2 contest. P. Uttley made the best aggregate of 32·4 secs., R. V. Bentley placing second with 25·2. National Cup day was much better, ideal weather following a rainy afternoon. Thermals were noticeable, and J. Owen's last flight was an outstanding one, his model being timed for 6 : 43·3 before disappearing from sight at a great height. This flight constitutes a record in the club Open class. Owen's total was 9 : 42·9, Bentley again placing second with a total of 3 : 43, and Uttley third with 2 : 30·1.

The OXFORD CIVIL DEFENCE M.A.C. (which, incidentally, is open to all, whether C.D. or otherwise) is progressing, and a glider contest was to be held on July 15th. (As this is written before that date I wish it all the best, and trust the weather played up decently.) Prospective members should call at the club premises, 9–10, St. Clement's Street, Oxford, on Wednesdays, between 19·00 and 21·00 hours, or write to the secretary, P. Duffy, at 29, Napier Road, Cowley.

The WOLVERHAMPTON & D.M.A.C. have been getting in some useful flying when weather permits, four good flights on May 22nd being 9 : 01 by J. Reid, 5 : 11 by P. Fisher, and 6 : 15 and 3 : 45 by G. Caddick, all flights o.o.s. S. Ward won the Consistency Prize at the Sutton Park Rally with three flights of 68, 71 and 74 seconds.

After being in existence for a year, the RUGBY M.A.S. has at last obtained a clubroom, and the committee are now busy cleaning and whitewashing prior to turning it over to the members. Little flying has been done this year though several models are ready for good weather—if and when !

Only one good day's flying weather has been experienced by the EAST BIRMINGHAM M.A.C. Fortunately the club glider record was raised to 2 : 38 by K. Thomas with his "Aegeus," which he was flying for the first time. He also won the rubber duration contest with a total time of 3 : 13, R. Jesson second with 1 : 33·5, but the latter fellow had his revenge in the glider event by winning with a total of 2 : 55·5.

The LUTON & D.M.A.C. had a spot of hard luck. Owing to an error they flew gliders in the National Cup, and of course this had to be disallowed. However, some consolation is derived from the fact that G. Williams set up a new Class B record for gliders with his flight of 14 : 48 o.o.s. (subject to official confirmation).

BRENTFORD & CHISWICK M.F.C. are holding an Annual Rally on Hounslow Heath on August 19th. Events will include petrol, scale, tailless, open rubber and glider, and a *concours d'élégance*. Full details may be obtained from F. J. Johnson, 140, Duke Road, Chiswick, London, W.4.

The BOURNEMOUTH M.A.C. (formerly Queen's Park M.A.C.) is going well, and records are being broken fairly consistently. J. A. Mountain made a flight of

S.M.A.E. COMPETITION RESULTS.

SOLIDS CUP.

1st	W. Anderson, Birmingham	1/48th Typhoon
2nd	F. G. J. Skinner, Rugby	1/72nd Lancaster

WESTON CUP.

E. Rawlings	Croydon	508·2 secs.
R. Dawkins	Bushy Park	499·2 ,,
R. Slaughter	Walthamstow	460·2 ,,
A. W. F. Alexander	Pharos	450·0 ,,
L. Massam	Walthamstow	426·3 ,,
R. H. Warring	Blackheath	416·4 ,,

MODEL ENGINEER NO. 2 CUP.

N. Stacey	Pharos	380·5 secs.
E. Aylward	Walthamstow	324·7 ,,
L. Claydon	Norwich	316·0 ,,
A. W. Geddle	Bromley	307·2 ,,
J. Partington	Pharos	300·8 ,,
P. Buskell	Surbiton	294·6 ,,

NATIONAL CUP.

Pharos	1468·4 secs.
Witney	1366·4 ,,
Birmingham	1290·8 ,,
Norwich	1278·2 ,,
Walthamstow	1172·7 ,,
Northern Heights	1158·1 ,,

FROG NO. 2 CUP.

J. D. Watkins	Croydon	450·4 secs.
B. Moon	Bristol	406·4 ,,
Miss M. Brown	Croydon	219·5 ,,
A. R. Laight	King's Heath	156·0 ,,
A. Rostron	Bury	154·0 ,,
J. Wingate	Streatham	137·5 ,,

(Results of Sir John Shelley Cup on page 448.)

13 : 13·6, while R. Parsons flew his "Aegeus" to a new glider record of 2 : 30. T. M. MacMallen put up an unofficial flight of 10 : 00 plus with a modified "Mick Farthing" glider.

The Midland Rally, held on National Cup day, was a great success, attendance being very good from all the Midland clubs. For once the weather was reasonably good, resulting in some good flying. Results were :—

Open Duration.

D. W. Harrison	Birmingham	454·5 secs.
R. J. Perry	Birmingham	394·0 ,,
G. A. Boonham	South Birmingham	302·1 ,,

Open Glider 300 ft. towline.

R. J. Perry	Birmingham	422·9 secs.
J. Reid	Wolverhampton	328·0 ,,
B. White	South Birmingham	324·0 ,,

Consistency.

S. Ward	Wolverhampton	6 secs. error.

D. W. Harrison lost his model on its second flight in the National Cup, the time being 6 ; 30 o.o.s. The same chap, while testing prior to the contest, broke the club lightweight r.o.g. record with a flight of 10 : 06, and was lucky to regain the model in time for the contest proper.

J. Ferdinand-of 4, Park View, High Street, Yiewsley, Middlesex, would be pleased to receive any information regarding his all white, polyhedral wing "Aegeus," which was last seen (after some 33 minutes' flying) heading in the direction of Uxbridge. Likewise C. M. Holden of 41, Marsh Lane, Farnworth, Lancs., lost his "Mick Farthing" glider in a May Thermal after some 25 minutes, and would be pleased to get it back ! Fuselage is yellow, balance of model white.

Chaps wishing to start clubs in their areas this month are as follows :—J. Larsen, 129, Norfolk Avenue, Palmers Green, N.13 ; P. R. Hankin, 33, Broadwalk, South Woodford, E.18 ; R. Lawton, 10, Dalton Avenue, Whitefield, Manchester (club to be formed in the Northenden area).

THE CLUBMAN.

NEW CLUBS

SOUTHAMPTON M.A.C.
W. A. Smith, 48, Bassett Green Road, Swaythling, Southampton.
BOROUGH OF CAMBERWELL M.F.C.
D. Packer, 122, Overhill Road, East Dulwich, S.E.22.
SOUTHALL M.A.C.
(No address given !)
RYELANDS D.A.C.
E. Sykes, 67, Austwick Road, Lancaster.
SWADLINCOTE M.A.C.
F. Pearson, 72, Lansdowne Road, Swadlincote, Burton-on-Trent.
KENT COLLEGE A.C.
C. D. Stacey, Kent College, Tremorvah, Truro, Cornwall.
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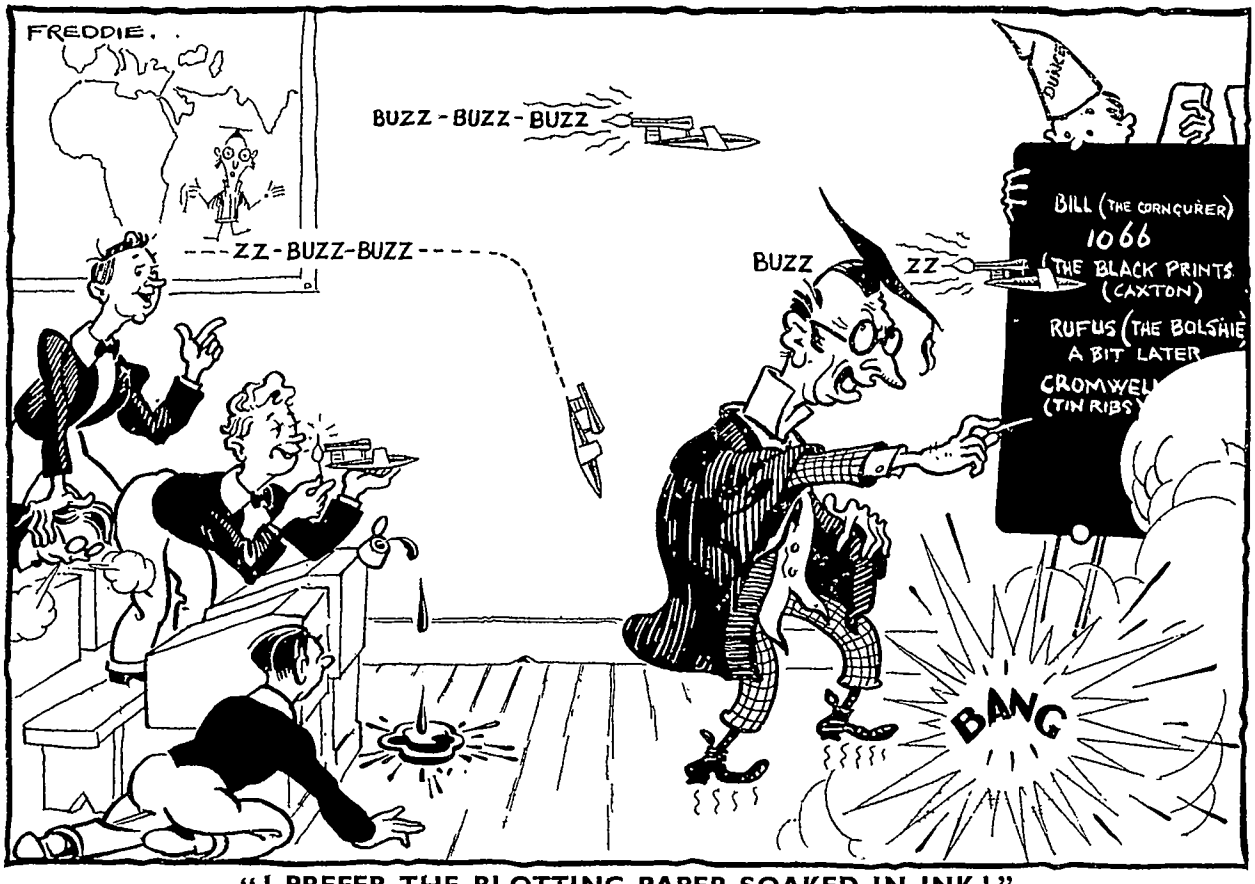

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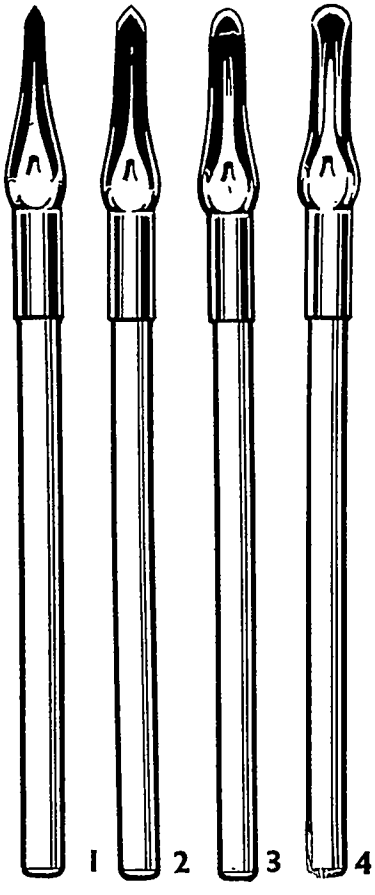

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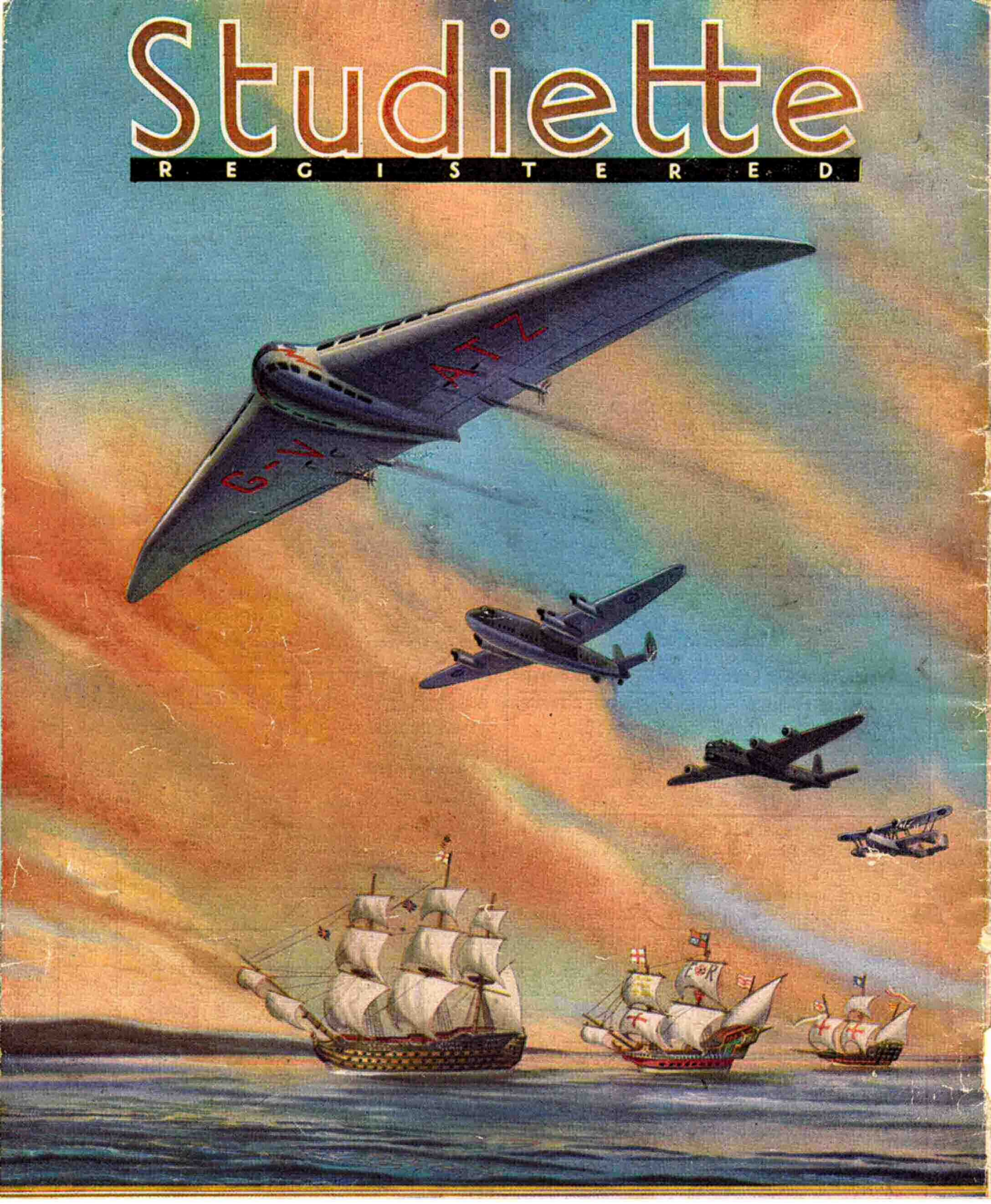

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