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AEROMODELLER

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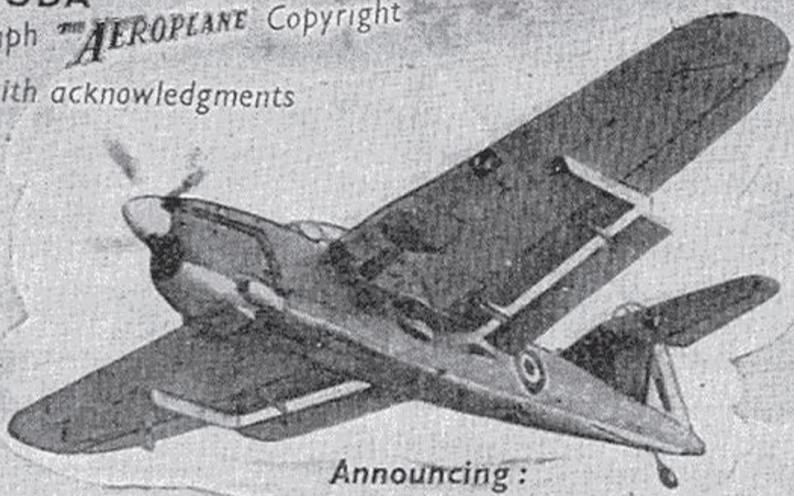

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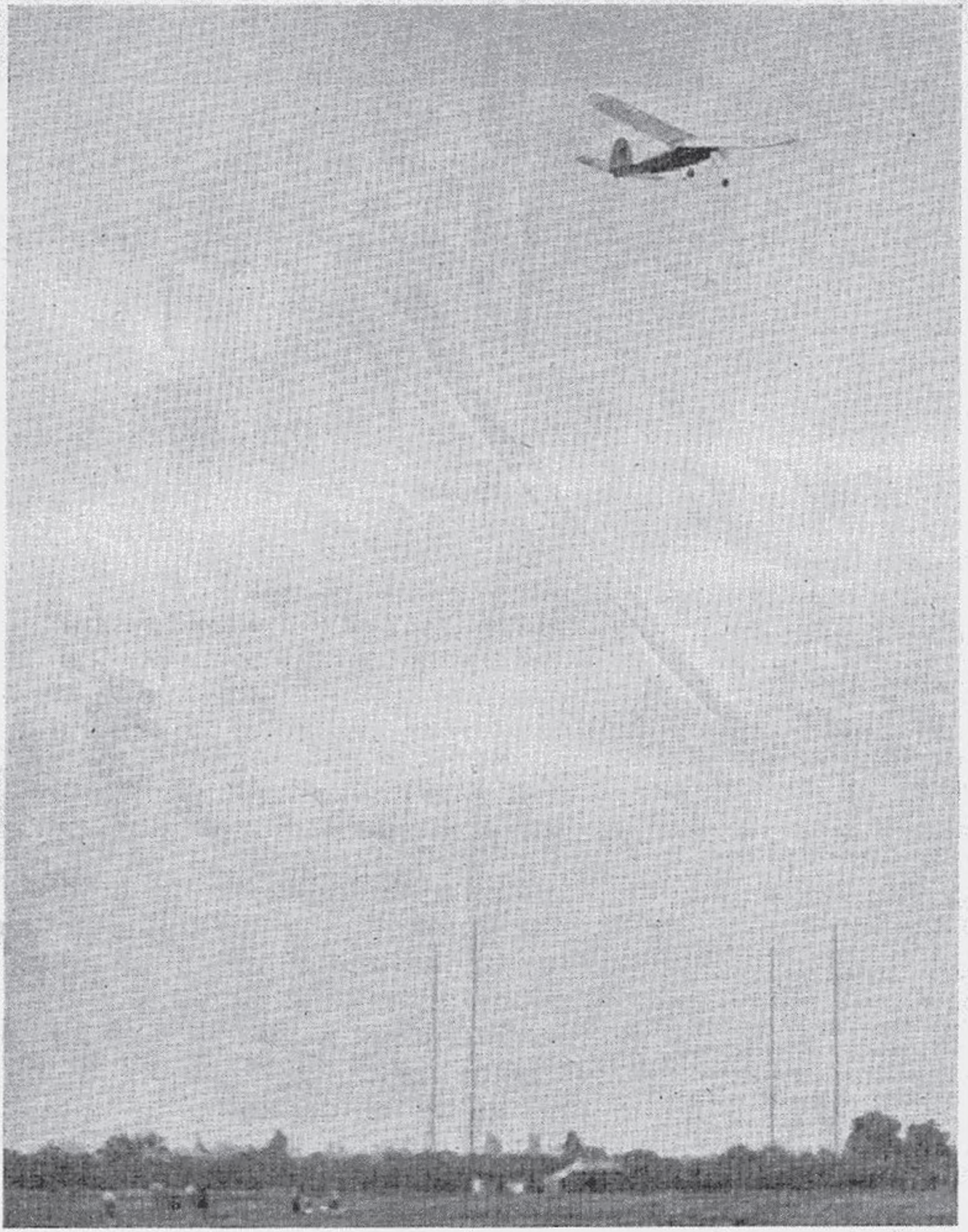


"INTO THE BLUE." The camera catches a competitor's model at the recent Hamley Trophy Contest. So portraying one of those satisfying moments known to all petroleers. A "revving" motor, nose up, and a steady climb into the blue.

EDITORIAL

DORLAND HALL AGAIN

IT is with very great satisfaction that we announce the second AEROMODELLER National Model Aircraft Exhibition, which will open at Dorland Hall, Lower Regent Street, London, in December.

Wide as was the scope of the first exhibition, held at the same hall last January, and considerable as was the enthusiasm aroused among modellers and the general public, we are confident that in every way that initial venture will be eclipsed. To begin with, the January Exhibition remained open for nine days, including two Saturdays. In that time it was visited by some 20,000 people, but inevitably there were many who could not get to Dorland Hall at that particular period.

Arrangements made for the second Exhibition, however, should obviate any disappointment, at least for the vast majority, for it will be open this time for twenty-three days, including five Saturdays, and covering the whole of the school holiday period. The opening date is Friday, December 14th, and apart from a Christmas holiday break from December 23rd to 26th, inclusive, the Exhibition will be open until the evening of Saturday, January 12th.

Not only are we extending the period of the Exhibition, we are also anticipating a much greater number of models on display. It was encouraging to have secured 700 last time, despite all the exigencies of war—the scarcity of modelling materials and time in which to use them, the restricted and uncertain transport, and the ever-present possibility of the resumption of air raids. Now, with the war in Europe brought to a victorious conclusion, the consequent ending of Civil Defence and Fire Guard duties, and the restoring of the basic petrol ration, we look for thousands of entries.

There is another reason for expecting a considerable increase in co-operation from model builders. Last time, we sensed a certain amount of " holding back," not directly due to wartime difficulties, but to a somewhat natural hesitancy to risk models in an Exhibition of such magnitude, and held under war-time conditions. Potential exhibitors doubtless asked themselves :— would the organisers be competent to handle with reasonable safety the volume of material they were proposing to put on display at Dorland Hall ? And what were the prospects in wartime of securing sufficient staff to cope adequately with a large number of models and an even larger number of visitors, including—in these air-minded days—a high proportion of eager youngsters with undisciplined feet and fingers ?

This time there should be complete confidence, for the number of models damaged or lost in the January Exhibition was amazingly small. Reckoned in terms of the volume of the exhibits, it was in the region of ·03 per cent ! We published the actual figures in the April AEROMODELLER, but for the benefit of new readers we would recall that the casualty list was as follows : five models were damaged when a group of enthusiasts in the gallery knocked down a large wooden aerofoil section ; three more were damaged by visitors ; thirteen suffered during the journey to or from the Hall, and ten disappeared into thin air ; these *may* have been stolen, but as seven of them were so very tiny, it is quite as likely that they were blown away and inadvertently swept up !

It was only to be expected that some small damage or loss would occur, and all the exhibits had been insured by the organisers for £5,000. Claims totalling £41 were received, and these were promptly met.

The same care will be taken with the forthcoming exhibition, adequate insurance cover will again be secured, and the organisers have last January's experience of an Exhibition on the grand scale to assist them in the still more ambitious effort now projected. And when to these factors is added the lessening (though admittedly not the complete disappearance) of wartime difficulties, we feel that we are justified in anticipating a record number of models, with all parts of the country well represented.

Further details, including information about the competitions to be held in connection with the Exhibition, will be given in subsequent issues. Meanwhile, we invite modellers to make a note of the opening date, and look into the matter of participation.

Counting Your Votes

Our readers have responded magnificently to the recent invitation to them to state their preferences as to the types of articles to appear in the AEROMODELLER. Several thousand forms were completed and returned to us, and our staff have for some time been hard at work sorting them and tabulating the information given. This information is interesting in the extreme.

It is characteristic of many people sub-consciously to regard *their own* opinions as entirely logical and so normal as to be shared by all other " reasonable " folk ! This census of opinions would certainly have taught us, had we not already had similar experience, that there is considerable diversity of outlook amongst entirely reasonable people. In short, even at the present stage of checking, it is clear that readers have provided ample justification of our reiterated plea for the viewpoint of " the other fellow."

It is particularly gratifying that so many readers with so many different viewpoints have co-operated, and, moreover, with such enthusiasm. It really does look like affording that which we urged so strenuously —a truly representative expression of aeronautical opinion. One reader voiced a complaint, and, moreover, in no uncertain terms ! Why, he wanted to know, did we not print the census form on a separate slip of paper and insert it in the AEROMODELLER instead of printing it on one of the pages, thereby forcing him to mutilate his copy in order to take part in the poll ? Well, we are sorry about that (but paper control regulations won't allow of loose insets), but gratified that despite his little " grouse " he *did* send in his form. Several other readers also felt a disinclination to cut out the form, but were so keen to record their votes that they actually went to the trouble of copying out the somewhat lengthy

wording on the form and so keep their AEROMODELLER inviolate!

In urging all our readers to co-operate in making this poll really representative and therefore of practical value, we were certainly asking them to give us plenty of work—and they have done so! We are glad of this, and all those who took part may rest assured that we shall study attentively the forms sent in, lengthy process though it be, and consider with the utmost care the conclusions to be drawn. Later, we shall have more to say on this subject, but we wish at this stage to express appreciation of the way in which the idea of the poll has been taken up and acted upon by so many of our readers.

Progress at Eaton Bray

Before the next editorial appears, Eaton Bray Model Sportsdrome will be in use. Not until next year will the full facilities and amenities which we enumerated in the July AEROMODELLER be available—the concrete take-off area, the mobile control tower, the team of model "retrievers," the supplies of hot and cold water, the model materials store, and so on—and the formal opening of the Aerodrome will not take place until then. But in the near future the ground will be available to aeromodellers at week-ends.

With the present difficult labour situation, not to mention the none-too-simple matter of material, the organising of Eaton Bray even to the initial stage of usefulness has been calculated to afford a headache or two, but we have been anxious to make the ground available in the present flying season as a kind of *hors-d'œuvre* to the more substantial benefits and pleasures to be enjoyed next year when the scheme is completed, and because we believe that with the large and ever-increasing amount of model flying, such a flying-ground will be welcomed at the earliest possible moment.

There is romance in the story of Eaton Bray, and modellers, we are sure, will be interested to hear about it when the appropriate time comes to recount it. As may well be imagined, so ambitious an undertaking did not fail to produce its crop of snags, and the way in which they were dealt with, often in unorthodox fashion, will be well worth the telling. We are sure that modellers generally will wish the venture all the success it deserves.

Low Speed Research

Latest news from the Low Speed Aerodynamics Research Association is that a News Letter is now being produced, and a copy of the first issue makes interesting reading. The Association, it will be recalled, was founded last February by Mr. N. K. Walker, who has since been chosen as Director of Research. Dr. H. Roxbee Cox has accepted the Presidency.

The News Letter records that about 100 people have now applied for membership, several reports have been produced and are almost ready for publication—the declared policy of the Association is to make these reports short and snappy, revealing thereby a sound appreciation of psychology that one would like to see manifested by other scientific bodies—and that eight wind-tunnels are in process of construction, including one by a well-known modelling organisation under the supervision of the L.S.A.R.A. Among the subjects covered by the reports referred to are "Boundary Layer Theory applied to the design of low-speed aerofoil sections" and "The Longitudinal Stability of Tailless Gliders."

The Association is now being organised in groups, each to study some particular aspect of low-speed aerodynamics, some of the aspects being performance and stability, gust research, engines, jets, and tailless designs.

For the hobby of aeromodelling to gain any appreciable degree of recognition in this country, states the L.S.A.R.A., it is essential that its important education value be recognised by the aircraft firms and national research associations. To this end the Association seeks to provide dependable data that will replace the hit-or-miss methods with which modellers generally have had to be content, and be of real value to the aircraft firms and research institutions.

Readers should note that Mr. N. K. Walker has changed his address which is now as follows: 9, Alexandra Road, Farnborough, Hants.

Modelling Abroad

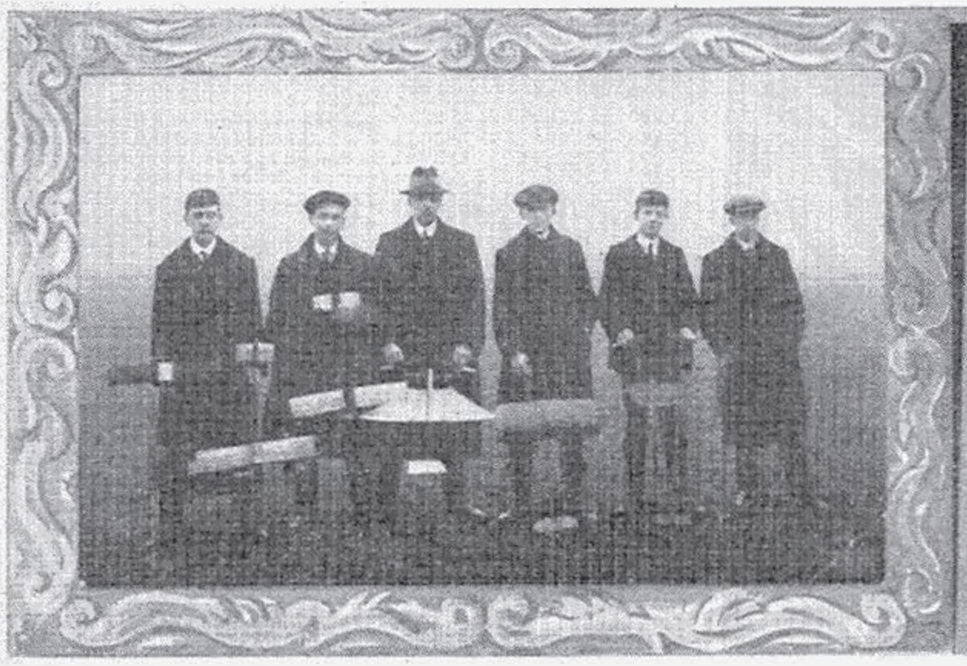
Those modellers who, during the war, have found supplies of material, especially rubber, cut almost to nothing, and anti-invasion ditches gouged out of their local flying-ground or vast conglomerations of warlike equipment cluttering it up, may well have pictured model flying as virtually extinct except in a few highly favoured spots.

That this is far from a true picture has been made abundantly clear by reports which have been coming in from various parts of the world. Much interesting information is now available of activities in America, Africa, Palestine, Italy and Germany. We feel that many readers will be glad to have this information, and have accordingly arranged for a senior member of our staff, well qualified by reason of practical modelling experience and acquaintance with some of the countries mentioned and several of our agents, to present the available material in the form of a series of articles. The first will appear in the October AEROMODELLER.

Frontispiece

Readers will have noted a slight re-arranging of our Editorial pages, which we have now carried a stage further, with the co-operation of the Astral Aero Model Co., who had a standing contract for their advertisement to face the first Editorial page. Until the early days of the war compelled us to cut down the size and number of pages in AEROMODELLER, we had carried for some years a photograph facing the Editorial page, and the Astral Company have been good enough to agree to our transplanting their advertisement to face the Contents page, so enabling us to recommence publication of a photograph facing the first Editorial page.

This month's photograph, taken during the recent Hamley Trophy Contest, shows a petrol model climbing steadily "Into the blue". For future issues we invite readers to send in photographs which they feel will qualify for such an important position in the magazine. For each photograph published we shall be pleased to pay a reproduction fee of three guineas. It is essential that photographs are large and clear. They should be printed on glossy paper and the negative should be sent whenever possible.



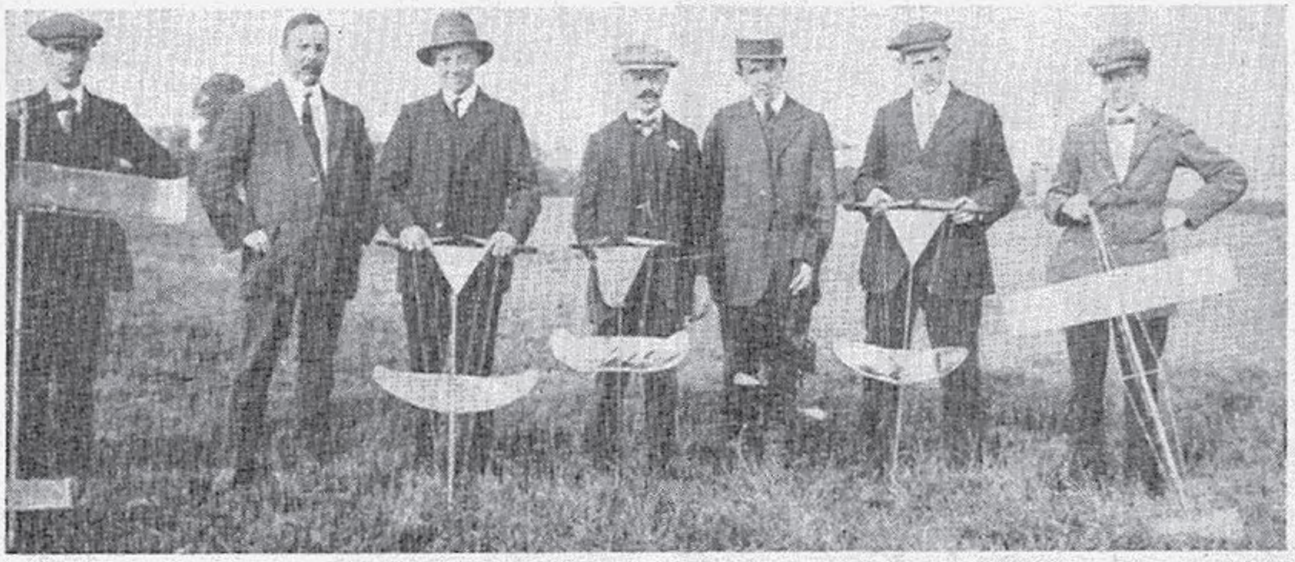
AN OLD CLUB MEMBER LOOKS BACK

BY S. J. POLLARD

ANY reference to early aeromodelling must necessarily refer to the efforts of the pioneers of full-sized (or, in the language of the period, "man-lifting") aircraft. In the years 1908–9–10, when I built my first models, these pioneers were closely studied, and, as with the aeromodeller of to-day, their efforts were confined mostly to the summer months, and any little success they had was duly noted. Early model enthusiasts used to adopt one or other of these early airmen, much as a young man of to-day has his favourite film star. The choice was small, as you could count them all on your two hands. I remember I favoured Santos-Dumont with his tiny monoplane, this itself, judged by present standards, being only a model, as it was very much smaller than a present-day light aeroplane. It had an engine of about 25 h.p., and to give instance of its constructional simplicity, the pilot's seat was a small piece of canvas slung similar to a deck-chair, and seated in this, that great pioneer crossed the Swiss Alps.

I built a model of this machine from sketches and photographs appearing in a London weekly illustrated paper. I must have possessed the outlook of a solid model fan, for to try its airworthiness never occurred to me. It was just a show piece, but it achieved something in starting a band of enthusiasts which were later to form a model Club in my home town, Worcester.

The next year, 1909, came the duel between Bleriot and Laytham with his "Antoinette," for the honour of crossing the English Channel first. Several models of these machines were built, as most daily papers gave drawings at the time. I remember our general construction: a fuselage of spruce, with piano wire struts turned at right angles and bound to longerons; butt-jointed wood struts held by glue we could not conceive. This was due to the originals having uncovered fuselages. Wings were generally all wire with sparsely placed ribs, bound and soldered, silk covered and single surfaced. Supported, even if they did not need it, by king posts and



The heading photo on previous page shows the original members of the Club in 1911. Note the covering of the flying surfaces! The author is third from the right.

Left, the Worcester M.A.C. on a visit to Malvern College in 1913. Note the tremendous improvement in the covering in the two years.

plenty of wires, strainers, etc. Usually they were powered by rubber about 3/32 in. by 3/32 in. square section, the only type to be purchased locally. I had flights of a few seconds' duration, but these models were to scale with a wing loading I do not care to think about. Another trouble was the small tail and vertical surface, but we did not appreciate these faults at the time.

At that time no one had seen a full-sized aircraft in this district, and I remember how we envied the boys who lived around Hendon and Brooklands, but our day was to come. The summer of 1910 brought a genuine Bleriot, which, however, finished up fatally for one onlooker. The enquiries which resulted from this crash brought two gentlemen from the Royal Aero Club to Worcester, Commander Perrin and Mr. John Dunville, and was I thrilled to come face to face with two eminent personages in aeronautics! I was the office boy of the local authority they visited.

However, to return to the models. It became increasingly apparent that to continue constructing tractor-type 'planes with the heavy materials we had available was useless, although we wished to see our models similar to the real thing, we used reluctantly the single stick in place of a built-up fuselage in order to produce a fair power/weight ratio.

This was the period of the first photograph taken early in 1911. The Worcester Club was now taking shape. You will notice the "A" frame twin propeller has crept in, though one member has retained some resemblance of the old Antoinette wing. This "A" frame construction became very fashionable, easy to build, in fact anyone with a limited knowledge of aerodynamics could construct one of these models. They possessed little character, with their steamed birch propellers and piano wire wing. All this called for slight effort in construction. Occasionally you brought off a good flight, but generally the duration was about 30–40 seconds. As their flight was swift and straight, distance from starting point was sometimes taken for competitions.

The duration enthusiast to-day has to put up with having his model called "paper bag filled with rubber"; ours were nicknamed "flying darts," "flying sticks," etc. There is no denying they depended on terrific speed to maintain flight as the wing surface of many shows.

Early 1912 found us giving up the twin propeller speed models for something with a better duration—large single stick, tail first pusher models, with carved propeller about 14 in. diameter, and split bamboo parallel chord mainplane with very pronounced upturned wingtips, covered with jap silk. The motor stick was well braced by means of king posts at its centre. You will notice one or two of these models in the 1912 photograph of the Worcester Club. I may mention here that gradual improvements in the performance of our models

Lower photograph on previous page shows the Worcester M.A.C. in 1912 with the author on the extreme right. The correct garb for a flying meeting in those days was considerably less abbreviated than it is to-day!

Left, the Club to-day. A happy group of members with an interesting variety of models. On the extreme left, in braces, is the author!

began to impress the general public, who then viewed full-sized aircraft with a certain amount of suspicion, and model makers, well—just young cranks!

Here I should like to make a few comparisons of aeromodelling then and now. Materials were always a headache as there were no shops that catered for the constructor like they do to-day. You could purchase strip hardwoods, but the many small sundries an aeromodeller requires came from some queer sources. Just the right type of cane or reed would be extracted from the sitting-room chair till it took on a bad list when sat upon. The small drill brace that every aeromodeller seems to possess to-day was not plentiful and far too expensive, so the kitchen egg beater would be confiscated as a geared winder, and when next found would have a forked end, which would not beat eggs. Cycle spokes, old clock springs, and canes from garden seed shops, all came in for the building kit.

With one item, however, we were more fortunate than aeromodellers of to-day—this was jap silk; it was available at any drapers at sixpence or less a yard, all colours. (No coupons!) This silk was very fine and when treated with the special varnish on the market at that time it produced a wing covering which was pliable to a certain extent, and would withstand any amount of hard knocks. I should like to see silk, treated in this way, in use nowadays. True we had only one surface to cover, and I know weight would creep in, but it is a suggestion for large duration fans and petroleers.

The rubber lubricant we used then might cause consternation to-day, it was a mixture of graphite and glycerine, used, by the way, on professional recommendation. It would be a trifle messy in these days of choicely-covered fuselages, but I am sure our rubber lasted longer, though we may not have put it to so great a test then.

The year 1913 saw the Worcester Club still making headway, the late Earl Beauchamp was our President, and our membership now had a respectable total. Students of the Victoria Institute Technical School provided us with many members, and from this same source we swell our ranks to-day. I remember it was every member's ambition to complete sixty seconds duration. It would be interesting to know when the minute was first recorded by a model. I believe some of the London Clubs had accomplished this in 1911.

We had a good many "field days" in 1913–1914 years (I do not think we used the word "Rally"; this belonged to the early motor cyclist). I recall the Worcester Club attending inter-club competitions at Birmingham, and what a wonderful membership they had there, complete with pavilion and full-sized glider, and here we found the single propeller pusher models most in favour. We met aeromodellers from many other clubs and I believe the best time of the day was around 80-90 seconds—not so bad for thirty years ago.

Another memorable day was spent by the Worcester Club in 1913, giving an exhibition to Malvern College; the photograph with lady in centre records this happy afternoon. Here history repeated itself. We gave a display at Malvern "Wings for Victory" week in 1943 at the invitation of Sir Alan Cobham.

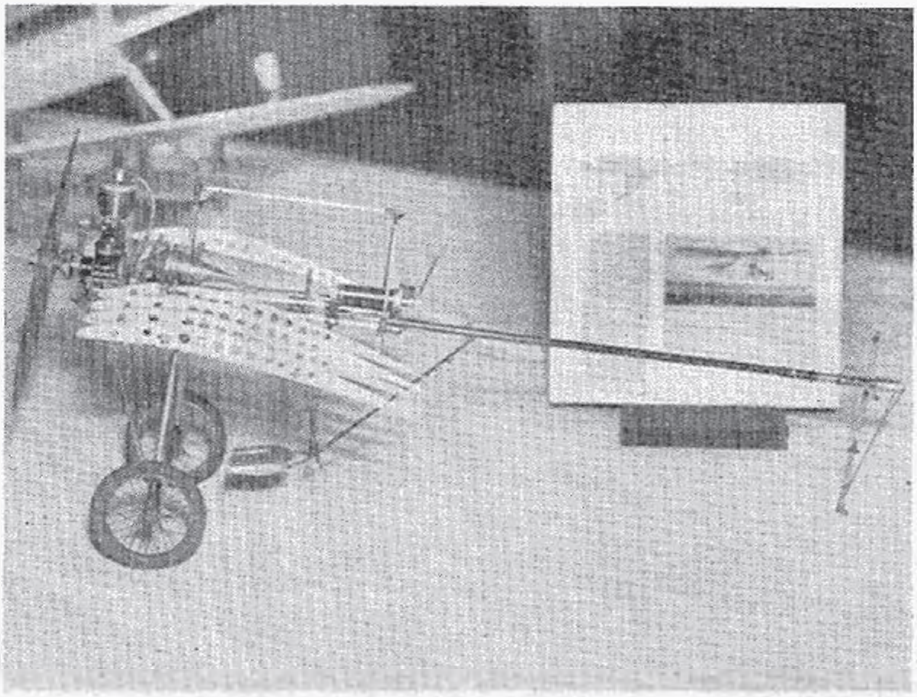
The single propeller models shown in this photograph stood first favourites for quite a number of years. We had now arrived at a more efficient size, a 30 in. span by 5 in. parallel chord mainplane with 4 feet motor rod, and 10 in. to 12 in. diameter propeller. I use the word "rod" as this was of bamboo, about $\frac{1}{4}$ in. diameter which had a great deal of work bestowed upon it—sanding down, etc. Although we knew nothing about pre-wound rubber motors these were just around the corner. We were using a 6 feet long motor to this 4 feet rod, excellent for extra duration, but this long motor used to hand down and alter the centre of gravity.

Until the arrival of balsa the stick model was our best performer, and fitted with an undercarriage it would damp the spirits of the built-up fuselage tractor enthusiasts, who used to be frequently putting in an appearance after the last war, although no one knew they were on the right track. I still have one of these old models in my possession, which is looked upon as a relic by present members of our club.

Here I must state that the Worcester Club had a long period of inactivity, a stalemate which I believe was general until balsa came to our aid.

Well, so much for the past, we now have a club backed by the local council, with several cups to be competed for annually. The last photograph shows the Worcester Club at its annual Holidays-at-Home Rally last August, which was highly successful, giving a non-stop entertainment to 2,000 people.

In conclusion, I would suggest that there must be many enthusiasts in the country like myself, who have been actively engaged in this pastime for 30 years or more, which perhaps suggests the formation of a "Company of Veteran Aeromodellers."



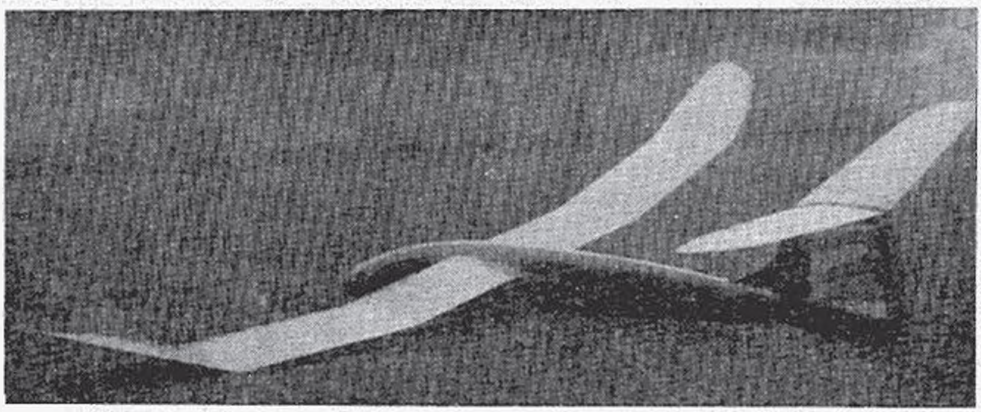
Another old timer—a flying scale model of an early Taube monoplane beautifully constructed by Mr. R. J. Trevithick, one of Aeromodelling's earliest pioneers. Even the wheels are built up with spokes! When completed, this model will most certainly demonstrate the art of real craftmanship.

ELEMENTARY AERODYNAMIC DESIGN

SAILPLANES

PART I

BY J. HALIFAX



(Fig. 1.) The modern formula! A 45 in. span sailplane by I. S. Cameron, which has a very fine performance. Notice the high-set tailplane and the type (C) fuselage section.

The spate of recent correspondence regarding that time-honoured controversy "Theory versus Practice" reveals that were the Theory presented in a simple, "easy to understand" manner, all the anti-theoretical modellers would be only too pleased to note, and inwardly digest, large quantities of their former bete noire. *This series has been written with the above object in view and the author, in the first of the series, will explain the aerodynamic design procedure for a sailplane, covering the subject from start to finish in simple terms that should be understandable to all. In a later series, when the essential principles have been grasped, the author will graduate to the design of powered aircraft of both rubber and petrol-driven types.*

THIS series is for the aeromodeller who has several machines to his credit, and now feels the urge to design a machine himself. I am assuming that this aeromodeller knows the very elementary principles of aerodynamics, but that his knowledge of mathematics is strictly limited. It would also be as well to state here, before we start, that we shall use "Nomographs" by R. H. Warring wherever possible. These lighten the burdened brain of the designer and cut out a lot of the drudgery in designing. When you have a copy make sure you understand how to use it.

Now before we can commence the actual design of any model, we must first visualise its general layout, and the first step in this direction is to determine the size of the model in terms of wing area. If we have a certain contest in view this will probably be laid down in the rules. If not, the decision must be based on such considerations as time, transport and building facilities. In any case, the wing area should not be less than 200 sq. ins., as below this size a wing is very inefficient.

My reader may be wondering why the size of a model is measured, in the first instance, in terms of wing area, and not span and chord. The reason for this is that the plan form of the wing depends, among other things, on its area. We shall investigate this in detail later.

Having decided upon the wing area, we must now consider the overall weight of the machine. Here we have a definite lower limit for competition work. The F.A.I. (Fédération Aéronautique Internationale) lays down that the wing loading must be at least 4·92 ozs. per sq. ft. In our particular example we will have an all-up weight of 8 ozs., which gives us a wing loading of 5·75 ozs. per sq. ft.

On the question of fuselages, we can thankfully take note of the fact that the slabsider *versus* streamliner controversy does not affect us, the streamliner holding undisputed sway in this field at least. Fig. 1 gives a few fuselage sections in use to-day with notes on them.

The last unit in this very rough outline of our model is the tail unit. We shall see how to calculate the fin and tailplane areas in Part V of this series, so their approximate position will be the only thing we shall be able to decide at this stage. The best position for the tailplane is high up on the fin, as on the model in Fig. 1. In this position it is out of the way of most of the turbulence in the air set up by the wing, thus reducing its drag and giving it a more powerful anti-spin effect.

We now have a rough idea in our minds as to the general arrangement of our model, so let us summarise all we have decided in the form of a specification before we commence the actual design calculations.

I. The wing area is to be 200 sq. ins.

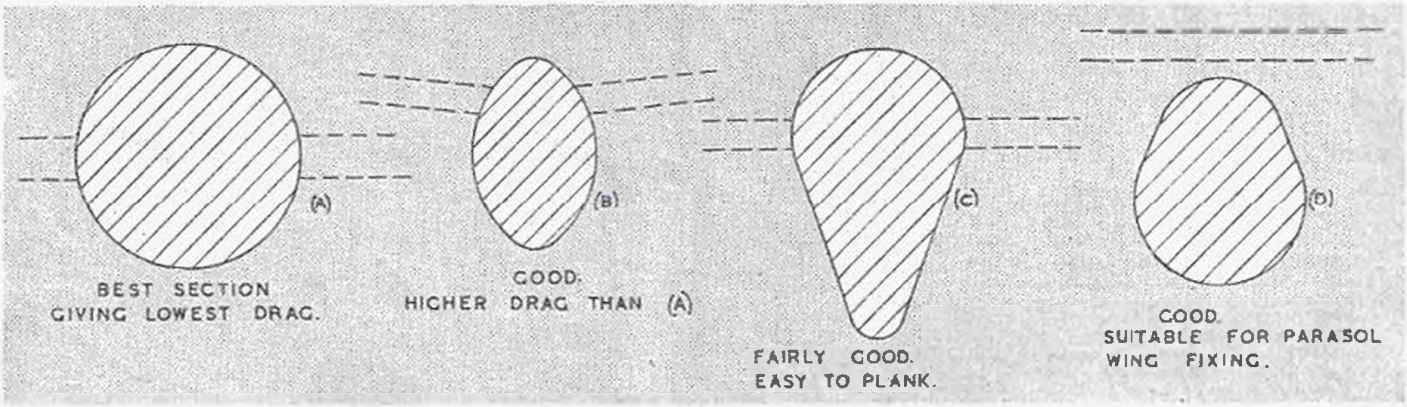
I. The weight is to be 8 ozs., giving a wing loading of 5·75 ozs. per sq. ft.

III. The streamline fuselage is to be of circular section.

IV. The tailplane is to be mounted high on the fin.

With these foundations we will commence to build up the complete machine on paper.

(Fig. 2.) *Fuselage sections. The dotted lines illustrate the wing positions for lowest interference drag.*



Scale Effect and the Choice of an Aerofoil.

Always the first step in the actual design of a model is the choice of the aerofoil section. Of the whole compromise that we call an aeroplane, the first and the greatest compromise is the aerofoil section, and a bad choice here will mar the performance of the machine at the outset. Before we make this choice, however, we must understand a little about scale effects.

Now one of the first things we learn in aerodynamics is that the coefficient of lift (C_L for short), is a constant for a certain aerofoil at a particular angle of attack, (the angle at which the aerofoil is inclined to the airflow, denoted by α) being independent of the airspeed. When we learn a little more about the science, however, we find that this is not strictly true, and that at very low airspeeds (*i.e.*, the speeds encountered in model flying) the maximum C_L is often much less than at the speeds associated with full-size aircraft. On closer examination we find that not only is the C_L affected, but the coefficient of drag as well (C_D for short). This coefficient is usually higher, and thus the ratio of lift to drag (L/D to the learned), which is a measure of the efficiency of the aerofoil, is lower. There is, unfortunately, no apparent uniformity in this variation, as will be seen when graphs of low speed aerofoil characteristics are studied. Some aerofoils even *improve* their performance, at least as far as the C_L is concerned, and generally speaking, the whole business is very irregular. Thus it is apparent that the data relating to our aerofoil *must* have been collected at model speeds.

Before we progress any farther we must see what that mystic word " Reynolds Number " means. This is just the scale used in measuring scale effect. Thus in practice we do not say that the data for such and such an aerofoil was collected at low speed, giving the airspeed, but that it was collected at a low value of Reynolds Number, giving the number. This is because scale effect is not an effect of the airspeed only, but the chord of the wing as well. Thus R.N. is equal to the velocity, times the chord of the wing in feet (VL for short), times a constant. At sea level this constant is 6300.

Thus R.N. = VL × 6300

It is very evident from this that the R.N. is usually an uncomfortably large figure, but although it must remain so in full size practice, because the " constant " we mentioned varies with the density of the air, and thus is affected by altitude, there is no reason why we should bear with it in the modelling sphere. We assume that our models fly in air of standard sea level density, and as wind tunnel tests are also at this density, the only variable factors are the chord and the velocity. Thus it is usual in aeromodelling to speak about VL values, and not R.N. Remember that V is in ft./sec. and L is in feet. Thus a model of wing chord 6 ins., operating at an airspeed of 12 ft./sec., would have a VL value of $12 \times \cdot 5 = 6$.

Now, as most modellers know, we have very little low VL data available at the moment. This is now on the mend, however, and with the L.S.A.R.A. in operation, we should soon be out of this unfortunate position. As it is, there are already several sections on which accurate low speed data is available, and one of these is given at the end of this article.

There is one other thing we must look into before we choose our section—the Power Factor. A curve called the Power Factor curve can be drawn for every aerofoil section, and this is inversely proportional to the power required to keep the aerofoil in motion through the air.

This factor is found by bringing the C_L for each angle of attack (or value of α if you prefer it) to the power of 1·5 (*i.e.*, $C_L^{1.5}$) and dividing it by the C_D for the same α. Thus the power factor expression is $\frac{C_L^{1.5}}{C_D}$

How this expression is derived is not within the scope of this article, so I must refer those more virtuous readers to any elementary book on aerodynamics. Let the rest of us be sufficed with the result of a high power factor, which is a low sinking speed.

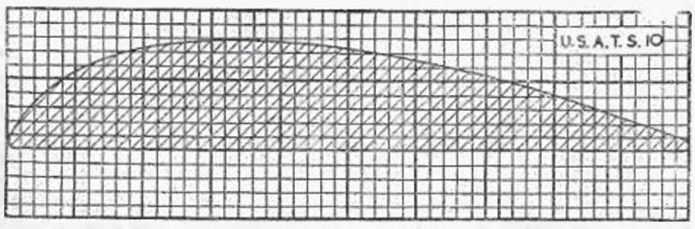
Now we are in a position to examine the virtues by which we must choose our aerofoil. These are :—

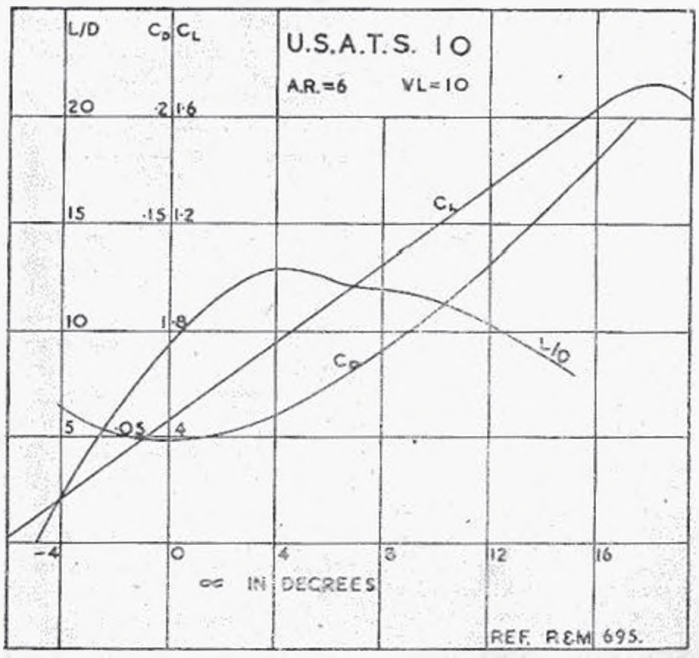
1. High Power Factor, preferably with a flattened peak to the curve, so that it is near its maximum value over a large range of α.
2. High L/D ratio.
3. Large maximum C_L.
4. Low C.P. travel.

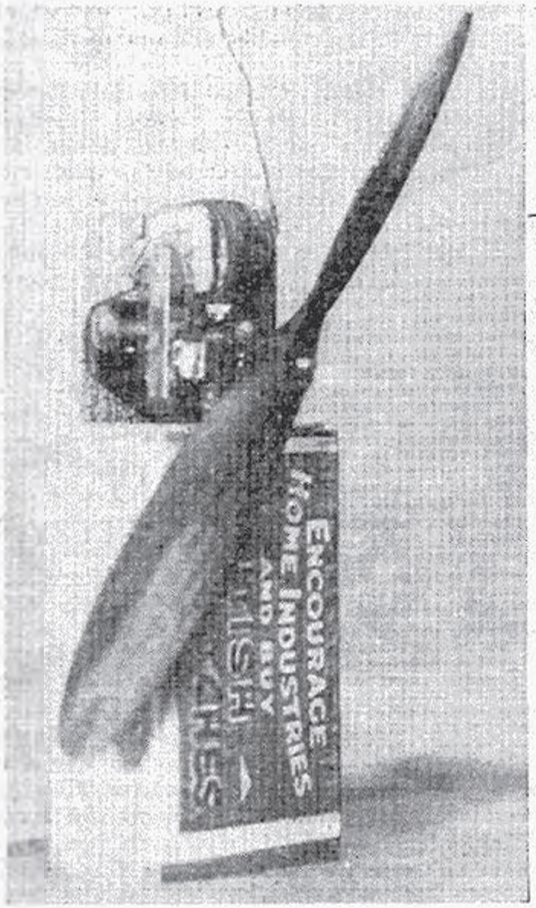
The C.P. (centre of pressure) is, of course, the point at which the lift acts, and this moves along the chord of the aerofoil as the angle of attack is varied. If this travel is very large trouble will be experienced with the stability of the model.

This is as far as we can go this month. Next month we will deal with the method of determining the angle at which we must build the wing into the fuselage for the lowest possible sinking speed.

This is as far as we can go this month. I should like in conclusion, however, to point out that the scope of these articles must necessarily be very limited. Thus I am compelled to steer a straight and narrow course through the vast sea of aeronautics, dealing only with those points and formulæ which are essential for sailplane design. If my readers have any queries, by the way, I shall be glad to receive them c/o The Editor.







AN ELECTRIC R.T.P. MODEL

BY ALAN SLACK

THE chief interest of this article is the electric motor, the weight of which is only ¾ of an ounce, and I believe is the smallest motor that has flown a model aircraft. The motor can easily be fitted to any type of fuselage. I made the motor as an experiment, and when driving a prop. the thrust felt good enough to justify trying it out on a light-weight model.

The next job was a plane to experiment with. After looking over some old models I came across one I thought would do. The wing span is 24 ins., and the area 72 sq. ins. The first section of the fuselage was cut off, the motor fixed to a thin ply former, and secured in position with two rubber bands. The total weight was 1·56 ounce. A camera tripod was used as a " pole ", for which a distributor was made to fit the screw at the top.

It was decided to have a trial on the asphalt square at the back of the house. This gave a maximum radius of 5½ ft. from the top of the tripod to the centre of the model. The wire used was 25 gauge D.C.C. copper. A few twists were given to the few wires to prevent them separating, and the outer end attached to the wing tip one-third from the leading edge. They were fixed to the wing tip with cotton, then passed under the wing to the motor. The bulk of the weight is concentrated in the motor right at the front of the fuselage. This meant that the wings had to be well forward, and if the motor was used in a scale model it would have to be placed further back, and a separate prop. shaft used long enough to engage with a driving fork on the motor shaft.

The first trial was with current supplied from the mains through a transformer of about 6 to 8 volts, but it was found that with the voltage drop due to the length of the wire, and low amperage, there was barely enough juice to fly the model. However, with a sharp push the machine did leave the ground and " hedge-hop " at a height of about 4 ins. This was not very satisfactory, so the transformers were replaced by three 2-volt accumulators connected in series. This made a great difference, and with the tripod about 30 ins. high the model gracefully took the air after a run of about 15 ft. It soon reached the height of the tripod, and flew round and round consistently at a speed of 11½ miles per hour. The accumulators were placed between the tripod legs, and as such a " trivial matter " as a switch had been overlooked in the excitement, it was found necessary to run in and catch the model—a feat at which one can rapidly become expert.

The next trial was with a wing of 90 sq. ins. area on the same machine. It flew excellently, but at only 8 miles per hour, and it seemed more susceptible to the breezes it encountered at this speed. All timing was done by stop-watch. A 20 volt, 5 amp. transformer has now been successfully used. This has a starter, each stud rising by 2 volts, so enabling the voltage to be varied. The longest flight to date has been around three minutes, and although the motor gets rather warm there has never been anything to worry about.

Construction of Motor.

The field and armature were sawn and filed to shape from ⅛ in. thick sheet-iron. The gap between field and armature should be as small as possible. Two holes are drilled in the field, as shown, for the two studs 11/16 in. long which are soldered in. On each stud a washer was soldered for the fibre back-plate to fit up to. The field was wound with 100 turns of 24 gauge enamelled wire, and the armature has 40 turns of 28 gauge wire on each pole. Both field and armature are connected in series.

The commutator body was turned from fibre, and drilled a tight fit on the shaft. A disc of brass about 1/64 in. thick was cut to the shape shown, and cut into three equal segments. Each one was drilled to take a small brass nail, the holes being countersunk on the outside. Corresponding holes were drilled in the fibre disc of the commutator. The small brass nail is passed through the fibre disc with its head on the outside, then through the hole in the segment with the countersink on the outside. With the two pressed together, and the head of the nail resting on something solid, a spot of solder is applied around the countersink with the nail protruding. The lugs on the periphery of the segments are bent over the fibre disc, and besides securing the segment at its outer edge, are used to solder the wire leads to and from the poles of the armature. The ends of the nails are cut off, and filed flush with the brass segments. Riveting would be hopeless with such thin brass. The commutator is assembled on the shaft with the gaps in the segments opposite the poles of the armature.

For the front bearing a strip of sheet brass about 1/64 in. thick was cut and bent as shown. This was drilled to take a piece of brass tube soldered in to form the bearing and lightened with four 3/32 in. holes as shown.

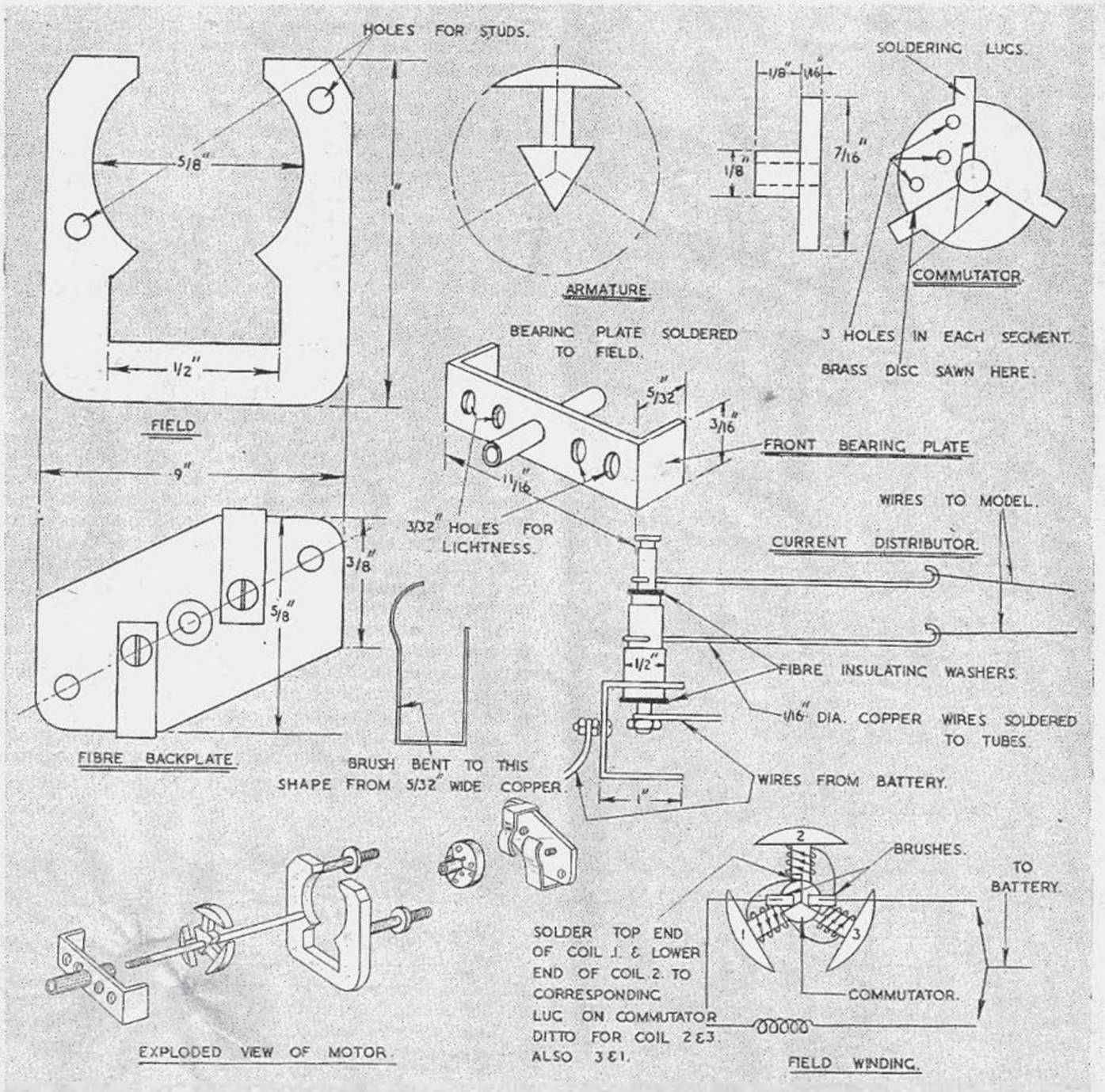
The back-plate is of fibre 1/16 in. thick, drilled to take the bearing tube, which must be a tight fit in the hole. The two brushes are attached to the back-plate, and the

assembly then mounted on the two studs which extend from the field magnet. The brushes are of copper foil bent to shape, and secured by small screws which screw into the fibre.

The shaft is a piece of 1/16 in. straight steel wire, screwed at its front end 1/16 in. Whitworth to take the retaining nut for the prop. This is about all of the motor, which should be a simple job for the average modeller. The propeller is 5 ins. diameter, carved from a hardwood block, ¾ in. wide, and ¼ in. thick, the weight of the motor and propeller being only ⅛ of an ounce.

The distributor is screwed to the top of the tripod, and has given no trouble whatever. The drawings show its construction clearly, and it is simple to make. The body is a piece of sheet brass 1/16 in. thick. Passing through the top of this is the copper or brass rod, insulated from the brass sheet by the fibre bush. Around this bush is the lower brass tube which makes contact with the body. The tube is a tight fit on the bush, but the tube which revolves around it must be an easy fit. A fibre washer fits over the upper end of the centre rod, and rests on top of the bush and fixed tube. This insulates the upper piece of tube, which should revolve freely around the centre rod. The length of copper wire bent and soldered to each of the rotating tubes is important as they give a positive rotational motion to the tubes, whereas the thin wire passing out to the model may have a tendency to wind round them. The contacts from the transformer are attached, one to the body, and the other to the bottom of the centre rod.

In conclusion, I would say that here is a good opportunity for anyone who has run out of rubber, and has any models he would like to see flying again, to do so without a lot of trouble, and in a very novel way.



GADGET REVIEW By "Bonus"

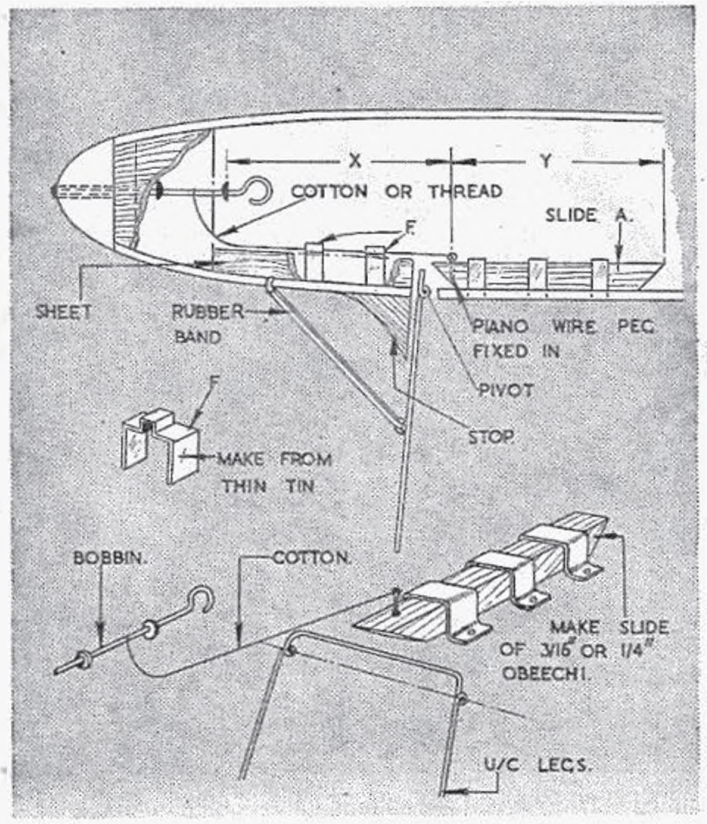


Fig. 1

FROM K. POTTER, of Hammersmith, comes a novel retracting and detracting undercarriage for rubber-driven models which is simple, foolproof, and presents no great constructional difficulties (Fig. 1). The airscrew shaft is fitted with a bobbin to which a length of thread is attached. As the motor unwinds the thread is wound up by the bobbin and the slide A is drawn forward through the thin sheet metal guides. When the slide contacts the extended portion of the undercarriage the legs are moved backwards. The length of the slide will govern the time that the undercarriage remains retracted; detraction takes place as soon as the slide clears the top of the undercarriage. The legs are pulled forward again against the stops by the action of the rubber band. When the slide clears the undercarriage the pin to which the thread is attached is pulled out of its slot and the slide remains at rest on the bottom of the fuselage. The nose should be planked as the pin is revolved rapidly by the airscrew shaft and might easily damage tissue covering. The distance X must be greater than distance Y otherwise the undercarriage will not detract.

We progress now from flying models to non-flying scale to investigate a gadget from D. L. BRUCE, of Greenford, Middlesex, another retracting undercart, this time for solids (Fig. 2). The tank A is made from thin metal and the joints carefully soldered airtight. An ordinary bicycle valve is soldered on to the bottom of the tank, and a small piece of brass tube, approximately $\frac{1}{8}$-in. internal diameter, is soldered to the side. The turbine is made as shown in the sketch, the shaft is an ordinary sewing needle. Fit the tank and the turbine wheel as shown in the drawing, then connect the side tube from the tank to the turbine with a piece of valve rubber. Form a small jet from wood or metal, insert it at the other end of the tube and fix it to play upon the blades of the turbine. Now a piece of cotton must be attached taut between the drum B and the lower part of the undercarriage legs. The working of the mechanism is simple :—Attach a cycle pump to the valve and give half a stroke to fill the tank with compressed air. A small wire clip must be made to fit over the valve tubing as close to the tank as possible to prevent the air escaping. When the clip is released the escaping air from the jet revolves the wheel, thus winding the cotton and retracting the wheels. By using a miniature piston and cylinder this mechanism may be used for opening bomb doors.

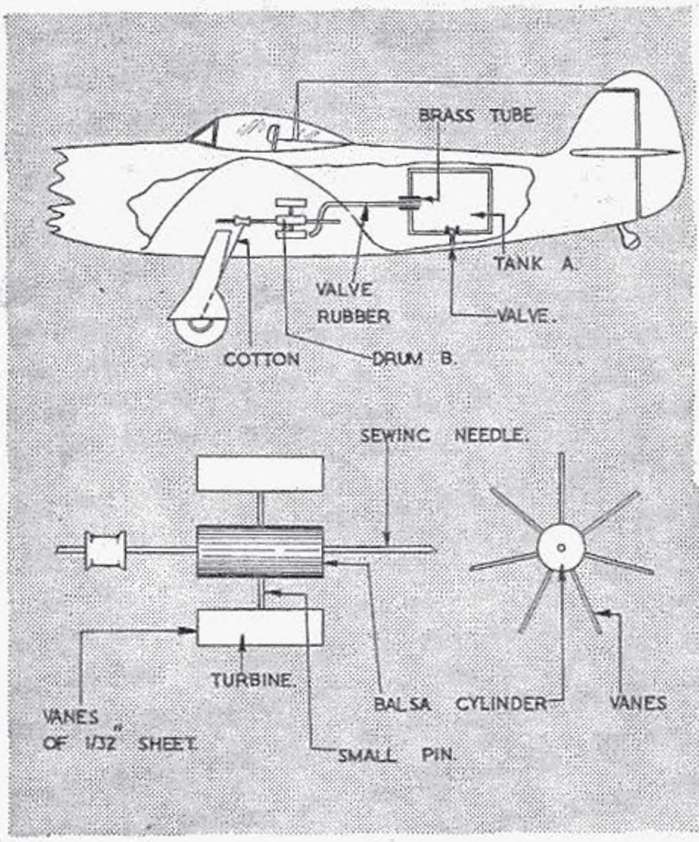
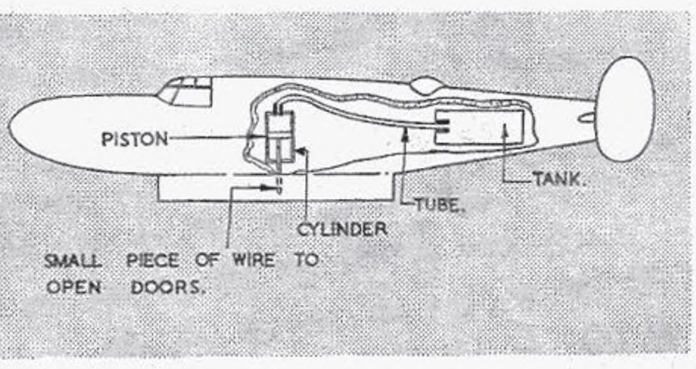


Fig. 2



In Fig. 3 we have a neat arrangement which entirely obviates the bugbear of getting correct and equal dihedral on each wing. It was sent to us by C. F. J. TILLER, of Sale. The diagram is completely self-explanatory, but care must be taken to see that all the boards are completely flat and free from warps, and that the hinge fits absolutely flush. The apparatus can, of course, be made to any length to suit a wing of any span.

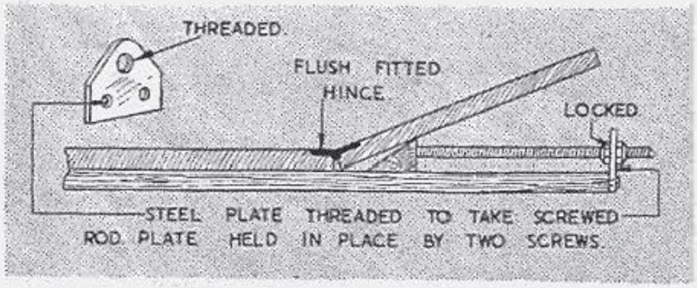


Fig. 3

A neat method of making transfers for models comes from P. O'KEEFE, of Hawkhurst. Draw the insignia or letters on the sticky side of an ordinary envelope economy label, then paint them in with either cellulose or oil-bound paint using two or three coats. When perfectly dry rub over the surface of each figure with a dry rag dipped in fine pumice powder, to remove the shine. To transfer the transfers (!), soak them in warm water for at least five minutes then remove and with a pocket knife gently lift up the top of the figure peeling it off the paper from the top downwards. Remove it, still hanging on the knife blade, to the model and lay it gently on in the desired position, fixing the bottom first and sliding the knife away as the top is laid down. The most important point is to make sure several coats of paint are used for the transfers, as if too thin they prove unmanageable.

For the edification of solid modellers comes an idea from J. B. MORLEY, of Farnborough Green, (Fig. 4) a method of making sliding cockpit covers that slide. Make A, the windshield, from heated celluloid, trim and cement into place. Mould the sliding roof B over a wooden former and bend the bottom edge inwards to fit grooves cut in the side of the fuselage. Mould the rear cover C, and curve so that B can slide over it. Cement a strip of paper over the groove to keep the sliding roof in place. For machines with hinged covers cut a strip of tin, bend to shape and cement the celluloid over it. Bend a strip of tin round a pin secured in the fuselage. Then cement on the windshield and rear cover to complete.

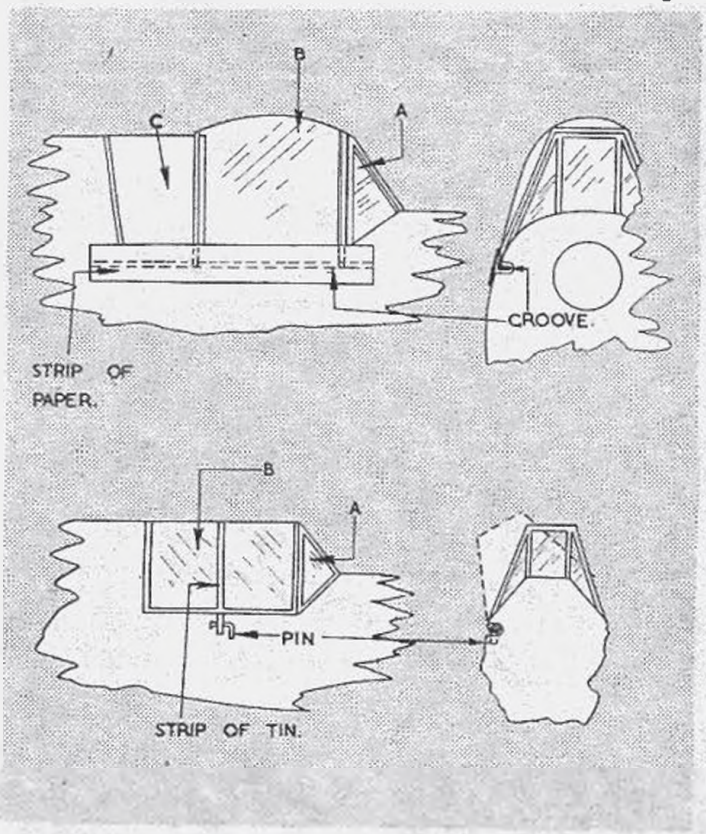


Fig. 4

C. DOWELL, of Atherstone, Warwick, sends us his method of getting over the difficulty of fitting interplane struts with pointed ends to model biplanes (Fig. 5). The struts are made from two pieces of hard balsa, soaked in dope, which are laminated together after having a groove cut down the centre. The wings are jigged as shown and two small holes are bored in the wing wherever a strut meets the wing. A long piece of florists wire is then cemented into hole X and the centre section strut is threaded on. The wire is then looped through Y, carried to Z, and another strut fitted on, and so on until the process is completed. The greatest advantage of this method is that the centre section struts are not deformed whilst the top wing is being fitted on.

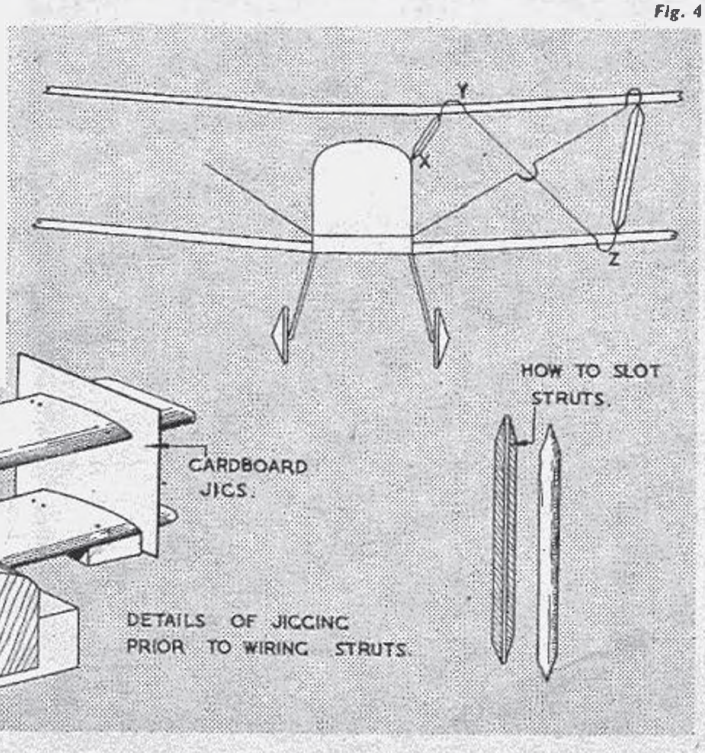
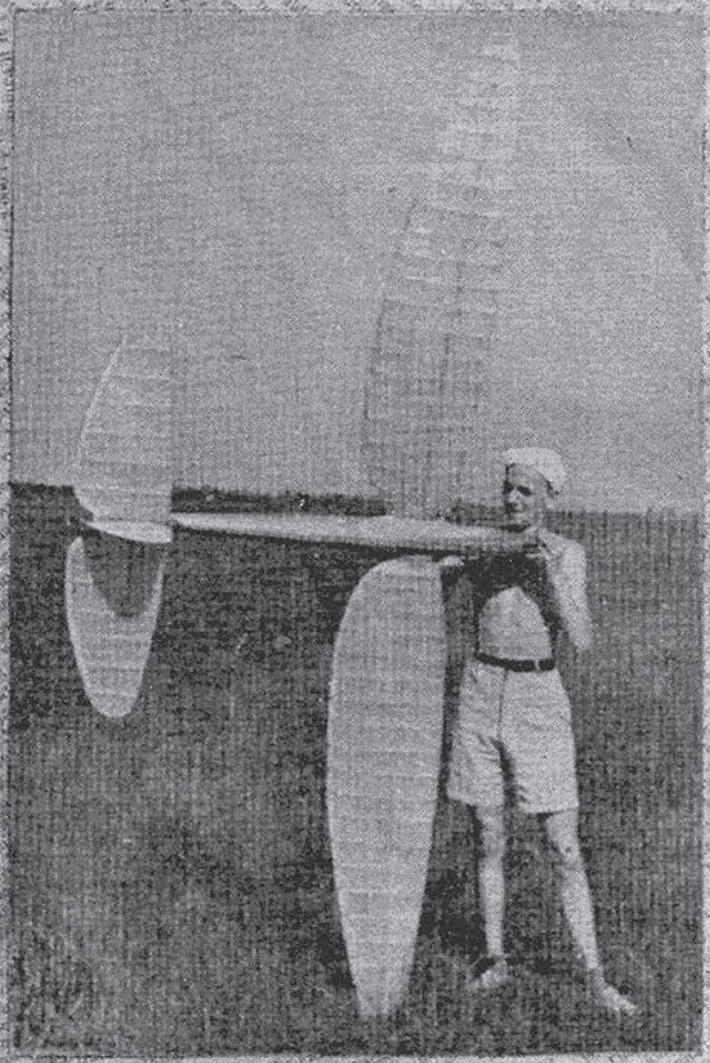
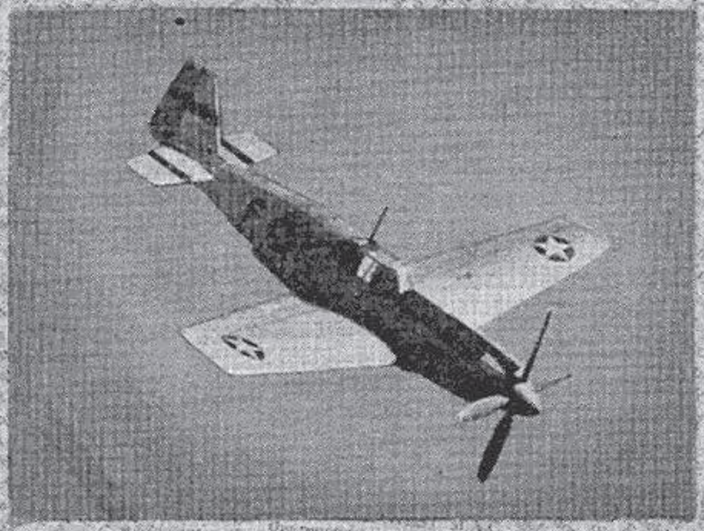


Fig. 5

Model

(Below.) THE SIZE OF IT ! A 9 ft. 6 in. span glider of typical Italian design, built by Renato Giva of Florence, Italy. Note the narrowed wing roots, a very common practice in Italy for which there seems to be little justification. The flimsy construction, too, would never suit an English climate!

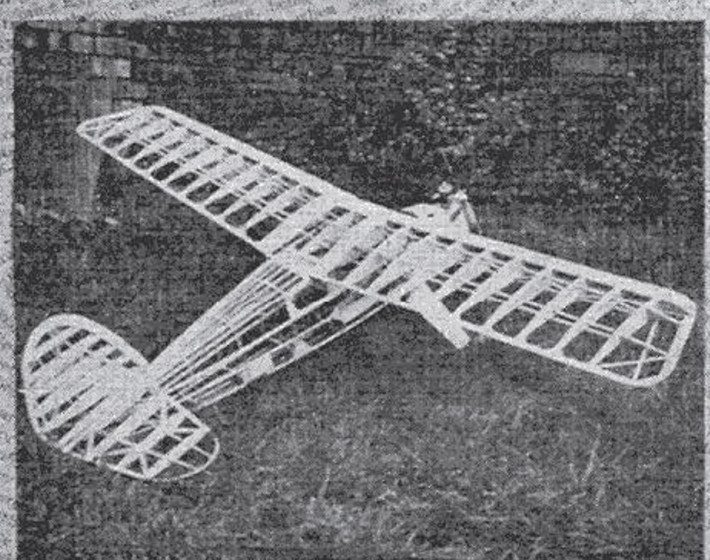


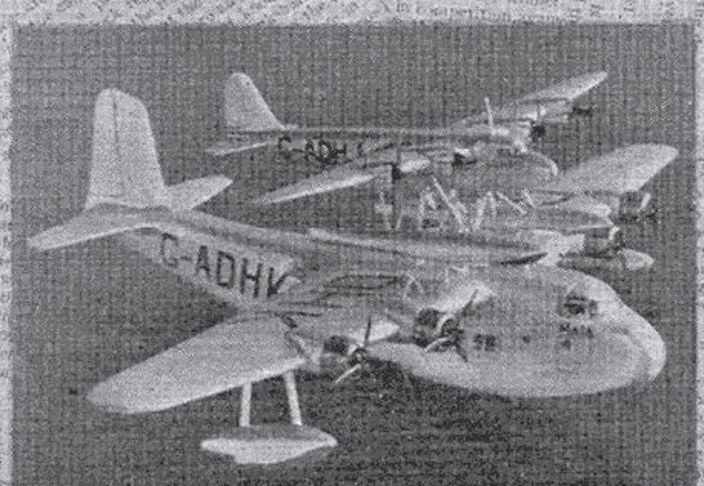


(Above.) HOLLOW SOLID. A built-up non-flying scale Mustang, P.51B of 27½ in. span, the work of Pte. P. Hockings at present of Keighley. The reason for the non-flying part of the specification—no rubber !

(Bottom left.) PATIENCE. Skeleton of a well-built Vulcan built from Aeromodeller Plans Service plans by Sgt. T.S. Rhead, now serving in India. The model took him every leave for four years to build and the original photos travelled some 14,000 miles to reach us. Even out there! Sgt. Rhead spends his spare time carving odd bits of balsa for use when he returns !

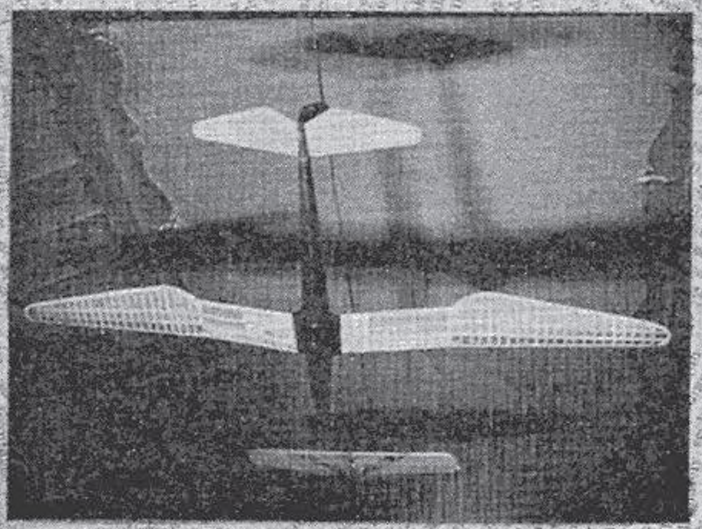
(Below.) " BIG FLEAS HAVE LITTLE FLEAS. . . ! " A nicely built model of the Mayo Composite by L.A.C. J. B. Smith of Lissett, Yorks. The model was built to 1/72nd scale from A.P.S. plans, and was constructed almost entirely of scrap. An " out of the rut " subject like this makes a pleasant change from the usual run of solids.

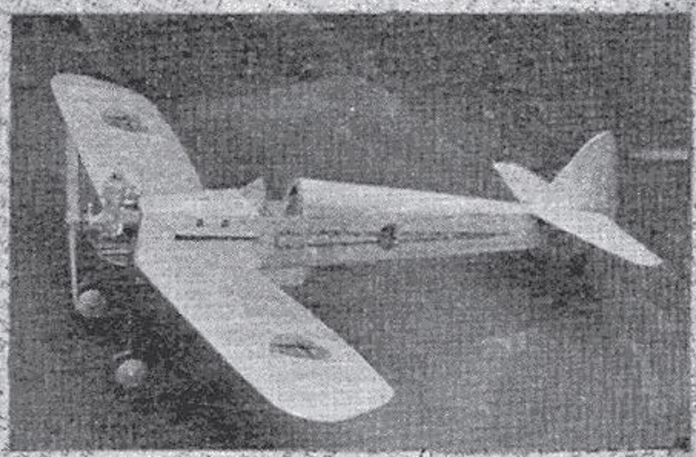




News

(Below.) ON A STRING. A 40 in. span control line model designed by H. Bowman of Cockermouth, powered with a 2·5 c.c. Hallam Baby. Note the original type of celluloid tank below the engine. An article featuring these is appearing in a forthcoming issue of the "Aeromodeller."



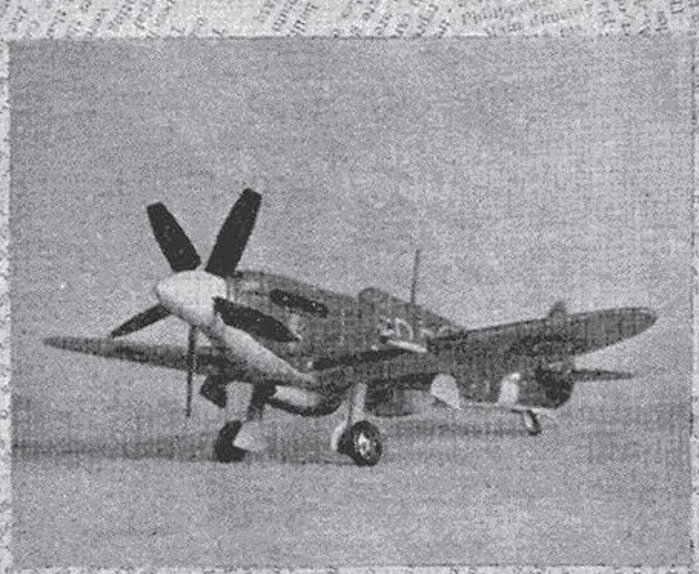


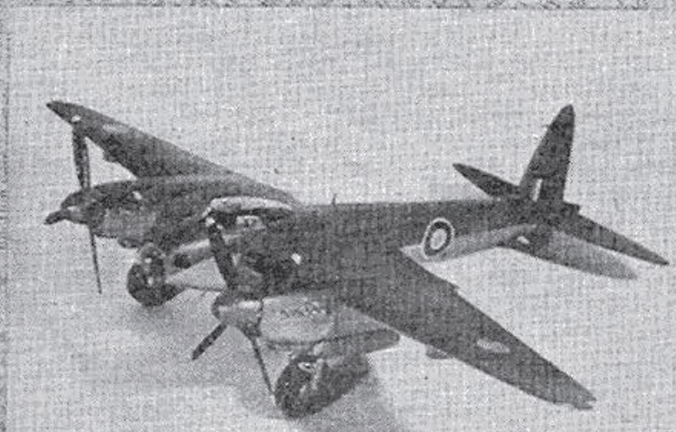
(Above.) PRIZE WINNER. A scene from Coventry M.A.C's Exhibition earlier in the year, with an excellent 'Condor' Sailplane suspended from the roof. This model took 2nd prize in its class.

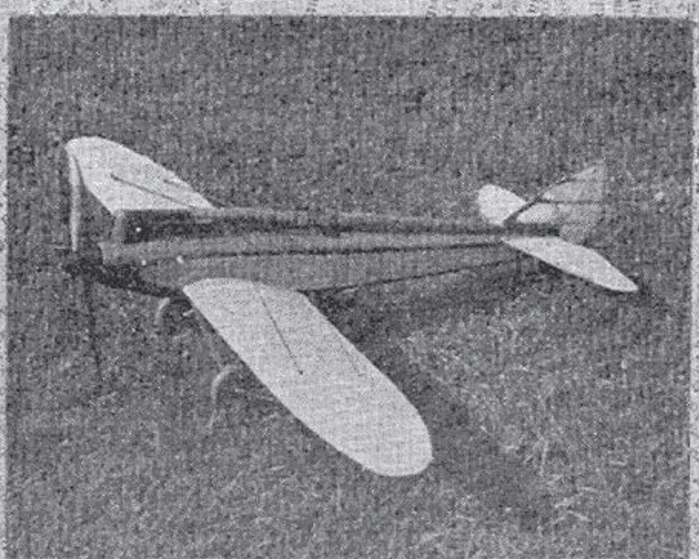
(Right.) FIVER. A flying-scale Spitfire XIV built by L.A.C. E. P. Edwards of Queensferry, of only 13 in. span. It is of monocoque construction, and was successfully designed to give a flying model with a solid appearance.

(Below.) WRONG. T. E. Bennett built this solid Mk. 9 Mosquito before it was off the secret list, making just one mistake, viz. 4 bladed props., since replaced by the correct number of three.

(Bottom right.) ONE WING ONLY. First class work from Brian H. Green of Birmingham in the form of a 22½ in. span 1" in.—1 ft. flying scale D. H. Tiger Moth. Note the landing 'wires', in this case represented by 1/32 in. sq. rubber. The whole model weighs under two ozs., a very creditable effort.



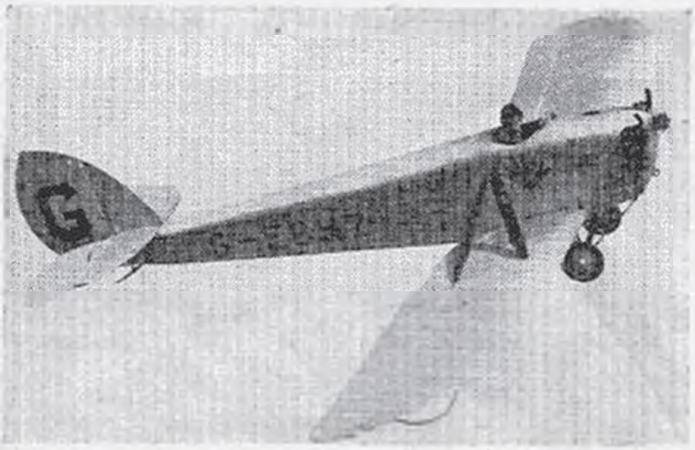




CIVIL AIRCRAFT No. 22

THE D.H.53

BY E · J · RIDING



A D.H.53 "Humming Bird" (A.B.C. "Scorpion" 35 h.p. flat twin engine) flying at the 1926 light aeroplane competitions at Lympne. "Flight" Photo.

A private owner demonstrates how easy it is to man-handle a "Humming Bird" on the ground—this machine is fitted with the 22 h.p. Blackburne "Tomtit" engine. "Flight" Photo.

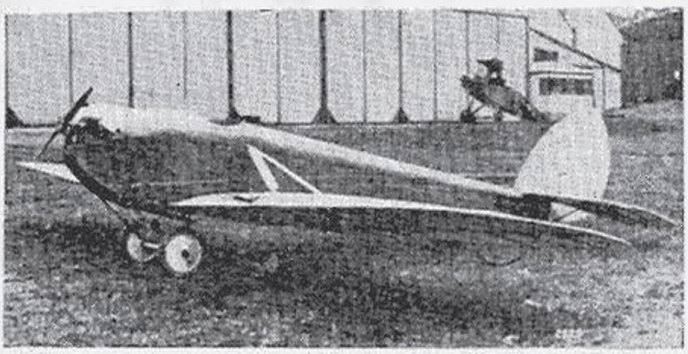
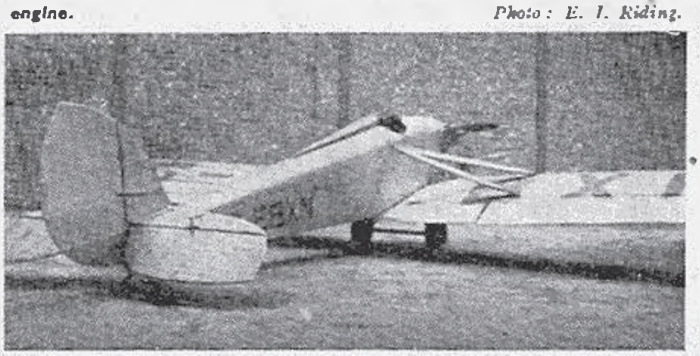


Fig. 1. The prototype "Humming Bird" fitted with the 750 c.c. Douglas motor-cycle engine. "Real Photographs Co., Ltd."

Fig. 4. One of the later versions fitted with a 36 h.p. Bristol "Cherub III" engine. Photo: E. J. Riding.



IN October, 1923, the "Daily Mail" organised a series of trials at Lympne for light aeroplanes with engines of under 1,000 c.c. The De Havilland Aircraft Company designed and entered two identical machines and although they failed to win any of the prizes, many people considered them to be the best all-round practical aircraft at the meeting.

In the hands of Messrs. Broad, Hemming and Capt. de Havilland, the "Humming Bird," as the type had been named, were shown to be extremely manœuvrable both on the ground and in the air. Towards the close of the meeting Broad performed a series of loops and rolls, a feat never before attempted on a light aeroplane. It became obvious from this spectacle that the '53 was no mere toy and that it could be regarded as a really sound all-weather machine suitable for the sporting private owner.

The first two "Humming Birds" to appear on the civil register were G-EBHX and G-EBHZ and they were fitted originally with the twin cylinder 22 h.p. inverted Vee type Blackburne "Tomtit," and the flat twin A.B.C. "Scorpion" engines respectively. Later models were equipped with the 36 h.p. flat twin Bristol "Cherub III."

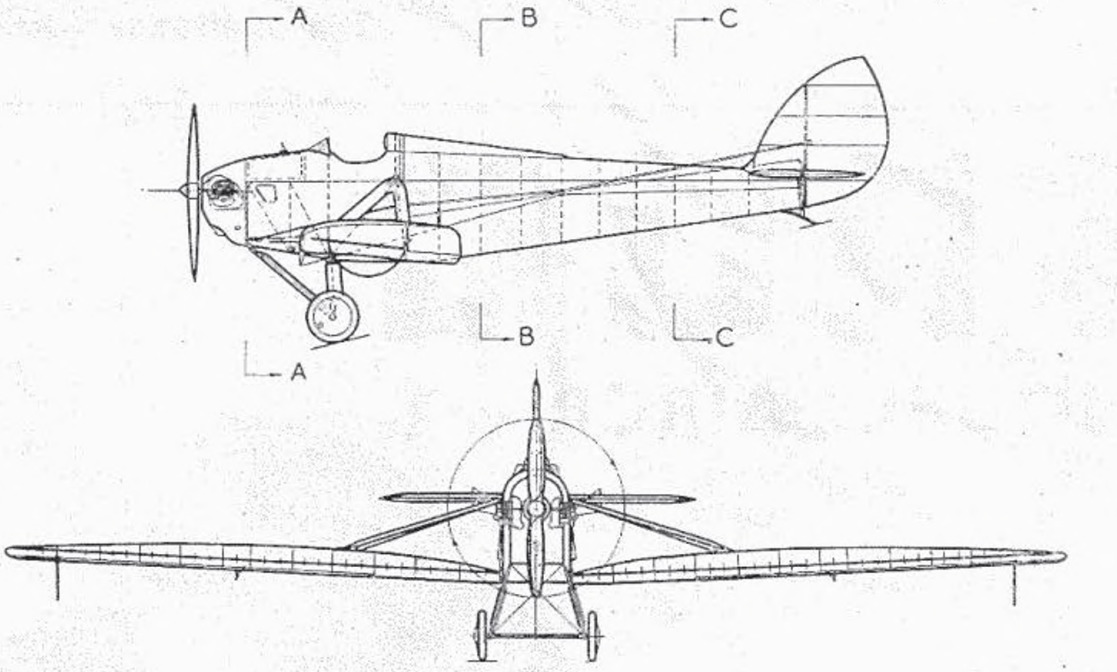
A small batch of D.H.53's were supplied to the R.A.F. for light communication duties in 1924. Some of these machines carried the serial numbers J.7270-3 inclusive, and another one, J.7325, was used for experiments in connection with the dropping of aircraft from the airship R.33 in 1925. These service D.H.53's were painted aluminium all over and carried red, white and blue roundels on the sides of the fuselage and underside of the wings only. The rudder carried red, white and blue flashes with serial numbers in black (the blue stripe adjacent to the rudder post). The majority of them were put on to the civil market during 1927-8, where they were soon snapped up by private owners who were quick to realise that they offered a cheap way of putting in flying hours, thus J.7272 ultimately became G-EBTT and altogether there were eleven machines of this type on the register.

At the outbreak of war there were still three or four "Humming Birds" lying about the country. One of these was the veteran G-EBHX, which says a lot for the design and construction of these early light aircraft. Another one, G-EBXN, was still in excellent flying condition, but it was unfortunately destroyed in a fire up at Hooton Park in July, 1940.

According to usual D.H. practice, the fuselage was built up from light spruce longerons and cross-members covered with plywood. The wings had two wooden box spars and "T" section ribs. The wings and tail surfaces were covered with fabric. The early machines had rubber cord shock absorbers on the rear undercarriage legs, but these were later superseded by pistons working in conjunction with rubber pads in compression inside steel cylinders.

The colouring of the civil machines was invariably aluminium all over with black, blue or green (as in the case of G-EBXN) letters and struts.

Specification (Blackburne engine): Span, 30 ft. 1 in.; length, 19 ft. 8 in.; height, 7 ft. 3 in.; wing area, 150 sq. ft.; tare weight, 310 lb.; loaded weight, 490 lb.; speed (max.), 76 m.p.h.; cruising, 50 m.p.h.; landing, 30 m.p.h.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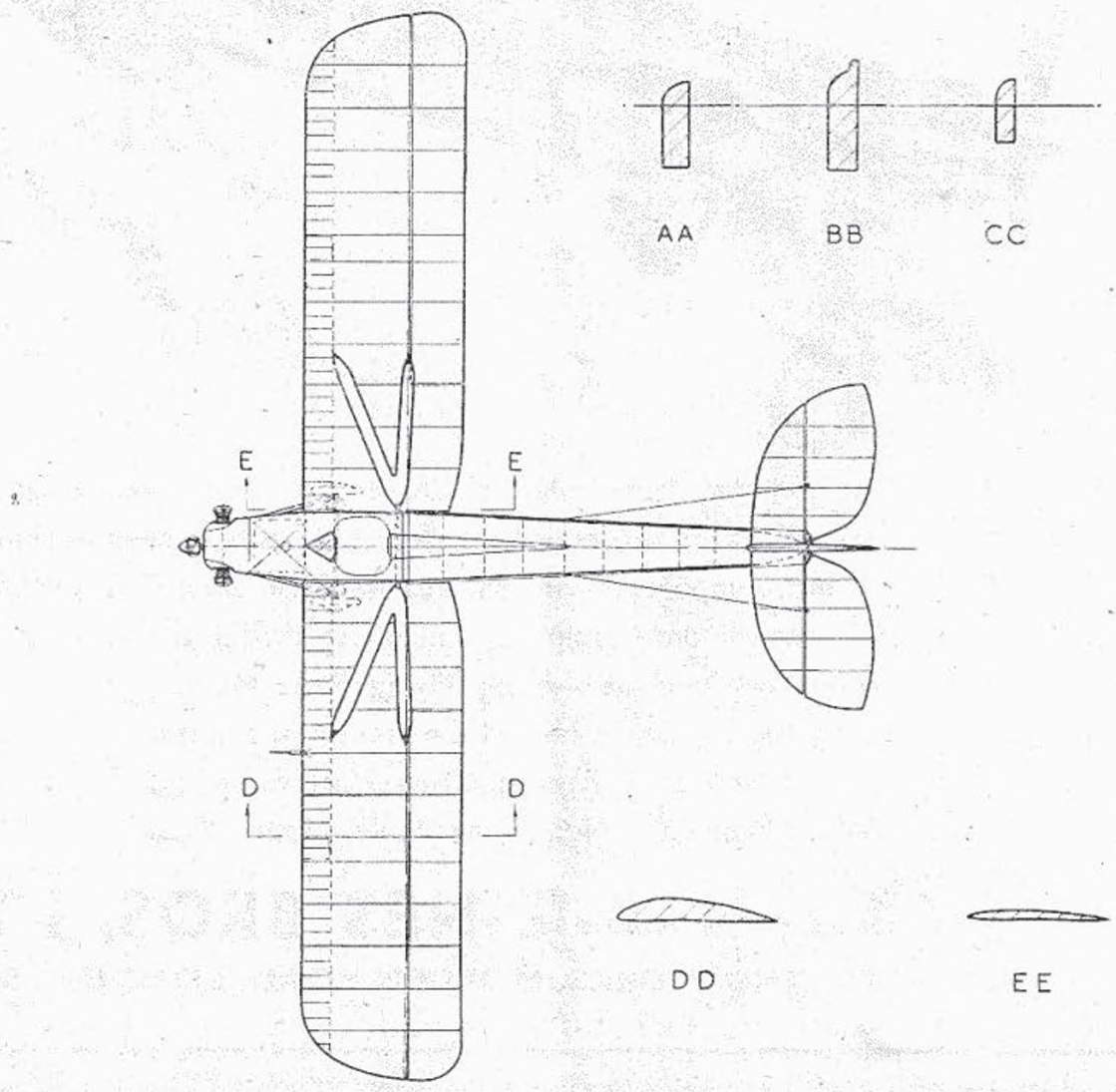
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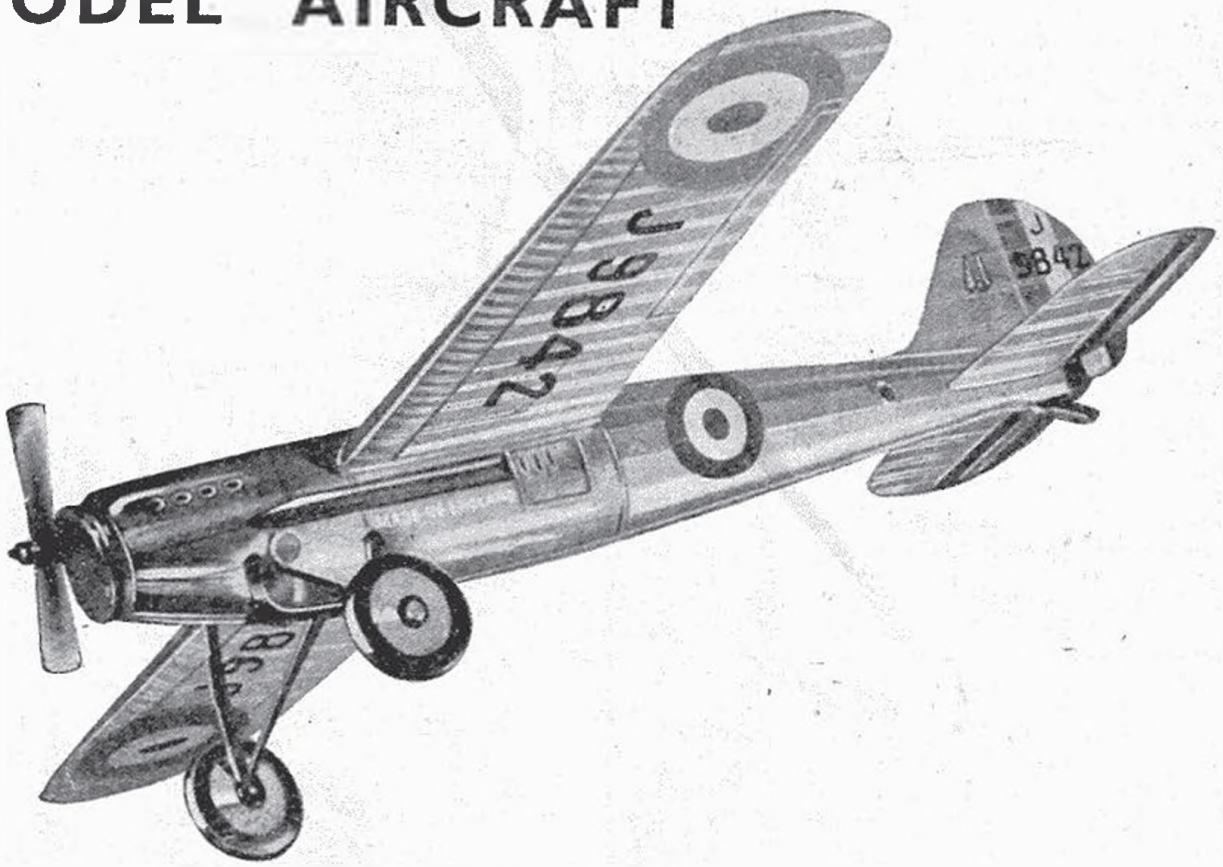

International Model Aircraft have not been producing Model Aeroplanes for 5 years because their experts have been working hard on more important winners, but we hope soon that all the latest models will once again be available to model aircraft enthusiasts. These will include :—Frog Flying Scale Models, Frog Flying Scale Model Construction Kits, Frog "Senior" Flying Construction Kits, Frog "Penguin" Non-Flying Scale Model Kits.

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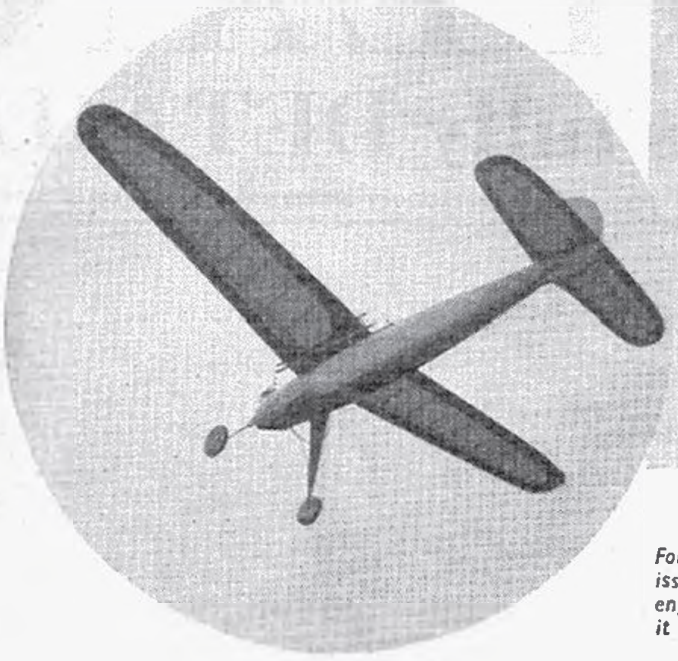
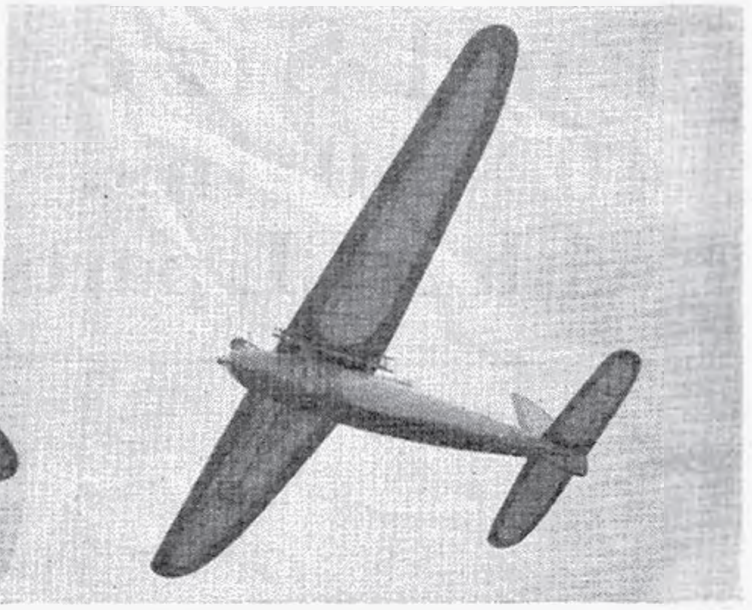
The *DUDE*





BY G · W · W · HARRIS

Following on the simple beginner's petrol model featured in the March issue, we present a somewhat more advanced machine of 64 in. span for engines of 4-6 c.c. The fine flying characteristics of this model make it ideal for competition.

WHEN this model was designed, special attention was paid to the following points :—

A. Performance.
B. Appearance.
C. Strength of structure.
D. Good and easy access to engine and its ignition system.
E. The ability to take hard knocks.
F. Mainplane mounting to be crash proof.
G. The tail unit to be light and rigidly fixed (experience has shown that all too often badly fitted tail units are the cause of smashed models and that rarely is the tail unit damaged).
H. Provision to be made for more than one type of engine fixing.

The designer also considered the possibility of scaling the design up to, say, 8 ft. span for radio control work.

Provided the instructions and drawings are followed and a little discretion is used no difficulty should be experienced in constructing this plane—so here we go :—

First of all study the drawing. Check up and see which will be the best way to mount your engine. Make yourself familiar with every detail, and the job will be an easy one.

Fuselage. Begin by laying a sheet of paper on the drawing ; trace through the formers, numbering each one as you go along. Cut each of these drawings out, allowing about $\frac{1}{8}$ in. margin ; do not cut the centres out yet. Now cement each drawing on to a sheet of $\frac{1}{8}$ in. balsa. Keep the grain vertical. If only the wood available is soft it will be best to cement a sheet of paper on both sides ; this will prevent it splitting during the cutting and other operations to follow.

Cut the formers out and slot them as indicated. Steam three lengths of $\frac{1}{4}$ in. by $\frac{1}{8}$ in. hard balsa to the shape of the three master stringers A, B and C. A way to assemble the fuselage is as follows : obtain about three feet of 2 in. by 2 in. deal and cut it up into lengths varying from 4 in. down to $1\frac{1}{2}$ in. Nail these blocks $2\frac{1}{2}$ in. apart on to a building board, keeping them square to a centre line, see plan.

A, B and C can now be fitted into the slots of the formers and the whole job squared up and cemented. Drawing pins pushed through the formers into the blocks will position them while the $\frac{1}{8}$ in. by $\frac{1}{8}$ in. stringers are fitted. (Avoid applying any undue bending forces to the stringers, otherwise when the fuselage is removed from the jig it may distort.)

The stringers should be fitted alternately from side to side (it may be necessary to steam some of the stringers).

Now lift the fuselage away from the jig and fit the $\frac{1}{8}$ in. by $\frac{1}{4}$ in. strips and the remaining stringers.

Study the fuselage drawing and then proceed to fit the various parts as shown. Note that one rear wing strut is staggered.

Undercarriage. Make up the undercarriage parts and assemble as follows : Cut out two stringers from each side of the fuselage between stations No. 1 and No. 2 to provide access for fitting the undercarriage legs.

Thread the legs into place and cement the whole job up ; all parts should be pre-coated with cement. Bind the ends of the legs with florist or brass wire, line up and solder. Fit the spreader bar landing wheels.

Fill in the legs with balsa, cover with silk and dope. Replace the stringers.

Now fit the engine bearers. Unless your engine is intended to run inverted I advise you to fit it upright. In any case, keep the thrust line as per drawing.

Sandpaper the fuselage all over until quite smooth.

From a soft block of balsa carve out the hatch slightly oversize, lay it in position and sand it to shape. Next hollow it out, dope it all over and when dry cover it with silk, now dope again.

Main Planes. It will save time if you work on both

Full Size 40 × 60 ins. PLANS with ALL parts fully DETAILED

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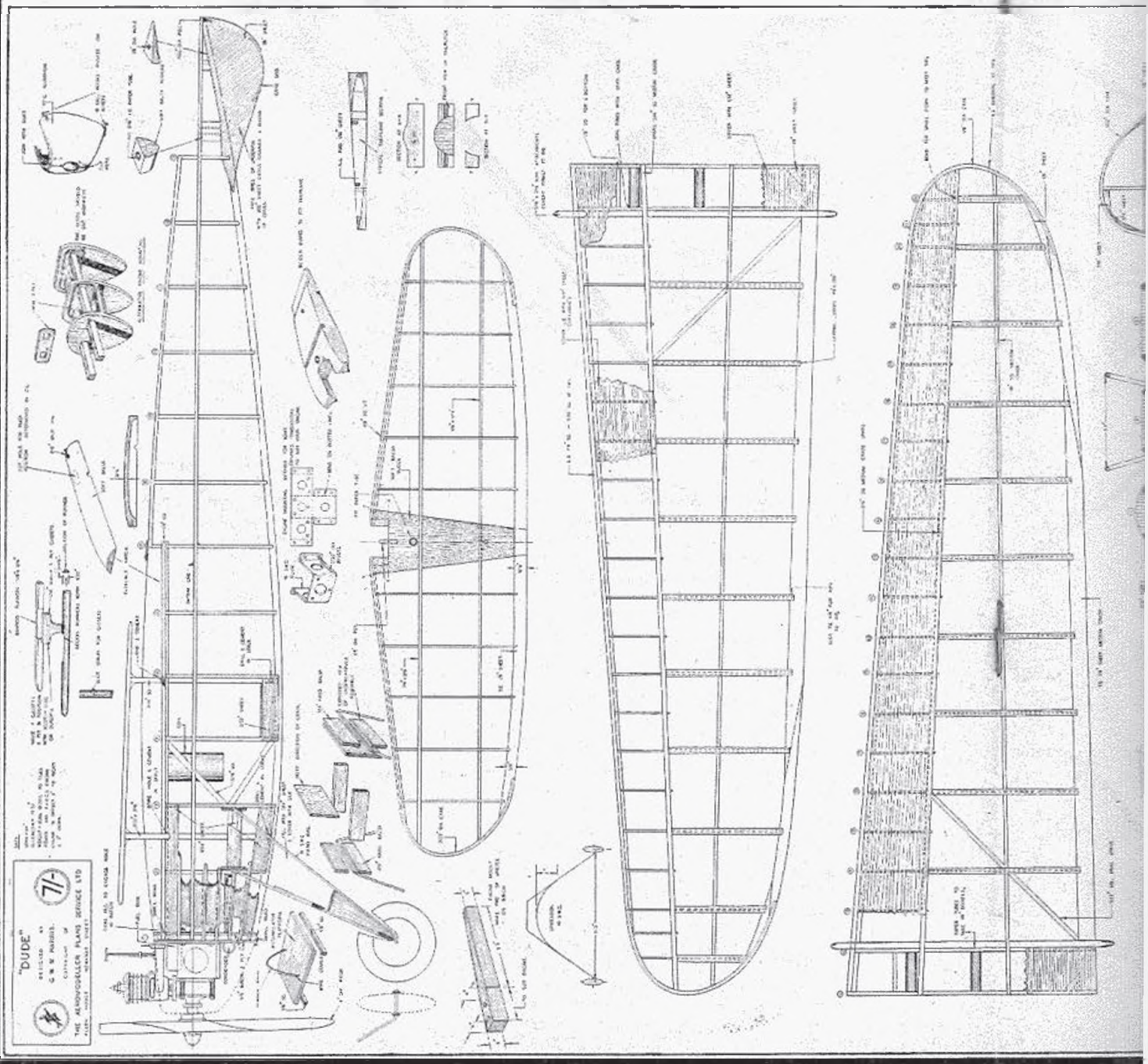

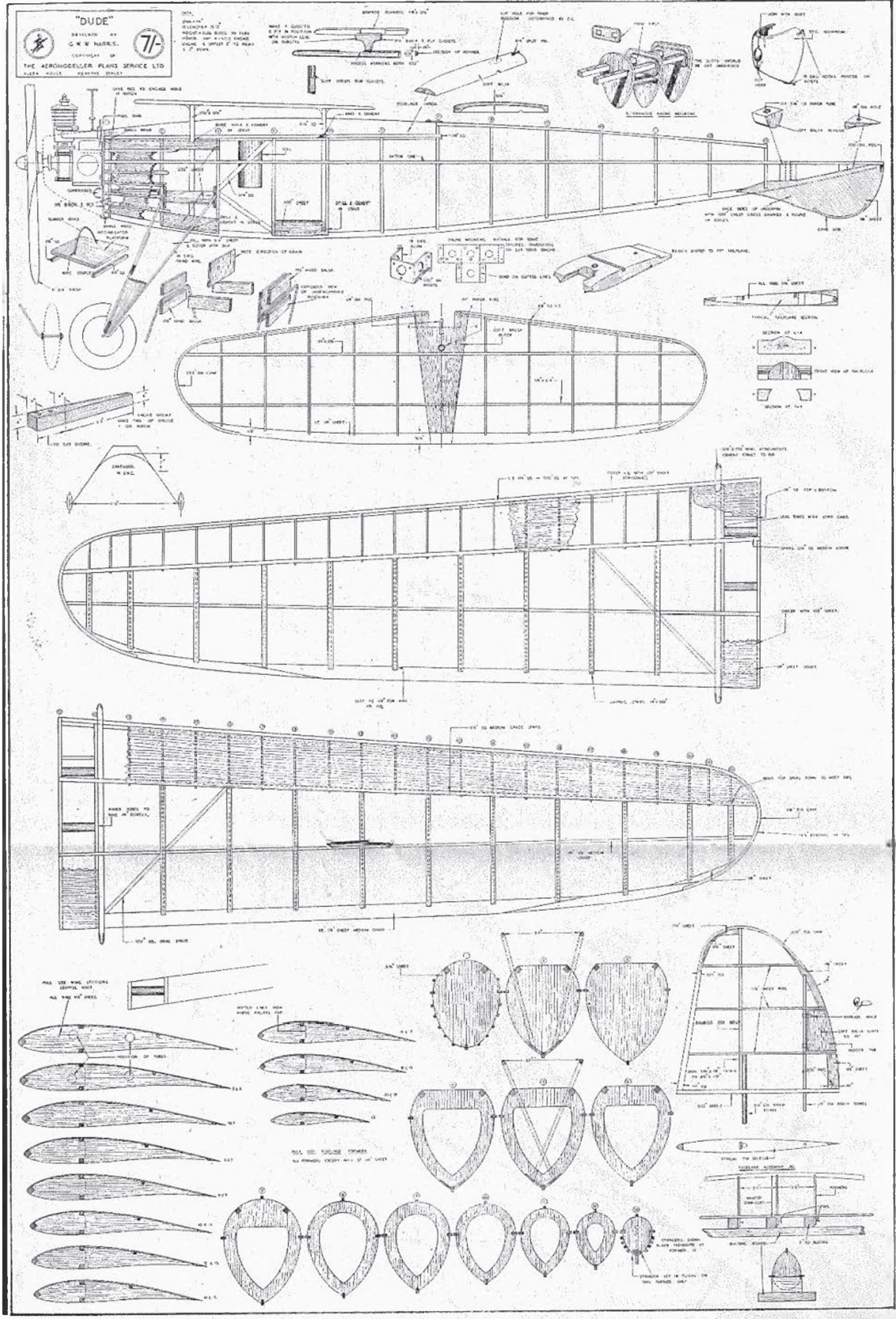

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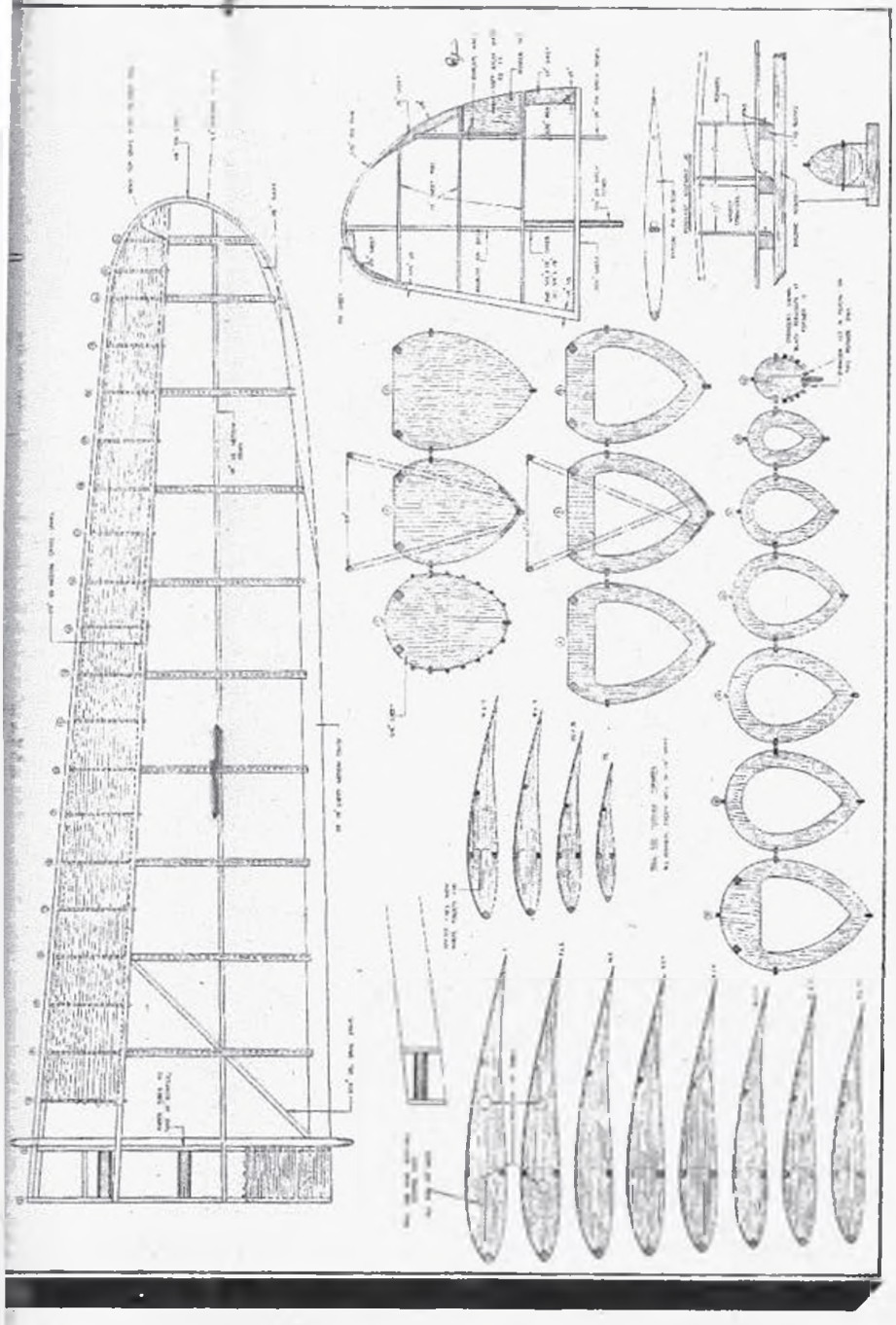


panels—changing over with each stage of operations.

The wings are not difficult to build so do not hesitate. Trace the ribs on to some 1/16 in. balsa, cut them out and slot them and clean up with sandpaper. Now plane up the leading and trailing edges to shape. Pick out some sound lengths of balsa for the spars, lay one of them on the drawing and fit the ribs to it; now push the top spar into place; make sure the ribs are in their correct order. Slot the T.E. and offer it up to the ribs for check; if or when O.K., cement the whole job up. While it is drying attack the other panel in a similar manner. The L.E's. can now be fitted. Use plenty of cement. Do not round off the L.E's. until the 1/32 in. sheet nose covering has fitted. Next fit the nose ribs.

Mark off and drill the root ribs. I find the job is best done by drilling the holes undersize, then worrying them out with a round file until they line up O.K. Make up the paper tubes and cement them in well and truly, smear them all over with cement.

Fit the tips. With a straight edge mark off the slots for the top rear spar ($\frac{1}{8}$ in. by $\frac{1}{4}$ in.)—the slots must be $\frac{1}{4}$ in. deep to prevent the spar showing through the covering. Cement the Vee block to the port wing root. Fit the drag struts. Clean up with sandpaper and fit the 1/32 in. sheet covering. Finally, fit the capping strips ($\frac{1}{4}$ in. by 1/32 in.) and sand all over. Note:—to obtain first class results make periodical checks by sighting the wings with the eye to see if they are true, particularly when the 1/32 in. sheeting is fitted.

Tail Unit. The stabiliser should be made first : it is very easy to make. Start by shaping out the centre block and make sure it fits the fuselage snugly, then drill two dowel holes. Mark off and drill the two fuselage blocks to suit. Now go ahead and assemble the stabiliser.

It will be noted that the fin is fitted with a birch or bamboo spar. Bamboo is to be preferred, because should the model overturn the fin will survive the blow. Clean up the tail unit and check for warps.

Assemble the model and stand it on a table, now close one eye and sight down from the front to the rear and check the alignment of the main plane's tail unit. If necessary, add a strip of say 1/32 in. balsa along the wing mounting that is low.

The model can now be covered and doped. The original machine was covered with silk, but bamboo paper will do quite well. It will be best to cover the fuselage with three separate pieces of silk or paper. Give the fuselage and mainplanes two coats of dope and the tail unit one. The machine can be colour painted to your pet scheme; my father finished his off in blue and cream, which looks very smart indeed.

By the way, do not forget the dodge of rubbing down each coat of dope and cellulose with fine sandpaper, very lightly of course.

Go ahead now and fit the ignition system. Fit the timer in a position where it will help to bring the C.G. about $\frac{1}{2}$ in. behind the mainplane spar. Note:—the battery should be in place when the C.G. is checked.

Propeller. The propeller size cannot be given here owing to the various engines that can be fitted to this machine. Our engine, which is home made, is 4 c.c. and is driving an 11 in. prop.

The engine is offset 2° to the right 2° down. If you are flying this model with a 6 c.c. engine go easy with the throttle or it will climb like a ding-bat!

Try to make the model fly in gentle turns to the right, the fin tab can be used to assist but do not abuse it, or the glide will be ruined and so might the 'plane. And remember VOLA CUM CURA!

HOW TO TRAVEL TO EATON

FULL facilities and amenities as previously described in AEROMODELLER will not be available until next year; but, from Saturday, September 15th *of this* year, the Sportsdrome will be available on Saturdays and Sundays for the flying of all types of model aircraft, from 10 a.m. to 9 p.m. Water for drinking purposes and lavatory accommodation for both sexes will be available, free; and it is hoped to make available a limited amount of protection from the rain.

Cars, motor cycles and bicycles may be parked round the sides of the Sportsdrome. Neither cars, motor cycles nor bicycles may, under any circumstances, be driven *across* the Sportsdrome, either from corner to corner, or from side to side.

Admission charges are as under:—

Adults, 1s. per person.

Persons under 16 years of age, 6d.

Both these charges will be reduced by half for admission after 5 p.m. on both Saturdays and Sundays.

Vehicles brought on to the Sportsdrome will be charged at the following rates:—

Motor Buses and Motor Coaches 2s. 6d. each.
Motor Cars .. .. .. 1s. 6d. "
Motor Cycle Combinations .. 6d. "
Motor Cycles (solo) and Pedal Cycles—no charge.

The following information is published with a view to enabling aeromodellers to find their way to Eaton Bray Model Sportsdrome:—

ROAD TRAVEL

1. Aeromodellers approaching from the NORTH and coming down Watling Street (Route A.5) can branch off at Fenny Stratford and proceed through Stoke Hammond to Leighton Buzzard, 2½ miles beyond which town is the village of Billington, adjacent to which is the Sportsdrome—or they may continue down Watling Street until they turn right at a point about 1½ miles south of the village of Hockcliffe. This turning leads through Tilsworth to the village of Stanbridge, which is about 1½ miles north-east of the Sportsdrome.

2. Aeromodellers leaving Leighton Buzzard take the Hemel Hempstead road (Route B.486). After about a mile they pass over a level crossing, and shortly after bear left at a Y fork. The road rises slightly to the village of Billington, which is on the top of a ridge. On the far (south) side of this ridge is a turning to the left, which is Billington Road, on the south side of which, about ¼ mile along, is the Sportsdrome.

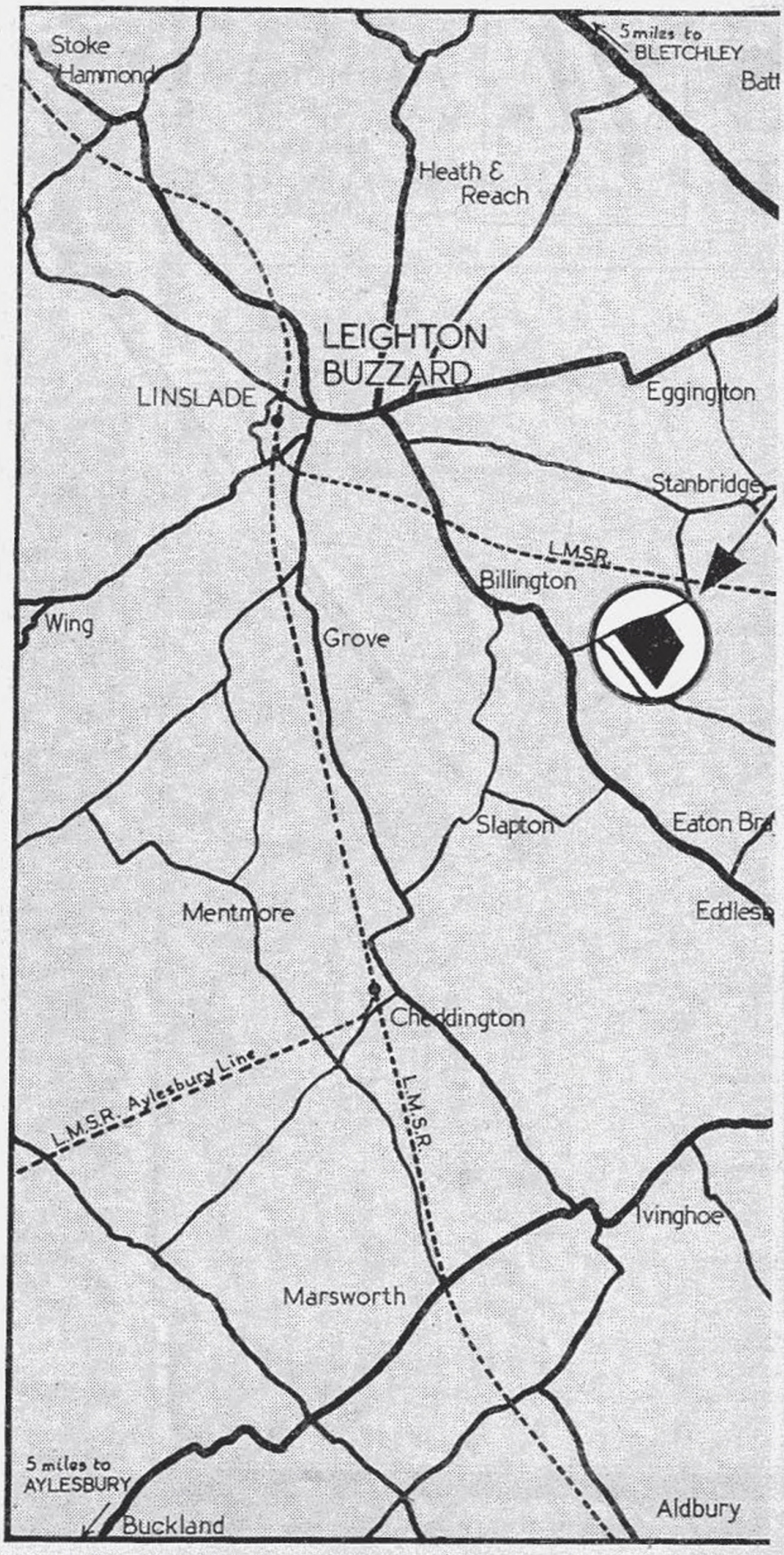
3. Aeromodellers turning off Watling Street and coming through Tilsworth and Stanbridge take the Leighton Buzzard Road out of Stanbridge, but very shortly turn left, travelling south, and within a few hundred yards pass over a level crossing, afterwards turning sharp right into the Billington Road, and so to the Sportsdrome.

4. Aeromodellers approaching from the SOUTH or LONDON AREA, make their way out of London via one or other of the main roads—those from the easterly side via the Barnet Bypass or Watling Street, and so through St. Albans, Redbourne, Markyate, Dunstable, and up Watling Street until they pick up the turning to the left through to Tilsworth (see Route 3 above).

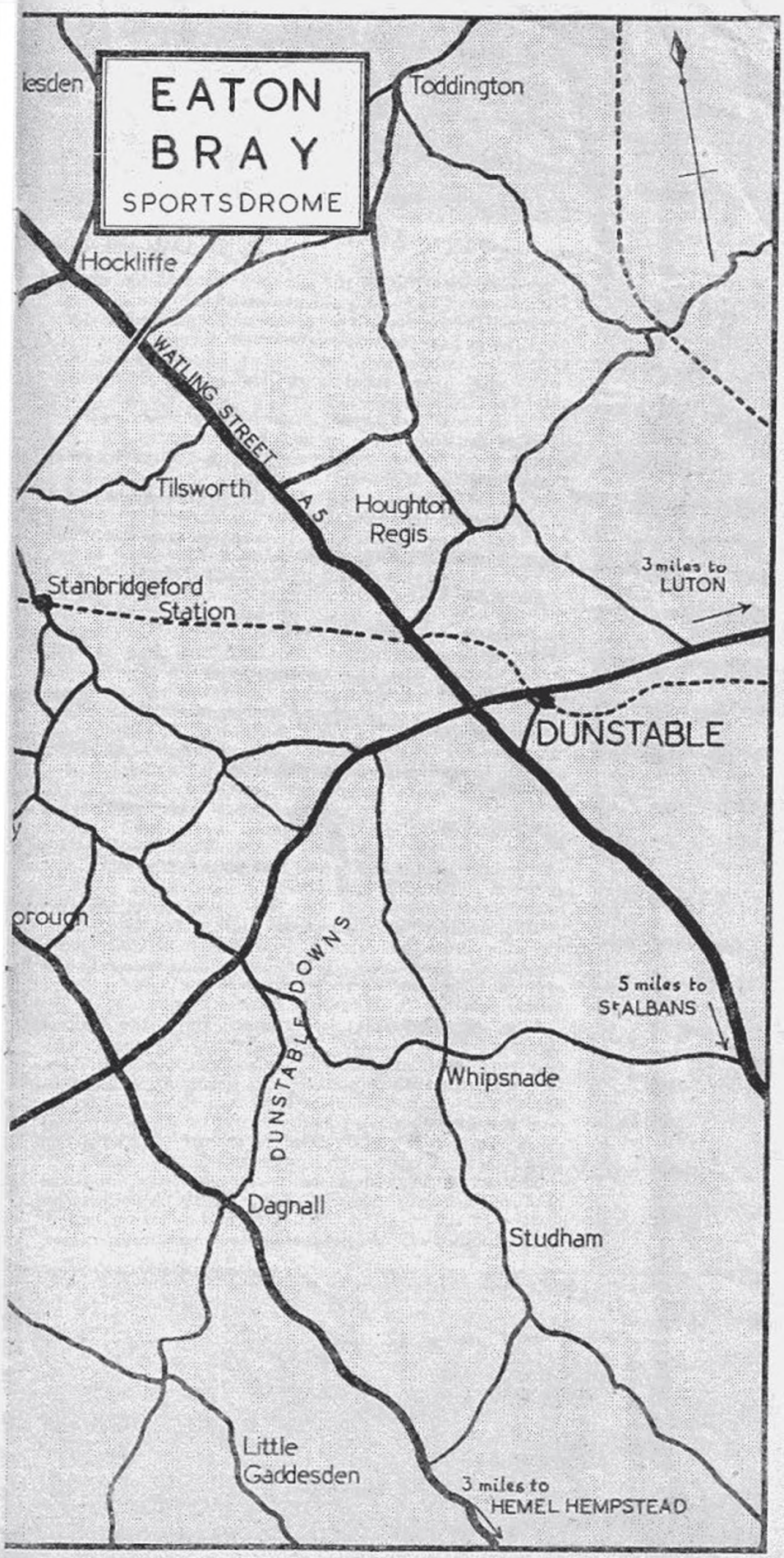
5. Aeromodellers from the more westerly side of London would come out via the Watford Bypass, taking the Tring Road through Kings Langley, but branching right in Boxmoor to Hemel Hempstead. From Hemel Hempstead they take the road straight through for Leighton Buzzard. Passing through the village of Dagnall, crossing the Tring-Dunstable road, and through Eddlesborough until reaching the village of Billington, where they turn right along the Billington Road and so to the Sportsdrome.

It is most important for aeromodellers travelling along this Hemel Hempstead-Leighton Buzzard road to bear in mind that the village of Eaton Bray lies to their right, AND THAT THEY MUST NOT TAKE EITHER OF TWO ROADS WHICH BEAR OFF TO THE RIGHT LABELLED "EATON BRAY." THESE WILL TAKE THEM TO THE VILLAGE AND NOT TO THE SPORTSDROME. Aeromodellers should keep on the main Hemel Hempstead road until they come to the village of Billington, and then turn right along the Billington Road to the Sportsdrome.

Suitable arrangements with the local authorities in regard to the erection of signposts have been made, and once aeromodellers are within a couple of miles or so of the Sportsdrome, no matter from which direction they approach, they will



BRAY MODEL SPORTSDROME



find clear notices guiding them to the Sportsdrome.

6. Aeromodellers approaching from a WESTERLY direction, and making their way through Aylesbury, are best advised to make straight for Leighton Buzzard, and then come out on the Leighton Buzzard-Hemel Hempstead road (see Route 2 above).

7. Aeromodellers approaching from the EAST, coming through Baldock and Hitchin, would take Route B.655 through Hexton, then through to Harlington, and so to Toddington, then through Tebworth, where they join Watling Street about ¼ mile on the London side of Hockcliffe. Thus they turn left, travel down Watling Street (towards London) a further ¼ mile, then turn right through Tilsworth and Stanbridge and so to the Sportsdrome.

8. Aeromodellers approaching from the SOUTH-EAST, coming through Luton, would make straight for Dunstable, and then up Watling Street until they meet the Tilsworth turning (see Route 7 above).

9. Eastern National bus service 18B runs between Leighton Buzzard and Dunstable. Aeromodellers should alight at the Billington road, *i.e.*, the junction that is directly under the letter "n" in Stanbridge. There are no buses before midday on Sundays.

RAILWAY TRAVEL

Under the still continuing "war-time conditions," it is not possible to arrange a full train service, less still special trains to Eaton Bray, although, no doubt, when normal conditions are re-established, we shall be able to do this.

Stanbridgeford Station is about 1¼ miles—a reasonable walking distance—from the Model Sportsdrome, but those aeromodellers who travel by train to Leighton Buzzard or Dunstable are advised to bring bicycles with them.

Meanwhile, the following train services from London are given :—

L.M.S., EUSTON TO LEIGHTON BUZZARD.

SATURDAY.		SUNDAY.	
Depart	*Arrive*	*Depart*	*Arrive*
7.35 a.m.	*9.1 a.m.	8.5 a.m.	9.35 a.m.
8.45 a.m.	*10.15a.m.	9.10 a.m.	10.26 a.m.
11.35 a.m.	*1.3 p.m.	11.35 a.m.	12.50 p.m.

LEIGHTON BUZZARD TO EUSTON. L.M.S.

5.10 p.m.	6.20 p.m.	5.7 p.m.	6.15 p.m.
5.24 p.m.	7.2 p.m.	6.31 p.m.	7.54 p.m.
7.12 p.m.	8.45 p.m.	7.34 p.m.	9.2 p.m.
10.28 p.m.	11.30 p.m.	—	—

L.N.E.R., KING'S X TO DUNSTABLE TOWN.

SATURDAY.		SUNDAY.	
Depart	*Arrive*	*Depart*	*Arrive*
7.28 a.m.	*9.27 a.m.	8.35 a.m.	10.24 a.m.
12.10 p.m.	*1.55 p.m.	—	—

DUNSTABLE TOWN TO KING'S X. L.N.E.R.

5.33 p.m.	7.31 p.m.	6.16 p.m.	8.17 p.m.
6.30 p.m.	8.35 p.m.	—	—

* Denotes that there is a connection with Eastern National Bus Route 18B, to Stanbridge.

L.M.S., DUNSTABLE TO LEIGHTON BUZZARD (*WEEK-DAYS ONLY*)

LEIGHTON BUZZARD	STANBRIDGE-FORD	DUNSTABLE (L.M.S.)
12.54 p.m.	1.3 p.m.	1.10 p.m.
5.30 p.m.	5.38 p.m.	5.46 p.m.
7.40 p.m.	7.48 p.m.	7.56 p.m.

DUNSTABLE (L.M.S.)	STANBRIDGE-FORD	LEIGHTON BUZZARD
1.16 p.m.	1.22 p.m.	1.31 p.m.
6.10 p.m.	6.18 p.m.	6.27 p.m.
8.15 p.m.	8.21 p.m.	8.30 p.m.

The Ham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HOUNSLOW HEATH

In direct contrast to the weather provided for the Sir John Shelley Cup the day dawned with bright sunshine, and a very light breeze which practically disappeared later on. Before long the field was one solid thermal and various unattached modellers flying gliders on the heath were consistently losing them in the slowly moving cumulus clouds a couple of thousand feet up.

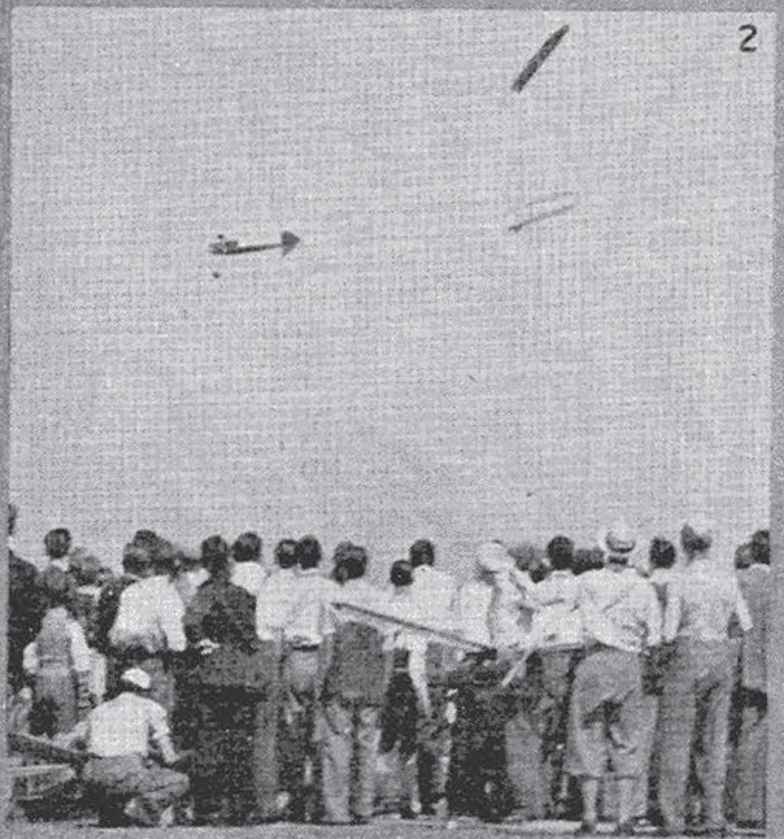
The day was not perfect, despite the glorious weather. The Contest was marred by lack of organization, no real arrangement having been made to cope with the great number of spectators and supporters who thronged the field. Piles of bicycles all over the heath were an ever present menace, and more than one machine suffered damage from a collision with some projecting part that would not have occurred if a suitable enclosure had been roped off, and all the cycles, trailers, etc., marshalled inside.

The contest was started during the early afternoon on the far side of the field, where the long grass and inadequately short take-off boards combined to result in numerous take-off failures. All that the large heavily-loaded models were able to manage was a slow hop, to land in the long grass a few yards further on. In many cases the grass seeds choked the engines or the stalks wound themselves right round the prop shafts in a glorious entanglement. Even when such *officially sanctioned* artifices as raising the end of the take-off board and giving the model a hearty shove were resorted to, many models still failed to "rise to the occasion." That well-known competition flyer Silvio Lanfranchi, of Bradford, seemed to have the right idea when he helped his model on its way by the simple method of dropping flat on the board as the model reached the raised end, resulting in a spring-board effect which fairly shot the model up in the air!

This situation was manifestly unfair, favouring as it did only those with lightly loaded models, and finally the officials were forced by general opinion to accept the urgings of several competitors to try a large circular tarmac on the other side of the field.

After this somewhat unfortunate start, the contest continued fairly smoothly. The meeting was marked by two very unusual incidents of a similar nature, viz., *visible* thermals which behaved like miniature whirlwinds, whirling newspapers and any light material high into the air; the second, which became clearly visible as it picked up large quantities of dust on the tarmac, was so strong that it lifted a large petrol model several feet in the air.

The array of models was really imposing, and the number must have totalled well over thirty. A noteworthy feature of the meet was the large and *interested* crowd, which, coupled with the number of models and competitors,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must have made this the biggest petrol gathering since the lifting of the ban, and a happy augury of things to come.

The Heading Photo shows a part of the large crowd Many well-known aeromodellers attended and are visible in the photograoh.

Photo No. 1. "*The Winner!*" R. C. Monks, of Birmingham, and his winning model. Powered with a 6 c.c. Baby Cyclone, it is of 5-ft. span, 500 sq. in. area and weighs 3¼ lbs.

Photo No. 2. "*. . . if I only had wings . . .*" and a considerable difference it would have made, too! Hancock's model caught by the camera just as the wings parted company and the fuselage began its brief journey earthwards.

Photos Nos. 3 and 4. "*Boosted take-offs.*" Left, G. W. W. Harris, of Croydon, manages to get his model off from the raised end of the take-off board during the first part of the contest. Right, R. C. Monks also succeeds.

Photo No. 5. "*Carter Patterson?*" Not quite! K. N. Ballisat, of Cheam, solves the transport problem with the aid of a motorbike and a carrying-box of gargantuan proportions.

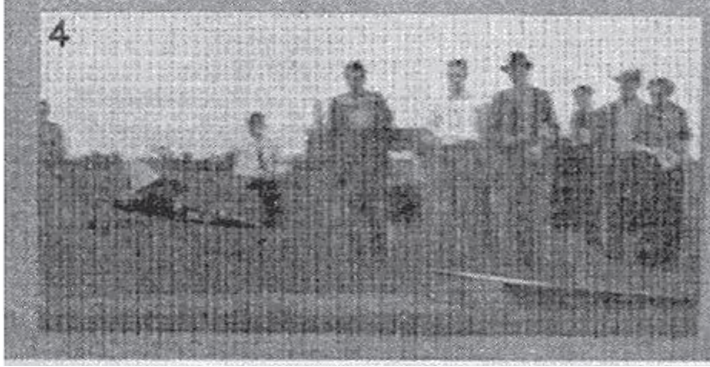
Photo No. 6. "*Lion-taming!*" K. Tansley, of Northern Heights, "winds" his modified Premier Lion amidst the admiring glances of a bevy of fans (?). H. J. Towner, S.M.A.E. Competition Secretary, seems to be the only person unaffected by the "Aeromodeller's Urge" to dress (or undress) for the occasion.

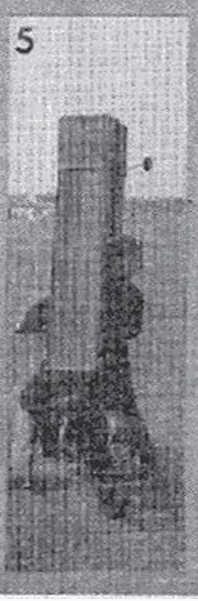
Photo No. 7. "*Biting the dust!*" The modified Quaker Flash belonging to A. Cripps, of Bradford, indulges in a burrowing session at the far side of the tarmac.

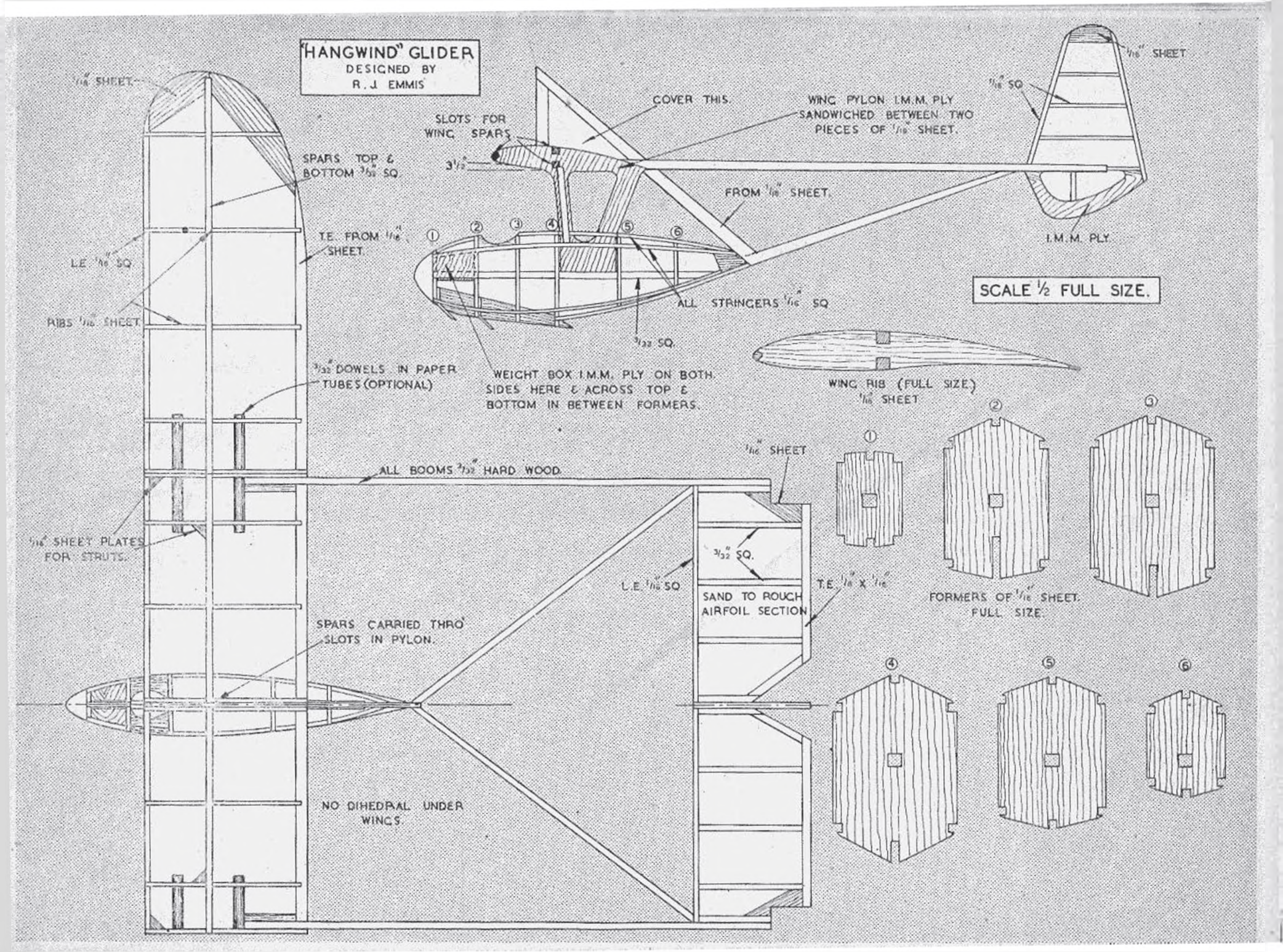
Photo No. 8. "*Scramble*"—but in this case away from the machine. G. W. W. Harris's model, which later took second place in the contest, causes slight qualms amongst a group of spectators!

Competitor.	Total Error.
1. MONKS (BIRMINGHAM) ..	27
2. HARRIS (CROYDON)	30·1
3. LANFRANCHI (BRADFORD) ..	35
4. GUEST (GENERAL AIRCRAFT)	40·2
5. HEMSLEY (BRIXTON)	42·5
6. TANSLEY (NORTHERN HEIGHTS)	55·5

One Adverse Point was registered for every second over the stipulated engine run of 20 secs. No Adverse Points were registered for engine runs below 20 secs. One Adverse Point was registered for every second the machine was airborne under or over the 40 seconds stipulated. Ten marks were awarded for the quality of the take-off, any marks lost counting as adverse points.






"HANGWIND" GLIDER
DESIGNED BY
R. J. EMMIS
1/16" SHEET
SPARS TOP & BOTTOM 3/32" SQ.
L.E. 1/16" SQ.
RIBS 1/16" SHEET
T.E. FROM 1/16" SHEET.
3/32" DOWELS IN PAPER TUBES (OPTIONAL)
1/16" SHEET PLATES FOR STRUTS.
SLOTS FOR WING SPARS
3 1/2"
COVER THIS.
WING PYLON I.M.M. PLY SANDWICHED BETWEEN TWO PIECES OF 1/16" SHEET.
FROM 1/16" SHEET.
1/16" SQ.
1/16" SHEET
I.M.M. PLY.
SCALE 1/2 FULL SIZE.
ALL STRINGERS 1/16" SQ
3/32" SQ.
WEIGHT BOX I.M.M. PLY ON BOTH SIDES HERE & ACROSS TOP & BOTTOM IN BETWEEN FORMERS.
WING RIB (FULL SIZE) 1/16" SHEET
1/16" SHEET
ALL BOOMS 3/32" HARD WOOD
3/32" SQ.
L.E. 1/16" SQ
T.E. 1/8" X 1/16"
SAND TO ROUGH AIRFOIL SECTION
SPARS CARRIED THRO' SLOTS IN PYLON.
NO DIHEDRAL UNDER WINGS.
FORMERS OF 1/16" SHEET. FULL SIZE.

PETROL TOPICS

BY
DR · J · F · P · FORSTER

I HAVE had an earnest request from a reader and would-be "petroleer" to go back to beginnings and write a "Petrol Topics" for the benefit of the very large number of young (and not so young) chaps who, in my own words in the May instalment are "itching to get cracking" on petrol models, but who were too young or who were quite satisfied to remain "rubberears" before the war, and who began to become interested at a time when engines had long since disappeared from the shops, and, during the ban, from the flying field also.

One is apt to forget that the war, having lasted six long years, has seen the growing up of a complete new generation of wage and salary earners, who are prepared to lay out a fiver for an engine as soon as one is obtainable, but who have never even *seen* an engine under 100 c.c. capacity, still less handled one or tried to operate one, and that therefore any technical references to engines, their operation, and especially any suggested modifications, are to them what square roots and formulæ are to me—just so much hot air!! Having long since forgotten the elementary principles of mathematics, I have to turn over the page mumbling "probably very interesting and enlightening if I could only work 'em out. Let's see what the author's answer comes to." Since he seldom gives it, or if he does it applies to a particular case only, I'm frequently little the wiser.

There have been several similar requests from time to time and now at last I feel bound to have a crack at starting at the beginning for the benefit of the hundreds of chaps who have never yet handled an engine but who will undoubtedly form the majority of petroleers in this country within the next five years. Apart from the few veterans who pioneered the "petrol game" in this country (and they—the men who started before 1930—can be counted on the fingers of two hands), there cannot be many petroleers who had flown petrol models for more than five years before the outbreak of war, and we can feel fairly confident that at least twice this number will start within the first five years after it.

Probably what I have to say will be considered highly unorthodox by many men who have been in the game longer than I have, but then my own beginning was unorthodox, as I came to the game practically unhampered by any preconceived notions of rubber-powered models, and I am not ashamed to admit that I had never built or wished to fly a duration model before building my first petrol model. I first built a 20 in. scale Miles Magister with a geared scale prop. which gave it a gradual and realistic take off, but I found that even with a super mown golf green or seaside sands a realistic landing came only once in ten times, purely by luck. Next I built a 30 in. scale Miles Falcon low-wing cabin job with nice big wheels inside "trousers." By the time I'd finished strengthening and modifying its structure and fitting first a gearbox and finally an automatic relay bringing a second motor into action as the first one faded out, and trying a new airfoil and a sprung undercart, the wing loading had gone up to about 10 ozs. per sq. ft., and she was fast becoming a projectile.

I couldn't help feeling that just as she had gained decent altitude, and the second motor had cut in and all seemed set for a nice steady flight, she started losing height again and the flight seemed over before I'd had time to reach for my camera!! On the other hand if I built a slow-flying duration model, looking like nothing on earth or in sky, there would be no object in getting a snapshot anyway! Then again, I have never mastered the technique of making a rubber motor last a season. I always wanted those few extra turns which ended in internal explosions within the creature's belly accompanied by bits of stringer and jap tissue flying in all directions followed by hours of repair work. "No Sir," I said. "I'm going to build something big and strong that will stay up as long as *I* say and not just as long as my rubber motor says."

Just then I met Col. (then Captain) Bowden who was flying what to me seemed a huge 7 ft. Kanga Kite, which used to make the most delicious landings after lovely slow and steady flights, and having already half built a scaled down model based on one appearing in an American magazine, resolved from then onwards to concentrate exclusively on petrol models. Fortunately for me, but very unluckily for him, I was in at the death of a perfectly good Cyclone engine when this big model glided into a stone wall, and he pointed out his knock-off mounting which had never previously failed to save damage to his engines and had only failed to do so that time owing to sheer bad luck, the hub of the airscrew having struck the wall between two projecting stones which prevented the normal knock-off action occurring. This taught me a sound lesson from the outset which I have never regretted, and I have never yet built a model with a rigidly mounted engine or without some form of knock-off engine mounting or airscrew shaft.

Unfortunately from the point of view of immediate success, though it certainly led to some interesting experiments later, I ignored his next piece of advice. Instead of building a large amply-powered model I thought I was being clever in starting with something very small for petrol models in those days, and bought one of the first baby engines of between 2 and 3 c.c. This proved quite incapable of maintaining even level flight from a hand launch, so that in the end I had to buy a second and more powerful engine. I know of several people who have made the same mistake, and in the hope of saving others, I would remind every beginner that however small or large the engines, within reason, the minimum weight of reliable ignition equipment which includes the ignition or spark coil, the batteries and flight timer remains the same, and though the idea of a really small and portable little model which can be carried about in an attaché case is very attractive to many people, its realisation in practice is very difficult. Even with the American Microdyne "Super Atom" engine which by all previous standards is in a class by itself for power/weight ratio, and develops as much power from its 1·5 c.c. as many earlier engines of three times its capacity, it is still a very real problem to design a model of 3 ft. span which will take off and land well in any but the most ideal conditions of weather and terrain. It *can* be done, and *has* been done, if little regard is paid either to appearance or to durability of the model as a whole; the use of very thin stringers and jap tissue covering and the careful selection of the right quality balsa for use in the right places enables one to save a few ounces on the airframe, but unless the wing loading is kept to less than 12 ozs./sq. ft., the gliding speed necessitates a very robust undercart judged by rubber model standards, and it is one of the biggest problems to design an undercart that will not become distorted with

repeated use, and yet will, when added to the irreducible weight of engine and all its accessories, weigh as little as ¾ lb. The difference in strength and immunity from tears in hedges, etc., between silk covering and tissue or even bamboo paper coverings is out of all proportion to the slight saving in weight, and one of my chief joys on first flying silk-covered petrol models was arriving home at the end of days of gruelling flying including landings in trees and hedges and finding no repairs and patching of the covering necessary.

Since writing the above, I have had an opportunity of trying one of the new silk substitutes (called PLANE-FILM), and though it is too soon to come to any conclusions on its long term durability, or whether in the course of time it becomes brittle or not, it is certainly much lighter than silk and seems immensely strong. It is an impervious film, somewhat like cellophane in texture, slightly elastic and therefore capable of covering compound curves, and because of its impermeability, requires much less weight of dope than is required to fill the interstices of silk.

The really small petrol model may sound attractive, especially if an ideal flying ground with really short grass is always at hand, but I certainly don't recommend it as a beginner's model, and it does not give the characteristic performance of the larger model, and most important of all, with few exceptions, the very small engines under 4 c.c. (*i.e.*, approximately ·225 cu. in. by American classification), were not quite as easy to manage as their larger brethren of around 6 c.c. and over. Obviously the smaller the model, the less latitude exists for increase in weight with age. Even rubberears know how the weight of a model gradually goes up with minor repairs, modifications, additions and absorption of rubber lubricant, etc. These are all proportionately bigger on petrol models but the addition of 1 oz. on a 3 or 4 lb. model makes little difference to the wing loading.

I have flown models with loadings of 1½ lbs. per sq. ft., but I don't like it, nor do their undercarts. Although the theorists will tell you that the only effect of increasing wing loading is to increase the gliding speed (*i.e.*, the *forward* speed), I am quite convinced that the sinking speed also increases on a badly streamlined model, and on a small model under 5 sq. ft. in wing area, the weight of undercart strong enough to stand up to repeated landings at wing loadings of over 1 lb./sq. ft. becomes disproportional to the total weight.

Going to the other extreme of light wing loading has never been one of my failings (or successes!). In this country we have nearly all " built fairly heavy," but in America petrol models with loading of under 8 ozs./sq. ft. have been fairly common. I have seen models of this loading in action, and personally I don't like their behaviour either under power or on the glide as much as a more heavily loaded machine, and when it comes to landing they are too inclined to bounce off into a stall, instead of sticking to the deck.

For all (reasonable) weather flying I would recommend a wing loading of between 10 and 14 ozs./sq. ft. The outstanding difference between the flying of petrol models and duration models is their landing. There is bound to be a certain element of luck in the sort of air conditions met with just before touching down, especially in " bumpy weather," but it is here that the more heavily loaded model scores, as it is less affected by inequalities in air density and velocity near the ground and is therefore more likely to make consistently good landings. Another point of prime importance in the flying of petrol models is to ensure that there is no tendency to stall. So far as the landing of a duration model goes, slight degrees of stall do not matter very much as the model probably noses over in any case and no one seems to care (though personally it gives me " the willies "), but this sort of thing on a petrol model may lead to quite serious damage. It is absolutely essential if consistent and crash-free landings are to be made that the glide is steady and free from any stalling tendency. However gentle the stall, switchbacking ensues and sooner rather than later the model will touch down at just the wrong point of the switchback and either dive in and nose over or bounce high and probably stall within a few feet of the ground.

The fitting of built-in or " letter-box " slots to wing tips has come in for a certain amount of criticism of late and I have heard it said that they make not the slightest difference to a model's stalling tendencies, and even that they increase such tendency, as proved by covering them over with silk or gummed paper. I think there is no doubt they are not quite as effective as Handley Page slots on outriggers, but they are less easily damaged and certainly add less drag, and if properly designed and positioned, without unduly blunting the leading edge of the shortened airfoil behind them, they undoubtedly work very well. At all events the use of *good* slots, which *do* work, help a model to negotiate the above-mentioned hazards including that very likely stall following a bounce landing, and I still intend to build them into all my wings, both land 'planes and flying boats.

Basic Principles of Model Aircraft Engines:

Quoting from the letter from the reader who finally urged me to write this " beginners' instalment " of Petrol Topics, he states: " How many, I wonder, are, like myself, ' lone hands ' who know no experienced ' petroleer ' and whose knowledge of an engine could be stated in a few words: An engine derives its power from petrol and oil; is about the size of the palm of your hand and weighs about 3–5 ozs. ? Probably the majority of these enthusiasts who are ' itching to get cracking ' have never even seen an engine stripped." He goes on to ask for a simple explanation of the working and parts of an engine.

In my book on engines I laboured the point that hitherto we have not seen a *model aircraft engine* pure and simple, designed throughout and exclusively for the job we aeromodellers call upon it to do. There were plenty of new makes and new models of old makes, but nearly all followed preconceived notions of general layout based on marine and stationary two-stroke engines. This layout is by no means ideal for our purpose, and there is a great deal of room for improvement in post-war designs, of which I hope we shall not have to wait much longer for concrete evidence. Pending the production (I hope in Britain as well as America) of new designs, I base my remarks on engines obtainable before the war.

I think it may be simpler to start with the prop. (the only thing that is common to rubber and petrol-powered models) and work backwards. The prop. is mounted on a shaft (usually ¼ in. diam.) and is driven by a disc known as the driving washer whose front face has either spikes or serrations to bite into the wood of the prop. A nut (sometimes in the shape of a spinner) and washer clamp the prop. hard against the driving washer. The shaft itself is usually hardened and ground steel and carries on its inner end a crank pin and counter balance weight, and it revolves in an accurately-fitting bush or

bearing, sometimes bronze, sometimes dural or other suitable alloy. Power is conveyed to the crank pin by the usual piston and con-rod or connecting rod of any reciprocating engine, whether steam or internal combustion. In a steam engine power is applied to both sides of the piston alternately giving both a push and pull action, but in internal combustion engines the power is applied on the far side of the piston only, and the momentum thus gained by the revolving shaft and counterbalance weight carries the shaft and prop. round the greater part of a complete revolution, so pushing the piston to the top of its stroke again and ready for the next application of power.

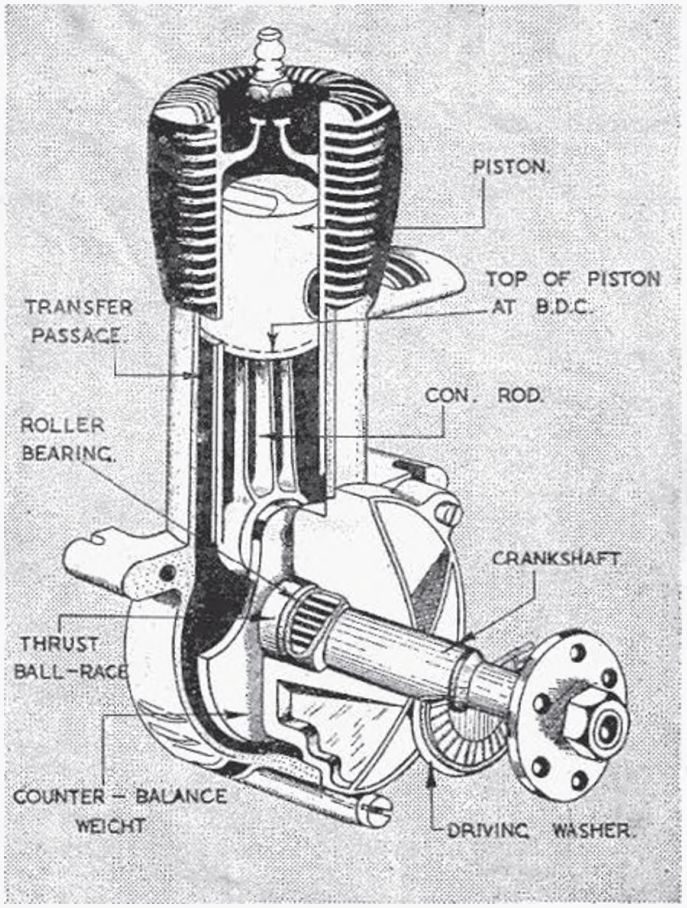
The piston slides up and down an enclosing cylinder, the one being an exact and gas-proof fit within the other. Some pistons are fitted with cast iron spring rings, but most are accurately lapped into their cylinders and to begin with are at least as gastight as those fitted with rings, though they may not wear quite as long as rings. The end of the cylinder is of course closed by what is called the cylinder head, which may or may not be in one piece with the cylinder itself, and through this is threaded the sparking plug with a gastight washer.

A mixture of vapourised petrol and air is introduced into the cylinder and compressed by the piston until it reaches the end of its stroke towards the cylinder head. The ratio between the volumes of the space in the cylinder head into which the mixture is compressed and the volume of the mixture before the compression stroke begins is known as the compression ratio, and this is so arranged that when the compressed mixture is ignited by a spark from the plug, it does not detonate or instantaneously explode, but burns at a definite rate causing progressive expansion of the gas, thus forcing the piston down the cylinder and turning the crankshaft *via* the con-rod.

The peculiarity of a two-stroke engine is that the complete cycle of events takes place in one revolution of the shaft involving only two strokes, one up and one down, of the piston. The more usual four-stroke engine used in cars and aero engines, etc., is much more efficient, but involves the use of valves timed to open and close at half the crankshaft speed, thus entailing another shaft (the cam shaft) and its reduction gearing from the crankshaft. The only moving parts in a two-stroke engine are the piston and its "gudgeon" pin on which the con-rod pivots; the con-rod and the crankshaft.

Whereas in a four-stroke the gas is *first* sucked in through the inlet valve (downstroke), *second*, compressed while all valves are closed (upstroke), *third*, ignited to give the firing stroke (downstroke), *fourth*, exhausted through the now open exhaust valve (upstroke), giving almost complete scavenging or clearance of exhaust gas. In a two-stroke, the crankcase in which the crank and counter balance weight revolve is utilised as a receiver of mixture, and while the piston travels to the top of its stroke compressing the gas in the cylinder head, it simultaneously sucks mixture into the crankcase either through a port or opening in the side of the cylinder uncovered by the piston at its point of "top dead centre" or through an opening in the side of a hollow crankshaft or through a hole in a disc rotating with the crankshaft within the crankcase, timed to open and close at or near the point of revolution at which the piston is at top dead centre.

As the piston returns on the firing stroke, the mixture trapped in the crankcase becomes compressed and just before bottom dead centre is reached the piston uncovers

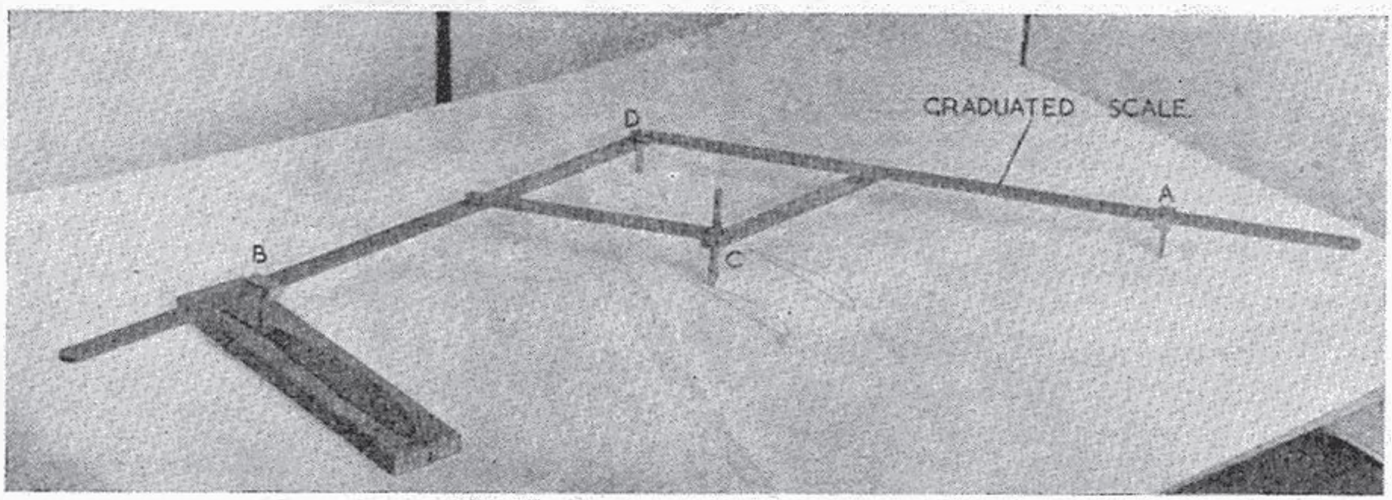


two more openings or ports in the cylinder wall. The larger one which begins to open a little before the smaller one is the exhaust port through which the spent explosion projects the usual delightful stink and blue smoke associated with petroleers! The smaller and later opening port is the transfer port and allows of the transfer of the already compressed mixture from the crankcase to the cylinder.

On most engines the piston top is so shaped that this incoming jet of mixture is directed upwards to the cylinder head so assisting to drive out the remaining exhaust gas, but it is obvious that in a two-stroke engine there must be *some* mixing of exhaust and incoming gases as complete scavenging is not possible. Much research has gone on over many years in the placing of ports and in the shapes of piston tops and deflectors, and even amongst full-size engine designers there is no one and only final way of obtaining the highest efficiency.

The conditions governing the perfect operation of this two-stroke cycle of events at the seemingly amazing speeds of 5,000 and even 10,000 times per minute, would take at least an article in themselves to describe, but I need a long breath before proceeding! They entail the description of the induction and ignition systems, and what is far more important, their intelligent operation by the budding petroleer. All of the foregoing occurs whether the operator likes it or not, and what he is far more directly concerned with is providing the fuel in the right proportion, *i.e.*, the petrol/air ratio and the means of consuming or combusting it, *i.e.*, a nice fat spark at the plug points at the right moment. Next month I will attempt to describe some of the most widely used systems, and my own, possibly unorthodox methods of operating them!

• THE SCALOGRAPH •



DESIGNED BY C · E · MOTH

IN all cases it is more accurate to reduce rather than enlarge.

The mechanism has been made with two short arms of 8 in. length and two long arms of 24 in. length, fitted together so that the two short arms form two sides of an 8 in. square with the 24 in. arms forming the other two sides which run on for the slides to slide up and down on.

There are two adjustable points.

An 11 in. template as illustrated will reduce from 7⅛ in. to 3⅜ in.; these being the limits of all aerofoil sections with this template.

Any size section can be drawn from an original without the tedious development method being required more than once.

For clarity I will call the slide that slides on the graduated figures A, and the slide that slides on the 24 in. figures B, the point where the short arms intersect at the copper tubing C, and the glider pin at the intersection of the large arms D.

Suppose a section of 5 : 1 in. chord is required, using the 11 in. template. Multiply the template chord by the length of the short arm (8 in.) and divide by the required chord length :—

$$\frac{11 \times 8}{5 : 1} = 17{\cdot}255$$

With the arrow on slide B facing towards the glider D, slide B until the arrow point comes directly over 17·255 in. on the 1 in. figures, screw home the trammel point to fix in position; then, as for B, slide A on the graduated scale until it also is at 17·255 in. Screw home the pin point and lock into position. Fix the pencil, which in this case is a spring loaded pin vice, into the copper tubing, by inserting the spring first, then handle end of pin vice, locating the 1/16 in. hole in the handle through the slot in the side of the tube with a piece of 16 gauge wire. Use H pencil lead. Force the pin at A into the drawing board, pin drawing paper with drawing pin conveniently under pencil, place template in a position so that when the trammel at B is placed at the trailing edge and leading edge the pencil does not foul the template, press home the two pins under the template into the drawing board, then commence drawing, keeping the trammel running smoothly and closely round the template. The pencil will draw out the required chord size but with one exception. The upper and lower surfaces of the trailing edge will have to be produced to a point to be exact. The reason for this is: The trammel at B is ⅛ in. diameter section on the working edge, therefore to get dead centre 1/16 in. was taken off all round the template; that explains why the template does not measure 11 in. chord length, but it was plotted to an 11 in. chord first, and then the 1/16 in. was removed. When using a trammel of this kind all templates must have this 1/16 in. taken off.

To enlarge or reduce from a drawing use pin points. Remove pencil lead and replace with pin point made for the purpose. Remove trammel and replace with pin point on B slide, then using as before or with rearranged formula, prick out at small intervals, and connect prick holes produced. A trammel at C and a pencil at B can be used, but I do not advise this method.

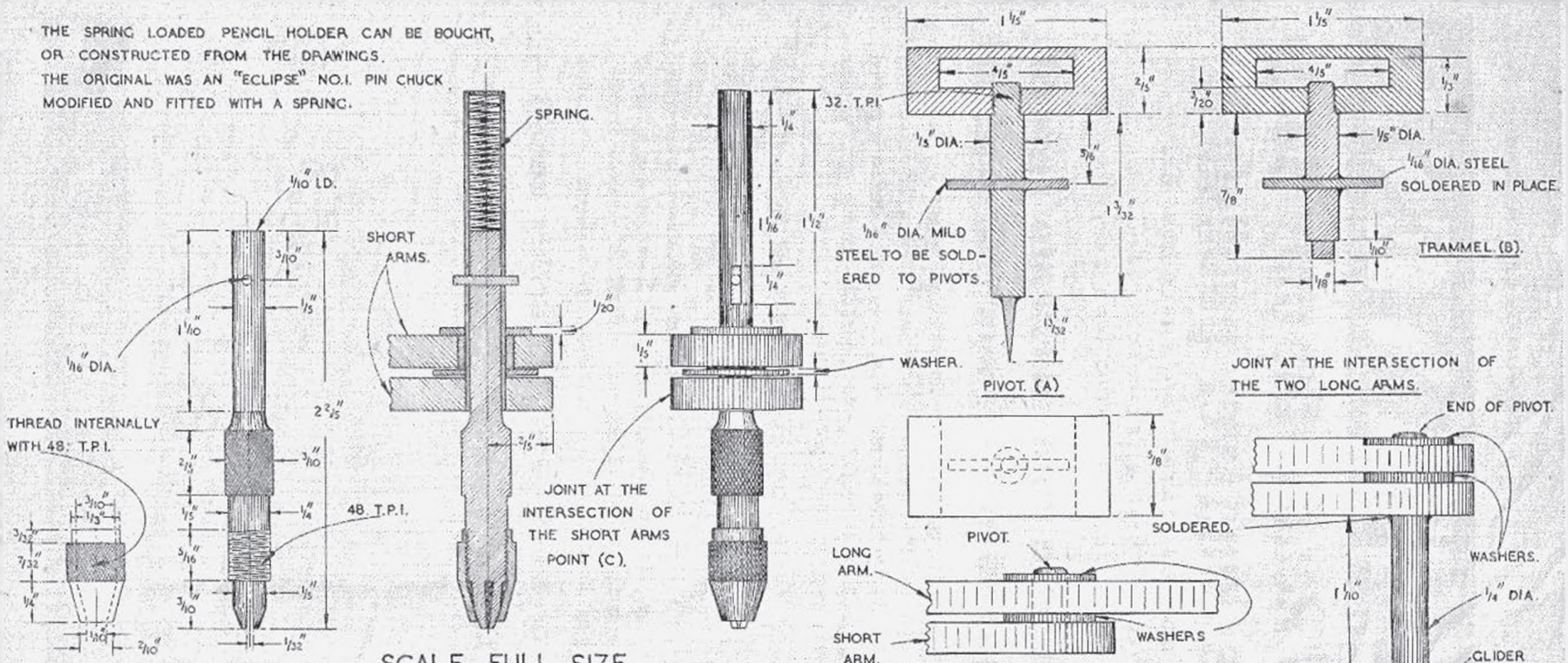
A smaller square can be used to separate the limits still further in the required chord sizes but the larger the square the more accurate the work produced. I find 8 in. on a 24 in. machine is ideal. On no account can the figures on either side be used if the square is continually being altered.

I can vouch for the complete accuracy of this mechanism; its real secret being that all points A, B and C must be in a straight line. The theory of the mechanism is, of course, entirely dependent on this fact, from which is worked out the graduated scales.

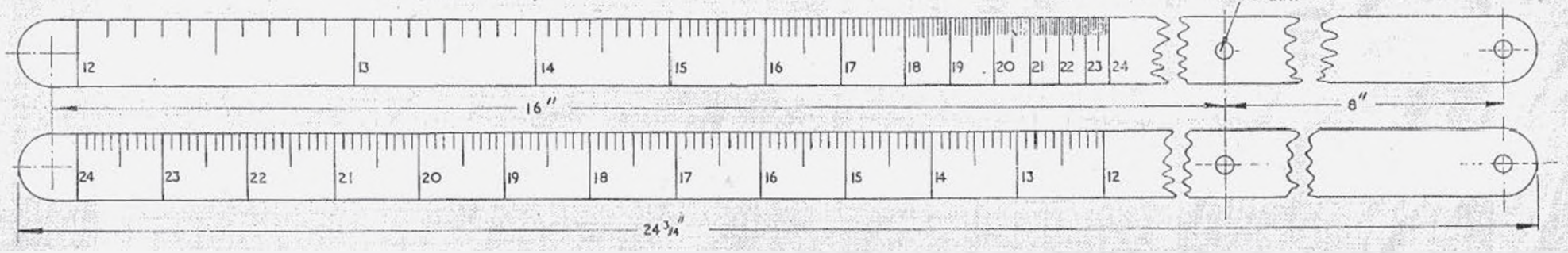
This apparatus would appear to be a variation of the well-known Pantograph.

We understand that the designer, Mr. C. E. Moth, is taking out a provisional patent, and is desirous of having the mechanism marketed. Whilst we publish this description, copyright of the mechanism is retained by Mr. Moth, who will be interested to receive enquiries from persons interested in manufacturing the mechanism. We shall be pleased to pass on enquiries to Mr. Moth.—[Ed.]

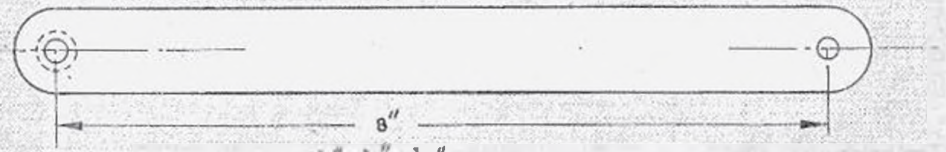
THE SPRING LOADED PENCIL HOLDER CAN BE BOUGHT, OR CONSTRUCTED FROM THE DRAWINGS. THE ORIGINAL WAS AN "ECLIPSE" NO.1. PIN CHUCK MODIFIED AND FITTED WITH A SPRING.



SCALE FULL SIZE
(EXCEPT ARMS.)

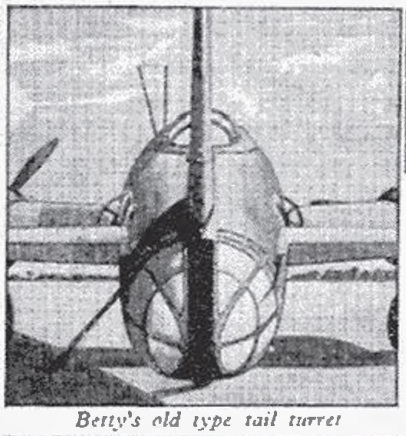


1/2 ACTUAL SIZE.

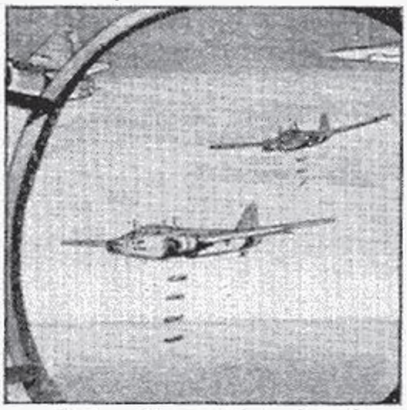


LONG ARMS 24 3/4" X 3/4" X 3/16" COPPER (ON ORIGINAL)
ANY AVAILABLE METAL WILL SUIT, HARDWOODS MAY ALSO BE USED.

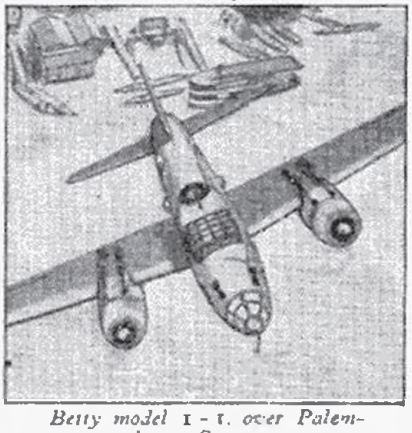
SHORT ARMS 8 1/4" X 3/4" X 3/16" BOTH IDENTICAL IN SIZE.



Betty's old type tail turret



Betty raid scene from lateral blister turret of another



Betty model 1 - t. over Palembang, Sumatra

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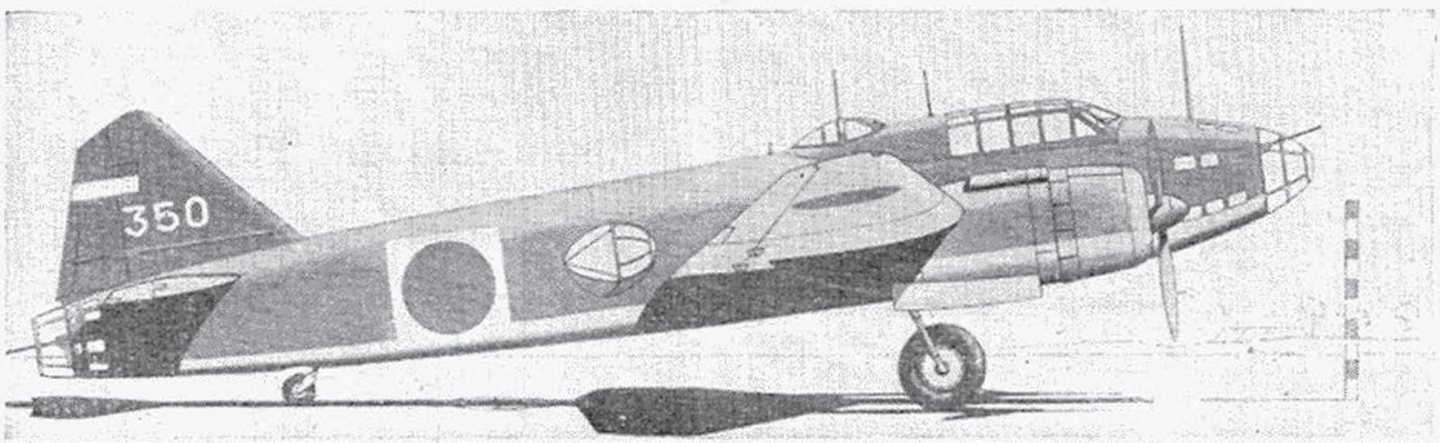
See top of next page for further details—

Below is Betty, the maid-of-all-work of the Japanese Navy. Normally shore-based but known to have operated from carriers. Span 82 ft. 4 ins. Length 65 ft. Cruising speed 235 m.p.h.



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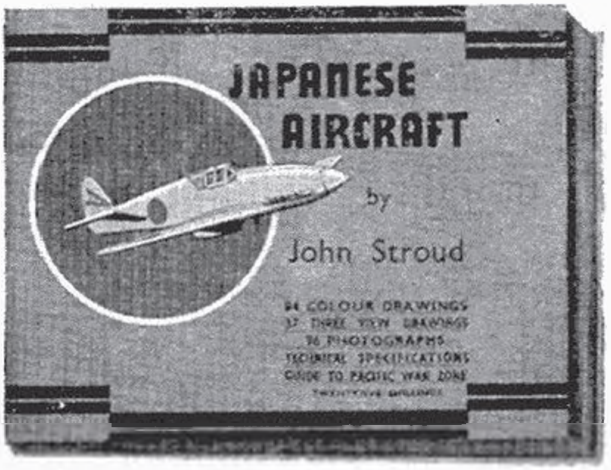
AIRCRAFT by John Stroud



The BOOK ITSELF — *its Size, Cover, Paper and Binding*

On Art paper, size 8½ x 11 ins., 64 pages, sewn, stiff board bound, in blue cloth, gilt blocked. Look on the bookstalls for the red, yellow and black dust cover, as illustrated.

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The Illustrations

In this advertisement are small reproductions from the double-page spread featuring the type "Betty." In the book the four drawings on the left are in full realistic colours. The three-view drawing below is also of "Betty" and taken from the same two pages. In addition to the double-page illustrations there are Eight Pages of Photographs of over Fifty Different Types, a Section illustrating Second Line Aircraft, Two Pages of Three-View Drawings of new Japanese aeroplanes released since this work was begun, including the Piloted Flying Bomb.

Altogether, in this one volume, there are 84 Full-Colour Plates, 96 Photographs, 45 Three-View Drawings and a full-page Coloured Map of the Pacific War Zone

The CONTENTS — Arranged for easy reference

Types are Classified according to their type and duty, and subdivided alphabetically according to their code names. Each of the 21 operational aeroplanes has two facing pages on which appear a Technical Specification, a General Description and History, a Photograph, a Three-View Drawing and Four Full Colour Plates.

Code Names Explained. As you may know, code names are used by the Allies for all Japanese Service Aircraft. The author explains how boys' names are given to fighters and girls' to most other aircraft.

Naval or Army Aeroplanes? On going into production Navy aeroplanes are given an official name and a function and model number. Army aeroplanes are given a designation comprising the designers' name, type number, function and model number. The author explains the system fully of how Naval and Army planes are coded with examples and a complete list of the code letters used.

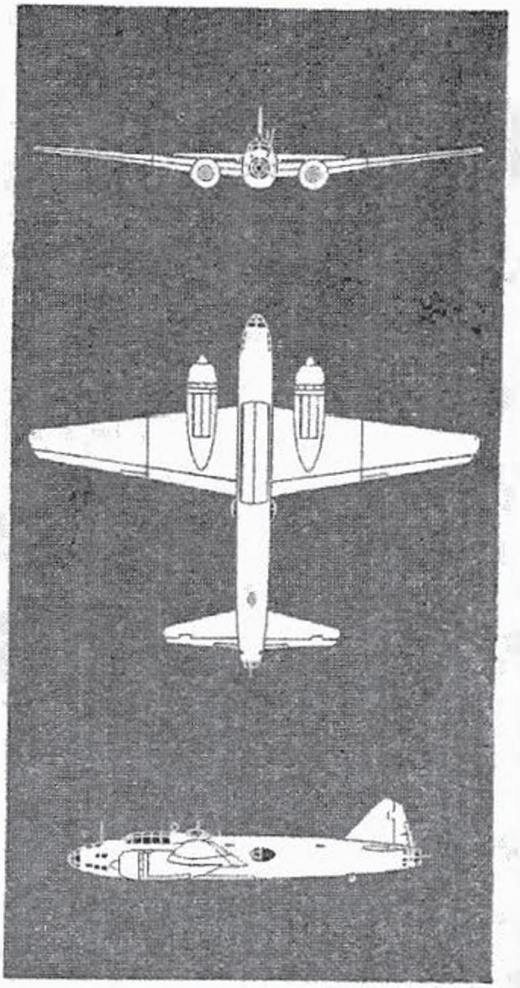
What is KANA? Kana is a form of Japanese ideography used by the lesser educated. It comes into JAPANESE AIRCRAFT because it is on some of the aeroplanes. Mr. Stroud explains its uses and effects, and has included a table for translating Kana.

Aeronautical Terms are included with their equivalent in Japanese, and in the Japanese ideography.

Japanese Aircraft Manufacturers. Short histories, with details of their aeroplanes, have been given.

Japanese Aero Motors are listed with the name of the manufacturer and a translation of the Japanese names.

Map of Pacific War Zone. A specially drawn and fully coloured map is also included with a number of topographical details of the area.



What You should do to Secure Your Copy

To be sure of your copy of JAPANESE AIRCRAFT you must place your order NOW. Shortage of paper has limited the number of copies. Therefore delay may mean disappointment. JAPANESE AIRCRAFT is a book you will be proud to own. Apart from its wealth of accurate information, the colour plates alone are worth the price of the book. Make sure of *your* copy. Place your order immediately with your local Modelshop, or Bookseller, or if you prefer, post direct to the publishers — send today.

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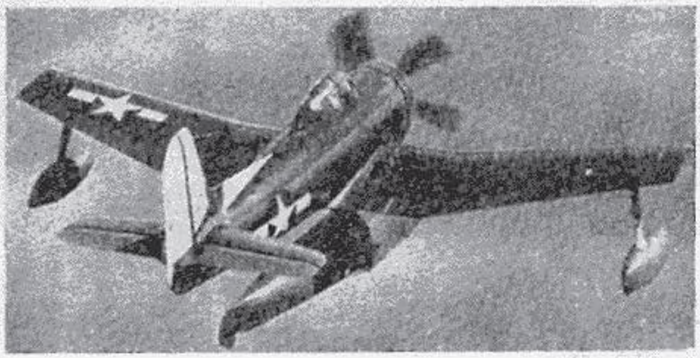
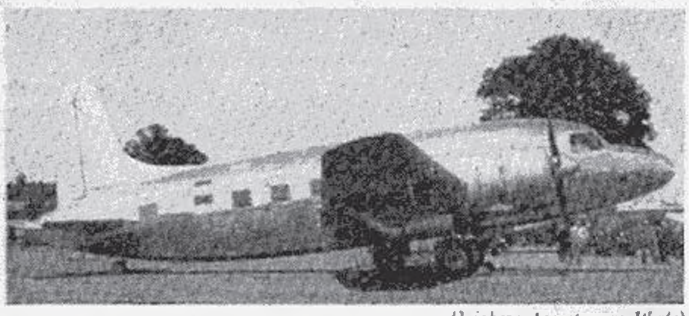


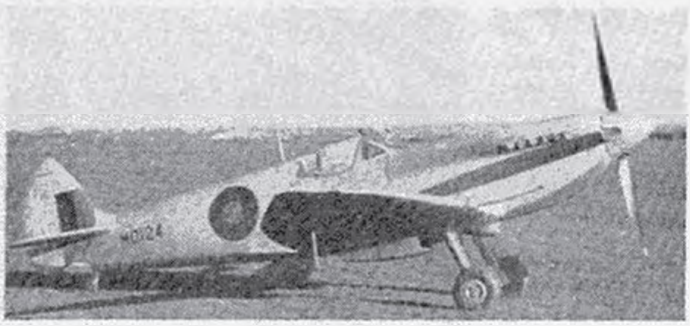
(New York Times Photo.)

RUFISH : Seahawks are now widely used in the Pacific.



(Vickers-Armstrongs Photo).

G-AGOK : The first prototype Viking, second British civil airliner to fly since VE-day.

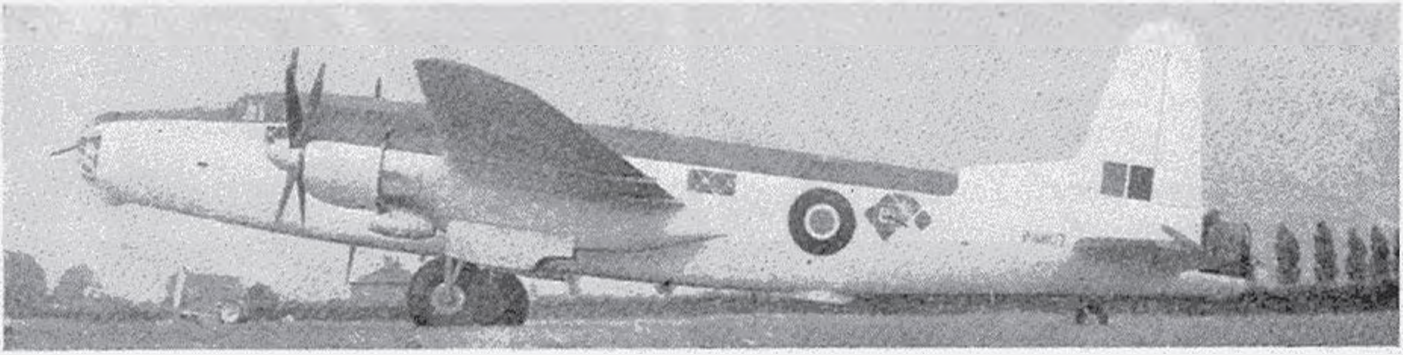


(Vickers-Armstrongs Photos.)

SIXES AND SEVENS : (Above) the Spitfire VII high-level fighter as used at one period on the Italian Front and (below) the Spitfire VII experimental high-level fighter.

PACIFIC RECCO : A Warwick V, used as a general reconnaissance bomber in S.E. Asia.

(A.T.P. Photo.)



Pacific Spotting.

Designed to replace the Kingfisher two-seater, the Curtiss SC.1 Seahawk single-seat floatplane is now in service with the U.S. Pacific Fleet as a high-speed reconnaissance aircraft. Seven prototypes were built, the first flying in February, 1944. The Seahawk has a wide speed range, giving high performance for combat and low cruising speeds for fleet shadowing. It can also be used for air-sea rescue. A nine-cylinder Wright Cyclone radial is fitted, with a four-blade Curtiss-Electric airscrew. The similarity to the Japanese Rufe is interesting.

In the Dakota Class.

The Vickers-Armstrongs V.C.1 Viking civil airliner made its first flight on June 22nd last, and became the second British transport completed since VE-day to fly. The Viking is a medium-range, medium-capacity aircraft with a crew of four and accommodation for 21, 24, or 27 passengers. It is the first British aircraft corresponding to the Dakota or D.C.3 formula and is expected to be in wide use on airlines both in this country and abroad before very long.

The Viking combines "Geodetic" Wellington-type wings with a new stressed-skin fuselage and is powered by two Bristol Hercules 130 radials of 1,675 h.p. each. Span is 89 ft. 3 in., length 62 ft. 7 in. and loaded weight 33,000 lb. Cruising at 210 m.p.h. with 6,955 lb. of payload the range is 1,000 miles.

The first Viking was all-silver and was registered G-AGOK.

A Centaurus-Warwick.

The Vickers-Armstrongs Warwick V has now been announced by the Air Ministry. The Warwick V is powered by two of the new 2,500 h.p. plus Bristol Centaurus eighteen-cylinder sleeve-valve motors and is fitted with four-blade airscrews. Warwick V general reconnaissance patrol-bombers have been flying in this country since early in 1945 and many have been sent out to South-East Asia to operate against the Japanese Navy. The Warwick V has an angular glass nose, the dorsal turret is deleted, and a retractable Leigh Light is fitted, as on the Wellington XIV. Armament includes one ·50 in. machine-gun in the nose and at each beam position and four ·303 in. guns in the power-driven tail turret. With a loaded weight of over 45,000 lb., the Warwick V has a top speed of about 290 m.p.h.

The Warwick V has white Coastal Command camouflage and one batch was numbered PN 807, PN 808, PN 809, etc.

MEMORANDA

BY
O · G · THETFORD

Another "Crikey."

The fantastic wing span of the Westland Welkin single-seat fighter—70 ft.—seems as likely to evoke the celebrated ejaculation "Crikey" as did the high speed of its predecessor, the Whirlwind, on its first appearance. The Welkin was produced at a period when the Luftwaffe was showing interest in the high-altitude bomber and attacks on this country were considered a possibility. The attacks never materialised, so the Welkin was built only in limited numbers and was not used by operational squadrons. The type proved useful, however, for experiments with pressure-cabin apparatus, a line of research in which the Westland Company is especially interested. The Welkin is generally similar to the Whirlwind, but has mid-wing layout instead of low-wing, and a much higher aspect ratio. It is powered by two Rolls-Royce Merlins, a Merlin 72 or 76 on the starboard side and a Merlin 73 or 77 driving a Rotol cabin supercharger on the port side. The Welkin has a top speed of 385 m.p.h., a range of 1,500 miles, a loaded weight of 17,500 lb. and an armament of four fixed 20 mm. cannons in the nose.

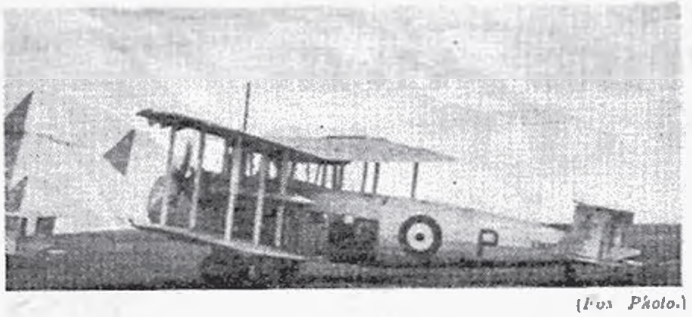
First British Operational Jet.

The Gloster Meteor single-seat jet turbine-propelled fighter first went into action with the R.A.F. against the flying-bombs in the summer of 1944 and later operated from bases on the Continent. The prototype first flew in March, 1943. The Meteor has a span of 43 ft. and a length of 41 ft. and is fitted with twin Rolls-Royce-Whittle Derwent or Welland gas-turbines spaced well out along the wing. The top speed is reported to be in the 500 m.p.h. category. Armament consists of four 20 mm. cannons in the nose.

R.A.F. Flashback—10.

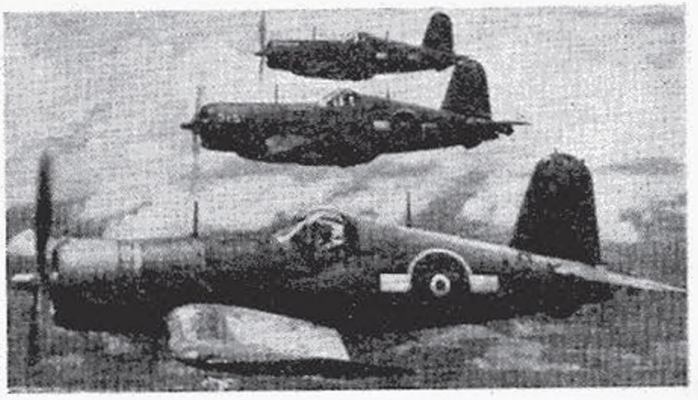
With the close attention now being paid to transport aircraft as a vital factor in air warfare it is interesting to see what was being done in the R.A.F. fifteen years ago. In 1930 the standard troop-carrier was the Vickers Victoria, a large biplane with two Napier Lion motors and a span of 87 ft. 4 in. The Victoria weighed 17,460 lb. loaded, carried 22 troops and had a top speed of 118 m.p.h. It was the equipment of Nos. 70 and 216 Squadrons in the Middle East until 1935–36 when the slightly improved Valentia came into service. The Victoria VI had two Bristol Jupiter motors.

The Victoria was doped all-silver and had the usual roundels and red, white and blue tail stripes of the period.

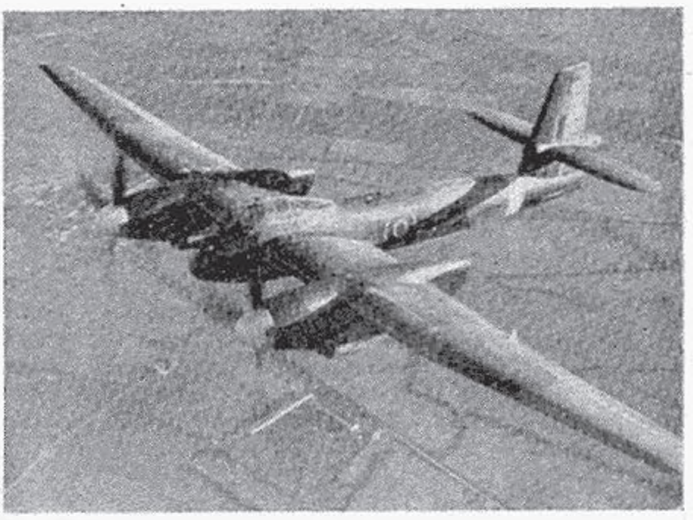


(Fox Photo.)

MIDDLE EAST, 1935: A Vickers Valentia troop-carrying biplane. See R.A.F. Flashback on this page.

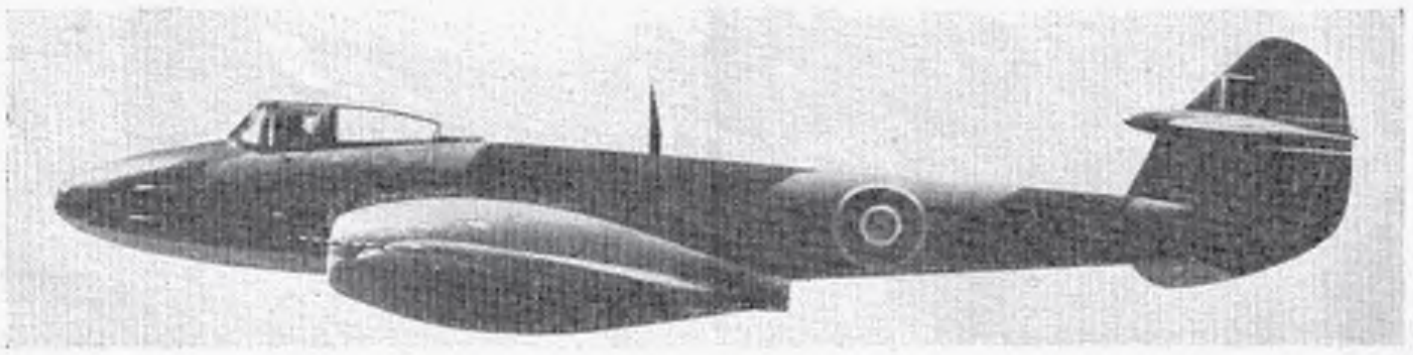


R.N.Z.A.F. ECHELON: Corsair fighters bearing New Zealand markings, and (below) HIGH ASPECT: A Welkin high-level fighter.



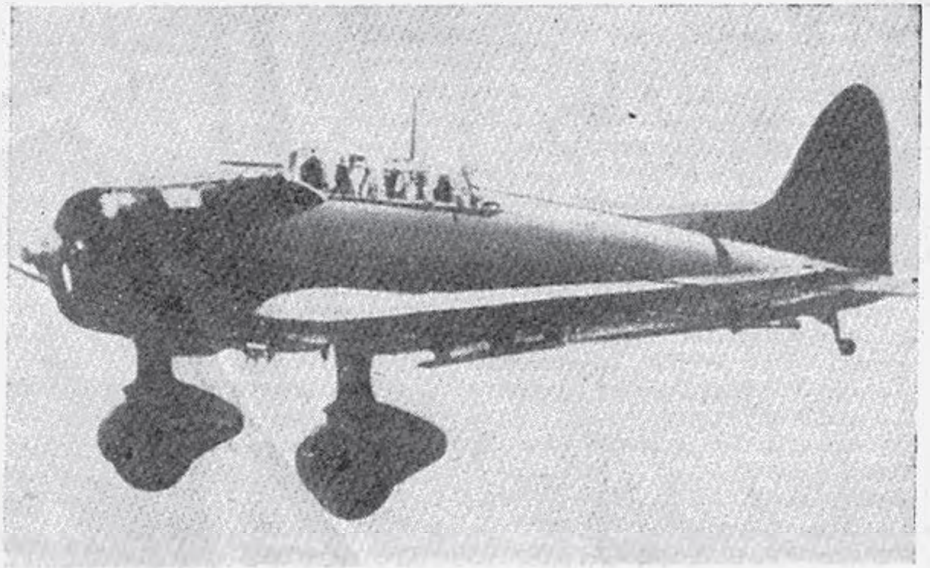
THE SQUADRON SERVICE: The Gloster Meteor was the first jet-propelled fighter to operate with the Royal Air Force.

(British Official Photo.)



AEROPLANES DESCRIBED XXXI

THE AICHI NAVY 99 VAL



STILL in large-scale service with the Japanese Navy until about a year ago, the Aichi Navy 99 Val dive-bomber became one of the most famous aircraft of the Pacific War because of its major part in the attack on Pearl Harbour on Sunday, December 7th, 1941. During this fateful attack, which brought the U.S.A. into the War, Val dive-bombers operated from Japanese aircraft-carriers in co-operation with Nakajima Navy 97 Kate torpedo-bombers, and the bombers were escorted by Mitsubishi Navy 00 Zeke fighters. The dive-bombers and torpedo-bombers inflicted a crushing blow on the United States Pacific Fleet, and the months that followed served to dispel still further the belief that Japanese Air Power was of second-rate quality.

We intend to feature a number of the more outstanding Japanese aircraft in future issues, and Val has been chosen as being representative of the modern aircraft with which Japan began the War, and the existence of which came as such a surprise to the United Nations.

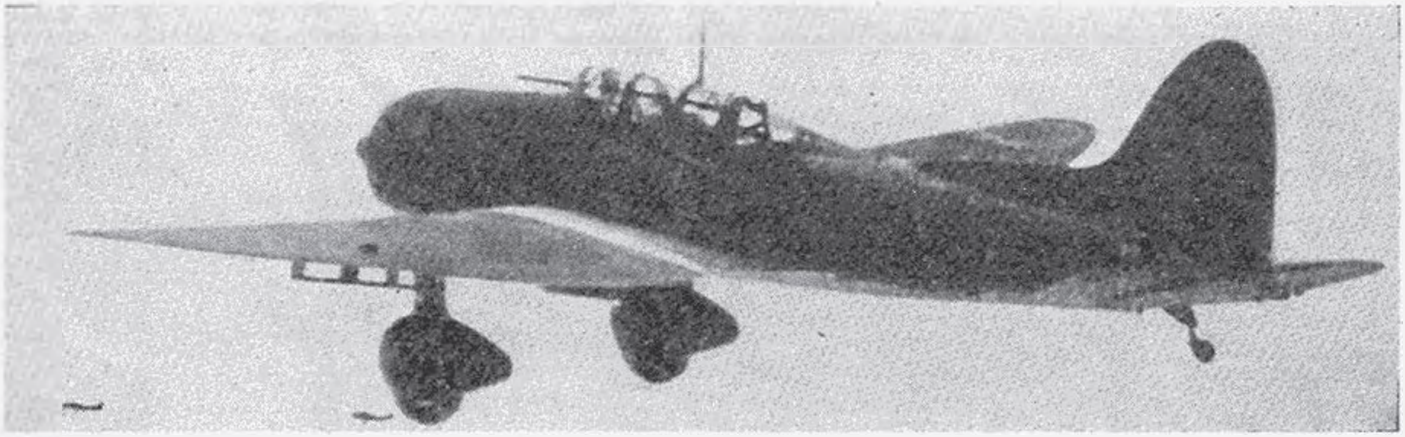
Val was first produced in 1939 and was put into full production by the Aichi Watch and Electrical Machinery Co., in 1940. In general layout, Val bore a remarkable resemblance to its American counterpart, the Douglas SBD Dauntless, but could be easily distinguished in combat because of its elliptical wings and fixed undercarriage, the Dauntless having straight taper on the wings and a retractable undercarriage.

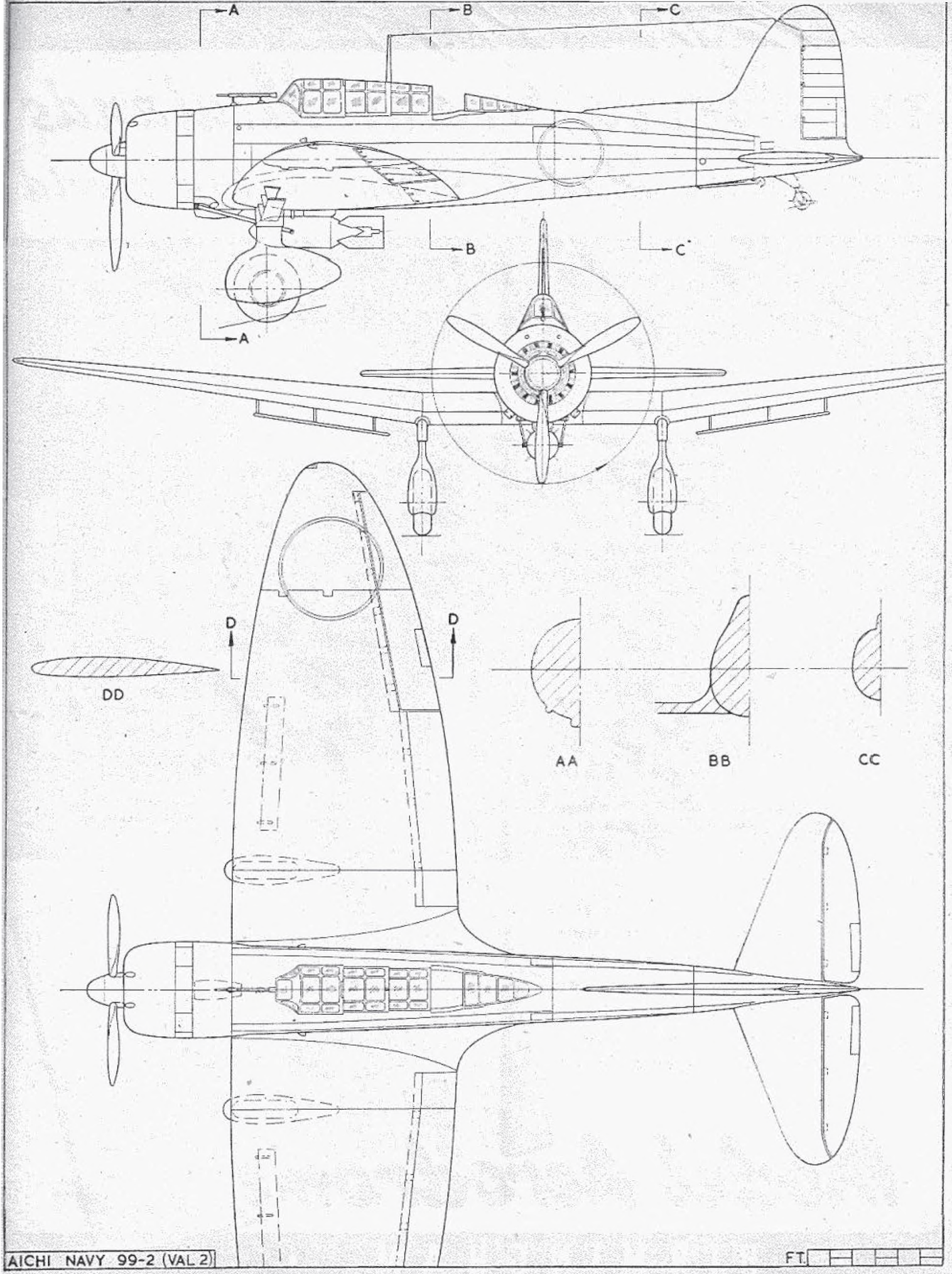
Three versions of Val were produced, differing mainly in the type of motor fitted and detail revisions to the cockpit hood. Aichi 99–1, 99–2, and 99–3, have had successively larger and more powerful motors. Aichi 99–2, used at Pearl Harbour, was fitted with a Mitsubishi Kinsei 44 fourteen-cylinder air-cooled radial. Aichi 99–3, the first example of which was discovered by U.S. Marines at Munda Airstrip, was fitted with a Mitsubishi Kinsei 54 motor of 1,280 h.p., an advance of 220 h.p. over the 1,060 h.p. of the Kinsei 44.

Val was fitted with dive-brakes beneath the wings and the bomb was carried on a crutch beneath the fuselage. The crutch was lowered prior to release so that the bomb fell clear of the airscrew. For easy stowage on aircraft-carriers the wing tips of Val were hinged about half-way along the aileron span and folded upwards. In combat, Val fell an easy victim to U.S. fighters because of its lack of armour protection and self-sealing fuel tanks. C. Rupert Moore's cover painting this month shows Val dive-bombers going down through the flak to attack a U.S. aircraft-carrier.

After three years of operations, which included the important Battle of Midway where Vals were widely used, the Aichi Navy 99 was finally retired in the autumn of 1944. Val was replaced as the standard Japanese Navy dive-bomber by Judy, a two-seat mid-wing monoplane with either in-line or radial motor.

Specification (Model 99–3): One Mitsubishi Kinsei 54 radial motor of 1,280 h.p.; crew of two; stressed-skin metal construction; span, 47 ft. 7 in.; length, 35 ft. 5 in.; loaded weight (99–2), 8,828 lb.; maximum speed (99–2), 241 m.p.h. at 7,700 ft.; maximum range, 1,250 miles; service ceiling, 27,200 ft.; climb, 1,740 ft./min.; twin 7·7 mm. synchronised machine-guns mounted in the cowling and either one or two manual 7·7 mm. machine-guns in rear cockpit; bomb-load, 1,050 lb. carried externally.





AICHI NAVY 99-2 (VAL 2)

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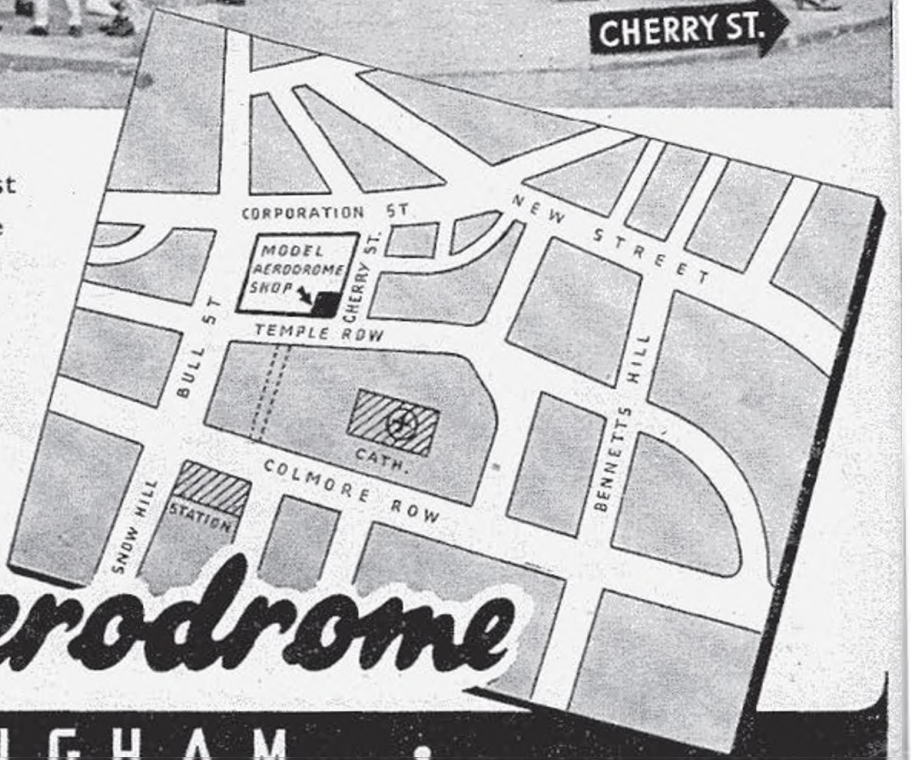
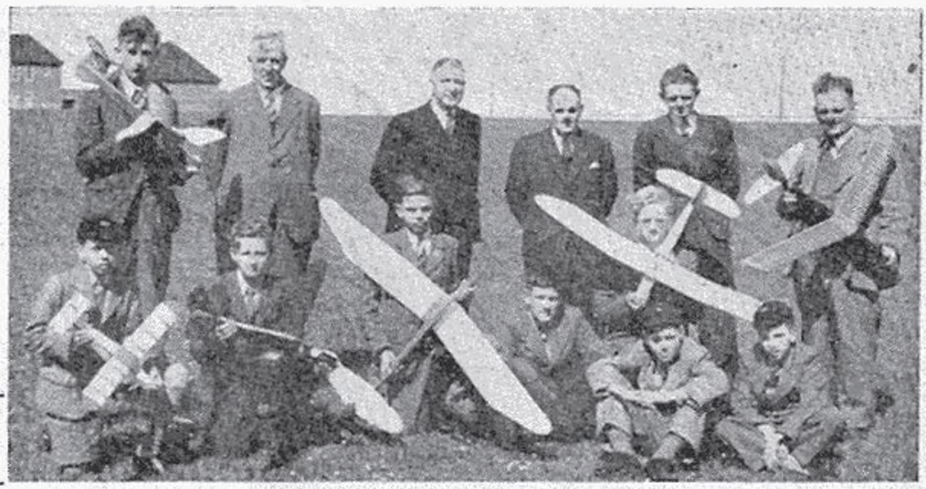


Model Aerodrome

• BIRMINGHAM •

CLUB NEWS

BY CLUBMAN



Members of the Basingstoke M.A.C. with the Mayor of Basingstoke, and our old friend Rip on the right.

I DON'T know how many of my readers are still securing copies of the American modelling magazines, but I have recently been fortunate to receive a few current numbers of "Air Trails," that very fine monthly publication edited by aeromodeller "Bill" Winter. In general control line flying seems to be receiving the major share of interest in the States, and some very good-looking designs are appearing, especially in the scale type class. I note with approval the steady improvement in the looks of the average "gas-job" over there, a large amount of the out-and-out freakishness having disappeared from recent published designs.

In his monthly discourse, "Dope Can," Carroll Moon (the American "Clubman"?) discloses that he has been studying some of our methods, and comes to the conclusion that "*the average British gas job is powered with a Brown or some similar ·60-cubic-inch motor and weighs about 5 lbs. . . . It's quite evident that our English cousins aren't 'hep' to the conditions of an American gas contest. First of all, a plane such as they describe would place a positive last, and demonstrate that even a brick can fly with sufficient power. With anything more than a motor run of 20 seconds, most American contest jobs would be gone forever, and many of them have flown away with runs of as short as ten seconds. Even our heaviest models soar beautifully and demonstrate their airworthiness with fine records. But to the British this type of flying is not worth while. . . . From where we sit it is easy to guarantee that the average British gas job would be handicapped tremendously in any American gas contest.*"

Well, what have our own gas fans got to say to that? From what I have observed myself I am inclined to agree that if it came to a straightforward contest between teams from both countries, we should be in line for a fairly severe beating. There is still too much motor trouble on the field, and I honestly think that some chaps use a competition to iron the bugs out of their machines! I fully agree that we have been handicapped over here by the ban on petrol model flying, lack of new engines and spares, plus the lack of spare time on the part of those chaps who would in the normal course of events be the high ranking fliers of this type of model. However, one cannot get away from the fact that petrol model flying in this country is still very much in the "hit-and-miss" stage (with one or two notable exceptions) and if it comes to the point of a resumption of International contests, we must start putting our models in order without delay.

Moon goes on to say . . . "*This brings up something that has been advocated by several American airmen returned from the European theatre. They suggest (and even plead) that some outstanding American put up a cup similar to the Wakefield Cup, to be competed for by flying teams of all nations—with only gas jobs eligible. They admit that special rules should be devised, but hold that these rules would not spoil the fun of competition as long as it was on a free-flight basis.*"

I don't know how far the Bowden Trophy contest satisfies the requirements of an International event, though if memory serves me right one factor that detracted from a full popularity with outside entries was that the contest should always be conducted in this country. I would give as my opinion that any contest set up as International must be so in all respects, and not confined to any one area or country.

Well, gas fans, there's plenty of food for thought in all the above, and I shall be pleased to hear from you on all aspects of the petrol model situation in-so-far as it affects contest and club matters, as I feel the time has come to start putting our house in order so that when we are again able to entertain teams from other countries we can at least put up a good show.

Results of two more S.M.A.E. contests to hand show a better spreading of the honours around the country, though times have not been all that remarkable. However, that times are as good as shown is all the more credit to the winners in view of the poor weather conditions that have obtained over most of the country recently. I am advised that a correction is required to the result of the "Solids Contest" as announced in last month's issue, P. Shepherd, of Rugby, being second place winner, and not Mr. Skinner as published.

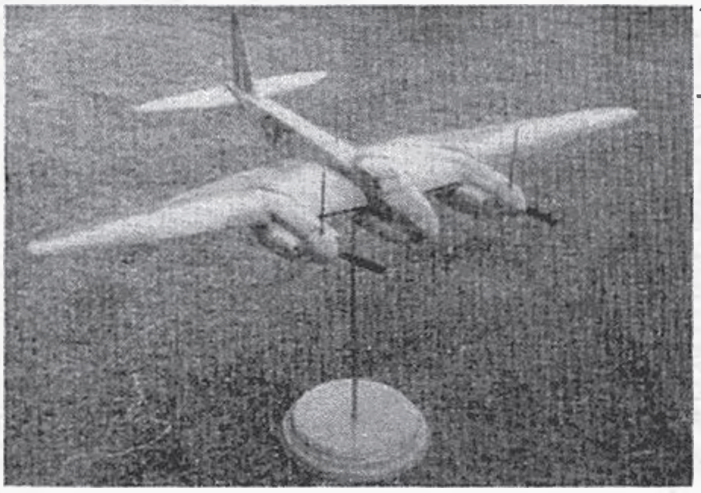
S.M.A.E. COMPETITION RESULTS

PILCHER CUP

H. Langley	Eston	677 agg.
J. P. Taylor	Rhyll	482.5 ,,
G. Whistle	Whitefield	462 ,,
A. G. Telford	Blackpool	378.2 ,,
A. H. Taylor	Bushy Park	354.7 ,,
G. Crux	Rochdale	351 ,,

FLIGHT CUP

W. A. S. Geddie	Bromley	536.2 ,,
J. M. Hardman	Rhyll	408.9 ,,
R. H. Warring	Blackheath	322.5 ,,



1/24th scale Mosquito built by C. A. Etheridge, incorporating hollow fuselage, fully detailed cockpit and retracting undercarriage.

The newly formed WOODFORD & D.A.S. has had a good start, D. Scrivener's modified "Leander" having broken the British Class "A" glider record (subject to official confirmation) with a flight of 42 mins. 3 secs. o.o.s. The model was winch launched from a 250 ft. towline, and vanished from view some three quarters of an hour later, being lost to sight mainly through eye strain. After launching, the model gained height very slowly, travelling in tight circles on various headings, but never far from the field for half an hour or so, then gaining height it gradually moved off in a S.W. direction and was finally given up when under hazy cumulus cloud at some 2–3,000 ft. altitude. Other records in the club are: H. L. rubber driven, 9 : 50 by M. J. King, and H.L. glider 50·2 secs. by C. A. Rawlings.

The BIRMINGHAM M.A.C. effort in the Pilcher Cup event was marred by bad weather, D. W. Harrison making top time with an aggregate of 5 : 02·5 flying his new 6-ft. span streamlined F.A.I. glider, and winning a club event at the same time, runners up being R. Monks and B. Dennitt. Flight Cup day saw better weather, but times were again rather poor, top man being Chuck Doughty, flying a diamond fuselage/mid-wing job for an aggregate of 2 : 47·9. Four members made the trip to Hounslow for the Hamley Trophy, R. Monks being the winner, as reported elsewhere in this issue.

The TORQUAY & D.M.A.C. recently conducted a South Devon Aeromodellers V.E. Day Gala on Milber Downs, results as follows:—

Senior Glider.		
L. Long	Torquay	4 : 31
L. Webber	Newton Abbot	3 : 05
J. Higgins	Torquay	2 : 55
Junior Glider.		
D. Webber	Newton Abbot	2 : 38
W. Wills	Torquay	1 : 13
D. Nosworthy	Torquay	: 55·5
Duration.		
G. Wilde	Newton Abbot	2 : 05
L. Webber	Newton Abbot	1 : 44
J. Cole	Torquay	: 44
Nomination.		
G. Wilde	Newton Abbot	2 secs. error.
Team event.		
Torquay	251 points	
Newton	178 ,,	
Exmouth	104 ,,	

Many gliders were lost during the day, one belonging to J. Brooks (Torquay) being recovered from about 10 miles away. The final five miles was over the water, the model being retrieved by a Naval Patrol, taken to Plymouth, and returned the same day to Torquay. Thanks Navy!!

R. Dobbs, of THE PARK M.A.L. put up a flight of 18 : 17·5 from Mitcham Common with his Atalanta glider on July 8th. The model, which has brown fuselage with white wings, was lost, and any news will be welcomed by the owner.

The SOUTH BIRMINGHAM M.F.C. held an exhibition, under the auspices of the Education Committee, on June 28th. Over a hundred models were exhibited, among them being Jock Bishop's electrically driven "Spitfire," which, though only in the 16-inch span class, weighs one pound, and clocks 27 m.p.h. round the pole! P. J. Boonham, having lost his "Aeolus" following a flight of 4 : 33 was notified by a farmer that it had landed on his ground, 18½ miles across the county of Warwickshire.

Received word this month from a very old (!) friend of pre-war S.M.A.E. days. D. A. Gordon, formerly of Hornchurch, is now in Cambridge and gives news of a newly formed club there, the CAMBRIDGE M.A.S., who hold meetings every Friday evening at Wesley Hall, Cambridge, where local and other lone fliers will be heartily welcome.

So far this year, glider flying in the LUTON M.A.C. has proved costly, no fewer than eight models being lost in June. Models have varied widely in construction and design, one model in particular causing great controversy. This job, built by junior member R. Minney, is 90-in. span, with wings dowelled onto a streamlined fuselage, *with a rib spacing of 4–4½-in.*!! This model, which is putting up a remarkably consistent performance, has a dihedralled tailplane and twin fins, and tows up very straight and fast. The Brown Trophy for duration models was a battle royal between Minney ("Ajax") and R. Brown ("Northern Star") resulting in a dead heat. At a fly-off on a later date, Brown proved the winner, and carried off his own trophy!! July 8th was the date for the Faunch Cup, and was flown in almost perfect weather, the lack of breeze being the main cause of complaint. Shades of "Damage" cup days!!! The contest was for F.A.I. gliders, and Minney won with his first tremendous flight of 43 : 03 o.o.s. with the aforementioned controversial model. A claim has been sent in for the British Class "B" record.

J. E. Wintle of the WEST COVENTRY M.A.C. took full advantage of decent weather on July 8th, and broke the club glider record with a time of 1 : 52; also won a contest with the best flight of the day 4 : 16 o.o.s.

The BASINGSTOKE & D.M.A.C. keep a club log of weather, etc., and a rather interesting table shows that up to July 6th, three Saturday evenings and two Sunday afternoons were good for flying, while ten flying meetings were complete washouts or gales. How does that compare with other club's findings?

Chaps from the BLACKPOOL & FYLDE M.A.S. have been getting around a bit lately, visiting the Northern Rally, Bradford and Huddersfield, and have collected a number of valuable contests in consequence,

plus a lot of experience. Four members went to Huddersfield, and collected first three places in the open duration event, Pete Uttley losing his lightweight after being timed o.o.s. for nearly five minutes. J. Owen also took third place in the open glider event. Uttley won the glider event at the Northern Rally with a flight of over five minutes, Bentley collected second place in the Concours, and Owen came third in the Consistency event. It pays to get about lads, as I found time and again before the war, and I recommend the Blackpool spirit to all clubs—and lone hands.

Members of the GREAT YARMOUTH M.A.C. are handicapped owing to lack of room at their H.Q., these being partly occupied by the military authorities! However, they have secured use of the local recreation grounds for the season's flying, and despite the assistance from helpful (?) children, some good flights have been recorded. G. Bullent with his "Elite No. I" won the glider event with an aggregate of 3 : 30·05, while K. Mancini's "Cloudhopper" broke the existing club duration record five times in one evening, his average time for the five flights being 1 : 32·05.

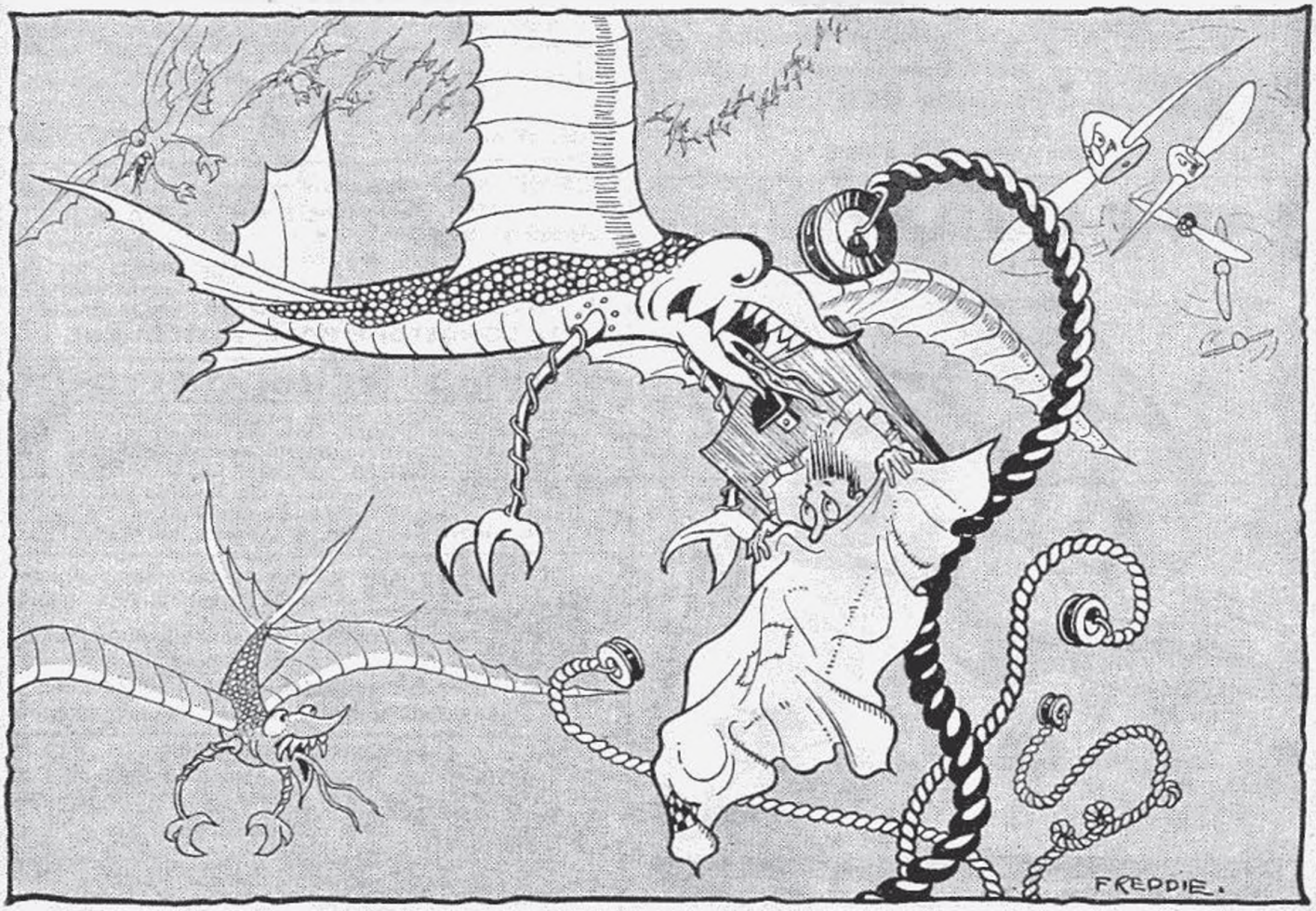
A good start to the NORTHAMPTON M.A.C. outdoor season was made by D. Holland who lost his converted "Diasphere" glider on the first outdoor meeting after an o.o.s. time of 8 minutes. The model was retrieved from a nearby airfield after a total flight of approx. 15 minutes. On the same day the N.M.E. Cup was won by N. A. Pettitt with a total of 208 points. The club glider contest on June 1st was won by A. Goodman with a time of 3 : 15·5, having earlier flown this model away with 2 : 50.

Much good flying has been accomplished in the NOTTINGHAM & D.M.A.C., petrol models being well to the fore. G. Pike has been getting a speed of nearly 70 m.p.h. with his "U" control job—breaking three props in the process, Pete Waller broke the club record with a fine flight of 9 minutes o.o.s., the machine disappearing at about 1,500 ft. altitude.

MERSEYSIDE M.A.S. was well represented at the Northern Rally and scored some measure of success. Mr. Gosling's beautiful 80-in. span sailplane "Heron" deservedly won the Concours, while I. S. Cameron won third place in the "All-in" duration event.

Sunday, July 8th, seems to have been a perfect day over most of the country, and the DONCASTER & D.M.F.C. were one of the lucky clubs flying that day. Two models were lost early in the proceedings, D. Helliwell's "Hoppity" disappearing after 7½ minutes. High light of the afternoon was F. Gearing's big scale biplane "Hornet Moth," which took off under it's own power and slowly circled above the crowd before coming in for a perfect landing. Not so perfect was the landing of W. Monks Flight Cup model as it spun to the ground after the nose and prop fell out about 1,000 ft. up. What's the idea—a new kind of dethermaliser?

A/A Waller, of "B" Squadron, 2 Flight, Apps Wing, Cranwell, would appreciate news of his "King Falcon" glider lost after a 10 minute flight on the 7th July. The machine had a red fuselage and white wings, with detachable tips fitted with slots. (A/A Williamson, whose lost model was reported in the June issue, had his



THE AEROMODELLER'S NIGHTMARE

job returned some six weeks later.)

J. Walden, of 82, Spen Road, Thames Ditton, Surrey, is endeavouring to form a model club in the Esher district, whilst Geo. A. Lovett of 26a, Warwick Street, Worthing, is prepared to start a club in that area. Any readers in these districts would do well to contact these chaps, as there is nothing like teaming up with others of like interests.

And so, for the present I leave you—as the chap in the travelogue films says. Here's hoping the end of the season sees more settled weather than we have enjoyed (!) so far, particularly for the very interesting Handley Page contest. The success of this venture should do well for model aeronautics, and I trust everything goes off without a hitch. Cheerio, blokes, until next month, and don't forget to let me have your views on the petrol contest situation as mentioned at the beginning of these notes.

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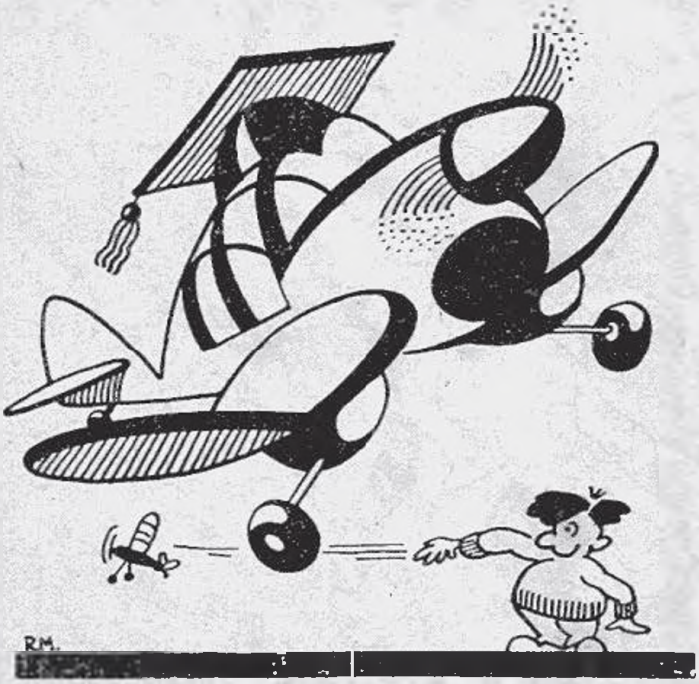

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CORRECTION

Mr. J. H. Maxwell asks us to point out that he is a Committee member of the A.E.A. Research Section and is *not* the Chairman as stated in the July Editorial.

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