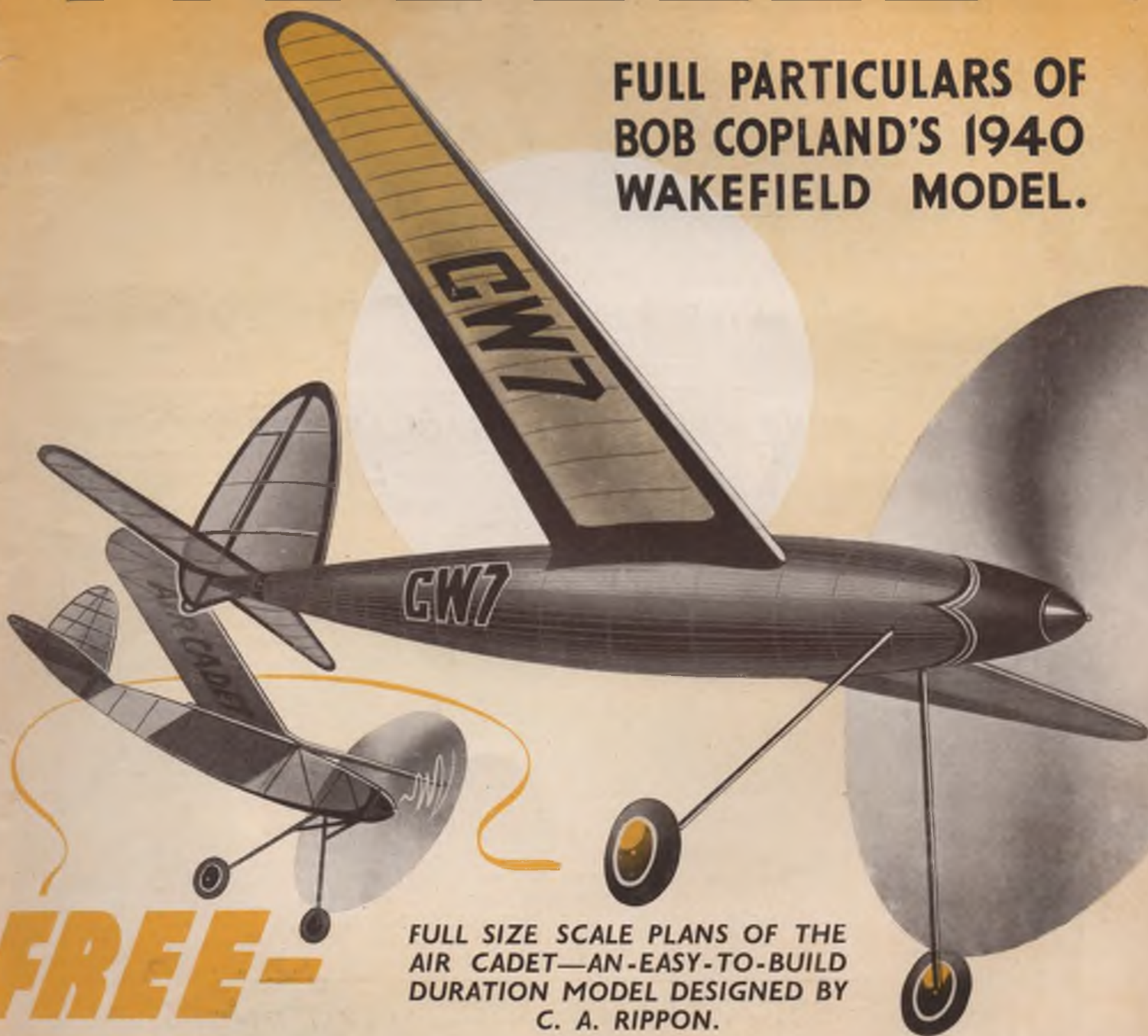


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AERO MODELLER

APRIL, 1940
VOL. 5 No. 53

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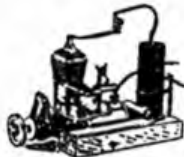
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VOL. V. No. 53

APRIL, 1940

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THE GRAF ZEPPELIN OVER ENGLAND?



This photo was taken by Mr. G. E. Stevenson, of the Whitstable, Tankerton and District M.A.C., and shows his model of the Graf Zeppelin. Length of the model is 3 ft. 6 in., maximum diameter, 5 in. Weight is 3 ounces. The model is built of balsa and covered with tissue. We think this is the finest photo of a model, effectively posed in relation to the background, that we have yet published. Can anybody beat it?

NOTE: THE "WAKEFIELD SURVEY" BY MR. ARNOLD WATHEW IS HELD OVER UNTIL NEXT ISSUE. READERS' ENTRIES ARE STILL REQUIRED AND SHOULD BE SENT IN AS SOON AS POSSIBLE

The AERO MODELLER

APRIL - - 1940

Vol. V. - No. 53

Tel. Leicester 65322

INCORPORATING
"THE MODEL AEROPLANE
CONSTRUCTOR"

Editorial



THROUGHOUT the newsagents' trade the letters "O.P." are recognised as standing for "out of print." "O.P." has been freely used regarding the

last three issues of THE AERO-MODELLER. Those of our readers who did not obtain copies of the January and February issues cannot hope to do so now, as all our odd copies have been used to meet direct orders so far as we were able. In regard to our latest (March) issue, we are afraid that a considerable number of new readers will remain disappointed, as we underprinted by at least 2,000 copies! We are afraid, also, that our Irish readers have been unlucky, as all supplies for Ireland were on a certain boat which hit a certain cliff during a certain fog at the end of February! As by the time the news was in London all copies of the March issue had already been sold out, we were unable to despatch a further supply, so unless the good ship was later salvaged, we regret that our Irish readers must go short of our March copies.

However, we have considerably increased the print of this issue, and trust that every would-be reader will obtain his copy without difficulty. Whilst on the subject of delivery of THE AERO-MODELLER, we do ask our readers for a few days' tolerance in regard to delivery. Our printers and distributors, like many other organisations, have suffered from the calling up of young men and also from the effects of illness; in addition, it must be realised that the Government has first call on the transport system of this country, and papers and many other commodities are naturally considered of secondary importance when munitions, and even coal for our homes, are urgently required. We have before now asked readers to report to us excessive delays in delivery of their copies, but so long as these war conditions last, we would point out that under certain circumstances it is quite likely that readers, particularly those some hundreds of miles away from London, may receive their copies four or five days after the normal publishing dates, which are the 20th to 22nd of the month.

Our Wakefield Plan.

In the centre pages of this issue is an article by Bob Copland describing how to build his 1940 Wakefield model. On page 269 is a reduced facsimile of the **large scale plan, size 35 in. x 45 in., which Bob has prepared, and which we are offering, together with an additional plan, containing several useful perspective sketches, and a complete list of materials, for**

the price of 1/- post free. Bob Copland and his achievements are too well known for us to dwell further on here, but we can say that he has made an excellent job of the plans of this model; every single part is drawn out full size, every rib is shown, and there are

a number of perspective sketches showing the building-up of the model. We anticipate a tremendous demand for these plans, and have printed a large number, so as to give delivery per return. We are confident that many aero-modellers, even if designing their own Wakefield models, will be able to learn a great deal by a study of Bob's plans, and as we know that a large number of aero-modellers will build the model, we propose offering some cash prizes for the best looking examples seen during this season. The competition will be organised on quite novel lines, and full particulars will be published in our next issue.

The "Air Cadet."

Given away with this issue is a large plan of the "Air Cadet," designed by Mr. C. A. Rippon, who is as well known as a successful designer of this type of model as Bob is for those of the Wakefield type. As many members of the Air Cadet Squadrons who will be building this fine plane will no doubt be fairly new to the hobby, Mr. Rippon has written a most lucid set of building instructions, which we are printing in full. The greater part of these instructions are given in this issue, whilst the section dealing with the covering and flying of the model will follow in our next issue, by which time we expect a good many models will be ready for covering.

We are pleased to announce that we have offered to the Air League of the British Empire a silver trophy, to be competed for by teams of Air Cadets from the various squadrons flying replicas of the "Air Cadet."

On behalf of the League, Mr. Leonard Taylor has accepted this trophy, and full particulars of the competition will also be announced in our next issue.

The National Guild of Aero-Modellists.

In the accompanying photograph are illustrated several of the Lapel Badges which are now available. The badges are attractively made in metal, the colours being black and gold. They may be obtained from the Hon. Sec. of the N.G.A. for the sum of 1s., post free. It is of great importance that all members of the N.G.A. should wear their badges, as they are a symbol of the fact that members have insured themselves against the



readers may obtain full particulars from the N.G.A. offices by sending in a postcard with their name and address thereon.

Petrol 'Plane Flying.

We have had one or two enquiries as to whether any ban has been imposed by the authorities on the flying of petrol 'planes. We are not aware of any such ban, and provided aero-modellers take sensible precautions when flying their models, we do not anticipate one. Our own opinion is that if a ban *is* imposed, it will be the aero-modellers' own fault! If some irresponsible person goes and flies a large petrol 'plane right in front of an Anti-aircraft Battery or near an Observer Corps post, he is bound to get himself into trouble! We do hope that those aero-modellers who this year will be flying petrol 'planes will confine their activities to recognised flying grounds, and that they will keep their 'planes on short flights, and not attempt to attain any great heights.

We think that it would be a good idea if responsible officials of those clubs with several petrol 'plane members would go to the nearest Anti-Aircraft Battery or local Observer Corps post, and show the men a petrol 'plane let them hear its engine running, and notify them of the times at which their models will most likely be flying. If we know anything about the average Anti-Aircraft or Observer Corps man, he will be so interested that he will probably be the first to ask for the 'plane to be sent up on a demonstration flight! We are *quite* sure that if methods such as there are adopted, there is far less chance of a ban being imposed.

The Wakefield Survey.

Whilst a number of readers have sent in particulars of their 1939 Wakefield models, on the form provided on the back of the blue print given away with our last issue, we can think of quite a number of owners of first-class 'planes whose names we have *not yet seen* on the entry forms so far received! Now Mr. Wathe, who is conducting this survey, does want it to be as comprehensive as possible. We have therefore arranged to publish the survey in our next issue, so will those readers who can help, please do so, and send in their forms by April 3rd at latest? Many thanks!

Tail-piece.

The suggestion made in our last issue, that a "swaps page" should be included in THE AERO-MODELLER, appears to be popular. At least three dozen readers have written approving of the idea, but not one has sent in any particulars of a swap. Presumably these folk are the kind who know which came first—the egg or the hen?

THE EDITOR



possibility of third party claims arising whilst they are flying their models.

Once again we would remind readers that all business of the N.G.A. is dealt with at Allen House, Newarke Street, Leicester. No correspondence should be addressed to Bournemouth, as it all has to be sent on to the new offices of the Guild.

There are still a number of last year's members who have not yet renewed their membership, and we would remind them that they are not benefiting from the insurance this year unless they *do* renew on the appropriate form. The 1940 certificates of membership are printed in blue. Last year's were printed in red, and these are now obsolete. Full particulars of the Guild, with terms of the policy, were printed in our last issue, but new

**GIVEN AWAY WITH OUR NEXT ISSUE—FULL-SIZE
PLANS FOR A FLYING SCALE MODEL OF THE
HEINKEL HE. 112—SPAN 17 $\frac{1}{2}$ "**



The Air Cadet

Designed by

C. A. RIPPON

Introduction.

THOSE of you who are in the Air Defence Cadet Corps know that the Corps came into existence to help you learn something of the mysteries of aviation, the Royal Air Force, and the industry. A taster, as it were, of all the interesting features. After you have been in it for a while you will find yourselves attracted to one or other of the specialised branches, and maybe you will eventually join the ranks of the Royal Air Force, or enter the industry with your minds made up as to what branch you want to follow. In other words, while an Air Cadet, you serve a form of elementary apprenticeship, and, if I may say so, from my own observations, a very enjoyable one.

Well, to enter the ranks of successful aero-modellers you must follow the same lines, however much you feel you would like to see a miniature "Hurricane" or "Wellington" of your own conception in the air, to be successful you must serve an elementary apprenticeship and "make haste slowly." So often do I see really smart flying scale models, which have taken literally months to build, put into the air to make one or two feeble attempts at flight, and then—curtains! It is, of course, natural that a newcomer who knows none of the pitfalls should look askance at some of our general flying models, and exclaim that they are "not like aeroplanes," and that *they* have no wish to build and fly anything but models that look like the real thing. Quite so. But many would not have met with disillusionment and disappointment had they started in a simpler fashion and, of course, we know that there is a definite place for the duration 'plane as well as the flying scale model. No one in his senses decries the racing shells of the Oxford and Cambridge crews because they are not in the fashion of the *Queen Mary* or H.M. battleship *Hood*, and, after all, even as the Oxford and Cambridge crews, for no apparent reason, other than one of sportsmanship, attract nation-wide interest from people who hardly trouble to know which end of a ship goes first, so do the Coplands and Dick Kordas, and other high lights of the duration world, hold the limelight in the face of the flying scale giants. So if you want to cash in on successful model flying of any type, you've got to start with something simple, and learn one thing at a time. The first and foremost objective is to see your model fly, and when you have had some considerable experience with duration models, you can then approach the problems associated with the more complex flying scale models with confidence and a sound appreciation of the magnitude of the job. Therefore, the model I am about to describe is the start-

ing point, and it has been produced with a view to introducing you to sound principles of design and building technique, and will, even *if not* perfectly built, give satisfying results. Nothing has been included that is not doing a job, all frills being rigidly ignored, and the methods of assembling the various portions are the result of careful and close study of the beginners' difficulties learned from my close association with their problems. As there is a possibility of a shortage of certain materials I should like to say that the model may be built with alternatives, such as silver spruce, pine, whitewood, and even birch, but the duration performance, due to heavier loading, in all probability will be less. The model, as constructed in balsa wood, has been stressed for silk covering so that those who desire a sturdier and more durable job may use the silk, the slight additional weight being $\frac{1}{4}$ to $\frac{1}{2}$ ounce at the most. Now, before I go on to instruct you further, note these few remarks. Study your list of needed materials, and compare them with the details on the white print. Remember, speed in building is not in itself meritorious; take pains and see that the work is sound, and, above all, do not remove work from the board until the glue is perfectly dry. Procure a board (preferably whitewood) without knots, about 30 inches $\times$ 6 inches, or long enough at least to take the job, and see that this board is really true and not warped in the length or hollow in the width.

Make up your mind, even if you have built models before, to follow my instructions and sequence explicitly, and I am sure that you will turn out a first-class job.

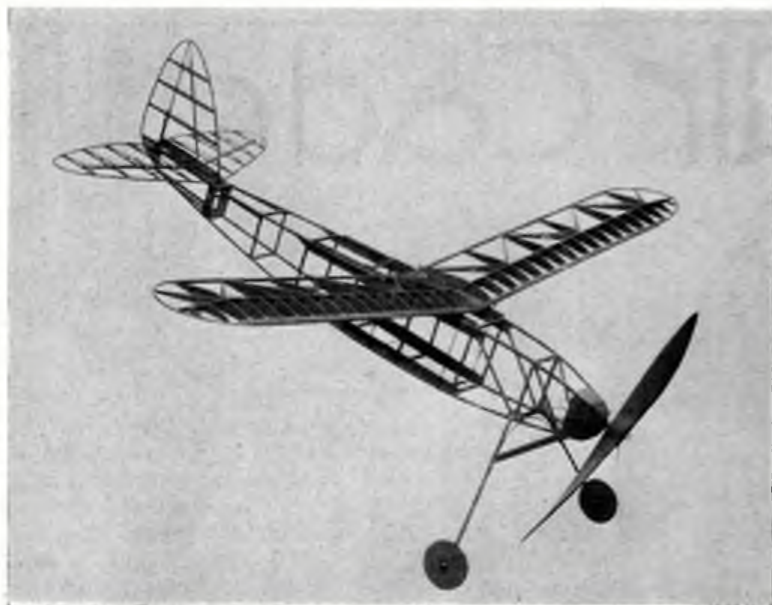
Do not actually build your parts on your print, but make a tracing of each part, cover the tracing with waxed paper, and work upon that. This method avoids you spoiling your print, and allows you to check up your work with your print while doing it.

Remember, that good work is never "near enough"; it's right. In other words, "near enough" is not good enough.

"The Air Cadet" is a high-wing tractor monoplane, and has features that make it possible for it to be packed into quite a small carrying box, very useful in these days of gas mask cases, etc., lumbering up buses!

The model is designed to a set of rules which has proved very popular and successful in my own club, The Northern Heights, and is receiving the blessing of the S.M.A.E. this year, for it will form the basis of one of the Society's decentralised contests. This is the specification called for:—

The main lifting surfaces to contain *not more* than 144 square inches.



The total weight of the model *not to be less than 5 ounces.*

The rubber motor to weigh *not more than 1 ounce.*

The tail area to conform to F.A.I. ruling, i.e. 33 per cent of the main lifting area.

Models built to this formula have made average flights of 90 seconds, and several models thermal flights of 2—12 minutes, timed out of sight.

Although the particular model described is depicted fitted with a 12 in. diameter 18 in. pitch hardwood airscrew, 14 in. or 15 in. balsa wood airscrews will probably improve the general performance, but the weight of the larger balsa wood airscrew must be the same as the hardwood 12 in., to avoid altering the trim, and the under-carriage legs lengthened to accommodate the larger airscrew.

The two halves of the wings are joined underneath at the centre, by a strip of gummed tape, or alternatively, a piece of silk, and held at the correct dihedral angle by the rubber band shown sprung between the pegs on the root ribs.

The method chosen for the wing construction is, in spite of the number of pieces, remarkably easy to assemble, and the resultant wing is sturdy, and will not warp out of shape easily and upset the incidence. The wing is set at a positive rigging angle of incidence of 3 degrees, and rests on the two $\frac{3}{16}$ in. $\times$ $\frac{1}{8}$ in. balsa wood runners, which are situated on top of the fuselage.

The tail is of a slight lifting section, and care should be taken to see that the section is made no thicker than shown; sufficient space is allowed beneath the fin at the stern post to allow for a certain amount of adjustment. The fin is also fitted so that it may be adjusted, but care should be taken to see that it is not moved too much at a time, because in view of the fact that the *whole* fin moves, it can be very easily overdone. The under-carriage is of a well-tested type, which I introduced in 1931, and for this type of model I have found nothing better, and see no reason to change. It has the merit that it stays firm and doesn't wobble about or shift the centre of gravity. Those who have never tried bobbins on their rubber motors will find that they are very convenient, and certainly many of our best flyers have testified to their worth. Now let's get down to "brass tacks."

Building Instructions: Fuselage.

After preparing your tracings of the various parts ready for actual work, and assuring yourself that you have all your materials earmarked correctly for their various jobs, select four pieces of 3 in. $\times$ $\frac{1}{8}$ in. $\times$ $\frac{1}{8}$ in. balsa, as firm and as even grained as possible, and steam them to the shapes of the top and bottom longerons respectively; if there should be a slight variation, use the two hardest for the bottom longerons. Do not try and force them to the shape, be quite certain that they will lie on the tracing to the correct curves without the assistance of the pins. When satisfied, cut them to within 2 inches of the finished length. You will note that the top ones stop short at about the leading edge of the tail seating. At this point a long splice has to be made, and it is wise to pin down the front portion of the top longeron and lay the rear straight portion over it, and use it for the cutting straight edge while it is pinned in place, afterwards glueing it into position. (By the way, I hope you've covered your tracing with waxed paper, because this joint is rather a messy one). Now pin your lower longeron into position, make sure that the pins are upright, and secure both top and bottom ones, so that they cannot slide about. Cut in your cross struts in



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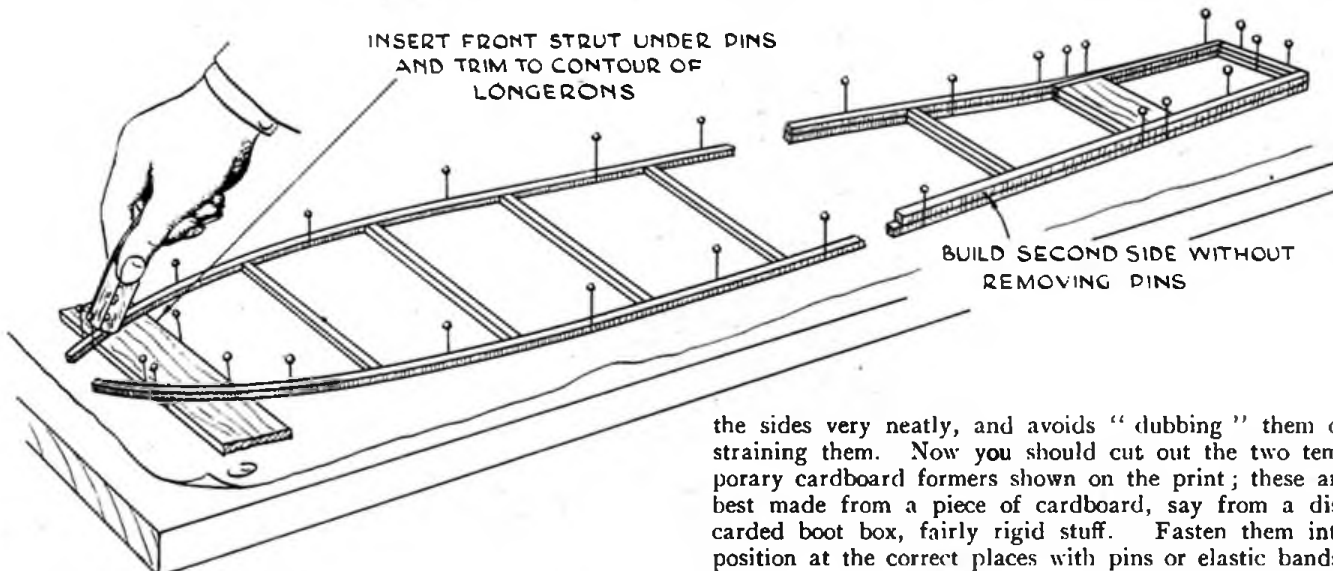
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pairs, laying the extra one aside for the second side. Satisfy yourself that they really are joints, too; don't rely entirely on the glue, it's just as easy to cut the joints right as wrong, and practice makes perfect. Fit the $\frac{1}{8}$ in. sheet balsa at each end by lifting the longerons from the paper, and slipping the required piece

will creep in. Before taking them up, cut to the exact length; this is important, for it governs to a large extent the accuracy of the final assembly of the fuselage. When you do take them up, lay them one at a time on the board and glasspaper each side, using a flat block with the glasspaper glued to it. This allows you to finish off



of $\frac{1}{8}$ in. sheet under; press down the longerons and use them as the cutting guide. By this means you can cut the pieces very accurately. You may have to shift the surrounding pins temporarily, but be certain you do not upset the line of the longerons. Cut these pieces in pairs also. Having fitted and secured your cross struts, etc., you can then fit the diagonal bracers at the nose (but do not cut extras in this case), and the associated fillets.

At the rear end of the fuselage, don't neglect to fit the stern post, and see that it is 90 degrees to the tail seating, which is on the datum line. This completes one side. Cover it with a sheet of waxed paper, and proceed to build the other side over number one. At this point I trust you will note the value of putting your pins in quite upright; any error will cause the second side to be incorrectly set up. As you have already cut your cross struts to size, this side should only take a very little time, the only fitting required being the front diagonal bracers. When the sides are finished, let them dry on the board for 24 hours. This ensures that no distortion

the sides very neatly, and avoids "dubbing" them or straining them. Now you should cut out the two temporary cardboard formers shown on the print; these are best made from a piece of cardboard, say from a discarded boot box, fairly rigid stuff. Fasten them into position at the correct places with pins or elastic bands, and clip the two stern posts together with clothes pegs or bulldog clips, and here make certain that the two sides line up to one another correctly. This can be checked by placing a parallel piece of wood across the tail seating, and another across the two sides at the wing position and looking towards the stern post. Note if the two "winding sticks," as they are called, are dead in line, if not, correct the job at once, for it is no good going on until it is right. When all is well carry on, cutting in the cross members, commencing with the $\frac{1}{8}$ in. wide ones at the stern where the rubber peg fits. Take a tracing off your print of this, and cut out two pieces dead true. A good tip here is to reverse them one on to the other to check up; to hold them in place while the glue is drying, cut out two cardboard clamps as shown in the sketch. (The size of these may be got from the print). Carry on the same with the pieces at the nose, once again checking up, and holding in place with a similar pair of clamps. Complete by fitting the $\frac{1}{8}$ in. square cross struts, which once again are cut in pairs, but these are held in position by "C" clamps, made from odd pieces of 18 or 16 s.w.g. steel wire. Jolly

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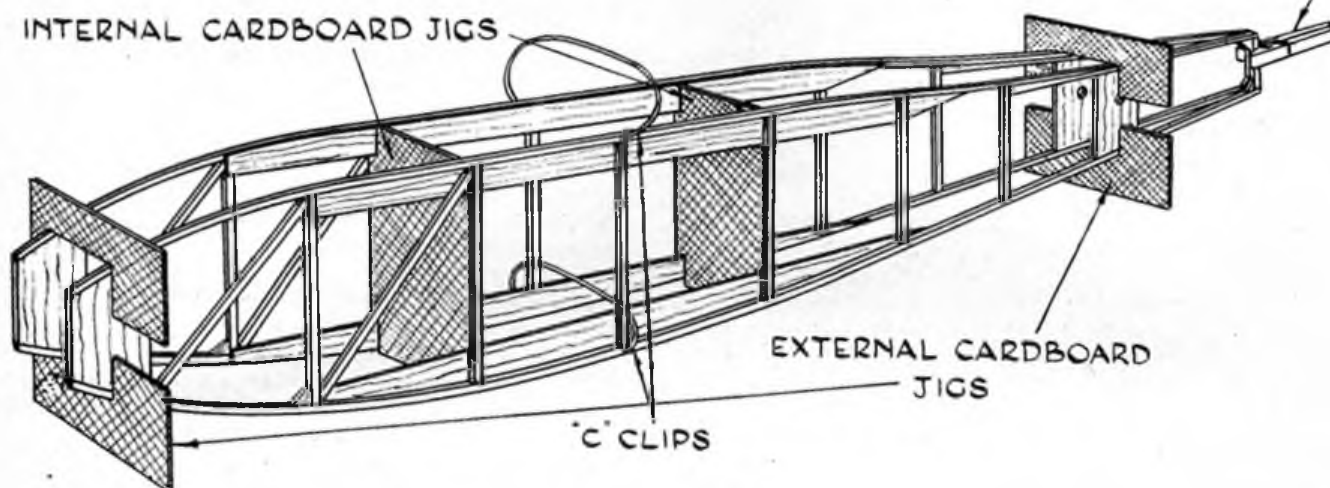
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useful chaps these. Cut out now some pieces of sheet celluloid, and fit as shown on your print; when quite dry, drill the holes where the under-carriage tube runs across with the tube itself, and push it into place, rivet a cup washer on each end, bind in the centre with $\frac{1}{8}$ in. wide gum strip, fit the hooks for the front legs into the sheet balsa. This piece of wire, by the way, goes right across the fuselage. Cement the paper tube at the stern post, which you can check into position by pushing in a piece of $\frac{1}{16}$ in. birch, allowing it to stick up so that you can sight it from the front, and make quite sure it is vertical. These paper tubes are quite easy to make. Just roll them as you would a cigarette, around a suitable former for the job you are doing; reference to the

sketches will help you to understand it, but it is very important that you wet *both sides* of the gum strip, but if you kink it or crease it while wet, throw that effort away, because it will be of no use whatever. Always leave paper tubes to "dry out" in their own time for about 24 hours, and they are good servants; force dry them, or use them too soon, and they are hopeless. The tail skid is a simple fitment that does not present any special difficulty; it is made from a piece of bamboo, and is about $\frac{1}{16}$ in. x $\frac{1}{16}$ in. at the end, which is sharply tapered and pushed in to the $\frac{1}{8}$ in. wide balsa horizontal cross strut, it fairs away into a fine skid but has a slight double bend, introduced by manipulation

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over dry heat—say a gas ring turned low. Always bend bamboo by dry heat, and allow it to get very hot right through before attempting to put a set in it, and, above all, do not scorch it, otherwise it will be useless. Bind with a couple of turns of fine thread to just ahead of the stern tube, and your fuselage is ready to cover when quite dry.

Wings.

If you study the details of the main spar and root ribs on the print and sketches, you will see that the two root ribs are each built up from three $\frac{1}{16}$ in. sheet balsa ribs glued together, and they are then slotted and fitted by means of a simple "halved" joint easily made by the help of the balsa cutter supplemented by a razor blade. The main spars are cut out from $\frac{1}{16}$ in. sheet balsa, and it is important that the angle to which the root ribs are set is absolutely correct before glueing together, as this angle determines the correct lateral setting of the wings. All this is best done before actually assembling the wing on the board, it being quite easy to make a cardboard template to check the angle from a tracing taken from the print.

Having got your first main spar mounted on your wing tracing, and the root rib glued into position, cut out the nose ribs and trailing ribs, and glue them into the correct positions. By the way, be quite certain that the edges that are butted and glued to the spar are actually at 90 degrees. Make sure your plywood or cardboard template that you use to cut them out by is perfect in this respect before you start. Now carry on by glueing the $\frac{1}{8}$ in. x $\frac{1}{8}$ in. leading edge into place, and follow up with the trailing edge. This is shaped up before

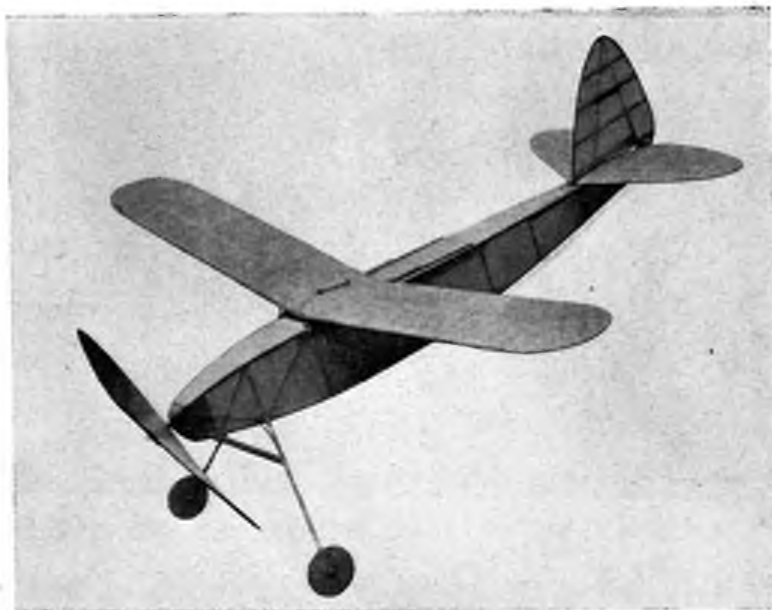
fixing from $\frac{1}{4}$ in. $\times$ $\frac{1}{8}$ in. balsa, using the glass-paper block mentioned earlier. Next fit in the diagonal bracers up to the last main rib, and the corner blocks at the wing root. The wing tips are made from $\frac{3}{32}$ in. $\times$ $\frac{3}{32}$ in. birch, steam bent, and it is a good idea to bind the two pieces of birch together, and steam them as one piece of wood. This ensures that both tips are equal. If you prefer to use bamboo you, of course, bend one piece and split it down after. Having done this, pin your wing tip firmly into position, so that the parts to be jointed lay over the leading and trailing edge, and cut the balsa so that the birch fits neatly, introduce the glue, and leave to dry, with plenty of pins holding it in place.

Meanwhile, you can fit the two outer nose ribs, and the last diagonal bracer. When perfectly dry, lift from the board, *turn* your tracing over, and repeat the performance for the other half-wing. Note that I said *turn* your tracing, don't make the mistake of assembling two right or two left wings. While the second half is drying you may complete the first, adding the piece of $\frac{1}{32}$ in. sheet balsa under the wing root, and shaping the leading edge with your glasspaper block, checking up by your print. You will notice that the wing tip lines up with the centre of the leading edge, but dips towards the rear of the wing. The paper hinge at the centre section is added after covering, and so are the bamboo securing pins.

Tail and Fin.

When you study the print, you will see that the outline of the tail consists of two halves joined to each other in the centre, by a piece of $\frac{1}{16}$ in. sheet balsa of triangular shape. These half-wing outlines must be steam bent to shape, in a similar manner to the wing type binding the two pieces of $\frac{3}{32}$ in. $\times$ $\frac{3}{32}$ in. birch together and gently manipulating the curves into the wood. Don't be impatient and try to hurry this job. I know you'll probably find the steam extremely hot, but as we used to say in the last war, "the first ten years are the worst," and after ten years of model making one gets used to such things as hot steam. Having got the shapes correct, pin the two on to your tracing, over the waxed paper, and proceed to fit in the piece of sheet balsa at the centre (a good idea if you prepare this first). Next cut out the flat bottom ribs from $\frac{1}{8}$ in. $\times$ $\frac{1}{16}$ in. balsa, and fit them carefully between the leading and trailing edges. Fit your $\frac{1}{8}$ in. $\times$ $\frac{1}{8}$ in. main spars, and over them the $\frac{1}{8}$ in. $\times$ $\frac{3}{32}$ in. top ribs, which you must cut from sheet balsa, for $\frac{1}{8}$ in. $\times$ $\frac{3}{32}$ in. is not a stock size. These top ribs lap over the leading and trailing edge. The centre rib is $\frac{1}{2}$ in. $\times$ $\frac{1}{32}$ in., also from sheet balsa. In between the main spar and the trailing edge, there are small spacers fitted in each rib; these help to preserve the shape of the ribs. Under the tail is glued a piece of $\frac{1}{8}$ in. sheet balsa, which serves as a locating block, and it should exactly fit the triangular opening in the top of the fuselage just ahead of the stern tube. Be quite sure that it is glued to the tail, so that it (the tail) is perfectly square across the fuselage. It is a good idea to glue it on after the tail is covered and doped.

The fin is of similar construction, except that the section is symmetrical. The base rib of the fin is inverted



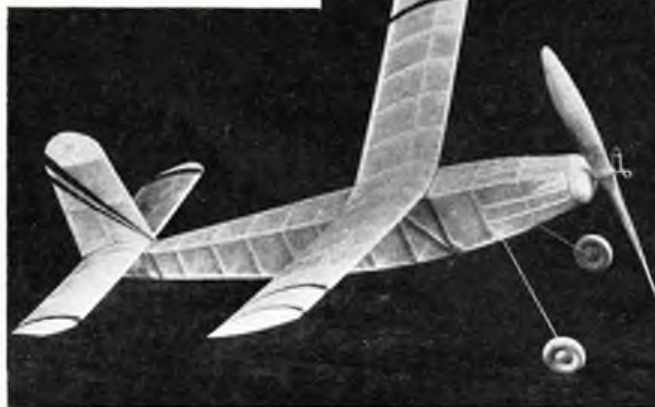
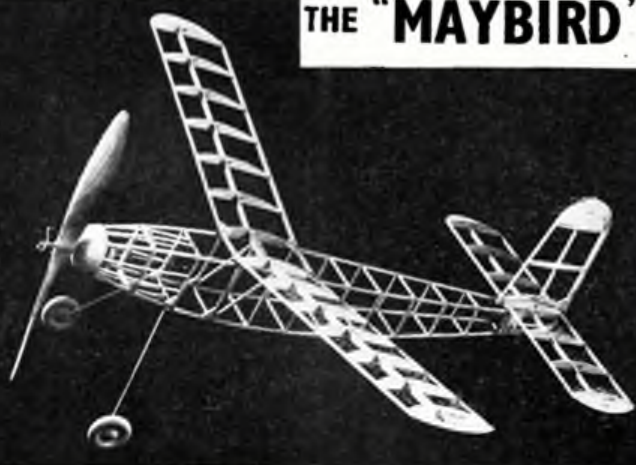
"T" section, and a hardwood vertical strut ends at its base, in the plug which locates the fin in its correct position, plugging into the stern tube; at the lower part of the fin will be noticed a bamboo peg, over which a rubber band is hooked and which passes under the tail skid and back again to the peg on the opposite side of the fin. At the front of the fin is a wire bridle to fit over the fuselage, and a small spiral of 22 s.w.g. wire is actually wound by hand over it before shaping up, to make the adjustable portion which is bound to the fin, and is kept firm by friction. It is advisable to add the paper tabs shown, because until the fin is covered those points are inclined to be weak, due to the end grain of the balsa.

The Nose Block.

This is carved from a piece of block balsa, and the best way to mark it out to fit the nose of the fuselage is to lay it on the table, upend the fuselage so that it is standing on the block nose down, then using a very fine pointed pencil scribe around the inside and round the outside of the fuselage nose. You should then have a clearly marked block, and a stout razor blade or pen-knife can be used to cut away the unwanted portions of the block, and it will fit the fuselage snugly.

Having done that, mark the position of the bush, back and front. Make quite sure that you have located both sides correctly, and bore through from *both* sides; this will ensure a truer job. If you haven't a drill, the bush itself can be gently rotated between finger and thumb, and used as a drill. Prepare two $\frac{3}{8}$ in. diameter celluloid washers, and thread one on to the brass nose bush.

Instructions for completing and flying this model will be given in our next issue. A full list of materials required is given on page 294 of this issue.

"ON TEST"**THE "MAYBIRD"****REPORT BY OUR "TEST PILOT"**

WITH the long fine days of Spring approaching, many enthusiasts will no doubt be looking round for an easily constructed model with a good performance.

The "Maybird" endurance model recently marketed by Elite Model Airplane Supplies, 14 Bury New Road, Manchester, would seem to serve this purpose admirably.

A kit supplied from stock by this firm has been chosen for this month's "On Test" subject; and the photographs above are of the model I built.

Span of the model is 27 in., and length 23 in. Not a large model, but one which I am certain will prove exceptionally easy to construct.

The kit is packed in a strong box, and contains materials of first grade M.A.T.A. quality: Balsa strip and sheet, a set of printed sheet balsa ribs, etc., 11 in. finished Paulownia propeller, free-wheeling shaft, a pair of balsa wheels, rubber, dope, cement, tissue, aluminium tube, wire, semi-finished noseblock, full instructions and comprehensive plan.

The building of the kit is quite straightforward and well within the capabilities of even very young aero-modellers. A very favourable point, indeed, I consider.

The fuselage is of the usual rectangular construction, and is built up with $\frac{3}{32}$ in. square balsa longerons and cross bracings. The first front section is rounded off by the addition of several sheet formers, and $\frac{1}{8}$ in. square longerons. A very robust job is assured if the construction is carried out accurately.

The wing ribs are printed on $\frac{1}{8}$ in. sheet balsa, and the wing construction is quite simple. The tips are built up from $\frac{1}{8}$ in. sheet.

The rudder and fin are built on the same principle as the main-plane. The rudder is hinged at the rear by a short length of piano wire, which enters a piece of aluminium tube fixed to the sternpost of the fuselage. The front of the rudder is fixed with a wire guide which straddles the fuselage, and allows the fin to be altered to control the direction of flight.

The undercarriage, whilst being simple in construction, is extremely strong. It consists of one piece of piano wire only, bent to shape. This piece of wire hinges on a length of aluminium tube, which is anchored in the bottom of the fuselage. The "springing" is derived from both the single length of wire which forms the undercarriage leg, and also the shock absorbing proper-

ties of the rubber band which holds the front part of the undercarriage against the fuselage.

The noseblock provided is semi-complete, is rather large, and is rounded off to conform to the streamlined part of the fuselage.

The propeller, which is 11 in. in diameter, and the free-wheel shaft, are provided complete, and only require assembling to complete the model.

White Japanese tissue is provided, and by using this and white tissue paste, a good covering job is assured. The wings and elevators may be decorated by applying strips of black tissue provided with the kit, and, as will be seen from the two photographs shown above, the "Maybird" is a very nice looking little model.

And now for the all-important matter of the flying capabilities of this model. The high-lift wing section, combined with low-wing loading and the large 11 in. propeller, give an exceptionally smooth and long power flight, followed by a flat lengthy glide, this latter depending naturally on local conditions, of course.

The rubber provided is made up into four strands 24 in. long, lubricated and installed in the fuselage in the usual manner.

It is always advisable to test the model with only about 200 or 300 turns on the motor, until one is definitely satisfied that the correct trim has been found, but the motor may be stretch-wound to 700 turns, when it is claimed that the model will give a very fine performance indeed.

I tested the model on a fine day with good sun and little wind, and after a final check over to make sure that there were no warps in the main-plane fin or elevator, gave it 100 hand-wound turns. The model flew quite well, but glided rather steeply. I counteracted this by moving the wing slightly forward.

With this improvement and 300 turns, the model flew for 45 seconds, which I considered very good.

With 400 turns the model clocked 67 seconds, and with 600 turns stretch-wound I obtained a grand flight of 85 seconds.

To sum up, this model is one of the best performers, considering its constructional simplicity and price, that we have dealt with in these columns. I shall expect to see many "Maybirds" "floating" round during this season.

The "MAYBIRD"

This is the model referred to on opposite page
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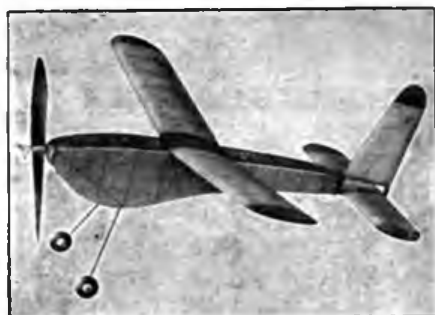


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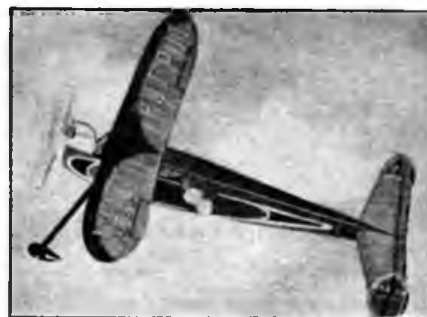
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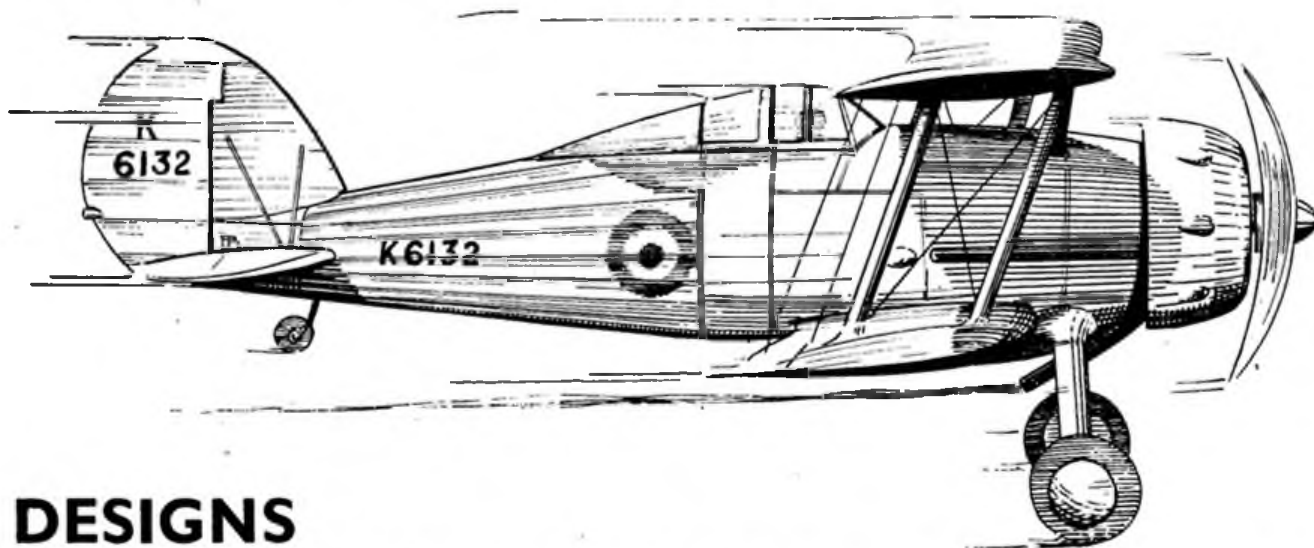
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DESIGNS FOR THE SCALE MODEL BUILDER—V

By PETER GARROD CHINN

SINCE introducing this series of articles, we have found that most readers seem to prefer the text to deal solely with machines suitable for flying-scale models, and are in favour of the "cutaway model" idea. Therefore, from now on, I shall deal with one or two single-engine (and occasionally twin-engine) types each month, and cut out the large multi-motor heavy bomber designs that are only suitable for exhibition-scale and solid-scale models. Since we are dealing with military 'planes, this will confine us mostly to light bomber, fighter and trainer aircraft.

A German fighter of which we have been hearing quite a lot lately is the Messerschmitt Me.110. Space does not permit a long description of this machine, but since I have described most other first-line fighters we cannot neglect this one.

The Me.110 is, as most people know by now, a twin-engined two-seat fighter of fairly large proportions; it might almost be considered as a multi-purpose machine, since it has been used for ground-attack, and could probably be fitted for dive-bombing. The standard version is powered with two motors of the type used in the latest Me.109—Daimler-Benz DB 601's of 1,150 h.p. each, which give it a speed of about the same as the "Spitfire." The motors, which, by the way, are twelve-cylinder units of 33,900 cc. (quite a step from our 9 and 10 cc. petrol 'plane motors!), are equipped with V.D.M. three-bladed controllable-pitch propellers, and it is believed that shell-guns firing through the spinner are also fitted. Two machine-guns are believed to be situated in the nose of the fuselage, and twin machine-guns are also provided for the gunner.

The Messerschmitt is, of course, a large machine for a fighter; its gross weight is, in fact, more than that of the "Blenheim" medium bomber. It has a span of 55 feet, and a wing-area of approximately 414 square feet. The aspect-ratio of the wing is about 7.3, and the wing-loading 36 lb. per square foot (approx.). Four hundred gallons of fuel can be carried, which will give the machine a normal range of 1,500 miles. The Me.110 cannot be compared with our own fighters, since it is

essentially a long-range fighter, and is even less manoeuvrable than the Me.109 and Heinkel 112. It is what the Americans might call a "convoy fighter," although it cannot be compared with U.S. machines, since it has not the climbing powers or manoeuvrability of American long-range fighters. It seems most likely that the Me.110's are intended for escorting bigger craft on bombing raids. In this case, their flexible armament is not sufficient to keep off our eight-gun fighters, and it would be necessary for them to break formation in order to make full use of their forward firing guns. Here it is obvious that the Me.110 will be outclassed. Its size and high wing-loading are bound to make it infinitely less manoeuvrable than our "Hurricanes" and "Spitfires," and France's Curtisses and Moranes.

A model of the Messerschmitt Me.110, however, should be quite a good performer (as far as can be expected from a twin-motor type). It has fairly large area wings supporting a slim fuselage, and the motor nacelles are not too bulky, which, using the right type of structure, should enable a model of low-wing loading to be built. I hope to deal with this machine as a flying model in a future article.

The success with which Finnish airmen have defended their country has set many people wondering just what machines Finland is using to meet Russian air attacks. It has not come as a surprise to most to learn that some of the fighters which have scored successes against Russian bombers are British. Excluding newer British, French and American types that are now being delivered, Finland's best fighters are Dutch Fokker D.21's, and British Gloster "Gladiators." The "Gladiators," according to recent reports, have already distinguished themselves, so considering that R.A.F. "Gladiators" have been in action against German machines, and that it also makes a good model design, I am taking this opportunity of giving a short description of the machine.

First produced in 1935, the "Gladiator" is the fastest biplane fighter ever to go into service with the R.A.F., and although its maximum speed is now

considered low, its climb, ceiling and manoeuvrability are as good, and in some cases better, than many modern fighters. Its initial rate of climb, for instance, is 2,300 feet per minute, which equals that of the "Spitfire," and is only 100 f.p.m. less than that of the "Hurricane." Its ceiling is 33,000 feet, and for manoeuvrability, as many pilots will tell you, the "Gladiator" is as good as some of the latest monoplane fighters. Another version, the "Sea Gladiator," is still in production (for the Fleet Air Arm). This model is about 10 m.p.h. slower, and has a correspondingly lower climbing speed and ceiling.

The structure of the machine is metal, fabric covered. The power plant is an 840 h.p. Bristol "Mercury" radial. The non-retractable undercarriage incorporates Dowty internally-sprung wheels, which makes for clean design. The machine has a maximum speed of 255 m.p.h., and a range of 420 miles at 210 m.p.h.

Plans for building a flying scale model of the "Gladiator," 19 in. span, are given in Mr. H. J. Towner and Mr. Howard Boys' book: "Scale Model Aircraft that Fly."

For this month's "cutaway model," I have chosen the American Curtiss P.40 described in the December issue. Eight hundred and fifty Curtiss "Hawk 75" fighters were ordered by France last year; probably further orders have since been placed. A proportion of these machines are reported to be fitted with Allison V-12 liquid-cooled motors, so it may be assumed that they are of the P.40 type. The earlier P.37, fitted with the 1,000 h.p. Allison, differs quite a bit from the standard "Hawk 75" design, so the type ordered (if ordered) is most likely to be the P.40, which apart from the nose section of the fuselage, is almost identical with the "Hawk 75A," or P.36 type.

The performance of the Allison powered version will be much improved over the Curtisses now in service with the Armée de l'Air. (The prototype P.40 was credited with a speed of nearly 400 m.p.h., and an initial rate of climb of over 5,000 feet per minute!)

Mention must be made here of the latest modification of the "Hawk 75," the P.42. This machine is fitted with one of the new Pratt and Whitney extension-shaft radials, which permits a long-chord cowling and a large spinner totally enclosing the motor. This version is, perhaps, even better streamlined than the in-line powered types; its speed is believed to be over 400 m.p.h. It would seem from this that the one big disadvantage of the radial air-cooled type motor, namely drag, has been overcome, and this should put it on an equal footing with the in-line type like the Rolls-Royce "Merlin," the Allison, and the Daimler-Benz. Air-cooled radials have, of course, certain advantages over liquid-cooled types, such as their ease of maintenance, and generally higher power-to-weight ratio.

The small sketches show how the P.37 and P.42 differ from the P.40.

Armament of the prototype P.40 consisted of two heavy (13.2 mm.) synchronised machine-guns, but if the French have ordered this type, it is obvious that they would insist on an armament at least as powerful as that fitted to the Curtisses now in service. (French "Hawk 75A's" have six 7.9 mm. Brownings, of the same type as fitted to the "Hurricane" and "Spitfire.")

The conventional, clean design of the P.40, makes it a good machine for reproducing as a flying model. Two

or three models by different designers have made their appearance, so it should be a model well worth building. Unless the builder is one of those modellers who like to stick strictly to scale, a slight increase in tail-plane area is advisable, and also in fin area if a large area flying propeller is to be used. Dihedral angle will also need an increase.

The nose-section of the model shown is of carved balsa as far as the leading-edge of the wing. This makes a firm base for the gun fillets, exhaust manifolds, and the two small coolers on the top and bottom (latter not visible in the drawing). The balsa nose also helps to simulate the metal plating of the real machine. Of course, the full-size machine is metal-skinned all over, but to use balsa covering throughout on the model would naturally result in reduced performance. Tissue and stringers are, therefore, used for the main structure. The large wing-fillets cannot be accurately represented with stringers, however, so carved balsa is also employed here.

The retractable landing-gear is a bit too complex to install in a flying model, since it must be made to swing back and at the same time to swivel, so as to allow the wheel to lie flush with the underside of the wing. It is best, therefore, to make it fixed (or detachable).

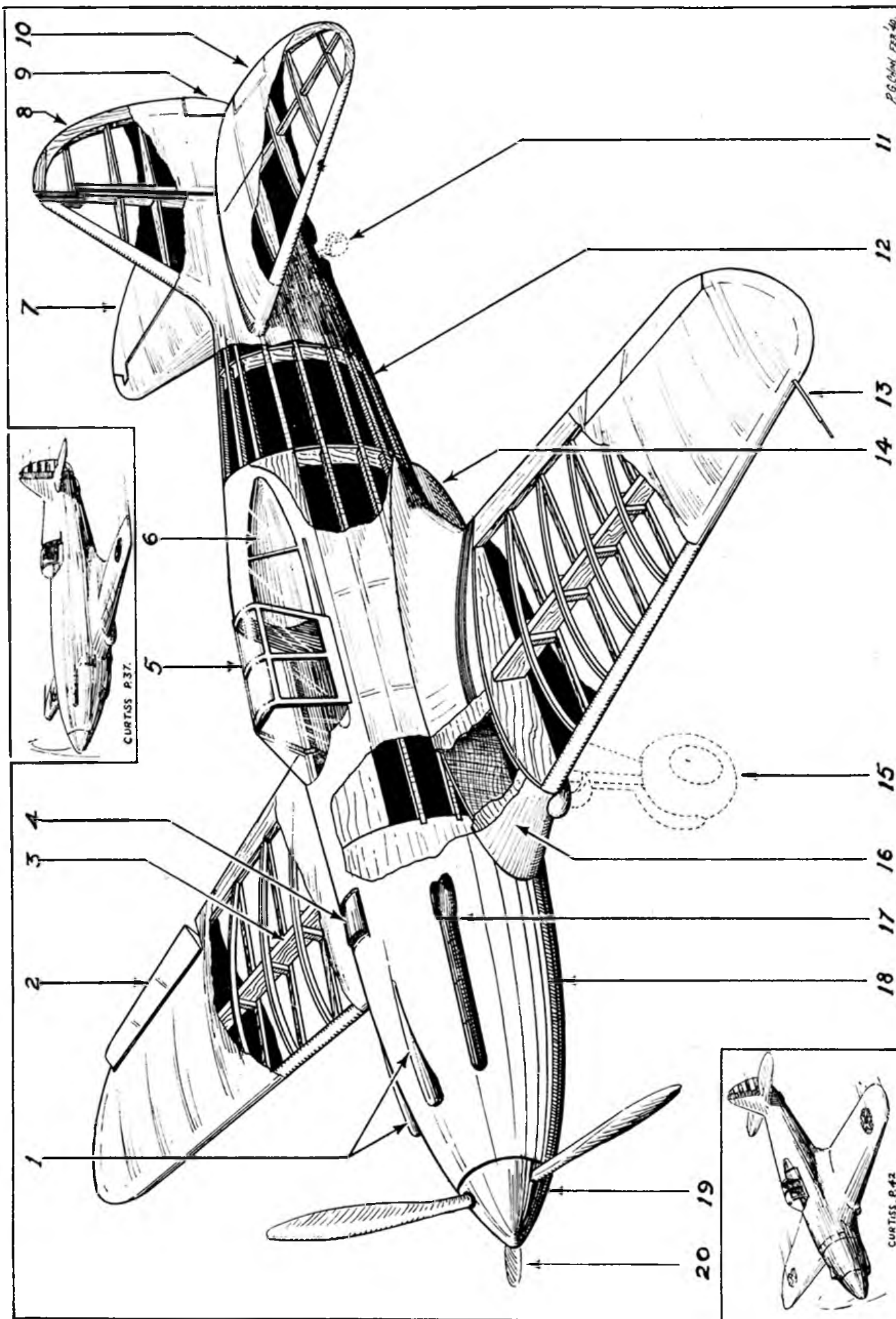
To make up for weight gained in using a balsa nose and fillets, box-spars and built-up type ribs are used in the wing construction. This makes no appreciable difference to the strength of the unit, but results in a worthwhile saving in weight. If the wings are made demountable, it is best to make each panel detachable from the fillets (these being firmly built on to the fuselage). Plugs and sockets could be used, or, since there is a considerable distance between the root-rib of each wing panel, the rubber shock-cord method could be employed, i.e. rubber-bands running through the centre-section and hooked to each panel.

The construction of the tail-surfaces is quite conventional. A movable rudder is shown in the drawing, and movable elevators could also be incorporated if desired. It is suggested, however, that movable control surfaces are used only on a detailed model, where realism rather than maximum performance is required, as they only add weight, and spoil the surface of the wing or tail. These various details can be regarded as optional, and are marked with an asterisk in the drawing key.

The cockpit hatch may be constructed of celluloid with a dural (or aluminium) frame. Note the rear-view panel, also covered in celluloid. Old photo negatives, cleaned, are excellent material from which to construct cabins for all types of scale models. The spinner should be shaped from balsa, preferably on a lathe. It is best made in two parts; the hub portion being solid and the propeller shaft being secured to this part (either fixed or by a free-wheel mechanism), with the rest of the spinner consisting merely of a hollow cap.

Since the undercart is rather short, it is perhaps best to use a three-bladed propeller, as the ground clearance will not allow a two-blade type to be of the diameter required for a light model. The triple-blade screw can be of smaller diameter, yet of large enough area without making the blades too spoon-shaped.

Finish the model in a natural dural colour, and add American Air Force stars to the wing tips with the words U.S. Army, on the bottom of the wings. A blue vertical stripe is painted on the rudder, and alternate red and white horizontal stripes are then added.



RIDING THE THERMAL

By H. J. TOWNER

IT is generally accepted that because of the luck of finding a thermal, duration is not a fair method of comparing one model's performance with that of another, and consequently a competition held under these circumstances is not fair.

It may not be, but then is any outdoor competition strictly fair? Doesn't the state of the ground favour one horse in preference to another? Or the hardness of a cricket pitch suit one bowler better than another? And who can tell in advance what state the ground is going to be on the following day?

But surely the uncertainty of the whole thing is that which adds the spice to sport.

Of course, for those who don't like this uncertainty, the only method really is to suspend their models in a wind tunnel, and by comparing the different readings determine who is the winner which, of course, is absurd, but scientific!

Now let us consider these rising air currents.

As far as we are aware there are only two kinds of "riser"—the air current flowing over an obstacle such as a hill, trees, house, etc., and a column of hot air.

Fig. 1 gives an idea of an air current flowing up and



FIG 1

over a cliff. It will have been observed that gulls will soar for hours just above or level with the top of a cliff, or just in front of the roof of a big building. They are making use of these "risers."

Towards the base of the cliff you will notice a "whirl,"



FIG 3

very similar to the turbulence of the air flow over a wing section when the wing is stalling.

This, of course, is the reason we cannot fly models at the foot of a hill or near to trees; we may get the lift, but we can also get the down flow, much to our sorrow.

The above type of "riser" can, of course, only give a model a temporary lift, as when the air current straightens out again so will our model.

Now a "thermal" is a column of warm air, and because it is warmer than the surrounding air it expands,

and in expanding it becomes lighter; therefore it rises, and it is this kind of rising air that we are chiefly concerned with.

By experience we find that a flat flying ground is more likely to give us thermals than a hilly one.

Cornfields, too, appear to start these rising currents.

On the other hand, the mass of air we may be flying in at a certain temperature may contact a mass of air at a lower temperature, such as may happen when a large cloud is passing overhead. Our warm air then proceeds to climb up on the back of the colder air, as shown in Fig. 2.

Now the usual suggestion put forward to minimise this risk of "soaring" is to increase the wing loading of the model with the intention of bringing it down more quickly without the "floating" effect a light model has.

It was with this in mind that the present Wakefield Rules were developed and the minimum weight increased to 8 oz.; but instead of duration times being lessened they have actually increased.

Personally, I believe that this is not because of the extra weight, but in spite of it, that we are getting these very long thermal flights.

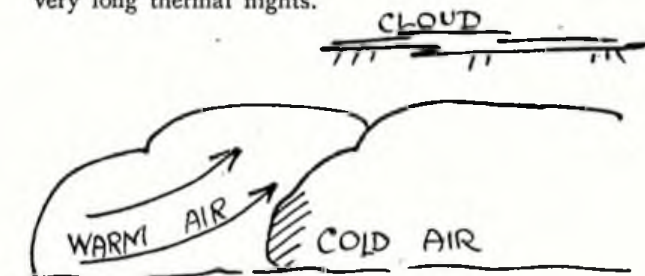


FIG 2

Extra weight will, of course, increase our gliding speed, but this may not increase our *sinking speed*, and it is this sinking speed that is the crux of the whole matter.

To make this quite clear Fig. 3 shows the flight path of a model in a glide, and the rate from which it drops from level A to level B is its sinking speed.

Fig. 4 shows the same model, but carrying a weight

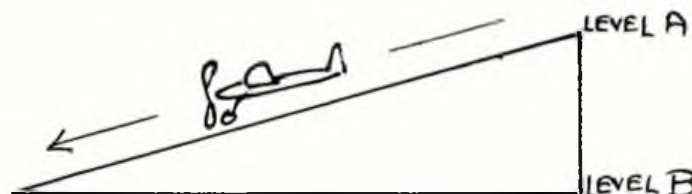


FIG 4

and flying faster, but at not such a steep angle, and taking the same time to drop from level A to level B.

Now if the sinking speed of the model is, say 3 ft. per second and the mass of air the model is flying in is rising at 4 ft. per second, then the plane will rise at the rate of 1 ft. per second in relation to the ground, and will continue to do so whilst these conditions remain.

It would appear, therefore, that under the present competition rules, although our weights have increased, our sinking speeds may have remained the same or become even less.

Although we have only studied the model in a glide for the sake of simplicity, the same "rising" effect takes

(Continued on page 277.)

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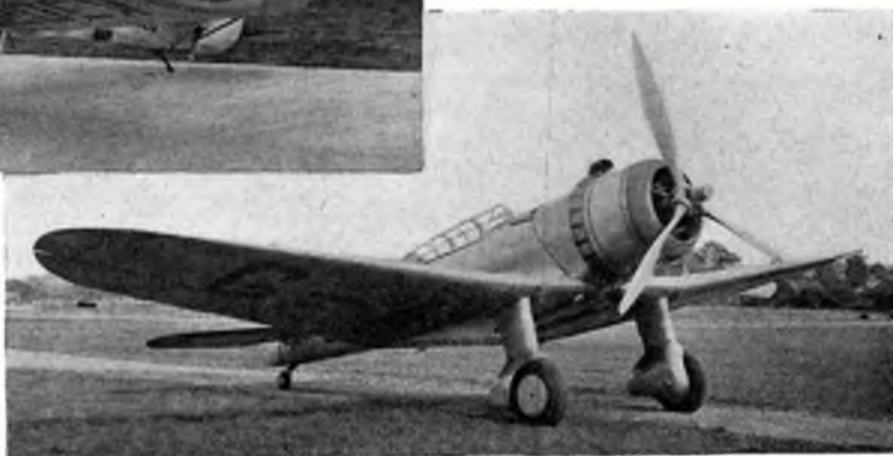
ADDRESS.....

THE OF THE SLEEVE-

By H. McDOUGALL



Above is shown a Hawker "Hart" fitted with a Bristol "Perseus" sleeve-valve aero engine, and "Rotol" airscrew for flight testing. On the right is shown one of the American Northrop all-metal monoplanes, fitted with Bristol "Hercules" sleeve-valve engine.



IT is a peculiar fact that while the average aviation enthusiast takes great interest in any new aeroplane which appears, he usually only gives passing interest to the engine with which it is powered.

In the descriptions of a large number of the new R.A.F. machines which have recently made their appearance, such as the Saunders-Roe Lerwick and the latest type of Vickers Wellesley, mention is made of the fact that their engines are of the "sleeve-valve" type, but very little publicity has been given to the fact that Britain is the only country which is putting into service large numbers of this revolutionary new type of engine.

The ordinary engine uses a poppet valve which is precisely the same type as used during the Great War. The cylinders of the poppet-valve engine are of the usual simple kind, and the operation of the piston is quite normal, just as in a motor-car. In the sleeve-valve engine, however, there is, in between each piston and the walls of the cylinder, a kind of sleeve, a thin metal tube inside which the piston operates. Each cylinder is equipped in the same manner, and all the sleeves are mechanically operated by an ingenious system of cams and levers, so that at each stroke of the engine the sleeve is pushed up the cylinder, and at the same time is caused to twist in such a manner that a peculiarly shaped port cut in the sleeve comes over a similar port in the walls of the cylinder, thus allowing the gas to escape. The full mechanical details of the working of the new engine are, of course, strictly secret.

The advantages of the new type of engine are elimination of valve maintenance routine, low fuel consumption, which is particularly important on long-range machines, lessening of fire risk, simplicity of quantity production and higher compression, resulting in increased power. Lastly, and perhaps most important, is the reduction of noise, a problem which has been engaging the attention

of designers the world over since the perfection of sound locators and predictor instruments.

The design and construction of the sleeve-valve engine has been almost entirely the work of the Bristol Aeroplane Company, to whom much of the credit for the recent advances of British civil and military aviation is due.

It is quite possible for a clever designer to design and build a completely new type of aeroplane in quite a short space of time. The Westland Lysander, which is totally unlike any other machine in the R.A.F., is a typical example.

With an aeroplane engine, however, this is not possible, for engine design is very largely a matter of trial and error, and literally dozens of engines are sometimes made before the completed type is ready to be produced in quantity.

The sleeve-valve engines which have just gone into service are the result of no less than thirteen years of constant research, for it was in 1926 that the Bristol designers decided that they would eventually supersede the normal kind. However, at that time this new type was still in its infancy, and so a special department was formed solely for research work with the new type.

First of all, small examples were constructed, using only a single cylinder, and later units with two cylinders in the form of a "Vee." After five years of experimental work very favourable results had been achieved, constant modifications being made as each new engine was constructed. In 1931 the designers decided that the principle on which the new engine operated was definitely practicable, and so all the best points of the single and double cylinder units which had been built were combined in an experimental six-cylinder unit, and it was found that this engine produced more power with less noise than its ordinary poppet-valve equivalent.

DEVELOPMENT VALVE ENGINE

During the last few years the sleeve-valve engine has been developed up to a stage where its performance is comparable with that of the more widely known poppet valve engine. In this article our contributor gives a general review of development up to the present date. By courtesy of the aircraft firms named, we are able to publish some excellent photographs illustrating these types of engine, which we trust will be of use to those "solid scale" modellers who delight in making their engines of as many parts as possible!

Here is an up-to-date example, in the Rolls-Royce "Merlin," as fitted to the Armstrong-Whitworth "Whitley" of the type of engine with which the sleeve-valve engine has to compete. Below is shown the interior of the cockpit of the Northrop monoplane shown on the opposite page. The photo-manometer can be seen suspended in the immediate foreground.

Eventually, the experience gained from these years of patient experiment were all combined in the Perseus radial of 1932, the first really successful sleeve-valve engine to be put into service.

Five of this type were installed in Imperial Airways aircraft and satisfactorily completed 2,500 hours of constant flying, and, apart from running smoothly and quietly, they were found to be economical on fuel and very easy to maintain.

Whether the new type of engine would run satisfactorily under abnormal conditions was the next question to be solved, and without further ado two Hawker Harts were borrowed from the Air Ministry, and, fitted out



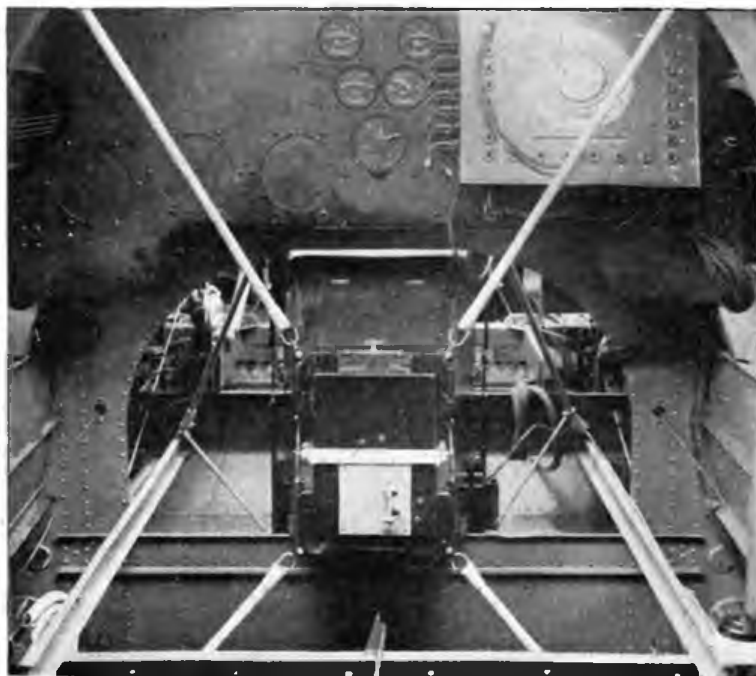
with the radial engines, they were sent off to Northern Canada.

The new engines successfully withstood the rigours of the Arctic winter, and the construction of a series of new and bigger engines was then commenced in earnest. Among the latest of the rapidly growing range of sleeve-valve engines are the Hercules II and the Taurus, both of which produce very considerably more than 1,000 horse-power. They are intended for use in military aircraft, and are now in production.

Each of these wonderful examples of man's ingenuity is really two engines in one. There are seven cylinders in each engine, and all fourteen drive the same crankshaft. This method of increasing power by doubling the engine is not new to British designers, but it is only recently that it has been utilised extensively.

Generally speaking, the British designer pays more attention to the problem of streamlining than his American counterpart, and in spite of its 1,375 h.p., the Bristol Hercules II measures only a little over four feet in diameter. It is only by keeping the overall diameter down to reasonable proportions, and thus allowing the engine to present only a small frontal area to the wind-stream, that the radial can hope to beat the much more easily streamlined in-line type in the race for speed.

To keep down this resistance the engine must be properly cowled, and in order to get the fullest possible advantage from the excellent engines which they have produced, Bristol designers have gone to abnormal lengths to ensure a good cowling. Only a few years ago radial engines in British machines used to be left out





each engine which is being tested. This instrument is known as a photo-manometer, and consists of 24 thin glass tubes arranged upright in a frame like the pipes of a church organ, and each tube contains a small quantity of liquid. From the bottom of the tubes flexible extensions run to the engine, and at the end of each one is a pitot head such as is used on an ordinary air-speed indicator. For the Hercules test nine of these pitot heads had their outlets between the cylinders of the engine, and six more came out at the rear of the cowling.

The glass tubes are surrounded by a light-proof box, the inside of which is electrically illuminated, and, a short distance away, also inside the box, is a roll film camera.

The Bristol "Hercules" sleeve-valve engine is here seen with the cowling removed, revealing the two rows of cylinders. The "gills" can also be seen in the closed position. On the opposite page is a close-up of the "Hercules II" installed in the Northrop fighter. Note how the "gills" are now open.

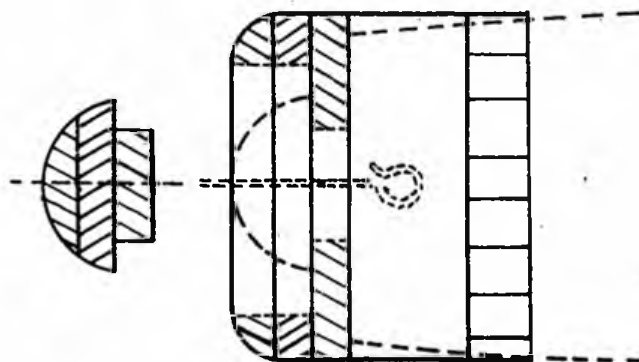
in the cold, on the Imperial Airways' "Hercules," which has just retired, for instance. Later, short cowls were added, and these improved the performance so considerably that all types began to appear ready cowed.

One recent innovation which has recently received considerable praise is the series of gills, small flaps arranged round the rear end of the cowling, which can be opened or shut at will by the pilot. These can plainly be seen on the accompanying photographs.

When the Hercules II, the first very powerful sleeve-valve, was finished and had satisfactorily completed its bench tests, it was bolted in place to a special "test bed" aeroplane, an imported American Northrop all-metal low-wing fighter, and the usual testing procedure was then carried out. This consists of 200 hours of really hard flying, which include a great number of full load climbs and all-out level speed tests.

During these tests the pilot makes notes of the engine's performance at all stages of the flight, and these he jots

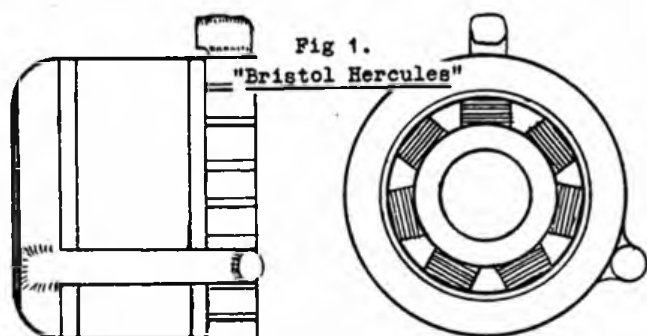
When the aeroplane is in flight the air rushes down the open end of each pitot head and through the flexible extension until it pushes the liquid up the tube. At regular intervals the pilot operates the camera, which



takes photographs of the glass tubes, and he also makes a note of the speed of the aeroplane at the time he took the photograph.

After the 'plane has landed the film is developed and each exposure is enlarged, and from the resulting photographs the designer can tell, by measuring how far the liquid has been blown up each tube, and calculating the pressure of air required to blow it to that height, just what resistance the particular part of the engine at which the pitot head was located has been subjected to.

In this way he can decide what streamlining is necessary and the best places at which to apply it. It was found that a long cowling equipped with gills and well curled at the front was the best for the Hercules. It is only by constant research and years of patient experimentation that British designers are able to keep abreast of modern aeroplane engine technique. They have long realised that great horse-power is not the only requirement of a good engine. Easy maintenance, reliability under abnormal conditions, and many other factors contribute to its success, and it can be truly said that the present British engines, both radial and in-line types,



down on a special kind of pad strapped to his knee. It is really a long strip of paper on two rollers, like the spool of a camera, and as each test is completed the roller is turned and a fresh sheet appears, so that when the machine has landed he has a very complete set of data on the performance of the engine.

A special instrument which has been installed in the Northrop ascertains the peculiarities of the cowling of

are, like modern British aircraft, as good, or better than those of any other country.

How does the introduction of the sleeve-valve engine affect the aero-modeller? It may be said without any doubt that it is a welcome development, for sleeve-valve engines, as mentioned previously, have much smaller diameters than any comparable poppet-valve radial engines. As every aero-modellist knows, the chief deterrent to the construction of radial-engined flying models is the resistance which the front face of the engine sets up to the airstream. Any reduction of this area is a distinct advantage.

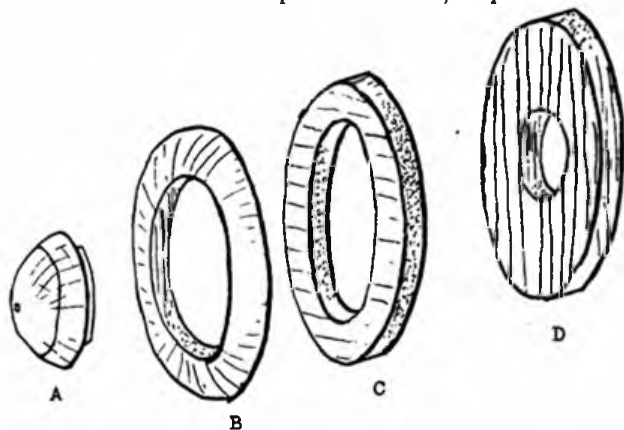
There are many ways of making radial engines for flying scale models, but there is not space here for the writer to detail all possible methods.

Fig. 1 shows a much simplified sketch of the Bristol "Hercules" engine. The circular crankcase shown in the front view is, on the actual engine, a mass of rods and tubes, while the outer rim of the cowl is curled to such an extent that only the short lengths of cylinders shown are visible. Also, the engine is set fairly deeply inside the cowl.

This engine is of the twin row variety, but little or nothing of the rear row is sufficiently visible to require reproduction on any but the most detailed scale model.

The constructional details of a model of this type of engine are shown in Fig. 2. It consists of three circular rims cut from sheet balsa, the actual thickness of which will vary with the size of the model.

The front rim B requires rounding off to represent the front of the cowling. C is a simple rim to add to the length of the cowling, while D is the former to which the "engine" (which may be drawn on paper in Indian ink and cut out with a pair of scissors) is pasted.



The centre of C must be cut away to accommodate the nose-plug A, which is made from laminated sheet balsa bushed with aluminium tubing and fitted with an additional piece at the rear made to fit in the hole in D.

The actual cowling may best be made from cartridge paper with the rear edge slit at intervals. The cowling having been formed into a tube E, it may be slipped round the engine, completing the structure. The "gills" may be opened out a little to give a more realistic appearance, if desired.

When fitting the engine to

Fig 3.
Smokers pipe.

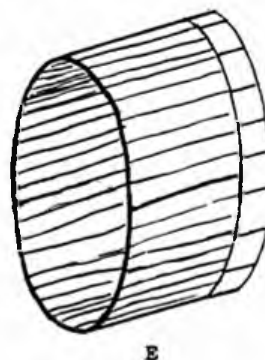
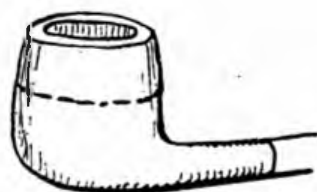


Fig 2.
"A Model Engine"

the model, the cowling should be slipped over the nose so that D is glued to the front fuselage former. A few washers will, of course, be necessary in front of the nose-plug, to prevent the propeller from catching the cowling.

A little more realism may be added by cutting the "engine" from cardboard and binding each cylinder with black thread to represent the cooling fins. This may then be pasted in place instead of the paper engine mentioned previously.

The exhaust pipe and air intake on top of the cowling may be very easily fashioned from scraps of balsa and simply glued in their respective positions.

The writer would like to acknowledge the assistance of the Bristol Aeroplane Co. in writing this article, and the permission to use the accompanying photographs.



Fig 4.
Finished Cowling.



Fig 5.
Machine Gun.

"OFF THE BEATEN TRACK" . . . An Unusual Model Described . . .

THE PTERODACTYL ——— By G. MAHONY

I HAVE often wondered why the Pterodactyl has not become more popular than it is. The one described in this article, although simple to build, is a consistently good and stable flyer, capable of making flights of one minute H.L. or 40 sec. R.O.G.

The accompanying drawings are to scale, and therefore only the more important measurements are given. The remaining measurements can be abstracted by dividers and scaled up.

Wing.

This is in one piece, being secured to the fuselage with rubber bands. Build up each half separately on a drawing board, taking care to incline the wing ribs and riblets to allow for the abnormal sweepback. The ribs are cut from $\frac{1}{8}$ in. balsa sheet, with the exception of rib "A," which is from $\frac{1}{4}$ in. balsa. When both wings are completed, prop them in position with a makeshift jig, and, after making dead certain as to the accuracy of the sweepback and dihedral, join their roots at the leading and trailing edges with 3 in. strips of balsa, afterwards adding $\frac{1}{8}$ in. balsa ribs and two more stringers to this centre section (Fig. 1).

Longitudinal Stability.

Make a port and starboard stabiliser as at Fig. 2, and glue one to the end of each wing at $4\frac{1}{2}^\circ$ negative angle

of incidence. (Consider the flat top-decking of the fuselage as the datum line, the wing being at 0° incidence). When assembled the stabilisers should be in line with their respective wings, and the fins should be vertical.

Fuselage.

This is slab-sided, with $\frac{1}{8}$ in. longerons, and has a plug-in nose-block and tail-block.

Undercarriage.

This is of the tricycle type. The one wheel at the back bears practically the entire weight of the 'plane, and is therefore brass bushed and rigidly supported by four wire struts (20 s.w.g.). The other two wheels are constructed as in an orthodox 'plane.

Propeller Assembly.

The 12 in. hardwood propeller is set at 4° downthrust, convex side nearest the fuselage. Power with ten strands $\frac{1}{8}$ in. flat rubber, well lubricated and plaited.

Trim the 'plane by moving the wing either backwards or forwards until the C.G. is correctly placed for gliding, then put on a few turns and adjust the downthrust. The longitudinal incidence being fixed at $4\frac{1}{2}^\circ$, increasing the incidence of the wing by blocking up the L.E. has no appreciable effect, of course, apart from decreasing the downthrust.

A LETTER TO THE EDITOR

DEAR SIR,

In the letter from the Halifax Club in the February issue of THE AERO-MODELLER, re the suggestion for cutting down the times and making a more substantial structure in the Wakefield contest, it appears at first sight that if an entrant knows that he has to carry more weight—and a dead-weight at that—he will definitely lighten his framework to the utmost, in order to add more rubber to carry the extra load, thus defeating the original idea and simply raising the weight again. You will remember that the weight was raised from 4 oz. to 8 oz. three years ago, but it didn't do the trick, though if the weight of the machines is raised sufficiently enough to keep them down, they will either speed or waddle around for a few seconds and then come in fast. Still, back to brass tacks.

The formula of 144 sq. in. span and 5 oz. minimum weight, including 1 oz. of rubber, was put forward by Mr. Rippon in 1937, and has been a regular event in the Northern Heights ever since. It produces a sturdy machine that is capable of taking hard knocks, giving an average performance of 60—75 sec., and that, being very economical to construct and run, is within reach of all. The average chord for this formula seldom comes under $4\frac{1}{4}$ in., giving an aspect ratio of 8:1. Anyone designing a machine, and possessing the slightest amount of knowledge in the hobby, should see that a wing of 3 in. chord

and 48 in. span (16:1) or $3\frac{1}{2}$ in. by 41 in. (12:1) would be weak, and therefore they must avoid it.

In limiting the rubber of Wakefield machines to 2 oz. or $2\frac{1}{4}$ oz. it would seem that, though not cutting out thermal flying, it would cut down the power duration, together with some of the altitude, and tend to make the entrant endeavour to get the longest effective power run and climb possible, instead of brute force and the fervent hope that some use, and would thus benefit the movement as a whole. I can't quite make out the sense in which the Halifax Club use the word "scope"—having always taken it as meaning the ability of a person to adapt himself to certain necessities or stated requirements. As I see it, there can only be one type of model for any of the duration contests—barring the biplane events—that is, a monoplane of any shape, size or section, according to the fancy of the flyer, without any gadgets to go wrong, as in a contest they usually find some fiendish way of doing so—with as few as possible movable components, the latter for the benefit of the entrant, the majority of whom get jittery and over-anxious once in a big competition.

While the above, to me, seems to be the best method for reducing times, there are bound to be others who think differently again, so please let's hear their suggestions and the pros and cons.

. . . Er . . . by the way, Halifax—got any batteries?

Yours sincerely,

R. L. BARBER, N.H.M.F.C.

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The range at present includes the Westland "Lysander," the Curtis 75a and the Messerschmitt Me 109, while the Boulton-Paul "Defiant," the Morane-Saulnier MS 406 and the Heinkel He 112 U are now in preparation. To make these machines more realistic and air-worthy they can be finished with FROG tautening dope and the correct shades of FROG paint which are sold by all FROG dealers.



SOLE CONCESSIONAIRES : LINES BROS. LTD., TRIANG WORKS, MORDEN ROAD, S.W.19

A 1940 WAKEFIELD CLASS MODEL

By
BOB COPLAND

On page 269 are given full particulars of how to obtain a set of full-size plans of Bob's 1940 model. List of materials required is given on one of the plans.

Our photo shows "Bob" launching one of his models at Fairey's Aerodrome last year.



ONCE again, being faced with a new season's flying, this time in circumstances unfortunately not of the happy type, the usual problem has cropped up. In other words: "What shall we build for the 'Wakefield' event?"

With the Wakefield Cup being postponed indefinitely much of the usual enthusiasm must, therefore, be lost. However, the S.M.A.E., and Warrant Officer Gutteridge in particular, have been thoughtful enough to realise that after the war is over we shall be behind in design unless this type of contest is encouraged.

With this in view, combined with the fact that my occupation is such that I am able to spend a little time on model building even now, despite the state of emergency existing, I have designed a new machine.

It is an improvement on last year's design, and though perhaps it bears some slight resemblance, is completely different in construction and shape.

On the whole, however, it is based on experience gained both in this country and abroad.

While realising that we were beaten last year by "slab-sided models," I still feel confident that the attempt we have made to streamline the model is well worth while. Even the Americans were impressed by the flying done the evening before the Wakefield contest by the English "streamlined" models.

The weights given should be adhered to as closely as possible, as this is essential to enable the C.G. to be kept in the correct position.

The following is a brief outline of the procedure during the building of the machine.

The Fuselage.

The rings used are made by winding as hoops.

Cardboard templates are made and strips of $\frac{3}{32}$ in. $\times$ $\frac{1}{8}$ in. balsa are wound round until four layers have been assembled. Cement may be used, but a cold water glue is advised.

If the latter is used, the pieces of $\frac{3}{32}$ in. $\times$ $\frac{1}{8}$ in. can be placed in water in order to render them more pliable and then wound on to the templates and pinned in position. Each layer is coated with glue, whichever glue may be used.

After the glue has set, the formers are sanded smooth and the two wing box formers must have the boxes assembled on them at this period. The boxes must be made strongly and well glued.

The templates of these two formers will have to be cut to suit the new former shape brought about by partly filling in with $\frac{3}{32}$ in. sheet balsa, as indicated on the drawing.

No. 1 former must have a template made to fit.

All templates must have a hole cut in the centre for assembly on a rod. The templates are used then as the assembly jig. See sketch for method.

The four main stringers are assembled, taking care that the wing boxes are kept parallel to each other.

Only certain formers are marked for stringer position, as it is felt that it is better to sight the stringers and keep them in a straight line, rather than adhere to given marks which, unless very accurate work is done, will give the stringers a wavy appearance.

Assemble the intermediate stringers, cementing them together at a point at the rear.

Remove the templates at this juncture and proceed with the remainder of the stringers.

Certain stringers must be cut to pass the wing boxes.

Fill in round the nose with $\frac{1}{16}$ in. sheet balsa, and also round the wing boxes.

Trim off the wing boxes to make flush with the remainder of the fuselage.

Fill in with $\frac{1}{16}$ in. sheet round the rear former. This allows the portion used as a tail fairing to be cut off as a combined unit.

Fit the tube for the undercarriage, strengthening the fuselage as indicated on the drawing, and fill in with $\frac{1}{16}$ in. sheet balsa.

The undercarriage tube is made by rolling gummed paper round a former made for the purpose.

Fit the tail peg blocks and drill the hole for the peg.

Fit the press stud on the top of the fuselage, as shown.

Fit the underslung fin and paper tube for fin rod.

Glue on $\frac{1}{4}$ in. by $\frac{1}{16}$ in. balsa for tail support as shown, and reinforce with a small block of balsa at rear end, as shown.

Cover the fuselage with two layers of tissue, crossing the grain for strength.

Fit the trimming weight, which should weigh $\frac{1}{4}$ oz. This is slung under the fuselage on a thread which is tensioned by means of a rubber band at the rear.

The weight is thus adjustable.

Wings.

The leading and trailing edges are carved to the sections shown on the rib drawings.

The ribs are cut out of balsa, as called for, and are cemented in their relative positions.

No. 1 rib must be made stronger to account for landing shocks, etc.

Birch tips are fitted as shown, and are reinforced with sheet balsa.

The fillets are added, and these consist of a balsa block at the trailing edge, shaped to suit and a piece of $\frac{3}{32}$ in. sheet cemented to the ribs and leading edge.

The end of the $\frac{3}{32}$ in. sheet is shaped to suit the fuselage contour at that point.

A few words about the wing stubs. Be sure and make a good job of the splicing and bind well with tissue. Make the wing stubs a good fit into the wing boxes. Loose or wobbly fitting is useless.

Cover with one layer of tissue.

Tailplane.

This is made as shown on the drawing, the leading edge being joined in the centre, and the trailing edge cut and strengthened as shown.

The portion of the tail end of the fuselage which was removed to make way for the tail seating, is cut to fit the top of the tail-plane and cemented in place. $\frac{3}{32}$ in. sheet strips are added along either side of this fairing, so that the tissue covering is made easier.

The tips are made of birch, as shown. The front portion of the fairing acts as a locating portion for the tail-plane, and a block of $\frac{1}{8}$ in. sheet is cemented on the front of the fairing.

The piece of $\frac{1}{8}$ in. sheet balsa is cut to fit inside the rear former. This piece then acts as a means of holding down the front end of the tail-plane.

The rear of the tail-plane is held down by the paper tube through which passes the fin rod.

The tail is covered with the grain of the tissue running across the bottom and *along* the top.

The Fin.

The fin is made to drawing, and the trimming tab which is built integral and then cut out after complete assembly, is held on by means of aluminium strips which act as hinges.

The bamboo rod fits into the paper tube on the fuselage, and the rear portion of the fin is held down by means of a rubber band round the dowel rod.

The front of the fin is held down by the dress snap which engages with the portion on the fuselage.

The fin is covered with tissue.

Undercarriage.

This is composed of two bamboo legs, which are made a tight fit in the paper tube in the fuselage.

The wheels have the ends of the axles recessed as shown and covered by $\frac{3}{32}$ in. sheet balsa in order to clean off the entry into the air.

The wheels are built up on the centre piece of $\frac{1}{32}$ in. birch plywood, and the special bushes must be well glued in position.

18 G. wire axles are fitted.

The Propeller.

This is of the one-bladed counterbalanced type, and folds backwards, and lies flush along the fuselage.

The folding movement is a sideways twisting movement to obtain the flush fit on the fuselage.

The propeller is carved from the block shown, and is kept as light as possible. The end at the hub is shaped to fit the slot in the spinner, and the hinge is well bound to the propeller. The hinge faces inwards and upwards.

The spinner is made up as shown, and the wire for the balance weight is forced into the hub before fitting the $\frac{3}{32}$ in. sheet birch plywood. The stop is reinforced with $\frac{3}{32}$ in. plywood, and the other portion of the hinge is cemented and bound with thread to the hub. The end of the propeller should fit into the slot in the spinner when the propeller is open. This takes the flying strain off the hinge to a great extent.

The bush is fitted to the spinner, and the locating tube for the winding hook is also fitted.

The nose-block is made up as shown, and the propeller shaft and ball-bearing fitted.

The lead weight is added to the end of the wire for ballast.

The wire is bent back a little to neutralise the pull of the blade, and so make for easier running.

To wind up the winding hook is pulled out, so disengaging from the brass tube in the spinner and allowing free winding with the winder.

The propeller folds, due to the pressure of the air-flow once the rubber motor has run out.

Flying.

Assemble the machine, using a "rubber rope" tensioner on the rubber motor.

The machine should balance at about 40 per cent of the root chord of the wing from the leading edge.

Test for gliding trim. If the model dives at this adjustment give the tail-plane a slight negative incidence and test again for glide. If the dive still persists despite an increase in negative incidence on the tail-plane, check the centre of gravity position again, and also the main wing incidence; this should be 3 degrees positive to the datum line of the fuselage.

When glide is achieved, improve by slight movement of the sliding weight.

Then try power tests.

No down thrust or side thrust has been built into the model, so this should be added in the form of packing, gradually reducing the size until the machine flies perfectly without any signs of a stall.

Cement packing in place once this condition is satisfied.

The model should turn in right-hand circles of about 100 feet diameter.



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"PETROL**TOPICS"**

By

Dr. J. R. FORSTER

A Monthly Survey of "The Other Fellow's" Activities

IN opening this series of comments, which it is hoped will become a regular monthly feature in THE AERO-MODELLER, I want at once to enlist the co-operation of all readers who are partly or mainly interested in petrol models and the still rather distant goal of radio control. In particular I appeal to that considerable company of enthusiasts who for various reasons are unable or unwilling to avail themselves of club membership, and through modesty or inertia have heretofore hidden their lights under bushels or in uncivilised corners of the British Isles.

One object of this monthly "topic" is to provide for all petrol modellers, both inside and outside the club movement (the latter to be referred to collectively as "Lone Hands"), an abstract "meeting ground," where fellow enthusiasts may have the pleasure or otherwise(?) of admiring or criticising one another's models, gadgets and ideas.

In addition, I hope that in time this feature may become a form of "debating ground," where ideas, both technical and otherwise, may be freely discussed. In short, although I may press my own comment thereon when I feel qualified to do so, I do not propose to make this feature too much of a "one man show," or to abuse the power of the Press for stuffing my own ideas down readers' throats, to the exclusion of other people's points of view.

While I shall try to live up to this good intention, I ought perhaps to warn readers at the outset, however, that I have one particular B in my bonnet, namely an insistence on the practicability of ideas, when in action *under field conditions*, and I shall probably bring a hail of abuse about my ears by ruthlessly criticising features which in my humble opinion do not appear to embody this quality. As a well-known pioneer of the movement once said to me: "*Toujours le Flyings.*"

It is an unfortunate fact that both inside and outside the clubs there are many petrol modellers who, while being practical experts at building and/or flying, are either incapable of or unwilling to set down their ideas in the shape of articles for publication. The movement is thus deprived of much useful information. It is, therefore, hoped that those of my readers who are modest

enough to admit this will, nevertheless, write to me, c/o THE AERO-MODELLER offices, telling of any experiences, new models built or building, useful gadgets devised by them, and particularly submitting any good photos of their models which they are willing to have published.

I, for my part, will do my best to persuade our long-suffering editor to publish as many as possible of those considered of most general interest, and hope to include from time to time sketches, photos and accounts of my own doings during the month.

In this way it should soon be possible to compile a few statistics regarding such matters as:

- (a) The prevalent types being built.
- (b) The most popular powers in use.
- (c) The number of active "Lone Hands" and club members in the country.

Having got this long preamble off my chest which, I undertake, shall not recur in subsequent "Petrol Topics," let us now get to business.

To start the controversial ball rolling I put the following question to you all, apropos of the "B in my bonnet," referred to above: *What is the object, if any, in putting a real live petrol engine into a model whose builder cannot or dare not make it fly?*

We all know to our cost that what goes up must come down, and if a model is so beautiful that its owner (probably wisely!) cannot bring himself to risk that inevitable reunion with mother earth which it must endure not once, but hundreds of times, then it has no right to be called a model aeroplane (which after all is something that flies, whatever else it does). This class of model should be referred to as "a model of an aeroplane" as distinct from a "model aeroplane," and as such should surely include a model of a full-sized engine, and should not be eligible with petrol models in a "Concours d'Elegance." Until we have perfect radio control, flying models have got to have crash-proof features, for the day inevitably comes to every model when a three-point landing cannot, by any stretch of imagination, be said to describe this "reunion." Nevertheless, a lot of very useful work is often done in such models, and if we can sort the sheep from the

goats many features with only slight modification can be quite safely embodied in a consistent flyer. Like most petrol modellers I have met, I personally have a leaning towards scale model work, and am always on the look out for means of making one's models more nearly true to scale while preserving their crash-proof and flying qualities.

Winter Flying.

Weather in my parts of the country has been well up to standard until the last half of January, when even then there were certain days when I was very tempted to set about making a pair of skis for "Old Reliable." Calm, foggy or frosty days, so prevalent at this time of year, coupled with the shortness of grass, absence of growing crops and cattle, are ideal for flying, but are likely soon to give way to the blustering winds of March, when most of us will be getting down to more serious construction for the summer. I have had some pleasant days with a rebuilt old age pensioner recently converted from a parasol into a high-wing cabin affair quite well streamlined and boasting an engine cowl. This was my first attempt at beating metal into shape, and proved easier than I had always imagined. Materials: One old aluminium "Grip-Fix" tin. Equipment: One round brass-headed fire poker clamped in a vice; a hammer, scissors, and half an hour's annoyance to the household from continuous gentle hammering!

This old veteran, affectionately known to the district as P.3, has (in parts at least) survived quite an eventful career of 2½ years and well over 1,000 flights. Notable disasters to her credit, but to my own discredit, include a straight line flight of about half a mile out to sea, from which she was rescued by sheer good luck. The engine, incidentally, was not my own on that occasion.

She also flew through the topmost branches of a 40 ft. elm tree one day. The propeller was untouched, and with both wings swept clean off, she dived headlong and wingless under full power, burying her engine fully 6 in. into (fortunately) fairly soft ground beside a stream.

The most famous occasion to the local populace (fortunately not long after I took out my first insurance policy) occurred as a result of a cam on my timer clock coming unsoldered and failing to cut the ignition. She flew in tight circles with a nearly full tank for 8 min. over our village, to my utter consternation, but to the great delight of the "locals," who were blissfully unaware of all the horrible possibilities of the outcome (I was by this time hareing after her in my car, probably a greater source of danger still, since I was more concerned with the view through the sunshine roof than through the windscreen). By great good fortune she ultimately landed quite nicely on the front lawn of a house three-quarters of a mile from the starting point, but I couldn't help noticing that it was only ten yards from the front windows. All this sounds "good fun" in retrospect, but it all leads up to that point which has been well flogged in this journal, namely the *imperativeness* of insurance, now so easily obtained through the N.G.A.

Timer Clocks.

Apropos of timer clocks, I cannot claim originality for my own latest "Little Ticks" (in which, by the way, the defect which caused the foregoing disaster has been remedied). But I am satisfied that a home-made one of this type is lighter, cheaper, and in my experience more

reliable and accurate than an "Auto-knips," and furthermore, they run for as long as 3—4 min., which, as suggested in my article in the March issue, would appear to be an advantage for these much neglected craft. If details of this "Little Tick" prove to be in sufficient demand from hoped-for correspondents, I will give them in next month's "Petrol Topics."

This month's photos are all necessarily my own (which I hope will not happen again if readers respond to my appeal), and include this old veteran P.3 during life, death and since her resurrection as a cabin job. The wing loading is now considerably reduced to under 12 oz., with a resultant great improvement in the glide allowing, in turn, a much lighter undercart—the vicious circle reversed for once. Other alterations include a hinged panel in the belly, on which is mounted the movable battery slide, which I feel has once and for all settled the battery housing problem. Fixed batteries mean movable wings, and I have come to the conclusion that ¼ oz. is little to pay for the tremendous advantage of being able to alter the C.G. by the simple manipulation of a fly-nut.

If we are to have scale flying models of modern low-wing machines we have got to have fixed centre-sections in which to mount the undercart. The wing is thus immovable fore and aft, and the advantages of a movable battery in these circumstances are at once apparent. Details of this development will be given in a future "Petrol Topics."

Batteries.

I would like to know how other readers fare with batteries. Personally, I have had more trouble and expense over this one item than any other. The fact remains that, in spite of the claims of the coil makers that their coils function on three volts (which I do not deny if one uses colossal capacity cells), nevertheless, in practice, especially in cold weather when the cell contents are less liquid than in summer, small cells simply will not deliver a sufficient current for more than a few seconds, presumably owing to the polarisation. Even in summer, using standard 4½ volt flashlamp batteries, I don't think anyone will deny that he has to discard batteries long before they are fully discharged, while they will still give a perfectly good light with a bulb. This means that only tip-top batteries are any use, and the majority of their electrical energy is wasted.

The whole question of coil operation in my experience

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hinges on an adequate *current* rather than *voltage*. If one can get a battery with a sufficiently low internal resistance to allow of a constant high-ampere output one is all right. In my experience, the more expensive makes of dry battery are built primarily for long life when out of use, and for uses for which they were intended, namely *intermittent* illumination of comparatively low wattage bulbs. In practice they get at least a day's rest between periods of use, and often weeks and, in fact, the better makes will retain their voltage when not in use for some months at a stretch.

Yet these very batteries are less efficient for our purpose than are the cheaper makes. I can only assume that the latter probably drop their voltage fairly soon (one knows that they certainly deteriorate, when not used or sold, in half the time of the good makes). Where they score is that they will continue to put out a big current for longer than the expensive makes. In other words, a short life, but a gay one.

The only solution, as I see it, is to have very small accumulators which theoretically will deliver an almost unlimited current, and I have recently been doing some quite encouraging experiments on the bench with a home-made twin cell 4 volt accumulator, knocked up from small pieces of scrapped car accumulator plates. The small celluloid containers proved to be quite easy to make leak-

proof with dope or model glue which, of course, dissolves celluloid. Its weight is $2\frac{1}{2}$ oz. against the 4 oz. of the standard $4\frac{1}{2}$ volt flash battery. If this proves reliable, charging up before each flight from one's 6 volt booster battery is a simple procedure. I think it is high time some enterprising firm of model supplies put such accumulators on the market. They should, of course, have unspillable or jelly electrolyte, or alternatively should be of the alkali, nickel iron type fitted to some American cars, as no harm results to these from direct short-circuiting. I will report later on final results.

Till then, happy landings, and in the meantime, do please send in your news and views (both pictorial and otherwise), and "Lone Hands" particularly, do let us hear of your existence at least. Failures are often more instructive than successes in this flying game, so do not tell only of your satisfactory models. Various types of undercart; methods of attachment of tail surfaces; experiments on twin-engine synchronisation; wing-tip construction; swivelling v. fixed tail wheels. All such things should provide plenty of scope for future discussion in "Petrol Topics."

The names of correspondents whose letters contribute towards the make-up of "Petrol Topics" will most certainly be published unless their writers express a desire to the contrary.

TEN-MINUTE TEST FOR THE TYRO

By D.M.H.

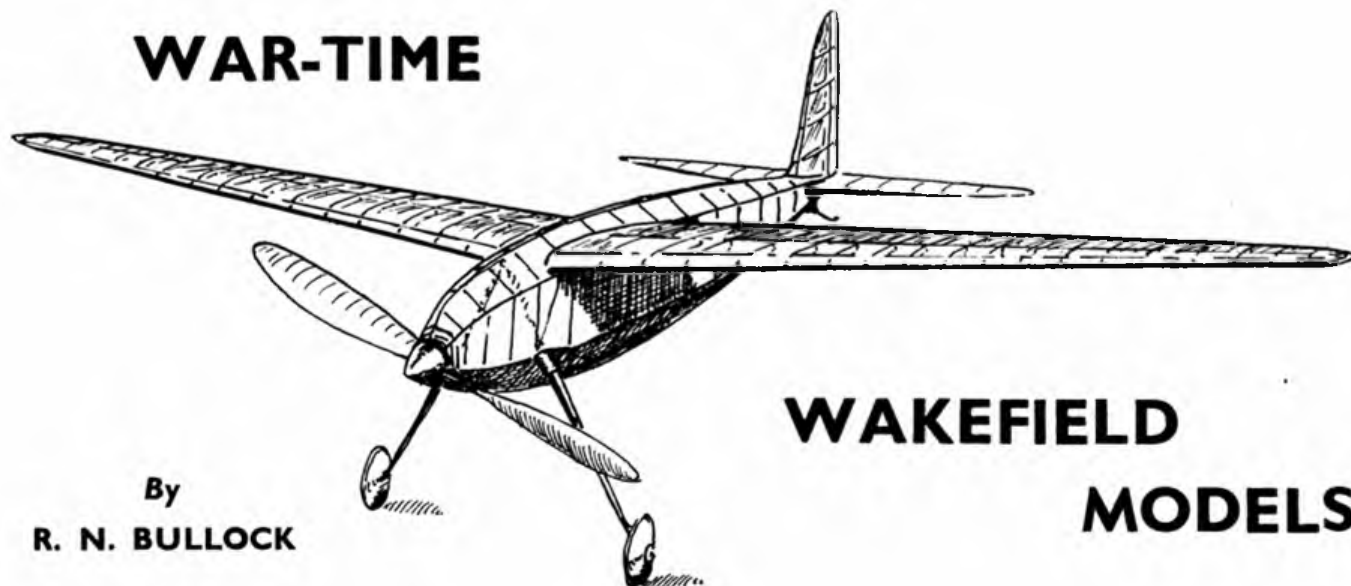
HOW much do you know about aero-modelling? Test your knowledge and see how many of these questions you can answer correctly.

1. The wing of a speed model is usually made thinner than that of a corresponding duration model because this
 - (a) Simplifies construction.
 - (b) Cuts down the resistance.
 - (c) Can be built stronger.
2. Which of these three wing types requires the most dihedral?
 - (a) Parallel chord.
 - (b) Elliptical.
 - (c) Highly tapered.
3. Coloured tissue is preferable to white tissue treated with coloured dope because
 - (a) The finish is better.
 - (b) It is stronger.
 - (c) It is lighter.
4. Side-thrust is used to
 - (a) Prevent the model from side-slipping.
 - (b) Counteract torque.
 - (c) Prevent the model from stalling.
5. The datum line is
 - (a) Another name for the thrust line.
 - (b) A horizontal line around which a fuselage is sometimes built.
 - (c) Angle at which the tail-plane is set.
6. Of these three woods used for propellers, which is the lightest?
 - (a) Paulownia.
 - (b) Ho-wood.
 - (c) Cherrywood.

7. The main purpose of dope is to make the tissue
 - (a) Tight.
 - (b) Airproof.
 - (c) Smooth.
8. Gottingen is
 - (a) A well-known American aero-modeller.
 - (b) The name given to a series of airfoil shapes.
 - (c) A kind of dope.
9. Which of these three sections has the thinnest trailing edge?
 - (a) Clark Y.
 - (b) RAF 32.
 - (c) Eiffel 400.
10. A model leaves the ground at an angle of 30 degrees from the horizontal. The lift is mainly supplied by
 - (a) Suction created by the air passing over the top of the wing.
 - (b) The slipstream from the propeller pushing downwards.
 - (c) Pressure of air underneath the wing.
11. A parasol monoplane is
 - (a) A model which can descend like a parachute.
 - (b) A model with its wing raised above the fuselage.
 - (c) A kind of autogyro.
12. The empennage is
 - (a) Centre-section of wing.
 - (b) Undercarriage.
 - (c) Tail assembly.

Turn to the end of "Clubman's" report, and see how much, or little, you know!

WAR-TIME



By
R. N. BULLOCK

WAKEFIELD MODELS

IF by any chance this present war continues for a year or two there is a possibility that certain materials used in the construction of modern competition models will become scarce if not entirely unobtainable.

The first and foremost of model aeroplane constructional material is balsa wood, the next tissue paper, and the third cellulose cement, or cellulose material generally; and these materials are all imported either in the raw state or otherwise; and thus will be missed should their import be stopped by the shipping difficulties.

The intention of this article is to draw the attention of the new and younger members of the model aeroplane fraternity to a few points that will enable them to still continue to build models, and particularly Wakefield models, if the supplies of the aforementioned materials should become unobtainable.

First I would point out that, by skilful use of silver spruce, three-ply, paper, wire, cane and glue, models can be built as light and as strong as balsa wood ones, but the amount of work entailed will be considerably greater, besides which more and better tools, greater skill and ingenuity will be required to produce the results stated earlier.

The only problem which seems insuperable is the covering of models with anything which is going to be quite so light and strong for its weight and easy to work as Jap. tissue. In its place are several grades of tissue made in this country, besides which there is "Cellophane" and "Pliafilm." It will no longer be possible to make butt joints with cellulose cement, so they will have to be devised to suit the conditions of glue and occasional binding. Glue is very strong, and in the early days of model building all joints, or practically all joints, were glued and bound. Now how are we going to build models as successful as the modern Wakefield model with heavier materials? Well, firstly it will be necessary to simplify your design, say from a sixteen-sided fuselage to an eight-sided one. Next, when you make any part of wood it must be of less volume; in fact, it must be of approximately one-fourth the volume or less of the equivalent balsa part; this in many instances will be quite impossible, but will have to be aimed at.

If the structure is simplified there will be fewer parts, fewer joints, and this in itself will save weight.

The propeller offers a very difficult problem, but will be greatly aided by the use of a lesser diameter, thinner blades with more under camber, run at high revolutions per minute.

This leads us to the choice of motor, which for a heavier model will need to be more powerful, and thus a twin skein gear is advised, allowing only an 80 sec. motor run instead of the usual 120 sec. of a good modern balsa wood Wakefield model.

I should suggest that with care the total weight of your first effort should not exceed $10\frac{1}{2}$ oz., as my own 1929 Wakefield, built with spruce, birch and wire with only its ribs of balsa, and these $\frac{3}{8}$ in. thick, with a twin skein gear, silk-covered, well doped, three-ply wheels, yellow pine propeller and 18 s.w.g. undercarriage, came to $11\frac{1}{2}$ oz.

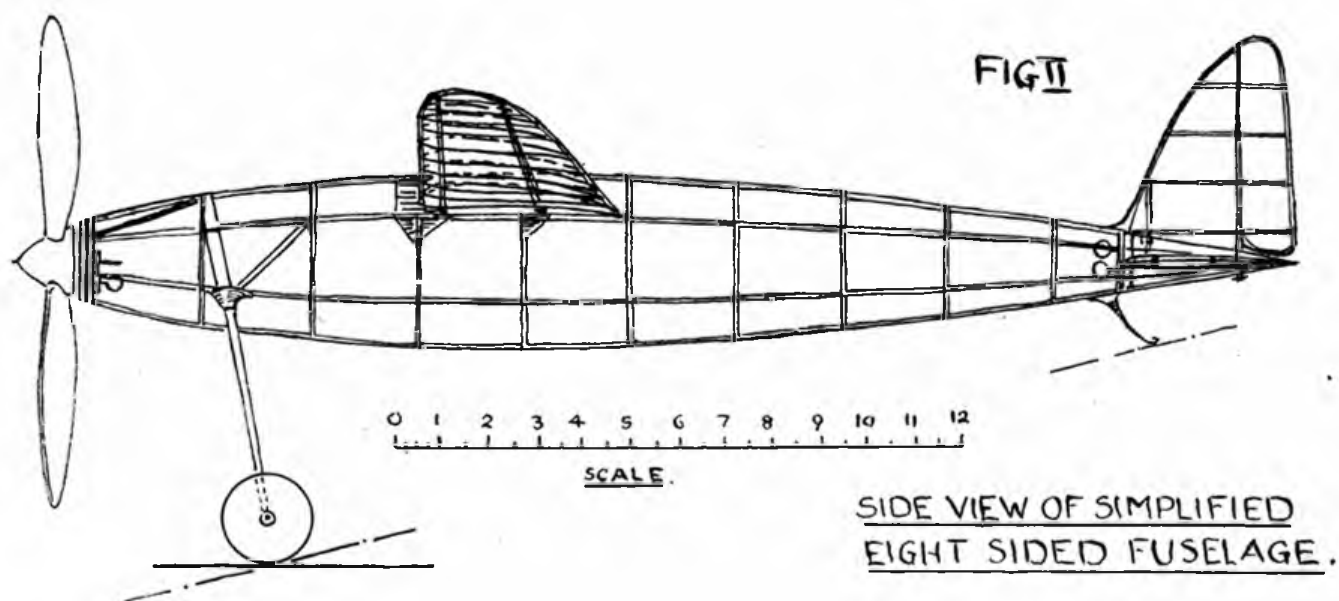
I feel that with the present-day advanced ideas of model design that it is not beyond the bounds of possibility to get down to the usual $8\frac{1}{2}$ oz., 200 sq. in., 18 in. propeller model with ordinary materials, but this is not really necessary, as there is no doubt that a heavier model will be a better model if only supplied with the former to climb; the reasons for this I must leave at the moment, as this article is meant to deal chiefly with constructional details.

I would advise a trial with an eight-sided fuselage, with $\frac{1}{8}$ in. $\times$ $\frac{1}{8}$ in. or a little heavier cross-section for the longerons, these to be of silver spruce.

The formers may be of any one of the formers shown in Fig. 3; the type chosen depends mostly on how much work you are prepared to do, the three-ply or the wire being the easiest, but not necessarily the best. Candidly, I would advocate the lapped, glued and pinned variety, but do not think the pin is really necessary after the glue is set.

The wire former is, of course, much less liable to breakage in event of a broken motor, but is not so nice from the standpoint of covering adherence or smooth outer contour. The appearance of the machine I would attempt myself with material other than balsa wood is shown in Fig. 1, and some details as to the position of the components in. Fig. 2, also a scale to find the approximate sizes.

The end of the fuselage, and the arrangement of the tail-plane and how its fairing which carries the rear motor looks is shown in Figs. 4 and 5.



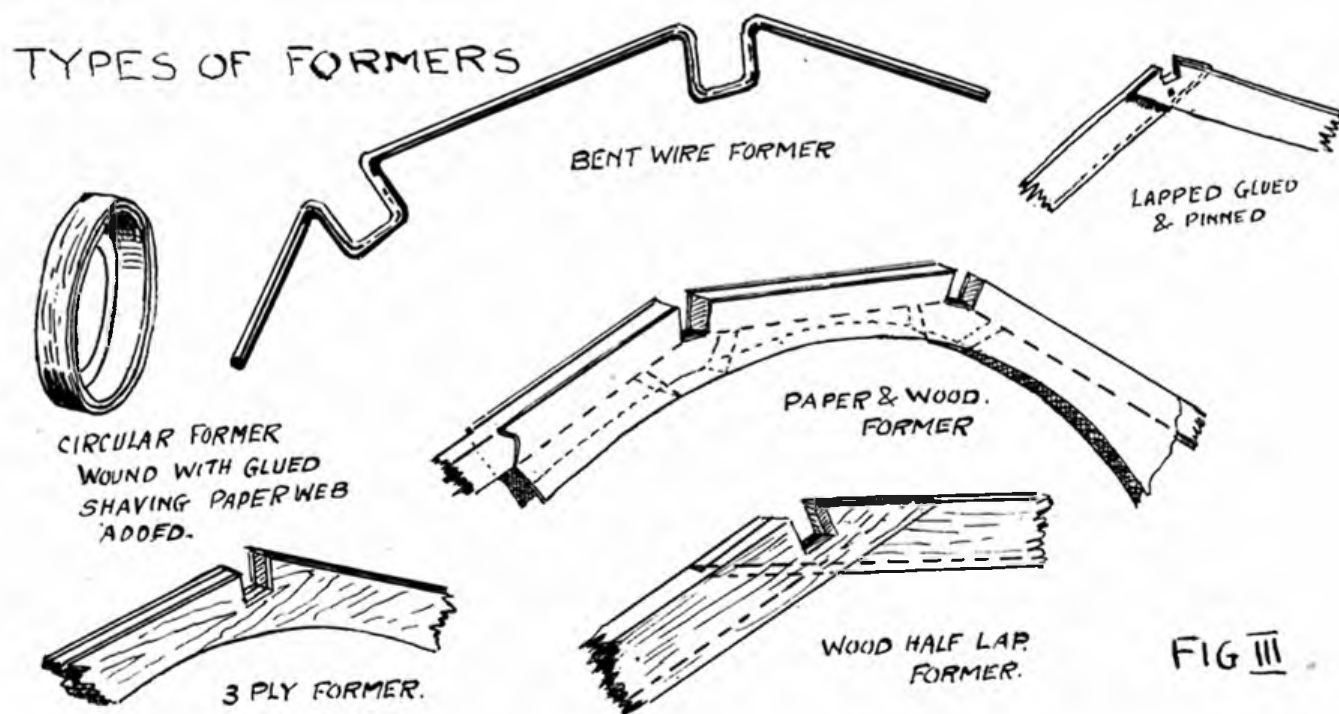
The gear nose and a possible type of fin or rudder are shown on Fig. 6. These are built of silver spruce very much lightened out, or fine material sections, in order to avoid weight. Fig. 7 shows a few types of main-plane ribs, any one of which will fill the bill if sufficient care is taken to get the weight down. If by any chance a parallel chord wing is to be used the ordinary flat silver spruce rib hole lightened lends itself to easy production, as it could be made in block form and sawn off in thin slices, and planed or rubbed down with sandpaper to approximately $1/64$ in. The other examples are heavier and would take considerable time to produce accurately, and even then they would be heavier than the simple example. When it comes to main-plane construction simple spars with top and bottom booms $1/8$ in. square or $3/32$ in. $\times$ $1/32$ in. separated by sheet balsa strutting or paper webs,

or even just separated by the ribs themselves, work quite well if there are sufficient ribs. The leading and trailing edges will need to be of smaller cross-section than what you have been used to, and will need to be either glued or bound into position.

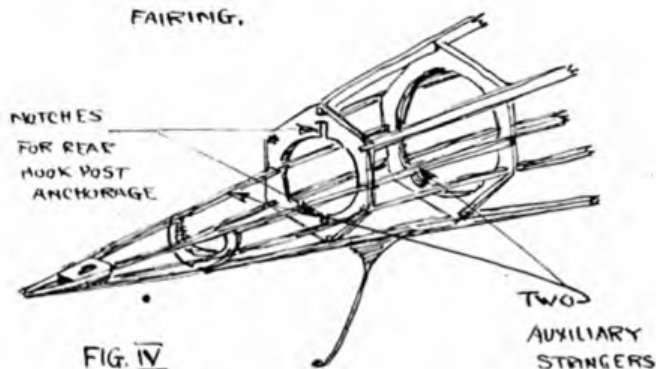
The tips can be either wire or bamboo, and if the war continues long enough it is bound to come down to wire in the end. (Fig. 8).

While considering lightening of parts without the use of balsa wood, Fig. 9 gives a scheme whereby a conical spinner of paper can easily be glued on to a carved propeller with the aid of two discs, which can be either thin wood or cork.

Fig. 9 also shows a thin three-ply wheel with large lightening holes, a hardwood hub, and a very flat paper cone fairing made in the same way as the propeller



REAR END OF FUSELAGE
SHOWING RECESS FOR TAIL PLANE & ITS
FAIRING.



spinner, except that the V cut out of the disc of paper needs to be only about 5 to 10 degrees.

Fig. 10 shows a few examples of the bulky nature of balsa wood parts just as a comparison with parts made from hard, heavier, but much stronger material. Do not let it cause you any fear, this heaviness, bulk for bulk, of spruce or pine compared with balsa wood, as it has been possible to build all-metal aircraft with material like steel or, in fact, steel which is many times as heavy as wood which was used at one time, and if designers had to build aeroplanes to-day which needed only to fly at, say, 80 to 120 m.p.h., with metal, they would weigh much less than the wood ones ever did, and it is the same with harder woods and balsa, the necessity to refinement of detail to get the weight down.

The proposed design would have two skeins of elastic weighing 2 oz. each, and a 14 in. propeller with 18 in. to 20 in. pitch running at rather higher r.p.m. than is usual in duration models.

The gear nose, shown on Fig. 6, would best be made

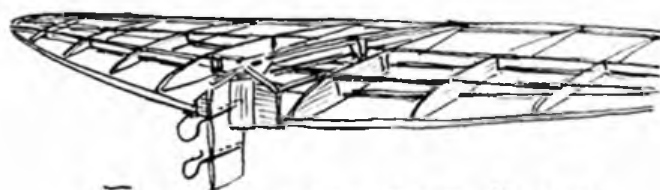


FIG. V
TAIL PLANE & BACK STRUTS.

from a $\frac{1}{8}$ in. ply disc and a wound ring glued on the back, with a bar or lid glued on, and bushes or plates of 28 steel or turned plate nailed on.

The rudder could have a cane, bamboo, or thick outline, a silver spruce main spar with bamboo prongs fixed into position, as shown. The ribs to be strips of new or thin spruce laid on the outside and bound or glued, or both, their greater dimension being vertical.

Bent wire parts such as formers or ribs can easily be made from the smaller gauges of wire (piano) or semi-hard, bound when necessary with the thin hair-like strands of copper wire obtainable from the inside of a length of electric flex, then sweated, using killed spirit (HCL + zinc) as flux. Never use fluxite—it is very bad. Always thoroughly clean and tin your copper-soldering bit. Wash or boil all finished parts in a weak solution of caustic soda to neutralise the acid and prevent corrosion. Glue is good, made from cheap cake, allowed to soak, then brought to a boil in a standard glue pot. If it tends to go bad a little carbolic acid helps.

The type of construction that may come into vogue to a great extent in the near future is that of fretted three-ply of the smaller thicknesses, 1 mm., $1\frac{1}{2}$ mm. and 2 mm., and formers of various shapes with internal cross braces where loads are high can easily be designed.

Remember that when designing an aeroplane, this member will take tension, a slight thicker one tension

FIG. VI

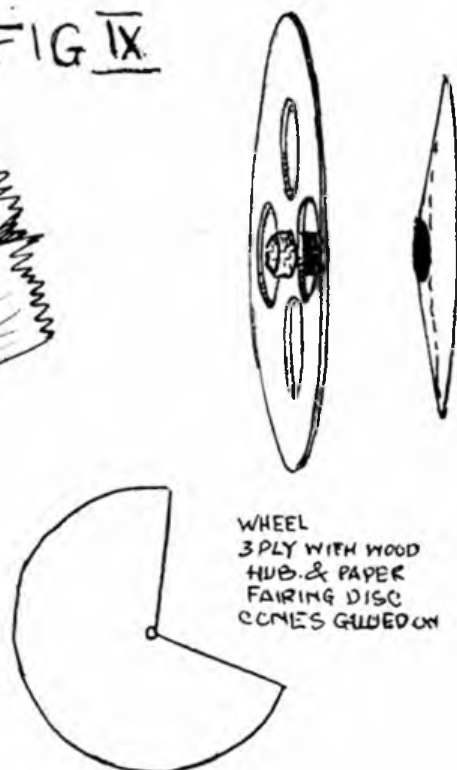


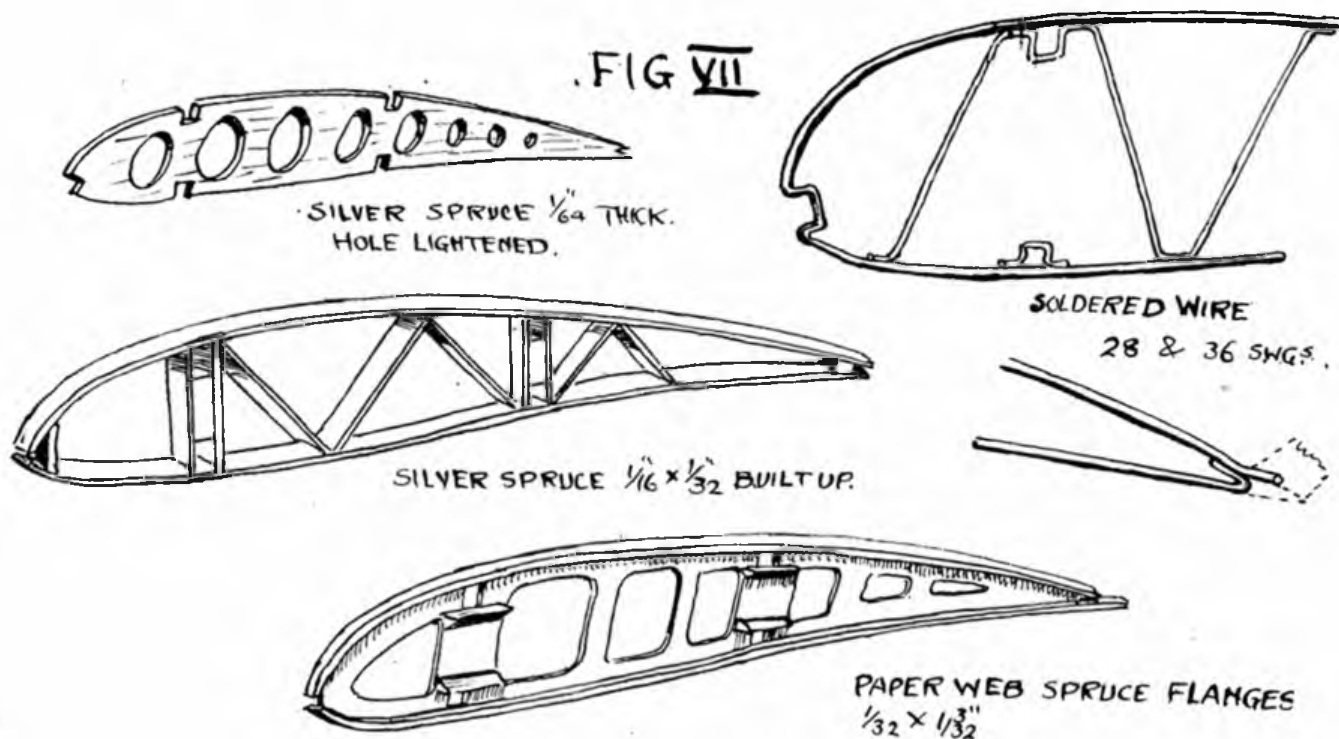
PAPER PROPELLER
SPINNER.

COMPLETE
ASSEMBLY.

TWO TRUNKATED
CONICAL DISCS

FIG. IX





and compression, but only if it is large enough in cross-section, compared to its length, to avoid bending when compressed.

When it comes to bending loads such as those imposed on main-planes, resistance to this stress is easiest met by getting your spar flanges as far apart as possible in a vertical plane without, of course, coming into contact with the covering in such a manner as to cause lines or ridges from root to tip on either the upper or lower surfaces, particularly the upper.

The sizes of materials are rather difficult to give unless one knows just where they are to be used. Let us con-

sider the propeller shaft 16 to 19 s.w.g. for 8 oz. to 10 oz. models is all right.

Book packs 18 or 19 s.w.g.

Stub axles 18 or 19 s.w.g.

Longerons $4\frac{1}{8}$ in. square. $8\frac{1}{8}$ in. square.

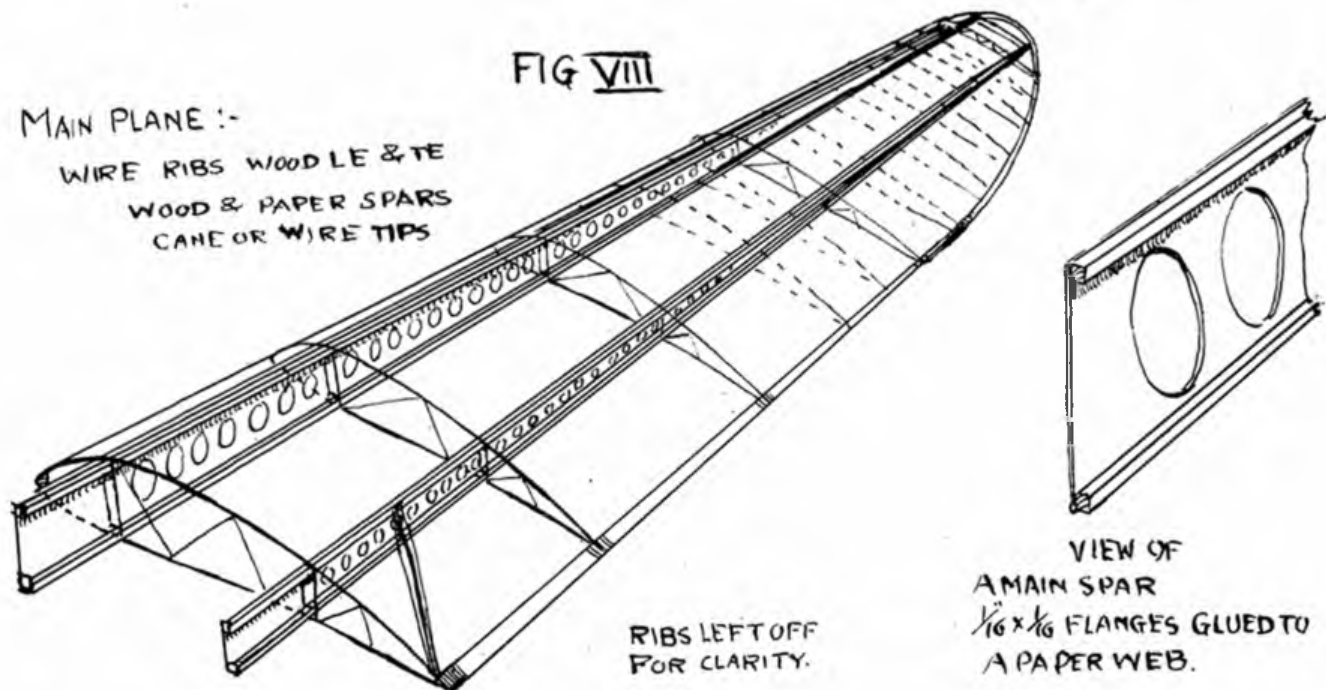
Formers $\frac{3}{16}$ in. to $\frac{1}{16}$ in., according to overall dimensions and job they are put to.

Tail skid 22 s.w.g.

Ribs $\frac{1}{64}$ in. to $\frac{1}{32}$ in.

Wheels $\frac{1}{8}$ in. $\times$ $2\frac{1}{4}$ in. diameter.

Cane legs cut from $\frac{5}{8}$ in. $\times$ $\frac{3}{32}$ in. $\times$ 10 in.



Propellers carved from 14 in. $\times$ 2 $\frac{1}{2}$ in. $\times$ 1 $\frac{1}{2}$ in. yellow pine.

Built-up parts, such as ribs, spars, formers, etc., left a good deal to the ingenuity of the builder, and how heavy or light to make parts is much a matter of material, its job, but also a good deal depends on whether one is willing to expend, say, four times as much time as when balsa was to be had cheaply and easily.

Don't forget your model needs the usual main features : 1 $\frac{1}{2}$ in. to 1 $\frac{1}{2}$ in. of dihedral per foot of $\frac{1}{2}$ in span.

Tail-plane of approximate 30 of the main-plane area. The C.G. somewhere between 30 and 50 per cent of the mean chord from the leading edge.

That the machine should be tightly covered without twisting or bending the framework, and that this covering must be air-tight. The model must be symmetrical in shape about its vertical central plane, that it must have some longitudinal dihedral, and last but not least "don't paint it;" and when it is built, unless you are an experienced modeller, don't wind it up and sling it into the air; as soon as ever you get into a field let it run partly wound, adjust, wind a little more until you have taught it to fly. Then and only then hand-launch it. Remember the work that has gone into your war-time model.

Concluded from page 258.

place under power, only in this case if the model is in horizontal flight and the thermal is rising at 4 ft. per second, then our model will rise at that rate too.

In full-size aircraft "flaps" are incorporated to increase the drag and thus steepen the angle of glide and bring the machine down more quickly, although its flying speed will be reduced.

On the other hand, by reducing drag to its minimum by efficient streamlining we shall flatten our glide, and although the machine may be travelling faster, it will take longer to sink.

The effect of this extra weight in our present Wakefield Rules has not achieved its desired effect, because having weight to spare, builders have built far more mechanically and aerodynamically better models than before.

That is to say, streamlining has been incorporated to a far greater degree in the way of "fairings," etc.

Finish, too, has improved enormously in the last few years, and the high gloss finishing dopes and varnishes obtainable to-day have, no doubt, all tended to diminish drag and thus improve our sinking speed.

Folding airscrews, too, must eliminate a great source of drag, and the more efficient we make our models the more we are likely to contact thermals or rather, I should say, make use of thermals.

Aspect ratio, too, is closely related to our subject. The higher the A.R. the better the model will soar.

It would seem, therefore, that one way to overcome this "soaring" habit would be to have a fixed maximum A.R. of, say 5 or 6, and to prohibit folding, or retracting or even a freewheeling airscrew, which would give the effect of an air brake and increase our sinking speed when the motor is dead.

We must always bear in mind the scientific advancement of our hobby, but by curtailing the model's soaring powers and concerning ourselves chiefly with the efficiency of the model under power, are we improving the breed? Or should we allow our aeroplane to convert itself to a fully fledged glider in mid-air?



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"INDOOR ANTICS"



By "RUSHY"

Continuing last month's epic of slow-motion flying. Did our hero get his deserts? Read on and laugh—or weep—please yourself!!!

HAVING, at great cost, successfully bribed the wife to let me off the lead, I journeyed to London and provided myself with the requisite ticket for admission to the Albert Hall—price 6d. (I have often thought since that the funds of the S.M.A.E. would be much stronger if all the persons I have seen there at different times had been as assiduous in this respect—from memory there were nearly as many people present at one meeting as were shown on the balance sheet returns for the season! How come?)

This was my first glimpse into the hallowed precincts of this mecca of great spectacles, and on bursting open the doors I half expected to be greeted with a fanfare of trumpets—but what did I get? From seemingly far in the well of a great circular expanse, dimly lit with one electric light bulb suspended from the 100 ft. height of the vast arena, came a tense hush, broken by a hoarse whisper—"Corblimey, if it ain't old Rushy! Where've you parked your sledge?"

Treating the rude greeting with my usual high-minded disdain—(come out the boy who laughed there!)—I took stock of the scene. Scattered over a small carpeted clearing, and surrounded by a forest of upturned chairs, were a number of aero-modellers conducting a strange-looking ritual. Here and there an arm would slowly rise, the hand would open, and, for all the world like a scene from a slow-motion film, the figure would move slowly round and round in a circle with head craned back, open-mouthed, giving the impression of rigidly held breath getting near explosion point. Snatches of familiar sound resolved themselves into numerous small winders whirring away, winding up rubber motors that looked as though the rubber bands had been used from the outside of the boxes instead of their proper contents.

Scattered at various heights up the terraced sides of the building could be seen individual figures scrambling in and out of private boxes, wandering up and down the many galleries, searching for elusive models that had taken the easy way out of things and refused to glide

gracefully to ground level. Lastly, at varying heights within the vast space enclosed by the terraces and roof were to be seen many and differing types of floating models, some tissue-covered, but the majority cloaked in much better looking microfilm than I had been able to conjure. Some were lazily turning circles in a semi-stalled attitude, giving a slight jerk every time the propeller made a revolution, while others were on a tail-chasing hunt and getting nowhere.

Making my way down into the arena, and having made the usual replies to the rude remarks my presence seems to conjure with some people, I proceeded to unpack the results of hours of patient work, and, with heart in mouth, commenced preliminary tests.

Here came snag number one. As luck would have it, I had picked a day when the outside conditions, combined with the ventilation system in the hall, produced a decided drift from one end of the arena to the other, and, not having previous experience of the conditions or ground, I made my first test at the wrong end of the room. Result, after about 30 seconds the model was well and truly lodged on a balcony about three tiers up!

But—it flew! Whoopee! And, more by good luck than judgment, I had seemingly got the trim right straight away. Still, that didn't get the model back for further efforts, so, without taking the sensible precaution of finding out the lay of the land from one of the old hands, I started out to find my way to tier 3, left of the organ.

Now, if you have been to the Albert Hall, you will know that it is a circular building, surrounded by a maze of corridors, staircases, doors that open, doors that are locked, and an awesome atmosphere that conjures up visions of the Hunchback of Notre Dame lying in wait around the next corner! What a spot to play murder! Or commit one!



... "to play murder . . . or commit one."

Well, after finding that the entrance door was also the only exit, I wound my way round to the left, climbed three flights of stairs, opened a door, and found myself in a place strictly reserved for ladies only! Most embarrassing! Hasty exit, though it didn't really matter, seeing that I must have been the only person anywhere near. Watson-like deduction showed that this especial type of compartment must necessarily be on the opposite side of the corridor to that which I required, and another door was tried. Ha, that's better, we're in the hall. But what's wrong? I'm about half-way up the side of the building—and on the right-hand side of the organ!

More thinking out, steps are carefully retraced, and, with wonderful judgment, I find myself on the left side of the organ, but one floor too low this time. Up we go

again, and, after over fifteen minutes of running up and down stairs and dashing along cold corridors, I find the right floor, the correct section, and the model, luckily unbent, resting on a red plush seat just like the little aristocrat I deemed it to be.

Having arrived safely back in the hall, further tests were made, and, with the model performing in a manner that delighted me, I asked Mr. York to put the ticker on it next time up. Fifty per cent turns and a little less elevation, and away it went for a nice flight of about 2½ minutes. O.K. That's quite nice, and with a full wind-up we should be able to do something worth while.

Bunny Ross, flying a fuselage type, had just set up a new record figure of 4 min. 40 sec., and I thought I might get somewhere near that. With full turns on, and windy that the whole thing would crumple under the strain, the launch was made, and a nice flight started. Everything went well, and three minutes was clocked with the model still going well and climbing O.K. Suddenly the bus started to drift down the hall, and within 15 or 20 seconds of the previous best time, the organ got in the way and put a stop to that flight, and all further flights for that night, as half the covering came off the wings, and the propeller did not like being wedged between a couple of the pipes. Coises!



... "most embarrassing."

Another mountaineering expedition over the organ finished up with the model being unceremoniously packed in the box, and the rest of the evening given up to looking, learning and listening—mainly the latter! One thing stood out a mile. I had been bitten, well and truly, with the "indoor" bug, and in spite of the ignominious finish to my first onslaught, I was more keen than ever on this new phase of model flying.

My impressions of that first meeting were—the feeling of immense space, the unusual hush that prevailed (so unusual for a meeting of aero-modellers, you will agree)—the comments heard when a model chose to land on the legs of an upturned chair; the constant cry of "Lend me your winder" and "Who's got a tube of cement?"; the way a model would lift perceptibly when passing over the heads of a group of S.M.A.E. officials, stood discussing a knotty point (Knowing bird); a chronic kink in the neck after two or three flights; the way everyone moved round in slow-time, with bated breath; Copland's evident grasp of the niceties of the game; the one or two anathemised nit-wits who would chuck solid balsa gliders and interceptor type buzzers about near delicate micro-filmies; and a feeling of regret when the hour called a halt to further flying and discussion. So ended a new experience, and the beginning of a new activity, luckily to be crowned with success, as you will later see.

For some time, apart from spasmodic visits to London, the "Floating Beetle" was not flown, it being my fixed conviction that one needed a place at least as large as the Albert Hall to even glide the darn thing. Also, I could not conjure up any enthusiasm among my fellow club members, though I am sure that if they could have witnessed a meeting of the type I had attended I would not have had to uphold the attractions of "indoor" work alone. (Incidentally, it was at one of these early meetings in London that I had the pleasure of meeting Horst Winkler, the German model expert, who was very interested in the proceedings, and took a photo of my model—said photo later appearing in a German model paper, the builder being titled as Von Rushbrooke!)

At the beginning of 1938 the Warrington M.A.C. advised me of an exhibition they were staging at their local drill hall, and it was intended to try and hold an indoor flying competition. What about it? Well, as secretary of a Society that likes other clubs to support anything that we do, it is up to me to put in an appearance at other meetings in return, and arrangements were made to attend.

I raked out the old fuselage model, and duly repaired the ravages of the last meeting; but, having an idea that the proposed room would not be too large, and knowing that the "Beetle" wanted plenty of elbow room, I decided that it was hardly the job for the task. One thing and another prevented further consideration until the Thursday before the meeting (due on the Sunday). Then, with a burst of energy that usually shows itself when doing things at the last minute, I got the drawing board out and, from a combination of other designs and information, drew up a stick type of indoor model, with a span of 28 inches.

This has a hollow main spar constructed from 3½ in. sheet, tail boom of 1/64 in. sheet, wing and empennage constructed on the usual indoor principle, and a 13 in. propeller, driven by two strands of 1/8 in. rubber. With experience gained on the first model, building was both easier and quicker, and, by staying up well after the wife had got the supper, washed-up and, thoroughly annoyed with me for not giving it a rest and going to bed, I finished the job in the early hours of the Sunday morning.

Arriving at the hall, a tour was made of the very fine show of models exhibited, and preparations were made to test out the job. Unfortunately, the room was comparatively small—about 30 ft. by 40 ft., and only 18 ft. high. This height was still further complicated by strings of bunting stretched across the top, but these proved a blessing as things turned out, preventing the models flying into the rafters above effective ceiling level.

The first thing to do was to get the model circling tightly enough to keep within the confines of the room, and with this done (by both offsetting the rudder and inclining the tail-plane) tests were made with half-turns. These proved very successful, and by the end of the afternoon nine full flights had been made, ranging from three to just under five minutes, and effectively cleaned up all opposition.

Try as I might, the five minutes mark could just not be reached, owing to the low ceiling preventing maximum turns being put on, and the general limitations of the room. Cold does not make for high durations at any time, and more so with microfilm jobs. However, the results were more than satisfactory, and I felt well pleased with the day.

It was queer to see the models flying in this room. After take-off, a model would slowly climb in circles until the hunting was reached, when the model would progress round the room in a series of up and down jerks as, when the propeller struck a flag, the resulting drop levelled off in time to bring the model into the next line of flags. Proceedings were enlivened by the flying of paper darts, thrown by a crowd of youngsters who made good use of the advertising leaflets distributed by the club!

Realising that, unless the impossible happened, Bob Copland's H.L. record of 18 minutes 52 seconds was unbeatable, at any rate by me, I decided to attack the other record, e.g. R.O.G., and for this purpose constructed a light undercarriage from balsa, with wheel rims cut from a small celluloid bottle. This answered the purpose well and was glued to the stick just under the C.G. to preserve the previous flying trim.

Another trip to London produced some good flights with this job, but unlucky conditions again prevented the standing record coming my way. One or two promising flights finished up on the top balconies, at a height that would have meant many more minutes added to the flight had the model glided down to the take-off level. However, that's all part of the game, and I decided to try again as soon as possible.

In the October of 1938 my club, in conjunction with two other Manchester clubs, staged what has proved to be the most successful exhibition of model aircraft staged in this part of the country, if not the whole of England—over 44,000 people attending a four weeks' show. One Sunday, during the run of this affair, the model was taken out of its glass case, and, in a hall that must be nameless

—apart from official records, an attempt was made to really bring home the bacon.

First attempts resulted in failure, owing to an unexpected down-draught forcing the model on its back, and the covering off one wing panel, but, repairs being carried out, a fresh attempt was made, and after two false starts the model started off on a well-behaved flight and broke the old figure with a time of 4 minutes 12 seconds. Cheers and general self-satisfaction followed—and, believe me, it's a nice feeling to know that you are the holder of a British record.

Further attempts to better this time at the Albert Hall have failed owing to similar causes as stated, and I look to the day when I can find the air in that spot still for a change, and not keep landing the model on the very top gallery! It's all right you know, but I'm not as young as I was, and those stairs. . . .!

Indoor meetings held in Manchester have produced some interesting flying, and at a meeting staged by the Lancs Club in 1939, Ken Bletcher, of the Windsor (Manchester) Club made a fine flight to break my record with a time of 4 minutes 23 seconds. Since the start of this confounded war we have held a number of indoor flying meetings in Manchester, when pylon flying with both duration and scale types has been successfully tried out, and microfilm modelling has found a number of new supporters. A new series of meetings to finish out the dark months should produce some good times (I think we can claim to be among the best performers at pylon flying—2½ minutes and more being fairly common these days), and I look forward to the day when I can once again say I hold the record.

And so to my final views on indoor flying. To those who haven't tried it yet, you are missing a good thing.

It may be of interest

to those who do not know us that since the war began our model aircraft customers have increased in number tenfold. We do not doubt for a moment that this has been brought about to a great extent by the current interest in aircraft, but we like to think that this is also largely due to the very comprehensive stocks of all types of model aircraft equipment which we carry.

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"A hall that must be nameless."

The golden rule is—work slow and carefully—always clean the bath after you've been using it as a microfilm tank—wind fast and walk slow—and chain the family to the walls while you're working! If married—ah, fate!—see what a hypnotic effect a box of chocolates and a library book will have on the better three-quarters! And, as one of our lads, in a contribution to the club mag., puts it

We are the microfilmies,
Round the pole go we;
We build our models nice and light
And hope we'll get a decent flight.
No thoughts of Nasty Nazis,
We are full of joy!
Some of us will wind up—BANG!
Then stand around and murmur "Hang!"
Or similar words of wicked slang—
We're happy girls and boys. Whoops!

AIR DEFENCE CADET CORPS NOTES

By DUTY PILOT

IN spite of my repeated requests made in this column and in circulars to the squadrons, I have still very little news to report, but one or two squadrons have found time to send me notes, and here is one which should be useful as a guide to other squadrons who are drawing up a syllabus of instruction.

Since the middle of last October some twenty cadets of No. 85 (Southgate) squadron have been undergoing a carefully graded course of instruction in model aeroplane design and construction.

After mastering the principles of the theory of flight and its application to model aeroplanes, the lectures dealt with wing sections, fuselages and undercarriages, both design and construction. Cadets were soon busy making "pole flyer" models, and two indoor duration competitions were held, the winners being cadets Bithrey (28.57 sec.) and Odams (25.67 sec.), the times being the average for three flights. These competitions were witnessed by the whole squadron, and a certain amount of amusement was caused by the antics of some of the models entered, while well deserved applause was given to the winners.

Further interest in aero-modelling was stimulated by some gliders made by the cadets, and the progress made has been indicated by the papers on home study sent in by members of the class and by the results of an oral examination.

The instructor recently suggested that cadets should now concentrate on the construction of duration models so that they would be in readiness for test and trimming flights at Easter, and intimated that he was designing a 36 in. span general purpose model, and hoped that with the co-operation of the cadets it would represent the squadron in competitions this season. The fuselage, tail unit, undercarriage and airscrew of this model are already made. The following are some details given by Lance-Corporal Thorne:

Chord, 4 in.

Main spar, $\frac{1}{2}$ in. $\times$ $\frac{1}{4}$ in. balsa.

Leading edge, $\frac{3}{16}$ in. $\times$ $\frac{1}{8}$ in. balsa.

Trailing edge, $\frac{1}{4}$ in. $\times$ $\frac{1}{8}$ in. balsa.

Ribs, riblets and V-shaped strengtheners, $\frac{3}{32}$ in. sheet.

Wing tips, $\frac{3}{32}$ in. birch.

The squadron honorary instructor in the subject of model aeroplanes is Mr. C. A. Rippon, of the S.M.A.E. and the Northern Heights Model Flying Club (no doubt well known to most readers), and in a recent progress report gave considerable credit to the members of his class, praising in particular the home-study papers sent in by Corporal Hockey and Lance-Corporal Lenney, to whom model aeroplane manuals have been awarded.

The Croydon wing has a room set aside for model making, and when visiting there recently I was shown some remarkably good work. I suggested to the Commanding Officer that a cadet in charge of modelling should write a report. The result was that I got the following from Cadet Raymond J. Best:

The model aircraft section of the Croydon wing has now been in existence for about three months, and so far

there seems to be a tendency to specialise on scale models, both solid and flying.

We have in the course of construction a scale model of a Comper "Streak," a single seat low wing monoplane, with a wing span of 7 ft. 10 in., which is one-third full size; the model will have all controls movable from the cockpit, including retractable undercarriage and folding wings. This model will be used for demonstration purposes only and for "theory of flight" lectures. It is being made in our own workshops at the Croydon headquarters.

The corps has had several visits from members of the Croydon and District M.A.C., who have been able to give us some welcome advice.

Also being constructed is a 6 ft. span gull wing sailplane with a monocoque "teardrop" fuselage, the tail unit being supported by a hollow boom. The wings have box spars and built-up ribs.

One of the cadets has a fine model of a Fairchild "24" nearing completion. It has a wing span of approx. 6 ft. and will be powered with a one-fifth h.p. gas engine. The engine class hope to work in co-operation with the model section by making petrol engines to power some of our future models. We are looking forward to the summer, as we wish to get going with duration models, and hope to have our first competition very shortly.

Volunteer Instructors Wanted.

No. 172 (Mid-Sussex) squadron reports that they have made a start in modelling, but have experienced more difficulties than could be wished, since expert instruction has been so hard to obtain. "Could you please help," the adjutant adds, "by giving the name of any person likely to be able to lecture the cadets or to assist in any way?"

There must be many aero-modellers somewhere near mid-Sussex who would be willing to help. Would volunteers please apply to C/Flight-Lieut. I. B. Ingall, Maltmans South, Cuckfield, Sussex? There may be readers of THE AERO-MODELLER in other parts of the country who might be willing to help a squadron in this way. If such readers will write to me I will put them in touch with their nearest squadron.

From No. 136 (Chipping Norton County School) squadron comes the following brief report written by a cadet:

Cadets of our squadron during the last month have built quite a collection of models, which include three Fairey Battles, two small gliders, an endurance model and a Hawker Hurricane. A Stothers glider is under construction, and we are attempting to build our own version of the Link Trainer, designed by one of the cadets.

We hope to send some photographs of these models next month.

Last month I promised the gift of a book to the sender of the best report. The decision this month is quite an easy one to make. The prize goes to No. 85 (Southgate) squadron for its report, which was sent in by C/Flight-Lieut. S. G. Rose.

S.M.A.E. REPORT

Notes on a Meeting of the Emergency Committee held at the Grafton Hotel, on Sunday, March 3rd, 1940.

There were present: Dr. A. P. Thurston, Mr. A. F. Houlberg, Mr. E. F. H. Cosh, Mr. L. J. Hawkins, Mr. R. N. Bullock, Mr. J. C. Smith, Mr. H. York, Mr. A. Bell, Mr. D. A. Gordon, Warrant-Officer Gutteridge, Mr. C. A. Rippon, Mr. C. S. Rushbrooke.

Visitor: Mr. D. A. Russell (Managing Editor, THE AERO-MODELLER).

Mr. A. F. Houlberg was in the chair.

The minutes of the previous committee meeting were read and confirmed.

Arising from the minutes was the question of badges for S.M.A.E. timekeepers. Mr. J. C. Smith had received a quotation for celluloid buttonhole badges, and Warrant-Officer Gutteridge showed a design for an armlet. It was considered that an armlet would be much more recognisable on the field than a badge. The Committee decided that quotations for the materials for the armlets should be obtained. Mr. Cosh stated that he would ask Mrs. Cosh to make one or two sample armlets for the consideration of the Committee at their next meeting.

A letter from Mr. M. R. Knight was read, in which he apologised for his absence owing to illness. The Committee wished him a speedy recovery.

Applications for affiliation were received from the following clubs:

Ilkley Model Aircraft Club, 12 members.

Peterborough Model Aero Club, 34 members.

Portsmouth and District Model Aeronautical Society, 22 members.

These three clubs were affiliated.

The following clubs were reaffiliated: Aldersbrook M.A.A., Bradford M.A.C., Bushey Park M.F.C., Chingford M.F.C., Fife M.A.C., Halifax M.A.C., Halton M.A.C., Harrow M.A.C., Hawker M.A.C., Hornchurch M.A.C., Lancaster M.A.S., Reading and District M.A.C., Torquay and District M.A.C., Victoria M.A.C., Willesden and District M.A.C., Woodford M.A.C., Yeovil and District M.A.C.

The Committee required further details from the Weston-super-Mare M.A.C. and Blackpool and Fylde M.A.S., before accepting their reaffiliation.

An application from the Croydon Club for a petrol ground was deferred. Mr. J. C. Smith, the Competition Secretary, offered to inspect this ground before its acceptance.

The Torquay Club also desired their ground to be passed for the flying of petrol models. Mr. L. J. Hawkins had already inspected this ground, and it was, therefore, passed.

From time to time applications are received for alterations to official timekeepers, and in order to facilitate the work involved, the Assistant Secretary, Mr. D. A. Gordon, was instructed to deal with all future applications. It was also decided that a card index system should be instituted, so that the Emergency Committee could know, with the minimum delay, and in spite of frequent changes of names, who were the official timekeepers of the various clubs.

The next business that came before the Committee was the discussion relating to the Editorial in THE AERO-MODELLER regarding Press reports. Mr. York stated that he would prefer not to report on this matter. The Committee, therefore, decided that the report of this discussion should be drafted from the minutes of the meeting, which are as follows:—

"The Editor of THE AERO-MODELLER was in attendance at the meeting, at the invitation of the Committee, and after some discussion, it was decided, wherever possible, to adjust the dates of the Committee's meetings, in order that reports of these meetings might be published in the next issue of THE AERO-MODELLER."

At this juncture, Mr. A. F. Houlberg vacated the chair in favour of Mr. Bell.

It is with great regret that the Emergency Committee announce that they have accepted the resignation of Dr. A. P. Thurston, as President of the Society.

Mr. Bell then vacated the chair in favour of Mr. Houlberg.

Mr. C. A. Rippon suggested that the Committee might see their way clear to accept squadrons of the Air Defence Cadet Corps as affiliated members at reduced fees. Several alternatives were mentioned, and Mr. Cosh was instructed to put this matter on the agenda of the next meeting. It was suggested that perhaps these squadrons might be affiliated under the rate applicable to sponsored clubs.

In future, Committee meetings will be held on the first Sunday of the month, at 4 p.m.

The meeting closed at 8.15 p.m. with a hearty vote of thanks to both Mr. Bell and Mr. Houlberg for their work in the chair.

H. YORK, *Hon. Press Secretary.*

As we go to press, we learn that Miss Pauline Gower has accepted a vice-presidency of the S.M.A.E.

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"NOW IS THE TIME" ————— says LEN STOTT

NOW is the time to get on with all those jobs you have promised yourself to do these last few years. Due to the black-out, most of us seem to have more spare time than usual, and we can put these enforced hours of leisure to good account.

That snappy scale model that has always been side-stepped, owing to the many hours it will take to make a sufficiently good job of it, to bag the first prize in the Concours de Elegance. There is that tricky folding prop. to increase the duration of glide on your rubber job, not forgetting the super-streamlined bus itself, visions of which are often at the back of your mind when your thoughts dwell on the contests to be won in the future. With the happy decision of the Society of Aeronautical Engineers to hold as many competitions as possible during the coming season, there are numerous new models to get on with.

The first competition will probably be for gliders, and this is a side of aero-modelling which is full of unbounded interest. There is much more to it than meets the eye when one is on the winch end of a 600 feet tow-line, and there is a stiffish breeze blowing. To get your model up safely a few hundred feet needs the hand and eye of an Izaak Walton when "playing it" on the line before its release, which if premature often has a disastrous result. or, as one of our members used to say, "The actual, horrible moment of impact was mercifully hidden from the enthusiast's agonised eyes."

Then there is the sea-plane competition, which affords the modeller with plenty of scope for his imagination in creating a plane that will just stay afloat long enough to pass the floatation test, of thirty seconds, and will then rise off the water instead of diving under like a submarine. Some of the season's most hilarious moments coincide with the sea-plane contest day, if previous events held by the Halifax and Bradford Clubs on Baildon Moor are any guide. With a swish and a swirl, the model which is faultily adjusted will dive down, nose first, turn over, and proceed to give an aquatic display worthy of Johnny Wiesmuller, whilst the unhappy owner looks on, or is encouraged by the crowd to wade into the pool and retrieve the sodden wreck.

Mention of wrecks brings us to the petrol-driven model, or, as our American friends call it, "The Gas Buggy." For sheer excitement and thrills, the flying of these power 'planes is unequalled. Now, again, is the time to design and build that crash-proof model. A few hours spent in looking back, in order to avoid past misfortunes, will be a stepping-off point from which to begin the bus that will be your pride next year when the "gasoleers" congregate.

Forgive me if the previous paragraphs appear to have dealt largely with disasters, but facts must be faced, and it is up to each individual aero-modeller to improve his machine until such things as "collapsible fuselages," "folding wings," "diving sea-planes," and "excavating petrol models," etc., are things of the past.

Finally, and probably of the most importance, is the work that must be put in, in creating the machines that will win back for Great Britain the "Wakefield" and "King Peter" cups. The "Wakefield" Cup has now been won by an American model for the last two years, and the "King Peter" Cup was won by France last year. Here, then, is sufficient incentive for any model aero enthusiasts to build a machine that will make history,



Secretary of the
Halifax Model Aero Club

Member of the 1938 Wakefield team,
winner of THE AERO-MODELLER
"Champion of the Northern Rally"
Cup, 1938, and numerous other
awards.

and bring honour to the home front once more. and, pardon me—"now is the time."

The difference between a model that is capable of winning contests and one that is faultily adjusted, is mostly one of millimetres. It is the fine points which are usually missed, and it is things being able to move, or slide about, that upsets the stability. How many times have you said, or heard said, "If it hadn't been for my wing moving, or the noseblock falling out, or taking off too much side-wind, etc., I should have been a winner." Constant practice, and infallible mental notes, are two essentials for success. The writer has often made many trips out to the flying ground to have just one or two flips round on a still evening to test out some new minute adjustment, which when the real time comes has proved invaluable.

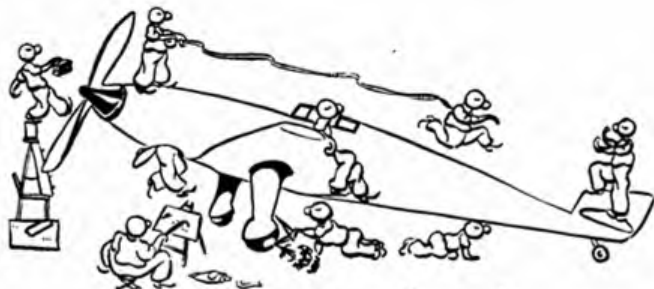
Whilst on this subject, here are two important "don't's" which should never be forgotten. Don't rush with the model you are making for contest flying, but make every part perfect, and if you have to do anything twice do it with a smile. As you may know, "the model is only as strong as its weakest part." The other don't is, never try and test out a contest model in a strong breeze. You cannot see what the necessary adjustments are, and you run the risk of damaging the model. Although repairable, it will add unwanted weight, and you will still be as far away as ever from getting the model in proper trim. With a new model, "half an hour of calm weather is worth half a day of windy weather." (Proverb copyright).

And now a word to club secretaries or other persons adorned with the distinction of M.U.G. Owing to the loss of many members due to the war, it is up to each club to make an effort to bring up the number of its members to normal. This can be done with a little extra work, and some advertising. This need not be costly, and if tackled in the proper way will be effective in bringing in hundreds of modellers who are not yet members of a club. The cost of having an interesting circular drawn up for distribution, and display from model supply shops, cinemas, clubs, and schools, etc., is not great, and will certainly pay for itself in the signing on of new members. A guide to the type of leaflet suggested is reproduced, and the cost of having 300 printed was about 15s.

By the time this appears our club will have had a fortnight's show at one of the local cinemas, in conjunction with the R.A.F. film, "The Lion Has Wings." This is a method of advertising which is most effective, and has had very beneficial results as far as our own club is concerned.

So there you are, plenty to do, and a good variety of work to choose from. Let me just repeat them: A sea-plane, a folding prop., a glider, a petrol bus, a "Wakefield," etc., and for the poor secretary, more running about, and don't forget, "Now's the time."

Numbers of our Clients have asked us how our "Cloudcraft" kits are produced. We instructed our tame artist to show you how, and this was the result.



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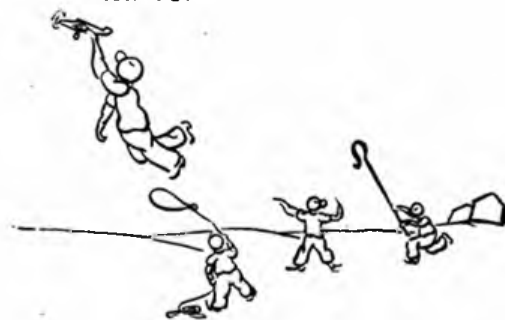
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West Sussex Model Aircraft Society. Results of Round-the-Pole Competition. All "Cloudcraft" 1/3 models.

1st F. W. Gates, "Lysander," average 88.43 sec.
2nd F. Killick, "Magister," average 86.06 sec.
3rd K. Colbridge, "Leopard Moth" average 85.2 sec.
4th Miss N. Robinson, "Topsy S." average 44.53 sec.

Mr. F. W. Gates best flight was 104.6 sec. extract from a letter from the W.S.M.A.S.: "Surely no finer tribute could be offered to "Cloudcraft" models."

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HAIL, blithe spirit of spring!—'twould seem that thou hast at long last begun to rub the sleep from thy peepers, and, if the muse deceiveth me not, sunshine is about to come out of retirement. (And I bet after all the strenuous effort on my part it will be raining like stink when this is published!) Still, we have at long last seen one or two days of promise, and after all the blue-pencil weather we have had this last winter, it comes very welcome. Doyewknow, the first day of sunshine I almost went out and bought the wife a fur coat! Yes, I said *almost*.

I'm as pleased as a dog with two tails this month. And why? Well, quite a number of you have recorded your appreciation of the way in which "yours truly" deals with the club news, and one club goes so far as to put my section at the top of their list of "features they like." As Ben Bernie would say—"Yowser, yowser, yowser. Verily has fame caught up with me—but what of the storm that follows the calm?" Anyway, thanks all those chappies who took the trouble to encourage the Clubman in his—at times—not too easy task. You know, chaps, it is a bit of a tussle sometimes to leave at least part of the report untouched, in all its pristine glory, but—well, with a hundred and one fellows sending in a hundred and one reports, there are bound to be a large number of differing styles. Some write just enough (or not just enough) to enable me to get the exact run of the thing (that's where my marvellous imagination comes in!) and others are so full of verbosity that the old blue pencil (mine, not Jack Warner's) gets red hot with dashing from one side of the page to the other. Still, it's interesting work and I like it—so we go merrily on.

Thanks, all those clubs who have sent me copies of their own club magazines. These make very interesting reading, and many show high degrees of both humour and entertainment properties. Naturally, most of the humour and inuendo is only understood by those directly connected with the clubs, but the general impression gained is that we aero-modellers can both give and take a joke better than most—and, after all, that's the best qualification for longevity that I know. Yes, I know beer is a good recipe also, but what is the good of that without congenial company and a bit of fun!

The photo that heads these columns this month is a fine example of both the aero-modeller's and the photographer's art. This is the sort of thing we rarely get, and it is with pleasure I am able to use this particular picture. The builder is Mr. C. W. Harris, of Yeovil, and the model, of course, is the always popular "Lysander." This model is 32 in. span, and the workmanship is very fine indeed, and this, coupled with intelligent photography (see how a decent background improves a photo!) has made a fine picture. I shall be glad of more photos of this type, and each month I shall use the best as a heading piece. Photos should not be less than post-card size, and clearness of detail will count a lot. Let us see what results we can get from a "best picture of the month" contest, shall we—and I'll see if I can wangle



a small monthly prize out of the Editor. (Agreed, 5s.—Ed.).

It surprises many people just how keen some of the enthusiastic aero-modellers are, and this becomes very apparent in some of the letters received here. Powers of observation seem to be enormously developed here and there, and my attention has been drawn to certain discrepancies of detail in some of the drawings published, both in THE AERO-MODELLER and other papers. I had not noticed anything out of the way in the drawings mentioned, but it soon becomes evident when following some of the corrections pointed out by correspondents. How many of you noticed the mistake in the recent "Spitfire" blue print, where the fuselage top in front of the cabin was shown rounded instead of flat?

A correspondent raises a pertinent point this month in regard to standardising the scale to which models are illustrated. Obviously, he says, it is rather misleading to have, say, a Spitfire built to a scale of $\frac{1}{2}$ in. to 1 ft. and a Messerschmitt to a scale of 1 in. to 1 ft. There is no true comparison of the real size of the full-size craft. This is a point well worth while considering, and I have passed on to the Editor for his contemplation. What are your views, chums?

Mr. F. E. Palmer, now in the R.A.F., sends me a very interesting photo this month of a model built in 1912 by a relation of his, Mr. P. Palmer. This model is after the Bleriot style, and makes interesting comparison with present-day models. No performance details are available, but the few facts I do know about pre-(1914) war model flying fills me with admiration for the remarkable performances sometimes obtained. Without the advantages of a trade organisation constantly bringing out new aids to the aero-modeller, and working with what would in many instances to-day be considered entirely unsuitable materials, the performances put up by some of these early types are not far behind the average modern model, which has all the advantages of light materials, ready-made design and many years' research findings behind it. Believe you me, these old stagers were not far behind when it came to "bringing home the bacon." If any of you have similar photos, I would be obliged if you would forward them to me, when maybe we can devote a special article to them. Performance figures, where



(Left) An old-time model with its builder, the late Mr. P. Palmer. After the Bleriot pattern, this model was built around 1912.

(Centre and right) Lost, stolen or strayed! Two views of the 32 in. span Stinson Tri-Motor missing from Manchester. If any person knows of its whereabouts, will they please ring Whitewash 2222—or better still, get in touch with THE AERO-MODELLER Offices.

available, will be appreciated, and due care will be taken of any photos, etc., received.

A most peculiar incident is reported in the Lancashire M.A.S. epistle this month. A very fine scale model, while on exhibition in a Manchester shop, has been stolen, and I feel that publicity through these columns has the best chance of bringing forth any news of it. A fully detailed model of a "Stinson Tri-Motor," the machine has a span of 32 in., and is finished in red and silver, with the lettering P.A.A. in blue on the side of the fuselage. Obviously a model of this type and size is not easily concealed, and the wonder is how on earth the culprit got it away from the shop. It's no easy job carting a fully-rigged model of this span about the place. However, knowing from previous experience what keen perception some of my readers have, I shall be grateful if any of you in the Manchester district who might have seen this model knocking about, or know of any clue to its recovery, would immediately communicate with me. (The model is the work of P. L. Smith, and was on show at the exhibition staged some time ago at the Manchester Central Library, so many of you must have seen this model then.) Now then, how many budding Sheerluck Bones have we in the movement?

News comes to hand from one source this month of success with the Mattioli-Randisi Disruptor described in the February number. From all accounts, this device certainly seems to do its stuff, and I shall be pleased to hear of the results of further experiments on these lines that any of you carry out. Don't keep all your findings to yourselves—pass 'em on for the benefit of your fellow enthusiasts.

Notification is given here and there of arrangements for inter-club meetings this season, and I for one am very pleased to note that this sort of thing is being done. Remember what I said earlier on about co-operation, and see what you can do to improve and extend the friendly relations that should obtain between rival clubs. Obviously, travelling facilities will detract from certain of the former large meetings, but it is still possible to run some sort of a friendly get-together—and my experience of war-time conditions is that everyone is looking for an opportunity to get around to every activity possible, and I think we shall see much good arising from these difficult times. I suppose it's the usual case of "what you can't have you want," and I know of any number of chaps who in the past have never put themselves out to go anywhere, and are now extremely anxious to know what this and that club are doing in the way of rallies and inter-club events. 'Twould seem, like many other things, that it takes a war to wake some of us up!

In one club magazine appears the following, which I heartily endorse:

"The long arm of Military Service reaches out, and more and more of our officers and members are hearing the call. To those who are deputed to carry on in their absence we must give our fullest support and co-operation, lest the good work already achieved be to no avail."

This is a sentiment that I recommend to each and every club, both as a group and as individuals. If you have been content in the past to let others do all the donkey work of carrying on the business of running your club, get down to it and see where you can help. As stated above, don't let the work of years go by the board just because the usual willing horses are called upon for other duties. It is *your* duty to see that the club continues in all its pre-war eminence, and preserve the work put in by those who may now be laying the law down to competitors in another type of contest!

One last word before slashing the monthly reports about. I get news now and then of evacuees doing their best to continue their modelling in their new homes. Now, if you know there are chaps like this in your district, see what can be done to keep their interest going, and invite them along to your meetings. There must be any number of chaps in this situation, as I know of many clubs in evacuated areas that have had to practically cease operations through the shifting of their membership. So, don't forget—extend the friendly mitt to these fellows, and see what a spot of helpful co-operation can do.

Right. All set? Let's go!

The ALDERSBROOK M.A.S. would like to know if anyone lost their "bad weather ration" last month! Despite the poor quality of that stuff they class as "deep and low depressions," five of these chaps turned out in deep snow and got in some pretty good flying. Scale models are all the rage at the present, and they would like to know the colour scheme of the American Army fighter, the "Seversky P.35." Can anyone oblige? If so, please drop a line to me, and I will forward the information.

The S.M.A.E. Treasurer, Mr. Hawkins, is a firm favourite among the TORQUAY AND D.M.A.C., he being one of their distinguished "evacuees." With the promise of a trophy, they are about to register their ground for petrol model flying, and have nine all ready for the fray.

Interesting news is to hand from the ILKLEY M.A.C. of experiments with the Mattioli-Randisi Disruptor (February issue). This device was tried out on a 9 oz.

Wakefield model, being placed out on the upturned tips. $\frac{1}{8}$ in. in front of the leading edge. The "results were truly amazing." To quote: "The 'plane will recover from an approaching stall with an upward twitch of the tail, and glide in to three-point landings with the tail well down, without the suggestion of a stall. The sinking speed seems to be greatly reduced if the trim is made nearer the stall than usual." I shall be glad to hear of other experiments in this direction.

These chaps have also been flying in the snow, and one member put up quite a creditable show by averaging 88 sec. for three flights when snow was actually falling. "Anti-aircraft fire" was added to the usual hazards recently when a spectator, throwing a large stone for his dog, misfired, and walloped a large model that had just been launched! From all accounts it was a shot any

badges, transfers, etc. Spot-landing competitions have been popular recently, this type of competition being capable of existing without thermals! An inter-club fixture is to be held with the Tunbridge Wells fellows, and it is hoped to arrange more of these "friendlies" throughout the season.

I must give a big hand to a lad this month. He is Denis Newton, of Northampton, who has spent four-and-a-half years in hospital, but manages to turn out some good-looking models, if the photo sent in is anything to go by. You will note his effort in one of the photos reproduced here, and considering this job was built on a plywood board, whilst Newton was in bed, the result is a very creditable piece of work. He claims to have built umpteen models, without much success, but this model, a "Clipper," is giving very good flight performances,



We regret that the caption for this group of photos has been mislaid, and we are thus unable to fully describe them. If the 13 aero-modellers concerned will kindly send us the necessary particulars on postcards, we will reproduce the photo next month with full particulars.

A.A. gunner would have been proud of—but fortunately no one was hurt—not even the "gunner." A fairly full competition programme has been arranged for the year, and it is hoped to hold inter-club meetings with those situated in the immediate neighbourhood.

The BATLEY AND D.M.A.C. started indoor flying late in 1939 in a small hall, part of a chapel. At the first meeting micro-film models by Messrs. Crosby, Horsfall and Hinchcliffe were flown, the latter bringing along a "coffin" full, which greatly interested the members. However, draughts and cross-currents played havoc with the models, the best flight being about 90 sec. by Mr. Hinchcliffe.

It was decided after this to concentrate on light tissue-covered models. Messrs. Rowles, Hirst and Hinchcliffe proved that this type (small tissue covered models of 50 to 75 sq. in. wing area, weighing approximately $\frac{1}{2}$ oz.) suited the hall, the latter managing to avoid the dozen electric light chandeliers to do 69 sec. These lights are a d— nuisance, to put it mildly, and several flights promising two minutes or more have been spoilt by collision with them.

R.T.P. flying has been largely confined to outdoor models suitably converted. "Torque about speed." Rumours are that Mr. Hirst intends to fly his gas job round the pole. A change from "mikes," what?

The SPELDHURST (Kent) M.A.C. are now affiliated to the S.M.A.E., and have equipped themselves with

and work is now proceeding on a more ambitious model, the "Lynx." Newton is sixteen years of age, and has been building models for three years. Congratulations for good work under difficulties.

Owing to rather high rentals required, the TUNBRIDGE WELLS M.A.C. have temporarily had to abandon their exhibition, announced last month. That's the trouble when trying to arrange these affairs, as I know from personal experience. The hire value of a room or hall seems to make a remarkable rise when a prospective client comes along! A promising set of models are making an appearance, and it is hoped to have periodic cinematograph shows by the vice-chairman.

Owing to the prevailing weather conditions, the STONEYGATE M.A.C., in common with most other clubs, have not been able to do much flying. However, Mr. Dunmore has smashed his 7 ft. petrol 'plane, after a 30 ft. power dive—ugh! sends shivers down your back, doesn't it! Consistent petrol model flying has been done by G. Hull with his 5 ft. span Cyclone powered job, and some interesting machines are on the build. (Messrs. Powdrell and McBaine, who wrote the article on wind-tunnel testing, are members of this club.) Two photos from this source show a Wakefield type with single-bladed folding propeller and a 45 in. span petrol model, which, complete with Spitfire engine, weighs 2 lb.

A reader passes on the following address, and trusts some of you may like to open correspondence with this American enthusiast. The chap is George Dieter, and



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The PETERBOROUGH M.A.C. have held a series of very interesting R.T.P. contests, including classes for duration, distance and scale types. Two more classes for speed and weight-lifting are to be held before the end of the indoor season, thus deciding the results for the Chairman's Cup. W. Harlow is in the lead at the moment, with a margin of 29 points. The scale event was won by L. Wilks, who averaged 48 seconds with a scale Messerschmitt BF.109 (jolly good time, eh?) while Harlow placed second with a 45 sec. average with an S.F.5. Application has been made for S.M.A.E. affiliation. Two photos show Messrs. Randall and Truss with their Wakefield models—a "Lynx" and a "Clodhopper" if I know my models right—and a group of the members at their field. Am I right in claiming that the two on the right are Mr. and Mrs. W. Smith? Birminghamites will recognise these two enthusiasts.

Mr. R. Johnson, a new acquisition of the STOCKTON-ON-TEES M.A.C., recently demonstrated a 24 in. span microfilm job, and so intrigued the rest of the members that a number of similar models are being built, and it is hoped to run a contest for this type shortly. Mr. Pemberton has designed an "original" plane called a Bitser, and, as the name implies, it incorporates bits of this and bits of that. The day of the trials arrived, and much fun was had, as the darn thing wouldn't fly until more bits, in the shape of a spanner and a pocket lighter, had been added to the nose! Flights of 45—50 sec. were obtained after this—but he daren't show his face in the club-room these days without being twitted about "weight-saving." These chaps would like to record their thanks to Mr. H. Nichols, of Seamer, through whose kindness they have the use of a 72-acre field, the only stipulation being that they leave the field as they found it. You lucky people—as a certain comedian would say! Wish we had summat like that in our club.

I am glad to hear this month from a club silent for some time—the PORTSMOUTH AND D.M.A.C. The secretary regrets the falling-off of the general enthusiasm, but the remaining officers, etc., are making strenuous efforts to get the club back to normal again. I honestly think that now, more than ever before, there is a chance for the really strong increase of aero-modelling in this country, and I trust the Portsmouth chaps will find this is so. So, any modellers in the Portsmouth district, get into touch with Mr. C. J. M. Sullivan at "St. Annes," 6 Worthing Road, Southsea, Hants, and do your bit to putting the club in a high position.

The CROYDON AND D.M.A.C. are now flying on

a disused golf course at Addington, just outside Croydon. A fine slope will give interesting soaring and gliding facilities, and Mr. Stone achieved fine flights, H.L., of 60 sec., while Mr. Putman proved that sailplanes can be designed to fly right from the drawing board. Mr. Hill (you will remember a photo of his "pusher" model, printed last month) has built an improved type to Wakefield requirements, and tests have shown promise, flights of 45, 65 and 69 seconds being obtained on half turns. This club is working to the scheme announced in these columns a short while ago, and fly on Wimbledon Common with the other clubs who use that ground. Easter Sunday will see the holding of an Invitation Day, open to clubs in the South-West London area, when popular competitions will be held. The ground is the Addington Golf Course, Featherbed Lane, New Croydon—and the date, of course, March 24th.

The LANCASHIRE M.A.S. have arranged a very comprehensive range of outdoor events, combining as far as possible with the official S.M.A.E. list. To relieve the strain on the pockets of members, all club events are free to the chaps, as, in these difficult and expensive times, a club fee together with the fee for the S.M.A.E. event makes rather a drain on individual resources. Altogether thirteen club contests will be held, plus the eight S.M.A.E. events, and this, combined with the indoor programme already in operation, makes this one of the biggest programmes I have heard of.

A special Scale Concours competition is to be held at the last indoor meeting on March 30th, when both flying and non-flying types will be judged on workmanship, finish, trueness to scale and detail. Valuable prizes will be awarded, and the event is open to any who care to compete. The meeting on this date will commence at 2 p.m. at the Manchester College of Technology, and a contest will take place for microfilm types, also R.T.P. events for both duration and scale types, time permitting. A competition held on February 22nd resulted as follows:

Av.				
W. Kuyser	84	70	76.75	76.92 sec.
J. D. Finch	62	82	74.2	72.71 "
A. W. Shaw	24	72	79.25	58.42 "

Finch put up the best time of the evening after the contest had finished, clocking 92 sec. with a super-light-weight tissue-covered job. Mr. C. S. Rushbrooke raised his R.T.P. scale record to 59.5 sec.—and stripped the gearbox when trying to get a few more turns on to try and pass the minute mark!

I have dealt with one item from this club separately, and the remaining matter concerns the production of the

"SKYLEADA" FLYING SCALE AND DURATION KITS



Skyleada "Minor," 28-inch wing-span duration model 5/6
 Skyleada "Swallow" 20-inch wing-span duration model 2/11

The "Swallow" is a smart cabin job, and a special feature of the "Minor" is the inclusion of riblets in the wing construction. As an example of SKYLEADA value, both kits include British-made hand-finished propellers.

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club magazine, *Contact*, of which I have been forwarded a copy. In an endeavour to conserve finance, and at the same time to continue production, the committee has bought its own duplicating machine, and production will be fully "homework" from now on. (I wonder if I shall be able to decipher the next issue!) Appreciation is expressed at the Fellowship of the S.M.A.E. conferred on the club secretary, Mr. Rushbrooke.

Another club running their own magazine is the WILLESDEN AND D.M.A.C., who sent along a copy for my perusal. This is quite a good effort—but I'm afraid the typist was in a hurry to catch a bus or something, as one or two letters have been missed altogether! However, these affairs must take a lot of time, and I am glad to see so many clubs with chaps willing enough to take on the work entailed.

The EDINBURGH M.F.C. has been entirely reorganised, and all communications should be sent to the secretary, Mr. L. Middleton, at 18 Craigmont Gardens, Edinburgh. During the winter season the membership has increased to about 40, and a popular series of fortnightly meetings has been arranged at the club-room. Once a month R.T.P. flying is held, with models of 18 in.—20 in. span, of either spar or fuselage type. A recent competition was won by E. Knox, whose best time was 51 sec., followed by L. Middleton and R. Knox. The former Knox made a fine flight outdoors under poor conditions when his 36 in. span model, fitted with skis, made a 90 sec. flight, disappearing from sight. Many ambitious models are under construction, one of which is shown in a photo, being R. Knox's 5 ft. span glider.

The MANX M.A.C. was started at the beginning of hostilities, and with a field on the outskirts of the town (Douglas, I believe), monthly competitions are being held. The club duration record is held by a junior, Alan Sheard, with a time of 81 sec., while the chairman, Mr. E. H. Diskinson, holds the weight-lifting record with a time of 32 sec., machine weight being 8 oz. and the load carried 5 oz.

Mr. R. W. Buck, of the DARLINGTON M.A.C., sends in a photo of his 28½ in. span model that won first place in a club event the first time out. Times are not given. This chap would like to see a competition for design—have any others of you similar wishes?

The SOUTH BRADFORD M.A.C. ask me to extend an invitation to any reader who may like to visit their pole flying contest—but the date given was February 24th. Sorry you didn't let me know in time for last month's issue, and I would be glad if all Press secretaries would make a careful note of the fact that it is no use notifying

me of any fixtures that take place before the 20th of the month following your notice being sent in. You must remember that your reports should be in no later than the 25th of the month, and that publication of same does not occur until the 20th of the following month. *Compre?* I know it's a bit awkward, but that's the way things are in the publishing world, and we can't get away from it.

The ULSTER M.A.C. have just held their first indoor flying meeting, and are very bucked with its success. Mr. Young, late of the Stockton-on-Tees Club, was the winner with an average time of 76.5 sec. with a 2 oz. model. (Height of pole 4 ft., with a 5 ft. line.) Colin Skelly has set up the first Ulster record with a 1½ oz. stick model, time being 112.4 sec. About 30 members took part in a grand flying bout on Boxing Day, flights averaging around the 70 seconds mark, with a best time of 101 sec. by Mr. E. Bingham's Wakefield model. Lectures and further R.T.P. meetings are being held, whilst a "Super Gala Day" is to be held early in June. This is open to the public, and it is hoped that teams from Eire and England will be represented. War has not affected this club greatly, apart from some of the flying field being under the plough, but I can't say what support can come from England at this period. But some might be on holiday there at that time, so keep me informed, Ulster, and I will bring the matter up again later on. Mr. A. N. Kinkead sends in a fine photo of his streamlined Wakefield model, and fine workmanship can be clearly seen. Nice-looking job, A.N.K.

The READING AND D.M.A.C. tried a successful pole-flying meeting, Mr. Lacey winning with a time of 81 sec. R.O.G.—a new club record. Members were also entertained by a film show given by Mr. Chandler. This club have also sent along a copy of their club magazine, which is very well got up—and is certainly humorous in parts. Thanks!

The exhibition being staged by the MERSEY M.F.C. is drawing large crowds, and six new members have been enrolled, presumably through the publicity gained. A challenge has been issued to the Birkenhead and Wirral clubs for a contest to be held over the Easter holidays. As there are always grouches about individual luck, the contest has been arranged under the following rules, which I give here in full for others' information:

- (a) All competitors must be subscribers to the competing clubs.
- (b) Machines can be flown proxy for any member of a team who cannot attend personally. Such flights to be notified to the secretary of the opposing clubs before the contest.



(Left) Ooh, what big eyes you've got!--or "So that's what the lads of Halifax do with all their spare time." A view of the exhibition staged by the Halifax M.A.C. (The seaplane seen in the right-hand corner is the model that won the Short Bros.' Seaplane Cup for D. Lees).
 (Centre) A $\frac{1}{2}$ -size Wakefield model built by F. H. Shaw, of Leicester. Weight is 6 $\frac{1}{2}$ oz., and span 3 $\frac{1}{2}$ in. Average flight is 14 sec.
 (Right) Another exhibition--this time by the Wirral M.A.S. And what did the warden do then, poor thing? Just look at all that light!

- (c) At the appointed starting time, all practice flying to cease, when it is expected that all competitors shall have their models in trim, thus ensuring that only one model shall be in the air at one time.
- (d) Each competitor shall have two flights. There will be half an hour's interval between the first round and the second, for retrimming purposes.
- (e) The team with the greatest aggregate of points (each second of flight to count one point) shall be the winner. Thus a lucky thermal flight will not greatly affect the issue.
- (f) Team numbers to consist of a number to be decided upon, most likely seven.

I shall be glad to hear of the outcome of this meeting. Should it prove a success, further challenges will be issued to the Chester, Southport and Liverpool clubs, with a further hope of challenges to the Lancashire and Manchester clubs.

This club tell me the story of how to get new members! Scene, member's bedroom. said member waiting for the doctor to call. Enter doctor, who sees a 4 ft. span model hanging from the ceiling. Interest of medico immediately aroused, and the facts come out that his seventeen-year-old son has been trying to find the club. Result, a new member, a happy patient, and a contented doctor. Now, don't all you club secretaries start draping the bedroom with models, and swinging the lead!

The NORBURY AND D.M.A.C. has recently been formed, and new members are cordially invited. Applications should either be in writing to Mr. P. T. Owen at 23 Broughton Road, Thornton Heath, Surrey, or personally to St. Stephen's Hall, Winterbourne Road, between the hours of 8 and 10 p.m.

At the A.G.M. of the BRIGHTON D.M.A.C. a rule was passed making it compulsory to hold third-party insurance, either through the N.G.A. or other insurance company. All flying meetings will be held each Sunday until further notice on the "Chattri," Patcham. All members serving with the Forces have been made honorary members until the termination of their service. The results of a recent handicap competition were:

R. Bravery	...	...	...	155.2 points
R. Goodman	...	...	...	126.0 "
S. Ward	...	...	...	108.8 "

The SKYBIRD M.F.C.. No. 374, are well on with a batch of scale models for the coming season, with a num-

ber of flying types. These chaps want to know why the Americans always seem to use hundreds of yards of $\frac{1}{8}$ in. flat rubber! Anyone know the answer?

When the weather is inclement--(Oh, naively put, mydeah Fotheringay!)-the GRIMSBY AND D.M.A.C. chappies gather round the electric radiator, switch the radio on, bring out "liquid refreshment," and devour THE AERO-MODELLER. (How do you like the taste of the cover, lads?) Several members turned out in the recent snow in an effort to determine the effects of ice formation. Result, the H.I. glider record was put up by another three seconds. Rules for the Gladding Cup are: Wing area, 140-160 sq. in.; weight, 6 oz; unrestricted fuselage formula; average of three flights.

The TROWBRIDGE AND D.M.A.C. members tried out an indoor steering competition for gliders, and found plenty of fun as well as instruction. A comprehensive outdoor programme has been arranged, flying to take place on the Wiltshire Downs, within a few yards of the famous Westbury White Horse.

An exhibition staged by the WIRRAL M.A.S. proved a huge success, and if the photo forwarded is anything to go by, it deserved its popularity. Increased membership has followed in the wake of this show, and the general interest shown by the public was gratifying.

In spite of very poor weather, high wind and sleet, the February Round of the W. and L.S. Cup of the WESTLAND M.A.C. was held, resulting in a win for A. Wilcocks, 79.4 sec., followed by J. Riddle, 78.5 sec., and L. Baster, 77.7 sec. Pretty close running that, eh?

The WEST SUSSEX M.A.S. seem to have got the hang of R.T.P. flying well and truly! Flying on a 3 ft. line, Mr. R. Warring put the club record up to 218.4 sec. when winning a recent H.I. competition. Full results were:

				Av. of three
R. Warring	...	...	...	184.8 sec.
F. Gates	...	...	...	155.8 "
T. O. Clements	...	...	...	93.4 "

The scale model class is most popular, and the present record of 57 seconds, held by F. Gates, gives a good indication of the performance that can be obtained from pole-flying such models. Incidentally, a "Lysander" has held this record from the start. Apart from their indoor activities, many new outdoor jobs are ready for

the fray, Mr. Warring having already commenced testing a 1940 streamlined Wakefield bus.

The SALISBURY AND D.M.E.S. have divided the Aircraft Section into three teams, under the captaincies of Messrs. Lovell, Scamell and Lailey. It is hoped that this innovation will make for greater enthusiasm and enjoyment, and also benefit the younger members. A very comprehensive programme has been drawn up, and as they have a number of young and/or inexperienced members, three contests have been designed especially for their benefit.

K. Scamell won both of two recent R.T.P. contests, with averages of 98.95 sec. and 103.3 sec. respectively, while R. A. Read raised the scale record to 43 sec. with his 24 in. span Comper Swift.

Another club to stage an exhibition was the NEW-CASTLE (Staffs) AND D.M.A.C., who received some fine publicity, and some new members, from a show held at the Grammar School, Wolstanton. An instruction class for juniors which precedes the ordinary club meeting looks like proving a popular innovation. (I like your advertising scheme, Newcastle, and will give it publicity later on, when you have reaped the benefits!)

The VICTORIA M.A.C. held a club championship R.T.P. meeting recently, the winner being Mr. N. Guy, whose times of 128, 130 and 130.4 sec. with an 18 in.

model were deserving of success. Not satisfied, he has now built a model that has been clocking $2\frac{1}{2}$ sec. on tests. Mr. M. R. Knight gave these chaps a lecture in his usual interesting and informative manner, which was suitably appreciated.

The CHEAM M.A.C. have also gone all R.T.P.—their models, I mean! Some are shaping well for the forthcoming competition for the Indoor Trophy. In spite of the lack of good flying days, several new models have appeared outdoors. A 4 ft. camouflaged "Viper" by Ian Davies flies well, and produces a fascinating purr from its geared motor when in flight, while Freddie Briggs claims the club "durability" record with his model that spent two months in a tree-top, surviving snow and ice, and is still capable of being flown with a patch here and there.

Mr. S. Collins, of the NORTHERN HEIGHTS M.F.C., has been turning in some good times with a folding propeller model, consistently obtaining best time of the day, while Mr. C. R. Clarke has raised the club R.T.P. record to 109 sec. A series of lectures has been arranged, Mr. Rippon having started the ball rolling in this respect.

The BARNES AND D.M.A.S. can chalk up one success for last season, Mr. R. Dove obtaining second prize in the S.M.A.E. photographic event, some consolation



"MINE CRATER? NEIN! THAT IS WHERE BOB COPLAND'S LIGHT-WEIGHT CRASHED."



(Top left and right) Members of the Peterborough M.A.C. out for a spot of flying.

(Top left centre) Mr. Coxall's well-known petrol model, having a rest at Fairey's. Photo by Mr. Collins.

(Top right centre) A 36 in. span model built by 14-year-old T. Kent, of Milton Regis. Best flight to date, 170 seconds.

(Bottom left) Mr. E. J. Bannister's petrol job. Member of the Victoria M.A.C.

(Bottom left centre) A "Tse-Tse Fly" by Mr. Brunkell, of East Dulwich.

(Bottom right centre) A good model built under difficulties by D. Newton, at present in hospital at Northampton. (See text).

(Bottom right) Another good effort by a youngster. A 24 in. span monocoque built by 13-year-old Geoffrey Himbert, of Oxted.

to him for his bad luck in the Wakefield Trials. A friendly visit from the T.M.A.C. finished with honours even in a "social games contest."

The ranks of the CHELMSFORD S.M.E. have been sadly depleted owing to causes already well known to you all, but it has been decided to carry on in spite of everything. A few new members have been enrolled, and good activities have been seen, with three petrol models on the stocks. Here's luck, fellows!

The first official competition of the season of the HORNCHURCH M.A.C. was held in the latter part of February, and, considering the state of the weather, some good flights were made, 82 sec. being the best time of the day. Unfortunately, the high wind took the models O.O.S. too quickly—and then "The Rains Came." Fini. All petrol models flown by members must be registered with the S.M.A.E., and all applications for registration must be countersigned by both the secretary and chairman of the club, any application which is considered unsuitable being rejected. In this way they hope to obviate any crack-brained flyer from spoiling it for everyone else. And a jolly good idea too.

Now that the military have vacated the clubroom of the BLACKHEATH M.F.C., organised activities have again commenced. Mr. Mackenzie has resigned the secretaryship, his place being taken by "Bill" White. Meetings have been well attended in spite of the weather, etc., and members have their eyes on the forthcoming S.M.A.E. competitions. Many fine jobs are being built, outstanding being those of Messrs. White, Galbreath and Simmonds. Blackheath are thinking of claiming another record—this one for National Service, they having members in the Army, R.A.F., Mercantile Marine, C.A.G., Police and A.F.S. (But didn't you know, B'heath, that the C.A.G. no longer exists?)

Will any enthusiast in the Taunton district please get in touch with the secretary of the TAUNTON AND D.M.A.C. at his address, 11 Clifford Avenue, Taunton? A very interesting snap is forwarded of a scale S.E.5. powered with a 1/5 h.p. engine. It is hoped that the

total weight will not exceed 3 lb. I shall be glad to hear of results with this job—the old S.E.5 has long been a favourite of mine.

The old Avenue A.C. has now been reformed under the title of the SOUTHBEND AERO-MODELLERS' CLUB. Owing to the taking over of the aerodrome by the R.A.F., much scouting around has taken place for a new flying ground, and a large field is now doing duty in this respect, the only really good point in its favour being that it is rent free! Club headquarters are at 12 Dryden Avenue, Southend-on-Sea, the home of the secretary, Mr. R. Patten. Club records of this club are:

Over 200 sq. in.,	H.L.	8 min. 40 sec.,	by D. Nichols.
" 100 "	"	H.L. 2 .. 30 ..	" J. Patten.
" 100 "	"	(Stick) 1 .. 10 ..	" J. Patten.
	H.L.		

Gliders—

Under 100 sq. in.	36 "	" T. McGrath.
" 50 "	1 "	10 " " R. Patten.
" 40 "	38 "	" D. Nichols.
Scale—Puss Moth	40 "	" J. Patten.

But, hey! Wake up someone down Southend way! He says they are "making up a team to go to the Wakefields." Do you mean this year—or last?

And so, my little plums, I leave you to the tender mercies of the Clerk of the Weather for another month. May you have good flying, satisfactory testing, and may the sun shine upon you! In fact, for de Lawd's sake, let's see a bit of decent flying weather for a change. So, until Hitler builds a synagogue, I remain,

Your old pal, THE CLUBMAN.

SOLUTIONS TO THE QUESTIONS ASKED ON PAGE 272.

Give yourself five points for each correct answer.

1. (b).	5. (b).	9. (c).
2. (c).	6. (a).	10. (a).
3. (c).	7. (b).	11. (b).
4. (b).	8. (b).	12. (c).

ANALYSIS.

50—60.	Excellent.	35—40.	Fair.
0—25.	Go buy a text-book.		

LIST OF MATERIAL Required for "THE AIR CADET" Duration 'Plane

FUSELAGE.

- 6 3 ft. x $\frac{1}{4}$ in. x $\frac{1}{4}$ in. hard balsa wood, longerons, cross-struts and diagonal braces.
 - 1 6 in. x $\frac{1}{4}$ in. x $\frac{1}{4}$ in. wide cross-strut at rear where rubber peg fits.
 - 1 4 in. x 2 in. x $\frac{1}{4}$ in. wide cross-strut at front of fuselage.
 - 1 18 in. x 2 in. x $\frac{1}{4}$ in. vertical bracing for sides of fuselage.
 - 1 6 in. x $\frac{1}{4}$ in. x $\frac{1}{4}$ in. bamboo tail skid and small pegs on wings.
 - 1 8 in. x 22 s.w.g. steel wire for front hooks on undercarriage, and those which pass across the fuselage at the nose.
 - 1 2 in. x 18 s.w.g. brass tube for undercarriage bushing.
 - 2 16 s.w.g. cup washers for ends of brass tube.
 - 1 3 in. x 2 in. thin sheet celluloid for reinforcing plates.
 - 1 3 ft. x $\frac{1}{4}$ in. roll of gum strip for front undercarriage legs, etc.
 - 1 Reel of thread.
 - 1 18 in. x $\frac{3}{8}$ in. x $\frac{1}{4}$ in. runners on top of fuselage for wing seating.
 - 1 2 in. x $\frac{3}{8}$ in. hardwood dowel for rear bobbin fixing.
- ### UNDERCARRIAGE.
- 2 8 in. x $\frac{3}{8}$ in. x $\frac{3}{8}$ in. bamboo to shape to oval section for legs.
 - 1 18 in. x 18 s.w.g. steel wire for axles, plugs at top of legs and spreader.
 - 1 Pair of 2 in. streamlined landing wheels.
- ### TAIL.
- 2 24 in. x $\frac{3}{8}$ in. x $\frac{3}{8}$ in. birch for tail outline.
 - 1 18 in. x $\frac{1}{4}$ in. x $\frac{1}{4}$ in. balsa wood for main spar.
 - 2 18 in. x $\frac{1}{4}$ in. x $\frac{1}{4}$ in. balsa wood for bottom ribs.
 - 2 6 in. x 2 in. x $\frac{1}{4}$ in. balsa wood to cut out top ribs from.
 - 1 4 in. x 1 in. x $\frac{1}{4}$ in. balsa wood for centre piece of tail.
 - 1 4 in. x 1 in. x $\frac{1}{4}$ in. balsa wood for locating piece to fit under tail.
- ### FIN.
- 1 18 in. x $\frac{3}{8}$ in. x $\frac{3}{8}$ in. birch for outline of fin.
 - 1 6 in. x $\frac{1}{4}$ in. x $\frac{1}{4}$ in. birch for vertical post.
 - 1 6 in. x 2 in. x $\frac{1}{4}$ in. balsa for ribs and diagonal strut.
 - 1 6 in. x 22 in. s.w.g. steel wire for the saddle over fuselage.

WINGS.

- 2 3 ft. x 2 in. x $\frac{1}{4}$ in. medium balsa wood for ribs, diagonal bracers and main spars.
- 1 3 ft. x $\frac{1}{4}$ in. x $\frac{1}{4}$ in. balsa wood for trailing edge.
- 1 3 ft. x $\frac{1}{4}$ in. x $\frac{1}{4}$ in. balsa wood for leading edge.
- 1 24 in. x $\frac{3}{8}$ in. x $\frac{3}{8}$ in. birch for wing tips.
- 1 8 in. x 2 in. x $\frac{1}{4}$ in. balsa wood for under the centre section.

NOSE BLOCK ASSEMBLY.

- 1 $1\frac{1}{2}$ in. x $1\frac{1}{2}$ in. x $\frac{1}{4}$ in. hard balsa wood.
- 2 18 s.w.g. brass push-in bushes (one for the airscrew).
- 1 18 s.w.g. "Run-true" bobbin shaft.
- 1 Ball race or alternatively 2 16 s.w.g. cup washers.
- 1 Small nail or screw for securing free-wheel pin.
- 1 Free-wheel pin from 20 s.w.g. steel wire.
- 2 Small sheet celluloid washers (cut from that previously mentioned).
- 1 12 in. diameter, 18 in. pitch hardwood airscrew, or 14 in. diameter, 21 in. pitch hard balsa wood airscrew.

SUNDRIES.

- 6 Yards of $\frac{1}{4}$ in. x 30 rubber, i.e. 1 oz.
 - 1 Bottle rubber lubricant.
 - 2 "Major" size "Run true" rubber bobbins.
 - 3 Sheets of Japanese tissue.
 - 1 Medium size tin of thin No. 2 banana oil.
 - 2 Brushes.
 - 1 Tin of cellulose lacquer for lining out, etc.
 - 2 Medium size tubes of cellulose cement.
 - 1 Medium size tissue paste.
 - Supply of rubber bands for undercarriage, wings and tail.
- NOTE.—The above details are as used on the original model, but certain items may already be in the possession of the intending builder, or he may prefer to modify the special items; there is no obligation to this, provided the main features of design are strictly adhered to.

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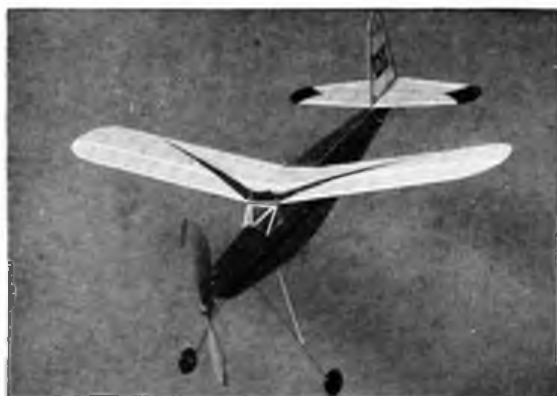
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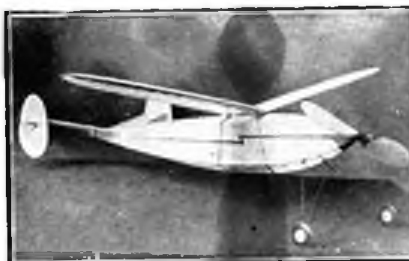
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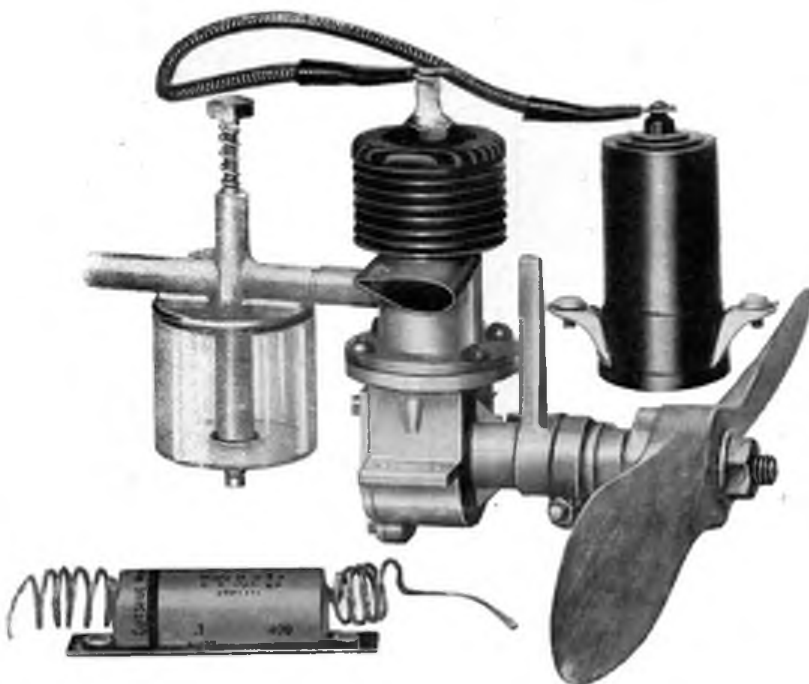
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Appendix - Links to the plans

The original issue comes with the full size plans "given away free" for the Air Cadet, an easy to build duration (rubber) model.

Air Cadet by C.A. Rippon

38" Rubber Duration

[https://outerzone.co.uk/plan_details.asp?ID=13140 ...](https://outerzone.co.uk/plan_details.asp?ID=13140)

[Document Page: 11](#)

Pterodactyl by G. Mahony; S.E. Capps

Rubber tailless. 3 view plan scale 1" : 1ft

[Document Page: 28](#)

1940 Copland Wakefield by R. Copland

44" Wakefield.

Plan is listed in SAM 1066 David Baker Heritage Library.

<https://www.sam1066.org/library.html>

[Document Page: 31](#)

