VOL 8. Nº. 89. ONE SHILLING APRIL 1943.

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SKYROVA

AERO MODELLER

(INCORPORATING "THE MODEL AEROPLANE CONSTRUCTOR")

Established in 1936 (Proprietors: Model Aeronautical Press, Ltd.)

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EDITORIAL

WHEN we announced our competition for petrol engine driven race cars, we were informed by some folk that it would attract very few entries. Well, it certainly did not attract thousands! We did not expect it to. Neither did we expect such a high standard of craftsmanship, as was revealed by photographs sent in by entrants. The competition has been a good success, and results are as follows:—

Class A.—Engines up to 6 c.c. capacity. £10. 10s. 0d. Prize to Mr. T. Cruickshank, of 105, Salisbury Road, London, N.W.6. Engine capacity, 5 c.c. Speed, 36·7 m.p.h.

Class B.—Engines between 6 c.c. and 10 c.c. capacity. £10. 10s. 0d. Prize to Mr. F. G. Buck, of "Villa Maria," Leek New Road, Hanley, Stoke-on-Trent, Staffs. Engine capacity, 7·5 c.c. Speed, 40·5 m.p.h.

We congratulate all the entrants on their initiative in building models for this competition, particularly in war-time; and in coming issues of this journal we shall describe a number of their models.

Calling all readers . . . .

On behalf of the advertisers in this journal we make an appeal to readers to abide by the usual "Rules of Commerce" when ordering goods advertised in THE AERO MODELLER. Whilst it is a fact that we receive an extraordinary small number of complaints from readers, bearing in mind war-time conditions and our large circulation; it is a fact, too, that in nearly every case an alleged complaint, when investigated, is found to originate in some stupid mistake *by the reader!*

These notes are inspired by a telephone conversation just concluded with one of our advertisers to whom we sent a letter of complaint received from a reader in Cornwall. Said reader had sent a cheque for 10s. 6d. for goods and had not received them. The proprietor of the firm immediately, on receipt of our letter, made a thorough investigation, and within an hour was on the phone to us explaining that the reader's letter and cheque had been duly received and the goods despatched; *but the reader had omitted to sign his letter, and the cheque was signed in the name of someone different from that now disclosed by the reader in his letter of complaint!!* Naturally, of course, the goods were despatched in the name of the person who signed the cheque and, equally naturally, they had not reached our reader!!

It seems extraordinary that folk should send cash, with a list of material required, *but give no name and address*, yet this occurs in quite a number of cases!

We ourselves suffer from this trouble, and at the time of writing have over 20 orders for plans/books undelivered, simply because the would-be purchasers omitted their names and addresses. This sort of thing is most annoying and disturbing, and gives everyone a lot of trouble even in peace-time, quite apart from leading to quite unjustifiable complaints against us or our advertisers. Will readers, therefore, kindly co-operate by checking over their orders before despatch, and *always* remember that when asking for lists or information, a stamped addressed envelope should be enclosed. It is *not* reasonable to expect an advertiser, or for that matter, THE AERO MODELLER, to provide information gratis, and also bear the cost of postage in addition!

"One-Seventy-Two" Scale Plans.

The four centre pages of this issue are occupied by a complete list of 1/72 scale plans and photographs of military aircraft, now available through THE AERO MODELLER Plans Service. All the aircraft described in Volume III of "Aircraft of the Fighting Powers" are included, as well as over 70 aircraft flown in the 1914–18 War; making a total of over 700 plans and photographs. Will readers please note the revised plan prices, now pro-rata to size (one, two or three page) and the introduction of *groups* of photographs (three, four, or five) of certain aircraft.

For the House Proud Aero Modeller.

On page 832 is published an invitation to readers to send a 2½d. postage stamp for a free specimen copy of "The Householder." This handy monthly magazine costs only 9d., yet contains some 50 pages of useful knowledge to householders of both sexes, including aero-modellers!

D. A. R.

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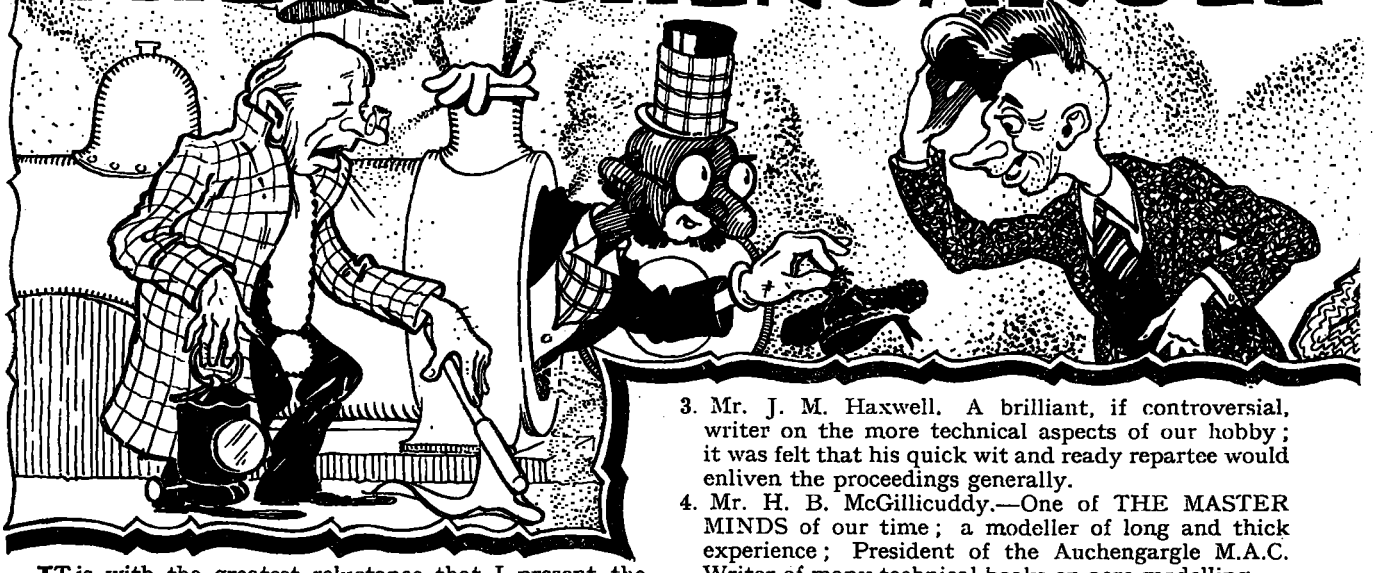
THE AUCHENGARGLE



IT is with the greatest reluctance that I present the following episode. Were the choice mine, it would never be written ; but the Maestro has expressed the wish that the story should be told in full, and in these circumstances my duty is plain. Here, therefore, are the FACTS ; and whatever the verdict of the public on these amazing events, it can never be other than a matter for regret that things fell out as they did ; and that a meeting of such brilliant intellects, assembled for such a noble purpose, should have degenerated into a vulgar and disgusting brawl.

The idea of an aero-modelling brains trust was received with tremendous enthusiasm from the very start. Long before the members of the trust, or the venue for the meeting had been decided, a flood of questions poured into the " Aeroyodeller " offices from all parts of the country. Many of the questions received showed a high standard of aero-modelling knowledge, others, alas ! were merely facetious and irrelevant ; such as the enquiry from the reader in Stipple Stuffling, who wanted to know how to prevent the colour from running when he washed out his wingtips.

No one would envy the task of the selection committee, with so many high technical authorities deserving recognition. Naturally, we in Auchengargle, and indeed all enthusiasts north of the Border, regarded McGillicuddy as a " cert." There were others, however, who quite openly stated that the old so-and-so had as much chance as an indoor model in a gale ; and it is no exaggeration to say that life-long friendships were broken, families divided, and clubs split up into violently hostile cliques over this point.

All doubts were dispelled when the composition of the panel was announced, and while there was disappointment in many places at the omission of certain names, it was generally conceded that the selection board had performed a very difficult task not only wisely, but well. The actual members of the Trust were as follows :—

1. Mr. D. A. Dussell.—Author of " Design and Destruction of Model Aircraft." Editor of the " Aeroyodeller," and builder of many outstanding models.
2. Mr. R. H. Borring.—The famous glider authority, a deep and erudite technician ; originator of the famous saying " The quality of Percy is not strained, he soars on the winds of summer, and gazes on the plains beneath."
3. Mr. J. M. Haxwell. A brilliant, if controversial, writer on the more technical aspects of our hobby ; it was felt that his quick wit and ready repartee would enliven the proceedings generally.
4. Mr. H. B. McGillicuddy.—One of THE MASTER MINDS of our time ; a modeller of long and thick experience ; President of the Auchengargle M.A.C. Writer of many technical books on aero-modelling.

For the important position of Question Master, the most obvious choice was our old friend, Mr. C. S. Bushrooke. It was universally agreed that his kindly personality, tact, elan, aplomb, and " savoir faire " would be equal in every way to the demands of the situation. He could be relied upon to keep the meeting well in hand.

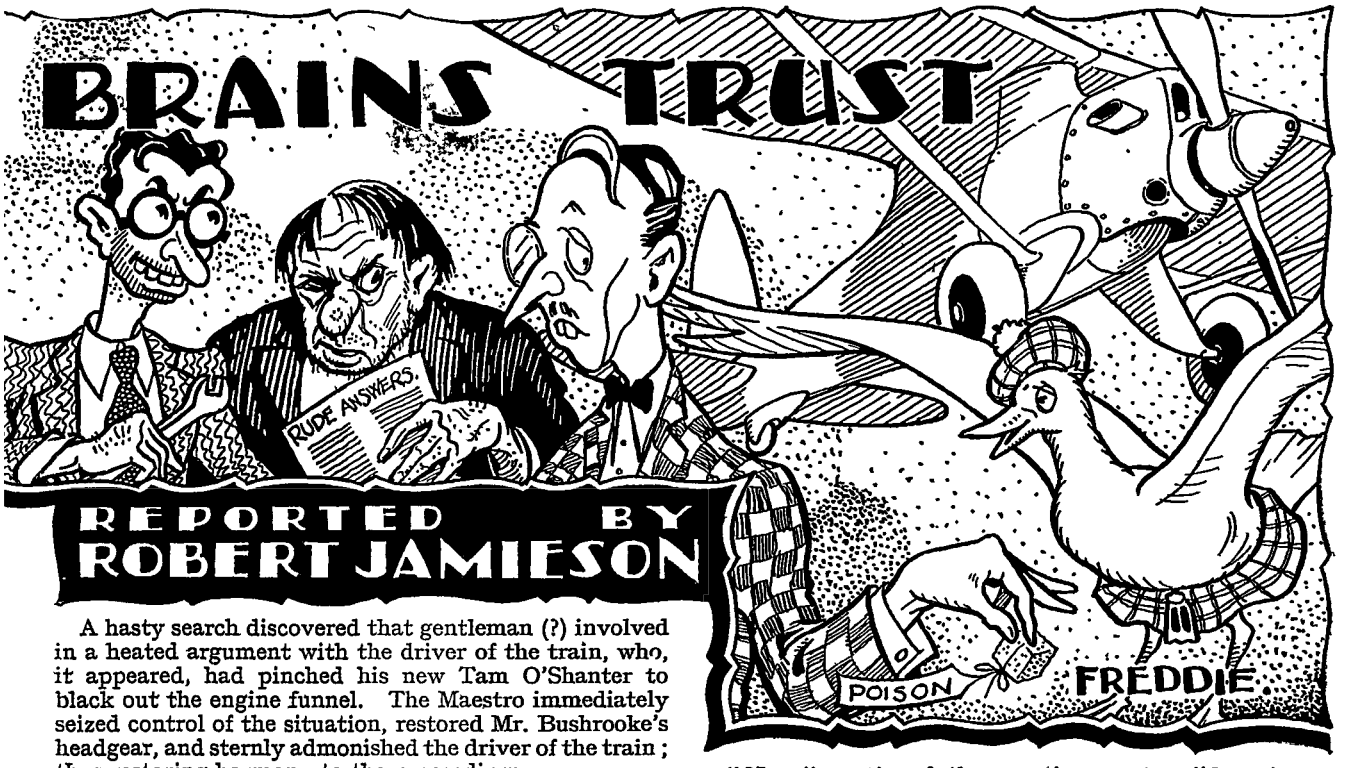
A snag was encountered immediately. McGillicuddy flatly refused to make the journey to London ; pleading ill health and advancing years. (Actually no cheap excursion fares were available, and the Maestro had hoped to make a cut out of his expenses from this source.) Happily, however, a solution to this difficulty was found immediately. Mr. Borring had spoken in glowing terms of his recent visit to Scotland, and he suggested to Mr. Dussell that the other members of the Trust should travel to Auchengargle and hold the first session there ; combining business with pleasure in a sort of " Props across the Border " goodwill mission.

And so it was decided.

Scenes of the wildest excitement prevailed at Auchengargle when we learned we were thus to be honoured. Preparations for entertaining our guests on a really lavish scale were immediately set in hand ; it would not be our fault if the Auchengargle Brains Trust was not an enormous success.

As the great day drew nearer, excitement mounted to a fever heat. Rumours and counter rumours flew among the members like a speed model that has broken loose ; Bushrooke was exchanging his beret for a Tam' O'Shanter, as a compliment to Scotland—Borring knew all, and was coming after the Maestro with a tommy-gun—Dussell was to make a demonstration flight over the town, seated astride his " Eastland Bystander," towing Borring seated astride his newest glider, and so on. Was it to be wondered at that several of our members were nearly ill with excitement when the great day dawned ?

The visitors were met on arrival by a party consisting of the Maestro, high officials of the Auchengargle Club, and a deputation from the Teuchle Toorie Club. The first to alight from the train was Mr. D. A. Dussell. He was looking bronzed and fit, and a tremendous cheer greeted his appearance. He was quickly followed by Messrs. Haxwell and Borring, but where was Mr. Bushrooke ?



REPORTED BY ROBERT JAMIESON

A hasty search discovered that gentleman (?) involved in a heated argument with the driver of the train, who, it appeared, had pinched his new Tam O'Shanter to black out the engine funnel. The Maestro immediately seized control of the situation, restored Mr. Bushrooke's headgear, and sternly admonished the driver of the train; thus restoring harmony to the proceedings.

Introductions being completed, the party left the station; and as they crossed the yard, a pleasant surprise awaited them. Dipping overhead, in graceful salute, was the Maestro's tame seagull "Drambuie." He was seated on his motor-stick, and towing a large red streamer on which were emblazoned the words "Welcome to Auchengargle." The visitors warmly complimented the Maestro on this pleasant little gesture; but as Mr. Borring looked up, a sudden look of angry suspicion crossed his face; and he shot a hasty glance at McGillicuddy. It was evident that Mr. Borring, in addition to seeing a seagull, smelled a rat; and while it would be exaggerating to say that Mr. Borring was hep, or that he knew all, it was plainly evident that he suspected plenty.

The party entered the waiting taxis (the taxis had not been waiting long, not as long as they had to wait for their bill to be paid) and were at once driven to the Auchengargle club room, where the Brains Trust was to be held, and the first thing that met their eyes on entering was the club's new petrol model, "Breeze of Ben McSplurge," named after our famous victory over the Teuchle Toorie Club. Mr. Borring glanced at it sourly, muttered something under his breath, and threw a dirty look at McGillicuddy. It was plain that the glider expert was labouring under some dark and secret sorrow. Mr. Dussell, on the other hand, was beside himself with delight. His face beamed with pure joy as he stood up on tiptoe to get a better look at the model. "Nice looking little job," he kept repeating, rubbing his hands together; "Nice looking little job."

But little time was wasted. The members took their places, and after a few opening remarks by the president, and some mutual compliments by the visitors, the first session of the Auchengargle Brains Trust was "on."

"The first question," said Mr. Bushrooke, "is rather a facetious one. It is signed 'Freddie,' and wants to know if Pie Face Jamieson is any relation to King Kong or Sweeny Todd."

"McGillicuddy?" He looked at the Maestro.

"No relation that I am aware of," replied our sage, amid general laughter.

"Now," continued the question master, "here is a real teaser; this enthusiast wishes to know what detrimental effects result when the prop. shaft is slightly bent, presuming the prop. to be in balance."

"Borring?"

The man from Skittlebampton threw the Maestro another dirty look. "If the flight path of the blades passes through an area of allergic confluence, the thrust/drag ratio will vary accordingly," he said.

Q.M. "Thank you, Mr. Borring. Dussell?"

Mr. Dussell was leaning back in his chair, gazing up at the petrol model. "I don't think the prop. shaft is bent," he said, "but it's difficult to tell, without dismantling the engine, of course."

Q.M. "Hmmmmmm————Haxwell?"

"The Slasgow boys————" began Mr. Haxwell; the question master silenced him with a look.

"McGillicuddy?"

The Maestro pondered for a moment, and then delivered the following:—

"An off truth prop., with each rotation,
Sets up a most severe vibration.
And all the 'plane, from fin to belly
Will shake and quiver like a jelly."

Borring looked daggers at McGillicuddy and breathed heavily through his nose.

"Well," said the question master, "Mr. Borring has gone fully into the technical aspects of the question, and Mr. McGillicuddy's explanation was straightforward and practical. The next question asks, what advantage are twin fins?"

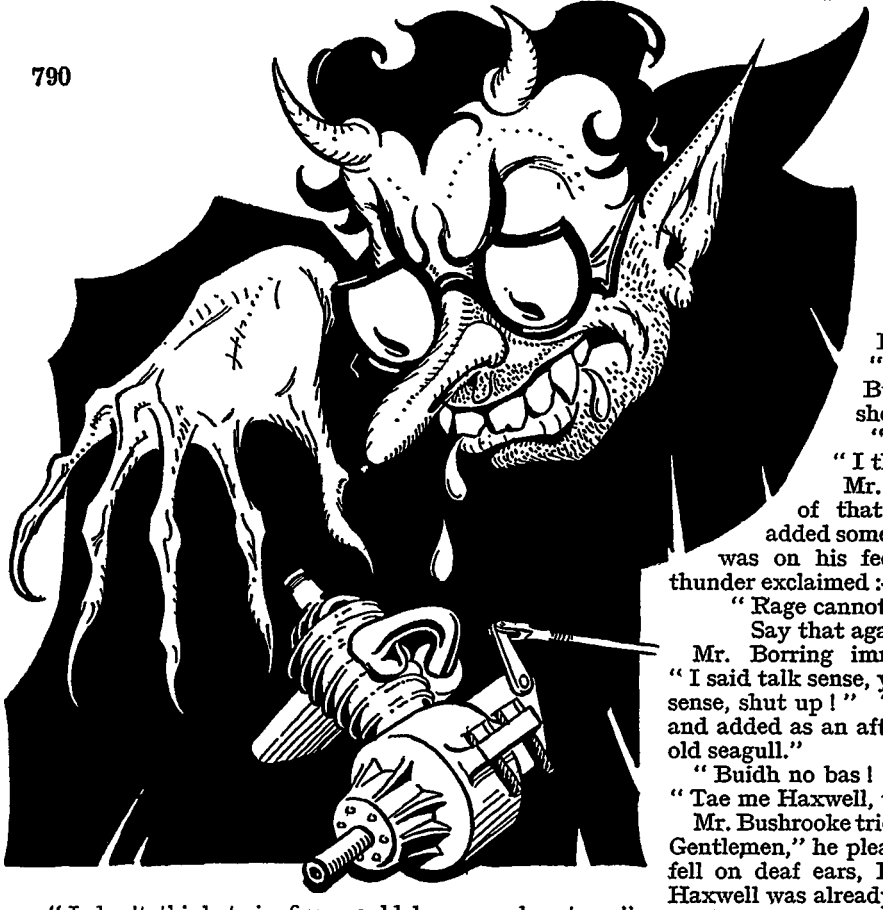
"Borring?"

Mr. Borring's face had grown noticeably redder, and he seemed to find difficulty in speaking.

"If the vertical area is greater than the cosine of the lateral axis, the directional graph will vary and curve according to the calepetic thrust employed," was his contribution.

Q.M. "Thank you. Dussell?"

Mr. Dussell had risen to his feet, and with his hands deep in his trousers pockets was gazing up at the petrol model.



"I don't think twin fins would be any advantage," he said, "not on this job, there may not be enough side-thrust, but you can't really tell, not without dismantling the engine, of course."

Q.M. "Hmmmmmm. Haxwell?"

"The Slasgow Boys" began Haxwell again, when Bushrooke's look silenced him.

"McGillicuddy?" The question master looked at the Maestro.

Mr. Borring was still muttering darkly under his breath, the Maestro seemed fully conscious of Borring's growing antagonism, and seemed to take a perverse delight in inflaming it further. He beamed on the company and his voice was smooth and bland as he replied:—

"Twin fins or but a single rudder?
Friend Borring's ruling makes me shudder,
And though my words may give offence,
I think twin fins are common sense.
No tail-plane tips to steam or bend,
Just stick a fin at either end."

Mr. Borring seemed to have difficulty in restraining himself. Mr. Bushrooke hastened into the breach. "Well—ah—um—I'm sure we are indebted to these gentlemen for their learned discourse. The next question is: How much incidence should be used with Clark Y wing section? Borring?"

"Not less than two degrees and not more than four," said Mr. Borring, "depending on the wing loading power/weight ratio and what degree of streamlining is employed."

Q.M. "Thank you, Mr. Borring. Dussell?"

Mr. Dussell was now standing up on his chair, absorbed in a deep and thorough examination of the petrol model.

"I don't think it is Clark Y," he said, without turning round, "hard to tell the angle of incidence, without dismantling the engine, of course."

Q.M. "Hmmmm." Mr. Haxwell was about to tell us the opinion of the Slasgow boys, when the question master interrupted him.

"McGillicuddy, how much incidence?"

"Och, just as much as he can get away with," said the Maestro. Borring seemed about to burst. "I'll repeat the question," said Mr. Bushrooke. "How much incidence should be used with Clark Y."

"Och, incidence!" said McGillicuddy. "I thought you said impudence."

Mr. Borring said, "You've got plenty of that, you old gasbag," and then he added something in an undertone. The Maestro was on his feet in an instant, and in voice of thunder exclaimed:—

"Rage cannot stem my limping rhyme,
Say that again—out loud this time!"

Mr. Borring immediately took up the challenge. "I said talk sense, you old twister, and if you can't talk sense, shut up!" Then he threw caution to the winds and added as an afterthought, "You and your mangy old seagull."

"Buidh no bas! Sassenach!" roared McGillicuddy. "Tae me Haxwell, this'll be another Bannockburn!"

Mr. Bushrooke tried to negotiate peace. "Gentlemen, Gentlemen," he pleaded, "don't be hasty." His appeal fell on deaf ears, Borring already had his jacket off, Haxwell was already at the Maestro's side, and McGillicuddy was advancing to battle, spitting on his hands in a business-like fashion.

When he saw that appeals to reason were useless, Bushrooke abandoned his role of peacemaker and made a sudden flank attack on Haxwell, just as Borring closed with McGillicuddy; the chair on which Mr. Dussell was standing went over with a crash, and the battle became general.

To and fro the desperate struggle swayed, sheer lust of battle descended on them all, out of the hut and on to the green sward beyond, the melee continued, till suddenly reason returned; the combatants stood apart rather ashamed, reconciliation was in the air, and in another moment handshakes and apologies were being tendered and accepted all round.

McGillicuddy was engaged in organizing a convoy to the nearest pub for the necessary lubrication, when Bushrooke let out a startled yell. "Somebody's missing, there's only four of us here."

A hurried roll call revealed that the missing man was Mr. D. A. Dussell. What could have happened to him? Remorseful and conscience-stricken we stared at each other, picturing him lying somewhere, perhaps seriously injured. We searched all round but could find no trace of him. Mr. Haxwell, passing the door of the hut, suddenly let out a startled cry. "The petrol model's gone!" The Maestro strode into the hut, then we heard him call out, "Come away in, lads' it's all right."

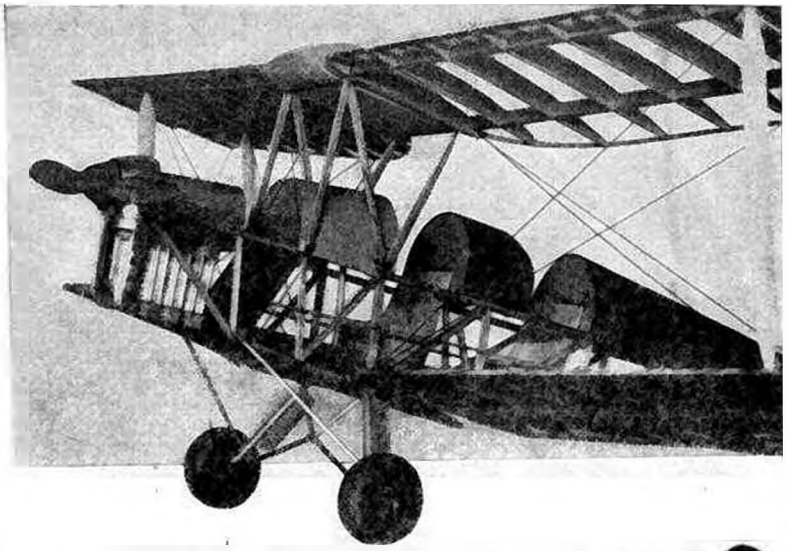
We hurried into the hut; he silently pointed.

Mr. Dussell was not missing. Mr. Dussell was not injured. Mr. Dussell was under the table, so was our petrol model, "The Breeze of Ben McSplurge." He had removed the engine from the frame and was busy dismantling it!

Thus ended the first and only session of the Auchengargle Brains Trust.

MODEL PHOTOGRAPHY

By E · J · RIDING



DH 82A. Tiger Moth, 1/12th Scale. Example of "close up" work WITHOUT the aid of a Portrait Attachment.

AT some time or other every aero-modeller feels a desire to capture a permanent record of his efforts. Sometimes it is merely a "snap," taken by the builder himself, and sometimes—if funds permit—a real studio job. It is for the benefit of those who fall into the first category that this article has been written, and it is hoped that the methods found satisfactory to the writer may solve some of the problems facing the amateur photographers in our ranks.

In the first case, don't be dismayed if your sole article of photographic equipment consists of a humble "Box" type camera. I've seen more good pictures taken with a box camera—by those who know how to use one—than by any Leica, Roleiflex or what have you!

Model photography can be divided into two sections: (*a*) Static, where detail is the sole object, and (*b*) Artistic, where cloud effects, "in flight" and realism are essential. Regarding (*a*), the aim is, of course, to secure the maximum amount of detail; i.e., assuming that you've taken pains over a wing covering or spent hours putting imitation rivets on a stressed skin fuselage, you naturally want it to show up in the picture. The secret of obtaining clear-cut pictures depends on 1. Using the smallest lens aperture and giving a time exposure, and 2. Whether or not the camera is in correct focus.

The best way to make sure of the latter point is to remove the back of your camera, place a sheet of ground glass against the opening, cover the head and camera with a black cloth and adjust your extension until the image is at the required size and definition. A portrait attachment will improve matters to a considerable extent, and any photographic dealer will fit one to your camera at a reasonable price.

These attachments as a rule are supplied with a table of figures telling you at what distance to set the camera when the attachment is in position.

Assuming that your model has been satisfactorily posed—i.e., if it is a dark coloured model, a white, previously dampened sheet will provide the most favourable background—preferably near the window where there is the maximum amount of light. It is always far more satisfactory to photograph models by daylight, as the interference caused by shadows is eliminated. The camera should be set up on a tripod or on another table on a level with the centre line of the model with the back to the light. Close the lens down to its smallest aperture; by doing this you use only the centre portion of the lens and both near and distant parts of the model will be in focus. See that the shutter release is set for "time," for the popular "Verichrome," "Selochrome" and Agfa "Isochrome" roll films give an exposure of from 1½ to 3 minutes, depending upon the amount of light entering the room and the colour scheme of the model. Nowadays, with the scarcity of films, it is far better to exceed this figure and have an over-exposed negative than to develop the roll and find that you've taken a spool of blanks.

If you are using a plate camera, I can recommend Ilford process plates. These plates are very slow and are commonly used for photographing machinery and copying pictures, etc. The photographs of the D.H. Tiger-Moth reproduced on these pages were taken with these plates, using a lens aperture of F.45 and an exposure of 10 to 15 minutes. So much for detail pictures. In section (*b*) the natural aim of the modeller is to make his model look as much like its counterpart and in as realistic surroundings as possible. The best way to do this is to pick a fairly level stretch of turf, such as a cricket pitch, preferably with trees at the far end. The photographs of the Avro 504K and Avian were taken during 1940 in a field in Buckinghamshire, of which a few square yards had been cleared with shears and scissors to provide "scale effect." All the models illustrated here are of the "built-up" type, i.e., with longerons, spars, etc., and are to a scale of 1 in. to 1 ft.

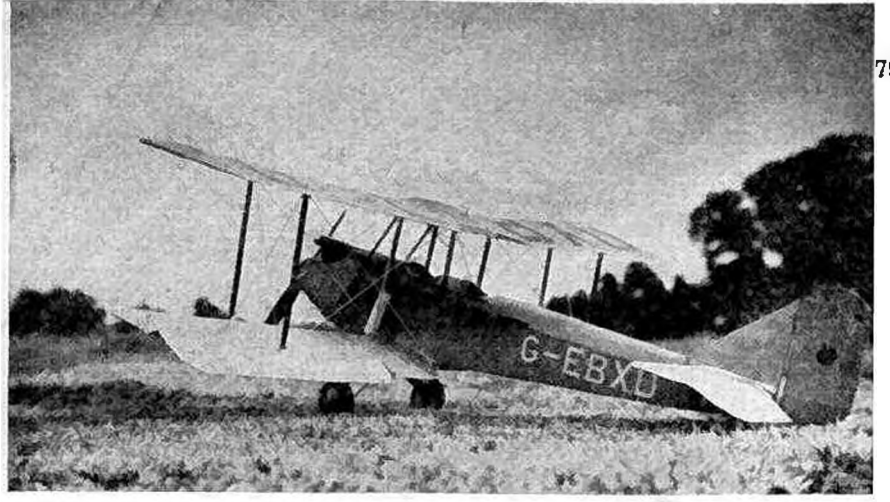
To obtain the most realistic results, the lens of the camera should be on a level with the centre line of the model and the correct focus obtained in the usual manner (see (*a*). Mark the position of the camera in relation to the model and load with film. Close the lens right down to its smallest aperture, replace the camera in position again and (in the case of a normal February day) give a time exposure of from 10 to 15 seconds. In summer time the exposure would be considerably shortened and about 1 to 1½ seconds would be ample.

When photographing a model to look as if it is in flight, it is advisable to suspend it by a single length of grey cotton attached to the side of the fuselage away from the camera, the wing being weighted internally for counterbalance. When taking "flight" photographs it is impossible to give a time exposure owing to the swinging movement of the model; therefore the camera can be held in the hands, giving an exposure of 1/25th to 1/100th of a second with the lens fully open.

The addition of a cloud filter—assuming that there

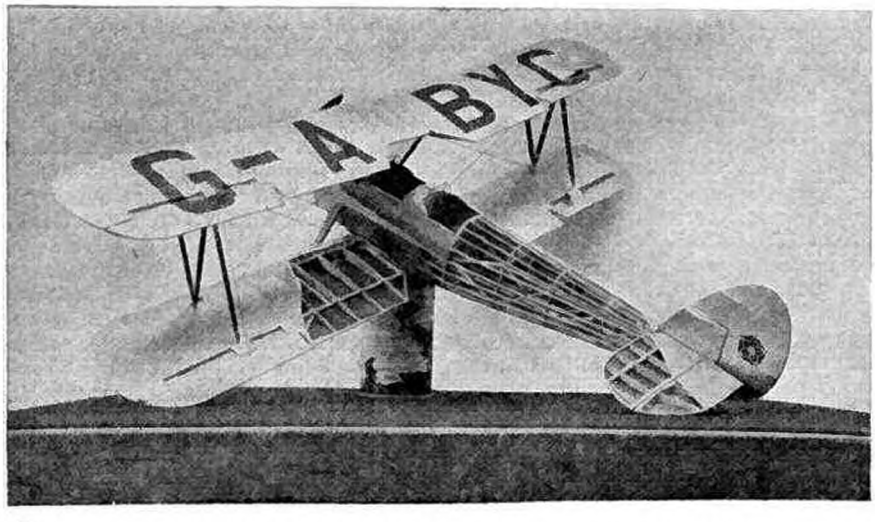
MODEL PHO

By E · J · RIDING



1/12th Scale Avro Avian IV. "Outdoor photography in natural surroundings."

Avro 504K, 1/12th Scale. "Another example of natural effect."



5 Avro 631 "Cadet." 1/12th Scale. Indoor photography by daylight.

6 Avro 631 Cadet, 1/12th Scale. Another

1 is plenty of sun and cloud —will give more pleasing results. Filters can also be fitted at any photographer's stores at a small cost. The best example of an "in flight" picture one has seen for a long time is that of the Hawker Hurricane reproduced here, taken by G. R. Woollett, of Maidstone, which was, judging by the negative, taken with a Leica or similar make of miniature camera. Note how the undercarriage is in the process of being tucked up—a detail which gives realism to the picture. Another point to remember is to remove the airscrew and substitute a bladeless spinner.

About eight years ago "dogfight" photographs used to be very popular. These should be taken indoors against a white sheet suitably dusted with burnt cork blown on in patches to represent a cloud background, the models being suspended upside-down by two or more lengths of grey cotton. When all swinging movement has subsided, give the same exposure as in (*a*) and

3

TOGRAPHY

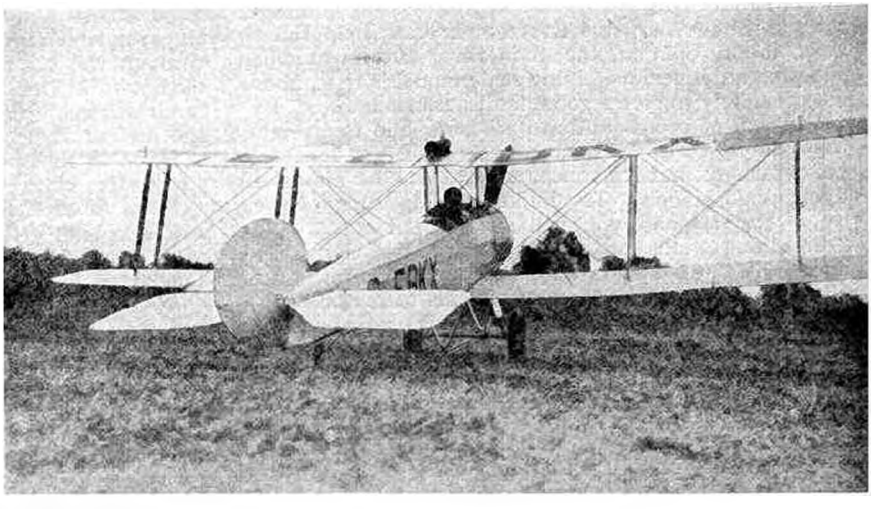
continued

remember that models of varying scale used simultaneously will go a long way towards giving an impression of distance as well as giving the picture depth.

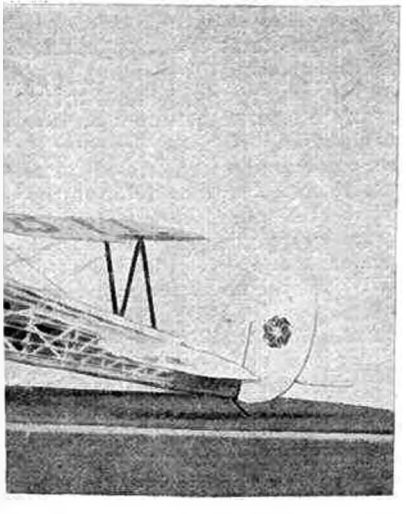
For example, if your "set" consists of two Spitfires converging on to a Heinkel 111 flying away from the camera, a 1/12th scale Spitfire partially filling the picture in the foreground and a 1/72nd scale Heinkel placed in the correct position with, say, a 1/24th scale Spitfire partially obscured by Spitfire 1, looks far better than if the models were simply strung out in a line. Remember, in "dogfight" pictures have one or two models partially obscuring each other, and if a selection of cut-out photographs of aircraft in flight are pasted on to your background the results can be quite startling.

To take a photograph of a model in actual flight it is essential to have a camera capable of a shutter speed of 1/250th of a second at least. To attempt anything of this nature with a slower exposure will only result in disappointment.

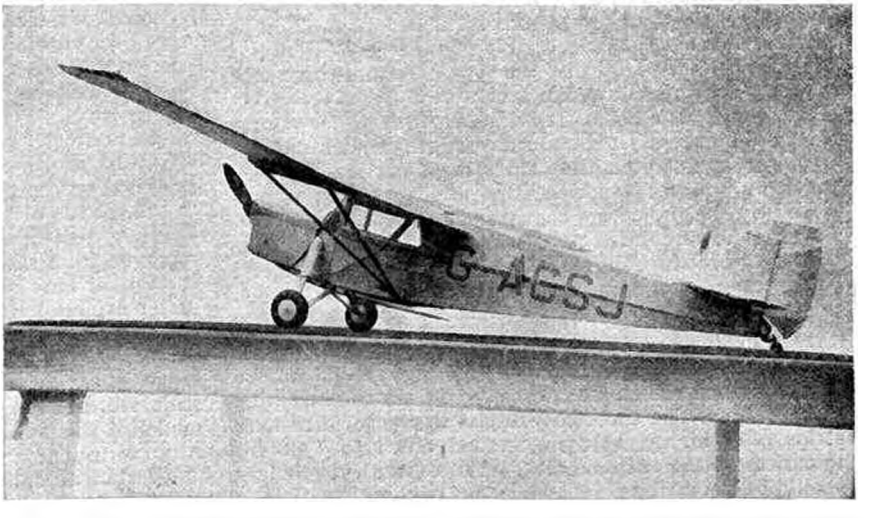
2 Avro 504K, 1/12th Scale. Example of Dark (Red all over Coloured Model against light.



4 Avro 504K, 1/12th Scale. "Another example of natural effect."

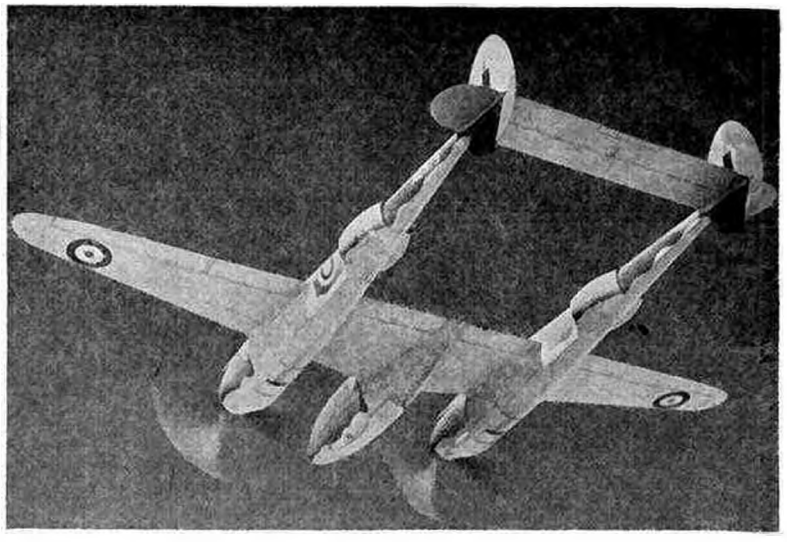


mple of indoor photography by daylight.



7 DH 85. Leopard Moth, 1/12th Scale. Another example of indoor photography by daylight.

LIGHTNING LAYOUT



FROM time to time some very ingenious and—up to a point—successful multi-engined flying scale models have made their appearance in THE AERO MODELLER. The types mostly favoured by the designers have been of the Wellington and Blenheim layout. As far as I can ascertain, by reference to back numbers of this journal, there has only been one model employing the "Lightning" type of layout—the Fokker G-1—by Mr. Towner. All except this model have necessitated some sort of flexible or jointed drive. Most of these types have been very successful, and, in fact, proved almost as efficient as the direct drive kind. But not quite. A fairly large percentage of the rubber power available must always be lost in friction. In addition, the weight of the drive does not exactly help things. Now, in my opinion, the main thing to aim at when choosing a design for a flying scale model is that, above all, it is likely to give a good flight performance.

It has often been said that if an aeroplane looks right, it is almost certainly bound to fly well. A debatable point perhaps, but it happens to hold true for almost all flying scale models. Try building a Mustang followed by a Ju. 87B and you will see what I mean. The "Lightning" falls into the category of aeroplanes that look right, but has so far failed to arouse any interest at all from the scale modeller. It stands to reason that a model of this kind will be more efficient than, say, a scale "Whirlwind." Why people always choose the hard way and lie awake at nights working out schemes whereby they can get their drives to negotiate about half-a-dozen 90-degree turns, I really do not know.

Of course, I may have got these "drive" chaps all wrong—they probably get quite a kick out of crossing swords with a piece of old curtain wire. In fact, if one of them ever builds a "Lightning" I bet he fits flexible drives from the airscrews to the rubber set in the CENTRE POD!

But to return to the "Lightning." The main advantages (again in my opinion) are as follows :—

Firstly: It really is a beautiful aeroplane and is without a doubt the most striking fighter in existence at the moment. In fact, just the type of 'plane you might expect to find in a Wellsian fantasy.

Secondly: The booms provide direct drive for contra rotating airscrews, plus normal length rubber motors.

Thirdly: A layout that lends itself particularly well to crashproof construction, the airscrews being protected by the projecting centre pod.

The following brief notes, in conjunction with the adjoining drawing, should give a clear idea of the general construction of a 1 in. to the 1 ft. flying scale model.

Tail Booms.

1/16 in. formers attached temporarily to $\frac{1}{2}$ in. square birch jigs in the usual manner. The jigs should not be removed until the entire booms have been covered with sheet balsa. The sheet covering is in the form of long strips of $\frac{1}{4}$ in. by 1/16 in. sanded down to 1/32 in. thickness at the extreme rear, when quite dry. Spaces should be left at the points where the wings and tailplane meet the booms; then covered in after these members have been attached.

Tailplane.

The construction of the tailplane is similar to that of the wing which is outlined below. The spars are carried through the booms and cemented to formers set immediately in front of them. A brace of $\frac{1}{4}$ in. by $\frac{1}{4}$ in. birch will keep the front end of the booms apart whilst the cement is drying. Now bind and glue a piece of 1/16 in. birch 3-ply (x) to the two F.9 formers. Construct the centre-section T.E. from three pieces of 1/16 in. sheet and triangular ribs. Attach to "x" and then bind with silk or twine. The twin fins consist of an $\frac{1}{4}$ in. sheet outline, with several rectangular ribs. The latter should be sanded down to a streamline shape on assembly.

Wing Panels.

Two $\frac{1}{8}$ in. by $\frac{1}{8}$ in. spars set in 1/16 in. ribs with a $\frac{1}{4}$ in. by $\frac{1}{8}$ in. leading-edge and a built up 1/16 in. sheet trailing-edge, go to make up one wing panel. Complete by covering to a third back with 1/32 in. sheet and then adding 1/32 in. by $\frac{1}{8}$ in. capping strips.

Centre Section and Pod.

Both of these are built together so as to form a single assembly. First join the lower wing spar to a full-size drawing, followed by a sheet balsa spar on which to slot the pod formers. These are cut horizontally at a point level with the undersurface of the wing at the root rib.

When all the ribs and the top halves of the pod formers have been fitted, the next step is to fit a similar leading edge to those used on the wing panels. The trailing edge is a vertical strip of 1/16 in. ply, shaped so that it fits flush with "x." Cover the L.E. and the upper portion of the pod with 1/32 in. sheet.

The best form of cabin construction for one as deep as this is the type that was described in some detail in the October issue of THE AERO MODELLER (Hotspur).

When this assembly is quite complete it can be removed from the plan in order that the other halves of the former may be added. Lastly, cover the remaining undersurfaces with sheet.

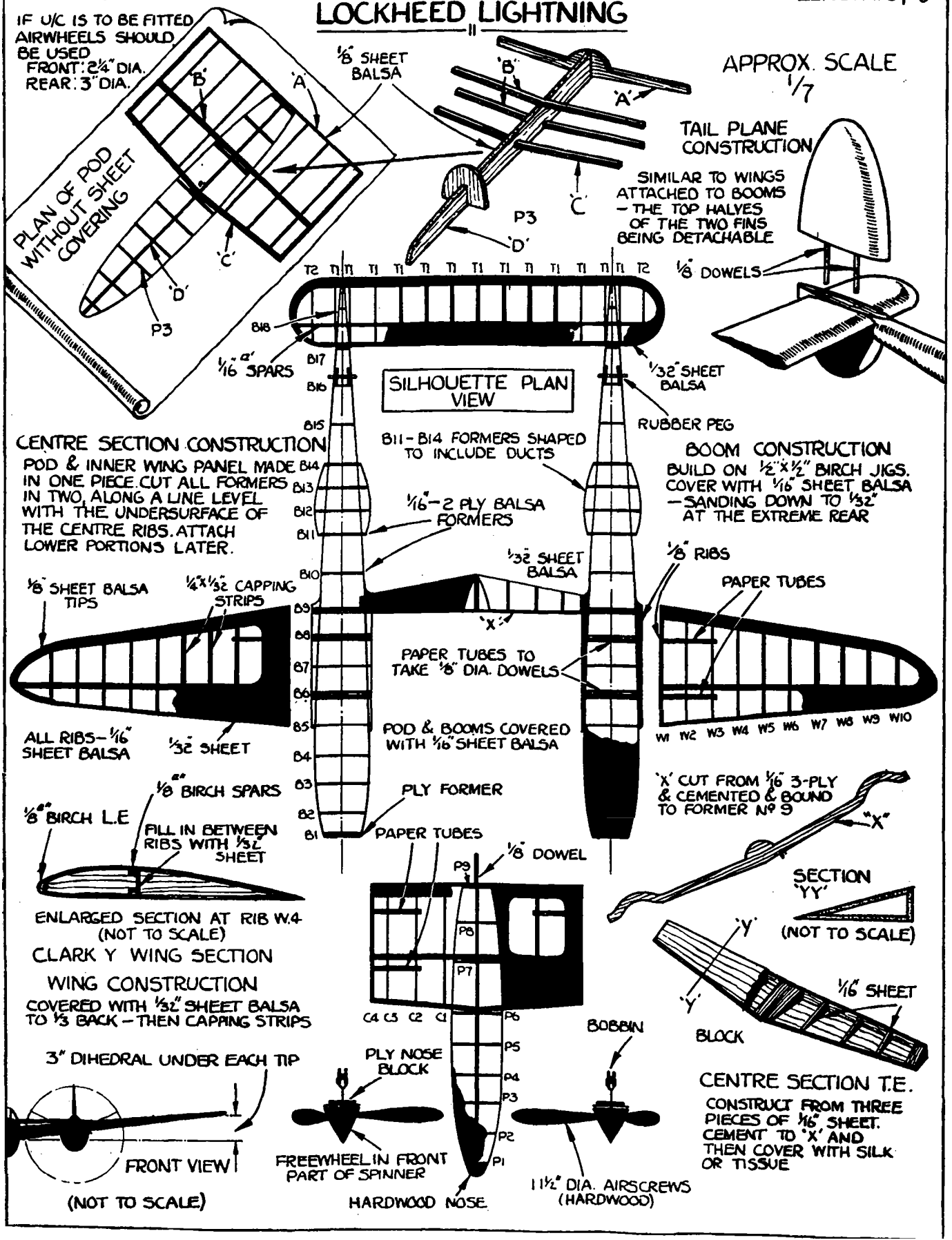
The remaining structural points are, I think, covered by the plan. I trust that this will be the means of arousing some interest in the "Lightning" as a flying scale job, and that as a result at least one photo of a model of this type will make its appearance in a future AERO MODELLER.

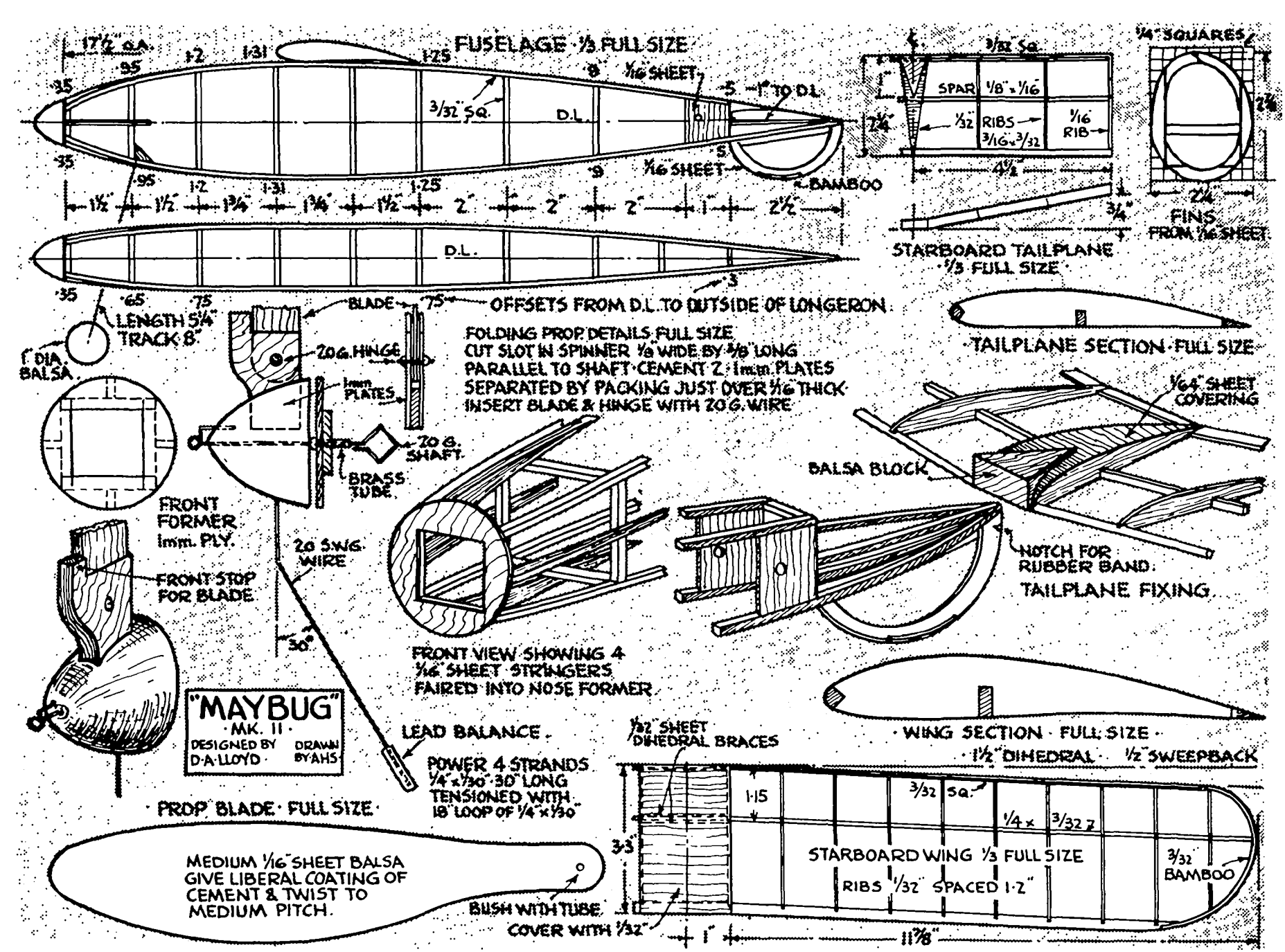
Another aeroplane of this type that should make a successful flying scale model is the F.W. 189.

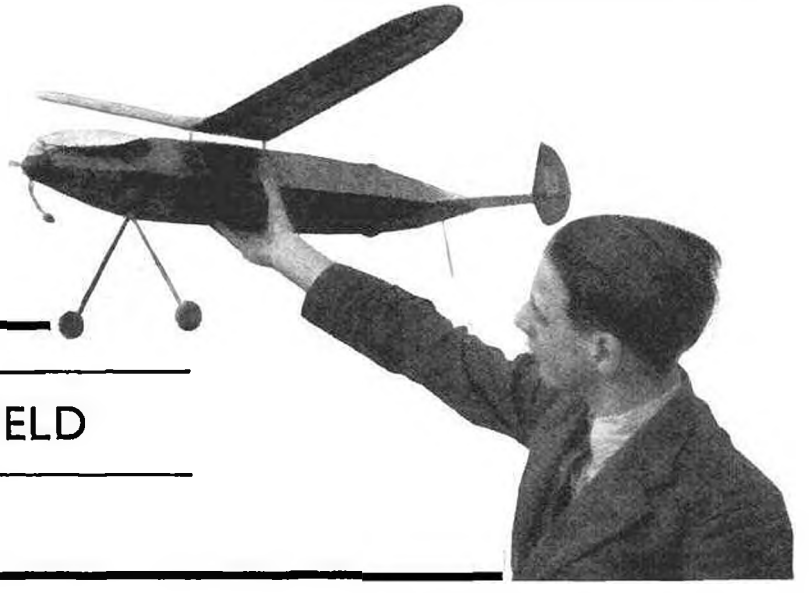
DESIGN FEATURES OF A 1" TO THE 1' LOCKHEED LIGHTNING

SPAN: 52" LENGTH: 37 5/16"

APPROX. SCALE 1/7




FUSELAGE · ⅓ FULL SIZE
17½" O.A.
·95
1·2
1·31
1·75
·8
1/16 SHEET
·5
1" TO D.L.
3/32 SQ.
D.L.
·35
·95
1·2
1·31
1·25
·9
1/16 SHEET
·5
BAMBOO
1½
1½
1¾
1¾
1½
2"
2"
2"
1"
2½
D.L.
·35
·65
·75
·3
OFFSETS FROM D.L. TO OUTSIDE OF LONGERON
3/32 Sq.
1"
2¼"
SPAR 1/8" × 1/16"
1/32" RIBS 3/16" × 3/32"
1/16" RIB
4½"
3¼"
STARBOARD TAILPLANE
· ⅓ FULL SIZE ·
¼" SQUARES
2¼"
2¼"
FINS
FROM 1/16" SHEET
1" DIA. BALSA
LENGTH 5¼"
TRACK 8"
BLADE
·75
20 G. HINGE
1mm PLATES
20 G. SHAFT
BRASS TUBE
FOLDING PROP DETAILS FULL SIZE
CUT SLOT IN SPINNER ⅛" WIDE BY ⅜" LONG
PARALLEL TO SHAFT · CEMENT 2 · 1m.m. PLATES
SEPARATED BY PACKING JUST OVER 1/16 THICK
INSERT BLADE & HINGE WITH 20 G. WIRE
· TAILPLANE SECTION · FULL SIZE ·
1/64" SHEET COVERING
BALSA BLOCK
NOTCH FOR RUBBER BAND
TAILPLANE FIXING
FRONT FORMER 1mm. PLY.
FRONT STOP FOR BLADE
20 S.W.G. WIRE
30"
FRONT VIEW SHOWING 4 1/16" SHEET STRINGERS FAIRED INTO NOSE FORMER
"MAYBUG"
· MK. II ·
DESIGNED BY D·A·LLOYD
DRAWN BY A.H.S.
LEAD BALANCE
POWER 4 STRANDS ¼" × 1/30" · 30" LONG TENSIONED WITH 18" LOOP OF ¼" × 1/30"
· WING SECTION · FULL SIZE ·
· 1½" DIHEDRAL · ½" SWEEPBACK
· PROP BLADE · FULL SIZE ·
MEDIUM 1/16" SHEET BALSA
GIVE LIBERAL COATING OF CEMENT & TWIST TO MEDIUM PITCH.
BUSH WITH TUBE
COVER WITH 1/32"
1/32" SHEET DIHEDRAL BRACES
1·15
3/32 Sq.
¼ × 3/32
STARBOARD WING ⅓ FULL SIZE
RIBS 1/32" SPACED 1·2"
3/32 BAMBOO
3·3
1"
11⅞"



PEGASUS

A UTILITY WAKEFIELD

By A. BURNS

Although not a pretty model, "Pegasus" more than makes up for its appearance by turning in consistent flights of 3½ minutes. This class of performance from a "flying horse-box," is the best recommendation we could give our readers. Also, the construction involved is very economical with regard to balsa—which is another good reason why the prospective Wakefield builder should make this model his choice for the coming season.

When we came to decide what to build for the 1942 season, the author and some of the members of the Stewarton M.A.C. had a talk in the clubroom, and decided that we would have to go in for a type of model which would entail the minimum of work in building, and be easy to keep in flying condition. We had less time to spend on the construction than ever before, and the bottom of the balsa boxes was well in sight, so we had reluctantly to agree that we could not go in for streamlining and would have to concentrate on making the best of a square type. We had a few ideas on the "crash-proofing" of models, and the snags we had struck in flying our former jobs were all reviewed and cures decided on. These are detailed later.

When the rough outline had been settled and the plans were drawn, we were horrified at the shape of the fuselage, and it was only when we saw the first one in the air that the club stopped heaping insults on the designer. Such remarks as "Flying Horsebox" and "Streamlined like a tramcar" were all too common; but the performance of the model belies them. In fact the one built by the author has flown all through the season in weather worse than anything we have experienced yet, and over all the timed flights it has an average of 3 minutes 30 secs., on our own ground. The best flights were two of 8 minutes 3 secs. and 10 minutes 14 secs. in the Weston Cup, the only day of good conditions we had, but the flight of 3.55 in the National Cup in a gale, was the most convincing proof of the worth of our attempts at "Crash-proofing." On that occasion two of the other models were destroyed completely by the wind, but the two Peggies both were undamaged, although the wind broke the safety device in my wings three times, and Charley Ewart's twice. We took a liking to the models after that.

The peculiar thing about these models is that they glide nose into wind in gusty weather, and are in sight much longer than normal as a result. We think this is due to the fuselage shape and the side area at the nose being small when the prop is folded.

The wings are built with a spar of hard ¼" square top and bottom, and in the centre bay these are made into boxes by adding sides of balsa or thin ply. When these are hard, the centre rib is cut to allow a Vee-piece of ¼" ply to be plugged into each half, to join them and set the dihedral. If hard stuff is used for the spars and the ply is of ordinary tea-box quality the wings will be a little stronger than the Vee-piece, and when the model is struck by a gust, when in your hand, or if it turns over on landing, the Vee-piece will break with a bang, and can be drawn out and replaced in a few seconds. These Vee-pieces are used up quite fast, so make a dozen at a time. The wings are easy to build and call for no other comment, except that if you must use softer wood for the spars, it would be advisable to add a web of 1/32" sheet from the centre half-way to the tips. To keep the top true to the section, the upper spar is set below the surface 1/16" and the small spaces in the ribs filled up with scraps.

The fuselage is a simple box, faired to a round nose, and to allow ampe room for the rubber this front former is wound from pine, and after it is in place the front spacers are cut away. The under-carriage parts must be added before the other formers are put in place, and as this is an unusual type, care is needed to get it right. The idea was that the spring type, as used in Pete, was liable to spread under the weight of a Wakefield, so we put it in at the bottom corner instead of at the side, and allowed the top of the leg to rest against the side of the fuselage, where there is a plate of sheet for

the other leg. Thus the legs can move backwards easily, but cannot spread. The snag is that the legs must cross, and that means that one goes into the fuselage well ahead of the other, so that they would be raked in opposite directions if the holes for the rubber bands were in the same place. To get the wheels level with one another, the band which springs the forward leg must come through a hole much further ahead of the corresponding one for the rear leg. This sounds very complicated, but a glance at the plan will make it clear. To prevent the legs jamming in the holes, these must be wider at the inside than in the outside, and it is a good idea to make them a firm fit for width, but an easy fit for length. The fit for width is needed to keep the legs from turning, thus allowing the wheels to be out of track. The tail skid is a very important member of the undercart. By careful experiment with the length of this we succeeded in reducing the take-off run from 3 feet to 2 inches in a flat calm.

Apart from the under-carriage fixings and their facings of thin ply, the fuselage calls for little comment. The tail peg runs through two pieces of $\frac{1}{8}$" sheet near the centre of the fuselage, which serve to centre the bobbin in the wide space, and also to stiffen the rear of the fuselage against collapse from torque. These must be well fitted and cemented. The sheet in the way of the wing mount is important, so do not omit it.

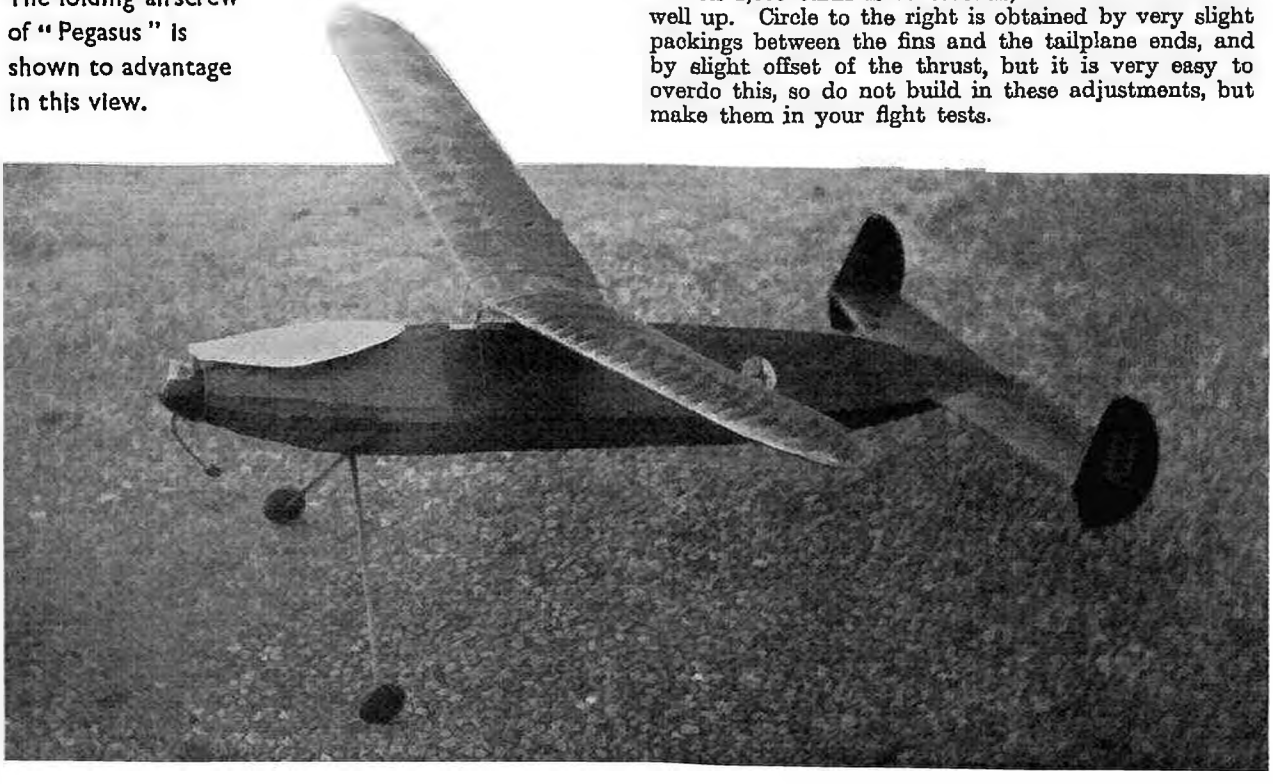
The tail unit uses an arrangement published in *Gadget Review*, and consisting of a box spar through which a band of four strands of microfilm rubber is stretched, with the fins hooked on to each end. The fins do not wobble in flight, if they have their area fairly divided above and below the hooks. These hooks must not be too long or they will break the spar when knocked out. The tailplane is built of outlines for ribs, the flat lower parts being assembled with the L.E. and T.E., then the spar cemented in place, and the tops added last. The end ribs are double to resist the pull of doped tissue.

The prop is a single blader of normal folding type. Take care that the pitch is not any greater than the amount stated, as the performance depends on this, and any increase will cut down the climb. The amount of downthrust needed will depend on the weight of the folding blade, and is none with a normal one and about 2 degrees with a very light type. A heavy blade is to be avoided, and holes may be cut in the blade, and then covered with tissue, if hard balsa is to be used.

The original model was doped on a scale suitable for our weather in these parts, and is heavy in consequence, being close on 9 ounces, but it should be possible to come down to $8\frac{1}{4}$ with care, when the performance will be better than the original, which in still air has a time of $2\frac{3}{4}$ minutes on 90% turns. The motor of ten strands of $\frac{1}{4}$ by 1/24th, or 18 of $\frac{3}{16}$ by $\frac{1}{32}$, should not be exceeded. If your model will not climb on that power then the prop is probably wrong.

Some experiments were made with this model to get the best rigging angles, and these are shown on the plan. The measurement of the distance between the lower surface of the centre rib and the top longeron is $\frac{3}{32}$ more than the same distance at the trailing edge. The first is best found by putting a thin ruler through the space between the wing halves which can be slightly parted for this purpose. If the glide is rather inclined to a dive, the tail can be given a very slight negative angle. The climb is adjusted by the thrust line, and probably no downthrust will be needed. The power run on 1,075 turns is 75 seconds, and takes the model well up. Circle to the right is obtained by very slight packings between the fins and the tailplane ends, and by slight offset of the thrust, but it is very easy to overdo this, so do not build in these adjustments, but make them in your flight tests.

The folding airscrew of "Pegasus" is shown to advantage in this view.



PEGASUS

DESIGNED BY
R·BURNS.

FUSELAGE ELEVATION · ⅓ FULL SIZE ·

WING L.E. POSITION

SPRING TENSIONER
DOWNTHRUST
0° 1° AS NEEDED.

DOUBLE HOOK

⅛" SHEET

C.G. APPROX.

8 M/M PLY

⅛" PLY

1/16 SHEET BETWEEN STRINGERS

⅛" SHEET

1/16" SHEET.

PAPER TUBE

1/16 SHEET

HOOK 24 S.W.G.

5 O.A. CANE SKID ⅛ DIA. TRY VARIOUS LENGTHS

¼" ⅛ 1/4 x 1/8 OVAL

3/8" x ⅛" TAPER TO 5/16 x 3/32

2¾" 9⅛"

U/C LEGS

18 G. AXLE AT 45° TILT.

F1 · 4 OFF 1/16" SHEET

F2 · 4 OFF

FULL SIZE NOSE FORMERS ·

LONGERONS & SPACERS ⅛" SQ.

FORMER 'X' · F1 F2

STRINGERS 1/16 x ⅛

CORNERS STRENGTHENED BY ⅛ x 1/16 STRIPS

BASIC FUSELAGE SIDE ·

SPACERS 2" APART.

1/16 SHEET

1¾" 2" 3¼"

.75" 1·375 1·8" 1·8" 1·65" 1·4" 1·0"

.33"

THIS SPACER IS REMOVED AFTER FORMER 'X' IS ADDED

WHEELS 1⅞" DIA. ⅜" THICK · OVAL SECTION.

FORMER 'X' · FULL SIZE ·

⅛ x 1/30 PINE [NOT BALSA] WIND ON ⅛" BALSA CIRCLE & USE THIS AS PLUG

CUT & GLUE A 'KEY' SEGMENT

PROP · SINGLE BLADE FOLDING TYPE · 9" RADIUS · 22" GEOM. PITCH · 2 BLADE · CARVE FROM BLOCK 2¾ x 1⅛"

DIHEDRAL SAFETY PLUG · FULL SIZE · FROM ⅛" "TEABOX" PLY.

OFFSETS FROM C.L. TO OUTSIDE OF LONGERON.

5⅜" 3½" 3½" 140° 150° 93° 93° ⅜ ⅜ ⅛" ⅛"

4 BRACES 24 S.W.G.

18 S.W.G.

WING MOUNT DETAIL
BIND & SOLDER ALL JOINTS
ADJUST ANGLE BY RESOLDERING BRACING WIRES.

1/16" SHEET

⅛" SQ. BRACE

2¾"

5" 2⅜" HOOK

1/16 SQ

1¾"

DOUBLE RIBS

1⅛"

⅛" SQ.

5/16 x ⅛

8½"

DOUBLE RIBS

3½"

PLUGS

4 STRANDS OF MICROFIL RUBBER THROUGH SPARS HOLDS FINS · STRETCH TO 3 OR 4 TIMES NORMAL.

PORT TAILPLANE · ⅓ FULL SIZE ·

TAILPLANE ROOT RIBS · FULL SIZE ·
RIB OUTLINES 1/16" SHEET · INDOOR STYLE ·
BOX SPAR FROM 1/32" SHEET.

LIGHTEN ALL RIBS EXCEPT ROOT RIBS

SPAR 1/16 BELOW WING SURFACE FILL GAPS WITH CHIPS OF 1/16" SQ.

POWER · 10 STRANDS ¼ x 1/24" 55" LONG · MAX. TURNS USED 1075. OR 18 STRANDS 3/16 x 1/30 1000 TURNS.

1" 9/16" 15/32

ROOT RIB · FULL SIZE · SECTION R.A.F. 32.

RIGGING MEASUREMENTS FROM TOP LONGERON

· WING AREA · 208·8 SQ.INS.

¼" SWEEPBACK.

½ RIBS · 1/32" SHEET

L.E. ⅛" SQ.

⅛" x 1/16" TOP & BOTTOM

1½" 3" 1¾" 5½"

HARD ⅛" SQ SPARS

1/16" RIBS SPACED 2"

⅛" SHEET SIDES

⅛"

CANE LOCATING PLUGS.

½" SQUARES

5/16" x ⅛" TAPER TO 7/16 x ⅛ AT ROOT

22"

⅛" x 1/16" TOP & BOTTOM.

· PORT WING · ⅓ FULL SIZE ·

TILT ROOT RIB 10° FOR DIHEDRAL.

WEIGHTS.	
PROP & NOSEPIECE ...	1·25
UNDERCARRIAGE ...	·55
WINGS ...	1·38
WING MOUNT ...	·35
TAIL UNIT ...	·55
FUSELAGE & SKID ..	1·72
	5·80
RUBBER & BOBBINS ..	3·10
TOTAL	8·90 ozs.

⅛" SQ. 1/16 x ⅛" 1¼" 1/16 DIA. BAMBOO 3" 1/16" SHEET OR WOUND 2¼" ¼" SQUARES. 1" 2½"

TAILPLANE AREA 67½ SQ.INS.

· FINS · 2 OFF ·

THE CASE FOR THE TRICYCLE

BELL AIRACOBRA I.

CONSOLIDATED CATALINA III.

THE last two or three years have seen an ever-increasing trend toward the tricycle type of undercarriage, both on fighter and bomber aircraft. So far, this method of tackling the increasingly difficult problem of take-off and landing has been mainly used in the U.S.A. Most of the larger aircraft concerns, such as Douglas, Bell and Lockheed, already have military machines embodying this feature in large scale production. Many people were inclined to regard the "tricycle" as a rather freakish alternative to the conventional type of undercart when it made its first appearance in this country. In fact, General Aircraft are the only company in England to adopt the "tricycle" so far. The "Cygnet," a normal two-wheel light 'plane, was redesigned and a third wheel added. This machine, by the way, is a side-by-side two-seater, twin-finned, low-wing monoplane, using either a Gypsy Major 130 h.p. or a Cirrus Major 150 h.p. engine. A military version of this machine is the "Owlet," the main difference being the blunter wing tips and the open tandem cockpits in the latter. Instructions for building flying models of both machines have already appeared in THE AERO-MODELLER.

There are several reasons for using a "tricycle" undercarriage on a model. The first of these is that a much steadier take-off can be obtained—sudden swerving to either side in gusty weather being eliminated, as the front contact with the ground keeps the tail from being buffeted from side to side.

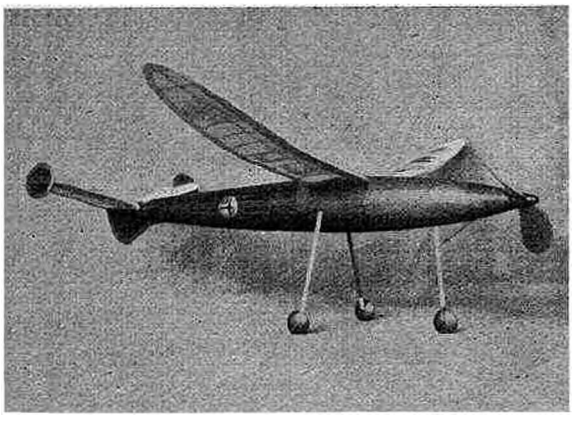
Secondly, perfectly good take-off can be made across or down wind, a procedure which is as safe as jumping on your model, if attempted with the usual landing gear. Thirdly, much neater and safer landings are experienced, there being no tendency to turn over if a rough patch is struck. Petrol fans will no doubt appreciate this, as a tip-over with a powered model, usually doesn't improve the engine or tailplane.

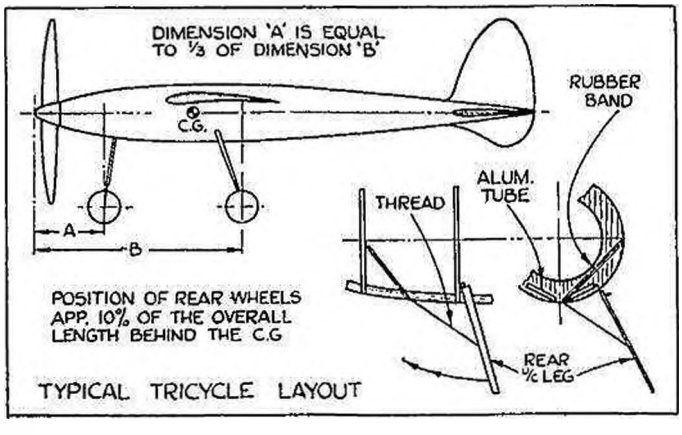
So much for the advantages. Drawback No. 1 is obviously increased weight, whilst No. 2 is our old enemy—drag. The latter can be eliminated, at the cost of adding still more weight, by making all three legs retractable. But this is easier said than done, as making an efficient retractable tricycle undercarriage is now by no means an easy task. Then again, the airscrew will have to take some hard knocks, unless one of the folding variety is used.

Bearing this in mind, the best arrangement for a duration model seems to be a fixed nose wheel; the usual retracting method only being used for the remaining two. The single wheel should not present much drag on its own, and should succeed in helping the model to make a landing of sorts.

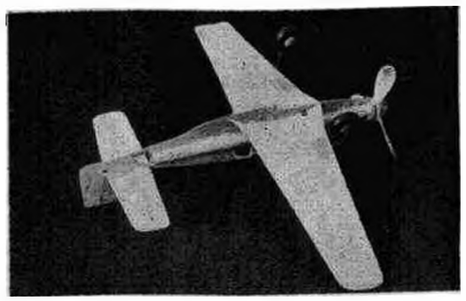
The accompanying photographs of full-size machines show clearly the general layout of most tricycles.

It will be interesting to see if many "tricycle" models make their appearance this year. Perhaps other modellers have already tried "tricycles"—if so, let us hear from them with regard to their success or otherwise in this field.

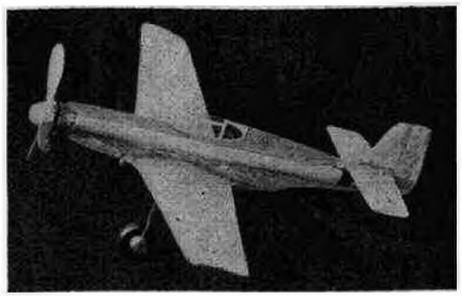




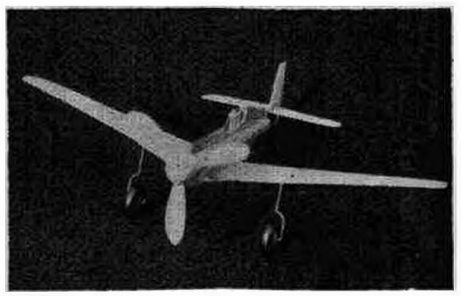
SILHOUETTE MUSTANG



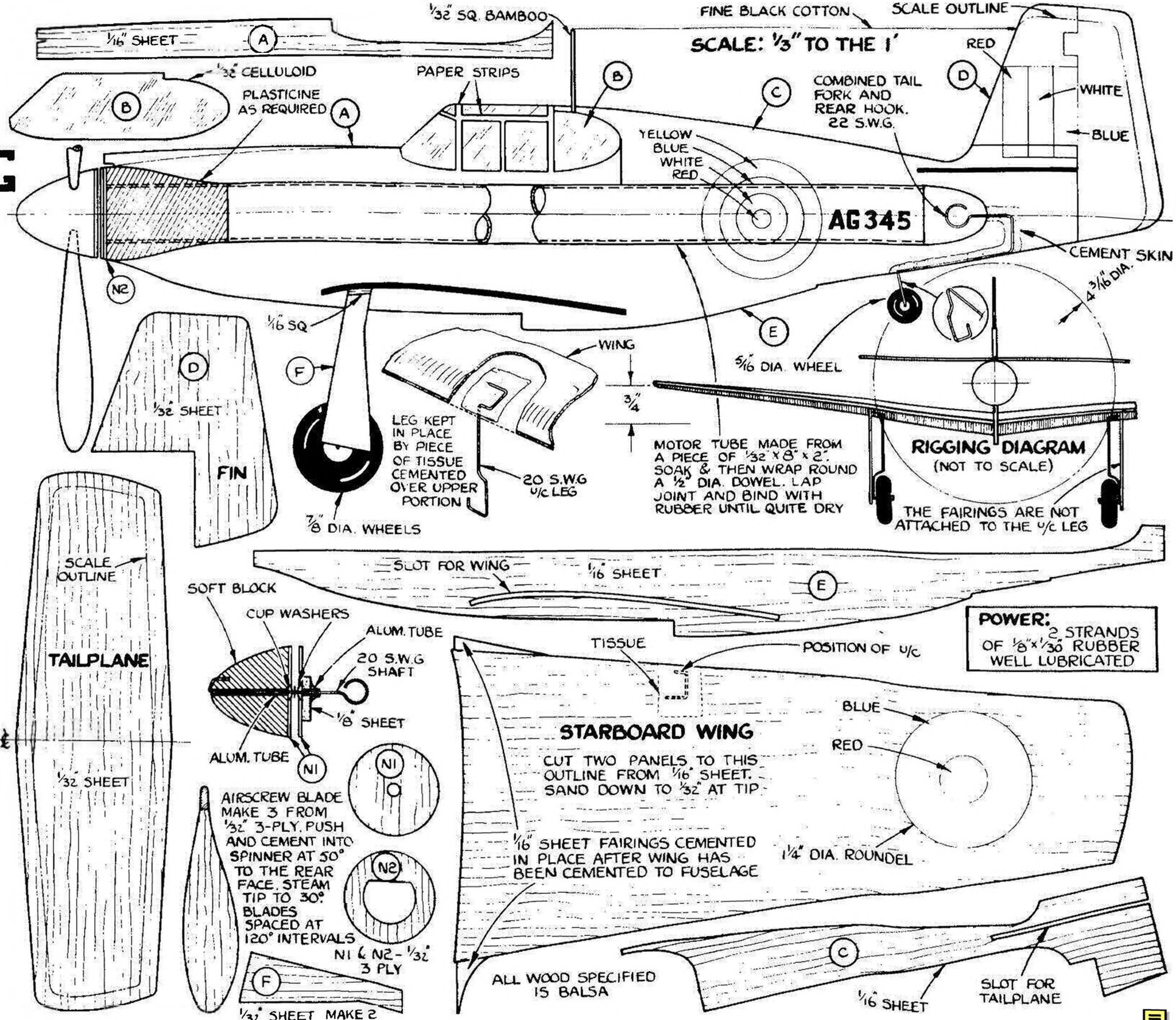
IF DESIRED, THE U/C & TAIL WHEEL CAN BE OMITTED SO AS TO INCREASE THE FLYING PERFORMANCE

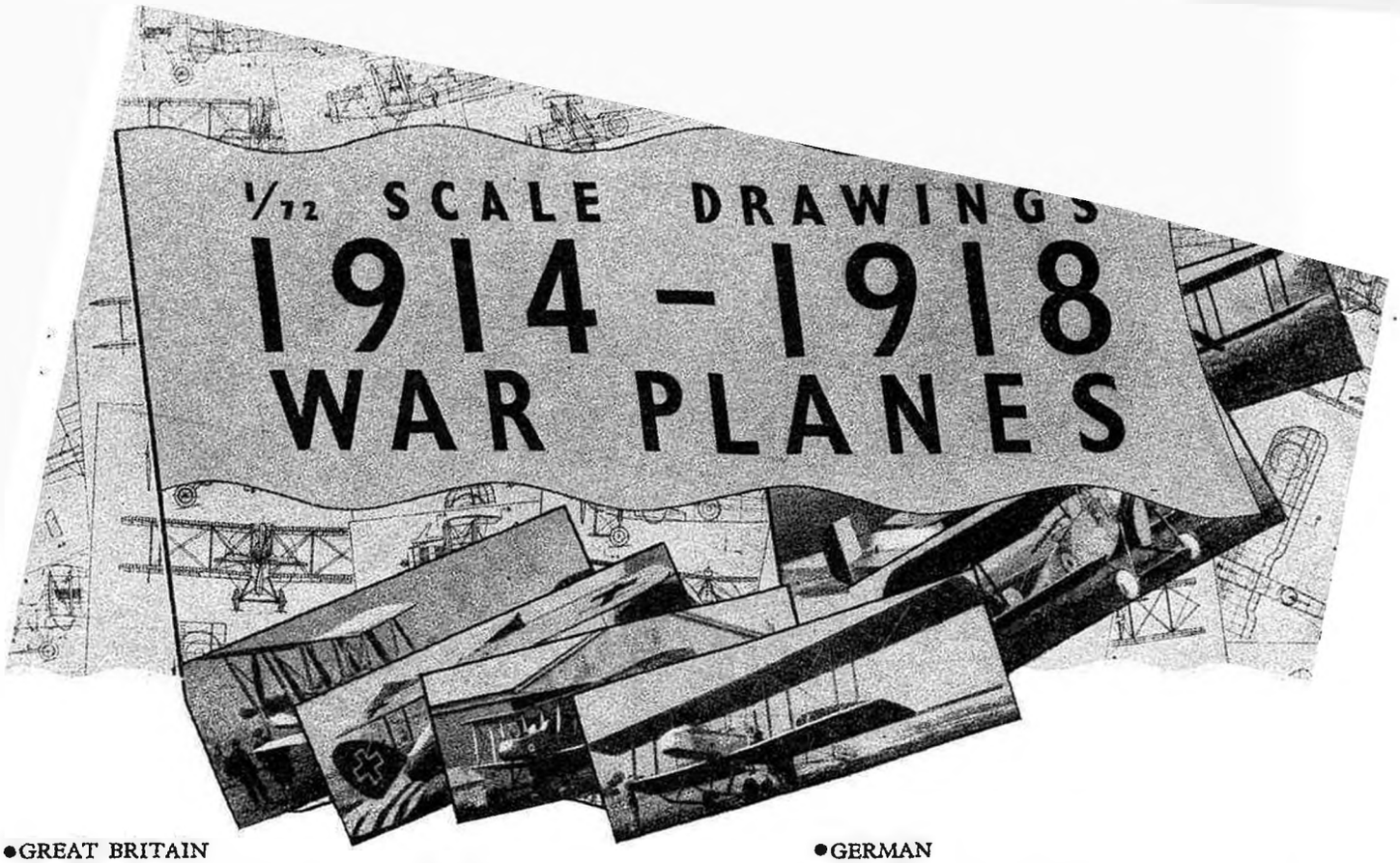


THE TAIL SURFACES ARE MADE FROM FAIRLY SOFT SHEET TO ALLOW THEM TO BE BENT FOR TRIMMING PURPOSES



THE MARKINGS AND ROUNDELS SHOULD ONLY BE APPLIED IF THE MODEL IS INTENDED FOR NON FLYING USE





•GREAT BRITAIN

Plan	Photo	
A/108	P/137	Armstrong Whitworth F.K.8
A/104	P/150	Avro 504K
A/106	P/144	B.E. 2C and 2D
A/114	P/159	B.E.2B
A/114	P/171	B.E.2E
A/90	P/159	B.E.12
B/47	P/151	Blackburn Kangaroo
A/87	P/152	Bristol Bullet (D Scout)
A/103	P/152	Bristol F2B Fighter
A/87	P/136	Bristol Monoplane
A/101	P/140	de Havilland 1a
A/100	P/139	de Havilland 2
A/100	P/162	de Havilland D.H.
A/99	P/138	de Havilland 5
A/99	P/140	de Havilland 6
A/98	P/139	de Havilland 9
A/98	P/138	de Havilland 9a
B/44	P/154	de Havilland 10
A/89	P/156	F.E. 2B and 2D
A/90	P/157	F.E.8
B/46	P/170	Handley-Page 0/400
B/46	P/170	Handley-Page V/1500
A/95	P/151	Martinsyde Elephant G100
A/95	P/149	Martinsyde Buzzard F.4
A/104	P/136	R.E.8
A/110	P/145	S.E.5a
B/44	P/162	Short 2NB
A/113	P/148	Sopwith Pup
A/113	P/148	Sopwith Baby
A/91	P/146	Sopwith Camel F.1
A/103	P/146	Sopwith Dolphin
A/110	P/147	Sopwith 1½ Strutter
A/112	P/154	Sopwith Snipe
A/91	P/147	Sopwith Tabloid
A/109	P/144	Sopwith Triplane
A/89	P/158	Vickers F.B.5 and F.B.9 Gunbus

•FRANCE

Plan	Photo	
A/102	P/149	Breguet 14 A-2
A/101	P/137	Maurice Farman Shorthorn
A/94	P/145	Nieuport 17 C-1
A/94	P/163	Nieuport 28 C-1
A/112	P/157	Nieuport 2 Seater
A/92	P/150	Spad S.VII
A/115	P/171	Spad 112

•GERMAN

Plan	Photo	
B/45	P/164	A.E.G. G105
A/107	P/153	Albatross C.III
A/107	P/164	Albatross D.I
A/109	P/153	Albatross D.III
A/105	P/143	D.F.W Aviatik C.V
A/88	P/165	Fokker Monoplane
A/97	P/165	Fokker D.VI
A/97	P/142	Fokker D.VII
A/88	P/142	Fokker Dr.1 Triplane
B/45	P/155	Friedrichshafen G.III
B/47	P/169	Gotha Go.5
A/96	P/166	Halberstadt D.
A/111	P/158	Halberstadt C.L.II
A/96	P/166	Halberstadt C.L,IV
A/108	P/163	Hanoverana C.L.III
A/115	P/172	Junkers J.1
A/102	P/167	L.V.G. C.V
A/111	P/167	L.V.G. D.IX
A/93	P/141	Pfalz D.III
A/93	P/168	Pfalz D.XII
A/92	P/168	Roland D.II
A/105	P/155	Rumpler C.V.

•ITALY

A/106	P/143	Ansaldo S.V.A

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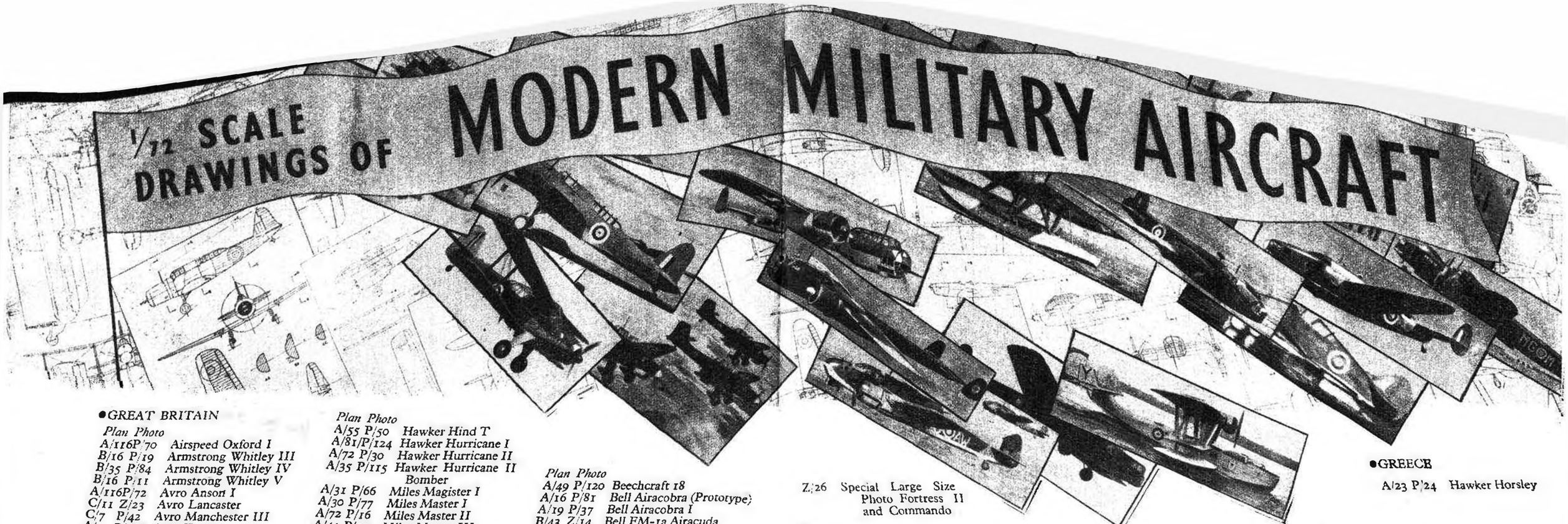

●GREAT BRITAIN

Plan	Photo	
A/116	P/70	Airspeed Oxford I
B/16	P/19	Armstrong Whitley III
B/35	P/84	Armstrong Whitley IV
B/16	P/11	Armstrong Whitley V
A/116	P/72	Avro Anson I
C/11	Z/23	Avro Lancaster
C/7	P/42	Avro Manchester III
A/9	P/169	Avro Tutor
B/15	P/40	Blackburn Botha I
A/63	P/80	Blackburn Roc I
A/84	P/79	Blackburn Skua II
A/32	P/123	Boulton-Paul Defiant I
A/75	P/18	Bristol Beaufighter I
A/38	P/98	Bristol Beaufighter II
B/35	P/83	Bristol Beaufort I
B/34	P/20	Bristol Beaufort II
B/39	P/125	Bristol Blenheim I & IV
A/75	P/41	Bristol Blenheim IVF & IVL
C/7	P/67	Bristol Bombay I
A/67	P/5	British Taylorcraft D
A/26	P/23	de Havilland Dominie I
B/19	P/64	de Havilland Hertford I
A/56	P/160	de Havilland Hornet Moth
A/13	P/120	de Havilland Mosquito IV
A/28	P/65	de Havilland Tiger Moth II
B/38	P/15	de Havilland D.H. 86B
A/20	P/71	Fairey Albacore I
A/69	P/67	Fairey Battle I
A/27	P/29	Fairey Battle (T)
A/82	P/82	Fairey Fulmar I
A/29	P/73	Fairey Seafox I
A/16	P/73	Fairey Swordfish I
A/85	P/121	General Aircraft Hotspur II
A/67	P/14	General Aircraft Owlet
A/57	P/127	Gloster F5/34
A/81	P/63	Gloster Gladiator II
B/15	P/46	Handley-Page Hampden I & Hereford I
C/6	P/43	Handley-Page Halifax II
A/56	P/131	Hawker Hector
A/54	P/127	Hawker Henley I
A/55	P/50	Hawker Hind T
A/81	P/124	Hawker Hurricane I
A/72	P/30	Hawker Hurricane II
A/35	P/115	Hawker Hurricane II Bomber
A/31	P/66	Miles Magister I
A/30	P/77	Miles Master I
A/72	P/16	Miles Master II
A/44	P/115	Miles Master III
A/27	P/12	Miles Mentor I
A/117	P/173	Miles M-28
A/22	P/8	Percival Q6 Petrel
A/22	P/21	Percival Proctor I
A/30	P/117	Reid & Sigrist Snargasher
B/31	P/66	Saro Lerwick I
B/13	P/72	Saro London II
C/6	P/43	Short Stirling I
C/8	P/87	Short Sunderland I
B/19	P/69	Supermarine Stranraer I
A/1	P/160	Supermarine S.4
A/1	Z/1	Supermarine S.5
A/2	Z/1	Supermarine S.6
A/2	Z/1	Supermarine S.6.B
A/68	P/86	Vickers Armstrongs Spitfire II
A/73	P/18	Vickers Armstrongs Spitfire III & V
A/31	P/68	Vickers Armstrongs Wellesley I
A/14	P/16	Vickers Armstrongs Wellesley II
B/39	P/86	Vickers Armstrongs Wellington Ia
B/34	P/20	Vickers Armstrongs Wellington II & III
A/28	P/71	Vickers Armstrongs Walrus II
A/68	P/80	Westland Lysander II
A/69	Z/5	Westland Whirlwind I

●AMERICAN

Plan	Photo	
A/48	P/101	Aeronca L-58B Defender
A/70	P/102	Beechcraft C-43
A/49	P/120	Beechcraft 18
A/16	P/81	Bell Airacobra (Prototype)
A/19	P/37	Bell Airacobra I
B/43	Z/14	Bell FM-1a Airacuda
C/10	P/28	Boeing Fortress I
C/11	Z/4	Boeing Fortress II (B-17E)
A/83	P/112	Brewster Bermuda I
A/84	P/124	Brewster Buffalo I
A/64	P/3	Cessna Crane I
C/3	P/83	Consolidated 28-5
C/10	P/42	Consolidated Catalina I
C/5	P/28	Consolidated Liberator I
C/1	Z/2	Consolidated PB2Y-3 Coronado
B/30	P/126	Curtiss A 18
A/61	P/74	Curtiss Cleveland I
A/60	P/130	Curtiss C.W. 21
C/1	Z/18	Curtiss C-46 Commando
A/15	P/65	Curtiss 75a Hawk
A/82	P/118	Curtiss P-40E Kittyhawk II & P-40F Warhawk I
A/73	P/32	Curtiss Mohawk IV
A/83	P/108	Curtiss SB2C-1 Helldiver I
A/47	P/111	Curtiss O-52 Owl I
A/53	P/132	Curtiss SOC-1 Seagull
A/53	P/132	Curtiss 503C-1 Seagull I
A/32	P/44	Curtiss Tomahawk I
A/17	P/38	Curtiss Tomahawk II
A/62	P/128	Curtiss YP.37
B/11	P/44	Douglas Boston II D.B.7
B/10	P/36	Douglas Boston III & Havoc II
B/9	P/74	Douglas B.18a Digby
B/27	Z/22	Douglas D.C.2 (C-33)
B/20	Z/19	Douglas D.C.3 (C-47 Dakota)
C/2	Z/24	Douglas D.C.4 (C-54)
B/10	P/29	Douglas Havoc I
Z/26		Special Large Size Photo Fortress II and Commando
A/33	P/110	Douglas SBD-3 Dauntless III
A/55	P/48	Northrop 8a Nomad I
A/33	P/110	Douglas TBD-1 Devastator I
A/61	P/133	Fairchild Argus I (C.61)
A/13	P/161	Grumman TBF-1 Avenger
A/57	P/128	Grumman F2F-1
A/40	P/97	Grumman Goose (OA-19)
A/40	P/97	Grumman Gosling I (J4F-1)
A/43	P/113	Grumman J2F-4
A/17	P/11	Grumman Martlet I
A/15	P/117	Grumman Skyrocket
A/46	P/95	Lockheed 12 (C-40)
B/11	P/85	Lockheed Hudson II
B/36	P/10	Lockheed Hudson V
A/71	P/122	Lockheed 322-61 Lightning
B/23	P/134	Lockheed-Vega Ventura I
B/36	P/37	Martin Baltimore I
B/43	Z/13	Martin B-26B Marauder
C/2	Z/15	Martin PBM-3Mariner III
B/14	P/78	Martin Maryland II
A/8	P/69	North American Harvard I
A/64	P/9	North American Harvard II
B/23	Z/17	North American B-25C Mitchell III
A/86	P/138	North American Mustang I
A/51	P/106	North American O-47B
A/59	P/131	North American N.A. 50
A/79	P/3	North American Yale I
A/79	P/1	Northrop N-3PB
A/51	P/116	Piper L-59a Patrol
A/86	P/33	Republic Lancer
A/42	P/114	Republic P-47B Thunderbolt
A/9	P/161	Ryan STM-S2
A/63	P/129	Seversky P.35
A/49	P/112	Taylorcraft L-57a
A/71	P/35	Vought-Sikorsky Chesapeake I
A/38	P/109	Vought-Sikorsky F4U-1 Corsair I
A/70	P/108	Vought-Sikorsky OS2U-3 Kingfisher
A/48	P/121	Vultee L-56 Sentinel
A/19	P/126	Vultee Vanguard
A/42	P/101	Vultee Vengeance I
A/44	P/102	Vultee Vigilant I (O-49)

●BELGIUM

A/3	P/53	Fairey Firefly II
A/3	P/53	Fairey Fox VI

●NETHERLANDS

B/7	P/68	Fokker G-1
B/7	P/57	Fokker T-8-W
A/6	P/60	Koolhoven FK.52
A/6	P/51	Koolhoven FK.58

●POLAND

B/9	P/64	P.Z.L Los
A/7	P/88	P.Z.L Mewa
A/10	P/58	P.Z.L P.24
A/7	P/54	P.Z.L Sum

●GREECE

A/23	P/24	Hawker Horsley

●GERMANY

Plan	Photo	
A/76	P/34	Arado Ar 95-See
A/76	P/6	Arado Ar 96B
A/74	P/4	Arado Ar 196
B/2	P/49	Blohm & Voss Ha 139
B/42	P/31	Blohm & Voss Ha 140
B/22	Z/7	Blohm & Voss Bv-141B
C/4	P/4	Blohm & Voss Bv 142
A/50	P/98	Bucker Bu 181 Bestmann
A/20	P/119	Bucker Bu 133 Jungmeister
A/18	P/59	Bucker Bu Jungmann
B/1	P/78	Dornier Do 17P
B/38	P/13	Dornier Do 17Z
B/1	P/76	Dornier Do 18K
B/3	P/77	Dornier Do 24
C/5	P/22	Dornier Do 26K
B/31	P/84	Dornier Do 215
B/22	Z/	Dornier Do 217E
A/21	P/39	Fieseler Fi 156 Storch
A/21	P/24	Fieseler Fi 167
B/3	P/52	Focke-Wulf Fw 58 Weihe
A/58	P/34	Focke-Wulf Fw 187
A/58	P/26	Focke-Wulf Fw 189
A/85	P/107	Focke-Wulf Fw 190 A3
C/8	P/123	Focke-Wulf Fw 200 Condor
C/9	P/122	Focke-Wulf Fw 200K Kurier
A/20	P/119	Gotha GO149
B/42	P/36	Heinkel He 59
A/77	P/19	Heinkel He 60
A/60	P/129	Heinkel He 112
A/18	P/88	Heinkel He 113
A/77	P/6	Heinkel He 114

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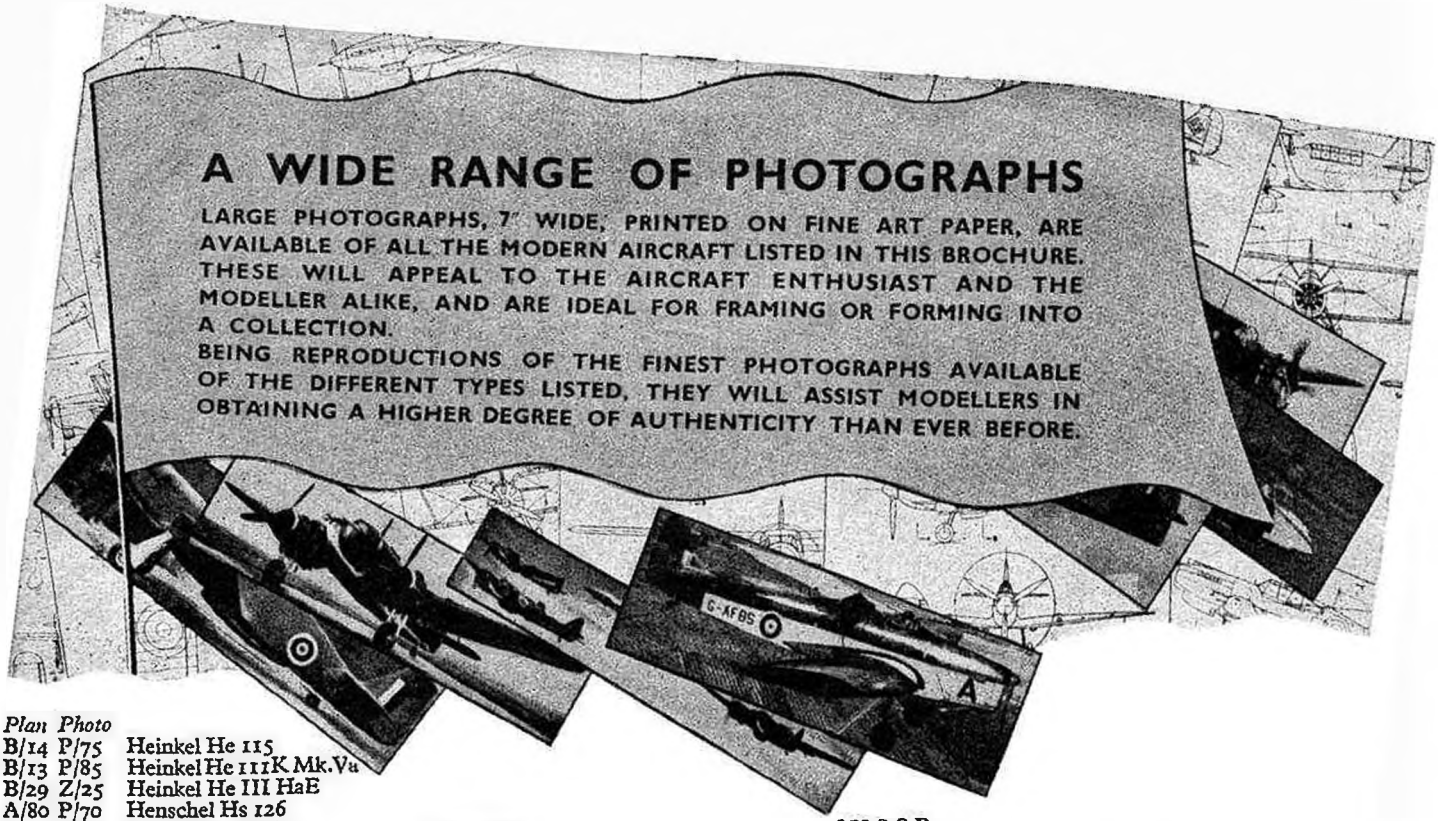

Plan	*Photo*	
B/14	P/75	Heinkel He 115
B/13	P/85	Heinkel He 111K Mk.Va
B/29	Z/25	Heinkel He III HaE
A/80	P/70	Henschel Hs 126
B/2	P/47	Junkers Ju 52/3M
B/18	P/75	Junkers Ju 86K
A/14	P/87	Junkers Ju 87B
B/12	P/81	Junkers Ju 88 A-1
B/29	Z/20	Junkers Ju 88 A-6
C/4	P/79	Junkers Ju 89K
A/50	P/105	Messerschmitt Me 108B Aldon
A/80	P/82	Messerschmitt Me 109E
A/74	P/32	Messerschmitt Me 109F
B/12	P/45	Messerschmitt Me 110 C-5
A/117	P/173	Messerschmitt 210 A-1

•ITALY

A/5	P/63	Breda 65
B/8	P/54	Breda 88 Lince
B/5	P/55	Cant Z501
B/5	P/51	Cant Z506B
B/40	P/17	Cant Z 1007 Alcione
B/33	P/41	Caproni Ca 133
B/33	P/2	Caproni Ca 135 bis
B/18	P/56	Caproni Ca 310 Libeccio
B/32	P/2	Caproni Ca 311 bis
B/32	P/5	Caproni Ca 312 bis
A/47	P/94	Caproni Ca 313
A/78	P/1	Caproni-Reggiane Re 2000 Falco I
A/52	P/100	Caproni-Reggiane Re 2001 Falco II
B/30	P/94	Fiat R.S. 14
B/8	P/61	Fiat B.R. 20 Cicogna
A/4	P/76	Fiat C.R 42 Freccia
A/4	P/48	Fiat G.50 Falco
A/5	P/49	Macchi C 200 Saetta I
A/52	P/104	Macchi C 202 Saetta II
B/40	P/17	Piaggio P 32 bis
C/3	P/93	Piaggio P 108B
B/4	P/50	Savoia-Marchetti S.M.79
B/4	P/55	Savoia-Marchetti S.M 79B
B/41	P/23	Savoia-Marchetti S.M 81.
B/41	P/12	Savoia-Marchetti S.M 82
B/27	P/93	Savoia-Marchetti S.M 94

•CANADA

Plan	*Photo*	
A/54	P/40	de Havilland 82C Tiger Moth
A/25	P/21	Fairchild M-62
A/66	P/27	Fleet Finch
A/66	P/27	Fleet Fort I
A/25	P/25	Noorduyn Norseman

•AUSTRALIA

A/65	P/25	Commonwealth Wirraway
A/65	P/8	de Havilland 94 Moth Minor

•FRANCE

B/6	P/52	Breguet 690-1
A/62	P/130	Bloch 151
A/59	P/126	Dewoitine D.510
A/8	P/56	Dewoitine D.520
B/17	P/9	Loire et Olivier 45-B-4
B/6	P/62	Potez 63
A/78	P/15	Potez 63-II

•JUGO-SLAVIA

A/24	P/7	Hawker Fury (Jugo-Slav)
A/24	P/14	Ikarus IK-2

•IRAQ

A/26	P/35	de Havilland 84a Dragon
A/23	P/39	Hawker Nisr

•U.S.S.R.

Plan	*Photo*	
B/25	Z/6	DB-3 & 3F (ZKB-26)
A/11	P/30	I-15 Chato
A/11	P/7	I-16 Rata
A/12	P/33	I-17
A/41	P/92	I-26 (Yak-1)
A/35	P/103	IL-2C (Stormovik)
B/25	Z/21	PE-2
B/24	P/135	MBR-2
A/12	P/31	R-10
B/17	P/22	SB-2 Katiuska
B/24	P/91	SB-RK
A/45	P/116	SU-2BB-1
C/9	P/13	TB-3
A/41	P/92	Yak-4 (BB-22)

•JAPAN

A/34	P/95	Kawasaki KB-97
B/20	P/90	Mitsubishi KB-96-I Otori
B/21	Z/3	Mitsubishi OB-96-4a
A/10	P/118	Mitsubishi Karigane II
A/37	P/96	Mitsubishi KB-86-Karigane IIM
B/21	Z/12	Mitsubishi OB-97
A/37	P/89	Mitsubishi S-00
A/34	P/99	Nakajima G-96
A/36	P/89	Nakajima S-96-2
A/36	P/96	Nakajima S-97

•NETHERLANDS EAST INDIES

A/43	P/111	Curtiss Wright C.W 21B
A/39	P/100	Fokker C-11-W
A/39	P/105	Fokker D-21
B/26	Z/10	Fokker T-4
B/26	Z/9	Fokker T-5
A/46	P/103	Lockheed 212a
B/28	Z/11	Martin 139
B/28	Z/16	Martin 166

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MY ENGINE

By LAWRENCE H. SPAREY

AT the present time model petrol engines seem to be very much "in the air," although, unfortunately, not in a literal sense. In preparation, however, for the not-far-distant time when our model flying fields will again resound to the enchanting buzz of model "gas" 'planes, I have drafted out a preliminary design for the engine I shall build myself when the happy day arrives.

By way of *bona fide,* it may be as well to say that I have designed and built a good many model engines over the course of a number of years. Some of them I count as successes, while a great many others were distinctly the reverse; in fact, if, as is supposed, one learns more from the failures than from the successes, my knowledge of these small engines should be pretty extensive.

Be that as it may, the present design is an attempt to weld together some of the features which I have found to be good, and although many builders of, perhaps, more experience than myself, will find much with which to disagree in the design, the fact remains that the features are not entirely speculative, but have been tried out on small engines at various times.

The chief point of criticism will be, I fancy, the rather heavy weight of the engine. Strange as it may sound, this is to me the least important feature, as my experience has shown me that other considerations far outweigh the question of weight. In fact, I am convinced that most of the troubles from which small petrol engines so notoriously suffer, are a direct outcome of the skimping process which excessive lightness must entail.

Let us take, for instance, the question of wear. I doubt whether many of us have really stopped to consider how short is the running life of a model petrol engine. At a high estimate I would put 50 running hours as the life of the average *good* engine; in fact, 20 hours would, in most cases, be nearer the mark; while many of the small, ultra-light jobs would be far below this. It is when an engine is worn out that most of the troubles begin. Worn crankshafts and bearings allow air to be drawn into the crankcase, thus weakening and upsetting the petrol mixture; worn cylinders and pistons destroy the compression and the crankcase suction; leakage occurs between the various engine ports; in short, one is left with the usual oily wreck that has done so much to render so remote the petrol 'plane enthusiast's chances of Heaven.

This preoccupation with weight is, I think, a legacy which more aeromodellers inherit from too much dabbling with the rubber-driven, duration model aeroplane. it has become for them an immutable law of the game, and when, therefore, they enter the sphere of the model petrol 'plane they do not realise that some different considrations may prevail. Happily, the desire to see our petrol aeroplanes wafted away in the thermals has not yet reached us from across the Atlantic. Our attention, therefore, may be directed to the building of stable machines, embodying the flying characteristics of the "real" aeroplane, rather than to the pursuit of petrol engined gliders. One of the finest power models which has ever graced our flying fields, and a winner of the Shelly Cup, weighed 8 lbs. The engine, without propellor, weighed 1 lb. 3 ozs! The beautiful take-off, steady flight, and the perfect landing of the aeroplane were a delight to watch.

Lest I be credited with having said more than I have written, I wish it to be understood that I have *not* said that weight is of no importance, and should, therefore, be neglected. What I do say, however, is that the weight question may be safely subordinated if it should interfere with more important considerations. The virtues which I demand from a model petrol engine may be put in numerical order, and would be somewhat as follows:—

1. Easy starting.
2. Reliability.
3. Long Life.

(Capacity about 6 c.c.)

4. Efficiency.
5. Weight.

Those of you with model engine experience will raise no question about the placing of the first requirement. An engine which will not start is an exasperation, and an infernal, humiliating nuisance which no one should be called upon to tolerate. Few, also, will disagree with point number two, as reliability is the essence of safe flying. Number three is really linked with the previous point, as an engine can only be reliable while it is functioning correctly.

Many will be surprised at the placing of efficiency so low upon the list. Efficiency has many interpretations, but in this instance I mean efficiency in the sense of high power output and high revolution rate. In spite of a lot of humbug talked to the contrary, small petrol engines for model aircraft need not be, and seldom are, of very high efficiency in the above sense. As compared with the small engines designed by a few enthusiasts for model boat racing, model aero engines make a poor showing. This is nothing to worry about, however. We do not race model petrol 'planes, nor do we require them to zoom up into the air like the proverbial rocket. Nothing is to be gained by overpowering any model petrol craft; rather the contrary, in fact. What we require is an engine with sufficient power to get our machine into the air, and fly it in a steady, controlled manner. Anything beyond this is superfluous. It may be argued that a larger model may be flown with a small, "hot-stuff" engine than may be flown with one not so efficient. What, I ask, are the peculiar advantages of flying a large model with a small engine, taking into consideration the short life and general "fussiness" of high-revolution, "hotted-up" engines? I have never discovered them.

Turning to my drawing of the proposed engine, I may state, at once, that this is by no means a finished design, and that it will receive some hours of "working over" before the first component is placed in the lathe. The main ideas are there, however, and may be readily seen in the drawing. It may be a good plan to enumerate the points of design in numerical order, but this time not in any particular order of virtue or efficiency.

1. *Dual Ignition.* Tests by myself and by others show that this is well worth the extra weight and complication of the electrical circuit. As the point was extremely well dealt with in this journal by another contributor any remarks of mine are unnecessary.

2. *Detachable Head.* The cylinder head, and all other castings shall be of electron metal, which is about two-thirds the weight of aluminium. I have used this metal in several engines, and can find no disadvantages whatsoever. Furthermore, the metal is most easy to machine. A detachable head is desirable as it facilitates inspection and cleaning. My drawing shows a detachable head clamped upon a cast iron cylinder liner which has fins turned in it for a small distance. This liner sinks into the crankcase casting, and the whole is clamped together by means of long bolts and nuts. The bolts pass through holes drilled in the liner fins. The use of *nuts* and *bolts* will be noted. Small screws which are threaded into aluminium alloys are anathema to me, as the thread usually strips out at the second attempt.

3. *Finning.* Short, thick fins are used to give but a moderate amount of radiating surface. Most small engines are overcooled, as the radiating surfaces are out of all proportion to the capacity of the cylinder. This is a prolific cause of oiled plugs.

4. *Piston.* This may be of aluminium alloy, in which case I require two cast iron piston rings. Alloy pistons require a relatively large working clearance, to allow for the large expansion factor of the metal. Rings are necessary, therefore, to obtain good compression for starting purposes when the engine is cold. Strictly speaking, I have a slight preference for a cast iron piston with no rings, which is made to a lap fit within the cylinder bore. Unless rings are made with watchmaking precision they are a snare and a delusion, and are far from being the cure-all which they are generally believed to be.

It will be noted that the gudgeon pin is held in a special fitting which bolts into the underside of the piston, so that the gudgeon pin does not protrude, in the usual manner, through the walls of the piston. The fitting is marked (5). This has been used to prevent the drilling of holes in the walls of the piston, which is a prolific cause of leakage when the parts wear. Many readers will not like the nut which is tightened down upon the top of the piston in front of the deflector, yet I can assure them that it has no disadvantages. In proof I may say that this method is used by Gems Suzor, the noted French model racing boat expert, on some of his super racing engines, which put up such startling performances in this country, in competition before the war.

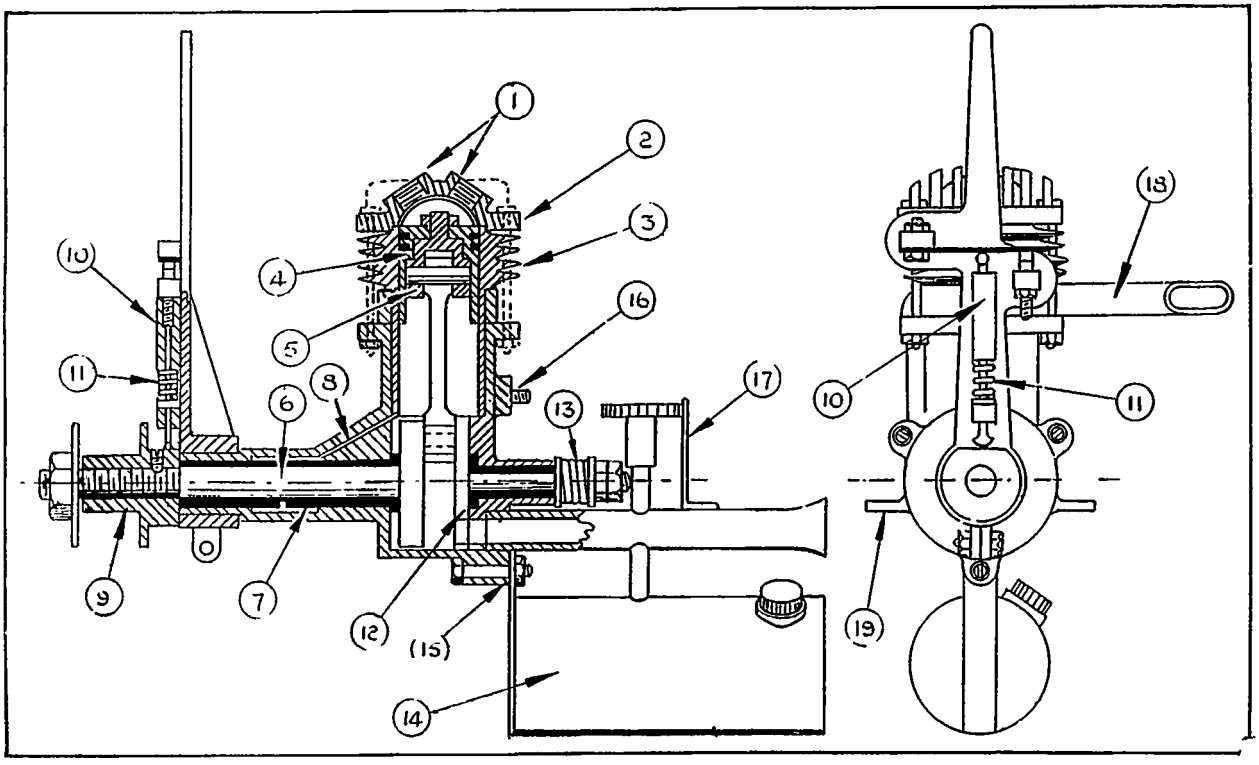
6. *Crankshaft.* As shown, this is of ample proportions, and is much larger than is usual, having a long shaft of $\frac{5}{16}$" diameter. This must be of chrome-nickel steel. Small crankshafts wear quickly, and nothing puts an engine out of commission so soon.

7. *Main Bearings.* These are shown in black ink, and must be of cast iron. This metal wears much longer than bronze, as, when used in conjunction with a fairly hard crankshaft, it wears into a glazed surface which is almost permanent. It must be well lubricated, however, and for that purpose, oilways are shown leading from the base of the cylinder (8).

9. *Propeller Mounting.* I require this to be a sturdy fitting which will not allow the airscrew to shift its position upon the shaft, as the position of the propeller in relation to the piston is an important factor in obtaining an easy swing-start. The contact breaker cam is incorporated with the propeller fixing.

This interesting Article will be continued in the MAY issue of "Aero-Modeller."

DRAWING OF THE SPAREY PETROL ENGINE.



A 1" to the 1' FLYING

The WESTLAND

FEATURED ON THE FRONT COVER

The Westland "Widgeon III" was developed from the Mark II version of 1924 and was one of the few examples of the parasol monoplane in this country. Produced in the early part of 1927, the Mark III version distinguished itself at several flying meetings throughout the country during that year. The prototype machine, G-EBPW was wrecked as a result of a collision with a Blackburn Bluebird during a race at the Bournemouth Whitsun meeting in June 1927, the pilot, L. P. Openshaw being killed. The first production machines were numbered from G-EBRL to G-EBRQ and were fitted with A.D.C. "Cirrus II" engines with the exception of G-EBRQ, which had an Armstrong-Siddeley "Genet."

The machine from which the model was copied—G-EBRO was registered on August 6th, 1927, and had the manufacturers serial number WA/1682. For many years it was owned by the Westland Aircraft Co. and used as a demonstration and service machine, after which it passed through the hands of several private owners and became a club machine with the South Staffordshire Aero Club at Walsall, where the accompanying photograph was taken in 1936. It was later sold to a private owner at Gravesend and at the outbreak of war was owned by Mr. A. O. Humble-Smith of Romford.

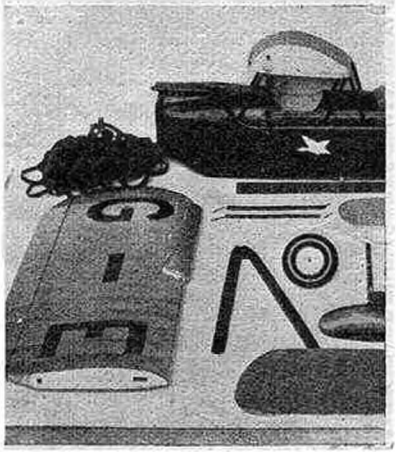
Westland Widgeons competed in the King's Cup races of 1927, 28, 30 and 31 and managed to secure 2nd and 5th place in 1927. One also won the Grosvenor Cup race in 1932, the pilot being the late C. S. Napier.

Structurally, the machine was of orthodox design, the fuselage being of the familiar spruce and plywood box construction with a welded steel tube engine mounting. Dual controls were fitted and the parasol wing arrangements made entrance very easy, the front cockpit being provided with a small door. The wings were also of wooden construction with box spars and spruce ribs the whole wing being fabric covered. Full-length ailerons were fitted and they differed from the rest of the airframe in that they were constructed from aluminium and duralumin. The wings folded about the rear spar attachment and were supported by a pair of steel tubular Vee struts. The centre section, containing a 15-gallon petrol tank was supported on four sets of inverted Vee struts and the under-carriage was of a new pattern embodying telescopic steel tubes in conjunction with coiled steel compression springs. The original machines had non-split axles and one set of radius rods attached to the bottom of the fuselage at the engine bulkhead. Later models had a modified divided type similar to that shown in the photographs.

A variety of engines have been fitted including Cirrus II and III, Gipsy I, Hermes I and Armstrong-Siddeley Genet II. The performance with the former was: top speed 110 m.p.h., cruising speed 90 m.p.h., service ceiling 14,000 feet and endurance about 3½ hours at cruising speed.

THE MODEL. With the exception of the rear end, the fuselage is built along the same lines as the full sized machine. The longerons and cross-members are

A SCALE DRAWING OF THIS MODEL 42½" × 28½
OBTAINED FROM THE 'AERO MODELLE



SCALE MODEL OF WIDGEON III.

By E. J. RIDING

$\frac{3}{32}$" by $\frac{3}{32}$" hard balsa and the covering is $\frac{1}{32}$" balsa sheet. The curved decking was built up separately on its formers and glued into position on the top longerons after assembly. The under-carriage was made from 22 s.w.g. wire, faired with flattened celluloid tube and the shock legs built up from $\frac{3}{16}$" dia. aluminium tube and $\frac{1}{8}$" dia. rod working in conjunction with two $\frac{1}{8}$" dia. compression springs but a simpler method would be to use 20 s.w.g. wire. A pair of 2" dia. celluloid wheels are fitted. The tailskid can be made from bamboo and glued into position at the end of the fuselage. The centre-section struts are cut in one piece from a sheet of 1 mm. plywood and glued and pinned into position on the top longerons. The combined wing strut and under-carriage radius rod attachment fittings are pinned onto a form of spar glued into a slot cut into the bottom of the fuselage. A similar arrangement locates the under-carriage leg attachment fitting.

The wings have two spars each consisting of two $\frac{1}{8}$" by $\frac{3}{32}$" balsa booms and the ribs are cut from $\frac{1}{32}$" balsa sheet.

The chord is constant throughout the span, so the ribs can readily be "mass produced" using a plywood template. The wing section on the actual machine is R.A.F. 34, but Clarke Y is used on the model. The wing tip bends are made from $\frac{1}{16}$" square birch steamed round a former and glued into slots cut in the leading and trailing edges. The tailplane and rudder are both made from $\frac{1}{8}$" by $\frac{1}{8}$" hard balsa and the supporting struts for the wings cut out in one piece from a sheet of 1 mm. ply, the grain running lengthwise. The end fittings are made from 24 s.w.g. aluminium sheet and riveted with $\frac{1}{2}$" pins onto the extremities of the struts.

The tailplane and rudder are not to scale, the former being 12" span instead of $8\frac{1}{4}$" and the chord $3\frac{1}{4}$" instead of $3\frac{1}{4}$".

The wings and tail surfaces are covered with superfine tissue and given a coat of banana oil, followed by a coat of silver dope. The fuselage is first treated with balsa filler, sanded to a glossy finish and then given a final coat of bright red. The letters G-EBRO on the fuselage are white and those on the wings are black painted as shown in the accompanying photographs. An $8\frac{1}{2}$" dia. yellow pine propeller is used powered with 10 strands of $\frac{3}{16}$" flat rubber. Final details such as exhaust pipe and manifold, engine cylinder head covers, wind shields, etc., can then be added. The all up weight of the completed model should be in the neighbourhood of $8\frac{1}{2}$ ozs.

The model will be found to be tail-heavy at first and the most suitable method of counteracting this is by filling the inside of the nose with plastic wood which, as well as adding the necessary weight, provides additional strength to the nose. When in correct trim, the model has a steady flat glide and is a very fast flier when under power. Landings are very good for a scale model and during a whole afternoon's flying, the only damage sustained was a broken strand in the motor. The duration of flight was on the average between 35 and 40 seconds.

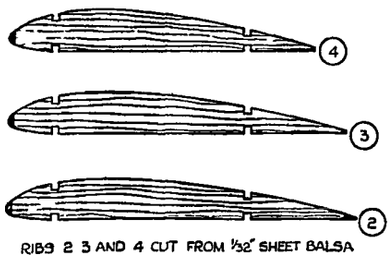
SHOWING ALL PARTS FULL SIZE CAN BE PLAN SERVICE' - PRICE 3/6 POST FREE.

WESTLAND WIDGEON III

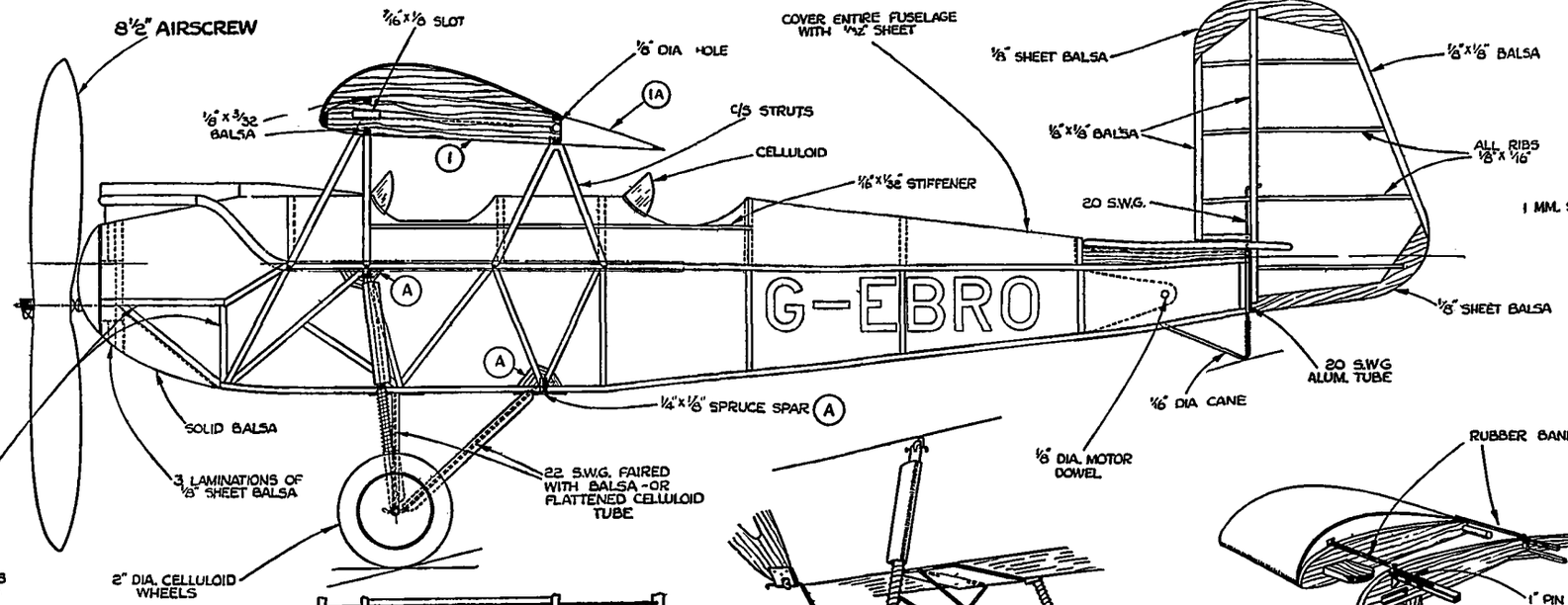
1" TO THE 1 FLYING SCALE MODEL

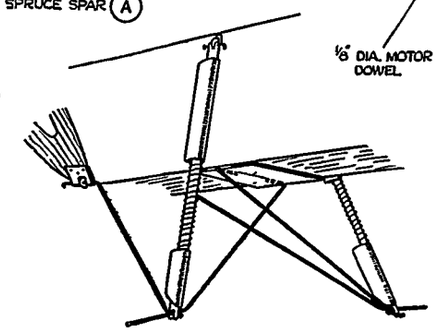
3/6

DESIGNED BY E J RIDING

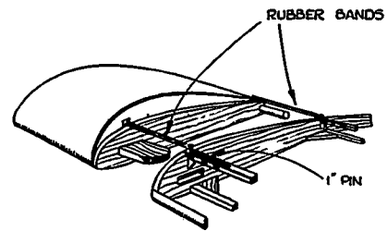


RIBS 2 3 AND 4 CUT FROM 1/32" SHEET BALSA

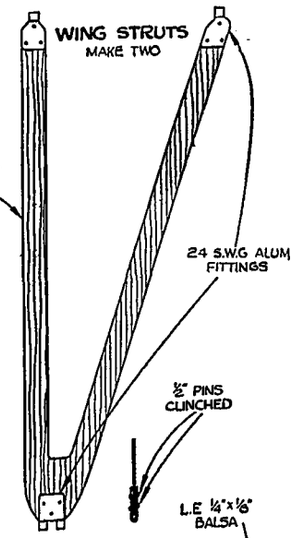


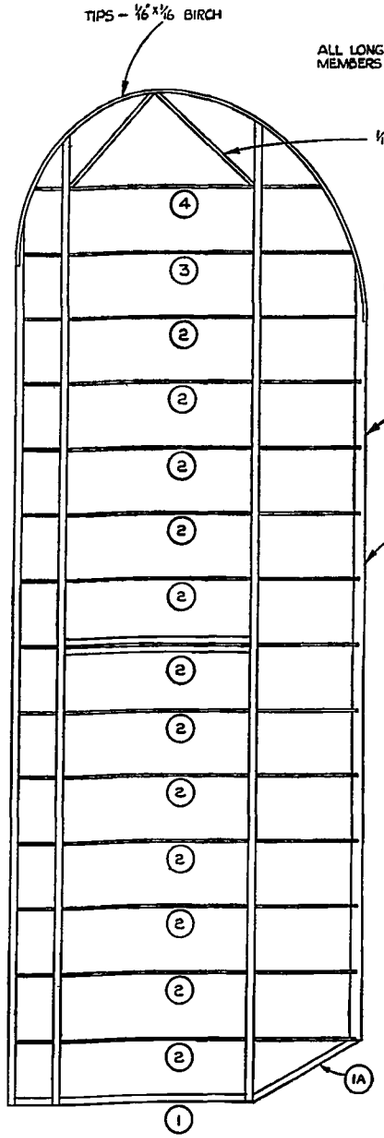


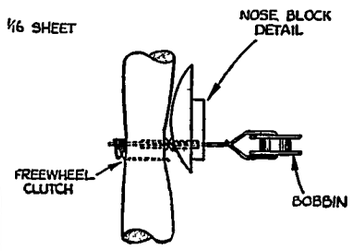
UNDERCARRIAGE ATTACHMENT

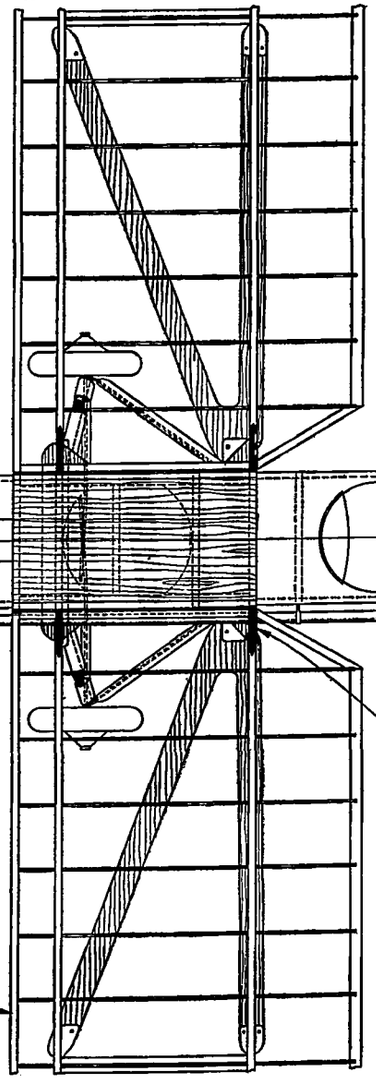


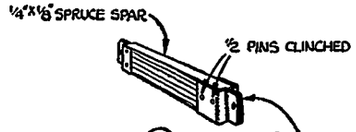
ATTACHMENT OF WING TO CENTRE SECTION



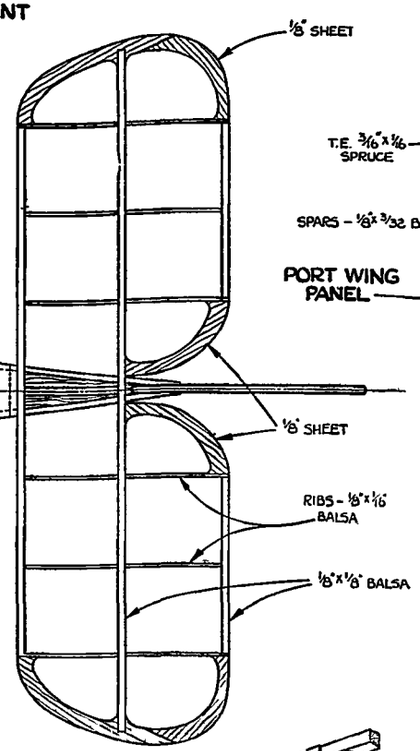


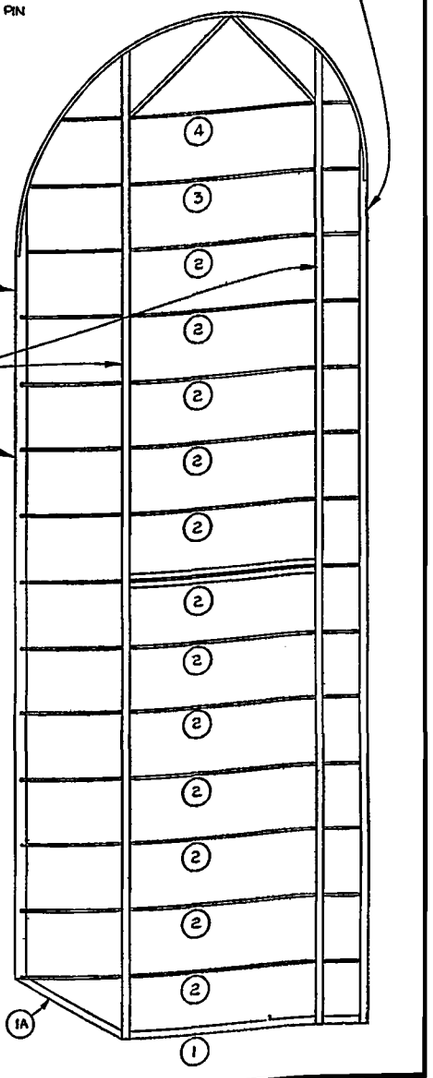


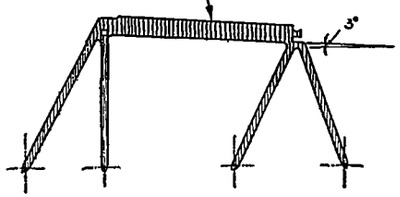




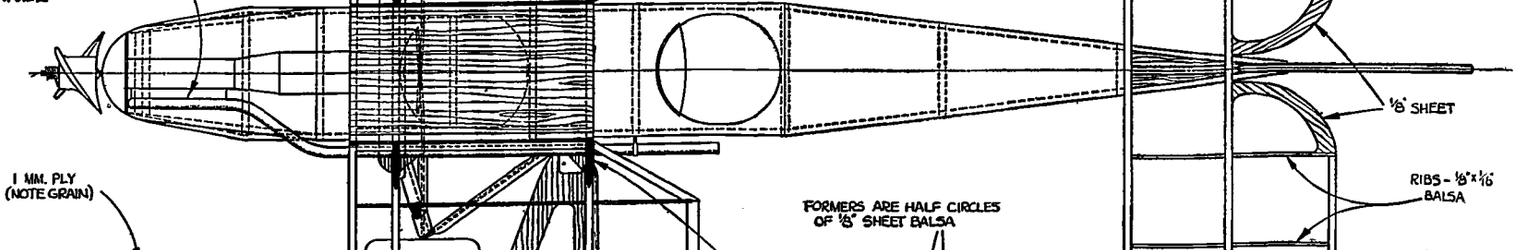
DETAIL (A) - STRUT & U/C ATTACHMENT



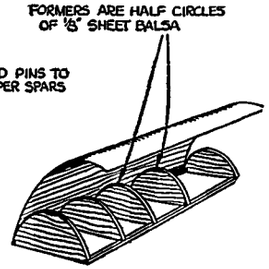




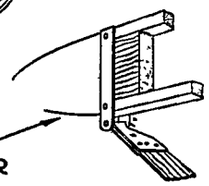
CENTRE SECTION STRUT-MAKE 2



PARTS OF WING PANELS DRAWN IN ONLY TO SHOW POSITIONS OF WING STRUTS



ASSEMBLE DECKING SEPARATELY & GLUE INTO POSITION ON TOP LONGERONS



ATTACHMENT OF STRUT TO WING SPAR

baby lightweight

By L. E. W. BURBRIDGE

Fuselage.

The fuselage I built was constructed entirely of $\frac{1}{8}$" by $\frac{1}{16}$" medium balsa as this was all I had, but a square section such as $\frac{1}{16}$" sq. or $\frac{3}{32}$" sq. should make construction simpler and more uniform. The method of construction used was similar to that used by C. A. Rippon in his "Air Cadet," as I find this is the most accurate and simple there is, and this is excellently described by him in the April issue of the "Aero-modeller."

The nose of the fuselage is filled in with $\frac{1}{16}$" sheet and a piece is also placed in two opposite sides of the fuselage behind bulkhead 8 for the bamboo rear peg to be fixed into.

A piece of $\frac{1}{16}$" sheet is cut to the shape "A" and cemented to one corner of the rear of the fuselage as shown to make a fixing between tail plane and fuselage.

Undercarriage.

This is bent in one continuous piece from 20 s.w.g. piano wire and is then bound to bulkhead 3 by means of strips of tissue. The wheels are of hardwood and are $\frac{3}{4}$" or 1" in diameter.

Wing Fixing.

This is constructed entirely of $\frac{3}{32}$" by $\frac{1}{16}$" bamboo and when dry is simply cemented to the opposite edges of the diamond in the *exact* position shown.

Tail Plane.

This has a leading edge of $\frac{3}{32}$" sq., a trailing edge of $\frac{1}{4}$" by $\frac{1}{16}$" and ribs of $\frac{1}{8}$" sq. which are shaped to a crude aerofoil shape after the cement is dry. The twin rudders are of $\frac{1}{16}$" sheet cut to the shape shown and cemented to the tips of the tail plane. The tail plane is then cemented to the piece marked "A" on the fuselage.

Main Plane.

This has a leading edge of $\frac{1}{8}$" sq., a main spar of $\frac{1}{8}$" sq., and a trailing edge of $\frac{1}{4}$" by $\frac{1}{16}$". Ribs are cut from $\frac{1}{16}$" sheet to the shape shown and the wing tips are also $\frac{1}{16}$" sheet. Each half of the wing is given $1\frac{3}{4}$" dihedral.

Covering.

The whole of the plane is covered in Jap tissue, which is afterwards steamed or sprayed as you prefer. The original model was white fuselage and tailplane, orange wings with blue centre section and with blue rudders. The main plane only was doped in order to save weight. If you follow C. A. Rippon's hints on covering you will not go far wrong.

Airscrew and Power.

The airscrew is carved from a block of fairly soft balsa $7\frac{1}{4}$" long by $1\frac{3}{16}$" by $\frac{7}{8}$" and when carved is given two coats of cement. For outdoor flying power is two strands of $\frac{3}{16}$" by 1/20" rubber 15" long (max. turns approx. 925).

For R.T.P. and indoor flying the airscrew diameter is increased to 8" and the power is two strands 20" long of $\frac{3}{16}$" by 1/30" rubber. Maximum turns are approx. 1,500.

No freewheel was fitted to the original plane in order to save weight, and anyway the airscrew is pretty small.

In order to get rid of excess rubber length again C. A. Rippon's wangles are followed. See May issue of "Aero-modeller."

Flying.

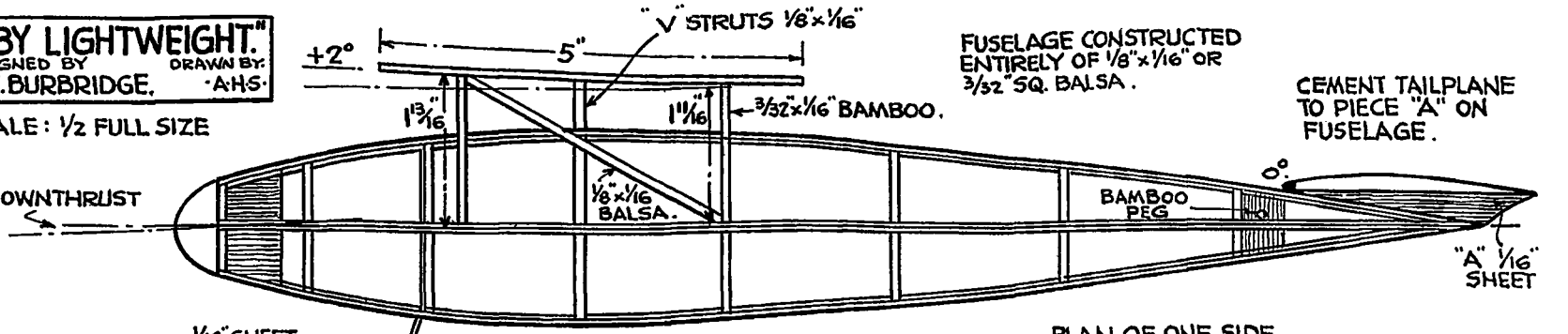
First get the plane gliding perfectly by moving the main plane backwards or forwards a fraction of an inch. Then without moving the mainplane try a power flight on 100 turns. On half turns or over a little down thrust will be needed. No side thrust was, however, needed, and the plane climbs in a steep right-hand spiral and glides in flat circles of about 50 yards diameter.

REDUCED SCALE PLANS FOR BUILDING THIS STURDY LITTLE MODEL ARE GIVEN ON THE OPPOSITE PAGE ➔

"BABY LIGHTWEIGHT."

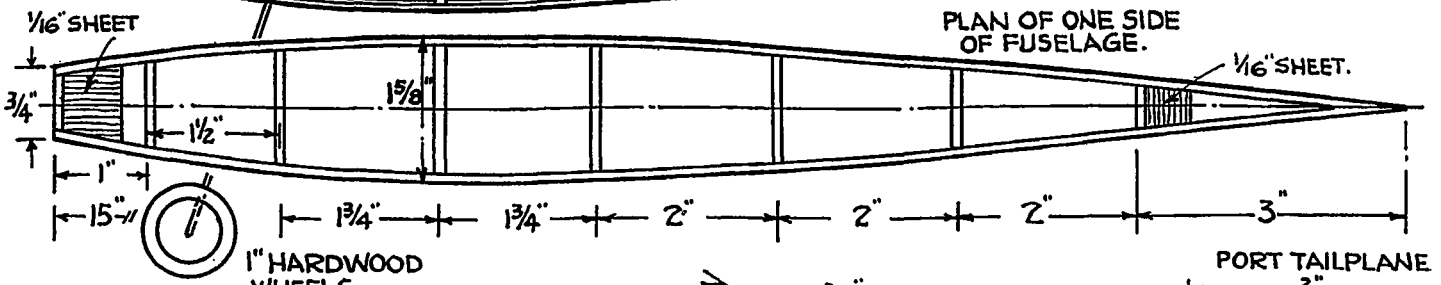
DESIGNED BY L.E.W.BURBRIDGE. DRAWN BY: ·A·H·S·

SCALE: ½ FULL SIZE



FUSELAGE CONSTRUCTED ENTIRELY OF 1/8"×1/16" OR 3/32" SQ. BALSA.

CEMENT TAILPLANE TO PIECE "A" ON FUSELAGE.



PLAN OF ONE SIDE OF FUSELAGE.

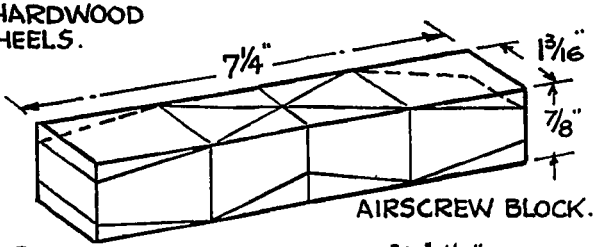
1" HARDWOOD WHEELS.

CERTIFIED PERFORMANCE.

FLIGHT Nº	SECONDS
1	57·4
2	61·2
3	63·8
4	61·4
5	73·4
6	67·6
7	81·2
8	66·8
9	76·6
10	72·4

AVERAGE OF TEN CONSECUTIVE FLIGHTS..... 68·18 SECS.

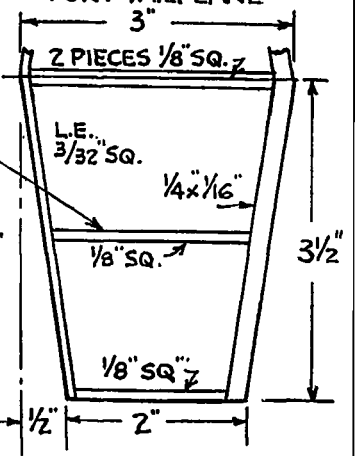
WHOLE MODEL COVERED WITH JAP TISSUE & WATER SPRAYED, DOPE WING ONLY.

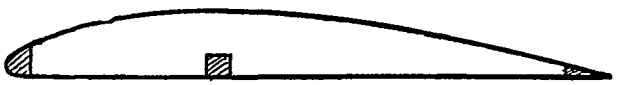


AIRSCREW BLOCK.

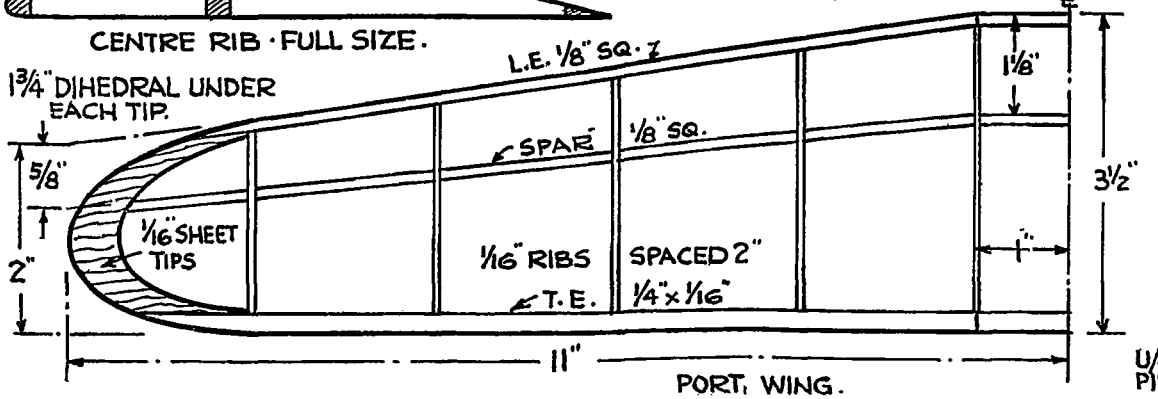
POWER: OUTDOORS - 2 STRANDS 3/16"×1/20" 15" LONG, MAX. TURNS 925 APPROX.
INDOORS - INCREASE DIAM. TO 8" WITH 2 STRANDS 3/16"×1/30", 20" LONG. MAX. TURNS 1,500 APPROX.

PORT TAILPLANE

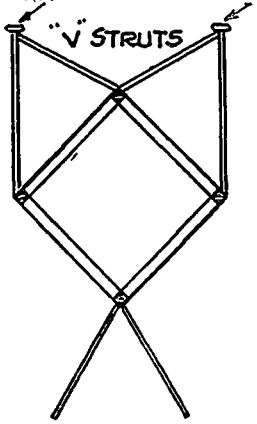




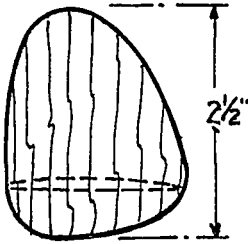
CENTRE RIB · FULL SIZE.



PORT WING.

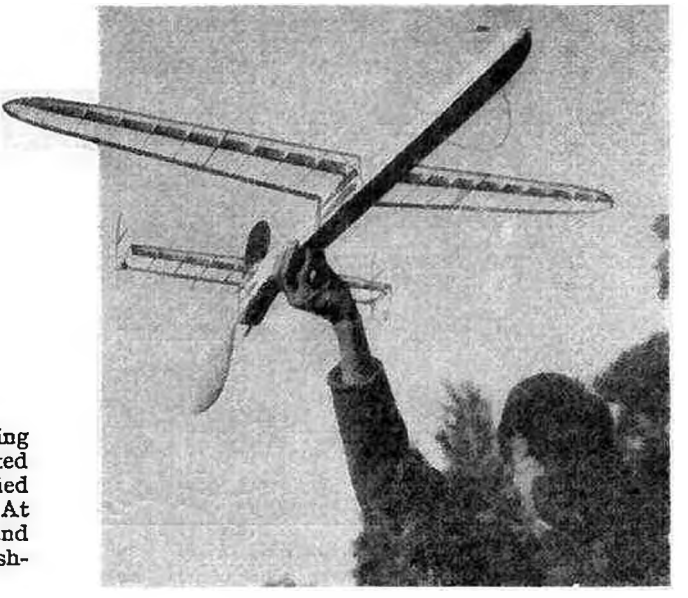


U/C. BENT FROM ONE PIECE OF 20 S.W.G.



RUDDERS 1/16" SHEET BALSA.

THE FOLDING PUSHER PROPELLER



THE model which young Michael Russell is holding aloft in the heading photographs originally started life as a twin-boomed pusher. Then it was modified [the booms broke, ED.] to the lay-out illustrated. At present the model is being flown as a stick tractor and I am seriously thinking of converting it into a "Push-pull."

In short, this design is far from stabilised and the time is therefore not yet ripe for this potential pusher to push into THE AERO MODELLER! As the title suggests, the purpose of this short article is to deal only with the folding, or rather, hinged, propeller of this model.

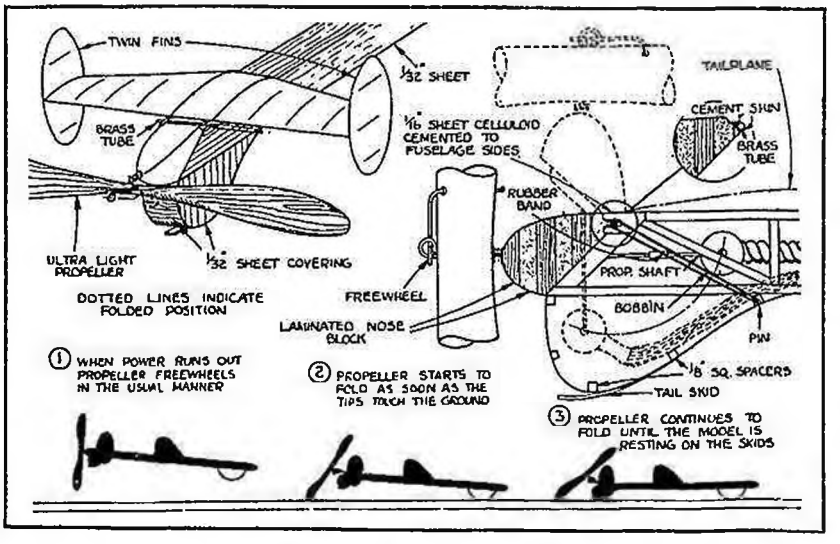
Stick models, unless a folding airscrew is used, come in for some pretty hard knocks on making contact with the ground. But folding a propeller against the airflow —in the case of a pusher—is no easy task. So I decided to compromise by fitting the usual free-wheel and arranging it so that the propeller swung up out of harm's way the moment its tip touched the ground.

After much sketching, a neat and strong folding arrangement was evolved, the small bulge on the underside of the fuselage being fitted so that the bobbin and rubber would not come in contact with the ground after folding.

When under power the nose block is just as steady as the usual type. After the power runs out there is not much chance of the assembly folding whilst the model is still in the air, unless it happens to be flying upside-down. Knowing my pusher, the latter condition is quite likely to come about, but even then the assembly would flop back as soon as the normal flying position was regained.

But, quite seriously, this idea is not just another gadget. It really does work well, and in my opinion is more than worth the small amount of extra time it takes to be fitted, as broken and splintered propellers are *entirely* eliminated.

Apart from pushers, there is no reason why this idea should not be used on both duration and scale tractors, especially the latter, as most flying scale models of military aircraft look much better if the undercarriage is left up or retracted. Quite a large number of modellers do this, using a fixed airscrew, which usually gets chipped or broken after a few flights.



So why not fit small wire skids just below the level of the airscrew, when folded? The nose block, being slanted in the opposite direction to that of a pusher, will tend to fold as soon as the tension of the pusher is relieved. A rubber band should therefore be fitted, with just enough strength to prevent folding in flight.

As the shaft will swing upwards on landing, a small hole should be left in the top of the fuselage. A small detachable hatch could be made to fill up the space when not flying the model.

I hope all these references to propellers and airscrews have not been confusing—but, after all the trouble people have gone to just recently to nail down the word propeller once and for all, I'm not going to stick my neck out!

the "BOWDEN BLUE GOOSE"

By C · E · BOWDEN A.M.I. Mech.E.

The Problem.

The petrol-driven flying boat is rather a mystery to most petrol fans, for there have been only a limited number of attempts to build and fly this type of petrol model, and certainly a very limited number of successes.

It is a particularly intriguing type of power-driven model because, apart from the fascination of operation from water, there is the dual excitement of producing a stable, airworthy machine and also a seaworthy machine that is stable on the water.

The problem perhaps sounds harder than it actually is, and this may be one of the reasons why so few petrol boats are attempted. There are certain simple rules and facts that make for a satisfactory flying boat, and I propose to discuss these points in this article.

I have noticed that in the majority of the model designs I have seen these fundamental rules have been broken in one or more cases. As a result the boat is not likely to be a satisfactory performer.

So far, I have not seen anything comprehensive laid down in connection with petrol-driven model flying boats. I think my early hideous and extraordinary-looking boat that still holds the British record for this class of model, was the first model boat to take off the water under its own power, and land again the right way up, although I admit in rather a wet condition, as you shall hear.

I subsequently built several more boats of gradually advancing design, which flew in and outside the harbour at Gibraltar, when I was stationed at that Outpost of Empire. Around this time Dr. Forster built a flying boat and brought it out to Gibraltar, and later it became a success and I saw it flying very well over the Bristol Channel at Porlock.

From this boat he developed the "Mermaid," drawings of which are published by THE AERO MODELLER.

I have often heard it said, and even seen it in print, that there would be no difficulty in beating my record of 30·4 secs. I quite agree, from the flying angle there is no real difficulty, and in fact I have often made longer flights off the water and have watched Dr. Forster's boat do the same. It may interest readers to hear, therefore, why the existing record is so short, and why in all probability it had not been improved upon up to the beginning of this war.

The strange-looking craft that I evolved in order to set up the first officially observed flight off water, took off from Poole water, about 1937, just above Hamworthy. A model petrol flying boat was a completely unknown quantity at that time, so there was no previous data to draw from and therefore the boat had certain exaggerated features to guard against the troubles I foresaw would have to be overcome to make a model stable both in the air and on the water. As a result, the boat had too large a wetted surface and was reluctant to get off the water with the 9 c.c. Brown engine originally fitted, but it was perfectly stable on the water. It would fly with perfect stability after a push start or hand launch on 9 c.c., and it would land and sit on the water in quite a severe wind and sea.

The problems I had to face were :—I was stationed at the time in the Midlands far from any suitable water and I had to get two official S.M.A.E. observers to come down for one day to some selected stretch of water, and it had to suit their convenience and my leave period. I had to ensure that my full-sized little speed boat was available on the selected water at the time decided upon ; also the weather had to be suitable ; so you will agree that in this busy world it was not easy to get all these factors to coincide !

I chose Poole water for my leave, and trailed my little speed boat behind my car from the Midlands, hoping that the weather would suit, and the official timekeepers recognized by the S.M.A.E. would be able to make it on the date arranged. My leave was short and the days went by, my wife expected me to fit in other holiday pursuits besides flying model flying boats, and the weather was bad ! As a result of all this I only got in one or two flights and I had to assist the boat off the water because I found the engine power was just not quite enough. On one occasion it got off unassisted after a long run, because the water had just the correct "popple" to assist unsticking, also there was just enough breeze to help the take off.

I knew that all these circumstances were most unlikely to repeat themselves on the day arranged for official observation ! I therefore fitted an old "Atom"

two-stroke 14 c.c. engine that I had by me; in fact the same engine with which I had put up one of the very early land 'plane records, which remained unbeaten for several years. This engine had a lot of power but was devilish heavy according to the advanced standard of those flying boat days, and it therefore upset all my balance arrangements of batteries, etc., on the 8 ft. span boat, just to make things a little more unlikely!

Anyhow, in went the engine at the last moment, and I had no time to test the boat before the fateful day. The weather was fairly reasonable, the timekeepers arrived and my speed boat started! I dared not make a trial flight as I felt if things were not so good there would be no observed flight at all.

Those of you who have not done any water flying cannot appreciate what may happen to an overheated little petrol engine that dives into salt sea water. There is unlikely to be any more flying that day, and if there is elektron in the engine's construction, as there was in my 14·2 c.c. engine, the engine must be stripped at once or the corrosion due to salt water will seize everything solid.

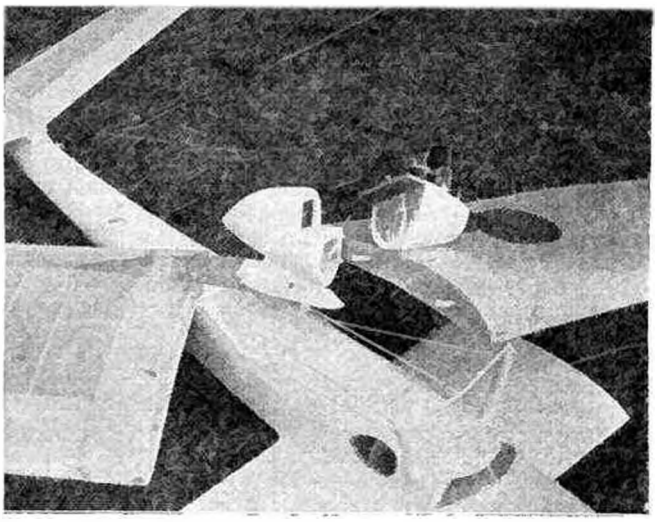
The compression of the 14·2 c.c. engine was fairly high as it had been hotted up for model hydroplane racing, after it had retired from landplane work. As a result of this high compression I had to use two flash-lamp batteries for flight.

In order to get an approximate balance I had to sling these batteries along the hull well aft, but this was guesswork without a test flight.

The boat got off well, but those infernal batteries were just too far back and the machine climbed at a pretty fierce angle and was stallish. This appeared to affect the flow of petrol. In those days I used gravity feed on this particular engine to a carburettor with midget float chamber. *Now* I should suck up the petrol!

Any way the engine eventually cut out and the boat landed with rather a wet splash the right way up and had the decency to sit on the water for master to retrieve. But nothing would induce that engine to start again that day.

I therefore contented myself with having set up the first rise off water record for petrol flying boats and determined that I would, at some later date, have another go at it with a better boat, incorporating the knowledge I had gained, *and* when I could get leave, weather, water and official timekeepers to synchronize. In the meantime I was ordered off to Gibraltar where official timekeepers just did not exist. I had a lot of good and soul-satisfying flying off the blue waters of the Mediterranean up to the time that Hitler—the anti-model man—put an end to all such pleasant occupations.



After the War.

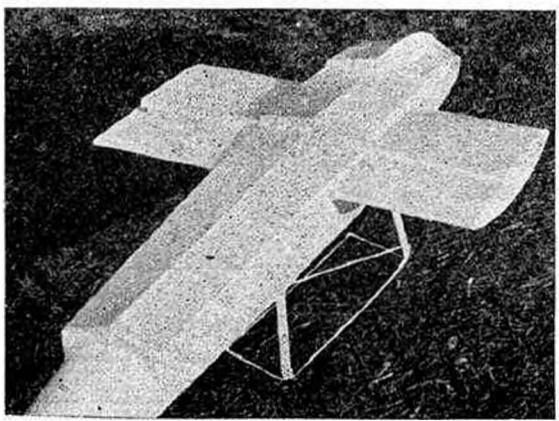
There will be no difficulty about putting up a nice fat record time after the war, and it is my great hope that we can organize a flying boat week at some large and suitable stretch of water, centrally situated and within reach of the majority. We should have some rare sport of a most interesting and absorbing nature.

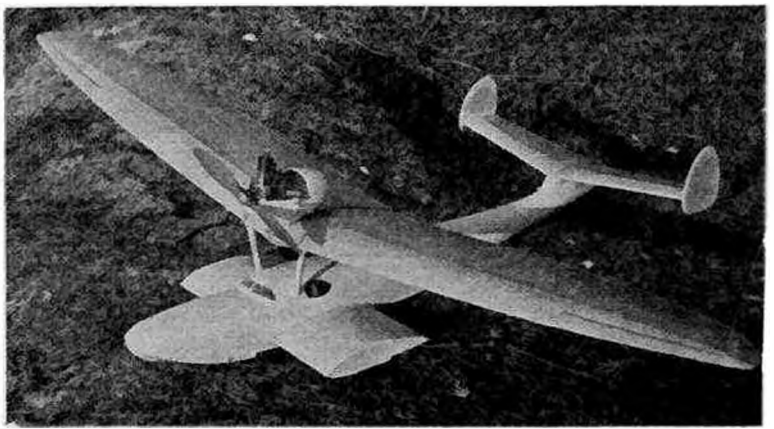
My latest boat.

Some readers will remember a description of two of my boats at Gibraltar with photographs of these boats in flight in the harbour with a background of the famous old "Rock" that means so much to our country now.

One of these boats, and a very successful one too, had a tapered wing span of only 4½ ft. but with a very large centre chord. It was powered by a 6 c.c. Baby Cyclone engine which is not easily affected by a little spare sea water.

This little boat was quickly whipped off the water by its engine and due to its fairly high wing loading was rather a fast, but very stable, flying machine. It landed fast after a fast but flat glide and its most satisfactory feature was its ability to ride on rough water before taking off and after landing. I have absolutely no use for a boat that is not really seaworthy, and that is liable to be blown over or dip a wing into the water. Anyone can produce such a machine, and I suggest that we adopt a stiff flotation test before and after the flight in any post-war record that is granted, and also in any flying boat competitions that are organized. The same applies to model seaplanes (i.e. floatplanes). From these boats I learnt that a short span is a great asset for lateral stability on the water, also that to locate one's ignition with a battery in the hull is a very bad practice as it gives rise to all sorts of ignition troubles due to damp. Wing tip slots and a fairly heavy wing loading, but with plenty of engine power, are the answer.





The photographs shown with this article are of my latest boat which is a development from my previous efforts. I have built it during the war, and as a result it is, of course, untested, except for gliding tests.

Let us examine its main points, because I have incorporated in this design the features that I have found desirable for success. I feel that this boat will be a useful competition machine, as well as a reliable boat to obtain pure fun in flying.

Fig. 2 is a photograph of the boat that shows general features. A balsa planked monocoque and streamlined fuselage is fitted with wide sponsons in lieu of wing-tip floats. These sponsons are provided with steps to assist the take off. They have sufficient surface to keep the model laterally stable on the water. Wing-tip floats are not usually desirable for a single-engined model, for owing to engine torque one float will usually touch and slew the model round out of the wind during the take off. Again, if the model lands with one wing a little low a wing-tip float may cartwheel the model round, and will then cause one wing to go into the water.

On this model the boat hull is watertight, and has no batteries, coil or wiring in it; merely a small breathing hatch that can be opened if any leaks are sprung.

The engine and coil and baby accumulator, weighing 3½ ozs., are all in a detachable power egg. See Fig. 5. This power egg is mounted on a thick 3-ply rib that is sandwiched between the two detachable wing halves. Two dowels pass through the power egg rib. The two wing halves are kept together by rubber bands and keeper wire hooks fixed in the wing halves at leading-edge, trailing-edge and centre spars both top and bottom.

The accumulator and the engine are thus mounted high and out of the way of spray, and yet the weight up high is counter-balanced by the hull low down, due to the parasol arrangement. The parasol wing makes for good stability, quick take off, and good glide, and therefore good, clean landings. It also keeps out of the way of spray and unnecessary weight of water; an important consideration. The wing is elliptical, which gives an efficient wing with a short span and yet plenty of surface. Thus we get our weights near the centre of the boat and so lateral stability on the water is good—and we get a reasonably light wing loading. We also obtain a large central chord and this is efficient for model work. Many people do not realise that a small chord does not give an efficient airflow over a model wing at the slow speeds models fly. A properly designed elliptical wing with suitable section is the answer to the petrol modeller's prayer!

My original wing-tip slots are fitted to ensure that there is no nonsense with regard to stalling. I have touched on this matter in articles in THE AERO MODELLER on the subject of stability, and I have described the construction of these built in wing-tip slots. They are very simple to construct.

The centre-section struts are built into the hull and are a permanent fixture that the detachable wing is located upon by rubber bands to wire hooks.

The centre-section struts are made from wire with balsa fairings bound with silk.

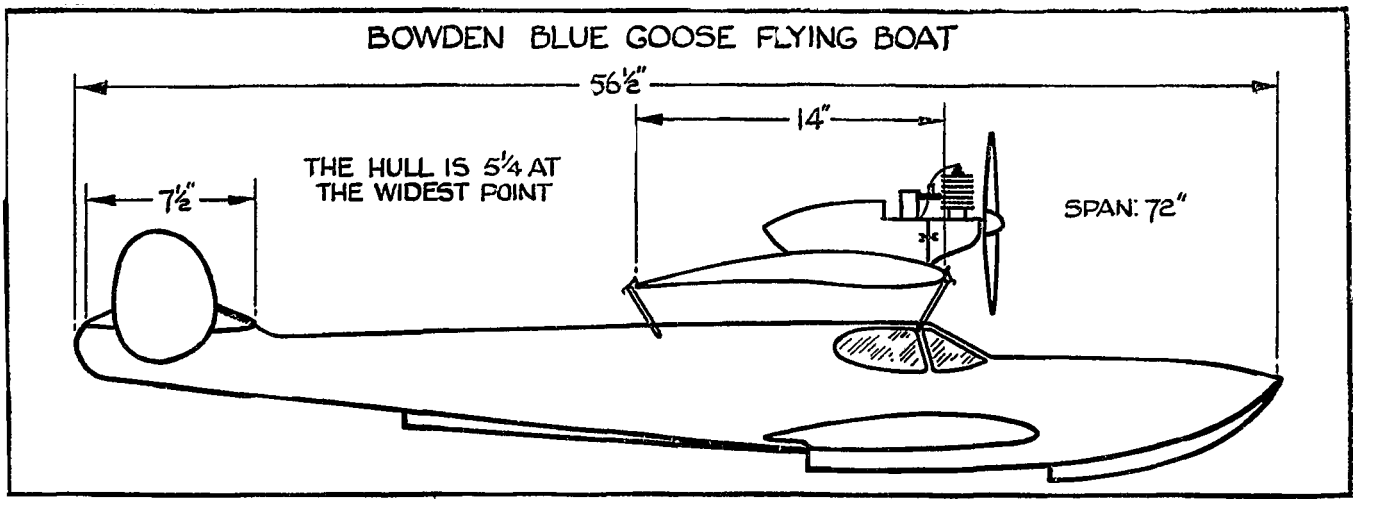
The tailplane is dihedralled and has small twin fins. I have found that this type keeps the model into wind excellently during the all-important take off if the fins look very slightly outwards from each other on the principle of trailing a drogue. The tailplane is kept on to its platform by rubber bands. The fins are well clear of the water.

The fuselage is made long: this looks after longitudinal stability both in the air and on the water. There is plenty of surface below the hull to keep the model from getting its tail unit blown into the water, and becoming waterlogged when sitting on the water. Every model constructed by my fellow aero-modellers that I have seen, has suffered from this defect without exception, although their proud owners snort at the idea of their boats being unstable longitudinally on the water. There must be enough surface sufficiently far aft to stop this distressing habit. If you will look at Fig. 4 you will see what a long stretch of hull bottom there is aft of the main step.

A seaplane or flying boat model always tends to dig its nose in and porpoise during the take off due to the high thrustline. There is no pilot to check this until the boat is well on its main step. I completely overcame this trouble on my first flying boat by fitting an extra step which is situated ahead of the main step at the C.G. of the boat. Thus the model tries to dig in its nose and is at once checked and bounced back by the forward step.

A slightly V step helps smooth landing and prevents a mighty splash. On the other hand a very pronounced V bottom tends to make a quick take off difficult: therefore a happy compromise is necessary—again look at Fig. 4. For main dimensions see Fig. 6.

The boat is painted shiny white which waterproofs it and at the same time makes it look well on the water or in the air. To relieve its whiteness it is called "Blue Goose"! The engine at present is a 9 c.c. Brown.



MONTHLY MEMORANDA

By O · G · THETFORD

R.A.F. Prototypes.

Special markings are carried by all prototype service aeroplanes undergoing flight tests at R.A.E. In addition to the normal service markings it is now necessary for experimental types to carry a letter " P " in yellow on the sides of the fuselage just ahead of the cockade. The letter " P " is surrounded by a yellow ring equal in diameter to the fuselage cockade and of one quarter the thickness of the " P." The letter is the same size as code squadron and identification letters carried on operational types which are six inches thick in each leg.

This regulation applies equally to American types of aircraft which are to become standard equipment in the Royal Air Force.

Private Venture Types.

Private Venture aeroplanes (i.e., types built by enterprise of manufacturing firms alone and not covered by Government specification) have a special system of numbering which replaces the usual serial number used by manufacturers for airframe identification. Each manufacturer within the British Aircraft Industry is allotted an initial letter not necessarily coinciding with the actual name of the firm (Phillips and Powis, Ltd., for instance, have the letter " U "). This initial letter is followed by a four-figure number beginning with " 0 " but not repeating either " 0 " or " 1." The entire marking is painted on the sides of the fuselage in the same location as a normal service serial number, also in black. It is not carried beneath the wings. A hyphen is painted between the initial letter and the four figures. This, of course, is not the case with service numbers. The most recent example of a P.V. aeroplane painted in this manner which can be mentioned is the Miles M. 28 training monoplane. For further details see below.

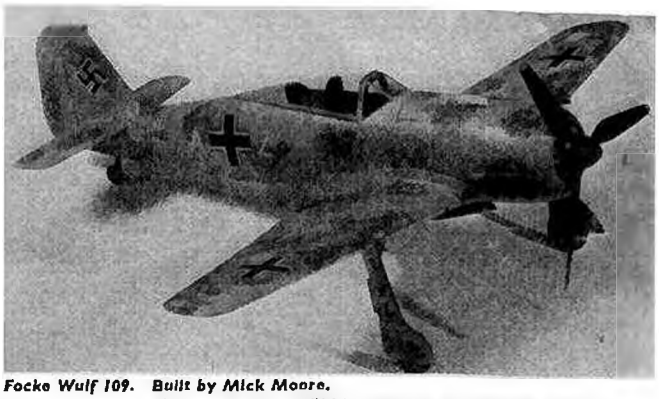
Ambulance Aeroplanes.

All aeroplanes employed on ambulance duties in the R.A.F. are painted according to the Temperate Land Scheme on the upper surfaces and are all white underneath. The Red Cross of Geneva is carried against a white disc behind the conventional cockade on the fuselage sides, the white background disc being of the same diameter as the cockade. The Cross of Geneva is also carried immediately outboard of the cockades beneath the wing tips. Ambulance aeroplanes are like trainers and communications types in that they carry their serial number beneath the wings. On the fuselage sides it is painted in white. Airspeed Oxfords and De Havilland 86Bs have been the chief types used for ambulance work in the R.A.F. One of the Ambulance Oxford's was serially numbered P 8833.

Two New Miles Trainers.

Information has been released on two new Phillips and Powis trainers, one of which is a Private Venture type and the other an improved version of a well-tried Service aeroplane. They are the Miles M. 28 trainer and communications monoplane and the M. 18, or Magister II.

The M. 28 is a two or four-seat low-wing cabin monoplane with twin fins and rudders and a backwards retracting undercarriage of conventional tail-down design. It is the first completely new design in the lightplane field since the war began and should be in demand for a club and private type in peace time. It is powered with either a Gipsy Major IIA and a fixed pitch airscrew ; a Gipsy Major III and a constant speed airscrew, or a Gipsy Major IIIA and a constant speed airscrew. The respective top speeds are 155 m.p.h. ; 160 m.p.h., and 176 m.p.h. Three versions of the machine are available. It can be used either as a two-seat side-by-side *ab initio* trainer (fixed pitch airscrew) ; two-seat intermediate trainer (constant speed airscrew), or four-seat communications type in the same category as the Proctor and Argus.



Focke Wulf 109. Built by Mick Moore.

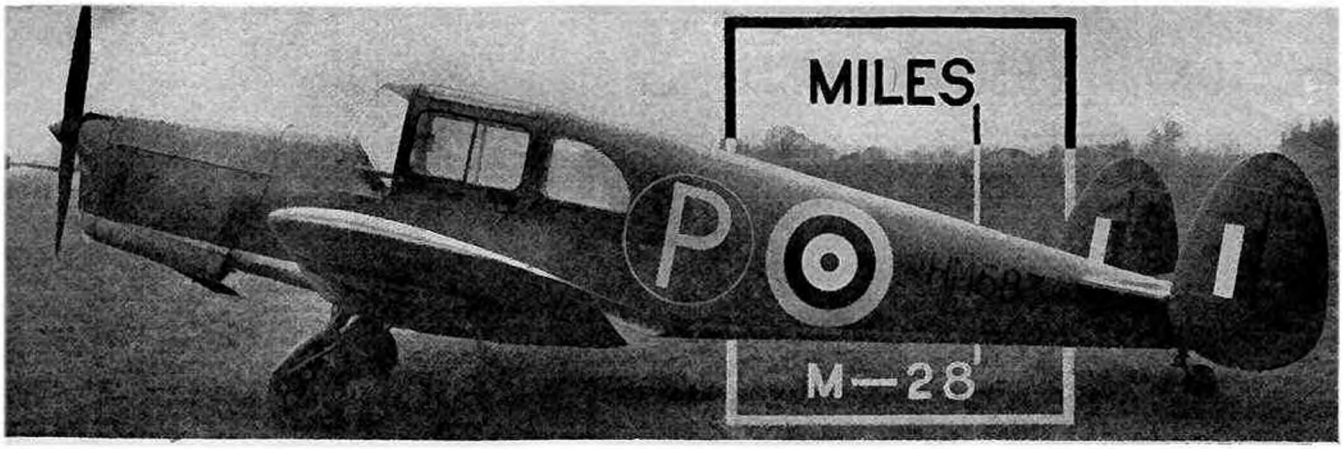
Customary training camouflage is carried by the M. 28 and it originally had the old type cockade and fin flashes with a wide white band. The prototype " P " is painted on the fuselage. The Private Venture number which it carries is U-0232, the " U " being indicative of Phillips and Powis.

The Magister II differs from the Mk. I chiefly in regard to the design of the wing panels. The wings are of very deep camber and have square-cut tips. The tail assembly has been modified so that the fin and rudder are set ahead of the tailplane à la Skua. Other improvements include wider cockpits and modified undercarriage with stubs axles replacing a forked device facilitating maintenance. A semi-spat is provided but in service is usually discarded. The experimental Magister II was fitted with spats but had no headrest to the rear cockpit. A manifold exhaust pipe replaces the four separate ejector stubs on the production model. A Gipsy Major III motor is fitted and top speed is 145 m.p.h.

The experimental Magister II had only the decking of the fuselage and the upper sides of the flying surface camouflaged (the fashion current for trainers just prior to and in the opening stages of the war). The rest of the machine, including the rudder, was training yellow. The whole of the fin was covered by the red, white and blue stripes. The experimental marking " U8 " was painted in black on the rear of the fuselage midway between the cockade and the tailplane root.

A B-17F Squadron.

At least one squadron of B-17Fs, the later version of the B-17E, is now stationed in Great Britain with the U.S.A.A.F. and has taken part in daylight raids over German-occupied territories. All the earlier operations by British-based U.S.A.A.F. Fortress squadrons were carried out with the earlier B-17E. The difference lies in the design of the bomb-aimer navigator's compartment in the nose. The B-17F has a completely plastic nose of more streamlined shape than the framed windows of the B-17E and an increase in performance results from the better aerodynamic entry. Two B-17Fs of the squadron are named " Wabash Cannonball " and " Bad Penny." The latter always (so far) turns up in the proverbial manner ! The names of the B-17Fs are painted on the sides of the nose just above the point where the drab camouflage meets the light belly. The first-named machine has its name in block lettering nine inches or so high whilst the " Bad Penny " carries its name in white script three times the size.



By H · J · COOPER

THE Miles M–28 (which has not yet been named by the Air Ministry) is essentially a Miles design, and bears the typical outward recognition festures of the Phillips and Powis Company. When, in 1933, the first Cirrus-Hawk was produced, a new fashion in monoplanes was introduced, and all subsequent types, from the little Hobby racing monoplane to the Peregrine two-motor transport, have born the family resemblance in wings and tail-unit. The M–28 is the first to utilise twin fins and rudders.

The other Hawks and Falcons and Magisters have made themselves famous on many record-breaking flights and as reliable trainers throughout the world.

The M–28 is built in three versions: the two-seat *ab initio* trainer, the intermediate trainer (for navigation, radio and air-crew training) and the four-seat communications monoplane. It is the latter version which is shown in the accompanying photographs and drawing, though the trainers differ only in minor and internal details.

The M–28 is of all-wood construction and is normally powered by a Gipsy Major IIa motor, though any aeromotor of about 150 h.p. can be fitted.

The undercarriage retracts backwards into the wings vertically, as on the Fairey Battle, and a small portion of the wheel is left exposed, though the whole undercarriage is surprisingly small and neat. The tail wheel does not retract.

The low wing is of thick section and is wooden throughout. It is built in three sections, with tapered outer sections and has rounded tips. Split trailing-edge flaps in five sections are fitted between the ailerons and under the fuselage. The tailplane mounts twin fins and rudders as end-plates, and is consequently square cut.

The cabin seats two side-by-side or, in the communications version, four in two pairs. The view on either side is particularly good because of the large side windows and the high, moulded windscreen. The rear windows are not usually fitted in the training versions.

Apart from its other duties the M–28 is suitable for army co-operation, ambulance work and as a light freighter. In the latter category a payload of 730 lbs. can be carried: the M–28 will make a useful civilian machine in more peaceful times.

The M–28 has a span of 30 ft. 6 in., and a length of 22 ft. 1½ in. The wing area is 160 sq. ft.

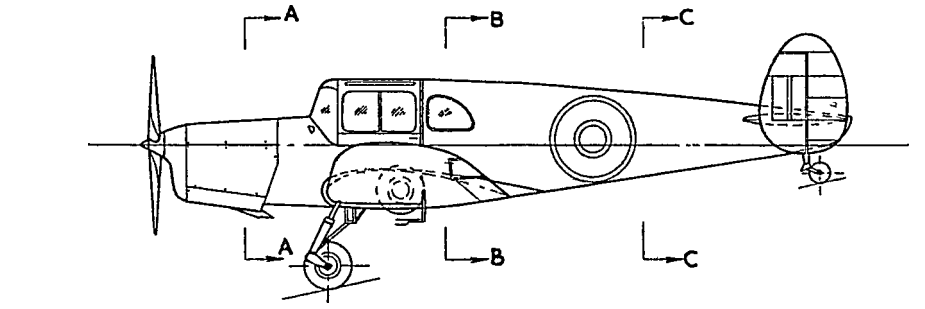
The tare weight is 1,450 lbs. and the loaded weight 2,358 lbs.

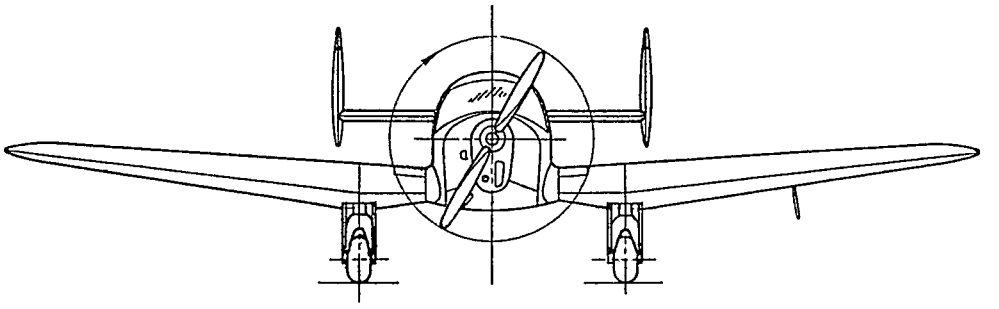
With a Gipsy Major IIa motor and a fixed-pitch airscrew the performance is:—maximum speed: 155 m.p.h.; cruising speed: 140 m.p.h.; range: 700 miles at cruising speed; climb: 950 ft./min.

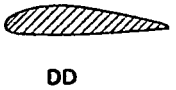
With a Gipsy Major III and a controllable-pitch airscrew the maximum speed is 160 m.p.h., and with a Gipsy Major IIIS and c.p. airscrew is 176 m.p.h. at 7,000 ft.

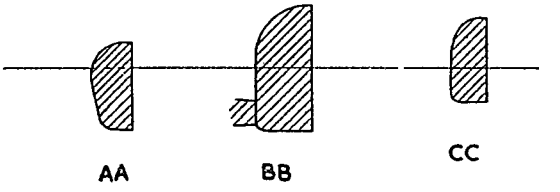
Miles M–28s are finished in the Training and Ferry Command schemes with dark earth and dark green sides and upper surfaces and yellow undersides. The usual roundels and fin marking are carried, though the latter is painted smaller than the customary 28 in. by 27 in. size. The machine shown in the photographs is the prototype, HM 583, and bears in front of the roundel on the fuselage the letter P in yellow as an indication that it is an experimental aircraft. This letter is abandoned when the machine goes into service.

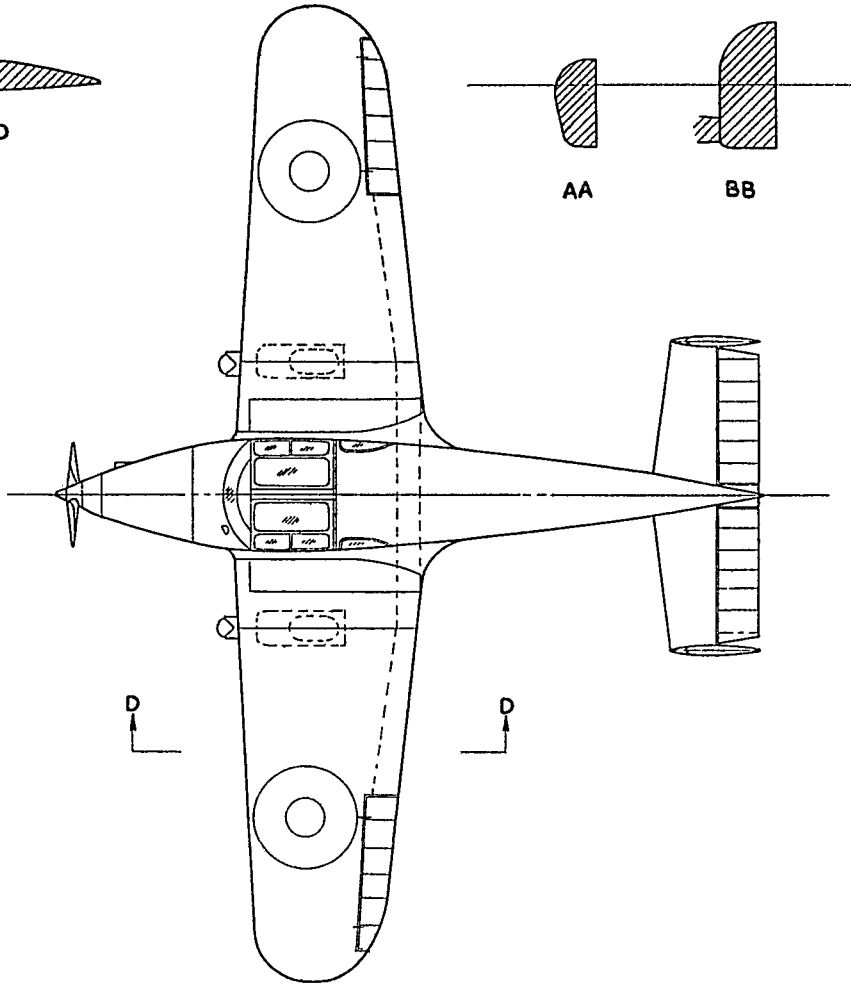
From a recognition point of view the M–28 is unique in that it is the only single-motor low-wing monoplane with a retractable undercarriage and twin fins, flying in this country. In the side elevation the high cabin is distinctive, and overhead the width of the fuselage and the square-cut tail will avoid confusion with any other type. *Next Month:* The Messerschmitt Me 210 A–1.











MILES M. 28.

FT.

Club News

By CLUBMAN

YOU will, of course, have noticed the discrepancy between the lists of S.M.A.E. Competitions shown in the March issue, but I must excuse myself by stating that the list as shown in the Club News columns of last month were as forwarded by the Hon. Comp. Sec., but were subsequently modified at the Annual General Meeting. Hence the difference!

I attended the meeting mentioned above, and very interesting it proved. My one criticism would be the lack of provincial delegates, though this is, of course, accounted for by the general lack of time of responsible officials, and travelling difficulties. I do feel, however, that it would pay the provincial clubs to be on hand at least once a year to air their views, and the Annual General Meeting is the right time to do so. The requirements of specific areas can only be properly put forward by persons actively connected with those areas, and the fact that occasionally rules, competitions, or other matters are not equitable to all is mainly due to the predominance of a certain section of the modelling public at meetings where such matters are conducted.

Not that I am putting the onus on those who do attend meetings—they have every right to attend, and the fact that other groups are not represented is not their pigeon. Unfortunately, however, only in very rare cases do we find people who can subborn their own local outlook to a purely national one, and realise that at S.M.A.E. meetings affairs are settled that have repercussions over a very wide area. One or two instances were evident at the recent Annual General Meeting where some individuals were insistent on matters being raised that have already been the subject of long discussion, and I do feel that a great deal of time is wasted by certain individuals who wish to have things all their own way.

However, I was pleased to note the way that the Chairman put the kibosh on such attempts, and altogether things went off very well indeed. That the Society can maintain, and even improve, its position under current far from helpful conditions, is a healthy sign, and I am making no idle statement in foretelling a great boom in National and International affairs after the present "spot of bother" is over.

Two changes in official positions resulted from the voting, one owing to the retirement of the Competition Secretary, and the other owing to illness of the Records Officer. Other changes took place in the Council, a full list being given last month. I was pleased to note the election of Mr. A. G. Bell to Fellowship of the Society, a position well earned.

The election of "George" Temple to the Council will do a lot to stimulate a phase of modelling in which I have always maintained we are well behind—namely, real honest-to-goodness gliding. So far we have only tickled the surface of this side of the hobby, and the presence of an accepted expert on the subject should do much to help from a National standpoint. Any who were present at the 1939 King Peter Cup affair will realise how we lay in the development of the competition sailplane, and without the current slack period in which to pull our socks up, we should have had a hard task to catch up with Continental advance. However, we shall see, but I think it safe to prophesy a real development from now onwards.

(Above.) A "Kirby Kite" sailplane built by P. Pearce of the Stratford-on-Avon Club.

Mr. A. R. Parker, formerly of the North Kent club, is now busy with A.T.C. work, and modelling is well under way, besides a full-size Slingsby Sailplane. For the construction of a "Hotspur" glider (ex A.M. plans) he used corrugated card, as used in box making, for formers, and found this quite suitable. We live and learn!! This chap (address: 3, Eversley Avenue, Barneshurst) would like the Secretary of the North Kent club to contact him, as he is sure a number of his cadets would like to join.

The NORTHAMPTON M.A.C. have been holding fortnightly meetings on Saturday evenings at St. Giles' Buildings. Although no very high durations have been put up, the meetings have been well attended, and a good variety of models have appeared, including several "Goons," microfilm and autogiro types. A demonstration of R.T.P. flying was given to the 8th Coy. Boys' Brigade at their headquarters.

No indoor flying has been possible with the OXFORD M.F.C. owing to lack of a suitable hall—though this is expected to be remedied shortly. In the Secretary's annual report he deplored the policy of some members who, on a competition day, bring models to the field and fly them, but fight shy of entering the competitions on the plea that "they are not good enough." Defeatism??

THE BLACKHEATH M.F.C. are hard at it building models for the Wings for Victory exhibitions, though held up for lack of the promised supplies of materials.

A nicely posed shot of the Westland Lysander built and photographed by J. F. Austin-Brown of the Halstead M.F.C.

A fund has been opened for the purchase of a Trophy in memory of Ron Mackenzie, their popular ex-secretary; who met his death recently in the R.A.F.

Along with many other clubs, call-ups has hit the EASTBOURNE M.F.C. hard, and it is necessary to almost entirely rebuild the club on a nucleus of old members. A club magazine is being produced in an effort to keep service members *au fait* with club affairs, and a rule has been passed that members away in the Services may have their models flown in club competitions by proxy. (Not a bad wheeze that, and worth trying out in other clubs.) J. Finch (who takes over club secretaryship from L. Downer) won the 1942 Championship with 23 points, runners up being Messrs. Downer and Burleton with 20 and 14 points respectively.

R.T.P. flying is progressing well with the LEEDS M.F.C., record times to date being 1 : 32·8 H.L. by H. Tubbs, and 1 : 21·3 R.O.G. by C. Furse. These two chaps shared the honours at two recent competitions, Furse winning the first with an aggregate of 3 : 06·4 and Tubbs the second with aggregate of 4 : 13·3. H. Vauvelle was runner up in each case. Outdoor flying records so far are held by Tubbs with 2 : 10·3 H.L. and 1 : 36 R.O.G.

It was decided at a recent meeting to reform the THAMES VALLEY M.A.C. The officials have been appointed and new members will be welcomed. Applications for membership should be made to the Secretary, c/o 5, Crown Passage, Kingston-on-Thames.

The AYLESTONE M.F.C. are on velvet! They have acquired a hall for indoor flying, two small rooms for general use, and—though how they've wangled it is a mystery—a *canteen*. The sweet young things who serve in said canteen are all young and innocent—one even wanted to know what balsa wood was!! A. Law won a recent r.t.p. event with an aggregate of 3 : 10, with second placer W. Jones timed at 2 : 52.

Mr. C. Hedges, of 13, Birchway Avenue, Blackpool, is the newly elected secretary to the BLACKPOOL & FYLDE M.A.S., and sends along the following scheme recently introduced into that club. Others may like to adopt this system.

PLANE RECOVERY SERVICE.
(P.R.S.)

The decision of the Committee on all points in connection with this scheme will have to be accepted as final, and it must be realised that the success of the scheme will depend very largely on the good-will of the members concerned.

The value of each machine entered under the scheme will be an amount equal to the cost of the material used in its construction and will be taken to the nearest half-crown.

A small label will be affixed to each machine offering a reward to the finder, on the plane being returned to the Club.

The reward payable will be decided by the Committee and will be calculated having regard to the value of the machine. Rewards, of course, will be payable by the "P.R.S."

Advertisements, if necessary, will be inserted in the "lost" column of the local paper.

The cost or "premium" will be at the rate of 3d. per half-crown, i.e., 10 per cent. of the value of the machine (as above) per HALF year commencing 1st January or 1st July.

If a plane is completely lost, or is accidentally destroyed, the owner will receive compensation up to full value (as per second paragraph above) of the machine. ("Accidentally destroyed" will include such things as: landing in a roadway and being "run over": alighting in the lake: etc.).

Any claim for lost or destroyed machines shall be placed before the Committee for settlement.

A "gang" of some of the younger members, particularly those with cycles, who are not flying (say, some of the "solid" members) could be employed at flying meetings as "chasers," being rewarded in some way for their services in retrieving planes, thus cutting down the risk of losing planes.

Members are also recommended to join the N.G.A.

Members of the HARROGATE Aircraft Club have had some good flying lately in their new field, Mr. Harding breaking the Club record with a model of his own design, time being 2 mins. 15 secs. New members will be welcomed; please communicate with the Hon. Treasurer, P. Duffy, 14, Malden Road, Harrogate.

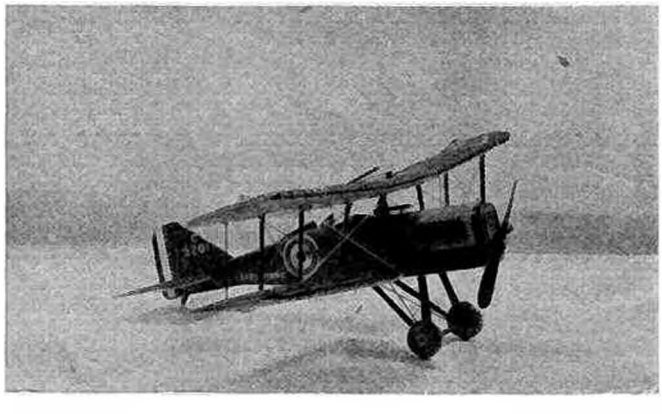
Flying Officer R. D. Kerr writes as follows:—

"I have been greatly interested in reading of McGillicuddy and his pet seagull Drambuie, and am prompted to write to you in view of an interesting experience encountered by a friend of mine, to enquire whether McGillicuddy has been visiting this district recently.

"My friend was flying a Lysander one morning a short while ago, when he was surprised to see a seagull formating on him—tucked in close under the starboard wing. He tried a few gentle turns to see if the seagull could keep in position. The seagull did so—beautifully—whereupon my friend tried to shake it off by taking violent evasive action, and actually dived to a speed of 220 m.p.h.

"Our feathered friend stuck tighter than ever, and even kinked a derisive eye at the Lysander! Here my friend

Nice little job of work by R. B. Fincham, of Cheltenham the model of course being the good old S.E.5.



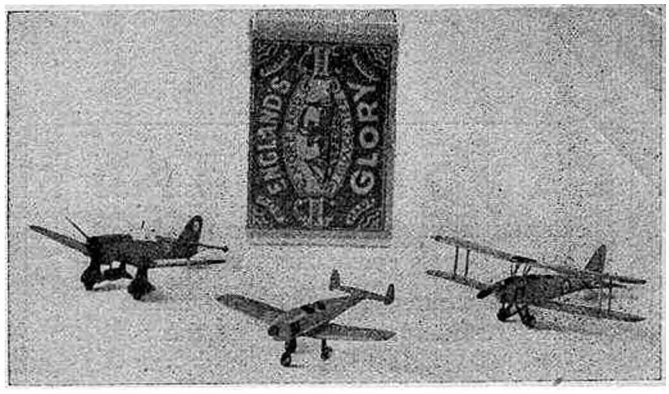
showed great ingenuity. He throttled back, changed to fine pitch and reduced speed to minimum cruising. Here the seagull stalled violently, dipping the left wing in doing so—and was not seen again.

" I hope this event will interest your readers. I wonder if it could have been Drambuie ? ? "

April 25th is the date fixed by the SHEFFIELD AIR LEAGUE SOCIETY to run off the Wilkinson Challenge Cup, open to all modellers in the Sheffield area. Contest is for three flights (2 r.o.g. and 1 h.l) for fuselage type models up to 7 ft. span, and members must be insured with the N.G.A. Winner holds the trophy for 6 months.

A second indoor flying Gala staged by the PHAROS M.A.C. proved an even greater success than the initial effort, and times were generally better owing mainly to the larger hall. Six visiting clubs were entertained, and Bill White, of Blackheath, had a real day out, winning the open duration event, and setting up best time of the day. Results were :—

		Aggregate
Flying Scale :	F. Houchin (Pharos)	55
	G. P. Tebb (Pharos)	45.5
Open Duration :	W. White (Blackheath)	215
	D. Lindo (Harrow)	172
Team :	Harrow	322
	Blackheath	293
Best time of the day. W. White		112

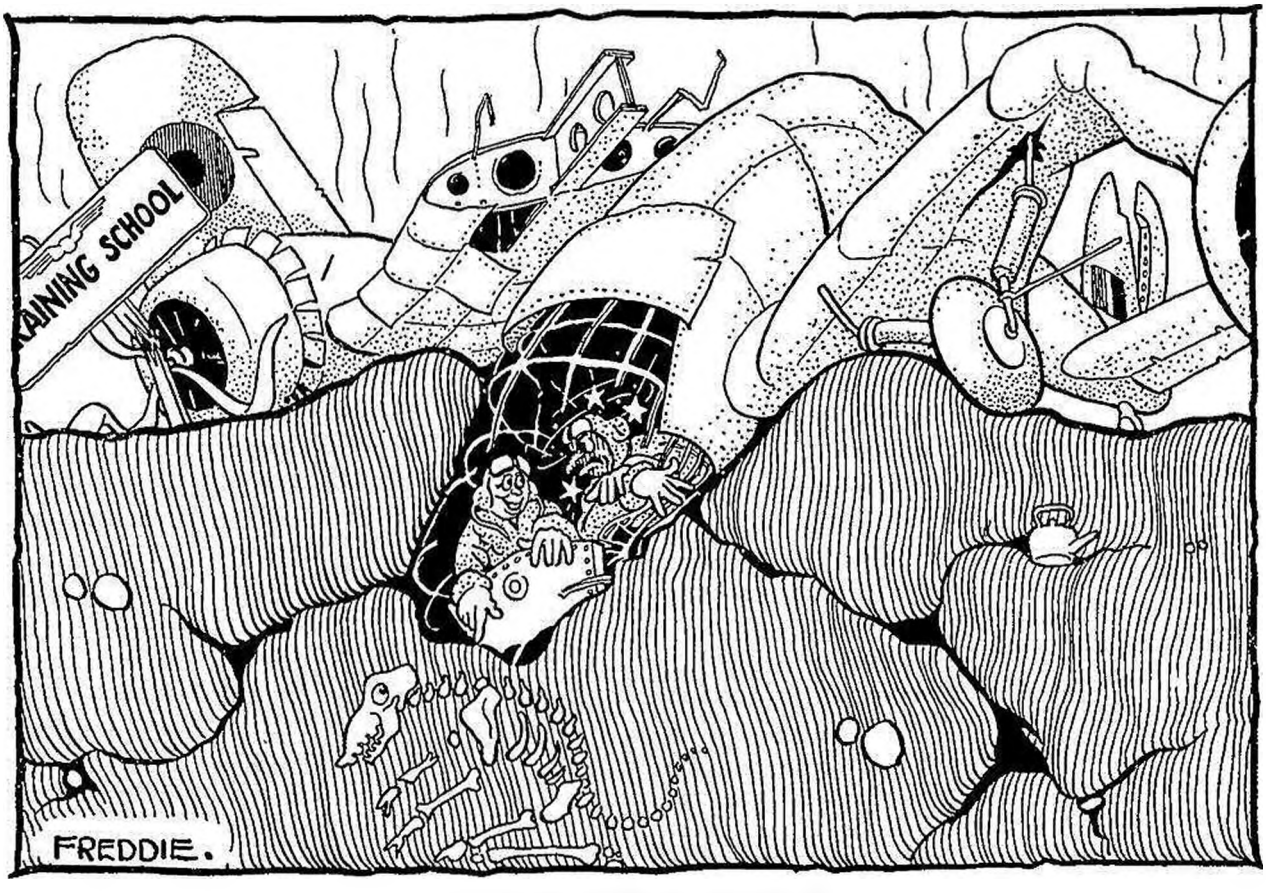


Another lot of models built by R. B. Fincham—this time a collection of real " tinies," as comparison with the matchbox shows.

Programme for the BEVERLEY & D.M.A.C. annual rally, held on the 30th May is as follows :—

1. Under 30-in. rubber.
2. Over 30-in. rubber.
3. Gliders—any type.
4. Wakefield.
5. Flying Scale.

The LUTON & D.M.A.S. recently held their annual Dinner and Social, during which prizes for the past year's successes were distributed. Winners were Messrs. Barrett, Clark, Hinks, Bateman, Capper, Poulton, and Mrs. Clark, who built and flew an " Ajax " with great success during the season. A drum, subscribed by members and friends, was presented to the local A.T.C.



" LOOK, SIR! A FOSSIL "

THE
CATON TROPHY
presented by the manufacturers of Caton's Super Power Aero Strip.

The winner for the 1942 season is
MR. M. WRIGHT of the
BUSHY PARK, M.F.C.
His time was 29 minutes 37·5 secs.

This Competition is open to all, from March to September, and Caton Limited give a cash prize each year of £5 5s. to the winner declared by The Society of Model Aeronautical Engineers.

group, who are also enthusiastic supporters of the model club.

The cat is out of the bag at last!! Mr. Hassall of the BIRMINGHAM M.A.C. demonstrated his 10 minute r.t.p. model at a recent gala day of the club, attended by Sir Robert and Lady Bird, both of whom are keen aeromodellers. Hassall's model is a modification of the Miles Majister, plans of which were printed in THE AERO MODELLER, and is powered with an electric motor. Take off is in about 12 feet, and landings, etc., are perfectly controlled by means of a resistance. Flight times are limited by battery capacity, speed being approximately 15 m.p.h. All up weight is 7 ounces. We hope to give details of this model in a later issue.

Three competitions held resulted as follows —

		Aggregate
Free Flight (any type) :	G. Bradwell	61
	F. Lewis	46.8
Class A.R.T.P. :	G. Bradwell	84.3
	N. Lancashire	53.2
Class B.R.T.P. :	J. Tyler	167.2

D. Jennings of the EAST BIRMINGHAM M.A.C. is going flat out to beat the Birmingham club's record of 1 : 47. His best time to date is 1 : 31.

To keep the ball rolling during the winter months, the BRISTOL & WEST M.A.C. held some glider contests, models being winch launched with 150 feet of line. Results were :—

		Aggregate
Glider F.A.I. :	C. E. P. Smith	102.8
	A. H. Lee	99
	J. Weber	69.6
Open Glider :	C. E. P. Smith	89.2
	R. T. Howse	83.8
	W. J. Gould	59.8
Glider F.A.I. :	C. S. Wilkins	87.1
	W. J. Gould	59.1
	A. H. Lee	53.4

The MERSEYSIDE M.A.S. held an indoor competition on the 14th February, during which all standing records went by the board. Machines were to Class "A" specification, and I. Cameron soon broke his own record of 93 secs. with a flight of 104 secs. Full results were :—

Junior.	M. Dabison.	87.35 aggregate for 2 flights.
	N. Davies.	64 aggregate for 2 flights.
Senior.	I. S. Cameron.	185 aggregate for 2 flights.
	R. F. L. Gosling.	124.53 aggregate for 2 flights.

The COVENTRY M.A.C. will commence operations on the 2nd May, at 3 p.m., at the field by "Hillcrest," Shelton Lane, Barnacle. Will all persons interested get in touch with the Secretary, T. Long, 18, Torcross Avenue, Coventry.

A number of chaps are wishing to get clubs going in their localities, and I give their names and addresses in the hope that other enthusiasts will get together and form new clubs.

R. A. Kent, Highland Park, Westhill, Ottery St. Mary; F. J. Dempsey, 62, Holomfouldhead Drive, Glasgow, S.W.1; J. S. Jenner, Alma House, High Street, East Malling, near Maidstone; C. Gaoter, 20, Hamilton Avenue, Barkingside, Ilford; S. Hallam, 77, Port Arthur Road, Swinton Dale, Nottingham.

J. F. Marwood, of 17, Houselands Road, Tonbridge, would like a pen pal about his own age, 15 years.

Surgeon-Lieutenant J. R. Stuart-White, of H.M.S. Norfolk, wishes to buy a petrol engine, but owing to the fact that by the time he reads announcements in these columns, any sales have been snapped up, he asks that any reader with an engine for disposal get in touch with him prior to making a general announcement in these columns. Address is c/o G.P.O.

And so, that's that for this month, and let's look forward to a bumper season, with plenty of good weather, and tons of thermals. I hope to hear of plenty of successful competitions, and now push off to try a spot of building myself. Cheerio.

The CLUBMAN.

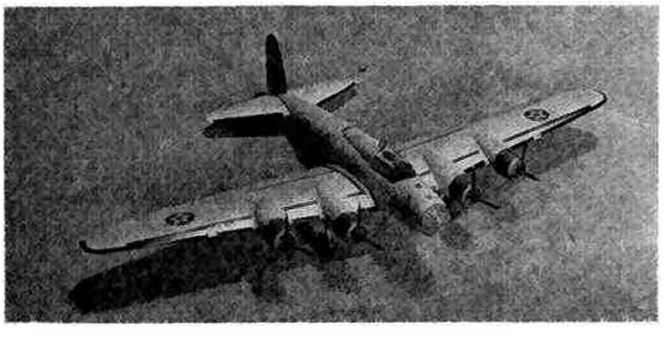
NEW CLUBS.

THAMES VALLEY M.A.C.
c/o 5, Crown Passage, Kingston-on-Thames.
NEWTON ABBOTT & D.M.A.C.
L. H. Webber, 43, Lime Tree Walk, Newton Abbott, Devon.

Secretarial Changes.

EASTBOURNE M.F.C.
J. Finch, The Drive Hotel, Victoria Drive, Eastbourne.
BLACKPOOL & FYLDE M.A.S.
C. Hedges, 13, Birchway Avenue, Blackpool.
TOLLCROSS & D.M.F.C.
B. Lane, 68, Easdale Drive, Shettlestone.
HEYWOOD M A.C.
H. D. Mason, 5, Rose Hill Street, Heywood, Lancs.
BRIGHTON D.M.A.C.
M. Down, 172, Old Shoreham Road, Brighton, Sussex.

This solid model "Fortress," built by G. Parkinson, of Chorley, features hollow fuselage and retractable undercarriage.



SOCIETY OF MODEL AERONAUTICAL ENGINEERS

The Minutes of the Annual General Meeting, held at The Royal Aero Club, 119, Piccadilly, W.1, on Sunday, February 14th, commencing at 11 a.m.

In the Chair :—Mr. A. F. Houlberg.

A splendidly attended meeting heard the Chairman open the proceedings by calling upon the Hon. Secretary to read the minutes of the last Annual General Meeting. These were confirmed by the acceptance of the resolution for adoption moved by Mr. H. W. Hills and seconded by Mr. W. M. White. The opportunity was taken by the Chairman to get the minutes of the Extra-ordinary General Meeting passed. After these had been read by the Secretary, Mr. Jackson moved, seconded by Mr. C. S. Rushbrooke, " Their adoption as read." Carried.

The Secretary's Annual General Report.

The Report followed.

The adoption of the report was moved by Mr. E. Keil and seconded by Mr. Jackson. Carried.

The Hon. Treasurer then submitted his Annual Report and Balance Sheet.

The Report followed.

The adoption of both was moved by Mr. Buckeridge and seconded by Mr. Collet. Carried.

Following the report, Mr. C. S. Rushbrooke moved, seconded by Mr. Briggs, " That a copy of the Balance Sheet be sent out by the Hon. Sec. together with the notice of the Annual General Meeting to the members." Carried.

The Competition Secretary's Annual Report.

Mr. H. J. Towner who had been co-opted on the Council recently with a view to assisting in competition matters, then gave the report in the absence of Mr. J. C. Smith.

The Report followed.

The adoption of the report was moved by Mr. H. P. Costenbarder and seconded by Mr. C. A. Rippon. Carried. Mr. Towner was thanked by the meeting for a fine effort.

The Election of Officers.

(Mr. D. A. Russell was elected Chairman for the purpose of the election).

The Election of Officers resulted as follows.

Vice-Presidents : Lt.-Col. C. E. Bowden, Capt. Pritchard, Capt. Plugge, and Mr. H. E. Perrin.

Chairman of the Society and Council	Mr. A. F. Houlberg.
Vice-Chairman of the Society and Council	Mr. C. A. Rippon.
Secretary of the Society	Mr. A. G. Bell.
Treasurer of the Society	Mr. L. J. Hawkins.
Competition Secretary of the Society	Mr. H. J. Towner.
Editor of the Journal	Mr. A. A. Courtney.
Press Secretary	Mr. H. W. Hills.
Records Officer	Mr. L. G. Temple.
Technical Secretary to the Society	Mr. A. F. Houlberg.

(The two Auditors to the Society : Messrs. D. A. Russell and E. Keil).

Ten names went to the vote for the other four positions on the Council.

The result was as follows :—Miss M. A. Green, Messrs. H. P. Costenbarder, C. S. Rushbrooke and W. M. White. The other six were : Mrs. Buckeridge, Messrs. Farthing, T. W. Wickins, Buston, Jones and M. R. Knight.

Fellow of the Society. The meeting elected Mr. A. G. Bell a Fellow of the Society.

The Secretary was also granted £20 Expenses Allowance for the past year.

1943 Outdoor Flying Programme.

The Council offered as a basis for discussion a list of competitions for the coming outdoor season. This resulted in a lively debate mainly because the Council had suggested that Gliders built to the Wakefield Formula, might be used in contests with a view to gaining further experience of this type of model. They felt that many lessons, even without the use of rubber were still to be learned. Mr. L. G. (Glider) Temple was in his element on this subject and his protest against " mixing the breeds " was ably put. He had many to support his views, and the Secretary at this point suggested that all Glider Competitions be of the " open type." This was agreed to by the meeting, but a reminder from Mr. E. P. H. Cosh, who we were pleased to see with us, that the Thurston Cup could only be contested under F.A.I. rules, caused the meeting to keep this contest apart from the other Glider Competitions.

The Brochure which now takes the form of a folded booklet, was displayed at the meeting, and on the resolution moved by Mr. E. P. H. Cosh and seconded by Mr. H. F. Costenbarder " That the Brochure goes out with no alteration to the Clubs to be used for the ' Wings for Victory ' exhibitions," was carried. Mr. D. A. Russell kindly agreed to arrange for the printing of the Brochure after the displays free of charge to the Society. He would use the outside of the back page for advertisement space for THE AERO MODELLER.

A hearty vote of thanks to the Chair was moved by Mr. C. S. Rushbrooke, seconded by Mr. D. A. Russell, was carried and brought the meeting to a close at 2.45 p.m.

A. G. BELL.

Regarding the two advertisements on page 732 of our last issue, we wish to make it clear that both of these were of half-page size. The " Large Range of Solid Model Accessories, all to 1/72 Scale " were advertised by the Northern Model Aircraft Co., and NOT by The Model Shop of Leeds, as might be inferred by the make-up of the two advertisements referred to above.

Kindly mention THE AERO-MODELLER when replying to advertisers.

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