

AERO MODELLER

MAY, 1940
VOL. 5 No. 54

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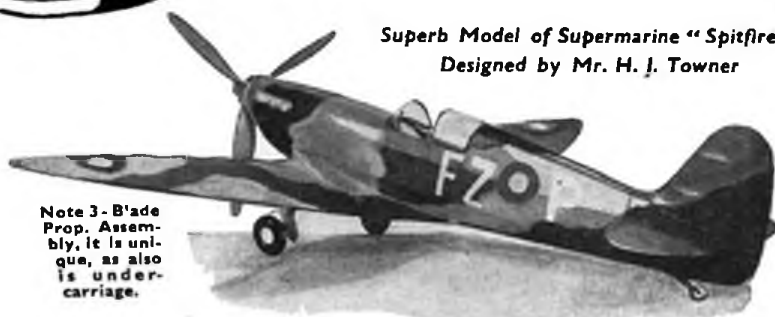
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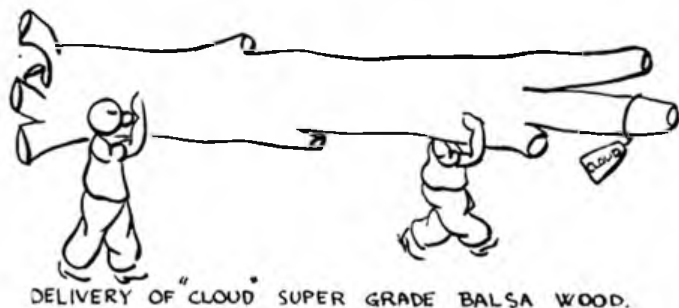
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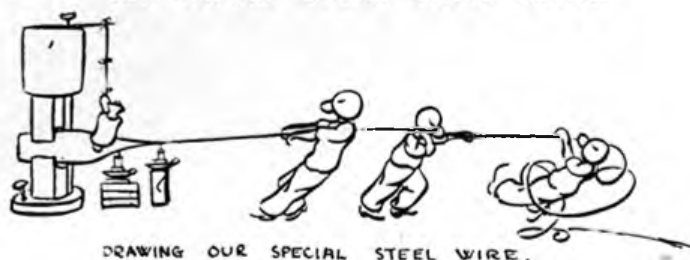
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Mr. F. W. Gates best flight was 104.6 sec. Extract from a letter from the W.S.M.A.S.: "Surely no finer tribute could be offered to "Cloudcraft" models."

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THE AERO-MODELLER

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NEWARKE STREET, LEICESTER, ENGLAND

Editor : C. S. Rushbrooke

Managing Editor : D. A. Russell, A.M.I.Mech.E.

Draughtsman : C. A. H. Pollitt

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Editorial

MAY - - 1940
Vol. V. - No. 54
Tel. Leicester 65322



OUR recent Editorial remarks regarding aero-modelling in L.C.C. institutes has brought us several interesting letters:—

Mr. C. T. Bird, whose activities we have already dealt with, has a steadily increasing attendance at his classes held in Holloway.

Mr. W. Wyse, of Fulham Men's Institute, has a very successful class. Here again our well-known Mr. M. R. Knight, of the S.M.A.E., is the instructor. Mr. Wyse says that his Institute added aero-modelling to its curriculum over a year ago, and recently held, with the co-operation of the Victoria and Brixton Model Aero Clubs, its third exhibition of model aircraft. Over 70 models were on view, representative of every type of model aircraft. Mr. Wyse concludes his interesting letter to us by saying that the model aeroplane class meets every Monday and Thursdays, from 7.30 to 9.30 p.m., and that new members will be welcomed, and offered, in addition to theoretical and practical instruction, pole flying, canteen facilities, and an air raid shelter.

Another institute where good work is being done is the Cloudesley School, Dowry Street, Islington, N.1. Here are held junior classes for lads from 14 to 18 years. The No. 9F Islington Squadron, of the A.F.D.C., also has its headquarters in this Institute, with Mr. H. Simmonds, of Blackheath M.A.C., as instructor.

From Mr. A. S. Notman we have had news of the Bethnal Green Institute classes, which were some of the first to be started within the L.C.C. organisation. We understand, however, that as at the outbreak of war the Government confiscated the Institute, the club and classes have had to be discontinued, though apparently most of the members have joined other local clubs.

It has been very gratifying to note the way aero-modellers have come forward to assist their local Institutes and Squadrons of the Air Cadet Corps as instructors, and we hope that this good work will continue.

Enter Mr. C. S. Rushbrooke.

From time to time we have given indications on these pages of the growth of the aero-modelling movement in general and THE AERO-MODELLER in particular.

It is just on three years ago that the journal came under its present ownership, and at that time the circulation was under 6,000 copies per month. For *this* issue we have printed 27,000 copies. There was a time when, if our mail exceeded a dozen letters per day we felt somewhat overwhelmed. Now our mail runs into several hundred letters per week, and from time to time the staff at our offices has accordingly had to be increased!

In the autumn of last year we recorded the appointment of Mr. J. H. Elwell as Assistant Editor, and in recent issues we have published articles by him on "solids," a type of model about which he knows a great deal. Mr. Elwell has now been called upon to serve his country, and for the time being his services will no longer be available to THE AERO-MODELLER. We feel sure that our readers will wish Mr. Elwell a safe and speedy return to his duties in the near future.

Now, with a view to considerably strengthening our organisation, we are pleased to announce that Mr. C. S. Rushbrooke has joined the staff of THE AERO-MODELLER, and will be in charge of the editorial offices at Leicester. Mr. D. A. Russell will continue as Managing Editor as before. Mr. Rushbrooke is, of course, too well-known to our readers, whether as an expert aero-modeller or the writer of instructive articles with a humorous twist, or as the author of the "A.B.C. of Model Aircraft Construction," to need further introduction to our readers, but we count ourselves fortunate in having secured the full time services of a man of such wide knowledge and experience in model aeronautics.

At the beginning of the year we hinted at a number of new features to be introduced into THE AERO-MODELLER throughout this year, and with the coming of Mr. Rushbrooke we are pleased to announce two more. Commencing in our July issue, Mr. Rushbrooke will conduct a page of "asked-and-answered" questions. He will select from the considerable number of enquiries we now receive some half-dozen of general interest to our readers, and these, together with the answers, will be published month by month. The second feature will be entitled, "Around the world of model aeronautics," and will be devoted to a pictorial record of what aero-aero-modellers are doing in other countries.

We receive quite a number of letters from all parts of the world, together with a number of magazines and papers dealing with aeronautics, both full size and model. Mr. Rushbrooke will extract from them the most interesting items of news, together with a number of photographs. We feel sure that this feature will be of interest not only to readers in this country, but to those in other countries.

The Air Cadet.

The interest shown in the "Air Cadet" designed by Mr. C. A. Rippon has been enormous. We understand that already there are a considerable number of models in various stages of completion, in fact, some of them have been waiting for the publication of this issue, in which are published the concluding instructions for building the model!

We publish herewith a short note from Mr. L. Taylor, Secretary of the Air League of the British Empire, accepting on behalf of the Air Cadet Movement the Silver Challenge Trophy we have offered for competition of teams from the squadrons flying models of the "Air Cadet":—

"The Committee of the Air League instruct me to thank you very much for the offer of a Silver Trophy for competition among the aero-modellers of the Air Defence Cadet Corps. They have great pleasure in accepting this generous offer, and hope that the competition which you have thus instituted will have the effect of improving the standard of modelling throughout the corps."

Bob Copland's 1940 Wakefield Model.

The interest shown in Bob Copland's 1940 Wakefield Model has also been enormous, and for a few days we were inundated with orders for copies of the magnificent set of plans we offered at the nominal price of 1s. post free.

We still have a number of sets of plans available, though early ordering is desirable. We announced last month that we proposed organising a competition on novel lines regarding this model, and are pleased to announce the rules, which are set out below.

"The Heart of Your Model. . ."

There is rubber and rubber. . . The trials and tribulations of the aero-modeller are not made the easier by

the (alleged) variations to be found in strip rubber. On the flying field one hears So-and-so boasting So-and-so's rubber, and someone else says that Someone-else's rubber is so much better! In most cases these expressions of opinion are of very little real value, since so many varying conditions can apply to an individual supply of rubber. In our March issue we published an article by Mr. J. H. Maxwell describing the researches made by a number of Scottish aero-modellers who took the trouble to test out various brands of rubber.

In our next issue we shall be publishing an article by Mr. P. Clegg entitled "The Deterioration of Rubber." In sending this article Mr. Clegg gave us particulars of his employment, and explained that he had at his disposal certain machinery not found in the average aero-modeller's workshop, and that he had also spent a number of years investigating characteristics of rubber. We feel, therefore, that his contribution is a valuable one, in that it is based on actual scientific research and experiment, and is not just so much an expression of personal opinion.

We Hear of Another Wind-tunnel.

Also in our March issue we published an article by Messrs. E. J. Powdrill and A. H. W. Macbean, who gave the results of a number of tests they had made on a wind-tunnel at Cambridge University. This article appears to have been well received. A few days ago we had a call at our offices from Mr. Powdrill, who showed us the results of quite a number of experiments he and his colleague have been making. They are fortunate in being able to obtain the use of a 20 in. by 30 in. section enclosed type wind-tunnel, which has recently been installed in the Zoological Laboratory at Cambridge, primarily for research work in connection with bird flight. By the kind permission of Dr. R. H. J. Brown, our contributors are hoping to continue their research throughout the summer, and we are pleased to announce that we have arranged that these will be made available for exclusive publication in THE AERO-MODELLER.

The next article in this series will also be published in our next issue.

Messrs. Powdrill and Macbean have also conducted a number of experiments with rubber motors, and these also will be made available to our readers in the near future. With the limited resources available for the

THE AERO-MODELLER "COPLAND'S WAKEFIELD MODEL" COMPETITION

Prizes: 1st £3 - 3 - 0 2nd £2 - 2 - 0 3rd £1 - 1 - 0
25 Consolation Prizes

RULES

1. All readers of THE AERO-MODELLER are eligible for entry, with the exception of employees of the company.
2. There is no entry fee.
3. The model must be entirely constructed by the entrant, and must be substantially to the published design.
4. Entries must be made on an official entry form obtainable from the offices of THE AERO-MODELLER.
5. Models will be judged on:
 - (a) Specified performance, as indicated on the official entry form.
 - (b) Construction and finish, as noted from photographs submitted by the entrant. Up to six (6) photographs may be forwarded. (Professional reproductions are advised.)
6. It is a condition of entry that the copyright of all photographs of the prizewinners' models will become vested in The Model Aeronautical Press Ltd., proprietors of THE AERO-MODELLERS.
7. A panel, consisting of the Managing Editor, the Editor, the designer, and one technical adviser, will judge the Competition, and it is a condition of entry that their decision must be accepted as final and binding on all points.
8. Entries must reach the offices of THE AERO-MODELLER by not later than August 31st, 1940.

Send a stamped addressed envelope for the official entry form.

majority of aero-modellers and clubs in this country the opportunity of the use of such apparatus is accorded to few, and we feel that aero-modellers in general will appreciate the courtesy of Dr. Brown in permitting the use of such valuable scientific apparatus for the study of science model aeronautics.

R.S.V.P. . . . and Oblige!

We understand that at the last Emergency Committee meeting of the S.M.A.E. attention was drawn to the remarkable lack of co-operation received from certain clubs, particularly with regard to questionnaires, etc., sent to them. A case quoted was the recent ballot on the question of cash prizes, when only a matter of approximately 60 per cent of the clubs circularised took the trouble—or, may we say, had the courtesy—to reply to the important questions asked.

Evidently somewhat the same trouble has been experienced by the executives of the movement in America, as the following quotation infers:

"A number of clubs have been informed that it is necessary for them to notify the governing body of their active membership, together with the name and address of the person or persons responsible for the conduct of business and correspondence.

"The reason for this is that clubs frequently change secretaries, addresses, or just 'fold up' and fade away without notifying headquarters, with the result that copies of journals, correspondence, etc., continue to be sent, and are a complete waste.

"The publications, etc., sent out are the property of the club, and should be turned over to the club, or discussed during club meetings. In requesting the

names and addresses of club executives, and notification of the continuance of the clubs, the governing body is protecting the club, and checking up its own files to ensure that it is not carrying a lot of 'dead wood' as far as defunct clubs are concerned."

Which all describes perfectly the position of the S.M.A.E., so remember—the fewer inactive groups the S.M.A.E. carries along, the more it can do for the active clubs!

Tail-piece.

From time to time we have drawn attention to the activities of some of the largest model aeroplane clubs in the country, where their membership is well over the hundred mark, how well organised they are, and what able men they have for officials—here is another side of the picture. We quote direct from a letter recently received from Master Ronald Coutts, secretary and treasurer of the Forfar Model Aircraft Club. He says: "The oldest member of the club is myself (16 years), and the youngest is 9 years old. There are 14 members, entirely self taught, and always very interested in 'gadgets' and new construction methods in THE AERO-MODELLER. Our duration record is 90 seconds R.O.G. so far. Our club-room is a disused photographic studio, measuring about 15 ft. by 30 ft. We hold pole flying events, and the record is 45 seconds round a pylon 5 ft. high, with a cord of 15 ft. radius. This may not seem too good, but all the models we use are of the outdoor type." We feel that all our readers will join in congratulating members of the Forfar Model Aircraft Club on their keenness and energy; and will wonder that it was ever suggested that the aero-modelling movement might suffer due to the outbreak of war.

D. A. R.

IN OUR NEXT ISSUE

★ A fully illustrated article describing an 8' span High-wing Petrol 'Plane	-	By D. A. Russell
★ Solid Scale Model Monoplanes	-	By H. McDougall
★ The Design of Tapered Wings	-	By Norman Hall Warren
★ Thermals	-	By R. W. Parr
★ Designs for the Scale Model Builder—VI	-	By Peter Garrod Chinn
★ Folding Propellers	-	By G. W. Day
★ The Deterioration of Rubber	-	By A. Clegg
★ A built-in direct reading Motor Turns Indicator	-	By S. E. Capps
★ Wind Tunnel Tests on Model Airfoils—II	-	By E. J. Powdrill & A. H. MacBean
★ The Aero Modellers' X-word—a novelty	-	By A. N. Other

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SLOTING FUSELAGE FORMERS QUICKLY By S. E. CAPPS

CUTTING slots in fuselage formers of a model to take longerons and stringers can be, and often is, a tedious job, and the more tired one becomes the more inaccurate the slots are cut.

When one takes, for instance, twelve formers for, say, a "Wakefield" type of fuselage that has anything from a dozen to two dozen stringers to form the shape, the job to cut the large number of slots required is not one to be relished.

Accuracy obviously must be the key to a successful shape, as many modellers know that badly cut formers prevent the smooth lines required for the modern machine being obtained. Besides, it has always been the opinion of the writer that correctly cut formers help considerably in the assembly, which can be accomplished in much less time.

To avoid, as far as possible, the tiresomeness mentioned above, and to ensure the former's slots being all the same depth, the device shown in the illustration was constructed. This arrangement was rigged up from an ordinary bench grinder, which it is assumed most aero-modellers possess, and was found so successful that it may be of use to others.

Slight alterations are required, and in no way impair the working of the grinder as a grinder. The grinding wheel is first removed and a wood disc substituted. This is shown at A in the sketch.

Next, drive into the front of the disc an ordinary nail of the kind known as cut nails. These are usually square and are more suitable for filing to shape shown at B. It is important that this should be done very carefully and the shape correctly arrived at. See also that the front cutting edge is very keen. Next cut a piece of plywood about $\frac{1}{4}$ in. thick, and secure this to the grinding rest with screws

as at C. Cut a mouth in the table thus formed by revolving the cutter and very carefully pressing the table against it. This is clearly shown in the illustration.

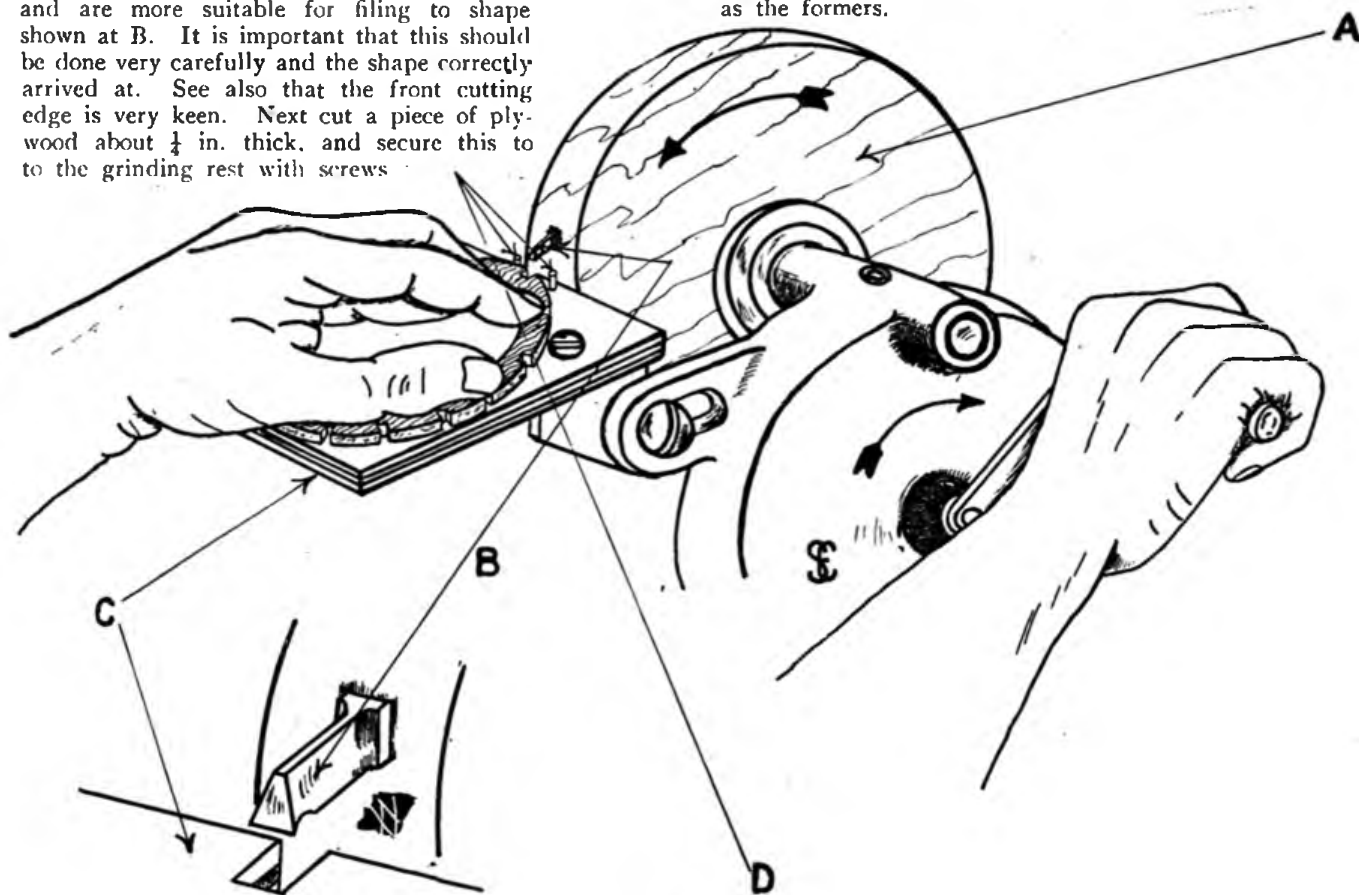
It is also important that the table should be at the correct height, and a good way of ascertaining this would be to lay on the top of the table a straightedge such as a rule, and to raise or lower the table until the lower side of the edge passes right across the centre of the grinder spindle.

Note very carefully the exact amount of depth required for the slots in the formers, and after cutting one slot this depth in one of the formers, place it in position on the table with the cutter in the slot.

Now carefully drive into the table the two small pins D. The object of these is at once apparent, as it will be seen that the slots can only be cut to the depth allowed by the position of these pins. Now, in operating the machine, the faster the cutter is revolved the cleaner the slot, particularly at the edges and corners.

Feed the formers on to the cutter very slowly and carefully, at the same time revolve the cutter as fast as it would be if it was used for grinding.

Carry out all operations with very great care, and the production of good, accurate, clean-cut formers can be accomplished in record time. Take great care also to keep the finger tips away from the cutter edge, as it will be at once realised that, should the cutter just catch the finger-tip it will slot that with equal facility as the formers.



A FLYING SCALE MODEL OF THE HEINKEL He 112

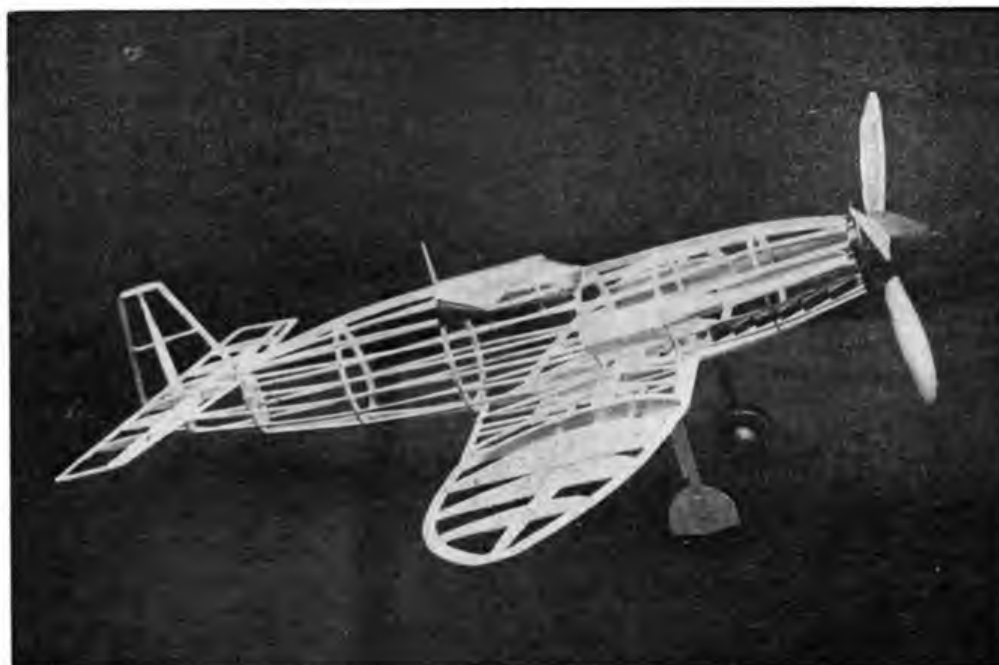
Designed by

C. A. H. POLLITT,

"Aero-Modeller,"

Staff Draughtsman

This fine photograph shows the clean lines and easy-to-build construction incorporated by Mr. Pollitt in his model.



SINCE the outbreak of war we have heard a great deal about the German Heinkel; in fact, the name has become inseparably associated with the abominable raids on our fishing fleets. However, the model I am dealing with this month is the Heinkel fighter, as distinct from the Heinkel bomber.

Dr. Ernst Heinkel, the German aircraft designer, has produced a variety of designs, varying in purpose from single-seat fighter aircraft, of which the He.112 is the most recent development, to the He.116, which is a trans-oceanic mail 'plane—four-engined job. What may have been the forerunner of the He.112 was the He.70, a commercial monoplane with saloon accommodation. One of this type was bought by the British Air Ministry for experimental and development work some years ago. I myself have actually worked on this machine, and it is my considered opinion that it is, to all intents and purposes, a demilitarised He.112. The general proportions of each are identical, and both are characterised by the gull wing. The tail units differ slightly, as do the cockpits. In the air the Heinkel is a remarkably "clean" looking job, though to my mind the elevator spar appears to be rather on the big side. It is interesting to recall that it was a Heinkel He.112U which established a world's speed record of 464 m.p.h. in March, 1939. This record was very short-lived, for it was again raised to a slightly higher figure by, if I remember rightly, a Messerschmitt. The disposition of the fuselage machine-guns rather mars the effect of an otherwise well-faired fuselage, though the slight loss has been obviously minimised.

Those of my readers who built the Messerschmitt I described in the February issue of THE AERO-MODELLER will quickly recognise the structural similarity of the Heinkel to it. The Heinkel is hardly as simple a model to build as was the Messerschmitt, yet all that is needed is the usual patience and, of course, time!

This, the Heinkel, is the first model to which I have chosen to fit detachable outer wing panels. There is nothing new about this, I know, but I have found that the benefits derived from this arrangement amply justify the extra time (and energy!) spent in making it. With this type of wing fixing it is not possible, or even intended, to guard against the wing being damaged in the event of a bad landing. Nevertheless, the arrangement does make for ease of replacement, and enables the entire model to be packed away comfortably in a box no larger than an ordinary shoe box. Strangely enough, shortly after I had completed this model I was, one morning, waiting outside a railway station, when a party of school-boys meandered by. They had obviously just come off a train, in from the country, and were on their way to school. Slung across his back, one of the boys had a large cardboard box. I should say, fully thirty inches deep and about twelve inches square, and protruding from the top of the box—it had no lid—were the fuselages of several models—mostly duration models, I believe. The thing that struck me was the infinite care and attention the boy must have taken in order to save his models from damage, particularly in the crowded hall of the station. The region in the immediate vicinity of his back and shoulders appeared to be a positive mass of elevators and wings, plaintively asking to be "wiped off." The incident instinctively brought to my mind the detachable wings of the Heinkel, and I felt finally satisfied as to my choice.

And now to the building of the Heinkel.

After having cut out the fuselage formers and attached to them the main top and bottom members of the fuselage, the $\frac{1}{16}$ in. square stringers may be fitted, taking note that it is on two of these stringers that the pilot's "glasshouse" is carried. On to the appropriate stringers the gun fairings on the fuselage sides can be fitted, and also the radiator fairing, which again is carried on two



The attractive lines of the Heinkel are revealed in these two photos of Mr. Pollitt's model. Duration is from 20—35 seconds, according to weather conditions.

stringers, this time specially prepared for the purpose and extending from No. 4 fuselage former to the wing trailing edge. The exhaust manifolds also sit on the stringers and can be added at this stage, though personally I always prefer to fit them after having covered the model.

One point calling for particular attention is the trough extending forward of the gun fairings, as far as the nose-block. This trough, of course, is purely intended to give a clear path for the machine-gun bullets as they speed from the gun and away through the propeller. On the model it is made from a length of solid balsa, shaped as shown on the drawing, and with the trough becoming gradually shallower as it nears the nose-block.

Again, as on the Messerschmitt, and for the same reason, don't finish the construction of the rudder until the elevator is in position, or else it will be found that the elevator "just won't go on."

The elevator—notice the span—is a separate unit, built in one piece and comprising a main spar and six elevator ribs. The spar, it will be observed, is well forward and picks up with the top rear member of the fuselage.

A feature that I was unable to show on the drawing,

owing to insufficient room (in turn due to economy of paper) is the method of carrying the trailing edge of the stub wings right into the centre of the model; in fact, picking up with the main bottom member of the fuselage.

Before completing the fuselage, cover the leading edge of the stub wings with 1/64 in. sheet balsa, and finally fit the undercarriage.

Next come the wings. Now these are in themselves quite a simple and straightforward job, comprising a single main spar and four wing ribs. The point to watch is the alignment of the bamboo dowels with the cardboard tubes accommodating them. The tubes should make a reasonably firm, though by no means a tight, fit with the dowels, and I would lay particular stress on this point. Frankly, I feel, on reflection, that it would perhaps have been better had I arranged to fit a shorter length of tube than that shown on the drawing, for the longer the tube—and the dowel—the greater the risk of their *carping*, and so resulting in too tight a fit.

In covering the model, the under surfaces of the wings and fuselage should be done with a white tissue, and the remainder covered with black tissue. The insignia is as shown on the drawing.

LIST OF MATERIALS.

Fuselage.

- Two sheets of $\frac{1}{16}$ in. $\times$ 3 in. $\times$ 3 ft. balsa, for fuselage formers, rudder, elevators, wings, air intakes, etc.
- Sixteen lengths of $\frac{1}{16}$ in. square $\times$ 3 ft. balsa, for stringers, etc.
- Small piece of block balsa for propeller spinner.
- One sheet of $\frac{3}{32}$ in. balsa, approximately 3 in. square, for wheel covers.
- Several pieces of tonkin bamboo for undercarriage ($\frac{3}{32}$ in. diameter).
- Several inches of wire, for motor hooks.
- One pair of $1\frac{1}{2}$ in. diameter celluloid wheels.
- One $\frac{1}{2}$ in. diameter celluloid tail-wheel.
- One $7\frac{1}{2}$ in. diameter three-bladed Paulownia or Howood propeller.
- Cup washers and small hardwood nose-plug.

One small piece of thin three-ply, for detachable nose-piece.

Wings.

Ribs cut from $\frac{1}{16}$ in. sheet balsa, used for fuselage formers.

Tail-plane and Rudder.

See fuselage.

Sundries.

- Tube of cement.
- One sheet of white tissue.
- One sheet of black tissue.
- One bottle of clear shrinking dope.
- Eight strands $\frac{1}{8}$ in. flat rubber, 3 in. longer than the fuselage.
- Cellophane for cabin.
- One sheet of thin white paper for insignia.
- One small tin of black drab for ditto.

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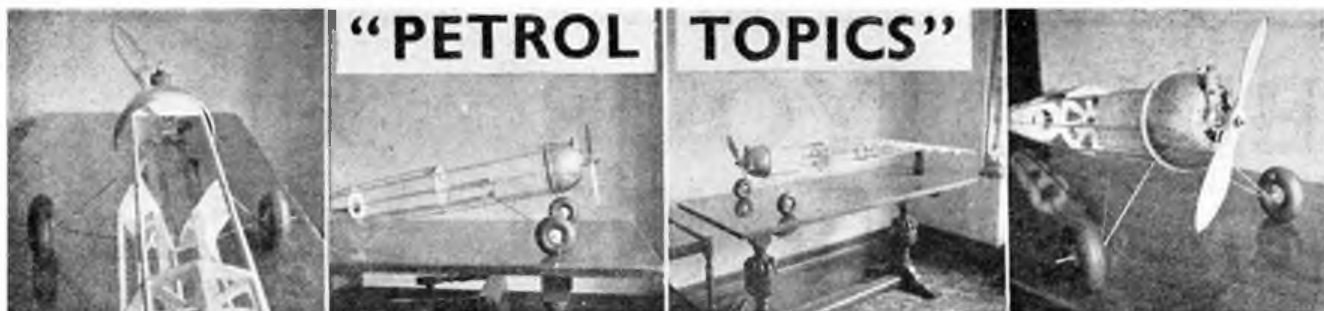
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SINCE banging out on the old typewriter the first instalment of "Petrol Topics," much smoke has issued from several engines; the great frost has come and gone, and a good deal of glue has been scraped from the fingers of "Yours Industiously."

P.3 has disgraced herself by flying away out to sea with a perfectly good Cyclone aboard! Any beach-combers on the shores of the Bristol Channel, Wales, or Southern Ireland, kindly note that they are at liberty to keep as a reward the perfectly good pair of wheels, in return for information establishing her landfall! This serves me right for holding forth on the reliability of my home-made clocks last month. Actually, I think it couldn't have been going at all, and I should dearly like to have found the wreckage in order to establish

the ghastly consequences likely to follow in the (probable) event of one engine cutting out or running weak or rich while the other continues to do its worst!

Mr. Cordey has foreseen this, but nothing daunted, has devised an ingenious rudder control which, if it works, should at least mitigate the consequences of one engine cutting, and furthermore the ignition circuits are so arranged that if one engine stops the other one is automatically stopped also, and provided this happens at a reasonable height there seems every possibility of there being time for a recovery of stability to occur and, we hope, a steady glide-in should ensue.

A study of the wiring diagram shows that both these safety measures depend upon the movement of a rudder bar forwards, on whichever side the slipstream diminishes

A Monthly Survey of the Other Fellow's Activities

By Dr. J. F. P. FORSTER

the position of the pointer when the "gas" finally gave out after about seven minutes at around 1,200 feet altitude and two or three miles off shore. Unfortunately the state of tide made it impossible to get out after her before darkness fell.

Her successor, P.8, is now in an advanced stage of production. Enough of my own doings, however, as what is far more important is the correspondence I have already received from "Petroleers" in response to the editor's note on this forthcoming monthly feature.

All this is very gratifying and encouraging for the future outlook of "Petrol Topics," and if this is any criterion before the first instalment has appeared in print I hope to have a brimming postbag from all you "lone-hands" in the course of the next few months. As many photographs as I can persuade our Editor to publish will be included.

I want to deal at some length this month with "Funf," an ambitious twin-engined "brain-child" of Mr. R. F. Cordey, of Stratford-on-Avon, now in an advanced stage of construction, as seen from the excellent photos submitted by him. The lure of twin-engine operation has probably tempted all of us at some time or another, and the very fact that so few have really got down to construction is proof of the vivid and realistic imagination (fortunately possessed by the majority of us) of

or ceases. Not only does this rudder bar move the rudder over against the engine which is still functioning but, in extreme cases, where one engine cuts out altogether, it also actuates a switch placed in series with the flight timer, and cuts the ignition to both engines.

The rudder bar is mounted on a fulcrum amidships and carries two discs at its extremities, which are located in the leading edge of the centre section at points two-thirds from the centre of each airscrew disc. The fulcrum is damped to maintain stability over a small range of varying slipstream pressures, but any considerable difference in the two slipstreams results in a big rotation of the rudder bar, and the remaining engine's ignition circuit is broken.



"Funf," designed and built by Mr. Cordey.

Mr. Cordey seems to have satisfied himself that in practice Frank Zaic's method of near-synchronisation of engines works all right. As will be seen, this consists of starting both engines independently, and when running at more or less equal speeds, one set of contacts is cut out of circuit, and those on the other engine act as master control. Personally, I have never managed to have two engines sufficiently evenly matched in performance to make it worth while really trying this out, but in view of Mr. Cordey's assertions that it really does work, I'm determined to have this experiment, at least on the bench one wet day.

Although not for a moment wishing to discourage Mr. Cordey from doing a very useful experiment (which I hope will save me a lot of broken balsa!) I must, if I am to live up to the promise given in my first instalment, offer criticism of certain points in the construction of the 'plane itself, which I fear very much spells trouble and disappointment to come unless modified in time. As all who look at his photographs can see, he has done a very lovely bit of work so far as scale-type construction goes, and it seems, to my way of thinking, illogical to spend so many hours and so much thought on "finishing" a model which, of all others, is *par excellence* a pure and very bold experiment.

rearing it through the most dangerous phase of a model's life, and at least until its safety devices are perfectly adjusted, by trial and error (make no mistake about the latter), I, for one, would very strongly recommend the fitting of crash-proof wing and tail surfaces.

The undercarriage is certainly a thing of beauty. I hope "Funf" will remain a "joy for ever," but not only on the ground. Here's luck, Mr. Cordey, and please keep us posted of results of tests in the air under power. By the way, I forgot to mention that the all-up weight is to be 6½ lb., with a wing loading of around 1½ lb./sq. ft. I should think you'll have to rumble in, Mr. Cordey? I may be wrong; I can only speak from my own experience, but I have found that 10 gauge spring steel wire has all it can do to live up to loadings of around a pound. It remains to be seen how welded aluminium brackets carrying vertically moving oleo legs are going to stand up to a pound and a half, especially since there appears to be no provision for backward movement. Not even Mr. Cordey, with his ingenious brain for gadgets, has incorporated a device for flattening out to a 3-pointer, and since models glide *into* the ground it is by now a pretty generally recognised requisite that undercarriage should have *some* degree of backward shock travel for best results.



The four photos at the top of the opposite page are of the 'plane designed and built by Mr. Spiers-Purdon. The outer photos in the above group show the light-weight model designed and built by Dr. Forster. Attention is drawn to the design of the undercarriage, which has given good results in practice. In the centre is another view of Mr. Cordey's "Funf."

The features which at once catch my eye as being "dangerous" under actual field conditions, from the point of view of susceptibility to damage are: First, fixed tail surfaces; second, fixed outer wing panels (*bolted*, if you please, to the centre section); third, moveable ailerons and elevators.

The alteration of these three points alone would surely render the initial gliding tests at least reasonably safe. If this is to become a real flying model (and I sincerely hope it is and would give a lot of petrol coupons to see it), it has got to have something done about safely

The first letter from a genuine lone hand comes from West Hartlepool, Durham. Mr. A. Spiers-Purdon is constructing a parcel of dynamite in the shape of a very lightly loaded, heavily powered, open cockpit high-wing monoplane. This is built, believe it or not, of eight yellow pine stringers on only five circular 3-ply formers. Wing and tail surfaces are of balsa, and he says that with 6 sq. ft. of wing area he is pretty confident that the all-up flying weight will not exceed 3½ lb. With this Utopian wing loading of 9·3 oz./sq. ft. and a 10 cc. engine (presumably ½ h.p.) it ought to have a climb of about 1 in 1. The problem would appear to be how to get it down once it goes up. Personally, I've found this solved only too easily, frequently before the engine run is due to finish! But, joking apart, this is certainly light wing loading by British standards. He draws particular attention to the pudding-basin engine cowl.

I see that our American contemporaries have at last been driven to combat the increasing tendency over there to build feather-weight "powerhouses," by adopting a new power loading rule, which imposes a minimum all-up weight per cu. in. piston displacement. Apart from S.P.'s effort, which is pretty near the limit allowed for 10 cc. in the new American rules, the tendency to be guarded against over here would appear to be opposite, and by contrast I'm not at all sure for purposes of safety

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that there ought not to be a maximum allowable wing loading. A model becomes little short of a projectile with loadings in excess of 1 lb./sq. ft., and the amount of metal that goes into the undercart is a menace! I expect this sweeping statement will bring howls of abuse about my ears, but I can take it! One of the chief objects of "Petrol Tropics" is to rouse some of you petroleers from your dust-laden workshops to give tongue to your emotions. If I succeed in doing this I shall be killing a couple of onlookers with one model, by promoting national fitness, for while howling you will be clearing out some of the balsa dust and gas fumes from your lungs!

One point in Mr. Spiers-Purdon's letter has given me something to get on with. He mentions his intention of fitting this "powerhouse" with floats after preliminary trials on a land gear, and in this connection asks my opinion of the possibilities of pole-flying it over water. This has fired me with the urge to try this out with a flying boat of mine. I pass on this query to you, my readers, as to be honest I still haven't tried out this new craze myself with petrol models. I've lain awake at nights picturing the horrible consequences should the line by accident become slack (due perhaps to dragging in the water at take-off) and begin to wind up round the pole. The only fixed pole I have in mind is one marking the entrance to the local fishing harbour, and as this is not more than 50 yards from the front windows of a rather swagger hotel, not to mention several fishermen's cottages, the consequences of a broken line don't bear to be thought of. I have toyed with the idea of fixing a swivel on the top of the mast of my small boat, but apart from the oscillations at that height in anything but a dead flat calm, the problem of starting arises, and would appear to call for a second boat to carry the operator. War and magnetic mines permitting, I look like being in for a lively summer!

Apart from one article in THE AERO-MODELLER a few months ago, not much has appeared in print about R.T.P. flying of petrol models. What is the maximum safe length of line with, says, a 3—5 lb. model hurtling round on the end of it, and what height of pole? Perhaps some of my readers can give us some personal experiences.

My mention last month of fixed centre sections for low wing models in which to mount the undercart, brings

me to another problem which has caused me many sleepless nights. I have tried out a new type of undercart mounted on the leading edge and front spars of a not too successful low-wing job, and which consequently has come in for some terrifically hard landings. This model is monocoque built, and has a fixed centre section which is partially stressed skin, and I must say that this undercart and centre section certainly can take it. The chief snag has been devising a really satisfactory method of attaching the outer wing panels so that they will give in the event of flying into hedges or in wing-tip landings, and yet be sufficiently rigid during flight so as not to fold up or to alter their incidence. Most of my trouble arose from the incidence becoming slightly different on one wing only, resulting in a nasty spin.

I have since built a freak baby low-wing, mounting a similar and *very* light gauge undercart, in which, instead of having a fixed centre section, the wing is split in the middle, and held together with dowels and elastic, and in heavy landings extra shock absorption occurs from a slight momentary increase of dihedral against the tension of the elastic bands. This is certainly very successful in practice, but fairing the fuselage into the upper surface and trailing edge of the wing is not very easy or pretty using this method, and if someone can solve the problem of safety attachment of outer wing panels to fixed centre sections they will be doing Mr. Cordey and me, to mention two only, a great service. In point of fact, the whole future of real scale model construction of modern low-wing machines is held up by this one great snag of providing for a crash-proof wing, in which is mounted the undercart. I have already proved to my own satisfaction that either wing or centre section spars can be built strong enough to withstand landing shocks in models weighing up to three pounds. The photos of this light-weight freak of mine show the undercart fairly well.

Well, chaps, thanks for your letters, and please let us have more, including advice, comments and criticisms of this feature if you feel like that about it. If you like it you needn't bother to say so, but just show your approval by sending in your contributions towards its make up, both pictorial and otherwise, and I'll do my best to dish up as many as possible of your views in the editorial ration allowed me.

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LETTERS TO THE EDITOR . . .

DEAR SIR,

Your March issue has interested me greatly, and this refers in particular to the wind-tunnel tests on model aerofoils by Messrs. Powdrill and Macbean. I have always held that experiments of this kind are of very great importance, and it is interesting to see that many of the differences which we believed existed between full-scale and model are borne out in the results published.

What seems to be not quite clear is that apparently one half of a wing was used in the tests, as both the area given and the size of the tunnel would make the use of a complete wing impossible. I mention this point, as some readers may conclude, as I did at first, that the data given contained an error.

The fact that the highest value for L/D occurs at a high angle of incidence where the value for CL is also great helps to explain the success of the "rocket" climb. We should, however, keep well in mind that zero lift in the case of sections like RAF 32 occurs at fairly large negative angles, and the fourth column should be used to fix the attitude of the wing to the datum line of the fuselage.

No mention is made of the centre of pressure, and it would be interesting to know whether any changes are due to scale effect. I take it that these differences are not large, or the authors of the report would have referred to it. All the same, some definite information on this point would be useful. Practice has tended to convince me that the C.P. does not travel as far back at small angles as full-size data indicate, hence the success of models with the C.G. at about 70 per cent.

I should like to make a remark concerning the L/D ratio. Our Dutch gliders will make flights of 90 sec., using a tow-line of 50 metres (approx. 165 ft.). Allowing for slack, this amounts to a rate of descent of 1.8 ft./sec. Assuming the speed to be 20-25 ft. sec. this gives us a gliding angle of one in 11 to 14. Flights like these are made without any appreciable benefit from thermals, as the average results indicated. Thus it seems that a well-trimmed glider of really good shape, specially designed for duration, of large size (very important in view of scale effect, chord in this case being 8 to 12 in.) can achieve an L/D ratio of 15. Figures like 25 seem to me, like they must to the authors of your article, quite impossible. Moreover, they are almost as high as good sail-plane figures.

It is certainly interesting to see that a folding airscrew (sorry, Mr. Hawkes, my superiority complex again) and retractable undercart pays for the trouble. Logic indicated their use, but small scale stuff has a habit of behaving differently from one's inclinations.

May I finally, to wind up this lengthy epistle, suggest that the authors might conduct some experiments on the effect of various normal and odd shapes. The fact that the folding airscrew blade offers less drag than the free-wheeling one, although the blade would seem to spoil the fuselage shape, is very interesting. I would like to refer to my remarks on this point in the last of my series on "Simple Aerodynamics," issue of June, 1939.

Trusting that model aviation may keep up the friendships that existed before the war, and of which I am glad to have many in England.

Yours faithfully,

J. VAN HATTUM, A.F.R.Ac.S.

DEAR MR. EDITOR,

I noticed in February, 1940, AERO-MODELLER that you wished readers to give their opinions about the style of said magazine.

I am a young woman, 19 years of age, and have studied aviation for nine years and built models for six years, mostly flying scale and solids. I've just turned out my first original design, an original Wakefield, and hope to fly it at our Nationals, and with good luck as No. 1 team member of our 1940 team. Here's hoping! I've never entered many contests, but have been a member of our N.A.A.

Well, that's the "dope" on yours truly—now about the "mag."

The best article I have read so far (I've gotten it since June, 1939) was concerning "Model Aviation in Germany." I wrote to Herr Schröter, but didn't receive an answer because of the darned war. The stories about "Job" by Arthur Mountstephens are also grand. The cartoons by "Freddie" are also O.K. by me. You certainly have a splendid idea in giving away plans with copies of the mag. The plans are given with great simplicity and clearness. Articles about photographing models is a grand idea, and also different constructional hints and gadgets. All technical articles are of interest to me. The "Clubman's" review is also good in showing what progress you English lads and girls are doing to forward this great sport of ours.

The only thing I didn't like so far is your treatment of the 1939 Nationals. How about more good words about us over here?

I have attended "Aurora Aeronautical Ground School," which is Government U.S. Army equipped, and it's really a great institution. I intend to be a limited commercial pilot some one of these days. Have been up in a Porterfield, Taylorcraft and Douglas C-3.

I intend to send some snaps of my models to you as soon as get them taken good enough. I have had my "Fairey Battle" published in *Flying Aces* mag.

Well, I'll zoom off now.

Happy landings from

MARION RATHRUN (Miss),

An American modeller.

DEAR SIR,

I recently read in your extremely interesting journal which, needless to say, I take regularly, an article by Mr. Pollitt re the building of the Messerschmitt Me.109. It seems that most people are doubtful as to the camouflage, and it so happens that when I was in Germany before the crisis of 1938, I not only saw the Messerschmitt, but lorries carrying wings and fuselages along the Autobahns.

The camouflage was a mixture of a dirty dark and bright green, by dirty I mean greyish green, the pattern as is known was zigzag, unlike ours.

The undersides were a silvery white. I believe, however, as Mr. Pollitt says, black is also used, pastel blue being used only on reconnaissance aeroplanes, black being used for the big bombers, such as the Heinkel and Junkers 88.

Yours faithfully,

P. FITZGERALD.

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Do not concentrate your thoughts upon war subjects. You will find it very worrying and very bad for the nerves.

Read, write, sketch, paint, study your vocation ; anything that will occupy your mind and your time. Make use of your spare time by concentrating upon something useful.

During the last war many people learned how to write short stories, etc. To-day a number of them are world-famed authors.

By becoming efficient in your vocation you can give the best service to your country and to yourself. The more you increase your earning power the better it is for the country and for yourself personally.

War or no war, earning power always brings its possessor to the front. It is no use waiting for better times. The ideal opportunity never arrives. We have to make the best of existing conditions. Therefore, delay is useless ; it is worse, it is harmful.

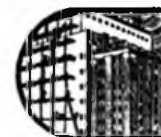
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SOLID MODEL

By J. H. ELWELL

These two photographs were taken by Mr. H. Brown. On left are shown two Fokker D.7s diving on a dispatch rider; and below, the pilot running to safety from his 'plane, a Fokker D.7, which has been shot down by a S.P.A.D.

I have done a bit of this work myself, and enclose a sample of the results. It shows a De Havilland 4 attacking German ground troops, while a Fokker D.7 comes to their rescue. The camera used

WELL, here we are again. Two months gone by, as I had to miss last month, being laid up with 'flu.

I should like to take this opportunity of asking readers to send me their views on this new series. I hope to continue each month, so far as is possible, and discuss readers' "solid" models, photographs and interesting facts and hints, in a style which I hope will be liked by all our "solid" enthusiasts.

If you don't like the style, write and tell me, and I will endeavour to alter it to suit the majority. If you do like these articles, the best way in which you can help is by sending details of all your new "solid" models to me at the offices of THE AERO-MODELLER, Allen House, Newarke Street, Leicester.

I am pleased to say that during the last few weeks I have had quite a number of very interesting letters from readers; the first one I should like to mention is that sent in by Mr. R. Pyne, of West Worthing. Mr. Pyne explains how he was looking through the pages of an American magazine, *Look*, when he noticed a "letter to the Editor" (yes, they get them over there just the same!) sent in by Peter M. Bowers, of Los Altos, California.

I reproduce the letter herewith :

FAKING AERIAL COMBAT.

To the Editor,

Douglas Rolf, of Darien, Conn., doubts authenticity (*Look*, February 14th) of the Cockburn-Lange World War Aerial Combat Photographs (*Look*, December 6th), and submits a photo, taken from a German airman, as proof that actual combat photographs do exist.

Sorry, but Mr. Rolf's contribution is not genuine. The falling 'plane, instead of being a B.E.2c, is an American Le Pere two-seater, a model that did not get overseas. The "victor" is apparently a British Martinside. The picture is a composite, the view of the Le Pere being an official Government photo, a copy of which I have in my collection.

I agree, however, with his belief that the Cockburn-Lange photos are faked. In my opinion they are excellent examples of miniature photography in which magnificent scale models were used.

was an ordinary Brownie, and the soldiers are cardboard silhouettes.

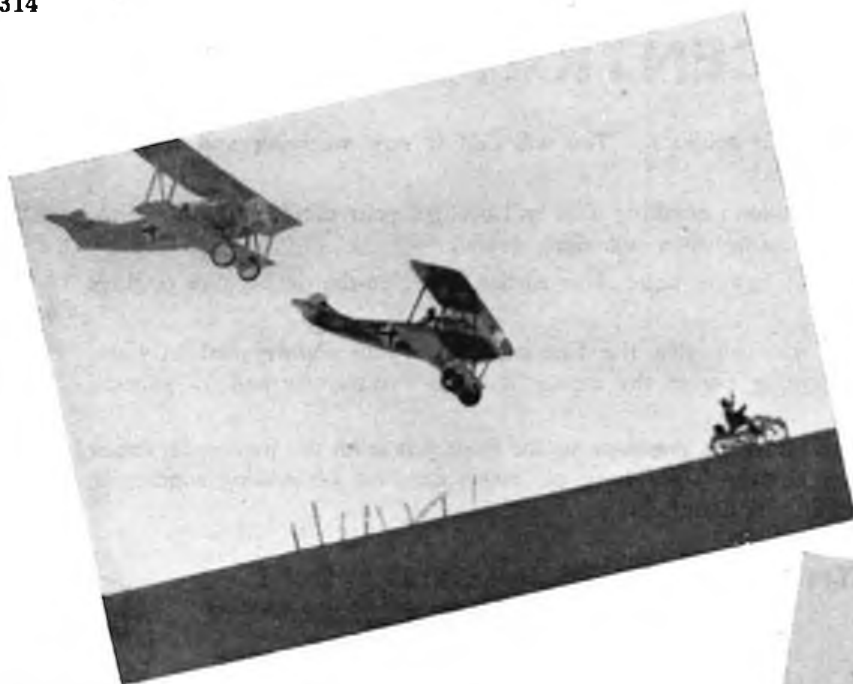
Los Altos, Cal.

PETER M. BOWERS.

Now all that must be extremely interesting to "solid" model aircraft builders, especially those who are interested in taking realistic photographs of their models, a point which I dealt with last month.

Mr. Bowers is well known in America as an aero-modeller of very great skill, but what he could do, as shown in the photograph which appeared above his letter in *Look*, our readers can do.

A day or so after reading this letter from Mr. Pyne,



AIRCRAFT

—Aero-Modeller Staff

Three of Mr. Elwell's models, photographed by himself with an ordinary box camera with portrait attachment.

I received a letter from Mr. H. Brown, of Bristol, enclosing two photos, which are reproduced herewith.

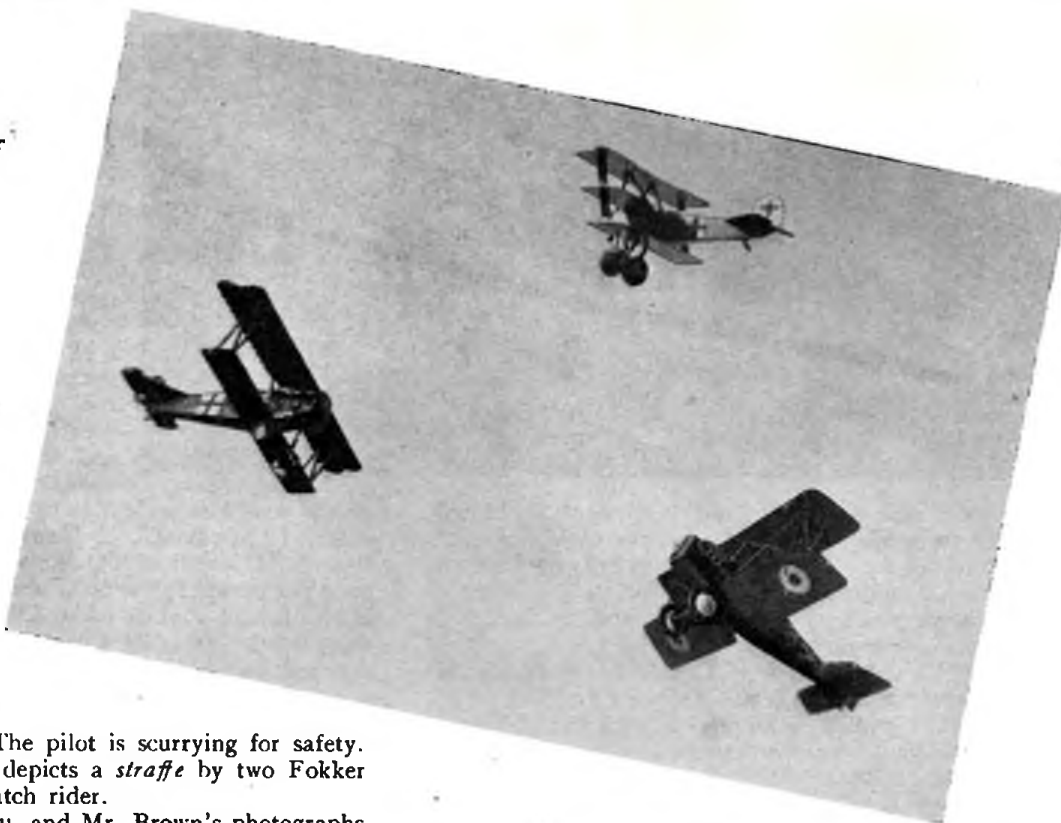
They are both extremely realistic pictures of the type referred to by Mr. Bowers. The first shows a French S.P.A.D. fighter diving towards the wreckage of a Fokker D.7 which has presumably just been shot down. The pilot is scurrying for safety. The second photograph depicts a *straffe* by two Fokker D.7s on an Allied dispatch rider.

There's realism for you, and Mr. Brown's photographs show plenty of forethought and imagination in the planning of the models and scenery.

A rubber model fan said to me one day: "I really can't see what you build those 'solids' for; they're all right to look at, but what else can you do with them except show them to people." Well, my view is that the above constitutes the answer.

Mr. Bowers, you will recall, said that he used an ordinary Brownie camera, which almost tempts me to say "I told you so," for the photo of some of my own models, shown on this page, were also taken with an ordinary box camera with a portrait attachment. The

This fine photo was taken by Mr. R. Briault, of Brighton, and shows his Miles "Magister," built from "Aero-Modeller" blue print, in a realistic setting.



three models in the photograph are the S.E.5, Fokker D.7 and Fokker Triplane.

Mr. Bowers's opinion of the Cockburn-Lange collection of World War aerial combat pictures must also be extremely interesting to all aero-modellers. The collection of pictures referred to were purported to have been taken by an officer whilst actually engaged in combat. He used a camera strapped to his cowl, and shot pictures intermittently with bullets.

I think you will agree that if the pictures above could be taken with a cheap camera, using models made by hand, it would be a comparatively simple matter to fake genuine photographs by using beautifully cast replica models, minutely painted, and expensive cameras and lighting equipment. But I am still not so sure that the results would be more realistic!

Now to present-day topics. I do hope that some of our readers will let me see some photographs of an aerial battle between a Heinkel 111 and a trio of "Spitfires," or a M.E.110 and a Bristol "Beaufort."

There is terrific scope for ingenuity here, and the results would be very interesting and informative.

As you will see, this month our "solids" article is mostly illustrated with photographs of the *past* war. Let us see what we can do to illustrate a future article with some really fine pictures of *ultra modern* aerial warfare!

The next letter of interest is from Mr. Thuck, of Tunbridge Wells, who sent me a picture which is also reproduced. It shows a group of models built by Mr. Thuck between the years of 1910 and 1915.

As Mr. Thuck explains in his letter, there were no kits or blue-prints for the aero-modeller of those days, and all Mr. Thuck's models were constructed of tin and wire from plans which appeared in *Flight* and other periodicals.



The wings were double surfaced, being made up of two pieces of tin soldered together, with the correct amount of camber built in. The engines which were mounted on some of the models, such as the "Gnome," were made from tinman's rivets with the tops cut off and soldered on to a piece of brass tubing.

Many of our older readers will no doubt recognise some of the models in Mr. Thuck's unique collection. The Cody, Sopwith and Dunn seaplanes; Farman, Cody and Caudron biplanes; Nicuport monoplane, and other aircraft of those days.

Mr. Thuck is commencing the fascinating hobby of model aircraft building again, and I am sure that all our readers will join with me in congratulating Mr. Thuck on his remarkable models, which would prove an interesting addition to any exhibition of model aircraft.

A letter from James May, of Aberdeen, gives some excellent tips on how to obtain that all-important finish on "solid" models before painting.

James tells me that the model should first of all be sanded smooth in the usual manner, after which one coat of enamel is applied.

The model is again sanded lightly, after which three successive coats of clear orange French polish are brushed on, allowing each coat to dry perfectly and sanding lightly before applying the next one.

A perfectly smooth surface should result, ready for the final coat of paint.

Here I should like to add a comment to all who build "solid" models of modern military aircraft. All British and foreign military aircraft which are camouflaged are

finished *mat*, not shiny or glossy. A shiny surface would defeat the very purpose of the camouflage, for on a sunny day the surface of the fuselage, wings, etc., would glisten and shine.

This is a mistake made by even experienced aero-modellers.

I advise readers to use the above method for obtaining a good finish, and for the final coat to use ordinary artist's oil colours (rather expensive, but worth it in the long run) mixed to the correct colours with a medium of half linseed oil and half turpentine. The paint will brush on smoothly and will

give a dead mat surface as on the full-sized aircraft.

Mr. J. Symmonds, of Ipswich, author of the article, "A Solid Model of the Sopwith 'Camel,'" sent me some photographs of some of his other models. A picture of the Bristol Fighter constructed by this young man is reproduced. It is 9 $\frac{3}{4}$ inches in wing-span and is fully detailed, as can be seen from the photograph.

I hope that many of our readers will produce models of the "Hampden," plans for which were presented with our March issue, and I hope to see photographs of both these models in due course.

It is early yet to see what response there has been to my appeal for all "solid" model aircraft builders to help in the important work of identifying enemy aircraft, but I should like to stress the importance of this work. All our builders of scale model aircraft should build as many models as possible of modern German military aircraft—by that I mean machines which are likely to cross our coasts—not Messerschmitts or short-range aeroplanes but Heinkel 111's or Dornier D.O.17's, etc.

I am sure that most of the branches of the Observer Corps would be very grateful for the services of two or three members of the local model aircraft club, to show them the chief points of identification, especially if the lecture was helped by actual solid models of the aircraft in question. In addition, there is now available the book, "Scale Plans of Military Aircraft." This is the book I hinted about in my first article. Full particulars are given in an advertisement on another page, and as I can modestly add that I have assisted in the preparation of the book, you can take it from me that it's *good*!

In the top photograph is shown the model of a Bristol "Fighter" built by Mr. H. Symonds, whilst the photo herewith shows the unique collection of "old-time" models built by Mr. Thuck.



C. A. RIPPON

*Completes his detailed building instructions
for*

THE AIR CADET

*Full-size plans of which were given away
free with our last issue.*

PUSH the bush into the nose-block, accompanied by some glue, and then thread the second celluloid washer on to the back of the bush, and glue it to the back of the block. You can now carry on with glasspapering the front of the nose-block to the correct finished shape, checking up by your print. To complete it, add the two small bamboo pegs, which locate the rubber band sprung from the undercarriage, which serves to keep the nose-block in position. Push the airscrew shaft in from the back, thread on your ball-race or cup washers, and the airscrew, and turn an eccentric loop of about $\frac{1}{8}$ in. diameter in the end of the wire with a pair of round nosed pliers. Make the free-wheel pin from 20 s.w.g. steel wire, and fasten to the boss of the airscrew with a fine nail or screw, and the nose-block assembly is complete.

The Undercarriage.

This is the most abused part of the model, and a great many aero-modellers are content to put up with just anything in the shape of an undercarriage. Ill made and ill fitted "undercarriage" are the cause of a great deal of unsatisfactory model flying, so let's get ours right.

Commence by preparing the bamboo legs. Cut two pieces 7 in. long, and $\frac{3}{16}$ in. $\times$ $\frac{3}{32}$ in. section. Now scrape them oval. Section with a penknife, or metal scraper, if you have one; finish off with glasspaper.

Cut off a 7 in. piece of 18 s.w.g. steel wire for the spreader, four pieces $1\frac{1}{2}$ in. long for the two axles and the two plugs, and using the domestic flat iron as an anvil, heat the two ends of the 7 in. piece and one end each of the $1\frac{1}{2}$ in. pieces, and hammer them into a flat tongue, which will fit nicely on the bamboo legs. This ensures that when bound and glued to the legs they will not twist, a common failing with undercarriage legs and wheel axles. Before binding the assembly together, bend the 7 in. piece into an arc, and bend the axles, etc., to the correct angles, as shown by the print. Solder cup washers to the axles to keep the wheels on, or bend the end of the axle up before cutting to length, and cut after bending.

Use fine thread, if possible, for the binding; it makes a sounder job and looks neater. Try and make a regular bind, not a rough job. I have already told you how to make the paper tubes, and for those for the undercarriage you will need four layers of paper. When finally fitting them see that they are cut correctly to the angles shown. One 3 in. fine rubber band trebled and lubricated forms the shock absorber in each tube, and it is easily threaded into place by means of a "button hook" arrangement made from 22 s.w.g. wire. At the top end of each strut, you will notice a groove filed into



it. This is to retain the rubber band in position, which holds the legs close to the fuselage.

Covering and Doping.

Before commencing to cover the air frame of your model go over it with glasspaper, and see that there are no prominent points that will spoil the lines of the model when covered, and also satisfy yourself that no odd pieces of glue are sticking out into the inside of the fuselage which might tear or puncture your rubber motor.

I usually commence covering operations with the fuselage, starting with the sides, and I leave about $\frac{1}{8}$ in. lap extending beyond the covered surface, which I stick down at right angles to it. I use a good tissue paste for the job, because it makes a clean and neat finish, and it enables one to strip a model easily when recovering is necessary, without leaving a nasty jammy deposit behind to make things difficult. Having done the sides, leave the fuselage to dry, and commence on the underside of the wings, observing the same procedure as before. Then go back to your fuselage and complete it. When covering the tops or cambered surface of the wings, I think you will find it easier to cover from the root rib out to the last full rib, and add the covering at the wing tip afterwards when the other part has dried off. By this method you will avoid any bad wrinkling at the tip.

The remainder of the covering is done in the same fashion, lapping over on each side, and thereby ensuring a neat finish. I advise a stouter quality tissue than the standard Jap tissue for the fuselage, if you can get it. When all surfaces are dried out, spray or brush them

with water, and once again put them aside for 24 hours. Don't put all your weight behind the spray though, because Jap tissue when wetted is frail, and I have known people to burst the tissue in their excess energy, and covering is not such a fascinating job that you want to do it twice before even getting a flight! I strongly advise you to use only a clear waterproof dope or banana oil for the finish. If you are fond of high gloss finish

TO MAKE PAPER TUBES, FOLD GUM-STRIP & STICK DOWN, LEAVING $\frac{1}{8}$ " OF GUMMED EDGE EXPOSED



THEN WET BOTH SIDES AND STICK ROUND OVAL FORMER, APPLY FOUR PIECES, REMOVE & LEAVE TO DRY.

TO MAKE WHEEL HUBS, ROLL GUM-STRIP ROUND BRASS TUBE AS SHOWN, AND THEN SAW OFF TO LENGTH REQUIRED.



there are some excellent preparations available, but as a rule they take a good while to dry, and if the model is handled before becoming quite dry all the advantages are lost. I do not advise painting the whole of the surfaces with coloured or pigmented dope or finish, because of the considerable increase in weight, although coloured cellulose lacquer is handy to "line out" the model. The airscrew, nose-block, undercarriage, and wheels may be attractively finished with it.

Trimming and Flying the Model.

By the time you reach the stage of final assembly, you will, of course, be very anxious to get your first flights, but this will be no excuse for scamping the last minute adjustments, and indeed might even lead to you wrecking your model without ever seeing it do one satisfactory flight, so be cautious and "make haste slowly."

Assure yourself that all surfaces are perfectly true—the wings firmly fixed at the correct dihedral angle on the fuselage, and that the tail and fin are at 90 degrees to one another, and that the nose-block is a firm fixing, and that the rubber band that holds it in position is to hand, anchored behind the legs of the undercarriage, which should likewise be fitted in true working order. If all this is O.K. then you can prepare your 1 ounce of elastic; bind the two ends together with strong thread, dress it with rubber lubricant, but do not leave it too wet to slop about the fuselage and so spoil your covering. Arrange it in a skein of 6 strands for a 12 in. airscrew, or 8 strands for a 14 in. airscrew. Fasten one end of the skein on to a run-true bobbin and bind the skein

close up to the hobbin with a small elastic band. Fix the skein in a similar fashion to the bobbin at the air-screw end, drop the tail end into the fuselage, and secure to the peg. While someone holds the model for you proceed to tension the motor by winding the front bobbin in and out of the skein, as shown in the accompanying sketch. When you have applied enough twists to the rubber—probably about 50 to 100—you will find that the nose-block, when attached, will be drawn snugly into position, and the skein will be trimmed so that when the rubber runs out during a flight, the centre of gravity of the model does not vary.

Apply a spot of oil to the shaft, and see that the airscrew revolves freely upon the shaft, and that the free-wheel pin disengages easily. You can now test the model for glide. Keep your fin in line with the centre line of the fuselage, position your wings so that the model balances upon the tips of your two first fingers at about one-third back from the leading edge. See that your tail-plane is firm and cannot shift. Now hand-launch the model into the wind, not too forcibly. If it "stalls" and comes down tail first, move the wing backwards a fraction of an inch and try again. If the model noses into the ground and shows no sign of a level glide, move the wing forward a fraction until you get satisfactory results. Perhaps you will have a friend present who can advise you; if not, take a trip to the local club's flying ground. I'll warrant you'll get some sound advice and help. So, if you have the chance of some practical help, take it. After a few attempts, you will, we hope, have gained some idea of the gliding angle and the speed at which you must launch the model. Having arrived at this point, move the front of the fin $\frac{1}{8}$ in. towards the left-hand side of the fuselage, hand wind the motor up about 100 turns (clockwise, looking at the front of the model), having engaged the free-wheel pin. If this is engaged the wrong way you will find it impossible to wind the motor, so you will soon learn that little lesson. Pack out the nose-block with a piece of $\frac{1}{8}$ in. sheet balsa on the left-hand side of the nose-block, and launch into the wind. Do not choose a gusty or very windy day for your first experiments; wait until you've got a sporting chance. If my calculations are correct, and you have made your model true, it should climb gently to the right, and after about 15–20 seconds, glide to the ground; if it doesn't you must practise until you get the correct results, checking up on all your adjustments, especially after bad and bumpy landings, which upset trim so quickly, but do not exceed 200 turns on your rubber until you are quite certain you have mastered the trimming, otherwise your model will suffer as the result of your over-confidence. The motor will, when run in well, take, in the case of 6 strands, about 800 turns with safety, but if made into 8 strands, about 600–700. Given the right conditions and aero-modeller's luck, you should soon be doing good durations, and if your model is adjusted for steady, right-hand circles, you will one day enjoy the greatest thrill of all keen "freshmen," your first "fly-away."

"RIP."

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Fuselage.

Including tail peg, one major bobbin and brass tube and wire hooks uncovered ... = $\frac{3}{4}$ oz.

Undercarriage.

Comprising wheels, legs, wire fittings, paper

tubes, and 5 rubber bands, unvarnished ... = $\frac{1}{2}$ oz.

Wings.

Complete, but uncovered ... = $\frac{7}{8}$ oz.

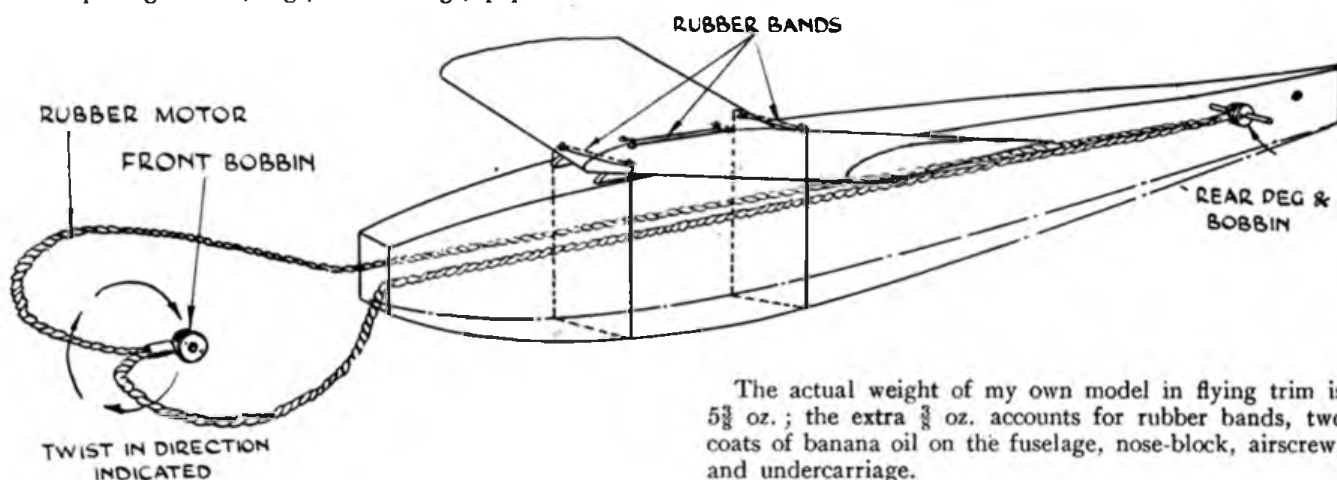
Tail and Fin Assembly.

Complete, with wire bridle on fin, but uncovered ... = $\frac{3}{8}$ oz.

Rubber (lubricated) ... = 1 oz.

Leaving for covering and doping ... = $\frac{3}{4}$ oz.

Total Weight ... = 5 oz.



The actual weight of my own model in flying trim is $5\frac{3}{8}$ oz.; the extra $\frac{3}{8}$ oz. accounts for rubber bands, two coats of banana oil on the fuselage, nose-block, airscrew, and undercarriage.

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FULL SIZE
SCALE PLANS
ARE IN CENTRE PAGES OF THIS ISSUE

BUILD THE

By J. SYMONDS



These two photographs are of our contributor's model, taken by "The Aero-Modeller" staff photographer.

THE Sopwith "Camel" was the most successful fighter 'plane produced by this country during the last war. It was brought out during 1917, and no less than nineteen squadrons of the R.A.F. were at one time equipped with this type.

Powered with either the 130 h.p. Clerget or the 150 h.p. Bentley rotary engine, the "Camel" had a top speed of approximately 115 m.p.h.

Main dimensions are: Wing span 26 ft. 11 in., length 18 ft. 9 in., chord 9 ft. 6 in.

Shape the fuselage from two pieces of balsa, each $5/12$ in. $\times$ $3/8$ in. $\times$ $3\frac{1}{4}$ in. Cement these together to form one block of wood $5/6$ in. $\times$ $7/8$ in. $\times$ $3\frac{1}{4}$ in. Cement together lightly, since pieces are later split apart to allow cockpit to be hollowed out.

Trace side view of fuselage from plans on to the block, omitting engine cowling. Carve to shape shown in A (Fig. 1). Next trace on top view and shape to B. Then round off top and front sides C.

Split two blocks apart, hollow out cockpit. Paint grey or black inside. If you wish to add cockpit fittings, do so now. Details of fittings are given in Fig. 2.

Finish fuselage by cementing halves together.

Cut wings from $3/4$ in. sheet balsa. Shape to cross-section given in plans, side view. Top wing is made in one piece, bottom in two halves.

The tail-plane and rudder are cut from $1/8$ in. sheet balsa.

Give all parts a coat of wood filler. A water glue is best. When dry, sand parts smooth with fine sandpaper and flourpaper.

Mark positions of ribs on leading edges of main and tail-planes. Cement pieces of cotton from leading to trailing edges, in these positions. Cover these parts with flying model tissue. This is doped on as shown in Fig. 3. Sand when dry.

Wing struts are made from bamboo. Full sizes are given in plans. Split bamboo to size, then scrape to streamline section. Give one coat of clear dope. Do not paint wing struts. Those of the "Camel" were of varnished spruce. Bamboo represents this very well.

Nine engine cylinders are made from solder lead which has been forced through a small nut. The crankcase is cut from wood, and cylinders are glued at even intervals round this.

It is advisable to lay the engine out on the plan, to ensure an even spacing of the cylinders. Push rods, two to each cylinder, are glued on last. They are made from 30 s.w.g. wire.

The engine cowl is made from plastic wood, which is moulded on a candle "former" as shown in Fig. 4.

Propeller is cut from $1/8$ in. sheet balsa. Carve as described in Fig. 5.

Each undercarriage "Vee" strut is made in one piece. Axle is shaped from bamboo. See Fig. 6.

Ready-turned wheels of the size needed are difficult to obtain. Make them from plastic wood and solder lead. See Fig. 7. Model shown in photo is fitted with this type of home-made wheel.

SOPWITH "CAMEL"—A "Solid" Model $\frac{1}{48}$ full size

Lay fuselage upside down. Cement lower wings to fuselage. Place block of wood $\frac{1}{2}$ in. high under each wing tip. This will give correct dihedral angle.

Place engine in cowl and cement to fuselage front.

Paint these parts now before adding other units. When dope is dry, cement the eight wing struts in position.

Add undercarriage, propeller, machine-guns, tail skid. Markings are painted in water-colours on thin paper, and stuck to model with clear dope.

Outline controls, etc., with Indian ink. This can be scraped to a fine line when dry with a knife point.

Rigging wires are of 30 s.w.g. wire. Cut slightly oversize and force ends into model.

Details of Colouring

Wing and tail-plane top surfaces

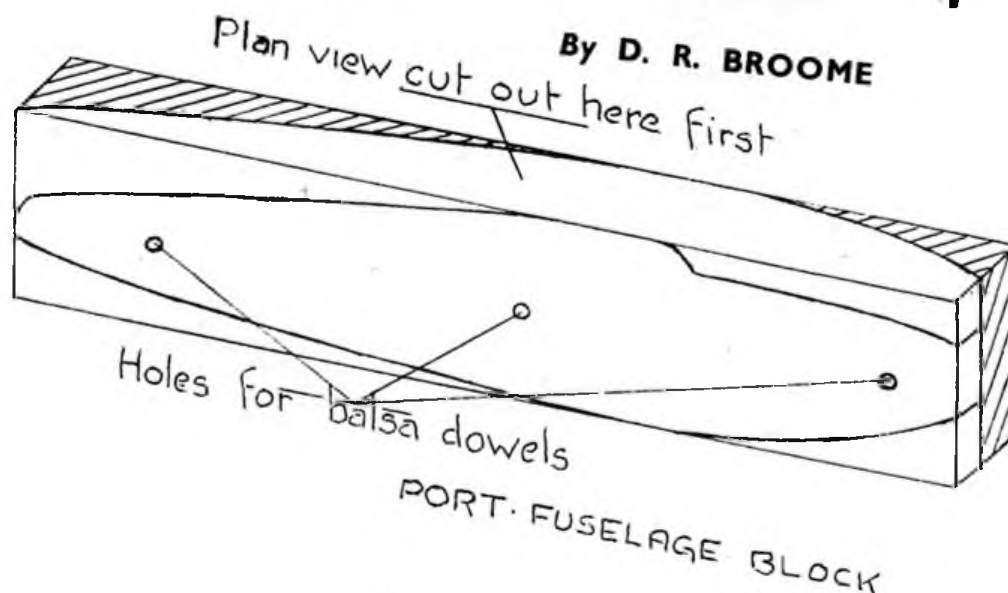
Green
Fuselage sides, from B to rear...Green
Fuselage top, from C to rear...Green
FinGreen
Wheel hubsGreen
Propeller bladesGrey
Engine cowlingsGrey
Fuselage sides, from A to BGrey
Fuselage top, from A to CGrey
Underside of wingsCream
Underside of tail-planeCream
Underside of fuselageCream
Wheel tyres, detailsBlack
Propeller boss ...Varnished mahogany



10s. 6d. cash prize will be paid to the sender of the best photograph sent in by June 5th of a model made from the plan given in the centre pages of this issue.

"SPLIT CONSTRUCTION" for SUPER-SOLIDS

By D. R. BROOME



NO doubt most, if not all, builders of really "super" solids have been puzzled at some time or another by the necessity of transferring side elevations and plans of fuselages on to the blocks of wood used for them without causing distortion. The side view must be transferred to the curved surface made when the plan view was cut out, or vice versa, and a more

LOOK AT THIS MODEL —



A 25" SPAN
GRUMMAN
"GULPHAWK"

Built by
MR. F. JONES
Photo by Mr. F. Cowan
both of Hackney M.A.C.

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(Concluded from previous page).

difficult job than the accurate reproduction of the projection of a curved surface upon the surface itself would be indeed hard to find.

This difficulty, however, need not be encountered if "split construction" is used. This method necessitates the use of two blocks of wood for the fuselage, which are joined, parted and rejoined as necessary.

The first move is to mark out on each block one-half of the plan view of the fuselage—opposite halves, of course—with the flat side of the tracing, which is the centre-line of the fuselage, to the side of the block, and to pare the wood to shape, using a chisel, plane, or any other pet tool the builder may have, and ensuring trueness by the frequent use of a set-square.

Now the side elevation is traced on to the flat side of each half, and cut out with a fretsaw, or by any other means, still using the set-square to keep the cutting true.

The halves are joined temporarily, and we have a "cubist" fuselage, absolutely accurate in outline, requiring only shaping down to cross-section templates to be completed.

Incidentally, and speaking of template work, this method of construction ensures a centre-line which cannot be erased or chewed out of recognition by sandpapering, as frequently happens to the orthodox pencilled variety.

Once shaped, the blocks can be taken apart again, and any necessary hollowing undertaken. Internal details, such as cockpit fittings, which will be out of easy reach later, can also be attended to at this point.

Rejoined, a final sandpapering is given, with special regard to the joins, and the job is finished.

This method can equally well be applied to the construction of seaplane floats, engine nacelles, and so on. Doubtless many applications will suggest themselves to modellers.

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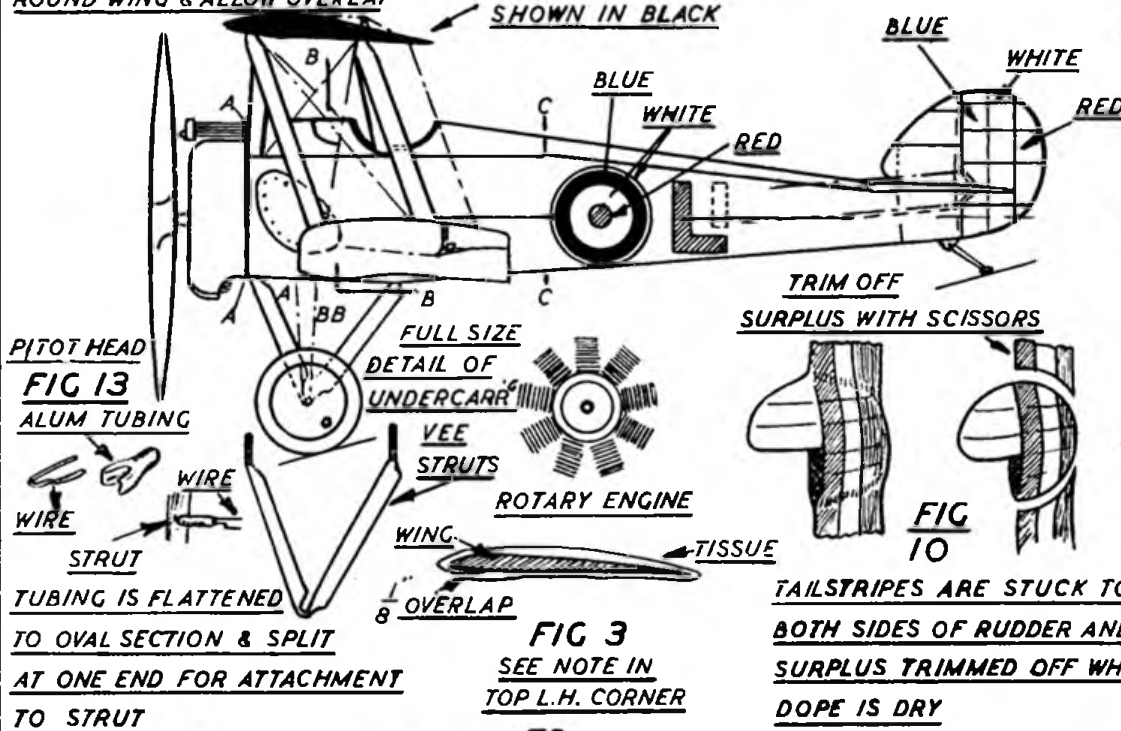
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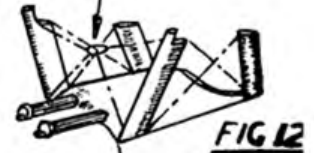
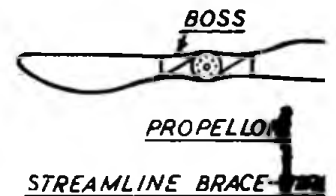
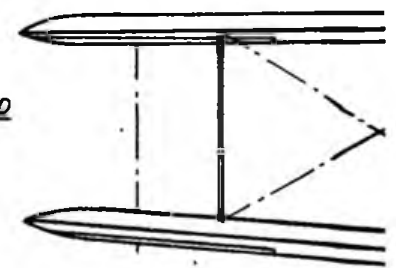
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NOTE RE FIG 3: WINGS ELEVATOR
& RUDDER COVERED WITH TISSUE, DOPE
TO UNDERSIDE OF LEADING EDGE. PASS
ROUND WING & ALLOW OVERLAP

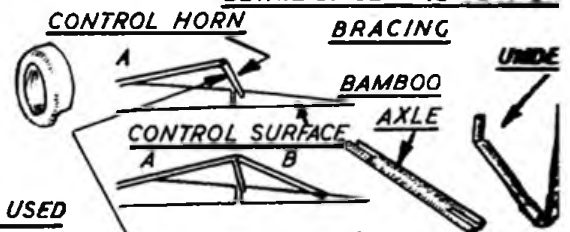
WING CROSS SECTION
SHOWN IN BLACK



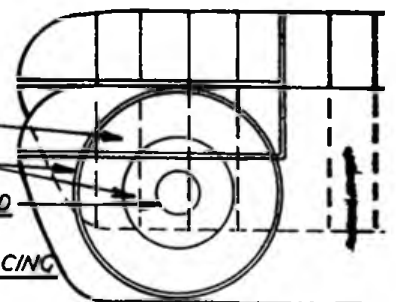
THE SOPWITH



DETAIL OF CENTRE SECTION



THIS PART FORMS
CONTROL HORN. SEE FURTHER
FIG 9 NOTE RE FIG 9 BELOW



NOTE RE FIG 9
CONTROL WIRES ARE FORM
AS SHOWN ABOVE & MADE FR



FIG 5 CAM
TAI

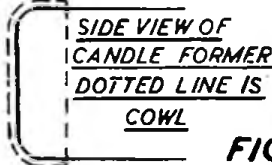
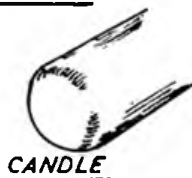


FIG 4

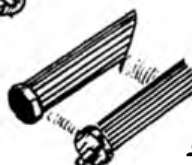
NOTE. ENGINE COWL IS PRODUCED WITH THE AID OF A CANDLE USED
AS A FORMER. END OF CANDLE IS FIRST CUT TO DIA. SHOWN ABOVE. SPREAD
PLASTIC WOOD TO A THICKNESS OF APPROX $\frac{3}{64}$ & ALLOW TO DRY THOROUGHLY
COWL WILL SHRINK UNLESS ALLOWED TO DRY ON FORMER. CUT OPENING
IN FRONT OF COWL $\frac{9}{16}$ IN DIA. CUT REAR EDGE TO SHAPE. SAND COWL
TO SMOOTH THICKNESS OF $\frac{1}{32}$ & REMOVE FROM FORMER. TO THE RIGHT
ARE TWO VIEWS OF FINISHED COWL. OPENING IN
BOTTOM IS CUT OUT LAST.



FIG 8

GUN BARRELS ARE MADE
FROM CORRUGATED
PENCIL LEAD

GUN BARREL
DETAILS



THIS DETAIL IS
TWICE FULL SIZE

SMALL PIECE OF ALUMINIUM WRAPPED
ROUND END OF BARREL, SMALL PIECE
OF WOOD IS CEMENTED TO FRONT OF
GUN BARREL

WIRE (A) RUNS FROM CENTRE OF
FUSELAGE TO CENTRE OF AXLE
CROSS WIRES BB RUN FROM
FUSELAGE SIDES TO AXLE SIDES

WITH "CAMEL" —

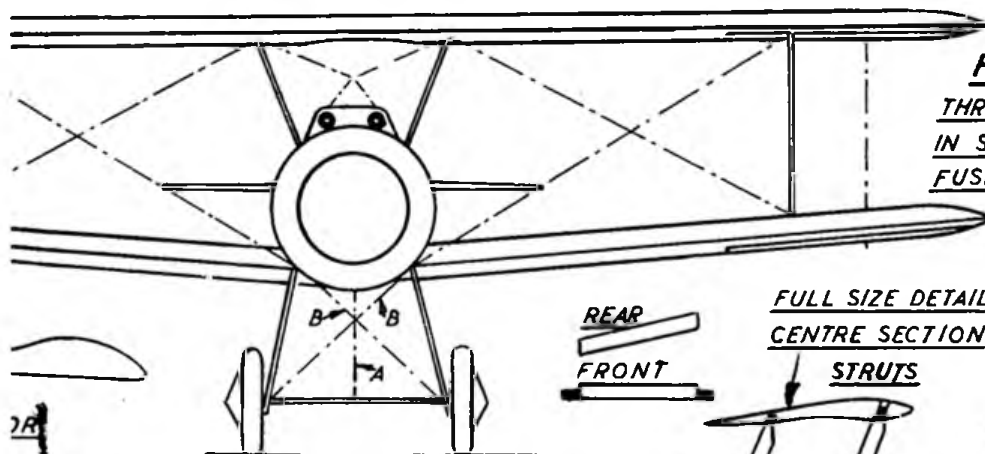


FIG 1
THREE STAGES
IN SHAPING
FUSELAGE

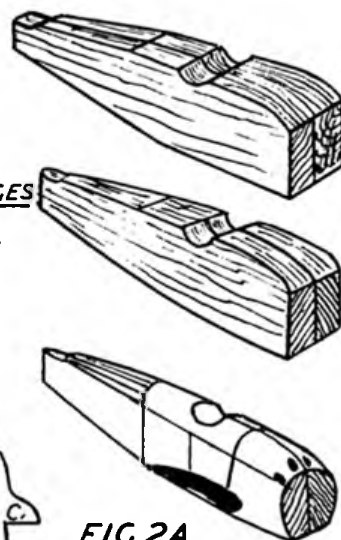


FIG 2A
PATTERN FOR SEAT
BEND A, AT RIGHT ANGLES
TO B; ARMS C, ARE
BENT ROUND SEAT

FIG 2D
JOYSTICK MADE FROM
BEHEADED PIN & STUCK
IN COCKPIT FLOOR

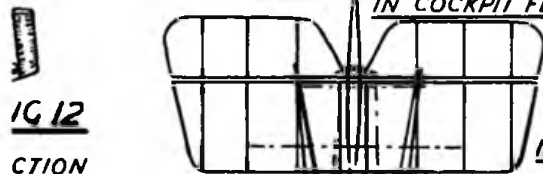
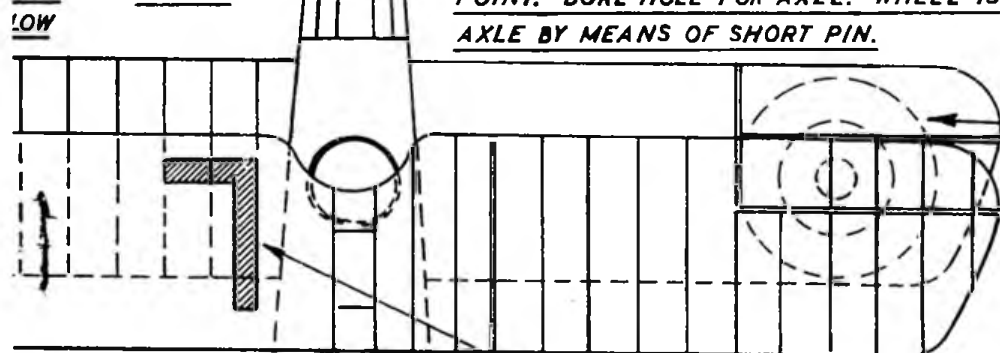


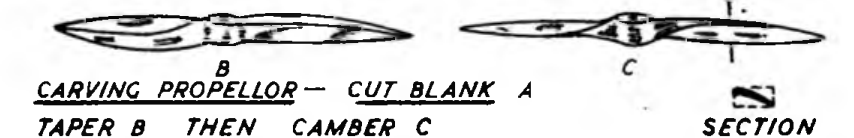
FIG 12
SECTION

FIG 6
UNDERCARRIAGE
DETAIL
TOPS OF STRUTS
FIT IN HOLES IN
FUSELAGE
ONE PIECE VEE
STRUTS



FORMED IN TWO PARTS
E FROM 30 S.W.G. WIRE

B
CARVING PROPELLOR— CUT BLANK A
TAPER B THEN CAMBER C



SQUADRON IDENTIFICATION
LETTER ON TOP SURFACE OF
STARBOARD WING IS WHITE

FULL SIZE DETAIL OF
CENTRE SECTION
STRUTS

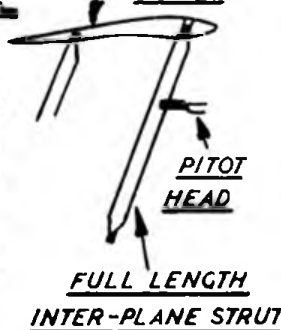
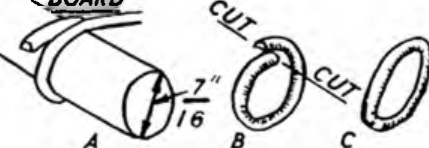
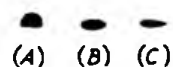


FIG 2B
INSTRUMENT
BOARD



WRAP SOLDER LEAD ROUND DOWEL OR ROD (A) CUT (B)
PUSH ENDS TOGETHER (C). THIS FORMS RIM OR TYRE
BUILD UP CENTRE WITH WOOD & PLASTIC WOOD TO A
POINT. BORE HOLE FOR AXLE. WHEEL IS SECURED TO
AXLE BY MEANS OF SHORT PIN.

FIG 7 ON RIGHT & BELOW
UNDERCARRIAGE WHEELS



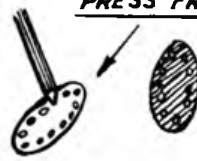
(A) CROSS SECTION OF
SOLDER WHEN BOUGHT.
FLATTEN TO (B) BY
BEATING WITH
HAMMER: FILE TO
STREAMLINE
SECTION (C)

CIRCLES ON UNDERSIDE OF LOWER
MAIN PLANE HAVE NO OUTER RING
OF WHITE

CUT COWLING PLATES FROM THIN
SHEET BRASS OR ALUMINIUM. MARK
POSITION OF RIVETS ON UNDERSIDE
PRESS FROM UNDERSIDE WITH NAIL

ON RIVET POSITIONS
MAKING SMALL DENTS
THESE LOOK LIKE RIVET
HEADS ON TOP SIDE OF
PLATE

FIG 11



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By
PETER
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CHINN



WINGS form a subject on which much controversial opinion has been expressed. This is realised when we hear of one model expert claiming the superiority of high aspect ratio, whilst another strongly recommends low ratio. A similar argument takes place over various aerofoil sections.

Most of these statements are ill-founded, for there is very little to work on theoretically. The sections we use were not originally designed for the slow speeds of models, and until some definite data can be obtained on low speed aerodynamics, we can only go by experience.

Of course, there are some fixed rules to help us. For instance, thick sections generally glide better than thin ones, and undercamber also improves the glide, since it decreases speed, yet maintains sufficient lift, but these facts are not enough to enable us to form any definite ideas.

Apart from the fact that most competition models are designed with a view towards obtaining a maximum glide ratio, all power-driven aircraft are designed to do the same job. That is, to maintain a certain height for a given amount of thrust.

The trouble with a rubber-driven model is, of course, that the power output is not constant, and

so the model's attitude is continually changing.

As we know, the sudden acceleration, due to the initial burst of power, causes the machine to climb excessively, and stall in consequence.

Probably you will be thinking: "Why does this not happen when the pilot of a full-size aeroplane opens the throttle, and thus accelerates his machine?"

To make the answer to this question quite clear, it is necessary to understand a little more about full-size flight.

First, there is the V^2 law, which deals with the velocity of bodies in gases. This law states that the resistance to movement varies as the square of the speed. Which, when applied to a wing, simply means that the aerofoil will lift four times as much at, say, 200 m.p.h. as it will at 100 m.p.h. (providing the angle of incidence is the same). Similarly, four times as much air will be affected, and four times the thrust will be needed.

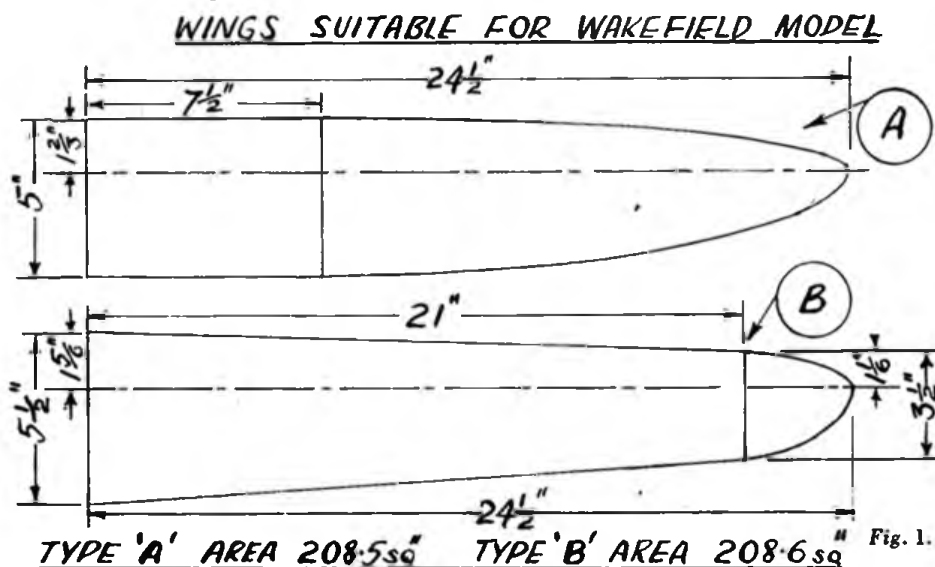
Therefore, an aeroplane flying on 60 per cent power at a positive incidence angle of, say 6 deg., will, if given 100 per cent power, not greatly increase its forward speed, but commence to climb. If, however, the pilot does not wish to climb, he elevates the tail—by easing the control column forward—and thus decreases

the angle of incidence of the wing to perhaps 2 degrees, when the maximum speed in level flight is then attained.

Closing the throttle to 60 per cent again, with the 'plane trimmed for high-speed level flight, will cause the machine to lose height, so that it is necessary to ease the stick back until the 'plane assumes level flight again (when the wing will be at the original angle of 6 degrees).

Since there is no one to trim our model through its power ranges, whilst in flight, we must design and adjust, to fulfil one condition, and modify to suit the other requirements.

The stage on which to base the design of a contest model is,



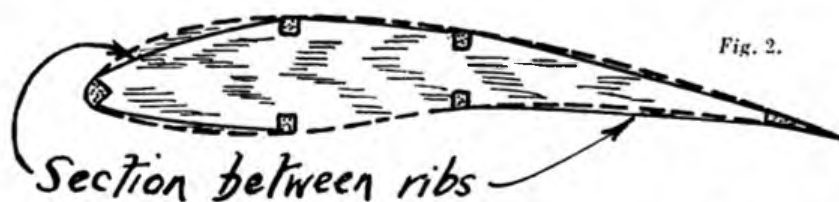


Fig. 2.

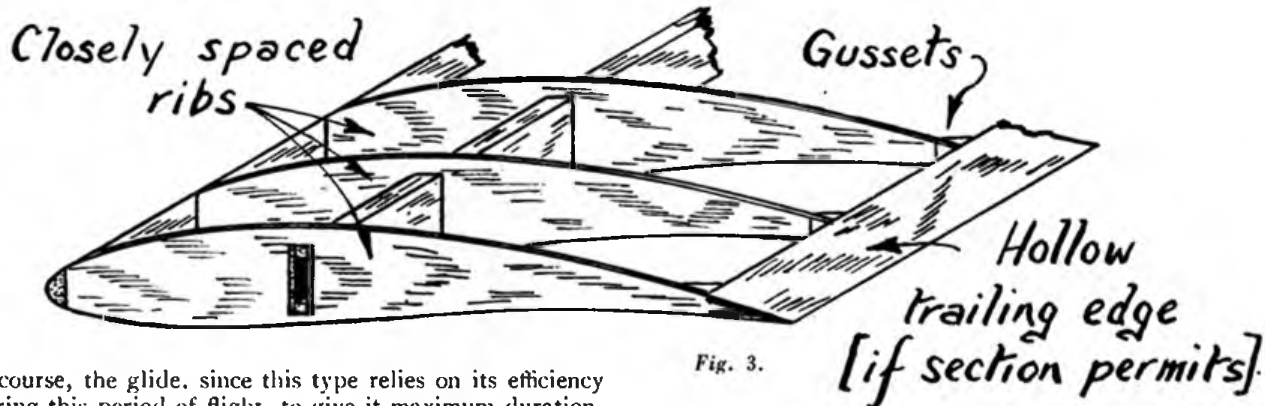


Fig. 3.

of course, the glide, since this type relies on its efficiency during this period of flight, to give it maximum duration.

The design of the wing to suit this condition is very important, and we will, therefore, decide the qualities which a good aerofoil must possess.

To take the section first, we know that thick sections have more lift than thin ones at a given angle of attack. However, at low speed centre of pressure, travel and drag increases are too great to allow use of sections above about 15 per cent chord thickness, and so it is advisable to concentrate on airfoil sections with a maximum thickness of one or two per cent either side of 12 per cent chord.

The Clark Y, Eiffel 431, R.A.F. 32, Eiffel 400, Göttingen 497, are some of the sections which qualify under this ruling.

Now for the question of undercamber. This is desirable in a model wing, since the action of a concave under-surface is, briefly, to increase the angle of attack for the lower portion of the wing, without increasing the angle of the upper surface, over which the air becomes turbulent at high angles of attack.

This type of section has a considerable centre of pressure travel, accounted for by the increased angle of incidence toward the trailing edge. For instance, the Eiffel 400 has a pronounced downwardly curved trailing edge, which will still produce lift when the leading edge is below the zero angle.

This concentration of lift at one point causes an unstable aerofoil, and this is one of the reasons why undercambered sections are not used on modern high-speed aircraft. In models, however, this unstable condition is easily counteracted by use of large and lifting type stabilizers, which tend to keep the angle of attack within certain bounds, and thus prevent excessive centre of pressure movement.

Stable sections, such as the N.A.C.A.M.-6, have low drag, and when placed at comparatively high angles of incidence have a good lift at high speeds, and are used in

full-sized aircraft because of this.

Since modern aircraft use flaps, there is no trouble in obtaining sufficient lift at the low speed necessitated by landing. Even though this type of aerofoil has to be placed at a coarser angle than an undercambered wing in order to get as high a lift-to-drag ratio, there is still a safe margin

before the stall is approached, as the stalling angle is much greater in full-size practice.

Aspect ratio is, as I stated earlier in this article, a subject on which much controversy has been expressed. Therefore there is little that we can do but to revise the advantages and disadvantages of each type.

A low aspect ratio will "hold" the airflow better because of the large chord, but the loss of lift and disturbance caused by tip vortices will be considerably greater.

Tip vortices, or eddies, are due to the high pressure air under the aerofoil rolling around the wing tip into the faster low-pressure flow on the upper surface. The best way of minimising these losses is to round the tip, making the taper as fine as possible.

Another disadvantage of low aspect ratio is that a larger dihedral angle is usually necessary to preserve lateral stability and to counteract the effect of torque on high-powered models.

A high aspect ratio wing has the advantage of acting through a longer moment arm, and thus enabling the dihedral to be decreased; also the small chord lends itself to finer tip tapering.

However, very small chords are undesirable, since the efficiency of the section decreases greatly. An aspect ratio above 18 for a Wakefield type would be impracticable. Constructional difficulties, too, rule out the use of very high aspect ratio wings.

It will be seen from these remarks that each type has its disadvantages, which, of course, accounts for the varied opinions. The best compromise seems to be a

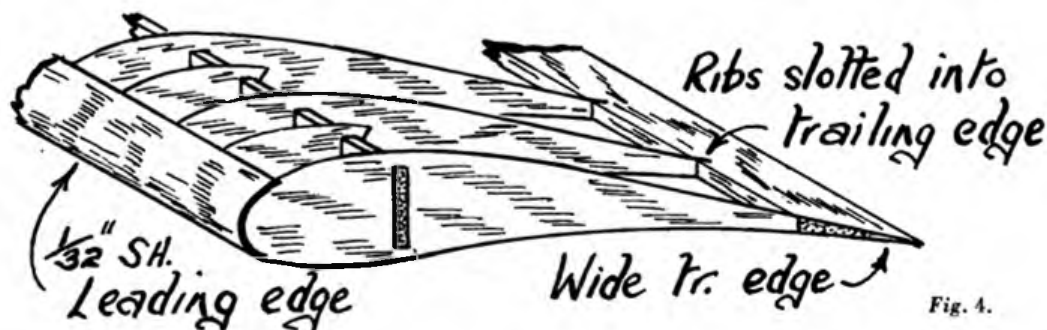


Fig. 4.

minimum ratio, with a tapering chord and thickness toward the tip, which brings us to the question of outline shape.

By using a wing tapered in plan and elevation we can gain the advantages of small tip vortices, large chords, large spin, and thus torque control, as well as an increase in structural strength.

Theoretically, an elliptical or double ellipse wing shape is the most efficient, but this has not been given so much attention by model builders as might be expected, due, no doubt, to its constructional difficulties.

The only trouble with a tapered wing is that the tips tend to stall before the centre, thus making it necessary to decrease the angle of incidence or alter the aerofoil section at the tips.

A root to tip chord ratio of about 2:1 is probably most efficient, although this usually has to be decreased slightly for a model built to Wakefield specifications, since, taking $3\frac{1}{2}$ in. as the minimum chord, the span would not be quite large enough to take care of the torque generated by the high power necessary for an eight ounce model.

Summarising the aerodynamic characteristics, it may be said that a good wing should possess:

An aerofoil section of reasonable thickness, with a good L/D at small positive angles of attack.

The section should be under-cambered to decrease sinking speed during the glide, and to enable the rigging angle to be kept low, thus maintaining a reasonable margin between the normal angle of attack and stalling angle.

A tapered outline, preferably of double-elliptical shape and with an aspect ratio of about 10, also having more taper on the trailing edge than the leading edge, in order to preserve longitudinal stability.

Elliptical shaped tips, with the curve beginning at least one tip chord length from the extreme tip.

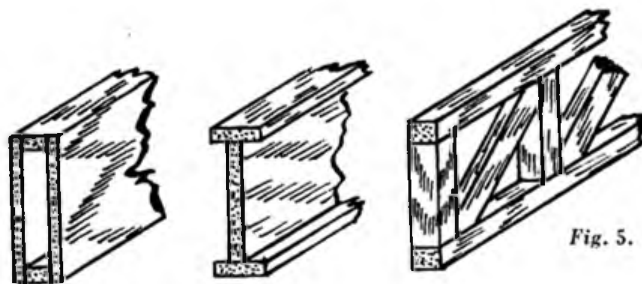


Fig. 5.

Two planform wing shapes, suitable for Wakefield size models, are shown in sketch 1.

So far no mention has been made of dihedral, since the actual angle necessary is dependent on the design of the rest of the model. For instance, a parasol-wing model usually needs less dihedral than a shoulder-wing type, due to the lower centre of gravity position.

If you are contemplating a high-powered model, it is advisable to use one of the "polyhedral" shapes, as this type has been found to offer more resistance to the effect of airscrew torque.

When using this type, however, avoid excessive upturn at the tips, as this encourages early tip stalling at large drift angles. The most efficient type of polyhedral is probably the semi-elliptical shape, in which the angle

gradually increases towards the tips, without a series of sharp breaks, as in a three- or four-panel type.

Before going on to construction methods, it is as well to consider the structural strain imposed on an aerofoil, and this brings up another point in favour of tapered wings.

Since the centre of lift in a taper wing is nearer the root than in a constant chord wing, the moment about the root will be smaller, and consequently less load imposed at this point.

Thus the wing can be made considerably lighter without loss of strength or rigidity.

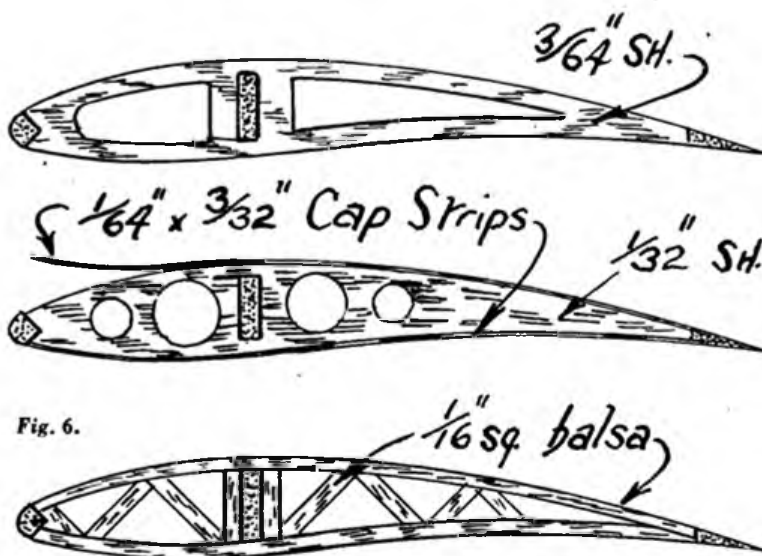


Fig. 6.

During recent years we have seen many different forms of wing construction. Some builders have favoured multispar, others one or two centre spars of deep section, whilst recently, wings containing no centre spars at all, but in place having deep section leading and trailing edges, have appeared.

There is much to be said in favour of each type, but I cannot help wondering why so many designers use flush-with-ribs spars, when a fabric covering is to be employed. Why go to the trouble of choosing an efficient section if it is to be ruined by this kind of construction. Surprisingly, performance does not seem to suffer, as championship models have been built with this type of structure. This seems to lend weight to the theory that the slow speeds and small cords of models do not allow the aerofoil sections to work efficiently.

However, it cannot be denied that the contour of the section is entirely altered by using flush spars, and a sketch to illustrate this is shown in Fig. 2. A sheet balsa covered leading-edge produces a similar result.

Of course, with any type of construction utilising silk or paper covering, the section is spoilt by the sag of the material between ribs, but this can be minimised considerably by spacing the ribs closer. For aerodynamic efficiency, the best type of wing would be one covered with balsa sheet, but under the present Wakefield rules this does not seem to be practicable.

However, a construction which meets most of the aerodynamic and structural requirements is shown in sketch 3. In this type of wing structure a single tapering centre box spar of deep section is used to provide most of the strength. The ribs are of $\frac{1}{32}$ in. balsa, and

(Concluded on page 332).

GADGET

Conducted and
C. A. H. POLLITT,

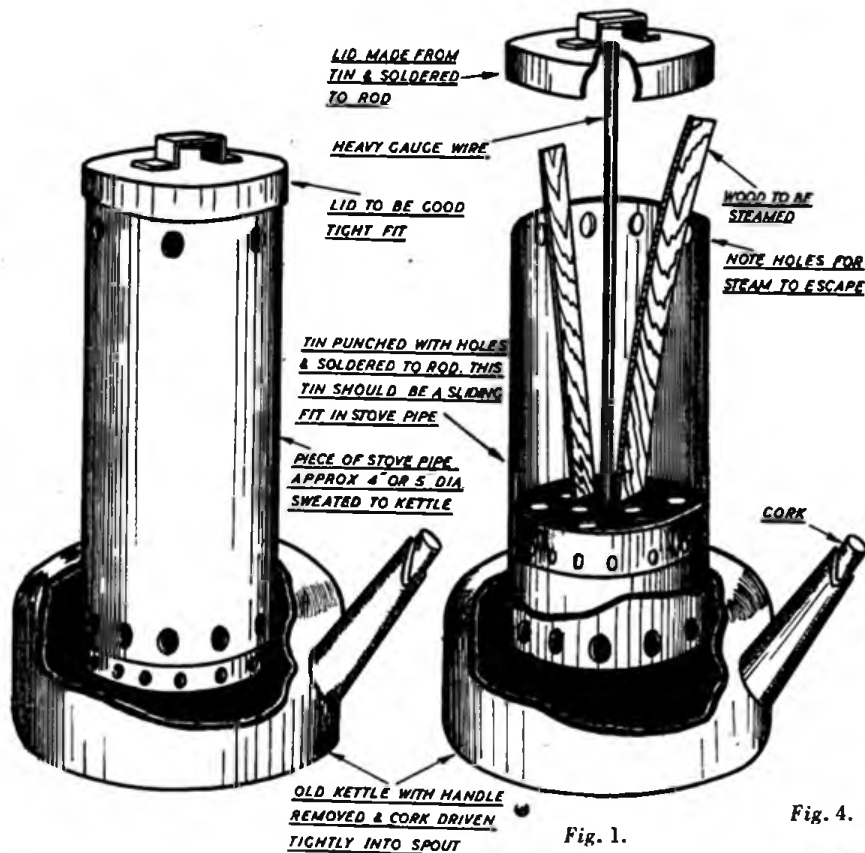


Fig. 1.

WELL, chaps, here's yours truly coming up for the third time, after having been "under the weather" for the past month or so. And hasn't it been a so-and-so? I was talking to a friend of mine the other day, and he was telling me about going down to the local M.A.C. recently. On arrival he was surprised to find the club secretary in difficulties, for there he was with only his head showing above the snow! My friend instantly offered his assistance, to which the secretary replied: "You look after yourself, old man, I'm stood on the club roof"!

And—to turn from the ridiculous to the sublime—here, this month, we have another collection of readers' ideas, and of really varied conception, including one from a reader in Holland and another from an American reader.

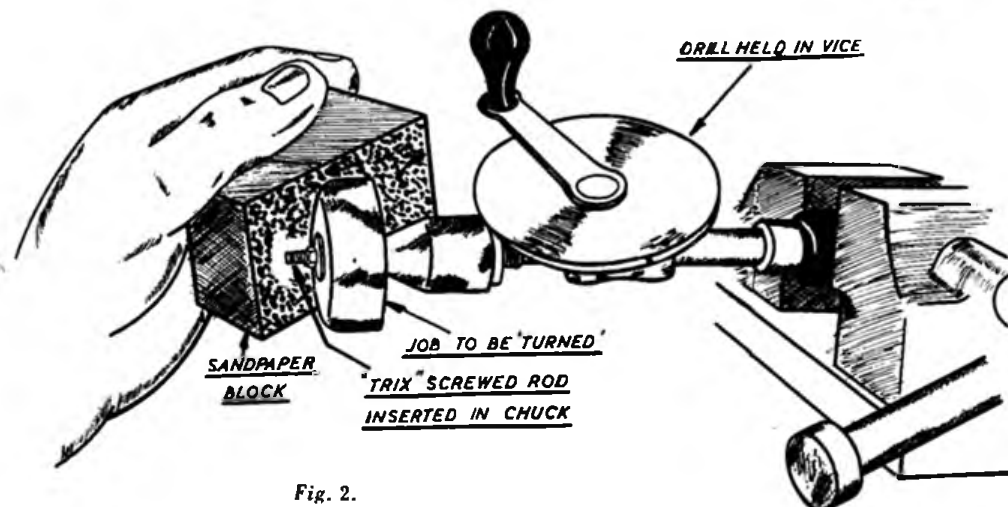
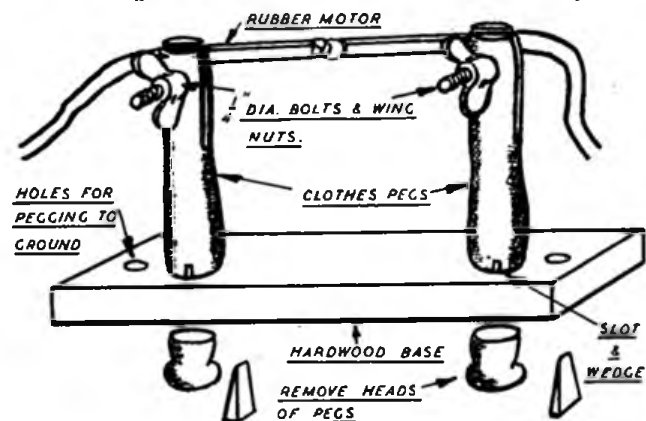


Fig. 2.

The first gadget is one which I myself slyly regard as a boon and a blessing (!), and is in the form of a steam chamber for steaming balsa and the like. The construction is fairly obvious from Fig. 1, and perhaps the only thing to be borne in mind is the need for keeping the bottom of the container some distance above the water level in the kettle. I should say a couple of inches of water would be sufficient. Providing it isn't given a chance to boil dry, this should prove to be an invaluable asset, and Mr. H. Hockenbush, of Sandbach, Cheshire, who has designed this appliance, is to be congratulated on his ingenuity.

Fig. 2 is an illustration of an idea sent in by Mr. J. Hartley, of Sheffield. In principle it represents a possibly crude, though nevertheless effective, turning machine or lathe. It comprises a small hand drill mounted horizontally in a vice, and a stout length of "Trix" screwed rod inserted into the jaws of

Fig. 4.



the chuck carries the work to be "turned." Plywood washers should be placed either side of the work, in order to prevent the nuts from damaging same. The "cutting tool" is a sandpaper block!

I am always pleased to hear from aero-modellers who are serving with the Forces, and here I have a suggestion from Aircraftsman I. W. Letts, of the Royal Air Force. Unfortunately I cannot reveal where he is stationed, but his idea, as shown in Fig. 3, concerns

REVIEW

Illustrated by

"Aero-Modeller" Staff Draughtsman

a wing fixing device (he himself calls it a "swindle"!). The elastic bands attached to the hooks on the wings pass through cardboard tubes, fitted across the fuselage and just below the roof. The upper end of each bamboo strut is hinged to the under surface of the wing.

Mr. A. Chapman, hon. secretary of the Notting-

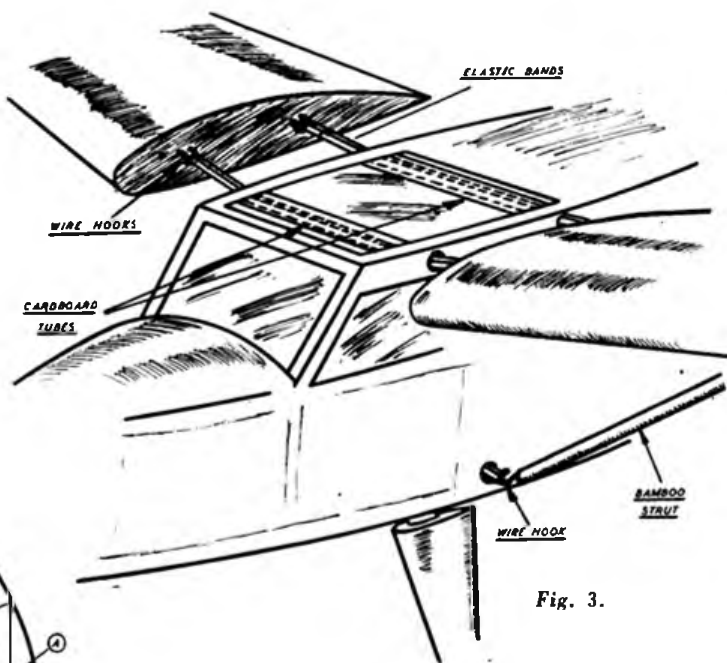


Fig. 3.

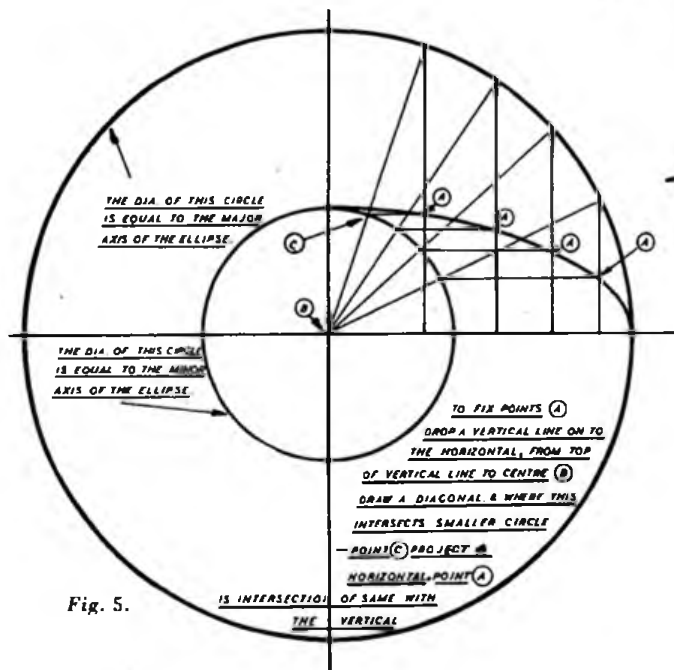


Fig. 5.

ham and District M.A.C., sends me a gadget for stretching a rubber motor to facilitate binding either side of a knot. This again is a really very simple idea, yet it could prove itself invaluable in an emergency and when there was no third party to assist one. As a matter of fact, I happen to know Mr. Chapman personally, and I can clearly remember him showing me some of his many models one time. He is a craftsman of the first order. Fig. 4 explains his idea.

I was particularly surprised, and equally pleased, to receive a suggestion from a Dutch reader recently. He is Mr. H. Veinstra, of 'S Hertogenbosch (I hope I've got that right. It doesn't sound too good!), and his suggestion is yet another method of drawing an ellipse. Apparently, these streamline fuselages are being tackled with equal assiduity abroad as at home, and Fig. 5 illustrates this latest suggestion.

Fig. 6 is a design for a folding propeller, and the idea comes from Mr. J. Walsh, of New Bedford, Massachusetts, U.S.A. During the power flight the blades of the propeller are maintained in the extended position by means of the winder hook. As the motor expends its power the small spring pushes the winder hook forward and so brings it out of engagement with the blades, which are hinged at their rear and automatically fold back on to the fuselage.

Mr. N. S. Orme, of Nuneaton, in Warwickshire, suggests a simple free-wheel device, illustrated in Fig. 7, which embodies a ratchet fitted on the front face of the propeller boss. As the motor runs down, the front end of the motor hook, shaped as shown in the sketch, automatically becomes disengaged from the propeller.

And finally we have Mr. A. W. Neel, of Buckhurst Hill, Essex, with an arrangement for locating the

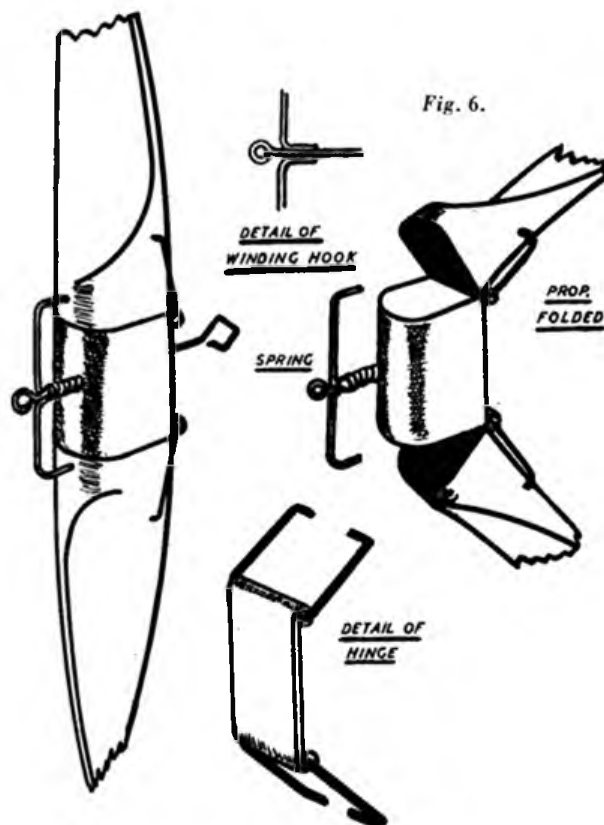


Fig. 6.

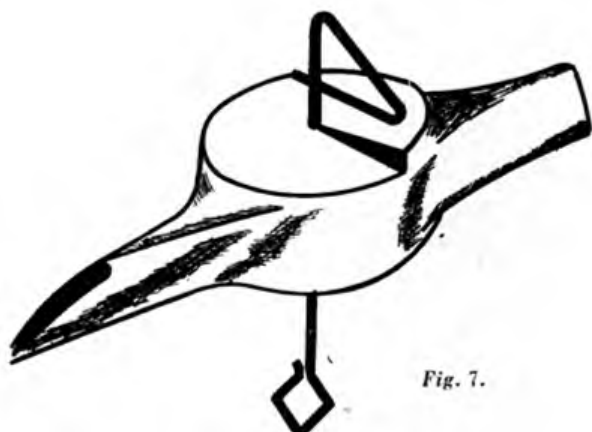


Fig. 7.

nose-block of streamline models. Attached to the nose-former are two small registers, diametrically opposite each other, and which are located in two small cut-outs suitably positioned in the front former of the fuselage. Fig. 8 shows the arrangement of the nose-former.

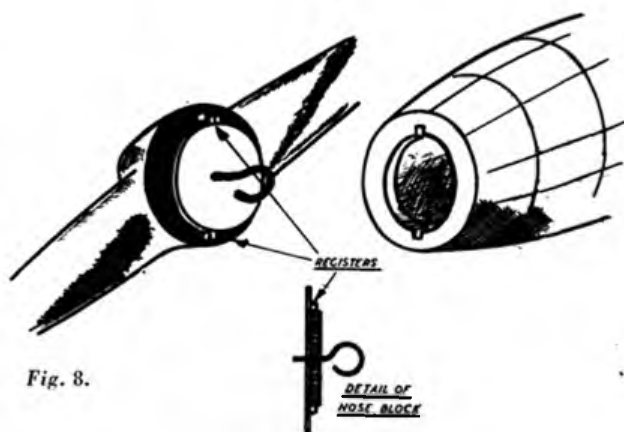


Fig. 8.

And now, in conclusion, and particularly for the benefit of new readers, I repeat my previous request for readers to send me their ideas and suggestions for publication in Gadget Review. Payment of from 2s. 6d. to 7s. 6d. will be made in regard to all gadgets published.

DOWN - THRUST

By ARNOLD WATHEW

DOWN from what?

From the top longeron of the fuselage? From the body centre-line? From the datum line?

Really, these are all most unsatisfactory answers to the question, since in the air none of these lines is fixed at any particular angle. What, then, can we substitute? Surely the only thing is the thrust line itself.

For horizontal flight the thrust line should be horizontal. Now, the primary condition for horizontal flight to be possible is that the forces tending to make the machine dive or nose over shall be equal and opposite to those tending to make it nose up and stall.

The machine can only be in this happy position when the thrust line passes through the *centre of resistance of the whole machine*. Any machine designed so that this condition is not met will not fly horizontally. It will either dive or stall.

The most common condition is that the thrust line passes below this point, so that it is general practice to slope the thrust line until it passes through the desired point. This seems to work very well and the machine flies. Really, the machine has been tilted backwards until the thrust line is horizontal.

Take the case of the average high-wing monoplane.

Its wing is set at an angle of 3 degrees incidence to the top longeron, and it has about 2 degrees of down-thrust either added or built in. Its owner would be vastly surprised to be told that he was really flying his machine with a wing incidence of 5 degrees and a tail incidence of 2 degrees, yet this is the actual fact.

Reference to my lift coefficient figures for Clark Y or R.A.F. 32, published in the November, 1938, issue of THE AERO-MODELLER, will show that this is about the correct angle for an eight-ounce machine flying at about 20 feet per second. Now, flying along the thrust line, a machine with 2 degrees of down-thrust has its fuselage tilted 2 degrees upwards to the line of airflow. Therefore its resistance will be greater since the projected frontal area will be increased. In spite of the increased use of the lifting tail, it is hardly possible to get the desired balance of forces in a high-wing monoplane without this tilting or down-thrust, and this, I think, accounts for the steady increase in models of the shoulder wing type.

After all, a high-wing monoplane, looked at along the line of down-thrust, has the same frontal projected area appearance as a shoulder-wing machine.

So design your machines around the thrust line. No other basis is really sound.

Concluded from page 329.

are spaced not more than one inch apart. The leading edge spar is of $\frac{1}{8}$ in. square or $\frac{3}{16}$ in. square balsa, fitted edgewise or upright, whichever suits the section. If the section has a reasonably thick trailing edge a hollow T.E. spar may be built up from $\frac{1}{32}$ in. sheet.

Some of the experimental sections that have been introduced to aero-modelling, have very high leading edges, and for wings using one of these sections a construction such as that shown in sketch 4 would be advisable. The main ribs are spaced about one inch apart with false ribs between them. The structure contains no solid leading edge spar, this being replaced by $\frac{1}{32}$ in. thick sheet balsa which helps to preserve the shape of the acute curve.

Both these methods of construction have high strength/weight ratios, and are particularly adaptable to wings of medium or high aspect ratio. In wings of very wide chords, an additional spar or some drag trussing might be necessary to make the wing more rigid.

In order to obtain a high power to weight ratio, it is desirable to make the construction of a duration model as light as possible. To minimise weight without decrease in strength, sectional materials should be used throughout the construction.

Sketch 5 shows three forms of centre spar, the box-spar, I-beam, and built-up type. Sketch 6 illustrates a simple rib with lightening holes, the "capped" type, and a very strong built-up rib, suitable for large models.

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WHEN Job Wood, the shining light of our club, flies his models, something usually goes wrong. When things come right it's usually fortuitous.

A few weeks ago, when I called upon him, he introduced me to an all-birch model of gigantic proportions.

"Feel the weight of it," he said, handing me the model, as he scratched his nose and added to the dust that invariably clings to that member whenever he is engaged with his models.

"That won't fly," I assured him.

"Oh, won't it," responded Job. "Most of that weight is rubber. Six geared skeins, and you just see." He had begun to wind the propeller.

The propeller simply roared round on release; and Job looked at me triumphantly.

"And you mean to tell me," I said, "that you, with only a rubber registration under N.G.A., have got the cheek to fly that?"

"Quite. It is rubber, isn't it?"

"Yes, but it could do as much damage as a petrol model."

Job looked thoughtful. Jubilantly careless as he is over his own affairs, he is reasonable enough when it comes to injuring others. He sighed. "Well, I did really want to fly it this evening."

He looked so disappointed that I caught his arm. "Come on," I said, "we'll find a place."

I had reason for regretting the rash decision later in the evening, when Job and I flew the model on a lonely piece of moorland near a golf course. There were one or two golfers on the course, but our moorland appeared deserted except for two people who watched us from the safety of a saloon car.

We came, at length, to that splendid moment when, with propeller fully wound, we prepared to see just what it would do. Everything seemed safe enough, but you never know. It may have been a slight unintentional shifting of the rudder, or a variation in the wind, or perhaps some scientific fact beyond my comprehension arising from that devastating piece of pent-up energy.

Anyway, that aeroplane described a lightning-like parabola, and came back at us in a flash. We both

JOB AND THE

sat down as it roared just over our heads. I understand afterwards that Job's remarks had something to do with his sitting on a stinging nettle.

With a deadly purpose, the aeroplane swooped low for a gorse bush. On the other side it nose-dived. I felt relieved when I realised that by now it had crashed. After all, it might have found the golf course and a golfer or a caddy, or something. We strolled to the bush and stopped suddenly at the sight which met our eyes.

"I'm blown," muttered Job.

For, spreadeagled on the ground, face downwards, was a man. Some yards away lay Job's 'plane, a litter of broken wings. We rushed over. There was a nasty looking mark on the back of the man's neck. He gazed at us helplessly, as we sat him up. I don't like dwelling on the scene. One must come across such incidents sometimes. Sufficient is it to say that within five minutes he had been seated in the back of the car that stood near, and the two strangers had whisked him off to his home.

"I'm blown!" repeated Job mournfully, again and again as we made our way homewards. Job had reason to moan. For the injured man was none other than Colonel somebody or other. We had recognised him well enough. The Colonel is a likeable but truculent member of our local council. He would recover all right, but the fact that a little matter of flying on the local park was before the council was the real tear in the tissue. This affair might well mean the end of our club.

The next evening Job called for me. There appeared to be one thing to do. That was to call on the Colonel and apologise straight away. Not that it would make much difference, and it was with trepidation that we waited at the Colonel's door, while his maid announced us.

We were ushered in at last, and though he looked a trifle sick, he looked good for a few council meetings yet.

"Good evening," he said, almost cheerfully, but as yet he didn't know just who we were.

Job opened his mouth. He cleared his throat. He tried to speak, but no sound came. He looked at me helplessly. Just then the Colonel rang his bell. He instructed his maid to bring whisky, and although Job and I do not indulge in that stinging confection, there seemed no reason why we should keep anything like conviviality from the meeting. We sipped.

The Colonel waved his hands airily. He had just taken a good draught of what appeared to be his staple food. The he got going. A purple vein stood from his forehead. As if addressing a stormy meeting of the council he roared, "If I had my way I'd ban the whole of that crazy sport."

Job, carried away by the emotion of the moment, drank more than was good for him in one go. He spluttered into his handkerchief, imploring me with his eyes to say something.

"Exactly," was all I could offer. "But . . ."

"Exactly," he boomed. "Why the thing's preposterous. I'd have all such people before the court. It's its . . ." Lost for words, he sought his glass for inspiration.

COLONEL ————— By ARTHUR MOUNTSTEPHENS

With another snort he returned to the attack. "Why only last week I heard of one of the blamed things nearly killing a man. Things like that, whizzing through the air and knocking people in the back of the neck. Loonies. That's what they are. Loonies. Ought to be locked up."

Clearly he did not realise that he was talking to two of the loonies who fly model aeroplanes. Job tried to speak again, but failed.

"Trouble is," said the Colonel, "Half of 'em don't know anything about the game."

In vain I searched for something to say. We had come to apologise, but we had made a bad start. "But," I offered weakly, as he continued to glare at us, "the wind is a bit troublesome at times, even for experienced hands."

"Wind?" he boomed. "That kind of feller wants the weather made for him. If the sunshine comes it's wrong. If it rains it's wrong. Anyway, where should we be without wind?"

As if to supply the answer, Job hiccupped. It was a perfectly windy hiccup; a juicy whisky-borne hiccup.

At this point I laughed. After all, there are occasions when one cannot help it. Job merely made more queer noises in his throat. The Colonel glared harder.

"Ever since that club started in the town I knew there was going to be trouble. This has put the lid on it. At our next meeting, sir, by gad, I'll show 'em." The Colonel's voice had risen to thunder. He was purple.

Job made another weak gesture.

The Colonel's fist came down on the table with a bang. "And the blithering idiot who did it, hasn't even come to apologise. Just wait until he does, I'll . . ." Words failed him.

It was quite evident by now that he considered us to be the two occupants of the car which had taken him home. I thought it best to keep silent. Perhaps we would write a letter. Perhaps we would come round when he felt better.

As I rose, Job jumped to his feet like a jack-in-the-box. The poor chap looked as though he wanted to get out into the fresh air.

"Siddown," the Colonel commanded. "Have another drink. By jingo! I owe you two a debt of gratitude for bringing me home last night."

We sat down. He poured out a drink or two. Job merely looked at his with a sickly grin and pushed it away.

"We sincerely hope that you will be well and about again," I said at last.

The Colonel returned me a rather keen look. Job must have nearly fallen through the floor at the Colonel's next words, for he said quite suddenly, "Didn't I see you flying a model aeroplane somewhere last week?"

Well, the cat was out now. I expected fireworks. But he merely smiled. The Colonel has one of those faces that don't improve with smiling. It took on a vacant look. I fancied that he looked quite inane as he turned his eyes towards the ceiling. Then I was quite sure. Our accident had had even greater disastrous results than we could ever have guessed. There was no doubt but what the blow had affected his mind a little.

For he said rather absently. "Pretty things. Quite a nice little hobby, too, I should think."

He rose quickly, and with an "excuse me," barely audible, left the room.

I looked at Job. He was sweating, and I could see that the same thought had come to him. How could one reconcile the Colonel's diatribe against model flying with his last remark.

"I think we'd better go," Job murmured to me, "while there's time."

I rose, too, but just then the Colonel returned. And, unfortunately, he had started again. For as he crossed the mat, he blared, "Yes, just wait till our next Council meeting. Things heavy as lead whizzing through the air. Just feel."

We had been half-way to the door. I turned prepared to feel the Colonel's bump at the back of his neck. Indeed, he had turned, too, and I could see the lump as large as an egg standing above his collar.

But I didn't feel, for the Colonel whipped round again suddenly.

"Yes, just feel the weight of it."

And he dropped a golf ball into my hand.

I shall never forget the sight of relief of Job as he realised the truth. He laughed. He even thumped the Colonel on the shoulder as he did so. I believe he would have seated himself again and drunk anything the Colonel offered him.

But I grabbed him by the shoulder and said, "Come on."

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" . . . that may be affected by thermals, and where the winner has the highest average time of three flights."

I HAVE been simmering over this point for quite three years now, and at last I see in print a few murmurings against those lucky wins in many events—particularly in the Wakefield event.

The time has come for me to point the way out of this rut, as I call it. Read my arguments and weigh the facts for yourself.

This contest business is a real mug's game, left as it is.

But all enthusiasts can, with a little exertion, put the matter in order, if they only realise why and how it all came about.

This hobby, like most of man's patience-absorbers, has been evolved gradually. I remember reading of the early enthusiasts going in for distance attempts as well as duration.

But in those days thermals could not be explained as all our lads understand them to-day, and so, in all fairness, can we blame them for holding their duration contests. Of course not.

Well now, if we are part of this evolution, then I think it high time that something was done about getting on to the next step.

arranged either early morning (dawn) or during the twilight, provided that there is no sign of thermal activity.

Yes, I know full well this will raise a storm of protests from certain quarters. Those lazy ***** will certainly object, but believe me that the very best flying time is as I have stated.

For the sake of a few slackers, don't hold your club back.

In support of the above, let me draw your attention to what our friend John Zaic says about heat's effect on rubber motors, so then even the rubber supports my views—we're getting a few recruits, it seems!

(Read page 168, first column, in THE AERO-MODELLER, February issue, 1940.)

Right, now then, this type would to my mind favour big propellers, with the rubber tensioners, but what of the high climb type?

(2) Steepest Climb, or Call it Performance.

The time from R.O.G. to when the ship commences to glide can be timed, and that will be a real contest,

MY CASE AGAINST THE PRESENT METHODS OF ALL DURATION CONTESTS ————— **By V. C. GRACIE**

Let's look at the question from the progressive point of view, and don't let me hear anyone saying what was good enough for Dad is still good enough for me.

The models themselves show progress—even to a point of being grossly overpowered—to my mind a really senseless aim.

I have now said enough against present methods, and may I say how really pleased I am to see reported, even in *Model Airplane News*, that at the last N.A.A. Conference it was stressed that original designs should be judged well in advance of the kit models. Only another of my aims to make our hobby a really modern sport and not merely a quiet didum's sort of pastime.

Now what are my ideas on modernising?

The foremost aim is to cut out the lucky win of any contest and place the winner of any future event in a position so that any other contestant will have to admit, even to himself, that that lad deserved the victory he achieved.

How can this be done?

By being ever so careful in drawing up the modern contest rules.

They must contain a spice of variety that will please all; the birds who would run the clubs only for this and that reason are unable to.

My suggestions are to split up into several classes one event that fails to impress, my desire being to give it a go in the following way.

(1) Duration.

To be flown under weather conditions where thermal assistance cannot interfere, as is only too obvious in the last four Wakefield finals results. Three attempts allowed—the longest one wins.

This is easily achieved by the contest times being

judging from certain crazy over-powered fiends—anyhow, they usually have a T.V. ending.

I do not here mean solely the longest motor run, but coupled with a vicious climb, shall we say, stretched out.

(3) Careful Design (Original) and Good Workmanship.

These points are very important to my way of thinking, and in this class you will find our future designers already having to decide for their own jobs some ticklish little problems. (Supply sheet of reasons).

A really useful idea to couple here with this section is that the judges should be some well known professional designers—really will open their eyes, besides give them new ideas—and give men at the top a first-class chance of perhaps a good position in one of the designer's aircraft works. The possibilities are great indeed here.

On looking through the last Wakefield results we see that the best group of flights was by Bob Copland. Can we call this an average?

(4) Consistency for Three Flights.

Of course, weather is again of the utmost importance here, and we may find that this event will turn into a type of all-weather contest. Who knows what form the new contests will take, but it is quite interesting to sit and think out a few trouble-free types.

One of the old arguments I positively loathe is the supposed judges favouring someone in particular. Tripe! If they cannot enter in a sporting spirit then we don't want their entry. That's plain.

Let's hear or read comments on this—even personal letters to me: V. C. Gracie, "Xenia," Southfield Road, Plumstead, Cape, South Africa.



THE BRISTOL FIGHTER.

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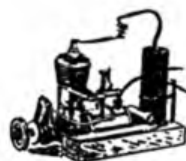
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A HIGH-WING MONOPLANE

By R. A. COLEMAN



THIS small model will be found ideal for using up odds and ends of balsa wood and materials which may have accumulated in the scrap box after building that last "super" job. It is also an ideal model for the beginner, being easy to construct, and although not a record-breaker, will give good, stable flights of over a minute and will stand up to quite stiff winds and a lot of hard wear.

Before commencing building, enlarge the scale drawing to full size, and it is as well to put a sheet of waxed paper over your drawing before building, to prevent the balsa cement sticking to it.

Wings.

Cut sixteen ribs from $\frac{1}{32}$ in. hard balsa sheet to the section shown, and two centre-section ribs from $\frac{1}{16}$ in. balsa sheet, which are $\frac{1}{4}$ in. longer, as shown by the broken line on airfoil and marked C on plan. Build up the wing in the usual way with $\frac{3}{32}$ in. square balsa leading edge, $\frac{1}{4}$ in. $\times$ $\frac{3}{32}$ in. balsa trailing edge, $\frac{1}{4}$ in. $\times$ $\frac{1}{16}$ in. hard balsa main-spar, and $\frac{1}{16}$ in. balsa sheet tips. Give wings $1\frac{1}{2}$ in. dihedral and put $\frac{1}{32}$ in. balsa plate each side of the joint of main-spar at centre-section; also block balsa at leading edge and trailing edge of same. Cement in four triangular fillets marked F on plan. Cover the centre-section with $\frac{1}{32}$ in. sheet balsa after trimming and sanding the block balsa. Fix four small wire hooks at centre-section, embedded in the block balsa and cemented, to hold the wing fixing bands in the right position.

Fuselage.

Build a pair of side frames as shown on plan from $\frac{1}{8}$ in. $\times$ $\frac{1}{16}$ in. hard balsa. Note the $\frac{1}{16}$ in. balsa fillets for undercarriage tubes, also the $\frac{1}{16}$ in. $\times$ $\frac{1}{8}$ in. braces glued to the inside of the frames just behind the rear undercarriage tube, and glue in the nose-pieces of $\frac{1}{4}$ in. $\times$ $\frac{1}{16}$ in. balsa.

Glue the rubber motor peg attachment plates of $\frac{1}{16}$ in. birch ply on the insides of the frames at the rear, and $\frac{1}{16}$ in. balsa filling pieces on top of the latter. A $\frac{1}{8}$ in. diameter birch peg passes through the lot, to anchor the rubber motor in the fuselage.

When building the side frames, make sure that the correct degree of down-thrust is incorporated.

Hold the frames vertical on the plan view of fuselage with pins, wood blocks, etc., and glue in the horizontal cross struts of $\frac{1}{16}$ in. $\times$ $\frac{1}{16}$ in. balsa on edge, also tail-post and $\frac{1}{4}$ in. $\times$ $\frac{1}{16}$ in. nose-pieces.

Cement in brass or dural tubes (18 g. internal diameter) for undercarriage anchorage, after drilling holes for same in the fuselage fillets. Fix tail-skid of 20 g. piano wire, also $\frac{1}{8}$ in. balsa block at tail to give correct negative incidence to elevator.

Cover the first bay of fuselage with $\frac{1}{32}$ in. sheet balsa. Cement on nose a $\frac{1}{16}$ in. birch plywood frame as shown at A on plan.

Tail Surfaces.

The elevator is of streamline section. Six $\frac{1}{32}$ in. and two $\frac{1}{16}$ in. ribs will be required to the shape as shown. The leading edge is $\frac{1}{8}$ in. $\times$ $\frac{1}{16}$ in., and trailing edge $\frac{1}{4}$ in. $\times$ $\frac{1}{16}$ in. Main-spar is $\frac{1}{16}$ in. square on top, and the tips are made similar to the wing tips. Cover the centre-section of elevator (top and bottom) with $1/64$ in. sheet balsa.

The fin is built similar to the elevator, but with three $\frac{1}{32}$ in. and one $\frac{1}{16}$ in. rib and no main-spar. Cement the fin securely on top of the elevator centre-section, and put a cement fillet round the joint. Fin and elevator are held on fuselage by a rubber band.

Undercarriage.

The legs are of tapered bamboo, with 20 g. piano wire plugs on top ends, which fit into the forward tube on fuselage, and wire axles (B on plan) bound on lower ends. The springs are of 20 g. piano wire as at D on plan, and fit into the rear tube on fuselage. Fit a pair of 1 in. diameter celluloid or balsa wheels, and turn over the end of axles to retain them. Give undercarriage a track of 6 in. or 7 in.

Airscrew.

Carve or purchase a propeller of 9 in. diameter by 13 in. pitch, of medium hard balsa, and put an 18 g. internal diameter duralumin bush through the centre.

Nose-block and Propeller Shaft.

Carve a nose-block as shown, with duralumin bush through to take the propeller shaft of 18 g. piano wire. Shape free-wheel parts and solder same in position on shaft; also shape winding ring after propeller is in position, not forgetting to put on cup washers, etc., before finally shaping the propeller hook. Put a short length of cycle valve tubing over the shaft hook to prevent cutting of rubber motor.

(Continued on page 340).

AT THE SIGN OF THE WINDSOCK



ON page 277 of our last issue were given particulars of the "Lancer," a new 37 in. span high-wing duration model, designed by Messrs. Model Aero Supplies, 146 Spring Hall Lane, Halifax. The kit of this model, which costs 12s. 6d. plus 9d. postage, contains a full set of material of first-class quality, a finished super-thrust propeller, and all ribs printed out. The 'plane complies with the latest S.M.A.E. formulæ for models with a wing area not exceeding 144 sq. in. A useful feature is the leather board box, which is supplied with the kit, and which will hold the model when it is completed.

Model Aero Supplies are also offering a range of super-thrust duration propellers and a special lubricant. Full particulars of these will be sent to interested readers who write to this firm, mentioning THE AERO-MODELLER.

* * * * *

We regret that, owing to a misunderstanding, the advertisement of Messrs. Studiette in last month's issue was repeated from the previous month's issue instead of a fresh advertisement announcing new models being inserted, as was intended. The advertisement that should have appeared then announcing the new Studiette Model Aircraft Kits, appears in this issue, on page 326, and we recommend all readers to send to Messrs. Studiette without delay for literature of the attractive new model aircraft kits they have produced. The address is: Studiette, Kent Street, Birmingham. Readers should mention THE AERO-MODELLER when writing.

On page 271 of our last issue appeared an advertisement which is again repeated on page 309 in this issue on behalf of Model Supply Stores, Dept. A, 17 Brazen-nose Street, Manchester 2, advertising a new service to owners of petrol 'plane engines. Model Supply Stores have recently enlarged their workshops, and are now able to deal with repairs to all types of engines. They offer a new service to our readers in that they will pay cash for engines or accept them in part exchange for other goods. Model Supply Stores also carry a large range of second-hand petrol motors, all of which have been stripped, overhauled, reassembled, and tuned up to makers' specification. Petrol 'plane enthusiasts would be well advised to communicate with Model Supply Stores when having engines to sell or requiring new or second-hand ones.

* * * * *

On page 323 of this issue appears another announcement by the Harborough Publishing Co. Ltd., Allen House, Newarke Street, Leicester, concerning the fifth publication in their series of books on Model Aircraft: "Scale Plans of Military Aircraft."

This book will undoubtedly have an immediate appeal to thousands of our readers. The plans have all been prepared by Mr. C. A. H. Pollitt, AERO-MODELLER Staff Draughtsman.

The Harborough Publishing Co. ask us to apologise to those who ordered copies of "The Design and Construction of Flying Model Aircraft," by D. A. Russell, and then had to wait several weeks for delivery. Each reader had a letter explaining the cause of the delay, and these orders were given priority as soon as supplies became available. From now onwards readers may rest assured that prompt delivery of all books advertised by this company will be possible immediately advertisements of the books appear.

A HIGH-WING MONOPLANE.—Continued from page 338.

Doping.

Weigh down the parts on a flat board to prevent warps, etc., paying particular attention to the tail surfaces in this respect. For damp weather flying, give one coat of banana oil over the dope.

Rubber.

The motor consists of from six to eight strands (three to four loops) of $\frac{1}{8}$ in. flat rubber, one-and-a-half times the fuselage length, which, when well lubricated and stretch wound, should take (on six strands) up to about 800 turns.

Flying.

Trim the model for a flat glide, moving the wing back or forward as the case may be. If the model shows a tendency to stall on the glide, the negative incidence block on the tail should be reduced slightly.

Now put about 150 turns on the motor and you should get quite a short stable flight, but if the model still stalls, increase the down-thrust with a small piece of packing behind the nose-block, but remember not to touch the tail-plane setting or the wing position once you have got as flat a glide as possible.

AIR DEFENCE CADET CORPS NOTES

By DUTY PILOT

The Mayor of Islington (Alderman D. McArthur Jackson, J.P.) inspects a petrol 'plane built by Cadet Fairey, of No. 9 F (Islington) Squadron.



FOR the first time since starting these notes I have more material than will go in the space allotted, so I must ask the pardon of those whose reports I have had to condense. The prize for the most interesting one goes to the Woolwich squadrons.

At a recent boxing tournament held by Nos. 56 and 92 (Woolwich) Squadrons the model section staged an exhibition of its work, which included a 48 in. high-wing petrol model, built by the squadron instructor. A novel Wakefield experimental machine shown was of 50 in. span, with a low wing, polyhedral tips and of R.A.F. 32 section. The fuselage was covered with diagonal planking of $\frac{1}{32}$ in. sheet. Another Wakefield machine shown was entered in last year's Elimination Contest and flew 12½ miles. Other exhibits included a 27 in. flying scale model Hawker "Hurricane" fitted with full detail, including an instrument panel with the correct lay-out. The squadron has also completed an 18 in. flying scale high-wing monoplane finished in the Corps colours of light and dark blue. The squadron number is on the fin and the name "Woolwich" just forward of the cockpit, with the Cadets' motto under a tiny Union Jack on the cowl. The beauty of this model is on the port side, which is entirely uncovered, thus exposing the details of construction and finish, which have to be seen to be really appreciated.

A great craze for indoor flying has started in No. 35 F (Edinburgh) Squadron, reports Lance-Corporal Thomas S. R. Jack. Owing to the size of the hall, microfilm jobs are out of the question, and activities are restricted to small tissue jobs and pole flying. Cadet A. Winstanley has built a spar model which shows a great degree of stability. It has a span of 15 in. and holds the record indoor duration of 43 sec. Another cadet flies a spar model with tip-dihedral. The squadron is sending a team of five to Glasgow for the Clyde Dockyard Model Contest. R. Flockhart is just completing a Baby Cyclone gas job, but can't get a petrol ration for it.

No. 85 (Southgate) Squadron is getting ahead with its "Air Cadet" (plans of which were published in THE AERO-MODELLER last month) and hopes to arrange some inter-squadron competitions. It has accepted a challenge from No. 36 F (Enfield) Squadron and is willing to take on any others. The squadron's "Air Cadet" has made a flight of 105 sec.

The model-building section of No. 110 (City of York) Squadron is building 27 in. duration 'planes. The cadets are arranged in groups of three, with an experienced modeller and two cadets to each model. Cadet F. Moses accepts on behalf of the squadron the challenge by No. 116 Squadron to a contest.

A petrol engine class is now engaged in machining the parts for an engine to be used by No. 9 F (Islington) Squadron in a model which will be entered in the inter-squadron competition in the summer. The Mayor of Islington, as shown in the accompanying picture, recently inspected the squadron and showed great interest in the model-making section. The squadron owes much to lectures and demonstrations given by the L.C.C. instructor, to whom, with Mr. C. T. Bird, head of the Evening Institute, much credit is due.

Summer holidays, followed by the war and black-out, rather put the damper on things at Belper Strutt School (No. 118 Squadron), reports Cadet C. B. Chadwick, but promising models have been made at home, and No. 118 hopes to do big things in the future. During the squadron's first term Chadwick and two others with several years' experience were chosen to instruct the younger boys, and on the whole, he says, results were very good, some being excellent.

From Collyer's School, Horsham (No. 87 Squadron), Cadet J. R. Buchanan writes to say that the squadron is receiving a great deal of help and expert guidance from outside, modesty preventing him from mentioning that the expert guidance is that of his own father, as Duty Pilot's troupe of trained spies has discovered. A "Wren" duration model, plans of which were published in THE AERO-MODELLER, has been built by combined effort, and a "Falcon" glider will soon follow it into the air. Plans for the summer include the construction of a 50 in. flying scale model of a "Hurricane," competitions for workmanship and finish, and a special competition for the unaided building of duration models. A display and competitive meeting is to take place before the end of July.

Mr. H. Benington, of Manchester University, who has a very fine collection of models, is giving instruction to the Manchester Wing. Since the class was formed

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members have constructed the "Blenheim," "Spitfire," "Bristol Fighter," "S.E.5," "Battle," "Hurricane" and "Heinkel 111 K." Mr. C. S. Rushbrooke is giving lectures on flying models, and is providing instructors each week. It is proposed to make the A.D.C.C. Model in time to hold competitions at camp in Whit-Week at Abergele.

No. 11 (Brooklands) Squadron was lucky to have Mr. Broomfield, of Weybridge, to start them on the right lines, and although he has now been called to more important duties, the modellers carry on under the supervision of Lance-Corporal Lovell. Chief interest at the moment centres round the production of a petrol-driven "Cloud Elf," which should be ready for tests soon. Other models in process are one Smith's "Wakefield" and two "Maybirds."

The "Wren" and the "Wasp" from Rushbrooke's "A.B.C. of Model Aircraft" are being made by No. 107 (Aberdeen) Squadron. Others on the board range from the "Lynx" to scale-flying models of the "Hurricane," "Spitfire," etc. About 75 per cent of the boys had had no previous experience of the hobby, and it was therefore decided that each flight be given a preliminary lecture. For simple models to begin with the "Club Moth" and "Sparrowhawk" were selected, and some of these are nearing completion.

Cadets with over three years' experience in model aviation were appointed instructors, and trainees were posted three to an instructor, reports Corporal MacIntyre, of No. 137 (Ayrshire) Squadron. The trainees started by building a small solid balsa glider of 9 in. span and went on to the construction of Club "White Wings." The cadets of the model section are enthusiastic and the standard of their work is high.

Cadet P. D. Lightowler reports that No. 13 F (Exeter) Squadron has a modelling section which meets weekly, instruction being given in groups of four or five by cadets with previous modelling experience. Several models are now well underway. THE AERO-MODELLER appears regularly in the school reading room.

An ambitious cadet of the Northwich Squadron has started on a 9 ft. span petrol-powered model, according to a report in a local paper. Two flying meetings have been held, and two prominent local residents have promised trophies for annual competition. The squadron's model aircraft club is limited to 25 members. Two local aero-modellers have put their collection of blue prints and technical data at the disposal of the cadets and are acting in an advisory capacity.

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S.M.A.E. REPORT

Brief report on a meeting of the Emergency Committee of the Society of Model Aeronautical Engineers, held at the Grafton Hotel on Sunday, April 7th, 1940.

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

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

The next business that came before the meeting was the result of the ballot taken amongst the clubs as to whether or not cash prizes should be given for S.M.A.E. competitions. The result of the ballot was as follows: Thirty-nine in favour of cash prizes and nineteen against. One club refrained from voting. Thirty-eight clubs failed to reply to the Society's voting card. A list of these latter clubs will be given in the *Bulletin*. The committee accepted the result of the ballot, which means that cash prizes will be given, as hitherto.

A letter was read from the Igranic Social and Sports Club (Model Aero Section) announcing their open competition, to be held on Whit-Monday, at Bromham, Bedford. Any club wishing to partake in this competition should get in touch with the hon. sec. of that club.

The committee sanctioned the Croydon and District M.A.C.'s ground for flying petrol models. This ground had been inspected by Mr. J. C. Smith.

A letter from THE AERO-MODELLER was read, announcing a competition for a cup to be given by that journal to the Air Cadets, and to be known as the "Air Cadet Challenge Cup." This is a decentralised competition, and will be held on August 11th. Affiliated clubs are requested to co-operate with their local squadrons and give every assistance possible. Full details of the competition, together with the rules, will be published in the *S.M.A.E. Journal*.

Correspondence relating to the Copenhagen International Model Exhibition was read, and the committee decided that if it was deemed advisable they would have pleasure in co-operating.

The Beaconsfield Club (C. C. Wakefield and Co. Ltd.) asked the committee for guidance in organising and judging competitions. Messrs. Bullock, Cosh and Rippon will assist in this matter, and Mr. Houlberg offered to attend, and, if necessary, judge the competition.

Correspondence from the Irish Junior Aviation Club regarding an international competition to be held in Dublin was considered, but it was felt that travel restrictions might interfere with the attendance of competitors from England. It is hoped that participation

in this competition may be possible at some future date.

Applications from Mr. Stuart Davis, of the Croydon and District M.A.C., and Mr. R. Copland, of Northern Heights M.F.C., to attend the next Council meeting, were granted.

The following clubs were affiliated:

Bedford Model Aero Club	...	75 members
Chester Model Flying Club	...	18 "
Hinckley Model Aero Club	...	24 "
Lysander Model Aircraft Club	...	56 "
Nottingham and District Model Aero Club	...	14 "
Stoneleigh Model Aero Club	...	17 "
Westland Model Aero Club	...	16 "

The following clubs were reaffiliated:

Barnes and District Model Aero Society.
Beverley and District Model Aircraft Club.
Barnsley and District Model Aero Club.
Blackheath Model Flying Club.
Batley and District Model Aircraft Club.
Bournemouth Model Aircraft Society.
Brighton and District Model Aircraft Club.
Dulwich Model Aero Club.
Ealing and District Model Flying Club.
Edinburgh Model Flying Club.
Glasgow Model Aircraft Club.
Lancashire Model Aircraft Society.
Luton and District Model Aeronautical Society.
Park Model Aircraft League.
Rugby Flying Club (Model Section).
Wakefield (Yorks) Model Flying Club.
Warwickshire Model Aero Club.
Gimsby and District Model Aero Club.
Cheam Model Aircraft Club.

The Glasgow M.A.C., in their application for re-affiliation, enclosed a donation to the Society of 10s. 6d. They also put before the committee several proposals. The committee had pleasure in passing a hearty vote of thanks for their generous action and for their helpful suggestions.

Mr. Cosh produced several timekeepers' armlets. The type of fitting was decided on, and it was suggested that quotations for celluloid discs bearing the word "Timekeeper" and the S.M.A.E. badge should be called for.

The committee unanimously elected Mr. C. J. Burchell a Fellow of the Society, in recognition of his work, which he has given to the movement for years.

The meeting closed at 9 p.m. with a vote of thanks to the chair.

H. YORK, *Hon. Press Secretary*.

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CLUB NEWS

by "Clubman"

WELL, well, well! It seems that the lighter nights have brought about some real intensive reporting, and this month's batch of press items just about rings the bell for numbers. I suppose that many clubs have now found it possible to carry on in almost a normal manner, and we shall be hearing much more of their activities during the coming months. However, this all shows a healthy movement, and it is all to the good of the game. It just about makes me a prophet! Remember what I said earlier on about "continuity" and the ability to carry on? I know some clubs are still feeling the effects of evacuation, etc., but I honestly think that 90 per cent of the clubs will find it possible to carry out a normal programme. Here's luck, anyway.

My plea for the elimination of "vicious competition" has met with warm support from many quarters, and one club has gone so far as to make a "leader" of it for their club magazine. One thing has been evident from the many reports received, and that is the very sincere wish of each and every club to get down to brass tacks and co-operate with their neighbours. For which admirable sentiment I feel very intimately responsible, and very pleased to see brought about. After all, we are in this game for the fun of the thing, and to let things get so serious that one carries a chip on the shoulder gets one nowhere! The continuous squabbles prevalent in some other sports, especially those where professionalism exists, should be quite enough of an example to us of what can happen when folk let monetary or other inducements outweigh the sporting aspect of the game.

A reader sends in an invitation this month for anyone serving in the Forces to visit him. This is an excellent idea, but I am not publishing his address, as if we were to allow the columns open for this purpose we should be swamped with notices, and there would be no room for the normal functions of the section! So I trust this chap will understand why his name and address is not given here, but I would say that it is up to the clubs to extend this sort of invitation to those enthusiasts who may be stationed in their districts. I feel sure that there are many aero-modellers stuck in strange places who would be glad of the opportunity of a chat and exchange of ideas with fellow modellers in their billeting areas. Now then clubs, what about it?

I have a letter this time from a chap in West Hartlepool, who wishes to know if others afflicted as he, deaf and dumb, are members of model clubs. I know of none myself, but it would surprise me if there were not. My experience has been that, when a fellow is unfortunately handicapped in one respect, he generally excels in some other, and I have seen some real works of art turned

out by them. I do know that a handicap as this is no bar to chumming up with aero-modellers, and I sincerely hope that our friend is soon fraternising with the other modellers in his district.

Space will not permit a fully detailed monthly list of each and every flying fixture, but I think we could find room for a calendar of "open" meetings, such as the Whit Monday affair at Bedford. Therefore, will all clubs who are including such events, as distinct from purely domestic fixtures, please supply me with full details, and a list will be kept up to date in these columns.

I've heard grouses in certain quarters regarding the inclusion of the new model class in this year's S.M.A.E. Competition programme. In spite of the journal giving full details, many chaps seem to have got the idea that this event is to supersede the present Wakefield type of machine, but this is completely wrong. Just think back and remember that it was agreed to make no change in the current Wakefield rules, but, with a view to collecting data for consideration at any time the Contest Rules may need modification, this new specification was introduced. Obviously, the best method of introducing a change is to have concrete facts to place before the public, and I consider the present method of dealing with the matter is ideal. With a programme uncomplicated by international events, we have an ideal opportunity for trying out new ideas, etc. One last word to those "grouses" who complain that their present Wakefield models are now no use! There are at least two events for your 1939 model, besides many others in which the machine can be entered—and, after all, if you are so darn clever with the present specification, surely all that skill and knowledge can be introduced into the smaller job.

One last grouse, then we can get down to the terrific number of reports sent in this month. May I appeal to all, whether as a club or individuals, to show a bit of courtesy in the matter of correspondence. I have heard complaints from certain officials who, in spite of much hard work in writing and posting letters, etc., to people, rarely get a reply from far too many of them. After all, it is only common courtesy to reply to a letter, so please remember that, though it may be a bit of a bore to get the pen and ink going, the chap who had the job of circularising you and many others had a much harder job of work than you, so spare a bit of consideration!

The annual exhibition of the SKYBIRD LEAGUE took place in March, when Squadron Leader H. W. Woollett, D.S.O., M.C., presided at the judging. The models this year showed a very high standard of

craftsmanship, and the judges had a most difficult, if interesting, task. Thirty-six models were selected for awards, the principal being:—

Skybird League Challenge Cup for best Club model:

Club 287a, of Leatherhead, for the second year running. (Airspeed Oxford.)

Runners-up Cup: Club 374, Liverpool. ("A. W. Siskin.")

Henry Channon Cup and Premier Craftsman's Medal: Norman E. Jones, of Westcliff-on-Sea. ("Fairey Seafox.")

Bullocke Cup: K. E. Curtis, of Norbury. ("Morane Saulnier.")

Craftsman's Cup: C. Pratby, of Woodford. ("F. E. 8.")

AERO-MODELLER Shield: D. O. Jones, of Bournemouth. ("Airspeed Oxford.")

Air League Shield: R. Guerrier, of Wokingham. ("F.E. 8.")

Lady Mairi Stewart Cup: To the previous holder, Miss J. Ridley Hooper, of Ipswich.

The next important feature for Skybird League members will be the North of Ireland Rally, which takes place in April. Organised by Lady Mairi Stewart, prizes will be presented by Lord and Lady Londonderry, and this event should be most interesting.

I see that the LANCASHIRE M.A.S. have lost their worthy secretary, who is undertaking the editorship of this journal. The Managing Editor has more to say on this subject elsewhere, but I see I shall have to watch my step from now on! I am sure this move will meet with the approval of all aero-modellists, especially the club chaps, as Rushy is well known as an exceedingly keen club fellow, and has done good work for some time past.

Our old friend, N. B. Rundle, of New Zealand,

NOTICE.

The Bedfordshire Model Aero Challenge Cup Contest, particulars of which were published in the February issue of THE AERO-MODELLER, will be staged on Whit Monday, May 13th, and is, of course, organised by the IGRANIC M.A.C. This date has been picked, as it does not clash with any S.M.A.E. events, and coming fairly early in the season, should appeal to all clubs, especially those who may have members almost due for "registering." It is hoped that the donor of the trophy, Sir Richard Wells—now a Vice-President of the S.M.A.E.—will be able to personally present the Cup to the winners.

Entry forms are now ready, and can be obtained from the Hon. Sec., Model Aero Section of the Igranitic Social and Sports Club, Igranitic Works, Bedford. These must be returned not later than April 29th. Don't forget that this event is open to all in the British Isles! (Any kind person got any spare petrol coupons going buckshee?) This year the event is to be staged at Bedford, and full details of ground, etc., are promised.

Mr. Hill thanks all those club secretaries who wrote regarding this event.

sends us another letter this month, in which he appreciates greatly the friendly contacts made with enthusiasts over here through the medium of these columns. With only a few clubs, mostly with smallish memberships, these chaps rely very much on knowledge that can be



(Top left and left centre) D. A. Martia, of Singapore, and his models. They also have that old bugbear—trees.

(Top right centre) A relic of the cold spell. A "Skeeter" on skis, built by J. N. Cochrane, of Eton College.

(Top right) Carrying on the good work—in both spheres—"Somewhere in France." F./O. R. Warson, of the Northern Heights Club.

(Bottom left) A scale Airspeed Envoy, built from "Aero-Modeller" plans, and constructed by J. Baxter, of Manchester.

(Bottom centre) High Wycombe lads out for a spot of flying.

(Bottom right) Solid scale "Hawker Osprey," built by G. Old, of Darwen.

sent them, and THE AERO-MODELLER has met with a great welcome in that far-distant outpost of the Empire.

The fine weather recently brought about some intensive testing, etc., this being the practice in the IPSWICH M.A.C. Bob Russell, their glider expert, clocked 185 sec. O.O.S., while a streamlined duration job put up a time of over 2 minutes. A visit by a crowd of evacuated Ilford club members was much appreciated.

I must give a big hand to the boys of the ASHTON AND D.M.A.C. this month for their efforts on behalf of the local Red Cross Unit. A four-day exhibition staged by them raked in the fine total of £11 16s., which was handed over to this deserving cause. Altogether 110 models were on show, and thanks are expressed to members of the Swinton and Lancashire clubs for the loan of models, etc. Two features of the exhibition were a

tive, and has held a series of indoor meetings, consisting of pylon flying and lectures. The winners of recent events were:—

Duration.—Mr. N. Wilson ... 105 sec.
Nominated Time.—Mr. F. Harris 47 sec.
Microfilm.—Mr. D. Palmer ... 49 sec.
Speed.—Mr. F. Harris ... 50 m.p.h.
Spot Landing.—Mr. H. Buller, bull's-eye!

A social evening held at the latter end of January proved a huge success, over 100 members and friends turning up. Members of the North Coventry Club arrived in force, and the annual prize-giving also took place.

The addition of a petrol section and an indoor model section to the CHIGWELL AND D.M.A.C., has aroused great enthusiasm, and the local village hall has been obtained for flying meetings. A 50 in. span Lysander



(Left) A 1/24th scale flying model of the "Hawker Hind," built by A. Doughty, of Shoreditch.

(Centre) An Etonian aero-modellist with his Miles. Mind those posts!

(Right) A fine piece of construction. A 6 ft. petrol model, based on the Bowden "Puffin," built by S. H. Smith, of Walmley, Birmingham.

reproduction of the Keil Canal Raid, and the crashed German bomber at Dalkeith—both "stunts" arranged by H. Parrish. A photo taken at this affair is reproduced on page 349, and shows a fine collection of models, with the usual bunch of awe-struck and envious onlookers. Good show, chaps!

This club's records stand as follow:—

Under 150 sq. in.—R.O.G., 126 sec., C. B. Jackson.
H.L., 180 sec., C. B. Jackson.
Over 150 sq. in.—R.O.G., 149 sec., R. Bardsley.
H.L., 199 sec., C. B. Jackson.
Wakefield Class.—R.O.G., 109 sec., C. B. Jackson.
H.L., 199 sec., C. B. Jackson.
Scale Class.—25 sec., E. Brown.
Sailplane. —57 sec., W. Titterington.
Biplane. —R.O.G., 66 sec., W. Titterington. H.L., 174 sec., W. Titterington.

Twenty enthusiasts decided to form the HITCHIN M.F.C., and this body is now well established. It is hoped that the local cricket ground can be obtained for a flying field, and subscriptions are 2s. 6d. for those under 16, seniors 5s., and non-flying members 1s. 3d. An exhibition will be staged on May 1st, and members have generously donated towards the prize list. The president warned the members that while a success was soon forgotten, a failure is too well remembered—a sentiment that I can heartily endorse! I also recommend another remark made, that the success of a club depends on the members, and not on the committee. This is only too true, and I am sure many clubs would benefit from a bit better co-operation from the rank and file. Now then—how many caps fit?

The WARWICKSHIRE M.A.C. has been very ac-

has been built by R. R. B. Smee (photo enclosed), whilst a Korda, built by A. B. Mason, has clocked 3 min. 34 sec.

The propeller-carving contest staged by the STCCKTON-ON-TEES M.A.C. was won by Mr. W. Brody, followed by Messrs. W. T. Martin and R. Mollison.

We have news this month from Eton College, where a number of the scholars have banded together for the building and flying of models. A couple of photos show examples of their activities.

The KEIGHLEY M.A.C. are now keeping their club-room open throughout the week, and it is hoped that more enthusiasts will enrol and make the gesture worth while. The view is expressed that "with a bigger membership we should feel justified in becoming affiliated to the S.M.A.E." I feel I should put you right there. Keighley. Smallness of numbers should be no bar to application, and, in fact, it is the practice now to encourage the largest and the smallest of clubs. Affiliation fees are based on the numbers of membership, so there is no hardship in that direction. Don't hold back, but get into the swim right away!

An indoor Stick Model Contest resulted in a win for Mr. S. Parkington, who averaged 56.75 sec., followed by Mr. H. Williamson, with a time of 43.25 sec. Outdoor flying has started, and a competition was to take place on Easter Sunday for members newly joined. The report states: "It is for members who have not been in the club more than six months with a wing span of 36 inches"! Now, don't tell me they mean the models!

The CROYDON AND D.M.A.C. held its annual general meeting on Wednesday, February 28th, Mr. Stuart Davis in the chair. Most of the previous year's

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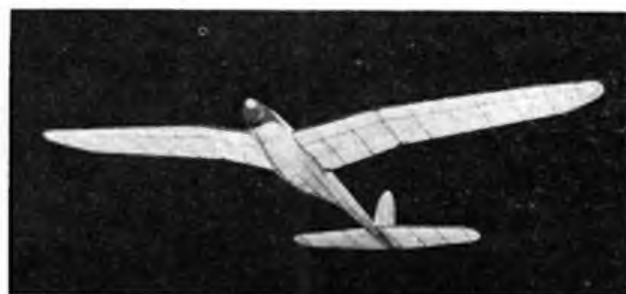
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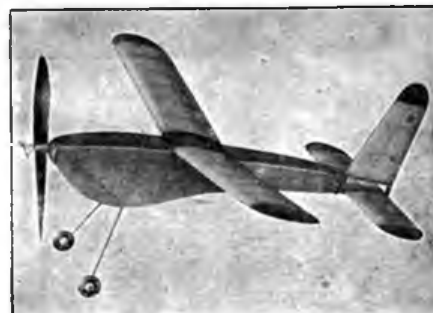
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officers were re-elected, and the trophies, of which there are eight, were presented, each winner to hold the trophy for one year and to receive a miniature. The balance sheet and reports were adopted, showing a satisfactory financial position and a membership of about 70.

Gliders are playing a large part in the flying activities on the new flying ground—a golf course—at Addington. It is particularly suited to this type of craft, owing to the fact that it slopes steeply, the best flight to date being about 4 minutes put up by Mr. Stone.

Mr. Pitcher is very successful with a slab-sided Wakefield which flies very steadily, his average flight being about 2 minutes. Mr. Hills is still doing great things with his "pushers," indoor and out, taking the second prize in a pole flying competition with a time of 37.7 seconds. This meeting was an invitation meeting, four other clubs being represented, the attendance about 60.

Results (total of 2 flights):—

1st, Mr. Headech, 74.1 sec.

2nd, Mr. Hills, 73.7 sec. (Pusher).

Nearest 47 sec.: Mr. Knight, with 46 sec.

The best flight of the evening was 79 sec., put up by Mr. Kelsey, of Cheam. After the competition a collection amounting to 32s. 1d. was made for comforts for members serving with the Forces.

The present "Cocks of the North"—the HALIFAX M.A.C.—are getting everything ready for another onslaught this year, and many promising models are reported. These chaps express approval of the "splendid efforts of the S.M.A.E. Emergency Committee in making it possible for the clubs to compete practically as pre-war," also thanks are sent to W./O. Gutteridge for his offer of the cup for Wakefield type machines. Well, that's what I like to see—a bit of appreciation of the work that is done behind the scenes for the benefit of the aero-modeller.

An exhibition held in a local cinema was a huge success, and has brought along a number of new members. It is planned to hold at "At Home" in Halifax shortly, at a café some Saturday afternoon and evening, when, besides a display of models, etc., there will be plenty of opportunity for a chat and an argument, while, after the "tea and buns," the annual prize-giving will take place. Members from other clubs in the district are cordially invited, and will be acquainted with the date later. Unfortunately, the Plugge, Pilcher and Short's Cups will not be available for presentation, being locked away in a strong room, but the "tinware" on show will dazzle the eyes out of the visitors, I am told. (A bouquet is chucked our way this month, for which many thanks. The appreciation is welcomed.)

An Originality Competition, staged by the HACKNEY M.A.C., was won by Mr. Pettipher, with a very novel fighter design, with retracting undercarriage. A fine "flying wing," designed by Mr. Tickner, was unfortunately unable to fly for the necessary 10 seconds. The under 5 ounces R.O.G. record was raised to 2 min. 5 sec. by Mr. Pettipher, who already holds the H.L. record with 7 min. 45 sec. out of sight.

The BEDFORD M.A.C. reports steadily increasing membership, over 70 members now being on the books. Mr. Cox, with a 6 ft. span glider, made a fine flight of 6 min. 13 sec. off a 200 ft. line, while Mr. Wadsworth did over 10 minutes with a 'plane of his own design. Many other fine flights were made on the same day, and altogether the day's flying augured well for the coming season.

An interesting "points" system competition has been instituted by the SALISBURY AND D.M.E.S. Whenever a member makes or breaks a club record, he receives 25 points, and the individual member with the highest points at the end of the season receives a special championship prize. I hear rumours of a Ladies' Section being formed in this club, and it is to be hoped that feminine charms will not distract from the serious business of building and flying! At any rate, these ladies will certainly be useful in keeping the club together in the absence of the male members.



A fine show of models at the Ashton and District M.A.C. recently-held exhibition.

Good news from the BIRMINGHAM M.A.C. this month—they now having access to their old aerodrome at Dunton, which will find favour with petrol members, as this ground is approved by the S.M.A.E. Records which were improved during the past season, now stand as follow:—

Light-weight:

H.L., Mr. W. Bushell ... 12 min. 13 sec.

R.O.G., Mr. H. Hassall ... 3 min. 45 sec.

Wakefield:

H.L., Mr. W. Jones ... 14 min. 27 sec.

R.O.G., Mr. W. Bushell ... 4 min. 38 sec.

Another club to include ladies amongst the members is the FURNESS M.A.S., and Mrs. Booth won the Ladies' Cup with an average of 47 sec. C. Opie won the G. B. Vanner Cup, and Mr. G. Finnigan captured the Junior Cup. Standing records in this club are as follow:—

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1 min. 19 sec.

Under 100 sq. in.—Mr. B. Booth ... 2 min. 30 sec.
Biplane—Mr. Wheeler ... 40 sec.

The CHESTER M.F.C. have decided to carry on as usual during the war, or at any rate as far as our friend "Hitler" will allow them to do, and it has been decided to apply for affiliation to the S.M.A.E.

The BEVERLEY AND D.M.A.C. is holding a Gala Day this year, the date being Sunday, June 2nd, and it is hoped that the usual supporters will turn up, together with many more. H. Padgett won the recent scale competition with a "Hawker Hart," C. Parsons placing second with a "Westland Lysander."

I am pleased to hear that the MACCLESFIELD M.A.S. is to be revived, and wish them the best of luck in their new efforts. This club unfortunately lost the majority of its members at the outbreak of hostilities, and it is hoped that at least some of the former activities will be able to be reinstated. One of their members had a lucky escape when an aircraft he was flying was shot down. Naturally, further details cannot be given here, but it just goes to show how many of the aero-modellers are really doing their stuff under the present circumstances.

A few pithy paragraphs from the CARDIFF M.A.C. report this month (quite a long report, I'm telling you). They are to organise a Welsh Rally some time during this summer, and I shall be pleased to receive fuller details of this, when due notice can be given in these columns, and support received from other clubs in the district. Anybody interested in this rally should get in touch with Mr. F. Waite, of 134 Richmond Road, Cardiff, South Wales. This club is applying for affiliation, and it is good to see clubs so far away from the main body getting down to such good work. Bud Morgan, whose photo appeared a couple of months ago, has pushed up the club's duration record to 90 sec. out of sight in a "snow storm." An indoor competition was won by J. Williams with a time of 42.2 sec., average of six flights.

Will you please note that all communications to the STONEYGATE M.A.C. should be addressed to Mr. H. S. Hodgson at 25 Alton Road, Leicester.

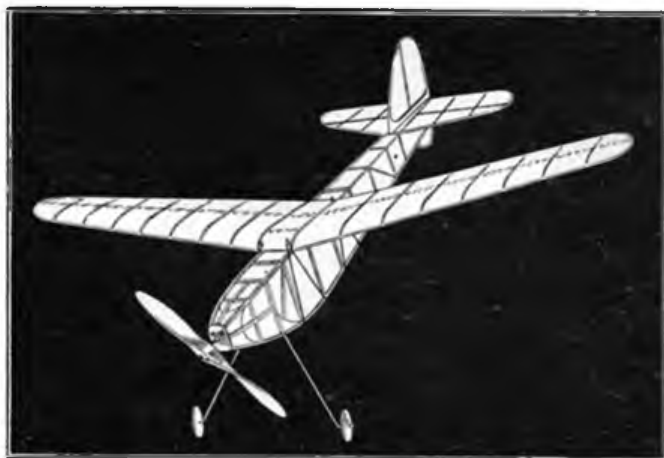
The HARROW M.A.C. are pleased to announce that Mr. A. Morgan has consented to become president, and his obvious interest and good nature should be an inspiration to all. Messrs. Young, Archbold and Worden have given lectures to this club, which were very much appreciated.

At the invitation of the Croydon Club, the CHEAM M.A.C. went along to learn something about R.T.P. flying. Pete Kelsey astonished the locals by putting up 95 sec. after his ship had been ruled out of the competition for a technical touch-down. In their own room the following week Mr. L. Forster won a competition with a time of 30.30 sec., followed by C. Walker, 22.56 sec., and R. Pearce, 21.16 sec.

A competition held on Easter Sunday by the ILKLEY M.A.C. was won by Mr. K. Anning with an average time of 89.3 sec.

An inter-club competition staged by the SPELDHURST (KENT) M.A.C. proved a big success. The day started with an inter-club team event, which resulted in the Tunbridge Wells Club placing first with an average

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time of 63.5 sec., Speldhurst coming along second with 51 sec. An open duration event was won by C. W. Quinnell with a time of 85 sec., R. Richardson, of Tunbridge Wells, placing second at 78 sec. A. Turley, of Speldhurst, third—77 sec.

A radio-controlled petrol model is being built by Messrs. Wade and Rakstraw, of the HIGH WYCOMBE M.A.C. This model is 9 ft. span and is powered with a 9 cc. Ohlsson engine. The actual control weighs approximately 9½ oz. and actuates the rudder only. It is hoped to fit the throttle and elevator controls as experiments progress. Mr. Day made a fine flight of 2 min. 54 sec. with a glider, which would have constituted a club record, but unfortunately was not officially timed.

The interest taken in models by the constructors of full-size aircraft is becoming increasingly evident. I am pleased to announce this month the formation of a new club to be known as the LYSANDER M.A.C. This club is, of course, connected with Westland Aircraft Ltd., and a general meeting held on March 6th formulated a set of rules, under which an ambitious programme will be conducted throughout the year. Application has been made for affiliation to the S.M.A.E., and the members are commencing with a standard model, the "Sparrow Hawk," designed by S. S. Van Hattam. All communications should be addressed to the hon. secretary, J. N. Earl, "Milduria," Ilchester Road, Yeovil.

A good idea is being tried out by the HORNCHURCH M.A.C., where the membership is divided into six flights, each under the control of a flight leader, who is responsible for looking after members in his flight, thus lessening the work of the secretary. This

innovation had its first try-out on Easter Sunday when a competition was held, and the idea seemed to work very well. Some very neat flying was seen on this day, when Messrs. R. Bowyer and W. Billingham made flights of over 5 min.

Owing to the calling up of various officials, the SWINTON AND D.M.A.C. have had to make other appointments, and Mr. E. Snape is now carrying on the secretarial duties. All communications, therefore, should be sent to him at 39 Granby Road, Moorside, Swinton, Lancs. Many of the members have attended the Lanes indoor meetings, and have gained knowledge in what "Rushy" calls "Indoor Antics." Members are preparing for the Cliff Cup, and speculation is rife as to what models will be listed for the "Flight Cup."

Woeful news comes from Chelmsford this month, ploughing having made havoc of the flying ground used by the CHELMSFORD S.M.E. Over sixty models were on view at a recent exhibition, and in spite of poor weather conditions some very good flying has been seen recently.

Two club records recently broken in the TUNBRIDGE WELLS M.A.C. are the R.O.G. duration of 105 sec. by Mr. Foster, and Mr. G. L. Wicks raised the H.L. record to 132 sec. A guess is made this month at the identity of Clubman, but I refuse to be drawn one way or the other (you can't catch old birds on chaff)!

News of more radio-control activity is sent from the NEWCASTLE (STAFFS) AND D.M.A.C., and in connection with this I shall be pleased to hear of final results, whether successful or not, with this type of model. Indoor flying has been tried out in this club, and a recent

competition was won by Dennis Oakes with an average time of 63.6 sec.

The KINGSTON AND DISTRICT and SOUTH MIDDLESEX Model Flying Clubs have amalgamated and will be known from now on as the THAMES VALLEY M.A.C. Under this new name it is hoped to play a prominent part in this area, and new members will be very welcome. All communications should be forwarded to Mr. P. Taylor, of 31 Eastbury Road, Kingston-on-Thames, Surrey.

Another new club to form is NEWSTEAD Aero Club, and persons interested are asked to get in touch with Mr. J. Sharpe, Newstead House, Stamford, Lincs.

Mr. S. W. Smortheol won the "President's" Cup of the CHINGFORD M.F.C. with a time of 93 sec., while Mr. Dupeé won a "knock-out" contest with a time of 91.6 sec. Decentralisation of "National" competitions is specially welcomed, and altogether the activities of this club seem to be in a healthy state.

A very successful exhibition was staged by the TORQUAY AND D.M.A.C. when, with over 200 'planes on show, some 5,000 people visited during one-and-a-half days of showing. This has certainly put them in the limelight! Very good times were put up at an indoor contest, when Mr. G. H. Aggett put up a time of 146.5 sec. R.T.P., while Mr. J. Jackson clocked 227 sec. on a free flight. (Jackson is an evacuee from the Blackheath Club).

The BLACKBURN AND D.M.A.C. has just celebrated its first birthday, and now has some thirty members on the books. Two or three flights made this season were potential record breakers, but unfortunately they did not have official timekeepers watching these models, which was just too bad! One enterprising member in this club has made an Ornithopter model, from which he has succeeded in getting flights varying from 5 to 10 sec. This club will be pleased if others in the district would get in touch with them with a view to holding friendly competitions.

Mr. Needham and Mr. Lee, of the Bristol Club, acted as judges at a recent exhibition of models held by the GLOUCESTER AND D.M.A.C. Mr. J. Newman won both first and second places in the event for duration models, while Mr. H. Ford won the scale model class. There were over twenty models entered in both events, and the visitors were very impressed with the models and their construction. This club will welcome visits from any other club in the district, and all their events are open to any who care to compete. Their present club record stands at 8 min. 21.8 sec. hand-launched.

The WOKING AND D.M.A.C. are pleased to report the receipt of two more trophies, one for gliders, the other for seaplanes. This club has a legitimate grouse this month, as they state that one or two clubs, and individual flyers, have been using their official flying ground at Chobham Common. Naturally, they have no objection to others flying on this ground, but they do object to these people doing damage, parking their cars in the wrong places, and leaving litter about, all of which is detrimental to their interests, and may lead to the loss of their access to this ground. I shall be glad if the delinquents will note these few words and cease to cause any further trouble in this respect. It is not exactly fair for one club to have to take the responsibility of other persons' shortcomings.

Mr. C. Newnes, of Slupton, has broken the club duration record of the KETTERING AND D.M.A.S. with a flight of 8 min. 37 sec. Owing to being some distance from their flying field (and allowed only six gallons of petrol a month for their cars), these chaps have made a trailer to put on the back of a bicycle, which is found to be very satisfactory. (What about letting me have details of this fitting to pass on to other clubs?)

At the request of many enthusiasts in the district the PORTSMOUTH AND D.M.A.S. has been revived and application for affiliation has been effected. A flying meeting held on February 23rd resulted in about 35 members turning up, with almost as many 'planes, and it is hoped that from now on progress will continue to be made. Mr. Parr won a limited time contest by clocking 45 sec. dead. Mr. Prinn placed second with 44.2 sec., and Mr. Carroll third with 46 sec. (Incidentally, somebody down Portsmouth way has been asleep for the past four or five years, as the report was addressed to THE AERO-MODELLER at the old address in London! Please note correct address to save delays in future.)

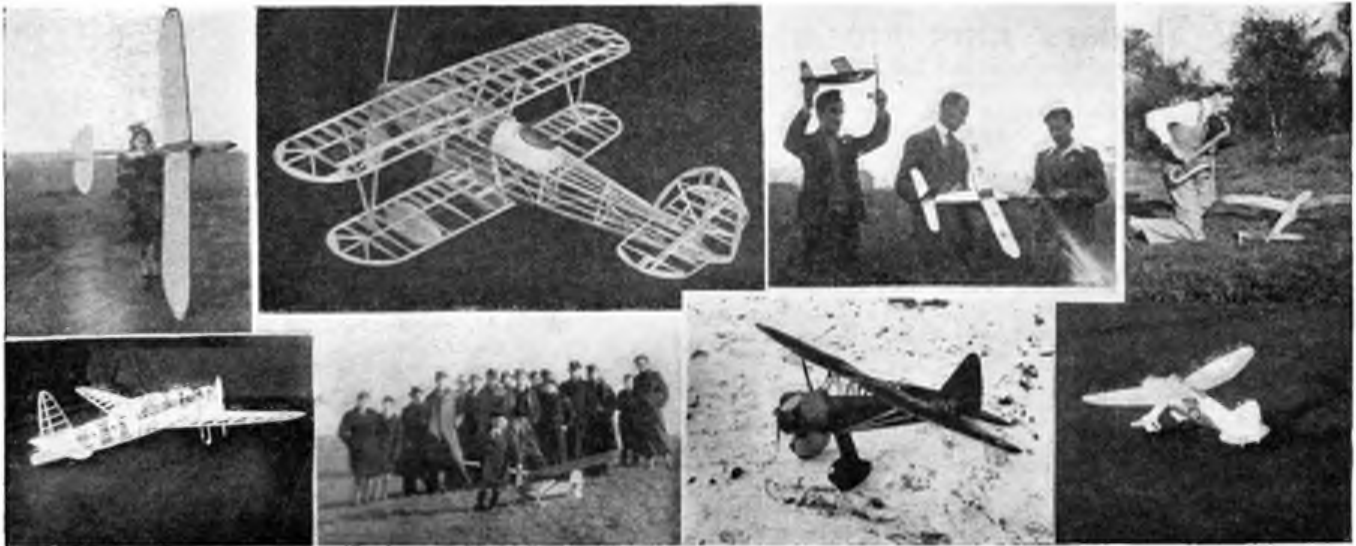
A very interesting meeting was staged by the LANCASHIRE M.A.S. at the end of March, when all types of indoor flying were indulged in and a special scale model Concours d'Elegance was held. Mr. C. S. Rushbrooke won the microfilm class; D. Wilde, of Swinton, second; while the winners of the scale event were as follow:

P. L. Smith, "Westland Lysander."
A. Edmondson, "Bristol Blenheim."
L. H. Fox, "Bristol Fighter."
J. Kitt, "S.E.5a."

The models in this latter class were of exceptional workmanship, and the detailed construction put into them gave the two judges, Messrs. Edwards and Gosling, a



Judging the Skybirds League Competition. (Left to right) Messrs. A. J. Holliday, L. Taylor, Squadron-Leader Woollett, and Mr. Walters.



(Top left) A fine-looking glider of 10 ft. span built by A. Wilson, of the Hayes Club. Of "tear-drop" section, the fuselage is built of spruce and ply forward, and balsa planking aft.

(Top left centre) 42 in. span "Hawker Fury," weight 12 oz., average duration 20 sec. Builder, Mr. H. S. Claymore, of Warwick.

(Top right centre) Messrs. Evans, Turner and Eifflander, of the Macclesfield Club, well-known "durationists" in the north.

(Top right) So you won't fly, eh! One way of scoring the flight out of a model!

(Bottom left) A 43 in. span Vickers Wellington built by D. Marsh, of Liverpool.

(Bottom left centre) Members of the Blackburn and D.M.A.C. at their first outdoor meeting of the season (complete with full-size mechanic!).

(Bottom right centre) Another large-scale model, this time a 50 in. span—well, you guess! Constructed by R. R. B. Smee, of the Chigwell and D.M.A.C.

(Bottom right) And still they come! But a bit smaller this time. The 19 in. Lysander built by F. W. Unstead, of Greenwich.

very hard job to place the models in their final order. A presentation was made to Mr. and Mrs. Rushbrooke, and many expressions of regret were voiced at their loss to the society. At this meeting, the clubs forming the North-Western Area met, when the affairs of the section were handed over to Mr. Snape, Mr. Rushbrooke no longer being able to continue in his previous capacity as Area Delegate.

I am glad to know that the "area" scheme is not being allowed to drop, and word is to hand this month from the North-East London Area reporting the proceedings of the meetings recently held. It was decided that any future meetings would be held bi-monthly, and it has been suggested to the clubs forming this area that they might centralise S.M.A.E. competitions as far as possible in the area.

Another new club has been successfully started in Scotland, to be known as the CARNOUSTIE M.A.C.

This is mainly due to the initiative of Mr. Brian Sheriff, a member of the Dundee Club. Will those interested (Continued at foot of page 354).



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CHESTERFIELD'S one and only aero-model shop has larger than ever stocks of balsa, tissues, dopes, cements, propellers, kits (solid, scale and duration). Barnett Kay, 75 Saltergate. Stamp for list.

DAGENHAM.—Whitehead's Model Airport, 11d Broad Street. Market balsa wood, kits and all accessories for aero-modelling. Everything advertised in THE AERO-MODELLER supplied. Headquarters, 718 Eastern Avenue, Ilford. Valentine 1429.

EDINBURGH.—"Calling all aero-modellers." Whatever your requirements, Frank Royle, 117 Buccleuch Street, is at your service. Fullest range of kits, balsa wood, petrol engines, accessories. Illustrated catalogue, 3d. post free.

HARROW.—Aero-Modellists' Supplies, Headstone Drive, Harrow 0837. We have the most comprehensive stock of model accessories, kits, balsa and Obeschi, the balsa substitute. Cloud Products stocked. Write or call.

HARROW.—A. H. Matthews, 15 Peterborough Road. For model aircraft supplies, balsa wood, cements, dopes, Japanese tissue, piano wire, celluloid wheels, plywoods and hardwoods of all descriptions.

HIGHGATE, N.19.—Stan. Gilks, Aero-Model Supplies, 112 Junction Road (Highgate Archway Underground), Archway 2982, require a number of second-hand engines, 3 cc.—10 cc., for cash. Condition immaterial. Stocks of most kits, balsa, dopes, etc.

IPSWICH, SUFFOLK.—A. J. Sneezum and Sons, 31/35 Norwich Road. Phone 2779. For all model aeroplane supplies. Atlanta, Cloud, Frog, Studiette, Tower, Veronite, Penguin, Scalecraft, Skybird, and Truscale Kits. Price-lists free on application.

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LONDON, S.E.16.—E. G. Jones, 121 Southwark Park Road. Large selection kits and parts. Plenty of balsa, cheap. April AERO-MODELLER in stock. Build your Air Cadet from our materials.

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WOKING.—Mouel Craft, 37 Goldsworth Road, wish to announce that they have removed to 39 Chobham Road, Woking. Old and new friends will receive our best attention.

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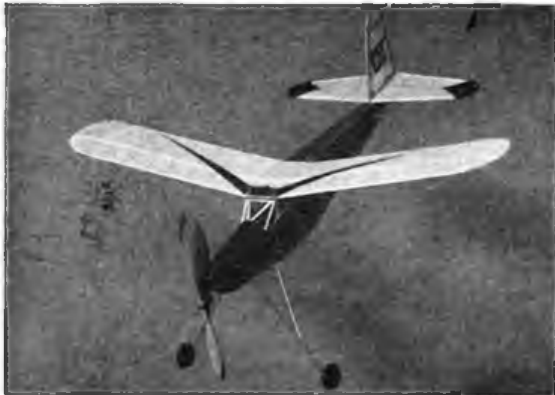
CLUB NEWS.—Continued from page 353.

kindly get in touch with the secretary, Mr. N. Piercy, of "Bona-Vista," Terrace Road, Carnoustie.

A suggestion from the MERSEY M.F.C. regarding a "Questions and Answers" column is, I believe, something that is already under consideration by the Editor. so look out for something on these lines in the near future. Obviously, many items of interest could be discussed; a section of this type, but naturally, time and space do not permit every new idea being brought out on the dot.

A new club, to be known as the EAST BIRMINGHAM M.A.C., has been formed, the Secretary being Mr. A. Nickless, of 29 Hereford Square, Saltley, Birmingham 8.

Well, that will be all for this month, and I am sorry that I have had to so drastically cut some of the reports, but with the enormous spate sent in this month, and the very necessary need to keep the Club Section within certain bounds, there was no other course open. Naturally, this is the usual effect created by the start of the outdoor flying season, but under the present circumstances, as long as we can get everybody in some sort of mention, we shall all have to be content. So, until next month, good flying and many thermals. THE CLUBMAN.



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6,000 revs. per minute,
with 10 in. propeller.

Weight complete with coil
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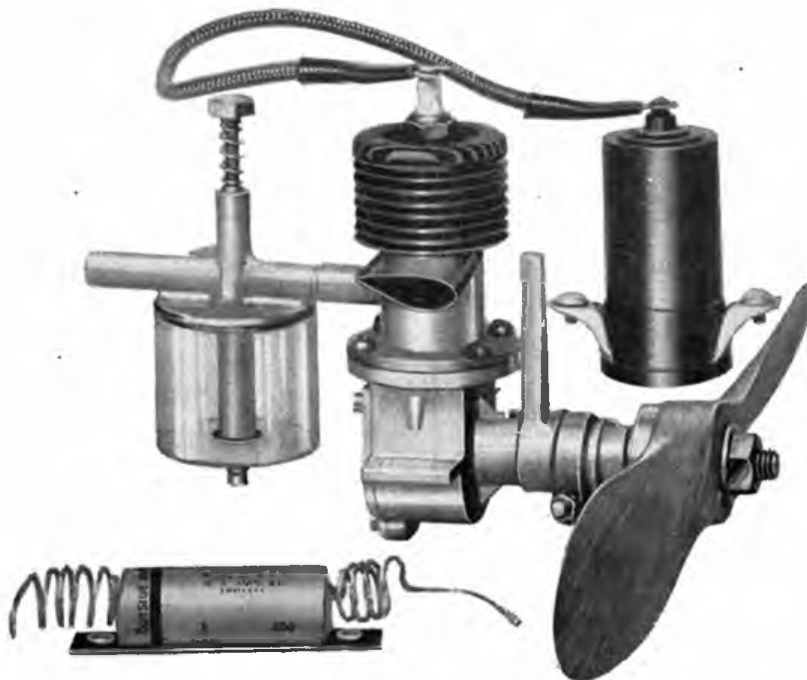
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Appendix - Links to the plans

The original magazine comes with a plan "given free" for building an Heinkel HE 112 .

Heinkel HE 112 scale model by C.A.H. Pollitt

Detailed construction article (Plan included as an insert)

[https://outerzone.co.uk/plan_details.asp?ID=11649 ...](https://outerzone.co.uk/plan_details.asp?ID=11649)

[Document Page: 13](#)

The "Air Cadet" Part 2 by C.A. Rippon

Conclusion of construction article for previous issue's full size plan

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

[Document Page: 20](#)

Build The Sopwith "Camel" by J. Symonds

Detailed construction article on building a solid model of the Sopwith "Camel". Union Page added.

[Document Page: 28](#)

High wing monoplane by R.A. Coleman

26" high wing rubber model. Plan (half scale) and article

[Document Page: 46](#)

NOTE RE FIG 3: WINGS ELEVATOR
& RUDDER COVERED WITH TISSUE, DOPE
TO UNDERSIDE OF LEADING EDGE. PASS
ROUND WING & ALLOW OVERLAP

WING CROSS SECTION
SHOWN IN BLACK

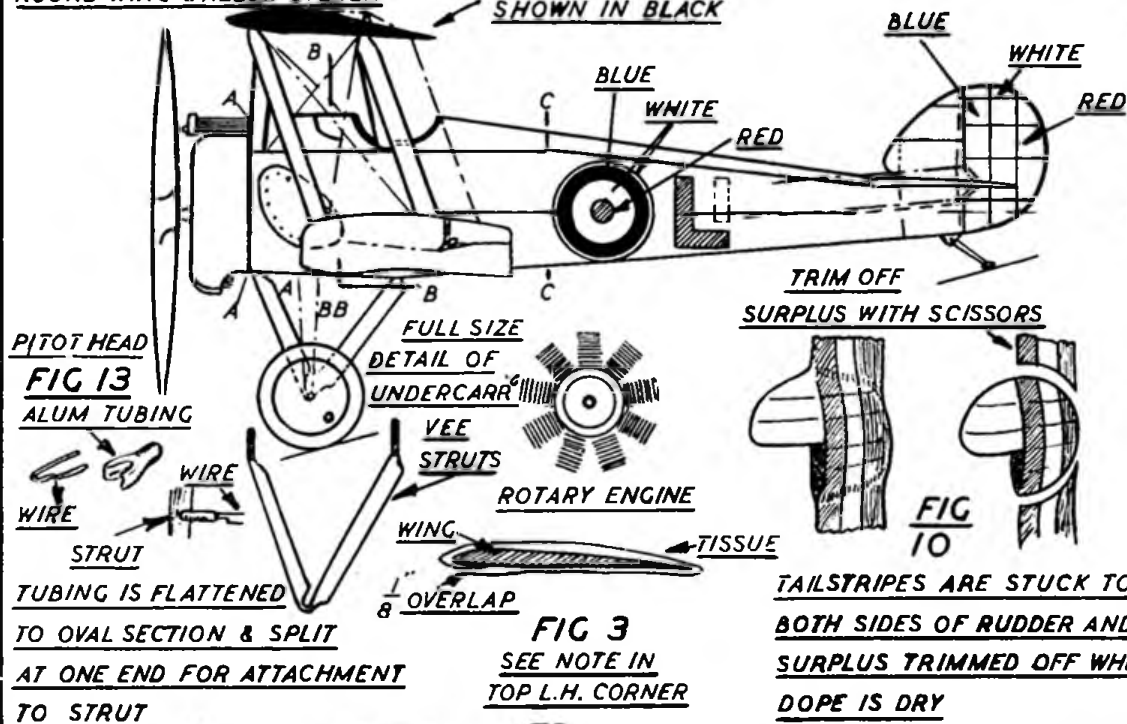


FIG 13
ALUM TUBING

PITOT HEAD
WIRE
STRUT
TUBING IS FLATTENED
TO OVAL SECTION & SPLIT
AT ONE END FOR ATTACHMENT
TO STRUT

FIG 3
SEE NOTE IN
TOP L.H. CORNER



CUT
END OF
CANDLE
TO THIS
DIA.

SIDE VIEW OF
CANDLE FORMER
DOTTED LINE IS
COWL

FIG 4

NOTE. ENGINE COWL IS PRODUCED WITH THE AID OF A CANDLE USED
AS A FORMER. END OF CANDLE IS FIRST CUT TO DIA. SHOWN ABOVE. SPREAD
PLASTIC WOOD TO A THICKNESS OF APPROX $\frac{3}{64}$ & ALLOW TO DRY THOROUGHLY
COWL WILL SHRINK UNLESS ALLOWED TO DRY ON FORMER. CUT OPENING
IN FRONT OF COWL $\frac{9}{16}$ IN DIA. CUT REAR EDGE TO SHAPE. SAND COWL
TO SMOOTH THICKNESS OF $\frac{1}{32}$ & REMOVE FROM FORMER. TO THE RIGHT
ARE TWO VIEWS OF FINISHED COWL. OPENING IN
BOTTOM IS CUT OUT LAST.

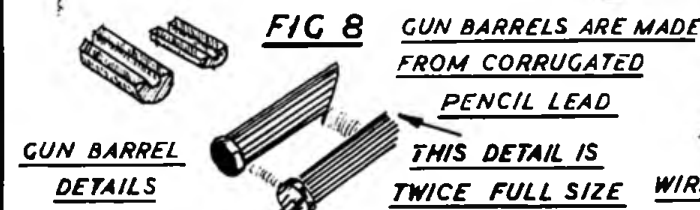


FIG 8

GUN BARRELS ARE MADE
FROM CORRUGATED
PENCIL LEAD
THIS DETAIL IS
TWICE FULL SIZE

SMALL PIECE OF ALUMINIUM WRAPPED
ROUND END OF BARREL. SMALL PIECE
OF WOOD IS CEMENTED TO FRONT OF
GUN BARREL

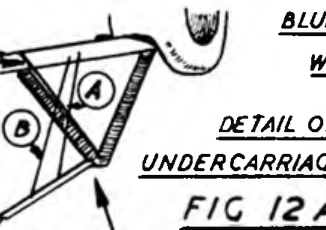
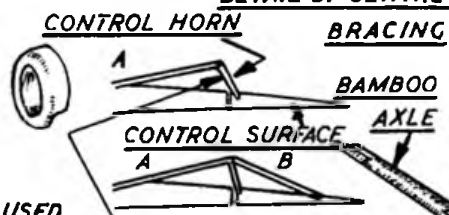


FIG 12 A

WIRE (A) RUNS FROM CENTRE OF
FUSELAGE TO CENTRE OF AXLE
CROSS WIRES BB RUN FROM
FUSELAGE SIDES TO AXLE SIDES



THIS PART FORMS
CONTROL HORN. SEE FURTHER
FIG 9 NOTE RE FIG 9 BELOW

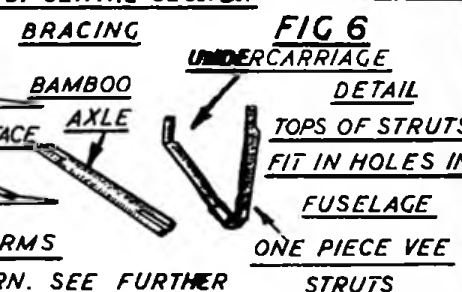


FIG 6
UNDERCARRIAGE
DETAIL
TOPS OF STRUTS
FIT IN HOLES IN
FUSELAGE

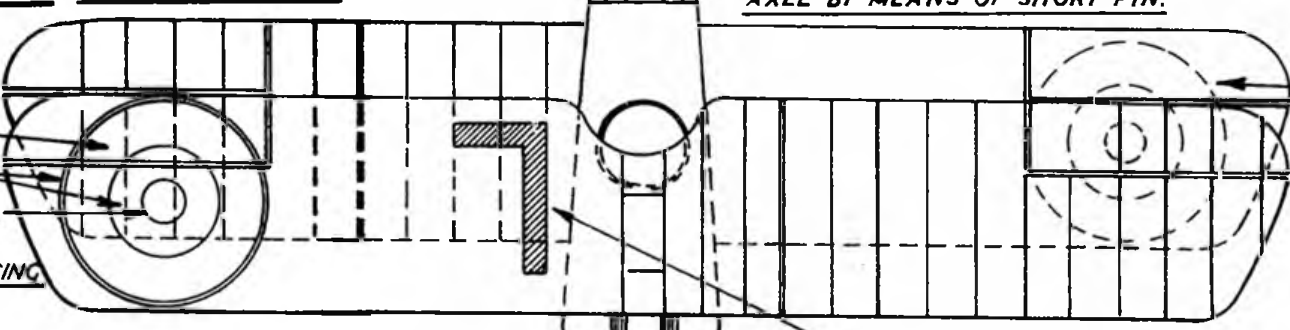


FIG 5 CARVING PROPELLOR— CUT BLANK A
TAPER B THEN CAMBER C

THE SOPWITH "CAMEL"

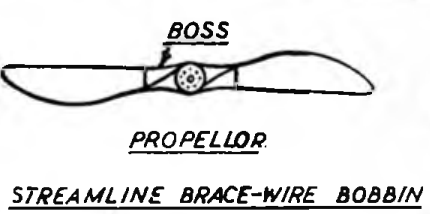
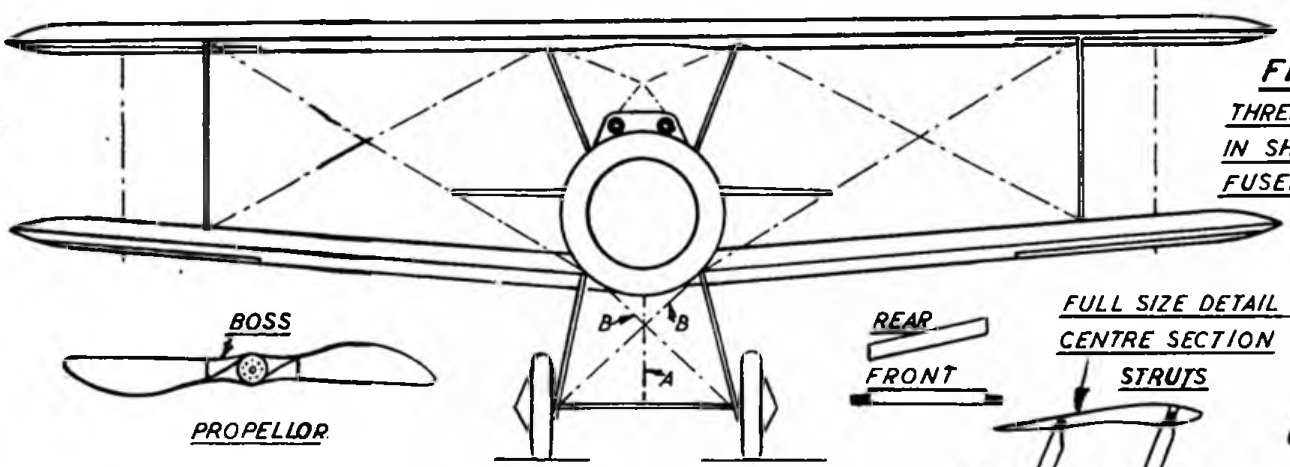


FIG 1
THREE STAGES
IN SHAPING
FUSELAGE

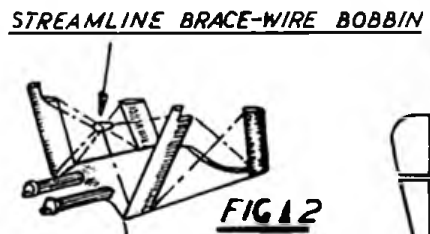


FIG 2A
PATTERN FOR SEAT
BEND A, AT RIGHT ANGLES
TO B, ARMS C, ARE
BENT ROUND SEAT

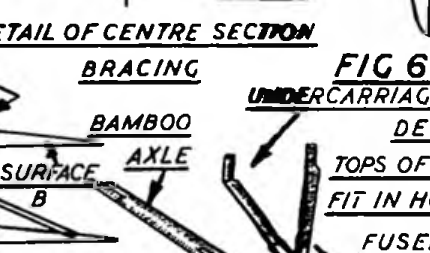


FIG 2B
INSTRUMENT
BOARD

FULL LENGTH
INTER-PLANE STRUT

FIG 7 ON RIGHT & BELOW
UNDERCARRIAGE WHEELS

(A) (B) (C)

(A) CROSS SECTION OF
SOLDER WHEN BOUGHT.
FLATTEN TO (B) BY
BEATING WITH
HAMMER; FILE TO
STREAMLINE
SECTION (C)

WRAP SOLDER LEAD ROUND DOWEL OR ROD (A) CUT (B)
PUSH ENDS TOGETHER (C). THIS FORMS RIM OR TYRE
BUILD UP CENTRE WITH WOOD & PLASTIC WOOD TO A
POINT. BORE HOLE FOR AXLE. WHEEL IS SECURED TO
AXLE BY MEANS OF SHORT PIN.

CIRCLES ON UNDERSIDE OF LOWER
MAIN PLANE HAVE NO OUTER RING
OF WHITE

CUT COWLING PLATES FROM THIN
SHEET BRASS OR ALUMINIUM. MARK
POSITION OF RIVETS ON UNDERSIDE
PRESS FROM UNDERSIDE WITH NAIL

ON RIVET POSITIONS
MAKING SMALL DENTS
THESE LOOK LIKE RIVET
HEADS ON TOP SIDE OF
PLATE



FIG 11