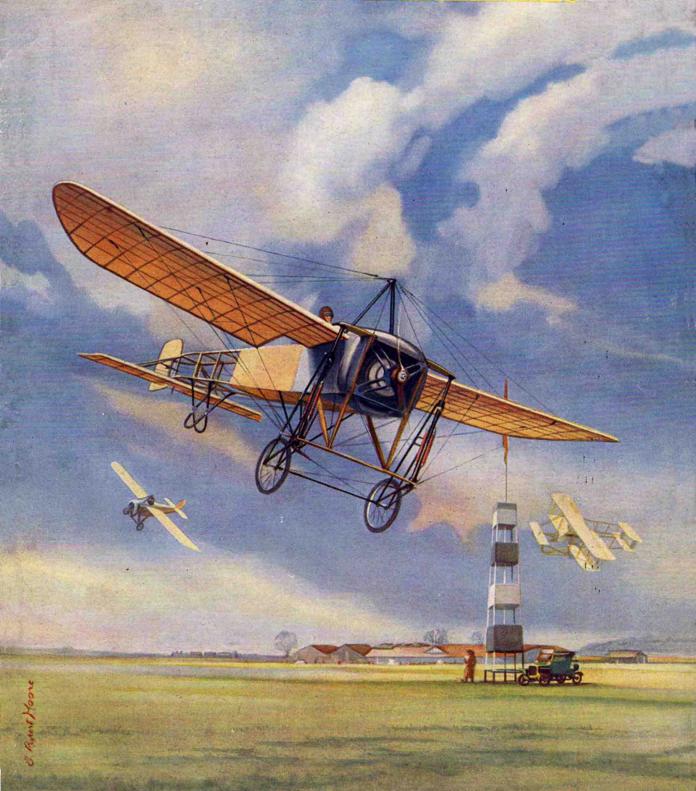
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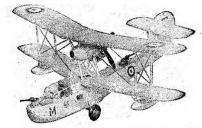
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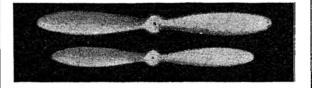
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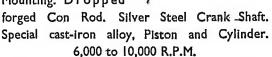
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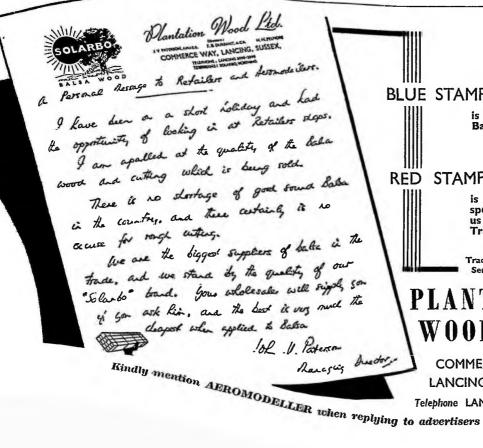
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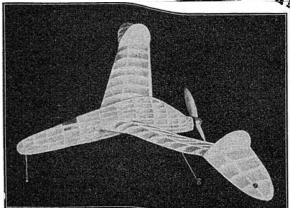
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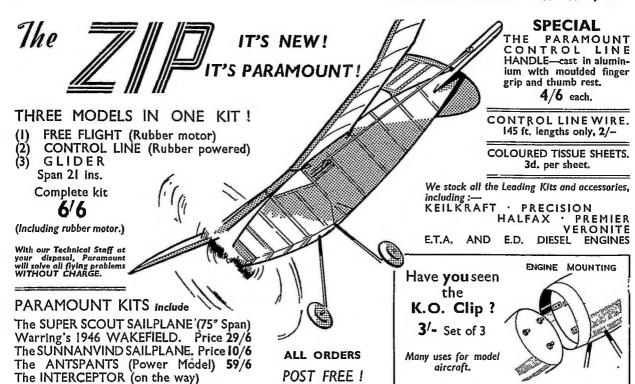
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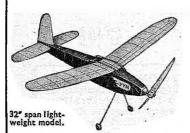
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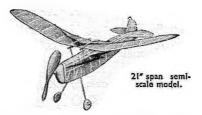
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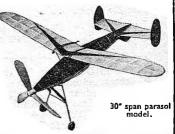
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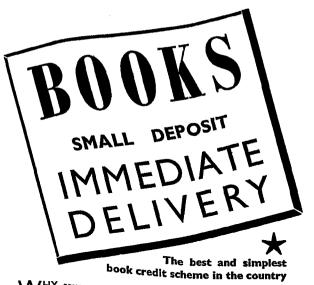
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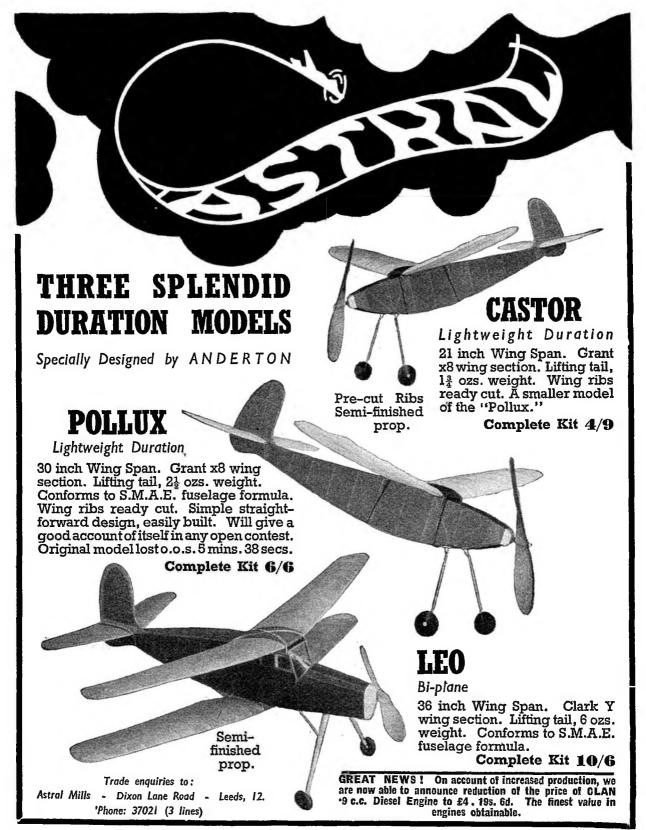
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Managing Editor:

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Editor:

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Published monthly on the 25th of the month previous to date of issue by the

Proprietors:

The Model Aeronautical Press, Ltd., Allen House, Newarke Street, Leicester. Subscription rate 18/6 per annum prepaid

(including Christmas Double Number). \$3.75 in U.S.A. direct from the publishers.

This periodical is sold subject to the following conditions:—
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> Advertisement Office: THE AERODROME,

Billington Road, Stanbridge, Nr. Leighton Buzzard, Beds.

Telephone: - - - - - - Eaton Bray 246

Editorial Offices: ALLEN HOUSE, NEWARKE STREET, LEICESTER. Tel.: LEICESTER 65322

Copies of all photographs appearing in "The Aeromodeller" which are marked "Aero-Copies of all photographs appearing in "The Aeramodeller" which are marked "Aeramodeller botograph" may be obtained from "The Studio," The Aeradrome, Billington Road, Stanbridge, Nr. Leighton Buzzard, Beds. (Cheques and P.O.'s to be made payable to the "Eaton Bray Studios".)

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EROMODELLE

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"Aeromodeller" Photograph

This splendld flying shot is of a rubber driven S.E.5A built to a scale of 13 ins. to 1 ft. by J. M. Greenland,

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A MOTHER'S LAMENT

ONCE again we commence this Editorial by extending to our many thousands of readers throughout the world the Season's Greetings and "Good Luck and Good Flying for 1948" from the Directors and staff of the Aeromodeller.

Since this Editorial must perforce be written early in the month, it goes to press when many leaves yet remain on the trees, and the view from the Editorial offices over the Aerodrome at Eaton Bray still reveals much evidence of this year's fine summer which has provided such excellent flying throughout the country. As to what the Clerk of the Weather has in store for us in 1948, we hesitate to predict, other than to say that it could hardly be finer than this year or "worser" than last!

Some weeks ago there were laid on the Editorial desk two "Letters to the Editor," the contents of which were such as to bring tears to the eyes of all but the hardest hearted. We publish them hereunder, guaranteeing that the first is authentic, but accepting no responsibility for the authenticity of the second!

To the Editor of the AEROMODELLER

Exeter.

Dear Sir,

As the harassed mother of a family of Aeromodellers, I shall be very grateful if you will tell me of something which will remove Balsa wood cement from boys' clothes, particularly from navy serge.

Yours faithfully, (Mrs.) H. E. Botcherley.

To the Editer off the AEROMODELLER

Eaton Bray.

dEre sER ?,

this is to let you no wot my Mum thinks about me bildin modle aeroplanes and if i Doant turn it up shes goin to chuck all my stuff in the dusbin or send me to liv with me aUNty,—oo keeps a pigsti anyow she ses.

all this come about corse i GOt sum Ballser gLuu on me best sUndy trowsis. corstrikme yu shood ave Herd Her carry on—egbert she ses if yuo thinks i aint got enuff to do wiv preserrving yore old MAns mild andbitter Staines on iHs speshul drinkin outfit and now yu as togo and get all stukup, oo woodent ave kids i asks yer!

weLL sir, it takes Me all day to fiddel 2 bob out of eHr to get my pantz cleend round at the FULlasyerwERTh

shop, and ther geezer their ses yore just lukky chum corse our BOss up in LEAdS as only jus found out ow to fiddel glue orfof boys pantz.

sO ser, you do not need to worri now if yore Kids gets gluud up and you can tel the missis nO she carnt ave yore coopons to by new ones with. bUT i still think as ow gluu wood kepe a luvly creece in my trowsis wot about paytenting the idear.

yOREs truely
EgberT cHUMLee,
(Office boy—" Aeromodeller.")

That the question of Balsa cement, and the domestic difficulties it is capable of creating, does not arise in isolated cases is shown by the fact that a short while before receipt of these two letters, the Secretary of the Model Aircraft Trade Association did, in fact, receive a letter from the Dyers and Cleaners Research Organisation, The University, Leeds, stating that one of his members had reported that "garments for cleaning accepted by him from schools had been found to have Balsa cement stains." These stains could not be removed and consequently our advice has been sought.

There followed an enquiry as to whether the University could be put in touch with manufacturers of Balsa cement, with a view to obtaining information which would enable their Research Department to develop some special "Balsa cement remover," since it would appear that the standard solvents used by Dry Cleaners are not always successful in removing these stains.

It appears that acctone is successful where the basis of the cement is cellulose acetate, amyl acetate or some other acetone type of mixture; but it is believed that in some instances cassein/lime/formaldehyde, and possibly waterglass (sodium silicate) may be employed, and in these cases the use of acetone would not be successful.

Chemistry not being one of our particularly bright subjects, we will leave the matter at this stage, but if any readers or manufacturers are able to offer advice or information in regard to preparations which may be successfully used for the removal of Balsa cement stains of all types, once again something "for the good of the cause" of Aeromodelling will have been achieved, and undoubtedly the many Mrs. Botcherleys, together with Egbert, will find life smoother, easier and cleaner!

Photographic Competition

MOST aeromodellers keep a photographic record of their modelling masterpieces; we do ourselves, always taking the picture before the first flip, of course! It is therefore with the intention of bringing forth into the limelight the best from these various collections that the Aeromodeller has arranged a photographic contest. Not forgetting those fortunate beings who possess film and can take advantage of the calm and fine weather that often exists in the pre-Christmas period to "have a go" especially for the competition.

To make sure that one and all are acquainted with what constitutes the most eligible type of photograph, let us quote paragraph 4 from the rules which can be found on page 63. "The contest is for the photograph in each section that, in the opinion of the judges, combines the highest standard of workmanship, as revealed by the clarity and composition of the photograph." In other words, a good clear photograph, well composed,

that does full justice to a first-class example of modelmaking, is likely to be the winner. The only exception to this will be entries for Section F, which is for action shots of any type of model. Here, of course, the judges will dwell mainly on the value of the photograph as an action shot, although first-class photographic compositions with a speck in the sky as the model will definitely not do.

Entry is free to all readers and handsome cash prizes are available in each of the six sections; the official entry form can be found on page iii of cover and must be used for all entries.

One final word to all entrants:—Make sure that your name, address, and code letter of the section that you are entering are written on the back of each photograph before you post your entry, and watch those backgrounds! Mother's washing is not the thing to view your latest model against.



The author and "Thistledown" his class A model, plans of which are given with this article.

INDOOR flying in this country has not reached the same heights of popularity that it has in America probably due to the fact that suitable halls are difficult to obtain. As a result of this, indoor flying here is usually confined to the winter months and plays its part in the majority of club's winter programmes.

Records here are therefore not so high as in America as regards free flying models but there is one branch in which at any rate we can claim to hold our own. That of course is in tethered flying or as it is more commonly known as round the pole flying. As this type of flying is possible in almost any room of moderate size the major part of this article will deal with this type.

R.T.P. flying in its present form was first introduced by R. N. Bullock about 1937 but did not achieve any great popularity. However, during the war it became increasingly popular and several important advances were made which resulted in the raising of the record to its present level of nearly six minutes.

Credit must be given to the Streatham Aeromodellers for their tremendous enthusiasm and efforts to advance this particular branch of the hobby.

During 1940-2 all R.T.P. models were tissue covered and the record stood at about 3½ minutes.

These models were nearly all of the "flat fish" type with a parasol wing mounting. This type employed a fuselage whose width was considerably greater than its depth, the idea being to use the fuselage to obtain extra lift. The average weight of these models was between 3/8 oz. and 5/8 oz.

During the winter of 1943, however, the author became increasingly interested and attended many of the Streatham clubs indoor meetings. Out of this friendly rivalry was born the present type of model.

Having reached what appeared to be the ultimate in tissue covered models considerable thought was given towards improving the design. Naturally the wing was the first thing to be considered and it was thought that if a smoother covering could be obtained the duration would be improved. Different methods of wing construction were tried to stop the wing from warping when the tissue was sprayed or doped with light dope, but none

of these proved really satisfactory.

Up to this time microfilm covering had not been used because it was considered too weak to be of any practical use. However, a heavy covering of microfilm on a standard model was tried to see what the result would be. This proved to be far better than anyone had foreseen and the record was immediately raised to nearly four minutes.

From here on it became one long friendly battle between the Northern Heights M.F.C. and Streatham M.A.C. to hold the record. As a result of this combined

effort the record changed hands with amazing frequency and at present is held by Ron Rock, Streatham M.A.C., with nearly six minutes to his credit.

With this brief history of R.T.P. flying let us turn to the general design requirements.

There are two main types of r.t.p. model.

Class "A"—Models up to 1 oz. total weight.
 Class "B"—Models over 1 oz. in total weight.

With the first type the S.M.A.E. general indoor rules calls for a line length of six feet with a maximum pole height of three feet.

With the class "B" the rules call for a line length of 12 feet with a pole height of six feet.

These line lengths and pole heights were formulated to ensure that the model would not merely hang down on the end of the line but must fly during its entire flight.

Class "A" models have been the most popular up to date and it is with this type that the absolute record is held. However, the following notes apply equally to either class with the exception that on the average, class "B" models will be more strongly constructed and probably somewhat larger. Microfilm covering can still be used with beneficial results.

Broadly speaking the type of model which has performed well up to present is as follows:—

High wing fuselage type with the wing mounted directly on top of the fuselage.

Wing and tail surfaces—microfilm covered, fuselage tissue covered.

The main factors governing the duration can be summarised as follows:—(1) Propeller and power combination. (2) Smooth and "air-proof" covering. (3) Light weight. (4) Streamlining.

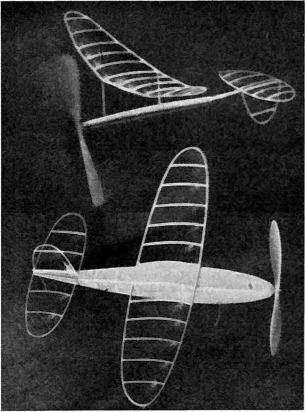
It will be noted that streamlining has been placed last on the list. It is felt that unless some extremely careful and cunning construction is used any advantage gained by the use of a circular or oval section fuselage as far as drag is concerned will be more than offset by the added weight. Therefore it is better to stick to the "slabsided" type with its resultant simplicity in wing mounting.

"Propeller and Power Combination."

Since the ultimate duration will be governed entirely by the length of time the propeller can be made to produce enough thrust to fly the model, it follows that much experimenting must be carried out to achieve the best compromise.

As a general rule the propeller diameter will be found to be approximately half the wing span of the model. The pitch should be approximately twice the diameter but this will vary with the wing loading and drag.

Since however a "fixed" pitch propeller will only operate efficiently at one particular speed of rotation it



"Aeromodeller" Photograph.

follows that in order to absorb the power of a rubber motor some sort of variable pitch is desirable.

This can be automatically achieved on an indoor model by the shape of the blades and by carving the blades thin enough so that the blades "fan" out under full power and gradually reduce in pitch as the power decreases.

A" sweptforward "blade shape will tend to "fan out" more than a symmetrical or "swept back" shape, but the final amount can only be achieved by gradually sanding the blades and hub until the best results are obtained.

The hub of the propeller must be made as small as possible to assist the "fanning out" process.

This of course greatly reduces the strength of the propeller and as an alternative it is possible to obtain good results by a chordwise cut in the leading edge of each blade. The length of this cut should be about a third of the chord and should be positioned at about halfway along each blade. This will enable the tip to "fan" and yet the hub can be made more robust.

Indoor propellers should be carved from solid in order to obtain the best results as a "bent" wood type tends to lose its correct pitch setting after a time

to lose its correct pitch setting after a time.

It is not advisable to "dope" or polish ultra light indoor propellers which have been designed to "fan out" as any changes in temperature will result in a change in pitch through warping of the blades.

The correct amount of power can only be found by experiment but as a rule the weight of the motor should be approximately half the total weight of the model. The length of motor used depends on the amount of room available inside the fuselage but should be approximately twice the length of the distance between the propeller hook and rear rubber mounting point.

Left, a typical indoor free flight model of Ken Young's photographed at a recent Northern Heights meeting. Below, another view of "Thistledown"; note the tissue covered centre section.

It is absolutely essential to obtain a smooth power output as a "fluctuating" propeller run will result in a considerable decrease in total duration due to wing and tail vibration and varying thrust. To achieve this it is better to use a motor made up of a number of small cross section strands. Motors made up of $\frac{1}{4}$ in. $\times 1/30$ in. or 3/16 in. $\times 1/24$ in. rubber definitely tend to "jerk" whilst unwinding thus causing fluctuation. In order to further assist in damping vibration it will be found to be beneficial to fit a miniature bobbin. This should be about $\frac{1}{4}$ in. diameter by approximately 3/16 in. or $\frac{1}{4}$ in. wide, and can be made from either a plastic or a piece of dural.

Smooth and Air-proof Covering.

The use of microfilm as a covering medium automatically fulfills the requirements as far as the wing and tail surfaces are concerned, but it should be noted that the covering must not be slack or wrinkled. A few notes

on microfilm are given later on.

Tissue covering of wings besides being heavier than microfilm does not achieve any degree of being "airproof" unless several coats of dope are applied. Thus, unless the structure of the wing is strong enough to withstand the shrinking effects it is better to keep to microfilm at least for models weighing less than 1 oz.

In order to assist the handling of the wing it is desirable to cover the centre section with tissue. This may be done either before or after covering with microfilm.

The fuselage may be microfilm covered if desired, but experience has proved that consistent results are only obtained after much testing of the model and handling a microfilm covered model is a tricky business at the best of times. Therefore it would seem to be better to tissue cover the fuselage and apply one coat of very thin dope.

No beneficial results have so far been obtained by double surface covering with microfilm but experiment in this line may lead to better results. Up to the present all high times have been achieved using single surfaces.

Light Weight.

It is important to build right down to the minimum weight but this must not be achieved at the expense of weakness. A "floppy" wing will cause more trouble and a decrease in performance. Wings should be stiff in themselves and should not have a tendency to sag. It is better to double the weight of the wing and have a strong structure rather than have a light wing which will flex.

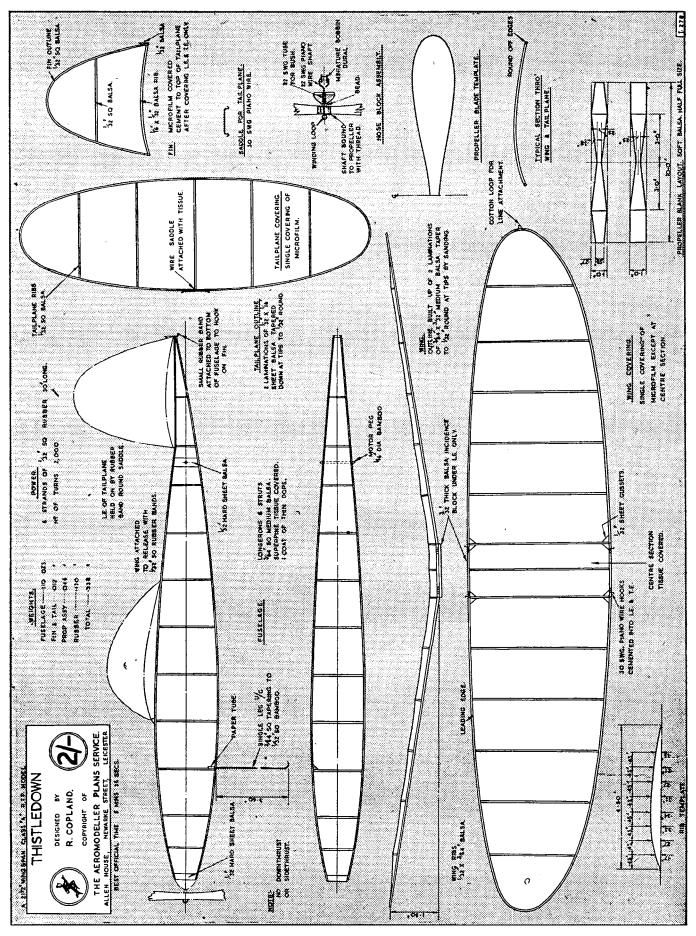
Similarly it is better to use small cross section hard balsa for the fuselage rather than a soft balsa with a larger section. Soft balsa is too easily crushed and soon loses its shape.

General Design.

As has already been stated the simple slabsided model appears to have everything in its favour particularly at the very slow speeds at which these models fly.

As a general rule the high wing type offers the most advantages but there is a case for a *low* wing model. During the later part of its flight the r.t.p. model flies very near to the floor and it is here that a low-wing model may score due to the greater "air cushion" effect because the low-wing will be so much nearer to the floor.

Fuselage shape should be as smooth in contour as possible with as little abrupt contour change as can be obtained. Cross sectional area should be kept down to



the minimum permissible to cut down the "wetted area" as it is felt that this is more important than creating an elliptical cross section.

Wing and tail plan form does not seem to be very important but an elliptical plan form is pleasing to the eye and is stronger torsionally than a parallel chord.

Dihedral is *important* but must not be overdone, $\frac{3}{4}$ in. under each tip for every 12 in. span is sufficient. Lack of dihedral will cause sideslipping when flying above the level of the pole. For this reason also it is advisable to mount the fin above the tailplane rather than under it.

Wing and Tail Section.

The upper curve of any of the standard sections used on outdoor models will work reasonably well indoors on a single surface wing but there is a section developed by an American especially for indoor models. This is the Mc.Bride B.7. and gives excellent results.

Rigging incidence should be between 3°-5° positive for

the mainplane, i.e. relative to thrust line.

The best C.G position up to date has been found to be approximately 40% of the chord from the leading edge of the wing. The line attachment should be in line with this position and on the extreme wing tip.

On all models flown, no side or downthrust was used, and the tailplane was placed in line with the thrust line.

General Construction.

The accompanying plan shows the typical method of construction together with the sizes used. For larger models the sizes should be scaled up accordingly.

Wings.

The best method of building up the outline is by laminating from thin section wood. The first step is to cut a cardboard template to the inside shape of the wing and wrap the strip around it. The second and third layer if used is then cemented on top. This method produces an extremely stiff structure. The leading and trailing edges should then be sanded down to shape.

Ribs.

Are cut from standard 1/32 sheet, speckle grained type if possible. Wing taper is obtained by cutting approximately 1/3 off the leading edge of each rib and 2/3 off the trailing edge to obtain the correct size.

The wing outline should be pinned down to the building

board whilst assembling ribs.

Fuselage construction follows standard practice except that very much smaller section wood is used.

Undercarriage.

A single bamboo strut is generally used and this should be only just long enough to keep the prop clear of the floor in the take off position so that when the model is flying the prop will touch before the undercart.

Notes on Microfilm.

Almost any standard dope or lacquer will act as a base for microfilm. For most of these it is only necessary to add castor oil to act as a plasticiser to make the film flexible. The bath or tray used for making the film must be absolutely free from dirt, grease or soap as these will stop the film from spreading. The tray or bath should be approximately $12 \text{ in.} \times 30 \text{ in.}$ for best results. Lifting hoops should be large enough to allow the wing or tail to be covered to have at least two to three inches of spare film all round.

These hoops may be made from any soft wire but must

have a handle formed at one end and must be reasonably stiff when shaped.

Making the Film.

The temperature of the water should be 60°-70°F.

Commence by pouring a little of the dope or lacquer straight into the surface of the water. This will immediately crinkle and gather up. Add a little castor oil to the solution and try again. Continue to add castor oil until a film forms which after about one minute begins to wrinkle slightly at the edges. The solution is then satisfactory.

To Make the Films for Covering.

The best method is to use a teaspoon and keeping it about one inch above the surface, pour the solution along the water in a steady unbroken stream.

To Lift the Film.

Select a hoop slightly less in size than the film on the water, press the hoop on top of the film and with a moistened finger gather the film up round the sides of the hoop.

Slowly lift one corner of the hoop off the surface and then with a sliding movement lift the hoop and film.

Then hang the film up to dry. The thickness of the film depends on the amount of solution poured on the surface. For general r.t.p. models a film having a red-green composition is desirable.

Covering with Microfilm.

The framework to be covered is moistened with saliva and then placed on the film and pressed gently on to it. The film must not be allowed to touch anything.

The film is then trimmed by using a hot needle or wire. This must not be hotter than a very dark cherry at maximum and is much safer when allowed to just cool to black heat.

The hot wire is run round the framework with a gap of approximately 3/8 inch.

General Notes on Trimming and Flying.

The room used must be as free from draughts as possible. The line used should be as light as possible. On all record breaking flights a tungsten line was used to minimise drag.

For most consistent results it is advisable to fly the model in an anti-torque direction.

Stalling is best corrected by moving the wing back.

Diving in is the most frequent trouble and nearly all r.t.p. models dive after their first circuit. This is due to an excess of power and line restraint. To stop the model from touching down at the end of the dive is a question of sufficient longitudinal dihedral angle. When a model goes "over the top" a further addition of negative incidence will nearly always cure it.

The fin should be set along the centre line of the model or set so that it tends to nose the model slightly outwards.

To obtain best results the model should fly above the top of the pole under the initial burst of power and should then settle down about level with the top of the pole. At this period the model should definitely be flying with the fuselage parallel to the floor and without any bank. Towards the end of the flight the tail will drop slightly so that the angle of attack is increased, this will give maximum duration and achieving this is a question of patient trimming.

Plans of "Thistledown" shown on previous page are to \(\frac{1}{2} \) scale and full size drawings may be obtained at usual price 2/- from the Aeromodeller Plans Service, Allen House, Newarke Street, Leicester.

less engine





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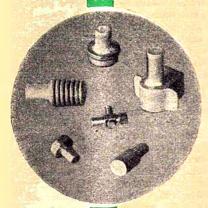
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From behind the " Iron Curtain" comes this glimpse of acromodelling in the Soviet Union which we know will be of great interest to our readers. We are indebted to Mr. Seager, who by virture of a visit with a British Youth Delegation was able to make personal contact with many enthusiasts in different parts of the Societ. He found amongst Soviet aeromodellers an intense interest in the activities of their British counterparts and furthermore a keen desire to correspond with individuals and clubs over here. Anxious to promote this interest we of the Aeromodeller wrote sending copies of this journal and other information to the aeromodelling centres at Kiev, Riga and Leningrad. This was in 1946 and to date no replies have been received and we can only conclude that officialdom in Russia does not wish to encourage an exchange of ideas and information, an attitude that is difficult to understand. Earlier efforts of ours to establish contact through the Soviet Embassy met with similar negative results in fact one official when pressed for information regarding Soviet aeromodelling journals very pointedly stated that they were for Soviet Aeromadellers !

However, we present the fullest information possible under the circumstances including a set of exclusive photographs that managed to trickle through. They were taken last August at the 16th All Union Contest, held at Moscow. Over 200 contestants from all quarters of the U.S.S.R. participated and it is claimed that 12 International records were established. 347 models were displayed including a jet, an ornithopter and a helicopter. Vassili Parlyuchenko broke the world record for duration models with a time of 52 mins. 15 secs., and Georgi Lynbushitin a well-known Soviet modeller exceeded his previous altitude record for power models by 1,135 metres. In the rubber driven scaplane class a new long distance world record was established by Pavel Lavior of 1,117 metres, and even a schoolboy A. Ilkin of the Uzbek Republic took a hand in the record breaking, clocking 1 hr, 20 mins, with a glider.

So much for a Soriet National Contest, and may we end with a plea to the appropriate authorities in Mascow to permit an exchange of ideas between the enthusiasts of Soviet Russia and Great Britain, it will do much to promote friendship and understanding, qualities sadly lacking in the international sphere at present.

By DONALD SEAGER

ON several happy occasions during a recent two-month tour of the Soviet Union I came across groups of keen aeromodel enthusiasts and soon became aware of their very real desire for contacts with British clubs and individual modellers. And yet, somewhere in the maze of distance and officialdom, this desire is blunted, side-tracked and eventually lost.

It is with very real pleasure, therefore, that I bring you a first-hand account of what some of these young Soviet modellers are doing and thinking. My only apology is that the technical information is somewhat scanty, but the difficulties of translation are mainly

responsible.

I had gone to the Soviet Union as a member of the British Youth Delegation and as a guest of the Soviet Government. Because of this I was able to visit many places which are difficult for the casual visitor to penetrate, and the presence of full-time interpreters did much to throw light upon the many interesting things I saw. My main interest was in the schools and youth clubs, and since these are the scene of many of the model-building groups, I was thus able to follow up this personal interest. In addition, I wanted to bring back as much information as possible concerning the air interests of Soviet youth.

The tour took us 8,000 miles through the Soviet Union, and among other places, we visited Moscow, Leningrad, Kiev, Stalino, Sochi and Stalingrad. In several of these places there was strong evidence of the very important role aircraft modelling is playing in youth activities, and this strong interest receives full official encouragement.

A word about general organisation, since this helps to give a more accurate impression of the nature of these groups of modellers which may be found anywhere from the Baltic to the Black Sea goasts.

There are few of the informal and scarcely organised bands of enthusiasts which you find in the most unexpected places in our Island. Rather does aeromodelling form an activity which is but a part of the general scheme

of work or recreation of a large organisation.

Foremost among these are the Osoaviakhim (Air and Chemical Defence) Society Clubs. Osoaviakhim is the nearestapproach I was able to discover to our A.T.C. This Soviet organisation caters for an age range of 16 to 25, has members of both sexes and is run on a self-supporting basis. This latter factor does not preclude the Government from giving the most generous assistance in the

Two Leningrad enthusiasts with a very interesting duration model, Note the folding airscrew and the kink in the fuselage at the rear. Admiting the model is Major-General of Aviation, M. Kozmin.

Centre: Two model aircraft builders from Kulbyshev with a large rubber driven seaplane.

For the best technical achievements in this Russian "Nationals," "The Cup of the Air Forces of the U.S.S.R." was awarded to the team of the Azerbaidjon Republic and the lower photograph shows Thrice Hero of the Saylet Union Ivan Kezhedub chief contest judge, presenting the prize to the winners.



form of equipment and instructors. It was in existence before the war and its main function is to train young people to take an active part in air defence.

It is not surprising, therefore, that one of the chief activities is model aircraft building, and a very high standard of skill is reached. Unfortunately I was not able to see one of these particular clubs at work, since they were only just recovering from the almost unbelievable general disorganisation caused by the war. But it was with an almost overwhelming pride that a young member talked of the prowess of these clubs. He was quick to point out that Osoaviakhim still held thirteen world records. Before the war, of the twenty-three world records, nineteen were won by aircraft builders of this organisation—mainly from the Moscow region.

Of the 1,000 modelling circles in existence today, the largest proportion are organised through the Pioneers, the youth organisation which deals with the 9 to 16 year olds, and it was with the work of these young enthusiasts that I came most closely in contact.

The Pioneer Palace at Leningrad, formerly the palace of Catharine, wife of Alexander III, is probably the most adequately equipped youth club in the world. Nearly all Leningrad's 300,000 children visit it at some time, and so keen is the competition for membership of its circles that they are held in three daily shifts.

It was here that I found a group of 20 boys eagerly listening to a short talk by their instructor—a university graduate in aeronautical science. Their room was beautifully equipped with a wide range of scientific apparatus, even including a wind tunnel in which the aerodynamic qualities of the models could be tested. Most of the modellers here were building solid scale models of Soviet military aircraft, and I discovered that the boys' enthusiasm for this type of modelling had temporarily overshadowed the appeal of making something which would actually fly. In addition, it should be remembered that suitable conditions for flying models are only to be found in the relatively short summer. At the time of my visit the temperature was minus 15 degrees Centigrade and the ground was thickly covered with snow.

In a later interview with the Director, he referred to the intense interest in aeromodelling and mentioned particularly the skilled instruction given in aerodynamics. This basically scientific approach would seem to be one of the reasons for Soviet model builders' fine results and in fact, many of these boys will later find themselves actively engaged in the design of full-scale Soviet aircraft.







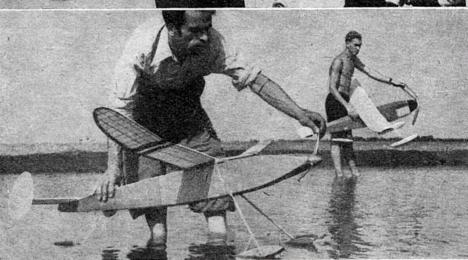
On the right is a typical Russian petrol model in flight. It would appear from a close study of all the photographs received that identical engines are used on all the power models.

Left: A Moscow model builder, Mikhail Pakhamov with his model sallplane that won first place in the appropriate contest covering 22 kilometres in 36 minutes.

Dimitri 'Slessarev and Vadim Osminin both from Mascaw with their large jet propelled model. No details of this interesting mathine are available unfortunately, but readers will note the particularly small jet autlet at the rear of the fuselage and the trimming tab on the storbaard wing, a feature apparently common to many of the Russian models,



A close up of three members of the victorious Azerbaldjan team. They are from left to right Sergel Kiriushenke, Nadyr Aslanov and Alexander Lenge. Nate the massive size of this petral model, truly a Russian giant.



Here we have Russia's most famous aeromodeller Pavel Pavlov of Moscow, about to R.O.W. his world record breaking seaplane. It appears to have a single bladed folding prop and is of course much larger than any other rubber driven model of this type that we have seen, in fact all of the models shown in this article appear to be a deal larger than their British counterparts.



In Kiev, centre of the rich Ukraine, I found a modelbuilding circle housed in rather different circumstances. Their Pioneer Club, like so many of Kiev's fine buildings, had been destroyed by the Germans. But the generous gift by Marshal Timoshenko of his own house had enabled them to start modelling again within a few weeks of the

Nazis being driven back from the city.

Here was none of the elaborate equipment of the Leningrad Pioneer Palace; a few simple benches, chisels, penknives and small hammers were the only tools, and this pathetic little show was brightened only by some fine These had been hidden during the wall diagrams. Occupation, for the Germans had used this building as a restaurant for their troops. The instructor, who gave his time voluntarily, was dressed in a dark suit and a colourful Ukrainian shirt. The dozen modellers ranged from 9 to 15 years of age and their keenness nearly overwhelmed

me,
"How many modelling clubs were there in England?"
they asked. . "How many members were there?"
These, and "What sort of models were we building?" These, and a dozen other questions, they fired at me before I could exchange more than a greeting with their instructor. He was a simple, likeable fellow and begged me to convey their greetings to British modellers.

The group were making flying models of the stick type and of their instructor's own design. They worked quietly and earnestly and despite their lack of equipment,

the standard was very high.

The instructor begged me to take anything I wanted "as a souvenir", he said, and looking round at those fine wall diagrams I had the greatest difficulty in forcing myself to ask for the oldest and shabbiest. But here were modellers working against the background of their ruined homeland, and it would have been criminal to have taken so much from so little, for it was clear that they might wait many months for new supplies. So much else was of more importance, homes above all.

In Latvia, where the general destruction is as appalling

as almost anywhere in the Soviet Union, the Riga Pioneers are now housed in a castle, formerly the home of Ulmanis, Latvia's dictator before the Soviet liberation. The building is almost entirely without furniture, and this prepared me for the shock which met me when I went into the model building room. For, admittedly it was in the afternoon, but the schools were on holiday and yet I found only one fifteen-yearold boy. He brightened visibly as I told him of my interest in modelling, and we talked for a long while in a queer mixture of French, Russian and English, aided by a little sign language. I soon realised the reason for this emptiness of the room. All the material the group had been able to acquire had been made into models, and he, himself, had been so hard put for suitable timber that he had already taken one model to pieces and rebuilt it in another form. The tools were there, the finished models were there, only lack of materials kept the modellers away. It was heartbreaking to hear this story from a fellow-enthusiast and I promised I would do anything I could to help. The Latvians, because of their past history, have a regard for the English which is, as yet, more pronounced than that of any other part of the Soviet Union. I only hope we may be able to help this boy and his friends. He partticularly asked for balsa wood as this was absolutely unobtainable in Riga.

I hope this short account may help readers to understand the background of war destruction against which Soviet model groups are striving to produce the fine models of which they are capable. Given the materials, they will be producing solid and flying models to challenge anything we can show them. I only hope contacts may be built up which will enable some form of international

exhibition of models to be held.

And, over and above the special interests which such contacts could cultivate and expand, there is a very real contribution they can make to Anglo-Soviet understanding and the future of world peace. Let us hope a common enthusiasm can overcome all obstacles.





The Author's latest record breaking flying boat of 4 ft. 8 ins. span powered with a 3.5 c.c. diesel engine.

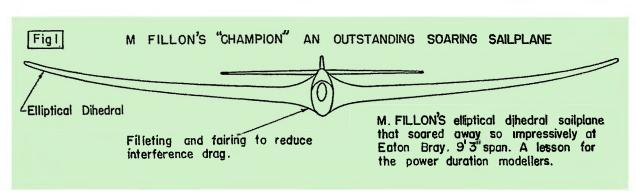
C · E · BOWDEN

Duration Power Flying. I attended the "Bowden International" Power Competition and then went on to "Eaton Bray" to see the end of the Competitions there. A very pleasant feature of these events was the large number of Aeromodellers from abroad. I thought the foreign sailplanes were more impressive than the powerdriven models which merely followed American practice and lacked individuality. There was more to be learnt from the former. The power driven models were for the most part pylon jobs of ordinary and well-known American set up for Duration Competitions, as opposed to precision and realistic flying. A view of Monsieur Fillon's French sailplane "Champion" (plans of which appeared in the AEROMODELLER March/April 1947 made me think along completely different lines for power duration models.

Those of you who saw Fillon's magnificent soarer clock 18 minutes out of sight with its wonderful steady and perfectly stable soaring flight must have been most impressed at the contrast between this type of steady duration flying, once the model was cast off the line, and the all too frequent gyrations, frequently followed by comparatively rapid sink, and in many cases a spiral spin, of the pylon jobs. Even the best trimmed pylon jobs that I saw, seldom steadily and surely gained height with completely stable soaring like some large bird or full sized sailplane, as in the case of Fillon's model. It appears that all one has to do in the case of Fillon's type of large soarer (9 ft. 3 in. span) is to get it up to the towline height and release it. Then the beautiful poem of stable soaring flight commences—I therefore suggest that the really expert duration power fans who

are reasonable capable of intricate building should try putting a motor into a soarer on the Fillon lines. engine should be cowled well into the nose with a simple retractable undercart. A motor of sufficient power is required to get the model up to tow line height during the limited motor run of course. That seems to me a more scientific type of duration achievement and incidentally a far better bet than the average pylon model which has an unstable set up, and which requires very careful trimming, one force against another, if really good flying is to be a reliable every time result. The fact is that the average modeller does not know sufficient about trim to get a pylon model perfect. Hence those horrid gyrations and spins one sees in the air on so many occasions. If you are an artistin trim and are prepared to look at the unlovely, unrealistic sight of a pylon model, then this type is O.K., but just fancy seeing one of nature's beautifully streamlined soaring birds with its wings stuck upon a pillar! Horrid you would say. It looks all wrong. The Fillon type of soarer on the other hand looks natural and looks right! What is more, it is right because it soars indefinitely and very beautifully. It has its wing streamlined into the fuselage like a bird, and it soars better than the best pylon.

In my view the pylon should be for the experts rather than for the multitude. At the moment it appears to be the other way round. The "multitude" in America



"Wee Sea Ber," a baby flying boat designed for diesel engines from 1 cc. to 1½ cc. The span is 36 inches.

and on the Continent follow in each other's footsteps and have developed "pylonitis" almost to the exclusion of every other type. Do not think that I want to abolish the pylon type. It had its definite place as a type, and gives a lot of fun and pleasure, as well as many thrilling flights. But we must not let it get us into a pylon rut, as has happened in America, and I believe that there are many people who do not understand this type's good and bad points, and who believe that if you want a good climb

followed by a soaring duration all you have to do is to build a pylon model and to hell with the looks! The Belgians' winning shoulder wing soaring power models have disproved this, apart from the non-powered soarers of the French, Dutch and Scandinavian Countries.

I want to explain the reasons why the pylon model does so often misbehave itself when it has climbed well, and when the power cuts or dies. I also feel that although the American aeromodeller has got the disease of "pylonitis" very badly, and as a result has got into a one track rut of great depth, that we in this country should have alternative ideas for obtaining duration results.

After all is said and done, a rut becomes deadly and soon kills initiative, and all the fun of the game. The greater the variety and individuality that modellers have, the greater the zest for experiment, and the more live becomes the movement.

I attended the Royal Aeronautical Society's aerial garden party recently and saw a very nice display of gliding (full size) with soarers on the "Fillon" lines, and when I was in Germany I examined the leading sailplanes, as well as observing their easy and lovely soaring flight. There are two noticeable features on nearly all these really first class soarers, apart from their streamline shape and lovely "surface finish" that makes them slip through the air so easily.

The very high aspect ratio wings are usually placed in the normal high wing or shoulder wing position. There was also a low wing at the garden party, and all wings are carefully faired in. The second feature is the almost universal placing of the rudder and fin behind the tailplane where it does not become blanketed. Now if the world's greatest soarers, that can soar like birds for hours, have their wings in this position, why should we have to elevate our model wings on an eminence in order to obtain duration soaring? We can get sufficient engine thrust



with an upward couple without a pylon, and we can get even better lateral stability without it, and we don't have to use polyhedral.

To give you some idea that even the Americans are becoming a bit restive with the frequency of their "Crackups" due to the inherent spiral instability of their almost universal pylon models, there have recently been some really interesting articles and hot debate between the leading American "giants" of aeromodelling, published in their papers—Mr. Winter, scientific leader A.M.A. and Carl Goldberg (Fellow-A.M.A.) are having a wordy battle royal over this spiral instability and the reasons for it.

Carl Goldberg agreed that "maximum spiral stability is achieved by combining great lateral stability with the smallest rudder possible." This is a very sound general principle. He also vehemently argues against those well-known American writers Grant and Winter who always maintain that the positioning of the C.G. high in relation to what they call the centre of lateral area (C.L.A.) is the real thing that matters because of the outward skid that they maintain takes place on a turn. Goldberg, I think

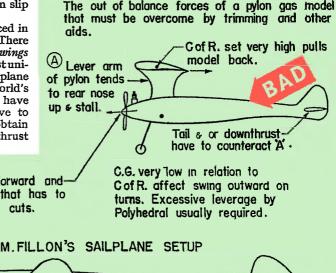


Fig 2

Thrust very low pulls model forward andupward with excessive climb that has to be damped out when engine cuts.

Centre of Resistance almost in line with C.G and riose moment weight which is equivalent to an engine pull

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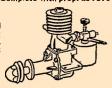
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rightly, points out that the C.L.A. is a false assumption to work upon because, like the centre of pressure of a wing or boat's hull, it moves fore and aft with different speeds, and is therefore not constant if viewed as a centre of lateral force. Also he argues that a good dihedral will roll over and automatically bank the model on a turn, using the C.G. as its pivot, and as a result the model ceases to skid outwards, and therefore there will be no particular force on the outside of the fuselage, so why worry about it unduly to the exclusion of all else as his opponents do.

Some of these American "giants" demand that the C.G. should be above the centre line of the fuselage, and the C.L.A. (centre of lateral area) should be behind and on a line approximately horizontal with the C.G. The wellknown American Frank Zaic, of very great model experience (and a frequent visitor to this country) makes the cute remark that if a man does not have the fortitude to whittle down his own rudder area he should let his " Apparently Frank now believes that it friends do it l takes more than a scissors or razor blade to cure spiral instability." I agree with him, although there definitely is quite a lot in the size of rudder as part of the trouble, and even more important the positioning of the rudder so that it never becomes blanketed, vide the German soarers' fin location.

So we see these giants contradicting each other, and the matter still in the melting pot in America.

The interesting thing to my mind in all this heated discussion over spiral instability in America is that it should occur now when the pylon model reigns almost supreme over there, and the pylon model is supposed to be the American answer to everything!

The fact is, as I show in my sketch, the fore and aft forces are very difficult to balance because the thrust line is so far below the centre of drag of the wing and when this centre goes forward due to added speed the set up becomes even more difficult to control. The method of setting the tail at a positive angle to cure the vicious tendency to stall under full power, may be very dangerous because it destroys the adequate fore and aft "Vee" angle so necessary for sound longitudinal stability, and if the model gets into a very sharp rise in speed the tail may and often does take charge in a dive that never comes out, because there is no corrective "Vee" angle of sufficient effectiveness,

It is also obvious that so much side area right up forward in a pylon model is difficult to balance during an

inwards side slip or vertical banked turn, by the correct rudder area aft, and the whole thing becomes even more tricky if the fuselage is oval or monocoque—a slabsider pylon model is easier in this respect. We find pylon models generally use polihedral.—Why is this so if the type is as stable laterally as people often try to believe, and yet a well-designed high-wing or even low-wing always get away with plain dihedral? The reason is that polihedral is a more powerful corrective later-

ally, and the pylon model requires this added corrective. The instability that has to be corrected is obviously due to these out of balance forces I have mentioned.

There is also no denying on the other side of the picture that a well set up and perfectly trimmed pylon model has a great performance. That is why it has become so popular in the States. But are they all trimmed well by the average man who probably is not an artist at trim?

The restive reader may say, but all these contradictory statements of the "giants" and your own remarks are so far negative, and sound like a politician delivering a harangue. They mean little. Tell us what you think is necessary for spiral stability. Be constructive!

This is not an easy thing to do in a short space without describing all the features of stable design. However, there are a few points that I have met with from practical trial and error that are worth briefly remarking upon.

I have tried all the combinations of high-wing, midwing, low-wing, parasol, pylon—different sizes of fins, fins on top, fins below, extra fins, plain dihedral, polihedral, fat under bellies, and lean bellied fuselages. The difficulty always is to draw the correct conclusions!

- I have found on my models that provided I reasonably balance the fin area with the side area forward (which includes the dihedral area), using a suitable moment-arm, it does not matter whether the weight of batteries, etc., is low or high. The same model will fly just as well as a petrol engine with battery slung low, as it will do with a diesel engine fitted and the battery removed.
- 2. What definitely does cause dangerous spiral instability is bad balancing of side areas fore and aft, and of course slabsided fuselages are more simple to predict proper working areas than the more difficult side flow of air over a monocoque oval fuselage in a side slip.
- 3. The placing of wings excessively high or low in relation to the thrust line causes dangerous circumstances and requires very expert and careful counter adjustment measures. This positioning of wings should not normally be attempted by a novice designer. It is also a mistake to have too much side area very high in relation to the side area low down, such as the pylon model, unless special aids are given to counteract both then one is on dangerous grounds.
- It is important that the thrust line should not be too far from the Centre of Resistance of the main-

plane, and do not forget that this Centre of Resistance travels forward as the speed of the model goes up. At any rate the thrust line should be near enough to the C. of R. of the mainplane to be controlled effectively by only slight down thrust. More than this is dangerous, especially if control by excessive positive tailplane setting is used. In the latter case, as I have already remarked, we destroy our fore and aft "Vee" angle to obtain fore and aft stability, and as the speed of the aircraft varies excessively, so does the controlling influence of the tail. Extra high speed may cause a violent dive that the model never gets out of. We often see this occur.

It is quite vital that the fin should not be too large, because this will turn the model into a nose down spin during a side slip inwards, which happens far more frequently when one wing drops, than Mr. Winter's "outwards skid."—In this respect,

Carl Goldberg wins I feel sure.

If the fin is too small the model will wander, and may also stall on a turn due to the nose rising and the tail sliding on downwards, and the model subsequently drops its nose into a spiral spin.

It is absolutely vital that when the model climbs steeply there shall be a portion at least of the fin that is never blanketed. I find that I can ensure straight take offs and directional stability under steep climb by fitting a properly proportioned undersin which never becomes blanketed. Have you found too that it is easier to get straight take offs with low wings?

Neither should one forget that the forward underbelly of a fuselage has an effect upon the model's type of flight. Thus a deep portly belly like a retired Army officer gives straighter flight than a lean tummy, so popular with another type of "model" of the female species. The latter incidentally helps an aircraft to turn in circles for thermal flying where desired—a useful tip that.

Although the pylon addicts may not agree with any of my remarks, I hope that these will get you thinking, and please remember that it is not only I who has raised this matter. The Americans have started it! And judging by what one so often sees, it is wanted!

A Revolutionary Coil. It has always been my dream to fit a flight battery of small size into a petrol model, and to start up without any difficulty for a day's flying, without carrying a booster battery about with me. A few American coils permit this with reasonable, but not absolutely reliable certainty. Well, you petrol fans, I have recently had two British coils, both replicas from the same manufacturer, that I have tested hard in this respect. They do it! To my way of thinking it revolutionises my petrol models. One of the reasons why I found myself going out more frequently with diesel engined models was because I hated being bothered by the weight of the wretched booster battery, and the plugging in and out of long leads, etc. I like the model all self-contained in these modern times, and the simplified wiring of no booster plugs. I have one of these little 13 oz. "M. I." coils fitted to a model with a stiff and not particularly easy starting 4.5 c.c. petrol engine. The flight battery is a single "Ever-Ready" pencell, No. 1915 of 3 volts. I made 15 starts and runs of 1 minute each over a period of 6 days on this same unchanged battery out in the cold garden, and sometimes in the damp evening air, because I have sometimes found single pencells will operate well indoors but fail out of doors.

I then got tired of trying to wear the thing down, and have left it at that. I shall now fly the model until the battery is exhausted. Just think of that, ye petrol fanatics, for your baby petrol models. It really does reliably cut down your ignition weight to approximately 31 oz. all up and no boosters.

The second similar coil I have in a flying boat, and I use the standard 4½ volt 4 oz. flash lamp battery. This is of course money for jam, but I wanted to try both types of battery. When I first heard about the performance of these coils I frankly did not believe it, because I have heard similar claims before, that have not worked out in hard practice. I feel sure my two coils cannot be exceptional examples.

I have since met the man behind this venture, and his identity intrigued me almost as much as the coil, for he is that well known ex. T.T. motorcycle rider of "Velocettes", Mr. Newman, and I happen to be a motorcycle enthusiast as well as a model maniac.

The coils are beautifully finished, and I feel that they revolutionise the petrol engined model for aircraft and boats. There is a tiny condensor already wired into the

coil which further saves weight and complication.

There is also a baby Magneto available weighing only 4½ oz., but I have not yet tried this, although Mr. Curwen the well-known model car enthusiast has shown me his car start and run with great reliabliity. At last I am through with boosters! This is a real step forward. Petrol engines now scream again in my models equally with diesels, and one of these coils is going into a hydroplane (speedboat) of mine.

Flying Boats. I have recently had a lot of letters about flying boats, and not long ago I officially raised my old record to 1 min. 12 secs. on Poole water, at the very spot, rather too near shipping for my peace of mind, where years ago I induced the first petrol boat to rise from the water. The heading photograph to this article shows the model which is a very simple affair with an exceptionally light water loading and three steps. It has a baby 36 in. span, I, 1/3 c.c. diesel sister called the "Wee Sea Bee" that also flies quite well.

Perhaps when the water is free from shipping and a large fuel tank is fitted, I may have a go at a longer record during the winter months, if time-keepers, boat, tide, and weather can all be induced to play up together.

Mr. David Carrow has sent me a very interesting photo of a little flying boat that he has produced. It is of a modified American full sized "Sea Bee." It can be seen sitting on the water in his photograph which incidentally he says was taken by an "ancient Brownie." I like this little boat, for it looks nice and yet is practical in its simplicity, a jolly good combination for aeromodellers.

Note that the two outboard stabilizing floats are situated close into the hull to prevent swinging on the take off and therefore have the same precautionary effect as my sponsons. Wing tips floats almost always cause a violent swing if the owner genuinely leaves the boat to take off unaided. This is owing to the leverage of one float touching the water out at the wing tip. Mr. Carrow originally wrote to me because he had trouble with the glide after the power ceased. I think this was due to not trimming as a glider first, and then leaving these settings and subsequently controlling power flight by thrust line alteration. Mr. Carrow now writes to say the model is O.K. and he has also allowed a little positive incidence on the tail to overcome the pusher "prop downwash." The wing span of this model is 45 in. and the length of the boat is 38½ in. The engine is a "Mills" Diesel of 1, 1/3 c.c. The model has interchangeable wheels or outboard floats so that she can be flown as a landplane if desired.



A LTHOUGH prior to the outbreak of war there were several designs afoot in this country for a pressurised air liner, it was not until June 14th, 1945, that the first machine of this nature, the Avro Tudor I G-AGRC took the air for the first time.

By May of the following year, Avros were so satisfied with the results of their labours that the press were invited to visit the Woodford assembly plant and taste the experience of high altitude flying in a modern luxury liner. It was then hoped that the Tudor I would see service on the North Atlantic run by the end of the year. The seemingly extravagant seating layout was called for by B.O.A.C. who had placed an order for a number of twelve seater day/night passenger and mail aircraft.

After a number of proving flights had been made by B.O.A.C. under various climatic conditions, the Tudor I was rejected by that concern on the grounds of excessive swing during take-off, and buffeting at speeds at or near the stall. Consequently G-AGST, bearing also the R.A.F. Serial No. TT. 181, one of the production models was sent to Farnborough to undergo further tests. As a result of altering the fin area and sealing up certain apertures in the air-frame structure, the swing was reduced, and not only was the stalling speed actually decreased from 92 knots to 86 knots but the effective range considerably increased. In spite of these improvements the Tudor I is still not in service with B.O.A.C. at the time of writing.

British South American Airways however, have recently

expressed themselves as highly delighted with their first Tudor IV, which is more or less a Tudor I but with seating accommodation for 32 passengers and with an extra 5 ft. 9 in. added to the fuselage, forward of the wing. Other modifications include the removal of the stub exhaust pipes, replacing them with collector pipes which discharge the exhaust beneath the wing.

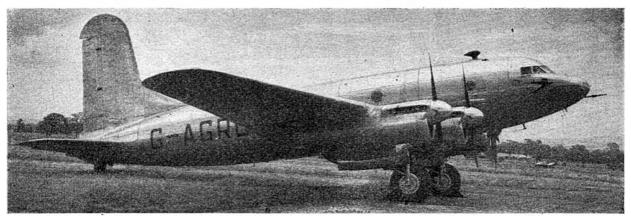
The inboard engine nacelles have been extended, and the overall height of the aircraft will eventually be reduced by 14 ins. in order to improve the ground angle.

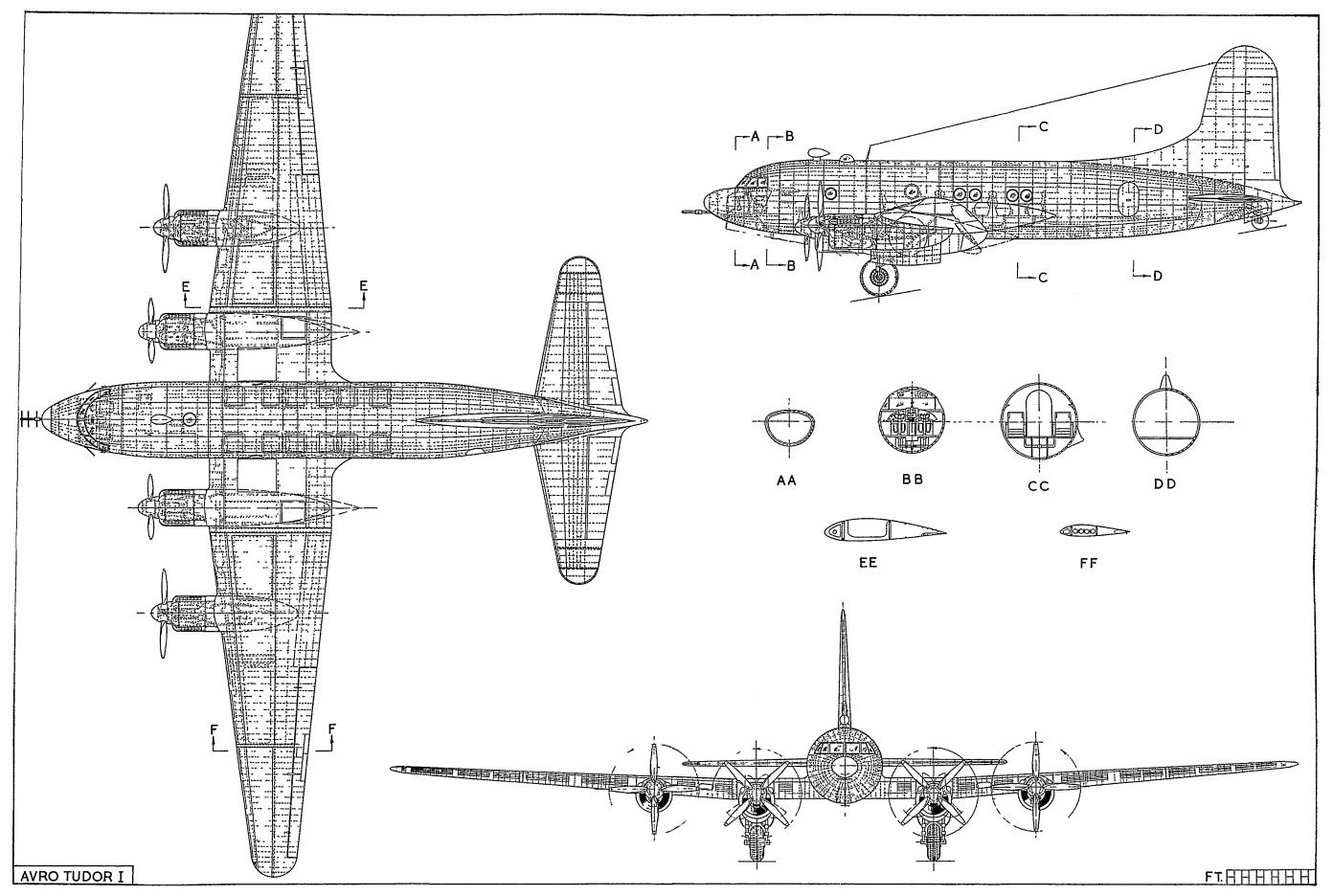
Power is supplied by four 1,850 h.p. Rolls-Royce Merlin 600 liquid cooled engines, driving four-bladed constant speed airscrews.

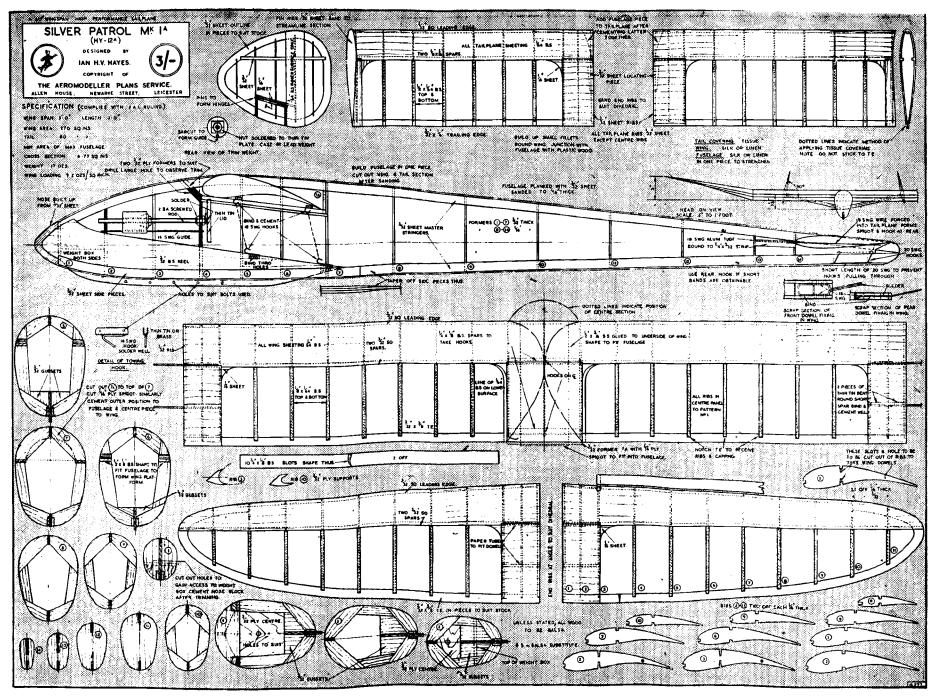
The first batch of Tudor I's was registered on September 5th, 1945, the numbers running consecutively from G-AGRC to G-AGRL.

Colour. Machines intended for service with B.O.A.C. have been left in their natural metallic finish, with registration markings, etc., on fuselage and wings painted in royal blue outlined in gold, this scheme being amply illustrated in the heading photograph. The three-view general arrangement drawing overleaf is drawn to a scale of 1/144, and ½ in. to 1 ft., reproductions of it can be obtained price 3/- from our Leicester Offices.

Span: 120 ft. 0 ins.; Length: 81 ft. 3 ins.; Height: 24 ft. 0 ins.; Wing Area: 1,421 sq. ft.; Tare Weight: 47,960 lbs.; Total Loaded Weight: 80,000 lbs.; Consumption: 1.19 m.p.g. at 20,000 ft.; Max. Cruising Speed: 290 m.p.h. at 26,000 ft. Range: 3,630 miles.







usual from the Aeromodeller Plans Service, Allen House,

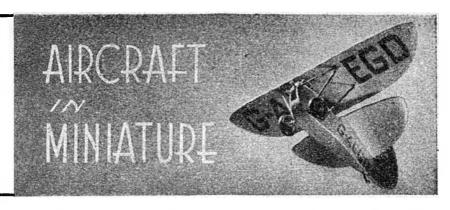
Newarke Street, Leicester.



Part VIII ASSEMBLING FUSELAGES AND WINGS-Continued

By W · O · DOYLEND

Le Pou du Ciel modelled by the author, a fascinating subject for the solid fan.



FURTHER type of high-wing fitting is used in models where each half of the wing a separate unit jointed to the top longeron of the fuselage and with the transparent panels of the cabin roof extending back along the fuselage between the wing roots. Examples of this type are the De Havilland "Puss Moth", Taylorcraft "Auster" and the Westland "Lysander". The treatment of the model will depend upon whether the cabin is to be solid or hollowed out and with built-up transparent panels. In the former case, the straightforward use of dowels is employed and the method of fitting is shown in Fig. 7 where the "Puss Moth" is used as an illustration. Note how the wing section of this type is tapered sharply at the roots leaving only a small section for fitting to the fuselage. Normally, in all cases where wings are thus fitted, they will also be braced by struts to the bottom of the fuselage and this bracing combined with the dowels will produce a sufficiently strong fitting.

Where the cabin is hollowed out and the transparent panels built up with celluloid, the dowel method is still employed, but in these cases the dowels will have to be soldered on to a wire framework which is built up from the fuselage much the same as it is in the actual aircraft. In Fig. 8 is illustrated a framework for the Westland "Lysander", the celluloid panels being fitted in sections

after the wings have been assembled.

Cranked or Gull wings.

One modern tendency in monoplane design is the use of gull wings, good examples being the Miles "Master" and the Junkers J.U. 87, "Stuka" dive bomber. If the angle of the bend is not too great, the steaming method will be applicable, shallow saw cuts being used where scoring is not sufficient to start a clean bend.

The wing is made in one piece as usual and tapered, cambered and scored, but whether the type is low or mid-wing, it is advisable to fit the wing in two halves. The centre portion is cut out and the root end of each

half of the wing filed to the engle which will give it the correct down sweep from the fuselage. The outer ends of the wing are then bent up to their correct dihedral and where saw cuts have been used, the cut on the lower surface will have to be filled in with plastic wood when the bending is completed. See Fig. 9. The two halves of the wing are then fitted to the fuselage with wire dowels in the normal way.

In some cases where the angle of the outer dihedral is large it may be easier to cut off the outer section, file the root to the desired angle as we did for the fuselage fitting, and re-assemble this portion also with wire dowels.

Biplane wings.

The assembling of biplanes is naturally rather more complicated than monoplanes, but by following a definite progressive sequence, most of the difficulties will be eliminated.

The lower wing is fitted first, normally by one of the two methods described for low-wing monoplane types, but mention might be made of one possible slight variation. This concerns cases where the lower mainplane lies slightly above the bottom line of the fuselage, one example of which is the Armstrong Whitworth "Siskin" fighter of 1925, and another, the Gloster "Gladiator". In such cases the use of wire dowels may not be satisfactory. This is specially so in the case of the "Siskin," where the lower wing is of narrow chord, 9/16ths of an inch on a 1/72nd model and of thin section. Here, the following method will be found useful.

A cut-out is made in the underside of the fuselage to take the lower wing. When the chord of the wing is narrow, as on the "Siskin", it will not be necessary to make any cut-out in the leading or trailing edge. But in other cases, the wing may also be cut as it is for the low-wing monoplane joint. The shaping of the underside of the fuselage is then finished off and the wing fitted up into the cut-out and glued. A small piece of wood is

Two more of Anton Hubert's splendid models. They both carry Swiss markings and are from left to right — the Fokker C-VE and the Messerschmitt 109.





then made to fit into the space remaining under the wing as shown in Fig. 10. The most satisfactory way of obtaining a good fit is to make this small block in rectangular form as shown and glue it into place. When the glue has set, the final shaping of the block down to the fuselage lines can be carried out with a chisel or file and sandpaper.

The main difficulty with biplane assembly is the fitting of the centre section and interplane struts and the top wing. We usually find that there are innumerable ends of struts to be fitted into an equally innumerable number of small holes, neither of which seems to have any desire to stay together for more than a few seconds at a time. A fair degree of patience is necessary in this job, and if the following sequence of operations is followed, the operation should cease to have many of its terrors.

It should be mentioned that in addition to the complete shaping, cambering, dihedral bending and scoring of the wings, holes for the interplane and centre section struts should be drilled in their respective positions before the assembling of wings and fuselage is commenced. The struts themselves should also be finished ready for fitting.

The fitting of the top wing is always commenced with the centre section. The centre section struts, which may be lengths of suitable gauge wire, are plugged and glued into the holes drilled for them in the top deck of the fuse-lage. Each strut should be cut a fraction longer than the finished length, allowance also being made for the short length required for plugging into the wing. See Fig. 11. These struts are splayed outwards and forwards to the correct angle if this is necessary, the gap of the centre section measured off on the struts the tops of which are then bent to a vertical position for fitting into the top wing.

The top wing is now trial fitted without glue on these centre section struts and the gap checked. When this has been adjusted and is correct, any portions of the wire struts projecting through the wing must be cut off and filed down flush with the wing surface. It should always be endeavoured, however, to get the struts just the right length so that they do not break through the top surface.

The top wing is now removed and the interplane struts are fitted and glued into the lower wing. They are given the necessary splay for the stagger of the wings, if any, their lengths measured off and the small section at the top bent to a vertical position as in the case of the centre section. See Fig. 12. The top wing is now given a trial fitting on all the struts, still without glue, and the gap between the wings along the whole span and also the stagger of one wing in front of or behind the other are measured and adjusted until they are correct. Any projection of the interplane struts above the top wing is dealt with as before. A check should be made to ensure that the lower ends of the struts have not been pushed down through the lower wing during the process of fitting. When everything is correct, the top wing is removed once more, the ends-of the struts are given a spot of glue and the wing is then finally assembled. A further check on gap and stagger should be made and the assembled wings then left for a while until the glue has set. Any surplus glue around the bases of the struts is then cleaned off with a razor blade and fine sandpaper.

Wire struts have been used in the above description, but struts may be made from thin sheet metal or even wood and details of these are given in a later Chapter. In all cases, however, the sequence of assembling should be the same.

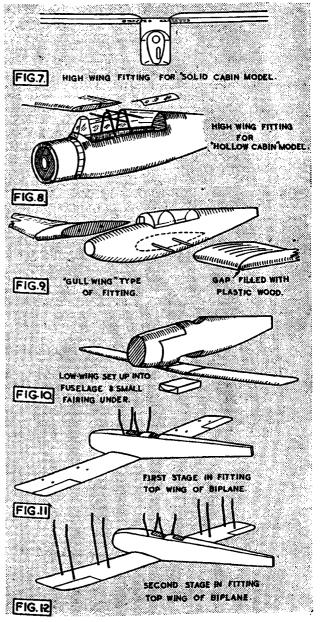
An unusual arrangement of biplane wings is found on the Bristol "Fighter" aeroplane of 1917. In this type the lower mainplane was suspended a little below the fuselage on short V-struts forming a lower centre section. In this case, the lower centre section struts should be fitted first and the lower mainplane assembled on them. From then on, the procedure is exactly the same as for a normal biplane.

Wing root fairings.

The wing roots of most monoplanes and some biplanes are carefully faired into the fuselage in order to give as good an aerodynamic form as possible and to prevent undue "interference" with the airflow by the two adjoining surfaces.

As well as running the horizontal surface of the wing in a gentle curve up to the fuselage side, the trailing edges of the wing roots are often curved back to merga gradually into the fuselage lines some distance aft of the wing

(To be continued.)



CONTROL LINE COMMENTARY F.B.THOMAS



Control Line Cavalcade—an assortment of the author's models of all shapes and sizes.

A T the end of my "Control Line Commentary" in the Aeromodeller of July last, I urged the building of true scale models. Since writing that, I've received photographs of a very pretty little 1/13th scale model Hawker Typhoon built by Sgt, Pilot G. W. Swaffield of Wallington, Surrey. She is powered by a Mills diesel, weighs 21 ozs. all up and flies well. When he wrote to me, Sgt. Swaffield was building a scale Mew Gull with wing flaps that lower automatically when the engine is cut. (Fig. 1 shows the Typhoon.)

Snaps of another interesting model, on American "semi-scale" lines, came from Kenneth V. Foster of the Leeds Model Flying Club (Fig. 2). This model is 26 in. span and powered with an Italian Movo 2 c.c. diesel. The snaps reached me during the big freeze-up, and Mr. Foster had been flying it successfully off snow, using skis! I hope we'll soon hear that Col. Bowden has U-controlled a flying boat!

Several readers have sent me snaps of control liners made by friends in the States. Some of these have shown very beautifully made models, but for the time being I would prefer to publish pictures of models designed and built in this country. The Americans have got at least three years' start on anyone over here as far as control line models are concerned, and their efforts can be seen in the American model papers.

If any reader is contemplating building a scale model of a full sized aircraft for U control work, I'd advise him not to be too ambitious with his first project. Choose a low wing model for preference, and one with a long tail moment so that the elevator response will not be too sensitive. Such a type, for example, as the "Moth

Sgt. Pilot Swaffield's elegant Mills-powered Typhoon.

Fig. 1.

sensitive. Such a type, for example, as the "Moth wing. Since it is had difficulty in such as the "Moth wing. Since it is had difficulty in such as the "Moth wing."

Weight is 21 ozs.

Minor" and keep the weight down to a minimum. In several articles on U control I have seen it stated that excess weight does not matter in this type of model. I am certain that this is wrong. If a model is to have a good performance, and perhaps ultimately be capable of aerobatics, a good power/weight ratio is essential. For a really sprightly performance you should aim at 5-6 ozs. weight per I c.c. of engine capacity for a petrol engine, and perhaps 7 ozs. per c.c. for a diesel. On this basis, the smaller petrol engines are ruled out as unsuitable for U-control work. I personally think a petrol engine under 4.5 c.c. is too small. But the story is different with small diesels because there is no coil and battery to carry. I've built a 24 in. span model with a "Mills" engine which weighs 9½ ozs. all up. (Fig. 3.) This model has an ample speed range and is capable of a vertical "wing-over". But such light models must be flown in fairly short (max. 30 ft.) lines. If longer lines are used the weight of the model will not produce sufficient centrifugal pull to maintain line tension. But for a primary "self-trainer" much higher power loading can be used. My Millsengined Canard flies nicely at an all-up weight of 16 ozs.

A control liner needs a springy and very rugged undercarriage, because the u/c is used far more than it is on a free flying model. Many full-sized low-wing aircraft suitable for scaling down for U-control work use an undercarriage attached to the wing, and for a time I had difficulty in finding a set-up for this that was rugged enough for the numerous take-offs and landings involved. I've tried one type of u/c which works extremely well and stands up to a lot of hard knocks without damaging the wing. Since it is possible that other aeromodellers have had difficulty in solving this problem, I'm giving a sketch showing the salient features (Fig. 4). A very thick wire can be used because the "springiness" is derived from the long "torsion-bar" which damps out the shocks sustained by the wing spar and avoids fatigue (due to frequent bending) of the u/c leg proper.

A true scale model looks more sightly if the controlline pick-up wires are led out through the wing tip instead of through the sides of the fuselage, because the latter arrangement calls for fairleads attached to the upper surface of the wingtip. Wires led out through the wingtip look nice and help to reduce drag, but they have two major drawbacks. In some models, the pick-up wires tend to vibrate madly when the motor is running on the ground, and this causes the control lines to get tangled together and in the event of a crash the pick-up wires can get bent, and after straightening may be dangerously weakened. I think that the best compromise (this applies to low-wing models) is to lead the wires out below the wing. Wing-tip fairleads are placed under the wing-tip, and the control plate in the fuselage is sited just below the level of the under surface of the wing. Such an arrangement is unobtrusive, and the pick-up wires below the wing should produce less drag than when they run out over the upper wing surface.

In past articles I have repeatedly stressed the importance of fitting to all control-liners an engine cut-off device that can be operated at will by the pilot. Many modellers I know are content to fly their models until the fuel runs out and then land them willy-nilly. If a pilot operated engine cut-out is fitted, a far greater degree of flying accuracy is possible, including "spot" landings. The only drawback is the necessity for a third slack line with its attendant drag. But this snag is more than outweighed by the increased fun of flying a model over which one has complete control from take-off to landing. and the fun is enormously increased by a further refinement—the ability to control engine speed in flight and on the ground. I've fitted up two of my models with a device to achieve this, by advancing or retarding the ignition. The photographs of one of my earlier models (Fig. 5) show the details fairly clearly. The ignition lever is normally held in the advanced position by a tension spring (which can be seen running up and out from the cylinder head, to which it is attached). Pulling on the third line retards the ignition and allows the model to be brought in to land with the engine running at reduced revs. Quite a small reduction in engine speed is sufficient to enable a model to make a "rumble" approach. Immediately outboard of the wing-tip the ignition line is linked to the engine cut-off line, and the lengths of these two are so arranged that when the third line is pulled right back the ignition switch is pulled to "off" and the aircraft comes to rest. Using this control, the model can be taxied very realistically, when the line is eased forward the engine roars up to full revs. and the model can be taken off.

With diesel engines speed control is not so easy, and with certain engines is impossible. On my scale model "Tiger Moth" I got over the difficulty by fitting a form of "blip switch" similar in operation to that used on the old Le Rhône Avros. My "Tiger Moth" is powered by a 2 c.c. Majesco diesel which is fitted with a plunger that can be lowered to obstruct the intake-tube between the jet and the cylinder. I arranged a spring to hold this plunger in the "up" position. Pulling on the third line lowers the plunger and stops the engine. But if the pull is released before the airscrew comes to rest, the engine picks up again and continues to run. To bring off a landing with the engine on, the motor is "blipped" repeatedly and the aircraft loses height gradually and finally lands. She can be taxied quite easily and taken off again at will.

Such an arrangement works very well for giving dual control to a novice and "circuits and bumps" can be continued until the fuel runs out. In my first article I gave a sketch of a dual control grip that I've used quite a lot for instructional purposes. But a much better method of giving "dual" has been suggested to me by Mr. R. H. Warring, with whom I've had lengthy correspondence on control-line matters. Fig. 6 should make Mr. Warring's duel control scheme clear.

When building a control-liner, make every effort to simplify engine starting. A choking device which can be

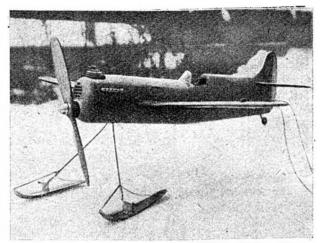
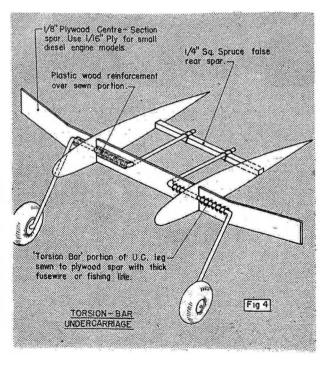


Fig. 2. A very handsome American-style effort by K. V. Foster of Leeds. No doubt ather modellers will try their hand at "ski-ing" this winter.



Fig. 3. Dignity and Impudence! The author's largest and smallest. The big fellow is a converted free flight Buccaneer, and the baby is the latest of the Candy (amily, No. IV.



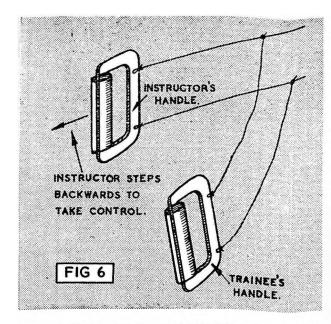
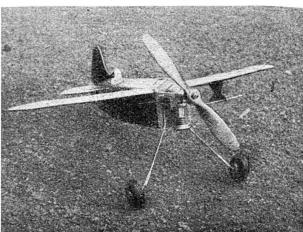




Fig. 5 (Above). A close-up of the Ignition control for engine-on landings, fitted to the author's Candy Mark I.

Below is an interesting if not very beautiful Ouragan-powered first design by F/Lt. Grampton, D.F.C.





(Above.) Shows Ron Moulton with enthusiastic helpers in between one of his many flights from the concrete take-aff base at Eaton Bray, International Week.

operated by a lever outside the aircraft saves endless finger-tip fiddling and avoids the large finger holes in the engine cowling. With inverted engine installations, a needle valve extension is necessary and an extension of the filler cap is a great boon. A clinical thermometer case soldered to the filler cap works well. These cases have a well fitting cap that "snaps" home, and the cap can project through the top cowling.

In conclusion, I'd be most interested to hear from anyone who has succeeded in looping a U-control model. I've looped a rubber-driven model many times, but I must admit that I've never quite had the courage to risk a loop with an engine-powered model! If any reader has looped, I'd like full details—length and type of line used, size and weight of model and power unit fitted.

B. Perrett control-lining his "Little Vagabond" illustrated in Model News.



FACTUALITIES Part Three BY JOHN HALIFAX Model of the moment—A. H. Wilson's justly famous tailless pusher, powered with an Ohisson 60. It features a laminar flow section, with elevons at only—4 due to the models fall size. Phenomenal climb and flat, stable glide helped to win it the Pterodactyl Trophy.



Tailless Models and the like.

S the number of tailless models and flying wings As the number of tames modellers are turning increases, more and more modellers are turning enquiring eyes in this direction; in fact it now seems demodé to use any other in a jet or rocket propelled machine.

The reasons are not hard to find. From the design point of view the calculations and drawings can be finished within half an hour, whilst the construction takes very little longer. In addition the trimming is relatively simple, since the Centre of Gravity and the wingtip "elevons" are the only two items to be adjusted on a sailplane, and these plus the thrust-line on a powered machine. Moreover a theorist can safely build one since even violent variations from the designed settings can be accomplished without being outwardly apparent! Many "first timers" are frequently discouraged, however, by the fact that their productions just will not fly

This fault can almost invariably be laid at the door of longitudinal stability, and if the following rules are observed it should disappear:

(1) Always ensure that the Centre of Gravity is well forward—the average model has a very limited range over which the C. G. may be moved, and if it lies outside this flight is quite impossible.

Always wash out the wing tips. By this is meant that the trailing edge is propped up during construction so that the angle of incidence at the tip is several degrees less than the centre section. This has the same effect as longitudinal dihedral on an ordinary model in that the wing tips act as a tailplane. A figure of between three and five degrees has been found best in practice, though this of course varies from section to section.

(3) Keep the tips as light as possible; at first sight this may seem the same thing as saying (1) above, but there is more to it than that. To discuss the reason would be to bring in Moments of Inertia, dynamic stability and the like, however, so the injunction shall stand as it is.

Because of this stability question the maximum life of this type of machine is unfortunately low, unless it is a specially constructed research machine. Thus, its full efficiency is never obtained, and unless a very low wing loading is used its flying speed will be somewhat higher than usual. Hence future research into this problem will almost certainly aim at curing this particular fault.

The best wing section in this class presents something of a problem, because although Laminar Flow sections can—and are—used (witness the first and second places in the Pterodactyl Trophy at Eaton Bray in September) they may require rather a large washout angle. The

alternative is to use an orthodox one with a reflexed trailing edge and considerably less downwash, but this is only satisfactory for fairly large models, since the reflex has no effect with small chords.

Fins should always be placed at the wingtips because this offers the two-fold advantage of placing them in the correct position for lateral and directional stability, and at the same time reducing the strength of the vortices which originate at the tip, and hence the drag. In many cases they are not needed at all, such as when a rocket or jet unit is mounted on top of, or behind the centre section.

It is a mistake, by the way, to mount the propulsive unit too high up in relation to the rest of the model. Such a position causes a powerful nose-down moment to be exerted during the power run, and is responsible for the erratic behaviour of many contemporary designs. The ideal position coincides with the centre of drag, but since this cannot be easily calculated it is advisable to make some allowance for adjustment after test flying. When the correct position has been obtained, any amount of thrust variation from a rocket unit should have no effect.

Pylons.

The rather unæsthetic pylon wing mount is at last earning a respite from its critics by virtue of its performance on the flying field, but the voice of conservatism is still heard in the land, and it seems appropriate to give the facts behind the case. In opposition may safely be said, that a machine of this type looks ugly: but that seems to be all. In favour we find that the following advantages accrue,

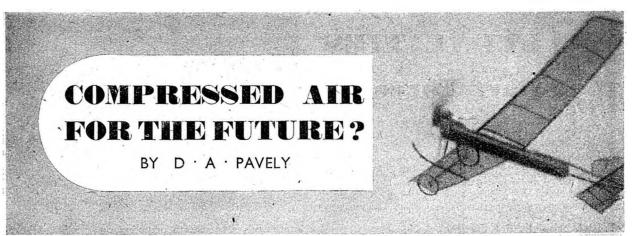
A large pylon concentrates the side area of a machine where it is most needed for spiral stability, and enables a small fin to be used; or more accurately it enables twin fins of smaller total area to be used, since a single centrally placed one should never be used as it will lie directly in the turbulent backwash of the pylon.

A large pylon enables the engine of a power model to be mounted directly under the leading edge of the wing, thus reducing the Moment of Inertia we mentioned earlier and hence increasing the stability.

A large pylon enables less dihedral to be used.

A large pylon places the wing so high up that if it is used in conjunction with a low mounted tailplane the latter is well away from the "wake" of turbulent air left by the wing.

These advantages are by no means peculiar to power machines, and in fact a number of pylon or "suitcase" gliders have been built and flown with excellent results.



TN the old days, the compressed air powered model i 'plane gave a very good account of itself. It was the first engine driven to beat Stranger's petrol-driven record of 51 seconds and often beat the rubber-driven model in competition too. Considering that modern design and technique would suit the compressed air power plant admirably, it is, to my mind, very surprising that it is to-day only conspicuous by its absence. What are its chances compared with the diesel and petrol-engined models? These have to "cut-off" after about 20 seconds' engine run, so the limited run of compressed air would be no handicap. It gives at least as much, if not more, power. It is independent of fuel and batteries. The engine does not require a correct fuel mixture, gives uniform revs and will start every time. It takes a much larger propeller, which running at lower revs is more efficient. The air pressure in the container could be used to actuate a "cut-off." The life of the engine is considerably longer, it does not rely on the precise fits of piston, cylinder and crankcase for efficiency. It has the disadvantage of being heavier and the air container has to be "pumped up." Regarding the weight, I estimate that a suitable plant could be made to weigh less than eight ounces. The air container could serve mainly as the fuselage and much of the weight of a normal one saved. With care there should not be a great difference in weight between a compressed air "thermal hunter" and a diesel ditto. A suitable plant would be: Engine 3-cylinder radial about $\frac{3}{8}$ in. bore; air container $2\frac{3}{4}$ in. diameter, 18 in. long; propeller 12 in. to 14 in. diameter, fairly coarse pitch. Particular attention should be paid to reduce leakage and losses. Feed pipes from valve to cylinders to be kept as short as possible. Judging from engines and drawings I have seen, it does not seem to have been appreciated how much these pipes waste. It should be realised that these feed pipes are filled and emptied once in every revolution and the compressed air in them is wasted when the exhaust opens. Transfer the air from the valve to the cylinder by the shortest possible route. Clearance between piston and cylinder head when the piston is at the top of its stroke should be reduced to a minimum, bearing in mind that for the air to fill a space before acting on the piston is again a waste of air, apart from the loss in expansion. Leather washers used on pistons should have a narrow skirt and the cavity filledor preferably a shaped disc or ring should be fitted to the cylinder head to fill the cavity when the piston is at the top of its stroke. A twin cylinder vertical engine with the valve on top of the cylinder heads, dispensing altogether with feed pipes,

would save pipe losses, but it has not got the power of the three-cylinder radial, anyway in my experience, also with its double crank throw and valve gear it cannot be made as light. The valve for the inlet and exhaust should be of the rotary disc type driven direct by the crankshaft. The diameter of the valve should be kept as small as possible and the ports large. This will have to be a compromise, but by not having too large a central hole, the diameter can be kept down to a reasonable size. Friction is an important factor and every effort should be made to reduce it to a minimum.

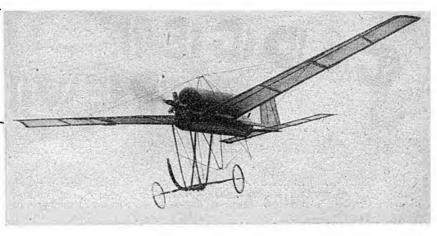
The air container 18 in. \times 2\frac{3}{2} in. should be made of brass foil, .004 thick, 6 in. wide and wound spirally on a wooden mandrel. If made with a longitudinal seam, like a tin can, it will tend to bow under pressure due to the unequal strength given it by the double thickness of the seam. 28 S.W.G. steel wire is wound spirally and tightly along the shell, end to end, with 3/16 in. spacing. The shell is fitted with hemispherical ends, these ends having about 1 in. lip for soldering them to the shell. A central longitudinal tie rod, 14 S.W.G., is added to reinforce them. Valve for inflation should be a Schrader or one of the plunger type, the ordinary cycle type valve being useless. Tinman's solder, the thick bar stuff to be used and all parts tinned before uniting them. "Fluxite" is the best flux for the job-don't use spirits. A union cock should be fitted so that a pressure gauge can be readily attached to and detached from the container. I don't believe in having the pressure gauge attached to the pump, it is not reliable enough. Air containers must be tested to a much higher pressure than it is ever intended to use. For instance my test pressure for a 24 in. × 3 in. container is 250 lbs./square inch and I would not exceed 175 lbs./ square inch in normal use. Air containers deteriorate with continual use so should be re-tested at intervals. Have something between you and the container when testing. My arrangement was to have a partition with the container on one side and the pressure gauge, pump and me on the other. Oil should not be introduced into the container. Air and oil under pressure don't agree! For this reason the pump used for inflation should only be lubricated with a high flash lubricant such as castor oil. An air container must be treated with at least as much respect as one would give a model steam boiler. You would not dispense with the safety valve, place boiler on a gas ring and not expect anything to happen!! The same applies to an air container. Don't pump up any container that has not been properly tested and is not fitted with either a safety valve or pressure gauge. For a modern compressed Left is a model of the author's that won first prize at a flight golf competition in 1921. It had a horizontally opposed engine with an 18-inch 4-bladed propeller. Right is the 1923 Kelly Cup winner that used two air containers and put up a time of 70 seconds!

air model, it will be necessary to provide some means for timekeepers to tell when the power has been "cut" as the propeller would freewheel. A propeller with folding blades might be the answer to this. Having given a

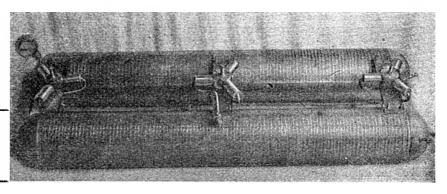
general idea of the lines, I should work on to produce a modern compressed air model. The following are a few particulars of my past experiments and results.

For all-round simplicity, the twin-cylinder horizontally opposed engine wants beating. Mine was made from a single piece of brass tube, the tube being cut away at the centre for the single throw crankshaft. The bore was 13/16 in., stroke 7/8 in. This engine coupled to a 24 in. \times 3 in. air container had an 18 in. propeller 22 in. pitch. It would fly a model weighing 2 to 21 lbs. in weight and had plenty of power. Maximum pressure used was about 150 lbs./square inch. The engine may seem large but economy of air consumption and increased duration of flight is not gained by reducing the size of the engine; in fact the reverse is the case. The big engine scores because it gives an effective thrust at the lower pressures. To explain: from experiments, I found that the maximum thrust should be at least half the weight of the complete model in order to use up the lower pressures in flight. Whilst a smaller engine would fly the 'plane, it would land with plenty of pressure still in the container. I had an arrangement to which a plant could be attached and which told me the maximum thrust at maximum pressure. It was a great help and enabled me to predetermine what the maximum weight of the model should be. It may seem that a reducing valve would be a great advantage, but having tried one, I don't think so. Without the valve the flight commenced with a really spectacular climb, flattening out into horizontal flight. With the valve there is little climb and from my experience, a disadvantage. It might be an asset if it was practical to use a much higher initial pressure. The compressed air model possesses an advantage that has been overlooked. That is, that its climb and flattening-out characteristic

is due to the lessening pressure in the air container. A container with pressure in weighs more than without and as most of its length is behind the centre of gravity, the weight of the compressed air makes the model tail heavy.



The tail rises in flight as the pressure decreases. The model, of course, is first trimmed for horizontal flight with little pressure in the container. I have tried many different sizes of air containers and have come to the conclusion that a 3 in. diameter with 24 in. length is the best all round for model work. A 4 in. diameter by 24 in. length has roughly twice the volume of the 3 in. but the stresses have also increased considerably. I have used the 4 in. diameter size on many occasions with complete success and have even gone to a 5 in, diameter, but I don't advise over 3 in. diameter, anyway not for the beginner. If more volume of air is required, two or more 3 in. diameter containers are preferable. The shell can be made amply strong, so the smaller the diameter can be kept thus keeping down the area of the end, the stronger is the container. The area of a 3 in. diameter is roughly 7 square inches and of a 4 in., 12 square inches, nearly double, and don't forget that pounds per square inch is pressing on every square inch of these ends. To charge the container, use a pump having a bore of 1 1/16 in, or less-the stroke is not important. I experimented with various types of pumps with varying bores, double and single acting. An ordinary foot stirrup pump turned out to be the best. (I still have it.) The bore is 1 1/16 in., the stroke 20 inches. With it I could get 250 lbs. per square inch pressure into a container. The effort of pumping increases with the bore of the pump. Using one with 11 in, bore at 100 lbs pressure—well, you have had enough. Maximum working pressure should be round the 150 lbs. mark, which is quite enough to give really good results, It is about eighteen years (until quite recently) that I have touched a compressed air model. However, I'm picking up the threads again and, who knows, next season may see at least one compressed air model.



An interesting twin 4 inch container unit built by the author for an inventor's experimental helicopter.



HAIL to the season of crackers—and therefore very pertinently to another session of Gadget Review conducted by Consus and confederate. Bagley does the drawings and Consus makes them as hard to understand as possible. Incidentally, to cover himself in the future, Consus feels that he ought to point out for the satisfaction of a querulous reader that a good idea in 1944 is often just as good in 1947, and if a gadget is reproduced that has already seen the light in the past it is asking a bit much for it to be picked out of the several hundreds by that time published and summarily rejected as somebody else has already thought of it. It is a very long chance that a similar idea is really a crib, although nevertheless such similarity is not encouraged when noticed (for the benefit of all those thrifty types who have already made a dive for their back numbers!). We would much rather use fresh and original ideas, but Consus' memory can't cope with remembering every individual contribution since Gadget Review first started. and therefore has to take a certain amount on trust. But his sublime faith in his readers unshaken . .

First of all this month comes an idea for dethermalising a glider which Consus feels safe in believing did not make a first appearance in earlier days—so hush, the critics, and take a peek at this simple but clever method of destroying a sailplane's trim, worked out by V. P. WILLCOCKS, of South Tottenham. A suitable length of paper tubing is made and fixed in to the fuselage so that the lower end is well in front of the C. G. (Fig. 1). The higher end of the tube is slotted along the bottom to allow for the travel of a timer arm which holds a heavy ball bearing at the top of the tube. As the airdraulic timer arm retracts along and through the slot, at the end of its travel it disengages the ball bearing, allowing it to run down to the end of the tube towards the nose of the glider thus making the model considerably nose heavy and bringing the model down in a steep glide. On large gliders additional ball bearings may be used if the weight of one is insufficient.

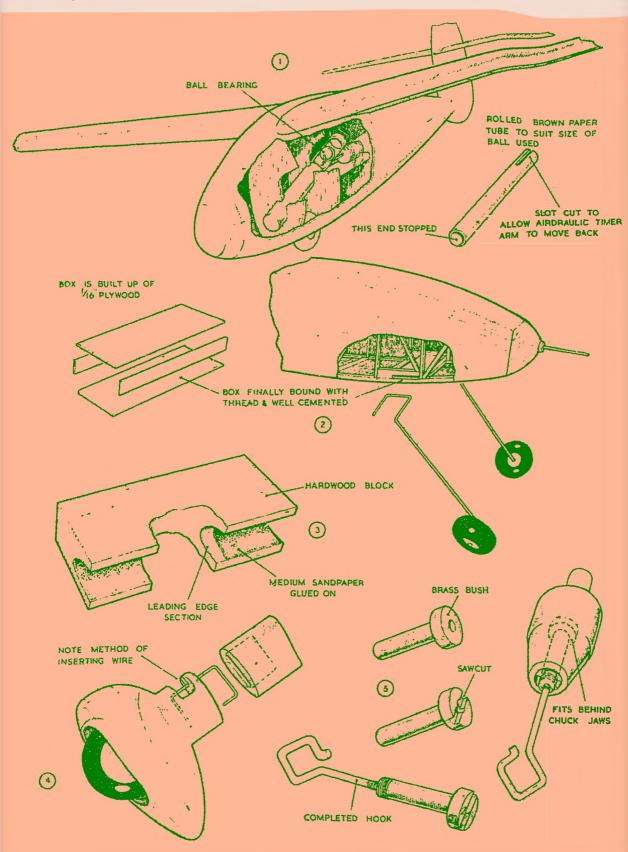
Simplicity is something that Consus is all in favour of, and here again is another very simple and practical gadget—an ingenious undercarriage fixing (Fig. 2) designed by J. R. THIMIDIS, of Brockley, S.E.4. This completely solves the detachable undercarriage question for the small duration model, as it allows the normal single wire leg to plug in and out of the fuselage side in a most inconspicuous manner. A box is made from 1/16th ply, the width of the fuselage, to the narrow dimension required to take the bent wire shape at the top of the undercarriage leg. The wire U is left bent rather open so that the pressure of the wire on the sides of the box prevents the undercarriage leg falling out.

Who is there that has not at some time or other removed the major portion of many a rib while engaged on the peculiarly difficult task of shaping the leading edge spar to the nose of the section? A device originated by T. WESTACOTT, of Exmouth, effectively prevents this unhappy result, yet takes only a few minutes to prepare for use. Designed for parallel chord wings, it consists of a small block of hardwood three or four inches long with a channel hollowed out down one side (Fig. 3) to the shape of the leading edge required, but to an extra depth all round of about 1/64 in. to allow a piece of fine sandpaper to be glued inside. To use all that is necessary is to rough shape the leading edge with coarse sandpaper or a sharp knife and then finish off with this gadget, which ensures a perfect shape along the whole length of the leading edge.

Another instance of the way great (sh!) minds work alike is provided by a further undercarriage fixing using the same system as Mr. Thimidis above, applied in a rather different manner (Fig.4). This method, by D. ATTWOOD, of Eastwood, makes use of the U-looped wire to provide the springing on a scale type spatted undercarriage as shown in the drawing. For the original machine, a 34 in. span Miles Magister, 20 gauge steel wire was found to give just the right degree of springing. The wire is bent to shape, fastened to the leg in the manner shown and firmly bound. The loop is then wrapped around with heavily glued brown paper to form the socket into which the loop plugs. When dry a virtually crashproof assembly results—in the event of a heavy landing the leg bends right back, and finally if the pressure continues, knocks right out of the socket in tongue and box fashion.

Next on our list is something for the bruised and battered stooges who squire the rubber model fiends, always at their own peril and very often to their own detriment. That polite "Would you mind holding, please?" accompanied by the disarming doffing of peculiar headgear, has often led many an unwary to a rueful regard for the suddenly unleashed energy of a rubber motor expended on his knuckles with painful vigour, the unhappy result of the winding hook parting company with the winder through an insecure fixing in J. MACDONALD, of Pollok, Scotland, the chuck. shows a nice regard for his helper's welfare, therefore, with his special winder hook fixing illustrated in Fig. 5. A 16 gauge brass bush cut with a hacksaw in the manner shown in the drawing is fixed onto the winder hook shaft, bound with fine wire and sweated solidly. The lip of the bush with the bent-over shaft let in then rests against the rear of the jaws of the chuck and it is impossible for the hook to slip out even if the jaws loosen during winding.

Keeping well out of the way of females on the rampage, Consus bravely broaches the subject of nylons—and ulterior uses for same. Believe it or not, as



P. GUILMANT of Southampton will tell you, an excellent covering for power model wings is nylon—and before the wags yell "Go on!" with heavy sarcasm, Consus hastens to add that he doesn't mean in the usual square yard but in the much handier form of stockings (ah)! All you have to do is to cut off the feet and draw one stocking over each wing panel, glueing as you go. Of course, if you favour the slim type you'll have to use high aspect ratio—though within reasonable limits the material stretches . . .! And if you, like Col. Bowden, are overawed with the performance of elliptical dihedral then you needn't even cut off the feet! By the way, though, don't forget the most enjoyable part of the whole operation—tenderly remove the lady's leg before commencing . . .

There'll be plenty of time for solid modelling during the dark nights, and ardent followers of this branch of aeromodelling may care to follow the example of A. KINGHAM, of Hayes, and make for themselves his cunning and highly useful tools shown in Fig. 6. Drawings A and B, show the progressive stages in the making of the basic tool from an old or broken hacksaw blade—the teeth are removed and then the remainder of the blade cut to the basic shape (B) or if several blades are obtained a complete set of cutters using shapes C, D, E, F, can be made—with any other special shapes that the maker may desire. The actual cutting edges may be a plain chamfer or alternatively a double chamfer to a point (see G and H), the decision being a matter more of personal taste than anything else. Lastly, J shows another simple tool, made from a larger power hacksaw blade, which performs a very useful function in removing greater amounts of material when rough shaping.

In these days of general shortages F, WALKER, of Walsall, sends a welcome hint which overcomes the lack of thinners for cleaning paint brushes, and will even clean them when the dope, tenacious stuff, has dried on. His system is to put in the palm of the hand a little household cleaner of the Mirro or Vim type, mix to a paste with a little water and then rub the brush well in it, making sure that the paste gets well among the bristles but is all washed out again. If the dope is real old "Rock of Ages" consistency one or two of these applications may possibly be necessary but all the dope will come off in the end. As long as all the bristles haven't too, all will be well.

J. G. CARROLL, of Dublin seems to have been putting in a little overtime, as he sends in the batch of three ideas drawn in Fig. 7. First is a jig for a monocoque fuselage which allows a fuselage of this type to be made without splitting and reassembling. By making the interior fuselage shape from nine or more square section strips fastened together instead of one piece, when the shell is dry it can be removed by pulling out the centre strip and then all the others in turn. The strips which form the pattern in this way are held together lightly with rubber bands, and all the necessary recesses and grooves for the interior bulkheads are cut away beforehand in the usual way. S'easy. Next a handy wing fixing, for R.T.P. models—piece A is glued to the underside of the wing, B is the mount parasol to the fuselage. A is held firmly on B by means of the tiny rubber bands shown, which are cut from cycle valve tubing and have just the right amount of strength to allow A to slide when necessary. Last of Mr. Carroll's ideas is a simplified form of the friction box retracting undercarriage which appeared in a recent Gadget Review. The diagram

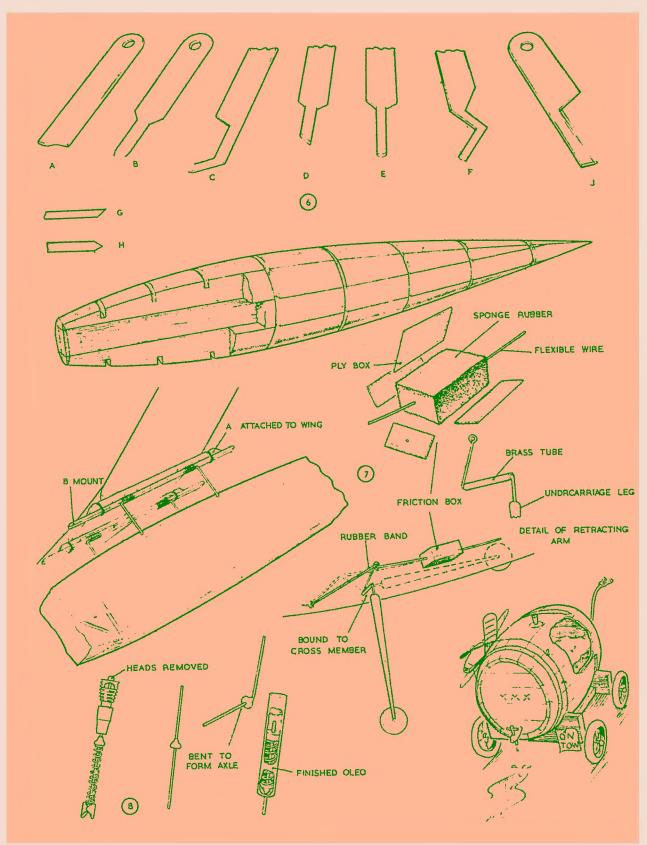
explains most of the details which are very simple, and the undercarriage works very well taking an average time of 6-8 secs, to fully retract.

Bamboo is a very useful material—ask any school master—but it is often impossible to obtain it in the particular sizes required for model work, and especially in the round section that is most useful. It is easy, however, to obtain a round section strip of any required diameter by using a simple method sent in by D. SHEARD of Huddersfield. A piece of metal sheet of around \(\frac{1}{3} \) in. thickness, such as an old hinge, is drilled with holes of the diameters of the required strips, and fixed vertically to the top of a bench or table. Bamboo is then stripped with a knife to suitable thicknesses, and forced into the correct hole from behind, when it can be drawn through with the aid of a pair of pliers. This gives a perfectly round bamboo strip of the diameter of the hole.

A useful aid for efficient flying comes from H. V. MARTIN of Southfields. who has come across the common trouble of loosened wing dowels during a hard day's flying, when a complete rectification means a major operation out of question in the circumstances. A very satisfactory repair, however, that is quick and effective, if temporary, is to run a strip of the self-adhesive cellulose strip often known as Scotch tape, now readily obtainable, right along and all round the join of the wing panel and centre section. If reasonable care is exercised to ensure that the join is held as tightly as possible, the fixing will be quite strong enough to stand up to the rest of the day's flying. Even dowels that have fractured inside the tubes can be held quite satisfactorily in this way.

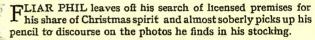
The most unusual devices have been pressed into use by the unimpressionable ranks of the gadgeteers, vide Gadget Reviews of the past, but N. SPURRIER, of New Milton is well up in the ways and means from odds and ends category with the two useful gadgets illustrated in (Fig. 8), both of which are derived from the innards of an ordinary Schraeder valve as fitted to all motor car inner tubes. The first scheme is to cut off the head of the pin at each end, and remove the trimmings to obtain the pin itself which is then to all intents and purposes a medium gauge axle with a washer ready mounted in the right place to prevent a wheel running up the leg. All that is necessary is to bend the axle to the required shape, add the wheel and solder another washer on to the end of the axle as a retainer. The second use for these valves is in making a scale-type oleo undercarriage leg for scale models. The same pin and washer are used, but with the small spring. undercarriage leg is drilled right down the centre to take the pin. A short length of tube is slipped over the bottom of the leg to form a sleeve, the spring is slipped over the pin and inside the sleeve and, a washer is cemented on to the bottom of the sleeve to retain the pin by means of the first washer already on the shaft. Thus a very good representation of an oleo is easily obtained, the wheel being fixed in the normal way to the bent up end of the

In his usual Christmas spirit Consus appends his own annual contribution to aeromodelling development. This is a carrying case specially designed to sustain the aeromodeller on week-ends far from civilisation. Not only the model—but sustenance as well! And to stop you looking at him in that tone of voice Consus bids au revoir, bags of balsa and the best of good times; in fact a very Merry Christmas!



MODEL NEWS





Some sparkle is brought back to his eye by the magnificent Model of the Month constructed by S. A. Millar of Luton. A "Bowden Contest", the model won the Concours d'Elegance on International Bank Holiday Monday at Eaton Bray this year, and no winner was ever more deserving! The flawless finish is obtained with Woolworth's paint and a lot of elbow grease, and as pretty as it is the model flew stably and well. Sincere congratulations, Mr. Millar, on a remarkable effort.

Photo 1 is an action photo as she should be taken! Nice camera work by B. Perrett of Torquay, getting his "Little Vagabond" jumping upwards in a very promising climb. Very pretty modelling also comes from P L. Petch of West

Very pretty modelling also comes from P L. Petch of West Wickham, whose flying scale E. D-powered Fokker D VIII is shown in Photo 2. Span is 58 in. and with a 12 in. prop to overcome the frontal area the performance is good, long scale take off, good climb and flat glide.

There is always something attractive about flying wings, and no one could call Photo 3 an exception . . . I Known as "Count Dracula", A. V. Holley's design is the fruit of much experiment and is particularly interesting in its being a Millspowered tractor.

The giant A.P.S. Horsa was always a fascinating machine for those who like big stuff, and Photo 4 shows this design





constructed by Sgt. Bull while with the M.E.F.—this version was modified to feature all-balsa construction.

This is the season of microfilm and R.T.P adventurings, and H. F Worsnop is preparing to sally forth with the Class "A" job illustrated in Photo 5. Best time so far is 2:10. Fliar Phil is always happy with a little human interest to make his readers look harder at his photographs. So unglue

Fliar Phil is always happy with a little human interest to make his readers look harder at his photographs. So unglue your eyes from Photo 6 for a moment and learn that the model is Bill Dean's original Slicker! Its 3.5 c.c. Arden takes it up in a very fast shallow climb, which according to many modern technical types is the quickest way to get up there.

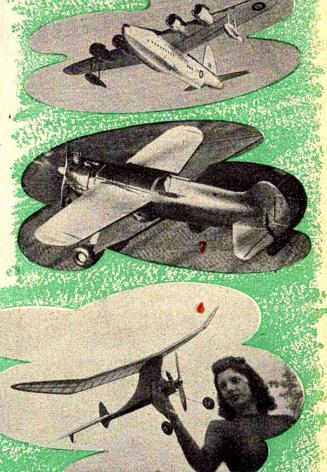
Speed and control line caperings seem all the rage these days, and S/Ldr. Lord, A.F.C. showed at Spitalgate that he was no mean hand at the game. His model in Photo 7 is an American design powered by a Kemp 4.4 c.c. diesel, and best speed to date is 54 m.p.h.

Really fine posing and photography comes from T. Ford of Mortlake who built the model in Photo 8. The model is of

Course, a 1/72 Sunderland.

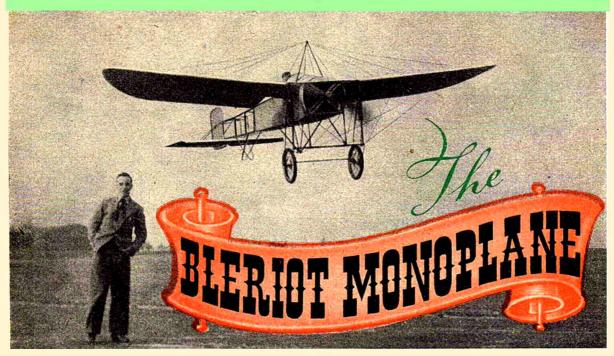
Lastly, Fliar Phil takes a leaf out of Consus' book and offers Photo 9—which shows the "gadget" used by the Moonrakers M.A.C. of Devizes for spotting errant models, the measure of success depending largely upon the balance of the unfortunate look-out and the power of his binoculars!

His stocking emptied, Fliar Phil, cold without, carries on looking for the means to warmth within . . . and wishes all faithful followers a very Merry Christmas!



A 1913 MILITARY TYPE BUILT TO THE SCALE OF 1.5 ins. TO 1 ft. by J. M. GREENLAND

(Incorporating the Moore Diaphragm Pat. No. 582542.)



THERE were several versions of the famous Bleriot Monoplane and no two appear to be exactly alike. The type used by M. Louis Bleriot in which he crossed the English Channel in 1909 had a 3-cylinder Anzani engine and was considerably different to this type which was used by M. Pegoud and Hucks (famous for the Hucks tailslide). It was known as the circuit type and is given in the R.F.C, rigging book as the military version and has the cutaway in the starboard wing for observation.

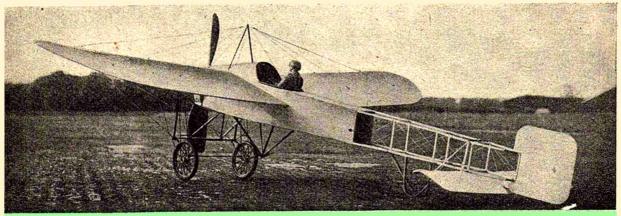
Mr. C. Rupert Moore has depicted this type of machine in his cover painting this month, and shows Gustav Hamel leading a 1913 Morane and a Longhorn Maurice Farmon in pylon racing at Hendon during one of the many sporting events held just prior to the war of 1914-18. An

almost similar machine flown by Pegoud when he looped the loop for the first time over England at Hendon.

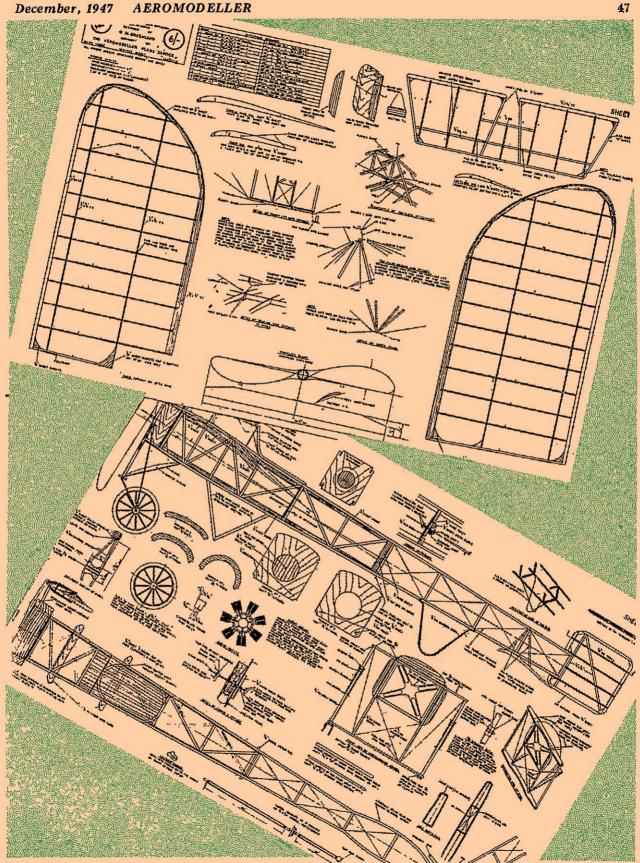
For the true lover of flying scale models, here is a machine that will offer endless pleasure. It is fascinating in flight, so slow that one can walk alongside it, and in every respect is the perfect replica of the famous machine it portrays,

Construction. The fuselage is built as a normal slabsided type of 5/32 sq. balsa, if 5/32 sq. is unobtainable 3/16 sq. sanded down will suffice, but see that the wood is very strong since the rear part of the fuselage is left uncovered. After building the two sides flat on the plan, they are joined together by the various formers, cross spacers, diaphragm, etc., and the last two bays of the

"Aeromodeller" Pholographs.



Our heading photograph shows this unique model in flight with the designer in the background, whilst above is another excellent photographic study by E. J. Riding. Note the pilot carved from balsa, which adds a great deal to the realism of the model.



fuselage are steamed to the shape shown in the top view. The uncovered rear part of the fuselage is braced with thread. Use seccotine or any fish glue to stick the thread in place since it tends to pull out of cement if it gets a hard knock. The thread should be banana oiled to prevent it from contracting when damped.

Note the angle that the thrust line makes with the

Note the angle that the thrust line makes with the datum line; it is therefore important to see that the nose former and the diaphragm are at right angles to the thrust line and not to the datum line. It is also important to see that the propeller shaft, the centre of the diaphragm plug, the motor peg are in a straight line. The landing and lift wire pylons are made of bamboo

The landing and lift wire pylons are made of bamboo or spruce and must be very securely fixed to the fuselage since the wires are held on by them

or sprince and indicate to very securely like to the diserge since the wings are held on by them.

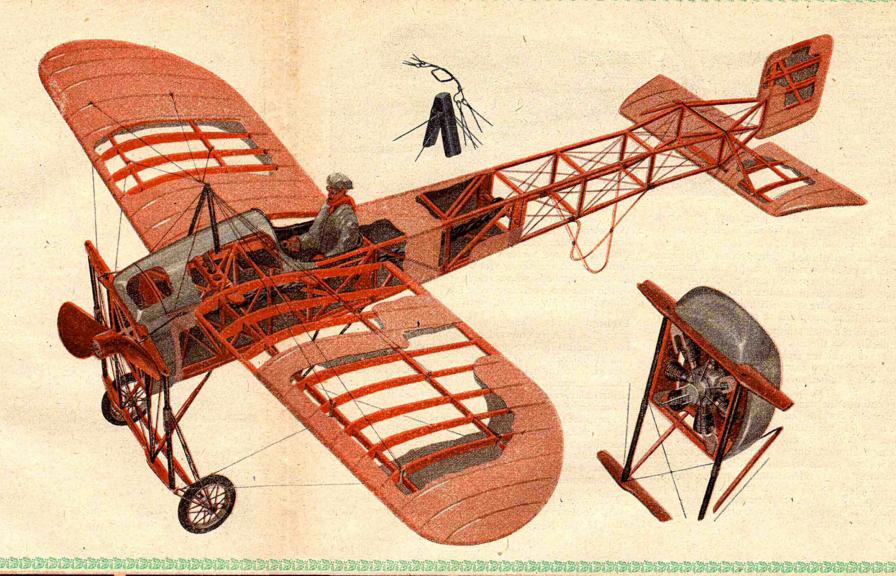
The Moore Diaphragm. The centre of gravity on this model is at 50% of the chord, and being of an extremely short nosed type it was necessary to keep the weight well forward. A Moore Diaphragm was therefore built into the model as this does away with the necessity for nose weight.

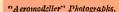
The principle of the Diaphragm has already been described by Mr. Moore in the Aeromodeller, but briefly what happens is this — A diaphragm with a plug in it is placed half way between each motor hook, the motor is not divided equally in halves but into 2/3 and 1/3 the shorter piece going behind the plug and the longer piece going in front. The plug has a flange on it which prevents the short piece from pulling the long piece backwards. The motor then has 2/3 of its weight in front of the diaphragm and 1/3 behind, whereas with a normal motor, the weight would be evenly distributed either side The Undercarriage. The horizontal cross members are cut from 1/8 three-ply and sanded to a streamline section. The vertical members are of birch dowel to the dimensions shown on the plan. Make sure that the sliding tubes for the compression legs are put on before assembling the "chassis", and don't forget to put the wheels on before bending the radius legs to shape!

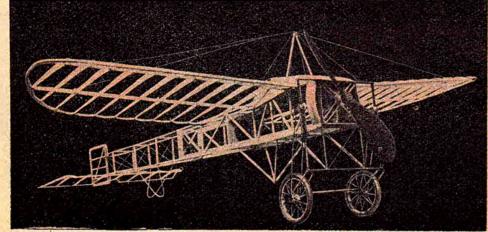
This method of springing the undercarriage is exactly the same as that employed on the real machine, it is very

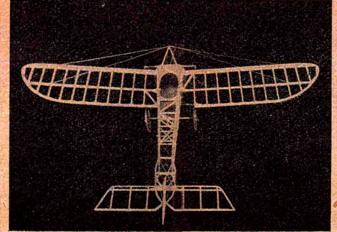
This method of springing the undercarriage is exactly the same as that employed on the real machine, it is very efficient and never once has the undercarriage been broken although the model has hit the ground at a variety of angles! The rubber loaded catch which holds the nose on allows a certain amount of "give" in a bad crash. The spreader bar between the compression legs

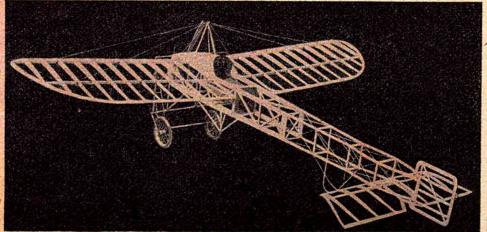
THE BLERIOT AS SEEN BY BAGLEY



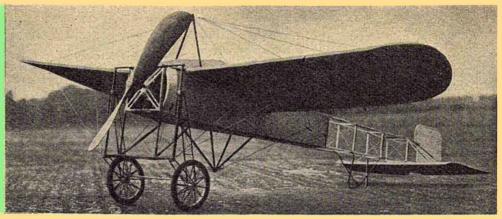








It is difficult to differentlate between the model
right, and the full size
machine below. This,
the military version of the
Bleriot "Circuit" Monoplane, was powered with a
30 h,b. Gnôme and it is
interesting to note that a
similar machine won the
"Circuit of Gt. Britain
Race" in 1911 covering
a distance of 1,010 miles!
Another similar version of
this grand old machine
was looped by Pegoud who
carried out the first ever
aerobatics. Not only did
he loop but also performed
the first half of a bunt,
flying inverted and then
half-rolling out. And this
in 1913 1



" Aeromodeller " Photo.

is not fixed but free to travel up and down so that the springing is "independent" (as shown in the perspective sketch of the compression leg).

The Wings and Tailplane. Construction of the wings and tailplane is perfectly simple except that the main-spars cannot be pinned to the plan on account of the undercamber. The angle of incidence of the tailplane is adjustable, but make sure that it cannot possibly slip or alter itself in flight as this leads to disastrous results!

Rigging. Stand the model in flying position and attach the wings, packing up the tips on books, etc., the correct dihedral angle of 1" at the tips. The landing wires (i.e. the ones on top) are then cut to length and attached as shown, care being taken to see that when the books, packing, etc., is removed, all the wires are in even tension, if they are not the wing will warp when the rubber tensioned flying wires are put on. The flying (or lift) wires must be so adjusted that their rubber bands do not stretch when the model is supported by the hands halfway out along each wing, but do not have them too tight or the wing will not knock off easily. It is easy to correct a warp by simply shortening a landing wire or two, but do not try to correct warps by over tensioning lift wires. Note that the plywood plugs projecting from the fuselage sides are merely to keep the incidence angle correct and not to hold the wings on.

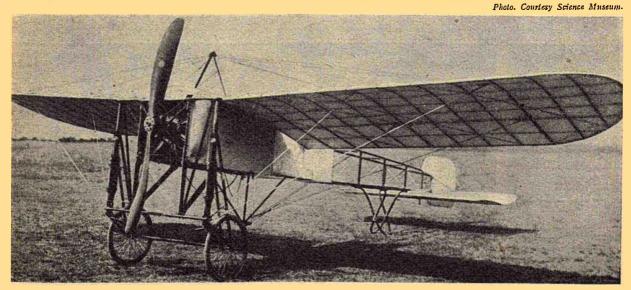
The Airscrew. The propeller is carved from American Whitewood. Make sure that it has the correct amount of undercamber, shown on the plan. The first propeller that was carved for this model had hardly any undercamber at all and the model would not take off. The new airscrew develops about three times as much thrust as the first one, and they were both carved to the same dimensions, only one had plenty of undercamber.

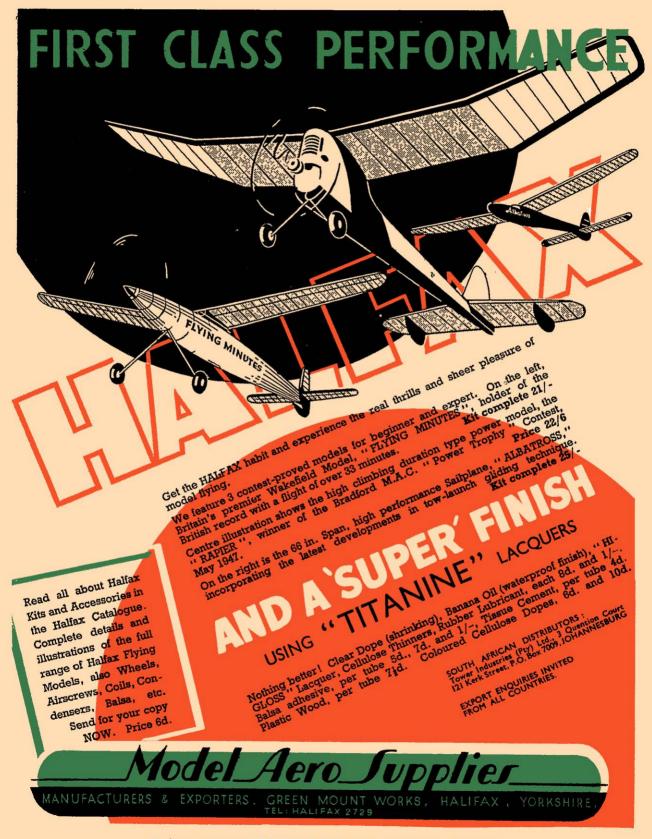
Flying. The best way of getting the model into the air is to give it short powered hops, not allowing it to gain much height in case something happens. The model should balance at 50% of the chord, no weights were necessary on the original model. If the model refuses to come "unstuck" it is probably under-elevated, but make adjustments very small since it is very sensitive to any alteration of tailplane angle.

The pilot shown in the photos was carved from solid balsa. He is wearing a peaked cap, put on backwards, a pair of goggles, a yellow scarf and a Norfolk jacket.

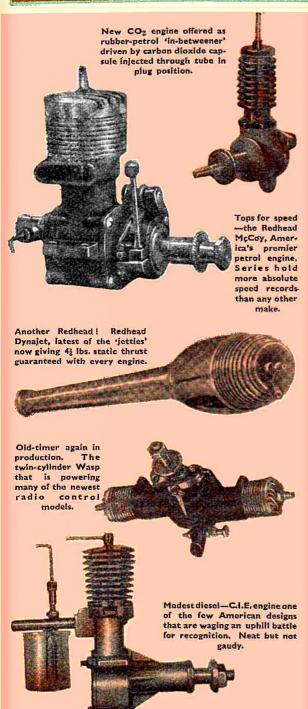
On a model of this size it pays to use a very strong cement, I therefore use Durofix which takes longer to dry than ordinary cement but is very much stronger.

Full size plans (see 1/7th scale reproductions) are available from the Aeromodeller Plans Service Ltd., Allen House, Newarke Street, Leicester.









IT'S Christmas time, so let's all go window shopping with the Boffin down Fifth Avenue, Brooklyn, Texas or any other American hobby centre you care to name and see just how the buddles spent their mythical dollars. There's so wide a choice of so many things that it is real hard work buying over there—especially as, in the words of one correspondent " motors are so plentiful that prices are down to \$10 to \$12 on some 10 c.c jobs, and a second hand motor has no value at all" Which means, of course, if we buy the wrong job first off, we've just some worthless ironmongery on the shelf, without a hope of flogging it on the next sucker. By the way, we had better settle just what a dollar is these days. According to The Times the exchange rate is \$4 02 to the f-so if we ignore the odd two cents we can safely quote one dollar as worth 5/-. This starts the market for engines, then at 50/-, which is even cheaper when you remember the average American pay packet is a good deal heavier than ours and most things proportionately dearer.

However, the Boffin has now exhausted his stock of economics and glued to the shop window. Why be pikers and consider the cheap lines—here is a McCoy Red Head 49 selling at \$25—£5 to you, let's forget the dollars and express prices in good old sterling—with a pedigree; Duro-matic the makers describe it as having "speed to spare"—for what we ask, when reading that it has clocked 125 87 m.p.h. a new official world's record control line speed at the All-Western Open, Los Angeles. A whole family of McCoy engines are available, from the cheapest Red Head 29 up to the celebrated Blue Head, which powers super speed race cars, nearly as fast as the control-liners, and there is no question of waiting, just put down your money and take your pick.

Interesting newcomers to the American market are the diesel brigade, led by Leon Shulman's Drone—just under 6 c.c. and selling at £5. 7s. 6d. This lovely little job is, internally, very like a de-luxe edition of the French Micron, and packs a powerful punch. Shulman, who is a pylon pioneer with his famous Banshee, Zombie and Zoomer designs, has now produced "Dronette" a control line kit to go with it. Dronette sells at 17/6, including rubber wheels, will fly "inverted loops, dives, square loops, outside loops and spectacles" The Boffin can appreciate the bit about "spectacles" in the light of some British control line flying! But maybe they don't mean quite that.

Then there is the Mite diesel—smallest fixed compression model on the market to date. This looks a little beauty, and does not seem to take after any other design. The C.I.E. makes the third—a model that is neat without being sensational. Finally a bright firm are offering "conversion sets" to fix up the famous Arden as a diesel. Alas the American public has not, according to our correspondents, fallen for the diesel to anything like the extent we have over here. The answer is that there are so many really good petrol engines on the market—and

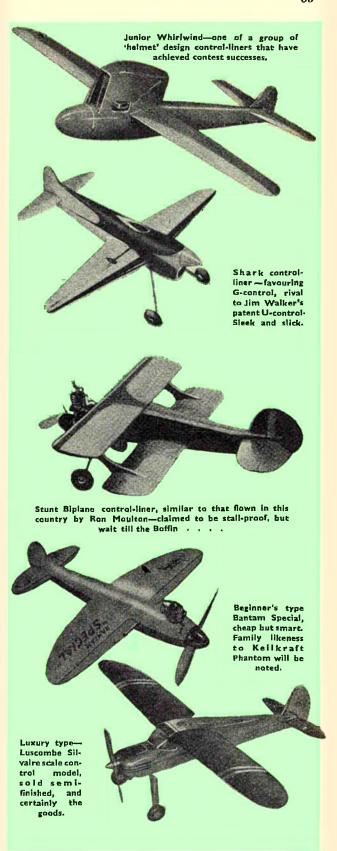
an abundance of light yet powerful "electrics" that the swing to diesel is practically non-existent. We must remember, too, that the American climate is less humid or something—only the expert can help the poor Boffin here—thus enabling the light pen-cell type of battery to function more efficiently than in Gt. Britain.

Added to which if your engine is a bit slothful you can always fill up the tank with "Inferno—sporting fuel and oil, it's hot" or "Liquid Dynamite" and add at least 10 m.p.h. These are but two examples of the hot fuel range available to petroleers. Liquid dynamite, will, it is claimed run an engine without ignition after it has been warmed up in the conventional manner. The Editor who was in the States earlier in the year saw this done—so, ladies and gentlemen, there's no trick about it. Very confidentially, the stuff smells of ether—so maybe diesels are infiltrating all unknown to their users.

Accent on everything is speed. The control-liner has achieved such a lead on all other forms of power modelling that m.p.h. has taken precedence over all else, and the Babcocks-America's father and son winning contest pair are the uncrowned kings of U-control. Just look into our shop window and see what the kits are like. What about a Bantam Special with take-off dolly "Spit" type wings and sleek lines selling at 13/9. This job could be mistaken for a Keilkraft Phantom so the British market can't be so far behind! Another Megow line is the Tyro—a control-liner successfully flown by a 31 year-old-and evidently just the Boffin's cup of tea, selling at 17/6. Then there is the Shark range of G-contro! kits, Sharkadet and Shark G-5 going at £1 to 25/-. Cheaper, but with a contest record is the Junior Whirlwind official record holder in two classes which costs 14/9. Then if you want more wings for your money there is Bipe-stunt trainer and winner of eleven first, five seconds and six thirds in thirteen meetings, which will set you back 19/9. There's no end to them—in fact, on one dealer's list alone, nearly sixty different control line. kits are offered for return post delivery ranging from 10/-, to an aristocrat like the Duraplane at £3, 2s, 6d., but mostly in the "under' £1" class.

Latest news in the control line world is that New York City has set aside part of the old World's Fair parking site as a model airport for enthusiasts from New York's 7-million population. "Six circles", we learn from Al Lewis in Air Trails, "have been equipped with adjustable ball-bearing mounted yoke 'pylons' and two others have been kept clear for stunt and test flying. Police protection is provided..." To assist the uninitiated, the yoke pylons are to prevent clever types in contests whipping their models to new fantastic speed heights: as for "police protection" we are very much in the dark as to who is protected from what. "For the present," adds Al Lewis, "jet model flying has been banned since it is feared the noise might irritate nearby home-owners..." Having heard one in the wide open spaces, we know.

Which, naturally brings up the jet angle. Minijet was first in the field with these flying flame throwers, but Dyna-jet has rather stolen its thunder, if that were necessary. First Dynajet produced 3½ lb. thrust for a weight of about 16 ozs., but latest model—the Red Head racing engine (they seem fond of this red-head designation for speed) flying at the same weight gives 4½ lbs. static





thrust guaranteed output equal to more than 2 h.p. exerted at 125 m.p.h. with 70 per cent. propeller efficiency which is quite a lot of horse-power to buy for £8 15s, 0d. Starting troubles which somewhat wore down our enthusiasm with the Minijet, for lack of a really powerful spark, have been overcome with the Dynajet and it really can be comparatively easily started with a hand pump, and one or two willing battle-trained veterans. Less hardy types will dive for shelter when the first whoomphs come! It really is a magnificent piece of work—and we envy any lucky types with American influence who get one over here. Tip for those who do, and fit it to a control-liner: watch out when the engine cuts, it will immediately climb to about sixty feet and then dive in, so some very nifty back pedalling on the line is desirable to avoid expensive prangs. The jet will take it, but probably not the model.

Having bought the kit, and then an engine or two there is a whole range of fascinating gadgets to sweeten the life of the control-liner fan. Do you want to "Thumit" with a dainty 100 per cent. fingertip control with flashy streamline handle in colourful plastic, or do you prefer a chromium finished handle to reel-in your line, with a whole host of cut-out, anti-twist and other devices fitted. Of course, you would not dream of starting the engine by flicking the prop.—there is always the "Spinit" starter to do this for you. And why fill up straight from the bottle when any number of fancy pourers enable you to give a shot of dope as elegantly as Sherlock Holmes with his hypodermic, while special stunting fuel tanks are available for loops, bunts and twists.

Even the humble razor blade has joined the bread line so far as America'. Aeromodellers are concerned. The really top-notch modeller has an X-acto tool cabinet—described as "a complete workshop of small hand tools, including blades, gauges, routers, punchers, drills, block planer, saw, spokeshave, sander, pliers, tweezers, etc., etc." Simpler souls are content with an X-acto knive alone with a colony of assorted blades at about 5/-. Cabinet will remind continental readers of the sort of thing issued to German modelling groups before the war, and used by the Swiss today. There's nothing new . . .

It may sound heresy to suggest any of these superb products fail to perform all the time at their best—nevertheless. American accessory manufacturers do offer a range of rev-counters and the like to enable the enthusiast to pep up his engine rather than put it on the shelf and buy another. For a mere 37/6 you can become the owner of Rev-tuner a precision instrument for measuring engine speed. This handy gadget will give instant recordings, and assist you in selecting the best mixture, prop., and dare we add, engine. If this seems on the dear side, well 10/— will produce the Vibra-Tak precision tachometer, which seems to do as much as the Rev-tuner at about a quarter of the price.

By the way, Frank Zaic has now reprinted the earlier Year Books in one volume under the title Model Aeronautical Encyclopedia Vol. I—containing the best from 1934—7. Vol. II will be a complete reprint of Year Book 1938: excellent value at 5/— a volume. Any number of model books are on the stands, Gas Modellers Guides, Fom's Book of Planes, a new book by Charles Hampson Grant, and, way up on Fifth Avenue, the complete Harborough range making a few dollars for Mr. Dalton.

Fascinating innovation is OK's new $\rm CO_2$ engine selling at 19/9 and powered by a carbon-dioxide capsule that gives about 50 seconds running time. A tube goes in where the plug would normally be and the capsule can be located to suit trim. In other respects the engine looks much like any other small two-stroke. This little job is recommended as the ideal in-between for rubber modellers going over to power. The price is certainly a temptation.

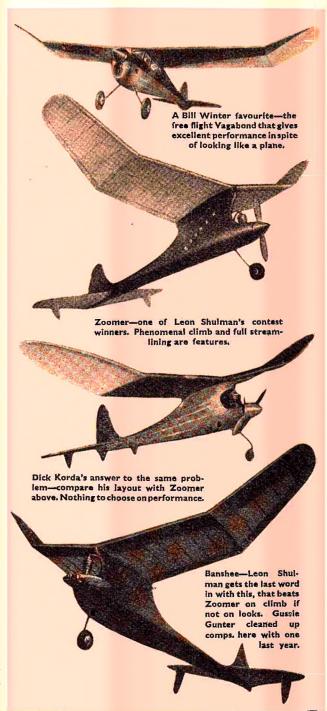
Radio control builders are catered for in a big way. There are a whole range of "build-it-yourself" manuals, and "build-it-yourself" kits, including escapements, relays receivers, transmitters, electric motors, solenoids, selectors, or the lazy modeller can buy the whole works ready made, at prices ranging from radio transmitter, receiver and escapement complete for £5 upwards to £40. Plans for practical radio control jobs have already appeared in American model magazines.

What about the rubber fans in this spate of high-power engines? Well, the U.S. Rubber Co. is once again making its famous "T-56" championship brown rubber. Some lucky French visitors during this year's International Week had wangled a few metres, and the Boffin certainly agrees it is well up to any pre-war "brown." Kits galore are there to tempt the balsa-butcher in this field. Jasco have now produced some well tried lines to supplement their wide "Thermic" glider range. Cleveland continue to produce the real thing with such items as their Cleveland Thermalier, a wire pylon, folding prop. job of 36 in. span selling at 5/- as a dry kit, that is, without cement or dopes. Expenditure of 5/- to 7/6 will place nearly a hundred kits within the price limit.

Free flight petrol models continue to exist in spite of u-control. Here the old Buccaneer is still available though such models as Wog and Vagabond, by Bill Winter, Korda's Powerhouse, and of course Shulman's Zombie and Banshee, and Carl Goldberg's Zipper are the popular choice. Variety is the keynote—quite frankly the Boffin does not think the Americans have anything in the free flight power line that we have not got over here, except harder balsa and perhaps a more lavish supply of accessories.

Grading of balsa is one advance the American jobbers have made in marketing their wood. Frank Zaic is said to select his wood personally log by log and then reject a third of it after sawing as below standard. Accepted wood is then classified as finest petrol quality, duration and indoor grades. The satin finish achieved on their best sheet has to be seen to be believed. Incidentally, most of the balsa over here is well below American average.

So much for window shopping in the American market. They certainly have something of everything, and if this starts a move for a new *Mayflower* trip exclusively for aeromodellers well, that's just too bad.







*RON 'REPLIES!

R. H. Warring takes up the cudgels on behalf of the pylon enthusiasts, replying to 'Purist' Stanhope Kenny.

STORERS CONTROLLED BY A CONTROL BY A

HAVE been asked to reply to Purist's Plea (October AEROMODELLER) and keep the answer to one page length. That makes the solution very simple—it can't be done! So I will just go on until the blue pencil calls a halt.

Purist seems to say that he does not like pylon models -particularly if they only have one wheel. What he does like is the "realistic" model, built on the principle that they are tough (they have to be, to take the knocks they suffer as a result of stability) and look pretty (to him), irrespective of the fact that the majority of models of this type show an unfortunate, and most marked, tendency to spin like a top at the slightest provocation,

But just a minute, Purist. Who is going to say where the borderline of realism appears? Some full-scale aircraft are far more fantastic in appearance than any pylon model-and one of the nicest looking full-size fighters yet produced—the Hawker jet fighter—is the nearest approach yet in outline to a streamlined Wakefield.

It all depends upon how you like your aeromodelling. and since *Purist* confines his arguments to power models, let's stick to this breed.

If you adopt an orthodox cabin-type layout and you just want a model which will fly, it is very difficult indeed to go wrong. And lots of people build and fly models of this type year in and year out and have a vast amount of fun with them. If they are satisfied with that, all well and good, and they may end up with a Concours d'Elegance winner.

But the mainstay of any "sporting hobby" is competition and, believe me, developing a consistent high performance contest model of any type takes a considerable amount of ingenuity, skill and perseverance. The emphasis here is on consistent performance, only achieved by adequate stability and efficient design. Appearance does not come into it-the designer is putting his model over the hard way by flying results, rather than "selling" it on eye-appeal. Not that the two need be divorced—a high performance "gassie" can look every bit as nice as a cabin job to an unprejudiced eye.

The pylon layout was started by Carl Goldberg nearly ten years ago, reaching its peak during 1940-43 in the States. Probably the best known pylon job—the Zipper -was kitted in 1940 and piled up a most impressive contest record. This layout represents probably the greatest single advance in the history of the petrol model. Of course people copied it-it was so successful! And of course they exaggerated it-there was always the chance of still further improvement in performance.

In the full scale world designers are putting more and more power into their airframes to get better performance. This is development. With the power model, the same thing is happening and because the pylon model is the safest way of handling power, Purist and his contemporaries raise the roof. (And why is it that all the kicks initially come from the same side? They have learnt enough, heaven knows—unwittingly or unwillingly -from the duration fans.)

If Purist and his friends would realise that the power model in this country is, at the moment, going through a transition stage—and that the super-freaks, as he would like them called, are only an intermediate solution, he would perhaps be in a better position to learn from what development is taking place all around him all the time. But if he persists in his present view his beautiful 44 in. span Piper Cub (or its replacement) will still spin in ten years time.

Frankly I like a good looking model as much as anyone, but never where performance is sacrificed for appearance on a contest model. And to get full enjoyment out of aeromodelling, it has got to be a contest model. Flying purely for pleasure is all good fun, for a while. But you eventually find that a day's flying really becomes a number of intermittent cross-country hikes. You get the same—and usually longer—trips when contest flying, but there is point behind it and the thrill of competition,

The good contest flier is bound to be a better designer and flier than a good non-contest or lone hand. He has got to be better to do anything at all.

I think a lot of those aeromodellers who believe in realism first before anything will find control line flying interesting. Here you can build in realism to the nth. degree, for weight and stability have relatively unimportant for sport flying. And you do not have a long chase after each flight. But I warn you, Purist, even in this field, the speed boys are going to outnumber the others for a while, with free-lance aerobatic models in close support. Ordinary control line flying is about the easiest type of model flying there is; speed flying needs considerably more judgment and skill and aerobatics is something for the experts only. Control line is the logical field for the flying scale fan.

I do not know if Purist has ever seen a "Banshee" the design by Leon Shulman. This model caricatures the pylon layout with exaggerated wing-tip dihedral. Even the fuselage construction is highly unorthodox (and, incidentally, of a type Leon Shulman himself condemned as highly impracticable some seven years ago). This model was undoubtedly a bold step made by a recognised design expert—and, remember, the leading designers seldom produce highly unorthodox models. Yet the "Banshee" is one of the nicest of all models to fly, and one with an amazing reserve of stability. Its stability is so outstanding that there are many lessons for designers of all types of power models.

But even with all its virtues it is capable of considerable improvement. The Zoomer, Shulman's development model, is rather less unorthodox and also "safe" to fly.

I have built and tested over a dozen American gas kit models during the past year and come to appreciate the point that, although I could produce a shoulder-wing design to climb as fast or faster than a similar pylon model, it probably would not be as safe. And, incidentally, the only model of the above series I cracked up was a cabin type. It spun in. Nevertheless, a cabin model can be made nicely stable for all conditions-by applying the lessons learnt in high performance flying.

So—enough of this nonsense of decrying the pylonduration gassie! The duration boys are developing the aerodynamics of power models and producing some pretty efficient structures.



THIS model was designed around the popular 1.3 c.c. Mills Diesel Engine. On commencing the design I decided upon a wing area of 210 square inches with an aspect ratio of approximately six-to-one, and due to its success in America, the wing section selected was N.A.C.A. 6409. The fuselage I decided should be approximately 50 per cent. of the wing span. I also endeavoured to group the main forces, i.e., thrust, lift, drag and weight, as closely as possible. This, the American magazines told me, would help to prevent the model going over onto its back during the climb. With all this borne in mind, and a drawing board in front of me, the result was the "Dizzy Diesel." The engine has not been given any side or down thrust, and this has proved quite satisfactory,

Construction.

The wing on this type of model must be capable of standing up to fairly high stresses, due to the speed, although possibly the most severe loading is caused through the model turning over on its back after landing. This is bound to happen when flying over rough ground or in windy weather. The result of this is a sharp blow in the centre of the spar; this is often forgotten when designing a model and is not remembered until the damage has been caused. In designing the main spar it should be borne in mind that the strength at the tips need only be slight to that of the centre section. The width of the spar, therefore, can be reduced towards the tips. In this case it was done by having the inner section $\frac{1}{3}$ in, wide and the outer 1/16 in. wide, the centre being reinforced with 1 m.m. ply. It should also be noted that a much stronger structure will be obtained if all the parts are given a coat of cement and allowed to dry before finally cementing together. The fuselage is built up on the "X" type of structure as used by Leon Shulman on his Banshee. It has the advantage of being simple and quick to build, and ensures correct alignment of the wing and stabilizer while giving a clean and well streamlined fuselage. I mounted the engine on beams, and not, as has been general in this country, a detachable mounting. This was done to minimise vibration. Bearing in mind the possibility of a crash, aluminium tubes were used for the engine bearers; these bend if any severe load is implied to the engine. The undercarriage also is slightly different, attachment being rigid and fitted direct to the engine bearers. Any heavy landing therefore is transmitted onto the bearers where the weight is fixed; i.e., engine, and not as in most cases to the balsa structure.

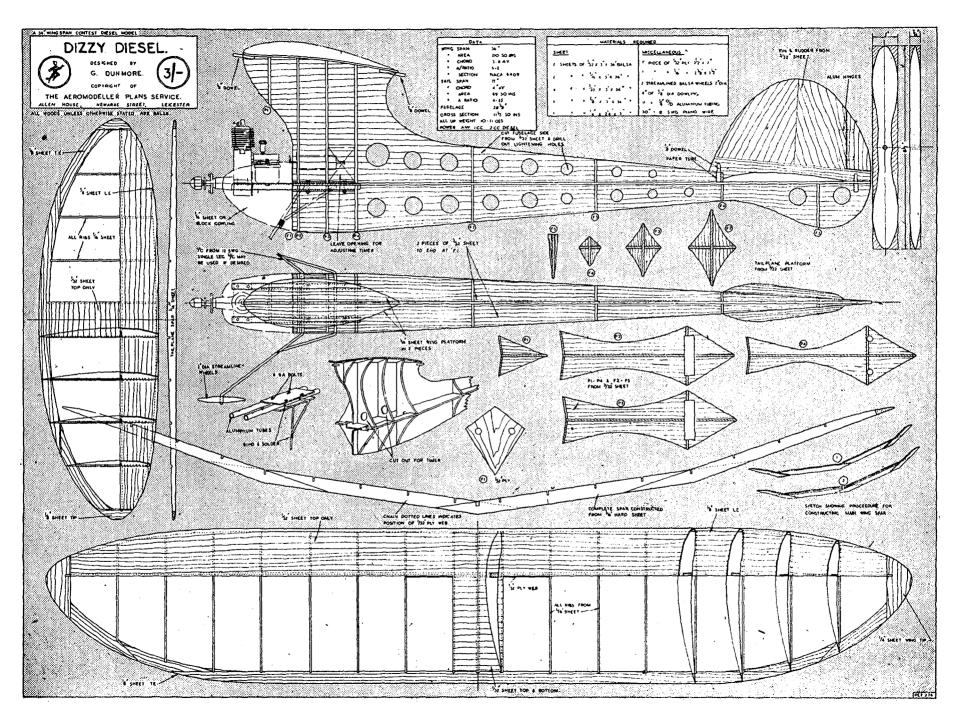
Fuselage.

First of all reproduce the fuselage outline on a sheet of 3/32nd medium grain balsa. Cut out the outline and lightening holes as required. Two or three sheets can be cemented together to give the required size. Next, cut the plan outline from 3/32nd sheet and cement to side elevation. Formers for the wing mount and the triangular gussets are now fitted. The wing platform is made from 1/16 in. medium hard sheet, the grain running fore and aft. Fit paper tubes to take fin dowels, dowelling for wing and stabilizer retaining bands and 22 s.w.g. piano wire skid to tail.

Lastly, attach flight timer in fuselage. A small door can be made to give access to timer valve.

Wine.

Cut ribs, as shown on drawing, from soft medium 1/16 in. sheet balsa. The main spar is built up in sections from 1/16 in. medium hard straight balsa and reinforced in centre with 1 m.m. ply. Care should be taken when



fitting ribs to spar to see that correct alignment is attained. Next, cement in trailing edge, leading edge and tips, which are made from soft $\frac{1}{4}$ in. sheet balsa. Finally, cover the top surface of the leading edge with 1/32 in. sheet balsa.

Stabilizer.

The construction is the same as that of the wing, but with a single-piece spar.

Fin.

The fin is built up from 3/32 in. sheet; this is made from three sections to give maximum strength and anti-warp properties (see drawing). The rudder is attached by thin aluminium strips. The fitting of two ½ in. dowels to correspond with the tubes in the fuselage completes the fin.

Engine Mount and Undercarriage.

Two lengths of $\frac{1}{4}$ in. aluminium tube are cut and drilled to take the engine bolts and undercarriage legs, etc. Cut two lengths of 12 s.w.g. piano wire for undercarriage. Insert undercarriage wire in corresponding holes in aluminium tubes and bend undercarriage legs to suit. Two plywood plates, 1/16 in. thick (see drawing), are cut and drilled to take the four 6 B.A. bolts at the back of the engine mount. Then bolt these two plates on either side of the tubes as shown. Thin copper wire is then bound round the undercarriage legs to form stops where they enter the tubes. This unit can now be fitted into the fuselage. The front former (1 m.m. ply) is now slipped over the front of the tubes and stuck to the front of the fuselage. This keys the engine mount in position. Cowling.

This can be made from soft balsa sheet cemented directly to the fuselage. A soft balsa block can be used to give the required curvature at the front. A small hole should be left at the bottom of the cowl to allow surplus oil to drain off.

Engine Installation.

The engine is bolted down by four 6 B.A. bolts, the heads of which are connected together by soldering short lengths of piano wire between slots in the head. These are then inserted from underneath the aluminium engine bearers, small thin fibre washers of a smaller bore than the bolt are forced on and screwed down to prevent the bolts falling out. The engine can now be placed in position and the retaining nuts are tightened up by means of a box spanner, A short length of thin wire is attached to the lever of the flight timer and the arm of the engine cut-off.

Covering and Finishing.

The wings and tail are covered in Jap tissue with the grain running from tip to tip: this is important as it helps to stop the wing warping as the tissue tightens most along the grain. Cover the lower section of the wing first and make sure the tissue has stuck to the under camber. If white photo paste is used, clear dope should be run along the edge of the rib before water spraying to ensure that the tissue does not pull away from the ribs. The fuselage is covered with the grain running around the body. The pylon requires a little more care and is best done by cutting strips of tissue approximately 1 in. wide and sticking to the front and rear of the pylon, allowing approximately 1 in. overlap. A little clear dope should then be run along the joint before water spraying. The whole model is then given one coat of clear dope, a second coat can be applied to the fuselage if desired. The fin and cowling are colour doped. The original model was covered in orange, with blue trimmings.

Propeller.

This is the most important part of the model. If the pitch is too low then the model is reduced to a slow forward speed, which naturally gives only a slow climb. On the other hand, if the pitch is too great the engine will not be able to turn it over sufficiently fast (the engine does not produce its maximum B.H.P. power until maximum revs. are obtained). We have therefore to make a compromise between the two. This is best done by deciding upon a given pitch and reducing the blade area and diameter until the required revolutions are obtained. (A speed indicator is useful for this purpose. These can be obtained for about 7s. 6d., and used in conjunction with a stop-watch, give fairly accurate readings.) In the case of the "Dizzy Diesel" the best results have been obtained with a propeller of 81 in. diameter and 6 in. pitch. This should be carved from a heavy wood to help the flywheel action, and the thickness of the blade being kept to a minimum to reduce the resistance of the propeller while revving.

Flying.

The flying of this type of machine requires a little different technique to that required of the more orthodox model. The relation between the wing and stabilizer, i.e. longitudinal dihedral, if altered to any great extent will cause the model to loop when under full power. Trimming therefore should be carried out as follows. First test-glide the model, over long grass for preference. If it has any nose-down tendency this should be counteracted by a little weight in the tail. Similarly, if the model stalls, counteract this by weighting the nose and not by altering the setting of the wing or stabilizer. Having checked the glide, power flights can now be attempted. An engine run of approximately 10 seconds and a full tank of fuel should be given. If a small quantity of fuel is used there is a danger of the engine cutting directly the model starts to climb, and the consequent dropping of the nose to attain gliding angle might cause a crash. The model, when launched under power, should have a very steep climb. If there is any tendency for the model to go over on its back and loop, then the positive incidence on the stabilizer should be slightly increased until a vertical climb is obtained. Downthrust should not be used for this purpose.

After the initial flights, the time switch should be set permanently to 20 seconds (the maximum allowed in S.M.A.E. competitions).

If these instructions are carried out there should be no trouble. All three models so far built have been a pleasure to fly, as they recover very quickly from a stall, even when the engine cuts at the top of a vertical climb. The best flight to date was made by Steve Lacey, with time of 331 secs. o.o.s. Under non-thermal conditions the model is capable of an average flight of 80–100 secs., providing the weight does not exceed 11½ ozs. all up. A single-wheel type can be built and has a first-class performance, but is not quite so crash-proof as the two-wheeler when landing and should not be attempted by the beginner.

Full Size Plans.

The full size working drawings of "Dizzy Diesel" (see ‡ scale reproduction on previous page) 28" x 38", are available in Plans Service, and may be obtained as usual for 3/- post free from Aeromodeller Plans Service, Allen House, Newarke St., Leicester.







M. A. T. A. PARADE

COUNCIL **MEMBERS** DISCUSS ACTIVITIES J. LAIDLAW-DICKSON

LITTLE cipher appears modestly tucked away in the corner of many of our advertisers' announcements, and occupies perhaps, a more prominent position on their notepaper, that must be puzzling to some of our younger readers—and be accepted without any particular reaction by those of the old brigade. Yet this little four letter monogram of the letters M.A.T.A., which stand for Model Aircraft Trade Association, has acquired quite a history since its informal birth in F. R. Barnard's drawing room in March, 1938. Just what is this trade association; what does it do for its members; and how does it help the average aeromodeller?

At a time when future supplies and well-being of the hobby are a little obscured by crisis after crisis we felt a fact-finding tour to gather information from those who have devoted much of their leisure to the development of this association might provide a Christmas story. The Chairman, H. F. Whitehead, of Whitehead's Model Airport, Eastern Avenue, Ilford, received us amid a wholesome smell of ether and balsa dust that offered just the right atmosphere for an aeromodelling quiz.

"Just what is this M.A.T.A., Mr. Whitehead?" we

enquired.
"Well," was the reply, "it is a mutual getting toexperiences for their mutual betterment. An opportunity for the newcomer to avoid the pitfalls into which the early traders unwittingly fell. A pool of brains and organisation to get the best quality materials at the right price, and to establish a standard of trading that will provide a square deal for the customer ".

"Has this worked out in practice?" we asked.

"Indeed it has—during the war years the M.A.T.A. was recognised by the Board of Trade and the Ministry of Supply as officially representing the model aircraft industry, and through its hands arranged the distribution of available stocks of balsa and rubber strip, and all other supplies that were scarce. Just at the moment stocks are well up, as you can see," and Mr. Whitehead indicated his own well-filled shelves, "But whether we shall all be able to say the same this time next year, who can tell? That is one reason why we are making a real drive to get every reputable trader into the association this year.

How many members are there now?'

"Over two hundred and fifty-but that is not nearly enough-we aim at a target figure of one thousand by the end of 1948.

"How do you recruit members? Can any trader be

accepted on application?"

"Oh no-potential members must have been in business in the model aircraft trade at least six months before they can be considered. In addition, they must provide at least two trade references, and be sponsored by existing members. In this way, by open discussion at a council meeting, if anything is known to their detriment, it can immediately be brought to light."

"This all seems very nice for the trader, but how does the individual aeromodeller benefit? Why should he go

to a M.A.T.A. shop rather than elsewhere?"

"First of all—it is a way of buying branded goods. Particularly at the present time our customers are reaping untold benefits from the 'inquests' held at council meetings upon the many new engines now being offered to them. As a result, few 'duds,' if any, are found in M.A.T.A. shops. If the customer has any just grounds for complaint he can always write in to the Association, when his charges will be fully investigated in open session. Then, again he has the benefit of knowing that the allocation of supplies through M.A.T.A. ensures its members have the pick of what's going. A non-member is not prevented from obtaining supplies, but he may well find the best has gone when he is in the market."

"Do the M.A.T.A. allow members to offer special

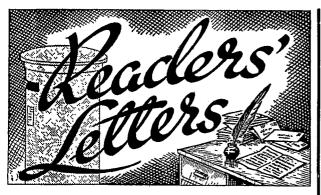
terms to Clubs?"

"Definitely not! This is a form of price cutting that can lead to endless complications. Should the discount be given to a club as such, or to its members? Why should the club member have better facilities than the lone hand? It could easily start a local price war where two or more members had shops in the same vicinity. We maintain that prices are already cut to the economic rock bottom for all customers. On the other hand. M.A.T.A. members all over the country give much appreciated encouragement to local clubs by taking space in Rally Programmes, and by gifts of cash vouchers exchangeable for goods to their prize funds."

"You have told me a lot about the association, Mr. Whitehead—now can you tell me something about yourself: How did you come to be in the model aircraft trade,

and finally, Chairman of the association?"

That's a very long story—going back sixteen years, to the days when my boy was a youngster and took up aeromodelling. I began to buy materials for him and his friends, and gradually found it became my main business. I



The Editor does not hold himself responsible for the views expressed by correspondents. Names and addresses of writers, not necessarily for publication, must in all cases accompany letters. DEAR SIR.

I would like, if I may, to reply to Mr. Bowden's letter, since he seems to have misunderstood mine.

Mr. Bowden for some reason assumes that I do not believe a good finish to be necessary to a high-speed aircraft. My point is that a good surface does not cause a high forward speed. If an aircraft is flying along straight and level and if the drag could be suddenly reduced by means of an improvement in the finish, the machine (whether model or full-size) would not fly faster, but would commence to climb. The speed would not be appreciably altered so long as the angle of climb was not large. If now the trim of the machine were altered (by moving the tailplane or elevators) until the model was again flying straight and level, the speed would be increased. It will be seen that reduction in drag does not cause a higher speed, although it does enable the higher speed to be obtained with the same power—but only after a change of trim.

I therefore contend that I was correct in stating that altera-

I therefore contend that I was correct in stating that alteration in the surface finish of a model does not alter the speed although this does not apply with accuracy if the model is

climbing or diving at a fairly large angle.

I should like to deal with another matter which might be raised in regard to my previous letter—it may be argued that large imperfections in the surface may cause the CL to be affected on account of their causing premature break-away of the flow, these however I feel are more poor structural work than poor finish and so do not affect the present argument. Mr Bowden asks if I have observed the "tremendous" finish on some modern jet-planes—I most certainly have, but as I have pointed out this finish does not itself cause the high speed—it merely enables the pilot to trim his machine to a low value of CL corresponding to a high speed without the drag exceeding the available thrust which would cause the machine to lose altitude.

Mr. Bowden also mentions boats—but a boat cannot go up and down! (except to a limited extent on waves) A boat is held up by the static phenomenon of bouyancy—not by the dynamic action of a fluid on lifting surfaces, it does not therefore have to move at a given speed to maintain vertical equilibrium under any given trim. Its speed is thus free to increase until the drag on the hull equals the propulsive force. Mr. Bowden rightly points out that this speed does not depend on the surface finish of the bottom of the boat.

Perhaps Mr. Bowden will read my original argument fully

and so get at my true meaning.

Upminster, Essex. D. E. Chandler.

We have received many letters supporting Mr. Chandler's argument, but Mr. Chandler himself explains it here as well as any. As others pointed out, Col. Bowden's defence would have been more accurate if he had used the expression "top speed." (Ed.) Dear Sir,

I note that in your description of the Bowden Contest given on page 654 of October issue, you mention my "attractively finished 'Quick Silver'".

In the interest of historical accuracy I must ask you to correct this statement.

M.A.T.A. on Parade (continued)

have always been interested in trade associations, as long ago as 1919 I was a founder member of the Poplar Chamber of Commerce.

Leaving Mr. Whitehead, we crossed over to North London to spend the evening with the Secretary, Mr. C. J. Bradstreet, browsing over the minutes of the association, and discussing past and future activities of members.

Mr. Bradstreet provided details of that first meeting at Mr. F. R. Barnard's house on 20th March, 1938, when Harry York became the first secretary, and the original council comprised in addition, Mr. S. Norman, of Model Supply Stores, Manchester, Mr. D. G. Brown, of The Model Shop, Newcastle, and Mr. Wood of Elite. This was later increased by the co-option of Mr. R. J. O'Neil of Cloud Model Aircraft, Mr. J. N. Mansour, then of International Model Aircraft, Mr. B. Coulthurst of Northern Model Supplies, and finally Eddie Keil. Mr. Barnard took the chair, an office he held until a few months before his death in November, 1945.

When Mr. Bradstreet took over the office of secretary in April, 1939, membership stood at only thirty-three. Mr. D. A. Russell, M.I.Mech, E, as Managing Editor of the Aeromodeller, had joined in January, 1939, and was to play a leading part in M.A.T.A. affairs throughout the war years.

The model I flew in the Bowden Contest was my Pioneer. This model is considerably larger than "Quick Silver" 72 in. span as against the latter model's 50 in. It is powered at the moment by a French engine, the 5 c.c. Micron and its total weight is 4½ lbs.

Up to date it has made 170 successful flights with only superficial collision damage. The "Quick Silver" is of similar outline but is not of scale dimensions to it.

Needless to say I would like to see more contests of the Fowden type where skill in the control of one's model is recognised and as a start would suggest that in all future power driven model contests any model which on a contest flight landed outside the flying ground should be disqualified. This at least would put the emphasis upon safety. Far too many models are going out of bounds to the annoyance of surrounding property owners and to the embarrassment of contest organisers who must perforce "take the rap".

Southgate, London. C. A. RIPPON.

To err is human—to forgive, divine Sorry, Rip! (Ed.)

Dear Şir,

Might I point out to your contributor, John Halifax that all his articles on performance in recent issues appear to have been based on the assumed fact that the CL in the climb and glide (throughout the flight) does not alter. He further deduced that maximum rate of climb corresponds to an angle of climb of 54 approximately, I think he will find, if he looks into the effect of changes of CL (with corresponding changes of L/D) for a typical model of high thrust/weight ratio, that this law does not hold at all rigidly.

With reference to Mr. Gabbutt's letter, I am pleased to see that the L D.C.3 M. section has been tested on a large heavily loaded model. Before discarding the section as being inferior for these conditions, it might be advisable to query whether the tailplane was placed near the wing wake. With L.S.A.R.A. sections this would cause a large nosing down effect, if the tailplane got in the wake, resulting in a higher speed, lower CL and a very inferior glide. Could Mr. Gabbutt supply me with a true to scale side view drawing of the model? My own experience with "wing replacements" experiments (making no attempt to retrim) can show the L.S.A.R.A. sections in a bad light especially if the tailplane is designed to come just where the L.S.A.R.A. section wake occurs.

Edgware, Middlesex. R. H. W. Annenberg.

As the association increased in numbers and scope, separate sub-committees were formed to safeguard the interests of the various groups interested. Thus the Manufacturer's, Wholesalers' and Retail Members' subcommittees came into being, and performed yeoman work during the difficult war years. As Chairman of the Manufacturers' Section, Mr. D. A. Russell did much to secure continuity of supplies during these hard times, and gave freely of his time and experience in heading deputations, presiding at meetings, and placing the Aeromodeller organisation at the disposal of the M.A.T.A. for clerical and publishing work.

It is particularly pleasing, that when, after the death of Mr. F. R. Barnard, the first Chairman, a Barnard Memorial Trophy was instituted to be awarded to that member whose work had been of outstanding value to the association, Mr. Russell should be the first recipient, jointly with the secretary, Mr. Bradstreet. Today, the association is thriving, and it has become necessary to employ a full time secretary to cope with the organisation. Mr. Bradstreet will, however, still be available for he

will continue in office as Treasurer.

The M.A.T.A. are especially fortunate in their choice of his successor, for they appointed Mr. Jenkyn Griffiths, B.Sc., who for many years has been secretary of the Incorporated Brewers' Guild. In this capacity he was

responsible, during the war, for the continued supply of beer. The story is told of him that, on one occasion, when cuts were threatened, he personally bearded Mr. Churchill at 10, Downing Street, and persuaded him that morale would suffer without supplies. He got them! This is the sort of man who will be guiding the destiny of the association for the future, so aeromodellers need have no fear their supplies will suffer for lack of an eloquent spokesman,

To assist him in the drive for membership and continued raw materials, he has an experienced Council behind him. Members this year, under Mr. Whitehead's Chairmanship are: Vice-Chairman, Mr. C. S. Stevens, Chingford Model Aerodrome; Council Members: Mr. J. O. Donovan, Brixton Model Shop; Mr Frank Royle, of Edinburgh; Mr. L. E. Lawrence, of Woods Sports; Mr. A. Hunt of Croydon; Mr. N. Keyser of Uxbridge Road, Shepherd's Bush; Mr. H. E. Hills of Downham, Bromley, Kent; Mr. David Jackson of "J's" Model Centre; Mr. A. Saddington of St. Albans; Mr. A. E. Ryall of West Drayton; Harry York of Model Aircraft Supplies, and Mr. D. A. Russell, M.I.Mech.E. In addition, Lt.-Col. D. D. Rothschild, M.B.E., of Premier, has been co-opted and will give the benefit of his wide business experience when health and his Territorial Army commitments permit.



CONTEST

Study the rules below carefully and use the entry form on page III of cover

RULES

The competition is open to all readers, and is organised by the Model Aeronautical Press, Ltd., Allen House, Newarke Street, Leicester.

There is no entry fee.

3. Employees of the Model Aeronautical Press, Ltd., are not eligible to compete.

The contest is for the Photograph in each Section that, in the opinion of the judges, combines the highest standard of workmanship as revealed by the clarity and composition of the photograph.

The contest is divided into Sections as follows :-Section A. Photographs of Solid Models.

Section B. Photographs of Rubber Driven Duration Models.

Photographs of Flying Scale Models. Section C.

Photographs of Gliders and Sailplanes. Photographs of Power Driven Models. "Action shots" pertaining to any of Section E. Section F.

the previous classes. 6. A prize of £5 (Five Pounds) will be awarded to the best entry in each section, i.e., a total of £30 (Thirty

Entrants shall complete the official entry form to be found on page iii of cover and enclose same with their EACH PHOTOGRAPH RAPH MUST entry/entries. CLEARLY STATE ENTRANT'S ADDRESS, AND CARRY THE CODE LETTER OF THE SECTION ENTERED.

8. Photographs shall be securely and safely packed, and

Here is a good sample of an un-covered subject covered subject sent by reader K. Brown, Note the dark neutral background to the model, which is of course a "Black Magic" forwarded to the "Aeromodeller" offices, Allen

House, Newarke Street, Leicester, to arrive NOT LATER THAN DECEMBER 31st, 1947.

A stamped addressed envelope or other wrapping must accompany each entry for purposes of return. 9. Results of the contest will be announced in the

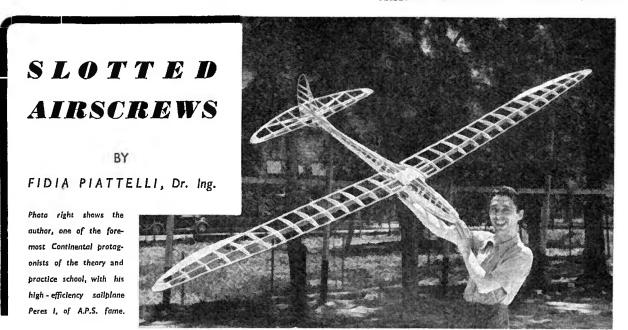
February 1948 issue of the "Aeromodeller", to be published on or about January 25th, 1948.

The organisers can accept no responsibility for entries lost or damaged in transit, or as the result of faulty or inadequate packing.

II. Whilst every care will be taken of entries the organisers accept no responsibility for any losses that may occur whilst in their possession.

12. No correspondence can be entered into in regard to the competition, and the act of submitting an entry will be construed as an unqualified understanding and acceptance of the rules, and that the decision of the judges and organisers shall be unreservedly accepted as final and legally binding.

All winning photographs automatically become the copyright of the "Aeromodeller".



I BELIEVE all readers of the Aeromodeller must have been extremely interested reading the article by Mr. D. H. Rutherford in the July issue. I think the author not only should be warmly congratulated for introducing a practical and elegant solution of the variable pitch airscrew in model size, but especially for reviving and stimulating general interest in the problem. There is no doubt that to use conventional fixed pitch airscrews in modern rubber or petrol powered models, fitted with specially designed laminar flow wings, is an

A B C

CL

1.6

1.2

D.8

8 12° 16° 20° 24° 0(°

UPPER PART OF LIFT CURVES FOR NACA. 23012 PROFILE (A) FIXED SLOT (B)

& HANDLEY-PAGE SLOT (©)

FIG.1

open contradiction and a sign of very unhealthy localisation of research efforts.

The importance, need and purpose of varying automatically the blade setting in flight have been well stressed in the above-mentioned article, and we intend now to focus the reader's attention on other possible ways of attacking the same problem, which may have some advantage in particular cases.

The problem itself may be formulated as follows: Rotational speed and forward speed combine at every moment to determine the effective direction of the relative wind for the moving airscrew blade. If rotational speed is kept constant, decreasing forward speeds will produce increasing effective angles of attack for the blade. A blade setting suitable for cruising speed is the one at which the effective angle of attack of the blade profile gives the maximum thrust for the available torque. This setting is too high for take-off or slow forward motion, since the blade will be stalled in this case, having a too high effective angle of attack.

Now we should remember that the same problem is encountered in wing and airframe design, and that two groups of solutions have been adopted. We may arrange our machine so that a large rear stabilizer, or, even better, a forward stabilizer, as in tail first machines, practically prevents the main wing from reaching the angle of stall, and effectively keeps it at the most efficient angle at any time, irrespective of wind direction or flying path variations. The other way is to fit so-called high-lift devices, as, for example, Handley-Page slots, to increase the angle at which stall occurs, with the additional benefit that larger angles are made useful for flight, and with them higher lift values.

The same two basical solutions may now be applied to the airscrew problem. The variable pitch airscrew (practically a variable setting airscrew) is an example of the first solution. In Mr. Rutherford's example, the stabilizer is materially there, with all advantages of simplicity of design and construction, and possibility of modifying, the effect on the finished item by trial and error methods.

But the same principle is practically incorporated in

all other full size or model airscrews. In general, we aim at establishing a state of equilibrium between two forces acting on the blade, i.e., the aerodynamic force, tending to twist the blade in one direction, and the centrifugal force which, according to the location of the masses along the blade and the shape of the latter. may be made to twist the blade in the direction that we desire. The equilibrium is reached in the case of the Rutherford airscrew, as in some Hamilton airscrews, by means of counterpoise weights. In some recent American airscrews, the whole blade is set off centre, that is the axes of the two blades of each airscrew are not coinciding, but parallel, and do not meet at the centre line of the hub. (Aeromatic propellers.)

In some other types, as in a pre-war Ratier airscrew, the blade is connected to the hub by means of a high pitch screw thread, so that the centrifugal force, trying to pull the blade away from the hub, will tend to unscrew, and therefore twist it in the appropriate direction. In model work we might adopt an inclined slot in the blade and a peg in the hub instead of the screw (or vice versa) and this would avoid Mr. Rutherford's counterpoise weights, but the inclination of the slot is of course somewhat difficult to determine and to

modify during the tests.

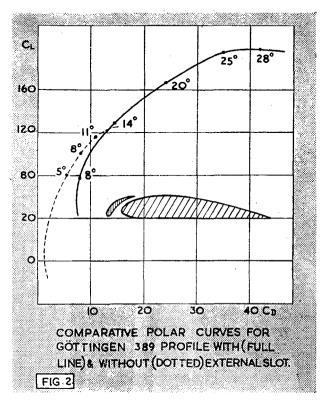
The centrifugal force may be put to use in quite different ways, and we are indeed surprised that this method has not yet been extensively used for powered model airscrews. Everybody knows that a folding blade is constantly kept in equilibrium under two opposing forces, i.e., the traction, which tends to fold it forward, and the centrifugal force, which tends to keep it flat on a disc perpendicular to the axis of rotation. Practically the propeller revolves in a very flat cone, with the vertex facing aft. Now if the folding hinge is arranged so as not to be at right angles to the blade axis (as usual), but to make an acute angle with the blade's leading edge, for every increase of the conusing effect (corresponding to a decrease in forward speed), there will be a decrease in effective angle of attack of the blade and vice versa. The blade will adjust itself automatically to all conditions of flight. This seems to us to be the simplest method of changing the pitch in flight, and has been successfully employed in a single blade full scale Everel airscrew before the war. It should be easy to reproduce it for model work and with a simple rotatable bushing in the hub to make the angle between hinge and blade adjustable, so as to be able to find the optimum for all engines and blade weights.

Let us now come to the second solution, corresponding to the high lift device in wing design. I have already mentioned in an article of mine (see Aeromodeller, November, 1946, issue), that some advantage could be gained enclosing the airscrew into a ring or venturi tube, of suitable proportions. I have not yet been able to make model tests of this device, but the results of wind tunnel research at fairly low Reynolds Numbers for the application of such devices to full scale aircraft induce me to believe that the propeller's efficiency would be much improved and made far less dependent from forward speed than with the conventional arrangement. Ringed airscrews might be made smaller, with more and wider blades, of thinner section, with better efficiency both at

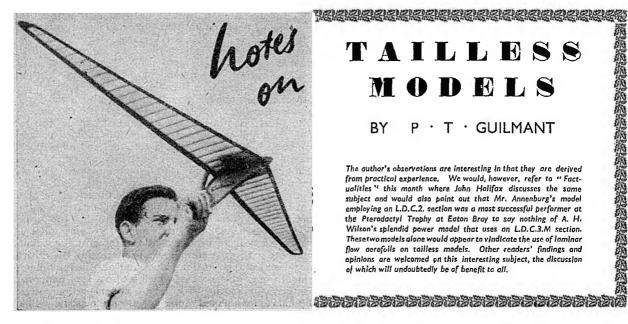
take-off and cruising speeds.

But since our principal aim is to avoid stalling at high effective angles of attack, why not fit a leading edge slot to the airscrew blades? The idea has been suggested before the war for full scale work, and we believe that only the tremendous advance in variable pitch airscrew

designs prevented it from being used in practice. should also bear in mind that slot arrangements and high lift devices in general are especially effective at low Reynolds Numbers and therefore far more suitable for models than for full scale use. This method would dispense entirely with moving parts of any type, rotating, sliding, or otherwise. It would be suitable for the takeoff of rubber-powered models, when the high torque available, which a slotted blade can efficiently convert into thrust, would pull a variable pitch blade into too fine pitch and consequent overspeeding. Slotted blades could be built rugged enough to withstand all ordinary handling and flying stresses without undue complication. They are also very simple to design and test. The slot being of the fixed variety, it may be discussed if it is better to add the slat in front of an ordinary blade, or to cut the slot into the normal profile. The latter solution may give a stronger blade in some cases, but the former is to be preferred for aerodynamical reasons. Recent tunnel tests have proved that the integral slot cannot compete with the external slat in increasing the critical angle and maximum lift value, and also in providing a smooth peak of the curve, which is also a very important feature. Comparing (Fig. 1) the upper portions of the lift curves for a naked profile (A), the same profile with an integral slot (B) and the profile with external Handley-Page slat (C) the increment of lift is more than doubled in the latter case. This for the best tested position and shape of the integral slot. More slots do not improve the matter, they only add to the drag. Even better results may be obtained with external airfoil slats applied to complete conventional profiles. A test of the Gott. 389 with external leading edge slat (Fig. 2) shows a maximum lift coefficient of 1.96 at low R.N. and at an angle of more than 28°, with a very smooth shape of the curve.



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TAILLESS MODELS

T · GUILMANT

The author's observations are interesting in that they are derived from practical experience. We would, however, refer to "Factualities " this month where John Halifax discusses the same subject and would also point out that Mr. Annenburg's model employing an L.D.C.2, section was a most successful performer at the Pterodactyl Trophy at Eaton Bray to say nothing of A. H. Wilson's splendid power model that uses an L.D.C.3.M section. These two models alone would appear to vindicate the use of laminar flow aerofulls on tailless models. Other readers' findings and opinions are welcomed on this interesting subject, the discussion of which will undoubtedly be of benefit to all.

SOME months ago, I decided to embark upon a methodical research into the Flight of Tailless Models. My aim was to find the best three view layout and weight for a large tailless model, bearing in mind all that had already been done in full-size and model research.

The main guidance I found by reading H.M. Stationery Office Publication on the German Horton Tailless Firm, whom I regard as being the most advanced experimenters in this field. No doubt they also undertook a process of elimination as I have done, and to simplify this article I will take the merits and faults of each component separately. It must be understood that I am not an expert on theory, and most of my conclusions are drawn from carefully watching many tailless designs in flight.

The Wing Section.

This is the most important aspect in tailless flight, and certainly the most controversial. Mr. Annenburg has told us to use L.D.C.2 or other Laminar Flow Sections, but I disagree. L.D.C.2 will, due to the vicious stall at 8 or 9 degrees, cause the wing to stall very violently, and can, if the model is nose heavy, cause the model to do an inverted loop, similar to rolling over a barrel. Also, once the wing is airborne, it loses height more quickly than other sections, partly, no doubt, because large amounts of tip washout have to be used to oppose the stall. I have used an L.D.C.2 on my mark one, see Fig. 1, with a flat under-surface. This, with about 15 degrees washout and no elevons, gave the model a delightful "hanging," soaring flight, approaching the stall-but not quite stalling, due to the large washout. Although delightful to watch, once it got up on the line it would lose height amazingly quickly due to the loss of efficiency caused by the excessive washout necessary. No, Mr. Annenburg, no laminar. Clark YH seems to be safe, with little C.P. movement, but unless a large sweepback is used can become whippy, and oscillate longitudinally. A fellow Club member used the "Sunnanvind" Section on a well sweptback wing and with little washout and small elevons and got good results. Why I don't know, because I have a feeling that this should not work. I feel that the section on a tailless, if having excessive undercamber, wants to roll itself over an invisible barrel—that's just a theory I have! Personally, providing the section has a slight reflex to control the C.P. movement, a flat undersurface (or slightly concave) and a good maximum thickness well forward, I can see no reason for worrying about advanced theory at this stage of tailless research. There are so many constructional failings against such advanced theory. My own section P.G. 1 follows this formula, see Fig. 1. It is based on the Horton Firm's Section, who, incidentally, also tried the Laminar Flow Section-and ended up by killing their test pilot!

Tip Washout.

A section, no matter what it is, needs washout. It varies with each individual section, but at least 3 degrees and not more than 15 degrees. The theory is that washed out tips stall after the wing root stalls, thus delaying the stall. It all revolves around how sensitive the section is to stalling, and how much lift you can afford to lose by this safety measure, which brings me to Tip Fins.

Tip Fins.

Like Van Hattum I do not believe in tip fins-odd flaps, elevons, things stuck on to stabilise. The wing should be able to look after itself, by good design and correct washout.

Tip fins should be avoided. They cause unnecessary tip disturbances and eddies, and in any case invariably break off when landing on rough ground. Longitudinal stability should be gained by a central fin, always below the wing. You see, by using a small strong fin under the wing you gain the following points. Directional stability without blanketing in side slips. Keel stability-or pendulum stability if you like. A point to take the knocks on landing, a fixture for the wing tongues, a fixture for tow hooks, nose weight, a place to grip while launching and so on.

Sweepback is essential. Don't think you can get away with no sweepback. The more you use, fundamentally, the slower the longitudinal see-saw, and greater the long stability. Not too much sweepback mind, or, A. H. Wilson with his now familiar model receiving the Pterodactyl Trophy from Mrs. D. A. Russell, ("Aeromodeller" Photograph.)

corkscrew instability will develop. Around 15 degrees sweepback is ample

Tapered Wings-Aspect Ratio.

Too much area at the tip makes the tip like the proverbial tail, it wags the model! A lot of tip area will take away that central control so vital to a tailless model. Keep the tips small, free and effective.

Aspect Ratio.

Too little, like the "Flying Pancake" the AERO-MODELLER published (pardon my nerve) will cause the model to wobble, while the maximum A.R. can only be arrived at by studying the Horton Tailless Firm, who found that a very high A.R. of about 25 was just too tricky to fly, I would suggest an A.R. between 10 and 15.

Dihedral.

Little or none. Too much (over 1 in, in 3 ft.) will cause side slip and tip wheeling, or sharp turn followed by a dive down wind. I advocate ½ in. for every 3 ft. of span. No dihedral at all is satisfactory, except that there is a tendency for the wing to "knife" its way into a side slip. No matter what sort of dihedral you use, make sure it is fixed by tongues and boxes. Never dowels or fixed wing. which invariably snap.

Construction.

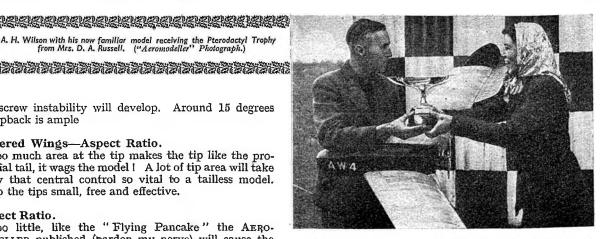
Multi-spar wings should be avoided because these have a tendency to shear where point loads are applied in crashes. Also these cause a skeleton effect if one's covering is not perfect. I favour sparless construction, enabling one to obtain a good section at the L.E. and T.E. which is so vital for wing section efficiency. Also a certain necessary whip is present in the structure, and warps may be steamed in or out, without much difficulty. If sparless construction is used washout can be steamed in, by other methods, it must be built in while constructing the wings.

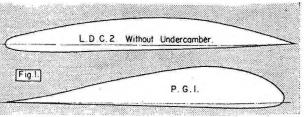
The underfin can be laminated from ply and balsa, see Fig. 2, into which wing tongues can be well glued. The best tow-hook to use is that used and I think designed by Guy Borgé, which was used on his A.V. 10 illustrated in the Aeromodeller. This is a spring type, see Fig. 3, which can be located in several different positions. The best hook position I have found to be at a point between the root rib leading edge, and where root rib maximum

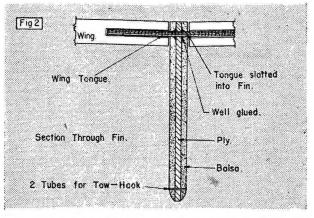
thickness occurs.

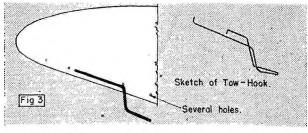
By using a central fin, it will be found that the model will be far more stable on the line because the position is similar to and acting like the V string of a kite.

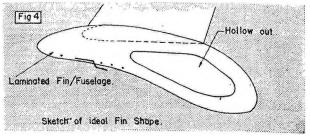
To finalise, it should be remembered that tailless models are difficult models to trim and fly. It will be found that simplicity will nearly always win over the complex. The simple formula is single, small fin set under, tip washout with no elevons or tip fins to interfere, and plenty of sweepback-but not too much. well be wrong in these personal theories and it is up to every serious modeller who has some new suggestion or idea to write up and pool their ideas, so that we may come nearer to the perfect design. (Who said-" no wing at all"?)











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A TALK ON TORQUE R. H. W. ANNENBERG, B.Sc.Eng.

A EROMODELLERS of all ages have, at some time in their modelling career, flown or attempted to fly a model with a single airscrew fixed somewhere in the model. This being so, the writer thought it might be a good idea to explain why certain methods of torque control are used. It was further thought that an explanation of some of the aeromodelling fallacles concerning the use of geared motors might prove useful and, for good measure, a few notes on that controversial subject "folding and free wheeling props " is also included.

It is clear, I hope, to any aeromodeller reading this article that, since an airscrew must rotate to give a thrust force, a torque must be applied to the shaft to maintain rotation. Suppose we consider an aircraft with a single airscrew flying along a horizontal path. Since a torque is required to maintain rotation of the airscrew, it has got to come from somewhere inside the model. The cynical will promptly reply that it comes from the motor, which of course is a very profound remark and bears much thinking about! The whole point of the matter is that not only does the motor turn the airscrew shaft, but also applies a torque to the fixing at its other end Now this fuselage structure is rather like a Government Department, it much prefers to "pass the baby", the baby in this case being the torque which it passes to the wings. It therefore follows that the wings must produce such air forces as to oppose the torque or else the model will roll. The crux of the whole matter is that for the aircraft not to roll, the wings must provide a rolling movement of the same magnitude as the torque applied to the airscrew shaft.

It can be said, however, that unless the model is powered by an even number of airscrews, pairs of which rotate in opposite directions, then the wings will have

to provide a torque if it is not to roll.

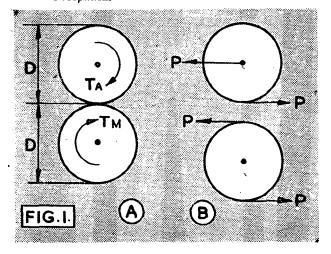
Our problem, then, is to determine ways and means of persuading the wings to provide an anti-torque, which can only be done by arranging for one wing to lift more than the other. This can be done by a combination of any of the following four methods.

(1) By giving one wing more incidence than the other

By using ailerons.

(3) By making the model circle.

(4) By sideslipping a model with dihedral and/or sweephack.



By far the most usual method is to combine (3) and (4), modellers call it "using sidethrust" being aware that it counteracts torque, but rarely being able to explain why, apart from the fact that the model goes. The antitorque due to circling results from the fact that the outer wing is travelling faster than the inner wing, with corresponding greater lift on the outer. The reason for anti-torque being produced by a dihedralled wing when sideslipping can be found in the multiplicity of articles written by aeromodellers on this subject, so I shan't repeat the process. It may be said that methods (1) and (2) are sometimes used by the experts, but certainly should not be used, except in moderation, as either method may seriously affect the trim on the glide.

From the above, it is clear that the standard method. of torque control (i.e. sidethrust) is likely to be the easiest to use. By this method the offset thrust line produces a yawing movement which can only be counteracted by the model circling. As above, the circling motion producing the yawing movement also produces the necessary rolling movement. A point to be noticed is that there is a side force causing sideslip and that if the dihedral is used on the model (as it invariably is) then the sideslip causes a rolling moment tending to eliminate the rolling moment due to circling. accounts for the lack of sensitivity to sidethrust of models with large dihedral and also explains why circles of comparatively small diameter can be obtained without rolling into the ground.

I consider that I might venture into the subject of slipstream effects, making the reservation that, of the whole of the realm of low speed aerodynamics, the effects of slipstream are the most difficult to predict.

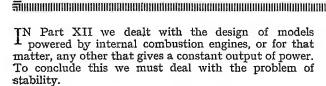
(1) Slipstream rotation acts on the wing in such a way as to counteract torque. (2) With sidethrust, the flow over the fin produces a yawing moment which helps the circling motion against torque. (3) With sidethrust if the part of the wing in the slipstream has dihedral then a rolling moment is produced which is in the same direction as torque.

We now consider the effects of gearing motors together, linking them at the same time to an airscrew. The most simple case, a direct drive using a single motor can quite easily be visualised. Clearly one end of the motor causes the airscrew to rotate and the other end of the motor is prevented from rotating by the rolling moment from the wing which is transmitted through the rear fuselage. It therefore follows that with a single direct drive, torque effects on the fuselage structure are confined to that part of the structure between the wing and the rear peg (except when holding the model by the nose and prop just after winding up).

Now consider a single motor geared to an airscrew (unity gear ratio) at the nose. With reference to Fig. 1. (a) shows the twin gears, TM being the torque applied by the motor and TA the resisting torque of the airscrew, (b) shows the two gears separated with the appropriate forces acting on each. If P is the load between the gears when they are working, it follows that TM=1PD=TA. But for the equilibrium of each gear there is a side load on each gear bearing of P and hence a torque on the nose block of magnitude $P \times D = 2TM$. Hence not only does the rear peg send a torque TM through the rear fuselage

(continued on page 71)

AERODYNAMIC DESIGN—Pt. XIII BY JOHN HALIFAX Tailless diesel by G, D, Miles on the right is an example of a type of model that presents stability problems all its own. In this instance this Mills powered 52° span model is very stable with a good climb and flat glide



Longitudinal Stability.

It was emphasised that a model's centre of gravity should be well forward if satisfactory stability is to be obtained. A position of 25% of the mean chord from its leading edge is about the best compromise although it may be a little further back if some stability can be sacrificed for slightly better efficiency.

With the innovation of "Aerofoil performance tables" (see accompanying table) there is no need to refer to a single graph for the design of orthodox models. Instead the slope of the moment curve is obtained from the appropriate column and inserted in the expression

$$F_W S_W (K.c. +x) F_T S_T y$$

where K=Slope of the moment curve

c=mean chord of the wing

x=distance between the C.G. and a point on the mean chord 25% back from the leading. edge of the wing (positive if C.G, is behind, negative if it is in front):

Sw=wing area.

 S_T =tailplane area.

y=distance between the C.G. and a point one quarter of the chord back from the leading edge of the tailplane.

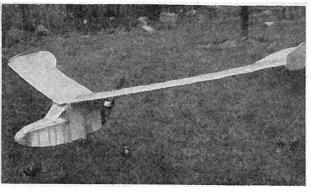
Fw & Fr are functions of the wing and tailplane Aspect Ratio respectively, and are obtained from Fig. 1.

All quantities are in inches and square

If the answer to this is negative, the model will be statically stable: if it is positive the model will be unstable. For the first case a value of the order of -2 indicates poor stability, and about -10 indicates good stability, and since all the quantities needed for the expression are known it provides a simple but valuable check.

If the stability is found to be insufficient, any or all of the following remedies can be employed.

- Move the C.G. forward.
- 2. Increase the area of the tailplane.
- 3. Increase the length of the moment arm by lengthening the fuselage.
- Increase its Aspect Ratio.



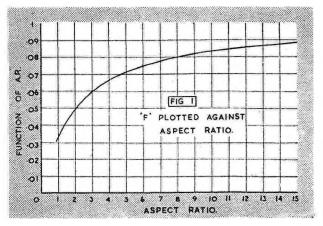
AEROFOIL SECTION	L.D.C.2.	N.60	N.6OR	GOTT 625	CURVED PLATE 417a	FLAT PLATE	
Optimum C _{I,}	o.a	0.7	0-5	0.5	0.8	0.4	
Profile drag coefficient CDJ	∙025	-028	-03	-03	-025	0.4	
Angle of Attack (A.R.⇔Infinity)	+ 2·7°	+ 19	+3·3°	—3°	+3·3°	+4°	
Critical VL	_	13-3	13-3	20	6	Less than 6	
C.P., position from wing nose (for optimum C _L)	58-3%	13.5%	19.4%	4.2%	12.9%	25.8%	
Average slope of moment curva	267	— ∙025	 ∙043	0	⊹∙037	0	
List/drag ratio	32.0	25.0	16.7	16-7	32.0	10	
Power factor	820	439	139	139	819	40	
Thickness/chord ratio	10%	12.4%	12.4%	20%	2.9%	2.9%	

If there is any doubt about the stability in the first place, it is advisable to work out the tailplane setting (given in Part XII) after the stability check.

In addition, care should be taken to ensure that the nose of the aircraft is fairly short and that the tail is kept light, as a model with a large fore and aft Moment of Inertia requires a larger degree of static stability than usual, a more accurate method of calculation will be given in Part XVI.

Lateral Stability.

This heading covers rolling, directional and spiral



stability, and largely depends on the dihedral angle and fin area. A simple method of calculating the exact relationship between these two is available* but has not been published. The L.S.A.R.A. has the matter in hand and a complete theory should be published in the near future. Broadly speaking, the two alternatives are these:—

(a) A thin streamlined fuselage with a large fin and a large dihedral angle. Most models today

are of this type.

(b) A fuselage which has a "forward fin" as, for example, a pylon model or a "Flying Suitcase" type of glider. This requires only a small dihedral angle and small fin area, and is there-

*L.S.A.R.A. Report No. 6. (Unrestricted) entitled "Lateral Stability-Part I" by N. K. Walker, B.Sc.

fore more efficient; a fact which is painfully obvious on the competition field!

The natural tendency of a model to turn under the influence of airscrew torque should always be counteracted by side thrust. The fin should only be used to trim for turning,

If the model appears to be spirally unstable during flight tests, the dihedral should be increased. An excellent way of testing power models with respect to lateral stability is to fly them on an ordinary sailplane towline. N. K. Walker, B.Sc., is the author of this idea, and gives as the reason the fact that all models, are unusually sensitive during towing.

Next month's article will contain a Nomogram giving tailplane area for normal models.

Section	Station % chord	0	1.25	2.50	5	7.5	10	15	20	30	40	50	60	70	80	90	95	100
Gott 625	Upper	5·50	9 00	10·80	13·30	14·95	16-35	18:25	19:30	20-00	19·05	17·35	15·05	12·10	8·60	4·75	2-75	0.65
	Lower	5·50	3·30	2·35	1 25	0·75	0-40	0:15	0:10	0-00	0·00	0·00	0·00	0·00	0·00	0·00	0-00	0.00
N.60	Upper	3·40	5·60	6·76	8·24	9·33	10·14	11-32	11 98	12:41	12·03	11-06	9·55	7·66	5·50	3·04	1·72	0.40
	Lower	3·40	1·91	1·46	0·96	0·62	0·40	0·15	0:04	0:04	0·22	0-48	0·71	0·78	0·64	0·37	0·19	0.00
N.60R	Upper	3·40	5·60	6 76	8 24	9·33	10·14	11-32	11·98	J2:41	11-95	10·79	9·18	7·42	5·75	4·28	3·66	3-20
	Lower	3·40	1·91	1·46	0·96	0 62	0·40	0-15	0·04	0:04	0-14	0·21	0·34	0·54	0·89	1·61	2·13	2-80
Flat, Plate	Upper }	0.00	0.80	1.00	1 30	1.40	1-45	1-45	1.45	1.45	1-45	1-45	1-45	1.45	1-40	0.80	0.40	0.00
417a	Upper	1·45	3·00	3·65	4·70	5 60	6 30	7 I5	7·75	8·60	8-80	8·45	7·85	6·90	5·70	4·25	3·55	1·45
	Lower	1·45	0·05	0·45	1·55	2-50	3-30	4·20	4·85	5·70	5-90	5·55	4·95	4·00	2·80	1·30	0·60	1·45

Talk on Torque (from page 69)

to the wing but the nose block sends a torque 2TM of opposite sign through the front fuselage to the wing. The net torque on the wing is therefore TM in the direction to be expected from a consideration of the direction of airscrew rotation.

A similar argument applies if only 2 motors are geared to the airscrew directly at the nose, only in this case there is no torque on the rear fuselage and the combined torque from both motors is transmitted to the wing by the front fuselage from the gear box. The case of twin motors geared up to the airscrew can similarly be shown to produce a torque in the front fuselage only, equal to the torque applied to the airscrew shaft. It will be clear that in every case, Newton's Law which says "Action and Reaction are equal and opposite," will apply and the wing will have had to produce a rolling moment equal in magnitude to the torque on the airscrew shaft. It does not follow, however, that the torques on any part of the fuselage will be comparable with the airscrew torque,

Of the great controversies which have raged in the aeromodelling movement in the past 10 years, the one of "Freewheel or fold" has occupied many modellers minds. The majority of explanations put forward from time to time would, frankly, leave a full scale designer saying "what a set of twerps some of these Aeromodellers are!" The writer is, unfortunately or otherwise, in the position of being able to sit on the fence and interpret the ideas of each side in terms of the other. It behoves me, therefore, to try and give the explanation that a full scale designer would give for the relative instability of a "folder" compared with a "freewheeler."

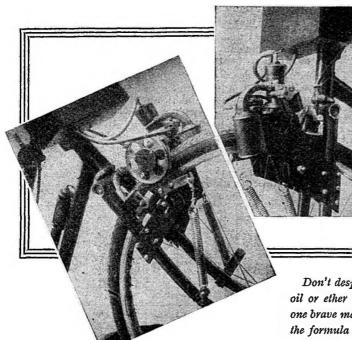
The full scale designer would agree with the "brake" effect of a freewheeling airscrew against diving and zooming. He would also agree that the gyroscopic effect of the airscrew when freewheeling tends to damp out

oscillation, but would point out that any rotation in pitch tends to produce rotation in yaw—this being a point which aeromodellers have not appreciated. One point about which model designers are very vague is to explain why (1) A model trimmed near the stall is far more difficult to make-stable in pitch than one trimmed for best glide (using a folding airscrew, of course.) (2) Why a streamlined job is more difficult to make stable than a slabsider. I am aware that standard model text books talk rather vaguely about the lower drag of the streamliner having less damping effect.

Some time ago, the writer was foolish(?) enough to investigate the mathematics used by full scale designers when working out stability in pitch. It came out after a lot of midnight oil had been expended, that the quantity CL²/CD was very important and has been given the name "Instability Index." In fact, for any given CG position, the greater the value of the instability index the more likely is the model either to be unstable in pitch or take a long time to damp out to a wobble in pitch. The instability index explains everything quite easily.

The maximum value of the index occurs at the stall and it therefore follows that stability is more difficult to attain at high lift coefficients. Comparing slabsiders with streamliner at the same lift coefficient it is clear that the slabsider has a lower instability index and hence is more stable. Another point is that when an airscrew folds, the CG shifts backwards. Now a full scale designer will tell you that if you move the CG backwards you reduce the stability in pitch even if you retrim for the same CL. Further to this the nose goes up and so does the lift coefficient with a consequent increase in instability index. Is it a wonder then that aeromodellers have trouble when fitting a folding airscrew to a streamliner? This is borne out by the fact that even the (streamliner) experts steer clear of folding props, presumably on a basis of "once bitten, twice shy."

AEROMODELLER December, 1947



72

NO PEDALS for Miss BLANDISH!

(with apologies to James Hadley Chase)

BY G · S · DAVISON

These pictures show the finished "Motor-cycle," The black cigar box above holds the coll, condenser and main tank

Don't despair about the basic—while they still sell lighter fuel and oil or ether and paraffin. Take one bicycle, one miniature engine, one brave man and one dark night to ride it, apply one to the other in the formula given below, take out an expensive insurance policy for the benefit of the wife and hiddies and—well, what are you waiting for?

In the summer of 1941, when in the Army and stationed in Northern Ireland, I got the idea that it would be interesting to make the smallest motor-cycle in the world.

Naturally, I did not go beyond a push-bike for the "cycle parts", for anything more robust would have been quite unnecessary. My idea was to obtain a model aircraft engine and to apply its power to the front wheel of the bicycle by means of a small bobbin driving on to the tyre. Spring loading was obviously desirable, but this was easy to arrange.

First, a word or two about the engine. It was a beautifully made 9 c.c., that at 7,000 r.p.m. developed 0.23 b.h.p. Unfortunately the crankshaft was of the single bearing type, and it was obvious that if I were going to place an upward thrust on the crankshaft via the friction driving bobbin, it would be necessary to extend the shaft and fit some sort of outrigger bearing, also a flywheel.

The necessary work presented no major problems, but took a long time. I extended the shaft about 1½ in. and fitted a 3 in. brass flywheel, made, incidentally, from the distributor gear-wheel of an old car magneto. The outrigger bearing itself was easy to make, but the bracket fashioned in sheet metal from an old car number-plate, kept me busy with hacksaw, drill and file for many a long evening. Fitting the wooden bobbin was also a ticklish job, as was the making of the various attachment brackets and the spring-loading assembly. The exhaust pipe I constructed out of an old car oil pipe, and the silencer is a small cylindrical tin, 1½ in. in diameter by $2\frac{1}{2}$ in. in depth.

I attached a small tin to the cigar box on the steering head which held the battery and the coil. This tin feeds the original tank, and the idea was that by means of a needle-valve I should adjust the flow so that there was a more or less constant level of petrol in the tank proper. Fitting up a float to control the level as in an ordinary carburettor, would have been too big a job—or perhaps should I say too small a job.

After months of work came the great day when all was ready for test. I tied the handlebars of the bicycle so that it was clear off the ground, inserted some petrol in the tank with a fountain pen filler, switched on the ignition, and pulled the front wheel. There was suddenly an earsplitting scream as the engine burst into life, dense clouds of smoke—the usual four-to-one petrol-oil mixture—filled the garage, and the front wheel went round at an almost incredible speed.

It was pouring with rain at the time—as nearly always in Northern Ireland—but this did not stop me getting on to the road immediately. Off we went—the noise was simply diabolical. Greatly excited, I roared along the road at what must have been at least 15 miles per hour.

The engine went well on its own tank, although when I attempted to top up this tank from the main tank above, I invariably got either too much or too little petrol. This was a little snag which could have been overcome by a float chamber had time permitted.

However, when it went it was great fun. Here are a few interesting points. On the flat it would take me along, without pedal assistance, at about 15 m.p.h. This represented an engine speed of approximately 5,000 r.p.m. On the least down-grade there was a surprising rise of speed and I am sure that I often exceeded 30 m.p.h.—and 10,000 r.p.m. Hills which normally meant hard pedalling in bottom gear of the three-speed hub could be scaled easily at 15-20 m.p.h. in top gear with light pedalling assistance.

As a matter of interest, the wooden driving bobbin, about one inch in diameter, showed very little wear after the season's use and the tyre showed no wear at all. Nor was there any transmission slip, even in wet weather,

But petrol consumption was perhaps the most surprising thing. On a flat stretch of road, using the original tank only and without pedalling assistance, I covered four miles at an average fast cycling speed on half-an-ounce of petrol, or an average of 1,280 m.p.g. Trump that!



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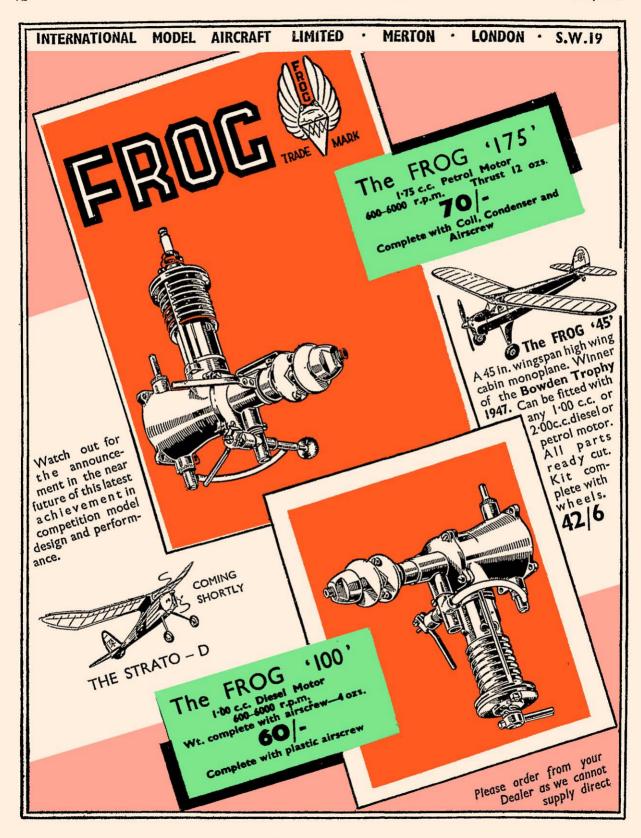
Runs inverted and in either direction. Very easy finger starting. Cubic capacity 2 c.c.,

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ICK FARTHING made his name with lightweight rubber jobs and gliders, with occasional jaunts into speed and indoor models. Rubber speed record holder since 1942, his most successful contest year before R.A.F. service intervened. Now 22, and single, and has been modelling since he was 12. Is giving up lightweights altogether for speed control-line. GIL HARRIS, a familiar face at most major power comps, specialises in all outdoor models. Much honour and glory in 1947 included many national contest placings and National Championship runner-up, as well as seventh individual placing in Swiss Internationals as British team member. Thirty years old, aero technician, one small daughter. Has been modelling for 20 years, literally hundreds of models. GUS MARAGET, well-known French modeller whose engine designs rate amongst the top in diesels. Regular visitor to international Week at Eaton Bray, Interested in models since he was ten, serious builder since 1936, is now 36 and married. Prefers power and rubber jobs, although is dogged by bad luck in competitions. "RIP," known to all London and most country modellers, and affectionately to his intimates as "Aeromodelling's best-dressed man"! Fifty-four, married, and one of the "grand old men" of the sport, being actively modelling since 1904. Founded Blackheath club in 1911 and Northern Heights in 1931. His historical notes and contest awards take three pages of handwriting. Co-author of two books, and model trader since 1928. One of the most colourful and best loved personalities in the game, J. L. PITCHER, genial elderly president of Croydon club, proof of the wide appeal of aeromodelling to all ages. Modelling most kinds of duration type models for ten years, being particularly successful with lightweight duration rubber jobs—now turning more to Wakefields, witness his recent Irish Nationals coup. Picture shows him winning this year's Lady Shelley cup for seaplanes.





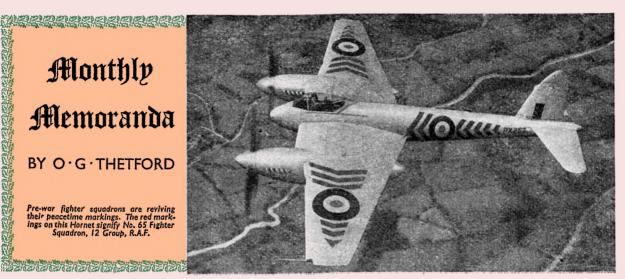
GUSTAVE MARAGET



Monthly Memoranda

Pre-war fighter squadrons are reviving their peacetime markings. The red mark-ings on this Hornet signify No. 65 Fighter Squadron, 12 Group, R.A.F.

BY O · G · THETFORD



Indian Aviation.

News is now forthcoming on the composition and equipment of the two air forces established by the Indian Union and Pakistan since independence was granted to India last summer.

Equipment of both air forces is of ex-R.A.F. origin. The Pakistan Air Force, a Tempest II of which is seen in an accompanying illustration, consists of two squadrons, One fighter squadron equipped with the Hawker Tempest II is stationed at Peshawar and one transport squadron equipped with the Douglas Dakota IV is stationed at Risahpur, near Rawalpindi.

Some of the aircraft retain their R.A.F. camouflage, but others are stripped of their paint and are operating in natural aluminium finish. The new national insignia of the Pakistan Air Force consists of a white star and crescent above and below the wings and on the fin, with a green and white roundel on each side of the fuselage.

The Indian Air Force consists of eight squadrons, seven of fighters and one of transport. The fighters are equipped with the Hawker Tempest II and the transport unit with Douglas Dakotas. The insignia of this air force has not yet been announced.

Hornet Squadron Markings.

Readers will recall the paragraph on the revival of pre-war dicing on the Hornets of No 19 Squadron (see these columns for August last). We now learn that two Nos. 64 (F) Squadron and 65 (F) Squadron, stationed in Yorkshire, are experimenting with the revival of prewar squadron heraldic devices on their aircraft.

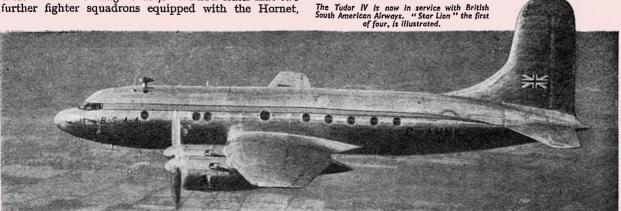
The present Officer Commanding No. 65 Squadron, Squadron-Leader Charlton Haw, D.F.M., Order of Lenin, who flew Hurricanes in Russia and scored five victories in the Battle of Britain, is now flying his Hornet PX 252 with No. 65's pre-war markings, as carried on their Gloster Gauntlets in 1937-8. These consist of seven "broad-arrows" in red on the fuselage and six "broadarrows" in red on the upper surface of each wing. On the wings the apex of each arrow faces the wing-tip and on the fuselage the apex is towards the nose. There are two arrows ahead of the fuselage roundel and five behind. On the wings, there are three arrows either side of the roundel. The aircraft is all-silver and carries the serial number in black beneath the wings as well as on the rear fuselage. On the first Hornet to be so marked, the war-

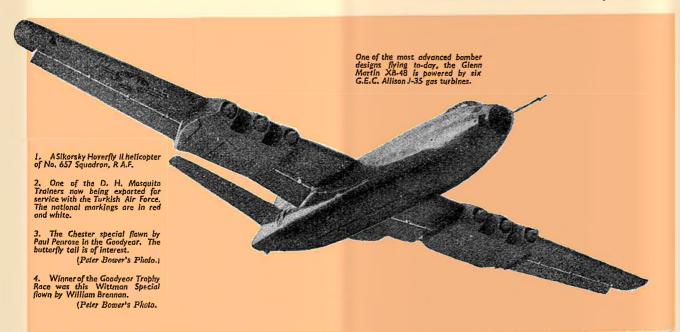
time code letters "YT-H" have been deleted.

The Hornets of No. 64 (F) Squadron are to carry the red and blue "trellice" markings familiar in 1937-8 on their Hawker Demon two-seater fighters.

Yorks of Transport Command.

One of the most popular aircraft of the R.A.F. with scale modellers seems to be the Avro York and therefore the following notes will be of interest.





Over two hundred Yorks have now been built for Transport Command and the type will remain in service even after the arrival of the new Handley Page Hastings and Vicker's Valetta.

The York is in service with four squadrons, including No. 24 Squadron, No. 51 Squadron, No. 242 Squadron and No. 511 Squadron. No. 24 Squadron may be said to have formed the germ from which the entire organization of Transport Command evolved since in pre-war days it was the only squadron in the R.A.F. devoted to purely transport and communication duties. Yorks now equip one flight of this squadron, the other flights having Avro Lancastrians and Douglas Dakotas. The squadron is based at Bassingbourne.

No. 51 Squadron at Waterbeach was formerly famous as a heavy bomber squadron equipped with Whitleys and afterwards Halifaxes.

No. 242 Squadron at Oakington was formerly a fighter squadron and became famous during the war with Hurricanes

Yorks of Transport Command have natural aluminium finish and are numbered between MW 101-MW 324. Specimen aircraft in service include MW 115, in service with No. 51 Squadron; MW 236 of No. 242 Squadron and MW 269 of No. 511 Squadron.

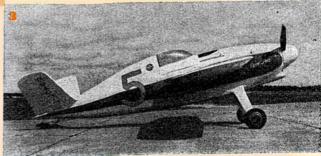
Hoverfly II in Service.

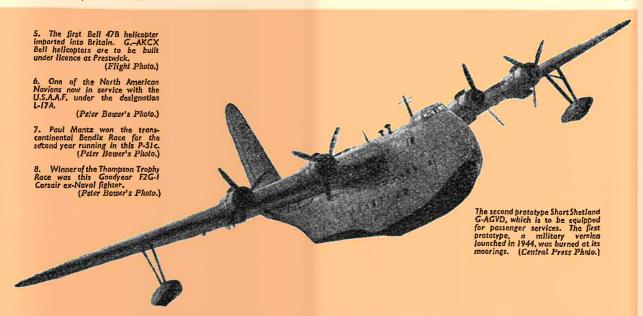
Second helicopter to go into service with the R.A.F. is the Sikorsky R-6A Hoverfly, now equipping certain

















Air Observation Post units. The Hoverfly II supersedes the more familiar Sikorsky R-4 which has served with the R.A.F. since 1944.

The Hoverfly II was first ordered from the U.S.A. in 1945 and deliveries to Britain commenced about a year ago. Modification procedure to R.A.F. requirements has been handled by General Aircraft, Ltd., of Hanworth.

Hoverfly II helicopters of No. 657 Squadron bear the code letters "TS", at one time familiar on Auster VI Air Observation Posts. The helicopters are camouflaged in drab green and are serially numbered KN 840 to KN 850.

The Hoverfly II is being used at the school of Artillery at Larkhill where Army officers are undergoing a special two-year course as helicopter pilots. Spotting for the guns is to be the chief task of helicopters in Army service, and modern policy favours the increasing use of helicopters for this task. The helicopter can operate nearer to the lines than the conventional light aircraft which requires the use of a landing strip frequently some distance away from the scene of operations.

Thirty-six Hoverfly helicopters are also in service with the United States Navy under the designation HOS-I, Powered by a 245 h.p. Franklin six-cylinder fan-cooled motor, the Hoverfly II has a rotor diameter of 38 ft., a loaded weight of 2,600 lb., a maximum speed of 100 m.p.h. and a service ceiling of 10,000 ft. The rate of climb is seven minutes to 5,900 ft. and the maximum endurance five hours.















A RECENT communication from an Argentinian correspondent gives details of a new undertaking there that will make your mouths water—though it is a debatable point whether such official control would be better than our somewhat super-democratic ways. I quote in full as follows:

"The Secretary of Aeronautics announces that there will shortly be constructed in the airpark of the city of Buenos Aires the building intended for the Official School of Aeromodelling, which will be under the direction of Sporting Aeronautics.

will be under the direction of Sporting Aeronautics.
"The said building will have lecture-workshops which will allow the simultaneous instruction of 200 pupils. The courses in theory and practice will be for the benefit of teachers and those intending to be instructors, but amaleurs interested may also attend.

attend.

"As an annex to the school an experimental workshop will function, equipped with machines and modern equipment for teaching aerodynamics in general. The school will provide free of charge materials for the students who take the course, and also these will be able to make use of a technical library. The projected building will have a frontage of 230 ft. and depth of 53 ft."

One of the main outcomes of the recent F.A.I. Annual Conference, held this year in Geneva, was a general modification of model specifications, and while we hope to publish a fully detailed precis of the new requirements as soon as these are received from official quarters, you will be interested to know right away that from now onwards the total area of all horizontal surfaces will form the basis for calculation purposes, all other design factors correlating with this.

In future the minimum cross section of the fuselage will be 1/100th of the total area for gliders, and 1/80th for rubberdriven and power-driven models. This should satisfy those who have been agitating for scope in the use of more slender fuselages, as this new requirement is an appreciable reduction over the old "length squared over one hundred" formula we are so used to.

Cash prizes will no longer be awarded at meetings, and it is proposed to introduce modifications to current Certificates to bring about a general unification. The hardest to obtain (and therefore something well worth possessing) will be the Class 3 Certificate, which requires qualifying three 3-minute flights in each of Rubber, Glider and Power categories. The flights in any one category must be made on the same date, and in all three classes within the period of one year. Engine run in the case of power models is limited to 30 seconds. This high class of Certificate will be the official F.A.I. form, all other grades being for National use only. Watch for full details of these and many other interesting innovations, which will be published at the earliest opportunity.

A move to bring about proper recognition and appreciation of the Merit Certificates of the S.M.A.E. is the decision to

The lads in the snow at the top of the page are members of the Northampton M.A.C. After this Christmas scene we have a cheary group from the Oxford Civil Defence M.A.C. followed by members of the Ewell Club with an impressive array of models. The Navy boys are from Arbroath and are shown here waiting in the rain at a meeting held earlier this year by the Scottish Aeromadellers Association. Finally we have members of the Cardiff M.A.C. with a most impressive array of silverwarethat they have acquired.

make possession of the lowest grade a qualification for entry to the British Nationals to be held next Whitsun. Though certain factions are known to be protesting against this requirement, I have no hesitation in stating that if a would-be competitor at these most important National events cannot meet the modest qualifications for the "A" Certificate (three flights of one minute's duration with any class of model) he surely cannot be considered worthy of acceptance for a countrywide competition. Individual club contests should be the proving ground for wider and higher grade events, and with current knowledge, kits, etc., it is child's play to get the qualifying flights.

Congratulations once again to CROYDON on winning the Plugge Cup yet again, coupled with a further win in the National Cup, This club keeps high up in all contests mainly by a concentrated effort—and entry into all the National competitions. Would that all affiliated clubs had the same spirit and consistency. It is a bit of a shock to find only eighty clubs entering the race from over two hundred groups.

The HORNETS M.A.C. entertained fellows from the Eastbourne club at an inter-club affair, and really cleaned the board. A. Anastasiou won the duration event with a time of 6: 32, P. Grange set a ratio of 4.76 to place first in the power class, also winning the nomination event. B. Clayton (home on leave from the R.A.F.) won the Concours.

A general re-shuffle has taken place in the CAMBRIDGE M.A.S., and flying now takes place at Waterbeach Aerodrome.

Results of a recent meeting held there were:

Glider	L. Woods	4:13
	J. N. King	l : 47·5
	- Nichols	1 : 12
Rubber	G. Rich	1 : 57
	J. N. King	1:47
	L. Woods	1:12
Power	P. H. Firman	
	L. Woods	

The ever increasing band of control-line enthusiasts will be interested in news of the formation of the first club devoted solely to this type of model flying—the NORTH LONDON CONTROL-LINE M.F.C. Exclusive use of the private football ground at the Alexandra Palace has been obtained, and there is ample accommodation for both fliers and spectators. All modellers—with or without models—are welcome, and a full programme of contests for 1948 is being arranged. Two cups have already been put up for this purpose.

E. Fullbrook, an eleven-year-old member of the BASING-STOKE & D.M.F.C., has won the club "Turner Trophy" with his good old standby, a "King Falcon." The last two rounds of the competition were held in rain, and the Falcon turned in constant flights of one minute. B. Cottrel of this club lost (no—had stolen!) a Mills diesel from his box while at the Southern Counties Rally, No. 2281. The person who has said engine can have the prop to go with it on application

via the secretary !!

Activities in the WAKEFIELD (Yorks) M.F.C. have increased, a very successful club Open Day on September 7th, and a second place in the Pontefract Rally going to the credit side. Local flying has seen D. Lund's "Sunnanvind" clocking flights of from 6-8 minutes, while power flying is well on the increase.

After a lapse of nearly eight years, the ABERDEEN M.A.C. is again in circulation, and is already having success in contests. First two places were obtained in the "Evening Express" Power trophy, top man being J. P. Beaton flying a "Little Vagabond" powered with a Mills. G. P. Whitehead lost his pylon diesel job on a trimming at the Abbotsinch meeting, time o.o.s. being 6:50. This was unfortunate as his club mates had nothing but misfortune in the contest.

Though not retaining the "Southern Counties Challenge Cup." the BOURNEMOUTH MAS gained two seconds.

Cup," the BOURNEMOUTH M.A.S. gained two seconds and a third in the contests. Four club events were staged

during September, results as follows:

Hillside Soaring	A. Arnold M. R. Flew	2 : 20·8 1 : 34·8
B.M.A.S. Power Cup	A. Weller	1 : 32
Junior Gilder Cup	C. E. Bowden G. C. Palmer N. Clarke J. Robinson	2:05·9 1:15·5 1:12

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A. Arnold
B. F. C. Smith
E. A. Robbins
A. V. Roe Trophy
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The LYDNEY & D.M.A.C. held a series of contests recently when unfortunately the ground was not too suitable, models going out of sight far too quickly. Times were:

Power	E. Goodwin	2 : 10 aggregate
	B. Russell	1:50 ,,
Glider	K. Markey	3:14
	B. Russell	3:08
Rubber	— Reynoids	1:40 ;;
	P. Roberts	39

John Groves won the CROYDON & D.M.A.C. power contest for the "Davis Trophy" with a ratio of 4.951. Second was Mick Dean (2.74) and third C. Chester (2.719)—all models being pylon types. The "President's Trophy" for rubber-powered jobs and gliders went to Johny Hall, all first places being taken by rubber types, which rather put the glider wallahs to shame! Winning the Plugge Cup for the third year running has rounded off a highly successful season for this club, other highlights being the Irish Nationals, National Champion-

ships, London Area Challenge Cup and the Short Cup.
The BARNSLEY & D.M.A.C. had a very enjoyable day with the Rotherham boys recently, taking home three prizes for their efforts. Club records at present are; Rubber—P. Ellison (Raff V) 6:30, Glider—K. Rowbottom (Vanda) 7:28.

Another club to send particulars of its record list is the TAUNTON & D.M.A.G., a fine time of 15.00 by J. Ford's "Thermic 50" being best in the sailplane class. The rubber record is held by H. A. Simpson with 7:42, both these records being o.o.s. Race for the best flight of the season is led by J. Skae with a time of 3:05 o.o.s.

In spite of being a school club, the AMPLEFORTH COLLEGE M.A.C. members have not been dormant during the holidays, R. A. Twomey having a flight of 31:00 with his very successful "Cobra," and M. D. Pitel winning the junior rubber class at Canterbury with his "Raff V," which put up the best time of the day. Celebrating its first birthday this month, the club has a fine set of records, including one British and a very good rubber r.o.g. List is as follows:

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Rubber R.O.G. M. D. Pitel 21:45
Sailplane T. E. D. Pakenham 7:02
Sailplane H.L. R. A. Twomey 5:46:6
Power R.O.G. R. E. Gore 6:38
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LONDONDERRY M.A.C. times are improving steadily. as the following results of their latest competition show:

```
Wakefield class
C. Austin
E. Floyd
Saliplane
C. Austin
B. Dunlevey
                                                                                             4:30 2 40:1:40
2:49 1 40:2:40
1:45 2 05:1:40
1:18 1 48:1:20
```

Some pretty good durations have also been put up by members of the OXFORD CIVIL DEFENCE M.A.C., who are enjoying a renewed burst of life after a temporary slump in membership. Flights notified are—Rubber, 4:50 o.o.s. by J. Meales—Glider, 8:02 o.o.s. by M. Hewitt—Power, 3:45 o.o.s. by Mr. Cruse. At a recent exhibition members took eighteen diplomas, R. Machin collecting no less than seven.

Having left Moreton-in-Marsh, F/Lt. Jackson-Wynch has got busy on his new station, Watnall, and organised a R.A.F. model club there. He is anxious to get in touch with a few of the local clubs around there with a view to fixing up some

contests.

The SOUTHERN CROSS A.C. had the best of things in a contest with the Eastbourne club, taking first three places in the glider class, and top two in the rubber comps. R. Honeycombe clocked 4:02.3 with his "Warring Glider," and T. Rendle 5:35.6 with his "Mick Farthing Lightweight." In spite of aggregates of over six minutes, this was not good enough to place the three best men in the S.M.A.E. Cup event, actual aggregates being 6:24 by L. Willard, 6:09.9 by G. Gates, and 6:16 by T. Rendle. The club's "Swallow Cup "for tailless models was won this year by K. Donald with an aggregate of 4: 35.3, followed to second place by G. Gates, only five seconds separating them. Gates won the Club Championship with an average of 2:15 for every flight he made.

A collection of successes and high times fill the report from the KINGSBURY M.F.C. J. Bowerman won first place in the Battle of Britain competition held at Langley with an aggregate of 9: 15, with a best flight of 6: 59, with team mate

G. D. Miles placing second with a total of 7:20, best flight 5:20. Bowerman followed this up the following day with a flight of 7:30 o.o.s. in the National Cup, losing the model and not completing his flights. Better luck came in the S.M.A.E. Cup, when his aggregate of 11:29 took him into fifth place, his clubmate M. Hanson bettering his time by 127 seconds to place third.

STREATHAM D.A.M. have had some very enjoyable outings to various meets during the season, losing no less than nine models at the Radlett show! Jimmy Wingate once again made his mark by winning the Junior Champion Cup

again hade his mark by winning the Junor Champion cap at Fairlop recently (London Area affair). The HARROW M.A.C. wound up the season by holding four club competitions. N. Gregory won the "Young Trophy" for lightweights with a single flight of 5: 48.5, following this up by placing first in the Power contest with an average ratio of 4·43. A. Jennings, who placed second in the lightweight event with an aggregate of 3:53·4, found this time good enough to win for him the "Morgan Cup" for new members. J. A. Britten totalled 5:13 to win the junior "Dakota Cup," thus following up his success of the previous week when he was runner up to Wingate at the Fairlop meeting. Gregory's Mills powered flying boat, which gained a mention at the M.E. Exhibition, has now been coaxed to R. O. W. in spite of it's 18½oz. weight. As a result of his efforts, a claim for the British record has been lodged with a flight of 2:08.5.

Although the fine autumn weather saw LEEDS M.F.C. members doing more outdoor flying than usual, the indoor season opened on October 16th, with an R.T.P. competition, a record number of 38 members attending. Junior Joyce, ably assisted by father, achieved a popular win with consistent flights of 1: 40, runner-up Ken Foster being a long way bellind.

The WALLASEY M.A.C. clubroom at Lindeth Avenue, is again in full swing for the winter indoor season. Outstand-

ing performances of the year were:

14:19 8:15 2:13 3:30 by P. Phillips by J. Baguley by A. Molyneux by J. Inkester Towline Glider R.O.G. Rubber

Both the glider flights were made during the "Daily Dispatch" meeting at Woodford, Phillips flying "Zaic Floater" and Baguley a "King Falcon."

Plenty of activity down with the SOUTHAMPTON M.A.C. lads lately, their latest issue club magazine giving good accounts of three meetings. Briefly, these consisted of a "free-for-all" day with the Portsmouth and Eastleigh clubs, a combined club-cum-S.M.A.E. event, and a precision power The inter-club affair resulted in a tie between competition. the locals and Portsmouth, times being as follows:

Open Rubber	M. Coxon	Southampton	2:05:3
	D. S. Haskett	Portsmouth	1:00-3
Open Glider	J. Richards	Southampton	11 : 10 o.o.s.
	E. D. Gordon	Southampton	8:03.6 0.0.5.
Open Power	J. Underwood	Portsmouth	3 : 12.2
	J. Caplehorn	Portsmouth	1:30.6
Nearest 45 secs.	W. Pryn	Portsmouth	44.25
	M Wanaham	Southamaton	E2

Coxon again showed his prowess in the S.M.A.E. competition, aggregating 6:21 for two flights and losing the model. Richards, flying a "Sunnanvind," totalled 6:32 to win the glider class. The power precision event provided a welcome change from the long succession of purely duration contestsand proved an education to many as well. Although the first model was sent away in good style, it was disqualified for exceeding the maximum duration required, whilst Nos. 2 and 3 failed to achieve the minimum ! | A junior, B. Leach, proved the eventual winner with L. J. Marshall a good second, and P. Cock a rather unlucky third.

The BLACKPOOL & FYLDE M.A.S. local Championship was flown off in a high wind, thus much damage and rather low times. C. J. Davey aggregated 3: 25.4 to win from R. Brownson, only 12 seconds behind. Davey also, proved winner over all champion for 1947 with a collection of 425

points, having entered all five contests to qualify.

The second of an interesting series of ENFIELD & D.M.A.C. contests were flown off on October 5th. All members are paired up as teams of two, comprising a novice and an experienced modeller. Weather conditions were calm but very foggy, resulting in models going 10.0.s. in under

Winning team was the Warren/Whalley 80 seconds. combination with an aggregate of 5:20. Recent flyaways include 3:30 by Pete Plummer's lightweight glider, 5:00 by K. Knott's rubber job, 6:15 by Ron Cooper's "Sunnanvind," and 5:51.8 by J. Warren's sleek new diesel model.

Gusty, showery weather awaited the MERSEYSIDE M.A.S. on S.M.A.E. Cup day but, for all that, the largest turnout of the season took place. Two juniors put it across the seniors, though Gosling's "Senior Gull" simply revelled in the strong wind. Times were:

W. Blanchard R. F. L. Gosling R. Aveyard (J) C. Hall (J) 2:09·5 1:58·5 1:03·5 33·5 1:35 1:36,5 1:42 42 2:10 2:19 2:08·5

Following the loss of two models on first flights, the ST. ALBANS M.A.C. team placed third in the National Cupno mean effort. This club also sent along a strong contingent to the Junior shindig at Fairlop on September 21st, when Derek Eastwell came out top man in the rubber class, having to take two flights (both o.o.s.) only to aggregate a winning 5:30'8. Acquisition of Bell Meadow (which lies within the precincts of the one-time Roman city) for control-line flying is giving the lads plenty of practice in readiness for the 1948 programme, which will undoubtedly include this form of flying.

Celebrating its first birthday is the PLYMOUTH M.F.C., with membership approaching the century mark. In order to keep in use various engines owned by members, a Model Car section is being conducted through the winter, and the first car—using a pusher airscrew driven by an E.D. diesel was tried out recently in the bottom of the drained boating

pond in Central Park, speed 21 m.p.h.

Following the (unpremeditated) removal of the complete nose of his Wakefield just before the PRESTON & D.M.A.G. contest for the "Birkbeck Cup," J. Hurst did a bang-on repair job and aggregated 3:53.6 to win, flying a "Copland Wakefield." C. Sharples was only 1.4 secs. behind with his "Korda," with third man J. Jackson, again with a Copland, totalling 2: 57.9.

A spectacular flight was made by A. D. Pearson's "Zoomer" from the DARLINGTON M.A.C. ground. Following a 30 second engine run, the model hit the very grand-daddy of thermals and remained aloft for 1 hour 10 minutes, recovered by two members who chased over hill and dale on a motorbike.

In spite of many top-class members being engaged at times the arduous task of organisation, NORTHERN HEIGHTS M.F.C. keep their end up as usual, latest success being the collection of first three places in the Keil Trophy flown at Fairlop, the chaps responsible being Tansley, Collins

Regarding the notice in last month's issue anent the disbanding of the Guildford club, the GODALMING & D.M.F.C. extends a welcome to all ex-members of the now defunct body. Meeting night is Friday at 7 p.m. at the Cooperative Assembly Rooms, Bridge Street, Godalming

As last year's winners, the PORTSMOUTH & D.M.A.C. have the job of arranging the conduct of the "Hampshire R.T.P. Challenge Trophy" this winter. This event is open to all clubs in Hampshire, for teams of six, and will be an allday affair. Date will be some time in January or early February, full details to be obtained from the Competition Secretary, Mr. W. Prin, 13, St. Mary's Road, Fratton. Portsmouth.

It is good to see the interest being taken in aeromodelling these days by some R.A.F. stations, and the current report from LITTLE RISSINGTON gives details of a well attended meeting, over eighty entries competing in four classes, Sgt. Harrison of Feltwell clocking best time of the day with 17: 35.6 o.o.s. Times in the glider class were not high, best being by Cadet Meijer with 4:58. F/Lt. Long again won the power section, thus retaining an unbroken record in this class. L.A.C. Coplestone carried off the main "solids" prize with a fine Bristol Fighter, and Cadet Hilliard earned a round of

applause for his demonstration of control-line flying.

To end this month's chatter, I have word from A. Imrie of
Station Cottages, Humbie, East Lothian, who would like to contact all modellers in East Lothian who are keen on forming

And so, this being the last issue for 1947, we now look forward to a bumper season in the new year of 1948. It is many moons since we had such a run of fine weather as experienced this year, and I suppose it would be presumptuously optimistic to look forward to another dose next year. Still, they can't shoot you for hoping, can they? So here's to an even better season than the past one, and may our chosen hobby go from strength to strength in every phase of its activities.

THE CLUBMAN.

NEW CLUBS.

PRESTWICK M.A.S.
R. C. Parsons, 36, Wellington Street, Prestwick, Ayrshire.
ZOOMERS (formerly Grantham Aeronuts). ZOOMERS (formerly Grantham Aeronitts).

J. Barker, 13, Launder Terrace, Grantham, Lincs.

ABERDEEN M.A.C.
F. G. Steele, 36, Woolmanbill, Aberdeen.

MARLOW M.A.C.
H. W. Hitch, 67, Dean Street, Marlow, Bucks.

NORTH LONDON CONTROL-LINE M.F.C.
H. J. Nicholls, 5, Ludlow Way, London, N.2.

R.A.F. WATNALL M.A.C.
F/Lt. L. W. Jackson-Wynch, D.F.C., R.A.F. Station, Walsall, Notts.

Hayes

10

Birmingham

SECRETARIAL CHANGES.

TUNBRIDGE WELLS M.A.C. P. J. Southgate, 12, Ravenswood Avenue, Tunbridge Wells, Kent.

S.M.A.E CONTESTS.

	NATIONAL	CUP.	
1	Croydon	207-02	points
23456789	Northampton	168-83	93
3	St. Albans	144-98	27
4	Park M.A.L.	142-65	23
5	Luton	138-13	**
6	Birmingham	132-50	"
7	Surbiton	110-22	**
8	North Kent	96.55	",
9	Bushy Park	82-82	,,
10	Ashton & D.	73-89	**
ΙĬ	West Essex	72-94	**
::		47 23	"

** (37 clubs competed.)

S.M.A.E. CUP K. H. Lloyd R. J. Perry M. Hanson N. Lee J. Bowerman A. W. Green P. Elton 1157-2 887-0 815-7 Harrow Birmingham Kingsbury 735-7 688-0 676-1 606-4 570-7 552-7 Croydon Kingsbury West Essex Birmingham Blackheath J. Homes 9 N. Marcus 10 W. A. S. Geddie 11 E. W. Evans 12 R. Ladd Croydon Zombies Northampton 529.0 Luton } **524**·5

Croydon (197 entries.)

PLUGGE CUP 1148-95 points 1023-67 890-57 846-48 842-96 797-86 Croydon Luton **Bushy Park** Hayes **Brentford** Northern Heights Streatham 796-67 Bristol 707-34 Blackheath Ashton Park M.A.L. 662-51

1947 INDIVIDUAL CHAMPIONSHIP

ı	A. H. Taylor	Bushy Park	292-5
2	B. Chandler	Croydon	288-97
3	N. Marcus	Croydon	288-22
4	S. Eckersley	Bradford	281.03
5	G. Salt	Birmingham	268-04
6	J. Higgins	Brentford	261-97
7	F. French	Hayes	248-87
8	S. A. Miller	Luton	246-97
9	A. A. Parker	Park	244-43
10 11	R. Minney	Luton	243-60
	R. Clements	Luton	238-37
12	B. V. Haisman	Liverpool	232-94
(46)		ned scores in the four	contests
•	5	ched uled.)	

MEXBOROUGH & D.M.A.C.
D. Wardingley, 9, St. Nicholas Road, Rawmarch, Rotherham, Yorks.

BOLTON M.A.S.
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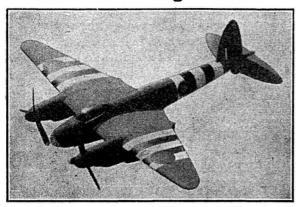
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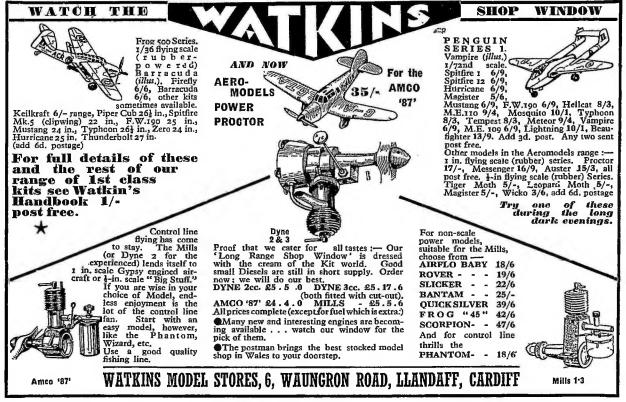
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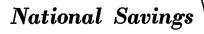


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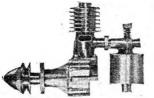
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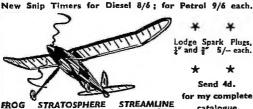
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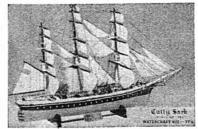
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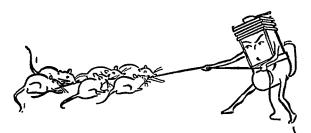
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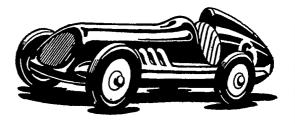
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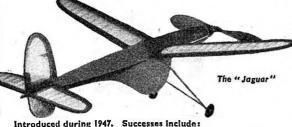
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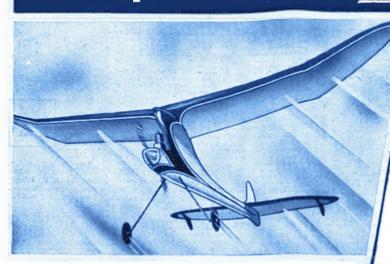
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