MODEL AIRCRAFT

1/-

JUNE, 1946
Vol. V. No. 6

THE JOURNAL OF THE S.M.A.E.

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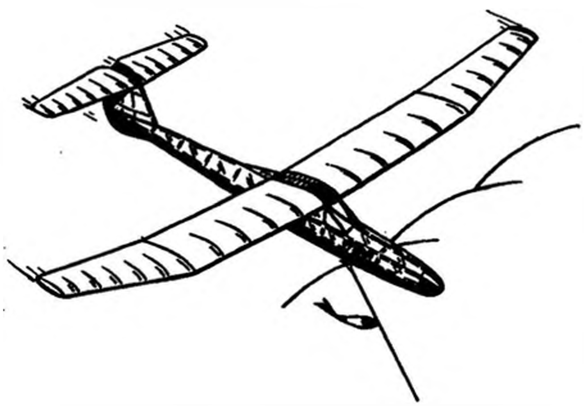

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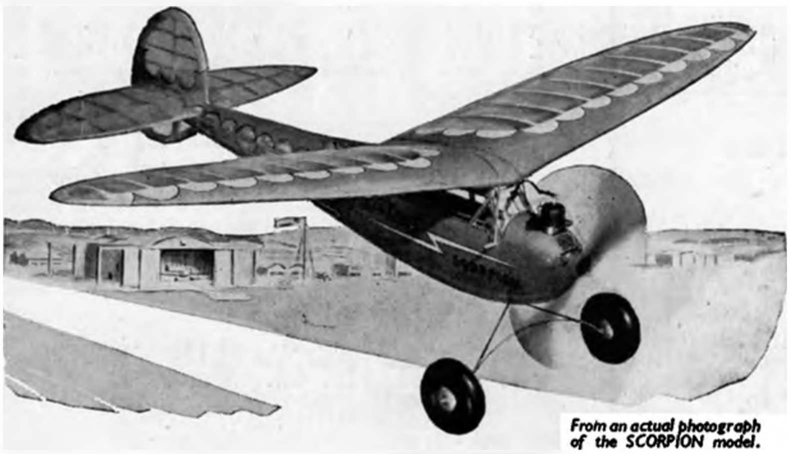

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MODEL AIRCRAFT

The Journal of the Society of Model Aeronautical Engineers

JUNE 1946

Volume 5. No. 6

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Edited by
A. F. HOULBERG, A.F.R.Ae.S.

The Editor invites correspondence, which should be addressed to him at "Crossways," 102, Staunton Road, Headington, Oxford.

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The Editor presents

A PERCIVAL MARSHALL PUBLICATION

Recent Rallies

The Rally season is now in full swing and judging from the attendance and number of entries for the first two—those held by the Surbiton and Bushy Park Clubs—their popularity is still on the increase.

The Surbiton Rally held on Epsom Downs was favoured by excellent weather and the pleasing spectacle of some ten models taking the air simultaneously was observed during the greater part of the contest.

The Bushy Park Rally at Hounslow Heath was not favoured with such good weather conditions, the day being both cold and boisterous. Nevertheless, the attendance was good, the "Petrollers" being particularly active and enthusiastic.

As a result of the gusty weather there were a considerable number of casualties amongst the petrol models, many of which could have been avoided by the competitors taking more care of the wind directions at the time of launching and making sure that their model was released at the correct angle. No model—either rubber or petrol—can withstand a combination of wind and torque acting in the same direction.

Four members of the Blackheath Club snapped at the Surbiton Rally at Epsom. They are A. Burrows, H. C. Baines, G. Hinkley, and R. C. Galbreath, reading from left to right.

A type of model which is not seen as often as it should is the semi-scale flying type. Here is an excellent example seen at the Bushy Park Rally. It is the work of "Air Taxi" Brooks (Photo by A. F. Houlberg.)

A tense moment in the Bushy Park Rally—withdrawing the booster leads and setting the timer prior to release. (Photo by A. F. Houlberg.)

The Bushy Park Rally marked the first entries in an open contest of auto-ignition engine-driven models. Models of this type were entered by A. A. Judge and G. Court, the latter's machine striking a thermal in a trial flight and disappearing out of sight.

It was returned a few days later as the result of publicity in the *Daily Mirror* by a member of the R.A.F., who found it, but not before he had taken it to pieces to try to find out how it worked and attempted to make it run on petrol.

News Review

Our Cover Picture

Our cover picture this month shows Ken Tansley, of the Northern Heights Club, starting up his T-9 petrol-driven model on Hounslow Heath, on the occasion of the Bushy Park Club's Rally, on April 21st. Tansley was the eventual winner of the Petrol Class at this Rally and he subsequently won the Sir John Shelley Cup at Hockley Heath on May 5th with the same machine. As the weather on both occasions was extremely cold and boisterous, these two wins establish this machine as being exceptionally stable and reliable, in addition to possessing good looks.

The Tansley T-9 was fully described in the pages of our February issue and it can be confidently recommended to those who wish to build a model which will give consistent results under adverse conditions. Full scale plans are obtainable from our Publishing Department.

The photograph was taken by your editor.

Merit Certificates

Details of the latest F.A.I. Regulations, which were agreed to at the last meeting held in 1939, and which are now being brought into effect, have just been received, and as a result it will be necessary to modify the qualifying requirements for the "International" Certificate, detailed in the article on Certificates of Merit in the issue of MODEL AIRCRAFT, dated October, 1945, in order to bring them into line with the present F.A.I. ruling.

The qualifications for the International Certificate are now :—

(*a*) One flight of over 3 min. R.O.G. with a "Wakefield" type model.

(*b*) One flight of over 5 min. with a F.A.I. Glider (Cable Launch 655 ft. line or Running Launch 328 ft. line maximum).

Note.—These are two separate endorsements and both are required before a certificate can be issued.

A Long-Distance Record

Transport Command have succeeded in establishing a new record for a flight to New Zealand from this country, and back, in the amazing time of 6½ days, with "Lancastrian" aircraft.

When it is realised that this journey entails a distance travelled of 12,830 miles at an average speed of 230 miles per hour, and that it beat the previous record by no less a margin than 22 hours the full merit of the performance will be appreciated.

In the organisation of this flight two aircraft and four crews were employed to avoid excessive fatigue of individual members of the crew. The second machine had the bad luck to encounter bad weather on its return to this country and found itself unable to accomplish a landing, so had to turn back and spend the night at Bordeaux.

A Record Hitch Hike

In establishing this record another record was unexpectedly achieved on the return journey.

It appears that when the machine landed at Ceylon the Captain was approached by an Australian air-gunner for a "lift" to England explaining that he had a date with an English girl living at Hove for a wedding and as he was unable to fix a berth on a boat he had decided to "hitch hike" to England. A Liberator had obligingly carried him over the first leg of the journey.

As his papers were in order and there was room for him, he was taken along. Well! Well! What luck!

Flying Boats

Information has been received that the Ministry of Civil Aviation have placed an order for twenty gigantic flying boats much bigger than anything which has yet been built. This is one of the largest orders for civil aircraft ever placed, and it is the intention to use these flying boats on the British civil air routes.

The boats are to an ambitious specification and will weigh some 120 tons each and be capable of carrying 100 passengers at a speed of 350 miles per hour over a range of 5,000 miles in still air.

From this it would appear that the Air Ministry is still pinning its faith on the flying boat for service on its projected long range routes, as a result of past experience.

Wireless Control

We recently pointed out in these columns that the position of aero-model enthusiasts who wished to make use of radio control was rather obscure, so far as the licensing position was concerned.

As a result of a letter addressed to the

Telecommunications Department of the General Post Office on this subject by the S.M.A.E., asking if experiments could definitely be carried out without licences, a letter was received which makes the position clear, and establishes that experiments can be carried out without licence, but asking all those who indulge in this form of experiment to inform the appropriate department of the Post Office.

We are giving the full text of the letter received from the Telecommunications Department, so that our readers can comply with their request in this matter.

Telecommunications Department,
General Post Office,
London, E.C.1.

The Society of Model
Aeronautical Engineers.

SIR,—With reference to your letter of April 3rd, I am directed by the Postmaster General to say that it is confirmed that, for the present, he has no objection to experiments in model control being made on the frequency of 460.5 Mc/s. It would be convenient, however, if persons transmitting on this frequency for model control would be so good as to inform the Radio Branch, W2/6, Engineering Department, General Post Office, E.C.1, giving name and address and quoting the reference number 16311/46, as it may be desirable at some time in the future to suggest a change of frequency for such transmissions.

I am Sir,
Your obedient Servant,
(*Signed*) J. V. ROBERTS.

In the interests of the model aeroplane movement, all who indulge in wireless control experiments must comply with the terms of this letter.

Tail-less Contests for 1946

The S.M.A.E. announce that Sir Frederick Handley Page has presented a further series of prizes for tail-less model aircraft for competitions during the present season.

The contest will take a different form this year, and will be held in conjunction with six of the principal S.M.A.E. contests to give provincial modellers who are interested a better chance of competing, as a number of promising models were unable to compete at the centralised contest last year owing to difficulties of travel.

For 1946, Sir Frederick Handley Page has offered a prize of £5 0s. od. in each of the following contests for the best performance made with a tail-less model, as an incentive to further experiment with models of this type.

Centralised Contests.

The Hamley Trophy (June 9th), petrol models.
The Bowden Trophy (August 4th), petrol models.
The Duration Contest (September 15th), petrol models.

Area Centralised Contests.

The Pilcher Cup (May 26th), gliders (S.M.A.E.).
The Thurston Cup (July 14th), gliders (F.A.I.).

Decentralised Contest.

The S.M.A.E. Cup (September 22nd), open rubber or glider.

As a further encouragement he has graciously offered a prize of £50 to the first competitor who *wins* any one of these six contests with a tail-less model.

For the purpose of these Handley Page contests, the rules of the 1945 contest will apply with the exception that the minimum area of the competing machines must not be less than 500 sq. in. The method of points allocation will be governed by the rules of the individual contests.

Detailed rules will be found on page 153.

Petrol or Auto-Ignition

The first major power driven competition of the year—that for the Sir John Shelley cup, held at Hockley Heath Aerodrome, on Sunday, May 5th—has failed to indicate that the auto-ignition engine has any ascendency over the petrol engine at the present stage of its development.

The lower scale of revolution, which is a characteristic of the auto-ignition engine, appears to render the take-off more difficult, as one would expect, but general observation would indicate that this is partly due to propeller design faults and that more attention to this aspect on the part of aeromodellers is justified.

Owing to its higher compression ratio the auto-ignition engine " packs a bigger punch " than its petrol counterpart, and it needs a larger propeller to absorb its output and convert it into useful thrust.

Those who enter the realm of experiment with this type of engine will find much benefit from proper thought regarding propellers, and on no account should they consider using the same propeller which they used with their petrol engine of the same capacity.

AN AUTOMATIC VARIABLE PITCH PROPELLER

J. B. ALLMAN

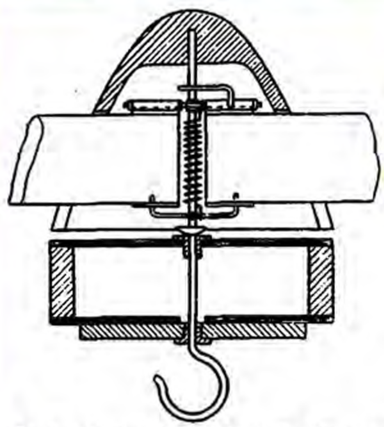


Fig. 1. Section of nose-block and spinner, showing variable mounting of blade roots.

A RUBBER-DRIVEN model, when fully wound, starts with very considerable power on the propeller, much more in fact than is required to get the model off the ground.

This excessive power is largely wasted, firstly due to the propeller trying to " cut a hole in the air " before the plane itself is under way and secondly, due to the model subsequently assuming a steep and inefficient climbing angle. Thirdly, a possible stall at the top of the climb if the trim is not correct.

Towards the end of the flight the remaining power is so reduced as to be of little value.

Now would it not be a good idea if we could release the power gently and efficiently at the start and more rapidly at the finish so that a more even thrust would be obtained throughout the flight. A slow but steady climb continuing until the power is nearly exhausted.

The following description of an automatic variable pitch propeller will tell you how this can be done.

This variable pitch propeller works in the opposite way to the variable pitch propeller on full sized aircraft, inasmuch as it starts with a high pitch and finishes with a low pitch.

Figure 1 shows the boss spinner and nose block with the variable pitch mechanism enclosed inside the spinner. The whole is constructed as follows :—

A suitable propeller must first be chosen, which has a diameter and pitch which will fly

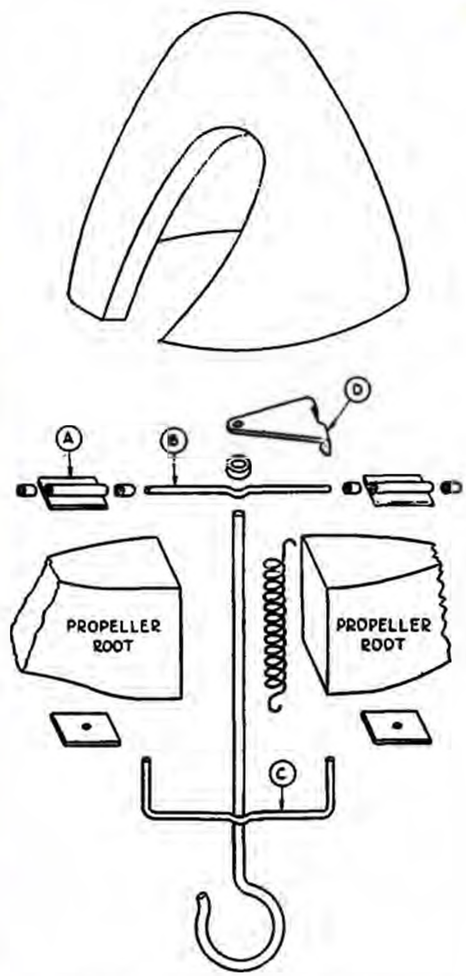


Fig. 2. Exploded view, showing components of variable-pitch propeller.

the plane under normal conditions. For example, let us say, a 12 in. diameter with a 16 in. pitch. This propeller is then cut into two.

To the front edge of each blade near the root we fix two small tubes, which have previously been soldered to two small brass plates of about 0.005 in. thick. See "A." Two similar small brass plates (without tubes) are fixed to the back of the blade roots and all are firmly cemented and bound with fine thread.

A steel wire of 18 or 20 gauge is then bent as shown at "B," and the ends are pushed into the two tubes on the propeller blades. Small collars are soldered on to the steel wire. A larger collar to fit over the propeller shaft is then fixed into the curved part of the wire and bound and soldered into position. The propeller blades are then held together, and in line, but they can swivel on the steel wire.

We next take the propeller shaft (of 16 gauge steel wire) and to it we fix an 18 or 20 gauge wire of the shape shown at "C," which is bound and soldered to the propeller shaft.

A light coil spring of about 30 gauge wire is then fitted on to the propeller shaft and fixed to the prongs. It must be a left-hand spring so that it will tend to lower the pitch when the spring is in tension.

The propeller can now be slipped on to the propeller shaft and a few turns applied to the spring before attaching the front end to the swivelling part of the propeller. The double prong is then inserted in two holes previously made in the rear plates.

It will now be found that the outfit will resemble a propeller, but the action of the spring will give it a very low pitch. Now we must not allow the propeller to assume a too high or too low a pitch, so we must fix some arrangement that will limit its variation. Let us say, a maximum of 18 in. and a minimum of 14 in.

We then fix a brass plate with two lugs shown at "D" to the front of the propeller shaft and bind it and solder it in position after the pitches have been checked and found correct. The two lugs pass one on either side of one of the brass tubes and the distance between the lugs regulates the amount of the pitch variation.

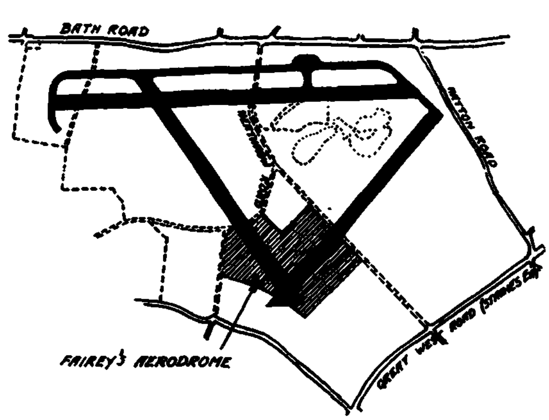
A carefully turned spinner then encases the whole mechanism. You may well ask whether this new gadget will work and has it ever been tried out. As a matter of fact the idea is just eleven years old but it has never been published before.

In 1935, "Will o' the Wisp," a model on which this propeller was fitted, secured a Wakefield Cup Bronze Medal, and a year later captured the Barnard Shield. It was not all due to the variable pitch propeller, but the mechanism certainly did work, and resulted in a very steady and pleasing take off, and a climb which continued until the rubber was almost exhausted.

THE PASSING OF HEATHROW

HEATHROW—which embraces the site of the old Fairey's aerodrome, has again been in the news of late; firstly, on account of the spirited criticisms which have been made in certain quarters concerning its alleged technical faults; and secondly, for the reason that its name has been changed to "The London Airport."

Widely divergent viewpoints have been expressed concerning the suitability of the site, the planning of the runways, etc., but we are not going to discuss the merits of the arguments advanced as we have enough argument, and to spare, regarding the design, performance and handling of our models. We have, however, found that few of the aeromodellers familiar with the old Fairey's aerodrome have the remotest conception of the enormous size of the new 'drome, and to help them to visualise the scope of the new London Airport, we are publishing a thumbnail plan of that portion of the Airport which is at present under construction and partly completed, on which we have indicated, by a shaded area, the original Fairey's aerodrome as we knew it before the war.



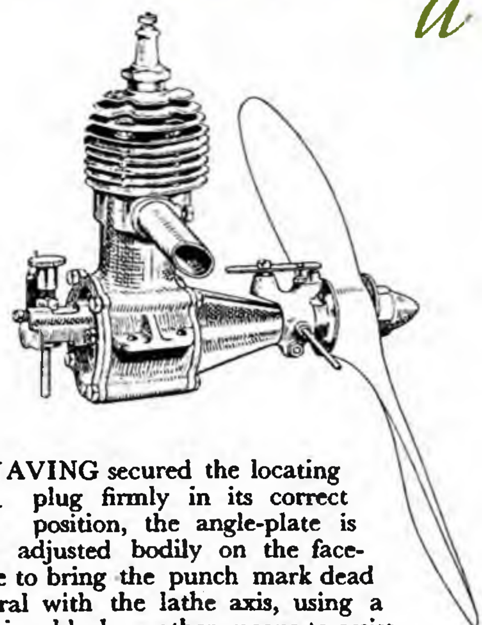
The three main runways in triangular formation shown on the plan are, however, only the first stage in the development of the new London Airport, which will eventually extend across the Bath Road.

THE "ATOM MINOR" MARK III

A New 6 c.c. Engine for MODEL AIRCRAFT

by

Edgar T. Westbury



HAVING secured the locating plug firmly in its correct position, the angle-plate is now adjusted bodily on the face-plate to bring the punch mark dead central with the lathe axis, using a scribing block or other means to assist accurate setting, after which the bolts securing the angle-plate to the faceplate are tightened up. It is desirable to balance the assembly, by clamping any odd pieces of metal on the faceplate, opposite the angle-plate, so that the lathe will run without vibration. The casting is then slipped over the plug, front crankcase face downwards (i.e. exhaust socket to the left) and clamped down with a plate or " strap "—not forgetting the paper washer—secured by the central set-screw, or better still, by a long strap with bolts at either end passing through the side slots of the angle-plate. It will be found necessary to set the outer end of the casting sideways so that it runs truly—this is done by swinging it round the plug, not by shifting the angle-plate—and it will be seen that this method of setting-up positively ensures that the axis of the bore will be in its correct location.

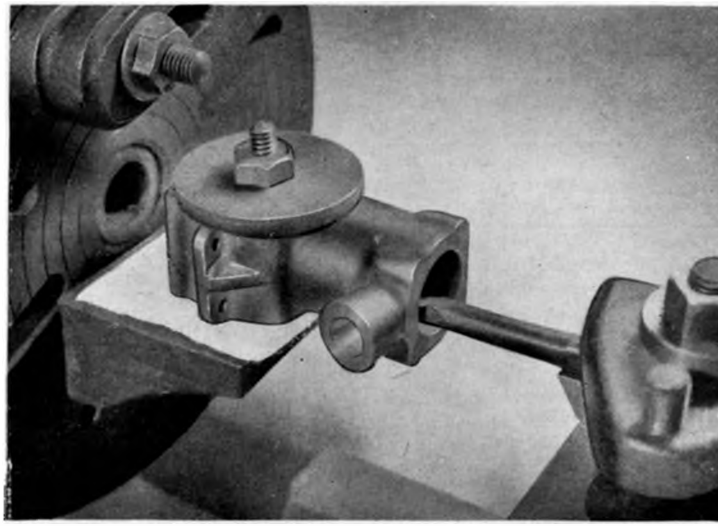
The boring and facing operation is now quite straightforward and will take much less time than the setting-up. Some constructors may begrudge the time taken in making clamping devices or simple jigs, but attempts to find short cuts are liable to lead to dangerous pitfalls. Any device which assists or ensures accuracy in engine construction is worth while.

The distance of the upper surface of the casting from the centre of the crankcase is of great importance, as it influences the position of the piston at the end of the stroke, and therefore affects port timing. Measurement should be taken from the crankcase centre and may be marked out on the edge of the casting before setting it up on the angle-plate. Should any error be made in this dimension, however, it may be compensated for when making other components, *so long as it is recognised and duly noted.*

Showing how the crankcase barrel may be bored and faced, holding the casting lightly in the four-jaw chuck with one jaw reversed.

Exhaust Socket

The exact angle and location of the socket are not vitally important, but it is just as easy to do the job properly as otherwise, and while the casting is mounted on the faceplate, it may be swung round 180 deg. and the angle-plate readjusted to bring the port central for boring and facing. A bevel gauge or protractor, set to 80 deg. and presented to the cylinder seating face of the casting, will enable the required angle to be obtained. Another way to bore the socket would be to clamp the casting on the lathe cross-slide at the appropriate angle and use a drill in the lathe chuck, but this is little, if any, easier and less accurate.



Boring the upper extension of the casting, which is mounted on an angle-plate (note sheet of paper under it to avoid marring the machined surface), and located by the plug as previously described.

Only the outer bore, to take the exhaust pipe, can be machined, the rest of the passage being cored so as to blend with a rectangular slot on the inner face. This may be cleaned out and faired off with riffler files or rotary cutters. The size of exhaust pipe specified (⅜ in. diameter) is adequate to carry away the gases in a normal aircraft engine of this capacity, but if desired, the socket may be opened out or tapped to take a $\frac{7}{16}$ in. diameter pipe ; this is recommended in cases where the engine is to be tuned up for maximum performance. The engine will, of course, run quite well without an exhaust pipe, but I think the fitting of the pipe is well worth while, and one of my pet aversions is the open-exhaust engine which sprays sooty oil all over the fuselage of a nice clean 'plane.

The feet of the bearers may be finished by milling, if one possesses the necessary facilities, such as a vertical slide or milling attachment ; but if not, they may be filed. It is very desirable that they should be in exact alignment, and level with the shaft axis, as this very much assists in setting the thrust line accurately when installing an engine. Most users of engines nowadays prefer to mount them on bearers, but there is a great deal to be said in favour of bulkhead mounting, which can be carried out quite easily in this engine, by attaching the rear crankcase cover flange to a mounting ring or plate. If this plan is adopted, the bearer flanges on the engine may be cut away.

Drilling and tapping operations for the crankcase and cylinder fixing-screws are best left until the mating components are completed, so that their location can be matched with the clearance holes in the latter.

It will be observed from the drawing of the body casting that a small internal notch, $\frac{1}{16}$ in. wide, is cut at an angle of 15 degrees to the vertical, at the base of the cylinder skirt, where it joins the crankcase barrel. The object of this, of course, is to clear the connecting-rod at its point of maximum angularity. This notch may be produced by filing, and its exact size and angle are not of great importance, so long as the required clearance is provided ; but it should always be remembered that clearances anywhere in the crankcase should never be unnecessarily large, or pumping efficiency will be impaired.

Any cleaning-up operations on the outside of the casting which may be considered desirable may be carried out at this stage, except the matching up of the bolting lugs with those on the flanges of front and rear covers, which should be left until the latter can be temporarily fitted in their correct positions. It may be mentioned that, at the moment, steps are being taken to ensure that the castings which are supplied for building this engine are of the highest possible quality and finish, so that little or no cleaning up will be required.

I have considered it desirable to describe in detail the operations on this casting, as I find that many engine constructors encounter difficulties through incorrect machining procedure. The other castings involve no special problems in setting-up and machining.

(To be continued)

SOLIDS OF YOUR FLYING MODEL

by W. A. DEAN

Here is Mr. W. A. Dean's actual flying model which he made the subject of a solid replica for record purposes as described.

HAVE you ever considered making solids of your favourite glider, petrol or duration models? I decided to build a reduced scale solid of my latest glider design recently and the result was very pleasing. Then it struck me that there were many models which I have built or admired at different times which were also worth remaking in this form. So that was the start of my rather unusual collection of solids.

The scale for these models depends entirely on the amount of room at your disposal. All my own models are built to a quarter full-size, which keeps even six-footers down to a reasonable span of 18 in.

The amount of work involved in the average solid of a flying model is far less than that for a real aircraft solid of similar size. For instance, a solid of Dick Korda's slab-sided 1939 Wakefield winner is simplicity itself and can be made up in a few hours. Propellers are the trickiest parts to construct on duration models—I usually fit discs of celluloid unless I feel particularly energetic. You'll probably do the same after the first 4-in. paddle-wheel propeller.

The usual solid constructional methods are still applicable and ribs and stringers can be represented in the usual way with cotton doped on. Very few flying models feature external bracing wires, so solids are mostly simplified in that direction.

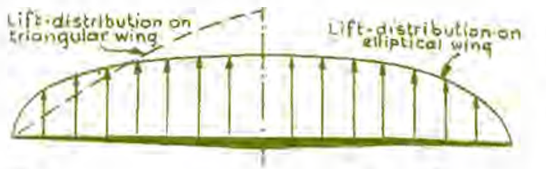
I use hardwood for all models, as wing sections are very thin in comparison with those on the normal solid scale and consequently balsa would break too easily. Most undercarriages can be made of single pieces of very light gauge wire with wheels made from sheet. The usual scale balloon type are suitable when it is desired to represent air wheels. The hardest items to model are petrol engines and it is a consoling thought that most designs call for cowlings nowadays. Retracting undercarriages, dethermalisers and similar gadgets can all be featured if you are a "super solid" fan.

Take care to use authentic colour schemes and lettering—especially with solids of your own models, as memory is very colour conscious.

When wings are retained by rubber bands or tongue and box fittings on the original model, the same method should be used on your solid. This is useful for packing purposes and is, of course, essential if you want a faithful reproduction.

It seems strange that modellers should turn out scale models of full-size aircraft by the thousand, and yet ignore their own hobby as a source of scale material. Surely the models of our own experiments are worthy prototypes.

The finished and attractively mounted solid replica which now graces Mr. Dean's drawing room.



For and against WASHOUT

By J. van Hattum A.F.R.Ae.S.

MANY models possess wash-out on the wing-tips. Sometimes this is considerable, sometimes it is only slight. In a good many cases, however, the builder cannot give precise reasons why he has done so and we may therefore assume that in some instances wash-out has been too liberally applied or might, with advantage, have been discarded.

In order to achieve the best results, the designer must try to combine the best possible shape with the essential requirements dictated by the need for sufficient stability. It will be clear that this leads to a compromise. If we are agreed on this, how do we stand with respect to wash-out?

Wash-out is nearly always obtained by either of one of the following methods :—

(*a*) Change of wing-section in the sense that a concave section is used for the main portion of the wing, while a symmetrical or bi-convex section is used at the tip.

(*b*) Reduction of "rigging-angle" over the outer portion of the wing.

In many cases these methods are combined.

Theoretically the wing will be most efficient when the lift-distribution along the span has the form of a semi-ellipse. This is achieved only when the wing itself is of elliptical plan-form. When the wing is more nearly rectangular, the lift-distribution will also assume a more rectangular shape. When the wing is of triangular plan-form, or very sharply tapered, the lift-distribution will be more nearly triangular. If a wing has a constant chord and a high aspect ratio, the lift-distribution will not be very far from the semi-ellipse. The same applies to a wing of trapezoidal plan-form, that is a normal, tapered wing.

The most efficient lift-distribution will be spoiled when the incidence at the tip is reduced, for it was assumed that the incidence was constant over the entire span. The diagram shows that pronounced wash-out has a very bad effect on the shape of the lift-distribution. At the tips there will be loss of lift and this loss will have to be made good by the remainder of the wing ; the wing will have to fly at a greater angle of incidence than before. At small angles of incidence it may even come to the stage when the tips experience a downward load, that is they supply negative lift. The effect on the lift-distribution ratio is exceedingly detrimental.

Wash-out may be a means to change the more rectangular lift-distribution of the rectangular wing to the elliptical. This applies to perfectly rectangular wings of small aspect ratio. Wash-out would improve their efficiency.

One is often told that wash-out increases the efficiency of wings as it reduces the induced drag. The reasoning follows the line that the induced drag is mostly made up of the drag due to tip vortices and by reducing the lift at the tip these vortices are suppressed. Now, there is nothing in theory to suggest that this will be the case. The induced drag-coefficient is dependent only on the square of the lift-coefficient and the inverse of the aspect ratio and not on the local conditions at the tip. When we reduce the incidence at the tip we may even make the tip entirely inactive, but this will only reflect adversely on the effective aspect ratio of the whole wing. If it were only a case of obtaining a small tip-vortex the triangular wing would stand out, whereas it most emphatically does not.

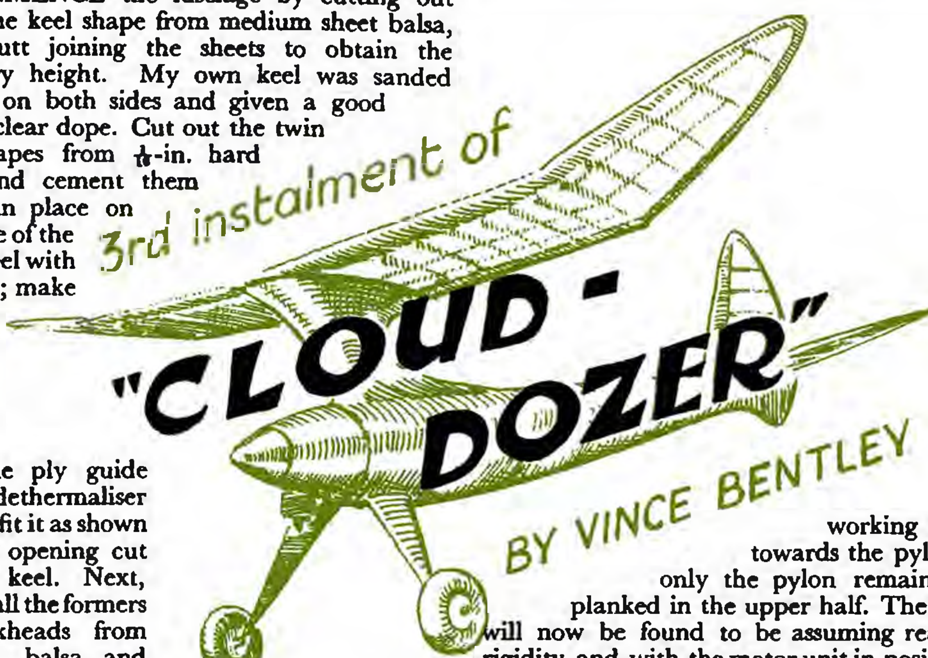
A more sensible argument in favour of wash-out is tied up with stability. When one reduces the angle of incidence towards the tip, one may make sure that while the central portion of the wing is stalled, the tips are still below the critical angle. This is desirable in full-size aircraft because of the danger that may present itself at the landing when one wing shows a tendency to drop. It increases the lateral stability ; when a model stalls badly it will dive, but remain level. But is this as desirable as all that? Many of us have found that a certain amount of lateral instability at the critical angle of incidence is not a bad thing. The model will drop a wing, get into a spiral and recover completely. Very often the laterally stable model will go on diving and stalling until it is stopped by the ground.

What is there left for wash-out to do? Strictly speaking, it is advantageous only as a means of improving the efficiency of rectangular wings of low-aspect ratio, but there is still the case of the laterally completely unstable model which continues to drop a wing when towed up and still has sufficient dihedral to ensure automatic stability.

3rd instalment of

"CLOUD-DOZER"

BY VINCE BENTLEY



COMMENCE the fuselage by cutting out the keel shape from medium sheet balsa, butt joining the sheets to obtain the necessary height. My own keel was sanded smooth on both sides and given a good coat of clear dope. Cut out the twin keel shapes from 1/16-in. hard balsa and cement them firmly in place on each side of the main keel with Durofix; make the little ply guide for the dethermaliser rod and fit it as shown over an opening cut in the keel. Next, cut out all the formers or bulkheads from medium balsa and build up the front bulkhead as shown, using Durofix for laminating. At this point it is best also to build up the motor mount bulkhead and ensure that it fits the front bulkhead correctly, after which the latter can be cemented in place on the keel and followed up by cementing all the other bulkheads, down to the beginning of the twin keel, using regular cement. Fit the 1/8 square hardwood stringer between the bulkheads at the dethermaliser position ; make up the fixed dethermaliser pull rod guide as shown, cement this between the twin keels, cut out and fix the under fin base, and follow with the 1/4-in. hard balsa tail-plane platforms. Now fit the formers to the twin keels immediately beneath the tail-plane platform.

During the periods of waiting for cement to set, finish the construction of the motor mount bulkhead and battery box unit, which should be well sanded and given several coats of clear dope until the surface is hard and polished all over. Use fine sandpaper between each coat of dope.

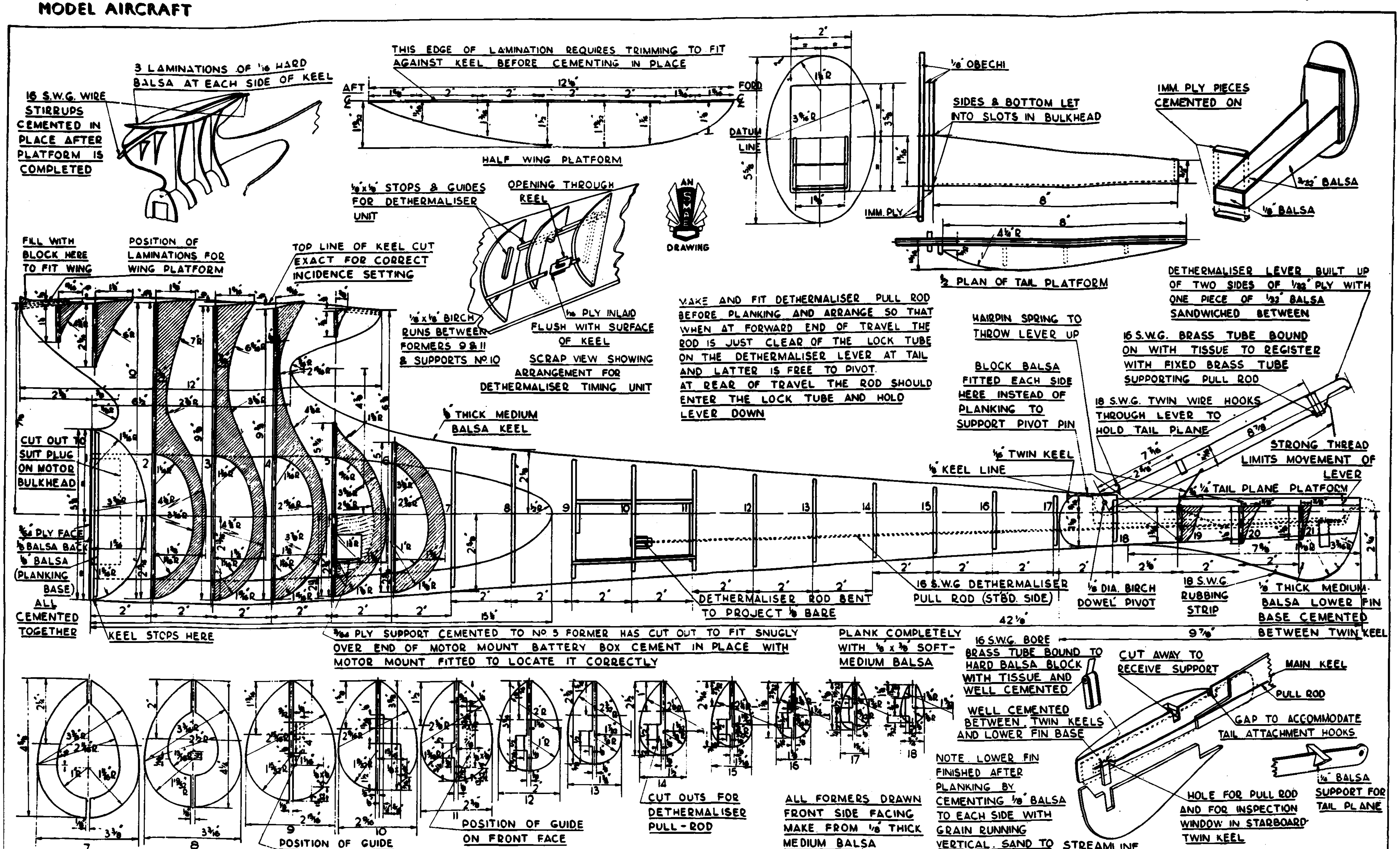
Make and fit the dethermaliser pull rod from 16 s.w.g. piano wire and make sure it works freely in its tube-guides.

Commence the planking of the fuselage by fitting two master planks, one at each side, taking care that the keel is dead straight before the cement is set. Continue planking, fitting planks alternately to each side and working upwards towards the pylon until only the pylon remains to be planked in the upper half. The fuselage will now be found to be assuming reasonable rigidity and with the motor unit in position, the 1 mm. ply steady on No. 5 bulkhead should be fitted, after which planking of the lower portion can be completed.

The fitting of planks at the tail, below the platform, will be found to be tricky, but a little patience, assisted by steam-forming the planks where necessary will result in a good job. The vertical grain side pieces can then be fitted to each side of the under fin, and the little window cut out for access to the dethermaliser pull rod.

Next, turn your attention to the pylon and fit the three laminations forming the wing platform. At the same time cut out two extra platform shapes from 1/4 medium balsa, which will eventually be cemented to the underside of the wing to correspond with the pylon top. Bend and fit the two 16 s.w.g. wire stirrups to the front and rear of the pylon and continue the planking from where it was left off, working upwards always, until the underside of the wing platform is reached. Right at the base of the pylon, at the front, where it sweeps round to the front bulkhead, I used two small blocks of balsa instead of planks. It will be necessary to steam-form most of the planks for the pylon, and I must warn you that it is the trickiest job on the fuselage ; use your own initiative in doing it as it is useless trying to describe the procedure, which, in any case, may not suit your own particular way of working.

The fuselage is now complete, ready for sanding down smooth and fitting the dether-



THE "CLOUD-DOZER" BY R.V. BENTLEY

maliser lever. The cut out for the removable dethermaliser timer unit should not be made until the unit is ready and at hand to ensure a snug fit.

The dethermaliser lever assembly is fully explained by the drawings, but very great care should be taken to ensure that, in the closed position, the pull-rod slides easily into the locking tube *without* the use of any oil.

Special Fuels

Quite a lot has appeared recently in American magazines, about the use of special fuels in improving motor performances, and a little has been seen in the British model press, but I would like to issue a timely warning, especially for the great many modellers who are or will be using petrol motors for the first time. The search for better and better motor performances has been stimulated by the rapidly rising popularity of control line flying in which speed is the major criterion in winning contests, and naturally, those enthusiasts who have got the most out of their efforts by development of more efficient 'planes, next turn to their motors in their quest for faster, faster, ever faster models.

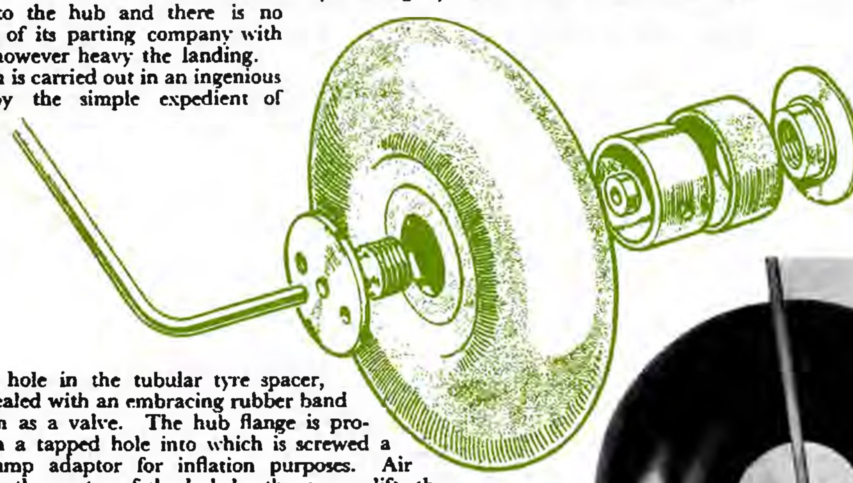
In any case, a reliable motor is more than half the battle in the usual free-flight contest ; special fuels and special adjustments mean increasing difficulty in starting and handling ; don't be one of those who " sit " a contest out tinkering with your motor all day, it is easy enough to be so without the assistance of " Super " fuels, etc. !

AN ATTRACTIVE BRITISH AIRWHEEL

We have recently had the opportunity of examining some airwheels, which have been placed on the market by Messrs. H. Rider and Son, of Wentworth Road, London, N.W.11, under the name " Riderwheels," which are not only attractive. but exceptionally well designed and constructed.

The wheels consist of a flanged hub on which is firmly clamped a moulded tyre by a flanged outer hub nut and a tubular spacer between the tyre rims to maintain their spacing. It will thus be seen that the tyre is rigidly clamped to the hub and there is no possibility of its parting company with the hub, however heavy the landing.

Inflation is carried out in an ingenious manner by the simple expedient of



drilling a hole in the tubular tyre spacer, which is sealed with an embracing rubber band to function as a valve. The hub flange is provided with a tapped hole into which is screwed a special pump adaptor for inflation purposes. Air forced into the centre of the hub by the pump, lifts the rubber band off the spacer and inflates the tyre, but immediately the pump pressure is released the rubber band again seals the tyre effectively.

Attachment of the wheel to the axle is also simple and efficient, and is carried out by means of a special washer (supplied), which is soldered on to the end of the axle and sandwiched between the wheel hub and the flanged hub nut to form a concealed stop, retaining the wheel on the axle and leaving the outer side of the wheel free from any projection.

The standard wheels are 3½ in. in diameter and drilled to take 10 S.W.G. axles (0.128 in.), but sufficient metal has been provided to allow the hub and stop washer to be drilled out to take 7 S.W.G. axles (0.176 in.).

An important feature is the fact that provision is being made by the manufacturer for spares to be available for servicing, so that the useful life of a pair of these wheels should be extensive.

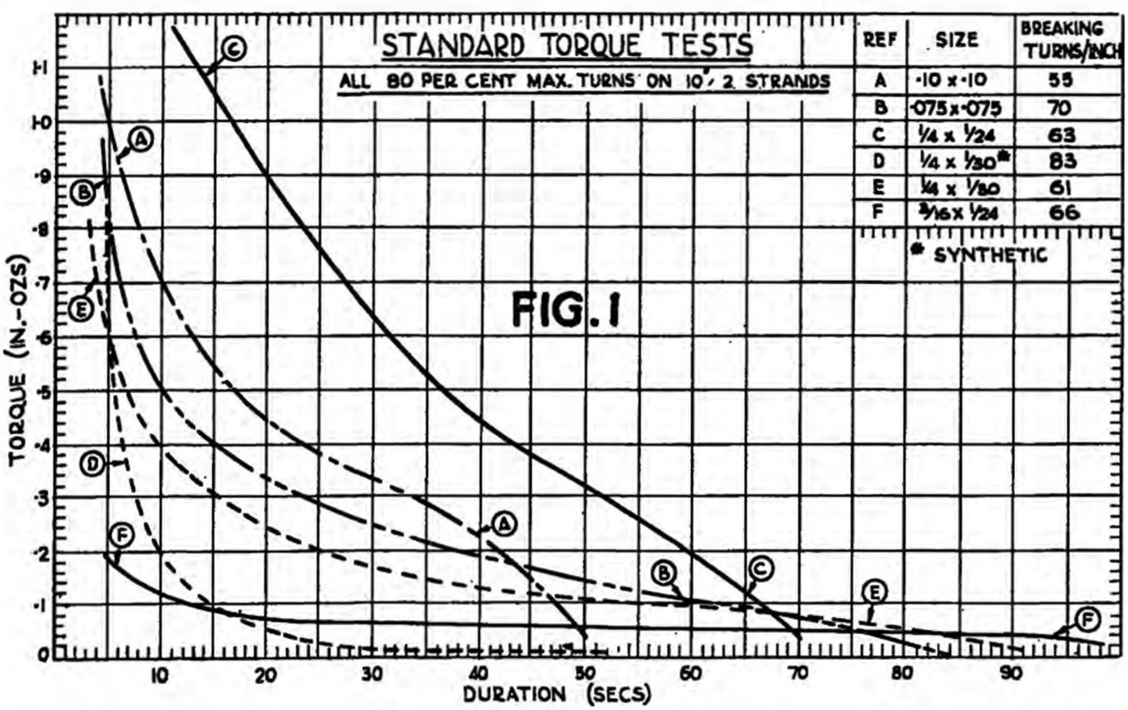
The Type " A " wheels (3½ in. diameter) are priced at 17s. 6d. complete, with key for tightening the hub, and pump adaptor, and are excellent value for the money. They compare more than favourably with the best American wheels available.

R. H. WARRING

Tests on RUBBER MOTORS

THE performance of a rubber driven model depends primarily upon the behaviour of the rubber motor. Good rubber gives *consistent* flights, whilst at the other extreme even the best of models will have a very poor performance if powered by a lifeless motor.

The method of torque testing rubber motors is already well known and results have been published, but such data have been of a general nature and applicable only to the particular model in question. True some very interesting facts obtained from Wakefield motor tests can be applied to all types of rubber motors—but none of the published results have, so far, done more than merely nibble the surface of the whole problem.



It was with this in view that the writer set out to make a series of tests on a *standard* instrument, so that direct comparison could be made of different brands of rubber. Each specimen motor consists of two strands, 10 inches long. Two such motors are made up from each sample of rubber available and well lubricated. One motor is then wound up to 100 turns and unwound; then 200 turns and unwound, and so on until the specimen breaks. The maximum number of turns per inch of that particular two-strand motor is thus established. The other motor is then broken in carefully to 80 per cent. maximum turns, rested and then torque tested at 80 per cent. maximum turns. Any number of tests may be made as a check. Finally the specimen is wound until it breaks as a check against the breaking turns found in the first case.

The results of a number of these standard tests are given graphically in Fig. 1. Many modellers will be able to identify the different types of rubber now available and can form an opinion as to its capabilities.

Actual torque output of the motor is measured since this is the best comparison. It is the *torque* developed by the motor which turns the airscrew and produces thrust. Thus torque comparisons are *direct* comparisons without the influence of the airscrew. Measurement of *thrust* developed, for example, would involve

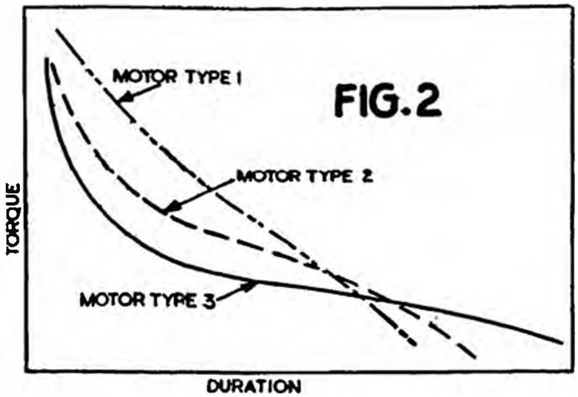


FIG. 2

both the characteristics of the rubber motor and that of the airscrew fitted for the test. The standard torque tester used is fitted with an air brake which develops no thrust.

Now different brands of rubber give different torque characteristics, depending upon the composition and processing of the rubber. For convenience we will take three hypothetical torque curves as characteristic of three distinct types of rubber. These are shown in Fig. 2.

Curve 1 is quite steep. That is to say,, the torque is continually falling off, almost uniformly, from the beginning to the end of the power run. The average torque is higher than that of 2 or 3, but the duration of the power run is lower.

Curve 3 shows a high initial torque, dropping off very rapidly at first, but soon settling down to a steady, almost constant value for a considerable duration. Curve 2 is more or less a combination of the two. The initial falling off in torque is not so marked, the curve is not so steep as 1, and the duration lies between the two.

The choice of which motor to use is often a matter of individual preference. For pure (outdoor) duration flying curve 1 is definitely superior on two scores. In the first place the average torque is high, providing plenty of thrust and a high rate of climb. Also the *rate of change of torque* is almost constant and thus more readily controllable than either 2 or 3. In the case of 3 in particular when approaching maximum turns the initial torque is so high as to seriously complicate trimming problems. To control the first burst of power excess downthrust may be required which is then detrimental to the rest of the flight. On the other hand, motor 3 will give a very long power run. The type of flight resulting is generally a short rapid climb at first followed by a long cruise under power. Motor 1, of course, would give a steady, reasonably rapid climb for the greater portion of the power run.

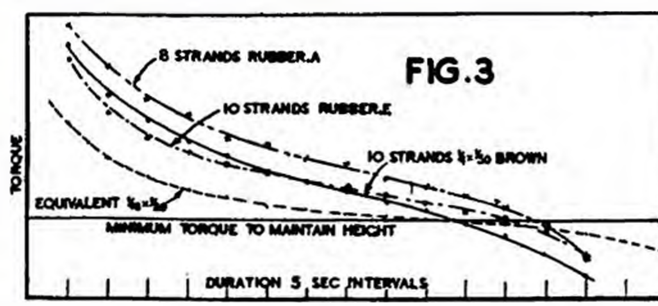


FIG. 3

Since the torque curve for one brand of rubber is almost invariably different from that of another brand—and even different batches of the same *brand* may vary, and, in extreme cases, different *ends* of the same batch—we now see the importance of knowing the class or type of rubber we are using.

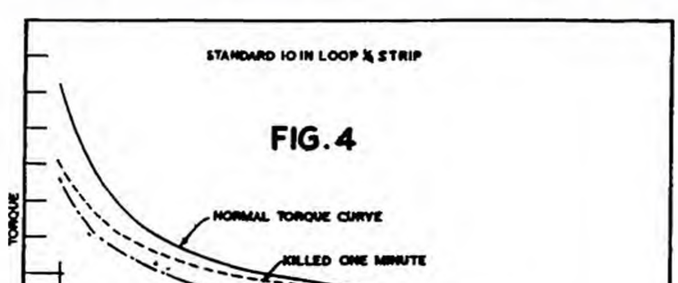


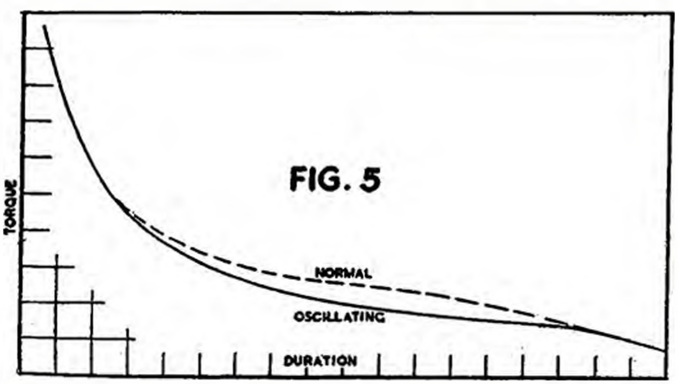
FIG. 4

For example, suppose that the model was trimmed on a motor similar to type 1. A new batch of rubber of a different brand (type 3) is obtained and made up into a motor of the equivalent weight and cross section. On flying the model with the new motor the result is quite different. It has only a short climb and then flattens out into a prolonged cruise. Adding more turns may even result in excess torque at first, followed by a stall. In fact, the model needs re-trimming.

Thus by having a knowledge of the torque properties of particular brands of rubber we can, to a great extent, avoid being " let down " on the flying field by a motor of unknown quality. A further graph of standard tests will be given at the end of this short series of articles and further graphs will be forthcoming from time to time as other brands and types of rubber become available.

Fig. 3 illustrates the result of torque tests on lightweight motors—ten strands of $\frac{1}{4} \times 1/30$ strip, or equivalent. The rubber may be identified by reference to Fig. 1. Note that motor (i) gives 63 seconds *climb*, whilst the two $\frac{1}{4} \times 1/30$ motors only give 53 secs. and 60 secs. with lower average torque but similar initial torque. The multi-strand motor was obviously too weak for the job, with less than 50 seconds useful power run and low average torque.

On flying tests with the writer's 1946 lightweight motor (i) gives about 100 feet additional altitude over (ii) and (iii). Motor (iv) only gives an ultimate height of about 100 feet.



All the motors in this test are roughly equivalent in cross section and equal in weight. Motor (iv) with several additional strands would give a curve similar to (iii), but have greater weight for the same length.

Another series of tests was conducted to find the effect of " killing " a motor by holding it fully wound for a certain time before releasing. It is an accepted fact that a motor does lose its power if not released at once when wound, but previously no tests as to the actual loss have been made.

The results are shown in Fig. 4. Most definite effect is a marked drop in initial torque. A one minute time lag corresponds to about the maximum generally experienced in competition work. It is interesting to note that the actual average torque is not very much lower.

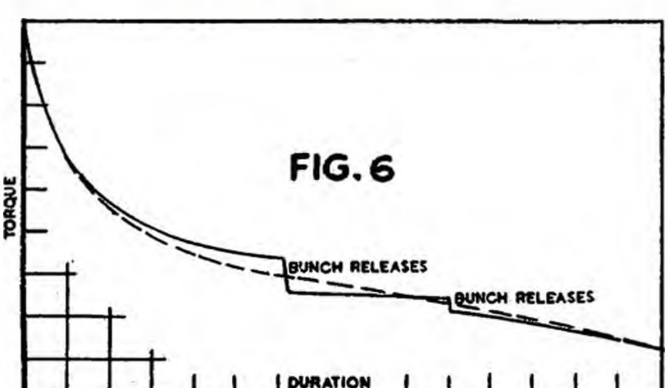
When the motor is killed for four minutes—a period not likely to occur in practice—the loss of torque is considerable. Neither is this loss compensated by increased power run.

This effect can sometimes be used to advantage, particularly in indoor models. By holding the motor fully wound for not longer than one minute the undesirable high initial torque is avoided with the main torque curve remaining approximately the same. But this is not very good practice. A far better method in such cases is to let off a few turns before releasing the model. This will be made clear in a later series of tests, showing variation of torque curves with number of turns on a given motor.

It will be noticed that the actual readings do not always lie on a smooth curve. The curve is really the " average " and the variation of the points is generally called the " experimental error." This is not quite true, however. In addition to the normal experimental error on any recording instrument two further sources of variation may occur.

In the first place, should the motor start to oscillate or unwind unevenly a considerable drop in torque is at once recorded. Fig. 5 shows this on a graph where the motor was deliberately made to oscillate after 12 seconds.

Secondly, even with the best of rubber, and the best of attention when winding, the motor seldom unwinds uniformly. It tends generally to bunch up a little, suddenly giving an extra spurt of energy (or so it appears) when the bunch frees itself. The result is shown on Fig. 6. *(To be continued)*



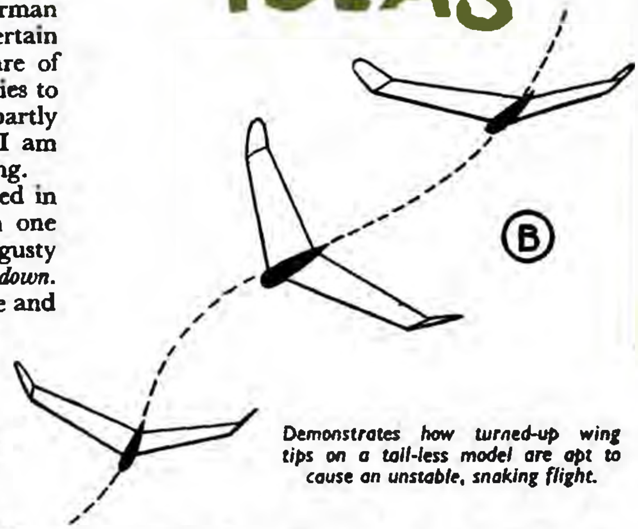
GERMAN TAIL-LESS IDEAS

By Lt.-Col. C. E. Bowden

HORST WINKLER, the leading German sailplane modeller, expresses certain views on the tail-less glider that are of interest, but do not quite explain his theories to one's entire satisfaction. Perhaps this is partly because his writings are in German and I am not particularly good at getting the meaning.

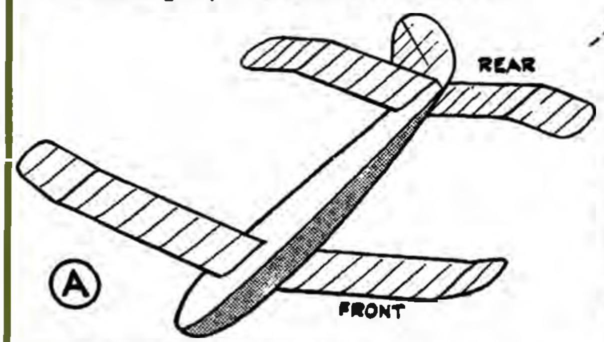
I have always been particularly interested in the down-turned wing tip because, when one watches birds, it is most noticeable that in gusty weather the soaring birds *turn their wing tips down.* Birds have been at the game for a long time and really have this flying business buttoned up. They are, therefore, worth watching. Winkler maintains that the turned-down wing tip model with a good hefty centre dihedral is particularly stable for tail-less models in gusty weather. He also states that a tandem-wing model is far more stable if the rear wing has turned-down tips. He further states that a tail-less model glider with turned-up wing tips rocks violently from side to side and is inclined to spin. I made some small model tail-less gliders with both types of tips and there is no doubt at all that in these small-size models his statements are correct.

If you have half-an-hour to spare try out these ideas with paper gliders with weighted noses or with "chuck" gliders as described in the February issue. It is great fun and doubtless you will soon be building big stuff with new ideas!



(B)

Demonstrates how turned-up wing tips on a tail-less model are apt to cause an unstable, snaking flight.



(A)

Shows a type of downswept wing tip, which prevents a tandem model rocking if fitted to the rear wing.

(C)

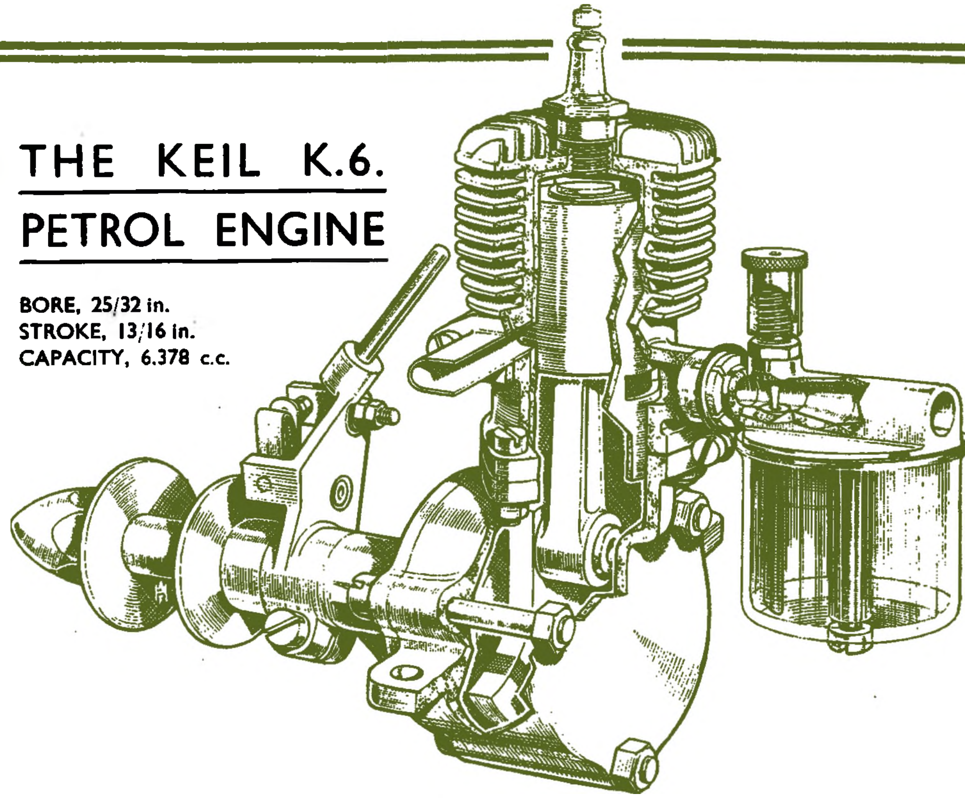
This type of down-turned tip stops rocking and is very stable in gusts. It is suitable for tail-less models.

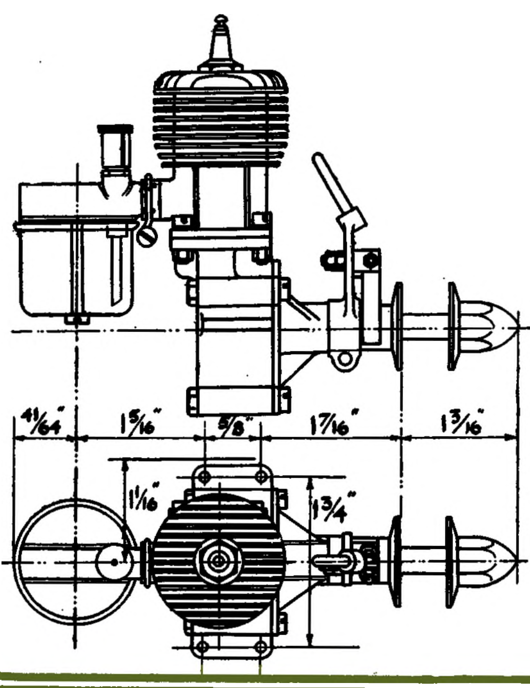
(D)

This model glider established the German distance record of 11,400 metres in 1936, and employed turned-down tips.

THE KEIL K.6. PETROL ENGINE

BORE, 25/32 in.
STROKE, 13/16 in.
CAPACITY, 6.378 c.c.





ONE of the latest British engines to reach a stage of practical production is the Keil-Kraft K.6 engine of 6 c.c. capacity. During its design, development, production and testing it has had the advantage of the supervision of ex-Government research engineers, who have been responsible for miniature petrol engine design during the war period. This has naturally expedited its development, since the results of this valuable experience has been brought to bear on its design and construction, and is reflected in the pleasing design and low weight-power ratio possessed by this engine.

Of 25/32-in. bore and $\frac{13}{16}$-in. stroke, the engine possesses an actual cubic capacity of 6.378 c.c. and its design includes a precision-lapped die-steel cylinder inserted in a die-cast magnesium-alloy cylinder, with integral ports, liberally finned and fully machined.

The piston is a new design machined from special alloy and precision ground. The little-end is carried in separate gudgeon-pin bearings attached to the centre of the piston crown, and the connecting-rod is a magnesium-alloy forging.

The crankshaft is of special steel and machined from the solid, hardened and ground.

The crankcase is a magnesium-alloy die-casting, which has been liberally braced to stiffen it against shock.

An outstanding feature of the engine is the venturi air intake, which has been carefully calculated to provide the correct air speed for good carburation, which, in conjunction with well-designed ports, ensures easy starting and smooth running in combination with a high power output.

A contact-breaker of sound design with the contact points well away from the source of oil contamination, is fitted. Of robust construction, it is accessible and easily cleaned.

An important feature o :the marketing of this engine is that adequate after-sales service is being organised so that purchasers of these engines will be ensured of continued service from them over a long period.

AN APPRECIATION

DEAR SIR,—I should like to congratulate Mr. Wilson on the success of the S.M.A.E. Annual Dinner. The very large attendance, Sir Frederick Handley Page's presence as principal guest, and the very evident enjoyment of the entire company, must have given him great satisfaction, as an S.M.A.E. official and as the organiser of the feast.

I don't know what the records may show, but the numbers present seemed to me greater even than in the palmy pre-war days, while the menu provided was extraordinarily good in these days of austerity.

There was one other matter that gave me—and I have no doubt, others—considerable pleasure, and that was the provision of Fellows' Certificates, and the presentation of them on so auspicious an occasion. My election as a Fellow of the Society several years ago was an honour that

CORRESPONDENCE

I greatly appreciated, and this visible record of the award is a most artistic finishing touch! Please convey my thanks to the Council.

Yours truly,
M. R. KNIGHT.

THE TREND OF MODEL SAILPLANE DESIGN

The article entitled "The Trend of Model Sailplane Design" must be valuable to all but the most experienced sailplane designers, but it contains an error which, I feel, should not go uncorrected. On page 16, paragraph 4, the author states: "By applying the well-known formula

$$V^2 = \frac{W}{Cl \times p \times S} \ldots\ldots$$"

Now all aircraft designers know the formula

$$L = Cl \times \frac{p}{2} \times S \times V^2,$$

which upon being transformed gives:

$$V^2 = \frac{2 \times W}{Cl \times p \times S}$$

Thus, in the first example given by the author,

$$V^2 = \frac{2 \times 0.625}{0.7 \times 0.00238 \times 3}$$

$\therefore V = 15.8$ ft./sec.—not 11.2 ft./sec. as given.

At a L/D ratio of 15 : 1 as in the example, this gives a sinking speed of $\frac{15.8}{15} = 1.05$ ft./sec.—instead of 0.746 ft./sec.

And in the second example:

$$V^2 = \frac{2 \times 1.25}{0.7 \times 0.00238 \times 3}$$

$\therefore V = 22.3$ ft./sec.—not 15.8 ft./sec., and the sinking speed is $\frac{22.3}{15} = 1.49$ ft./sec.—instead of 1.056 ft./sec.

It will be seen that, despite this technical error, the comparison still holds good, and its implication is correct, but the danger lies in the chance that a new designer may note the original formula given and arrive at absurdly low forward and sinking speeds when designing his models. If the old Kl had been substituted for Cl in the formula it would have been correct (although in the practical example the lift coefficient would have to be 0.35 instead of 0.7, giving the same result) and this may account for the error.

I would also like to point out that it is hardly fair to consider the little "Habicht" glider as an example of modern sailplane trend in Germany, as this aircraft was only a training glider, and a very dangerous one at that! It is believed that it was used to train future M.E.163 pilots. Most modern high-performance sailplanes retain aspect ratios of around 15 : 1 as before the war. However, full size sailplanes do not set a standard for model sailplane design due to considerations of scale effect, inherent stability, etc.

Yours faithfully,
A. O. SUTCLIFFE.

(EDITOR'S NOTE:—Our correspondent is correct in his statements concerning the formula, but as he points out the error does not affect the argument in any way. His remarks concerning the "Habicht" machine are not agreed. The machine was one of Germany's standard pre-war aerobatic machines and not a mere trainer although used for advanced training during the war.

The aspect ratio of 15 to 1 quoted by our correspondent confirms the author's statement that lower aspect ratios are now used by the Germans since it was customary for aspect ratios of over 20 to be used.)

THEORY AND PRACTICE

When one reads that a certain system for model work is "not based on any theory, and is, therefore, recommended as a sound basis on which to work" . . . . the obvious reaction is to make a grab for the old typewriter and open fire. Such a remark is too good to be missed!

Theory and Practice. What a lot of misunderstanding there is about the shortcomings of theory and the supposed overwhelming virtues of pure practice; but first we must define exactly what we mean by those terms.

When, in 1941, in Vichy France, I decided to have a shot at inventing a hydrofoil boat, because I considered (quite rightly) that it was the complete answer to the torpedo, I knew little or nothing about aerodynamics, although I had built model aeroplanes that flew from the ground before the last war, when I was about 12 years old.

But although I can smile today at some of my early efforts in this field of research, I know that my method of approach to the problem was correct. I did not spend my time in the workshop, but in the library, and I did not attempt to draw even a rough sketch of a hydrofoil craft until I had thoroughly understood what this aerodynamic stuff was all about.

Of course, I had other problems too that required answering.

Just what was the resistance encountered by a boat at speed? What units could one take to express such forces in terms of tonnage per knot, or HP per ton per knot, or what not? My ideas on all these points were just as hazy as those of the average citizen you may meet, and you may take my word for it that if the average citizen starts experimenting on hydrofoil boats, or on any other similar problem, without first "going to school," he is going to waste a lot of money and finish up wiser and sadder.

Again, when a new bomber is being designed, would the designer propose to "try on" fifty different types of wing until a good type was found to work well in practice? Yet your correspondents who only recommend schemes that are based on no theory would be obliged to follow such a course or surrender unconditionally to the virtues of theory. Lastly, let me remind you that the Wright brothers were continually obliged to abandon practice and make theoretical tests of wing sections, and that brings me to the point I want to make.

You may say that wind tunnel tests are proof in themselves that theory has broken down, since we are obliged to construct such apparatus to obtain practical measurements. To that there are two answers. Firstly, only pure theory allows us to *apply* the knowledge obtained from tunnels to full-size craft, and, secondly, the breakdown of theory on wing flow theory is only apparent and not real. What really happens is that the *complexity* of the problem is such that theory has to be abandoned for the sake of simplicity. For instance, when a man gets killed by a bus in a London street, it *should* be possible to calculate that event 24 hours in advance if all the elements of the problem were known. The fact that such a calculation is impossible in practice, is no proof that the theory employed to calculate the speed of the bus is false and, therefore, useless. So, to sum up, we may say that theory is rather like a language which we know as yet imperfectly and which no man will ever be able to use completely, just as he is unable to construct a machine that can play 20 games of chess at one time.

In theory, everything is predictable, and that statement is a pure truth, but in this imperfect world most of our problems on complex matters bring into play so many imponderables, that practical experiment is often "more practical," and sometimes the only way to obtain an answer. However, it should be remembered (and this is my advice to young experimenters) that a result obtained by pure practice, which is not interpreted in terms of pure theory, is an experiment that has been thrown away.

CHRISTOPHER HOOK,
Chairman of the Hydrofoil Society.

CALCULATING THE CROSS-SECTION

DEAR SIR,—I would like to comment on a statement made in the article "Original Designing—III," in the March issue of MODEL AIRCRAFT. The remark at fault is where the author is discussing the calculation of the fuselage diameter for a given area of cross-section. He says, "otherwise this will have to be done by trial and error."

This, of course, is not the case, since by rearranging the formula given, i.e. :—

$$A = \pi R^2 \text{ to give } R = \sqrt{\frac{A}{\pi}}$$

$$\text{or } D = 2\sqrt{\frac{A}{\pi}}$$

where A is the given area and D the required diameter.

I would suggest that this is a far superior method to that of trial and error, and it is the one adopted by all my acquaintances. I hope the author of the article concerned will take the opportunity of making his life simpler, and in future adopt this method.

Yours faithfully,
J. M. HARDMAN.

THE STRETCH WINDING OF RUBBER

In the April issue of MODEL AIRCRAFT, Mr. Chasteneuf repeats the oft quoted instruction that a rubber motor should be stretched to 5 times its original length before winding. I wonder if he, or any other reader, could tell me why "5 times" has come to be regarded as the correct amount of stretch? My own "theory" on the subject is as follows.

The basic assumption is that a rubber motor will stretch to 10 times its original length (call this 10L), and whether this is done by stretching in a straight line (linear stretch), by twisting (twisting stretch), or a combination of both, does not matter very much.

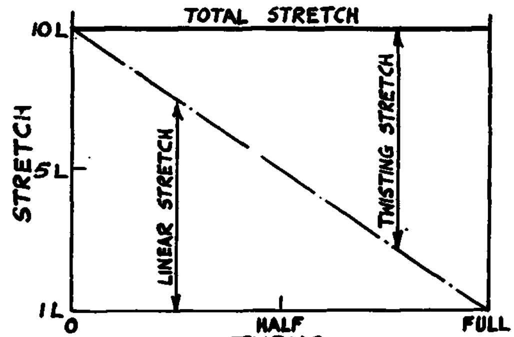


FIG. 1

Now, the greater the linear stretch at the beginning of the winding process, the greater the number of turns attainable. Therefore, the ideal winding procedure would appear to consist of 10L linear stretch at zero turns, decreasing gradually to 1L at full turns. Since the twisting stretch obviously starts at 1L and increases to 10L, the total stretch (linear plus twisting) is 10L throughout the operation. Fig. 1 shows this diagrammatically.

This ideal procedure *can* be used on very small motors, but, on larger ones, a 10L linear stretch puts a great strain on the modeller's nerves and muscles. For that reason a compromise has been struck, consisting of 5L linear stretch at zero turns, maintained at 5L until half-turns, then gradually decreased to 1L at full turns. This procedure, illustrated in Fig. 2, is the one usually recommended by writers on the subject.

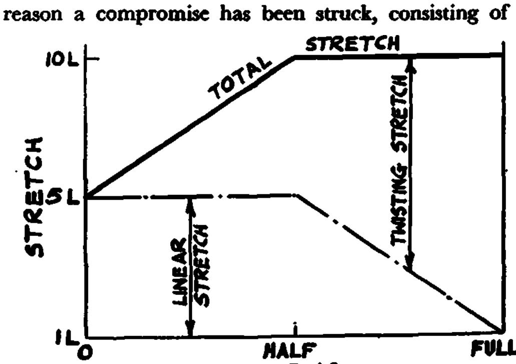


FIG. 2

Tests show that the "ideal" procedure permits something like 15% more turns than the "compromise."

On the practical side, it should be pointed out that very little present day rubber will stand a 10L stretch. Therefore, if the "compromise" procedure is employed, with a 5L initial linear stretch, the motor will be overstrained at the half-turns point. This may be the reason for the frequent reports of pre-war rubber breaking at little more than half turns. For safety, an initial linear stretch of not more than 4L should be used, until good natural rubber is once more obtainable.

Yours faithfully,
J. H. MAXWELL.

Club Shows

MANCHESTER AND BRISTOL

The two pictures on the right were taken at the successful exhibition held by the Whitefield Club.

The upper photograph indicates that a comprehensive selection of models was on view.

The two bottom pictures were taken in the exhibition staged by the combined Bristol Model Clubs, which drew a gate of over 50,000 people. On the left can be seen an interesting indoor model with a triangular fuselage, while in the glass case is Mr. T. Howse's pre-war microfilm record breaker. The attractive petrol model on the right is the work of Mr. Garnett.

NEWS from the CLUBS

S.M.A.E. 1946 COMPETITION CALENDAR

	JUNE	9th—HAMLEY TROPHY (PETROL) NORTHERN AREA.
	,,	16th—WESTON CUP (WAKEFIELD) (PLUGGE POINTS).
	,,	23rd—NORTHERN AREA RALLY (1) IN MANCHESTER AREA.
D	,,	30th—FROG JUNIOR CUP AND NATIONAL CUP (TEAM CONTEST).
	JULY	14th—THURSTON CUP (GLIDER) (F.A.I.) (PLUGGE POINTS).
	,,	28th—NORTHERN AREA GLIDER MEETING (MERSEYSIDE) AT CLWYD.
	AUGUST	4th—BOWDEN TROPHY (PETROL) INTERNATIONAL LONDON AREA.
D	,,	11th—FLIGHT CUP (RESTRICTED) WOMEN'S CHALLENGE CUP.
	,,	11th—NORTHERN AREA RALLY (2) AT BAILDON, BRADFORD.
	,,	18th—NORTHERN AREA "DAILY DESPATCH" GLIDER TROPHY.
	,,	22nd—"MODEL ENGINEER" EXHIBITION.
D	,,	25th—K. & M.A.A. CUP (BIPLANE) AND CIVIL SERVICE CUP (PAYLOAD.)
	SEPTEMBER	1st—GUTTERIDGE TROPHY (WAKEFIELD) FROG SENIOR (INTERNATIONAL) CUP (FLYING SCALE).
D	,,	8th—WHITE CUP (FLYING-BOAT) AND LADY SHELLEY CUP (SEAPLANES).
D	,,	15th—PETROL CONTEST (DURATION ON LIMITED RUN).
D	,,	22nd—S.M.A.E. (OPEN RUBBER AND GLIDFR).

D = DECENTRALISED COMPETITIONS.

COMPETITION RESULTS

THE GAMAGE CUP COMPETITION

Held on Sunday, April 14th, 1946.

There were approximately 200 entries, and, subject to a further scrutiny, the following are the first twelve placings.

Place No.	Name	Club.	Aggregate.
1.	Warring, R. H.	Zombies.	2806.7
2.	Millar, J. R.	Northern Heights M.F.C.	2008
3.	Brockman, D. A.	Zombies.	1438.85
4.	Pitcher, J. L.	Croydon M.F.C.	1314.9
5.	Taylor, J. P.	Rhyl & Preston M.F.C.	1282.5
6.	Kelsey, S.	Cheam M.F.C.	1251.1
7.	Farthing, M.	Croydon, M.F.C.	1237
8.	Watkins, J.	Croydon M.F.C.	1231.2
9.	King, M.	Walthamstow M.F.C.	1190
10.	Armes, A. C.	Pharos.	1161
11.	Calvert, E. H.	Bradford, M.F.C.	1148.75
12.	Lewis, E. H.	Blackheath M.F.C.	1082.6

SIR JOHN SHELLEY CUP

Position	Name	Club	Points
1	K. M. Tansley	N. Heights	115.5
2	Mrs. D. P. Gunter	Bushy Park	93.5
3	C. Earp	,, ,,	58.2
4	E. Keil	N. London	54.9
5	G. A. Paul	Bushy Park	50
6	C. Doughty	Birmingham	44.75
7	N. D. Howard	Cheadle	43.6
8	W. S. Warne	Bushy Park	41.8
9	L. Pribyl	,, ,,	37.45
10	N. Lees	Bradford	34.95
11	W. Dalloway	Birmingham	26.7
12	B. C. Gunter	Bushy Park	25.75
13	F. Guest	,, ,,	21
14	H. Tickner	Hackney	20.2
15	H. Green	Bushy Park	19.6
16	Miss R. Baker	,, ,,	16.1
17	S. Lanfranchi	Bradford	15.5
18	F. Chatwin	Birmingham	10
19	F. Hempsal (Proxy. D. G. Lees)	Bradford	7
20	J. T. London	,,	6.25
21	R. Ginns	Coventry	2.75

Total number of competitors, 33 ; 2 made no attempts. 15 no flights in 1st round ; 17 no flights in 2nd round, and 3 made no attempts ; 8 no flights in 3rd round, and 13 made no attempts.

THE HANDLEY PAGE CONTEST FOR TAIL-LESS MODELS, 1946

Rules

The contest will be held in conjunction with the following S.M.A.E. competitions.

Centralised Contests

The Hamley Trophy (June 9th), power models.
The Bowden Trophy (August 4th), power models.
Petrol Duration Contest (September 15th), power models.

Area Centralised Contests

The Pilcher Cup (May 26th), gliders (S.M.A.E. formula).
The Thurston Cup, (July 14th), gliders (F.A.I. formula).

Decentralised Contests

S.M.A.E. Cup (September 22nd), open rubber or glider.

Rule 1. The contest will be governed by the rules of each particular competition so far as points allocation is concerned, but any tail-less model competing for the Handley-Page prizes will have to conform to the technical rules which follow.

Rule 2. The contest is for tail-less type models having a minimum area of horizontal or substantially horizontal surfaces of 500 sq. in.

Rule 3. Auxiliary aerofoils, retractable or otherwise, will be permitted, but they must be so arranged that when extended their whole area is located within half the mean chord length of the surface of the wing. Fixed auxiliary aerofoils must also be located within half the mean chord length of the surface of the wing.

Rule 4. The contest will be open to gliders and power-driven models using any type of motive power in accordance with the rules of each qualifying contest.

Rule 5. The flying capacity of the models will be judged in accordance with the rules of each qualifying contest, but the entrant must, in addition, demonstrate the controllability of his model by making right- and left-handed turns. The direction of the turn must be nominated by the entrant prior to each attempt.

Rule 6. The machine must make a qualifying flight of at least one minute during the contest.

Rule 7. Power-driven models will be limited to the engine run defined for each contest, and the length of the tow-line for launching the gliders will also be limited by the rules of the individual contests.

Rule 8. Three flights must be made and power-driven machines must rise from the ground under their own power.

Rule 9. The tail-less machine making the best performance in the six qualifying contests will be awarded a prize of £5 in each contest.

The first tail-less model to win any one of these six qualifying contests will be awarded a prize of £50.

Rule 10. A condition of entry will be the submission of general arrangement drawings on the date of the contest. The quality of the drawings will not be taken into account in the judging of the contest.

Rule 11. The results of the contests, together with the drawings, must reach the Hon. Competition Secretary of the S.M.A.E. within seven days of the date of the Area Contests.

MIDLAND AREA RALLY, APRIL 28th, 1946
Held at Hockley Heath Aerodrome

A fairly high wind was blowing, and, in consequence, there were fewer entries and lower times. Visitors included Mr. A. F. Houlberg, Mr. R. V. Bentley, Mick Farthing, and Howard Boys.

The rally was run by the Birmingham Club by arrangement with the Midland Area Council, and ran smoothly from start to finish. Many clubs were represented, from Blackpool to Northampton.

Results were as follows :—

Open Rubber Contest (2 Flights R.O.G.)

1.	R. Perry	Birmingham	200.0 secs.
2.	D. W. F. Harrison	Do.	154.9 „
3.	Owen	Blackpool	144.6 „
C'lation	Viles	Worcester	83.0 „

Open Glider (50 yard line, aggregate of 2 flights)

1.	R. Monks	Birmingham	177.0 secs.
2.	R. Perry	Do.	95.1 „
3.	G. F. Salt	Do.	91.3 „
C'lation	G. Toms	Coventry	68.0 „

Petrol Duration (engine run 25 secs. limit). Total of 2 flights

1.	R. Monks	Birmingham	128.8 secs.
2.	C. Doughty	Do.	96.4 „
3.	W. Dallaway	Do.	49.0 „
C'lation	G. H. Ginns	Coventry	25.9 „

The Birmingham Club hope that their efforts to achieve an organised contest met with success in spite of the bad weather, and that all competitors and visitors enjoyed the meeting.

LONDON AREA COUNCIL
Keil Trophy Rules

To be held on Sunday, July 7th, 1946, provisionally, at Hounslow Heath.

1. The competition is open to all power models.
2. There will be no postponement from the date fixed for the contest.
3. Three judges will be appointed.
4. A competitors' enclosure will be provided. All competitors, with their models, must be in this enclosure fifteen minutes before the time fixed for starting.
5. The order of starting will be determined by a draw.
6. The competitors' names will be called in order for each flight ; each competitor will be allowed a maximum time of three minutes to start after his name has been called. Any competitor starting his engine before his name is called will be disqualified for that flight. Each competitor will be allowed one minute in which to start his engine without losing points ; thereafter points will be given against starting, one point being added for each minute taken (with the maximum of three minutes ; above this, no flight shall be recorded).

7 (*a*). Each entrant shall be allowed three flights. The duration of these shall be within stipulated limits (*e.g.*, between 80 secs. and 100 secs.), which shall be determined on the day of the contest by the judges, according to weather conditions. Any error from these stipulated durations shall count against the entrant (2 pt. = 1 sec. error). (*b*) The duration of the engine run shall count against the entrant (1 pt. = 1 sec. engine run). Models must rise off the ground without push or assistance.

8. Timing will commence on the release of the model by the competitor.
9. Immediately after each flight the model shall be brought to the judges ; points will be given against damage, with a maximum of 10 points for the whole contest.
10. No test flights shall be allowed between the competitors' flights or after the competitors have taken their models to the enclosure. No repairs will be allowed between flights. No spares may be fitted. Any competitor disobeying this rule will be totally disqualified.
11. The winner shall be the entrant with the lowest number of points.
12. The competition will start at 2.15 p.m. Competitors are not eligible unless their machines are in the enclosure by 2.0 p.m.
13. Any appeal against the judges' decision shall be handed to the L.A.C. Competition Secretary in writing, immediately after the event, with a fee of 2s. 6d., which shall be forfeited if the appeal is not allowed.
14. The entry fee will be 2s. 6d., payable between 2 p.m. and 2.15 p.m. at the control board.

It is hoped to find a more suitable ground, but if this is impossible, the contest will take place at Hounslow Heath.

NORTHERN CLUB NEWS
By "Northerner"

Quite a large number of model aircraft enthusiasts attended at the flying field of the Rhyl and Prestatyn Club to fly in the M.E. No. 2 Area Centralised event, but the number was not as large as expected, and out of all the clubs in the North, only twelve were represented. I would like to congratulate our friend Mr. Hardman and his colleagues at Rhyl, on their good organisation.

From the Blackpool and Fylde Model Aeronautical Society we received a copy of their usual monthly club magazine, and a very interesting issue it is, with its "Who's Who" on the club's committee, ¼-in. scale drawings of J. Owen's F.A.I. glider, some interesting Wakefield notes, and a very interesting article by the chairman of the club on the contest problem. The Doncaster and District Model Flying Club seem to have been well amongst the thermals, for there is a report of a glider launched from a 100-ft. line disappearing into the blue after 9½ mins., then Mr. Gearing with his gas job "Thor," did an excellent flight, going up until it was a mere speck in the sky, and it was followed for over 10 mins. Recognition by the Cheshire Education Authorities is reported from the Cheadle and District Model Aeronatical Society. One of the club's new members is J. Brandwood, who is also an honorary member of the Paris Aero Club. An increase in the attendance at their monthly contests is reported from the Bury and District Model Aero Club, and D. Helm won the first event and prize by clocking 199 secs. The model ended its life by landing in front of a moving bus (Wot! no brakes?). The tail-less expert of the club, Mr. E. Hargreaves, is working on a large tail-less gas job and will probably be taking part in the tail-less event organised in France by the Rhône Aero Club.

Mick Farthing models are well to the fore in the Leeds Model Flying Club, and flights of seven to ten minutes are reported. An exhibition was held at the Queens Arms, Leeds, at Easter. The Whitefield Youth Movement Model Aircraft Club, glider section, has hopes of "doing things" at Doncaster. The latest craze seems to be scaling up models that were successful last season. The "Wanderer," which did so well last year, is very popular. From the Greenfield Model Aircraft Club there still comes reports of R. T. P. contests, the winner of the last event being C. W. Jones (junior). A hut has now been rented by the Wilmslow Model Aircraft Club, and same has already been used to house an exhibition. In order to encourage competition in this club, Mr. H. Wraith has kindly presented the "Alpha Trophy," for award to the member with the most successful model for both appearance and flying.

Reports of more good flights come from Cheadle Hulme Model Aircraft Club, D. Tennant making a a flight of 7 min. 54 secs. O.O.S., with a G.9 glider. G. Whitehead is reported to have put the chuck glider record up to 1 min. 15 secs. O.O.S., with a specially designed 9 in. job. The model was lost.

I hear that the Radcliffe and Whitefield (1005) Squadron of the Air Training Corps are to form a Model Aircraft Club. The membership of the club will be open to all interested, and not confined to members of the A.T.C. Details can be obtained from C. C. Molden, 1, Cranford Avenue, Whitefield, near Manchester.

BRENTFORD AND CHISWICK M.F.C.

Attendance has been large at flying meetings, and some of the best flights were :—E. R. Brisley, 6 min. 23 sec., O.O.S. ; N. J. Hayward, 5 min. 43 sec., O.O.S. ; E. C. Grover, 4 min. 5 sec., O.O.S. All the models landed in and around Teddington.

Fifteen members have obtained S.M.A.E. Class A certificates, and one, T. Evans, has his B as well.

There were only six entrants for the Gamage Cup, Mr. D. A. Paveley making the highest aggregate, with 198 sec.

Fifteen members competed for the club's Ford Cup, and W. Snow won it for the second year in succession, with 291 sec. ; W. Porter was 2nd, with 226 sec. ; and J. Day was 3rd, with 187 sec.

In the M.E. No. 2 Cup, the best club time was made by W. Marley, with an aggregate of 116 sec.

THE BRISTOL AND WEST MODEL AERO CLUB

The most important step taken recently has been the institution of regular monthly club meetings. These are held on the third Monday evening of each month, at the Haymarket Tavern, Horsefair, and a cordial invitation to all interested modellers in the district to come along to these meetings is given.

The only noteworthy flights for the Gamage Cup were 4 min. 57.1 sec. by Mr. Garnett, and 3 min. 19.6 sec. by C. S. Wilkins, obtained with a streamlined shoulder wing Wakefield and a lightweight shoulder wing respectively.

M.E. No. 2 Cup day was just the opposite to the Gamage, with a strong wind and drifting rain until five o'clock, when the rain stopped, but not the wind. The latter proved disastrous to many models, which were spun into the ground immediately after take-off. Best flights were 76.9 sec. by R. T. Howse, with a shoulder wing lightweight, and 77.6 sec. by M. Garnett, with his streamline Wakefield, the latter flight being made in pouring rain.

CAMBRIDGE MODEL AERONAUTICAL SOCIETY

The C.M.A.S. held a flying meeting at Marshall's Aerodrome, Cambridge, on April 27th. Results were a bit disappointing, but doubtless it was a case of the old scapegoat—the weather. The actual results were :—

(1) *Chuck glider*—R. J. Bond, 25 sec.

(2) *Glider (tow launch)*—Group A (under 15 years of age), D. Blackham, 66.5 sec. ; R. Brown, 21 sec.

Group B (15-18 years), Berryman, 80 sec. ; A. Broad, 78 sec.

Group C (seniors), P. Firman, 53 sec. ; L. Woods, 53 sec.

(3) *Duration*—Group A, D. Nichols, 32 sec. ;

Group B, A Thompson, 40 sec. ; P. Hall, 34 sec.

Group C, O. Turner, 44 sec.

Some good flying took place on Good Friday, L. Woods losing a "three footer" glider, timed 10 min. 59 sec., O.O.S., and P. Firman losing a "Thermic 50," O.O.S.

COVENTRY MODEL AERO CLUB

R. Toms, flying a modified indoor job on Gamage Cup day, established a new club open rubber record with a flight of 3 min. 7 sec. He topped the club list of entries with an aggregate of 373.5 sec. ; next came A. J. Barr with 369.8 sec.

Twenty-four of our members attended the Midland Rally at Hockley Heath, by coach. G. Toms and Mr. Ginns were the only two members to win prizes, both consolation ones.

We are trying to obtain permission to use the local airport for a Midland Rally, on July 14th. If we get permission, the Thurston Cup will be held there, for the Midland Area.

CROYDON AND DISTRICT MODEL AERONAUTICAL CLUB

Over twenty members entered for the Gamage Cup, the three highest aggregates being over 20 min. Mr. Pitcher, with 21 min. 54.9 sec., placing fourth. The following Sunday we attended the Bushy Park Gala Day, at Hounslow. In the rubber class, we took first, third, and fourth prizes, won by B. Mulley, B. Chandler and J. L. Pitcher respectively. On M.E. No. 2 day we obtained second, third and fourth places in the London Area, these being obtained by Watkins, Marcus and Hall respectively.

NOTE :—THE CROYDON GALA DAY WILL TAKE PLACE ON SUNDAY, JUNE 9TH. KEEP THIS DATE OPEN.

KINGSBURY M.F.C.

On Sunday, April 14th, the club journeyed to Hounslow Heath, R. Monk losing his converted gas job on the first flight of the day, the model landing later at Felton.

Soon after, P. Haley's "Slow Joe" put up times of 10 min. O.O.S., and 8 min. 11 sec., O.O.S., the model being retrieved on both occasions.

Next model to go was J. Bowerman's "Raffity," which disappeared and landed later at S. Hounslow.

Later in the day, J. Bowerman's "Tempus Fugit" was timed O.O.S. after 10 min., the model landing about 30 min. later at Teddington, and being retrieved after an exciting four-mile chase by three members.

On April 19th, G. Miles' beautifully streamlined high aspect ratio lightweight flew for 7 min. 55 sec., and R. Monk's club job was timed O.O.S. after 5 min. 3 sec.

On April 20th, R. Monk's club job again did the trick, flying O.O.S. after 7 min. 1 sec., landing later at N. Finchley, about five miles away.

Later in the day, J. Bowerman's "Raffity" was timed O.O.S. after 9 min. 35 sec., the model landing three hours later at Aveley, in Essex, a distance of 24 miles away. The model was chased as far as Kilburn by R. Monk. Tribute must be made to this fellow's model-chasing activities ; he is never loth to follow a model, and simply revels in a good cross-country run.

On April 22nd, R. Miles raised the rubber R.O.G. record, his model disappearing into the clouds.

On May 1st, R. Monk lost his "Hippo."

LEEDS MODEL FLYING CLUB

A flying meeting was held on March 31st, at the club field at Wyke. There was a good turn-out of both rubber and glider, and F. C. Anderson had 7 min. 30 sec. O.O.S. with his Mick Farthing glider. The model has since been recovered. H. Tubbs flying "away" had 10 min. with the same model.

More petrol models are on the stocks—the scale "Owlet" is nearing completion, and, among other things, has the "spark" controlled from the cockpit. Mr. Vauvelle had his usual steady flights at Baildon a few weeks ago.

Several members attended a recent lecture by E.T. Westbury on miniature petrol engines, and came away more enthusiastic than ever to build "petrol."

LUTON AND D.M.A.S.

The first competition of the season, an open sailplane contest, was a big success, although the weather was not kind. Total number of entries was thirteen. First, second, and third were : R. Clements, flying a stick model ; R. Minney, flying an eight-sided shoulder wing twin fin model of his own design ; and L. Capper, who has just been demobbed, and is finding his competition "feet" again.

Gamage Cup day saw another big turn out, together with ideal weather, which makes the times look disappointing. On its second flight R. Minney's "Ijax" leapt off the board and rocketed skywards as though there was a jet unit fitted. After attaining a terrific height, the model proceeded to disappear on a thermal after 10 min. 53 sec. Another very interesting model, which came second, was Hucklesby's Wakefield model. This model, a Minney design, flew remarkably well and, fortunately for the owner, developed a stall while high up in a thermal, and came down.

Later in the evening, friend Minney proceeded to terrify us with an 11 ft. 4 in. span replica of his record breaking 7 ft. model. If this chap builds any bigger we shall have to hire a lorry for him.

On Easter Monday a good number of the club went to Eaton Bray and entered for the rubber, glider and petrol contest. Club members were placed second, and two thirds in the rubber contest, although considerable surprise was shown in the fact that it was hand launch.

The club's petrol fiend had tough luck in the petrol contest. his vintage model performed extremely well, but his engine overran the allotted time by about two seconds each time, thus disqualifying him. In this contest it was well and truly proved that take-off areas need to be fenced or roped off.

MARSTON GREEN M.A.C.

We entertained the Birmingham Society of Model Engineers at our annual meeting, when a very pleasant evening was spent.

An exhibition will be held at the First Aid Point, Marston Green, on May 24th and 25th (Friday and Saturday). We are having the welcome support of the Birmingham S.M.E.

Hon. Secretary: Eric J. Withington, 213, Tile Cross Road, Marston Green.

MERSEYSIDE MODEL AIRCRAFT SOCIETY

The event which marked the end of the indoor season was an inter-club rally and indoor flying meeting, held in the Central Hall, Liverpool, on Friday, April 5th. Five local clubs were present. The main event was a duration R.T.P. contest, but times were not up to the usual standards. Special mention should be made of a very neat Pusher model, built by Mr. Harrop. This flew well, and should be an excellent performer in free flight. Mr. Edwards, secretary of Merseyside, treated onlookers to some very nice scale flying with his super detailed "Hawker Fury." Results: First, Merseyside M.A.S.; second, Wallasey M.A.C.

Best time in the Gamage Cup was by Mr. Barry Haisman, who has just returned from the Forces, with a time of 7 min. Mr. Gosling made 5 min., and Mr. Sutcliffe 4 min.

The Rhyl outing was very enjoyable, and Mr. Haisman again put up Merseyside's best time.

THE NORTHERN HEIGHTS MODEL FLYING CLUB

During the weeks immediately before the outdoor flying season started, it was considered that the weekly lectures given to the N.H.M.F.C. should have a topical interest, and the first lecture was by A. G. Bell, who dealt with the structural and elementary design of Wakefield models, laying emphasis on the fact that for the tyro in this line the best proposition was the slab-sider.

Other lectures were "Structural Design of Petrol Models," by K. M. Tansley, and on the Friday before the Gamage, a talk on "Trimming" by Bob Copland.

Congratulations to Mr. Copland for being selected as a member of the indoor team to represent the London Area versus the Northern Area.

Mr. Copland put up consistent 4 min. flights, using a type of model which he pioneered for R.T.P. flying, the tissue and microfilm job.

In the Gamage Cup, the rubber Gremlin plagued every competitor. Breakages were the order of the day, and our hopes were laid low. Best aggregates were Mr. J. R. Miller, who, by the way, was about the only flyer not to break a motor, scored a total of 2008.0 sec. His model was "Dusty V. III"—a diamond fuselage Wakefield with constant chord wing and tail, folding single-blade airscrew and mono-wheel undercarriage.

The N.H. Gala Day

Older model builders will hold very happy memories of this event, which was a great feature of the pre-war calendar. On June 30th, this event is to have its first post-war appearance, when, by the graciousness of the Hawker Aircraft Co., Langley Aerodrome (near Slough) will be the venue of a comprehensive set of model competitions.

Full details may be obtained from the secretary, N.H.M.F.C., 61, Avenell Road, Highbury, N.5.

ST. ALBANS MODEL AERO CLUB

A very generous action by the president, Mr. J. Greening, has taken the form of the presentation of a cup to the club. This cup will be awarded each year to the most active member of the club, on the basis of the following points system:—

First place in any competition entered into or held by the club, 6 points; second place, 4 points; third place, 3 points; for entry into the competition, 1 point.

WALTHAMSTOW MODEL AIRCRAFT SOCIETY

In the Gamage Cup, M. King, flying a parasol lightweight, totalled 19 min. 50 sec. O.O.S. Other flights of over 11 min. were also recorded. Most models were lost in thermals.

Some spectacular flying has taken place lately with the introduction of speed models. Sid Sutherland, home on leave, has tested his new unique pusher flying boat with success.

YORK MODEL AIRCRAFT SOCIETY

York M.A.S. started the season with a real "flying start" on April 14th. It was a perfect day. There is a vogue for designing gliders (as rubber is still something of a rarity) and out of 14 gliders, half were designed by their owners.

The best time for the afternoon was 336 sec. O.O.S., by a fairly large model with terrific parasol mounting, while Farthing's lightweight was, as usual, to the fore, with 212 sec.

We have before us what we hope will prove an interesting competition season.

CHANGE OF ADDRESS AND NEW SECRETARYSHIP

Kings Heath and District M.A.C.—G. F. Clarke, 67, Beechwood Road, Kings Heath, Birmingham 14.

Romford and District M.A.C.—D. Foreman, 8, Alloa Road, Goodmayes, Ilford.

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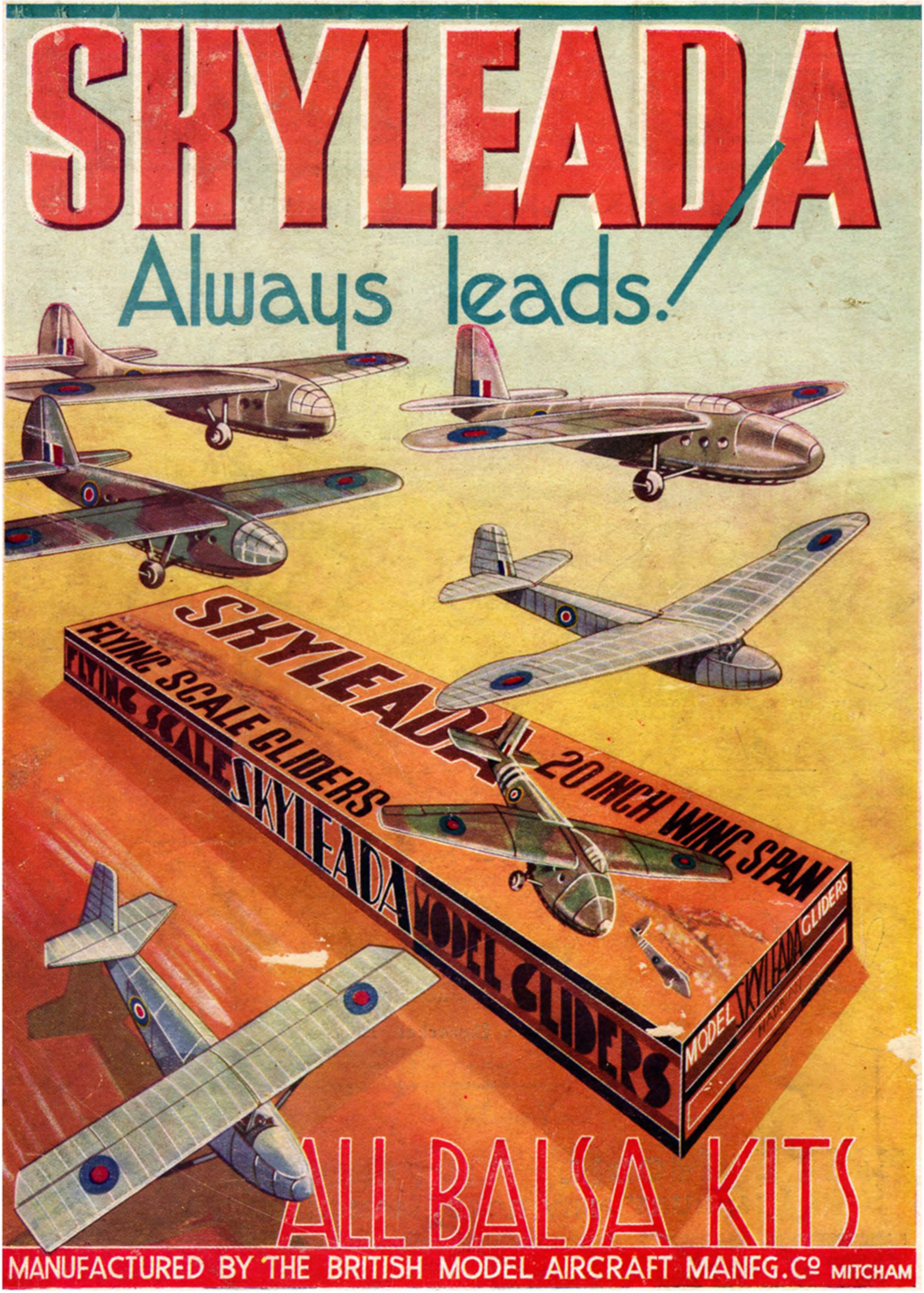
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